

New Gear Extravaganza! • Start Your Own Record Label

Electronic Musician[®]

May 1996

DIGITAL DREAM MACHINES

Alesis

ADAT XT

Fostex

CX-8

Panasonic

MDA-1

Sony

M-800

U.S.



95



05
127



THIS AD CONTAINS 8 REASONS TO BUY YOUR FREE 1-HR. MACKIE

1 VLZ CIRCUITRY FOR ULTRA-LOW NOISE AND CROSSTALK. Did we just make up a fancy name for the same old circuitry? Nope. VLZ (Very Low Impedance) is a Mackie innovation based on solid scientific principles. Through the careful deployment of high operating current and low resistor values at critical points in our consoles, we're able to dramatically reduce thermal noise & adjacent-channel crosstalk. Open up all the channels, subs & masters on a Mackie B•Bus console and compare what you hear (or rather don't hear) with any Brand X console. Because Very Low Impedance circuitry needs loads of high current, we ship a humongous, 220-Watt Triple-Regulated power supply with every B•Bus

2 IT EXPANDS ALONG WITH YOUR NEEDS AND BUDGET. You'd be surprised just how many B•Bus console setups like the one below are currently in use. But you don't have to start out this way. Start out with a 24•B or 32•B and then grow your B•Bus console 24 channels at a time with our 24•E add-on modules. 1, 2 or even 3 of 'em connect in minutes. They come with their own 220-watt power supply; optional meter bridges are available.

3 IMPECCABLE MIC PREAMPS. A console can have motorized dooflammers and an optional MIDI espresso attachment, but if the mic preamps aren't good, you don't have a fully-useful production board. Our discrete preamps with large-emitter-geometry transistors have won a critical acclaim for their exceptional headroom, low noise (-129.5dBm E.I.N.) & freedom from coloration. VLZ circuitry in the preamp section also reduces crosstalk.

4 THIS CONSOLE JUST PLAIN SOUNDS GOOD. Sure, you may be able to buy a Brand X console for less. But you end up with a console that sounds like...well...a Brand X console. Granted, we're getting into a pretty subjective area here...but we have tall mounds of B•Bus warranty cards that rave about our consoles' "clarity," "sonic purity," "sweet sound," "transparency," "lack of coloration" and a lot of other superlatives we wish we'd thought of first.



Above: 24•E 24-ch. expander with optional MB•E meter bridge and stand.

6 MAC® & WINDOWS® 95-BASED AUTOMATION THAT'S RELIABLE, PROVEN AND AFFORDABLE.

Along with affordable digital multitrack recorders, the Mackie B•Bus has made it possible to do world-class productions on a modest budget. But until now, Big Studios have still had one remaining and unattainable creative "secret weapon"... computerized level automation. That's why we developed the UltraMix™ Universal Automation System. It gives you fully editable and recallable control of input, channel and master levels — plus features not found on even the most expensive proprietary Mega-Console automation systems. Equally important, it doesn't degrade sound quality, introduce zipper noise or cause

audible "stepping." UltraMix is currently being used to mix network television music themes and on several major album projects — by seasoned engineers who grew up on Big Automation Systems. Their verdict is that UltraMix is a serious automation solution — stable, reliable and frankly easier to use than more expensive systems. The basic system controls 34 channels and can be expanded to as many as 128 channels. UltraMix Pro™ software, for 030/040 & Power PC Macintoshes and PCs (Windows® 95 required), includes a wealth of



UltraMix™ includes the Ultra-34 Interface, UltraPilot Controller and software for \$2797 suggested U.S. retail. Macintosh® or Windows® 95-compatible PC not included.

features like editable fader curves, built-in level display, unlimited subgroups, SMPTE time code display, event editor with pop-up faders, optional control of outboard effects devices and the ability to play Standard MIDI files from within the program.

† Mention in this ad denotes usage only, as reported to Mackie Design, and is in no way intended to constitute official endorsement by the artists or groups listed.

* As compiled by a leading Independent Console Video "actoid Evaluation Laboratory. Your count of superior Mackie B•Bus console features may vary.

SONS TO BUY OUR 8-BUS CONSOLE. VIDEO CONTAINS AT LEAST 71.5* MORE.



5 PROFESSIONALS REALLY USE THEM. The members of Boyz II Men could have afforded any console they wanted for their studio's second room. They chose an 80-input 8•Bus with 102 channels of UltraMix™ automation. In the studios of artists as diverse as k.d. lang, Yes, Queensryche, Lee Roy Parnell, Aerosmith, Bryan Adams, Carlos Santana, Whitney Houston, Eric Clapton & U2, our consoles really are used to make great music.

FREE VIDEO! Choosing the right 8-bus console can be pretty confusing these days. That's why we've whopped up a free video that gives you some solid reasons to buy a Mackie 8•Bus. This eclectic compilation contains excerpts from our epic 8•Bus Video Owner's Manual, an introduction to UltraMix™ Automation System and an award-winning short subject, The 2nd Mackie Home Video. Watch all three parts before you part with bucks for any 8-bus console.



FREE VIDEO FINE PRINT. Visit your local Authorized Mackie Dealer for a real live 8•Bus demo, and then snag your free video. This handsome offer is good while supplies last, or until August 31, 1996, whichever occurs first. So, you snooze, you looze. Limit: one per customer. If you just can't seem to make it to a dealer, it's available from Mackie by phone or fax request - no reader response cards. Allow six weeks for delivery. You will also receive our 48-page 8•Bus and UltraMix™ Universal Automation System color

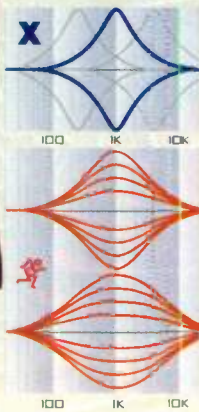


Above: 24•E 24-ch. expander with optional MB•E meter bridge and stand. Above left: 32•B with optional MB•32 meter bridge and stand.

Above: The SideCar, matching 8•Bus equipment rack.

7

WIDE MID RANGE EQ. Whether you're tracking or mixing, equalization is one of your most important creative tools. We concentrated on important things like giving you Classic English Console EQ capabilities. By that, we mean extremely-wide-bandwidth peaking equalization that can be used to achieve effects that simply aren't possible with narrower EQ. Most Brand X midrange EQs have a fixed bandwidth of about 2 octaves (blue graph above right). You can sweep it up & down the frequency spectrum, but the "sharpness" of the EQ curve is always the same.



This kind of EQ is good for some purposes...but if you've worked with it before, you know it's too drastic and localized for gentle changes in overall tonal coloration. The 8•Bus' true parametric Hi Mid lets you spread the bandwidth out to as much as 3 octaves (red curves at left). That extra octave of "width" gives you a whole new creative palette.

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8 LEGENDARY RELIABILITY.

This is one of those factors you probably don't think much about - until your console goes down at in the middle of a critical session...at 2AM on a holiday weekend. Built with pride in Woodinville, WA, USA, 8•Bus consoles have an enviable 3-year track record for enduring continuous, round-the-clock use and abuse.

tabloid. This video offer is available to respondents in the U.S. only. Canadian readers, call SF Marketing at the toll-free phone number below. In other countries, please consult your local Mackie Designs Authorized Distributor.

MACKIE™

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I N S I

FEATURES

36 CREATIVE SPACE: RUSH LIMBO

So what are you doing for *your* summer vacation? When supergroup Rush took an extended holiday after a grueling world tour, guitarist Alex Lifeson went home to cut a solo album.

By Greg Pedersen

44 COVER STORY: MODULAR DIGITAL MADNESS

MDMs are here, there, and everywhere, but users are still debating the pros and cons of ADATs and DA-88s. Is one machine really better than the other? Decide for yourself after checking out the info we've collected from online pro-audio forums, professional engineers, and repair centers. We also preview the second generation of MDMs from Fostex, Panasonic, and Sony.

By Michael Molenda

56 NAMM'S GREATEST HITS

Boogie down with the flashy new products unveiled at the gear industry's show of shows as EM Senior Editor Steve O. spins his pick hits from the 1996 Winter NAMM convention.

By Steve Oppenheimer

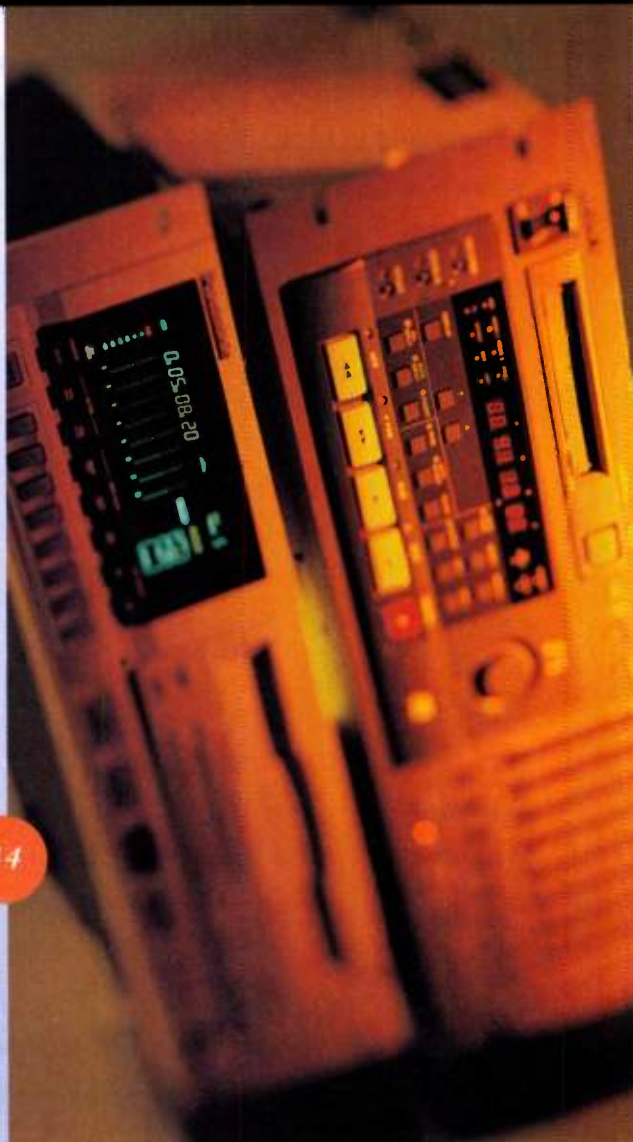
78 MULTITASKING MARVELS

Satisfy those cravings for tasty signal processors with our buyer's guide to 39 multi-effects boxes that can be yours for less than \$700. It's quite a feast!

By Brian Knuve



78



44

DEPARTMENTS

- 8 FRONT PAGE
- 12 LETTERS
- 20 WHAT'S NEW
- 146 AD INDEX
- 154 CLASSIFIEDS

COLUMNS

- 34 PRO/FILE: Hula A Go-Go**
Soak up some island blues with the hard-partyin' Hula Monsters.
- 94 DESKTOP MUSICIAN: Home, Home on the Web**
Start clocking your 15 minutes of fame by building a Web page.
- 100 SQUARE ONE: The Wizard of dBs Returns**
The Wiz is back on the scene to explain the mysteries of acoustic decibels.
- 106 WORKING MUSICIAN: Label Machinations**
Steer your own career by starting an independent record label.
- 114 SERVICE CLINIC: Voltage-Controlled Oscillators**
Exorcise assorted VCO curses and whammies from analog synths.
- 162 TECH PAGE: For a Few Cents More**
A truly microtunable synthesizer engine makes prime time in real time.



REVIEWS

- 121 E-MU Darwin** modular hard-disk recorder
- 129 KURZWEIL K2500** keyboard workstation
- 137 TANNOY PBM 8 LM** powered monitors
- 139 ROLAND GP-100** guitar preamp
- 143 ENSONIQ/Q UP ARTS Steve Gadd Drum Scores** sample CD
- 145 ENSONIQ DP/2** multi-effects processor
- 150 GROOVE TUBES EQ1** tube equalizer

Cover: Photography by Barry Maniz.

Special thanks to Panasonic and Sony Electronics.

write your

How often have you had a great inspiration that somehow got lost on its way to the sequencer? Sure, technology keeps advancing, but that hasn't always made it easier to do what you want to do – write a song. Until now.

Meet the MR-WorkStation, a new keyboard designed for the songwriter in all of us.

To start, we studied the songwriting process, learning from musicians at all levels, across all genres – people just like you. We learned what tools you needed. What frustrations you had using a workstation keyboard or a computer. Then we came back full of fresh, new ideas and built them into the MR-WorkStation.

Take the Idea Pad, for instance. Noodle around a bit. Try out a few ideas. Yeah, that last one was a keeper! Don't worry, your inspiration has already been captured – the MR-WorkStation always remembers what you play.

Need a groove? Play along with some of the most natural-sounding rhythms you've ever heard, thanks to the onboard Drum Machine. Send your ideas to the 16-track sequencer to develop them further. Use the Song Editor to quickly build your arrangement, and get the final mix just right with the Mixdown strip.

We wanted these great new concepts to be easy to use, so we put all the right controls on the front panel. Arranged in sensible groups so you don't waste time searching through complex menus.

Of course there's more – like support for Standard MIDI Files and General MIDI, a powerful voice and effects architecture (the same as our MR-Rack), fast sound editing, 64-note polyphony, our SoundFinder™ interface, and much more.

ENSONIQ has always been known for making powerful features easy to use. The MR-WorkStation raises that standard. It's a great-sounding instrument that makes it easier than ever to write a song – right here, right now.



Capture your inspiration here. The Idea Pad™ records everything you play, all the time. Use it with the Drum Machine – it remembers that too. Send any idea you like to the onboard sequencer for further development.

Here's your drummer, complete with 8 variations and 8 fills. Load in new rhythms from disk and edit the patterns to try different drum kits or quantization feels. It can even be synchronized to the sequencer to save time and note memory!



next song here



Arrange it here.

The Song Editor gives you a natural, easy-to-use interface for arranging your sequences into songs. Make a playlist by choosing the order of your sections. Trying a new arrangement is as easy as A, B, C (or A, C, C, B, D, or A, D, C, B, E, ...).



Mix it here, with direct access to each of the effects sections - reverb, chorus, and any of the 40 insert effects. Plus control over panning, volume, solo, and muting - use it just like a mixing board.



MR-WorkStation
61-key synth action

MR-WorkStation Weighted Action
76-key weighted piano-action

64 Voices

Over 1200 Sounds

14 MB Wave ROM
expandable to 86 MB

Up to 12 MB Flash Memory
loads ASR/EP5 and .WAV samples

24-Bit Effects

Idea Pad™

Drum Machine

16-Track Sequencer

GM/SMF Support

Disk Drive

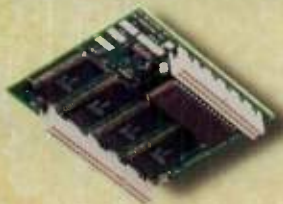
4 Outputs

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610-647-8908 fax

ENSONIQ
LEADING THE WORLD IN SOUND TECHNOLOGY

Here are your expansion options.

The MR-WorkStation has 3 expansion slots, which can hold either wave expansion or Flash memory for sample loading. Expand your wave ROM with up to 24 MB per board, or add 4 MB of sample memory per board, in any combination you need.



Here's the Coupon. Use it to get more information on the MR-WorkStation!

- Send me more information on the MR-WorkStation.
- I'd also like info on:
- ASR Series samplers
 - SQ Series synths
 - DP/4+ effects processor
 - MR-Rack expandable synth
 - KT Series weighted action synths
 - 1682-fx mixer
 - DP/2 effects processor

Name _____
Address _____
City _____ State _____ Zip _____
Phone (____) _____

ENSONIQ Corp., Dept. M-44, 155 Great Valley Parkway, P.O. Box 3025, Malvern, PA 19355-0725

Info Coupon™



TWO OPINIONS ON ART

One thing I can count on with *EM*, regardless how much I get out of any articles, is that Michael Molenda's editorial comments are going to be interesting, challenging, inspiring, and caring. I want to figure out a way to magnify March's "Front Page: Tangible Art" and hang it from ceiling to floor on the wall of my little home studio. Thanks for your continued encouragement. It's this sense of editorial mission that keeps me a subscriber.

Alan D.
alandmuse@aol.com

In Mr. Molenda's editorial "Tangible Art," he states, "if you don't document your music on CD, cassette, or vinyl, you're a phantom." Although I understand the spirit of this statement and generally agree with it, there is another important form of musical documentation that Molenda has ignored: notation.

My concern is that we are breeding a generation of musicians who lack the traditional skills required of previous generations. Now, before your readers get their blood in a boil, understand my point: There are many fine, well-trained young musicians out there. However, today it seems there are fewer people who believe in the value and discipline of practicing a musical instrument and more people who believe that all there is to music creation is setting off a drum loop on their Casio and plunking out a couple of chords on the keyboard.

Written music is at the heart of our

musical tradition. Many of our greatest composers are remembered today simply because they wrote their music down. It's virtually cost free, and it can convey the most powerful musical ideas any trained musician can understand. By excluding this from your editorial (I understand this was not the direction you intended), you give way to the prevailing winds that traditional musical accompaniment is no longer a prerequisite. With that, I take issue.

These tools, these electronic-music machines, are only as valuable as the music we can create with them. As someone who has invested an enormous amount of time in the craft of music and who depends on current technology to make his living in music, I implore you not to sell short the value of these traditional musical skills. Everyone, if you don't yet know how, learn to read and write music. It will enrich your abilities as a musician as well as your life.

Chuck Butler
75342.461@
compuserve.com

PURE OPINION

The author of "Serious Musicians" ("Letters," March 1996) typifies the standard, slightly peeved

readers of every special-interest magazine. Although the writer was not actually hell-bent as some to make a point, it does reflect the mindset of the "purist."

The right to individual opinion is the strength of our culture. It goes hand in hand with a capitalistic society that lets people choose what they prefer in a market. (Remember Beta videotape?) The masses choose their music—that's all there is to it. If you're disgruntled with the stock commercial artists, there are plenty of other musicians to listen to. So if you don't like it, don't buy it. Popularity sells. This is a marketing concept that many do not grasp and perhaps do not *want* to grasp. I think, however, that we should all be thankful we have so many types of music to choose from.

Randy DeFord
Monticello, IN

CAN'T SEE THE FOREST

Mary Cosola's article "Working Musician: Seductive Promotion" (March 1996) succinctly explains everything warped and twisted about the music industry. If Cosola spent half the time listening to the music that she now spends obsessing over promotional flowcharts and neat-o keychains, she

OOPS!

Due to printer's error, two photos were left out of the March 1996 "What's New." So for an interactive experience, we have included easy

cut-out photos of the Rane VP 12 and the t.c. electronic M2000 for you to cut and paste onto p. 21 of your March issue.



JUST ADD MUSIC

Vision 3.0

We'll Provide the Studio

Once upon a time, putting together a home studio was a difficult, expensive, risky venture—it required lots of time, and quite a bit of technical expertise. Now Vision 3.0 puts a home studio into your Power Macintosh™ instantly.

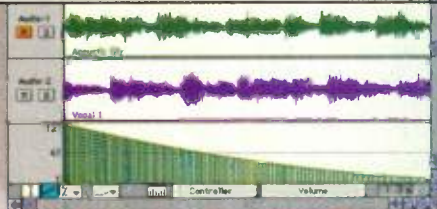
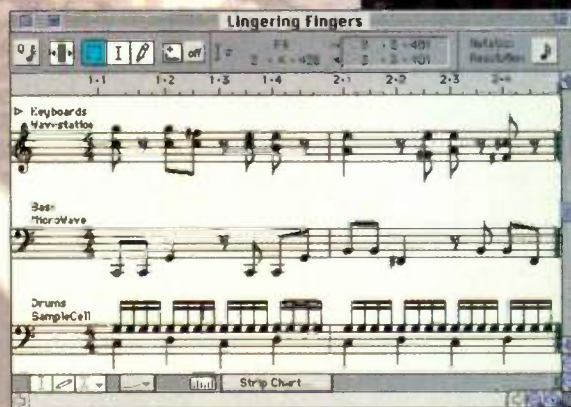
Vision 3.0 makes it simple to record 16 bit audio and edit it in the same window with your MIDI sequences—*without any additional hardware*. Crisp vocals! Sizzling guitar! Right there with your sequenced keyboard and drum parts.

To make studio set-up simple, and keep things running smoothly we've included *OMS™ 2.0* (the Open Music System) software, as well as our latest edition of *Galaxy™ 2.0* the Universal Librarian.

So don't worry about wiring diagrams and patch bays, install Vision 3.0 on your Power Mac, and before you know it you'll be turning your ideas into crystal-clear recordings, hip sequences, and fresh mixes.

Get Vision 3.0 and start making Music today.

Call (800) 557-2633 ext. 285 for literature • (415) 856-3333 for dealer information
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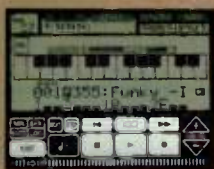
COMPOSE YOURSELF.

You never know when or where inspiration will strike. But with the PMA-5 palm-held Personal Music Assistant, at least you know where you can put it.

The PMA-5 is the most intuitive creative tool for anyone with a musical thought. Utilizing advanced pen computing technology, the PMA-5 is the ultimate portable



Realtime faders give you control of volume, panning, reverb and chorus levels for all 8 tracks.



Intro, fills, verse, chorus, ending—the Style Track lets you lay out your song visually.



27 different chord types to choose from in any key with any bass note—even a different chord on every beat.



With step editing you can go deep. Change the velocity and duration of one note, move it a few clock pulses ahead, or insert individual events.

music workstation. It's as simple as touching a pen to a screen. You can perform all operations and even play individual notes from the on-screen keyboard. You can access 600 backing patterns and 100 styles ranging from Monk to Funk and Sting to Swing. And, for on-the-spot improvisations, you can use the ad-lib function to play solos or melodies without knowing anything about music. Choose from over 300 Roland sounds and assign them to any of the 8 tracks in the built-in sequencer. Then add on-board effects including eight types of digital reverb and chorus. The PMA-5 can even function as a 16-part multitimbral GM/GS sound module.

When you're ready to get back to less comfortable surroundings, the PMA-5 has a built-in computer interface. And, because it's MIDI compatible you can play or record into the PMA-5 from a MIDI controller. You can even exchange Standard MIDI File data with your computer for freedom you never had before.

When traveling with a band won't work, the PMA-5 will. Since the PMA-5 is battery powered, you can have a band at your side anytime or anywhere. Choose from up to 20 songs, select bass and drum parts, transpose to any key at will, choose a preset style or create your own. It even has a built-in start/stop jack.

Try the PMA-5 at your nearest Roland dealer. Or, better yet, try it someplace more inspiring.



Roland

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Roland Canada Music Ltd. 5480 Parkwood Way, Richmond, B.C. V6V 2M4 (604) 270-6626
<http://www.rolandus.com> Fax Back Information (213) 685-5141 ext. 271 COMPUSERVE GO ROLAND





• LETTERS

might claw her way free of the "CD slag heap formerly known as her desk." Yikes.

R. J. Stuart

Locust Attack Records
squirrel@tiac.net

R. J.—You're right. The music industry is warped and twisted; that's why we wanted to run an article that would help readers find a way to get their releases heard by reviewers and the like. Believe it or not, I actually listen to all the CDs I get, and my desk is still overrun. And isn't it funny how two sentences in a 2,000-word article can turn in to

my "obsessing" over something? Talk about obsessive. Yikes.—Mary C.

PIECING IT TOGETHER

Your article "Bits & Pieces" (February 1996) was very helpful to me, especially the section on recording bass by Glenn Letsch. Getting a solid, punchy bass sound on tape has always frustrated me, and Letsch's tips have definitely helped me get back on track. The article also underscored the lack of readily available, specific information on

recording electric bass. I get the feeling Letsch has just shown us the proverbial tip of the iceberg and has lots more to share with us on this subject. How about a follow-up bass article?

Fred Sampson
no address given

Even though I'm a 41-year-old MIDI maniac, I look forward to each month's issue of **EM** like a little kid waiting for Christmas. Reading "Bits & Pieces" was like sitting down to a feast of insight.

My partner and I have nonmusic careers and a "nights and weekends" project studio, and we hope someday to make our facility a full-time business. For guys like us who don't have the luxury of spending the bulk of our time in the studio experimenting with things such as mic selection and unorthodox signal processing, your publication is most welcome and appreciated. Thanks to articles like this one, we benefit from years of experience shared by the pros. Your excellent product reviews help us make informed equipment-purchase decisions. Thanks, in part, to **EM**, our equipment arsenal and clientele are growing rapidly and the future looks bright.

Steve Mark
stevemk@gnn.com

Your articles on making better home demos are a real help. As an engineer, I can take those simple techniques and put them to work on either \$100 pieces of gear or \$100,000 pieces of gear. Your recent article on how top albums were recorded was the tops ("Bits & Pieces"). But I think the pros overlooked one of the biggest issues facing most home recordists: taking the time to get it right. Too often, home engineers settle for less than perfect—an audio flub here, a missed note there. Taking the time to get everything right, be it on a 4-track or a 24-track, will make the difference between a great-sounding track or audio hell.

Tao
sac71602@saclink1.
csus.edu

BUILD YOUR OWN

Thanks for "DIY: Build the EM Theremin" (February 1996) and the article on building your own Moog Prodigy VCF and VCA ("Service Clinic:

GET REAL

The PRO-3 from Motion Sound
Sound only a REAL rotating horn can produce.

PRO 3 PATENT PENDING

"Thanks to acoustical physics, the Motion Sound Pro-3 creates a sound that hasn't been – and may never be – replicated electronically."
Mark Vail *

"That's the stuff."
Dale Ockerman, Doobie Brothers*

"The Pro-3 kicks ass."
Barry Gould

"(Believe It Or Not) Spot on Perfect."
Mark Vail *

*May 1995 KEYBOARD magazine

MOTION SOUND

From the people that put sound into motion.
13281 South 1300 East · Draper, Utah 84020 · Phone 801.572.9811 · Fax 801.572.7411

PEAVEY
SPECTRUM
SAMPLE PLAYER

Buy a Sample Player, Not a Translator.



Peavey introduces the Spectrum™ Sample Player, a sample playback module which reads Akai S-1000 banks from CD-ROM or any SCSI storage medium. It includes 2 MB of internal sample RAM and will support up to 32 MB using standard SIMMs. Unlike other sample players which translate the Akai format into their own language, the architecture of the Spectrum Sample Player will play S-1000 volumes verbatim; there is no translation involved, so you hear the sounds the way they were intended to be heard.

Akai makes the S-1000 and does not make or license the Spectrum Sample Player. Akai is a registered trademark of the Akai Corporation.

- 2 MB RAM [exp. to 32 MB]
- 24 Voice Polyphony
- 2 Envelopes per Voice
- 3-Pole Filter per Voice
- MIDI In/Out/Thru
- Stereo Audio Outputs
- 16 x 1 Backlit Display
- 25-Pin SCSI Connector

EAST★WEST

Has the largest selection of Akai compatible sample libraries available anywhere. For a FREE EAST★WEST Catalog, Call (800) 833-8339.

The MONITOR Magazine is a publication filled with the latest information musicians want to know. To receive 4 issues for only \$5 (price good in U.S. only) send check or money order to: Monitor Magazine, Peavey Electronics, 711 A Street, Meridian, MS 39301 • (601) 483-5365 • Fax: (601) 483-5366 • <http://www.peavey.com> • AOL Keyword: Peavey • CompuServe: 64 Peavey • ©1995

World Radio History

● LETTERS

Build a Moog Filter," March 1996). This is the type of information that would make me want to subscribe to **EM** instead of just thumbing through it for a couple of minutes at the newsstand. Now, if you can add a few more articles aimed at using the equipment I already own instead of just making me salivate over more equipment I really can't afford right now, I'll be a happy camper.

Troy V. Sutton
sfctrts@sfccard.
unocal.com

MORE FINE PRINT

I am puzzled by a statement in Michael Aczon's article "Working Musician: The Fine Print" (February 1996). He tells us to file an SR (sound recording) copyright-registration form to establish ownership rights in our master recordings, which is certainly the wise thing to do. But then he says that "if you also wrote all the songs, be sure to register those as well with copyright form PA."

I was under the impression—and the

instructions for form SR seem to bear this out—that ownership rights to both the sound recordings and underlying musical works (compositions) can be registered simultaneously with form SR by indicating authorship of both at the bottom of section 2.

Have I overlooked something? Perhaps there is a good reason to pay twice as much and register for each of these rights separately. If there is, please enlighten me!

B. D. Decker
Lancaster, TX

Author Michael A. Aczon responds: *Many independent projects are released with the intent to create industry interest from as many sources as possible; therefore, I advise my clients to keep both their record- and publishing-company options open. Because this may require selling off one set of rights while retaining the other (i.e., entering into a publishing deal where the publishing company assists in seeking an artist or distribution deal for the project), it is wise to file separate copyright forms to sidestep an inadvertent transfer of both sets of rights. Your reading and understanding of the SR copyright form is correct. Although it is possible to register both the masters and the underlying musical works on the same form, I should have qualified my statement in the article to apply to those artists intending to seek separate record-company and publishing-company opportunities.*

WE GOT SIZZLE

I thoroughly enjoyed the article "Sizzling Sequences" (February 1996). As long as you include groundbreaking articles such as "Tuning Up" (December 1995), "The Feel Factor" (October 1987), and the aforementioned piece that encourage electronic musicians to reach beyond the automatic, facile, and familiar aspects of programming, playing, sequencing, and mixing, I will continue to benefit from your magazine.

Steven Holsworth
laggy@aol.com

WE WELCOME YOUR FEEDBACK.

Address correspondence and e-mail to "Letters," Electronic Musician, 6400 Hollis St., Suite 12, Emeryville, CA 94608 or emeditorial@pan.com. Published letters may be edited for space and clarity.

A Dozen Projects,
**One
Microphone!**



Vocals, acoustic and electric guitar, piano, tom toms, snare, cymbals and oh yes... even kick drums. This uniquely designed condenser microphone features a servo head amplifier delivering unparalleled transparency and sonic performance, allowing you a level of flexibility not available from any other microphone.

... and all this flexible performance can be yours at a price making owning a dozen a wonderful possibility.

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How much is your creativity worth? You really can't put a price on something so valuable. The powerful new QS6™ 64 Voice Expandable Synthesizer gives you everything you need to push your creativity to new levels. It's the affordable solution for musical inspiration.



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The QS6 has everything from realistic acoustic instruments to cutting-edge and vintage synth sounds, all accessible at the touch of a button. Its digital 16-bit linear non-compressed samples provide warm, clean, and incredibly accurate voicing for every performance. The onboard multieffects - reverb, chorus, flange, delay, rotating speaker effects and more - use the same advanced processor as our Q2™ Master Effects. Combine these effects with the massive sound library, and you'll create CD-quality mixes right from your synth. QS6's rhythmic/sonic loops let your creativity groove just by holding down a single key. The semi-weighted keyboard offers velocity, release velocity and aftertouch for expressive playability. It's all packed into a tough all-metal chassis that will take the punishment when you take your show on the road.

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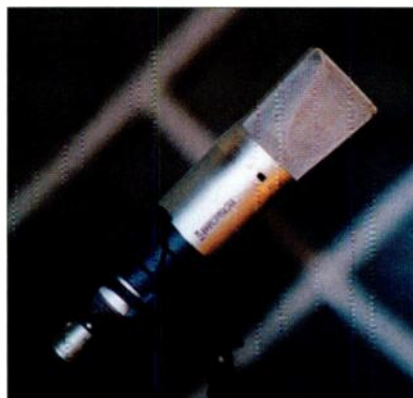
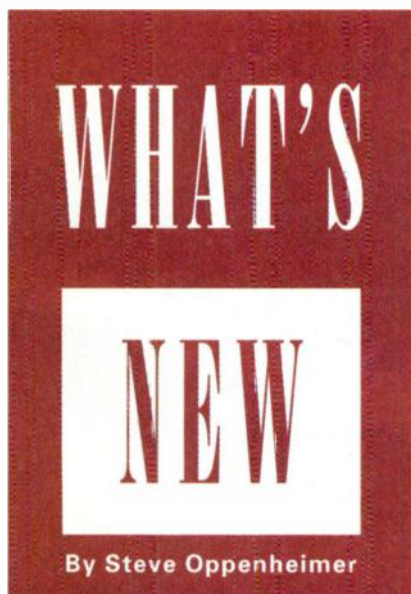
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ALESIS

64 VOICE POLYPHONY --- 8 MEG OF ROM --- 640 PROGRAMS --- 61 NOTE KEYBOARD --- 500 MIXES



▲ RODE NT2

I don't know whether Foster's is really Australian for "beer," but it appears that Rode is Australian for "condenser mic." The folks down under are exporting Rode's NT2 large-diaphragm condenser mic (\$749) via Event Electronics.

The NT2 is hand assembled and features dual pressure-gradient transducers with gold-plated connecting points and transformerless circuitry. It offers a switchable highpass filter, selectable polar patterns (omni and cardioid), and a -10 dB pad switch.

The mic's frequency response is rated at 20 Hz to 20 kHz. In fact, the manufacturer's graph shows a response that is almost dead flat up to 10 kHz when set for omni and flat except for a 2 dB dip from 20 to 40 Hz when set for cardioid. Event Electronics (distributor); tel. (805) 962-6926; fax (805) 962-3830.

Circle #401 on Reader Service Card

▼ MACKIE CR-1604-VLZ

Five years ago, Mackie Designs' compact CR-1604 mixer took small studios by storm. It was the first good-quality, 16-channel board we all could afford. The second generation CR-1604-VLZ (\$1,199) adds several valuable features that were high on many users' wish lists.

The most obvious improvement in the VLZ is the addition of four subgroups with faders, making it a 16 × 4 × 2 board. (The original 1604 is 16 × 2.) Channels can be assigned to buses 1/2, 3/4, or the main L/R bus. All inputs and outputs are balanced except the inserts, headphone jacks, and new RCA tape inputs and outputs. However, the balanced ins and outs also accept unbalanced connections. The new 60 mm logarithmic-taper faders use a long-life wiper material and are designed to be usable over their entire length.

The channel input trims have been redesigned to handle a wide range of levels (+10 to -40 dBu for the line inputs, -10 to -60 dBu for the mic inputs). In addition, they've been relocated at the top of the mixing surface instead of on the same panel as the jackfield. As with the original 1604, the new mixer's I/O pod can be rotated for rack or tabletop use, but doing so no longer affects the trim location.

Also welcome are the 1604-VLZ's sixteen mic preamps; the older CR-1604 has just six. The midrange of the 3-band EQ now is sweepable (100 Hz to 8 kHz), but the high and low shelves are fixed at 12 kHz and 80 Hz, respectively. An 18 dB/octave low-cut filter is also provided on each channel. You can select in-place AFL or PFL solo.

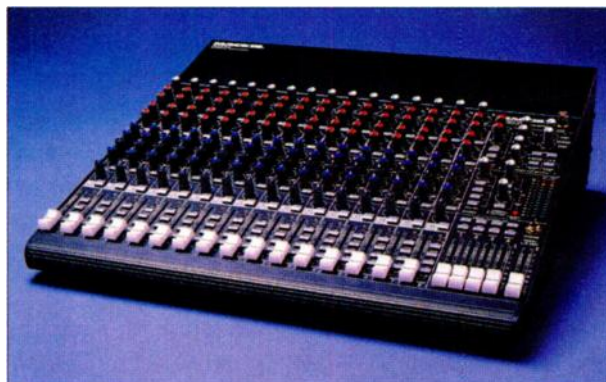
The CR-1604-VLZ has six aux sends (four simultaneous); auxes 1 and 2 are switchable pre/post-fader, and the other auxes are post-fader. The four aux returns have individual solo and level controls. Aux returns 1 and 2 include a second volume control that lets you

route them back to aux sends 1 and 2. This lets you route "wet" signals to two monitor mixes. Aux return 3 can feed the main mix or either pair of subgroups (1/2 or 3/4), and Aux return 4 can go to the main mix or the Control Room/Phones mix for adding effects or a cue/click track to a separate headphone mix. The headphones can receive either subgroup pair, the main L/R bus, or the stereo tape returns.

The new board has postfader direct outputs on channels 1 through 8 and pre-fader inserts on all channels. Along with the four subgroups, this makes the 1604-VLZ much more multitrack-friendly than the original CR-1604.

If the CR-1604-VLZ is a compact mixer, Mackie Designs' 1202-VLZ (\$429) is a subcompact board. New features on this updated version of Mackie's 12-channel model include 3-band EQ, a separate Mute Alt. 3/4 stereo bus (like the one on the original CR-1604), solo, balanced XLR mic/line outputs, a low-cut filter on channels 1 to 4, a new monitoring/cue section, and 60 dB of gain at the XLR mic inputs (channels 1 to 4).

As with the original 1202, you get four balanced mic inputs with phantom power, four unbalanced line inputs, four stereo balanced line ins (which accept unbalanced signals), two aux sends per channel, two stereo returns, four channel inserts, tape in/out, and more. Both new Mackie boards feature the company's very low impedance (VLZ) circuitry, which is designed to minimize noise



and crosstalk. Mackie Designs; tel. (800) 898-3211 or (206) 487-4333; fax (206) 487-4337; e-mail mackie@mackie.com.

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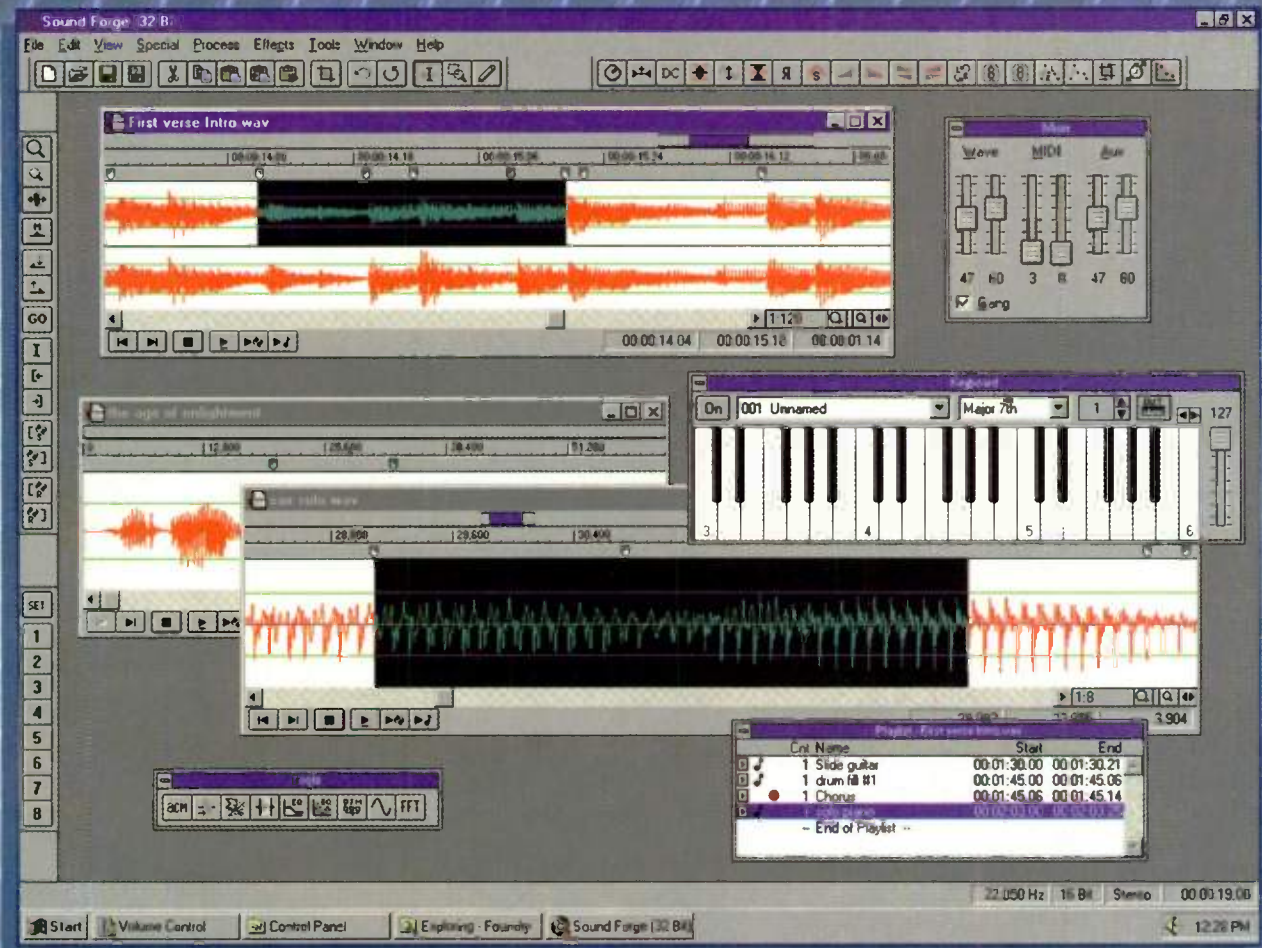
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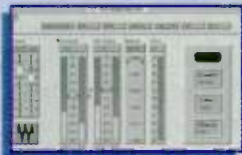
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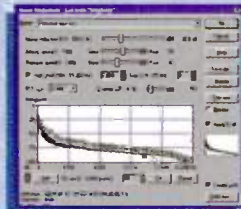
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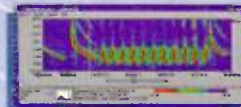
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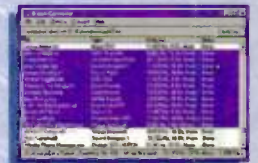
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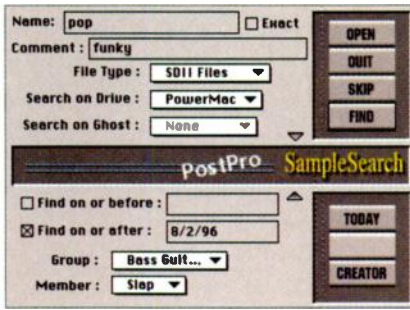
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▲ GALLERY PRECISION AUDIO TOOLS

The more sampling and hard-disk recording you do, the more problems you will have manipulating and organizing your audio files. Gallery Software has addressed these and several other digital audio concerns in its Precision Audio Tools suite of programs for the Macintosh (\$1,495). The suite includes five programs, two of which (*SampleSearch PLUS* and *CDStudio*) are also available separately.

The first module is *VoicePro*, which lets you script the recording process (including automatic file naming) using a simple text file. For example, you can provide an artist with a record-cue light, peak-overload indicators, and other onscreen prompts. You can monitor sample rate, stereo/mono status, and bit depth. *VoicePro* uses any Apple Sound Manager-compliant audio recording hardware.

The most recent take can be played with the spacebar. Previous takes are listed in another window and can be played individually or in groups. A field in the Takes list lets you assign one of seven user-definable ratings to each take. This information is piped to *Sample-*

Search, where it can be displayed and used to search or sort takes. *VoicePro* offers three systems for doing retakes, including an automatic numbering system for multiple takes of scripted cues.

The second part of the Gallery suite is *SampleSearch PLUS* (\$295), a database, search engine, and batch processor for digital audio files. The program lets you quickly search all your drives by name, drive, file type, creator type, size, time, date, comment, and user-assignable keyword. It then finds the selected files and transfers them to the desired disk. You can examine and edit comments, including Mac desktop comments and the proprietary embedded comments in Sound Designer, AIFF, and SampleCell files.

Sound Designer II, WAV, and AIFF files can be auditioned directly from disk. The program also can open SDII and AIFF files into its editing environment, where you can create, view, and manipulate SDII Regions and automatically export or recombine them. The Auto Region Marker analyzes the data and marks a Region for each burst of audio. *SampleSearch* even has an audio recording page.

SampleSearch offers batch copy, move, and delete functions for arbitrary groups of files. Other batch processes include AutoCrop (which automatically tops and tails files) with append silence, pre/postroll, fade in/out, normalize, and 16-bit-to-8-bit conversion (without dither). Batch file-format converters include Sound Designer II, AIFF, QuickTime, SND, PC WAV, PC RAW, and PC SMP. Complex folder hierarchies are treated as a flat filing system, so you can do simultaneous

batch processing across multiple drives.

SampleCell II owners can not only audition files but "Resolve" Banks and Instruments. The Resolve function analyzes the file pointers that describe the links between Banks, Instruments, and samples. If you have moved a sample or Instrument, making the existing link invalid, *SampleSearch* finds the new location and updates the link.

RegionReader, the third module in Precision Audio Tools, lets you display and print SDII Region information. One very cool feature allows batch processing using any Mac or Windows/DOS audio-processing program, including SDII plug-ins, while still preserving the individual Regions. The program also lets you use a text script to automatically assign names to SDII Regions.

CD Studio (\$149) lets you transfer Red Book digital audio via SCSI from an audio CD (in a CD-ROM player) to hard disk. The program can save the data as SDII, AIFF, or WAV files at 22.05 or 44.1 kHz with 8- or 16-bit resolution. It can drop in/out markers on the fly and transfers audio at two to four times real time (depending on your CD player). *CD Studio* only supports Apple CD-ROM drives.

The last tool in the kit is *Audition*. This drag-and-drop sample player lets you easily play AIFF or SDII samples from the Mac desktop.

InVision Interactive (distributor); tel. (415) 812-7380; fax (415) 812-7386; e-mail dennym@cybersound.com; Web <http://www.cybersound.com> or <http://www.demon.co.uk/gallery/>.

Circle #403 on Reader Service Card

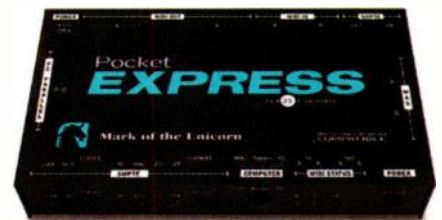
▶ MOTU POCKET EXPRESS

It's not uncommon to sequence on both a Mac and a PC. Perhaps you run special software on one machine or you work in multiple studios and want to be sure your MIDI rig works in all environments. Maybe your computer is just having an identity crisis. At any rate, living in both worlds usually means buying two MIDI interfaces. (Yes, you could buy a GM module with a dual-platform interface, but then you're paying for a synth.) Mark of the Unicorn thinks this shouldn't be necessary anymore, and thanks to the Pocket Express (\$195), it isn't.

The 2-In, 4-Out, 32-channel Pocket Express connects to the parallel port on a PC; Mac users can use either or both serial ports. LEDs indicate the presence of a MIDI signal at each input and output. The unit also includes an all-format SMPTE reader/generator with jam sync, which can be controlled from the front panel. A Bypass button lets the interface pass signals when the computer is off.

MOTU also introduced the PC-MIDI Flyer (\$89), a 2-In, 2-Out, 32-channel MIDI interface for Windows PCs. The wedge-shaped unit connects to the parallel port and is powered from the computer. It,

too, has a Bypass feature that passes signals when the juice is off. Mark of the



Unicorn; tel. (617) 576-2760; fax (617) 576-3609; e-mail info@motu.com; Web <http://www.motu.com>.

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Recording Magazine

"As close as we've seen to a magic black box, the BBE 462 is probably the most cost-effective improvement you can add to your rig."

Guitar Player Magazine

"Listening on a variety of loudspeakers - JBL, KRK, Meyer, Tannoy, Yamaha and a few lesser-known names - I discovered that the BBE Process provided a nice punch to older recordings without being brittle or shrill. The LF contour emphasized the bottom end, without undue boominess."

MIX Magazine

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DR8 - \$3495.00 Sugg. Retail Price
8 Track Disk Recorder

On 1992 we introduced low cost disk recording with our 4-track DR4d. Thousands of DR4d's have found their way into broadcast facilities, recording studios, post production houses, and project studios. Combining our experience with input from thousands of end users, we created the DR8 and DR16. Whether you're just starting out with your first 8-track, upgrading your current tape-based MDM, or even if you're planning on a double-whammy, 128-track, multi-interfaced, graphically-based, post production facility, the new DR Series from Akai will serve your needs and grow with you in the future. It's an important fact to consider when someone tries to sell you a "budget" digital recorder that never really meets your needs. Check out these features and you'll "see" what we're talking about.

MORE FEATURES:

18 bit ADC • 64X oversampling

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Built-in mic preamps

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50 pin SCSI port



DR16 - \$4995.00 Sugg. Retail Price
16 Track Disk Recorder

EVEN MORE FEATURES:

Balanced 1/4" TRS in/out

Switchable +4/-10dB line levels

8 in 8 out + stereo master (DR8)

8 in 16 out + stereo master (DR16)

Media The DR8 can be equipped with an optional internal 1 GB SCSI drive, while the DR16 is available with an optional 2 GB internal SCSI drive. The DR Series recorders are both equipped with a standard 50 pin SCSI port allowing a combination of up to seven SCSI drives with disk overflow recording capability. Lists of compatible drives are available from Akai product information.

Data backup is achieved through standard audio DAT or Exabyte.

At the time of this writing, the Iomega Company is preparing to go into production with their new 1 GB "JAZ" drive, a removable media SCSI drive which will greatly enhance the capabilities of our new DR Series recorders. Stay tuned for more info in our upcoming ads. Better yet, test drive a new DR Series recorder today at your local Akai dealer.

Now You Can See It.

Mixing Some of our competitors' disk recorders use a portion of their recording LSI to provide mix capability. While this saves money, it can also produce audio artifacts like "zipper" noise when adjusting such critical functions like EQ, pan, and fader level. On top of that, many disk recorders won't even let you make real-time adjustments during mix down, eliminating a critical part of the creative recording process. The heart of the DR mixer is a 16-channel, 24 bit custom LSI designed to provide real-time dynamic digital mix capability. Built-in 99 scene snap-shot automation for all functions and dynamic automation via external MIDI sequencers, combined with 8 or 16 channel 3-band parametric EQ option, ensures that the only limit in the DR Series mixer is your imagination. With its built-in 16 channel mixer, the DR8 becomes the perfect compliment to any 8-track recorder you might currently own. It can mix down its 8 tracks of internal digital audio with an additional 8 inputs from a sampler, tape machine, or a live performance, all in the digital domain. The MT8 mix controller provides a 16 track console format for dynamic remote control of all mix and EQ parameters.

(Monitor/Keyboard/Omega Drive and Batteries not included.)



SuperView™ We sort of went into a frenzy packing new features into our DR8 and DR16. When we stepped back to take a look at what we'd done, we realized we crammed a whole roomful of equipment into a single 5U box. In order to help keep track of everything that's going on inside our "studio in a box", we developed the SuperView™ SVGA monitor board. SuperView™ mounts internally in the DR8 or DR16 and provides envelope and track information for up to 16 tracks of audio, as well as region highlighting for record, playback, and edit. SuperView™ is further enhanced by 16 track level meters with indicators for left/right master out and aux 1/2 out. The time indicator will read in the same format as the DR front panel. SuperView™ requires no external computer, simply plug your SVGA compatible monitor into a SuperView™ equipped DR Series recorder and you're ready to go. SuperView™ enables real-time video representation of audio status; no waiting for screen re-draws. What you hear is what you see.

Keyboard Interface To increase the power of SuperView™ even further, we added an ASCII keyboard input to the SuperView™ card, allowing a standard ASCII keyboard to operate as a control interface for SuperView™ equipped DR Series recorders. Function keys will provide the ability to zoom in on a single track, as well as zoom in/out timewise for precise edit capability. All tracks and locate points can be named, allowing you to manipulate and track large amounts of data in a very simple manner. A unique interface has been developed to allow track arming, transport control, and edit functions directly from the keyboard, providing enhanced productivity through an intuitive human interface design.

OPTIONS:

SuperView™ SVGA card - \$699

ADAT interface - \$299

MIDI interface - \$299

S.M.P.T.E. read/gen - \$379

RS422 video sync - \$299

BiPhase film sync - \$299

2nd SCSI port - \$299

MT8 MIX controller - \$799

8 channel 3 band parametric EQ - \$550

16 channel 3 band parametric EQ - \$699

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► **MOTION SOUND R3-147**

Motion Sound specializes in rotating-speaker effects. But unlike electronic Leslie simulators, Motion's devices produce the sound of a rotating horn by using—are you ready for this?—a *real* rotating horn. This approach delivers the most realistic Leslie sound since the original Leslie.

In its new R3-147 (\$1,099), the company has acoustically isolated and suspended its Pro-3 rotating-horn system (described in the April 1995 "What's New") in a 4U rack-mount box. The input signal is routed through an onboard tube pre-amp with pre- and post-preamp gain control and then sent to the rotating horn.

The lower rotor of a Leslie is electronically simulated, which helps limit the unit's weight to a modest fourteen pounds. You can add variable amounts of frequency modulation and amplitude modulation to the lower rotor simulator.

The top rotor in the system is internally miked with two pairs of microphones



(left and right channels in close and distant miking positions). Mic-placement controls let you create a custom mix between the close and distant mics, and a built-in mixer lets you set the balance between the upper and lower rotor sounds for the left and right channels.

You can independently set the final speed, acceleration rate, and deceleration rate for the upper and lower rotors, and you can disable either rotor. The speed of each rotor can be controlled from the included footswitch or via MIDI.

Contour controls adjust the timbre between a low, Leslie 147-like sound and a brighter sound similar to that of the Pro-3. A cabinet simulator gives you the choice of a closed or open cabinet or a mix of the two.

The two inputs are on 1/4-inch connectors; both 1/4-inch and XLR outputs are supplied. The unit also includes an effects send/return loop on 1/4-inch connectors. Motion Sound; tel. (801) 265-0917; fax (801) 265-0978.

Circle #405 on Reader Service Card

▼ **KEYFAX TWIDDLY BITS**

Even if you haven't heard of Keyfax Software, you are familiar with the writing of its head honcho, regular **EM** contributor Julian Colbeck. Given his writing flair, you can bet any product from Colbeck will have a distinctive flavor. And indeed, Keyfax Software's *Twiddly Bits* series (\$34.95/vol.) is unique.

Twiddly Bits is a multivolume library of Standard MIDI File (SMF) patterns in a

variety of musical styles. These aren't cover songs; they're an assortment of multi-instrument licks, riffs, and effects played by professional artists. You import them into your sequencer and cut and paste the parts you want. You've seen drum-pattern libraries that work this way, but *Twiddly Bits* go far beyond drum parts.

For example, *Volume One: General Instruments* contains SMF patterns for bass, brass, drums, guitar, organ, piano, strings, synths, and woodwinds. You get assorted guitar licks, chords, strums, riffs, and whammy-bar effects; brass falls, stabs, riffs, and swells; bass pops, slides, slaps, and pulls; and much more.

Volume Two provides assorted gating effects that use MIDI Volume (CC 7) to turn your own sounds on and off. If you're hunting for lots of live-sounding, unquantized electric and acoustic guitar parts, check out *Volume Three*. This volume offers more than 300 guitar

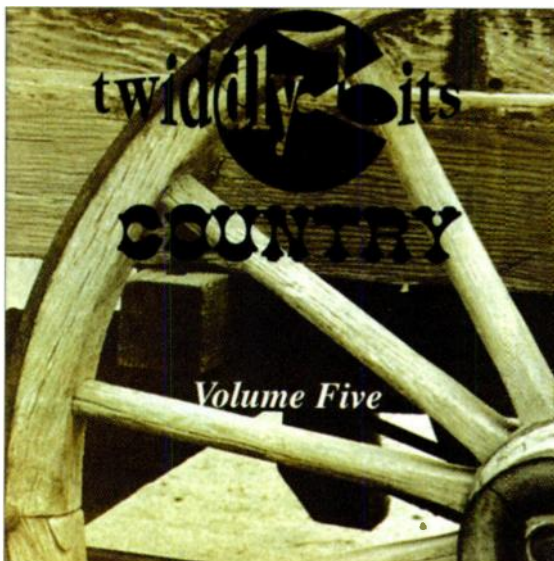
motifs from bluegrass banjo to blues, flamenco, and high-octane dance grooves. *Volume Four* offers 2- and 4-bar drum and percussion patterns in a wide range of styles, including rock, jazz, country, and hip hop. Time signatures include 3/4, 4/4, 5/4, 7/4, 6/8, and 7/8.

Volume Five presents country parts in SMF format. You get almost 600 phrases and motifs played on Roland guitar synths, Zeta MIDI violin, and KAT percussion controllers. You also get banjo, fiddle, bass, guitar, piano, pedal steel, harp, and drum parts. *Volume Six* supplies UK-style funk patterns.

Keyfax also has initiated a new Master Series, starting with *John "Rabbit" Bundrick Classic Rock and Country Piano*. Finally, the company's newest series features music from around the world; it begins with *Brazilian Rhythms*, produced in Rio de Janeiro by Richard (Ritchie) Court and performed by top-flight Brazilian drummer Alfredo Dias Gomes.

All *Twiddly Bits* volumes are available on 3.5-inch floppy disk for PC and Mac. Keyfax Software; tel. (408) 688-4505; fax (408) 689-0102; e-mail JaiceEee@aol.com; Web <http://www.gmedia.net/keyfax>.

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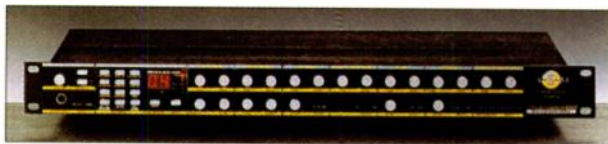


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World Radio History



▲ **NOVATION DRUMSTATION RACK**

Having established its analog-synth credentials with its BassStation bass synths, Novation has plunged into emulating analog percussion with a combination of sample playback and physical modeling. The 1U rack-mount DrumStation Rack (\$999.95) is designed to emulate the sound of Roland's classic TR-808 and TR-909 drum machines.

The 12-note polyphonic instrument provides 50 drum kits. You can route in-

dividual drums to a panned position on the main L/R bus or to any of six assignable individual outputs.

The DrumStation offers several unusual features. For example, you can add a variable amount of distortion to each drum sound, and you can truncate up to 99 ms of the front portion of each drum sound independently. (The only other sound-editing parameters are tuning and level.) A sync-trigger output sends MIDI Clock messages.

There's a normal Audition feature for listening to the current sound, but you can use the Autotrigger to audition the sound as played in a basic 4-beat/bar pattern,

with Start, Stop, and Tempo controls. Each type of drum is programmed from a separate section on the front panel; if you move a control in another section, Autotrigger switches to that sound.

All front-panel rotary controls send their values via MIDI CC messages. The unit's control functions can respond to either MIDI Control Changes or Velocity. You can choose whether a drum sound responds to Note Off messages; if it does, the drum's duration is determined by how long the note is held. Music Industries Corp. (distributor); tel. (800) 431-6699 or (516) 352-4110; fax (516) 352-0754; e-mail basstation@aol.com; Web <http://www.musicindustries.com>.

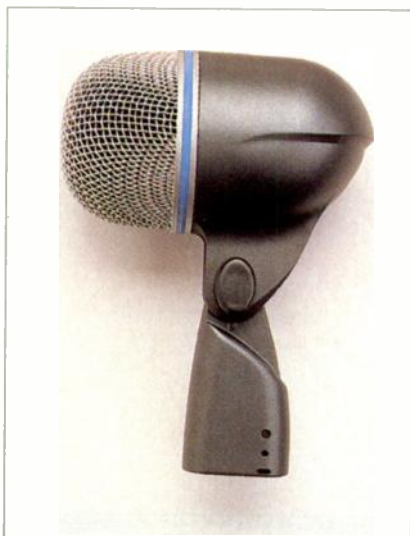
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▶ **SHURE BETA 52**

Shure mics have long been a common choice for miking drums. The only problem was cramming the full-sized mics in position. Shure has solved this problem with two new dynamic mics: the Beta 52 (\$310) and Beta 56 (\$240).

These small but potent performers use an adjustable locking assembly that makes it simple to angle them as needed. Both mics are low impedance and have XLR connectors. Their cases are made of silver-blue enamel-painted, die-cast metal with a hardened, matte-finished, steel-mesh grille that looks as if it can take a real beating.

The Beta 52 is tailored for the low fre-



quencies generated by kick drums, floor toms, and other bass instruments. The supercardioid mic handles up to a whopping 174 dB SPL (@ 1 kHz), with a frequency response of 20 Hz to 10 kHz. It weighs in at 21.6 ounces.

According to Shure, the low-profile Beta 56's supercardioid pattern is extremely consistent, helping to maximize gain before feedback. The 16.7-ounce mic is designed to handle all the mid-sized to smaller drums as well as other mid- to upper-range instruments. Its frequency response is rated at 50 Hz to 16 kHz. Shure Brothers, Inc.; tel. (847) 866-2200; fax (847) 866-2279.

Circle #408 on Reader Service Card

▶ **A.R.T. PRO MPA**

Following the successful debut of its budget Tube MP preamp, A.R.T. has released two more low-cost tube preamps. Both use a hybrid of solid-state and tube technology.

The new top of the line is the Pro MPA (\$599), a 2U rack-mount, 2-channel unit. The preamp features a pair of VU level meters. Each channel has independent input- and output-level controls, up to +20 dB gain, phantom power, phase-reverse switches with status LEDs, and a variable highpass filter.

On the unusual side are a pair of 10-segment LED ladders calibrated to the unit's 12AX7A-based output circuitry. These meters monitor the tube's sonic

behavior and indicate the amount of "warmth" resulting from the current gain settings.

Both balanced XLR and unbalanced 1/4-inch inputs and outputs are provided. The manufacturer rates frequency response at 20 Hz to 40 kHz (+0, -1 dB). THD is rated at <0.1% (typical) and EIN at -132 dBu (XLR to XLR, A-weighted).

The other new A.R.T. tube preamp is the Dual MP (\$329), which is basically a pair of Tube MPs in a 1U rack-mount enclosure. It features an internal power supply, front-panel instrument/line inputs, rear-panel XLR I/O, and a 4-stage "sonic character" LED ladder that is

similar to the 10-segment display on the Pro MPA. Each channel has input and output level knobs, a +20 dB gain switch, a phase-reverse switch, and defeatable phantom power.

The Dual MP's frequency response is rated at 10 Hz to 20 kHz (+0, -1 dB). THD is rated at <0.1% (typical) and EIN at -129 dBu (XLR to XLR, A-weighted). Applied Research and Technology; tel. (716) 436-2720; fax (716) 436-3942; e-mail artroch@aol.com; Web <http://www.artroch.com>.

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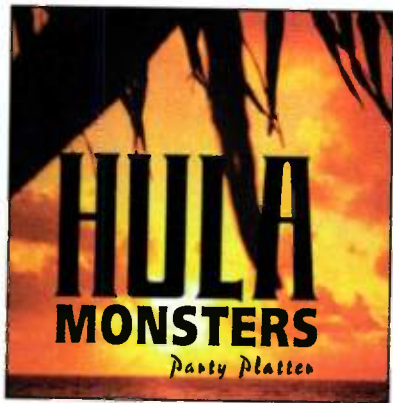
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World Radio History



PRO

FILE

Hula A Go-Go

Rock, swing, and sway with the Hula Monsters.

By Mary Cosola

Jon Bare and Hank "The Hula" Mann are by far the best hula-swing-rock musicians in L.A. Well, okay, they're the *only* hula-swing-rock musicians in L.A., but if there were any others, they wouldn't rock nearly as hard as these two.

Bare and Mann, the creative duo behind the Hula Monsters, met during a jam session at a Santa Monica tavern, hooking up a few weeks later to play at the Los Angeles Marathon. When they discovered how well Mann's Hawaiian steel-guitar playing meshed with Bare's more aggressive rhythm and lead guitar, they knew they had hit upon something special. With the help of Chet McCracken on drums and George Hawkins on bass, the duo immortalized their unique sound on disc by producing *Party Platter* at Bare's 24-track home studio.

Like accomplished chefs, Bare and Mann managed to cook up an innovative creation from a variety of familiar musical styles. The result is something like a whiskey-soaked hula: the coolest blues and country grooves resonating through Hawaiian timbres

courtesy of Mann's 14-string, solid koa, steel guitar. Lest I mislead you into thinking this is some kind of wacky novelty music, rest assured that Bare and Mann put together a well-crafted album of seriously fun tunes. It's hard to pinpoint why these styles work well together, they just do.

Blending musical styles is a difficult proposition, a fact not lost on Bare. He devoted a lot of time experimenting with different guitars, mics, amps, and mic placement in order to get the sounds to gel on tape. Fortunately, Bare had access to several guitars and vintage amps that were loaned to him for the project.

"I didn't have a lot of experience recording steel guitar," explains Bare. "We discovered pretty early on that the fuzzy guitar tones I'd normally go for with rock lead guitar didn't work next to the super clean steel guitar. So for the rhythm and lead guitar tracks, we worked to get tones that had a lot of 'oomph' and sustain and sounded real fat without being fuzzy. We'd go through every possible combination of guitars, pickups, and amps

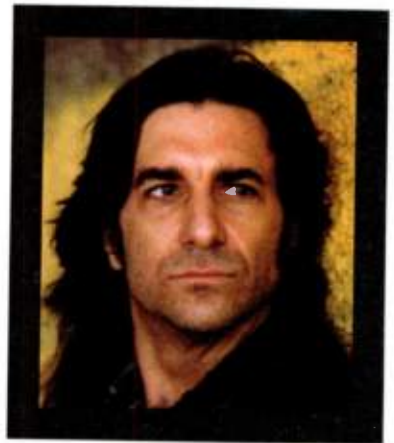
until we got a sound that really worked for that particular song. Only through time-consuming experimentation can you get it right, and every song was different."

One thing the Hula Monsters didn't have to labor over were the drum tracks. Bare and Mann were fortunate to have McCracken, known for his work with the Doobie Brothers, for the *Party Platter* project. He had an intuitive grasp of the swing beat necessary for this unique style of music. McCracken has since gone on the road with other projects, so for live gigs, Bare and Mann have had to painstakingly audition other drummers.

"The problem with this style of music is that there's an extremely narrow groove wherein lies the pocket," says Bare. "Even some of the best rock drummers cannot play hula music. It's about playing with swing and finesse without being loud."

Their live shows are a legendary embodiment of the fun, anything-goes island spirit, complete with hula dancers in grass skirts. Why go back to your little grass shack when you can rock and swing in L.A.?

For more information contact Mega Truth Records, PO Box 4988, Culver City, CA 90231; e-mail jonbare@aol.com.



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An assortment of time-based effects (including chorus, flanging, phasing, delays, pitch shifters, and combination effects) are there to add richness and life to a track. And a selection of world-class reverbs lets you place each instrument in its own perfect "space" in your mix.

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Small Plate	8 Voice Chorus	Guitar Amp 4	Inverse Expander	EQ-Flanger-DDL
Large Room	Flanger	Digital Tube Amp	Ducker/Gate	EQ-Tremolo-DDL
Small Room	Phaser-DDL	Dynamic Tube Amp	De-esser	EQ-Vibrato-DDL
Gated Reverb	Rotating Speaker	VCF-Distortion 1	Rumble Filter	EQ-DDL with LFC
Reverse Reverb 1	Speaker Cabinet	VCF-Distortion 2	Van der Pol Filter	Sine Wave Generator
Reverse Reverb 2	Tunable Speaker 1	FuzzBox	Vocal Remover	ADSR Envelope Generator
NonLinear Reverb 1	Tunable Speaker 2	Guitar Tuner 2U	Vocoder 2U	Distortion-Chorus-Reverb
NonLinear Reverb 2	Parametric EQ	Pitch Shifter	No Effect	Distortion-Plate-Reverb
NonLinear Reverb 3	EQ-Gate	Fast Pitch Shift	Plate-Chorus	Wah-Distortion-Reverb
MultiTap Delay	EQ-Compressor	Pitch Shift-DDL	Chorus-Reverb	Compressor-Distortion
Dual Delay	Guitar Amp 1	Pitch Shift 2U	Flanger-Reverb	Flanger-Reverb

inputs, two outputs, and two processors the DP/2 is equally useful as two separate mono in-stereo out effects devices or as a true stereo device utilizing both processors.

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By Greg Pedersen

RUSH LIFESON

While supergroup

Rush took a

vacation,

guitarist

Alex Lifeson

went home

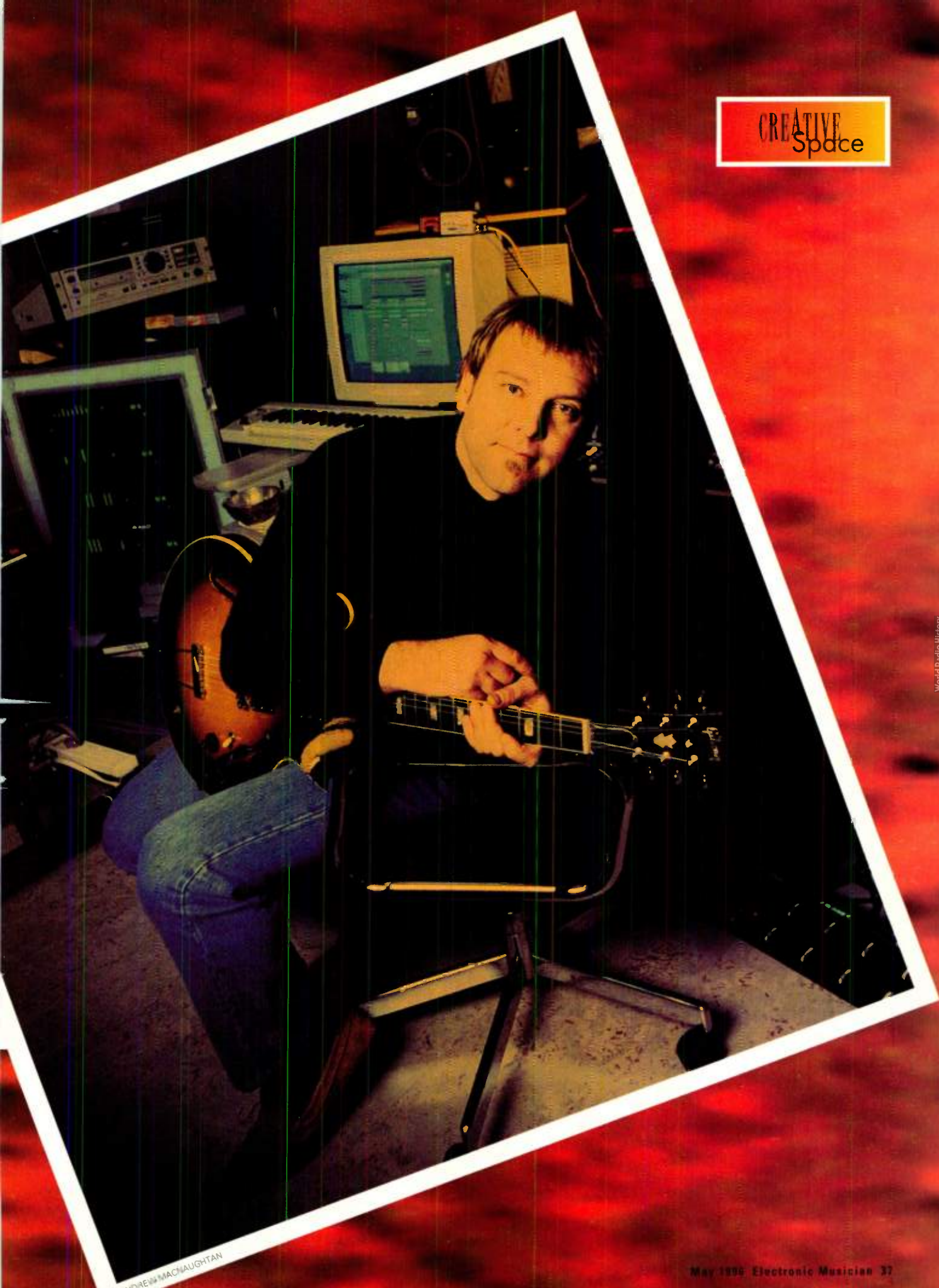
to make

a solo

album.

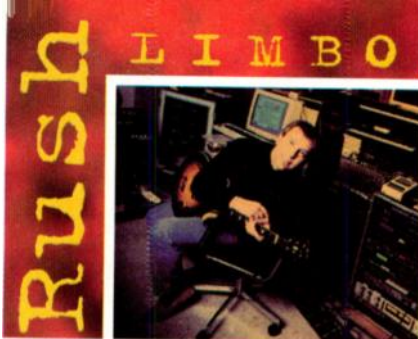
Given the fickle loyalties of the record-buying public and the constant influx of talented new artists, most rock stars are fortunate if they have careers spanning a couple of years, let alone a couple of decades. But even after twenty years, guitarist Alex Lifeson remains the central figure in the continuing success story of the Canadian power trio, Rush. His fluid guitar solos and songwriting prowess have helped the band earn enough gold and platinum albums to wallpaper the White House.

In 1994, after a grueling international tour, Rush decided to take an unprecedented year-and-a-half hiatus before starting work on a new album. Lifeson spent this period writing and recording songs at his Toronto home studio, Lrxst Sound. The result is *Victor* (Atlantic Records), Lifeson's first solo release. *Victor* is a clear departure from the exquisitely layered Rush sound, as the album's subject matter of dark, unsavory love is matched with an aggressively raw production style.



ANDREW MACLAUGHTAN

World Radio History



ROUGHING IT

The Alex Lifeson who thrills Rush fanatics is known for his elegantly chorused and overdriven guitar tones. For the *Victor* project, however, Lifeson wanted to revamp his guitar sound, seeking a starker, more modern quality. In this quest, the limitations of his personal studio actually worked to his advantage.

"My room is small and box-like," explains Lifeson, "and it generates standing waves. There's a very quick slap that isn't particularly attractive, so I couldn't get an ambient guitar sound in there. Fortunately, I didn't want one. I really wanted a more direct, in-your-face sound anyway, so we just close-miked the amps. If I wanted more separation between my [speaker] cabinets, we'd build enclosures around them using some road-case covers. Then, we would place the microphones inside the enclosure—sticking them right up against the cabinet's grille cloth—and close everything off."

Lifeson used his trusty Gibson Les Paul and Fender Telecaster to lay down the majority of guitar tracks on *Victor*. Generally, he recorded four guitar tracks for each song. Some selections feature the Les Paul raging through a JCM-series Marshall head; others fea-



ANDREW MACNAUGHTAN

Lifeson got a little help from his friends on *Victor*. Pictured left to right are Edwin (vocals), Bill Bell (rhythm guitar), Lifeson, and Blake Manning (drums). Lifeson played guitar and bass on most of the songs, with Primus bassist Les Claypool pitching in on one track.

ture the Telecaster recorded direct-to-tape with outboard preamps.

"For the miked tracks, I used a Shure SM57 and a Sennheiser MD 421—the classic mics for recording guitars," says Lifeson. "They produce a really nice, warm midrange, and the top end is punchy without being brittle. These characteristics really help when you're recording Marshalls, because the amps tend to be brittle themselves. Also, both

the SM57 and the MD 421 are very responsive to how you position them. You can move one of them a quarter of an inch and get a completely different timbre."

The direct tracks were used to add different tonal textures to the miked-guitar sounds. For these tracks, Lifeson played through a DigiTech GSP 2101 signal processor/tube preamp and a Palmer speaker simulator.

"You can get a pretty warm direct sound from the GSP 2101, but it sounds best when you blend it with amp tracks," he says. "On its own, the 2101 sounds rather small. As a writing tool for the early demo stages, however, the 2101 was quite effective. It has some great preprogrammed sounds, and you can call them up quickly."

THE QUIET ZONE

Lifeson admits that he loves it loud, but coaxing blissfully distorted tones from his arsenal of guitar amps often requires a quieter approach.

"I don't think you need excessive volume to get the right sound," he says. "In fact, in a lot of cases, cranking up the volume only means that you're overloading the amplifier's preamp stage to the point where it doesn't work

The Victor's Spoils

Here are the main tools that Alex Lifeson used to produce *Victor* in his home studio.

Console	Mackie 32•8, 16•8
Monitors	Acoustic Research AR 18; Dynaudio Acoustics BM5
Recording Media	Alesis ADAT (4) with BRC; Digidesign Pro Tools; NAD 6300 cassette; Panasonic SV-3700 DAT
Power Amplifier	Bryston B3
Microphones	AKG C 414, C 3000; Audio-Technica ATM63; Beyer M 88N; Electro-Voice RE20; Neumann U 87, KM 84; Sennheiser MD 409, MD 421; Shure SM57, SM7; Sony C-55, F-660
Signal Processors	Alesis 3630; Ashley SC50; Brooke Siren DPR 402; DigiTech GSP 2101 with Palmer PDI-05 speaker simulator; Lexicon 224, PCM 70; Neve 1073 EQ; Roland SDE-3000; t.c. electronic 2290 DDI, 1210 Spatial Expander; UREI 1176
Computer/Software	Apple Power Macintosh 7100; EMAGIC Logic Audio



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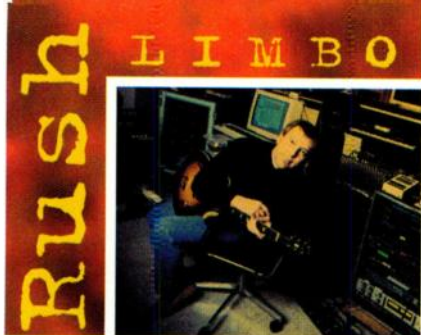
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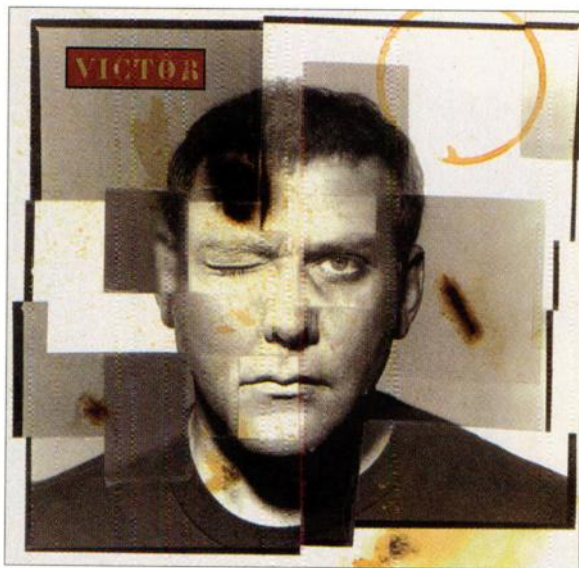
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in harmony with the output stage. You get this ugly distortion that makes it tough to get any articulation in your playing. I didn't record at very loud levels. I'd typically push the amp's preamp control to get the distortion I wanted and bring up the output control just enough to get the speakers reacting. That way, I could even use small amps with very little volume and still get a big sound."

While making the demos for *Victor*, Lifeson recorded all his acoustic-guitar parts through a Country Gentleman stick-on, transducer pickup. For the actual album tracks, he planned to re-record the acoustics by miking them in his main room. However, he was so pleased with the sound of the acoustic guitars on the demos that he used those takes for the final production.

"Initially, I didn't want to set up mics and spend a lot of time getting acoustic sounds," says Lifeson, "and I ended up really liking the direct sound. I used an inexpensive transducer, but I was able to get some beautiful sounds by running the signal into the GSP 2101 and fiddling with the EQ. On the song 'Start Today,' for example, I recorded one pass that had all the midrange frequencies yanked out. Then, I played another pass with a different chord inversion and a different set of EQ parameters. Ultimately, I overdubbed six acoustic guitars to produce a big stereo sound. For that effect, direct recording was the way to go because miking the guitars would have diluted the stereo image by also picking up six tracks of room reflections."



Lifeson decided to produce his first solo album, *Victor*, during a one-and-a-half year Rush hiatus.

DIGITAL DOMINANCE

Although Lifeson spent years working with analog tape, his personal studio is fully equipped with digital gear. He uses Alesis ADATs with BRC as well as a Digidesign 16-track Pro Tools system



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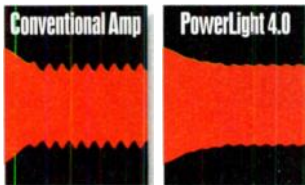
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An aluminum heat-sink tunnel designed with the maximum possible surface area transfers heat and dissipates heat.

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QSC's renowned protection circuitry is enhanced by the PL 4.0's "smart" supply which matches power delivery to changing musical demand. The 4.0's thermal management keeps the amp cool under extreme conditions (even 2 ohm loads). And with the 4.0, **EMI and RFI are absent**, making the amp safe for wireless mics.



Less power sag, less clipping intermodulation, more bass impact, cleaner transients...PowerLight.

INCOMPARABLE AMP

You won't see or hear another amp with the power and performance of the PowerLight 4.0. **Call your QSC Dealer or QSC direct at 714-754-6175** for complete details.

The front panel of the PL 4.0 features comprehensive LED status arrays, detented gain controls with soft touch knobs and 2 dB steps for easy resetting.

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4 PowerLight Models

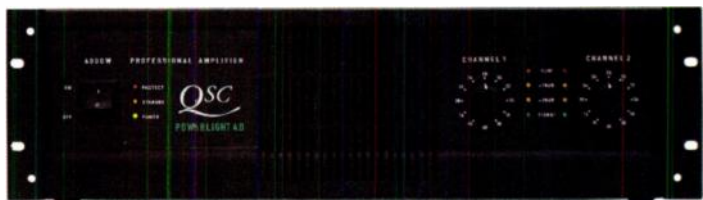
MODEL	8 Ω *	4Ω *	2 Ω **
PowerLight 1.0	200 Watts	325 Watts	500 Watts
PowerLight 1.4	300 Watts	500 Watts	700 Watts
PowerLight 1.8	400 Watts	650 Watts	900 Watts
PowerLight 4.0	900 Watts	1400 Watts	2600 Watts

*20 Hz-20 kHz, 0.1% THD, ** 1 kHz, 1% THD

PowerLight 4.0 Key Features

- ▶ *PowerWave™ Switching Technology*
- ▶ *Advanced Thermal Management System*
- ▶ *DC, Sub Audio and Thermal Overload Protection*
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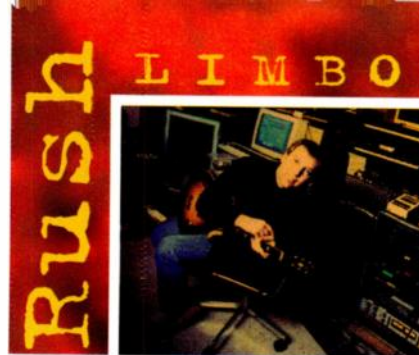
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with EMAGIC *Logic Audio* as his digital audio sequencer.

"Working with digital is great," he says. "Punch-ins are seamless, and you never hear the punch-in or punch-out. I prefer to record to ADAT at this point, although I find that I'm recording more and more to Pro Tools. From a songwriting standpoint, it's great to be able to record everything into Pro Tools and then have the ability to cut and paste sections to develop arrangements.

"Another great thing is that I can put my digital studio into flight cases and bring it to wherever Rush is recording," he continues. "Let's say there are some keyboard things we like that I did at home on *Logic Audio*. To use those tracks on the record, all we have to do is lock the sequencer to time code and fly the parts in. We've also lifted vocals from Pro Tools and flown them in. Digital recording has made songwriting more convenient and more efficient because if you get something you like, you don't have to redo it."

RUSHING OFF

The fact that Lifeson is willing to take chances with his guitar sound and his songwriting style shouldn't worry longtime Rush fans. For one thing, although he has adopted a more brutal sound for *Victor*, his guitars still bear his signature chorus effects.

"I swear I'm really trying to get away from that," he laughs. "But I *do* like what chorusing does to guitars. I often use a t.c. electronic 1210 Spatial Expander to create a wide chorus that adds a shimmering movement to the outside edges of the stereo spectrum."

But would it really be a bad thing if some of the stark musical concepts behind Lifeson's solo project crept into his work with Rush? After all, he is simply accomplishing a goal every musician should strive to achieve: he's evolving.

Greg Pedersen is a freelance writer who admits to ditching his childhood piano lessons after discovering Aerosmith.

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MAIN INSTRUMENT PLAYED _____

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Okay, bragging is too strong a word. But we are very proud when one of the most important, rule-breaking, producers in recording history has become a Mackie 8•Bus fan.

After all, Eddie Kramer's role in the making of popular music has changed its sound forever¹. His recipe? "Make a record unlike anything that's ever been heard." So, while other engineers in London were churning out England's formula Pop of the Day, Eddie Kramer was across the console from a strangely-dressed young man from Seattle named Jimi Hendrix. Together, they broke practically every

sonic and musical rule in sight. The result was an aural legacy of such originality that it still sounds amazing — even revolutionary — a quarter century later.

Eddie hasn't gotten any more conservative over the years. So it's not surprising that a man with Kramer's receptiveness to change would add a 32•8 to his creative arsenal. A mixing console that costs hundreds of thousands less than those he's worked on for most of his awe-inspiring career.



1. Including Hendrix, Led Zeppelin, Kiss, Buddy Guy, and more recently, his work with other Mackie mixer owners: Sting, David Abbruzzese, Vinnie Colaiuta, Stanley Clarke, Tony Williams, Steve Vai, and Carlos Santana.

2. He hates the location of the 8•Bus' talkback button.
3. According to Eddie, Eric Shenkman (Spin Doctors), Little Red Wagon Mobile Recording Studio, Bootsy Collins and John McEnroe have purchased 8•Bus consoles at his urging.

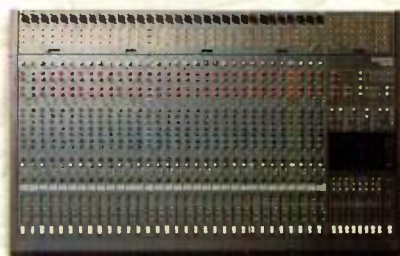


A console he says he likes for its "...sweet EQ, dynamic range, and cleanness."

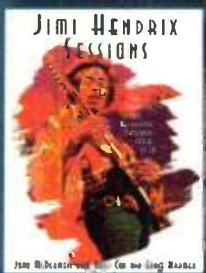
Eddie wanted to do more than just take advantage of the creative and lifestyle options afforded by the project studio revolution. He also wanted to help DRIVE it. So a year ago, we agreed to lend Eddie a 32•8 in return for his feedback. Since then, we've learned Eddie is not shy about expressing his opinions. Luckily they're mostly good².

And Eddie Kramer recommends Mackie consoles to his associates, too³. In these cynical times (when pop stars accept millions to "endorse" products they admit later to having never tried), we at Mackie Designs think that's the only kind of "endorsement" worth having.

If you're in the market for a serious but affordable mixer, we hope you'll take a close look at the only 8•bus console Eddie Kramer says is worth having.



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alien preinvasion scouts from a 1950's sci-fi flick, they've infiltrated the lives and culture of Earth-bound musicians. But these "spies" aren't Martians or Venusians, they're modular digital multitracks, and they've forever changed the balance of power between home studios and large pro facilities.

It's no secret that a savvy home recordist with an Alesis ADAT or a TASCAM DA-88 can produce audio tracks that sound magnificent. Even the pros have caved in: innumerable hit records, film and television soundtracks, and advertising underscores have been cut on MDMs. There's nothing left to prove. The invasion has been a total success.

Well, maybe not a *total* success. MDMs are bona fide audio wonder machines, but the little sprites can be frustrating at times. For one thing, the technology is relatively young, so system quirks are not uncommon. Few MDM users have escaped logging a period of downtime.

Then there's the great tape debate. The ADAT records on the S-VHS format, whereas the DA-88 uses Hi-8 mm, and everyone seems to have an opinion about which format is

more robust. Unfortunately, there currently is no conclusive evidence to prove which camp is right. And that brings us to another aspect of the MDM world: the alliance factor. Fostex and,

more recently, Panasonic have joined the ADAT team, and Sony has thrown

its support to the DA-88 forces. More manufacturers, more machines, more choices: how the heck do you decide which MDM to put into your studio?

To help answer that question, we've compiled a status report on the MDM phenomenon. We have conducted a


number of interviews with professional recording engineers, cruised several online pro-audio forums (such as the Producer's Forum in America Online's "Composer's Coffeehouse"

and the rec.audio.pro Internet newsgroup), and checked in with some independent service centers. We also queried the manufacturers to get an official word on some topics and to let them discuss *their* perceptions of the MDM market. Finally, we assembled preliminary information

on the new Fostex CX-8, Panasonic MDA-1, and Sony PCM-800.

Our mission was to collect enough real-world session data to provide a "user's overview" of each machine. We wanted insights regarding the pros and cons of available

MODular DIGital WADness



MDMs and also how each manufacturer deals with tech support and service. Finally we wanted to know about common system glitches and what type of user gravitates to a specific format. Because this isn't a product face-off, we're not drawing any conclusions for you, but we believe that the counsel of your peers can be a valuable asset, whether you're planning to re-

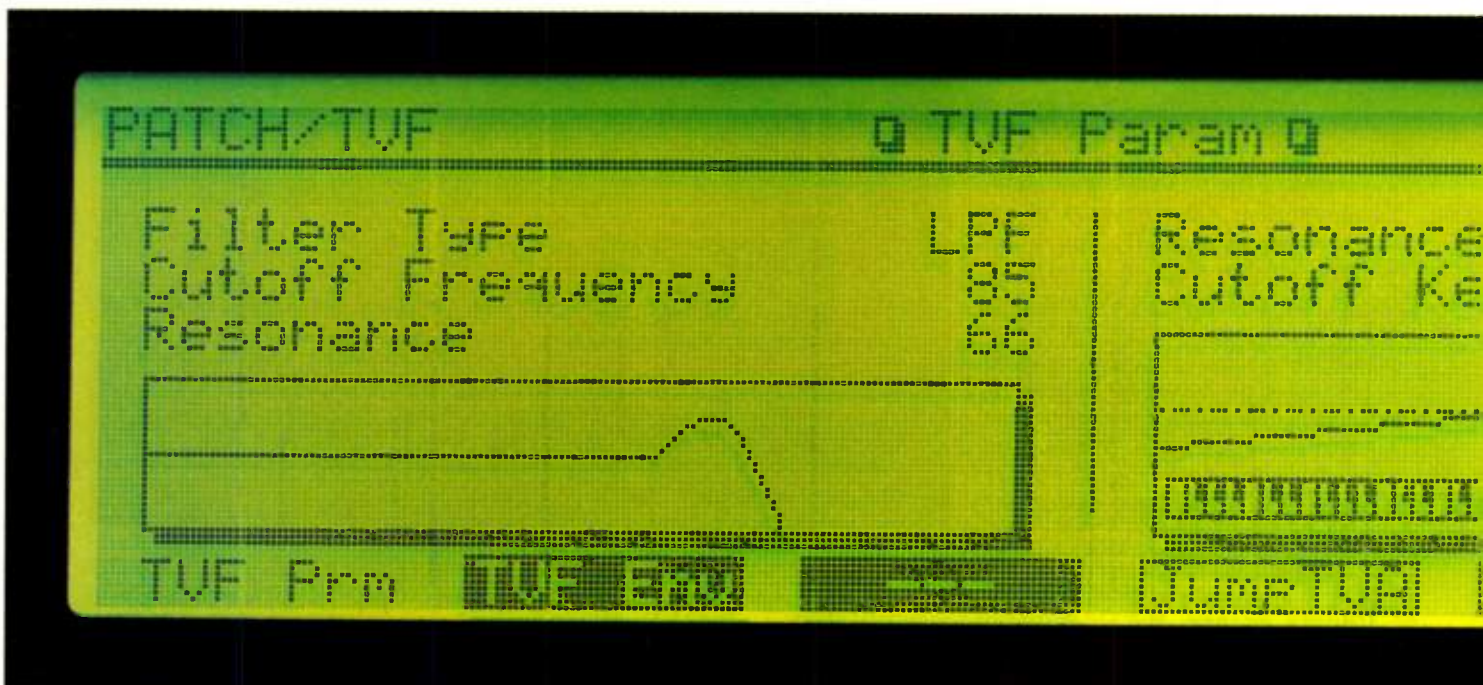
vamp a current **by Michael Molenda**

system or considering your first MDM purchase. Hopefully, you'll gain a better sense of which MDM would make a good creative partner. Knowledge is power.

A shameless display

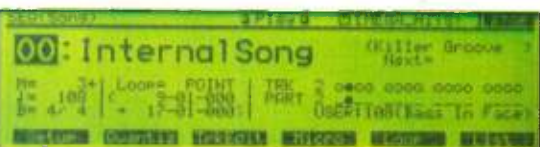
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polyphonic synth engine, massive expandability, a full featured sequencer, extensive controller features and a big, friendly 320 x 80 backlit LCD



The architecture

RISC technology provides 64-note polyphony, 16 multiimbral parts, and lightning-fast response. The fully programmable synth has a flexible architecture which includes multiple filters, ring modulation, and a unique wave booster. 640 patches give you an incredible collection of acoustic instruments and dynamic synth textures.



The sequencer

An enhanced MRC-Pro integrated sequencer provides linear, loop, and pattern recording up to 60,000 notes, groove templates, unparalleled editing power, and the ability to sync SR-JV80 beat loops.



The control sliders

Onboard sliders provide a variety of useful functions including automated mixing, on the fly sound editing and more.



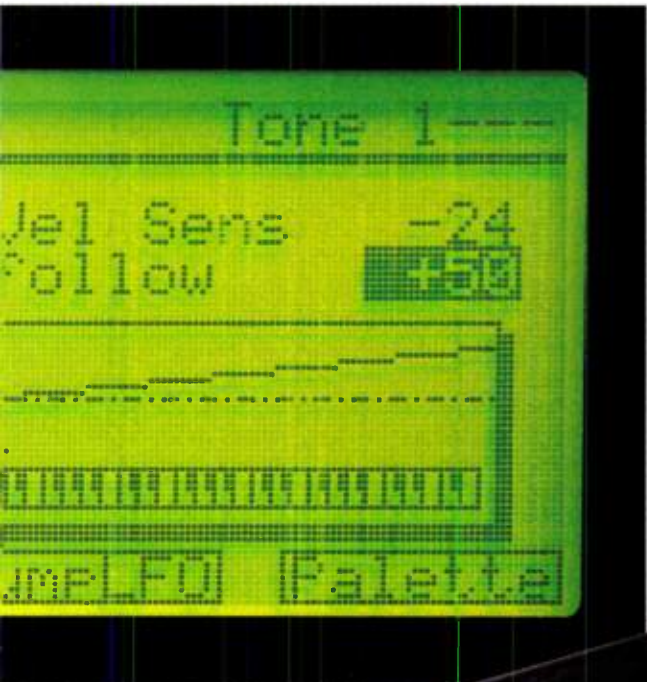
The effects

This graphic interface makes it easy to enhance your sounds using the three onboard effects processors. Select digital reverb, chorus and a multi effects processor which includes rotary, pitch shifting, auto wah, overdrive, delay and more.



of power.

display that shows you everything except the evening news, what is there for us to feel sorry for? Except maybe, the competition.



Much more than filler

Easily accessible performance options include Roland's RPS which allows full-blown sequences to be triggered from individual keys. The programmable arpeggiator has 32 musically useful styles which can be synced to the sequencer, including guitar strums and picking, slap and synth bass patterns, all with variable accents and swing.

Mind expansion 101

Nine expansion boards are available for the XP-80. Each board contains 8MB and up to 255 patches of all new sounds. And you can access up to four expansion boards at once, including the new SR-JV80-09 Session board.

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possible for Fostex's quality-control department to discover problem machines before they went out the door. In fact, every single machine that Fostex sells gets thoroughly examined before it's shipped.

Reportedly, Fostex learned a hard lesson when the first RD-8s developed some problems in the field. To bolster quality control, the company resolved to open every box and check each unit on the bench. The CX-8's stability was also helped by the fact that Alesis had solved most of the XT problems before units began shipping to Fostex.

Service station. In addition to its U.S. "home office" in Norwalk, California, Fostex uses an extensive national network of independent service centers. For machines under warranty, all parts and labor are free. The user prepays for one-way shipping to Fostex, and Fostex pays for return shipping. For machines that are no longer under warranty, a nominal hourly rate is charged along with any parts costs.

Service periods vary depending on the problem and the overall workload. Pro users are often able to get speedier repairs if they call the service manager directly. Typically, provisions can be made to get pro machines back on the job as soon as possible.

Update access. As system software updates are released, EPROMs will be sent to users for do-it-yourself installations. It is critical that CX-8 owners send in their warranty cards to ensure they receive updates. Fostex distributes the software revisions by simply pulling the CX-8 warranty cards and mailing the EPROMs to the listed addresses. In other words, if you snooze, you lose!

PANASONIC MDA-1

As Panasonic has produced some awesome professional DAT machines and video decks, power ADAT users are looking to the release of the MDA-1 with more than a bit of anticipation. However, the MDA-1 is cut from the same mold as the XT and the CX-8. The only differences are cosmetics and connectors.

Vive la difference. Panasonic opted for XLR connectors to handle the balanced, +4 dBu analog I/O. This is a way cool idea, as it ensures compatibility with any studio or recording situation. After all, everybody has XLR cables handy, which is certainly not the case with the often-expensive multipin connectors required by the XT and the CX-8. (The high-quality ELCO connectors I bought from Clark Cable for my XTs cost \$325 each!) This configuration makes the MDA-1 a great choice for mobile recording and for studios that do not wish to commit to a specific multipin connector.

The XLRs also make the MDA-1 the perfect "spare" (provided, of course, that you can afford a standby machine). For example, if you want to add eight tracks to your project, all you need are sixteen XLR cables to press the MDA-1 into service. You don't have to buy the extra XLRs, either. Most musicians can beg or borrow that many cables from friends.

Furthermore, the MDA-1's XLR outputs are servo balanced *and* capacitor

extensive repair network, but service policies for the MDA-1 were not finalized at press time. Initially, repairs will be handled exclusively by Panasonic's four U.S. factory service centers. Then, once training programs are in place, the company's independent repair shops will be authorized to perform MDA-1 service.

Update access. As with the service policies, a final plan has not been developed regarding software updates.

SONY PCM-800

The fact that TASCAM's DA-88 has a virtual choke-hold on post-production audio must have intrigued the mammoth Sony Corporation, one of the premiere manufacturers of professional video equipment. Obviously, having their own MDM would make the "all Sony" editing suite an attractive option for studio managers who have trusted the Sony name for years. In any case, the Sony alliance is a huge boost for the Hi-8 mm MDM, and Sony's version of the DA-88, the PCM-800, should further increase the format's absolute



Panasonic MDA-1

coupled; the XT's balanced outputs are not terminated with capacitors. The end result of this design change means little to the machine's operation and sound quality, but it still counts as an enhancement.

Current events. Panasonic plans to release the MDA-1 this spring, possibly by the time you read this. The retail price will be \$3,495. No options have been announced yet, but you can be certain that some type of remote controller will be forthcoming.

Service station. Panasonic has an

dominance of the audio post-production market. Talk about a slam dunk!

Vive la difference. The PCM-800 carries its pro audio status very seriously, so it doesn't offer unbalanced -10 dBV RCA connectors. It goes with +4 dBu, balanced XLR connectors all the way. Again, using XLR connectors is a very slick way to ensure that the machine is compatible with most all studio- and live-recording situations.

A more critical difference between the PCM-800 and the DA-88 is the fact that Sony drop-kicked the TDIF-1

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(TASCAM Digital Interface) connector used by the DA-88. Instead, the PCM-800 uses DB25 multipin ports to carry eight channels of AES/EBU digital information on stereo pairs. Direct digital audio transfers between the PCM-800 and the DA-88 are therefore impossible without TASCAM's optional IF-88AE AES/EBU interface.

Current events. The PCM-800 is the most expensive member of the MDM brigade, retailing for \$5,995. Options include the RM-D800 remote control (\$1,500) and the DABK-801 sync board (\$800). The current system-software version for the PCM-800 is 1.12.

Gremlin watch. At press time, there were virtually no online complaints about the PCM-800. Scattered critiques regarding Sony's implementation of the Hi-8 mm format were mixed. Some users liked the PCM-800 better, whereas others complained that the machine really doesn't "improve" on the DA-88. Interestingly, a few posts commented that they preferred the *sound* of the PCM-800 to the DA-88, claiming that the DA-88 sounded "darker." Both machines, however, employ the exact same analog-to-digital (Crystal Semiconductor) and digital-to-analog (Analog Devices) converters.

Service station. "We're a service-oriented company," says Sony Product Manager Tim Derwallis, "so one of the PCM-800's main selling points is its service backup."

The PCM-800 is assigned to the same national network of regional service centers as Sony's broadcast and pro-audio divisions. There is no blanket policy for service problems, as each repair is dealt with on an "urgency of problem" basis. According to Derwallis, however, the typical service turnaround is between one to five working days.

Update access. ROM-only updates are announced via tech bulletins that are sent to Sony dealers and PCM-800 owners. (Once again, don't forget to send in those warranty cards if you want your updates!) The new EPROM can be ordered as a "no charge" part to be installed by the user.

TASCAM DA-88

The DA-88 is the undisputed monarch of the audio post-production community. Any soundtrack composer, sound designer, or jingle producer bringing finished tracks right into the post house better have them recorded on this machine. In fact, the DA-88 has such a dominant presence in film and television production that it won an Emmy—yes, an *Emmy*—for Outstanding Achievement in Engineering Development.

In the home-studio world, however, the DA-88 is not nearly as dominant. The ADAT beat the DA-88 into stores and also maintained a lower retail price, which helped Alesis capture a mammoth share of the musician's market. Put bluntly, a musician who owns a DA-88 will have a harder time finding compatible MDM partners to make backups and trade tapes.

But things may change dramatically this summer when TASCAM unleashes *its* musician's machine, the DA-38. Price will no longer be an issue, as the DA-38 will list for \$3,499. In addition, many of the DA-38's features are aimed at the working environment of the typical home or project studio. These goodies include an electronic patch bay that lets the user route any input to any track, digital track copying, and an optional MMC-38 interface that offers MIDI Machine Control and outputs MTC or LTC. Of course, the DA-38 is fully compatible with the DA-88 and the Sony PCM-800. Yep, it may be one hot summer for MDM disciples!

Current events. The retail price for the DA-88 is \$4,799. Options include the RC-808 basic transport remote (\$225), the RC-848 full-function, multiple-unit remote control (\$1,599), the SY-88 Sync Board (\$849), and the IF-88AE Digital Interface for AES/EBU and S/PDIF (\$1,149). The current system-software version for the DA-88 is 3.10. The current software version for the RC-848 is 3.01, and the SY-88 is now at version 3.19.

Tape debate. Hi-8 mm is obviously a newer technology than VHS. This doesn't necessarily mean that it is *better* than VHS, but there are definitely a few improvements. For example, Hi-8 mm tape follows a more direct path to the rotating head than its VHS cousin and, unlike VHS cartridges, Hi-8 mm cassette shells are completely sealed. Which format has more robust data-storage capabilities? It's too soon to tell. More than a few engineers have wondered aloud whether *any* of these digital tape formats will still be playable in ten or twenty years. Here's my advice: always make at least two backups of critical masters.

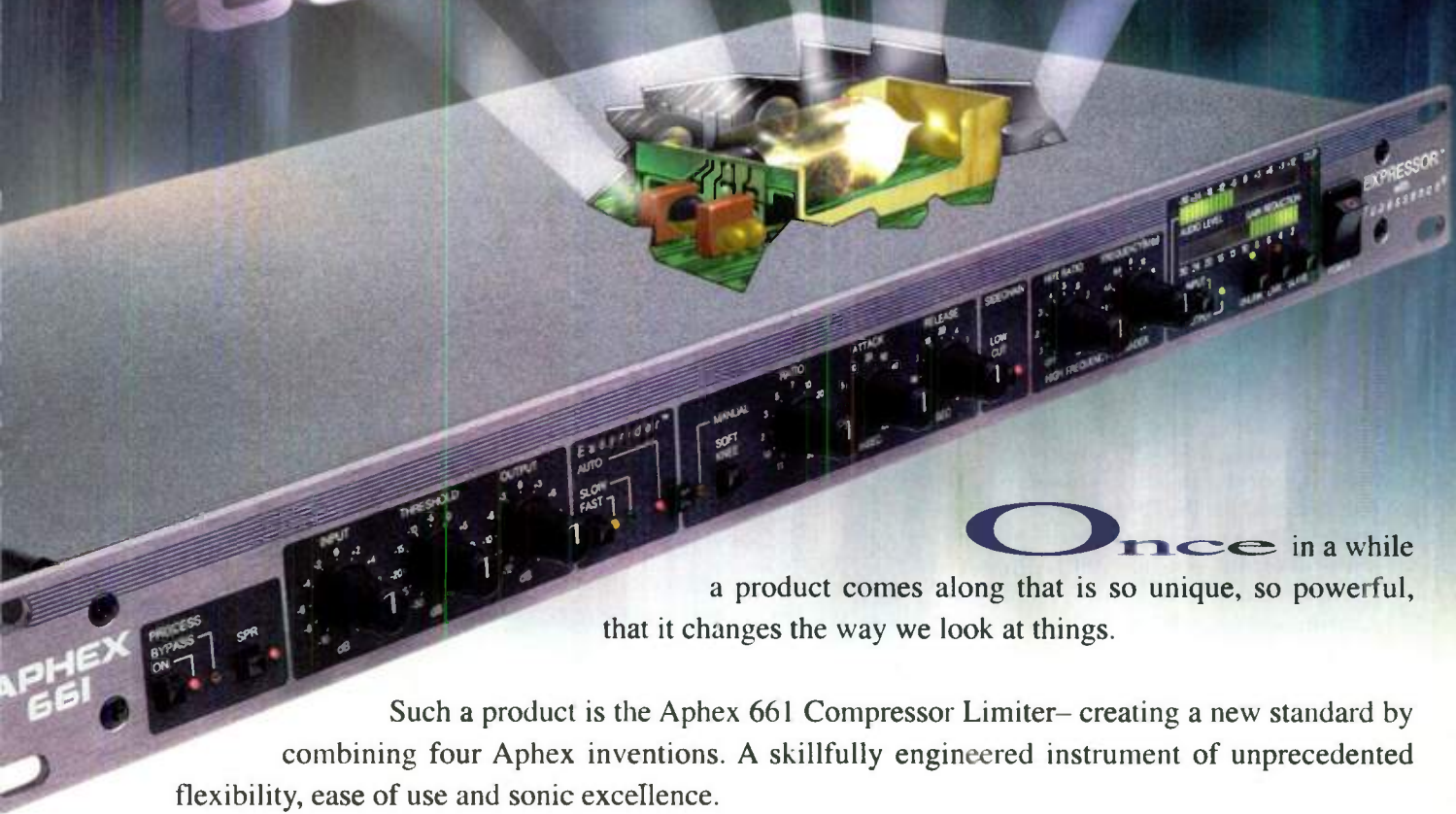
Gremlin watch. Online posts from DA-88 users report occasional data dropouts, digital spikes, and audible clicks. According to Neal Faison of TASCAM technical support and customer service, these glitches are often traced to bad tape or dirty heads.

"We don't see a lot of this type of problem with audio post users because they're already acquainted with the care of rotary heads," he says. "They



Sony PCM-800

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clean their video-deck heads all the time, so they just add the DA-88s to their maintenance routine. Manual head cleaning is something that every user can do to improve performance. However, TASCAM doesn't publish anything on this operation because text directions are no help—you must be *shown* how it's done. A visual cleaning lesson is essential because you can damage the heads if you do it wrong."

As far as finding "good" Hi-8 mm tape goes, TASCAM doesn't recommend any specific brand, but they do suggest using MP formulations. However, the subject of which tapes produce the least number of dropouts is regularly debated in online forums, where Sony is often mentioned as a safe choice. In addition, a casual survey of post-production engineers revealed that many post houses swear by 3M's AHD113 or Maxell's HMBQ series.

Service station. Faison states that typical factory service takes ten to fifteen working days. Of course, the service period can shrink or expand depending on the department's work load. For warranty work, the user must prepay for shipping to TASCAM (or an authorized service center), and the manufacturer will pay for the return shipping.

Pro users can generally expect a 5- to 8-day turnaround. Faison typically discusses the problem with the pro user and ensures that a letter detailing the machine's service needs will be attached to the unit when it reaches the repair center. TASCAM is also beginning to open regional service centers, and soon customers will be directed to send malfunctioning DA-88s to the closest facility.

In addition, TASCAM offers a "fax back" service that provides a quick, easy way to pick up an operational reference guide for the DA-88, SY-88, and RC-848. Simply call (800) 827-2268 and request Document #1120.

Update access. Registered owners receive free software updates. As most DA-88 users do their own maintenance, TASCAM usually mails out an EPROM

with instructions for a do-it-yourself upgrade. Also, whenever a machine is sent in for service, it is automatically upgraded to the latest software version at no extra charge.

GOOD THINGS

One of the inspirations for attempting this "State of the MDM" feature was the amount of grumbling I often hear (and *see* in online forums) about the hassles of dealing with these beasts. It seems that even semiprofessional users expect MDMs to perform as flawlessly as the expensive analog multitracks that reside in big, megabuck studios. The "whine squad" complains about sync problems, transport problems, and maintenance downtime as if Studer and MCI 24-track decks never suffer the same fate. They do. Even professional engineers and producers—who should know better—seem surprised when an

machines are certified marvels that have helped expand the community of audio-savvy recordists.

Simply put, the existence of MDMs has given more people access to better sound. Today, the young artists I produce are critically aware of audible hiss and audio quality. This was not the case even five years ago, when the demo experiments of ambitious bands were limited to cassette ministudios. As a result, few up-and-coming acts questioned (or understood) the sound-sculpting decisions of big-studio engineers. Now, many of these acts are using MDMs to make demos that sound so amazing, the tracks are often used on the final, major-label release.

In this changing audio world, the "studio" has been demystified, and I think that's a good thing. I believe that when artists are not intimidated by technology, they are free to concen-



TASCAM DA-88

inexpensive MDM doesn't perform as ruthlessly vigorous as one of the \$30,000 dream machines.

It should be painfully obvious that such comparisons are unfair. The current family of MDMs range in price from \$3,450 to \$5,995. They were born less than five years ago. I don't think these "infants" can be expected to measure up to expensive analog systems that have been bullied in the studio trenches for more than 30 years or so.

Let's face it: *every* emerging technology has its quirks. MDMs are certainly not innocent of frustrating glitches. But, as my dad always says, "the good points override the bad." All of these

trate on what they're trying to communicate and ultimately produce more passionate works. So, whenever you hear a new record that literally explodes from your speakers, awash with intense, unfettered personality, remember to thank Alesis and TASCAM for blowing the doors off the temples of audio snobbery. The people who made that record probably forged their inspiration on an ADAT or DA-88 before "going public." Lucky you.

EM Editor Michael Molenda recently opened *Tiki Town*, a brand new production studio with noted producer and tiki expert, *Scott Mathews*.

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▶ Software Upgradable Hardware Design	New HARDWARE features can be added from software, such as 24 bit audio & more!	✓	✓	✓
▶ Multi-Track Transfer Mode	Free up CPU time! Increase multi-track software performance! Do 24 bit SRP (w/software upgrade) ...	✓		
▶ Shielded Transformers	Reduce common-mode noise and clock phase jitter.	✓	✓	
▶ Flexible Ground Strapping	Achieve optimal grounding configuration.	✓	✓	
▶ Independent Master or External Sync Clock	Maintain sync during SRP for internal digital mixdowns... Sync [analog &] digital output to an external clock.	✓	✓	✓
▶ Multiple Card Support	Use multiple Multi!Wav Digital cards in one PC.	✓	✓	✓
▶ 256/512 Bit Upgradable RAM FIFO Buffer	Improve performance by reducing sensitivity to hardware underruns & overruns.	✓	✓	✓
▶ I/O Overload Protection	Protect against misconnection of I/O up to 50 VDC.	✓	✓	✓
▶ LC Filtered Analog Supply	Improve receiver PLL performance by reducing noise.	✓	✓	✓
▶ Multi-Layer PCB	Improve performance by reducing "digital" noise.	✓	✓	✓
▶ 64 Selectable Addresses	Eliminate hardware installation conflicts.	✓	✓	✓
▶ Professional Sample Rates	48kHz, 44.1kHz, 32kHz (software selectable).	✓	✓	✓

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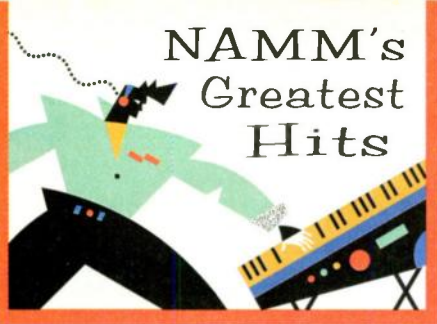
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MODULAR HARD-DISK RECORDERS

One of the most significant themes of this year's NAMM show was the continued development of modular hard-disk recorders. These products offer excellent audio quality, the ability to back up to DAT or via SCSI, better portability than desktop computer systems, more editing power than MDM tape decks (though less than computer-based solutions), and a familiar, tape recorder-like user interface. NAMM attendees discovered new machines for studios on modest budgets as well as for the big spenders.

Since Akai first attempted to address this market in 1993 with the DR4d, at least eight more portable hard-disk recorders of assorted flavors have arrived from five companies: Akai's DR8 and DR16, E-mu's Darwin, Fostex's DMT-8, Roland's DM-800 and VS-880, and Vestax's HDR-6 and HDR-8. All were prominently shown at NAMM. Clearly, portable hard-disk recording is a fast-growing product category.

Roland's VS-880 Digital Studio Work-

station is the newest member of the club and our choice for the number-one smash hit of the 1996 Winter NAMM show. This midpriced hard-disk recorder includes a digital mixer that, like the more expensive DM-800, combines traditional faders and knobs with buttons and an LCD. With the VS-880, it is much easier to afford Roland hard-disk recording technology than ever before. In response, on the final day of the NAMM show, Fostex sweetened its deal by slashing the DMT-8's price from \$2,795 to \$1,995.

The ministudio-style VS-880 features eight discrete tracks. Each of the eight discrete tracks contains eight layered virtual tracks, so you can assign any one of eight takes per track during editing and mixdown.

The system uses 18-bit DACs and ADCs and samples at 48, 44.1, or 32 kHz (selectable). You can cut, paste, copy, move, insert, and delete any audio segment and insert 1,000 locate markers per Song, which can be recalled through numeric keys. The unit can store a total of 200 Songs on disk. All edits are nondestructive, with up to 999 levels of Undo. The unit syncs to MIDI Clock, MTC, or MMC, and locations can be displayed in absolute time or measures.

One of the VS-880's most apparent strengths is its all-digital mixer, which

offers eight physical channels (with faders). You can simultaneously record six external signals via a stereo pair of S/PDIF (RCA) digital inputs and four analog inputs (on unbalanced 1/4-inch and RCA jacks). Eight internal buses route the disk tracks, so you can mix up to fourteen signals. S/PDIF and analog master outputs are provided on RCA connectors.

All mixer settings can be saved as one of eight snapshot Scenes and can be recorded in real time via MIDI. The unit offers eight channels of 3-band parametric EQ for tracking, which can be reconfigured as fourteen channels of 2-band EQ for mixdown. There are two aux sends (on RCAs). Other features include playback-time compression/expansion (75% to 125% of the original) and Preview/Scrub.

The VS-880 comes with an external SCSI connector and either a 540 MB IDE internal hard drive (\$2,495) or an Omega Jaz 1 MB removable drive (\$2,895). You can also use the S/PDIF outputs for archiving to audio DAT.

The optional VS8F-1 Effects Expansion Board (\$395) can be addressed via two internal stereo buses. It provides 100 user programs and 100 preset effects, including reverbs, delays, COSM (modeled) amp simulation, RSS 3-D, and dynamics processing.

PC-BASED DIGITAL AUDIO

Although modular hard-disk recorders have many advantages, professional recordists who do extensive audio editing generally use computer-based hard-disk recording systems. Most, though not all, of the leading systems of this type have been built around the Mac. The Mac has been especially dominant in studios that integrate MIDI sequencing with hard-disk recording. This time last year, only one digital audio sequencer (Steinberg's *Cubase Audio*) even existed for the PC, and it worked with only one high-priced DSP/converter system (Yamaha's CBX-D5).

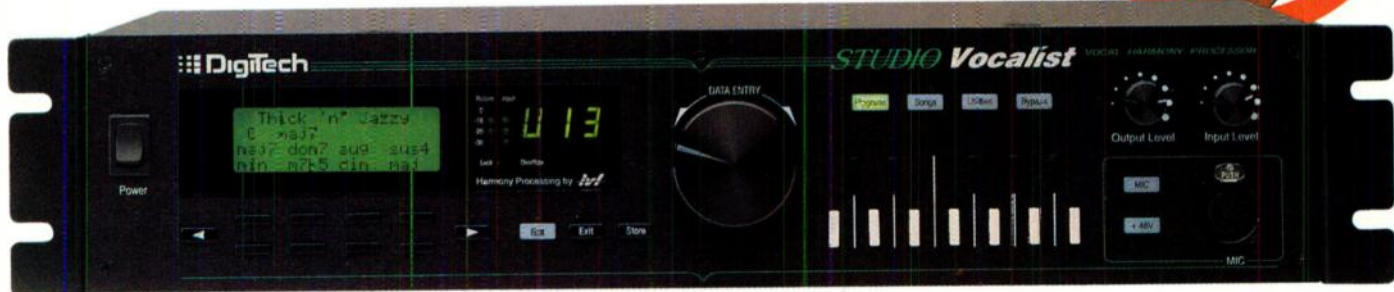
All that has changed, thanks to an influx of new products and a bevy of upgrades. Let's start with two new digital audio recording hardware/software packages for the PC.

Although it has existed in Europe for more than four years (it was developed in Germany), CreamWare's tripleDAT (\$1,798) has just recently been released in the United States. The system comprises an audio card and *tripleMAGIC*



Roland VS-880

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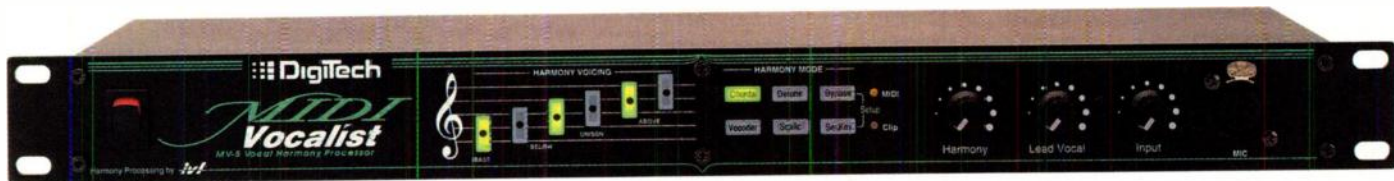


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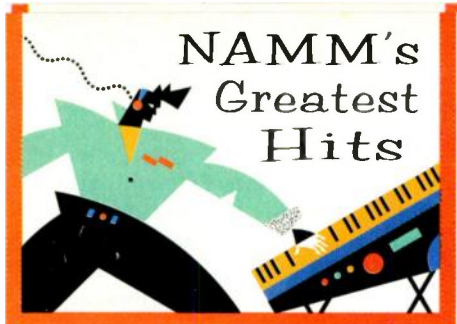
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NAMM's Greatest Hits



Center for Computer Research in Music and Acoustics (CCRMA). On-screen graphic sliders provide control over the synth parameters, and a software editor is scheduled for release during the second quarter of this year.

The 16-part multitimbral *Reality* is General MIDI compliant, and other sounds can be easily added. A specially optimized reverb algorithm is included. Polyphony varies as a function of CPU speed, topping out at approximately 64 voices. The type of sounds you choose also affects the amount of CPU time required; for instance, waveguide sounds take more CPU time than PCM sounds.

DIGITAL MIXING SYSTEMS

Until Yamaha introduced the ProMix 01 (reviewed in the February 1995 *EM*) and 02R (see the August 1995 "What's New" column), digital mixers were a tool for the very rich. But the ProMix lacks digital inputs and has only one S/PDIF output, and the much more powerful 02R (which started shipping as of NAMM) will set you back almost \$10,000.

Korg is hard at work trying to bring quality digital mixing with multitrack digital I/O to the rest of us. Its new SoundLink DRS-series products, scheduled for release this summer, garnered much attention at the NAMM show. The centerpiece of the series is Korg's 168RC (\$3,500), an all-digital, fully automated, 16 x 8 x 2 mixing console that features two ADAT optical inputs (sixteen channels) and eight analog inputs with 18-bit A/D converters.

The analog inputs are configured as

two mic inputs on XLRs with phantom power; two mic inputs on balanced, TRS 1/4-inch connectors; four line-level channel inputs on 1/4-inch TRS jacks; and two analog tape returns on RCAs. All four mic inputs have 20 dB pads and insert points. A routing matrix assigns the 24 inputs to mixer channels or internal buses.

The 168RC offers two ADAT optical outputs; one handles the eight subgroup outs and the other goes to the 16 x 8 routing matrix for expansion or external processing. An S/PDIF output carries the main L/R mix, and there are seven analog outputs, including the main L/R mix, two aux sends, the L/R monitor outputs, and the stereo headphone outs. For those who need more analog inputs and outputs, Korg will offer the optional 880 A/D (\$1,200) and 880 D/A (\$1,000) interfaces, which provide eight channels of audio conversion for the ADAT interfaces.

Each of the sixteen mixer channels includes interface select, level, pan, two aux sends, two effects sends (which feed the internal processors, discussed in a moment), solo, mute, and output assignment. The first twelve channels have dedicated faders and 3-band EQ, configured as semiparametric (i.e., with level and frequency controls but not bandwidth) high- and low-shelving bands and a fully parametric midrange band. Memory is provided for 30 EQ setups.

The 168RC also sports two effects processors that deliver 32 types of effects, including reverb, delay, pitch shifting, dynamics processing, and speaker simulation. It comes with 50 user-editable effects presets. The effects outputs are routed via an internal matrix.

Almost everything in the console, including routing and configuration set-



Interactive Light Dimension Beam

tings, can be saved to the 168RC's 100-Scene internal memory. These Scenes can be recalled from the front panel or via MIDI Program Change. In addition, all of the parameters can be controlled in real time via MIDI, so you can use a sequencer to completely automate your mix.

The other SoundLink DRS product that elicited much comment at the show is Korg's 1212 I/O PCI Multi-Channel Audio Interface (\$1,250) for the Power Macintosh. This PCI card, which was initially developed by OSC, provides twelve I/O channels for the Power Mac, configured as two channels of analog I/O on 1/4-inch TRS connectors, one ADAT optical interface, and a stereo S/PDIF I/O on a mini-DIN connector that attaches to a breakout cable with RCAs and a BNC word-clock input. Like the 168RC console, the card can be used with the optional 880 A/D and 880 D/A interfaces.

With the 1212 I/O card and any Sound Manager 3.0-compatible hard-disk recording software (such as Macromedia's *Deck II*, which is bundled with the card), you can use the Power Mac's digital audio capabilities without being limited to the computer's stereo I/O and mediocre converters. Equally important, you can route multitrack digital audio between your Power Mac and an ADAT or other products with the ADAT optical I/O.

WEIGHTED 88-KEY CONTROLLERS AND SYNTHS

We were surprised at the number of new 88-key weighted controllers and synthesizers at the show. Sure, we expected to see Korg's Trinity ProX and Kurzweil's K2500X 88-key synths; after all, they were announced some time ago. (The Trinity ProX was announced in the October 1995 "What's New." The



E-mu Systems E4K

SOUND PROCESSOR

WAVE EDITOR

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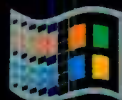
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NAMM's Greatest Hits



K2500X was announced in the May 1995 "What's New," and the 61-key version is reviewed on p. 129 of this issue.) The main news on these products is that they're shipping.

What we didn't expect were new 88-key weighted keyboards from Alesis and Roland. Alesis showed a prototype of its 88-key QS8, which features the same synthesis engine as the QS6 synth (described in the October 1995 "What's New"). Although it has all of the same features (including a Mac/PC serial interface and support for Alesis' *Sound Bridge* sample-transfer software), the QS8 is more than an 88-key QS6: it also has new sounds, four sliders (the QS6 has one), an ADAT optical output, two simultaneously available PCMCIA slots, and two assignable continuous pedals. The keyboard action was built by Fatar, which manufactures the actions for most weighted-action keyboard instruments. The QS8 should be available by the beginning of May.

An even bigger and very pleasant surprise was Roland's A-90 and A-90EX. Roland hasn't offered a new 88-key controller since the venerable A-80 hit the scene back in 1989, so a new controller was long overdue. This thing looks like a killer product. It is Velocity and Channel Pressure sensitive and features Roland's PA-4 hammer-action, cantilever-based keyboard. It can store 64 user programs in onboard memory, and you can store another 64 with the addition of an optional M-512E RAM card (\$129).

The A-90's user interface resembles that of Roland's JD-800 synth, with large, dedicated buttons that directly access many of the most important functions. A separate set of controls is provided for use with an external sequencer. You get a pitch-bend wheel, a mod wheel, four sliders, and a re-designed bend lever that defaults to pitch bend and modulation. All the controllers are fully programmable.

Perhaps the biggest complaint about the A-80 was that when you changed programs, it always reset the slider values so that the sliders' apparent (physical) positions became meaningless.

With the A-90, however, you can choose whether the sliders will be reset or retain their apparent values.

With its four independent MIDI Outs, the A-90 can control up to 64 MIDI channels. It also has two MIDI Ins, which can accept A-90 SysEx info or merge incoming data with the A-90's data, routing the combined datastream to the MIDI Outs. The keyboard can be divided into eight zones, which can be configured as eight external zones (i.e., controlling external sound modules) or as four external zones and four

internal zones. The internal zones control the optional onboard sounds.

You can add sounds to the A-90 by plugging in Roland's new VE-RD1 64-Voice Piano Expansion Board (\$545), which can be quickly and easily accomplished with a screwdriver. This turns the A-90 into an A-90EX (\$2,995). The 64-voice polyphonic expansion board provides 128 editable preset sounds as well as onboard effects. Roland is particularly proud of its new "true stereo" piano sample. The effects include reverb, chorus, delay, and

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more. The A-90's expansion slot can also accept Roland's other VE-series expansion boards.

KEYBOARD WORKSTATIONS

Despite reports of slowly diminishing sales in recent years, many manufacturers appear bullish about keyboard workstations (keyboard synths with effects and a sequencer). In addition to the Korg Trinity and Kurzweil K2500, we saw Technics' recently released WSA1 (reviewed in the March 1996 *EM*) and Roland's new XP-80.

The XP-80 (\$2,595) has all the hallmarks of another winner for Roland, who had more than its share of hot new products at the show. (I'll turn you on to yet another cool Roland gadget shortly.) It features the same 64-voice polyphonic, 16-part multitimbral synth engine found in Roland's well-received XP-50 (reviewed in the September 1995 *EM*) and JV-1080 synth module.

The new synth workstation has 8 MB of onboard ROM samples and features four expansion slots that accept SR-JV80 series expansion boards. Each expansion board adds another 8 MB of sounds, so you can expand the XP-80's sound ROM all the way to 40 MB, which provides more than 1,500 sounds. The sounds can be routed to a pair of independent outputs in addition to the main audio outputs. The unit's built-in effects processor offers 42 insert effects, including reverb, chorus, dual pitch shift, distortion, and ring modulation.



Waldorf Pulse

The XP-80's MRC Pro sequencer is GM compatible and supplies sixteen primary tracks (not including the separate tempo track), each of which can send on sixteen MIDI channels. The sequencer features loop recording, shuffle and grid quantize, and Roland's Realtime Phrase Sequencing (RPS), which lets you assign entire 16-part patterns to individual keys for triggering on the fly. A new Nonstop function allows you to change parts during recording, without exiting Record mode.

You can store 100 patterns or one Song (which can contain up to 60,000 notes) in onboard memory. Up to 180,000 notes can be saved to disk via the unit's 3.5-inch floppy-disk drive, which reads MRC Pro, S-MRC, and Standard MIDI Files. The sequencer can read songs directly from disk in real time; no more waiting for songs to load. The XP-80 sends MIDI Machine Control (MMC), so you can control via remote the transport of an MMC-compatible audio recorder (including the VS-880) in sync with the sequencer.

The unit's 76-note, semiweighted keyboard is mounted in a solid metal chassis. The user interface features a large (320 x 80, full-dot), backlit, graphic LCD and several dedicated function buttons. In addition to the usual assignable pitch-bend/mod lever, there are four assignable pedal jacks and four assignable sliders for real-time tweaking.

The XP-80 has several additional special features, including an onboard arpeggiator and a dedicated Click Out with volume control, which can be used to help steady your drummer's tempo in live performance or provide a click track for rehearsals and recording.

E-mu raised a few eyebrows by offering its first new keyboard sampler since the Emax II in September 1989. This time, the company went high-end, adding a 76-note, semi-weighted, Velocity and Channel Pressure sensitive keyboard to an enhanced version of its Emulator IV sampler (reviewed in the November 1995 *EM*).

The E4K is available in 64- and 128-voice versions (\$3,995 and \$4,895, respectively), and the 64-voice version can be up-

graded to 128 voices with a plug-in option board (\$995). It offers 16-part multitimbral operation and comes with 4 MB of sample RAM, expandable to 128 MB via 72-pin SIMMs. Audio can be routed to any of eight analog outputs (including the balanced L/R main outs) by plugging halfway in, as with E-mu's Proteus modules, which mixes the incoming signal with the sampler's output. The unit also has S/PDIF digital I/O.

The instrument includes four faders that allow real-time timbral modification and features a "Thumbby" button, which is a thumb-sized switch mounted next to the pitch-bend and mod wheels that can control any E4K switch parameter in real time.

The E4K features E-mu's Digital Modular Synthesis, which essentially consists of extensive mappings of control sources to sets of synth parameters, with a choice of 58 sources and 55 destinations. You can have one DMS setup per voice up to the unit's polyphonic limit. By moving one controller, you can alter multiple parameters that you think will work well together to create practically useful timbral shifts.

The sampler comes with a 270 MB internal hard drive loaded with more than 150 MB of samples. A new SoundSprint feature allows you to quickly load presets into memory from any attached SCSI volume as you browse through the sounds, so you can play the sounds almost as if they were in ROM. You can even mark sounds with BookMarks and instantly call them up with the Preset keys.

An 18-bit discrete stereo effects processor comes standard and offers reverb, delay, flanging, chorusing, early reflections, and panning. These effects can be controlled with the faders and routed via the unit's internal patch bay-tree matrix.

Strictly speaking, the E4K isn't a keyboard workstation because it doesn't have a sequencer that lets you record your parts. However, it does have a Standard MIDI File reader/player that can play type 0 and 1 SMFs. Sequences can be stored and loaded as E4K banks or treated as separate objects. In addition, the E4K can act as an MMC controller for an external sequencer.

IF IT QUACKS LIKE A DUCK . . .

In our November 1993 issue, Paul Lehrman wrote an insightful and typically pithy review of Jupiter Systems'

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NAMM's Greatest Hits



(now AnTares') *Infinity* sample looper for the Macintosh. After gently berating the product for not offering the in-depth sample-editing features of Passport's then-discontinued *Alchemy* (which has since been brought back to life), Lehrman confessed, "Forgive me if it seems I'm criticizing a horse for not being a duck, but Mac-based sampling fans happen to be in dire need of a new duck."

Well, Mr. Lehrman, Berkley Integrated Audio Software (BIAS) has your new duck. It's called *Peak* (\$299), and from all appearances, this nondestructive sample editor for the Macintosh is no turkey. To start with, it seems quite fast, even on a 68030 or 68040 machine, but especially running in native code on a Power Mac. Because it is nondestructive (unlike *Alchemy*), it offers unlimited Undo/Redo, and you don't have to wait for the program to write a new file just to audition the results of an undo or paste.

You get unlimited zoom (with zoom memory), and waveforms are redrawn in the background. The program can read and write 8- and 16-bit AIFF and SDII files and Red Book audio. WAV and QuickTime support will be added in v. 1.1.

This is a heavy bird, especially if you get all the options. It offers plenty of waveform editing capabilities. You can join two mono files into stereo (assuming they are at the same sample rate) or split stereo to mono and can create custom fades and blends. The Loop Surfer feature lets you adjust loop start and end points on the fly; when you find the loop you want, you can capture it as a defined region or as a new file. The program's support for the Adobe Premiere plug-in architecture means you can integrate it with processing software from companies such as Waves and InVision.

More features can be added with Peak Accessory Paks (\$129 each). For example, the *Composer/Audio Designer Pak* supplies such features as phase vocoding and pitch change. The *Audio Pro Pak* gives you declipping, gain changing, normalizing, sample-rate

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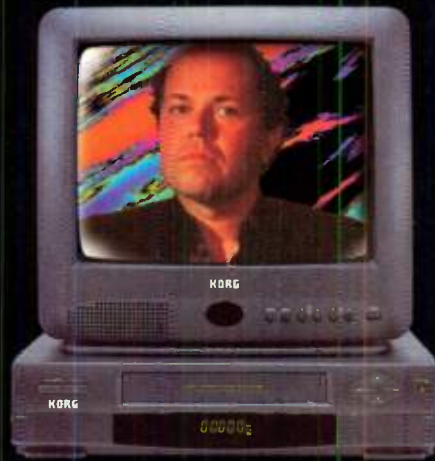
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NAMM's Greatest Hits



conversion, and time compression/expansion. The *Bias Audio Librarian Pak* provides batch-file processing and Thresholding, which automatically separates multiple audio events in a single file into multiple regions. It can use Apple Events to allow you catalog and audition sounds from Apple Event-capable database programs such as Claris' *FileMaker Pro*.

Unlike Macromedia's *SoundEdit 16* or recent versions of Digidesign's *Sound Designer II*, BIAS' *Sampler Pak* supports SMDI, which lets you transfer samples quickly via SCSI to SMDI-compatible machines (currently the Peavey SP; E-mu ESI-32, e64, and EIV; and Kurzweil



Korg 168RC

K2000/K2500). *Peak* can also exchange samples directly via SCSI with the Ensoniq EPS/EPS-16/ASR-10 and Kurzweil K2000/K2500 samplers. (We're lobbying BIAS to support the other major samplers, so if you're seriously interested, please contact them and join EM's "We Want a New Duck" campaign!) Until June 30, 1996, BIAS will bundle all four Accessory Paks when you buy *Peak*. All in all, there are plenty of good reasons why this fair fowl should fly high.

BEAM ME UP!

In popular parlance, a Beamer is slang for a BMW. But Interactive Light, Inc., could give the term a whole new meaning for electronic musicians. The Beamer of tomorrow could be a musician who uses the company's innova-

tive Dimension Beam alternative MIDI controller (\$499).

The Dimension Beam emits an egg-shaped beam of infrared light. The unit senses the movement position in 3-D space of an object breaking the beam. As you move through the beam, the device continuously sends values within a user-defined range. Although the beam is 3-D, the product actually responds to one parameter: the degree to which the infrared light is reflected off the object moving through it. (For details on Smart Beam technology, see the December 1995 "Tech Page.")

The user can define the desired size of the beam and assign values for its outer "skin" and central "core." (The company originally used an onion analogy to describe the infrared beam's shape, hence the terminology.) The unit interpolates values for the areas between the "skin" and "core." In Control mode, you can select one user-programmable MIDI message, which can be Pitch Bend or any Control Change (0 to 127), optionally accompanied by a single Note On/Off.

In Scales mode, the Dimension Beam sends note messages instead of Control Changes, giving you an invisible "instrument" in 3-D space. Users can choose a root and one of sixteen preset scales or create their own scales. The product comes with six factory presets and can store up to six user presets, which can be recalled from the unit's keypad or Freeze pedal (included).

The Dimension Beam offers 1,000-point resolution. The system does not require the performer to hold or wear a sensor, but it is advisable to use reflective tape if you are working at the outer edges of the beam. Because infrared light can't be seen by the unaided eye, the system can be almost invisible to the audience. It ignores ambient, steady-state stage lights.

FAT, FATTER . . . FATTEST?

When I arrived at the CreamWare booth to check out tripleDAT (described earlier), I discovered the hard-disk recording company was sharing its booth with German synthesizer manufacturer Waldorf, of Wave and MicroWave fame. Waldorf synthesizers always sound incredible, so when I

noticed a 2U rack-mount module off to the side, I had to check it out.

The mystery module turned out to be Waldorf's Pulse monophonic analog synth (\$999), and it sounds like a cross between an ARP 2600 and a Mini-moog. Talk about fat! This beast starts with three oscillators, which can produce triangle, sawtooth, and pulse waves, with pulsewidth modulation. Its 24 dB/octave (4-pole) cascade filter offers resonance up to self-oscillation, and you can overdrive its input.

There is an internal mixer, a noise generator, and two ADSR envelopes, each with four different trigger modes. You get two LFOs: LFO2 just generates triangle waves, but LFO1 emits sine, triangle, and sawtooth waves as well as sample-and-hold. Although the unit is mono, it has two audio outputs.

The Pulse provides fifteen internal modulation sources, including the LFOs, Envelope 1, Velocity, a Pitch Follower, and mod wheel. The sixteen modulation destinations include oscillator 1 pitch, pulse width, filter cutoff frequency, and resonance. The arpeggiator syncs to MIDI Clock, and all parameters can be controlled via MIDI Control Changes. The synth comes with 59 presets and 40 user memory locations. For \$1,099, you can get the Pulse Plus, which adds CV, gate, and audio inputs.

CHEAP 'N' CHEERFUL

Several products at NAMM qualify as cheap 'n' cheerful, but two really stood out. The first was Alesis' NanoVerb (\$179), a 1/2-rack-space digital effects processor that probably is the smallest reverb Alesis has made since the original MicroVerb back in 1987. Small it may be, but this baby features 18-bit converters and 20-bit internal processing, and its algorithms are mostly derived from the company's hot QuadraVerb 2 and MidiVerb 4.

The NanoVerb produces flanging, chorusing, delay, rotary-speaker emulation, and a selection of reverbs. Its only controls are input level, wet/dry mix, output level, program select, and a Program Adjust control that lets you adjust one predetermined parameter for each program. The unit's two LEDs show whether the power is on and indicate input signal presence and clipping. That's all you get, and it's all you need for many applications. I'll take two: one to stuff in each front pocket!

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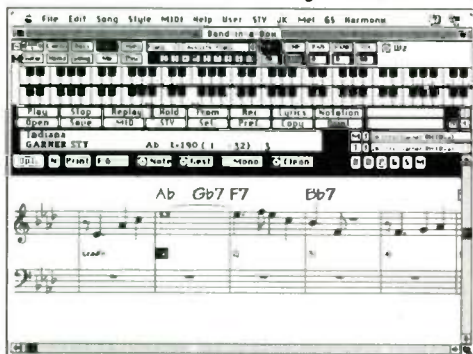
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MEMORY REQUIREMENTS: DOS (640K), Windows (3mb), Macintosh (4mb), Atari (1040)

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And now for something completely different from Roland, which really excelled at this show. The PMA-5 Personal Music Assistant (\$595) looks somewhat like an Apple Newton or other PDA, but it's really a baby MIDI studio with a sound source, effects, a sequencer, and an intelligent arranger.

The closest thing to the PMA-5 in concept is probably Yamaha's QY series, but there are numerous significant differences. The most obvious is the fact that you control the PMA-5 using a touch screen with a touch pen

or your finger. The only button is the power switch, and the only knob is the volume control.

The PMA-5 includes a 28-voice polyphonic, 16-part multitimbral GM/GS sound source with 306 instruments and sixteen drum sets. The effects processor produces eight types of digital reverb and chorus.

The integrated sequencer and intelligent arranger provide four melody tracks and four backing tracks. You can record in real time or step time. The sequencer's memory holds up to twenty songs (approximately 21,000 notes). The intelligent arranger features 100 preset Music Styles, including introductions and endings that emulate contemporary hit songs and popular musical genres. You can also create and store your own patterns.

The PMA-5 can import and export Standard MIDI Files and connect directly to a Macintosh or PC serial port so you can move song and pattern data between the PMA-5 and the computer. For example, you can create a basic arrangement on the PMA-5 and load the sequence into a computer sequencer for detailed editing or live playback. Roland's optional *PMA-5 Convert Tool* software for Windows and Mac (price tba) is required to convert SMFs to and from PMA-5 format.

The unit can run for about five hours on six AA batteries or can use an optional AC adapter. With batteries, the PMA-5 weighs one pound, six ounces. A cover protects the unit's touch panel for travel. The only audio output is the headphone/line-out minijack. **EM** Technical Editor Scott Wilkinson was smitten with the concept and appearance of this cutie, so it's safe to say he'll offer us a closer look at it when the product ships.

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Metalithic Systems tel. (800) 937-6744 or (415) 332-2690; fax (415) 332-6735;
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Roland Corporation US tel. (213) 685-5141; fax (213) 722-0911;
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TSI International Sales (Waldorf) tel. (310) 452-6216; fax (310) 452-3886;
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Wildcat Canyon Software tel. (800) 336-0982 or (510) 527-5155; fax (510) 527-8425;
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NO MAS!

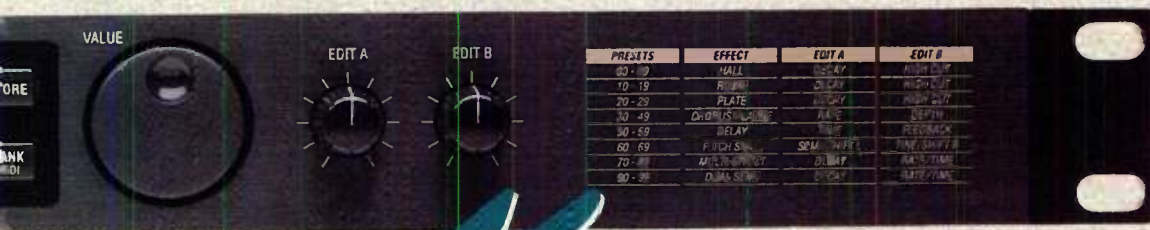
I'm very encouraged by the new gear at NAMM, with its noticeable emphasis on integrated systems (both software and hardware) and improved user interfaces. The continuing growth of digital audio sequencers and modular hard-disk recorders is especially interesting; both offer nice compromises between audio quality, value, ease of use, and editing power.

With a NAMM show this large, we inevitably saw more winners than will fit in one article, even when restricting the selection to "greatest hits." I haven't even started discussing the attractive new microphones, improved mixers, less expensive in-ear monitors, variety of wireless systems, important hardware upgrades, stunning new sound libraries, and lots more.

Faced with this embarrassment of riches, I reluctantly have to emulate prizefighter Roberto Duran's infamous surrender cry: "No mas!" We plan to bring you the lowdown on these new tools but not all at once. Now if you'll please excuse me, I'm going to go play some music in a home studio filled with high-quality, not-so-old equipment the NAMM show just made obsolete.

EM Senior Editor Steve O. is taking his faithful German shepherd and going into hiding where all the manufacturers whose new products he hasn't written about yet can't find him.

Simply Logical



MicroVerb[®] 4

PRESET/PROGRAMMABLE 18 BIT SIGNAL PROCESSING

Introducing the new **MicroVerb[®] 4** from Alesis. It's the logical solution for songwriters and performers who need great-sounding, easy-to-use, affordable digital effects.

GREAT SOUND MicroVerb 4 provides 200 programs of reverb, delay, chorus, flange, rotating speaker effects and more, many in true stereo. Some Programs offer up to three effects at once. Plus, MicroVerb 4 provides two real-time editing knobs so you can easily tweak the two most logical parameters in each program (like decay and high cut on a reverb or chorus rate/depth) without complex programming hassles. Then, you can save 100 of your edited effects patches in a dedicated User bank.

GREAT PERFORMANCE MicroVerb 4 also makes it easy to add life to your live performances, since it responds to MIDI

program change and modulation, and provides a two-way footswitch jack that offers both bypass and program control. And with 18-bit converters and a 20kHz frequency range, MicroVerb 4 offers professional-level processing at an incredibly affordable price. You can't get more logical than that.

When you're in the groove and need to get a great sound without spending a lot of time getting set-up, the new MicroVerb 4 is simply the logical choice. Check it out at your Authorized Alesis Dealer today.

For more information about MicroVerb 4, see your Authorized Alesis Dealer or call 310-841-2272. MicroVerb is a registered trademark of Alesis Corporation.

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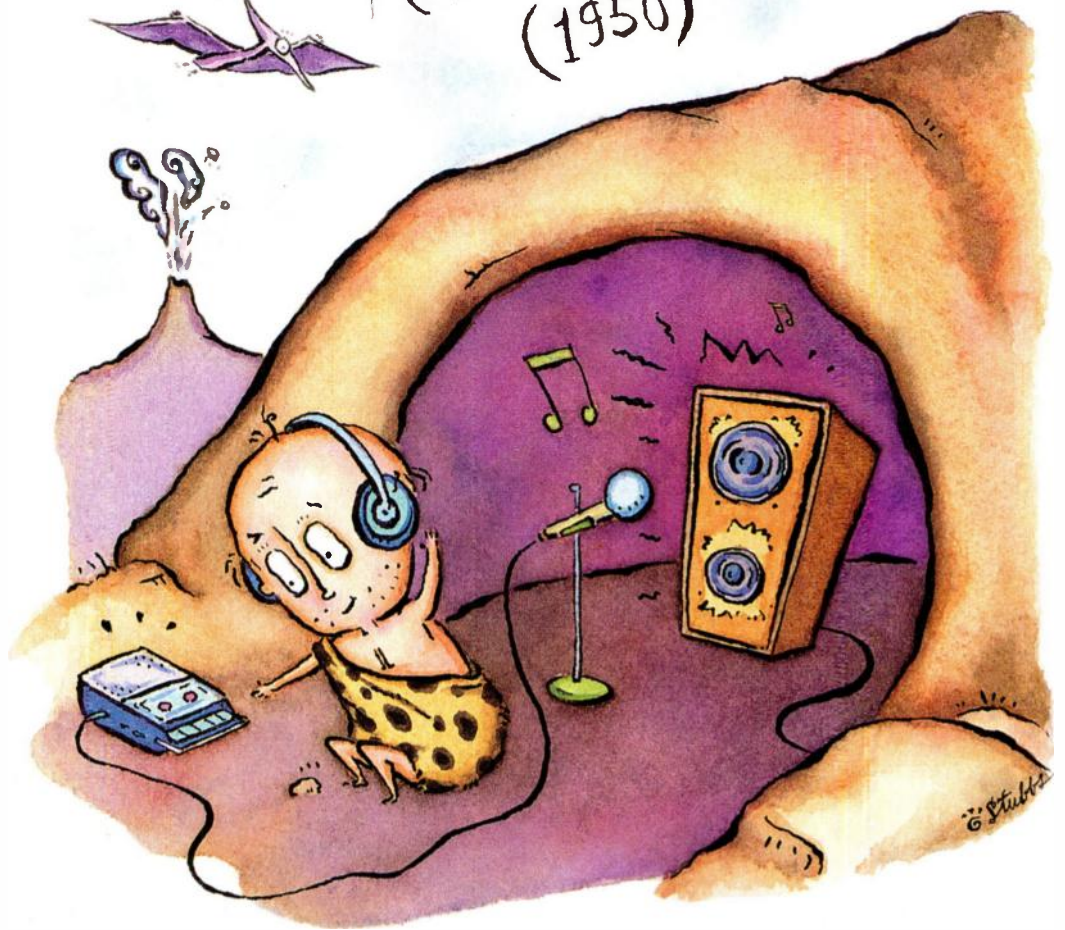
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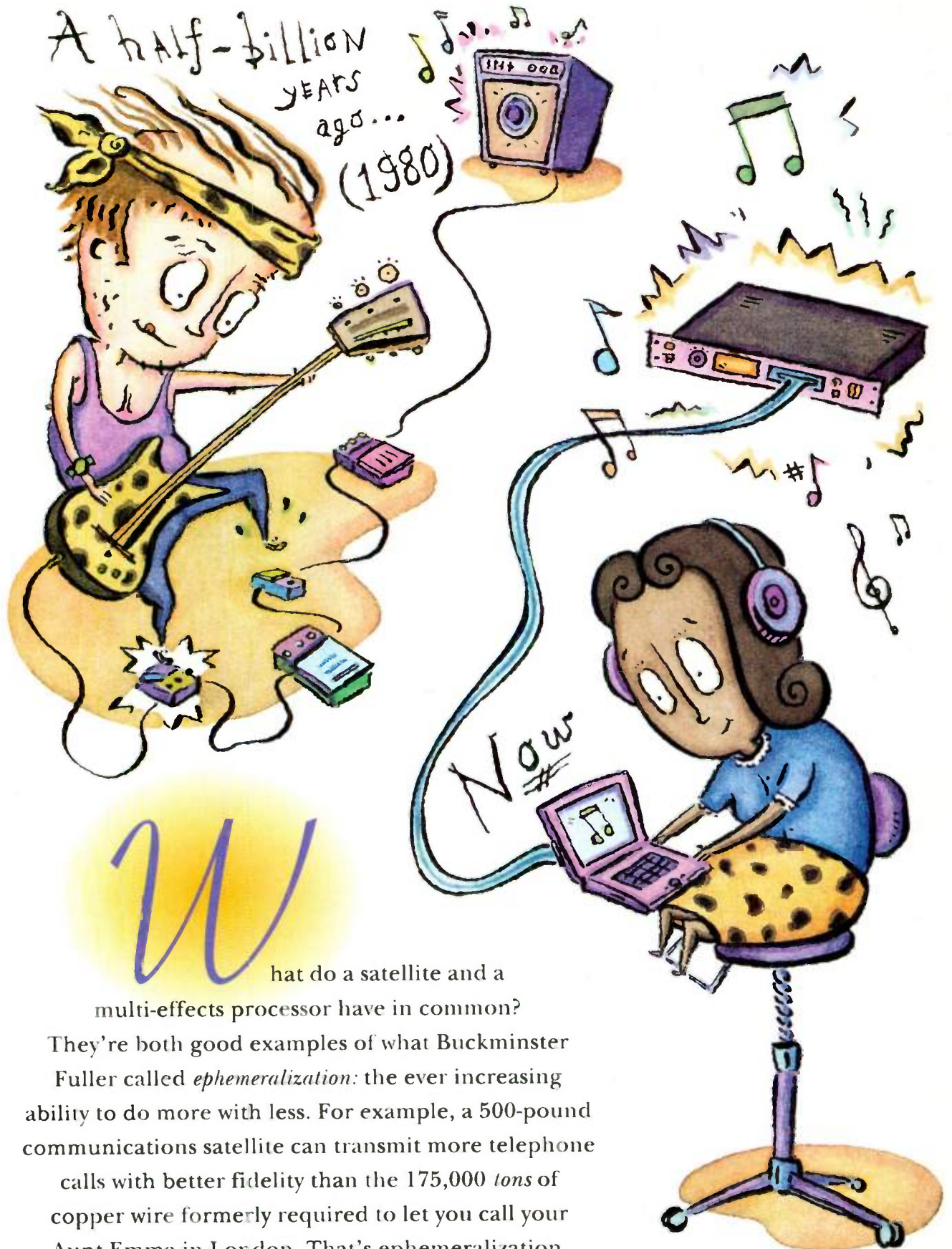
Multi *Tasking* Marvels

●
Brian
Knave

A billion years ago...
(1950)

The EM
Guide to
Multi-Effects
Processors





W

hat do a satellite and a multi-effects processor have in common?

They're both good examples of what Buckminster Fuller called *ephemeralization*: the ever increasing ability to do more with less. For example, a 500-pound communications satellite can transmit more telephone calls with better fidelity than the 175,000 tons of copper wire formerly required to let you call your Aunt Emma in London. That's ephemeralization.

ILLUSTRATIONS
by Charles
Stubbins

Made for the way you play.

Turn it
ON

Turn it
UP



TR
SERIES

With the all new TR Series loudspeakers, you can crank it *all* the way up. Because with protective SonicGuard™ Circuitry, they are more bulletproof than any speakers in their class.

Fact is, we've already put the TR speakers through the most merciless torture test in the industry by cranking them at full throttle for 300 hours. So a 3-hour gig is just a warm up act.

And while you're playing hard, rest assured your sound is never compromised. With features found only in higher-end speakers, the TR speakers always maintain a balanced output of crisp highs and killer lows.

At JBL our goal was to bring you a more affordable JBL speaker, not a cheap one. So turn it on. Turn it up. And give the new TR Series a listen. At this price, it's time to get a speaker that was made for the way you play.

JBL

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TR. MR. SR. The unbeatable line-up of sound reinforcement products from JBL Professional.

Multi-Tasking Marvels

Effects processors have evolved similarly. To put reverb on a vocal track in 1950, an engineer had to play the track through a speaker placed inside a huge echo chamber and capture the desired reflections with a microphone or two. Today, a single box smaller than a sock drawer can emulate the acoustical environments of dozens of vintage echo chambers. That's ephemeralization. Likewise, in 1980, if you wanted to play your Strat through multiple effects—say, distortion, flange, and delay—you had to perform a tap dance atop a maze of stomp boxes and cables. Today, one box can let you configure any conceivable sequence of far-out effects. That's ephemeralization again.

And tomorrow? Well, the future may be bright for electronic musicians, but so is the present. Rather than trip down Prediction Lane, why not take a guided tour of the hippest multi-effects processors currently on the market? That's exactly what we did at the 1996 Winter NAMM Show, and the pickings are anything but slim.

To help illuminate a path through



Sony HR-GP5

this garden of sonic delights, we've compiled a comparative chart (see pp. 88-93) that lists multi-effects processors you can snag for \$700 or less. Even at the top of the scale, that's a cheap tariff for all the processing power under the hood of, say, the BOSS GX-700 or the new Valve FX from DigiTech. Then again, if you're on a macaroni-and-cheese budget, you can take comfort in thrift-conscious units such as the Alesis NanoVerb or the A.R.T. FXR.

Of course, using effects is a subjective science. One user may just die for analog compression and distortion, whereas another prefers totally digital processors. For that reason, we'll also explore why we chose certain features for our chart's comparison categories. Now, loosen those old rackmount screws, and prepare to gear up!

ANALOG AND DIGITAL EFFECTS

It's no secret that analog sound has come back with a vengeance. In fact, the last time we undertook a similar survey, the resulting chart was entitled the "EM Guide to *Digital* Effects Processors." (See "Studio Toys" in the October 1991 issue of *EM*.) But in keeping with market demand, some manufacturers are touting analog circuitry in their recent offerings. Naturally, the common analog allies are distortion and compression, but you'll also find EQ, noise gates, and high- and lowpass filters. If analog sound still warms your heart, you don't have to go away cold.

Of course, a unit's digital-effects menu is still the main attraction for most buyers. In the spirit of comprehensive reporting, we've listed the digital goodies in alphabetical order.

NUMBER OF SIMULTANEOUS EFFECTS

This column lists the number of different effects the unit can produce at one time. It's easy to assume the more the merrier, but be careful: a towering stack of effects can quickly devour processing power, which, in turn, may decrease the parameter choices of some effects. Limited delay times, decay times, and other sonic compromises can ruin the fun of stacking up half a dozen effects. Be sure to audition the unit to determine the maximum number of effects that can be used without sacrificing sound quality.

USER-CONFIGURABLE EFFECTS CHAINS

Just ten years ago, the ability to put a unit's available effects in any order was unheard of. Though still a software feat of the first order, a number of manufacturers have cleared this technological hurdle, and the fruit of their labors

MANUFACTURER LIST

- Alesis** tel. (310) 841-2272; fax (310) 836-9192; e-mail alecorp@alesis1.usa.com
American Keyboard Products (Viscount America) tel. (800) 253-0293 or (810) 253-0290; fax (810) 333-2808; Web <http://www.akp.com>
A.R.T. tel. (716) 436-2720; fax (716) 436-3942; e-mail artroch@aol.com or artroch@cis.compuServe.com; Web <http://www.artroch.com>
DigiTech tel. (801) 566-8800; fax (801) 566-7005; Web <http://www.digitech.com>
DOD tel. (801) 566-8919; fax (801) 566-7005; Web <http://www.dod.com>
Korg tel. (516) 333-9100; fax (516) 333-9108; e-mail product_support@korgusa.com
Lexicon tel. (617) 736-0300; fax (617) 891-0340; e-mail 71333.434@compuserve.com; CompuServe MIDI Vendor B
Peavey tel. (800) 821-2279 or (601) 483-5365; fax (601) 486-1278; America Online keyword [peavey](http://www.peavey.com); Web <http://www.peavey.com>
Rocktron Guitar Rack Technology tel. (810) 853-3055; fax (810) 853-5937; e-mail rocktron@eaglequest.com
Roland Corporation US (BOSS) tel. (213) 685-5141; fax (213) 722-0911; CompuServe [go roland](http://www.rolandus.com); America Online keyword [roland](http://www.rolandus.com); Web <http://www.rolandus.com>
Samson (Zoom) tel. (516) 364-2244; fax (516) 364-3888
Sony tel. (201) 358-4197; fax (201) 358-4907
Yamaha Corporation of America tel. (714) 522-9011; fax (714) 739-2680; e-mail info@yamaha.com

Multi-Tasking Marvels

is noted in our chart. For the home recordist who demands absolute sonic control of his or her signal chain, user-configurability is a must. Some units, though not offering total user-configurability, do provide a number of pre-selected order-of-effects configurations. Depending on your preferences and needs, these selections may suffice.

PROGRAMMABLE WET/DRY MIX

"Dry" defines the source sound (a guitar, a tape track routed from a mixer's effects send, etc.); "wet" is the processed signal (reverb, chorus, and so on). Obviously, the ability to mix the audible amount of these two levels is fundamental to sculpting sounds. A manual mix knob works for this application, but it requires that you run back to the effects unit in order to make

each wet/dry adjustment. The programmable wet/dry feature, on the other hand, allows you to save the wet/dry mix as part of the effects program. Then, when you change effects via a MIDI foot controller or sequence, the wet/dry mix is maintained.

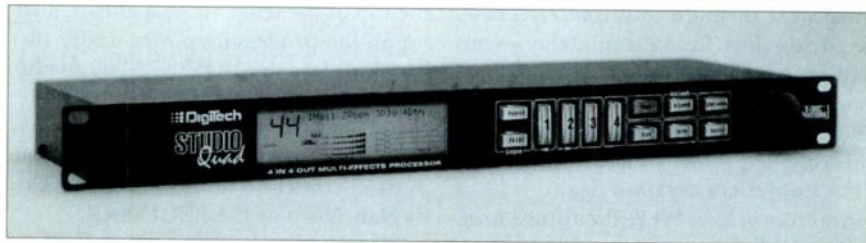
MAXIMUM DELAY TIME

Usually, the more you spend, the more delay time you get. Depending on your processing needs, you may want to grab as much time as you can. After all, a thousand milliseconds is only one second. Is that enough? If you love cavernous rebounds, vaporous washes, and unrepentant, Zeppelinesque echoes, maybe not. But don't be taken in by

big numbers alone: dial in the maximum delay time and listen carefully to how the sound holds up from the first repeat to the last. Also, listen for unpleasant artifacts when using long delay times with long effects chains.

MIDI REAL-TIME CONTROL

One of the ultimate performance features of an effects processor, MIDI real-time control lets you adjust parameters "on the fly" while playing or sequencing. For example, you could program a sequence to slowly increase the amount of an instrument's reverb decay during a fade-out or to control the sweep of a chorus or flange. If this feature is critical to how you perform or mix,



DigiTech Studio Quad

TUBE SOUND



MP110 DIRECT DRIVE
Mic Preamp \$ 230



ADB3 Stereo Tube
Direct Box \$ 200



RP220 Stereo Tube
Mic Preamp \$ 500

RP282 Stereo Tube
Compressor/Limiter
\$ 600



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Michael Brecker – World Class Musician, New York

“the more i know,...

the less I know. I'm constantly in the shed. Sometimes it's just maintenance, and sometimes I'll go through really creative periods – on the saxophone and the

EWI. Always trying to get better, trying to improve. I work on identifying the holes and exploring ways to fill them. I've always positioned myself in lofts, apartments or houses that I could play in. I set my space up in a way that makes it convenient. I keep the tools that I need nearby. My saxophone, piano and a set of

drums. I keep the electronics in the other room, so I'm not so attracted to pushing buttons. In that small setting, I'm able to achieve more on the instrument, focus on the music at hand. I can sit at the piano, pick up the horn – it seems to feel right that way. Ultimately, I'm not sure where ideas come from. I hear melodies often when I'm away from the piano – doing other things.

I get inspired by other musicians, ideas come to me driving in my car, you never know. I find that it's particularly important, in writing, to keep myself open

for ideas – and to be in the proper environment to take advantage of them. It will usually start on the piano for me, and eventually makes its way to the computer. Then I'll organize the ideas, evolve it and do the fine tuning.”

Michael Brecker

EMAGIC

Technology with Soul.

Multi-Tasking Marvels

audition the unit's performance chops. Inelegant implementation of real-time controllers can produce jagged response times and audible zipper noises as the value of an effect parameter is increased or decreased.

NUMBER OF SIMULTANEOUS MIDI CONTROLLERS

If you make a lot of parameter changes in real time or set up automated mixes from your sequencer, you need multiple simultaneous MIDI controllers. As you might expect, there's usually a direct correlation between dollars spent and the number of controllers offered. Because MIDI control changes take place almost instantaneously, one good multi-effects processor with ample simultaneous controllers can cover a lot of processing ground—assuming you're

willing to do all the required programming. Your automated mix can delegate a rapid-fire series of changes, and the effects unit will respond accordingly, in real time.

NUMBER OF FACTORY AND USER PRESETS

Factory presets provide good, ready-to-use processing options if you want to get right to work. In addition, factory presets are a great jumping-off point for creating your own sounds. And consider this: the majority of users rely exclusively on factory presets. It's a convenience thing.

Keep in mind that there's such a thing as overkill. Too many options can inhibit creativity. I mean, who has time

to scroll through 500 presets and audition 1,500 parameters, anyway?

User presets, of course, are lifesavers if none of the factory presets suit your palate. The ability to program and save your own creations is essential if you don't want to be chained to the same chorus effect that graced, say, Michael Jackson's last 29 hit singles. Fortunately, only some of the lower-priced units shackle you to factory presets.

DISCRETE PROCESSING CHANNELS

A discrete processing channel is one that goes all the way from input to output without being combined, or "summed," with another channel. Buyers

(text continued on p. 92)



BOSS GX-700

PG Music
announces...

PowerTracks Pro™ ...at the incredible
price of \$29

SEQUENCER/NOTATION/PRINTING FOR WINDOWS (IBM)

"Solid sequencing at an unbelievable price" Electronic Musician

NEW!
Version 3.0

PowerTracks is a professional, fully featured MIDI sequencing/notation/printing program, and is so easy to use. With version 3.0, we've added Wave file (audio) recording & playback, allowing you to add an audio track to your MIDI sequence! And we include versions for Windows 3.1/95 AND DOS, so you'll be able to use PowerTracks on all of your machines!

NEW
**PowerTracks Pro
3.0 for Windows**

For starters... PowerTracks has all the Pro features found in sequencers costing hundreds of \$\$ more.

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 & PRINTOUT (on any printer): Enter/edit/display music in standard music notation. Intelligent/automatic features such as: correct beaming/tying of notes/minimize 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!! 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!

WAVE FILE SUPPORT: Record and Play WAVE (audio) files inside the program (to 48kHz). Record an audio track of your singing or guitar playing along to a MIDI Sequence - all stored on disk!

PROGRAMMABLE: Programmers can extend the features of PowerTracks using the language of their choice (C, Basic, Delphi) using .DLL files. Customize PowerTracks to your needs, or purchase third-party add-ons for your synthesizer/sound card.

NEWEST FEATURES: We've added 30 new features in Version 3.0 - Wave file record and playback, lyrics, drum pattern editor Piano, Auto-Hand Splitting • Programmable using DLLs • Patch/Bank names • non-GM Drum mapping • Win95 friendly • over 30 new features in all (existing customers may upgrade for \$15)

DELUXE WINDOWS INTERFACE: Multiple Windows - Staff Roll, Event List, Tracks, Bars, Meter, Tempo, Piano keyboard, Guitar fretboard.

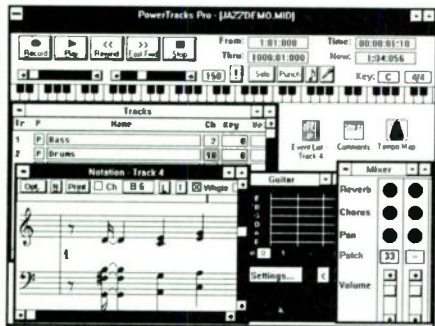
BUT POWERTRACKS GOES MUCH FURTHER... WITH EXCITING FEATURES NOT FOUND IN OTHER SEQUENCERS!

✓ Enter/print out Chord symbols in Notation ✓ Automatic Drum tracks (100 drum styles included) ✓ Reads in Chord Symbols from Band-in-a-Box 6.0 MIDI files ✓ Patch caching for Gravis Ultrasound ✓ Comprehensive support for Guitar (on-screen guitar, tab printout) ✓ Built-in Roland Sound Canvas Editor ✓ On-screen piano and guitar show notes as they're played ✓ Pro MIDI files included

Our customers love PowerTracks!! Here are some actual comments from customers...

"Killer software" "Unbelievable" "Intuitive and powerful" "Best MIDI program on the market" "I love the notation" "Incredible features & easy to use" "Other packages just don't compare" "Totally unbelievable - I love it!"

REQUIREMENTS: PowerTracks for Windows - Windows 3.1/Windows 95, IBM Compatible AT, 386 or higher, 2mb RAM. Supports any device compatible with Windows 3.1 including Roland MPU401, Music Quest MOX interfaces, Key Electronics MEDIATOR, SoundBlaster, AdLib, TurtleBeach, etc.
PowerTracks for DOS - DOS 3.3 or higher, 640K, XT/286/386 or better, MIDI interface (Roland MPU401, Music Quest MOX series, SoundBlaster MIDI and FM sounds, Mediator, Roland SC7, Yamaha TG100) or AdLib/SoundBlaster compatible sound card.



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.

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The pioneering technology of Logic Audio 2.5 allows you to work the way you want to... without traditional limitations.



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Logic Audio

Logic Audio is the flagship product in the award winning Logic System. EMAGIC offers the unprecedented power of MIDI Sequencing, professional quality scoring and the ability to record and manipulate up to 48 tracks of digital audio, depending on your hardware configuration. With the highest resolution available for any MIDI sequencer, 960

PPQ, and the incredible power of non-destructive real-time editing, Logic Audio integrates each of its components seamlessly. Make a change, see the change in each window in real-time. But Logic Audio does not stop there. For the first time, you can configure your studio the way YOU want to work. You can see the end of other digital audio sequencers' limitations, by using Apple's™ Sound Manager (AV™), Digidesign's™ Audio Engine (DAE™), Yamaha's™ CBX D3/D5™ and Digidesign's™ Pro Tools III™ with TDM™

simultaneously (even automate TDM plug-ins on the fly). Using Logic Audio's Environment, you can quickly and easily configure your studio exactly the way you want to. Logic Audio also gives you the powerful suite of DSP functions known as the Digital Factory. Along with unlimited MIDI and Scoring tracks you will own the most powerful composition and production tool available, at a price that will be pleasantly surprising. You owe it

to your music to join the incredibly long list of professionals that have switched. While other companies tell you what they will have (maybe) one day, Logic Audio gives you the power of the future today. Available NOW, at fine music and computer stores world wide.



What do you say

to the world's first
affordable 64-track

Digital Studio Workstation?





Welcome home.

Say hello to the first fully integrated digital recording workstation practically anyone can afford. The VS-880 is for anyone who ever wanted more and more out of their home or studio recording environment.

A 14-Channel Digital Mixer

The VS-880 comes with a 14-channel digital mixer with digital EQ, Fader, pan and mixer parameters can be automated by MIDI control change messages. Internal snapshot automation is included.

An 8x8/64 Virtual Track Digital Recorder

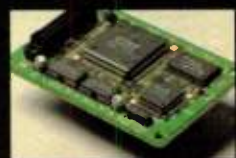
Eight primary tracks with eight levels of virtual tracks give you the ultimate in recording flexibility. Record multiple takes, edit or undo edits and compile the best parts of various takes to create the perfect track without compromise. You can accumulate up to 64 instantly accessible tracks and choose eight for final mixdown.

Digital Mastering

The VS-880 is fully digital and has digital in and out. This makes it compatible with all your existing digital equipment, both linear tape-based and non-linear hard disk format.



The rear panel has four RCA and four 1/4" inputs, digital in/out, MIDI in/out for sync and automation, a programmable footswitch input, headphone jack, two aux sends, master outs, and a SCSI port for archiving or adding additional storage devices.



Digital Editing

With the VS-880, you get fully non-destructive editing capabilities. You can copy, move, exchange, insert, cut and erase tracks. Because it functions like a word processor, you can select the perfect chorus of your song, copy it or move it somewhere else without re-recording it. Or cut out another section and have the remaining material slide over and fill the open space automatically. And if you're not satisfied with a particular edit, simply return to the previous performance. Instant locate points make editing on the VS-880 as user-friendly as it gets. For advanced applications, functions like Scrub Preview or Time Compression/Expansion are available.

The user installable VS8F-1 Effect Expansion Board adds two completely independent stereo multi-effects processors. There are 200 patches, extensive effects including 3-D RSS capability, and guitar effects chains with COSM-based guitar amp simulator.

Two Digital Effects Processors

A VS8F-1 Effect Expansion Board can be easily user-installed, giving you two totally independent multi-effects processors. Reverb, stereo delay, chorus, flanging, vocoder as well as distortion/overdrive and guitar amp simulation are a few of the effects that can be added during recording or during final mix in realtime. Three dimensional effects based on Roland's proprietary RSS[®] system are also included.

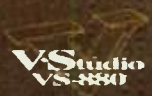
Digital Memory

You can choose the type of memory which best suits your needs. Select a 540 MB internal drive or an internal 1 Gigabyte removable Iomega[®] JAZ[®] drive capable of 500 minutes of recording time. A standard SCSI port allows for easy connection to external drives such as Iomega[®] ZIP[®], magnetic optical or other storage media.

Synchronization

The VS-880 is MIDI compatible for synchronization with MIDI Time Code (MTC) as both a master or slave. MIDI Machine Control (MMC) also allows automated transport control, putting playback, fast forward, rewind and more at your fingertips.

It's time to turn your home or workplace into the studio you've always wanted. Call (213) 685-5141, ext. 798 to order a free demonstration video.



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Multitasking Marvels: The Goodies Chart

Manufacturer/Model	Analog Effects	Digital Effects	Number of Simultaneous Effects	User-Configurable Effects Chain	Programmable Wet/Dry Mix	Max. Delay Time (ms)
Alesis MicroVerb 4	none	ambience, chorus, delay, flanger, reverb	3	no	no	1,270
Alesis MidiVerb 4	none	ambience, chorus, delay, flanger, reverb	3	no	yes	1,299
Alesis NanoVerb	none	chorus, delay, flanger, reverb, rotary	3	no	no	1,270
A.R.T. DRX-2100 SE	7-band EQ, compressor, expander, LPF	chorus, delay, flanger, pan, pitch shift, reverb, tremolo	13	no	yes	1,800
A.R.T. Effects Network	highpass filter, lowpass filter	chorus, delay, flanger, pitch shift, reverb	1	no	yes	2,000
A.R.T. FXR	none	chorus, delay, flanger, pan, reverb, tremolo	4	no	no	500
A.R.T. FXR Elite II	none	chorus, delay, flanger, pan, reverb, tremolo	4	no	yes	500
A.R.T. Multiverb Alpha SE	7-band EQ, 13-stage lowpass filter	chorus, delay, flanger, pan, phaser, pitch shift, reverb	7	no	yes	1,800
BOSS GX-700	distortion, overdrive	3-band EQ, chorus, compressor, delay, flanger, intelligent pitch shifter, limiter, noise suppressor, pan, phaser, preamp, reverb, ring, modulation, speaker simulator, tremolo, vibrato, wah	13	yes	yes	2,000
BOSS SX-700	none	3-band parametric EQ, chorus, delay, intelligent pitch shifter, reverb, Roland Sound Space 3-D pan, rotary speaker, flanger, stereo phaser	5	yes	yes	1,400
DigiTech RP-6	3-band parametric EQ, compressor, distortion, noise gate	auto pan, cabinet simulator, chorus, delay, EQ, flanger, reverb, tremolo, pitch shift, wah, whammy	8	no	no	800
DigiTech RP-10	compressor, distortion, EQ, noise gate	auto pan, cabinet simulator, chorus, detune, delay, EQ, flanger, phaser, reverb, tremolo, pitch shift, wah, whammy	8	no	yes	1,400
DigiTech Studio Quad	none	auto pan, chorus, detune, delay, flanger, graphic EQ, noise gate, parametric EQ, phaser, reverb, tremolo, pitch shift	4	yes	yes	1,399
DigiTech Studio Twin	none	delay, detune, flanger, noise gate, reverb, parametric EQ, tremolo	3	no	yes	640
DigiTech Valve FX	4-band parametric EQ, compressor, distortion	auto pan, auto wah, chorus, delay, detune, EQ, flanger, phaser, pitch sampler, reverb, tremolo, wah, whammy	8	no	yes	1,400
DOD 512	none	chorus, delay, flanger, pan, phaser, pitch shift, reverb, tremolo	2	no	yes	740
DOD FX7	compressor, distortion, EQ, noise gate	chorus, delay, detune, flanger, phaser, pitch shift, reverb, tremolo, wah	7	no	no	500
Korg AX30B	some distortions are hybrid	3-band EQ, 5-band EQ, auto wah, chorus, delay, dynamic effect, flanger, hold delay, mixer, modulation delay, octave, pan, percussion effect, phaser, pitch bender, pitch shifter, random step filter, reverb, sweep modulation, tap-tempo delay, vibrato	5	no	yes	1,000

MIDI Real-Time Control	Simultaneous MIDI Controllers	Presets (Factory/User)	Discrete Processing Channels	A-D/D-A Resolution (Bits)	Inputs (Type & Number)	Outputs (Type & Number)	Power Supply	Additional Features	U.S. Retail Price
yes	2	100/100	2	18/18	1/4" (2)	1/4" (2)	external	dual footswitch jack	\$299
yes	2	128/128	2	18/18	1/4" (2)	1/4" (2)	external	48 kHz sampling rate, auto level sensing, compare/bypass bypass	\$399
no	0	16/0	2	18/18	1/4" (2)	1/4" (2)	external	bypass, program naming	\$179
yes	8	443/200	1	16/16	1/4" (2)	1/4" (2)	internal	bypass, program naming	\$669
yes	4	100/100	2	16/16	1/4" (2)	1/4" (2)	internal	program naming	\$449
no	0	255/0	2	16/16	1/4" (2)	1/4" (2)	external	bypass, mix control	\$259
yes	2	255/255	2	16/16	1/4" (2)	1/4" (2)	external	bypass	\$345
yes	8	404/200	1	16/16	1/4" (2)	1/4" (2)	internal	bypass, program naming	\$575
yes	6	100/100	1	22/18	1/4" (1) front and (2) rear	1/4" (2)	external	-10 to +4 dB variable knob, bypass, headphone jack, tuner	\$695
yes	5	128/128	2	18/18	1/4" (2)	1/4" (2)	external	-10/+4 dB switch, bypass, responds to MIDI note number and Velocity	\$645
no	0	40/40	1	16/16	1/4" (1)	1/4" (2)	external	built-in foot controller with expression pedal, bypass, headphone jack, presence control, tuner	\$399
yes	10	100/100	1	16/16	1/4" (1)	1/4" (2)	external	built-in foot controller with expression pedal, bypass, chromatic tuner, headphone jack	\$599
yes	8	100/100	4	18/20	1/4" (4)	1/4" (4)	external	-10/+4 dB switch, auto level setting, bypass, data wheel, program naming	\$499
no	0	99/99	2	18/20	1/4" (2) TRS	1/4" (2) TRS	internal	data wheel	\$299
yes	10	128/128	1	16/16	1/4" (1)	1/4" (2)	internal	12 AX7 tube preamp, bypass, chromatic tuner, data wheel, headphone jack, presence control, program naming	\$699
no	0	480/none	2	16/16	1/4" (2)	1/4" (2)	external		\$229
no	0	30/30	1	18/16	1/4" (1) and 1/8" (1) stereo	1/4" (2)	external	built-in foot pedals, bypass, data wheel, expression-pedal jack, headphone jack	\$249
no	0	30/16	1	18/18	1/4" (1) and 1/8" aux	1/4" (2)	external	bypass, compare, pressure pedal, program naming, tuner	\$425

Multitasking Marvels: The Goodies Chart

Manufacturer/Model	Analog Effects	Digital Effects	Number of Simultaneous Effects	User-Configurable Effects Chain	Programmable Wet/Dry Mix	Max. Delay Time (ms)
Korg AX30G	some distortions are hybrid	3-band EQ, amp simulator, bend, chorus, compressor, delay, flanger, hyper resonator, modulation delay, pan, phaser, pitch shifter, reverb, ring modulation, tap-tempo delay, tremolo, vibrato, wah distortion	6	no	yes	1,000
Korg G1	some distortions are hybrid	delay, distortion, EQ, overdrive, speaker simulator, wah	6	no	yes	550
Korg G2	none	12-string simulator, chorus, delay, EQ, exciter, limiter	7	no	yes	550
Korg G3	none	chorus, compressor, distortion, flanger, overdrive, semiparametric EQ	5	no	yes	550
Korg Pandora	some distortions are hybrid	cabinet resonator, chorus, compressor, delay, distortion, echo, EQ, flanger, overdrive, pan, phaser, reverb, tremolo, vibrato, wah	6	yes	yes	730
Lexicon Vortex	none	auto loop, ducker, echo, flanger, Haas effect, modulated taps, phaser, rotary speaker simulator, tremolo	2	no	yes	1,900
Peavey Addverb III	none	2-channel mixer, auto pan, chorus, compressor, delay, distortion, envelope filter, EQ, exciter, noise gate, overdrive, pitch shift, reverb, reverse reverb, speaker simulator, stereo simulator, tunnel	8	yes	yes	724
Peavey Univerb III	none	chorus, delay, flanger, phaser, reverb, rotary speaker	2	no	yes	724
Rocktron Intelliflex LTD	none	chorus, delay, dynamic ducking, hush noise reduction, pitch shifter, reverb	4	no	yes	1,500
Sony HR-GP5	none	amp simulator, auto pan, chorus, compressor, crunch, delay, distortion, flanger, EQ, exciter, intelligent pitch shifter, limiter, modulation, overdrive, phaser, reverb, reverse shift, ring modulation, rotary speaker, slow attacker, tap delay, tremolo, variable mic positions, wah	7	yes	yes	1,364
Sony HR-MP5	none	amp simulator, auto pan, chorus, compressor, crunch, delay, distortion, dynamic filter, EQ, exciter, flanger, intelligent pitch shifter, limiter, modulation, noise gate, overdrive, phaser, reverb, reverse shift, ring modulation, rotary speaker, slow attacker, subharmonic generator, tap delay, tremolo, variable mic positions, vocal canceler, wah	4	yes	yes	1,364
Viscount EFX-1	none	ambience, compressor, chorus, delay, distortion, echo, feedback, flanger, guitar multi, keyboard multi, noise suppressor, pan, pitch shifter, phaser, reverb, rotary, sustain	6	no	yes	600
Viscount EFX-2	none	compressor, chorus, delay, distortion, flanger, guitar multi, keyboard multi, noise suppressor, pan, pitch shifter, phaser, reverb	6	no	yes	600

MIDI Real-Time Control	Simultaneous MIDI Controllers	Presets (Factory/ User)	Discrete Processing Channels	A-D/D-A Resolution (Bits)	Inputs (Type & Number)	Outputs (Type & Number)	Power Supply	Additional Features	U.S. Retail Price
no	0	50/16	1	18/18	1/4" (1) and 1/8" aux	1/4" (2)	external	bypass, compare, pressure pedal, program naming, tuner	\$425
no	0	9/9	1	16/16	1/4" (1)	1/4" (2)	external	bypass, compare	\$350
no	0	9/9	1	16/16	1/4" (1)	1/4" (2)	external	bypass, compare, tuner	\$425
no	0	9/9	1	16/16	1/4" (1)	1/4" (1)	external	bypass, compare, headphone jack	\$300
no	0	20/0	1	18/18	1/4" (2) and 1/8" aux	1/4" (1)	external or 2 AA batteries	bypass, headphone jack, metronome, program naming, tuner	\$299
no	1	32/32	2	16/16	1/4" (2)	1/4" (2)	external	tap tempo via front-panel button	\$479
yes	8	128/128	2	18/18	1/4" (2)	1/4" (2)	external	compare, program naming	\$349
no	0	16/0	2	16/16	1/4" (2)	1/4" (2)	external	remote footswitch jack	\$159
yes	8	80/80	1	16/16	1/4" (2)	1/4" (2)	external	-10/+4 dB switch, bypass, compare	\$699
yes	4	100/100	1	18/18	1/4" (2)	1/4" (2)	external	auto tuner, bypass, jog/shuttle encoder	\$595
yes	4	100/100	2	18/18	1/4" (2)	1/4" (2)	external	auto tuner	\$595
no	0	128/106	2	16/16	1/4" (2)	1/4" (2)	external	-20/+4 dB switch, bypass, program naming	\$499
no	0	49/0	1	16/16	1/4" (1)	1/4" (2)	external	-20/+4 dB switch, bypass via pedal	\$299

Multitasking Marvels: The Goodies Chart

Manufacturer/Model	Analog Effects	Digital Effects	Number of Simultaneous Effects	User-Configurable Effects Chain	Programmable Wet/Dry Mix	Max. Delay Time (ms)
Viscount EFX-10	none	ambience, compressor, chorus, delay, distortion, flanger, guitar multi, hum canceler, keyboard multi, line driver, modulation, noise suppressor, overdrive, phaser, pitch shifter, predistortion, reverb, rotary, sustain, vocal canceler, wah	6	no	yes	2,980
Viscount PX-Multi	none	ambience, compressor, chorus, crunch, delay, distortion, flanger, keyboard multi, noise gate, pitch shifter, phaser, reverb, rotary	6	no	yes	1,000
Yamaha REV100	none	delay, reverb, reverb with chorus, reverb with flanger	2	no	yes	740
Zoom 1010	distortion	chorus, compressor, delay, doubling, EQ, flanger, reverb	6	no	yes	420
Zoom 1202	none	chorus, delay, flanger, reverb, wah	2	no	yes	740
Zoom 3030	distortion	compressor, delay, phaser, pitch shift, reverb	7	no	yes	1,000
Zoom 4040	distortion	compressor, delay, phaser, pitch shift, reverb	6	no	yes	1,000
Zoom 7010	distortion	chorus, compressor, EQ, flanger, phaser, wah	6	no	yes	420

(continued from p. 84)

should beware: you cannot tell whether a unit offers discrete processing simply by looking at the number of inputs and outputs. For example, the A.R.T. DRX-2100 SE has two inputs and two outputs, but the input signals are summed to mono. This mono signal is processed by a single effects algorithm and routed to the unit's two output jacks. The number of discrete processing channels is one.

If left and right channels are kept separate from input to output, the unit is said to have two discrete processing channels. However, in most cases, identical mono algorithms are applied to each channel. This is not the same as true stereo. True stereo also requires two discrete processing channels, but each channel is processed by a stereo algorithm that maintains left and right relationships with all reflections intact.

Special mention, by the way, goes to

DigiTech for their new Studio Quad, the only box listed here that provides *four* discrete processing channels. More expensive units, such as Ensoniq's DP/4+, also offer this feature, but DigiTech is the first manufacturer to deliver it for less than \$500. So, what can you do with four discrete channels? For one thing, you could simultaneously service four aux send/returns

on your mixer, processing four instruments with four different effects. Or you could set up two discrete stereo effects. Now *that's* ephemeralization.

A/D AND D/A BIT RESOLUTION

Higher bit resolution translates into a more accurate reproduction of the source sound. In other words, the more bits, the finer the "picture." You can compare this process to the amount of dots per square inch on a printer. The more dots you have, the clearer the printer's reproduction.

INPUTS AND OUTPUTS

This item is hardly of earth-shattering significance, but let's face it: without knowing how these things hook up, you won't know how to, well, hook them up. As you might expect, 1/4-inch unbalanced jacks are the norm. However, you'll also encounter the occasional balanced 1/4-inch connector, 1/8-inch headphone connector, and "jam-along" jack. (The jam-along jack is for those



Korg Pandora

MIDI Real-Time Control	Simultaneous MIDI Controllers	Presets (Factory/User)	Discrete Processing Channels	A-D/D-A Resolution (Bits)	Inputs (Type & Number)	Outputs (Type & Number)	Power Supply	Additional Features	U.S. Retail Price
yes	2	128/106	2	16/16	1/4" (2)	1/4" (2)	external	-20/+4 dB switch, bypass, edit parameters in real time, headphone jack, program naming, true-stereo processor	\$650
no	0	128/none	1	16/16	1/4" (1)	1/4" (2)	external	15 pedals, -20/+4 dB switch, bypass footswitch, headphone jack, pedal keyboard mode	\$519
yes	8	99/99	2	16/16	1/4" (2)	1/4" (2)	external	"one-touch" program selector	\$299
no	0	30/12	1	18/18	1/4" (1)	1/4" (1)	external	ultra-compact pedalboard	\$199
no	0	512/none	2	18/16	1/4" (2)	1/4" (2)	external		\$249
no	0	28/28	1	18/16	1/4" (1)	1/4" (2)	external	auto-chromatic tuner, built-in expression pedal, headphone jack	\$299
no	0	40/40	1	16/16	1/4" (1)	1/4" (2)	external	auto-chromatic tuner, built-in expression and volume pedal, headphone jack	\$449
no	0	40/24	1	18/18	1/4" (1) and 1/8" (1) stereo	1/4" (1)	external or 6 AA batteries	built-in 10 watt amplifier "flip-top" speaker, guitar tuner, headphone jack	\$349

instrumentalists who want to plug in a favorite compact disc, dial in some cool effects, and jam along.)

POWER SUPPLY

Wall warts can be a nuisance because they hog powerstrip jacks. However, by separating the power supply from the unit, manufacturers are able to reduce internal hum, more easily gain FCC approval, and save manufacturing costs.

ADDITIONAL FEATURES

Every sales rep can tell you why his or her company's effects processor is special—so we've granted them a column to do just that. Basically, here you'll find any unique features our carefully considered columns failed to address.

CONCLUSION

Ephemeralization is a force to be reckoned with. Fortunately, it's a benign force, responsible for breakthroughs in recording technology that have brought previously unheard-of capabilities into



Peavey Addverb III

home studios around the world.

The multi-effects processor is a key player in this story. Compared to what was available only a decade ago, the boxes you'll find listed here are incredible machines and remarkable values. Not only are they capable of performing more tasks at once than ever before, they sound better and are more user-friendly to boot. Let's face it: to the extent that technology facilitates

artistry, the home recordist who makes bad art can no longer put the blame on lame equipment.

So survey the proceedings carefully, choose your tools wisely, and get back to making music. The golden era of home recording has arrived.

There's a hole in Assistant Editor Brian Knave's signal-processing rack where all the money goes.



Home, Home on the Web

Start an Internet homestead with some help from America Online.

By Scott R. Garrigus

What if I told you that you can promote your music 24 hours a day for less than the cost of your monthly haircut? It's true. A Web page is the ultimate billboard for showcasing your talents to a vast community of cybercitizens. So, why haven't you joined the club? Maybe you

think it's too much trouble or too complicated a task to tackle on your own. But really, putting together your own Web page is almost as easy as designing a document in your favorite desktop-publishing program.

The cool thing is that many Internet providers now offer free Web space to their subscribers. Providers will give you a specified amount of space on their Web servers, which supply the address that allows Internet surfers to visit your page.

I decided to post my site on America Online, as I already had an account with them. AOL offers 2 MB of Web space per screen name (the ID tag of AOL customers), and as one account can have up to five screen names, this meant I had a total of 10 MB to play with. In addition, AOL offers free copies of its Navisoft *Navipress* Web publishing software for the Macintosh and PC. *Navipress*, like other commercial publishing tools such as Adobe *PageMill*, allows you to build your Web page in a WYSIWYG (What You See Is What You Get) environment. This approach offers you a huge advantage over having to struggle with HTML, the computer language used in the creation of Web pages.

AOL subscribers can snatch a copy of *Navipress* by logging on to the service and then typing in the keyword *navipress*. Once you're at the Navisoft page, simply follow the directions to

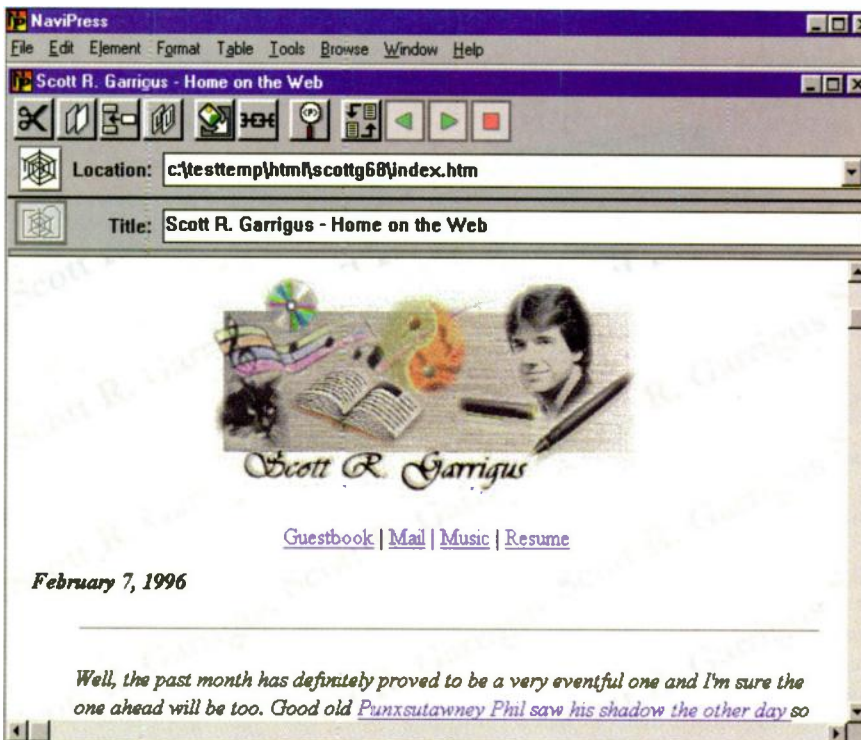
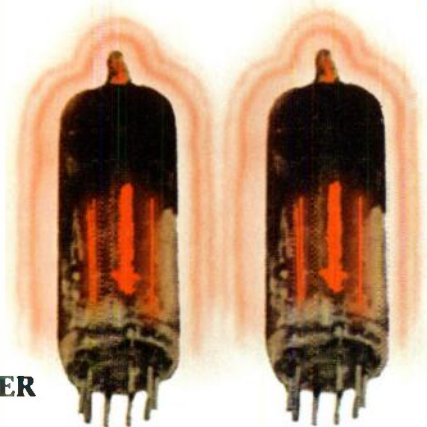


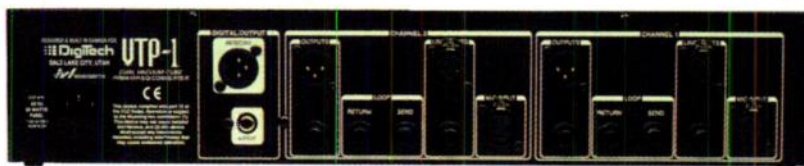
FIG. 1: Assembling the title page for author Scott Garrigus' Web page was as easy as using a word processor, thanks to America Online's *Navipress* Web publishing software.

Warm up your digital...

NEW



WITH THE **DigiTech**
VTP-1 DUAL VACUUM TUBE
PREAMP/EQ/ANALOG TO DIGITAL CONVERTER

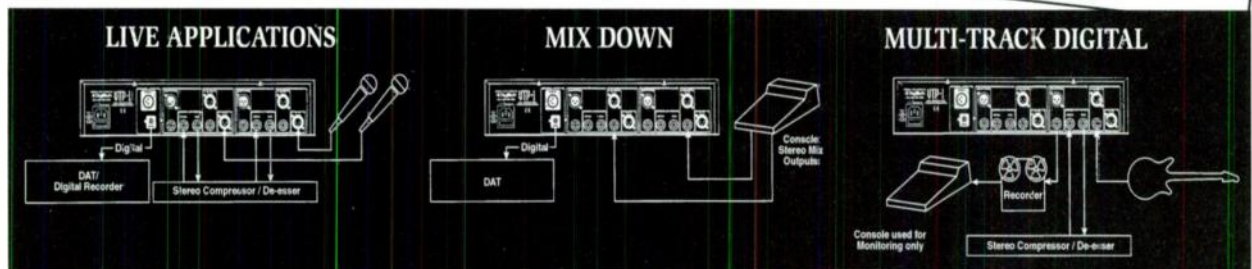


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The new VTP-1 from DigiTech offers a unique blend of essential components that can help you, the digital studio owner, add that missing warmth to your recordings. The VTP-1 incorporates a hybrid vacuum tube mic preamp, tube line amp/DI, flexible, 4-band equalizer section, and an 18 bit analog to digital converter in an attractive 2U chassis at a price much lower than you would expect.

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● DESKTOP MUSICIAN

download the software and documentation. But that's not all! AOL's Web Diner (keywords *web diner*) provides Web builders with a full menu of free graphics, tools, resources, and construction tips.

BUILDING A HOME

After you log off AOL and install *NaviPress*, you can get right to work. First, open a new page by using the New Page command (in the File menu) and give the page a title—such as "Home on the Web"—by typing it into the title field located at the top of the document (see Fig. 1). Before you go any further, however, it's a good idea to set up a folder on your hard drive for your Web page and all its associated files. Now, save your new page to the folder you just created by going to the File menu in *NaviPress* and choosing Save. This will keep all the elements together when it's time to upload everything to your Web space on AOL.

The next thing you'll want to do is pick a background color for your page by selecting the Body Attributes command (in the Format menu). In the Body Attributes dialog box, select Background Color from the Pick menu, and select a predefined color or define your own custom color. The dialog box also

allows you to choose a color for the text. Be sure to choose a text color that contrasts with the background or your page will be difficult to read. For my page, I chose black text against a white background.

PERSONAL TOUCHES

From here, you can do almost anything you want to personalize your page. Your Web page can be in any format or style, and it can incorporate text, graphics, sound, video, and links to other Web pages. The easiest medium to add is text: just start typing. It's exactly like using a word processor. Formatting options (such as bold, italic, and underline) are available by going to the Format menu and using the Type Style command.

Incorporating graphics is pretty simple, too. Just position the cursor where you want the picture to be inserted, and use the Image command in the Element menu to add it to the page. Before you cut and paste images into your page, there are a few conventions you should follow. For example, it's a good idea to limit images to 256 colors, as most people browsing the Web still use this graphics mode. If you were to include higher-resolution color pictures, the dithering required to render them

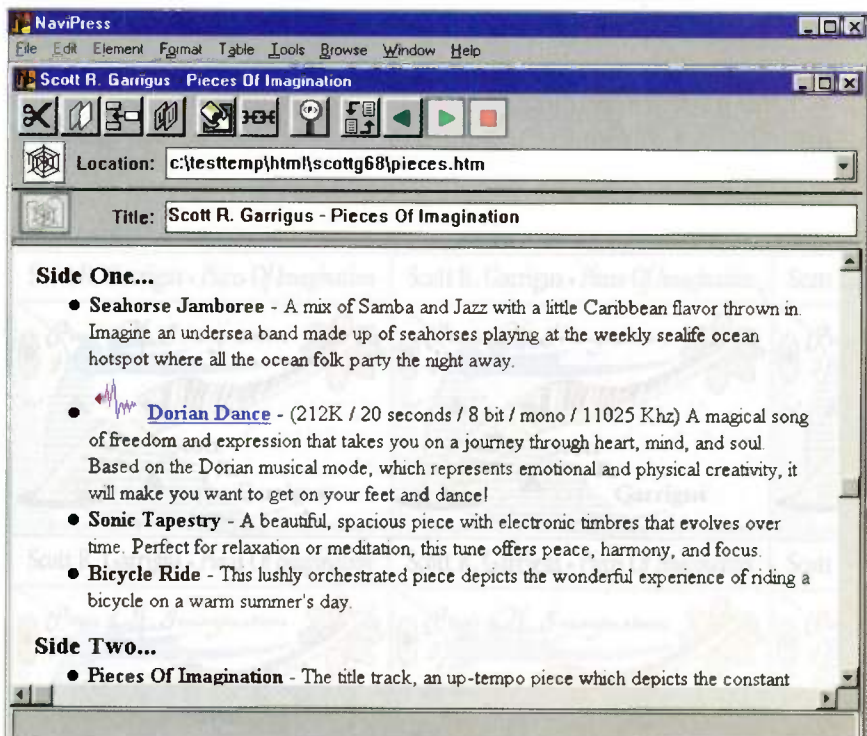


FIG. 2: Setting up a link to a sound file is easy. Anyone reading the page can click on the underlined text to automatically download a music clip.

**THE MOST
POWERFUL,
EASIEST TO USE,
BEST SOUNDING
SYNTHESIZERS★
JUST GOT
MORE POWERFUL,
EASIER TO USE
AND BETTER
SOUNDING.**

The synths with the largest on-board sequencer, 6 DSPs for 10 simultaneous effects and the easiest user interface just got a whole lot more powerful. Introducing the **Yamaha W5/W7 VERSION 2.**

The W5 and W7 (76 and 61 keys, respectively) now come with a total of 512 preset voices (with the capability of storing thousands) that you can arrange any way you want in a 16 song, 100,000 note sequencer. A "virtual mixer" interface makes working with the sequencer and effects as easy as it gets.

The W5/W7 Version 2 also includes:

- **Playback Effect (DNA® Groove Templates),** let you apply pre-programmed and user-programmable quantizing and swing factors into the playback of specified tracks without altering the original music data. (Of course you can write the groove data into the sequencer as well.)
- **A total of three preset voice banks,** plus hot new techno, dance and other voices which add unprecedented sonic dimension and musical range.
- **Cue Play,** which lets you trigger-start a song or sequence phrase from a specified measure simply by pressing a Track button. Assigning a different phrase for each of the 16 Track buttons lets you cue up the right groove or music "hit" at the right time.
- **Multitrack Loop Recording,** which lets you jump from track to track and record or spot

overdub new parts in any specified series of measures to capture inspiration as it strikes.

- **Song Remix,** which lets you mix alternate versions of your tunes complete with automatic track solo, mute and other commands which you can input in realtime. The result is greatly expanded on-board automated mixdown options.

- **Quick Split/Layer,** lets you split or layer voices on the fly as you play. The new Dynamic Split feature lets you play two voices with a "Floating split point" that's determined by note prioritization based on how you play the keyboard. And, of course, you also keep the 4-zone capability of the original W-Series.

- **Tempo Delay,** which automatically calculates the delay time of System Effect 3 to the tempo of the song, eliminating sonic clashes and smoothing out your mix.

- **Expansion Cards,** which add 4MB each of exceptional voices. Cards include "Grand Piano," "Vintage Sounds," "Rhythm Section" and the newest, "Dance Massive."

Now that you've read about the W5/W7, it's time to hear and see them in action. ★ **Call (800) 932-0001 ext. 650 to order a free CD and to find the location of the dealer nearest you for a demo.**



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for 256-color palettes would actually make the "high res" images look worse than the "low res" images.

The number of colors you use will also determine the file format in which you save your graphics. For 256 colors or fewer, the GIF (Graphics Interchange Format) is used. For more colors, JPEG (Joint Photographic Expert Group) is the necessary format. Both formats employ compression algorithms, but JPEG files use a type that often affects picture quality. For this reason, GIF is the more widely used of

the two formats. Most graphics utilities let you save files in either format.

Another basic element of a well-appointed Web page is the link. Links are very hip ways to turn surfers on to other interesting Web pages. All the user has to do is click on a boldfaced or different-colored hypertext title (or graphic "hotspot") to be transported to the designated Web page. With *NaviPress*, adding a link to another Web site is as simple as highlighting either a graphic or text identifier and using the Link command in the Element menu

to open a Link dialog box. In the Link To Page field, simply type in the URL (Uniform Resource Locator) of the Web page that you want to link to. An example of a URL would be my own Web address, <http://users.aol.com/scotg68/>.

Believe it or not, adding a sound or video file is almost as easy as adding a link. Instead of typing a URL into the Link To Page field, however, you type in the file name of the desired sound or video file. (An icon will identify the link as either a sound or video file.) When someone browses your page and clicks on one of *these* links, instead of taking them to another page, the audio or video file will be downloaded (see Fig. 2). Of course, as with graphics, there are some conventions to follow regarding file format and size.

You can choose from many different audio file formats, but the three most popular are AIFF (the standard Mac sound format), AU (the standard Unix sound format) and WAV (the standard Windows sound format). In terms of compatibility, it doesn't really matter which format you choose because most Web browsers support all three. As far as file size is concerned, however, AIFF and WAV files take up the most space because they do not employ compression. For example, a 20-second AU



**The really cool thing
is that many
Internet providers
now offer free
Web space to their
subscribers.**

audio file—which *does* employ compression—requires about 157 KB, as opposed to the 213 KB needed for the same file in the AIFF and WAV formats. Of course, although you save space with AU files, you also lose a bit of audio quality to the compression algorithm. Experiment with the formats to see whether you want to offer smaller files or to produce better-sounding audio. Your page, your choice!

Memory becomes more of an issue with video files because they eat up a

THANK YOU ELECTRONIC MUSICIAN READERS!

An open letter from Morris Ballen, Disc Makers Chairman

Dear Friends,

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Sincerely,

Morris Ballen, Chairman



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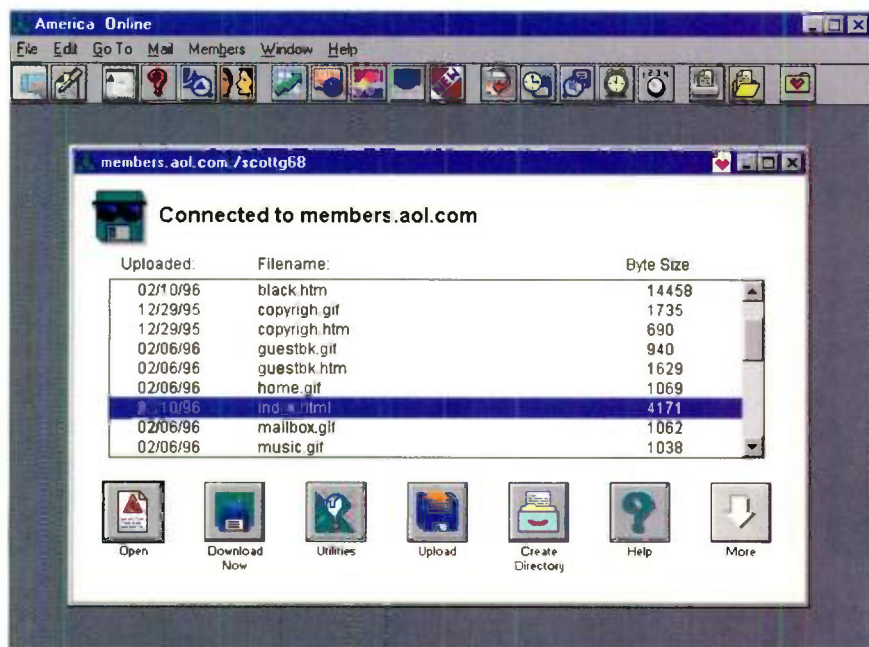


FIG. 3: Unfortunately, uploading Web page files to your America Online Web site must be done one file at a time.

tion of it. For example, a 15-second snippet of a video clip (with audio) by the group Elastica was 2,057 KB! As with audio files, there are three main types of video formats: AVI (the standard Windows format), MPEG (a multi-platform format), and QuickTime (the standard Mac format). AVI is hardly ever used because it is specific to Windows and can't be played on any of the other platforms. MPEG is compatible with all platforms, but as running it requires expensive hardware, it is not widely used. The best choice, therefore, is QuickTime, which plays on both Macs and PCs with ease.

GOING UP!

Once you've completed (and saved) your page to its designated folder, it's time to upload your files to AOL and put them on the Web. Log on to AOL with the screen name that you want your Web page to be listed under, and type the keywords *my place*. Then, simply click on the Go To My Place icon to be transported to your reserved Web space. To start transferring your files, click on the Upload icon, type in the name of the file you want to send, and click on the Continue button. A final dialog box will appear that asks you to locate the file on your hard drive and start the transfer process. Unfortunately, this process must be done with every file you want to upload (see Fig. 3).

Once you have sent all the files over to your space on AOL, you will need to complete one final step to get your page on the Web. While still within your place on AOL, select the HTML file that you created with *Navipress*. This file should now have a file extension of .HTM. Click on the Utilities button and then click on the Rename button. Rename the file INDEX.HTML and click OK. This will tell any browser that connects to your URL to automatically load your page. The URL for your AOL Web page will be <http://users.aol.com/screenname/>. The screen name is, of course, the screen name under which you saved your Web files. You now have a nifty homestead on the Internet frontier. Congratulations!

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Scott R. Garrigus invites readers to stop by his "Home on the Web" at <http://users.aol.com/scottg68/> and have themselves a look around the joint.

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The Wizard of dBs Returns

Dorothy and friends come back to learn about acoustic decibels.

By Scott Wilkinson

When the Wizard of dBs entered his workshop, he was surprised to find Dorothy and her friends waiting for him. He had taught them about decibels as they relate to electrical audio signals a few months ago. (To catch up with our story, see "Square One: Watts & Vol's & Logs, Oh Me!" and "Square One: The Wizard of dBs" in the December 1995 and January 1996 issues of *EM*.) "What brings you back to my fair city?" he asked.

"Well," Dorothy began, "we've just been to a Smashing Munchkins concert, and it was painfully loud. We talked to the sound guy after the show,

and he said it had reached 130 dB in the arena. Now, I remember everything you told us about decibels, but I didn't know what he was talking about."

The Wizard nodded knowingly. "I'm sorry I didn't get to that part of the lesson last time, but I was late for a ballooning convention in Oz," he said. "In addition to the electrical applications we discussed back in January, decibels are also used to measure the intensity of sounds we hear." With that, the Wizard launched into an explanation of acoustic decibels.

WHAT'S IN A NAME?

"As you'll recall from our last encounter," the Wizard began, "there is a difference between the terms *volume*, *level*, and *gain* with respect to electronic audio signals. Well, there is also a difference between the terms *power*, *intensity*, and *loudness* when referring to acoustic sounds." He went on to explain that acoustic power is the total energy radiating from the source per second, which is expressed in units of watts (W). For example, a clarinet generates a peak power output of 0.05W, whereas a trombone can put out over 6W of power.

Intensity is the amount of power that reaches a given surface area (say, one square meter) located a given distance from the source. It's typically measured in watts/square meter (W/m^2). As a sound wave expands away from the



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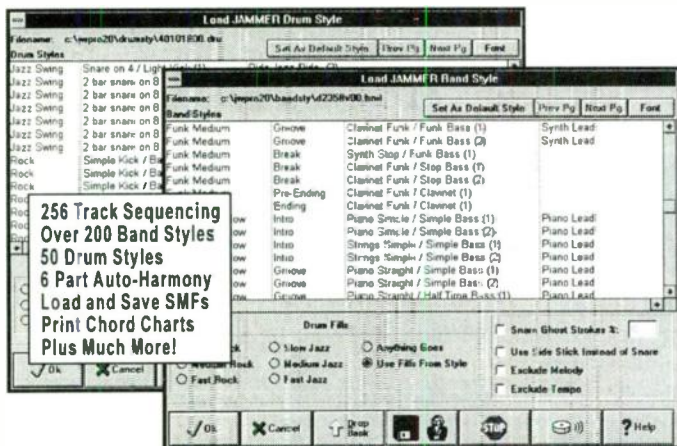
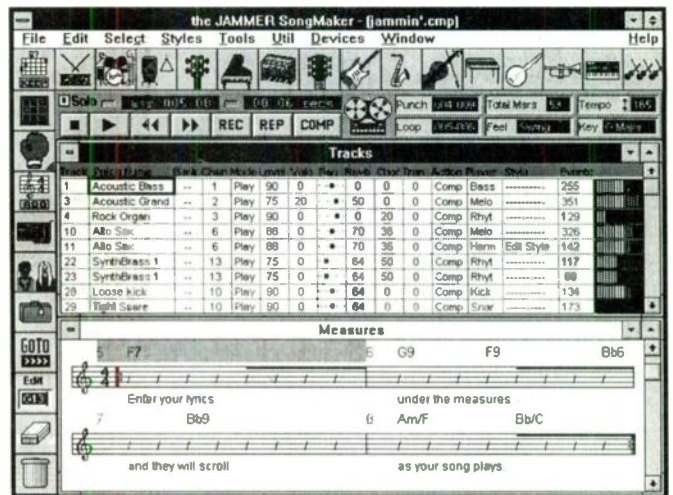
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source, the total power it carries is distributed across an increasingly larger surface area. As a result, the amount of power in a given area decreases as you get farther from the source. This is one reason sounds get softer as you move away from the source.

The term *loudness* refers to our perception of intensity. In this context, it should not be confused with the loudness control on many stereo systems, although that control's function is related to how we perceive intensity.

Perceptual loudness depends on several factors, including the amplitude of the eardrum's oscillation, the amount of noise-induced hearing loss, and the subject's age. Also, people's evaluation of loudness can vary depending on the ambient noise to which they're accustomed; one person's soft is another person's loud. This makes loudness difficult to quantify. Nevertheless, many people have been tested, and the results have been averaged to form a pretty good picture of loudness (more in a moment).

Of course, there are limits to the sonic intensity we can perceive. For most people with normal hearing, the softest detectable sound has an intensity of 10^{-12} W/m²; the loudest sound most people can tolerate without pain

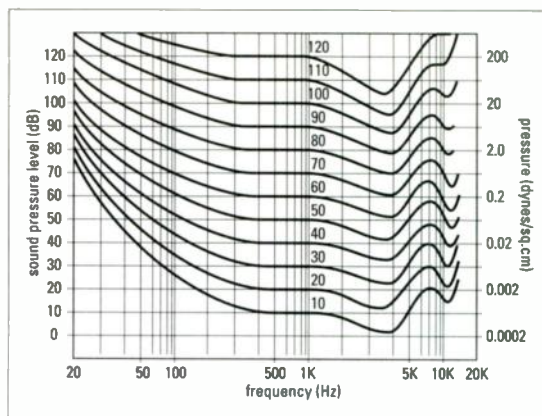


FIG. 1: Equal-loudness curves indicate the SPLs required for different frequencies to sound equally loud to most people with normal hearing. Each curve is identified by the SPL at 1 kHz, which is also known as the *phon* of the curve.

has an intensity of 1 W/m². These values differ by a factor of one trillion, which illustrates just how sensitive the human hearing system is. This range is too large for practical purposes, so the logarithmic decibel scale comes to the rescue once again.

PRESSURE TACTICS

Next the Wizard introduced his guests to another acoustical term: *sound pressure*. This is the force per unit area that vibrating air exerts against the resistance of an eardrum or microphone diaphragm. It is measured in units called *dynes/cm²* or *Newtons/m²*. (The latter units are also called *Pascals*.)

Sound pressure is analogous to electromotive force pushing electrons

How Loud Is Loud?

dB SPL	Typical Source
140	.45-caliber Colt pistol (25 feet)
130	threshold of pain
120	studio-monitor level, rock music (10 feet)
110	studio-monitor level, film scoring (20 feet)
100	loud classical music
90	heavy street traffic (5 feet)
80	cabin of commercial jet (cruising)
70	passenger compartment of car on freeway
60	average conversation (3 feet)
50	average suburban home (night)
40	quiet auditorium
30	quiet whisper (5 feet)
20	very quiet recording studio
10	rustling leaves
0	threshold of hearing

against the impedance of a circuit. As a result, it is treated like voltage and uses the "20 log" formula for decibels, which express the *sound pressure level* (SPL) and are denoted *dB SPL*.

Most types of decibels are measured with respect to a reference level, which is called "0 dB," and dB SPL is no exception. However, the reference value for dB SPL is more difficult to define than are values for other types of decibels. The reference value is the softest level at which a young person with undamaged hearing can detect a sound in the ear's most sensitive frequency range (1 to 4 kHz). As mentioned earlier, this corresponds to an intensity of 10^{-12} W/m², which is equivalent to 0.0002 dynes/cm². In other words, 0 dB SPL = 0.0002 dynes/cm².

Now that 0 dB SPL is established, the amplitudes of various acoustic sounds can be measured with respect to this reference level (see sidebar, "How Loud Is Loud?").

If we perceive one sound as twice as loud as another, the difference between them is actually 10 dB, not 6 dB as you would expect from the math. Remember, perception is subjective. In fact, this is another reason that Bels are divided into decibels: one Bel (ten decibels) represents a doubling of perceived loudness according to the average response of many test subjects.

PERCEIVED REALITY

One of the most interesting aspects of the human hearing system is that we are not equally sensitive to all frequencies. If you had a sound system that reproduced all audible frequencies with the same SPL, the low frequencies would appear softer than the midrange. Conversely, if a low frequency and a midrange frequency appear equally loud, the SPL of the low frequency is higher than the SPL of the midrange frequencies. We are also less sensitive to high frequencies. In other words, the human hearing system does not exhibit a flat frequency response.

The quest to quantify loudness led two researchers, Fletcher and Munson, to examine the hearing system's frequency response by playing different frequencies for a large number of people. They measured the SPL of each tone they played and correlated it with the test subjects' indication of equal loudness with respect to a 1 kHz tone at

a fixed SPL. The averaged results of their research are depicted in *equal-loudness curves* (see Fig. 1).

Each curve indicates the SPL required for different frequencies to appear equally loud to most people with normal hearing. As you can see in Figure 1, low frequencies must be delivered at a higher SPL to sound as loud as midrange frequencies. For example, a tone at 50 Hz must be over 40 dB SPL to sound as loud as a 1 kHz tone at 10 dB SPL. Interestingly, as the overall SPL increases, the equal-loudness curves flat-

ten out a bit, which may be one reason that engineers monitor at such high levels.

Each equal-loudness curve is identified by the SPL at 1 kHz. This is also known as the *phon* of the curve. For example, the 30-phon curve in Figure 1 indicates the SPL required for all frequencies to sound as loud as 1 kHz at 30 dB SPL.

Because the human hearing system does not exhibit a flat frequency response, meters that measure SPL are normally calibrated to compensate,

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especially in the low frequencies. This compensation is called *weighting*, and it results in readings that correspond to our perception of loudness. If we hear different frequencies as being equally loud, the meter registers them as equally loud, regardless of their SPLs.

There are three major types of weighting: A, B, and C (see Fig. 2). With A weighting, the meter is much more sensitive to low frequencies than to

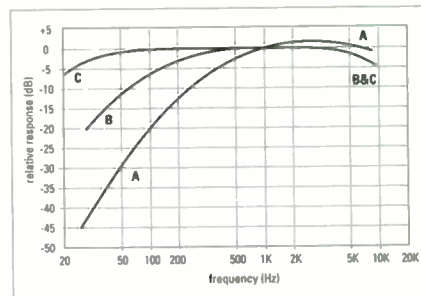


FIG. 2: Weighting in SPL meters compensates for the fact that human hearing does not exhibit a flat frequency response. A weighting is used for relatively low SPLs, and B and C weighting is used for high SPLs, where the human frequency response is flatter.

midrange frequencies. In fact, the response of A weighting is roughly the inverse of the 40-phon equal-loudness curve, which makes it ideal for relatively low levels. As mentioned earlier, the equal-loudness curves flatten out at high SPLs, so B and C weighting don't compensate as much as A, making them better suited to metering high-level sounds. If you see a spec such as "dB SPL (A-weighted)" or "dB (A)," it means that the measurement was taken with an A-weighted SPL meter.

UP, UP, AND AWAY

Once Dorothy and her friends understood the use of decibels with acoustic sounds, they went right out and bought ear plugs and an SPL meter to take to future rock concerts. They weren't going to lose their hearing just for a few hours of fun.

After they left, the Wizard returned to his work, pouring over new-product brochures from the ballooning convention. Perhaps one of the manufacturers had finally solved the problem of steering those blasted things.

EM Technical Editor Scott Wilkinson always wears hearing protection at Smashing Munchkins concerts.

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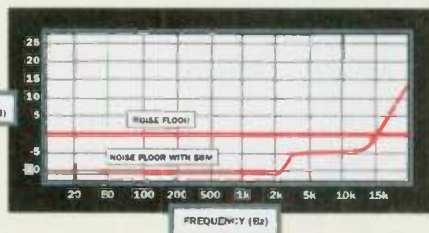


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Label Machinations

Establishing a record label is not for the faint of heart.

By Mary Cosola

The adage goes like this: If you want something done right, you have to do it yourself. It is this DIY ethic that has spurred the cottage industry of independent, self-produced CDs. And even though the home-studio boom has given musicians unprecedented control over the technical and creative aspects of their music, getting it out to the masses is as difficult as ever.

As always, major record labels offer little help to independent-minded and niche-market artists. In fact, many la-

bels no longer sign acts unless (a) they've already sold scores of records or (b) a small indie label—indies being the unofficial minor-league proving ground for today's music industry—has developed and marketed the artist to a certain sales and visibility level. As a result, many musicians are no longer waiting around to get signed by a label; they're just creating their own.

It's not only a desire to sell their own music that has some of these artists starting labels. Some go into business with other musicians to pool resources and promote local artists. Other entrepreneurs have started labels because of a passion for certain hard-to-find styles of music. Whatever your reason for starting a record label, rest assured that it is more than just a difficult task, it is a labor of love.

BUSINESS REALITIES

The business aspects of starting a label are not much different from setting up any other type of business. You should select a name for your label and do a trademark search to make sure no one else has laid claim to the name; then go ahead and file for your trademark. Your next step is to file a fictitious business-name statement, or a dba (doing business as), with your city or county clerk. Once that's done, you can obtain a resale license, a business license, and a federal tax identification number. These documents are all crucial



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in establishing your label as a legitimate business. You'll also need these licenses to open a bank account in your business's name.

All of this paperwork might seem like a hassle, but it makes good business sense. Setting up a separate legal entity for your business can protect your personal assets should your label endure financial straits. Also, be sure to carefully detail how the work and profits are to be divided if you are establishing the label with bandmates or other individuals.

HAPPY TOGETHER

Before you spend your time and money setting up your label as a business, you need to have a good idea of what you're trying to accomplish. I don't mean that you need to create some kind of five-year blueprint to megamillion-dollar success, but you should have a good idea of why you want to create a label. Is it just an umbrella company under which you'll release only your own work? Perhaps you want to help other musicians in your area release their albums: they'll come to you with

finished tracks, and you'll take care of distribution and promotion. Or maybe you want to actually sign, develop, and produce acts.

If you're like most people who start labels, you're long on ideas and short on money. Because you don't have the money to hire a staff, all of the legwork is up to you. You are the business manager, the promotions coordinator, the media contact, the new-talent scout, and maybe even the producer. These seemingly insurmountable tasks are reason enough not to go into business by yourself. By working with a partner or two, you can share the business expenses and the workload.

Larry Sloven and Bruce Bromberg are perfect examples of how this type of collaboration can pay off. They are the founders of HighTone Records in Oakland, which has produced such acts as Dave Alvin, Big Sandy and His Fly-Rite Boys, and Joe Louis Walker. They were fortunate in that their first release was Robert Cray's *Bad Influence* in 1983. The album did quite well, giving Bromberg and Sloven the industry attention and financial returns necessary to keep their label alive and kicking.

Bromberg, who continues to produce many of HighTone's artists, was a sales rep and producer for now-defunct Tomato Records in Los Angeles. Sloven was working in record distribution for The Music People in Emeryville, California. Both kept their day jobs while they worked to get HighTone Records off the ground. Sloven even played label exec on his lunch hours, phoning distributors from the pay phones of a local hof brau.

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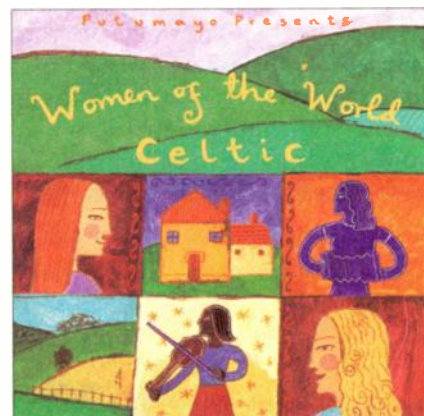
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As the title implies, Putumayo's *Women of the World: Celtic* CD is a compilation of contemporary Celtic female artists, including Máire Brennan of Clannad and The Mollys.

"They had those nice old-fashioned phone booths, with seats and doors," laughs Sloven, recalling HighTone's early days. "It was a lot of work. This is a treacherous business. You need a real knowledge of how the industry works. Aside from the luck of having our first release do so well, the reason we survived at the beginning was that we each knew different important aspects of the business."

Conversely, Dan Storper knew nothing of the music business when he started Putumayo World Music. He had built a successful business in New York City as a retailer and wholesaler of crafts and contemporary clothing from around the world. His intention was to collect music by international artists to play in his stores, an idea that came to him when he was walking through San Francisco's Golden Gate Park and heard the band Kotoja playing.

"There were hundreds of people of all ages and ethnicities dancing," recalls Storper. "The music was just joyous. It struck me that this was the type of music I wanted playing in our stores."

Storper combed record shops for music from around the globe and personally made several tapes to be played in his stores. Many of the artists were well known in their native countries, but their music was hard to find in America. The music received phenomenal feedback from employees and customers alike. That positive response gave him the idea of licensing and selling the music. When Storper mentioned the idea to his friend Richard Foos, owner of Rhino Records, Foos responded that Rhino was considering a foray into world music, and a collaboration was born.

Storper selected the music and put together the packaging and liner notes; Rhino handled the licensing, manufacturing, and distribution to record stores. In a marketing move that proved to be the key to Putumayo's success, Storper marketed the CDs to retail outlets other than record stores. Putumayo releases are carried in gift and clothing shops and in stores such as The Nature Company and Rand McNally Map and Travel. Their music is even played on the trams at the San

Diego Zoo, and the CDs are sold in the zoo's gift shop. The collaboration with Rhino continued for a year and a half, and in 1994 Putumayo took over all aspects of running the label.

"Even though I had a lot of experience in business and marketing, the process of setting up a label was a major learning experience for me," says Storper. "Working with an established company like Rhino that knew the ropes helped enormously."

LEARNING ON THE FLY

When Bob Haddad started Music of the World (Chapel Hill, North Carolina) back in 1987, he didn't envision it as a way to make a living. At that time, he was a teacher and jazz singer living in Brooklyn, making high-quality demo tapes for world-music artists to sell at their gigs. Nine years later, his record label is flourishing, with a recent release, Shankar's *Raga Aberi*, earning a 1996 Grammy nomination in the World Music category.

It was his love of jazz that led to his interest in world music. "I started to notice," says Haddad, "the influence

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that traditional music, most notably African and to some extent Indian music, had on jazz. It was a revelation for me, learning about traditional music from other cultures. As I got more interested in it, I met musicians from all over the world, which eventually led me to producing cassette tapes for them."

When he first started the label, Haddad did all the work himself, producing the artists (which he still does), getting distribution, and writing up contracts. Because producing and manufacturing music is costly and distribution so tough to secure, some of his early contracts specified the number of cassettes the artists were to purchase from him, guaranteeing that he would at least break even.

"By no means was I a savvy business person, but I was persistent" says Haddad. "I didn't intend to start a business, it just evolved into one. The business end wasn't part of the original impulse, it was my passion for the music."

Much like Storper, Haddad has taken some alternative routes to marketing Music of the World releases. He points out that music magazines aren't the only places to buy ads. By associating the music with the listeners' lifestyles and interests, you can expose your music to people who might not ever pick up a music magazine.

"We've had a lot of success with marketing our music in magazines dedicated to history, archaeology, and travel," he explains. "People who read

those types of magazines are people who are interested in other cultures, so naturally they have an interest in the music we offer."

The owners of Silly Bird Records (Berkeley, California) have taken it upon themselves to champion music from the quirky, underground, alternative rock set. Their approach to selling music is as unconventional as the music itself. Established in 1993 by Ken Stockwell, Andy Jewett, and Kennedy Greenrod, the label's first release was an album that featured Jewett and Greenrod's band, Erasergun, on one side, and Stockwell's band, Malleduck, on the other.

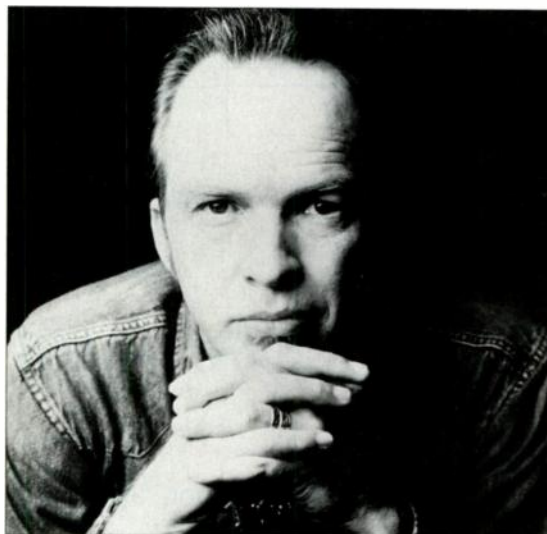
In the ensuing three years, Silly Bird has continued to add artists to their roster, including the Irving Klaw Trio from Olympia, Washington, and Fibulator from West Oakland. For the Irving Klaw Trio's recent self-titled release, Silly Bird put out the CD while another label handled the LP, and the band members are using their contacts to secure additional distribution for their album. It's definitely an all-for-one philosophy to running a label.

"We have different deals with everybody," explains Jewett. "Even with Fibulator, the deal for the second pressing of the CD was different than the one for the first pressing. We don't sign people to a contract and say, 'Now you are on our label.' We just set it up on a project-by-project basis."

"With exception of our own bands, we haven't paid for any recording costs for the bands on our label," says Stockwell.

"They bring us a finished project, and then we help out from that point—anything from contributing money for the pressing and doing some of the legwork to actually doing all of the work to get it ready for distribution."

The partners split up the work according to who has time and talent to do what needs to be done. Jewett is the appointed schmoozer, talking to bands about possible deals and making follow up calls to distributors to make sure they're pushing Silly Bird releases. Stockwell handles all the accounting and money matters.



Dave Alvin is one of many singer/songwriters who have released albums on Oakland's HighTone Records.

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As with any kind of business, the longer you can keep your label alive, the better chances you have for long-term survival. "We're starting to hear our releases on the radio more frequently now," says Stockwell. "It seems like people are taking us more seriously because we've been around for a few years. Now they realize that we're not some fly-by-night operation."

GETTING IT OUT

The most labor-intensive aspect of running a label is making the public aware of your music. If you want your music sold in record stores, you need to line up distributors to carry your releases. Or you can bypass the distributor relationship by setting up your own mail-order company, *à la* Windham Hill. The problem with that approach, though, is that it leaves you running *two* businesses, your label and the retail operation.

In addition to lining up distributors, you need to promote your artists to the record-buying public. So once again, the solution lies in hitting the phones and the pavement, building for yourself an extensive database of names and numbers. You'll need to gather information about radio stations that play your label's genre of music, media outlets for reviews, distributors, and maybe even contacts at larger labels, if you want any of your bands to get picked up.

"We spend a lot of effort on promotion and publicity," says Haddad, "especially on the retail side. We have people calling record stores to make sure stuff is in stock and relaying that information to the sales people in the field. We do promotional materials and mailings, follow-up faxes, and so on. It's very important to have your communications act together. That's a difficult thing to coordinate when you're starting a label. It's difficult enough at that stage to even get your recordings out and get the funding you need to keep things rolling. A good thing to do is to rent mailing lists from appropriate magazines or catalogs. That's a great way to start a database."

Storper stresses the importance of not only believing in your music but also creating a product that's going to get the attention of consumers and distributors. "This is a very competitive environment," he explains. "You have to offer something that really stands

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out. Great music with terrible packaging or great packaging with weak music isn't going to click the way strong music and strong packaging will."

The biggest obstacle most small labels face is distribution. Don't just blindly mail out your releases hoping to get a bite. Be sure to get a contact name at each distributor before you do your mailings. That way, you can send your release to the appropriate person, and you'll know who to call when it comes time to follow up. Distributors get hundreds of releases every week, so it's important to cultivate a relationship with people on the inside. Also, the music industry is built on hype, and every label lays claim to having "the next big thing." You need to prove that your artist has a decent enough following to make his or her album worth a distributor's time and money.

"Distribution is really tough," says Jewett. "In the best case, the distributors take your record, a month later retailers start ordering it, they get invoiced for the copies they ordered, and if they sell your records they pay

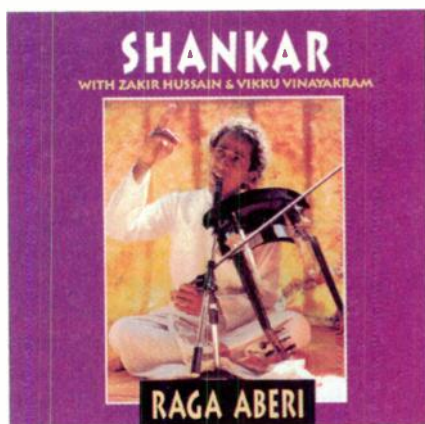
get paid by the distributor until the returns come in, and then it often depends on whether you have another release that they want. Again, we were fortunate when we started out, because people wanted our first few records. So we got paid because we had records that our distributors needed."

PARTING SHOTS

If running a record label is this much work, why do people continue to do it? More often than not, it's a love of the music.

"I do it because I find it incredibly satisfying to be a part of a record company that puts out music that we love," says Jewett. "I've always admired people who successfully run tiny labels and continue to put out amazing albums. When I get a hold of music like that, I just think about the people who had the courage to put their money into releasing this weird little thing that I love. I wanna be like that."

Mary Cosola is associate editor of Electronic Musician.



Music of the World earned a 1996 Grammy nomination in the World Music category for Shankar's *Raga Aberi* and was the only independent label in the category.

you three months later. That's *if* they sell them."

"What's happened to us is that many distributors keep the profits until they've broken even on their investment," points out Stockwell. "Then we start getting our money after they've gotten theirs."

Sloven agrees that dealing with distributors is tough for smaller labels. He explains, "Even if you get a deal with a national distributor, you'll be an extremely low priority. You don't

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Voltage-Controlled Oscillators

Catch a waveform and ride out VCO troubles.

By Alan Gary Campbell

The voltage-controlled oscillator, or VCO, is the principal sound source of an analog synth. VCOs vary widely in design, but the basic idea behind most VCOs—a current-controlled, sawtooth oscillator—is (see Fig. 1). A constant-current source charges a timing capacitor, which is buffered by an op amp or other high-impedance device. A trigger circuit drives a solid-state switch (usually a FET) that shorts the timing cap and resets the circuit at a preset trigger level. The process repeats indefinitely, and the circuit oscillates. Because the cap is charged by a constant current source, the output waveform is a linear, rather than exponential, sawtooth (“ramp”) wave.

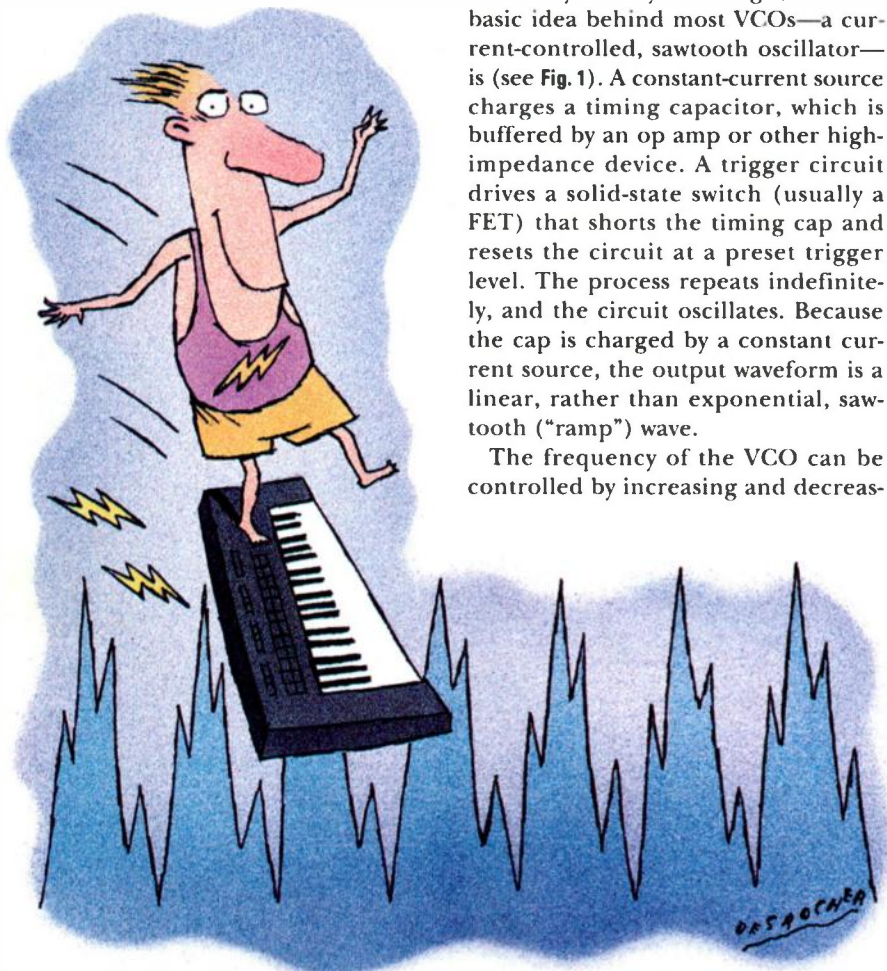
The frequency of the VCO can be controlled by increasing and decreasing

the charging current. A simple transistor subcircuit can provide both current control and exponential voltage-to-current conversion to achieve a 1 volt/octave scale.

There are inherent limitations in this design. Most significantly, with a discrete-transistor exponential converter, thermal effects cause exponentiation, and therefore intonation, errors. Early efforts to minimize such errors placed a temperature-compensating (“tempco”) resistor in the feedback loop of the oscillator CV summer.

A better solution applied a matched transistor pair on a single substrate (the Fairchild 726 or similar dual transistor), whereby one transistor formed the exponential converter and the other served as a thermally coupled, auto-correcting reference. This scheme is used on the updated Minimoog oscillator card (shown in simplified form in Figure 2) and is the precursor of the “heated chip” IC VCO. With the advent of IC multitransistor packages, such as the RCA 3046 5-transistor array, it was possible to have dual converters with a single reference, though this chip is also found in circuits that use tempco resistors, for example, the original Minimoog oscillator card.

Another limitation is the fixed and comparatively long switching time of the reset circuit (which is often one microsecond or more). At low operating frequencies, the switching time is



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insignificant compared to the period of oscillation. But as frequencies increase, the switching time adds noticeably to the period, with the result that the oscillator pitch becomes audibly and progressively flat. This can be corrected with feedback around the CV input circuit and by using various high-frequency compensation methods. Due to component aging and individual circuit variations, it is desirable to tweak this parameter as part of the normal oscillator-calibration routine, and a Hi Freq trim is often provided.

A less serious problem is presented by the switching transients that occur when the timing circuit resets. Generally, these are easily attenuated with a passive filter network; but if the network fails, the transients can cause instability in subsequent waveshaping circuits.

WAVEFORM CONVERSION

One of the advantages of the sawtooth oscillator is the relative ease of waveform conversion. A typical pulse-converter subcircuit is shown in **Figure 3**. A simple, dual op amp summer/comparator circuit provides pulse waves with a fully adjustable and voltage-controllable duty cycle (that is, width), from about 1% to 99%. With zero control voltage at the input and the Width pot at midpoint, the output is an approximately 50% duty-cycle pulse (square) wave.

Sawtooth-to-triangle wave conversion is also straightforward. The sawtooth is reasonably linear, so a simple tran-

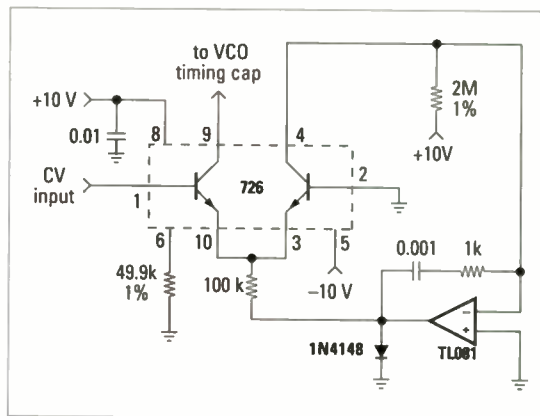


FIG. 2: Minimoog updated oscillator card tempco circuit. The 726 dual-transistor-on-a-chip provides an exponential converter and a thermally coupled reference.

sistor circuit configured as a precision, level-dependent inverter/voltage-follower is sufficient. The circuit simply follows the sawtooth wave during the first half-cycle and inverts it during the second half-cycle (or vice versa, depending upon the phase of the circuit). The Minimoog sawtooth-to-triangle converter subcircuit is shown, in somewhat simplified form, in **Figure 3**.

After a fairly linear triangle wave is obtained, it is simple to convert it to a sine wave, though this function is not commonly implemented in nonmodular synths. A typical sine-converter subcircuit uses a bipolar transistor pair, slightly overdriven, to "round off" the triangle wave. With correct circuit adjustment, harmonic distortion of about 3% or less is possible. (Incidentally, the famous Moog VCF can function as a stable sine-wave oscillator; see the March 1996 "Service Clinic: Build a Moog Filter" for details.)

Given the enduring popularity of the Minimoog, it seems appropriate to mention its two rather nonstandard waveforms. Both Oscillators 1 and 2 incorporate a composite sawtooth/triangle waveform (Waveform switch position 2), which is formed by combining 1/6 sawtooth with 5/6 triangle via a passive summing network. Oscillator 3 substitutes a reverse sawtooth wave for the composite wave.

Despite the desirability from an engineering standpoint of accurate exponential conversion and good waveform linearity, the inherent errors in scale and waveshape are the variables that, ironically, give the Minimoog and other classic synths their vaunted timbral "naturalness."

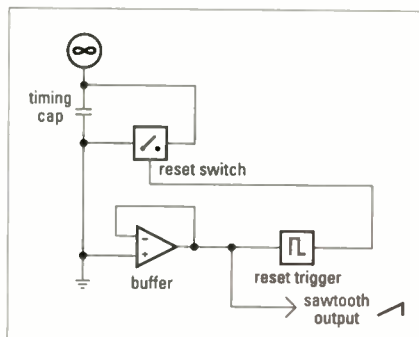


FIG. 1: Sawtooth oscillator simplified block diagram. In a VCO, the exponential converter replaces the indicated current source.

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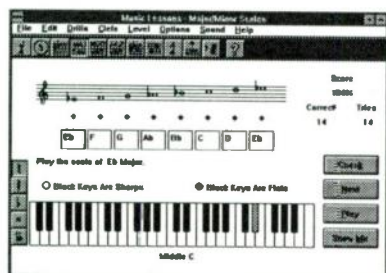
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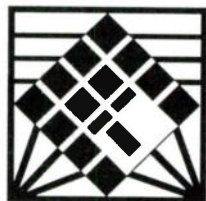
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• SERVICE CLINIC

CALIBRATION

Full calibration of an analog synth is generally necessary only after a major repair. In most instances, intonation errors and mistracking can be alleviated by simple oscillator calibration. But the power supply should be checked first. Although a 4.5-digit, high-accuracy DMM is required to calibrate a power supply, a 3.5-digit pocket DMM is sufficient for a quick check. If the bipolar power-supply voltages are reasonably close to the rated levels and are approximately symmetric, it is best to leave the supply calibration alone, as changing it will affect all the circuits and necessitate full calibration.

A strobe tuner is best for oscillator calibration, but a high-accuracy digital chromatic tuner is adequate. Do *not* attempt to calibrate oscillators using a cheap digital tuner or by ear with reference to another keyboard. Allow the unit to warm up for at least 30 minutes before attempting to calibrate its oscillator, and place it well away from drafts and heating and air-conditioning vents. Select a square-wave output. (Some tuners can trigger more easily in response to two fast wave edges.) Set

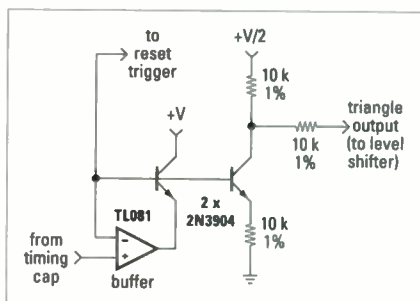
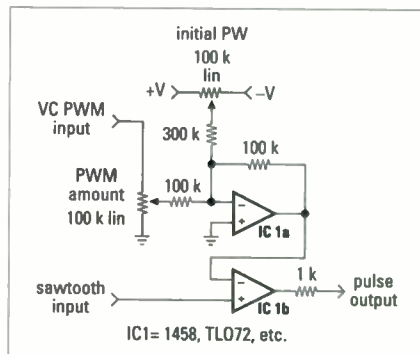


FIG. 3: In a typical pulse-converter subcircuit (top), a dual op-amp summer/comparator circuit provides pulse waves with a fully adjustable and voltage-controllable duty cycle. A sawtooth wave can also be converted to a triangle wave with a simple, Minimoog-type converter subcircuit (bottom).

the filter cutoff at maximum and filter resonance at minimum.

Be sure to follow the correct calibration procedure. Some adjustments that appear to be related to the oscillators

A strobe tuner

is best for oscillator calibration.

are actually unrelated, and some instruments require the Range adjustment be made before the Scale, whereas others require the opposite. Obtain the service manual or a copy of the calibration procedure before you start.

TROUBLESHOOTING

Problems with keyboard output and CV summing networks were covered in recent "Service Clinic" columns. In general, when all oscillators are pegged at subsonic or near-supersonic frequencies, a defective keyboard-output circuit or CV summing circuit should be suspected. These circuits are easily checked for voltage offsets using a DMM.

Problems with individual oscillator waveforms can be readily traced back to the affected subcircuits. Problems with scale or tracking can be more elusive, because various failure modes have similar symptoms. Scale errors and erratic operation can indicate a defective exponential converter, but dirty keyboard contacts can also cause pitch warbles, so clean the contacts first.

Range and/or scale drift over time may indicate a bad tempo resistor or bad transistor array but may also indicate power-supply drift, a bad keyboard-output circuit, or miscalibration of the exponential converter reference (when calibration is provided for). Significant scale errors and lower-than-normal oscillator frequency indicate a leaky timing cap or reset transistor. And don't overlook the electromechanical components: dirty or worn switches, pots, or interconnects can cause highly erratic operation.

EM Contributing Editor Alan Gary Campbell owns Musitech, a consulting firm specializing in electronic musical instrument design, modification, and service. He is also the publisher and editor of the New Music Journal.

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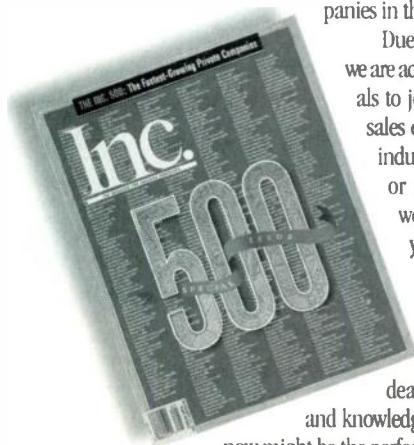
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Reviews

- 121 • E-mu Darwin hard-disk recorder
- 129 • Kurzweil K2500 synth workstation
- 137 • Tannoy PBM 8 LM powered monitors
- 139 • Roland GP-100 guitar preamp
- 143 • Steve Gadd Drum Scores
- 145 • Ensoniq DP/2 effects processor
- 150 • Groove Tubes EQ1 tube equalizer

E-mu Darwin

By Erik Hawkins

This promising modular hard-disk recorder is still evolving.

If you've been reading *EM* for the last year or so, you must have noticed the dramatic growth in the field of modular multi-track hard-disk recorders. Focusrite, Roland, Vestax, and Akai have introduced new products in this genre, and it should come as no surprise that the sampling experts at E-mu Systems have joined the club.

E-mu's new 8-track Darwin hard-disk recorder should prove a potent competitor. Although some of Darwin's expansion options have not yet been

its front panel is recessed in the On position so you won't accidentally kill the juice. The power cord is a detachable IEC type.

Darwin records 16-bit audio at 44.1 or 48 kHz (switchable) using 16-bit ADCs; playback is via 18-bit DACs. Only one sample rate can be used per song. Although the most important sampling rates are supported, I wish the unit could sample at 32 kHz, too; a lower rate is useful for squeezing more recording time out of the hard disk when you don't need the best recording quality. For example, I'd like to use 32 kHz when I'm doing rough drafts on songs or I want a dirty-sounding recording. Lower sampling rates can also be handy for low-fi multimedia and broadcast applications.

Using the optional ADA1 sync card (discussed later), up to sixteen Darwins can be synched together for a total of 128 tracks. MIDI In, Out, and Thru ports permit remote operation of its transport and record functions via MIDI Machine Control (MMC).

Three subspecies will be available, which differ only in their storage options. The Model 4000 (\$3,195) has no internal disk drive; E-mu provides a list of compatible SCSI hard drives on its Web site (see "Product Summary"). Currently, the largest hard-disk partition that Darwin can address is 2 GB, but larger drives can be used.

The Model 4001 (\$3,795) comes with a Conner 1 GB hard drive, which yields about 196 track minutes at 44.1 kHz. (Darwin reserves 20 MB for its Project files, such as playlists, track names, and locate points.) This is the model I received for review.

The third subspecies, Model 4002 (\$3,995), will ship with an Iomega Jaz 1 GB removable drive instead of an internal drive. Unfortunately, the Jaz drive was unavailable at press time, so I couldn't test one. The removable drive fits neatly into the face of the unit, just to the right of the 10-key pad and the jog/shuttle wheel. Its 1 GB removable cartridges will cost about \$100.



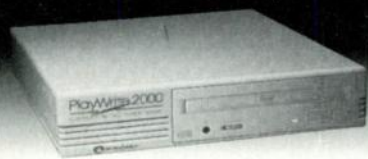
E-mu's Darwin modular hard-disk recorder offers great sound and a graphic LCD that makes editing and track management easy. The feature set is still evolving, though, and the onboard mixer only offers pan and level control.

released and its feature set is incomplete, its basic design and potential for expansion make it a product to watch.

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• DARWIN

SCSI INTERCOURSE

Darwin comes with a SCSI port for connecting external drives. It formats its SCSI volumes in Windows format, and its audio data is stored as Windows WAV files. These are mind-blowing features; tracks recorded on Darwin can be played back and edited with any Windows computer and WAV-editing software. According to E-mu, you can take any volume that has Darwin tracks on it, plug it into the computer, and access the tracks. (My studio is Mac-based, so I didn't get to try this.)

This opens up a whole world of editing possibilities, to say nothing of the potential for adding more tracks. Currently, this is a one-way street; once the files have driven over to another platform, you can't drive them back to Darwin. E-mu would like to make this avenue a two-way street, which is an excellent idea.

LIFE IS GROWTH

Five expansion slots are located on Darwin's rear panel, along with two internal expansion slots, providing an impressive capacity for growth. Two cards are already available for the rear expansion slots: the Analog Input Expander (\$249), which adds four 1/4-inch TRS inputs, and the ADAT digital I/O interface (\$149), which adds eight channels of I/O on a "lightpipe" optical connector. No TASCAM TDIF interface is currently planned, so DA-88 users have to buy the ADAT interface and a third-party (e.g., Spectral or Kurzweil) ADAT-to-TDIF converter.

An ADAT 9-pin sync card (\$349) that allows sample-accurate sync between ADATs and Darwins was shown at the recent Winter NAMM show and should be out by the time you read this. (DA-88 users will not be pleased, as E-mu has no plans for a DA-88 sync card, ei-

ther.) A SMPTE sync card (price tba) is planned for the middle of this year.

Currently, nothing is available for the two internal expansion slots, but E-mu expects to release a DSP card this summer that will include everything from compression to time stretching to pitch shifting. Also in the works is a SCSI card to connect a host computer for remote operation and visual waveform editing. (The stock SCSI port is for disk access only.)

MATING RITUALS

All Darwin's analog inputs and outputs are on 1/4-inch TRS jacks. Balanced or unbalanced plugs can be used, and the inputs and outputs are switchable between -10 dBu and +4 dBu operating levels.

The unit comes standard with four analog inputs, which can be routed independently to any track. With the aforementioned Analog Input Expander card, you have a total of eight fully assignable inputs. You can record on all eight tracks simultaneously, making Darwin great for recording on location and capturing bands "live" in the studio.

Darwin has eight individual analog outputs, which are hard wired to its eight tracks. A headphone output on the unit's face includes its own volume knob. The headphone output is clean, but I couldn't get enough gain from the headphone amp.

The unit has one stereo pair of S/PDIF digital inputs and outputs on RCA jacks. The digital outputs are switchable between S/PDIF and AES/EBU formats, but AES/EBU interfacing doesn't always work reliably because an RCA-to-XLR adapter must be used. As mentioned earlier, the optional ADAT I/O card adds eight channels of digital I/O.

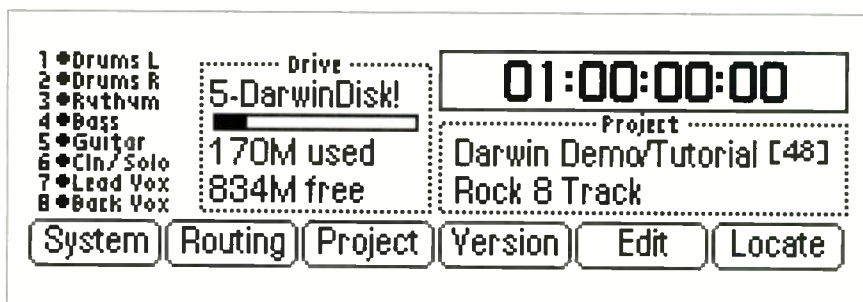


FIG. 1: Darwin's main window shows everything from track names to the song name to the current location. The soft keys located just below the LCD provide access to all main functions. (Courtesy E-mu Systems)

Other than the headphone output, the digital output is the only stereo mix output. Line-level stereo mix outputs would have been nice for situations in which, for example, you want to use external analog processing for mastering or you want to combine and process both Darwin tracks and sequenced synthesizer tracks during mixdown. Of course, you can accomplish the same thing by connecting external DACs to the S/PDIF outs.

A FINE DISPLAY

Darwin's main display is a 240 x 64 pixel LCD screen (approximately 5.25 x 1.75 inches). Its contrast can be adjusted to fit just about any taste. Cursor movement is facilitated by a set of four cursor keys. Six soft keys (buttons whose functions change according to the window you're in) are located beneath the LCD (see Fig. 1). An Exit key is provided for returning to the previous page or the main window.

Almost everything can be named: tracks, Projects (songs), Versions (sets of virtual tracks; see the section "Virtual Slavery"), and hard disks. Track

names can be up to eight characters in length, Project and Version names can have up to 23 characters, and a hard-disk name can have up to eleven characters. The names are displayed in the LCD, making Darwin as easy to read as an open book. Track management is a breeze; you'll never again say, "I don't know what's on that track because I lost the track sheets." With Darwin, the information is in the machine.

Data entry is marvelously well implemented. Three separate data-entry methods can be used: a 10-key alphanumeric pad, increment/decrement buttons, or the jog/shuttle wheel. Based on the context, Darwin knows when you need to enter both letters and numbers or just numbers, and it provides only the characters you need.

Location time can be viewed in the Main, Edit, and Locate windows. Darwin displays the location in hours, minutes, and either frames and hundredths of a frame, seconds and milliseconds, or seconds and samples. A stock Darwin only displays internal time, but with a sync card, it can also display an external master clock's time.









INHERITED TRAITS

The unit's tape deck-style transport buttons (Return To Zero, Rewind, Fast Forward, Play, Stop, and Record) make you feel right at home. The Fast Forward and Rewind buttons have multiple speeds: one press for slow (5x), two quick presses for medium (20x), and three quick presses for fast (100x). This feature, once found only on expensive 24-track analog machines, is really helpful for getting around. It would be even more useful if Darwin could engage Play and Rewind/Fast Forward simultaneously; currently, audio tracks cannot be monitored while in Rewind or Fast Forward mode.

The RTZ button breaks with tradition in that it always takes you to the assigned start time of a Project, even if it's not 00:00:00.00 (e.g., RTZ takes you to 08:04:22.28 if this is the Project's start time). You can also hit Play, Record, and Stop (in that order) by sequentially stomping on a normally-closed footswitch.

Beneath each track is a Record Enable button. When armed, its LED flashes red for Standby and glows a

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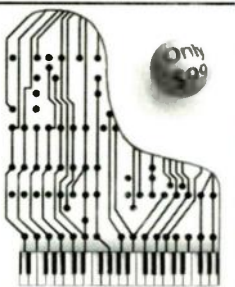
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• DARWIN

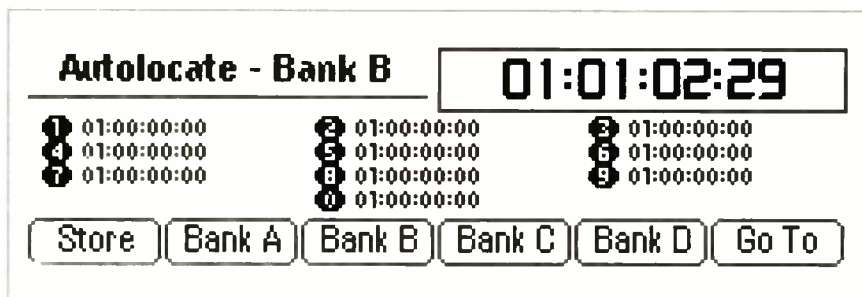


FIG. 2: The Locate window displays the times of each locate point in the current bank. This window also displays the Project's current position. (Courtesy E-mu Systems)

steady red when recording. As with most tape decks, you get into Record Standby mode by holding down the Record button and hitting the Play button which sets both buttons' LEDs blinking. Hitting the Play button then starts the unit recording.

Unfortunately, Darwin does not accept multiple, sequential punches: you can punch out by hitting Play or holding down the Play button and hitting Record, but you cannot punch back in. The unit must be stopped and allowed time to store the last take before you can reenter Record. This is a real pain if you like to keep rolling while doing multiple punches (e.g., punching in on every verse and out at every chorus to expedite recording a rough vocal track).

Auto-record and auto-loop are not available from Darwin's front panel. These functions are available through MMC, but when I work alone, I count on having them readily available from the front panel so I can concentrate on my performance. It defeats one major advantage of a stand-alone unit if the only way to access these features is from an external device. Fortunately, E-mu plans to add auto-record and auto-loop in the future.

There is a dedicated Rehearse button for trying out punches without actually recording, but it's not very useful without auto-record and auto-loop. Hitting the dedicated Input Mode button to switch between monitoring the source and monitoring the disk does essentially the same thing as entering Record with Rehearse on.

Eight 10-segment LEDs provide track metering. Oddly, all the LEDs are green; there are no yellow LEDs to indicate optimum levels or red LEDs to indicate clipping. This didn't pose a problem, though; in fact, I never even noticed it while I was recording. The LEDs are of the peak-hold type, with a

hold time of about two seconds. The top LED functions as a clipping indicator. When the level comes within 1.5 dB of clipping, it flashes for two seconds.

GETTING AROUND

Darwin's jog/shuttle wheel comes close to mimicking a jog/shuttle wheel on a professional video machine but doesn't quite make it. Spinning the jog wheel (the inner wheel) lets you scrub audio forward or backward. The faster you spin, the faster it plays, ranging from 25% of normal speed up to normal speed. The shuttle (outer) wheel plays forward or backward at eight different speeds, from 25% of normal speed to twice normal speed. The farther you turn it toward the right or left stop points, the faster the audio plays.

Unfortunately, the control feels cheaply constructed. The jog wheel is difficult to spin, and the indentation for your finger is too small. In addition, the wheels on my review unit tended to stick together; according to E-mu's rep, I probably just got a bad wheel. The changes in playback speeds are stepped by large increments, which makes finding precise cue points difficult. The jog/shuttle wheel works only when the transport is stopped and is not available from Play mode.

Every Project and every Version has its own set of locate points. Locate points are arranged in four banks, with ten locate points per bank. Only one bank of ten locate points is available at a time. To access a different bank, Darwin must be stopped, the Locate window recalled, and the new bank selected. Locate points in the current bank can be accessed directly from the 10-key pad.

The locate points can be recalled during playback without stopping or dropping out of Play. This is a nice feature; you don't always have to hit Play

after hitting Locate. Locate points cannot be named, but each locate point's time is displayed in the Locate window (see Fig. 2).

Storing a locate point is simple and can be done from almost any window, but it cannot be done on the fly. The machine must be stopped first, and the current time at which it is stopped is the new locate point. This is a drag. A dedicated Go To button, which is available from almost every window, allows direct access to any marked location via the 10-key pad.

FINDING THE RIGHT PATH

Four internal buses allow any of Darwin's inputs to be routed to any track according to three preset routings. The first preset uses one bus to send analog input 1 to all eight tracks. The second preset uses two buses, sending analog input 1 to odd tracks and analog input 2 to even tracks. The third preset uses all four buses to route analog inputs 1 through 4 simultaneously to tracks 1 through 4 and 5 through 8. A fourth routing preset, which requires the ADAT digital I/O card, uses eight buses to route ADAT digital inputs 1 through 8 to tracks 1 through 8.

If the presets don't meet your needs (say, for internal bouncing or S/PDIF transfers), you can create your own signal flow. Internal track bounces are completely in the digital domain, so there is virtually no sound degradation.

The signal-routing presets allow a single input to be split or multed to several tracks. However, you can't do this in custom routings; you can only connect one input to one track. This is too bad, because it makes some applications a bit more difficult. For example, if you're playing guitar into analog input 1 and sending a DAT with background music into the S/PDIF input, you can't send them all to tracks 7 and

8 for a stereo mix. Of course, you can internally mix and bounce the tracks down after they are recorded; user-definable mults would just save a step.

VIRTUAL SLAVERY

E-mu's advertising campaign for Darwin talks a lot about Virtual Slave Reels. However, this term is only mentioned once in the manual and never in Darwin's menus. What the ads call a Virtual Slave Reel is more properly called a Version.

The Version is Darwin's most highly evolved feature. Essentially, a Version is an 8-track playlist that points to the original audio data. Because it is actually a set of pointers (hence, the term "virtual tracks"), it uses almost no hard-disk space. Darwin can only play eight tracks at once, but the virtual tracks can be nondestructively edited and bounced down to Darwin's eight audible tracks. You can create and mix an unlimited number of these Versions, which makes Darwin much more powerful than it would be as a simple 8-track machine.

Let's examine this by creating a hypothetical Project. Having recorded seven rhythm tracks (say, six tracks of drums and one track of bass), we'll create a Version from this data.

Next, we'll submix our seven Version tracks onto track 1 and erase the other tracks, making them available for, say, background vocals and guitar. Even though we erased the material on seven tracks, the original tracks are still intact, because we are working from a playlist. Once all the tracks are filled up in this second Version, we can create another new Version and continue the process.

After creating and recording several Versions, we can go back to each one and pull out the tracks we want to keep in our final Version. All the tracks in all

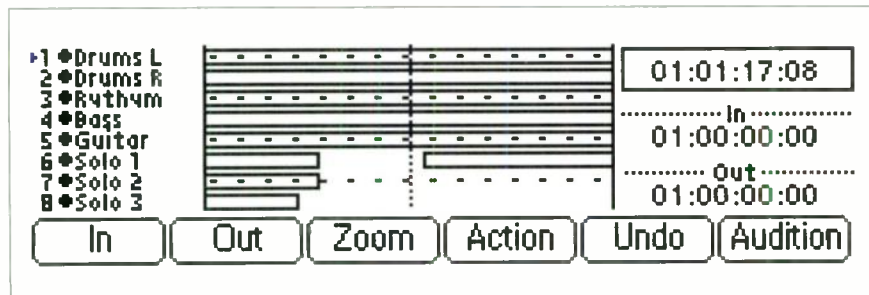



FIG. 3: The Edit window shows each of the current Version's tracks by name, along with the current time and In/Out points. The graphic blocks represent recorded audio. (Courtesy E-mu Systems)

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Versions of a Project can be interchanged through the clipboard. However, you cannot interchange tracks between Projects.

The in and out edit points are remembered and saved with each Version, making it easy to swap tracks between Versions. Each Version points to the original data or is a copy of a previous Version, so the time lines (including song start time, current time, and locate points) are identical, and everything should (theoretically) line up with the original tracks. As you create Versions, their default names are sequentially numbered (Version 1, Version 2, and so on).

SONIC GENE SPLICING

Editing on Darwin is nothing like working with a computer-based digital audio workstation. However, because it has some graphic representation of recorded tracks, Darwin offers some editing advantages over competing modular systems, most of which lack a graphic display.

The editing window (see Fig. 3) displays recorded information in the form of "tape" blocks. Although they do not show waveforms, the blocks give you a good idea of how a chunk of audio is positioned in time and with respect to other chunks of audio.

Basic editing functions include Cut,

Copy, Insert, and Replace. Copy and Cut work pretty much as you would expect: just select a region and copy or cut it. However, unlike with most modular hard-disk recorders, when a selection is cut or copied, it is placed in a clipboard. As with a personal computer, the contents of the clipboard are then available for pasting.

Insert pastes the region from the clipboard into a track, moving everything else in that track to the right to make room for the new data. Replace pastes the clipboard's contents into a track and overwrites the existing data. There is a dedicated button for auditioning the clipboard; in the future, E-mu plans to make this button user-definable.

The other main editing features are Erase, Extend, and Move. Erase clears a selected area; the erased section is not placed in the clipboard. Extend inserts silence into a selected area, moving existing audio to the right to make room for the silence. Move allows a selection to be nudged forward or backward by a programmable amount.

All editing functions can be done on several tracks simultaneously. For example, tracks 1, 3, 7, and 8 can be simultaneously copied and then inserted. That's a lot of editing power for this type of product.

You select a track for editing by simply highlighting the track in the Edit window using the cursor keys. To select a region for editing, you just choose in and out points, which can be done on the fly or while the transport is stopped.

In addition to auditioning the region in the clipboard, you can audition a selected section defined by In and Out points. This feature comes in three flavors: you can play the region between the In and Out points, or from two seconds before the In point up to the In point, or from the Out point to two seconds later. As with Clipboard Audition, the button that activates the Section Audition feature will eventually be user-definable.

UNDO BE DO BOP

Taking advantage of Darwin's micro-processor-based muscle, E-mu gave the unit multiple levels of Undo (user-selectable up to sixteen levels). Of course, the more levels of Undo you have, the less recording time is available. I found two levels of Undo sufficient in most cases.

The Undo window is beautifully implemented, offering brief descriptions of each of your previous moves (e.g., Move, Erase, Record Take) up to the amount of Undo levels you have specified. A Redo function "undoes" your most recent Undo. The number of Undo levels is retained when Darwin is turned off.

A Reclaim memory function throws away all levels of Undo and the clipboard contents in order to restore hard-disk space. This is an important feature with Darwin's current OS (version 1.02) because regardless of how many levels of Undo you have chosen, Darwin always saves all sixteen levels to disk. (The ability to select the levels of Undo is strictly for editing convenience.) This eats up a lot of hard-disk space, noticeably reducing available recording time on a 1 GB drive.

A MIXED BAG

The onboard mixer offers few features and pales compared to the mixers on most competing products. It only provides level and pan control over the internal tracks. It has no automation, EQ, effects sends, mutes, or solo functions, neither does it respond to MMC. The mixer's lack of features is a glaring weakness.

The faders can attenuate track signals up to -96 dB over 47 steps, which is just over -2 dB per step. (A step is equal to one press of the increment or decrement button.) The faders only attenuate signals and do not provide any extra boost for already recorded signals.

Fader and pan values can be entered directly from the 10-key pad, but the results are not always desirable. For example, hitting the "5" key results in a -6, not a -5; with pan, only center (zero) and right-channel (positive) values can be entered from the pad.

Darwin's mixer settings are retained when the power is turned off. However, these settings are not saved with each Project or Version. As a result, if you are monitoring over headphones or the S/PDIF digital output, you must re-adjust all the mixer settings every time you open a new Project or Version.

SLOW PROGRESS

Darwin's processing time is slower than most modular hard-disk recorders. Whenever you record or edit something, the unit requires a certain amount of time to crunch numbers.

Darwin Specifications	
Number of Tracks	8
Analog Inputs	4 (1/4" TRS)
Analog Outputs	8 (1/4" TRS)
Converters	16-bit A/D, 18-bit D/A
Digital I/O	S/PDIF, AES/EBU (1 pair, switchable)
Sampling Rate	44.1 kHz, 48 kHz (switchable)
Sampling Resolution	16-bit
Operating Level	-10 dBu, +4 dBu (switchable)
S/N Ratio	>100 dB
Frequency Response	20 Hz to 20 kHz (±1 dB @ 44.1 kHz)
THD	<0.03%
THD+N	<0.05% (1 kHz sine wave, A-weighted)
Dimensions	5.25" x 13.25" x 17.125"
Weight	17 lbs.

It's not an inordinate amount of time, but it is noticeable. For instance, recording on a single track for 30 seconds requires about three seconds of calculation time. The more complicated the action, the more processing time Darwin requires.

During this time, Darwin's transport will not move. However, like a computer, it will accept several commands while it is processing and then perform them after the number crunching is complete. I got it to perform up to three consecutive commands (Undo, Locate, and Record) that I entered while it was processing.

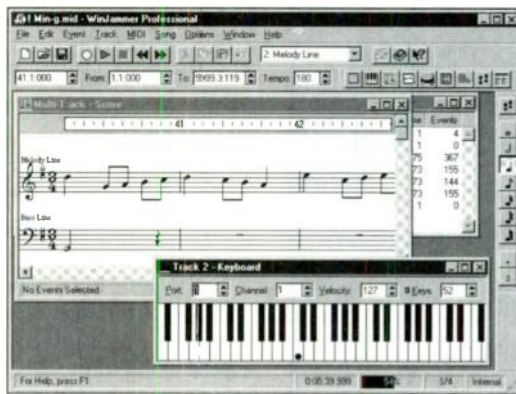
Switching between modes causes Darwin to literally stop in its tracks. If you want to hop from the main window to the mixer to adjust some levels, Darwin stops playback as soon as you hit the Mixer function. I hope this inconvenience is fixed in the future.

EVOLUTION OVER TIME

Synchronization is a critical feature of any audio recorder. As a master for a MIDI system, Darwin works wonderfully. It sends MTC via its MIDI Out port at 24 fps, 25 fps, 30 fps, and 30 drop-frame. Unfortunately, the important video synchronization rate of 29.97 nondrop is not included. I synched sequences in Opcode's *Vision 3.0* and MOTU's *Performer 5.0* to Darwin at 30 fps and didn't encounter any problems as long as Darwin was the master.

However, using MIDI Machine Control to lock Darwin to a sequencer was

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SPEIR MUSIC Dallas, Texas

Product Summary

PRODUCT:

Darwin modular hard-disk recorder

PRICE:

Model 4000: \$3,195

Model 4001: \$3,795

Model 4002: \$3,995

MANUFACTURER:

E-mu Systems Inc.

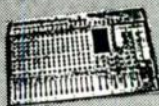
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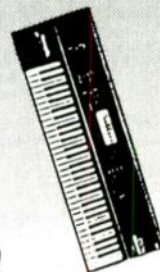
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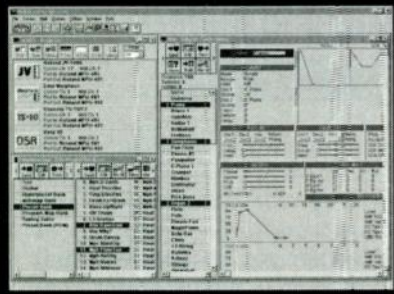
EM METERS	RATING PRODUCTS FROM 1 TO 5			
FEATURES	●	●	●	
EASE OF USE	●	●	●	●
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INSTRUMENTS

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● DARWIN

erratic and unpredictable. With both *Vision* and *Performer*, I had problems getting consistent locks and ended up with more flaming between tracks (which indicates an inaccurate lock) than phasing (which indicates an accurate lock). With *Performer*, Darwin locked best when it received start times that were even instead of odd (e.g., a SMPTE start time of 00:01:12.22 versus 00:01:12.23). But even this method did not always result in an accurate lock.

E-mu said this was not Darwin's fault but was the result of the MMC device sending an inaccurate start time. It could also simply be the physical limitations of MMC, which is not known for hiring the most accurate form of synchronization.

Fortunately, the ADAT 9-pin sync card should give Darwin sample-accurate lock with ADATs and other Darwins. This will give Darwin full slave capability in an ADAT system so that tracks can be freely transferred between the units.

At this point, Darwin does not support SMPTE directly. E-mu plans to release a SMPTE card later this year. When the SMPTE and ADAT sync cards are out, perhaps E-mu might make it possible to use Darwin's sync and location features to control an ADAT system without a BRC, which would be extremely cool.

GUARDING YOUR BACKSIDE

Survival in the digital-recording world often depends on reliable backup. Darwin's tracks are backed up via its SCSI port. You can back up to another hard disk, a 4 mm data DAT, or almost any removable medium. I successfully backed up to an external hard-disk and a Python 4 mm tape drive.

However, all is not sweetness and light in Backupville. Darwin's current OS does not include backup verification, which forces you to do a complete restore before you know whether your backup was successful. If your backup was not successful, the original tracks are probably long gone, and you're stuck with no way to restore them.

In addition, Darwin does not recognize whether the target (backup destination) drive is the same size as the source drive. Consequently, Darwin thinks it can back up a 1 GB hard disk to a 600 MB disk, but of course, it can't. This is no problem as long as you make sure the target drive is as big or bigger

than the source drive.

Even though Darwin is equipped with S/PDIF, it can't back up to audio DAT. DAT recorders are common and cost-effective these days, and providing audio DAT backup capabilities would be a good idea. Audio-only backup (no track names, locate points, etc.) can be done directly to ADAT with the ADAT digital I/O interface card. This feature would be greatly enhanced if E-mu implemented full backup to ADAT tape, as in Akai's DR8. This would offer an even less expensive backup medium than DAT.

SURVIVAL OF THE FIT

At least eight modular hard-disk recorders in various flavors are already available, and it looks like more will arrive in the near future. Despite this intense competition, Darwin seems to have all the necessary elements needed to be successful. It sounds great, has innovative features, is extremely expandable, and is reasonably priced. With its eight tracks, ADAT interface options, and Version feature, it could prove to be the perfect multitrack for project studios.

However, if it is to avoid eventual extinction, it will require consistent, speedy, and ongoing development from E-mu. Darwin's OS, though solid (it never crashed on me), is short on features. E-mu has promised that many of these features will be implemented in the not-too-distant future.

Darwin has some really great features, such as the Versions, and some really weak features, such as its mixer. Some of the missing features are minor (e.g., the user-definable buttons don't work yet). But the lack of auto-record, for example, is a bigger stumbling block. The synchronization capabilities will be greatly augmented when the ADAT and SMPTE sync options are released, and the Jaz-drive model should be greeted warmly when Iomega finally ships the Jaz. But those things haven't happened quite yet.

Clearly, Darwin is a good product with great possibilities. Its potential seems mostly limited by E-mu's ability to fulfill its promises that Darwin will continue to evolve.

A musical madness has been festering inside the mind of Erik Hawkins for several years. The first single from this madness is now being painfully yet joyously birthed.

Kurzweil K2500

By Scott Wilkinson

**This workstation proves
you can't have too much
of a good thing.**

According to the familiar adage, you can have too much of a good thing. However, this is certainly not true when it comes to synths. A case in point is the Kurzweil K2500, which represents the next generation of K2000 technology. The K2000 is a great synth; the K2500 is even better. In fact, it's at least twice as good: many of the new instrument's basic specs are double those of its predecessor. In some respects, they're up to eight times as good.

Because the K2500 is so closely derived from the K2000, I will concentrate on their differences here. For more complete information on Variable Architecture Synthesis Technology (VAST) and other basic aspects of the K2000, see the review in the March 1992 *EM*. The K2000RS rack-mount module with sampling option was reviewed in the May 1993 issue. Since then, however, the K2000's software has undergone another major upgrade, much of which is now in the K2500's software. As a result, I will cover a few major features that have been in the K2000 for a while.

The new instrument is available in three versions: the K2500 is a 76-note keyboard model with semiweighted action, the K2500X includes an 88-note weighted keyboard, and the K2500R is the rack-mount module. All models can include the sampling option as well as three sound-expansion ROM Blocks. I reviewed the K2500 with sampling option, expanded Program RAM, and all ROM Blocks.

FIRST GLANCE

Of course, both keyboards are sensitive to Velocity and Channel Pressure (Aftertouch). The K2500 has one of the best semiweighted actions I've played; it's a big improvement over the K2000 keyboard. The K2500X has the same weighted Fatar action as the PC88, which is highly regarded by many piano players.

The K2500 uses a fluorescent backlit display, which is much brighter than the K2000's electroluminescent backlit LCD; both are the same size. Fortunately, the controls are arranged in much the same way as the K2000, so they will feel familiar to users of the previous synth. The mode buttons are joined by three dedicated sequencer buttons: Record, Play/Pause, and Stop.

The most obvious physical change is the addition of eight assignable control sliders and associated buttons. Three additional buttons appear to the left of the sliders. Another important change to the K2500 is the presence of two assignable ribbon controllers. A long ribbon is located over the keyboard and stretches from G2 to B5, and a short ribbon is located under the modulation and pitch wheels. I'll discuss both these new features in detail shortly.

Above the mod and pitch wheels are two assignable buttons called Panel Switches, which resemble Ensoniq Patch Select buttons. These buttons can be programmed to send any Control Change (CC) or other MIDI messages with a user-definable value. They can also send a user-definable Note On; the corresponding Note Off is sent when you release the button (momentary) or when you press the button again (toggle). Directly above these buttons is a floppy-disk drive.

The rear panel includes six pairs of 1/4-inch analog audio outputs (four in-

dividual outputs and Mix L and R outs) and a 1/4-inch headphone jack. The individual outputs double as insert points and send/return jacks, which is very cool. The sampling option adds two balanced, low-Z, XLR inputs; one 1/4-inch TRS, high-Z, stereo input; and digital I/O in the form of AES/EBU or S/PDIF on XLRs and optical Toslink connectors. The rear panel also includes space for the forthcoming Kurzweil Digital System (KDS) 8-channel digital audio output that will come with the KDFX multi-effects board, which is due sometime in 1996.

There are four switch-pedal inputs, which can be assigned to perform the same tasks as the Panel Switches. For example, you could use one pedal to play a kick-drum sound. In addition, there are two continuous footpedal inputs and one breath-controller input, which replaces one of the footpedal inputs; you can't use both at the same time. Nevertheless, I applaud the breath-controller input; it is far too rare in the synth world.

Of course, the rear panel also sports MIDI In, Out, and Thru ports. In addition, the Thru can be switched to provide another Out, which carries the same data as the primary Out. This doesn't give you 32-channel capability, but it does reduce the amount of daisy chaining you have to do.

There are two DB25 SCSI ports, one of which is labeled SCSI Through. This means the K2500 doesn't have to be at



Kurzweil combined a top-notch feature set and excellent sound in its K2500 keyboard workstation. A variety of options are available, but the base unit includes programmable faders, ribbon controllers, a 16-track sequencer, effects, and the same powerful synth architecture as the K2000.

the end of a SCSI chain, which makes it more flexible than most instruments. Finally, a power switch and IEC-type power cord round out the rear panel.

ZOUNDS, WHAT SOUNDS!

The K2500 boasts 48-voice polyphony, which is twice what the K2000 offers. Both instruments are 16-part multitimbral. The VAST synthesis architecture hasn't changed, and the DigiTech effects processor is the same. However, the effects have been completely revoiced, and the internal mix levels have been tweaked to improve the average signal-to-noise ratio by approximately 6 dB. In addition, there is a greater variety of halls, rooms (even a bathroom and closet!), and other effects. A new parameter called Dither is intended to smooth out the unwanted distortion that sometimes accompanies digital effects. I tried changing this parameter on different effects programs, but I heard little, if any, difference.

The basic hierarchy of Objects, modes, and editors remains unchanged (see Fig. 1). However, there are now eight Drum Channels instead of one, and Programs on these channels can each have up to 32 Layers. In addition, Setups can now include up to eight Zones instead of three.

As in the K2000, the base model of the K2500 includes 8 MB of sample ROM, and the same 8 MB ROM Blocks A (Orchestral) and B (Contemporary) are available. In addition, the daughterboard that holds the ROM blocks now includes an 4 MB piano sample. This sample is the same as the one in Kurzweil's MicroPiano module, but in true stereo and with different programming. The piano Programs derived from this sample are stunning; they blow the stock piano sounds away.

One of the things I don't like about the K2000 is the fact that the stock ROM Programs are not organized in any discernible way. Fortunately, the K2500 fixes this problem; the various types of instruments (pianos, guitars, drum kits, synthesizer leads, etc.) are grouped together, making them much easier to browse when looking for that perfect sound.

Most of the stock Programs are excellent. In particular, I like the electric pianos, organs, drums, choirs, and basses, although there isn't a good fretless. In addition, the tenor sax and some of the brass Programs are surprisingly good.

In addition to Orchestral sections, the Orchestral Block gives you several solo versions of most instruments, including second chair. This is great for

assembling your own sections instead of relying on full-section Programs. (See "Sizzling Sequences" in the February 1996 EM for more on this technique.) In most cases, the section version doesn't include programmed vibrato, which is good. (The "Orchestral Flute" is an exception.) The solo versions do include vibrato, which is too fast in some cases (e.g., "Solo Bassoon"). Fortunately, the vibrato is programmed into these sounds, not part of the sample, so it can be tweaked or removed. The brasses and woodwinds are surprisingly good for samples.

The Contemporary ROM Block includes many ethnic and world percussion sounds. I particularly like the tablas and mbira. This ROM Block also includes many other types of sounds. For example, as good as the stock organ sounds are, the Contemporary organs are even better. There are several saxes based on a new alto sax sample; the alto sax Programs sound quite nice, but the soprano sax doesn't cut it. The modern drums are nice and punchy, and the basses kick butt, although there still is no fretless.

The Setups inspire creativity when you play them. Of course, there are many splits and layers among them, including a number of complete orchestras, rock bands, and jazz ensembles. In addition, there are quite a few arpeggios and grooves. Of the stock Setups, I had a lot of fun playing "Ethereal Split," "Multi Chords," "Mr. Wiz," and "C#2 Jam." Another cool stock Setup is "3-Sec Talk Sldrs," which sounds like psuedo speech synthesis.

As you might imagine, many Contemporary Setups are grooves and arpeggios triggered by one key. I laughed when I came across "Don'tGetFooled," which sounds just like the classic Who song. The Orchestral Setups are mainly ensemble stacks and layers, which I tend not to use in my music. However, there are several "Switch Orchestras," which change their instrumentation when you press the Panel Switches. "Wondrous Spaces" is really trippy, and "Metal Orch Pad" is huge. Oddly, there are a couple of groove Setups in the Orchestral group that don't seem to belong.

MEMORY ALPHA

Battery-backed Program RAM (PRAM) holds all Programs, Setups, Songs, etc. The stock K2500 comes with 240 KB of

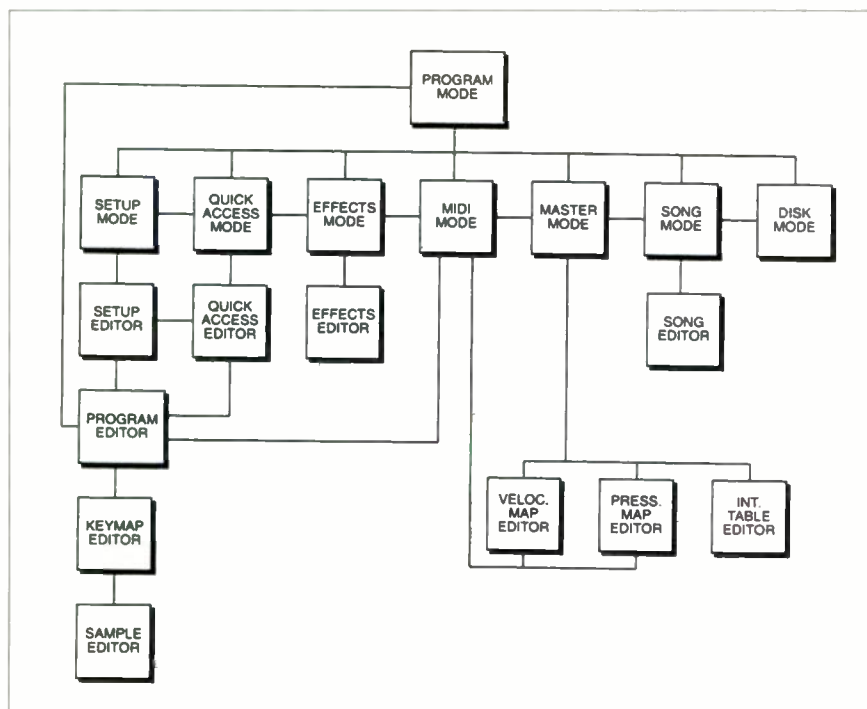


FIG. 1: The K2500's various modes are well organized and accessible from various locations. (Courtesy Kurzweil)

PRAM, compared with 120 KB in the K2000. The PRAM can be expanded to a total of 1.25 MB in the K2500, and the K2000 can be expanded to 760 KB. The sampling versions come with 2 MB of sample RAM, which can be expanded to 128 MB with standard SIMMs. This is twice the maximum sample RAM in the K2000.

The K2500 can accommodate an internal hard disk and external SCSI devices with capacities of up to 2 GB. As with all matters SCSI, you must be careful to use proper cables and keep the length of the SCSI chain to a minimum. I wanted to transfer the contents of my K2000's hard disk to the K2500 so I could use it in place of the older machine on an album project. However, this requires a DB25-to-DB25 SCSI cable, which is not commonly available. After making sure that all SCSI IDs were unique (including both instruments and their hard disks), I tried using a standard serial cable, which immediately crashed both machines. Kurzweil sent me a proper SCSI cable with DB25 connectors on both ends, which worked fine.

One of the biggest drawbacks of the original K2000 was its disk- and file-management capabilities, which were abysmal considering its SCSI connection, space for an internal hard disk, and the many types of files it had to deal with. Thankfully, this was addressed in version 3 of the K2000 software, which was carried over to the K2500. Called Advanced File Management, this feature provides hierarchical directories and extensive file-management tools. These tools include load, save, copy, move, delete, and rename, all of which can be easily applied to single Objects, groups of Objects, or entire Banks directly on a disk or in memory. In addition, it's easy to select only the types of Objects you want to work with.

Backup is a snap, and you can tell any connected SCSI devices to spin down, which is great in a quiet studio. One of the coolest functions of the Advanced File Management system is the ability to specify a "boot macro" file, which is loaded from disk whenever the instrument is turned on. I use this feature to make sure the proper sam-

ples are loaded into sample RAM. Finally, you can audition samples directly from disk without loading them, which is very convenient. However, you can hear only the first second of data.

When loading files into the K2500's memory, you are limited to specifying the Bank into which they will go (200s, 300s, etc.). However, you have several options if the target Bank already contains data. The new data can overwrite the old data, or the K2500 can use any blank locations without disturbing the old data. In addition, the new Objects can be loaded to sequential numbers, or they can retain the numbers they were saved with, assuming those numbers are available. This flexibility is rare in keyboard products and quite welcome in this instrument.

QUITE A SETUP

Most of the software changes are in the Setup mode, which boasts a completely new editor. For one thing, Zones can now be created, duplicated, and deleted like Program Layers. You can also copy, paste, and clear individual Zone parameters.

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The Channel/Program page includes a parameter called Entry Program Change, which determines whether or not the internal sounds change in each Zone when you select a new Setup. It also determines whether Bank Select and Program Change messages are sent to MIDI Out when you select a new Setup. Both of these items contribute to the K2500's power as a master keyboard controller.

The Key/Velocity page lets you specify the note map for each Zone. The available maps include linear (normal), inverse, white keys only, black keys only, and several staggered maps called 1 of 2, 2 of 2, 1 of 3, 2 of 3, etc. These staggered maps play every other key or every third or fourth key, which lets

you combine two or more K2500s for greater polyphony. Among the Velocity parameters is a selection of curves (see Fig. 2), which can be applied independently to each Zone.

Amazingly, you can establish up to three independent pitch-bend ranges to each Zone in the Bend page. Normal Pitch Bend range is specified in semitones and cents, but Aux Bend 1 offers independent up and down ranges and defaults to CC 21. Aux Bend 2 has only one range setting and defaults to CC 15.

All continuous controllers (sliders, ribbons, wheels, foot controllers, breath controller, Velocity, and Aftertouch) can be scaled and biased, and they can have their own response curves, which are the same as the Velocity curves. In

addition, all controllers (including the switches) can have Entry and Exit values. Entry values are applied when the Setup is selected in Setup mode, and Exit values are applied when a different Setup is selected. This is great for pre-configuring the sound and resetting controllers when you exit a Setup. Each type of controller has its own page to set these parameters.

Of special note is the powerful arpeggiator that can be used in Setup mode (see Fig. 3). It's global, but it can be turned on or off for each Zone. You can define a high and low active key as well as several types of latching, which determines how the arpeggiator responds to notes played on the keyboard. Several additional parameters provide plenty of options, including the ability to control the tempo in real time and sync the arpeggiator to MIDI Clock. I found some very interesting riffs in conjunction with the staggered note maps.

When you change Setups, the sound can change immediately or only after the last sound from the previous Setup is released. You can even trigger a song to begin playing when you select a Setup. However, the Setup must not have any Zones on the same channels as the song tracks, or the Programs assigned to those tracks will not be used; the Programs assigned to those Zones will be called up instead.

In Program mode, everything goes through a Control Setup. This was also true of the K2000, but it was completely transparent to the user in the older synth. In the K2500, the Control Setup is available for programming, and you can save various versions for different applications.

SLIDE AHEAD

The eight sliders can be programmed to send any CC and other MIDI messages. Their primary application is mixing within Setups and songs, but they can be used to control virtually any aspect of the sound. They can also be used as MIDI faders to control external devices. If you don't assign an Entry value to a slider in Setup mode, the value might jump when you move it; if you do assign an Entry value, it remains in effect until the physical slider reaches that value. Eight buttons above the sliders are used to mute and solo Setup Zones and song tracks; integrated 3-color LEDs indicate the Zone's or

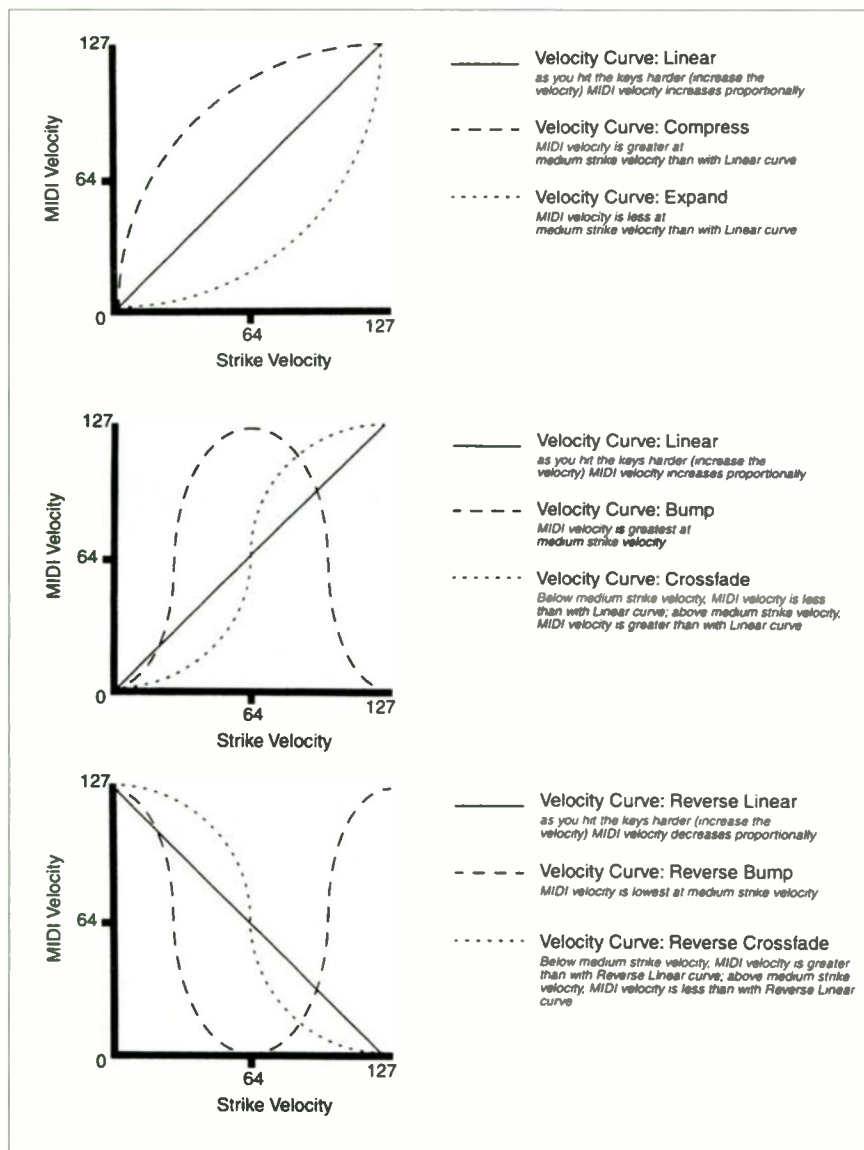


FIG. 2: These Velocity curves are available in Setup mode. They can also be applied to any controller. (Courtesy Kurzweil)

track's status. Unfortunately, these buttons are not programmable.

Three additional buttons are associated with the sliders. Solo lets you mute and solo Zones by pressing the appropriate button above the sliders, and Mixdown displays a graphic mixer with faders and pan pots. This resembles the sequencer mixer page, but the sliders address MIDI channels rather than tracks. Soft buttons below the display let you select whether the physical sliders send Volume or Pan messages and whether they are assigned to channels 1 through 8 or 9 through 16. These messages can be sent to the internal sounds, MIDI Out, or both.

The MIDI Faders button lets you assign any MIDI channel, CC message, and initial value to each slider (see Fig. 4). You can also save up to four assignment configurations and recall them with soft buttons. This is the epitome of convenience.

The sliders are flexible and useful, providing immediate and intuitive control over the mix and other aspects of the sound. In conjunction with the new KDFX effects, the next major revision of K2500 software will add organ drawbar control to the sliders' capabilities.

CUT THE RIBBON

The ribbon controllers are configured in the Setup editor. The long ribbon can encompass one long zone or be divided into three smaller zones. An arrow above the middle indicates the center of the entire ribbon; two arrows to the right and left indicate the smaller zone boundaries. The long ribbon is sensitive to the direction of movement but not to pressure. The short ribbon is sensitive to both direction and pressure.

Of particular importance is the Position parameter, which can be set to Relative or Absolute. If it's set to Relative, anywhere you touch becomes the "center" from which positive and negative values are sent as you move your finger right or left. Absolute fixes the center in the physical center of the ribbon. Another important parameter is Spring, which determines whether or not the controller value returns to its nominal value when you remove your finger from the ribbon.

The ribbons are great fun to use. They let you play incredibly expressive vibrato and pitch bends. In addition, you can play notes from them: a good example is the "Harp Arps Rbn" Setup

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in the Orchestral ROM Block, which lets you play a harp gliss from the large ribbon. The notes it plays are specified in a special Keymap within one of the Programs. I would prefer to play any set of notes on the keyboard with one hand and strum a gliss of those notes on the ribbon with the other hand.

SEQUENCE THIS!

Another major improvement that first appeared in the K2000's version 3 software and made its way into the K2500 is the onboard 16-track sequencer. Without expanded PRAM, its capacity is approximately 60,000 events or 30,000 notes; with expanded PRAM, the capacity is approximately 314,000 events or 150,000 notes. You can construct songs with up to 99 sections, called Steps, but these Steps are limited to 16,000 events or 8,000 notes. This is a minor annoyance; it's certainly easy enough to assemble a song from several Steps, but I'd prefer no limits in this regard.

The main sequencer page includes all basic song information and track status (see Fig. 5). You can record, play, and stop with the appropriate soft buttons or the dedicated buttons below the mode buttons. The LED in the Play button flashes with the tempo, but there is no indication of the downbeat (e.g., flashing red on the downbeat), which would be nice.

You can record in real time or step time, and you can include variable time signatures and tempos. The Misc page

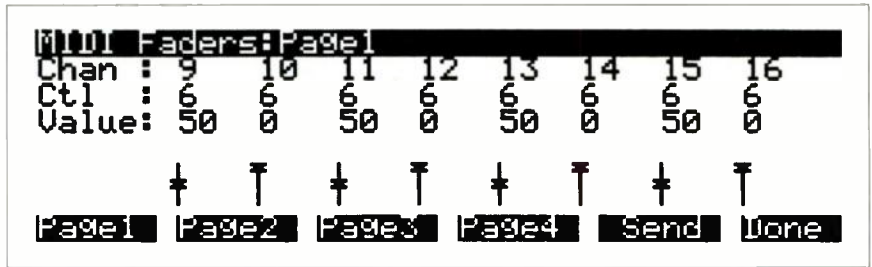


FIG. 4: The sliders can be configured to send any MIDI CC message on any channel, and four sets of assignments can be saved and recalled. (Courtesy Kurzweil)

provides a variety of useful record and playback parameters, including quantization on input, auto punch-in and punch-out, looping, synchronization, count off, and click options (see Fig. 6).

The editing functions are remarkably complete, including event-list editing with filtered viewing (i.e., you see only those events you specify) and cut/copy/paste/delete functions. Specified events in any section of a track can also be cut, copied, pasted, and deleted.

Other track functions include bouncing, inserting, and transposition. In addition, you can shift data backward or forward by single ticks. (Recording resolution is 768 ppqn, but editing resolution is 480 ppqn.) Both normal and groove quantization are available with a complete set of parameters, which is very cool. Finally, you can thin controller data, modify Velocities and controller values, and remap any type of controller data to any other type.

This is one of the most powerful se-

quencers in any keyboard workstation today. I found it very easy to get around thanks to a logical layout. The feature set rivals many computer-based sequencers, which is high praise indeed. Of course, you don't get the advantages of a large monitor screen, but you can sequence at any time without having to boot up your computer.

MO' BETTA

There are so many enhancements in the K2500 that it would be impossible to describe them all in a single review. However, a few more are definitely worth mentioning. For example, the system software and ROM Objects are now stored in flash ROM, which can be updated from floppy disk using the Boot Loader. This approach is far superior to swapping chips in the K2000.

My review unit didn't initially include the Setups for the A and B ROM Blocks. These Setups were sent to me on a floppy, and I installed them with the Boot Loader, which offers the options of installing the system software or Objects as well as various diagnostic routines and a hard reset. This is a truly wonderful enhancement, because it lets you update the software from a floppy disk instead of taking the machine to an authorized technician for a chip swap.

There are several improvements in the sampler. For one thing, the K2500 can sample its own outputs, complete with dynamic filtering, effects, and sequencing. You can also sample an external signal in sync with the sequencer, which then plays the sample at the appropriate moment when you play the sequence. In addition, the level meters are now active in real time while you are sampling; they were disabled during sampling in the K2000. Sample Skipping plays every other sample, which effectively doubles the sample rate. Normally, samples at 48 kHz can't be transposed upward by more than

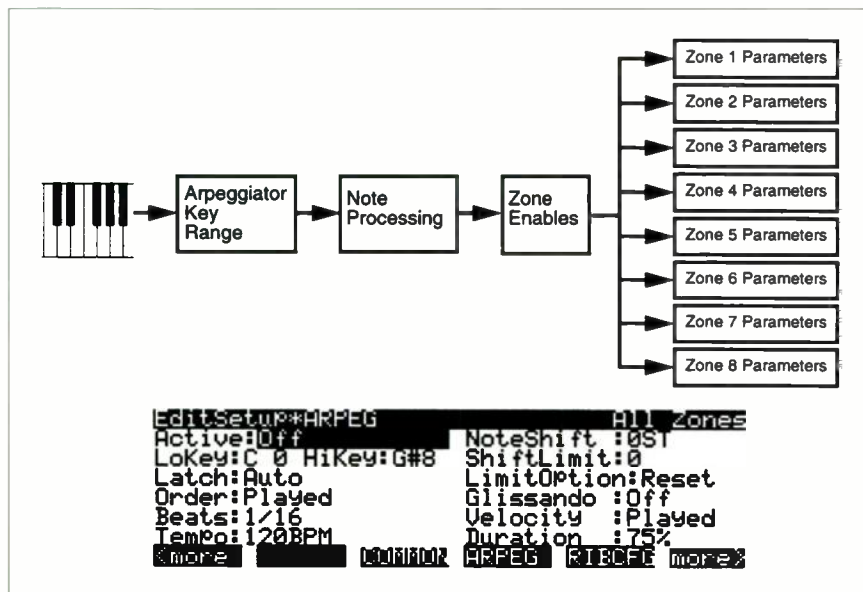


FIG. 3: The arpeggiator can be applied to any Zones in a Setup. (Courtesy Kurzweil)

one octave; skipping every other sample lets you transpose a 48 kHz sample upward by as much as two octaves. However, it can induce some unwanted artifacts into the sound.

Each sample has a user-definable start point, end point, and alternate point. In the K2000, you can assign a controller to determine whether or not the alternate point will be used. You can also do this in the K2500, but it goes one step further: you can also control the position of the alternate point from a continuous controller in real time. This helps make articulation even more expressive.

In the K2000, the minimum nonzero EG attack time is 20 ms, which leads some people to complain that the sound is not punchy enough. In the K2500, the minimum nonzero attack time is 2 ms, which enhances the punchiness significantly. A new Impact parameter in the Envelope Control page of the Program editor amplifies and clips the first EG stage, which works best on sound with lots of transients, such as analog synth bass and violin.

WRAP UP

I know the K2000 fairly well by now, so the K2500 felt familiar. This is good, because it's even deeper and more powerful than its predecessor. Much

Product Summary

PRODUCT:

K2500 keyboard workstation

PRICE:

K2500: \$4,720

K2500X: \$5,250

K2500R: \$3,685

Sampling option: \$795

MANUFACTURER:

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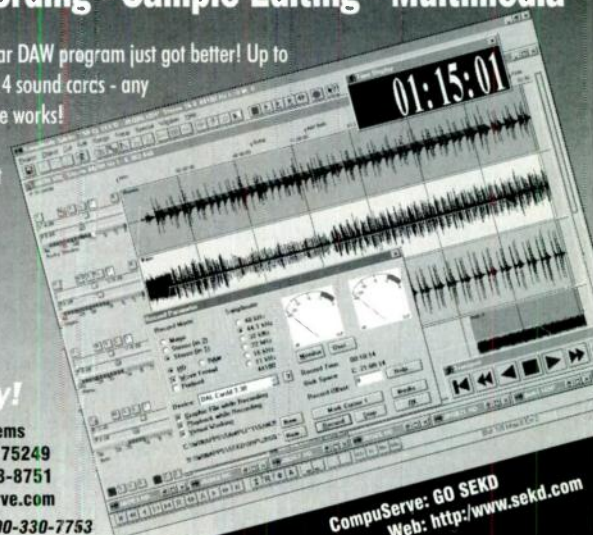
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● K2500



FIG. 5: The main sequencer page reveals song and track status. (Courtesy Kurzweil)

of the new power is found in Setup mode. In fact, it's entirely reasonable to use this mode most of the time, even when playing a single Program. Setup mode also provides monstrous master keyboard capabilities; the only thing lacking in this regard is multiple, independent MIDI Outs.

Unfortunately, I was unable to try the new KDFX effects or the DMTi digital-audio interface because they weren't ready by press time. Kurzweil makes fine products, but the company tends to announce them too early; the K2500 itself was first announced in "What's New" exactly one year ago.

Nevertheless, the K2500 was well worth the wait. Granted, it's expensive at \$4,720 for the base 76-key model (with no sampler), but so are other comparable workstations. But when you consider what you're getting in terms of standard and optional features (i.e.,

importantly, the ROM Programs and effects were ported directly from the K2500. (The *vx* stands for Voicing expanded.) In total, the K2vx includes 600 ROM Programs and 300 Setups. Best of all, the list price is only \$500 more than a base K2000's; the ROM Blocks and PRAM expansion cost \$1,325 if you buy them to retrofit into an existing instrument.

All of this leads me to believe that Kurzweil will continue to develop the K2500, as well. In fact, I hear the list of proposed enhancements for the next major software upgrade in the K2500 is 28 pages long. Among the enhancements I'd like to see is a hard-disk recording function. Fortunately, updating the software and ROM Objects will be a cinch, thanks to flash ROM and the Boot Loader. In addition, Kurzweil will make all future software upgrades available online and free of



FIG. 6: The sequencer Misc page lets you specify many record and playback parameters. (Courtesy Kurzweil)

just about everything but the kitchen sink), the price seems more reasonable.

Kurzweil has an excellent reputation for continuing to support and develop existing products; the company plans to upgrade the K2000 software at least one more time. In addition, a new version of that now-venerable instrument is available: the K2vx. This is a K2000 loaded with both ROM Blocks and the PRAM expansion. Perhaps more im-

charge. That's right—free of charge. This decision slightly increased the initial price of the instrument, but I think the tradeoff is eminently equitable.

The K2500 is truly an awesome instrument. It sounds fantastic, it's packed with useful and well-implemented features, its lineage is impeccable, and it will continue to expand and improve. All that remains is for you to write a check. ●

Tannoy PBM 8 LM

By Steve Wilkes

Superb clarity and imaging distinguish these powered near-field monitors.

A few years ago I had a listening experience that made a lasting impression on me. After a particularly grueling gig (low turnout, bad playing, etc.), I repaired to a friend's house for food and conversation. Tired and frustrated, I lay on her living-room floor, wallowing in lame-gig despair. My friend had recently acquired a new set of studio monitors and hooked them up to her stereo system. She put on the beautifully produced *Cruel Inventions* by Sam Phillips and left me alone with the music.

The monitors and music were so wonderful that my frustration was quickly replaced by awe. It was as though my world had suddenly gone from black-and-white to Technicolor.

The next day, I went out and bought a pair of the same monitors.

I hadn't had an equally profound listening experience until a pair of Tannoy PBM 8 LM powered monitors arrived on my doorstep. Listening to these speakers, I rediscovered that stunning feeling of having the listening experience taken to a new level.

DYNAMIC DUO

Tannoy has brought together two powerful components to create this dynamic system. The PBM 8 II enclosures contain a 1-inch, silk-dome tweeter and an 8-inch, fully injection-molded woofer. The hard-wired crossover provides bi-wire connections for biamping the system.

Each speaker enclosure is powered by a Limpet power amplifier, which is built into a 1-piece, high-pressure, die-cast metal housing. (A limpet is a type of marine mollusk that clings tenaciously to rocks, just as the power amp clings to the back of the speaker cabinet.) Because each enclosure has its own Limpet, the left and right channels are fully separated, which helps produce superior stereo imaging.

A Neutrik jack on each Limpet amp-

PBM 8 LM Specifications

Type	2-way
Tweeter	1" soft-dome
Woofer	8" injection-molded cone
Amplifier S/N Ratio	-110 dB
Amplifier THD	<0.01
	(20 Hz to 20 kHz)
Crossover Frequency	1.9 kHz
Frequency Response	45 Hz to 25 kHz (±3 dB)
Peak Power Handling	125W (@ 8Ω)
Dimensions	15 1/8" x 10 1/4" x 10 3/4"
Weight	24.1 lbs.

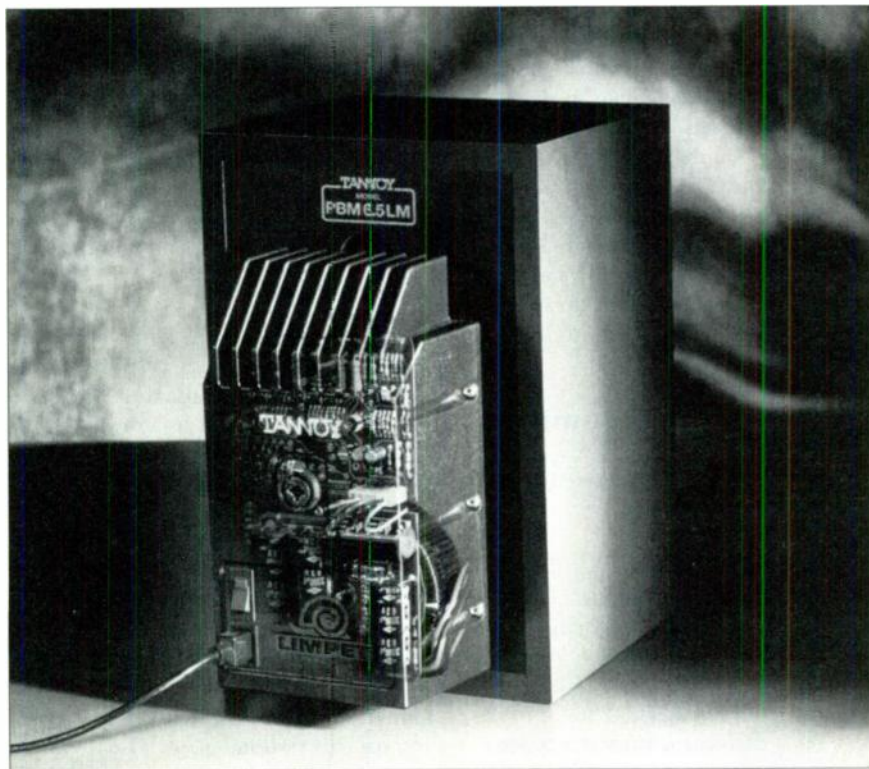
lifier provides unbalanced, 1/4-inch and balanced XLR connections. The unit's input section accommodates 0.775, 1.0, or 1.5 volt levels, and a soft-knee limiter prevents damage to the drivers. Each amp has its own internal power-supply with IEC connector. The power supply can handle most common European, American, and Asian household voltages (e.g., 120 VAC, 220 VAC, and 240 VAC).

Due to the Limpet power amps, the PBM 8 LMs weigh considerably more than the average near-field monitors. At 24 pounds each, they'll provide a bit of a workout for engineers who tote their favorite monitors from one studio to the next.

PRELIMINARY LISTENING

I began my evaluations by listening to three CDs that provided a nice variety of styles and sounds. I started with a true test of power, Alice in Chains' *Grind*, an album I love for its warm, dark, punchy sound. Surprisingly, this CD came across with a much more open, spacious, and balanced sound on the 8 LMs than on my old monitors.

Next up was David Wilcox's *Home Again*, a beautifully recorded folk album with sparse instrumentation: vocals, acoustic and electric guitars, bass, and percussion. The 8 LMs seemed tailor-made for this album: the breathtaking clarity in the high and low end really made the music shine. The kick drum, in particular, was a joy to the ear, nicely demonstrating the beauty of the 8 LMs' extended low-end response.



Like the mollusk it's named for, the Limpet power amplifier clings to the back of Tannoy PBM 8 LMs and PBM 6.5 LMs (shown here). Each enclosure has its own Limpet, providing complete channel separation.

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Seen from the front, the Tannoy PBM 8 LM is identical to the PBM 8. With the design-matched Limpet power amp attached, the speaker attains improved bass response and startling resolution in the high end.

performers' breathing were clearly audible. In this open and spacious classical setting, the 8 LMs simply glowed with sonic magic.

STUDIO APPLICATION

While working on this review, I wrote a cue in a mainstream jazz style for an ad agency that was producing a new CD-ROM for Kenwood. This gave me the opportunity to monitor on the PBM 8 LMs during the mixdown stage.

Again, I was most impressed by the low-end response. My acoustic-bass sample had a warmth and depth I had never detected with my old monitors. It came across with incredible presence, yet it never sounded boomy, thanks to the 8 LMs' smooth balance. The dark, Tyner-esque midrange from the acoustic piano was so accurately reproduced and the highs from the cymbals

and vibes were so clear that I was almost convinced the "quartet" was performing in my home studio. One of the more remarkable aspects of the 8 LMs is their incredible balance and linearity throughout the frequency spectrum and a virtual absence of any annoying bumps. With the David Wilcox album, it was clear that the 8 LMs indeed deliver smooth and accurate frequency response, even at different monitoring levels.

Brahms' *Sonata for Cello and Piano*, performed by Emanuel Ax and Yo-Yo Ma, was next. Here again the clarity, balance, and solid stereo imaging of the 8 LMs ruled the day. Ma's and Ax's performances sparkled on these speakers. Beautiful subtleties such as the

After listening to the mix in different environments, I was sold on the Tannoys. The mix sounded warm and intimate—key qualities of an acoustic jazz quartet—on my old monitors, through a friend's studio monitors, and even on a cassette boombox. I'm primarily a drummer and electronic percussionist, not an engineer, so to achieve a great mix was an absolute joy.

CONCLUSION
Tannoy's PBM 8 LMs offer superior balance and frequency response at all monitoring levels, amazing low end, and excellent stereo imaging. And at \$1,395 for a powered system, the 8 LMs provide good bang for the buck, especially if you consider what it would cost to buy a separate power amp and speakers of equal quality.

To top it off, the speakers are easy on the ears. After spending two days mixing the cue, I suffered no serious ear fatigue. The cost-conscious consumer should think twice before passing on this system.

Steve Wilkes is an assistant professor at Berklee College of Music. (Special thanks to Crit Harmon and Ginny Fordham.)

Product Summary

PRODUCT:
PBM 8 LM powered monitors

PRICE:
\$1,395/pair

MANUFACTURER:
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VALUE	●	●	●	●

Roland GP-100

By Riley Wilson

A guitar preamp/ processor for the twenty-first century.

Guitarists are a peculiar bunch. They sport wild new clothes and hairstyles, yet they persist in playing instruments and amps that are at least a generation old. Guitars from the '50s and amps from the '60s are still the weapons of choice as we enter the back half of the '90s.

Flying in the face of this "retroolution," Roland's new GP-100 preamp/processor purports to mimic some of the coolest amps and effects created during the last 40 years. If the GP-100 is good enough to replace vintage gear, Roland may change the face of the entire guitar amp/effects market.

FIRST GLANCE

The GP-100 sports an attractive, brushed-gold front panel, which makes it stand out in a rack of black faceplates. Input and headphone jacks with 1/4-inch connectors are found on the front panel, along with signal and clipping LEDs and Input and Output level controls. The preamp controls are rotary pots that handle volume, bass, middle, treble, presence, and master volume.

A 2-line by 16-character, backlit LCD reveals which of the 400 Patches (programs) is currently selected. Roland's factory presets occupy numbers 201 through 400; users can bend, fold, spindle, mutilate, and save Patches 1 through 200. Also on the front panel are buttons labeled Preamp, Global, Tuner,

Utility, Write, Exit, Meter, and Effect, which provide access to the corresponding parameters and functions. Parameter and Number/Value knobs and a power switch round out the controls.

The back panel includes a duplicate input jack, two sets of send/return jacks, and two pairs of output jacks. In addition, there is a MIDI In and a combination MIDI Out/Thru. Two External Control jacks can be connected to the footswitch jacks on other devices. This allows the GP-100 to automatically turn external effects on and off or to switch channels on an external amp when you call up a particular Patch. The Effect Remote/Expression Pedal jack serves one of two functions: you can connect a latching footswitch to turn the effects on and off, or you can connect a continuous footpedal, which controls the parameter specified by the Controller Assign function (discussed shortly).

A single jack labeled Control 1/2 accepts one or two latching or nonlatching footswitches, which can perform various assignable functions. (To connect two footswitches, you need an optional PCS-31 cable that terminates with a 1/4-inch TRS plug at one end and two 1/4-inch TS plugs at the other end.) The connected footswitches can step through the Patches, turn a particular effect on and off, mute the entire device, adjust the LCD contrast, and turn Assign Hold on and off. (Assign Hold determines whether or not the current controller values will apply when the Patch changes.)

Except for the MIDI ports, all jacks are 1/4-inch jacks. Roland uses a permanent power cord instead of a flimsy wall-wart cable.

The GP-100 is both a preamp and a signal processor. The preamp can be linked with the effects to create a Patch or used independently from the effects. In the first case, the preamp settings

are stored with the effects settings in a Patch; in the second case, the preamp is controlled directly with the front-panel knobs.

COSMIC TONES

The GP-100's secret weapon is Composite Object Sound Modeling (COSM), which is the technology behind Roland's VG-8 guitar synth. The VG-8 simulates, or models, various guitar bodies, pickups, preamps, effects, speakers, and microphones to produce a complete "record ready" guitar sound. (EM reviewed the Roland VG-8 in the November 1995 issue.)

▼ The GP-100 really shines in the studio.

Similarly, the GP-100 employs COSM technology to model classic guitar amps, speakers, and effects with uncanny accuracy. There are fourteen different types of simulated amps and twelve types of speaker cabinets, which can be unmiked or miked with dynamic or condenser microphones at different distances.

There are plenty of effects, including compression, chorus, reverb, ducking delay, EQ, noise suppression, flanging, intelligent harmony processing, panning, phase shifting, tremolo, vibrato, and wah. As you might expect, Roland also reprised its own discontinued gems, such as the BOSS Feedbacker, Slow Gear, and Vibrato.

Let's take a look at a few preset Patches. "Classic Stack" is a very good approximation of a Marshall 100-watt amp through two 412 cabinets. "JC-120



The Roland GP-100 produces high-quality guitar effects, including a wide variety of modeled amp and speaker simulations.

Clean" simulates Roland's own guitar amp with the stereo chorus engaged. "Van Halen" is a clean, blackface Fender Twin and a gritty Matchless/AC-30 clone. These sounds are extremely realistic; close your eyes, and you'll swear it's the real McCoy.

Thankfully, the GP-100 is devoid of the lame "Music Soundtrack" effects found on many preamp/processors. The engineers who built this unit must like guitar players and classic guitar sounds, because they're all here: Fender tweeds, MESA/Boogies, both channels of a 100-watt Marshall, Soldanos, the Peavey 5150, Matchless—the list goes on and on.

My main beef is the absence of a Hi-watt simulation. The Marshall 1959 comes close, but it's not the same. Additional amp models, such as a Fender Super Reverb, Polytone, 50-watt Marshall, and Dumble Overdrive would have been great, as well. Of course, Roland did not try to simulate every guitar amp ever made; they selected the amps they thought were the coolest, and every guitar player will find at least one they wish Roland had included.

In addition, the Patches are strongly rock oriented, and some of the rock sounds are unnecessarily duplicated. I'd prefer to have more country, pop, R&B, and jazz sounds.

PLUG IT IN

Using the GP-100 is simple: plug in your axe and turn it on. You can specify a solid-state or tube amp with integrated speakers or separate, stack-type speakers. You can also adjust the tonal color of the output according to the type of speaker you're using. A chromatic tuner allows you to tune up before you jam.

You can step through the Patches

with the Number/Value knob or footswitches connected to the Control 1/2 jack. Patches can be recalled directly with an optional FC-200 MIDI foot controller or using MIDI Bank Select and Program Change messages. In addition, the FC-200 can be used to program the GP-100 via SysEx as you play, providing "no hands" editing capability.

EFFECTS ALGORITHMS

The effects are organized in five groups called Algorithms: Basic, Delay, Harmony, Vintage, and Dual. In all Algorithms except Dual, you have complete control over the order of the effects, including the send/return point and speaker simulator. The only exceptions to this flexibility are the Feedbacker, which is fixed as the first effect in the Vintage Algorithm, and the reverb, which is always the last effect. However, you can place the send/return point after the reverb. In addition, you can place the reverb in parallel with the effect immediately preceding it, and each effect can be turned on or off independently.

Incidentally, the reverb is digital, with no attempt to mimic the all-important spring reverb found on most guitar amps. In addition, its fixed location in the signal chain reduces the unit's flexibility. This was one of the few disappointing aspects of the GP-100.

As its name implies, the Basic Algorithm includes a simple collection of effects that are available in the other Algorithms (see Fig. 1). The Delay Algorithm features a 4-tap delay with up to 4.8 seconds of delay per tap, 100 pan positions, and a ducking function. In addition, you can set the delay time by stepping on a footswitch four times to establish a Tempo Delay. Unfortu-

nately, the delay doesn't sync to MIDI Clock.

The Harmony Algorithm offers 4-voice, intelligent harmony processing, with up to 740 ms of predelay for each voice and 100 pan positions. Each delayed segment can be played forward or reversed. The Vintage setting includes the Feedbacker and Slow Gear effects; the Dual Algorithm offers two similar but independent signal paths (see Fig. 2).

Editing the effects is a breeze. Of course, the specific parameters depend on the effect in question, but it's a simple matter to scroll to the desired parameter and change its value. Using the Control Assign function, you can



The GP-100 is both a preamp and a signal processor.

assign various real-time controllers to many parameters. The available controllers include an expression pedal connected to the Effect Remote/Expression Pedal input, a footswitch connected to the Control 1/2 jack, Aftertouch, Pitch Bend, and Control Change messages 1 through 31 and 64 through 95.

Up to sixteen control assignments can be made for each Patch. One source can have multiple destinations, and one destination can have multiple sources. You can also limit the range of values, which is great for tailoring the sound just the way you want it.

For even more processing, you can send the signal through an external effects box and back into the GP-100 via two pairs of send/return jacks. As mentioned earlier, you can place the send/return point anywhere in the signal chain, which determines the position of both loops in the path. The effects loops can operate as a stereo pair or as two independent mono loops. In the latter case, the loops can be in series or parallel, and the output from the send/return point in the signal path is mono.

Finally, the send/return loops can behave like an insert point, which takes the entire signal out of and back into the GP-100, or as a mixer aux send,

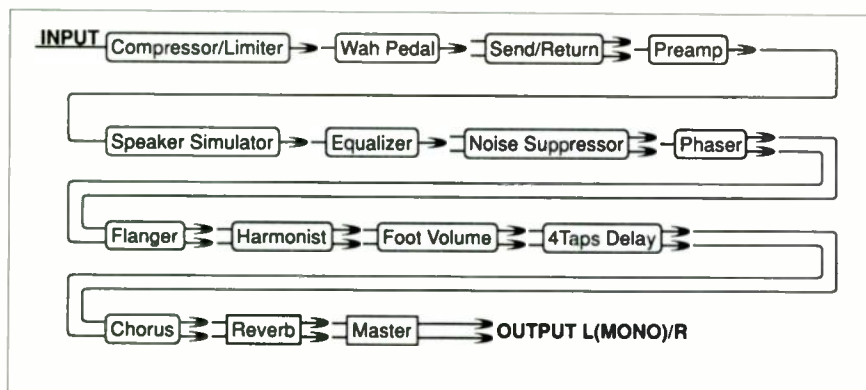


FIG. 1: The Basic Algorithm includes a nice variety of effects. (Courtesy Roland Corp. US)

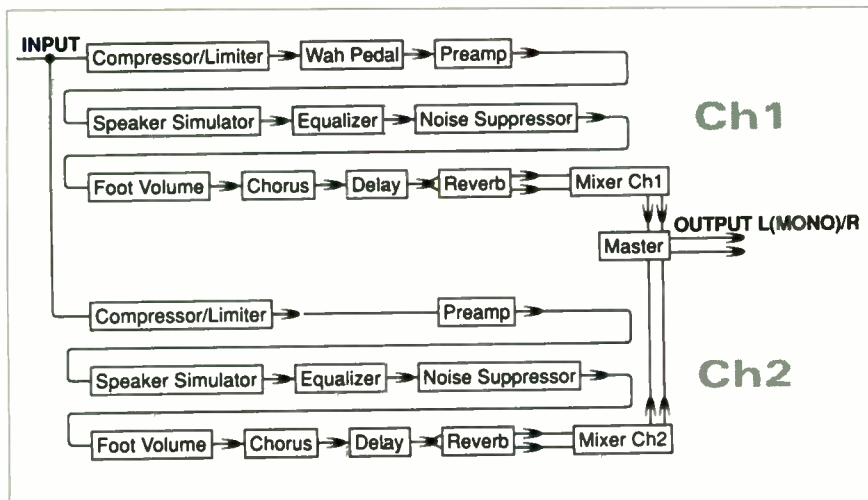


FIG. 2: The Dual Algorithm lets you simulate two different guitar sounds with two independent signal paths. (Courtesy Roland Corp. US)

which includes a wet/dry control. A third option branches the signal without returning it to the unit. For example, if you place the send/return point before the modulation effects, you can send a dry signal to tape while listening to the processed sound, which provides many guitarists with inspiration.

IN THE FIELD

I tried several guitars through the GP-100, including a Fender American Standard Strat, a Fender Heavy Metal Strat, a Gibson L6S, a Rickenbacker 360, and a Kramer Pacer. As you would expect, each guitar sounds different, even through the same Patch.

The Standard Strat and the Ricky sounded a bit thin with some Patches, but many of the clean tones fared best on these two guitars. The GP-100 gave the Ricky a biting midrange on clean Patches such as "Black Face Twin" and "Bright JC-120."

For some tunes, this sounds terrific. However, a Gibson with humbucking pickups achieved the best results when I wanted to really nail heavy distortion sounds such as "Jimmy Stack" and "Metal Flanger." The Kramer, which is equipped with Seymour Duncan single coils and a bridge humbucker, sounded the best of the lot overall, followed closely by the HM Strat. The ability to combine single-coil and dual-coil pickups on one guitar lets you take full advantage of the myriad tones offered by the GP-100.

To test the GP-100 in a live situation, I used it on a casual gig with my trio, which plays jazz, rock, Top 40, and

country. I played the Gibson L6S into the GP-100, a Crown DC-300A power amp, and a pair of Peavey 112 cabinets. The sound was big and full but not punchy. In fact, my biggest initial disappointment with the GP-100 was its lack of punch onstage.

I discovered that virtually all the Patches use compression, which cuts down the typical whack you get from a normal guitar amp when it's played hard. After speaking with Roland, I learned that the GP-100's default settings are optimized for recording. The compression can be eliminated by turning off the mic within the speaker emulator, which restored the punch I was after. Alternatively, the speaker simulator can be turned off globally, which

Product Summary

PRODUCT:

Roland GP-100 guitar preamp/processor

PRICE:

\$1,195

MANUFACTURER:

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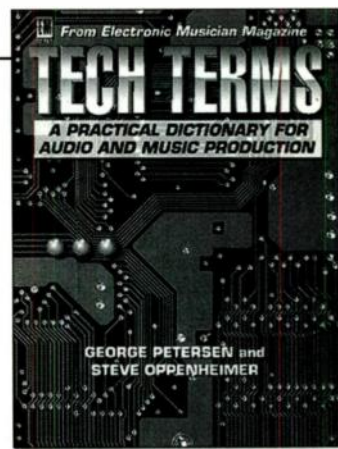
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● GP-100

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RED-LIGHT DISTRICT

The GP-100 really shines in the studio. The compressed and processed sounds that lacked punch in a live setting really sparkled on tape. Because most of the Patches are equalized, I didn't have to add EQ at mixdown, even on a 4-track cassette ministudio.

Players who record multiple guitar tracks on a 16-track or larger machine will have a field day. Patches based on the Dual Algorithm (see Fig. 2) let you play one part through two different amp sounds simultaneously. That way, you can simply route the outputs to separate tape tracks. This can save time when you are laying down a single part and want to experiment with different sounds. And you don't have to schlep multiple amps and effects.

Guitarists who do lots of demo sessions will enjoy the portability of the GP-100. Once you get comfortable editing Patches, the GP-100 promises to be a big time-saver in the studio. The fact that all effects except reverb can be put in any order, modified, or pulled from the rig altogether will make many players rethink their current setups.

CONCLUSIONS

I've already mentioned my few quibbles: the digital-sounding reverb, paucity of nonrock sounds, and lack of a Hiwatt simulation. But these are minor complaints, especially when you consider that Roland has taken guitarists out of the Dark Ages and into the twenty-first century with the GP-100.

Those who love classic guitar sounds can finally have one box that does it all (well, almost all). For some session and live players, the GP-100 can actually replace their vintage gear. If you think \$1,195 isn't cheap, add up the price of all these amps and effects purchased separately. In terms of cost versus performance, this unit is a real bargain. The GP-100 might become as significant to guitarists as the DX7 was to keyboard players. Congratulations, Roland; the GP-100 is a real gem.

Riley Wilson is a guitar teacher, writer, and performer based in Raleigh, North Carolina. His work has appeared in Guitar World, Guitar School, and Vintage Guitar. Special thanks to Eddie Berman and Music Loft, Raleigh, N.C.

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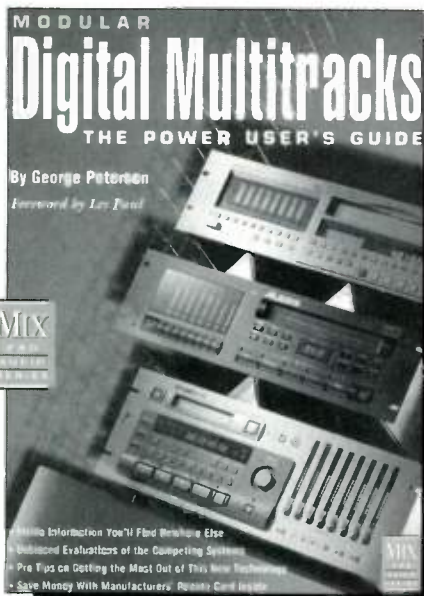
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Ensoniq/Q Up Arts Steve Gadd Drum Scores

By Al Eaton

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Not only is Steve Gadd one of the most recorded drummers in history, he is one of the most musically articulate and dynamic drummers you will ever hear. Proficient in more styles than you can shake a drumstick at—funk, rock, blues, jazz, Latin, Afro-Cuban, you name it—Gadd has performed and recorded with such megastars as Paul Simon, Grover Washington, Al Jarreau, and Rickie Lee Jones.

I couldn't wait to get my hands on Gadd's drum samples. The thought of what I could do with all those different styles had me itching with excitement. I wasn't disappointed. From the moment I heard the first grooves, I knew working with this 2-CD set was going to be a lot of fun.

The project was engineered by Jay Messina and cooperatively produced by Ensoniq's Scott Frankfurt and well-known producer and ex-Miles Davis keyboardist Jason Miles. Frankfurt also consulted extensively with Q Up Arts' Doug Morton. Ensoniq manufactures the ASR-format CD-ROM version, and Q Up Arts manufactures the audio CD version and CD-ROM versions in E-mu ESI-32/e64/EIV, Akai S1000/1100, Roland S-series, and Kurzweil K2000/K2500 formats. Ensoniq's ASR-10 CD-ROM is available from both companies. I reviewed the audio version, as the CD-ROM versions were not available yet.

QUALITY KITS

The thing I like most about these tracks is their superb sound quality. Producers Jason Miles and Scott Frankfurt deserve congratulations for a job well done. The drum-kit mixes are undoubtedly some of the best I've heard from sampling CDs.

The drums are up front and punchy, and they easily cut through an instrument-laden track without sounding too overbearing or losing their presence in the track. The samples sound as if the drums were recorded with only the

raw room ambience, and the liner notes contain no mention of outboard reverbs, delays, or other effects.

Gadd alternates between two kits. He has a Yamaha Custom Recording set with a 22-inch Maple kick, five toms ranging from 8 × 8 inches to 18 × 16 inches, and a 14-inch Ludwig Supraphonic 400 chrome snare. His second set has almost the same configuration but with smaller middle toms and a 13-inch Yamaha snare instead of the Ludwig. He uses the same set of four cymbals with both kits.

Both drum sets were recorded in stereo for the song-length phrases, single hits, and single phrases. Most of the single-hit samples were extracted from the extended phrases. This way, the single hits and short phrases could be used on top of or in conjunction with the full-kit tracks without sounding as if they were added from completely out of the blue.

This mix-and-match concept works well when you want to combine and edit phrases and hits to create a more personal arrangement. Usually, though, you'll want to use single hits or phrases from the same drum kit as the main phrases you've selected. This is no problem, as there are only two drum kits to work with. On the other hand, you might *want* to mix the sounds together. Just for fun, I combined hits and phrases from the different drum kits, and nothing stuck out in an unmusical way.

Of course, any part of any phrase can be edited and looped to create a repetitious hip hop or rap feel. But to my ears, the tracks sound a little too live and clean for a real hip hop vibe. So rather than chop the tracks into little loops, I found myself using long phrases. That way, it sounded as if there were a real drummer in the studio.

GENEROUS GENIUS

No one can accuse Frankfurt and Miles of skimping: each CD in the 2-disc set is more than 73 minutes long (close to the maximum capacity), with 45 tracks on volume 1

and 44 tracks on volume 2. That's a total of over 146 minutes of pristine drum tracks, hits, and phrases in one package.

The styles include a generous sampling of Gadd's genius. The track and phrase names are usually good indicators of their musical style and feel: "Brush Samba," "Slinky Vibe Hot 8's," "Touching Ballad," "Latin 3's," "Backstreet," "Stateside," "Reggae," and so on.

Each selection starts with a full drum groove consisting of verses, choruses, and bridge. Some grooves are nearly four minutes long, but the average groove lasts around two minutes. Because you are only dealing with drum parts, you can easily cut and paste the samples to accommodate various song structures. These long phrases are then broken down into shorter phrases of equal length, divided by about a second of digital black (silence).

This is useful when trying to create a rhythm track that does not match the one on the sample CD. For example, if you want to restructure an arrangement, you can manipulate the separate phrases. The short phrases are somewhat different from each other, which is desirable when going for that "live musician" feel. And getting a "live" feel is one of the main purposes of this collection.

The individual kick, snare, snare cross-stick, tom, hat, and crash/ride hits



Ace producers Jason Miles and Scott Frankfurt and world-class drummer Steve Gadd joined forces to create *Steve Gadd Drum Scores*, a first-class audio CD/CD-ROM library of sampled drum hits and phrases.

● STEVE GADD DRUM SCORES

are supplied with all the different dynamics from *pp* to *ff*. You also get variations of each hit, including played with sticks, with brushes, and as a drum roll.

With everything mostly prelooped, I truncated the samples to the desired length. From there, I just had to work up the arrangements in my Pro Tools system via drag-and-drop.

DOCUMENTATION

Q Up's documentation is thoughtfully laid out and makes it practically a no-brainer to find everything. It tells

you not only the tempos and approximate lengths for each phrase, but the measure each came from within the track and the kit it was performed on. Ensoniq's documentation is even more extensive, including controller mappings, ASR-10 Patch Select assignments, and a brief description of each phrase.

I wish the documentation included a few more details about the song arrangements in the audio version. However, it's easy to figure things out by listening to the tracks, especially when a drum fill leads into the next section

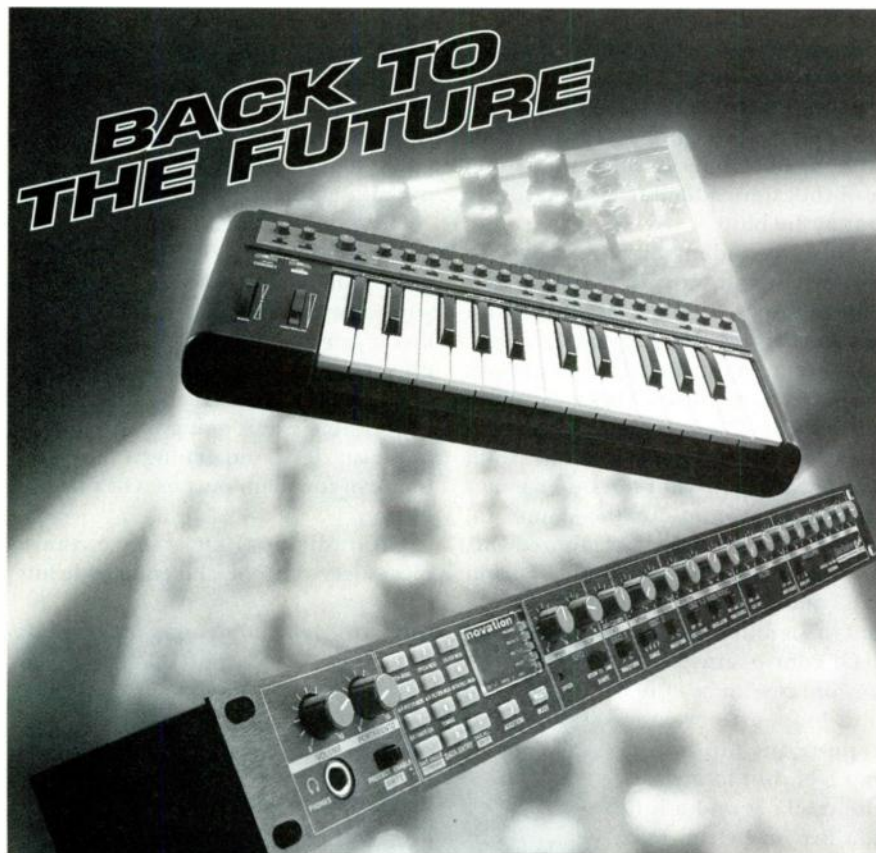
and the phrases are cut into equal parts. Because most grooves are in 4/4 or 3/4 time, you can feel each phrase without having to sit and count.

HE'S HIRED!

As with most drum-sample libraries on audio CD, it takes a bit of sampling time to capture and loop everything you want into your sampler or hard-disk recorder. Q Up has made it relatively easy to get the job done, but you'll still save a lot of time by getting the set on CD-ROM, where everything is cut, looped, and mapped to the keyboard for immediate use.

With very little effort, I now have one of the world's best drummers on my tracks, and I didn't have to go to New York or pay a fortune to hire him (though he'd be well worth the price). Without a doubt, Steve Gadd is about to become one of my most used in-house musicians. Hooray for "live" musicians on CD!

Producer, engineer, and musician Al Eaton lives in the San Francisco/Oakland Bay Area, where he produces primarily rap and hip hop. He is the owner of One Little Indian Music Productions.



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AUDIO QUALITY	●	●	●	●	●
DOCUMENTATION	●	●	●	●	●
VALUE	●	●	●	●	●

Ensoniq DP/2

By Michael Molenda

**Half a DP/4
still offers
audio ecstasy.**

Donny Osmond once whined in a *Spin* interview that the public is skeptical of "goodness." Donny has a point. A fair chunk of humanity often poo-poops smiling, candy-coated Disney values and immerses itself in a fascination with life's seedy underbelly. Maybe that's why a single trash-talk show can pull in way more viewers than an entire season of PBS documentaries.

So if you're looking for dirty ditties about Ensoniq's DP/2 multi-effects processor, this review ain't gonna float your boat. I'll say it up front: the Ensoniq DP/2 and I have a major love thing going. I have a few quibbles, of course, but nothing that will end up screaming from tabloid headlines.

At \$795, the DP/2 is a rockin' good deal for home- and project-studio recordists who demand dazzling audio. (For a guide to some hot and hip multi-effects processors *less than* \$700, be sure to check out "Multitasking Marvels" on p. 78.)

I consider the DP/2 a "no excuses" signal processor that can bestow a track with darn near the shimmer and glory of the audio legends that reside in big-studio racks.

And that's not all: the DP/2 also serves up 600 presets with two independent, 24-bit DSP chips that allow you to use the unit as two separate effects boxes. Wow! Now, if you can stomach more such praise, please read on.

CLASSY CHASSIS

The DP/2 stuffs all its audio magic into a 1U frame with easily decipherable front-panel controls. Ensoniq must have seriously considered feedback about the often-mystifying user interface of the original DP/4, because the DP/2's operation has been simplified to the point where a manual is almost unnecessary. I used the DP/2 on more than twenty mixing and tracking sessions before I even flipped open the abbreviated user's guide, and I didn't need the

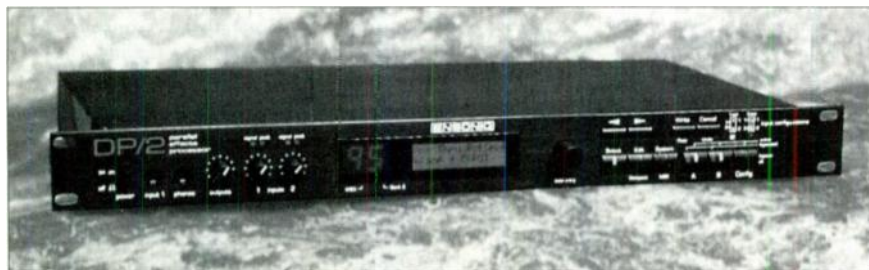


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main manual until a client inquired about MIDI controller sources.

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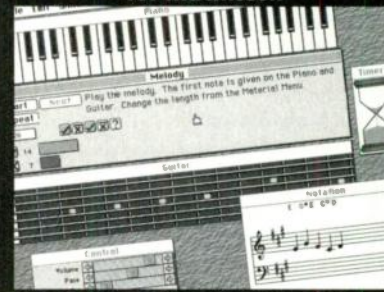


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Advertiser	Reader Service #	Page	Advertiser	Reader Service #	Page
Acoustic Sciences Corporation (ASC)	501	104	Microboards of America	553	122
AdB International	502	55	MIDI Solutions	554	104
Akai	503	26-27	Mission Recording & Audio	555	138
Alesis (QS-6)	504	19	Mix Bookshelf	556	141, 142, 147
Alesis (MidiVerb 4)	505	77	Motion Sound	557	16
American Pro Digital (APD)	506	145	Musician's Friend	558	42
Aphex Systems	507	53	Musicware	559	153
Applied Research & Technology (ART)	508	117	Musitek	560	124
Armadillo Enterprises	509	70	National Keyboard Workshop	561	112
Audix	510	107	Novation/Music Industries	•	144
BBE Sound	511	25	Opcode	562	13
BBE Sound #2	512	70	Peavey (Spectrum)	563	17
Bellari	513	82	Peavey (Mixer)	564	51
Berklee College of Music	514	116	PG Music (Band-In-A-Box)	565	74-75
Berkley Integrated Audio Software (BIAS)	515	125	PG Music (Power Tracks Pro)	566	84
Big Briar	516	153	Pro Audio Supply	567	133
Cakewalk Music Software	517	4-5	QCA	568	152
Caruso Music	518	149	QSC Audio Products	569	41
Computers & Music	519	109	Radikal Technologies	570	149
Creamware	520	42	Rhythm City	571	148
Crown	521	66	Rich Music	572	142
CTI Audio	522	18	Rock 'n Rhythm	573	119
Digidesign	•	31	Roland (PMA-5)	574	14-15
Digidesign #2	•	32-33	Roland (XP-80)	575	48-49
Digital Piano Buyer's Guide	523	161	Roland (VS-880)	576	86-87
DigiTech (Studio & MIDI Vocalist)	524	59-60	Sam Ash Music Stores	•	135
DigiTech (VTP-1)	525	95	Shure	577	72
Disc Makers	526	98	Sonic Foundry	578	22-23
Discount Distributors	527	136	Sony	•	105
Drum Trax	528	131	Sound Quest	579	128
Electronic Musician	529	147, 148	Soundspiration	580	135
Electro-Voice (EV)	530	39	Soundtrek	581	101
EMAGIC	531	83	Speir Music	582	127
EMAGIC #2	532	85	Spirit	583	69
E-mu Systems	533	21	Starr Labs	584	96
Ensoniq (MR Workstation)	534	10-11	Steinberg/Jones	585	65
Ensoniq (DP/2)	535	35	Sweetwater Sound	586	9
Ensoniq (MR Rack)	536	115	Sweetwater Sound #2	587	120
Europadisk	537	102	Switchcraft/Raytheon Co.	588	62
Fatar/Music Industries	•	40	Switchcraft/Raytheon Co. #2	589	63
Guitar Center	538	151	Tascam	590	111
Hohner Midia	539	123	Taxi	591	110
Hughes & Kettner	540	103	Thoroughbred Music	592	118
Imaja	541	145	Tune 1000	593	119
Interactive Light	542	108	Voyetra	594	61
JBL Professional	•	80	Waves	595	113
Keyfax Software	543	136	West L.A. Music	596	112
Korg (Trinity)	544	29	Whirlwind	597	99
Korg (Prophecy)	545	71	Whisper Room	598	152
Kurzweil Music Systems	546	163	Wildcat Canyon Software	599	133
L & M Music	547	150	WinJammer	600	127
Leigh's Computers	548	141	World Records Group	601	150
Mackie Designs (8•Bus)	549	2-3	Yamaha	602	97
Mackie Designs (Eddie Kramer)	550	43	Yorkville	603	67
Mark of the Unicorn	551	164	Zefiro Acoustics	604	138
MiBAC Music Software	552	118			

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C. "NAMM's Greatest Hits," p. 56	709	710	711	712
D. "Multitasking Marvels," p. 78	713	714	715	716
E. "Desktop: Home, Home on the Web," p. 94	717	718	719	720
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401	407	413	419	425	431	437	443
402	408	414	420	426	432	438	444
403	409	415	421	427	433	439	445
404	410	416	422	428	434	440	446
405	411	417	423	429	435	441	447
406	412	418	424	430	436	442	448
ADVERTISER INFORMATION							
501	520	539	558	577	596	616	635
502	521	540	559	578	597	617	636
503	522	541	560	579	598	618	637
504	523	542	561	580	599	619	638
505	524	543	562	581	600	620	639
506	525	544	563	582	601	621	640
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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
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518	537	556	575	594	614	633	652
519	538	557	576	595	615	634	653
RATE THE ARTICLES IN THIS ISSUE! SEE FACING PAGE FOR DETAILS.							
701	704	707	710	713	716	719	722
702	705	708	711	714	717	720	723
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401	407	413	419	425	431	437	443
402	408	414	420	426	432	438	444
403	409	415	421	427	433	439	445
404	410	416	422	428	434	440	446
405	411	417	423	429	435	441	447
406	412	418	424	430	436	442	448
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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
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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
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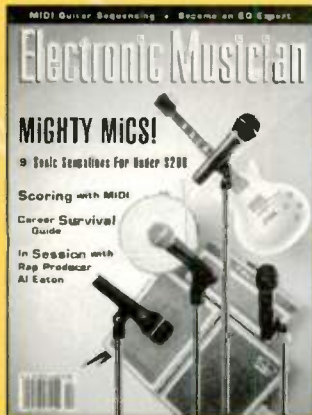


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headphone jack that allows you to program effects in private while an engineer (or a bandmate) is tweaking other aspects of a mix.

The knobs are limited to the basics: input 1 level, input 2 level, a single level control for outputs 1 and 2, and a data-entry knob for preset selection and parameter editing. (Right- and left-arrow buttons also are provided for selecting parameters.) You get a handy



Every reverb in the box is lush and sensual.

Compare function and Cancel/Undo. You also get two flavors of Bypass: Unit A and Unit B let you independently bypass the DP/2's two signal processors, or you can globally bypass the unit (via software).

System status is monitored by an LED numeric display and a 32-character alphanumeric LCD. The large numeric display illuminates the selected preset number, Bank number, and, in Edit or System MIDI mode, the active parameter. The LCD, of course, provides more detailed information on parameters and presets.

Two-stage peak LEDs monitor signal levels for each input. A few more stages would have been nice, especially if you're running a +4 dBu system, as the

unit doesn't have a lot of headroom. Signals can hit the red real fast, and once they do, the audible distortion is pretty ugly. Last, but not least, two input configuration LEDs alert you to whether single- or dual-source input processing is active.

The back panel contains MIDI In, Out, and Thru jacks; two independent connections for an optional, dual footswitch (for changing songs and presets); two independent, balanced inputs; and two independent, ground-compensated outputs. A ¼-inch jack accepts an optional control-voltage pedal for control of volume, wah, or envelope swell, depending on the selected algorithm or preset. Power is supplied by a lump-in-the-line external power supply, which is an improvement on the usual wall-wart, as it doesn't hog your power strip. The power supply tends to get rather hot, but enough cable length is provided to move it away from the unit (or effects rack) and provide adequate ventilation.

LUSCIOUS SOUNDS

Okay, prepare for more mushy stuff. (I warned you!) The DP/2's reverbs, delays, and modulation effects are absolutely brilliant. Source sounds are beautifully rendered with exquisite sonic details—the reverb decays, for example, fade to silence without producing dropouts or other artifacts—and the editing parameters are powerful enough to dial in just about any timbre you desire. I was never pushed into a corner because the unit

PLUSH PLUS

The DP/2's big sibling, the stupendous Ensoniq DP/4 (reviewed in the September 1992 *EM*), has now been replaced by the new and improved DP/4+. At \$1,795, the "Plus" offers several truly cool enhancements over the original. You still get 400 presets, but seven new algorithms have been added to the menu (VCF-Distortion 2, Guitar Amp 4, Digital Tube Amp, Dynamic Tube Amp, Tunable Speaker 2, Guitar Tuner, and Vocal Remover). Other choice improvements include: balanced inputs and ground-compensated outputs, +4/-10 switching, seamless effects switching (audio

does not cut out when one effect crossfades into another), LED indicators that show the current Config source mode, an additional LED step for the input level meters (thank you!), a true hardware bypass, and a headphone jack.

In addition, a Neutrik combination ¼-inch/XLR input on the front panel allows easy input of mics, guitars, and keyboards. Audio quality, especially on the guitar/amp effects, has been improved for even quieter operation. All in all, the DP/4+ is a brilliant choice for recordists who want more of a great thing.

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The DP/2 is one of the grooviest multi-effects processors on the market.

the DP/2's reverb constantly proved to be the sexiest choice available.

I typically used the DP/2 to dress up lead vocals. Some of my favorite presets for this application were "Warm And Fuzzy," "Orchestra Spaces," "Luscious Plate," "Ballad Reverb," and "Famous Hall." (I tend to mix large reverbs in the background to let the initial "hit" of the vocal sound upfront and in-your-face while the long decays wash the ends of phrases back into the track.)

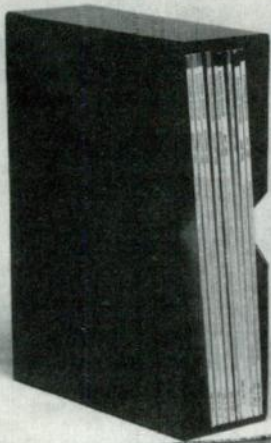
I'm also a modulation nut, and the DP/2's chorus, phase, flange, and pitch-shifting effects are chock full of personality. The flanger, for example, doesn't just swish, it pulsates with all the retro grandeur of "Itchycoo Park" analog-style flanging. I was knocked out by this, because many processors simply produce nice, clean digital modulation effects. There's certainly nothing wrong with that, but when I use modulation as an "effect," I don't necessarily want pristine audio quality. I want funk. I want a twisting, turning gyroscope of sound that pulls the listener into a psychoacoustic vortex.

To this end, the DP/2's ability to emulate vintage modulation effects is a dream come true. I even found a preset ("Phaser Chorus") that nailed the sound of my all-time favorite phaser: a late-1970s, cast-iron, Roland stomp box that I never should have sold.

The only marginal effect is the pitch-shifter algorithm. It's serviceable enough for producing wacky sounds, but it's a little dicey for fine-tuning

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vocal goofs and emulating background harmonies, as some artifacts are present. The vocoder algorithm is fun, but I doubt I'd actually use it for anything.

The DP/2 also includes dynamics processing: noise gating, compression, expansion, ducking, and de-essing. Again, these are serviceable processors that add functionality to the box, but they simply don't stack up against dedicated dynamics processors. And finally, in the spirit of full disclosure, I must admit that I didn't even test the vocal-remover algorithm. I'm just not a karaoke kind of guy.

GUITAR RIFFS

The DP/2 is definitely one of the grooviest multi-effects processors on the market, but the little over-achiever wants to be a hot guitar preamp, too. That's a nice touch to help out home recordists who don't have the space or equipment to track killer guitars. Unfortunately, the sounds aren't killer. The DP/2 takes some valiant shots at emulating vintage tubes, speakers, and fuzz flavors, but nothing the DP/2 delivers will entice a guitarist into surrendering a favored amp or preamp.

It's not that the simulations are all that bad, but they just don't *sound* right. Timbres often seem brittle or boxy, depending on the specific emulation. For example, on the heavier amp presets, such as "Shred" and "Screamin' Amp," the midrange frequencies exhibit a cranky quality that, to my ear, cheapens the effect. The fuzz and distortion presets produce the requisite buzzsaw quality, but they also produce a slight honk in the mids that calls attention to

the fact that you're riffing with a replica. The sonic blemishes are a shame, because the DP/2's digital tube emulations track performance dynamics very well. Dig into your strings, and the preset barks accordingly; back off for some sensitive caresses, and the tones sound soft and gentle.

None of these critiques should be taken to mean that the guitar presets are worthless. In fact, most of them sound wonderful as *secondary* elements that can be used to bolster existing guitar tones. I actually had a lot of success "fixing" poorly recorded guitars by fading an appropriate DP/2 preset just underneath the butchered tones.

For example, a lifeless solo was energized by combining the original, blasé amp tone with the DP/2's "Voxy Lady" preset. I was also able to toughen up a limp, direct-recorded rhythm-guitar track by running it through the DP/2's "Clean Brit Amp" emulation. Finally, as it never hurts to have an extra tuning resource in your rack, I should mention that the DP/2's on-board guitar tuner is a useful perk.

All of the guitar presets were auditioned with a Fender Stratocaster plugged directly into the DP/2's front-panel input. For the studio listening sessions, signals were routed into a Mackie 32•8 (no channel EQ was activated), a Hafler 9303 power amp, and Audix Studio 1A monitors. Private listening tests were monitored through Sony MDR-V6 headphones.

IT'S A LOVE FEST

I haven't stopped using the DP/2 since we received it for review. It has literally graced every project I've produced or engineered for months. I wouldn't think of mixing without it, and now that this review is finally published, I'm going to have to buy the thing. How could I part with it? The reverbs and modulation effects add so much zip to a track that the source sound actually seems more animated and alive. I mean the DP/2 is the closest thing to a "Talent" button that I have in my mixing arsenal.

Although the DP/2 also beckons me to use it as a guitar preamp, I won't. The guitar effects and speaker emulations are fine replicas, but they don't possess the sizzle and slam of "real" amps and top-drawer preamps. No matter. I love the DP/2's effects. I can't live without it. Send me the bill. ☺

Product Summary

PRODUCT:

DP/2 effects processor

PRICE:

\$795

MANUFACTURER:

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**Groove Tubes
EQ1**

By Rob Shrock

**A new tube EQ
re-creates
vintage sound.**

The recent pilgrimage back to tube technology has put many studio owners in the unenviable position of paying exorbitant prices for vintage gear or wading through the plethora of new tube units (many of which are tube/solid-state hybrids) in search of a warm, full-bodied sound. For most, it's not a question of whether to acquire tube processors but which ones to buy and how much to spend.

The EQ1 from Groove Tubes is a half-rackspace, quasi-parametric, tube equalizer that stands squarely in the tradition of vintage equipment. Sporting a chrome faceplate; large, black '60s-looking knobs; and a huge, external power supply, the EQ1 reeks of legitimacy. This baby is solid and sounds great. It may be just what you're looking for.

LESS IS MORE

Groove Tubes has taken a "less is more" approach by using simple circuits with quality components and hand-selected tubes for the gain input and output buffer amps. The entire EQ section is passive, and no inductors (coils) are used in the signal path, which minimizes phase distortion and keeps the signal clean.

The large boost/cut knobs are detented; the 12 o'clock position sets the band at unity gain, and there are five

detents on each side that progressively boost (right of center) or cut. The crossover points between bands are switchable between preset frequencies (see sidebar "EQ1 Crossover Points"). The bands are not continuously variable, but this quasi-parametric arrangement allows you to precisely document settings (with a pencil) for future recall as well as exactly match settings between two EQ1s for stereo applications.

A tricolor LED shows the output level: when the light is green, the signal is at -10 dBU; yellow is 0 dBU; and red is +10 dBU. A front-panel switch on the left of the unit toggles between 0 dB (line level), 10 dB pad, and bypass, which is called EQ Out. The back panel accepts both balanced and unbalanced XLR and 1/4-inch, line-level inputs.

A separate power supply, the PS2a, is required. Fortunately, the same unit also provides power for all other Groove Tubes products, including the MD-1, MD-2, and MD-3 condenser microphones and DP-1 and MP-1 microphone preamplifiers. The PS2a's two connection ports allow several units to be daisy-chained via DB-9 in and out connectors located on the back of each unit. Each PS2a can power up to ten 12AX7 tubes, allowing it to power various combinations of devices based on the number of tubes in each unit. (The idea is that a single PS2a powers a pair of microphones, preamps, and equalizers.)

The PS2a power supply I received was reminiscent of an old Neumann power supply: gray metal casing, heavy, and slightly warm to the touch. After about three weeks, a capacitor went bad in the power supply, which created a nasty 60 Hz buzz in my pair of EQ1 review units. Groove Tubes promptly sent another PS2a, this one black instead of gray, and all was well again.



Groove Tubes' EQ1 tube equalizer provides a broad, musical palette of tone-shaping control. Because no coils are used in the signal path, there is minimal risk of phase shifting.

SOUNDSCAPE

Although the EQ1 sounds great in almost all applications, I found it to be notably better at some things than others. The sound of the EQ1 is reminiscent of vintage equalizers such as the Pultec, and its design is best suited for broad, subtle tonal shaping. It is difficult to create drastically filtered effects such as a simulated voice-through-a-telephone or a sharply notched, low-frequency rumble. Think of the EQ1 as a large brush for painting broad strokes of color rather than a fine-detail brush.

I sometimes found it necessary to turn certain bands all the way, or nearly all the way, up or down to achieve a desired sound. For those who tend to be judicious with equalizers, such extreme tweaking can feel a little uncomfortable at first. The amount of boost or cut depends greatly on the positions of the crossover switches. As a result, it's extremely difficult to calculate precisely how much you are changing the gain in a given band.

Widening the bandwidth also increases the amount of boost or cut for

each detented position, which is why it is difficult to create deep notches with narrow bandwidths. At the narrowest bandwidth settings, each click of the knob is equal to approximately 1 dB of boost or cut; at the widest setting, it increases to 3 dB per click. It takes only a few minutes to get a feel for how the EQ1 operates, after which it's pretty easy to dial up sounds. These knobs are made for crankin', so don't be timid.

ON THE JOB

The EQ1s were a godsend for one of my rock projects. Recently, I have been building final mixes by storing processed tracks, ambiences, delays, and submixes to slave-ADAT tapes as I go. This allows a few quality pieces of gear to do extra duty, avoids the expense of having multiple units at a single mix-down session, and provides an accurate, ongoing representation of the final mix during overdubs. Meanwhile, the original tracks are still available as a safety net in case a processed track doesn't quite work later and needs to be redone.

I had recorded ten tracks of powerful, progressive-rock drums directly to ADAT with no EQ or compression. Beginning with the overheads, I equalized (and compressed) two tracks at a time and stored them to a second, synched ADAT. The EQ1s did a wonderful job of musically balancing the wide frequency range captured by the overheads. The detented boost/cut and switchable crossover design of the EQ1 allowed both channels to be set exactly the same, which helped minimize any phase shift between the two overhead tracks. Although phase shift is a common problem with most equalizers, it did not raise its ugly head during my various EQ1 applications.

With a little experimentation, I was able to get a great overhead sound, but it took playing around with various crossover points in the midrange. Attenuating the frequencies between 200 and 1,250 Hz (with the gain knob about three clicks to the left) and between 1,250 and 3,150 Hz cleaned up the mud and created a nice balance of warmth and fullness from the toms and bright sparkle from the cymbals. I was

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• EQ 1

concerned, though, that the high-frequency cymbal content might present a problem, as the highest crossover point of the EQ1 tops out at only 8 kHz and the EQ simply shelves all higher frequencies. But to my surprise, cranking up the highs above the 3,150 Hz point created a nice, round sparkle without harshness or noise. (There were other times when I would have appreciated a crossover point above 8 kHz.)

Next up were the kick and snare. Having already tweaked out the overheads made it easier to shape the kick and snare frequencies to complement the overall drum sound. Adding low-frequency impact to the kick was easily achieved by boosting the frequencies below 80 Hz (with the gain pot four clicks to the right) and cutting by approximately the same amount between 315 and 1,250 Hz. The combination of EQ and compression brought the kick right up front while maintaining a sense of 3-dimensional depth.

Zeroing in on the exact "click" of the beater on the kick drum was more challenging. I was able to accent the beater click somewhat with wide-open boosts above 1,250 and 5,000 Hz. But because the EQ1 lends itself more to tonal shaping than aural surgery, in the end I opted to EQ the bass drum with a digital equalizer. This allowed me to zero in on the beater click with the digital EQ while maintaining the tube coloration and body from the EQ1. I'll probably reprint the equalized kick from the original tracks as the album progresses and I discover the best combination of the two equalizers. But the digital EQ alone on the original kick track definitely did not impart the same fullness as the EQ1 did.

Equalizing the snare track was a snap: a shelving boost from 5 kHz up and a

narrow cut in the midrange between 500 and 800 Hz made this particular snare drum come to life and blend well with the snare sound in the overheads. I continued this process two tracks at a time, next equalizing the four toms and two hi-hats. The result is that the drums on all eight songs sound great and are holding up to repeated listening as the project continues.

WARM VOCALS

One of the great strengths of the EQ1 is its effect on vocals. I have a custom set of solid-state mic preamps which are clean and quiet but, when captured with a condenser microphone directly to a digital recorder, can sound hard and edgy. Just running a prerecorded vocal track through the EQ1 seemed to warm up the low midrange and take off the edge without even engaging much equalization. And boosting the shelf above 8 kHz restored the "air" that can sometimes disappear in recording, without creating a sibilance problem.

The EQ1 is also extremely effective at cutting out the midrange edge of a vocal track without destroying the sound by overequalizing it. There is a silky edge to the highs that is evidently characteristic of tubes, because I never get it with a strictly solid-state signal path. I really like this equalizer on vocals.

FAT MIX

I recently completed a short corporate film for Texas Instruments that was done strictly with synths and samplers and mixed to Dolby Pro Logic Surround. Because about half of the elements were simulated orchestra, I wanted to do as much as I could to make the orchestral sounds full. The solution? Run each track through the two EQ1s on the way to the ADAT. The result? Everything sounded much fuller and more "mature" than the generic—and painfully common—sound of keyboards recorded directly to a tape machine.

The EQ1s were great at adding bottom to low strings and timpani, and all it took was a small boost under 125 Hz. My ensemble violin samples sounded smoother once I had pulled out some of the mids between 500 and 1,250 Hz, and a broad boost above 3,150 Hz opened up the top end of my chimes and other metallic percussion samples. But synths and sound effects benefited

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**EQ1
Crossover Points**

The EQ1 has four selectable crossover switches, each with three positions. The switches determine the bandwidth of the adjacent knobs.

1st switch	50 Hz	80 Hz	125 Hz
2nd switch	200 Hz	315 Hz	500 Hz
3rd switch	800 Hz	1,250 Hz	2 kHz
4th switch	3,150 Hz	5 kHz	8 kHz

the most: the EQ1 was perfectly suited for the wide frequency ranges, artfully shaping them until they fit together like pieces of an audio puzzle.

This project, like most film and video ventures, ran down to the wire, going from mixdown session to producer's hands in one afternoon. Thanks in part to the EQ1s, the prerecorded tracks on tape already sounded great, which allowed me to spend more of my precious mixdown time on creating imaginative surround effects rather than just getting the basic sounds together.

WISH LIST

The only problem I had was level matching. There is no output-level control to compensate for changes in level introduced by equalization. While equalizing some vocal tracks—patching directly from ADAT to EQ1 to ADAT—there were occasions when the level boosts from the EQ overdrove the input to the second ADAT. To correct this, I had to run the signal through a separate gain stage (mixer) to bring the level down, which is not an ideal way to go. The 10 dB input pad on the EQ1 lowers the level but also decreases the signal-to-noise ratio. (The 10 dB pad is intended for lowering the input, not the output.) I applaud the “less is more” design approach, but my wish list for this product includes a high-quality, bypassable output control for situations where level matching is critical.

I also don't care for the tiny switches used for the input level and crossover points. They are very small and barely

protrude past the plane of the faceplate, making them difficult to move without using your fingernails. Furthermore, there is a loud pop that accompanies switching the EQ1 in and out. Although not potentially damaging except at high monitoring levels, this is annoying. Finally, the shiny chrome faceplate looks great until you work with it a lot; after that it glaringly details all the fingerprints that result from trying to grab onto those tiny switches.

CONCLUSION

Groove Tubes has a real winner with the EQ1. Its strengths lie in its broad tonal-shaping palette and ability to impart the heralded “tube sound” to just about anything you put through it. The design allows a lot of control over midrange frequencies—it's particularly good at enhancing snare drums and vocals without adding harshness—and makes it almost impossible to drastically screw up a sound. Although not ideal for extreme equalization effects, the EQ1 delivers a classic, warm sound reminiscent of vintage British equalizers. Also, the unit is quiet and easy to operate.

On the down side, it's a little expensive, especially for stereo applications (for which you need two units). Furthermore, the EQ1 can be powered only by the “optional” PS2a power supply, which therefore is a necessity instead of an option. This adds considerably to the cost, though at least you can power multiple Groove Tubes units from one supply. Finally, the crossover switches are too small for my taste, and I would like to have an output control for level matching.

Despite these minor criticisms, I really enjoyed using the EQ1s. They are extremely musical equalizers, and I would use a pair all the time if I owned them. The EQ1 can gently massage a track to fit into a mix without creating unpleasant artifacts, and even when you try to abuse it, it still sounds good. If you are ready to make the jump to high-quality tube gear for your recordings or you are in need of a first-class equalizer, the Groove Tubes EQ1 is a definite option to check out. Go ahead, heat one up.

Product Summary

PRODUCT:

EQ1 tube equalizer

PRICE:

EQ1: \$695

PS2a: \$350

EC3 connecting cable: \$20

MANUFACTURER:

Groove Tubes

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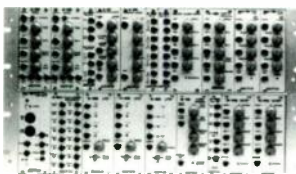
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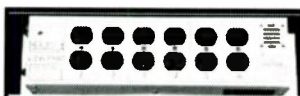
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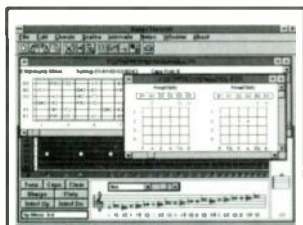
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Last month's "Tech Page" profiled a fictitious product that supposedly debuted at NAMM. (April fool!) However, I really was invited to a company's hotel suite at the show to see and hear an exciting product currently under development. The company is Justonic Tuning, Inc. (tel. 604/682-3456; fax 604/669-3301; e-mail 71232.2242@compuserve.com), and the product is a microtunable synthesizer unlike any on the market.

During the last ten years or so, some synth manufacturers have included the ability to tune their instruments to scales other than 12-tone equal temperament. However, the resolution is relatively coarse for precise tuning (typically 1 cent). In addition, it is difficult to smoothly retune these instruments on the fly as you play. This makes it impractical to use just intonation if you modulate to different keys or even use different harmonies within the same key (see Fig. 1). The MIDI Tuning Standard (MTS) provides adequate resolution and the ability to retune individual notes and entire scales on the fly, but virtually no instruments implement it.

Justonic Tuning is developing its own system to address these issues. In conjunction with another company, Virtual DSP (e-mail dames@vdsp.com), Justonic is designing a synth engine with a tuning resolution of 0.01 Hz. If two notes are not perfectly in tune, the worst-case beat period is

For a Few Cents More

Real-time just intonation finally makes its debut.

By Scott Wilkinson

100 seconds, which is essentially imperceptible. The system can currently deal with 12-tone scales, which are specified as a series of ratios. Future versions will include other types of tunings.

The key and root of the scale in which you are playing can be independently specified by sending MIDI note messages to the synth. Instead of using mathematical computation to determine pitches, the Justonic system uses a $12 \times 12 \times 12$ array of pitch values derived from the ratios of the scale. Specifying a key and root selects one set of twelve values from the array, which are used to tune the synth. This avoids the rounding errors that can arise from computation-based systems. It's also faster than real-time computation, which makes it ideal for live performance.

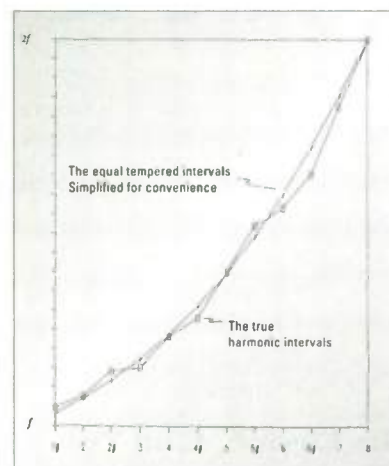


FIG. 1: Just, or harmonic, intervals sound more "in tune" than equal-tempered intervals, but they are not evenly distributed within the octave, which makes it difficult to play in any key. (Courtesy Justonic Tuning, Inc.)

There are three ways to specify the key and root. The system includes a chord-recognition algorithm that analyzes your playing and retunes the synth accordingly. You can also record key and root note messages into a sequence if your music is predetermined.

The most flexible approach is to enter the key and root notes manually from a separate keyboard or footpedal board. You can also enter the key and root notes from a separate zone on the master controller. This can be applied to any number of synths at once, and a separate "key/root player" can control the tunings for an entire ensemble.

The current prototype sound module uses four Motorola DSP56002 processors to generate 2-operator FM sounds with up to twelve voices of polyphony, and the user interface is implemented on a Windows computer. However, this only provides a demonstration of the concept and a research tool to help develop a commercial product. That product is intended to be a massively parallel, DSP-based, additive synth engine that will also include a convolver to perform granular synthesis. In addition, it will respond to MTS.

The primary goals of Justonic Tuning and Virtual DSP are to produce a commercially viable synth with the aforementioned tuning capabilities and a full range of real-time musical expression. In addition, they want this synth to pass the Turing test, which means a listener would be unable to distinguish between an acoustic instrument and its simulation if they were hidden from view. These are lofty goals indeed, but they portend some interesting times ahead. ☉

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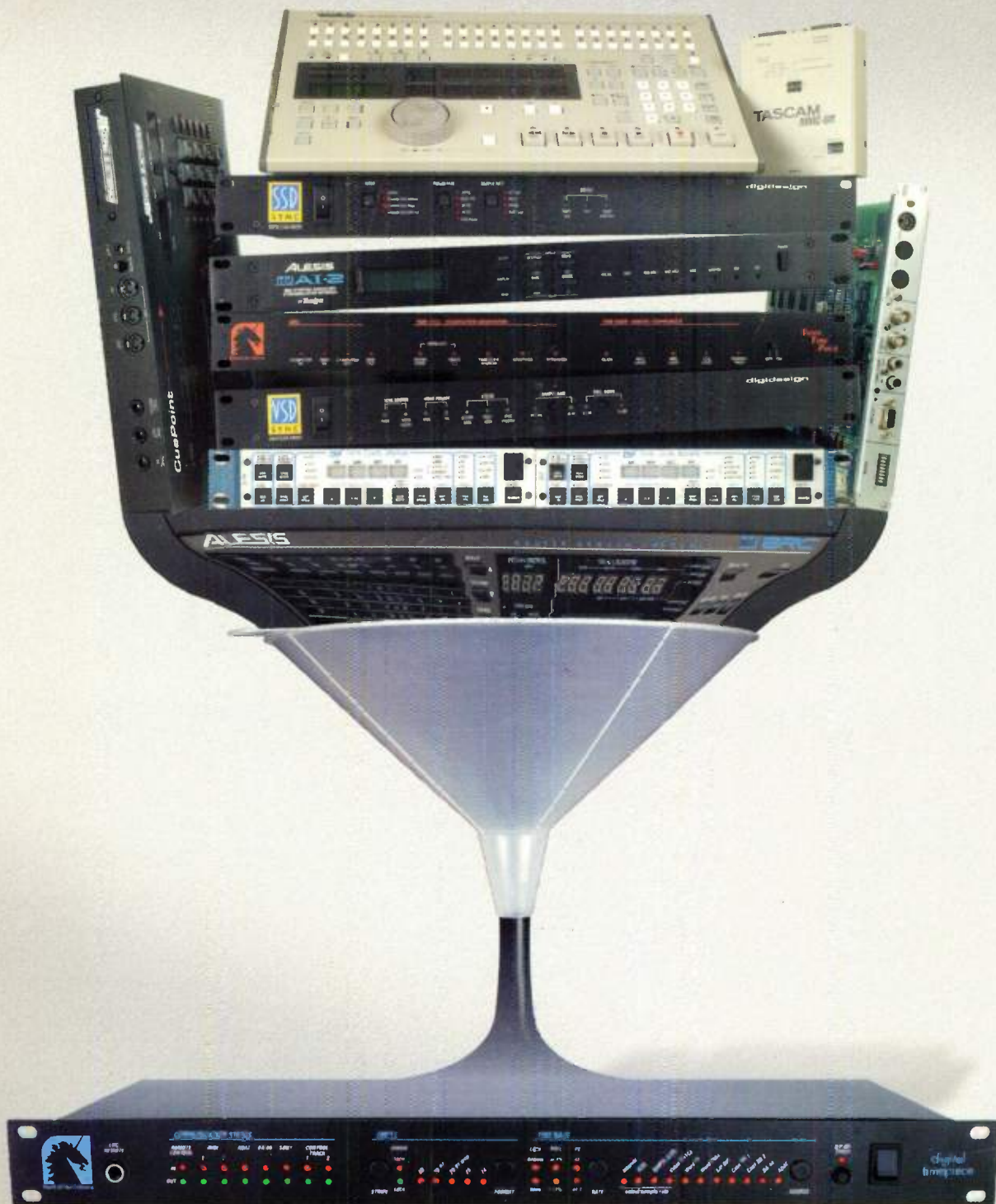
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