Auto-Accompaniment Roundup: *Band-in-a-Box*, *Jammer*, and *Jazz* • *Pro Tools TDM* 5.1 and 14 more reviews

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February 2002

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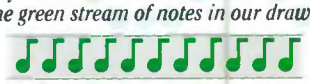
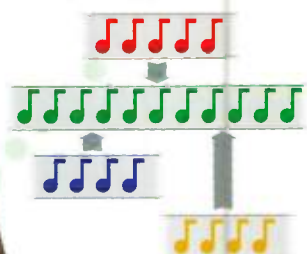


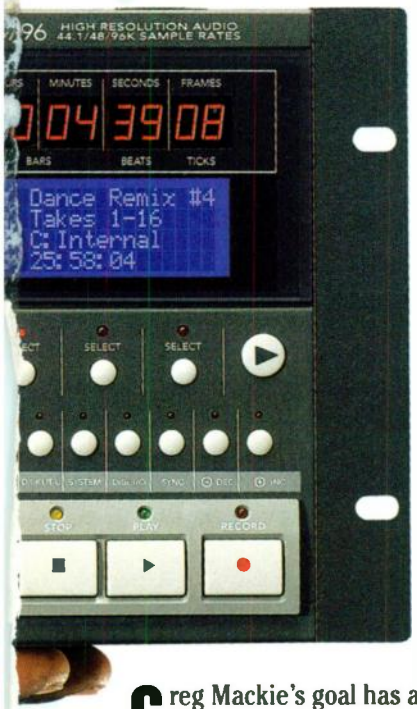
If you want to change something on a track, the recorder permanently erases the old data and records new data over it (red notes in the drawing below).

*The **non**-linear MDR24/96 records any number of alternate segments on separate parts of the hard disk and automatically "punches them in" during playback. You never lose your any previous work.*



DISK RECORDING FOR $1999*

linear MDR24/96 at a special intro price.



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Remote 48 (*Remotus Deluxai Way-cooius*)

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Remote 24 (*Getzajobdonus Economicai*)

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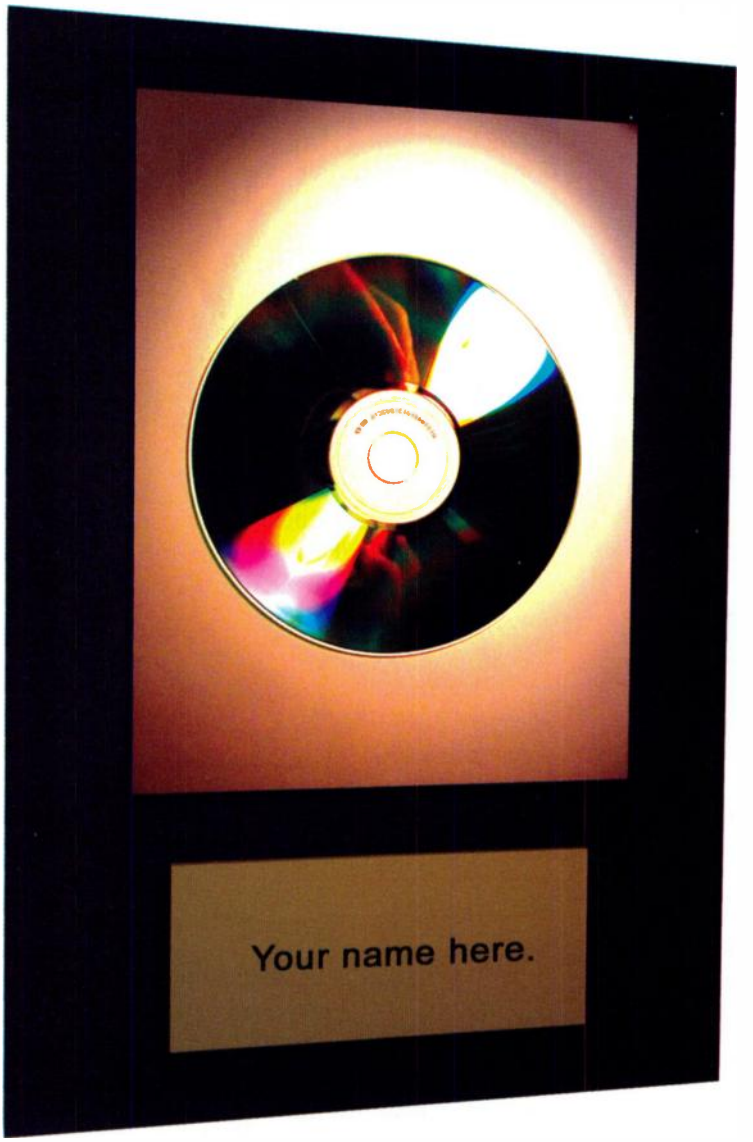

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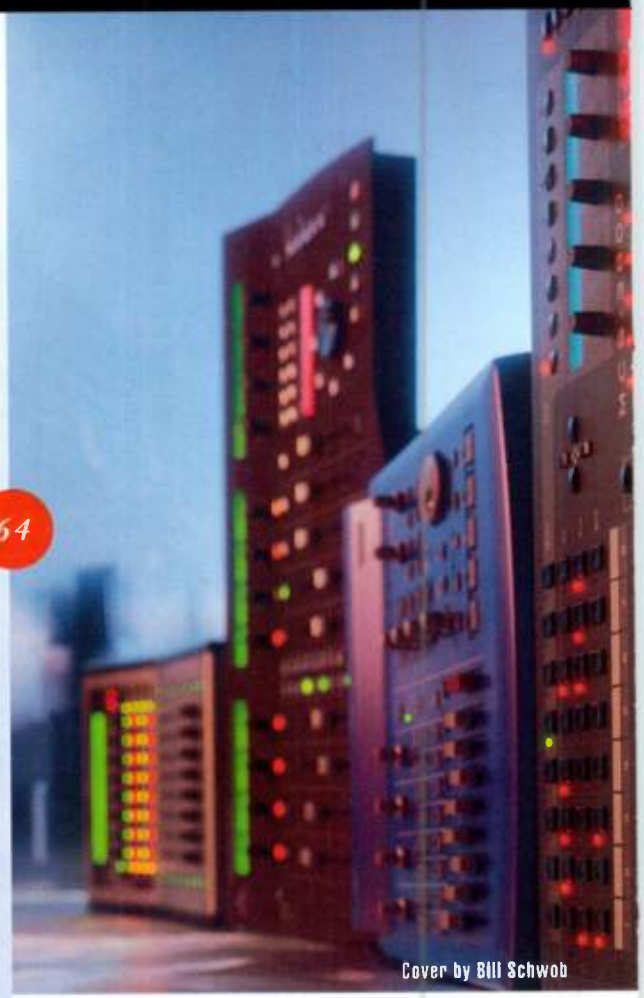
FEATURES



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Cover by Bill Schwob

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DEPARTMENTS

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COLUMNS

REVIEWS

No Explanation Necessary


ANTHONY PIDGEON

Under the circumstances, it was remarkable that the 111th Audio Engineering Society convention took place at all. The show was originally scheduled to be held from September 21 to 24, 2001, in New York City, which was made impossible by the terrorist attack on September 11. Many in the audio industry thought the show would be canceled, but the AES decided that the show must go on and rescheduled it for November 30 to December 3 at the original venue. It proved to be a good decision.

However, the new dates meant that the AES convention would be held just six weeks before the larger Winter NAMM show in Anaheim, California. AES/New York is an expensive show at which to exhibit, and with the U.S. economy in recession, a number of companies decided to save money by skipping the AES show and waiting for NAMM.

Some industry veterans sharply criticized the companies that canceled, stating that everyone should have supported the show, the industry, and the city of New York. Because of the circumstances, emotions were high, and some companies that bailed out apparently felt compelled to explain their decision. A few offered weak rationalizations, which was unfortunate, because it was clear that the primary issue was money—which is a legitimate reason to pass on a trade show.

For companies that mostly sell into the MI market and those that weren't ready to unveil new products at AES, skipping AES to save their efforts for NAMM was understandable. For companies that were struggling financially, spending money on a trade show that was not a dealer show might be irresponsible.

On the other hand, some companies may have missed a good opportunity. Yamaha unveiled its new $20,000 DM2000 digital console at the InterBEE 2001 broadcast show the previous month in Japan. The AES show would seem to have been a perfect place to introduce the DM2000 to the U.S. pro-audio market.

The greatest public condemnation was reserved for Digidesign, which not only is a major player in the audio market but provides affordable booth space for dozens of development partners, many of which cannot otherwise afford to exhibit at large shows. Its absence, therefore, left many small companies out in the cold. Were I a development partner, I suspect I would not be pleased.

But if Digidesign failed its partners in some way, that is the only legitimate grounds for criticism of the company's decision to cancel. No company owes it to the audio industry to support the show, and Digidesign doesn't owe anyone but its partners an explanation of what amounts to a private business decision.

No-shows notwithstanding, the AES show was a solid success. True, the show was smaller than planned, but it was well attended (especially the first couple of days), and spirits were high. Exhibitors and show attendees seemed happy just to be together in New York, with their businesses and lives mostly intact. Everyone seemed determined to move our industry forward. We saw a number of interesting new products, although few of them introduced new ideas. As for the companies that bailed out, hopefully we will see their products and technologies at NAMM.

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What makes this instrument truly revolutionary is KARMA. It's brilliant! This technology is versatile, innovative and always inspires me to come up with new ideas. I'm amazed by the control that it gives me and the way I can turn a few knobs to create a completely new part. KARMA certainly is the most unique system I've seen in a long time. I produce a lot of dance music, and this keyboard continues to breathe new life into my tracks. Plus, it saves me tons of time! But I'm afraid to bring it to a live gig because someone might figure out my tricks. (ha ha)

Karma is truly the most inspiring workstation I've ever played. Thank you for creating such an outstanding instrument.

Sincerely,

Chuck Johns

Chuck Johns

Electronic Musician 2002 Editors' Choice

STORY #23

Chuck Johns Queens, NY

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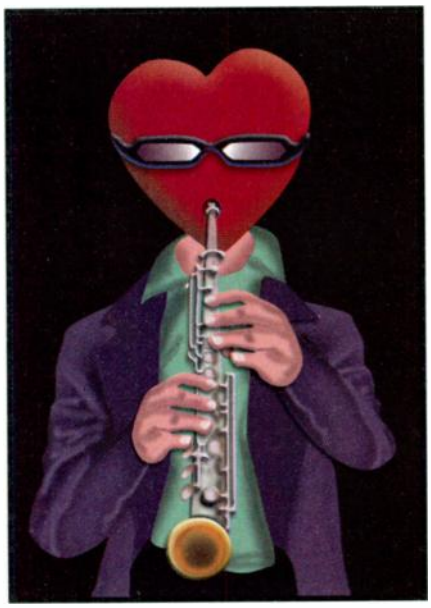

MAE LAROBIS

DOH!

Thank you for publishing the Algorithmic Arts *SoftStep Pro* review (December 2001). However, as much as I appreciate the reviewer's attention to detail, I was dismayed to see the review was for *SoftStep Pro* 2.06a, which was superceded by version 2.1 in July 2001.

The review was fair and accurate for version 2.06a, and I am pleased that it received such a positive review overall. However, all but one of the "minor points" the reviewer found fault with were fixed in version 2.1.

Although *SoftStep Pro* doesn't have a "user-customized palette of modules" (nor will it; module execution order is conveyed by the module menu order), it is no longer true that there are "no group move, copy, or delete functions" or that there is "no help index." Those features have been implemented in *SoftStep Pro* 2.1.

John Dunn
Algorithmic Arts
via e-mail

MONEY—IT'S A HIT

I just read "Working Musician: Follow the Money" (November 2001) and noticed a few things off the bat. Although the article is generally informative and helpful, some issues must be addressed. I preface this by stating that I run an independent label and a publishing company.

First, the cost of manufacturing CDs is much lower for replication of tens of thousands of units, especially if you own the plant. The major labels' parent companies (Time Warner, BMG, UMG, Sony, and EMI) own replication plants. It's not costing them as much as stated in **Fig. 1.** Even an independent label doesn't pay that much for replication. In fact, the majors do replication for some independent labels; one would surmise that internal work is charged a lower rate. For independents, the rule that my associates and I hold fast to is less than $1 per unit for manufacture. We do that by finding plants that will deal directly with us and do unit amounts that are reasonable for our sales. We also use reputable printers that can duplicate what we need at a reasonable cost.

Second, rarely will a label want to pay full rate for mechanical royalties if the artist wrote his or her songs (¾ rate is $0.56 per ten songs). But if the label also controls the publishing (which is often the case), the parent company makes that money, as well. As for distribution, the article indicates that the label pays $5 per unit. However, the label pays itself because it owns the warehouses, the trucks, and the distribution network. The label actually makes $11 to $12 per unit if the CD sells at $15. It would take the label about 44,000 units to break even. Contemporary jazz albums on major labels sell about that many copies.

Also, in the not-so-distant past (at least I hope it's not still going on), there was *cross-collateralization,* in which a label could recoup an advance from one album or contract from, say, the mechanical royalties of another album or contract. That's a messy situation in which a label would again end up paying itself.

Raymond Jones
via e-mail

X-RATED

Nice job on "Desktop Musician: Mac OS X for Musicians" (October 2001). It was a perfect account of the state of the new OS and how developers have reacted to it. The author's prognostications about future systemwide features, however, arrived on our doorsteps just short of when Apple realized them. Almost all the suggestions made in the article are now features in 10.1.

Apple does have a renewed dedication to the professional musician. The addition of a systemwide MIDI organization system and plug-in format marks the beginning of a new era in making music on the Mac. I hope **EM** continues to keep readers informed about what to expect as Mac OS X develops.

Kevin Schlei
Milwaukee

In "Desktop Musician: Mac OS X for Musicians," Jim Rippie stated that companies such as Emagic and Mark of the Unicorn will be releasing support for Mac OS X. I use Emagic *Logic Audio* for my PC running Windows 98, and Windows XP will be released soon. Will companies such as Emagic, Steinberg, and MOTU provide support for XP? If so, what would be some pros and cons related to XP and music production?

Gerry Gonzales
via e-mail

Gerry—I spoke to several companies you mentioned, and they plan to support Windows XP. In some cases, your current software will work with XP right out of the box; that's likely to be the case if it was already Windows 2000–compliant. On the other

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hand, if the software you are using isn't Windows 2000–ready and doesn't work with NT (the predecessor of 2000 and XP), you'll probably need an updated version.

How much better your musical experiences will be using XP is not strictly a function of your software; your sound card and the state of its drivers have as much to do with that. If you happen to be using Cakewalk's Sonar *and your hardware offers WDM drivers, you can expect excellent performance using XP, though not particularly better than what you could get with Windows 2000. I would also expect you to do well with Emagic's upcoming versions of* Logic Audio, *which will be Windows XP–compliant.*

Remember that XP and Windows 98 have major differences in the interface and elsewhere. Microsoft is pushing its software and solutions onto the user more aggressively in Windows XP than in previous versions of Windows. I don't take kindly to that. It's too early to know how well XP is going to work in various musical situations.—Dennis Miller

GIMME SOME TRUTH

I enjoyed Michael Cooper's "Truth or Consequences" in the November 2001 issue. I've been interested in studio acoustics for years and regularly share information through the acoustics mailing list (acoustics@yahoogroups.com) and the Studiotips Web site (www.studiotips.com), both administered by Dan Nelson. I've developed a *FileMaker Pro* solution to calculate and graph room modes, identifying potential problem frequencies. That and other resources are available at the Studiotips site.

I have three questions regarding less expensive room-analysis alternatives:

1. One inexpensive method for room analysis involves using a test CD to generate tones and pink noise and an audio-level meter. The pink noise is used to establish a base level; then, each tone's level is measured and graphed. Besides the limited range of frequencies available on a CD, is there some reason this method is undesirable for those on a tight budget?

2. I have two single-channel parametric equalizers that I'd like to use for room EQ (dbx 242s). In general, mono parametrics seem to be cheap and more plentiful than stereo models. Does that approach have disadvantages?

3. When using Metric Halo's *SpectraFoo* for room analysis, which Spectrograph display should be used (Peak, Instantaneous, or Average Hold Trace)? Are other *SpectraFoo* settings critical to accurate room measurement?

Stephen Marinick
via e-mail

Author Michael Cooper replies: Stephen—Analyzing a room's response using a test CD and audio-level meter is problematic for two reasons, one of which you noted: the limited number of frequencies available on the CD make finding and correcting the exact room-mode frequencies a hit-or-miss proposition. Also, the frequency response of the audio-level meter's built-in microphone is likely to be skewed in the low-bass region, compromising the accuracy of your measurements. Unless your data-capture signal chain (mic, mic preamp, and A/D converter) is truly flat, you won't know whether your noted aberrations in response are from room response, equipment response, or both.

Two mono parametric equalizers should work as well as a dual-channel unit for room-equalization purposes as long as they are identical models and high-quality units. I'm not familiar with the dbx 242. Remember that your recording and mixing decisions will be made based on what your room equalizers tell you, so use the best equalizers you can afford.

When using SpectraFoo *to analyze a room's frequency response, I like to use the Average Hold Trace. The human ear tends to ignore short-lived peaks in evaluating spectral balance, and often peaks in response don't accurately represent what's going on. I set the average rate for a settling time of a few seconds; any shorter makes the display respond to peaks too much, and any longer makes me wait too long after making an EQ adjustment to gauge the results. Also, because you're using pink noise to do your testing, set* SpectraFoo's *Accumulation mode to Pink Noise Is Flat. I also use Log Averaging mode to weight the display to approximate the way the human ear hears. Finally, set* SpectraFoo's *resolution to 1/24 octave or "continuous" so you can see enough fine detail to avoid affecting neighboring frequencies when you correct the room response with your equalizer(s).*

WE WELCOME YOUR FEEDBACK.

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

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The entire, historic, grand La Madeleine, Paris cathedral and the Cavaillé-Coll organ for GigaStudio! For the first time ever in any sampled pipe organ, the original cathedral ambiance is included via release triggered samples.

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The beautiful, clear tone of a massively multi-sampled Martin 000-16. More than 1,200 discreet, unlooped samples are dedicated to the instrument, providing more than a gigabyte of incredible realism with hammer-ons, pull-offs, palm mutes, release-damps and more.

Bigga Giggas/ Post Harpsichords I

Two antique harpsichords captured in every detail using world-class microphones and mastered originally in 24-bit audio. This library is perfect for keyboard purists seeking to reproduce the great early keyboard compositions on the instruments for which they were written.

Q Up Arts/Symphonic Fields Forever

Beautifully evocative solo and small section orchestral instruments. Perfect for both Pop and Classical orchestration as well as acoustic textures. Features superbly recorded multisamples of celli, violins, choir, flute, bassoon, tuba, double basses, clarinet and more.

Bigga Giggas/ Harmonica Essentials

Turn your Giga system into a professional blues harmonica player! Acoustic and electric harp in 8 keys and 4 tempos, with over 1100 licks,with effect banks in each of the keys to help fill in between licks.

Q Up Arts/Psychic Horns by Jason Miles

The killer collection of brass sections of stereo trumpet, tenor sax and trombone. Includes long and short sustains, loops, riffs, swells, falls, and stabs. For Pop, R&B, Funk, Jazz...if a brass section can play it, you can too!

Sonic Implants/ Drum Series 1

From the real to the surreal, these drums sound amazing. All drums and cymbals are recorded in stereo, with no loops, and with heavily multi-velocity. Even the snares are sampled at multiple places on the drum. Includes 250 drumkits and instruments.

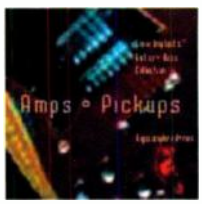
Bigga Giggas/Sune's L100 Hammond

Every note of this great-sounding organ's 9 drawbar settings, recorded in extremely long looped samples, with fully controllable virtual drawbars in GigaStudio.

Q Up Arts/ Heavy Guitars

A grungy, harsh, ruthless collection of guitar samples... leads, mutes, scrapes, scratches, power chords, slides, feedback, harmonics and more.

Bonus 60Hz hum sample included on CD-ROMs. Rock on!



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WHAT'S NEW

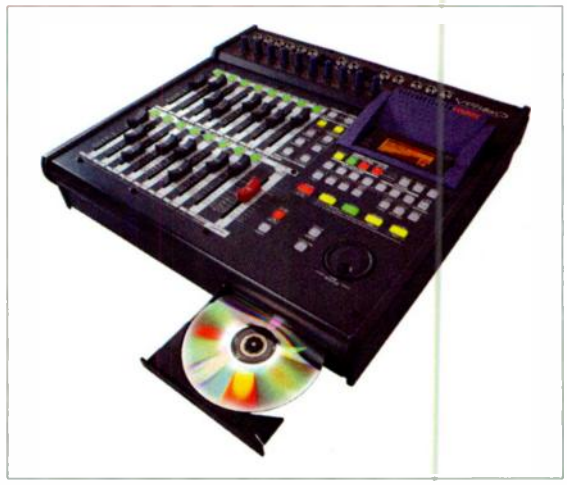
By Marty Cutler

BLUE MICROPHONES BABY BOTTLE

The Baby Bottle ($649) is a pressure-gradient, large-diaphragm condenser microphone that offers a cardioid polar pattern. The mic features Class A discrete electronics and transformerless output. Blue's suggested recording applications for the Baby Bottle include drums, acoustic instruments, electric guitars, and vocals.

The Baby Bottle uses a diaphragm that is handcrafted of 6-micron gold and aluminum-sputtered Mylar film. The microphone's frequency response is rated at 20 Hz to 20 kHz, with a signal-to-noise ratio of 87 dBA. The maximum SPL is listed as 133 dB for 0.5 percent total harmonic distortion. The Baby Bottle ships with a swivel-mount attachment. Blue Microphones; tel. (805) 370-1599; e-mail blue@bluemic.com; Web www.bluemic.com.

FOSTEX VF-160



Fostex's VF-160 ($1,799) is a 16-track portable digital studio offering 16-bit, 24 kHz recording and playback capabilities. Eight additional virtual tracks can be freely assigned to any track.

The VF-160 comes with a 20 GB internal hard drive and a built-in CD-RW unit. Fostex uses its proprietary FDMS-3 technology to provide more efficient disk and CPU management without data compression. The unit provides a 50-pin SCSI terminal for adding additional hard drives.

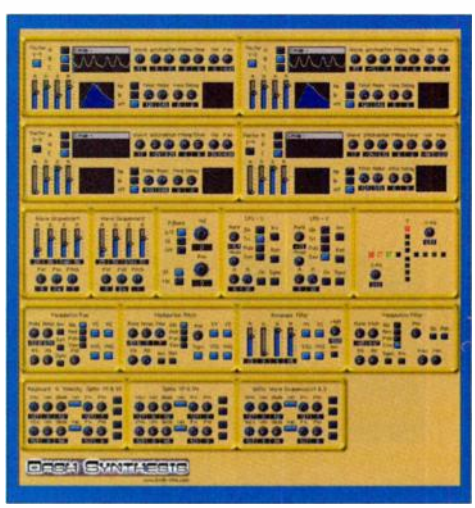
You get 60 mm faders, a compressor, and 3-band EQ (with parametric mids and highs) for each channel. The unit also has a master EQ and compressor. Two independent multi-effects processors provide reverb, delay, chorus, and pitch shift. The VF-160 features 99 Scene memories and supports dynamic automation when used with a MIDI sequencer.

Two of the eight mic inputs offer XLR jacks, phantom power, and unbalanced ¼-inch insert jacks. Each channel has two unbalanced ¼-inch effects sends and two auxiliary sends. You also get ADAT optical I/O and a switch that lets you change the ports to S/PDIF I/O. For analog outputs, the VC-160 provides two unbalanced ¼-inch jacks, a pair of RCA jacks, and a ¼-inch stereo headphone jack. Fostex Corporation of America; tel. (562) 921-1112; e-mail info@fostex.com; Web www.fostex.com.

DASH SYNTHESIS DAVECTOR

The open architecture of Native Instruments' *Reaktor* has spawned a host of compatible synthesizers designed by third parties. Among those is *DaVector* ($18), which draws its inspiration from the Korg Wavestation.

For starters, you get a resonant multi-mode filter. Four-way vector controls offer crossfades between four filters as well as crossfades between oscillators. *DaVector*'s Wave Sequence feature is a playlist of samples for each oscillator that can provide complex rhythmic and timbral motion for as many as 256 measures. You can trigger waves randomly and synchronize Wave Sequences and other parameters to MIDI Clock. Modulation capabilities include pitch, amplitude, filter frequency, filter envelopes, and vectors. *DaVector* has two LFOs, and you can modulate the speed of one LFO with the other.



The synthesizer's 5 MB sound set includes waveforms derived from the Korg Wavestation as well as new samples. You get 43 presets including classic Wavestation Performances. *DaVector* will run on any Macintosh or Windows computer capable of supporting *Reaktor*. Dash Synthesis; e-mail info@dashsynthesis.com; Web www.dashsynthesis.com.

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- 1 x MIDI I/O, 16 channels high-speed MIDI

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36 Channels of audio and 16 Channels of MIDI

HDSP Meter Bridge: freely scalable level meters, peak and RMS calculation directly in hardware

TotalMix: 720 channel mixer with 40 bit internal resolution

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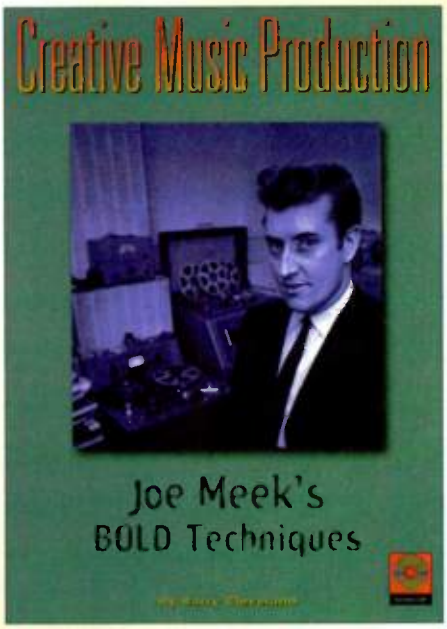


▲ ARTISTPRO.COM

The late Joe Meek is renowned as a producer and innovator in the realm of audio production. Although much has been written about Meek, *Creative Music Production: Joe Meek's Bold Techniques* ($34.95) by Barry Cleveland sets itself apart by delving more deeply into Meek's imaginative and unorthodox recording methods, as well as the environment of the recording industry he helped reinvent.

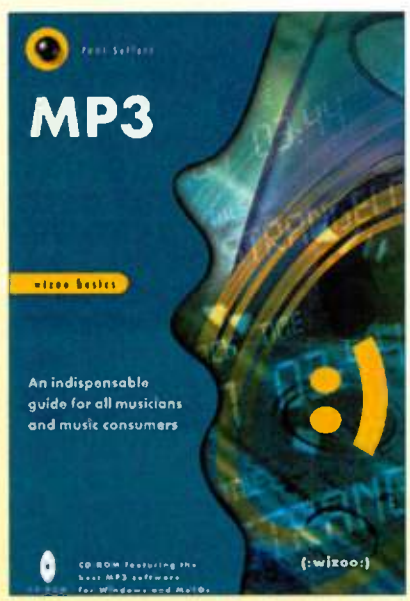
Cleveland provides an exhaustive look at the equipment Meek used and abused. The author offers detailed analysis of songs from Meek's album *I Hear a New World,* and the book includes a CD of the original, unaltered recording (which has been unavailable since 1960). The book is lavishly illustrated with photos of Meek's gear, correspondence, and other documents. The appendix features a complete Joe Meek discography.

Also from ArtistPro, *Studio-in-a-Box: The New Era of Computer Recording Technology* ($34.95), by **EM** contributor Erik Hawkins, is an up-to-date survey of the powerful audio-production tools provided by today's computers. The book offers a rundown of everything you need to produce professional-quality recordings with a minimum of external gear.

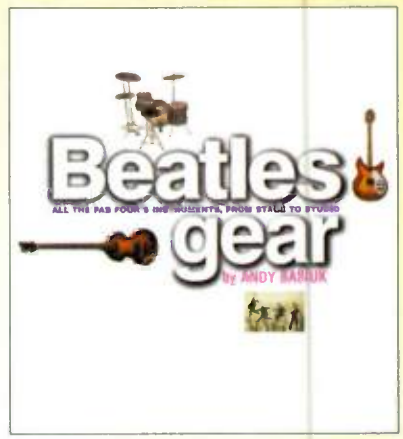
Hawkins' book begins with a list of applications and ten reasons for using a virtual studio. The author explains the components of a computer-based digital audio workstation (DAW), from digital audio sequencers, plug-ins, and software synthesizers to the computer and peripherals. He also covers hardware components, including controllers, audio and MIDI interfaces, and monitors. Hawkins provides examples for both Macintosh and Windows platforms. ArtistPro publishing/Hal Leonard Corporation (distributor); tel. (866) MIXBOOK; Web www.artistpro.com.

▼ WIZOO

Paul Sellars's *MP3 Music on the Internet* ($32.95) discusses the technical, logistical, and legal aspects of the MP3 format. The book comes with a CD-ROM featuring a variety of applications, including MP3 players and encoders for Windows and Mac users.



The book explains how the MP3 format works, where you can download or publish music, system and software requirements to work with MP3s, and how to encode high-quality audio. The book also offers a number of tips and tricks for encoding, explanations of the legalities of sharing MP3 files, and links to a number of MP3 resources. Wizoo GmbH; tel. 49-421-701-870; e-mail info@wizoo.com; Web www.wizoo.com.



▲ BACKBEAT BOOKS

Just when you thought you knew everything about the Beatles, Andy Babiuk gives you *Beatles Gear* ($40), which relates the history of musical instruments and recording tools used by the Fab Four and provides insight into the evolution of the Beatles' sound. The book traces the careers of all four musicians from their formative years in skiffle bands to the band's breakup.

Babiuk compiles information that was gathered from instrument makers, roadies, engineers, and firsthand interviews with Paul McCartney, Ringo Starr, and George Martin, among others. *Beatles Gear* provides a generous selection of photographs of the group's instruments, contemporary advertisements, and pictures of the Beatles in action. Backbeat Books; tel. (866) 222-5232; e-mail books@musicplayer.com; Web www.backbeatbooks.com.

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D-CODER

WALDORF D-CODER – The first 3rd party Plug-In to become available on the platform is an integrated Vocoder and Synthesizer by German synth-legend WALDORF. The number of vocoder bands is adjustable beyond the usual 25 – and the included polyphonic synthesizer provides an integrated sound-source. Can be played like any other VST-instrument!

* Manufacturer's suggested retail price. MasterX3 available separately from 03/2002.
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▶ DIGITECH VOCAL 300

The Vocal 300 ($249.95) is DigiTech's latest effects unit, featuring a built-in expression pedal that lets you control as many as three parameters at once. The device can be used for subtle vocal sweetening or for creating dramatic effects.

The Vocal 300 lets you use as many as seven effects at one time. The effects include EQ, vibrato, pitch change, an envelope follower, a variety of reverbs, and mic preamp models. The Vocal 300 also offers Voice Characters, which are voice modeling algorithms; Pixelator, for a ring-modulator-type sound; and Strobe, which produces staccato vocal effects. You get 40 factory presets and 40 user presets, which you can overwrite with your own patches. The Vocal 300 has 20-bit converters and a sampling rate of 44.1 kHz.

The Vocal 300 offers an unbalanced ¼-inch input, a balanced XLR input, and an ⅛-inch input. For outputs, the Vocal 300 provides a stereo ¼-inch TRS jack, an XLR jack, and an ⅛-inch headphone jack. DigiTech; tel. (801) 566-8800; e-mail customer@digitech.com; Web www.digitech.com.

▶ MOTU 896

From Mark of the Unicorn (MOTU) comes the 896 FireWire digital-audio interface ($1,295), a 2U device that supports 24-bit, 96 kHz recording on Macintosh and Windows systems. The 896 provides eight balanced Neutrik combo analog inputs, eight XLR outputs, eight channels of ADAT Lightpipe I/O, and two channels of AES/EBU I/O. Two analog XLR jacks let you connect the device to a pair of speakers. You can daisy-chain four 896 units together for a total of 72 channels of I/O.

Each of the 896's analog inputs features a microphone preamplifier with defeatable 48V phantom power. Eight trim knobs offer control over the analog input levels. The device also features a front-panel ¼-inch headphone jack and a footswitch jack for punching in and out of record.

The 896 includes a 9-pin jack for ADAT sync and a pair of BNC jacks for word-clock I/O. The AES/EBU I/O supports sampling rates up to 96 kHz. Sampling-rate conversion is provided at the input or the output, and the AES/EBU output can double or halve the clock rate depending on the incoming audio sampling rate.

The 896 comes packaged with MOTU's *AudioDesk* digital-audio recording software; the *MOTU FireWire Audio Console* application; WDM and ASIO 2.0 drivers for Windows ME, 2000, and XP; and drivers for ASIO 2.0 and Sound Manager for Mac OS 8.6 and 9.0. Mark of the Unicorn, Inc.; tel. (617) 576-2760; e-mail info@motu.com; Web www.motu.com.

▼ VERMONA M.A.R.S.

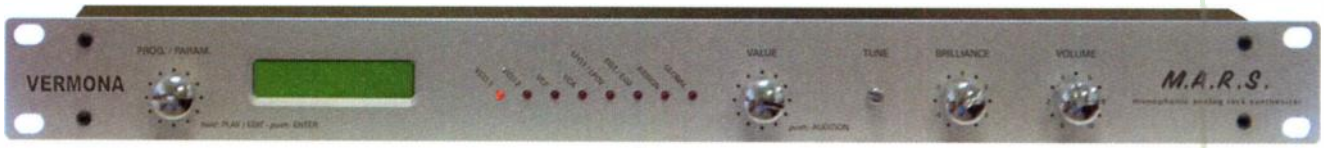
Vermona's M.A.R.S. ($549) is a monophonic analog synthesizer in a 1U case. Because of the design, M.A.R.S. doesn't have much real estate for front-panel controls. However, the two rotary encoders let you select any available parameter and change its value in real time. You can also control the synth's parameters using MIDI.

M.A.R.S. includes a voltage-controlled filter, two analog voltage-controlled oscillators, and a voltage-controlled amplifier, all of which are under the control of two invertable ADSR envelope generators and two LFOs. The VCOs are identical and generate sawtooth and rectangle waves. You also get a pulse wave with a fixed pulse width of 12.5 percent, a pair of suboscillators, oscillator sync, white noise, and ring-modulation capabilities.

The LFO waveforms, which include rectangle, triangle, two types of sine waves, and sample and hold, have adjustable symmetry. In addition, the LFOs can either run freely or be triggered with a Note On message.

The synth's 24 dB–per-octave lowpass filter lets you modulate cutoff frequency and resonance. Available modulation sources include Pitch Bend, Modulation, and Aftertouch, which can be applied to other synth parameters, as well.

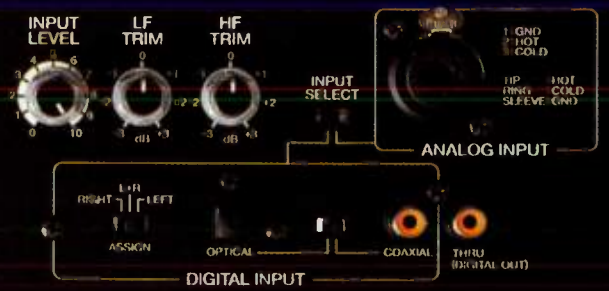
M.A.R.S. has an unbalanced ¼-inch output and a ¼-inch footswitch jack. Enport (distributor); tel. (402) 398-0198; e-mail info@vermona.com; Web www.vermona.com.

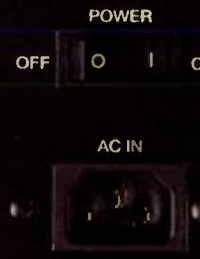


Roland

Roland® DS-90A DS-50A

A DIGITAL STUDIO SHOULD HAVE DIGITAL MONITORS (DUH).





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SOUND ADVICE ▲▲▲▲

▲ SPECTRASONICS

Sound-design wizard Eric Persing and ace studio drummer Bob Wilson have produced *BackBeat* ($199), a set of lean, in-the-pocket drum grooves for Spectrasonics. The collection comes on three CD-ROMs with samples prepared for Groove Control in Akai, E-mu, or Roland formats, accompanied by an additional WAV file CD-ROM. You can also purchase a single-CD audio version (without Groove Control) for $99.

In addition to Wilson, *BackBeat*'s producers captured drummers Greg Bissonette, John Ferraro, and Eric Boseman in a wide range of contemporary performance styles. Each groove features a different drum kit.

BackBeat offers 450 loops arranged in 39 categories. Loops include song-construction elements that offer fills, intros, breakdowns, and isolated cymbal and sidestick patterns. Groove Control allows you to change the tempo, time signature, pattern, and feel of the performances without pitch-shifting artifacts. You can also change the pitch of individual drum elements. Ilio Entertainments; tel. (800) 747-4546 or (818) 707-7222; e-mail ilioinfo@ilio.com; Web www.ilio.com

▶ PROPELLERHEAD

For users of Propellerhead's *Reason* comes *Strings ReFill* ($89), a library of sampled string-section phrases. The phrases were processed with Propellerhead's *ReCycle* to allow changes in tempo, pitch, and feel without the artifacts associated with time stretching. Because phrases have been sliced into individual components, you can also rearrange musical phrases in *Reason* in real time. In addition to instrument phrases, the package includes samples of individual instruments for use in *Reason*'s *NN19* sampler.

Samples include violin, viola, and cello patches; pizzicato articulations; harp glissandi; and various ensembles. The 288 loops are *ReCycle* REX files that can also be used in Steinberg's *Cubase VST.*

Sampling sessions for *Strings ReFill* took place in Documentary Studio in Moscow, which offered an acoustically sound environment for orchestral recording. MIDIMan/M Audio (distributor); e-mail maingate@propellerheads.se; Web www.propellerheads.se.

BITHEADZ

BitHeadz's *AfroCuban Percussion* ($69.95) dishes out 130 MB of grooves for use with *Phrazer* digital audio-sequencing software. Despite the potentially misleading title, the loop sources include percussion styles from countries other than Cuba.

In addition to Cuban rhythm variations such as *rumba guaguanco,* you get rhythms from Haiti, Puerto Rico, Brazil, and Trinidad. The collection includes well-known rhythms such as the merengue and mambo, and lesser-known rhythms such as *rumba lyesa* and *rumba columbia.*

A trial version of *Phrazer* comes standard with *AfroCuban Percussion;* you can upgrade to the full version of the program for $299. BitHeadz; tel. (401) 886-7045; e-mail info@bitheadz.com; Web www.bitheadz.com.

▼ SONIC FOUNDRY

The two-CD *Total Spanish Guitar* ($59.95) collection provides acoustic-guitar performances for use in Sonic Foundry's *Acid* loop-sequencer software. The performances range from traditional to modern styles.

Total Spanish Guitar offers guitar performances suitable for everything from slow ballads to up-tempo music. Performances include *rasgueado* rhythms and fast *picado* solos. Samples are arranged according to musical style, with categories including Habanera, Grueso, and Fuego. You also get folders containing leads and tremolos, as well as other articulations. Sonic Foundry; tel. (800) 577-6642 or (608) 256-3133; e-mail customerservice@sonicfoundry.com; Web www.sonicfoundry.com.


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MIDIMAN OXYGEN 8

MIDIMan's Oxygen 8 ($179.95) is a USB-powered keyboard that sports eight fully programmable rotary knobs for real-time control. Besides being powered by the USB connection, Oxygen 8 can run on six 1.5V C batteries. That allows you to use the 25-note keyboard as a stand-alone desktop MIDI controller.

The unit's eight rotary knobs support any MIDI message on any MIDI channel, providing continuous control for tweaking synths or software mixers. You can assign the data slider to offset Velocity, transmit MIDI Volume, or control Pan, chorus rate, and reverb depth. Oxygen 8 includes Modulation and Pitch Bend wheels. Naturally, you also have the option of transposing the keyboard's output.

Oxygen 8 comes with drivers for Windows 98, ME, 2000, and XP, as well as Mac OS 9.0.4. Drivers are also available for Mac OS X. Other keyboard controllers from MIDIMan include the USB Keystations, which combine a keyboard controller with a single-port MIDI interface. The units come in 49- and 61-key versions ($229.95 and $279.95, respectively). The keyboards connect to and draw power from a computer's USB port. The Keystation 49 can also run on six C batteries.

The Keystation's MIDI implementation is robust: you can assign the Data Entry wheel to send any MIDI Control Change message, and the keyboard transmits Aftertouch. Pitch bend and modulation wheels are also included.

You get two MIDI Out Ports; the first acts as a MIDI Thru and passes data from your computer to external devices. The second MIDI Out port lets you use the controller without a computer. The Keystations include the same drivers as Oxygen 8. MIDIMan; tel. (626) 445-2842 or (800) 969-6434; e-mail info@midiman.net; Web www.midiman.net.

ROLLS RP252

The RP252 from Rolls Corporation ($275) is a 2-channel compressor/limiter with a noise gate. Front-panel controls give you control over threshold, compression ratio, attack, release, gate threshold, gate release time, and output level for each channel. The two channels can also be stereo linked.

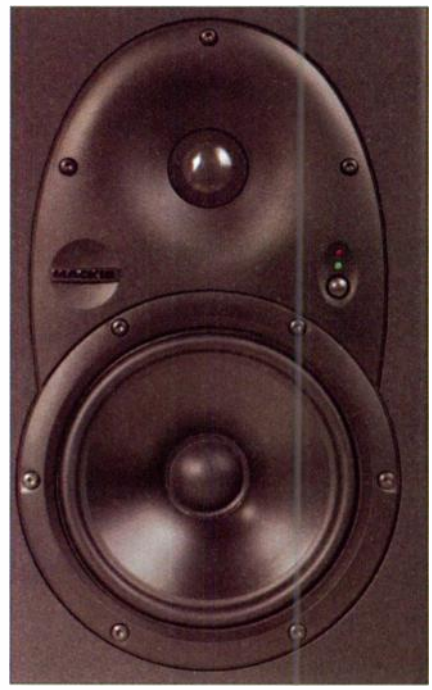
The front panel has a 10-segment LED meter to indicate gain reduction and an LED that shows gating activity. The rear panel sports balanced ¼-inch and XLR inputs and outputs and, for each channel, unbalanced ¼-inch sidechain jacks. A switch lets you toggle between –10 dB and +4 dB operation.

The RP252 offers +20 dBu of output gain, and it can handle a maximum input level of +21 dBu. The compressor threshold range is –40 to +12 dBu, and the attack time ranges from 0.2 to 10 ms. Total harmonic distortion for the unit is listed as 0.5 percent. Rolls Music Corp./Bellari; tel. (801) 263-9053; e-mail rollsrfx@rolls.com; Web www.rolls.com.

MACKIE HR624

Based on its larger HR824 active monitor, Mackie has introduced the HR624 ($649 each), a two-way bi-amped active monitor that can be used for close-field applications or within a surround-sound system. According to the manufacturer, the HR624 features a zinc-cast elliptical wave guide that provides improved dispersion and a composite honeycomb, rear-firing transducer that extends the bass coverage to 49 Hz (–3 dB). Integrated amplifiers provide 100W output to the 6.7-inch woofer and 40W output to the 1.0-inch tweeter. The speakers are magnetically shielded.

The HR624 offers rear-panel controls for sensitivity, an 80 Hz highpass filter, and a high-frequency shelving filter. The monitor also provides controls for optimizing the bass frequencies. The front panel features a Standby/Mute switch as well as LEDs for indicating power and overload.



Mackie rates the HR624's frequency response from 50 Hz to 20 kHz (±1.5 dB). XLR and RCA jacks are provided as inputs. Mackie Designs; tel. (800) 898-3211 or (425) 487-4333; e-mail sales@mackie.com; Web www.mackie.com. ❀

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- >> Really Easy To Use

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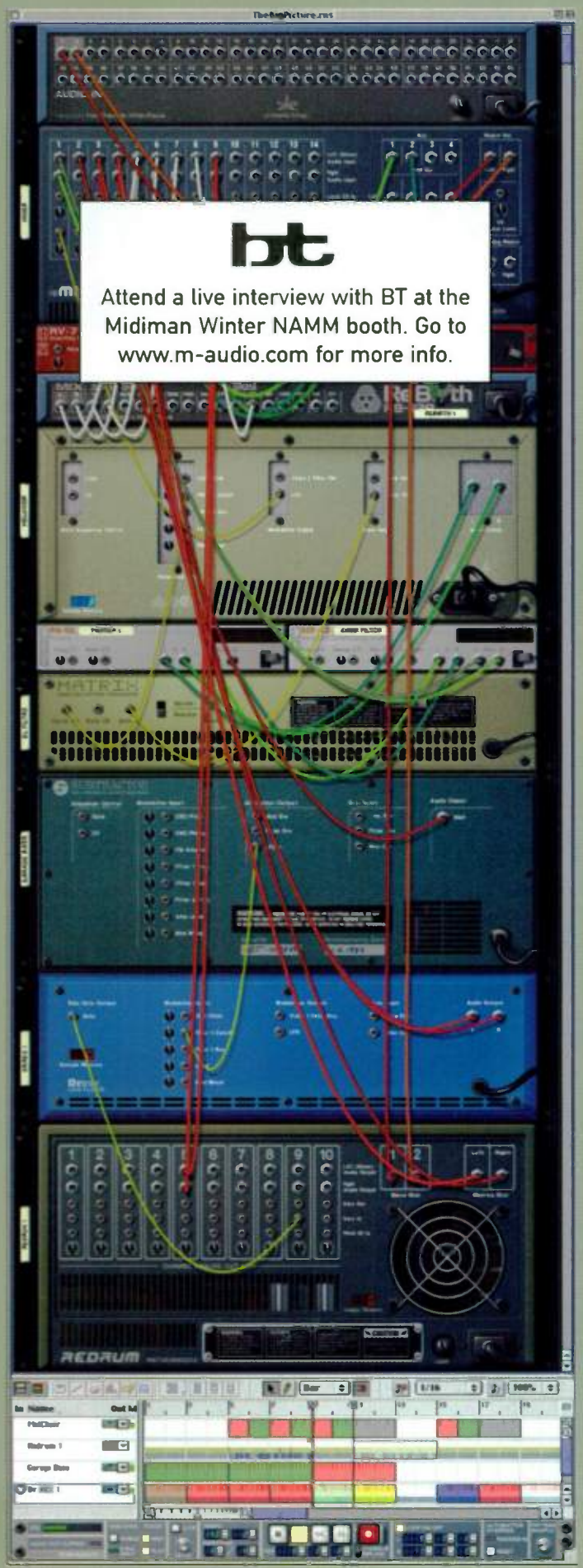
02



One keypress flips the entire rack around, revealing the back of all units, ready for patching.

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TECH PAGE

By Scott Wilkinson

A Piezo My Heart

A new piezo supertweeter goes where no tweeter has gone before.

The advent of new, high-resolution audio media, such as Super Audio CD (SACD; see "Tech Page: CD—The Next Generation" in the March 1998 **EM**) and DVD-Audio (see "Tech Page: CD? No, DVD!" in the July 1998 issue and "World of Options" in the August 2001 issue), requires enhanced playback equipment to fully exploit their potential. For example, a DVD-Audio disc can store digital audio at sampling rates as high as 192 kHz, which translates to a practical frequency response beyond 90 kHz. Humans can't distinguish anything higher than 20 kHz, but many audio professionals believe overtones above that frequency contribute to an overall sense of spaciousness and fine detail, perhaps by producing low-level combination tones within the audible range.

If that's true, the next problem is reproducing frequencies above 20 kHz. The Multimedia Development Center at Matsushita (Panasonic's parent company) is working on a piezoelectric "supertweeter" with a flat frequency response from 10 to 100 kHz. With appropriate crossover circuitry, such a driver could be combined with standard tweeters, midrange drivers, and woofers to greatly extend the frequency response of full-range speaker systems, revealing all the detail that DVD-Audio and SACD offer.

A supertweeter can be built using more conventional diaphragms, such as domes or ribbons, but it would be prohibitively expensive and not easily mass-produced. On the other hand, piezoelectric transducers have been used in various ultrasonic applications for many years, and they are relatively easy and inexpensive to make.

Pierre Curie discovered the piezoelectric effect in 1883. He noted that certain materials, such as quartz crystals, produce a voltage when they are mechanically stressed. Conversely, those materials' shapes are deformed when a voltage is applied to them. As a result, they can be used as transducers, converting mechanical vibration into an electrical signal (for example, in phonograph cartridges and mics) or vice versa (as with speaker drivers).

Quartz is the most common mineral on Earth, but it is not easy to fabricate into useful forms for piezoelectric applications. Fortunately, polycrystalline ceramics, such as barium titanate and lead zirconate titanate, also exhibit the piezoelectric effect after being heated and subjected to a strong DC electric field, which aligns the molecular dipoles within the material.

The Matsushita team started by affixing disks of a piezoelectric ceramic called PCM5 to either side of a larger nickel-iron disk held in a frame (see **Fig. 1**). When an audio voltage was applied to the electrodes (one connected to the ceramic disks and the other attached to the metal disk), the frequency response was markedly uneven. Piezoelectric materials tend to have sharp, narrow resonances at high frequencies, which are unacceptable in speaker drivers.

The team found that attaching rubber dampers to the ceramic disks effectively controlled the resonances. Mathematical models and subsequent experiments determined that conical rubber dampers worked the best because the amplitude of the resonances is greatest at the center and decreases toward the outer perimeter. Another factor is the cavity formed by the tweeter frame and the damper, which can affect the frequency response of the driver. Conical dampers yielded the best response, possibly because they form a short hornlike structure with the frame.

The end result is a supertweeter with a flat frequency response from 10 to 100 kHz. Now all that's needed are amplifiers, preamps, and source devices that can support the extended frequency range made possible by DVD-Audio and SACD. I'll keep you posted on developments in those areas as the brave new world of audio reproduction develops. ●

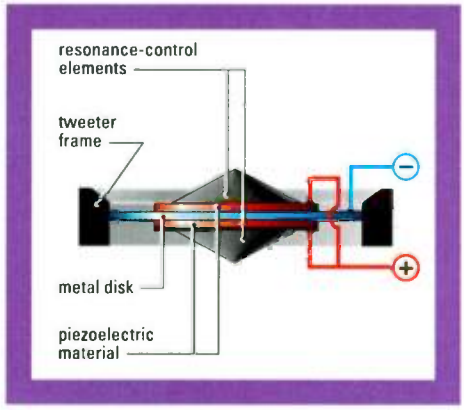
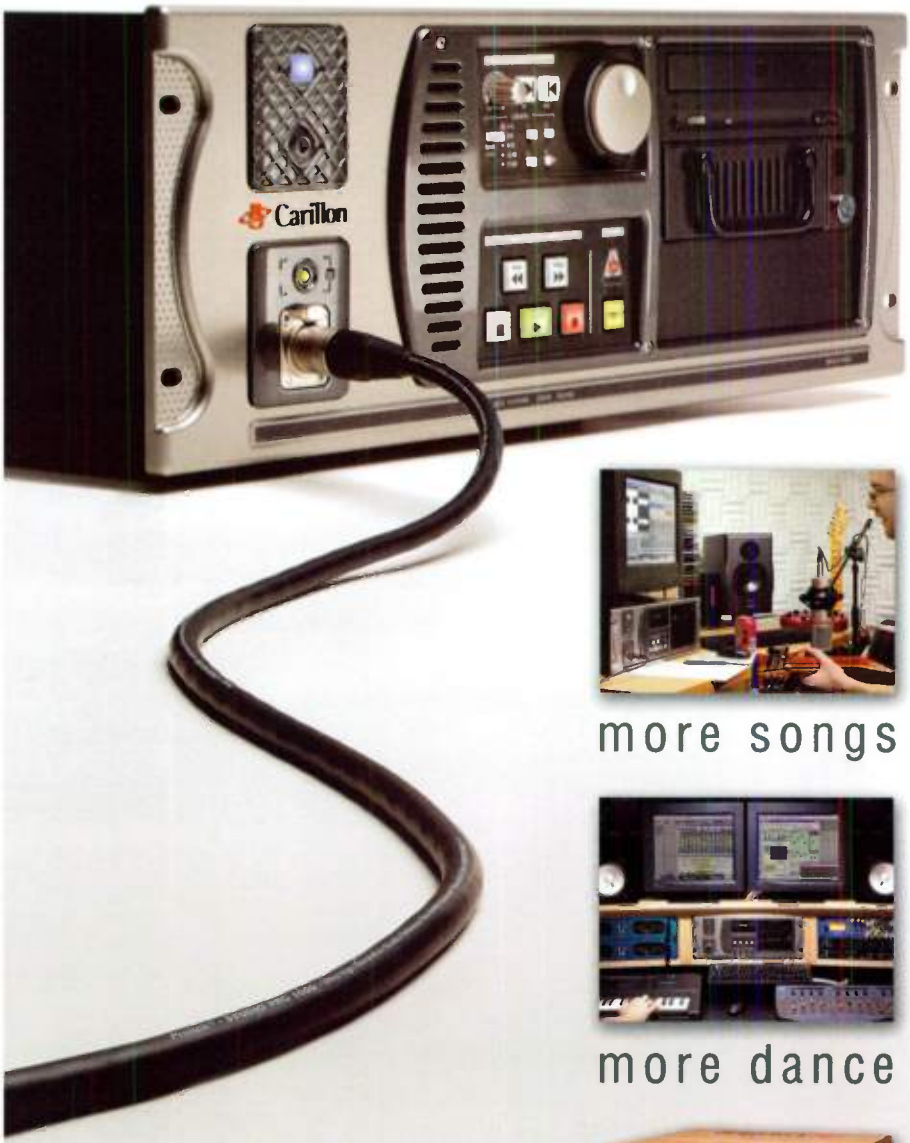


FIG. 1: Matsushita's supertweeter consists of two piezoelectric ceramic disks affixed to a metal disk within a frame. Conical dampers control the resonance of the ceramic material and form an acoustic horn with the frame, resulting in a flat frequency response from 10 to 100 kHz.

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.



The Carillon development team mixes writers, sound designers and producers with engineers and programmers responsible for the build and support of thousands of computer music systems, from the early days of the Apple II and Commodore 64 to the very latest fibre-channel networks.

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	P4 1.5GHz Windows 98SE	256Mb 133MHz SDRAM	20GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cakewalk Sonar	AudioTrak Maya & MIDI Expansion	✔
	P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio AudioPhile Sport 1X1	✔
	P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 44	✔
	P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Propellerhead Reason	M-Audio AudioPhile	✔
	P4 1.7GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	15" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1 Halion VST	M-Audio AudioPhile	✔
	P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 66 and Omni I/O Sport 1X1	✔
	P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	M-Audio Delta 10/10	✔
	P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1 NI Reaktor, B4 and Pro 52	Creamware Powersampler Carillon RK8	✔
	P4 1.7GHz Windows 98SE	256Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Logic Gold EXS24 Sampler	M-Audio Omni IO Delta 44 Emagic MT4	✔
	P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	Cubase VST 5.1	MOTU 2408 MKII Steinberg Midex 8	✔
	P4 2.0GHz Windows 2000	512Mb 400MHz RDRAM	80GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Dual Plextor 24x10x40 CDR	32Mb ATI Rage Pro Card	Sonic Foundry Sound Forge	Lynx Two ISDN Adapter Ethernet Adapter	✔
	P4 2.0GHz Windows 2000	1024Mb 400MHz RDRAM	20GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Plextor 24x10x40 & 5 blank CD's	Dual 17" Black CRT Monitors Matrox G550 32Mb Dual Head	Steinberg Nuendo	Nuendo 8 I/O + MIDI Nuendo 9652 PCI Carillon RTM1 Midex 3	✔
	P4 1.7GHz Windows 2000	512Mb 400MHz RDRAM	18GB System Barracuda SCSI Dual 36GB Audio Barracuda (SCSI with Hot Swap Caddies)	Plextor 24x10x40 & 5 blank CD's	Dual 19" Black CRT Monitors Matrox G550 32Mb Dual Head	Digidesign Pro Tools TDM	Digidesign Pro Tools Mix24 System Digidesign 888/24	✔
	P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 16x10x40 Speed CDRW & 5 blank CD's	19" Black CRT (as std) 32Mb ATI Rage Pro Card	Sibelius GigaStudio 96 5x Siedlaczek Orchestral CD's	M-Audio AudioPhile	✔
	P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 40GB Samples 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	17" Black CRT (as std) 32Mb ATI Rage Pro Card	GigaStudio 160 Sound Forge XP	M-Audio Delta 1010	✔
	P4 1.7GHz Windows 98SE	512Mb 400MHz RDRAM	20GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD & ZIP250	Dual 17" Black CRT Monitors Matrox G550 32Mb Dual Head	Reaktor, B4, Pro 52, Retro AS1, Tansman, Rebirth, Reason, Unity DS1	Mixtreme I/O, Midisport 8x8, Carillon RK8	✔
	P4 1.5GHz Windows 98SE	256Mb 133MHz SDRAM	40GB Seagate Softsonic ATA/100 7200rpm Drive (Partitioned for System & Audio)	Black 40x Speed CD-ROM	32Mb ATI Rage Pro Card	N/A	N/A	✔
	P4 1.7GHz Windows 98SE	512Mb 133MHz SDRAM	20GB System 7200rpm 40GB Audio 7200rpm (Seagate Softsonic ATA/100)	Black 16x10x40 Speed CDRW & 5 blank CD's	32Mb ATI Rage Pro Card	N/A	N/A	✔
	P4 2.0GHz Windows 98SE	512Mb 400MHz RDRAM	20GB System 7200rpm 80GB Audio 7200rpm (Seagate Softsonic ATA/100)	Plextor 24x10x40 & 5 blank CD's	Matrox G550 32Mb Dual Head	N/A	N/A	✔

The Carillon AC-1 is silent, robust and portable. I can keep it switched on in the control room without even thinking about fan noise. I wouldn't hesitate to recommend the AC-1 to anyone buying a computer for music..."

Mike Hedges

Mike Hedges is one of the industry's most in-demand producers, with recent credits including *U2, Manic Street Preachers, Travis, Texas & The Beautiful South.*

He has recently taken over Wessex Studios - recording venue for a long list of legendary albums - and London's longest operating studio after Abbey Road. A complete refurb is underway, with design/ acoustics by Andy Munro, and will include a new 5.1 mix suite and dedicated programming and track-lay rooms. Hardware will include Mike's well documented collection of classic analogue, including the EMI console from Studio 2 at Abbey Rd - used to record Dark Side of the Moon.

Hedges is also involved with 2kHz Studios in West London which has been solidly booked since opening in February. Venue, personnel and equipment all contribute to a warm-sounding and spontaneous recording environment. This has been particularly popular with guitar/vocal based artists looking to make an album in days rather than months.

Mike's Carillon AC-1 system is used with Digidesign's Pro Tools 001 hardware and Logic Audio Platinum software. It is primarily used as an off-line editor for comping and editing tracks created on Wessex Studios' main Pro Tools TDM systems. Sessions are transferred between systems on CD in 24 bit .wav format. The system was supplied with Sonic Foundry's Acid Pro and Mike has installed other goodies like Fruity Loops and Beat Creator.

Mike Hedges' AC-1 specification:

- Intel Pentium III 800MHz
- 256MB 133MHz SDRAM
- 20GB ATA/100 Quantum Fireball Plus 7200 RPM System Drive
- 30GB ATA/100 Quantum Fireball Plus 7200 RPM Audio Drive
- Yamaha 8824 CD Writer
- Adaptec 2904 SCSI Card
- 16MB ATI Rage Pro Video Card
- 15" Black LCD Monitor
- PS2 Mouse & Keyboard with Shortcut Overlays

"...All the reservations people have had about using PCs for serious music applications no longer exist - Pro Tools LE runs faster on the Carillon than on our Mac. More bang for the buck has made Windows the people's platform - there are so many users out there and that means loads of useful and creative programs from small developers for the PC which just aren't available on the other platforms."

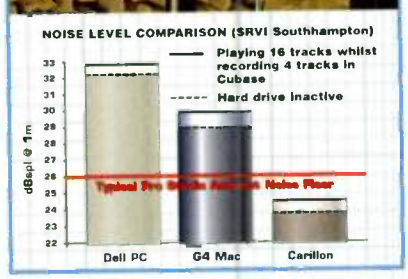
These are some others who have purchased Carillon computers to date:

(their inclusion does not denote an endorsement)

Air Studios - Lyndhurst Hall, Grand Central Studios (leading post house), Joe & Co (award winning music house), Royal Court Theatre, Mama Mia. *Unsolicited on the net:* "What a computer - it has worked perfectly out of the box!", "I have an AC-1... I think these are easily the best PC's on the market for Pro Tools.", "Tell me these PC's don't rock! (p.s. I'm not an employee)"

The Carillon AC-1 was purpose engineered for the near silent environment of a professional recording studio. Our enclosure design reduces transmitted noise and is damped to prevent sympathetic vibration with internal components. De-coupling rack ear gaskets and massive Sorbothane feet increase the sense of isolation and the very quietest components complete what *Sound on Sound's* Martin Walker described as "to my knowledge the quietest production PC available". But don't take our word for it - see the results of tests carried out in the anechoic chamber at Southampton University's Institute of Sound and Vibrational Research.

soft machine



Our Carillon UltraMute PSU combines special low hum transformers with an all new fan, featuring substantially smoother fan-motor bearings and a reduced turbulence fan blade design.

A unique processor fan incorporates a radical new 360° radial fin heat sink. This patented design provides a far greater surface area than conventional coolers for increased heat dissipation with a reduced airflow requirement.

To minimise hard drive noise we fit *Seagate SoftSonic*™ Fluid Bearing Drives and enclose them in a *Molex Silent Systems*™ foam-lined sleeve to reduce drive noise by over 90%.

Carillon

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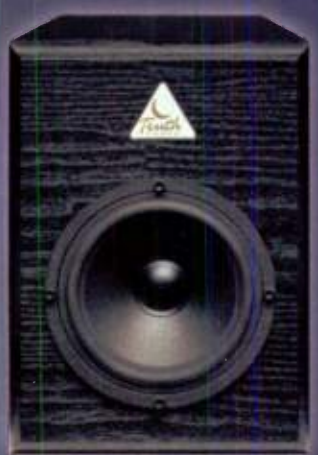
Patent Application Nos US 09/909,130 CE 01306246.8 GB 0018000.0

Prepare for the Truth!

Truth Audio announces its' new product line for 2002. Four new speakers that will show you the way to clean and accurate mixes. From the TA-1A close-field monitors (active version of the rave-reviewed, award winning TA-1P) to the TA-2A active and TA-2P passive mid-field monitors, we've got the Truth you've been searching for. Add the new TA-SW powered subwoofer for the ultimate 5.1, 6.1, 7.1 Surround systems. For more information visit us on the web at www.truthaudio.com. Prepare yourself for the Truth!

TA-1A / TA1-P
active or passive close-field



TA-SW
active sub woofer

TA-2A / TA-2P
active or passive mid-field

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WEB PAGE

By Gino Robair

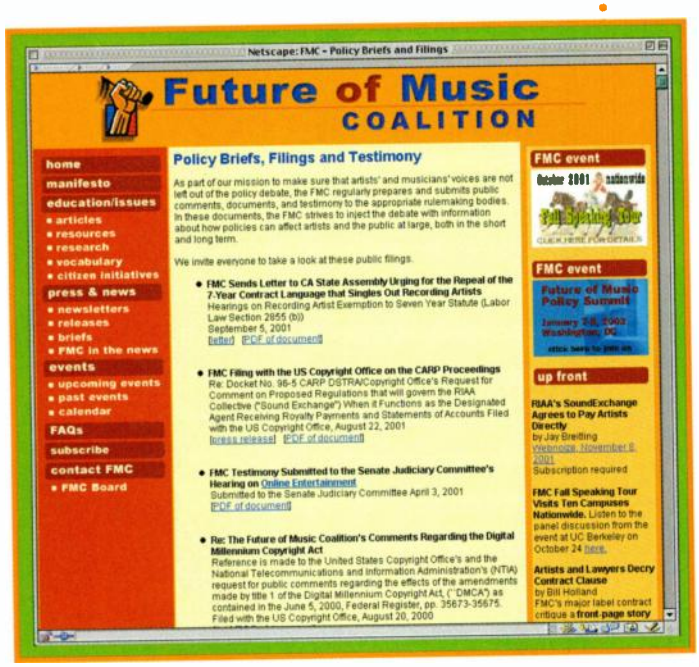
WEB SITE OF THE MONTH

The issues that surround intellectual property are increasing in complexity as music technology continues to evolve. Meanwhile, major record labels and federal regulatory agencies are struggling to keep up. The Future of Music Coalition (FMC; www.futureofmusic.org) was created to address the issues surrounding copyright in the digital age and their effect on recording artists. For anyone chasing the dream of the Big Record Deal, this site provides important information about the machinations of the industry at large.

In its mission statement, the FMC says it will foster an open discussion of issues pertinent to musicians and music consumers, provide research about the record industry, and publish its findings and disseminate the views and needs of recording artists to the media as well as policy makers. In addition, the FMC has posted a manifesto on its site that details three areas of concentration. The first focuses on the development of Internet music technologies that thwart piracy and allow artists to be compensated for their work. The second addresses the conflict of interest that exists between the Recording Industry Association of America (RIAA), recording artists, and major labels. The third examines the problems inherent in the Secure Digital Music Initiative (SDMI).

The topics in the FMC site are well organized, with categories such as Education/Issues, Press and News, Events, and FAQs given in the left frame. Among the items in the Education/Issues category is Vocabulary, which provides a glossary of legal terms relevant to rights management. A list of the FMC's public filings and testimonies can be found in the Briefs category. That section also includes the organization's letter to the California State Assembly "urging for the repeal of the seven-year contract language that singles out recording artists," which is particularly interesting.

The FMC Web site is updated regularly and includes links to relevant stories appearing in the media and a calendar of events. For example, the organization sponsors an annual policy conference.



DOTDOTDOT.COM

For a little remixing fun, check out the **Vocal Factory** (www.thevocalfactory.com). The site has vocal samples for you to use in a project and asks you to submit the results. If your mix is chosen, the Vocal Factory will include it on a sampler that is presented to A&R and other record-industry folks in an attempt to get a record deal. There is one caveat: the Vocal Factory retains the rights to all vocals on its site, so read the Terms and Conditions page carefully regarding your rights to the remix you create. . . .

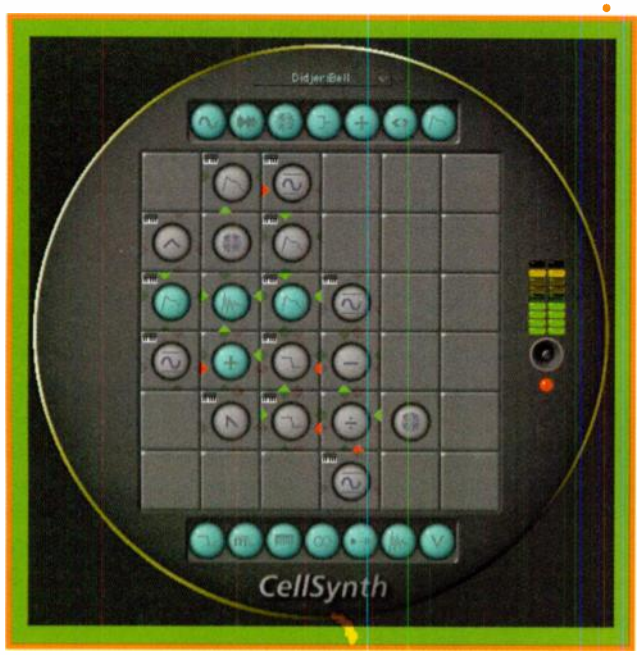
To hear examples of naturally produced electric music, surf no further than **SpaceWeather.com**'s site about *sferics* (www.spaceweather.com/glossary/inspire.html). Sferics (short for atmospherics), and related phenomena known as *tweeks* and *whistlers,* are electromagnetic transmissions caused by lightning. Although the overall frequency range of sferics—just a few hertz to over a million hertz—exceeds people's hearing range, the emissions listeners can hear have an appealing snap, crackle, and pop, with an occasional glissando thrown in. The INSPIRE VLF (very low frequency) receiver at NASA's Marshall Space Flight Center in Huntsville, Alabama, is the source for the audio examples on SpaceWeather.com. For additional examples, visit the INSPIRE Web site (http://image.gsfc.nasa.gov/poetry/inspire/advanced.html) for a live audio stream of these intriguing sounds.

DOWNLOAD OF THE MONTH

Living Memory's *CellSynth* 1.6 (www.cellsynth.co.uk) is a shareware modular synthesizer application with a built-in Automation Sequencer and audio recorder. *CellSynth* comes with more than 150 example patches and a step-by-step tutorial to get you started building your own. The shareware registration fee is $95 and is required to enable the Automation Sequencer; all other features, including Load and Save, are fully functional in the unregistered version.

You create patches in *CellSynth* by dragging modules onto a six-by-six patch Matrix. Any module can receive audio and control input from any adjacent module, whether it be on the left, right, top, or bottom. Connections are activated by clicking triangular buttons along the module borders, thus eliminating the need for patch cords. The output is controlled by a built-in audio mixer containing a channel strip for each module in the Matrix. Any module can contribute to the output.

CellSynth's modules include three sound generators (a multiwaveform oscillator, a noise generator, and a sample looper), four routing and control modules (a router, a mixer, a panner, and an ADSR envelope generator), seven audio processors (multimode, lowpass, and comb filters; phaser; delay; reverb; and vocoder), and a step sequencer. Each module has its own control panel for setting its various parameters and managing the mix of audio and control inputs from adjacent modules. In addition, you can build custom control panels for the whole patch, complete with graphics and MIDI remote control.



CellSynth can be used as a monophonic synth, but it is best suited for processing multiple synchronized loops. The Sampler module has a basic sample editor built in. For an audio example of *CellSynth,* listen to the MP3 file DidjeriBell on the **EM** Web site. Minimum requirements are a Macintosh G3/233 MHz, 64 MB of RAM, OS 8.5 or later, Open Music System, and *Sound Manager* 3.0 or later.—*Len Sasso*

WEB APP

If you're looking for an easy way to add interactive sound to your Web page, check out what Pulse (www.pulse3d.com) and its audio division, Sonicopia (www.sonicopia.com), have to offer. The companies' Pulse Sonifier is an integrated authoring program that lets you assign music and sound effects to any image or link on a Web page, without having to code HTML and JavaScript or use additional Web-authoring tools.

The Pulse Sonifier is available as a subscription service. For a small monthly fee, you get 24/7 access to Pulse Sonifier and its online audio library. That is important because all of the sounds reside on Pulse's server and are accessed from there as your page loads.

Remarkably, pages enhanced with the Pulse Sonifier load quickly because graphic elements are given priority. That lets you view the page while the sonic elements are loading. Pulse Sonifier uses the ubiquitous Macromedia Flash audio engine in your browser for playback.

Using Pulse Sonifier is surprisingly easy and requires no software download. Just point your browser to the Pulse Sonifier Web site (www.pulsesonifier.com) and begin auditioning and selecting sounds by type and keyword. Sounds are also presented in themed sets to help you in the selection process. Music cues and rollover effects in

each set are composed in the same key, which adds to a page's aural impact.

Next, type in the URL of the page you want to sonify. The server-based application calls up a copy of your Web page in your browser so you can see what you are working on. Finally, drag and drop the sounds you want from the library dialog box onto any text and graphic elements on your Web page. The application lets you click on the elements or roll over them to hear how the sounds work, without having to reload or publish the page.

When you have finished adding your sounds, you are then prompted to publish the revised Web page via FTP; download the page to your hard drive; or have it e-mailed to you. That's all there is to it.

Pulse Sonifier can be used by PCs running Windows with Microsoft *Internet Explorer* 5 or later (a Mac version is in development). However, Web pages sonified by Pulse Sonifier work with other browsers and computer platforms. Pulse is currently developing advanced text-to-speech technologies and upload features that will soon allow consumers to create their own audio content.

BAND ON THE WEB

When it comes to delivering style and substance, few indie groups are as together as the Boston-based synth-pop trio Freezepop (www.freezepop.net). The band's first full-length release, *Freezepop Forever,* contains 12 tracks that hark back to the structural simplicity of Kraftwerk, Orchestral Maneuvers in the Dark, early Depeche Mode, and the Human League. Freezepop's songs offer clever arrangements with orchestrations so sparse that, at times, they seem almost invisible. The key element is the band's secret weapon: the Yamaha QY70.

"The QY70 is really the biggest influence on Freezepop's sound," says the Duke of Candied Apples, chief composer and engineer for the band. "I thought it would be great for composing while out playing shows or on a plane, and then in the studio, I would replace all the sounds with better ones. I quickly realized that it has some great sounds for writing blippy synth pop. So I decided to start a new synth band and limit myself to only two pieces of gear: the QY70 and a Music and More (MAM) vocoder."

RICK WEBB

The Duke's passion for the QY70 borders on fanaticism. On Freezepop's Gear page, his correspondence with Yamaha about suggested improvements to the product is proudly displayed. The page also details the Duke's tidy recording setup, which includes Mark of the Unicorn (MOTU) *Digital Performer* 2.71, a MOTU 2408 interface, a Yamaha 03D digital mixer, and a Lexicon MPX-1 effects processor.

However, it's the sound of the QY70 that helps keep the music smart and clear, even onstage. "It also makes playing shows pretty simple in terms of lugging gear around," the Duke says. "It's a great little box to use live because I can jump around a lot and not be confined to a keyboard. My job during a show is to handle the song arrangements: working in Pattern mode, I call up the verses and choruses and also mute and unmute tracks during the song to mix up the orchestration. It's a flexible way to change songs around live and bring something new to them each time we play. "

The vocoder also plays an important part in Freezepop's music. Onstage, the Other Sean T. Drinkwater covers those parts using a Roland VP-330. "It is the dreamiest vocoder ever," adds the Duke. Drinkwater also uses a Roland JP-8000 for additional synth textures.

Vocalist Liz Enthusiasm shares songwriting duties in Freezepop. Her voice has a charming innocence as she skillfully navigates the seductive melodies of "Plastic Stars," "Tender Lies," and "T DJ." Her fascination with Japanese pop culture is partly responsible for the band's wonderful song "Tennis Boyfriend," which Enthusiasm sings in Japanese. "Liz took a semester of Japanese in college," says the Duke. "So she was able to write the lyrics and pronounce them correctly. And the Japanese vision of the future—from the late '60s and early '70s—is very appealing to us."

Enthusiasm, who has a background in graphic design, is also responsible for Freezepop's cohesive look, which encompasses its album art, Web site, and merchandise. Many bands fail to achieve this kind of consistency in packaging, but Freezepop is a winner. The band's Web pages and CD design are attractive, free of clutter, and easy to read.

"The visuals you present to the world are so important, and the Web site has really been one of the best ways for us to get our music out there," the Duke says. "We get a lot of comments from people that our Web site is fun. We try and update it all the time, with photos from shows, an advice column, recipes, and, my favorite section, Fan Art."

Freezepop's new EP, *Fashion Impression Function* (Archenemy Records), features four new songs as well as remixes of songs from *Freezepop Forever.* In addition, the band's song "Science Genius Girl" appears in the interactive video game *Frequency* for the Sony PlayStation 2.

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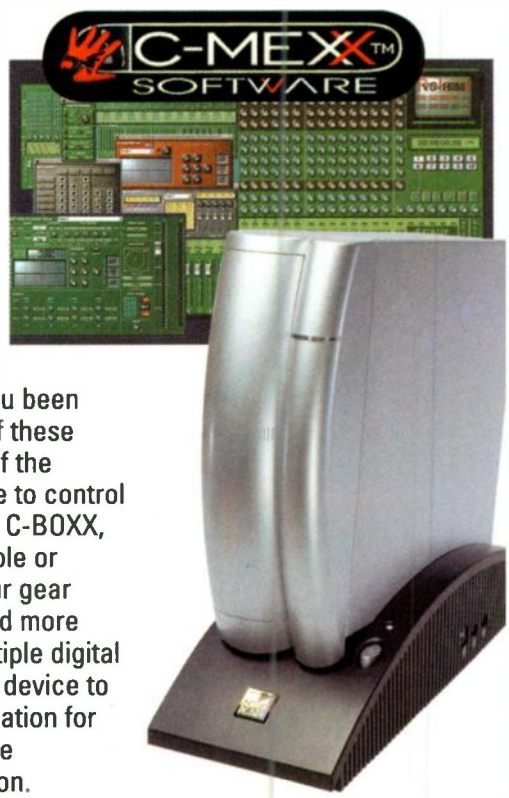

If you've got a Roland VS1680, Yamaha Digital Mixer or Fostex D2424, you need the C-BOXX. Never before have you been able to access every feature of these devices so easily by using all of the benefits of a software interface to control your hardware. Simply put, the C-BOXX, powered by C-MEXX's C-Console or Visualizer software, makes your gear easier to use, more flexible, and more editable. Use it to manage multiple digital mixers as if they were a single device to quickly setup mixes and automation for your digital recorder or as a live recording and mixing companion.

"Knowledge"
"these guys know what they're doing"
Guy Allison: Musician/Song Writer/Producer- Doobie Brothers

"Flawless"
"SoundChaser computers are flawless."
David Kahne: Producer - Sugar Ray, Paul McCartney

"Five Star"
"Five Star Technical Support."
Cliff Martinez: Film Composer - *Traffic, Sex Lies & Videotape*

San Francisco New York Los Angeles Nashville

Sucks (for computers at least)

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SOUND CHASER

VINTAGE PAGE

By Julian Colbeck

Fender Rhodes Stage Piano Mark I

Produced: 1970–79
Made in: United States
Designed by: Harold Rhodes
Number produced: more than 100,000
System: hammer action, electric pickups
Price new: $500–$1,800

Today's prices:		
	Like new	*$750*
	Like, it's okay for its age	*$500*
	Like hell	*$300*

The Fender Rhodes electric piano possesses one of the most recognizable sounds in modern music. The Rhodes' popularity has waxed and waned over the decades since its introduction, but its sound is still in vogue today in Beck's rock, Brand New Heavies' funk, Chick Corea's jazz, and even in Emagic's *EVP88* and *EVP73* virtual electric-piano plug-ins.

The Rhodes piano was the brainchild of musician Harold Rhodes. While a flying instructor stationed in Greensboro, North Carolina, Rhodes designed his first portable acoustic piano for the U.S. Army Air Corps in 1942. Beginning with a pile of aluminum tubing salvaged from a B-17 bomber, Rhodes fashioned a sort of xylophone with a 29-note keyboard. Following World War II, Rhodes built a self-amplified, 38-note electric model called the Pre-Piano after taking apart a chiming clock that used spun-metal rods called tines.

At the 1959 NAMM convention, Rhodes introduced the Piano Bass, which was later enthusiastically embraced by Ray Manzarek of the Doors. Of all the models to emerge over the years, however, perhaps the best known and most desirable is the 73-key Fender Rhodes Stage Piano Mark I.

Introduced in 1970, the 132-pound Mark I is made of wood, covered in a fabric-reinforced vinyl called Tolex, and sized to fit into a box that measures 45.25 by 9.85 by 23.63 inches. A compartment in the top cover houses four telescoping tubular steel legs that screw into the instrument's underside at a splayed angle for sturdy setup. A long metal sustain pedal attaches to the keyboard mechanism through a small hole in the center of the piano's underside via interlocking rods. Unfortunately, the pedal arrangement has always been difficult to fit and invariably slackens or falls out in the middle of a gig.

The original Stage Piano's control panel is sparse, with a volume knob, a tone knob, and a stereo ¼-inch TRS output jack. The Mark I's Bass Boost is a passive tone control, though some of the later models offer active tone control. The curved, sloping lid makes it impossible to stand your beer, sheet music, or another instrument on top without the framelike contraption that was seen occasionally in the 1970s.

The Mark I was manufactured in 73- and 88-key models. On the early Mark Is, the hammers were made of felt-covered wood; they were replaced on later models by rubber-covered plastic. Sound is generated when the key action causes the hammers to strike the tines. Audible vibrations are picked up by a system of individual magnets positioned close to the tip of each tine.

With keys that are slightly shorter and narrower than standard piano keys, a typical Rhodes piano began life with a wrist-breakingly stiff action. The weighted keys usually took months to loosen up and settle down; most became *knackered*—a term commonly used among Rhodes players—in their first year or so. Accordingly, no two instruments feel or sound quite the same. Some are a pleasure to play, and others are simply murderous.

The classic Rhodes sound is highly expressive—part

The National Association of Recording Arts and Sciences (NARAS) awarded Harold Rhodes its Lifetime Achievement Award in 1996. At the awards ceremony, keyboardist Chick Corea said, "The Rhodes represents the only true advancement to the piano keyboard of the 20th century."

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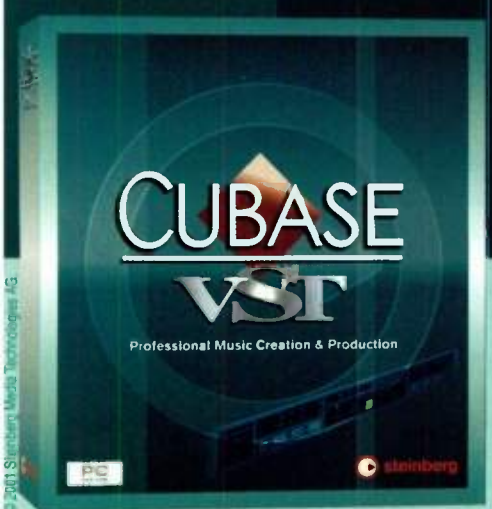

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bell, part xylophone, and part piano. With its relatively soft, muted tones and brilliant dynamics, the Rhodes piano is especially well suited to the subtleties of jazz. Hitting a note really hard produces anything from a harmonic or a dull thwack to a clear, loud, crystalline tone.

Two hardware pieces that greatly influence the Rhodes sound are the amplifier and the effects processor through which the piano is played. Shortly after the Mark I's introduction, the Fender Twin Reverb established itself as the amplifier of choice, in part because of its appropriately moody tremolo. The Roland JC-120 Jazz Chorus is also an excellent choice for amplification, especially with its creamy built-in chorus effect. Before the JC-120, players had to rely on chorus and phaser pedals that were notoriously noisy and ate batteries for breakfast. Still, if you want the authentic feel of the '70s, you may opt to take the stompbox route.

Rhodes pianos were produced in large quantities, and they're still in plentiful supply. Bargains abound, and with a little patience and skill, you can perform most repairs yourself. If you want to hear, see, and feel how musical instruments were before digitization made everything virtual, a Rhodes presents the lesson perfectly.

Before you purchase a Rhodes, give it an aural and a physical examination. Keyboard action is a matter of personal taste, but an action that's too loose is probably on its way out. Don't be overly concerned with the evenness of the tone or the loudness of individual notes; both are easy to correct by adjusting the angle or distance between the tine and the pickup. You should be aware that during the late '70s, then-owner CBS substituted some of the original construction materials, resulting in an instrument with a tone that Harold Rhodes considered inferior to earlier and later models.

With the exception of the tines, which break frequently, the Rhodes is fairly maintenance free. Fitting and replacing tines is laborious rather than difficult and requires nothing more than a screwdriver, a pair of pliers, reasonably good eyes and ears, and a steady hand. Each tine is cut to an approximate length and then fine-tuned by scraping tuning springs along its length.

You can obtain replacement parts from a huge variety of sources, and third-party modifications have always been available. From the mid–'70s until the mid–'80s, the most popular mod was Chuck Monte's Dyno-My-Piano, which employed mechanical and electronic makeovers to make the Rhodes sound even brighter and more bell-like.

Plenty of resources are available on the Web, but nothing comes close to the Rhodes Super Site (www.fenderrhodes.org). There you'll find online versions of the original brochures, user guides, and service manuals for various models, as well as fascinating historical information, FAQs, classified ads, and a lengthy list of repair facilities.

Although the Fender Rhodes itself has gone in and out of fashion, digital emulations of its sound have remained popular since the age of the Yamaha DX7, which for many players provided a most effective substitute. During the late '80s, when the Rhodes piano reached the height of unfashionability, I abandoned mine beneath a friend's house.

Harold Rhodes died on December 17, 2000. He was much more than an idiosyncratic keyboard inventor, but he remained fiercely proud of his robust family of electric pianos, and with good reason. The Fender Rhodes piano is assured a place in musical history, and it remains a viable force in today's music. Go play one and you'll discover why.

PRICE GUIDE

The quoted prices reflect typical street prices you must expect to pay in U.S. dollars. The buy-in on vintage instruments, as with vintage cars, is just the beginning, though. Most of the original manufacturers are long gone, so maintenance and repairs are expensive.

Julian Colbeck *has toured everywhere from Tokyo to São Paulo with artists as varied as Yes, Steve Hackett, John Miles, and Charlie.*

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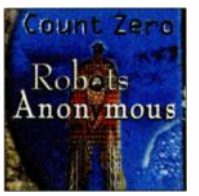
By Matt Gallagher

Basement High Jinks

Count Zero's *Robots Anonymous* is an offbeat, tongue-in-cheek work in which retro pop meets electronica. "I've always been interested in mixing rhythm-section stuff and electronic stuff," says Peter Moore, Count Zero's primary songwriter, who also recorded and engineered the album. *Robots Anonymous* pays tribute to pop luminaries such as Gary Glitter, Peter Frampton, Portishead, and Blur while also referencing Aphex Twin and Squarepusher.

Count Zero builds sophisticated guitar and synth pop from the ground up.



The band consists of Moore on vocals, keyboards, and guitar; Will Ragano on guitar and vocals; Brendon Downey on guitar, keyboards, and bass; Elizabeth Steen on keyboards; Bernard Georges on bass; and Eric Paull on drums. The band recorded 7 of the album's 11 tracks in Béla Studios, which is ensconced in the basement of Moore's three-story house in Brighton, Massachusetts.

"I built an adjoining control room," Moore says. "There's a laundry and furnace, and it certainly isn't soundproofed, but it works for me. I can have clients over." However, the room lacks adequate sonic separation. "When the whole band is playing, the live sound is overwhelming the sound coming off the monitors in the control room," he says.

Moore owns both current and vintage recording gear. "I like the hybrid," he says. He used a Digidesign Pro Tools III system running on a Power Mac 7500. His main synth is a Kurzweil K2000R, and his sequencer of choice is Opcode's *Studio Vision*. Moore's mic cabinet consists of a Microtech Gefell UMT 70S, an AKG D 112, an Audio-Technica AT4051a, Crown PZM mics, a Sennheiser MD 421, and a vintage Shure 55SW. His outboard gear includes an HHB tube preamp, a Summit Audio DCL-200 compressor, an Empirical Labs Distressor, a Lexicon MPX 500, an Ensoniq DP/4, and a Tech 21 Sans-Amp. Moore treasures a Premiere Spring Reverb Tank built circa 1960. "I've always loved the sound of spring reverbs on things other than guitars," he says. "They just add an automatic cheesiness."

JEFF CROWE

***Robots Anonymous*/Count Zero**

The acoustic drum parts on *Robots Anonymous* breathe well amid the album's electronic elements. Moore lets Paull's drumming set the pace, refusing to lock it into sequenced patterns. "A drummer drives the whole band," he says. "That's what keeps it feeling like a rock band." Moore recorded drum tracks through the Summit compressor to an Otari MX-505 Mk III-8, 8-track analog tape recorder synced to Pro Tools, sometimes sending the overhead mic signals directly into Pro Tools. "I like the Otari for the beefiness that it has," Moore says. He also used triggers.

The drum sounds on "go Go GO" are samples recorded "in this abandoned bank vault with two cheap condenser mics placed left and right, John Bonham–style," says Moore. "I like the fact that I have my own sounds." The pianos on *Robots Anonymous* are samples of a 1933 model Steck Baby Grand from Moore's childhood home. The string samples on "Roach Motel" originate from a sample library he created.

All the tracks on *Robots Anonymous* segue into one another. "I tried to get the bass and drums together, and then everything was added on one by one after that," Moore says. "I always have a DAT at the ready to be able to record an idea. I'd record the band jamming sometimes," he says, cataloguing "the key, tempo, and vibe.

"I try not to dictate every single thing, so the band has some leeway," Moore says of the songwriting and recording process. "It seems sort of autocratic, but it works. It just means I have to do a lot of work, so whatever. I like it." ☻

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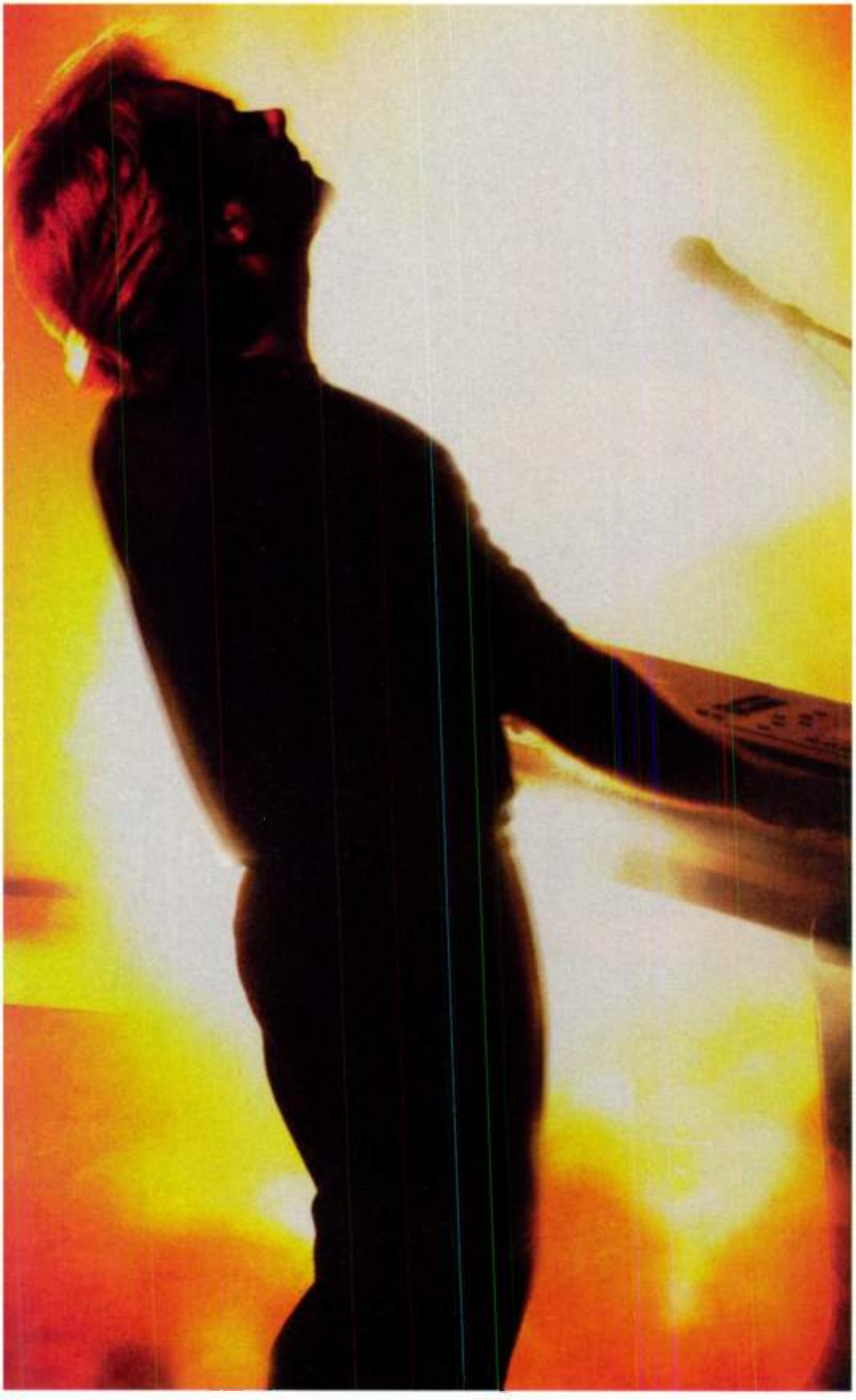

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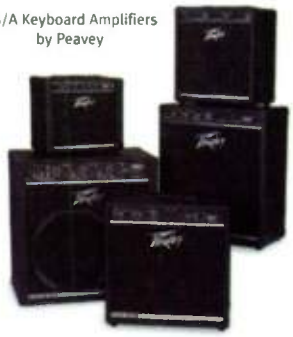

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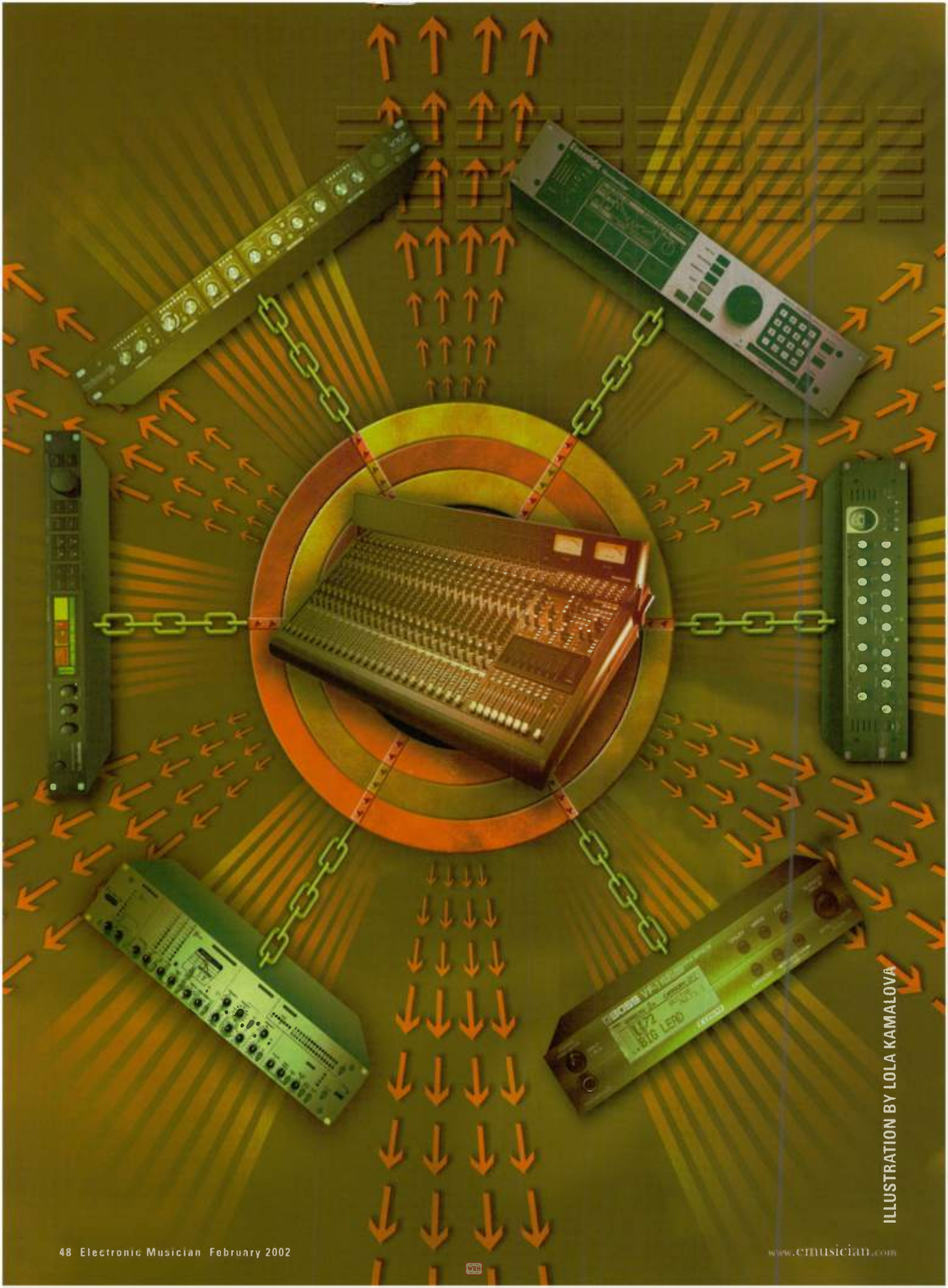

ILLUSTRATION BY LOLA KAMALOVA

Chain, Chain, Chain

By Michael Cooper

Whether you record and mix with hardware consoles or operate in the virtual world of the digital audio workstation (DAW), you need to know the various ways to route signals to effects processors in order to get optimal sound from your equipment. In this article, I will explain the advantages of using

How and when to use inserts, sends, groups, and mults for signal processing.

channel, subgroup, and master bus inserts; channel and subgroup aux sends; and master outputs for signal processing. I will also explore the reasons why using one signal route instead of another will yield superior results in specific applications. Advanced applications involving the use of mults, by which signals are split into two or more paths for separate processing, will also be discussed.

For simplicity's sake, I will address each topic from the perspective of hardware consoles, because DAW-based virtual mixers tend to emulate the routing capabilities of their real-world counterparts. However, CPU-processing limits occasionally require alternative methods of doing things on a DAW, and I will focus on those when appropriate.

ALL OR NOTHING

I'll begin by discussing ways to process individual channels rather than an entire mix. The first output you're likely to encounter in a mixer's audio path, the channel insert, provides one of the best ways to process audio. When you patch a signal processor to a channel insert, 100 percent of that channel's signal flows out of the insert's send connector, through the signal processor, and back into the same mixer channel via the insert return (see **Fig. 1**). For that reason, it is best to use a channel insert when you want to process the entire signal, not just a portion of it.

Equalizers, compressors, and reverb units work best when you process the entire signal, so they are commonly used with inserts. The reason for compressing a vocal track, for instance, is to limit its dynamic range. Unless all of the vocal's signal is sent through the compressor (through a channel insert, perhaps), a portion of the signal will retain its original dynamic range, thus preventing you from keeping a firm lid on loud passages.

Instead of using the channel insert, you can patch the compressor in-line with an outboard mic preamp while tracking the vocal or route the output of your recorder through it while mixing. But if you need a mixer's pad and input preamp to optimize the signal level before compressing it, the channel insert is the best place to patch the compressor into the mixer.

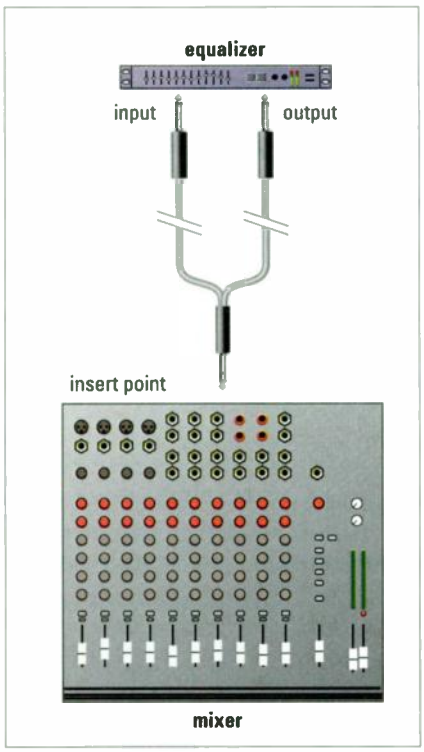

FIG. 1: Outboard processors, such as compressors and equalizers, are often connected to a mixer's channel insert. In this example, the entire audio signal is routed from the mixer, through an equalizer, and back into the mixer.

An outboard equalizer is another signal processor that can be used in a channel insert. If you have a bass-guitar track, for example, that is boomy in the 100 Hz range, patching an equalizer into the track's channel insert will let you reduce the desired frequency. Because 100 percent of the bass guitar's signal flows through the equalizer with that setup, none of the signal will escape the EQ's corrective influence. Other effects that work well in channel inserts include aural exciters, which generate harmonic distortion to make a track sound brighter and louder, and the BBE Sonic Maximizer, which corrects unwanted phase shift and enhances transients.

Using an insert requires an insert cable, which typically has a 3-conductor ¼-inch TRS plug at one end and a pair of 2-conductor ¼-inch TS plugs at the other (see **Fig. 2**). On most mixers, the ring of the TRS plug sends the signal to the processor, and the tip returns the signal to the mixer.

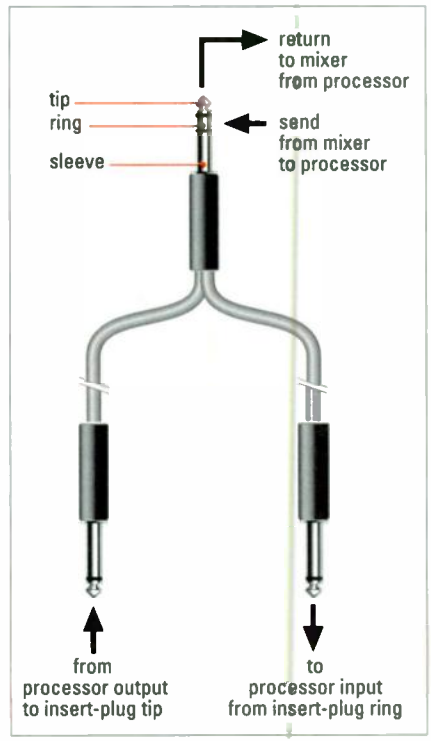

FIG. 2: An insert cable usually has a 3-conductor TRS plug at one end and a pair of 2-conductor TS plugs at the other. In most mixers, the ring portion of the TRS plug sends the signal to the processor, and the tip portion returns it to the mixer.

DO NOT INSERT

Although you can patch a time-based effects processor (such as a digital delay, a reverb unit, or a multi-effects processor) into a channel insert, there are several reasons not to do so. To begin with, you have to adjust the processor's onboard wet/dry mix control to set the level of effect you want. Many effects processors have an inversely proportionate wet/dry mix control. That means when you increase the dry output level, you simultaneously decrease the wet output level and vice versa. That type of control works fine with mono chorus and flanging effects, in which you generally want a fixed 50/50 mix of wet and dry signal. However, it's difficult to adjust the mix on delays or reverbs in a channel insert if your processor doesn't offer independent control of the wet and dry output levels.

Say, for example, you want to raise the reverb level on a vocal track during mixdown without lowering the amount of its dry signal in the mix. A processor's inversely proportionate mix control won't enable you to do that, because increasing the wet signal using that control will lower the dry signal at the same time, defeating your purpose. A few effects processors offer a discrete dry output, but patching the dry output to your mixer will use up another line input, which may not be available.

Furthermore, if your mixer offers fader automation, you'll be much happier recalling reverb levels on your mixer's aux-return faders than manually restoring wet/dry mix settings on your processor. Many effects processors do not store the wet/dry mix control's settings in RAM, though devices that control that parameter in software often do. Regardless, adjusting the wet/dry mix at the mixer using an aux send is much easier and faster.

LAST RESORT

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channels to the same effects processor, such as a reverb. When you use an aux send, route only a portion of the channel's dry signal to the outboard processor; that way, the dry signal will still show up on its channel fader, letting you control its level in the mix. The dry signal does not noticeably decrease in level when you use an aux send. Rather, an amplified mult of the channel's signal is sent to the mixer's master aux send. From there the signal goes to your effects processor, along with the signals from other tracks using the same aux send.

The wet/dry mix on an effects processor is usually set to 100 percent when patched to an aux send, because the level of the wet signal is controlled by the mixer's effects-return faders or knobs. The dry-signal level, on the other hand, is controlled with its mixer-channel fader. That setup gives you independent control of wet and dry levels at the mixer.

The aux send's ability to apply the same effect to multiple tracks simultaneously has a couple of benefits. For example, fine-tuning the parameters of one effects processor that is used on a number of channels is more efficient than attempting to match settings on a number of processors that are dedicated to individual channels.

In addition, using aux sends for plug-in effects on a DAW lets you use CPU resources more efficiently than you could if you added effects to each track. Plug-in effects, especially reverbs, can be huge CPU hogs. You'll quickly run out of CPU resources if you use the same plug-in (and redundant parameter settings) on inserts for multiple virtual mixer channels. A better way to add the same effect to multiple channels is to bus each channel to a common aux track and apply the plug-in just once to the aux track's insert, thereby applying the plug-in's effect to all bused channels simultaneously.

In Mark of the Unicorn's (MOTU's) *Digital Performer*, for example, you can use channel sends to route several background vocals to a common aux track by way of bus 1 (see **Fig. 4**). The aux track's input is set to bus 1 so it can receive all of the send signals and route their combined signals to a plug-in by way of its insert. Because you're using only one instance of the plug-in in this case, the drain on your CPU will be a fraction of what it would be if you instantiated the plug-in for each mixer channel.

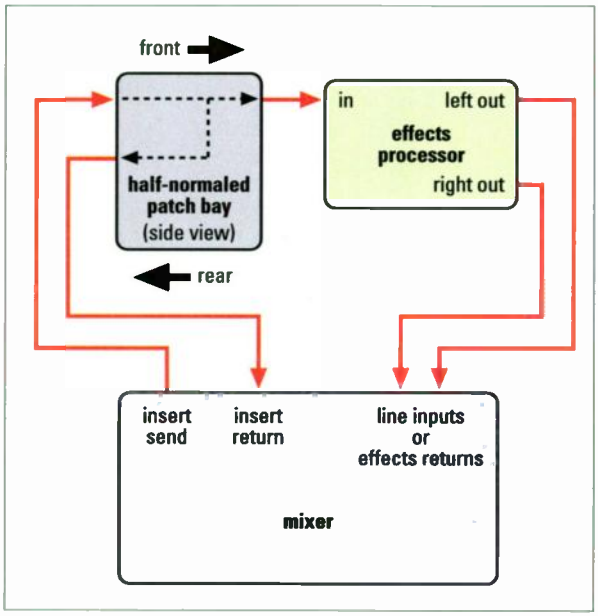

FIG. 3: A mixer's channel insert sends a signal to an effects processor, and the processor's outputs are routed to separate mixer line inputs (or effects returns) rather than returned to the original channel's insert. The mixer channel's insert send and return connections must be half-normaled at a patch bay for the dry signal to return back to its channel.

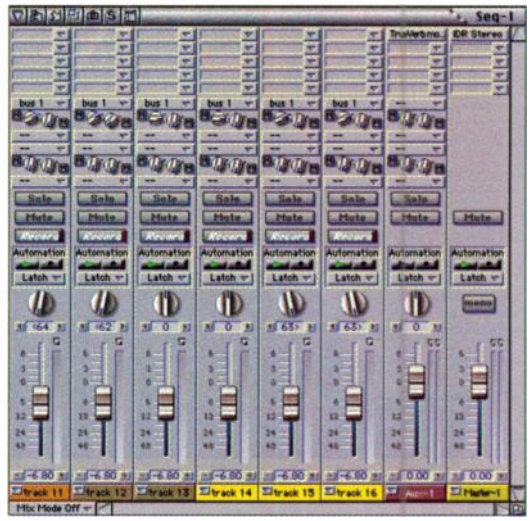

FIG. 4: You can lessen the strain on your DAW's CPU by using an aux track to apply a plug-in to several tracks at once. Here, an aux track receiving input from bus 1 in *Digital Performer* receives effects-send signals from several tracks. The aux track then sends those combined signals to a Waves reverb plug-in by way of the aux track's insert.

ACT OF PRESERVATION

Many hardware mixers and some DAWs let you route an aux-send signal either pre- or postfader. When an aux send is configured postfader, the effect's wet/dry ratio is preserved at the mixer as you raise and lower channel faders; lowering a channel's fader simultaneously lowers the aux-send signal level. That keeps you from having to adjust effects-return fader levels at the mixer or wet/dry ratios at the effects processor every time you make a level adjustment with a track's channel fader. (In most cases, you'll want to keep the balance between a dry track and its effects relatively constant throughout the mixdown process.) As a result, postfader effect sends are used more often than prefader effect sends, although the latter configuration definitely has its uses.

As the name implies, a prefader aux send is not influenced by channel-fader moves, because the signal is sent to the processor through the aux send before it gets to the fader. Therefore, the processed signal level from a prefader aux send remains constant, no matter how you move its corresponding channel fader.

One use for this type of configuration is to keep a vocal track's reverb level

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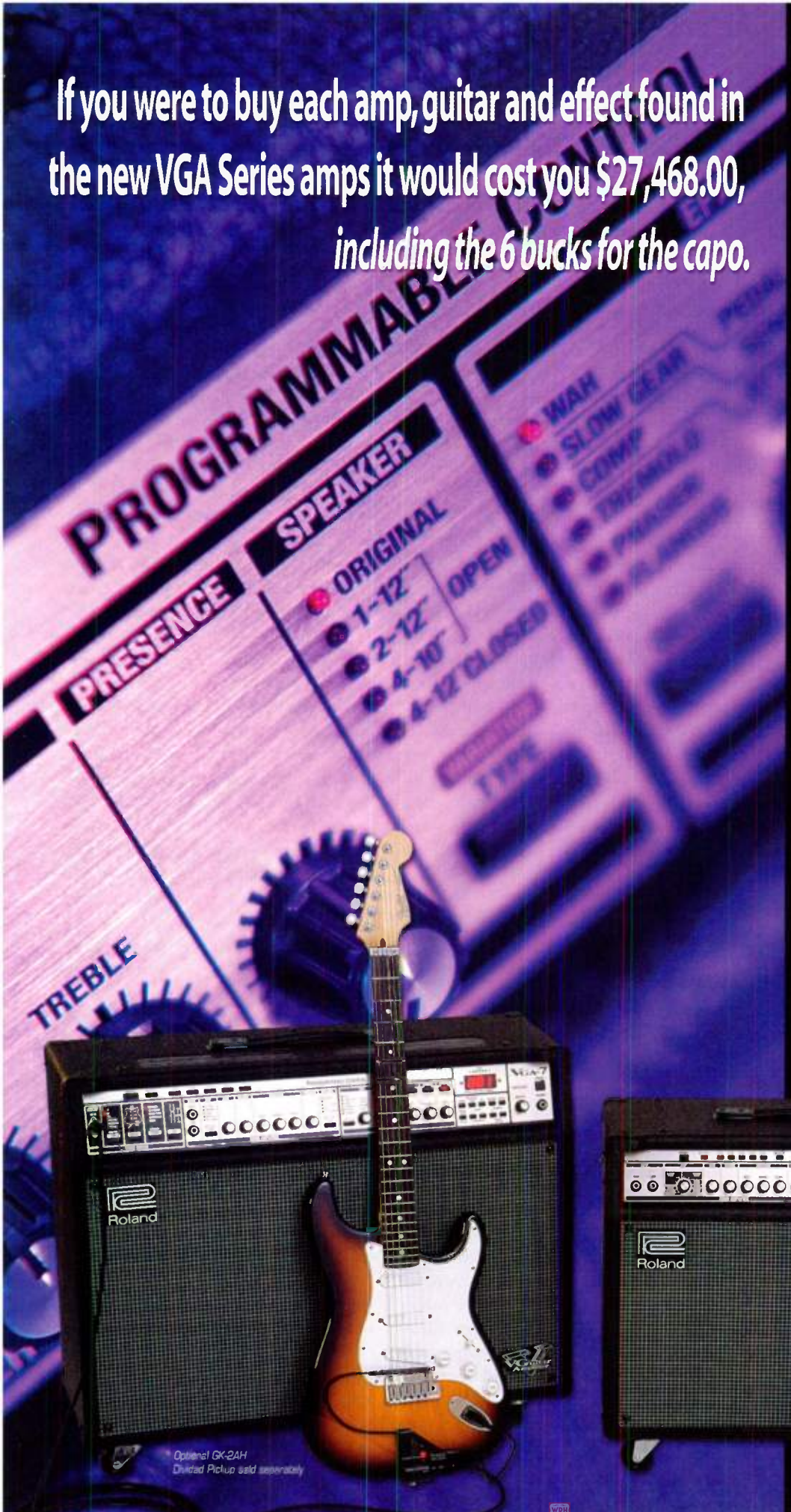

constant while you lower its dry level. Set the level of reverb you want the vocal to have in the mix by turning up its pre-fader aux send, which is routed to your reverb unit, until the effect sounds right. Then, slowly lower the vocal's mixer-channel fader. As you lower the fader, the vocal's dry level dips while the level of the processed signal remains constant. The result sounds as though the vocalist is walking away from you: the dry sound gets quieter, leaving just the reverberations of the room.

DOUBLE YOUR PLEASURE

A mono aux send works fine on lead vocals and other mono tracks but may not be exactly what you need to process a stereo pair of tracks that are routed to two mixer channels. Some mixers offer stereo sends for this purpose; other mixers, including many digital ones, let you pair two mono aux sends together so that they function as one stereo unit. Usually the odd-numbered sends (for example, aux 1, 3, and 5) serve as the left channels, and the even-numbered sends (aux 2, 4, and 6) serve as the right.

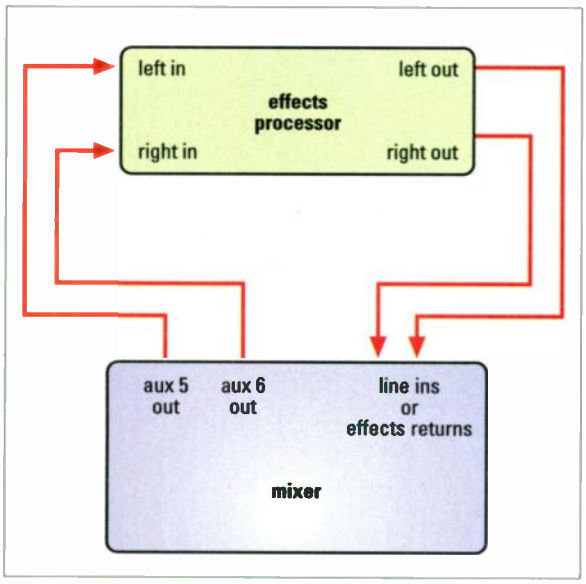

FIG. 5: This is the correct way to route paired aux sends to a stereo effects processor and back to the mixer.

You must have a stereo effects processor to take advantage of stereo or paired aux sends (unless you are employing the aux sends to feed a headphone amp, which is beyond this article's scope). Simply patch your mixer's left and right aux sends to the left and right inputs, respectively, of your stereo effects processor (see **Fig. 5**).

When using stereo or paired aux sends, how you pan the mixer channels determines which aux sends—left, right, or a combination of both—they will be routed to. For example, if the left side of a stereo keyboard track is panned completely to the left, its stereo aux-send signal will be sent only out of the left (odd-numbered) aux sends. If you pan the keyboard channel dead center, it will be sent equally to both aux sends. Panning the two channels hard left and hard right, respectively, lets you keep the left- and right-channel effects processing discrete for each mixer channel.

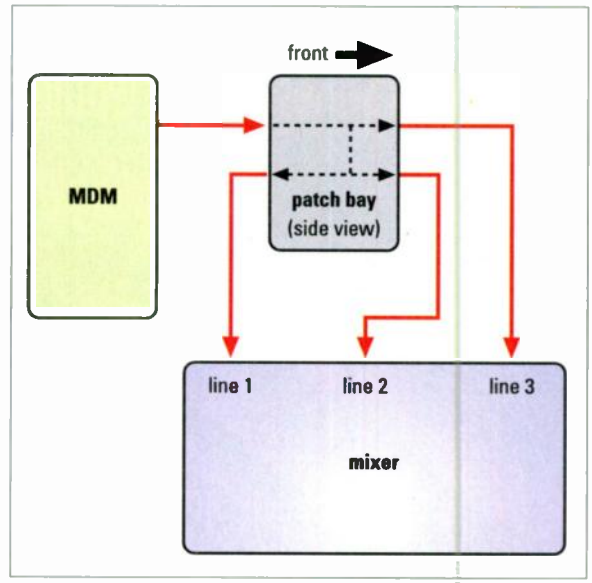

FIG. 6: A patch bay configured for parallel routing can split a track's signal into three mults, each of which can be routed to a separate mixer input for different kinds of processing.

GROUP STRATEGY

Discrete left and right processing offers a wider stereo field and avoids the phasing problems that occur when miked stereo tracks are combined into a mono aux send. Stereo aux sends can be used to process any stereo tracks, including acoustic guitar, background vocals, and drum tracks. Background vocals and drums are often assigned to the stereo aux sends that serve mixer subgroups. Here's how you can use a subgroup's aux sends and inserts for more efficient and creative mixing.

Say you want to add the same reverb to three or more background-vocal tracks. You might be tempted to set the aux-send level that feeds your reverb unit for each mixer channel separately. However, as the mix progresses and you begin to finesse the aux-send level for one of the channels, you'll likely need to rebalance the aux-send levels for all of the other background-vocal channels, as well. Fortunately, there's a more efficient way to do that.

You can work faster by busing all of the background-vocal channels to a common subgroup. To spread out the background vocals in the stereo field, bus their channels to two subgroup faders, pan the channels so that each one is where you want it to appear in the stereo field, and then hard-pan one subgroup channel fully left and the other fully right. Now you can use a single subgroup aux send to adjust the amount of reverb (or other effect) for all of the background vocals routed to that subgroup.

That strategy is beneficial only if you want to add the same amount of effect to all of the tracks in the subgroup, as is often the case. Subgrouping the background vocals also lets you control the levels for the background-vocal tracks using only one (in a mono subgrouping)

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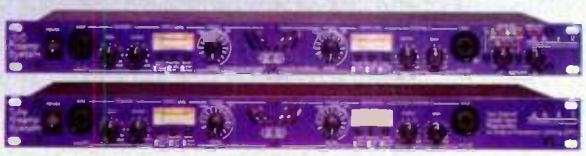

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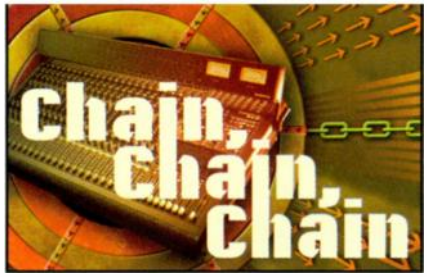

or two (for stereo subgrouping) faders.

Some high-end mixers (Harrison consoles, for example) also offer subgroup inserts. They let you simultaneously and equally process subgrouped channels through outboard dynamics processors or equalizers. Many top-flight engineers will bus an entire drum kit into a stereo subgroup (or, alternatively, to a pair of multitrack bus outputs), out to a stereo compressor, and then return the compressed drums to a pair of line inputs on the console. That setup controls the drum kit's level as a whole while enhancing mic bleed to give the kit more of a live sound.

When you bus a DAW's virtual mixer channels to an aux channel, you are actually subgrouping. As noted previously, subgrouping a DAW's virtual mixer channels onto an aux channel enables you to conserve CPU resources by using only one instantiation of a plug-in effect for all of the subgrouped tracks.

It may surprise you to know that even the most inexpensive mixer offers subgrouping of sorts, though you might not think of it as such. The king of all subgroups is the stereo master bus, whose level is controlled by your master fader.

TAKE ME TO YOUR MASTER

When you assign all of your mixer's channels, subgroups, and effects returns to your mixer's master stereo outputs, you are subgrouping everything down to a pair of output channels. Most mixers offer you one more shot at processing the entire mix before it leaves the mixer by using master-bus inserts, which, like channel inserts, are commonly configured prefader.

Just like channel inserts, master-bus inserts are best used with gear that is meant to process 100 percent of the bus's signal. Therefore, master-bus inserts are commonly used for adding compression, limiting, and equalization to an entire mix. When using master-bus inserts, use the highest-quality gear you can get. Your entire mix is running through whatever you patch into those inserts, so the quality of the processor will have a profound impact on your mix's overall sound.

Most low-cost digital mixers don't offer master-bus inserts per se, but you can usually add digital dynamics processing or EQ to the master bus using the mixer's software interface. If your digital mixer does offer master-bus inserts and they are not digital, beware the additional signal-degrading D/A/D conversions required to send your mix to an analog processor and return it to the mixer. Some high-end digital consoles offer digital master-bus inserts that let you patch in a digital processor and thereby remain in the digital domain. There are several other ways to interface digital outboard processors with digital mixers, but they involve in-depth discussions about digital sync distribution

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Top photo: Extasy Studios, North Hollywood, CA, courtesy of Gemelec, Inc.

and data formats—subjects that are beyond the scope of this article.

THE END OF THE LINE

If you use an analog console, it is almost always preferable to use its master-bus inserts instead of its master-bus outputs for routing the entire mix through analog compressors and equalizers. But those who own a low- or midpriced digital console that does not offer master-bus inserts must often use the mixer's master analog-stereo outputs for further analog signal processing of the mix. For instance, to add analog EQ to your entire mix using this method, just route your digital mixer's master analog-stereo outputs to an analog stereo equalizer's left and right inputs and patch the EQ's left and right outputs to your mastering deck or DAW to record your mix.

You can use the same setup for inserting an analog stereo compressor (or an analog stereo-linked, dual-channel compressor) in between your digital mixer's master analog-stereo outputs and your mastering deck or DAW. Nevertheless, there is one drawback to compressing your mix using that setup: your mix will become uncompressed once its level falls below the compressor's threshold during the fade-out. The change in dynamics is usually not too noticeable on the low-level material contained in the fade.

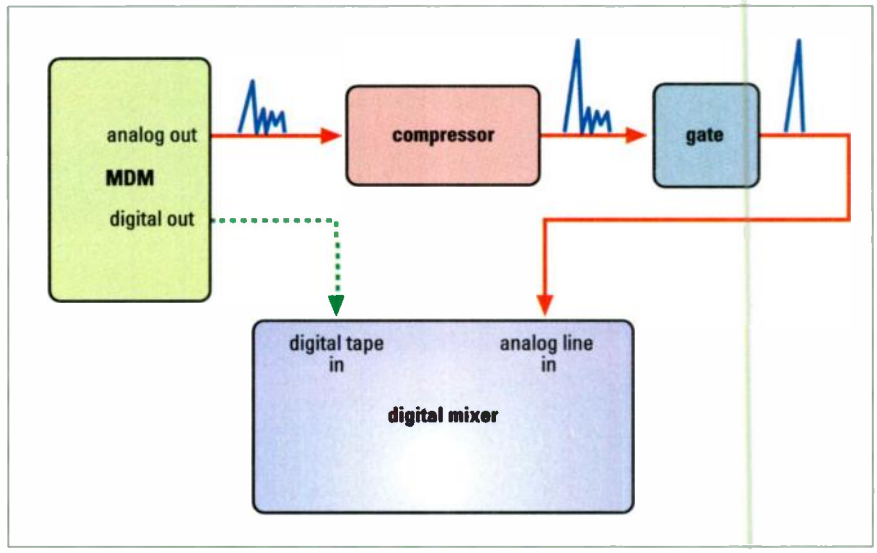

FIG. 8: If your MDM offers simultaneously hot analog and digital outputs, you can use the analog output to process the track and then combine the processed sound with the original track's digital signal inside your digital mixer.

If the change in dynamics bothers you, however, there is a work-around: you can bus all mixer channels to two analog bus outputs, route those bus outputs to a stereo compressor, and return the compressor's outs to spare mixer line inputs that are, in turn, routed to the master stereo bus. As long as you stay in the digital domain postfader on the master faders, that is a good strategy. You don't want to use that routing if you're printing your mix to DAW or DAT by way of the mixer's master analog stereo bus outputs, because that would require a second signal-degrading round-trip through the analog and digital converters.

So far I've written about routing tracks to signal processors after their signals are already inside the mixer. I'll now detail an advanced application for routing individual tracks to signal processors before they've entered the mixer, using the versatile and mysterious mult.

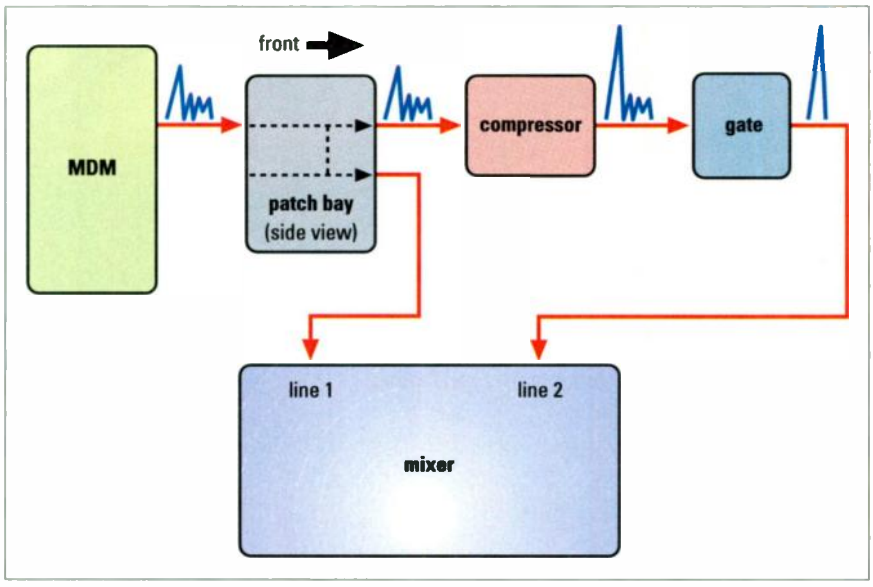

FIG. 7: A patch bay configured for half-normaled or parallel routing can be used to split a snare track into two mults. One mult is processed with a compressor and a gate and is then combined with the unprocessed mult at the mixer to create a layered snare sound.

I'M MULTING!

The term *mult* is commonly used in two ways: as a noun to denote a multiple (a signal split off from the original signal), and as a verb to denote the act of multiplying or splitting a signal. Mults are often used to split a signal into two or more paths that can then be processed differently.

For example, you might mult a lead-vocal track so that you can give each of the two or three resulting signals different EQ treatments: one suitable for

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verses, another for choruses, and perhaps another for the bridge. A patch bay that specifically offers a parallel routing configuration is handy for multing a signal into three parts (see **Fig. 6**). With a parallel configuration, a signal that is patched from your MDM, for example, into the top-rear patch bay jack is split into three identical signals. Those signals leave the patch bay at its top-front, bottom-front, and bottom-rear jacks. You can then route the three signals into separate mixer channels, where they can be processed separately. As each section of the song comes up during mixdown, you simply unmute the lead-vocal channel that has the desired EQ settings for that section of the song while muting the other two lead-vocal mults.

You can use the same multing method to create a killer snare-drum track. Split the snare track into two parts using half-normaled or parallel patch bay jacks (see **Fig. 7**). Send one signal to the mixer unchanged. Route the other signal to a compressor, followed by a gate. Set the compressor's ratio, threshold, attack, and release controls so that the attack of the snare drum's stick hit is greatly accentuated. Then, gate that sound so that all that gets through the gate is a short burst of the accentuated attack you created with the compressor. Route the gate's output to a separate mixer channel and mix it with the original snare for a rocking power-pop sound.

If you work with a digital mixer and MDM, you don't even need a patch bay to set up the aforementioned snare-drum mult (see **Fig. 8**). Route the unprocessed snare track to your mixer through a digital input as you would normally do. At the same time, route your MDM's analog output for that snare track to the compressor and gate for treatment and send the processed signal from the gate's output to a separate line input of the mixer. That will let you mix the processed signal with the unprocessed digital input. For the method to work, however, your MDM must offer hot analog and digital outputs simultaneously.

THE CLEAREST PATH

Ultimately, the best route to use for signal processing depends on what you want to accomplish. Understanding the uses and limitations of inserts, sends, buses, groups, and mults is the first step toward creative mixing and your ticket to mastering advanced applications.

Once you have a firm grip on the basics, don't be afraid to try wild routing variations with different processors. The next new sound to hit the airwaves might be your own.

Michael Cooper *is the owner of Michael Cooper Recording, located outside the beautiful resort town of Sisters at the base of the Oregon Cascades.*

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take control

By Rob Shrock and Brian Smithers

A MIDI control surface adds the look and feel of a hardware mixer to your digital audio workstation.

From professionals to hobbyists, an increasing number of musicians are migrating to hard-disk recording and editing systems to take advantage of the seemingly limitless possibilities that personal computers offer. However, the new technology has brought about a sea change in the way musicians think about and execute their music-production work. In the not-too-distant past, music tracks were mixed entirely by sitting at a mixing console and pushing faders up and down, turning knobs, and reaching for a rack of gear to tweak an effect or EQ.

In today's digital audio workstation (DAW) environment, everything is presented graphically on a large-screen color monitor, and your head never has to venture too far from the sweet spot. Although the power of proprietary and native DAW systems seems to increase exponentially from year to year, the basic interface design of a desktop music system has remained virtually unchanged for about a decade. A monitor, a keyboard, and a mouse are still the primary methods for manipulating all of the bits and bytes in a computer-based music project. Unfortunately, as many desktop musicians have discovered, a mouse and a keyboard are not the best or most intuitive tools for mixing audio.

Enough time has passed since the introduction of the DAW that musicians now have a better perspective on the advantages and disadvantages of both the old and the new ways of manipulating music, and traditional mixing tools are attracting new interest.

Enter the MIDI control surface. This hardware interface offers a more immediate and intuitive command of an array of common mixing, recording, and editing tasks by providing varying combinations of faders, knobs, buttons, Jog wheels, and dedicated transport controls. In short, many traditional hardware-interface elements are now available for the virtual desktop studio. Most musicians are accustomed to and comfortable with these more tactile controls, and they often provide an efficient method for maintaining work flow that is not as easily achieved with a mouse and keyboard alone.

Which control surface is right for you? That depends on several factors, including the specific functions you need, your available desktop space, your ergonomic requirements, and your budget. (For a list of full reviews of MIDI control surfaces in **EM**, see the sidebar "In Review.") To better manage the growing number of MIDI control surfaces on the market, we'll divide the units into two broad categories: basic control surfaces for less than $900 and high-end controllers that range from about $1,000 to about $3,500. We'll also take a look at two high-priced control surfaces from Digidesign for professionals who want to combine the power of a DAW with the working environment of a traditional high-end console (see the sidebar "Top-Notch for Pro Tools").


Photography by Bill Schwob

Inexpensive Control Surfaces

By Brian Smithers

Those with limited budgets need not suffer the dread *mixitis rodentus*, the horrible condition caused by excessive mouse-handling while mixing. Indeed, various devices to protect you from plague-carrying vermin are available for just a few hundred dollars. Offering the most important features—such as faders, buttons, and transport controls—of their high-end counterparts, these affordable control surfaces put two-fisted mixing well within the reach of almost anyone.

The less-than-$1,000 price range is not the place to look for an all-encompassing solution, though, and you will see that each device has its niche. To compensate for limited feature sets, they provide useful extras ranging from audio I/O and easy connectivity to built-in effects. Each comes with a bundled digital audio sequencer program (or includes a built-in sequencer), enhancing its appeal to cost-conscious users and beginners alike. I'll take a look at four control surfaces with prices ranging from $379.00 to $899.99 and describe what each unit has to offer.

THE PLAYERS

In this group, the Peavey StudioMix ($899.99; see **Fig. 1**) provides arguably the tightest integration with its host software. That stands to reason because the StudioMix was created jointly with Cakewalk and doesn't directly support other applications. It offers fewer options than the other moderately priced units, but its options are especially well suited to Cakewalk's functions. The StudioMix ships with Cakewalk *Professional* 8 (Peavey offers a free upgrade to *Pro Audio* 9), and the unit is also compatible with Cakewalk's top-of-the-line *Sonar*. Not included in this roundup is Peavey's PC 1600x ($399.99), a generic 16-fader MIDI control surface without dedicated transport controls or bundled music software.

The Doepfer Regelwerk ($650; see **Fig. 2**) is a MIDI fader box and an 8-track analog pattern sequencer. It is the odd bird in this roundup, as some key functions of the other control surfaces are not included in Regelwerk's feature set. The Regelwerk, on the other hand, offers 24 faders—far more than the other units. Not for the fainthearted, the Regelwerk

requires more MIDI savvy to program than the others; however, it's also best geared toward real-time MIDI performance. The 5U rackmountable device has a clean-looking, no-nonsense, industrial look and feel.

The most flexible unit of the bunch is the Tascam US-428 ($625; see **Fig. 3**). A bundled version of Steinberg *Cubasis VST* only scratches the surface of the US-428's feature set; Tascam's Web site keeps an updated list of compatible host programs. The US-428's audio I/O alone is noteworthy, offering four 24-bit inputs and two 24-bit outputs—more than most USB audio interfaces.

Edirol's U-8 ($379; see **Fig. 4**) is affordable and comes bundled with IK Multimedia *Groovemaker DJ* and a custom version of either Cakewalk *Home Studio* 9 or Steinberg *Cubasis* for Windows. The *Groovemaker DJ* software lets you play, mix, and randomize grooves on the fly with control of eight stereo loop tracks. The U-8 incorporates a set of useful built-in effects that can be used nondestructively or applied during tracking or mixing. The unit's interface is dominated by EZ-Recording wizards designed to simplify the setup process.

FIG. 2: The Doepfer Regelwerk is a MIDI fader box as well as an 8-track analog pattern sequencer.

MOUSE KILLERS

The No. 1 advantage of using a control surface is that multiple hardware faders are better for mixing than a single mouse or trackball is. The tour of these interfaces therefore begins with faders. The Regelwerk aside, all the control surfaces feature eight channel faders along with a dedicated master fader. The U-8, the StudioMix, and the Regelwerk offer 60 mm faders, and the US-428 provides 45 mm faders. As with the heavy hardware, additional banks of eight faders are a button press away. The Regelwerk has a clear advantage: it allows direct control of its 24 faders without bank switching.

When I first reviewed the U-8, writing fader automation from the control surface wasn't possible. Thankfully that has changed, at least with the Cakewalk version. With the other units, automation has been a primary selling point from day one. Only the StudioMix's faders are motorized, which makes updating automation much easier and looks way cool.

The US-428 offers a single Pan knob that controls the selected track; the U-8 has no pan controls. The StudioMix has two knobs per channel that are assignable to pan, aux send, or level. The allocation of two knobs per channel combined with the fader motors and the ability to swap assignments (for example, using the fader for pan) gives the StudioMix a decided advantage for real-time recording of mix automation.

Each channel strip has one or more corresponding buttons. On the U-8, the buttons are clear and illuminate to indicate solo, mute, or record-ready status. Interestingly, only solo can be set directly by pressing the button. The US-428 has two sets of buttons (select and mute/solo) and three rows of LEDs (mute/solo, record-ready, and select). The StudioMix has one button per channel, but it can be assigned to mute, solo, record-enable, write fader (automation record-enable), and aux-enable. A Modifier key to let you switch assignments on the fly would be a welcome addition to the US-428.

Except for the Regelwerk (which offers Start and Stop buttons only), the units provide standard transport controls, which are especially nice to work with. QWERTY equivalents for Start, Stop, Rewind, and so forth are built into every music-production program—I

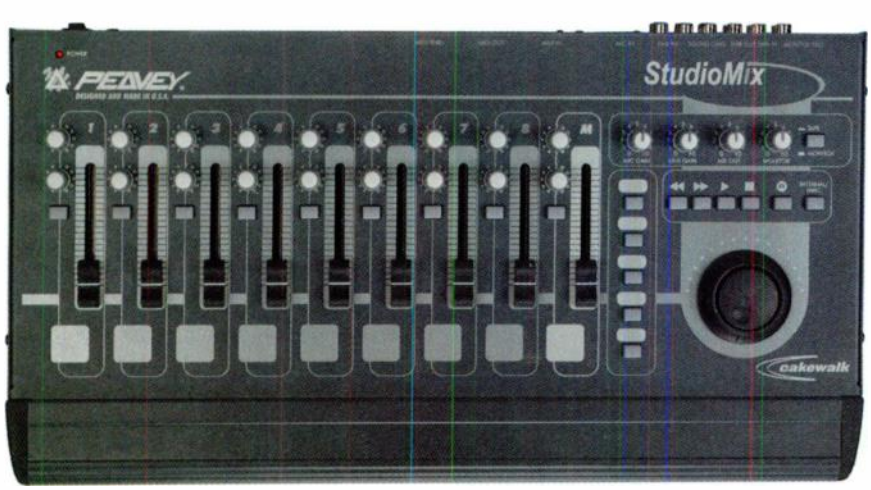

FIG. 1: Peavey created the StudioMix jointly with Cakewalk. The control surface offers excellent integration with Cakewalk software.

haven't actually clicked on a Rewind icon in years—yet punching a dedicated button to start recording feels so much less like word processing.

Precise positioning is achieved with Data/Jog wheels, and the StudioMix includes a real Shuttle control, as well. A Shuttle control is the collar around a Jog wheel that allows variable-speed fast-forward and rewind; the Jog wheel provides precise manual positioning. Like the motorized faders, the StudioMix's full-service Jog/Shuttle wheel contributes to its more serious professional feel.

FIG. 4: Edirol's affordable U-8 includes a set of useful built-in effects and *Groovemaker DJ* from IK Multimedia.

PRESS HERE

The personality of each controller becomes clearer when you go beyond the channel strips and examine what additional functions are present. For the most part, I'm talking about buttons: how many are there, and what can they do? With the StudioMix, the answer is a simple five buttons, and they can be assigned to almost any Cakewalk menu item, screen layout, StudioWare panel, or CAL macro. Because two buttons are typically assigned to bank switching, that leaves three assignable buttons. The assignability is as great as the number of buttons is inadequate.

Above the U-8's transport controls is a set of buttons devoted to markers and modes. You can set or locate to markers, turn looping on and off, and enable or disable autopunch. Farther up are buttons to help navigate dialog boxes. Dedicated buttons select windows or menus, represent Yes/Enter and No/Exit, and provide cursor control. The Data/Jog wheel is as much a part of the control set as it is a part of the transport controls. Additional buttons and knobs are devoted to the U-8's EZ features and effects.

Like the U-8, the US-428 has buttons just above its transport controls for setting and locating to markers. Nearby are two unique buttons: Input Monitor makes the first four channel faders control the direct-monitor mix of the US-428's four input channels; Null disengages the faders from writing values long enough for you to set them to correspond to current values.

The US-428 contains a cluster of three knobs and four buttons to control the host program's EQ settings. The buttons select between four frequency bands, whereas the knobs modify gain, center frequency, and bandwidth. To the right of the EQ cluster are four buttons to select Aux sends, an Assign button, and three software-specific function keys, which in *Cubasis VST* are used to open the Audio Mixer window, to open the VST FX Send window, and to toggle between open windows.

The Regelwerk has no knobs, but it boasts an impressive collection of 72 buttons and 56 LEDs. In addition to its function buttons, rows above and below the 24 faders help program the step sequencer and pattern playback. Having three separate banks of eight faders at your fingertips eliminates the need for bank swapping to access more than eight channels. That makes the Regelwerk well suited for simple level-riding tasks

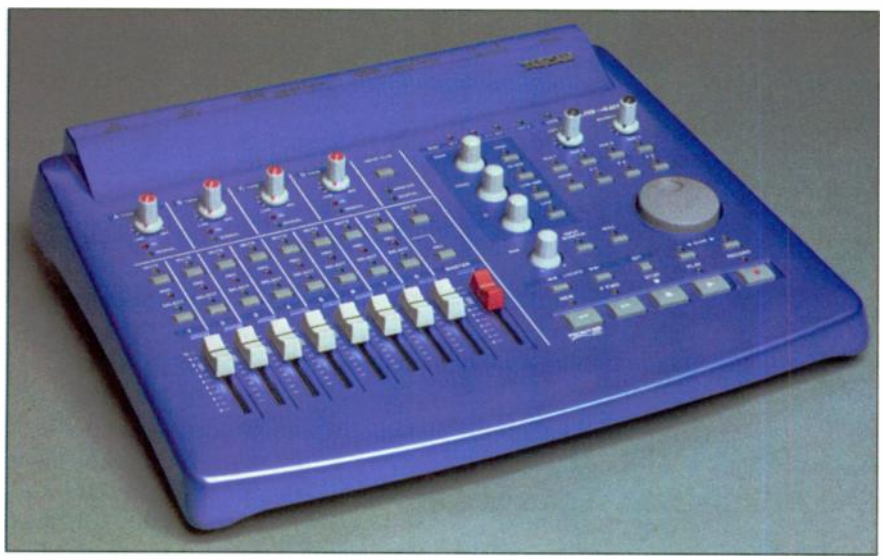

FIG. 3: Tascam's USB-based US-428 boasts four 24-bit audio inputs and two 24-bit outputs.

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that don't require full integration with a DAW as well as for modulating other MIDI parameters in real time. (The Regelwerk looks somewhat like a small lighting console, which would make it a good control surface for operating a MIDI-controlled lighting rig.)

LISTEN UP

Audio I/O is another area of major differences among the three controllers. The StudioMix most resembles the "big iron" insofar as it offers the ability to route analog audio to and from your audio interface. A single mic input and L/R line inputs are complemented by stereo sound-card input and output, stereo monitor output, stereo tape input and output, headphone output, and MIDI In, Out, and Thru. All audio connections are unbalanced RCA except the mic (XLR) and headphone (¼-inch). Four front-panel knobs control relative mic, line, mix, and monitor levels.

The U-8 goes one step beyond the StudioMix: it functions as a stereo 16-bit, 48 kHz audio interface. Various inputs are available, including line, mic, and guitar levels, as are 16-bit S/PDIF digital I/O and MIDI In and Out. A single RCA output pair and a stereo ¼-inch headphone jack allow monitoring. Oddly, the mic input is an unbalanced XLR connection.

Not just a controller, the US-428 is also an impressive USB audio interface, with four ins and two outs providing 16- or 24-bit, 44.1 or 48 kHz audio. XLR mic inputs (balanced) and ¼-inch line inputs are available, with two ¼-inch inputs switchable to guitar inputs. Add to that two MIDI Ins and Outs, a 24-bit S/PDIF digital I/O, RCA main outputs, and a stereo ¼-inch headphone out, and you have quite a bit of connectivity.

GETTING ALONG

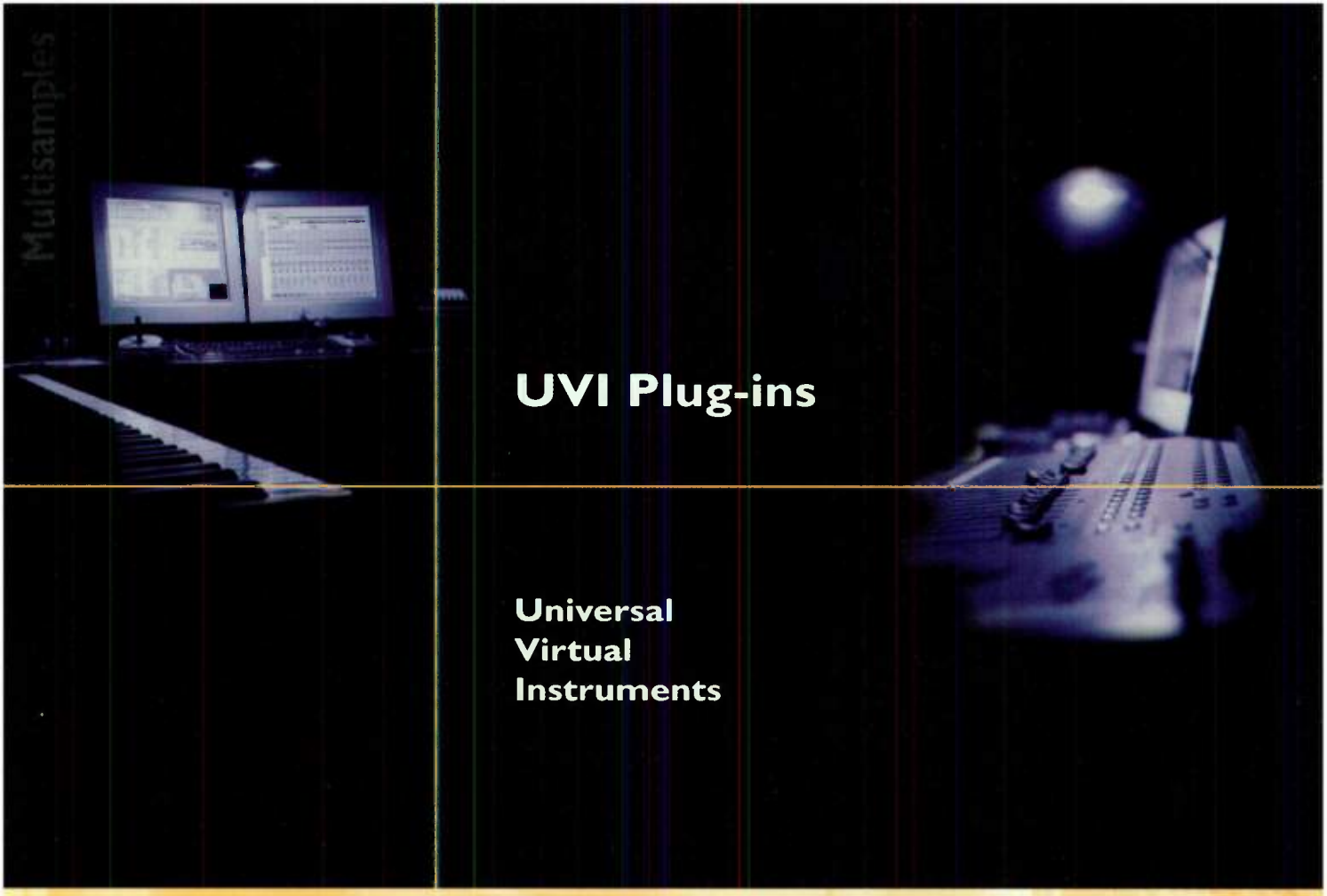
Software compatibility is the key ingredient for these controllers. If a control surface doesn't work with your favorite program, it isn't much good. With the StudioMix, the compatibility issue is easy: it works with Cakewalk *Professional* 8 or later and *Sonar*. Theoretically, you could reverse-engineer a controller map to let it control another program, but do you really want to? Give Peavey credit for excellent execution of a limited vision.

The U-8 works nicely with its bundled version of *Cubasis* or *Home Studio* 9, but don't plan to use the unit with other software. The Edirol Web site has teased about Mac and Windows 2000 drivers, but there's no sign of them. The U-8's built-in effects, however, are generally good, which adds value to the bundle.

The Regelwerk is not designed for any specific software, but it has an extensive set of Auto-Learn features for recognizing and storing MIDI commands. In many ways, it is the least useful as a DAW front end. It doesn't provide a full set of dedicated transport controls or even knobs for panning. It is quite powerful and highly programmable as a MIDI fader controller, and it's perfectly suited for live, dynamic MIDI performance or as an interface for a software synth. Its built-in pattern-based sequencer and other unique features, such as its eight control voltage and gate outputs, may appeal to some users.

The compatibility champion is clearly the US-428. The only one of the four to support Macs, it provides tactile control for Digidesign *Pro Tools*, Mark of the Unicorn (MOTU) *Digital Performer*, Emagic *Logic Audio*, Steinberg *Nuendo*, and other programs. It also has been adapted for use with software synthesizers. One of its coolest applications is to control Native Instruments *B4*. Imagine the irony of emulating the legendary Hammond behemoth with a laptop and a MIDI keyboard while the compact US-428 provides virtual drawbars and control of things such as preamp drive, vibrato speed, and audio I/O. Try doing that with a mouse!

Brian Smithers *is associate course director of MIDI at Full Sail Real World Education in Winter Park, Florida. You can reach him through his Web site, http://members.aol.com/notebooks1.*



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HIGH-END CONTROL SURFACES

By Rob Shrock

Although it's possible to tackle some DAW-based mixing and automation tasks using simple MIDI controllers, that approach has clear limitations. If you want a more sophisticated and detailed hardware interface for your software, a growing number of high-end control surfaces can provide you with much more than simple fader and transport control.

As you might expect, high-end MIDI control surfaces come with high-end price tags—some are more expensive than good-quality compact audio mixers. Nevertheless, they offer powerful features and a level of intuitive control of DAW functions that together make the investment worthwhile for many personal-studio owners. If you need speed, ease of use, and more complete access to your DAW in a hardware interface, one of the high-end control surfaces could be for you.

All of the units apply the "8-track paradigm" to their design, meaning that you have command of only eight simultaneous channels at a time. To access more than eight channels in your DAW, you need to switch channels or banks using the control surface's interface. The units also provide control of plug-ins and effects and offer varying degrees of automation depending on the specific hardware and software implementation.

POWER PLAYERS

The Mackie Designs HUI ($3,499; see Fig. 5) has made its way into various facilities, including home and project studios, audio- and video-editing suites, and even some mastering houses. The HUI is the only control surface in this group that also passes audio signals. The HUI sports a versatile monitoring matrix that allows for independent routing of three stereo inputs into three stereo outputs and offers a discrete mode for monitoring 5.1-surround mixes with a single master-volume control. The HUI's first two channels also provide analog microphone paths complete with preamps and phantom power, which lets you control an overdub session while tending to your

DAW's other needs. The HUI even supplies a third input for a talk-back mic that is routed to the monitor section, or you can use the built-in mic. A mono Summing button and a big Volume knob allow the HUI to elegantly solve DAW-monitoring challenges, such as dealing with multiple speaker setups and headphone distribution.

JLCooper markets a line of powerful and versatile workstations that are capable of audio and video editing and are designed with expandability in mind. The MCS-3800 ($2,999.95; see **Fig. 6**) can be linked with multiple MCS-3000X Expander units ($1,999.95). Each expander adds eight more faders and function buttons, and it can operate as a less featured standalone unit. (Optional end caps are available for standalone expanders to give them a finished look.)

The series also includes the MCS-Panner joystick module ($999.95) for multichannel surround mixing, the MCS-Orbiter touch-sensitive motorized joystick panner ($1,999.95), and a slew of other specialized add-ons. JLCooper's mix-and-match approach to control-surface configuration is too extensive to cover in this roundup, but it also includes the FadeMaster series, a less expensive line of smaller four- and eight-fader modules that can function as basic standalone controllers or in combination with other units.

FIG. 6: JLCooper's MCS-3800 was designed with quality and expandability in mind.

In addition to functioning as a general control surface, the Radikal Technologies SAC-2K ($1,849; see **Fig. 7**) has meticulous profiles for Digidesign *Pro Tools*, Mark of the Unicorn (MOTU) *Digital Performer*, and Steinberg *Nuendo* that provide detailed control of functions specific to each application. Overlay sheets rename the silk-screened button labels on the unit for easy identification.

CM Labs provides a control surface that squeezes the most functionality into the smallest space. The MotorMix ($995; see **Fig. 8**) was one of the first affordable controllers for those making the leap into native desktop recording and mixing, and it's still a popular choice among musicians. In spite of its small footprint, the MotorMix is powerful, and you can link multiple units to form a larger work surface. A separate transport control is also available.

Although the control surfaces perform many of the same operations, each has a unique look and feel. In many ways, the HUI resembles Mackie's popular D8B digital mixing console, which drew some of its design elements from the HUI; it's one of the largest of the pack. The SAC-2K is also rather large compared with some of the others, and it showcases a sporty, modern look. The MCS-3800 looks and feels much like a professional video editor, whereas the MotorMix has a footprint not much larger than a sheet of paper.

FIG. 5: The Mackie HUI provides a versatile monitoring matrix along with its motorized faders.

FADE AWAY

As with the inexpensive MIDI control surfaces, the main attractions of the high-end units are their banks of faders. In addition to supplying a more direct approach than a mouse to making level changes, hardware faders make it possible to independently ride the levels of multiple tracks at the same time. Expectations for fader responsiveness are understandably higher with control surfaces costing well over $1,000, as most of these units do.

All of the units in this group feature a bank of eight motorized, touch-sensitive 100 mm faders. Moreover, they allow two-way feedback of information, meaning that changes to virtual faders made in the host software are actively reflected

in the faders. You can update or overwrite the fader settings on the fly by simply moving the faders. The HUI and SAC-2K also have an additional dedicated master fader.

The faders on the HUI, MCS-3800, and SAC-2K are all good quality and comparable in response and feel. The faders' travel paths are smooth, and there is only a bit of play when you wiggle the faders from side to side.

The faders are smooth and consistent as long as you don't lean on them. Pushing down while moving a fader causes it to catch and interrupts the flow of the move. When I first got the HUI, I exerted a bit of downward pressure on the faders in a way that had always been acceptable on full-size consoles. Backing off the downward pressure and thinking "touch" rather than "push" eliminated the problem. The MCS-3800 faders respond in a similar manner.

The SAC-2K also took some getting used to; the concave finger rests on the faders are slicker than those on the HUI and the MCS-3800. My finger had a tendency to slide around in the curves of the faders, so at first I grabbed the fader at the top and bottom to initiate moves. That's not a healthy way to continuously operate a level control, and I eventually retrained myself to drop my finger straight down on the fader, which helped. However, I would prefer to have a textured surface on the faders so my fingers wouldn't slide around unnecessarily.

As moving faders go, these three workstations are all pretty quiet. The only time that mechanical fader noise would be an issue is if you had several hyperactive channels continuously jumping around. (If that's your bag, most of the units provide power-up demos with synchronized dancing faders.)

FIG. 8: The CM Labs MotorMix squeezes a great deal of functionality into a surprisingly small footprint.

The faders on the MotorMix felt stiffer and a bit grainier than those on the other units, though according to CM Labs, the fader mechanisms are the same as those on the SAC-2K. The faders were noticeably noisier than those on the other units, and the motorized movement was not as smooth. Also, a small plastic film guide that is designed to keep out dust is in the path of the fader track. In some spots on certain channels, the plastic makes a high-frequency crinkling sound when the fader is moved quickly; that could be bothersome to some people. Nevertheless, the MotorMix faders seem reliable and durable.

Not one of the faders in this collection of control surfaces feels anything like the faders on an SSL or a Trident console—that would be an unrealistic expectation. However, a gentle touch can yield excellent response with these controllers.

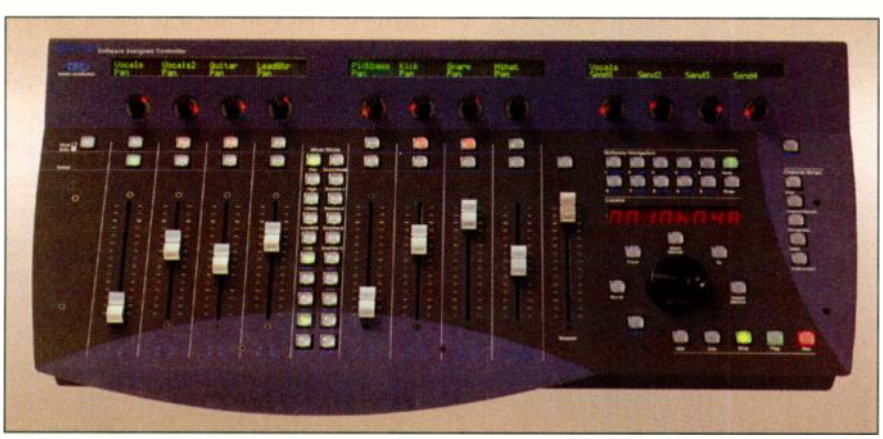

FIG. 7: The SAC-2K from Radikal Technologies includes excellent profiles and overlay sheets for *Pro Tools* and *Digital Performer*.

DO THE TWIST

Buttons and knobs abound on the units. The HUI, MCS-3800, and SAC-2K

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KORG

TOP-NOTCH FOR PRO TOOLS

Although control surfaces like HUI and MotorMix are made to interface nicely with Pro Tools, Digidesign makes its own Pro Tools control surfaces for high-end, deep-pocketed customers who need a more robust hardware interface.

PROCONTROL ($11,995)

ProControl, Digidesign's first control surface for Pro Tools, is intended for high-end post-production and music facilities, a fact reflected in its extremely high-quality mechanical components, expandable architecture, and high degree of configurability (see **Fig. A**). Each of the eight channel strips provides a 100 mm touch-sensitive, motorized fader; Mute, Solo, and Select buttons; an eight-character scribble strip; a rotary encoder; and several controls for automation and plug-in editing control. Other controllers include a Scrub/Shuttle wheel and an *x-y* track pad. ProControl can automate all automatable parameters in Pro Tools, including plug-ins.

ProControl communicates with Pro Tools through a 10Base-T Ethernet cable connected to the computer rather than through MIDI, as third-party surfaces generally do. In that way, it gains the bandwidth necessary to accommodate meter and fader data, which can be substantial with larger configurations. The network connection also allows you to control a Pro Tools system in one part of a multiroom studio with a ProControl located in another section of the facility.

ProControl's monitoring and talk-back sections are the only places where audio passes through the control surface. The monitoring section is fed by analog outputs from Pro Tools, and its function is mostly to provide a master monitor-volume control and amenities like dimming when talk back is used. Eight inputs in the monitor section can be configured as four stereo pairs or for surround monitoring. The master volume control affects a maximum of six channels, so it can act as a master for 5.1 format mixing.

You can expand ProControl with two optional add-ons. Each Fader Pack ($6,495) adds 8 faders (as many as 48 faders), and the Edit Pack ($7,495) adds 2 motorized, touch-sensitive joysticks for surround panning; 8, 40-segment meters; a QWERTY keyboard with color-coded keys; a 2-button trackball; and 20 dedicated function buttons.

In addition to the faders, each channel has a four-character scribble strip; Mute, Solo, and Select buttons; and a rotary encoder. The encoders can be used individually for adjusting channel parameters or in aggregate as a horizontal row of parameter controls for a plug-in.

FIG. B: Digidesign's Control/24 is much larger than most control surfaces, but it offers 24 motorized faders and tight integration with Pro Tools.

Sixteen Class A Focusrite mic preamps as well as two DI inputs make Control/24 a good bet for tracking on Pro Tools. The monitoring section features 12 mono inputs that can be configured as 6 stereo inputs; 2, 5.1 inputs; or even 3, 4.0 inputs—an arrangement more flexible than with ProControl.

Other utility features include an independent submixer, which mixes eight stereo inputs down to a stereo pair; a talk-back return to allow monitoring of the talent through a mic hung in the studio; and two ¼-inch assignable switch connections.

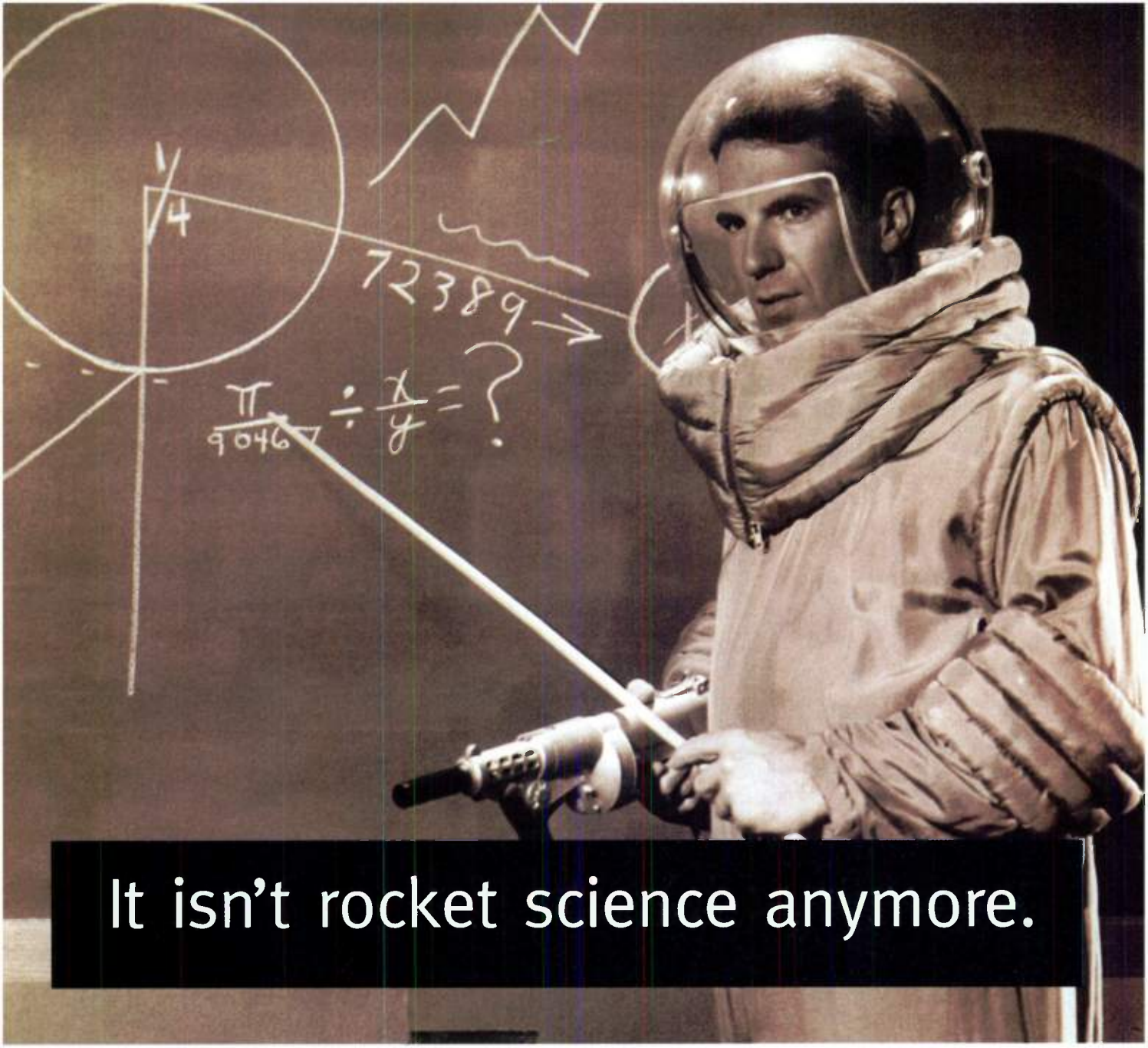
Like ProControl, Control/24 communicates with Pro Tools via Ethernet. Both surfaces also feature illuminated switches for quick operation in low light, and Control/24's automation capabilities are virtually identical to ProControl's.

—Larry the O

FIG. A: Digidesign's expensive ProControl provides expandability and a high level of integration with Pro Tools systems.

CONTROL/24 ($7,995)

Control/24 looks somewhat like a traditional large console (see **Fig. B**). It's substantially larger than ProControl, and its big footprint may pose a problem for small desktop studios. Although it has much of the same functionality as ProControl, Control/24 boasts lots of analog inputs and 24 touch-sensitive, motorized faders. Its construction and control capabilities, however, are not quite as robust as ProControl's, and it's not expandable.



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have conveniently located dedicated transport sections for play, record, stop, as well as other functions and also provide Jog wheels for scrolling and scrubbing. The MCS-3800 alone offers a shuttle-ring mechanism surrounding its Jog wheel. The HUI and MCS-3800 also have a numeric keypad. On the SAC-2K, clicking on the Num button converts a group of numbered buttons into a numeric keypad. The MotorMix offers dedicated Play, Stop, Fast-Forward, and Rewind buttons, but they are not arranged as conveniently, and the labels are more difficult to read than those on the other units.

The HUI, the MotorMix, and the SAC-2K furnish dedicated knobs for adjusting channel parameters such as panning, send amounts, and so forth. The MotorMix uses a single knob for assigning the parameter of the individual channel knobs, whereas the HUI, SAC-2K, and MCS-3800 have a separate row of knobs for adjusting plug-in parameters, EQ, and other functions. The MCS-3800 does not have knobs specifically assigned to each channel, making it a bit less intuitive but no less functional for setting channel panning and other parameters.

The HUI, MCS-3800, and MotorMix have dedicated Solo and Mute buttons on each channel. The SAC-2K is a little different: it uses a single button per channel for both functions; a master switch determines the mode.

The HUI has the biggest and most

SOCIAL MIXER

If you're using a mixer with your DAW, you already have plenty of faders, buttons, and other controllers at hand. Wouldn't it be nice to use your mixer as a control surface, too? Most digital mixers on the market (and even a few analog mixers) allow you to do that to one degree or another through MIDI.

Several levels of control are possible. The most basic and common level simply lets you assign the hardware controllers (such as faders) to standard MIDI messages, usually continuous controller and switch messages. The second level of control involves MIDI Machine Control (MMC), which lets you control your DAW's transport from the mixer. The highest level of control incorporates more specialized implementations for more tightly integrated control.

Assigning faders and switches to standard MIDI messages is supported by every digital-mixer manufacturer I talked with. In all cases, faders can be mapped, but the number of mappable controls beyond the basics varies from mixer to mixer. Some, like Mackie's D8B, support virtually every knob and switch on the surface for MIDI transmission.

Generally, this assignment is accomplished by defining a custom layer that maps each fader or switch to a specific MIDI message. Most mixers allow the mapping to be done more or less arbitrarily, though they may impose some restrictions such as allowing a fader to send continuous controller messages but not Note On or Program Change messages.

Typically, however, assignments are made using one of two schemes: successive mixer channel strips all use the same controller numbers, with each strip having its own MIDI channel, or successive strips use different controller numbers for the same hardware controller, with all strips sent over the same MIDI channel. Tascam's DM24 has two kinds of layers (MIDI and controller layers) that match those two scenarios.

Mapping your mixer's controls to your DAW's parameters can be a time-consuming process, but the result can be stored as a snapshot once it's all done. Some manufacturers provide templates for particular DAWs, such as the Yamaha 01V's Cakewalk *Pro Audio* 9 template or the templates provided on Soundcraft's Web site for the Spirit 328. The 01V also has a Learn mode that is bidirectional; it can receive MIDI data from the DAW software and map the parameter to the selected controller.

Some mixers can also send MMC, though as you might expect, implementations vary. Roland's VM-3100 provides transport and track-arming controls, and the DM24 even transmits its Jog/Shuttle-wheel output as MMC. Panasonic's DA7, on the other hand, provides only basic transport functions.

Finally, some mixers incorporate more customized functions. The DA7 includes a mode that emulates Mackie's HUI control-surface protocol, instantly allowing control of basic fader, mute, solo, and pan functions in banks of eight channels at a time. Roland's VM-7200 is not able to transmit standard MIDI messages but does send SysEx messages that will be usable with some upcoming products. Tascam is also planning to add HUI emulation to the DM24 in its version 2 software.

Ultimately, however, use of a digital mixer as a control surface is limited by the DAW's capabilities to accept such messages. For example, Pro Tools no longer allows any MIDI controller to be mapped to its parameters; rather, it requires a special "profile" file for the controller. As always, check your owner's manual for details.

—Larry the O

complete collection of dedicated buttons. Included are buttons for auditioning, looping, zooming, various automation and editing modes, and keyboard shortcuts. Footswitch jacks provide for remote control of functions such as play and record, and your computer's mouse can be attached to the HUI for convenience.

All four units offer LCDs. The MotorMix has one 2-by-40-character display. The HUI and the MCS-3800 provide a 2-by-40 display as well as a dedicated LED location and time display. The HUI also includes stereo bar-graph meters for each audio channel. The SAC-2K offers the most displays, with three 2-by-40 screens and a location and time readout like that on the HUI and the MCS-3800.

In Review

During the past couple of years, EM published reviews of most of the control surfaces in this roundup. If you want a more in-depth look at the products, check out the following reviews:

CM Labs MotorMix	3/00
Edirol U-8	9/00
Mackie HUI	1/00
Peavey StudioMix	11/99
Radikal Technologies SAC-2K	1/02
Tascam US-428	9/01

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GETTING ALONG

All of the controllers work with an extensive variety of music-production applications, such as Cakewalk *Sonar*, Digidesign *Pro Tools*, Emagic *Logic Audio*, MOTU *Digital Performer*, and Steinberg *Cubase VST* and *Nuendo*. (Check the manufacturers' Web sites for a list of supported programs.) The control surfaces have been developed with particular support for Pro Tools. The HUI and SAC-2K also package detailed control-surface plug-ins specifically designed for *Digital Performer*, and the MCS-3800 currently posts a *Digital Performer* plug-in (still a beta version as of this writing). In addition to most major sequencers, many software instruments are also supported by these units. The SAC-2K, with more than 45 virtual-instrument edit templates, is especially noteworthy.

The MotorMix is designed for basic ease of use, especially for Pro Tools users (Digidesign is the exclusive distributor of MotorMix). It provides access with a minimum of fuss to the most commonly required functions such as transport control, fader automation, soloing, muting, and plug-in editing. Its small size makes it a good choice for those who need portability or want to conserve work space. Although its faders are a little noisy, the unit is a good value.

The MCS-3800 is totally professional. It's a bit generic on the surface because many of the buttons don't have specific names, but it's easy to learn how to use. The MCS-3000 line is quite extensive; for those who need expandability and a wide range of compatibility with other hardware, especially video equipment, the MCS-3800 is an excellent choice. It's not cheap, but JLCooper has been a proven leader in controllers and synchronizers for many years, and it shows.

The SAC-2K was one of the easiest pieces of gear to get started with. I used it with *Digital Performer*, which simply entailed plugging in the MIDI cables, creating a *FreeMIDI* device, and copying the supplied plug-in into the proper folder. Minutes later I was writing fader moves. Although it supports many music applications, the SAC-2K is especially well suited for Pro Tools, *Digital Performer*, *Nuendo*, *Cubase VST*, and Magix *Samplitude*. In addition, the SAC-2K gets top marks for its snazzy appearance.

The HUI is perfectly suited to Pro Tools and supports *Digital Performer* and Soundscape *RED*. It is elegant, highly functional, and powerful. Its audio features give the added bonus of meeting your monitoring and talkback needs while also providing two microphone channels, making it potentially the most practically useful of the bunch.

Rob Shrock *has recorded or performed with Burt Bacharach, Garth Brooks, Ray Charles, Elvis Costello, Sheryl Crow, Whitney Houston, LeAnn Rimes, Dionne Warwick, Stevie Wonder, and many others.*

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SO POWERFUL IT'S FRIGHTENING

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CRAIG (#5) > SLIPKNOT

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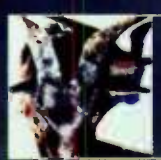

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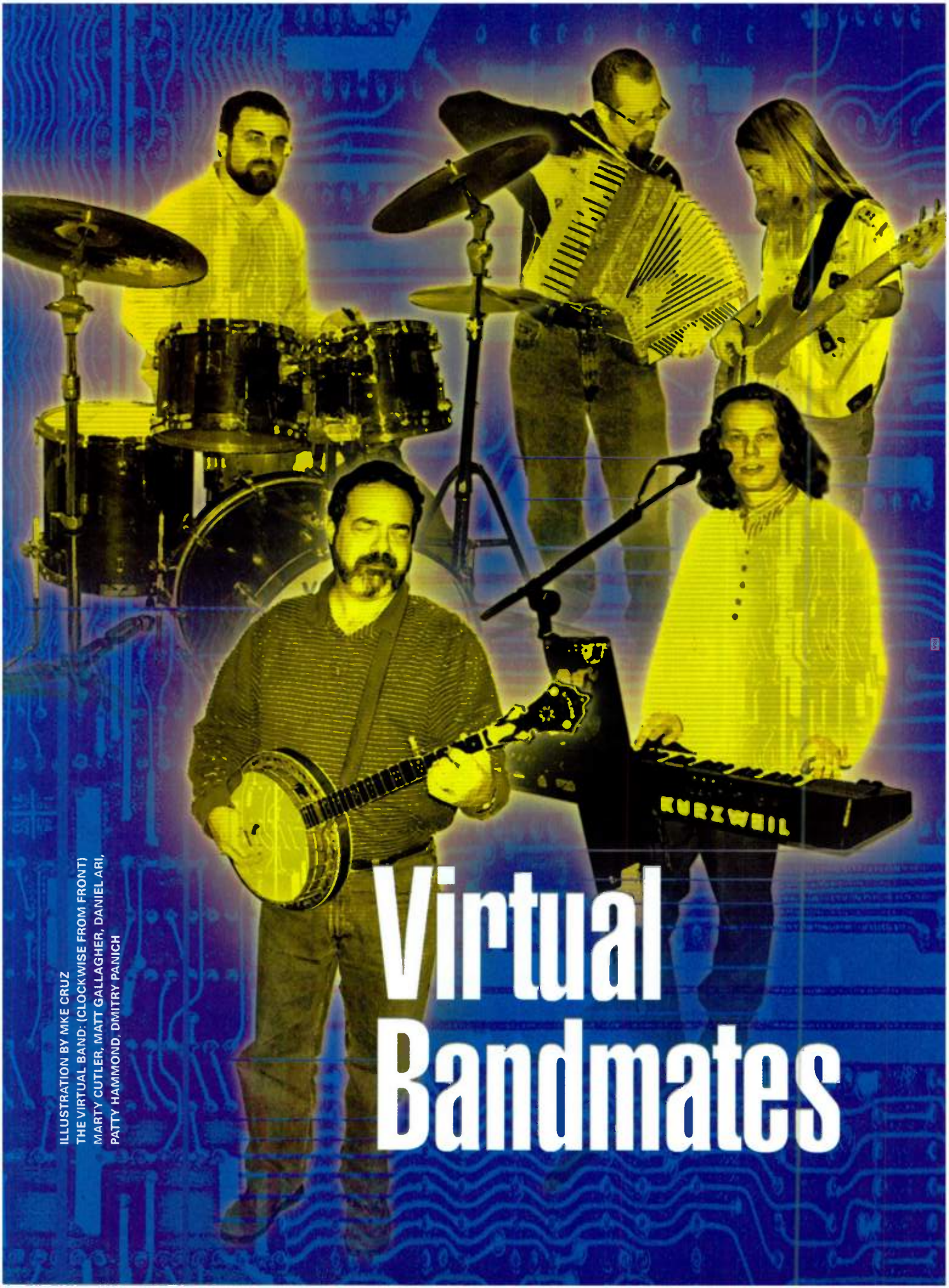

Virtual Bandmates

ILLUSTRATION BY MIKE CRUZ
THE VIRTUAL BAND: (CLOCKWISE FROM FRONT)
MARTY CUTLER, MATT GALLAGHER, DANIEL ARI,
PATTY HAMMOND, DMITRY PANICH

Modern MIDI sequencers are unquestionably powerful tools for composing. But when inspiration strikes, it can take a lot of time and effort to develop ideas using a sequencer. By the time you finish your drum parts and lay down bass lines, pads, and arpeggios, you easily can find yourself astray from your original creative impulse. Sometimes it's easier to let the computer make some musical choices for you.

Today's auto-accompaniment programs shatter the amateur-home-keyboard stereotype.

The same idea holds true if you simply want to create some music for practicing. You might find it easy to sequence a piano-and-bass rendition of "Giant Steps" that cycles through all 12 keys, but programming a lively drum part for the tune may not be so easy if you aren't a drummer.

Moreover, the type of controller you play may determine how convincing your parts turn out; chord voicings played on a keyboard are often quite different from those played on a guitar. Keyboardists can try this little experiment: Play a simple G-major chord, "strumming" from low note to high and then high note to low. Now, try playing alternating up and down strums in eighth notes at 100 bpm. It's not that easy, is it? Conversely, guitarists will find playing some piano-chord voicings to be an exercise in futility or an invitation to carpal tunnel syndrome.

By Marty Cutler

Virtual Bandmates

The world of MIDI composition would be a mighty dull place if it didn't help musicians travel beyond the boundaries of their musical skills. Fortunately, a handful of clever companies with some interesting ideas about computer-music composition have introduced auto-accompaniment programs. Experienced players may scoff at these tools, but auto-accompaniment programs can enable anyone to create some very stylistically convincing music in a ridiculously short time.

The term *auto-accompaniment* is really an oversimplification for these programs. You certainly can use the software to generate backing tracks, but you can also try out new arrangements or use portions of the files to generate individual instrument parts for use in a more full-featured sequencing program. You may want to use them to print out quick charts for band rehearsals or rapidly produce a sketch of your ideas while the creative spark is burning. One program will even randomly generate entire songs—complete with melodies, solos, and titles—with a minimum of user input.

I analyzed three of the best-known auto-accompaniment programs: PG Music's *Band-in-a-Box Pro* (Mac/Win), SoundTrek's *Jammer Professional* (Win), and MiBAC's *Jazz* (Mac/Win). *Jammer SongMaker* is a pared-down version of *Jammer Professional* with fewer style-editing features and no tempo map. SoundTrek also offers *Jammer Live,* which interacts with live input but does not generate music on its own. In addition to *Band-in-a-Box Pro,* PG Music offers *Band-in-a-Box MegaPAK,* which shares the same program and feature set but includes several more musical styles. Owners of the *Pro* version, however, can purchase additional styles at any time.

The programs share a few traits; for example, all three rely on a chord-chart metaphor for entering music. It's relatively easy to just jump in and create music with any of the programs, but from there differences abound. The three programs examined here offer widely divergent stylistic and compositional tools; keep in mind that a feature that one musician might consider an asset may be unnecessary or even a hindrance to another.

Each program has inherent strengths and weaknesses from the standpoints of musical authenticity, orchestrational offerings, and even compositional styles. Given the space allotted here, it's difficult to cover every feature of three fairly deep programs; nevertheless, a broad overview such as this may point you toward the program that will best meet your needs.

IT'S A SETUP

All of the programs are initially set up for General MIDI (GM) instruments. However, you can set patch maps for just about any synthesizer using Bank Select and Program Change messages. *Jazz* is the exception—the current version supports only Program Change; a forthcoming update will offer access to FreeMIDI, Open Music System (OMS), and QuickTime Musical Instruments. That will allow you to access any instrument in your MIDI system through multiple MIDI ports. For now the program supports only single-channel MIDI interfaces. Of course, any multiple-port interface that can route inputs to a single port will also work.

Band-in-a-Box and *Jammer Professional* contain patch settings for a variety of popular synthesizers; therefore, if you don't have a GM-compatible synth, you can probably find an appropriate patch for the task.

Non-GM synths may have different transposition settings, so all of the programs allow you to transpose the MIDI output to a suitable range for your device. In addition, all of the programs let you assign alternate notes for drum kits if your sounds don't correspond to a GM or XG drum map. *Jazz* could stand some updating in that area. You can transpose piano and bass parts one octave above or below the GM standard pitch. In most cases, that range should suffice, but I have seen instruments programmed at higher and lower octaves on occasion. The work-around is to transpose the patch in question to the desired range. Furthermore, *Jazz* only provides notes for a standard drum kit with no Latin-percussion parts. The manual suggests remapping the standard-drum-kit notes to trigger Latin percussion sounds. However, when I tried that, the resulting performance sounded neither authentic nor musical; after all, drum kits and hand percussion usually do not play redundant parts. It is also too bad that a standard-drum-kit map can't coexist with percussion elements.

FORM AND FUNCTION

Once you've set up your instruments for playback, you're ready to make music. *Band-in-a-Box* is probably the easiest to jump-start. When you first load the program, it's happy to vamp endlessly on a generic swing groove in the key of C if you let it. Naturally, that can get monotonous, so you'll want to enter chords, set a key signature, and pick a musical style. *Band-in-a-Box* is pretty flexible about which of those elements you can start with. Unlike the other two

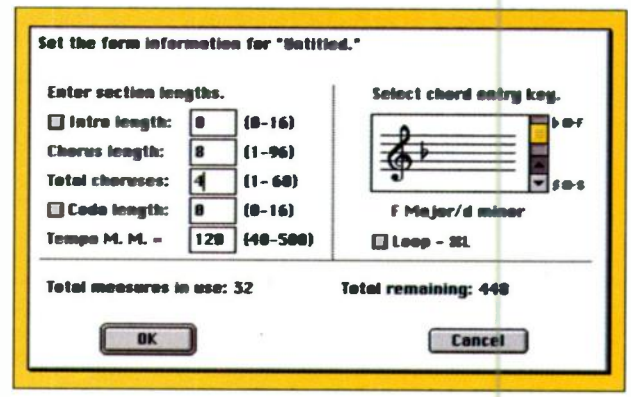

FIG.1: The Form tool in MiBAC *Jazz* lets you set up the structure of your song. You can add an introduction and set its length, the number of chorus bars and repetitions, and a coda. The upper-right section lets you set the key signature with the scrollbar.

vintage line

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programs, you don't have to immediately concern yourself with song form; *Jazz* and *Jammer Professional* require you to determine the number of measures in advance. However, *Jammer Professional* has a sizable list of template files for different types of music to get you started, and you can create your own templates. *Jazz* doesn't provide any templates, so it's a good idea to invest a bit of time in creating song-form templates. Devise the number of bars you need, type any chord into the measures, and save the file; the program is flexible enough to let you make alterations and conceive details later. All three programs let you enter chords with your computer keyboard; you navigate though the measures with either the left and right arrows or the Tab and Shift keys. *Jazz* provides a Chord Help window in which you can audition the available chords, select a root and chord quality, and paste a chord into the selected measure. *Jammer Professional* and *Band-in-a-Box* let you enter chords with a MIDI controller.

ERRONEOUS MONK

To lay out the basic song structure with *Jazz*, you simply click on the Form tool in the right-hand column. The dialog box opens and lets you set up intro, chorus, and coda lengths (see **Fig. 1**). Alternatively, you can choose not to create an intro or coda. You can then select a key signature in the right-hand section of the dialog box, which shows the key and accidentals as you scroll through your choices. Finally, you can choose to loop the song.

Despite its relative simplicity, I found *Jazz* to be a bit less graceful to get started with than the other two programs. The program is far more literal about the way you assemble your song. In *Jammer Professional* and *Band-in-a-Box*, when you leave a measure blank, the previous chord becomes the reference for the blank bar. *Jazz*'s insistence on creating a chord entry for every measure can be fatiguing, especially if you are creating a long song form with lots of measures that hang on a single chord.

Furthermore, if you make a typo while entering chords, such as entering a flat with b instead of Option + B (the program's keystroke for a flat symbol), *Jazz* doesn't reject the typo until you have completely written and compiled the entire song. On the other hand, if you accidentally type in an R chord, *Jammer Professional* and *Band-in-a-Box* will steadfastly refuse to enter it. *Jazz* will highlight your errors, so you can make corrections, but I would prefer to fix them immediately rather than wait until I've completed the song form. Cleaning up errors at that point can be especially tedious if you have copied and pasted measures with invalid chord entries.

Band-in-a-Box has a significantly more complex user interface than the other programs; in fact, the screen is populated

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by enough buttons, menus, and icons to confound you at first glance. Nonetheless, creating your song form couldn't be easier. A Title Bar shows the song name, a musical style, a key signature, a tempo, and the range of measures that define a chorus length (see **Fig. 2**). Clicking on the numbers enclosed in parentheses lets you set the starting measure of your chorus. Measures preceding the start time play only once, automatically defining an intro section, and you can set a tag or coda or let the program automatically generate a two-bar ending. You can assign Part Markers for any group of measures to either an "a" or "b" substyle. The substyles produce different performance variations. For example, an "a" substyle might contain busy piano or guitar comping, whereas "b" might offer a sparser piano with a walking bass. Each substyle contains a number of possible performance variations picked at random to give a more interactive feel to the playback. The program offers two ways to enter chords: you can use the QWERTY keyboard to type them in, or you can play them in one at a time from your MIDI controller. *Band-in-a-Box* lets you insert four chords per measure (three in waltz styles).

LET'S JAM

Jammer Professional employs a more linear, modular system for song form (see **Fig. 3**). With *Jazz* and *Band-in-a-Box,* the basic modus operandi is to create an intro, a chorus with a number of repetitions, and a coda—the program creates automatic variations for you. With *Jammer Professional,* however, individual elements of songs reside in a variety of files containing Intros, Grooves, Breaks, Drum Fills, and Endings. You assign the sections to measures as song structure requires.

If you are content with the choices offered by the templates, load a template and type in your own chords. The strength of this program is that you can customize every (or any) measure of music that *Jammer Professional* generates, and virtually any individual instrumental performance in the arrangement can be changed at any time. You might be tempted to pigeonhole *Jammer Professional* as a sequencer with a bunch of prefabricated components, but in fact, the program randomly generates different performances for each section of the song. With a click on the Compose button, you can create a new rendition of the entire song, selected measures, a single instrument, or just the snare part of the drum performance, for example.

DEVIL IN THE DETAILS

Jammer Professional's greatest strength, however, can also be one of its greatest weaknesses. Both *Jazz* and *Band-in-a-Box* make it quick and easy to create a song form with a modicum of variation. *Jammer Professional* will not change or vary styles until you provide a new pattern. Nonetheless, *Jammer Professional*'s modular measure-by-measure, instrument-by-instrument approach is seductive, which is a good thing if you want to experiment with your song. Yet that can be distracting for those who think that just one more drum tweak will provide that truly inspirational practice track.

Both *Band-in-a-Box* and *Jazz* offer tools to provide more fine-tuning and customizing, though not at the microlevel that *Jammer Professional* provides. For instance, *Band-in-a-Box* lets you create a number of hits, shots, and rests of different durations. You can also formulate rhythmic anticipations at any point in a song with as great as 16th-note precision. *Band-in-a-Box* and *Jazz* allow you to write bass pedals with a variety of rhythmic figures. Both programs let you instruct any instrument to lay out for as long as you need.

ELEMENTS OF STYLE

Stylistically, *Jazz* is perhaps the most straightforward of the three. The program offers a three-instrument ensemble consisting of piano, bass, and drums. *Jazz* focuses on four styles: Jazz 4/4, Latin, Slow 4, and Jazz 3/4. Each of the four styles has three substyles: Ballad, Normal, and Up Tempo.

The substyles offer very different feels. For example, the Latin Ballad style has a bit of a shuffle and is reminiscent of late–'60s to early–'70s funk, whereas

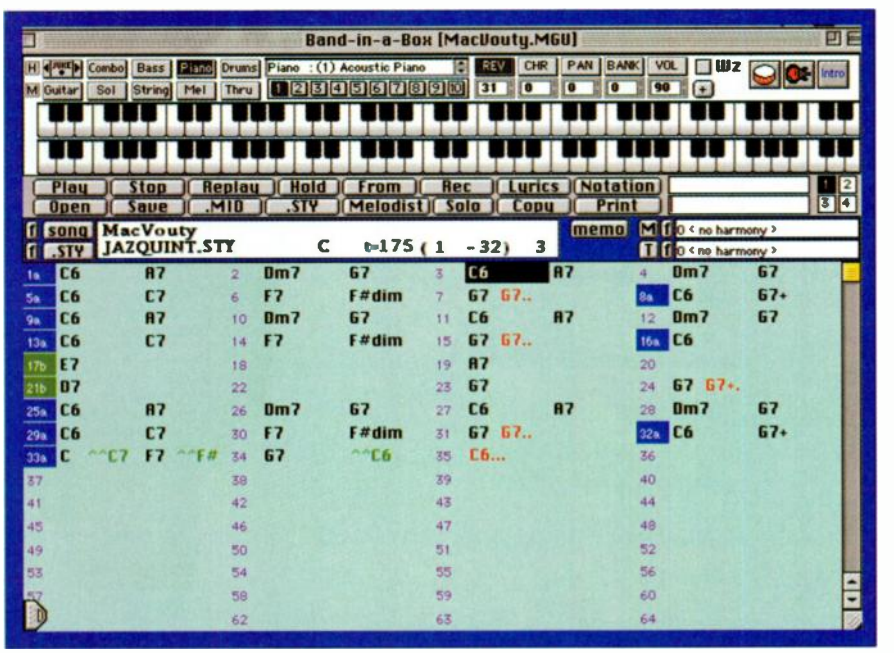

FIG. 2: Clicking on the *Band-in-a-Box* Song Title window accesses basic song-form parameters, key signature, and tempo as well as your song's title. Clicking on the More button takes you to additional song-form and performance features, including setting up a coda and chord embellishments.

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Latin Normal conjures the feel of Horace Silver's "Song for My Father." By and large, the comping is excellent with some nicely loose-limbed drum parts. The drums offer the most rhythmic variety in the program with somewhat less rhythmic variation in the piano and bass. I found myself wishing that the instruments would change roles, perhaps with more active bass or piano lines, leaving the drums to hold the rhythmic fort.

You can change styles and substyles at any measure for as long as you like; for example, you can switch from a Jazz 4/4 with an Up Tempo substyle to a Latin Ballad. You can replace the style at the same place for every chorus or at a specific chorus, and you can alter styles for every instrument or for individual instruments. I was able to transform a tune with a Latin groove to one with a swing feel, with the drums shifting to swing a measure early—the way a real drummer would cue the rest of the band. The ability to mix and match styles so flexibly, coupled with the variations included, gives you a hefty measure of musical expressiveness.

Jazz provides additional facilities for tweaking the performance. You can scale Velocity at any measure for all instruments or for individual instruments and make it happen for selected measures or every repetition of those measures. The program lets you transpose measures or "humanize" the performance in a similar fashion.

STUMP THE BAND

If you want to create that rendition of "Giant Steps" in all 12 keys, think again. Except in one substyle, Up Tempo, *Jazz* supports only two chords per measure—a tremendous drawback for a program targeted at jazz pedagogy. Unfortunately, unlike the other substyles, the four-chord substyle provides little in the way of stylistic variation; in fact, the bass line and piano continuously play on every quarter note, which creates an unjazzlike feel.

Surprisingly, *Jazz* has a limited palette of chord options; for instance, you cannot directly enter *slash* chords (chord symbols indicating a nonroot tone in the bass). Those chord types have been common in jazz and gospel music for some time. One work-around is to type in the upper part of the chord and then create a bass pedal for the selected measures. However, creating pedal tones constrains the part to the rhythmic patterns offered in the menu and can break up the groove. Additionally, you can't mix 4/4 measures with 3/4 measures or vice versa, and odd meters other than 3/4 are not supported at all.

TRACK OF ALL TRADES

Jammer Professional caters to a wider variety of tastes, offering rock, pop, jazz, country, and even bluegrass styles. The program supports various time signatures in all genres (as unlikely as a bluegrass tune in 11/8 might seem). Overall, the styles are effective at creating well-played, tight-sounding music, but the program occasionally comes up short in authentic stylistic detail. For example, bluegrass sounds more like a rock musician's concept of bluegrass; the banjo rolls sound more akin to a programmed arpeggiator than to a banjo, lacking any of the rhythmic nuance or drive of the real instrument. I'm no bluegrass purist, but the drumming sounds too heavy-handed, and as any traditionalist will tell you, drums are verboten to begin with. Similarly, the scarcity of jazz distinctions other than swing and a few smooth-jazz flavors may not be your cup of tea.

Still, *Jammer Professional* has tricks up its sleeve that the other programs don't. The ability to define the song stylistically measure by measure and instrument by instrument is a musical polyglot's delight. You can load new funk variations into a funk tune: try eight bars of funk, eight bars of bluegrass with or without funk drumming, and then segue into a reggae groove with jazzy swinglike horn blasts. Furthermore, every style is replete with customized parts, including synchronized bass and guitar unison parts, vivid ensemble runs, drum fills, and keyboard lines.

Clicking on the Compose button can seed tons of variations on these lines, and stringing together a few measures of the fills can impart an almost Frank

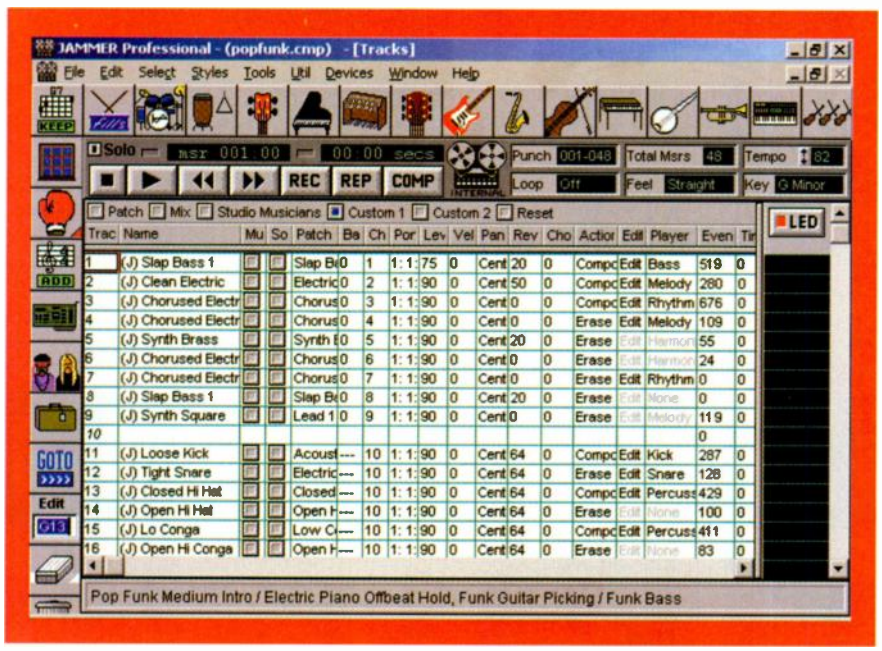

FIG. 3: The more modular system of composition used by SoundTrek's *Jammer Professional* provides a wealth of options for generating music. Each track can have its own composer, letting you mix and match composers for any instrument.

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Zappa–like, through-composed feel to the music (see **Fig. 4**). You can lock any of the tracks to prevent an instrument from being edited or recomposed. Instrumental tracks are not limited to preset groups of instruments, and you can build tracks by adding Musicians. A *Musician* is a track that plays back an instrumental part; you assign styles for the instrument to play. *Jammer Professional* can also change meter at any measure. The program handles this task remarkably well: funk grooves, for example, with time signatures of 7/8 or 9/8 are not a problem.

▼

***Band-in-a-Box* offers an almost encyclopedic collection of musical categories.**

INSIDE THE BOX

Band-in-a-Box has a somewhat awkward way of handling time signatures other than two or four. You can select any range of measures and use the Set Time Signature of Scrap command. Then, choose a number of beats per measure. The change is not always handled smoothly; for example, changing a group of measures from 4/4 to 3/4 simply lops off the end of a measure, resulting in instrumental parts that sound unnaturally curtailed and drum fills that are displaced to new measures. Just the same, altering the time signature provided a few pleasant surprises. Clearly, some styles are better than others at creating odd time signatures; for instance, it is better to create a 5/4 song using a Jazz Waltz with alternating

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measures of three and two than to use a 4/4 jazz style and add a beat for each measure.

Band-in-a-Box can also change styles at any measure, but it is an all-or-nothing proposition. You can't insert a keyboard part from one style and a drummer from another, for example—you get whichever variations and instruments are contained in a given style. Of course, you can create a new style that contains all of the elements you want, but that's not as quick or as intuitive a process as the method provided by *Jammer Professional*.

The program offers an almost encyclopedic collection of musical categories, ranging from barbershop quartet to rap and zydeco, with nearly all points in between. Of the three programs, *Band-in-a-Box* is the easiest for trying out your song in a completely new genre. If you're not happy with your song rendered as a bebop tune, you can select any of the more than 700 styles (including polkas, if your taste allows), and the program will generate your tune in seconds, complete with all of the stylistically correct trimmings.

Many of the Individual styles aim at replicating a specific artist's approach; for example, PopRiff does a creditable job of emulating the feel of "Every Breath You Take" with its arpeggiated guitar parts and simple, pumping bass line. The Meth8081 jazz variation is a remarkable piece of work with wonderfully propulsive drums, strummed acoustic rhythm guitar, and locked-in bass. PG Music can't spell out the inspiration for the style, but it obviously draws from the rhythm section of Pat Metheny, Charlie Haden, and Jack DeJohnette. The program offers a multitude of jazz forms, many with piano comping in the style of well-known artists, including Bill Evans and Herbie Hancock. In all fairness, I'm not an expert on the stylistic nuances of those players, but the performances satisfy my overall impression of their differences.

The original bluegrass styles that the program incorporates are less than authentic. If you want to create bluegrass with more detail and considerably more ethnic flavor and feel, you should check out PG Music's Unplugged collection. Nonetheless, a few problems do crop up in those styles, too. Because the program randomly picks patterns to play back, patterns that play open chords may get selected and transposed with the chord changes. Banjo parts often rely on a droning fifth string, and the drones also get transposed. On the other hand, the rhythmic feel is accurate, and it conveys the realistic, unquantized push and pull of the real thing. Also, be sure to check out Rebecca Mauleon-Santana's authentic Latin grooves, which include Afro-Cuban, Brazilian, and other regional subsets of the genre.

A STYLE ALL YOUR OWN

Despite the number of available musical choices, you still may find the need for something other than the programs' preset offerings. With *Jammer Professional*, you can edit the preset styles to a very high degree for rhythmic feel, tweak note choices and change Velocity nuances, and save the results as a new type. Although you can't create a completely new category from the ground up, the program makes it possible to create some radical hybrids. *Jazz*, however, has no options for building new styles; what you're given is what you get.

Of the three programs, only *Band-in-a-Box* allows you to create completely new varieties from scratch. The program lets you play or step-record individual parts for the "a" and "b" substyles. Each substyle contains as many as 30 cells for each instrument. Every cell can be a unique performance, offering plenty of variation on playback. You can also weight the probability that any passage for a given instrument will be selected.

LEGATO OR CLAMATO

The most recent version of the program provides some exciting Stylemaker shortcuts, including the ability to import any portion of a previously recorded Standard MIDI File (SMF) for use as a style pattern. You can do the same for the drum and percussion parts, too. That gives you the opportunity to invent,

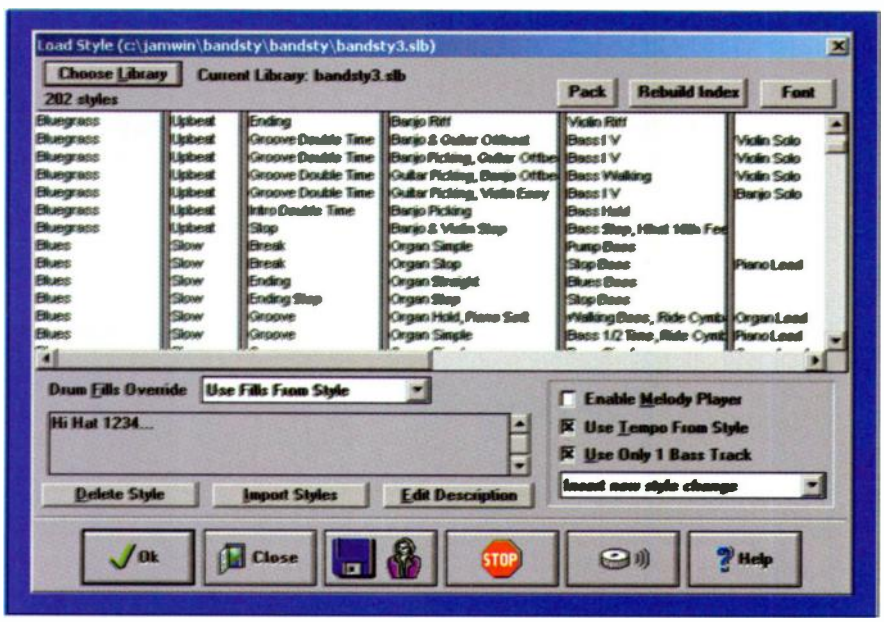
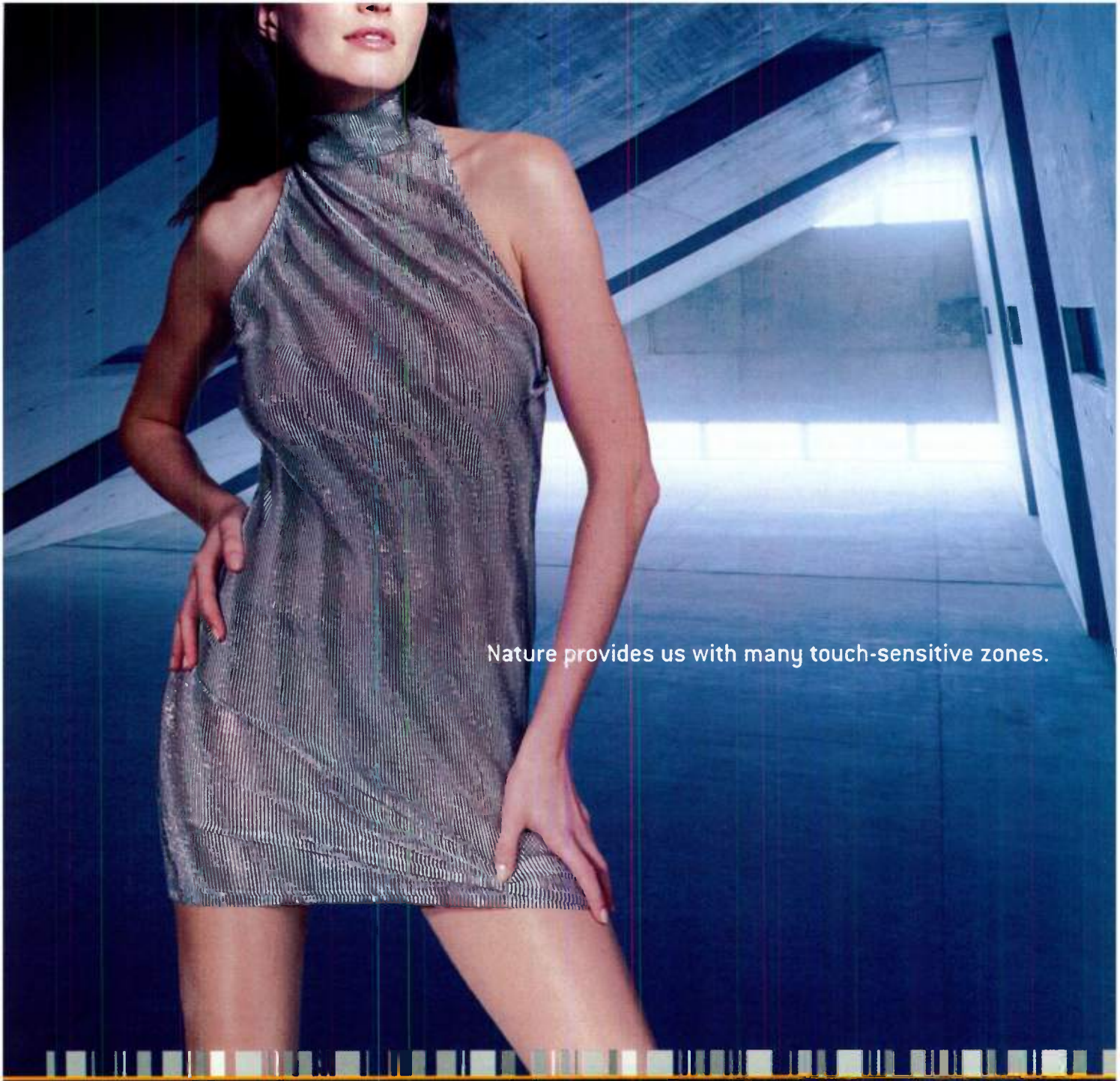


FIG. 4: Clicking on *Jammer Professional*'s Compose button presents a list of styles that you can insert over a range of measures. Furthermore, you can mingle styles from any of the musical genres available.


Nature provides us with many touch-sensitive zones.

Virtual Bandmates

clean up, and fine-tune styles if you own a more full-featured sequencer. You can create authentic, properly voiced guitar strums or fingerpicking patterns simply by entering rhythmic single-note macros.

The most exciting new feature is the option to extract and add instrumental parts from any style for use in a completely different style and then save the composite as a new style. In a matter of minutes, I was able to enhance a Guaracha style with a James Taylor–like fingerstyle guitar part. That capability can offer endless possibilities for creating hybrid styles.

MUSIC MINUS NONE

After you have created your styles, generated a song, and tweaked it to perfection, you will naturally want to play along; all three programs provide the space for you to do so. However, in its current version, *Jazz* requires Apple's MIDI Manager and the Patch Bay application to play along with a MIDI controller. On its own, the program doesn't provide a MIDI Thru channel option—that's a serious limitation if your only sound source is a single MIDI keyboard. If you don't want to use MIDI Manager, plan to use a separate keyboard with Local Control set to on or play an acoustic instrument.

The other two programs make it easy to play along, and you can record your jams for posterity. If you'd like to clean up after your recording, *Band-in-a-Box* provides an event list and a notation window, and *Jammer Professional* offers an event-list and a piano-roll editor. You can edit any of the tracks in *Jammer Professional* and save a highly customized version of your song. *Band-in-a-Box* lets you do the same, but you need to save your tweaks immediately as an SMF before clicking on Play again, because the song will regenerate the performance. *Jammer Professional* also lets you enter a tempo map, so your song can speed up or slow down as needed. *Band-in-a-Box* allows one tempo change per measure only; that is too coarse a resolution for accelerandos or ritardandos, but enough for minute variations from bar to bar.

GOODIES

The features that I have detailed so far barely scratch the surface of what these programs offer. For example, all three can create and print chord charts; *Band-in-a-Box* lets you print your work as a chord chart or in standard notation.

Band-in-a-Box also lets you print any track in tablature. Nonguitar parts are intelligently mapped to proper fingerings, so guitarists can try their hands at playing sax solos. With version 10, you can quickly convert single-note melodies into accurate chord-melody solos in the styles of esteemed jazz guitarists. If that's not enough, you get an editor to create your own favorites.

MEET THE COMPOSER

You can create powerful, expressive music in *Jammer Professional* just by applying overall Band Styles and clicking on the main Compose button, but you'd be missing a much deeper level of musicianship inherent in the program's modular design. The Compose command is an aggregate of individual Composer types: Rhythm, Melody, Harmony, Percussion, Composers for kick or snare drum, and more. In keeping with the modular concept, these types call up individual Composer styles that you can edit and save. For instance, you can edit a Bass Composer style by providing note, rhythm, and Velocity choices.

Among the three programs, *Jammer Professional* stands alone with its robust support for MIDI Control Change (CC) messages. *Band-in-a-Box* lets you set MIDI Pan Position, Main Volume, and Chorus and Reverb levels, but those are static adjustments. *Jammer Professional* allows you to record and edit any MIDI CC; it can even generate a stream of CCs on its own. That's especially useful for Techno and other contemporary styles that rely heavily on timbral motion.

Since version 8, *Band-in-a-Box* has offered an extremely powerful Melodist feature that goes far beyond generating a simple melody. You can let the program generate an entire song: melody,

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FEATURES

Product	Price	Editable Styles	Record Live Performance	Print Chart/Notation/ Tablature
MiBAC *Jazz* 1.61 (Mac)	$149	no	no	yes/no/no
SoundTrek *Jammer Professional* 4.0 (Win)	$129	yes	yes	yes/no/no
PG Music *Band-in-a-Box Pro* 10 (Win)	$88	yes	yes	yes/yes/yes
PG Music *Band-in-a-Box Pro* 8.0 (Mac)	$88	yes	yes	yes/yes/yes

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chords, and all. If you'd like, the computer can make all of the choices for you, or you can provide your own input at any level of depth that you choose. For example, you can select an overall style, increase the incidence of atypical chord progressions, or create a more legato melody track. Besides offering a great creative kick-start for ideas, the Melodist is an effective practice tool, because you can't be sure what the program will throw at you.

The program's Soloist feature can generate authentic-sounding solos in a wide variety of styles from bluegrass to bop, but some of the rock soloists were too manic. Fortunately, you have controls to reduce the busyness of the solo. (How many times have you wanted that control for your nonvirtual bandmates?)

I HEAR A RAP CD

Band-in-a-Box records a single 16-bit, 44.1 kHz mono audio track and includes a few digital signal processing plug-ins such as reverb and compression. The program also supports DirectX, opening up the process to a wide variety of third-party plug-ins. You can render complete song performances as stereo 16-bit, 44.1 kHz WAV files and burn them to a CD—all without leaving the program.

The wealth of amenities that *Band-in-a-Box* offers is staggering, and the company aggressively adds updates and new styles. However, the program is not without problems. The user interface could stand some pruning: many buttons occupying precious onscreen space are redundant menu commands. Furthermore, the Mac version's interface and key commands don't always adhere to Mac conventions. For instance, pressing Command + A should select all measures for editing; instead, the command initiates song playback.

More significant, I'm annoyed and disappointed by the feature lag between Windows and Mac versions. At present *Band-in-a-Box* for Macintosh is only at version 8, whereas Windows users are three upgrades ahead (version 11 for Windows is available as of press time). The new, easier style-creation features and enhanced guitar-oriented MIDI tools are missing on the Mac, and that's a severe letdown.

I'm no less disappointed that *Jammer Professional* has no Mac version whatsoever. The program provides a unique cross-pollination of traditional linear sequencing and algorithmic composition. The ability to easily edit the elements that generate the music at the level of the individual instrument is intriguing and offers enormous appeal to any musician with a healthy eclectic streak.

Overall, *Jazz* is in need of a major update. The provided styles reflect little of the change that music has undergone orchestrationally, rhythmically, and harmonically during the past three decades. Multiple-port MIDI interfaces have been around for some time, and the program should be able to take advantage of that capability. *Jazz*'s inability to allow a play-along MIDI channel without using the antiquated Apple MIDI Manager is a serious inconvenience. The addition of a track for recording with your controller is a must-have if you want to save your performance for later evaluation. On the positive side, *Jazz* is the only program that can run on a 68000 Macintosh; considering the impoverished state of so many music-education labs today, *Jazz* may be an important option.

Caveats aside, any one of these programs can provide hours of fun woodshedding with your instrument. Also, they can be tremendous creative tools with the ability to quickly create anything from a sketch to a full-fledged arrangement of your musical ideas. Musical growth depends on practice and creativity, and auto-accompaniment programs can be great companions for both activities.

In a former life, assistant editor **Marty Cutler** *created a bunch of Soloists and the Unplugged styles for PG Music's* Band-in-a-Box.

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

Discussion Groups and Bulletin Boards

Product	URL
MiBAC *Jazz*	www.mibac.com/wwwboard/wwwboard.html
PG Music *Band-in-a-Box*	http://groups.yahoo.com/group/band-in-a-box; www.pgmusic.com/ubb
SoundTrek *Jammer*	none

Minimum System Requirements

Product	Platform/Processor	RAM	Operating System
MiBAC *Jazz* 1.61	Mac/68000	1 MB	OS 6.0
PG Music *Band-in-a-Box* 8.0	Mac/68030	8 MB	OS 7.5
PG Music *Band-in-a-Box* 10	Win/486DX	16 MB	Windows 95/2000/NT
SoundTrek *Jammer Professional* 4.0	Win/80386	4 MB	Windows 3.1
SoundTrek *Jammer SongMaker*	Win/80386	4 MB	Windows 3.1

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How Joe Meek's innovations changed pop-music making.

Meek First

On February 3, 1967, Joe Meek inexplicably murdered his landlady with a shotgun and then turned the weapon on himself, thus ending a career that led from promising beginnings to international fame and, finally, to oblivion. Along the way, Meek had a powerful effect on the British recording industry, fundamentally changing the way records were made.

In the mid–'50s, British recording engineers were, in fact, engineers, to the point that they wore white lab coats. Producers, on the other hand, wore suits. Engineers executed standard procedures that were developed to record sounds with the greatest possible fidelity, whereas producers, who were charged with making the creative decisions, rarely understood recording technology. Equally important, both classes of professionals were employees of large studios and record companies. Truly independent engineers and producers were unheard of at the time.

Meek changed all that. In the process, he provoked an industry-wide backlash that is difficult to understand from a modern perspective because most of his innovations have been so thoroughly absorbed into common practice that they are hardly noticeable. Besides breaking nearly all the prevailing audio-engineering rules, he demonstrated that an individual could engineer and produce million-selling records in a home studio. Although Meek's gear seems downright primitive now, his studio techniques can be put to use in today's personal studios.

• • • By Barry Cleveland • • •

Courtesy Mirror Group and Partners

Meek First

LONDON CALLING

Robert George "Joe" Meek, born on April 5, 1929, was a precocious child. By the time he was 10, he had written, cast, and produced theatrical performances by and for the children in his village, and he had built a crystal radio set, a microphone, and a single-tube amplifier. At age 14, he upgraded his rig and worked dances and parties as a mobile DJ; at 16, he acted as musical supervisor and provided sound effects for local theater groups. In the summer of 1953, he built a disk cutter that he used to cut his first record, a sound-effects library.

Meek began his professional recording career in 1955, working as an engineer for IBC, the largest and most advanced studio in London. From 1955 to 1957, he engineered dozens of hit recordings for major British stars, often adding sonic touches that distinguished them from other pop recordings of the time. He tweaked the tape recorders to get more level on tape, placed mics close to sources rather than at the "correct" distance, and used compressors and limiters for creative rather than corrective purposes. Perhaps worst of all, Meek sometimes intentionally distorted preamplifier inputs!

Many producers resented what they perceived as Meek's challenges to their authority, but his recordings had a funny way of becoming major hits; at the end of the day, that's what mattered to the artists and the record companies. Because so many of Meek's recordings became hits, some producers, including jazz and world-fusion pioneer Denis Preston, refused to work with anyone else.

But Meek was not happy working within the confines of IBC. The studio manager and many members of the staff resented Meek's attitude—as well as his tendency to throw fits when he didn't get his way—and they treated him badly. Much of that can be ascribed to professional jealousy, but it was no doubt exacerbated by the fact that Meek was homosexual. Of course, that didn't keep the "rotten pigs," as Meek called them, from trying to steal his "secrets."

Meek left IBC in September of 1957 and a few months later helped Preston found Lansdowne studio. Meek designed a 12-channel mono tube mixer with EQ on every channel (a luxury at the time), which he had custom built by EMI/Hayes. Meek also installed EMI TR50 and TR51 recorders (see Fig. 1) and oversaw all of the studio's technical arrangements. The engineers at IBC called Lansdowne "The House of Shattering Glass" because of its clarity of sound, and in 1959 it became one of London's first stereo studios. Meek remained there until November 1959.

JOHN REPSCH

FIG. 1: This EMI TR51 was Meek's primary mixdown machine until early 1963. It had three heads, took reels as wide as 8.25 inches, and ran at 15.0 and 7.5 ips.

BEEN THERE, DONE THAT

While working at IBC and Lansdowne, Meek set a number of precedents in the English recording studio. Besides being the first to put microphones close to (and sometimes inside) sound sources, Meek experimented extensively with microphone selection, which gave him a broader palette of sounds.

He also worked with reflective surfaces. For example, he had trumpet sections play against a cement wall to record early reflections at IBC, and he sometimes used large movable Lucite panels to liven up the sound of a dead room at Lansdowne. Other reflective surfaces useful to Meek included those inside the echo chambers in both studios (see the sidebar "Delay, Reverb, and Echo").

Meek was the first engineer in the United Kingdom to use compressors to create pumping and breathing effects rather than merely to control dynamic range. He also pushed limiters to the max to get the hottest possible levels on tape and took advantage of analog tape's natural compression characteristics. It is also likely that Meek was one of the first engineers to direct inject the electric bass by plugging it straight in to the mixer.

In addition, Meek began experimenting while at IBC with sound-on-sound recording using two recorders. According to veteran engineer and producer Adrian Kerridge, who worked with Meek at the time, "He and [producer] Michael Barclay used to work what they called *composites*, which they made track by track by track. What they were in effect doing was multitrack recording using the composite method. Nobody else to my knowledge in London, in fact, in Europe—I don't know about America—was working this way at that time."

Kerridge also reports that while at Lansdowne from 1958 through 1959, Meek used two tape recorders to produce flanging, an effect usually considered to have been developed in the mid-'60s. "It was very successful," Kerridge adds, "and we used it a lot, together with expansion, compression, and limiting."

OUTSIDE THE BOX

Changing the way individual sound sources were recorded was only one aspect of Meek's vision. Ultimately, he revamped the entire recording process

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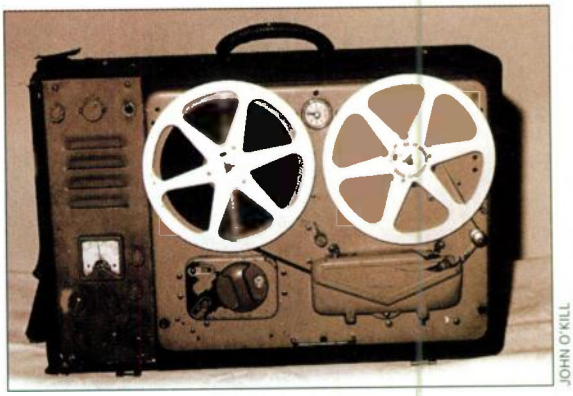
Meek First

and arrived at entirely new ways of working. For example, British pop recordings made in the mid– to late '50s had a lot of "room" sound. Microphones were placed away from sound sources, and separation was achieved by keeping the musicians apart from each other. Meek close-miked sources, largely eliminating the room sound, and then used compressor/limiters to tighten up the sounds and give them more punch. Whatever ambience was lost because of the close-miking technique was made up for by sending everything to an echo chamber. That basic concept, though so common now that it's taken for granted, was considered radical (and wrong) at the time.

Trad-jazz trumpeter Humphrey Lyttleton's "Bad Penny Blues" is one of the best-known examples of the way Meek's approach changed the character of recordings for the better. The song was built around a rolling boogie-woogie piano bass line and pushed along by a snare drum played with brushes. Meek compressed the dynamic range of all the instruments far beyond what was usual for jazz recordings, but he also made the brushes prominent and intentionally distorted the piano bass line.

"It was Joe's concept," says Preston. "He had a drum sound, that forward drum sound, which no other engineer at that time would have conceived of doing, [and] with echo. And Joe created this at a time when I was [being] told that the rhythm section should be felt and not heard. He was the first man to use what they then called distortion. I know what they call it now—now they build it into gear! And that made a hit out of what would otherwise have been another track on a jazz EP. It was purely a concept of sound." "Bad Penny Blues" made it into the Top 20 on the *pop* hit parade.



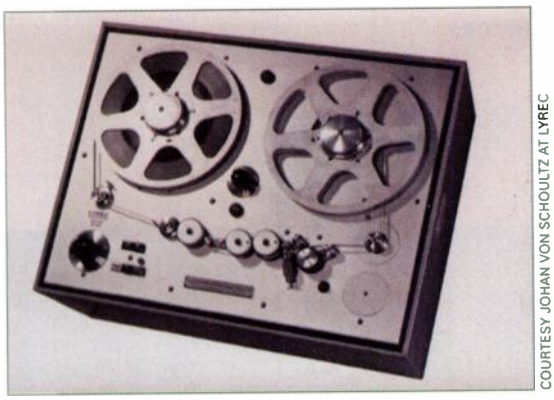
JOHN O'KILL

FIG. 3: Meek used his Vortexion WVB recorder for tape delay. The unit is now owned by John O'Kill.

INSIDE THE BOX

It was during his time at Lansdowne that Meek built his now famous black boxes. One was a Pultec-style equalizer that Nigel Woodward, its current owner, describes as "probably the warmest, smoothest, most transparent equalizer ever made." Another of his black boxes was a Langevin-style compressor/limiter, which Kerridge now owns (see the sidebar "Meek's Black Boxes"). Meek left both units at Lansdowne when he departed.

The third and most important black box was a spring reverb unit made from a broken fan heater. According to Kerridge, "It worked very well, and Joe was very secretive about it. To my knowledge, this was probably the first spring echo unit of its kind. It produced a very twangy and reverberant sound that he used to great effect on many of his recordings." (That was a year before Alan Young developed the Accutronics Type 4 reverb unit for the Hammond Organ Company in the United States.)



COURTESY JOHAN VON SCHOULTZ AT LYREC

FIG. 2: Meek used a twin-track Lyrec TR16 like this to record two synchronized tracks. It had three motors and three heads, took reels as wide as 11.5 inches, and ran at 30.0, 15.0, and 7.5 ips.

SOUND EFFECTS

As a young man, Meek became quite skilled at designing original sounds and at recording unusual sounds from his environment. While at IBC, he put those skills to good use. When vocalist Anne Shelton recorded "Lay Down Your Arms," a song with a military marching beat, the producers wanted to add the sound of actual marching soldiers. Instead, Meek had Kerridge shake a box of gravel back and forth, producing the same basic sound. The record was a massive hit.

Also while at Lansdowne, Meek began making recordings at his tiny Arundel Gardens flat. One of those recordings was a full-length LP that employed several unique recording techniques and featured an extraordinary variety of original sound effects.

HEARING NEW WORLDS

In 1959 Meek recorded his "Outer Space Music Fantasy" called *I Hear a New World.* (The original recording was released on CD for the first time as an addition to my *Creative Music Production: Joe Meek's Bold Techniques,* published by MixBooks/artistpro.com in 2001. Previous CD releases contained a drastically altered version of dubious historical significance.) The recording was not only made in his apartment but also recorded in stereo. In addition to engineering the record, Meek composed all of the music. His musical concepts were arranged by Rod Freeman and performed by a group called the Blue Men. How Meek was able to work in stereo remains a mystery, as nobody who was there at the time recalls seeing any stereo machines, much less a stereo mixer.

That largely neglected recording is

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interesting because it provides fascinating insights into how an early audio innovator, working at the dawn of commercial stereo, dealt with issues such as phase relationships, imaging, and the juxtaposition of dry and processed sounds. Beyond that, Meek's use of signal processing, tape manipulation, and tape loops put the record in a class by itself.

And then there are the sounds. In addition to bass, drums, and guitar, the instruments Meek used included a homemade steel guitar, a tube-powered keyboard called a Clavioline, a piano with thumbtacks in the hammers, and test oscillators processed in various ways. Meek also used his tape delay as an instrument by pushing it into self-oscillation with over-the-top regeneration. Sound effects included bubbles blown through drinking straws, a comb scraped across an ashtray, shorted electrical circuits, and milk bottles played with spoons. Meek often processed sounds as they were recorded. Tapes were processed by changing speeds, playing them backward, or splicing loops.

Meek wanted to go beyond the static stereo recordings that were being made at the time, by introducing motion into his mixes. On a promotional recording made in 1960, Meek remarked, "I've tried—and I've had to do it rather carefully—to create the impression of space, of things moving in front of you, of a picture of parts of the moon."

Sometimes he did that by panning a sound from one side to the other. He also used the reverb and echo returns to create motion by panning the dry sound to one side and the effect return to the other, or by having the processed and dry sounds on one side, but the effect bleeding over to the other side. On "March of the Dribcots," Meek made the sounds "march" from one side to the other by continuously varying the balance of high and low frequencies for each sound.

On the title track of *I Hear a New World,* Meek used loops and other forms of tape manipulation to great effect. The core of the song is a repeating three-note bass line that is either a tape loop or a very steady bassist; the drummer syncs to the bass loop. The vocal track is sung in rounds of three, with different processing on each round. Two voices in tight harmony sing the first line. The same line, with identical phrasing, then repeats with different EQ and effects. The voices on the third line are sped up to double time so that they are pitched an octave higher.

The phrasing of the sped-up vocal follows that of the other two parts. To get that effect, the vocalist sang at half speed and time (perhaps at 15 ips) and was recorded onto one machine while listening to the backing track playing at half speed on another. When the slow track played back at the higher speed (30 ips), it was roughly in sync with the original, though it was pitched an octave higher. The new track was then transferred onto the master recorder.

Now such techniques are used by nearly everyone. But in 1959, they were truly revolutionary for a pop-music producer to be using.

304 HOLLOWAY ROAD

Although he couldn't play an instrument, was tone-deaf, and had little sense of rhythm, Meek had been writing songs and lyrics for years. Les Paul and Mary Ford had a hit with his "Put a Ring on My Finger." Meek used the money he received from that to cofound Triumph Records, one of England's first truly independent pop record labels, in 1960. Besides producing albums, Meek acted as A&R man, choosing—and in some cases

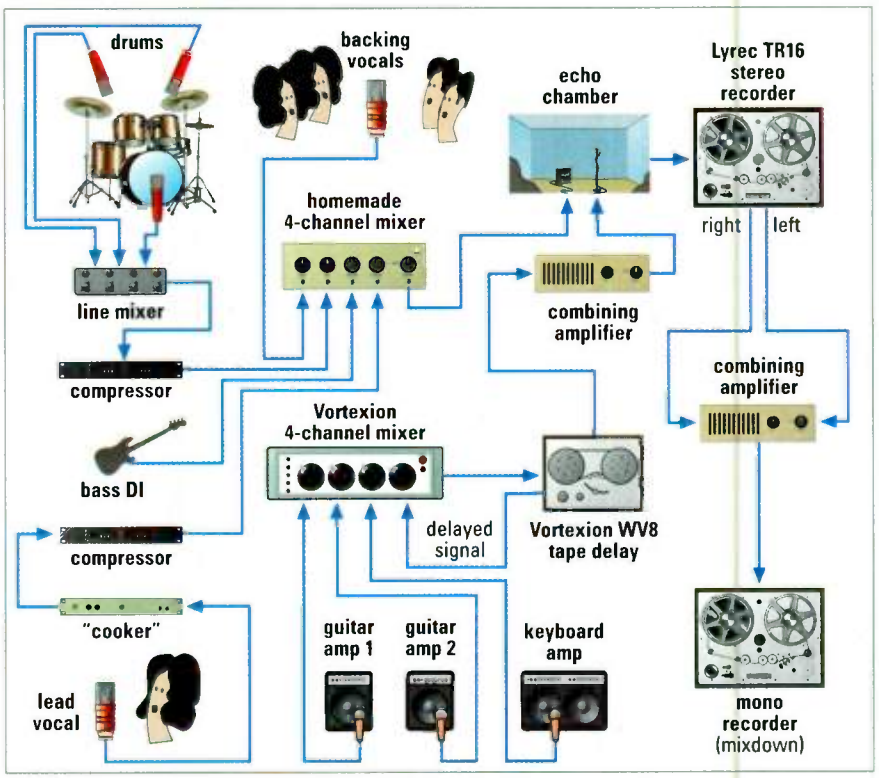

FIG. 4: This is one possible configuration of Meek's recording setup. Using two 4-channel mixers and a 3-channel line mixer, he would have been able to mix eight mics and a DI bass. He also could have added tape delay to two guitars and a keyboard using the Vortexion WVB recorder and routed the entire mix to an acoustic echo chamber and back, before recording the combined signals onto one track of the Lyrec twin-track. Once he had recorded onto both Lyrec tracks, he could mix the two tracks to one of his mono recorders.

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managing—the artists and bands that he recorded (a practice that continued long after Triumph's demise).

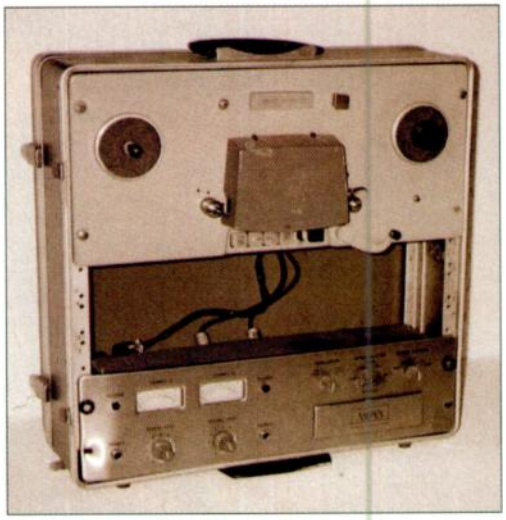
Meek resigned from his position with the label after only nine months and formed a partnership with a film company owner who helped bankroll a new recording studio. Meek located the studio in a three-level flat above a leather shop on a busy street in a bleak section of north London. He lived and worked at 304 Holloway Road for the rest of his life.

The studio was on the third floor and could be reached only by climbing several steep flights of narrow stairs. The stairs are nearly as legendary as the studio itself: musicians who angered Meek were routinely thrown down them, followed by their gear. The recording area, which measured approximately 18 by 14 feet, was at the front of the building, with two large windows overlooking the street. The 11-by-12-foot control room had no direct view of the recording area; Meek had to run back and forth between the two rooms to communicate with the musicians.

"The studio windows were insulated, and then boards were nailed over them and acoustic tile and drapes [were placed] over the boards," says Dave Adams, who helped prepare the studio. "We heard very little outside sound."

Meek described the studio as being "the size of an average bedroom. No larger. I've covered the walls with acoustic tiles . . . all the walls except one, which is covered with a thick curtain. This has very good absorbing power, and the studio is extremely dead. The floor is carpeted, and the ceiling is completely covered in tiles. One wall has some tiles missing, and this gives me a certain amount of brightness. But basically it's completely dead."

Meek also claimed that he had converted a small room directly above the control room into an echo chamber. Unfortunately, nobody can corroborate the story. Nonetheless, the sound of an echo chamber can be heard clearly on nearly every recording made at 304 Holloway Road, so a room was used for that purpose—very likely the bathroom. In fact, sometimes Meek had vocalists sing in the bathroom to get an echo sound.



JOHN CAVANAGH

FIG. 6: Meek used this Ampex PR10 stereo recorder for various purposes, including tape delay.

DAVID PETERS

FIG. 5: Joe Meek circa 1966 in the control room at 304 Holloway Road. Equipment shown includes the EMI BTR2 (bottom left), the Astronic EQ, and the Ampex PR10 recorder (directly behind Meek). In the rack (from top to bottom) are an unidentified rack unit, the Altec 438A compressor, Meek's homemade mixer, the Vortexion 4/15/M mixer, two Quad preamps, the Fairchild 658 spring-reverb unit, and several patch panels.

MEEK'S MACHINES

When trying to determine the gear that Meek used at 304 Holloway Road, it is important to remember that during a period of six years, lots of equipment that was not documented may have been used in the studio. In addition, simply knowing what gear was present in the studio doesn't necessarily offer much insight into the Meek sound, because he modified practically everything that he owned.

Those two points notwithstanding, two documents throw quite a bit of light on the subject: an RGM Sound (Meek's production company) equipment list showing capital expenditures for equipment during the period from September 19, 1960, to May 12, 1964, and an auction manifest of equipment compiled after Meek's death. A handful of photos of the studio control room taken at various times show important pieces of gear.

When the studio opened in 1960, Meek's main recorder was a Lyrec TR16 twin-track (see **Fig. 2**), an extremely high-quality Danish-made machine widely used within the film industry. It ran at 7.5, 15.0, and 30.0 ips and accepted reel sizes as wide as 11.5 inches, including *cine spools*. A stock TR16 did not have synchronized record and playback heads (an overdub on track 2 would therefore be out of sync with track 1), but Meek modified his machine for that purpose. Meek also had two EMI recorders: a two-head TR50 and a three-head TR51, both full-track mono machines. By late 1962, he had added a three-head Vortexion WVB, which he used to produce tape delay (see **Fig. 3**). By early 1963, he'd acquired EMI BTR2 and Ampex Model 300 professional full-track recorders.

In the earliest days, Meek's primary mixer was a 4-channel homemade device with variable *top lift* (a British term for high-frequency boost) on each

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channel. Small line mixers were also used to sum line-level feeds from various sources. By September of 1962, Meek had added a broadcast-quality Vortexion 4/15/M 4-channel mixer. Together, the two units provided a total of eight high-quality mixer channels—four with EQ—that could be combined in various ways. Although he added a 6-channel stereo mixer in late 1964, most 304 Holloway Road recordings were made using the two 4-channel mono mixers.

Meek also had several preamplifiers with multiple inputs that he used as auxiliary mixers. Included was a modified RCA Orthophonic hi-fi preamp/filter unit that he referred to as his *cooker*. The Orthophonic provided three inputs, had simple tone controls, and could be easily overdriven into a smooth and musical distortion. The device was most often used to fatten up lead vocals, but it also served as a backing vocal submixer (see **Fig. 4**). At some point, Meek also acquired RCA and Dyna preamps, which he could have used to add inputs or tone coloration when necessary.

PROCESSORS AND MICS

His selection of outboard gear was quite limited. At first Meek had only a few dynamics processors, including a 30-year-old BBC limiter and a homemade compressor. In February 1963, he acquired Altec 438A and 436B compressors, and by September he added several Fairchild dynamics processors: a Model 660 limiting amplifier, a Model 663 compact compressor, a Model 661 Auto Ten, and a Model 673 Dynalizer. He obtained a second Model 673 four months later and a Model 655 after that. Around 1966 Meek also acquired a Fairchild 658 professional spring reverb, which is pictured in photographs of his control room from that period (see **Fig. 5**).

Equalizers were equally scarce. In early 1963, the selection in Meek's possession was limited to a tone-control unit and a midlift control, both probably homemade. According to Ted Fletcher, who worked with Meek in 1963 or 1964, some of Meek's other EQs were "things in tobacco tins, with little inductors and capacitors soldered together." Meek also added EMI 843 and 844 passive equalizers and an IBC CU-3H active equalizer to the studio at some point.

Meek's main microphones were two Neumann U 47s, which he used primarily on vocals; six AKG D 19/60 dynamics for instruments; and two Reslo ribbon mics—one for vocal groups (working both sides of it) and a heavy-duty model for kick drum. He also had a Neumann SM 2 stereo condenser (which broke continually), and HMV 235CH and Western Electric ribbon mics that he used less frequently. By the end of his career, Meek had added Telefunken NSH, Elam models 250 and 251, Beyer models M61 and M23, and RCA variable impedance and dynamic microphones.

Because he was creating mono mixes, Meek monitored on a single Tannoy Red, a popular reference speaker used in recording and broadcast studios throughout Britain and Europe. The Red employed Tannoy's dual-concentric speaker design: in this case, a high-frequency driver mounted at the center of a 15-inch woofer. Meek powered the system using audiophile-quality Quad preamps and power amps.

The wires that connected Meek's gear snaked across the floor or were suspended in midair. Many, if not most, of the wires had no plugs on the ends; Meek just twisted the wires together. But cables weren't the only things that covered the floor: tape boxes were piled everywhere, and discarded bits of edited tape reportedly rose to ankle height.

EARLY RECORDINGS

In November of 1962, Meek recorded himself walking around his studio, describing his gear and the way he used it. The following is an excerpt:

"The main machine is a Lyrec [TR16] twin-track. I usually record the voice on one track and the backing on the other. The other recorder is [an EMI] TR51; this I use for dubbing. The artist has his microphone, a [Neumann] U 47, in the corner of the studio, screened off from the rest of the musicians. He can sing his heart out without anyone taking notice of him. He's going on a separate track [of the Lyrec]. The bass is fed in direct, the guitars have microphones in front of their amplifiers, [and] the drum kit has two or three microphones placed around it.

"Then, I dub the artist's voice on again. I listen to the tracks that we've

LISTENING TO MEEK

Nearly all of Joe Meek's major recordings were mixed to mono. Now people tend to think of mono as the same sounds coming out of the right and left speakers with no stereo separation, but Meek mixed using *one* speaker. Remember that, during Meek's entire career, most people listened to music on one speaker. Meek's records were targeted largely to teens, most of whom listened on inexpensive phonographs and even less expensive transistor radios. So if you want to hear the recordings the way they were intended to be heard, you should listen to them on a single speaker.

But don't listen to a Meek record through a cheap speaker. Although most people at that time listened on inexpensive systems, Meek mixed using a Tannoy Red driven by a Quad preamplifier and power amp combo, all of which were state of the art at the time. The best way to glean his intent is to listen to his recordings using the highest-quality speaker available—preferably a studio monitor with a flat frequency response.

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Meek First

already got. . . . Sometimes they're good enough, but as a rule, [the vocalist] wears headphones and the track's played back to him, and it's dubbed onto my TR51. So we have voice and rhythm tracks."

Notice that Meek does not record the voice onto the second track of the Lyrec, as he had the guide vocal cut at the same time as the rhythm track. Instead, he mixes it in real time with the rhythm track from track 1 of the Lyrec, straight to the EMI TR51, saving a generation of track bouncing. Meek continues:

"Sometimes [we] use four strings, never any more: four violins, perhaps a French horn, and a harp. Sometimes a choir, perhaps three girls. The method I use for recording strings is to have a microphone pretty close to them. The four of them sit [in opposing pairs], and then I delay the signal with the [third] head of the Vortexion. I feed this back in again, which adds a reflection that gives you eight strings. On this I put my echo-chamber sound and also some of my electronic echo. After I've finished, I've ended up dubbing from my TR51 onto [one track of] the Lyrec. [And after recording the orchestra on the Lyrec's second track] I have the extra orchestra on one side, and the voice and the [rhythm] track on the other. And that's all I do at my premises. I then edit out the best takes, [and] go along to IBC and mold them together."

Meek was fanatical about separation, as difficult as it was to achieve in his Holloway Road flat. When miking guitar amps (which were usually Vox AC30s), he'd place an AKG D 19 right against the grille and then throw a heavy blanket over it. Similarly, he'd place a Reslo ribbon mic in front of a bass drum and put a heavy blanket over it, taped to the toms. The latter technique became commonplace a few years later, but Fletcher and others believe that it originated with Meek.

Meek made hundreds of recordings during his first couple of years at 304 Holloway Road, but two of them are particularly significant: "Telstar" and "Johnny, Remember Me."

JOHNNY, REMEMBER ME

Recorded in middle 1961, "Johnny, Remember Me" is considered by many to be Meek's most impressive recording, and it was also his first No. 1 hit. The record was a *death disc* about a guy who hears his dead lover's voice calling to him from across the moors. Meek's seance-loving partner, Geoff Goddard, claimed that spirits helped him write

DELAY, REVERB, AND ECHO

The terms *delay*, *reverb*, and *echo* are often used interchangeably when describing Joe Meek's sound. However, they indicate three distinct effects.

Delay in the '50s and early '60s meant mechanical delay. It was achieved most commonly by using a three-head tape recorder (see **Fig. A1**). A three-head machine has a gap between the record and playback heads. Consequently, if the playback head is on at the same time that a sound is recorded onto the tape, there is a short delay while the tape travels from one head to the other. The delay time is adjusted by changing the tape speed.

Reverb was not a common audio term in the 1950s. By the early '60s, the term had largely come to mean spring reverb (see **Fig. A2**). (Plate-reverb technology had been developed by the late '50s, but no evidence suggests that Meek had access to it.) Spring-reverb units are devices with transducers connected to the ends of a group of springs. Sound passes through the springs and comes out the other side slightly delayed, with a characteristic spring sound.

In the late '50s and early '60s, echoes were produced using an echo chamber, which was a highly reflective room with a speaker on one side and a microphone on the other (see **Fig. A3**). Sound was sent to the echo chamber by amplifying it and playing it on the speaker. The microphone picked up by the sound as it echoed around the room and then returned to the mixer, blending with the original, dry sound. Any space with reflective surfaces could be converted into an echo chamber, and ad hoc chambers were created from stairwells, closets, parking garages, and bathrooms.

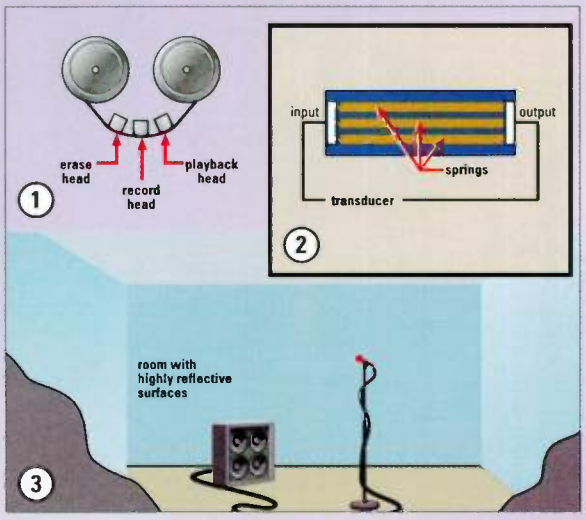

FIG. A: This diagram shows how delay, reverb, and echo effects differed in Meek's day. A three-head tape machine was used to create delay effects (1), and a set of springs with transducers on each side was used for reverb (2). A resonant room, with a speaker for sending sound and a microphone for receiving sound, was used for echo effects (3).

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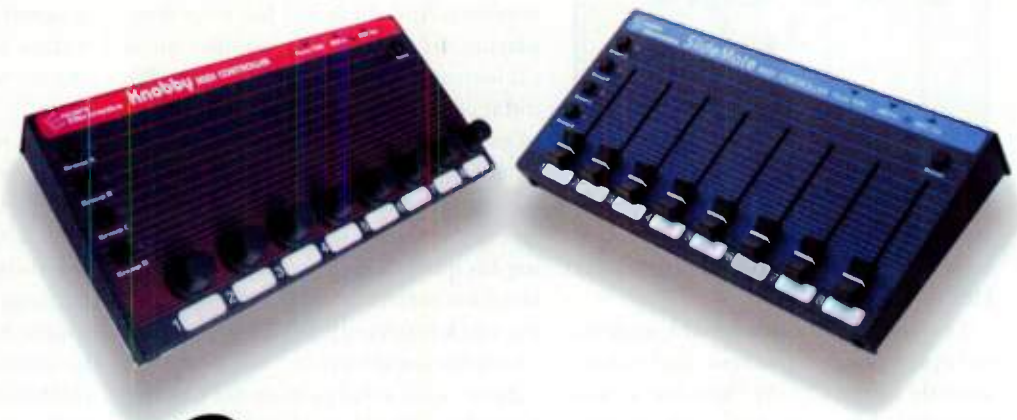

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the song. In fact, Goddard and Meek believed that regularly they were visited and assisted by the spirit of Buddy Holly.

The song is still impressive, with its sweeping sonic grandeur and otherworldly authority. At the time it was released, however, it was absolutely revolutionary.

When interviewed for the Meek documentary on the BBC program *Arena,* vocalist John Leyton remembered the session this way: "When I recorded 'Johnny, Remember Me,' I was in the sitting room behind a little screen, and the rhythm section was in the room with me. The violin section was on the stairs, the backing singers were practically in the loo, and the brass section was underneath, on another floor altogether. And there was Joe next door, playing his machine like another musical instrument. It was quite bizarre. We did it over and over. Joe wanted plenty of exciting atmosphere in it, and it was a really exhilarating sound with the galloping, driving beat. [Joe] was getting all excited, slapping his leg and combing his quiff." Elsewhere, guitarist Reg Hawkins relates how they had to play the track repeatedly for an hour, after which his hand bled.

Brass and strings may be on the recording, but if so, they are hard to distinguish. The predominant instruments are the acoustic and electric guitars, bass, hi-hat-driven drums, and either a harp or a sped-up piano. Other sounds emerge in some places, but they are mostly washes of sustained tones with little harmonic definition. Meek combined and submixed the sounds in the same way that a synthesist layers patches from several synthesizers and treats them as one sound. He brought the sound cluster in and out as it suited him. He also added fairly long delays on a few keywords here and there, which at the time was quite novel.

It is estimated that "Johnny, Remember Me" has more than 30 tape splices. Unless they were of the rhythm tracks, Meek probably bounced vocal overdubs to blank tape (along with the backing track) until he had enough usable bits to work with. Then, when he edited the best parts together, the rhythm tracks already would be in sync, making it more difficult to detect the splices.

TELSTAR

"Telstar," inspired by the satellite that ushered in the telecommunications age, was Meek's biggest hit. It spent two weeks at the top of the U.S. charts in December 1962 and reached similar heights throughout the world.

From a recording perspective, "Telstar" is fascinating. It has so many overdubs that the underlying layer of sound, particularly in the low mid frequencies, is little more than a sonic blur. There are several drum parts, two bass parts, a triple-tracked Clavioline (spanning three octaves), a sped-up piano playing harplike arpeggios, and a gorgeous solo guitar during the breaks.

An abundance of speculation has surfaced regarding the sound effects that open and close "Telstar." One common theory is that Meek recorded a flushing toilet and then reversed the tape, but if you play the record in reverse, you will not hear any obvious flushing sounds. What you will hear are sounds reminiscent of those found on *I Hear a New World,* which were almost certainly produced the same way.

If you have ever plugged a microphone into a tape echo and cranked up the regeneration while making plosive and other vocal sounds, you'll recognize much of what you're hearing on "Telstar." Meek ran the source sounds—whatever they were—through a spring reverb and a tape delay, with the tape regeneration set so high that it went into self-oscillation. You mostly hear the sound of the oscillating tape delay and not the source sound. He also captured

MEEK'S BLACK BOXES

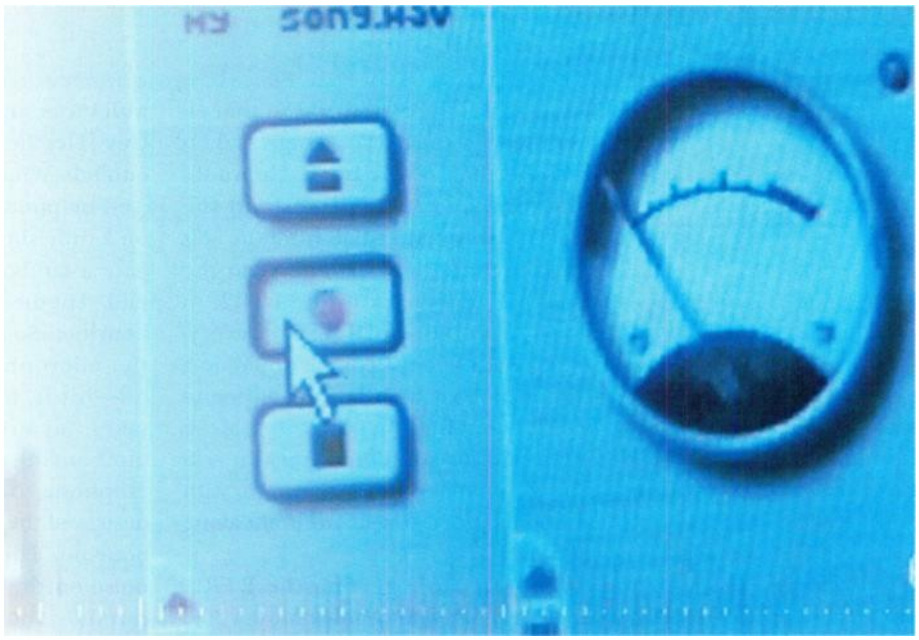
Meek built several pieces of gear that eventually became known as the *black boxes,* the most famous of which was a spring-reverb unit. Meek reportedly constructed the reverb unit from a broken HMV-manufactured fan heater during late 1958 or early 1959. He kept the unit taped up and carried it with him so that no one could examine it and discover how it worked. Meek put the unit through several revisions as he experimented with different types of springs and perfected the electronics.

ADRIAN KERRIDGE

PETER CHADWICK

FIG. B: These are two of Meek's so-called black boxes: the Langevin-based compressor/limiter (top) and the Pultec-based equalizer (bottom).

While at Lansdowne, Meek also built a compressor/limiter based on Langevin designs and circuitry and a black-box equalizer based on the Pultec model (see **Fig. B**). Nigel Woodward, who now owns the unit, describes Meek's equalizer as "probably the warmest, smoothest, most transparent equalizer ever made."



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a spring sound by knocking on his reverb device, and a tapping sound probably produced by tuning a pair of test oscillators close enough to the same pitch to cause beating. Those sounds were edited together and then reversed by turning the tape around.

BTR, TOO

Royalties from "Telstar" provided Meek with enough money to buy some impressive new gear. He was unable to get satisfactory results mixing the Lyrec's two tracks down to mono on the TR51. As a result, he purchased an EMI BTR2 professional full-track recorder in February 1963. Having two pro machines to work with made signal degradation from track bouncing much less of a problem, letting him modify his recording technique.

According to guitarist and recording engineer Peter Miller, who worked with Meek then, "[Meek] only had two machines. He would very often get the band recorded onto the Lyrec, which was usually his first machine. He would put the band on one track and put the vocal on the second track. The vocal track would also include maybe a guitar track or solo sax or something else—whatever lead instrument wasn't playing at the same time as the vocal. And then he would mix that onto his EMI BTR2 mono 1-track. And at the time that he'd do the mix, he would add on anything else that he wanted—either another track or effects processing."

Fletcher describes a modified version of the same technique. "The technique he used most of the time while I was there was to lay down the backing track on the full track of the BTR2 so that the recording occupied the full quarter-inch in mono," he says. "He would then remove the tape and put it on to the Lyrec machine, where he would erase one half. There would still be the original backing track on the one half of the tape, and he would add to that either the lead voice or backing vocal on the other half of the track. He would then mix the backing track and the vocal track together live while he was recording another part and send the three elements back to the BTR2, in mono on full-track. If he had everything he wanted by then, he would do a final mixdown with additional compression and EQ." In both cases, Meek might add an additional track in real time as he mixed down to mono, with additional processing at any point along the way.

A month after getting the BTR2, Meek purchased an Ampex Model 300, another professional full-track mono machine. Having two pro full-tracks gave Meek increased recording options. For example, by bouncing between them, he could build up a rhythm track using the full width of the tape and only have to go to half-width (on the Lyrec) once. Meek also purchased an Ampex 351/2 twin-track at some point, giving him 2-track bouncing capabilities, and an Ampex twin-track semipro model called a PR10 (see **Fig. 6**). It is rumored that Meek also had an Ampex multitrack in 1966, but the evidence is inconclusive.

LAST RIGHTS

In 1964 Meek had his final No. 1 U.K. hit with "Have I the Right?" by the Honeycombs (featuring female drummer "Honey" Lantree). The tune went to No. 4 in the United States and topped the charts in Australia, Japan, South Africa, and Sweden. "Have I the Right?" is best known for its "stomping" gimmick. To generate a really big kick-drum sound, Meek placed microphones below the wooden studio stairs and had several musicians stomp along in time with the music. But that wasn't all.

"On the final mix of 'Have I the Right?,' we were just sort of tickling it up and getting the master ready with Joe late one evening," Fletcher recalls. "The 'come right back' line still wasn't heavy enough for him. He tried all sorts of things to get this right: we kicked cardboard boxes, hit cardboard boxes with sticks, and in the end, he said, 'No, Guy [Fletcher's brother], it's not loud enough. What you've got to do is this.' And he put an AKG D 19 microphone on a little short stand on the floor and gave a tambourine to my brother and said, 'Hit the microphone with the tambourine.' So my brother gently tickled the microphone, and Joe said, 'No, no—hit it, hit it, hit it!' During the takes, my brother was smashing this tambourine onto the top of the microphone so hard that he completely destroyed the microphone and the tambourine. There's a horrible cracking noise on the record, and if you listen carefully, you can hear it."

LEGACY

It is commonly held that Meek was a casualty of the British Invasion and that he got further and further out of touch as the '60s progressed. Critics point out that he had practically no hits in 1965 and '66, suggesting that the music simply wasn't up to par. That may be true generally, though he made some extraordinary recordings during that period, many of which were never released.

Regardless of how you assess the value of Meek's later recordings, another factor must be considered when pondering his demise: Meek was a textbook paranoid schizophrenic, and his condition worsened significantly toward the end of his career. He believed that almost everyone was out to get him. He also was subject to wildly erratic mood shifts, including violent outbursts that eventually made successful interactions with others nearly impossible for him. Apparently, when Meek pulled the trigger on that fateful February morning in 1967, he believed that he had run out of options.

Barry Cleveland *is the author of* Creative Music Production: Joe Meek's Bold Techniques *(www.artistpro.com). He also plays guitar in the improvisational quintet Cloud Chamber (www.innerviews.org/inner/cloud.html). Visit www.barrycleveland.com for more information.*

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Power Windows

Build music-marketing muscle with Windows Media Encoder.

By Todd Souvignier

Giving away music is a timeless promotional strategy. But when you give away a song, shouldn't you get something in return? This article will show you how to transform a free audio file into an effective online promotional tool. It's easy to do and doesn't require fancy programming skills. You just need a little-known feature of Microsoft's *Windows Media Encoder (WME):* the ability to insert URL scripts into an audio file.

When an audio file contains URL scripts, a browser window opens and a specified Web page appears anytime the song is played on a computer connected to the Internet. That gives you the power to show photographs, lyrics, band information, and even advertisements each time your song plays. It turns a free song into an effective marketing tool, helping build traffic at your Web site, increasing sales at your e-commerce pages, and forging a direct connection with your listening audience.

WME is cool free software, but it's not the most intuitive or user-friendly concoction ever to come out of Redmond. Therefore, I'll cover in detail the steps required to insert URL scripts into your music. I'll also provide a quick look at some ways of measuring your audience and converting traffic into sales. (If you don't have *WME,* you can get the latest version at Microsoft's Web site. See the sidebar "Online Resources.")

FIG. 1: By inserting URLs into your music, you can deliver photos, lyrics, band information, and even advertisements to your listeners.

PREPARATION

To insert URL scripts into your audio files using *WME,* you must have a Pentium II/200 MHz with Windows 98

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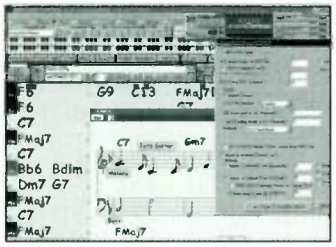


NEW FEATURES IN BAND-IN-A-BOX VER. 11 FOR WINDOWS

THE LATEST VERSION OF BAND-IN-A-BOX ADDS 50 MORE NEW FEATURES! First off, you'll get the "**MIDI File Chord Wizard**" that reads any MIDI file and interprets the chords for you to be displayed in Band-in-a-Box. We've added new "**Jazz Music Fonts**" for music, chords, lyrics and titles, giving you the option of authentic-looking jazz notation and symbols. We've added a "**Direct-to-Disk**" **Audio Rendering** feature that allows you to directly convert your Band-in-a-Box song to an audio .WAV file in 5-10 seconds, rather than having to wait 3-4 minutes for the song to render in real time!

There's a new **Melody Embellisher** that automatically adds life to existing Melodies by **adding slurs, grace notes, vibrato, legato changes, extra notes** and more, to simulate the varied interpretations that different musicians make when playing a Melody.

To make all of your Band-in-a-Box music sound better, we've added the famous **Roland VSC3 MIDI Synthesizer** – this greatly improves the sounds that you hear from Band-in-a-Box. In our "blindfold" listening test (www.pgmusic.com/blindfold_compare.htm), our users rated the sounds from the VSC3 to be #1 – better than Wavetable soundcards and even better than hardware sound modules! This synthesizer works with Band-in-a-Box and any other Windows MIDI program to improve your sounds.

The **Guitar Styles** gave been enhanced with a **Jazz Guitar** "**highest-4-strings-comping mode**" that has voice leading on the highest four strings to simulate a "sax section." The Melodist now composes songs for **BeBop tunes** and **Jazz Ballads**. **The main window chordsheet now has selectable fonts**, font size, and number of rows.

Band-in-a-Box Version 11 also includes **Notation Enhancements** such as the ability to display and print **Multiple Tracks of Notation** at once. Now you can view and print bass, piano, etc. tracks at the same time! You can also add "**Section Text**" and **Boxed Text** to your notation. The appearance of the notation has also been enhanced with **slanted beams, chord/music/lyric font selection** and more. There's a new **Scrub Mode** that allows you to quickly hear a part of the notation by moving the mouse over the notes. **And much more...**

"...one of the few music products that sits in the 'must-have' category."
Sound On Sound, July 2000

MORE FEATURES IN VERSION 11...

OVER 150 STYLES INCLUDED: *Jazz, Latin, Waltzes, Pop/Rock, Classical, Country, Folk, Ethnic, Euro-Tek, Fusion, Blues, Unplugged, Praise and Worship, and more!*

AUTOMATIC SOLOING. *Simply select the soloist you'd like to hear and play with (from over 100 available) and Band-in-a-Box will create & play a solo in that style, along to any song! This is hot!*

AUTOMATIC SONGS & MELODIES. *Compose a new song in the style of your choice, complete with intro, chords, melody, arrangement & improvisation. You can go from nothing to a completed song in one second!*

STANDARD MUSIC NOTATION *and leadsheet printout of chords, melody and lyrics. Enter your songs in standard notation & print out a standard lead sheet of chords, melody and lyrics.*

AUDIO TRACK. *Add vocals or any instrument to your Band-in-a-Box song.*

NEW IMPROVED GUITAR SUPPORT. *Animated Guitar Fretboard Window – displays any track; Guitar tablature – on-screen or print out notation complete with Guitar TAB.*

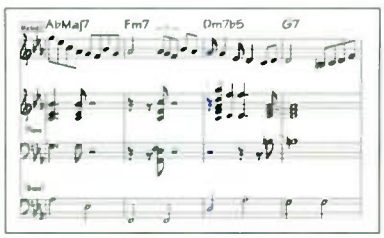
BIG LYRICS WINDOW. *Great for singalongs and Karaoke!*

BUILT-IN SEQUENCER ALLOWS YOU TO RECORD OR EDIT MELODIES.

BUILT-IN STYLEMAKER™. *You can create your own 5 instrument styles using the* ***StyleMaker*** *section of the program.*

AUTOMATIC HARMONIZATION. *You can select from over 100 harmonies to harmonize the melody track, or harmonize what you play along in real time. Play along in "SuperSax" harmony, or harmonize the melody with "Shearing Quintet". Create your own harmonies or edit our harmonies.*

BURN YOUR OWN AUDIO CD. *Now you can convert ("burn") your Band-in-a-Box composition directly to an Audio-CD. The resulting CD will play in any standard Audio-CD player. Requires a CD-R or CD-RW drive.*



Display and print Multiple Tracks of Notation at once

BAND-IN-A-BOX PRICES...

FIRST-TIME PURCHASE *(Band-in-a-Box for Macintosh® currently available at ver. 8.0)*

✔ **Band-in-a-Box Pro Version 11**...$88
Includes Version 11, Styles Sets 1-3, Harmonies Set 1, Soloist Set 1, Melodist Set 1 and bonus software ***SlowBlast!*** *(Windows® version only)*

✔ **Band-in-a-Box MegaPAK version 11**...$249
The MegaPAK contains "the works" – version 11 ***PLUS*** *Styles Sets (1-29), all Soloist Sets (1-9), Melodists (1, 2), The MIDI Fakebook, PowerGuide Instructional CD-ROM, and bonus software* ***SlowBlast!*** *(Windows® version only)*

UPGRADES
Includes Band-in-a-Box Version 11 upgrade ***PLUS*** *Styles Set 27*

✔ **Regular UPGRADE from version 10**...$49
From Version 9 or earlier or crossgrade...$59

✔ **MegaPAK UPGRADE from version 10**...$149
From Version 9 or earlier or crossgrade...$159

ADD-ONS FOR BAND-IN-A-BOX...each $29

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✔ **NEW! Styles Set 28** – Smooth Jazz

✔ **NEW! Styles Set 29** – Top 40 Country

✔ **MORE STYLES SETS** – Set 26: Classic Country • #25: Vintage Jazz #24: Guitars and More! • #23: Contemporary Country • #22: 60's British Invasion #21: Top 40 • #20: Southern Gospel • #19: Requested • #18: Praise & Worship #17: Unplugged • #16: All Blues • #15: Nashville Country • #14: Jazz/Fusion #13: EuroTek • #12: Country/Swing • #11: Classical • Styles Sets #4-11

SOLOISTS SETS: Soloist Set #9 – Blues Guitar, Country Piano & More...$29
Disk Sets #2-8...each $29

The MIDI Fakebook for Band-in-a-Box... $29

COMPREHENSIVE CD-ROM VIDEO INSTRUCTION FOR BAND-IN-A-BOX: includes Vol. 1 (Basics) and Vol. 2 (Advanced) of "***Inside Band-in-a-Box***"...$49

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SE, 2000, ME, or NT 4; an Internet connection; one or more songs that you want to (and have the right to) distribute; and a Web site where you would like to increase traffic or build revenue. That could be your own Web site or your pages at an aggregate site such as MP3.com or Vitaminic. With those pieces in place, you are ready to proceed.

Download and install *WME* and then select the song you wish to encode. (*WME* accepts WAV, ASF, WMA, and MP3 audio-file formats.) You may need to extract the track from a CD or record it through your sound card and save it as a WAV file. You'll get the best results if you use WAV files as source material; working with previously compressed (ASF, WMA, or MP3) audio files causes a further loss of sound quality.

Choose the Web pages that you want to show your listeners. For your own ease of use, open each target page in a Web browser, click in the browser address field to highlight the URL and then copy (Control + C) and paste (Control + V) each URL into a text document. Save the URL list in a convenient place because you'll need it when you begin encoding.

Take some time when selecting your URLs; you are creating a form of packaging that is as salient as any album cover. Pick pages that won't detract from your music. Band photos, bios, lyrics, news, or commerce pages are naturals (see **Fig. 1**). Any page that pays you for traffic or listeners is also a good candidate—members of affiliate referral programs or MP3.com's Payback for Playback take note. Don't choose pages that automatically play sound, because they'll interfere with the listening experience.

Once you have finished the preparation work, load *WME*. Unfortunately, *WME* is not preconfigured for inserting URLs into audio files, so you must create a new encoding Session and Profile.

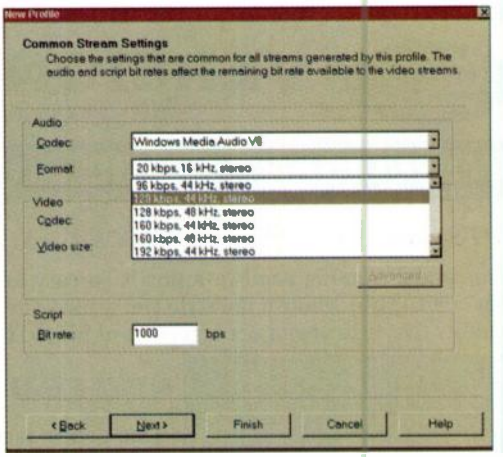

FIG. 3: Select audio-output attributes from this pop-up menu in the New Profile dialog box.

CREATING A SESSION

When you launch *WME*, a Welcome dialog appears. Select Create a Custom Encoding Session by clicking on the second radio button from the top. Click on OK or press the Enter key to exit the Welcome dialog.

The New Session dialog now appears. That dialog includes several tabs; the Sources tab is displayed by default. In the Sources tab at the bottom of the dialog are the "Source types for this session." Deselect Video and then choose Script.

Just above the Source types, click on the New button to open the New Source Group dialog. In the middle of the New Source Group dialog, click on the Audio menu. At the bottom of the Audio menu list, click on "Browse for file." Use the resulting Open-file dialog to locate and select the song you plan to encode. That dialog will close once you select a file, and you will return to the New Source Group dialog.

In the New Source Group dialog, click on OK or press the Enter key to confirm your audio-file choice; then, exit the dialog. You will now be back at the New Session dialog (See **Fig. 2**). Click on the Display Information tab at the top of the dialog. Type information about your song—title, author, and copyright, for example—in the fields provided. The information will be displayed in the *Windows Media Player* as your song plays.

Next, click on the Profile tab at the top of the New Session dialog. Click on the Manage button on the right side of the box. You will now see the Manage Profiles dialog, which specifies the output-file attributes. Because none of the factory preset Profiles support Scripts, you must make a custom Profile.

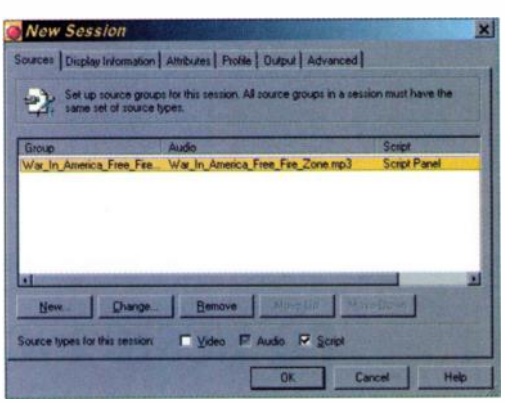

FIG. 2: The Sources tab in the New Session dialog box shows the Audio and Script source settings.

CREATING A PROFILE

Click on the New button on the right side of the Manage Profiles dialog. You now will be in the New Profile dialog. Type a unique name, such as "my custom profile," in the Name of Profile text field.

Choose your source types by deselecting Video and then choosing Script. Compressed is the default Output setting; leave that as is, or you'll end up making a WAV instead of a WMA file.

Click on the Next button or press the Enter key to go to the next page of the New Profile dialog. In the Common Stream Settings page, click on the Audio Format pop-up menu (second from the top) to reveal the format choices. Scroll through the Audio Format menu and select the desired output format (see **Fig. 3**).

For high-quality music, select one of the 44 or 48 kHz formats. Bit rate (displayed as kbps) determines the sound quality of your output file; higher bit rates sound better than lower rates but result in larger file sizes. If file size is an issue and you don't mind the loss of stereo image, try one of the mono settings that are available at bit rates as fast as 48 kbps.

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Four 1/4" jack (Line-in)
Power On/Off switch

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At the bottom of the Common Stream Settings page, in the Script section, enter a numeric value in the Script Bit Rate field. Microsoft documentation recommends 1,000 bps as the setting for that application. Lower values result in slower Script execution; higher values offer no noticeable benefit.

Click on the Finish button to exit the New Profile dialog. You are now at the Manage Profiles dialog; click on the Close button to exit. You will return to the New Session dialog, and your new Profile should be displayed in the Profile pop-up menu. If you do not see your new Profile and it is not listed in the Profile pop-up menu, you probably forgot to select Script in the New Profile dialog.

ONLINE RESOURCES

Audiogalaxy
www.audiogalaxy.com
Check out *Audiogalaxy Satellite* for setting up file sharing on your computer.

CCNow
www.ccnow.com
This site offers turnkey e-commerce systems for small online businesses.

MP3.com
www.mp3.com/newartist
The 500-pound gorilla of band sites is now a creature of Vivendi Universal.

Vitaminic
www.vitaminic.com
Vitaminic is the European equivalent of MP3.com.

War in America
www.neteze.com/todds/freefire.html
See URL scripts in action. Download or stream at this site.

WebTrends Live
www.webtrendslive.com
Visit this site to find tools for measuring Web-site traffic.

Windows Media Encoder
www.microsoft.com/windows/windowsmedia/en/wm7/encoder.asp
Free downloads and documentation are available at this site.

Windows Media Player
www.windowsmedia.com/download
Free Windows and Macintosh versions are available at this site.

DEFINING THE OUTPUT FILE

Click on the Output tab at the top of the New Session dialog. Deselect Broadcast Encoded Output and select Encode to File. Click on the Browse button to open the Browse for Output File dialog. Use that dialog to navigate to the location where you want to store your new file. That could be any folder on your computer or the desktop.

Type an original name, such as "my new file," in the File Name text-entry field. Check that "Windows Media Audio files (.wma)" is displayed in the Save as Type pop-up menu.

Click on the Save button or press the Enter key to exit the Browse for Output File dialog. Exit the New Session dialog by clicking on the OK button or pressing the Enter key. You'll see a prompt indicating that *WME* "has been customized to show only the panels you need." Click on the OK button to exit the prompt.

You have now finished configuring *WME* and have returned to the main encoder display. You're ready to start encoding!

ENCODING AND INSERTING

Open the text file you created during the preparation stage and position it onscreen so that your list of URLs is visible and accessible without a lot of extra mousing around (see Fig. 4). Locate the Script panel in the lower part of the *WME* window directly beneath the General, Display Information, and Connections tabs.

Click on the Start button in the lower-right corner of the encoder window. Click on the URL Script command button (the little globe icon with the chain links) in the Script panel. In your text file, click and drag to select the first URL in the list. Copy the selected URL to the Clipboard.

Now go back to the encoder. Click on the Script data text-entry field next to the Insert button. Paste the URL from the Clipboard into the Script data field and click on the Insert button. Your first URL has been inserted into the encoded audio; repeat the process for your other URLs.

In your text file, click and drag with the mouse to select the next URL in the list. Copy the selected URL to the Clipboard. Double-click on the Script data text-entry field to highlight the previous entry and then paste the URL. Click on the Insert button. Continue copying, pasting, and inserting until you reach the end of your URL list.

Observe the File Progress bar in the lower panel; when you reach the end of the song, click on the Stop button. You'll receive a prompt asking, "Are you sure you want to stop encoding?" Click on Yes or press the Enter key.

If you're slow with the mouse, *WME* continues encoding while waiting for you to confirm the prompt. Fortunately, that warning can be skipped by going into the Tools menu/Options dialog/General tab. Deselect "Warn before stopping encoding."

Looping is an important feature in *WME*. When *WME* reaches the end of the source file, it returns to the beginning of the song and continues writing to the output file until you click on the Stop button. That's nice if you're broadcasting—it lets you turn on the audio and leave it—but it's a drag when encoding to a disk file.

You can't turn off the looping feature, so you must click on the Stop button to end encoding. You'll want to time your stop accurately by watching the File Progress bar. Otherwise you'll cut off the end of your song or append an unwanted bit of the beginning onto the tail end of your output file. Catching a good cutoff point isn't difficult, but it's a bit of a hassle. A few moments of silence at the end of your source file provide a margin for error.

Another minor drawback of *WME* is that it does not let you listen to the audio when you are doing a file conversion. Therefore, you can't tightly synchronize URL insertions to specific points in the song. Even without tight sync, however, you've just turned your song file into a muscular marketing machine.

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DISTRIBUTING YOUR FILE

Most file-sharing networks, such as Audiogalaxy, support sharing of WMA files. Because of the huge amount of traffic and high level of interest in music on those networks, they are excellent places to distribute files and find new fans. My little unfamous band sees as many as 100 downloads per day from such services.

WMA files are also perfect for e-mailing because they are smaller than similar-sounding MP3s. Just make sure your contacts want and expect to receive such an attachment before you send it, or hostility may result.

Naturally, you can place links to your WMA files on any page of your Web site so visitors can download or even stream the audio (see the sidebar "Easy Streaming"). WMA files with URL inserts are not appropriate for embedded play in Web pages, however; the page flips when the URL script is executed, thus interrupting playback.

METERING AND MONIES

Make sure you keep track of your hits when you start pushing listeners to your Web site. Utterly corny old-fashioned visible Web counters ("You are visitor number 00014 since January 1, 2000") may actually work to your disadvantage.

A hip metric solution is offered by WebTrends Live. The site's free Personal Edition service counts an unlimited number of pages. No real programming and no log files are required. When you sign up, you get a chunk of HTML code. Paste the code onto the bottom of your Web pages. The HTML adds a little button, and you're set to go. Periodically check into the WebTrends Live reporting area, view its easily understood charts and graphs, and watch your traffic grow.

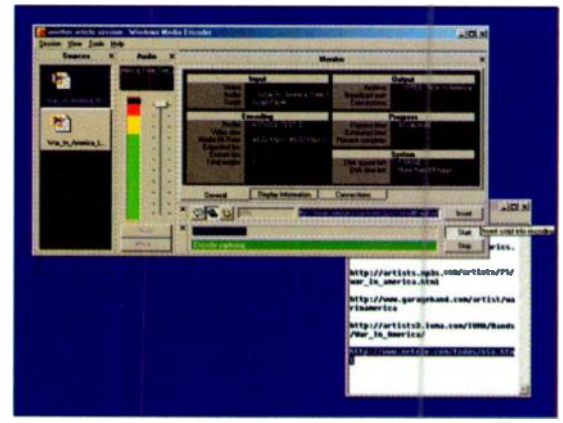

FIG. 4: A text document containing your URL list (lower right) is good to have on hand when encoding audio. URLs are pasted into the Script text-entry field, which is highlighted here.

However, what good does all that traffic do if you can't make money from it? One route is to get into the CD business.

If you don't already have a disc to sell, MP3.com offers the DAM CD program. You incur no risk or investment, the company presses discs on demand and handles order processing and fulfillment, and you split the money with MP3.com. Unfortunately, the sound quality is not pristine; to make the discs, MP3.com takes MP3 files and converts them to WAV files. Because MP3.com doesn't work with uncompressed files, DAM CDs never sound as good as CDs that you burn yourself (from WAV or AIFF files) or discs that are professionally replicated.

If you have a CD-R drive or if you already have a CD, you can set up your own sales area. That used to be expensive and cumbersome, but now poor musicians can take secure credit-card transactions just like the big shots. CCNow offers a turnkey e-commerce system that is perfect for independent artists. It handles the merchant account, credit-card authorization, and customer service; it even provides the shopping cart. You just link to the cart from your sales pages; then, ship and confirm the orders as they arrive in your e-mail. Even cooler, there's no setup fee and no maintenance charge; CCNow simply takes a 9 percent cut of each sale.

COMMERCE DEPARTMENT

A wise person once said, "If we did this just because we loved music, we'd call it the music art instead of the music business." Even if you are a music lover, you deserve to make money from your efforts. If you've put the time and energy into building a Web site, make sure you're getting some hits. Experiment with these techniques. They can help cultivate your Web traffic, increase your sales, and enhance your connection with your listeners.

Todd Souvignier *is president and cofounder of Exploit Systems (www.exploitsystems.com), a firm that enables e-commerce through peer-to-peer file sharing. He also plays bass with the group War in America (www.warinamerica.com).*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

EASY STREAMING

Streaming is a snap. You'll need to make an ASX file, or metafile, that points to a WMA file. First, upload your WMA file to any convenient place on your Web site. Then, create a text file in *Notepad* or another text editor. The file must contain the following text:

```
<ASX Version="3.0">
<ENTRY>
<REF href = "http://www.yourwebsite.com/
filename.wma"/>
</ENTRY>
</ASX>
```

Save the text file under any name (with no spaces) with the extension ASX after it (for example: mysong.asx). Next, upload the ASX text file to your Web site. Finally, create a link on any Web page to the ASX file. For example, if you named your ASX file mysong.asx, link to: http://www.yourwebsite.com/mysong.asx.

When visitors click on this link, *Windows Media Player* will launch, the file will be streamed to them from your Web site, and if you have embedded any URL scripts, those Web pages will open for the listener.

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- EQ Magazine.

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- Built-in tuner

Visit korg.com/d1600 for a demo.
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RECORDING MUSICIAN

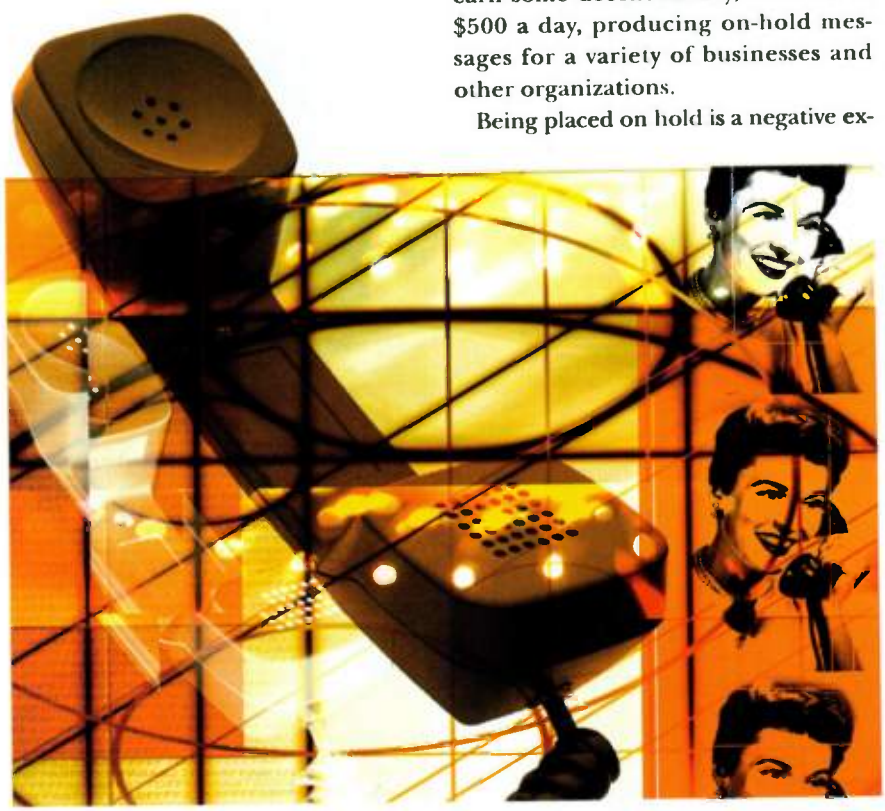
Money on Hold

Make money producing on-hold messages in your personal studio.

By Jeffrey P. Fisher

When you call a company and are placed on hold, you typically hear music, a radio station, or a promotional message for the company. Ask yourself: who makes those phone messages? Why isn't it you? With a simple personal studio, you can earn some decent money, as much as $500 a day, producing on-hold messages for a variety of businesses and other organizations.

Being placed on hold is a negative experience. When a company puts one caller on hold every 5 minutes for only 15 seconds during an 8-hour business day, that adds up to more than 100 hours a year that people are on hold. One survey reports that executives waste more than 15 minutes a day on hold. Savvy companies transform that negative time into something positive. Any business can benefit from the active custom on-hold messages you can provide.



MIKE CRUZ

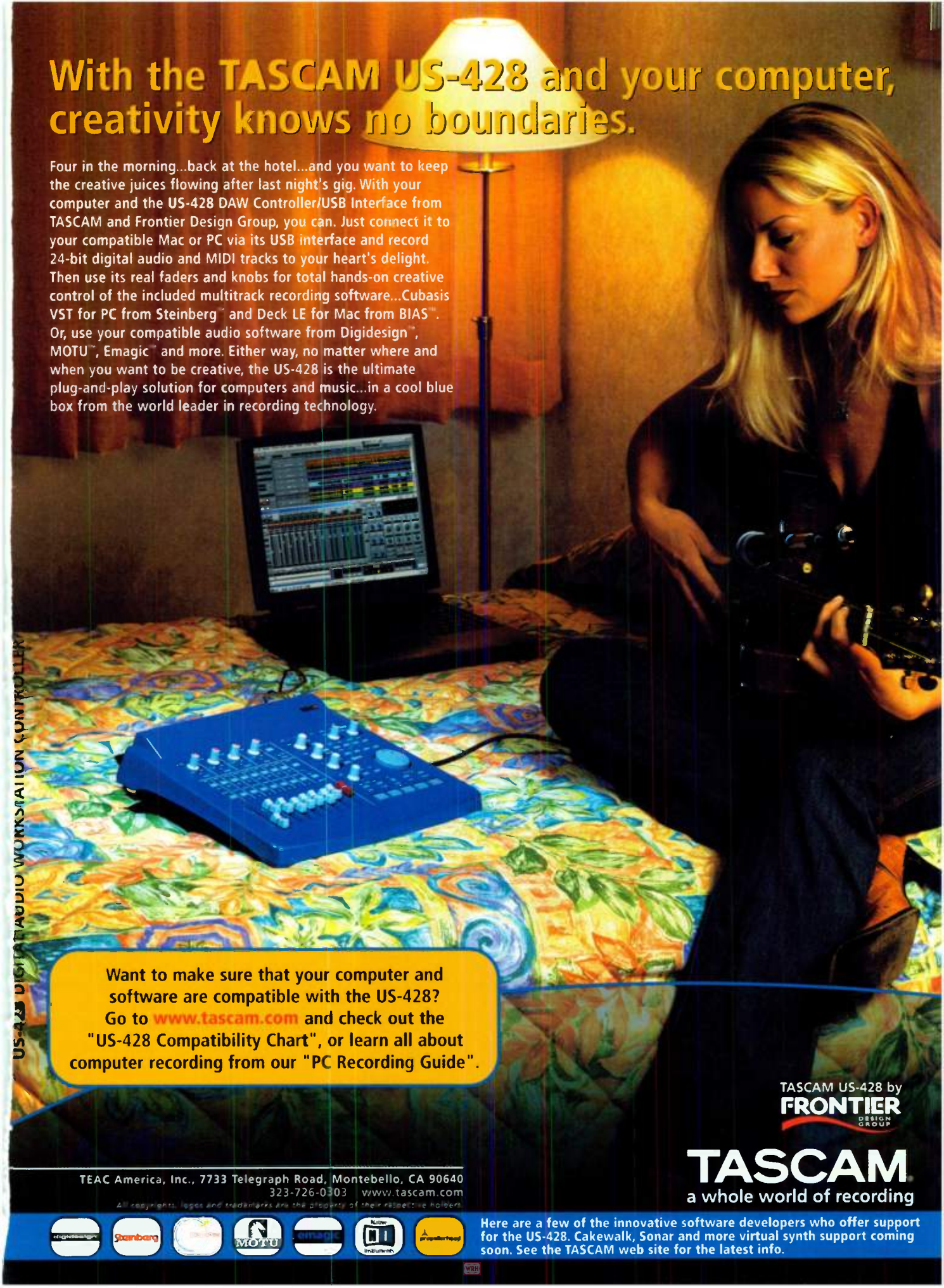
Custom on-hold content typically comprises two elements: music and messages. Music provides the general filler to keep callers motivated to wait. Messages punctuate the music with promotions and other information to motivate callers further. On-hold messages do the following:

1. Stop people from hanging up. Nothing is worse than dead air on the phone while a caller waits.

2. Keep callers interested. Long waits seem shorter when messages provide entertainment and information.

3. Sell and *up-sell* callers (to up-sell is to sell additional products or services besides the core product). Surveys indicate that as many as one in five callers purchase the product or service mentioned on hold.

4. Eliminate music-licensing fees. Playing a radio station or music CDs through a telephone system constitutes a public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Here are a few of the innovative software developers who offer support for the US-428. Cakewalk, Sonar and more virtual synth support coming soon. See the TASCAM web site for the latest info.

performance of the music and is subject to music-licensing fees.

5. Saves your clients money. Compared with other promotional methods (for example, radio advertising), on-hold messages are inexpensive—not to mention easy to control, monitor, and update.

CLIENT NEEDS

The ability to play music on hold is a function of your client's telephone equipment. Typically, businesses with multiline telephone systems have on-hold messaging capability. Otherwise, they must contact their telephone equipment supplier—not the telephone company, which may charge exorbitantly for the service—to have the feature activated. On-hold messages can also be made to work with single- or dual-line telephones with the addition of a coupling switch (see **Fig. 1**).

Your client also needs a way to play back the on-hold messages. The two most popular choices are a CD boom box and a dedicated digital playback device. The CD boom box must have a headphone or a line-out jack, a volume control, and an Infinite Playback (repeat) mode. Simply connect the boom box to the phone system's music-on-hold input, set the CD player to Repeat, slip in the CD of custom messages that you produced, and press play; the messages will play until stopped. The on-hold message thus plays at all times, whether or not someone is on hold.

Digital on-hold messaging equipment comes in two varieties: remote and cassette download. Both versions have the necessary output jacks and volume control. The remote download lets you send the messages by modem to the machine through an attached phone line. I prefer the type that comes with a cassette deck attached. You record the custom messages onto an analog cassette, put the cassette in the machine, and press play. The tape plays once to transfer the messages into digital memory. The tape won't play again unless the digital memory is erased (in a power failure, for instance). To replace the messages, simply load in another tape with new on-hold information. Digital playback devices come with three different playback-loop times: 3- to

4-minute, 6- to 8-minute, and 10- to 12-minute loops. (One good source for these devices is Premier Technologies.)

THING OR TWO

You can prepare custom on-hold messages with minimal studio gear. All you need is a multitrack recorder (digital audio workstation [DAW], MDM, cassette portastudio, or what have you); a cassette deck or a CD burner (for the final mix); a quality microphone and a mic preamp; royalty-free music (or original music) and possibly sound effects; voice talent; a script; and a quiet space for recording.

I began earning money preparing on-hold messages using a cassette-based portastudio and a Shure SM57 microphone. I now use Sonic Foundry's *Sound Forge XP* and *Vegas Video*, a Marshall 2003 large-diaphragm condenser mic, and a Joemeek VC3 preamp directly plugged in to my computer's sound card. This setup works for all of my production work, including on-hold messages.

THE RIGHT STUFF

Most on-hold segments use instrumental music. Work with your client to select an appropriate music style, one that appeals to callers and complements the client's image and message. After determining the style, you have two ways to get the music you need: compose original music or buy a royalty-free music library. Never use copyrighted material for on-hold message productions.

If you compose original music for the spots, don't expect to be paid for it beyond what you charge for the project. It is possible, however, to use your original music repeatedly—that is, with different clients. I often use tracks from my own *Melomania* music library as well as other old tracks from previous projects. Now is your chance to dust off those oldies and finally get them heard.

If you prefer not to compose original music or you're under a tight deadline, *buyout* library music provides an inexpensive alternative. You pay one fee for the music, after which you can use it nonexclusively without paying royalties or worrying about infringement. Such library CDs cost more than regular music discs; typically, you get a couple of hours of music in a variety of styles for about $100. Use your favorite Internet

FIG. 1: Skutch's T-700 Message-On-Hold Coupler ($135) works with any phone line. Its RCA jack lets the user input music and message programs for the benefit of callers on hold.

search engine to find links to different offerings.

THE PAID PIPER

If you have the pipes or know someone who does, you may be able to avoid hiring voice talent. Professional voice actors usually do a better job, though. I once had a pro do a nine-minute read straight through with no errors. To find appropriate people, look for a directory in your area that lists creative talent. Contact a nearby college theater department for possible candidates. Also, check with a local chapter of the Toastmasters Club. It makes sense to have a stable of voice actors you can call on as situations arise, too, because some clients prefer certain voices to others.

Don't hire someone sound unheard. Ask for a demo and carefully review it to make sure the talent has the sound you need. Additionally, bring the person in for an audition. Give him or her some copy to read, record the session, and listen critically to the performance.

Get a talent release for the work the performer provides. Essentially, the person signs a letter giving up his or her rights to the performance in exchange for a one-time payment (see the sidebar, "Sample Authorization of Release"). Fees for nonunion voice actors range from $75 to $150 per hour; union rates are significantly higher. You'll always pay a one-hour minimum, even if the person works only ten minutes. A cost-effective approach, therefore, is to record several on-hold packages for different clients in one session.

WRITE RIGHT

You don't want callers to hear the same message over and over because that defeats the whole purpose of custom on-hold messages. Instead, record a series of messages on various topics and space them out with a 12- to 15-second music-only break between each message. Then continuously loop the package on the telephone system. If the client has typically short hold times, the overall loop length can be brief—say, four to six minutes. You should be able to squeeze eight to ten messages into that time allotment. If the client's hold time is longer, produce a longer loop with more messages and larger music-only gaps between them.

For most on-hold message scripts, think radio spot, only shorter. There are essentially four approaches to take when writing the spots:

1. Image building: "We stand behind every product we manufacture."

2. Soft sell: "Ask us for more information about our products."

3. Hard sell: "When you order a second large one-topping pizza, you get a 2-liter bottle of soda free."

4. Reminders: "Thanks for holding," "We'll be with you shortly," "Sorry for the delay," and other niceties.

Use information provided by your client to draft the messages. One of my clients publishes a newsletter, and all the information I need to write the company's on-hold messages comes from that. Most messages you'll produce will be straight announcer for 8 to 15 seconds, with a music bed underneath. That's just enough time to plug an upcoming event, offer a product or service, provide store locations and hours, and assure the caller that someone will be with him or her soon. Get creative. You can do straight announcer, duos, slice-of-life or other reality spots, a message from the company bigwig, and more. The trick is to create enough variety to make the caller's wait more enjoyable.

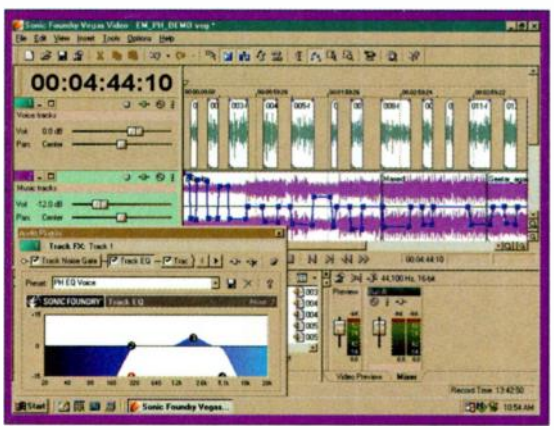

FIG. 2: Producing on-hold segments is easy with nonlinear software such as Sonic Foundry's *Vegas Video*. Note the volume automation envelopes that lower the music so the voice is clearer.

THAT'S SO LINEAR

For a linear, tape-based recording system, follow this basic method: Record the voice to one track of your multitrack. Go for a clean, dry sound. When using multiple voices, put them on separate tracks. Time the gap between each on-hold message segment with a stopwatch. You'll also have to do live punch-ins to fix mistakes in the voice tracks. (Don't fret. I have produced dozens of on-hold messages that way using only a cassette portastudio.)

Next, add music to other tracks. If you use different music cuts, checkerboard the tracks so you can crossfade them during the mix. Depending on the script, sound effects may eat other tracks.

Telephone speakers are lo-fi, mono, and limited in frequency and volume response. Typically, they roll off fast below 300 Hz and above 5 kHz. You are not mixing for radio here. Instead, you want a tight, in-your-face sound limited in both dynamic and frequency ranges. Monitor through headphones, but instead of placing the cans on your ears, lay them faceup on your mixer. You may need to crank the volume to hear, but the sound mimics the telephone earpiece well. If your mix works on this setup, it'll be fine on the phone. You'll also want to check the mixes on your regular monitors at some point to make sure you don't have any unwanted noise or other problems.

Obviously, the voice is the most important part of the mix; it must be clear, consistent, and fully intelligible. The music and sound effects, though also important, are secondary. Start with the music level 12 dB below the voice track and ride the gain during mixdown. On the voice track, EQ out everything higher than 5 kHz and lower than 300 Hz and add a slight bump (2 to 4 dB) at 2 kHz. Equalize the music track the same way, except do a 2 to 4 dB cut at 2 kHz. That carves out a hole for the voice to sit in.

Last, compress the whole mix. Try a 4:1 or higher ratio with fast to medium attack and slow release. Mix to cassette or burn a CD as needed.

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HEM AND DAW

A DAW-based studio makes producing on-hold messages a snap. You don't have to worry about the gaps between messages or punching in talent mistakes. Instead, save complete voice takes of each message to its own file and edit any mistakes in post-production. Always listen to every take before the voice talent leaves—you don't want to discover later that a word was blown, distorted, or missing and have to call the person back and pay him or her again.

Record the voice tracks into a 2-track or multitrack recorder. I record mic to preamp to sound card direct to *Sound Forge XP*. Each message goes into its own file complete with retakes. When the talent leaves, I create copies of the session files and clean them up, deleting blown lines and replacing them with good takes, trimming starts and ends, removing breaths and lip smacks, and so on. Additionally, I usually gently compress the tracks and then normalize their volumes to 98 percent.

Launch your multitrack software of choice (I use *Vegas Video*) and drag and drop the complete voice messages to one track, leaving appropriate gaps between segments (see Fig. 2). Set the track's level to 0 dB. The music segments go onto another track. *Vegas Video* automatically crossfades segments when you drop them on top of one another. Note that the music track's level is set at –12 dB.

Use volume envelopes on the music tracks to automatically duck (lower their levels) under the voice and increase them between message segments. Apply the aforementioned EQ settings to the voice and music and then compress the entire mix (also as described previously). Render the final project to a WAV, AIFF, or other appropriate file and either dub to cassette or burn a CD, depending on the client's needs. When you create a custom CD, burn the same program over and over (I usually do about ten programs) so the CD player doesn't keep playing the same part of the disc. Once the project is complete, I create a backup-data CD with the raw voice files, the edited versions, the *Vegas Video* project file, the music tracks, the final-mix WAV file, and any project notes.

THE BIZ

About 75 percent of on-hold packages total six minutes or less of play time. My fees typically range from $120 to $250 per package, with most falling in the $175 to $200 range. Out of this fee, you must pay for your talent, music licensing, and any other fees (blank cassettes or CD-Rs, for instance). You can make additional money selling the equipment needed for on-hold messages (the CD boom box or digital player) by marking up its cost 25 percent or more.

It's easy to get started looking for first or new clients. Get yourself hired by your current employer, for example. Ask friends, family, and other business associates for leads. Make a few calls to likely candidates (for example, retail stores, car dealers, and software companies). Mention your on-hold services to clients who use you for other services. Pitch to local ad agencies that produce promotions for their clients. Contact telephone equipment sellers and persuade them to recommend you.

In addition, you might write a sales letter or flyer that explains your services and package it with a quality demo tape or disc. Make the promotional material so it can be mailed, e-mailed, and posted to your Web site. Keep the demo short (less than two minutes) and include your sales message and examples of on-hold messages you've done. If you're new to this, create fictional examples and replace them with real ones after you land a few gigs. (You can see and hear an example of how to promote on-hold services on my Web site, www.jeffreypfisher.com/hold.html.)

One great thing about producing on-hold messages is that clients will usually want to update their messages regularly. That puts even more money in your pocket. Contact past buyers at least once each quarter and pitch updates to them. Between new clients and repeat business, you can soon be rolling in dough from your on-hold services.

Jeffrey P. Fisher *is the author of Profiting from Your Music and Sound Project Studio and two other popular music-industry books. You can reach him at www.jeffreypfisher.com.*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

SAMPLE AUTHORIZATION OF RELEASE

Print the following Authorization of Release on letterhead and fill in the blanks (as indicated by the parentheticals). The talent should sign and date the form and retain a copy; you keep the original.

For value received in the amount of (indicate dollar amount), I, (print talent's name), the undersigned, give and grant (your company name), its affiliates, successors, and assigns the unqualified right, privilege, and permission to reproduce in every manner or form, publish and circulate video, sound recordings, or films of recordings of my (indicate what the talent did, for example, voice or musical contribution) arising from (indicate project title), and I hereby grant, assign, and transfer all my rights and interest therein. I specifically authorize and empower (your company name) to cause any such videos, films, or sound recordings of my (indicate again what the talent did), to be copyrighted or in any other manner to be legally registered in the name of (your company name). My contribution to this work shall be considered a "work made for hire," and as such, I, my heirs, executors, administrators, and assigns hereby remise, release, and discharge (your company name) for and from any and all claims of any kind whatsoever on account of the use of such recordings, including, but not limited to, any and all claims for damages for libel, slander, and invasion of the right of privacy. I am of lawful age and sound mind and have read and understand this Authorization of Release.

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WRH

Microtuning

Use your synth's alternate-tuning capability to achieve "perfect pitch."

By Scott Wilkinson

During the past 15 years, many fundamental music-technology concepts have been explained in "Square One" (originally titled "From the Top"). In 1997 EM *technical editor Scott Wilkinson combined many of these columns into a comprehensive primer titled* Anatomy of a Home Studio: How Everything Really Works, from Microphones to MIDI, *published by EMBooks, an imprint of Artistpro.com (www.artistpro.com).*

Our readership has continued to grow, and new readers shouldn't be left behind. Rather than try to reinvent the wheel, we will periodically reprint excerpts from the book as "Square One Classics." These articles will clarify the essential, unchanging concepts that make it possible to be an electronic musician.

DMITRY PANICH

Anyone who works with synthesizers knows that an infinite number of pitches exists between two notes separated by an octave. All you have to do is move the pitch wheel while playing a note to prove the existence of an infinite palette of pitches within an octave. Therefore, it seems strange that Western music uses only 12 pitches. Those 12 pitches, which are repeated in each octave, are the basic foundation of most Western music styles.

Guess what? Except for octaves, none of the intervals and chords played with those pitches are precisely in tune. Musicians normally don't notice that their music is minutely out of tune, because they have become accustomed to the 12 pitches during the past 200 years.

To play intervals and chords that are completely in tune, the precise pitches of many notes must be shifted slightly from their normal frequencies. *Microtuning* is the term used to describe those tiny frequency adjustments. Trained

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singers, wind-instrument players, and fretless stringed-instrument players constantly perform those shifts to produce intervals that are as in tune as possible. On the other hand, keyboards, fretted strings, and mallet-percussion instruments can play only fixed frequencies and therefore are never perfectly in tune.

Why did Western music settle on a set of notes that is always out of tune? How can electronic musicians overcome the tyranny of such a limited palette of pitches? To answer those questions, you must understand the nature of musical intervals and what it means to be in tune.

TUNING INTERVALS

A note is defined by its pitch, which corresponds directly to its fundamental frequency. Intervals consist of two notes sounding at the same time or sequentially, and chords consist of several simultaneous intervals. The relationship between those notes is often expressed as the ratio of their frequencies. In the interval of an octave, for example, the frequency of the higher note is exactly twice the frequency of the lower note; the ratio of the two frequencies is 2:1.

Intervals with ratios of two whole numbers are called *pure intervals.* The common pure intervals include the octave (2:1), the perfect fifth (3:2), the perfect fourth (4:3), the major third (5:4), and the major second (9:8). There are many other intervals, but some can be one ratio or another, depending on the tuning system. For example, the ratio of a minor second is 16:15 in one tuning system and 17:16 in another system.

Other tuning systems, including that used in Western music, use intervals that cannot be expressed as ratios of two whole numbers. Such intervals are called *impure,* and their ratios are called *irrational.* Those intervals are impossible to represent with whole-number ratios, so a different interval-measuring system was developed.

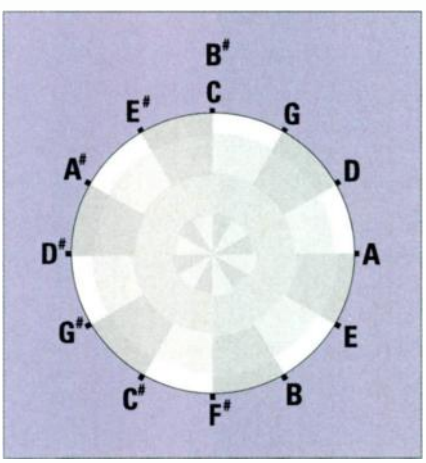

FIG. 1: The circle of fifths becomes a spiral if you use pure perfect fifths. The final B♯ is 23.46 cents higher than the starting C (discounting octaves).

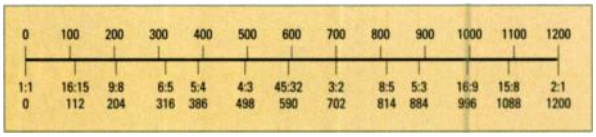

FIG. 2: In just intonation, each interval with the root of the scale is pure. The scale above the line is the familiar 12-tone equal temperament.

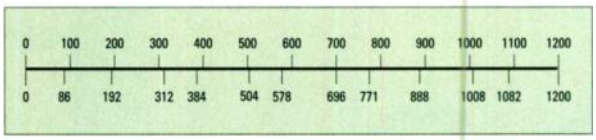

FIG. 3: Meantone temperament was one of the first attempts to create a 12-tone tuning that would allow modulating into other keys. It was not entirely successful.

The octave was divided into 1,200 equal intervals called *cents,* which let you measure pure and impure intervals in the same way. For example, the pure major third is approximately 386 cents, whereas the impure major third used in Western music is exactly 400 cents. As a result, modern major thirds are sharp with respect to the pure variety.

All music students encounter the circle of fifths in their studies (see **Fig. 1**). The graphic includes all 12 notes of the standard Western tuning system in a sequence of perfect fifths. In that tuning system, the circle closes on itself, because B♯ is just a different name for C. Those two notes are called *enharmonic equivalents.* But if you use pure perfect fifths in the exercise, the final B♯ is 23.46 cents higher than the starting C (discounting octaves). Under those conditions, the circle of fifths becomes a spiral of fifths.

That 23.46-cent discrepancy is called the *Pythagorean comma,* named after the ancient Greek scholar Pythagoras, who did a lot of fundamental research of musical intervals. Because most tuning systems are octave based (that is, they include a set of intervals that repeats in each octave), the Pythagorean comma must be placed in the scale to preserve the pure octave. Exactly how that is done is the art of creating a tuning system.

TUNING SYSTEMS

Constructing a tuning with nothing but pure intervals, you must specify each interval individually. Such a system is generally called *just intonation* (see **Fig. 2**). Each interval with the root note sounds perfectly in tune. However, like most scales other than the common Western tuning, the notes in just intonation are not equally spaced. As a result, you can play only in the key defined by the root note and a few closely related keys. For example, in just intonation with a root of C, the major third from C to E is 386 cents, but the major third from B to D♯ is 428 cents (42 cents sharp with respect to a pure major third). So in the key of C, everything sounds fine, but modulating to the key of B sounds terrible.

One of the first tunings to allow modulating into other keys is called *meantone temperament* (see **Fig. 3**). *Temperament* refers to the fact that some or all intervals are tempered, or adjusted, from their pure forms to allow performances in different keys. In meantone temperament, some perfect fifths are shortened slightly to accommodate the comma. However, they are not shortened by the same amount, so some keys sound distinctly better than others.

By the beginning of the 18th century, Western music was becoming more complicated and modulating into increasingly distant keys. Many musicians and theorists devised temperaments to allow modulation into any key. Among the most successful was Andreas Werckmeister (see **Fig. 4**), whose temperaments were used by J. S. Bach and others. The notes were still not equally spaced in the scale, so each key had a distinct

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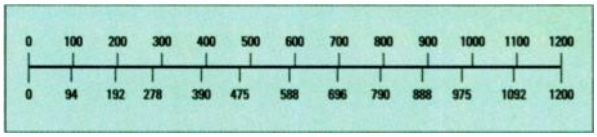


FIG. 4: Andreas Werckmeister created many temperaments, including this one, which is now called Werckmeister III.

FIG. 5: Wendy Carlos's alpha tuning uses equal steps of 78 cents. The tuning produces perfect fifths and fourths, major and minor thirds, and minor sevenths that are very close to pure in any key.

character. In fact, Bach wrote *The Well-Tempered Clavier* to demonstrate the character of each key in a temperament.

During the same period in history, other musicians experimented with *equal temperament*, in which the 12 notes were equally spaced within the octave. That "equality" is achieved by shortening each perfect fifth in the spiral of fifths by about 2 cents, making each one exactly 700 cents. The interval between consecutive notes in the chromatic scale is exactly 100 cents, which collapses the spiral into the circle of fifths.

With that compromise, you can play in any key with equal ease. Each key sounds identical, with no change in character from one to another. Unfortunately, they also sound equally out of tune. Compared with their pure forms, perfect fifths are 2 cents flat, major thirds are 14 cents sharp, and minor thirds are 16 cents flat. The other intervals are similarly out of tune compared with their pure forms.

Other scales with equal steps come closer to producing pure intervals. Some musicians divide the octave into 19, 31, or 53 equal steps, and those scales include many almost-pure intervals. Wendy Carlos has taken a slightly different approach, assembling a series of equal steps that doesn't repeat in each octave. Her *alpha* scale (see **Fig. 5**) includes steps of 78 cents each. The tuning produces nearly pure thirds, fourths, fifths, and minor sevenths, though there is no pure octave.

As Western musicians converged on 12-tone equal temperament, the rest of the world was using many different tunings, some of which survive to this day. The musics of Indonesia, India, Asia, and the Middle East sound exotic and foreign because they are based on intervals different from those in Western music. For example, Indonesian music primarily uses one of two scales: *Pelog* or *Slendro* (see **Fig. 6**).

TUNING SYNTHS

One primary reason to adopt 12-tone equal temperament is the historical tendency toward music that is intended to be played on a fixed-pitch keyboard and that modulates into diverse keys. With early tunings that are highly key dependent, you must retune the keyboard instrument each time you play in a different key. That is not something you'd want to do with a harpsichord or an acoustic piano in the middle of a piece of music. Equal temperament eliminates that requirement, so it found favor among Western musicians.

Retuning digital synthesizers is easy. All it takes is the appropriate software to recalibrate the oscillators to produce any set of frequencies you desire. The Yamaha DX7II was the first widely available synth to offer that capability. Since then many electronic-keyboard manufacturers have included the ability to use tunings other than equal temperament.

Most of those instruments—which include models from E-mu, Korg, and Kurzweil—can retune only the 12 notes in an octave, and those tunings are repeated in all octaves. For key-dependent tunings, you can usually specify the desired root note. In a few instruments, you can retune each note in the entire MIDI range independently. That capability lets you construct larger tunings, such as 53-tone equal temperament or the Indian 22-note scale from which ragas are derived.

Synthesizers with alternate tunings usually can't share their tuning data

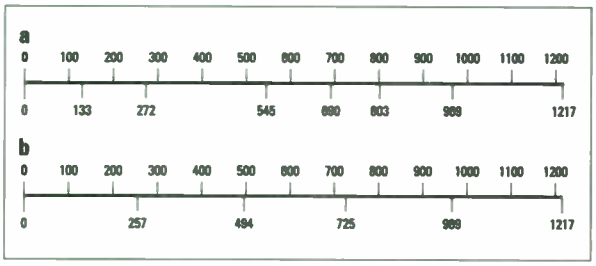


FIG. 6: Indonesian music uses two main scales: Pelog (a) and Slendro (b). The tunings probably arise from the harmonics of the gong and the struck-bar instruments used to play them.

with dissimilar instruments or retune on the fly, so Robert Rich and Carter Scholz developed the MIDI Tuning Standard (MTS), which was added to the official MIDI specification. The standard includes two major parts: bulk dumps and single-note retuning. It outlines the messages by which an instrument can be retuned during a performance. The specified resolution is 0.0061 cent, which is fine for most researchers and musicians.

USING TUNINGS

Alternate tunings can be used in many ways, particularly with synths. Early and ethnic music can be played with more authenticity, and you can achieve better consonance in all forms of music, particularly if you don't modulate into widely divergent keys. Even if you do modulate, you often can change tunings at the same time. For example, you might create two synth patches with the same sound and different tunings, such as just intonation in the keys of C and B, and select the patch that is tuned to the key you are playing in.

Another important application of microtuning is education. If you're a music teacher, you can impart a greater sense of historical perspective to your students by playing music with appropriate tunings from different periods and locations. For example, play a sequence with equal temperament followed by the same sequence in just intonation. The difference is startling. You also can explore the world of sound and acoustics with greater ease and precision.

Using alternate tunings has never been easier, thanks to modern music technology. Hopefully, manufacturers will continue to offer that capability in their instruments and include support for MTS, which brings microtuning into the MIDI fold and provides musicians with even greater resources for composition and experimentation. After all, if electronic musicians don't push the musical envelope, who will?

You can read more about microtonality in **Scott Wilkinson***'s book* Tuning In: Microtonality in Electronic Music, *published by Hal Leonard Books.*

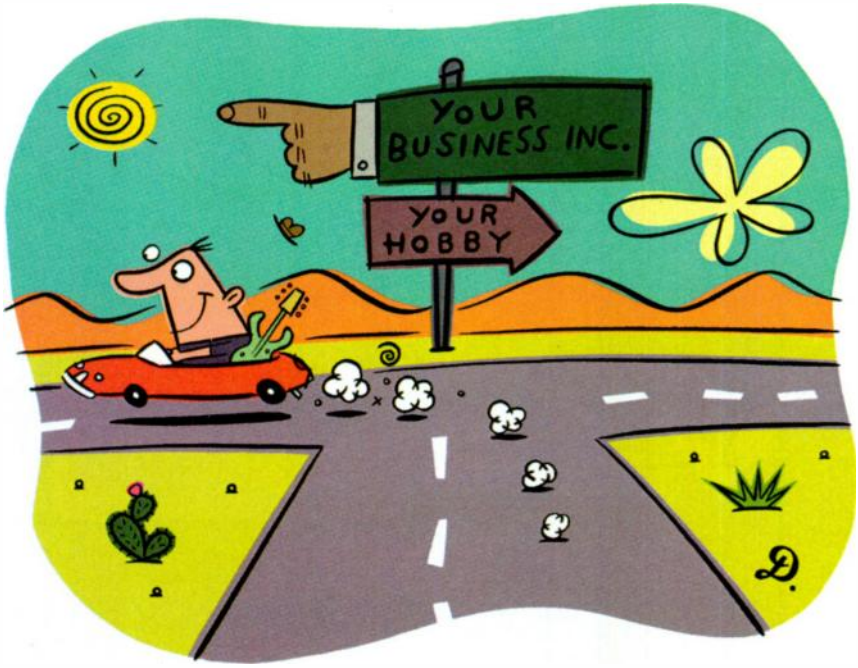
We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

Going Legit

Setting up a legitimate business makes good legal and financial sense.

By Eric Leach

I've seen your living room: your rig, which started out as a 4-track cassette recorder and a DX-7, now has engulfed the entire room, expanding like some hideous floor-space-eating robot. Your furniture consists of a TV and an Anvil-case chair pathetically shoved into one corner. Your neighbors hate and fear you; they think you're some kind of mad scientist. But you're not—you're a businessperson, and this is your business. You are also typical.



JACK DESROCHER

Young entrepreneurs usually start out in the music industry by turning their passionate hobbies into livelihoods. In fact, the music industry is somewhat unique in that most music business is done by individuals—artists, musicians, songwriters, engineers, producers, and so on—working as independent contractors rather than as employees of a large company. However, being in business for yourself doesn't mean you can't be a "company"; most successful individuals in the industry eventually form some type of formal business entity. For example, successful songwriters form publishing companies to administer pitching and selling of their songs. Working musicians and producers form production companies. Successful artists quite often form their own record companies.

Artists and professionals do that because forming a business is considered the best way to legitimize themselves as serious players in the industry. It has quite a few practical advantages, as well. If you are serious about turning your passion into your livelihood, consider creating a formal business entity.

One word of caution before I continue, however: forming a business can sometimes be simple, but it can also

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be complicated, and the stakes can be high. I will explain the benefits of such an endeavor and provide a general overview of what's involved. Such general information can be invaluable, for example, when speaking to a formation attorney, because you can be sure the attorney adequately and accurately protects your interests. Although self-formation kits are readily available, risks are involved with such an approach, and the money saved may not be worth the cost of inadvertently incurring tax or legal penalties or risking your assets. Therefore, I recommend that if you are interested in forming a business entity, thoroughly educate yourself or consult a competent attorney.

BUSINESS SMARTS

Here are a few places to start your research on forming a business. When you're ready to take the big step, consult an attorney. If you can't find a suitable one through word of mouth, your state bar association is a good source for referrals.

Artistpro (www.artistpro.com) sells many music- and music-business-related books. The company also publishes *The Recording Industry Sourcebook,* which offers hundreds of leads and contacts in every facet of the music industry.

Nolo Press (www.nolopress.com) is a noted legal self-help publisher. It offers many books and software packages about tax laws and forming and running a business. Nolo also offers music-business law books, such as *Music Law: How to Run Your Band's Business,* by Rich Stim.

The **Small Business Association** (www.sba.gov) Web site provides a wealth of invaluable information to any small-business owner or owner-to-be. Be sure to check out its links to other resources.

The **StarPolish** (www.starpolish.com) site has music, music news, columns, and features. The real find on this site is the Advice section, which offers many articles about specific areas of the music business, including financial and legal matters. The site's Resources section lists various professionals and services, such as accountants, attorneys, and industry associations and organizations.

GIMME SHELTER

Life is good—you have work lined up, you're getting paid, and you work your own hours. Why would you want to go through the formality of forming a company? One good reason is that certain types of business models allow you to protect your personal assets. From a legal standpoint, business entities such as *corporations* or *limited liability companies* (LLCs) are considered distinct legal entities from their owners. In other words, your company would be considered a legal "person," separate and distinct from you as a person, and your liability risk therefore is limited to the capital in the entity itself. That means that you are not personally liable for the business's debts, losses, or legal liabilities, including lawsuits.

For example, say you land a fat contract to produce a movie soundtrack. Unfortunately, your cat gets sick, and while nursing it back to health, you miss your deadline. The film company claims your failure to deliver the soundtrack on time has ruined its production schedule, sues you for breach of contract, and is awarded $100,000 in damages. If you are doing business without the protection of a formalized business entity, there goes the house, the car, and probably the marriage (and maybe even the cat). However, if you're doing business as an LLC, for example, and your company signed the contract, then only the company's assets can be attached. Yet heed this word of caution: failure to adhere to legal rules such as keeping your business and personal assets separate can place that protection at risk. That is a good example of how consulting with qualified legal counsel when forming your company can help you avoid running afoul of such rules.

Legal entities such as corporations and LLCs are also considered separate tax entities from their owners. Consequently, you may be able to use the entity to shelter business income instead of paying personal income taxes on all business profits each year. Although the company itself would have to pay income taxes based on revenue or profits, those tax rates are often lower initially than personal tax rates and very well may save you money. Tax laws are complex, so seek the advice of a competent accountant or tax attorney.

As noted previously, one main advantage of creating a formal business entity is that the people you do business with will take you more seriously; even established clients may begin to look at you with new respect once you've formed your business. Certainly banks and other lending institutions tend to take loan or other financing applications more seriously when a business entity rather than an individual is applying. You also will have more loan and financing options as a business rather than as an individual.

KINDS OF BUSINESS

So you're ready to take the plunge and formalize your business. What type of business model should you choose? Sole proprietorship, partnership, and corporation—what's the difference?

Sole proprietorships and *partnerships* are the most common types of small-business entities. If you set up shop in your garage and start selling your goods or services, you are by default a sole proprietorship. If you work with one or more partners, you are by default a general partnership. Those organizational types are considered *informal* business entities because they generally do not require registration with the state and do not provide any protection for personal assets. It is important to note that simply filing a Fictitious Business Name Statement (also known as a *dba* or "doing business as") is not a type of formal business registration; it merely reserves your business name with the county.

Other types of partnerships are considered formal business entities. *Limited*

"Four Major Labels Came to See Me Because I Joined TAXI"

Lizard McGee -- TAXI Member

Most musicians never get a chance to meet an A&R person in the flesh. I had A&R guys from Columbia, Dreamworks, Maverick and Hollywood all come to see my band, Earwig, play live.

I spent the next day hanging out with one of them at his house. I played more songs, and we talked one-on-one for hours.

All this happened as a direct result of becoming a member of TAXI.

Ironically, I almost didn't join. Like so many other people, I didn't know a lot about TAXI, and I wondered if it was really legitimate. It just sounded too good to be true.

But I spoke with a few friends who were already members, and they explained how TAXI worked. It made sense.

I began to think about not only getting my music to record labels and publishers, but also pitching my songs to TV shows and movies to make some extra money with my music.

So, I joined, and it's already paying off big-time. Earwig is building a huge buzz because of all the contacts we've made through TAXI.

We haven't signed a deal yet, but we've definitely penetrated the so-called "inner circle" of the music industry. And that's exactly where you need to be to get yourself signed.

Can TAXI get you into the inner circle? They'd be the first to tell you they can't promise anything. But four A&R people watching my show was all the proof I needed to know that TAXI can really deliver, if your music is right on target.

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And if your music is a little bit off-the-mark, TAXI is probably the best thing you can do to whip it into shape. The written feedback you'll get from their A&R department is incredible.

You'll also get to meet top industry executives face-to-face at TAXI's annual convention, the Road Rally. As a member, you'll get FREE passes for you and a couple of guests.

This private convention is renowned for being the best in the business. Just one pass is worth far more than your TAXI membership fee, but you'll get three for FREE.

Whether you're pitching yourself as an artist, pitching your songs, or going for Film and TV placements, TAXI is definitely the place you need to call.

Just ask for their free information kit, and get yourself signed up in a hurry.

I did, and my only regret is that I didn't do it sooner. TAXI has turned out to be the best investment I've ever made in myself.

partnerships allow for investing partners (the limited partners) to essentially sacrifice management rights in return for personal-asset protection, leaving management of the partnership to the noninvesting partner (the general partner). *Limited liability partnerships* (LLPs) are partnerships that protect the partners' personal assets but are allowed only for select types of businesses (usually legal, accounting, and architectural businesses).

A *corporation* is the most recognizable type of formal business. In a corporation, the shareholders actually own the company, and the directors and officers manage the business (although certainly a single person can be both a shareholder and a director or officer). Similar to limited partnerships, the shareholders generally sacrifice management rights (with several notable exceptions, in particular the right to elect the board of directors) for personal-asset protection.

LLCs are a fairly recent and popular type of formal business entity. In an LLC, the business generally can be informally structured, like a sole proprietorship or general partnership, but provides personal-asset protection to the "members" (that is, the owners). That, as you may have deduced by now, is an attractive combination for new small-business owners.

WHAT'S YOUR TYPE?

You're probably wondering which type of business model you should choose. As mentioned previously, choosing nothing defaults you to sole proprietorship or general partnership, leaving your personal assets at risk. Limited partnerships are useful if you have a *silent partner,* which most are not lucky enough to have and still places the general partner's personal assets at risk. LLPs are not usually available to most business types, leaving corporations and LLCs as the most common choices for new small-business owners.

A corporation is the classic choice, mainly because of the fact that many new businesspeople have never even heard of an LLC. The main problem with corporations, however, is that they are relatively burdensome to operate. Adhering to various required corporate formalities such as shareholder's meetings, director's meetings, issuance of stock, and the like can pull you away from valuable time that should be spent running your business. Although some states allow one- or two-person corporations and the formalities for such close corporations are ordinarily less troublesome than for larger corporations, you still must contend with a fair amount of red tape. Furthermore, despite the claims of late-night infomercials, proper setup and operation of even a small corporation can be expensive. However, there are advantages, as well, such as potential tax and image benefits.

The LLC, however, is in most states the best type of formal business entity for new small businesses. Like a corporation, an LLC can protect your personal assets, and like a partnership or sole proprietorship, it is flexible, inexpensive to set up, and operable with few required formalities. In fact, a written agreement between the members is not even required, and some states allow for single-member LLCs. In other words, you can run the business the way you've been running it all along and still protect yourself. That's not to say that a written agreement between you and your partners isn't a good idea—on the contrary, it's a very good idea. The point is, you have the option.

BECOMING A BIG SHOT

"Okay, Mr. Bigmouthed Lawyer," you say. "You talked me into it. How do I form my business entity of choice?" Unfortunately, step-by-step instructions are beyond the scope of this column. Furthermore, most formation laws are state laws and can vary considerably from state to state. Resources such as books, Web sites, and software kits are great for educating yourself, but to be safe, consult an attorney or prepare to spend a fair amount of time researching the law. (See the sidebar, "Business Smarts," for a brief listing of resources.) However, I can lay out some general requirements.

All formal business entities must file

paperwork with the state in which they do business. Further information concerning the requirements, and sometimes even downloadable forms, likely can be found on your Secretary of State's Web site. In California, for example, LLCs must file initial paperwork called Articles of Organization, which provides the state with basic information about the business. The state requires similar paperwork, called Articles of Incorporation, for corporations. Update paperwork, which is called a Statement of Information for LLCs, or a Statement by a Domestic Stock Corporation or Statement of Officers for corporations, must be filed at regular intervals thereafter.

Corporations are also required to draft bylaws that outline the general rules by which the corporation will operate. Also, significant business actions taken by a corporation must be formally approved through shareholders' or director's meetings and recorded in official minutes of those meetings. Additional rules are often set out in various types of supplemental agreements between the shareholders, such as shareholder agreements or voting agreements. LLCs have no such requirements, though the operating rules of the company are often set out in Operational Agreements between the members.

More steps may be required by your state, county, or city. For example, you may need to obtain a Federal Employer Identification Number from the state in order to pay employees or open a bank account. Your county may require a Fictitious Business Name Statement if you're doing business by a name other than the name filed with the state in the Articles of Organization or Articles of Incorporation. Your city may require a business license. Again, information about those requirements usually can be found on the agency's Web site.

THE BOTTOM LINE

If you're serious about your business, you'll have to jump through these hoops eventually. Consider whether you're in it for the long haul or are simply getting by until your record deal comes through. If you decide to formalize, talk to some of your friends or business acquaintances to get some help in deciding what type of business to form and how to form it. Once you decide how you want to proceed, enlist the aid of an attorney. As Hans and Franz were fond of saying on *Saturday Night Live*, "You pay me now, or you can pay me later."

Eric Leach *is an intellectual property and business law attorney at Goodman and Leach. A reformed musician, he is the author of several articles concerning the music industry and related legal matters. Contact him at eleach@goodmanleach.com.*

We welcome your feedback. E-mail us at emeditorial@primediabusiness.com.

REVIEWS

DIGIDESIGN

PRO TOOLS TDM 5.1 (MAC/WIN)

Surround-sound capabilities and stability mark this important upgrade.

By Nick Peck

Surround sound is everywhere. Once the exclusive bastion of film, multichannel audio has spread rapidly into the worlds of music, games, and broadcast. The advent of affordable home theater, DTS, DVD-Audio, and multichannel game consoles ensures that every recording musician and audio professional will become involved in surround sound in some capacity.

Digidesign brings the Pro Tools system squarely into the multichannel age with the appropriately numbered version 5.1. The new version includes a solid set of new features as well as improved MIDI implementation, file management, user interface, and plug-ins.

Digidesign's *Pro Tools TDM* 5.1 includes surround-sound capabilities when used with a Pro Tools/24 Mix system.

NEW PATHS

The first step Digidesign took toward creating a multichannel environment was to completely change how *Pro Tools TDM* 5.1 interacts with the outside world. The new I/O setup window (see **Fig. 1**) gives you signal-routing flexibility by allowing you to easily group, name, and configure all inputs, outputs, inserts, and buses.

The *path* is the organizing layer between *Pro Tools TDM* 5.1 tracks and the hardware I/O. Each path has from one (mono) to eight (in a 7.1 surround system) channels. Once a

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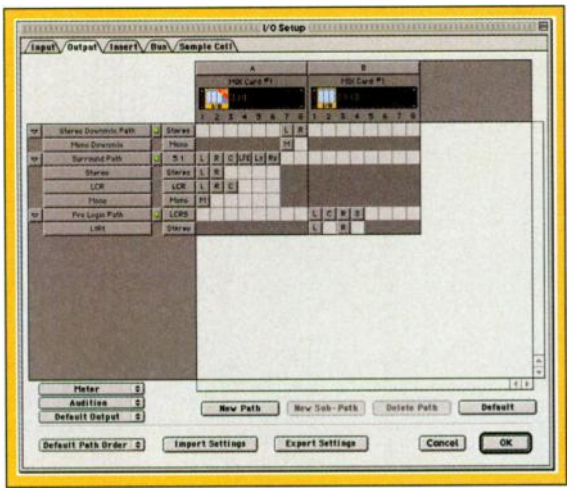

FIG. 1: The I/O Setup window lets you intuitively define connections between tracks and hardware devices.

path is selected, the channels for that path appear on a grid that displays the hardware I/O units connected to the system. Each channel is configured by dragging its icon (left, right, center, and so on) to whichever output is desired. Furthermore, each path can have a number of subpaths, which contain a subset of the number of channels in the main path.

For example, take a 5.1 surround output path with six channels—left, right, center, subwoofer, left surround, and right surround—configured to the first of a pair of 888 I/O output tracks 1 through 6, respectively. (They can be configured to whatever outputs you want, however, even across different I/O units). Under that surround master path, stereo, LCR, and mono subpaths that also use the same outputs can be created. That means the stereo subpath would send left-channel information to output 1 and right-channel information to output 2, just as the surround master path does.

Paths can be defined for inputs, outputs, inserts, buses, and the SampleCell TDM sampler card. The entire I/O setup can then be exported for use in other sessions. All I/O setups can be selected in the Create Session window or imported into other sessions. Getting the hang of setting up paths can take a while, but once you become comfortable with it, it's a great way to work.

ON TRACK

The reason for having a flexible signal-routing structure is clear when you look at tracks. The limitation of mono-only audio tracks in *Pro Tools* is no longer an issue. Tracks can now have one to eight channels, just like paths. The channels in a track are recorded or edited as a unit, and the corresponding regions are stored in the region bin hierarchically, under the master region name (see **Fig. 2**). Recording to a 5.1 track called "Strings" would result in a region called Strings_01 and a series of subregions called Strings_01.L, Strings_01.R, Strings_01.C, and so forth.

Multichannel tracks have separate software meters for each channel in the Edit and Mix windows. Any edits or manipulations of a multichannel region affect all channels. Multichannel tracks need to be connected to hardware ins through paths or subpaths with the same number of channels. To record to a 5.1 track, you must create a 5.1 input path.

Output paths work the same, although multichannel tracks can be routed to mono output paths. Mono tracks have the most flexibility: they can be assigned to output paths of any number of channels. A really cool feature is the ability to assign each track to multiple output paths at the same time. That means that, with enough hardware outs, you could work simultaneously on a 5.1 mix, a quad LCRS mix for Dolby Pro Logic, and a stereo reduction from the same session. However, keep in mind that the surround capabilities of *Pro Tools* 5.1 are available only on 24 Mix systems and above.

AROUND THE ROOM

Once you have defined the paths and track assignments, you can begin mixing in surround. Every mono track that is assigned to an output path of four or more channels will have its panners replaced by a small surround-grid icon that shows the relative position of the track in the surround field. Stereo tracks have two surround grids next to each other. Tracks with more than two channels are simply bused directly to their assigned output path, with no pan control. The *SurroundScope* plug-in does a nice job of showing the energy distribution and phase coherency of a multichannel track on meters as well as a surround view.

You access the Surround pop-up window for each track by clicking on the output asterisk in the track's mix view (see **Fig. 3**). That window is the heart of surround mixing in *Pro Tools*. It depicts the position of the sound as a green dot on a grid representing the surround matrix. Speaker icons, representing the location of the physical speakers in the matrix, appear around the edge of the grid—an LCRS matrix has three speaker icons across the front and a single speaker in the center of the rear; a 7.1 matrix shows five speakers across the front and two in the rear.

In addition, the window contains a separate fader for the low-frequency enhancement (LFE; the ".1") track. Moving the dot on the grid positions

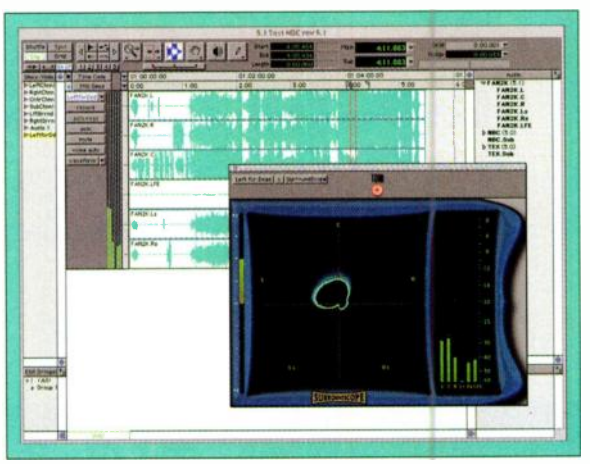

FIG. 2: In the right corner of this screen shot, notice that a collection of surround tracks are stored hierarchically, under the master region name. In the center of this screen shot is the *SurroundScope* plug-in window.

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FIG. 3: To get the Surround pop-up window for a track in the mixer, click on the asterisk just above and to the right of the fader corresponding to the track you want.

the track in the listening space. All of the features can be automated; to move the sound over time, you must arm the automation and then drag the dot around.

You can also move the position of the audio along a straight line through the matrix by using the position controls. The Front and Rear knobs control left and right positions in the front and rear, and the F/R knob controls the position of the audio along that continuum. That lets you move the position of a sound using one knob.

The Center % knob controls how much of the audio appears in the physical center channel. In film mixes, center is often reserved for dialog to enhance intelligibility, so keeping sound effects out of the center as they pan from left to right is crucial.

The Divergence portion of the Surround pop-up window refers to a track's *width* within the surround matrix. Any track can be a single sharply focused point in the audio field, or the track can be widened to encompass a broader location. Divergence is handled just like position: Front and Rear knobs represent the width of the sound as it emanates from the front or rear, and an F/R knob represents the ratio of front-to-rear energy. The ratio is displayed graphically as a blue polygon within the surround grid. The Divergence controls can be automated, too.

Yet another critical element in surround applications is the concept of *bass management;* the redirection of all low-frequency information below a specified crossover point into the subwoofer channel. Because bass frequencies are far less directional than higher frequencies, keeping unnecessary low frequencies out of the speakers allows them to operate more efficiently. My only gripe with the surround functionality of *Pro Tools TDM* 5.1 is that it has no integrated bass-management system. The *Woofie* plug-in ($249) from Kind of Loud Technologies will handle the problem, but I would prefer a solution integrated into the *Pro Tools* Surround window.

MORE MIDI FRIENDLY

Although its MIDI implementation is no match for advanced sequencers such as Emagic's *Logic Audio* or Mark of the Unicorn's (MOTU's) *Digital Performer*, *Pro Tools TDM* 5.1 boasts some new MIDI features that make its sequencing capabilities more usable. The most important is the MIDI Event List (see **Fig. 4**), which is interactive with the Edit window. Events selected or changed in one are immediately updated in the other. Notes and controllers can be inserted or edited easily, and a view filter can be applied to show specified event types.

The Pro Tools MIDI implementation has other interesting additions. Now, you can patch a MIDI controller through *Pro Tools TDM* 5.1 to a MIDI module without being in Record mode; multiple MIDI data streams can be recorded simultaneously, and each stream can be assigned its own track; each MIDI track can be assigned a sample offset to make up for sluggish attacks or latency issues in the system; and on the Macintosh platform, synthesizer patch names are available through Open Music System (OMS) name services.

PLUG IN TO SURROUND

One of *Pro Tools*' great strengths is its TDM-based plug-in architecture. Digidesign improved the architecture to accommodate multichannel audio. Multichannel tracks can use new multichannel plug-ins that are designed for the new system as well as multiple instances of standard mono plug-ins (one per channel). You can adjust each instantiation separately or link them together to one set of controls.

Another long-awaited improvement is the ability to have multiple plug-in windows open at once. Each plug-in window can now stay up until it is dismissed or replaced by a new plug-in. You can drag and drop instances of a plug-in to different positions on the same track or move them to various tracks. They can also be Option-dragged

PRODUCT SUMMARY

Digidesign
Pro Tools 5.1 (Mac/Win)
digital audio workstation
Pro Tools/24 Mix w/ *Pro Tools TDM* 5.1
$7,995
Upgrade from v. 5.0.1 or earlier
$295

FEATURES	4.5
EASE OF USE	4.5
DOCUMENTATION	4.0
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Stable. Multichannel capabilities. Widespread third-party support. Large user base throughout pro-audio industry.

CONS: TDM system is expensive.

Manufacturer
Digidesign
tel. (800) 333-2137 or (650) 731-6300
e-mail prodinfo@digidesign.com
Web www.digidesign.com

to other tracks, which creates a copy with the same settings as the original plug-in. Each small graphical user interface (GUI) improvement enhances the mixing process dramatically.

However, there's no free lunch in multichannel audio: a plug-in's 6-channel version requires far more digital signal processing (DSP) than the mono version. A substantial 5.1 mixdown can quickly bring the DSP resources of a powerful 24 Mixplus system to its knees. Digidesign attacked that problem from three directions: by making Real Time AudioSuite (RTAS) plug-ins available in TDM sessions, by creating a new DSP chip-sharing technology called MultiShell II, and by adding one more Mix Farm card to the standard system.

The RTAS system is the host-based plug-in format used with the *Pro Tools LE*/Digi001 system. In a Pro Tools TDM system with version 5.1, RTAS and TDM plug-ins can be used in the same track, but the RTAS plugs have to come first in the chain. Using RTAS plug-ins takes a load off of the DSP cards but increases the load on the CPU and adds to system latency.

MultiShell II lets multiple compatible plug-ins share time on the same DSP chip. Waves began that idea with its WaveShell-DAE system, in which all Waves plug-ins shared the same chips. Now Digidesign has created a standard that all manufacturers can share.

Finally, Digidesign is now pushing its new flagship Pro Tools Mix3 package, which consists of two Mix Farm cards and one Mix Core card. At a list price of $11,995 for just the DSP cards—I/O is not included—the system is extremely powerful but brutal on the wallet.

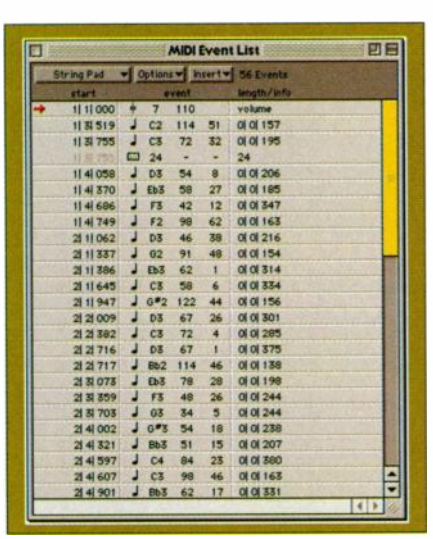


FIG. 4: The MIDI Event List is a welcome addition to *Pro Tools*, enhancing its MIDI capabilities substantially.

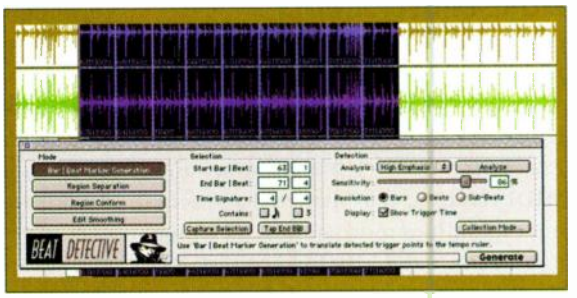


FIG. 5: With Beat Detective, you can create tempo maps and tighten human performances. Unfortunately, for Digi001 users, this feature is not available in *Pro Tools LE* 5.1.

EDITING IMPROVEMENTS

Digidesign made a number of small but useful improvements to the user interface and editing features. On the Macintosh side, Digidesign improved the use of dialog boxes by using Apple's standardized GUI. That includes navigation buttons, in the upper-right corner of the box, that allow you to set favorite folders. The Create New Session dialog box lets you specify the I/O settings (with defaults for stereo, a variety of 5.1 formats, and your own I/O routings), the native audio file type (WAV, AIFF, or Sound Designer II), as well as bit depth and sample rate. However, it always defaults to 24 bit, 44.1 kHz rather than the settings of the last session you created.

The nifty new Universe pop-up window provides a graphic overview of the entire session, which allows you to navigate a long session with just one click. The E key is now a toggle that enlarges and shrinks the area near the edit bar, and the Hyphen key toggles between Waveform and Volume view. The Tab-to-Transient option uses the Tab key to move the edit bar to the next transient in a track. That is great for dialog editing, percussive sounds, and spacious tracks, but not as useful for dense tracks. An adjustable threshold preference would really help dial in the usability. Version 5.1.1 (which will be available by the time you read this) includes GUI improvements in the area of showing or hiding and sorting tracks as well as a useful Single Zoom mode, which jumps back to whatever editing tool was last used after a single use of the Magnifier tool.

WHAT'S IN A NAME

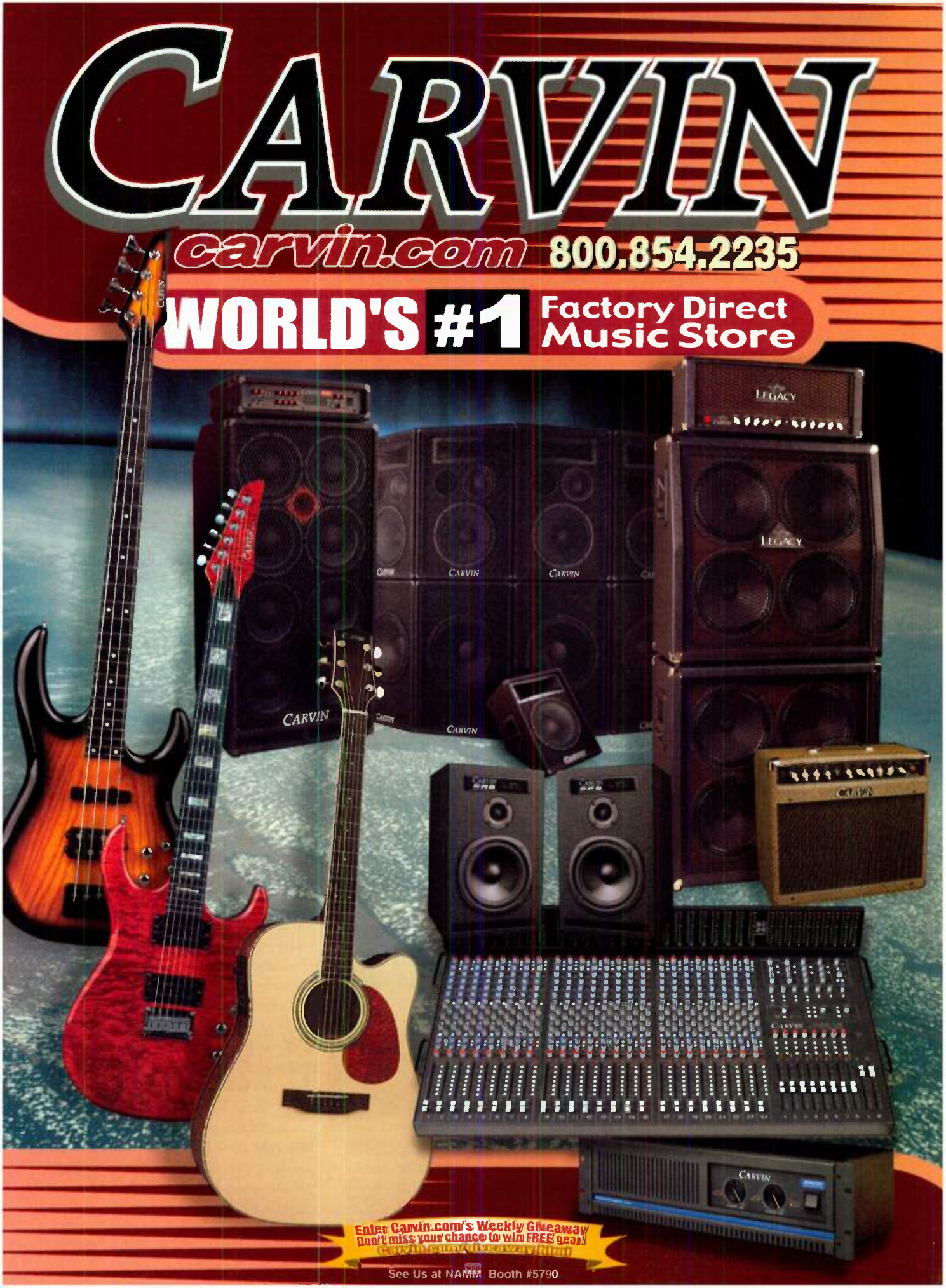
Previously, one had to be careful when referencing audio files that were outside a session's audio-files folder. Moving a file to another hard drive or directory caused *Pro Tools* to lose track of its location, creating major headaches. Additional confusion resulted from *Pro Tools*'s default naming convention: a hard drive with many sessions can end up with dozens of audio files named Audio 1_01.

Digidesign has addressed those issues by adding a *universal identifier* (UID) to each file. The internal serial number is used to track the files, making it easier for *Pro Tools TDM* 5.1 to find them if they move to other folders or volumes and letting you discriminate between files of the same name. Audio files that can't be found at all are considered to be offline but still part of the session.

Blue *ghost* regions appear in the Edit window, where the online data used to be. You can still edit or delete those regions, but you won't hear the results. The names of the missing files appear in italics in the region bin and are automatically relinked later when the files are made available. In addition, the naming convention for fade files has changed from a numerical sequence (for example, Fade 01, Fade 02) to long streams of random letters (Fade abYBBQgHGbZHM4).

ON THE BEAT

Beat Detective (see **Fig. 5**) is a spiffy new tool used to create tempo maps and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tighten up human performances. You can select a region of audio (a percussive element, such as a kick drum, works best) and ask Beat Detective to analyze it to a resolution of bars, beats, or subbeats. You can help Beat Detective out by telling it what the starting and ending bar or beat value of the region should be and by adjusting the analysis sensitivity. Beat Detective will then create a tempo map and adjust the bars and beats accordingly.

That feature is wonderful for aligning the *Pro Tools TDM* 5.1 counter system to a human performance after the fact. In addition, you can separate the audio into regions at the beat locations analyzed and then conform the data to line up at a different tempo, effectively quantizing the audio performance. Making that sound good in a real-world situation takes some effort, but the ability to tighten the timing or change the tempo of a performance is powerful. A smoothing facility is included to crossfade through gaps that might stick out in the audio.

BUT WAIT, THERE'S MORE

The Strip Silence feature has been greatly improved. It's used to remove silent or quiet areas of audio from a track and separate the remaining material into individual regions. Strip Silence has always been a rather difficult beast to tame. Typically it involved repeated experiments with the Threshold setting to find a good fit. Now, before you commit to processing the file, Strip Silence shows you graphically which areas will stay and which will be deleted as you operate the Threshold slider.

Disk allocation, or the method of determining where Pro Tools stores audio data for different tracks, is much more flexible now. Each track has its own path assignment, so you can assign each track to record to a different folder, if you desire. You can also set the Root Media folder (previously the Audio Files folder in the same directory as the session file) to whatever you want. In general, that idea is flexible, albeit a bit dangerous: as files spread out, keeping track of their locations can become difficult.

However, that opens the door to new paradigms of distributed media processing. For example, take a network of people working on a piece of music or a film simultaneously. If the network (local or Internet) were fast enough, dialog, music, and effects could all be recorded onto a centralized server. That would allow files to be distributed easily, and creating backups would be less of a headache.

Additional improvements around the edges of the program will appeal to various types of users: 16 levels of undo, an Auto Save function, track-import ability, and OMF import and export functionality using *DigiTranslator* 2.0 are available. If you use Avid's video boards with your Pro Tools system, you can have multiple digital-video segments in the video track. In addition, you can record video directly into *Pro Tools TDM* 5.1 rather than capturing it separately and then importing it. Unfortunately, those video features don't work with the third-party boards from Aurora and Miro, which are frequently used with Pro Tools.

Pro Tools TDM 5.1 also supports Sony 9-pin VTR emulation through a direct connection to the serial port. That makes it easy to control the system with a remote transport mechanism such as a Microlynx.

Minimum System Requirements

Pro Tools TDM

MAC: Macintosh 68000; 12 MB RAM; Mac OS 7.0; free modem/printer/USB port

PC: 486 DX2/66; 12 MB RAM; Windows 95/98/ME; free COM (1–4)/USB port

CRASHPROOF

The marketing department often avoids mentioning one of the most important improvements an upgrade can offer: namely, fewer crashes. That is certainly an improvement on *Pro Tools TDM* 5.1, the most stable version of the program I've ever used.

Daily system crashes were a fact of life for me up through version 5.0.1. But I had *Pro Tools TDM* 5.1 running on multiple systems 16 hours a day for three weeks while recording Foley for a film, and it never crashed. That is the type of bread-and-butter software that can be relied upon in a serious production environment.

BETTER THAN EVER

It's hard not to rave about *Pro Tools TDM* 5.1. The software is mature, robust, stable, and flexible. Not surprisingly, Pro Tools remains the system of choice for a large percentage of the professional-audio industry.

The new surround-mixing capabilities are worth the price of admission alone. However, the greatly improved I/O routing, system stability, and MIDI features make the upgrade from 5.0 to 5.1 a no-brainer for any current Pro Tools user.

Nick Peck *owns Perceptive Sound Design, an audio post facility for film and games. He also plays keyboards in the jam band Ten Ton Chicken.*

Pro Tools Specifications

Audio Tracks	64
Virtual Tracks	64
MIDI Tracks	128
Buses	64
Sends Per Track	5
Inserts Per Track	5
Resolution	24-bit; 16-bit
Sequencer Tracks	128 maximum
Sequencer Resolution	960,000 ppqn, synced to internal or MIDI Clock source
Quantization	whole note–64th-note triplet

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Luxury usually comes with a hefty price tag. Not so with the new TASCAM **DM-24 32-Channel 8-Bus Digital Mixing Console**.

The DM-24's features are usually reserved for super high-end mixers. With 24-bit/up to 96kHz digital audio, the DM-24 blows away the standards in sonic quality for affordable consoles. With its internal automation, you'll get more power at your fingertips than you would from those huge consoles in commercial facilities. With some of the finest spatial and modeling processing from TC Works™ and Antares™, you can create fully polished productions without ever going to the rack. With incredibly flexible routing, fully parametric EQ, machine control capabilities, touch-sensitive motorized faders, and lots of audio interfaces, you can integrate the DM-24 into any studio environment.

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NATIVE INSTRUMENTS

BATTERY 1.0 (MAC/WIN)

A drum-sample player with a difference.

By Len Sasso

A percussion section is sometimes called a battery. Native Instruments' *Battery* puts a percussion section on your desktop, and in this case, the batteries are definitely included. *Battery* comes with 20 Kits (more than 600 MB of percussion samples) covering a broad range of styles. In addition to its own Kits, *Battery* can load Kits in Akai, *LM-4*, *LoopA-Zoid*, *Reaktor*, and SoundFont2 formats. Software-sample players, percussion-oriented ones in particular, are not exactly in short supply these days. But *Battery* stands apart from the crowd in its ease of use, its thoughtfully designed user interface, and its extensive real-time sample processing. You can download a limited demo version of *Battery* from the company's Web site.

Battery includes standalone and VST Instrument–plug-in versions. Because the standalone version does not provide a MIDI-file player or hard-disk recorder, it's mainly useful for studio sequencing, live performance, and Kits setup. Used with a percussion controller and a well-endowed laptop computer, *Battery* is certainly gig ready. The plug-in version is better suited for use in a desktop studio because there, the audio can be kept in the digital domain and *Battery* can be more accurately synchronized to other MIDI and audio tracks.

Sound quality and latency—the vital issues with any software synthesizer or sample player—depend on the CPU's speed and the quality of the audio card and its drivers. For this review, I tested the standalone and VST versions on a Mac G3/300 MHz. I used the built-in Sound Manager audio as well as an Emagic AW8 audio card. The VST host was *Logic Audio* 4.7. I experienced low latency and excellent sound quality in all configurations. Because the samples are held in RAM, a large chunk of memory is required to load some of the bigger Kits. I had to assign 128 MB to the standalone version and 192 MB to *Logic Audio* to load the largest Kit.

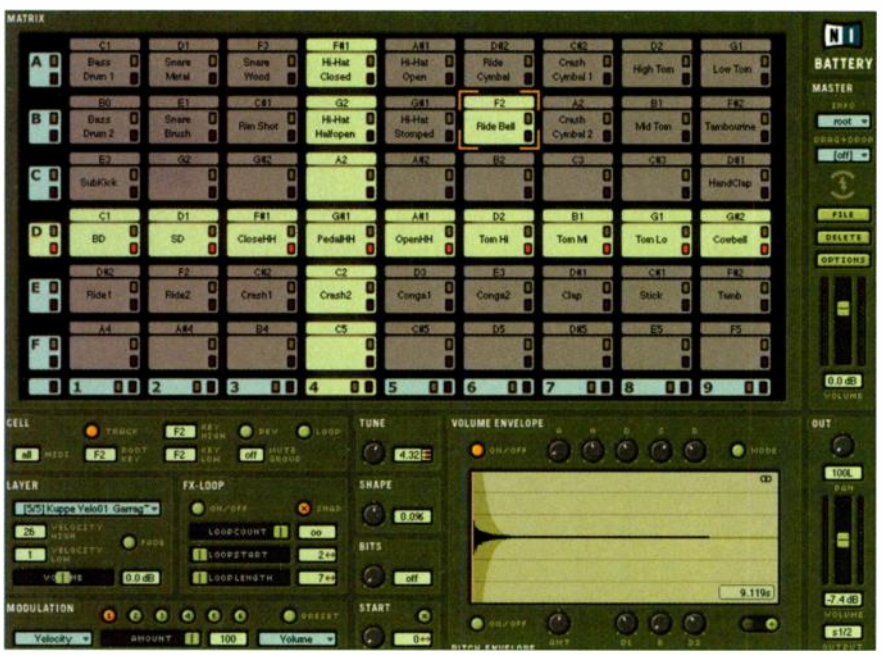

FIG. 1: *Battery*'s control panel features 54 drum pads (Cells) arranged in a six-by-nine Matrix. Six control sections below the Cell Matrix provide extensive real-time manipulation of sample playback.

Minimum System Requirements

Battery

MAC: PPC/300; 64 MB RAM; OS 8.6; OMS; Sound Manager–compatible audio interface

PC: Pentium II/300; 64 MB RAM; Windows 98/2000; compatible sound card

BANG ON A CAN

Battery's user interface consists of a single screen (see **Fig. 1**). Fifty-four pads, called Cells, are arranged in a six-row–by–nine-column configuration called the Matrix. Each Cell can hold as many as 128 samples, called Layers, which can be Velocity switched, Velocity crossfaded, or simply layered (played simultaneously).

The Matrix arrangement of Cells facilitates two useful operations: drag-and-drop copying, swapping, and rearranging of samples and Cell muting and soloing. Drag and drop is supported from the computer desktop as well as within the Matrix. From the desktop, you can grab any number of AIFF or WAV files and drag them to any Cell in the Matrix. Multiple samples are automatically distributed throughout consecutive Cells.

From within the Matrix, you can drag and drop individual Cells as well as whole rows and columns. You can choose what Cell data is to be dragged: everything, everything but MIDI data, just MIDI data, or a specific section of Cell parameters. Furthermore, dragging within the Matrix can copy the source to the destination or swap the two, the only minor inconvenience being that you have to change Options settings rather than toggle between drag modes with a key command. *Battery*'s drag-and-drop features make creating, rearranging, and combining Kits an absolute breeze.

Each Matrix Cell has its own Mute and Solo button. Soloing a Cell temporarily mutes all other Cells. Multiple Cells can be soloed, and any previous muting is restored once soloing is deactivated on all Cells. Rows and columns have their own Mute and Solo buttons for toggling all Cells in that

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FIG. 2: Battery's Envelope and Wave Display section shows the Volume Envelope (green shading), the Pitch Envelope (red line), and the user-defined FX-Loop (left of the green vertical line) for the selected Cell.

row or column. In addition to being useful for auditioning and tweaking Cells while a MIDI file is playing, the Mute and Solo buttons are useful for managing multiple Kits. Space permitting, you can load several Kits (they must use the same MIDI notes) into different parts of the Matrix and then use the Mute buttons to select which Cells are used from each Kit. Unfortunately, you can't control the Mute and Solo buttons with MIDI.

TAKING CONTROL

Located below the Matrix, *Battery*'s individual Cell controls are organized in six sections: Cell, Layer, Modulation, FX-Loop, Tune/Shape, and Envelope/Waveform Display. Except for the Layer section, which controls the layering of individual samples within a Cell, each section's controls affect all Layers (samples) within the Cell. At first it seemed odd that controls for loop points, tuning, and envelopes would affect every sample simultaneously, but as I worked with *Battery*, that arrangement was often what I wanted. When I needed a workaround, I simply assigned samples to separate Cells so that I could control the parameters individually.

The Cell, Layer, and Modulation sections located on the left side of the control area are mainly concerned with MIDI control. That is where you assign note ranges, mute groups, and Velocity zones; control keyboard tracking, looping, crossfading, and reverse playback; and assign MIDI Controller routings. The FX-Loop, Tune/Shape, and Envelope sections affect sample playback. They allow you to set up a custom loop to play back a specific number of times, modify a sample's tuning, distort a sample with waveshaping, change its bit depth, move the sample start point, and create pitch and volume envelopes. Furthermore, all the parameters in these sections are also available as modulation destinations.

The FX-Loop is one of *Battery*'s more unusual features. It allows you to define a second loop and specify the number of times it repeats. The FX-Loop always takes precedence over the internal loop (the loop defined in the sample). Once the FX-Loop plays its requisite number of times, the internal loop takes over or the sample plays to the end, depending on whether the Cell section's Loop parameter is turned on. You can use FX-Loop for everything from flams to subloops within loops. Combined with other effects, such as reverse playback and pitch enveloping, it can produce mind-boggling results.

Battery 1.0's Volume Envelope is straightforward. It has Attack-Hold-Decay (AHD) and Attack-Hold-Decay-Sustain-Release (AHDSR) modes. The Pitch Envelope is slightly more unusual; it is a two-ramp envelope with a movable break-point. You set the initial pitch, the break-point pitch, and the time for each ramp. The Pitch Envelope is independent of the FX-Loop, which means that you can apply an envelope to the pitch of the entire FX-Loop and then play the remainder of the sample. You could use that, for example, to create an accelerating sequence of kicks at the beginning of a beat-loop sample. **Fig. 2** shows *Battery*'s Envelope and Wave Display section with both an AHD Volume Envelope (shaded green) and a Pitch Envelope (red line). FX-Loop is turned on, which produces the four kicks to the left of the vertical green line.

The Tune/Shape section has controls for sample tuning, waveshaping, bit-depth reduction, and sample start point. Distortion techniques such as waveshaping and bit-depth reduction can add a lot of grit to a percussion sample. Three scales are available for tuning adjustments: pitch (±3 octaves in cents), percent, and note value (quarter notes to 16th-note triplets). The note-value scale, which is available only when *Battery* is synced to MIDI Clock, is convenient for adjusting loop tempo by simple pitch shifting. This handy option is also provided for setting the FX-Loop length. I often found myself wishing for an internal tempo setting so I could use note values in standalone operation.

Battery's Modulation section provides six modulation routings for each Cell. Modulation sources include MIDI Velocity, Pitch Bend, Note Number, Aftertouch, and any MIDI controller. You can also assign a constant, a random value, or the current loop count as a source. Destinations include

PRODUCT SUMMARY

Native Instruments
Battery 1.0 (Mac/Win)
percussion-sample player
$199

FEATURES	4.5
EASE OF USE	4.0
QUALITY OF SOUNDS	4.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Excellent user interface. Easy Kit assembly. Extensive real-time sample manipulation.

CONS: Requires a fast computer and lots of RAM. No tempo control without MIDI Clock. Can't save Kit MIDI settings separately from samples.

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FIRST WE LISTEN

volume, pan, pitch, and all of the effects sections' parameters. You can save Modulation presets to disk (although that doesn't work on the Mac) as well as drag them between Cells. You can also apply Modulation positively or negatively, so, for example, you can, set up a footpedal-to-volume crossfade between two Cells triggered by the same note.

A DIFFERENT DRUMMER

Percussion-sample players are like plumbers: they do an important job, but not a particularly glamorous one. *Battery* does its job well indeed, but the real surprise is that it also offers room for a great deal of creative manipulation. That is largely because of the ample supply of Cells, the ease with which you can dispatch the drudgery of setting up Kits, and the unusually robust effects and modulation sections.

▼ **Battery's drag-and-drop features make creating Kits an absolute breeze.**

You can use *Battery* for more than basic percussion. It's an excellent loop-sequencing and layering tool, even to the point of simple remixing. It is also a good tool for managing sound effects, again because of its effects and real-time modulation controls. In a pinch, it could even fill in for your keyboard sampler. With the cost of software percussion-sample players typically ranging from free to cheap, *Battery*'s $199 price tag does not put it at the low end of the buying spectrum. However, when you consider its unique features, the premium seems well justified.

Len Sasso *is a writer and composer living on California's Central Coast. Contact him through his Web site at www.swiftkick.com.*

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DEMETER

HM-1

A fat-sounding, high-quality tube mic preamp you can afford.

By Michael Cooper

James Demeter of Demeter Amplification has been designing and building quality tube gear for more than two decades. In 1980 he launched the first commercially available tube direct injection (DI) box, the venerable Demeter VTDB-2b Tube Direct, and it's still selling strong. (For more information about the VTDB-2b, see "Direct Action" in the November 2001 issue.)

I've always been impressed with what Demeter cooks up, so I eagerly took the affordable HM-1 tube mic preamp (see **Fig. 1**) for a test-drive. The unit belongs to the company's H-Series product line, which is composed of *hybrid signal processors* (those containing both tube and solid-state components) offered at attractive prices. The HM-1 is a dual-channel, 1U, rackmountable unit employing quality components throughout, including Jensen input transformers, 12AX7EH tubes (for amplification duties), and solid-state line drivers (to electronically balance the transformerless outputs). The HM-1 boasts a remarkably flat frequency response: less than 0.1 dB fluctuation from 20 Hz to 20 kHz.

SKIN I'M IN

The HM-1's sturdy steel and aluminum chassis is ventilated on its top and bottom plates and gets only slightly warm when cooking up your signals. Rear-panel I/O consists of balanced XLR and ¼-inch TRS jacks for each channel (see **Fig. 2**), wired in parallel so you can use any combination of jacks for input and output. The TRS jacks are not cross-coupled, so you can patch unbalanced gear safely to the HM-1's I/O with standard guitar cords. As with other equipment that uses this ubiquitous plug-and-play I/O topology, 6 dB of signal level is lost at each jack that you use in Unbalanced mode. The rear panel also provides a standard IEC connector with a detachable three-prong AC cord.

Each channel also provides an unbalanced ¼-inch DI jack on the front panel for direct-instrument input. The DI inputs access the HM-1's circuitry after the input transformer but before the tube gain stage. Both front and rear input jacks can accept mic or line-level signals.

Each HM-1 channel sports the same generous allotment of front-panel controls. Four buttons access, from left to right, a low-cut filter, 20 dB mic pad, 48V phantom power (with associated status LED), and polarity inverse. The Low-Cut switch rolls off lows below 200 Hz with a gentle 6 dB–per-octave slope, resulting in a 12 dB cut at 40 Hz.

The 20 dB mic pad is placed in the circuit before the input transformer, so it doesn't work for DI inputs (which enter the box after the transformer). Musical instruments put out relatively weak signals, however, so you usually don't need to pad them. Giving DI inputs a transformerless entry into the HM-1 better preserves an instrument's original tonal balance. Demeter's design makes good sense.

Each channel also has a continuously variable rotary gain control that provides as much as 30 dB of additional tube-amplification gain. The minimum and maximum values vary depending on which input (mic or DI) you are using and whether the pad is switched in for mic input. With the Gain knob set at hard left (fully counterclockwise), a DI input will receive 12 dB of gain; with the knob turned hard right, the

PRODUCT SUMMARY

Demeter
HM-1
tube mic preamp
$1,299

FEATURES	5.0
EASE OF USE	4.5
AUDIO QUALITY	4.0
VALUE	4.5

RATING PRODUCTS FROM 1 TO 5

PROS: Rich tube sound. Quiet. Loaded with features. No-fuss interfacing with balanced and unbalanced gear. Easy, flexible use. Priced attractively.

CONS: Instrument DI could use a slightly deeper bottom end for recording bass instruments. Output meters not calibrated to any standard. Owner's manual inadequate.

Manufacturer
Demeter Amplification
tel. (818)994-7658
e-mail info@demeteramps.com
Web www.demeteramps.com

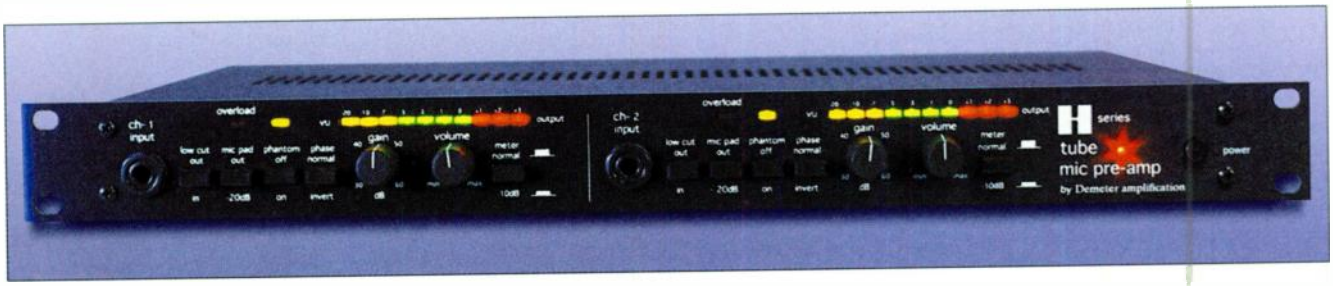

FIG. 1: Designed for the personal-studio market, Demeter's HM-1 (soon to be HXM-1) tube mic preamp likely will also win fans in higher places, thanks to its quality build and superlative sound. The unit employs a hybrid tube/solid-state circuit design.

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FIG. 2: The HM-1's rear panel provides XLR and ¼-inch inputs and outputs. The ¼-inch input jacks can handle high-impedance mic signals.

30 dB boost results in a total 42 dB of added gain for a DI input. That should be enough to attain close to a 0 dBFS level on most digital recorders with balanced inputs.

A hard-left Gain-knob setting will provide 30 dB of gain for mic input signals (with the pad switched out); switch in the pad, and the level drops to 10 dB of gain. Setting the Gain knob hard right gives you 30 dB more gain. You get 60 dB total with the pad switched out and 40 dB total with the pad switched in. The HM-1's maximum gain of 60 dB should be adequate for recording with most condenser and dynamic mics. The unit can handle a hefty +29 dBm maximum output level in Balanced mode, which is more than sufficient for most professional applications.

A front-panel overload LED lights up to warn you that the signal level is within 6 dB of overloading the tube-amplification circuit. If you have the gain control set to minimum for a microphone signal and the overload light is still on, switching in the mic pad should drop the level enough to preclude distortion.

Each channel also provides a continuously variable rotary Volume knob, which you can use to smoothly fade your output level from unity down to silence. Because the attenuator occurs after the tube amp, however, it will do nothing to prevent overload caused by blazing levels occurring before the tube amplifier. That's the microphone pad's job.

Each channel contains a tricolor, ten-segment LED output meter—an upscale feature that is not found on most cost-effective microphone preamps. The LED is referenced to a +3 or –8 dBm level, depending on the setting of the reference-level switch. (Each channel has its own switch.) Three red LEDs show levels above the 0 mark, but the scale of the meters is arbitrary. With one of the meters referenced to +3 dBm, I fed roughly –9 dBFS input to the A/D on my Yamaha 02R's channel insert to light all three of the HM-1's red LEDs. Plenty of headroom was still available (both on the HM-1 and the 02R) beyond the top of the meter's range, but the meter was useless for gauging hotter levels. I would prefer the HM-1's meters to be calibrated so that the top LED is referenced to the mic preamp's maximum output level or to some digital standard such as +19, +22, or +24 dBm. As they stand now, the meters should work well with systems calibrated to –10 dBV nominal operating levels.

GOOD BREEDING

Demeter products tend to have a characteristic sound that's composed of a smooth, clear upper midrange; tight bottom end; and gobs of tube richness. My first test of the HM-1 confirmed its heritage.

It's hard to judge the subtle sonic signature of a mic preamp in isolation, so I set up a comparison test. I pitted the HM-1 against two heavy hitters (both of which cost considerably more than the Demeter): a Millennia HV-3 solid-state mic preamp and a Pendulum Audio MDP-1 all-tube mic preamp. I then recorded some acoustic-guitar tracks through each unit, with a spaced pair of DPA 4011 mics.

The HM-1 sounded more present in the upper mids than the HV-3 did, but

HM-1 Specifications

Amplifier Type	Class A
Input Connectors	(2) balanced ¼"; (2) balanced XLR
Output Connectors	(2) balanced ¼"; (2) balanced XLR
Maximum Gain	60 dB (mic); 42 dB (instrument)
Maximum Input Level	–5 dBu (mic, pad out); +13 dBu (instrument, pad out)
Maximum Output Level	+29 dBm
Frequency Response	20 Hz–20 kHz (±0.1 dB)
Dynamic Range	124 dB
Total Harmonic Distortion (@ 30 dB gain with –30 dB in)	0.015% (@ 1 kHz)
Signal-to-Noise Ratio	–120 dB EIN
Phantom Power	48V
Tubes	(2) 12AX7EH
Filter	200 Hz highpass (6 dB/octave)
Pad	20 dB
Metering	10-step LED (input)
Power Supply	internal (IEC jack)
Dimensions	1U × 10.5" (D)
Weight	11 lb.

CHANGES AFOOT

By the time you read this, the Demeter HM-1 will have been upgraded to the HXM-1. The new model, priced roughly $100 more than the original, will incorporate component upgrades, including improved output transistors, an additional capacitor said to extend the unit's bass response, and minor cosmetic changes (different graphics for the front panel and round silver buttons rather than the rectangular black ones).

not as full in the bass (though it produced more bass than the MDP-1 did). The HM-1 also sounded more lush and subjectively louder than the HV-3—just what you'd expect from a quality tube mic preamp. But of the three preamps, the MDP-1 was the richest and most open sounding.

Although the HM-1 delivered respectable transient response, it could not compete with the HV-3 or the ultradetailed MDP-1. As for noise levels, with 50 dB of gain applied, the HM-1 sounded about as quiet as the HV-3.

The HM-1 sounded great on male and female vocals, both recorded with an AKG C 414 B-TL II solid-state microphone. The sound was present but not harsh. Male vocals cut easily through a pop-rock mix and positively brimmed with sweet overtones. The HM-1's bass and low-mid frequency response was just enough to keep male vocals sounding full and balanced, without blurriness. Female vocals sounded nicely detailed, without suffering excessive sibilance.

DIRECT ROUTE

To examine the HM-1's DI function, I plugged in my '62 Strat through the front-panel ¼-inch input jack and laid down a track. The results were absolutely awesome. The track sounded ultrapristine and present, sprinkled richly with tube harmonics, yet warm and round. The crystalline high-end detail was beautifully married to a tight bottom end.

In an A/B comparison with the Demeter VTDB-2b Tube Direct (DI box), both units initially sounded identical on electric guitar. But then, I lowered the HM-1's volume control and cranked the gain to drive the tube gain stage harder. That rounded off the edges and added some delicate hair to the guitar track, making for a different sound—something you can't do with the VTDB-2b.

I also compared the HM-1 with the VTDB-2b on direct injected electric bass. The HM-1 yielded a wonderfully rich and present sound, but the VTDB-2b produced a more extended bottom that gave more weight to the track.

HYBRID POWER

The Demeter HM-1 is a solidly built, generously featured, versatile, and all-around great-sounding tube mic preamp that costs considerably less than you might expect, given the unit's pedigree. Premium tube gear doesn't come cheap, but with the HM-1, Demeter is clearly doing its part to put high-quality audio within reach of those with less than world-class budgets.

The HM-1 does a good job on a variety of instruments and sounds downright great on vocals and as a tube DI on electric guitar. Aside from the owner's manual, which is painfully short on details, I found little to criticize. If you are looking for a fat-sounding, affordable cream machine that can handle a variety of applications, check out the Demeter HM-1. Your ears and your wallet will definitely thank you.

BLUE

KIWI

Panache meets utility in this bold, uncompromising condenser mic.

By Brian Knave

One of the challenges **EM** editors face is determining, from a steady stream of new products, which are most appropriate for readers' needs (and thus, which products should be reviewed). Personal-studio outfits typically run on tight budgets, so price is a measure of appropriateness. But we also have to take into account quality, utility, and versatility.

Blue Microphones' Kiwi is considerably more expensive than most other solid-state, large-diaphragm condenser mics we have reviewed, and we were hesitant at first to take it on. But the closer we looked, the more it made sense to review the Kiwi. To start with, this is Blue's top-of-the-line solid-state mic, so the quality was there. In addition, the Kiwi has nine polar patterns—more than any other solid-state large-diaphragm condenser mic—so we figured it was also versatile. And when we learned that the Kiwi comes with a first-rate shockmount—an optional item that can set you back some serious dollars elsewhere—the Kiwi seemed increasingly more of a good grab, and one that many readers might consider making. After all, for those who record instruments, the mic is the first and arguably most important part of the signal chain—not a place to skimp.

Blue's best efforts merge in the Kiwi, a delicious-sounding and versatile large-diaphragm condenser mic that balances old-world craftsmanship with high-tech savvy.

SUMPTUOUS FRUIT

Nearly a foot long and as thick as a beer bottle, the Kiwi is a formidable-looking microphone with a high-tech yet old-world vibe. The body is a metal canister finished in matte green (the microphone is named after the fruit, not the bird) and topped with a large lollipop-style grille cage. The lollipop—constructed with hand-woven, double-layer mesh—is chrome plated on the forward-diaphragm side (the side active in Cardioid mode) and finished in satin-nickel on the rear. A brass logo plate adorns the canister's front and further helps to identify the mic's address side in cardioid pattern.

On the canister's lower back is a round nine-position Polar-Pattern switch marked with icons for omnidirectional and figure-8 patterns at the extreme settings, cardioid in the center, and three intermediate positions on either side of cardioid. The switch, which is knurled, protrudes just enough from the canister to let you get a grip. The XLR posts at the bottom of the mic are gold-plated.

Complementing the Kiwi's spartan yet classy look is a minimalist circuit design and an emphasis on quality throughout. The modern, transformerless electronics feature Class A discrete circuitry (no integrated circuits) and high-quality components such as metal film resistors and capacitors; by design, the Kiwi has no attenuation pads or high-pass filters that could compromise the signal. I follow Blue's argument for not providing pads or filters, and to be honest, I did not miss either feature while testing the Kiwi. Besides, most folks who use a premium microphone will pair it with a high-end preamp, which likely will offer one or both features. Still, I felt compelled to knock off a half point in the Features rating for the Kiwi, if only out of consideration for the companies that traditionally provide pads and filters for their top-of-the-line condenser mics.

The Kiwi's dual-diaphragm, double-backplate capsule (built and tensioned by hand) mounts to the amplifier using a rubber stem that provides excellent internal shock protection. The stem's natural flexibility also allows for a unique Blue feature: three brass screws that secure the capsule by locking it down during shipping. Those must be removed before operating the mic, but they can be reinstalled at any point.

FIT FOR A KING

In keeping with its regal bearing, the Kiwi comes nestled inside a beautiful cherry-wood box lined seamlessly with sumptuous purple velvet over a perfectly cut bed of foam rubber. The box is fitted with big brass hinges and a latch, and the company name and logo are painted artfully on top in blue and gold. An attractive, well-written, and helpful user manual (complete with detailed tips about recording a variety of instruments) is included.

The Kiwi's shockmount (see **Fig. 1**) is a

PRODUCT SUMMARY

BLUE
Kiwi
large-diaphragm condenser microphone
$2,299

FEATURES	4.5
EASE OF USE	5.0
AUDIO QUALITY	5.0
VALUE	5.0

RATING PRODUCTS FROM 1 TO 5

PROS: Dual-diaphragm, hand-built, hand-tuned capsule. Class A, transformerless electronics. Beautiful, natural sound with solid lows and silky highs. Versatile. Quiet. Big dynamic range. Outstanding transient response. Nine polar patterns. Solid, uncompromising design and construction. Attractive, distinctive styling. Comes with wood jeweler's box and classic spider-type shockmount.

CONS: Large size can make it difficult to position in tight spaces.

Manufacturer
Blue Microphones
tel. (805) 370-1599
e-mail blue@bluemic.com
Web www.bluemic.com

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MORE CORE.

FIG. 1: Free with the Kiwi, the Shock from Blue is a premium-quality, solid-brass shockmount patterned after the spider-type shockmounts of yesteryear.

perfectly crafted near-replica of the classic spider-type shockmount. That comes as no surprise, considering that Blue cut its teeth building quality parts and accessories for other microphone manufacturers. Although the Shock, as Blue calls it, may seem an unoriginal accompaniment to such a distinctive-looking mic, it's a welcome part of the package. This elegant, robust, and time-tested shockmount is easy to position, holds the mic securely (yet not so tightly that you can't turn the mic inside the mount), and provides superior protection against floor rumble and inadvertent bumps. The unit is consummately manufactured from solid brass, and I especially appreciated the beefy stand clamp and extra-large wing nut.

A note about mounting the Kiwi in the Shock: it's best to position the shockmount roughly in the center of the Kiwi canister, with the logo plate visible between the two collars (O-clamps). If you put it so the logo is above the collars, you'll block access to the Polar-Pattern switch on the back of the mic or even force one collar to close around the switch. Conversely, if you position the mic low in the shockmount with the logo plate below the two collars, there won't be room left to mount the Blue pop filter.

The Pop ($199; see **Fig. 2**), also manufactured by Blue, is based on the pop filters built by EMI engineers during the Beatles' heyday. The simple design employs a felt-lined collar that slips over the grille assembly and around the Kiwi's canister body. The filter, which employs a layer of exceedingly fine stainless-steel mesh, is attached to a post which, though short, allows for a modicum of adjustment using a knurled locking nut. Like the Shock, the Pop is built to exacting standards from solid brass. (Both units also fit vintage Neumann U 47 and U 48 microphones.) My only gripe is that the Pop's collar barely fits over the Kiwi grille assembly, so care must be exercised while attaching it; once on the canister, though, it readily slides and snaps into place.

Another optional accessory is the Kiwi Cable ($54.95), which is intended to work

as a system with the Kiwi, the Shock, and the Pop. In this case, it makes sense to keep the system intact—this high-quality, high-definition quad cable is made solely from virgin materials (rather than from recycled, and thus impure, metals).

FINELY TUNED

The Kiwi capsule—basically a multipattern version of Blue's B6 Bottle capsule, which is meant for vocal and general use—is tuned by hand to capture full lows (the bass response doesn't start rolling off until below 30 Hz) and low mids and to accentuate an airy top end. A slight dip in the 500 to 900 Hz range seems to enhance the mic's exceptional clarity, and an equally slight rise in the 1 to 4 kHz region ensures a solid midrange response. Most noticeable is a smoothly rising presence boost starting at about 7 kHz and peaking by 3 dB in the 12 to 15 kHz region. That boost, which extends past 22 kHz, makes for a bright, open, yet silky-smooth high-end response that must be heard to be appreciated.

The Kiwi's sound varies depending on the polar pattern selected. The omni pattern offers the flattest response, thanks to the lack of bass buildup from the proximity effect. As you move the selector counterclockwise (toward the figure-8 icon), bass frequencies increase gradually as the proximity effect intensifies, producing an overall warmer or darker sound. But the tonal changes are slight as compared with those produced by some other multipattern mics, and overall, the Kiwi exhibits minimal bass boosting, even in the tighter directional patterns.

Skipper Wise, cofounder of Blue Microphones, describes the sound he was going for while developing the Kiwi capsule. His primary objective, he says, was a "continuousness" of sound or "absence of disjointedness" throughout the frequency response. "I don't want to hear the top, mid, or bottom end being separate from the rest of the spectrum," Wise says. "I have found, when this continuousness is achieved, that the whole sound appears to have depth."

FIG. 2: The Pop, an optional pop filter designed to work with the Kiwi, uses an extremely fine stainless-steel mesh to guard against plosives.

Wise evidently achieved his aims. The Kiwi is a wonderful-sounding mic that is

BRIAN KNAVE

FIG. 3: The Kiwi proved an excellent choice for miking Dobro. Here, guitarist Buddy Craig (left; miked with an Earthworks QTC1) and Nashville Dobro master Rob Ickes lay down tracks for Craig's soon-to-be-released album, *Midlife Chrysler.*

natural and transparent overall, with a pleasingly musical balance of warm, solid lows; well-defined yet mellow mids; and a bright finish that brings subtle detail to the fore. The mic's highs, though clearly bolstered, are smooth and well integrated and never sound brittle, harsh, or spitty. Furthermore, the images captured by the Kiwi have a hard-to-describe solidity and depth (perhaps the "continuousness" that Wise described); by comparison, lesser mics can sound flat or one-dimensional.

In addition to its outstanding clarity and unity of sound throughout the frequency range, the Kiwi is a supremely quiet mic with a big dynamic range. That means it can readily handle the demands of high-end digital-recording environments. The Kiwi also exhibits fast, lifelike transient response, predisposing it not only for vocals, percussion, and plucked, strummed, or hammered strings but also for Foley, voice-over, and room-miking applications.

I compared the Kiwi closely on various instruments with several other high-end solid-state mics, including models from Neumann, AKG, and Microtech Gefell. Of those, a Neumann U 87 from the '70s came closest to matching the Kiwi sonically. The two mics differed mostly in the low mids and extreme highs: the U 87's low mids (between 150 and 300 Hz) were more forward, making for a slightly fuller or sometimes cloudier sound. Overall, the Kiwi produced brighter, better defined, yet equally smooth highs.

In addition, I closely compared two Kiwi mics to each other. Except for subtle differences in the upper high-end response—something that is probably inevitable among hand-built transducers—the two mics sounded nearly identical.

WORKHORSE WONDER

One thing that impresses me the most about the Kiwi is its versatility. I had the opportunity to use this mic for many months in the studio, recording dozens of different instruments—including voice, acoustic guitar, mandolin, Dobro, lap dulcimer, piano, drums, and tons of other percussion—as well as electric-bass and -guitar cabinets and the Kiwi rarely failed to flatter. Seldom did I encounter an instrument (violin comes to mind) that sent me scurrying for a different mic. In short, this is one of the most versatile large-diaphragm mics I have used. If I were required to record an album with one mic, the Kiwi would be my pick.

I tried the Kiwi on half a dozen male and female vocalists in singing and speaking applications, and it almost always proved to be a great, if not excellent, choice. However, the Kiwi is very sensitive to plosives, so some type of pop filter is all but required for recording vocals. The Pop does an exemplary job of stopping air blasts and was sufficient most of the time. In some cases, though, I also had to use a standard nylon-mesh filter positioned between the Pop and the mic capsule. That combination quelled all but the most forceful blasts and also helped smooth out the sound on overly sibilant singers by mildly attenuating the Kiwi's bright, detailed top.

The Kiwi is a fantastic pick for all percussion. I used it on snare drum, drum sets (in both overhead and room-mic configurations), tambourines, bongos, congas, timbales, dumbek, cajon, pressure drum, claves, guiro, reco-reco, pandeiro, cabasa, shakers, cowbells, agogo bells, woodblocks, and several odds and ends (including an album cover played with brushes), and I loved the results in almost every instance. The Kiwi is especially flattering on hand drums or similar sources for which you want to accentuate high-end detail for added realism (hand sounds on conga heads, for example). But even on difficult, high-pitched sources such as zils and triangles, which vex many large-diaphragm condensers, the Kiwi faithfully transduced each piercing hit, exhibiting no distortion, harmonic imbalance, or other weirdness. Although it wouldn't be my first pick for a triangle track, the Kiwi did manage to capture a usable nongrating sound from that hard-to-record instrument.

I also loved the Kiwi on all the stringed instruments (unbowed) that I miked with it. In the heat of recording sessions, you often don't have time to conduct mic-comparison tests, so trying out new or unfamiliar microphones is risky

Kiwi Specifications

Element	externally polarized, DC bias capacitor ("true" condenser)
Diaphragm	1", 6-micron, gold- and aluminum-vapor-deposited Mylar
Polar Patterns	9
Frequency Response	20 Hz–20 kHz (±2 dB)
Dynamic Range (amplifier)	95 dB
Sensitivity	19 mV/Pa (@1 kHz into 1 kΩ)
Signal-to-Noise Ratio	87 dBA
Self-Noise	8 dBA
Power	48V phantom (±4V)
Maximum SPL	133 dB (for 0.5% THD)
Dimensions	11.13" (H) × 2.50" (D)
Weight	2 lb.

business—it can waste not only time and money but also your talent's best takes. Fortunately, the Kiwi didn't let me down. For a country "slamgrass" project I've been working on with guitarist and songwriter Buddy Craig, I had only one night to record Nashville Dobro star Rob Ickes, who was on tour at the time. Naturally, I hoped to get Ickes on as many tracks as possible, and I wanted his tracks to sound great—after all, this is a man who is used to recording in the best studios Nashville has to offer.

Although I had been using the Kiwi for only a couple of weeks, I was already feeling pretty confident in its abilities, so I took a chance and put it up (in cardioid pattern), hoping for the best (see **Fig. 3**). Neither Craig nor Ickes had ever heard of the Kiwi, but as soon as they heard playback of the first take, everyone was sold. "Sounds great to me," said Ickes. And that was that.

A similar thing happened the following month when I recorded Joe Craven (percussionist, violinist, and second mandolinist with the Dave Grisman Quintet) on mandolin. I typically opt for a small-diaphragm condenser when recording mandolin, but the Kiwi sounded so good (in cardioid pattern) right off the bat that I went with it and never looked back. A few weeks later, I trained the Kiwi (this time in omni) on Craig's acoustic guitar for an overdub session, and again I was stunned by the richness, realism, and clarity of the signal. "Those are the best-sounding guitar tracks we've gotten so far," Craig said. I have used the Kiwi exclusively on Craig's guitars ever since. Indeed, the Kiwi has become so indispensable to my production efforts that I have gone into hock to buy one.

LATTER-DAY CLASSIC

The Blue Kiwi is a premium large-diaphragm condenser microphone that sets new standards for excellence in its class. Stunning to behold, a delight to use, and delicious-sounding on a broad range of sources, this brilliant performer demonstrates what can be achieved when manufacturers take a no-compromise approach to engineering and design. By combining the best of old-world know-how and modern technology, Blue has fashioned a distinctive transducer that bridges the gap between the legendary handcrafted mics of yesteryear and the stringent demands (greater bandwidth, bigger dynamic range, and so on) of digital recording.

Although the Kiwi will likely remain out of reach for many readers due to its relatively steep price, it is actually a good deal by professional standards (not to mention a lasting investment). Those seeking a studio condenser mic that can cover a lot of ground while maintaining the most pristine signal path should give the Kiwi serious consideration. I can all but guarantee you won't be disappointed.

Brian Knave *is an associate editor at* **EM**.

WIARD

300-SERIES MODULAR SYSTEM

A quirky and original analog modular synth stands out from the crowd.

By Robert Rich

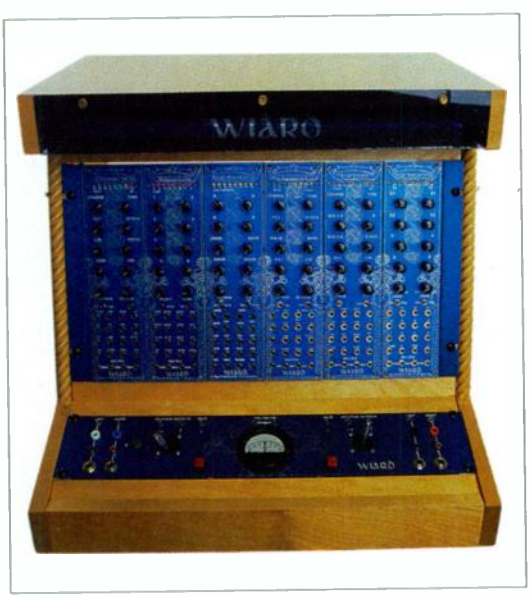
A new generation of analog modular synthesizers has quietly come of age. Such instruments update the best of vintage designs by offering modern circuitry and the advantages of computer control through MIDI-to-voltage conversion. The new modulars often reflect the maverick attitudes of their designers, who have a unique and iconoclastic vision for making music. When a synth designer's tastes run toward the experimental, the resulting designs lend themselves to experimentation. In Wiard's case, experimentation is not only encouraged but also difficult to avoid.

Wiard's founder, Grant Richter, describes the Wiard system as a cross between the ARP 2600 and Buchla Music Easel. I think that description deemphasizes the strangeness that separates the Wiard from other synths. Richter collects vintage gear and owns and repairs rare Buchla, ARP, and Serge modules. He wanted the Wiard synth to fill a singular niche within the panoply of analog options. He wanted to build something optimized for novelty, a sonic amusement park—in his own words, something of a Chinese puzzle box.

NOT YOUR MOM'S MODULAR

The Wiard neither looks, behaves, nor sounds quite like anything I have ever used (see **Fig. 1**). With its cobalt-blue panels, Celtic silk-screen designs, and rows of multicolored LEDs, it looks custom-made for a space-rock band like Hawkwind or a performance at Burning Man or the Stonehenge Free Festival. Sonically capable of traditional or bizarre analog timbres, it can also emit biting digital-hybrid tonalities reminiscent of a PPG Wave. With its slew of hidden features and uncompromising design, the Wiard is one of the most unusual, challenging, and downright quirky modular synths ever made.

The Wiard modular presents a challenge to reviewers because they simply can't become fully acquainted with it in a short period of time. Each module has an identical matrix of knobs and jacks, with few visual or ergonomic clues to guide an unfamiliar user. Input and output jacks intermingle, camouflaged among voltage controls and gates, and shorthand silkscreened legends do little to help distinguish inputs from outputs.



STEVE JENNINGS

FIG. 1: The cobalt-blue Wiard modules have an unusual look and an even more unusual sound. Although you can use them as separate signal processors, Wiard modules provide a comprehensive and complementary set of functions when used together.

SWISS ARMY SYNTH

Wiard conceives each module as a multifunction unit that will perform both audio and voltage-control duties. Most modules have enough features to function as standalone tone generators. Together they form a very compact, full-featured synthesizer.

Wiard makes seven different built-to-order modules in its 300 series. By the time you read this, an eighth module, the WoggleBug, will be added. For this review, I received an early Wiard One system, which comprised six modules: the Classic VCO, Sequantizer, Envelator, Waveform City, Omni Filter, and Dual Mixolator. (Since then, Wiard has unbundled the 300-series modules and dropped the Wiard One designation.) The system included Wiard's handy rack-mountable Joystick Controller ($349) with two joysticks, two momentary gate buttons, a voltmeter, and adapter jacks. I also used the Borg Filter as a standalone.

A seven-module system (with one of each module) provides four oscillators, two single VCAs, two stereo VCA/ring modulators, three multimode filters, four envelope/lag processors, a random voltage source, an eight-stage sequencer, and six four-way multiples. When you consider that the Sequantizer module can double as a wave-shaping oscillator and frequency

PRODUCT SUMMARY

Wiard
300-Series Modular System
modular analog synthesizer
$439–$599 per module

FEATURES	4.5
EASE OF USE	2.5
AUDIO QUALITY	4.0
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Deep controllability. Digital/analog hybrid module. Compact size.

CONS: Dense and confusing patch panels. Poor documentation. Wall-wart power supplies. Difficult to learn.

Manufacturer
Wiard Synthesizer Company
tel. (414) 769-0791
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Aardvark Pro Q10

Direct Pro Q10 is a computer based digital multi track recording solution from Aardvark. Powerful DSP-based virtual mixing software eliminates the need for an external outboard mixer.

Zoom MRS-1044 Digital Multitrack

The MRS-1044 is a digital multi track workstation, featuring 10 audio tracks, a programmable stereo drum track and a programmable bass track for a total of 13 tracks.

ZOOM

Roland VS 2480 24 Track

Roland

The VS-2480 is the first self-contained recording workstation to offer 24-track/24-bit digital recording with 64-channel digital mixing, onboard effects processing and optional CD burning.

Yamaha Motif-8 88-Note Workstation

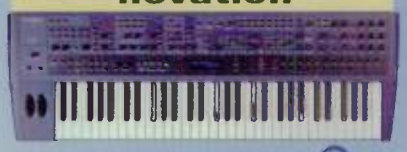
MOTIF combines the best features of a number of recent Yamaha products into an all-in-one music production workstation that will revolutionize the way music is made.

MOTIF

Novation SuperNova II Synthesizer

The Supernova II Keyboard features a 5 octave velocity sensitive keyboard with aftertouch.

novation



Tascam DM-24 Digital Mixing Console

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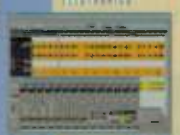

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divider—or that the Envelator module can act as a dual LFO, mixer, VCA, chaotic function generator, and voltage-controllable ADSR—you begin to see the flexibility hidden within those few modules.

The modules share an identical panel layout, which makes it easier for Wiard to have the sheet metal manufactured in small quantities. Although the visual similarity between modules can make it more difficult to distinguish functions on a dark stage, it does contribute to a nice symmetrical appearance. Each module has ten knobs, two switches, a row of eight LEDs, and 20 ⅛-inch minijacks arranged in five rows and four columns. Most modules use the bottom row of four jacks as a multiple to assist with complex patching.

Six modules fit side by side in a 6U-tall rack adapter. Exposed circuit boards sit behind each front panel, with LEDs mounted on the top board and minijacks on the bottom board. The jack panel has extra solder pads at each connection, allowing users to customize their own normalized routing behind the patch points. An aluminum box houses the module's guts, and at the back of this chassis lies the power connection, a 5-pin MIDI-style DIN plug (see **Fig. 2**).

Large DC wall warts supply power for as many as three modules through a power-distribution truss. I don't like wall warts, especially when they pile up like sleeping hamsters behind the racks. However, they allow Wiard to economize, and they prevent the risk of exposing users to line voltages behind the modules.

DMITRY PANICH

FIG. 2: The electronics for each module are housed inside an aluminum enclosure. Notice that each 5-pin DIN jack powers three modules.

DIGITAL HYBRID

Wiard provides two very different types of oscillators—the Classic VCO ($439) and Waveform City ($599), the latter of which crosses over into the digital realm. Waveform City generates digitally encoded wavetables much like the PPG Waveterm and Waldorf Microwave. You can treat the wavetables just as you would an analog VCO with control voltages, variable sync, and so on. Waveform City also contains its own envelope/lag processor and VCA, which are useful for adding expression.

Waveform City's wavetables are arranged in 16 banks with 16 waveforms each. You can sweep through the waveforms within a bank using voltage control. Wiard employs a rather complicated technique to scan through the samples within each wavetable: a sawtooth wave is sent from an analog VCO to an A/D converter, and the numerical output is used to sequence through the selected waveform. The lowest part of the sawtooth sets the pointer to the start of the wavetable, and as the voltage rises, the pointer moves through the wavetable to the end.

Using patch points to separate the analog scanning oscillator from the digital wavetables, Waveform City lets you warp the timbres. The analog VCO that Waveform City uses to scan through its wavetables provides most of the features you could want in an oscillator, including multiple waveforms and frequency modulation (FM), but it does not offer pulse-width modulation (PWM).

You can use Waveform City as a simple analog oscillator. More important, due to the fact that Wiard provides a patch point to the input that controls the wavetable pointer, you can scan the wavetables with something other than a sawtooth, thus modifying the shape of the resulting waveform. Consequently, you can modulate that digital waveshape the same way you can modulate an analog VCO.

Waveform City is one of the few wavetable oscillators that can respond to audio-frequency modulation. The results are grainy, glitchy, chaotic, and interesting. That flexibility makes Waveform City the star of the Wiard system, giving Wiard its most unique and characteristic sounds. (Owners of Synthesis Technology MOTM and Blacet systems will be pleased to know that Wiard has licensed the Mini-Wave—a diminutive version of Waveform City with MOTM- or Blacet-compatible front panels—to Blacet.)

ANALOG PURISTS

Wiard's other oscillator module, the Classic VCO, is pure analog and offers more features than any analog oscillator I have ever seen. It generates simultaneous sine, triangle, sawtooth, and pulse waves. When switched to low-frequency mode, the oscillator ranges from 0.1 to 20 Hz; in high frequency mode, it tracks well through a full ten-octave range. Variable PWM, coarse and fine frequency controls, sync, and dual FM inputs fill out the usual VCO capabilities.

Additions to the standard features include a continuous Sync control that provides a range from hard sync to no sync at all. I know of only a few other VCOs that offer soft sync, but I don't remember seeing any with continuous sync control. The Classic VCO also provides both linear and exponential FM inputs.

Like most Wiard modules, the Classic VCO provides a few features that would normally require additional modules. A built-in envelope and slew generator, normalized to a built-in VCA, provides basic attack and release functions. (As usual, you can defeat all normalized connections by plugging a patch cord in to the associated jack.) You can use the additional features to add volume expression to the

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synth voice without wasting a full-featured VCA elsewhere in the system. The simple envelope generator (EG) is actually a lag processor with independent upward and downward contours. If you wish, you can place an audio signal into the envelope's Gate input and use the circuit as an envelope follower.

Also lurking on the Classic VCO's front panel is a lone jack that provides a separate Random output whose wandering voltages are clocked by the VCO's frequency. That output is the closest thing to a noise source on the Wiard system, generating a pseudo-random sequence with 64 voltage levels. It resembles Buchla's 200-series Source of Uncertainty module and works best at lower frequencies, in which the output acts like a sample and hold. At audio frequencies, it sounds rather grainy. I wish Wiard provided a true noise source somewhere in the system; to its credit, though, the random output gives something different from the norm.

ENVELATOR

The Envelator ($439) does double duty as a dual LFO or EG. When I first looked at the Wiard system, I puzzled over the lack of a standard ADSR envelope. The Envelator provides two separate two-stage envelopes, which you can individually set to attack-decay (best for trigger input), attack-release (best for gate input), or cycling (for use as LFOs). Unlike those in most EGs, the envelopes grow shorter as you turn the attack and decay knobs clockwise. The inversion makes sense in Cycle mode, because a clockwise turn then increases the cycling frequency, but it's not intuitive for setting the envelope times.

Voltage-controlled attack and release times, as well as a built-in voltage-controlled mixer that combines the two envelopes with external sources, make the Envelator quite powerful. Initially I asked, "How do I get more complicated envelopes?" After a phone call to Richter, I realized I wasn't thinking flexibly. By separating the functions of a single complex envelope into two simple envelopes, the Envelator gives you the best of both. For ADSR response, simply set one envelope to AD mode and the other to AR. The Mix output then emits an ADSR envelope, and the Mix control determines the sustain level by adding either more or less of the shape's sustaining half. By adding voltage control to the different stages of the envelope, you can create intricate and expressive dynamic shapes. Those tricks take time to grasp, as do many of Wiard's more interesting features.

SEQUENTIAL CIRCUS

Wiard's Sequantizer ($439) provides eight stages of continuously adjustable voltages and can be clocked from an external source. Built-in voltage quantization makes it easier to hit equal-tempered notes with the knobs. Each stage has a corresponding gate output, and for odd time signatures, you can shorten the sequence length by means of a Reset jack. To add complexity, a Select knob and corresponding voltage input allow you to rearrange the order of the pattern. Plus and minus octave-transposer inputs accept gates for either upward or downward transpositions, and a separate voltage-transposer input can shift the sequence by other intervals. A Glide knob and corresponding voltage add portamento, and you can easily patch it to create per-stage portamento like the old Roland TR-303 has.

A Sequantizer output marked *10V* is useful if you want to create microtonal sequences or if you need a greater voltage range than that available from the Sequantizer's main output. The main output emits voltages after they have passed through the lag processor and quantizer; the quantizer limits this output to 1.5V.

Typical of the Wiard modules, a few thoughtful extras allow you to use the Sequantizer for purposes other than simple arpeggios. Because it can clock at audio frequencies from an external source, you can use the Sequantizer as a frequency divider and waveshaping oscillator. When clocking through all eight steps, it creates a tone that appears to be three octaves below the clock frequency. If you shorten the recycle time, you change the division; for example, if you patch the Sequantizer to reset at step 3, it generates a periodic waveshape an octave and a fifth below the clock. By adjusting the knobs for each stage, you can change the shape of that audio waveform. (The trick works better from the 10V output because of its hotter levels.)

DMITRY PANICH

FIG. 3: Based on the Buchla Lopass Gate and the Korg MS-20 filter, Wiard's Borg Filter offers two independent Vactrol-based filters with individual VCOs.

FILTRATION

Wiard provides two very different filter modules, the Omni Filter ($599) and the Borg Filter ($439). Both provide switching between lowpass, bandpass, and highpass modes, in addition to variable resonance and FM inputs. In other respects, however, the filters differ dramatically.

The Omni Filter offers allpass response and voltage-controllable mode switching, with inputs for four separate signals. One Mix knob controls the gain for inputs 1 and 2, and another for inputs 3 and 4. Four voltage-control inputs provide a 1V per octave input, two frequency-control inputs

I'M BIASED

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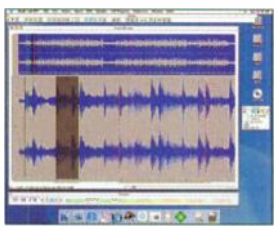

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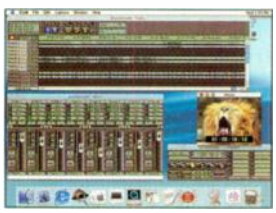

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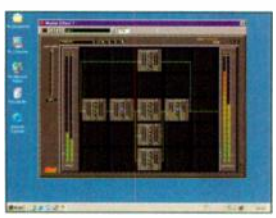

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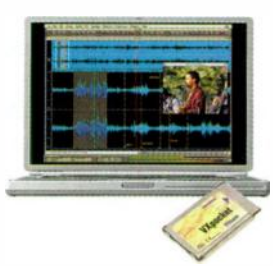

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with associated attenuation knobs, and a linear FM input with its own attenuator. The second frequency-control knob inverts the input voltage when you turn it to the left and boosts it positively when you turn it to the right.

The Omni Filter also includes coarse and fine frequency knobs, Q (resonance) control, and an attenuator knob for the Q's voltage-control input. Mix and Phase switches blend the dry signal with the filtered signal for phase-shifting effects in Allpass mode. Voltage-controllable mode switching really sets the Omni filter apart and allows for some dramatic automated sonic mutations.

As you turn the Mode knob clockwise (or send it a voltage), you switch the filter through lowpass, bandpass, highpass, and allpass responses. Most filters that allow multiple modes provide only 12 dB–per-octave (2-pole) response, typical of a state-variable design. However, the Omni isn't a state-variable filter, and it provides a full 24 dB–per-octave cutoff.

A separate 12 dB–per-octave output taps the 2-pole response as well. Wiard achieved this response the hard way. The Omni Filter employs a discrete op-amp design with a sound similar to that of the ARP 2600 filter. The Mode knob and voltage input together control a high-frequency pulse-width-modulated switch that reconfigures the filter circuit. You can create some bizarre effects by letting the switch hang between two filter modes as it buzzingly crossfades between two responses.

Here's a quick story to illustrate what it's like to work with a company as small as Wiard. During the course of this review, I had several conversations with Richter. I told him that I thought the filter sounded a bit bland and that I didn't like the way the resonance was frequency-dependent. The filter squawked at higher frequencies and sounded a bit thin to my ears, and I couldn't get a really punchy, resonant low bass sound. He said nobody had mentioned that before, but he agreed with my complaint.

After pondering the problem, Richter called me back the same day. He came up with a tweak to the filter design that he will offer to existing customers and incorporate into future shipments. I overnighted my Omni Filter to him, and he returned it the following week, vastly improved. Richter's responsiveness left me with a great impression of Wiard's customer service.

Even with the new modifications, the Omni Filter still sounds very clean, a bit clinical, and definitely more ARP than Moog. Now the resonance tracks evenly through the frequency range, and the cutoff goes low enough to squash a subharmonic bass note.

In contrast, the Borg Filter sounds anything but clinical. Squawky by design, this thing has attitude. The Borg includes two separate filters with Mode knobs that select lowpass, bandpass, or highpass (see **Fig. 3**). The filters' 2-pole response gives them a characteristically buzzy sound, but you can gang them in series to create a 4-pole response. Wiard hybridized the Buchla 200-series Quad Lopass Gate and the Korg MS-20 filters to create the Borg, which employs a Sallen-Key design with Vactrol circuits at the FM inputs. The design attenuates high-frequency modulation, making it more difficult to create audio FM effects, yet it works well for slow, sweeping multiple resonances.

For built-in FM, the Borg Filter incorporates two independent VCOs with simultaneous triangle-, sawtooth-, and square-wave outputs. The oscillators normalize to the filters' FM inputs, but you can also use them as additional LFOs or tone generators.

The Borg's labeling is confusing at first. With filter-resonance knobs labeled *Peak* in the manner of an old Korg, filter-cutoff voltage inputs labeled *Key Follow*, and VCO inputs labeled *1V/Oct*, the front panel is not exactly self-explanatory. Nonetheless, the Borg Filter proved to be quite useful after I became accustomed to its idiosyncrasies.

300-Series Module Specifications

Synthesis Types	analog subtractive synthesis; digital wavetable, nonlinear synthesis ([256] 8-bit waveforms/nonlinear transforms in Waveform City module)
Polyphony	1 note per oscillator module (when used with external MIDI-to-CV converter)
VCO Frequency Range	0.1–22 kHz
LFO Frequency Range	0.1–50 Hz
VCO Pitch-Tracking Accuracy	±5 cents over 8 octaves
Dynamic Range	80 dB
Gate Input Range	1.5V threshold
Audio-Signal Inputs	up to ±10V; >50 kΩ nominal impedance
Audio-Signal Outputs	±5V; <1 kΩ nominal impedance
Control Voltage I/O	1V/octave; ±10V range
MIDI Ports	none (external MIDI-to-CV required)
Patch Points	(20) ⅛" minijacks per module
Sequencer	quantized 8-stage CV (in Sequantizer)
Power Supply	±15 VDC; rearmounted 5-pin DIN connects to wall warts
Module Dimensions	2.83" (W) × 10.50" (H) × 10.50" (D)

BLENDING AND BENDING

The Mixolator ($439) hides a wealth of amplitude- and timbral-shaping features, but its hermetic silk-screened labeling doesn't help decode its potential. The Mixolator is actually a dual stereo VCA, which can also work as a ring modulator, mixer, and panner. It can mix both audio and control-voltage signals.

Each half of the Mixolator provides two X inputs (added together) and one Y input. Each input has its own gain knob. The X and Y channels stay

separated for stereo applications. The Z input (which has its own attenuation knob) provides the voltage for VCA gain. Another knob allows you to adjust the response to Z from linear to logarithmic. When you switch the mode from VCA to Ring Mod, an inverted copy of the X output is mixed into the signal so that only the sidebands remain from the sum of the X and Z inputs. The Mixolator provides positive and inverted phase outputs for X and Y channels, which are useful when you are mixing control voltages or when you're creating complicated feedback patches.

SONIC PLAYGROUND

In terms of novelty, the Wiard modular system succeeds in spades. Its most innovative module, Waveform City, allows it to enter the edgy world of digital tonality while maintaining the fluid maneuverability of analog control. Its multifunction envelope/slew generators encourage you to think openly and to explore the mutable possibilities of analog circuitry.

Any instrument with personality tends to guide its user into certain sonic territories. A synth's tonal strengths and weaknesses, combined with its user interface, suggest certain directions. I found myself gravitating toward brighter, more edgy timbres on the Wiard than on other analog synths. The combination of Waveform City's overtone grit and the somewhat bright-sounding Wiard filters suggests an industrial high-tech sheen more than soft organic warmth. The magic of a modular synth lies in its flexibility, so your impression could well be entirely different. I suspect that explorers in the realm of glitchy electronica, artists like Autechre or Tetsu Inoue, could find a mother lode of good noise within the Wiard's wires.

The system comes with sparse documentation that barely hints at the deep possibilities hidden within each module. Even if you are well versed in analog synthesis, you might find yourself climbing a learning cliff so steep, you'll wish you had ropes and crampons. If you can overcome the initial sense of unfamiliarity, however, you will soon begin to discover the depth and flexibility in Wiard's unusual approach.

The Wiard system would make an excellent addition to a synthesizer collector's arsenal and an impressive live-performance synth for experimentalists, technophiles, and spaceheads. I wouldn't recommend it as a synth player's only axe, and I would discourage most neophytes from considering it, given its price and difficulty. But if you're looking for something completely different—something that challenges you to retool your sound-making palette—Wiard might be the playground that keeps your electrons smiling.

Robert Rich *refuses to plug his new CD,* Bestiary, *which doesn't use strange, glurpy modular-synth noises. You never read this bio. You may now wake up.*

ALESIS

ANDROMEDA A6

A real analog polysynth for the 21st century.

By Peter Freeman

Occasionally, a musical-instrument manufacturer introduces a product that marks a real departure from its usual fare, an instrument that elevates the company into a higher echelon of quality. For Alesis, the Andromeda A6 might be that instrument.

Although several ambitious analog synthesizers have been produced in recent years, people no longer live in a climate where fully analog dinosaurs dominate the landscape. The expense and effort involved in designing and producing a powerful analog synth are considerable, even daunting, in today's economic climate. Consequently, it is particularly noteworthy when the design process leads to a product that the company is able to manufacture and sell successfully.

The Andromeda A6 is a fully programmable 16-voice synthesizer with 32 real analog oscillators, two independent multimode filters, and extensive hands-on controls (see **Fig. 1**). The Pitch-Bend wheel, Modulation wheel, and ribbon controller are completely assignable to any modulation destination or MIDI continuous controller. Thanks to a sequencer that emulates analog sequencers of the 1970s, each Program can store its own 16-step sequence of three simultaneous modulation signals and note triggers. Onboard effects provide analog distortion and digital signal processing. Two audio inputs let you route external sound sources through the A6's filters.

The Andromeda comes with a well-written manual that covers everything you need to know to operate it, including an introduction to analog synthesis. The manual is definitely one of the better ones I've read recently for an instrument of the A6's depth.

The A6 is a complex instrument with a tremendous number of features, and I don't have enough space to cover them all in detail. Instead, I've tried to touch on the essentials and especially the aspects that best illustrate the instrument's design and feel.

HARDWARE HEAVEN

The A6's design is definitely hardware intensive. For anyone who grew up with classic synths such as the Sequential Circuits Prophet-5 or the Oberheim OB series, the A6 is a happy return to the familiar panorama of knobs and buttons. Most of the 72 knobs and 144 buttons are dedicated to specific functions, except for eight soft knobs whose functions change depending on what's displayed on the LCD (see **Fig. 2**). Beneath those are eight soft buttons that are similarly software assignable.

At the center of the A6's front panel is the large backlit LCD that serves as the main control area. When you adjust an A6 knob, the LCD displays that parameter's values by default; you can, however, defeat that function using the Lock Display function. In addition to being able to see the current state of all or most parameters related to an A6 function at a glance, you can adjust them numerically (and thus with greater precision).

On the rear panel, eight ¼-inch TRS jacks provide individual outputs for all 16 voices by putting odd-numbered voices on the tip and even-numbered voices on the ring (see **Fig. 3**). A pair of main outputs is supplemented by two aux outs and a stereo headphone jack. Two CV Inputs allow external modulation of any oscillator destination and filter cutoff or resonance. Three Filter Audio Inputs facilitate processing external audio through the Andromeda's filters. The A6 also provides jacks for a CV footpedal, an assignable footswitch, and a sustain pedal, as well as a PC Card slot for external data storage.

MIXES, NOT MULTIS

The A6's two basic modes are Program and Mix. A Program stores a complete set of synthesis and effects parameters in one of 128 User Program locations. In addition, two ROM Preset banks contain 128 Programs each.

A Mix is a combination of as many as 16 Programs set up as layers or splits. Mixes can contain as many Mix Channels (Andromeda's term for Programs inside a Mix) as desired, but they must share the A6's total 16-note polyphony. Mix mode provides control over transposition, level, panning, and controller enable for each Mix Channel. Each Mix Channel can receive on its own MIDI channel for multitimbral operation. Two Mix banks, one Preset and one User, each provide 128 locations.

The fastest way to recall Programs is with the Program Group (bank select) and Program Number buttons located just above the ribbon controller. You

FIG. 1: One of the few polyphonic analog synthesizers in production, the Andromeda A6 offers a wealth of knobs and buttons for extensive hands-on control. Every control transmits MIDI data and every parameter responds to MIDI data, so that you can automate every real-time edit recorded into a sequencing program.

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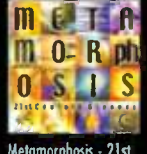

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of audio inputs routes one stereo or two mono signals to voices 15 and 16. Those signals replace the oscillators in the signal path so that playing the keyboard triggers the envelopes, tracks the filters, and so on to process the external audio. The input pair also employs Schmitt triggers as a modulation source to trigger any appropriate destination, including EGs.

As a straight external-signal filtering processor, the A6 offers quite a bit of flexibility because of the power of its Pre- and Post-Filter Mix sections. The same variety of textures that are possible when using the instrument's oscillators as the filter input become even more interesting when you run external sources through the filters. For example, you can use the Mix routing mode to combine Filter 1 bandpass and Filter 2 lowpass to emphasize different, opposite parts of an input source's frequency spectrum, leaving a hole in the midrange—an unusual and (with some LFO modulation) dramatic effect.

I especially like using the Filter Feedback control coupled with the Noise/External level knob to create some extreme distortion of the A6 filters. Predictably, that technique works especially well on drums and rhythm loops, though its usefulness isn't limited to those sounds.

TIMBRAL CHARACTER

The sound of the Andromeda was, according to Alesis, modeled on the original Moog modular synths. To my ears, the A6 emphasizes the high and low frequency ranges with a bit of a dip in the lower midrange. However, a lot of an instrument's perceived warmth resides in the frequencies between 200 and 400 Hz, so the A6 sounds a bit harsh or aggressive at times.

Working with the A6, I could realize almost any analog-type sound I had in mind without too much difficulty. I was particularly interested in creating basses, percussion, and shifting drone textures, all of which the Andromeda produced quite well.

In the bass department, the A6's inherently strong low end coupled with its powerful filters made coaxing huge but defined basses from the synth simple. The filters easily handled the classic analog "resonance-snap" percussion sounds,

Andromeda A6 Specifications

Sound Engine	analog subtractive synthesis
Keyboard	61-note semiweighted; Velocity sensitive; Channel Aftertouch
Polyphony	16-note, 16-channel multitimbral
Oscillators	(2) analog oscillators, (1) suboscillator per voice
Filters	(1) 2-pole resonant multimode, (1) 4-pole resonant multimode per voice
Sequencer	(3) parameters × (16) steps; (1) sequencer per Program
ROM/RAM Programs	128/256
ROM/RAM Mixes	128/128
Memory Card Slot	(1) PC Card SRAM (256 KB–2 MB)
Audio Outputs	(2) ¼" TS main; (8) ¼" TRS individual; (2) ¼" TS aux; (1) ¼" stereo headphone
Audio Inputs	(3) filter inputs
Control Inputs	(1) CV pedal; (1) assignable footswitch; (1) sustain; (2) CV inputs
MIDI Ports	In; Out; Thru
Display	240 × 64-pixel backlit LCD
Dimensions	40.1" (W) × 4.8" (H) × 16.1" (D)
Weight	47 lb.

PRODUCT SUMMARY

Alesis
Andromeda A6
polyphonic analog synthesizer
$3,499

FEATURES	4.0
QUALITY OF SOUNDS	3.5
DOCUMENTATION	3.5
VALUE	3.5

RATING PRODUCTS FROM 1 TO 5

PROS: Flexible. Lots of dedicated controls. Fun to program.

CONS: Understandably expensive. Presets lack warmth. Heavy.

Manufacturer
Alesis Studio Electronics
tel. (310) 301-9563
Web www.alesis.com

and the combination of the LFOs and looping envelopes made complex sustained tones interesting.

INTO THE FUTURE

The Andromeda A6 is an extremely powerful and versatile instrument that can produce an enormous range of textures. The only way to fully comprehend its breadth is to spend some time programming it yourself. The A6 is capable of real sonic depth and is reasonably simple to use, given its complexity.

Although the A6 is a well-thought-out and nicely constructed instrument that will definitely make a killer performance machine and studio piece, the factory presets don't completely do it justice. Fortunately, the programming process is easily learned by anyone with some experience with analog synths. A segment of the populace will buy the A6 just because all the knobs look cool, but if you're really interested in creating original, genuinely analog sounds, the Andromeda is one of the only modern options available.

The A6 sounds a bit chilly, and it's not the most organic-sounding instrument. During the review process, I compared it with a Memorymoog, a Prophet-5, and a Voyetra Eight, and the A6 definitely lacked the warmth of those older machines. Certainly, the Andromeda isn't wanting for clarity or punch, and it does have impressive bottom- and top-end "poke." With a little work, however, it is possible to coax a warmer class of sounds from the A6, if that's what you're after.

Perhaps my biggest surprise was how uncompromising and serious the A6 is, particularly in light of Alesis's previous synthesizers. Since the Andromeda's introduction, however, the company has gone bankrupt and been bought by new ownership, and it's attempting a phoenixlike resurrection. Alesis's tribulations aside, the A6 is definitely worth the attention of anyone serious about analog synthesis. It's certainly a lot of fun to program and play.

Peter Freeman *is a bassist, composer, and producer in New York. He has worked with artists such as Seal, John Cale and Chris Spedding, Jon Hassell, Nile Rodgers, Sussan Deyhim, and Shawn Colvin.*

UNIVERSAL AUDIO

2-610

A slice of history in a 2-channel tube mic preamp.

By Myles Boisen

Back in the middle of the 20th century, you couldn't just walk into your neighborhood audio store and buy a mixing console. Generally speaking, mixers were custom units designed and built by the recordists (that is, engineers) that used them. One such engineer was Bill Putnam Sr., who also designed the famed 1176 and LA-2A compressors recently reproduced by the revived Universal Audio company.

Putnam's tube-based 610 was the first modular console (one in which individual channels can be removed for repair while the board remains in service). But more importantly, the 610 sounded great. The few models still in use are highly coveted collector's items steeped in audio history. New generations of Frank Sinatras and Brian Wilsons can now experience some of the 610 vibe, spiffed up with modern innovations such as phantom power and DI inputs, in the Universal Audio 2-610 2-channel tube mic preamp.

BACK FROM THE PAST

Retro styling, along with the less visible benefits of old-fashioned build quality, are obviously high priorities at the new Universal Audio. With its cool purple jewel lamp and big black knobs, the 2-610 looks like a museum piece right out of the box. Weighing almost 12 pounds, the solid metal 2-rackspace chassis seems meant to last well into the next millennium. The gray and black color scheme makes it clear that Universal Audio isn't buying into modern graphics trends. The enclosure is well ventilated at the top, and heat is minimal for a device of this type. A peek at the interior reveals quality parts, a large torroidal transformer, American-made General Electric 6072A tubes, and 12AX7a tubes silk-screened with the Universal Audio logo.

The 610's straightforward rear panel has three balanced XLR jacks (mic input, line input, and line output) for each channel, an IEC power-cord jack, a fuse holder, and an AC voltage-selector switch. It lacks insert jacks and has no provisions for –10 dBV operation.

Each set of channel controls on the front panel is delineated by a raised rectangular section; the two sets are separated by the company logo, AC power switch, and individual 48V phantom power switches located in the center of the panel. Individual channel controls are simple and arranged in a spacious, orderly fashion with the massive Master Level knob (marked numerically from 0 to 10 with intermediate dots) as the centerpiece. According to Universal Audio's David John Hinson, that level control is located in the circuit between the initial tube gain stage control (marked in decibels: –10, –5, 0, +5, and +10) and the final tube output stage. Hinson also says the negative gain settings were not a feature of the original 610 console circuit but were added for the 2-610.

The unit's two tube gain stages let you achieve a wide variety of tube coloration and harmonic distortion. The manufacturer recommends keeping the Level control set between 7 and 10 and making coarse adjustments with the Gain knob to get the cleanest sound out of the preamp. Incidentally, the 2-610 has no level or peak metering of any kind.

The Gain knob and a Polarity Reverse switch occupy the upper left corner of the channel section. Below those are the ¼-inch DI jack and a 5-position Input Select switch. That control selects either line, microphone, or DI input as the source, with variable impedance settings for mic (500Ω and 2 kΩ) and DI (47 kΩ and 2.2 MΩ). As explained in the thorough and well-illustrated manual, variable input impedance can be used to match the source with an appropriate load, as well as to subtly adjust the tonal characteristics of some microphones and electronic instruments. All input and output signals pass through custom-designed transformers.

An equalization section is located to the right of the Master Level knob. High-frequency shelving values are switchable between 4.5, 7, and 10 kHz, with boost and cut available in 1.5 dB increments between –9 and +9 dB. Similar cut and boost increments are available for low-frequency shelving, with corner frequencies switchable between 70, 100, and 200 Hz.

GUITAR HERO

During its stay at my Guerrilla Recording studio, I put the 2-610 through a workout on a variety of instruments and musical styles. Despite the unit's impressive pedigree as a component of classic vocal tracks, electric-guitar recording was the main application in which this preamp consistently stood out. Engineer Bart Thurber (who shares the studio and records mainly punk and alternative bands) was the first to rave about the way the 2-610 handles loud guitar. After I tried the unit on a jazz guitarist, Thurber and I excitedly swapped tales about the 2-610's tube magic on all kinds of amplified-guitar tracks. Adjectives such as "creamy," "beefy," and "unbelievable" came up repeatedly in our lavish praise sessions,

Based on the legendary Universal Audio 610 modular console, the Universal Audio 2-610 is a 2-channel tube mic preamp that is faithful to the original circuit design but adds a few helpful goodies such as phantom power, direct inputs, more boost and cut settings, and variable impedance controls.

and the 2-610 quickly became the new studio favorite for guitar tracks.

On a guitarist playing a Gibson 175 through an assortment of Fender tube amps, a Royer Labs R-121 ribbon mic took on unexpectedly huge dimensions when coupled with the 2-610. The recorded tone was luscious and thick with a powerful, dominating midbass richness that was inescapable on even the smallest monitors. The 500Ω input setting worked best with the Royer mic; a Sennheiser MD-421 dynamic (placed next to the R-121 as a secondary mic on the cabinet) sounded more transparent at the 2 kΩ mark. Typically, the higher (2 kΩ) input-impedance setting produces less input gain (as much as a 5 dB reduction), as well as subtle differences in frequency response. Such timbral changes are largely dependent on the microphone and its response to changes in impedance loading. In particular, ribbon mics such as the R-121 and the Coles 4038 really shine when coupled with the 2-610's 500Ω input.

On this session, the R-121 and the MD-421 exhibited plenty of bite, and a 1.5 dB boost at 4.5 kHz was all that was needed from time to time to add a bit more cutting power. On other electric-guitar and -bass tracks, a 1.5 dB boost or cut in the low end was always sufficient to produce noticeable thickening or thinning.

The 2-610 played a major supporting role on a project by the band Lower Forty-Eight. On all of the backing tracks, guitarist Andy Lund's cabinet was double-miked (with the R-121 and the MD-421), and many parts were subsequently doubled, resulting in as many as four tracks of 2-610-flavored guitars. The 2-610 captured one of the most gorgeous and stunningly powerful rock-guitar sounds I have ever heard—and I have recorded literally hundreds of guitarists. Electric bass also seems to thrive through the 2-610, and I generated superb depth and definition by taking the instrument direct, both through the 2-610's DI input and using a Manley Tube Direct Interface patched into the 2-610's mic input.

2-610 Specifications

Input Connectors	(2) XLR balanced mic; (2) XLR balanced line; (2) unbalanced ¼" instrument
Output Connectors	(2) XLR balanced
Maximum Gain	61 dB
Maximum Input Level (mic)	+3.5 dBu
Maximum Output Level	+20 dBm
Microphone Input Impedance	500Ω, 2 kΩ (selectable)
Hi-Z Input Impedance	2.2 MΩ, 47 kΩ (selectable)
Frequency Response	20 Hz–20 kHz (±1 dB)
Dynamic Range	100 dB
THD	0.25% at minimum gain; 0.40% maximum gain (at +4)
Signal-to-Noise Ratio	>82 dB (at maximum gain 61 dB)
High-Frequency Shelving EQ Boost/Cut	1.5, 3, 4.5, 6, 9 dB (switchable)
Low-Frequency Shelving EQ Boost/Cut	1.5, 3, 4.5, 6, 9 dB (switchable)
High-Frequency Shelving EQ Corner Frequency Select	4.5 kHz, 7 kHz, 10 kHz (switchable)
Low-Frequency Shelving EQ Corner Frequency Select	70 Hz, 100 Hz, 200 Hz (switchable)
Power	48V phantom power, DC (switchable per channel)
Tube Types	(2) 12AX7a; (2) 6072A
Power Requirements	115V or 230V (switchable)
Dimensions	2U × 12.125" (D)
Weight	11.75 lb.

WOOD AND METAL

On a couple of occasions, I paired the 2-610 with a Neumann KM 183 small-diaphragm omnidirectional mic on acoustic guitar. The combination was pristine and predictably warm, though in one instance the 2-610 didn't provide enough high-end sparkle in the mix. Switching to a Grace 101 transformerless, solid-state preamp made a world of difference by bringing out the highs and a sense of immediacy the 2-610 lacked. However, with a brighter close mic (a Neumann CMV 563 with the M55 omni capsule) on a different guitarist, the 2-610 successfully captured a cool 1960's-era rhythm-guitar sound.

For a range of other acoustic instruments, including wood and metal percussion, alto and tenor saxophones, and trumpet, the 2-610 was characteristically warm and euphonious. Some louder percussive sources tended to compress or lose their transient sharpness when too much gain was applied; however, moving the mic back or notching down the gain restored the edge.

I was surprised that the 2-610 didn't work to my satisfaction on an acoustic jazz bass recorded with the MD-421. For that application, the preamp was simply a bit too warm and lacking in high-end definition. Compared with other tube preamps I regularly use, the combination of the 2-610 and the MD-421 seemed to pick up excessive room sound, probably due to tube compression. Noise was never a problem on the delicate acoustic sounds, and the 2-610's rated 61 dB of output gain was sufficient for all sources.

The 2-610's rear panel provides three balanced XLR jacks (mic in, line in, and line out) for each channel.

They *LAUGHED* when I said they could have **Perfect Pitch**

. . . until I showed them the simple secret *—and they heard it for themselves!*

David Lucas Burge

Learn to recognize EXACT tones and chords—BY EAR!

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The true story behind the worldwide #1 best-selling ear training method

by **David Lucas Burge**

It all started as a sort of teenage rivalry . . .

I'd slave at the piano for five hours daily. Linda practiced far less. Yet somehow she always shined as the star performer at our school. It was frustrating. *What does she have that I don't?* I'd wonder.

Linda's best friend, Sheryl, bragged on and on to me, adding more fuel to my fire. "*You* could never be as good as *Linda*," she would taunt. "*Linda's* got *Perfect Pitch*."

"What's Perfect Pitch?" I asked.

Sheryl gloated about some of Linda's uncanny abilities: how she could name *exact tones and chords*—all BY EAR; how she could sing any tone *—from mere memory*; how she could play songs —after just *hearing* them!

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

But it bothered me. Did she *really* have Perfect Pitch? I finally asked Linda point-blank if it was true.

"Yes," she nodded to me aloofly.

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

"OK," she replied.

Now she'd eat her words . . .

My plot was ingeniously simple: When Linda least suspected, I challenged her to name tones—*by ear*.

I made her stand so she could not see the piano keyboard. I made sure other classmates could not help her. I set up everything perfectly so I could expose her Perfect Pitch claims as a ridiculous joke.

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

I had barely touched the key.

"F♯," she said. I was astonished.

I played another tone.

"C," she announced, not stopping to think.

Frantically, I played more tones, skipping here and there all over the keyboard. But somehow she knew the pitch each time. She was *AMAZING!*

"Sing an E♭," I demanded, determined to mess her up. She sang a tone. I checked her on the keyboard—but she was right on!

Now I started to boil. I called out more tones, trying hard to make them increasingly difficult. Still she sang each note perfectly on pitch.

"How in the world do you do it?" I blurted. I was totally boggled. (age 14, 9th grade)

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

"I don't know," she sighed. And that was all I could get out of her!

The dazzle of Perfect Pitch hit me like a ton of bricks. My head was dizzy with disbelief. Yet from then on, I knew that Perfect Pitch was real.

I couldn't figure it out . . .

"How does she DO it?" I kept asking myself. On the other hand, why can't *everyone* recognize tones by ear? It dawned on me: people call themselves *musicians* and yet they can't tell a C from a C♯?? Or A major from F major?! That's as strange as a portrait painter who can't name the colors of paint on his palette! It all seemed odd and contradictory.

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

You can be sure I tried it for myself. With a little sweet-talking, I would get my three brothers and two sisters to play tones for me—to name by ear. But it turned into a guessing game I just couldn't win.

Day after day I tried to learn Perfect Pitch. I would play a tone *over* and *over* to make it stick in my head. But later I couldn't remember any of them. And I couldn't recognize any of the tones by ear. Somehow they all sounded the same after awhile; how were you supposed to know which was which—just by *listening?*

I would have done anything to have an ear like Linda, but it was way beyond my reach.

So, finally, I gave up.

Then it happened . . .

It was like a miracle . . . a twist of fate . . . like finding the lost Holy Grail. Once I stopped *straining* my ear, I started to listen NATURALLY. Then the incredible secret to Perfect Pitch jumped right into my lap.

I began to notice faint "colors" within the tones. Not *visual* colors, but colors of *pitch*, colors of *sound*. They had always been there. But this was the first time I had ever really "let go"—and *listened*—to discover these subtle differences.

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

The realization struck me: THIS IS PERFECT PITCH! This is how Bach, Beethoven, and Mozart could mentally envision their masterpieces—and

know tones, chords, and keys—all by ear!

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

Bursting with excitement, I went to tell my best friend, Ann (a flutist).

She *laughed* at me. "You have to be *born* with Perfect Pitch," she asserted. "You can't *develop* it."

"You don't understand Perfect Pitch," I countered. I showed her how to listen. Timidly, she confessed that she too could hear the pitch colors. With this jump start, Ann soon realized that she had also gained Perfect Pitch for herself.

We became instant celebrities. Classmates loved to call out tones for us to magically sing from thin air. They played chords for us to name by ear. They quizzed us on what key a song was in. Everyone was endlessly fascinated with our "supernatural" powers, yet to Ann and me, it was just normal.

Back then I never dreamt I would later cause such a stir in the academic world. But as I entered college and started to explain my discovery, many professors *laughed* at me.

"You must be *born* with Perfect Pitch," they'd say. "You can't *develop* it."

I would listen politely. Then I'd reveal the simple secret—*so they could hear it for themselves*. You'd be surprised how fast they changed their tune!

In college, my so-called "perfect ear" allowed me to *skip over* two required music courses. Perfect Pitch made *everything* easier for me—my ability to perform, compose, arrange, transpose, improvise, sight-read (because—without looking—you're sure you're playing the correct tones)—and my *enjoyment* of music skyrocketed. I learned that music is very definitely a HEARING art.

Oh, so you must be wondering what happened with Linda? Please excuse me, I'll have to backtrack . . .

It was now my senior year of high school. I was nearly 18. In these three-and-a-half years with Perfect Pitch, my piano teacher insisted I had made ten years of progress. And I had. But my youthful ambition still wasn't satisfied. I needed one more thing: *to beat Linda*. And now was my *final chance*.

The University of Delaware hosts a music festival each spring, complete with judges and awards. To my horror, they scheduled me that year as the *grand finale* of the entire event.

The day arrived. Linda gave her usual sterling performance. She would be tough to match, let alone surpass. But my turn finally came, and I went for it.

Slinking to the stage, I sat down and played my heart out. The applause was overwhelming.

Later, posted on the bulletin board, I discovered my score of A+ in the most advanced performance category.

Linda got an A.

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

Join musicians around the world who have discovered a new secret for success with the **Perfect Pitch Ear Training SuperCourse**:

● "Wow! It really worked. I feel like a new musician. I am very proud I could achieve something of this caliber." *J.M.* ● "Thanks...I developed a full Perfect Pitch in just two weeks! I don't know how it worked. It just happened out of nowhere like a miracle." *B.B.* ● "It is wonderful. I can truly hear the differences in the color of the tones." *D.P.* ● "I heard the differences on the initial playing, which did in fact surprise me. It is a breakthrough." *J.H.* ● "I'm able to play things I hear in my head a lot faster than ever before. Before the course, I could barely do it." *J.W.* ● "I hear a song on the radio and I know what they're doing. My improvisations have improved. I feel more in control." *I.B.* ● "In three short weeks I've noticed a vast difference in my listening skills." *T.E.* ● "I can now identify tones and keys just by hearing them. I can recall and sing individual tones at will. When I hear music now it has much more definition, form and substance. I don't just passively listen to music anymore, but actively listen to detail." *M.U.* ● "Although I was skeptical at first, I am now awed." *R.H.* ● "It's like hearing in a whole new dimension." *L.S.* ● "I wish I could have had this 30 years ago!" *R.B.* ● "Very necessary for someone who wants to become a pro." *L.K.* ● "This is absolutely what I have been searching for." *D.F.* ● "Mr. Burge—you've changed my life!" *T.B.* ● "Learn it or be left behind." *P.S.* . . .

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VOICE OF REASON

On its first vocal outing, paired with a Lawson L47MP tube mic on a folksy male singer, the 2-610 exhibited a bit too much tube splatter on sustained notes and sounded overly grainy in the high end and noticeably compressed. On other singers as well as on a few saxophonists, I observed similar results ranging from graininess to audible distortion. In those instances, I was generally using high-output, large-diaphragm tube mics such as the L47MP or Manley Cardioid Reference.

Thurber related problems he had pairing the 2-610 with a Neumann TLM 103 (which has a hot output). But he did on occasion capture "a little extra edge" on vocal tracks (primarily sung by loud rockers) by coupling the 2-610 with the Lawson L47MP.

In most of the aforementioned cases, the 2-610 gain was set at its minimum –10 value and the Master Level knob was set between 7 and 10. The preamp output was routed directly to analog tape at +4 dBu. Decreasing the Master Level knob did little to alleviate the distortion, indicating a potential problem with headroom at negative gain settings in the 2-610's initial input stage. Whatever the cause may be, the 2-610 wasn't always a prime candidate for vocal recording with tube mics. In my experience, vintage Ampex and Telefunken V72a tube mic preamps can also present such problems; often, I'll end up coupling tube mics—at least when they provide adequate tube coloration—with clean, solid-state mic preamps.

I obtained good results on a quiet female singer by using a CMV 563 tube mic with the 2-610 at 500Ω. It still took some fiddling to get rid of vocal grit, though. The best solution seemed to be to set the Master Level knob to maximum, reduce the initial gain, and move the singer back from the mic. Padding the mic's output or increasing the input impedance should also reduce input gain to the 2-610 so as to obtain a clearer, less compressed sound.

I also generated a terrific sound using a Shure Beta 58 with the female singer doing scratch vocals. That inexpensive stage dynamic mic sounded amazingly rich, airy, and expensive through the 2-610. It had no problems with graininess or undesirable coloration; indeed, in a blind test I might easily have mistaken the Beta 58 for a costly tube mic. I was even inspired to use the Shure mic for some of the final vocal tracks.

HOW LOW CAN YOU GO?

To get a sense of how the 2-610 stacked up against other all-tube preamp designs, I conducted loudspeaker tests using a Neumann KM 140 positioned on a full-range monitor playing music in a variety of styles. The 2-610 definitely matched or beat the competition. Up against a modified Ampex 350 series preamp, the 2-610 supplied a tad less high-end sizzle but conveyed more solid and extended bass response. I noted similar results when comparing the 2-610 to a vintage Telefunken V72a tube pre: the V72a offered a more aggressive sound but much less roundness and depth in the low end. Finally, compared with a Peavey VMP-2 (an excellent 2-channel tube pre that costs less than $1,000), the 2-610 proved vastly superior in both high-end detail and low-end punch.

Just for fun, I pitted the 2-610 against a selection of renowned solid-state preamps. Although transistors and op-amps offer distinct differences in upper-midrange and treble clarity, nothing in my racks could beat the 2-610's authoritative and deep lows.

I also compared the 2-610's dual channels with each another. One side (the channel I used for the loudspeaker tests) had a bit more low-end depth, and the other was slightly sweeter sounding and exhibited smoother upper mids. In addition, when setting the Level knobs for identical output gain, the two channels seemed to differ by as much as a half a point on the knobs, depending on the program material and input gain. Fortunately, the Level controls are continuously adjustable, so that was not a big problem; however, my observations underscore the differences in consistency and calibration between tube and solid-state circuits—a concern for critical stereo-recording applications.

PRODUCT SUMMARY

Universal Audio
2-610
tube mic preamp
$2,295

FEATURES	4.5
AUDIO QUALITY	4.5
EASE OF USE	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Rich tube sound. Quiet. Variable impedance on mic and DI inputs. Line-level input capability with access to all features. Polarity reverse. Onboard EQ. Well-built.

CONS: Difficult to set gain for adequate headroom on some high-output microphones. No level or peak metering. Stereo channels not perfectly matched.

Manufacturer
Universal Audio
tel. (831) 466-3737
e-mail info@uaudio.com
Web www.uaudio.com

I WALK THE LINE

The ability to go line level into the 2-610 is an exciting and seductive feature. In that mode, the signal continues to pass through the transformers, the tubes, the polarity-reverse circuit, and the equalization section, making the 2-610 extremely useful for coloration of tracks or stereo mixes. I even used it to salvage overhead drum-mic tracks that had phase problems and a thin sound.

On stereo mixes, the –10 gain adjustment combined with maximum settings on the Master Level control yielded clean and relatively uncolored results. As with most high-quality tube gear, the 2-610 seemed to expand the highs and lows a bit and gave the mix a creamier and slightly compressed finish. Raising the gain and decreasing the level added more tube coloration; at the +10 gain value, it was possible to get deliciously nasty distortion on line-level tracks or mixes. But at those extreme settings, the two channels of my demo unit didn't compress equally,

which created minor difficulties in stereo-level matching.

Generally, the 2-610's high-shelving EQ is especially useful for adding crisp detail at the 7 and 10 kHz settings. The high-shelving EQ sounded smooth and sweet when applied in small increments, but Thurber and I agreed that boosts of more than 4.5 dB became overbearing and harsh sounding.

The 2-610's low EQ is certainly powerful in additive as well as subtractive applications; however, a single 1.5 dB click in either direction can sculpt the low end drastically. On some mixes, for example, the smallest available bass boost (+1.5 at 70 Hz) was excessive and made the kick drum sound too *thuddy*. Although that might be just the thing for warming up a chronically thin mix, for subtler mastering corrections, the 1.5 dB increments were too coarse. Fortunately, on most mixes, just running the signal through the 2-610 provided a deep and satisfying low-end boost, even without EQ engaged.

WORKING MAGIC

Using a time-honored tradition of tubes and transformers, the Universal Audio 2-610 adds an authentic old-school glow to all kinds of miked sources. This versatile preamp also is a good value when you factor in the vintage vibe, the dual channels, and the unit's unique ability to do double-duty as both a tracking and a mixing tool. Any recording can potentially benefit from line-level tube-stage processing, and with the 2-610 there is an undeniable fun factor in doing just that.

The 2-610 has been an absolute smash hit for guitar and electric-bass recording at my studio. Indeed, it's hard to imagine doing another rock, jazz, or blues session without it. I am concerned, though, that the 2-610 is not clean enough for all vocal styles, especially when used with a high-output condenser microphone. Moreover, although a Neumann U 47 or a AKG C12 through the original 610 console is considered by many the ultimate signal path for vocal recording, with the unit I reviewed, my recording skills, and an assortment of tube mics and singers, the creamy vocal sounds of yesteryear rarely materialized.

As with most classic tube designs, users should not expect the 2-610's abundant sonic personality to be perfect for all applications. Nonetheless, the unit can work magic on amplified instruments, electronic keyboards, strings, horns, and percussion and in ambient-miking applications. I also highly recommend it for use with ribbon and other low-impedance microphones.

Myles Boisen *is a guitarist, producer, composer, and head engineer at Guerrilla Recording and the Headless Buddha Mastering Lab in Oakland, California. E-mail him at mylesaudio@aol.com.*

CLAVIA

NORD LEAD 3

Clavia's third-generation synth leads in sonic potential and ease of use.

By Greg Negoescu

In 1995 an obscure Swedish company named Clavia breathed new life into a traditional synthesizer form with the introduction of its Nord Lead synthesizer. With the marketing cry of "No samples," Clavia unveiled its virtual-analog synth, which emulated the functions of an old-school analog synthesizer through the use of digital circuits.

Six years later, in a market full of virtual-analog synthesizers, it's easy to forget just how groundbreaking the Nord Lead was. Now Clavia has introduced the third generation of the Nord Lead, which offers a greatly improved sound engine, more polyphony, and a new benchmark for real-time control and editing.

RED ALL OVER

Over the years, Clavia's products have shared a distinct look and feel that sets them apart from the competition. The Nord Lead 3 is no exception. It features a fire-engine red rolled-steel exterior that feels solid and roadworthy. The compact (albeit heavy) 49-key instrument presents the user with lots of controls arranged in a logical and accessible fashion (see **Fig. 1**). The front panel's left portion is dedicated to file and performance functions, and the center of the panel places editing controls within easy reach. The top panel's right side still provides enough room to accommodate a Clavia Nord Mini-Modular synth, which looks very much at home there.

The 46 rectangular push buttons on the Nord Lead 3's surface are the same style that appeared on earlier versions of the instrument. The buttons feel sturdy and help greatly in accessing functions with a minimum of menu surfing. There are also two displays: a 32-segment backlit LCD for housekeeping and editing, and a 3-digit LED dedicated to FM and oscillator frequencies. Near the LCD is a large plastic rotary dial for changing parameters. Because of Clavia's a-knob-for-every-function philosophy, the dial is used mainly to call up patches: there's no alpha-wheel editing here.

Knobs are essential to the classic analog-synthesis experience and offer a means for intuitive programming and real-time control. In the Nord Lead 3, Clavia has taken the knob into the digital domain: a circular LED graph surrounds the knob and provides instant feedback on the knob's position (see **Fig. 2**). The knobs turn freely, relying upon the digital indicators to let you know when you've set them to their limits.

The Nord Lead 3 keyboard has a springy, quick synth action that supports Velocity and Aftertouch. You can split the keyboard into two sections, but with only 49 keys, you don't have much room to work with.

The rear of the Nord offers a full complement of jacks, including separate control- and sustain-pedal jacks, four assignable output jacks, a power switch and fuse holder, and MIDI In, Out, and Thru (see **Fig. 3**). Unfortunately, the stereo headphone jack is on the rear as well.

The first Nord Lead had a power cable permanently attached, which, though convenient, became a problem when the cable wore out because of stress. The Nord Lead 3 uses a removable 2-pin power cable that looks more like a power cable from a portable stereo than from a professional music product. I wish it used the standard IEC 3-pin power cable found on most pro gear. That way you'd always have a spare cable if needed.

WOOD AND STONE

To the left of the keyboard is the most controversial portion of every Nord Lead, the Pitch Stick and Modulation Wheel. Those performance controls have inspired a love-hate relationship with many users, who complain that their size and feel aren't right. I find, however, that the highly tactile controls add greatly to the playability of the instrument.

The Pitch Stick, which is made of wood, has just the right amount of resistance for digging into a pitch bend. The Modulation Wheel, which is made of metal but has the feel of granite, rolls nicely under a sweaty thumb.

Functionally, the Nord Lead 3 continues the tradition established with earlier models by using a four-part multitimbral

FIG. 1: The Nord Lead 3 is the latest in Clavia's series of analog modeling synthesizers. This 49-key model offers a vast range of editing options.

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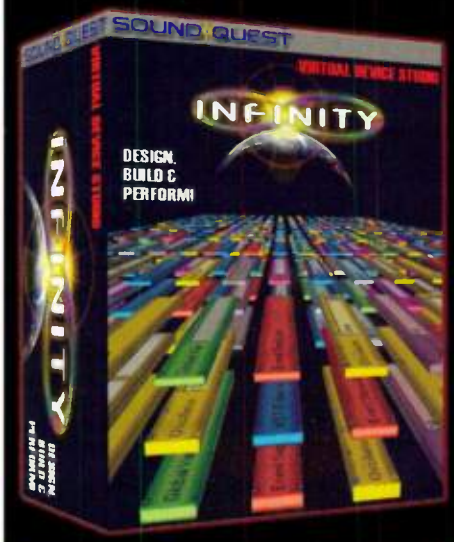

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Infinity even includes an army of premade software devices including additive, subtractive and FM synths, Drum Kits, Organs, and Samplers. Dozens of audio effects units are also provided, along with many sophisticated MIDI processing devices like arpeggiators, pattern sequencers and even a multi-track MIDI event recorder for oustanding device automation!

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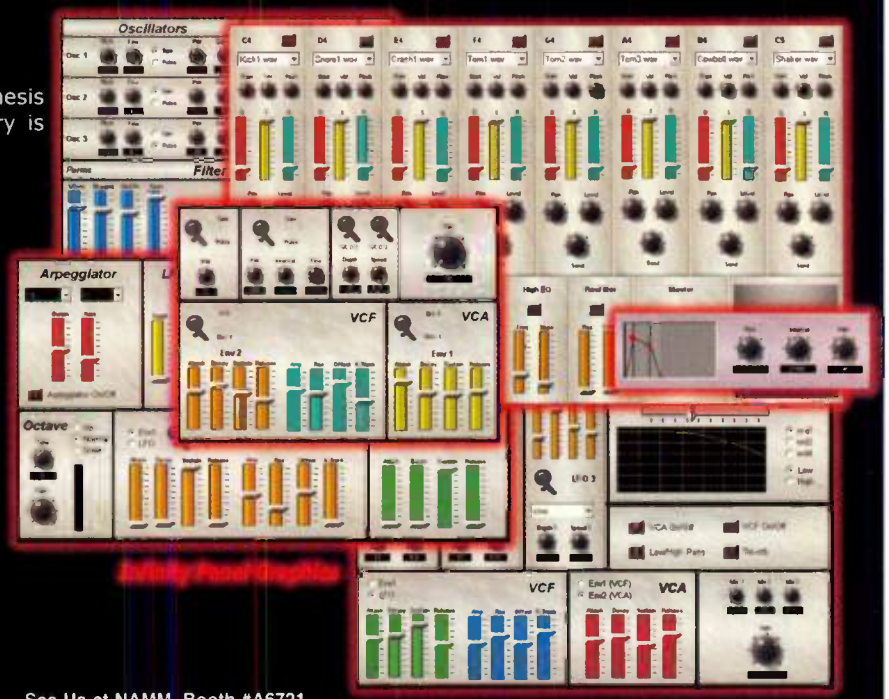
•Digital Audio	Oscillators, modulators, samplers, filters, reverbs, delays, I/O, mixers, meters, scopes, FFT, envelope generators
•File	Binary, ASCII, run, file list
•Graphics	Background, bitmap, graphical controls
•Interface	Cakewalk MFX, Cubase VST, joystick, keyboard, mouse event, windows, serial port, disk patch
•List	Build, split, find, tag, SysEx
•Logic	Boolean, choose, route, edge detect
•Math	Function, min/max, random, delta
•Messages	Append, convert, message, print, transmit, receive, import, export
•MIDI I/O	In, out, note, patch, controller, MTC, SMPTE, note track, sustain, SysEx
•MIDI Process	Channelize, controller map, data thin, event filter, pitch invert, velocity scale
•Storage	Integer, float, array, collect, dup, pair
•Timing	Counter, delay, delta time, rhythm



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structure. Each part, or *slot,* in Clavia parlance, has a dedicated button below the main display. Each slot can access any of the 128 patches present on 8 banks. There are no protected factory banks, so any patch can be overwritten. Adding new programs from an external source is easy, provided you have a MIDI sequencer handy. Unlike prior Nord Leads, there is no provision for removable storage media on the Nord Lead 3.

Stacking slots for a layered sound is accomplished by holding down the buttons of two or more slots simultaneously. In a performance environment, it's easy to stack sounds to create rich textures, and saving a configuration of slots and performance settings is the basis for the Nord Lead 3's Performance mode.

THE NORD SOUND

From a sonic perspective, the Nord Lead's Performances demonstrate the full power of the instrument. Despite the lack of built-in effects, the Performance patches, which contain as many as four single programs, sound rich and full. That is because of what Clavia calls Polyphonic Unison mode. This mode fattens up the sound considerably and allows for variable detuning without stealing any of the Nord's 24 polyphonic notes.

The Clavia programmers were going for subtle yet complex patches in the Nord Lead 3, which is a change from the in-your-face factory patches of earlier Nord Leads. The screaming lead sounds are still present, but the new factory sounds have much more depth, warmth, and complexity.

Some highlights include Dreamer, a shameless knockoff of Tangerine Dream; Rock Stadium, a nicely distorted lead synth; and 10cc Wheel, a great electric piano and pad layer with tremolo. I also like the aggressive rave lead called TechYes, and Magic Box, which is a subtle and disturbing combination of warped bells and piano that will undoubtedly find a home in movie soundtracks. Many Performances use the Nord Lead's built-in arpeggiator, which, though primitive, provides some nice sparkle in the mix. (Version 1.1 of the operating system will offer a significantly enhanced arpeggiator.)

The single patches also provide a wide range of textures through a variety of leads, basses, pads, classic FM sounds, and synth effects. There are far too many interesting single patches to comment on them all. When you listen to the factory sounds, it feels like a highlight reel of classic synths. Some patches are reminiscent of Moog instruments, DX7 programs, and PPG Wave sounds, among other notables.

The sound of earlier Nord Leads has been described as edgy, hard, raspy, and digital. The Nord Lead 3 provides a much greater range of textural possibilities without sacrificing the sonic edge Nord Lead aficionados have grown to love.

A feature of other Clavia instruments, Morph Groups, makes an appearance in the Nord Lead 3. The Morph Group is a performance feature that lets you control as many as 26 parameters simultaneously using one modulator. You can also set up the range of modulation for each parameter. Using that feature, you can effectively morph from one sound to another in real time without changing a patch.

Morph Groups are assigned from their control source, which can be Velocity, Keyboard, Aftertouch, a control pedal, or the Modulation Wheel. The LED rings around the knobs provide a cool light show as the values in a Morph Group change. The Morph Groups have countless practical applications and really add to the Nord Lead's reputation for live-performance control.

FIG. 2: The Nord Lead 3 uses digital knobs to adjust parameter settings. LEDs indicate the position of the knob, which makes editing easy.

PRODUCT SUMMARY

Clavia
Nord Lead 3
analog-modeling synthesizer
$2,699

FEATURES	4.0
EASE OF USE	4.5
QUALITY OF SOUNDS	4.0
VALUE	3.0

RATING PRODUCTS FROM 1 TO 5

PROS: Huge variety of analog sounds. High level of intuitive control using virtual knobs. Easy and fun to program.

CONS: Limited to four-part multitimbral. Basic arpeggiator. No onboard effects. Flimsy power cord.

Manufacturer
Clavia/Armadillo (distributor)
tel. (727) 519-9669
e-mail info@armadillo.com
Web www.clavia.com

EDITING ALTERNATIVES

The appeal of traditional analog synthesis has been the ease and immediacy of shaping sounds. To create something new, you just reach out and turn some knobs. The Nord Lead 3 lets you do that. At the same time, the instrument transmits MIDI information based on knob movement. You can also create a new patch from scratch by using the FM Init and Sound Init buttons. The buttons initialize a generic template patch for you to build on.

The Nord Lead 3 offers lots of visual feedback while you're editing. For example, LEDs on the front panel light up next to waveforms, modulation destinations, and filter configurations as you work. Additional feedback is given by the LCD, which snaps to the numeric value of the parameters you change. All in all, the Nord Lead 3 has the most active front panel I've ever seen, and the instrument is a real joy to program.

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Type: FET 6 µm single diaphragm
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Output impedance: <200 Ohm.
Load impedance: >1000 Ohm.
Maximum SPL:131dB SPL
Noise: (Line): 27dB (A weighted)---17dB.
S/N: 77 dB.
Power requirment: 48 +/- 4V.
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Output Noise: <18dB typical, A weighted
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WRH

Nord Lead 3 Specifications

Audio Outputs	(4) unbalanced ¼" (–10 dBu)
Other Ports	MIDI In, Out, Thru; (1) control pedal; (1) sustain pedal
Polyphony	(24) notes
Multitimbral Parts	4
Sound Engine	subtractive synthesis/FM synthesis
Keyboard	49-note, Velocity-sensitive, Aftertouch
Controllers	Pitch Bend; Mod Wheel
RAM Programs	(8) banks, (128) single programs (1,024 total); (2) banks, (128) performances (256 total)
Dimensions	34.25" (L) × 3.90" (H) × 10.90" (D)
Weight	13.8 lb.

ANALOG AND MORE

Clavia now describes the Nord Lead 3 as an advanced subtractive performance synthesizer rather than a virtual analog synthesizer. That reflects the unit's enhanced sound engine, which encompasses much more than traditional analog synthesis. The Nord Lead 3's oscillators cover the basics well, with a complement of standard analog waveforms: sine, variable pulse, sawtooth, and noise are present for OSC1 and 2. The harmonic content of both oscillators can also be changed using a variable waveshape control. When noise is selected, the waveshape control is used to change the color of the noise.

Not content with modeling conventional analog synthesis alone, Clavia has added FM to the oscillators. A staple of '80s music that is now being revived in the synthesizer community, FM has earned a notorious reputation for being difficult to program. That isn't the case with the Nord Lead 3. Its 2- and 4-operator FM synthesizer is completely programmable using knob and push-button controls, and it is a breeze to operate. A display inside the oscillator section shows carrier and modulator values. The display also serves as a frequency indicator when FM is not active.

Having worked with FM on other digital synths, I can easily see the value of a knob-based editor. By playing with the controls, you can quickly dial up a variety of woody and metallic sounds.

In addition to two forms of FM (linear and differential), the Nord Lead 3 offers Ring Modulation and a new form of modulation called Distortion Modulation. Distortion Modulation combines amplitude modulation and distortion to create gritty and dirty textures.

The LFOs of the Nord Lead 3 are also more comprehensive than those of its predecessors. There are plenty of waveforms to work with. In addition to square, saw, triangle waveforms, you get three nonstandard waves: Stepped Random, Soft Random, and Special, a percussive wave suitable for rhythmic effects. The LFOs can also be pressed into service as additional envelope generators (EGs). When an LFO acts as an

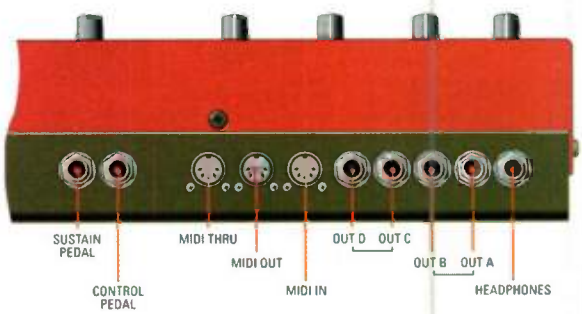


FIG 3: The rear panel sports four audio outputs and MIDI In, Out, and Thru jacks. The headphone jack is inconveniently located on the rear panel, as well.

envelope, the Rate control is used to determine the speed of the envelope.

The Nord Lead 3 delivers two multimode filters to conjure a variety of fat, analog-sounding textures. In Single Filter mode, you can select from conventional filter types—such as bandpass, band reject, highpass, and lowpass—in 6, 12, and 24 dB–per-octave versions. In addition, the Nord Lead 3 offers a Classic filter designed to emulate the famous Minimoog filter sound (it is closer than most, but don't sell your Mini), as well as a Distorted Lowpass filter for grungy, snarling filter sweeps. Filter resonance can be set anywhere from 0 to self-oscillation.

For complex filter tasks, you can invoke one of the Multi Filter modes. Those let you use the two filters in series, in parallel, or as a comb-style filter for classic phase-shifter effects. Multi Filter modes combine two filters in various configurations, such as lowpass and highpass filters in parallel or series, or two bandpass filters in parallel. You can also access the Multi Peak and Multi Notch filters, each of which combines three allpass filters.

Like the oscillators, LFOs, and filters in the Nord Lead 3, the EGs surpass those found in other analog-modeling synths. Three EGs are available: one ADSR dedicated to the filter, another ADSR for the Amp, and a simple AR that can be used as a generic modulator. On all three EGs, the envelope stages can be set from a blistering 0.5 ms to a Brian Eno–like length of 45 seconds. In practice, the envelope generators were more than adequate for Kraftwerk-style percussive filter sweeps, which demand a fast response from the filter EG.

Other features include the ability to invert the Mod and Filter envelopes when using the Envelope Amount knob and the ability to loop the Mod envelope so it functions as an LFO. When the Mod envelope is acting as an LFO, the Attack and Decay settings are used to set the speed.

LEAD ON

If you're a Nord fan, you'll find the Nord Lead 3 to be a worthy successor to the line. If you're not a Nord fan, the range, depth, and subtlety of the Nord Lead 3 may make you one.

The Nord Lead's price places it squarely in a field populated by tough competition. Most synths in this price range are workstations that can play many roles by offering sequencing, sampling, synthesis, and physical modeling. Among the analog specialists in this price range, many use samples, wavetables, vocoders, and step sequencers.

Instead of trying to be all of those things, Clavia designed the Nord Lead 3 for high-end analog modeling with an emphasis on live performance, playability, and sound quality. After all, there are still no samples being used in this instrument.

Craig Negoescu *is media director for frogdesign. When not wearing uncomfortable MIDI-controlled robot suits, he is pushing the envelope of sound design for frog's clients.*

RAVEN LABS

TRUE BLUE EQ

The little blue processor that could.

By Karen Stackpole

During the past three years, relative newcomer Raven Labs has designed and produced a respectable selection of direct boxes, preamps, and mixers for musicians and engineers alike. The latest addition to the fold is the True Blue EQ, a 5-band semiparametric equalizer that promises professional signal shaping at a reasonable price. This simple box is designed to allow some precision nip and tuck on signals as needed, whether you're tracking, mixing, or simply honing the sound of your instrument. If you're occasionally stymied by the relatively limited filters and equalizers often found in smaller mixers, the True Blue EQ could be a welcome alternative.

BLUE HORIZON

The True Blue EQ is a compact mono unit with a simple dark-blue two-piece chassis. The Raven Labs logo, the model name, and the control markings are emblazoned in white on the faceplate. Four rubber feet provide a bit of padding and grip for placing the unit on a flat surface. A threaded machine-screw stud at the center of the base provides the option of mounting the unit on a rack shelf. That's a nice touch, as an accumulation of free-floating pieces of outboard gear can clutter up a studio or become a hassle in a road rig.

The front panel is laid out simply, with two rows of juxtaposed pairs of potentiometers for five frequency ranges (see **Fig. 1**). Each band has two knobs: a level control that allows for as much as 15 dB of cut or boost, and a frequency-sweep control. On the top row, the first band is labeled Low and covers 30 to 100 Hz. The next band, labeled Low-Mid, ranges from 100 to 300 Hz. The third, labeled Mid, ranges from 300 Hz to 1 kHz. Positioned in the second row are bands labeled Treble (1 to 3 kHz) and Ultra Hi (3 to 10 kHz). An EQ In/Out button located in the lower-right corner allows for bypass and is accompanied by a red LED indicator. A Power on/off button with a green LED indicator completes the faceplate controls.

The neatly arranged rear panel of the True Blue EQ contains both balanced ¼-inch TRS and unbalanced ¼-inch TS input and output jacks (see **Fig. 2**). Two stereo minijacks are provided for power. A custom AC adapter provided with the unit supplies +9 and –9 VDC for the device's voltage rails. The second jack, labeled Out, lets you power several Raven Labs products from a single adapter by daisy-chaining them together. A dual-battery bay accommodates two 9V batteries. The True Blue can operate for as many as 100 hours on battery power. An internal mechanism automatically switches to battery power when the AC adapter is not connected; that's a useful backup if the wall wart is accidentally pulled from a socket while the device is in use.

According to Raven Labs, frequency-level adjustments are made by adding or subtracting the original signal to or from itself in a parallel circuit arrangement. That approach aims to avoid the pitfalls of active-series EQ circuit designs, namely muddiness and phase shifting. The equalizer sounds clean and quiet and doesn't exhibit the high-frequency phase-shifting problems characteristic of some less expensive equalizers.

FIG. 1: Raven Labs' True Blue EQ is small but effective for precisely tailoring signals. Front-panel knobs allow you to sweep and boost or cut five frequency bands.

PRODUCT SUMMARY

Raven Labs
True Blue EQ
semiparametric equalizer
$349

FEATURES	4.0
EASE OF USE	4.5
AUDIO QUALITY	4.0
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Small, portable. Clean sounding. Narrow bandwidths useful for precisely shaping sounds without adversely affecting adjacent frequencies. Optional 9V-battery power. Power-out jack allows daisy chaining of multiple Raven Labs units. Three-year warranty.

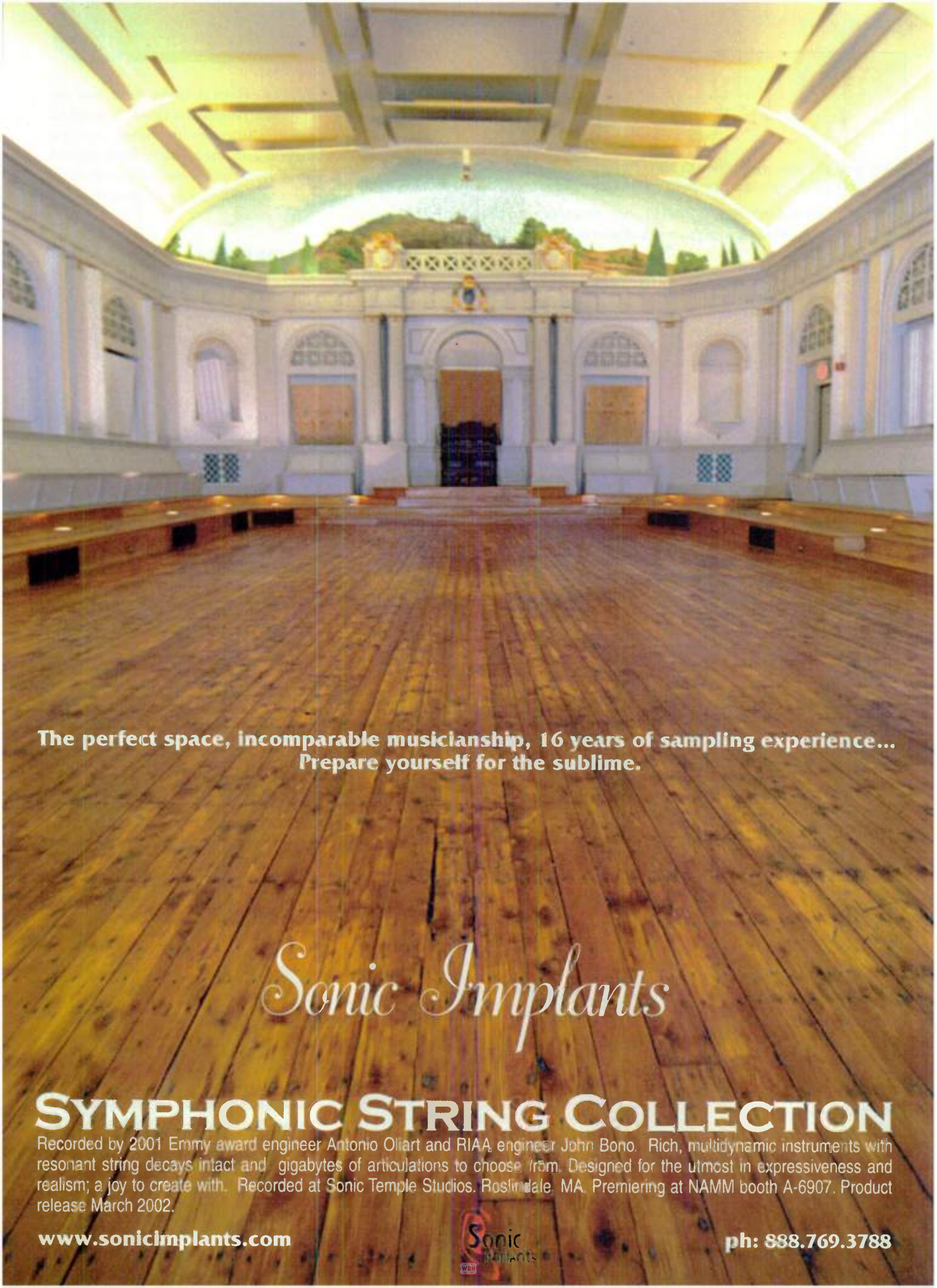
CONS: Fixed bandwidths. Somewhat confusing EQ In/Out button. Slight drop in gain and transparency when unit is in circuit.

Manufacturer
Raven Labs
tel. (818) 368-2400
e-mail raven-labs@aol.com
Web www.raven-labs.com

By design, the True Blue offers fairly narrow bandwidths, apparently even more so in Cut mode—a characteristic that makes it behave much like a notch filter. Such an attribute allows surgical precision in shaping a sound but without negatively affecting the quality of the signal.

Standard sweepable equalizers on small to medium-size boards tend to have broader bandwidths, making, say, a 3 dB change quite noticeable. The effect is less radical with the True Blue. Although the level pots are labeled ±15 dB, the difference sounds more as if it's between 6 and 8 dB. A small issue I had with the test unit's level pots was the lack of center detents. Thankfully, current models feature pots with center detents.

Also, the EQ In/Out button is less than intuitive, because when the button is pressed in, the EQ is out, and when the button is out, the EQ is in. Granted, the illuminated red LED is an adequate clue; but even a simple bypass label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would be easier to understand than the current arrangement. In addition, when the unit is in circuit, there is a slight drop in gain, even with all the level pots set to 0. The unit is not completely transparent sounding, though the overall effect is clean.

INSIDE TRACK

I put the True Blue EQ through many tests. Most notably, I used it while making a compilation demo CD for Bay Area cellist Samantha Black. It proved useful in doctoring a cassette recording, putting it more on par with digital source materials (CD and DAT) for the same project. I also brought the unit into a mixing session for disco-funk band Double Funk Crunch at Guerrilla Recording in Oakland, California. Here's what I discovered.

While making Black's compilation demo CD, I found the True Blue EQ to be a true friend. The hiss on the cassette was pretty bad, and the recording sounded rather roomy. With a couple of deep cuts in the high end and a little taming in the lows, I cleaned up the sound enough that it wasn't radically different from the digital recordings. It was still noisy, but far less so. I was sold on the usefulness of the True Blue in this application, especially compared with attempting the same precision cuts with the EQ on a compact mixer.

During the mixdown session at Guerrilla Recording, the True Blue made a positive contribution on a variety of sources. A slight boost at 80 Hz enhanced a kick drum without making it sound boomy, and a small boost in the high mids brought out the side-sticking

FIG. 2: The True Blue's rear panel has both balanced and unbalanced ¼-inch inputs and outputs. Supplementing the ¼-inch AC input, an AC out lets you daisy-chain additional Raven Labs devices to run off a single wall wart. Dual 9V-battery holders allow optional battery power when AC is disconnected.

True Blue EQ Specifications

Frequency Bands	(1) 30–100 Hz; (1) 100–300 Hz; (1) 300 Hz–1 kHz; (1) 1–3 kHz; (1) 3–10 kHz
Cut/Boost	±15 dB
Inputs	(1) balanced ¼" TRS; (1) unbalanced ¼" TS
Outputs	(1) balanced ¼" TRS; (1) unbalanced ¼" TS
Frequency Response	10 Hz–63 kHz (–3 dB)
Noise	–90 dBV (IHF unweighted)
Distortion	0.002% (@1 kHz)
Power	AC adapter; (2) 9V batteries
Dimensions	6.70" (W) × 2.26" (H) × 6.00" (D)
Weight	3 lb.

on a snare drum while remaining true to the source sound. The unit also did a good job of rolling off the highs around 8.5 kHz on a perky keyboard part and putting a little body into the sound at 250 and 750 Hz.

Thin-sounding male vocals were pleasantly plumped up with modest boosts at 100 Hz and a few carefully chosen low-mid frequencies. On a slightly nasal-sounding female vocal track, boosting the low mids by about 2 dB subtly improved the sound. Thanks to its narrow bandwidth ranges, the True Blue EQ is an excellent diagnostic tool—it really allows you to hear where there's a bump in response. Similarly, it excels at enhancing signals while maintaining their original quality.

TRIED AND TRUE

Raven Labs has a winner in the True Blue EQ. The unit has a neutral sound, and it lets you make surgically precise adjustments to signals without affecting their fundamental sonic characteristics. Although transparency diminishes slightly when the EQ is in circuit, the overall sound of the unit is clean and free of distortion. In addition, the True Blue offers more precision and tighter bandwidths than the semiparametric EQs found on most compact mixing boards.

Karen Stackpole, *an independent engineer, operates Stray Dog Recording Services, based in Berkeley, California, and directs the studio maintenance course at Ex'pression Center for New Media in Emeryville, California.* *Special thanks to Myles Boisen.*

ARTURIA

STORM 1.5 (MAC/WIN)

An all-in-one software loop studio with extensive automation.

By Len Sasso

Version 1.5 of *Storm* is a major upgrade of Arturia's flagship all-in-one studio software. It now comes in Mac and PC flavors, supports ASIO and VST on both platforms, and sports several new high-end sound modules. *Storm* is optimized for creating one-measure, 16th-note loops and combining them into Songs with full parameter automation. It makes the process extremely fast and comes packed with a huge supply of preset patterns. If it were my job to name this product, I might call it *Jiffy Loop*.

A *Storm* Studio consists of a software Rack of instruments and effects together with a multitrack Song Sequencer. *Storm*'s 11 instruments fall into three categories: drum boxes (5), synthesizers (4), and sample loopers (2). Also, a sampler module records and plays AIFF, WAV, and MP3 files of any length that available RAM can accommodate. *Storm*'s ten effects include the usual suspects as well as several creative alternatives. The Studio Rack holds four instruments and three effects at a time, which limits each song to that number of modules. However, songs can be recorded and bounced into the EZtrack sampler module for more complex compositions.

Storm installs from a cross-platform CD-ROM and requires run-time Java, which is supplied for the Mac and PC. (All audio processing is programmed in assembly language for optimal performance.) MIDI is handled on the PC by DirectX and on the Mac by Open Music System, the latest versions of which are also provided. *Storm* requires challenge-and-response authorization and automatically takes care of that the first time you launch it if your computer is online. Otherwise, *Storm* generates a printout that you can mail, fax, or e-mail to Arturia for the response code. (*Storm* runs 20 times without authorization.) I had no problems with automatic online authorization.

Software that attempts to run several synthesizer and sampler modules at once generally requires a fast CPU, and *Storm* is no exception. A full *Storm* Rack pushed my Mac G3/300 MHz (the minimum recommended configuration) beyond the 80 percent CPU limit on several occasions. However, on my Pentium III/700 MHz laptop, *Storm*'s CPU meter stayed comfortably within the 25 to 35 percent range. For VST operation, you also must consider the host's CPU load. *Storm* requires a VST host that supports multiple audio outputs. (currently only Steinberg's *Cubase* does so.) I tested *Storm* 1.5 for this review, but version 1.51, which contains several enhancements and bug fixes, should be out by press time.

FIG. 1: Storm's Studio Builder is where you assemble your Storm Studio Rack. A Rack can contain as many as four instruments and three effects processors. The Kepler Pattern Sequencer and Mixer shown here are automatically included in every studio.

Minimum System Requirements

Storm

MAC: PPC G3/300; 64 MB RAM; OS 8.6

PC: Pentium II/300; 64 MB RAM; Windows 95/98/2000/ME/XP

BUILDING A STUDIO

The first job during any *Storm* session is to build a Studio by selecting the instruments and effects that you want in the Rack. (Alternately, you can load a Studio from disk.) **Fig. 1** shows *Storm*'s Studio Builder screen with a fully configured Studio. To add modules to the Rack, simply drag them from the Instruments and Effects menus at the sides of the Rack. To delete them, drag them back from the Rack to the menu. When you drag a module to the Rack, it is placed in the slot to which it is dragged, moving other modules down as needed.

Storm Studios don't require any cabling, because instruments are assigned mixer channels according to their position in the Rack, and each instrument has bus sends to each of the Studio's effects. Each effect also has bus sends to the other effects. (*Storm* 1.51 will feature back-panel cabling for routing instruments to separate audio channels on systems in which the sound-card drivers and host environment support that.) Once you're acquainted with *Storm*'s instruments and effects, you can build a Studio in a matter of nanoseconds.

After you configure your Studio, click on the Start button, which takes you to *Storm*'s colorful Composer window (see **Fig. 2**). *Storm* takes a few moments to compile the Studio and then starts playing your song. What song? Most instruments have a built-in Pattern Sequencer filled with preset patterns. If you haven't yet recorded anything in the Song Sequencer, *Storm* simply starts looping the first pattern for each instrument. I'll look more closely at the Song Sequencer in a moment, but one of its main uses is to let you program pattern changes for each of the instruments' Pattern Sequencers.

Storm's Pattern Sequencers operate slightly differently for different kinds of instruments, but with a few exceptions,

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the patterns are always one measure of 16th notes. (A built-in global Shuffle setting frees you from the constraint of straight 16th notes.) Each of *Storm*'s five drum boxes has eight drum sounds, and their Pattern Sequencers generate Velocity-sensitive triggers for those sounds. For the synthesizers, the Pattern Sequencers generate MIDI notes and, in some cases, MIDI Control Change (CC) data. The H3O sample looper has four four-bar sample tracks, and a pattern for it is an arrangement of samples on those tracks. Scratch has no Pattern Sequencer; it simply loops the samples assigned to each of its two turntables.

In addition to MIDI Notes, triggered drum sounds, and looped samples, a *Storm* Song consists of sound-parameter changes (such as control-panel knob and slider changes), mix automation, and global chord changes. Again, those are recorded in different ways for different types of instruments. For the drum boxes, the sound-parameter changes are recorded in real time as part of the Pattern Sequence. All control changes are therefore one-measure loops. The Pattern Sequencers are always in Record mode. Everything else (instrument and effects parameters, mix automation, pattern selection, tempo, time signature, and key signature) is recorded in the Song Sequencer.

Storm's control-panel knobs and sliders can be assigned to MIDI CC messages. Right-clicking (Control-clicking on a Macintosh) on the control opens a window in which you can select the MIDI CC number and MIDI Channel with the mouse. Any MIDI CC message received while the window is open makes the assignments automatically. The keyboards of *Storm*'s synthesizers can be assigned to incoming MIDI Note messages in the same way. (MIDI triggering for the drum boxes will be added in *Storm* 1.51.) Once assigned, automation can be recorded using MIDI or the mouse.

Storm's Song Sequencer has five tracks—one for each of the four instruments in the Rack and a fifth Mix track for recording everything else. The tracks are arranged in four-measure blocks across the top of the Composer window. The Song Sequencer has two recording modes: Real Time and Static. In Static mode, you select a group of measures, and any change you make to any control (for the relevant track) becomes the setting for the whole selection. You can delete all the data in a selection of measures, but you cannot delete just the data for an individual parameter, thereby regaining manual control of that parameter. (That is a tremendous inconvenience that I hope will be remedied in a future update.)

Once you've composed a Song, you naturally want to record it, and *Storm*'s built-in audio recorder allows you to do just that. (When *Storm* is operated as a VST plug-in, the recorder is not necessary.) Recording can be started and stopped manually or set up automatically for a specific range of measures. Audio is recorded in *Storm*'s compressed-audio Cassette format. Cassette files can be exported in AIFF, WAV, and MP3 formats. Even though Cassette recordings are compressed, they can make *Storm* Studio files large and slow to load. Generally, it was more convenient to export them to my hard drive in one of the other formats and then delete the Cassette files from the Studio. The three MP3 files accompanying this article on the **EM** Web site were exported directly from *Storm* with no need for any other encoding software. (Very nice!)

FIG. 3: Psion is one of four identical Storm drum boxes. Each drum box has its own set of eight classic sampled drum sounds. Psion's samples are from the Roland TR-808 and TR-606.

FIG. 2: *Storm*'s Composer is a colorful collection of the instruments, effects, and other modules in your Rack. Most instruments have 16th-note Pattern Sequencers for programming one-measure loops. The Song Sequencer at the top automates pattern and front-panel control changes.

THE SOUND OF THE STORM

As mentioned, *Storm* has three kinds of sound-generating instruments: drum boxes, synthesizers, and sample loopers. In addition, the EZtrack sampler is for recording and playing back samples of arbitrary length in AIFF, WAV, and MP3 formats. For bouncing submixes, creating extended compositions, and extracting fragments of samples for use in the sample loopers, EZtrack is an essential ingredient of the *Storm* package. Unfortunately, it is the one *Storm* module that did not perform up to standard. I encountered multiple crashes as well as extremely unreliable playback and eventually gave up trying to use it. (I transferred *Storm* mixes to my sequencing software as a workaround.) Arturia is aware of the problems and says that they have been fixed in version 1.51.

Drumming up a storm. Four of *Storm*'s five drum boxes—Hork, Meteor, Psion, and Puma—are virtually identical drum-sample players. Each has eight sampled drum sounds with controls for pitch and decay. Hork's samples are from an acoustic kit. Samples in Meteor and Psion are from Roland TR-909,

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PRODUCT SUMMARY

Arturia
Storm 1.5 (Mac/Win)
software synthesizer workstation
$199

FEATURES	4.0
EASE OF USE	4.5
QUALITY OF SOUNDS	3.5
VALUE	4.0

RATING PRODUCTS FROM 1 TO 5

PROS: Fully loaded Pattern Sequencers. Extensive MIDI and onscreen automation. Records directly to disk in AIFF, WAV, and MP3 formats.

CONS: EZtrack sampler performance is erratic. Can't delete individual control automation. Onscreen controls sometimes respond slowly.

Manufacturer
Arturia/Thinkware (distributor)
tel. (800) 369-6191 or (360) 594-4275
e-mail sales@thinkware.com
Web www.thinkware.com

TR-808, and TR-606 drum machines. Puma contains samples of ethnic percussion instruments.

Most of *Storm*'s Pattern Sequencer patterns work well together, and that goes for Studios with multiple drum boxes, too. I dropped the four drum boxes just mentioned into a Rack with delay, compression, and flanging effects. Then I programmed some pattern changes into the Song Sequencer and, in about five minutes, had a viable multidrum loop going. You can hear the results in the 4drums MP3 file at www.emusician.com.

You're not limited to *Storm*'s canned patterns, and programming the drum boxes' Pattern Sequencers is extremely easy. **Fig. 3** shows Psion's Pattern Sequencer and control knobs. The patterns are represented by the eight rows of 16 LEDs. Clicking on an LED cycles a pattern step through four Velocity levels and then off. Moving any knob by sending it MIDI data or using the mouse while the pattern is playing causes the motion to be recorded in the pattern. (Clicking and holding a knob in the same position for one measure results in a fixed value.)

Storm's fifth drum box, Tsunami, is a synthesizer rather than a sample player. Four of its sounds are based on noise, and the other four use a sine-wave oscillator. Each noise sound has controls for level, pan, lowpass-filter cutoff and resonance, and an amplitude attack/decay envelope. Each oscillator sound has controls for level, pan, an attack/decay pitch envelope, and an amplitude-decay envelope. Tsunami's Pattern Sequencer is the same as on the other drum boxes.

***Storm*'s synthesizers.** *Storm* has four synthesizers: Arsenic, Equinox, Bass-52, and Orpheus. The latter two are new to version 1.5. Arsenic and Equinox use the same, basic synthesis engine with one oscillator (sawtooth or variable pulse wave); a 2-pole resonant lowpass filter; and attack/decay envelopes for amplitude and filter cutoff. The difference is that Arsenic has a single voice and is designed for synthy lead and bass parts, whereas Equinox has three voices and is designed to play chords from the dominant (mixolydian) or relative-minor (aeolian) scales.

Bass-52 is a physical-modeled bass synth and is probably the best sounding of the lot. It features a lowpass filter with attack/release envelope and vibrato. Its Pattern Sequencer has controller lanes for vibrato amount and Velocity. Bass-52 and Arsenic let adjacent notes be linked for a legato effect with portamento. (Portamento is always on, and the glide speed is linked to *Storm*'s tempo.) Bass-52 can be played through MIDI but is programmable only with the mouse using its piano-roll editor.

Orpheus is the most sophisticated of *Storm*'s synths and takes up two Rack spaces. It has 16 voices, and its Pattern Sequencer holds patterns as long as eight measures. Patterns can be programmed in real time with incoming MIDI Note messages. The Pattern Sequencer has controller lanes for Velocity, filter cutoff, and balance between its two oscillators. Orpheus is the only *Storm* synth with preset memory (64 factory and 64 user).

Orpheus's synth architecture features two wavetable oscillators with vector-waveform mixing. Each oscillator has 32 dual waveforms, and hard sync and FM are available. Orpheus has a multimode 4-pole filter with ADSR envelope. The amplitude envelope is also ADSR, and there are two multiwaveform LFOs. A MIDI-controllable *x-y* vector is provided for simultaneously adjusting the mix level of each oscillator's two waveforms, and the LFOs can be assigned to modulate the two dimensions of the vector. (In short, you can get a lot of timbral motion out of this little puppy.) Orpheus is the only synth suitable for pads, but it will also crank out good-sounding leads. Processing an Orpheus pad with *Storm*'s SeqFilter effect can produce vocal results. The OrpheusPad MP3 file at www.emusician.com illustrates that technique.

Get in the loop. *Storm* 1.5 has two loop-based sample players: H3O and Scratch. H3O is a 4-track, 4-measure sample player that plays samples in AIFF, WAV, and MP3 formats. *Storm* comes with a small selection of acoustic-instrument-riff samples, but you will quickly want to get into using your own. H3O's Pattern Sequencer remembers the samples and their arrangement on H3O's tracks and, like the others, holds 64 patterns.

One of H3O's most unusual and useful features (called Fragmentation) is the ability to overlap samples on the same track. Option-dragging (Control-dragging on the PC) copies of the same sample, each with its own transpose and volume levels, to adjacent 8th- or 16th-note positions on the same track produces interesting repetitive patterns. The piano part on the PianoScratch MP3 file at www.emusician.com is a Fragmentation of a single piano riff.

Scratch is a dual-turntable sample player. You can crossfade between the two turntables, control their speeds independently, and scratch on either. Scratching is done by clicking on the turntable—horizontal motion crossfades and vertical motion scratches. Scratching, crossfading, and speed can also be automated using MIDI CC messages.

What key are we in? *Storm* provides a four-measure Pattern Sequencer, called

Kepler, for selecting key and mode (major or minor). It holds 64 patterns, but in this case, each pattern step represents a key signature that lasts two beats. All the synthesizers and the H3O sample looper adjust their pitches to the root key of the current Kepler step. Equinox also adjusts the third and sixth degrees of its chords to Kepler's mode, lowering those degrees when the mode is minor.

Just for effect. *Storm* has eight effects modules. Two noteworthy additions, a vocoder and a limiter/compressor, are downloadable from Arturia's Web site. Compressor sounds good and is an especially welcome addition for Bass-52 and the drum synths. It features graphic adjustment of the compression ratio, threshold, and output gain as well as knobs for attack and release times. The ten supplied presets cover most of the bases.

Vocoder has a built-in carrier synthesizer with two oscillators, a noise source, a lowpass filter, and an LFO. The carrier has ten presets and a real-time programmable *x-y* control that can be applied to four parameter pairs. The modulator source can come from any of *Storm*'s instruments. Most likely, that would be a vocal sample from one of the sample players, but the drum boxes also make good modulators. The carrier plays chords selected on an on-screen keyboard. Eight programmable chord presets are available, and preset changes can be automated. You could not call it a high-end vocoder, but it can be quite effective, especially buried a bit in the mix.

Two rhythmic effects are worth mentioning: SeqFilter and Dual Delay. SeqFilter is a resonant lowpass filter with 16 sliders to control the filter's cutoff frequency. The slider values are stepped through in sync with the sequencer (each slider represents a 16th note). SeqFilter's main drawbacks are the absence of slider presets and of automation for the sliders. Dual Delay is a stereo delay line with delay times set in 16th notes and knobs for direct and cross-channel feedback.

The other effects—Chorus, Distortion, Flanger, LPFilter, Reverb, and Ring Mod—are just what you'd expect to find. They all sound decent; none are fantastic.

WEATHER REPORT

Storm is a terrific loop machine; I was addicted from minute one. Its strong points are its excellent array of drum boxes, its ease of use, and its well-thought-out supply of factory patterns to get you started. Its synths are good sounding, and Bass-52 is excellent. H3O and Scratch fill a niche in sample looping, and H3O makes combining multiple samples into creative new loops a breeze.

Aside from a few minor glitches, the Pattern and Song Sequencers are well conceived and fast to program. For generating good-sounding loops, this is probably about as easy as it gets. Given its array of modules, *Storm*'s price tag seems reasonable and is about in the middle of this expanding genre of all-in-one software studios. ❦

Quick Picks

TASCAM

Scarbee J-Slap Bass (GigaSampler)

By Zack Price

Performed and produced by Danish bassist Thomas Hansen Skarbye, Tascam's *Scarbee J-Slap Bass* CD ($149) is designed to capture all the nuances of electric bass playing using the slap technique. In this playing style, the thumb slaps the lower notes while the forefinger pulls or snaps the alternating upper notes. The technique is popular in jazz, fusion, funk, rock, and other musical styles. Skarbye used a Celinder J Update 4 bass, recording all samples direct to keep the sound as clean as possible and to avoid unnecessary coloration. In fact, the only enhancement in tone was a small amount of bass boost from the instrument's built-in Aguilar OBP-1 passive treble and active bass preamp.

Bass Jammin'

The *Scarbee J-Slap Bass* library consists of three GigaSampler (GIG) files: J-Slap 1, J-Slap 2, and J-Slap 3. The first sample was recorded using only the bridge pickup, the second uses the bridge and neck pickups, and the third uses the neck pickup alone. Because of the pickup positions, J-Slap 1 has a brighter timbre, J-Slap 3 has a darker tone, and J-Slap 2 (due to the combination of both pickups) has a fuller sound.

Each GIG file contains several Instruments, including Jam Bass, Jam Bass-Trills, Studio Bass, Slides, and Fingered Harmonics. If you want to quickly lay down a bass track, Jam Bass is the logical choice for live performance. However, Jam Bass is much more than a basic slap-bass patch. Its keymapping, Dimension, and control parameters are extensive. For example, the standard playing position for each string is mapped across the keyboard, with an alternate playing position for some notes starting two octaves below the standard note map. You can manipulate the volume level of the release triggers, which controls the staccato release on all sustained notes, with a foot controller.

In addition, Mod Wheel and Velocity values combine to trigger a variety of playing techniques. For instance, a Mod Wheel setting of 0 through 31 combined with various Velocity values controls the four levels of thumb slaps on the E and A strings and the levels of plucked notes on the D and G strings. A Mod Wheel setting of 32 through 63 combined with Velocity causes notes to be half-muted, muted with lots of overtones, or muted with few overtones. Setting the Mod Wheel anywhere from 64 through 95 triggers fast grace notes up, whereas Mod Wheel values 96 through 127 let you play legato tails from hammer-ons and pull-offs.

Jam Bass also includes 150 Slide mixes mapped on the keyboard from E5 to D8. The Foot Controller regulates the direction of the slide; the Mod Wheel controls the three slide-note speeds.

The separate Jam Bass-Trills patch plays two types of semitone trills produced by rapidly sliding the finger back and forth over a fret or by alternating hammer-ons and pull-offs. The Mod Wheel position determines whether the trill notes are played on the D string or the G string.

Is It Live?

Although you can produce a realistic slap-bass passage using Jam Bass and Jam Bass-Trills, constructing a perfect slap-bass track calls for the Studio Bass, Slides, and Fingered Harmonics patches. However, they often require patch changes (each Instrument is assigned a patch number) as well as ample use of key switches (assigned notes outside the playing range for switching from one articulation to another) and different types of controller messages. As you might guess, it could take you a few passes to create the ultimate bass line.

The Studio Bass patches differ from the Jam Bass patch in that the Trills are included as part of the patch, and the Studio Bass patches use key switches instead of the Mod Wheel or Footswitch to change between the various techniques.

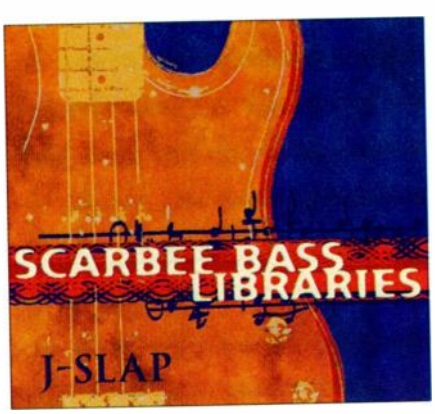
The Studio Bass patches also reproduce the sounds of alternate fingerings by triggering samples created at different positions on the fretboard. To play a note on the desired string, simply insert a patch change for the Studio Bass that plays that note at that particular position. You will have your ultimate bass track when you've edited the notes, patch changes, and Control Change information to work together properly.

Slaphappy

Scarbee J-Slap Bass can help you create perfect slap-bass tracks. That may seem like an exaggeration, but listen to the demo songs and you'll be a believer. To create the ultimate bass part, take some time to learn the ins and outs of this complex library, even if you limit yourself to the Jam Bass Instruments. Nonetheless, the rewards are well worth the time spent.

Overall EM Rating (1 through 5): 4.5

Tascam; tel. (323) 727-4864; Web www.nemesysmusic.com



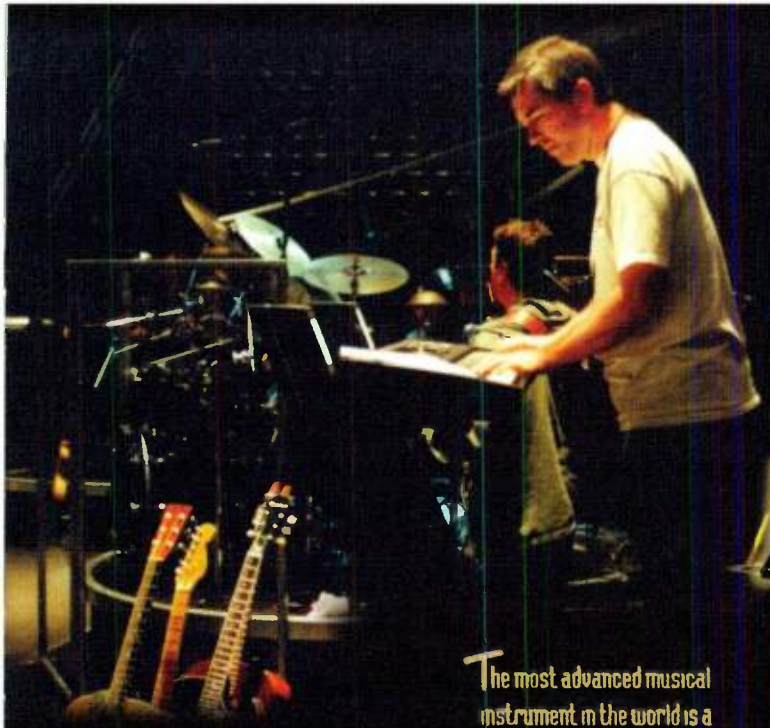
Tascam's *Scarbee J-Slap Bass* library offers a full range of playing techniques and alternate fingerings for creating highly realistic slap-bass parts.

EASTWEST

Quantum Leap Rare Instruments (GigaSampler)

By Zack Price

The three CD-ROMs in *Quantum Leap Rare Instruments* ($499.95) contain the sounds of 16 ethnic instruments from Europe, India, the Far East, and the Middle East. Most musicians can identify the sound of tablas, Highland bagpipes, and Chinese gongs; this collection also contains several instruments with less familiar names. Even if you are unfamiliar with the



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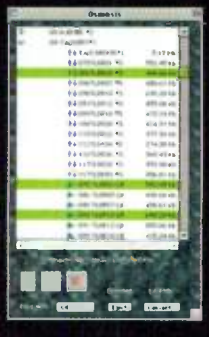
Osmosis is a PC and Macintosh-s utility that allows you to convert entire Akai-s S-1000/S-3000 and Roland S760/770 formatted disks into Unity or SampleCell-s formats. Osmosis will read samples from almost any removable media disk, and display the disk file hierarchy in a single window. Also, the entire disk directory can be saved to a text file. Convert all those great Akai-s and Roland-s libraries into the modern world of computer-based sampling. It makes the perfect companion for Unity DS-1 or SampleCell-s.



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sounds of the *duduk* (Armenian flute), *gadulka* (Bulgarian fiddle), or *launedda* (Sardinian triple pipes), you've probably heard them in movie soundtracks.

The string and wind instrument samples on *Rare Instruments* (except for Highland pipes) use key switching to create various ornamentations or alter the playing style. Although the documentation doesn't detail which ornamentation a specific key triggers, the patch name indicates where the trigger keys are located. Currently in GigaSampler format, *Rare Instruments* should soon be available in Akai format.

The Gong Show

The Far East disc contains five instruments: Chinese gong, Thai gong (aka nipple gong), *erhu* (a two-stringed Chinese fiddle), Taiko drums, and *rag dung* (a 10-foot-long Tibetan trumpet). The 34-inch Chinese gong is played with large soft mallets, sticks, and hammers, providing a variety of excellent tonal characteristics. The 23-inch Thai gong also yields an outstanding assortment of sounds, particularly when struck at the nipple.

The erhu comprises a mahogany sound box covered with a snakeskin membrane. Its two steel strings are played with a horsehair bow lodged between them. Because the erhu's small size made it necessary to close-mic the instrument, the scrape of the bow is prominent in the samples. Although the scrape can be bothersome when playing solo, it's no problem in an ensemble setting or when you use key switching to trigger the ornamentations.

Although a great deal of the ethnic sounds on EastWest's *Quantum Leap Rare Instruments* are quite familiar, you probably don't know the names of all the instruments in this three-disc collection.

Each of the 18 Taiko drum instruments provides a collection of sounds that you can layer for additional texture or to create ensembles for playing polyrhythmic percussion tracks. For the perfect soundtrack to ancient ceremonial scenes, add the deep tones of the rag dung.

Within You, Without You

The Middle East and India disc features sarangi, tablas, Middle Eastern fiddle, and the duduk. The sarangi is a bowed instrument with 4 main strings and 12 sympathetic strings. If you listen to classical Indian music or psychedelic music from the '60s, you might recognize its distinctive, almost weeping sound. The key to capturing the sarangi's flavor is to layer the resonance trails patch with the main patch. Mastering the key triggers to play the various ornamentations, slurs, and slides is crucial in reproducing an authentic sarangi performance.

The tablas sound excellent, but they're unnaturally panned hard left and right, respectively. Because they are mono samples, though, you can make pan adjustments with an outboard mixer or edit and save their pan positions.

The duduk and Middle Eastern fiddle lend an exotic air to world music arrangements. Because many ethnic instruments aren't tuned to equal temperament, *Rare Instruments* producer Nick Phoenix used Antares' *Auto-Tune 3* pitch-correction plug-in and a Roland VP-9000 sampling effects processor to retune and stretch the dudek and other instrument samples.

Trans-Europe Express

The Europe disc contains the greatest number of instruments, as well as some of the rarest instruments in the collection. The gadulka is a Bulgarian three-stringed fiddle with additional sympathetic strings for added resonance. From Sardinia, the launedda is a three-piped flute on which the player plays two-note chords with the left hand and a melody with the right hand.

With a distinctive medieval sound like a buzzing bagpipe-and-fiddle hybrid, the hurdy-gurdy is a stringed instrument that's bowed by cranking a wheel under the strings to create a drone. To play a melody, the fingers do not touch the strings; instead, the player presses keys that activate string stops.

Anyone who's seen a Ricola commercial should be familiar with the deep, rich sound of the Alpen horn, and everyone will recognize the Highland or Scottish bagpipes. To reproduce the various attacks employed in bagpipe playing, *Rare Instruments* uses Velocity switching rather than key switching. The resulting instrument is easier to play authentically in a single pass.

You should also recognize the mournful sound of the uilleann pipes, or Irish bagpipes, if you've seen the movie *Braveheart* or heard the music of Enya. Another instrument that can be heard on many soundtracks, the Irish low whistle, is often associated with the sound of the uilleann pipes, but its sound is versatile enough to combine with Indian and Far Eastern sounds.

A Rare Find

Anyone who uses ethnic sounds in their music should check out *Quantum Leap Rare Instruments.* Although the cost might seem a little steep, the producer points out that many of the instruments on the three CDs are rarely sampled or seldom sampled well. He has meticulously assembled and recorded many performances by expert players. Moreover, he has taken great care to make the samples as usable as possible. Although he has provided the tools to recreate authentic performances, you need to develop a feel for how the instruments should sound, which means learning to use key switching in the stringed and wind instruments. With practice, your efforts will be rewarded.

Overall EM Rating (1 through 5): 4.5

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LINE 6

Echo Farm (TDM; Mac/Win)

By Nick Peck

Line 6 has made a name for itself by using advanced physical-modeling technology to duplicate the sound of vintage gear. The company's *Echo Farm* plug-in ($495) for Pro

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Genre: R & B

Artist: Steve McWilliams **Song:** Goodbye
Genre: Rock

Artist: Sabers & Roses **Song:** Sabers & Roses
Genre: Patriotic/Other

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Tools TDM systems emulates the sound of old analog, digital, and tape delays. Based on the Line 6 DL4 Delay Modeler stompbox, *Echo Farm* brings simulations of such celebrated delays as the Oberheim Echoplex (tube and solid-state versions), Roland Space Echo, and Electro-Harmonix Deluxe Memory Man to your Pro Tools session.

Farm Implements

Echo Farm offers 12 basic delay models: 5 direct simulations of vintage gear and 7 other types, which include sweep echo, ping-pong delay, and reverse delay. Each model has adjustable delay time, feedback amount, time ramp, output level, and mix amount. An info screen provides historical information about the original equipment that Line 6 studied in creating its model. In addition, you get model-specific knobs, such as wow/flutter and drive controls in the Echoplex EP-1 model, and threshold and ducking settings for the Dynamic Delay.

You can set delay time in milliseconds or by using a bpm-based tempo display. Once you set the tempo, you can program delays as note values from 32nd to whole notes, including triplets and dotted notes. There is also a tap-tempo button. The Time Ramp control determines whether changes in delay time are executed immediately or ramped with a bit of pitch smearing. That smear is an integral part of the analog-delay sound and a nice touch.

Test for Echo

Echo Farm is a breeze to use. Strap it across the insert point of a track or use it as an auxiliary track. Select mono- or stereo-output mode, grab a basic model, and start twirling knobs. Every feature supports automation, which gives you precise control of how the delays wobble and chatter within the track. The software is stable, and the graphics are retro and colorful.

I tried *Echo Farm* on a variety of materials. In each case, I was able to enhance the sound with minimal effort. The Echoplex model created a convincing tape slap on voice, whereas the Sweep Echo model created a shimmery, phaselike delay well suited to acoustic guitar. The Memory Man model created chorused delays that sat in the background of an acoustic-piano track. I passed footsteps through the Roland Space Echo set with a short delay and high feedback time. It sounded like aliens walking through a resonant, vocoded tunnel. In general, the delays tend to roll off the brightness and clarity of the original material, just as an analog delay or tape echo would.

Some of the delays felt a shade clean for my taste. I would have liked to have a global "grunge" knob that would add a bit more noise, round off the delays in unpredictable ways, and add more overall randomness to the way the algorithms perform.

Compare and Contrast

I'm a bit of a vintage purist, so I was curious about how *Echo Farm* compared to my Echoplex and Deluxe Memory Man hardware units. The overall feel of *Echo Farm* is clearly in the ballpark—the echoes have a warm, filtered sound, and the way they tend to change shape as you manipulate the delay time is great. But I don't think *Echo Farm* is a perfect model of the original.

For example, one of the coolest aspects of the Deluxe Memory Man is its ability to overdrive the feedback, which creates a chaotic caterwaul that changes in unpredictable ways. *Echo Farm*'s Memory Man model remained calm and polite despite my efforts to make it screech and howl. Moreover, each model offers a maximum delay time of 2,500 ms. That's plenty generous for most delay models, but it means that the long sound-on-sound loops for which Echoplex is famous are not duplicated here. Although it may not be a dead ringer for the originals, *Echo Farm* is warm, malleable, and musical. The graphics are fun, the sound is retro, and the operation is clear, simple, and intuitive. Overall, *Echo Farm* makes a fine addition to any Pro Tools Mix system toolbox.

Line 6's *Echo Farm* is a TDM plug-in for Pro Tools Mix systems that emulates the warm, fuzzy character of vintage analog and tape-based delay units.

Overall EM Rating (1 through 5): 4

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BEST SERVICE

Smart Violins (Akai S1000 and S5000; E-mu EOS; GigaSampler)

By David Rubin

Even with the most carefully recorded string-ensemble samples, producing runs and phrases that sound as though a real orchestra performed them can be difficult. As many sampler owners have woefully discovered, when you trigger a succession of single samples, you lose the nuances that occur when string players connect a group of notes into a passage that should sound like a single fluid gesture.

Producer Peter Siedlaczek, well known for his *Advanced Orchestra* and *Orchestral Colours* sample libraries, has confronted that problem with the release of his new *Smart Violins* collection ($349.95).

The three-disc set (four discs in Akai format) contains ascending and descending diatonic runs, 36 short major and minor Disco Licks, and a pair of brief, slow phrases performed by a 16-member violin section. Each sample is offered at three tempos (100, 120, and 140 bpm) and in all 12 major keys.

Running Away

The smartest part of *Smart Violins* is the section devoted to diatonic runs. In addition to straight ascending and descending runs, ascending sawtooth and wavy runs—named after their appearance on paper when notated—move upward in a less direct manner than straight ascending runs. All runs cover at least a two-octave range.

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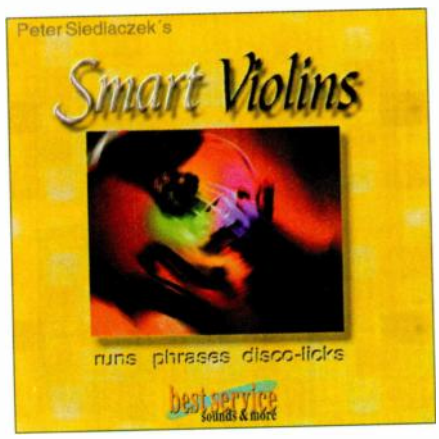
Quick Picks

A small collection of runs might not seem like much until you discover that you can begin any run from any diatonic scale degree and choose one of two variants: a run that *begins* on the selected note or one that *ends* on the selected note. Because most runs don't begin and end on the same note, those variants let you select the type of run that is most appropriate to the musical context. For example, if you want a run to play on a particular note on the downbeat, you can choose a run that starts on that note; if you want the run to lead up to the downbeat, the other variant is the better choice.

The ability to trigger runs from any scale degree makes *Smart Violins* a versatile tool for a variety of musical styles. Choose a run in C and hit the D key, and you get a D-Dorian run; hit the A key and you get an A-natural-minor run.

Smart Violins is even more interesting when you combine runs in various ways. For example, if you layer an ascending and a descending run in the same key, you can produce contrary-motion runs that end an octave apart. Play a triad in any key, and you hear three parallel runs that never clash. The tempos are nicely consistent, so layered runs sync beautifully, and they sound quite realistic because each run is derived from a different sample.

The two elegant slow phrases work much like the runs. Recorded at the same three tempos, the phrases can be triggered from any diatonic note over a two-octave range. Although the two-measure phrases are somewhat generic in nature, they sound especially sweet when layered in root-position triads.



Peter Siedlaczek's *Smart Violins* from Best Service provides a multifaceted collection of violin-section runs and phrases in different keys.

Hot Licks

The Disco Licks section offers a collection of jaunty single-measure musical fragments. The 36 samples (available in all 12 keys) are mapped across the keyboard in a group. Don't be put off by the section's unfortunate name; these musical building blocks are good for much more than simply adding string-section riffs to dance music. You can connect the measure-long phrases in lots of interesting ways. Several combinations could work well for film or TV soundtracks. Having all of the phrases available at once makes trying different combinations in real time easy.

The rest of the library consists of single-note samples mapped into chromatic multisamples. You can use them to flesh out your string parts by connecting the runs and phrases with your own lines drawn from the same violin section. The samples include sustained (looped) and staccato notes, glissando variations, and repeated detached notes. The set also includes 23 short solo-violin fragments that are looped to create some unusual rhythmic patterns.

Smart Stuff

With several thousand runs, riffs, phrases, and single-note multisamples, *Smart Violins* is a versatile string-writing construction kit in a full range of major, minor, and modal keys. The documentation is excellent and includes written examples of the runs and other bits of music, which are a tremendous help in locating and working with the samples.

If you're on a tight budget, *Smart Violins* is also available in a one-CD Light version that includes the single-note samples and all of the other patches, but only in C, E♭, and B♭. Professionals who do a good deal of arranging, however, should stick with the full version; it offers much more to fiddle around with.

Overall EM Rating (1 through 5): 4.5
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Composing Interactive Music

By Douglas Geers

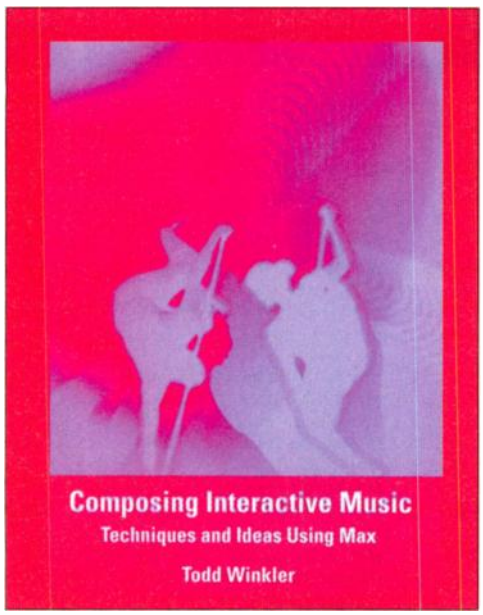
I used to dream of creating robot bandmates that would stay on the beat, show up on time, and follow my directions. That robot band is still a fantasy, but today, it is possible to create virtual musicians in software that listen and react to other players. This kind of music, in which computers follow along with and participate in real-time performances, is commonly called *interactive music*. For those interested in delving into this new but growing genre, Todd Winkler's book, *Composing Interactive Music: Techniques and Ideas Using Max* (paperback, $34.95; cloth, $54.95), is an excellent place to start.

Winkler has been writing interactive music for many years, and it is obvious that he understands his subject thoroughly. Even better, he has a wonderful ability to present his ideas clearly and concisely to beginners. *Composing Interactive Music* works well as a step-by-step primer and would be ideal as a textbook for an interactive-music class.

Measure One

The book begins with a quick history of interactive music, providing context without getting bogged down in details. Winkler then defines three basic types of interactions, comparing them to string quartets, symphony orchestras, and jazz combos. He also wisely points out that, because the computer is a new instrument, we can find new ways of structuring and playing music with it. These concise discussions are well done and provide a solid foundation for the remainder of the text.

Next, Winkler begins his discussion of how to create interactive software, the central subject of the book. *Composing Interactive Music* is focused entirely on how to make interactive music using Cycling 74's graphical composition program *Max* and is just as much a tutorial on *Max* as it is one on interactivity in general. PC users are left in the cold here, because *Max* currently exists only on the Macintosh platform (a Windows version is expected in the first quarter of 2002). How-



***Composing Interactive Music* by Todd Winkler is a guide to using Cycling 74's *Max* composition software to create interactive music, in which a computer listens to musicians and responds to their playing.**

ever, Winkler's decision to focus on *Max* was an intelligent one: *Max* is a sophisticated and established program with an intuitive interface, but until now, it has lacked a high-quality reference book that tells users how it works and why it is a powerful, creative tool for musicians. *Composing Interactive Music* fills this gap admirably.

Beginning in Chapter 3 of the book, Winkler explains how to create interactive software. At every step along the way, he demonstrates how you can realize these goals in *Max*. He begins with fundamental programming concepts, and he soon introduces *Max* "objects," which are the graphical boxes that perform all of its algorithmic actions. Winkler continues with how to connect objects to generate output from *Max*. Commendably, even Winkler's first example produces interesting musical results. This immediately demonstrates *Max*'s usefulness and entices the reader to continue.

Chapters 4 and 5 explore the larger issues of programming structure and interface design. Though these topics sound less than exciting, they are crucial to building effective and reliable virtual musicians. Winkler keeps the discussion interesting by using *Max* to construct MIDI delays, computer-improvised melodies, chord sequences, filters, and more.

Moving On

With the foundation in place, the text proceeds to more sophisticated topics. Chapters 7 and 8 cover methods for teaching computers to listen, remember, and react to rhythms, melodies, and chords played by the user. Fortunately, Winkler's presentation remains clear here as he opens the doors to amazing possibilities. These two chapters are the best in the book, providing techniques that can transform the computer into a responsive musician.

The last three chapters move to quite advanced levels. These include MIDI System Exclusive messages, performance-synchronization techniques, and interaction with video, graphics, and dance. The text provides solid introductions to the more esoteric issues for interested readers.

Music to the Max

Overall, *Composing Interactive Music* is a lucid and valuable initiation into the new world of interactive music. Musicians beginning to explore *Max* should pick up a copy immediately, as this text will speed and clarify their understanding immensely. For added convenience, the book includes a useful CD-ROM containing software versions of all the *Max* examples presented in the text.

The book's greatest limitation is that it does not discuss Cycling 74's audio synthesis and processing software program *MSP*, which is now the most intriguing part of the *Max* system for many composers. However, Winkler's techniques can easily carry over to *MSP*, and so this limitation does not invalidate his book. I hope that Winkler will revise the text to address these possibilities, but until that happens, he has certainly given us a wonderful start in *Max* and interactive music.

Overall EM Rating (1 through 5): 4.5

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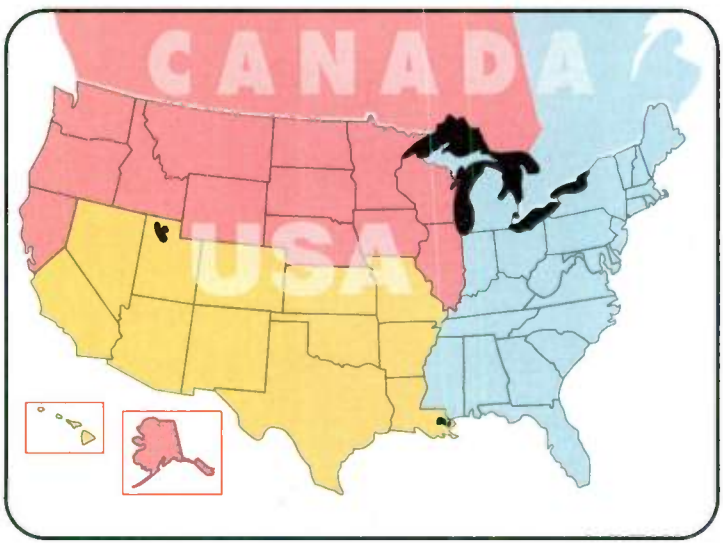

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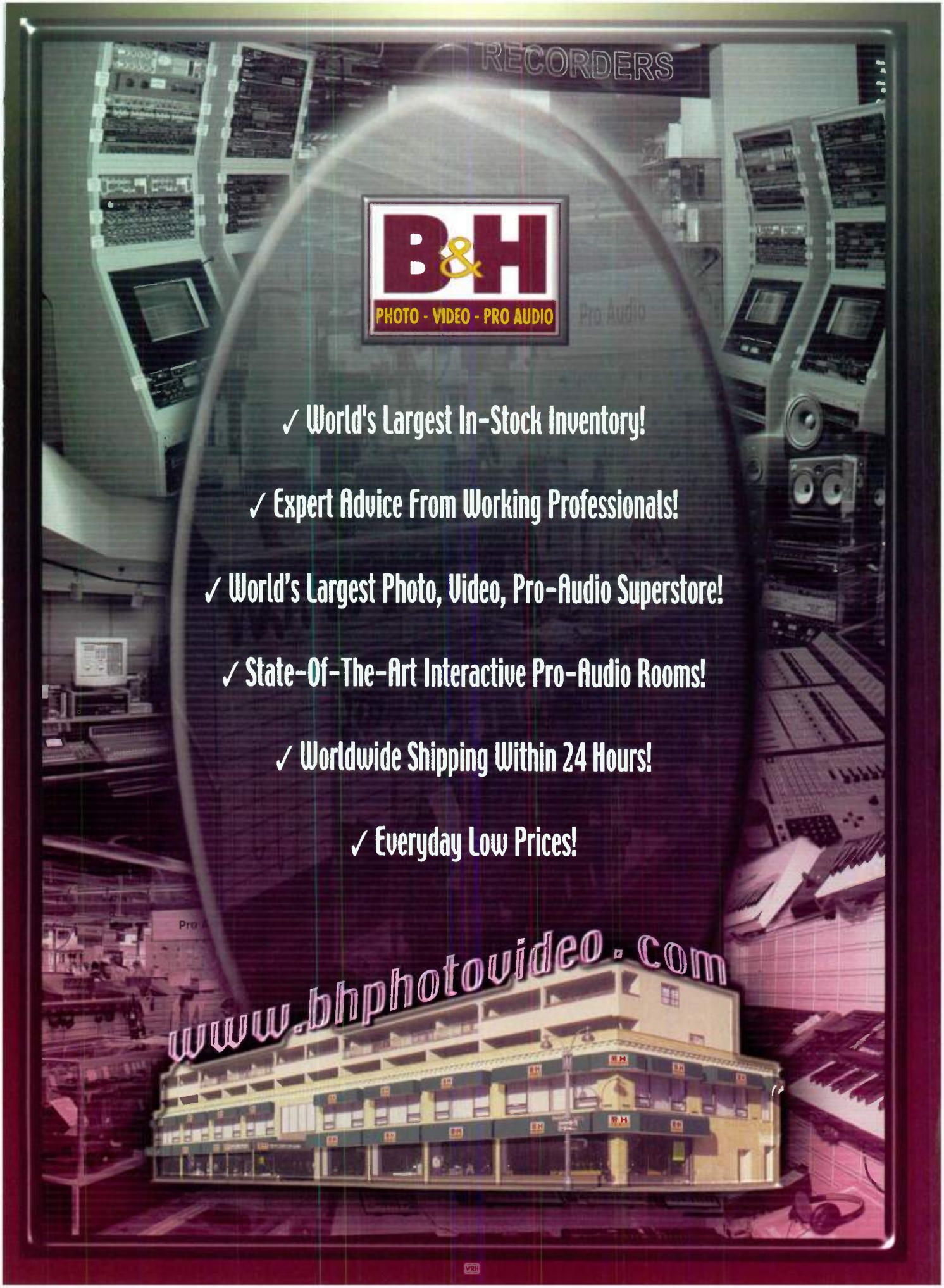
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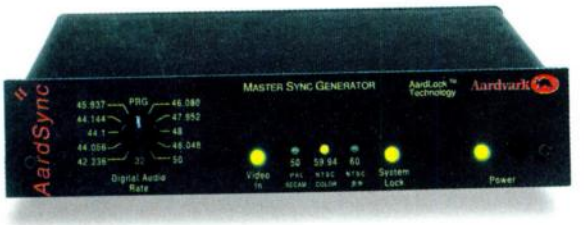

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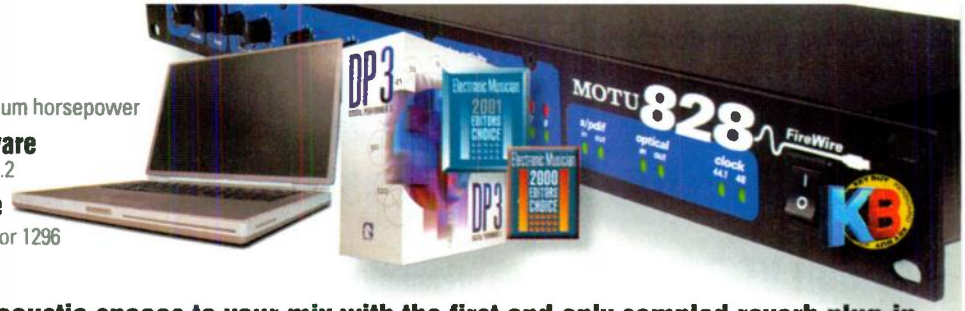

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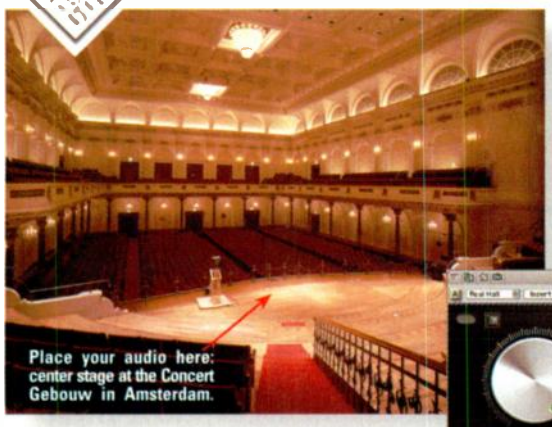

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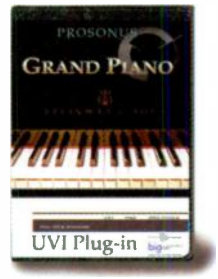

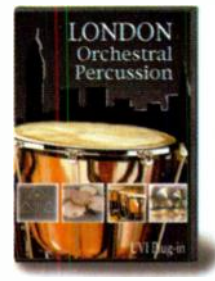

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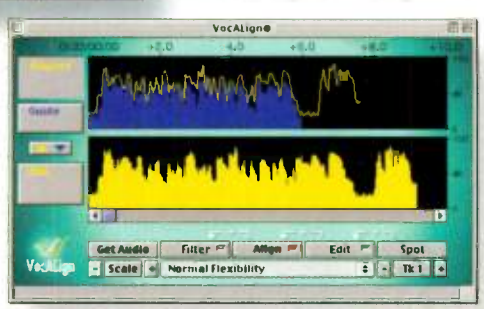

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By Larry the O

All Roads Lead to Home

A well-worn ancient Chinese proverb, generally attributed to Lao-tzu, says that "a journey of a thousand miles begins with a single step." That is very true—as far as it goes. If your journey is between two points connected by a single road, you have only to keep putting one foot in front of the other. But what about when the journey is not one that simply goes from point A to point B but one that reaches its end only in the confluence of several separate, though often related, "subjourneys" through different territories?

Many projects—including albums, films, and games—fall into this category. A typical studio album has tracking, overdubbing, and mixing phases, and it is not uncommon for those phases to overlap for different songs in the course of production. It can get confusing and even overwhelming.

Planning, better known as pre-production, should be your first line of attack, but once pre-production is done and production gets underway, everything has to move toward a conclusion. How does one juggle all those concerns and get them there?

Often the best strategy is not following each step through to completion or multitasking, but incremental improvement. A task is advanced by a modest but significant amount, and then the next task is similarly brought up a notch and so forth, rotating through all the tasks until they are finally all done. A task that sits too long without receiving attention will lose momentum, stagnate, and fall behind. It can seem frustrating for no single task to reach completion until near the end, but there are good reasons for taking this approach.

The creative act rests more in editing than in generating source materials. During the course of a project, the original idea tends to be modified and reshaped as the concept develops. If one task is taken all the way to completion, it will probably need significant reworking when the overall picture changes. Related to this is the notion that the final work is the sum of all the tasks—or, more accurately, the interaction of the ideas behind them—suggesting that alterations in one area will inspire changes to another. If some tasks are far along while others have not yet been started, there is no coherent context, which stunts conceptual interaction. Further, project needs unanticipated in pre-production (and there are usually at least a few) may not surface until late in the project if there are areas wholly untouched before then.

Finally, many projects, such as albums, consist of multiple iterations of more or less the same process (each song having pretty much the same production phases). By rotating through the tasks and raising each a notch every pass, the process gets worked through the first time, and the remaining iterations can be much more effective and efficient.

The concept of placeholders is key to this method. Demos, guide tracks, rough mixes, sequenced parts to be replaced later with live players: these are all tactics for laying a foundation that encapsulates a whole picture of what you are aiming for. Some placeholders may even make it into the final product.

I'll mention one last major benefit of the incremental improvement approach: facing the beginning of a large multifaceted project can often give one a major case of *blank-page syndrome,* in which the scope of the project is so overwhelming that it's difficult to see where to begin. By tackling the problem in nibbles, it becomes less daunting, and once a few pieces are in place, momentum naturally starts to pick up.

Not every project needs to be approached incrementally. Songwriting, for instance, often happens by either the words or the music being written in its entirety before the other is even started. But when faced with a journey of a thousand miles and a dozen destinations, breaking it into pieces and raising the level of each piece a bit at a time can make plain the way to bring it all home. ❀

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