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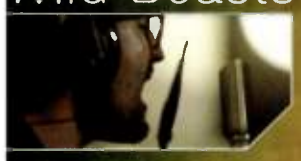
RICHARD DEVINE
A Musical Mad Scientist Talks Tech

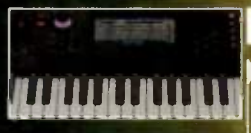
IN THE STUDIO
Wild Beasts



VIRTUAL AMPS

A guide to software collections that model your favorite cabinets and effects

MOD SQUAD
Rossum Electro-Music Evolution

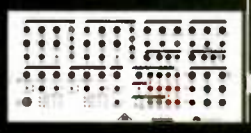


REVIEWS

YAMAHA
MONTAGE

PROPELLERHEAD
REASON 9

SHURE
KSM8



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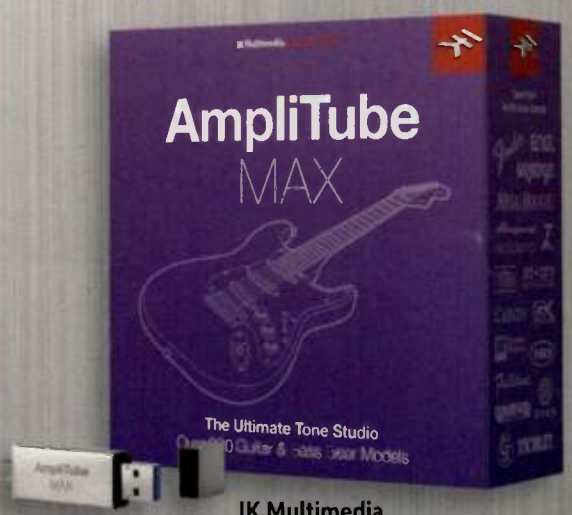

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10.16
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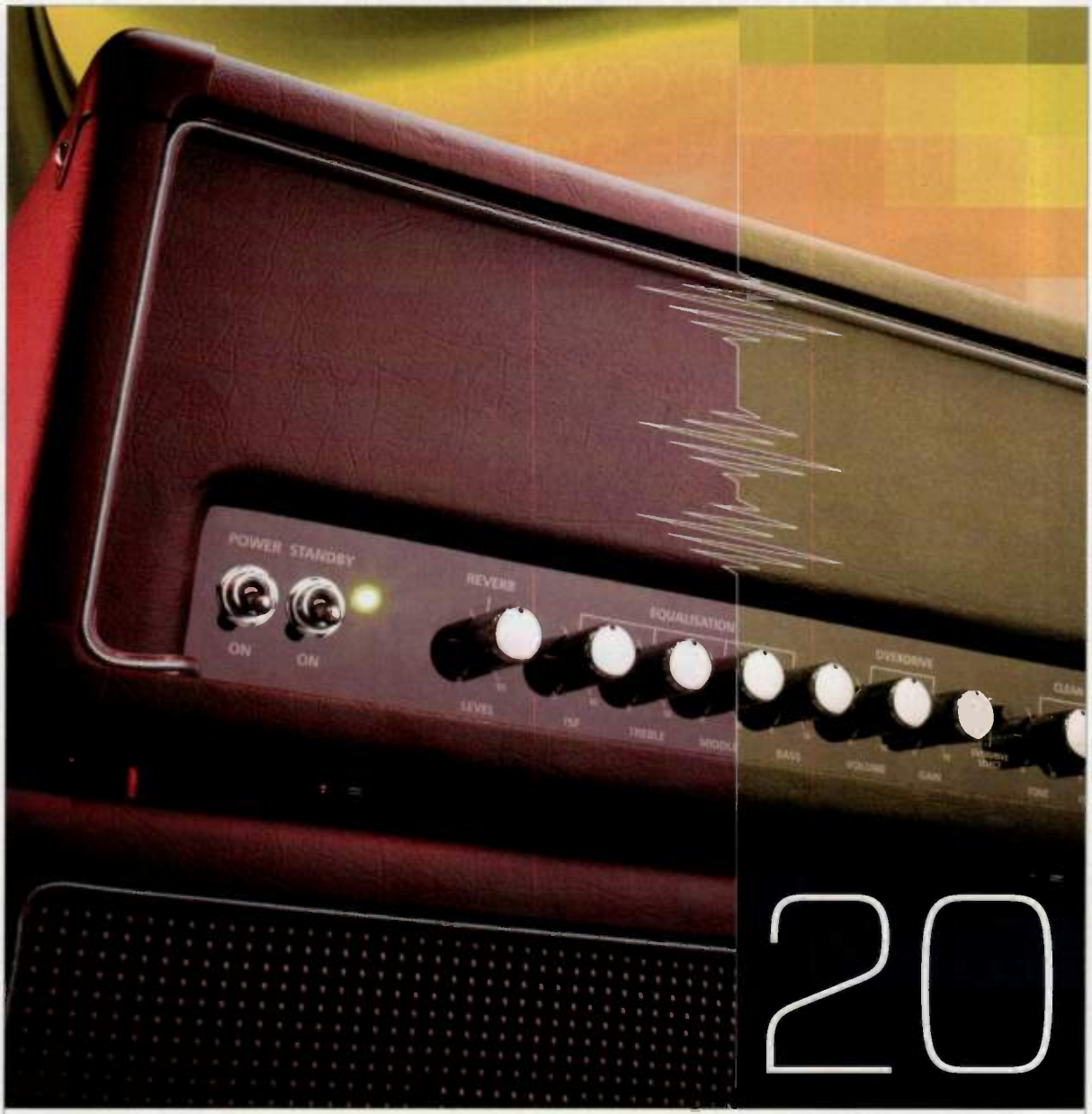
CONTENTS



20
AMP-SIM PLUG-INS

Looking for effects to take your guitar or bass tone to the next level? Check out our guide to virtual amp collections.

DEPARTMENTS

HOW TO

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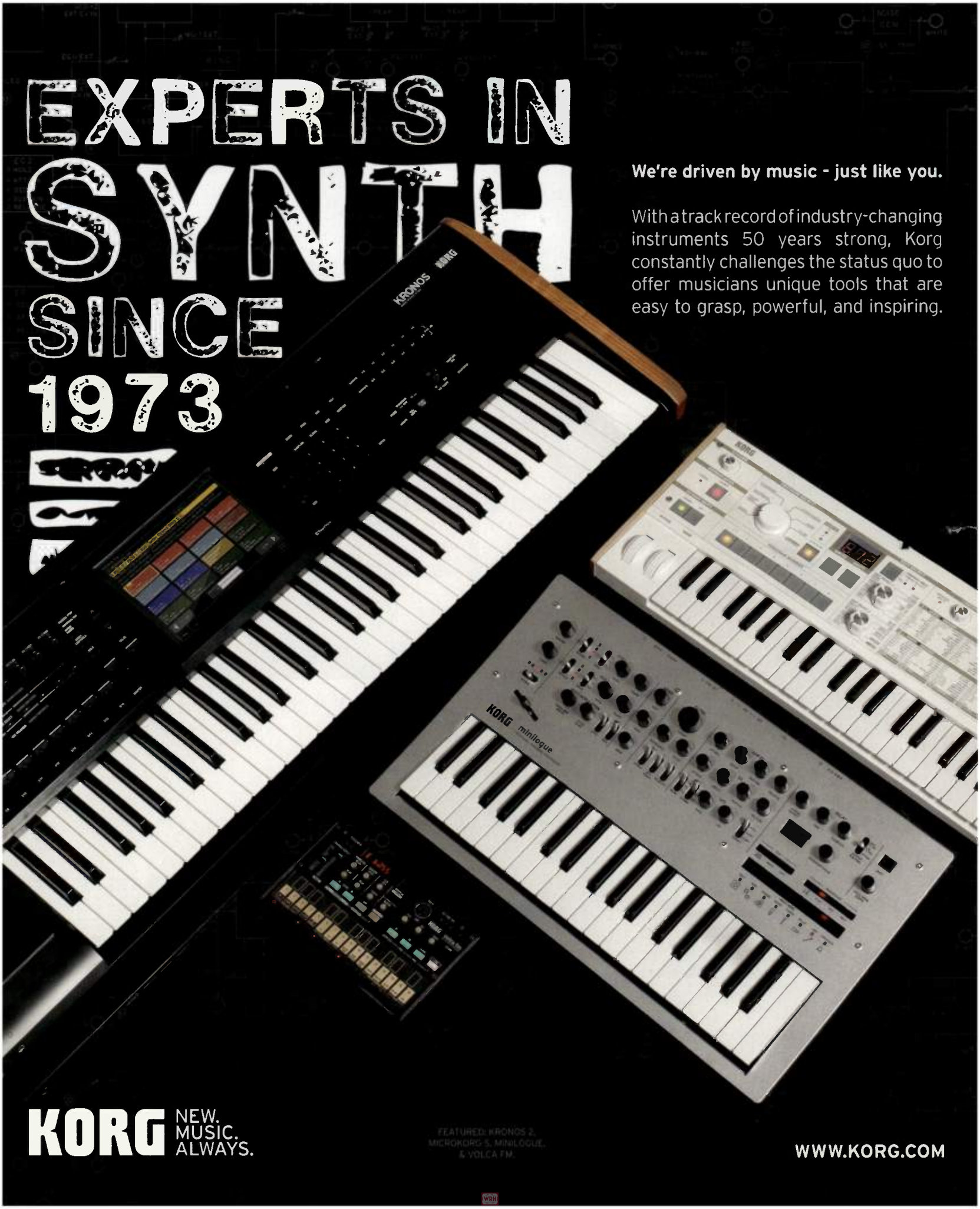
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13

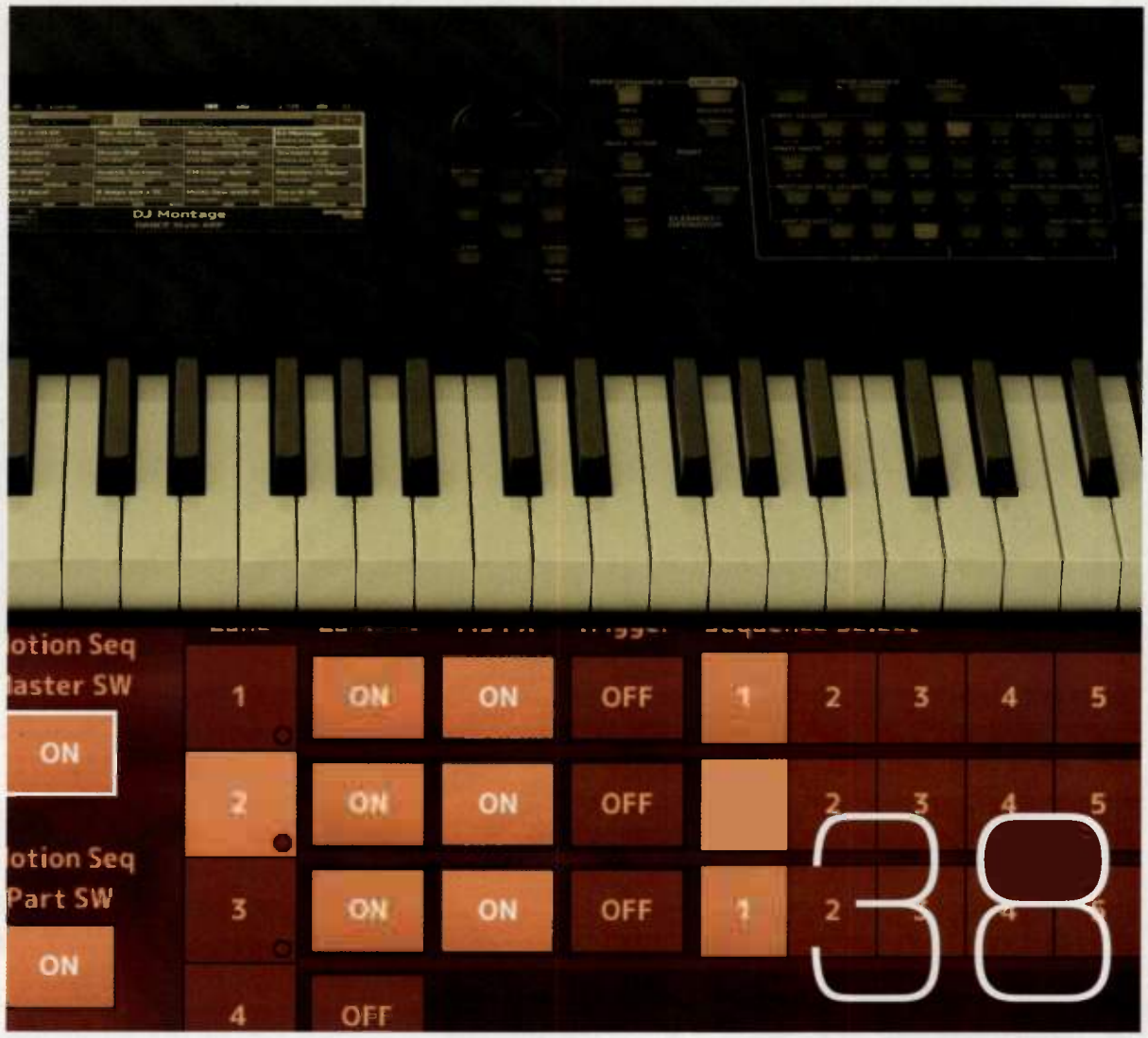
IN THE STUDIO
Wild Beasts

28

RICHARD DEVINE
The electronic adventurer talks modular synths, sound design, and making tough gear choices in his new production space.

36

PLAYLIST
New releases from The Pixies, Biosphere, Boxed In, and more!



YAMAHA MONTAGE

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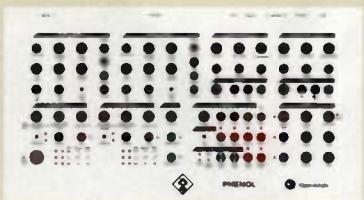
GEAR REVIEWS

42

PROPELLERHEAD REASON 9
Music-production software

46

SHURE KSM8
Dual-diaphragm handheld mic



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Standing with Songwriters

THE MUSIC industry suffered a blow in August when the US Department of Justice concluded its two-year review of the 75-year-old consent decrees that govern collective licensing and decided that it would not modify the existing regulations, and would require PROs to adopt "full-works licensing" of all members' works, even when they only hold rights to a fraction of a song.

Under this "100% licensing" framework, anyone holding as little as 1% ownership of a work has authority to license the full work without permission from other rights holders. So, not only do creators have less control over co-written works, licensee "rate shopping" will potentially drive rates down, squeezing already-tiny songwriter royalties and further devaluing music.

There are serious artistic implications: Publishers and PROs could disallow co-writing to preserve rights, discouraging creative collaboration in an industry that thrives on it.

PROs are fighting back: BMI through litigation and ASCAP through legislative reform. Meanwhile, you can take action. Make sure your metadata is in order. Get better acquainted with your PRO. Write your Congressperson; join advocacy efforts at standwithsongwriters.org. And let us know how you are adapting to the new regulations by sharing your story with Electronic Musician@musicplayer.com.

SARAH JONES
EDITOR
sjones@musicplayer.com

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WEB HIGHLIGHTS

This month on emusician.com

Richard Devine
The Extended Interview

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Remixing With Reason 9
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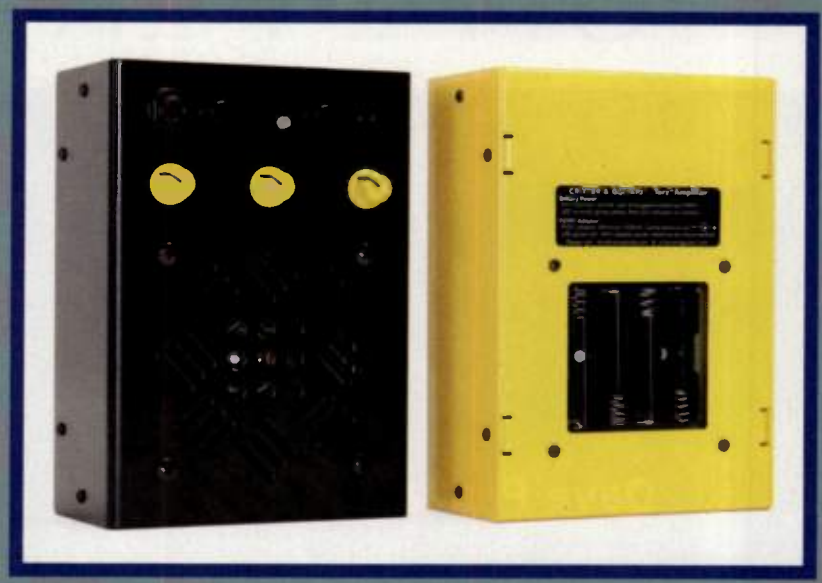
gadget geek

Sting Like a Bee With Terz



Brooklyn-based synth company Critter & Guitari makes a couple of retro-cool boutique products for Jack White's Third Man Records, but our current favorite is the Terz, a loud little portable amp that runs on 4AA batteries. The 7-watt wonder features a 4" speaker, silicon-distortion and germanium-distortion circuits, a low/high gain switch, and a 1/4" input. Available in deep black or canary yellow; $250 at critterandguitari.com.

BY BARBARA SCHULTZ

>> Wild Beasts with John Congleton

"I WOULD say that Hayden [Thorpe, guitar/vocals] has a brilliant pop sensibility. He knows when things are likable, and he's not shy about admitting that. I really like that he wants to make something that appeals to people," says producer/engineer John Congleton, a Grammy winner for his work on St. Vincent's eponymous 2014 album.

"On the other end of the spectrum, you have Tom [Fleming, bass/vocals], who is just as talented and brilliant, but doesn't want things to be immediately satisfying. He wants the listener to work for it, and to make a commitment to the music in order to get more out of it. It's a great dynamic."

Congleton's observations encapsulate the sound of Wild Beasts' latest release, *Boy King*, which the band wrote and demo'd in their Logic-equipped London rehearsal/recording space, and then recorded and mixed in Pro Tools X with Congleton in his studio, Elmwood Recording (Dallas). With its aggressive guitar and synth sounds, tight drums, and sweet vocals, *Boy King* is infectious and challenging in equal measure.

Wild Beasts write all of their songs as a group, beginning with an idea that Thorpe or Fleming has saved to a laptop, but those nuggets don't become songs until the singers get into the studio with guitarist Ben Little and drummer Chris Talbot.

"We have Logic and our [Allen & Heath] live mixing desk in the studio. We have some mics and our full-band instrument setup," says Little. "But as is always the case when you have a lot of nice equipment, all the best parts get recorded on your phone!"

Wild Beasts shared increasingly elaborate, well-formed demos with Congleton, before traveling to Texas to record in Elmwood, which centers around a one-of-a-kind Neve 53 console—yes, the band flew from London to Dallas to record via a former BBC desk.

Congleton had the band set up for live recordings in his main tracking room. "We were working the songs out in the studio together, and by virtue of that, everybody has to be recording at once," he says. "We're trying out changes to the songs, and it would be really hard to do that if we were just recording drum tracks. A kind of mantra I have with bands is, 'Everybody goes to work day one.'"

During tracking, Thorpe would sing/speak a guide vocal to an Electro-Voice RE20 mic. "After we decided we had a take or a composite take that everyone felt good about, Hayden would sing a workable scratch—something more inspiring to listen to while we worked on the song," Congleton explains. "On a couple of occasions, that vocal ended up on the record, but for the most part vocals were overdubbed later with a Neumann U48.

"We'd just keep working out the kinks of each song. Ben or Tom or Hayden might grab some pedals they'd never used before, or I would suggest something—a pedal or amp or a different guitar—and we would start experimenting.

"We also got sounds from a Roland Juno-6 and from [Spectrasonics] Omnisphere, and from something called the Dewanatron Swarmatron. It's a boutique thing that was popularized in Trent Reznor's *Social Network* soundtrack. Also, Hayden had a program on his laptop with some cheap softsynth sounds that we manipulated heavily. That's what you hear in the first song, "Big Cat"—that bizarre, out-of-tune choir sound. At first, he had reverb and all kinds of effects on it, but I said, 'Take it all off.' We left that weird, dry sound that was actually quite unpleasant.

"I think a lot of things happened that were a surprise to them but were revealed because they experimented with those sounds or with some of my gear that's of the gnarly guitar variety. That, to me, is one of the best things about making records: when the record reveals itself to you that way."

Wild Beasts' Hayden Thorpe (above-left and far left), Ben Little (above and above-right), and Tom Fleming (left).

1

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audient.com

4

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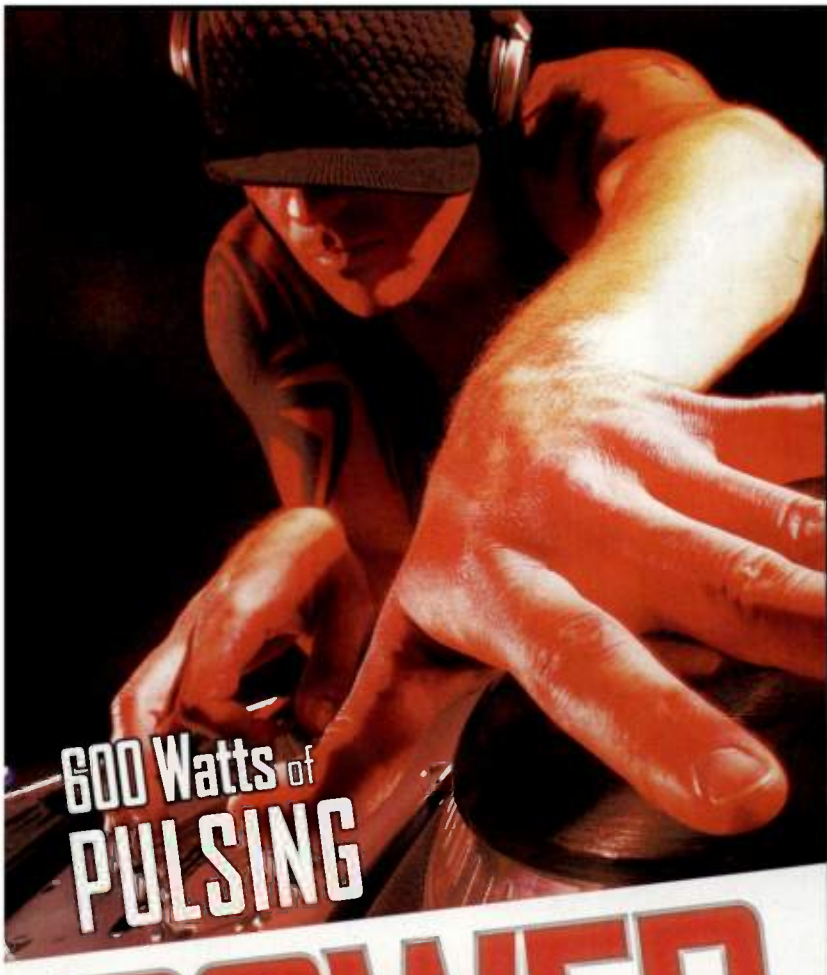
TARGET MARKET Musicians, field recordists, sound for picture

ANALYSIS As feature rich and portable as a Zoom recorder but configured as a 4-channel interface.

zoom-na.com

All prices are MSRP except as noted

Continued on pg 16



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From pg 14

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While you're at it, check out the award winning Zebra2, Diva, Bazille, Satin and Presswerk. Same developer, same website, same fun factor.

The 16HP Evolution module is based on a classic Moog ladder filter. The Evolution's online manual (rossum-electro.com) contains a wealth of information about the concepts behind Rossum's filter design; consider it mandatory reading for anyone interested in subtractive synthesis, in general.

ROSSUM ELECTRO-MUSIC

Evolution

A classic lowpass filter design takes on new dimensions

BY GINO ROBAIR

Back in the early '70s, Dave Rossum was co-founder and "Chief Wizard" at E-mu Systems, a company that evolved from producing analog modular synthesizers to pioneering a range of digital technologies.

The Evolution Variable Character Ladder Filter ($369 street) marks Rossum's return to the analog synth world with Eurorack products that are exceptionally well-engineered and solidly built. As a resonant lowpass filter, the Evolution is based on the classic E-mu 1100 design that, in turn, improved on Bob Moog's patented ladder concept. Though there are already plenty of ladder-based filters on the market, Rossum's design adds ingenious touches that give users unprecedented control over signal processing.

For example, the input and output are DC-coupled, allowing you to process control voltages as well as audio signals. Running CVs through this module—especially while modulating its resonant features—will really get your creative juices flowing.

The Evolution goes easily into oscillation—with or without audio input—and Rossum's design lets the module be used as a wide-range VCO when the filter is in resonance. The 1V/octave input is designed to track through 10 octaves accurately, and the module displays an especially hefty low-end. The cutoff frequency has two additional CV inputs for control, one with an attenuator and one with a bi-polar attenuverter.

The Q setting also has a pair of CV inputs (one with an attenuverter), as well as Q Compensation. The latter gives you control over the level of the passband *below* the filter's resonant peak (whether the module is resonating or not). When the knob is fully counter-clockwise, the timbre of the audio thins out as the filter goes into resonance, just as expected. As you increase the level of Q Compensation, you reintroduce frequencies that were reduced as resonance increased. Use it to add girth to the output or set it so that you don't hear any decrease in the passband spectrum when going into resonance.

One of the most exciting features of the Evolution is its Genus parameter, which let's you dynamically control the filter's cutoff slope from 3-pole (18 dB/octave) to 6-pole (36 dB/octave) with a continuous transition. The Genus knob sets the slope when no CVs are used, or weights the modulation toward one extreme or the other when placed under voltage control. Two CV inputs are provided, and Genus CV 2 includes an attenuverter that can be used to narrow the modulation range. Switching the cutoff slope is particularly handy for changing the resonant tone, and modulating it can provide a variety of bubbly, ringing sounds.

Species, on the other hand, sets the input level going into the filter ladder, and it provides enough gain to seriously overdrive the circuit. I ran vocals and drum tracks through the Evolution and used Species to creatively shred the sound. Increasing the level of Species when the filter is in oscillation decreases the resonant tone. This offers loads of creative possibilities and yields a wide range of full-spectrum, buzzy textures, especially when rhythmically modulated.

All of these features add up to create a powerfully versatile filter. And while it can be used as a smooth sounding LPF, the Evolution has a musically satisfying edge to it once you start flirting with its resonant qualities—and that's before you even touch the Species control. Nonlinearity is at the heart of the design, tracing back to its early-'70s roots. Yet, the Evolution reaches beyond vintage emulation and can sound as modern as you need it to be. ■

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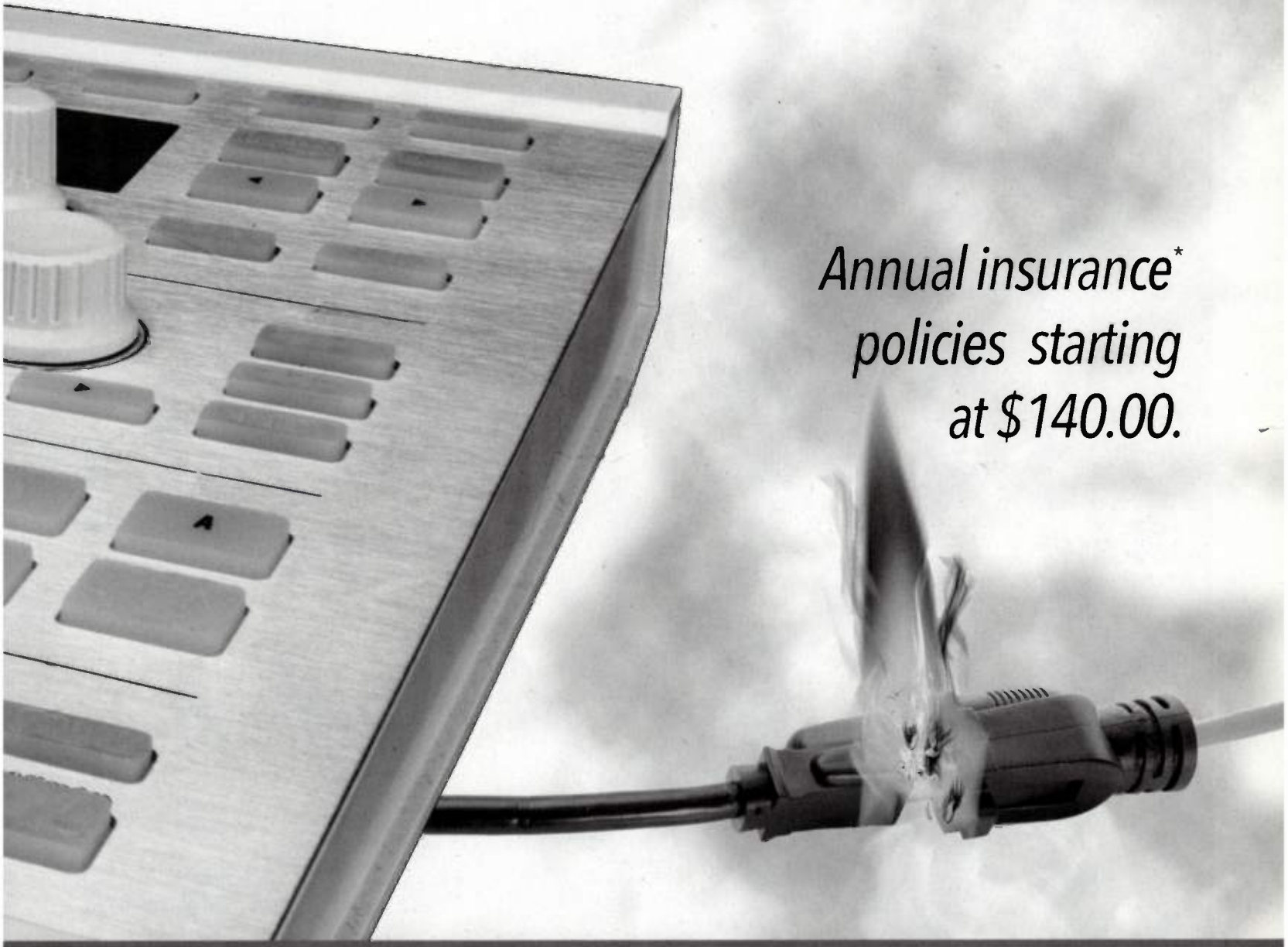

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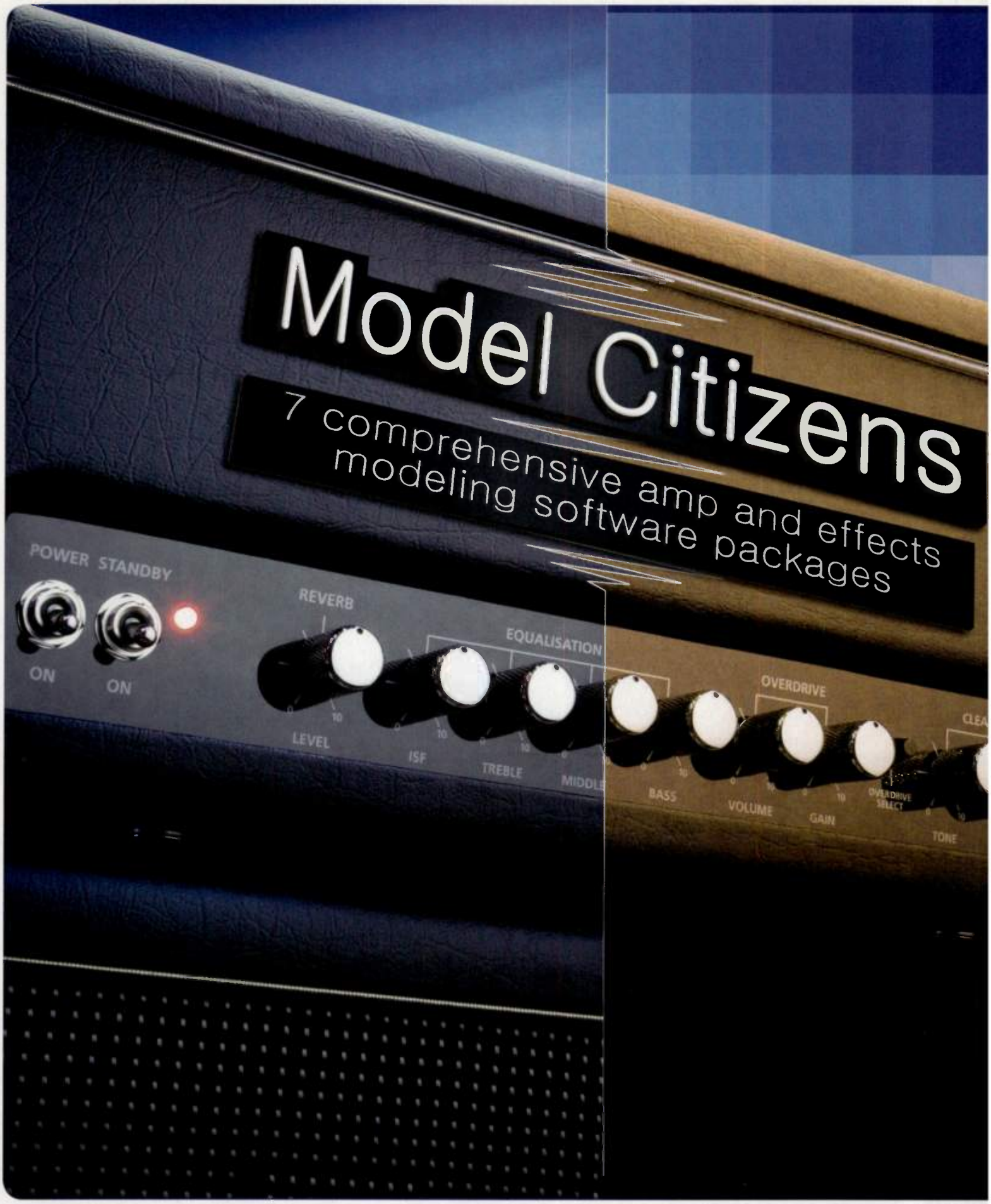
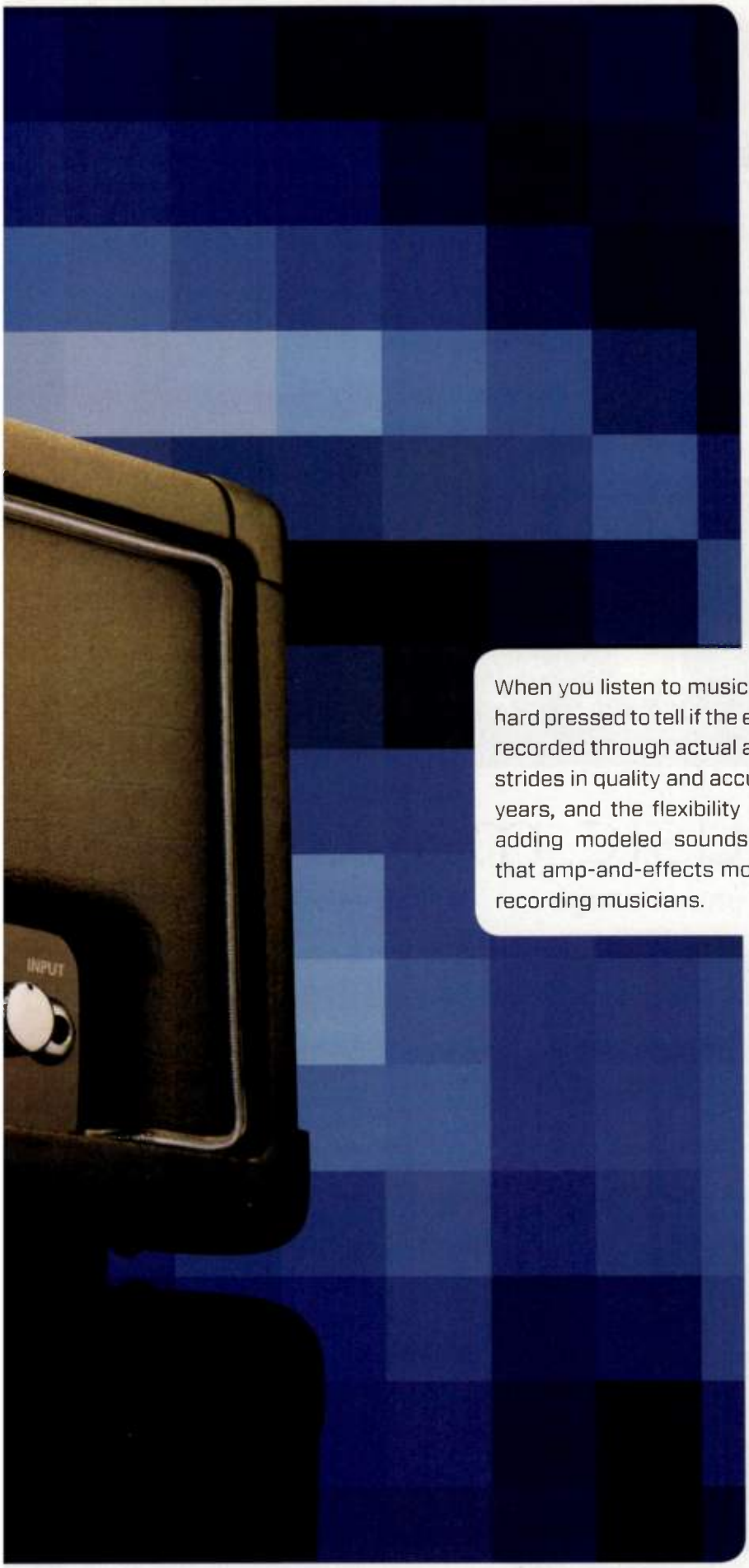


Model Citizens

7 comprehensive amp and effects modeling software packages



BY MIKE LEVINE

When you listen to music produced in the past several years, you may be hard pressed to tell if the electric guitar and bass parts you're hearing were recorded through actual amps and effects, or modeled ones. Between the strides in quality and accuracy that modeling has made over the past few years, and the flexibility and convenience that recording parts DI—and adding modeled sounds during mixdown—provides, it's small wonder that amp-and-effects modeling software has become so popular among recording musicians.

The increasing demand for such software has fueled the competition among developers, and the guitarist, bassist, or producer has more choices than ever. These days you can find products ranging from those that offer a model of a single amp and cabinet, to large collections that give you multiple amps, and cabinets and multiple effects. In order to compare apples to apples, we're going to focus on the latter in this roundup.

The products we'll cover include IK Multimedia AmpliTube 4, Positive Grid Bias FX, Waves GTR3, Native Instruments Guitar Rig 5, Line 6 Pod Farm 2.5, Peavey ReValver 4, and Overloud TH3. All the products come both as standalone versions and as plug-ins for Mac and PC. All support the major plug-in formats, with one notable exception: Pod Farm 2.5 doesn't support AAX, Avid's current Pro Tools plug-in format.

In many ways, these products are quite similar. They give you large collections of rig choices for guitar, and some for bass. Components can generally be mixed and matched. All the programs offer emulations of "classic" amps from the major manufacturers like Fender, Marshall, Mesa/Boogie and others, but vary more in terms of boutique amps models and more obscure brands, and a similar dynamic is at work with effects.

For the most part, the developers of these products don't have official licensing deals with the amp and effects manufacturers, but they make their virtual amps and effects look very similar to the actual ones modeled and give them names that clearly hint at what they are.

All of the products covered in this roundup give you the option to set up dual rigs, each with its own amp, cab, and effects that are then combined at the output with a mixer of some type. They also all include choices of virtual "mics" that can be placed on the modeled cabinets, and, in most cases, moved around to some degree. They all also offer such basic necessities as tuners and noise gates, and many give you loopers. All let you save and recall your own setups, and control parameters via MIDI.

With some of these applications, you can choose from different tiered versions, all of which have the same basic architecture and most of the same features, but offer more or less modeled gear, depending on the price. All either offer a free version with a token set of models or a free demo of the full version. Either way, you can get a flavor for the software before plunking down any money.

IK MULTIMEDIA AMPLITUBE 4

AmpliTube is one of the perennial leaders in the amp-and-effects modeling category, and with Version 4, it adds more models and features. In addition to a nice selection of amp, cabinet, stompbox, rack effect, and microphone models (the size of the library you get varies depending on whether you buy the standard, Deluxe, or Max edition of AmpliTube 4), all versions of AmpliTube 4 include the new British Collection, comprising five new matching amp and cabinet models based on classic Marshalls.

AmpliTube 4's cabinet management has been updated with the new Cabinet Room section. In addition to featuring stunning 3D graphics, it lets you choose a cabinet, whether to use one or two mics, your mic models, positioning, and room type. Then you can mix and pan the various mics, and dial in separate room mics and a DI signal. AmpliTube 4 is the only modeler in this article that lets you swap out speaker types within a given cabinet (12" speakers only), giving you a choice of 29 speakers.

Also new to AmpliTube 4, in the standalone version, is an 8-track recorder section, where you can record, overdub, edit, and mix audio tracks, using AmpliTube's effects. The new 4-track loop-

AMPLITUBE 4 (Mac/Win, VST, AAX Native, AU, Standalone)

AMPLITUBE 4 ($149.99): 9 amps, 10 cabinets, 29 speakers, 12 effects, 4 mics

AMPLITUBE 4 DELUXE ($299.99): 25 amps, 29 cabinets, 29 speakers, 48 effects, 12 mics

AMPLITUBE 4 MAX ($499.99, download; $529.99, USB drive boxed version): 80 amps, 92 cabinets, 29 speakers, 112 effects, 19 mics

AMPLITUBE CUSTOM SHOP (free): 4 amps, 5 cabinets, 11 effects, and 3 mics

KEY FEATURE: 29 speaker models that can be swapped inside cabinet models

er has a cool spinning graphics reminiscent of the iOS app Loopy HD. Version 4 also brings a second tuner option called UltraTuner, which IK touts it as being accurate down to 1/100th of a cent.

Supplement your library of models by purchasing additional "gear"—including officially certified Orange, Mesa/Boogie, Fender, and Ampeg collections or even individual models—through the free AmpliTube Custom Shop software (which is not the same as AmpliTube Custom Shop, the free version of the amp modeler), a separate standalone "store" application.

POSITIVE GRID BIAS FX

If you're looking to get great sounds quickly, with little or no tweaking necessary, you'll like Bias FX. Not only does it come in two Mac/Windows versions, Bias FX Desktop and Bias FX Professional, it's also available for iPad, in a version containing the same features and models as in Bias FX Desktop.

All the incarnations of Bias FX give you models based on amps by major manufacturers like Fender, Marshall, Vox and Mesa/Boogie, Roland, Peavey, and Orange, but once you get into the Professional version, you'll also find boutique amps from Bogner, Dr. Z Amplification, ENGL, and Matchless, among others. Although the model GUIs are designed to look like the amps they're modeling, the controls are uniform from amp to amp. The model collection can be expanded with The Metal Signature Pack ($49), which adds 6 signature amps/cabs and 6 effects.

The effects collection is expansive, even in the Desktop version, with models based on famous pedals like the Ibanez TR-808, the Electro-Harmonix Electric Mistress, and the MXR Dyna Comp, to name just a few. The Professional version adds such classics as the Klon Centaur and DigiTech Whammy Pedal, among many others. Bias FX also features emulations of well-known studio rack gear including the Manley Massive Passive, Teletronix LA-2A, and UREI 1176.

All the versions of Bias FX have the same GUI, which defaults to a view of the signal path. Alternately, you can switch on Pedal Board view which depicts the effects on a pedalboard, with cool 3D graphics, with the amps pictured above them. Mixing and matching amps and cabs is easy, and creating dual signal paths is a snap. Components can be moved around by dragging and dropping.

Bias FX lets you download and upload setups via its ToneCloud web site. There you can find patches created by well-known guitarists like Neil Zaza, Marty Friedman, and others, plus patches from users, arranged in genre-specific categories.

Another cool feature is the ability to load amps created in Bias Amp, a separately purchased application (also for Mac, Windows, and iPad), which allows you to construct your own amps by choosing internal components such as tubes, and transformers. Bias Amp also has a feature called Amp Match that creates an amp model based on the sound of a recorded guitar track.

POSITIVE GRID BIAS FX (Mac/Windows—VST, RTAS, AAX Native, AU; Standalone—iPad version also available)

BIAS FX DESKTOP ($79): 12 amps, 12 cabinets, 32 effects, 2 mic models

BIAS FX PROFESSIONAL ($179), 32 amps, 32 cabinets, 62 effects, 2 mic models

Demo versions available

KEY FEATURE: ToneCloud website lets you share patches with other users

WAVES GTR3

When you open Waves GTR3 in your DAW, you'll notice more than just mono, stereo, and mono-to-stereo plug-ins. Besides the full version, called Waves Tool Rack, you have the option of opening modular plug-ins containing only amps or effects (in 2-, 4-, or 6-slot pedalboards). This modular approach lets you open only the models you want on a track, without the CPU load of the full plug-in. You can even open the tuner separately.

The Tool Rack plug-in (the same interface that opens in standalone mode) is extremely easy to use, putting everything right at your fingertips. It has two amp slots above a six-slot effects pedalboard. The two amps can be linked, in which case changing one changes the same parameters on the other; or unlinked, where you can adjust them separately. Phase and Delay controls are part of the interface, with the latter making it easy to dial up wide stereo sounds very quickly.

Although many of the models in GTR3 are based on classic amps, there's no attempt to emulate their look or specific control sets. Instead, the amps have a unified look (although some models have different color GUIs) and the same control knobs.

The amps have descriptive generic names like Warm, Overdrive, Scream, Crush, and Inferno. The only way to find out what these processors were actually modeled from is to look in the manual. There you'll discover that Waves used amps like a 1966 Ampeg Gemini II, a 1964 blackface Fender Super Reverb, a 1980 Marshall JMP, and a Koch combo, among others.

Several models are just listed in the manual as being from "a boutique amp in Paul Reed Smith's collection." Also included is a bank of amp models from guitarist Neil Citron, which features models from a customized Carvin Legacy, an Ibanez TN120 Thermion, and a modified '60s-era 100W Marshall Plexi.

While some might find fault with Waves' generic approach to naming and depicting the amps, it can be an advantage, because it makes you focus more on what you're hearing, rather than on what you expect a certain type of amp to sound like.

A nice selection of Global presets are also available for Tool Rack and the Amp and Stomp plug-ins.

NATIVE INSTRUMENTS GUITAR RIG 5

Native Instruments Guitar Rig 5 Pro combines straight-ahead modeling of classic amps with some innovative effects, and even a looper.

One of the many appealing aspects of Guitar Rig 5 Pro is its super-convenient drag-and-drop interface. Drag components from the Component Pool on the left into the rack area on the right, and away you go. Although the company can't use the actual names for trademark reasons, you'll find accurate models of amps by Fender, Marshall, Orange, Mesa/Boogie, and Hi-Watt, among others in the collection. It's easy to tell what the amps are from their suggestive names and look.

The Control Room Pro module is one of several options for miking cabinets. Choose a cabinet, a mic model, and one of three mic positions. Dial in the percentage of room mic sound and adjust the phase, if need be. Click on the mixer tab, pan the mic, and adjust its volume relative to other miked cabinets. A large choice of mic models, from dynamics to condensers to ribbons is provided.

Guitar Rig 5's Tool modules add functionality. These include two Tape Deck modules, one before and one after the rig in the signal chain. You can load MP3s into the Pre tape deck. Tape deck audio can also be time stretched and pitch shifted, which is handy for learning licks and solos. The Loop Machine lets you record, overdub, and reverse loops.

On the effects side, Guitar Rig 5 Pro offers a huge amount of choices including expected guitar effects such as distortion, overdrive, reverb, and delay, plus modulation effects like chorus, flanger, tremolo, and phaser. In addition, you get five Modifier modules: Step Sequencer, Analog Sequencer, Input Level, and Envelope. These can be placed in the rack and assigned to control one or more parameters on effects, amps, cabinet modules, and so forth, adding rhythmic modulation to the audio and creating unusual effects.

The Master FX module lets you place effects after your rig's signal chain, so they aren't affected when you switch to a different preset. The Container lets you set up macros so you can control multiple effects parameters at once.

Guitar Rig 5 Pro and the free version, Guitar Rig 5 Player, can host other "Powered by Guitar Rig" effects, such as Reflektor convolution reverb; Rammfire, an amp and cabinet model based on Rammstein guitarist Richard Z. Kruspe's rig; and Tracktor's 12, a group of 12 DJ effects from NI's Tracktor software. The Powered by Guitar Rig effects are included if you're a Komplete 10 owner; if not, you have to buy these add-on effects separately.

LINE 6 POD FARM 2.5

Line 6 has been in the amp-modeling field since the beginning, and the models contained in Pod Farm 2.5 reflect the company's skill in emulating amps and effects. Pod Farm comes in three versions—Platinum, Standard, and Free—each with a different-size model collection.

WAVES GTR3 (Mac/Win—AAX Native, RTAS, AudioSuite, VST, AU, SoundGrid; $129)

37 amps, 23 cabinets, 26 effects, 12 mics

Demo version available

KEY FEATURE: Generic naming and look of models let you focus on the sounds

NATIVE INSTRUMENTS GUITAR RIG 5 (Mac/Win—VST, AU, ASIO, Core Audio, WASAPI, AAX Native, Standalone)

GUITAR RIG 5 PRO: ($199 or included with Komplete 10 and Komplete 10 Ultimate): 17 amps, 27 cabinets, 54 effects, 8 mics

GUITAR RIG 5 PLAYER (FREE): 1 amp, 17 cabinets, 13 effects, 2 mics

KEY FEATURE: Modifiers let you rhythmically sync parameters

LINE 6 POD FARM (Mac/Win—AU, RTAS, VST)

POD FARM 2.5 STANDARD ($99): 23 amps, 29 cabinets, 35 effects, 4 mic models

POD FARM 2.5 PLATINUM ($299): 106 amps, 46 cabinets, 103 effects, mic collection

POD FARM FREE: 4 amps, 4 cabs, 13 effects, 2 mic preamps, mic collection

KEY FEATURE: Preamp models add the sonic signatures of consoles and outboard processors.

When you install Pod Farm 2.5, you not only get the full plug-in with all the features, but also 11 modular plug-ins that provide just one aspect of the collection such as guitar amps, bass amps, modulation effects, reverbs, tuner, and so forth. If you don't need the full plug-in, you can use the targeted modules to save CPU.

Pod Farm's GUI features the Signal Flow View Display, where you can drag in components from a rotating display above. Change the order by dragging components forward and back, and click the Dual button on the Control bar at the top to create a dual signal chain, which is controlled by the Mixer module.

One of Pod Farm 2.5's strengths is its breadth of models, especially in the Platinum version, but also in Standard. You'll find models of Fender, Marshall, Vox, Mesa/Boogie, and Matchless amps, among many others, as well as a collection of Line 6's proprietary amp models. Mix and match amps and cabinets to create hybrid setups. If you have the Standard version, you can fill out your model collection using Line 6's Model Packs, available online in the Line 6 store.

The effects selection is impressive in Pod Farm 2.5 and even more so in the Platinum version. A large selection of dynamics processors, distortion and overdrive pedals, modulation effects, delays, reverbs, wahs, and filters are included. The Platinum version's effects roster also features a selection of effects that imbue synth-like tones to your guitar or bass.

A cool feature of Pod Farm 2.5 (both Standard and Platinum) is its collection of six mic preamp models, which emulate outboard and console preamps, including Vintage U.K. (based on the Neve 1073), Modern (based on the Avalon VT-737), among others. These are not only useful in guitar and bass rigs, but can be inserted on other instruments and are quite effective on vocal tracks.

PEAVEY REVALVER 4

When ReValver was first released, it broke the mold for modeling software by letting you go under the hood and tweak the modeled electrical components in an amp to change the sound. Now, in its fourth major version, ReValver continues to set itself apart by offering unique features.

ReValver 4 software is free, and comes with a token model collection. The idea is to populate it with models from Peavey's "Amp Store." The Producer Pack is the most comprehensive package Peavey offers, and gives you a nice selection of modeled amps, including classic amp models and a number of Peavey amp models, as well as cabinets and effects. You can also buy individual models and theme-based collections.

ReValver 4's Input and Output Modules, which look like 500 Series racks, come before and after the main signal chain, but feature important processing. Chief among those are modules for Peavey's Audio Cloning Technology (ACT). In the Input Module, ACT provides a form of guitar modeling. To use it, start by profiling your guitar by playing rapidly into ReValver. Once the soft-

PEAVEY REVALVER 4: (MAC/WIN—VST, AU, AAX)

BASIC FREE VERSION: 3 amps, 3 cabinets, 4 effects, 3 mic models

PRODUCER PACK ($99) 17 amps, 23 cabinets, 18 effects, 28 mics

KEY FEATURE: ACT guitar modeling

ware captures your guitar's sonic imprint, ACT profiles can be applied to change, say, an electric into an acoustic, a hollowbody into a solidbody, and so forth. Available profiles depend on which ACT libraries are loaded in your version of ReValver. A small collection of Profiles comes with the Producer Pack, and you can get additional Libraries at the Amp Store for just $2.99 each.

ACT is also present in the Output Module, where it processes your output with various rig profiles. On both the Input and Output ACT modules, an Effect Blend slider lets you dial in as little or as much of the ACT process as you want.

Also new in ReValver 4 is the RIR 2 Cabinet module, which makes it easy to swap cabinet and mic models, change mic placement, and dial in filters, delay, and ambience. GIG mode, only available when you run ReValver as a standalone, gives you eight slots at the top of the GUI where you can save your own rig setups and easily switch between them.

Another unique feature to Revalver is the ability to host third-party plug-ins from within the plug-in or standalone version.

OVERLOUD TH3

TH3, the successor to Overloud's TH2, offers an appealing mix of excellent design and sound quality, and a model library that provides both familiar and unique selections.

In addition to amps that were clearly modeled from Fender, Marshall, Orange, Roland, Mesa/Boogie, Dumble, and Peavey units, TH3 also offers authorized models from boutique brands that you don't usually find in amp modeling software, including Brunetti, DVMark, and THD. Metal fans will be happy to discover authorized models of the Randall T2 and Lynchbox, and two complete banks of Randall presets.

OVERLOUD TH-3 (Mac/Win—AAX, RTAS, VST, AU; $249)

72 amps, 37 cabinets, 75 effects, 18 mics

Demo version available

KEY FEATURE: Authorized model collections from Brunetti, DVMark, and THD

The abundant supply of stompbox and rack effects cover just about every category you could want, from distortion to ambience to modulation and more. Some of the coolest effects in TH3 are the pitch-related ones, including the stunning (2-voice) Harmonizer.

TH3's clean-looking GUI centers around the Sound Chain area in the middle, where you can drag and drop components to create your rig. Choose from a number of preset zoom levels to see larger or smaller versions of the Sound Chain. An overview image of the entire chain is shown below it, which is helpful when you zoom in close on a particular component. A pull-down menu of categorized components makes it easy to find what you're looking for.

Double-clicking or right-clicking on a speaker cabinet in the Sound Chain opens up the Cabinet Properties window, where you can activate and adjust up to four mics. Two are on the front of the cabinet, one on the rear, and one is at a 45-degree angle. Choose your front mics from 18 models, and position them by moving them back and forth and side to side. Mix in as much or as little of the other two mics as you want. The IR Cabinet is a speaker cabinet that can be loaded with two impulse responses from a provided library, or you can import your own.

TH3 also has a nicely featured Looper, with features like overdubbing, Reverse, Autostart, Metronome, and more. ■

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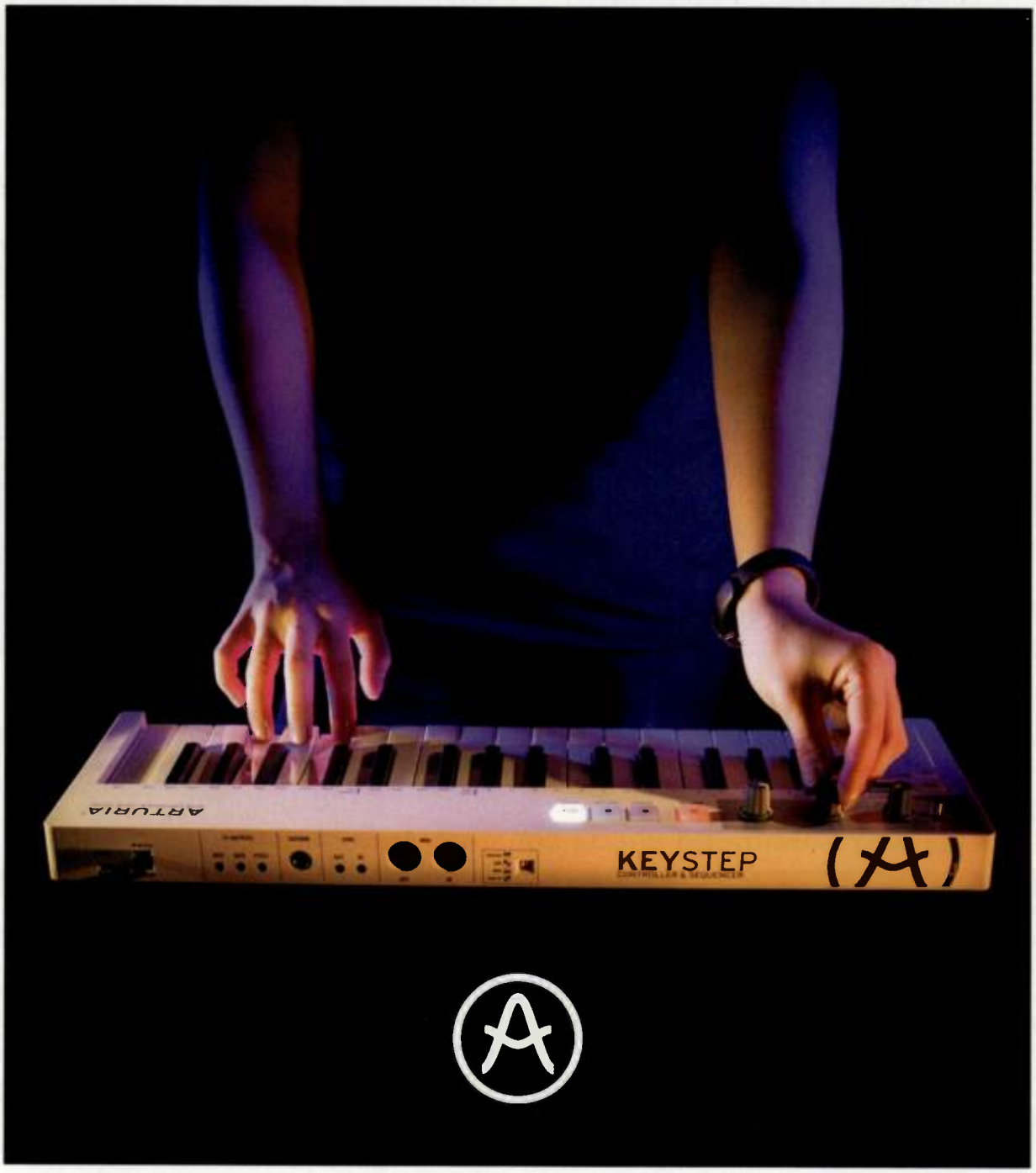

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RICHARD DEVINE

The modular mad scientist and in-demand sound designer takes us inside his new studio and sheds some light on his creative process

BY TONY WARE

Richard Devine emerged 20 years ago as an industrial techno producer armed with a pawnshop ARP 2600 and a thrash metal mentality. As digital signal processing evolved, so did his passion for the fiercely nonlinear in Csound, SuperCollider, and Composers' Desktop Project. His early years were spent recording oxidized robofunk and dislocated filters for IDM record labels, such as Schematic, Chocolate Industries, Warp, and Sublight. He was a laptop contortionist, performing in DIY venues worldwide. This led to long-running relationships with companies such as Native Instruments, who commissioned him to develop tools for signal mangling.

Over the past two decades, Devine has come full circle as both an artist chasing electroacoustic tangents and as an in-demand commercial sound designer. In recent years he's shunned in-the-box performances to become a figurehead of the rampant modular synth community, headlining showcases and panels when he's not kept busy creating presets for software instrument developers and companies (including Barnes & Noble, LG, Nike, Sony, Apple, and Google, and video game designers) in need of distinctive UI sounds, sample banks, campaign themes, and advert effects. Though, he says, it all still starts as chicken scratch outlines and scribbled Post-it notes.

Devine has launched a Vimeo series of in-studio Eurorack performances, complete with extensive patch notes (vimeo.com/richarddevine), which exhibit his enthusiasm to share his experiences. He took a few moments away from work on Google's virtual reality experiences environment, Daydream, to discuss building a new studio, watching modular synths swing from dusty to desirable, and drawing inspiration from nature.

You started in the mid-'90s hoarding second-hand hardware, transitioned to digital sound generation ensembles, then dove headfirst back into compiling banks of blinking LEDs. What were your goals for your recent studio build?

When I built this space, we designed the room to be spacious, with everything accessible, because at one point years ago I had so much gear it was stacked in multiple closets, and I'd waste so much time looking for something before even using it. The more commissions I'd get, the more I realized I needed everything already running and ready, where I could just hit record. The room needed to feel clean and uncluttered. So, first I did something that was hard, but I recommend it: I got rid of a lot of gear I only used once or twice.

Did you hold on to any totems from your old workflow?

I still have an ARP 2600 that was one of the first things I bought, and it's still a staple for sound effects. I grew up using it, understanding its signal flow and modulation potential, finding out what

it was capable of at the most subtle and extreme levels, and that old-school approach stuck with me whether I was figuring out how to connect up objects in a program like Max/MSP or patching new Eurorack modules. If you try to do something simple with new gear—just listen to the oscillators, the filters and VCAs, try to make a simple snare or string pad—then you quickly realize what applications a synth is good for and where in your palette of sounds it sits. I often like to see if I can create an entire piece of music with just one synth or system.

Any gear you wish you hadn't pruned?

I wish I still had an EMS Synthi AKS, but I sold it way, way before this studio. At the time I felt there was a shift happening where you could do such complex computational synthesis in the box, very detailed and exotic stuff. And it was becoming really hard to get parts and maintain things like the Germanium transistors, etc., for some of my older synths. Now there is a crazy resurgence in that stuff, people buying and servicing synths.

About 12 years ago my friend Josh [Kay, of Schematic Records and Phoenicia] picked up some early Doepfer A-100 stuff and one night we played with it for hours. I was blown away by the possibilities of custom-designing a system from the ground up. So I bought a case, and they don't call it "Eurocrack" for nothing. Soon I had two cases, and then there were people like Plan B, Livewire Synthesizers, Analogue Solutions, Make Noise.

Fast forward to the past five years and I was really missing how I made music with the ARP and early Roland modulars in the late '90s.

You can do incredibly powerful stuff in the computer, controlling every microsecond of a piece, but it's through this crude interface of a mouse, keyboard, and controller that feel disconnected from the act of creating and manipulating sounds. I was missing the physical interactivity, that instant gratification of a hardware synthesizer, where you make 10 to 15 adjustments in seconds. For my professional work I'm still very much in the box, but for my personal compositions and performances I have shifted my focus to modular and exclusively using only external hardware/pedal effects like the Eventide H9 and Strymon pedals.

So, that philosophy of immediacy influenced your hit-spacebar-and-go studio routing?

The entire idea was to center the studio around my travel setup, which is a MacBook Pro, a Teenage Engineering OP-1, and an iPad or two. With that I can get most of the sound design and editing I want done, whether I'm in a hotel, airport, coffee shop, etc., and then I come to the studio where I can just bring up a channel and record all the hardware instruments. I've got a Yamaha DM-2000VCM console, with all the synthesizers and drum machines, etc., routed into its 56 inputs, and that is connected to another computer that's dedicated to instrument tracking.

Devine's modular station comprises two Goike custom cases and 8 6U/12U modular portable cases.

The main mixing area centers around a Yamaha DM2000VCM, used for tracking of all the hardware synths and drum machines.

Devine's "synthesizer corner" is a mixture of classic analog and digital synths.

I run Ableton Live, Logic Pro, Pro Tools and Nuendo set-ups for different clients. But I don't use my desk when mixing. I've got a separate analog rig that uses an Apollo 16 into a Dangerous Music 2BusLT/Monitor ST/DACST combo for mixing and monitoring, then I'll take the stereo mix and send one final pass through the Avalon VT-747SP. A lot of my mixes are just UAD-2 Satellite/Apollo16 Thunderbolt OCTO, FabFilter Pro Q2 and Pro-C 2, BrainWorx BX_XL V2, SoundToys Decapitator, and iZotope

Ivory II

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Trash 2 plug-ins, plus Dangerous Music summing, which gets me the right coloration and control. For me it's about keeping good dynamics. I don't overcompensate with multiband compression to get a solid brick of volume out. I'm just about getting lots of detail, clarity, imaging, which is more about working with careful adjustments of levels, and giving each voice its own space. There are Genelecs all over for monitoring—including the 8250A, 8020C's and 6020A, all with dedicated subs—because they are in a lot of post houses and offer detail without being fatiguing so I can listen for long periods at a time. I've also got them hooked up in quad and surround configurations. Plus, I have a Samsung soundbar, Avantone MixCubes and Sonos systems for level checks.

Close-up of the workstation rig.

Devine's mastering mixdown setup features UA Apollo-16, Dangerous Music 2Bus LT, and Avalon VT-747SP Class A tube stereo compressor/limiter with built-in EQ.

Having a long history bridging the digital and analog worlds of synthesis, where do you find they overlap and are most divergent?

I've used Max since Version 2, when it was sold by Opcode Systems, and Reaktor I have used since it was called Generator, around 1998. There were people scared to work in them, and Cycling74 and Native Instruments have done so much to make it easier to use so that now people see it's an environment just like a modular synth: You create a sound source, then decide how you want it to be manipulated, where that should go and what it should then affect. Importing objects in the computer is an identical start to an empty Eurorack patch. Where it splits is that with patching physically it's all about your ears, what you're hearing, and sometimes working with a computer can be misleading, because you might choose to embellish something just because you see a lull in the timeline, not because it will create the best audio output. You have to make decisions based on whether something sounds interesting, not on what it looks like.

You recently contributed patches to the Moog Model 15 app for iDevices. Do you feel it's a solid window into modular signal flow without the need for color-coded cable organizers?

I personally think that's a great introduction for a lot of people who might not have dived into analog or modular synthesis. Picking the System 15 is perfect because it's not too overly complex and has a lot of basic things: a delay and filter section, you can understand what a VCA does, how the envelope section affects working with the VCA. You can understand how working with attenuators can create nuances within a patch. I think they did all the right things to where even an extremely experienced person or a beginner can immediately get stuff right away. Sure, analog behaves differently based on temperature changes, age of parts and other factors, and you can't replicate those fascinating inconsistencies in the digital environment, but it's still a faithful reproduction to the point most people will only find finely nuanced differences between the real thing and the app.

And is it those perfect imperfections that have you reaching for more and more Eurorack?

I did laptop sets for nearly 15 years, moving from Cubase to Ableton Live, using the Lemur controller then Push and Max for Live, and those sets were great. But with Eurorack I really like the spontaneity, how something can go "wrong" at any second and shift the entire patch so drastically that the glitch becomes a happy accident driving into a completely different space with variables I might not have thought of, and I can improvise based on the energy of the room. It forces you to concentrate on the performance. My patches aren't something I just plug in and bring the volume up. It's all control voltage, which means there are fluctuations constantly moving from module to module so the slightest thing can shift everything toward the wrong direction. Once the sequencer runs I have to do everything, compose on-the-fly, and decide when something comes in or is pulled out. It's not like in the computer where I could see there are just 16 bars of this instrument and where I can easily overlap something else to move things along.

A lot of the patch snippets you post recently to Instagram (instagram.com/richarddevine) have leaned more melodic. Is this because your spec work is for more universally palatable sounds and there is a bleed of influence between worlds?

No, I consider my artistic and commercial work worlds to be completely separate, even though they share gear. Designing UI sounds in interesting because they have to be [universal] and recognizable by anyone. They have to tell the user whether a device is connected, disconnected, or some mode or state that it is in with very simple elements: a pitch, a pattern, a sequence to convey the message. So I have had to study how envelopes, short sounds, pattern recognition translates through an ambient environment. And you can learn interesting things about how frequencies sit in the spectrum of everyday noise and apply them to composition. However,

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electro-harmonix

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in my modular sets I try not to repeat things at all. There are no recalls. I perform the patch, pull the patch, and explore new things.

Both your personal and professional sound design incorporate a lot of field recordings. How do you capture these and then how do you balance real and fake space in mixes?

Recently I've had to collect real environmental recordings that aren't processed in any way, captured at specific distances so that they match what a viewer is seeing in a scene. For that I've been using the Sennheiser MKH 8040 RF condenser microphones. I have four, so I have a rig that's X/Y and one in ORTF for ultra-wide stereo. And I've been experimenting with the Sanken CO-100K, which records in extended range up to 100k and gets an incredible amount of high-end detail. The Sennheisers also go up to 50k, which comes in really handy when you're pitch-shifting stuff down at 24/96. I record everything at 24/96, so when I pitch it down it replays all this information at super-high quality and you get some really interesting stuff my older microphones couldn't hold up at 20Hz to 20kHz or 18Hz to 20kHz frequency ranges. For downsampling stereo mixes, I usually use the Apogee Rosetta 200's UV22HR 24-bit to 16-bit dithering process, and I can hear the difference in natural sources.

When I'm doing binaural recording I use the DPA Microphones SMK4060 stereo kit on my own head held by iPod headphone clips for runners, the BudFits. For ambisonic recordings I've also been using the SoundField 450ST MKII system. And for a recorder I use the Sound Devices 788T, which is eight channels. Even when I'm just hiking to clear my head I always bring a Zoom H6 or Sony PCM-D100 recorder, because you never know what you're going to run across. I try to plan the best times to avoid noise-pollution factors, but there are things you can't escape, and that's when I use iZotope RX Advanced to remove unwanted reverb and noises. Spectral Repair is your best friend.

In the digital environment I love abusing convolution technologies. They're so much more interesting than just placing a sound in the typical halls or the Taj Mahal or whatever. You can take the amplitude frequency information of one sound and then convolute that on another sound, almost like a crude form of sound morphing. For example, you can take a cymbal sound, use that as an impulse and play someone talking and that cymbal impulse gets applied so it sounds like the cymbal is talking. A technique I like is taking white noise and doing these long-tailed automation draws, taking the noise and panning it left speaker to right speaker, then taking two paths of white noise and crisscrossing them and tailing those out maybe four to eight seconds and turning that into an impulse. Then you take that back into something like [Logic Pro's] Impulse Response Utility and into Space Designer and play a dry snare drum through it and it will take that information and almost do that automation as it adds information that isn't in the sample.

How do you establish the right amount of highly stylized processing in a project?

I recently made some presets for Native Instruments' Replika XT multimode delay, and I look at my contribution as a springboard for users who might not have thought to do something. I try to give an esoteric personality trait to an instrument or engine without getting too overboard, unless that's what the company wants. But to start I treat it like any other instrument, like my first ARP 2600, and I test out all its facets till I run across some spontaneous thing that reveals character.

Is initiating a dialogue your goal with all the patch bay expressionism on the Vimeo channel?

The videos are definitely about experimenting, trying to do more with less, which is a different side of me. In the past I'd always flood the entire frequency spectrum with every sound possible. But lately I've been trying to choose very wisely what elements I have in the mix, translating them to something that can work over the course or five or six minutes of music. I'm trying to find if I can not use 1,000 modules and sounds, just six or seven elements that are very choice and can elegantly flow you through a composition.

I don't have a record label at my back saying I need to make something for them to sell. I can just do things because I want to try them. I've got probably 150 tracks recorded with the modular, and I'm seeing how receptive people are. My idea for an album is ten tracks that are all modular, with a video recorded of each to accompany them. So I want to release the album as both a vinyl record and a catalog of ten patches with links for how the entire album was made, a chronological order of how the songs came together, so you can study the patch notes and video performance of each track in real time. I want the entire album to be something people can listen to, enjoy and reference. People can look back and see what my hands were doing, what modules are used; it will be this diary of musical modular patches. It's always been important for me to share a narrative with sounds, but also to give people something that makes them want to research. My biggest motivation is to hopefully inspire everyone. ■

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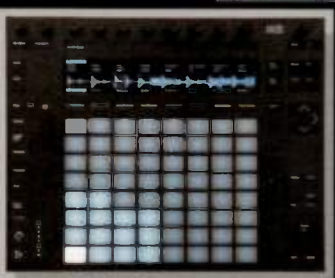

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BARBARA SCHULTZ

PIXIES
HEAD CARRIER
PIXIESMUSIC/PIAS

The sophomore result of a protracted, at times turbulent reunion, this is the payoff of six weeks of arrangements and rehearsals. But instead of feeling workshopped, these 12 songs crackle with combustible spirit. Pointy, fuzz-washed leads and pulpy, spaced-out chords drip with tremolo, flange, the tube-warmed veracity of the '50s, '60s, and '90s. The woody midrange of precision rhythm buoys a ringing attack, showing bassist Paz Lenchantin fully integrated into a less violent, still gleefully cutting Pixies.
TONY WARE

BIOSPHERE
DEPARTED GLORIES
SMALLTOWN SUPERSOUND

The formless songs of Biosphere's twelfth album are produced by hundreds of samples of Eastern European and Russian folk music recordings, their disembodied voices hovering like beautiful ghosts circumnavigating your skull. Recorded at his home in Poland, near the site of World War II's Katyn Forest Massacre, *Departed Glories* evokes death and darkness, the beatless symphony a work of spine-chilling sonic mindgames. "With Their Paddles in a Puddle" and "Than Is the Mater" summon an angelic world from beyond the grave.
KEN MICALLEF

BOXED IN
MELT
NETTWERK

Oli Bayston's debut offered a tidy blend of cerebral dance pop and experimental electronic rock, defined further on this follow-up. Starting upbeat with the grooving "Jist," Bayston steadily takes the tempo down as the album progresses. On the way he hits the early-'90s rave-up "Forget," the quiet tones of "Black Prism," and the softly grazing rhythms of "Open Ended." As great as the combination of elements is, Bayston's universally pleasing voice remains the main attraction.
LILY MOAYERI

KRIS ORLOWSKI
OFTEN IN THE PAUSE
TONE TREE

Though *Often in the Pause's* dream pop can touch on the commonplace, beneath Kris Orlowski's gruff voice and flowing tunes lies the heart of a shoegazer, an introvert cloaking his seclusion in alt-country and indie angst. The album casts a contemplative mood, from the Byrdsian guitar overlay of "Electric Sheep" to the somnambulant sheen of "Always Bring Me Back." The fact that Orlowski's music has found favor as mood enhancer on TV (*Grey's Anatomy*, *Hart of Dixie*) does nothing to diminish its glow.
KEN MICALLEF

PAUL CAUTHEN
MY GOSPEL
LIGHTNING ROD

The listener's first impression of singer/songwriter Cauthen's release is nostalgic: There's something very Waylon about the opener "Still Drivin," and overall, about Cauthen's deep-throated voice and commanding style. When Cauthen lets loose vocally, his voice shows almost operatic beauty and control—a la Raul Malo. But there's a lot of tenderness to these songs as well, and sonically, the guitar and keyboard sounds are just dirty enough to keep Cauthen firmly on Americana ground.
BARBARA SCHULTZ

DRIVE-BY TRUCKERS
AMERICAN BAND
ATO

After two decades and now 12 albums with nary a misstep, Drive-By Truckers continue deconstructing the pride and shame of heritage with soulful country-fried swagger. Bordering Neil Young's ragged glory and a Stones/Skynyrd bluesy boogie, DBT display more haunting tenderness, never forced to overcompensate because the songwriting holds such gravity. Intimate character studies alternate empathy and sympathy, while the more condemning open dialog on the Confederate flag, police brutality, systemic racism and more, attack maladies with melody.
TONY WARE

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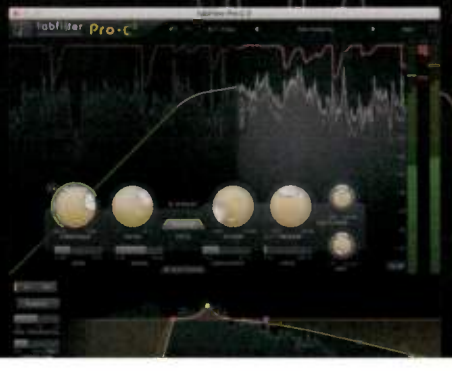

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NEW FLAGSHIP WORKSTATION REVEALS NEW WORLDS FOR MUSICIANS

BY GEARY YELTON

Writer, synthesist, and former *Electronic Musician* senior editor Geary Yelton lives in North Carolina's Blue Ridge Mountains.

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Montage7, $3,500
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usa.yamaha.com

For 15 years, no other synth workstations have been as successful and enduring as Yamaha's Motif series, ranging from the original Motif (2001) to the ES (2003), XS (2007), and XF (2010). Today, you see them almost everywhere you see working musicians. Leveraging the creative potential of recent music technology, Yamaha now has a new and improved flagship synth, the Montage.

Yamaha has fused two of its most successful synthesis technologies in a single instrument—or rather, a trio of instruments with different-sized keyboards: the Montage6, 7, and 8. Each of these incorporates a new generation of the AWM2 (Advanced Wave Memory) sample-playback engine alongside a new generation of frequency-modulation synthesis called FM-X. Integrated into those two sound engines is a novel approach to hands-on, real-time techniques for animating sound, a bundle of features collectively called Motion Control.

LAY IT OUT FOR ME

The Montage delivers 128 stereo voices of AWM2 and 128 of FM-X for a total of 256 voices of polyphony. Moreover, its front panel strikes a visually pleasing balance of abundant controls and just enough blank space to make the controls easy to view and reach. In most ways its layout resembles the Motif XF's but sporting a sleeker, updated look. The Montage's most distinguishing physical characteristics are a color touch panel LCD measuring 7″ diagonally, and a multicolored rotary encoder called the SuperKnob.

A bank of eight multifunction knobs, level sliders, and Scene buttons dominate the front panel's left side. A grid of illuminated buttons for accessing sounds and bringing them to life dominates the right. Buttons on the far left determine exactly which functions the eight knobs control. The LED ladder displays that are adjacent to every slider and collars that encircle every knob indicating their positions are very handy when you want quick visual feedback, especially on a dark stage. Flanking the very responsive, high-resolution display are a data dial and buttons for controlling sequencer transport, transposing octaves, maneuvering through parameter settings, and performing similar functions. Notably, there are no controls beneath the LCD, making it perfect for resting your palm while using the touch panel.

The keyboard senses velocity and channel Aftertouch, both of which are freely assignable to a variety of destinations. To its left are pitch-bend and mod wheels, a short horizontal ribbon controller, two assignable buttons, and two more for controlling the Motion Sequencer. Having all those controls under your left hand enhances the Montage's expressive capabilities, and the bank of knobs and sliders is just inches away.

Along with balanced stereo main and assignable stereo outputs on TRS jacks, a 1/4″ jack for stereo headphones is located around back (see Figure 1). Two unbalanced 1/4″ analog-to-digital inputs accommodate line levels or a single microphone. Two more jacks accept a sustain pedal and an assignable footswitch, and the two expression pedal jacks are also assignable. Three 5-pin DIN connectors handle MIDI In, Out, and Thru.

A type-B USB connector lets you exchange MIDI and audio data with your computer, and a type-A USB connector accommodates a flash drive for saving and loading data.

Flip the power switch, and the Montage is ready to play in about 20 seconds. If a user-definable period of inactivity passes (30 minutes is the default), the power switch toggles itself off with a *snap*!

ONCE AROUND THE BLOCK

Unlike the Motif, the Montage is always in Performance mode. It has no individual Voice, Master, Mixing, or Sequencer modes. A Performance can host as many as 16 Parts. Many factory Performances comprise a single instrument, such as piano, synth, or kalimba, while many more layer several Parts. Each Part can contain an AWM2 sound, an FM-X sound, or a Drum sound, depending on its sound engine (see Figure 2). You can assign separate outputs to independent tracks in your computer's DAW.

When the Montage powers up, it displays a bank of 16 Performances called a Live Set, giving you immediate access to all 16. Scroll through a number of Live Sets and instantly select any Performance by touching the screen. You can easily register and arrange any Performances to create your own Live Sets, too. When you switch from one Performance to another, notes sustained from the previous Performance are not truncated abruptly as they are with most electronic instruments, which is helpful when you're changing presets on-the-fly.

Pressing the control panel's Performance button opens the Performance Play screen, displaying the Parts that make up the current Performance in a mixer-like configuration. Here you can add or delete Parts, change their levels, mute or solo them, define splits and layers, apply arpeggiation and Motion Sequencing, and the like. For more precise control over the mix, you can control most of the same parameters using buttons on the panel's right side and sliders on the left.

Touch the Performance name to edit Performance parameters and search for Performances arranged by category. Press the Category Search button to see Performances divided into pianos, bass, strings, chromatic percussion, ethnic instruments, sound effects, and ten other categories. Each category has eight subcategories. Subcategories for keyboards, for example, include clavi, FM piano, synth, and so on. You can also search for Performances by attribute, such as sound engine type, or by name, using an onscreen QWERTY keyboard. Although you can't search by keyword as you can with many soft synths, some subcategories have descriptive names like Bright, Plucked, and Analog.

Pressing the Audition button plays a musical passage that's individually tailored to show off any Performance you select. Some are excellent, and the keyboard and front-panel controls are active during audition.

START YOUR ENGINES

The Montage's sample-playback engine is essentially similar to the 8-Element AWM2 in the previous generation but with expanded ROM content. If it were uncompressed as 16-bit linear data, according to Yamaha, it would be 5.67 GB—more than seven times the size of the Motif XF's. You also get 1.75 GB of flash memory for storing user data. Still, with flash RAM so cheap, I'd hope for more, especially when it competes with the massive content of computer-based sample players. All the Montage's AWM2 samples sound remarkably better than the Motif's, presumably because of more detailed multisampling and superior digital-to-analog conversion.

Although their sonic quality is uniformly higher, the architecture of AWM2 voices is almost identical to those in the Motif. (Among the differences are the way Motion Control is implemented as well as the insertion effects.) In fact, the Montage can load sample libraries designed for the Motif XF. The biggest differences are that the Montage allows two insert effects on every Part, and Motion Control can modulate dozens of voice parameters independently. Some of the onboard acoustic samples are among the best I've heard on any synth, and many of the more electronic sounds are strikingly original. The CFX grand pianos are real standouts, though I feel many other instruments are too limited by the memory constraints.

FM-X is the Yamaha's classic frequency modulation synthesis engine extended and updated for the 21st century. It has up to eight operators per voice rather than the DX7's six, delivering potentially more complex and lifelike timbres. It more closely resembles the sound engine in Yamaha's rare but legendary FS1R than the DX7's. Whereas the DX7 offered 32 configurations of operators called algorithms, the Montage gives you 88. Operators can be any of seven waveform types called Spectral Forms. You can vary the harmonic content of most Spectral Forms using the Spectral Skirt parameter and modulate harmonics by applying velocity to the Spectral Resonance parameter.

The Montage offers some relatively intuitive real-time FM editing capabilities. If you've ever tried to edit DX7 sounds on-the-fly, you'll appreciate the vast difference. Although not all FM-based factory presets leverage its advantages, FM-X sounds are capable of greater nuance and animation than in previous generations, and Motion Control ups the ante considerably.

Using the FM Converter Web app running in Google Chrome, you can convert any voice created for the DX7, DX7s, DX7II, TX816, or TX802 to FM-X format. The Montage's implementation goes way, way beyond anything the DX7 could do, and its superior D-to-A conversion means better sound all around.

ANIMATION SUBSTATION

Because any electronic keyboard is a collection of on/off switches, enabling the most expressive playing possible is always a challenge for synth designers. Yamaha makes it possible to articulate the Montage's sounds as you play using an interactive system of performance controllers and techniques it calls Motion Control. The Montage's Motion Control comprises the SuperKnob, Motion Sequencer, and envelope follower. Just as important for animating your music, though, are the arpeggiator, Scene buttons, and corresponding sliders.

The SuperKnob is a morphing macro controller that can assigned as many as 16 parameters per Part, as well as 16 parameters to the top Performance level. (Yamaha notes that the direct parameter control aspect, as opposed to channel CC messages alone, is one of the big improvements provided by the Montage.) Most factory Performances have some kind of SuperKnob function, generating multiple timbral identities from a single Performance as you twist the knob from one extreme to the other. As you twist and turn it, the partially translucent SuperKnob morphs from one color to another.

It can crossfade sounds, transpose pitch, alter effects settings, change operator frequencies, and affect almost any combination of control signals simultaneously, raising some parameter values while lowering others. Some changes sound sub-

Fig. 1. You'll appreciate the stereo inputs on the well-endowed back panel for processing external audio, modulating the onboard vocoder, or driving the internal envelope follower.

tle, and others sound extreme. Morph a gentle pad into a throbbing beat, or an acoustic piano into an electromechanical one. For hands-free operation, you can control parameters assigned to the SuperKnob with an expression pedal, too.

Unlike a traditional sequencer, the Motion Sequencer streams control signals rather than notes and beats. Rather than record parameter changes you make as you play, the Motion Sequencer lets you enter steps graphically, one at a time. You set up sequences in advance and, as you perform, automatically step through whatever changes you've programmed in sync with an internal or external clock. You can even change the modulation depth of each step using the sliders during a performance.

Motion sequences can be as long as 16 steps. You can change each step's shape, so that its audible effect is abrupt or gradual. Create smooth transitions between steps or trigger random values, and control these changes in real time using Motion Sequencer knobs labeled Shape, Smooth, and Random. Each Performance can have up to eight motion sequencer lanes, with as many as four lanes assigned to any one Part.

External audio can also be a Motion Control source. When you route audio to the Montage's envelope follower, its signal can control parameters in real time. For example, the sound of live drums or rhythm guitar could modulate tempo, filter frequency, operator levels, or any other parameter or complex combination of parameters you choose.

The Montage's remarkably sophisticated arpeggiator is another essential ingredient. If you're accustomed to arpeggiators offering up, down, and a handful of other patterns, this is a very different beast. The arpeggio function makes the Montage an auto-accompaniment keyboard that plays backing tracks. It supplies more than 10,000 musical phrases and rhythm patterns in many specific musical styles. It divides phrases and rhythms into 18 categories, mostly instrument types, and 25 subcategories, either music genres or modulation destinations. A future update will allow you to create your own arpeggios.

The Montage can store complete parameter sets, including arpeggios and Motion Sequences, as Scenes within each Performance. Instantly load them on-the-fly by pressing any of the eight Scene buttons below the sliders. Scenes recall snapshots of practically every setting. Selecting different Scenes can dramatically change which Parts (including Drum Parts) you'll hear in a Performance. Assembling Scenes allows you to organize sounds within a Performance in real time, as you play.

NOTHING ELSE LIKE IT

One definition of the word *montage* is "a composite picture made by juxtaposing or superimposing separate pictures," and that's an apt description of Yamaha's new flagship synth. It combines two very different timbre-production techniques with a multifaceted approach to manipulating sound, delivering a multidimensional whole greater than the sum of its parts. The Montage's musical personality is as defined by what happens when you engage the Motion Sequencer or SuperKnob as by its sample-based AWM2 and suped-up FM synthesis sound engines. With the Montage, you can more easily make more animated music than previously possible, even if you don't often know exactly what parameters you're modulating. And its timbral content is dependably excellent, with more genuinely useful sounds than its predecessors.

Just about any synthesist or keyboard player has something to gain by using the Montage. It offers a tremendous assortment of instrumental colors and signature sounds no other synth can duplicate. It's absolutely killer for improvisational electronic music, too, because it invites you to explore the places it takes you musically and sonically. The Montage is superior to the Motif in every way, and I have no doubt Yamaha will sell a lot of them. ■

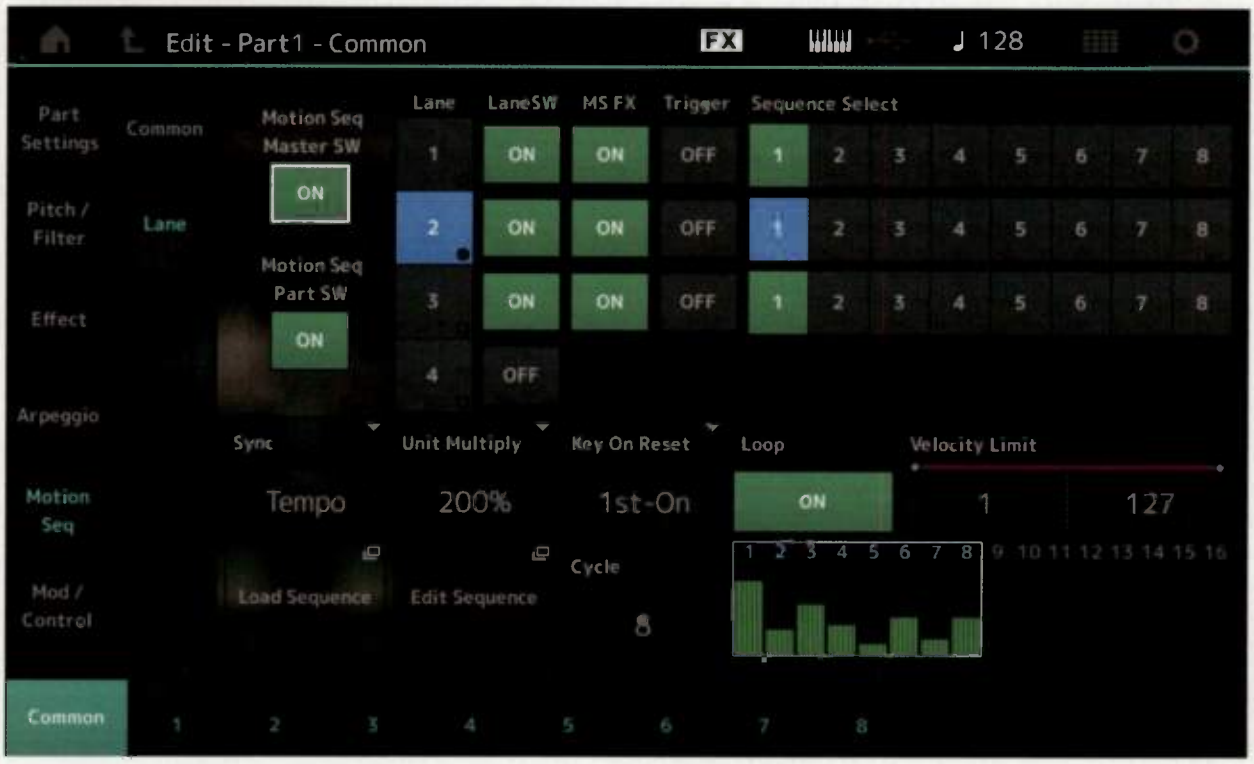

Fig. 2. The touch panel LCD affords ample opportunity to dig deep into Montage parameters, including Motion Sequences.

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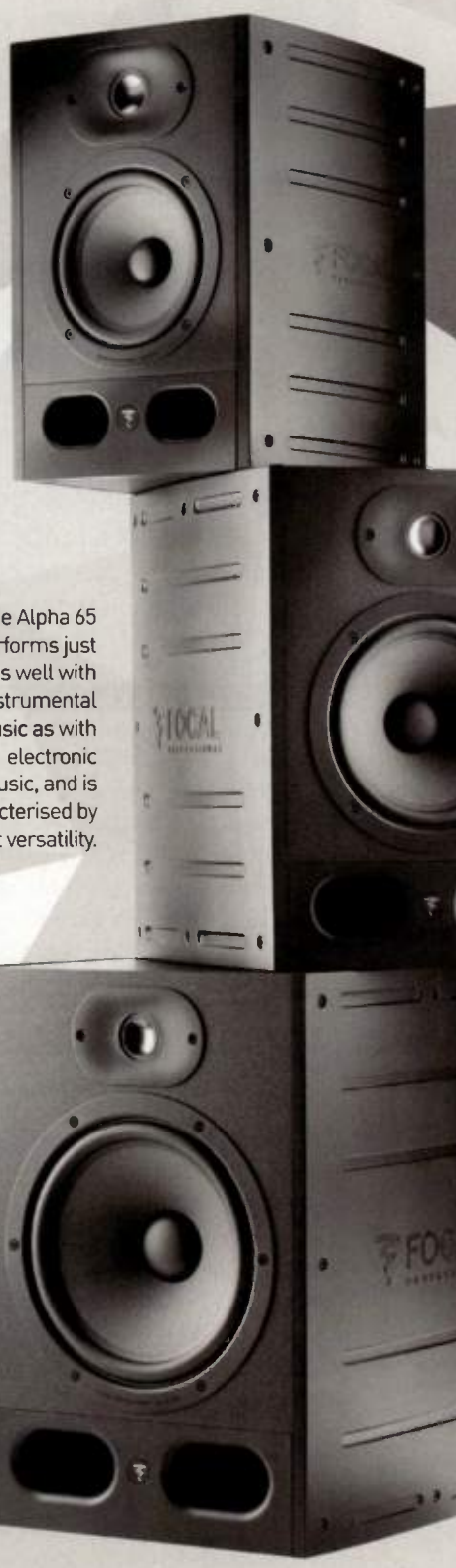

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PROPELLERHEAD

Reason 9

UPGRADE ADDS MORE TOOLS FOR CREATIVE MUSIC PRODUCTION

Reason 9 has arrived and, though it doesn't contain any new instruments, it offers a slew of significant new features that augment the power of the program to help users become more creative and productive.

BY MIKE LEVINE

Mike Levine is a composer, producer, and multi-instrumentalist from the New York area.

STRENGTHS

MIDI Player modules. Pitch Editor. Bounce Audio Clips to MIDI. Bounce in Place. Several workflow additions including Edit Mode buttons. Beefed up Sound library. GUI themes.

LIMITATIONS

No new instruments. Must restart program to see Theme changes

$399 street
Reason Essentials 9: $69 street
propellerheads.se

MEET THE PLAYERS

The marquee additions are three new MIDI effects: Dual Arpeggio, Note Echo, and Scales & Chords. Collectively referred to as Players, they can be dragged and dropped onto an instrument to open up additional creative possibilities (see Figure 1). Dual Arpeggio is like having two highly programmable arpeggiators in one. The dual processors work in parallel on your MIDI track or input, and, if you want, each can be assigned an independent key range.

Each of the arpeggiator sections has controls for Rate (note value), Octave, and Direction (Up, Down, Up + Down, and Random). With the Pattern slider off, you get the functionality of a monophonic arpeggiator. When it's turned on, you can use each arpeggiator's 16-step grid to program different patterns, which respond to whatever notes you play. You can set the duration of each note in the pattern (1/3-step, 2/3-step, or a 1-step), the velocity for each step, the number of steps, transposition, and so forth. The Dual Arpeggiator comes with a bank of preset patterns that show off what the effect can do.

Note Echo is a programmable MIDI delay module that can be used like an audio delay processor, but it can also do things that would be impossible on such a device. The Step Length parameter is the equivalent of delay time and can be set in milliseconds (0 to 1,000 ms) with Tempo Sync off, or to a rhythmic value (1/128 to 1/2 note) if it's on. Up to 16 steps (repeats) can be programmed. The Pitch Control lets you set a value up to ±12 steps, and anything other than 0 will raise or lower each successive echo by the specified interval. As a result, you can create some pretty wild effects. For example, with all 16 steps selected, a Pitch setting of -1 or +1, and a Step Length of 1/32, you'll hear a glissando when you hold down a single MIDI note on your keyboard. With a lower Step Length and larger intervals you can get arpeggiated melodic lines from single notes.

The third Player, Scales & Chords, constrains MIDI tracks or MIDI input to a specific scale and key. If the Chords option is turned on, it creates chords based on the scale and key. You can select from a range of scales and modes including major, minor, harmonic minor, pentatonic, dorian, phrygian, and more. You can also create your own scales using the Custom setting.

With the Chords function on and a scale and key chosen, you can adjust the number of notes in the chord (from 2 to 5) and select one of four different inversions. Playing other notes in the scale will give you chords based on the scale degree you're playing. In the key of *D* major and three-note chords selected, playing a *D* note will yield a *D* triad, an *E* note an *E* major triad, a *G* note a *G* major chord, and so forth. The higher the chord note setting, the more complex the chords become. So, for example, if you chose a *D* Major scale and 4-note chords, you'll get a *Dmaj7* instead of a *D* triad when you play a *D* note.

You can also add a note an octave up, an octave down, or both to fatten up the chord. The Color button adds another note and makes the chord

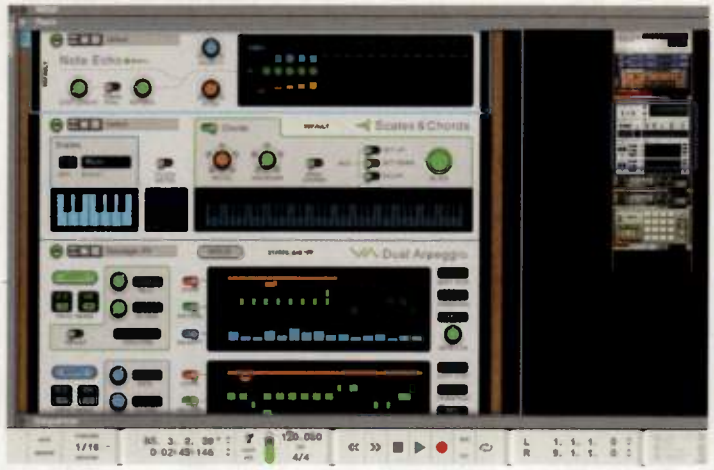

Fig. 1. The three Player modules shown in the Rack

Fig. 2. The Pitch Editor is in the center of this session, which uses the optional Dark GUI Theme.

more complex, whereas the Alter button is a momentary switch that changes the chord to one that's not in the selected key, such as changing a major IV chord to minor. For non-keyboard players, Scales & Chords offers the power to play a solo with no "wrong" notes, or to play virtually any chord with one finger.

PITCHING STAFF

Another notable addition in Reason 9 is the Pitch Edit mode, which is not only powerful but very easy to operate. If you've used other pitch editors, Pitch Edit mode will seem familiar (see Figure 2). It shows you the notes from a monophonic audio track in a piano-roll display, with a continuous black line going through them that graphically represents the modulation of pitch. You can select individual notes, or multiple contiguous notes for editing.

The quickest way to correct a vocal track or section is to select all and apply the Pitch Correct effect, which will move the selected notes to the nearest pitch center. You can also drag a note up or down in pitch. When you do, the setting in the Transpose mode affects whether the note will move to the next note center, to a spot relative to its original pitch, or wherever else you place it.

When a note is selected, it becomes highlighted and sprouts two handles—the Drift Handle and the Transition Handle. Adjusting the Drift Handle lets you reduce the amount of vibrato or modulation in the note. This gives you more control over the editing, as does the ability to use the Razor Tool to cut a note in two, so you can edit them separately.

The Transition Handle smooths the transition times between notes, but it only works on notes you've already edited. You also have limited con-

trol over the length of notes and their start times, and you can quantize notes from Pitch Edit mode.

All of the editable parameters for the pitch editor, including some that can't be adjusted from the piano roll, are displayed in editable numerical boxes on the tool bar. These include Position (start time), Note, Fine-Tune, Drift, Preserve (preserves some expression when the Drift is turned way down), Transition, Formant, and Level. Considering the ubiquity of vocal pitch editing in popular music, the Pitch Edit mode is an important addition in terms of Reason's competitiveness with other DAWs.

And with the addition of Pitch Edit, there are now three edit modes in Reason—Slice Edit, Pitch Edit, and Comp Edit. Propellerhead has made it easier to switch between them by adding dedicated Edit mode buttons in the toolbar. When you select an audio clip in the timeline, you can easily choose the edit mode you want.

CATCHING THE BOUNCE

Reason 9 also introduces audio-to-MIDI conversion, and its implementation of the feature is both accurate and user-friendly. Just put an audio track into Pitch Edit mode, then right-click (Win) or Control-click (Mac) on an audio Clip and choose Bounce Audio Clips to MIDI: Presto—a new version in the form of a MIDI track appears, with the Subtractor synth assigned initially as the instrument. Alternatively, you can just drag an audio clip onto an instrument in the Arrange view, and Reason will instantly convert it to MIDI.

Based on past experience in other programs, I was expecting the audio-to-MIDI process to do only a so-so job of capturing the rhythmic aspects of the source audio. But when I played the original track and the MIDI version simultaneously, I was impressed with how accurate the conversion was. It wasn't perfect, but darn close.

As a guitarist who isn't much of a keyboard player, I love that I can record a lead guitar part, convert it to MIDI, and turn it into a synth solo. It's also a useful effect to use on vocals. The creative possibilities are vast, especially with Reason's entire MIDI sound library at your disposal.

Reason 9's new Bounce in Place feature lets you render any clip—MIDI or audio—with effects, which is great for saving CPU. Just select the clip or clips and hit Bounce in Place, and the rendered version appears below the original track.

Propellerhead has also beefed up Reason's sound collection with more than 1,000 new sounds, many of which are Combinator patches. If you produce EDM or other electronic genres, you'll be particularly pleased with the Reason 9 Sounds bank. It contains all the new sounds along with a choice selection from Reason 8. Included with the new sounds is the content from two previously optional Refills, Electromechanical Refill (EP, organ, and Clav sounds) and RDK Vintage Mono (vintage drum sounds). For those who still want access to the older Reason sounds, the Reason Factory Sounds bank is included, as well.

But it's not just the sounds that have changed, the look of the program has too—that is, if you want it to. Reason 9 lets you switch between the standard color scheme and two other themes, Blue and Dark, which are more in line with the current DAW trend toward dark-colored GUIs. You must restart the program for a theme change to take effect.

REASONS TO BE CHEERFUL

The powerful new features in Reason 9 further enlarge what's already a robust application: The Players offer powerful new ways to construct and manipulate your MIDI parts; Bounce Audio Clips to MIDI and Bounce in Place significantly enhance your options for moving tracks between formats; and the addition of Pitch Editing means you can now tune vocals inside Reason without having to export or ReWire to another DAW. On my wish list for Reason 10 would be video support, which would make the program even more alluring for those who work with picture.

If you're a Reason user, Reason 9 is an upgrade worth getting. But if you haven't tried Reason yet, there's never been a better time. ■

SHURE

KSM8 Dualdyne

A SUCCESSFUL NEW TECHNOLOGY IN VOCAL MICS

BY STEVE LA CERRA

Steve La Cerra is an independent audio engineer based in New York. In addition to being an *Electronic Musician* contributor, he mixes front-of-house for Blue Öyster Cult and teaches audio at Mercy College, Dobbs Ferry campus.

STRENGTHS

Very smooth response. Wide sweet-spot. Leakage is well-controlled. Beautifully constructed.

LIMITATIONS

Extended LF response can result in sensitivity to wind noise or popping.

shure.com
$499 street

Microphone transducer technology hasn't changed radically since the development of the "big three"—condenser, moving coil, and ribbon. While there have been incredible refinements, applications of new materials, lighter membranes, stronger magnets, resilient ribbons that resist tearing or stretching, and improved manufacturing techniques that ensure consistency, the basic operating principles for each type of transducer are mostly the same today as when they were first developed.

Shure recently introduced the KSM8 Dualdyne microphone, touted as the first handheld vocal microphone to employ two diaphragms in the same capsule. Nit-pickers may note that AKG produced several "two way" mics in the late 1960s and early 1970s but those operated much like a two-way speaker, with one capsule handling the high frequencies and the other handling the low frequencies. And of course many multipattern condenser mics employ two diaphragms on a common back plate to achieve pattern switching. These were not Shure's motivations for developing the Dualdyne capsule.

Shure's goals for the Dualdyne were to provide the sound quality normally associated with a condenser capsule while maintaining the rugged nature of a moving-coil transducer; controlling proximity effect while providing a very wide sweet spot; obtaining a smooth, wide frequency response and an accurate cardioid polar-pattern.

The patented design of the Dualdyne capsule employs two membranes. The front "active" diaphragm is a moving-coil element. The rear diaphragm is passive—sort of like a passive radiator in a loudspeaker—and this diaphragm contributes to the capsule's inverted airflow system. Energy from the passive diaphragm is re-directed and phase-manipulated to achieve the desired frequency response, directionality, and control over proximity effect.

Most directional moving-coil microphones have three personalities: Move the mic close to the singer and proximity effect becomes an issue; place the mic at a distance from the singer that is "just right" and the mic sounds balanced; move the mic too far away and the voice becomes thin. Omnidirectional mics, on the other hand, do not exhibit proximity effect. The Dualdyne's second diaphragm, along with the reverse airflow principle, allows the KSM8 to behave somewhat omnidirectionally at low frequencies; omni enough to control the proximity effect, but directional enough to control bleed from nearby instruments.

Not content to stop at the capsule, Shure revisited other features of the KSM8. The pneumatic shock mount was designed to reduce handling noise, and the hardened carbon-steel grille protects the capsule from damage. The grille is lined with woven, water-repellent fabric for protection against wind, plosives, and moisture. Shure's Diaphragm Stabilization System stabilizes the active diaphragm when it is struck with plosive sounds while reducing handling noise.

Physically, the KSM8 is nicely designed. Its profile is similar to that of the KSM9, with a slender handle and a sort of squared-off head. Removing

the grille reveals the Dualdyne cartridge, which resembles nothing I've ever seen and is proudly adorned with the Shure logo at the top (see Figure 1). It's almost too beautiful to hide.

A peek inside the grille shows a foam pop filter at the top and the water-repellent material lining the sides. Unlike many of the interior "shock mounts" I've seen, the KSM8's shock mount actually appears (and proved to be) resilient enough to do something about mechanically transmitted noise. The KSM8 is available in the wired version, which I tested, as well as versions that are compatible with Shure's wireless systems.

I used the KSM8 in two very distinct contexts—in a loud rock band for either of two singers, and then on a solo performer with an acoustic guitar. Results in the rock band were very different depending upon who was singing. Singer One tends to sing off-mic and has less-than-stellar mic technique (e.g., he varies his distance quite a bit over the course of the night). His voice sounded great on the KSM8—smooth, present but not peaky and, dare I say, "tube-like" and balanced. His voice sat on top of the mix without ever becoming overbearing. Using other vocal mics with Singer One, I sometimes need an EQ cut of 4 to 5 dB in the vicinity of 3 to 4 kHz to prevent shrillness. Not so with the KSM8. And at no point did I notice any proximity effect. The KSM8 was fantastic on his voice.

Singer Two has a very different technique and a very different vocal quality: I would describe his voice as "smoky." He tends to consistently work right on top of his mic and he commented how he felt that he could stay close to the KSM8 thanks to its flat grille (as opposed to a round grille). However with his mouth on the grille, the KSM8 did produce some proximity effect, emphasizing the low-mids and reducing presence in the mix. Used with either singer, the KSM8's noise rejection from the stage was excellent, and bleed was minimal.

In the context of the solo performer, the KSM8 performed like a champ while revealing some interesting characteristics. Leakage from the acoustic guitar into the KSM8 was barely audible, which is not usually the case when miking a singer/acoustic guitar player. And what little guitar did make its way into the KSM8 did not have the weird, phase-y sound that instrument leakage often produces. In fact it sounded like I was using the KSM8 on the guitar, except that the guitar level was a lot lower than that of the voice. More importantly, I didn't have to lock the singer into a head vise in order for his voice to sound consistent. The timbre of his voice barely changed when he moved, and proximity effect was not an issue for him because he never got on top of the mic.

The KSM8 reduces, but does not eliminate, popping from plosives. Although initial A/B'ing against another mic might make you think that it pops *more*, when you listen carefully you'll find that popping on the KSM8 is less severe than on other mics. In addition, the KSM8 is more extended in the low frequencies, so voices simply sound more full in the low end.

A few times I used the KSM8 outdoors and it captured a fair amount of wind noise. But it's tough to qualify how much wind the KSM8 captures vs. a garden-variety handheld mic because the KSM8 produces higher fidelity than most vocal mics. It's impossible to know how much wind noise would be present if the rear diaphragm of the KSM8 was turned off, because it can't be. It's kind of like that first time you put up a good condenser mic in the studio and hear the air conditioning rumble: The mic reveals the noise because it has the capability to do so. In any case, use of a gentle highpass filter at around 90 to 100 Hz cured the wind issue as well as the occasional sound of foot tapping transmitted through the mic stand.

In regards to distance and position, the KSM8 maintained sonic integrity across a range of about ±50 to 60 degrees—far outside the norm for a typical vocal microphone. The sweet spot is fairly deep, from about 1.5 inches to around a foot away from the grille. There is a subtle loss of presence as the KSM8 is moved away from the singer's mouth but nothing like what you get with a traditional vocal microphone. In fact you'd be hard pressed to hear a difference in sound as a singer moves closer to and farther from the KSM8, and you certainly don't feel like anything is being lost. Keep in mind that if the singer does put his or her mouth on the grille, the KSM8 will provide some "warm and fuzzies" from proximity effect.

The KSM8 solves what I feel is one of the main problems exhibited by using condenser mics in a live context: They deliver fidelity and sensitivity at the expense of increased bleed from the stage, while generally providing a narrow sweet spot. The KSM8 provides the fidelity, permits a wide range of movement without changing its sound, yet still manages to control leakage from nearby instruments as well as proximity effect. And it greatly reduces handling noise without loss of low-frequency response. Quite an accomplishment! ■

Fig. 1. A view of the well-designed KSM8 Dualdyne cartridge.

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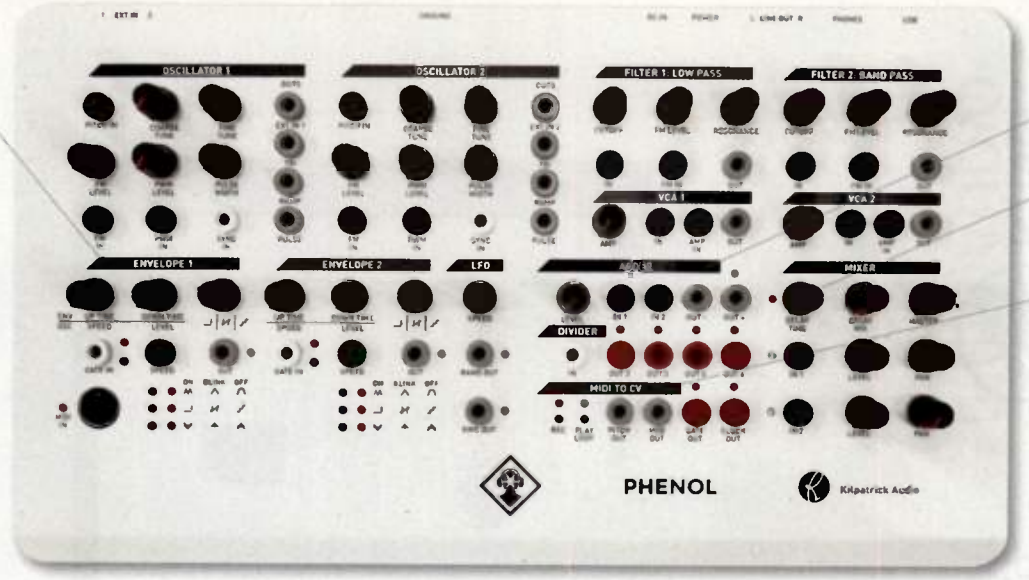

Phenol is an analog synth that uses banana plugs for patching and includes standard and USB MIDI input, lowpass and bandpass filters, and scale quantization from the envelope generators.

KILPATRICK AUDIO

Phenol

A DESKTOP ANALOG SYNTH THAT'S FUN AND EASY TO PATCH

BY GINO ROBAIR

Originally funded through a Kickstarter campaign, the Kilpatrick Audio Phenol presents a hybrid approach to analog modular synthesis: It provides a patchable interface like a semi-modular synthesizer, yet it doesn't have a default synth voice connected behind the panel as you would find in such instruments as the Korg MS-20, Doepfer Dark Energy, and Roland System-1m (to name just a few). To hear sound from Phenol, you have to plug-in patch cables.

Of course, one reason people buy semi-modular synths is that they provide a relatively safe gateway to the world of fully modular instruments. They allow a musician to explore synth patching with the knowledge that they can still make sounds when they get stuck.

Similarly, Phenol provides a straightforward interface that is perfect for those getting started with modular synthesis, but who wouldn't know where to start when it comes to assembling their first system. And while it lacks the security blanket of a hardwired patch under the hood, Phenol's well-organized front panel is easy to figure out for the uninitiated.

KEY TONES

As you would expect, Phenol offers a basic complement of subtractive-synthesis tools. Its two voltage-controlled oscillators provide individual sawtooth, pulse, and triangle wave outputs, as well as a jack for the external inputs. And, it offers a pair of resonant voltage-controlled filters—one lowpass and one bandpass—that do not go into oscillation. A CV input with an attenuator is provided for modulating the cutoff frequency.

In addition to its feature-rich envelope generators (more on these in a moment), Phenol includes two DC-coupled VCAs, a digitally generated LFO with sine-wave and random-voltage outputs, a clock divider, a signal Adder (active mixer) with positive- and negative-phase outputs, an audio mixer with two inputs and pan controls, and a stereo digital delay.

All of the front-panel connections are made using banana plugs, rather than 3.5mm or 1/4" plugs as with other synth formats. (See "Going Bananas" sidebar on page 52.) However, audio I/O and the headphone output utilize 1/4" connections.

Although the MIDI implementation is basic, it's great having an onboard MIDI-to-CV converter, especially one that accepts both 5-pin DIN and (class-compliant) USB connectors. Phenol responds to MIDI Channel 1—monophonic, last-note priority. Note messages go to the Pitch and Gate outputs, mod wheel messages appear at the Mod Ouput, and MIDI clock signals produce 16th-note pulses at the Clock Output. The synth recognizes pitch bend, which you can adjust—from 1 to 12 semitones—using Program Change 1 through 12.

Phenol also provides a simple sequence recorder when you use MIDI. Using step or real-time input, you can add more than 500 notes/rests, as well as capture Pitch Bend, and then play the sequence as a one-shot or a loop. As the sequence plays, you can transpose it by sending it MIDI Note messages. Quick and intuitive!

LEDs are used throughout Phenol's panel to indicate levels and signal phase, making it easy to tell what's going on as you patch. And the metal case

Gino Robair is the editor-in-chief of *Keyboard* magazine as well as *Electronic Musician*'s technical editor.

STRENGTHS

Extensive EG features. Stereo digital delay. MIDI-to-CV converter. Bandpass and lowpass filters. Adder and clock divider.

LIMITATIONS

Resonant filters do not oscillate. Too few patch cables included. Voltage fluctuations when stacking cables on outputs.

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feels rugged enough for use onstage, without being too cumbersome for the desktop. In addition to the external power supply, Kilpatrick includes 10 banana cables of different lengths: While that's enough to get you started, once you introduce MIDI, you'll need more, so order another 10 and take full advantage of the patch points. It's also worth noting that Kilpatrick's design allows you to stack up to three patch cables *going into most inputs*, although the tradeoff is that stacking on outputs will sometimes cause small voltage fluctuations.

ABOVE THE BASICS

Although the feature set above may seem like standard fare to those who are used to inexpensive keyboard synths, you'd be hard pressed to assemble all of these elements into a modular system (including a case and power supply) for what Phenol costs. Moreover, a handful of Phenol's features help it stand out at this price point.

The Adder is an active mixer for combining audio or control signals. Using its output knob, you can double the signal strength at the outputs—perfect for adding crunch or beefing up CV levels. The Adder also provides a pair of outputs of opposing phase. This allowed me to do CV-controlled panning by sending each of the Adder outputs to separate VCA amp inputs, then patching the VCA outputs to individual mixer channels that were hard-panned.

As you would expect, the Divider subdivides a clock signal or LFO input. In this case, you get discrete pulse outputs at divisions of 2, 3, 4, and 6. Furthermore, when Phenol receives a MIDI clock

Going Bananas

The banana cable is a popular format for modular synth patching largely because it's stackable: It allows you to send control signals to several destinations at the same time without using a mult module. Other manufacturers that use banana connections include Buchla, BugBrand Cyndustries, Fenix, and Modcan.

On Phenol, the jacks are color-coded so you can easily see their function: black is for CV and audio inputs, gray for CV or audio outputs, white for pulse/gate inputs, and red for pulse/gate outputs.

One downside of using banana connectors is that they do not include a ground wire like 3.5mm or 1/4" cables do. Consequently, if you want to patch Phenol to another modular synth, you have to make a ground connection between the two.

Phenol and other banana-based synths provide a jack specifically for this: Simply connect a patch cable from the ground jack of one synth to the other and you're all set. On the other hand, if you want to patch between Phenol and modules with 3.5mm and 1/4" jacks, run a cable from your Eurorack or 5U system to the Phenol's External input jack. No additional grounding is needed if you are simply connecting Phenol's audio outputs to a mixer.

start message, the Divider outputs are reset.

Another useful feature is the built-in delay, which is intentionally noisy and lo-fi (especially so when you turn Delay Mix past the 12-o'clock position). You can use this section as a conventional echo effect or as a processor in its own right. The delay resonates nicely if you turn Delay Mix all the way up and Delay Time all the way off. Then, as you slowly increase the Delay Time, you will be treated to a range of metallic tones.

ENVELOPES, PLEASE

Where Phenol becomes *really* exciting is in Kilpatrick Audio's implementation of the envelope generators (EGs). The EGs have two top-level modes—Envelope and Oscillator—with a button matrix and knob to dial-in a particular type of voltage behavior. In Envelope mode, you can create simple attack-release and attack-hold-release shapes, with knobs to control the speed of the rise and fall of the voltage. In Oscillator mode, the output voltage varies continuously and the same two knobs now set the Speed (frequency) and Level (depth) of the voltage. So, if your patch needs another pair of LFOs, here's where to find them. But it gets even better!

The second row of buttons on each EG provides three additional modes that coordinate with the third knob (the one with the cryptic symbols printed below it). In Steps mode, the knob alters the smoothness of the output voltage: When set fully clockwise, the waveform is smooth; as you turn it counter-clockwise, you begin to hear stepping, with the steps getting larger as you continue turning. In Scale Quantize mode, you will hear arpeggiated notes, and that third knob selects one of 16 scales. The third mode is a Gate Delay, where the third knob sets the length of time before the EG is triggered.

Using the Steps and Scale Quantize modes, you can create rising/falling sequences that are quantized or not. Moreover, you'll get fairly sophisticated rhythmic patters as you change the Up Time and Down Time settings while cycling in either mode.

The lower row of buttons control the EG's Output mode—Normal (the output voltage goes from low to high), Inverted (high to low), and Absolute Value (a reduced-range, positive-direction voltage). To top it all off, you can use a voltage to alter the rates of the rising and falling voltages by patching a signal into the Speed jack.

That may seem like a lot to keep track of, but the feature implementation quickly becomes intuitive as you play with Phenol. Then, you'll see how incredibly performative the instrument is. For example, with the EGs in Oscillator mode and Scale Quantize selected, all you have to do is sweep the filter cutoff and add some delay and panning to get into psychedelic territory.

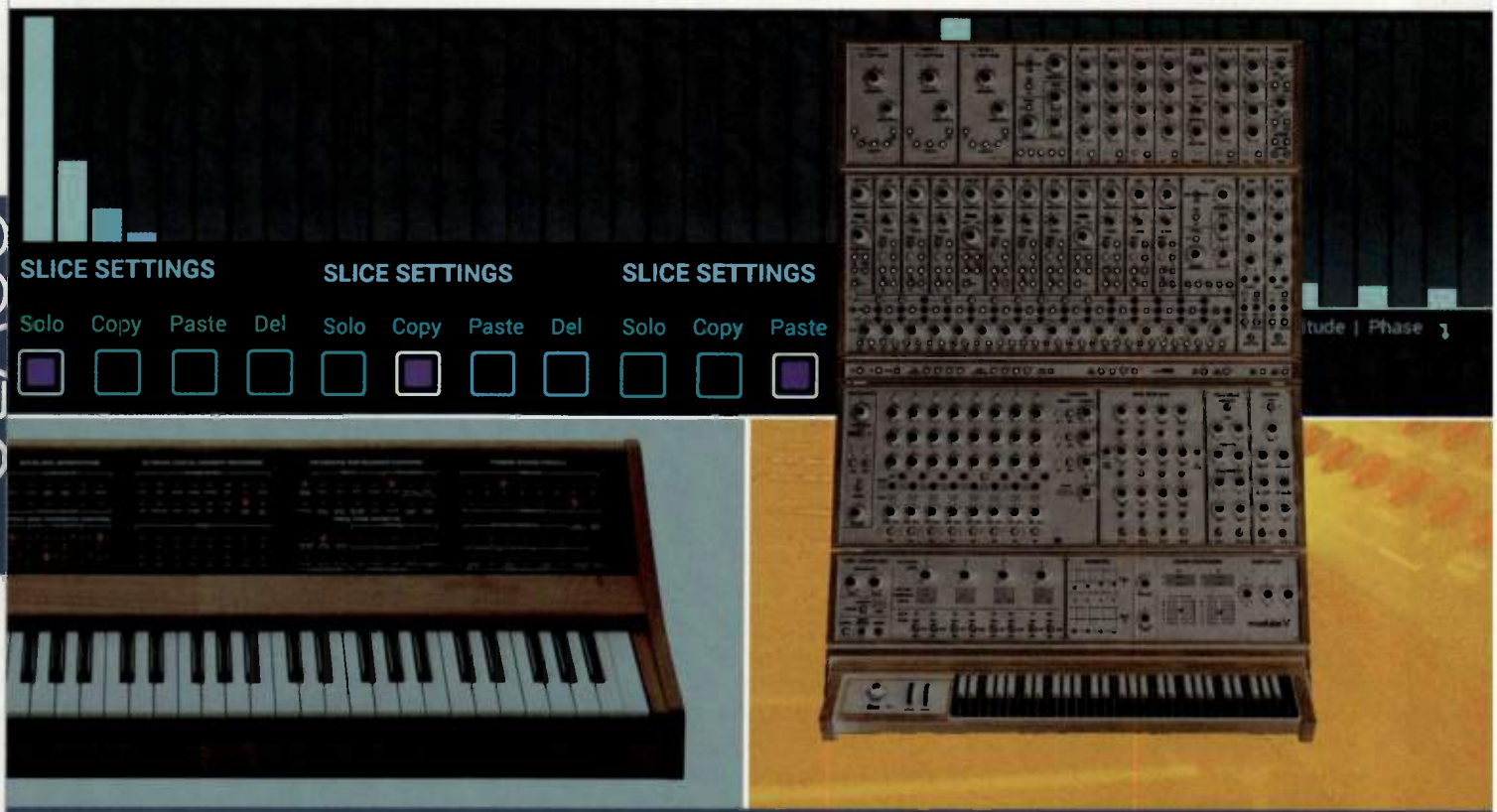
ORGANIC SYNTHESIZING

In terms of sound quality, Phenol's timbre palette ranges from mellow to gritty. It gets surprisingly crunchy when you modulate parameters at audio rate. Frequency modulation on the VCOs, in particular, yield some of the grainiest textures. If you were wondering about the product's name, this should clue you in to why it was chosen: Phenol can cop an attitude.

And although the resonant filters don't go into oscillation, they can still provide bubbly, glorpy sounds when needed. I liked having both lowpass and bandpass filters available, especially when processing drum loops through the External Inputs: I used the lowpass to get big, punchy bass while modulating the upper mids and highs with the bandpass.

Overall, Phenol has a unique sound and interface and is a blast to use. Experienced synth players will appreciate that it plays well with other instruments, whether or not they have banana jacks, and it can be integrated into any MIDI-based DAW or performance system. For musicians who want to get their feet wet in a modular-synth-style environment, Phenol is a great learning tool, providing a respectable feature set that is easy to wrap your brain around. ■

MASTER CLASS



Arturia Synclavier V

Tap into this software's FM and additive synthesis powers

BY FRANCIS PRÈVE

Electronic Musician contributor Francis Prève is a professional sound designer and an editor-at-large for *Keyboard* magazine.

Arturia's reboot of the NED Synclavier has given synthesists everywhere a reason to rejoice. For starters, the company reduced the price from its original jaw-dropping $500k (fully loaded) to a mere $199. More importantly, it delivered one of the most powerful digital sound design engines to thousands of softsynth fans.

While many of its flagship features—like FM and additive synthesis—are now stock elements in studio arsenals, the Synclavier's fusion of those two technologies remains astonishingly powerful, once you understand what's going on under the hood. The secret to mastering the Synclavier isn't just brushing up on its synthesis tools, but also discovering how they interact with NED's other innovations, like Time Slicing and a wide assortment of hands-on macro parameters that make editing complex FM patches much more intuitive, once you get the hang of the system. So let's get started.

SYNCLAVIER FRONT PANEL

While the bottom section of the Synclavier V's knob-based interface is straightforward and self-explanatory, the upper panel offers a lot more control for tweaking the factory presets. (See "Front Panel Translation" sidebar at right.) What's more, there's a factory preset in the Templates category that lets you treat this panel as a relatively painless introduction to FM synthesis.

The preset is called Simple Sine, and that's an apt description for its basic tone—a single sine wave and

FRONT PANEL TRANSLATION

Voice Chorus and Chorus Fine add a second, identical oscillator that can be tuned to intervals and/or detuned.

FM Amount behaves similarly to a lowpass filter cutoff knob in the 0.000 to 0.200 range; beyond that, the results are extreme and harsh—interacting dramatically with the harmonic envelope.

FM Ratio loosely translates to an oscillator's "waveform" parameter, with additional metallic and bell-like options, thanks to the Synclavier's ability to set fractional ratios.

With small amounts, **FM Fine** can add a bit of harmonic detuning animation. Larger amounts deliver nasty ring-mod-like artifacts.

Frame Speed will do nothing for the Simple Sine preset, but on many other factory presets it will govern the speed of evolving sounds.

The amplitude and harmonic envelopes function similarly to VCA and VCF envelopes (the latter when the FM Amount knob is set above zero). For more predictable results, set the harmonic envelope's release stage to maximum.

The vibrato section behaves like a pitch LFO, whereas the stereo section works like autopanning, unless the phase knob is set to zero (fully counter-clockwise), in which case it functions like tremolo/VCA modulation.

nothing more, which is why it works so well as a way to grasp the Synclavier V's essential parameters.

Hands On: Here's how to get started with the Simple Sine preset. Start by adjusting the amplitude envelope, leaving its sustain parameter at maximum value for the rest of your explorations. From there, you'll notice that the harmonic envelope doesn't seem to have any effect; that's because there's no frequency modulation in the sound yet, so turn the FM Amount knob in the Partial Settings section (which reflects all of the mixer parameters, as we'll discuss below). As soon as you increase its value, you'll immediately notice a dramatic timbre shift and the harmonic envelope parameters will now affect the sound more predictably.

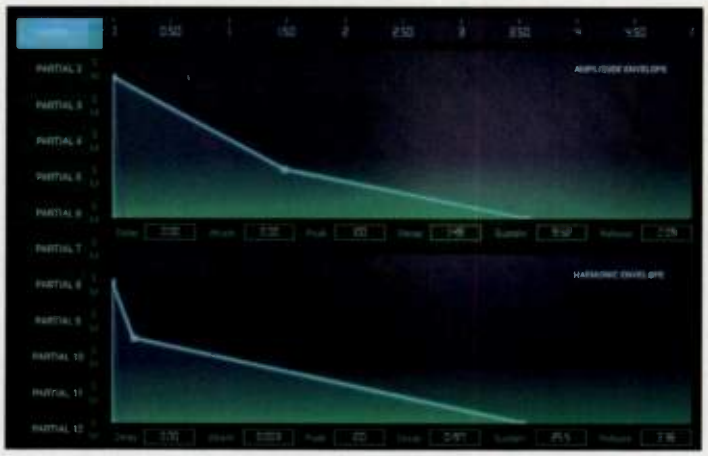
At this point, I'll let you in on a little secret for getting more from FM synthesis, even if you're only experienced with traditional analog and subtractive synths. There's a way to translate the Synclavier's front panel to more familiar parameters via the Simple Sine preset. It's by no means exact—and I'll elaborate further in the next sections—but it's enough to help build confidence before you fully dive into its inner workings.

I'd recommend spending a fair amount of time with the Simple Sine preset and front panel before reading further, unless you already have a grasp of FM synthesis, because we're going to go much deeper in these next sections.

FM BASICS

At first, FM synthesis may seem incredibly daunting, but at its core lies a very simple principle that may make it easier to understand: It's just vibrato. The differentiating factor is that unlike traditional synthesizer vibrato—a sine or triangle wave LFO (Low Frequency Oscillator) applied to pitch—the "vibrato" in FM is in the *audio range*. So, instead of creating the operatic, Theremin-like quiver that we know and love, the audio rate pitch modulation of FM synthesis instead manipulates the harmonic content of the oscillator output.

Taken a step further, these core elements of FM synthesis's approach to pitch modulation are no longer the familiar "oscillator" and "LFO" that create vibrato. Instead, they're referred to as "carrier" (the oscillator we hear) and "modulator" (the source of the frequency modulation). Alone, the carrier waveform generates its own harmonic spectrum, and in the case of classic Yamaha's DX-style FM synthesis, that waveform is a sine wave consisting of a single frequency: The fundamental. From there, the modulator is applied. Depending on its tuning and waveform, this will generate a series of additional higher frequencies, which are usually (but not always) integer harmonics. The end result of the carrier/modulator interaction is a new waveform that can be shaped over time by adjusting the modulator's envelope parameters. For example, a short modulator envelope with quick decay and no sustain will add sharp transients to the carrier's tone, whereas a longer decay will create smoothly morphing harmonics until the modulator's intensity reaches zero. Of course, these are only two examples of using modulator envelopes, with more complex attack, sustain and release settings allowing for different types of timbral shifts.



Synclavier envelopes

On the carrier side, its envelope governs the overall volume of the FM patch, much like a VCA envelope controls the loudness contour of a classic analog sound. Fortunately, the envelope names of the Synclavier V are more aptly defined than those of other FM synths: Amplitude (carrier) and Harmonic (modulator). Simply put, the harmonic envelope handles timbre—like a filter envelope—while the amplitude envelope handles volume. With this knowledge in place, take some time to experiment until you start getting predicable results.

ADDITIVE BASICS

Additive synthesis relies on a completely different approach to tone generation. In the Synclavier, you've got individual level and phase control over the first 24 harmonics for both the carrier and the modulator. Leaving the modulator out of the equation for a moment, this allows you to sculpt the timbral output of the carrier by adjusting the relative volumes of these harmonics—and truly, the possibilities are endless.

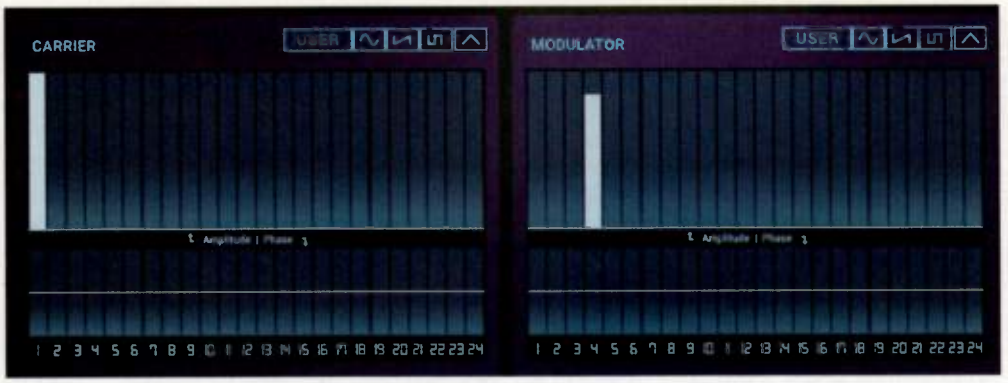
That said, thanks to the Synclavier V's presets for common waveforms like sawtooth, square, and triangle, you can quickly see the harmonic content for these classic waves. Sawtooth waves contain *all* integer harmonics descending in volume, whereas square and triangle waves contain only *odd numbered* harmonics at decreasing intensities. For further experimentation, note that you can create formant-like vocal waves by "scooping out" sections of these harmonics—or bell-like textures by adding a few widely-spaced single harmonics. And keep in mind that these additive textures can be quite complex on their own, *before* you start integrating the FM features described above.

PARTIALS: FM MEETS ADDITIVE

Unlike the majority of FM synths—Ableton Operator and Xfer Serum being notable exceptions (see sidebar on page 58)—the Synclavier is unique in that it combines both FM and additive synthesis tools in the form of "partials" that consist of carrier/modulator pairs with independent control of harmonic structure for each. This allows for patch designs that would require complex arrays of interconnected modulators (often called "algorithms") on Yamaha's system or more recently, Native Instruments' FM8 softsynth. The Synclavier V's independent harmonic control for each carrier/modulator pair lets you quickly dial-in the your basic waveform on the carrier, then sculpt the sound further by adjusting the harmonics of the modulator.

Hands On: To quickly get a feel for the Synclavier's approach to creating interesting partial pairs, set both amplitude and harmonic envelopes to a classic gate shape with full sustain, then set the modulation amount to 0.00 in the Time Slices window and the FM Mod for that partial to 1.000 (maximum) in the Mixer window. From there, max out the volume of *only the first harmonic* in the carrier. This will result in a pure sine wave akin to the Simple Sine preset. Next, increase the modulation amount (in the Time Slices window) for that partial to 2.00. This will introduce a bit of FM from the modulator. With those settings in place, experi-

Modulator harmonics



Carrier/modulator pair with 1 to 4 ratio tuning

ment with different spectra for the modulator by simply dragging your cursor around in the harmonic editor. If you hold a key, you can hear the results in real time as you make these adjustments. When you find a texture you like, this becomes the *maximum* harmonic content of your partial pair (unless you further adjust the modulation amount parameter) and you can then adjust the harmonic envelope to add animation to the partials. Once you get the hang of that, it's a simple matter to expand your experiments to the carrier harmonics, modulation amount, and amplitude envelope.

Pro Tip: You can simulate traditional DX-style FM synthesis by limiting the carrier and modulator to just the first harmonic sine wave, then adjust the ratio parameter in the Synclavier V mixer section according to your objectives, but that's the slower method when working with multiple partials in the Time Slice window. Instead, select single harmonics in the additive editors and adjust the volumes accordingly. Since FM ratio settings correspond to specific harmonics, a carrier/modulator pair with a 1 (carrier) to 4 (modulator) ratio tuning can also be accomplished by simply adjusting the volume of the first harmonic in the carrier and the fourth harmonic in the modulator.

TIME SLICES

The feature that sets the Synclavier apart from every other FM synth is a line that sits at the top of the Time Slices window, above the carrier and modulator. This is a timeline that allows you to animate the values of *every parameter in the window*—up to fifty times for a single partial pair. This isn't simply impressive, this is absolutely paradigm shifting. Here's why.

In the previous section on setting up the parameters for an FM/additive partial, we manipulated the harmonics and FM amount for the carrier and modulator, which is extremely powerful in its own right. With time slices, we can specify those values as a specific snapshot, then create an entirely new set of values for a second snapshot—called a "frame" in Synclavier parlance—and use the timeline to morph from one state to the next. Each partial's timeline can incorporate up to 50 unique frames over the course of up to 300 seconds, allowing for insanely complex sounds that evolve for up to five minutes without repeating.

Hands On: Start by setting both envelopes to a gate shape, as outlined in the "FM meets Additive" exercise, then create a somewhat muted-sounding set of values for the harmonics with an FM amount at 2.00 or lower. This will serve as the Synclavier's "Basic Partial", i.e. the first point in the timeline. From there, click on the Copy button above the carrier, click anywhere on the timeline (to create Frame 1) and click the Paste button. This will copy all of the values from the Basic Partial to the first Frame. Now, hit the "solo" button to focus exclusively on Frame 1 and make a few radical adjustments to the parameters in that frame. Go wild, as this will allow you to see and hear what's possible with this feature. Once you've edited the frame, unclick the solo button. If you've followed the steps correctly, the sound will now morph from the Basic Partial to Frame 1, based on its position on

Time Slices timeline

the timeline. You can now move Frame 1 to *any* position in the timeline. Move it closer to the partial for quick decay-like effects or further down the timeline for slowly evolving textures. Once you pick your jaw off the floor, contemplate the fact that you can repeat this process 48 more times with a single partial pair—and there are twelve partial pairs in the Synclavier V, as opposed to the original's set of four.

Pro Tip: To get the most dramatic and controllable results from the timeline, keep your amplitude and harmonic envelopes at full sustain with no decay segment, then create unique frames that encompass multiple parameter values and move those frames around on the timeline. The results will be a more sophisticated form of the DX7's multi-envelope breakpoints, but with up to 50 discrete points for a single partial.

12-WAY MIXER & KEY DYNAMICS

Now that you have a feel for what each partial can do on its own, you can dive into the Synclavier V's mixer section, which allows you to fine-tune the blend of up to 12 simultaneous partials and/or map them to different sections of the keyboard for splits and layering.

Every partial has its own set of eleven global mix parameters. Here's a handy cheat sheet for understanding what's available:

Volume and Pan: Adjusts the level and panning for each partial.
Tuning: Detuning for each partial up to 125 cents in either direction.
Transpose: Interval tuning for each partial up to 24 semitones in either direction.
Octave: Sets the octave range for each partial.
Voice Chorus/Fine: Any setting other than zero activates a tuned duplicate for that partial, which can range from an octave below the original to the sixteenth harmonic (four octaves higher).
FM Mod: Governs the total FM amount for that partial. Setting this to maximum (1.000) before switching to the Time Slices window gives its individual modulation parameter greater range.
FM Ratio/Fine: Adjusts the coarse and fine tuning ratio for all modulators within that specific partial.
Pitch Track: Turns off keyboard pitch-tracking for that partial, which is useful for both drones and creating unpitched transients.

Note that these are the same parameters available on the Synclavier V's second set of front panel knobs, but in this window, they're visible simultaneously for all partials. Any adjustments made in either interface will be reflected on the other.

The Key Dynamics window is useful for complex crossfade layering and splitting of the keyboard. While the uses for this feature in the context of simple DAW sequencing may not be obvious, some FM patches can sound extremely harsh in the top range of the keyboard. Copying the offending element to a second partial, then lowering the FM amount for that partial and crossfading between the two ranges is a time-honored method for keeping a sound balanced across the entire keyboard range.

To round out our Master Class, here are a couple more Pro Tips: In the Key Dynamics window, grabbing either end of the partial's range from the bottom corner allows for abrupt split transitions, while grabbing it from the upper corners allow you to crossfade between partials based on key position.

Pro Tip: To achieve more traditional "chorus" effects via the mixer, set the Voice Chorus to 1.000 (unison) and adjust the chorus Fine knob a few cents in either direction. For a more dramatic effect, copy the desired partial to a second partial slot and detune each by the same amount of cents in opposite directions and then pan each by equal amounts. ■

Top: Key Dynamics window Bottom: Single-partial mixer

OTHER SOFTWARE

While the Synclavier is in a league of its own when it comes to blending FM and additive synthesis, you can still apply some of these techniques to other softsynths—notably Ableton Operator and Xfer Records' Serum.

ABLETON OPERATOR

One of the most popular FM synths, Ableton's Operator offers customizable additive waveforms—with up to 64 adjustable harmonics—for its carriers and modulators. In fact, if you use the dual, stacked carrier/modulator pair algorithm, you can simulate the basic sound of two Synclavier partials. As for the Time Slicing tools, you'll have to depend on complex track automation to recreate those, but with a bit of patience and *a lot* of time, that's possible too.

XFER RECORDS SERUM

While everyone thinks of Serum as the ultimate wavetable softsynth (and it is), Serum includes the ability to create original waveforms via additive-based editing and bidirectional FM between its oscillators. Of course, with only two oscillators, you're limited to simulating a single Synclavier partial. To recreate Synclavier-style Time Slicing, you can generate several different harmonic states in the additive editor, then use the wavetable morphing tools to shift smoothly between them. From there, use envelopes or LFOs to modulate the FM amount. This requires a bit of forethought, but the results are truly impressive.

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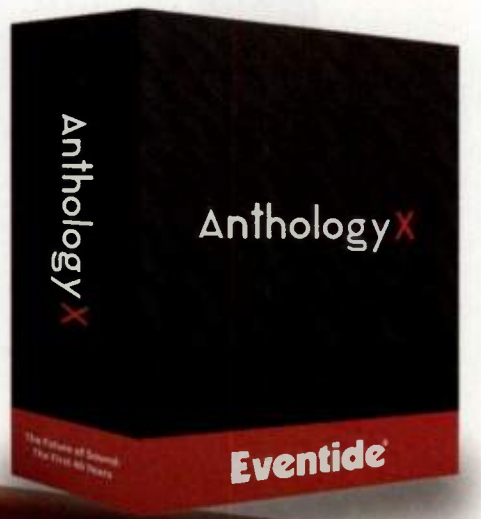

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Fig. 1. The Avid Mod Delay III plug-in's Automation window, with the Master Bypass, Delay Left, Feedback Left, Delay Right, and Feedback Right parameters selected to be automation enabled.

Plug-In Automation Tricks

Get past the presets to harness your software's true potential

BY BARRY CLEVELAND

Barry Cleveland is a San Francisco-based journalist, guitarist, composer, recording artist, and audio engineer; visit barrycleveland.com.

It wasn't *that* long ago that the prices of professional-quality effects and other signal-processing plug-ins put them beyond the reach of those recordists with modest budgets—and some, such as those made by Eventide, were only available for pricey Pro Tools TDM systems.

Nowadays, however, every major DAW comes with a variety of often-excellent plug-ins, and an astonishing number of choices are available from dozens of third-party manufacturers. These range from basic equalizers and dynamics processors to emulations of classic outboard gear to wondrously creative products with no precedents in either the analog or digital worlds. And more than a few of them are ridiculously inexpensive or even free.

Perhaps because of the nearly overwhelming number of choices and the fact that most plug-ins include lots of superb presets, many users don't take the time to become familiar enough with their plug-ins to harness their full potential—and even fewer take advantage of the creative possibilities offered by plug-in automation.

ENGAGE

The specifics for engaging plug-in automation vary from one DAW to the next, but typically you'll need to enable it both globally and for the individual plug-in you want to automate.

For example, in Pro Tools you choose Automation from the Window menu and enable global plug-in automation by clicking the Plug-in button in the Automation dialog box. To automate an individual plug-in, click its Auto button to launch the Plug-In Automation window (see Figure 1) and select the parameters you want to automate. Then, activate automation on the audio or aux track into which the plug-in is inserted.

ON AND OFF

One exceedingly obvious candidate for plug-in automation is the Bypass button. Besides performing relatively straightforward tasks like adding a delay to a keyboard track during a solo, you might want to add a really dramatic effect into the mix selectively, say, on every other beat or even particular notes of a phrase. For example, you might apply some over-the-top phase shifting to the drum fill before the final chorus, or drench the last note of a vocal in thick reverb, or drop in a highpass filter to make an entire mix sound like it is being heard through a telephone speaker.

Fig. 2. The Universal Audio EP-34 Tape Echo plug-in with the Repeats control set high enough to produce self-oscillation and a delay time of 628 ms.

Dramatic touches such as these can go a long way toward livening up an otherwise predictable mix.

GET A MOVE ON

The vast majority of plug-ins are essentially static, and even modulation effects such as flangers, choruses, and auto-panners generally operate at a fixed rate.

Plug-in automation empowers you to continually vary modulation rates, delay times, and feedback; EQ curves; filter cutoffs; and other parameters in whatever ways you like, transforming those heretofore set-and-forget plugins into super-dynamic sound shapers and bringing entirely new forms of expressiveness to your mixes.

DELAY MAYHEM

Up until the late 1970s, "delay" effects were produced exclusively using mechanical devices that employed analog tape, and by far the most popular unit in the U.S. was the Echoplex. (Numerous other echo machines were commonly used in Europe and the U.K., including the Binson Echorec, which used a rotating metal drum rather than tape.)

Eventually people discovered that if you got an Echoplex to self-oscillate by cranking up the Echo Repeats control, and then moved the delay time slider back and forth, it would produce psychedelic "spaceship" sounds. No one used this effect in cooler ways than the members of Miles Davis' "electric period" bands, who all seemed to have Echoplexes of their own.

Well, you too can get in on the action if you have an Echoplex plug-in such as the Universal Audio EP-34 (See Figure 2). Just automate the Repeats control, turning it up and down to get the desired amount of feedback, and then do the same with the virtual delay time slider. And although it may not be quite as groovy, you can also do this with other tape-echo simulators that don't have sliders, simply by manipulating the delay time using a virtual knob or whatever controls that function. For example, I've gotten fantastic results with the Waves H-Delay plugin.

MANIPULATING HARMONIES

Another thing I like to do with plug-in automation is to change the intervals being generated by pitch-shifters in real time. For instance, instead of just adding an interval such as an octave or a fifth to a part, try changing the interval every so often in ways that make sense rhythmically—or don't make sense, if *that's* the sound you are after. I frequently do this with a Lexicon PCM Native Pitch Shift plug-in, but it may be done with any pitch shifter that doesn't glitch when you adjust intervals in real time.

Of course, this concept can be taken considerably further. With a multi-voice pitch shifter, for example, you could have two or more intervals changing at once, effectively "orchestrating" new harmonic structures. I recently did this with a single-note drone as the dry track, creating three ever-changing harmonized lines that rose and fell as the piece progressed.

I hope these few examples will have inspired you to explore automating your own effects plug-ins. The possibilities are governed only by the scope of your imagination. ■

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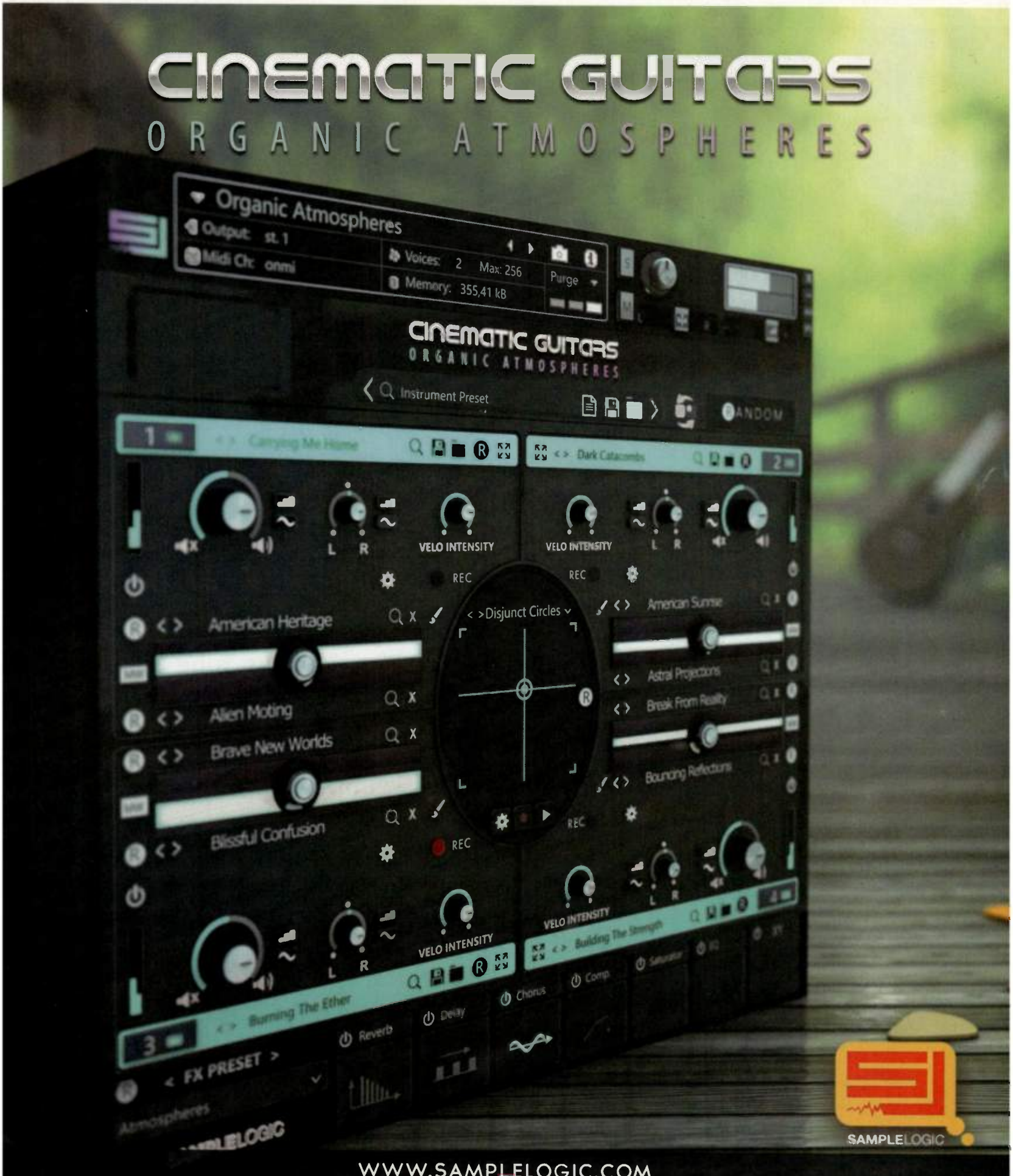
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