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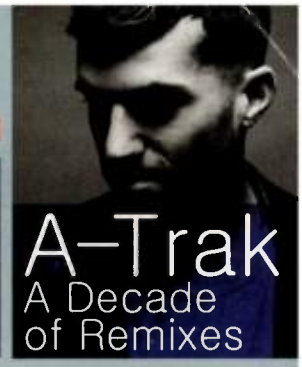

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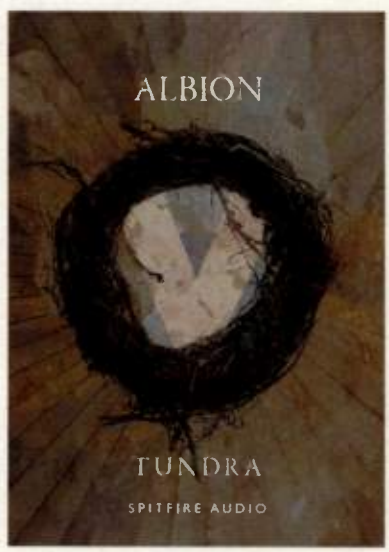

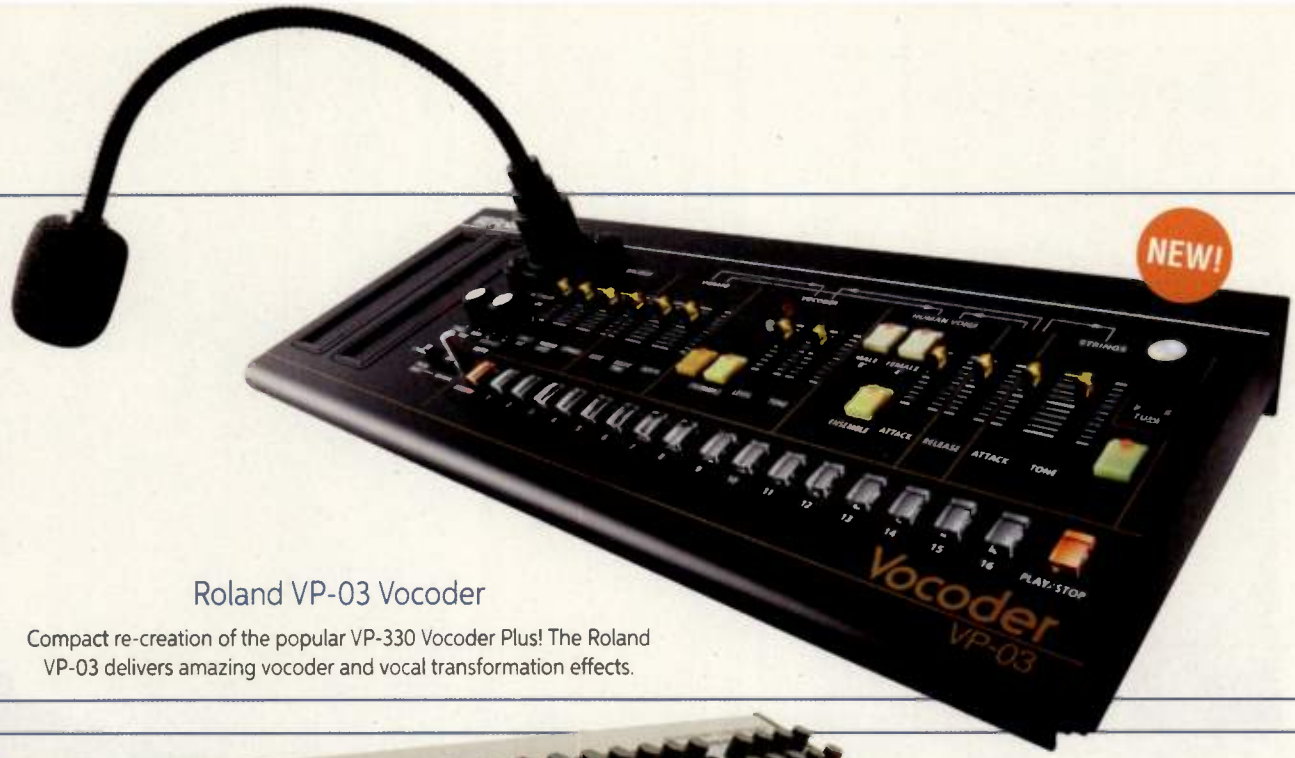

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Whether you're a songwriter, producer, DJ, or a musician recording your band on the go, we'll help you outfit your studio with the right gear for the music you make.

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The German-born, Berklee-bred composer talks about tapping into boundary-free musical inspiration to score the dark, fantastical kingdoms of *Game of Thrones*.

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1" silk dome tweeter utilizing neodymium magnets give the MX Series monitors a smooth and natural high-frequency response.

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STUDIO MONITOR

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8" POWERED
STUDIO MONITOR

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Available exclusively at: Guitar Center · Musician's Friend

insight

Mastering and Mindset

AS TECHNOLOGY keeps growing less expensive and more sophisticated at the same time, the lines between songwriting and performing, tracking, and mixing, continue to blur—particularly in the home studio. But as music makers embrace broader creative roles, there's still a clear distinction between mixing and mastering.

Low-cost mastering tools have lowered barriers to entry for musicians and engineers, and aim to demystify the process through simplified interfaces and presets. (And some automated "self-mastering" software would have you believe that mastering requires little to no decision making on anyone's part.)

But owning mastering tools doesn't automatically make you a mastering engineer; no plug-in offers a substitute for the experience, objectivity, and exceptional critical listening skills that a professional mastering engineer, with dedicated tools, in an acoustically sound environment, brings to the table.

That said, we do recognize that some situations—releasing a single, creating a club track—might call for handling those finishing touches yourself. In this month's Master Class (starting on page 48), we ask top mastering engineers to share a few techniques for fine-tuning your mix, using plug-ins. The key is knowing when you should take matters into your own hands.

You've put a lot of work into crafting a great recording. Make sure it gets the treatment it deserves.

SARAH JONES
EDITOR
sjones@musicplayer.com

electronic MUSICIAN

WEB HIGHLIGHTS

This month on emusician.com

Recap: Ableton Loop Conference 2016

Plus...
The DIY Advisor: Make Money off Your Gear
Bonus Sound Clips:
Korg volca kick
Roland TB-03/TR-09

...and lots more!

gadget geek

Get Loopy With BrandNewNoise

Brooklyn-Based artist Richard Upchurch's BrandNewNoise (brandnewnoise.com) collection of handmade "sound gadgets" are designed to delight, whether you're on the hunt for that secret weapon for your studio, or you just want to have some fun with the kids. Boxes include the original Loopy Lou voice-recording looping gadget with pitch control and 1/8"output, the Zoots low-fi thumb piano recording gadget ($90), and the Shaka Khan gadget ($82), which lets you record and loop whatever you can fit into two small "percussive vials."

A DIY kit is also available.

—SARAH JONES

app tip Reactable Rotor

BY MARKKUS ROVITO

Create an original piece with this unique modular synth app

REACTABLE ROTOR (for iPad with iOS 8.0 or later, reactable.com) approaches modular synthesis with a unique interface that connects circular modules in a highly customizable layout that encourages serendipitous discoveries. It also utilizes separately sold physical Rotors that conduct the capacitance of your fingers to work like a knob on the iPad's surface and supports Ableton Link syncing. This primer will have you making fresh loops fast..

1. Drag one of the colored loop players onto the canvas close enough to the center dot (audio output) to establish a connection. Double-tap on the looper to open the edit window, and tap the list icon to find drum loops to load into the four sample slots.

2. Drag a sine and/or saw synth onto the canvas and double-tap it to open the window to operate the keyboard, factory presets, and sound-shaping parameters, including an ADSR envelope and settings for up to four oscillators per synth.

3. Drag the monophonic sequencer to the synth you want to be the bass and the polyphonic sequencer to the synth you want to be a lead or pad. Double-tap the sequencers to open grids where you can draw in notes and edit their levels.

4. Drag an effect (delay, reverb, chorus, ring mod, distortion, or bit crusher), into the path of any source you want effected, and double-tap it to edit its parameters.

5. Drag modules like LFOs or an Accelerometer to connect with the effects and modulate their character. LFOs have various waveshapes, timing, and depth.

6. Save your session and/or record a performance to a WAV file.

Motor to the iTunes App Store to get Rotor for $19.99.

CLASSIC EM Steve Albini, October 2008

IN 2008, analog champion Steve Albini was already 25 years into his studio career, and had been working out of his Chicago studio, Electrical Audio, for just over a decade. We talked to him about his tracking techniques, go-to mics, and the evolution of his recording process; here's an interview excerpt. (Read our full interview at emusician.com.)

EM: Like a lot of people, you started by recording yourself on a 4-track. And before Electrical, you had a recording studio in the basement of your house. What are some of the things you've learned along the way about the process of recording?

Albini: There's an analogy about recording that came to mind not that long ago. Think of three types of movies: a normal character/content/dialog movie; a super-high-tech movie, like *The Matrix*; and something technically bone simple, like *The Blair Witch Project*. Those three kinds of movies pretty much cover the spectrum of the technology of moviemaking.

Now, not every movie can be made on a camcorder. But a lot of movies can. If you took a character-driven film and made it more simply just by using camcorders instead of with big Hollywood production values, you wouldn't lose much of the movie. You'd still get the important aspects. But if you took a movie like *The Matrix* and tried to fake it with a camcorder, you wouldn't convince anybody.

With audio, it's similar: it's a matter of trying to make your production environment suitable for the music that you're recording. If you're recording music that has certain technical demands on it, and you can't satisfy those demands, you should move the job to another studio. Just be honest with yourself. —**RICH WELLS**

2

4

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3

1

WAVES

GREG WELLS TONECENTRIC

Effects plug-in

$129

HIGHLIGHTS Part of the mixing engineer's Signature Series, ToneCentric is based on the sound of vintage analog gear (vacuum tube compressor and mixing console, tape machines) that Wells uses on recordings by Adele, Katy Perry, OneRepublic, and others • provides analog-style harmonic enhancement and depth • one knob to control it all • mono in/out and stereo in/out operation • I/O Link button

TARGET MARKET Studio production and live sound

ANALYSIS Designed to provide easy-to-use and subtle tonal shaping.

waves.com

2

ARTURIA

DRUMBRUTE

Analog drum machine/ sequencer

$499

HIGHLIGHTS Fully analog drum machine • each of the 64 sequences can have 64 steps • pattern chaining for 16 songs • 17 percussion sounds—kicks, snare, hats, toms, clap, zap, and Latin instruments • individual-instrument and mix outputs • controls include Level, Pitch, and Decay • step repeat and looper functions • Steiner-Parker filter • Swing and Randomness dials for patterns • stereo headphone jacks • USB • MIDI • DIN and clock sync

TARGET MARKET Producers, musicians, composers

ANALYSIS A portable beat-production machine for studio and stage.

arturia.com

3

PLUGIN ALLIANCE

BRAINWORX BX_ROOMS

Mid-side reverb plug-in

$199

HIGHLIGHTS Stereo Width control • Pan M to position the mid channel of the reverb • 2-band EQ • Room Shape parameter • Quick Select button provides five environments, each with three sizes • Mono Maker for collapsing the wet signal based on a selectable corner frequency • low- and high-end damping • parameters for input Directivity, Source Distance, and modulation frequency and amount • selectable bit-depth for the wet signal

TARGET MARKET Recording and mixing engineers

ANALYSIS A powerful tool for creative and corrective signal processing.

plugin-alliance.com

4

SIMMONS

DA350

Electronic drum monitoring system

$499 street

HIGHLIGHTS A 350W, 2.1 sound system utilizing Class D power • includes a 10" subwoofer and two 4.75" satellite speakers that can be stored inside the sub cabinet for transport • built-in 3-channel mixer with 2-band shelving EQ • aux inputs • Bluetooth enabled for wireless audio playback from a portable device • stands (with cases) included • total weight is 60 lbs.

TARGET MARKET Drummers, schools, houses of worship

ANALYSIS A relatively lightweight solution for rehearsals or gigging with electronic percussion setups.

simmonsdrums.net

All prices are MSRP except as noted

6

8

5

7

5

IK MULTIMEDIA

MODO BASS

Virtual instrument

$299

HIGHLIGHTS 12 physically modeled instruments including Fender, Gibson, Hofner, Ibanez, Music Man, Rickenbacker, Warwick, and Yamaha basses • selectable electronics (passive or active pickups with 3-band EQ, piezo) • three playing styles—pick, pluck, slap • two modeled bass amps and cabs • seven stompboxs • string options include type, material, gauge, and age • compatible with AmpliTube Custom Shop for additional tonal shaping

TARGET MARKET Composers, performers, studio production

ANALYSIS A variety of popular instruments that are highly customizable for nearly any musical style.

modobass.com

6

ELEKTRON

ANALOG HEAT

Stereo effects processor

$749

HIGHLIGHTS analog stereo processor featuring eight distortion circuits, a multi-mode filter, and a 2-band EQ • includes an LFO and envelope as modulation sources • 5-pin MIDI In/Out/Thru • stereo 1/4" I/O and headphone jack • two 1/4" control inputs • supports Overbridge, so that Analog Heat can be used as a VST/AU plug-in or 2x2 USB audio interface (CoreAudio, ASIO, WDM)

TARGET MARKET Musicians, DJs, producers

ANALYSIS A portable analog effects unit for desktop use as well as gigging.

elektron.se

7

ROLI

BLOCKS

Modular iOS controllers

$79.95, $179

HIGHLIGHTS Handheld, wireless, MIDI-over-Bluetooth system • works with Roli's free iOS app, Noise • Lightpad Block ($179) is a 5-dimensional touch-sensitive controller that responds to a variety of gestures • Live Control Block ($79.95) parameters include scale select, melody, chords, arpeggiator, octave, favorites • Loop Control Block ($79.95) offers record/play/pause, quantize, undo, learn, and a click track • Noise app provides 100 sounds and works with the Seaboard Rise

TARGET MARKET Beginner and pro musicians

ANALYSIS A unique, yet powerful and portable, music making system.

roli.com

8

KORG

ARP ODYSSEI

Synthesizer for iOS

$19.99

HIGHLIGHTS Virtual-analog synth modeled on the three different versions of the classic ARP Odyssey • three lowpass filter types • programmable arpeggiator • drive • x/y Touch Scale pad • effects • voice assign mode for playing chords • supports Inter-App Audio and Audiobus • compatible with Korg Gadget DAW app and Apple GargeBand

TARGET MARKET Performance, recording, production

ANALYSIS Using its proprietary Component Modeling Technology, Korg provides access to all three models of this venerable synth, while adding modern touches to expand the sound palette.

korg.com

The 4ms Dual Looping Delay can be used as a looper or delay within a multitude of mono and stereo configurations.

4MS

Dual Looping Delay

FROM FRIPPIN' TO RIPPIN' IN 20HP

BY GINO ROBAIR

The result of a collaboration between 4ms and Gary Hall (designer of the Lexicon PCM42 in the early '80s), the Dual Looping Delay (DLD) is specifically designed for musicians who capture and manipulate audio loops in real time, whether onstage or in the studio. In addition to providing 2 minutes and 54 seconds of loop time per channel at 16 bits (half that amount of time at 24 bits with Version 5 firmware), the DLD's CV I/O adds extensive modulation capabilities that Eurorack users expect.

The module can handle audio input frequencies up to 24 kHz, and internal digital processing is done with 24-bit, 48kHz resolution. DC coupling of each audio input is also an option.

The module can be configured in several ways: two mono channels, mono-in/stereo-out, single- and dual-input cascading delays, or sound-on-sound-style. Both channels have their own Mix control, as well as an insert for processing the delays, and a knob and CV inputs for Feedback and Delay Feed. You can select the Reverse or Hold modes for each channel manually or with a trigger.

Though each channel has independent audio I/O, both channels follow the same clock—called Ping—which you can set tap-tempo-style or with an external signal. Nonetheless, you can make the channels sound as coordinated or disconnected as you like. Outputs for the clock and time divisions are available and can be patched back into the DLD or used to control external modules.

The division or multiplication of the clock for each channel is set via its Time knob and division switch. From there, you can add modulation from the Time CV inputs. As a result, the DLD can go from resonant Karplus-Strong timbres (tunable via CV) to evolving delays nearly three minutes long. You can even do "windowing" and "granular scrubbing" to move within sections of a loop.

One of my favorite DLD patches was designed to create Frippertronic-style effects: Using the outputs from a Tom Oberheim TVS-Pro, I exploited the full delay length of each channel to build sustained chords, which were hard panned to each speaker for pseudo stereo effects. Later, I cross-patched the clock signals to introduce rhythmic variety and add stuttering within the stereo field.

Synchronizing the module from an external clock is fun and inspiring. I patched a gate signal from the TVS-Pro's sequencer to the DLD's Ping input and dialed in polyrhythmic divisions for each delay to enhance and extend the sequenced pattern. Patching Loop A's clock output to the Time B input, and vice versa, delay rhythms could be intensified as I improvised with the Time controls and simulated out-of-control tape-delay buildup with the Feedback knob.

As a basic delay and looper, the DLD is surprisingly easy to use given its deep functionality. But expect to invest some time with the module to fully understand its capabilities. In that sense, the DLD could be considered a work in progress, in a good way: Most new features (such as 24-bit audio quality), added via simple firmware updates, are musically useful and based on user feedback.

At $415, the DLD is no impulse buy. But if you crave extensive looping and modulation in a Eurorack environment, the Dual Looping Delay's broad feature set and excellent sound quality will more than satisfy. ■

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A STUDIO FOR ANY SCENARIO

Gear inspiration for your production situation

BY MIKE LEVINE, STEVE LA CERRA, AND MARKKUS ROVITO

If you're like us, you're looking for any excuse to feed your gear lust, and we think the beginning of a new year is as good a time as any to update your studio.

We know choosing the right gear can be overwheming, so to help you focus, we've picked three popular ways of working—a songwriter suite, DJ producer studio, and mobile recording rig—and spec'd out sample rigs for each. To keep things practical, we stuck to real-world budgets: There are a few splurges here and there, but most of the products here top out at a few hundred bucks. (And to keep things simple, we're assuming you already own basics like a computer, furniture and acoustic treatment, and cables.)

Whether you're starting from scratch or updating key components, you'll find plenty of tools here to help you make better music. Happy shopping!

THE SONGWRITER STUDIO

Gear for producing vocals, live instruments, and pro demo tracks

TOTAL BUDGET: THIS RIG WILL RUN BETWEEN ABOUT $7,000 TO $10,000 DEPENDING HOW YOU SPEC OUT YOUR OPTIONS.

BY MIKE LEVINE

This studio was created for the songwriter who produces demos and the occasional album. It's designed to provide the tools necessary to help facilitate the creative part of songwriting, and to produce professional-sounding tracks. It's equipped to record vocals and live instruments, and features a solid collection of software instruments, including plenty of synths.

To keep the budget reasonable, and to make the studio "apartment friendly," I did not spec it for live-drum recording. I'm assuming that for the great majority of songs produced here, virtual drummers will be used. That said, I chose an interface that can be expanded to provide enough mic inputs for live drum recording down the road, if the physical space can support it.

Interface: I chose the RME Fireface 802 ($1,999) for three main reasons: First, the 802 has excellent-quality converters and mic preamps. You get four of the latter, along with eight analog inputs and outputs for a total of 12 analog channels of I/O.

Second, should your studio expand, and you need more channels of mic preamps, the interface contains two sets of ADAT I/O, allowing you to easily expand it with ADAT-equipped external mic pre units or interfaces. The 802 offers a total I/O count of 30x30.

Finally, you don't need to buy a separate monitor controller, because it has a built in speaker switcher and talkback system. Its TotalMix console software, although not particularly user friendly, is very powerful, and lets you access the interface's built-in DSP, so that you can create a latency-free cue mix with effects. The Fireface 802 also has a pair of headphone outputs, meaning you can hold off on getting a separate headphone amp, at least for the time being.

Some might object that the unit's connectivity is FireWire (800/400) and USB, and not Thunderbolt, but here's my rationale: If you still have a FireWire based computer, you won't be shut out. Also, USB will likely be supported down the road, and is backward-compatible, meaning you'll be able to use it with future computers. What's more, the Fireface 802 offers excellent performance using either FireWire or USB.

Monitors: There are lots of stellar monitors to choose from, but I went with the PreSonus R80 ($499 each), for a number of reasons: Not only do they provide a nice, balanced sonic picture, but their AMT ribbon tweeters put out a smooth and non-fatiguing high end. What's more, they have 8-inch woofers, so they are able to reproduce enough bass to give you a pretty fair picture of the bottom of your mix. And finally, they're very compact for 8-inch monitors, and can be used in virtually any size studio.

I also chose the JBL LSR305 ($149 each), which you can switch to periodically to change your perspective during mixing. They're an excellent value, incorporating technology developed in JBLs top-of-the-line monitors; and the 5-inch woofers will offer a different sonic perspective from the 8-inch woofer in the R-80s, which is what you want in a second monitor pair.

Headphones: I've included two pairs of headphones. For the primary model, I'm going with the Shure SRH1440 ($299). It's in the upper-mid range—pricewise, that is—but offers flat frequency response and an open-back design, which is superior for mixing. I'm suggesting the closed-back AKG K-240 ($69.99) for your second headphone pair. It offers a good combination of sonics and value.

Microphones: For a songwriter, having a quality vocal mic is important, so I'm splurging a little here with the Telefunken CU-29 Copperhead ($1,295) tube condenser mic. Although considerably less expensive than the company's flagship ELA M 251, the CU-29 is a mic worthy of the Telefunken name, and captures big and warm-sounding vocals that will flatter virtually any singer. It's also quite good for acoustic guitar.

I'm also including a Studio Projects C4 ($349) small-diaphragm condenser mic pair. There are lots of good pencil condensers for instrument recording, but I chose these because they not only offer excellent sound, but have interchangeable cardioid and omni capsules. This gives your mic collection some additional versatility.

Finally, I'm including a Shure SM57 ($99), a mic that any studio should have, for miking guitar amps, brass instruments, and more. Since the other mics are all condensers, it's good to have a dynamic to balance out the collection.

DAW: I'm going with PreSonus Studio One 3 Professional ($399.95, Mac/Win). It offers an excellent recording feature set, is easy to use (for a DAW, that is), has a nice collection of software instruments and processing plug-ins, comes with Melodyne built in, and gives you the Project Page, a separate environment for mastering and assembling albums and other multi-song projects.

Software Instruments and Processors: Native Instruments Komplete 11 Ultimate ($1,199) gives you a huge collection of sampled instruments and synths. It also includes some excellent reverbs, compressors, and EQs. On the instrument side, you get Kontakt 5,

Sample Magic Magic AB 2

Native Instruments Kontakt 5

a sampler with a ton of third-party library support, which means almost unlimited expandability. You also get Guitar Rig 5, which provides you with a solid collection of guitar amp and effects models.

Although Studio One comes with Melodyne Essential (and integration capability for any version of Melodyne), I'm recommending that you step up one level and get Melodyne Assistant ($149 to upgrade from Melodyne Essential), because it gives you the full suite of Tools such as the Pitch Tool and the Timing Tool, which are necessary if you want to get the most out of Melodyne.

For virtual drumming, I'm including Toontrack's EZ Drummer 2 ($149). Not only does it have solid sounds, its drum-part programming is easy, and it features a large groove library. Once you've created a MIDI drum track, you have the option of using any of the myriad Kontakt 5 drum sounds, should you want something different than EZ Drummer's offerings.

One indispensable mixing tool is Sample Magic Magic AB 2 ($60.66), which makes the AB'ing process really easy. I'm also suggesting iZotope Ozone 7 ($249) for mastering your tracks. While you may use a mastering engineer for albums, if you're doing a lot of demos, you're going to want to be able to make the tracks sound loud and polished, and Ozone 7 is the perfect choice for that.

MIDI Controller: Because I'm basing so much of my software instrument sounds around Komplete 11, I'm going all in and springing for the Komplete Kontrol S49 ($599) keyboard, which offers tight integration with Komplete, including automatic parameter mapping, a unified browser for all of the Komplete sounds, and more.

Allen and Heath Qu-16

THE MOBILE RIG

Capture multitrack recordings of rehearsals and gigs

TOTAL BUDGET: THE TOTAL PRICE FOR OUR MOBILE RIG IS AROUND $4,000—VERY REASONABLE WHEN YOU TAKE INTO ACCOUNT THAT IT'S PERFORMING DOUBLE-DUTY FOR RECORDING AND P.A.

BY STEVE LA CERRA

Our mobile system is perfect for recording rehearsals and performances with relative ease, but offers a distinct bonus: You'll be able to use most of the gear for your band's P.A. and for making multitrack recordings, without the hassle of dragging around a computer.

Mixer: The centerpiece of this system is the Allen & Heath Qu-16 Digital Mixer. At a street price around $1,800, the Qu-16 packs a plethora of performance into a compact package that can be rack-mounted for easy transport. As its name implies, the Qu-16 features 16 balanced XLR inputs—A&H AnaLOGIQ preamps with recallable gain and individually switched phantom power. Two rear-panel stereo TRS inputs can be used for line-level sources, and the front panel adds a third stereo input on a 1/8-inch jack for easy connection to an iPod. A USB port enables the Qu-16 to act as a 24x22 DAW interface, but the big deal for working musicians is the integrated USB multitrack recorder. A&H's exclusive Qu-Drive recorder provides 18 channels of audio recording or playback (at 48 kHz/24-bit resolution) directly onto a USB drive connected to the front panel. This enables you to record each input channel to its own track, plus record a "patchable" stereo feed from any pair of mix outputs such as two aux outs or the L/R bus. All recording functions are accessed from the Qu-16's front panel so you don't need a computer running DAW software. All you need is the external drive, and the Qu-16 can provide bus power for the drive if needed.

The Qu-16's compliment of 12 outputs facilitates routing of four mono and three stereo monitor mixes (great for IEMs) in addition to the main L/R outputs. All outputs have 4-band parametric and 31-band graphic EQ, plus a compressor and delay. Input channel processing includes 4-band parametric EQ, compressor, gate, high-pass filter and polarity reverse. Four onboard effects engines can generate a wide variety of delay, reverb, and modulation effects, so the system really covers a lot of territory.

Storage: A Glyph STUDIO mini mobile hard drive can be used for storing audio from the Qu-16. Available in 500GB, 1TB, or 2TB capacities, the STUDIO mini has USB 3.0, FireWire 800, and eSATA ports, so you can easily connect it to a studio computer for remixing. The 1TB model has a drive speed of 7,200 RPM, easily handling the 18 data streams from the Qu-Drive. The STUDIO mini can be bus powered or can be powered using an optional external power supply. Glyph backs up

Glyph Studio mini

Shure SM57

Radial ProD2

(sorry!) the STUDIO mini with a 3-year hardware warranty, 2-year level 1 data recovery, and 1-year advance replacement, so you can rest easily after you return home at 5am from that gig. At a street price around $185, it's a no-brainer.

Mics: You'll need microphones to capture the instruments, so let's start with the drums. Since we'll be multitracking, we can close-mic the kit and remix later. The Audix D6 (around $200) has an extended low-frequency response contoured specifically for kick drum, but it's also useful for miking large toms or a bass amp. Its cardioid pickup pattern reduces bleed and avoids feedback, and the body is machined from a solid block of aluminum for durability. A Shure SM57 or Audix i5 can handle snare drum, either mic retails for $100 and is quite comfortable for the application.

Tom mics will be Sennheiser e604s; a three-pack sells for around $350. They're compact and easy to place, plus they include clips for mounting onto the tom rims—which means fewer mic stands to carry and less clutter on small stages. Overhead mics will be Shure PGA181 condenser microphones. These little beasties are side-address, cardioid condenser mics boasting a frequency range from 50 to 20,000 Hz and the ability to handle SPLs up to 138 dB. Not only will they serve as our overhead mics, but back at the studio we can use them on a wide variety of acoustic instruments or vocals, so we'll get a lot of use out of them. Street price is around $94 each.

Do we even need to mention which mic to use on guitar amp? Okay, we'll say it: Add another Shure SM57 to the tab, please. It's another no-brainer. For a distinctly different flavor on guitar amp, we'll add a CAD Audio D82 ribbon microphone (around $160). Are we crazy? Yes—but that has nothing to do with this feature. The D82 was designed for use in live situations to deliver classic ribbon tone with a bit more extension in the high frequencies. It will handle SPLs up to 140 dB, so parking it in front of a guitar amp shouldn't pose any problems.

A vocal microphone is an extremely important component in the audio chain for both live sound and recording. The Audio-Technica AE-4100 (street price around $189) is a dynamic cardioid microphone with a gentle rise in the high-mid frequencies to maintain presence in a busy mix. It has a multi-stage grille to protect against popping 'P's and 'B's while maintaining high-frequency clarity, and features internal shock-mounting to minimize handling noise. Plan on at least two in case you need one for a background vocal.

DIs: Direct boxes will provide the proper interface between bass and keys and our mixer. The ProD2 from Radial Engineering is perfect for keyboards. It's a passive stereo DI with custom isolation transformers that feature extremely low phase distortion in the critical bass and midrange. A ground-lift switch eliminates the likelihood of hum or noise issues resulting from ground loops, while a 15dB pad makes sure that hot synth outputs won't cause distortion. The ProD2 has dual ¼-inch inputs, ¼-inch "thru" jacks for patching into a keyboard amp, and balanced XLR outputs for connection to the mixer. Street price is around $150. Our bass DI will be a Radial ProDI (around $100). Similar in concept to the ProD2, the ProDI is a single-channel direct box with Radial's custom transformer to eliminate noise, ¼-inch input and thru connections, and a balanced, low-impedance XLR output. The ProDI and ProD2 feature 14-gauge inner chassis and outer shells to protect the circuitry from damage and make sure that they play gigs as long as you do.

Monitoring: The recordings created with this system won't be mixed until later on, but we do need a way to audition channels and confirm that our track routing is correct via the Qu-16's headphone jack. For that purpose we'll need headphones. Audio-Technica's ATH-M50x cans have a closed-back design, meaning that they help isolate your ears from noisy stage environments when cueing channels. Sharing the same sonic signature as A-T's popular ATH-M50, the M50x adds the option of detachable coiled or straight cables in two different lengths. Its natural reproduction, wide frequency response (15 Hz to 28 kHz), and accurate bass response have made the ATH-M50x very popular in studios. The collapsible design makes it easy to carry a high-quality monitoring reference anywhere. Street price around $175.

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Ableton Live

Pioneer/Dave Smith Toraiz

Lauten Audio LA-320

Focusrite Scarlett 18i8

Roland DJ-808

Xfer Serum

THE DJ/PRODUCER STUDIO

Whether you're cooking up or slinging the beats, this rig has you covered

TOTAL BUDGET: YOUR MAIN STUDIO WILL RUN ABOUT $3,300. THE TRAKTOR PATH WILL ADD ABOUT $5,400 TO $5,700; THE SERATO PATH WILL ADD AROUND $6,200; AND THE PIONEER PATH WILL ADD ABOUT $6,800 TO $7,100.

BY MARKKUS ROVITO

The producer/DJ has ruled electronic dance music basically since the genre's inception with the Chicago house and Detroit techno of the '80s. However, now "producer/DJ" is a distinction—something you might search for online or fill out in a personal survey. It's not as easy to fill out the equipment in the producer/DJ's setup though. One has to decide the platform on which to DJ and make sure the surrounding gear plays nice with it.

We're considering the three most popular digital DJing platforms you see today: one based around Native Instruments Traktor hardware and software, Serato DJ software with approved hardware, or a laptop-free Pioneer DJ hardware setup using tracks prepped with its Rekordbox software.

DAW: Ableton Live 9.7 Suite ($799) or **Standard** ($499): Now that both Native Instruments Traktor and Serato DJ are compatible with the Ableton Link live-performance syncing protocol, the Ableton Live DAW really does rule the producer/DJ roost. If you collaborate with other EDM producers, which has become standard practice, chances are they'll work in Live rather than anything else. Opting for the more expensive Suite package will open you up to the world of both free and paid Max for Live devices, as well as the important addition of the pro-level Sampler device, Live's full array of soft synths, extra processors and 54GB of sound material, compared to Live Standard's 11GB.

Here's a breakdown of the three potential paths. **Traktor Path:** Native Instruments' digital DJ platform continues to steadily expand into areas or more dynamic live performances. The 4-deck Traktor Kontrol S8 ($1,199) includes Traktor Pro 2 software and is pre-mapped to control the new Remix Deck step-sequencing features. The S8's built-in color displays, 16 pads, and huge complement of effects, looping, and other controls make it a Traktor master's dream. You could also save some money, get the same software and most of the same hardware conrols with the Traktor Kontrol S5 ($799).

Maschine Jam ($399) also adds deluxe step-sequencing hardware controls for the included Maschine 2 beat production software. Its many modes include melody input, 16-pad drum mode and Ableton Live mapping mode. The very cool Smart Strip touch faders handle all manner of track, effect and other parameters. The Maschine software can sync over virtual MIDI to Traktor, and it works as a standalone production environment or a plug-in for Live or other DAW. It's 29GB of bundled sounds and plug-ins, including the Massive, Monark, Prism, Retro Machines, and Vintage Organs instruments, will be an important part of your audio palette.

Serato path: With the massive Roland DJ-808 ($1,499), the Serato DJ software (included) has its

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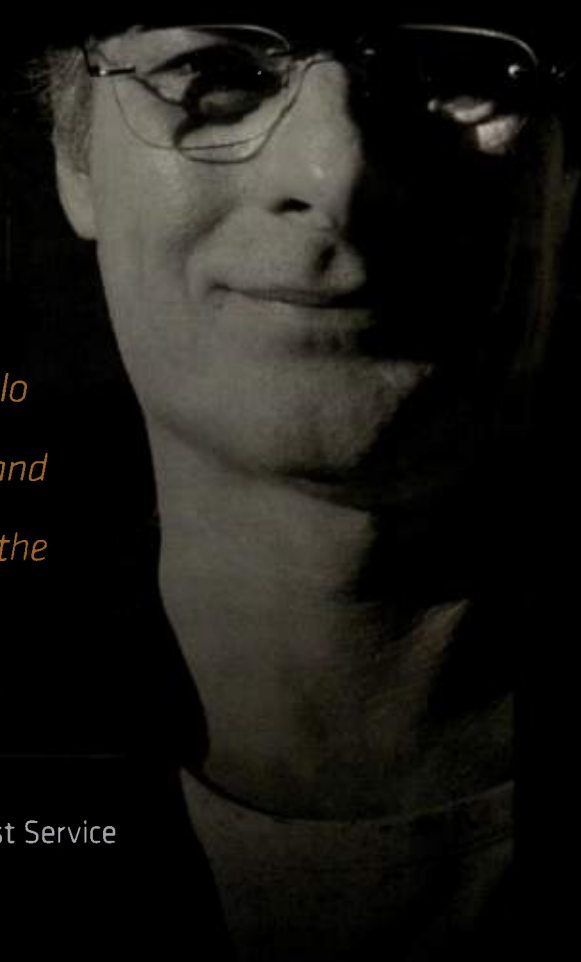

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SOUNDS GOOD.

first flagship controller/instrument hybrid. Besides being a full-featured, 4-deck controller, it adds both a TR-S drum machine/sequencer and a full VT voice transformer for the mic input across the top. The TR-S includes the latest Roland analog-modeled kicks, snares, claps, and hats, letting you sequence four parts of built-in drum sounds, as well as samples from the upgraded 8-slot Serato Sampler. Everything is synced to Serato DJ's clock, and you can expand the rig with two Roland Aira Link USB ports for syncing other Aira modules.

Ableton's Push 2 ($799, standalone; $1,398 total for Live 9.7 Suite + Push 2; or $1,148 total for Live 9.7 Standard + Push 2) represents the most complete and integrated Ableton Live pad controller available. Designed to handle note playback, sequencing, audio chopping & mangling, mixing, live performance, and more, Push 2 fits right into both studio and live setups. Its high-resolution and dynamically updating display makes Push 2 an indispensible focal point when using the Live software.

Pioneer path: DJing with software and controllers can make for an incredibly creative and freeing experience, yet a huge portion of big-time DJs don't exploit that available potential onstage, instead sticking with the club-and-festival-standard Pioneer media players and mixers. Such systems are also very powerful and allow fabulous jocks to show up merely with USB sticks and rock the crowd. To prepare for those sets, the Pioneer DJ XDJ-RX digital DJ system ($1,499) effectively mimics the larger Pioneer ecosystem. It's a large standalone piece with two USB drive-ready decks, a 2-channel pro mixer, and a helpful 7" color display showing dual waveforms. You can even load music straight from an iOS or Android device. Prep your tracks on the included Pioneer Rekordbox software, practice on the XDJ-RX, and then take your music to the club and throw down.

> "Producer/DJ" is a distinction—something you might search for online or fill out in a personal survey. It's not as easy to fill out the equipment in the producer/DJ's setup, though. One has to decide the platform on which to DJ and make sure the surrounding gear plays nice with it.

We still need a killer music production/performance machine, and Pioneer put out one of the pieces of the year to fit the bill, the Pioneer DJ/Dave Smith Instruments Toraiz SP-16 sampling workstation ($1,499). This throwback to high-end hardware beat machines is a 16-track sample sequencer for the studio or stage that includes all the modern touches, such as multicolor pads with velocity levels, DSI analog filters, a 7" color touchscreen packed with various screen of information, multi-function touchstrip, and Pro DJ Link for connecting other Pioneer gear (MIDI also available). It comes with 2GB of samples loaded in the 8GB memory, and also reads from USB drives.

Controller: I chose the excellent Arturia Keylab 61 ($399) keyboard controller by process of elimination. I wanted something both tough enough for the road and capable enough for the studio, with 16 large drum pads and a good software bundle. The Keylab 61 automatically maps its knobs, faders, pads, and transport controls to Ableton Live, and the included Analog Lab 2 soft-

ware adds more than 5,000 presets taken from Arturia's acclaimed V Collection of 17 vintage-synth emulating plug-ins, all pre-mapped for tweaking on the Keylab.

Synths and effects: Although so much of music production takes place in the box these days, the wise producer still insists on a bit of inimitable analog class in the mix. That's why I recommend the Korg Minilogue ($499) 4-voice analog keyboard. It has a unique analog sound a hugely diverse feature set for the price. It includes a 16-step sequencer, tape delay emulation, MIDI and Sync I/O, two oscillators per voice, and eight voice modes, such as Unison and Chord modes. A crucial audio input lets you treat external signals to the creamy analog filter.

Many of your virtual instrument needs will be fulfilled from Ableton Live's stock devices, Maschine's large bundle and/or Arturia's Analog Lab, but we still want to add at least one marquee soft synth. For that, you hardly go wrong with "it" synth of the moment, Xfer Serum ($189). This wavetable synth also adds extensive modulation and tone-shaping abilities using elements of sampling, additive, subtractive, and other synthesis techniques.

To handle most of our processing needs, the newly updated iZotope Music Production Bundle 2 ($599) strikes a remarkable deal. It includes the new Neutron Advanced mixing plug-in, Ozone 7 Advanced for mixing and mastering, Nectar 2 Production Suite, VocalSynth, Trash 2 for effects and sound design, RX plug-in pack for restoration and the Insight metering suite. Many of these products are multi-function masterpieces in their own right, and they total more than $2,000 in individual MSRPs.

If you fancy even more instruments and effects, look into any soft synth from U-He and/or the 19-plug-in Soundtoys 5 ($499) bundle.

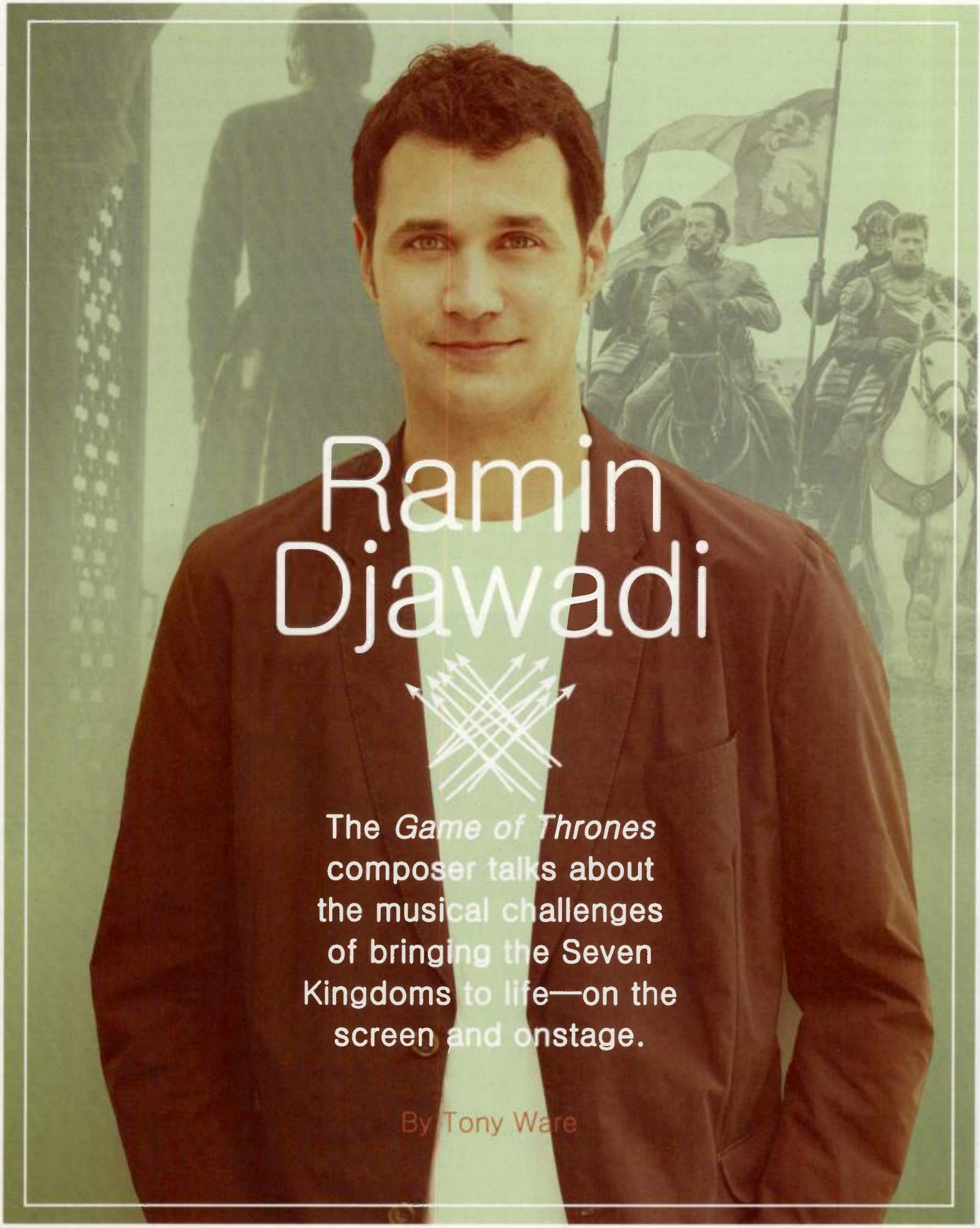
Audio interface: Consider an additional audio interface as optional but a welcome supplement to the other hardware and software here. Each of the DJ hardware systems above includes one or two mic inputs and multiple line/phone RCA inputs. However, to record multiple instruments or vocalists and design complex audio routing, something like the Focusrite Scarlett 18i8 Second Gen ($319) 192kHz USB interface will handle all your needs with four quality mic preamps and eight analog inputs with minuscule latency. It also has a healthy software bundle including a 16-track version of Pro Tools | First with 12 extra plug-ins for amp simulations and effects. With that, you can deliver your productions as stems for mixing or a stereo mix for mastering using the Pro Tools standard. You'll also get extra Softube and Focusrite plug-ins for EQ, compression, reverb, delay, saturation, and mastering.

Monitoring: For DJ headphones that tick all the boxes for sound quality, sound isolation, durability and comfort, the Pioneer DJ HDJ-2000MK2 ($349) hit the sweet spot. The closed-back ear cups rotate 180 degrees for listening, and their 30kHz frequency response limit, sound isolation, and over-the-ear comfort will keep you wearing these while producing tracks as well.

For their precisely accurate detail and deep stereo imaging, the JBL LSR308 active bi-amped studio monitors ($400/pair) have become darlings of project studios, at a high-value price. This 8-inch woofer model gives you a little extra boom to the low end, and the monitors excel at smooth high-end, which will decrease ear fatigue. They also offer a wide stereo image and both XLR and TRS balanced inputs.

Microphones: You can acquire good microphones for both studio and live use without going overboard on price. For gigs, why deviate from simply the most trusted and most used dynamic vocal mic? The Shure SM58S ($104) is just that, with an on/off switch—helpful for DJing.

For recording vocals and nearly anything else you throw at it, the Lauten Audio LA-320 ($499) large-diaphragm vacuum-tube cardioid condenser mic has earned raves for its vintage German-inspired sound and character for a mid-range price. It handles SPLs up to 130 dB, so you can record loud sources confidently. ■



Ramin Djawadi

The *Game of Thrones* composer talks about the musical challenges of bringing the Seven Kingdoms to life—on the screen and onstage.

By Tony Ware

German-born, Los Angeles-based composer Ramin Djawadi has been mapping a wide-ranging musical topography almost since birth—learning to play piano by ear at four, studying classical arrangements, bending guitar strings and tones in a band, immersing himself in Middle Eastern instrumentals, completing foundational studies at Boston's Berklee School of Music, before taking a transatlantic leap and apprenticing under Hans Zimmer.

This led to many collaborations and eventually breakthrough works for *Blade: Trinity* and the first *Iron Man* film. So, when HBO and *Game of Thrones* showrunners David Benioff and D.B. Weiss approached him about scoring the show, which debuted in 2011 and has completed six seasons, Djawadi drew on boundary-free creativity to journey across fantastical lands and commanding personalities through musical blends.

Taking advantage of the tracking rooms and custom sound library at Remote Control Productions, Hans Zimmer's Santa Monica-based post-production facility where he maintains his studio, Djawadi adds new language to the show's musical vocabulary of conspiring melodies, haunted keys, and unpredictable sonic impact. Whether recording stringed instruments or keys, comping prepared piano, musical antiquities and sound effects, or writing for small ensembles and full orchestra, Djawadi doesn't worry about drawing on any singular period or place so much as enhancing sweeping tension throughout the Seven Kingdoms and beyond.

In 2016 new Djawadi works could be heard not just in *Game of Thrones*, but also in the *Warcraft* movie, as well as HBO's *Westworld* series. In February 2017, however, Djawadi is set to return to the lands of ice and fire as he explores a new kingdom—arenas—while leading the Live Nation and HBO Global Licensing-produced *Game of Thrones Live Concert Experience*.

He took a few minutes to talk about his personal story arc, technological shifts and influential alliances, and the interaction and adaptation of instrumentation and visuals.

Tell me about the musical experiences that built the foundations for your work as a composer.

I always wanted to be someone who could write music for film, and I think that having a background in different music and styles helped. Growing up in Germany I had a lot of classical [Romantic] music around me, then I heard Metallica as a teenager. And I studied jazz at Berklee, so those influences all set me up as a film composer needing to write for different dynamics. And I'm half German and half Middle Eastern, so there is the influence of the [Iranian] music my dad listened to, as well.

Orchestrating a show like *Game of Thrones*, how do you balance sound that is big in personality but microdetailed, and that introduces characters and themes without clashing with what's happening on screen?

With *Game of Thrones* we have a lot of characters, so I had a lot of choices for instrumentation, and you want to distinguish characters and locations. And it's a dialog-heavy show, so sometimes I have to be very careful frequency-wise to not make the pieces too full. Sometimes you realize the small cues work really well, meaning it could just be a solo instrument like the cello, which has an important role because the show is dark and the cello, having a wide range but still sounding beautiful in the low register, was a good fit. And it fits under dialog, as well. Obviously, we go a lot bigger in the big action scenes in later episodes—that's when we really can open up with orchestra and percussion, when we're up against swords clanging and horses so we need music that lets loose and stands against that.

Did your love of westerns—and space westerns in the case of *Star Wars*—influence how you approach cues?

Absolutely. Elmer Bernstein's *The Magnificent Seven*. John Williams. And the Morricone stuff influences me big time, because he would have a single melodic guitar or chord or whistle clearly stating thematic elements, and *Game of Thrones* has a little of that in violins or cello. A minimalistic approach can work so well, and then when you open it up with bigger cues you get this great contrast without having walls of sound competing with dialog.

When did you first incorporate technology as an instrument?

Growing up, I started on an organ, which had an element of this with rhythm accompaniment built into it. As a teenager, I had an Korg O1/W [workstation synthesizer] with an internal 16-step sequencer, and that was my first real exposure to technology where I could do arrangements for the band or myself and then play on top of them with the guitar. And I had an analog 4-track, so that's how I started recording and layering tracks. But that sequencer was a big thing for me in learning to arrange and layer tracks. I would take classical scores, like Mozart's Symphony No. 40, and pull the different parts into that, and that's how I learned a lot about dissecting arrangements.

Then I was exposed to a little bit of sequencing at Berklee in the '90s. They had a learning center with sequencers and I would go quite a bit to learn about it, but at the time there weren't enough great sounds just these basic MIDI sounds, so it wasn't that fun. The big exposure I had to technology was when I moved to L.A. and started working with Hans [Zimmer], which was a completely overwhelming experience. When I walked into those studies I couldn't believe the amount of samplers. They just had walls and walls of E-MU and Akai and Kurzweil samplers—some just for strings, or percussion, or piano—and that's when I learned the craft of sequencing.

Technology has changed and helped a lot over the years, and I have been so lucky to get to work with the same great engineers as Hans, with like Alan Meyerson—seeing how he mixes the orchestra, how engineers do their microphone placement. Because it's one thing to work with the computer to set up a composition and it's another when you have musicians play, because there's so much more to it in terms of dynamics ... it comes to life and changes so much.

How do you demo, then how do you translate compositions for the orchestra?

My whole studio is based around Logic as my sequencer, with Pro Tools as my virtual mixer. I program all the different parts in Logic, or if I can play something I do it myself in my studio. I always have a microphone set up to record my own instruments. So off of Logic is how I present my demos to producers or directors, then once it's approved, it goes to an orchestrator. I don't do my own notation. From my sequencer I just export a MIDI file and that goes to my orchestrator who then deals with extracting the different parts to the violins, cellos, etc., and then it goes to a copyist who will print out the parts and then it's in front of the orchestra, played and performed in Prague for *Game of Thrones* specifically and then sent back for Pro Tools.

Do you have a microphone preference in your studio?

I have a Neumann M49 I use a lot, and being a guitar player, a Shure SM57. Some of my other favorites are a Neumann TLM 103, Royer 122V, and AKG C414. For preamps I have a Neve 1073, Manley FORCE, API 512c, and API 7600 (212L) channel strip. But a lot of times because my studio is at Remote Control [Productions] I'll just borrow microphones for specific instruments from their huge array. I'll say I want to record this, what would be good, and they'll suggest something.

I understand that you have synesthesia [a condition where the stimulation of one sense triggers a sense impression relating to another part of the body]. How does that impact the way you develop a character's theme? Does the tonality of dialog inspire an instrument with similar "coloration" to it?

The whole color thing was something I was never aware of till someone pointed it out to me, so describing it is a struggle. But it's a combination of things, not really the voice of the character but really the setting of what I have on the screen. So, with *Game of Thrones* it's something like when we're north of the Wall with these blue tones, or Danerys is in the desert with its yellows ... those are the things that subconsciously influence me somehow. But it's never as simple as I see blue and therefore it's this

note. There are still so many different colors on screen, a red outfit or other things playing a role. It happens more subconsciously and it's hard to describe. But it's not so much the voice as the visual, the plot, and the action, where say yellow enters the blue scene, that might trigger me to go to certain notes or keys. It's several elements.

When you compare a demo to the final product, how do they compare? How much does it change in post-production?

Usually not that much. Listening to my demos, you usually get a pretty clear idea of the final product. There should rarely be any surprises. Sometimes it's not possible; for example, the choir in *Game of Thrones* is singing lyrical phrases, but it's their own language Valyrian, so I can't emulate it. There are no samples like that except for some classical, religious choirs, so I just use a regular choir sample and I tell the producers they will eventually sound like this and that. Otherwise, each instrument is somehow represented in one way or another.

In terms of the upcoming concert tour, what are the challenges of re-creating the show's world for the stage?

From a storytelling standpoint we have six seasons of material and I have to condense it to around two hours, so picking the most important scenes and themes is going to be the hardest challenge. And then from a reproduction point of view, I just have to see that I can cover those parts with the orchestra, soloists, and then incorporate elements I did as sound design that must be played on the keyboard or triggered as samples.

The show's set design includes multiple stages and modular screens. How does the visual presentation change the pacing of the musical performance?

I'm definitely adapting the music to the show. While the orchestra is stationary and all the violins won't suddenly get up and walk about, the choir is mobile and the percussionists are somewhat as well, as is the solo violinist. So, as we're doing the setlist I'm definitely aware that musicians need time to get from A to B and make things happen. Letting the choir reset in position, etc., will all be worked out.

With your Logic sessions and sources potentially coming into play on the back end, will you oversee that directly as you conduct or will someone else trigger those elements alongside the live instrumentation?

I'm still trying to figure that out, as I do want to conduct the orchestra but there are pieces I want to perform myself. So, if I play synthesizers or some other instrument, obviously someone else will conduct. I just have to figure out the best way to use either a controller or instrument.

The dulcimer, for example, is something I would love to play live, as it's such a cool-looking instrument and I want people to see it. But then there are sounds that have always been synthetic or sampler-based, and I might have manipulated them, so they have to be triggered.

What challenges will performing in arenas present in terms of keeping music and visuals in sync and balanced?

We'll be playing with click tracks and streamers, as hearing each other has challenges, and I want to make sure everything, live and on screen, matches. And everything has to be amplified; this is so unlike a concert hall, so you can't rely on natural sound of anything. We want to make sure it sounds as good as possible anywhere you are sitting, and you can't achieve that without microphones on all instruments and making a mix of some sort. It's more a rock 'n' roll approach than a classical, because the setting doesn't make that possible.

There are so many interpretations of *Game of Thrones* tracks online. Will you let any of those influence how you translate or reimagine a track?

I'm definitely planning on having some arrangements that are different, just to make it interesting, but it won't be like a rock version of something I don't think because it would be too surprising and out of place for the audience. But *Game of Thrones*, even though it's orchestral, is a fairly modern score, not traditionally written, so once we're in rehearsals maybe we'll say it's fun to do something. We've also talked about the idea of having guest artists appear, and depending on who those people are, that might trigger an idea. I'm leaving it open, we'll have to see how it fits. ■

A concept video for the Game of Thrones Live Concert Experience can be viewed at gameofthronesconcert.com.

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PLAYLIST

FLAMING LIPS
OCZY MLODY
WARNER BROS

Flaming Lips' fans love them for many reasons: their riotous arrangements, their playful subject matter, the inner-cranium fantasy that inhabits their productions. That final quality is the jumping-off point for *Oczy Mlody*, which twirls and spins like a mirror ball drifting through hyperspace. An album of clinky programmed drum beats, humming keyboards, and swirling synthesizers and guitars, *Oczy Mlody* is also a thing of forlorn ambient beauty. Even when the rock groove of "Nigdy Nie (Never No)" kicks in over strobing synths, it's brief departure from the album's somnambulant vocals and twinkling sonic architecture. Dreaming is good, total immersion is even better.

KEN MICALLEF

SALLIE FORD
SOUL SICK
VANGUARD

Sallie Ford, who recently split with her band The Sound Outside, calls this a "confessional album... about insecurity, anxiety, and depression." Certainly, the lyric feel is painful, and more personal than Ford's band recordings. I mean, she banshee-wails, "Just hold me!" in a song called "Unraveling." However, as they say in sports, ownage is ownage, and Ford owns these feelings, she owns her fabulous retro '60s-thrash sound, and she owns such a strong voice that the misery she pours into this record comes back as power.

BARBARA SCHULTZ

DAEDELUS
LABYRINTHS
MAGICAL PROPERTIES

In Greek mythology, Daedalus built the Labyrinth to contain the Minotaur. SoCal beat deconstructionist Daedelus built his *Labyrinths* to release the beast. The retrofuturist nomad collages fidgety chimes, low-end shudders, and melodic clusters, inspiring you to get down and level up. Like a bespoke video game where BPM-agnostic stages and styles branch between gleeful subversion and blissful equilibrium, *Labyrinths* scrolls through sequencing and jazz-informed instrumentation, portamento and arpeggiators, vocal collaborators, and bassbin conditioning.

TONY WARE

THE LE BOEUF BROTHERS
IMAGINIST
NEW FOCUS/ PANORAMIC

Le Boeuf brothers Pascal (piano) and Remy (saxphone) join with contemporary classical ensemble JACK Quartet for an impressive album that frames chamber jazz in swooning tone poems, dexterous musicianship, spoken word, and Franz Kafka. "Imaginist" refers to the early 20th-century Russian poetry movement characterized by striking images and metaphors. From that, the Le Bouef Brothers conjure lofty compositions with smoky jazz interludes, ultimately finding fruition in Kafka's "A Dream," a narrated piece as dramatic as it is fanciful.

KEN MICALLEF

ALEJANDRO ESCOVEDO
BURN SOMETHING BEAUTIFUL
FANTASY

Co-produced by Peter Buck (R.E.M.) and Scott McCaughey (the Minus 5), Escovedo's latest bursts with the joy and edge that the former Nuns and Rank & File member has always brought to his wonderful singer/songwriter/punk albums. "Heartbeat Smile" charms with cowpunk guitars and harmonies that evoke Rank & File, while the darker rhythms of "Beauty of Your Smile" and "Luna de Miel" are closer to hardcore. This is pure pleasure from an artist who gets that punk and melody are friends.

BARBARA SCHULTZ

CLOUD NOTHINGS
LIFE WITHOUT SOUND
CARPARK

Workshopped with bandmates for more than a year and recorded in three weeks, Dylan Baldi's fourth album as Cloud Nothings is a less amphetamine, no less cathartic set of fiercely catchy power-pop melodies. While drums don't hit like the rabbit punches they were throughout the lo-fi confessional bedlam of 2014's *Here and Nowhere*, these nine tracks still kick your heart in the ass. Vocals find parity with ringing chords, amplifying the singalong properties.

TONY WARE

ULRICH SCHNAUSS
NO FURTHER AHEAD THAN TODAY
SCRIPTED REALITIES/PIAS

Schnauss' synthesizer manipulations give a pad-y twist to the noodly experimentations that define early IDM ("Intelligent" Dance Music). This characteristic is at the center of his latest album, which marks a return to Schnauss' early works with atmospheric washes and string-y sounding keys, exemplified on the *Midnight Express* score-like "Thoughtless Motion." Otherworldly and immersive, *No Further* suits Schnauss' latest appointment as a member of original electronic pioneers Tangerine Dream.

LILY MOAYERI

Fig. 1. The Wing Upright from 1900 can be played using its natural sound or prepared, offering Marxophone and tack-piano timbres.

SPECTRASONICS

Keyscape

A TREMENDOUS COLLECTION OF CLASSIC KEYBOARDS ON YOUR DESKTOP

BY GEARY YELTON

Contributing editor Geary Yelton has reviewed software for *Electronic Musician* for 30 years. He lives in Asheville, North Carolina, and Venice, Florida.

STRENGTHS

Tons of sample data. Tremendous tonal variety. Painstaking multisampling and processing. Undo/redo functionality. Excellent effects modeling. A consistently realistic playing experience.

LIMITATIONS

Tons of sample data. Can't select individual instruments to install. Needs a fast computer or SSD for optimum results. Can't resize GUI. No standalone version.

$399
spectrasonics.net

The first time I played a really good sampled piano plug-in, I knew right away that everything was about to change. It was like having a concert grand you could carry under your arm. With today's mega-gigabyte sample libraries and advances in modeling instrument behavior, music technology has advanced almost immeasurably since then.

Keyscape, from the company that makes Omnisphere 2, is a virtual instrument plug-in featuring 36 sampled keyboard instruments and more than 500 patches. Alongside an outstanding concert grand piano, you'll find a unique upright piano, numerous electric pianos, plucked keyboards, keyboards that play bells, keyboard basses, and even a miniature electric organ. Most are acoustic or electromechanical, with three synthesized pianos. Extensive multisampling encompasses all the velocities, mechanical noises, squeaks, resonances, and release overtones that capture the imperfections and idiosyncrasies needed to breathe life into virtual instruments.

When you install Keyscape, you can't install only the instruments you want. You must choose either the Full or the Lite installation, selecting content for all 36 or for only 8 sampled instruments. If you choose Full, 77GB of data will be installed. If you choose the 30GB Lite installation, you'll get six electric pianos, a Yamaha grand, and a Clavinet C—essential instruments for live performance. If the sample data were uncompressed, installations would require three times as much drive space, according to Spectrasonics.

KEYS TO THE KINGDOM

Keyscape's user interface resembles Omnisphere 2's, with a patch browser on the left and controls on the right. Instruments are divided into families—acoustic pianos, Clavinets, and so on—with patches furnishing variations of each instrument. Keyscape is not multitimbral, meaning it loads only one instrument at a time. Its parameters are tailored to individual instruments, and they duplicate the original instrument's controls when possible.

Dominating the non-resizable GUI is a graphic image of the active instrument, with tabs that determine the knobs, buttons, and menus displayed below. Tabs vary from one instrument to another, but Main, Settings, and Info are always available. Depending on the instrument, one or two additional tabs may be labeled EQ, Tone, Amp, Effects, Wah, or Comp. Even the Main parameters depend on the selected instrument and may include sections for Mix, Timbre, Character, Performance, and so on.

You can begin playing an instrument almost as soon as you select it, even before it's finished loading. However, sustained notes from the previous instrument will be cut off when you select a new patch.

One of Keyscape's most touted capabilities is that Omnisphere 2 can open its patches, courtesy of sharing the Spectrasonics STEAM folder. Sure enough, after I installed the latest Omnisphere update, all of Keyscape's content appeared in its browser. Apply Omnisphere's effects and so on to Keyscape's patches. You can create multitimbral setups with splits and layers combining Keyscape and Omnisphere content, and that's a significant

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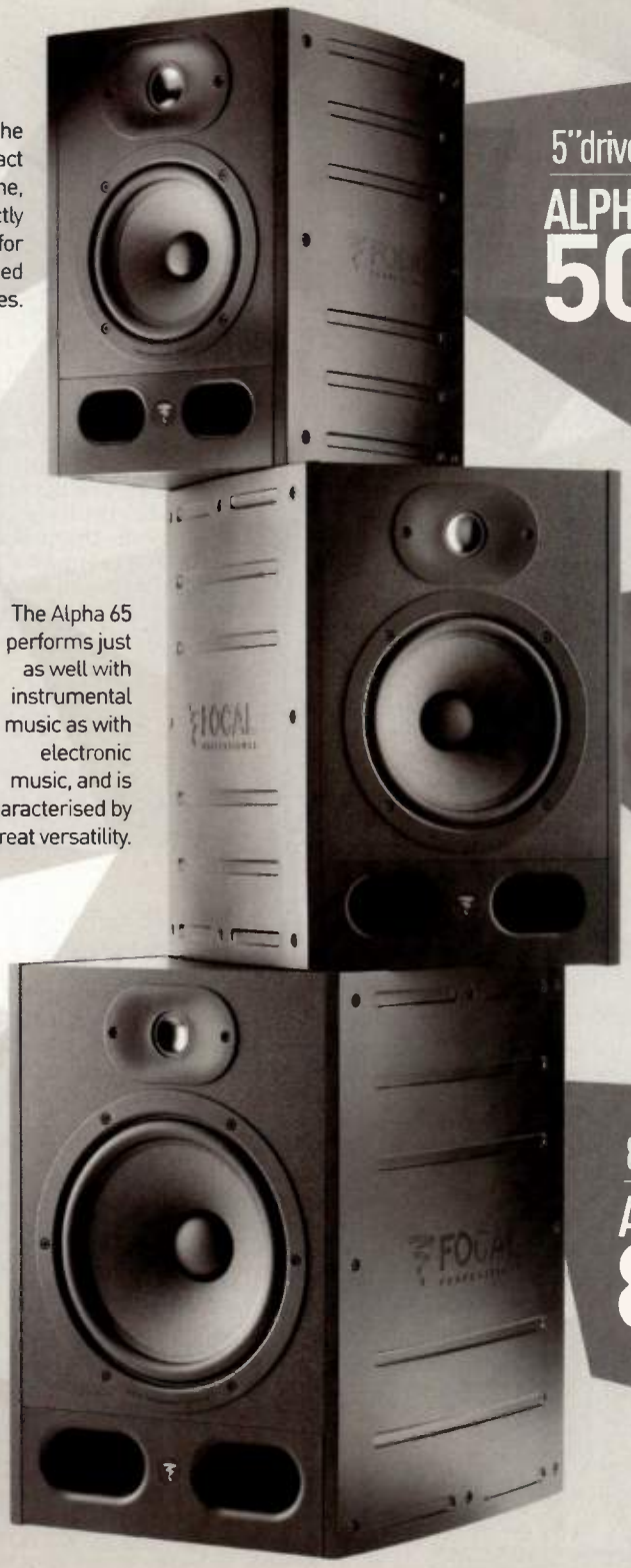

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Fig. 2. Using Keyscape has certainly broadened my perspective on keyboard history. For example, how many readers have played a dolceola, the fretless zither with a keyboard.

Fig. 3. Some patches provide effects that are unavailable on the original instruments. I've become enamored of the patch Harmochord – Dronescape Deep, which features a sub-octave unison and 25 seconds of reverb hang time.

plus for many users.

When appropriate, Spectrasonics recorded acoustic instruments in stereo using close mics and room mics and electric instruments through their outputs. Both direct and miked samples were recorded when possible.

For instruments with preamps, their controls are modeled in software. Electric instruments are paired with modeled amplifiers or stompboxes with which they're commonly used. An electric piano, for example, may include models of a Vox AC-30 or Fender Twin Reverb, and some instruments emulate name-brand chorus, distortion, or wah-wah pedals.

Keyscape's documentation, like other Spectrasonics reference guides, is available online, and it is downloadable as a PDF document if you prefer. We have a lot of ground to cover here, so let's take a brief look at Keyscape's content.

PIANOS GALORE

For LA Custom Grand Piano, Spectrasonics sampled a 7-foot, 6-inch Yamaha C7 with modifications to increase its dynamic and tonal range. Its sound is exceptional, with a sweet tone that cuts through a mix without ever sounding brittle. The velocity layering is perfectly smooth and natural, with no discernable steps between samples, and it's a pleasure to play. If you already play a high-end sampled piano and you're happy with it, this instrument won't necessarily displace it, but you'll have an excellent alternative when you need one.

Keyscape's other acoustic piano is a rare and extraordinary Wing Upright manufactured in 1900 (see Figure 1). It's fitted with a mechanism that has flexible blades terminating in metal balls that bounce on the strings, very much like a Marxophone. Another mechanism positions metal rings between the hammers and strings to produce tack piano sounds without modifying the hammers.

You're probably familiar with Rhodes Pianos, developed by Harold Rhodes in the mid-'60s. Hammers strike tuned metal rods called tines, and electromagnetic pickups convert their vibrations to electrical signals. Rhodes–Classic is a restored 88-key Mark I Suitcase model from the early '70s. Rhodes–LA Custom is a handpicked 73-key Suitcase built in 1974 and modified to produce the rounder, more bell-like "E" Rhodes sound heard on hundreds of records. Keyscape's patches offer different combinations of amp settings, reverb, and modulation effects for both instruments.

The Vintage Vibe Tine Piano is a modern instrument that looks like a Wurlitzer and sounds like a Rhodes. It incorporates recent technology to improve the playing experience while remaining faithful to the Rhodes sound. Its tone lies somewhere between the two genuine Rhodes Pianos.

Wurlitzer electric pianos are essential to many musical styles (think "What'd I Say" by Ray Charles). The hammers strike metal blades called reeds, and pickups are connected to a built-in amp and speaker. The 140B sampled here was the first solid-state model and has a 1/4" output as well as a speaker.

The best-known Wurlitzer is the 200A, introduced in 1974 with an updated amp and speaker design and a tone that's not as bright as the 140B's. In addition to patches recorded from both direct and speaker outputs, you can dial in the keys' mechanical sound on both Wurlitzers.

The Yamaha CP-70 has a real piano action and strings, along with piezoelectric pickups and an internal preamp. Although it weighs 287 pounds (I used to help move one frequently), it splits into two sections and still stays in tune. Keyscape captures the CP-70's shimmery personality better than any other sample library I've heard.

The rarest electric piano in the collection is the Weltmeister Claviset, made in East Germany in the '60s. It has metal reeds plucked by rubber discs, electromagnetic pickups wired to a battery-powered preamp, and filter tabs for selecting tones.

Additional electromechanical pianos include the vaguely Wurli-like Hohner Pianet M, N, and T. The Pianet N sounds rather Wurli-like, the M sounds thinner, and the T sounds darker. You also get some sparkly Rhodes-like tones from two digital pianos and a synth made by Roland.

PLUCKED, STRUCK, AND BLOWN

Invented in the early 1300s, the clavichord was primarily for home use and composition because it was too quiet for public performance. Small metal blades called tangents strike brass or iron strings, whose vibrations travel through the bridge to the soundboard. The patches here present some fine variations. My favorite, Clavichord–Epic Cinema, relies on octave layering and generous reverb to make it unique and gargantuan.

Originally designed as an electric clavichord for classical performance, the Hohner Clavinet took off in an entirely funkier musical direction after the release of Stevie Wonder's "Superstí-

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Fig. 4. Omnisphere users can open Keyscape instruments and toggle between either plug-in's user interface.

tion" in 1972. The Clavinet C, included here, offers more punch with fewer electronics than the better-known D6. Vintage Vibe delivers a modern take on the Clavinet sound with the Vibanet. It has an onboard auto-wah filter and a mechanical mute switch, both modeled in Keyscape. Its sound is fuller and brassier than the Clavinet C's, and natural pitch bend during every decay gives it a bit more *quack*.

The dolceola is a seldom-seen fretless zither with a keyboard made in the 1900s (see Figure 2). Its sound resembles a hammer dulcimer with a dollop of guzheng, depending on the patch. Some patches are evocative of the Old World, and others are more harpsichord-like.

For Electric Harpsichord, Spectrasonics sampled a Baldwin Solid Body Harpsichord, the kind The Beatles used on the song "Because." This collectable instrument was sold from the mid-'60s to early '70s. Most patches also model the solid-state Baldwin Model C1 Custom guitar amp that's usually paired with it.

Made in the '60s, the Koestler Harmochord is an electric harmonium with a motorized blower instead of bellows (see Figure 3). Playing the unprocessed Harmochord patch feels and sounds like playing a real pump organ, with harmonica-like tones and mechanical noises specific to individual keys.

CLEAR AS BELLS

Invented in 1886, the bell-like celeste has a tone similar to a glockenspiel, but not as bright. You probably know it from Tchaikovsky's "Dance of the Sugar Plum Fairy." The Simone Brothers built the one sampled here in the 1940s.

The Schulmerich ChimeAtron is a miniature electronic carillon. Housed in a 2-foot-tall wood enclosure, it has dual keyboards, a tube amp, and hammers that strike bell rods. I especially like the Vibraharp patches. It's a shame that so few

ChimeAtrons survive, because the tone is quite lovely.

Another rare keyboard, the dulcitone has felt-covered wooden hammers that strike tuning forks resonating in a small wooden sound chamber. Because of this instrument's portability and tuning stability, it was once popular aboard trains. It is quieter and has a slightly brighter sound than the celeste, which proved more suitable for orchestral use.

MINI PIANOS AND KEYBOARD BASS

Toy pianos can be ideal for creating whimsical or otherworldly atmospheres. The 1930s-era upright sampled for Toy Piano–Classic has tuned glass bars instead of strings. Fitted with metal tines, the Muse Toy Piano Grand produces a more satisfying tone. Tones above A4 sound more like a real piano (as if they were sampled from a different instrument), and tones in the lower register sound like church bells.

Schoenhut (in business since 1872) made the Glockenspiel Toy Piano, which has metal bars and really sounds like a glockenspiel. A Jaymar Upright Toy Piano from the 1930s had its tines replaced with saucer bells, giving its tones a tinnier ring you might associate with an ice cream truck or a door opening in a cheese shop.

Also in the 1930s (apparently a golden age for tiny pianos), Wurlitzer manufactured a series of compact pianos. One of them is the rare 44-note Student Miniature Grand. It has a split lid that opens like wings, a cast-iron harp, and two strings per note. It sounds more like a real piano than toy pianos do, especially in the upper ranges.

Music historians consider the Rhodes Pre-Piano the first electric piano. In 1946, Harold Rhodes designed and built a few of them by hand. Beset by manufacturing challenges, he abandoned it two years later. The Pre-Piano's sound more closely resembles the Muse Toy Piano Grand than the piano that would make him famous.

No bass player was ever a member of The Doors. Instead, Ray Manzarek played a Vox Continental or Gibson G-101 organ with his right hand and a Rhodes Piano Bass with his left. Introduced five years before the Rhodes Piano, the Piano Bass has metal tines, rubber-tipped hammers, and a passive output. Its unique personality shines through in these patches, with some of them modeling a Fender Bassman amp. Another selection, Vintage Vibe's Tine Piano, has a switchable tube preamp, a greater dynamic range, and more percussive punch.

Also included are the Basset 1 and Basset 2 from East German manufacturer Weltmeister. Both are battery-powered instruments with tines plucked by rubber discs. They sound darker than the other keyboard basses and suffer from inharmonic coloration and poor dynamic response.

IN THE KEY OF LIFE

Some of Keyscape's best patches are duos, virtual instruments created by layering two sampled instruments. Electric Acoustic Grand, for example, combines LA Custom C7 with the Yamaha CP70, and Christmas Blend combines Celeste with Toy Piano – Glock. Some duos give you Mix controls to alter the balance between them.

Keyscape is a keyboard enthusiast's dream collection. Spectrasonics assembled the most sought-after instruments they could find, painstakingly captured every tonal subtlety and noise, mapped the results, and delivered a sample library like no other. Where else could you find so many cool and interesting keyboards in one collection to add to your stage or studio rig?

As always, nothing is perfect. You need a fast computer (an SSD is recommended) to handle so much real-time data (though thinning it is possible), and Keyscape is available only as a plug-in (a standalone version is planned). Without exception, though, playing every instrument is as close to playing the real thing as technology can muster. If you enjoy playing keyboards, you'll love Keyscape. ■

Maschine Jam's multicolored 8x8 click-pad grid enables step-sequencing, manual piano-roll note input and real-time Keyboard mode.

NATIVE INSTRUMENTS

Maschine Jam

GET ON THE GRID AND STEP TO THIS

BY MARKKUS ROVITO

Electronic Musician's web editor, Markkus Rovito, drums, DJs, and contributes frequently to *DJ Tech Tools*.

STRENGTHS

Easy step sequencing of one, four, or eight sounds at a time. Smart Strips with eight function modes. Dynamic multicolor backlights on all controls. Fantastic software bundle. Randomize/Humanize features.

LIMITATIONS

Factory MIDI mappings for third-party software need some work.

$399 street
native-instruments.com

At first glance, the Maschine Jam looks like Native Instruments' answer to the Ableton Push 2—which at its onset felt like the long-awaited Maschine-style interface for Ableton Live software—crossed with a Livid Instruments Base II. Both its design and its name indicate that NI has targeted the healthy cadre of electronic musicians who make music in a free-flowing, spontaneous manner, and perform live similarly. And what good is the Maschine Jam's 8x8 multicolor backlit "click-pad" grid? If you've familiarized yourself with the Push 2, you probably expect not only Scene and Pattern launching, but also note input, a 16-pad drum mode and step sequencing.

Maschine Jam delivers all of that, but its Smart Strip touch-faders hold the secret to its uniqueness for both production and performance. Beyond adjusting Macro, mixing, and track controls, the Smart Strips also let you play chords and "strum" instrument sounds like a guitar, as well as perform live-oriented effects tweaks (see Figure 1). When you throw in Maschine Jam's formidable software bundle and DAW mappings, you have a square-shaped powerhouse for just under $400.

FLOW TOY

Even when you know what Maschine Jam can do and have seen it in action, it takes a little time and concentration to break through the outer shell of the controller's operating scheme to get to the gooey center. Once you do, however, the sense of creative liberation washes over you.

For anyone who needs a primer, the Maschine 2.5 software that comes with all Maschine hardware feels like a DAW, except that it doesn't do full-scale multitrack recording and that it handles the timeline a little differently with arrangements of 16-sound Patterns into Scenes. Other than that, there is a sophisticated sampler, mixer, unlimited AAX/AU/VST plug-in hosting, automation and a great browser. Maschine also works as an AAX, AU, or VST plug-in inside any compatible host.

A typical Maschine Jam creative session might start with you loading up some sound Groups from the browser using the Browse button, push-button encoder and directional buttons (D-pad). You can audition the sounds using Pad Mode, which highlights the 16 numbered click-pads for playing all the sounds in the Group in a finger-drumming style; or in Keyboard mode, where the pad-grid triggers notes from bottom to top with the root notes highlighted in white. The D-pad scrolls the notes up or down on the grid.

You can also hit the Notes button by the faders and use the Smart Strips to play single notes or chords. Either way, as you touch the Smart Strip from the bottom and slide a finger up, notes play from low to high. In Guitar mode, you can strum the Smart Strips from bottom to top to play any six notes you choose. Choosing modes like Notes and Keyboard on the hardware brings up a special Maschine Jam-exclusive overlay screen in the software with options that you select on the hardware encoder. For example, Notes mode brings up the overlay for picking between Guitar or Chords mode, choosing any scale you want, turning

Fig. 1. Maschine Jam's Smart Strips have eight modes. They can be used to play or "strum" notes and chords, adjust plug-in settings, and alter a Group's level, swing, tuning, and other settings.

Chords on or off and picking the type of chords to play. The encoder is also capacitive, so it will bring the overlay back up when you touch it.

You can record patterns in real time from the various note input modes, but to really get up and running fast, hit Step to access the great Maschine Jam step recorder. The 8x8 grid becomes a step sequencer for one, four, or eight sounds in the group. If you're step-recording one sound, you can use the 16-pad drum grid to quickly select which sound to record. Just hit play and start tapping in 16th-note steps. This allows you to build up funky beats in very little time. To add variations, go back to the Song view on Maschine Jam, hold Duplicate, choose a pattern from the grid as the source and then a second slot as the destination. You can then edit the duplicate in the step sequencer, and in that way, you'll start filling Pattern slots almost as fast as you can imagine them.

However, you can also use the pad-grid to input notes manually into the piano roll, and that's almost as much fun as the step recorder. With the 8x8 grid in Piano Roll mode, the x-axis represents 16th-note steps and the y-axis represents the notes on the piano. The D-pad buttons navigate around the piano roll. You can be as precise as you want here, but honestly, half the fun comes from just punching in patterns that you think might sound cool and adjusting them from there to see what you get.

THE MIDAS TOUCH

During the darker ages of music technology, touch strips raised big ol' red flags: They were known for wearing out and/or freaking out, sending unwanted signals. However, Native Instruments has by now proved its touch-strip pedigree. The company pulled a move of Apple-level audacity when it removed the jog wheels from its Traktor Kontrol DJ boards in favor of touch-trips a couple of years ago. Millions of successful DJ sets later, NI put touch-strips where pitch bend and mod wheels used to be on its Kontrol S keyboards. So there's every reason to embrace the Maschine Jam's Smart Strips, especially because they're the center piece of a multi-function control section with eight modes of utility. In practice, the Smart Strips responded terrifically: You can swipe them from top to bottom as fast as you like for sweeps, or use more than one finger to tap between values.

The Smart Strips can control the Macros, Levels, Aux levels, Tune settings and Swing settings for Groups, individual sounds and even the Master channel. Plus the aforementioned Notes button turns the Smart Strips into an instrument for playing single notes or full chords.

The Perform button brings up one of eight performance effects designed for improvisational tweaking on the Smart Strips—filter, flanger, ring mod, stutter, tremolo, scratcher, and two different echoes. You can choose a different effect for each Group (track) in Maschine and tweak the effect amount from the Smart Strips for eight Groups at a time. (The arrow buttons along the bottom of the controller scroll through Groups if you have more than eight.)

Maschine Jam's Lock button lets you create a snapshot of your current parameter setup, which you can recall at any time during a performance. For example, after locking a pattern you like, continue playing and building up the music: Then hit Lock again to instantly call up the snapshot and return the parameter setup to what you had previously saved. (You can also morph between any of the 64 snapshots you create.)

To gain access to all plug-in parameters—Maschine's internal effects and instruments as well as third-party plug-ins—hit the Control button to bring up the plug-in view in the software (see Figure 2). The selected plug-in's controls will be laid out in parallel with the Smart Strips, and you can scroll through them with the arrow buttons on the hardware. Maschine's built-in plug-ins, as well as any NKS-compatible plug-ins—including those in the Komplete 11 Select bundle that come with Maschine Jam (details below)—are guaranteed to be tightly integrated with the hardware. There's a growing list of NKS-adopting developers, such as Arturia, Softube, Waldorf, and others. However, many effects that I tried from smaller shops like Glitchmachines and D16, which don't yet officially support NKS, worked like a charm with Maschine 2 and Maschine Jam. Only a few plug-ins I tried had occasional parameter slots that were empty.

Fig. 2. With Maschine 2 hosting a plug-in, the Maschine Jam's Smart Strips in Control mode work the plug-in parameters.

SOFTWARE AND MIDI MODE

The Maschine Jam's generous software bundle should delight users new to both Maschine and the Native Instruments universe. It comes with the newly revamped Komplete 11 Select bundle, which combined with the soundware that comes with Maschine, totals 29GB of instruments, effects and sounds (more than 2,500 in all). The collection is curated to eschew filler and to appeal to present-day pop, R&B, hip-hop, and the currently dominant styles of electronic music.

Best of all in my opinion, you get 11 high-class instruments including the Massive synth (which almost single-handedly carried dubstep to the next level of popularity years ago), Reaktor Prism synth/effect, Monark synth (a Minimoog replica), Retro Machines Mk2 (samples of iconic vintage synths), the Gentleman antique upright piano,

Scarbee Mark 1 (Rhodes-style electric piano), Vintage Organs, West Africa percussion, Drumlab, Replika delay and the Solid Bus compressor. There's absolutely no garbage on that list. Maschine 2 also includes a healthy array of meat-and-potatoes processors.

But the Maschine 2 software bundled with the Maschine Jam is only half the equation, as the whole Maschine concept rests on the hardware/software synergy. However, the hardware alone makes for a rather enticing MIDI controller for other software, as well, and like the other Maschine pieces, Maschine Jam has an easily accessible MIDI Mode. So far, there are five template mappings available for Maschine Jam in the included Controller Editor software—Ableton Live 9, Bitwig Studio, FL Studio, MCU Transport, and Mackie Control Light. The Live 9 mapping arouses curiosity, because the looks of Maschine Jam suggest that it might be used like a pseudo-substitute for the more expensive Ableton Push 2. During the review, the Ableton mapping offered little more than note input: A recent update adds sequencer and mixer control, and more. The Mackie Control Light mapping worked well, but was also fairly limited, offering transport controls, channel faders, and channel muting.

JAM ON IT

When compared to Maschine Mk2 ($599) or Maschine Studio ($999), Maschine Jam presents a lower-cost, high-value entry point to the Maschine ecosystem without sacrificing much by the way of functionality, although it lacks displays and full-size pads. With its excellent, well-rounded software bundle, it would be a dream for electronic music newbies. Purists may hate this comment, but if you have musical ideas, Maschine Jam's robust step-sequencing and piano-roll note input can help you realize those ideas without any particular instrumental ability or special finger dexterity.

But, of course, it's a pro-level product, as well. And when paired with another Maschine controller, Maschine Jam simply expands your potential to produce and perform creatively with its 8x8 click-pad grid and Smart Strips complementing the encoders, displays and full-size pads of the sibling hardware.

Overall, I can recommend Maschine Jam even more highly than the other Maschine products that I've been using for years. After a short initial head-scratching period figuring out the interface, this piece of hardware let me seize control of Maschine with a fluidity that had me pumping out great Patterns and Scenes with my feet up, reclined in a chair. If that's not progress, I don't know what is. ■

KORG

volca kick

A LOW-COST POWERHOUSE FOR MODERN DANCE LOW-END

BY FRANCIS PRÈVE

Producer Francis Prève has been designing synthesizer presets professionally since 2000. You can check out his new soundware company at symplesound.com.

STRENGTHS

Analog signal path. Sequencer. Overdrive. Some parameter automation. Touch FX. Sync I/O. Runs on battery or AC power. Built-in speaker.

LIMITATIONS

May be a bit too specialized for some musicians.

$159 street
korg.com

Now more than ever, modern dance-music genres are closely tied to specific sounds and synths. Where would EDM be without the supersaw, or deep house without the M1 piano and FM bass? While it's certainly possible to carve out a unique space as an artist by crafting your own presets, for some genres, you have to stick to a very specific palette of sounds to get noticed.

With that in mind, it is no overstatement to say that Korg's new volca kick is tailor-made for generating the distinctive kick-drum sounds of the trap, hip-hop, and hardstyle genres. That's not to say it isn't also fantastic for creating smaller, vintage-style bass drums and toms, because it excels at those, as well. But for artists looking for instant production credibility in the above styles, the volca kick is poised to become as indispensable as the 808 when it comes to low-end bombast.

With its MS20 filter-based resonator positioned front and center on the panel, it provides a fantastic lesson on how self-oscillating filters can be used to create massive kicks. Tuned to higher frequency ranges, the volca kick is capable of conjuring other classic percussion elements, as well as Kraftwerk-friendly zaps.

What is especially cool about the volca kick is the clever way it introduces sophisticated sound-design techniques to a broader audience. While there are other kick-centric modules, they've often used non-standard terminology to describe their parameters. Not so with the volca kick. Savvy users will grasp that Pitch controls the filter's frequency cutoff, while Bend and Time govern the filter envelope and decay, respectively. But that may be a tad *too* deep for newcomers looking to nail the trap sound. By balancing that type of information, Korg successfully straddles the line between keeping the pros happy and letting novices feel a sense of agency as they craft their own kicks and basses.

Along the top of the unit you will find additional parameters: Pulse Colour and Level are useful for tweaking the transient "click," and the Amp envelope's Attack and Decay are great for exploring the darker side of techno bass lines.

The Drive and Tone controls are crucial for re-creating the ear-splitting hardstyle 909 kick: A little goes a long way with these parameters, but with some experimentation you can even delve into dubstep pseudo-wobbles and subsonic drones that would sound right at home in atmospheric tracks when coated in generous amounts of reverb.

As with its siblings, the volca kick's sequencer is a breeze to program. It provides automation for the majority of its parameters, supports pattern chaining, and includes the Touch FX feature for easily adding time divisions and creating sequence variations. The Accent and Swing parameters can be used to breathe dynamic life into your patterns, and the 16 factory sequences do a great job of demonstrating this.

While mainstream synthesists may find the volca kick a tad too exotic to become an essential part of their rig, it is an absolute necessity for artists and producers who work in bass-heavy genres. The immediacy of its interface makes the volca kick fairly indispensible, especially when you factor in its ability to live-sync with many Korg products (minilogue, electribe, SQ-1, and other volca modules), as well as Ableton Live when using Korg's Link-enabled SyncKontrol app. ■


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PRA AUDIO

WiC for Computer

WIRELESS AUDIO INTERFACE FOR TRACKING GUITARS

BY MARTY CUTLER

The last thing I need is another cable of any kind. I'm writing a book about guitar products, so gear moves in, hangs out for a while, and goes back to the manufacturer. In between shipments, my workspace looks like a NAMM show collided with a clown car. When I was approached about reviewing yet another wireless guitar system, I blanched at first. After all, the last thing I needed was a hardware receiver with a cable plugged into the back of my interface. It turns out I had the concept all wrong.

PRA Audio offers two versions of its wireless guitar system—WiC for Guitar, for use with an amplifier, and WiC for Computer, which I tested, for direct recording. This model uses a USB receiver that plugs into your computer. The small transmitter is connected by a standard 1/4" cable to the guitar and worn on a belt clip or attached to the guitar strap. Along with the transmitter and the USB-A receiver, PRA Audio supplies a well-made 3' unbalanced cable and a leather holster clip for the receiver, a USB charger unit with a couple of outlet adapters, and a charger cable. The rechargeable battery lasts for around 20 hours and takes about 2.5 hours to recharge fully. I tested WiC for Computer with a 2009 Macbook Pro and a 2015 iMac Retina 5K (both running OS X El Capitan), as well as an iPad Pro with iOS 9.3. Windows is also supported.

Pairing the wireless device is simple, but the process took me several tries to accomplish, possibly due to the preponderance of WiFi systems I had up and running. Nevertheless, transmitter and receiver recognized each other in short order, and pairing was instantaneous and automatic from then on. On the Mac, the WiC receiver shows up in System Preferences as well as in Audio MIDI Setup without the need for additional drivers.

Setting up WiC for Computer in most of the DAWs I use was simple. In MOTU Digital Performer, Apple Logic X, and Ableton Live, I specified WiC as my input and my existing audio interface as the output. However, some software, such as Steinberg Cubase, Propellerhead Reason, and PreSonus Studio One Pro didn't automatically support separate audio inputs and outputs. As a result, I had to use it as an aggregate device in Audio MIDI Setup, which is easily done, though the procedure got a bit convoluted in Cubase 8.

However, setting it up for use in an iOS device is a breeze. All you need is a Lightning-to-USB Camera Adapter and the AudioBus app, and it works. I checked out WiC for Computer's iOS compatibility within Apple GarageBand and Steinberg Cubasis, and it worked with both DAWs with great results.

WiC for Computer lays down an uncompressed, clean and detailed 24-bit, 48kHz signal, and it expertly captured the juicy, center-pickup tones of my Epiphone Genesis Deluxe without dropouts, even at a distance of 35 line-of-sight feet. Moreover, the system worked great in tandem with my Fishman TriplePlay wireless MIDI guitar system, and I can't underplay how liberating it is to be untethered from even more cable.

PRA Audio WiC For Computer will be a boon to guitarists and engineers who need to put some distance between the instrument and computer fan noise or screen interference. I highly recommend it to anyone who records electric guitars in the personal studio. ■

Marty Cutler is busy putting the finishing touches on his new book for Hal Leonard. Stay tuned.

STRENGTHS

Wireless. Clean, uncompressed, detailed signal. Allows you to play at a distance from the computer.

LIMITATIONS

Some DAW software requires you to select WiC as an aggregate device.

$249
praaudio.com

TB-03 and TR-09

CLASSIC SOUNDS AND FUNCTIONALITY, WITHOUT THE BOUTIQUE PRICE TAG

BY FRANCIS PRÈVE

STRENGTHS

TB-03: Knockout re-creation of the TB-303 with integrated effects. Additional step entry mode makes programming sequences much easier. Analog CV/gate and trigger input.

TR-09: Flawless re-creation of the TR-909 sound and interface. Independent compressors for kick and snare. Analog trigger output. Multiple audio outputs via USB.

LIMITATIONS

TB-03: Can't save synth settings with sequences.

TR-09: TR-09 knobs may be a too tiny for some.

TB-03: $349 Street
TR-09: $399 street
rolandus.com

Almost three years ago, Roland unveiled its AIRA line. Eschewing analog circuits for impressive digital re-creations of iconic '80s products, the AIRA collection quickly caused a stir in the synth community. While purists complained that Roland should have stuck with resistors and capacitors, contemporary producers were delighted to have access to convincing replicas with modern amenities.

This year Roland expanded its Boutique line utilizing the same DSP-based ACB (Analog Circuit Behavior) technology used in the AIRA gear: The TB-03 is based on the legendary TB-303 Bass Line and its built-in sequencer, while the TR-09 models the classic TR-909 Rhythm Composer, a hybrid analog/sample-based drum machine.

TB TEST

I was a bit surprised that Roland followed the AIRA TB-3 with a second iteration of its 303 heritage, but it made total sense to me after spending several days with the TB-03. While the TB-3 includes more features and a futuristic interface, its inclusion of non-303 dance-friendly sounds gave it a little *too* much range. This was a huge plus for some, but others found that it distracted from the original 303 experience.

The TB-03's interface and synthesizer engine are identical to the original, right down to its sequencing tools that are so opaque that, without a manual, atonal honks and rhythmic screeches are about the only thing you can make with it. Fortunately, the TB-03 includes a manual that makes understanding its cryptic system a bit more approachable for newcomers. Better still, it incorporates a second mode, called Step, that radically simplifies programming, so you can make sequences that are musically intelligible. And if those tools aren't enough, you can always control it via MIDI over USB and sequence directly from your DAW.

This brings me to another detail that I haven't seen mentioned elsewhere: The TB-03 is compatible with Roland's K25m Boutique keyboard. If you have ever wanted to actually *play* a 303, now you can. And I assure you, it's great fun.

As for the synth itself, any perceived differences between an original and the TB-03 are either psychological or due to the decaying circuitry of the vintage unit. If you're unfamiliar with the 303 architecture, it's a single sawtooth/square oscillator followed by an unusual 3-pole resonant filter, with additional control over filter envelope modulation and a single decay parameter for the envelope. The original's accent and tuning knobs are present here, too, to be thorough.

In the upper right corner of the panel are three additional knobs for direct control over distortion amount, delay time and delay mix/feedback. If you're familiar with the "acid house" sound of the late '80s and early '90s, these effects are absolutely essential for re-creating that sound, so these are useful deviations from the original specs. What's more, the overdrive can be set to one of three modes that model different types of distortion pedals, and the delay can be switched to reverb mode if you're after that particular sound of the era.

ONE AFTER 909

Even more surprising than the TB-03's release was the launch of the TR-09. I've been a diehard user of the AIRA TR-8—both live and in the studio—and its ability to capture the sound of the 606, 707, 808, and 909 is stunning. The AIRA also features innovative rhythmic effects, but as with the TB-3, that's the main reason purists have contested its credibility so vocally: It's just *too* modern.

So in that context, it made sense for Roland to revisit the TR-909 and maybe silence a few more naysayers. Here the Boutique form factor replicates the front panel of the original 909 almost perfectly, including its slightly wonky approach to programming patterns and tracks (e.g., songs). It's not all that hard to get the hang of creating original patterns with the TR-09, but the overall paradigm feels a wee bit dated by today's standards. Fortunately, there's both USB and DIN MIDI connectivity available for those who'd rather take advantage of their DAW's sequencing tools.

What's more, the USB features include the ability to sub mix the individual drums into four digital stereo pairs, allowing for a lot more flexibility in a production situation. If you want to record your jams live into a DAW and worry about mixing it later, you're covered.

As for the sound, it's functionally indistinguishable from the original. Whether you're in a club environment or adding it to a remix, there's really no audible difference between the TR-09 and the TR-909, save for the original's ever-present noise floor. Each drum features exactly the same parameters and their effect on the sound is identical. Hardstyle kicks, two-toned toms, and gritty sampled cymbals are all in place. You can even get the snare to do that tiny tonal click in addition to its more readily identifiable splashy smack. Bottom line: The range of the TR-09 covers the same territory as its namesake.

Dynamics processing is an added bonus, here, as the kick and snare (but not the other drums or stereo mix, sadly) include their own independent compressors. These can be fine tuned by using a couple of key combinations that are easily memorized. But if you're a 909 fan, you'll probably set them up once for that punchy '90s house sound and leave it.

Lastly, there's a trigger output on the front panel for compatibility with analog sequencers such as the SH-101 or, more aptly, the TB-03. This can be programmed independently, unlike the original, which was tied to the rim shot. This amenity is a perfect example of how Roland has managed to remain faithful to the original instrument while adding little touches that probably should have been available in the first place.

CONCLUSIONS

In a review for *Keyboard* magazine last year of Roland's earlier Boutique synths (the JU-06, JP-08, and JX-03), I took the miniature synths to Switched On Music (Austin's vintage synth store, er, boutique) and tested them against the originals (visit keyboardmag.com to read the review). As someone who has relied on the originals since their introduction, I could wholeheartedly attest that there was no credible difference between the Boutiques and their analog forebears, unless you like the sound of dying Juno voice cards and scratchy Jupiter pots.

After spending a couple of weeks comparing the sound of the TB-03 and TR-09 to the vintage models, as well as the larger AIRA units, I can honestly say that the Boutiques are actually *better* than the originals. For starters, you can get them for a tenth of the price of an original model on eBay and not have to worry about maintaining delicate analog circuitry as it ages. More importantly, their new features completely offset any perceived absence of street cred. They work and sound exactly like the originals, integrate essential processing tools that are key to their signature sounds, and are more flexible in every way, including CV and trigger compatibility with analog gear.

If you've always lusted after a real 303 or 909 but couldn't afford the outlay, the TB-03 and TR-09 will satisfy that craving and then some. ■

MASTER CLASS

Mastering, Plug-In Style

Pro engineers share tools and tips for fine-tuning your final mixes

BY GINO ROBAIR

Gino Robair is *Electronic Musician*'s technical editor. He is also a musician, educator, and editor-in-chief of *Keyboard* magazine.

Once a project has been mixed, there is one more step before it's ready for commercial release—mastering. With such a wide variety of affordable plug-ins available for the job, it makes sense that musicians would want to learn how to use them.

I asked five professional mastering engineers to share tips for someone who is either exploring mastering for the first time or wants to take his or her work to the next level using readily available plug-in processors.

WHAT NEEDS TO BE DONE?

Based in New York City, Sarah Register (sarahregister.com) has worked on several Grammy-nominated projects during her 17 years behind the mastering console, both in the analog and digital domain. As for what musicians should ask themselves before mastering their own mixes, she says, "What else is there that you hope to get out of this material? And that question can be answered in many different ways."

When Register explains mastering, she finds that a visual reference resonates with most people. "Mastering is like being handed a picture that already exists: You're not going to be able to remove a tree from the picture, but you can shape and adjust how the colors of that tree are sitting with the colors of its neighboring elements. Crudely, it's like Instagram filters: You can put filters on it and affect things in different ways and make different kinds of internal edits, but you're not re-taking the picture."

For musicians who feel they *can* improve their mixes, I asked Register what she would recommend. "The standard options in most DAWs have gotten better and better, so the basic tools aren't inaccessible anymore. All of the DAWs have their own plug-in options for compression, limiting, and EQ that are totally viable and they can use to take their music a long way."

She also says that a specialized mastering product such as iZotope Ozone 7 can suggest ways to work. "There are lots of preset options," she says. "It's a fun way of looking at how different solutions have struck engineers in this realm. I would unhesitatingly tell beginners to start with presets." But she adds that a preset rarely provides a quick-fix solution. "There is always the ambiguity of different material. Rock songs from two different artists are going to have totally dif-

INGE COLSEN

Sarah Register with Bianca Casady at The Mastering Palace in 2015.

ferent dynamic and sonic properties. But certainly presets are a good place for beginners to start when thinking about what kind of signal chain to use."

Having worked with Sonic Solutions and Pyramix software in the past, Register relies on Magix Sequoia when working in the digital realm. "Sequoia's internal plug-ins are fantastic," she says, noting one called Ammunition, a compressor with a limiter option. "It's versatile and you can dig pretty deep into it and have it do exactly what you want." Among her favorite third-party plug-ins is Brainworx bx_digital EQ running on Universal Audio's UAD platform. "I like its digital mid-side approach," she notes. "And it can be as sensitive as you want it to be."

Based on her nearly two decades of experience, Register recommends embracing improvements in technology. "At any level, you're still learning. If you can be present and keep your heart open to what's going on, and your mind active and interested in what's happening with all of these new experiences, you're always learning new ways to do things better." That, she says, provides a more fulfilling experience for her clients.

ONE STEP AT A TIME

Like Sarah Register, Joe Palmaccio (theplaceformastering.com) suggests that anyone interested in exploring mastering can start with what their DAW provides. "I would probably start with equalizers," he explains, "because if I'm doing a mastering session, and I'm going to change the sound of something, most of the time I'd do it with an equalizer.

"A good parametric EQ would be preferred; one that links in stereo so that you're not adjusting the left and right channels separately (unless you need to). And while this might sound counterintuitive, I suggest an EQ with more bands than fewer bands because, typically, when you're doing mastering equalization, the increments you change in the sound are minute. You might want to make a small adjustment in the top end, in the midrange, and in the low-mids. Whether it's a tube emulation or linear phase EQ will be less important when you're starting out. But if you only have a 3-band EQ that's not fully parametric, your options are limited.

Joe Palmaccio of The Place...for Mastering.

"After that, if we're going to stay basic, I'd probably add a 2-channel compressor," Palmaccio explains. "That opens a Pandora's Box, because there are so many varieties of emulations, whether it's based on a tube compressor or a FET compressor. There are many other places you can go, but if you're trying to see if you can improve your mixes, start with the EQ first and then the compressor."

Once you get used to using basic EQ and compression for mastering, Palmaccio recommends moving up in complexity. "Multiband compression is the next place where you can start altering the tone of your mix; what I call band-splitting or dynamic equalization. A de-essing plug-in is also very important. I use them regularly, in hardware and in software. It's one of those things you tend to use all the time." Palmaccio recognizes that these types of processors can seem complicated to the novice, so he suggests visiting the developer's website, as well as YouTube, to view instructional videos when needed. And although he takes advantage of the processing tools in his Sequoia workstation, Palmaccio uses plug-ins from iZotope, Plugin Alliance, Universal Audio, Waves, and Slate Digital.

He adds that he might take his mastering work from the corrective realm into the creative—what he calls "tone bending." "Once I put up a mix and get a general feel for it, I might think that it could sound better with something that emulates a tape machine, a transformer, or some sort of console emulation, as if we're going through a virtual bus. That's something you wouldn't think of as an effect in its hardware form, but in the plug-in world it can be a cool effect."

Palmaccio explains that there are several factors that determine the types of processors chosen. "It can be based on the genre or the style of production. Is the mix really aggressive, where you hear every transient and it really jumps out of the speakers and everything has clarity and sharp edges, or is it a woolly-sounding mix where the top end sounds like it's rolled off? That will inform what I might or might not do."

Of course, the clients' needs are part of the equation. "I always talk to someone about the project, whether it's the producer, the mix engineer or the artist. If the mix is warm and fuzzy, and it's the kind of thing were the artist says that they really want you to feel like you're lost in the gauze of this thing, you have to respect where they're coming from in terms of how they envision the way the song presents to the listener."

LESS IS MORE

"I do all my work in the analog domain, and most of the people doing front-line albums are still working that way," states Gavin Lurssen of Lurssen Mastering (lurssenmastering.com). "So I don't use software per se. We do have some tools that we bring in to touch things up, but we do the bulk of our work in the analog domain."

However, Lurssen notes that "a lot of the equalizers and devices that are built into the digital workstations are pretty good. We find ourselves using the basic EQ in Pro Tools fairly often to clean up something, shelve something, or pull out some rumble. It's a very healthy-sounding EQ. You can use some very basic stuff to do work with great impact."

In 2016, Lurssen Mastering teamed up with IK Multimedia (ikmultimedia.com) to release Lurssen Mastering Console (Mac/Win/iOS), a software app the emulates the analog processing chain and console used by him and Lurssen Mastering engineer Reuben Cohen. "The main reason we created the app," Lurssen explains, "is that we recognized that people were doing their own mastering without any experience or knowledge on how to use these incredibly powerful tools. First, second, and third gear—that was the intent behind creating [Lurssen Mastering Console]. It's actually doing mastering for you, and then you've got to take it the rest of the way." As with other specialized software, this app provides a way to see how engineers configure different kinds of processors in a mastering context.

Based on the genre of music you select within the app, Lurssen Mastering Console creates a chain of various equalizers, compressors, and other tools that Lurssen's engineers would typically begin with in a similar situation. "Whatever the style, we have a starting point," Lurssen explains. "It'll give you equalizers and compressors in the chain that relate to that kind of music. And then it provides some very rudimentary adjustments on highs, mids, and lows—the whole spectrum—to help you make adjustments without feeling overwhelmed. Of course, you can change the processors once you start, but it gives you that starting point."

As an example, Lurssen describes how he would approach a project in the Americana style. "Nice, mellow, warm, lush—the first thing in that chain would probably be a tube equalizer followed by a tube compressor. The gain structure going into it will also be set a little looser so you're not hitting the effects as hard.

"An EDM track, on the other hand, needs to be hard-hitting and in your face, so we would have solid-state EQ with something that might have a de-esser on the end, so you can really hammer the EQ and clamp it down a little bit on the highs and it doesn't become brittle."

Lurssen says that a major problem that exists today is that people overuse their equipment, and the plug-in is designed to help change that. "We want to get people to use it in a subtle way. For us, the overall sentiment is that less is more."

KEEP PERSPECTIVE

"The thing that aggravates me the most in this industry is this constant pursuit of turning our craft

Gavin Lurssen of Lurssen Mastering.

into a process or into a plug-in itself," say Eric Boulanger, owner of The Bakery Mastering (thebakery.la). For him, resolution is of the utmost importance, and he wants to hear exactly how the music sounds as he is creating the final master. "I'm monitoring from the output of SADiE, which is recording everything. And that's truly what's leaving the studio.

"Typically, I load in and play back files through Pro Tools, and that will feed my console, and then an A-to-D converter that will record into SADiE, where my masters will be stored. If I do everything digitally, I use an outboard SRC [sample-rate converter], so it's not going through the console, but through the SRC from 192 to 44.1 kHz, if we're going to that format. So, no matter what the chain is, I'm listening through the entire process."

Boulanger also says that his demands in resolution are why he favors the UAD plug-ins. "If you have x amount of resolution going in, you don't lose it going out of any plug-in. You can get, artistically, what you want to do without a loss in quality."

Boulanger utilizes Pro Tools templates, where the plug-ins sit inactive in the inserts until needed. "If I decided to try the Shadow Hills plug-in, I'll activate it. Within five seconds, I know if I'm in the right direction or not. And if you're not in the right direction, you turn it off. It's important to listen rather than obsess over what's on the screen.

He points out that another danger—whether using plug-ins or analog gear—is inadvertent gain change. "You might add a processor and think 'Whoa, this makes it sound so much better.' Even though you're not applying any changes, the plug-in is making the audio 3 dB hotter. And to the ear, louder is always better. The word of caution when using a processor is to be aware of your levels.

The Bakery's Eric Boulanger

Put tones through things and make sure you're at unity, so when you're making comparisons, you're doing it all at the same level."

As for go-to plug-ins, Boulanger mentions digital limiting, saying he uses just a touch of FabFilter Pro-L at the very end of the signal chain. "I'm not using it for gain; it's mainly to catch overs." In addition to its simplicity, he likes being able to turn off the metering and lights, so that he is not distracted by the visuals. "The single greatest danger of any plug-in is the eye candy; looking at your screen and being more enthralled with what's on it instead of truly listening to what you're doing."

Boulanger also utilizes the Massenburg DesignWorks MDWEQ5 parametric EQ on the Universal Audio UAD-2 platform. "I use it when something needs to be very transparent; a really good high-res recording that's just a little cloudy. You cut out a little bit of that mud in the 100Hz range and, when you make up the gain later, it just opens up and sings."

But while making sure your signal path offers the best resolution you can get, Boulanger points out that quality mastering requires more than simply gathering the right tools. "The only thing people are buying with the service that I provide as a mastering engineer is perspective. It can take six months to record an album and about a month to mix it: I master an album a day. So the perspective is very different. That's what mastering engineers bring to the table." For the musician expecting to record and master the same project at home, Boulanger thinks that that kind of perspective will be difficult to achieve.

Nonetheless, he suggests a strategy for someone dabbling with mastering. "Start by working on older material that you haven't been obsessing over for the past four months. Do something that is fresh. If you can't do that, get ahold of other mixes, because perspective is the name of the game."

BIG PICTURE AND DETAILS

"We have a very high-end analog system here, and most of my mastering is analog," says Jessica Thompson, who works at Coast Mastering in Berkeley, California. In addition to being an in-demand mastering engineer, she also specializes in audio restoration. "Most of my digital tools are either for restoration or surgical applications."

I asked Thompson what she thinks is the most important skill for someone planning to master their own project. "To be able to think about both the big picture *and* the details, because that's what a mastering engineer does," she says. "We focus in on all of the details of your music, while simultaneously considering the big picture. It's an unusual way to work, but if you don't have the ability to work on the details and the big picture simultaneously, you're going to screw up something; either a particular instrument is going to sound weird or your overall balance is going to sound off."

Because many musicians are interested in archiving and/or releasing recordings from cassette tape and vinyl, I asked her to describe her audio-restoration workflow, as she prepares these types of projects for the mastering stage.

"The first and foremost thing is to get the best possible digital transfer of your analog materials. I always do a high sample-rate, flat transfer with the best converters I can get my hands on, using the cleanest signal path. I do it at 96 or 192 kHz. Then I keep that as an archival transfer and a backup I can return to in the future.

"It's so easy to get a bad transfer, even with cassette," explains Thompson. "You might think, 'I can just pop it into the cassette deck and hit play,' but it doesn't work that way. Cassette decks are all calibrated differently." For example, she explains that problems with the azimuth during a transfer can result in a loss of high-end or add phase-iness. Her own deck has a control for adjusting azimuth.

Coast Mastering's Jessica Thompson specializes in both audio restoration and mastering.

"If you're working on a restoration project for release," she adds, "most of the time you get one chance to get [the transfer] right. And if you do it wrong, it's entirely possible you're going to destroy your source material or something is going to get released at sub-par quality. And you don't want that."

For Thompson, audio restoration is a multi-step process. "First you have to correct what's on the format and what it could or should have been if it were recorded in an ideal scenario. And then you start the enhancement process. With a cassette, I will clean up some of the hiss or the noise floor that exists on that format. Or I might do some spatializing stuff that corrects an azimuth that was off. Those are big, general strokes that are just trying to get things in the right space. And then I'll do a second pass where I'm trying to enhance. That's where I use EQ and try to bring out some clarity in the bass, or some richness in the vocals. And then I will often do a third pass where I fix drop-outs, warbles, or tape distortion that shouldn't be there—all the little things.

"Nearly all of this clean-up work is digital and in the box," Thompson says. "These often need a lot more surgical attention and for that I use plug-ins. Sometimes I can do everything I need to do in the analog chain. But if there is something particular about the mix that, say, requires very high-Q cuts to deal with a whistle in the microphone that is really piercing and pops up now and then, I will use a digital EQ."

Her toolkit includes Sony Oxford Restoration plug-ins and products from iZotope. "I've used the Waves Restoration Suite, and whenever possible, I use CEDAR," she adds. "But that's all for detail work. Using an archeological metaphor, we're not talking about digging with a shovel here. This is the part where you get down with your toothpicks, toothbrushes, and tiny chisels and etch out little bits of noise that shouldn't be there, without damaging the overall songs.

"It's easy to be heavy-handed with this stuff and lose sight of what you're really trying to capture," Thompson continues. "When you do that, you can rip the soul out of a project, or layer it with digital artifacts that sound worse than the inherent noise floor of the archival medium. Nothing's worse than hearing something that's been remastered from vinyl where the clicks and pops of the vinyl have been scrubbed out with such a heavy hand that you have also destroyed all of the beautiful transients of the percussion in that recording. It's so easy to lose perspective and get so focused on clean up that you lose track of the vibe of the music. "

How does she recommend removing vinyl artifacts successfully? "If you're just beginning, do it manually and spend about four hours per song doing it. This trains you to hear the best way it can be done. Then, later on, if you try to teach yourself to do it with an automated plug-in, you'll have a sense of what the artifacts sound like and you'll be able to hear when you're pushing it too far. You have to invest the time.

"I usually do it with a spectral repair tool in iZotope, because then you can hone in exactly on the click, visually," she adds. "Often, automating a declicker doesn't work, and it sounds better to do it manually, I'm going to do it manually. You literally go through, second by second, and every time you hear a click you etch it out with your spectral repair tools."

Once Thompson is satisfied with her restoration work and it's time to master the project for release, what more needs to be done? "It's like mastering any other piece of music. You're interpolating what it could sound like in the best-case scenario and seeing how far you can take it with the tools in front of you.

"A cassette is naturally going to have a certain amount of noise floor and a certain type of compression, and certain frequency limitations just based on the medium. In some ways, when re-mastering, you're going to try and make up for that, but you also acknowledge that this is a cassette and it's always going to sound like that. You're never going to make it sound like a sparkling, contemporary digital recording. It will always sound like something that is going to live a little bit in the past, in that space that is signified by cassettes.

"The big picture is the song, or the album, or the genre where this music lives in time and space; its cultural context. You've got to understand if you're working on archival music that was recorded in the early '80s or the mid-'60s, and know what it should and what it could sound like, and how far you can take it. Not that you can't change it, but a cassette should sound a little like a cassette. Vinyl should sound a little like vinyl. You should nod to that in your re-mastering work." ■

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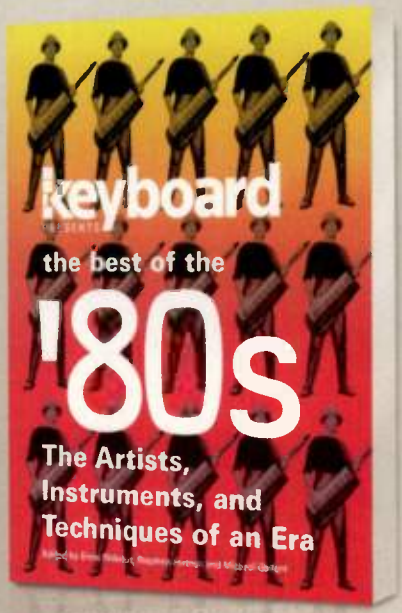

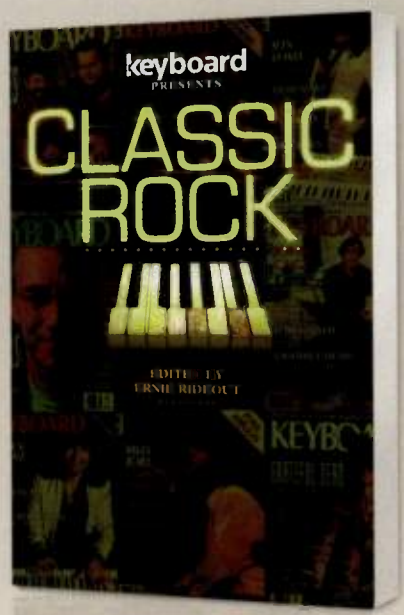

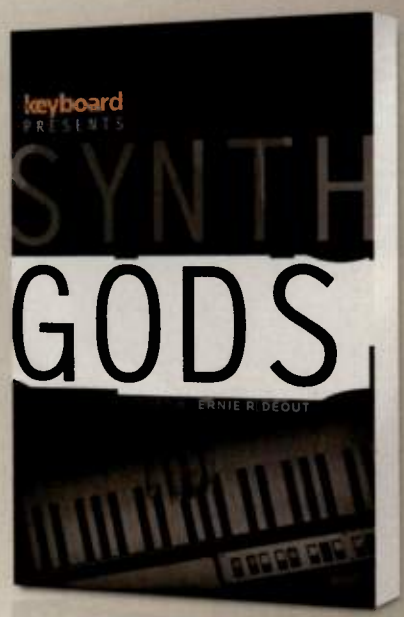

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Fig. 1. Fault's dual frequency shifters and delay lines add a virtual bottom mic to a snare track for added sizzle.

First Aid for Snare Drum

How to use Unfiltered Audio's Fault plug-in to add a sizzling, virtual bottom mic

BY MICHAEL COOPER

Michael Cooper is a recording, mix, mastering, and post-production engineer and a contributing editor for *Mix* magazine. You can reach Michael at michaelcooper@bendbroadband.com and hear some of his mixes at soundcloud.com/michael-cooper-recording.

When recording acoustic drum tracks, virtually everyone mikes the snare drum from above to capture the sound of stick hits. But if a bottom mic isn't also used to record the sound of the rattling snare wires, the drum can sound almost like a bongo at mixdown. You can add sizzle by triggering drum samples or gated white noise, but there is another way: Use frequency shifters and delay lines to add a virtual bottom mic to the mix.

Unfiltered Audio's Fault Stereo Spectral Shifter plug-in gets the job done in just a couple minutes. Follow along with Fig. 1 as I describe the control settings.

DOWN TO THE WIRE

The basic idea is to generate a discordant cluster of high frequencies—sounding like rattling snare wires—from the snare drum track. First, put Fault's Frequency Shifters into Ring (ring modulator) Mode and activate the Anti-Alias button to filter out generated frequencies that are above Nyquist (half that of the sampling rate).

Crank Fault's Frequency Shifter knob fully clockwise and raise the Mult (frequency multiplier) control to roughly between x1.5 and x2.2; these settings will generate frequencies roughly 1 kHz higher than the snare drum's dry sound. Set the Spread control to roughly x0.9 to lower the frequency of the right-channel shifter slightly with respect to that of the left-channel one. In Fault, both the left- and right-channel frequency shifters contribute to processing a mono signal; set the Pan control to the noon position to give them equal weight.

Next, boost the frequency shifters' left- and right-channel Feedback knobs (in the Feedback Matrix) to between 1 and 1:30 o'clock positions to make the processed sound sizzle more. (Caution: higher settings could produce runaway oscillation.) These knobs shift the generated high frequencies again by the same interval, adding yet more frequencies at the plug-in's output; unlike with delay feedback, shifter feedback happens instantaneously, and the result sounds like a timbral shift higher rather than a series of discrete tones rising. You can also raise the shifters' X (cross-channel feedback) control very slightly to thicken the resulting burst of noise; if the sound starts to break up, lower the control.

Next, we're going to slightly increase the duration of the burst of noise generated by the frequency shifters. Dial in roughly 5 and 5.5ms Delay settings respectively for left and right channels, and set all three Delay Feedback controls (Left, Right, and X, in the Feedback Matrix) to roughly 12:15 to 12:30 o'clock. (Again, higher settings could produce runaway oscillation.) Adding delay feedback sends the entire processed signal (including the frequency shifters' wet signal) back for processing again, creating an extremely dense cluster of harmonically unrelated, high-frequency noise. It's important to note that Fault's delays are feedback-only effects—they do nothing unless their feedback controls are turned up. This construct allows the frequency shifters' wet signal also to pass through to output undelayed, making the noise cluster even denser—and very briefly sustained—when combined with delayed signals.

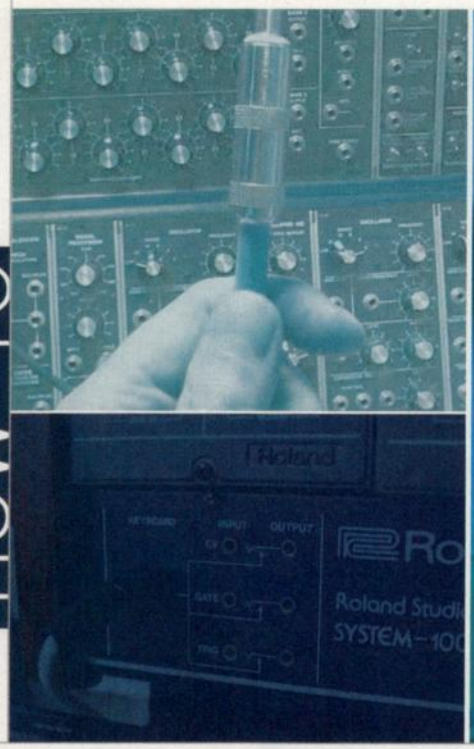
> If you don't record rattling snare wires, the drum can sound almost like a bongo. You can add sizzle by triggering drum samples or gated white noise, but there is another way: Use frequency shifters and delay lines to add a virtual bottom mic to the mix.

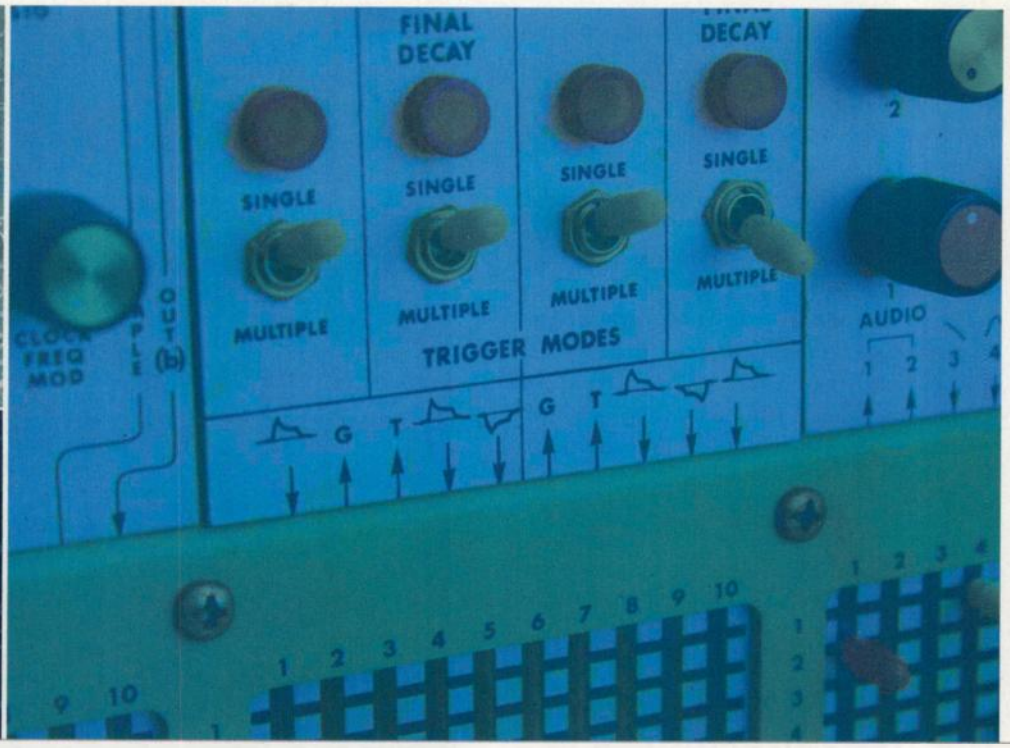
BOOST AND FILTER

If you're not hearing enough "bottom mic" at this point, turn up Fault's Input (gain) control roughly 5 dB to prolong and intensify the feedback effects, augmenting the number of virtual snare wires rattling. In Fault, cranking the input gain doesn't affect the dry signal; it only gives you more effect.

If the sound is too bright or brittle, lower the Feedback Filter's LP (lowpass filter) control to roughly the 1 o'clock position to roll off some highs. (Make sure the Filter All button is deactivated to avoid also dulling the dry signal.) Finally, set Fault's Dry/Wet knob to between roughly the 10 and 1 o'clock positions to add the right balance of "bottom mic" to the snare track's top-miked sound. With the right settings, nobody will ever guess your bottom mic was a plug-in! ■

HOW-TO





Understanding Synth Gates and Triggers

From S-Trig and V-Trig to modern modular and MIDI

BY ROGER ARRICK

If you've worked with synthesizers, specifically the analog variety, you've undoubtedly used gate or trigger signals. Understanding these signals is a basic requirement for using a modular synthesizer, a virtual modular, interfacing gear, and a number of other instruments in a typical studio, even electronic drums.

BACK IN THE DAY

When some of the first analog synthesizers were being designed in the '60s by the likes of Bob Moog and others, it was obvious from the start that several types of signals were needed to control the various aspects of the instrument. One of the major advancements during this time was voltage control, which allows the output of one circuit to control parameters of another in real time, effectively automating changes of a sound. Voltage control uses a variable voltage to control a variable parameter, like an expression pedal provides variable control over volume.

But another signal was needed—an On/Off signal to indicate a key had been pressed, to start a sequence, or to activate individual drum beats. In many early systems, this signal was called Trigger. The name implies a quick signal marking the start of an event, but in many cases this signal indicates a start by turning On, then an end by turning Off. This applies nicely to keyboard keys being pressed then released. Most modern synthesizers call this signal Gate.

The first versions of Trigger signals were not voltages but a switch to ground; these were called Switch-Triggers, or S-Trig for short. The benefit of an S-Trig is that multiple devices can short the signal to ground in parallel without additional circuitry. In a keyboard controller, for example, a bus wire is shared by all keys and each key makes contact to ground to produce a single, shared On/Off Trigger signal (see Figure 1).

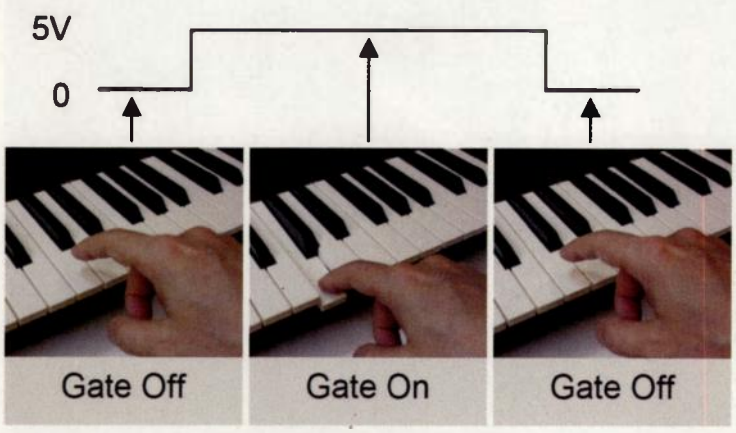


Fig. 1. In a keyboard controller, a bus wire is shared by all keys and each key makes contact to ground to produce a single, shared On/Off Trigger signal.

Fig. 2. An S-Trig plug and vintage Moog S-Trig inputs

Fig. 3. Korg Mono/Poly with Trig I/O (which offered polarity control)

Fig. 4. A simple cable providing a passive circuit converts from from Gate (Voltage-Trigger) to Switch-Trigger

S-Trig made sense for the early hardware and to the designers of the time, but the need to parallel multiple controllers was overestimated and the benefits of simpler circuitry inside the keyboard controller was a benefit to the manufacturer, but not the user (see Figure 2).

The disadvantage of S-Trig is that a switch-to-ground signal is unlike a typical voltage signal in a voltage-controlled synthesizer, and it requires a conversion to and from S-Trig to a voltage version for many common operations. This voltage trigger is sometimes called V-Trig on older systems, or simply Trigger. Conversion requires special cables and/or modules adding to the complexity of patching. For example, instead of patching a sequencer clock directly to an envelope generator, the user must patch through a V-Trig to S-Trig converter module using two different types of cables—not very intuitive.

GATE ADOLESCENCE

As time went on, many designers and manufacturers moved to a simpler voltage version of S-Trig for On/Off signals and referred to it as Gate. Gate, being a voltage, has the added benefit of being compatible with other signal sources in a typical analog synthesizer. For example, a square-wave LFO can produce a Gate signal to fire an envelope generator, and a sequencer's clock output can fire an envelope generator, all without conversion.

Fig. 5. A Modern MIDI interface providing a 5-volt Gate output, along with pitch and velocity

Through the first golden era of analog synthesizers, Gates prevailed, although some couldn't agree on voltage levels, polarity, or connector style (see Figure 3).

MID-LIFE

In addition to Gate, some modern systems recycled the term "Trigger" for another purpose. This type of Trigger is used by keyboard controllers in conjunction with a Gate signal to retrigger envelope generators when multiple keys are pressed. This Trigger pulse is typically 5 volts and very short—somewhere around 5ms.

MODERN MATURITY

Modern analog synthesizers, both modular and normalized, have largely settled on a standard for Gate, and this makes life simpler for everyone in this new second golden era. These Gates are typically 5-volt signals with positive polarity (5V = On, 0V = Off). Technically, there is a specific voltage where the input circuitry trips from one condition to the other, and that could be 1 volt or 4 volts or somewhere in-between. The good thing is, virtually all modern Gate inputs, regardless of format, will trigger on most Gate outputs—and in most systems, Gate uses the same type of connector as audio and control voltages.

COEXISTING WITH SWITCH-TRIGGERS

Integrating vintage equipment and even modern gear that use Switch-Triggers is relatively easy, although cumbersome. In most cases, the conversion needs to go from Gate (Voltage-Trigger) to Switch-Trigger, and that's easily done with a simple cable containing a passive circuit (see Figure 4). These cables are readily available and inexpensive, or they can be DIY'd if you have the tools and skill.

Going from Switch-Trigger to Gate is a different matter, though, because producing a voltage requires a voltage source. The solution to that is typically a special interface module.

THE MIDI CONNECTION

If your experience with interfacing gear is mostly with MIDI, you might be wondering where Gate signals fit into the grand scheme of things. MIDI transmits messages including Note On, Note Off, and a host of other information. MIDI Note On and Note Off messages are basically Gate and Pitch information in a digital form. To get Gate and Pitch voltages from MIDI requires a converter box or a module. The converter reads the MIDI messages and creates Gate and Pitch signals that are then used to control the oscillators, envelope generators, and other modules in an analog synthesizer (see Figure 5).

In a nutshell, Gates are simply On and Off voltage signals typically carried on a 1/4" or 3.5mm phone plug, and sometimes a banana plug, depending on the system's format style. Gates are used for carrying information about when a key is pressed or when a note starts and stops, but also commonly used to turn things On and Off, start sequencers, and fire envelope generators. Gates, like so many other concepts in analog synthesis, are simple ideas capable of producing powerful results. ■

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HOW-TO

Help!

How to Hire People to Fill in the Skills You Don't Have

BY RANDY CHERTKOW AND JASON FEEHAN

There are a lot of nonmusical facets to running a music business, including graphic design, photography, marketing, public relations, promotion, merchandising, distribution, and more. All of this work requires a lot of time, attention, and effort for your business to be successful. Often, all these activities need to happen at the same time. Yet, many musicians choose to do it all themselves.

Fortunately, a huge talent pool is available to help: Thanks to revolutionary web services that connect skilled contractors with those who need them, you have access to a world of freelancers. Here are five steps to find qualified help:

1. Define what you need. Do you need to create artwork for an album or poster? Do you need help with setting up a Wordpress website for your band? Do you need accounting help? The more specific you can be, the easier the search and the better the outcome.

2. Use a site or service that can hook you up with the right talent. The work you identified will point the way to a service that can help you. Like any temporary employment agency, most of these services make their living by taking a percentage, or cut, of the contractor's fee. So, pay attention to the payment. There are new services popping up all of the time, but here are a few worth exploring:

Upwork.com: Upwork is possibly the largest and most expansive talent site. It covers nearly every major skill area and represents workers you can tap from all over the world.

99designs: 99designs specializes in graphics, art, and design, so if you're looking for help with images for your merchandise, website, videos, or music release, give this site a try.

Fiverr: The talent on Fiverr knock out small projects for a set fee of five dollars. This could be researching venues where you can play live or identifying podcasts or MP3 blogs where your music might be featured. It could also be creating a video clip or promo. Check out the site to get a sense of the skill sets available and the scope of their projects. This is a great place to "try before you buy"; if you end up liking the work you get from Fiverr on a quick project, then you can contract with that person directly for larger projects.

3. Make your listing as specific as possible, and make it clear that you want work for hire. Being clear upfront will help manage expectations. Be sure to specify that it's a work for hire, so you can repurpose the product for other uses. If you're not sure how to do this, see The DIY Advisor article: "How to Hire Photographers, Graphic Artists, and Other Professionals as a Work for Hire" at emusician.com.

4. Manage and delegate. Most people you'll work with will probably be in another city or even another country. Stay in communication with them as they progress. Set up milestone deadlines to keep the project on track. Make sure they can reach you when they have questions, but don't micromanage. For delegation tips, see The DIY Advisor article "The Three Secret Steps to Successful Delegation" at emusician.com.

5. Tap multiple sources. You may want to hire more than one contractor to work on a given task, especially if you're using sites like Fiverr, where the initial bid is so inexpensive and the scope is so limited. For instance, you may have a few artists create and submit album art so you can consider different styles and options.

Once you start employing contractors to handle some of the tasks you have before you, you'll see that don't have to do everything yourself. Hiring others help can propel your business forward and free yoto u up to focus on other things—like your music. ■

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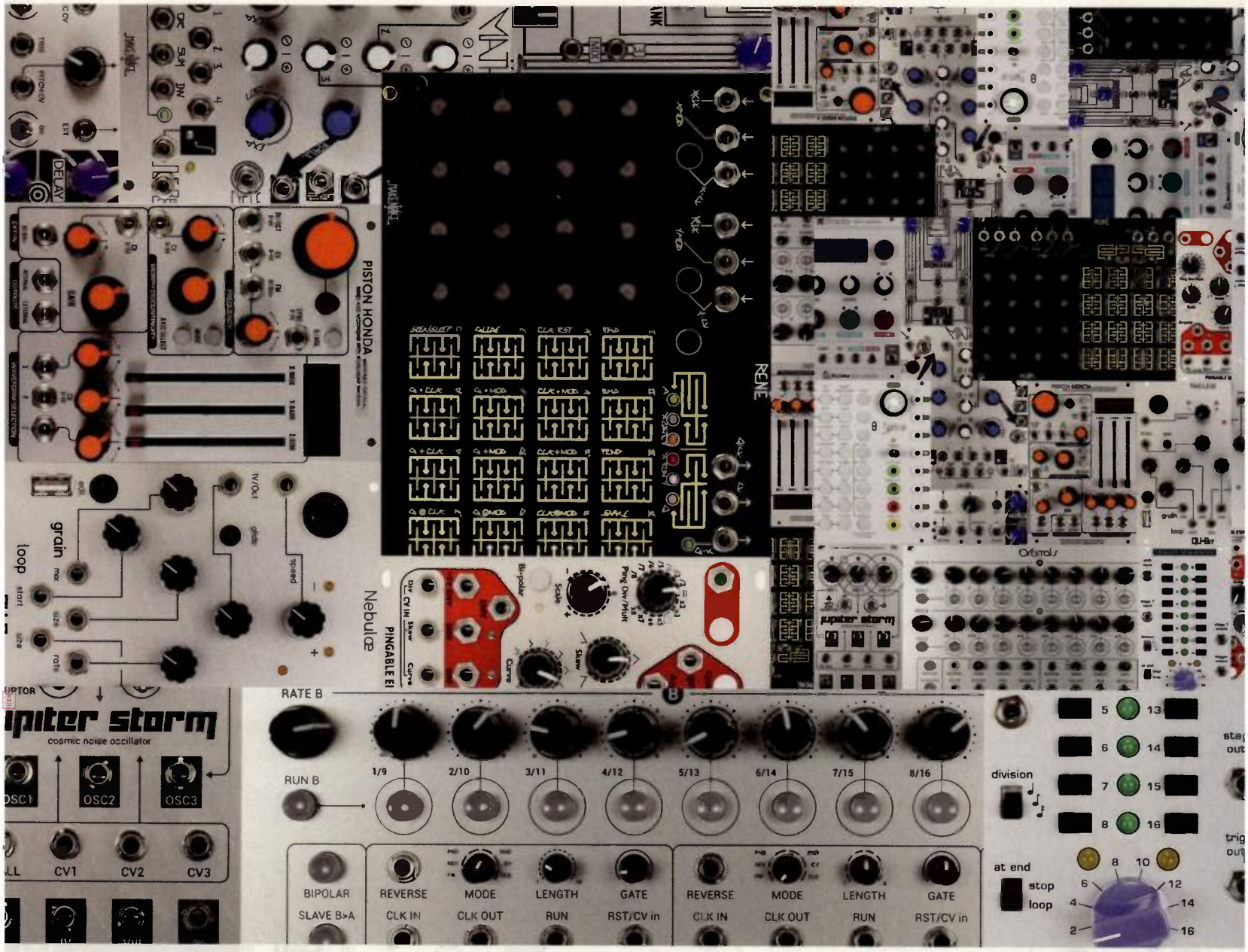
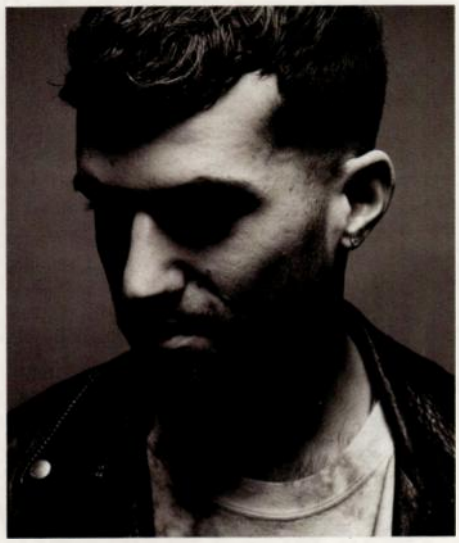


FIVE QUESTIONS

A-Trak

The DJ, producer, and label head shares insights on the evolution of his remix work over the past decade



KENNETH CAPPELLO

BY SARAH JONES

Grammy-nominated DJ/producer Alain Macklovitch's career dates back to 1997, when at 15, he became the youngest person ever to win the DMC World DJ championship. After dominating turntablist competitions in those early years, and later, collaborating with Kanye West as the rapper's go-to tour DJ, A-Trak cofounded Fool's Gold records in 2007. And Duck Sauce, his collaboration with DJ Armand Van Helden, topped charts around the world with the smash 2010 track "Barbra Streisand," widely considered EDM's first viral video hit.

In November, A-Trak released *In the Loop: A Decade of Remixes*, a 13-track compilation of his most beloved remixes from the past decade, including reworkings of songs by the likes of Disclosure, the Yeah Yeah Yeahs, Martin Solveig, and Phoenix.

You learned to produce by first remixing. How has that perspective informed your production approach?

Generally when you do a remix, you sift through the parts of the original song and you look for these little nuggets. You look for bits and pieces that you can reassemble your own way. In recent years as I've worked more on my own original songs, I still approach the process the same way. I'm not like a traditional songwriter who grabs a guitar and starts strumming and humming. I'll get in the studio with a singer, but even as I record them, I'm looking for those little nuggets again, that I can then turn into a song. When I made my song "We All Fall Down" with Jamie Lidell, I recorded his vocal to a simple kickdrum and bassline, and then I grabbed his vocal and created a whole new track behind it—I essentially remixed myself to create that song.

In the liner notes for your remix of Bingo Players' "Cry (Just a Little)," you talk about it sometimes being harder to remix a dance track than to cross genre lines. How are the challenges of re-imagining a track like "Cry" different from say, remixing the Yeah Yeah Yeahs?

Right. If you take the Yeah Yeah Yeahs song [A-Trak's remix of "Heads Will Roll" is included in the compilation], for example: The simple act of taking their vocal and adding a house beat and synth bassline already makes it sound like a remix. Then it just becomes an exercise in finding the best beat and best bassline. But for "Cry (Just a Little)", they already had a great house track for it. My work consisted in producing it with different choices. I needed to figure out how to make it sound updated, and still be good! I often say that production boils down to choices: What kind of bassline will I choose to match the vibe of the vocal? Do I want a big, thumping kickdrum or a warm house kickdrum? Do I want a bunch of effects on the vocal or do I keep it dry? And so on. Well, when you're remixing within the same genre, your range of choices is a bit more limited and you're competing more directly with the original.

For the remix of Boys Noize's "Oh!" all you had to work with was a talkbox vocal, the "oh" sample, and hi-hats. How does working within these kinds of limitations challenge you?

I actually really enjoy the limitations. Sometimes when you're going through the original parts of a song and deciding how to approach your remix, you might get seduced by some great sounds in the original and it becomes a challenge to break away from them and create your own. You can sit there thinking, "Wow what a beautiful analog synth pad," when you should be thinking, "What new sounds can I create here?" With the Boys Noize remix I had just enough bits and pieces to use and I was able to paint around them and really take it to a new place.

This compilation represents a broad spectrum of work over a decade; as you were curating tracks, what were the hardest to let go?

The only difficult part of finalizing the tracklisting was, we weren't able to clear my remix of Kanye's "Stronger," and it's because that song itself contains a Daft Punk sample and their clearance agreement was only valid for Kanye's version; it didn't apply to remixes. We almost managed to clear it, but we were at the deadline to get this project out on time. Aside from that, I had a pretty clear idea right from the start of which ones to pick in order to tell the story.

I love your idea of remixes creating an ecosystem, a bond with artists. How has that ecosystem evolved over the past decade with a changing EDM landscape?

Ten years ago there were still factions in electronic music and DJs from one scene rarely talked to ones from another scene. For example, I remember the first time I reached out to Laidback Luke to remix a track on Fool's Gold [Treasure Fingers' "Cross the Dancefloor"]. In those days it was uncommon for a Dutch commercial house DJ to collaborate with indie guys in the U.S. like us—hip hop DJs who were getting interested in a sound called Electro at the time. Now, practically every release has a trap remix, a big-room house remix, a tropical remix, a twerk remix, etc. Every possible connection has been made and they become go-to choices. But still, the whole scene and the whole infrastructure have gotten so big that those bonds help it all grow in a healthy way. ■

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