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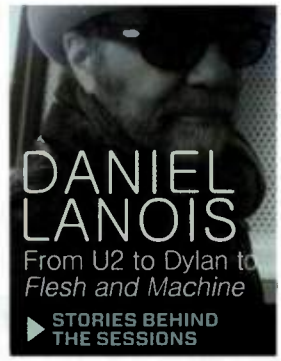

DANIEL LANOIS

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5 Analog Synths

Make big sounds in a small box pg. 24

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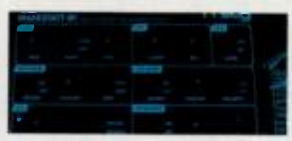

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Studio Electronics Boomstar SE 80

Studio Electronics Boomstar 5089

DEPARTMENTS

HOW TO

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Dave Smith
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insight

Be Part of the Solution

AS WE went to print, the Internet was blowing up with news of Taylor Swift pulling her catalog from Spotify, and issues of fairness in artist compensation. In the production community, these conversations tend to lead to talk about audio quality.

Streaming and download services compete to deliver music "data" to the consumer as efficiently as possible—which usually (but not always) means lossy codecs, low bit rates, and some degradation of fidelity.

Keeping track of it all can be challenging. Do you know what happens to your music once it's released into the world? Do you understand why your tracks sound better on, say, Spotify Premium vs. XM Radio?

You might assume that you can't control the end result, but you can. You can make some tweaks to optimize your mixes, but what will really make a difference is educating yourself: Understand the specs. Learn format-delivery requirements, and upload your own music, so you can control how it gets encoded. Buy your music in various formats to see how it sounds. Want to dig deeper? Start with our Master Class with engineer Andrew Scheps (page 66).

Consider format fidelity when you listen to music, too. Artists' royalties are impacted when you stream music for free. Because consumers—not engineers, not Taylor Swift—ultimately drive the market, in the end, we all can make a difference.

SARAH JONES
EDITOR
sjones@musicplayer.com

electronic MUSICIAN

WEB HIGHLIGHTS

This month on emusician.com

Web Exclusive: The DIY Advisor

Randy Chertkow and Jason Feehan share business tips, interviews with thought leaders, and inspirational advice from successful artists.

Plus...

Photo gallery from The Bots

Interview outtakes with Daniel Lanois and Jamie Cullum

Bonus materials from Andrew Scheps' "Lost in Translation" presentation

Bucket-brigade delay audio examples

...and lots more!

gadget geek

UDG Urbanite Series

Protect Your Controller on the Road

UDG (Udggear.com)'s new entry-level Urbanite Series of bags and sleeves offers cost-effective protection for hardware controllers while you're out and about.

The MIDI Controller Flightbag (shown) features high-density, egg-crate foam interior padding that cradles delicate jog wheels, faders, and buttons; a second storage compartment holds two 19" laptops, and a third section stores hard drives, headphones, cables, and other accessories.

The Flightbag features adjustable foam inserts with instructions for customizing fit for various hardware units. Flightbag models start at €129.95 (about $162); for a scaled-down alternative, UDG's MIDI Controller Sleeve options start at €79.95 (about $100).

app tip TC-Helicon Voice Jam Studio

Your voice becomes the backup band in this multitrack looper with effects.

BY MARKKUS ROVITO

WHETHER YOU'RE a Reggie Watts wannabe of improvisational beatboxing/singing talents or just a songwriter humming out ideas, TC-Helicon's VoiceJam Studio for iPad (www.voicejamstudio.com; $19.99 at iTunes) combines a 4-track looping workstation with professional vocal and voice-transforming effects so you can quickly construct and/or perform vocal compositions. Publish a full audio/video performance to the Internet in a matter of minutes by following these steps:

1. Start the performance recorder to record your singing, everything you do with your recorded loops, a video of what you do on the screen, a video from the iPad's front-facing camera (optional), and any AudioBus app track you want to input in place of the metronome.

2. Select from 50 excellent vocal effects settings, and record loops up to eight minutes long into the four available tracks. Each track can have four overdub layers, with undo/redo for the overdubbed recordings.

3. Create spontaneous arrangements with the track Play/Stop buttons, the master All Play/All Stop buttons, and One-shot and Scrub launch modes, which let you launch audio loops from anywhere within their waveforms.

4. Mix the tracks using their level, pan, filter, and Q (resonance) knobs. Tap the knobs once to begin automated knob sweeps.

5. Stop and save the recording. You can also save the VoiceJam Studio session for future recall. You can post saved performances directly to YouTube, SoundCloud, or your device's Camera Roll.

ASK!

I WANT TO USE A RIBBON MIC FOR RECORDING, BUT WHEN I'VE TRIED IT, THE RESULTS DON'T SOUND GOOD. I OFTEN HAVE TO CRANK THE INPUT GAIN OF MY 2-CHANNEL USB INTERFACE ALL THE WAY UP TO GET ANY SIGNAL. WHAT AM I DOING WRONG?

BENJAMIN CANALE
PAHRUMP, NV
VIA EMAIL

One reason passive ribbon mics may not sound good with a low-cost audio interface is that the interface's preamps don't provide enough gain. They typically offer 55 to 65dB of gain, which is fine for a condenser mic, but not enough for a passive ribbon mic, which needs 70 to 80 dB to sound good. The input impedance of your interface may also be too low, which also negatively affects a ribbon transducer's sound quality.

An easy fix is to place a device such as the Cloud Microphones Cloudlifter CL-1 ($149) between the mic and interface input. This handy device boosts the mic signal 25 dB before it gets to your preamp. And although you feed the CL-1 phantom power, it doesn't pass through the device, so it won't damage your ribbon mic. (It is *never* a good idea to send phantom power directly to a passive ribbon mic.) Another option, albeit more expensive, is to use a preamp specifically designed for ribbon mics, such as the AEA Ribbon Pre ($895). Both solutions work well with dynamic mics, too, greatly increasing their sound quality beyond what you're getting now.

Active ribbon mics, however, have an internal preamp that accepts phantom power, giving you greater output level (with the correct impedance) than a passive ribbon design. Examples of active ribbon mics (and their street prices) are the AEA N8 ($1,098), the Cloud 44-A ($1,899), and the Royer R-122 ($1,750). Sure, these mics aren't cheap, but they will provide a lifetime of recording and will sound even better when you upgrade your preamps or interface.

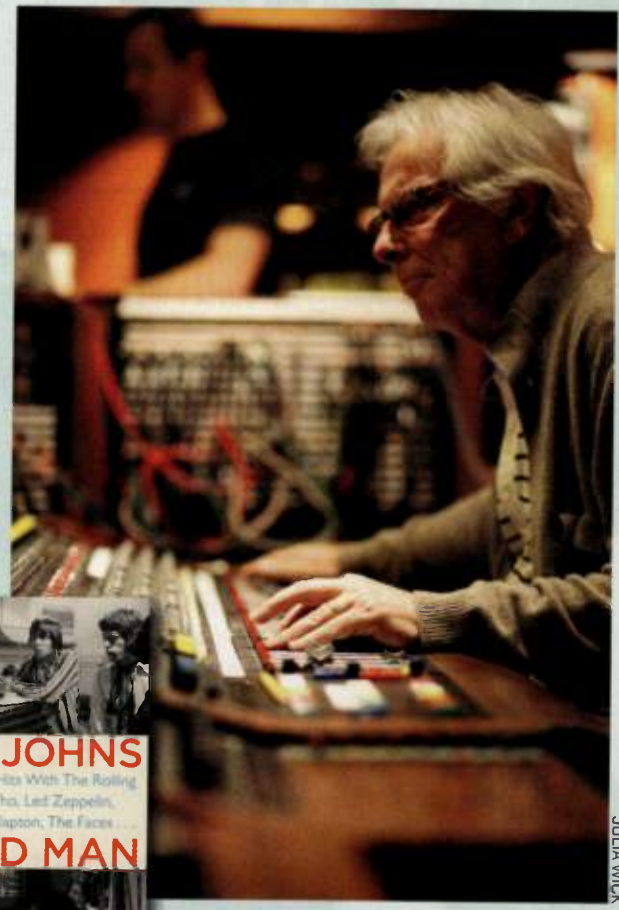
THE EDITORS

The Cloud Microphones 44-A phantom-powered ribbon mic also features switchable response curves.

>>> Got a question about recording, gigging, or technology? Ask us! Send it to ElectronicMusician@musicplayer.com.

FIVE QUESTIONS WITH
Glyn Johns
Sound Advice from the Sound Man

BY SARAH JONES



JULIA WICK

LET IT BE. Who's Next. Slowhand. The iconic albums engineered by Glyn Johns shaped rock 'n' roll history. In his new memoir, *Sound Man: A Life Recording Hits with The Rolling Stones, The Who, Led Zeppelin, The Eagles...* (Penguin Books), Johns takes us inside four decades of studio sessions, from those legendary albums of the '60s through recent work with Ryan Adams and Band of Horses. Here, Johns reflects on the evolution of his role in the studio.

You're known for preserving the essence of live performance in the studio. How has your background as a musician informed this process, and do you think it is important for producers to be musicians?

It is not important at all for a producer to be a musician. It can certainly help in some situations, but when I worked as an engineer, I came across many really good producers who could not even whistle a tune. Equally, some of the most successful producers have been outstanding musicians—my son Ethan being a perfect example.

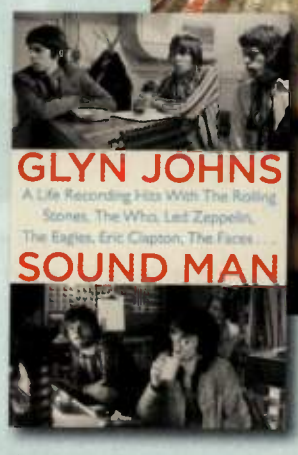
You explain how you discovered stereo drum recording during the *Led Zeppelin* sessions. Any tips for capturing a big Bonham-style sound in small spaces?

It is impossible to get a sound like John Bonham unless you are John Bonham. The recording technique remains the same; it is the drummer who gets the sound.

Over the decades, you've witnessed a radical evolution of recording technology. How do you make sure that technology continues to serve your creative process?

My approach to recording has never changed that much. Hopefully, I will continue to learn every time I walk into a studio.

I still believe that analog recording is far better than digital. I still believe in trying to capture the performance of a piece of music with as many of the ingredients playing live as possible. I still mix without a computer. I believe it is far quicker. Computers take all the spontaneity out of a mix.



Although there are many aspects of modern technology that I respect in the hands of others, very little has happened in the past 40 years that has done anything to improve the end result of the way I like to work. In fact, it has been mostly detrimental.

You talk about your struggle to find a "contemporary" sound. What kind of advice would you offer home recordists seeking to perfect their craft?

You are asking me to give advice on a topic that I am a self-confessed failure at. Not a good idea.

What's your best guess as to where the next chapter of the music industry will lead us?

If I knew the answer to that, it would certainly be in the book. God knows, but let's hope it is as exciting as what has preceded it.

What's your BEST TIP for creating a signature EDM sound?

Win a Novation Launchpad S and Launch Control XL!

YOUR TAKE

Send *Electronic Musician* Your Stories, Win Gear! Send your answer to this month's question to ElectronicMusician@musicplayer.com. If we choose your tip, you'll win a **Novation Launchpad S & Launch Control XL**, the ultimate controller for Ableton Live, which provides 16 buttons, 24 knobs, and eight faders that integrate seamlessly with Live. The package also includes Launchpad S, to give you even more control over your grid of loops and samples.

IN THE STUDIO

>> The Bots with Justin Warfield

BY BARBARA SCHULTZ

WHEN MUSICIAN/PRODUCER JUSTIN WARFIELD FIRST HEARD THE BOTS six years ago, he was so excited about their music, he brought them to the attention of his management, and reached out to the closest thing The Bots had to a manager at that point: their mom. The Bots, Warfield learned, were brothers Anaiah and Mikaiah Lei—then aged just 15 and 12.

Before even meeting the brothers, Warfield found out they are Rancid fans, so he kindly mentioned them to Rancid frontman Tim Armstrong. "Tim said, 'They sound great, but to really be a band, they need to go on the road—get out there and play,'" recalls Warfield, a former member of the Geffen act She Wants Revenge.

Five years later, The Bots had a deal with FaderLabel, and Warfield's management had taken them on. They were ready to record a full-length.

Warfield recorded four songs with them; the Bots then tracked a few songs with Nick Zimmer of Yeah Yeah Yeahs, brought them back for Warfield to work on, and for the next several months they began to shape their punk-meets-electronica album *Pink Palms* in Perfect Kiss, the studio that Warfield and his SWR collaborator Adam Bravin then operated in L.A.

There were numerous avenues into the arrangements and recordings—from live performance in a rehearsal space, to Warfield programming beats first and the Bots playing on top, to the three of them passing instruments and ideas around in the control room until they found a groove.

"I played some bass. I did all the programming, and played a couple of guitar parts as well, but 90 percent of what you hear on the album is the brothers," Warfield says.

Just before beginning The Bots' sessions, Warfield had sold his Pro Tools HD3 rig and installed Apogee Ensemble and a new Mac running Pro Tools 10. Sessions took place, on and off, over the course of seven months; they would break when The Bots left to play Coachella, SXSW, etc., and then reconvene.

Mikaiah Lei plays an assortment of what Warfield calls "thrift-shop guitars." Warfield miked up his reissue 1965 Fender Twin amp with a Shure SM57, and put an SM7 on his '65 Fender Super reissue. Guitars always went through Warfield's Calrec pre's and were panned hard left and right."

ADAM BRAVIN

Engineer/producer/musician Justin Warfied.

"Mikaiah plays guitar through a bass amp and a guitar amp, and he has two massive pedalboards. I had all the cabinets and drums miked, and we had a Roland SPD-SX pad set up in the live room in case Anaiah wanted to trigger 808s or samples.

"The first song I co-wrote with them, 'Blinded,' started with something I programmed. I do some programming in Pro Tools, but mostly I use Native Instruments Maschine. The feel and timing and quantization and even the filters do a good job of emulating the old stuff without being decidedly retro. My sample libraries are on my hard drive and I either program them straight on the grid or through Maschine. But most of the samples and sounds I use get manipulated either with plug-ins or outboard gear, or both."

Warfield used a few different reverbs: a Roland Chorus Echo, as well as Avid D-Verb and R-Verb. "Any songs that sound sort of reggae dub-style were done by hand with a tape echo. On vocals I used R-Verb, SoundToys' Decapitator, the H-Delay. And there was a lot of SoundToys EchoBoy for ambience where I wanted something between slapback delay and reverb.

The go-to vocal chain was a Neumann U87 to an API 512c, into a UA 1176. "Another go-to for me is the [Waves] L1 Ultramaximizer plug-in. It's great on vocals and incredible on snare drums—any time you want to keep something that's just a little peaky under control," Warfield says.

"It was an interesting blend, because it's not necessarily an electronic album, but the way I process audio, there's a very electronic base and background," Warfield continues. "My manager said, I want you to capture that Southern California punk energy like Red Hot Chili Peppers, Fishbone, and Rage Against the Machine—not sonically, but in the energy of this band. That was a touchstone for me."

NEW GEAR

1

NEUMANN
U47 FET
Condenser microphone
$3,999.95

HIGHLIGHTS K47 capsule with double large diaphragm • cardioid pattern • 40Hz to 16kHz frequency range • features slight boost above 2 kHz • -10dB lowcut filter at 140 Hz • -6dB pad • 137dB max SPL • comes in a wooden case with serial number certificate

TARGET MARKET Recording engineers

ANALYSIS Reissue of a classic studio mic with great attention to detail.

u47fet.neumann.com

2

WAVES
CODEX
Native software wavetable synth
$200

HIGHLIGHTS Granular, polyphonic wavetable synthesizer • progressive wavetable scanning • subtractive synthesis features • two oscillators • arpeggiator • 16-step sequencer • formant control • effects include delay, reverb, chorus, bit crusher, and distortion • modulation matrix • standalone and plug-in versions included

TARGET MARKET Composers and musicians

ANALYSIS A highly configurable soft-synth that allows you to import your own samples and wavetables.

waves.com

3

AEA
N8
Active ribbon microphone
$1,098 street

HIGHLIGHTS Phantom-powered ribbon microphone with figure-8 pattern • designed to work with any mic preamp • 20Hz to 20kHz frequency range • matte black color keeps it discreet in film and video applications • completely made in Pasadena, California

TARGET MARKET Engineers and musicians

ANALYSIS Utilizing the aluminum Big Ribbon from its R44 mic, AEA designed the N8 to work well on instruments such as bowed strings and for use as a room mic or drum overhead.

ribbonmics.com

4

SIMMONS
SD500
Electronic drum kit
$499.99

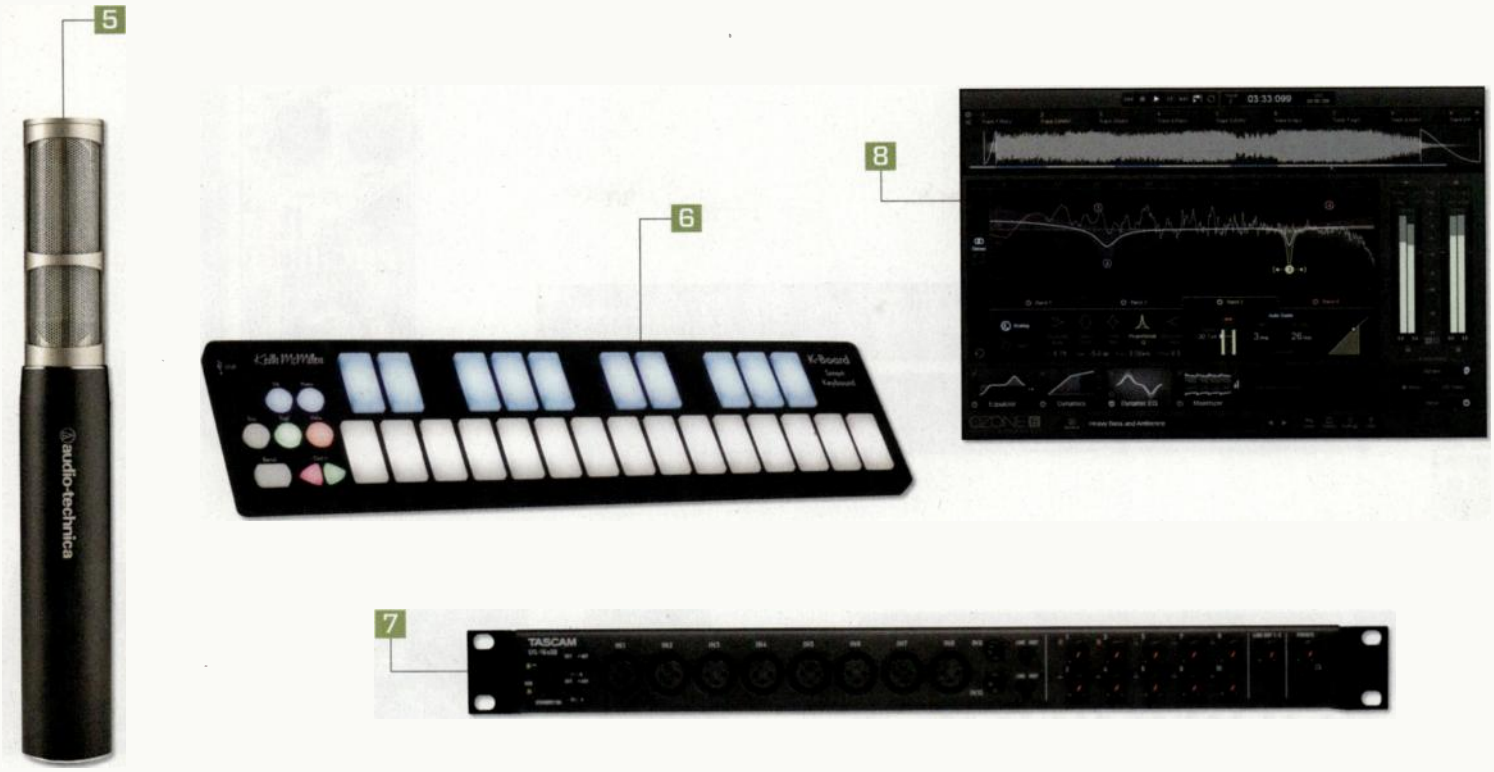
HIGHLIGHTS 5-pad kit with 9"dual-zone snare, three 8" toms, kick pad with integrated pedal, hi-hat pad and pedal, 12" ride, and 10" chokable crash • SD500 sound module offers USB MIDI, 64-voice polyphony, and 50 drum kits built from 350 sounds • round-robin playback of snare and ride samples • 1/8" TRS stereo audio input

TARGET MARKET Rehearsal, studio, education, houses of worship

ANALYSIS An entry-level kit that offers a number of pro-level features.

simmonsdrums.net

All prices are MSRP except as noted



5

AUDIO-TECHNICA

AT5045

Cardioid condenser microphone

$1,399

HIGHLIGHTS Large-diaphragm, side-address, electret condenser with rectangular element • 20Hz to 20kHz frequency response • handles up to 149dB SPL • 141dB dynamic range • internal shockmount around capsule • includes isolation clamp, windscreen, and hardshell case • available as a stereo pair (AT5045P; $2,499)

TARGET MARKET Professional and personal studios

ANALYSIS Featuring a quick transient response and low-noise electronics, the AT5045 was designed for recording acoustic instruments and use as drum overheads.

audio-technica.com

6

KEITH MCMILLEN INSTRUMENTS

K-BOARD SMART KEYBOARD

USB MIDI keyboard controller

$99

HIGHLIGHTS 25 keys that react to velocity, pressure, and tilt • pitch-bend pad • buttons for selecting octave, sustain, and preset • unbreakable • backlit keys • USB-bus powered • works with iOS devices when paired with Camera Connection Kit • available exclusively at Guitar Center

TARGET MARKET Musicians

ANALYSIS Includes many of the outstanding performance features of the KMI QuNexus, but without the CV I/O and Mini-USB Expander port.

keithmcmillen.com

7

TASCAM

US-16X08

USB audio/MIDI interface for Mac, Win, and iPad

$299.99 street

HIGHLIGHTS 24-bit, 96kHz interface with 16 audio inputs • 8 Ultra-HDDA mic preamps with 56dB gain range • 2 front-panel instrument inputs • 8 1/4" TRS line inputs and line outputs • DSP mixer with compression, 4-band EQ, and a reverb send on each channel • USB2.0 High Speed port • standard MIDI I/O • standalone mode provides independent use of the mic preamps

TARGET MARKET Musicians and personal studios

ANALYSIS Rugged design for use in studios as well as at gigs.

tascam.com

8

IZOTOPE

OZONE 6

Mastering software

$249; Ozone 6 Advanced $999

HIGHLIGHTS Includes maximizer, stereo imager, dither, EQ and dynamics processing • dynamic EQ and insight metering tools available in Advanced version • exciter for adding harmonic content • standalone and plug-in versions • standalone app can host VST and AU plug-ins • redesigned GUI

TARGET MARKET Recording and mix engineers, musicians

ANALYSIS In addition to providing essential mastering tools, this impressive update provides DSP effects that can be used creatively before and during a mix.

izotope.com

10

11

9

12

9

M-AUDIO

OXYGEN

USB MIDI keyboard controllers

$119-$229

HIGHLIGHTS Available with 25, 49, and 61 keys • USB MIDI • eight velocity-sensitive trigger pads (larger models include 9 assignable faders) • transport controls • LCD screen • Directlink automatically maps the controls to your DAW • USB bus powered • bundled with Ableton Live Lite, Sonivox Twist, and AIR Music Technology Xpand!2

TARGET MARKET Composers and musicians

ANALYSIS A redesign of the Oxygen line that provides the modern conveniences needed for studio and stage work.

m-audio.com

10

APOGEE

ENSEMBLE

30x34 Thunderbolt 2 audio interface for Mac OS X

$2,495

HIGHLIGHTS 24-bit, 192kHz Apogee converters • 8 mic preamps with 75 dB of gain and stepped gain controls • 16 analog outputs • front-panel, instrument-level jacks with Class A JFET inputs and outputs for reamping • internal/external talkback mic capabilities • speaker selection switches • buttons for Mute, Dim, and sum-to-mono • works with OS X Yosemite

TARGET MARKET Musicians and personal studios

ANALYSIS Designed to work with any DAW supporting Core Audio on Thunderbolt-equipped Mac computers.

apogeedigital.com

11

ELECTRO-HARMONIX

PITCH FORK

Polyphonic pitch shift/ harmony pedal

$174.66

HIGHLIGHTS Adds harmonies • Dual mode provides two harmony notes, including above and below input • intervals range from minor 2nd to 3 octaves • Detune mode • footswitch provides Latch and Momentary modes • expression pedal input for controlling pitch • runs on batteries or included power supply

TARGET MARKET Guitarists

ANALYSIS When used with an expression pedal, Pitch Fork provides automatic glissando effects when you take it out of bypass mode.

ehx.com

12

MACKIE

MIX5, MIX8, AND MIX12FX

Small-format mixers

$69-$159

HIGHLIGHTS 5-, 8-, and 12-channel mixers with all-metal chassis • 1/4" and RCA I/O • phantom-powered mic inputs • EQ on each channel • the Mix12FX includes a 60mm Main output fader and 12 digital effects, such as delay, reverb, and chorus • stereo headphone jack with dedicated volume control

TARGET MARKET Musicians onstage and in the studio

ANALYSIS Affordable mixers that don't take up much space yet offer plenty of I/O for their size.

mix.mackie.com

All prices are MSRP except as noted

13

EISENBERG

VIER

Software synthesizer (Mac/Win)

$99

HIGHLIGHTS Software emulation of the Doepfer MS-404 analog synth • four rack-modules in one instrument • audio-range modulation using anti-aliasing oscillators • parameter linking • voice management capabilities • AU, VST, RTAS, AAX • free trial version available

TARGET MARKET Musicians, producers, and composers

ANALYSIS With four synth modules on the screen and a host of macro controls, Vier is more than a one-to-one virtual version of Doepfer's mono rack-synth.

eisenberg-audio.de

14

NUMARK

NDX500

DJ media player/controller

$249 street

HIGHLIGHTS Software DJ controller • play music from CD, mp3 CD, and USB flash drive • USB audio interface for music playback from your computer • touch-sensitive scratch and search wheel • auto-bpm and tap-override features • three hot cues • vinyl-style braking • pitch change up to 100% in either direction • anti-shock, buffered skip protection

TARGET MARKET DJs and beat producers

ANALYSIS Grab and play music from common digital sources while using modern scratching features.

numark.com

15

AKG

P220

Condenser microphone

$149 street

HIGHLIGHTS Large-diaphragm, cardioid condenser mic • side address • -20dB pad • lowcut switch: 12 dB/octave at 300 Hz • 20Hz to 20kHz frequency range • includes shockmount and aluminum case • part of AKG's Project Studio mic line that also includes the P120 ($99 street), P170 ($79 street), P420 multipattern large-diaphragm mic ($199 street), and P820 large-diaphragm tube mic ($699 street)

TARGET MARKET Musicians, recording engineers

ANALYSIS A re-fresh of AKG's entry-level studio mics.

akg.com

16

SHURE

PSM 300

Stereo Personal Monitoring System

$699

HIGHLIGHTS 24-bit, digital, stereo system operating on 24MHz frequency bands • wireless coverage to 300' • entry-level P3TR112GR system includes SE112 Sound Isolating earphones and MixMode to create a personalized mix • P3TRA215CL pro system includes SE215 Sound Isolating earphones and P3RA bodypack receiver with adjustable limiter and EQ • supports 15 channels per frequency band

TARGET MARKET Touring musicians, houses of worship

ANALYSIS An affordable wireless system designed to be easy to set up and use.

shure.com

17

MOTU

24Ai AND 24Ao

Digital audio interfaces

$995 each

HIGHLIGHTS 24-bit, 192kHz • USB 2.0 Hi-Speed • 24 channels of balanced analog input (24Ai) or output (24Ao) • 48 channels of digital audio • 48-channel digital mixer with routing matrix and splitting • wireless standalone mixing • Web-app control • 32-bit floating-point DSP effects • ADAT and Word Clock I/O

TARGET MARKET Recording engineers, professional and personal studios

ANALYSIS A convenient way to get 24 channels of high-quality analog I/O, and plenty of digital I/O, in just 2RU.

motu.com

18

ANTELOPE AUDIO

PURE2

2-channel digital converter and clock

$2,195

HIGHLIGHTS 24-bit, 192kHz A/D and D/A converter • master clock source with AFC jitter management system • 2 XLR and balanced 1/4" inputs • XLR outputs • 8 Word Clock output jacks • S/PDIF, Toslink, USB, and AES/EBU digital I/O • headphone output with dedicated D/A converter • relay-based analog volume control • stores user presets

TARGET MARKET Recording and mastering studios

ANALYSIS Antelope Audio has put its respected converter and clocking technology into a smaller, more affordable format.

antelopeaudio.com

19

AVID

PRO TOOLS | DUET AND PRO TOOLS | QUARTET

USB 2.0 audio/MIDI interfaces for Mac/Win

$1,099 and $1,899 street

HIGHLIGHTS 24-bit, 192kHz resolution • USB MIDI • Duet features 2 mic/instrument inputs and 2 balanced 1/4" outputs; Quartet has 4 mic/line/instrument inputs and 6 balanced 1/4" outputs • Quartet adds 8 channels of digital input via ADAT/SMUX and speaker selection • buttons for mute, dim, mono sum

TARGET MARKET Musicians, personal studios, educational facilities

ANALYSIS Two Apogee-designed interfaces are now Windows compatible and come bundled with Avid Pro Tools 11.

avid.com

20

ROLAND

HS-5 SESSION MIXER

Headphone mixer

$599 street

HIGHLIGHTS Supports 5 inputs (line-level, instrument-level, and XLR) • provides 5 stereo headphone outputs, each with its own mix • built-in COSM amp modeling and effects • USB port for capturing stereo mixes to a flash drive or sending tracks to a computer DAW • 1/4" and 3.5mm stereo headphone outputs • metronome with tap tempo • saves setups to flash drive

TARGET MARKET Musicians, educational facilities

ANALYSIS A convenient way to rehearse with headphones and record the results.

rolandus.com

All prices are MSRP except as noted

Graphite Mini

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MF8 | 8-Channel/Fader Mini Control Surface

M25 | 25-Key Velocity-Sensitive Mini Keyboard

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M32 | 32-Key Velocity-Sensitive Mini Keyboard

SAMSON

Rather than rely on preset algorithms that model spaces of various sizes, the Erbe-Verb gives you independent control over every variable of your virtual environment.

Make Noise Erbe-Verb

Get ready to add a new dimension to your modular system

BY GINO ROBAIR

Reverb—we often set it and forget it. Perhaps we alter a parameter or two using automation, but rarely do we exploit its full potential. (Most products don't even give us the option.) But spend a few minutes with the Make Noise Erbe-Verb ($489) and the way you think about reverb will be changed forever.

The DSP was programmed by the module's namesake, Tom Erbe, the developer behind soundhack and the Make Noise Echophon. His research into reverb algorithms took him back to seminal designs of the '70s, which helped him devise a unique approach to a common effect.

Rather than rely on preset algorithms that model spaces of various sizes, the Erbe-Verb offers independent control over every variable of your virtual environment. The results will free you from "in the box" thinking by giving you the tools to use reverb-based parameters compositionally: Rather than putting the module at the end of a patch to simulate an arbitrary room, the Erbe-Verb can be integrated *into* a patch to add pitch, timbre, and timing variations ranging from subtle to extreme.

Here, traditional reverb elements such as size, decay, predelay, depth, and output mix are enhanced with Absorb (diffusion and damping characteristics), Tilt (low/high-frequency boost at the output), Reverse, and internal modulation capabilities, all of which are under independent CV control (often, with an associated attenuator). Yet the overall layout of the module remains easy to understand and use.

The Size parameter simulates environments ranging from 35 to 9.3 million cubic feet—great for creating effects from resonators to sustained drones. You can modulate the Size parameter in real time using its CV input and attenuator.

Predelay works independently of the Size setting, giving you the ability to add single echoes or create environments that couldn't exist in nature. An associated CV input is also available for modulation.

The Predelay knob interacts with the module's Tempo and Reverse features, as well. Feed a pulse into the Tempo input and the Predelay control now acts as a quantizer of sorts, dividing or multiplying the response in relation to the input signal—great for creating delay-like sounds. Press the Reverse button (or send a gate signal to its CV input) and the Predelay knob will set the amount of input that is reversed in the wet output. (The dry signal stays in the analog domain, and the Mix level is voltage controllable.)

The internal modulation's Speed and Depth controls can be used to add pitch movement and wobble, to smooth out resonance, or to impart metallic coloration. You can significantly increase the Speed's range by sending a CV to the Tempo input.

Self-oscillation using the Decay control is one of the Erbe-Verb's particularly exciting capabilities. Crank up the Decay parameter, then patch the module's CV output (its level is based on the average energy of the reverb) to the Decay's CV input in order to tame the feedback. To get lovely bowed cymbal timbres, unplug your audio input, turn the Decay to about 4 o'clock, and sweep the Tilt CV with a slow LFO. Set or modulate the Absorb control to further shape the Decay's behavior.

The processing and modulation capabilities of the Erbe-Verb are so powerful and inviting, you'll have to remind yourself to use it as a stereo reverb once in awhile! This is one module you're likely to use in every patch. ■

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Desktop Dynamos

Five new analog synths that offer a big sound in a portable package

BY GINO ROBAIR

Whether you use a keyboard or a DAW, it can be inspiring to have a bit of analog goodness on your desktop or in your performance rig. But size is often an issue in these situations; you don't want a unit that takes up a lot of space or is too big to schlepp to a gig. In this article, we'll look at five self-contained instruments that provide fat analog sounds within a diminutive footprint. (Read about other tabletop analog synths, from Dave Smith Instruments, Doepfer, Korg, and others at emusician.com.)

Arturia MicroBrute SE

ARTURIA.COM
$329 STREET

In both hardware and software, Arturia has mined a variety of vintage analog sounds. Among their recent products, the most exciting have been the MiniBrute and its diminutive brother, the MicroBrute. Both keyboards combine classic monosynth features with the buzzy and pungent timbres of the Steiner-Parker multimode filter—a major standout against the more commonly used ARP, Moog, and Oberheim varieties.

Recently, Arturia released the MicroBrute SE, a limited-edition model that is available in three uncommon colors (white, blue, and orange), with a gig bag and patch cables thrown in for good measure. Like the original MicroBrute, the SE has a reduced-size and a 25-note keyboard that is surprisingly easy to play, with pitchbend, an assignable modulation wheel, and octave switches nearby. Overall, the front-panel controls are intuitively laid out yet provide a surprisingly powerful interface, considering the limited feature set compared to the MiniBrute.

Three waveforms are available simultaneously—sawtooth, square, and triangle—each with its own level control and tone-shaping knob (Ultrasaw, which adds two phase shifted copies to the tone; PWM; and the wave-folding Metalizer, respectively). To add girth to the sound, Arturia includes the Overtone oscillator, which provides either a sub-octave or 5th above the main oscillators; the associated mix control can be modulated with a CV.

The resonant multimode filter provides high-pass, lowpass, and bandpass responses. I'm a big fan of the Steiner filter's throaty bandpass response, especially for bass sounds where a little resonance is added. The MicroBrute SE delivers that tone (and more), especially when you mix in the Overtone oscillator.

In addition to the usual filter controls—frequency cutoff, resonance, envelope amount, keyboard tracking—Arturia includes something called Brute Factor, which increases the level of an internal audio feedback loop as you turn the knob. Crank it up to seriously intensify the sound, or use it to warp the pitch range of the resonant filter. A little bit goes a long way.

The Arturia MicroBrute SE has a built-in CV patchbay that significantly increases the modulation possibilities of the synth.

Another delight is having a slider for each stage of the ADSR envelope generator, as well as the ability to patch it to the filter and VCA. Of course, it would be nice if each stage had its own EGs like the MiniBrute provides, but space doesn't allow it.

The step sequencer can store up to eight patterns and sync to an internal or external (MIDI) clock. The Tap/Rest button is used to set the tempo manually or to add rests when recording a sequence. You can use the keyboard to transpose the sequence in either direction, and the LFO, which provides three waveform choices, can be synchronized to the step sequencer, if desired. Because it goes into audio rates, the LFO (in combination with the volatile filter) can be used to add harmonic complexity.

The inclusion of 3.5mm patch points is one of the coolest aspects of this family of instruments, because it gives you the ability to stretch their timbral capabilities even further. The modulation matrix is located on the front panel and features a pair of CV outputs (LFO and EG) and six CV inputs (Metal, Saw, PWM, Pitch, Filter, and Sub). The rear panel provides further extensibility with a gate input and output, a pitch output (which follows the pitchbend wheel), and an audio input for running external audio through the MicroBrute SE's filter—yum!

You can use the modulation matrix to repatch internal signals to the six destinations, which is exciting on its own, or bring in CVs, gates, and triggers from external instruments, such as a Eurorack or Frac Rack modular, both of which also use 3.5mm cables. The MicroBrute SE comes with two Stackcable patch cables to get you started, but I guarantee you'll want more.

An unbalanced 1/4" output, a 3.5mm stereo headphone jack, a standard MIDI In port, and a USB connection (for MIDI and data) complete the rear panel. MicroBrute Connection software (Mac/Win) is available online and can be used for editing and firmware updates.

In addition to the surprising amount of sonic flexibility it offers—from gentle to face-ripping—the other major draw of the MicroBrute SE is its size: At just over a foot wide and 8.7" deep, it doesn't require much space, yet it feels solid when you're punching out bass lines or tapping in sequences. The result is a ton of analog goodness from a lightweight synth that won't empty your bank account.

More than just a drum machine, the Elektron Analog Rytm combines analog drums sounds and sample playback capabilities with loads of intuitive live-performance features.

Elektron Analog Rytm

ELEKTRON.SE

$1,549

Referred to as an 8-voice drum computer by Elektron, the Analog Rytm is a hybrid rhythm composer that complements the company's other analog instruments: the Analog Four and the Analog Keys. And like the other synths, the Analog Rytm includes specialized performance features that make it equally suitable for stage or studio use.

The instrument provides eight analog drum voices, each of which can be enhanced by a sample playback engine, a noise source, an analog multimode filter, and analog overdrive circuit. But rather than offering eight identical percussion voices, Elektron's engineers created 15 different types, called Machines, to fill specific roles: a range of single-, dual-, and multi-oscillator synths for creating simple drums, complex percussion, and metallic sounds, respectively.

Additionally, each voice has its own VCA, pan control, stereo reverb and delay sends, and discrete output. To provide flexibility in such a small package, the individual instrument outputs are available in pairs from 1/4" TRS jacks, intended for use with an insert cable (a y-cable with a TRS plug on one end and a pair of TS plugs on the other). You also get a stereo pair of unbalanced 1/4" outputs, a 1/4" headphone jack, a USB port, and MIDI In, Out, and Thru (the latter serving as Sync outputs).

The samples aren't just limited to percussion sounds, but include a variety of waveforms, sound effects, and rhythmic elements (piano, bass, guitar, and so forth). You can load additional samples by connecting the Analog Rytm to your computer via USB and using the Elektron C6 utility app.

The main interface feature is a matrix of 12 pads, each of which senses pressure, velocity, and Aftertouch, while providing colored lighting cues to indicate their status. The 0.75" pads are responsive and easy to play despite their size. The row of buttons at the bottom of the panel are used for triggering and programming duties.

An Analog Rytm pattern can include 12 drum tracks, although only eight tracks are voiced at a time. Kick, snare, and two of the toms have priority, while the other instruments work in pairs, where one sound will choke the other when the two are hit simultaneously (e.g., open hi-hat cancels closed hat). Each pattern includes an FX track, which can control Send (delay and reverb) and Master (distortion and compression) effects, as well as a dedicated LFO.

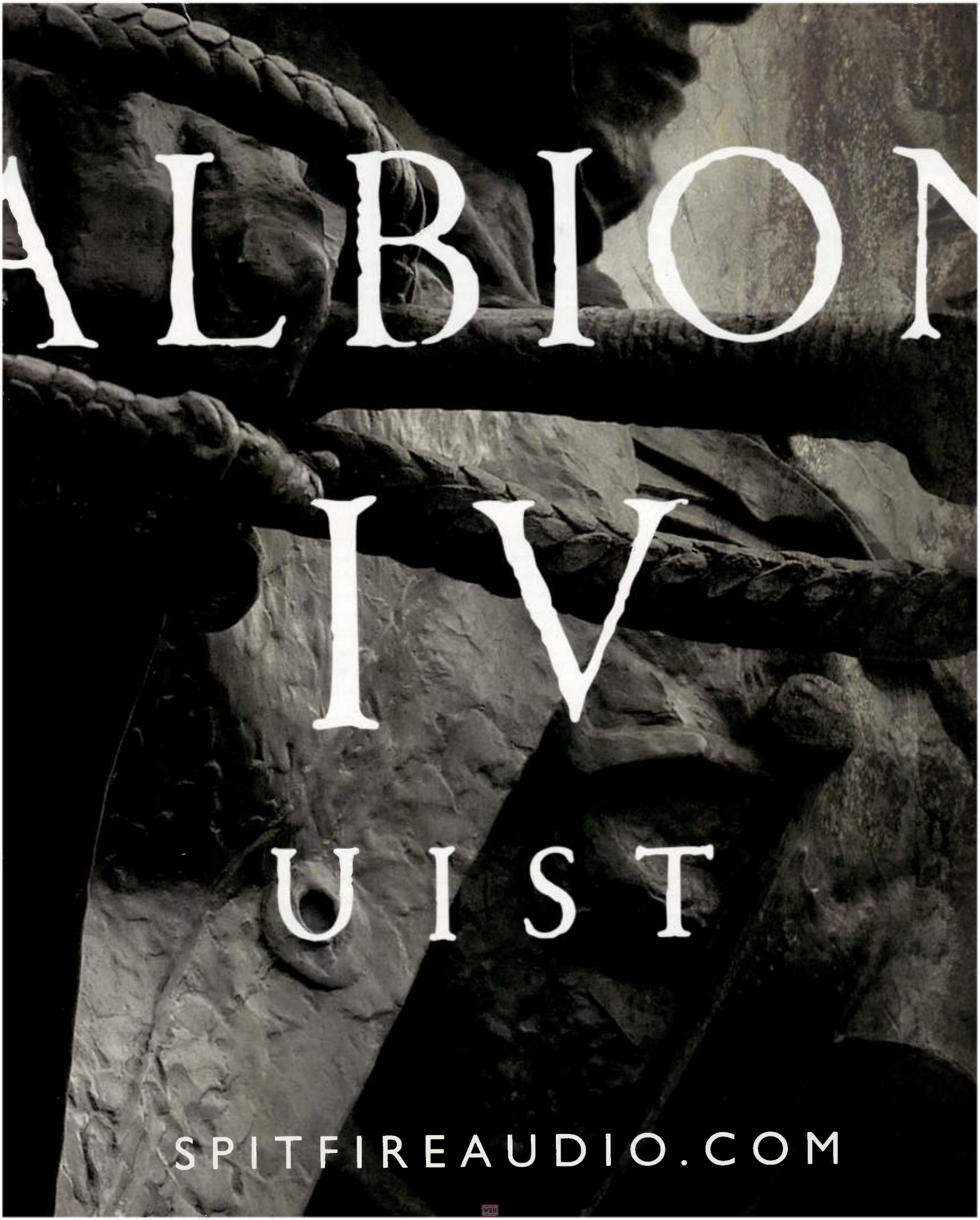
The Analog Rytm has 128 Kits already setup, each of which holds 12 drum Track sounds, the FX track, and control data. Once you've selected or assembled a kit, you create your Patterns, save those as a Song, and then store up to 16 Songs in a Project. This lets you build an album or set worth of material that is readily at your fingertips. Now it's time to use the Analog Rytm's real-time performance features.

In Performance and Scene modes, pressing a pad can alter several instrument-related parameters simultaneously. For example, using a Performance Macro in Performance mode, you can alter the intensity of the effects on, say, the kick drum by the degree of pressure you put on its pad. Scene mode can be used to switch between parameter changes when you press a pad. Chromatic mode lets you play a sound (an analog instrument, a sample, or both) chromatically through a four-octave range using the pad matrix. Hit Mute, and you can silence individual tracks by tapping the appropriate pad. Dedicated buttons make it easy to jump between these modes.

The interface, overall, is set up to give you quick access to most sound parameters while playing the instrument. With clever use of voicing, tuning, effects, and the performance modes, you can make the Analog Rytm sound like an entire rhythm section.

The analog sound palette is wide ranging—from traditional percussion and instrumental sounds through old-school e-percussion to state-of-the art EDM timbres. The programmability and effects give you a lot of flexibility over each sound, while the velocity and Aftertouch capabilities, combined with the stereo delay and reverb, allow you to achieve deep dimensionality with your beats.

Be sure to download the PDF manual from Elektron's website, because it provides all the geekier info you'll need to take full advantage of what this instrument has to offer—and believe me, there's a lot going on here.


ALBION
IV
UIST
SPITFIREAUDIO.COM

The Moog Music Werkstatt-01 is an easy-to-assemble synth kit that packs a big sound and loads of features into a small metal case.

Moog Music Werkstatt-01

MOOGMUSIC.COM
$329 STREET

With the Maker/DIY craze in full swing, it's nice to see Moog Music get into the game with a kit that anyone can build—absolutely no soldering required.

Although the Werkstatt-01 appears to be designed for beginners, there is plenty for intermediate and advanced users to explore. Moog included several design features aimed at education and modification, such as the test points and "experimentation pad" located on the circuit board. The synth's schematic is also available for download.

A growing number of projects and tutorial videos are online at werkstattworkshop.com; in addition to showing synthesizer basics, they demonstrate control and modulation techniques that are surprisingly easy to set up on this powerful little sound module. The online retailer SparkFun (sparkfun.com) sells a mod kit ($29.95) for the Werkstatt-01 to help with the projects shown online, and they even bundle the extra goodies with the synth itself ($349.95).

You can also find "fan pages" online that describe various techniques for hot-rodding the Werkstatt-01, such as adding Arduino or MIDI control. Note that the manual says "hacking or modifying your Werkstatt-01 in any way will naturally void your warranty..." You've been warned!

The Werkstatt-01 kit includes everything you need to build the instrument, except a screwdriver and scissors (see Figure 1). What you're doing, essentially, is attaching the pre-assembled circuit board to the bottom of the metal case with screws, capping the keyboard buttons, then screwing on the top panel. It took me 15 minutes to assemble the instrument, and that's only because I was staring at different parts of the circuit board to see what it offered. (I hope Moog eventually offers a see-through case!)

Once everything is assembled, plug in the power adapter, connect the audio output to an amp and start jamming. The synth has a 13-note keyboard of buttons that are raised slightly from the case and easy to play.

The voice architecture is pure Moog: a VCO with selectable sawtooth and pulse wave; a 4-pole ladder filter with knobs for cutoff and resonance; sections for routing modulation sources to the VCO and VCF; a triangle/square-wave LFO with rate control; a two-stage envelope generator with switchable sustain; a VCA that can be set to sustain or to follow the EG; a portamento/glide control; and a miniature patchbay. All this in a case that is roughly the size of a paperback book.

Despite its simple design, this synth sounds big! And because the LFO goes well into the audio range, you can create some seriously complex tones when using it as a modulator.

The tiny patchbay gives you additional tools to expand the Wersktatt-01's timbral palette: five CV inputs (VCA, VCF, LFO, and linear and exponential FM for the VCO), 14 CV outputs (two of just about everything), and an audio input. Use the supplied patch wires to do fun things like modulate filter cutoff with the oscillator.

With so many patch points, it's obvious the synth was designed to interface with the outside world. However, because the patch wires are not grounded, the manual suggests plugging the Werkstatt-01 and the external synth into the same mixer so they share a common ground. The manual also explains how to make hybrid cables that have, say, a 1/4" plug on one side. I simply used alligator clips to connect my 3.5mm Eurorack cables to the Werkstatt-01's patch cables—brute force, but it worked perfectly. I had so many interconnections going at one point, it felt like the Moog was part of my modular system.

In fact, I wouldn't be surprised to see someone put a Werkstatt-01 behind a modular panel. Its rich, full-bodied sound makes a great addition to any synth setup, yet it's a blast to play on its own.

Fig. 1. Assembling the Moog Music Werkstatt-01 is simple: All of the parts are included, along with easy-to-follow instructions.

Studio Electronics Boomstar SE 80 and Boomstar 5089

STUDIOELECTRONICS.COM
$999/$949 EACH (STREET)

Studio Electronics have built a solid reputation with their line of high-quality, studio-grade analog synths. Recently, they've put their energy into semi-modular desktop products called Boomstar, each a complete MIDI-controllable, fully analog synth-voice that is chock full of useful features.

Using a sloped case reminiscent of the classic Oberheim SEM, Boomstar synths start with the basics—a pair of VCOs, an LFO, a VCF, a VCA, two EGs, internal modulation routing, an audio input, and a mixer. But what makes them so special is their sound quality and modulation capabilities. As a result, the Boomstar synths are suitable for a wide range of musical situations.

The main difference between the five Boomstar modules is the filter implementation (and related controls, if any). For this feature, we've chosen two of the most recent releases: the SE 80, which is based around the classic Yamaha CS-80 filter; and the 5089, which has a Moog-style, 4-pole lowpass ladder-filter. But before we look at those specific modules, let's examine the features that are present in every Boomstar synthesizer.

To begin with, the Boomstar oscillator implementation is geared toward flexibility. Oscillator 1 lets you combine two waveforms—triangle or sawtooth with sine or square—as well as add a square-wave sub oscillator at half or full strength. Pulse width can be modulated internally or manually set. With oscillator 2, you can choose one of three waveforms (ramp, triangle, and square), switch it to hard sync with oscillator 1, and turn off pitch tracking for a drone effect. Both oscillators have independent controls for tuning, modulation depth, and range, the latter notated in organ-pipe lengths to indicate octave (2′ to 32′, plus a low-frequency setting)—a tip of the hat to Moog and Yamaha synths.

An LFO with a continuously variable waveshape—sine through random—provides pulse-width and frequency modulation to the oscillators, frequency modulation for the filter, and retriggering of the VCA. The rate can be set manually or synchronized to MIDI, where it is subdivided in a dozen different ways.

Boomstar synths have independent four-stage envelopes for the VCF and the VCA. The filter EG can be looped to create an LFO, while the VCA EG has single- and multitrigger modes (for achieving different types of keyboard phrasing, such as legato), a Drone mode, and the ability to be triggered by the LFO. The VCA envelope can also act as the master envelope for both the filter and amplifier, freeing up the filter envelope to do other things. Both EGs can be inverted. The VCA also includes an Overdrive switch—very nice!

The filter section has controls for cutoff frequency, resonance, envelope amount, and modulation depth (sourced from the LFO or VCO 2). A three-position switch (full, half, off) determines the degree to which the filter tracks the keyboard. An audio input (3.5mm) is available when you want to run external sounds through the module for filtering and gating effects.

A row of tiny knobs lines the bottom of the panel giving you additional hands-on control over master tuning, MIDI pitch-bend distance, portamento/glide amount, MIDI velocity sensitivity, and the level of PWM from envelope 1. My favorite part,

Although the Boomstar 5089's resonant, lowpass ladder filter helps it create classic tones of the '60s and '70s, its gutsy sound fits modern musical stylings with aplomb.

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residentaudio.com

however, is the mixer, which offers individual volume controls for each oscillator, as well as ring-modulation (based on the frequency settings of the oscillators), white noise, and feedback (the output routed back into the synth, internally). Dialing in just a touch of ring mod or feedback can add a lot to a patch, but of course you'll want to crank them up and make the module scream. And with ring mod and noise onboard, not to mention a cross-modulation control among all the internal routing capabilities, you can make some really tangy sounds.

Studio Electronics thoughtfully included a row of 3.5mm jacks on the top of the panel, providing direct oscillator output and CV (pitch, filter cutoff, and VCA) and gate inputs. On the back are standard MIDI I/O, an Overflow button for connecting several Boomstars together, and a Learn button for automatically setting the MIDI channel. The unit has a single unbalanced 1/4" output jack, and all of these features are packed into a desktop-friendly case that is easily rackmountable.

At this point you're probably wondering how five models with essentially the same feature set can sound so different from each other. The answer is the filter design. Each module is voiced around a classic synth sound, such as the 2-pole Oberheim SEM (Boomstar SEM), the 4-pole lowpass filter of the Roland TB-303 (Boomstar 3003), and the ARP 2600-style 4-pole lowpass filter (Boomstar 4075).

What makes the SE 80 stand out in the Boomstar line is its far-reaching sound palette, which is directly attributable to having two filters in series—a resonant highpass filter followed by a resonant lowpass filter. The module includes two additional controls that are dedicated to the highpass filter—frequency cutoff and resonance.

This dual-filter configuration gives you the ability to design sounds across a wider timbre and frequency spectrum than the other Boomstar modules. For example, it's easy to create quasi-vocal sounds that are reminiscent of a formant filter, or make a resonant bass with low chirps on the attack that ends with high, bell-like timbres during the release. The SE 80 is capable of very aggressive sounds that fit modern dance styles, yet the filters provide plenty of subtle tone shaping that can help the synth fit into a more traditional role.

And although both filters are resonant, they don't go into full oscillation. But they do provide just enough ring to help create percussive and strident tones, especially when you switch the VCA into overdrive.

In contrast, the Boomstar 5089's lowpass filter is happy to self-oscillate when you crank it up. Or back it off a bit to get the yummy squelch that's perfect for leads, bass, and percussion.

The overall sound of the 5089 is big and full; you'll want to play it through full-range speakers to really experience the low end this synth can produce. Those classic analog synth instruments—fat basses, solid leads, brass, plucked sounds, disco drums—are all in there and easy to conjure up.

Whether you use a keyboard or DAW to play the Boomstar instruments, they assimilate easily into a MIDI-based environment. At first glance their price may seem steep: But do the math and you'll realize that it would be very difficult to assemble a modular synth with these features (that sounds this good) for less, once you take into consideration the case and power supply needed for a modular system.

All told, the Boomstar line provides a classic set of old-school tones that fits modern musical styles while easily interfacing with modern and vintage gear. ■

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DUNAJ

DANIEL LANOIS

as artist and producer

One-on-one with the legend who leaves an unmistakable sonic imprint, yet also captures the unique gifts of every artist he produces.

BY BARBARA SCHULTZ

DISCUSSING HIS process, Daniel Lanois describes pieces of music in physiological terms: Songs have spines and limbs; they glitter or glow when they wear jewels. He has, for decades, found his way into new projects by first identifying that spine, or core, of the music, and then arranging parts around that center. In some cases—such his production of momentous albums for U2, Emmylou Harris, Bob Dylan, etc.—the singer's voice becomes that core. All else serves and relies on that center.

On Lanois' ambient records, like his new album *Flesh and Machine*, that center is simply a beginning: "This is the technique that I've embraced over the years," he explains. "It started when I worked with Brian Eno in the early '80s; we made a lot of ambient records. You build your music according to plan, and then strip away the spine or the central character of your plan; then you're left with the ornaments: the overdubs, the garnishings, the effects. By removing the center, I'm left with the garnishings and the ornaments as my center."

On *Flesh and Machine*, Lanois has fashioned moving atmospheres from human voice, processed sounds, and traditional instruments, such as frequent collaborator Brian Blade's drums. Each song creates a scene and a mood; most are quite rhythmic, but they surround rather than ground the listener.

"A lot of what you're hearing on this record are by-products of a plan that is no longer there. The ornaments seemed to be more interesting than the center. It's a technique that is easy to pull off in record making, but harder to pull off in architecture!"

Lanois shared details about his latest album, as well as his unforgettable work with other artists as a producer, engineer, musician, and inspiration.

Tell us about the process of making *Flesh and Machine*. Where, and how, did you create the material for this album?

There's a track on this album called "Sioux Lookout," and that's Brian Blade on the drums—one of the great drummers. When we started that song, I really liked what Brian played but I didn't like a lot of what else I had on there, so I removed what I didn't like, and then I thought: Well, the drums sound terrific, but they're maybe a little bit too simple in that presentation. They sound like a regular jazz kit. I thought, What can I do with this to bring it into the future?

So we sent his bass drum performance to this computer program [Drumagog; see page 37] that replicates his bass drum performance in an isolated sound, including preserving the dynamics of his performance. That gave me a more hip-hop-sounding rendition of his bass drum. We then sent that to a massive [Axys] P.A. that I have in my studio, so the room was just shaking with this hip-hop bass drum sound. Then we put that through a fuzz wah pedal, and the fuzz wah provided a tone, a note, to the bass drum.

Then I recorded the bass note onto the track, and fed that bass note to an [AMS] Harmonizer and created seven other pitches. I printed all of those onto the multitrack, and then I created a bass line from Brian's bass drum by playing the faders and choosing the notes that I wanted for the bass journey of the song. This now meant that I was perfectly locked to Brian's bass drum because he was the source of it all, and it sounds like the most amazing, sticky bass player is following every kick drum beat that's being played by Brian.

It's a very long process, and I wouldn't recommend it necessarily, but that's how we did it and it gives an idea of how we made the album.

Where did you record?

That process that I just described was done in Los Angeles. I also have a studio in Jamaica and one in Toronto, and sometimes we just do things on the road.

What recording platform do you use?

I use a Canadian machine called a RADAR. Otherwise, I use equipment I've collected over the years, from old instruments to favorite microphones and processing boxes. I don't put all of my eggs in the plug-in basket. I still use some pieces of gear that I like; I still use my AMS Harmonizer, which I've been using since the late '70s. It has a great voltage control oscillator that's very musical, and I'm very good at working it. By performing the VCO with my hand, I can put a very processed electronic sound into it, but have it sound like a human voice. That's part of my technique, too.

The worst thing I could ever do is find a setting on a piece of processing gear and go and have a coffee. That doesn't appeal to me. We don't like flower arrangements. We like flowers blowing in the wind! [Laughs]

Is that all synthetic voice on the new album? Do you use your own voice at all?

Yes, I use human voice. My voice appears on the track called "Opera." I sampled my voice and created a palette of notes to perform, similar to the bass technique I just described. But there's another track on there, "Rocco," the opening track on the record—that's my friend Rocco DeLuca. He has the most beautiful voice. Of all the tracks on the record, that one has the most straight-up vocal performance. It's based on Bach. We have the chord sequence and bass line from a Bach piece, and Rocco jammed a bunch of performances over the top. After he left the studio, I meticulously went through them and created a nice melodic and harmonic journey to the piece.

Some years ago, I discovered these singers from Bulgaria: the Bulgarian Women's Choir. They sing harmony, and occasionally it gets very dissonant and the hair comes up on the arm and then settles back down to a comfortable place. I wanted to visit what I remember of the Bulgarian Women's Choir on this piece with Rocco.

Do you have favorite mics or vocal chains, for you or for Rocco?

I usually use just a Shure Beta 58. I generally don't like to wear headphones, and I like to get right on the microphone. The Shure is a very high-quality mic at a very affordable price; I can get more isolation and better signal-to-noise ratio. But I still have my favorite tube

Lanois in his studio with drummer Brian Blade (seated) and engineer Alex Krispin

SELECTED CREDITS

Lanois has worked on recordings by Brian Eno, Paul Oakenfold, Sinead O'Connor, Jerry Lee Lewis, Jimmy Cliff, and so many others. A few of the film scores that include his music are *All the Pretty Horses*, *Good Will Hunting*, *Trainspotting*, and *Sling Blade*. Here's a selection of the big albums:

YEAR	ALBUM TITLE	BAND	CREDITS*
2012	Battle Born	The Killers	Composer, Producer
2010	Le Noise	Neil Young	Producer, Production Assistant
2003	Shine	Daniel Lanois	Artist, Composer
1998	Teatro	Willie Nelson	Composer, Mandolin, Omnichord, Photography, Producer
1997	Time Out of Mind	Bob Dylan	Guitars, Photography, Producer
1995	Wrecking Ball	Emmylou Harris	Bass, Composer, Dulcimer, Guitar, Mandolin, Percussion, Producer, Vocals
1989	Yellow Moon	Neville Brothers	Guitar, Keyboards, Mixing, Producer, Vocals
1987	The Joshua Tree	U2	Bass, Guitar, Omnichord, Percussion, Producer, Vocals
1986	So	Peter Gabriel	Engineer, Guitars, Horn Arrangements, Percussion, Producer

* Note: Other producers and engineers also contributed to some of these albums.

mics. I like to use my Sony C37A that I've talked about in other interviews, but consequently, I've driven the price of those up to where I can't afford them any more!

I've learned my lesson, though. I'm going to find a cheap piece of equipment, I'm going to buy them all, and I'm going to talk about them in magazines and sell them back to people! [Laughs]

It sounds like the processes of writing and recording were fluid—that there weren't necessarily separate phases for creating the material, and tracking.

That's correct. And it's because I'm very quick to abandon what I thought was my best plan, and chase the thing that seems to be more exciting to me. The plan is constantly changing, and if I happen to hit on a sound that's inspiring, I just go with it and trust that it will lead me to a fascinating place.

Did you bring in an engineer, other than yourself, on this album?

Yes, a couple of people. A young man named Alex Krispin helped me out quite a bit on this record. Mostly, I need a friend moreso than an engineer! Some things I want to do are sort of far out, and it's nice to have a mate to help, or just to get down on all fours and plug stuff in with."

Could you talk about the importance of Brian Blade's drumming to your music?

What a great, bright light he's been in my life, first and foremost. He's just one of the greats, and has everything in his playing that I love about acoustic drumming. We also play in a gospel band together. His father is a gospel singer, and a pastor in Shreveport, Louisiana. We play in his group, which is called the Hallelujah Train. So, no matter what happens out there with technology, and whatever dreams we have about what our music should be, we keep our feet on the ground when we play in his father's church.

Are certain instruments or pieces of audio equipment shared across all of your studios?

I'm loyal to the RADAR, and I've collected nice instruments and microphones over the years, and processing boxes that I really love. I think we can safely say that at any given time through any given era of record-making, there have been stand-up pieces that should be cherished and kept alive.

I have a nice collection of Steinway pianos, for example. I hand-picked them and restored them, because I understand how important that is. Bob Dylan is a great piano player, and we started and finished his *Time out of Mind* record on one of those pianos. I thought Bob never sounded better on a piano than he did on that one.

I have my collection of guitar amps and Les Pauls from the '50s, and that enabled me to chum up with Neil Young. He enjoyed the fact that I feel a devotion to these pieces that he also has a devotion to.

I also have some great consoles: I use a Neve 8068 in my L.A. studio, and I have BCM-10s—those little sidecar Neves. In Toronto I have a massive Midas Heritage 4000 [analog live sound console]. I still really like my AMS Harmonizer, so I keep one in each studio.

How do you begin producing another artist? How does the process you developed with Eno work with roots artists—Emmylou Harris for example?

Emmylou Harris is one of the great singers, as Aaron Neville is, and for that matter, Bob Dylan—one of my favorite singers—and Bono. I've been lucky to work with some of the great vocalists, and if you're lucky enough to be in that arena, then you're smart to try to capture those singers at their best. I've found that those early takes are really important to record making.

With Emmylou, specifically, I made sure we treated her as the center and that she would dominate the picture, and I surrounded that beautiful center with other musicians and other instruments. The vocals you hear on Emmylou's *Wrecking Ball* album are all live vocals. There are a few repairs, but not many.

So the technique was [to say], "Okay, Emmylou sit down. I'll sit real close to you, and let's play the song and bring in other players around us." We performed the songs, treating her as the center, and the ebb and flow that happens around her is pretty important. It's kind of a self-mixing system, because people are not going to obliterate her singing while she's sing-

BRIAN BLADE + DRUMAGOG

Engineer Adam Samuels on manipulating bass drum sounds for *Flesh and Machine*: "We used the Drumagog plug-in on on 'Sioux Lookout' and 'Opera.' I used Brian Blade's bass drum to trigger an isolated sound that was then processed through a distortion pedal and amplified thru a P.A. It was re-recorded with a [Shure] Beta 58. This sound was tuned to a few different notes: each note was sent out to a fader on the console. Dan 'played' the notes on the faders and comped together a bass line composed of this tuned, distorted bass/kick sound. It has the benefit of being perfectly in time with Brian's bass drum and it added something magical to the song."

ing. There's a built-in respect for such a person. Musicians obviously serve her phrasing at the time.

That takes care of an awful lot of mixing concerns, and then, once I think we have a take, I'd ask Emmy to sing it a second time, and then another, so I have three vocals, done minutes apart from the original, so the spirit of the song is still in the air. Her phrasing, everything about her singing, is still in her. That might not be there two weeks later in overdubs; it has a lot to do with emotions and the spirit of the moment.

With live vocals you have instruments spilling into the vocal mic, which is a big part of the sound, so for the safety overdubs, I have to pipe the sound of the band back to her through speakers to replicate the presence of musicians in the room. She's wearing headphones on overdubs, so if I don't give her the sound of the musicians, it's not going to make any sense.

Do you use the same method with other singers?

With Bob Dylan, same thing. With Bono, same thing, but we always use wedges for his singing. If you're dropping in a lyric change a week later, you have to pay attention to what you're feeding back into the speakers.

It gets quite complex, though, because not everything works out with the technique I just described. If I try to do it acoustically and it's not happening, then I have to have another card up my sleeve. So, I tend to have another technological angle. I made a record with Bob Dylan called *Oh Mercy*, and on that record, for a lot of the songs I used a bass drum figure on a Roland 808 beatbox. I fed that 808 bass drum figure to Bob in a big Electro-Voice monitor right in front of him, so that became the point of reference for tempo and groove. Then I overdubbed drums and bass on afterward; I played most of the bass on that record myself. Willie Green, who lives down the street, came and overdubbed the drums.

I might have a good idea in my head about an approach, but I have to be humble enough to abandon that should it not be working, and have another approach on reserve.

Do you ever bring other artists whom you produce into your own studios?

I've usually gone to them. All the U2 records I did were made in fascinating locations around Dublin, or we went to Germany. We've always enjoyed building a studio around a project. It establishes a nice level of commitment to the project. You might not get quite that same feeling walking into a commercial studio. I've done that, too, and it's worked out fine, but there's something nice about saying, "We're going to build a place for the artist." That's what I did for the Neville Brothers on *Yellow Moon*. That's what we did for *The Joshua Tree* with U2, and for a Willie Nelson record called *Teatro*.

When I asked Willie how he got started, he said, "Well we were only ever a dance band." So, I decided I would replicate the dance club that he played in as a kid. I had an old Mexican cinema in California at the time; that was my shop. I put some risers in there and had some dancers in, so he didn't feel like he was in a recording studio. We got a very nice performance from him. We were able to make a beautiful record in four days. ■

Barbara Schultz is the managing editor of *Electronic Musician* and *Keyboard* magazines, and a contributing editor to *Mix*.

STUDIO STATIONS

Daniel Lanois did most of the tracking for *Flesh and Machine* in his L.A.-area home studio with engineer Alex Krispin. "You know the idea of mixing a record where all the tracking is finished and then you sit down and mix it? That never happened with this record," Krispin says. "We were mixing through the whole process. I feel a lot of the artistry of this record—the wacky sounds and the very deep soulful sounds—happened because we kept mixing."

Krispin and Lanois kept several stations ready to go in the studio. "Everything is always left set up," the engineer explains. "If you have a good bass sound, don't mess with it. If you have a good drum sound, don't touch it. It means I can run over to the RADAR, and I know if I hit [tracks] one through six, I know I will have my drums up. I know where everything is."

Most of the microphones used in Lanois' stations for this project were Shure SM57s. Both Lanois and Krispin laugh a bit talking about this—probably aware that outsiders may expect to read a very precious list of vintage and esoteric mics. However, the whole concept of leaving stations set up means that versatility and reliability are paramount. "We are fully supportive of the SM57," Krispin says. "There's something so magnificent about those microphones. I put them on kick drums, pianos, guitars, bass rigs—it sounds great."

Krispin shares details about a few of the stations:

"A really important part of the bass sound on 'Opera' and 'Sioux Lookout,' [which Lanois describes in our interview] is the Axys P.A. speaker stack. We would print a kick drum, tune the kick drum, and then run the kick drum through his Axys P.A. and mike that, really pushing it hard. That's one of the main stations.

"For another, we had a [Roland] 808 with a little dub setup on it. We were doing a lot of work through that for drumbeats. There was also a microKorg as well as a [Maestro] Rhythm King drum machine, and they were all going into a Mackie mixer that had access to a few different delay boxes that were on aux synths. The dub station signal was taken direct.

"At our guitar station, most of the sounds came from his Fender Tweed amps from the '50s—between '53 and '58. 'Aquatic,' for example, which is a beautiful steel piece, came out of two Fenders: one Pro-Amp and one Bandmaster. One is a 310 speaker cabinet and the other is a 15, so they're bigger than the standard Deluxe Tweeds. We were hitting them through his Korg SDD-3000 delay [rack unit], which he's been using for years. The SDD-3000 is his preamp, so to speak, and we hit the amplifiers with line-level from that. That was all set up in the foyer of his house.

"Most piano sounds were from an upright Steinway, that we also captured with a 57. We're not big fans, as you can tell if you listen to the record, of shimmery high end. We don't use condenser microphones. I just grab a little cushioning—a towel or a little pillow—jam it in the back of the soundboard, and move it around until it sounds good."

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MCVIAN ETIENNE

Jamie Cullum

British Jazz superstar collaborates with producer/engineer Benedic Lamdin and his band, Nostalgia 77, to record his latest album, *Interlude*, live to tape at The Fish Factory in London

BY KEN MICALLEF

CONVENTIONAL WISDOM holds that jazz is an American art form: the crossroads where blues and folk rhythms meet European harmonies and the resulting concoction is pure swing. Sure, such Euro trailblazers as Michael Garrick, Graham Collier, and Keith Tippett have dipped their sometimes avant garde toes into the swinging brew, but that has never changed jazz's complexion. So it comes as a shock that the spike-haired, soul-crooning British artist Jamie Cullum made *Interlude* (Blue Note), an album that not only swings its knickers off, but does so with great rawness and authenticity.

"I grew up reading Jack Kerouac and listening to Miles Davis and Charlie Parker and imagining being a New Yorker in the '30s, '40s, or '50s," Cullum explains from his home in Great Missenden, Buckinghamshire, England. "Modern jazz records sound so shiny. I want my version of jazz to have a bit of dirt on it. I like jazz when it was about behaving badly and girls and sticky floors and forbidden times. I heard jazz first on the dance floor, or chopped into drum and bass music. That's what gave the music its edge for me, that fact that it was sampled from old music that was layered and made with that kind of grit."

Cullum's *Interlude* was recorded live to tape at The Fish Factory in London by producer/engineer Benedic Lamdin and his band, Nostalgia 77. Their name may recall a K-Tel record of golden oldies hits but this quintet is the real deal, performing jazz with a genuineness that recalls Duke, Louie, and Mingus.

"I've loved the sound of Benedic's records that he's been making with Nostalgia 77 for the past ten years," says Cullum. "Their records don't sound like anyone else. I knew that they were recording live to analog tape, and looking at these old records that they loved and wondering, apart from the musicians, what are they doing that we're not doing now? That was recording in one live room, not using that many mics, mixing it as you've already set it up, and recording live and cutting it to tape. None of us are anti-digital Luddites, but for this type of record this approach works really well. Because you're trying to capture the spirit of the moment and if you get it sounding right then not only the musicians and the songs but the *sound* can tell part of the story as well."

Recording a band with vocals live to tape remains a rarity on either side of the Atlantic, but as sometimes happens, the English take the best of American music and spin it back at us. Cullum reinvigorates such warhorses as "Come Rain or Come Shine," "Make Someone Happy," and "Good Morning Heartache" like a natural jazz singer, injecting the music with power, passion, and a certain beat that is pre Rat Pack, closer to the Broadway bounce of early Ellington (or Slam Stewart), the mystery grooves of Nina Simone, and the bittersweet strains of Billie Holiday and Lester Young. The immediacy and depth of swing heard in *Interlude*'s 15 tracks is undeniable.

"The challenge was great," says Cullum, "because I was walking into a room full of musicians that I didn't know. Recording that way you've got that feeling that if the take is going well for everyone, you don't want to be the one who messes it up. And if you do mess it up, how bad is it, or did you just give it more character? Once you've cut a few songs that way you get used to things not being totally perfect. And you get used to things being real and human."

Recording *Interlude* in three days' time without a signed label deal made the project all the more daring, but Cullum, England's only Platinum-selling jazz artist, is used to taking risks.

"I had a deal on the table but it wasn't one I wanted to sign," Cullum confides. "It was more about having a BBC jazz radio show for four years and wanting to make a jazz album again. I didn't know what it was going to be, we just booked three days in the studio and did some recording, there was no endgame in sight. It's like recording used to be: You'd book a session; you weren't thinking of an album, you didn't know what you'd get out of it. It's more about booking the time and see what happens."

Though his enormous UK success allows Cullum the freedom to do almost entirely as he wishes, one thing he didn't chance was his choice of vocal mics.

"I have an old Neumann U47 and a new Telefunken ELAM 250," he explains. "I use the 250 a lot. When singing this kind of music I want more air around my voice. I didn't worry or rest enough, I just sang it. I found myself using the ELAM more than the U47. That's because the 47 needs a little work at the moment. But I also love singing through my Shure SM7 for pop stuff. I find that the Telefunken doesn't lie to me, but it does capture all that richness.

"When I made my third album, *Twentysomething*, [producer] Stewart Levine had definite opinions about recording jazz," Cullum continues. "That I shouldn't sound like an old person, but someone in their 20s. The problem is you get these beautiful old microphones and they make you want to sing like you're old and schmaltzy. So I use mics that don't give me a false sense of machismo. And I don't like monitors that trick me into thinking a track sounds really good, which is why I like Yamaha NS10s. I like a mic and monitors that don't lie to you."

Located in Dollis Hill, London, The Fish

Benedic Lamdin on Recording Drums With Three Mics

"The main reason for using minimal mics is to create a focused image of the drums without phase problems. I find one mic in the right place either over the snare or in front of the kit captures a good image of the drums if the drummer plays with a good balance.

You can fine-tune the balance of hi-hat and snare by angling the mic toward the hi-hats or away—usually either a U67 or M49 or Coles 4038 two drum sticks above the snare. I sometimes use kick and snare mics to add weight to the picture but sometimes for other style recordings one mic still works. I like an Akai D25 on kick and either a small condenser or dynamic mic on the snare. I don't like it too close. Further out always sounds more natural to me."

Factory is Benedic Lamdin and Nostalgia 77's home turf. Lamdin works on an API Legacy console, recording to a Studer A80 Mk II (and Pro Tools), without plug-ins, but to outboard units from UA Teletronix (LA2A), Pultec and Lang EQs, EMT 140 Plate, and Telefunken and Ampex mic preamps. Minimal gear or not, Lamdin captures a warm, immediate, and live sound at The Fish Factory.

"It's about not too much close-miking, and not too many mics," Lamdin says. "Three mics on the drums, some mics on the different horns, but mainly a stereo pair. A mono mic on the piano. I like the Coles ribbon mics. They kick out loads from the sides so you can put the sax player right in front of the drums and that works, for instance. And if you record without headphones the band balance themselves, really. The simple miking scenario is also restricted by having only 16 channels to work with on the tape machine. Something like Charles Mingus' *Ah Um* sounds very muscular, and it was recorded in similar fashion."

Lamdin recorded acoustic piano with a single Neumann U67 "in line with where the lid comes down." Acoustic bass was tracked using a Neumann U47 pointed straight at the bridge. Drums were recorded very minimally, with a Neumann M49 "just above the kit," an Akai D25 on the kick drum just outside the front head and "different things on the snare drum." A pair of Coles 4038s for trumpet and saxophone, "quite far back from the horn players, one big pace back, which evens out any notes that jump out between the two horn players." Everything went through the API's onboard preamps.

Lamdin set up the group in a circle in the live room, with gobo screens between the musicians and the studio's brick walls to cancel reflections. Cullum sang live (and played piano) in the room with Nostalgia 77, punching in only about 10 percent of the vocal tracks in an isolation booth.

Sitting in his home studio, which holds a complete Pro Tools rig and 3,000 LPs, Cullum says he will record this way again, with everyone recording live to tape with no headphones and minimal isolation."Recording this way was a reminder of how important it is to capture a moment," he asserts. "I love technology, and it excites me, but it's still important to capture a performance. Whether it's like Flying Lotus, who pieces music together in an electronic way, but there is a huge amount of both performance and imperfections on his new record. The recording process needs to tell a story. When it does, you can have something really special." ■

Ken Micallef also writes for *DownBeat* and *Modern Drummer* magazines.

PLAYLIST

NUDE BEACH
77
Don Giovanni

Nude Beach don't sound like the Talking Heads (whose earthshaking debut album was also called *77*), but they are influenced by a good many '70s and '80s indie rock 'n' roll and punk groups, such as early R.E.M., Replacements, and Tom Petty & the Heartbreakers. Glam shades of T. Rex and Stones-esque power moves also creep in. This trio—with their catchy songs and walls of guitar sounds—have taken on a lot, but they do it all with joy and skill. The result is a blast.
BARBARA SCHULTZ

ANDY STOTT
FAITH IN STRANGERS
Modern Love

Manchester-based Andy Stott works the subterranean realms on *Faith in Strangers*, creating dense pieces in shifting layers of sound. Static-filled beats morph into suffocating rhythms ("Science and Industry"), and dry synths intimate *Blade Runner*-like alienation ("Violence"), providing all the comfort of an empty alien teat. Exploiting field recordings, found sounds, and ethereal vocal treatments, Stott re-imagines his heralded 2012 release, *Luxury Problems*, as a bleak yet oddly welcome world.
KEN MICALLEF

THE SMASHING PUMPKINS
MONUMENTS TO AN ELEGY
Martha's Music

The combination of super overdriven guitars along with Billy Corgan's unique voice is here in force. With the addition of Tommy Lee's drums, "Elegy" is a winning effort. True to his style with The Pumpkins' '90s hits, producer David Botrill's mix serves these new songs with pop-ish synth loop intros that often remind the listener of Cheap Trick or The Who at the top of their game, using simple melodies as counterpoints to the wall of power chords.
CRAIG DALTON

RYAN BINGHAM
FEAR AND SATURDAY NIGHT
Axster Bingham

Singer/songwriter Ryan Bingham wrote songs for his latest album, alone in an Airstream trailer on a mountain, somewhere out in California. The full-blown recordings he made in the studio with producer/engineer Jim Scott flesh them out with big, soulful folk-rock tracks that subtly echo the *Crazy Heart* sounds that earned this artist Grammy, Oscar, and Golden Globe Awards. As always, Bingham's arresting, scratchy vocal only adds to the raw intensity of his beautiful songs.
BARBARA SCHULTZ

RUN THE JEWELS
RUN THE JEWELS 2
Mass Appeal

Run The Jewels are two dirty boys coming down on the side of dissonance, the duo of El-P and Killer Mike delivering caustic bangers and cerebral screeds. The two aren't just rapping on the beat; they're beating the rap game: Decades into their careers, they've honed a rawness dragging the lineage of the Bomb Squad, Da Lench Mob, and the Dungeon Family through dystopian grime. Percussive arrangements and sociopolitical provocation flows from claustrophobic barrage to intoxicating slur.
TONY WARE

MARIANNE FAITHFULL
GIVE MY LOVE TO LONDON
Easy Sound

Marianne Faithfull's dark, smoky voice is played against spectacularly gorgeous, ethereal arrangements produced by Rob Ellis and Dimitri Tikovoi and mixed by Flood. With other musical contributions by Brian Eno and members of the Bad Seeds, and songs penned by Nick Cave, Steve Earle, Roger Waters, and more, the sounds are sometimes lush and haunting, sometimes more like big folk Pogues-esque anthems (like the title track). Check this one out and find the great beauty in contrasts.
BARBARA SCHULTZ

OH LAND
EARTH SICK
Tusk or Tooth/Kobalt

Nanna Øland Fabricius, aka Oh Land, is a Scandinavian pop artist working every electronic dance cliche known to man, woman, and beast, yet somehow she makes everything fresh and soap-scrub appealing. Perhaps it's her bold good vibrations or peachy-keen vocals; Oh Land brings sunshine to our world in the irresistibly buoyant "Head Up High," the adolescent bubblegum balladry of "Nothing Is Over," and the clanging pistons of "Hot 'n' Bothered." Expect squeaky-clean good things.
KEN MICALLEF

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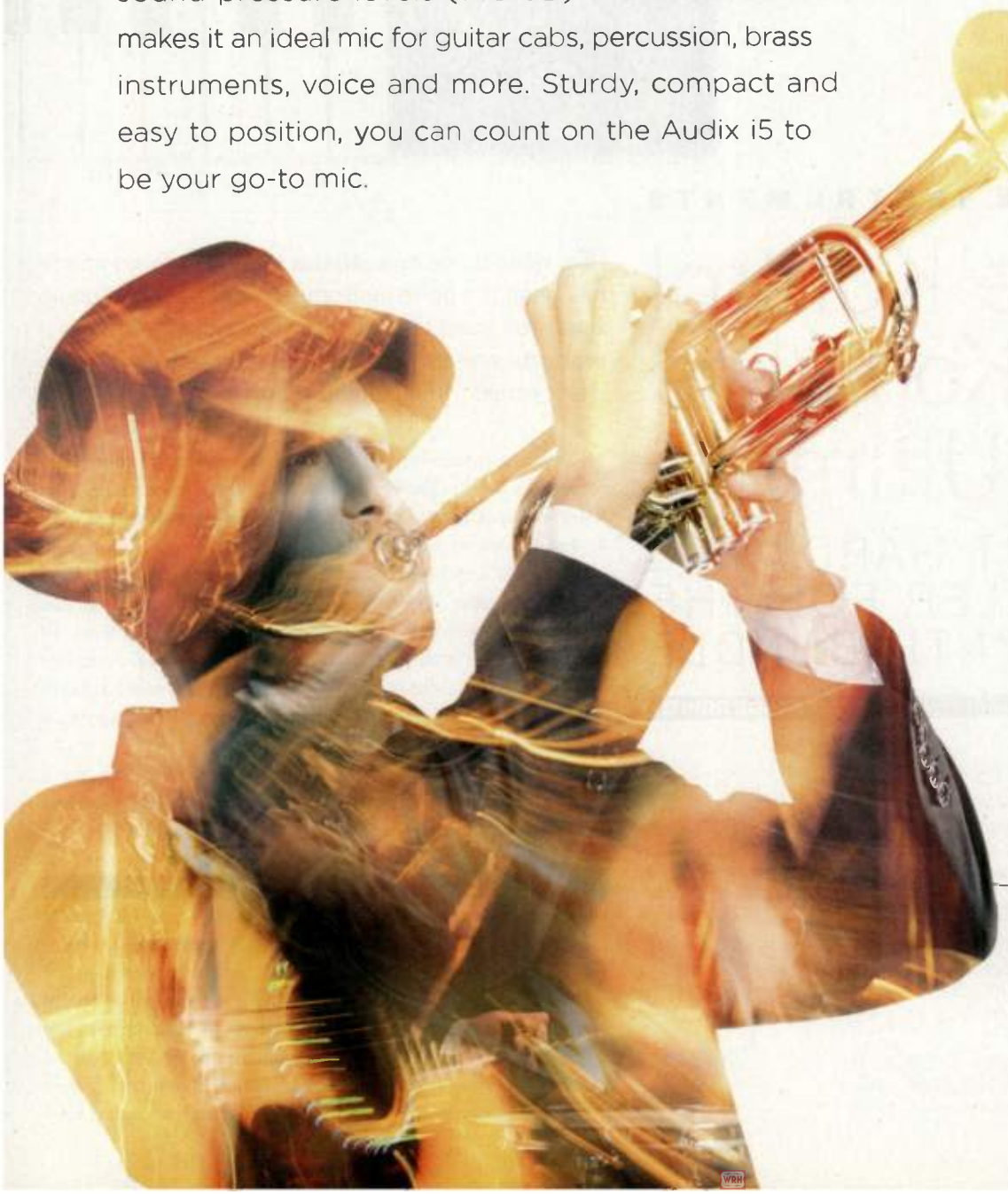

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NATIVE INSTRUMENTS

Komplete Kontrol S49 and Komplete 10 Ultimate

THE PERFECT HARDWARE CONTROLLER FOR THE ULTIMATE SYNTH BUNDLE

BY MARKKUS ROVITO

Markkus Rovito is a musician, DJ, and journalist based in San Francisco.

STRENGTHS

Excellent integration between software and keyboard controller. Light Guide keys. Powerful Scale and Arp functions. Encoder/display pairings step through all available plug-in parameters.

LIMITATIONS

On Macs, the Komplete Kontrol plug-in only works in 64-bit host applications. The Komplete Kontrol arppegiator doesn't output MIDI notes. The Kontrol S controllers' MIDI In and Out only work when connected to a computer.

Komplete 10 Ultimate: $999 street
Komplete Kontrol S49: $599 street
native-instruments.com

For quite some time, Native Instruments Komplete has been the go-to instrument/effect/sound bundle when you want to maximize your industry-standard products-per-dollar ratio. That remains true with the latest version, Komplete 10 Ultimate.

Native Instruments now offers innovative keyboard controllers made specifically for use with its virtual instruments—the Komplete Kontrol S25 ($499), S49 ($599), and S61 ($699), with 25, 49, and 61 keys, respectively.

Similar to how Maschine brilliantly brought phrase-based beat production under one integrated hardware/software umbrella, the new Komplete line enhances the value of the Komplete 10 Ultimate bundle with the Komplete Kontrol software. Komplete Kontrol works as a standalone program or a plug-in within a DAW and comes with Komplete 10 whether you buy one of the Kontrol S keyboards or not.

However, when you add a Kontrol S controller, you get a flawlessly integrated keyboard that lets you quickly load, play, and edit all the sounds that the Komplete bundle has to offer.

KOMPLETE 10 ULTIMATE

For the past couple of updates, Komplete ($499) and Komplete Ultimate ($999) have kept their prices steady while adding content and/or plug-ins—this top-notch bundle has only gotten better with age. Komplete 10 Ultimate stuffs 75 products—all of Native Instruments' instrument and effect plug-ins—and more than 17,000 sounds totaling 440 GB of content onto a portable USB 3 drive, which is meant for installing the bundle onto different computers if you need to over time. The plug-ins must be installed to your

computer's drive, but thankfully, you can install the sound libraries to an external drive.

Komplete 10 Ultimate ships with six brand-new instruments: The Reaktor-based Rounds, Kontour, and Polyplex instruments take advantage of the new performance features of the Kontrol S keyboards, and three new acoustic pianos—the Gentleman, the Maverick, and the Grandeur—make up NI's Definitive Piano Collection. Other recent additions include Drum Lab, Session Horns, and Supercharger, which come with either bundle option, and Action Strikes, Molekular, and Rise & Hit, which are only included in Komplete 10 Ultimate.

The three new piano instruments include up to 18 velocity zones and about 20 presets that were meticulously sampled from three distinct pianos (see Figure 1). The Gentleman is an old-timey upright piano, the Grandeur is a lavish concert grand, and the Maverick is more of an all-purpose grand piano. Each one sounds marvelously detailed, with the same generous interface where you can alter articulations and nuance. You have control over the Tone (EQ, depth, transients, and a compressor/tape effect), Anatomy (velocity curve of the keys, key release, and the level of noise from the hammer, damper, pedal, etc.), and Space (26 reverb types, as well as room size and mic distance).

In contrast to the simple yet elegant Definitive Piano Collection, the three new Reaktor-based synths offer a lot more complexity if you dive into their advanced editing views. On the other hand, by sticking to their default, simplified views, you can take advantage of their amazing sound sets quickly while still making meaningful edits.

Polyplex is the easiest to grasp (see Figure 2). It's a tool built for quickly constructing drum and rhythm kits and then making beats. It gives you eight sound slots—each one layering up to four samples—and several dozen presets to fill them; most are completely modern-sounding, floor-ready drum kits, but there are many sound effect, vocal, and synth stabs thrown in as well. In addition, you can randomize a whole new 8-note kit or randomize each sound slot, one at a time.

Each instance of Polyplex holds eight sounds, assigned to an octave of white keys in an onscreen keyboard or on the Kontrol S keyboard. You can rifle through sounds, find your favorites, and build a monster set of 64 total sounds at the ready. Or use the different kits to create alternate setups that you switch between during a track, recording the kit switches into your DAW, if you like.

For deeper editing, the advanced view lets you swap and edit samples in each slot. You can reverse them; tweak the envelope, LFO, or EQ; and apply up to four effects from a list of 18.

Rounds includes two synth engines: a 2-oscillator, analog-style synth and a 3-oscillator FM synth (see Figure 3). The novelty of Rounds is in the dizzying Voice Programmer, eight blocks of four cells/sounds each that cycle through in a rhythmic sequence. You can distribute the 16 patches per instance throughout the Voice Programmer and adjust its rhythms.

Fig. 1. The new Grandeur Definitive Piano Collection instrument shown within the Komplete Kontrol host, with the Komplete Browser and Perform Panel Arp showing.

Fig. 2. The new Polyplex rhythm kit synth has colored cells that reflect on the Kontrol S49's Light Guide keys.

Kontour takes phase modulation synthesis to beautiful new levels of texture. You can painstakingly edit sound using the advanced view or enjoy its default view, where many of the key parameters are consolidated into just four controls (see Figure 4). Those four controls also

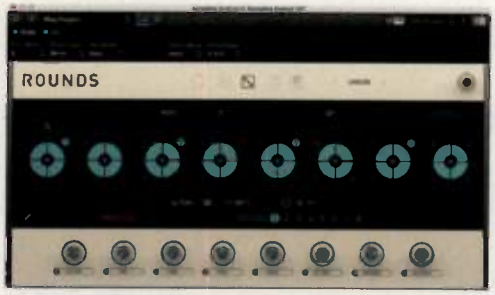

Fig. 3. The new Reaktor-based Rounds synth with the Perform Panel Scale showing.

Fig. 4. The new Kontour synth shown in its editing view. The instrument includes a Motion Recorder, as well.

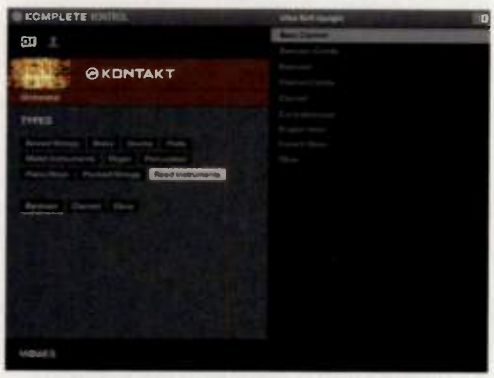

Fig. 5. When called up from the Komplete Kontrol S-Series keyboard, the Komplete Browser looks like this.

have a Motion Recorder with modulation. Use the preset modulation curves or record your own.

I quickly fell in love with the gorgeous detail of Kontour's sound, which reaches from decidedly organic to frightfully alien. Digging into its edit view paid dividends in ear candy. For example, a simple pad sound can split into fantastic layers of satisfying noise when you fiddle with the comb filter, cabinet distortion effect, different envelopes and mixers, and so on.

Komplete 10 Ultimate's new Reaktor-based synths offer a world of sonic exploration unto themselves and further exemplify how much you can do with the overall package. We can't cover every piece of the Komplete 10 Ultimate package here, but the six new additions live up to the quality standards of the other industry favorites, such as the Kontakt 5 sampler, Guitar Rig 5 Pro amp and cabinet suite, and Reaktor 5, Absynth 5, and Massive synths. If you need any one of those plug-ins, you might as well consider the Komplete 10 bundle: For all the high-end dynamics processors, cinematic score-worthy instruments and sound libraries, Komplete 10 Ultimate is still the best value that it's ever been.

KOMPLETE KONTROL SOFTWARE

While you'll get the most out of the new Komplete Kontrol software host with one of the Kontrol S keyboards, it comes with the Komplete 10 software packages on their own, so you can take advantage of its most obvious perk: the Komplete Browser. This takes the familiar NI browser that you find in some single programs like Maschine, Reaktor, or Kontakt and applies it to the entire Komplete sound and instrument patch library.

The Komplete Browser lets you search both the Komplete Library and the file tree of your computer desktop for compatible files (see Figure 5). Within the Library, you can search the factory content and your user presets in the same manner—all the instruments, certain types of instruments or one specific instrument. You can filter the options with keywords from a text field and/or by drilling down to particular patches by Types (Bass, Drums, Guitar, Synth Lead, etc.) and Modes (Arpeggiated, Chord, Monophonic, Synthetic, etc.).

Komplete 10's effects plug-ins and patches aren't available from the Komplete Kontrol program, because Komplete Kontrol is only for playable sounds. So you can load Komplete 10's effects from your normal DAW plug-in menu. Both Komplete Kontrol and the individual Komplete 10 plug-ins are available in AAX, AU, and VST formats. Note that on a Mac, the Komplete Kontrol software will only work as a plug-in at 64 bits.

The Perform Panel has two sections—Scale and Arp (arpeggiator). These work with either a Kontrol S keyboard or with any incoming MIDI notes. However, the Kontrol S keyboard provides enhanced features (covered in the next section). Both the Perform Panel and the Komplete Browser are collapsible, saving display space.

In Scale mode, Komplete Kontrol will only play selected notes, regardless of what MIDI note comes in. (Wrong notes are rounded up to the nearest Scale tone.) Choose the Root Note, then select from 15 Scale Types (major, minor, major pentatonic, blues, Japanese, flamenco, etc.).

In Chord Mode, each single note can trigger 2-, 3-, or 4-note chords. You can create chords around specific intervals using the Harmonic Chord Mode setting or work diatonically by selecting Chord Sets.

The arpeggiator has two modes: Arp and Note Repeat, the same beat-oriented feature from Maschine and the Akai MPC series. Note Repeat lets you choose the note value, swing amount and gate percentage for the repeated notes.

There are five Arp types for varying the order of notes played, and 22 note-values for the Rate—from whole notes to 128th notes (including dotted and triplet values). In addition to swing and gate values, Arp has eight Sequence settings that apply rhythmic variations to the arpeggio, an Octave rage of 1-8, and a Dynamic percentage which scales the velocities of incoming notes.

You can use the Scale and Arp modes simultaneously, which makes for really interesting results when you input the notes of several chords into the arpeggiator at once. All told, it's an extremely capable arpeggiator and a great tool to apply to any Komplete sound.

KOMPLETE KONTROL S49

Although Komplete 10 Ultimate's possibilities already seem endless, you can use them in a more streamlined way with one of the Komplete Kontrol S-Series keyboards. We received the Kontrol S49 for review: Aside from the number of keys, there is no functional difference between it and the S25 or S61.

The keyboards have semi-weighted Fatar keybeds with Aftertouch, a USB port, MIDI I/O, and two MIDI-assignable footswitch jacks. However, with all the power needed for the LEDs and displays, the Kontrol S-Series requires AC power. Also, the MIDI I/O ports only become active when the controllers are connected to a computer over USB, so that limits your ability to use them with a MIDI module onstage without a laptop.

Immediately, one notices that the Kontrol S-Series is not stuffed with every assignable control type possible. Most MIDI controllers these days include mini channel strips of knobs, sliders, and buttons, as well as drum pads and whatever else can fit, but the Kontrol S is different. Eight encoders, each with a 3-line display, and two arrow buttons with an accompanying display are all you have to tap into Komplete's instruments.

Using NI's Native Map technology, every Komplete instrument already has its parameters mapped, so when you load them, the arrow display tells you the preset that's loaded and how many pages of eight parameters you can step through. For example, if there were 64 controls mapped, the arrow display would show "1/8" and then "2/8" if you step to the next page, and so on. The display under the appropriate knob shows the name of the parameter with the specific value.

To have this level of preset mapping available to the largest software-instrument bundle in the world is incredible. If there were a number-one reason to pair a Kontrol-S keyboard to Komplete, that would be it.

Of course, the downside to all of that is if you

play in the stryke zone

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want to use a Kontrol S-Series as a master MIDI keyboard for your DAW and other plug-ins, you have a limited control set. In addition to the keys, you only have the eight knobs, two footswitch jacks (footswitches not included) and pitch-bend and modulation touch-strips that can receive MIDI assignments. You can create as many templates as you want in the free Controller Editor software or use your software's MIDI Learn function. But a Kontrol-S keyboard will serve you best if you're using Komplete instruments as your main sound sources.

The Kontrol S-Series does offer some advanced host integration features, depending on your DAW: Ableton Live 9, Apple Logic X, Steinberg Cubase 7.5, and Nuendo 6 work with all the available host integration features, such as using the Kontrol S backlit arrow keys to navigate and select DAW tracks or recognizing the transport controls.

After some initial setup, I got the Kontrol S49's host integration functions working in Ableton Live 9.1.6. Then I set up eight MIDI tracks, all with different instruments loaded into Komplete Kontrol, and I was able to swap between the tracks and record parts in an 8-bar loop, quickly putting together the basis of a song mostly from the keyboard itself. Although I used my mouse to solo and mute tracks, among other tasks, the Kontrol S49's host integration definitely saved me time.

DAWs that don't support the full integration features but offer Mackie Control will at least allow you to use the Kontrol S's transport buttons. Of the major DAWs, that only excludes Avid Pro Tools 11. Nonetheless, every host will allow the Kontrol S keyboard full control over the Komplete Kontrol plug-in.

One more novel twist is the LED feedback from the pitchbend and modulation touch strips. The strips can be assigned to any parameter depending on the preset, but their behavior mimics traditional pitch-bend and modulation controls. Both will jump to any spot you touch with great responsiveness, though the pitch strip will spring back to the center, while the modulation strip will remain at the last spot touched. In the software preferences, you can set the speed and ballistics of the springiness of the pitch strip.

With the Kontrol S-Series, NI introduces Light Guide, a color-coded light system for each key that is customized for individual Komplete instruments and for the Komplete Kontrol Scale and Arp features. A multi-color LED sits above each key, and at their most basic state, they are half-lit when inactive, and fully lit when a note plays.

Many Komplete instruments have their own uses for Light Guide. In Battery, for instance, the keys are color coded to the drum cell colors. In Polyplex, not only are the eight drum cells color coded, but the eight keyboard keys that hold the different kit setups are shown in red; you see immediately which kit is active and can easily switch between them or use the Octave buttons to position them on the keyboard where you want them. In Rounds, there is a separately colored zone for switching the different Voice Programmer sequences, and key zones get their own colors in instruments such as Kontakt.

Light Guide also lends a hand to Komplete Kontrol's Scale and Arp functions. A Key Mode feature to the Scale only works when you're using a Kontrol S-Series keyboard. In Standard Key Mode, Light Guide lights up only the keys that are in that scale, with the root notes illuminated to stand out. Hitting a darkened key will trigger the next note up in the scale. There's also an Easy Key mode: Whatever scale you're using, the root note is mapped to middle C, and you only play the white keys. (Black keys don't trigger anything in that mode.)

RAPID-FIRE SOUND DESIGN

The Komplete Kontrol arpeggiator has tons of great options, including plenty of Rate note values. While the highest of those values, 128th notes, seems kind of ridiculous at first, they can be really cool for creating unexpected sounds and effects. Combining it with the Scale Chord Mode takes you even further.

To see how powerful this can be, choose a basic preset, such as an acoustic piano or plucked string instrument. Turn on both the Scale and Arp from the hardware or software buttons. Set the Scale Chord mode to Harmonizer and choose a 3- or 4-note chord. Set the Arp Rate to 1/128 and your master tempo to around 120. Now press one key and see what you get. You may be surprised by how alien your sound has become, like a vintage 8-bit arcade sound or some kind of alarm or laser beam. Changing the arpeggiator Type on-the-fly can alter the effect drastically.

To take it to extremes, add more notes by holding down three or four keys, and also increase the Octave setting. It's interesting what adding just one additional octave or another note can do. Play around with the different Sequencer settings. If you find that adding octaves and changing the Sequencer are reducing the rapidity of the notes and making them more recognizable, add distortion, flange, filter, or other effects to your DAW track, or simply try another sound.

KOMPLETELY KONTENT

With the Komplete Kontrol S-Series keyboards and companion Komplete Kontrol software, Native Instruments has done for its Komplete 10 Ultimate bundle what the company did for beat production with Maschine; created a beautiful harmony that binds the advantages of software with dedicated hardware.

Sure, the Komplete Kontrol S-Series keyboards cost more than many other MIDI keyboards of their size. And you can use any of those to control the Komplete instruments and effects. But you will be missing out on the convenience and time savings of a fully integrated system that the Kontrol S controllers provide.

And it's pretty amazing that you can purchase Komplete 10 Ultimate and the Komplete Kontrol S49 for less than the price of many keyboard workstations. ■

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ReValver's GUI has been rebuilt from the ground up.

PEAVEY

ReValver 4

ROCKIN' AMP SIM ADDS AWESOME GUITAR MODELING AND MORE

BY MICHAEL COOPER

The Peavey ReValver guitar-amp simulator has won adoring praise for its tube-like tone and deep editing capabilities: Even the modules' tiniest virtual electronic components—tubes, transistors, capacitors, and the like—are subject to your hot-rodding whims.

Michael Cooper is a recording, mix, mastering, and post-production engineer and the owner of Michael Cooper Recording in Sisters, Ore.

STRENGTHS

Sounds terrific overall. Versatile. Easy-to-use. Deep editing. Expandable through the Amp Store. Gig Mode for live use. Inexpensive.

LIMITATIONS

ACT (guitar input) profile is volatile. Time-based effects do not sync to host's tempo. Acoustic guitar models and some effects fall short. Not compatible with MK III.V presets.

Peavey ReValver 4: Basic: Free; Producer Pack: $99.99; upgrade from MK III.V: $49.99
peavey.com

ReValver 4 ups the ante, big-time. The new release adds guitar modeling that alters the tone of your axe to match another's, placing the sound of numerous virtual acoustic and electric guitars at your fingertips. The new RIR 2 cabinet modeler attains a higher level of realism than the legacy RIR module by emulating the impedance interaction between the selected cab and amp (see Figure 1). But we're really talking a complete makeover here, as ReValver's audio engine and GUI have been rebuilt from the ground up, adding real-time 64-bit operation to its legacy real-time 32-bit and offline 64-bit modes. The cross-platform amp simulator comes in both lite and full-featured versions, the former offered as a free download.

Both a standalone application and plug-in (in VST, AU, and AAX formats) are included. I reviewed the AU plug-in in MOTU Digital Performer 8.06 (DP), using an 8-core Mac Pro running Mac OS X 10.9.5. My sonic assessments were made playing a '62 Fender Stratocaster routed in series through a Millennia TD-1 recording channel (set to contribute the least amount of coloration: DI input/FET gain/transformerless output), to an Apogee Rosetta 24/96 A/D converter, and into the digital input of a MOTU 2408mk3.

ACTING UP

ReValver 4's outstanding new guitar modeling (dubbed Audio Cloning Technology, or ACT) analyzes the tone of your strummed guitar at the amp sim's input to create a sonic profile of your instrument (see Figure 2). Then, using presets stored in a pop-up menu, it changes your guitar's tone to that of a different acoustic or electric guitar. You can click a preset's audition button to hear a short recording of the actual guitar that was modeled. ACT also lets you shape the tone of your complete rig—or two rigs set up in parallel signal paths—at ReValver's output. ReValver 4 also includes a new normalization function that sets the optimal input level for the guitar you're using.

The new RIR 2 Cabinet Simulation Module is far more versatile and user-friendly than the original RIR, parsing the cab and mic selections into separate pop-up menus (instead of an integrated impulse response) and allowing you to graphically edit the mic's placement on the speaker cone (angled on- or off-axis) and add room ambience. You can still use the original RIR interface, which is especially useful for loading third-party impulse responses.

The standalone version of ReValver 4 offers Gig Mode for live use. Using MIDI Program Changes 1 through 8 in turn, Gig Mode switches seamlessly among eight presets you've previously loaded into slots at the top of the GUI. Three filters let you tweak the tone of the eight presets as a whole, optimizing their sound for a particular P.A. system, hardware-based guitar rig, or venue. The whole enchilada can be saved as a bank and different banks recalled for, say, different sets you plan to play live.

WHAT'S IN STORE

The free version of ReValver 4 includes two amp modules, a lite version of the aforementioned RIR 2 Cabinet Modeling module (featuring three cabs and three mics with multiple mic positions), two stomp boxes, one effects module, a signal splitter (for playing through two rigs in parallel), several ACT input (acoustic- and electric-guitar models) and output (global tone) presets, and access to Peavey's online Amp Store. (Enter your account there by clicking on an icon in the GUI.) At the Amp Store, you can purchase more than 100 additional amps, cabs, stomp boxes, effects, and ACT bundles à la carte using PayPal; prices range from $1.99 for a RIR 2 cabinet to $7 for an amp module.

To get all the features for ReValver 4 described in this review—plus dozens more cabs, mics, stomps, and effects and ACT Strat and Les Paul preset bundles—you'll need to buy the ReValver 4 Producer Pack or upgrade to it from ReValver MK III.V. Besides a much greater selection of mics and RIR 2 cabs, the Producer Pack includes re-modeled versions of most of the amp and effect modules that came with MK III.V. The Amp Store offers a boatload of additional content. Because ReValver 4's models and code are all new, MK III.V presets are not forward-compatible with it.

FIRING UP

Peavey asserts that ReValver 4's ACT modeling involves more than just EQ matching, and my listening tests confirmed this: I could clearly hear saturation changes for different electric guitar models, and dual-pickup selections produced euphonious phase changes. While there are many terrific-sounding electric-guitar models offered, I wasn't impressed with the acoustic-guitar presets (at least not with electric guitar input); they tended to sound glassy and brittle. A blend control let me adjust the balance between the sound of my Strat and the selected model, creating a hybrid instrument. Cool!

At the time of this writing, ReValver 4 loses your ACT guitar profile when you switch global presets, making you prompt ReValver 4's analysis of your instrument again. Peavey promises an update that will allow you to store your guitar's profile within a preset. One application this will allow (using the standalone application's Gig mode) is instantaneously switching virtual guitars playing through different amps and cabs, all with one simple MIDI Program Change command.

The new RIR 2 cabs and World Wide Verb effects module (combined reverb and delays, with filters) sounded excellent. I also really liked the Again Stereo Delay module (which has a tap function) when set to produce discrete echoes; with its chorus and ambience effects defeated, it sounded wonderfully warm and lush. I wished the new Käften Noise Gate module offered an adjustable range control; it didn't always eliminate enough noise when using high-gain setups. The new Square-Phase stomp and Digital Flanger sounded a little thin to my ears.

ReValver 4, like earlier releases, can't sync parameter values for time-based effects (delay, chorus, flange, and reverb) to the host's tempo, but Peavey promises to implement this soon. There are still no undo and redo functions, making edits a unidirectional process.

But Peavey got the most important stuff right: excellent and wide-ranging electric-guitar tones, deep editing capabilities, and an extremely intuitive and well-organized user interface. The inexpensive price makes the ReValver Producer Pack a compelling choice for new buyers, and the ACT instrument modeling alone makes an upgrade from MK III.V an absolute must. ReValver 4 is a winner! ■

Fig. 1. ReValver's Amps & Cabs view. In the RIR 2 module (at the bottom of the GUI), note the disclosure arrows for the separate pop-up menus for cabs and mics. Clicking on any of the dots on the RIR 2 speaker icon moves the virtual mic to the corresponding position. Clicking on the shopping basket (top right of GUI) takes you to the online Amp Store.

Fig. 2. The ACT preset menu, showing stock content and additional Amp Store instrument models.

Quick Tip: PROFILE YOUR GUITAR

To help ReValver record an accurate sonic profile of your guitar, first select an instrument preset (a modeled guitar) in the ACT input module. Click on the preset's record button and strum bar chords—alternating up and down strokes—up and down your guitar's neck until the profiling process completes in about ten seconds.

Small, portable, and iPad-friendly, the Simmons Stryke6 puts six pads and two pedals under your hands and feet at a budget price.

SIMMONS

Stryke6

A LOW-COST IPAD CONTROLLER YOU HIT WITH STICKS

BY MARKKUS ROVITO

Markkus Rovito is a musician, DJ, and journalist based in San Francisco.

STRENGTHS

Low price. Includes 30-pin and Lightning cables. Long battery life. General MIDI compatibility.

LIMITATIONS

Unreliable iPad app connectivity with power cable attached. Short iPad cables. The casing can trigger pads when hit. False triggering when a pad is hit too hard.

Simmons Stryke6: $299.99 MSRP, $129.99 street
simmonsdrums.net

The wealth of iPad music apps for musicians and producers has led to an influx of compatible music hardware. One such device is the Simmons Stryke6 drum pad, a plug-and-play iPad controller that also connects to computers via USB.

The Stryke6 includes cables with Lightning and 30-pin iPad connectors, a USB power cable for charging the internal battery, and a USB cable for sending MIDI to a computer as well as drawing USB bus power. Strangely, the controller had problems connecting to iPad apps when its power cable was also plugged in.

The Stryke6 supports the iPad 2 and later running iOS 6 or higher. The fully charged internal battery worked for more than six hours with an iPad connected. (Note that the Stryke6 does not supply power to the iPad, itself.)

The six rubberized, velocity-sensitive pads are meant for playing with sticks, and you're encouraged to use the small plastic one that come with the unit. If you use full-size drumsticks and hit the pads very hard, you might trigger neighboring pads. You can also play it with fingers and hands, though the pads are not as responsive as dedicated finger-pad controllers. Colored lights around the pads illuminate when you strike them, and LEDs indicate when you use the two included foot pedals.

The Stryke6 has four rubber feet for tabletop use and is about the size and weight of a 13-inch Macbook. The controller, pedals, and cables will easily fit inside most laptop cases along with a computer.

APPS AND MIDI

The free Stryke Drums app for the Stryke6 has three modes: Boot Camp, Groove Coach, and Free Play. In the latter, you can play along to the 16 preset songs or freestyle it using one of the six drum kits—Standard, Rock, HipHop, Brush, Latin, and FX.

Boot Camp includes short lessons for beginners on everything from how to hold the sticks to the fundamentals of reading music, such as time signatures and note values. There are nearly 50 lessons and tests for developing your ability to read music and play in time.

Groove Coach tests your ability to play along to the preset songs in either Game mode, which shows you a color-coded rolling timeline of notes (as you'd see in a game like *Rock Band*), or Pro Drummer mode, in which you play more complex parts along to the songs using sheet music. Stryke6 also worked great as a standard drum controller for MIDI-controllable iOS apps such as Alesis DMTouch (free).

As a MIDI controller over USB, Stryke6 worked equally well. It has no editor software or on-board hardware configuration, but the unit sends General MIDI info for a drum kit. For example, if you open a MIDI track in Ableton Live and put a Drum Rack on the track, the Stryke6's kick, snare, hi-hat, and other pads line up as they do with the Stryke Drums app. If your software has MIDI Learn, you can use the pads and switches to control other things.

BEAT IT!

Overall, the Stryke6 provides a low-cost alternative to more expensive e-drum gear, but without all of the high-end finish. While it is oriented towards beginners, the Stryke6 may appeal to experienced musicians as well, whether they use it onstage or in-studio with an iPad or a laptop. ■

L502 5-Channel Mixer

L802 8-Channel Mixer

FRONT AND CENTER

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Fig. 1. The Osc window displays Serum's two oscillators as well as envelopes, LFOs, and associated parameters. You can drag and drop envelopes and LFOs onto control knobs to modulate their parameters.

XFER RECORDS

Serum

WAVE GOOD–BYE TO BORING SYNTH SOUNDS

BY MARTY CUTLER

Wavetable synthesis isn't a new concept: In the '70s, synthesizers such as Wolfgang Palm's PPG used digitally stored waveforms as lookup tables. With the capability of sweeping through the tables to produce animated sounds, you could create timbres that went beyond what most analog synthesizers of the time were capable of.

There have been numerous wavetable synthesizers in the software domain, most notably Steinberg's version of the PPG, Arturia Prophet V, Native Instruments Massive, and MOTU MX4. Xfer Records' entry into wavetable synthesis is Serum, which manages to combine great depth in programmability while maintaining an intuitive user interface. Serum is available as a download that includes AU, AAX, and VST plug-ins, and I tested it on my 2.93GHz, 8-core Mac Pro using OS X 10.9.5 with 14 GB of RAM.

FASCINATIN' OSCILLATORS

Serum has four main windows: Osc, FX, Matrix, and Global. Osc tops off with sections for each of Serum's four oscillators (two main oscillators, plus Sub and Noise). The Sub Oscillator serves up basic analog-style periodic waveforms, which you can transpose up or down by four octaves, so you are not restricted to sub-oscillator functions. You can send the oscillator directly to the output (bypassing filter and effects settings), set pan and level positions, or use it as a modulator for AM, FM, ring modulation, or sync functions.

In addition to sharing the same modulation capabilities as the Sub section, the Noise oscillator has a one-shot mode that is useful for adding attack-transient effects. Used as a transient, you generally wouldn't want the pitch to change according to the notes played, but you can enable pitch tracking with a click on a button. Additionally, you can set the start time of the noise playback or randomize it.

The Osc window displays the wavetables inhabiting the two main oscillators and harbors what are arguably Serum's most compelling features (see Figure 1). Although Serum provides a huge menu of wavetables, you can place your own WAV or AIF files into the user Tables folders and load them into oscillators, at which point they will be put into tables and divided into frames: I whiled away hours plundering my sample libraries to take advantage of this feature.

The waveform View windows toggle between an animated view of all frames or a single-cycle view. But that is just the tip of the iceberg because Serum includes a remarkably feature-rich Wavetable Editor (see Figure 2), where, among other things, you can select a pencil tool to redraw the waveform, choosing from a palette of shapes including sine, up and down curves, and noise, among others. You can also resynthesize tables as Fast-Fourier Transforms, editing the harmonics for each frame.

Marty Cutler is fond of cats, regional Chinese cooking, five-string banjos, and synthesis, although generally not all at the same time.

STRENGTHS
Powerful wavetable synthesis. Extensive modulation and tone-shaping features.

LIMITATIONS
Can be CPU-intensive. No standalone version.

Serum: $189
xferrecords.com

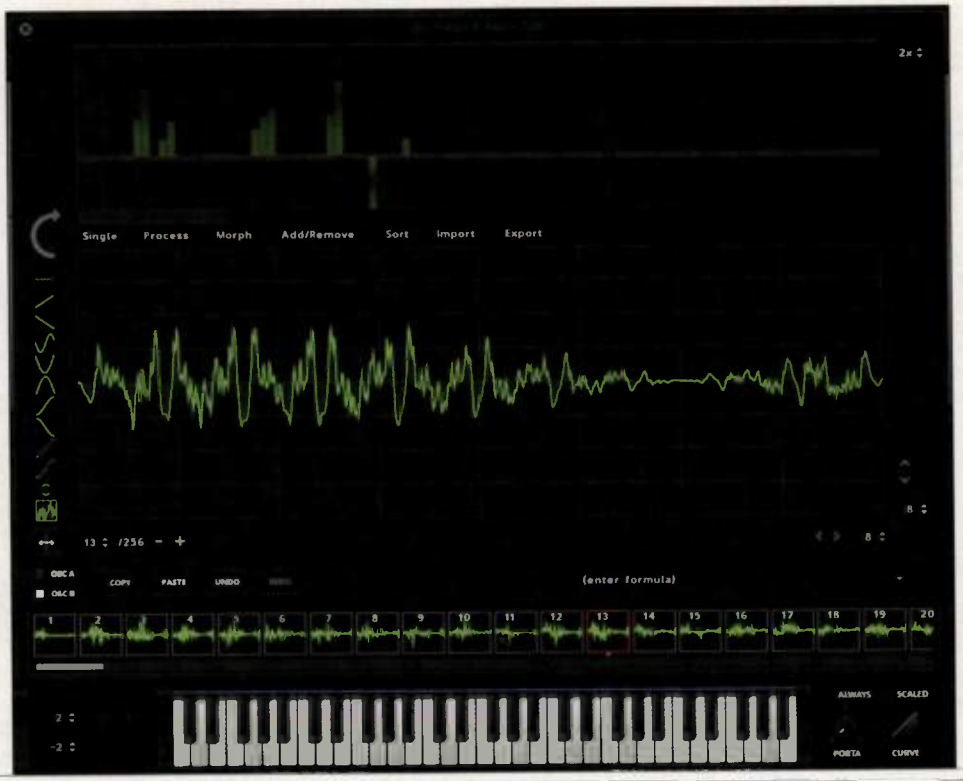


Fig. 2. Among other capabilities, Serum's Wavetable Editor lets you create wavetables frame-by-frame or by resynthesizing samples. You select a frame to edit from the graphic at the bottom of the editor.

Serum lets you build complex wavetables from scratch. If you're mathematically inclined, you can type in formulas for the synth's Formula Parser to create a custom table or start from a preset menu of formulas.

Using the above-mentioned features, you can build a wavetable frame-by-frame. Wavetable sounds can transition abruptly from one frame to the next, or you can use Serum's generous set of tools for smoothing transitions, including crossfades and morph algorithms, phase inversion, and removal of the fundamental.

YOU'VE GOT TO MOVE

Once you have chosen or built your oscillator wavetables, the Osc page provides plenty of ways to add depth and motion. For starters, Unison will add multiple voices of the same oscillator. Use the Detune dial to create a range of sonorities from subtle thickening to atonal clouds of sound. You can fine-tune the amount of detuning using the Blend dial, which adjusts the amplitude of the unison voices against the original voice. The Phase control determines at which point the table will start to play, and you can dial in a degree of randomness to the sample's start time.

Easily the centerpiece of Serum's features (or any other any wavetable-based synth, for that matter) is the capability to sweep the oscillator wavetables, and Serum provides numerous ways to do that, from cyclic repetition to random access. In the Warp section, you can regulate the strength of the warpage and select oscillator-sync variations, waveform quantization, as well as amplitude, ring and FM modulation from the various oscillator sources.

Serum has two filters. One is available on the Osc page and governs either or both oscillators. The other filter type affects the output stage of the patch. Serum provides a rich choice of filters, including the usual 1- to 4-pole highpass, lowpass bandpass, peak, and notch types as well as comb filters, flanger-style effects, emulations of classic synth characteristics, formant filters, and so on. In addition to cutoff, resonance, pan, and drive controls, various parameters are attached to different filter types. For example, the more complex multimode filters have a Morph dial while Formant filters have a knob to sweep the formants.

MODULATION AND FX

Right- or control-clicking on any dial opens a menu of modulation choices ranging from Mod wheel and Aftertouch to any of Serum's envelope generators, LFOs (including Chaos LFOs), and the Noise oscillator. You can drag and drop LFOs and envelopes to destinations, and an indicator appears in their windows showing that they are assigned (with the destination showing up as you mouse over it).

The three envelope generators are AHDSR and, as with most soft synths worth their salt, you can grab any envelope stage and move it on the graphic display or type in precise values. Likewise, you can grab LFO handles and reshape the waveform. A folder provides an assortment of intriguing custom waveforms as well as basic shapes, all of which you can tweak and save into a user folder.

The Matrix page reveals more options for modulation assignments and lets you fine-tune those you have made on the Osc page. For example, you can add curves to the modulation as well as create bidirectional motion and assign auxiliary modulators.

Serum's solid and flexible FX page includes reverb, delay, flanging, and other modulation effects.

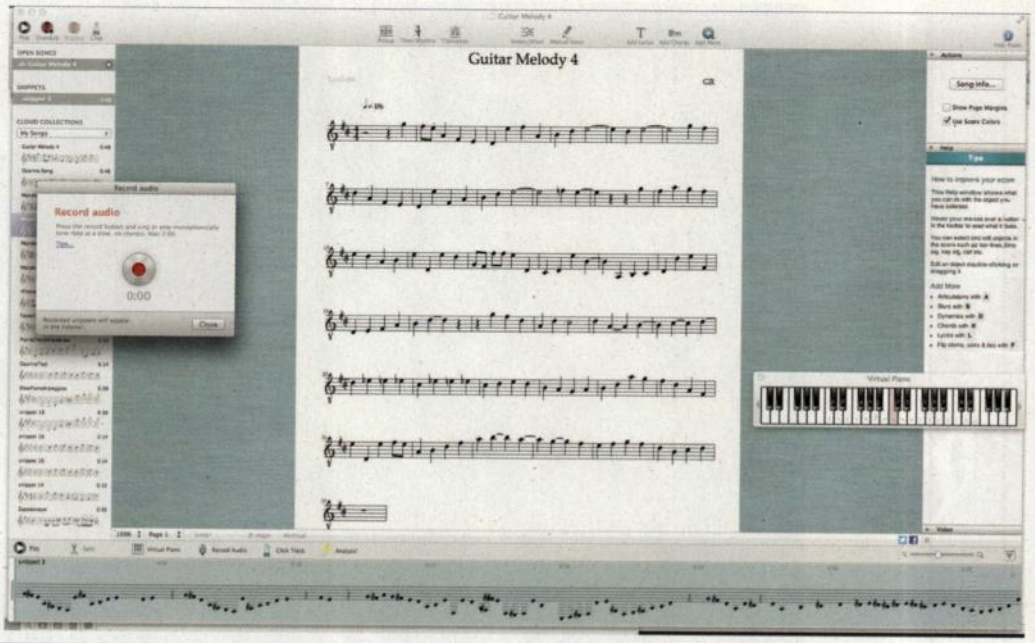
I HEAR YOU

It's pointless to try to describe Serum's sound with any accuracy; the instrument's sonic landscape is truly vast. Suffice it to say that the presets are by turns gritty and distorted or silky and evolving—and sometimes these characteristics can inhabit the same patch.

Everything is laid out in a remarkably logical order. I rarely used the PDF manual to find what I needed. It's easy to smooth raunchy patches and just as easy to rough up smooth tones. The instrument's resources are fantastic, and there's plenty of room for bringing in your own samples and warping the daylights out of them.

With that much power comes a hefty CPU load. To play some of the complex patches, I had to choose a lower oversampling option in the Global menu (though I hardly noticed a difference in sound quality).

Overall, Serum brings together sound-shaping resources from a number of synthesis techniques, including sampling, subtractive, additive, and resynthesis, in a remarkably synergistic instrument. I recommend this synth to anyone anxious to explore exciting sonic territory. ■



A typical score page after analyzing audio input (visible on the staff at the bottom of the screen) but before editing. Note recognition was spot-on. The contextual Help window on the right makes it easy to locate the editing tools you might want to use.

DOREMIR

Score Cloud

TRANSCRIPTION AND SCORING SOFTWARE

BY GINO ROBAIR

STRENGTHS

MIDI and notation transcription from monophonic audio input. Easy to use. Free version available. Syncs with iOS app.

LIMITATIONS

No click track for audio recording. Cannot pre-select time signature for audio recording.

Studio Silver: Free
Studio Gold: $4/month with unlimited online storage
Studio Platinum: $7/month for storage on or offline
scorecloud.com

Although Web-sharing features are nothing new to music notation software, Stockholm-based DoReMir Music Research modernizes the concept with ScoreCloud (Mac/Win), which lets you upload scores to a cloud-based server from your computer or iOS device.

However, the highly touted feature of ScoreCloud is its ability to transcribe monophonic audio input from the built-in mic on your computer or iOS device, while remaining so easy that a novice can figure it out. That's a tall order, but ScoreCloud delivers.

Audio capture is simple. Select the Record Audio icon, click the Record button, and after a three-second countdown, start playing. You get two minutes of record time. When you're done, the pitches you played are displayed on the staff at the bottom of the screen (see screenshot above). Tap the space bar to hear MIDI playback. To see the notes displayed as a score page, hit the Analyze button. Now you can edit and save your work to the cloud.

I tested the audio transcription feature using piano, acoustic guitar, voice, ocarina, and mandolin, all with great results. The accuracy of ScoreCloud's pitch recognition was extremely high, yielding very few wrong notes. In fact, failure was largely due to poorly articulated notes or inaccurate timing on my part.

Thus, successful use of ScoreCloud's audio-transcription feature rests on the musician's shoulders: You get the best results from clean, well-articulated playing. ScoreCloud's biggest challenge is recognizing meter: Several times I played straight eighths in 4/4 that were transcribed as 12/8. That's simple to fix with the editor. And if it doesn't recognize that you began on an upbeat, it's easy to shift the notes. (I did that in the piece you see above.) I look forward to having a click when using audio record mode: DoReMir plans to implement that feature soon.

You can also use a MIDI controller or the onscreen keyboard for note input, which lets you use the built-in metronome. Here, too, the more accurate you play, the better the transcription will be. Playing along with the click track, ScoreCloud accurately notated triplets and quintuplets. You can also input notes manually, have multiple voices on a staff, create several parts, add lyrics, and a lot more.

Thanks to its easy-to-navigate editing features, ScoreCloud is great for capturing and developing ideas quickly. It's not intended to compete with full-featured programs such as Sibelius or Finale, and it doesn't. However, you can export a ScoreCloud score as an XML file for use in other notation programs, as well as create PDF, MP3, and MIDI files to share with colleagues.

The beauty of ScoreCloud is that it doesn't take long to figure out. I captured my first audio snippet five minutes after downloading the program. After it was analyzed, I hit Save, named the file, and it went online. From there, I could listen back to it on my iPhone using the free ScoreCloud Express iOS app, which can also record and upload audio, though with limited editing features.

Like all new software, it has some minor bugs, but nothing serious. Just keep in mind that you need an Internet connection to connect to the server and to use ScoreCloud Express.

While it won't replace my other notation programs, ScoreCloud's ability to capture ideas swiftly and accurately from monophonic audio input is the reason it'll get used more often. ■

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IZOTOPE

RX 4 and RX 4 Advanced

TAKING AUDIO REPAIR AND ENHANCEMENT TO THE NEXT LEVEL

BY MIKE LEVINE

Mike Levine is an editor, writer, and multi-instrumentalist who lives in the New York area.

STRENGTHS

Clip Gain line with breakpoint editing. Leveler module. Ambience Match. EQ Match. GUI is easier to read.

LIMITATIONS

Manual needs more detail.

iZotope RX 4: $349 (upgrade $149)
iZotope RX 4 Advanced: $1,199 (upgrade from Advanced versions: $399, from standard RX $849)
www.izotope.com

iZotope's RX software—especially the Advanced version—provides a comprehensive suite of audio restoration and enhancement tools. Yet, with every update, new tools that you didn't realize you were missing—ones that you will soon not be able to live without—are added.

True to fashion, RX 4 Advanced offers a selection of new modules and features that will significantly enhance your workflow for audio restoration, mixing, and mastering.

Both RX 4 and RX 4 Advanced come with standalone and plug-in versions, although the feature set varies a bit between the two workflows. The standalone versions are structured like a 2-track editor, but with a waveform display that can also be viewed and edited as a spectrogram, or a combination of the two. You can then open various modules from within the program and apply them to the audio.

The biggest news for the standard version of RX 4 is that the easy-to-use, real-time Dialogue Denoiser plug-in has been added; it was previously available only in the Advanced version. However, both versions get significant additions, such as a Clip Gain line that can be edited using breakpoint automation (see Figure 2). This helps you edit levels more quickly and conveniently than before.

Another cool new feature is RX Connect, which allows you to send audio to RX 4 from a DAW or NLE (nonlinear editor), work on it, and then send it back, all in a relatively seamless way. It alleviates the need to export files from your host, work on them in RX 4, resave them, and then import them back into your DAW.

Although RX Connect worked well in Avid Pro Tools 11, there's a workaround for some other DAWs. For example, in Apple Logic Pro X, Ableton Live, and Cakewalk Sonar, you have to set RX 4 as your external editor in order to edit selected files from within your sequencer. I tried this alternative method using Logic Pro X and, although it was not quite as convenient as in Pro Tools, it's still much easier than the alternative. The iZotope support page shows which apps work directly with RX Connect and which require the external editor.

If your host is compatible with RX Connect, a new module called RX Monitor lets you monitor playback from RX 4 in your host. This can be helpful depending on your monitoring setup and whether you have a native or hardware-based audio system for your host.

Another improvement is that Hum Removal now has an Adaptive mode designed to react to changes in the frequency of the hum over time in the source audio, and adjust the notch frequencies accordingly. Other notable changes are full-screen support for Mac; a reverse audio feature, located in the Process menu; support of FLAC and Ogg Vorbis files; improved display of metadata; and a GUI refresh that makes it easier to use during extended sessions.

MODULE MADNESS

RX 4 Advanced has added several new modules that serve a wide variety of needs (see Figure 1).

EQ Match. EQ Match samples the frequency profile of one audio file and transfers it to another. This is really handy when you have, say, an overdub

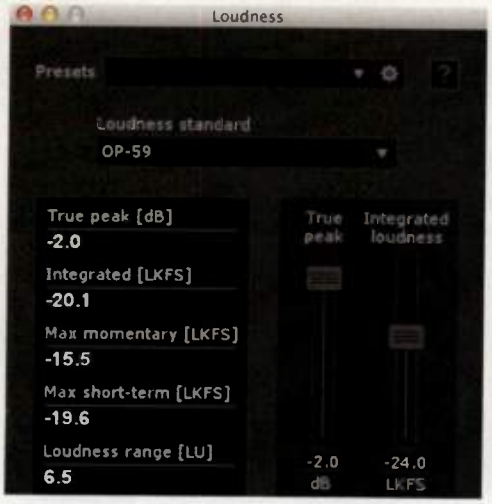
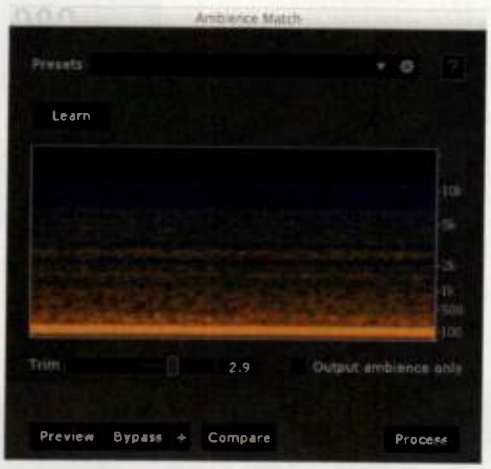


Fig 1. The four new modules in RX 4 Advanced are Loudness, EQ Match, Ambience Match, and Leveler.



that doesn't match tonally with the original recording for whatever reason, or a spoken-word file that needs to be combined with another but was recorded on a different microphone. Matching EQ plug-ins are nothing new, but this is by far the easiest and most effective one I've ever used.

I tried it out with two voiceover files, each recorded on a different mic. I pasted both into the same audio file, and it was easy to tell where the part from the second mic started, due to the frequency differences. All I had to do was select the source audio and press the Learn button, and then select the target audio and press the Process button. EQ Match worked quickly and easily, and the two recordings sounded close enough to be used together.

Ambience Match. When editing audio for video, you often run into situations where you want to extend the ambience from a shot beyond where the audio ends, or you have other dropouts in ambience that you want to fill. You might even be pasting in a separate bit of recorded voice and trying to make it sound like it was captured in the same ambient space of your main video. Ambience Match can extract the ambience from a recording and combine it with another section of audio, or generate a separate ambience file for you to use on a different track in your DAW or video editor.

According to iZotope, Ambience Match works best when you use as much audio as possible "that combines both ambience and non-ambience" for the Learn function. Even on a voice recording, it will extract the information from anywhere in the audio file. I used it for such tasks as re-creating the background ambience from a large convention center for a video edit, as well as ambience in a rehearsal space. I even used it when editing a stereo drum loop to fill in spots where I created a hole by cutting and pasting.

Leveler. This may be the most significant module in the update. It's an automatic processor that levels the selected audio based on a set of user-adjustable parameters. These include Speed (similar to attack on a compressor); Amount (adjust the maximum amount of gain to be applied to the leveler); Noise, which is designed to lower gain during pauses and is mainly useful for spoken word audio; and Target RMS. If you've had experience editing podcasts or videos or other long-form projects, you know how tricky it is to keep levels balanced throughout the production—this is where Leveler comes in. It can also be used on sung vocal tracks to keep them even (saving you from writing fader rides into automation), as well as instrumental tracks such as bass or drums.

Presets are included to help you get various kinds of results. Examples include "Accurate and Nuanced" and "Fast and Intense." After you've run Leveler, show the Clip Gain line to see all the adjustments that the module made.

Leveler is an exciting addition with a lot of potential for many different applications. I hope iZotope adds more detail about Leveler and its controls in the manual.

Loudness. This module is designed to make a recording compatible with a range of broadcast loudness standards. Choose a standard from the menu, hit process, and the level of your file (or selection) is adjusted to match it. If you're working in the broadcast field, or for some reason need your file to conform to one of the standards, Loudness will be extremely helpful.

ADVANCED ADVANCEMENTS

Although iZotope did make some important improvements to the standard RX 4, most of the action is in the Advanced version, and the feature discrepancy between the two is now wider than ever. Nevertheless, RX 4 is still a great value for the money, and very powerful for conventional

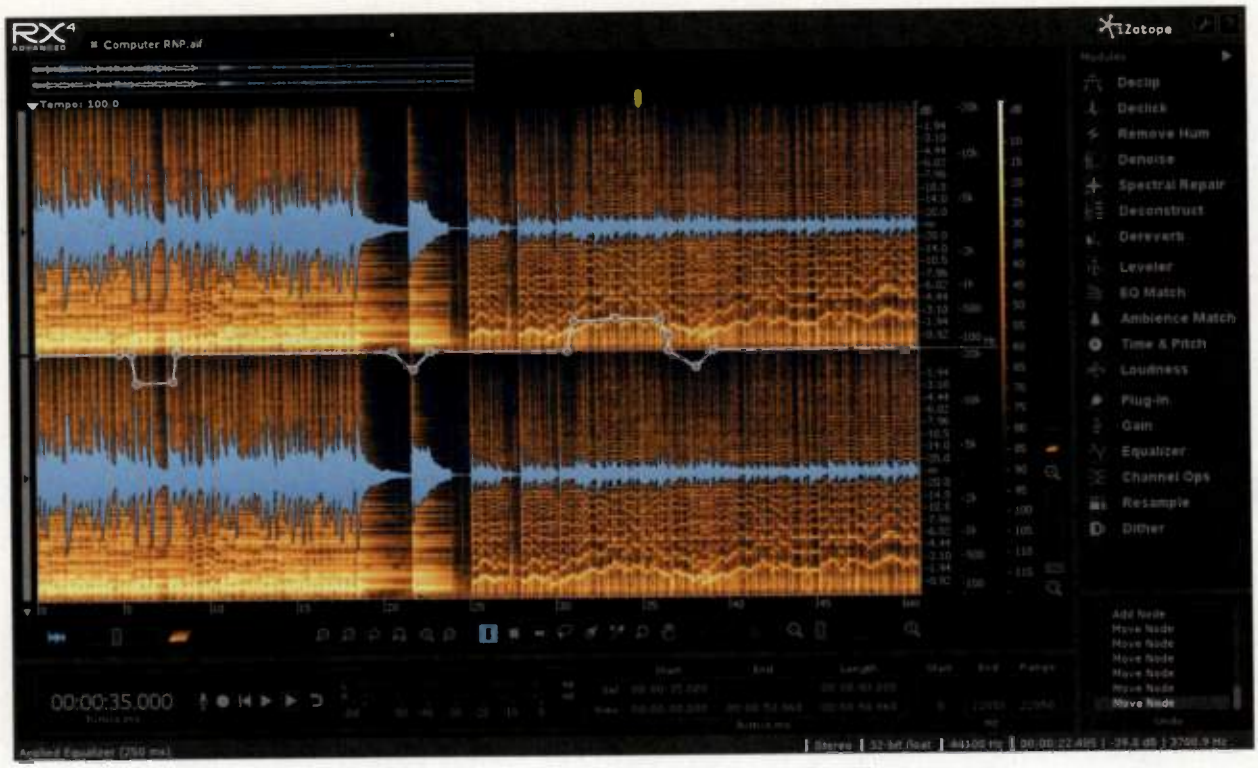


Fig 2. One of the new features in both RX 4 versions is the adjustable Clip Gain line.

audio restoration tasks.

RX 4 Advanced, on the other hand, is now a powerhouse that will be even more useful for video editors, music producers, and serious podcasters, among others. The additions of Leveler, EQ Match, and Ambience Match, in particular, make this definitely worth the upgrade price for existing users of the Advanced version.

While the documentation could be a little more detailed in spots, overall, iZotope scored once again with the RX update. I can't wait to see what they add to the next major release. ■

REVIEW

FOSTEX

PX-6

Powered monitors for the personal studio

BY LARRY THE O

$899/pr street
fostexinternational.com

THE FOSTEX PX-6 is an active, near-field monitor with a ported bass-reflex cabinet that features a 6.5" woofer driven by a 50W amp and a 1" soft-dome tweeter getting 28W. A multimode knob is used to set the volume level as well as adjust the DSP-based high- and low-frequency EQ response (using a FIR-style filter). The analog inputs include an XLR/TRS combo jack and an unbalanced RCA input—fitting for studio and DJ-style setups. The monitor also has a fade-in circuit that gradually raises the output level when you switch on the power.

A highpass filter set at 85 Hz can be switched in when the PX-6 is used with a subwoofer, and you can adjust the phase of the monitor to correct for any timing differences that result. (The manual gives detailed setup instructions for phase adjustment.)

I was impressed with the PX-6's clean sound reproduction, and the solidity of the phantom center image speaks well for the monitor's phase coherency. I heard none of the grating high-frequency distortion afflicting many affordable small monitors.

However, the frequency response did not sound at all flat to me. Bass and, especially, vocals were pushed out front. Boosting high frequencies with the onboard EQ helped smooth out the high end a bit. Consequently, it may take some time to learn how to do mixes on the PX-6 that translate to other environments. (The frequency response chart in the manual shows 48 Hz to 20 kHz, though no tolerances are given and the response plot uses 10dB divisions, so the spec is approximate.)

On the other hand, the PX-6 was not at all fatiguing to listen to for long periods. Overall, the PX-6 is a clean monitor with a small footprint that makes it easily transportable, as well. ■

DAVE SMITH INSTRUMENTS

DSM01 Curtis Filter

True old-school sound in a modern format

BY GINO ROBAIR

$179
davesmithinstruments.com

A NAME you often hear associated with classic analog filters is Doug Curtis, founder of Curtis Electromusic Specialties (CEM) and designer of dozens of ICs—VCOs, VCAs, and VCFs—that have been used in vintage *and* modern synths from Oberheim, Sequential Circuits, Linn, Moog, Simmons, and Doepfer, among many others.

The classic Curtis lowpass filter has attitude and is often described as brassy or aggressive, with a resonant frequency ranging from earth-shaking to ear-piercing—just what you need for percussion, bass, leads, and effects.

Dave Smith Instruments put new Curtis chips (not NOS versions) into its DSM01 Curtis Filter, a skiff-friendly 8HP Eurorack module with 2-pole (12dB/octave) and resonant 4-pole (24dB/octave) responses.

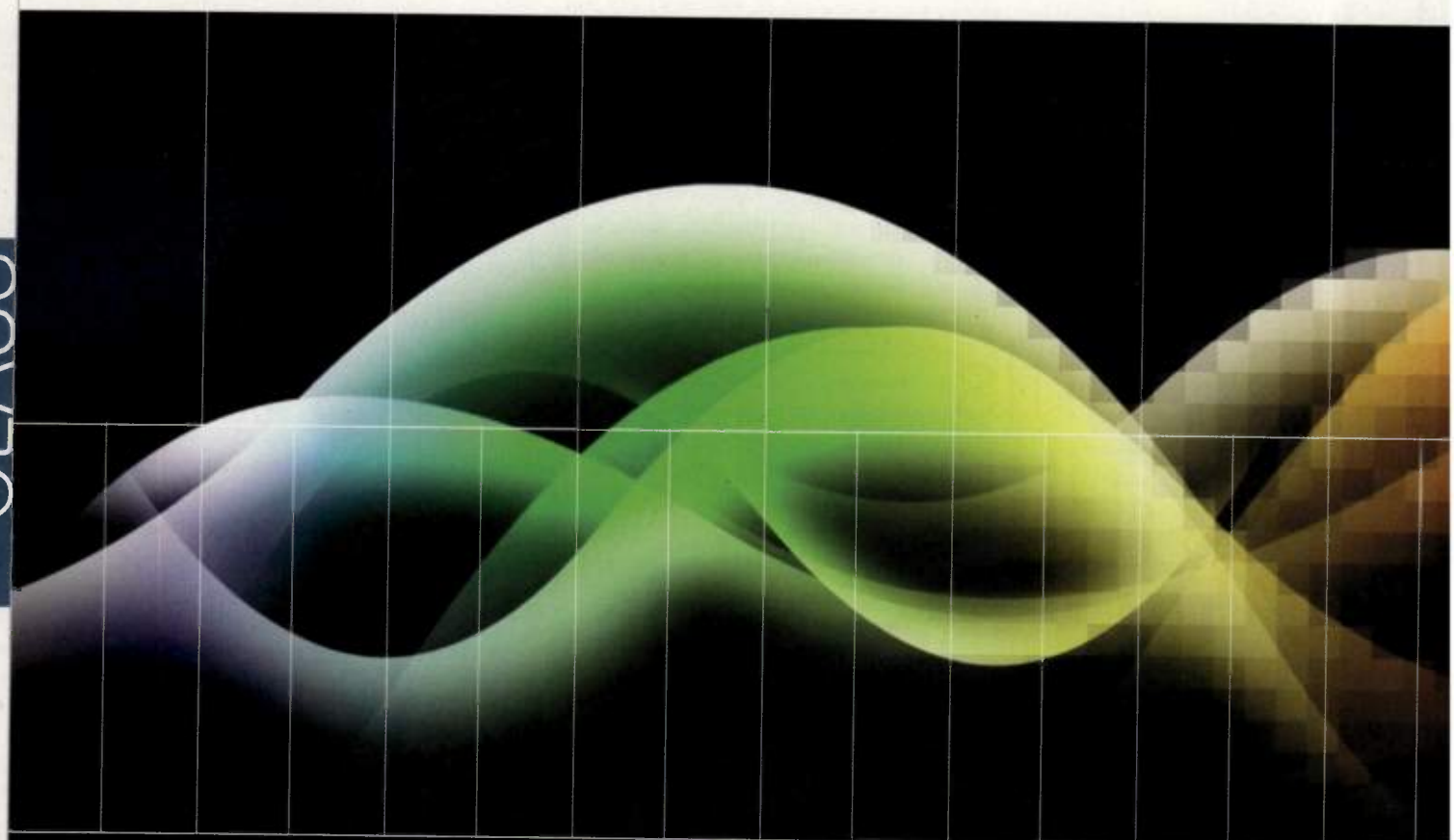
In addition to a direct filter output with CV inputs and knobs for frequency cutoff and resonance, the module has a VCA with dedicated I/O. Whatever you feed the VCA input (an EG, for example) controls the volume coming from the VCA output. Both outputs can be used simultaneously. A switchable boost of about 5.5 dB is also available at the filter input.

The onboard VCA lets you sculpt the sound right from the module and is especially handy when wringing out that juicy 4-pole resonance the DSM01 is capable of. You don't even need an audio input: just crank the resonance and ping the VCA input.

Just for fun, I put the DSM01 up against my Sequential Circuits Pro-One, which has a CEM3320 filter: In 24dB mode, the module sounded identical to the synth, including its resonant behavior.

While that's certainly impressive, I'm more interested in the fact that the DSM01 can be sweet or nasty, depending on what's needed in a patch. Versatility and attitude is why you choose the Curtis filter sound, and the DSM01, with its built-in VCA, gives you plenty of both. ■

MASTER CLASS



Hearing Is Believing

Engineer Andrew Scheps is on a mission to bring music and tech communities together for a common understanding of how consumer audio formats impact the listening experience. Learn why these specs are so important—and how you might have more control than you think.

BY SARAH JONES

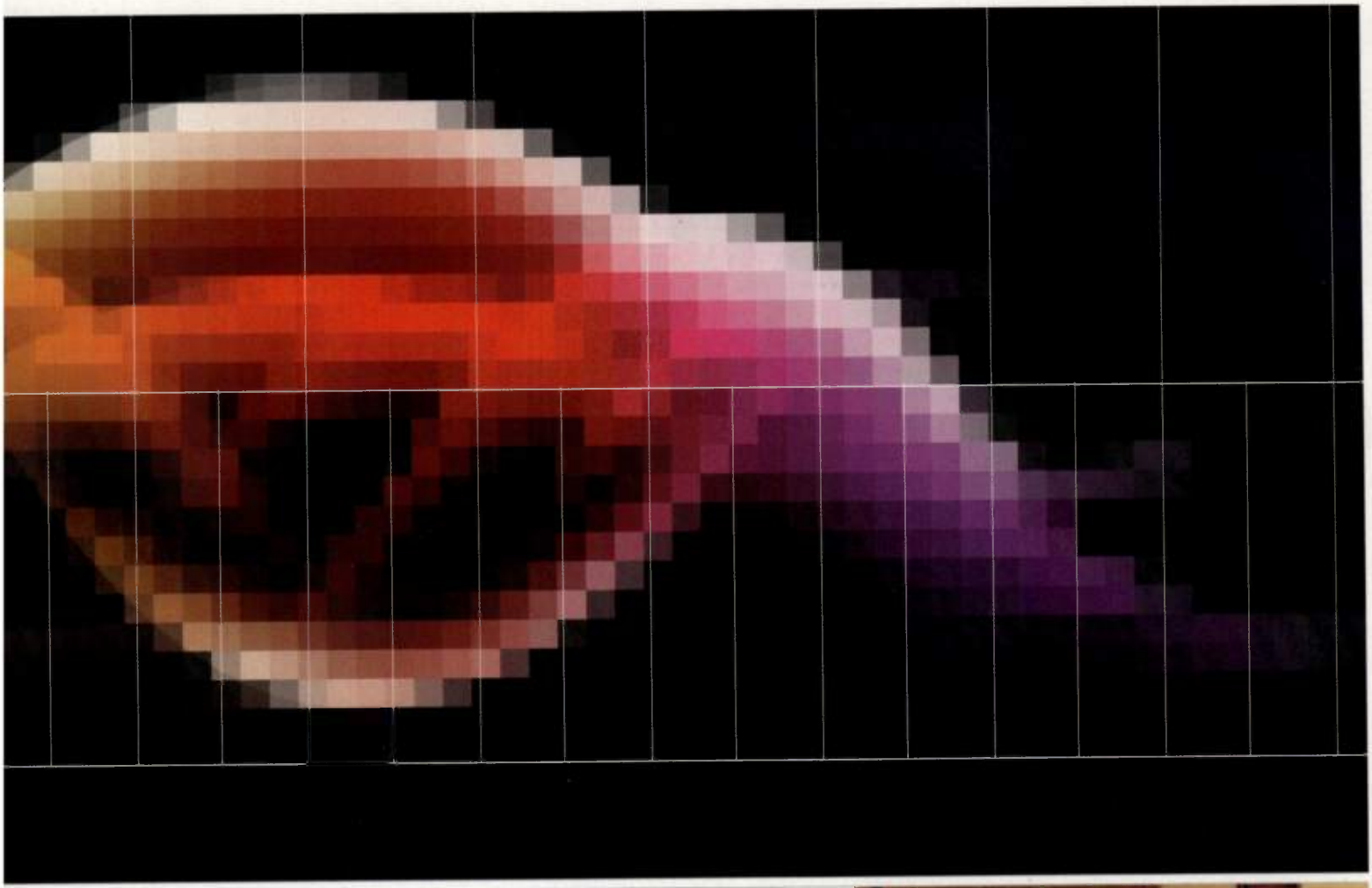
You know how to make a killer mix. And you know to make sure that it is carefully mastered. But what happens after that? What exactly happens to your tracks once they are sent out into the world?

Engineer Andrew Scheps wanted the answer to these questions.

With two Grammys and mixing credits ranging from Adele to U2, the Red Hot Chili Peppers, Black Sabbath, Jay-Z, and Metallica under his belt, it's safe to say Scheps has the mixing part down. But like many producers and engineers, he needed a resource for understanding the differences in the variety of consumer audio delivery formats available to him. So he built it himself.

For the past year-and-a-half or so, Scheps has been on a road show of sorts, traveling around the country giving lectures on audio quality in association with the Recording Academy. His presentation, called "Lost in Translation," gives attendees a chance to compare many of the current music services to demonstrate the audible differences among the various file formats they use.

Granted, file-format and bit rate information is made available by the services and can be found if you search for it, but Scheps' presentation provides it all in one place and gives it context, accompanied by a listening session including examples from all the major services. And perhaps more importantly, in a time when music technology is more dependent than ever on distribution and delivery technologies, he's bringing the production community and the music-tech community—including Ama-



zon, Apple, Google, iTunes, PONO, Rdio, Rhapsody, SoundCloud, and YouTube—together to open a dialog about the importance of sound quality.

I sat down with Scheps to get his take on the evolving format landscape and learn how musicians, producers, and engineers can do their best to ensure that their music is heard as it was meant to be.

Tell me about the genesis of the "Lost in Translation" project.

When I started my label, I started to have to deal more with the production side of things than I ever had before. Obviously, as someone who mixes records, I care about mastering, but that's sort of as far as it went. Once I had to start distributing through all of the digital services and manufacturing vinyl, I started to really pay attention to what happens after mastering.

Coinciding with that, the Recording Academy put on an event in L.A. called GRAMMY Future Now, which was a one-day, TED-style conference. They asked me to put together something, so I decided to do an audio-quality presentation. One that had nothing to do with the record-making side, but to take the record as a finished product—no matter what it sounds like, and no matter what sample rate it is, no matter whether it was an audiophile, good-sounding record or whether it's a really dirty, distorted, good-feeling record—and follow it through the food chain from when it leaves mastering to when it gets into the consumer's hands.

I really wanted to spend some time talking about the roads I'd traveled, figuring out why so much of the music I heard just didn't sound that good.


Andrew Scheps

How did you structure the demonstration?

For the comparative listening portion, I put together a playlist of 18 songs across a wide set of genres. I then went and got every single commercially available version of the songs that I could. I had the high-res that was for sale on HD Tracks, and a copy of the CD, which I would rip the AIFF files from. I then bought the tracks on iTunes and on Amazon, and then did live streaming at that point from Spotify, YouTube, and Rdio. Since then, the streaming landscape has changed quite a bit, so services come and go in the presentation. As far as I could, I tried to make sure that exactly the same master had been used to create these files for all of the services.

The idea is, attendees pick one of the songs, pick a format they want to listen to it in, and then compare it to another format immediately afterwards. This allows people to really listen to the different formats side by side and make real comparisons. In most cases it's a very real difference in audio quality that is pretty easy to hear as you jump around.

I quickly realized that just playing the tracks wasn't enough on it's own, I really needed to provide context so everybody knew exactly what they were listening to without me having to stop and explain anything, so that became the setup with slides. I talk about the history of recorded music, digitization, lossless versus lossy codecs, and then lay out which file formats and bit rates the music services

are using. And then, of course, you have to go into, well, who cares if it sounds better or worse? So you have to start talking about how people react when they listen to music, which in a lot of ways is a much more important issue, trying to talk about the emotional content of the music, which is the whole point. Artists, producers and engineers often talk about the technical side of recording and making records, but all we're really trying to do is to make some art come out of the speakers and induce emotion in the listener. So how is that impacted by the audio quality?

So much of this is anecdotal, and subjective.
Yeah, it is very anecdotal. And that's the problem. Because there are all kinds of anecdotes about how, well, you know, kids who've only heard MP3s prefer MP3s. And it turns out that's not true at all, and that's been tested in a very scientific way.

Everybody is going to make their own kind of judgment and decision. But I love that I can give people the opportunity to get in a room and actually listen back to back. It's not double blind, and it's not the most scientific thing in the world, but it's a pretty good chance to actually hear the differences for yourself.

During your demo, it was interesting to watch the audience question playback volume, converters and cables, ask you to turn off the air conditioning—but you don't really need a critical listening scenario to hear the difference.
One of the things that really drove it home to me is when I was putting the presentation together for the very first time. I'd gotten all of these files together, and I was arranging them all. I was checking things on the computer, and listening on my laptop speakers, just to make sure, okay, that is that song, and then looking at the file info to make sure it was the right bit rate, and things like that. And I could absolutely hear the difference on my laptop speakers, and I wasn't expecting or trying to.

So it's not this weird, audiophile, you-have-to-be-in-a-perfect-listening-environment thing to experience the difference; it's just listening to music.

What were attendees—from both the tech community and the production community—most surprised to learn from these exercises?
You know what's interesting? Basically the reactions have been exactly the same. When I'm with the production community, there's a lot of information that people kind of know but don't know, in terms of which bit rates all of these different service providers are giving you, what's the difference between MP3 and AAC, who developed AAC, etc. They all know little bits and pieces of it but haven't put it all together. And in the tech community, a lot of people know some of the theory—and in a much more thorough and technical way than I do—but they don't have a big picture in terms of, what does that mean when you're making a record?

But in terms of the actual listening experience, and what people are hoping to get out of music, it's exactly the same no matter who is in the room. We are all just consumers and music lovers at the end of the day.

It's a little surprising to hear that the production community doesn't understand differences between bit rate, bit depth, what happens during transcoding.
I think everybody sort of has a handle on what those terms mean. But they haven't put two and two together in terms of the different services, and what it is that they're serving up, because they haven't had to. It just doesn't come up.

It's sort of the macro version of word processors. Everybody used to know what a manual typewriter did because they were watching it do it. Nobody who isn't a hardcore programmer really knows what a word processing program does anymore, and you don't have to; you just have to know how to operate it. And I think the for music production, it's very much a parallel progression.

> "Remember that the streaming and download services are not music companies. They're data delivery companies."

A lot of technical knowledge used to be a given in the recording industry, and it's not any more. Anybody can open up a laptop and use the software that comes with it to make a record. And that record can sound amazing. I'm not advocating that everyone needs to have a hugely technical background. But it is very, very simple to just jump in, without any technical background at all. Which is great for the creative side of it, but from the technical side, it's a disaster.

With physical media like vinyl, people have learned to accommodate for the format limitations in the production process.
Yeah, but you know what? Even that is slightly misunderstood, or at least there is still misinformation floating around. Because I grew up learning that with vinyl there are certain things you couldn't do with the low frequencies. And I just cut a record for Low Roar that completely breaks the rules on what you're allowed to do with bass, and it cut perfectly and plays great. So even on vinyl, which has been around for more than 50 years, I think we're still figuring stuff out.

One interesting side effect of the resurgence in vinyl has that people are having a look at more technical aspects of the sonics of their work, because they've been producing music for so long without having any restrictions whatsoever, in terms of the physical limitations of the formats they're delivering on. But now you've got music with so much more low end, and it's so much louder than it used to be. Figuring out how to translate that onto this 50-year-old technology, it's pretty fascinating how easily it can actually work.

What do you think are the biggest misconceptions about lossy codecs and streaming formats?
I don't know if this is a misconception, but I think one of the things that people don't necessarily take into account is, there's nothing inherently horrible sonically about the lossy codecs. At low bit rates, they sound terrible. But at high bit rates, in quick A/B tests, it's very hard to tell an encoded file that's done well that you bought off iTunes apart from the CD.

What matters is what goes into those codecs. To have a master that is actually a full-res master, that has been prepared properly, that is 24-bit, that has about half a dB of headroom. That will make a great-sounding iTunes file, for instance.

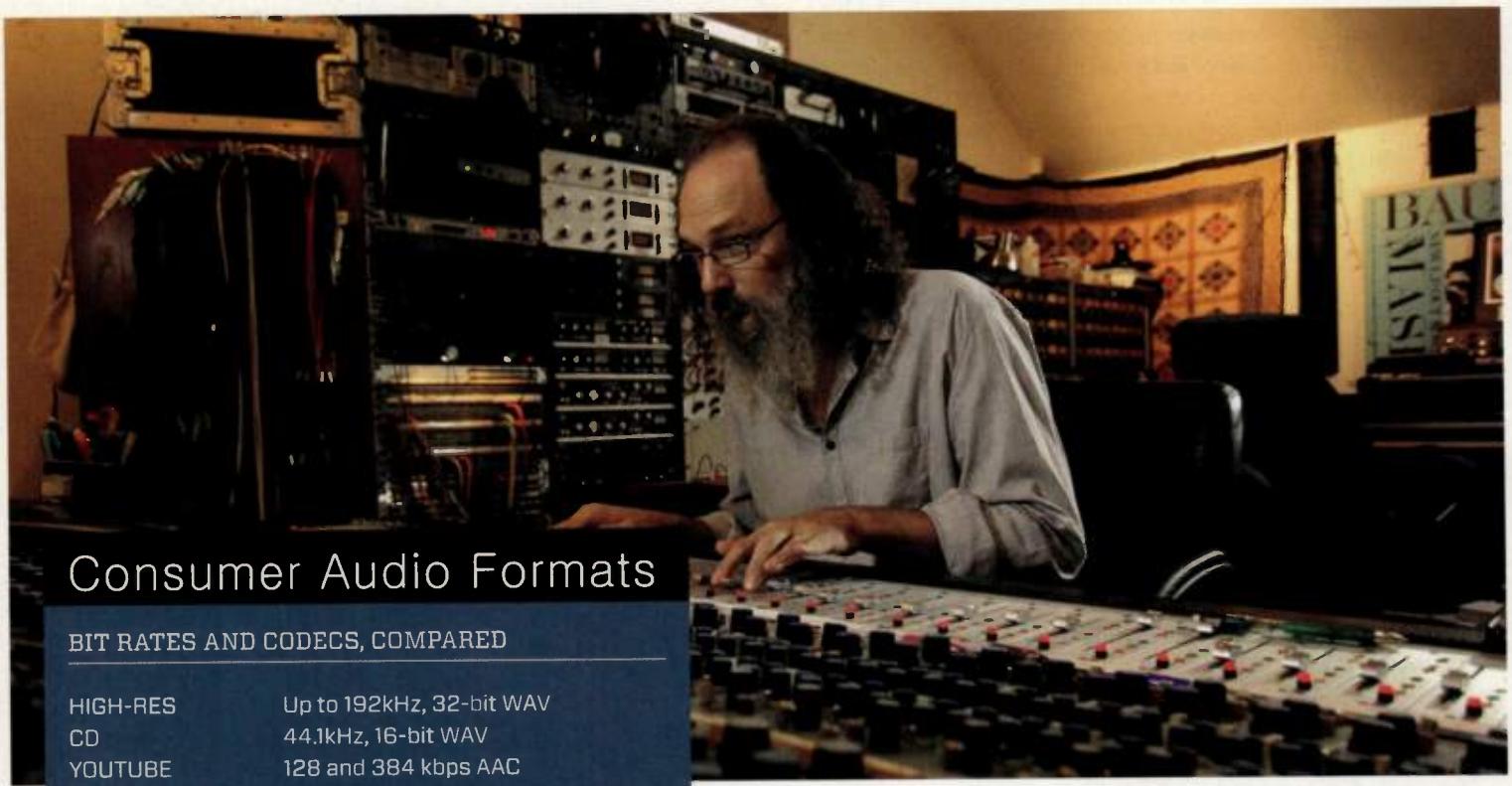
But you can have that exact same codec at a higher bit rate, which is what YouTube uses when you're watching high-definition video. That's actually the 320 AAC, as opposed to a 256 AAC, which is what iTunes sells. But if you give it an MP3 to encode, it's going to sound terrible. Because you're taking one lossy format and transcoding it to another.

Maybe there's a little too much emphasis given to the numbers involved with the bit rate and the bit depth and the sample rate and things like that, and not enough attention paid to the process of actually creating these files in the first place.

You're presenting a holistic argument, but we are dealing with real numbers in some sense.
Yeah, we are. But it isn't as easy as just comparing the numbers. It's a great place to start, and I think it's a really good guideline, but it is much more complicated than that. At some point you actually really do have to listen, and you have to trust your ears. And to really live with those results and try and figure out what means going forward. And that's much, much more difficult.

With a visual product, it's very easy to put ten people in a room and nine out of ten times they will agree on what looks better. People don't trust their ears. You can be tricked by just making it a tiny bit louder. If you're watching it with video, a better-looking video will make the audio sound better. It's a much more difficult, weirder process to assess audio, and it's much harder to be objective about it.

Data pipes are improving all the time; how do you see that impacting the evolution of these codecs?



Consumer Audio Formats

BIT RATES AND CODECS, COMPARED

HIGH-RES	Up to 192kHz, 32-bit WAV
CD	44.1kHz, 16-bit WAV
YOUTUBE	128 and 384 kbps AAC
PLAY MUSIC	Up to 320 kbps
BEATS MUSIC	320 kbps MP3
SPOTIFY	160, 320 kbps Ogg Vorbis
ITUNES	256 kbps AAC
AMAZON	256 kbps MP3
RHAPSODY/RDIO	192 MP3
XM SAT	39 kbps proprietary
ANALOG	acoustic pressure wave, voltage

I think it's twofold. The first thing is, and I don't want to sound angry about this, but it's really, really, really important to remember that all of the streaming and download services are not music companies. They're data delivery companies. It happens that they're delivering music because that's a very big market, even though it's shrinking significantly every year, but it is still a huge amount of money.

There hasn't really been an incentive for any of these companies to say, "Yeah, but we're the better-sounding one." Because it is much more about, "We're the one that delivers all of your music, immediately, no matter where you are. And it doesn't buffer, and it doesn't stutter, and everything plays." So as big as the pipes are, they're always being tailored for worst-case scenarios.

Now, what's interesting is that there are some technologies that help with that, like Orastream, which is an adaptive streaming technology, so the bit rate will actually climb and fall based on your connection. And it's not each time you play a song that it decides what bit rate you'll hear. It's instantaneous and dynamic.

They use a version of a Fraunhofer codec; it's the MP4 SLS layer. It's a worldwide standard for data compression that wraps a file in a way that it can be played at any bit rate. And they can stream up to 192kHz/24-bit uncompressed audio. And there are companies like Tidal, who is streaming CD-quality audio. Deezer's Elite service streams 35 million songs in 16-bit FLAC. Companies are starting to differentiate themselves based on bit rate.

But I think that basically there'll just be one little round of catch-up while everybody ups their bit rate, the same way they did when Apple flipped the switch and went from 128 to 256. And I wouldn't be surprised if Apple is the last to do it, but they will up it as well, because Beats Music streams at 320, and they've bought that. But for any service to change the quality of the music they are providing, it means they have to re-encode their catalog, and they're paying the labels millions of dollars a year for the privilege of playing the catalog already and that agreement may or may not cover another bit rate or format.

And as much as people want to vilify the streaming companies, 70 percent or more of their revenue is being paid to the rights holders. To really change the income model, companies need to require you to pay money to subscribe, as opposed to having a free tier. But as long as there's YouTube, you have to have a free version of your streaming service to compete or no one will use it. That's the real quandary we're in, is that the business model has been free for so long that no one will pay.

But that really does go back to the core of audio quality. The consumer drives all of this. If the consumer says we're not going to buy your subscription because your audio sucks, then providers will make their audio better. If a provider gives the consumer something that is obviously better then he or she will want it.

The vast majority of music discovery is happening on YouTube, where audio is completely dependent on video streaming rates. What can music creators do?

It's twofold, and neither side of it is terribly good. You have to decide whether you just don't put your stuff up on YouTube at all, or you only put up really, really crappy versions hoping that makes people go buy your music if they like it.

But part of my argument in terms of how people listen to music is, the worse it sounds, the fewer people are going to like it enough to want to spend money on it. There's some weird, shifting threshold of when you decide you love something; and the worse the music sounds, the harder it is for that music to make it up over that threshold.

So if you want to make it sound good, then every artist needs to upload their own music to YouTube, because they can control what file gets encoded. You can upload up to a 48k/24-bit WAV file for your audio source, and that will make a really good-sounding AAC when people are watching the high-res video, which give you the 320k AAC file.

But then, all they're doing is reinforcing the fact that that's good enough in terms of where people are going to get their music. And the business model at YouTube is (to oversimplify): ignore copyright, sell ads on it.

If you upload a song that has a copyright holder, or you are the copyright holder and someone else uploads your song, you are presented with three choices: You can, it's fine that someone violated my copyright, just leave it up there for free and YouTube will host it, and that's it. Or you can say, take it down, because it is copyrighted and someone has violated my copyright and that shouldn't be allowed to happen. Or you can do what almost every single artist in the world does: Say, okay, you've violated my copyright, but I really, really need the money, so please monetize that video with ads and give me some unknown percentage of the money, because it's my song.

And it has just decimated the entire idea of copyright. People just assume that everything in the world should be on there for free.

Given so many end points for your music, and levels of control, do you take anything into consideration as far as your mixes?

While making a record, I absolutely don't take it into consideration at all. And I don't really think anybody should. I think you need to make the record that sounds right to you. I use the phrase "the best-sounding record you can make." But I don't mean that in an audiophile, win-a-Grammy-for-your-engineering way. Because we're not all that type of engineer. You just have to make the record that you think sounds awesome, and is exciting, and is the record you wanted to make musically.

Then the only thing really to know, if you have control over what is sent to the different digital services, is that first of all, mastered for iTunes, all that means is they can encode a 24-bit source instead of 16-bit source. And they've optimized their codec so that a 24-bit source sounds much better than a 16-bit source. They would prefer that you send in 96k/24-bit, but their encoding at anything above 44.1 is a two-step process where first they just sample-rate convert it down to 44.1, because the AAC encoder itself can only accept 44.1.

The other thing is, especially on Mastered for iTunes, it has to come from a verified mastering house. So those mastering engineers know that one of the most important things to make that encoding work well is headroom. It doesn't mean that your mix can't be super, super loud and have lots of square waves and lots of distortion, but what it means is when you're done, just gain down the mix between 0.5 and 0.7 dB, and it will sound better going through the encoder.

The reason is, as you go through any of the lossy encodings—MP3, AAC, Ogg Vorbis—you pick up harmonic distortion as you encode, and that adds level. And if you're already at digital 0, then you're going to overshoot, and you get very nasty distortion. Which is not the clipping that you've put into your mix because you like the way it sounds. It's just full-on, digital shaving off the top of a waveform, with no regard to anything, because it just can't recreate that level.

So if you're just sending files to be put in, like if you're using a digital aggregator, if you don't have a distributor and you're not going through a label, this is how you would put out your record: Take your final mixes, after they're mastered and as loud as you want them to be, turn them down half a dB, and they will sound better once they are encoded. The same way you would do slightly different mastering for vinyl if you've got a very bright record, with a lot of esses.

What about heavily compressed mixes?

Again, if you just turn them down before the encoding, then you'll be fine. I know there are a lot of people who are up in arms about dynamic range, but I still mix loud, and I will probably always mix loud, because that's what sounds good to me. I'm not going to win an engineering Grammy, and that's fine. I'm okay with that. But I think people think a lot of the records I mix sound exciting, and that is what I'm proud of. And I know that if I take those incredibly loud mixes and turn them down 0.5, 0.7 dB, they'll encode just fine, and sound like the loud mixes they already are.

Are you encouraged by the growth in high-resolution consumer formats?

I think there are some good omens in that area. I think things like Sonos are brilliant. Because they don't make you give up the convenience: to have wireless speakers that can actually stream 48k/24-bit audio between each other is amazing. And they actually sound good.

There are a lot of cars that sound amazing now, where you would absolutely hear the difference between an MP3 and a CD.

There was a movement at AES this year, in association with the Consumer Electronics Association's High Resolution Audio Initiative, to introduce a logo for devices that play high-res audio. And their definition of high-res audio is anything better than CD quality, so 44.1/24-bit would count as high-res.

Consumer-audio manufacturers see a need to differentiate themselves as having products that sound good and are capable of playing back these files. So that's a huge step in the right direction.

Basically, the more people are aware that stuff could sound better, the better off we are. And I think that the idea of a home stereo is starting to take root again as well.

Sony has a high-res Walkman now, and they're actually calling it a Walkman again, which I think is pretty fun. There's the Pono player, which when it comes out will be very cool. Its business model is a little bit different, with its own store, but there are a lot of ways for people to listen to the music.

That was the other thing until recently: You could buy this high-res stuff off of HD tracks for years now. But you didn't know how to play it back, and it was seen as an audiophile alternative, not just something that sounds better. Now, there are devices specifically set up to play those files, so you no longer have to be a geek to figure it out.

96/24 and DSD sound awesome, and some vinyl sounds awesome. There are some amazing-sounding CDs. I would say that the more I do this research, and the more I do the listening, the less I'm convinced that consumers need super-high-sample-rate stuff.

I think that the lossy-versus-lossless argument is a much, much more important topic to look at. I think there are neurological consequences to some of the lossy encoding that goes beyond just subjective audio quality assessment. Nothing is proven yet, but we're heading in that direction.

It's been made really easy for the consumer. But do you think that's enough?

It takes education along with it. But I think that consumers love to have good stuff, and I think that we're also going to get back to where the music that they love will be really important to them, even though they may not ever buy it, because I unfortunately think that that business model is gone now.

But they will care how it sounds when they want to play somebody a song they like. They're not going to want to hit Play and it's some transcoded YouTube video and they forget to go to high-res, and it sounds terrible, and their friend is like, "Yeah, whatever, that song's okay, I guess." They want people to be blown away, and they'll actually want to make sure that it sounds good. So hopefully that will start to just be part of listening again.

Somebody goes to your presentation, gets inspired, and is ready to take the next step. What should they do?

Make sure that you've got masters that sound good, and make sure that whoever is sending them off to the services knows that maybe getting a little headroom for the encoders is a good idea. That's sort of it from the record-making side. As artists, though, you can make your hi-res stuff available. Even if you're signed to a label, force the label to make it available. And as consumers, you've just got to be smart; every time you can, take the YouTube video up to one of the HD video formats, because that's the only way to get better sounding audio. If you're on Spotify, actually pay for the subscription and then go into audio preferences, and check high-quality audio, which is unchecked by default. It doesn't take a whole lot to educate yourself.

Do you sort of feel like the poster child for this movement at the moment?

I have no idea. If I am, that's a good thing. The whole idea of the presentation is to take lots of stuff that you kinda-sorta know and encapsulate it and put it in context so now you can go off and do something yourself. So if I'm the poster child for that sort of education, I love that. ■

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HOW-TO

Build Bucket-Brigade Delays

Get creative with delay effects by using classic gear configuration techniques

BY MARTIN GOULD

Delay effects have retained their status as key tools for electronic musicians for more than 50 years. Although most modern delay units use digital technology to generate their effect, many musicians still turn to older technology to achieve the warmth and character associated with earlier hardware units. One such example is a bucket-brigade delay, which was widely used in many different genres throughout the 1970s and 1980s. In this feature, we explore how a bucket-brigade delay's structure leads to its unique sound and delve into some of the creative possibilities that bucket-brigade delays present electronic musicians.

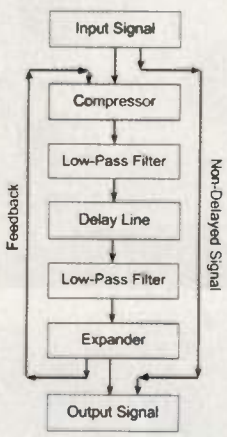


Fig. 1. A typical signal path for a bucket-brigade delay

Fig. 2. The EHX Deluxe Memory Man bucket-brigade delay

AN INTRODUCTION TO BUCKET-BRIGADE DELAYS

The central idea of a bucket-brigade delay dates back to 1969, when Philips engineers Sangster and Teer noted that a delay effect could be achieved by sending a signal through a chain of capacitors. In this chain, the first capacitor briefly retains an incoming signal, then passes it on to the second capacitor, which briefly retains the signal, then passes it on to the third capacitor, and so on. The bucket-brigade delay gets its name from this configuration, which looks like a line of firefighters passing buckets of water.

When the signal emerges from the final capacitor, it has been delayed by the amount of time that it took to pass through the chain. The length of this delay time is controlled by the rate at which each capacitor passes its charge to its neighbor—the higher the rate, the shorter the total delay time.

Because each capacitor in a bucket-brigade delay only passes its signal along the chain at discrete times, any high-frequency components of an input signal that enter this chain could create an inharmonic distortion known as aliasing. To combat this, bucket-brigade delays also contain a pair of lowpass filters—one each side of the delay line—that remove any high-frequency components from the signal. In addition, many bucket-brigade delays also compress an incoming signal before feeding it into the first lowpass filter, then expand it after it emerges from the second lowpass filter, to prevent overloading of the capacitors and to reduce unwanted noise. This signal path (see Figure 1) gives bucket-brigade delay units their unique sound. As with many other delay effects, the output signal can also be fed back to the start of the signal path, to repeat the whole process.

CREATIVE POSSIBILITIES

Bucket-brigade delay units offer many opportunities to get creative with delay effects. Thanks to their lowpass filters, sounds often emerge with hollow, ethereal characteristics. When used with long delay times, bucket-brigade delays can create haunting, distant echoes of entire musical phrases. With shorter delay times, bucket-brigade delays can add rich textures to sounds and help to achieve the impression of a heavily filtered, unison performance.

Another creative use of bucket-brigade delays is to change the rate at which a signal is passed along the delay line when the buckets are already full (i.e., when a signal is already passing through). This creates a sweeping, melodic, bubbling effect that has been widely used in many musical styles.

By modulating this change (e.g., via an LFO), a bucket-brigade delay can also create a pulsating sound for chorus and vibrato effects.

HARDWARE AND SOFTWARE BUCKET-BRIGADE DELAYS

A wide range of hardware bucket-brigade delay units are available on the market. Figure 2 shows a classic hardware bucket-brigade delay unit called the Deluxe Memory Man. As with many types of hardware, some bucket-brigade delay units sell for huge amounts of money because many musicians seek to capture a specific signature sound in their work.

Thanks to analog modeling techniques, a range of digital plug-ins that mimic the core functionality of hardware bucket-brigade delays are now also available. Instead of passing a physical charge through a chain of capacitors, digital bucket-brigade delay units pass a signal through a memory buffer. Most digital bucket-brigade delays use the same signal path as shown in Figure 1. As with the hardware units, the lowpass filters ensure that the discrete-time sampling of the input signal does not produce audio aliasing. Although the compressor and expander are not necessary to tackle the physical issues associated with passing charge through a series of capacitors, most digital bucket-brigade delays still implement these features in order to reproduce the characteristic sound of their hardware cousins.

Digital bucket-brigade delays also offer a wide range of benefits associated with digital music production, which open doors for many creative possibilities. For example, by using host automation it is possible to program far more complex parameter changes than is feasible to perform by hand. Also, it is possible to synchronize a digital bucket-brigade delay to the master tempo of a track. This feature is very helpful for creating delay effects with large amounts of feedback, because it ensures that the repeated echoes of each sound always align with the beat.

Figure 3 shows the bucket-brigade delay module in the Future Audio Workshop's Circle2 synthesizer. This synthesizer has a semi-modular setup that enables parameter modulations via the small circles on the interface.

By modulating the delay time and feedback parameters, digital bucket-brigade delays produce complex, evolving effects that can add character and variation to any element of a track. Thanks to the warmth and character of such effects, bucket-brigade delays are the ideal go-to solution for creating delays that are bursting with personality.

A demo of Circle2 is available as a free download from the Future Audio Workshop website and offers an excellent opportunity to gain hands-on experience of working with a bucket-brigade delay. You can hear audio clips demonstrating bucket-brigade delay effects at emusician.com. ■

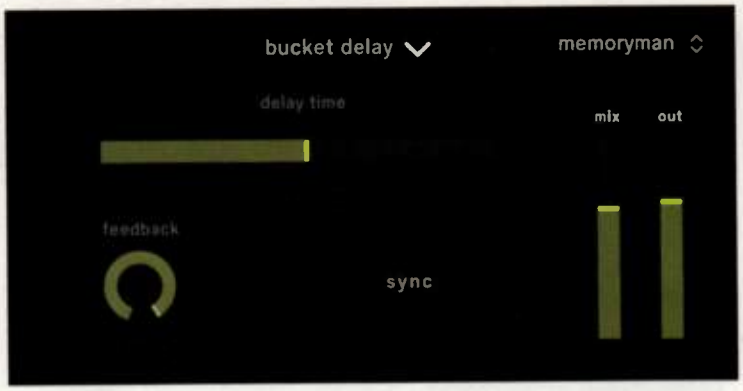
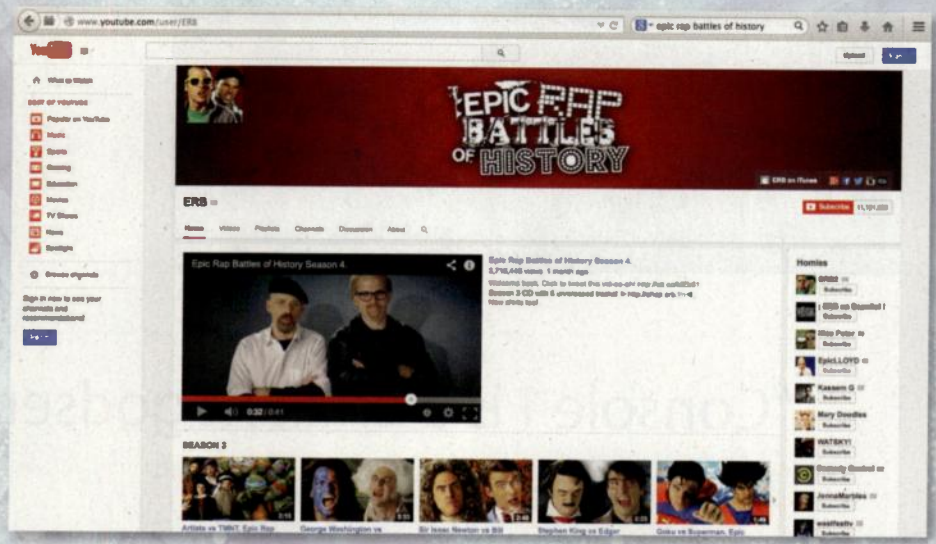


Fig. 3. The Bucket-Brigade delay unit in Future Audio Workshop's Circle2 Synthesizer



The Epic Battles of Rap History channel boasts more than 11 million subscribers and videos with more than 95 million clicks. Learn how you can increase your own video clicks and boost revenue.

Seven Tips to Increase Your Video Views on YouTube

Boost clicks—and revenue—with these simple free and low-cost techniques.

BY RANDY CHERTKOW AND JASON FEEHAN

Randy Chertkow and Jason Feehan are authors of *The Indie Band Survival Guide* (St. Martin's Griffin), now in its second edition. Check out their new column, "The DIY Advisor," at emusician.com.

YouTube continues to be the number one search engine for music, so many musicians have turned to video to promote themselves. As we outlined in an earlier article ("Five Ways to Make Money on YouTube," October 2013), music videos can generate significant income—especially when they generate a lot of views. If you're planning on making a video, try these steps to increase the number of clicks and views of your next creation:

1. MAKE IT COOL TO SHARE

Pete Shukoff (a.k.a. Nice Peter), who's one half of the brains behind the popular Epic Rap Battles of History satire series (youtube.com/user/ERB), explained that the goal is to make videos that *make people look cool for sharing them with their friends*. With most (ERB videos clocking in at 50- to 90-million-plus clicks, Skukoff and partner Lloyd Ahlquist a.k.a. EpicLLOYD, are clearly on to a winning formula.) When you change the focus from the content itself to making the person look good for sharing it, your videos can change to cultivate more engagement within the content, by adding questions (such as asking the fans for ideas), themes, over-the-top content, or a style that makes sharing irresistible. For ideas, get inspiration from videos that you've shared with your friends (even if they're not music related, since you need imagery for your music video).

2. GIVE YOUR VIDEO A "CLICK ME" TITLE

Clever titles can get your video viewed even if fans don't know what they're going to get when they click on it. After all, videos don't take a lot of time or commitment to try out, so titles that are mysterious, sexy, or hint at controversy get clicked no matter what's in the video. Test out different video titles with friends before posting to see which one

might be the most intriguing. Keep in mind that picking the right title is also important for your blog posts, newsletters, tweets, and other links.

3. ORGANIZE YOUR CHANNEL BY CONTENT

If you are going to be releasing more than just music videos, organize your channel by grouping related content into playlists so viewers can easily find what they are looking for. For instance, create separate playlists for live footage, music videos, behind-the-scenes, and so on. Although you can split different content into separate channels, it's better to merge all of your subscribers and views into a single channel, because higher numbers help drive new viewers.

4. CROSS-PROMOTE WITH OTHER MUSICIANS AND VIDEO CREATORS.

Collaborate on your music and video projects with other creators (not just musicians!) who have large audiences, to get new viewers. For example, Nice Peter worked with Key & Peele, Snoop Dogg, and Weird Al Yankovic, just to name a few. And if you can find a way to make your videos relevant to websites with large audiences, share them to see if they'll post them. Also, trade "likes" with other creators since your videos will appear in each of their feeds. And, remember that videos can also be cross-promoted on other blogs, social media, newsletters, or email—don't just limit yourself to YouTube.

5. ADD A POST-ROLL AFTER THE VIDEO AND ADD A CALL TO ACTION

Don't just let the video end! You worked hard to get people to watch your videos, so add a post-roll after each one so you can further promote your channel while you still have their attention. Use the post-roll to ask your fans to:

- subscribe to your channel
- like your video
- buy your track or music (link it in your description!)
- share your video with their friends
- watch other videos on your channel
- watch other artists and creators you work with

There's no need to do all of these, but at a minimum always ask viewers to subscribe so that you can get one-time watchers to catch your next release.

6. USE YOUR SOCIAL NETWORKS TO SHARE AND ANNOUNCE YOUR CONTENT

Video is one of the easiest types of media to share online, and your social networks are the seed that can start getting your video posted, noticed, and re-shared. In your posts, make sure to tell them to check out your video, share it, and like it, to improve your response.

7. PAY TO PROMOTE (IF IT MAKES SENSE)

Advertising isn't expensive on today's platforms, and YouTube allows for a few types of paid promotion (youtube.com/yt/playbook/promotion.html). For example, if you meet conditions, you can create a video ad to promote your channel (FanFinder) (support.google.com/youtube/answer/2801888?hl=en). Or you can use Google's Adwords to promote your video and channel (Adwords for Video, google.com/intl/en/landing/awv/). Other advertising options include Facebook (facebook.com/advertising) and Twitter (business.twitter.com/start-advertising). Make sure to keep an eye on your statistics. They will help you understand which videos fans like, and help you determine if your promotional campaigns are working.

The steps for improving your viewership start *before* videos are being produced and continue during and after the release. The more you plan in advance for generating views, the easier it is to pull off. Finally, if your video gets popular, don't forget to modify the video description, discussion, and annotations on it in order to promote your other work. A single success can be used as a launching point for all of your future efforts. ■

HOW-TO

Craft Bass Synth Sounds for Electronic "Bass Music" Genres

Automation curves and layering tracks help you achieve a huge, crackly, wobbly sound.

BY MARKKUS ROVITO

Markkus Rovito is a contributor to DJTechTools.com, drummer, electronic musician, and DJ.

The overall category of "bass music" breaks down to many flavors: dubstep, trap, neuro, and others. In any case, distinctive bass synths characterize the sounds. You could, no doubt, find some instrument presets and sample packs that will help you make this music, but creating the sounds yourself will help you find your own style. These tips deal with layering the basses, including a granular synth top layer, and automating the pitch for some of that trademark wobble.

Fig.1. A three-oscillator Massive patch with OSC1 pulse width and shape synced to LFO, OSC3 set to square and pitched an octave below, and tube amp effect.

As always, start with these suggestions and fiddle around for your own results!

BASS LAYERS

For the main bass part, you can use just about any three-oscillator synth. We want to start with a buzzy bass line, so make the first two oscillators variations of sawtooth waves if possible. Also if possible, use an LFO to modulate the pulse width modulation of one of the oscillators. Make the third oscillator a square wave and pitch it an octave below the other two oscillators. Don't use any filters, and turn Unison mode on with a voice setting three if available. Finally, put a tube amp effect on it with the overdrive set to about halfway (Figure 1).

Create a track group or instrument rack with the main bass and a sub bass patch in it, so that whatever notes you play will trigger both bass parts. Check your instrument presets for a suitable sub bass patch; it should have a long sustain, and its oscillators should be heavy on square waves. Also, use EQ on the two bass parts so they don't interfere with each other's frequencies.

AUTOMATED PITCH BEND

Record a simple bass line of 8 to 16 measures. In fact, for these purposes, it could be a single, long-sustained MIDI note. Then run the track through a multiband EQ plug-in, where the EQ has a single bell curve of about +10dB. Set the starting frequency for that bell around 150 Hz, and then write an automation curve in your DAW for the bell, so that as it moves along the automation curve, it pitch-bends the sound. Using different geometric repetitions in the automation curve is a good way to get the very mathematically tight bass "wub-wub-wubs" you hear in electronic bass music.

To accentuate the effect, take that same automation curve and copy it to other effect parameters (Figure 2), such as the amount of a distortion effect, ring modulator, etc.

To make the bass patch sound even bigger, duplicate it twice, and pan one of them hard left, de-

Bounce, Chop, and Stretch

Bounce all three layers to audio and save that clip in a folder. Now when you load that clip into a session, chop up different parts of it that you like the best and place them in an arrangement, leaving some silence between them and using varying amounts of time-stretching on some of them to get that, glitchy, stilted, and hyper-chaotic feel of bass music. Repeat this whole process with different bass sounds and automations curves.

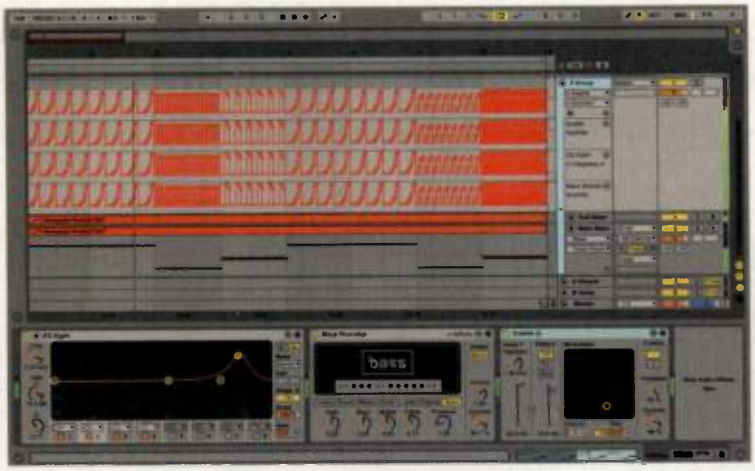


Fig. 2. Syncopated automation curves are modulating the EQ bell curve frequency band, amp simulator wet/dry and chorus wet/dry all at once.

Fig. 3. Max for Live's Granulator II in Ableton Live 9 with the shape set to Fall, the Spike turned up for a sawtooth effect, the Spread turned up to widen the sound, and an LFO modulating the grain size and start position.

tuned down a few cents, and other panned hard right, detuned up by a few cents. To save processing power, you may want to bounce the bass track to audio before duplicating it.

GRANULAR LAYER

For the granular top layer, use one of the many granular synthesizers, like Granulator II in the Max for Live portion of Ableton Live 9 Suite, Camel Audio Alchemy, Steinberg Padshop, the low-cost Sound Guru The Mangle or the free Sknote Grainz.

This layer will be an atonal sound to put on top of the bass to add texture. We'll load a found-sound sample into the synth to turn it into a crunchy, squishy high-end layer. You can find a lot of ambient sound samples that may work for this. As one quick suggestion, you could record your own sample of tearing a long sheet of paper to get a few seconds of tearing sound.

As this sound will go on top of a bass sound, filter out its low frequencies using the EQ or filters your synthesizer has. If there is a highpass filter, use that and set the cutoff to about 800-850 Hz.

In most granular synthesizers, once you load your wavetable sample, you can choose the position in the sample you want notes to start on, the grain size (or amount of the audio to play before looping), and the shape of the loop, which is similar to the oscillator shape in other synths. To get more of a crackly, choppy sound, set the shape to something like a sharp sawtooth. In Granulator II, this is called the Fall shape, with the Spike setting turned up a bit. You may also have an LFO at your disposal, which you can use to modulate the grain size and start position to add further texture to the sound. Finally, use the Spread setting in Granulator II (or equivalent) to widen the stereo sound of this layer (Figure 3).

To combine this layer with the main basses, copy the same MIDI notes from the bass track into the granular track. Also, copy the same effects and automation curves that you used for the basses above and paste those into the granular track. ■

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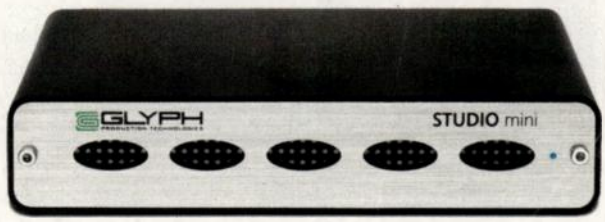

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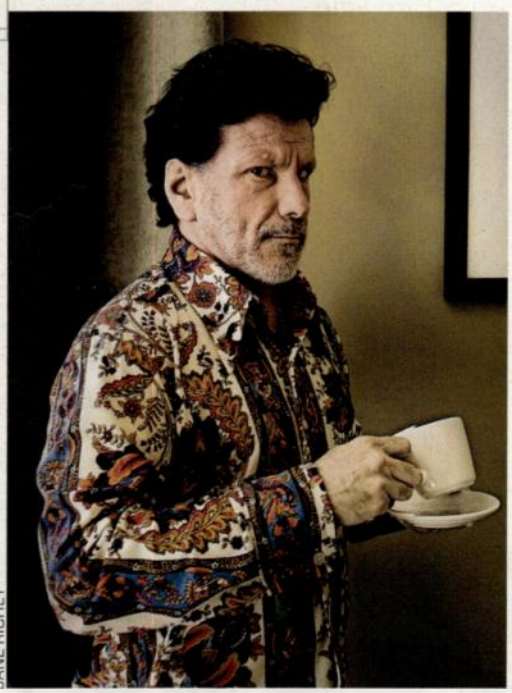
Embracing the Learning Curve

Recognizing the cycle of highs and lows in the creative arc

BY GINO ROBAIR

Self doubt—it can be the enemy of creativity. Focusing on our faults and weaknesses, whether real or imaginary, can paralyze us, but it doesn't have to. So how do we put the negativity to good use?



JANE RICHEY

ARE WE IN A DITCH OR A MINE?

No matter what our artistic practice is, at some point we feel like we're stuck in a rut—neither growing nor moving forward. We may even see our earlier work as being inferior and not as good as we once thought it was, especially when compared to that of someone we admire. Consequently, we feel like we're standing still or, worse yet, moving backward.

These feelings are, in fact, normal, and understanding that they are part of a natural cycle can help us find breakthroughs that take our practice to new levels.

So let's start by viewing the source of our frustration from a different angle: Imagine a graph that tracks our skill level against our ability to analyze and evaluate it, starting from the beginning of our career. Occasionally, the lines will crisscross each other: improvements in our skill set lead to a plateau, where we work for a time; then, at some point, we begin to recognize possibilities we hadn't seen before. It is at that point where we get the feeling that we're stuck, behind, or incapable of doing the level of work we think we're capable of.

Could it be we feel that way because our ability to analyze our work, or the work of others, has surpassed our skills at that moment?

These are frustrations we go through from the moment we start learning our craft. In the beginning, everything is new to us, and there is rapid growth as we move from the basics to an intermediate level. For example, a guitarist graduates from memorizing the note names to mastering chord progressions and scale relationships, whereas recording engineers move from the fundamentals of acoustics and signal flow to mic selection and positioning, processing and mixing techniques, and so on.

As we grow through each level, there is an interplay between our skills, goals and developing interests. Through trial and error, we figure out what works for our own needs, guided by our ear and subjective tastes.

But growth isn't linear: We don't develop at a steady rate throughout our lifetime. In the early years, everything above our skill level needs to be discovered and untangled, and the more effort we put into it, the faster we progress. Eventually, we get to a place where we feel competent and able to do the work at a level we're proud of. If we're lucky, this will lead to greater challenges and further opportunities for growth.

But while the result of all the time and energy we put into our craft is a greater understanding of our field, the accompanying increase in critical faculties can, paradoxically, highlight our shortcomings, making us feel like we haven't progressed at all.

I'm not talking about the emotional peaks and valleys we experience daily, but the longer process, where the short-term ups and downs are merely the harmonics of a larger, fundamental emotion. Recognizing that a broader pattern exists, and then trusting that it is a cycle that we will survive, is a key to long-term success and happiness in your chosen vocation.

This is not to suggest that all of our discontent will suddenly vanish. Rather, by approaching the occurrence of self-doubt as a trend (one that you know will be followed by a period of challenges that take you to a higher level of proficiency or awareness), the fear of failure can be avoided. At that point, it simply becomes a matter of finding the path that satisfies our inherent need to grow.

Here, we can use the crossroads as a metaphor, where we are presented with an opportunity to push ourselves forward, even though the direction might not be obvious just yet. If we permit ourselves to focus on process rather than goal, and look at our work in the long term, then we can better determine which is the best direction to take. And each time self doubt crops up, we use it as an impetus to ask new questions, challenge ourselves, and generally up our game.

My favorite example of a simple, yet creative way of using a creative block to one's advantage is the *Oblique Strategies*, a deck of cards created by Brian Eno and Peter Schmidt. Each card presents an idea or approach—some of which are generalized, others more specific—that can be used as a strategy for breaking through an impasse. The deck's subtitle, *Over One Hundred Worthwhile Dilemmas*, is telling because it includes the word "worthwhile." In other words, it is the process through which we overcome the creative obstacles that makes the results worthwhile.

However, some of the most debilitating obstacles come from within. And although that should make it easier for us to recognize the situation and immediately rectify things, it often proves to be the most difficult.

It is in the moments of my own self-doubt when I am reminded of a recent tweet from Yoko Ono: "If someone is unpleasant to you, draw a halo around his or her head in your mind. He/she is an angel who came to teach you something." Then I turn the thought inward and ask, how can I use the frustration I have with my own work to move forward?

It's times like these that we have to give ourselves the benefit of the doubt. ■

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