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UNIVERSAL AUDIO

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VT-3



TB-3

TR-8



TLM 107

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It's easier than ever to capture quality recordings on your iPad! The iTrack Dock integrates directly with your Lightning-equipped iPad and gives you 24-bit/96kHz recording capability. This outstanding interface includes two world-class Focusrite preamps, MIDI connectivity, and more. Don't sacrifice sound quality for portability; grab an iTrack Dock and get great-sounding results anywhere.



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Push with Live 9 Suite

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moog

Sub 37 Tribute Edition

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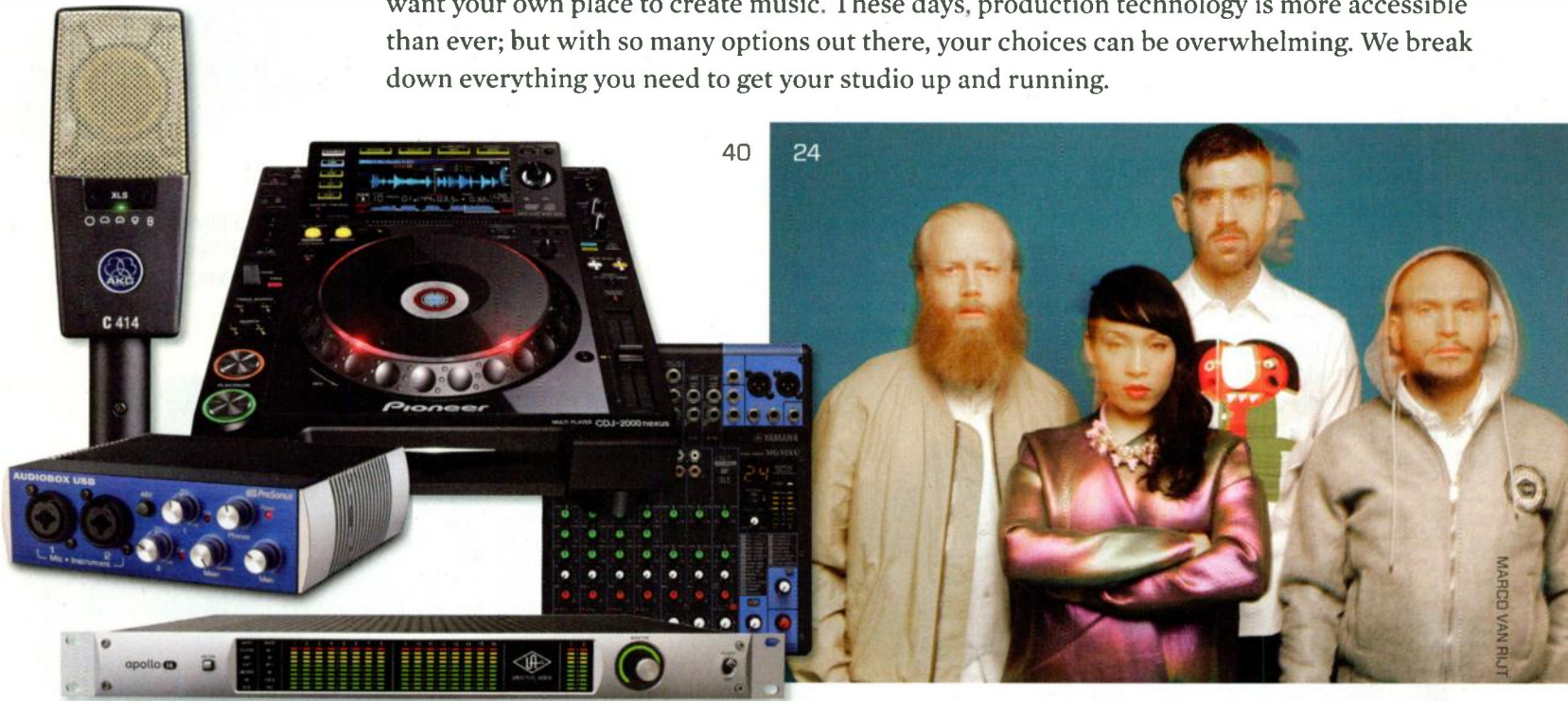
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electronic MUSICIAN

COVER FEATURE

- 40 **Three Scenarios, Three Rooms** Whether you're an artist, engineer, or DJ, you want your own place to create music. These days, production technology is more accessible than ever; but with so many options out there, your choices can be overwhelming. We break down everything you need to get your studio up and running.



FEATURES

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07.2014



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Canada Post Publications Mail Agreement #40612608
 Canada Returns to be sent to Bleuchip International, P.O. Box 25542, London, ON N6C 6B2. Periodicals Postage Paid at San Bruno, CA, and at additional mailing offices.

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PLEASE DIRECT ALL SUBSCRIPTION ORDERS, INQUIRIES,

AND ADDRESS CHANGES TO: 800.289.9919, outside the US

978-667-0364,

emmag@computerfulfillment.com

Back Issues are available for \$10 each at 800.289.9919,

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Prophet 12 Module

insight

Goals and Gear

“WHAT’S THE best mic?”

“Which interface should I buy?”

“What should I have in my studio?”

If I had a dollar for every time I’ve been asked these questions, I’d be writing this note from the Italian Riviera.

My answers, of course, are always “What are your goals?” and “What’s your budget?”

Without that vital information, any purchase you make is a potential waste of money.

The second question is easy: You can only spend what you have (or your credit card will allow). But figuring out your goals—the capabilities your rig should have—must be carefully considered. For example, you have to plan for the future (e.g., potential technology changes, extra I/O requirements, and so on), while satisfying the needs of the present. The savvy shopper is the one who figures

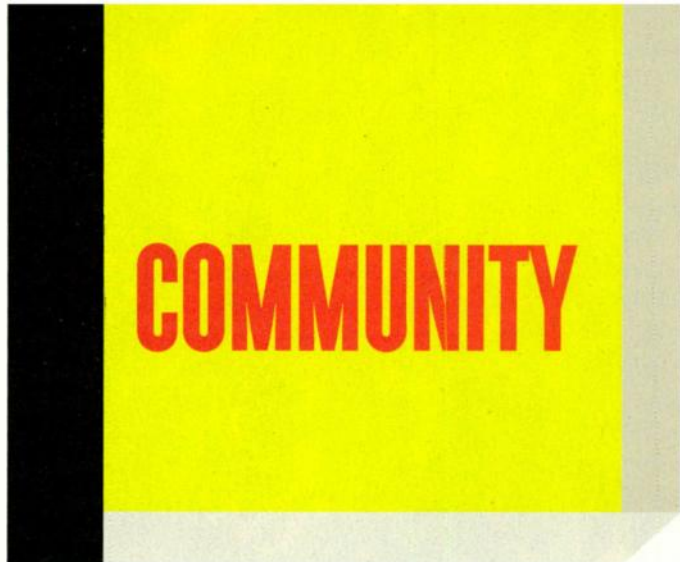
out these details *before* hitting the retail spots.

In “Build a Studio for Any Scenario,” beginning on page 40, we demonstrate the thought process that goes into determining the kinds of products you’ll need (rather than simply want) for a given production situation. But even if the studio of your dreams doesn’t fit into one of our categories this month, you’ll learn a lot in this article from how we approached our final buying decisions, even if they’ll differ from your own.



GINO ROBAIR
TECHNICAL EDITOR

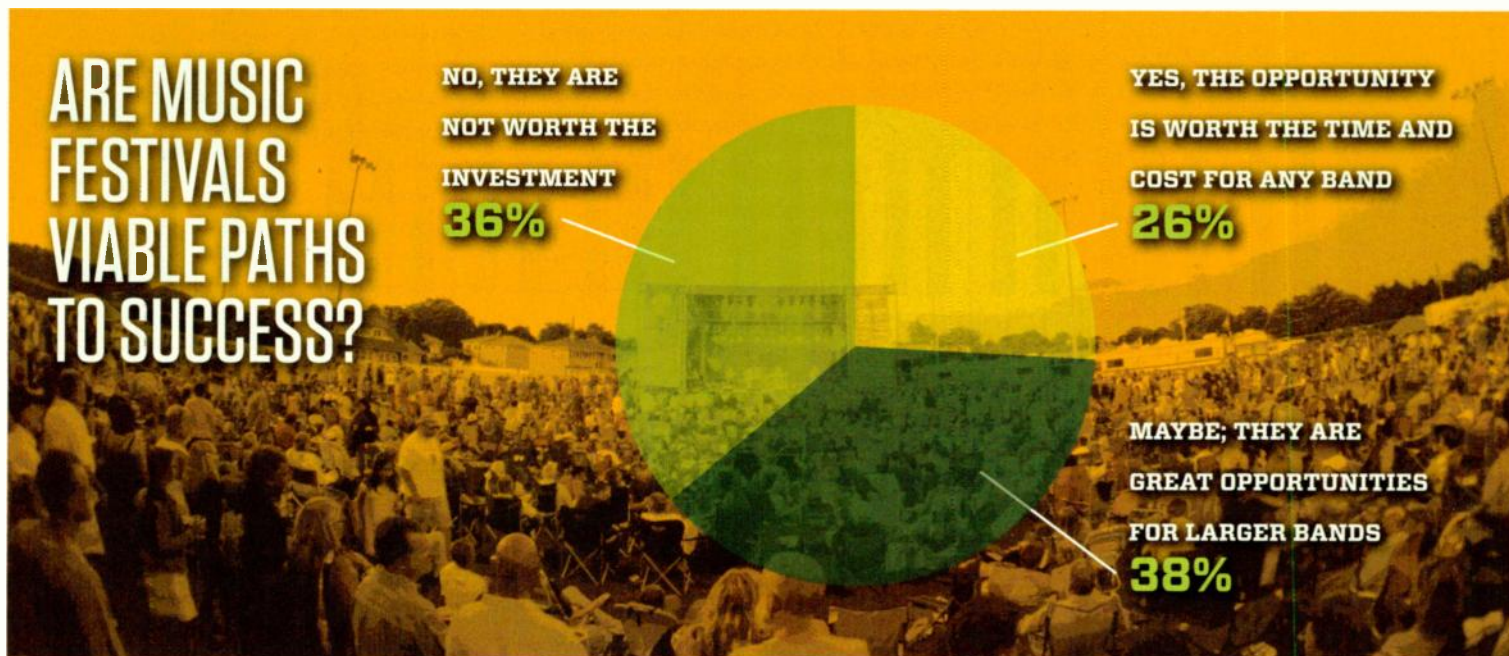
Our goal is to help you get the most for your money, not fill your studio with useless crap.



“SH*T TO REMEMBER: A COMPUTER IS A TOOL, NOT AN INSTRUMENT... SOME DUDES DEVOTE THEIR LIVES TO INSTRUMENTS, OTHERS TO ELECTRONIC COMPOSITION BY CPU.”

Deadmau5 tweets sent in response to comments from Arcade Fire praising bands still playing “actual instruments” at Coachella, April 23, 2014

The Electronic Musician Poll



IN THE STUDIO

>> Sarah Jaffe with McKenzie Smith

BY BARBARA SCHULTZ

SINGER/COMPOSER SARAH JAFFE'S ALBUM *DON'T DISCONNECT* (KIRTLAND) has the sounds of synths and acoustic instruments that were manipulated to seem synthesized. Drummer/producer McKenzie Smith worked with Jaffe in his Redwood Studio (Denton, Texas; redwooddenton.com), which he owns with bandmate Joey McClellan.

Jaffe's new songs started with sketches that she'd bring into Smith's studio to flesh out, with engineer Jordan Martin capturing the action to Pro Tools. "She had cool ideas, but they were 45-second bits," Smith says. "I would get a rhythmic idea and a groove, maybe get the bass drum sound I wanted first; some of that sounds like an electronic kick drum, but it's actually a small marching bass drum that I have. I would beef it up and sometimes make it sound electronic in the mix. It has the human element and the processed, digital element."

Then, Smith and keyboardist Evan Jacobs would layer in keys and synths. "Sarah and I would try out simple lines and lay down synth ideas, and then for more complex stuff, we had Evan," Smith says. "One sound people will recognize is a [Roland] Juno 60 I have that's temperamental. If you get a cool sound going, you better hurry and record it before you lose it!"



Sarah Jaffe with McKenzie Smith in Redwood Studio

Nord and Prophet keyboards were also used. A Moog Little Phatty supplied the bass lines on all but three tracks.

Smith's studio is in a 1,200-square-foot out building on the same property as his late-'60s home. There's a small guest apartment, tracking room, iso booth, and a control room, where Jaffe ended up recording a lot of her vocals.

"The studio vibe was extremely relaxed," Smith says. "She'd be doing a 'scratch vocal,' sitting on the couch in the control room. We had an SM7 up at all times, and she'd say, 'Let me lay down this thing real fast.' But, listening back later, she would say, 'Could we just keep that vocal take? I really like it.'"

"Sarah is an extremely consistent singer, though. She's great all the time. So if we went back to redo anything, it was to get better control over the sound, never because of her performance."

ask!

I PLUG MY ELECTRIC BASS DIRECTLY INTO AN AUDIO INTERFACE'S HIGH-Z INPUT, BUT IT ALWAYS SOUNDS "CLINICAL" AND DOESN'T WORK WELL WITH MIXES. I WANT A REALLY STRONG LOW END, BUT WITH A GOOD HIGH END SO YOU CAN HEAR THE BASS WHEN MIXED IN WITH OTHER INSTRUMENTS. PEOPLE SAY DYNAMICS CONTROL IS IMPORTANT AND I'VE TRIED COMPRESSORS, BUT DON'T LIKE THAT "SQUEEZED" SOUND. ADVICE?

PAUL RODRIGUEZ
HOUSTON, TX
VIA E-MAIL

Bass is a tough instrument to record and play back, because its notes lie in a range that speakers and headphones have a hard time reproducing. Good sound starts with the instrument itself; note that tuning is critical. The frequencies are so low that any sympathetic resonances will create long, rolling beat frequencies that weaken the sound. Also check your pickup height. If you have a light touch and want to emphasize the percussive transients, move the pickups closer to the strings. If you play with

a heavy pick and want to emphasize sustain, move them farther away. To check levels, play your bass while watching your DAW's meters; angle the pickup if needed to balance levels between the higher and lower strings.

Dynamics control often helps—a more consistent signal will play back more consistently. However, many bass players prefer limiting over compression because the limiting process (which trims peaks instead of trying to serve as a "sustainer") can emphasize your "touch" and

make the bass sound more responsive. Also, a little high-frequency shelving boost on mixdown will help provide more definition.

Finally, there are some excellent bass amp sims (IK Multimedia, Native Instruments, Waves, MOTU, Line 6, Overloud, etc.) if you want some "growl" to complement the DI's pristine sound. Compared to guitar amps, bass sims don't need to deal with lots of distortion and high frequencies; this makes it easier to create realistic emulations. **THE EDITORS**



There's *much* more to recording bass than amp sims, but they can definitely help add character. Clockwise from upper left: Waves GJR, Native Instruments Guitar Rig, and IK Multimedia AmpliTube.



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

NEW GEAR



1

1
Nektar
Impact LX25 and LX61

USB MIDI keyboard controllers

\$129.99-\$229.99

HIGHLIGHTS 25- and 61-note velocity-sensitive keyboard • 8 assignable rotary encoders and 8 assignable pads • on-the-fly pad mapping • LX 61 includes 8 assignable faders and buttons • transport controls • pitch and modulation wheels • 3-digit LED display • footswitch input • octave and transposition buttons • stores 5 user presets and 4 maps for the pads

TARGET MARKET Musicians, composers, DJ/producers

ANALYSIS Designed to integrate directly with most major DAWs for use with mixer, effects, and instruments.

nektartech.com



2

2
Soundness
SoundSoap 3

Audio restoration software for Mac OS X

\$149 street

HIGHLIGHTS Updated interface • high-resolution Wash window • improved Learn Noise functionality • works in 32- and 64-bit hosts • supports audio recording and drag-and-drop of video clips in standalone mode • Audio Units/VST/RTAS/AAX plug-in formats • one-click sharing to e-mail, social media, and cloud storage

TARGET MARKET Musicians, recording engineers, and video artists

ANALYSIS Designed to be intuitive and easy to use for anyone needing to mitigate unwanted audio artifacts in recordings, including those made with video.

soundness-llc.com



3
Native Instruments
Molekular

Plug-in effects suite

\$149

HIGHLIGHTS 35 effects with modulatable parameters for Reaktor 5, Reaktor 5 Player, and Maschine • designed in cooperation with Zynaptiq • morph between sound variations using your mouse or modulation input • five categories of effects: Bread and Butter; Dynamics and Distortion; Modulation and Filters; Delay, Stutter, and Glitch; Pitch and Resonator • four assignable macro controls

TARGET MARKET DJs, producers, sound designers, musicians

ANALYSIS A heavyweight collection of highly configurable effects that cover every type of project.

native-instruments.com



4
Mackie
Thump

Powered P.A. loudspeakers

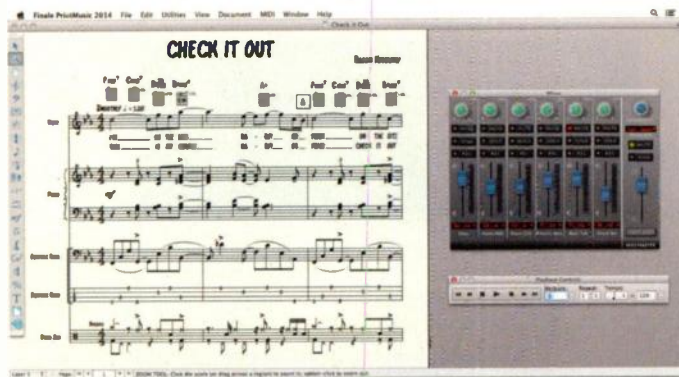
\$389-\$879

HIGHLIGHTS 1,000W 12" and 15" versions with 2-way crossovers • 1.4" titanium tweeter • 3-band EQ with sweepable mids • time-aligned transducers • mic and line-level inputs • 1,200W Thump 18S 18" powered subwoofer with two XLR inputs and stereo highpass outputs • Class D amplification

TARGET MARKET Gigging musicians, clubs, houses of worship, live-sound engineers

ANALYSIS A heavy-duty, high-output sound system. Thump12 and Thump15 have angled backs that make them suitable for use as stage monitors.

mackie.com



5
Waldorf
Streichfett
String synth module
\$325

HIGHLIGHTS Desktop polyphonic synthesizer that focuses on classic '70s-era string machines • brass, organ, and choir presets • monophonic solo section with tremolo • ensemble and time-based effects • controls for crescendo and release • stereo outputs • MIDI and USB ports
TARGET MARKET Keyboardists and musicians looking for a portable synth with vintage sounds for stage and studio
ANALYSIS A great-sounding hardware synth that resurrects a wonderful class of instrumental sounds in a convenient package.
waldorf-music.info

6
Fender
Passport Venue
Portable audio system
\$999.99

HIGHLIGHTS 600W • Class D amplifier • integrated 10-channel mixer • 4 mic inputs with phantom power and switchable pads • XLR, 1/4" mic/line/instrument, and 1/8" stereo line-level inputs • treble and bass controls and reverb send on each channel • integrated USB flash drive-based recording (16-bit/44.1kHz WAV) and playback (WAV/mp3) system • output for powered subwoofer
TARGET MARKET Bands, DJs, event managers, educational facilities
ANALYSIS A highly portable P.A. system suitable for medium to large audiences.
fender.com

7
MakeMusic
Finale PrintMusic 2014
Music notation software
\$119.95 (\$39.95 upgrade)

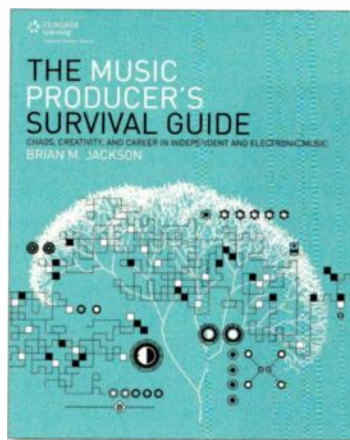
HIGHLIGHTS Note entry from MIDI keyboard, ASCII keyboard, or by scanning score pages • orchestral scores can include 24 staves • built-in sound library • supports VST/AU virtual instruments • Human Playback functionality • exports audio, MIDI, and musicXML files • Score Manager • automatic range checking • beat-assigned Smart Shapes • support for the new Finale file format
TARGET MARKET Composers, musicians, students
ANALYSIS PrintMusic 2014 provides a way to use many of Finale's outstanding features, but at a much lower cost.
finalemusic.com

8
Arturia
MiniBrute SE
Analog synthesizer
\$599

HIGHLIGHTS Adds step-sequencer with 64 steps • Mod, Gate Len, and Swing parameters • 6 pattern sequences • Steiner-Parker multimode filter • sub oscillator • Ultrasaw and Metalizer features for adding harmonics • an LFO with sample-and-hold • audio input • USB and standard MIDI I/O • CV/gate I/O
TARGET MARKET Keyboardists, DJ/producers, and modular-synth owners looking for a CV/gate controller keyboard
ANALYSIS With its retro look, the MiniBrute SE adds an old-school step sequencer to a highly portable and powerful monosynth.
arturia.com

Continued

NEW GEAR



9
Auganizer
Auganizer
 Audio Units plug-in organizer
\$34.99
HIGHLIGHTS Allows you to rename and organize your Audio Units plug-ins in Apple Logic Pro X and Garageband and Ableton Live • requires Mac OS X 10.6 or higher • arrange AU plug-ins by group, subgroup, or customized name • includes Cover Flow for loading plug-in GUIs • supports 32- and 64-bit plug-ins, Automap, 32 Lives, and other wrappers • import/export settings
TARGET MARKET Audio Units plug-in users
ANALYSIS This is the utility app you've been waiting for.
auganizer.com

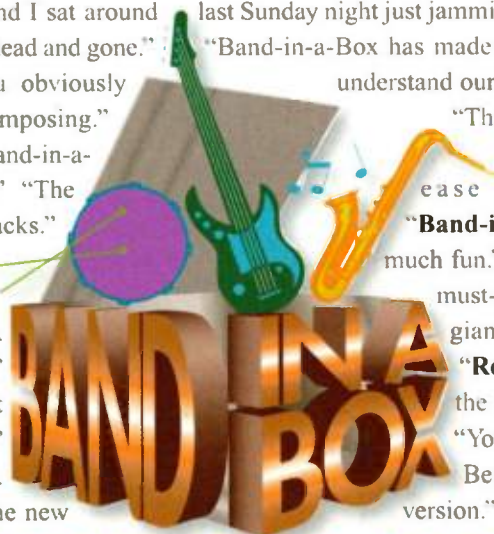
10
Ear Trumpet Labs
Mabel
 Multipattern condenser microphone
\$1,000
HIGHLIGHTS Two medium-large, fixed-cardioid electret condenser capsules with transformerless FET circuitry • cardioid, figure-8, and omnidirectional patterns • high-end frequency response to 14 kHz • capsule is mounted in a copper-ringed basket with brass grille • stainless steel yoke and copper-and-brass body • internal dampening to minimize handling noise
TARGET MARKET Recording engineers and musicians
ANALYSIS Hand-built in Portland, OR, Mabel focuses on classic looks and sound quality for tracking acoustic instruments and voices.
eartrumpetlabs.com

11
Cengage
The Music Producer's Survival Guide
 By Brian M. Jackson
\$34.99
HIGHLIGHTS Subtitled "Chaos, Creativity, and Career in Independent and Electronic Music," the book covers the philosophy of music production, spanning the history of music technology, while offering practical advice on networking and career planning.
TARGET MARKET Musicians, engineers, producers, and DJs
ANALYSIS A uniquely non-traditional exploration of the creative process that examines a plethora of subjects, including technical and theoretical approaches to music, lifestyle decisions, and thoughts about consciousness and the mind.
cengageptr.com

12
Neumann
KH 120 D
 Digital studio monitor
\$TBD
HIGHLIGHTS Digital input and output on BNC connectors • accepts AES3 and S/PDIF format at 24-bit/192kHz • XLR analog input • front-panel bass reflex ports • analog Class AB amplifier • time-delay compensation up to 400 ms • bass, low-mid, and treble controls • dip switches to control logo lighting and ground lift
TARGET MARKET Recording and mix engineers doing stereo or surround work
ANALYSIS Designed for use as close-field monitors or rear speakers in a multichannel system.
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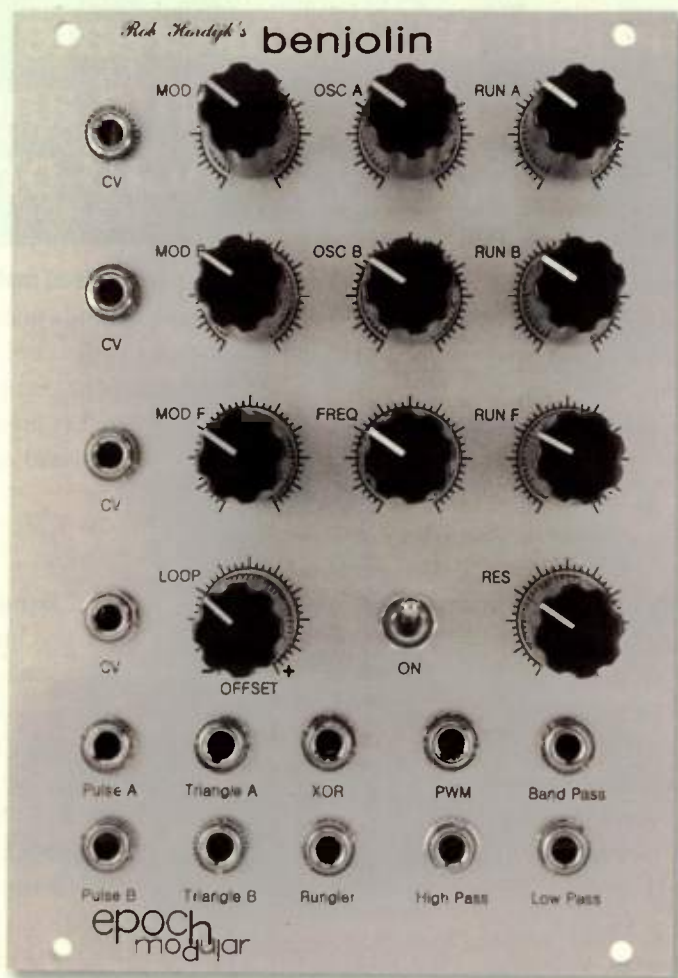
BY GINO ROBAIR

ROB HORDIJK made a name for himself with his mad programming skills on the Nord Modular G2 and his elegantly handcrafted hardware synths. Inspired by chaos theory, he designs instruments such as the Blippoo Box that let you explore unpredictability to a very high degree, using a minimum amount of circuitry.

One design that is popular among DIYers is the Benjolin, which Hordijk refers to as being “bent by design”—an allusion to the hardware hacking concept of circuit bending. In this instrument, Hordijk exploits “the interference patterns between two oscillators,” based on his imaginative use of cross-modulation. Sylvan Lee of Epoch Modular not only put Hordijk’s Benjolin behind a Eurorack panel, he added several features that greatly expand its usefulness.

Meet the Rungler The Benjolin begins with two analog oscillators that provide pulse and triangle signals at its output jacks. In addition, the triangle output of each oscillator is normaled to the modulation input of the opposing oscillator. External modulation inputs and attenuators are included.

The triangle waves are also fed into a comparator (oscillator A sets the frequency while oscillator B determines the pulse length) to create a pulse-width



The Benjolin’s panel design keeps cabling away from the knobs. It’s worth noting that each output has a different peak-to-peak voltage range: The filter outputs go from +2 to -2V, the triangle outs are ±4V, the rungler and XOR are ±5V, the pulses are ±8V, and the PWM range is ±8.5V.

used elsewhere as audio sources, clocks, or CVs.

The rungler provides far more exciting and musical material than other entropy-generating modules because of the way Hordijk has integrated it into the Benjolin’s design. The slightest turn of a Run knob can send the module into an entirely new soundscape, with the rate of change happening glacially or at audio rates.

modulation signal, which has its own output. Furthermore, the PWM signal is summed with the output of the rungler (explained below) and sent into a resonant 2-pole filter that provides independent highpass, bandpass, and lowpass outputs. Oscillator B’s triangle wave is normaled to the modulation input controlling the cutoff frequency, with an external mod input and attenuator for both sources nearby.

What really defines the Benjolin, beyond all this cross-mod fun, is Hordijk’s famous rungler circuit. It starts with an 8-step shift register that accepts a serial pulse from oscillator A, which is treated as an XOR signal that is clocked by the pulse output of oscillator B: When oscillator A’s value is low and oscillator B’s signal is high, data in the shift register moves to the next stage.

The shift-register’s output goes through a 3-bit D/A converter, and the chaotic results are fed back into the modulation inputs of the oscillators and the filter; the Run A, Run B, and Run F knobs control the amount of rungler at each modulation input, respectively. Discrete outputs are provided for the rungler and XOR signals, which can be

The Benjolin includes a very handy looping function that recirculates data in the shift register at a rate set by oscillator B. Looping also changes the waveshapes coming from the rungler and XOR outputs. A signal of 0.7V or greater at the loop CV input will begin the patterning. The associated toggle switch engages a bipolar-offset control that can be used on its own to create loops or to alter the bias of an incoming voltage. Lee suggests plugging a piezo into this jack, perhaps from an external percussion controller, to grab rungler patterns—very hip.

Source of Certainty It is important to note that, despite its chaotic capabilities, the Benjolin can also be used in more linear ways. For example, it’s great for creating drones, beats, and melodic patterns, as well as serving as a clock source, all with very predictable results.

Consequently, the Benjolin can supplement any modular system, thanks to its wide range of abilities. Yet, it’s very powerful on its own and capable of everything from glorpy burbling and slowly evolving textures to face ripping noise. ■

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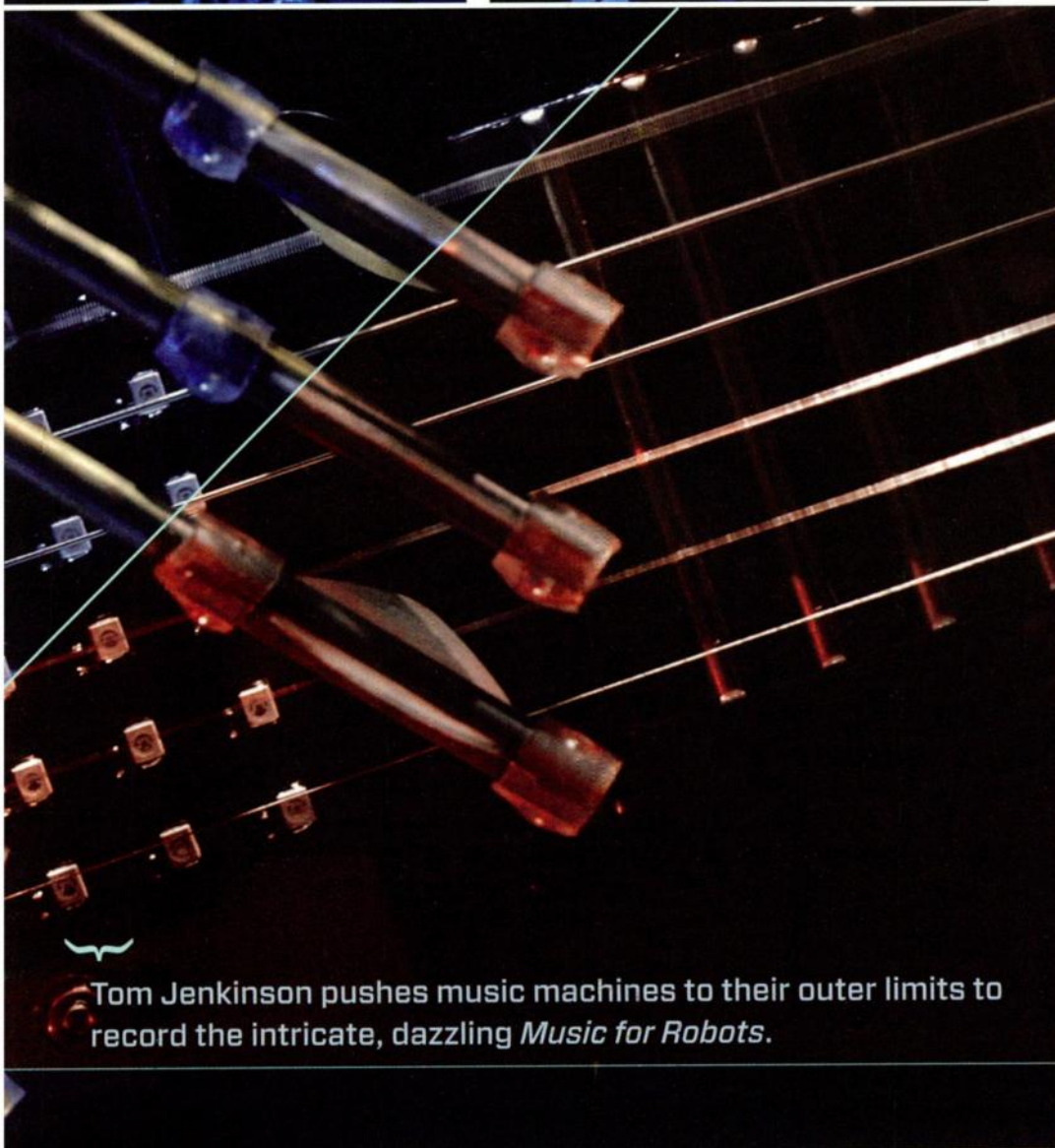
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S q u a r e p u s h e r



The Z-Machines guitar robot plays with 78 "fingers."





Tom Jenkinson pushes music machines to their outer limits to record the intricate, dazzling *Music for Robots*.



BY KEN MICALLEF

WHEN TOM Jenkinson, aka Squarepusher, debuted in 1996 with his now-classic Warp album *Feed Me Weird Things*, its combination of tremor-inducing drum and bass rhythms, twisted synth phrasing, and Jaco Pastorius-inspired electric bass playing was simply startling. Jenkinson accompanied similarly minded and freakily futuristic English programmers such as Aphex Twin, Chemical Brothers, Luke Vibert and Underworld, diving headlong into a brave new world of sampled/sequenced/cut-up collage.

While his compatriots wandered off into dithering head space or circled the same terrain, Jenkinson continued to push himself and recorded prolifically—not always with predictable, or even pleasing, musical results, but he never lost the plot. He never stopped searching.

Fifteen albums and 18 years later, Jenkinson collaborated with a team of roboticists from the University of Tokyo, composing music for their robot band, Z-Machines, and *Music for Robots* (Warp) was born. Writing for a guitarist (“Mach”) with 78 fingers that can play at 1,184 bpm, a drummer (“Ashura”) with 22 arms, and a keyboardist (“Cosmo”) that fires green lasers to “play” his keys, Jenkinson sent MIDI files to musical producer Kenjiro Matsuo, who worked with the roboticists to produce Jenkinson’s music, which he then mixed.

Z-Machines have performed metal and J-Pop, but nothing as musically sophisticated as the sounds of Squarepusher. Indeed, the first notes of “Sad Robot Goes Funny” sound exactly like Jenkinson’s lyrical Fender Jazz Bass playing, before the music turns baroque as the guitars enter, then free as the drums execute



Jenkinson in the studio.

a Vinnie Colaiuta-worthy cadence and more guitars spin webs of dulcet melodies. It sounds like humans, and it sounds like machines.

Music for Robots is very ambitious, from the pastoral lute sounds of “World Three,” to the sweetly plucked guitars of “You Endless” (Jenkinson has always had a soft spot for mushy ballads), to the madly churning Stravinsky-fusion-in-Hell sensations of “Dissolver.” Some may dismiss the album as heartless prog rock on steroids, or a fusion fatalist’s notion of musical self-indulgence, but in a world increasingly controlled by whirring hard drives, overseen by global surveillance and entertained by programmed music that barely resembles music, *Music for Robots* is a beautiful embryonic first salvo from a future where glistening sounds transport us, where styles can be dialed in, where the impossible becomes possible, and the final frontier is endless.

What was your goal when you began writing for the robots?

Before embarking on the project my question was, “Can the Z-Machines do something which is compelling for the listener? Can they make music which survives the novelty value of music being performed by a robot?” A lot of the interest in this project comes from the

gimmick value of these machines, the robots. But I don’t want this to be a gimmick. There’s no point in recording a music box with attitude. There has to be something at the core of it which is valid, musically. It has to go beyond the simple technical details of how it’s done. It has to make you feel something.

Did you have a plan?

I had four weeks to write the music, so there wasn’t time for an overarching plan. I just had to see what I could do in that time. The whole thing was restrictive. The robots require a hell of a lot of maintenance, they need a team of people to work them, and storage is financially intensive in Japan, so this amounts to a monstrous financial burden. So it had to be done in short space of time, with no time for refinement or developing the big concept. “What can we do that is good?” was the main idea.

guidelines to move forward. But this is not a particularly different process for me. I am always working out the boundaries of the instruments; that is one of the concepts I’ve always liked playing with. The boundaries are explored in this project, as well as what happens when you push them into the zone where they’re not able to completely, consistently deal with the data proficiently anymore.

Do you see the similarities between Z-Machines and Pat Metheny’s Orchestrion?

The Orchestrion is really cool, but Pat should give it to me. [laughs] At least lend it to me! The Orchestrion is impressive, but you need to take music to the outer limits, really see what the machines can do. If I want to play music with sensitivity, nuance, and subtlety, then I will play it. I won’t get a f*cking robot to play it. I’ll do it myself. Like I did on *Music Is Rotted One Note* or *Just a Souvenir*, where all the drums were live and nothing was sequenced. I want to use the robots for their strengths. The robots are amazing at playing music of ridiculous complexity with accurate timing. They are not so great at playing music with nuance.

“Given that the Z-Machines are essentially playing conventional instruments, albeit being played in an unconventional way, it’s still a conventional recording process. So the guitar was DI’d, the drums were miked, and so forth. The recording process was totally old-school.”

So how did you infuse soul into the Z-Machines? Did you use writing software?

I started off experimenting, trying to establish how fast the robots could play and the degree to which I could get them to play consistently, and if there’s any kind of interdependence between what the robots play between one another. Trying to establish the degrees of freedom, if you like. Then it was, how fast the drum robot could play consistently; they’re all run by compressed air.

Z-Machines use pneumatics to play the instruments in the same way as Pat Metheny’s Orchestrion.

Yes, it’s all run pneumatically, so if you play all the drums at once, does that drummer robot literally run out of air? These considerations are what I started off with. I sent MIDI files for [Z-Machines] to do tests with, and they returned the recordings of those tests so I could work out the limits of the machines and use those as

On “Dissolver,” the Z-Machines play the equivalent of 128th notes; the fastest music I’ve heard that wasn’t a total blur. They were broad sweeps of glissandos, basically. Once locked-in, did the robots play back the music consistently each time?

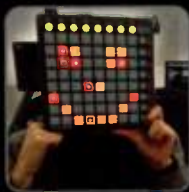
Even though they’re machines, the performances are not identical each time. There’s a degree of inconsistency. There’s a sort of fluidity in the way the robots deliver the performances. It can be extremely fast, and by and large what they play is locked and tight. But they’re not 100 percent consistent; I find that quite interesting, especially when you push the robots to the very upper regions of how fast they can play. Then they start behaving in a less predictable way. There is a section in “Dissolver” where the guitar robot does what you call “shredding.” There’s a section beyond that where the guitarist robot is playing data which is generated mathematically using sets of equations rather than me composing as



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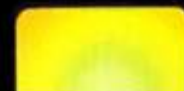
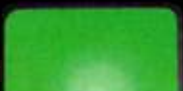
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such. I let the equations run and they generate the data. That's where I was really testing the upper limits of what the robots can do. It's playing notes all over the fretboard at virtually the same time; exploring not just in terms of speed but in terms of making sounds with the guitar. It would never be possible for a human being to do that.

Tell me about those equations.

I set up equations and recorded the output in MIDI form. In that respect, the robots are not as outlandish as you'd think. They are still running the basic MIDI protocol using the conventional MIDI notes and MIDI controllers, admittedly being employed in a unique fashion.

What about MIDI and dynamics?

None of it plays with any dynamics. The drummer has many sticks but they play at fixed velocities. There are three sticks for each drum: one that plays soft, another medium, and another loud. But the guitar robot doesn't play with any dynamics whatsoever. You have to build the nuances into the arrangements of the notes. They have this classic robot thing going on, like in *Doctor Who* with [fictional mutant race] the Daleks. They can take over the universe, but they can't go upstairs. They can play a million notes a second, but they can't play with any amplitude control. The guitar robot has this odd rotating pick arrangement for his right hand; it's a stick that rotates one way then the other way; it has a pick attached to the end so when it rotates one way, it plucks a string, and then after that it plucks it the opposite way, to resemble the sound of up and down strokes.

Is the drummer robot playing all the drums behind his head and in front as well?

He plays everything; all of the drums. It's basically about the limitations. The guitar robot will move the position of his right hand to strike the strings in different places to emphasize harmonics, but it's uniform tonality. I am interested in baroque music, and these early instruments such as organ and harp, they are very uniform in their dynamics as well. So I find that a different type of challenge to write for. I thrive on limits; my mind is adapted to dealing with music, making situations that are difficult. When I began in 1996, I didn't even have a proper sequencer.

When I interviewed you at your studio in Hackney in 1996, all you had were a simple computer, Fender Jazz Bass, and lots of Dizzy Gillespie and Charlie Parker records.

Yes, I had the basses, an Akai sampler, drum machine, a synth, an eight-track recorder, but it was all very limited. My studio doesn't look that different now, here in Essex. I thrive in the



“Basically, I am representing the actual performance of the Z-Machines. There is no editing, no tweaking, no cutting up of phrases and duplicating them in Pro Tools ... This is a robot band and this is what a robot band sounds like.”

situations where it's difficult. Necessity is the mother of invention, they say.

How were the Z-Machines recorded?

I've never actually seen them. This was all conducted online. But given that the Z-Machines are essentially playing conventional instruments, albeit being played in an unconventional way, it's still a conventional recording process. So the guitar was DI'd, the

drums were miked, and so forth. The recording process was totally old-school. On the one hand, you have this set of instruments that are utterly familiar to everyone. Everyone knows these sounds. They are so drowned in cliché.

Did you apply any plug-ins, any effects during the recording or mixing process?

I have tried to represent the performance that they would give at a show; that was my goal, as if I was at the mixing desk. You can hear a little dynamic processing, a little reverb, a slight bit of motion on the faders for emphasis. But basically, I am representing the actual performance of the Z-Machines. There is no editing, no tweaking, no cutting up of phrases and duplicating them in Pro Tools. It's not a bunch of machines in a lab that I've processed the f*ck out of and you don't know what is what. This is a robot band and this is what a robot band sounds like.

There is a section in “Remote Amber” in which the drummer is playing a free section on the snare drum, and it sounds like a live jazz drummer.

I played that on my sequencer, just bashing it in. That's where the robot drummer starts to sound natural. And you can even hear the squeaks of the robot's arms before it strikes the drum. I could have edited those out to make it perfect, but that's part of it, its hinges squeaking. Admittedly they could have put a bit of WD40 on it! That was interesting. I am essentially asking, “Can robots play jazz?”

What's the future of you and the Z-Machines?

I have my own versions of software that will make up sequences of notes; perhaps you can call that improvising. I don't know if I classify that as improvisation; that has to come from a human mind. Or at least a mind. Improvisation comes from spontaneity, and spontaneity is one thing artificial intelligence hasn't got a grasp of. It is very good once you set it in a direction, but coming up with new ideas? That's where improvisation gets exciting, coming up with something new on the spot. Expecting a robot to do that is a little bit optimistic. ■

Ken Micallef is freelance writer and photographer based in New York City. His work has appeared in many publications, including DownBeat, eMusic, and Modern Drummer.



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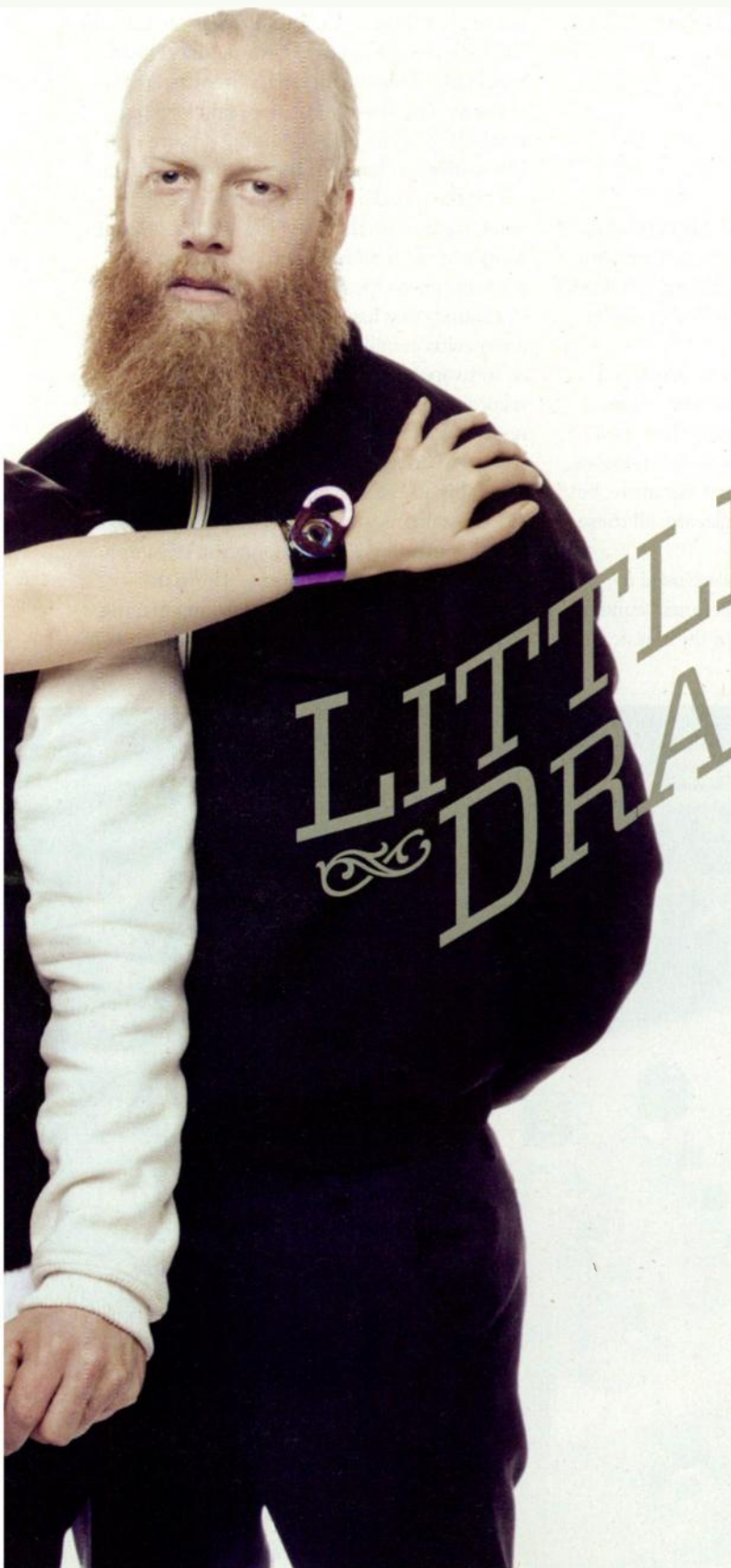
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Swedish quartet adds more traditional instruments in the studio, but breaks out their synths to re-create the sounds of *Nabuma Rubberband* in concert

LITTLE DRAGON

BY LILY MOAYERI

SWEDISH FOURSOME Little Dragon keeps the musical job descriptions loose. Members include vocalist Yukimi Nagano, Hakan Wirenstrand on keyboards, Fredrik Wallin on bass and keyboards, and Erik Bodun on drums—both acoustic and synthetic. But each member is involved in all aspects of the Little Dragon sound. On their fourth album, *Nabuma Rubberband*, Little Dragon taps into a soulful side, veering into R&B tones and organic elements.

Part of the softer sound of *Nabuma Rubberband* is attributable to Little Dragon's choice of material and part of it comes from Jaycen Joshua, who mixed the album. This is the second time Little Dragon went outside their lair for mixing; the previous time was for their sophomore album, *Machine Greens*, where, according to Wirenstrand, some of the vibe got lost in the process.

Joshua's first attempt at mixing *Nabuma Rubberband* also conflicted with Little Dragon's desires—particularly his auto-tuning of Nagano's voice, which is a big no-no in the Little Dragon camp. Joshua, who is known for his radio-friendly touch in the soul and R&B world had to adjust his approach with his second stab at *Nabuma Rubberband*. This time it worked on both sides.

"[Joshua] made it easier to listen to," Wirenstrand says. "He said that people want him to mix according to his taste, but we didn't want that. He was really open and listened to where we were and where we wanted to go. It was super professional. He made a contemporary, pop-y, radio-ish album."

“Sounds that have been processed a lot and are specific combinations of different synths or software, we sample the stems from the recording. But sometimes they’re too short and not enough to sample and work with, then you have to re-create it more the best way you can.”

—FREDRIK WALLIN

“It was interesting to try someone external, to let go of the music,” says Wallin. “That was tricky in the beginning because it’s so precious to us and we produce and mix at the same time so it’s part of the song’s character. You have to trust that the song and production has its own life and it’s going to come through, even if someone else, someone that has more of a focus and that’s what they do, works on it. And it definitely came through.”

The warmer sound on *Nabuma Rubberband* also stems from the instrumentation. This album marks the first time Little Dragon uses actual strings, played by Gothenburg Symphony Orchestra’s string section. Production of the song “Lurad,” for example, started with synth

strings from Cubase’s HALion. Little Dragon then wrote some score for the live strings, but when the Symphony’s strings played it, it wasn’t what they had in mind; they needed to clarify their intentions further.

“It was the phrasing,” says Wirenstrand. “We had to communicate a lot. They knew they were in a different situation than their normal setting and they were up for it. We’ve got the notes and the right time signature, but then there is glissando and staccato, all these things that make it musical.

“Most classical musicians are used to getting as much dynamic directions,” concurs Wallin. “We haven’t worked in the classical

field much but after a while we made our point by being more descriptive, explaining, singing of the melodies, and playing the original.”

When songs on the album are performed live, however, the symphonic strings have to get taken back to the synthesizers, as do other parts. Synthesizing various elements to take on the road takes longer than the actual rehearsal, especially since the members of Little Dragon make a point of avoiding loops and backing tracks if they can help it, finding it more interesting to change things up in the moment.

“If the sound has a specific character, you want to play with that live,” says Wallin. “Certain sounds are a bit more generic, so you could probably tweak those out from the synth live. But sounds that have been processed a lot and are specific combinations of different synths or software, we sample the stems from the recording. But sometimes they’re too short and not enough to sample and work with, then you have to re-create it more the best way you can.”

Wallin uses a Nord Wave live while Wirenstrand uses a Yamaha Motif with a MIDI controller. This combination of sample workstation and synth engine, where the sample is either mixed from the stem playing straight or in conjunction with synth sounds,

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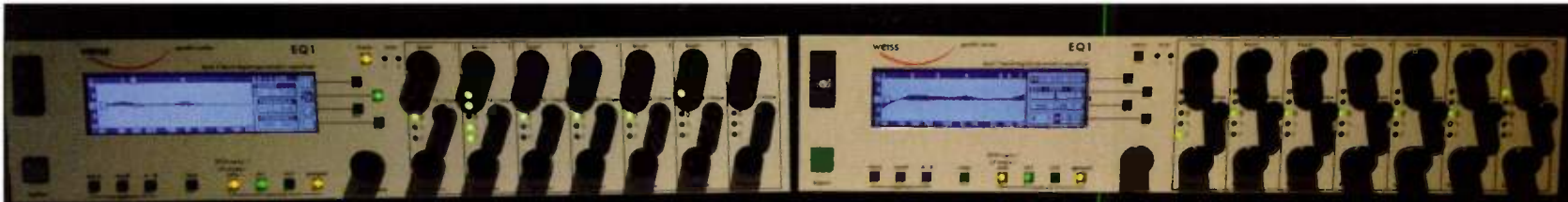
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provides them with the character they're looking for live. Bodun also triggers kick and snare drum samples from the stems on his

Roland SPX pads, which are played along with his acoustic drum set, creating layers of synthetic drum sounds.



Drummer Erik Bodun manipulates parts recorded using the Drumagog plug-in to make them sound more organic.

During recording the Drumagog plug-in is used a lot; Bodun tweaks it, so it doesn't sound like a plug-in. In some cases, such as on "Cat Rider," everything is played live. "Bodun is the best drummer I know," says Wallin. "At the same time, there's something about the drum machine sounds, so the combination of his groove and touch with an 808 is perfect to make it more punchy and present. It's the best of both worlds."

On the plug-in front, *Nabuma Rubberband* marks the first time Little Dragon has used Universal Audio software, which allowed the group to color in the sounds and create sounds characteristic of hardware that the band had never had the budget for in the past.

"We often joke about having GAS: Gear Addiction Syndrome," says Wallin. "There always another plug-in that can give you something else, something more." ■

Lily Moayeri is based in Los Angeles. Visit her website at pictures-of-lily.com.



More Online
Little Dragon list their choice studio gear.
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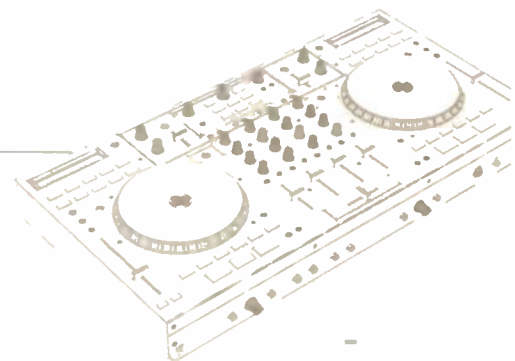


DAN REED

TEN SNAKE



For *Glow*, producer/DJ finds his muse in classic synths, VST plug-ins, and the voice of Fiora



■ BY TONY WARE

MARCO NIEMERSKI, better known in clubs and record stores as Tensnake, established himself in 2006 as a producer/DJ who was unafraid to buck the trend toward minimal dance music in his native Germany. Operating from Hamburg, Niemerski pulled from a more glamorous, hedonistic tradition of U.S. and U.K. deep house, mixing melodic chords, rolling organs, piano stabs, boogie bass lines, and wistful vocal samples. Initially armed with synthesizers such as the Yamaha SY85 and the Roland Juno-10, Niemerski persistently expanded his studio with a balance of venerable gear and the latest VSTs, continually working toward a middle ground between catchy and crunchy.

So it shouldn't be a surprise that Niemerski's debut artist album, *Glow*, walks a line between cutting edge and vintage, featuring contributions from Nile Rodgers (Chic, Daft Punk), Jamie Lidell, MNEK and Stuart Price (Jacques Lu Cont, Madonna), Fiora and more.

When we spoke with Niemerski, he was in Los Angeles exploring some collaborative projects before beginning a summer of Pacha gigs on Ibiza and then a North American tour. He took some time to reveal how he translates classic gear signatures and modern techniques into emotionally and physically moving sounds.

What do your sessions look like, and are you better set up to bring people or parts in?

My session setups really depend on the song. It was mainly the case that I wrote the instrumental in my studio in Hamburg using Ableton Live on a PC. I have a collection of synths and external gear, but the writing process often starts with plug-ins. I always start from scratch. I don't have a template. Very often I try not to worry on the sounds in the early phase of writing.

For example, one of the first songs finished was "Feel of Love" with Jamie Lidell and Stuart Price. I had the track almost finished in Germany, but then I had the idea to take it to a different level and that Stuart Price, who is also rooted in the '80s like me, could help take it there. So I took the MIDI files to Los Angeles to his studio and we started from scratch. Mainly all the synths you hear, including the bass line, are an ARP2600 synth he has there. Then we felt we needed a singer. We had used a lot of LinnDrum samples [sourced from vintage EPROMs and sequenced in Native Instruments Kontakt], which made us think of Prince, and that made us think of Jamie Lidell, who has a voice in that ballpark. So we sent him an instrumental and he sent us back a vocal he recorded.

While at Price's studio did you sample any of his gear for future projects?

No, I don't necessarily like sampling synths. Maybe it's stupid to think, but the magic can't be captured in samples. It's not as vivid and alive as the real deal. The ARP was so big and somewhat complicated, and sounded so fantastic, but I'm glad it's Stuart's and not my synth. I'm very impatient sometimes and need to get quickly to results, so I'm a happy user of presets I tweak to use. I never build patches from scratch.

When you're trying to get the ideas out quickly, what are some of your go-to tools?

Very often I start with a drum loop. For example, I have this library of loops partly coming from sample CDs and partly created myself. So, if I have an idea to do a track that is '80s- or '90s-related, it's very important what drum sounds you start with. If you want '90s house, the

909 sample is needed. And for '80s you can do LinnDrum, Oberheim, or Boss drum samples.

Then it could be a software synth. Probably at the moment for everything I am using the [u-ha] DIVA if I want a polysynth, and for mono I am a massive fan of Monark by Native Instruments. Sometimes I prefer it to the DIVA for that bit of oomph. A lot of digital emulations and plug-ins you have to send them through a preamp and do tricks to make them sound alive and 3-D in the mix, but with the Monark it's easier to handle.

Sometimes I use my Oberheim Matrix 1000, which is one of my favorite synths for pad sounds. I have quite a collection of synths, though they are not all hooked up all the time. I have two of the Matrix, because obviously they are mono so I can pan them as stereo. I got a [Roland] Jupiter-4, a Juno-106 but also the 60, and a JX-3P. I got a Moog Voyager, a Yamaha DX7 ... quite a collection.

Do you track yourself playing those live or do you draw in MIDI notes for them when supported?

I try to play them myself, but I record the MIDI not the audio material whenever possible. I'm kind of scared of rendering audio too early, because I can't go back, so I try to keep everything MIDI as long as possible. This also, of course, keeps me from coming to a result quickly because with all those possibilities you might have too many choices.

How do you tweak a preset? Do you sculpt bass reinforcement more at the source or in the chain?

Over the years, you have your collection of favorite sounds to get to a result, so I tweak in terms of envelope, release, attack, filter. Very often I don't do much outboard besides EQ'ing and delay on bass lines. It has to sit nicely in the mix, and that's way more important than getting the most unique-sounding bass line.

When I start working I have an idea of the drums I want to use, then with the bass I'm the same: I know what I'm looking for, whether it's a warm, rubbery Moog sound or a cold FM sound. You just need to know your sound, your libraries, your presets and then you can adapt by putting different filters or moving oscillators a little bit. It's not rocket science; just know your stuff, whether it's analog or digital.

Are there ways you intentionally misuse or abuse a module or process to make a desired effect?

Every producer knows you sometimes make a mistake: accidentally move bricks in your sequencer and something totally amazing pops up that sounds better than what you tried to achieve in your arrangement before, so it's very important to stay open-minded. I don't break stuff, though I'll experiment with, like, tearing paper and recording it for a hi-hat, etc. It depends on the production and what you want to hear in there. You need some elements that define your soundscape and make you sound different than anybody else.

I'm a VST junkie. While I don't need any new plug-ins, I'll try new stuff. I want to try the new modular system from Native [Instruments], Molekular; when it comes to laptop production I don't know what is out there but I'm open.



“I don't break stuff, though I'll experiment with, like, tearing paper and recording it for a hi-hat, etc.”

What are your favorite ways to liven up or tailor the dynamics?

That changes all the time. If I don't need super colored compression I just use the internal plug-ins of Live. With the latest version 9, I really like the Glue Compressor simulating the SSL. Sometimes I'm using the [Universal Audio] UAD [powered plug-ins] compressors; the Fairchild [tube limiter] I'm using quite often, as well as the SSL [bus compressor and E Series channel strip] simulations.

Another thing I love is the Harrison [32C/32C SE Channel EQ] plug-in. If you put the Harrison UAD plug-in on a piano and EQ it

a little, it sounds so different, giving this shiny professional touch. I like it for every signal that needs a certain vibe in the higher frequencies.

Also, Native just released Supercharger [one-knob tube compressor], and it's very simple but very good on all kinds of signals. On the album I used a lot of 1176 emulations and the Live internal plug-ins for the most subtle compression.

For simple delays, if I don't need a lot of color I use the delay from Ableton. You can pan it left and right and get very quickly to your results. You can filter the delayed signal, which makes it very easy to place bass lines in the mix. Very often instead of reverb I use delays with very short delay times.

I did *Glow* with a mix engineer [Ash Workman], so I can't really say how to do all the mix tricks because it's not all me. When I produced the songs I used very different

setups, sounds, and plug-ins. But what definitely helped make it all sound like it went together as an album was that we mixed the whole thing in the Premises studio in Hackney [London] on a Trident console, which is weird because it's more famous for its rough, rock sound. But I used a lot of plug-ins and I don't even have a summing mixer at home, so everything sounded cold and digital, and this made it important to me to bring it out of the box into a board. And we have real tape saturation there, too; printing it to tape before importing it back into the box helped bring some warmth.

This is your first release with so many singers. How did you approach the album's vocal processing?

I mainly worked in the box during the mixdown of the album. I used a lot of Waves plug-ins for EQ'ing and compression. I'm not a pro when it comes to vocal processing, as I just started working with them. At home I have the Manley VOXBOX, which I like a lot, as well as API preamps, but when it comes to vocal recording I'm not super picky or professional so whenever possible I prefer others do it.

All the songs with Fiora I recorded. For “58 BPM” we have the Manley working and a little bit of pre-EQ'ing, then we recorded straight into my RME Fireface, because that entire track was created in the box besides the vocals. We had both a [Microtech] Gefell [GmbH] and a [Neumann] U87 microphone in the house.

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Also we recorded in the small project studio room—no vocal booth or whatever. It was straight into my machine and I just used whatever comes in handy, like plug-ins with the UAD cards.

Fiora is on seven of 16 album tracks and seems to be somewhat of a muse; tell me about the songwriting process for those tracks.

I think I met her when I was in the middle of the album and I was looking for a female voice. We have a mutual friend in Berlin that introduced us, so I sent her the instrumental to “See Right Through.” It’s mainly three chords playing all the same stuff over and over and a pretty simple, deep house drum loop. She sent me back vocals one day later, and I was super surprised what she did with the track. Often with house or electronic music the lyrics aren’t deep and meaningful, but she really cared about lyrics. I was surprised how good and fast she was, so we met in Hamburg at my studio. The chemistry was so good, we ended up working on all the songs, starting almost from scratch, and all the lyrics and hook lines she wrote herself.

Does using Ableton Live help you make the transition from the studio to live performance?

Yes; at the moment I am playing out in clubs using Ableton Live and the Akai MPC40. When I started I played live sets of only my own songs, so I know this program and gear inside and out. This year I’ll stick to DJ’ing while I work on a live concept involving Fiore and guest session musicians. A live drummer is very important to me, while also working in LinnDrum samples, etc. I want to play some synths, but it’s all in the works still because it’s very important to me to find magic that you can really feel when it all comes together onstage. But for now I’m using a Max4Live patch—a version of Isotonik by Darren Cowley he customized for my needs—though one day I might be switching to CDs because I like the idea of traveling with two USB sticks only.

Are there special ways you prepare edits and clips when you take material from studio to stage?

The main problem with the album is, it’s not really club music because it’s too slow or too pop, so I will probably create my own edits and remixes to play in my sets. The disadvantage of using Ableton for DJ’ing is you have to warp them all through, which takes a lot of time, unless you have only tech-house tracks where recognition works well upfront. I don’t try to

prepare myself too much. I have my favorite tunes of the moment and I know what works better at a festival vs. a small club.

Are there ways your time in the studio influenced what you’re playing now, and ways what you’re playing now might influence future productions?

What happened after I worked on the album is I realized I want to look more into producing, sitting in the studio with others instead of being onstage. As much as I love deep house and U.K. garage, suddenly everything sounded the same for a while and I got excited for pop music and creating my own version of pop music. But everything goes up and down and once in the studio for a while I can look forward to DJ sets again. It’s about keeping the balance of both worlds. ■

Tony Ware is a writer and editor based outside Washington, D.C.



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Solvent

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SUCTION

Much of the music heard in *IDOW* was created by the film's producer, synthesist Jason Amm (aka Solvent) using many of the instruments featured onscreen. Stylistically, Amm covers a lot of territory, mining classic Numanesque tones for "Transfer Function" and exploiting generative patches in pieces such as "Wow" (which sounds like the synth is saying the word). It's a cohesive collection of tracks that you'll likely keep in rotation. The first taste is free on the Suction Records Bandcamp page.

LAURA PALLANCK



Plaid

Reachy Prints

WARP

Part of IDM's first wave, Andy Turner and Ed Handley are ace compilers of springy, syncopated robofunk full of filtered tone sweeps and jaunty melodies. Operating as Plaid since 1991, the "post-techno" duo has delved into woozy bass music and almost classical motifs, balmy trills and increasingly pressurized breakbeats. This tenth album includes plinky synths nodding to Human League's art-school era, as well as dreamy, cascading harmonics. In other words, it's classic Plaid.

TONY WARE



Lykke Li

I Never Learn

LL RECORDINGS/ATLANTIC

There's something as raw as childbirth at work on Lykke Li's third album, *I Never Learn*. Chanting monotone vocals over aggressively strummed acoustic guitars, the title track climaxes in swirling Mellotron and spooky choral vocals. "No Rest for the Wicked" is similarly sparse, and beautifully anthemic, drums banging and pianos clanging in a canyon of reverb. Co-produced with longtime collaborators Björn Yttling and Greg Kurstin, *I Never Learn* cuts to the quick, beauty bookended by sorrow.

KEN MICALLEF



Jolie Holland

Wine Dark Sea

ANTI

The marvelous singer/songwriter Jolie Holland channels some old-fashioned Delta blues and some wondrous Waits-esque, post-punk, under-construction noise on *Wine Dark Sea*. She's got a little Lucinda Williams inside her, and a little Billie Holiday, too. This distorted, inventive, song-centered, romantic thing of beauty isn't easy to pinpoint, but it is unforgettable. From the first fuzzy notes and thump of the opening track, "On and On," listeners will be held in thrall.

BARBARA SCHULTZ



LP

Forever Now

WARNER

You've heard L.A. big-mouth LP before: She wrote Rihanna's "Cheers (Drink to That)" and Christina Aguilera's "Beautiful People." LP's debut brings her arena-ready songs, booming vocals, and ukulele strums to centerstage. Tapped as a star of the future by Martin Guitars, who built her signature ukulele, LP's larger-than-life songs are fleshed out by her massive voice, which recalls an evil embryo of a Big Mama Thornton and Slim Whitman on steroids.

KEN MICALLEF



Fennesz

Bécs

EDITIONS MEGO

In 2001 Austrian electroacoustic composer Christian Fennesz released *Endless Summer*, a benchmark for DSP-lacerated melodies. Now he has returned to a twilight beach with his first album in six years, a gently swelling new standard of luminescent acoustic motifs cresting into brackish granular drifts. While many Fennesz compositions begin "traditionally," played on Fender guitars into custom-built circuit benders, it's through physical modeling synthesis and harmonically corrosive patches that Fennesz generates his blissed-out refractions and alluvial melancholy.

TONY WARE



Lee Fields & the Expressions

Emma Jean

TRUTH AND SOUL

What luck that Lee Fields is still making perfect old-school soul records after 45 years in the business. Arrangements on his latest may owe some of their style to Stax, or Hi, or Motown, or some combination of those and more, but the big heart beating in the middle of the taut rhythms and elevating horns and funky guitar riffs is always Fields, whose sweet, raw voice remains as arresting as it was when he cut his first side in '69.

BARBARA SCHULTZ

AT GUITAR CENTER



STEVE AOKI

5-FINGER DIM MAK FOR YOUR EARS

DJ extraordinaire Steve Aoki may have begun his career throwing parties at UC Santa Barbara, but gifted with both an artist's heart and true entrepreneurial spirit, he's built an empire based on having a good time listening to music. With his globe-trotting lifestyle, that means producing on the go. Like many other artists, the software revolution makes this possible for Aoki. The combination of powerful laptops, like the MacBook Pro he prefers, with a dizzying range of music software and the worldwide Internet connectivity that comes with modern mobile devices, means that wherever he is, he can be working. As he explains, "Sometimes, I just land off a plane and I'll come up with an idea and start humming voice memos in my phone—I've got a million of them. Most of them are just rubbish, but some of them have something that I could possibly use in a song."

For his last album, *Neon Future*, Aoki took some time away to find a new perspective. "I rented out a cabin in Mammoth Mountain for two weeks and also one in Big Bear," he explained. "I wanted to be completely isolated from every possible distraction. [It] was all just compiling all of these concepts and ideas that I've been diddling [with] and writing on the road. I was able to flesh all of them out in one go. So I recommend that idea that, if you can't get anything done, sometimes your own studio is your enemy. You need to do something in a new creative space and be away from the world, if you can."

Read the entire interview and see the gear at guitarcenter.com



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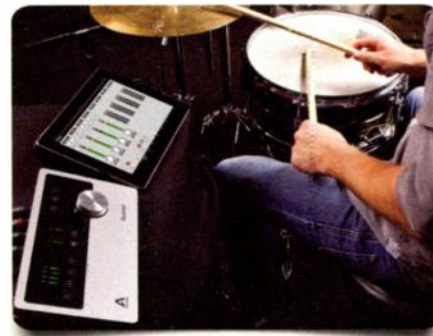


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GEAR

Get the gear that fits the kind of music you make

BY MIKE LEVINE, GINO ROBAIR, AND MARKKUS ROVITO

WITH SO much reasonably priced recording gear available, it's easier than ever to set up a studio that matches your musical needs. However, the increasing number of options in each category—mics, monitors, mixers, and software—can make determining what's right for you *and* your budget confusing.

With that in mind, the editors at *Electronic Musician* chose three genre-neutral ways we make music—solo songwriter, solo DJ/producer, and 4-piece band—and designed studios around the basic requirements of each. We presume that each artist already has a computer with a CPU fast enough to handle music production software, so we didn't include them in our virtual shopping spree. Additionally, accessories such as cables, pop filters, and adapters are not included because there is such a wide variety to choose from. (However, we do recommend that you never skimp on cables of any sort; purchase the highest quality models you can afford.)

SONGWRITER STUDIO

BY GINO ROBAIR

WHETHER YOU'RE sharing your ideas with other songwriters and performers or submitting demos to industry professionals, the recordings you hand out must have high-quality sound. But that doesn't mean you have to spend a lot of money to get it. With a few choice pieces of gear and careful attention to gain staging and mix levels, you can achieve pro results for a very reasonable outlay of cash.

My studio is designed for the singer/songwriter who is just getting started with a recording system (or upgrading from something older) and wants the technology to stay out of the way of his or her creativity. The goal, however, is to be able to record and mix songs with efficiency and professional results, while remaining small enough to fit into any casual environment—home, apartment, office space, or hotel room.

The artist's main instrument in my dream studio is acoustic guitar, with some keyboard chops thrown in. Therefore, we need a mic that sounds good on voice and guitar, and a keyboard controller and software instruments for fleshing out backing parts. The interface must have at least two XLR inputs so I can, for example, record voice and guitar simultaneously to separate tracks.

I will suggest two scenarios: One is a low-cost, prepackaged option that provides the basic tools necessary for capturing inspiration when it hits; the second is a modular configuration, giving the artist room to grow into bigger projects and collaborate with others.

The Package Deal When it comes to low-cost/high-value products, PreSonus is hard to beat. I've been a fan of their high-quality mic preamps for years and have found their recording and concert gear to be user friendly, well built, and great sounding.

For that reason, my first studio is based around the PreSonus Music Creation Suite (\$399.95), which includes nearly everything you need to get your ideas to hard disk with minimum fuss. The system is based around the AudioBox USB, a USB bus-powered desktop interface with a pair of phantom-powered mic inputs on the front panel. However, the inputs are on combo jacks that accept instrument-level signals—perfect for

Songwriter Studio

PACKAGE DEAL



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A LA CARTE STUDIO

Apple Logic Pro X (Mac) or Sonar X3 Studio (Win) \$199/each
Yamaha MG10XU \$199
Samson Graphite M25 \$79.99
Mackie MR5mk3 (pair) \$300
Audio-Technica ATH-M40x \$99
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Auralex MoPad \$44.99
OnStage MS7701B EuroBoom stand package \$39.99
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Primacoustic
VoxGuard



Audio-Technica
ATH-M40x



Yamaha MG10XU



Blue
Microphones
Bluebird



Apple Logic Pro X



Samson Graphite M25

times when you want to record guitar parts directly into the computer.

The Music Creation Suite includes the M7, a large-diaphragm condenser mic that will work well for tracking voices and instruments, as well as a pair of HD3 closed-back headphones for monitoring. A 9' mic cable and desk stand are also included. Balanced 1/4" TRS monitor outputs, a 1/4" headphone jack, and standard MIDI I/O are on the interface's rear panel.

To capture your work, PreSonus includes Studio One Artist 2 (Mac/Win), a complete digital audio workstation for recording and editing audio and MIDI. The DAW includes a wide variety of plug-in effects and virtual instruments, and 2.5 GB of loops and other audio content. On top of that, you can flesh out your songs with the killer orchestral library included in Notion, a full-featured music notation program that comes with the Music Production Suite. The included sample library was recorded at Abbey Road Studios using the London Symphony Orchestra. Notion is also great for creating lead sheets in standard notation or tablature.

To take full advantage of your system's virtual instruments and scoring capabilities, PreSonus adds the PS-49, a 49-note USB keyboard that offers velocity-sensitive keys, seven assignable controllers, and pitch and modulation wheels. They even throw in a powered USB hub that can handle the keyboard controller as well as the audio interface.

To promote and sell the music you'll be creating (as well as tickets and merchandise) PreSonus offers Nimbit (nimbit.com), which has three levels of pricing (including a free level). In fact, you can take advantage of Nimbit whether you buy the Music Production Suite or not, so check it out.

Now all you need is a good set of close-field studio monitors to accurately evaluate your work. I suggest we stay with PreSonus and add a pair of Eris E5 (\$125 each) active monitors. The E5 has a 5.25" Kevlar woofer and 1" silk-dome tweeter, and provides 80W of power using Class A/B amplification. It has acoustic tuning controls so you can match the speaker response to your mixing environment, and the input options include RCA, XLR, and 1/4" TRS (perfect for use with the AudioBox USB).

Studio Smart, a la Carte Of course, every musician has different needs, so I've assembled a more modular studio based around a core of solid products, many of which can be added over time if need be.

The concept behind my choices remains the same; this is the studio that focuses on your creativity and not the technology.

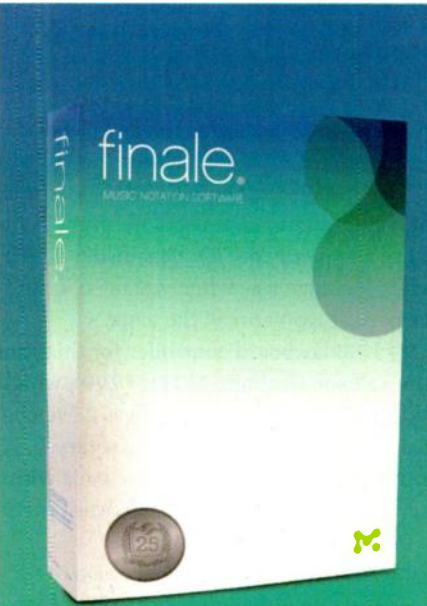
Software For the DAW, I've selected different products for each OS. On the Mac side, it's really hard to beat Apple Logic Pro X (\$199). The workflow in the latest version has been significantly streamlined while the feature set remains top-notch. Whether you're recording audio, sequencing soft synths and samplers via MIDI, editing, scoring with notation, mixing, or mastering, Logic Pro X delivers pro-level results.

For example, I love the intuitive way that Drummer, Logic Pro's new drum-sequencing toolkit, can be used to create realistic parts for a song. (As a professional drummer, I don't offer such praise unless it's earned.) And with Drum Kit Designer, you can customize the selection of instruments your virtual drummer plays to suit the song. If you have an iPad, you can control Logic Pro X from anywhere in the studio—exactly the kind of thing you want when you're recording yourself.

Windows users are not out in the cold as long as Sonar X3 is around. I've chosen the Studio version (\$199) because it's priced the same as Logic Pro X while offering plenty of high-quality content. Recording, sequencing, mixing, mastering, sound for picture—Sonar X3 does it all.

Sonar is well-known for the fine sound of its virtual instruments, including Session Drummer 3, Roland Groove Synth, and Z3ta+ Classic; you get 19 instruments in all—and plenty of effects for every aspect of production. Yet, if you want to keep it simple and focus on your art, Sonar X3 will stay out of the way.

Interface/Controller Whether you're on a Mac or a PC, you need a pro-quality interface. The setup I've chosen makes room for writing partners, session musicians, and any other guest that can add something useful to a project. Rather than choose an 8 or 16-channel rackmountable interface that would have a software front end, I decided to take the admittedly old-school, hardware-based approach: The Yamaha MG10XU (\$199) is a 10-channel, USB 2-based analog mixer/digital interface offering 24-bit, 192kHz resolution. The unit provides four Class A mic preamps, as well as six line inputs (in stereo pairs) for use with hardware synths, samplers, drum machines, and output from external mic preamps. Two of the mic channels have built-in compressors, and all four mic inputs include a pad and low-cut



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switch. EQ controls are available on every channel, as are Send controls for the built-in SPX effects engine. The MG10XU has a small footprint, is lightweight, and offers good sound quality and plenty of I/O. That also makes it perfect for stage use, when you need it. And at this price, it won't break the bank.

My USB keyboard controller for this studio is the Samson Graphite M25 (\$79.99), which is action-packed for its size. It offers 25 velocity-sensitive mini keys, 8 assignable rotary controls, and 4 velocity-sensitive pads with Aftertouch for recording virtual drum parts.

Mics/Monitors Of course, we also need transducers on either end of the recording chain. On the input side, I'm including a no-frills large-diaphragm, cardioid condenser that sounds fantastic for the price—the Blue Microphones Bluebird (\$299.99). I've heard this used on dozens of recordings and it never fails to capture the tone and transients of the voice and acoustic instruments remarkably well. I realize it's one of the most expensive

items in this studio, but the vocal mic should be one item you don't skimp on.

I'm also including a Shure SM57 for the simple fact that it's a great bargain at \$99. Its cardioid pattern and unique frequency response make it perfect for instances where a dynamic mic is required, such as guitar amps and percussion.

And despite what you might think, it works very well for miking acoustic guitar, depending on the musical style you're working in.

One suggested accessory that will be helpful when using the mic for vocals is the Primacoustic VoxGuard (\$99). Because there's so much ambient noise (hard drives, computers, etc.) and odd room reflections in the home-studio environment, it's helpful to have something that you can use to isolate your mic from external interference without adding too much weight to the mic stand. Speaking of which, let's throw in the OnStage MS7701B EuroBoom stand package (\$39.99) so we have a pair of booms, which we can use at home or at gigs.

A pair of Mackie MR5mk3s (\$150 each) are the monitors I want in this studio. With a total of 50 watts of output per monitor, the 5.25" woofer and 1" tweeter deliver a very accurate, non-hyped sound during playback. And it includes all the mod-cons I may ever need, such as three different

inputs (XLR, TRS, RCA) and EQ controls to compensate for acoustical anomalies in the room. To get the most out of these monitors, I suggest placing them on a set of Auralex MoPads, which will only set you back \$45.

Despite the ability to work with collaborators in my studio, I am only selecting one set of headphones; visitors must bring their own! The Audio-Technica ATH-M40xs (\$99) are not the cheapest set of cans out there, but they certainly sound the best for the price. And, just as importantly, they're comfortable, which is what you want when overdubbing or editing for hours on end.

BAND STUDIO

BY MIKE LEVINE

THIS SETUP is designed to allow the members of a 4-piece band (e.g., two guitars, bass, and drums; or one guitar, one keyboard, bass and drums) to record at the same time. It would also accommodate a fifth person, a singer, if he or she didn't play an instrument. In addition, my studio offers two monitor pairs for mixdown, with the ability to switch between them. The

PowerTools for Studio



Gold Digger™ mic selector

Instantly select and compare your four favorite microphones to find the one that best suits a particular vocal or instrument track. The Gold Digger features built-in 48V phantom power generator, trim controls for a fair comparison and solid wire connection to ensure the pure mic signal arrives without coloration.



QR VIDEO LINK



Cherry Picker™ preamp selector

Plug in your favorite mic and instantly compare between four mic preamps to find the one that best suits the instrument or vocal track. The Cherry Picker features 100% pure copper signal path with gold contact relays for absolute signal integrity. You'll love the way it improves your workflow and efficiency!



QR VIDEO LINK

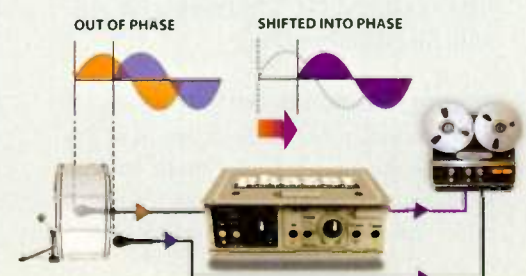
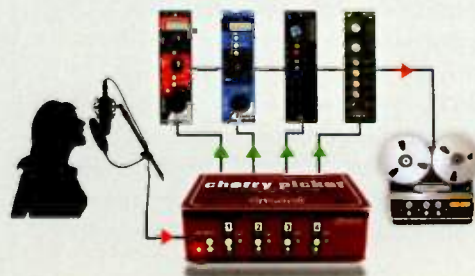


Phazer™ phase alignment tool

Add realism and depth to every instrument! The Phazer is an analog tool that lets you adjust the phase relationship between two sources such as two mics in a room so that the fundamentals arrive at the same time. Think inside and outside the kick drum, top and bottom of a snare, or near and far with an acoustic guitar.



QR VIDEO LINK



Band Studio

MAC SYSTEM

Avid Pro Tools
 Apollo Twin Duo
 Focusrite Saffire Pro 40
 Radial ProDI (x2)
 Radial Reamp JCR
 Audix FP7 7-piece drum microphone kit
 Shure SM57
 AKG C-414 XLS
 PreSonus Eris E8 (pair)
 Yamaha HS5 (pair)
 Mackie Big Knob
 Sample Magic Magic A/B Software
 Audio-Technica ATH-M40fs (x4)
 Shure SRH940
 Art HeadAmpPro6
 Onstage Stands MS7701B Euro Boom microphone stand package
 Additional Onstage Stands MS7701B boom stand
 On-Stage Stands MS7920B Bass Drum/Boom Combo Mic Stands (x2)
 IsoAcoustics ISO-L8R155 Speaker Stand (pair)
 Argosy Classic Speaker Stands (pair)
Total \$6,218.12

WINDOWS SYSTEM

Avid Pro Tools
 Focusrite Saffire Pro 40 (x2)
 Metric Halo Production Bundle
 Radial ProDI (x2)
 Radial Reamp JCR
 Audix FP7 7-piece drum microphone kit
 Shure SM57
 AKG C-414 XLS
 PreSonus Eris E8 (pair)
 Yamaha HS5 (pair)
 Mackie Big Knob
 Sample Magic Magic A/B software
 Audio-Technica ATH-M40fs (x4)
 Shure SRH940
 Art HeadAmpPro6
 Onstage Stands MS7701B Euro Boom microphone stand package
 Additional Onstage Stands MS7701B boom stand
 On-Stage Stands MS7920B Bass Drum/Boom combo mic stands (x2)
 IsoAcoustics ISO-L8R155 Speaker Stands (pair)
 Argosy Classic Speaker Stands (pair)
Total \$6,268.11



Art HeadAmpPro6

Continued

Professionals...



EXTC™ guitar effects interface

Add excitement and uniqueness to every track by incorporating funky sounding guitar pedals to your signal chain. Imagine... adding a wah to a kick drum, distortion to a vocal or a jet flanger to the keyboards. The EXTC makes it easy by unbalancing the signal, adjusting the impedance and then re-balancing it for you.



QR VIDEO LINK



MC3™ monitor controller

Select between two sets of monitors without adding any form of buffering electronics in between your recording system and monitors. The MC3 features a pure copper connection to eliminate distortion. Turn on or off a sub and adjust the level, collapse the mix to mono and monitor your mix using headphones or ear buds.

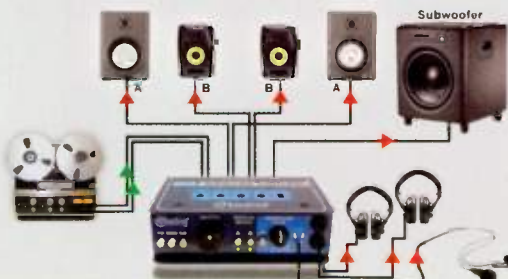
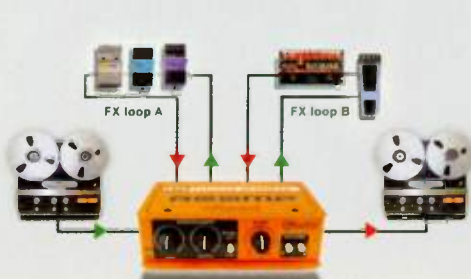


QR VIDEO LINK



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UA Apollo Twin Duo



Radial ProDI



Mackie Big Knob

Avid Pro Tools



AKG C-414



PreSonus Eris EB (Pair)



Shure SM57



Shure SRH940



Audio-Technica ATH-M40fs



Yamaha HS5



Good



Better



Best



Hosa



Hosa Pro



Hosa Edge

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items were chosen with both quality and economy in mind. I saved money where I could on products that wouldn't compromise sound quality or the studio's capabilities.

DAW/Interface For the DAW, I chose a native version of Avid Pro Tools 11 (\$699), which can run on either a Mac or PC. Although more expensive than other DAWs out there, Pro Tools offers what many consider to be the best audio-recording-and-editing feature set around. Its Elastic Audio, Elastic Pitch, and Beat Detective features are extremely useful tools. And although its MIDI capabilities are not as finely developed as its audio features, they are solid enough for bread-and-butter tasks.

While Pro Tools 11 includes a decent plug-in collection, I'm supplementing it with the plug-ins available in the Universal Audio Realtime Analog Classics bundle, which is included with the Apollo Twin Duo (\$899), one part of the two-audio-interface tandem I've selected for this studio. Plug-ins included in the bundle are the UA 610-B Tube Preamp and EQ; Softube Amp Room Essentials (guitar and bass amp modeling); the Teletronix LA-2A Legacy; the Pultec EQP-1A Legacy; RealVerb Pro; 1176SE/LN Classic Limiting Amplifiers Legacy; and the CS-1 Precision Channel.

The second interface is the Focusrite Saffire Pro 40 (\$499.99), which offers eight mic preamps, ADAT optical connectivity to connect to the Apollo Twin, and MIDI I/O.

Why two interfaces? While there are many single interfaces with eight mic inputs on the market, that configuration is not sufficient for this studio, which needs the capability for six drum mics, along with inputs for two guitars, a bass, and a reference vocal while tracking. Connected via their ADAT ports, the Apollo Twin and Saffire Pro 40 create a 10-mic-input system.

Universal Audio's Apollo Series is appealing because of their quality mic preamps, the aforementioned UAD2 plug-ins, and the ultra-low-latency hardware monitoring. The Duo version has two SHARC processors, allowing you to open a fair number of plug-ins at a time. The preamps in the Saffire Pro 40 are solid performers and well-priced.

Because the Apollo Twin only runs on a Mac, I'm specifying an alternate interface setup for Windows users that includes two Saffire Pro 40s, connected together via ADAT Lightpipe. To make up for not having the UAD2 plug-ins, I've added the Metric Halo Production Bundle (\$449), which has a nice selection of plug-ins including a channel strip, transient shaper, reverb, multiband dynamics

processor, multiband expander and analog signal-path modeler.

Mics, DIs, and More This studio needs enough microphones to capture a drum kit, guitar amp, and vocal at the same time. I'm counting on the band being able to put the guitar amp in another room and, if possible, the reference vocalist in another, to reduce or eliminate bleed into the drum mics. If that's not possible, the guitar can go into DI through one of two Radial ProDI boxes (\$99.99 each) that I've included. (The bass will go through the other.) I have also included a Radial Reamp

JCR (\$199) to give the band the flexibility to reamp guitar and bass parts, if needed. Although Radial's products are not the least expensive out there, they offer excellent quality and are built like tanks.

For drum mics, I chose the Audix FP7 (\$499) drum-miking kit, which *Electronic Musician* gave a very favorable review to, in the May 2010 issue. The FP7 kit features dedicated snare and kick mics, three tom mics, and a pair of overhead mics. I'm assuming that most of the time the band will record with six mics on the drums (kick, snare, two tom mics, and two overheads), but this allows for

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the option of a seven-mic setup. For miking the guitar cabinet, I chose the tried-and-true Shure SM57 (\$99).

For vocals and miscellaneous miking tasks, I chose another classic mic, the AKG C 414 XLS (\$899). It's not only solid for vocals, but handles virtually any other miking application you throw at it. The C 414 offers a total of 9 polar patterns, providing plenty of options, and it includes a pop filter.

Monitors/Headphones I chose two pairs of studio monitors: the PreSonus Eris E8 (\$400/pair) and the Yamaha HS5 (\$400/pair). It's important to be able to switch between different monitors when referencing a mix. To facilitate that switching and to provide talkback, I included a Mackie Big Knob (\$299) monitor controller.

The Eris E8 has an 8" woofer, allowing it to cover the bass frequencies well. It's a smooth-sounding monitor that offers accurate reproduction in all frequency ranges. And for the price, the pair is an excellent value.

For the second pair, I chose the smaller Yamaha HS5 (\$400/pair) monitors. The 5" woofer gives a different perspective on the audio during mixdown compared to the Eris. *Electronic Musician* reviewer Michael Cooper gave the HS5 kudos for "unsurpassed clarity, detail, imaging, and transient response in its price range."

To further aid in mix referencing, I included a must-have plug-in, Sample Magic's Magic AB (\$50.30), which makes it easy to A/B your mix with existing recordings—an important capability, especially in an untreated studio.

Each band member will need headphones for tracking, so I chose four pairs of Audio-Technica ATH-M40fs (\$49 each). With its circumaural (over-the-ear) design, the ATH-M40fs provides the isolation that the band needs during tracking. One lucky band member will get to use the Shure SRH940 (\$299), which is designed for sonic accuracy when mixing. If you're counting, you noticed that I included five pairs of headphones for a 4-piece band. Having a spare pair is always handy in case one breaks, and it also allows me to add that vocalist, or have a non-band member (friend, producer, etc.) listen in during a tracking session.

To provide the headphone feed, I've chosen the ART HeadAmp6Pro (\$199), featuring six outputs, balanced main inputs, and separate EQ and level controls on each channel. Because it's rackmountable and heavy, it is less likely to be pulled over by the headphone

cables than a tabletop model, even when it's not actually rack mounted.

Stands A setup like this is going to need a lot of mic stands. We'll start with an On-Stage Stands MS7701B Euro Boom Microphone Stand Package (\$129), which includes six boom stands. That will take care of the vocal mic, snare mic, two rack tom mics, and two overheads. I added another single MS7701B (\$24.95) stand for the floor-tom mic. For the kick and guitar cabinet mics, I included two low-profile boom stands—On-Stage Stands MS7920B Bass Drum/Boom Combo stands (\$28.95 each).

We also need monitor stands. I'm assuming that the studio will have a table for the computer, with room for the Yamaha monitors, which will sit on IsoAcoustics ISO-L8R155 (\$99.99/pair) stands. These stands offer isolation and adjustable height and angle. The PreSonus monitors, which are larger, will sit on Argosy Classic Speaker Stands (\$169), which are floor stands that are 42 inches in height.

THE DJ/PRODUCER STUDIO

BY MARKKUS ROVITO

PRODUCING AND DJing electronic music creates such a beneficial feedback loop that it's almost loony to only do one or the other. If you make recognizable, dancey jams, someone will book you to DJ whether you can do it well or not. And it's nearly impossible to reach the next level of DJing without said recognizable dancey jams.

In order to set you up with a killer rig for both producing and performing dance music, I take you down the paths of the two most adopted digital DJ platforms: The Serato path pairs you up with Ableton Live software and gets you ready to step in front of some of the most commonly-seen equipment in big-club DJ booths; the less expensive Native Instruments Traktor path may be better for those of you who will create a personal DJ workflow and are likely to take their own DJ rig with them to gigs.

You can certainly mix and match enticing items from either setup. And depending on your computer, you may need to add a powered USB hub.

THE ABLETON/SERATO PATH

DAW and DJ software The Ableton Live 9 Suite + Push bundle (\$1,198) is my choice for the setup. Ableton Live is the most mature, flexible, and powerful software product that combines

a full-featured DAW with a platform for structured or spontaneous live performances. The suite includes all of Ableton's effects and virtual instruments, Max for Live, and a huge 54GB soundware collection.

The suite also includes the Bridge for Serato Scratch Live. With the Bridge, you can load a Live set onto a deck of Scratch Live, as well as record Scratch Live sets straight into Live for editing and post-production.

Serato Scratch Live (normally \$499, but included in the price of the Rane mixer below) offers four decks, a sample player, and tempo-synced DJ effects. It has become the favorite of DJs who rely on vinyl and virtual turntable control, and it is the most common in-house software at top clubs.

Audio Interface Rane's Sixty-Two (2-channel, \$1,999) and Sixty-Eight (4-channel, \$2,599) are the modern marvels of DJ mixers. Both include Serato Scratch Live and Serato DJ software.

Aside from being top-shelf scratch mixers, they include dedicated controls for the effects, loops, cue points, and track browsing in Serato software, and two USB ports for switching DJs seamlessly. For studio recording, take advantage of their six stereo record channels and four stereo playback channels.

DJ, Pad, and Keyboard Controllers

The combination of Serato software with Pioneer CDJ multi-players has become a club favorite for digital DJ booths. Two CDJ-850's (\$1,798), will give you the club-standard Serato control surface, or a pair of CDJ-2000 Nexus (\$3,998) units will add large color displays that show Serato's track info. Both of them playback compressed and uncompressed audio files from CDs or USB sticks and work as an integrated USB HID controller for Scratch Live or as MIDI controllers for other software.

There are many great controllers that integrate with Live 9, but the Ableton Push (normally \$599, but included in the DAW bundle above) button-grid controller goes beyond simple clip-launching and beat tapping. Because it can also be used for playing and sequencing melodies and chords, as well as sound design and mixing, it has become an indispensable tool for the studio and stage.

The new Akai MPK261 (\$499) keyboard controller features out-of-the-box integration with Ableton Live, providing four banks of MPC-style pads, eight knob/fader/switch strips, and 61 semi-weighted keys with Aftertouch. Included synths and grand piano instruments from Sonivox add more fuel to the fire.

DJ/Producer Studio

THE NI TRAKTOR/MASCHINE PATH (LOW END)

Cockos Reaper, discounted license \$60
 NI Traktor Kontrol S2 MK2/Traktor Pro 2 \$449
 NI Maschine Mk2 \$499
 Korg Taktile \$349
 NI Komplete 9 \$499
 KRK Rokit Powered 6 G3 x2 \$399
 Shure PG58 \$54
 Total \$2,309



Cockos Reaper



NI Traktor Kontrol S2 MK2

THE NI TRAKTOR/MASCHINE PATH (HIGH END)

Cockos Reaper, commercial license \$225
 NI Traktor Kontrol S4 MK2/Traktor Pro 2 \$699
 Focusrite Scarlett 18i8 \$349
 NI Maschine Studio \$999
 Korg Taktile \$349
 NI Komplete 9 Ultimate \$999
 Arturia MicroBrute \$299
 KRK Rokit Powered 6 G3 (pair) \$399
 Shure SM58S \$104
 Total \$4,422



NI Maschine Mk2



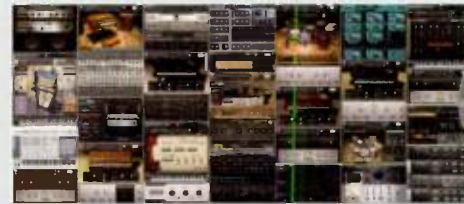
Korg Taktile

THE ABLETON/SERATO PATH (LOW END)

Ableton Live 9 Suite and Push bundle \$1,198
 Pioneer CDJ-850 (pair) \$1,798
 Rane Sixty-Two/ Serato Scratch Live \$1,999
 Akai MPK261 \$499
 Acustica Nebula Pro 3 \$192
 DiscoDSP Synth Bundle \$275
 Novation Bass Station II \$499
 Pioneer RMX-1000 \$799
 Yamaha HS8 x2 \$700
 Shure SM58S \$104
 Total \$8,063



KRK Rokit Powered 6 G3



NI Komplete 9



Shure PG58

Shure SM58S



Focusrite Scarlett 18i8



Acustica Nebula Pro 3



Pioneer CDJ-850

Novation Bass Station II



DiscoDSP Synth Bundle



Arturia MicroBrute

Synths and Effects Let's supplement Live 9's instruments and effects with a couple of excellent low-cost plug-in bundles. The Acustica Audio Nebula 3 Pro Bundle (\$192) includes more than 400 hardware emulations of preamps, compressors, EQs, filters, reverbs, and time effects. The DiscoDSP Synth Bundle (\$275) drops an awesome virtual analog synth (Discovery Pro), PM/FM synth (Phantom), additive synth (Vertigo), and sampler into your plug-in folder.

With its two oscillators, sub-oscillator, and beastly filters, the Novation Bass Station II

(\$499) hardware, keyboard monosynth emits bowel-shaking rumble, as well as lead tones. Patch memories, extended programmability, an arpeggiator, and USB and MIDI I/O make this an attractive modern monster.

The Rane mixer's amazing FlexFX section lets you utilize its internal effects, software effects, and an external effects loop all at once. The Pioneer RMX-1000 Remix Station (\$799) collates a devastating collection of time-based effects dedicated to the building up and breaking down of energy in a DJ set. It has several types

of hands-on control, including a touch-pad, and an included plug-in version offers the same effects for studio use, turning the hardware into a dedicated plug-in controller.

Monitors/Microphone Even when producing bass-heavy club music, transparency is the most important thing you want from your monitors: The Yamaha HS8 (\$700/pair) concentrate on just that. The HS8s are active, bi-amped, near-field studio monitors providing 120W per speaker, and they blast out a clear and

focused sound that lets you hear every detail. XLR and 1/4" inputs mirror the master and booth outs of the Rane mixers.

For the largely in-the-box production of electronic music, you typically need one good vocal mic, so go with one that can also double for live use during your DJ sets. The Shure SM58S (\$104) is the most trusted and the best value for professional studio and live vocals. The SM58S model adds an on/off switch over the regular SM58, which will come in handy while DJing.

THE NATIVE INSTRUMENTS TRAKTOR/MASCHINE PATH

DAW and DJ Software Cockos Reaper (\$60 discounted; \$225 full commercial license) presents perhaps the greatest value in the world of DAWs. It specializes in efficiency and stability, but gives you a formidable feature set for multitrack recording, audio and MIDI editing, plug-in support, and a well-rounded suite of effects.

Traktor Pro 2 (\$99, included in the price of the controllers below) has done the most to transform the way DJs perform, making the loops, triggers, and effects of the software the instruments, rather than turntables. It has the most diverse and flexible effects sections and samplers (called Remix Decks) of any DJ software.

DJ, Pad, and Keyboard Controllers With Native Instruments Maschine MK2 (\$499) you get an excellent hardware/software music production system for recording and performance. Maschine is not a complete DAW, but contains its own sequencing, instruments, sounds, and effects, and it works as a standalone or plug-in program. It can also sync to Traktor through virtual MIDI. The monster Maschine Studio (\$999) has a deluxe interface, but is much bigger, which is something to consider if you want to use it live.

All about expression, the Korg Taktile-49 (\$349) is a 4-octave keyboard controller featuring a Kaossilator x/y pad that is able to generate notes and scales or double as a trackpad mouse. The arpeggiator includes its own rhythm patterns, and the 16 illuminated pads can be used to play chords in the scale of your choice. It also has eight knob/fader/switch strips and semi-weighted keys.

Native Instruments' two all-in-one Traktor controllers offer the tightest integration with the software on the market, excellent sound quality and output levels, and full licenses for Traktor Pro 2. For 4-channel mixing and more

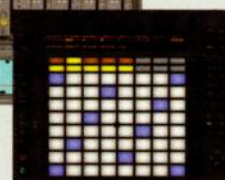
DJ/Producer Studio (Cont.)

THE ABLETON/SERATO PATH (HIGH END)

Ableton Live 9 Suite and Push bundle \$1,198
 Pioneer CDJ-2000 Nexus x2 \$3,998
 Rane Sixty-Eight/ Serato Scratch Live \$2,599
 Akai MPK261 \$499
 Acustica Nebula Pro 3 \$192
 DiscoDSP Synth Bundle \$275
 Novation Bass Station II \$499
 Pioneer RMX-1000 \$799
 Yamaha HS8 (pair) \$700
 Shure SM58S \$104
Total \$10,863



Ableton Live 9 Suite and Push



Pioneer RMX-1000



Yamaha HS8



Akai MPK261



Pioneer CDJ-2000 Nexus

Rane Sixty-Eight



hands-on control, go with the Traktor Kontrol S4 MK2 (\$699); the 2-channel Traktor Kontrol S2 MK2 (\$449) drops some features but still controls Traktor's Remix Decks.

Audio Interface Consider this optional. If all you need is vocal recording, you can use the mic input of the Traktor controllers.

However, for more extensive recording of external instruments, the Focusrite Scarlett 18i8 (\$349) gives you respected sound and up to 18 inputs, including four mic preamps, in a small package.

Synths and Effects There's no better way to round out Maschine's sounds and effects than with Native Instruments Komplete 9 (\$499). It includes NI's flagship products like the Kontakt 5 sampler, Reaktor modular synth, Guitar Rig 5 Pro, Massive, FM8, Absynth, and Battery, as well as many effects and 120GB of samples. For even more of everything—

including 370GB of samples, a hard drive, and NI's best tools for cinematic production—go with Komplete 9 Ultimate (\$999).

If you decide on the optional audio interface, breathe a little analog life into your music with the Arturia MicroBrute (\$299), a great-sounding mini-synth that you can take with you anywhere. It features a patchable modulation matrix, USB MIDI, and a built-in step sequencer.

Monitors and Microphone For a budget set of monitors, the KRK Rokit 6 G3 (\$399/pair) gives you a wide sweet spot, consistent sound at high SPLs, and a balanced sound across the frequency range. In addition to XLR and TRS inputs, the RCA inputs let you use these speakers with the Traktor controller's booth outputs.

As with the Ableton/Serato path, the Shure SM58S (\$104) mic won't steer you wrong. If you really need to pinch pennies, go for the slightly more consumer-oriented Shure PG58 (\$54), which also has an on/off switch. ■



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Supports ASIO, Core Audio, Windows Audio Session API (Windows 8) | Thunderbolt cable included | Thunderbolt is a trademark of Intel Corporation in the U.S. and/or other countries.

World Radio History

MakeMusic Finale 2014

Notation software takes another leap forward

SUMMARY

STRENGTHS New file format allows sharing of scores across different Finale versions. Better default handling of staves with multiple layers. Score Manager better organizes features related to staff layout. A number of refinements improve workflow.

LIMITATIONS No custom Staff Sets in Studio view. Cannot import 24-bit or mp4 audio files.

\$600 retail;

\$350 academic;

\$140 upgrade
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BY ROB SCHROCK

THE LAST version of MakeMusic's flagship notation program reviewed in *Electronic Musician* was Finale 2011. Since then, a number of significant features have been added in both Finale 2012 and the latest release, Finale 2014.

The biggest news may be that Finale's new file format (.musx) is now backward-compatible with Finale 2012 files and will be forward-compatible with all future versions. This is a welcome feature for large projects involving multiple arrangers and copyists working in different versions of the program.

In addition, the tool icons have been elegantly redesigned; no more garish color choices. The new icons are immediately recognizable for anyone who has worked with Finale; the intention was to make it easier for users to jump between different machines and

Finale's new .musx file format is designed to make your current work compatible with Finale 2012 as well as future versions of the program, so that it is easier to work with collaborators.

operating systems, and have everything remain comfortably familiar. Although the new tool buttons felt a bit small at first, I got used to them after a few days of scoring and have come to appreciate the cleaner look.

The linking of scores and parts has been a Finale feature for a while. Finale 2014 now gives the user additional control over what may be linked or not, including ties, angles, beam extensions, dots, and stem length. Hairpins and trills can also be unlinked. For example, notes can be changed or corrected everywhere simultaneously while still preserving intentional differences in slur shapes between the score and parts.

When the user is working with multiple layers in a staff, accidentals and rests automatically look much better by default. Gone are the double accidentals when two

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One feature of Finale that is sometimes overlooked is its ability to import an audio file to play along as you create your score. Only 16-bit AIFF and WAV files, as well as mp3 files, are currently recognized for import, but it's worth the extra effort to create.

layers fall on the same note, and the separate “high and low” rests for two parts now default to a single, shared rest when appropriate (although you can switch back to having duplicated rests if you want). Smart Shapes, like trills and crescendos, are now attached to specific beats that easily result in expressions that automatically look consistently good in both the score and individual parts as the surrounding context changes.

A “keyless” option is now available in the Setup Wizard, resulting in all necessary accidentals being displayed. This makes it easier to write an entire score without key signature when using transposing instruments. Both the individual measures and existing staves can also be made to be keyless afterward, and any necessary accidentals will be displayed.

Sound Set Since the introduction of Garrigan instrument libraries in Finale, score playback has always been top-notch in this notation program. New instruments have been steadily added over the years, and a partial list added in



Fig. 1. Finale 2014's Studio View, showing the Tap Tool, mixer, a reference audio file that has been imported, and the Playback Controls window.

Finale 2014 include Alto Flute, Banjo, African Percussion, Bass Flute, Contrabass Clarinet, Eb Clarinet, Flugelhorn, Piccolo Trumpet, Steel Drums, Tablas, and Tubular Bells. The Human Playback feature has been further refined with several more techniques and styles, resulting in playback that provides a remarkable musical interpretation of traditional score markings.

Finale 2014 can export an audio file of the score playback for dropping into a DAW session as an orchestration reference. Volume, record, mute, and solo for instruments are immediately available in Studio View or by pulling up the Mixer window, although customized Staff Sets are not available in Studio View (see Figure 1). I like to solo different sections, strap compressor and EQ plug-ins across the main outputs to beef them up, and export multiple audio files (strings, horns, woodwinds, etc.) so I can more easily manipulate them later in my DAW.

One feature of Finale that is sometimes overlooked is its ability to import an audio file (like a rhythm section rough mix) to play along as you create your score. Only 16-bit AIFF and WAV files, as well as mp3 files, are currently recognized for import, but it's worth the extra effort to create. If the original audio reference was not performed at a specific tempo, there is a Tap tool that allows you to set the beats in Finale to match your track. It's a great way to orchestrate using your ears, which I'm sure our musical forefathers would have embraced.

Introduced in Finale 2012, the Score Manager puts control over the look and sound of the score and individual staves in one window. Staff names, transposition, clef, score order of instruments, and sound playback can be edited easily with the changes to score appearance and instrument sounds reflected automatically. Adding

new instruments is simple, with new staves automatically placed in the correct position of the score, based on your score-order setting, and the correct sound played back. Staves can have different transposition and playback settings, such as when a sax needs to switch to a clarinet in a particular part.

The main usability issue I have found is that I must reach for my mouse to change to specific tools a bit more than I'd like. Although there are keyboard shortcuts within certain tools, I wish there were a way to customize what you use to switch between a handful of common tool choices by keystroke (e.g., going from note input in Speedy Entry to slurs in Smart Shapes). Of course, there is a certain amount of GUI interaction required in all major music apps, but as a Logic user, I am used to switching between tools more quickly, either with the help of key modifiers or by right-clicking. Finale has some catching up to do, in this regard.

Finale Analysis Overall, Finale's workflow has continually improved, to the point that the main thing slowing me down is just deciding what I want to write. Exporting parts results in a better-looking layout by default, and the Score Manager is brilliant. The audio playback keeps getting better and more comprehensive, and the backward and forward file compatibility will be welcome by many power users.

Finale 2014 feels very stable, capable and reliable, and it remains the standard. ■

Composer/producer Rob Shrock is currently working on the new release from UK Atlantic artist Rumer. He also serves music director for the legendary Dionne Warwick.

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Roland AIRA TR-8, TB-3, and VT-3

Classic acid
machines, reborn

BY MARKKUS ROVITO

WITH ITS new Aira series of products, Roland revisits some of its most popular analog designs, the TR-808 and TR-909 Rhythm Composers, TB-303 Bassline, VP-330 Vocoder Plus, and SH-101 keyboard synth—instruments that have defined the sound of popular music for a generation. But unlike its competitor Korg, which continues to mine analog technology, Roland chose to use digital techniques to bring back its classics.

Using a unique modeling approach it calls Analog Circuit Behavior (ACB), which analyzes the specs of each original instrument down to the circuit level, Roland has created the TR-8 Rhythm Performer, the TB-3 Touch Bassline, the VT-3 Voice Transformer, and the System-1 Plug-Out synthesizer. Each instrument marries modern workflow conveniences to old-school sound

SUMMARY

STRENGTHS Fantastic reproduction of signature analog sounds. Focus on hands-on control for live performance. Scatter effects. High value for the price. Thoughtful interface and consistent build quality for mid-priced units.

LIMITATIONS Too few drum sounds in the TR-8. Could use more memory locations. No DAW integration via plug-in versions.

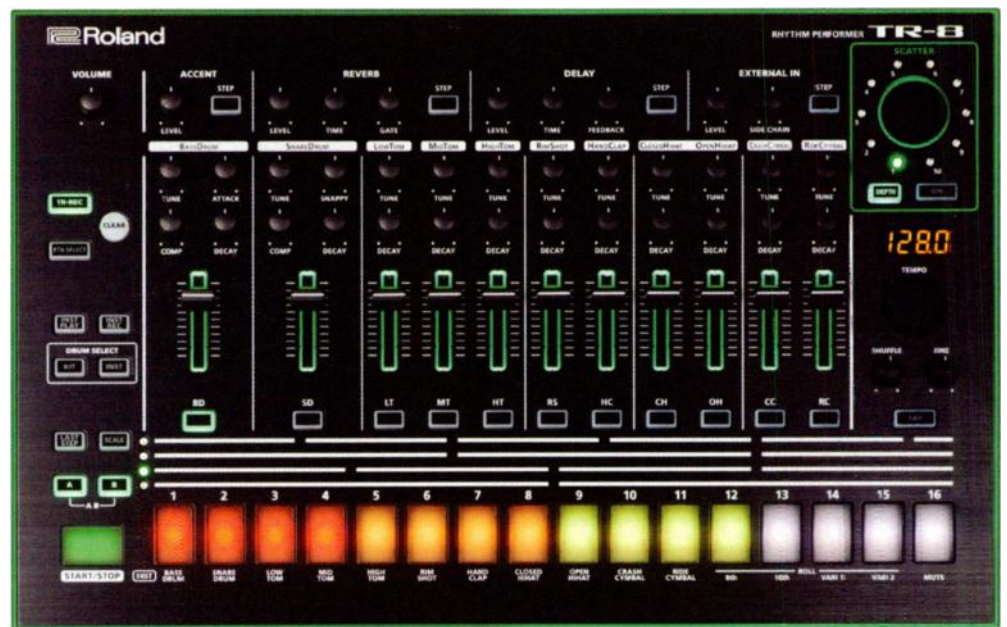
TR-8: \$499 street;

TB-3: \$299 street;

VT-3: \$199 street
roland.com/aira



What's not to like about the TB-3's handy touchscreen and Scatter effects combined with a recreation of the TB-303 resonant filter?



With the TR-8, the classic sounds of Roland's TR-808 and TR-909 are back, but with modern conveniences such as USB connectivity and real-time performance effects that process external audio as well as internal sounds.

quality. The quartet can be interconnected to create a complete performance system, or operate on its own or in any combination. (At the time of this review, the System 1 wasn't available; watch for a full review of it later this year.)

Unlike their namesakes, the Aira instruments can be used as USB audio interfaces to send audio into your DAW. In addition, the TR-8 and TB-3 can transfer MIDI over USB. And although the TB-3 and VT-3 can be powered via USB, the

TR-8 cannot. The signal paths in all three devices feature 32-bit/96kHz resolution, which means you'll hear no digital zipping or aliasing, even during long, slow filter sweeps.

Every instrument in the Aira series has a version of the Scatter effect, a performance tool that slices, stutters and rearranges patterns into real-time variations that you control. The particular Scatter functions in each instrument match the role the unit plays in performance.

TR-8, the Beat Box Combining the sounds and workflow of the TR-808 and TR-909, the TR-8 makes it quick and easy to step-record beats into its 16 pattern memories—each of which offers A and B variations—including Accents and the application of Reverb and Delay to each step. There are 16 drum kits, each of which has 11 instruments selected from an overall library of 28 drum sounds. Each of these instruments has its own volume fader and knobs for Tune and Decay. In addition, the snare has Compression and Snappy controls, while the kick drum gets dedicated knobs for Compression and Attack.

The recording tools include Shuffle, four Roll buttons, and four time signatures. The tempo range is from 40 to 300 bpm.

The modeled 808 and 909 sounds are convincing; you'll love the signature fat-and-smooth kick tones and the shrill sibilance of the hats and cymbals. While some people will say they miss the hiss or the ever-elusive "analog warmth" of the originals, the TR-8's sounds are as close to the originals that digital re-creations are going to get.

The TR-8 has the most elaborate Scatter section, with a knob to select one of 10 types, providing stutter and glitch effects, pattern reversal, changes in gate length, and so on. The knob can also be used to set the Depth for each Scatter type. Audio fed into the TR-8's input jacks can be processed through its Scatter engine.

All Your Bass Are Belong to TB-3

While keeping the sounds of the TB-303 intact, the TB-3 reconstructs its interface with a user-friendly, pressure-sensitive touch screen. Five screen modes let you play and sequence the sounds and select from 64 patterns, with up to 32 steps in each. Record in real time or in step mode, with Accent, Slide/Tie, and Clear/Rest buttons to make it quick and easy to get the results you want.

The Env Mod screen puts envelope modulation, and decay under your fingertip. The XY Play mode assigns pitch change and volume to the x-y axis and modulation to pressure. Scatter provides eight variations with 10 levels of depth for each one, which you activate by touching or sweeping through them on the screen.

You also get a re-creation of the TB-303's signature smooth filter with its screaming resonance, which, along with 26 original sounds, does a great job of mimicking the timbres and behavior of the original model. However, the TB-3 throws in 108 additional



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The VT-3 is an easy-to-use vocoder that offers a wealth of other vocal effects at a reasonable price.

4-oscillator sounds for you to sequence, process and mangle on-the-fly, making it an attractive value for live performance or recording. The TR-8 and TB-3 lock up with each other when connected with a standard MIDI cable, making an old-school 303/808/909 jam session simple to set up.

VT-3 for Vocals The most straightforward and least expensive of the Aira line is the VT-3, an easy-to-use vocal processor for stage and studio. Plug into the XLR/TRS combo jack in back (phantom power is available for the XLR input) or into the 1/8" mic input in front. Then select one of the 10 vocal effects—vocoder, synth, lead, bass, megaphone, radio, Scatter, or one of two types of pitch correction. For each setting, you get individual sliders for wet/dry balance, reverb, pitch (± 1 octave) and formant, the latter of which ranges from female- to male-like characteristics. At any time, you can use the Robot button to remove pitch variations and add more of a synthetic sound. In addition to using the Bypass button, you can bypass the effects using a footswitch. Three memory slots let you save and recall settings.

It's great to be able to achieve VP-330-type vocoder effects so easily, but there's more to the VT-3 than that. Adjusting the Pitch, Formant, and Mix Balance provides an impressive range of vocal effects for creating synthetic voices and special effects or exploring different timbres for background parts. The VT-3 will appeal to a broad audience thanks to its processing quality and the wealth of effects the unit can achieve.

All Together Now Anyone who has been clamoring for 303/808/909 substitutes, whether for the sounds or the live-performance capabilities, will want to check out the Aira line. While there are other all-analog clones available, they naturally cost much more and won't include fun stuff, like touchscreens and the Scatter mode. And while analog purists may scoff at the digital sound or the updated interfaces, the simple truth is that the TR-8, TB-3, and VT-3 sound amazing, are fun to play, and are attractively priced. ■

Markkus Rovito drums, DJs, and contributes frequently to DJ Tech Tools and Charged Electric Vehicles.

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Universal Audio Apollo Twin

A two-channel interface that doesn't cut corners on quality

BY MIKE LEVINE

UNIVERSAL AUDIO'S Apollo line of interfaces have garnered high praise for their audio quality and design, but they have been out of the price range of many home recordists—until now. The Apollo Twin—available in Duo and Solo DSP configurations—is a Thunderbolt-ready, tabletop version for Mac OS X that provides two analog inputs, six analog outputs, and the same high-quality 24-bit/192kHz audio converters as

SUMMARY

STRENGTHS Affordable Apollo interface. Intuitive controls. Excellent sounding preamps that are under software control. UAD-2 plug-ins included. Plug-ins available for monitoring, tracking, and mixing. Zero-latency hardware monitoring with effects.

LIMITATIONS Only compatible with Thunderbolt-equipped computers running Mac OS X.

Apollo Twin Duo: \$899 street

Apollo Twin Solo: \$699 street
uaudio.com



Fig. 1. The Apollo Twin's intuitive controls are all located on the top panel.

the original Apollo. And as you would expect, the Apollo Twin lets you record with very low latency through the UAD Powered Plug-ins.

Orbiting the Apollo Twin The Apollo Twin is roughly 6" x 6.5", weighs 2.5 lbs., and has an angled top for the controls. But despite its size, the interface feels solid and substantial when you lift it, and the top panel is conveniently laid out (see Figure 1). The large knob in the center is used for controlling input and monitoring levels, depending on whether the Preamp or Monitor button is pressed. Push the knob in Preamp mode to switch between setting the level for input 1 or input 2. The Monitor button toggles the knob between controlling the monitor output and headphone levels.

The first five buttons below the lighted display select mic or line input and engage the low-cut filter, phantom power, pad, and polarity inversion for the selected channel, respectively. The Link button lets you use the knob to adjust both input channels simultaneously when you're using the Apollo Twin for stereo recording. A high-impedance

instrument input and a 1/4" headphone jack are on the front edge, facing the user.

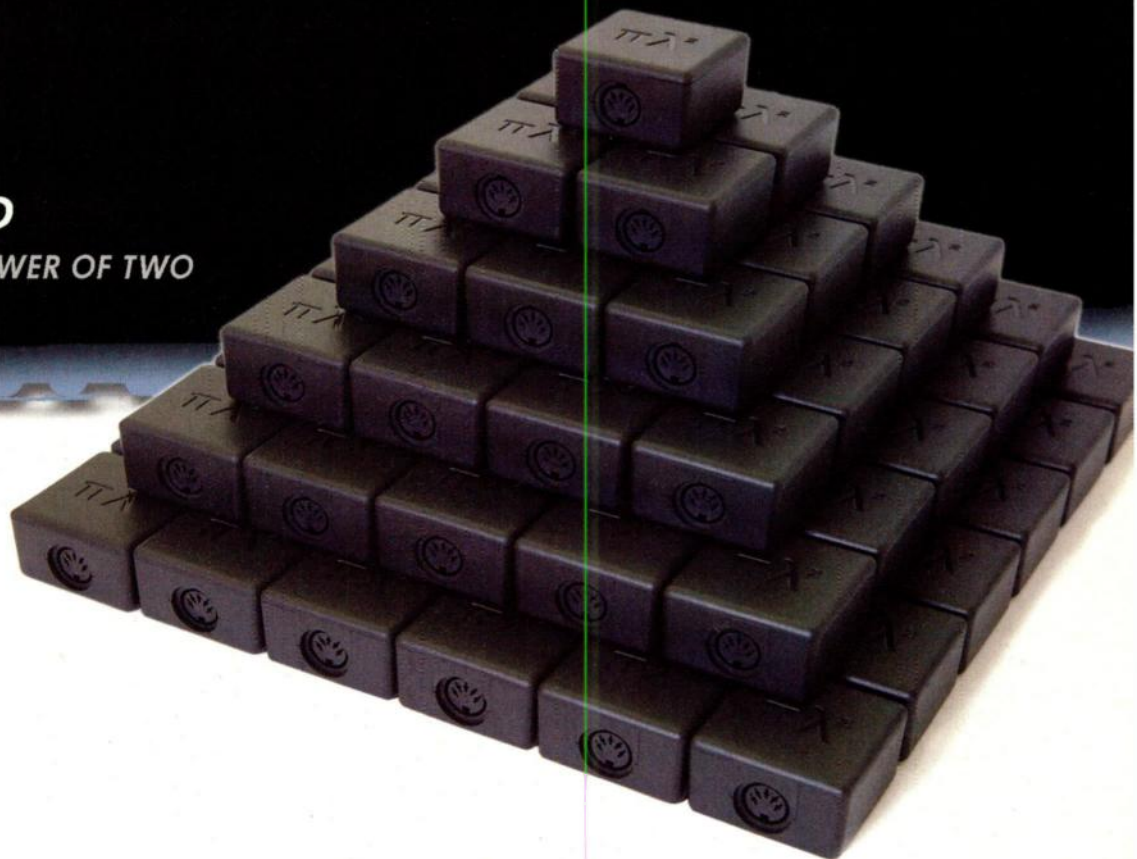
The rear panel has two mic/line inputs on combo jacks, two pairs of 1/4" outputs (Line and Monitor), a Lightpipe optical input that can be configured for ADAT (for 8 channels, with S/MUX for high sample rates) or S/PDIF (for two channels) digital input, and a Thunderbolt port (see Figure 2). Unfortunately, a Thunderbolt cable is not included (although some retailers are throwing them in when you purchase the Apollo Twin), so be ready to plunk down an additional \$30 to \$40 for a cable, depending on the length.

Unlike the original Apollo, the desktop version has no FireWire connectivity, and Universal Audio's documentation states that FireWire-to-Thunderbolt adapter cables are not compatible. If you don't have a Thunderbolt-equipped Mac, you can't use the Apollo Twin as an interface. That rules out those of you with pre-Thunderbolt Macs, as well as all Windows users. However, you *can* use the Apollo Twin as a standalone 2-channel preamp by connecting its analog outputs to another audio interface.

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On the Software Side The Twin is the first of the Apollo line to feature Universal Audio's new Unison technology, which allows the preamp plug-ins to communicate bi-directionally with the hardware mic preamps in the unit. The software can be used to change the physical characteristics of the mic preamp, such as the gain staging and impedance—very cool!

A major component of the Apollo Twin ecosystem is its software UAD Console application, which gets installed to your computer, along with some utility applications, after you download it from the Universal Audio website (see Figure 3).

Console is where you insert UAD-2 effects, including the new 610-B tube preamp plug-in. You not only get the modeled sound of the preamp, but you can also use its gain and EQ adjustments as you're tracking. The 610-B is part of the included plug-in bundle (more on that in a bit) and can also be used as a DAW insert after you've recorded.

Console lets you place insert or bus effects on the Apollo Twin's inputs. The handy Global switch toggles between monitoring with the effects and recording with them. I loved having this flexibility. I've used other interfaces that have onboard DSP, but never one that made it so easy to use (nor one with built-in effects that sound anywhere near this good).

The Console application allows you to save sessions, as well. So if you have, say, custom setups for different clients, you can easily recall them, instead of having to reinvent the wheel every time.



Fig. 2. With the exception of the Hi-Z instrument input and headphones, the unit's I/O is located on the easily accessible rear panel.

Included with your purchase is the Realtime Analog Classics Bundle, which gets installed on your Mac, along with the rest of the UAD plug-in lineup. They are all part of the main Apollo Twin software bundle that you download when setting up the unit. The bundle includes 10 plug-ins from the UAD-2 collection; the rest of the UAD-2 plug-ins (assuming you don't already own some) will run only in demo mode, unless you purchase and authorize them.

The fully functioning plug-ins provided with the bundle include the 610-B Preamp and EQ; Softube Amp Room Essentials, a suite of excellent-sounding modeling plug-ins for guitar and bass; legacy versions of UAD's 1176SE/LN, Pultec Pro, and Teletronix LA-2A; the comprehensive CS-1 Precision Channel strip, which gives you EQ, dynamics, and ambience effects; and RealVerb Pro, a handy reverb plug-in.

Sometimes a plug-in bundle is just an inexpensive add-on when you buy a piece of hardware, but that is not the case here. Other than the preamp, the included plug-ins are not among the newest generation of UAD-2 effects, but they are all very good and very useful. Considering that most à la carte UAD-2 plug-ins cost between \$200 and \$400, it is a bonus to have this useful selection included.

Flying the Apollo Twin Once you get the hang of using the integrated software and hardware system, the Apollo Twin is a total breeze to use. The user interface is thoughtfully designed, and I found it intuitive to operate, which is more than I can say about other audio interfaces I've used.

My review unit was an Apollo Twin Duo, which features two SHARC DSP chips. Also available is the lower-priced Apollo Twin Solo, which has only one SHARC DSP chip, but is otherwise identical. I tested the Apollo Twin with a MacBook Air running Mac OS X 10.8 (Mountain Lion), and it performed very smoothly. I was able to open quite a few plug-ins before running out of DSP. To give you an idea of how many I could have open at a time, I set up an 8-track project and inserted a CS-1, Pultec Pro Legacy, and Teletronix LA-2A Legacy plug-in on each track, which used up about 84 percent of the UAD-2 DSP. Of course, the number of plug-ins you can open at a time depends on which ones you're using, because some are more resource-hungry than others.

I tracked guitar and bass through the Softube amp-modeling plug-ins, and acoustic guitar through the 610-B preamp, using the Apollo Twin's monitoring features, and there was no perceptible latency, no matter where my DAW's buffer was set (as long as I remembered to mute the output of the DAW channel I was recording into).

I was impressed with the sound of the preamps, both with and without the 610-B plug-in inserted. To my ears, they offer a significantly higher level of quality than you'd expect from preamps on an audio interface. What's more, the EQ and gain controls on the 610-B plug-in made it possible to alter the tone on input significantly.

Twin Me With the Apollo Twin, Universal Audio has succeeded in creating a lower-priced version of the Apollo without sacrificing quality. Assuming you have a Thunderbolt-equipped Mac, the Apollo Twin gives you excellent sound quality, UAD-2 plug-ins, and no-latency monitoring in one piece of gear. ■

Mike Levine is a musician, composer, and producer from the New York area.



Fig. 3. The UAD-2 Console software, with the included UA 610-B preamp open.

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HOW TO

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A Guide to Game Audio Middleware

Understanding tools for designing
interactive sounds

BY STEVE HOROWITZ AND SCOTT LOONEY

WE ALL know that videogames are a huge business, which brings new opportunities for composers and sound designers. Maybe you're a complete newcomer to sound for games, or perhaps you are already creating audio for traditional, linear media like film or television; but if you're considering taking the leap into game sound, first you need to understand the process and tools. In this feature, we'll break down middleware—how it works and what options are available—but let's start with the notion of designing audio for an interactive medium.

Imagine a linear medium, such as a film: If a character goes into the dark, spooky castle and opens the door at 13 minutes and 22 seconds, you can easily create or obtain a sound of a creaking door and place it on the timeline in your DAW at that exact point. Once you synchronize it with the film, it will always play at the same time.

Now imagine that each time you watch this film, the character goes into the house at a different time. This is a prime example of the unpredictability of the game environment. How could you successfully create sounds for a medium when you don't know when a particular action is going to happen? You need to move away from using time as a basis for organizing sounds and concentrate on the actions themselves. Let's think of our spooky house situation from the perspective of the action: At some point, the character is going to come up to the house and open the door. Let's list it as an action, like this:

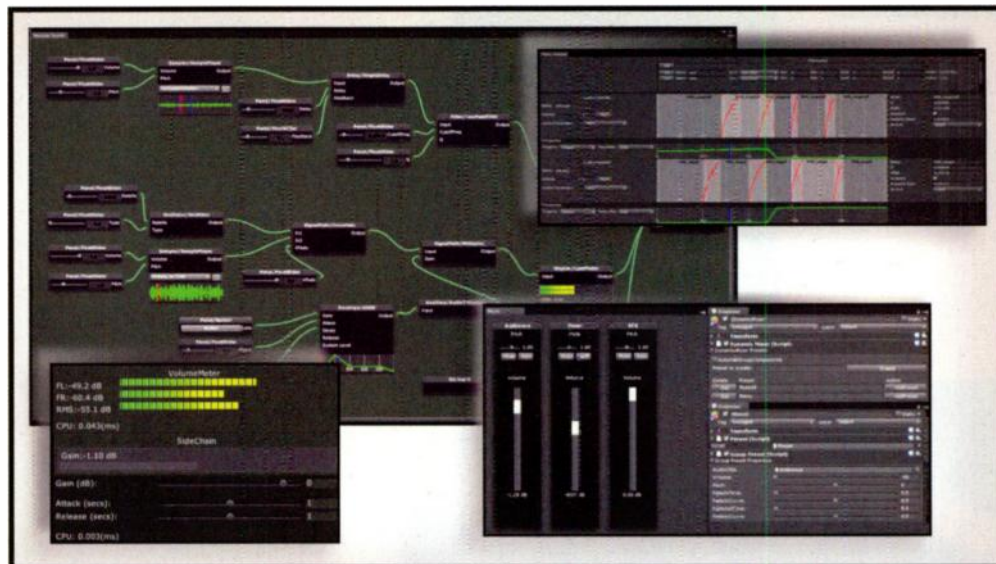
Action #001 Spooky Door Opening >
Play 'spookydoor.wav'

Now we've defined our action. How do we trigger it? In a movie, we may be out of luck, but fortunately in the game, something—most likely animation code—is going to cause the door to move. Hook up the code that triggers the door animation with the sound of a creaky door and voila! Instant sync—whenever the character opens the door, the sound will play.

This shift in thinking requires that each sound in a game exists as a unique element. We can't use a mix of sound effects and music anymore, except in certain situations. Everything has to be mixed and mastered separately. Furthermore, we have to be really organized with all of these audio files (huge AAA adventure games can contain hundreds of thousands of files!) so that the programmer knows what to do with these assets in the game.

It also means that the way the audio is triggered in a game is intimately tied up with the way the game is designed, and each game is a complete universe unto itself. It has its own sets of rules and regulations and rules for emergent behavior and interactivity, and any change in terms of game design can significantly affect the way the sounds are triggered.

Meet the Middleman: Middleware A typical game engine has an awful lot of things to do. In essence, it has to run an entire virtual world, complete with animations, shading and rendering, visual effects, and of course, a lot of audio. It must coordinate the overall interactive logic of a game. It needs to know both the location of rich media assets (including music, sound effects, and voiceover files) as



Middleware, such as Tazman Audio's Fabric, is a bridge between the game sound designer and the programmer.

well as when (and when not) to call them up. Even in a small game, this can add up to a large amount of data that needs to be coordinated. In a large game the scope can extend into tens or hundreds of thousands of assets. Game engines are software packages that make games possible, and it takes a talented and dedicated group of designers to program the engine to do all this work efficiently.

Back in the day, a sound designer made noises and delivered those noises to a programmer in some file format or another, and that programmer put those files in the game in some way or another. Since this was a one-to-one relationship, it was usually a pretty efficient system.

As games got more complex and people were often far apart, it became standard practice to make those noises and deliver them to a programmer, maybe over the Internet, along with a text document with file names and instructions about where these sounds were supposed to go and what they were supposed to do. (This process is still in use today.) But, over time, software has emerged to handle an increasingly larger amount of the heavy lifting between the game engine and the programmer, and sound designer. This software is called middleware.

Audio middleware is a type of engine that works along with the core game engine and sits, in a sense, in between the sound designer and the programmer. Its main job is to allow the designer, who may not be a programmer, to have more control over how, when, and where his or her sounds are triggered in a game.

Let's look at a car-racing game. A car has a motor and when the car goes faster, the sound

of the motor changes in different ways—RPMs increase, gears shift, and the engine sound changes pitch and intensity. Let's say the designer makes three sounds: car sound slow, car sound medium, and car sound fast. In the past, the programmer or integrator would take these three sounds and write lines of code that would trigger them, in real time, in the game as the car got faster. The programmer would need to take the time to program the sounds, adjust them, and make sure they worked correctly during gameplay, and while they were doing that, they could not be doing other programming tasks.

Now let's look at how this same car sound could be developed using audio middleware. The biggest difference would be that this whole task can be accomplished by you, the mighty sound designer! Most audio middleware packages provide a graphical user interface, which looks similar to Pro Tools or other DAW applications; the sound designer would work in this interface and deliver a finished sound setup to the programmer. The audio designer and the programmer only have to know and agree on certain parameters, called hooks, that are used in the game.

Let's get back to our three files: car fast, medium, and slow. The sound designer will create these sounds and import them into the middleware program of choice. Once they are in the program, the designer will attach necessary elements such as crossfades or map game parameters to the audio. In this example, it is quite common that the game engine will be keeping track of the speed of the car, probably in miles/km per hour, and the programmer will create a hook called `car_speed` inside their code and give this hook

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to the audio designer. As the car speeds up, this parameter value will increase.

First, however, we need to create what is often referred to as an event. Remember when we referred to being concerned about the action itself rather than the time it takes place? This is an extension of that concept embraced by middleware. Think of an event as a “container” for some kind of action or state in the game; an event can be tied to anything in the game, and it can consist of multiple parameters driven by the game’s logic.

Now that we have the hook of car speed, we can create a custom parameter in our middleware editor or GUI that is mapped to the different engine sounds we have. The value of the parameter will then control the timing and crossfades as well as the selection and balance of our low, medium, and high-speed car engine sounds. It may even control the speed/pitch of the sounds. It is then a relatively simple matter to export sound files, along with a text or configuration file, and deliver to the programmer. All the programmer has to do is tie the value of the parameter to the game’s event using lines of code, and voilà! The car’s visual speed will now match its perceived audio intensity.

This is a very generalized example that should give you an overview of how the middleware process works. The details surrounding the building of complex audio events tied to game states and parameters can get quite involved. The main point to take away here, however, is that middleware creates an all-round win-win situation: Sound designers have more control over their work, confident that the material they deliver is actually what they will hear in the game, and the programmer doesn’t have to spend as much time on the audio in the game.

Audio Middleware Structure Most middleware consists of a programmed codebase that is split into two major sections or areas. The most important to us is the GUI. This section, usually set up in a separate application, is primarily set up for the audio designer to import, configure, and test audio. Its main purpose is to allow the non-code-savvy composer or sound designer to become a sound implementer.

Once audio configuration and testing are complete, the implementer can then build one or

more sound banks with configuration information that the programmer can use to integrate the audio system with the rest of the game code. Commonly these banks and files can then be placed inside the game by the implementers in order to test them out within the game environment. In some cases, the game itself can be hooked to the middleware in real time.

The Other Side of the Fence: The API

Although the audio middleware system is constructed around a codebase, the game programmer will rarely deal with it at that level. It’s much more common to use an API, or Application Programming Interface. This is a set of instructions and script-based standards that allows access to the codebase without having to delve too deeply into the main code, which in some cases may not be accessible—in other words, it may be what’s called closed source. Web standards such as HTML5, CSS, and JQuery are referred to as open source, which means their code is public.

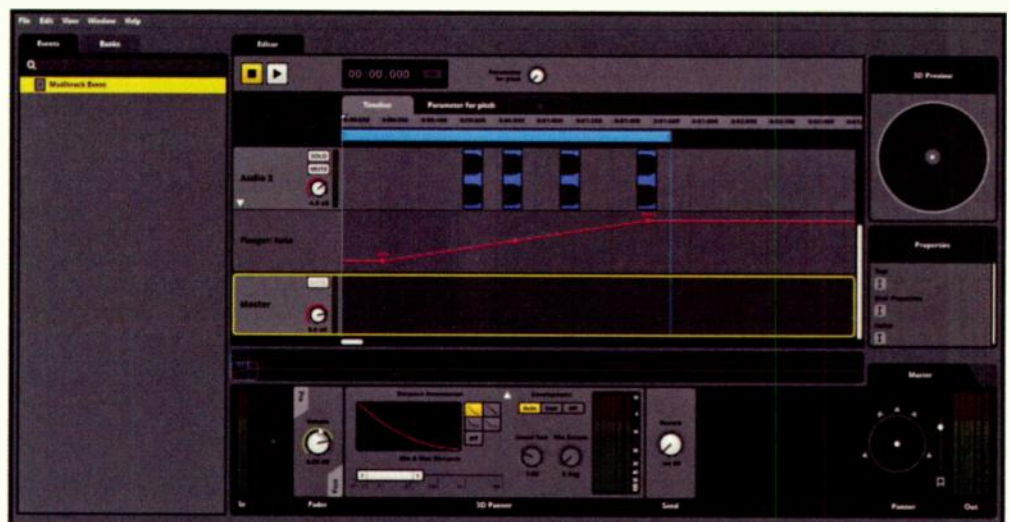
Middleware's main purpose is to allow the non-code-savvy composer or sound designer to become a sound implementer.

A middleware company, such as an audio tool development company, usually releases its API to the public so that other software developers can design products that are powered by its service. In some cases, the company lets people use it for free—for example, for students and individual users.

Middleware Tools Let’s take a brief look at the commercial middleware products available today. These are used mainly by small to mid-size independent game developers.

• **Firelight FMOD Studio** Firelight Technologies introduced FMOD in 2002 as a cross-platform audio runtime library for playing back sound for video games. Since its inception, FMOD branched into a low-level audio engine with an abstracted Event API, and a designer tool that set the standard for middleware editing/configuration reminiscent of DAWs. Firelight has since continued its innovation, releasing a brand-new audio engine in 2013 called FMOD Studio, which offers significant improvements over the older FMOD Ex engine, such as sample-accurate audio triggering, better file management, and an advanced audio mixing system that allows buses, sends, and returns.

Within the FMOD toolset, a sound designer/implementer can define the basic 3D/2D parameters for a sound or event, in addition to effectively mocking up complex parametric relationships between different sounds using intuitive crossfading and the ability to draw in automation curves and use effects and third-party plugins to change the audio. Music can be configured within FMOD Studio using tempo-based markers



Firelight FMOD Studio offers sample-accurate audio triggering and a mixing system that allows buses, sends, and returns.



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and timed triggers. Due to its flexible licensing pricing structure, FMOD is now a solid and widely adopted audio middleware choice and continues to be a major player in today's game development environment.

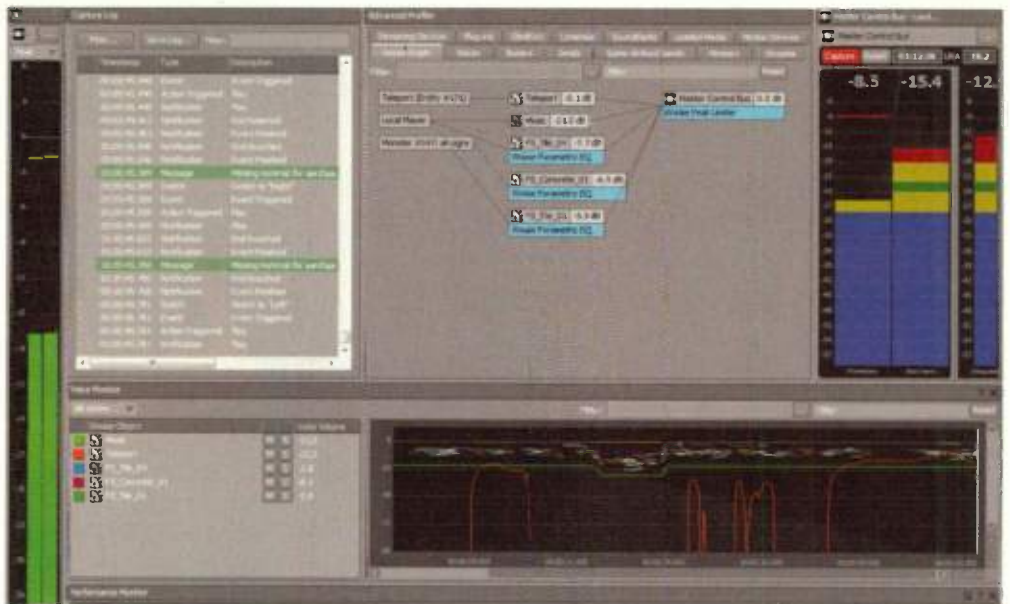
- **Audiokinetic Wwise** Introduced in 2006, the Wwise (Wave Works Interactive Sound Engine) toolset provides access to features of its engine from within a staggeringly comprehensive content-management UI. Its abstracted and modular Event system, which allows extremely complex and intricate results from simple operations that can be nested within each other, has become a standard for many development houses worldwide. Wwise can configure events via typical audio parameters, with finely controlled randomization of volume, pitch, surround placement, and effects, as well as logic, switch/state changes, attenuation profiles, and more. Its Interactive Music Engine enables the generation of unique and unpredictable soundtracks from a small amount of existing music material.

Profiling is also a strong feature in Wwise; its ability to mock up every aspect of the engine's ability brings the toolset further into a full prototype simulation outside of the game engine.

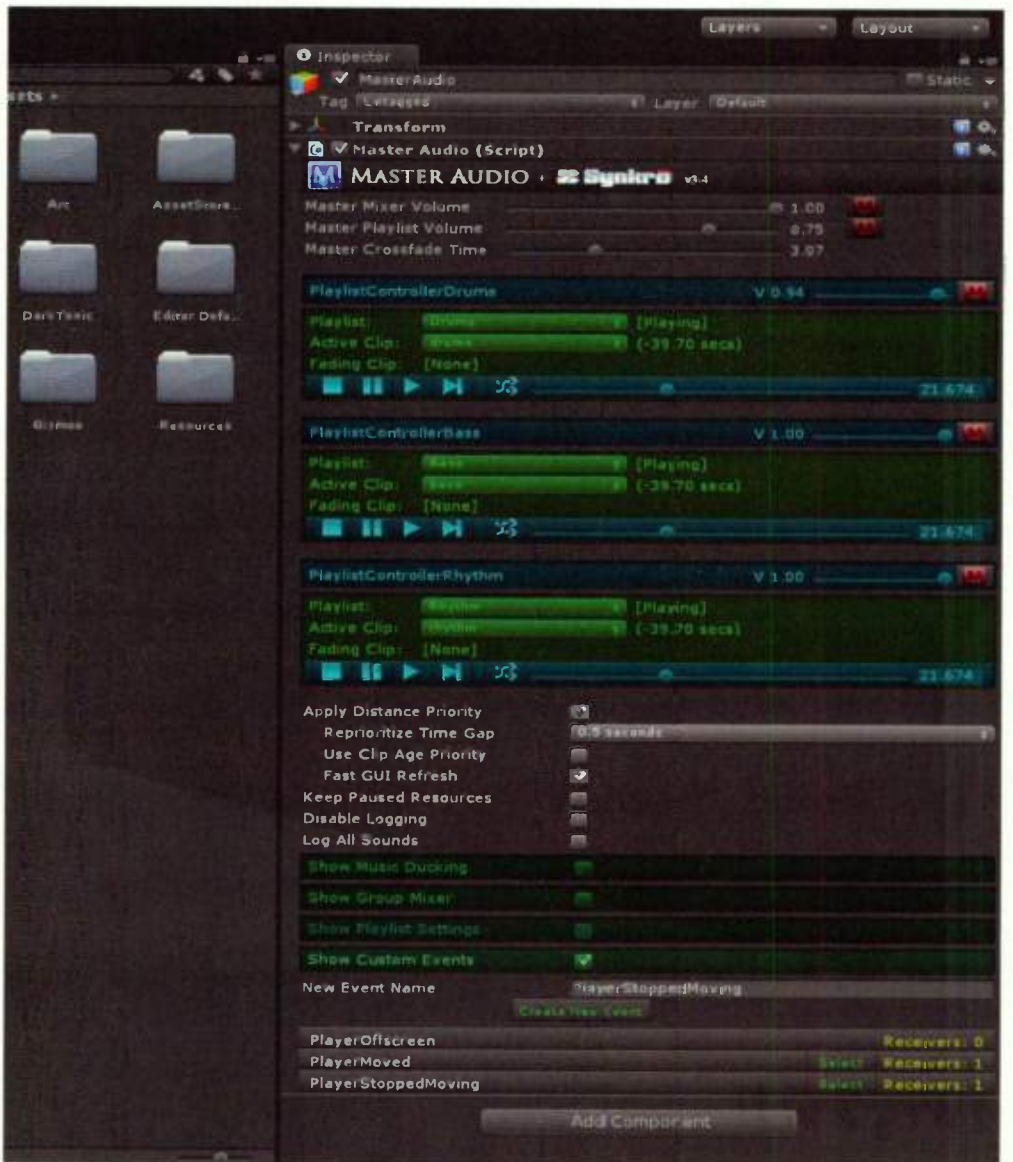
Recently Audiokinetic announced a Mac-compatible public beta version of the Wwise Editor; plus upcoming MIDI integration of Wwise with support for downloadable sound banks of virtual instruments. Look for more developments on this front in the fall.

- **Tazman Audio Fabric** The Fabric toolset from Tazman Audio is another example of the changing dynamics of the game audio market. We've briefly mentioned the Unity3D game engine as a prominent force; although Unity is based around the FMOD engine and API, it offers very few features for sound designers to obtain middleware-like functionality without having to learn code in the process. Fabric was created to address this situation at a very high and sophisticated level.

With an event-based system of triggering and sounds, plus randomized and sequenced backgrounds, parameter-based game mixing, and a modular-based effect building system, Fabric is becoming more and more a tool of choice for developers desiring a more high-level integrated tool inside Unity. Recently, however, Tazman Audio signaled its intent to



Audiokinetic Wwise's Event System has become standard for many development houses worldwide.



Dark Tonic's Master Audio is an example of Unity-based middleware.



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release the engine to work with a number of other game engines, which should be available sometime in 2014.

• **Miles Sound System** The Miles Sound System is one of the most popular pieces of middleware. It has been licensed for more than 5,000 games on 14 platforms. Miles is a sophisticated, robust, and fully featured sound system that has been around for quite some time—John Miles first released MSS in 1991 in the early days of PC gaming. Today, Miles features a toolset that integrates high-level sound authoring with 2D and 3D digital audio, featuring streaming, environmental reverb, multichannel mixing, and highly optimized audio decoders. Along with all the usual encoding and decoding options, Miles uses Bink audio compression for its sound banks. Bink Audio is close to MP3 and Ogg in compression size, but is said to use around 30 percent less CPU than those formats.

Other Unity-Based Middleware Along with Fabric, there has been a slew of audio middleware toolsets within Unity that are becoming increasingly available. Though perhaps not as sophisticated in certain ways as the larger middleware options, these toolsets provide a lot of variety and flexibility in helping non-programmer types to implement interactive audio behavior in games that don't require a lot of adaptability.

Chief among these is Master Audio from Dark Tonic Software. Master Audio features easily configurable drag-and-drop creation of sound events with instancing, probabilities, and randomized pitch and volume. Preset objects can be set up to trigger sounds on a variety of basic game conditions, like collision, trigger messages, etc. Notably, it also features grouping of sound events into buses (similar to Groups

on a traditional DAW mixer window), as well as ducking of buses or sounds via other sounds or buses. This is convenient to create balanced mixes when lots of loud explosions happen, for example. The playlist section is also very versatile. Multiple playlists are supported and accurate crossfading between tracks of the same length is easily configured using the new Syncro feature. Other tools with roughly equivalent features are the Clockstone Audio Toolkit, SectrAudio, and SoundManager Pro. Documentation is relatively clear and concise as well.

This new field of Unity-based middleware is also producing innovations that some of the bigger-name developers don't even have yet. Sectr Audio provides volumetric and spline-based audio sources. (That's an audio source

Most of the software discussed here can be downloaded for free, which makes exploring the latest middleware programs easy.

confined to a non-spherical space or curve.) Generative audio is provided by the new G-Audio toolset from Gregzo, as well as the more retro Sound Generator from DarkArts Studios, and much more. Do you want a plugin in your game that will bitcrush any audio source that is playing? You can get it here, as well. Look for this field to be expanding. It's an incredibly fertile place at the moment with lots of different approaches.

Last but most certainly not least, Unity

updated audio mixing features in the upcoming Version 5, announced at the 2014 Game Developers Conference. Featuring in-game mixing, busing, ducking and automation of mix parameters, it's sure to be a welcome addition to game audio folks working in Unity when it hits (hopefully by fall 2014).

Take Control As we have seen here, middleware engines give today's sound designer an amazing degree of control over the way audio behaves and develops within a game environment. The first audio middleware programs were developed in-house and were the proprietary property of the companies that built them for specific uses within specific titles. Over the years, third-party companies have come along to provide audio engines and code bases for all sorts of platforms that did not have access to them before. Along the way, the sophistication and power of these tools has significantly increased. Nowadays, middleware puts a lot of this power directly into our hands, so we can make sure that the sound we are hearing in the game is exactly what's intended.

Probably the best news for all of you budding game audio experts is that most of the software discussed here can be downloaded for free, which makes exploring and bringing yourself up to speed on the latest middleware programs easy. Make no mistake about it, understanding audio middleware programs is a skill that all game audio professionals should have readily available in their bag of tricks. ■

This feature was excerpted from *The Essential Guide to Game Audio* by Steve Horowitz and Scott R. Looney, ©2014 Taylor & Francis Group. All Rights Reserved. Interactive learning materials, including a companion iOS app, are available at gameaudioinstitute.com.

Steve Horowitz composed the soundtrack to the Academy Award-nominated film Super Size Me, has worked on hundreds of game titles, and engineered the Grammy-winning True Life Blues: The Songs of Bill Monroe. Scott Looney pioneered interactive online audio courses for the Academy of Art University, and has taught at Ex'pression College, Cogswell College, and Pyramid Training. He is currently researching procedural and generative sound applications in games, and mastering the art of code.



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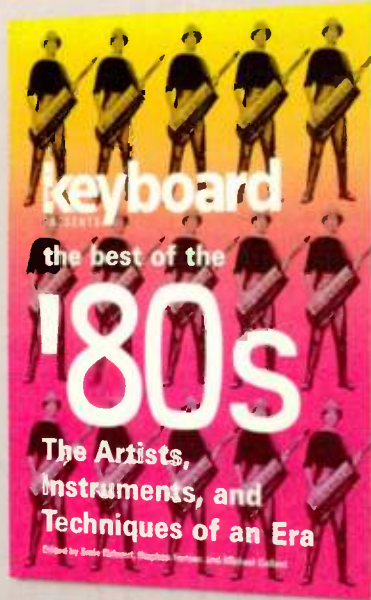


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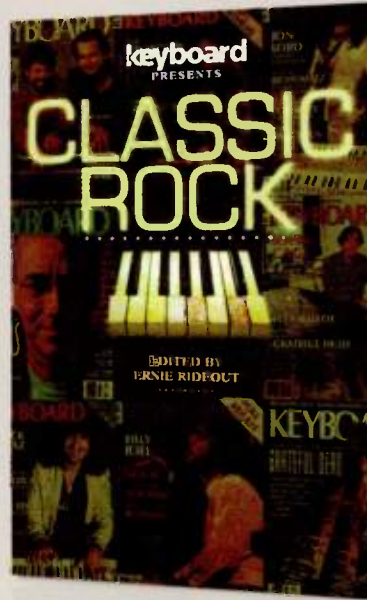
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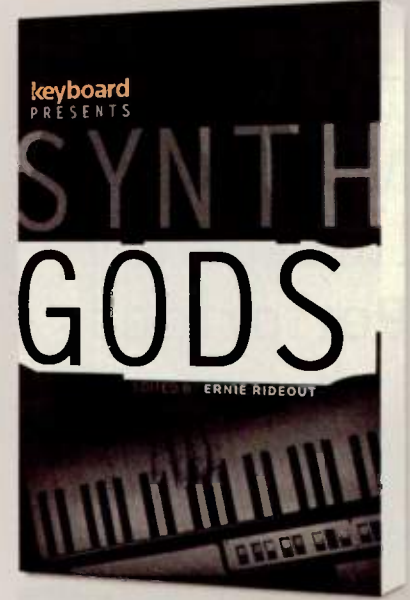
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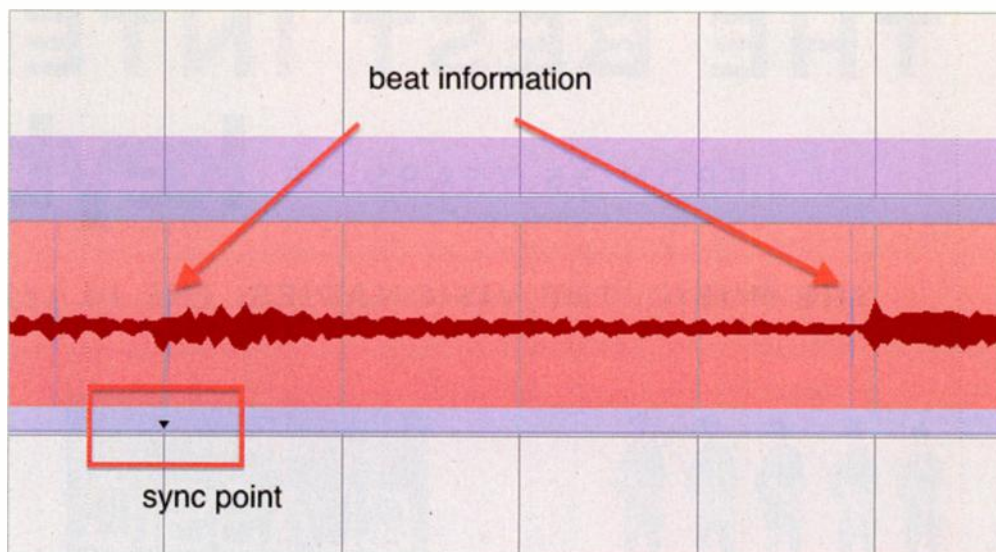
Tempo Mapping in Digital Performer

Create a grid to match recorded parts

BY STEVE LA CERRA

EVERY SO often, you need to deviate from the normal recording process. Suppose for example, that a singer/songwriter demos a song with guitar and vocal, and that demo turns out to be a “keeper.” Overdubbing a live rhythm section to those parts is not the easiest thing in the world, even for experienced musicians. Having a click track as a reference would make overdubbing easier, but if the original was played without a click, you’ll need to create one that follows the audio. This is known as a tempo map and is accomplished in Digital Performer by placing control of the tempo under the Conductor Track. There are many ways to add tempo data to the Conductor Track, such as manually inserting a tempo change, or analyzing an audio file for tempo data and applying it to the conductor track—which is what we’re going to learn here. The tempo map will give us a click that respects the artist’s original performance while allowing overdubs to be referenced to a grid that matches and moves (or not, if you ultimately quantize) with the original tracks.

Open a new session in Digital Performer and import the reference audio. For the time being, we’ll deal with one audio track, but these concepts can be applied to multiple tracks.



Detail of Digital Performer’s Sequence Window: When Digital Performer’s “Automatically Analyze Beats in This Project” and “Automatically Analyze the Tempo of Audio That Has No Tempo” settings are checked, beat information is displayed in the soundbite.

Drag the audio file from the Soundbites window into the Sequence window. Leave a bit of room at the start of the sequence; I like to drag the start of the audio file to the beginning of bar 3. Do not edit the audio file. Under DP’s Take menu in the Sequence window, you can duplicate the track and work on the copy if you prefer.

Two important DP settings are in play here, and they can be found under Preferences > General > Background Processing > Automatic Beat and Tempo Analysis.

These settings are Automatically Analyze Beats in This Project, and Automatically Analyze the Tempo of Audio That Has No Tempo. If these are checked, you will see beat information in the soundbite, as seen in the screen shot above. (These are the blue-gray vertical “ghost” lines in the soundbite.) If you do not see beats in the soundbite, command/double-click the soundbite to open the Waveform Editor. Select the entire waveform. Under the Beats menu, choose Find Beats in Selection. DP will go to work, analyzing the file for beats. This may take a moment, depending upon the length and complexity of the file, and CPU speed. Click on the Beats tab and you’ll be able to see the results.

Return to the Sequence window and select the soundbite. Under the Audio menu, choose Adjust Beat Sensitivity (control-D) and move the slider until you see the strong beats in the audio file. Then click Apply.

Back in the Waveform Editor, click the Tempo tab. Depending upon the Preference settings, DP may or may not have

automatically analyzed the file for tempo data. If you don’t see tempo information, select all and under the Tempos menu choose Analyze Soundbite Tempo. DP will extract and display the tempo data.

You now will see a sync point in the soundbite window—a small black triangle pointing downward, probably directly below a transient (also shown in the screen shot). Listen to the file and determine which beat the sync point falls on, musically speaking. For example, if it is on a “1,” drag the soundbite so that the sync point snaps to the “1” of a nearby measure. (Make sure that Snap to Grid is on.) If the sync point is in an odd place, you may need to clear it (select the soundbite and choose Clear Sync Point under the Audio menu). You can then double-click the I-Beam cursor to a new location and choose Set Sync Point under the Audio



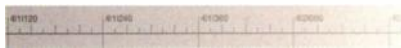
Digital Performer will extract and display your tempo data.

menu. I find it helpful when the sync point is a strong downbeat near the start of the audio file. Listen to the session with the click on. The click should coincide with the sync point, but probably has little relevance to the rest of the audio file.

In the Sequence window, select the soundbite. Under the Audio menu, choose Adjust Sequence to Soundbite Tempo. If Tempo Control is not set to Conductor, DP will ask you if you wish to switch it. Do it. The sync point should stay where you laid it, and the tempo data will be imported to the Conductor Track. The remainder of the sequence will now conform to the audio.

Listen to the session and you'll notice that (a) the click follows the audio and (b) tempo is established at the beginning of the soundbite, thus giving you a count in. Depending upon how rhythmic the audio was, and how sharp the transients, click and tempo should now line up with the audio.

If the Conductor Track needs tweaking go to the Project menu, choose Modify Conductor Track>Adjust Beats. Drag Beats in Edit Window should be checked, as should Apply Adjusted Beats Until End of Sequence and Preserve Realtime Performance. For



The tempo map will give us a click that respects the artist's original performance while allowing overdubs to be referenced to a grid that matches and moves (or not, if you ultimately quantize) with the original tracks.

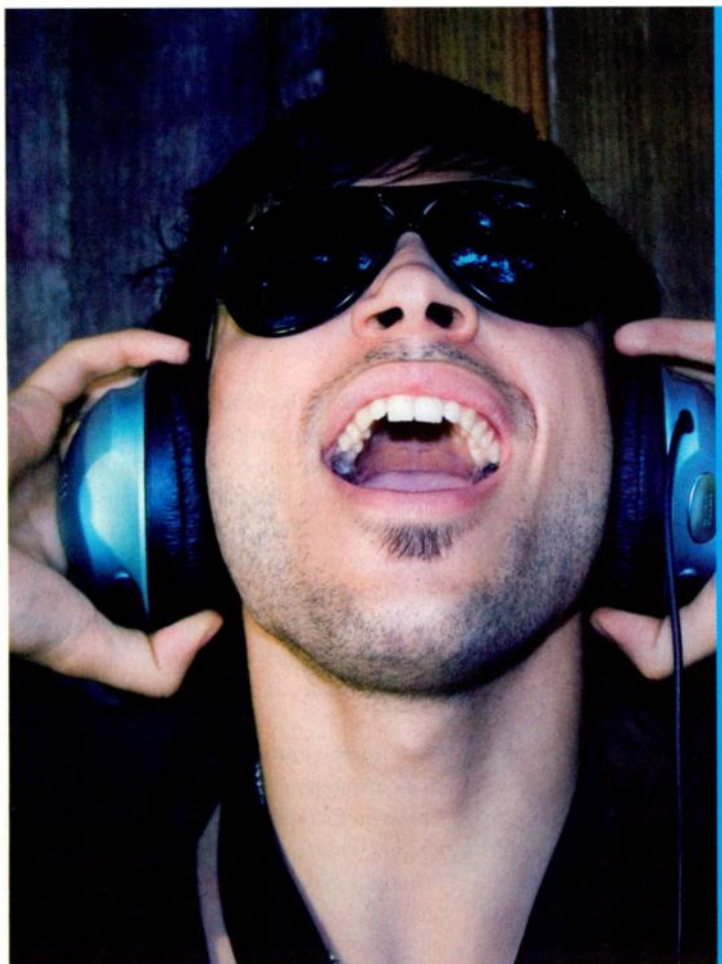


Adjust: you can choose Measures or Beats. At this point, it probably makes sense to Adjust: Beats. Set Snapping to Notes or Audio Beats, which will enable you to snap a bar/beat indicator to line up with a beat in the soundbite. Be aware of the fact that if you close this window, the function is suspended.

When you lay your cursor over the soundbite file, it turns into a double-sided arrow with an anchor at the bottom. This tool will let you snap bar and beat lines in the Conductor Track to the beats in the analyzed audio, thus aligning the click to the performance. I find it helpful when doing this to turn on Auto Rewind, and as I progress through the file move the memory start time forward.

You now have a tempo map and click that other musicians can use for overdubbing purposes. In the future, we'll look at how to use this to quantize audio to the grid. ■

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



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A Music Supervisor's Story

Stephanie Diaz-Matos shares her career path and advice for musicians aspiring to license their music

BY LILY MOAYERI

IF YOU are a *Lost* devotee, you would remember seeing Stephanie Diaz-Matos' name in the credits during the 2006-2007 season as music supervisor. A music business veteran, Diaz-Matos doesn't just have television shows on her resume. She is equally adept at providing

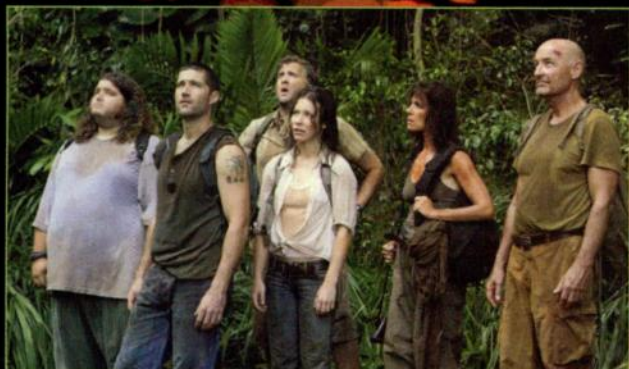
music supervision. I knew I loved music and working with picture and the dimension music brought to picture.

I moved on to London Records, where I met Randy Poster, who at the time was music-supervising *Velvet Goldmine*. Even though

come in from script phase to when it's released, it's a year. It's a different tempo. You develop a dialogue in a film too, but with a television show you have more time to explore it.

Once you're commissioned for a project, what's your first step?

I usually read the script before speaking to the director about what he has in mind. I let it wash over me and make notes about what I'm hearing as it evolves in my head. Then I meet with the director and flesh out tone or ideas I was getting from the words on the page and the director will bring his or her point of view to it, and then the collaboration starts. Sometimes there are things that have been scripted and sometimes there aren't. Or sometimes there are things scripted that the director would like other ideas on, and the dialogue starts.



"Lost was on a need-to-know basis. I did not get any information other than, "We need a 1950s song from London," or "We need an Asian hip hop song."

music for film, including the Michelle Obama favorite *The Inevitable Defeat of Mister & Pete*, and commercials, such as the Verizon spots featuring the talents of Philip Glass. She likes to do it all.

How did you get started in music supervision?

I went to film school and of all aspects of filmmaking, I enjoyed editing the most and was moved by how much the music can influence the picture. I was watching MTV's *Amp*, saw the credits, called MTV and got to the producer of the show, Todd Mueller. He gave me an internship, and when I graduated, he gave me a job picking music for the interstitial segments. At the time I didn't know there was a career called

my job wasn't to assist him, I did when I could. When the label closed, I started music-supervising commercials at advertising agency Ogilvy and Mather. [Poster] asked if I wanted to start a company with him. I did that for seven years, and now I'm music-supervising for myself.

What are the main differences between music supervision for a television show and for a film?

TV shows are fun because the pace is swift and they're episodic. Once you get in a groove and establish a tone, over the course of a season you can get a great dialogue going. Films, the whole story is told in an hour-and-a-half and that's your palette and you can't vary from that. If you

You work with composers to create original scores. Do you prefer that to licensing?

I like it all. My career is different than a lot of other music supervisors because I work with commercials, film, and television. If I'm strictly searching for songs on one project but then on another project I'm helping make music with a composer, there's a balance and a bit of everything, which keeps me motivated, inspired, fresh, and full of ideas.

How do you convey what you're looking for to a composer?

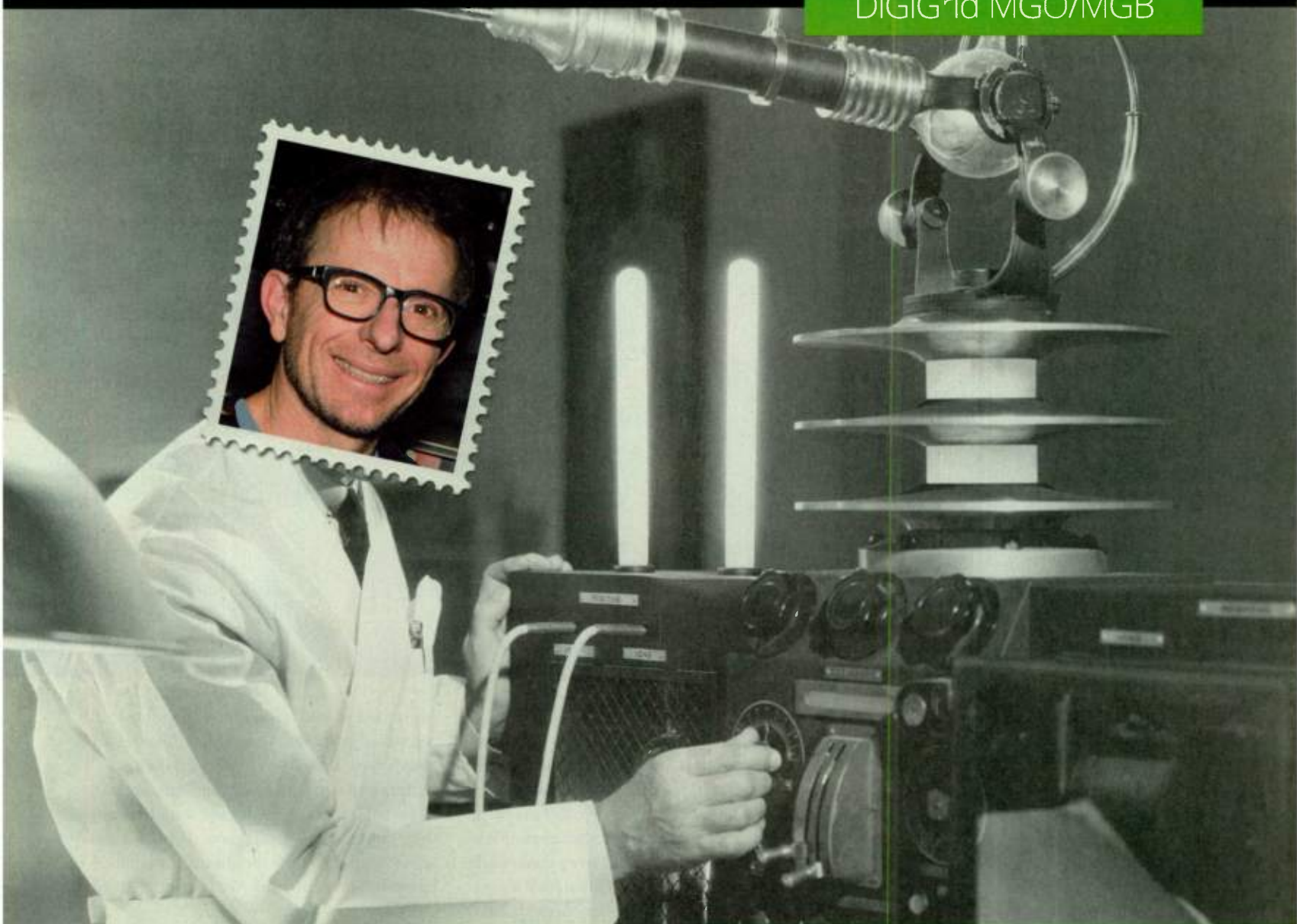
I have no formal musical training. I took piano lessons when I was already doing this because I thought maybe I should know how to play piano. I stopped because the instinctual side



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of what I bring to a project is what I've got to work with. If I get to a point where I'm a musician also, I may not be able to be that translator who can go between a musician and a studio.

What do you look to bring to the visual?

So much of the emotional texture and inner story is offered through the music and the editing. The main thing is to bring out the story. I take the cue from the directors and the producers in terms of what they want to convey, and I try to bring the musical component that is going to do that. It's a lot of trial and error and discussion. Generally it's fun and successful if the directors/producers have a point of view.

Since the music for *Smash* was written into the script, did that make your job different?

That show was unusual because there was such a volume of music. For instance, there's a string quartet that needs music and no one's thinking about that, so [Roth] and [Villanueva] would say, "Here's five songs they can do for that," then we would pick from that. There's the music that you're acutely aware of because it has a song and dance with it, then there's all the background source music that no one thinks about and there's no money left in the budget to pay for.

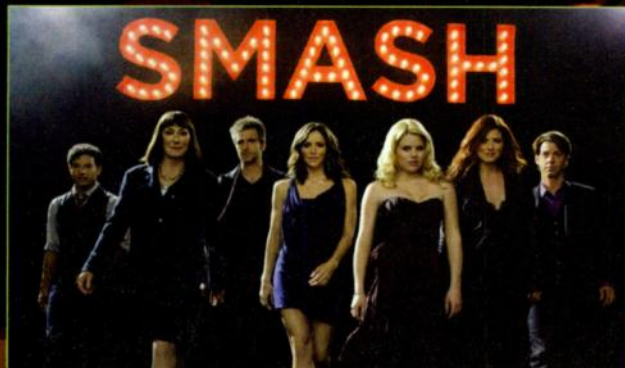
You music-supervised one season of *Lost*.

That was on a need-to-know basis. I did not get a script. I did not get any information other than, "We need a 1950s song from London," or "We need an Asian hip hop song." It was unique. It wasn't easier or harder, but I've never worked like that before and I haven't worked like that since.

Third-party licensing companies and agents who represent music are very important. They have a curated roster that's presented to me with the understanding of the needs of film and television. I don't listen to everything I'm sent. If you're sending me something one-off, it'll get cataloged but it'll get lost, especially if it's not from a referral and there is no personal connection to it.

There are many composers and musicians I have personal contact with who are huge resources to me. I remember one composer sent me his website, it was super organized, and I needed someone, so I gave him a call. We ended up working really well together. If I like something, I cold-call myself so it's always good to have contact information and be easy to find.

What should musicians have ready if you decide you do want to license their work?



"On *Smash* [my job involved] being on set to supervise the on-camera music, and being in the studio to supervise all the recordings—specifically for the hit list storyline."

You worked on *Smash*, which was a musical show. How was that experience?

I worked with two supervisors in Los Angeles, Jennifer Roth and Jojo Villanueva, on that. *Smash* was shot in New York and my job on that was music performance manager. *Smash* was particularly intensive because there was so much music that had to be written and recorded for every show, but then they also had to learn choreography for every show, so [my job involved] being on set to supervise the on-camera music, being in the studio to supervise all the recordings—specifically for the hit list storyline. They would be going from recording session to dance lesson to set. Recording sessions were happening at the end of a long shoot day. It was like a 24-hour job, but it was so fun.

Have there been instances where you felt strongly about one of your choices but the director or producer wasn't on the same page, and were you able to change their minds?

There have been times when I've lost the battle and times where I've won. I've gotten people to see the validity of the cue and wrap their heads around it and to take what to them feels like a leap of faith. And then there have been times when this cue is killing me, I can't stand it, we need to change it, and they're like, no, we love it. Ultimately, I believe it's a director's medium, and when I start pushing it's because I sincerely believe that I'm onto something that is going to help their vision come to fruition.

How can a musician get his or her music to your attention?

Musicians should always have their music registered with ASCAP and BMI. They should always have their deals done with their co-writers and with their label and they should know what that deal is. If they want to license their music, they should know a little bit about how it works, so they should read Donald Passman's book [*All You Need to Know About the Music Business*].

Key words of advice?

As with anything, anybody who has great mentors along the way, that's a real gift and a blessing. Relying on relationships and friendships has proven me well—and that's the hardest thing to find. ■

Lily Moayeri is based in Los Angeles.



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Pop Culture

Seven techniques pros use to tame vocal plosives

BY MICHAEL COOPER

PLOSIVES—THOSE nasty *b* and *p* consonants that explode out of the mouth with a burst of wind—can mar a vocal track by causing a mic to produce low-frequency thumps and pops. At best, these boomy artifacts distract the listener from a song's vibe and eat up your mix's headroom. At worst, they can damage your subwoofer with repeated occurrence.

In this article, I'll detail methods used to break the wind. The best strategy is to prevent vocal pops in the first place.



Use a Nylon Pop Filter The foam wind screen that is supplied with most condenser microphones will tame plosives, but not without also severely dulling high frequencies. A nylon pop filter is a much better tool for the job, as it will subdue plosives while

fully preserving detail, air, and nuance in the performance. For the greatest protection from pops, place the filter close to the singer's mouth and several inches from her microphone.

Change the Mic's Height If you don't have a pop filter at your disposal, or it's not getting the job done, raise or lower your mic on its stand a couple inches so that the singer's mouth isn't blasting directly at the mic's diaphragm. Just be aware that raising the mic will result in a more nasal sound, while lowering it will emphasize the singer's chest register. So if, for example, the singer sounds thin to begin with, lowering the mic will lend better balance to his or her tone than raising the mic would.

Avoid Using a Small-Diaphragm Condenser Large-diaphragm condensers and moving-coil dynamic mics are less sensitive

to plosives than small-diaphragm condensers (SDCs). If you must use an SDC to record vocals (or want to for creative purposes), place the mic a considerable distance from the singer or point it at the ceiling and have the vocalist sing over the top of the head capsule. The takeaway is to avoid having the singer puffing on-axis and at close range to the tiny, lightweight mic diaphragm, or it will surely pop.

Select a Less Directional Polar Pattern

Setting a multipattern condenser to omni mode will make it the least vulnerable to vocal plosives. As you progressively advance the polar pattern through cardioid, hypercardioid and bidirectional modes, the mic's sensitivity to plosives will increase. As long as you don't need the off-axis rejection and bass-proximity effect that the more directional patterns inherently lend, opening up the mic's polar

fade will usually do the trick. Adjust the length of the fade so that the consonant is still audible and intelligible, but keep the fade long enough so that the thumping bottom end is quelled.

Use a Filter Where a vocal track is infested with many pops, you may not have the time to fashion a fade for each instance and still meet your client's deadline or budget. The solution is to slap a highpass filter (HPF) on the track.

The FabFilter Pro-Q equalizer plug-in does a great job for this application (see Figure 2). Adjust the filter's slope so that it's very steep: 48 dB/octave. Fine-tune the filter's corner frequency to find the best compromise between attenuating the vocal pops and preserving the singer's bottom end. Unless the track is for a bass or baritone singer with a signature bottom end you must

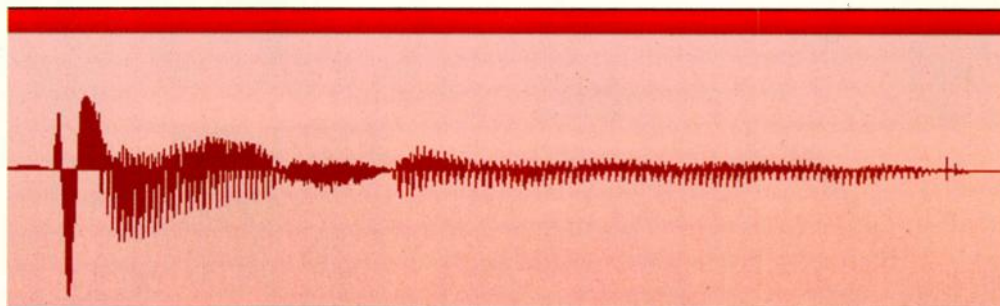


Fig. 1A. The waveform for a vocal track clearly shows a plosive at the start.

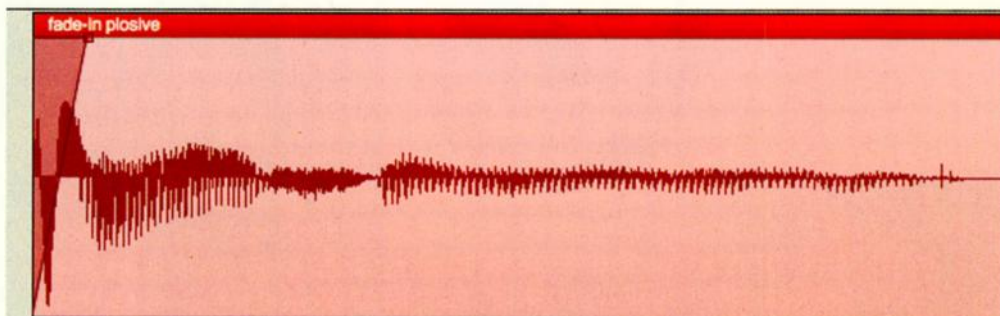


Fig. 1B. A tiny slice of audio is cut immediately before the plosive's onset to create a new region. A fade is then created at the start of the region to attenuate the plosive.

response (toward omni) is a good strategy for reducing vocal pops and thumps.

Up until this point, we've looked at ways to avoid recording vocal pops in the first place. If your track is already polluted with unruly plosives, there are a few ways you can subdue them in the mix.

Fade In The most reliable and transparent way to suppress a vocal pop is to use your DAW's fade tool to fade in the attack portion of the plosive (see Figures 1A and 1B). A linear



Fig. 2. An HPF is fashioned in FabFilter Pro-Q to suppress vocal pops.

Fig. 3. The Waves C4 plug-in is used to dynamically diminish the effect of vocal pops without thinning the overall timbre of the track.



fully preserve, you can usually begin rolling off bass frequencies below 100 Hz without making the vocal sound thin. Because the filter's action will extend higher than the corner frequency, you'll want to set the latter to roughly 70 Hz to produce the desired response.

Compress the Bottom End If an HPF thins the vocal track too much, try compressing the plosives using a multiband compressor. Be aware that most plug-ins won't do the job without throwing the baby out with the bath water. The Waves C4 Multiband Parametric Processor is the rare exception and the most capable plug-in I've used for this purpose (see Figure 3).

Switch C4 to Electro behavior and hard-knee response. Set the bass band's crossover to around 110 Hz, and bypass the other (higher) bands. Plunge the bass band's range control to -24.0, and dial in super-fast attack and release

times. Adjust the band's threshold so that C4 attenuates plosives but doesn't compress where they don't occur. You may not be able to make the low-end thumps completely inaudible, but they'll sound a lot less noticeable after C4 is through with them. ■

Michael Cooper is a recording, mix, mastering and post-production engineer, a contributing editor for Mix magazine and the owner of Michael Cooper Recording (www.myspace.com/michaelcooperrecording) in Sisters, Ore.

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Toontrack EZdrummer 2

Configure track outputs for external processing

BY GINO ROBAIR

OBJECTIVE

Send each track in the Mixer to its own output channels in your DAW or audio interface for additional processing.

BACKGROUND

In addition to having the ability to solo, mute, and adjust the panning for every instrument and effects track in the Mixer, EZdrummer 2 provides 16 stereo outputs that can be assigned to as many as 32 DAW tracks (or outputs on your audio interface in standalone mode) as discrete pairs of channels. Here's how you make those assignments.

TIPS

■ Step 4: When you select a new drum kit from any sound library in Multitrack mode, the new instruments will be automatically configured to discrete output pairs.



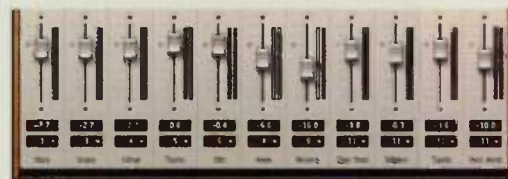
Step 1 From EZdrummer 2's main window, select the Mixer tab in the upper bar.



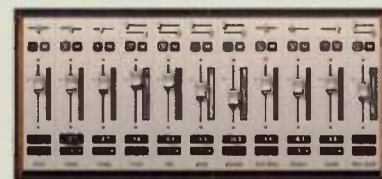
Step 2 Locate the orange windows sitting directly below each fader and output-level window. The orange number indicates the stereo output channels selected for that track. Output 1 means the audio from that track is being sent to channels 1 and 2 of your sequencer or audio interface (typically, the main stereo outputs).



Step 3 Click on the orange number to reveal a pull-down menu where you will see each of the numbered stereo-output channels, 1 through 16. At the bottom of the list it says Stereo and Multichannel. If you want all of your tracks sent to the main stereo outputs of your interface, select the Stereo option on any track. This will automatically switch all of the tracks to output 1 and all channels will now go to the main stereo output bus.



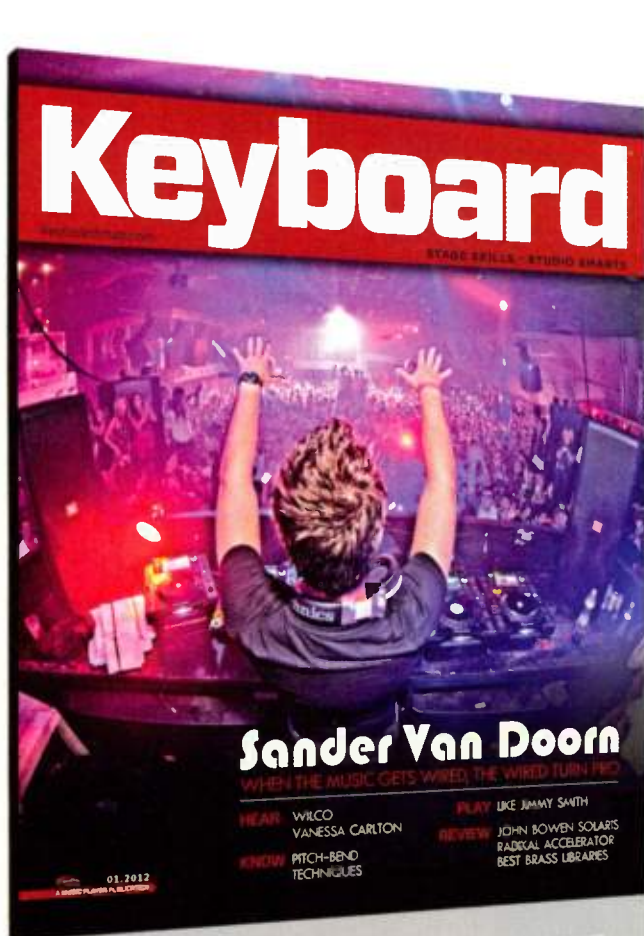
Step 4 If you select Multichannel from the pull-down menu, the tracks will automatically configure to appropriate outputs. (The change may take a few seconds to happen.) For example, Output 2 in the Mixer sends the audio from that track to channels 3 and 4 of your audio interface, Output 3 to channels 5 and 6 of your interface, and so on. Alter this default layout by manually changing the outputs for each instrument as needed. Notice that your mono *and* stereo tracks are assigned to stereo output pairs and that panning controls are provided in each track.



Step 5 Sometimes only one or two instruments need a discrete output: Beginning in Stereo mode, you can assign individual instruments to separate outputs as required for external processing, while the rest of the kit pieces go to Output 1. In this case, the kick and snare are going to their own sequencer tracks so they can be processed using DAW plug-ins.

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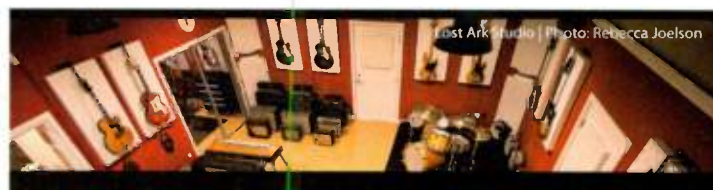
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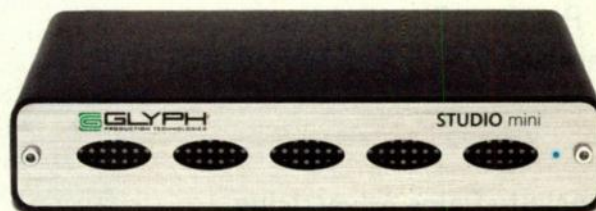
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The Five Styles of Music Technology Journalism

Is music journalism an oxymoron? You'll know the answer after reading about these five popular (and I use the term loosely) styles of reporting (and I use the term loosely).

BY CRAIG ANDERTON



1

Total cluelessness.

When there's a music-industry event, newspapers send out the "human interest" writers who normally cover hair salon openings, or heartwarming stories about the kitten adopted by a baby alligator, and whose technology IQ goes negative when confronted with a microwave oven control panel. On the plus side, there's *prank potential!* Tell these reporters you've heard Fender and Hartley Peavey are buying Yamaha, and will name the company Fendamartley. They'll print it! All the fact-checkers were fired in the last downsizing.

2

Terminally hip

hipness. Yessiree, this guy is a true insider—so bow down and *grovel*. He's a huge fan of Trent Razor, and gabs with gusto about 128-bit, CD-quality MP3s. His hearing is *so* much more refined than yours that he finds anything recorded at less than 384 kHz to be sonically insulting. Soon he'll install \$56,000 speakers (honest!) so he can be even hipper . . . once he determines whether they'll fit in his rented room in mom's basement.

3

The concert reviewer of doom.

Everything sucked. Really. The concert was as much fun as a vacation at the Department of Motor Vehicles, the drummer had less charisma than a metronome, the sound system was so loud it killed cockroaches, and the venue was even scarier than ending up in a stuck elevator with Justin Bieber. Oh wait . . . sorry . . . my mistake: that was the lead guitarist being interviewed! The *reviewer* actually liked the show.

4

Bloated self-importance.

These are the music *journalistes* whose interview with Tiësto starts off with describing in great detail what Tiësto means to the reviewer, includes lots of references to him and Tiësto being bros ("When I called Tiësto, he said 'Who the hell are you?' Ah Tiësto, old friend . . . always with the jokes!"). And of course, there are probing questions about what Tiësto thinks of the interview. Oops—time's up! So much for Tiësto.

5

Industry exposés and scoops.

These stories often begin with a question: "Did that [insert name of well-known producer] trash his Vegas hotel room?" No one cares if it's made up. Anything you can think up has probably happened anyway in our certifiably insane industry. Other ways of covering your butt include starting every sentence with, "It's been reported that." In fact, it's been reported that Hartley Peavey and Fender are buying Yamaha! See how easy that was? Now just post that all over the web, and you too can be a *music journalist!*

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