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JACK WHITE

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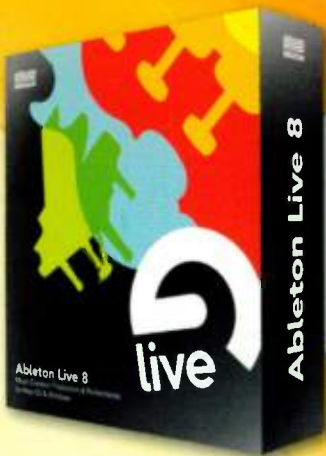
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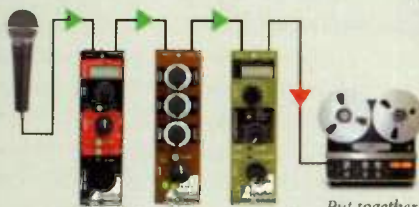
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What Matters Most

A FEW weeks ago, I was chatting with my friend Vance Powell, who had just finished recording Jack White's new solo project, *Blunderbuss*. Vance shared some pretty cool stories about live tracking, analog machines, and killer Nashville musicians. And then he told me something that blew me away: White took the mixes to Bob Ludwig and asked him to master *without dynamics processing*.

In this era of loudness wars and "competitive" mixing, it's a bold move to forego compression. But people like Jack White are leading a movement that shifts the focus from "what does this sound like on the radio?" to "what does this sound like to the person who wants to hear my music?" They're inviting the listener to embrace the dynamics, the detail, the subtle nuances of the song. It's cultivating a long-term relationship in which the music becomes more revealing with each listen, rather than more fatiguing.

This isn't a wholesale endorsement of any particular recording method. It's just a reminder that production should never be a barrier to the song. And this concept doesn't have to be at odds with commercial goals—*Blunderbuss* debuted at Number One.

We'll likely never go back to the days when fans rushed out to buy a record the day it came out, invited their friends over, sat together in front of the stereo, and just *listened*. But projects like *Blunderbuss* are a move in the right direction.

SARAH JONES
EDITOR
sjones@musicplayer.com

COMMUNITY

> "THE FIRST BEATLES ALBUM IN AMERICA CAME OUT IN 1964 AT $4.98 LIST. IN TODAY'S DOLLARS, THAT WOULD BE $35 FOR A 28-MINUTE, MONOPHONIC 8-SONG ALBUM."

Tommy Boy Records founder Tom Silverman, in *Digital Music News*, June 7, 2012

The *Electronic Musician* Poll

DO YOU USE "LOW-FI" TECHNIQUES, (BIT REDUCTION, INTENTIONAL ALIASING, SATURATION) IN YOUR RECORDINGS?

NO, I ALWAYS STRIVE FOR GREAT SOUND QUALITY **26%**

I AM INTRIGUED BY THE CONCEPT, BUT HAVE NOT TRIED IT **10%**

SOMETIMES **32%**

I AM TOTALLY INTO RADICAL AND "LOW-FI" RECORDING **32%**

How do you reference your mixes?

Here's our favorite response. Brian Gier wins a pair of Auralex Phlat Feet. Thanks, Brian!

I kit-built a low-power FM transmitter that I use to reference mixes on a variety of radios in the house. I feed the stereo mix into the transmitter, set some loop points in Digital Performer and walk around the house while checking the sound on my collection of radios. Shower radios, clock radios, car radios (while sitting in the garage), boom boxes, and an old transistor radio help me listen for clarity and mono-compatibility. If it sounds good on my army of devices (in different acoustic environments), it'll sound good everywhere. I am also researching using an iPad as a control surface so I can make mix tweaks on the fly via Wi-Fi. I have used the radio transmitter for about ten years and it yields great results!

BRIAN GIER
VIA EMAIL

Send *Electronic Musician* Your Stories, Win Gear! Talk to us! Share your tips with *Electronic Musician*, and we'll print our favorite in an upcoming issue. And if we choose your letter, you'll win sweet gear! This month, we're giving away a Grace Designs SB-30 30cm stereo microphone placement bar with precision engraved markings for setting width, incidence, and rotational measurements. Contest open to U.S. residents age 18 and over.

THIS MONTH'S QUESTION: **WHAT'S YOUR FAVORITE TECHNIQUE FOR MIKING LIVE ENSEMBLES IN SMALL SPACES?**
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ask!

I WANT TO BRANCH OUT FROM MY TRUSTY STRAT AND GET INTO SOME OF THE NEW HIGH-TECH GUITAR VARIA-TIONS. I'VE HEARD GREAT THINGS ABOUT THE LINE 6 VARIAX, BUT PEOPLE TELL ME ROLAND HAS REALLY GOTTEN THEIR MIDI GUITAR SYNTH THING TOGETHER. HOW IS THE VARIAX FOR SYNTH SOUNDS?

K. G. PETERSEN
SAN DIEGO, CA
VIA EMAIL

Roland
VG-99

It's apples and oranges. A *MIDI/synth guitar* uses a hex pickup to convert each string's audio into control signals that send pitch and dynamics data to MIDI synthesizers (either onboard, or external). Limitations are tracking—the accuracy with which the conversion process follows your playing— and latency, as it takes time to analyze a note before generating a control signal. MIDI guitars let you play instruments like piano, saxophone, etc. from your guitar, although it requires practice to play cleanly enough to get good triggering. Guitar synth latency can be as much as several dozen milliseconds for the lower strings.

The Line 6 Variax is a *modeling guitar*. It also uses a hex pickup, but applies sophisticated signal processing to emulate a variety of classic guitar sounds. There are no tracking issues, as it works on the string signal itself, and latency is not an issue. Unlike MIDI guitar, the Variax can accept any playing style, and handles techniques like hammer-ons or different picking angles. Roland and Fender collaborated on a modeling guitar, the VG-Strat; it's considerably simpler than the Variax, offering five basic sounds (normal and four models) and six alternate tunings.

If your priority is emulating a wide variety of guitar sounds in a self-contained instrument that nails those emulations, the Variax is ideal. For synth sounds, you want either a Roland synth guitar system, or their stellar VG-99—which provides MIDI and/or modeling with any Roland-compatible pickup or guitar.
THE EDITORS

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

NICKI MINAJ
OAKLAND, CA
APRIL 24, 2011

Twenty-six-year-old Onika Maraj, a.k.a.
Nicki Minaj, joined rapper Lil Wayne
last year on his *I Am Still Music* tour,
which also featured performances
from Blink 182 drummer Travis Barker
and the Beastie Boys' Mix Master
Mike. Minaj, who was discovered by
Lil Wayne and is signed to his label,
Young Money Entertainment, worked
the sold-out crowd at Oakland's Oracle
Arena with her whirlwind 10-song set,
a highly theatrical Barbie meets-Cirque
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rapid rhymes, wild choreography, and
even a lap dance for an unsuspecting
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PHOTOGRAPH BY STEVE JENNINGS

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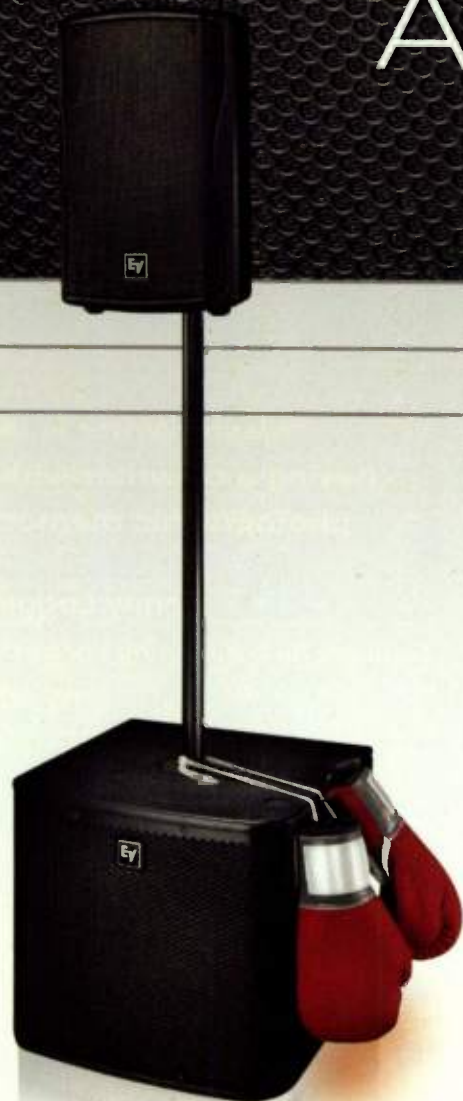
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All photos of Jack White by Jo McCaughey

JACK WHITE

On *Blunderbuss*, his solo debut, the analog purist makes spur-of-the-moment choices and proves that you don't have to buy into the loudness wars to make a Number One record

BY KYLEE SWENSON GORDON

MAKING A gut decision has never been hard for Jack White. "If somebody asked me, 'We're going to record a guitar part in a hotel room: What do you want in the room?' I'd say, 'I want a 15-watt amp with a reverb, that Supro guitar, a ribbon microphone, and a reel-to-reel,'" he reveals. "Somebody else would say, 'Why don't you bring down ten of my Les Pauls, three Stratocasters, a Tele, four of the Silvertones, the Marshall, a Twin Reverb, six other amps, and we'll record 45 guitar tracks. And then I'm going to go on vacation and you engineers pick the best one.'"

While many famous guitar players like to surround themselves with nearly endless options, that's not a process that appeals to White. He's most comfortable making resolute selections made in the blink of an eye. "I make my decisions early on and eliminate right from the get-go so I don't have to make those choices down the road, because that just makes it harder on you," he says.

The youngest of ten siblings, White took on a love for rock, blues, and country and started out as a drummer in local bands in Detroit. The singer and multi-instrumentalist has since paid his dues leading the White Stripes, The Raconteurs, and the Dead Weather, and he's collaborated and/or produced artists ranging from Alicia Keys and Loretta Lynn to Conan O'Brien, Bob Dylan, the Rolling Stones, and even Insane Clown Posse. His latest project is his first solo effort, *Blunderbuss*, which debuted in April and was his first album to hit Number One on the *Billboard 200* chart.

He also heads up a record label and store, Third Man Records, as well as his own studio, Third Man Studio, in Nashville. He loves vinyl, and he likes to produce expensively made novelties such as liquid-filled and triple-decker records. "I want to make those things exist," he says. "I want to put vinyl in kids' hands."

White is also an analog-tape loyalist, nostalgic for the days before the advent of DAWs. "You just didn't have any choices to labor upon back then," he laments. "When people say, 'I like this guy's record, but it's overproduced,' as a producer I think, 'What does that mean, overproduced?' I wouldn't want someone to say that about my music, and I don't even know what that word means. All I can think of as a synonym of that word is 'opportunity.' And that can be a bad thing for some people."

The former chief engineer for Blackbird Studio in Nashville, Vance Powell—who engineered and mixed *Blunderbuss* at Third Man—is a bit more outspoken on the subject of "opportunity."

"To me, the biggest thing destroying modern music is that no one will make a f**king decision," Powell says with a laugh. "'I've gotta have all these tracks and all these playlists of different takes 'cause we might want to change it later.' No! Don't do that. Just say, 'Yes! I boldly go forward with this.' And that's the great thing with Jack is that he makes bold decisions."

To Powell, the lack of commitment in recording these days stems from fear. "That's what putting off those decisions is," he says. "I have this motto, and that is, 'Just because you can do it doesn't mean you should.' Just because you can align and tweak and tune and make a performance perfect, that doesn't mean you should do it. Humans are humans. The world I live in and definitely the world Jack lives in, sometimes the warts are the diamonds, so to speak."

Powell also believes the old tools to be tried and true: "Egyptians built pyramids, and they didn't have any laser saws or huge trucks or anything. And those things are pretty cool. [*Laughs.*] Let's put it this way: We sure haven't built anything cooler that will still be standing in 5,000 years."

Recording in an analog studio, it helps that White is a confident guitar player and musician and doesn't mind losing good takes. "Many times I have actually recorded over something we liked," Powell says. "We're working on a tape machine that works ludicrously slow, and it's just really hard to punch in and out on. Sometimes you get it, sometimes you don't. There have been times when we didn't and I'm like, 'Well, we really liked that part, but now it's gone. I'm sorry.' And he'll just go, 'It's okay. We'll just do it again better.'"

While White goes with his gut, he's also apt to change his mind about things like arrangements. And when that happens in an analog studio, it's nothing like a quick Pro Tools Shuffle. It takes hours. And when he doesn't change his mind, he'll occasionally regret it later. "There's a consequence to making quick decisions," he says. "But it's like any mentor or parent will tell you: Just go with your gut. You're going to be wrong sometimes, but in the end you'll at least know that you went with what you felt was the right thing to do at the time."

In the Live Room *Blunderbuss* was largely tracked live at White's Third Man Studio, with few overdubs. The studio includes two 2-inch 8-track Studer A800 tape machines and a stereo-modified Neve desk originally from a broadcast studio in Johannesburg, South Africa. The Studers run at the superslow rate of 7-1/2 ips. "You get an hour and six minutes on a reel of tape, and it has a dense, effected sound," Powell asserts. "What goes in isn't exactly what

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CHALLENGING STEREOTYPES

On tour for *Blunderbuss*, White brings two bands: one with all-female musicians and one with all-male musicians. "I said, 'What if I had two bands, and neither of them knows if they're going to play that night?'" he explains. "The idea behind the experiment is that it's really shaking things up. It's been a really funny, strange learning experience for everybody in the camp. The novelty of it competing with the reality makes you think. You have people vocalizing stereotypes, like, 'I saw both bands, and I thought the girls were gentler and warmer.' And I'm like, 'Are you crazy? The girls are kicking ass. They're playing twice as loud as the guys last night.' It's funny. Sometimes people's preconceptions overpower what they're seeing and hearing with their eyes and ears."

comes back, but what goes in is enjoyable. It allows you to be able to make a great-sounding rock record that can be played really loud if you want because there's none of that digital harshness. We listened to 15 ips, and we were like, 'Wow, that sounds great.' Then we listened to 7-1/2, and we were like, 'Wow, that sounds really . . . interesting.'"

Although only four of the 13 songs on *Blunderbuss* went to more than eight tracks (maxing out at 14), the track limitations still left plenty of decisions to be made. "You have to make hundreds and hundreds of taste choices all day long while you're working," White says. "If you're recording one song, and you have a few musicians with you and a four-track, you have to decide the tone of the bass, the tightness of the snare drum, how long the decay on the ride cymbal is, what compression you're using on your vocal microphone, and if you're using real reverb compared to digital reverb. You have to make those choices over and over and over again."

At Third Man Records, there's a vault with

tapes of outtakes. There's not an abundance of extra material, though. "If you take a White Stripes album like *Elephant*: There's only one take of every song," White says. "That's it. If it didn't sound good, we just erased it."

In the past few years, White streamlined his decision-making process even more by producing 45s for other artists. "I started this thing called the Blue Series where an artist—say, Tom Jones—would come into the studio in Nashville, and I would ask, 'What do you want to work on?' And he would say, 'I would like to do "Jezebel,"' this Frankie Laine song. I'd be like, 'Okay, what if I got a harp player in here, pedal steel, a drummer, maybe I'll play acoustic guitar?' And I'll start making some calls and see who's in town and available.

"An hour or so later that day, a handful of musicians walked in the door to work on 'Jezebel.' None of those musicians knew they were going to be work on 'Jezebel' or Tom Jones' record that morning. If I told them two weeks ago this is what they were

doing, all these cats would have gone and learned 'Jezebel' off of YouTube, would have come with a preconception of what it would have been, and they wouldn't have brought the urgency or excitement to that scenario."

That sense of urgency played out repeatedly through the course of recording *Blunderbuss*. The album's first single—a quiet, drum-less ballad called "Love Interruption"—was recorded live, in a 20x24-foot room, in one take. The full band recorded it once, but they ended up using the pared-down version with White on vocals and acoustic guitar, singer Ruby Amanfu singing backups, and Brooke Waggoner playing Wurlitzer. Clarinet/bass clarinet player Emily Bowland overdubbed her parts later.

For "I'm Shakin'," a cover of the 1960 hit song written by Rudolph Toombs for Detroit-based R&B singer Little Willie John, White and a few other musicians rehearsed it, and the second run-through ended up on the record. "We had a talkback mic out in the room so that while they were rehearsing, Jack could shout out chord changes or talk to people in the room,"

Powell explains. That setup—an Ampex mic going through a Union Tube & Transistor More line-driver pedal and plugged into an Ampex 672 tube-amp speaker with an SM57 miking the amp—was used for White's vocals. "That amp is buzzing like crazy, but you know what? It doesn't really matter," Powell says with a shrug. "That happened. It was real, and I would never in a million years think of jumping through some hoop to get the buzz out."

White also sings through a Neumann U47 or RCA 77, the signals for which go into the Neve console into a Universal Audio 1176 compressor or Neve 2254 compressor in the desk. "Often I'll put the 77 and the 47 up real close to each other," Powell says. "And if Jack decides he wants to use the 47, we'll just swing the 77 out of the way at 90 degrees, and then I'll use that as a room mic to get the sound of his room into the vocal. So there will be two vocal mics, the mic plugged into the amp, maybe an amp-mic DI, and a mic on the actual amp, and they're all combined to one track to make the collective entire sound. That's called commitment. [*Laughs*.]"

Let It Bleed For White's solo work and the last Dead Weather record (*Sea of Cowards*), Powell sometimes used two tracks for the drums, giving the kick drum its own track to "really punch it to tape," he says. But oftentimes, as with the *Lone Ranger* soundtrack they've been working on, the drums get bounced to one track to leave space for the unknown, such as strings. While Powell uses gobos in front of the drums and bass amp, there's still a lot of sound melding together. "The bleed is what makes the record sound right," Powell says. "That's what glues the whole thing together."

White's drum kit is a '60s-era, four-piece Ludwig kit with a 22-inch kick (no hole). Powell miked the kick drum with a Klemt Echolette ED12 mic (a modified AKG D12). He also placed a Shure SM57 on the top of the snare, SM57 on the bottom, an occasional AEA R92 ribbon mic for the rack and floor toms, and an AEA R88 overhead mic. For compression, Powell used an 1176 for the top snare, an 1176 or Fairchild on the kick, and a Neve 32609 or RCA BA-6A as the final compressor to tape. Bouncing everything to one track, Powell was careful not to make the snare too loud: "You only have so much flux

on the tape, and since it's running at 7-1/2, you've got to be careful that you don't crush the transients," he says.

One challenge Powell had while managing bleed was with the parlor-sounding double pianos on "Hypocritical Kiss." White, drummer Carla Azar, Waggoner, and guitarist Olivia Jean tracked it with White playing electric bass, as upright bass player Bryn Davies was on her way from another session. Waggoner initially played piano on an upright Steinway (miked from behind on the soundboard with a single mono U47 fet). "When we played back the take, I noticed that there were a lot of drums in the piano track," says Powell. "Carla played pretty loud, and Jack has this huge 26-inch ride

> "Jack wanted to have a vinyl record that had no digital processing whatsoever on it. So he wanted to record from the one-inch to another one-inch. I haven't done that in, *wow*, a pretty long time. And of course to make CDs and downloads, I also recorded at high-resolution digital, at 96/24."
> —Bob Ludwig

cymbal that is the loudest ride cymbal on the planet. It's coming through everything. I was like, 'We should really clean this up,' and he said, 'Well, we'll just have Brooke play it.'"

As this was a live take, Waggoner had to contend with an inexact time frame while recording her overdub. "She was having a hard time nailing it exactly, but she ended up playing this cascading part where she's playing an eighth note or a quarter note behind her original track," Powell explains. "Then when we were mixing, I fooled around with having the pianos panned left and right and having the drums in the middle. But when it got to the solo at the end, the piano washed out the drums. So I panned the drums to the right, and the tracking piano with the room and the drums to the left, and then I put Brooke's piano on the right with the drums. When you listen to it, it sounds like one huge piano, but it's really a double track."

Because there were so many commitments made early on, mixing *Blunderbuss* was not a long, arduous process: mainly panning, levels, and a little bit of parallel bus compression via an Acme Opticon. "There's not a single song on this record that took more than four or five hours to mix tops, and that's with us going to lunch in the middle of it," Powell says with a laugh.

Blistering Guitar One of the most powerful guitar parts on the album is the riff on "Sixteen Saltines," which White happened upon by accident. "That's really funny because I was testing a '60s Fender reverb tank to see how long the reverb was lasting for whatever we were going to record that day," he says. "It has a Dwell knob, and I was trying to see where to put it. So I played that riff on my Telecaster because I wanted that riff to stop, and I was like, 'Man, record this riff real quick. I'm starting to like it.'" [*Laughs*.]

Powell miked up a '63 Fender Vibroverb with a Neumann U 67, White played it twice, and Powell panned the tracking guitar to the right and overdub double—played through the More pedal for a clean gain—to the left. "The amp was on the floor, and I put the 67 right on the speaker, right on the outside edge of the cone," Powell elaborates. "That's a single 15-inch driver. That U 67 went to Jack's Neve 1073, and I go in the line input, not the mic pre, because the 67 has enough level that you don't need the mic pre. If I pad the mic, it always

sounds bad, so I'll use it without the pad and just go in the line input."

Guitar solos tend to be blisteringly loud on Jack White's albums. "I will push back on that sometimes with him and be like, 'Do you think it's too loud?'" Powell says. "But he's like, 'It can never be too loud.'" One happy accident really pushed a solo to the extreme: Powell intended to send the guitar signal through the line input for "Take Me with You When You Go"—but didn't. "That's a patching mistake," he admits. "We'd been using this ribbon mic for some fiddle and mandolin, and I wanted to use it on his guitar solo. We'd used a couple of Helios modules as EQ on another tracks, so they were set up to go into the line input, which was perfectly great because I knew the level coming out of this mic would be loud. He was playing that riff, and I patched into the Helios and slowly turned the fader up, and when I did, I realized that it was patched into the mic input. Out on the floor, we have a remote mic pre for the ribbon, so the ribbon was sending a huge, line signal into the mic pre,
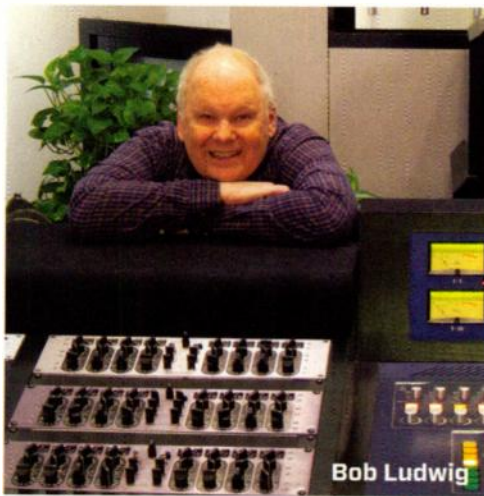
Bob Ludwig

and it was blowing up the Helios module in a most unbelievably fantastic way."

Compressionless Mastering One stipulation White had for mastering engineer Bob Ludwig was that he wouldn't use any dynamics processing in the mastering process. "There was a study from Earl Vickers [sfxmachine.com/docs/loudnesswar] about the 'loudness wars,'" Powell says. "As the loudness war escalated, record sales went down. I'm not saying we're killing the vol-

ume war. But I think it's a very bold move for Jack to say, 'I realize that there are records out there that are going to be louder, but I don't care.'"

Mastering without compression is something that White wanted to do for a while. For years when he asked engineers about it, he didn't get a definitive answer. "I read this book, *Perfecting Sound Forever* [by Greg Milner], and it was very interesting, talking about the loudness wars and the speed wars back then—33 versus 45 [rpm]—and how history has gone through all this bizarreness of trying to get the best-quality sound. So this album came up, and I was like, 'Can we just not change the dynamics of the song? Just make it louder, but don't compress or limit it?' Bob Ludwig was like, 'Of course we can do that.' And I was like, 'Why the hell didn't anyone tell me that you can do that?! I've been asking this question for years!'" So the master came back, and it sounded great. There's nothing squashed or lost in the dynamics, and it still sounded really loud."

Bob Ludwig's tape mastering rig.

While leaving dynamic processing alone, Ludwig did have to do a double session for *Blunderbuss*. "Jack wanted to have a vinyl record that had no digital processing whatsoever on it," he says. "So he wanted to record from the one-inch to another one-inch. I haven't done that in, *wow*, a pretty long time. And of course to make CDs and downloads, I also recorded at high-resolution digital, at 96/24. Mastering in this case was basically just signal path integrity, level rides, and equalization."

Ludwig's studio has two modified Ampex one-inch, 2-track tape machines. "Tim de Paravicini of Esoteric Audio Research [EAR] used to make these beautiful tube electronics that we used on one of the cuts," he explains.

"I'm not saying we're killing the volume war. But I think it's a very bold move for Jack to say, 'I realize that there are records out there that are going to be louder, but I don't care.'"
—Vance Powell

"Our machine has different sets of playback electronics: his tube and then Mike Spitz's Aria Electronics with the solid-state, Class-A electronics. And then the recording machine

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was an Aria Class-A machine, as well."

For the analog session, Ludwig used Manley Massive Passive, George Massenburg, and SPL EQs. "If it was something that was a clinical thing that needed a cleaning up, I used the Massenburg or SPL," Ludwig says. "And when it was an overall, fat kind of sound, it was the Massive Passive."

For the digital pass, Ludwig used a Pacific Microsonics digital converter and a Merging Technologies Pyramix digital workstation. In order to match the one-inch sound as closely as possible, Ludwig did careful alignment. "When I did the EQ master for the one-inch, I went through five alignment tones—the 1k, 10k, 15k, 100Hz, and 50Hz—to make sure that the playback of it was as accurate as I sent to it."

Ludwig spent some time doing subtle gain rides to push choruses and splicing together edits of different mixes. As the album had to be mastered twice, it also had to be edited twice, so much of his work went to splicing into the one-inch master and then editing again in the digital domain. On "Freedom at 21," Ludwig spliced in
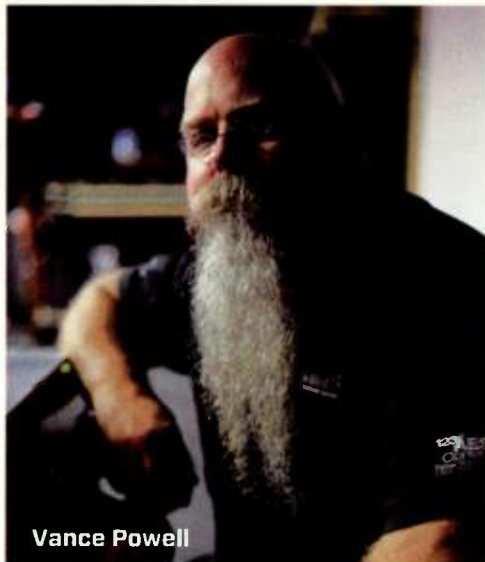
Vance Powell

one of the background vocals from the vocal-down mix for just one second. Another microscopic fix on a song was a popped "P" on the word "Put." "I had to do a separate pass using the Manley Massive Passive with a 122Hz hi-pass filter to get rid of the pop and edit in the 100 millisecond fix into both the one-inch and the digital," he says. And "Hip (Eponymous) Poor Boy" required multiple versions. "Jack went through it with a fine-tooth comb until every mix and

every note was just right," Ludwig reveals.

In the end, White was pleased that he was able to avoid compression overload for *Blunderbuss*. "Nowadays when you're recording," he says, "you put a compression pedal on your guitar going to your amp. The microphone from your amp to the tape has compression on it. Then you compress in a submix to another track. Then you compressed it again with the bus compressor to the final stereo mix. Then the stereo mix goes to mastering and gets compressed yet again. Then the album comes out and gets played to radio and gets compressed *yet* again. Sometimes you're talking about seven or eight compressions of that original signal before someone actually hears it on the radio."

And let's not forget MP3 compression: "Oh God, yeah, totally!" ■

Kylee Swenson Gordon is a writer, editor, and musician based in Oakland, CA. Her first book, Electronic Musician Presents the Recording Secrets Behind 50 Great Albums, *comes out this month.*

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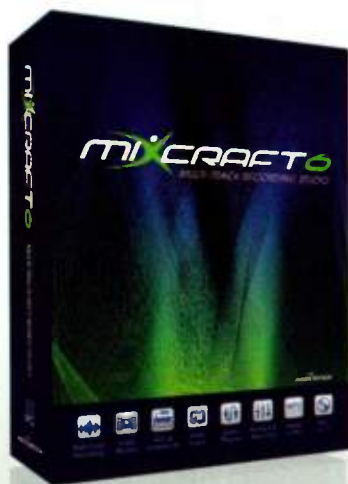
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The *Electronic Musician*

Hall of Fame

Honoring the people and technology that have shaped the way we create music

BY CRAIG ANDERTON, JON CHAPPELL, GINO ROBAIR, LORI KENNEDY, AND SARAH JONES

The world of musical electronics has been graced with giants, and we have benefited from their contributions. For many of them, simply seeing the results of their inspiration has been reward enough—when Bob Moog saw Reason's "patch cords" sway when the program switched views to the back of the "rack," he witnessed his past become the future. And he loved it.

As the beneficiaries of the geniuses in our industry, it's time to give them the recognition they deserve. In this spirit, we have inaugurated

The *Electronic Musician* Hall of Fame to honor those who have given us the tools, the technology, and the music we enjoy today. We've deliberately limited the number of categories so the spotlight can shine that much more brightly on the selected inductees, but we already have plenty of worthy nominations for the future.

We hope you will join us in this yearly tradition to honor a select group of people, as well as the gear and technologies they created, that changed our world. For that, we are thankful and appreciative.

The screenshot shows a Macintosh "Step Editor" application window with menu bar: File Edit Change Windows Layout Goodies. Fields include Tuplet = 3 : 2, Articulation = 100%, Velocity On = 80 Off = 64, 16:1:000, T 7, C 1, K3 PO3/PO9 guitar rhythm. Transport controls: Play, Pause, Step, Record, Count Click, Auto, INT Sync, AO. Current Time 0:00:36:15, Tempo = 92, 15: 1:000.
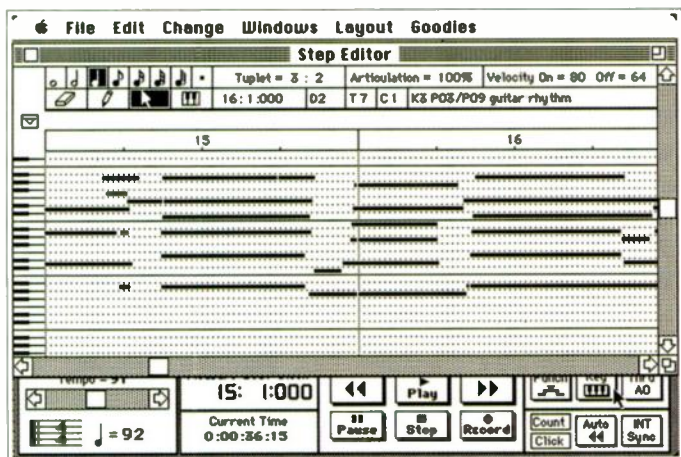
TRAILBLAZING TECHNOLOGY
MIDI

Quick—name some other technology introduced in 1983 that's still with us. Are you running Lotus 1-2-3 and Microsoft Word V1.0 on your IBM PC XT? Or computing on an Apple IIe with a whopping 64K RAM—and undecided about whether to go with Beta or VHS?

Maybe the 5-pin DIN connector isn't MIDI's dominant lifeform any more, but the protocol is still going strong in USB interfaces, ringtones, the controller protocol within your DAW, and much more. Why?

First, rival companies set aside their rivalry for the good of the industry—MIDI represents the opposite of the "not invented here" syndrome. Despite Sequential Circuits' Dave Smith and Roland's Ikutaro Kakehashi being major players in birthing MIDI, giants like Yamaha understood the potential and fully supported the open, royalty-free specification. Second, high-tech companies like E-Mu (which would have preferred to see a more so-phisticated Ethernet-based protocol) nonetheless adopted MIDI because being so inexpensive, it was economically feasible to gamble on including MIDI—even if it failed.

Of course, MIDI did anything but fail. It linked the world of computers with musical instruments, live performance, recording, and even theater, leading to ramifications we still feel today. And let that be a lesson to the rest of the world: cooperation can trump competition. Our industry can be proud not just for adopting MIDI, but crucially, for adopting the philosophy that made it possible.

IMMORTAL INVENTOR
Bob Moog

If you've ever tweaked an ADSR envelope, changed the cutoff on a 24dB/octave lowpass filter, or clamored for the sound of true analog synthesis, you're already familiar with Robert A. Moog, one of electronic music's most influential engineers. However, although his contributions to contemporary music made his name a household word in the '60s, Moog's influence extends far beyond his pioneering work in subtractive analog synthesis.

As a precocious teen, Moog began marketing Theremin kits under his own name, but his deep appreciation for the instrument remained throughout his life: He not only helped rediscover virtuoso Thereminist Clara Rockmore, but decades later, launched a Theremin resurgence when he started making them again under the Big Briar name.

Moog was a curious, restless, no-nonsense person whose wide-ranging interests went well beyond the confines of instrument design—which was not confined to analog circuitry.

Whether with Big Briar, or Moog Music after he regained the legal rights to his name, Bob continued innovating with digital products for companies such as Kurzweil and Bomb Factory, and by designing custom controllers for musicians and composers. After his death in 2005, he left behind a breathtaking amount of ideas and unfinished projects, spanning decades of work that's detailed in his notebooks and prototypes.

The Bob Moog Foundation was created to preserve this work, and honor his youthful inventiveness by providing science education through the use of music via the MoogLab Student Outreach Program.

RECORDING REVOLUTION
Alesis ADAT

In the early '90s, digital tape recording wasn't news. But in 1991, Alesis, known primarily for low-cost MIDI effect modules, blew the minds of recordists everywhere by creating a new multitrack recording paradigm: modular digital multitrack (MDM). Combining several tape transport technologies and software development from Fast Forward Designs, the ADAT was a 3U 8-track digital recorder with eight VU meters, SVHS videotape-based transport, high-quality 16-bit converters, ample I/O, an onboard sample-rate/speed control, and a sleeper feature dubbed Lightpipe, which is still in use today.

Seemingly overnight, recordists went from clunky analog tape-based multitrack machines to something ideal for a home-studio Goldilocks: a form factor that was not too big, not too small, but just right.

Not content to stop with the innovation of recording digitally onto readily available videotape cassettes, Alesis included the LRC remote control to complement the well-designed interface, and created an architecture that allowed synchronizing up to 16 machines for a total of 128 tracks. It was a trip to hear the machines shuffling back and forth to get their sync on, but it worked.

Long after the transports were idled by technological successors, recordists still used ADATs

for their converters and Lightpipe interfacing. And despite Alesis' assumption that ADAT would be a transitional technology, the original model evolved into additional tape-based versions (including one designed in conjunction with Studer) and around a decade later, transitioned to the hard-disk based HD24—which yes, had the same basic form factor.

CUTTING-EDGE MUSICIAN
Trent Reznor

Composer, singer-songwriter, and producer Trent Reznor has been chopping, tweaking, and layering dissonant chords with razor-sharp expertise for over 20 years. Primarily known as founder and leader of Nine Inch Nails, Reznor channeled his self-loathing and vitriol (*Pretty Hate Machine*, 1989; *Broken*, 1992; *The Downward Spiral*, 1994), despair and loss (*The Fragile*, 1999), anger and sobriety (*With Teeth*, 2005), cynicism (*Year Zero*, 2007), and struggle and catharsis (*Ghosts I-IV* and *The Slip*, 2008) to create an evolutionary catalog of music.

In addition to musical evolution, as an artist Reznor adapted to music industry changes by taking the DIY route and creating his own paradigm. Tired of record labels, he started Null Corporation in 2007—shattering traditional distribution models and doing business and art on *his* terms. You can download entire albums (even many multitracks of songs) for free. Fans

can still buy physical CDs, LPs, and special limited-edition versions; favoring fidelity, he offers much of his work in FLAC, CD-quality M4A, and even 24/96 formats.

Reznor and longtime creative partner Atticus Ross ventured into film scoring, melding music and sound design for *The Social Network* (2010) and *The Girl With the Dragon Tattoo* (2011), garnering them a Golden Globe and an Oscar (*SN*), and a Golden Globe nomination (*GWTDT*).

While Reznor has eschewed the cornstarch, eyeliner, drugs, and alcohol, he's held onto the black clothing—only now you can occasionally catch him in a tux while he picks up an award or two for his moody, tension-filled compositions.

BREAKTHROUGH INSTRUMENT
Yamaha DX7

Before 1983, FM synthesis had yet to leave academia and enter the music industry. Then Yamaha incorporated the FM research of Stanford's John Chowning into the DX7, making an FM instrument for the masses. And the masses went nuts.

When early adopters first gathered around a DX7 and stepped through the presets, they couldn't believe their ears: gasp-inducing tubular bells, a carillon choir of eerie metallic verisimilitude (complete with ambience), and an arsenal of digital pianos—not just several variations of ultra-realistic Rhodes sounds, but convincing clavinet and Hammond organ, complete with key click. Anything with a "struck and pluck" quality, like the gorgeous marimba, leaped to life with the DX7's algorithms. As one musician said, "The DX7 was not only lighter and smaller than a Rhodes, but *better*." For several years after its introduction, a keyboardist couldn't even get an audition without owning a DX7. A typical ad read: "Wanted: Keyboardist with DX7 who can play." Those requirements were listed in order of priority.

The DX7 transmitted on only one MIDI channel, was difficult to program, and was

capable of full-range MIDI velocity only if you wielded a sledgehammer. But once you heard those bell, piano, and percussion sounds, all was forgiven. The DX7's superlatively crispy transients and stunning realism just couldn't be matched by subtractive synthesis. FM—and by implication, digital synthesis—became part of the permanent vocabulary of synthesists, sound designers, and musicians everywhere.

MUSICAL METAMORPHOSIS
Les Paul and Mary Ford:
"How High The Moon" (1951)

In 1946, Bing Crosby suggested that Les Paul assemble a collection of gear in his garage—and thus began a series of recordings that has influenced music making for 60 years. His first sound-on-sound experiments involved cutting a second groove into an acetate record, but he eventually settled on recording to one disc lathe, then playing along with the music while recording to a second lathe. Although his 1948 single "Lover" demonstrates his overdubbing prowess (and his mastery of half-speed recording to achieve double-speed, octave-transposed melodies), we've chosen a subsequent release to mark the beginning of modern recording because it exemplifies the DIY aesthetic upon which Electronic Musician was founded.

By 1951, Paul's studio consisted of an Ampex 900 tape recorder, homemade mixer, RCA 44BX ribbon mic, Lansing speaker, and military-surplus headphones—state of the art for the time, with analog tape providing the breakthrough that allowed Paul to maintain audio fidelity despite numerous generations in overdubbing. The mixer helped maximize each overdub's effectiveness, as he recorded his guitar simultaneously with Mary Ford's vocal; Ford sang only a few inches from the mic to increase her voice's intimacy, thus introducing close miking into the engineer's vocabulary.

When the duo cut "How High the Moon," all the pieces were in place. The tight harmonies, bathed in Paul's trademark slapback echo, rocketed the single to Number One for nine weeks in 1951—and ultimately inspired generations of artists and engineers.

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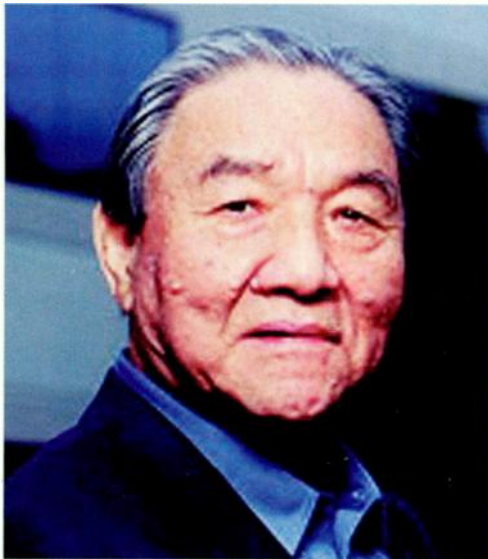
Roland stands tall in full-line electronic music manufacturers, offering deep inventory in amps, keyboards, electronic drums, digital pianos, effects, guitar synths, and even MIDI accordions. Yet many people are surprised to learn that, unlike some other monolithic Japanese electronics companies, Roland is the product of a single boot-strapping visionary: Ikutaro Kakehashi.

Mr. Kakehashi was born in Osaka, Japan, in 1930, and after overcoming a tough childhood, gained entry into competitive chemical engineering school. He instead used his mechanical engineering skills and considerable tinkerer's wherewithal to operate first a clock-and-watch repair business, and later, an appliance-repair shop. During this time, he was plying his innovations in the field of electronic instruments, inventing and repairing electronic organs. In 1972 Kakehashi founded Roland Corporation, where he served as president until 2001. He still serves with the company in a senior advisory role.

Today, Roland stands on the forefront of progressive electronic gear. From now-established lines, like their iconic BOSS effects, V-Studio series and V-Drums, to their more recent forays into the V-Piano and the Capture interfaces, Roland continues to innovate. But to see more evidence of a visionary in action, look no further than the electronic guitar market—where Roland virtually curated the industry by releasing new instruments, modules, and ever-evolving technology for more than

three decades. One can well assume that the far-seeing Ikutaro Kakehashi is standing watch over this, as well as other trends both emerging and established, at Roland.

LIVE SOUND RE-INVENTION
Bose L1 System

The L1's originators, Ken Jacob and Cliff Henricksen, felt something was wrong with the traditional "P.A./monitors/backline" way of amplifying music—it put too much gear on stage, separated musicians from their audience, and was difficult to control in a nuanced way.

After defining what was wrong with existing systems, they set about defining what would be right. They were inspired by multiple factors, but in particular, by the way live performance traditionally involved individual musicians creating sounds from their own spatial locations. In 1995, this concept translated to the breakthrough of a system that deployed an individual system for each instrument or voice—in essence, the amplification system became an extension of the instrument, rather than a separate entity. Furthermore, they decided that the system had to be both portable and cost-effective.

After going through several prototypes, they made another breakthrough—the separate bass box—and the team grew over the years as more people became involved in testing the concept and gear. Before its release in 2003, the final element—ToneMatch, which voiced the system to

various instruments—fell into place.

When the L1 hit the market, the initial wave of "this can't possibly work" skepticism dissipated as more musicians had the chance to hear the benefits of this radical approach. The transportable, line array-plus-bass bin "personal P.A." has now become a standard—but it all traces back to the pioneering work that created the L1.

UNSUNG HERO
Stephan Schmitt

Stephan Schmitt, with Volker Hinz, founded Native Instruments in 1996—before the 1999 introduction of VST instruments. Since then, CEO Daniel Haver and CTO/President Mate Galic have helped guide the company from two to 300 employees, and into the position of being an undisputed leader in both virtual instruments and hardware. Yet this growth was built in large part on the foundation that Schmitt created with Reaktor (née Generator).

Two of Schmitt's early decisions accurately anticipated the future. The first was realizing that native processing would be powerful enough to create sophisticated virtual instruments, which led him to drop doing DSP-based development. The second was creating a modular system (inspired by software's modular nature) that offered vastly more potential than simply emulating a particular synthesizer or pursuing a sample-based route.

Reaktor also became a prototyping environment for NI's instruments and effects, including FM7, Guitar Rig, Pro-52, B4 organ (one of the tipping points that caused keyboard players to ditch their B3 in favor of a laptop!), Massive, various Maschine and Traktor effects, and more. NI also provides a free version of Reaktor that can host new instruments, like Razor.

Schmitt left NI in 2011 to start the company Nonlinear Labs, with the goal of designing more specialized instruments for niche markets. Yet he continues to be involved with NI on various projects, and remains a part of the company he helped found. ∎

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Bassnectar

Finding simplicity in re-imagining, remixing, and remastering music

BY TONY WARE

DJ/PRODUCER Lorin Ashton, better known by his marquee moniker Bassnectar, has spent more than a decade producing independent albums and EPs, such as the recent *Vava Voom*, that juxtapose panicked and blissed-out time signatures, submerging audiences in a sonic bath of dubstep, drum 'n' bass, ragga jungle, glitch-hop, and digital hardcore; basically, anything with a breakbeat and a pulse is structurally valid. Here he takes a moment to discuss the value of ergonomic MIDI controllers and online collaborations, the best way to achieve overdrive without burnout, and how making complex sounds can be a simple process.

Over the past couple of years, the media has trumpeted the emergence of a new rave generation. Where do you see yourself in the contemporary bass-music arena?
You know, I've been at this for a long time . . . I don't follow a lot of rules, and the ends justify the means for me. I'm self-taught in a lot of my musical knowledge, and I'm shamelessly into collaboration. I started to take guitar lessons when I was 12 or 13 and learned [Nirvana's] "Smells Like Teen Spirit," [Metallica's] "Enter Sandman," and [Black Sabbath's] "Iron Man." I stopped taking lessons after that.

I basically learned how to play "Iron Man" and then started playing it backward, and learned how to play different parts of it half as fast, double-time, and then tried to put the

Nirvana riff over it. Everything I've done since has been some kind of mutation or remix of what I hear around me.

I allow myself to be fearless with my choices because sometimes I might choose something that isn't impressive to geeks at all. It might be called dumb, but to me it's just powerful or groovy. Maybe it's just that *F*-note sub, but turned upside down.

What would you say is your typical workflow from concept to completion?
I truly have no format. I tour full-time; I'm probably home no more than a month out of the year. When I *am* at home, I usually have several computers open with several projects . . . going back into ten-year-old Reason programs, scouring through DATs that I recorded in the mid-'90s at University of California, Santa Cruz when I was there for an electronic music minor and working with full-sized E-mu synthesizers, looking for samples for remixes and my DJ sets, going through my record collection to put out an *a cappella* from a song and mess with it, playing with a new glitcherama plug-in someone sent me.

Tell me about the technology that has been key during your musical development.
Honestly, I wish I had immediately followed the advice of my teacher, who said once you find out a good way to make music, you should cancel your subscription to the music

magazines, find what you know and don't ever update anything, just let yourself get creative. I've worked with a lot of different tools over the years. I'm friends with Josh [Hinden] from Twisted Tools . . . I have a good relationship with Native Instruments . . . and I'm sure I could make amazing noises with a lot of new soft synths, but I've got so many noises already. I could never synthesize another song and still have albums of ideas just from the samples I've collected over the years . . . you could take away all the synths and I could have fun making remixes of existing material all my life.

I used Opcode [Systems] Studio Vision, and then moved into Cubase really early on, working with a Kurzweil Synthesizer and a Yamaha mixer. Then I would use the studio up at UCSC for the most insane f**king synthesizers, all patchbay galore. I don't even remember the models, but I would record them to tape and physically cut the tape up myself, then transfer it all that to ADAT. And every record that I would buy, because I was a pretty avid record collector for ten years, I would digitize so I could sample every kick, every snare, every little breakdown, every synth stab . . . collecting sample libraries like baseball cards. Then I switched to ReWiring Reason into Cubase, and that was really the breaking point for me, being able to have everything in one piece of software. That's where I first simplified and felt a lot of liberation by confining myself to that one program. My friends using Logic would always tease me that my stuff was too low-fi, but I just had fun doing it. I loved hitting the tab button all day, looking at the wires shake; it was just inspiring to me, being able to make things quickly manifest.

Dylan [Lane, who records as ill.Gates] was the one that gave me a reason to get into Ableton Live, because he worked with me for about a month to simplify in another way, building a template based on ideas that I had for creating and DJing with clip packs.

Is this before Max for Live and other customizable environments?

They were trying to teach [Cycling '74's] Max to me at UCSC and I was kind of at the point of my university career where I was so sick of being in class and I just wanted to make gangster noises. I really wanted to make psytrance, and my professor wouldn't let us make that kind of music. He wanted us to explore musique concrète and old-school electronic composition. I

appreciate that now; it was the Mister Miyagi technique. Max for Live, though, it was just a reflex for me to avoid it. The nerdier it is, the more options, I just get scared. I just want to really reduce all those options if it's possible. Even DJing, I just worked with Sixty Works Controllers to develop a simple controller for easily busting out customized live remix DJ sets [paired with ill.Gate's modified DeeJayus Ex Machina template for Trigger Finger].

Currently, your primary workstation is Ableton Live and a custom MIDI controller?

The MIDI controller is strictly for live performance . . . and, since I'm not a pianist, I've been mousing in my MIDI notes since Cubase in the '90s. I move really quickly like that. I just need a laptop and headphones, really. I've got so many of my songs and albums into Ableton that I'm able to remix and sample myself a lot, which is a massive time saver. Every year I update the Vengeance Sound kicks and snares I'm using and then use them all, the same ones, for every song. Around 2004, I started calling things "muscle beats," and I would use their stock kicks and snares and hats and create a beat that had all the power of the frequencies I wanted. I'd cover it up with bright, sharp, high-passed tops, a bashing snare, just giving a different personality to the drum sounds but basically using the same sub with Reason and in Ableton, just a massive synth sine wave. That speeds things up immensely.

As your methods have changed how has your relationship with subbass changed?

My relationship with subbass has been transformed by several things. I don't actually think of music competitively, but I really need tracks that can at least stand up to the previous few tracks' drops in a DJ set, so the bass note has to be an E, an F, an $F\sharp$, maybe a G. And I toured with my own sound system, which meant I get to play E notes, because few club systems could really reproduce an E. With this record, I started using D, and went down to C for the Pennywise remix just because the systems that I'm on are finally reliably able to reproduce that kind of signal.

In the past I was more worried about whether I could perform sounds, not so much how they all went together. I would just f**k around, hitting my mouse on the synth to find a note that I liked and just play it. Now I think about what I want to combine melodically into a range if I want it to be a heavy drop track. I'll mirror my sub with a synth pop to make a cohesive bass sound where the sub is isolated just by itself in a pure sine. I'll use 808 subs and boom kick samples when I need an atonal bass line and I'm trying to figure out the tuning of the song and how it can stay thick.

One major thing for me was learning how to use sidechain compression and properly duck my sub out by my kick, and making sure that the kick is sitting on the right frequency for the track to deliver the power that it needs without competing with the sub . . . I remember seeing Datsik, and he used to physically cut out the sub by hand everywhere the kick was. It's funny seeing different people's techniques for trying to get rid of the competition there. Also, duck from the snare . . . do a layered snare

Avery Cunliffe

with kicks and midrange synths and all kinds of stuff that goes away for a perfectly tuned crunch. Having a dive on your [hit] that sits out and allows for the split-second before you drop a heavy, steady *F*-note covered with high-frequency and midrange synths while your beat plays, I don't think you can really get a heavier sound than that.

But the way I work with subbass has also been transformed by mastering. I have a full-time mastering engineer for [personal label] Amorphous Music who was at first brought on just to master all my music. Lately, however, I've been having him remaster my old record collection because even two-year-old tracks couldn't compete anymore. Now that I'm going back I've been able to re-incorporate some real gems from all genres, like Nu Skool breaks is just a goldmine. He'll remaster a track, then I'll highpass it and put in my own sine wave, my own kick, my own big muscle snare, and basically crash hats or something, fill in some high frequencies, and just use the original record as a midrange, almost like a lead. It's

allowed me to revitalize my own record collection and make it contemporary.

At one point, you were doing a lot of your own "remastering" of tracks for your DJ sets, just applying compressors and limiters. What would you consider your indispensable techniques?
If I'm going to drop a track in three hours, I'll use PSP Vintage Warmer or a Waves L2 Ultramaximizer, but I'd always prefer to send it off to my mastering guy. If you have the luxury, I would always recommend that you learn your synths and dial in your samples and all of your techniques, but when it comes time to sit it all at a certain level, send it to a mastering engineer. I mix on Mackie HR824s, first mixing the kick and snares, focusing around 110 to 120Hz and making them as loud as I can stand, then working with the hat, keeping it bright, then putting in the sub before I mix everything else up as quiet as I can keep them. Then I offer it to the mastering engineer with a kind of limited sound mix: kick, sub, snare, and the rest of the track.

The techniques that I would say have been crucial in the last record are more in the earlier stages, when I think about what I'm putting on top of the sine wave in each song. Like, in "Butterfly," there's a churning reese [bass synth sound] and it's the same I used in the [Ellie Goulding] "Lights" remix but there's three of them. On one of them, I'm holding down a slow-motion wobble, and it's got the highpass cut at probably 400Hz, and it's basically like a ghost. You mute the sub and it sounds like this thin, frail synth track. Then there's this thing I call "the dog," because it makes a "woof" sound. It's what would have been a wobble bass in [Native Instruments] Massive but with the resonance turned up so high it's basically just the sound of resonance on the filter. Talk about positive distortion; the sound has been so overly processed by Ableton's compressor that it gives the 200Hz frequency to the "bass line." And then there is a key-tuned saw wave with a little bit of motion; you can do it in the Voicing tab in Massive, where you can control the stereo presence. I love turning on the Pan

Position and f**king with the spectrum fader, going into the Unisono Spread and taking it up. I'll have that be the third component in the top notches on the sub, to give it a prickly little feeling to the ears even though what listeners are probably hearing most is that low-pass, high-pass, midrange chunk and then that woof, which pops through all of the different speakers even when the sub isn't there; it's kind of the "ghost" sub. [Techniques] like that are how I make a strong reinforcement rhythm section. On that track, there's like six drum groups and an insane bass group with so many stacks to get that sound.

But then using that same exact kick, that same exact snare, I can make a song like "What," which is a totally different song, with its own balls-out, laser-y, dubstep drop. The rhythm section is identical to "Butterfly," but what's happening on top is totally different. Something like "Vava Voom," that dubstep drop at the end there is the same exact sine patch, using one of these three kicks, and one of three snares, but then

just masked by a whole different texture on top.

Letting myself dial in the rhythm section and then keep the same rhythm "guitarist" for every song as I play different leads on top of it is what allows my mastering to go so quickly. There's no real mystery; there's always that same perfectly tuned and thick gelled-together rhythm section. And there's a parameter in the compressor in Ableton when you activate the sidechain called the Model FF1, FF2, or FB, and it opens up to FF2 by default. But I think it just sounds better on FF1 when you're doing sidechaining. There's a lot less rubbing, so I use that and a hella-fast attack, a hella-fast release, a pretty aggressive threshold and ratio. I set up two different devices to duck the sub from the kick and a little less from the snare.

What would be your number one pointer for developing a custom sound?
I really advocate simplicity. Pick your five kicks, pick your five snares, pick whatever your subbass signal is gonna be. Pick a couple of atonal dives. Create them in Massive or

pull them out of a sample kit, put 'em in a drum rack, save that drum rack. Save a channel strip. Pick one synth. Then just try to make a couple songs, whether it's Massive, [Tone 2's] Gladiator, [Rob Papen's] Sub-BoomBass, or Albino, just pick one sampler. Pick just one folder of samples. Then box yourself in with one sequencer and just work for a while. You don't need to worry about constantly updating, constantly upgrading, constantly getting the newest, latest thing, because if you do that, it's blindingly possible that you may never get a single song written because you're so busy trying to keep everything updated. That may fly in the face of your magazine, but I believe it to be true. ∎

Tony Ware is a frequent contributor to Electronic Musician.

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White Rabbits
Milk Famous
WHITE IRIS

FROM ONE guitar great riff to the next infectious loop, rockers White Rabbits have talent and ideas that stand up against recent releases from Jack White and the Black Keys. They've paid serious attention to the greatest composing tool there is: drawing something from influences and shaking it up into something truly your own. This band takes sparkly tonic from Radiohead and Depeche Mode-style tight rhythmic creativity and mixes it with their own favorite vodka for a great kick in the imagination. A well-crafted mix highlights hypnotic bass and shiny, gritty vocal tones. CRAIG DALTON

PATTI SMITH
Banga
COLUMBIA

Possibly more than any other album in her long, groundbreaking career, *Banga* captures the many voices of Patti Smith—the spoken-word poet reciting on top of a delicate track, the deep, aggressive rock 'n' roll singer, and all those nuanced gradations in between. The transitions between speaking and singing are almost imperceptible, but these are extremely dynamic, as well as artful, tracks. The pen is mightier than the sword, especially when a great rock 'n' roll band has the writer's back. BARBARA SCHULTZ

Delicate Steve
Positive Force
LUAKA BOP

Guitar is his main instrument—it's what Steve Marion does with it, along with loads of signal-processing gadgets and a hard drive full of circuit-bent drum samples, that makes his strain of instrumental electro-pop so compelling. Instantly memorable melodies emerge from the freaky ether (like singing voices on the funked-up "Afria Talks to You"), and layered chords that at times evoke a slightly off-kilter, almost synthetic take on late-'60s soul ("Two Lovers") or slick Afropop ("Tallest Heights"). BILL MURPHY
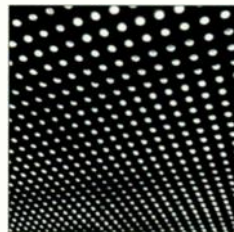
Beach House
Bloom
SUB POP/BELLA UNION

Victoria Legrand and Alex Scally deliver their fourth mid-tempo dream-pop album with drum machines still set to jazz brushes, just now bolstered by stacking kicks and foundational sub-bass. Like 2010's *Teen Dream*, *Bloom* is redolent with reverberant guitar arpeggios, dizzy chords, and appropriately blooming harmonies, but there's greater tonal depth and more sonorous presence to the instrumentation (Legrand on keys, Scally on guitar/bass/keys, augmented by Daniel Franz on live percussion). TONY WARE
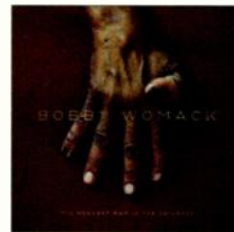
Bobby Womack
The Bravest Man in the Universe
XL RECORDINGS

The only thing richer than the respect Womack commands is that silky, sonorous voice. In his first release since 1994 (produced by Damen Albarn and Richard Russell), Womack nails it cold with a collection that's relevant and reverent—no surprise from an artist who has written numerous hits, but refreshing to experience in such strong form. From deeply personal spoken-word observations to simple, gorgeous arrangements such as "Deep River," a "living legend" finds true meaning here. CRAIG DALTON

Liars
WIXIW
MUTE

Named appropriately with an ambiguous palindrome, the latest album by nomadic trio Liars collects oblique sequencing, treated drums, and field recordings. Compiled on laptops in the woods and finished in studio sessions beneath a Los Angeles freeway, *WIXIW* trades the ominous analog percolation of 2010's *Sisterworld* for isochronous rhythms and digitally effaced wobbles. Edited with input from Mute founder Daniel Miller, Liars' largely electronic recent production is an exercise in building gradually, rather than charging in. TONY WARE

Lorn
Ask the Dust
NINJA TUNE

Marcos Ortega's latest outing smoothes the harsh edges of 2010's *Nothing Else*; the sawtoothed synths and lumbering rhythm of "Ghosst," for example, bear a vague resemblance to dubstep's son-du-jour (Flux Pavilion and Nero especially), but any teeth-clenching mid boosts are dialed way back, favoring space, ambience and texture over onslaught. Don't even try to dance to it; *Ask the Dust* is better suited for scoring your next film noir, and that's a good thing. BILL MURPHY

Roundup

Microphones

We review models in every category, for every application
BY PHIL O'KEEFE

IF YOU'RE into recording, microphones are your window to the world—and everyone enjoys a new view now and then. Like a photographer's lenses, microphones not only capture our "images," but shape and color their characteristics. And just like lenses, you need a good selection to cover every situation.

While some mics may be good for general-purpose use, more specialized models may be a better choice in some circumstances. With variety in mind, and sticking to relatively recent releases (within the past three years), I took a close look at eight microphones in eight different categories. First we'll cover some of the typical characteristics and defining features of that mic category, then have a closer look at the particular model, and close with some other microphones that fall into roughly the same mic category type.

It was a lot of work, but I had a blast, and was very impressed with the field overall. In fact, there isn't a bad mic in the bunch. I'd be happy to have any of them in my mic locker.

Blue Yeti Pro
$249.99 MSRP, $249 street
bluemic.com

They're not just for podcasting: USB mics are also excellent mobile-recording tools—you don't have to haul a mic, mic preamp, and audio interface just to record your band rehearsal. They can also serve as desktop mics and headphone interfaces for VOIP applications.

But are they "pro"? Some look and feel cheap, offer only 44.1/48kHz sample rates, and top out at 16-bit resolution. That's fine for low-res podcasts, but you can do better: Blue's Yeti Pro USB mic offers sample rates up to 192kHz with 24-bit resolution. System requirements are reasonable (USB 2.0 port, 256MB RAM, Windows 7/Vista/XP Home Edition or Professional, or Mac OSX 10.6.4 or later), and both installation and operation are a snap.

The Yeti Pro's build quality and heft inspires confidence. It weighs 1.2 lbs, not counting the 2.2-lb. removable yoke-style desktop stand (included). A standard mic stand mount is built into the mic's base. The Yeti Pro retains the original Yeti's three-14mm-capsule design; capsules can be combined to provide four polar patterns—omni, cardioid, figure-8, and X/Y stereo. Multiple patterns are rare in USB mics, but this feature really contributes to Yeti Pro's versatility. In particular, stereo recording helps separate Yeti Pro from the pack.

In addition to its USB 2.0 out, Yeti has a 5-pin XLR output. A short XLR "Y" cable breaks this into color-coded left and right 3-pin XLR outputs; selecting a mono pattern mults the signal to both outs. (Note that the analog configuration requires phantom power.) There's no pad switch, but the 120dB SPL rating (0.5% THD @ 1kHz) means you can use Yeti as a room mic for your guitar amp or drum kit with little risk of overload. However, it's probably not suitable for close-miking a kick drum.

The overall sound quality is very pleasing—there's a slight peak near 4kHz in most modes, a few dB of rolloff in the highs above 10kHz, and a somewhat steeper rolloff below 200Hz that minimizes boominess with close-miked vocals.

Few USB mics include regular XLR outs, but this option significantly increases the mic's versatility and interfacing possibilities. Instead of being a specialist mic for podcasting duties (note that the digital headphone volume control and mute button on the mic's front, usable only in USB mode, are ideal for podcasting), the Blue Yeti Pro is a real workhorse that you'll find useful in the studio and on your mobile recording adventures. Most importantly, the sound quality is so good that it sets new standards for this type of microphone.

Alternatives: Studio Projects LSM, MXL Trio, sE Electronics USB2200a

Large-Diaphragm Condenser
Neumann TLM 102
$1,020 MSRP, $699.95 street
neumann.com

A good large-diaphragm condenser is often a mic collection's centerpiece, and usually the first choice for lead vocals and other "featured" tracks. They also serve well as general-purpose mics for multiple recording tasks.

The TLM 102 is disguised in a smaller-than-expected package. While this design may mean a lower "wow" factor for impressionable clients, the Neumann name and outstanding overall sound quality will quickly quell any apprehensions. Additionally, the TLM 102's small size opens up other possibilities, especially for placement—it can fit into tight spots (like toms, where the TLM 102 shines) that other mics couldn't accommodate. Due to its relatively light weight. the TLM 102 can swing out over a drum kit without requiring an extra heavy-duty stand, and it sounds fantastic used as a mono overhead or percussion spot mic. The basic appearance resembles the earlier TLM 103, only smaller; it's available in either black or nickel finishes.

The TLM 102, like many other large-diaphragm cardioid condenser mics, is fairly stripped down—no pattern, pad, or bass rolloff switches. As long as your preamp has a pad, you won't miss it on the TLM 102—it handles levels up to 144dB so yes, use it on kick as a second mic to augment your large-diaphragm dynamic. The response won't flinch, even on the loudest of amps or when blasted with a trumpet. Stick it on a snare drum's side; it can handle the level and reward you with a highly authentic representation of the drum.

The frequency response is impressively flat, with a gradual rolloff below 75Hz, and a 4–5dB presence peak centered at 10kHz that extends from about 6kHz to 15kHz. That's higher than the 5–7kHz centered peaks you'll find on several other mics; the result is less stridency in the upper mids, and more sparkle in the "air" region. There's some proximity effect, so close-miking can fatten up the low end on thin-sounding sources. The TLM 102 lacks a highpass filter, so to trim lows, you'll need to rely on your preamp's highpass filter.

The only included accessory is a standard SG 2 stand mount. Because the TLM 102 is somewhat susceptible to stand-borne vibration despite the internal elastic capsule suspension, budget for an EA 4 ($129.95 MAP) or similar shock mount.

The TLM 102's overall sound is remarkably smooth, natural, silky, and sensual—even on fairly reedy voices. Although it lacks some of the upper midrange emphasis of other mics, in return, it offers more body and richness than some of the more "hyped," bright-sounding FET condensers. Aside from being present, crisp, and open without being harsh or strident, it's also a fairly quiet mic with low self-noise. In short, this is one of the best new mics to come from Neumann.

Alternatives: Bock Audio 195, Sennheiser MK4, Audio-Technica AT4047/SV, AKG C-214, Audix SCX25, Microtech Gefell M 930, Mojave Audio MA-201fet

Ribbon
Cloud JRS-34P
$1,499 MSRP, $1,399 street
cloudmicrophones.com

Ribbon mics have surged in popularity. Their ultra-light diaphragms promote excellent transient response, providing a more detailed and natural sound than most small- or large-diaphragm, moving-coil dynamic mics. Coupled with less-accentuated upper-midrange and high frequencies, ribbons yield a detailed yet mellow sound—the perfect foil for digital recording's harsh edges. However, ribbons are the most fragile mic type by far, and their low output levels usually require a high-gain, low-noise preamp.

The Cloud JRS-34P is hand-made in the U.S. from U.S.-sourced components. Designed in collaboration with Stephen Sank, and named in honor of his father, the late Jon R. Sank—an RCA engineer who designed some of their best ribbon mics, including the BK-11A—Stephen used the knowledge and tools his father passed down to him to create a new
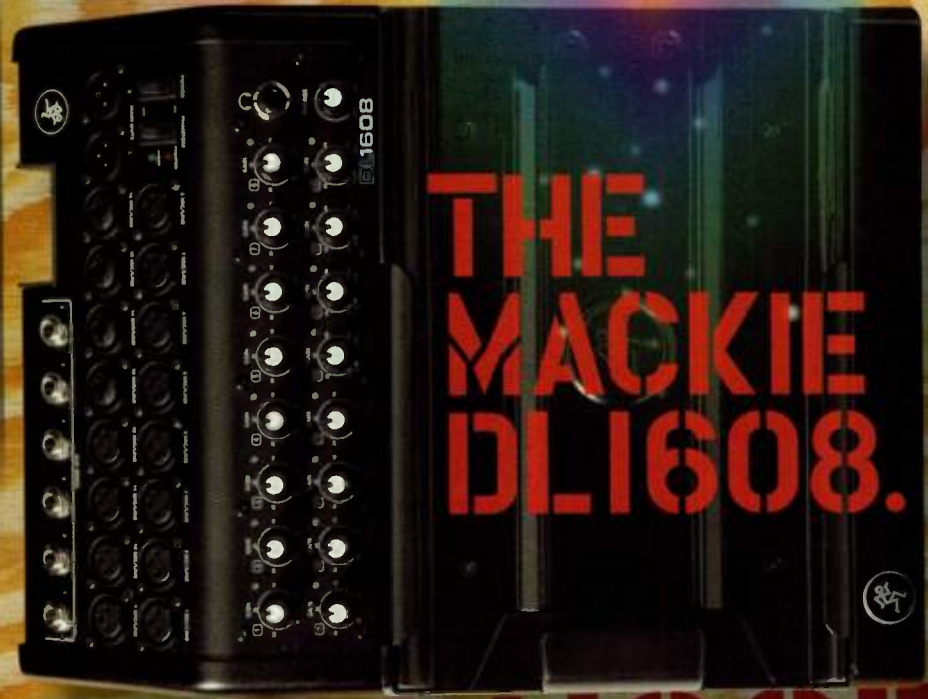
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mic that follows the tradition of classics like the RCA BK-10A and BK-11.

The JRS-34P lacks the onboard Cloud-lifter JFET preamp built into the active JRS-34A model, but other than that omission (and a different body color), is identical. Why passive? The low-output impedance (150 ohms) and passive electronics allow for creative "loading" (thus more potential sonic variety) when paired with mic preamps using different input impedances. (Using a Cloud-lifter Z outboard box, I could get multiple sounds from the JRS-34P without changing preamps.) The Cloudlifter Z's variable impedance is also more versatile than the fixed impedance (3-kilohm) Cloudlifter built into the active JRS-34A, so if you have a variety of mic preamps or a Cloudlifter Z, the less-expensive passive version makes sense.

The ribbon material is pure aluminum, only 1.8 microns thick, and follows the RCA 44 ribbon specs: 2.5" long, 0.19" wide and 13 corrugations per inch using a vintage RCA corrugation tool. The ribbon is tuned to 12Hz. The mic has modern improvements like neodymium magnets and a high-quality Cinemag output transformer. The classic bi-directional polar pattern offers outstanding side rejection of 45dB. This characteristic is advantageous when miking multiple sound sources within the same room, such as a guitar-playing singer. The build quality is first-rate; accessories include a hardwood storage box, drawstring cloth mic cover bag, and allen wrench for tightening the mic's built-in stand mount. I also tested the optional Cloud universal shockmount, which does an excellent job of isolating the mic from stand-borne vibrations (and works great with other medium to large mics).

Although the recorded sound depends largely on your preamp, you'll still hear a world-class ribbon mic: excellent detail and smoothness, great transient response, outstanding off-axis rejection at the sides, abundant proximity effect, and a very pleasant, natural sound quality without any harshness. The highs aren't as extended as a quality condenser, but the detail isn't lost, either. You'll need a good preamp, but the mic's sound will delight you.

Alternatives: Beyer M160, Royer R-121, AEA R84, Audio-Technica AT4080, Blue Woodpecker, Cascade Fathead II, Shure KSM313

Multipattern Condenser
Lewitt LCT 940
$2,099 MSRP, $1,499 street
lewitt-audio.com

Multipattern condenser mics are more versatile than large-diaphragm condenser and fixed-capsule small-diaphragm condenser mics, due to their user-adjustable polar patterns—savvy recordists can exploit variable polar patterns for stereo mic techniques like Mid-Side and Blumlein stereo, and tailor the mic's "null points" to suit particular recording needs. (Good mic technique includes aiming the mic's "dead side" at what you don't want to capture, not just aiming the sensitive side toward the sound source.) Multipattern condensers let you tailor the amount of room ambience captured without altering the mic's physical placement, by dialing up a wider or tighter polar pattern.

The LCT 940, designed by Lewitt CEO Roman Perschon in Vienna, Austria, is manufactured at their own Chinese facility. Don't let that idea put you off—this is an exceptional mic, and the package exudes class; obvious care went into both the design and build quality. Nine polar patterns are selected via a large jog dial on the power supply, with the selected pattern illuminated in white. Patterns include bi-directional, super cardioid, cardioid, wide cardioid, and omnidirectional, along with four intermediate patterns. (With intermediate patterns, neighboring patterns are illuminated in red.)

Additional switches on the power supply select attenuation (–6dB, –2dB, and –18dB pad) and highpass filter (–12dB/octave at 40Hz, and –6dB/octave at 150Hz or 300Hz) settings. While quieter than most mic switches, there's still a slight audible pop when adjusting the settings. (Lewitt says they have since corrected this.) "Locking" the front panel settings prevents unauthorized adjustments, and you can even engage a self-attenuation feature that automatically applies appropriate attenuation if the mic senses clipping. Accessories include a camera-style case, power supply with a generously long 26' 11-pin cable, foam windscreen, and a really nice shockmount.

The LCT 940 provides both tube (12AX7) and FET-based amplifiers and impedance converters, available simultaneously, to bring the capsule's low output up to usable mic levels. This is a very quiet mic—especially by tube mic standards—with cardioid-mode self-noise ratings of 12dBA (tube) and 8dBA (FET). FET mode is similar to Lewitt's LCT 640, and tube mode, the LCT 840. Mics with both tube and solid-state signal paths are extremely rare, and the LCT 940 is the only one I've seen that can blend between a warm, fat tube sound and a clean, clear FET sound in any ratio.

This mic is open-sounding and very detailed, but not hyped or harsh. Even without

the FET/tube signal-path blending, the many different low-frequency rolloff settings and polar patterns provide exceptional sonic adjustability. This is the first Lewitt I've tried, but it won't be the last—I'm very impressed that a single mic can give this degree of versatility, and fit so well with a wide range of sound sources.

Alternatives: Mojave MA-300, Audio-Technica AT4050, Telefunken AR-51, AKG C-414 XLS, Shure KSM44A, Lauten Audio LT-381 Oceanus, Neumann TLM67, Charter Oak SA 538

World Radio History

Large-Diaphragm Dynamic
Electro-Voice RE320
$419 MSRP, $299 street
electrovoice.com

Large-diaphragm dynamic mics may not be as popular as their small-diaphragm cousins, but every well-rounded mic collection needs at least one—they rock for sound sources with high SPL and lots of lows, like kick drums and bass cabinets. They can also work well on guitar amps, sax, and brass (especially bari sax, trombone, and flugelhorn), have been a voiceover/broadcast favorite for decades, and have even supplied the lead vocal tracks for many hit songs. They're less susceptible to vocal overload and sibilance issues than most condenser mics, and their tendency to highlight and accentuate the lows makes them ideal for nasal- or thin-sounding singers.

From the outside, the RE320 looks much like an all-black version of its famous predecessor, Electro-Voice's legendary RE20. Its size is identical, and the weight nearly the same, but significant differences make the RE320 more than just an RE20 with a new paint job.

The RE320 replaces the RE20's highpass filter with a dual-position voicing switch. The flat setting sounds similar to the RE20, but not quite as full below 100Hz, and with a touch more upper-mid detail. This makes vocals cut through

a bit better. The response is relatively flat, but a slight presence peak in the 5kHz–10kHz range helps with articulation. It really helps miked guitar amps cut through a mix, too.

The other switch position has a pre-EQ'ed character tailored specifically for kick drums, with increased lows, a dip in the low mids centered at 380Hz to reduce mud, an enhanced peak at 4kHz for beater attack definition, and a fat, punchy sound overall. It does remarkably well at giving a great kick drum sound with little effort.

Like the RE27N/D (another RE20 descendent), the RE320 uses a neodymium magnet; its output level and sound both sit somewhere between the RE20 and RE27N/D, with the RE320 being hotter, slightly brighter, and more detailed/open than the RE20, but not as much so as the RE27. Compared to the RE20, the RE320 has a bit snappier response on attack transients.

Because it incorporates a humbucking coil, it's very resistant to hum and noise. The "Variable-D" design also means less susceptibility to proximity effect and off-axis coloration—this is a very quiet and forgiving microphone, and a great choice for vocalists who can't stand still.

While the RE20 is manufactured in the U.S., the RE320 is built in Asia, which probably explains its lower price tag. Still, the build quality appears to be up to E/V's usual high standards, and the RE320's sound quality and versatility make it an excellent choice for your first (or second) large-diaphragm dynamic mic.

Alternatives: Shure SM7b, Audix D6, Heil PR40, AKG D112, Sennheiser MD 421-II

Small-Diaphragm Condenser
DPA 2011C
$799 MSRP, $799 street
dpamicrophones.com

Small-diaphragm condenser mics excel for flat frequency response, minimal off-axis coloration, dynamic range, fast transient response, and high-SPL-handling capabilities—with the tradeoff of higher self-noise levels. They require phantom power, and tend to be more fragile than dynamic mics. They're good on practically anything (with the possible exception of ultra-low frequency sounds)—drum overheads, acoustic instruments such as acoustic guitar and mandolin, woodwinds, acoustic

grand and upright pianos, and general stereo applications (particularly A/B spaced pairs for choirs and X/Y stereo instrumental recording).

With a history of exemplary small-diaphragm condenser designs, DPA is considered one of the world's premier microphone brands—their 4011 cardioid condensers are recording studio standards. The new 2000 Ceries bridges the gap between DPA's affordable miniature mics and

their more expensive 4000 Series.

The DPA 2011C consists of two main components—the MMC2011 capsule (two 4060/4066-style miniature diaphragms sharing a common backplate in a single cardioid capsule) and MMP-C preamp/compact body. This helps increase sensitivity, while reducing noise levels. The 2011C is a couple of dB noisier than the

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4011C, but still measures a fairly respectable 20dB (A-weighted). The capsule mounts just under the rear grilles of the short interference tube, keeping the cardioid pattern tight and consistent.

The 2011C's modular design lets you swap capsules (including 4000 Series capsules), bodies, and preamps. The C (compact) body type is similar to DPA's larger A-style preamp, but with a slightly rounder, more "forgiving," and slightly less-transparent tone. DPA's B-style preamp adds high-boost and low-cut filters; the 2011C includes no switches.

The 2011C's frequency response is quite flat, with only a relatively mild, broad 3dB peak centered at 12kHz. The lows are extended, too; at moderate-to-close miking distances, the 2011C has a balanced sound, with plenty of body in the lows to support the detailed highs, and the option to exploit the proximity effect.

Off-axis sound quality greatly influences the way a small diaphragm condenser sounds, especially when used in stereo pairs, and the 2011C is very uniform. This characteristic greatly increases the sense of realism with stereo. The pair of 2011C mics I tested were selected to match within 1.5dB sensitivity, making them ideal for stereo pair usage. DPA also included an accessory kit with one of the nicest stereo bars I've ever used, which features markings for A/B, ORTF, and X/Y stereo configurations to speed setup.

DPA designed this mic in part for live sound, and tailors the off-axis frequency response to increase gain before feedback. For the studio, you might prefer two 2011C mics instead of the pricier 4011; they have a definite sonic resemblance, and the 2011C's dynamic range (117dB typical), self-noise, and maximum SPL before clipping (146dB) are all within a few dB of DPA's higher-end offerings. You get roughly 80 percent of the 4000 Series sound quality at half the price—that's impressive value. If you've wanted DPA quality but couldn't afford it, the DPA2011C is the DPA for the rest of us.

Alternatives: Neumann KM 184, AKG C451B, Røde NT55, Audix F9, Mojave Audio MA-101, Audio-Technica AT4051, Shure KSM141

Stereo
MXL Revelation Stereo
$2,499 MSRP, $1,995 street
mxlmics.com

In the days of analog tape, stereo mics were a specialty mic category—given track limitations, dedicating a pair of tracks was a rare luxury typically reserved for drum overheads or the occasional horn section. However, with computer recording largely eliminating track limitations, we have more opporunities for stereo recording, and more mic options for those situations. Most stereo mics are large- or small-diaphragm condenser types; some are fixed X/Y stereo, while others offer adjustable patterns and even movable capsules. There are even a few stereo ribbon mics.

The unique MXL Revelation Stereo has twin large-diaphragm, center-terminated capsules configured in a fixed 90-degree X/Y stereo arrangement, and twin tube electronics. While its hand-selected Electro-Harmonix EF86 pentode tubes are less common than 12AX7 and 6072 triode tube types, these high-gain, low-noise tubes have a long audio history, appearing in such mics as the vintage Neumann U67. They're an excellent choice.

The Revelation Stereo is well accessorized. The camera-style case holds a two-channel power supply, 15' seven-pin cable, and two 15' Mogami XLR cables. Internal wiring is also Mogami. The power supply has a main power switch, twin XLR outs, and a pushbutton switch that engages a 12dB/octave highpass filter at

125Hz. The mic has a –10dB pad as well. The case lets you store the mic without removing it from the included large, well-engineered shock mount and Y-yoke mount, which simplifies disassembly and storage.

A good stand is a must—at three pounds, this mic is heavy. If you're going to swing it out over a drum kit, use sandbags to counterbalance and secure the stand. I'm less convinced about using stereo on point sources such as single vocalists, but you can easily run just one output and use the mic as a standard cardioid condenser. In this case, rotate it 45 degrees off-center so the capsule in use is on-axis.

The head grille is very open, and uses a single layer of mesh. Stripping out extra mesh layers is a popular trick for mic-modification gurus, but this process makes the mic more susceptible to breath noises and vocal plosives. Here, like with these modded mics, you'll need to use a good pop screen with vocals.

Overall, the sound is agreeably warm and relatively uncolored by any major frequency-response peaks or dips. I really liked it as a room mic and drum-overhead mic, where its balanced sound worked great on the cymbals. The X/Y stereo configuration picks up less room ambience than some other stereo designs, such as M-S and Blumlein stereo configurations. X/Y also has better mono

compatibility than most other stereo configurations, and is probably the best choice for a single-pattern stereo mic.

Alternatives: Avantone CK-40, Røde NT4, MXL V67Q, Audio-Technica AT4050ST, Sontronics Apollo, Violet Flamingo Stereo, Royer SF12, Shure VP88, Audio Engineering Associates (AEA) R88, Telefunken ELA M 270, Manley Gold Reference Stereo

Microphone of choice.

B0 Cardioid Large Diaphragm:
The ultimate big vocal sound

B1 Cardioid Small Diaphragm:
The accuracy plus capsule

B8 Large Diaphragm Cardioid Condenser:
The versatile capsule

B7 Cardioid Large Diaphragm Single Backplate:
The classic vocal sound

The Bottle

Bottle Rocket Stage One

Bottle Rocket Stage Two

B2 Figure of Eight Large Diaphragm:
The vintage capsule

B6 Cardioid Large Diaphragm Dual Backplate:
The Blue standard/ The modern presence vocal sound

B3 Cardioid Mid-sized Diaphragm:
The neutral capsule

B5 Large Diaphragm Pressure Omni:
The presence omni

B4 Small Diaphragm Sphere Pressure Omni:
The big omni

Change is good.

Blue's Interchangeable Capsules Series gives you the ultimate in audio flexibility and range – it's like having nine microphones in one! Featuring the *Bottle* (Blue's premier mic), *Bottle Rocket Stage One* (solid state), and *Bottle Rocket Stage Two* (tube), this trio of recording tools integrate the best of Blue's discrete Class A circuitry with a unique and revolutionary system of interchangeable capsules, *The Bottle Caps*. In seconds you can hot swap between up to nine different capsules, giving you a wide palette of tonal characteristics and pickup patterns that would take a stuffed mic locker to duplicate! Found in many of the world's most respected studios, these mics deliver perfect sound for any recording application.

Visit us on the web and discover our complete line of award-winning microphones for studio, stage or desktop. Whatever your sound, Blue is the right choice!

Blue
Microphones

www.bluemic.com

Small-Diaphragm Dynamic
Telefunken M81
$279 MSRP, $249 street
telefunken-elektroakustik.com

Small-diaphragm dynamic mics are often chosen as a "first microphone" due to their low cost and wide availability; their relatively simple, rugged design also makes them a "workhorse" choice for live use. In the studio, they're a good match with guitar amps, hand drums and percussion, rack toms, snare drums, brass instruments, rotary speaker cabinet horns, and more. While they usually lack a condenser's extended frequency response and snappy attack transients, or a ribbon mic's detailed sound and fast transient response, they're tougher than those mics. If dropped, hit, or subjected to tough environmental conditions, a small-diaphragm dynamic mic has a better chance of survival than more delicate models.

The M81 revises Telefunken's M80 with a more linear frequency response. The M81's high frequencies aren't as "forward" as the M80's, and the low-frequency rolloff seems slightly lessened, giving a more balanced sound. The M81's twin presence peaks, centered between 4–5kHz and 9–10kHz, help with articulation, vocal intelligibility, and bring out the attack of rack toms and the crack of a snare. While not as present as the M80 in a "bright, modern vocal mic" way, it still offers plenty of upper mids and highs for vocals, especially when the M80's extra brightness is a bit much for a particular singer.

The 30Hz–18kHz frequency response is pretty extended by dynamic-mic standards; the top-end response offers a somewhat condenser-like quality, presumably due to the diaphragm's relatively light weight and moving coil. Less mass generally equals better transient response, and the M81 fares better than many other moving-coil dynamic mics. The tight cardioid pattern provides reasonable levels of off-axis coloration and very good gain before feedback, which is appreciated on a loud stage. The M81 also works well when placed close to a sound source, as the well-controlled proximity boost can fill out the sound a bit.

On the outside, the mic replaces the M80's black body and standard chrome grille with a cool flint-gray body and tri-chrome black grille. The body design is exceptionally well-balanced, and the slightly rubberized finish is easy to hang on to, even with sweaty hands. The handling noise is quite low, due to the mic's rubberized finish and internal rubber capsule mounting. Breath noise and pops from plosives are reasonable for this type of mic, and it is noticeably less sibilant than the M80 on hissy singers.

The M81 is a first-rate, general-purpose small-diaphragm dynamic mic that works well in a variety of applications. If you need extra highs to help your voice cut through a mix, the popular M80 is still available—but overall, I find the M81 to be a better mic, or at least a more versatile and balanced-sounding one. Its more neutral character flatters a wider range of sound sources, and it's an excellent choice for both live and studio applications.
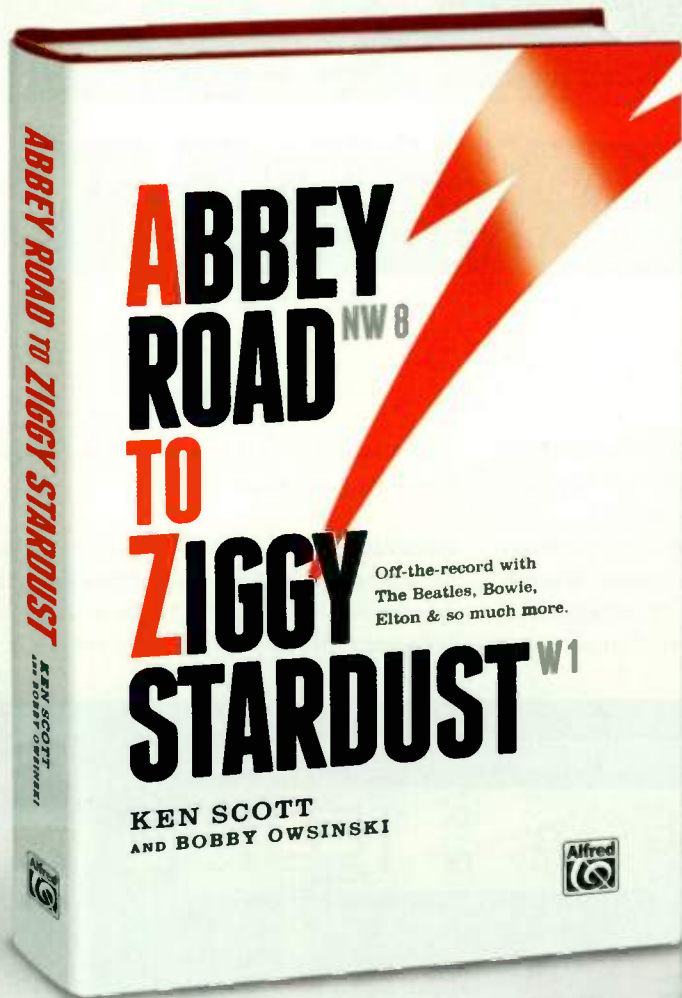
Alternatives: Shure SM57, Audix i5, Sennheiser e609, Heil PR22, AKG D7, Audio-Technica ATM650, Electro-Voice N/D767a ■

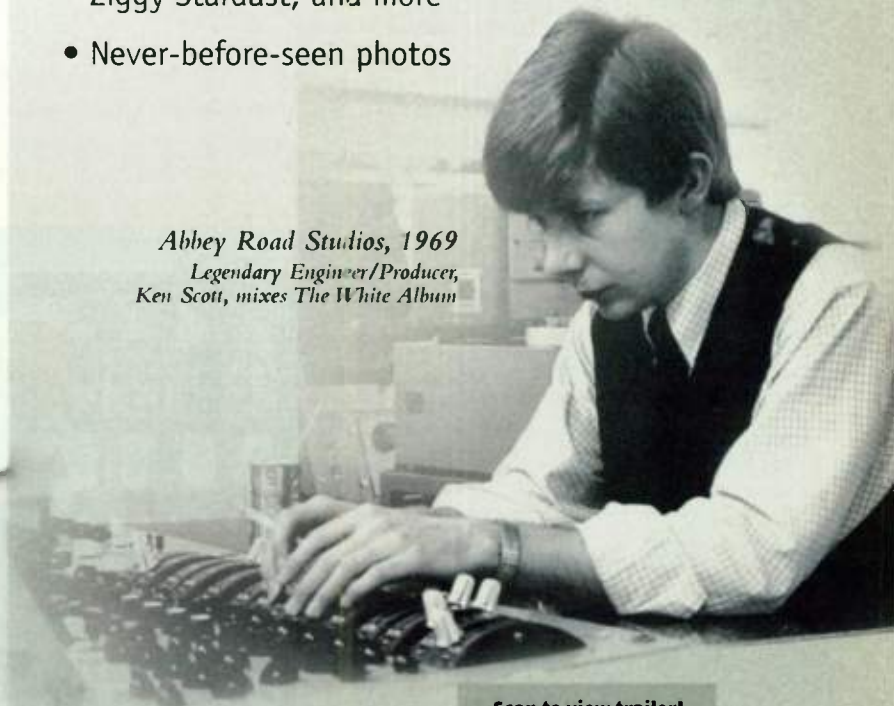*Phil O'Keefe is a regular contributor to Electronic Musician.*

More Online
Learn more about mic types and pickup patterns.
emusician.com/august2012

World Radio History

Universal Audio Apollo

Audio interface with UAD-2 DSP

BY CRAIG ANDERTON

SUMMARY

STRENGTHS: Near-realtime monitoring through UAD-2 processors while recording. Useable as standard UAD-2 plug-ins (VST/ AU/RTAS). 32/64-bit drivers. Sophisticated mixer software. Excellent sound and build quality. Four digitally-controlled mic pres with up to 65dB gain. Upcoming Thunderbolt support. Word clock I/O with termination.

LIMITATIONS: No MIDI ports. Windows drivers not yet available. May require add-on card for full bandwidth with some FW800 Macs. Analog Classics bundle are the only included plug-ins, although there's a $100 voucher for the online store. No master output inserts.

Apollo Quad **$2,999** MSRP, **$2,499** street; Apollo Duo, **$2,499** MSRP, **$1,999** street
uaudio.com

OKAY . . . APOLLO. The Big Deal at Winter NAMM. You *could* review it as an audio interface with a built-in UAD-2 card, which would be sort of like reviewing a car by how it looks, not how it drives. Because the Apollo story isn't as much what it *is*—we've seen audio interfaces and UA's powered-plug-ins before—but what it

does. So we'll cover the basics, but more importantly, the implications.

Overview Apollo has 18 inputs. Eight of these are analog 1/4" TRS line ins; the first four can serve as mic inputs (with XLR ins and digitally-controlled gain up to a ribbon-friendly

Fig. 1. Apollo's mixer goes far beyond the average interface's mixer applet.

Be Moved
Inspiration meets Integration

Get Moving
Connectivity meets Mobility

MOX6–semi-weighted 61-note

MOX8–88-note graded hammer action

⊓ □ X –The Mobile Motif

For the past decade, Motif synthesizers have been the industry standard for both live performance and studio production. Combining Motif technology with new multi-channel USB computer integration technology and bundled VSTs, the MOX 6 and 8 are the most powerful, mobile and affordable Yamaha music workstations ever. They are destined to bring Motif music production to a whole new generation of players and producers.

- 1217 Voices and 355MB of waveforms taken directly from the Motif XS
- 256 Performances with 4 arpeggios that spark your musical inspiration
- Direct Performance Recording to the internal Song and Pattern sequencer
- Extensive keyboard controller features for all major VSTs and DAWS
- Built-in 4-in/2-out USB audio interface with one-cable computer connectivity
- Comprehensive cross platform software bundle including: Yamaha YC-3B organ, Steinberg Prologue Virtual Analog, Cubase AI DAW
- Extremely lightweight for mobility (MOX6–15.4 lbs, MOX8–32.6 lbs)

For detailed information scan
QR code or visit www.4wrd.it/moxem9

⊛YAMAHA

65dB). The mic pres are Burr-Brown PGA2500 chips, which are extremely high quality. The first two ins can also serve as instrument DI inputs, using front-panel 1/4" jacks. ADAT S/MUX optical ins provide eight ADAT channels at 44.1/48/88.2/96kHz, and four channels at 176.4 and 192kHz. The other two ins are stereo coaxial S/PDIF (optical isn't available), which can do automatic sample rate conversion if the source doesn't match Apollo. The outs are eight mono TRS 1/4" line outs, stereo monitor outs, two stereo headphone outs, and S/PDIF out. Apollo includes word clock I/O with termination, but no hardware MIDI connectors.

The front panel's user interface has a single mic channel's buttons (mic/line, lowpass filter, phantom power, pad, polarity flip, and stereo link) and gain control. Pushing the gain knob steps through the four inputs. There are eight 10-step LED meters and a stereo output LED meter (also ten steps); an output monitor control and two headphone level controls round out the front panel.

The global (110/240V, 50/60Hz) power supply is a large "line lump" with an IEC connector (the unit ships with US and Euro cables.) The power supply connector is no flimsy mini-jack, but a macho multipin XLR connector.

With FireWire 800 interfacing, you get excellent bandwidth. The bad news (at least for Windows users) is that Apollo is currently Mac-only, with 32- and 64-bit drivers. Unfortunately many compatible Macs with FW800 ports can deliver only an FW400 port's bandwidth, but if needed, you can install one of the inexpensive, UA-recommended FW800 cards to bring your Mac up to spec. Also, props to UA for recommending *against* particular FW800 cards, and naming names.

Expect Windows support this summer, although you'll need to buy a compatible FW800 card due to variability among Windows computers. Thunderbolt support is also slated for summer.

Surprise: It's a Mixer Most interfaces have mixer applets that let you route inputs to outputs for zero-latency monitoring (which UA more appropriately calls buffer-free monitoring), but Apollo takes this concept much further (Figure 1, page 58) to take advantage of the onboard UAD-2 DSP. (Apollo comes in a Duo or Quad version, with two or four SHARC ADSP-21469 chips respectively.) Each channel has four inserts for UA's effects, and two internal aux buses have four effect inserts. (External aux busing through hardware isn't out of the question—route your signal to a headphone out, then bring the signal processor's output back into two analog ins.) Note that there are no master output insert slots.

The input channels have solo and mute buttons, as well as two aux send controls with input panning. The two headphone outs are treated the same way as buses, but include on/off buttons. You can right-click on a channel fader or panpot, and copy the mix to any headphone or aux send—a real time-saver. Apollo remembers your mixer settings even when not connected to a computer, making it a suitable

digital mixer for keyboard rigs and the like. However, if you power it down then power it back up without a compuer, only the routing and mix is remembered.

UAD-2 Processing Few plug-in lines are as universally liked as UA's Powered Plug-Ins, even by analog audio snobs. But the key here is they serve multiple purposes. They can exist as VST/AU/RTAS plug-ins within your DAW, like a normal UAD-2 card. But if they are inserted into the mixer's channel or bus inserts, you can record with processing while monitoring the processed sound in near-real time—in other words, you don't experience latency caused by monitoring through your computer. You can also send the dry signal to your DAW, but listen to the DSP processing—ideal for vocalists who want to hear compression and limiting in their earphones, but whose effects you don't want to record with the vocal track.

Furthermore, you can do a complex mix within Apollo, and send the mixed output to your DAW. When recording multiple inputs simultaneously across analog and digital inputs, you may need path delay compensation, but this isn't necessary with individual instruments where inter-instrument phase coherency isn't an issue. What's more, you can deploy a combination of UAD-2 plug-ins within your DAW and within the mixer so you can listen to existing tracks, as well as monitor the input you're currently recording into, through UAD-2 processing.

There are also some pretty slick features. For example, for inserts with several plug-ins, you can open all of their GUIs simultaneously as a "channel strip." (However if the height exceeds that of your screen, you can't move it up to see lower plug-ins that may be hidden.) An even slicker feature is the Console Recall plug-in. This inserts like a standard VST/AU/RTAS plug-in, and provides limited control over the console while working within a DAW; and it can also save and load mixer configurations, and store a console's configuration within the DAW.

Apollo is also ideal for those using a laptop in live performance. As the DSP inside Apollo does the "heavy lifting," your laptop doesn't have to work so hard. What's more, the laptop could provide backing tracks or run DJ software, while using Apollo's inputs for mics and instruments with

realtime processing. Ableton Live fans definitely need to know about Apollo.

Is That It? Nope. There are lots of subtle features and options designed to speed workflow (for example, a switch to determine whether insert effects go to your DAW for recording, or are routed purely for monitoring). And you can pick a workflow for the task at hand, like

ignore the mixer applet when mixing—use the plug-ins solely in your DAW, and Apollo as a way to get your DAW output into the real world. In my tests with MOTU's Digital Performer, the flexibility afforded by Apollo became pretty obvious. Couple that with seriously excellent build quality *and* sound quality, and it's no wonder that Apollo has gotten so much attention from the cognoscenti. ■

Focusrite ISA Two

Dual-mono mic preamp

BY CRAIG ANDERTON

SUMMARY

STRENGTHS: Selectable input impedance. Quality input transformers add character and improve the signal-to-noise ratio. Open-sounding preamps. DI for instruments. 80dB gain is enough for ribbon mics.

LIMITATIONS: Nothing significant.

$1,099.99 MSRP
focusrite.com

BACK IN 1985, George Martin commissioned Rupert Neve to create a channel strip—and its ISA 110 mic preamp became the genesis of the ISA Series. The ISA Two continues that tradition with a dual-mono preamp that's intended to provide a quality link between your mics/instruments and recorder.

The Signal Path Audio enters via rear-panel XLR mic or 1/4" TRS line ins. (Both preamps have identical I/O.) Front-panel 1/4" jacks with a 2-Megohm input impedance provide a convenient DI for instruments. Lundahl LL1538 input transformers, which are wound to extend high-frequency response (mic/DI ins are down less than –1dB at 100kHz @ 60dB gain), not only add that bit of inductive "warmth" but also provide 20dB of gain to help boost the signal-to-noise ratio.

The XLR outs are complemented by 1/4" TRS insert send and receive jacks. Signal always feeds the send jack, thus providing a parallel preamp out, while a front-panel insert in/out switch routes the return to the output. A standard IEC cable feeds the internal "global" power supply (100–240V, 50/60Hz); the unit comes with a variety of plugs for different AC power sources.

Controls The two channels have identical controls. One button steps through the three inputs, while another steps through four different mic input impedances. Switchable impedance can change a mic's character, so this isn't just about matching. Regarding gain, a "master" gain range button selects either a 0–30dB or 30–60dB range. A Gain control has four steps that each represent 10dB of change (e.g., –20, –10, 0, or +10dB for the line in and 0–30, 10–40, 20–50, or 30–60dB for the mic

in). An additional trim control can add up to 20dB of additional gain for the mic and line ins, or serve as an input level control for the instrument input.

Buttons for phase (polarity) flip and +48V phantom power, along with a three-pole high-pass filter (16–420Hz, 18dB/octave slope) and accompanying in/out button, round out the controls. Metering is two 8-stage LED meters that can be custom calibrated using two rear-panel trim controls.
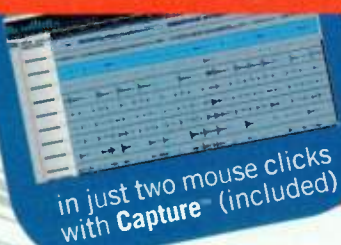
In Use Don't underestimate the value of selectable impedance. Lower impedances tend to emphasize lows, while higher impedances give a brighter sound and a touch more level. This is particularly obvious with dynamic mics, and adds a couple "free mics" to your mic locker. The sound is "open," with that slight warmth from using transformers, and the noise level seemed lower than expected—again, the transformers help here, due to the extra gain. Crosstalk and common-mode rejection specs are also excellent.

Overall, this is an "obvious" preamp. It's easy to use, has all of the expected I/O and controls (and then some), and you can set up your sound in minutes—the lit buttons help you parse settings that much faster. Having one switch and two controls for setting gain may seem excessive, but that configuration makes it easy to dial in the right amount of gain, as well as repeat settings.

Note that the ISA Two doesn't replace the ISA One; instead, it extends the line into a convenient, 1U format for dual-mono preamplification. As more project studios recognize the importance of mic preamps in the signal chain, the ISA Two delivers no-nonsense preamplification at a reasonable price. ∎

Buy a PreSonus StudioLive™ and get the only compact digital mixer that can do all this and more.

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Without a sweet suite of seamlessly integrated software,
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StudioLive different from its competition.

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Live Sound
International
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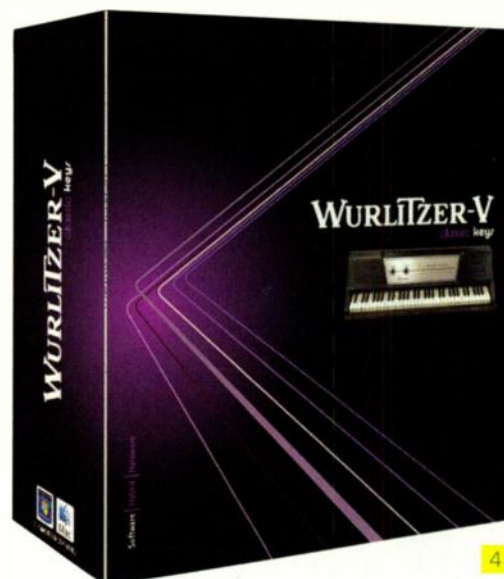
1

Nomad Factory
Magnetic Bundle
Vintage-emulation plug-ins
$149

HIGHLIGHTS Bundle includes
Magnetic II reel-to-reel audio tape
modeling plug-in (with tape/tube
saturation, tape color, vintage EQ,
boost) and Echoes analog echo box
(models Echoplex, Tel-Ray Oilcan
delay, Electro-Harmonix Memory
Man, and Boss DM-2 analog delay)
• both plug-ins are designed to
model "warmth" • VST, AU, RTAS

TARGET MARKET Engineers who
want to impart analog emulation
and warmth to digital recordings

ANALYSIS One of the hottest plug-
in categories is vintage-gear
emulation; by bundling tape and
echo plug-ins, this combination
provides savings compared to
buying them individually.

ilio.com

2

Peavey
IPR 3000
DSP power amp
$799.99/$599.99

HIGHLIGHTS Loudspeaker
management • 1,490W RMS/
channel at 2 ohms • 7.8 lbs. •
onboard DSP lets users set up EQ
curves, delay speakers, crossover,
horn EQ, and more • includes
Waves MaxxBass psychoacoustic
bass processing • includes presets
for various loudspeaker types and
musical genres

TARGET MARKET High-power
sound-reinforcement situations
where light weight and fast setup
are priorities

ANALYSIS Peavey was the first
company to produce digital power
amps for live performance. Their
latest amps build on the original
IPR line with several DSP and
design-related improvements.

peavey.com

3

V-Moda
Faders VIP
Tuned earplugs
$20

HIGHLIGHTS Designed to reduce
hearing loss and prevent
tinnitus • four sizes of medical-
grade, hybrid silicone fittings
for optimal comfort • reduces
noise levels by 12dB across the
frequency spectrum, while still
allowing music and speech to
pass through • detachable cord
and carrying case

TARGET MARKET Musicians/
DJs, concertgoers, tradeshow
attendees

ANALYSIS The Faders VIP, a product
of the Ear Armor division of
V-Moda, are designed to help those
who make their living by using
their ears reduce the possibility of
hearing damage when listening to,
or creating, loud music.

vmoda.com

4

Arturia
Wurlitzer-V
Electric piano plug-in
$129 boxed, download $99

HIGHLIGHTS Physical modeling
engine • standalone, VST 2.4/3,
32/64-bit, RTAS/AU • three
output modes: Studio (virtual
DI box and reverb), Stage (with
guitar amp sim, multiple mic
and speaker options, and spring
reverb), and Rotary (rotary
speaker sim) • in-depth control
parameters such as pickup axis,
impedance, damper position,
hammer hardness, etc.

TARGET MARKET Project studios,
performers who use laptops onstage

ANALYSIS Wurlitzer V ups the
ante with four amp sims, three
modeled mics, and 11 vintage
effects to create the typical
environment in which Wurlitzer
electric pianos were played.

arturia.com

All prices are MSRP except as noted
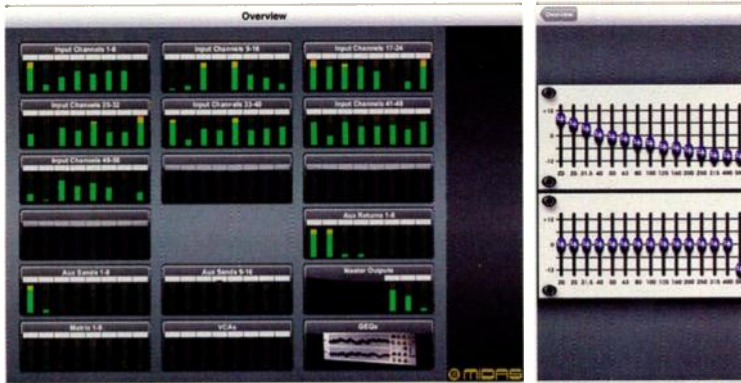
5

MIDAS
Mixtender
iPad app
free

HIGHLIGHTS Provides wireless remote control of the MIDAS PRO Series (PRO2/2C/3/6/9) and XL8 digital mixing systems • access all input faders, all bus contributions and masters, input/output channel mutes, and output GEQ remotely • 64 input /27 output meters viewable at the same time • use multiple iPads simultaneously on a single console

TARGET AUDIENCE Owners of PRO2/PRO2C digital mixing systems

ANALYSIS The plethora of iPad-based remote mixing controllers exist for a reason: They're extremely useful, particularly due to the wireless nature of remote control. Now PRO Series and XL8 owners can take advantage of this convenience.
midasconsoles.com

6

Positive Grid
JamUp Pro
Guitar multieffects app
$19.99

HIGHLIGHTS For iPad, iPhone, iPod Touch iOS 4.2 or later • 17 hybrid amp models, 30 stomp and rack models, sound-on-sound phrase sampler, iTunes jam player • works with the JamUp Plug ($39.95) and other iOS guitar adaptors • up to seven simultaneous amps/effects • chromatic tuner, metronome, and 16 presets • expansion packs and free, "lite" version available

TARGET MARKET Guitar players who use iOS apps

ANALYSIS iOS guitar amp devices are becoming more common. JamUp's main point of differentiation is the phrase sampler's ability to overdub, as well as export recordings.
positivegrid.com

7

Avid
Sibelius First
Notation software
$119.99

HIGHLIGHTS Combines Sibelius Student and Sibelius First into a single music-composition tool • 64-bit technology and support for the latest operating systems • video export functionality • online publishing—direct sharing to YouTube, SoundCloud, and Facebook • enter notes via scanning, transcribing, or MIDI import • MusicXML interchange • premium sound library

TARGET MARKET Students, musicians, composers

ANALYSIS While most DAWs have notation capabilities, a dedicated program almost always gives better results. Sibelius has long been a leader in this field; Sibelius First brings notation/scoring capabilities to a wider audience.
avid.com

8

American DJ
Flat Par Series
Low-profile LED pars
5-LED models $339.95, 12-LED models $599.95

HIGHLIGHTS Two RGBW models: QWH5 (5 x 5-watt RGBW LEDs), QWH12 (12 x 5-watt RGBW LEDs) • two RGBA models: QA5, QA12 (same as QW models but with RGBA LEDs) • power and DMX ins/outs are on the fixture's side for easy uplighting and trussing • 50,000-hour lamps • l34W with 5-LED models, 80W with 12-LED models

TARGET MARKET DJs, clubs, bands with self-contained lighting setups

ANALYSIS As more bands and DJs start to carry lighting, cost and weight become crucial. The 5-LED models weigh only 6 lbs. and the 12-LED models weigh 7 lbs.
americandj.com

The Dap-Kings lay tracks in Daptone Records' House of Soul studios.

roundtable
Miking Musings

Three seasoned pros give us the lowdown on recording acoustic instruments

BY BILL MURPHY

WHILE TODAY'S top recording engineers place a lot of value on vintage and esoteric mics and preamps, most agree they mean little without a good performance. "I've always been against the rules of schooled recording," Mark Howard says, "because performances and communication go such a long way." As Daniel Lanois' lead engineer for more than 20 years, and as a producer in his own right on albums by the likes of Marianne Faithfull, The Tragically Hip, and Victoria Williams, Howard has the cred to buck convention when he wants to. "Whatever mics or gear you have, or whether everything needs to be isolated or not—it's like, hey man, just get it on tape and *then* you can start worrying about that stuff. You can have the perfect isolated guitar, but without that magical take, you're really nowhere."

That said, even those who don't have access to Yo-Yo Ma or Herbie Hancock can still capture the best recordings possible of acoustic instruments. Naturally, it all begins with mics and mic placement. We asked Howard, along

Virtual Miking With Guitar

Most engineers use two mics with guitar to get a good stereo image, but this can lead to phase issues, make setup more challenging, and of course, double the preamp noise.

So try this alternative: Mike the guitar with a single mic, and use "virtual miking" to create the stereo image. This eliminates all phase issues, keeps noise down, and means you can spend your money on one really great mic instead of two "okay" mics.

Position the mic carefully for the most balanced tone, and record into your DAW. Make three copies of the track. Pan one copy left and run it through a lowpass filter so you hear the "boom" of the body. Pan the second copy right and run it through a highpass filter to accent the finger squeaks and fretting/picking. Pan the third track to center, and roll off some lows and highs to compensate for the increased lows and highs in the left and and right channels.

The end result sounds like the guitarist is right in front of you, with the panned channels positioning the guitar in the stereo field. And with no phase issues, the guitar will have a strength and presence that's difficult to achieve with two mics. —*Craig Anderton*

Setting up virtual mics in Cakewalk SONAR X1. Non-relevant sections are grayed out for clarity; the EQ on the right shows the highpass filter.

Sugarman 3 (left to right)—Rudy Albin, Neal Sugarman, and Adam Scone.

Nick Gordon

with the Dap-Kings' Neal Sugarman and producer Bill Laswell's chief engineer Bob Musso, to weigh in on their approaches to getting the most out of live strings, horns, and percussion, and we got some pretty interesting answers.

Hanging on Strings "I tend to use microphones like paints," Howard explains. "If I want a certain tone or color—especially with acoustic guitars, and even pianos—modern or bright microphones can get a bit harsh. A dark microphone usually gives me a smoother result, so I've had a rule of thumb from early on to use ribbon microphones, like old RCA 44s or 77s, or the Coles 4038 from the BBC period. It's basically a creamy, warm sound, like the

acoustic guitars you hear on those old Rolling Stones records with Jimmy Miller [*Beggars Banquet*, *Let It Bleed*]—they don't sound like picks on a fretboard, you know? Modern acoustic guitars can sound almost too sparkly through a brand new Neumann, so for anything bright, I'll use a dark microphone on it."

If you don't have an extra two or three grand to bid on a vintage RCA ribbon mic, there are cheap alternatives available. (The MXL R144, for example, retails at around $100, and does a decent job of smoothing out high end.) Of course, because ribbon mics tend toward low output, it helps to have a decent mic pre—Howard swears by his GP2 BL99s, designed by Bob Lanois—and, if you're on a budget, there

are lots of options. (For example, you can get a Focusrite ISA One, based on Rupert Neve's original design, for less than $500.)

Gear aside, though, Howard's approach to capturing an acoustic guitar, piano, or string section is unique among most engineers, primarily because he doesn't work in a traditional studio. His journeys have taken him to some unusual locales, including an old schoolhouse (for Tom Waits' *Real Gone*), a turn-of-the-century New Orleans mansion (for Bob Dylan's *Oh Mercy*), and Daniel Lanois' own cathedral-like home in Silver Lake (for Neil Young's *Le Noise*). Howard often ends up traveling with his studio, which these days is stripped down to a TASCAM DM3200 digital desk and an iZ Technology (formerly Otari) RADAR 24 hard disk recorder.

"For me, the studio *is* the recording area," he explains, "so usually I'm sitting at the console, and the band is right there next to me. Especially on acoustic instruments, I like to keep everybody in a really tight circle, just relying on each other instead of headphones. The way people make modern records, with everybody isolated in different rooms, you end up losing that communication. The way I do it, you can get a pretty incredible thing that nobody ever really thinks about. That communication goes a long way, as far as tightness in their playing is concerned."

Howard cites Dylan's *Oh Mercy* as an example; at times, there were nearly a dozen people, including several guitarists, elbow-to-elbow in one room, with only a few mics set up. (Howard never sweats about leakage when he's recording.) Two years later, he took a similar approach to pianist and minimalist composer Harold Budd's *By Dawn's Early Light*, with

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a few variations. The result is an album that literally resonates with an acoustic lushness of space—natural reverb in particular.

"That was also in New Orleans," Howard recalls, "in this big room with chandeliers and a fireplace. Harold was playing a 1920s Steinway B grand. He's a very soft player, so I put an RCA 77 right on top of the piano, maybe an inch off the soundboard. There were blankets draped over the whole piano, because we had strings, harp, and B.J. Cole on pedal steel in the same room, with separate ribbon mics on them, too. And again, they were all huddled up in a semicircle, with no headphones, and they just performed it. I mean, it was incredible."

Gimme Some Horns Saxophonist, composer, and Daptone label head Neal Sugarman knows a thing or two about nailing a live performance. Not only does he lead the horn section for one of the tightest touring bands on the planet (Sharon Jones and the Dap-Kings), but he's also a bandleader himself. The Sugarman 3, the trio he founded in the mid-'90s with organist Adam Scone and drummer Rudy Albin, has just released *What the World Needs Now*—the group's first album in ten years and, sonically, a definitive nod to producer David Axelrod's late-'60s Capitol era. A number of guest players, including bassist (and Daptone producer and co-founder) Gabe Roth and trumpeter Dave Guy, help round out the session, which swings hard in the spirit of Daptone's raw and quirky "urban retro soul" sound.

"As musicians, I think we're all getting better at what we do," Sugarman says, "and to make a richer-sounding record, you have to start with the arrangements. And what we talk about sometimes in arranging is real different now than what we used to talk about. For instance, the idea of 'Let's sound dumb, hard, stupid, and energetic,' that was maybe ten years ago. Now it's more about, 'How can we get this record to sound *open*? What *don't* we need, so the music can breathe a lot more?'"

For recording the horns, Sugarman relies on a method that hasn't really changed much since he started working with Roth in the studio more than ten years ago. On Dap-Kings sessions, the three players—tenor sax, trumpet, and baritone sax—will gather around one mic, which is usually a vintage Shure 315 ribbon mic (in mint condition, often less than $300 on eBay).

"When we're recording, it's always about

ART's Voice Channel is just one of many mic preamps that features a variable input impedance control (located to the right of the input jack).

Free Microphones!

Don't you wish you could have some more mics in your mic locker? Choose a mic preamp with variable input impedance, and you can. Dynamic mics in particular sound different when feeding different input impedances, from brighter and louder with higher impedances, to darker and softer with lower impedances. The difference is subtle, but can definitely be significant enough to add a certain "character" you might not have otherwise. —*Craig Anderton*

the blend," Sugarman says, "and of course, that's after we've decided that this is the right arrangement for the song. That's a given. But is there enough trumpet? Is the trumpet being supported properly by the tenor? Is the baritone poking through the right way? We're all on one microphone, so we only have one shot at it. But you also have to trust the guy behind the desk. So when we ask Gabe, 'how's the blend?' he might say, 'Sounds good—trumpet take one step back,' you know?"

Everything at Daptone studios is recorded to tape, and Roth will sometimes hit the horn section with a Tube-Tech PE1C Program Equalizer to fine-tune the high end, but for the most part, the horns are recorded pure, just as they sound in the room. "One thing I will say is when we're picking microphones, we're trying to get a character out of them," Sugarman

clarifies. "Those old ribbon mics can be real temperamental—we might even use an old RCA or one of the Shure 'Elvis' mics [the 55S 'Baby Unidyne'] if the other one gets blown out. Microphones have a lot of personality, and we're conscious of that. You're making a record, and it all has to fit together, whether you want a darker sound or a brighter sound. So there are a lot of variables—everything from what room we decide to cut the horns in to what microphone we're gonna use."

Percussive Thinking Having worked with producer Bill Laswell for more than 20 years, Bob Musso has seen a lot of heavyweight drummers and percussionists walk through the doors at Orange Music Studios in New Jersey. When he's not manning the Neve desk at Orange, Musso also teaches at New York's Institute of Audio Research, so he has his ears wide open to the nuances of recording drum kits and hand drums.

"I've seen engineers mic up drum kits with nothing but U87s, and nothing but SM57s," he says, "which is the difference between a hundred-dollar microphone and a three-thousand-dollar microphone. Honestly, I think anything is possible. From my experience, if I'm recording a good musician, I can put one mic in front of them, and they're gonna sound great. But as far as adjustments go, I'm constantly looking for whether someone has too much of a dynamic range and starts overloading the mic or the preamp. I might put on a pad or back off the mic or just change it. I'm always up for changing if my choice doesn't work for a situation."

Bob Musso.
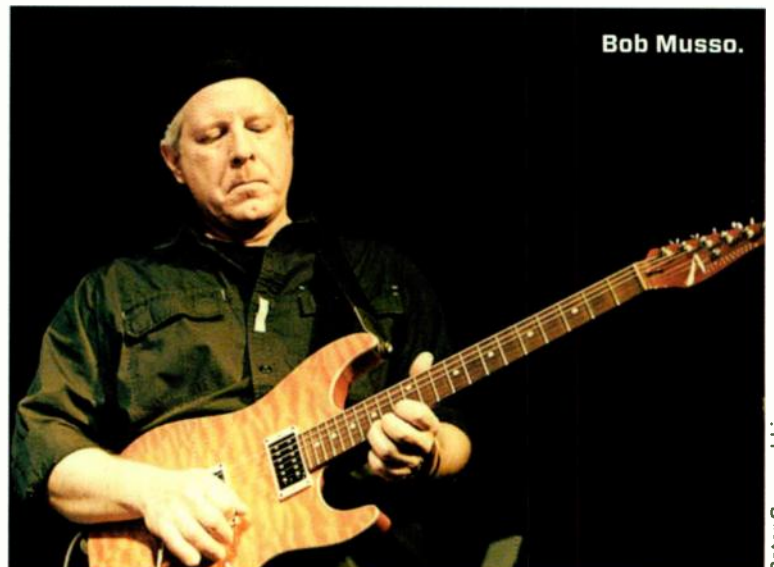
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One of the more versatile mics that Musso relies on is the Sennheiser MD421, which he'll use on the inside of a kick drum, on toms, on congas, and in one special case, on tabla drums. "I don't think there's anybody on the planet who plays harder than Zakir Hussain," he says, citing the tabla maestro known for his work with the '70s fusion group Shakti, as well as with Mickey Hart, Bela Fleck, and Laswell's Tabla Beat Science. "I usually end up using 421s on him because they won't distort. I remember when that mic first came out, it was advertised with a .38 special pistol in front of it, basically to say that it wouldn't distort if you fired a gun from a foot away [laughs]. So whenever I hear anything really loud, I'll use 421s because they really keep the definition under those circumstances."

In general, when recording Hussain, Musso will set up two 421s about four inches away from the center of each tabla head, with one room microphone (usually a Neumann U47 tube) about two to three feet away, angled downward. He always checks the

An isolation booth is one way to reduce noise when recording acoustic instruments, but another possibility is a wireless mic and a quiet space away from any background noise.

Ssssh . . . Keep it Quiet

Unless you have a dedicated, soundproofed area, background noise—especially from computers and air conditioning—is always an issue when recording acoustic instruments. One possible solution is an isolation booth, like those made by WhisperRoom (shown; whisperroom.com) or VocalBooth (vocal booth.com), although they're not exactly in-expensive. A less costly workaround is to use a wireless mic with sufficient range that you can find a quiet room (or even a large closet), set up your mic inside, and close the door. Although many wireless mics are designed specifically for vocalists, there are models intended for more general-purpose miking, as well as multiple wireless systems designed for wind instruments. While the sound may not be quite as wonderful as your favorite wired mic, in situations where low noise is critical, wireless can provide a suitable answer. —*Craig Anderton*

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phase of all three to avoid any cancellation.

For anyone else on tablas, large-diaphragm condenser mics like the Neumann U67 and U87 are usually the best bet because they tend to pick up more subtleties.

Musso always assigns a separate track for each mic, and depending on the player and the performance, he might use a combination of Neve (1073, 1081, 1084, or 1066) or Focusrite (ISA 828) preamps, primarily for their sonic character or coloration. He starts off adjusting the gain somewhere between 50 and 75 percent—far enough above the noise floor to avoid recording a noisy signal, but with enough headroom in case of sudden transient bursts that could cause an overload or clipping. If the bottom is too thick, he'll engage a highpass filter to roll off some of the low end. In general, he doesn't compress, limit, gate, or EQ the mic signal before recording, preferring instead to leave his options open for later.

He takes a similar approach to miking and recording congas. "A lot of the time, I'll use the 421s pointed at the center of the conga head, with a U47 or a U67 room mic above them. If the drummer isn't playing hard, I might use a pair of AKG 414s or ADK Hamburgs. For me, it depends not only on the volume that the person's playing at, but especially the room that they're in. If it's an overdub and they're in the center of a large room by themselves, I can pull the mics away a little more and get more of a room sound, which is more natural for congas. But if they're playing with a group, then I'll usually get more of a close-miked sound to avoid leakage."

As always, experienced engineers like Musso stress the importance of keeping your ears open. If you're trying to emulate the reverberating strings on James Brown's "It's a Man's Man's World" or the dry, gritty sound of the Horny Horns on Parliament's *Mothership Connection*, give yourself a few different options for recording the source before you get into applying compression and effects sends. The main thing is to get the *performance* you're looking for—after that, the rest will follow. ∎

Bill Murphy is a freelance writer based in New York City, and a regular contributor to Electronic Musician and Bass Player.

Mark Howard in the studio with Neil Young.

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Fig. 1. A mult for a lead vocal track is removed from the mix bus and sent pre-fader to a Lexicon LXP Native Reverb plug-in in Digital Performer. The Waves H-EQ Hybrid Equalizer plug-in pre-conditions the mult's reverb send, rolling off highs.

Working with the Mighty Mult

Use this powerful technique to improve your mixes and streamline workflow

BY MICHAEL COOPER

WHICH OLD-SCHOOL engineering routine can be used to increase headroom, pre-condition effects and sidechain inputs, and simplify writing automation during mixdown? Answer: the mult. This simple but versatile procedure is often overlooked, but it can be a terrific aid for a variety of mixdown tasks.

For the uninitiated, "mult" is jargonistic shorthand for both the words "multiply" (the action) and "multiple" (the result). Multing a track multiplies it by making an exact copy of it. The result is a mult, or multiple, of the track.

In the analog realm, a mult is created by routing a track to a patchbay in which the top row of jacks is half-normalled to the bottom row. Inserting a patchcord into a top jack creates a new path for the signal while also preserving its flow to the

jack below it. Splitting the signal into two paths in this manner allows you to process each copy of the signal differently.

Multing a track inside your DAW is even easier—just duplicate it. You can then route and process each of the tracks—original and copy—differently.

In this article, I'll show you a few ways to use mults to turbo-charge your mixes and simplify your workflow. For simplicity's sake, I'll assume you're mixing inside the box. Ready? Let's split!

Goose the Level The most basic use of a mult is to give a track more level—free of clipping—after it's already run out of headroom. In the final stage of mixing, for example, you might realize that the lead vocal track sounds

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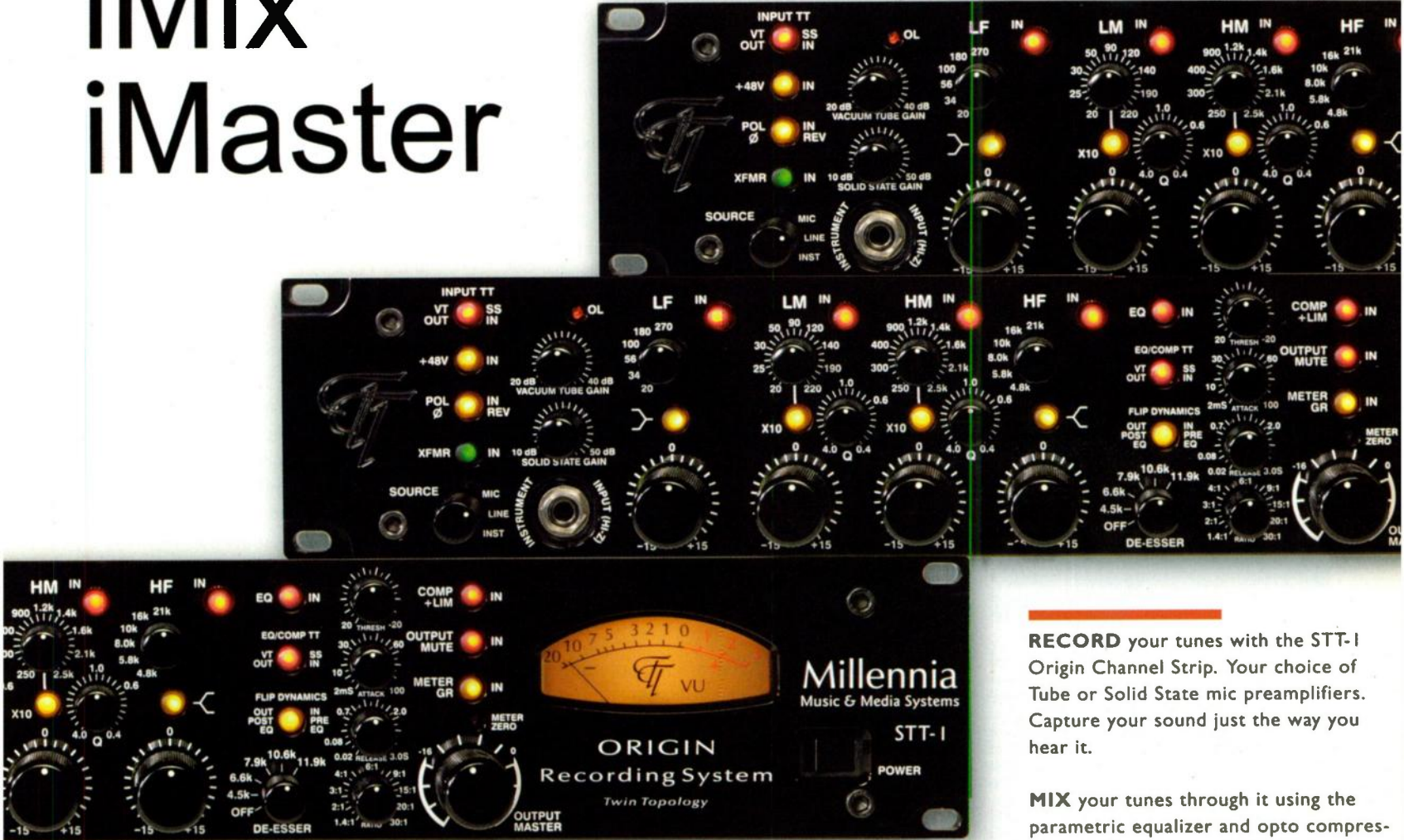
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too quiet. If its level is already close to clipping and the backing tracks are mixed to perfection, you've got a problem: Either raise the lead vocal track further and suffer the clipping distortion, or lower all the backing tracks and skew your carefully wrought balance. The solution is to mult (duplicate) the lead vocal track, assign the mult to an unused mixer channel, and raise its fader until the vocal sounds loud enough. (You must have some remaining headroom on your mix bus in order to accommodate the extra level.) Be sure to add the same signal processing to the mult as was applied to the original track so that they sound the same.

Double-track It To add pizzazz to lead vocals in the mix, apply pitch-correction (using Antares Auto-Tune or Celemony Melodyne, for instance) to its mult but not to the original track. The dynamically shifting differences in intonation will create a lush automatic double-tracking (ADT) effect superior to what any chorus plug-in can fashion. By riding the mult's fader, you can introduce the ADT effect to different degrees during various sections of the song. Generous fader boosts during choruses breeds excitement.

Pre-condition Effects Say you've routed the lead and background vocals (BVs) to the same bright hall reverb. The BVs sound beautifully present, but the lead vocal sounds *too* bright. The solution? Kill the lead vocal's reverb send, and mult the track. Pull the mult's fader all the way down, bus the mult pre-fader to the reverb via an effects send, and aggressively roll off the mult's high frequencies with an EQ plug-in instantiated pre-fader (see Figure 1). The lead vocal's reverb will now sound suitably dark, while the timbre of the dry (original) lead vocal track—and that for the BV's reverb return—will remain unchanged. This technique is often referred to as "pre-conditioning" an effect because it changes how the effect will sound on a source-by-source basis.

You can also use a mult to transform a compressor into a vocal de-esser. (Compressors with fast time constants work best for de-essing.) The crux is to pre-condition the compressor's sidechain. Slap the compressor on the original vocal track. Mult the vocal, but don't add a compressor to the mult. Using a pre-fader EQ plug-in on the mult, drastically cut all frequencies below 5kHz and boost generously

above 5kHz. Plunge the mult's fader all the way down, and send the mult pre-fader to the sidechain input for the original vocal track's compressor. The sidechain will now "hear" a horribly bright vocal that exaggerates any sibilance, but the vocal will sound normal in the audio path. Set the compressor's threshold to initiate compression only when sibilance occurs. Voilà, the compressor acts like a de-esser!

Simplify Writing Automation A male lead vocalist will sometimes sound too muddy during verses when he's singing near the bottom of his range and too bright when he's hitting high notes in each chorus. You could automate dynamic EQ changes throughout the song, alternately boosting and cutting highs as needed. Alternatively, you could mult the lead vocal track and be done in a fraction of the time. EQ the original track to sound brighter (for use during verses) and cut the mult's high frequencies (for use during choruses). Automate the respective channel mutes for the original track and mult so that the appropriately EQ'd vocal turns on during each song section. If you later decide to change the vocal's timbre during the chorus, for example, you'll only need to make a static change for the mult's EQ. Had you not multed the lead vocal track, you would've had to overwrite its dynamic EQ changes on each and every chorus. Just another example of how mults save the day! ∎

Michael Cooper (myspace.com/michael cooperrecording) is a mix and mastering engineer based in Oregon, and a contributing editor for Mix *magazine.*

> **This simple but versatile procedure is often overlooked, but it can be a terrific aid for a variety of mixdown tasks.**

Alex Moulton

Tatiana Arocha

Audio Branding: The Next Frontier

One specialized niche in commercial composing may well be the wave of the future

BY BILL MURPHY

WE'VE ALL heard audio logos before—just think of Apple's Mac startup sound, or the five-note Intel melody that Blue Man Group spoofed for the company's Pentium ads (or my childhood favorites, those '70s logos for PBS and the U.K.'s Thames TV). "Mnemonics" like these are meant to inspire an emotional attachment between a brand and our collective memory. The most effective ones get filed away in our brains and absorbed into our everyday lives, forever associated with a positive experience that can be triggered by a simple suggestion.

No, it's not *The Manchurian Candidate*, but there *is* an art behind it. And in today's socially connected world, that art has expanded beyond a simple logo to encompass full-blown marketing strategies under the rubric of *audio branding*. Musician and producer Alex Moulton

knows the territory; in 2001, he founded the New York-based audio production firm Expansion Team (expansionteam.org), and recently merged the company with Eyeball (eyeballnyc.com), an agile and forward-thinking boutique ad agency, where he's now creative director.

"In the lingo of the industry, you have what are called 'touch points,'" Moulton explains. "Ten years ago, audio touch points were very limited; you could only reach people primarily through TV and radio. You couldn't play full polyphonic sound on a cellphone, for example—just a very simple ringtone. Now we have all these new audio touch points that can branch out to anything on the Internet and a million places in between, and this allows you to extend a brand in unique and interesting ways. Part

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of it is the audio logo, but a large part of it is the brand's overall sound."

That sound can take many forms, from the music people hear when they're on hold with customer support, to the sound design that comes to be associated with a particular product (such as Verizon's high-tech ads for the Droid smartphone). Whatever the element, it usually takes months of careful preparation

and collaboration to fold it into a successful audio branding campaign—mostly because the approach is so new.

"A lot of companies are just starting to think about audio for the first time," Moulton observes, "so the process has to be fully collaborative, all the way up to the CEO. What you're trying to create can be so elemental in its end usage—a four- or five-note melody, or

a sound effect, or a suite of sounds—that you have to make sure there's an emotional buy-in from everyone at the company, otherwise it won't be successful."

The first step, as with any marketing campaign, is research. "We're looking for qualitative data about what we think the audience likes and doesn't like in relation to the brand," Moulton says. "Then we dig into the psychology of that, and we start to build a profile of the audience. We only start to talk about musicians, composers, sound designers, and musical references when we're in the real exploratory phase. This is where I think being a musician is key, because we do a lot of free exploration. You hope for happy accidents, and maybe there are new techniques or tools like a synthesizer, plug-in, or filter that could send you off on a more exciting path—as long as you're sharing your progress and feeding it up the chain to make sure you're going the right way."

From a musician's standpoint, audio branding is a highly specialized field, but it's wide open if you share the underlying philosophy, which is all about understanding the needs of the brand and its audience first. "The market is not saturated with composers or musicians who only pursue this," Moulton says. "At the same time, I don't think I would require that someone come to me with audio logos they've already done for other brands. And I would probably be *turned off* by people who just say, 'I've made a bunch of audio logos—these could work for you.' That's based on nothing, because it doesn't take into account the psychology and the research part of it. Anyone can write three or four notes and make it sound cool, so it's not about that. But I think there is a spectrum of companies that are doing this now, and just contacting them and telling them that you're passionate about this kind of work, that's the majority of it."

For more information about companies you can contact, visit the Audio Branding Academy online (audio-branding-academy.org) or the LinkedIn group on Sonic Branding and Identity (linked.com/groups?gid=726837). For a more nuanced take on audio branding, try the personal blog of Noel Franus (nfranus.posterous.com), formerly with Sonic ID and curator of the Intentional Audio blog. ∎

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Acoustica Mixcraft 6

Use instrument tracks to control MIDI-aware effects

BY CRAIG ANDERTON

OBJECTIVE

Provide hands-on control for audio plug-in effects that respond to MIDI input

BACKGROUND

Some plug-ins (particularly pitch correction) can respond to MIDI input, but not all DAWs make it easy to do this. Mixcraft 6 treats MIDI control of audio plug-ins similarly to sidechaining.

TIPS

■ Step 4: Multiple effects can respond to MIDI control, either from the same instrument track or from different instrument tracks, as all MIDI tracks are available from the drop-down menu.

■ Step 6: You do not need to arm the MIDI track's Record function to control the plug-in effect.

Step 1 Choose Track > Add Track > Virtual Instrument Track. This creates a MIDI track, with the default name Instrument Track.
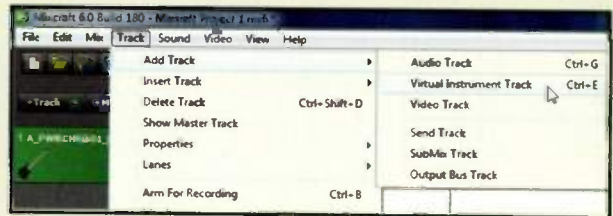
Step 2 Click the FX button on the audio track where you want to insert the MIDI-aware plug-in.

Step 3 In the track's FX selection box, choose an effect that accepts MIDI input (e.g., iZotope's Stutter Edit).
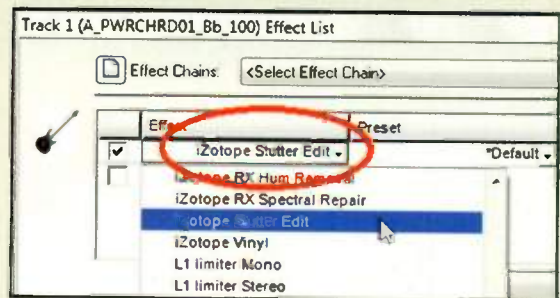
Step 4 In the FX selection box's "Use MIDI From Track" drop-down menu, choose the MIDI track you want to use for effects control.
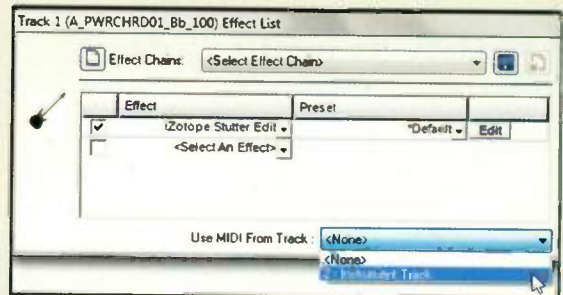
Step 5 From the MIDI track's choose device drop-down menu, select the desired keyboard or other MIDI controller.

Step 6 Play your MIDI controller to control the plug-in effect. If you don't want to hear the instrument sound from the instrument track, click the Mute button. (This will not mute MIDI data, only the instrument audio.)

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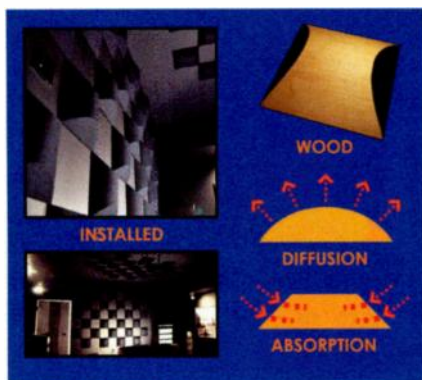
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BY CRAIG ANDERTON

1 CBS Copycode

Say "hi" to stupid: Put a −50dB notch at 3,840Hz, and if a recorder senses there's nothing up there, it can't record. Besides, upper mids are for snobs. But it's a *brilliant* strategy for protecting music: If the music sounds worse, *no one will want to steal it!* Hmmm, the catch is, they might not want to buy it, either . . . oopsies.

2 "The Worst Sound in the World"

It's official—and I'm not making this up! After statistical analysis of more than 1.1 million votes, Professor Trevor Cox of the University of Salford's Acoustic Research Centre found that the public considers vomiting the most horrible sound ever. But cheer up, techies: Microphone feedback came in a close second.

3 The Free Earbuds They Give You on Airplanes

Lilliputian bass, treble as ugly as political ads, midrange distortion optimized for masochists, and the same degree of comfort as sticking a No. 2 pencil in your ear . . . what's not to like? Mitigating factor: The level of quality properly complements the in-flight alleged "chicken" dinner.

4 "Remasters" of Classic Tracks

Okay, some of these are done well. But the people who take perfectly good music and slap on a limiter and boost the highs deserve a special place in hell . . . like maybe the room where the Spice Girls play 24/7 at top volume with 14dB of limiting, 26dB of boost at 4kHz, 8-bit resolution, and an 8kHz sampling rate. But there *is* an upside: Even Satan won't go in there.

5 P.A. Systems in Train Stations (Except Japan)

"Your attention please! Train number geemum to ummphnerk is now jupersnif at gate grigarf! Flig snapoo gronflinum!" ■