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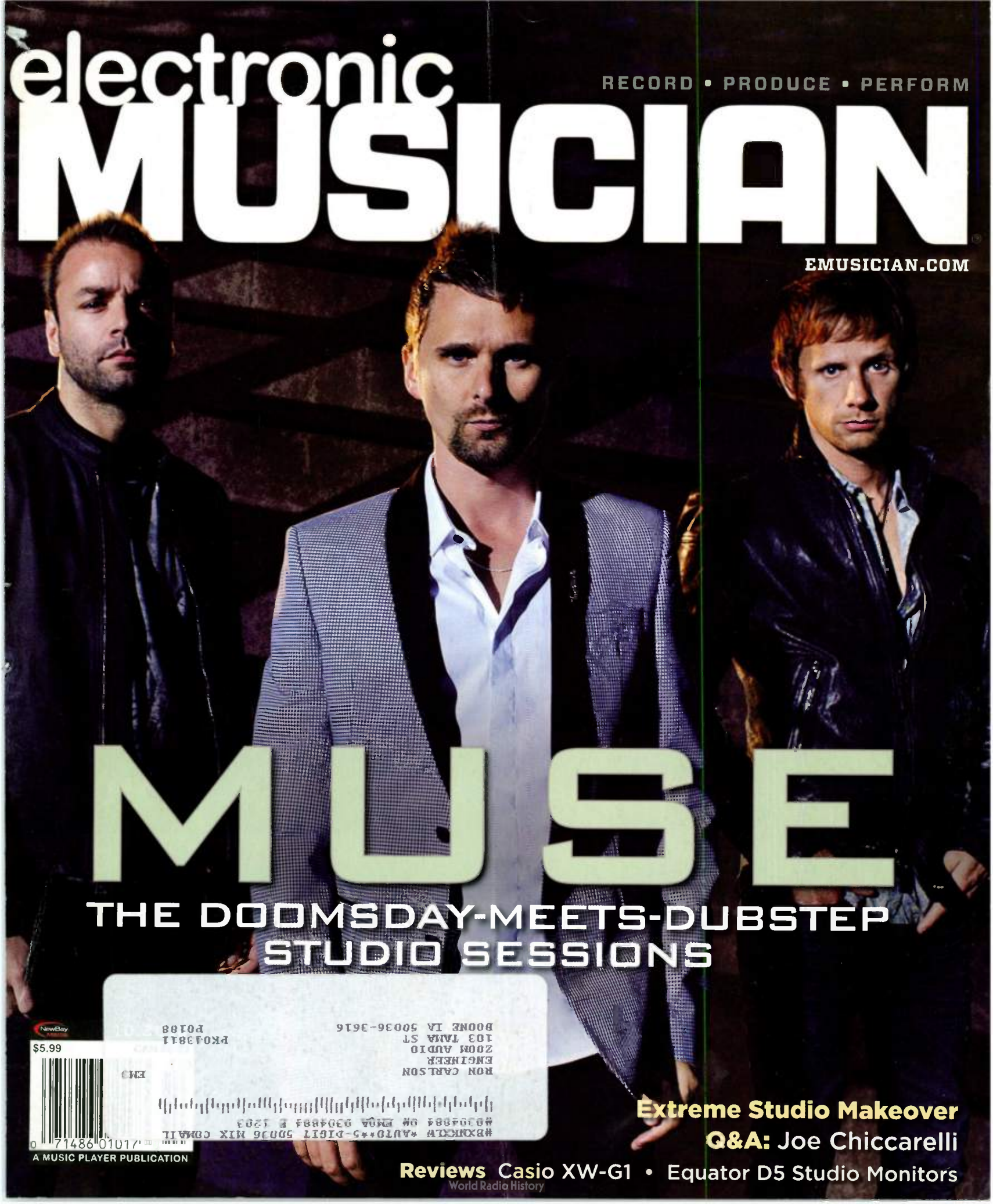

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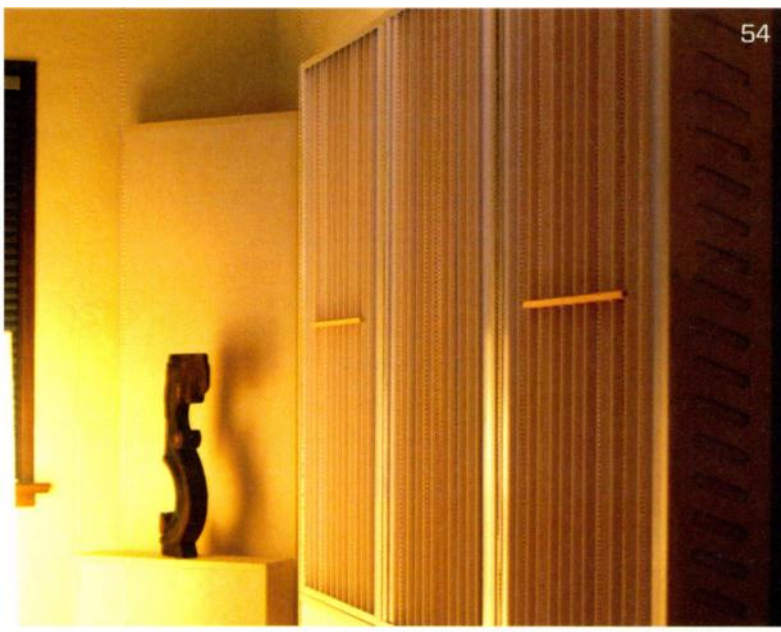

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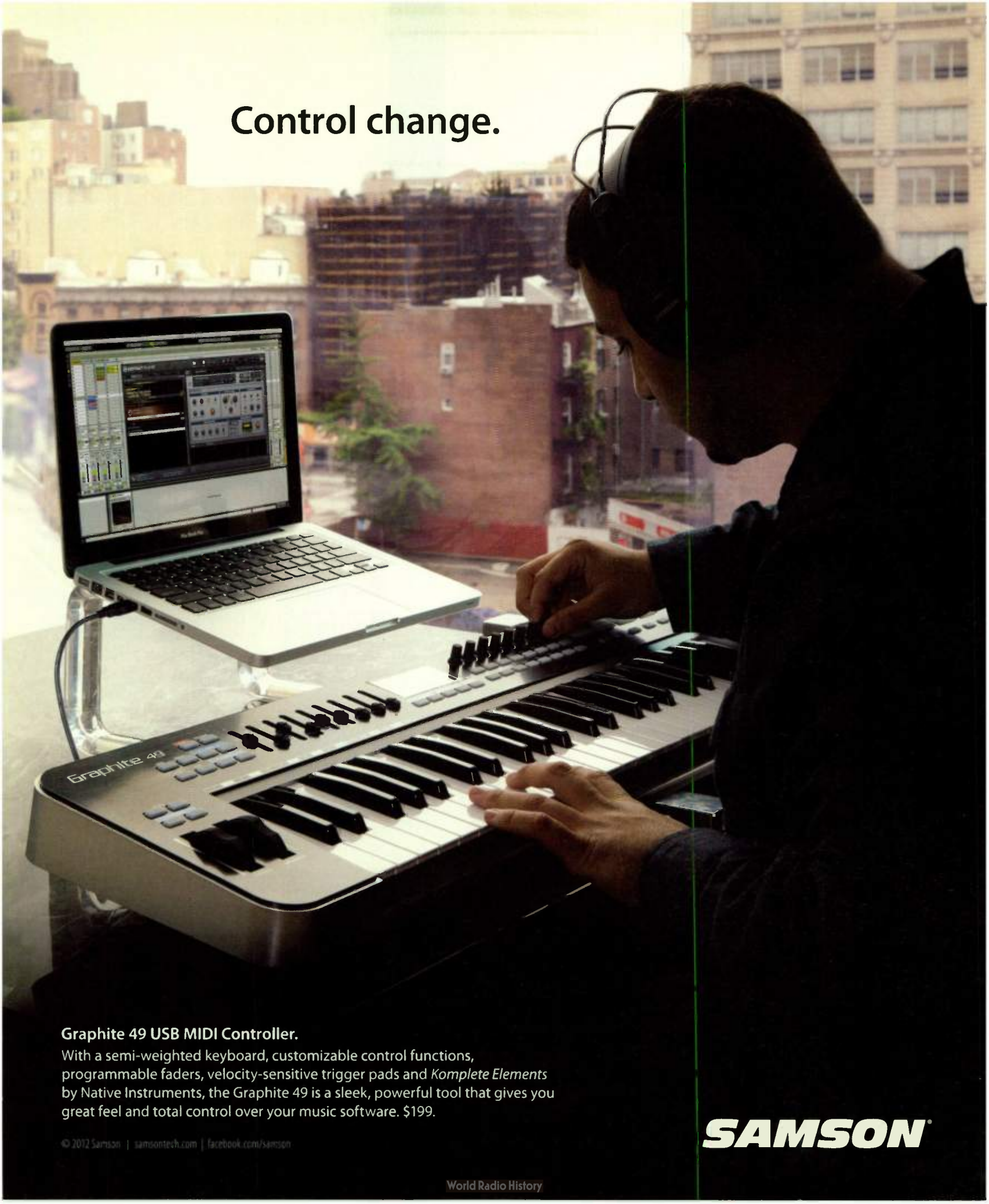

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Your Studio, Your Sound

WE'RE ALL on tight budgets these days, so studio investments are often painful exercises in prioritizing. Do you splurge on a new microphone or upgrade your workstation? Do you add a new outboard effect or a suite of emulations? Maybe it's time to take a hard look at your room.

In the quest for the ultimate production tools, it's easy to overlook the fact that your listening environment has a huge impact on the accuracy and translatability of your mixes. Of course, the ideal way to optimize that environment is to hire a professional. But this pricey solution can be out of reach for musicians and engineers working in project studios. Sometimes, a more realistic option is to study up on acoustics and apply some simple, proven techniques yourself. The complex science of sound can be daunting, but a little math can go a long way—your solution might be as simple as correcting your monitor placement.

In our "Extreme Studio Makeover" feature (on page 26), we pick the brains of three top studio designers to find out simple, practical tips for improving your space.

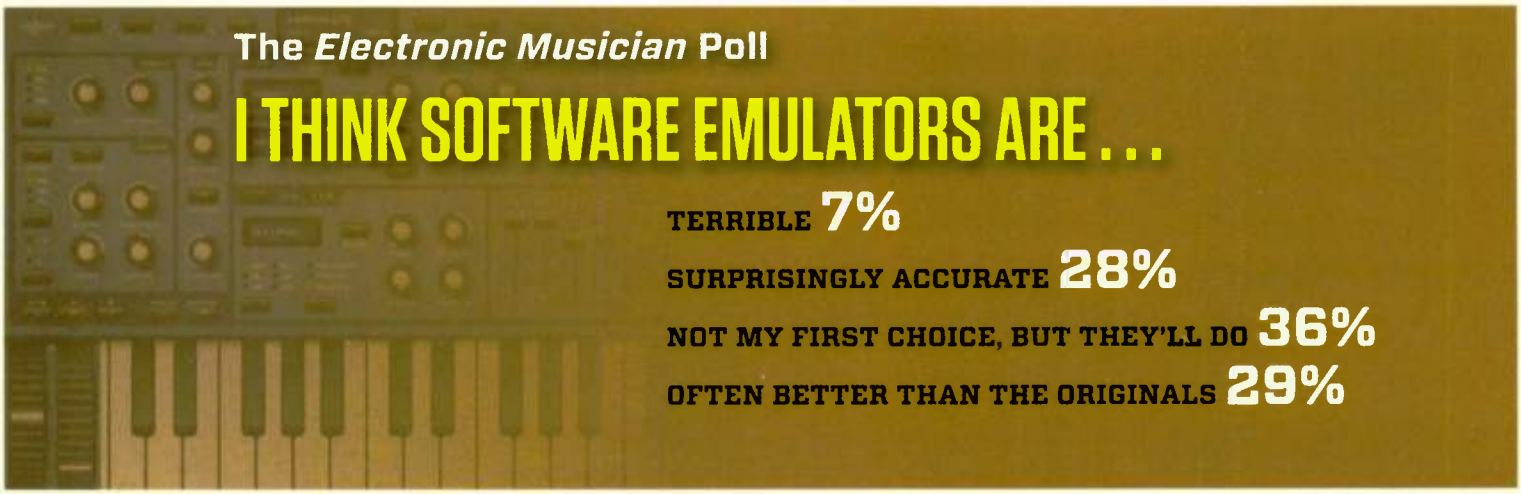
Ready to dig in deeper? In our "Acoustic Materials" Roundup (on page 54), we investigate DIY options ranging from foam panels to portable iso booths.

There's no "one size fits all" solution, so don't be afraid to experiment. Show us your results! Send before-and-after pics to ElectronicMusician@musicplayer.com. We'll publish our favorite makeover in an upcoming issue.

SARAH JONES
EDITOR
sjones@musicplayer.com

"NOT EVERYBODY IS AN AMANDA PALMER. SOME PEOPLE ARE HERMITS, SOME PEOPLE ARE LEGACY ARTISTS WHO ARE NOT GREAT WITH TECHNOLOGY. BUT IT'S COOL BECAUSE THERE'S A DIVERSITY."

Tatiana Simonian, Twitter Music Industry Relations, in *Billboard*, August 4, 2012



DIG MY RIG

Here is the business end of my home-based recording studio control room (top). Because of the existing wall construction and very odd planning laws in our area, I couldn't make a nice big window between rooms, so I put flat screens in each room with cheap color security cameras above those screens. It works well; in fact I have found that people tend not to feel so much like they are in a "fish bowl," and tend to relax and deliver better takes. Also shown is the live room (bottom), which was unfinished at the time the photo was taken. The white cloth behind the timber slats has been re-done with black cloth and looks so much better. The room was actually our double-car garage and measures approximately 32 meters square. Plenty of room for what I need.

SHANE HUGHES
DOMENIC SOUND
BRISBANE, AUSTRALIA

ask!

I HOPE YOU TAKE PRODUCTION AS WELL AS TECHNICAL QUESTIONS. WHEN RECORDING, IS IT BEST TO HAVE AN IDEA OF EXACTLY WHAT YOU WANT AND IMPLEMENT IT AS YOU GO ALONG, OR JUST START WITH A BASIC IDEA AND WRITE "IN THE STUDIO"?

JEFF MCDONOUGH
KANSAS CITY, KS
VIA EMAIL

Even with an audio loop-oriented program like Ableton Live, don't overlook using MIDI tracks to help build a song.

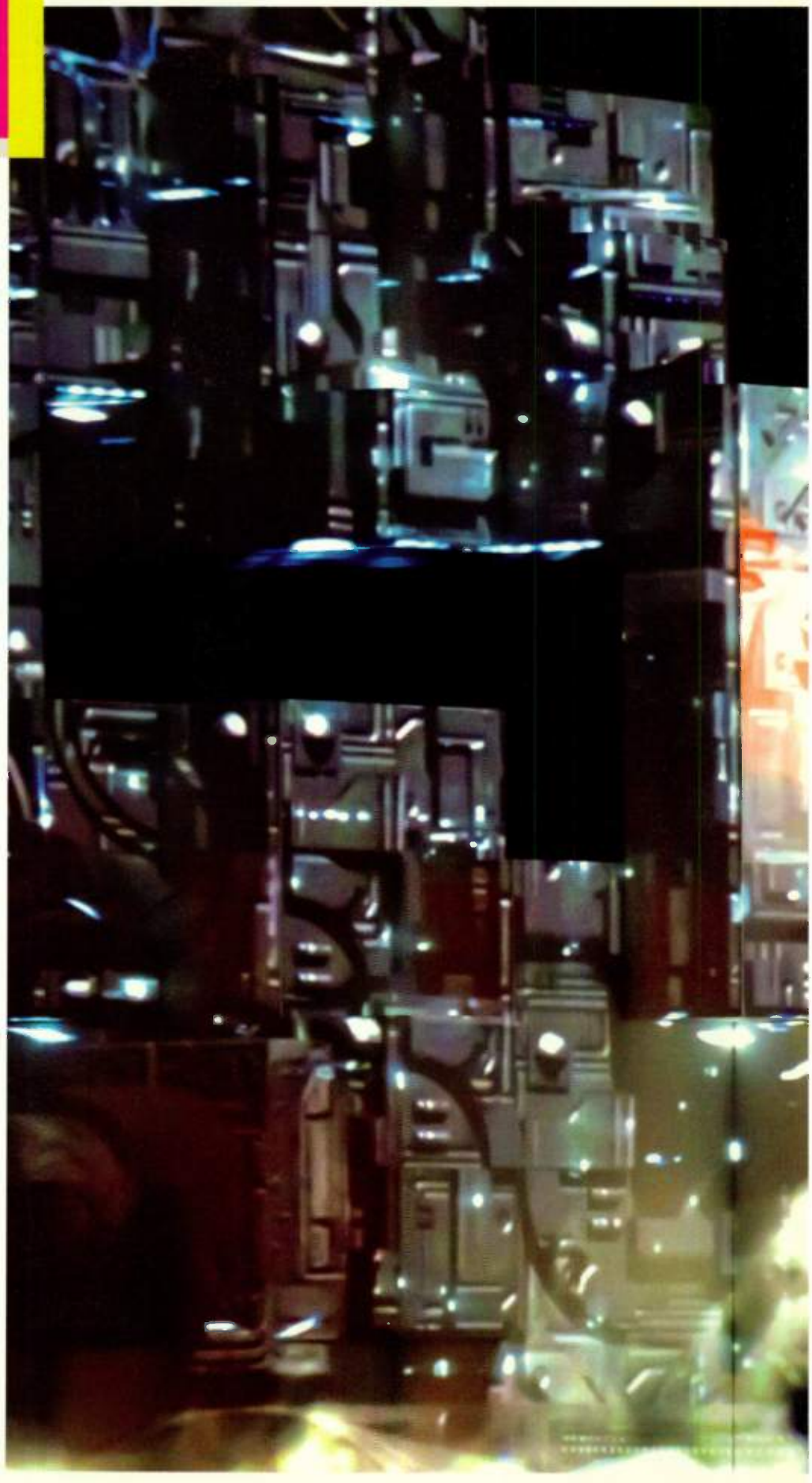
Different people gravitate naturally to particular workflows, so try both and see which produces the most satisfying results. That said, we prefer getting tracks down fast, while the creative juices are flowing. As soon as you leave that mindset and start editing parts, you've crossed over from "right-brain" thinking to "left-brain" thinking, and it's not always easy to get back into a creative groove. (It's the same principle as hearing the phone ring when you're recording, and getting sufficiently distracted that you lose your creative spark.)

This is one reason why MIDI is useful for sketching out songs—the data is so "fluid." You can change sounds, key, and tempo at any time, as well as record audio versions of parts to replace the MIDI versions. This offers the best of both worlds: You can lay down tracks fast and use them if they're "keepers," but if not, you can revisit them for additional editing. As a bonus, MIDI sequences lend themselves well to template projects with pre-assigned instruments and tracks; this can also encourage the creative process by reducing the "boot computer to start recording" time.

THE EDITORS

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

FIRST TAKE

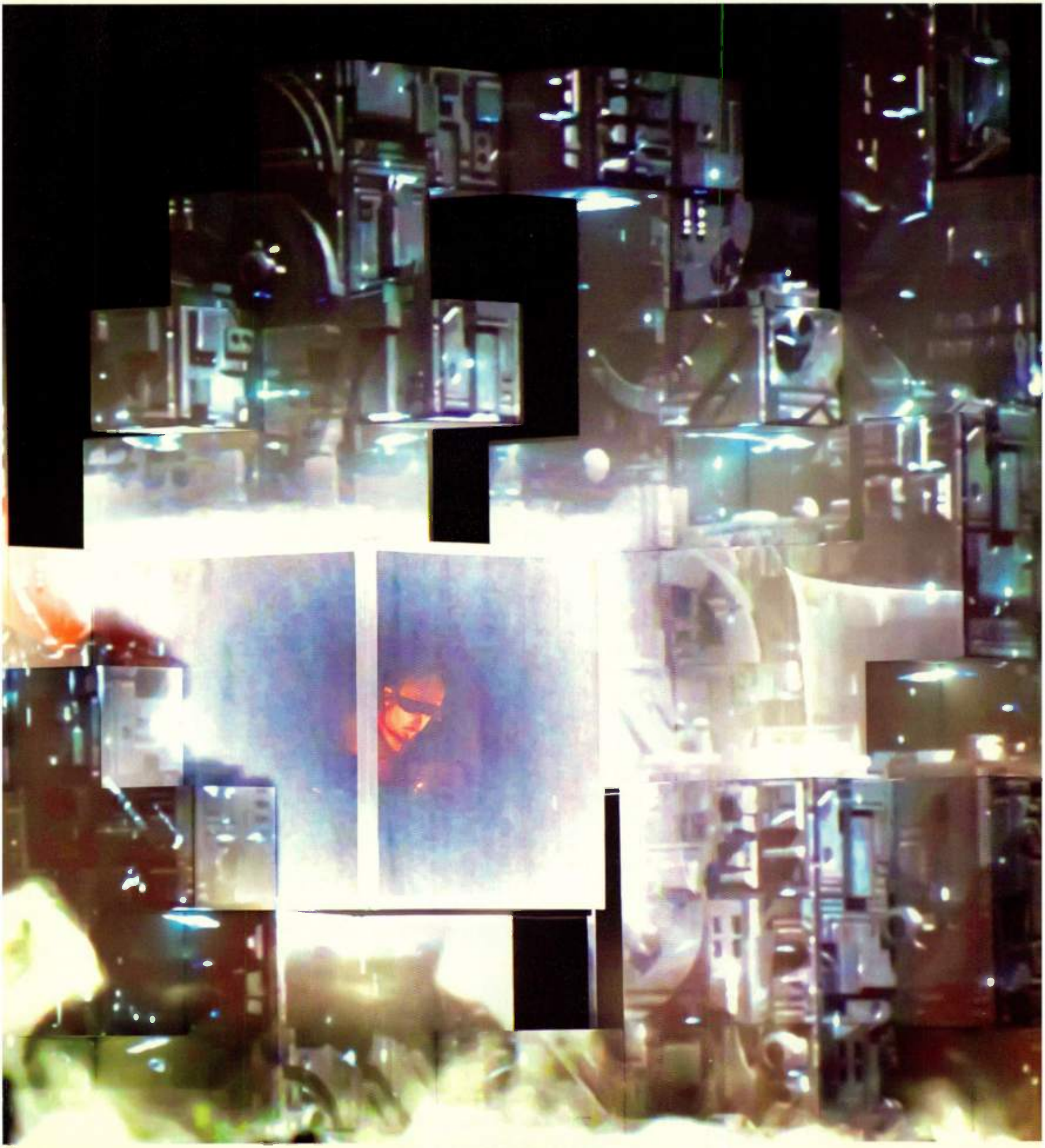


AMON TOBIN

INDIO, CA
APRIL 13, 2012

Electronic music met performance art this spring at Coachella 2012 as Amon Tobin tweaked fractured sci-fi sounds into the early hours of the morning, controlling a highly technical stage show from an acrylic box nestled inside a towering sculpture of projection cubes reminiscent of the *Blade Runner* skyline. The performance reflected the aesthetic of his recent release, *ISAM*, which Tobin says came together in physical way, with synthetic sounds taking on the fluid feel of acoustic instruments: "To me it's all about mixing these worlds of recorded, found, and synthesized sound. I'm not claiming to invent the wheel here, but I had to form a working method that I was totally unfamiliar with, and that really opened up possibilities that I had no concept of before."

PHOTOGRAPH BY DAVE VANN



"I've Already Earned $50,126 Using TAXI and My Little Home Studio."

Matt Hirt – TAXI Member

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I've already cut deals for more than 70 of my songs, and they're getting used in TV shows like Dateline, Law and Order SVU, and The Osbournes. And yes, I'm making money.

I was kind of surprised that the recordings I make in my little home studio were good enough. I guess size really doesn't matter;-)

Want to know what does matter? Versatility. Being able to supply tracks in different genres makes you even more desirable for Film and TV projects. I didn't know that until I became a TAXI member and started going to their members-only convention, the Road Rally.

If you joined TAXI and never sent in a single song, you'd still get more than your money's worth just by going to their convention. It's three days of incredible panels loaded with some of the most powerful people in the music business, and the cool part is that it's FREE!

Unlike some of the other conventions I've attended, the panelists at the Rally are friendly and accessible. I've never been anywhere that gives you so much great information, and so many chances to meet people who can help your career.

If you've needed proof that a regular guy with ordinary equipment can be successful at placing music in TV shows and movies, then my story should do the trick.

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Muse (left to right)—Dominic Howard, Matthew Bellamy, and Christopher Wolstenholme.

MUSE

On *The 2nd Law*, the British rockers craft an apocalyptic rock opera of surreal textures, orchestral soundscapes, and organic dubstep elements

BY KEN MICALLEF

IS MATTHEW Bellamy the Orson Welles of rock? Striding into Muse's Q Prime management office in New York, Bellamy appears intense, talkative, and *extremely* focused. As Bellamy explains the songwriting and production processes behind Muse's sixth studio album, *The 2nd Law*, it's as if he's giving tutorials in thermodynamics; self-production; solo vocal, guitar, and keyboard tracking; and innovative miking techniques; bookended by paranoia-inducing Doomsday scenarios.

"The second law of thermodynamics states that 'energy in any isolated system is always going to be in a state of entropy,' basically losing energy," Bellamy explains. "Everything in the universe is spreading out and cooling down, all the stars are doing that, and time is the actual result of this. Also, we're all going to die."

An apocalyptic rock opera that expresses thermodynamic theories through mock spoken-word newscasts, *The 2nd Law* is also a queasily perfect production piece comprised of full orchestra, an operatic choir, Bellamy's Freddie Mercury/Thom Yorke-styled vocals, ARP 2600 and Buchla Series 200e modular synths, Muse's surging stadium rock approach, and surprising variations on the dance trend of the moment: dubstep. The fight for survival is *The 2nd Law's* scary mission statement.

"We have these instincts to grow and to be free," Bellamy states. "But we're living in a world where that is becoming increasingly impossible. It's the conflict between that desire to expand versus doing what is right for an enormous population on one limited ecosystem. Everything that has driven us through thousands of years of evolution is being questioned for the first time."

Recorded in AIR London's Studio One, East West Recording Studios (Los Angeles), and Shangri-la (Malibu), *The 2nd Law* is Muse's second self-produced album following 2009's *The Resistance*. Engineered by Adrian Bushby and Tomasso Colliva, mixed by Chris

MUSE

Lord-Alge, Spike Stent, and Rich Costey, and mastered by Ted Jensen, the record was tracked on AIR's custom vintage 72-channel Neve/Focusrite console with original "AIR Montserrat" 1081 mic preamps and GML automation. From soaring opener "Supremacy" to hope-inspiring pounder "Follow Me" to the dubstep-drenched title track and the epic final track (which closes with the sound of the earth slowly dying), *The 2nd Law* is a stunner, a downer, and just perhaps, a masterpiece.

"This production was very collaborative between the three of us." Muse includes Christopher Wolstenholme (bass, vocals, keyboards) and Dominic Howard (drums, synthesizers, sampling). "We were all more present in terms of production than on *The Resistance*. I've always been influenced by film music, growing up I was drawn to Stanley Kubrick's *2001: A Space Odyssey* and [Ridley Scott's] *Alien*. Hans Zimmer is another great film composer I've enjoyed. All that worked its way into this album."

Audio-Visualizing for Fun and Profit

Like the late Frank Zappa, Matthew Bellamy likes nothing better than to spend his days in the studio, and if possible, going it alone. Extremely studio savvy, as are Wolstenholme and Howard, Bellamy tracks his own vocals, guitars and keyboards; he also scored Muse's dense orchestral accompaniment using Pro Tools MIDI functions and VSL and East West symphonic libraries before handing off to conductor/arranger David Campbell.

"I sort of audio-visualized the music on the album," he says. "On the more orchestral songs, I could hear them, visualize them, or audio-visualize them. I tried to remember the original feeling or sound I heard in my head and refocused on that. But ultimately, even though there are hundreds of overdubs we always manage to keep what we do as a three-piece as the primary thing."

Two dissimilar tracks from *The 2nd Law* reveal Muse's amazing competency at production and performance. "We deliberately set ourselves a production challenge to produce [two tracks] in a way to create almost opposite results," Bellamy says. "'Follow Me' was originally a regular-sounding rock track with normal

(Left to right)—Engineers Tommaso Colliva and Adrian Bushby, Matthew Bellamy, Dominic Howard, and Christopher Wolstenholme.

TRACK NOTES

Engineer Adrian Bushby shares some details from the *2nd Law* guitar- and bass-tracking sessions.

GUITARS

"Matt [Bellamy] runs multiple amps at once when tracking guitars: Diezel, Marshall, Vox, also a Fender sometimes. We would get the sounds up and then manipulate a certain part of an amp for a certain section. We might re-amp through a delay, and we had a Fractal Audio Systems amp modeler, too.

A Shure SM57 always works for guitars. Matt likes to have a Royer 122, and because we have so many different amps I will have a FET 47 on the 4x12 cab, and if we have another 4x12, use a 57, and a Royer or the FET 47, and AKG 414, a couple AEA ribbons, and a few Sennheiser MD441s. It's about what suits the amps. I tried to use an array without going too crazy on everything; going for different flavors. I will place the mic right on the grill, dead center, back it up with the Royer so it doesn't crap out and distort. Everything went through the AIR Montserrat 1081 preamps.

Matt does a lot by himself; he's a genius, man! He also records all of the piano by himself, and guitars. We'd be down in another studio tracking drums and bass, and he'd be in the other room doing all the guitars by himself. Done."

BASS

"We used a clean DI, a Reddi DI, and a clean bass sound using a Markbass head, with 4x10 and 1x15 cabs. And an old Marshall 80s bass head, panned left to right—one side has an Animato pedal, on the other side, a Big Muff. That is Chris [Wolstenholme]'s sound. Between songs, we'd change pedals out, and send another pedal thru DI, or a digital-sounding amp with a close and bright sound.

We used an E-V RE20 for the clean sound on the two heads; for the distortion, we had a Shure SM7 on one, and RE20 on the other, mic pres from Neve, and an 1176 for the distortion, and then use whatever stereo compressor I have in the room.

We did a lot of re-amping, which was interesting. We'd almost recreate a sound, after the part had been played — sending the DI through filters, then that DI back to the amp, and automating things."

MUSE

instrumentation, then once we recorded it we replaced each instrument with electronic samples. We found sounds that mimicked the acoustic instruments electronically. It sounds like a rock band but it's all synths and samples. We used Native Instruments Battery as a drum machine, and we also created our own samples and processed them."

"Follow Me" thumps like Giger's Alien seeking human blood, while "The 2nd Law Part One: Unsustainable" spews coiled subterranean bass rhythms and screaming synth tones—the currency of contemporary dubstep. "On 'The 2nd Law Part One: Unsustainable,' we created something using synths and drum samples that evoked Nero or Skrillex," Bellamy explains. "That kind of build-up, then a drop down to a heavy bass line and electronic drums, then we replaced it all with real instruments; it's the direct opposite of 'Follow Me.' That was a challenge as well, because heavy dubstep—which some people call 'brostep'—that genre is actually closer to rock music, it's more interesting than what is coming from guitars in general. It was a real challenge; can real instruments even compete any more with that kind of genre?"

How did Bellamy and Wolstenholme recreate the stomach-shredding electronic dynamics of dubstep on puny bass and guitar? "We saturated the guitar and bass in heavy distortion and used DI distortion as well to give it some fizzy distortion," he explains. "Then we added some phasers and some 'whirring' samples to make the guitar and bass become one sound. Some of the crazy bass lines in dubstep go right up to the ceiling then plunge down to the sub-bass. We used guitar for the top end, then bass for the middle to the bottom, and we made them merge into one part. It's a combination of extreme pitch-shifting using a whammy pedal which I was using to go two octaves up, then down, then dive-bombing. As I was dive-bombing, Chris' bass would take over with a 'whirring' sound. It's kind of what dubstep is all about, done with guitar and bass."

Guitar-Synth Monsters Bellamy played custom Manson guitars on the album, including a seven-string model with its bottom E string drop-tuned. On album opener "Supremacy," Bellamy's passionate vocal cry morphs into a screaming guitar solo. One of his custom

"Heavy dubstep is actually closer to rock music; it's more interesting than what is coming from guitars in general. It was a real challenge; can real instruments even compete any more with that kind of genre?"
—Matthew Bellamy

Manson guitars has a built-in Kaoss Pad, but this effect was something entirely different.

"That's two [Tech 21] SansAmps with the lead vocal down the middle," Bellamy explains. "The SansAmp on the left had a 45-millisecond delay, the one on the right had a 65-second millisecond delay. The distortion is in stereo, but the main vocal was dry and right down the middle. You get this big-sounding vocal, but it evokes guitar as well because it's going through a SansAmp guitar simulator. It creates this strangely large, chorus distorted sound."

Bellamy loves arpeggiated synths, which adorn *The 2nd Law* like Rick Wakeman and Steve Reich dueling to the death. "We used a lot of modular synths on the album," Bellamy recalls. "An ARP 2600 and a Macbeth Studio Systems M5. But the most insane-sounding and annoying one was the Buchla Series 200e. We've never been able to get that on a record before because it has such a glassy, brittle, bright, full range sound. It's so bright, when you put it in with rock it makes everything else sound dark and brown. The arpeggiated parts in 'Follow Me,' the synth in the beginning of 'Madness' going 'wow wow wow,' and a couple other songs, 'The 2nd Law Part Two: Unsustainable,' that's the Buchla. We'd use [Native Instruments] Massive and [Rob Papen] Predator soft synths as guides, then replace them with modular synths. We also used an Analogue Systems' French Connection, which is like an Ondes Martenot; it's basically a CV controller that gives you the exact same controls as a Martenot, but you can hook it up to modular synths to get crazier sounds. That was part of the complex overdubs in 'Follow Me.' When I sing '[When darkness] surrounds you,' there's 18 French Connections all going 'mmmmmmmm' and sliding in opposite directions. That created this very contrapuntal spreading-out sound."

As well as typical close-miking of the drums (Neumann U47 for room mic, AKG 190 as close room mic, PZM floor mics, Shure SM91 inside the kick, FET 47 outside the kick, Shure Beta 7 on snare, Cducer boundary mic taped to snare, Sennheiser 421 on toms, U47 underneath rack tom, FET 47 underneath floor toms, AKG 451s on overheads), Dominic Howard and engineer Adrian Bushby practically re-amped his set, adding to the record's streamlined punch and serious low-end wallop. "Even though a lot of the songs have acoustic drums," Bellamy explains, "we'll add additional samples of the same drums to get a bigger sound. Dave Bottrill (Tool) did that, I believe. And we placed a P.A. system behind the drums, and routed the bass drum and snare drum though the P.A. Then when we recorded the room sound—the bass drum and snare drum sounded massive. Rather than it being too cymbal heavy, you're getting the boom from the bass and snare drums. That was the original intent on 'Supremacy,' then as a variation we ran Dom's electronic samples through the P.A., instead of acoustic drums. So Dom was playing the close-miked drums in the room, but as his foot struck the bass drum it triggered a sampled electronic bass drum coming through the P.A. system. We got the dry acoustic sound but also this crazy, large room sound, which you think is organic, but

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GC PRO

MUSE

room sound, which you think is organic, but it's a combination of acoustic and electronic samples."

Bellamy in Your Face Is Matt Bellamy a control freak? A man on a mission? A genius? It's hard to tell. Like many geniuses, he seems to be at his best when he's alone, working at his own pace, "the hobgoblins of little minds" not obstructing his view. One of the greatest vocalists in rock, Bellamy is also perhaps one of the most shy.

"The engineers help me with setup and sounds, to where I have a few mic options," Bellamy explains. "Then I ask everyone to leave. Working with other people, sometimes I get impatient. Working alone I can go at my own speed; sometimes I am very perfectionist and will do things ludicrous amounts of times, but usually I will do three or four takes, then comp them together. I know all the plug-ins I may or may not need. Sometimes I try different mics, different approaches, different levels from singing to shouting. And I do like to be dramatic in my performance; I like to sing barefooted, it's silly things. But it also lets me be more brutal with myself."

Bellamy's vocal signal chain is a Neumann U67/Neve 1073 mic pre/Urei 1176. He runs an EL Distressor on the return to get some "extreme compression" and a Bomb Factory LA-3A for a little additional compression in Pro Tools.

"One trick I do is to use a mastering finalizer on the lead vocal. It's a limiter that gives a much more full-on compression. I like SoundToys plug-ins for vocal delays as well. I also used the RCA 44 ribbon mic into a mic pre made by the Mercury [Recording Equipment] Company. It gives you the ability to really overdrive the input whilst trimming it back to the point where you can get an okay input level on the Pro Tools inputs. That enabled me to do songs like 'Madness' where I am singing very quietly, but I wanted to have a big sound. I am almost whispering there. It's overdriven, so I can really get it in your face."

In the surreal soundscape of "The 2nd Law Part Two: Isolated System," newscasters read dire reports over "Tubular Bells" styled piano patterns; it's the sound of the world running on empty. The track glitches and misfires as if the global power grid is suddenly going black.

"I did all that manually in Pro Tools using a combination of time-stretch, time-compress, and pitch-shift and literally, straight-up editing," Bellamy elucidates. "It was very improvised. We recorded the lady from Channel 4 reading the script. Then I enlarged the waveform and just chopped little milliseconds out of it. Other times, I cut and pasted a little bit to create a stutter effect. Then I'd take one word and time-stretch it slightly, or pitch-shift it. It's just applying randomness to create the sound of things falling apart."

A Matter of Science The *2nd Law* is a seamless, tactile, present, extremely polished production. Muse are master studio boffins, and their team is equally proficient. But there's an indefinable quality to the album. It glistens. "We made a conscious effort not to overuse brickwall compression," Bellamy says, by way of possible explanation. "That works really well in electronic music like Daft Punk or Justice. But that's leaves nothing for the mastering engineer to do. With more organic sounds, especially sounds where there's a differential between the dry transients and the room reverb, if you brickwall that it can make it all brown and mushy. It's harder to take that approach with rock music. We steer clear of mastering our own tracks. It's dangerous territory."

Dangerous territory for most bands would be entering a recording studio without a record producer. From Radiohead to Beyoncé to Snoop Dogg (or is that Snoop Lion?), no artist leaves home without their producer. So who do Muse think they are?

"Whenever you allow someone else's input into anything you do, you are instantly admitting to a certain lack of either a desire to control or a lack of confidence," Bellamy insists. "Perhaps it's my knowledge of production and orchestration and arranging, but I [understand] producers and I've caught producers saying something because they feel that is what they're there to do. It's like bringing in the A&R guy from the label, which we've never done, but if you ask him what he thinks he has to say something and it might be critical. The more people you involve, the more people who will try to justify their existence. We will work with producers again, but I am definitely able to decipher genuine constructive input versus someone trying to justify their presence in the room.

"And Dom, Chris, and I are naturally drawn to production work," Bellamy concludes. "We're all good at Pro Tools and we all know our way around plug-ins and modular synths and miking. Production is a science, but it's not rocket science." ■

"The more people you involve, the more people who will try to justify their existence. We will work with producers again, but I am definitely able to decipher genuine constructive input versus someone trying to justify their presence in the room." —Matthew Bellamy

Ken Micallef has covered music for all the usual joints, including DownBeat, *The GRAMMYs,* Rolling Stone, *and Emusic.com. His first book,* Classic Rock Drummers *(Hal Leonard), is currently in reprint status while he manages his family's cabbage patch down south and ponders the future of the vinyl LP and tube amplification.*

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BIG RIBBIE STUDIO MAKEOVER

BY BARBARA SCHULTZ

You don't need to hire a superstar acoustician to build, or rebuild, your personal studio . . . but it surely would help, wouldn't it? Professional studio designers bring a wealth of scientific knowledge, tools, and experience to their projects. And sometimes what's even more important: They come with an open mind, helping clients to envision ways of working they might not have considered. But this article isn't for the lucky few who can afford to retain one of the country's top designers; it's for owner/operators who want to get the most from their space on a limited budget.

Generously, three top-tier studio designers—Fran Manzella, Chris Pelonis, and Peter Grueneisen (see sidebar on page 32)—agreed to offer some practical advice on essential issues for *Electronic Musician* readers. We asked some of the big questions and gathered detailed information. You'll find even more at emusician.com.

For someone with an existing studio who is thinking about moving to a different room, or adding a room, what shape or type of room will help them minimize acoustical problems?
Manzella: If a client is choosing a new room, I'll tell them to gather the dimensions of the various spaces they're looking at and give them to me, and we can run simulations here and tell them, "This one looks problematic, this one looks better, this one looks best," and then they can use that information and weigh it against any other variables.

Some clients come to me and say, "I want to do a bedroom studio," and they have a room in mind because it's got a great view, but it's an odd shape and they're already having some low-frequency problems in there. I'll go down to their place and I say, "Wait, what about that room over there?" Probably 50 percent of the time I end up putting them in a different room because I'll measure it up and quickly run some calculations, and it's clear that the other room's

One of Manzella's recent designs: 25th Street Recording in Oakland, CA.

FRAN MANZELLA

"If you want to address the acoustics of the room, that's one project. If you want to build a room, that's another."

going to be much less problematic.

Whether you're working in a small room or a large room, one thing that's really hard to change is the actual dimensions of the room. If the geometry of the room gives you problems, then you're getting into a construction project. Do you want to do a construction project? If you want to address the acoustics of the room, that's one project. If you want to build a room, that's another. If you want to change the size of the room, that's somewhere in between the two.

Pelonis: A rectangular space—not square—is best to start, and you don't want doors or windows near the corners, because you're going to want to be able to treat those corners. If the door is right in the corner, let's just move the door. It's going to cost a few hundred bucks, but hopefully you're going to be here long enough to where you just forget about that.

The modal response of the room is going to be determined by the height and the width and the depth of the room. You can use a really cool little widget from Apple called an A-NO-NE Wavelength Calculator. I can put in the length of a room and it tells me the wavelength that correlates to the measurements. Then it also tells me where the harmonics are. What you don't want is big gaps between the harmonics, or a big accumulation, like harmonics that are landing very close to each other. So just being rectangular isn't always the answer. Or RPG (rpg.com) makes a room optimizer: a PC

Pelonis designed this room for actor/artist Jeff Bridges.

CHRIS PELONIS

"Moving things around without having something to tell you what's happening as a result of the movement is a big mistake."

program that will calculate your best scenario in terms of dimensions.

Grueneisen: There are so many different factors in different situations that come into play, whether it's a place that's too close to a neighbor, or it's too close to a kid's bedroom, or there's some other issue concerning soundproofing. Picking the right space that doesn't force you to deal with very difficult and expensive isolation issues can be a very important thing.

And then in terms of the geometry: whether it's a symmetrical space, a nonsymmetrical space, whether it's enclosed or open, if it has a lot of windows. There are factors that come into play that can really hurt or really help.

What do personal studio owners need to know about speaker placement?

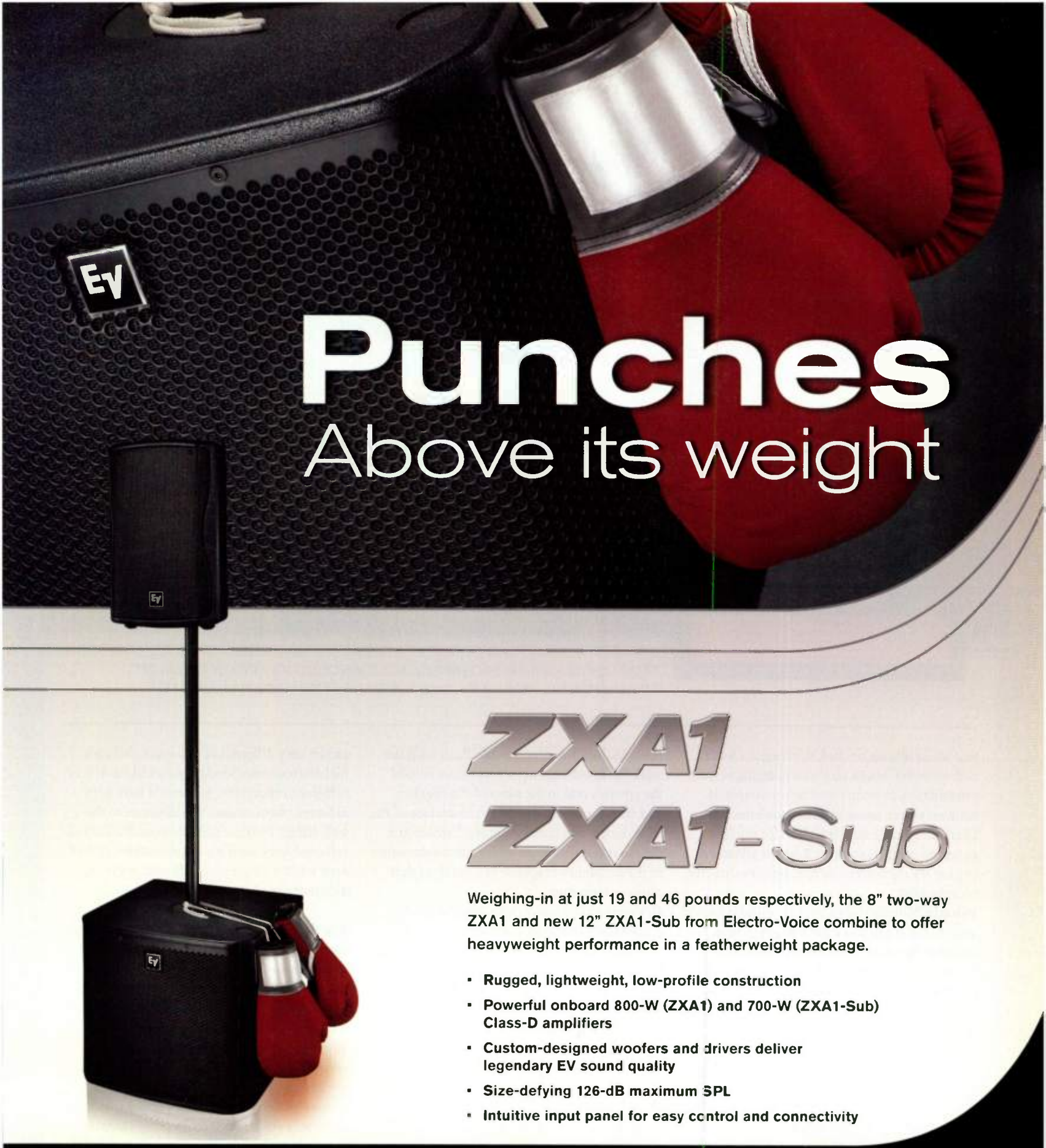
Manzella: Speaker placement is the single biggest thing you can change in your room to address problems, especially bass problems. There's a couple of factors that come into play, and the biggest one is speaker boundary interference, especially in a small space.

The distance that the low-frequency speaker is from all those boundaries—the walls, the floor, the ceiling—creates a series of potential cancellations at the mix position, and the closer you put the speaker to the corner, the more bass you get. You're shortening a couple of those path lengths to the two sidewalls, so those two reflections cause higher frequency cancellations and they don't cause low-frequency cancellations. In a corner, that speaker gets reinforcement from all the modal energy in the corner. And this is the most common call I get: "The bass isn't right. I'm having trouble translating my bass. I'm having trouble hearing the bass."

One of the biggest things they can do is experiment with speaker placement, and the best way to facilitate that is to get the speakers off your furniture and get them onto some stands. Whether you're listening on 6-inch two-ways or 10-inch three-ways, getting them onto stands gives you the flexibility to move things around more without necessarily having to move your whole rig.

When somebody hires us, obviously, we measure everything, and we will experiment with different speaker placement to try to find the flattest low-frequency response, but this can be done by ear, too. If you've got a good ear, you can move the speakers around and find a pleasing amount of bass that sounds even. What I discourage people from doing is trying to do this with sine waves and an SPL meter. You play any pure sine wave, and you're going to walk through nulls, peaks and valleys. Any room does that. The key is not having a whole bunch of valleys at the same place. You don't want to have a dip at 60 and 80 and at 100 all in the same place.

Another thing that's good to have is one of these inexpensive realtime analyzers that are available for iPad or iPhone these days. Of course, their weakness is always low-frequency [information]; if you try to use the built-in



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A room in A.R. Rahman Studios in Chennai, India, designed by Peter Grueneisen.

PETER GRUENEISEN

"If the room is not arranged symmetrically, it will distort the information you get from the speaker, because the room interacts with the information so much."

mic on an iPhone or iPad, you've got a lot of roll-off below 60Hz, so if you're trying to get information down in those lower couple of octaves, you're going to have problems. But I just got a really neat interface for my iPad called an iAudio Interface 2, and it allows me to plug my measurement microphone directly into the iPad.

Pelonis: Moving things around without having something to tell you what's happening as a result of the movement is a big mistake. You want to get a microphone that is reasonably accurate and software like Fuzz Measure or Smaart Live, for example. You've got to start with a really solid barometer of tools.

Boundary interference is really important for people to understand. Low frequencies are somewhat omnidirectional; they don't just fire out with a trajectory from the front of the speaker the way the other frequencies in the spectrum do. They fold out and go around the sides and back—they go everywhere. So, if you have a speaker that's standing somewhere in the middle of the room, or not flush with the wall, the low-frequency energy goes behind the speaker and to the sides of the speaker, and then it regenerates off of the surface of the boundaries, and it arrives at the listener at a different time interval. That causes a deviation in the frequency response as a result of that phase information.

Grueneisen: In many cases, proper speaker placement just comes down to some basic ground rules. Maybe the most important thing is that there is symmetry to the room, so that the speakers are set up along an axis that is as symmetrical as it can be, and that means that the distance to the walls is the same on both sides, that the room itself has symmetry to it so it doesn't, for example, open up to a very large area on one end and is really confined on the other end.

If the room is not arranged symmetrically, it will distort the information you get from the speaker, because the room interacts with the information so much. The bass response can be very different in that case, and on a higher-frequency level, you would have very different reflections; you would have very different room modes. The distance to the wall affects the time that the sound takes to be reflected back, so if it's not symmetrical that time will be different to different walls and different elements.

Are there any prefab or DIY solutions you would recommend to correct acoustical issues in a room?

Manzella: We work a lot with RPG, so I tend to default to their products. They make a selection of off-the-shelf low-frequency absorber products, including their Modex series, which are membrane absorbers that are covered in fabric. They make triangular-shaped ones for corners. They will tune them at specific frequencies, so if I measure the room and notice that there's a particular buildup at 63Hz, we can buy traps tuned for 63Hz. They will also build them in flat boxes;

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the depth depends on what frequency you're talking about, but it's the kind of thing we can hide in ceilings, so I end up recommending their products quite a bit.

One thing I think that everybody needs in their small room as well is broadband bass trapping—not just tuned bass trapping. This is also on every DIY site out there: Put a bunch of rigid Fiberglas behind fabric in a framing system, and put that in a corner. There's a lot of low-frequency information congregating in the corners of every room. So if you put in some Fiberglas and porous absorption, you'll turn a lot of that energy—through molecular friction—into heat, and you'll calm down a lot of that low-frequency information that's bouncing around in and building up at the boundaries and corners. That will always help; you can't have too much of it. A popular misconception is that if there's not enough bass in my room, I have too much bass trapping. No. If there's not enough bass in my room, I don't have enough bass trapping.

Pelonis: If you look at those Modex Edge products on RPG's website, you can download their brochure, and you'll see the performance specs. The results that are plotted on graphs are actually of a room that I did. This product isn't super cheap, but you can see how it very gradually transitions from reflection to absorption as it gets into the lower frequencies, and you don't have a bunch of big dips and peaks and valleys. Most low-frequency devices don't do that. They're peaky, or they have big holes and they're not gradual, and the idea is that, because this thing is faceted, it causes dispersion, say, on the back wall; it very gradually transitions from low-frequency absorption and high-frequency dispersion, and you get really natural responses.

If you can't afford to buy RPG products, you can build your own makeshift Home Depot low-frequency absorbers. One of the best ways to do this so that it's not lumpy is to get a product like Bonded Logic; it's nontoxic cotton insulation [bondedlogic.com]. You can just sort of stuff that in the corners a couple of layers deep and put a piece of stretch fabric across the front of it, and although it's not going to transition into diffusion the way the Modex Edge product does, it will settle down the low-frequency modes considerably.

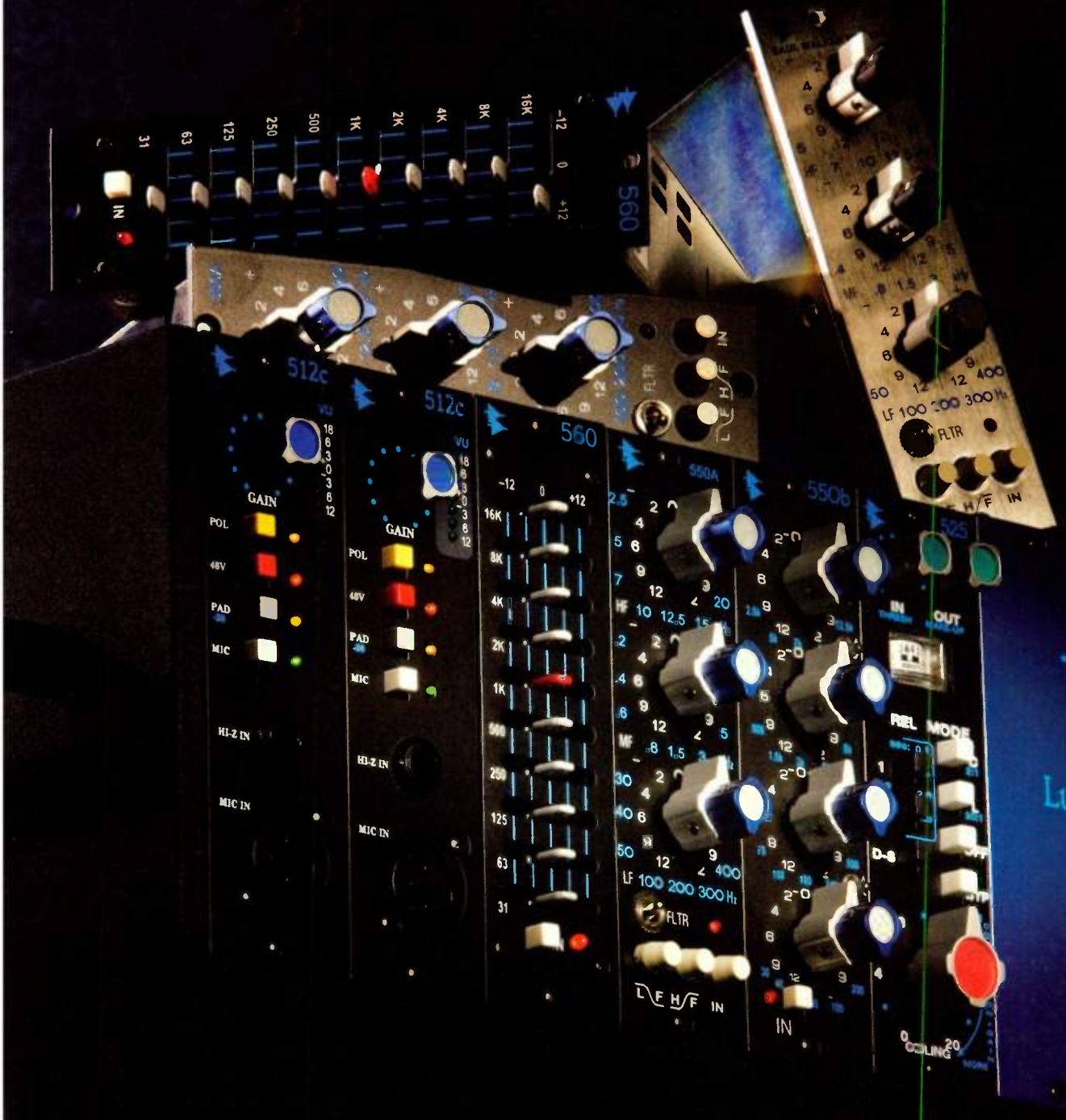
THE EXPERTS

Francis Manzella is a former NYC studio engineer who has operated FM Design (fmdesign.com) for more than 25 years. Manzella's projects include studios for large commercial concerns such as NBC, UMG, and Virgin Records; private studios for Joe Perry and Harry Connick Jr.; and a host of other recording, mixing, and mastering facilities, large and small, nationwide. Manzella is also a co-developer of the Griffin loudspeaker line.

Chris Pelonis operates Pelonis Sound and Acoustics (pelonissound.com) from his home base in Santa Barbara, CA. Pelonis's client roster includes big names such as Disney, Sony, and Skywalker Sound, and he's completed numerous private studios, including recent work for the members of Third Eye Blind and for actor/artist Jeff Bridges, for whom Pelonis also serves as touring guitarist/musical director. Pelonis has also developed his own Signature Series of studio speakers.

Peter Grueneisen is the creative force behind Santa Monica-based design firms studio bau:ton and nonzero\architecture (bauton.com). He's completed hundreds of audio facilities since co-founding bau:ton in 1990, including studios for 20th Century Fox, NBC Universal, Sony, and DreamWorks Animation, and individualized workspaces for composers within Hans Zimmer's Remote Control Productions. A recent addition to Grueneisen's company is a design/build branch called Greeniron Constructs.

Feast Your Ears.



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Grueneisen: There are a lot of manufactured acoustical products now, and I think that's been getting better over the years. Magazines like *Mix* and *Electronic Musician* are actually a great resource, as well as the Internet—look at the ads and articles and see what's out there. You have to be careful, though, because with these manufacturers, their one main goal is not necessarily to give balanced advice—they're primarily selling products.

What about low-cost solutions for isolation issues?

Manzella: When it comes to low-frequency isolation, the long and short of it is, it's mass and airspace. If you don't build another room inside the room, the question becomes: Can I double the mass of all these walls? Because looking at it really simply, if you double the mass, you cut the amount of sound transmission in half. But doubling the mass of an existing wall is often not that easy. I look at a lot of older apartments in New York City, and a lot of them are plaster and masonry walls—you can't double the mass of it without building another wall. So what can you do?

You can hang a ceiling if the ceiling height allows for it. That will certainly partly address transmission to above and transmission from above. Other than that, the only thing you can practically do is to address the openings—the windows and the doors. You could put a better door on. You can put door seals around the perimeter and the bottom of the door; that costs about $500 a door opening, so it's not outlandish. As far as the windows go, if it's your place, you can upgrade the windows to newer windows, which generally use better-insulated glass. You can also consider putting in a secondary set of windows, particularly in a city, where you have more of a problem with outside noise getting in.

There are a couple of companies selling secondary window systems that we often recommend. The one we most use in New York is called Cityproof (cityproof.com). They build to order what are basically miniature sliding-glass doors on a 1-inch track. They'll put up to half-inch glazing on it, so when properly installed and sealed, it makes quite a bit of difference.

Pelonis: Quiet Rock [soundproofing drywall; quietrock.com] is very good. Green Glue [noiseproofing compound; greengluecompany.com] works. RPG and Kinetics [kineticsnoise.com] and Mason [mason-industries.com] have some different types of channel clips that work nicely. I've been using RPG's CDM system a lot lately, and it's very good; that can help you with your wall isolation.

There are a few different isolation matt materials that you can lay down on a floor—put down a couple layers of something dense like cement board and MDF over that. Then there are the spring or puck isolators that end up giving you a 4- or 5-inch-thick floor, and those work pretty well. Or you can go so far as to actually pour a concrete slab over the isolator so that you have multiple layers of isolation and density and mass, but that's an expensive solution.

As far as doors and windows, Pemko [pemko.com] makes acoustical hardware that seals the door much better. You can also take matt to that door on both sides, like barium-loaded vinyl or even drywall; just putting more mass on that door will help. I've also taken those barium-coated vinyl to create flaps around the perimeter of the door, so when the door closes you've got this flap going over the seal. It's not going to seal it, but it is going to put a barrier in front of the source.

On windows, you want to use laminated glass, not dual-pane. A dual-pane window does a lot for thermal, but it doesn't do a lot for sound.

Grueneisen: I think the isolation is always the biggest issue for a personal studio because it's usually more costly to do something really effective about isolation problems if you are too close to a neighbor or a bedroom. Room selection is really the most effective tool to help with that, to put something in the right space can save a lot of money in the long run.

Your doors and windows—anything that's a weak spot—are the first things that should be treated. Put seals around the doors, so there's as little as possible air exchange when it's closed. And in addition to that, create intermediate spaces—what would be called a sound lock. If you could have a hallway with doors on both ends, that is very effective rather than just having one door. If you just have one door and somebody opens it, it's no longer there.

Other openings that are sometimes ignored are where you have your air conditioning. The ducts connect to other rooms, and the sound can travel through those ducts. Ideally you would have a separate air-conditioning unit for that space. And even here in L.A., you sometimes need to heat the space, but the equipment will need cooling all year round, so you can't actually use the same piece of equipment to do both at the same time. To really solve it, for a single space you might need two units.

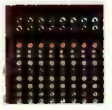
Spea nts who want to track drums in a smallish personal studio?

Manzella: Go to a big space. Often, I tell people, "Just don't do it." If you're going to maintain your situation—whether it's residential or commercial—with your neighbors, and you're not going to spend a couple hundred thousand dollars on isolation, you're going to cause anxiety with your neighbors and you probably won't be that happy with the results.

Pelonis: You would definitely need more professional advice in this case, but I've personally recorded drums in rooms that were 250 or 300 square feet, and they sounded great, but the rooms were well treated. Again when you get in those spaces, the low-frequency control is going to be pretty important, and then achieving the sound you're going for—the right amount of diffusion, absorption, reflection. It really would be best to hire somebody to help with that, because you could spend a lot of time and money building things and tearing them out, and that's not necessarily what you want to do, right?

Grueneisen: I would say, be really nice to the neighbors! [*Laughs.*] You know, it can be tricky when you're being really loud next to other people. The first thing is definitely going to be isolation, and I think all the other things we talked about apply here except even moreso: how to seal your openings, how to position your space, how to schedule when you're recording or playing—it's just a more extreme version of everything else. But like with everything else, people are very resourceful in the industry these days and they do things that awhile ago wouldn't have been possible. ■

Barbara Schultz is a frequent contributor to Electronic Musician *and* Mix*, as well as a book editor and reviewer, among other things.*



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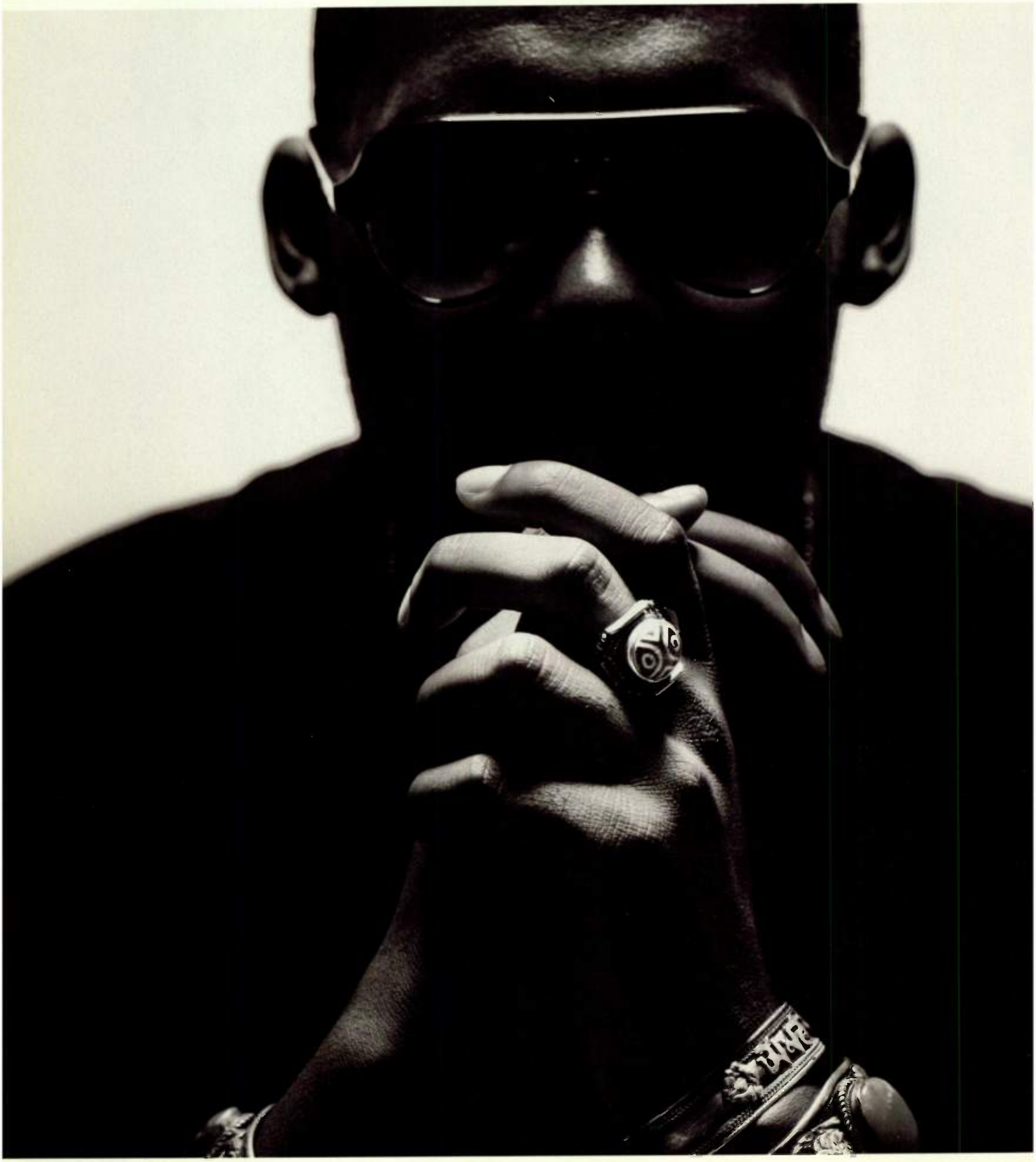

LISTEN

Flying Lotus

Moving Forward by Dialing Back on *Until the Quiet Comes*

BY TONY WARE

AS FLYING Lotus, 28-year-old Steven Ellison has released three increasingly acclaimed full-length albums, several EPs and singles, a generous amount of bumper music for programming such as Cartoon Network's *Adult Swim*, and he has helped shepherd the efforts of several like-minded circuit arsons on his personal imprint Brainfeeder. Ellison is preparing to release *Until the Quiet Comes*, his fourth long player total and third LP for U.K. label Warp, and with it he's working to break from some of his previously established tendencies and insecurities.

Prior to composing *Until the Quiet Comes*, Ellison moved from a house in L.A.'s Echo Park to one in Mount Washington, CA, upgrading his home studio's acoustic space. He migrated his primary workflow into Ableton Live. He's furthered his jazz-leaning piano-playing skills.

Most of all, however, Ellison has attempted to unlearn. His self-declared approach on the new album—which is a long-form concept inspired by holographic universes, lucid dreams, and astral projections—involves recording a feeling of childlike innocence through melodic refrains rather than the urgent overdrive of 2010's *Cosmogramma*.

Ellison's formative palette isn't exclusive. He grew up like many kids in greater Los Angeles: living inside a Nintendo; obsessing over Dr. Dre and Snoop Doggy Dogg's *Doggystyle*; developing his relationship with music while listening in the car as he traveled around his hometown of Winnetka, CA, deep in the west-central district of the San Fernando Valley.

Eventually he was passed a mixtape that revealed L.A.'s rave underground, a jungle mix rinsed with hardcore breaks by DJ R.A.W. This blend of percussive madness cut with moments of melodic clarity was a gateway drug that led him to the drill n' bass and IDM coming out of England. "I'd drive to Tower Records at 10 P.M., when it was more empty . . . and I'd take over a listening station, going to the imports and trying to hear stuff I'd never seen before," says Ellison.

He went to college, studying film at the Academy of Art University in San Francisco, delving into the concepts of motif and structure, of grain and edge enhancement, of racking focus and cohesive narrative. In college he expanded his experiences with Aphex Twin, Squarepusher, Autechre, J. Dilla, Madlib/Quasimoto, El-P, MF Doom, Django Reinhardt, the Doors, and

Led Zeppelin, among many others that encapsulated the same compelling flutter and wow as a 35mm projector.

College also allowed Ellison new physical interactions with music. Walking the city streets, Ellison got to add new, grittier context to pivotal albums. In addition, he reassessed the texture of vinyl. "Hearing Madlib, a guy who wasn't afraid to flip these jazzy records in new ways, was really important, because at the time it was a lot of Mannie Fresh productions, the No Limit sound with keyboards," says Ellison. "Madlib opened me up to exploring old records again, and I became convinced I could sample *and* use keyboards."

Perhaps the most fundamental realization for Ellison was when a friend, who has worked with the Brainfeeder label as a VJ under the name Dr. Strangeloop, introduced him to the potential of laptops. When not discussing avant-garde film, the two would talk about fringe music, and Ellison would sometimes miss class because he'd be wrapped up in creatively destroying media within his new digital sketchbook.

Years and several releases would pass, though Ellison never forgot his initial fascination with G-funk's repetitious drums, whistling bass and meticulously sequenced string machines and piano solos. Nor did he neglect his Technics 1200s and stacks of wax, slowly amassing a quite sizeable personally sampled sample library. For a period, he did concentrate on his film background, however, assembling some materials for a documentary on his great-aunt, meditative jazz pianist Alice Coltrane (wife of pioneering saxophonist John Coltrane). The documentary has yet to materialize, but this bloodline is admittedly beyond the public domain of influences, and the family lineage partially explains certain chord choices and the interest in astral mystical states that permeates *Until the Quiet Comes*.

First and foremost, however, Ellison retains the sense memory of when he was just delving into his digital-analog hybrid sound full of blown-out contrast and A-B moments of striking transparency. "My biggest influence is not wanting to repeat myself, unifying the album around ideas that feel brand new and . . . make an innocent feeling come alive," says Ellison. "When I tinker with music, I try to remember that I'm always going to be a student of it."


Mastering engineer Daddy Kev

Sitting in front of his Focal Professional Twin6 Be monitors, flanked by a Moog Voyager, Fender Rhodes, and Wurlitzer electric pianos and an Access Virus TI synth, among other key inputs, Ellison's cockpit is a collection of relatable tools. It's here he drafts the pressurized fragments and subtle artifacts of his rustling dream world's retro-futuristic infrastructure, meticulously nudging clips off the grid, flipping psychedelic soul synths over layered irregularities. But to him it's nothing out of the ordinary.

"I think a lot of the theories about my production are funny, because I don't do anything that is science fiction," says Ellison. "I use the same shit as everybody else, it's just that my ideas are a little different.

"Do I bit-crush? No, definitely not," he continues. "Do I drive things in the master? Absolutely; it's nothing unusual. For my drums, I simply play them in myself and don't quantize it. I don't see what's so mysterious about that; I've just got rhythm. The only thing I use as a controller is an Akai MPK49 and a mouse. I don't even use the pads on it that often to program drums; I mostly key them in."

You can still find a Reason instance up on the MacBook Pro on occasion, as Ellison finds the possibilities in Ableton Live almost overwhelming at times. Recently he appreciates some limitations within his tools so he can focus more on mixing and arrangements rather than pure tonal pulverization. He even keeps collaboration simple. For instance, Brainfeeder artist Stephen "Thundercat" Bruner provides live bass for several tracks, and the process was as simple as plugging the bass into a DI on Ellison's Apogee Ensemble multichannel FireWire interface.

"He riffs around, maybe I'll suggest where I feel it can be more or less busy, and the combination of ideas manifests itself into a bass line," says Ellison. "All that matters to me is getting the idea into the box with the levels flat. Once it's there, I have more control on the actual tone and how I want to maximize it, unify it with other samples and virtual instruments." Additional elements include live strings, as well as vocal contributions from Niki Randa, Laura Darlington, Erykah Badu, and Radiohead's Thom Yorke.

Push play on *Until the Quiet Comes* and round piano runs, plucky chords, panning shakers, and a resounding thump coalesce. Even when it sounds like jazz brushes are turning into whips of static electricity and the shaking of pens in a cup is in a heated argument with some liquid funk, there's less of a feeling that the 8-bit themes of imaginary video games are powering up to conspire with a dissident breakbeat. Whereas on previous albums there would be a tendency to fold realities in on one another, the new LP feels like it's more composed around a true north. "One of the reasons I named this album what I did is because I feel there's so much chatter in my mind, around me, so I

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worked so hard to find that quiet, confident space to just be me."

Another way you could look at the title is in light of the album's actual dynamic range, which lends credence to the saying that the master is now the student. "I've been learning to bring things down before I even start," says Ellison. "I'll start composing a track at like –8dB, then I have all this headroom to play with afterward. I've learned how to tuck and limit things, learned to EQ before you limit. I learned a lot of things late, which is awesome because . . . these opportunities to learn make me want to work even more, to take advantage of this new knowledge.

"I can get what I was getting, but with an even better result now that it's pulled down more before the master," he continues. "I didn't think in terms of, did I use this short attack, this long release, and will it work again, but through trial and error and multiple mixes, I get it to where it sounds good. There's more restraint in this record and that was a lot of fun to explore."

A lot of this insight into more efficient compression has come about through interaction with Daddy Kev, Alpha Pup Records label head and the mastering engineer for the majority of FlyLo releases. Ellison met Kev through the Low End Theory, a "producer's lounge" that Kev launched every Wednesday at the Airliner in Lincoln Heights, Los Angeles. The two met when Ellison brought his laptop to freestyle at the beat cypher, and they have been friends for much of the past decade. One of the reasons Kev feels the pairing works is because he understands the mentality of producers who also do their own mixdowns, and what type of input they want in the process.

"I learned a long time ago, the best engineers know how to shut the f**k up and just work, and I pride myself on being able to do that," says Kev. "The mastering phase for Flying Lotus isn't just a technical process. It's him giving birth . . . and it's very intimate. We may go through multiple mixes so a certain 808 can sit right in the pocket for him, and while he's finishing his edits its my job to boost just the right things by a decibel or two, and keep things sonically correct.

"Flying Lotus mixes in general have a lot of high end that needs reduction, so I want to say I'm spending a lot of time from 1kHz up," says Kev. "And he has a lot of complex stuff happening in that range so I have to be really careful on what I'm locking into and bringing down; my EQ settings are always the thinnest possible as I'm trying to do delicate surgery up there."

To maintain and reinforce dynamics, Kev uses a digital/analog signal chain on the mastering rig at his Echo Chamber Studio in Eagle Rock, Los Angeles, and he prefers to rely on EQing rather than limiting to get desired levels. First the Flying Lotus mixdowns go into Pro Tools 9 on a Mac Pro working at 96/24 (to comply with Mastered for iTunes

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stipulations). Here Kev applies Brainworx bx_digital V2 EQ ("I always mono the bass from 90Hz down," he says) and uses Sonalksis SV-517 mk2 Equaliser plug-ins for the more detailed work.

"I like the Brainworx because of its fidelity and it allows you to do very, very slight adjustments to the EQ curve," says Kev. "It also does a frequency-isolation thing. Say you're sweeping up and down to see what you want to adjust; it will only play back that frequency +/-100Hz, to just give you that section when you're trying to find what you want to notch out. The Sonalksis I think is very neutral, but with a nice analog feel, and it has a setting that displays a kind of spectral analysis of the waveform as you play back, so you can see what's happening at a frequency."

The signal then goes out an Apogee Symphony I/O into a pair of Avedis e27 EQs, an Empirical Labs EL7 FATSO Jr., and an SSL FX-G384 gray-faced stereo bus compressor. "The FATSO I only use for the warmth effect it has, which is kind of like a high-frequency limiter where it ducks out the really nasty stuff," says Kev. "I don't use it as a compressor at all. The SSL I hit for the compression at 1dB max, more like a half-decibel; gain reduction is barely moving the needle." The signal then goes back into Pro Tools, where Kev uses the Sonnox Oxford Limiter gingerly.

Monitoring with Focal Professional's CMS 65 and the CMS SUB, as well as a club-oriented QSC KW153 and JBL SRX728S rig, Daddy Kev helps solidify the familiar Flying Lotus crunch, but with harmonic issues toned down. Kev recognizes an influence on that reduction is the result of Ellison's new philosophy toward excess.

"He used to be printing mixes that were completely maxed, so this record was definitely different, as he provided much more headroom," says Kev. "There's usually quite a bit of sidechaining, and he uses that kick to trigger compression on a bunch of different organ, string, bassline sounds, whatever he wants to be affecting. I think since he's moved and upgraded his monitors, he's become more aware of the limitations of plug-ins, how far he can really overload things without the signal falling apart. Looking at way back until today, his compositional understanding, his ability to balance arrangements, has really moved forward into a less-cluttered headspace."

Indeed, *Until the Quiet Comes* is a Flying Lotus album more redolent with salient tones, and Ellison is proud to limit distracting frequencies and unnecessary segues. "I've been working diligently to explore theory, but put clear feelings into the music, too," he says. "As long as technology has allowed us to distribute music, I have been in the mix trying to find stuff, and now I'm realizing the most fun, effective ways I can share that feeling of finding things that aren't meant to happen together, but work."■

Tony Ware, a writer-editor based outside Washington, D.C., is more blooming onion than Flying Lotus; multilayered, sometimes a bit heavy, but always flavorful.

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Chiccarelli with singer/songwriter Keaton Henson at Sunset Sound in Los Angeles.

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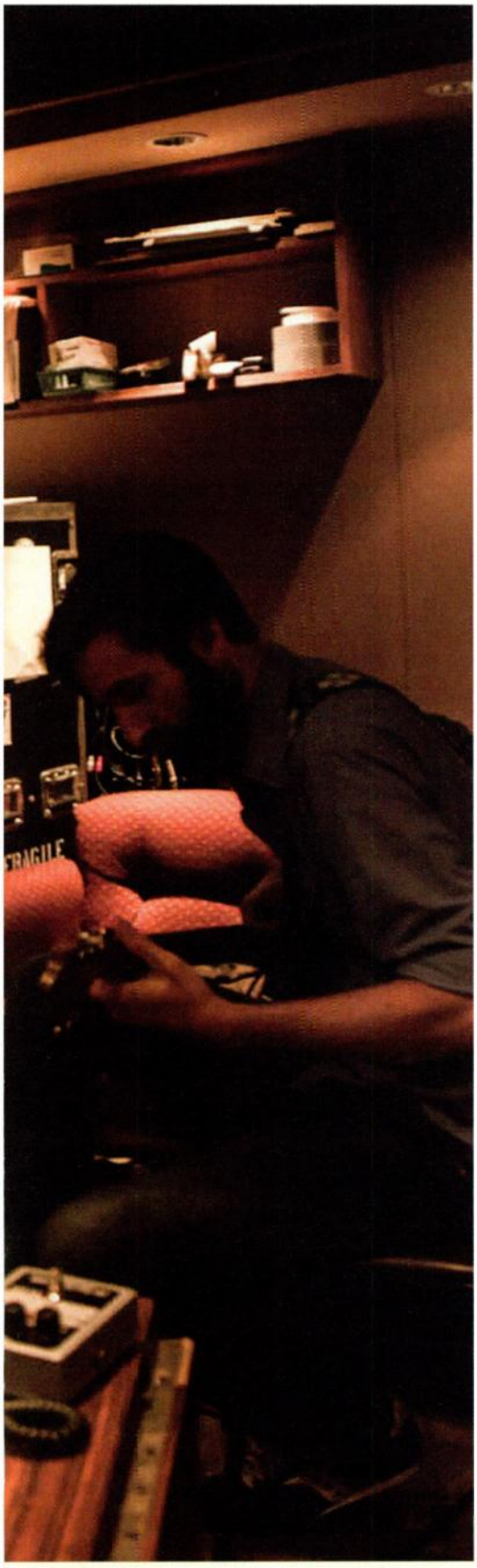

Joe Chiccarelli

Why less is more, but talent is everything

BY CRAIG DALTON

IT'S HARD to imagine anyone with a more diverse collection of successful major album and singles credits than Joe Chiccarelli. Having jumped at the chance to engineer with Frank Zappa in his just-getting-started days, he hit the ground running and has been moving along at a great clip ever since. The list of recordings bearing this multiple Grammy winning producer/engineer's soulful touch is as long as it is broad. From Etta James to Alanis Morissette, from U2 to The White Stripes, Chiccarelli's devotion to building creative mixes, showcasing stellar voices, and crafting enticing aural atmospheres points to the diversity of his own outstanding talents as an engineer, musician, and producer.

Chiccarelli has just finished up a number of projects, and iTunes and radio airwaves are buzzing with his signature production sound and creative influence. On some of these albums he's the sole producer, and on others he's sharing the role. Producing the new Alanis Morissette album along with composer and producer Guy Sigsworth (Madonna, Seal, Bjork), has given him new insight on collaborating in the studio, and his efforts are currently riding high on the charts with Morissette's "Guardian" and Jason Mraz's new single "I Won't Give Up." *Electronic Musician* caught up with him while he was on a break from the action in Los Angeles. Always talkative and eager to share, he was happy to discuss his personal recording philosophy and the technical and performance particulars of albums you've heard or will be hearing soon.

You've been credited by many with having a great propensity to showcase amazing vocal performances in your work. There is a real up-close and personal connection that seems to be going on from the singer to the listener on many songs.

A song is only as great as the singer. I'm really old school about that. A great singer makes your job really easy. In a sense that's the first and foremost thing that you hear. Maybe you hear a great guitar hook in the intro of the song, but if the vocal and the story don't carry it through the three-and-a-half minutes or whatever it is, you're not interested. It's still all about that, and recently I've been very lucky to have worked with such great singers such as Alanis Morissette and Jason Mraz, but also with others

like Elton John, Beck, and Bono. These are people who are just masters of pumping big emotions through a microphone. I think it's the key, getting it so that you're committed and connected for that entire vocal. Sometimes it's a simple thing, just one magical take. Jack White can be the master of that; when he's on, it's really simple. Other times, it's about crafting a vocal performance. Jim James from My Morning Jacket is great at knowing how to layer his voice and use echo and effects to deliver a beautiful emotional blanket. Alanis is such a pro after so many albums; I mean, she just gets up to the microphone, and two or three takes and you're done. She's got a beautiful tone, and it's pretty easy that way.

What do you do to as far as your preproduction process before tracking sessions?

It's something I definitely take a lot of time with. I make sure that songs are in the right key for the singer. However, sometimes it's a matter of doing the opposite—putting the song in a key that may not be the most comfortable but provides them with a different tone. They may have a big, strong voice that's really full, and if you put them on the lower edge of their range, it can make them sound maybe softer or more vulnerable. From there, it's choosing the arrangement and instrumentation so that it doesn't fight the vocal, choosing a guitar sound that doesn't swallow the singer. It's easy to get a big guitar or a big drum sound, but I'm always keeping the singer in mind. When I'm working in rehearsal for preproduction the singer is there and singing along; same thing goes for when I'm tracking live, and if the singer isn't there, I like to have a guide vocal that I can build things around. It's really important to me that the singer be the focus, no matter what the band is about, soundwise.

On Alanis Morissette's new album, *Havoc and Bright Lights*, it must have been an unusual way to work, with Guy Sigsworth programming the songs first and then you working backward with the live tracking...

It was a challenge, indeed; it was almost like the "remix" album was done first, having sort of reverse engineering going on. It was actually kind of fun; she was great, in that she gave me a lot of freedom. I used several members of her band but coincidentally a lot of them were people that I've worked with before on other projects as session musicians. The tracking sessions included Victor Indrizzo, the L.A.studio drummer who also plays in her band; Sean Hurley did most of the bass playing along with Paul Bushnell; Dave Levita, who is her live guitarist, played almost all of the guitars on the album. Lyle Workman, an L.A. session guitar player and film composer , did a lot of the big rock guitars as well. These are people that both Alanis and I have great relationships with. They understand her and what she likes, and that kind of made it easier for me.

You seem to have a relaxed way of getting involved in the songs, of inserting your influence into the arrangements and production values—almost like you are a member of the band.

Most artists come in with an idea of what they want; it's rare when someone doesn't. No matter what the credit reads it's always an equal collaboration with the artist. Truly, It's almost always the songwriting that determines where an album is going to go. Sometimes we'll do a number of very different versions, just trying to find the most honest place for the song. On [Jason Mraz's] "I Won't Give Up," we did a very simple acoustic version, which ended up being the current single version out now, but also we did a blue-eyed soul, Memphis-sort-of-feeling version; and we did a much more uplifting pop ballad version of the song, as well. You certainly want to serve the song, but at times you also want to serve the audience and the record company and a lot different people, so you'll try different things to see what will have the most honesty and impact.

There usually seems to be a very prominent percussion sound going on up front with the vocalist in your mixes that works very well. Can you elaborate on that?

Groove is really important, no matter what the music is; it's the vehicle in which the vocal rides. It's like the train or the automobile underneath it, so I really to make sure the groove kicks the vocal in the butt, that it percolates it, keeps it alive. Whether it's the syncopation with the kick drum, or if it's something more intricate, I definitely pay attention to that.

You learned your craft in an era when commercial studios were more vibrant, and you gained knowledge in that community atmosphere. What can you tell people who are working in more isolated personal setups; how do they avoid "cabin fever"?

You know, that's really a good question! That's easy to get caught up in, even if you're working in a commercial studio. The home thing...for me, it's tricky. It's nice having the "no pressure" environment where you can experiment and try things that you might not if you knew that you only had a certain amount of days or budget restrictions. It's easy to get locked in routine, though. When I was doing the album with The Shins, *Wincing The Night Away*, James Mercer had worked on his own on the album for a while before I came in. He needed someone to bring in some objective opinions. I spent probably three months working on that record to bring an outside perspective. I just kind of showed him some possibilities and options that he couldn't see himself, because he was working in a very isolated environment on his own.

It doesn't always work with other art forms, but certainly some of the best music can come from great collaborations. You look back and whether it's George Martin and The Beatles, or Gus Dudgeon and Elton John, or Lanois and Eno with U2, those are great collaborations. Having somebody there to help you see something that you missed is a great asset. I even find that myself. I'll be working on something for months and somebody will all of a sudden come into the room and hear a track for the first time. A great A&R person can be a major asset to me; someone who can remain objective throughout the whole process. He or she may say something like, "I know you guys are really loving this track, but the groove in the verse isn't as great as the groove in the choruses." Or maybe, "Do you think this one section you have as a breakdown, maybe it's too long or it doesn't need it at all." It's amazing to have someone come in and give new perspective on something you may have been working on for months and you can't see it clearly. Objectivity is really a wonderful gift.

Having stepped right into working with Frank Zappa early in your career, what ideas did you learn from him that you find you are still using today?

The best thing that he taught me is that there

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are no rules. He tried to break every rule wherever possible. [laughs] The minute you box yourself into a certain way of working, you're dead. I try to embrace change and challenge.

What do you look for in demos when you are starting a project?

It's different for different kinds of music; obviously, from somebody who is doing something that is beats driven, I would want something that has a major sense of what the groove is. For a singer/songwriter project, I want demos that are very basic. I'm happy with a very lo-fi iPhone recording of something that's just guitar and voice or piano and voice. That way, it leaves me room to imagine all of the possibilities. Occasionally, people come in with fully formed demos that sound great, and you think, look, don't change anything, except here in the bridge where you kept the same color going for the rest of the song; maybe it could take a left turn, maybe be more dramatic. I'll just be tweaking them up a little bit. Certainly, the home-recording thing is great; you can make demos that are record quality.

Can you give us some advice on producing a home/personal-studio recording?

On a recording level, I think about space. People are so keen to try all of their tricks and layer things to such a large degree so that there's no space in the recording whatsoever; it's just inundated with overdub after overdub. I get many recordings where there's like a hundred tracks of things on there. You know, you can get by very well with just two great guitar tracks rather than forty of them layered in the same range and same sound; as a result, it just sounds small. Sometimes two well-recorded, well-orchestrated guitar parts sound way bigger than forty tracks all layered in the same range, same tonality, same guitar; they all kind of cancel each other out.

That's certainly a technique that has served the Rolling Stones well.

There's a lot to be said for that, and Keith is the master of really coming up with one part that slowly evolves over the song, and it kind of incorporates those five guitar parts you are thinking of, but those parts happen at different moments, helping build the song and taking it to another place.

It doesn't always work with other art forms, but certainly some of the best music can come from great collaborations.

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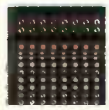
How do you go about tracking in the studio? Do you like to have a live feel?
Tracking-wise, I definitely enjoy when everybody is in the same room at the same time, feeding off each other; there is that sort of "X factor" that happens when you get a lot of great players in a room. If I'm doing bands, I don't like to layer the records; I like to build it as a band. All great bands kind of fill in all the extra pieces by playing together. That's the magic of a band like U2. Sometimes it may seem that the parts are very simple, but when you put it all together, it's like this chemical explosion. Getting people in the same room is important. The Café Tacuba record I'm working on is being done in studios and clubs and even restaurants. We're inviting guests, 60 to 150 people to sit in the room with them while they're playing. It's still a recording session, the band is wearing headphones and things are miked up the same way as in a studio, but there's a select audience for emotional support and feel. It's a challenge, of course, with a P.A. system in the room and there may be other distractions, but there is something about having that extra energy that's inspiring.

What's coming up with you?
Well, I just finished an album for this really great U.K. based artist named Keaton Henson; he's a singer/songwriter. The songs are very intimate, stripped back, very vulnerable, and personal; he sings very quietly. Emotionally, the songs are very strong. I mixed the recordings up at 25th Street Studios, Dave Lichtenstein's studio in Oakland. He's got a great-sounding room and console. I'm tracking another band up there this fall—Long Beach based Hellogoodbye, who had a huge hit a few years ago on Drive Thru Records..

Later in the year I'm working with Bernard Fanning, the former singer of the huge Australian band Powderfinger. As well as being in the midst of co-producing this record for Café Tacuba, a really amazing Latin band that's been successful for 20 years.

Can you tell our readers something they may not know about you?
Like everybody's career, it's up and down. You have good years and not-so-good years. I'm always pushing myself to see what's next and what's new. It's important to me to be fresh; I hate getting into routines and not feeling creative or like I'm repeating myself. I'm also challenging myself designing a couple of pro audio products, and I'm working on a music TV show. I always think of those actors that do Broadway plays for years, and their ability to make it fresh every night is amazing to me. Fortunately, making new records with new artists every few months brings a new approach, but I certainly still want to bring new challenge and perspective to everything I do. ■

Craig Dalton is a regular contributor to Electronic Musician.



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A conversation with renowned producer/engineer Dave Rideau

Dave, tell us about your studio...
Cane River Studios is my personal mixing room where I now mix 80% of my projects. It is a fusion of digital and analog technology.

Who are some of the better known clients you have worked with?
Janet Jackson, Usher, George Benson, Sting, Al Jarreau, TLC, Kirk Franklin and Earth, Wind, and Fire.

What do you do there as opposed to a commercial studio?
I LOVE commercial studios... it is where I have spent most my career. But changes in our business have forced producers to find ways to get projects done for less without sacrificing quality. Recording in big rooms with the interaction of musicians then editing and mixing in a well designed home studio seems to give us the best bang for buck.

What acoustic problems did you have?
I had a decent sounding room before but at higher volumes certain gremlins raised their ugly heads, mostly evident in the low-mids.

How did you configure the panels?
I have a wall directly to my left where there is no opposing wall to my right. I decided to go floor to ceiling with 3" thick panels to make this wall "disappear" as much as possible. Then I configured 12" x 48" Broadway 2" panels on the parallel walls with space between them to control the first order reflections. I then added a MaxTrap corner bass trap.

Did you do the set up yourself?
I did. I like doing this sort of thing. I actually got my first job in the industry as part of the crew that built Westlake Recording Studios in Los Angeles.

What improvements have you noticed?
The room sounds great! The sound stage is more focused and I noticed a big improvement with a tighter low end. I rarely playback at louder levels but when clients are over it happens. Now it sounds much less congested.

How does it translate to other rooms?
The main test I measure my mixes by is how they translate to the mastering rooms I use. The ultimate compliment you can receive from a mastering person is "I didn't have to touch my EQ". That happens more often since I treated my room with Primacoustic Broadway panels.

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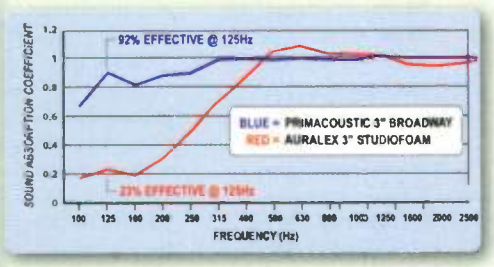

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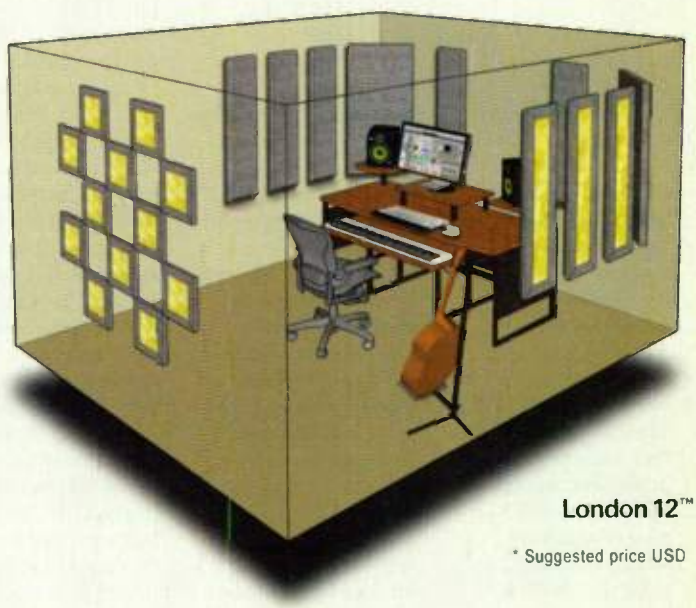

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John Cale
Shifty Adventures
DOUBLE SIX

JOHN CALE'S latest is a subterranean journey through weirdly glitched surfaces, lovably crafted MPC loops, and droning sampled vistas. Cale's rustic, dry-as-a-corncob vocals rub against catchy melodies and arrangements that recall Bowie, David Sylvain, and early Talking Heads, all of whom Cale has influenced with one effort or another. Wryly referencing '80s production styles, its MPC loops so obvious that you can hear the seams; it's as if Cale purposely used older technology for its limitations, thus producing a warmer, more romantic sound overall. A collection of insular, dreamlike songs, *Shifty's Adventures* are completely inside his mind.
KEN MICALLEF

The Souljazz Orchestra
Solidarity
STRUT

Canada's Souljazz Orchestra gives itself a lot of rope in utilizing different styles. On *Solidarity*, the focus is on Caribbean rhythms, tropical percussion, African beats, and Latin swagger. Filtered through the most ancient instruments the Orchestra could lay its hands on, it is the heavy-duty brass that dominates *Solidarity*. Prominent honking horns blast through multilingual lyrics, most of which are incomprehensible. It's about the vibe that's being created, which is one of big-band jubilation exemplified on "Serve and Protect."
LILY MOAYERI

Adrian Sherwood
Survival & Resistance
ON-U SOUND

A producer, remixer, label owner, and tastemaker for more than three decades, Adrian Sherwood surprisingly has only three personal albums in his impressive catalog, which spans dub, post-punk, hip-hop, industrial, rave, and related rebel rockers. Whereas much classical dub aims its helical transients into spiritual perpetuity, this album corkscrews toward a more claustrophobic terminus, drawing comparisons to Massive Attack's *Mezzanine*. Inspired by global socio-economic pressure, Sherwood lets burnt circuits slink through decaying reverb shots and into reflective arrangements.
TONY WARE

Toddla T
Watch Me Dance—Agitated
NINJA TUNE

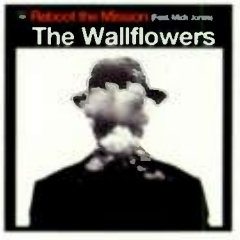
Toddla T, specialist in raucous, grime-laced party tunes, enlists his hometown idols, Ross Orton and DJ Pipes, to remix his last album, repackaging it as *Watch Me Dance—Agitated*. Anchored in skanky dancehall riddims, gutter rhymes, and street soul vocals, *Agitated* brings an even dirtier touch to Toddla's already filthy beats. This re-set lends itself nicely to Toddla's well-shaped originals like "Badman Flu," now "Badder Man Runs." Leisurely dub tracks serving as breathers, slowing the mood.
LILY MOAYERI

The Helio Sequence
Negotiations
SUB POP

Portland, Ore. duo the Helio Sequence is cresting off a flood of compounding instances, in part literally. After heavy rains ruined the ambient indie rock group's studio, singer-guitarist Brandon Summers and drummer-keyboardist Benjamin Weikel rededicated a newer, larger space to capturing warmer analog impulses than on previous albums. The self-recordists excel in commanding racking focus, selecting initially blurred background washes and gently tightening the mix to flush these treatments out, concentrating them into crisp psyche-folk glazes.
TONY WARE

Firewater
International Orange!
BLOODSHOT

Firewater frontman Tod A resides in Istanbul these days, and that tells a lot about the sound of Firwater's latest punk record *International Orange!* Produced by Tamir Muskat of Balkan Beat Box, this musical culture clash joins powerful political lyrics with mostly Eastern European and Middle Eastern rhythms and horn parts, and ethnic strings, all laid on top of a solid rock 'n' roll foundation. If The Clash had made a Turkish record, it would go something like this.
BARBARA SCHULTZ



The Wallflowers
Glad All Over
COLUMBIA

Speaking of The Clash, Jakob Dylan has always counted the seminal punk band among his greatest influences, and the album's first single, "Reboot the Mission," a duet with the Great Mick Jones that leans heavily on the funky sound of "The Magnificent Seven." The rest of the record has a lot of soul, too, with complex, varied arrangements showcasing Dylan's strong songwriting. Highlights include the piano-and-guitar-noir "It's a Dream," and the shimmering, anthemic "Won't Be Long."
BARBARA SCHULTZ

LUST

Roundup

Acoustic Treatment

It's the best way to nuke "bad vibrations" in your studio

BY CRAIG ANDERTON

PEOPLE SCREAMING about the importance of acoustics were voices in the wild not that long ago. But as more studios shift into homes and garages that were never designed with acoustics in mind, more people are asking the question, "Why does my music sound fine in my studio but horrible when I play it elsewhere?" and the answer is . . . acoustics.

Savvy studio owners hire professionals to do the design work for them. This process, while not necessarily cheap, is often the best investment any studio owner can make; acoustic treatment will be the one piece of "gear" that you'll use on every recording and every mix. A pro knows exactly where placing bass traps, absorption, diffusion, and the like will do the most good—and has the tools to perform any necessary tweaking. (For expert advice from top studio designers, see our "Studio Makeover" feature on page 26.)

But what if, for financial reasons or just because you want to learn, you decide to treat your studio space yourself? Fortunately, companies that make acoustic products are more than happy to educate you about how it all works, in the hopes you'll buy their products. (See the sidebar on page 58 for recommendations on some good internet resources, including a few product lines from top studio designers such as Hanson Hsu [Delta H designs], Carl Tatz [Auralex], and Chris Pelonis [Pelonis Sound]) Meanwhile, here are the terms and concepts you need to know before you start your journey to seek out and destroy nasties like flutter echoes, cancellations, standing waves, acoustic coupling, and more.

Fig. 1

Fig. 4

Fig. 2

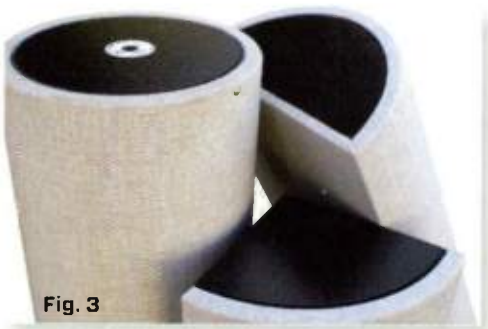


Fig. 3

Fig. 1. Primacoustic sells turnkey packages as well as individual products. The London 12 Room Kit is a live-end, dead-end (LEDE) room design; it includes 22 panels in a choice of three colors, and is designed for rooms that measure approximately 120 square feet.

Fig. 2. This shot shows RealTraps' Diffusor Modules, MiniTraps in the wall/ceiling corners, and Corner MondoTraps and Fat MondoTraps in the wall/wall corners.

Fig. 3. Acoustic Sciences offers Full-Round, Half-Round, and Quarter-Round Tube Traps. The Full Round version rotates to present sides that provide absorption or diffusion; the Half-Round and Quarter Round versions combine absorptive and diffusive properties.

Fig. 4. This plug-in GUI from ARC version 2 shows room response before (orange line) and after (white line) correction.

Absorption Untreated rooms have several problems, but the most common involves sound waves bouncing around inside the room. On their journey they combine and cancel each other out, causing peaks and nulls—in other words, your room is a gigantic parametric equalizer with thousands of bands, all adjusted by a gang of psychotic monkeys.

Absorption absorbs sound, so absorptive treatment would seem to diminish most sound that bounces off walls. However, problems are often most pronounced at low frequencies, which require specialized solutions, usually in the form of bass traps. This is because in smaller rooms, the wavelength of a bass sound's single cycle might be longer than the room itself, and cannot be controlled by thin foam panels and other wall treatments; typically, separate absorbers control midrange/high frequencies and low frequencies (see Figure 1). Fiberglass material designed for acoustics (covered with fabric for both aesthetics and to contain the fiberglass) is a popular absorptive material, as is acoustic foam.

If you can afford to reduce your room size somewhat, creating a second sheetrock wall offset at least a couple inches inward from an existing wall can also help control reflections. Sheetrock has some "give" so it absorbs sound, and the airspace between the two walls also helps. This approach also tends to keep sound within the room by decoupling vibrations from the "public-facing" walls. For similar reasons, absorptive panels are also offset inward from the wall somewhat.

Diffusion Absorption won't stop all reflections, so diffusion helps make those reflections less objectionable. When rooms have parallel surfaces, buildups happen at frequencies that relate to room resonances. If non-parallel walls aren't an option, diffusers mounted on walls scatter the sound in multiple directions to defeat these resonances. Diffusors on non-parallel surfaces are even better. Between absorption to reduce reflections and diffusion to create more desirable reflection characteristics, you can cover most of a room's inherent problems (see Figure 2).

Effective diffusion can reduce leakage if one instrument is reflecting off the wall into a mic for another instrument. Scattering the sound waves can reduce the amount of ambient sound hitting other mics.

Acoustic Sciences' portable, cylindrical TubeTraps (see Figure 3) represent an interesting combination of absorption and diffusion

Super Silencers: Prefab Vocal Booths

The following tip is excerpted from The Studio Builder's Handbook *by Bobby Owsinski and Dennis Moody. For more information on this informative guide for improving the sound of your home studio on any budget, visit Alfred Music Publishing online at Alfred.com.*

Sometimes the only thing that's needed is a really quiet place to record vocals or voiceovers. You can build that space yourself, but if you're in an apartment, condo, or some space that you plan on leaving someday, it's best to be as portable as possible. That's where a prefab vocal booth comes in.

The beauty of a prefab vocal booth is that not only is it portable, but it's capable of giving you great isolation as well. Most of them are easy to float, so it can become a room-within-a-room, and the acoustics are controlled, so it's not too dead. They're so quiet, some night owls in big cities like New York even use them to sleep in during the day. So what's not to like?

If you've ever spent more than 15 minutes in a totally isolated area, you know that the heat soon becomes oppressive, which means that some sort of climate control is required, and that's where the expense comes in. While most manufacturers of vocal booths have an option for HVAC, the whole idea becomes a lot more costly and complicated once that factor is introduced. Most vocal booths will have a heat exchanger that will keep the heat down, but still may be too hot for extended sessions.

Another issue with prefab vocal booths is that they provide excellent isolation at mid and high frequencies, and only good isolation at low frequencies. If you're only concerned about recording vocals or narration, this will never be a problem, but if the booth is large enough for drums, you have to take that factor into account. One of the best reasons to purchase a prefab vocal booth rather than attempt to build one yourself is that building a small room that actually sounds good is far from trivial. You may end up with a worse-sounding space than when you started if you try it yourself and do it incorrectly. Manufacturers of portable booths spend a lot of time perfecting the acoustics of the space, so the products are pretty good right out of the box. Many manufacturers also make enclosures for guitar amplifiers so you can crank till your heart's content without affecting your neighbors. While these work pretty well, remember that an enclosed space could cause your combo amp to overheat unless it has ventilation, which might compromise the isolation that you're getting in the first place. Non-ventilated enclosures should work well with speaker cabinets, though. Just like with premade acoustic components, be sure to check out the shipping and packaging costs before you order, as they can be prohibitively expensive. Vendors for vocal booths, drum booths, and speaker enclosures include acousticalsolutions.com, soundsuckers.com, vocalbooth.com, clearsonic.com, whisperroom.com, and realtraps.com.

for midrange/high frequencies. On the Full-Round model, half of the cylinder is reflective for diffracting/diffusing sound, while the other half is absorptive; the way you orient the TubeTraps around a performer can help control the acoustics within that environment.

Wanted: Dead . . . or Maybe Alive Before you go too crazy with absorption, analyze your needs. Absorption reduces a room's reverb time, which generally a good thing when mixing and mastering, but may not be ideal for tracking—Jon Bonham's drum sound on Led Zeppelin's "When the Levee Breaks" proves that room ambience can be a beautiful thing. While that example may be a bit extreme, a little "air" in a room can make guitar amps come alive and add a little depth to vocals. For a more "live" sound, diffusors become more important than absorbers, as the reduction of resonances gives a more "open" feel and less high-frequency information is absorbed.

Some larger studios have LEDE (live end/dead end) rooms that conform to a standard design in which one end is live, and the other dead. So you could, for example, set up drums in the live end and guitar amps in the dead end if you plan to add ambience to the guitars during the mix. Even better, scope out your studio to see if there are other options. A nearby tiled bathroom can give a super-live sound, while a large closet that's filled with clothes can serve as a vocal booth that's ideal for narration, where you typically record dry and add ambience artificially.

Isolation In addition to room acoustics, "in-room" acoustic considerations include leakage and sound isolation. Acoustical coupling is a common isolation issue with simple solutions: For example, a "floating floor" for drums helps minimize the transference of kick drums, drum hits, impulse sounds from high-hat stands, and the like from working their way into the floor—and then to walls, other mic stands, etc. Some studios also float bass and guitar amps, which often sit on a floor and couple sound into the room.

Minimizing leakage is usually done with gobos—portable panels that absorb sound. For example, when miking a bass amp, you can surround it with gobos and place mics inside the gobo "fort." Taytrix's StackIt Gobos are like a Lego setup for gobos; you can stack them, adjust them to different angles, or even enclose a loud sound source such as a guitar amp.

Other isolation methods include isolation shields, such as Primacoustic's Crashguard, which wraps around drum mics to keep leakage away from cymbals. I've also become dependent on their TriPads, which are basically foam isolators for mic stand legs that isolate the mic stand from the floor—if you can't float a floor at the source, at least you can float a mic stand at the destination. And IsoAcoustics makes speaker stands designed to provide isolation for speakers, which of course produce a lot of vibrations. (If you have the resources, you might even

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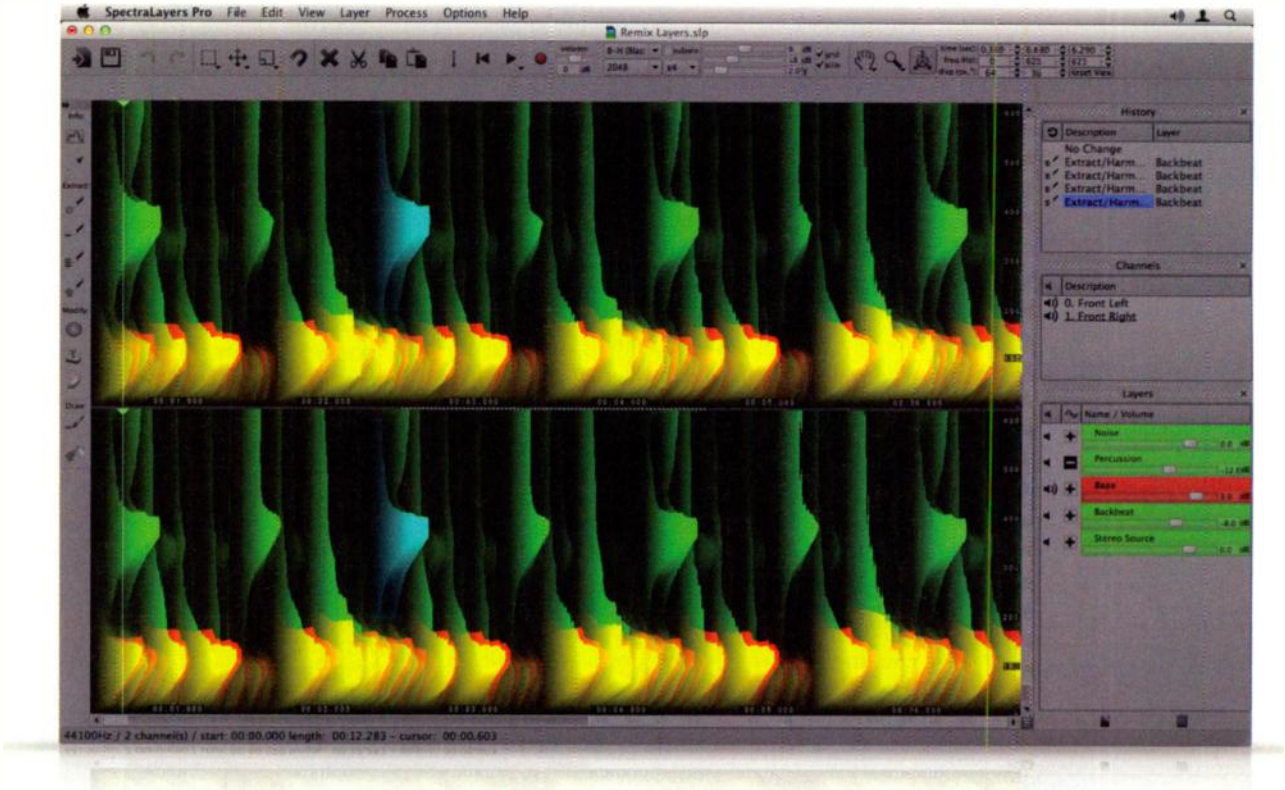

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Fig. 5. sE Electronics' portable Reflexion Filter Pro reduces room ambience to achieve a "drier" vocal or instrument recording.

consider a prebuilt iso booth; see sidebar on page 56 for tips.)

Getting Attached Don't overlook the importance of the way you attach absorption panels or diffusors to the wall, as some adhesives eat away at foam. Auralex has several adhesive products, from Tubetak Pro Liquid, designed for permanent mounting, to TEMP•Tabs, which are designed to be temporary and are ideal if you plan to move your studio around (or want to live with a particular treatment for a while before committing to a permanent installation).

Quick Fixes I'm generally not a fan of quick fixes, but when all else fails, these simple options can make a huge difference.

- **Primacoustic Recoil Stabilizers** These mount under speakers, providing isolation and stabilizing speaker motion. It seems like snake oil, but after extensive testing (because frankly, I didn't see how the "miracle cure" claims could be true), there's no doubt it makes a major, audible difference in terms of bass, imaging, and an overall "tighter" sound.
- **Bright Star Audio Isonodes** These reject vibration—put them under your portable hard drive, tube amps, units with transformers, and the like to quiet them down and minimize "bad vibrations."

MANUFACTURER LINKS

Acoustic Sciences acousticsciences.com
Acoustimac acoustimac.com
Audimute audimutesoundproofing.com
Auralex auralex.com
Clearsonic clearsonic.com
Creative Insanity Designs creativeinsanitydesigns.com
Delta H Design deltahdesign.com
Ghost Acoustics ghostacoustics.co.uk
GIK Acoustics gikacoustics.com
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Fig. 6. Auralex's MAX-Wall lets you set up a mixing or recording space without having to attach anything to the walls—renters, take note.

IK Multimedia ARC (Advanced Room Correction) System This is one of the best-kept secrets for those who want better mixes: It's a system for DAWs that combines a measurement microphone and measurement software, but the unique element is a correction plug-in (Figure 4 on page 55) that compensates for room issues. You can mix and record with the plug-in inserted in the master bus, so your mixes are targeted to acoustics with a flat response. When it's time to render to a stereo mix for duplication or other environments, bounce without the plug-in . . . very clever. Recently upgraded to Version 2 (with upgrade pricing for Version 1 owners), ARC works well because it doesn't do pin-point EQ for just one sweet spot, but the measurement process takes the entire room into account for broader, more forgiving correction. It even lets you create alternate references like TVs, club P.A. systems, radios, and the like so you can mix to a specific target playback medium.

- **JBL MSC-1** This monitor system controller incorporates their RMC (Room Mode Correction) process. As a controller, it can switch among three input source and two sets of speakers (including subwoofer management); it includes EQ, mute, sub on-off, and level. Like ARC, the RMC process requires using the included reference mic, but it corrects mostly low frequencies where errors tend to be most egregious.
- **sE Electronics Reflexion Filter** This is primarily for vocalists and narrators, as it provides an "acoustic shield" (Figure 5 on page 38) that blocks your voice from reaching the walls and creating echoes, but also shields against those reflections returning back into the microphone. It's a highly effective concept.
- **Instant Recording Space** Can't do permanent acoustic treatment? Check out Auralex's MAX-Wall (Figure 6). ■

EDUCATIONAL RESOURCES ON THE WEB

Auralex: auralex.com
RealTraps: realtraps.com
John L. Sayers: johnlsayers.com/phpBB2/index.php
Ethan Winer's acoustics forum on MusicPlayer.com: forums.musicplayer.com/ubbthreads.php/forums/24/1/Ethan_Winer_Acoustics_Forum

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Fig. 1. The XW-G1 may look a lot like Casio's XW-P1, but offers features aimed more toward the groove/DJ/sampling crowd.

Casio XW-G1 Synthesizer

Groove features with a synth/sampling engine

BY CRAIG ANDERTON

SUMMARY

STRENGTHS:
Brings something new to the party. Cost-effective. Solo Synth engine is extremely flexible. User sampling and looping. Excellent companion software, although front-panel editing is pretty transparent. Cool step sequencer. Solid realtime control.

LIMITATIONS: Sampling process is convoluted. Sample memory not expandable. Lacks the XW-P1's Hex Layer and Drawbar Organ engines.

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REMEMBER THE "synth vs. sampler" debate, when people eventually figured out they were different animals so they ended up using both? Apparently Casio came to the same conclusion, so they introduced the XW-P1 with multiple synth engines for hardcore synthesizer fans, and the XW-G1 for the more groove/DJ/sampling crowd. The surface similarities (see Figure 1) belie the significant internal differences.

I've become a major XW-P1 fan because it goes places other synths don't. It's quirky, brilliant, fun, surprisingly deep, and nothing else is quite like it . . . or comes in at that price. You may find the architecture or UI off-putting at first because it's unique (a word I don't use lightly), but once you wrap your head around "the Casio way of life," it's a blast. The G1 manual (downloadable at casiomusicgear.com) explains the synth in great detail; this review will concentrate more on summarizing the G1, and describing its particular *gestalt*.

Overview The G1 dispenses with the P1's Hex Layer and Drawbar Organ engines, replacing them with a Sample Looper and a flash memory-based Sample Player with ten presets. Sampling/looping RAM allows 19 seconds of a mono signal at a 21kHz sampling rate; halve that for stereo or when using the 42kHz sampling rate. Files can then be transferred over to Flash ROM as user waves to free up the RAM buffer.

The P1's assortment of PCM Melody and PCM Drum Tones, which you can think of as a sort of super General MIDI module with sounds ranging from adequate to outstanding, remains intact but more importantly, so does the Solo Synth and its "Minimoog thinking on steroids"—it's a monster.

The highest level of operation, the Performance, stacks up to four sound engines (one Solo Synth, and the rest PCM Tones or user Waves).

However the G1 isn't just about sounds and samples, but control. The Multikey feature, which allows using an octave of keys as trigger controllers for various functions, is quite cool. The 16-step step sequencer is similar to the P1's, with a few key differences: nine tracks instead of 16, four controller tracks, and a couple additional ways to trigger it. The G1 also offers a 16-step arpeggiator and phrase sequencer. Don't overlook these, particularly the Phrase Sequencer, which can serve as a scratchpad recorder of notes and/or controllers for catching inspirations and riffs, or on a more formal basis, provide "drop-in" sequences—for example, I made a cool little sample-and-hold controller phrase to drive the filter.

I also play guitar, and with the external input, I can use both hands while the phrase sequencer alters notes and other parameters. *Notes?* Yes, this external input (for mic, line, or instrument) has an oscillator block that provides realtime pitch transposition while

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you play keys. It's lo-fi for sure, but that's its charm, as you can transpose your way to some really wacky sounds.

Each zone can have its own arpeggiator and phrase; the step sequencer can be enabled/disabled for each zone. The sequencer is great for building up patterns, and with a little manual-reading time, easy to use. I can even do an approximation of my Ableton Live "fader-slamming" act by using the nine sliders to control mixer levels for the sequencer tracks, and of course, it's ace for drum patterns.

Other control options include four assignable realtime control knobs, and the usual pitch bend and mod wheels. These controls take a little getting used to, as they're fairly small and close together; but you can manipulate both simultaneously with ease.

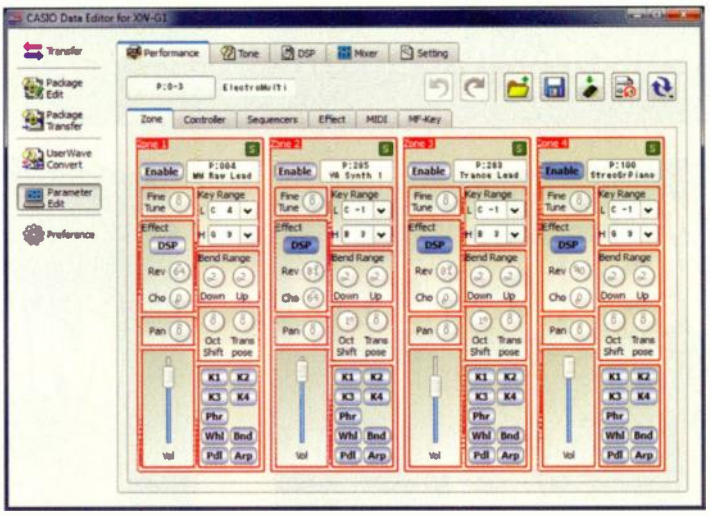

Fig. 2. The cross-platform editor is an invaluable addition to the keyboard, not just for programming but also for understanding its architecture. This shows a Performance's parameters.

Looping and Sampling The looper does what you'd expect, but more—like being able to re-sample sounds from within the G1, although you can also plug an instrument into the back and treat the looper like a standalone effect. It can also work with sampling. (I'll describe that later.)

Sampling does some things well, some things superbly, and some things . . . not so well. Transposing a sample across the keyboard works great—transposition quality is good, and the G1 recognizes a sample's loop. If you try to transpose way out of range, it will just repeat the top octave of the range so there's no dead space on the keyboard.

Multisampling is non-standard; a G1 user wave tone has only one sample, so there are no conventional multisampling split points. Instead, you assemble up to five samples consecutively, one after another. Each "split" then specifies the start and end of each section within the sample; in other words, each split plays back a different portion of the sample. Each split can loop from an arbitrary point in the middle to the end, but for instrument sounds, you can't specify the loop points with sufficient accuracy to do short (*e.g.*, only a few cycles) loops. No sample editor that I've used can generate multiple loop points within a single sample that the G1 will recognize. If you want a multi-sampled cello, this is not the droid you're looking for.

However if you have a sampled phrase like a piece of music, it's a *very* different story. Defining different sections, mapping them to keys, and being able to loop them makes for some great breaks, DJ-style loop mashing, sound effects, stutters, and more. What's more, the looper fits resampling like a glove—for example, it's easy to record five consecutive step sequencer sequences, shuttle the wave into a tone, and the G1 automatically sets the split points and you can start playing immediately. The integration among all the G1 elements—looper, step sequencer, sampler, arpeggiator, etc.—is a *major* strength.

Computer Connection Casio's G1 Editor/Librarian (see Figure 2) is a stellar addition to the package. It's well-crafted, and doesn't have that tentative feel some custom editors do. It needs better documentation for sampling and user waves, but overall, does the job. It's also the quickest way to understand the G1's architecture and capabilities. The manual will fill you in on the details, but spend 30 minutes with the editor and you'll have the big picture.

The G1 communicates MIDI (but not audio) over USB, but also has 5-pin DIN MIDI jacks so you can drive it with, for example, a controller with aftertouch (which the Casio synths lack, but recognize) or use the G1 as a four-zone master controller.

DSP Yes, you have effects—46 total for any of the tones, including the basics as well as combinations (compressor + wah, distortion + flanger, etc.). The Solo Synth only offers six effects, although Casio gets extra credit for making one of them a ring modulator. They're reasonably good, but I suspect in the studio, most people will run the synth dry and use their favorite plug-ins.

Extras As mentioned earlier, this product is deep, and it has lots of extras. The Solo Synth can blend two oscillators, two PCM waveforms, the external input, and a noise generator; it also has 8x8 matrix modulation, and an overall filter to complement the ones for individual voices. The G1 can run off batteries, and the sliders provide a control surface for three banks of Solo Synth parameters. And the Step Sequencer is wonderful—there isn't space to tell its full story, but it's an important part of the synth.

Oh, and the G1 is really light and easy to carry around. No, the case isn't all-metal, but Casio has some kind of mojo that makes these keyboards more rugged than they would seem at first.

Conclusions The G1 is just as much fun as the P1, and for groove fans, perhaps even more so. Stepping back, the thing that distinguishes Casio's new synths is the fact that they are *new synths*. I know some keyboardists who have Rigs of the Gods but got themselves one of these puppies because, to quote one, "this is the most fun I've had with a synth in a long time." Just remember to approach these synths the way they *want* to be approached; appreciate them for their unique characteristics, and you'll have a blast. I sure am. ■

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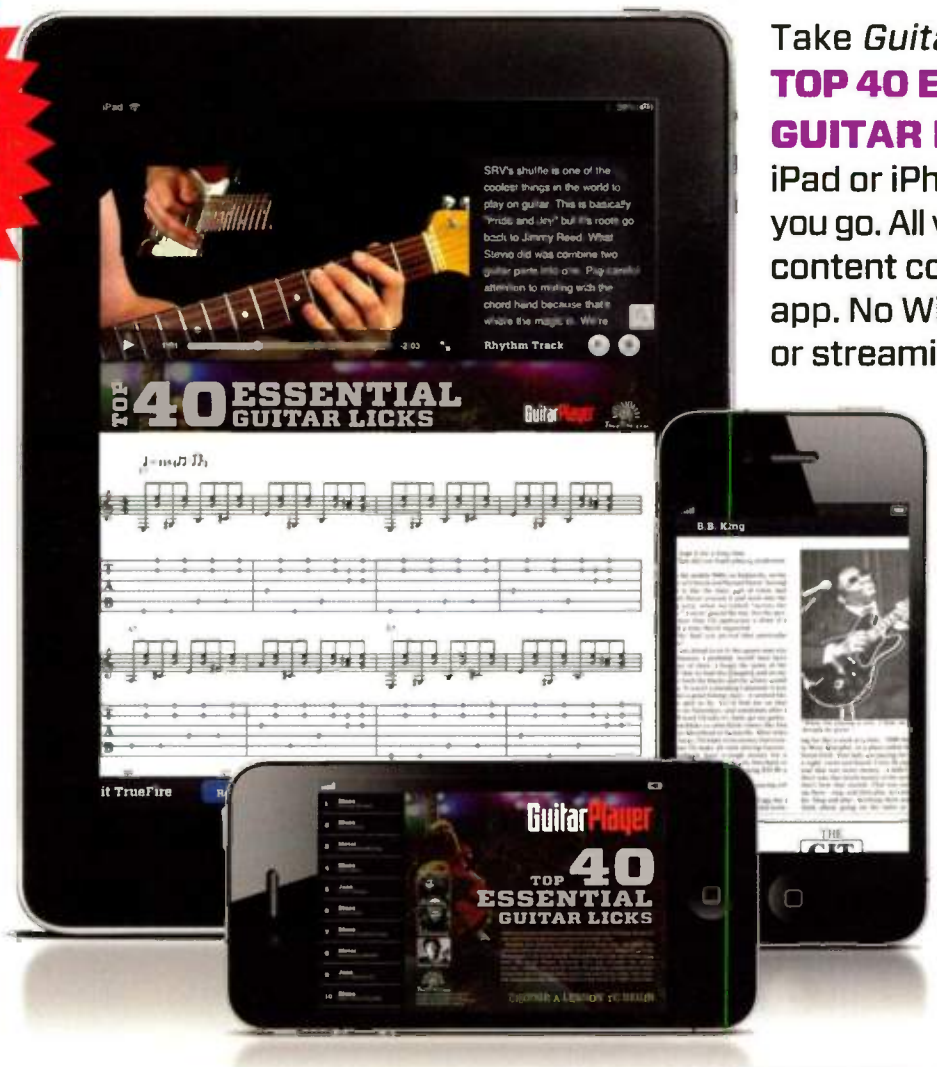

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Equator D5 Studio Monitors

Off-the-hook cost-effectiveness in an active speaker

BY CRAIG ANDERTON

SUMMARY

STRENGTHS: Extremely cost-effective. Accurate. Non-fatiguing. "Boundary" switch is clever. 60-day trial period lets you evaluate in your own listening environment.

LIMITATIONS: Nothing significant.

$299.99/pair, direct sales only
equatoraudio.com

EQUATOR IS best-known for high-end speakers priced with four significant figures. So I can imagine the following happening when the D5 was first introduced. . . .

Someone sees an ad for the Equator D5 at $299.99/pair. Sensing that the company obviously made a typo, and buttressed by knowing the FTC would require them to honor that price anyway, he calls the company.

"I'd like to order a pair of your D5s. The ones for . . . $299.99."
"Thank you for your order. What's your shipping address?"
"First, just to make sure, you do stand by that price, right?"
[slightly confused] "Yes, they're $299.99 a pair."
"You realize that you have to sell them to me at that price, right?"
[more confused] "Well, yes, the price hasn't changed since our phone call began."
"But even when you get it wrong?"
[long pause] "Sir . . . excuse me, but are you feeling all right?"

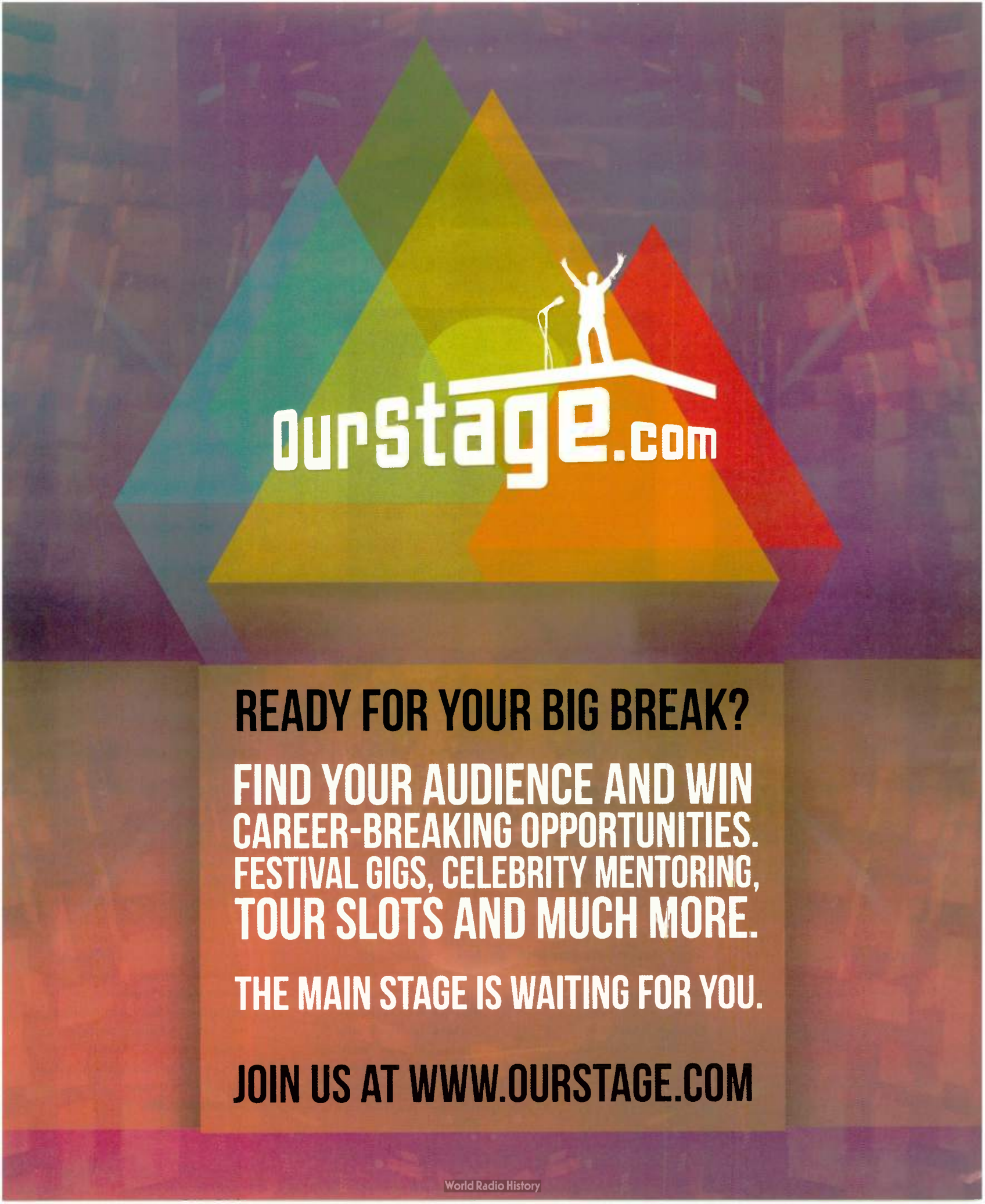
Yes, they really are $299.99/pair.

Full disclosure: I don't like reviewing speakers. They're subjective, and I can't include audio examples. Besides, the "best" speakers for mixing classical music aren't always the best speakers for dance remixes. So, I'm writing this review to give you a heads-up. If you're on a tight budget but think, "well, given the price, they can't be that good," you should know they *are* that good. Yes, there are better speakers—if you're willing to pay a lot more, for something with a considerably bigger footprint. But if there's a better speaker that's even close to this price range, I haven't heard it. The midrange has excellent definition, particularly in the upper mids—they're smooth and non-fatiguing. The bass is superior to the response you'd expect from a 5.25" speaker in a small cabinet; I gave it a workout with some electro mixes, and it definitely holds its own.

What's more, Equator apparently realizes it's asking a lot to expect someone to buy speakers direct without hearing them so their 60-day money-back guarantee (less shipping) means people needn't be reluctant to check them out. Yet I doubt they get many returns. After a day or two, these speakers settle in nicely: their distinguishing characteristics include accuracy that doesn't grate, and the ability to make mixing a satisfying, not just clinical, experience.

Construction of the all-wood ported cabinet is solid, the size is right for smaller studios (9.75" x 7" x 8.5"), and the speaker is Equator's trademark coaxial type with a a 5.25" woofer and 1" silk tweeter. It offers balanced XLR in, balanced/unbalanced 1/4" input, sensitivity control, and a rear-panel on-off switch. (I prefer front-mounted switches, but my workaround is a switched barrier strip.) The one exception to the no-frills approach is a three-position "boundary" switch, which optimizes response for speaker placements—corner, free-standing, or in front of a wall. This a surprisingly effective, and considerate for smaller studios where speaker placement may be constrained.

Even selling direct, Equator can't be making a ton of money on these speakers; what's more, they mention "introductory price" on their website. Given the reputation these speakers are earning, this low price might not last forever. These speakers are an exceptional deal, but don't take my word for it: Given the return policy, you can find out for yourself. ■



1

2

3

4

1
HK Audio
LUCAS Nano
Sound system
$699 street

HIGHLIGHTS Self-contained, 22lb. package with dedicated subwoofer and 3-channel built-in mixer • two specially-designed, mic-stand-mountable satellite speakers • speakers can also mount directly on top of the sub via HK's Easy-Click connectors (requires no additional wiring) • stereo link connection pairs two LUCAS Nano systems to increase power, range, and number of inputs • up to 120dB SPL

TARGET MARKET Solo and acoustic performers and presenters

ANALYSIS "Personal P.A.s" keep getting smaller and lighter, while maintaining reasonable power levels, convenience, and capabilities.

hkaudio.com

2
PreSonus
ADL 700
Hardware channel strip
$1,999 street

HIGHLIGHTS Class A preamp with one 12AT7 and two 6922 tubes • FET-based compressor • 4-band semiparametric EQ • separate balanced XLR mic, balanced XLR line, and 1/4" TS instrument inputs with single balanced XLR out • designed by Anthony DeMaria • ±300V power rails for maximum headroom • dual-transformer design • Input source select switch with variable mic-input impedance

TARGET MARKET High-end recording and live performance

ANALYSIS The ADL600 stereo tube preamp has been a hit, so the ADL700 reduces costs by offering a single-channel version.

presonus.com

3
Waves
Version 9 for live
Plug-ins
Price varies

HIGHLIGHTS 64-bit support and hard-drive activation for Yamaha/Allen & Heath/DiGiCo/Venue/MultiRack • V9 plug-in versions now added to SoundGrid Pro and Live bundles • No iLok required, easy-to-use activation system • can activate to USB flash drive • one-click license recovery for lost or damaged devices • run Waves V8 and V9 plug-ins side-by-side in MultiRack

TARGET MARKET Live performance and sound reinforcement

ANALYSIS Waves plug-ins are making inroads into live performance. Version 9 introduces far more convenient licensing, and supports 64-bit systems.

waves.com

4
TC-Helicon
Mic Mechanic
Vocal toolbox for singers
$149

HIGHLIGHTS Compact effects pedal • eight reverb and delay effects • delay ranges from simple slapback to near-infinite echo effects • tap tempo to match delay times to the music • use Auto Chromatic Pitch Correction transparently or as an effect • automatically adjusts EQ, compression, de-essing, and gating • can be controlled from TC-Helicon's MP-75 Modern Performance Vocal Microphone (optional)• all-metal construction

TARGET MARKET Primarily live performance, but also recording

ANALYSIS TC-Helicon continues to apply the expertise from their pro rack systems to inexpensive pedals for live performance.

tc-helicon.com

All prices are MSRP except as noted

5
Aphex
Audio Xciter Studio
Music player app
$9.99
HIGHLIGHTS Audio app analyzes and enhances Apple iOS device audio in real time • based on proprietary DSP-based processing • intended to restore detail/spaciousness to data-compressed music • a portion of the proceeds from Audio Xciter's sales go to Respect the Music, Aphex's foundation supporting music and arts education • Android version also available • free demo download
TARGET MARKET Those who listen to audio books or music through iOS/Android devices
ANALYSIS Audio with heavy data compression loses several desirable sonic attributes; Xciter is designed to compensate for these negatives.
audioxciterapp.com

6
Steinberg
Padshop Pro
VST granular synth
$79.99
HIGHLIGHTS Enhanced version of Padshop • includes 3-band parametric EQ per layer and algorithmic reverb • import WAV and AIF samples up to ten minutes long for advanced sound design projects and custom presets • drag-and-drop sounds recorded in Cubase into Padshop Pro • 50 new presets • retail version includes the Zero Gravity Expansion Pack with 250 new presets
TARGET MARKET Synthesists looking for unique, evocative sounds
ANALYSIS Padshop has been one of the most innovative synths to appear recently, but lacked the ability to import samples—until now.
steinberg.net

7
Casio
Privia PX-850
Digital piano
$1,499.99
HIGHLIGHTS 88-note tri-sensor scaled hammer action keyboard for realism and responsiveness • "AiR" sound engine greatly expands waveform memory compared to previous generations • emulates damper resonance and compensates for the hammer's string-strike speed at different velocities and key ranges • up to 256 notes of polyphony, sympathetic resonance and cabinet simulation • can record 44.1kHz WAV files to USB thumb drive
TARGET MARKET Studios, home, worship, acoustic piano alternative/replacement
ANALYSIS The Privia line has always been considered cost-effective, but the newest line raises the standard for sheer sound quality.
casiomusicgear.com

8
Korg
Kronos X
Keyboard workstation
$3,199 street (61 keys)
HIGHLIGHTS Doubles PCM RAM capacity to approximately 2GB • expands SSD capacity to 62GB • contains pre-installed demo versions of Korg's EXs 10-13 expansion sample series of Kronos Sound Libraries • runs OS 2.0, allowing user Sample Banks for creating high-capacity, custom sample libraries • can expand with second SSD • USB Ethernet support • 73-key model $3,699; 88-key $3,999 (street prices)
TARGET MARKET Recording and live performance for keyboard players
ANALYSIS Kronos X provides a logical update to the original Korg Kronos, introduced in early 2011.
korg.com

The author at work in his studio, Michael Romanowski Mastering in San Francisco.

LEARN

The Art of Mastering

Understanding the creative element of this final step in the production process

BY MICHAEL ROMANOWSKI

TO MANY, mastering is a mysterious necessity. What really happens during mastering? What can I expect from it? Why do I need a mastering engineer; can't I just master my own project? This is a big topic with as many answers as there are opinions.

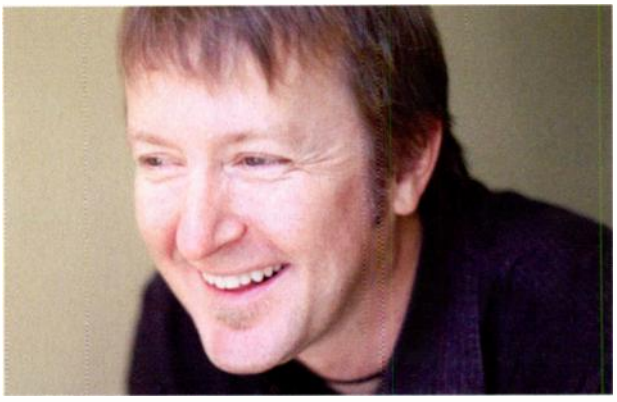
Let's start at the beginning. Mastering, in its essence, is the last step of the artistic process, and the first step of the manufacturing stage. But there's much more to it than that. Like all aspects of making records, the process has evolved over time from strictly producing exact copies of records (*i.e.*, LP lacquers from mix tapes) to assembling multiple media sources and sculpting the final sonic presentation.

Like every step in the recording process, mastering incorporates both art and science; I'll offer my perspective on the artistic element.

The Big Picture: Artistic Goals The real-world artistic goal of mastering is translatability. People listen to music in all sorts of environments: big speakers, little speakers, iPods, cars, headphones, laptops. If your goal is to make the music sound as true to the artist's intent as possible, you will provide a broader and longer music-enjoyment experience for listeners.

Mastering engineers create a cohesive body of work from a collection of songs, and creating that "package" sound requires understanding the artist's goals. The songs on any given album were recorded and mixed over a period of time—and often, in different studios and with different engineers along the way. This process often introduces sonic variety from song to song. Here is where I will refute the argument that "no one listens to full records anymore; they only listen to singles." I'll just call bullsh*t and leave this topic for another day. There is not enough space in

In mastering, we only have two channels to work with. We cannot change the mix; we can only change the perception of the mix.



Michael Romanowski

entire magazine for me to get into listening habits, psychoacoustic fatigue related to the loudness issue, or the relationship between artist and consumer. I will leave my soapbox sitting comfortably beside me for the time being. Let's get into the session flow and the process of mastering.

The Mastering Process: A Walkthrough First, a little background on me, for context: I've been professionally mastering records since 1994; I am the owner and chief engineer of a two-room mastering facility, Michael Romanowski Mastering, and owner of the historic recording studio Coast Recorders, both in San Francisco. (I am also a co-owner of a tape-only label called The Tape Project.)

Mastering typically starts with an artist/producer/engineer delivering mixes to me. Songs can come in many forms, even within the same project. While it is most common to get audio files from a DAW, I still get material on 1/4", 1/2", and even 1" tape. (Some projects even rely on cassette tape or LPs as a master source.) I always encourage the client to be at the mastering session, because this is a *subjective* process. Like mixing, mastering is art, and art is experiential; it is in the ears of the beholder. Having clients present also helps to answer any questions that they, or I, might have. They might want to learn how to prepare better next time. They may have opinions on presentation, or they may just want me to demystify the process. There are times when it is very helpful to me to know more about the mixing or recording sessions—for example, to explain whether certain sounds are intentional, or to discuss the merits of different versions of the mixes, or if multiple release formats are required for various distribution channels such as LP and high-res digital releases.

The next step is to listen to the mixes. I cannot, should not, and will not make any decisions until I have been able to give everything a critical listen and can begin to develop an objective opinion. In fact, I believe that one of the very core tasks of the mastering engineer is to develop opinions, based on an objective perception.

This is big. *Very* big. My mantra: "I should not be making any changes to the audio until I have enough perception information to form opinions." Opinions on what, you may ask? Things like, Is there enough low end in the mix? Do the vocal frequencies sound natural? Is the last song way brighter than the next song? Does the dynamic range feel natural? Is it too compressed? Is this soundstage supposed to be from the drummer's perspective?

How do I form these questions or try to solve these issues? I listen. I form ideas as to what I think the content sounds like. I think about what the music *could* sound like. This is the core of the art: My opinions have been developed over time through thousands and thousands of hours of listening—not listening to content, but listening to presentation. By the way, maintaining objectivity is exactly why the mix engineer should not be the mastering engineer. When one is deeply familiar with, or emotionally attached to the content, it is extremely difficult to be objective.

Now that I have established a Point A (what the record sounds like) and Point B (what I think the record could sound like), the next step is to figure out how to get from A to B. The only way I can feel confident about my decision-making process is to be confident in my own perception of the mix. Here, I want to emphasize that although mastering engineers rely on many specialized tools, the most important piece of equipment in my room, *is* my room.

Once I have been able to listen and make judgments about the presentation of the audio, I will decide which equipment to use—never before. That would be like putting salt on your food before you taste it. (By the way, I find that food analogies work well in explaining audio. There will be more forthcoming. I have lots of them.)

Mastering is a Zen-like process; I rely on my perception and opinions to guide my actions. While this is true for every step in studio production, let's break down the stages for a minute. Recording engineers make choices about capturing individual sounds—from choosing the correct mics and mic placement to configuring gain structure, signal flow, etc. Their function is to commit the best representations of elements of a performance to media for balance and playback. The mixing engineer's job is to balance recorded elements and create the presentation that the artist or producer envisions. Mastering is all about translatability and presentation of this complete body of work. Back to food: Someone grows the food. Someone cooks the food. Someone serves the food. The farmer (recording engineer) knows his soil, water, and fertilizer needs, his crops. The chef (mix engineer) knows the balance of ingredients—the chemistry of combinations, the taste. The service (mastering engineer) is all about making the elements of the meal presentable to the diner: the proper portions (EQ) in proper places. The right timing (pacing and fades) and temperature (dynamics). The final phase of quality control between creation and consumption—here, between the artist and the listener.

The "Sound" of Mastering I am regularly asked, "Do you specialize in a certain type of music?" and, "Do you have a 'sound'?" As for the first question, objectivity is a requirement for me, so style of music does not matter. Some may argue this point, but I will stick to my guns and insist that the translatability sought

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after in the mastering stage of engineering is dependent on frequencies and dynamics, not content. Don't get me wrong: I'm a longtime musician, and I am a true music fan. I listen to a lot of music away from work. I still put on music at home and sit on the couch and just *listen*. I dig into the songs and the instruments, the sounds, the words, and inflections. But for mastering, I couldn't care less that the third verse is about a favorite truck, or that this rock song has a pedal steel in every song. These are important for content, but not for my objectivity. The questions I ask myself are "how does this song sound?" "How does this relate to other songs, sonically?" "How does this record flow from song to song?" "Will this draw listeners in, or will it make their ears touch in the back?" These kinds of questions do not rely on the subject matter of the song, or even the style of music. Now, there are exceptions to every rule. There are key elements to pay attention to in specific genres. For example, heavy compression and classical music do not play nice together. Or, something I just learned recently—de-essing Czech singers can make them sound like they have a speech disability.

Opinions differ about having a "sound" as a mastering engineer. I recently spoke on a panel with my good friend and fellow mastering engineer Gavin Lurssen. An audience member asked us if we thought we had a "sound." Gavin said without hesitation that yes, he had a sound. I just as quickly said no, I do not. I have always maintained that as with producers, there are two types of mastering engineers, and both are sought after.

Some producers are sought after for their "signature" sound; when artists complete projects with them, they sound more like the producer than they did going in. Some producers are sought out by artists who want to sound more like themselves than they did when they started. Jeff Lynne and Todd Rundgren are great examples of these two approaches. When artists work with Jeff Lynne, they end up having elements of his style and sound—a sort of vibe and space—incorporated into their music. On the other hand, Todd Rundgren produces records sound like a polished, focused version of the artist. I have always strived to take the latter approach. I feel that it is my job to best present the artist's material as naturally and openly as possible. To me, this will help ensure long-term accessibility of the artist's vision of the record. But I learned from that panel discussion that I can try to adapt to the audience's perspective. Will they mostly be listening in a club at loud levels? Is this going to be something that people will likely listen to on their phones during their commute? Is this quiet dinner music? These perspectives do affect my production choices. So yes, in some ways, I *do* have a sound. This comes back to the importance of having an initial conversation with the client about the goals of record.

Preparing For Mastering Now that you have a better idea of the mastering engineer's perspective, there are a lot of things you can do to optimize your experience. Let's start

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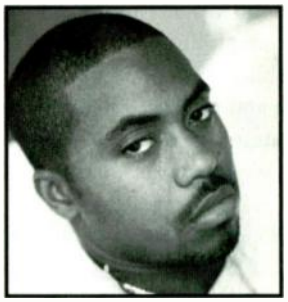
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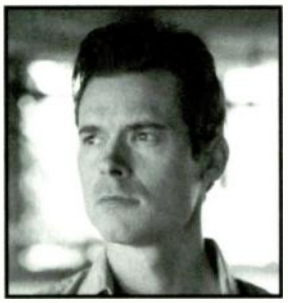
Tegan & Sara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Old Crow Medicine Show


Derek Trucks &
Susan Tedeschi


Mark Foster
Foster The People

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with the basics. First, get organized! Know what your songs are called, which version of the mixes you want to use, and where they are located on a drive. I have had many sessions in which clients would come in, hand me a bag of un-labeled DATs/CDs or a hard drive, and they would have no idea what I should be looking for. This is the quickest way to increase your billing time: Most mastering engineers work by hour, and taking time to search for the correct mixes, or trying to reach the mix engineer to figure out what the labeling hieroglyphics mean, can take as long as the session itself. It is also helpful to have a good working order of the songs. It does not need to be the final version—that often changes before the final master is made—but we have to have something to work with, especially when assembling a reference for you.

Do not put fades on files unless you are absolutely sure that that is exactly what you want. We can make songs shorter or shape the fade in mastering, but we cannot make them longer. You may think your fades are correct for the song, but when it comes time for assembly, a little more tail may make the difference for a natural flowing record—especially on a live record with applause, or one that feels "chopped."

If your mixes are digital, it is helpful to know their resolution. This is not completely necessary, but useful when setting up for the session. If you are bringing your mixes on tape, please, please, please print alignment tones from the recording deck. Analog can sound really great, or it can sound really crappy, depending on the skill of the engineer. Tracks with a high noise floor or improper record alignment can make us wish they arrived on DAT instead.

With any media, it is preferable to have some headroom, so leave at least a few dB of room at the top to work with. This does not mean turning down your master fader in your DAW. This means leaving some dynamics and headroom for the mastering engineer to make necessary adjustments to each song so that they can become a single body of work without compromising other tracks.

Remember that anytime we need to EQ, we are adding or subtracting energy. Given that there's a finite number of ones and zeros in digital files, that means we would have to process the sound just to process the sound. Do not over-compress or use the master bus to add gain to your mix. This processing is unnecessary and irreversible. Back to my food analogies: This would be like trying to take flour out of a cake that has already been baked. I have talked with many mix engineers who tell me that when starting a mix session, the first thing they do is put a couple of EQs and compressors on the master mix bus. What? That is insane. Another food analogy: That would be like starting with a cup of salt and trying to add just enough of the other ingredients to make soup—ass-backwards. I realize the importance of providing a mix reference that you and your clients can use to compare to finished records you listen to regularly. But it's important to understand that the mastering process is not complete.

Removing excessive compression or master bus gain in mastering is like trying to take flour out of a cake that has already been baked.

Those finished records have been mastered already; your mixes haven't. If you want to get an idea what might happen to the mix during mastering, and you feel like you need to squash for a client's reference, okay, but take that processing off the mix before mastering.

Understand (or if you have a client, explain) why you are intentionally removing this processing. Whether you are the artist, the engineer, or both, it's important to remember that you are being relied upon for your expertise. If you are an engineer, your clients expect you to guide them through the parts of the process that they either don't know about or shouldn't be paying attention to. You trust them to be an intentional artist, and they trust you to be an intentional engineer. I sat on another panel with producer/mixer Chris Lord-Alge, who fielded a question from a mix engineer who wanted to print stems and alternate mixes to take to the mastering session. He asked, "Why would you even think of doing that?" The person responded that he was not sure what it was going to sound like and wanted to be prepared. Chris shot back, "How could your client trust you if you did not even trust yourself?" The moral of the story? *Own* your work.

Remember that in mastering, we only have two channels to work with. We cannot change the mix; we can only change the *perception* of the mix—shifting the focus, perhaps, using EQ to get rid of problem frequencies while adding others that may be lacking. In mastering, compression is a way of bringing the mix forward a bit, or to glue the instruments together a bit more. At this stage, these are finishing tools, not construction tools. If someone is recording and says, "let's just capture it; we will fix it in the mix," they are already starting on the wrong foot. The same goes for mastering. If mix engineers say, "let's fix it in mastering," they are passing the buck and not doing their job.

Hopefully I've helped demystify the art of mastering a little bit here. I haven't even touched on the technical side and manufacturing process, which I'll save for another time. I'll finish by emphasizing the most important points: Mastering is an art form, and should be approached as such. Since mastering is about the presentation, it is subjective, yet still requires an objective perspective of the music. There are as many opinions about how mastering is needed and used as there are engineers. Music is art. And art is not a competition; it's an expression. When my clients leave at the end of the day and have a reference in their hand that represents all of the hard work they have put in, all of the time and money spent, all of the emotions and hardships they went through to make their record, I want them to be proud of their body of work. I want their fans to be able to listen into the music. I want them to be drawn into what the artist has to say. I am honored by that trust that they put in me with their creation. My job is to help artists better express themselves and connect with their fans. And I love it. ■

In addition to being the owner and chief engineer of Michael Romanowski Mastering and Coast Recorders in San Francisco, Romanowski is president of the San Francisco chapter of The Recording Academy and an active member of the Producers and Engineers' Wing. He is also a musician and a teacher.

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MOTU

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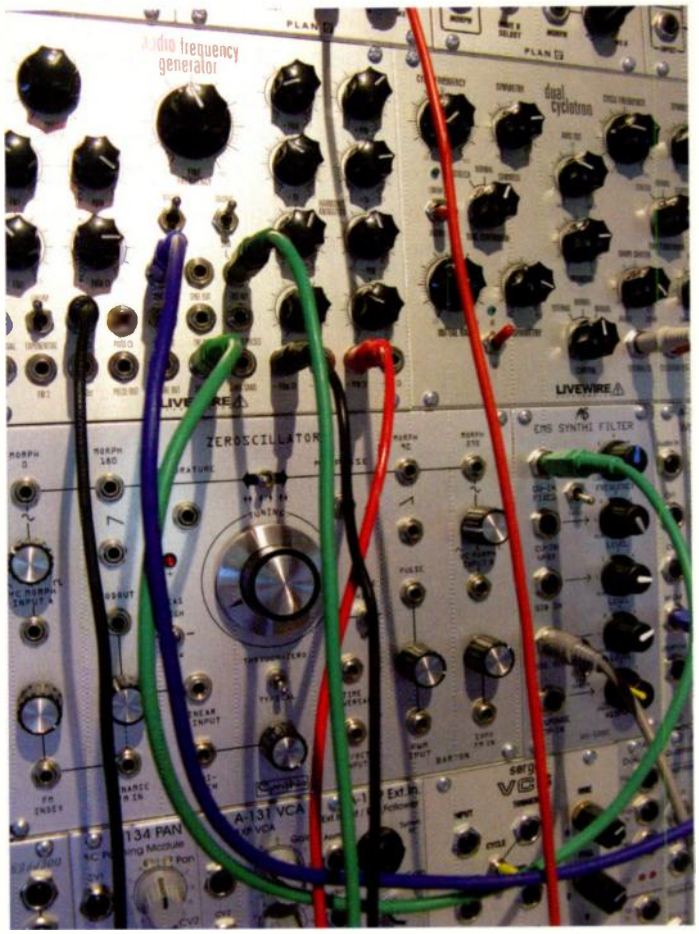

A smattering of Eurorack modules patched together.

Module Mania

Shopping for your first analog modular synth

BY GINO ROBAIR

THESE DAYS, it's not uncommon to find hardware modular synthesizers in personal studios, because they can be used in so many different ways—from synth duties to processing a mix. Many musicians feel that the analog circuitry in these instruments offers a level of sound quality that is unattainable in the digital realm.

Although they look complicated and exotic with their endless tangle of patch cables, a modular synth is fairly easy to use. And modern modules are far less expensive than vintage ones, which also require TLC and maintenance.

A collection of analog modules gives you maximum flexibility in sound design; you can assemble a system that meets your specific needs. Best of all, a modular synth can be fully integrated into your DAW workstation via MIDI using a standard MIDI-to-CV converter or by utilizing software controller plug-ins such as MOTU Volta and Expert Sleepers Silent Way.

If you're new to hardware modular synths and are interested in assembling one, here are some things to consider.

Form and Function Like a guitar-effect pedalboard, a modular synth holds a collection of devices that you connect using patch cables. However, synth modules are capable of much more than the average stompbox offers. In addition to patching audio through them, modules accept and/or generate control voltages (CVs), which are used to modify parameters in real time with greater resolution than MIDI offers.

Some modules include digital circuitry, though the patch connection between them remains analog. If you're interested in an analog-only system, you'll have fewer module options and you may miss out on products that benefit from digital control.

Modular systems come in a variety of form factors based around panel dimensions, cable and jack size, and power requirements. By sticking with a standard format, you'll create an instrument that is easier to manage than a system that mixes modules of varying sizes and power needs. The format you choose is important because it determines the variety of modules you'll have access to, which ultimately plays a role in your sound palette.

Typically, musicians choose a format based on the connector size—1/4", 3.5mm, or banana. (The latter two offer stackable plugs.) Modules

with 3.5mm connections tend to be smaller than other formats and take up less space, though it also means that the knobs and jacks are closer together. The main formats in this size are Frac Rack (supported by Blacet and Metalbox) and Eurorack. Eurorack has become the most popular modular format, showing explosive growth in terms of manufacturer interest (more than 60 companies support the format) and module diversity. Eurorack and Frac Rack modules are just over 5" tall, and their cases fit into standard 3U racks. However, they have different power requirements, the Eurorack power connectors being the easier of the two to work with.

Some people prefer using ¼" jacks because the modules tend to be larger and there is more room for your fingers. The main supporters of this format include synthesizers.com and the original Synthesis Technology/MOTM modules.

Other form factors are proprietary, such as those used by Buchla and Modcan. Both companies use banana jacks for control signals, though Modcan also has a line of modules that uses ¼" jacks.

Regardless of format, the price of a module is usually based on its feature set. Generally, you can put modules into one of two categories—single-function and multi-function. As you would expect, single-function modules are often less expensive than multi-function units. A simple utility module can cost less than $100, while a multifunction module can run nearly two grand. However, you'll often need more rack space and spend more money using single-function modules to create a sound than you would a multi-purpose module that does the same job within one panel.

Typical Uses With so many modules to choose from, it helps to determine how you'll use them before you invest in a system. Here are a few of the most common ways modular synths are utilized.

• **Subtractive Synthesis** If you're interested in building a classic analog bass or lead instrument, you've come to the right place. Your typical monosynth includes a VCO or two, a VCF, a VCA, an envelope generator, and perhaps an LFO. The manufacturer and module you choose for each of these will determine the overall timbral palette your instrument is capable of. By combining modules from several manufacturers, you can create a highly personalized synth that sounds like no other.

• **Filter Box** Analog filters make everything sound good. Engineers often have a collection of filters for processing audio tracks while recording or mixing, which can include envelope filtering and auto-wah effects. Although you can find plenty of 4-pole Moog-style lowpass filters, you'll also find other classic sounds (such as recreations of the Oberheim 2-pole or EDP Wasp filters) as well as designs that are more modern. If it can be driven into resonance, a filter module can also be used as an additional sound source.

• **Signal Processor** While there are hundreds of fuzz and distortion boxes on the market, how many of them have multiple CV inputs? Waveshaping modules, for example, provide a wider array of distorted tones than any pedal, while giving you realtime control over numerous parameters. Imagine slowly modulating the quality of distortion as you play a solo!

Other types of voltage-controllable processing include ring modulation, delay, reverb, and a host of DSP-based effects. In fact, having a voltage controllable DSP-based module allows you to integrate digital processing into a complex patch without having to interface with a traditional rackmount processor or your DAW.

• **Control Surface** The earliest analog modulars from Buchla and Moog had ribbons and touch-sensitive pads that allowed greater control over sound shaping than traditional piano-style keyboards. A new wave of non-keyboard controllers are available for modern modular systems, ranging from updated ribbons to capacitance pad arrays and force sensing resistors.

• **Video Processing** A recent development in the Eurorack format are modules designed for use with video. Davey Jones Design offers a single processor, while LZX Industries has a collection of modules that provides a wider range of utility, from video mixing to pattern generation. In addition, Brownshoesonly makes a triple VCA that is compatible with the LZX system. ■

Gino Robair is a musician, composer, teacher, and author.

Sonnox's Oxford Denoiser is a sophisticated plug-in that not only lets you adjust the noise reduction and threshold (including at multiple frequencies), but gives you a range of additional parameters to tweak the processed audio.

Noise Busters

Audio restoration software is not just for cleaning up old recordings

BY MIKE LEVINE

WHEN YOU hear the term "audio restoration" (ar), it probably brings to mind repairing clicks and pops on recordings transferred from 78RPM vinyl recordings, or maybe forensic applications like you might see on a CSI episode.

But audio restoration software can actually come in handy for more day-to-day applications, such as reducing computer and drive noise that leaks onto your music tracks, cutting out hum, removing clicks and pops, minimizing hiss or artifacts during a song's ringout, lowering the background noise in film or video soundtracks, or cleaning up dialog for podcasts. Some products even offer the ability to remove fretboard finger squeaks and other extraneous sounds, without affecting the surrounding audio.

AR software comes in many varieties, from dedicated plug-in suites to standalone editors to noise-reduction features built into audio editors. (For instance, Sony's SoundForge includes a very robust audio restoration toolset.) Audio restoration products range in price from less than $100 to more than $3,000. Generally speaking, the more expensive the product, the more sophisticated the algorithms, and the more precise the control you get. That said, you can find some great options in the $300–$400 range, such as iZotope RX (which also comes in the more-expensive RX Advanced version).

Allergic to Noise One of the most common reasons people turn to audio restoration software

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Audio restoration software can come in handy for day-to-day applications, beyond repairing clicks and pops.

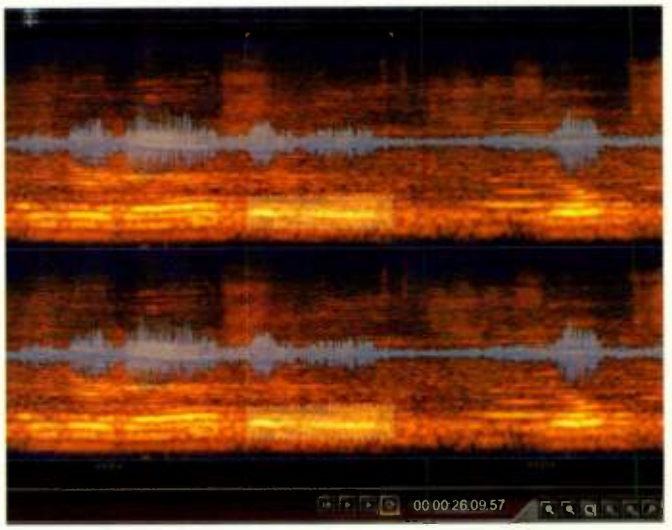


Fig. 1. iZotope RX allows the user to select and edit audio within user-selected time and frequency ranges.

is to reduce broadband noise. As the name implies, it's noise that's comprised of a range of frequency components, as opposed to, say, 60Hz hum. Examples of broadband noise would be steady room noise picked up low signal-to-noise ratio recording situation, machine noise, and even the murmur of voices in the background.

Now that most people record DAW tracks at 24-bit resolution, the chances of recording a noisy track are significantly diminished. But one area where noise runs rampant is on recordings made by the built-in mics on video cameras. Not only do cameras often record in noisier 16-bit audio, but since the mics are mounted on the camera, they're rarely positioned close enough to the intended source to record it with a favorable signal-to-noise ratio.

Virtually every audio restoration package offers denoising software to help reduce broadband noise. To get the best results, you are usually asked to select a short section of the audio containing only noise (if you can find one), so that the program can calculate the frequencies and levels of the noise signal. This setting is sometimes called the "noise profile" or "noise print." The software then processes your audio like a multiband gate, squashing down the frequencies in the noise profile, but leaving the rest alone. Often you can adjust the global threshold of the noise print (or thresholds for individual frequencies within it), giving you even more control.

When reducing broadband noise, you must be careful not to overdo the reduction. The more you dial in—either by increasing the reduction amount or raising the threshold—the more digital artifacts will be introduced into the signal. This can result in a sort of underwater-sounding effect that's both unnatural and unpleasant. You have to experiment with the settings, and try to find a happy medium that reduces the noise sufficiently, but doesn't degrade the fidelity too much. The louder the noise is in relation to the source to begin with, the more difficult this task will be.

Steady-state noises, like an air conditioner, for instance, are much easier to reduce than variable noise (such as a crowd murmur). The needs of your project will determine whether you lean toward more intelligibility with a less natural sound, or vice versa.

If you want to apply denoising to a music track, you'll have to be even more judicious in the amount of reduction that you dial in, because fidelity is even more important. Be sure to solo and compare the track, both processed and unprocessed. Try slowly backing off your reduction amount until you hear the noise returning, then raise it up just enough to make the noise disappear.

Noises Here, Noises There Random noises of short duration are potential gremlins in music recordings. Whether they're finger squeaks, chair squeaks, or car doors closing outside your window, they can ruin an otherwise well-recorded take. Some AR programs, such as iZotope RX and Algorithmix Renovator, allow you to isolate and remove such noises without discernibly disturbing the surrounding audio.

There are a couple of tools for doing this. First, a spectral editor (see Figure 1) lets you select sections of audio in both time *and* frequency domains, which makes it a lot easier to isolate a stray noise for attenuation or removal.

I've used RX's Spectral Repair module extensively, and I find its ability to get rid of finger squeaks and many other types of stray noises to be downright uncanny. Like the other processes described in this article, use it with care and try to select only the offending audio from the spectral display, or it can create unnatural-sounding results. But when properly applied, it's very impressive. I've also used it to fix a ringout note with a chair squeak in the middle of it, by setting Spectral Repair to replace that squeak with interpolated audio from before and after it. In other words, based on its calculations of the material that came just before and after the squeak, the software generated a replacement that fit in seamlessly.

I've covered examples of just some of the uses for audio restoration software. It can be a very handy part of your DSP arsenal, and, once you own it, you'll be surprised how often you use it. ■

Mike Levine is a regular contributor to Electronic Musician.

Cakewalk Sonar

Use multiband limiting to provide loudness "maximization"

BY CRAIG ANDERTON

OBJECTIVE

Make an audio track louder and even out dynamics, with minimal artifacts

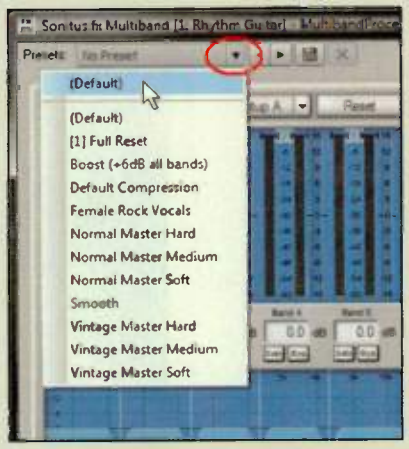
BACKGROUND

Although limiting can increase the apparent loudness of audio, you can sometimes hear the results of limiting as audible artifacts. Multiband limiting, sometimes called "maximization," can reduce these artifacts; fortunately, Sonar's Sonitus:fx Multiband compressor can be tweaked into serving as a natural-sounding multiband limiter.

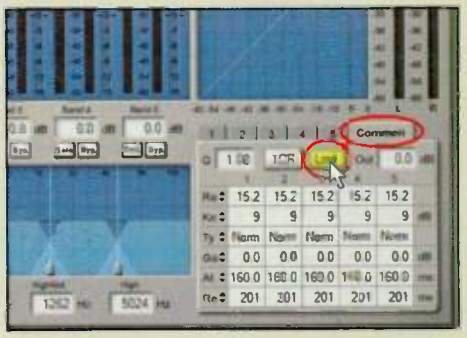
TIPS

- Step 1: Drag the Sonitus:fx Multiband from the plug-in browser into the FX bin as shown, or right-click in the FX bin and choose Multiband Compressor from the Audio FX context menu.
- Step 4: With some program material, you can boost the gain by up to 6dB (*i.e.*, 6dB of limiting), and sometimes even more, with no audible degradation.
- Step 5: Don't expect miracles; you can't increase the gain by huge amounts without having at least some audible distortion.

Step 1 Insert the Sonitus:fx Multiband into the track or bus you want to maximize.

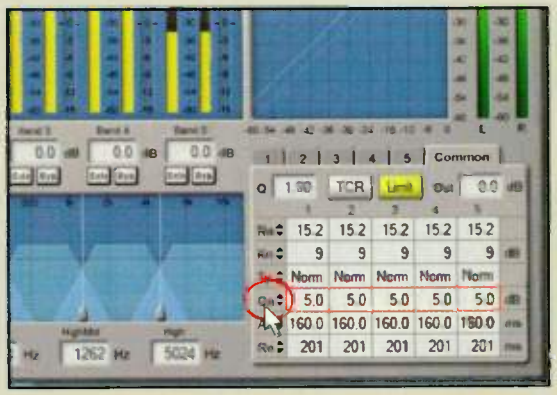


Step 2 Choose the Multiband's Default preset.

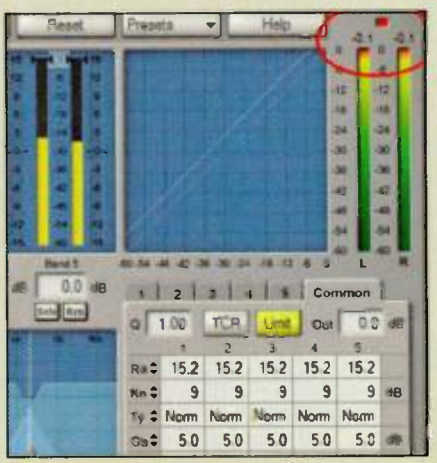


Step 3 Click the Common tab, then click the Limit button.

Step 4 Click the Common section's Gain parameter label and drag up to boost the level going into the limiter.



Step 5 The output meters will peak at a maximum of -0.1dB, even when hit with signals above 0dB. In limiting mode, a lit meter clip indicator means that limiting (not distortion) is occurring.



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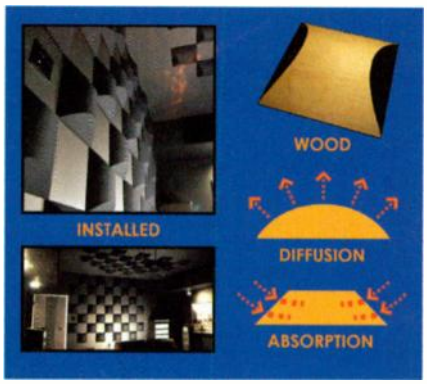

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Five Music-Related Events that Could Sway the Presidential Election!

BY CRAIG ANDERTON

1

Barack Obama promises that if elected, he will sponsor a songwriting competition to create "a national anthem that normal human beings can actually sing." To further sweeten the pot, he pledges to commission a new version of "Hail to the Chief" that doesn't sound like a beer commercial from the Third Reich.

2

Mitt Romney swears that if elected, he will never, *ever* sing in public again without being processed through pitch correction. His popularity soars as he's hailed for being "a truly *compassionate* conservative after all."

3

Sting lookalike and former Governor **Mike Huckabee** promises that should Romney win, he'll stop pretending he's actually a hip musician, or that his Little Rockers would be anything other than the house band for "Big Al's Gas & Go" were it not for their exposure on Fox News. Polls taken shortly afterward show a sudden, dramatic surge for Romney.

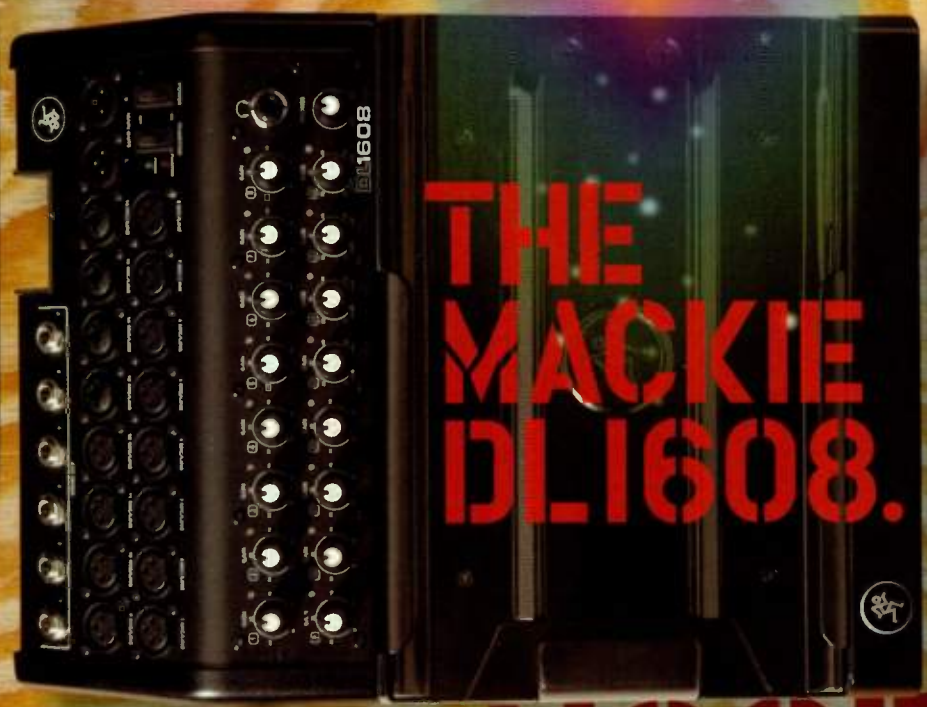
4

Alleged rock guitarist/ draft dodger **Ted Nugent** claims he'll either be "dead or in jail" if Obama is elected. Sensing an opportunity when they see one, millions of likely Romney voters—having heard bits of Nugent's recent concerts and seen English translations of his latest rantings—switch their votes to Obama.

5

Libertarian **Gary Johnson**, running on the "Choose a Rational Non-Sociopath for President" platform, appeals to the musician vote by saying he will de-criminalize marijuana "24 hours after taking office." Unfortunately his strategy backfires when supporters of the measure can't remember which day they're supposed to vote, the location of their polling places, or how his name is spelled.

Note: I am aware that someone, somewhere, somehow will be offended by something that is said in this column. So, please accept this sincere pre-emptive apology, and know that I am truly sorry from the bottom of my heart that you are easily offended.



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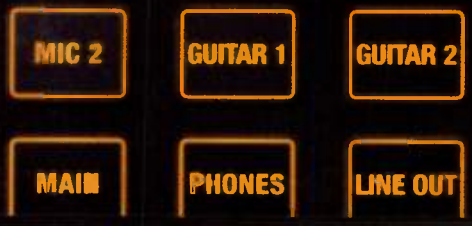

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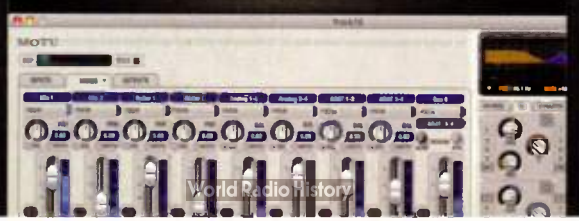

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