MIX

PROFESSIONAL AUDIO AND MUSIC PRODUCTION

TUNE YOUR STUDIO

▸ ROOM EQUALIZATION
▸ INTELLIGENT MONITORS

▸ THE YEAR IN STUDIO DESIGN **CLASS OF 2008**

New Concert Venues

Indy's Back!
SOUND FOR SUMMER'S BIGGEST SEQUEL

nner Machine,
Buffalo, N.Y.

A PENTON MEDIA PUBLICATION

World Radio History

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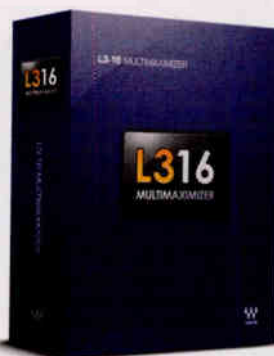and reverbs, available only from Waves.

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We've got an incredible selection of some of the best microphones available for studio and stage alike. You'll find condensers, dynamics, and ribbon models (plus Sweetwater-exclusive mic packages and a wide range of mic accessories) from manufacturers such as Shure, Neumann, Royer, Sennheiser, AKG, and many more!

SENNHEISER

AKG audio-technica RØDE NEUMANN Earthworks Blue

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At Sweetwater, you'll find exactly what you need to create some of that elusive studio "magic," thanks to our incredible selection of processors. Our huge warehouse is stocked with great reverb, delay, and multi-effects units from Eventide, Yamaha, Lexicon, and TC Electronic, plus a host of others.

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Eventide t.c. electronic lexicon dbx YAMAHA

Mixers

Toft Audio ATB-32

The mixer is the nerve center of your operation, and we know you want the best possible unit for your money. Our knowledgeable Sales Engineers are here to help you find the one that's just right for you. We carry an incredible range of mixers from Allen & Heath, Mackie, Yamaha, and many, many more.

ALLEN&HEATH MACKIE. Toft Audio Designs TASCAM.
PEAVEY YAMAHA Soundcraft

Preamps

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There's no more important item in your signal chain than a good preamp — and we have a huge selection of them. Whether you want to add "color" to your sound or seek pristine transparency, Sweetwater has the preamp that's just right for you, from great manufacturers such as Avalon, Focusrite, PreSonus, and Manley, just to name a few.

Solid State Logic A Designs VINTECH PreSonus
AVALON DESIGN MANLEY Focusrite

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MIX®

PROFESSIONAL AUDIO AND MUSIC PRODUCTION
JUNE 2008, VOLUME 32, NUMBER 7

features

On the Cover: The Goo Goo Dolls' Inner Machine (Buffalo, N.Y.) was renovated by John Storyk three decades after he designed the original studio, then called Trackmasters. To learn more about the new space, see "Class of 2008" on page 26. **Photo:** Bob Mussell.

contents

Thirsty for Tone?

Tube · Solid State · Tone-Blending

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The new 710 Twin-Finity Microphone Preamplifier & Instrument D.I.
Phase-aligned blending of tube and solid state transimpedance circuits.
Satisfy your thirst for tone. **www.twin-finity.com**

Mirror, Mirror On the Wall

Maybe it's all the time I've been spending in airports, but I've read a lot of trashy tabloids lately; it's my guilty pleasure. My favorite parts of those magazines are the candid shots of stars—action heroes ordering lattes at Starbucks, starlets pumping gas in baggy sweats. There's something about peeking past the polished celebrity image to see if the no-makeup reality measures up. Reality isn't always pretty.

The same can be said about audio—just because something sounds "great" in the control room doesn't mean it will sound as good on other speakers. Admittedly, most recording is done in less-than-honest acoustic environments, yet even with all the available tools for diagnosing and correcting room problems, the solution is sometimes a good, hard look in the mirror. Perhaps you've grown "comfortable" with your room sound, but you have the nagging feeling that your studio isn't all it could be. It's easy to be intimidated by the science of acoustics, but there are simple, practical steps you can take to improve your room response.

No single treatment method will fix all of your acoustic problems, but a good place to start is your monitors. Do you like your playback system because it "sounds good" or because it provides an accurate representation of your tracks? If you want extra shimmer and a big bass boost, don't look for it in your monitors—put it in your mix.

An acoustician I spoke to mentioned that 70 percent of his room-tuning work involves finding the ideal speaker configuration/listening position for the most linear frequency response. You might be reluctant to move speakers away from the walls because they'll take up valuable real estate in the room. Or you might be a victim of the force of inertia: You placed your near-fields on the meter bridge one day as a quick fix, and there they remain. However, setting speakers on stands and making minor adjustments in their downward angle can often make a significant improvement in reducing the effect of secondary reflections from the console surface. Monitor placement is a crucial—yet often overlooked—piece of the puzzle, and happily, it's one of the cheapest acoustical solutions available.

Optimizing the sweet spot is easier than you think. Available tools range from common-sense math (a little symmetry goes a long way) to user-friendly predictive programs. With that in mind, Bob Hodas explains the basics of choosing and applying digital EQ to tune studio loudspeakers in this issue, while Michael Cooper looks at the latest offerings in "intelligent" self-aligning monitors.

However, this infusion of technology need not result in sterile, cookie-cutter control rooms. Whether you're building a new facility or upgrading an existing studio, it's important to remember that there's no "one size fits all" solution for room tuning. Need some inspiration? Check out the gorgeous rooms in our "Class of 2008" feature (page 26), which spotlights some of the hottest new studio designs debuting in the past year. Approach your room as a unique space and don't be afraid to experiment.

Sarah Jones

Editor

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Letters to Mix

TRUTH IN AUDIO

Paul Lehrman's April 2008 "Insider Audio" column, "The Emperor's New Sampling Rate," addresses a study by David Moran and Brad Meyer that was published in the September 2007 Journal of the Audio Engineering Society. The study concludes that recording professionals, recording students and audiophiles who participated in listening tests were unable to distinguish between high-resolution audio and 16-bit/44.1kHz CD-quality audio. A number of readers responded to Lehrman's column.

Kudos to Paul Lehrman for daring to report what I've suspected all along—that people who claim to hear big differences at high sample rates are kidding themselves.

Lehrman wrote, "Something is causing people to say they are hearing differences." I recommend Deep Throat's dictum to "follow the money." The people who advertise in *Mix* need to sell a constant stream of new stuff to meet their sales targets. And how are you going to make people dissatisfied with their old stuff unless you can convince them that the new stuff sounds better? It's a classic case of the marketing axiom that you have to sell the disease before you can sell the cure.

Engineers willingly (if perhaps subconsciously) play along with this gambit because of our evolved craving for status and one-upmanship. "I can hear a difference" is simply a modern version of "I can throw my spear farther." Audio engineers who nod their heads about how one piece of gear sounds "dramatically" better than another one (on the basis of absurdly unscientific "listening tests") remind me of art critics and religious cultists, both of whom try to create an environment in which only the superior anointed ones are allowed to possess the "truth."

The problem is that the general public doesn't

buy the mythology. Despite the best efforts of art critics to convince us that paint spilled on a canvas is great art (at least this week), most people stubbornly continue to buy traditional landscapes to hang on their walls. And despite the efforts of Golden Ears to convince us that their favored box will reveal vast new vistas of sound, most consumers continue to be quite content, thank you, with CDs or the even-worse MP3s.

If you absolutely must have a high sampling rate, pick 24-bit/88.2kHz and be done with it. You'll only triple your storage and bandwidth requirements, and the ease of downconverting to CD format will minimize the potential for other mischief.

Rob Lewis

You stated that the sound experiment [Meyer and Moran] performed is up for debate, and there's room to do different types of experiments. But the article came off a little bit negative to me. I believe high-fidelity recording is worth fighting for, and am a little disappointed about the effects the article might have on the next generation of engineers. I feel like *Mix* should aim to inspire and educate.

I'm working as a second engineer for Bill Schnee in North Hollywood. I'm 27 years old, and most engineers my age didn't have the opportunity to work in the analog days. Whether its analog or digital, engineers need to strive for better sound instead of settling for the regular lo-fi Pro Tools sound.

Darius Fong

Only near the end of Paul Lehrman's April 2008 "proof" that CDs are, in fact, "perfect sound forever" does he finally fess up and admit that listeners still were able to conclude that "virtually all of the SACD and DVD-A recordings sounded better than most CDs—sometimes much better." He sidesteps this inconvenient truth by hypothesizing that audiophile engineers must apply more "care and affection" to their work than do commercial producers (whose budgets, by the way, must be many, many multiples of the boutique labels).

By scornfully dismissing the opinions of people who actually care what recorded music sounds like ("tweakheads" in the author's parlance), Lehrman epitomizes the willful ignorance that is at least partially responsible for our current dreadful state of sonic affairs: live music amplified to levels that cannot be endured without earplugs (talk about unclear on the concept!), MP3s on ear buds as the new "industry standard" and popular music recorded with the compression meter pegged and motionless from intro to fade-out. It seems

to me that to just abandon the idea that there can be appreciable (if not always immediately measurable) improvements in recorded sound does a great disservice to all of us who consider ourselves, first and foremost, music lovers.

Bob Nachtigall

Paul Lehrman replies: *First of all, please understand that I personally did not perform this experiment—I am merely writing about the work of two scientists (whom I happen to know) as reported in a highly regarded, peer-reviewed scientific journal. So I have no stake in this, except that I do believe that Messrs. Moran and Meyer are onto something.*

Mr. Nachtigall, I'm afraid, misses the point of the paper: The researchers conclude that the high-end discs sound better not because they use a better medium, but because they were made better by people who care a great deal about sound. What they are saying is that these recordings, whether they end up on SACDs or plain ol' CDs (assuming the CDs are mastered well), will sound equally good. One of the conclusions we should all draw from the paper is that just because a lot of CDs sound crummy doesn't mean that CDs have to sound crummy.

Meyer and Moran most definitely "care what recorded music sounds like"—they've both been in the field for more than 30 years—and that's why they did the study. No one disagrees that there will always be room for "improvements in recorded sound"—better microphones, preamps, speakers and room acoustics are worthy goals for any studio or any designer—but what the researchers found is that adding extra data to the delivery system beyond the capabilities of a CD doesn't improve anything.

I absolutely agree with Mr. Fong that "high-fidelity recording is worth fighting for," but we need to recognize just how that fight should be waged. This paper tells us that we would do better to insist that our recordings are made with greater technical expertise and sensitivity to the music rather than demand more bits and bytes. ∎

Light **Metal**

No other tool in the professional recording chain has more stringent requirements than the audio monitor – it is the last piece in an often complicated chain of events. At Genelec our goal is to deliver these sound experiences to you as they are intended by the original performer. Genelec active monitoring technologies, including our die-cast aluminum enclosure, offer you an undistorted, dynamic and natural sound without adding or removing anything from the electronic signal. No matter how heavy your recording sessions are, discover the Genelec system that suits your needs at
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Drive Unit Protection Circuitry
Room Response Controls
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High Performance Reflex Port

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PRODUCTS HITS FROM NAB 2008

With its theme of "Where Content Comes to Life," this year's NAB expo—held April 11 to 17, 2008—offered all you'd expect from the world's largest media show but with some considerable differences. A few major players opted out of exhibiting (notably Apple and Avid), but there was plenty of action .

Throughout NAB, attendees were talking high-def, but conversations seemed to center on the gear being used on the Beijing Summer Olympics and on the expanding area of Internet Protocol Television (IPTV). Many stations were shopping for new systems as the February 2009 changeover to digital TV broadcasting edges closer. And we found plenty of interesting new audio gear. Listed alphabetically, here are our picks for the show's Top 10 product debuts. For expanded show coverage and a list of *Mix* Certified Hits, visit www.mixonline.com.

The whisper-quiet, phantom-powered A440 from Audio Engineering Associates (www.wesdooley.com) boasts the greatest usable dynamic range of any ribbon microphone manufactured today. Promising to deliver bass with authority, the A440 has a flat frequency response, holding an accurate figure-8 polar pattern down to 20 Hz.

Sound Devices 788T location recorder can record to FireWire or USB.

The latest generation of CEDAR's (www.cedaraudio.com) Dialogue Noise Suppression technology combines the features of the DNS1500 and DNS2000. Like its predecessor, the DNS3000 ($10,000) integrates with, and is controllable from, Pro Tools via a plug-in interface, but also adds onboard scene save/recall and motorized faders for dynamic noise reduction locked to the session or SMPTE.

DPA Microphones' (www.dpamicrophones.com) 4017 shotgun mic features roll-off and high-boost switches, and a permanent third-order high-pass filter at 50 Hz.

Genelec's (www.genelec.com) 6010A and companion 5040A sub handles signals from stereo to 5.1. The two-way 6010As feature a 3-inch bass driver and ¾-inch tweeter—each powered by 12-watt amps. The 5040A sub is powered by a 40W amp and extends the LF response down to 35 Hz, and features a volume control for the system, five main I/O channels and dedicated LFE controls.

Holophone's (www.holophone.com) PortaMic 5.1 ($599) has a 2.5x1.5-inch mic head with six separate mic elements mounted on a 1-inch-high encoder that outputs two channels in the Dolby Pro Logic II format for routing to any broadcast camera or stereo recording device.

Now available in a single rackpace unit, iZotope's (www.izotope.com)

ANR-B's ($4,995) advanced noise-reduction technology can intelligently identify and suppress environmental broadband noise, hum, phone line artifacts and more. Ideal for radio call-in programs and on-location broadcasting, the unit detects noise in real time and adapts to changing noise over time, allowing for automatic operation with little to no input required from the user.

Lawo's (www.lawo.ca) mc²56 offers the full performance of its mc² Series in a reduced surface with compact dimensions. The mc²56 uses the Lawo HD core with up to 512 DSP channels, 144 summing buses and a routing capacity of up to 8,192 crosspoints. The complete functionality of the mc² Series is available, including the transfer of snapshots within the mc² family, as well as dynamic automation and networking with other Lawo products.

Minnetonka's (www.minnetonkaaudio.com) SurCode for Dolby Digital is now available as a plug-in option for its AudioTools AWE. Fully licensed and certified, this $495 software-only Dolby Digital encoder provides access to the full complement of professional encoding features.

Taking its lineage directly from the MKH 800, the Sennheiser (www.sennheiserusa.com) "MKH 800 Twin" ($3,356) has front and back capsules with separate outputs to a 5-pin XLR that breaks out to standard XLRs. The signals can be recorded to individual channels and then phase-manipulated and combined later, effectively changing the pattern of the mic after the recording.

Sennheiser MKH800 Twin

The Sound Devices (www.sounddevices.com) 788T is a full-featured 8-track location recorder with eight mic preamps, 160GB internal SATA disk drive, Compact Flash card slot and the ability to record to an external drive via FireWire 400/800 or USB 2—all at the same time. The aluminum chassis weighs less than four pounds and accommodates individual controls and connectors for each of its eight inputs, plus numerous additional I/O and data connections.

'ROCK BAND' SOARS

In just four months since its November 2007 release, Rock Band videogame's downloadable content went six-times Platinum; that's 6 million downloads. And it's not going to stop now that more tracks are continually being added, including songs from Mötley Crüe, who will be the first band to release their new single, "Saints of Los Angeles," as a downloaded, playable track in the game.

BRUCE KAPP, 1951-2008

Bruce Kapp at Chicago's Soldier Field, circa 1977

Touring industry veteran Bruce Kapp, who is credited with helping to develop the concept of national gigging, was born with concerts on the brain: While in high school, he booked bands in and around his hometown, Chicago. After receiving a degree in marketing from Northwestern University (Evanston, Ill.), Kapp opened his own talent agency, which booked bands throughout the Midwest.

By the 1970s, he formed Celebration Concerts, a concert-promotion company whose clients included the Super Bowl of Rock series at Chicago's Soldier Field stadium featuring Emerson Lake and Palmer, Pink Floyd, Ted Nugent and Peter Frampton. He spent nearly a decade at PACE Concerts, starting in 1984, and later joined Magic Works, which was acquired by SFX Entertainment in 1998.

His most recent gig was senior VP of touring at Live Nation, overseeing jaunts by Aerosmith, Jimmy Buffett, Def Leppard, Van Halen and others.

SEEN AND HEARD

"We have the right to earn compensation from all types of 'performances,' including direct, live renditions and indirect recordings, broadcasts, digital streams and more."

Linda Perry signs her name.

—ASCAP's "Bill of Rights for Songwriters and Composers"

GOING GREEN IN THE STUDIO

Whatever your view is on global warming, making your business—and your studio—more "green" is not only a wise investment in tomorrow, but can also cut down on your monthly electrical bills today. Here are some great jumping-off sites to get you thinking green and saving some green:

- www.treehugger.com
- www.worldwatch.org
- www.gogreeninitiative.org
- www.epa.gov
- www.thegreenguide.com
- www.auralex.com/Eco/Green.asp

ON THE MOVE

Who: Paul Taylor, president of Ultrasone

Main Responsibilities: sales, marketing, logistics, maintenance, accounting, office operations

Previous Lives:

- Ultrasone AG, marketing and sales
- STI GmbH, operations/human resources, customer relations, marketing
- U.S. Army

The most interesting concert lineup would be: The Who, Van Halen, KISS, Joe Satriani, Rush, Dream Theater and Led Zeppelin.

The first thing I'd buy after winning the lottery would be: a beach house.

Currently in my MP3 player: (to exercise) Led Zeppelin, KISS, Dream Theater, Black Label Society, Tool, Van Halen and Godsmack; (to relax) Keiko Matsui, Brian Culbertson, Fourplay, Paul Taylor, Jim Wilson and Kim Waters.

When I'm not in the office, you can find me: listening to music, jogging and, on Sunday afternoons, tasting California wines.

LISTEN...PLAY

Go beyond the printed page and log on to www. mixonline.com to get extra photos, text and sounds on these select articles—plus much more online:
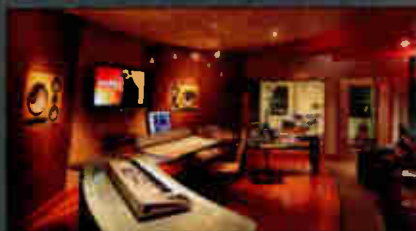
WATCH: "Class of 2008"
This was a banner year for new studio grand openings, but there's just not enough room to showcase them all in print. Check out an expanded photo gallery of new rooms—you may end up in one of them soon to record your next project!

WATCH:
"Optimizing Speaker Performance in Your Studio"
Check out this free Webcast hosted by veteran acoustic consultant Bob Hodas.

LISTEN:
"Recording Notes"
Now you know how they recorded it, but what does the album *sound* like? Check out these clips for George Strait's *Troubador*, Joe Satriani's *Professor Satchafunkilus and the Musterion of Rock* and this month's Classic Track, Brownsville Station's "Smokin' in the Boys Room"—okay, you know what *that* one sounds like!

LISTEN: "Field Test":
Burgin McDaniel Komit Compressor
Check out this MP3 of the Komit used on a session with Donnell Davis, George Benson's drummer.

CURRENT

ZAPPA SQUARED

Coinciding with the release of the two-DVD (plus bonus audio CD) *Zappa Plays Zappa* filmed live in 2006, Dweezil Zappa takes a new ZPZ entourage on tour this summer, beginning June 6 in Minneapolis. The DVDs, produced by Pierre and Francois Lamoureaux, feature more than three hours of performances. Pictured is Zappa relaxing in the family's famed Utility Muffin Research Kitchen Studio, which was recently updated with a Euphonix System 5 digital console, Steinberg Nuendo and Focusrite LiquidMix.

GADGET CORNER
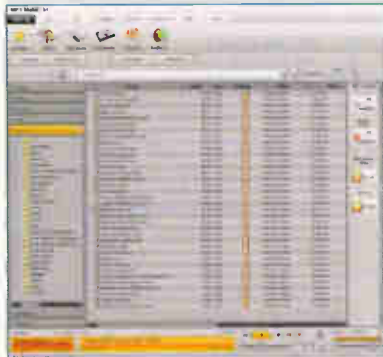
Don't just take your friends' music advice. Magix's (www.magix.com) MP3 Maker 14 Deluxe (PC, mobile players, cell phones, PSP, iPods, etc.; $29.99) features a built-in MUFIN integrated music-recommendation technology developed with the Fraunhofer Institute, creators of the MP3 format. Based on a computerized algorithmic sound analysis of music, the software "listens" to a song and then finds and recommends something similar; these "if you like this, you'll like this" tracks can be automatically compiled into your playlist.

TEC NEWS ON MIXONLINE

Mix subscribers and others who wish to keep abreast of this year's TEC Awards nominations, voting schedule, TECnology Hall of Fame, Les Paul Award and other TEC-related information can find complete updates on the *Mix* Website, www.mixonline.com.

INDUSTRY NEWS

Previously with Guitar Center, **Tom Menrath** joins **Audio Agent** (Seattle) as VP of brand management...New York City–based **Sound Lounge Music & Sound Design** hired executive producer **Marcus Smith**...New members of **Auralex Acoustics'** (Indianapolis) executive team: **Joseph Ziemer**, senior director of global and broadcast divisions, and **Tim Martin**, director of sales...Handling national sales for **Martin Audio** (Waterloo, Ontario) is **Al Brown**...**Genelec** (Natick, MA) appointed **Scott Esterson** to the newly created position of Western sales manager...New sales manager, Mexico, at **Bosch Communications Systems** (Farmington Hills, MI) is **Ernesto Montañez**...Detroit's **Gold Sound** added account exec **Rebecca Smialek**...Distribution deals: **One Systems** (Nashville) is rep'd in Texas, Oklahoma, Arkansas and Louisiana by **Dimension Point Marketing** (Houston); **Symetrix** (Mountlake Terrace, WA) named **Pearson and Pearson** as its rep for the Rocky Mountain area; **Telex** (Burnsville, MN) is distributed in Canada by **SF Marketing** (Quebec); and **Wohler** (Hayward, CA) named **Joseph Electronics** (Niles, IL) as its U.S. master distributor.

Tom Menrath

Work directly on screen

Cintiq 21UX
interactive pen display

The Cintiq 21UX interactive pen display combines the advantages of a large-format LCD monitor with the control, comfort. and productivity of Wacom's most sophisticated patented, cordless, battery-free pen technology. With a 21.3" display, the Cintiq 21UX delivers a highly sensitive pen-on-screen experience and a generous work area for controlling the cursor in your favorite applications.

Adding a Cintiq 21UX to your digital audio workstation is one of the easiest ways to speed up your workflow. Because working with a pen directly on the screen allows you to take advantage of your natural hand-eye coordination, you can quickly and easily control sophisticated software interfaces for music and post production. Controlling faders and sliders in your favorite audio application has never been easier than using the pen directly on the screen. Wacom's patented electromagnetic pen technology ensures that you are getting the highest level of pen precision on the market today.

Works with Mac OS or Windows operating systems. alone or in multiple-monitor environments.

BY PAUL D. LEHRMAN

You Light Up My Brain

Exploring the Science and Magic Inside Music

So I was washing the dishes after dinner with the TV on. The set in the kitchen is one of those little countertop jobs with rabbit ears and a 2-inch speaker. I flipped to one of the local PBS stations, and to my delight there was Jeff Beck wailing away. Suddenly, he stopped playing, and this…this *child* with long frizzy hair and a cherubic face was ripping off an absolutely breathtaking bass solo on an instrument almost as large as she was. I was immediately transfixed and damn near broke the plate I was rinsing. I plunked myself down in front of the diminutive tube to watch what I can only describe as a moment of unalloyed, unimpaired, unselfconscious musical joy, hardly diminished in its transmission by the fact that the audio was completely devoid of any of the bass' fundamental frequencies and boasted at least 30 percent harmonic distortion.

If you have seen the second of Eric Clapton's *Crossroads Guitar Festivals*, then you know what I'm talking about. Beck's hour-long set was arguably the highlight of what was—inarguably—one of the best rock 'n' roll concerts in history. Only two of Beck's tunes made it onto the PBS telecast and the Rhino DVD, but they are incredible, and you can find most of the rest on YouTube. After the concert, and especially after the broadcast, the blogosphere was filled with speculation as to who this young woman was. Guesses ran from Beck's daughter to the offspring of former Grateful Dead members Keith and Donna Godchaux, but it soon came out that she is no scion of rock royalty, but merely a ferociously talented 22-year-old from Australia named Tal Wilkenfeld.

Wilkenfeld has been playing music a relatively short time. She grew up in an apparently normal middle-class family, and started playing guitar at the age of 14. Then she did something rather unusual at age 16: She dropped out of high school and moved to L.A. to study and gig. A year or so later, she took up the bass, and before long she had an endorsement deal with Sadowsky Guitars and was playing with the likes of Chick Corea, Susan Tedeschi, Vinnie Colaiuta (who was also in Beck's band at *Crossroads*) and the Allman Brothers Band. She recorded her own album last year, and it features high-energy fusion and funk, plenty of complicated time signatures and a whole lot of all-star playing. The bass community has gone nuts over her, and some are hailing her as the second coming of Jaco Pastorius. I wouldn't go that far, but she is going to be a force to be reckoned with.
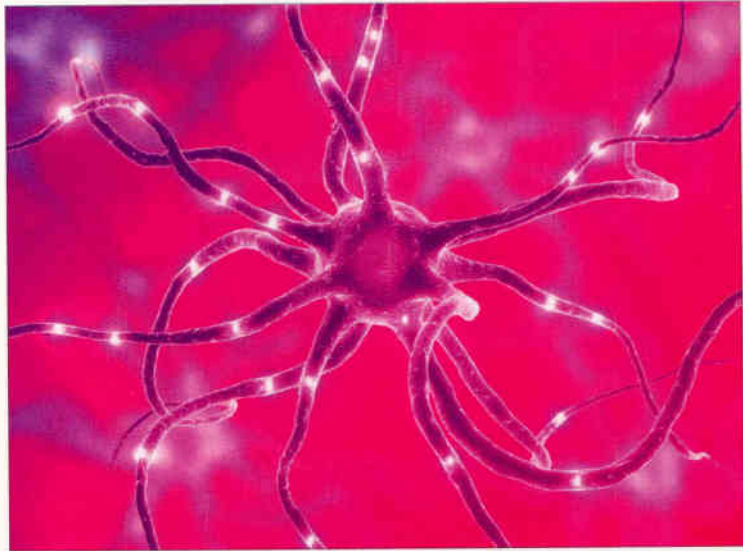
But the main thing that makes it so wonderful to watch and hear her is that she is just having so much damn *fun* being up onstage and playing music. It's all about the music and the myriad ways it makes her, the people she's playing with, and the people they're playing for, feel. She doesn't seem to notice that she's a young woman playing with a rock god 40 years her senior—she's just playing. And Beck looks utterly delighted to be sharing the spotlight with her. As one longtime fan put it, "I've never seen him play *to* someone onstage with him before." Whatever influenced Wilkenfeld to veer off the well-worn path she was expected to follow, it was the right thing to do. There's so much happening up on that stage, on so many levels, that the performance leaves you breathless and begging for more.

Music causes us to respond in many ways, often simultaneously, and sometimes even in contradiction to each other. And it's largely at a nonverbal level—nobody said or sang a word during Beck's entire set. Philosophers and prophets have likened music's power to magic—they have no other explanation for how so much can be communicated between people without words. But as the late Arthur Clarke so succinctly postulated, we consider something to be magic only if our technology isn't sufficiently advanced to understand it. And in the case of humans' response to music, our technology is catching up fast.

There has been a veritable explosion recently of articles and books about how music affects the brain. Books like *This Is Your Brain on Music* by Daniel Levitin (who delivered the keynote address at last fall's AES convention) and neurologist Oliver Sacks' *Musicophilia*

World Radio History

have topped the best-seller lists. At the most recent International Conference on Music Perception and Cognition, more than 600 papers were presented. There are currently three-dozen university research centers on four continents devoted to the neuroscience of music and hundreds of other independent scientists working in the field.

What they are finding is no surprise to those of us who work with music every day: Its effect is profound and very, very complex. For one thing, "Music activates the same parts of the brain and causes the same neurochemical cocktail as a lot of other pleasurable activities like orgasms or eating chocolate," writes Levitin. "Serotonin and dopamine are both involved." This means that music is similarly addictive and may help to explain why musicians are susceptible to drug problems: They can't be playing 24 hours a day, so they try to find something to fill the void. But that effect is important for nonabusers, too. "Most people in Western society use music to regulate moods, whether it's playing something peppy in the morning, or something soothing at the end of a hard day, or something that will motivate them to exercise," Levitin says.

Although scientific writings about mu-sic and the mind date back as least as far as the 1970s, a more recent technological development has boosted the quantity and quality of research: Functional Magnetic

> ## Music is such a precious thing, and science is only confirming what a unique and valuable medium it is.

Resonance Imaging, or fMRI. Like its older sibling, plain-old MRI, fMRI takes remarkably sharp and detailed pictures of the structures inside a living organism without invasion or risk. The difference is that while the MRI is a snapshot, the fMRI shows action and in real time. Neuroscientists have gathered tons of knowledge with this tool about how human brains react to various stimuli. A favorite stimulus of researchers, because it is controllable and widely variable in its many parameters, is music.

What they've found is that right along with the complex models being built of the brain's response to chemical changes, the topological model—the part of the brain that is affected when music is heard—is much more complicated than most people ever thought. fMRI research shows that music is not perceived at one specific site; instead, the response is distributed.

Jamshed Bharucha, a psychologist and violinist at Tufts University, where I teach, gave a lecture to the music department in which he showed fMRI pictures where you could clearly see distinct areas of the brain literally lighting up in response to changes in different musical parameters. You could see that the ways in which the brain responds to melody are different from the way it responds to harmony or key or tonal structure or rhythm.

Bharucha points out that the deep, non-verbal level on which music communicates indicates that it is as old, if not older, than language. For our ancestors, it was how stories were told. "We should pay more attention to music as a medium for memory and cultural knowledge," he writes. "Prior

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to writing, which is very recent, [music may have provided a way] of asserting our cultural memory and passing that on through generations."

If you've spent time around older people, you've likely seen evidence of the sub-verbal power of music among people today who have impaired brain function. An elderly relative of my wife's has been in a nursing home for the past year. Once a highly articulate woman, she now can rarely formulate a coherent sentence. But whenever my wife goes to visit her, one of the first things she says is, "Is Paul here?" followed by, "Will he play the piano?" Even my inelegant attempts at Mozart, Bach and Cole Porter on the beat-up spinet will make her day. When she is depressed or anxious or grumpy, the staff knows to pull out a CD of her favorite Irish harp music and put the headphones on her. She doesn't know what she is listening to, or even *how* for that matter, but whatever expression was on her face is quickly replaced by a peaceful smile.

Another woman—I'll call Edith—in the nursing home hardly talks at all. If you say something to her, she'll turn her head to look at you and say a word or two, but no more. She can't eat by herself so she takes meals in her room, where one of the aides cuts up her food and puts it in her mouth. Last Christmas, my wife and I had dinner at the nursing home, and after dessert I sat down at the piano and banged out a few seasonal tunes. All of the talking and clanging of dishes stopped, and many people started to sing.

Astonishingly, above them all was the Edith's voice, who had been wheeled in when her aide heard the music start. Staring intently at me so as not to miss a note, she sang all the words of all the carols and songs, sometimes even adding a harmony. If you could have watched her brain on an fMRI screen at the time, it would have looked like the sky over the Statue of Liberty on the Fourth of July. When the high note at the end of "O Holy Night" came, she soared into it and there wasn't a dry eye in the room.

After I finished my little set, I went over to her and tapped her on the shoulder. "Merry Christmas, Edith," I said into her ear. She turned slowly to look at me, an expression between sorrow and fear on her face, and said, "I don't know that song."

Music is such a precious thing, and science is only confirming what a unique and valuable medium it is. Those of us who are able to make our living in the field should be very grateful that our work can be so meaningful on so many levels. We get to play, listen, shape, mold and pass along music to others so that they can experience and be affected by it. We can't always describe in words what it is we do and how we do it. Frank Zappa was famously quoted as saying, "Writing about music is like dancing about architecture," but we know when it's right. And that might happen when we hear Tal Wilkenfeld solo'ing on "Cause We've Ended As Lovers" through a 2-inch speaker or a silent old woman finding the perfect high E-flat on Christmas Day.

It would be great to see an fMRI on Wilkenfeld's head when she's adding her unique voice to those classic tunes with Beck, or flying with Chick Corea. Just like Edith's, the light show would, without a doubt, be spectacular. But even more than that, I'd just like to sit down with her and jam. ∎

When Paul Lehrman was 22, he thought he was a pretty good bass player. Now he knows better. His more recent brain flashes are documented in The Insider Audio Bathroom Reader, *available at Amazon and MixBooks.*

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THE CLASS OF 2008

A Selection of This Year's Hottest New Studios

▶ ON THE COVER, INNER MACHINE

Inner Machine (Buffalo, N.Y.) is enjoying a second life thanks to a couple of former studio gofers, Robby Tacak and John Rzeznik—now better known as Goo Goo Dolls. Twenty years ago, Tacak and Rzeznik were working for then-owner Alan Baumgardner and his commercial clients. They recently purchased the studio, and with the help of the original designer, John Storyk and wife/partner Beth Walters, founders of Walters-Storyk Design Group, they've made the rooms over to support their own projects.

"I first designed this studio, then called Trackmasters, over 30 years ago," Storyk says. "Obviously, it needed to be renovated. The equipment was tired, they needed a new mechanical room—but the main acoustic need for Johnny [Rzeznik] was to completely change the acoustic signature of the live room, creating an enhanced reverb time, capable of recording drums and other session work, specifically for the group."

WSDG added a vocal booth and spec'd new surface treatments in all of the rooms. "The curved soffits on the [tracking room] ceiling were refilled and resurfaced," he explains. "We changed all of the original fabric to wood membranes with specific finishes. There are two different wood thicknesses to give a variety of membrane absorption characteristics at low frequencies. We introduced a variable-acoustic panel system on the walls, due to the need to deaden the room from time to time. The default RT60 for the room is close to 1.0 seconds and smooth through the entire frequency domain."

The owners worked with WSDG system engineer Judy Brown to integrate an API Legacy console, new main monitors and a large collection of vintage outboard gear. A full-range Augspurger monitor system will soon be installed under the guidance of Professional Audio Design. The control room photo shows that two racks (far right) are detached from the rest; these racks on rollers house Rzeznik's favorite pieces of gear

PHOTO: BOB MUSSELL

(Groove Tubes Vipre mic pre's and Glory Comp compressors; Mercury EQ-P1s, M76ms and M72s; RCA BA 66; Chandler Limited TG2 and others) and can be moved all the way forward to the mix position.

"I'm proud of the fact that this room that we built 30 years ago, whose infrastructure is still sound, could be reborn to accept totally different acoustic requirements," Storyk says. "Often when a studio's purpose ends, the studio dies, but this studio is now rebuilt to serve a new purpose that's consistent with what artists and bands are doing in the 21st century."

PHOTO: GEORGE ROOS

◀ 2 HARD RECORDS

Francis Manzella (FM Design Ltd.) designed this recording studio for Jeremy Harding's 2 Hard Records label in Kingston, Jamaica. Harding, who manages Platinum artist Sean Paul, works with other local producers and writers, and produces 2 Hard artists in his new studio, which opened in December 2007. Equipment includes Digidesign D-Command and Pro Tools HD, Griffin G1.5 main monitors and loads of MIDI gear.

◄ JNH STUDIOS

Studio A of composer James Newton Howard's personal facility in Santa Monica, Calif., includes architectural and technological updates to the room that studio bau:ton originally designed for him in 1996. The redesign, by bau:ton's Peter Grueneisen, opened the space to accommodate a large flat-panel monitor on the front wall. An equipment rack was removed and bass trapping was reconfigured to accommodate a new seating area on a riser behind the composer's desk. The sloping front wood ceiling was also replaced with a high, nearly level fabric surface, and warm cherry flooring and paneling were added. Howard's extensive equipment includes a Euphonix System 5 console and B&W monitoring. The redesign was completed in January '08.

► RADIOBU

Russ Berger Design Group designed this 1,100-square-foot studio, which serves as the new home of Sirius Satellite program *Martha Quinn Presents*. Located in Malibu, Calif., the studio is also available for theatrical, television and Web 2.0 post-production, audio mixing and voice-over projects. Design features include custom acoustic fabric wall and ceiling treatments, walnut flooring and lots of natural light. Open for business in February '08, the studio has a 32-channel Digidesign ICON system with 48-channel analog I/O, API and tube front end, SSL summing, a selection of vintage mics and outboard, ISDN and custom Precision Kinetics 7.1 surround monitoring.

▼ CREAM

Cream Recording Studios is a new music recording/mixing facility housed within the London headquarters of UK-based equipment supplier/rental company GearBox. Opened in March '08, Cream was designed by Roger D'Arcy of Recording Architecture to accommodate large-scale music production, with an emphasis on film scoring and other sound-for-picture projects. Cream features a new 72-channel SSL Duality analog console, custom ATC surround monitoring, and a wide choice of vintage and classic mics, and outboard gear.

▼ CALIFORNIA ROAD STUDIOS

Situated in Orchard Park, N.Y., is California Road Studios, a multipurpose tracking/mixing facility by Lawrence P. Swist Designs. The studio opened in September '07, and features an 800-square-foot tracking room and a 120-square-foot iso booth. Designer Larry Swist reports that the large room has a 1.6-second reverb time optimized for drum tracking; reverb times can also be adjusted down to accommodate a variety of production requirements. Featured equipment includes Pro Tools HD3, a Digidesign D-Command console, Avalon and Focusrite mic pre's, and Dynaudio 5.1 monitoring.

▼ KMA Music

In the heart of Manhattan, KMA Music was designed by Francis Manzella (FM Design Ltd.) as a mixing, tracking and writing studio for independent engineers and producers, as well as for KMA's staff composers. Situated in the Brill Building, KMA opened in April 2007 and offers a Digidesign ICON, Pro Tools HD, Griffin G1.5 main monitors, a Yamaha Grand and an unsurpassed view of Times Square.

PHOTO: GEORGE ROOS

PHOTO: ROB LAYGEN

▲ Humber Recording Studios

This studio opened in September '07 to serve the music and recording programs at Toronto's Humber Polytechnic College. Designed by Canadian firm The Delarson Group, Humber Recording has a 30x30-foot main tracking room with variable acoustics, as well as two iso booths and a 30x20-foot control room with RPG Quadratic Diffusors. Major equipment includes an SSL Duality 48, Pro Tools HD2 and Dynaudio surround monitoring.

▼ Aaron Merrill Music & Sound

Composer/producer/engineer Aaron Merrill completed his new facility in Highland, Utah, in March '08. The hybrid studio was designed by Precision Acoustic Design to accommodate a variety of audio, music and film-scoring tasks. The 23x21-foot control room features a custom 10-foot touch-screen control surface, and the 20x18-foot recording area has 12 adjustable acoustic panels that let in natural light and allow control over the room's characteristics and reverb time.

PHOTO: PRECISION ACOUSTIC DESIGN

▼ Fraser Performing and Recording Studio

Dennis Janson (Janson Design Group) designed this studio for WGBH Boston Public TV and Radio (Brighton, Mass.). Pictured is the tracking room of this 2,000-square-foot space with a 28-foot ceiling. Acoustical features include double-wall construction around the studio on spring-isolated, floating concrete floors. RPG Quadratic Diffusors are installed on the lower-half of the walls, with 2-inch-thick, fabric-wrapped panels fixed to the upper-half. Ceiling panels are RPG Skyline 3-D diffusors, and corner bass traps are built in. The studio opened in September '07, and features an SSL C224 mixer, ATC mains and Aviom Pro 16-channel headphone mix/monitoring to supplement a proprietary headphone/cue system.

▶ JCB Music

With a design by Studio 440 Architecture & Acoustics, the main control room of JCB Music (Santa Monica, Calif.) is configured for composing and recording. RPG acoustical treatments are strategically placed to enhance acoustics and reverb time. Isolated and/or floating cement slabs were used to isolate spaces, and room-within-a-room construction helps ensure low background-noise levels. JCB is equipped with a Euphonix System 5 console, Genelec 1039A LCR mains, and Yamaha 01V and 02R96 mixers. The studio opened in June '07.

PHOTO: BENNY CHAN/FOTOWORKS
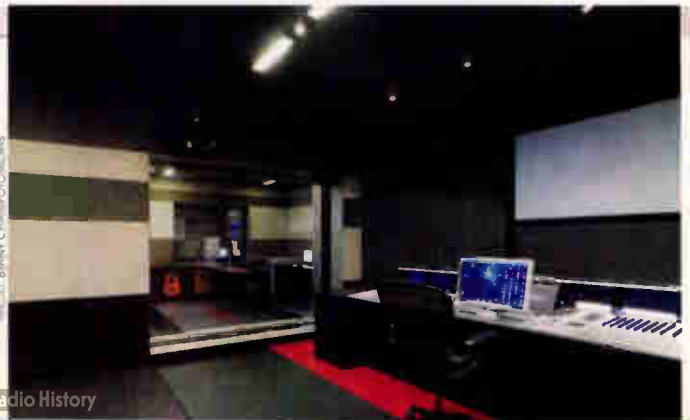
▶ SETAI RECORDING STUDIO

Situated in the penthouse of the Setai Hotel (South Beach, Fla.), artist Lenny Kravitz's Setai Recording overlooks the Atlantic. Kravitz and his team envisioned the studio as a warm and luxurious facility that would provide the same level of service that is offered by the hotel. Matt Knobel led the technical design; acoustical design was by Ross Alexander (Synergetic Services), and includes custom-fabricated modules for LF control, mid- and high-frequency diffusion, and critically located mid/high absorption. Miami's Acoustical Components provided additional wall and ceiling finishes. The studio went online in January with an SSL C200 console and ATC monitors.

◀ WESLEYAN EXPERIMENTAL MUSIC STUDIO

Completed in September '07, the Experimental Music Studio at Wesleyan University (Middletown, Conn.) serves as a recording/mixing space for student music and post-production projects. Lou Clark of Sonic-Space designed the studio to be acoustically neutral and flexible. Equipment from MOTU, Alesis, Tascam, Mackie and more is on rolling equipment racks, and the room has large gobos with built-in diffusers that create a large, cylindrical diffuser when they are placed next to each other. Rigging bars mounted to the ceiling, down the center and around the perimeter of the room allow speakers to be hung in a variety of positions.

▼ DIANTE DO TRONO

The most striking element of Diante Do Trono (Belo Horizonte, Brazil) is probably the way in which three of the main Genelec 1032 5.1 surround speakers are housed within the panoramic glass wall between the tracking and control rooms. Other equipment includes a Digidesign Control|24 console, Pro Tools HD3, and a selection of outboard processing and vintage mics. The Walters-Storyk Design Group designed the facility, which opened in February '08 and includes a 600-square-foot live room and a 350-square-foot control room with two iso booths.

▲ METHODS AND APPLICATIONS LABORATORY

In the Northeast corner of Mercenary Audio's Foxboro, Mass., warehouse is the new Methods and Applications Laboratory (MethLab). The studio was designed by Fletcher and the Mercenary Design Group/CNF Consulting to handle sessions and serve as a research facility for developing and testing new equipment designs. Though much of the gear changes with new consulting projects, the room is centered around a modified 32x8 Yamaha PM2000 and custom monitors controlled by a Crane Song Avocet. Acoustics are based on a modified live-end/dead-end design; murals, animal-print fabrics and carpet complete the aesthetic. ∎

THE
OTHER CLASS OF 2008

Hot New Venues Combine Versatility With High-Performance Audio

BY SARAH BENZULY

There's just no slowing down the demand for high-quality venues in which to take in your favorite band, watch your favorite sports team, catch up with the opera or any other number of entertainment outlets. And whether they're showcasing a band onstage or a sports announcer, these new venues are spec'ing high-end audio systems on the top of their "must-have" list.

▶ THE SLOWDOWN

Saddle Creek Records, the label co-founded by indie favorite Conor Oberst (Bright Eyes), is making its mark in the live sound world with The Slowdown, its new 470-capacity bar and club in downtown Omaha, Neb. The space hosts performances by regional and touring artists. Ohio-based A/V system integrators SoundCom installed three sound systems, including a main (14 Electro-Voice XLD281s, four QRx218S dual 18-inch subs) and a smaller one (four Electro-Voice Fri+152/64s); monitoring is via Electro-Voice Xw16a monitors and a Fri181S sub; amps are from Crown. A Midas Verona V-480-8 holds court at FOH with a fine selection of outboard gear. Mics are Shure, beyerdynamic and Sennheiser models. Another Midas board—a V-320-8—sits at monitor world.
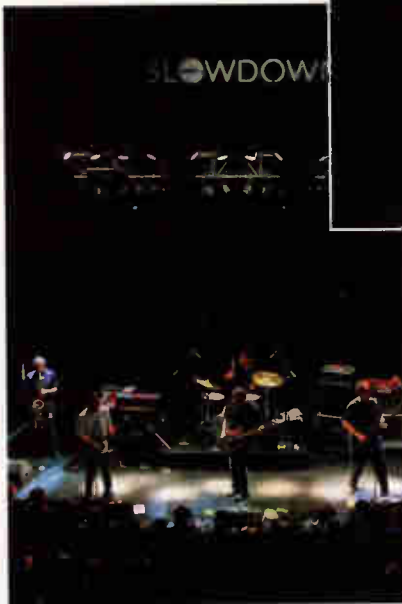
▲ BLUSH CLUB

Blush (Winnipeg, Canada) opened in December 2007 after a multimillion-dollar renovation to the 10-year vacant spot. Owners Sam Colosimo and Jack Salvaggio chose Integrated Entertainment Technologies to handle audio and lighting support systems after a successful partnership in working on the owners' Empire nightclub. To help supplement live music to the club's dance music core, the team installed Yamaha IF Series speakers (IF2115/64, ISI1218 sub-bass cabs, IF2108 for DJs), which are managed by a DME 24n processor for 16 different speaker locations. The system's remotes provide a single control to time-fade between band and DJ, as well as control the VIP area. At FOH sits a Yamaha LS9-32 board from which a visiting engineer can also mix monitors; the monitor mix position includes a Yamaha MG32/14 FX mixer, C112V wedges and drum monitor, and P3500 amps. The system also includes a Digiflex splitter snake, Shure mics and a Rane TTM 57SL DJ mixer.

▶ CAFÉ 939

The building that houses the new Café 939 under-21 club at Boston's Berklee College of Music may have been around for a while, but this 200-person-capacity concert venue has a newly designed music performance space. Located next to the Cactus Club, the café spotlights the school's emerging artists, as well as local and national touring acts. Puerto Rican sax player Miguel Zenon opened the new venue with a performance on April 2. A Yamaha M7CL-32 digital console can handle both FOH and monitor mixing; visiting engineers have access to the desk's full array of onboard processing. All speakers (Meyer Sound UPJ-1P with USW-1P sub) and monitors (Meyer Sound UM-1P, UM-100P) are self-powered.

◀ HOTEL NIKKO RRAZZ CLUB

Owners Robert Kotonly and Rory Paull opened their Rrazz Club in San Francisco's Hotel Nikko in mid-March. The 190-seat club, which occupies a lobby-level space formerly used as a meeting room, gives the City by the Bay a new place to check out cabaret music. The $1-million project includes a Yamaha M7CL 32 digital board at FOH and Nexo GEO speakers; amps are Yamaha T4n and T3n. Broadway vet Matt Berman designed the sound and lighting. In its first year, the club will welcome lounge singers such as Diane Schuur and Jane Olivor, as well as a summer run of "American Idols in Concert."

▼ HSBC ARENA

Home to the NHL's Buffalo Sabres and the Buffalo Bandits lacrosse team, as well as hosting a slew of music concerts, ice shows and other entertainment, the 20,000-seater HSBC Arena (Buffalo, N.Y.) sports a new audio system, thanks to Clair Bros. Audio Systems, which finished the project in just nine-and-a-half weeks while the arena was in use. The company installed six Dolby Lake processors to control the zoned and distributed JBL VLA speaker system (six clusters, each containing 10 VLA901 190-degree line array elements), driven by QSC PowerLight 3 Series and CM16a amps; a Yamaha M7CL-32 digital console sits in the mix booth. The existing upper-delay ring speakers were reused with new amps and processing. A complement of Shure UR24D/Beta 87A handheld mic systems are available, as are a PSM600 in-ear monitoring system and assorted wireless mics. The "ice" area has been updated with JBL PD5212 cabs underhung from the center-ice scoreboard.

▲ ROBERT AND MARGRIT MONDAVI CENTER FOR THE PERFORMING ARTS AT UNIVERSITY OF CALIFORNIA DAVIS

Continually upgrading this fine venue, XXXX Audio (Sacramento) recently completed an audio overhaul of the Jackson Hall, a room that hosts more than 100 performances annually, including orchestras, rock concerts, lectures and dance performances, as well as varied programming from the school. As the hall is deep—with rear seats as far as 148 feet from the proscenium—the 1,801-seat venue now boasts a Meyer Sound M'elodie line array and 600-HP subs (processing under Meyer Galileo loudspeaker management). Also part of the upgrade are a Midas Legend board at FOH and a Yamaha M7CL at monitors (or as an alt FOH console).

▶ MACPHAIL CENTER FOR MUSIC

The recently constructed, $25-million, state-of-the-art MacPhail Center for Music (Minneapolis) saw a design and install by Audio Video Electronics (AVE) for the sound, video and lighting systems. The main space, Antonello Hall, features fully modular seating and stage placement. The lobby can serve as an informal concert hall, with seating on the wide staircase leading to the second floor. The second to sixth floors are filled with 56 studios, including acoustically isolated rooms for bands, percussion, etc. All of the major performance and rehearsal spaces can send audio signals to each other or to the Pro Tools–centered recording studio located adjacent to Antonello Hall via an Aviom Pro64 digital networking system. For a variety of traditional setups with the stage on one side of the room and rows of seats in front of it, AVE flew six Danley SH-50 full-range loudspeakers from the 25-foot ceilings in an L/C/R configuration. For stage in the round, four Danley SH-100s in a 10-foot circle from the center of the room fires out in all directions; FOH feeds the rest of the building and the minimal QSC Basis processor needed for the Danley complement. ∎

Room Tuning

By Bob Hodas
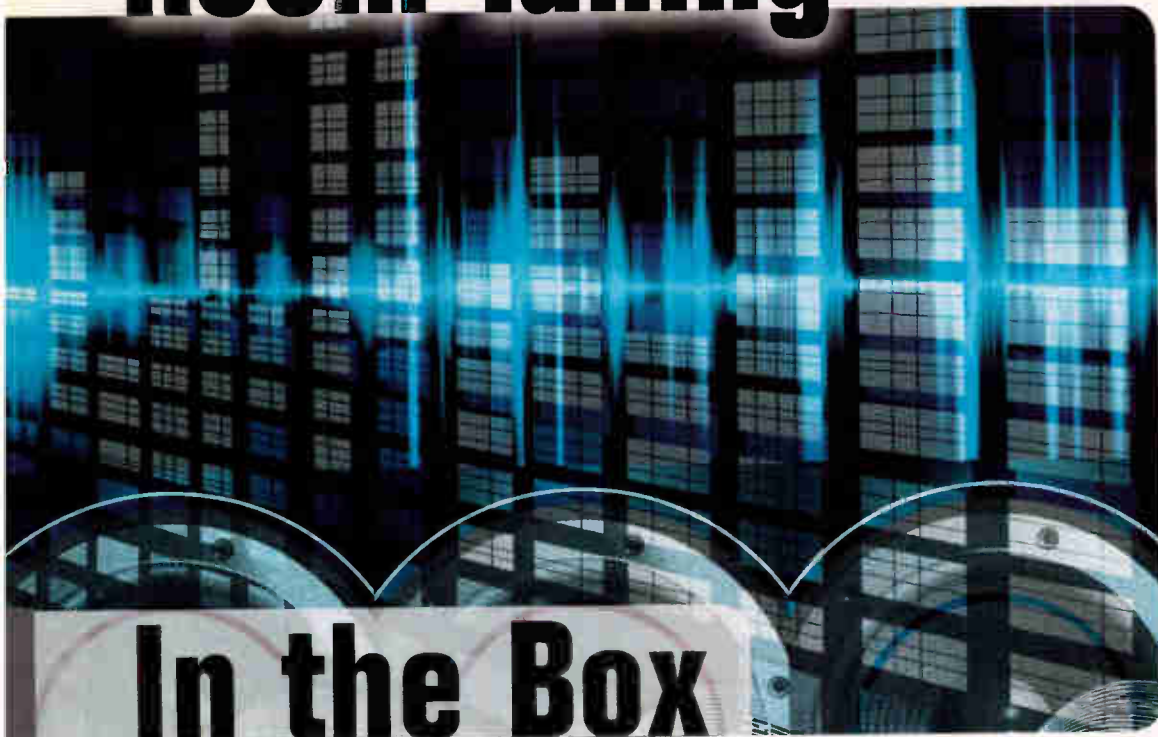
In the Box

CONSIDERING **DIGITAL EQUALIZERS** FOR **STUDIO MONITORS**

More and more, the recording studio environment is becoming one of plug-ins replacing outboard gear. I know several engineers who are mixing inside the box and forgoing the use of mixing consoles. As an extension of that, many of my room-tuning clients are considering how to use equalizers with their DAWs for tuning their control room monitors. Some follow the standard of using either digital or analog hardware EQs for their monitors, just as they would with a mixing console. Some have taken the approach of buying control room monitors that have digital equalization built into their amplifiers. Some are assigning plug-in equalizers to the output bus and tuning the room using an analyzer, and some are considering plug-in-automated equalization systems.

In this article, I'll examine alternatives for digital equalization of your control room. and play a bit of the devil's advocate by providing examples of issues to watch out for if you rely on an automatic EQ system.

KNOW YOUR OPTIONS
At the most basic level, you need to consider the consequences of moving audio from a DAW into a digital equalizer and back out into an analog amplifier. If you use the equalizer's analog inputs, then you're looking at three conversions to get to your monitors. For my money, the smart way to go would be to come out of the DAW digital out and into the digital input of your outboard equalizer. This way, you only have one digital conversion in the chain. In either case, sampling rate should be your primary concern; aim for a minimum sampling rate of 96kHz, 24-bit. Even at this sampling rate, you are restricting the signal path going to your monitors.

Some people see a digital EQ's inherent processing delay as a negative, but I really don't think this is much of a problem. The amount of delay incurred in these conversions and processing hardly amounts to much more than the effect of moving your speakers back 1.5 to 2.5 feet. This delay may even be of some benefit in reconciling video delay induced from using plasma screens.

Using digital equalizers allows more room-tuning flexibility than with analog. In most cases, you have the advantage of more bands of parametric equalization to use in the process of room tuning. Some equalizers allow you to set delays and compression, and incorporate crossovers—all in the digital domain. You also have the ability to store presets, which, for instance, let you have a curve for broadcast produc-

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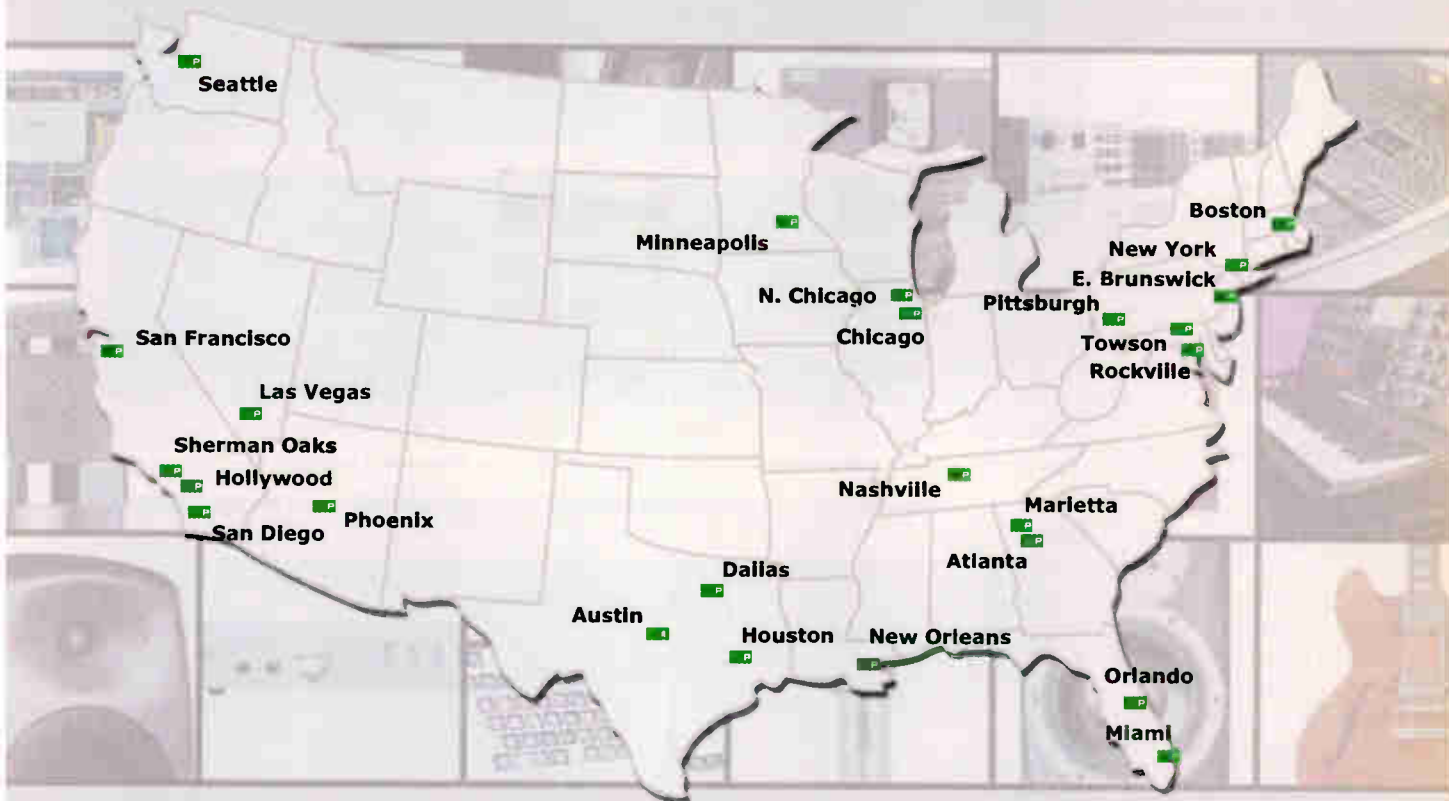
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tions, a Dolby X-curve for film mixing or a personality curve for mixing rock 'n' roll.

Digital EQs can come as part of self-powered speakers, as stand-alone boxes or as plug-ins for DAWs. They are either controlled by the user (in which case, the room gets tuned by some person with an analyzer) or by a computer, what I will term automated tuning systems. The computer systems that I feel most comfortable with give the user some ability to tweak the automated tuning, allowing for some human decisions about the final outcome.

The pursuit of automated equalization seems to be a trend that is growing in this industry. For example, even a certain speaker company—which in the past has basically accused me of being "Satan's spawn" because I used equalizers to tune its speaker systems in studios—has come out with a self-powered speaker that also contains auto-equalization.

BEFORE YOU EQ

It is important to understand what constitutes good equalization technique before turning your process over to a computer. Equalizing speakers in a room should be the icing on the cake; it should be the last thing that happens in a studio, not the first. Seventy percent of getting a good room/speaker interaction is physically finding that critical physical placement of the speakers and the listener. Simply setting up a pair of speakers in a room and believing that you can force them into alignment with equalization is a huge mistake.

Remember that some aspects of the speaker/room interface must be treated acoustically, not with equalization. One example would be first-order reflections: The frequency response of first-order reflections mixed in with the speaker's direct signal changes as the listener moves around the console. If fixed with equalization, then a dip in one listening position may become a peak in another listening position. Equalizing bass response also requires some specific care. If you try to fill in a large hole in the bass re-

Figure 1: Response of a medium-sized DVD remixing room; measurements taken over a large area
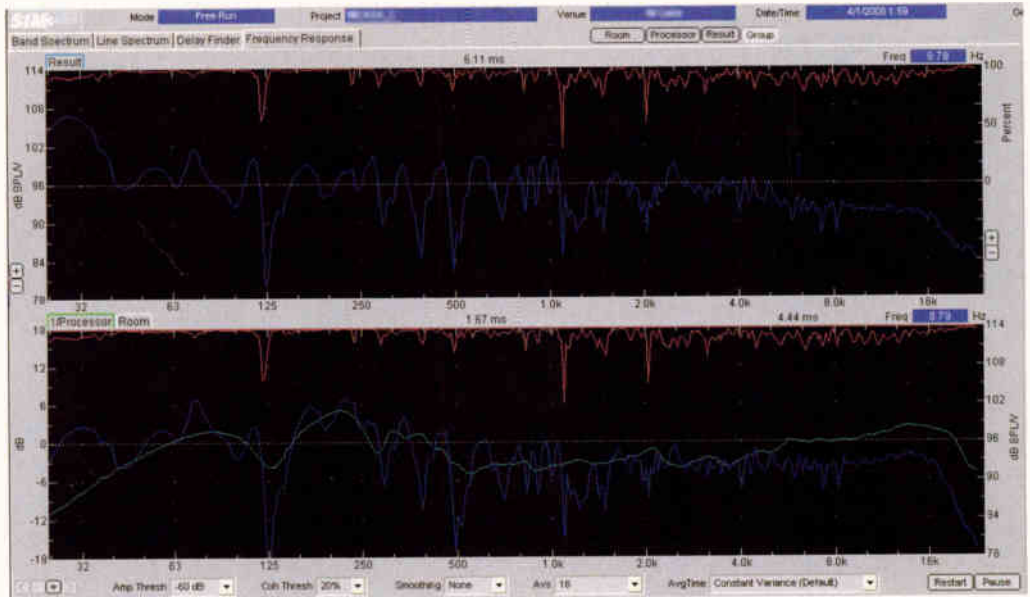
Figure 2: Response of a small quality-control room; measurement mic moved through a small area

sponse with equalization, you'll wind up cutting a lot of headroom out of your speaker system, resulting in distortion. Ideally, bass response should be within ±6dB acoustically before applying equalization.

Some auto-alignment systems solve the problem of equalizing first-order reflections by simply restricting the upper limits of the equalization that will be applied. This upper limit, depending on the manufacturer, seems to run from about 200 Hz to about 400 Hz. While audio purists believe you should never equalize high frequencies, this philosophy can restrict the system; for example, the system certainly cannot apply a Dolby X-curve if one is required. It is also important to know the resolution of the filters in the low

frequencies. If the filter resolution is only a half- or third-octave, then you're not going to get a very accurate room tuning, no matter how sophisticated the analysis computer.

Learn which types of filters are used in the equalizer you're going to apply to your system. It is important to understand that room resonances are minimum-phase phenomena. This means that to truly correct a room resonance, you must use a second-order minimum-phase filter. A linear-phase filter is good for correcting frequency linearity inside of a speaker box or perhaps to contour an instrument or voice in a track, but will not truly correct a room/speaker problem.

Automatic EQ systems work by analyzing samples of noise played through speakers,

Figure 1: High-frequency detail
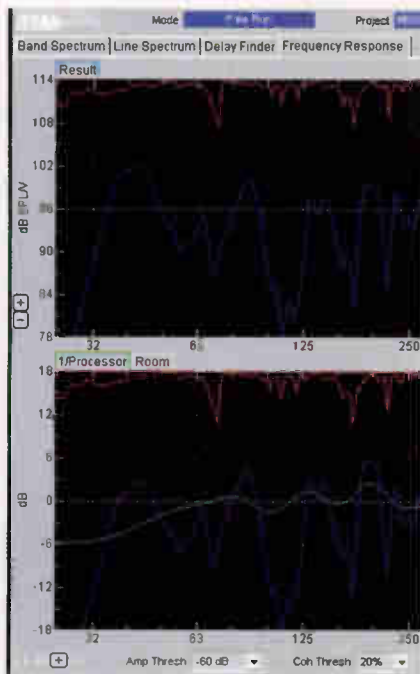
Figure 1: Low-frequency detail

as picked up by reference mics placed at various points in the room. Here's where the systems vary. Some systems require several microphones spread throughout the listening position. Some use just one microphone and take samples from only one position in the room. Others use one microphone but sample several positions throughout the room, while still others test in real time as

Figure 2: High-frequency detail

Figure 2: Low-frequency detail

the user moves a microphone throughout the listening position. While most people seem to think it's good to get a frequency response average within the mix position, there doesn't seem to be a single concept as to what the best methodology is.

PUTTING THE TEST TO THE TEST

I measured one auto-equalization system in

World Radio History

two different rooms to illustrate its effects on room response. A client of mine decided to replace his aging analog equalizers with one of these digital self-tuning systems and asked me to measure the results to make sure they maintained a good response after the changeover. One room was a medium-sized space with a freestanding 5.1 system used for remixing DVD soundtracks. The other was a small quality-control room with a smaller 5.1 system mounted into the walls. This particular automatic system uses equalization throughout the audible frequency range. There is no set upper limit on the frequencies that the equalizer will adjust, and the user can make adjustments once the auto-EQ has done its job.

The tuning for the room in Fig. 1 on page 34 was performed by one of the developers of the auto-equalization system. The developer's concept is to take an average of the frequency response fro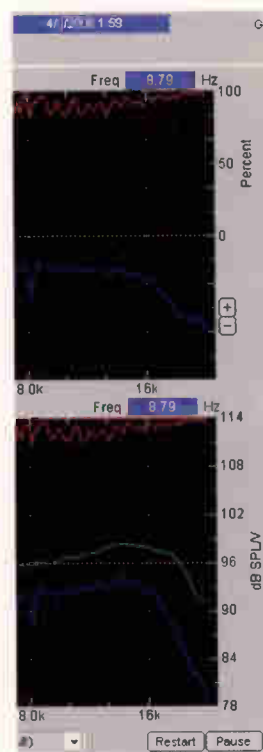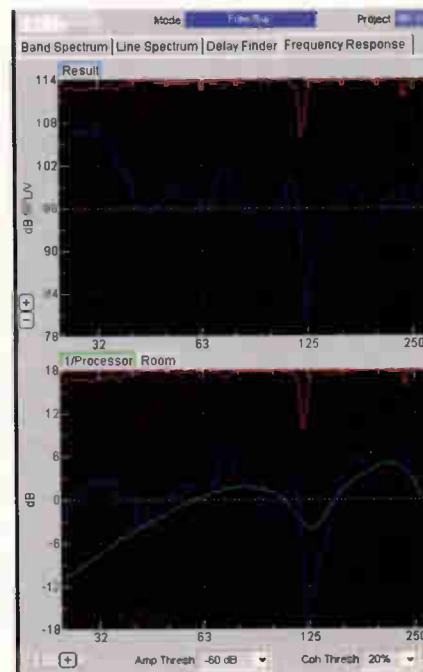m a fairly large section around the console. One microphone was used to sample noise; the mic was moved live over a fairly large area throughout the mix position while pink noise was played through the speakers. The tuning for the room in Fig. 2 (also on page 34) was done by the studio engineer, along with a representative of the company that developed the auto-EQ system. For this system, the same basic measurement technique was used, but the engineer kept the microphone restricted to a much smaller space around the mixing console. The room in Fig. 2 is about half the size of the room in Fig. 1.

Let me briefly explain the charts that you are seeing. The bottom window represents the curve of the room prior to the application of equalization, with the inverted equalizer curve overlaid. The top window represents the equalized room. The blue trace in the top and bottom windows represents the frequency response. This is viewed in 48th-octave resolution. The red trace at the top of each window represents coherence and, in this instance, is an indication of the amount of reflections mixing in with the direct signal. The green line in the bottom window is the inverse curve of the equalization that the system applied. (So if the trace is above the zero line, it is actually a cut; if it is below the zero line, it is a boost.) The inverse display simply allows you to see how well the equalization fits into the room curve. I placed my mic at the center mix position as most engineers will reference to this position when listening to a finished mix.

Remember that these are high-resolution shots of the room (48th-octave resolution). While I consider ±6 dB to be a quite good response, the response curves would never

look smooth like you might see using 1/3-octave display. The first thing that struck me about Fig. 1 was the 6dB boost that the system applied in the high frequencies. The tweeter has a natural roll-off above 16 kHz. Although, as you can see, the system does a very nice job of taking the rolled-off tweeter and making it flat out to 20 kHz, boosting this area to get a flat frequency response is going to stress the tweeter a great deal, and most likely will result in excess noise in the system, as well as distortion. Moving lower in the frequency response, you can see that quite a few adjustments were made in the midrange.

These are minor adjustments in areas where there are first-order reflections and I really don't see how they are necessary. In the case of these reflections, as you move across the mixing console, peaks will become dips and dips become peaks, so the adjustments are not meaningful. Of particular concern to me are the boosts at 300 Hz and around 600 Hz where I measure excess energy to begin with, and a cut around 800 Hz where I measure a hole due to a first-order cancellation. In the low frequencies, the system does a nice job of not trying to fill in the large holes such as those around 100 Hz and deals with a couple

of high-Q resonances quite well. What disturbs me in the very low end, though, is that the system applies a shelving boost of the frequencies below 50 Hz. This would put undue stress on the woofer and remove headroom from the speaker system.

Looking at Fig. 2, we see the system's same tendency in the high frequencies to boost beyond the design capacity of the tweeter. It is also obvious that a roll-off has been inserted above 4 kHz. We must take into account that this room is being used for quality control for DVD movie soundtrack releases. In this situation, one would want the room to have a fairly flat frequency response, not a personality curve. The HF roll-off was applied by the engineer after the automatic EQ had been performed to "sweeten" the sound of the system. (Perhaps boosting the tweeter beyond its capacity made the system a bit harsh?) This sweetening will result in the engineer missing high-frequency problems, such as vocal sibilance, that need to be addressed in the post-production process. Looking lower on the chart, many small adjustments were also made to the midrange—again, something I feel is unnecessary. The system appears to do a pretty good job in the area between 60- and 500 Hz. But as in the other room, I'm amazed to see a 12dB shelf from 60 Hz on down. This results in a 10dB boost at 30 Hz—something that is completely unacceptable in a room where accuracy is the goal.

I am not saying that all of the auto-alignment systems available will perform as strangely as the examples I used; I've only looked at a few. But the point I'm trying to make is that completely trusting these systems, without any backup measurements, may not be prudent at this point in time.

To date, I have yet to see an automatic tuning equalization system that can do as good a job as a well-trained professional. However, I am sure that these systems will continue to become more and more sophisticated. A system that gives the user extensive capabilities to override and tweak the auto-EQ adjustments could prove to be quite desirable. For the time being, my recommendation would be to find someone to help you properly set up your speaker system and address the acoustical issues. Then if you want to use an auto-equalization system, have someone perform some measurements alongside, just to make sure you don't get yourself into too much trouble. ∎

Acoustic consultant Bob Hodas has tuned more than 1,000 rooms across the world. Visit his Website at www.bobhodas.com.

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BY MICHAEL COOPER

One model from the Equator
Audio Q Series

Genelec SE System
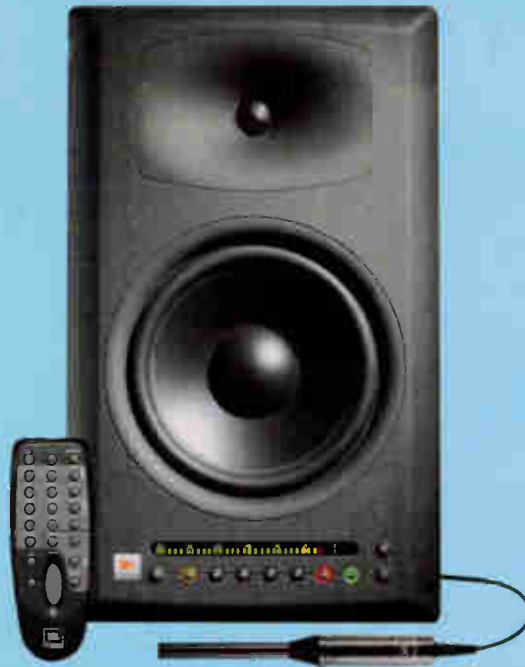
JBL LSR4328P

Intelligent Studio Monitors

SELF-ALIGNING SYSTEMS PROMISE THE WORLD WILL BE FLAT

Every listening space—whether a state-of-the-art control room or a simple basement/bedroom studio setup—has a problem: the laws of physics. As soon as you enclose a space with walls, a ceiling and a floor, the monitoring system's frequency response goes out the window.

There's no avoiding this hazard completely (although capable studio design and construction can minimize the damage to the point where it becomes fairly negligible). The presence of parallel room boundaries, such as facing walls or opposing floor and ceiling, causes the build-up and nulling of SPLs at certain frequencies within a room. These peaks and dips, called "room modes," dramatically skew the frequency response at some places in the room while having little effect at others.

Speaker-boundary effects—caused by the acoustic coupling of speakers to nearby walls, tabletops, shelves or other surfaces—also wreak havoc by arbitrarily boosting bass frequencies. And sound emanating from monitors invariably gets diffracted when it hits the edges of nearby gear and furniture, resulting in comb filtering. What's worse, these aberrations in frequency response are different for every room and monitor setup, precluding any one-size-fits-all solution.

Splayed walls, vaulted ceilings and various acoustic products (bass traps, diffusers and polycylindrical absorbers) can greatly mitigate many of these problems, but not everybody can afford them. There's also a limit to what

acoustic materials can fix. Truth be told, most of us work in rooms that aren't flat. Adding to these problems are manufacturing tolerances. Those little plus and minus signs in the frequency response spec show you that due to minute variances in materials and construction techniques, each monitor will have a slightly different inherent frequency response than the others.

Many studio owners use software and outboard EQs to help flatten their monitoring system's frequency response. Analysis software such as Metric Halo SpectraFoo or EAW's Smaart can be used to identify the worst room modes (those with the deepest peaks or troughs in response) and speaker-boundary effects for your particular setup. Parametric EQs—placed in the monitoring path— can then be used to boost or cut at frequencies affected by the room modes to bring the response closer to flat. (For reasons too complicated to detail here, only room modes below roughly 200 Hz need to, or should be, treated.) Shelving filters can also be used to roll off any unwanted bass boost caused by speaker-boundary effects.

Recently, a number of monitor manufacturers have bundled analysis software with the onboard digital signal processing in their monitors to accomplish what outboard EQ and third-party software do—and, in some cases, do them much better. Such bundled software essentially measures deviations from linear response for your system— monitors *and* room—followed by corrective equalization

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to help flatten the overall response.

To keep the process as simple as possible, some systems automate the routine. The user typically sets up a microphone in the control room, and after a few button-presses/mouse-clicks, the software takes over, automatically handling the rest. There's no need for you to set up test gear, analyze data and make manual adjustments to EQs; the monitors are intelligent enough to align themselves.

This article examines the current crop of active, self-aligning studio monitors. All the models detailed here operate with included or optional analysis software, along with proprietary automated digital processing. To keep the article focused on the cutting edge, monitors without automatic alignment are not included. Those that simply offer the same switched equalization presets for all production units or don't use proprietary analysis software are not covered, although the attached "Honorable Mentions" sidebar on page 44 offers a brief discussion of such.

GREAT EXPECTATIONS

Before we dive into the details, we should mention what you can expect from an intelli-

gent monitoring system. Some intelligent systems choose to treat only peaks and not dips in response. In such cases, the argument is that boosting frequencies where room modes cause notches at the reference position is ineffective and will eat up precious system headroom. I believe you can treat notches with EQ boost and get excellent results—*if* you know what you're doing. However, most self-aligning systems are designed so that even a novice can achieve great results, a reasonable approach that can provide a significant improvement in system response.

The number and type of filters (e.g., parametric or shelving) included in an intelligent system partly determine how powerful and effective it will be. The quality of the filters plays an enormous role, too; a noisy filter that causes phase shifting does more damage than good. But don't overlook traditional considerations such as driver size and power specs when shopping. Even the most powerful DSP can't make a tiny speaker produce enough bass to drive the neighbors nuts. Check out the chart below for these and other important buying considerations.

It's also important to realize that room

modes behave differently at various positions in your room. A room mode that causes a huge dip in response at the mix position may have little or no effect a couple feet away and cause the opposite effect—a huge peak—where your clients are sitting. Therefore, any corrective EQ determined from test measurements taken at your listening position will only fix the frequency response at that location.

Here's where networked systems really shine: letting the user control all connected monitors from one position—optimally, the listening position. Networked systems typically allow users to store/recall different EQ setups tweaked for various listening positions throughout the room. By toggling through these presets, the producer and clients can, in turn, hear a spectral balance that's approximately the same as that which the mix engineer hears.

Additionally, networked systems often let the user balance one monitor's level with respect to another's, without moving from the sweet spot. The network may also permit tweaking an included subwoofer's phase to achieve optimal bass response with satellite

INTELLIGENT STUDIO MONITORS, AT A GLANCE

COMPANY AND PRODUCT	DIMENSIONS (HXWXD, INCHES)	WEIGHT (LBS.)	AUDIO INPUTS	DRIVERS	RETAIL (EACH)	NOTES
Equator Audio Q8	13x13x13	34	1/4" TRS, XLR	8"/400W; 1"/400W	$1,500	Self-alignment requires purchase of optional software ($495); co-ax design.
Equator Q10	15x15x15	54	1/4" TRS, XLR	10"/400W; 1"/400W	$2,000	Self-alignment requires purchase of optional software ($495); co-ax design.
Equator Q12	17x17x15	65	1/4" TRS, XLR	12"/1,000W; 1.5"/400W	$2,500	Self-alignment requires purchase of optional software ($495); co-ax design.
Equator Q15	21x21x21	92	1/4" TRS, XLR	15"/2,000W; 1.5"/400W	$3,000	Self-alignment requires purchase of optional software ($495); co-ax design.
Equator Q18	21x21x44	132	1/4" TRS, XLR	18"/3,000W	$5,000	Subwoofer; self-alignment requires purchase of optional software ($495).
Genelec 7260A	20.75x18.2x14.3	59	Single/dual-wire AES/EBU (4x XLR)	10"/120W	$3,295	Subwoofer; self-aligns using GLM network software ($675).
Genelec 7270A	24.6x21.9x19.3	112	Single/dual-wire AES/EBU (4x XLR)	12"/250W	$4,350	Subwoofer; self-aligns using GLM network software ($675).
Genelec 7271A	29.75x31.6x19.3	180	Single/dual-wire AES/EBU (4x XLR)	Dual 12"/500W	$5,795	Subwoofer; self-aligns using GLM network software ($675).
Genelec 8130A	11.25x7.4x7	12.3	1x XLR (analog, AES/EBU)	5"/40W; 0.75"/40W	$1,065	Self-aligns using GLM.SE network software ($595).
Genelec 8240A	13.8x9.4x10.9	20.8	Analog XLR, AES/EBU	6.5"/90W; 0.75"/90W	$1,850	Self-aligns using GLM network software ($675).
Genelec 8250A	17x11.25x11	32	Analog XLR, AES/EBU	8"/150W; 1"/120W	$2,795	Self-aligns using GLM network software ($675).
Genelec SE7261A	20.75x18.2x14.3	59	AES/EBU	10"/120W	$3,295	Subwoofer; self-aligns using GLM.SE network software ($595).
JBL Pro LSR4326P	15.25x9.3x10.3	28.5	XLR, 1/4" TRS, AES/EBU, S/PDIF	6.25"/150W; 1"/70W	$619	Includes remote controller, self-aligning speaker networking software.
JBL Pro LSR4328P	17.25x10.5x10.6	32.5	XLR, 1/4" TRS, AES/EBU, S/PDIF	8"/150W; 1"/70W	$879	Includes remote controller, self-aligning speaker networking software.
JBL Pro LSR4312P	19.75x16x19.25	66	XLR, 1/4" TRS, AES/EBU, S/PDIF	12"/450W	$1,139	Subwoofer; includes remote controller, self-aligning speaker networking software.

Intelligent Studio Monitors

monitors. Rather than making an adjustment at the subwoofer, it makes sense to do this under network control from your listening position, where you'll be making decisions about your mixes' bass perspective.

Attentive readers will notice I haven't talked about equalization fixes for comb filtering. This is because EQ can't correct this. Acoustic diffusers are usually used to mitigate comb filtering, but ergonomics at the mix position severely limits their application for combating near-field diffractive effects. Simply put, you can't move your mixer's faders if there are diffusers on top of them! That said, Equator Audio Research has devised a *time-based* solution for comb filtering.

THE CONTENDERS

Listed alphabetically, here are some current offerings in monitoring systems that provide self-correcting capabilities.

Equator Audio's (www.equatoraudio. com) Q Series of self-correcting, bi-amplified reference monitors includes four different satellite monitors—the Q8, Q10, Q12 and Q15—and a companion subwoofer, the Q18. The satellites all sport custom coaxial designs that time-align their high- and low-frequency drivers. Before each unit leaves the factory,

built-in DSP corrects deviations in frequency response caused by minor variances in materials and manufacturing processes. The company also provides two software programs—one included, the other optional—for use with these monitors.

The software requires you to manually enter your room's dimensions and speaker positions, then makes some calculations and automatically applies a combination of parametric and shelving filters to help flatten the response. Only the first harmonic for each of the three axial room modes are corrected by default using fully parametric filters. (This is in addition to applying one shelving filter per monitor to correct speaker-boundary effects.) But the software allows you to multiply the default frequencies by whole numbers (e.g., 2x, 3x or 4x) to correct other harmonics that may be stronger than the fundamental and in greater need of correction.

The optional Secondary Reflection Correction™ (SRC) package ($495 list, Mac/Win) takes analysis and correction to a much higher level. It's a separate and fully automated DSP program that analyzes collected data using an included calibrated microphone. SRC automatically finds the three worst offending (axial) room modes and

Honorable Mentions

Some manufacturers offer systems that don't self-align but include analysis software or customized DSP solutions to help flatten frequency response.

JBL Professional's first-generation RMC (Room Mode Correction) monitor—model LSR 6328SP—is not auto-correcting, but can correct for room modes in any particular room after running a manual 30-minute setup procedure. The optional LSR6312SP subwoofer includes the RMC kit and provides RMC capability when used in 2.1 or 5.1 systems with JBL's LSR6332 and LSR6325P models.

Klein + Hummel (www.klein-hummel .com) and **KSdigital** (www.ksdigital.de) offer monitors that use Finite Impulse Response (FIR) filters, which preserve phase linearity while adjusting frequency response. Neither company offers analysis software, but each provides room-correction software that is implemented in a similar fashion. You'll need to "shoot" (gather test data for) your room yourself or hire a specialist to do so, using third-party hardware and/or software. You then send your test measurements to the company and they send you a data-set containing corrective equalization, which uploads into

nonvolatile memory inside the monitor(s). Note that the O 500 C digital active main monitor is currently the only Klein + Hummel model that uses this type of technology.

Tannoy's (www.tannoy.com) Activ-Assist (Mac/Win) software measures the frequency response of your setup comprising the company's Precision or Reveal Series monitors. The software then suggests settings for the monitors' cabinet-mounted DIP switches, which provide fixed-equalization presets fashioned to correct typical speaker-boundary effects. The filters must be set manually and are too broad in action to correct room modes (which was not the manufacturer's intent).

For those who want to take an *a la carte* approach, several new, out-of-speaker solutions are available—such as **IK Multimedia's** (www.ikmultimedia.com) ARC and **KRK's** (www.krksys.com) Ergo. These systems work with a wide variety of monitors, allowing users to turbo-charge their existing setups with the latest technology. If you're mostly pleased with the performance/sound of your current monitors, systems such as these provide an affordable alternative. —*Michael Cooper*

Get Ahead Of The Curve

Whether you're just starting out in desktop recording, or you've already laid down a few thousand tracks, you've probably heard of the KRK Rokit. For years RoKit has been the popular choice for accurate monitoring in home and studios large and small. Rokit enthusiasts include guitar players, bass players, electronic musicians, re-mixers, beginning artists, and industry professionals. Now is a great time to check out the all-new Generation 2 RoKit Powered Studio Monitors. Generation 2 RoKits set a new standard with even better performance and accuracy, raising the bar once again. So "Getting Ahead Of The Curve" means even more than ever.

Our new Generation 2 RoKits have radically curved edges which virtually eliminates diffraction and provides a wider sweet spot. Our engineers also gave the Generation 2 RoKits a more accurate response curve to match the new cabinet, custom drivers, and our true bi-amplified and active crossover systems. Designed for the studio and not just a showroom demo, Rokits allow you to hear your "Real" mix.

We have made the industry's best seller better. Give the new Rokits a listen, and become a believer too. Regardless of your budget or experience level, the new Generation 2 Rokit Series gives a whole new meaning to the phrase "Getting Ahead Of The Curve."

Rokit 8
Rokit 6
Rokit 5

ROKIT KRK SYSTEMS

For more information visit **www.krksys.com/rokit**

applies corrective parametric EQ. Advanced users can edit the filters' settings (including frequencies). Both software packages will by default only treat peaks caused by room modes, but will also allow you to apply boost to notches. Both also allow each speaker to have its own filter settings. (This is especially important for surround setups, as well as stereo setups in an asymmetrical room, as speaker-boundary effects vary with speaker position.)

SRC also automatically identifies and corrects comb filtering caused by secondary reflections, such as those that result from sound bouncing off a mixing console. An adaptive, time-based algorithm (*not* equalization) treats as many secondary reflections as the software finds. Equator purports that SRC retains a large enough sweet spot so that problems don't occur as you move your head at the mix position.

SRC's networking software can optimize the speakers' combined response for different listening positions, giving your clients seated at the back of the room their own sweet spot. Stereo, 2.1, 5.1, 6.1, 7.1 and 8.2 configurations can be optimized and saved for later recall. You can switch among up to four different saved setups, mixing and

matching up to eight satellites and two subs. SRC can also adjust the sensitivity, tone contours (e.g., high-frequency tilt) and speaker grouping (allowing tweaks to groups of monitors at once) for each monitor in the setup. The subwoofer's output can also be delayed to align it with the satellites.

Genelec (www.genelecusa.com) offers two self-aligning, networked systems that are almost identical but work with different monitors. Genelec Loudspeaker Manager™ (GLM) software works with the DSP chip sets built into the company's 8240A and 8250A satellite monitors, and 7260A, 7270A and 7271A subwoofers. The Small Environments™ (GLM.SE) DSP system is integral to only the SE7261A sub, but extends its control to up to eight 8130A satellite monitors connected to the sub via single-wire AES/EBU connections.

Both systems use computer-controlled network software packages with nearly identical GUIs. (GLM is Mac/Win; GLM.SE is currently PC-only but will soon also support the Mac.) The systems identify and organize the speakers connected to the network (as stereo or multichannel setups), and control volume, muting and soloing for each speaker. They also include a calibration mic that captures swept test tones produced by the speakers.

Genelec's Auto-Cal software routine then analyzes your room's response and automatically equalizes the monitors in the system to correct room modes and speaker-boundary effects. Auto-Cal only cuts frequencies when addressing room modes, leaving notches untouched. The software also adjusts subwoofer phase and sensitivity to integrate the sub optimally with satellite monitors in the system.

The main differences between the GLM and GLM.SE systems are the number and type of digital filters available to them and how many loudspeakers they support. The GLM network can support up to 25 main (satellite) monitors and five subs. The system offers four notch filters, two low-shelving filters and two high-shelving filters for each satellite in the system. Each filter can be independently tweaked to a different setting for each speaker. Thus, each satellite can have four room modes equalized and apply shelving filters to both mitigate speaker-boundary effects (using low shelving) and adjust the balance of bass and highs to taste. A sub under GLM control can have four notch filters and a bass roll-off filter applied to its output (in addition to auto-phase and sensitivity adjustments).

Under GLM.SE software control, each of

the SE7261A sub's eight highpass outputs can treat two room modes with notch filters. Located on the 8130's rear panel are manually adjustable DIP switches for controlling analog filters; the switches remain active and can be used with the GLM.SE's digital filters. GLM.SE software also adjusts the sub's phase and level sensitivity for optimal integration with satellites. The GLM.SE software can only address the SE7261A. Both GLM and GLM.SE software can store multiple setups for different listening positions.

You won't have to get out of your chair to correct your room's response using JBL's (www.jblpro.com) LSR4300 Series studio monitors. The three models in this line—LSR4326P and LSR4328P satellites, and LSR4312SP subwoofer—can all be networked for synchronized control from the mix position. Network control extends way beyond just correcting room modes: Speaker-level calibrations, individual-speaker solo, input source selection and all EQ parameters can be adjusted using the system's included infrared remote control. Or get some exercise and make the adjustments from each speaker's front panel. The included LSR4300 Control Center Software brings all this functionality under Mac/PC computer control.

You can configure up to two LSR4312SP subs and eight satellites—mixing and matching LSR4326 and LSR4328 units—to create a surround monitoring setup. JBL's system will automatically align all of the 4300 Series speakers in your setup so that the sound arriving at your mix position sounds balanced. A setup that includes the LSR4312SP sub provides LFE input, bass management for the satellites, adjustable crossover points, and level and polarity calibrations of the sub with respect to the satellites.

Plug the LSR4300 calibration mic into one of the speakers in your setup, and, at the push of a button, JBL's Room Mode Correction™ (RMC) system will automatically analyze and correct peaks in frequency response caused by room modes. The system doesn't merely analyze response at a single on-axis point in the room, but takes omni-directional measurements to better match what the engineer hears. Seventy-two measurements are taken, including those of the direct, reflected and reverberant sound fields. Only peaks caused by room modes between 20 and 160 Hz are treated; notches in response are left untouched. RMC can also address speaker-boundary effects, but room modes get priority treatment.

Each speaker—including the LSR4312SP sub—can correct one room mode using a parametric filter set to any of 73 frequencies. Each speaker's filters can be set independently of those for the other monitors in the system. The filters are on ⅓-octave centers and offer Q values from 1 to 16. The LSR4326 and LSR4328 each provide HF and LF shelving filters that can be manually tweaked to tailor spectral balance.

GET SMART

Self-aligning monitors are here to stay and will become more powerful as studio pros become more comfortable with—and enamored by—the technology. However, current systems do have their limitations. Room modes are powerful forces that don't easily yield to equalization. Correcting comb filtering is even more challenging. Even the most intelligent system won't produce a perfectly flat frequency response, but it should be a lot closer than what a standard monitoring setup can provide. The result will be greatly increased accuracy in your monitoring chain that should translate to better mixes. Sure sounds like a smart investment to me. ∎

Mix *contributing editor Michael Cooper has written more than 300 articles about pro audio during the past 20 years. Visit him at www.myspace.com/michaelcooperrecording.*

Crack That Whip!

Latest *Indiana Jones* Blends New Sounds With Familiar FX

By Blair Jackson

When film directors and actors revisit cherished characters and "franchises" many years, or even decades, after their initial successes, they do so at their own peril. The landscape is fairly riddled with long-delayed sequels and prequels that failed to measure up in the popular mind, from *The Two Jakes* (Chinatown II) to *Godfather III* to, yes, even the mega-successful recent *Star Wars* trilogy.

But the public has been clamoring for a fourth *Indiana Jones* adventure from Steven Spielberg and Harrison Ford basically ever since *Indiana Jones and the Last Crusade* was released in 1989. And now Indy is back—cue iconic John Williams main theme! By the time you read this story, *Indiana Jones and the Kingdom of the Crystal Skull* will have been in theaters for a week or more and both the critics and the public will have weighed in on whether the old Indy magic is still there. Sitting here writing about the film weeks before it opens, however, I can say this much: Everyone involved in the film seem

to *love* working on it, and the post sound team, some of whom I interviewed right after the final mix was completed in late April, definitely believe that the film is up to very the high standards of the original 1980s Indy trilogy.

It helped that Spielberg was able to tap so many of the craftspeople who had either worked on the earlier films or who have been part of many or most of his more recent efforts. Editor Michael Kahn, composer John Williams and sound designer/supervising sound editor Ben Burtt all helped on *Raiders of the Lost Ark* way back in 1981 and were integral to *Crystal Skull*. Among the key post-production sound personnel, co-supervising sound editor Richard Hymns was a dialog editor on Indy II (*The Temple of Doom*) and a supervisor on III (*The Last Crusade*), as well as several other Spielberg films; ADR supervisor Gwen Whittle was a sound editor on III; and re-recording mixer Andy Nelson has handled music and dialog for a dozen Spielberg films since *Schindler's List*. Additional sound designer and re-recording mixer Chris Scarabosio, fresh off an Oscar nomination

for *There Will Be Blood*, has only been part of Spielberg's retinue since *Munich*, but he has roots that go back to the *Young Indiana Jones* television series (for which he won an Emmy), and he was part of the Skywalker Sound group that made the three *Star Wars* prequels, which were, of course, directed by *Indiana Jones* co-creator/screenwriter/editor George Lucas. So the connections, and people's affection for the material, run very deep.

Appropriately enough, the *Crystal Skull* post story begins with Burtt. "It started for me back in September [2007], when I went to L.A. and read the script in a secret room with a guard at the door," he says with a chuckle during a break from mixing this summer's Disney-Pixar spectacle, *WALL-E*. "They were still shooting at the time, and I hadn't had a conversation with Steven yet. But I went through it, as I always would, making lists and noting questions and sort of deciding what are all the sounds I might need to make this movie? From the script, you can see there are going to be certain vehicles and certain weapons and locations, and you figure that for the Crystal Skulls themselves, you'll need a lot of supernatural sounds like we did for the Ark or other things in the past. Then Richard [Hymns] and I were able to go down on four or five occasions and sit with Steven at the KEM flatbed in a traditional film editing room—as we would have done back on the earlier *Indiana Jones* films—go through the film and look at each scene and discuss what sounds were needed in greater detail, and get Steven's ideas. Each time, I'd come back up here [to Skywalker Sound] armed with more specific marching orders as to what to do."

Hymns comments, "Ben's approach is really unique with Steven because they're like a couple of kids—you put them together and everyone else becomes almost invisible. They talk in a language that most of us don't understand, like Steven mentions an old movie and Ben immediately connects, knows exactly the sound he's talking about—he might even have it in his library—and they move forward in that way. And they're always talking about movies

Chris Scarabosio, sound designer/re-recording mixer, was nominated for There Will Be Blood.

Ben Burtt, sound designer/supervising sound editor, worked on Roiders of the Lost Ark.

from the past to relate to the soundtrack we're working on. To be in a spotting session with those two is a joy for me."

In this case, Burtt says, "I knew from the beginning that we'd want to refer back again to some of the sounds we'd established in the earliest films because Indy still has a whip, he still has a gun, there are going to be fights and chases—though, of course, we wanted to do new things with those sounds, too. I always try to create a world of sound for each movie I work on.

With this one, I knew we wanted to start by having the original library of sounds brought up to date because they really only existed on old quarter-inch tapes. Portions of them had been copied and digitized in a different manner over the years—some had gone to PCM and Betamax, or whatever we were using in the '80s. But I didn't trust those earlier generations, so I said, 'Let's go back and restore the whole collection.'" Burtt's frequent sonic collaborator, Matt Wood, set up a work environment for Burtt's 24-year-old son, Benny, to transfer the analog tapes to Pro Tools via a mint-condition Otari MX5050 and Apogee A/D converters. Everything was classified in a Sound Miner database so that the editors could easily get to any sound.

Even employing bits and pieces from the earlier films, Burtt, Scarabosio, Hymns and the sound editors still conjured up

about 700 new sounds for Crystal Skull—which Burtt describes as fairly typical, while noting that for WALL-E, he and his team created the most sounds he ever has for a film—"about as many as all the Indy movies put together." Because of conflicting schedules of the two films, Burtt had to "divide myself mentally very severely—certain days I would be just doing Indy and certain days I'd do WALL-E. I'd never try to mix the two." Hymns organized and supervised much of the day-to-day work of the FX crew, and Scarabosio, in addition to doing additional sound design, later did most of the hands-on FX and Foley mixing, which was done down in L.A. at Fox (mainly to be closer to Spielberg) in a Neve DFC room laid out almost identically to the main mixing stage at Skywalker.

Burtt explains, "My job was to design the sounds for Indy, and for all the work they did up here at Skywalker, I was able to follow through and give the editors all the spotting sheets and lay out the structure for the whole film—kind of like an architect would lay out the plans—and then I was able to sit with each editor in each premix and get what I wanted out of it. Then it was sent to L.A. for final mixing, so at that point my main contact was I had the ability to sit in on the mix over the

Skylink box so I could go into a room and see and hear in real time what they were doing, and also had a video iChat link so I could talk to the editors on the stage, or with the mixers, or with Steven, and that worked really well. Obviously, it's not quite as good as being there in person, but sometimes I'd go down to the mix on weekends, so in the end it was fine."

Burtt generally likes to take a first stab at certain scenes himself and, as you might expect from the mastermind behind the sound of Star Wars and earlier Indy films, specializes in coming up with adventurous, unusual and supernatural FX—"sounds that don't relate to the everyday," he says. "Sounds that are there for telling the story of things you encounter that you've never seen before," such as the mysterious Crystal Skulls of the title (which all of the sound team refuse to describe for confidentiality reasons) Scarabosio notes, "Ben has such a talent for going over the top but not being completely crazy unless it's appropriate because he has this other sense of being almost out of his mind. But when you put it to picture it works," he says with a laugh.

Scarabosio and Hymns were responsible for more of the straightforward effects. Hymns explains: "I very specifically do the vehicles and anything vehicle-related, and other things in the more literal world. I don't design sounds; I go out and

Richard Hymns, co-supervising sound editor

record vehicles, and we did a lot of that on this one—all sorts of military vehicles and motorcycles, 99 percent of which I drove myself, and it involved *a lot* of crazy driving on an airfield and off-road."

Much of that recording was done at remote Agua Dulce airport, located northeast of Los Angeles, "right near the Vasquez Rocks where a lot of old movies were filmed; a real historic spot. There's a tiny airfield nearby you can rent. They close the whole thing

Andy Nelson, music and dialog mixer

down and it has half-a-mile or more of runway, and on the sides they have hills with dirt roads and there are huge stretches of somewhat flat and somewhat bumpy areas to do all sorts of things. So I had an array of vehicles that I drove like a lunatic. One of my sound effects editors, Addison Teague, and my assistant, Dee Selby, both had Sound Devices rigs—a 722 and two 744s—and a variety of mics. I like to mike the exhaust, the manifold, the engine compartment, the interior in stereo if it's got an interior. We did some racing and jumping and landing, bumps and rattles galore. For some things, we used the library—obviously, we're not

going to wreck cars every time we have one onscreen. We have a huge library of over 100,000 sound effects.

"There's a 20-minute chase in the film," he continues. "It's a whole reel. The first time I saw it, my stomach sank and I remember Ben turning to me, and saying, 'Well, you've got your work cut out for you!' There were 50-plus pages of notes. I wrote down very specifically what the vehicles do: 'A reflection shot of a hot rod tracking alongside another vehicle for six seconds, accels into frame alongside, tracks for three seconds, then drops back a little and then steadies behind a bit, then accelerates, fast-by, and into the distance.' And they all have exact timings. My specialty, if I have one, is that when I write out these notes, I can get into a vehicle and in my head count it out and pretty much re-enact something so it fits the picture almost exactly so I don't have to do too many [sound] edits. Plus, we have a rig on the site so I can look at the picture on a small screen, and say, 'That's going to work pretty close; I can edit that to fit,' and know that I've got it and not just go out and record a bunch of stuff and go back to the edit room later, and say, 'Oh, I forgot to do this!' There were endless pages of notes and endless recordings to do, so we were out there for a couple of weeks."

Scarabosio did "a lot of big metallic crashes and also a lot of organic-type stuff—vegetation and trees cracking, trees falling, trees hitting; there's a whole chase in the jungle, so it's what happens to that vegetation that I worked on partly. I did a lot of recording in China Camp [in Marin County]; there's quite a lot of trees back there, and lots of different kinds of brush and trees in varying degrees of decay."

In general, he says, the approach was to be focused and economical when it came to sound design. "One of the things we were trying from the outset was to not cut a bunch of extra stuff—we knew we didn't want to have layers and layers of stuff that we'd have to keep removing later in the mix. The main thing was always to focus on what we knew was going to be important, and for the most part it's pretty obvious."

As always, the final mix was an intricate dance between effects, dialog and music—at every step along the way, the sound team knew that eventually their work would be interwoven with another grand and prominent John Williams score.

"John's score is fantastic," Hymns says. "I knew that it was going to be big, and I knew from Steven's spotting sessions roughly where there would be music, but other than that, John doesn't give you temps or

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World Radio History

sound for picture

guides to work against; but composers almost never do. You have to cut [FX for] everything because you don't really know where the music's going to go and you don't know what music is going to be dropped or changed. Steven will sometimes change a cue, or sometimes John will say, 'You know, I wrote this for here, but I'm thinking I'd rather switch to something softer.' And if you haven't cut the sound effects to play alone, you're going to be left high and dry."

In the case of the big chase scene, Hymns says, "It was the most difficult reel to mix because you've got nothing but effects running all the time and they're very exciting and very necessary, and then you've got music that's playing all the time and it's very exciting and necessary, so it's like a wall of sound, and you have to go through it inch by inch again and again and again, and you find these places where it's best for the music to kind of duck down a little and the sound effects soar, and vice-versa. You weave this thing and it's really something you cannot see when you begin; it's very stressful trying to figure out how this is going to work. You don't want to lose anything but you can't play *everything*. It took several days getting that sorted out, and then it suddenly emerges. Different people have different ideas. It's a real collaboration, and serendipity plays a part, too."

"Actually, a lot of mixing is about removing things," adds music and dialog mixer Andy Nelson during a break from working on *Kung Fu Panda*. "You're always going to go into the game fully loaded, and then you start saying, 'All right, what *don't* we need?' And we're all involved in that process—the other mixers and even John Williams, who's terrifically collaborative. When we're putting a reel together, John has great ideas—not just about music, but about the feel of a scene.

"One thing that was new for me was that Shawn Murphy [who recorded the score at Sony] gave me a separate 5.1 mix of reverbs and that really helped me, because in some of the action scenes it allowed me to dry up the sounds slightly, which helps with clarity when you're putting a lot of sound effects to it, and then in the more lush areas, it allowed me to play the reverb full level with the orchestra. So John and I would sit and experiment with that.

"The music tends to sort of set the style of the movie on a certain level," Nelson continues, "and when you're dealing with such an iconic piece as the *Raiders* theme—for me, I bring up the music faders and there's that theme and I've got a big smile on my face— I'm in heaven playing with this stuff." ∎

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Blue
Microphones

Presidents of the United States of America

Photos & Text by Steve Jennings

After a long break from touring, the Presidents of the United States of America (Chris Ballew, vocals/guitar; Andrew McKeag, bass/vocals; and Jason Finn, drums/vocals) have returned to the scene in support of a new album, *These Are the Good Times People*. *Mix* caught up with the threesome and crew at San Francisco's Great American Music Hall.

According to front-of-house/tour manager Jon Dunleavy, the tour is not carrying much production. "I carry a few choice mics—Audix OM5, Shure SM58s; the rest the house can provide. As long as the P.A. is decent and the console is clean and they have a reverb and delay, I'm good to go. For the in-ear monitors, we also run ambient mics. On a tight-budgeted tour like this, your hands are tied; if you're a decent engineer, you can make it work." As for outboard, Dunleavy picks from the best that the club offers. "I've known the band a long time, so it's easygoing and we all get along and have fun."

At this show, monitor engineer Kyle Anderson manned an Allen & Heath GL2800M board, providing three mono wedge mixes and three stereo IEM mixes. "The IEMs for Chris and Andrew were mainly used for vocals," Anderson explains. "The wedges up front were used primarily for guitar and bass. The wedges allowed them to feel the music, as well as hear it. The drummer relied on the in-ears only. In addition to the 18 mic inputs going to FOH, I mixed two audience mics into their IEMs so they could interact with the crowd better." Monitors are McCauley SM95-2 run in passive mode, powered via Crest.
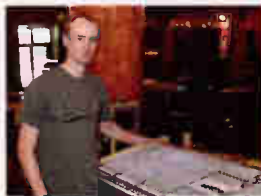
Monitor engineer Kyle Anderson

FOH engineer Jon Dunleavy

FixIt

FOH engineer Jayme Braun recently finished up the third leg of the Adore 2007 tour. You can also find Braun mixing house for JoJo, Switchfood, Bryan White, Mandisa, New Breed and many others.

Getting a great vocal tone that stands out in the mix but that does not kill everyone in the front row to hear it above the music can be a real nightmare. Here, the right mic choice can save the day. I use the Shure KSM9 because it has a switchable pickup pattern. In really small venues with a loud stage, I use the hypercardioid pattern for the extra noise rejection on the capsule. Another trick that really works well is to determine the dominant frequency in the singer's voice and then cut about 2 to 3 dB of that frequency out of every other instrument onstage. This creates space for the vocal to sit in and lets the vocal cut through without pushing the level really hard and possibly distort your preamp. Adding a highpass filter at around 170 Hz can help keep sympathetic vibrations in the mic stand from causing feedback on stages that are hollow.

inside

News

San Francisco Ballet FOH engineer Kevin Kirby opted for dual Lectrosonics TM400s and an Earthworks PM40 PianoMic system to mike the grand piano during the ballet's anniversary gala.

Front-of-house engineer **Neston Eaton** is using the H15 capsule from **Sabine** with the **Audix** head and receiver's Mic Super Modeling set on the SM58 for **John Conlee**. "He's got a very powerful voice with a lot in the upper-mids, and this mic helps smooth that out very well," Eaton says. The **Glen Street Theatre** (Sydney, Australia) finished an extensive refurbishment that included a new **Meyer Sound** system provided by **Coda Audio Services Pty Ltd.**.... Australian production company **Eclipse Lighting and Sound** added to its **Electro-Voice** inventory an XLC 127DVX line array system...Theatrical production *Love, Janis* is premiering **JBL's** new full-sized VerTec system, spec'd by sound designer **Eric Stahlhammer**...**Matchbox** Twenty FOH engineer **Jim Ebdon** explains using **Royer** R-121 mics on the band's current tour: "We have two guitar players, each with three guitar cabinets placed underneath the stage and facing backward, and there are four R-121s positioned on four of the cabinets. Each cabinet is isolated from one another with foam, so this gives us the ability to mike each amp independently. The mics are positioned up against the grille cloth at about a 45-degree angle. In addition to feeding these signals to FOH and, ultimately, to the audience, these signals are also the source for the guitarists' in-ear monitor mixes."

his·to·ry

'his te ri, 'his tri – [**his**-*tuh*-ree, **his**-tree]
–*noun*, *plural* –ries
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On the Road

Ani DiFranco

Front-of-house engineer John Lee Hardee was recently spotted at the Langerado Festival mixing for Ani DiFranco. Here's what he says about mixing up his style for festival performances; for a photo gallery, visit mixonline.com.

How much gear are you carrying?
We are carrying everything—except FOH! Why carry a desk when you can just carry a card? It fits in the palm of my hand. I have been mixing the show on the Digidesign D-Show (my personal fave), and the Yamaha 5D and M7. We have the Yamaha M7 for monitors, as well as an Audix, AKG and Sennheiser mics.

How do you keep her vocal up-front?
Ani has a witty inflection and pronunciation, which gives her voice presence and an amazing beauty. We use the Audix OM5 to demonstrate these qualities as naturally as possible. This mic has the two things I'm listening for: warmth and clarity. I also use a BSS DPR-402, barely working the compressor. But the de-esser earns its money every night. She sings, she recites poetry, she talks, she whispers and she shouts.

Do you have a specific mixing technique?
Delicate and in your face—all at the same time. There are a lot of intricacies and a lot of spaces. The musicianship is mind-boggling. Recently, Ani and Todd [Sickafoose] are joined onstage by the amazing Allison Miller on drums and backing vocals, along with Mike Dillon on vibraphones, marimbas, tablas and various other percussion. It's completely acoustic and organic.

Does your style change when you're at a festival?
I turn it up. Our usual setting would be a theater, symphony hall or auditorium, so when we get outside, circumstances allowing, I give it some gas. I'll goose the kick drum a little extra, make sure the bass is covering the area and have some fun.

Now Playing

Silverstein

Sound Company: Rat Sound (Oxnard, Calif.)
FOH Engineer/Board: Sean M. Palmer (also tour manager)/Yamaha M7CL
Monitor Engineer/Board: monitors mixed via FOH
P.A./Amps: house-provided
Monitors: Sennheiser ew300s, Ultimate Ears UE-Pro
Outboard Gear: dbx, TC Electronic
Mics: Sennheiser e900 Series
Additional Crew: stage manager/guitar tech Kevin Kennaley, drum tech Richard Fernandes, guitar tech Paul-Marc Rousseau, lighting director Dougie Gandel

Celine Dion

Sound Company: Solotech (Quebec)
FOH Engineer/Board: Francois "Frankie" Desjardins/Studer Vista 5 SR
Monitor Engineer/Board: Charles Ethiere/Studer Vista 5 SR
P.A.: Meyer MILO, MICA, 700HP, M'elodie, CQ-2
Monitors: Sennheiser EW-500/AC3000/Net-1, Aura Sound AST-2B-4, Powersoft LQ-2804
Outboard Gear: TC Electronic System 6000/Fireworx/Reverb 4000, Eventide Eclipse, XTA SIDD, Junger B42, Rosendahl Nanyosync HD, SSL X-Logic, Millenia NSEQ-2
Additional Crew: Denis Savage, tour manager; Mario St-Onge, system engineer; Marc Theriault, wireless engineer; and system techs Patrice Lavoie, Etienne St-Jacques, Marc-Olivier Germain, Marc-Olivier Magnan

MicroWedge Makes Stage Debut

The Orpheum Theater (Los Angeles) was filled with music-loving concert-goers to check out a performance by Don Was and the Was (Not Was) band, featuring Brian Wilson and Kris Kristofferson. What those folks didn't know is that they were also getting the first look at the new EAW MicroWedge Series stage monitors. Rat Sound Systems supplied the SR rig and support, including crew chief Tom Caraisco and monitor engineer Andy Turner.

The MW12 is the first EAW Micro-Wedge Series product to be released since an agreement was reached between LOUD Technologies Inc. and MicroWedge developer Rat Sound Systems in late 2007. "The old MicroWedge was solid and performed well when compared to other wedges, but these new ones are night-and-day superior," enthuses MicroWedge inventor Dave Rat, who is working closely with the EAW Engineering Group on the development of the new series. "This is a whole new deal. I knew the wedges were a big step forward, but what I did not expect was such an overwhelming embrace so quickly from our own engineers, and the artists and band engineers."

"We really, really like the performance of these new wedges," notes Caraisco. "Once Andy got things going onstage and went through all of the mixes, he was genuinely pleased."

World Radio History

World Radio History

World Radio History

Chester Bennington (left) and Mike Shinoda (right, vocals/guitar) sing through Audio-Technica Artist Elite Series AEW-T6100 mic/transmitters, with AEW-R5200 dual receivers. The crew uses three systems: Shinoda (main and spare), Bennington (main and spare) and one for guest mics. Antenna combiner is an Audio-Technica AEW-DA550C with ATW-A49 antennas.

LINKIN PARK

inkin Park's Midnight to Midnight tour hit cities across the U.S. in support of their latest album of the same name. Fans attending the concert can purchase a digital souvenir package, a post-gig memento that features an audio download of the entire concert—mixed by front-of-house engineer Ken "Pooch" Van Druten and made available on the Web after the show. Audio Analysts is supplying all board groups and Atomic Pro Audio is providing an Adamson rig. Mix caught up with the band at Arco Arena in Sacramento, Calif., one of the tour's last stops.

Photos & Text by Steve Jennings

Ken "Pooch" Van Druten (far-right photo, center) mixes on a Digidesign D-Show Profile, using the onboard Waves Live Bundle, Digidesign All Access package, URS comps and Serato plug-ins.

The P.A. comprises 12 Adamson Y18 per side with four Adamson Y10s as underhangs, two clusters of four SpekTrix boxes flown in the mother grid for sidefill, 16 Y10s per side for side hang, eight Spektrix per side for coverage of the for 270 degrees. "On the four shows that were sold as end-stage 360 degree," Van Druten says, "we added another 16 Y10s for coverage. All [speakers are] using XTA processors and Lab.gruppen amps. We are the first major tour in the U.S. to exclusively use the Adamson system and we are really happy about it."

System engineer Evan McElhinney, who is seen holding a 12-inch Motion Computing table PC running XP Pro, says that unit was the main control for the 10-processor XTA network they operate daily. Also pictured: system engineer Brett Stec.

"Brad Delson uses Randall amplification and XL cabs (with built-in stereo direct outs) loaded with vintage 30s at a 16-ohm load," says his tech, Sean Paden. "We also use Audio-Technica mics: 4047s and 4050s. I have 11 guitars in my touring vault. He uses Audio-Technica wireless units and antenna combiners. My rig is dual-mono, so after a small front-end effect chain, which lives in the racks, the signal 'y's' into two Randall RM4 preamp chassis, each containing four Dave Friedman–modded MTS modules. This gives me all the flexibility to mix-and-match tones."

According to DJ/sample tech Jason LeMiere (left), Joe Hahn's (above) rig is really two rigs: a DJ side and a sample side. "The DJ consists of two Vestax turntables, a Vestax digital hybrid mixer, Line 6 distortion effect, Pioneer EFX 1000, M-Audio Trigger Finger, Rane Serato Scratch LIVE interface and a Mac to run it all. The sample rig is eight M-Audio Trigger Fingers and a Mac running [Native Instruments'] Kontakt as a Pro Tools plug-in for all the samples."

Bassist Dave "Phoenix" Farrell (below) plays Ernie Ball/Music Man Stingray basses, as well as Fender '59 Reissue Precision basses. According to bass tech Ted Regier, "From the guitar it goes into an Audio-Technica wireless system. Then the signal is split and goes into a dbx 160A compressor into a SansAmp PSA-1 preamp into an Ampeg SVT Classic amp into two 8x10 cabinets. The other side of the split goes into a SansAmp RBI preamp. FOH receives direct signals from both SansAmps; no mics on the cabs."

From left: Kurt Schneck (Shinoda guitar tech), Sean Paden (Delson guitar tech) and Ted Regier (Farrell bass tech)

At monitor world, from left: P.A. system tech Rick "I am not Picky" Procopio, crew chief John "Boo" Bruey, monitor assistant Paul "Pablo" White, P.A. systems tech John "JB" Brotherton and monitor engineer Kevin "Tater" McCarthy

Monitor engineer Kevin McCarthy is manning a Yamaha PM5DRH. "I am mixing underneath the rolling stage that carry with us, dead center between the hydraulics for the drum and DJ risers," he says. "The video company supplies us with spy cams that we have located on the sidefills stage-left and -right, one on the keyboard and one on the drum set. I mix off the FOH pressure, which is difficult from underneath a low ceiling, being center and behind all the backline speakers. You have to trust your mix because you are not in the same environment as the musicians."

All bandmembers are on in-ears except for Delson, who wears foam plugs with gun muffs over the top. The rest of the musicians wear Ultimate Ears UE-7s with the exception of Bennington, who wears Sensaphonics 2MAX. "We all use Sennheiser EW300 G2 systems powered with a custom Audio Analysts power supply, a Shure PA 821 combiner with Professional Wireless Systems helical antenna and cables," McCarthy adds. "I use a Sennheiser A2003 UHF antenna for my cue under the stage. Wedges are all Adamson M15s underhang, and sidefills are Adamson SX18s."

Drum tech Brad Stonner (right) gives the rundown on Rob Bourdon's kit mics: kick drum, Audio-Technica AE2500 and a Shure Beta 91; snare top and bottom, Shure SM57s; hi-hat, A-T ATM 450; toms, A-T ATM 350s; ride, A-T AE5100; overheads, A-T AT4050s; talkback mics, A-T ATR 20s.

Celtic Woman

TRADITIONAL IRISH MUSIC EASILY FLOWS WITH OTHER STYLES

By Gaby Alter

Against a twinkling backdrop of stars, a woman appears, holding a fiddle, dancing lithely in a long dress and playing a Celtic melody. She passes between two drummers, each with a modern drum kit and an arsenal of traditional percussion instruments. Enter four women in elegant evening gowns, backed by an eight-person choir, singing rich harmonies with virtuosic precision as the fiddler continues her dance.

Celtic Woman: A New Journey is the third installment in the Celtic Woman series. Built to showcase four outstanding Irish female vocalists and the fiddler, Máiréad, the series is the brainchild of executive producer Dave

From left: Tom Stegemann (system tech), Jason Dallin (RF tech), Wayne Pauley (FOH), Gordon Adams (monitor engineer) and Jason McCarrick (system tech)

Kavanagh and David Downes, the musical director of that other popular Irish export, *Riverdance*. As its drum setup suggests, Celtic Woman is a mix of modern and traditional. Songs include Irish standards like "Danny Boy" weaving alongside hits by Enya and Josh Groban, as well as originals by Downes. Celtic Woman began as a PBS special, a one-time concert broadcast live from Dublin in 2004. Its massive popularity and accompanying CD/DVD prompted the organization to take the show on the road, resulting in a combined seven U.S. and world tours, and two follow-up CDs and TV broadcasts. The CDs have secured the top three spots on *Billboard*'s World Music charts for a record 95 weeks, and the tours have played in such places as Carnegie Hall and Radio City Music Hall, as well as the International Forum in Tokyo and The Point in Dublin. The current outing began in February in Dallas, and played across the States through May, ending in Los Angeles' Greek Theatre.

CREATING THE LIVE FEEL

Wayne Pauley, the show's front-of-house engineer since 2006, helped with the systems design as the show's venues grew. "My part has been to take the vision of David Downes and [record producer] Andrew Boland and try and interpret that into a live format," he says. "The people that come see this show have a very high expectation. I make sure that every seat in the house gets the best possible show.

"The show started out as a theater show," he continues. "The venues we started in were 1,500 to 2,500 seats. Now it's grown substantially. Some arenas that we've

played [are] somewhere between 7- and 9,000. When you take a theater show like this and put it in an arena, you really have to treat it like it's a very unique animal. It's not the kind of situation where you can just plug a bunch more speakers in and turn it up."

Pauley chose Meyer Sound P.A. systems to handle the job, with 24 MILOs, 24 MICAs, 12 HP-700 subs, and six UPJs for sidefills an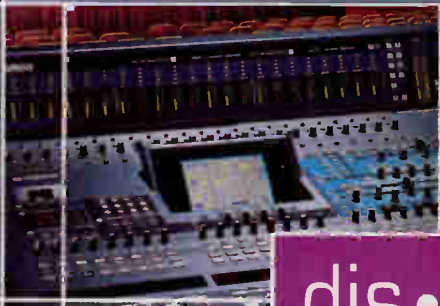d 10 UPMs for front-fills. "It's a pretty substantial amount of gear to carry around because we do several different sizes of venues, from theaters to big theaters to arenas," Pauley says. "Basically, carrying two P.A. systems has been just an enormous blessing. The fact that we can load into an arena and knock the socks off it, and the very next day load into a 2,500-seat theater and be just as intimate with it is really fantastic. We've been in arenas that were sold in what's called 180 degrees. We don't normally do that. So we were able to hang two normal arena arrays, and we used the theater arrays on the sides to do a side-hang or side-wash to cover those extra people on the sides."

Pauley considers the P.A. to be ideal because it can handle the large variation in SPL due to the show's many genres of music. "To me, the Meyer system has great fidelity at a lot of different volumes. [The show is] very quiet at times and very loud at times. It's one of the few shows that I can literally say stretches from 85- or 90dB C-weighted to almost 110 C-weighted. To make something sound good at 110 and sound good at 85 dB is quite a task. And that's one of the biggest reasons why I love this stuff."

Pauley also appreciates the system's software prediction program, MAPP. "It will let you optimize how you hang the P.A. best to suit the room for its height, angle, degrees of angle between the speakers so you know exactly what every seat's going to sound like before you ever put a piece of P.A. in the air. It'll show you through color graphs how loud or soft it'll be in any one seat, and you can adjust the output of the speakers accordingly to make it a more smooth pattern so it's just as loud at the back wall as the third row. It really helps in allowing us to make certain that everyone that comes to see the show has a great experience."

MIXING IT UP

Because the show spans a wide variety of musical genres, Pauley often changes effects and settings. "When I started, the way it was explained to me was that every song is basically its own little entity and you should treat it accordingly," he remembers. "And that's not just with levels, but with tones and equalization and effects and everything. It's basically
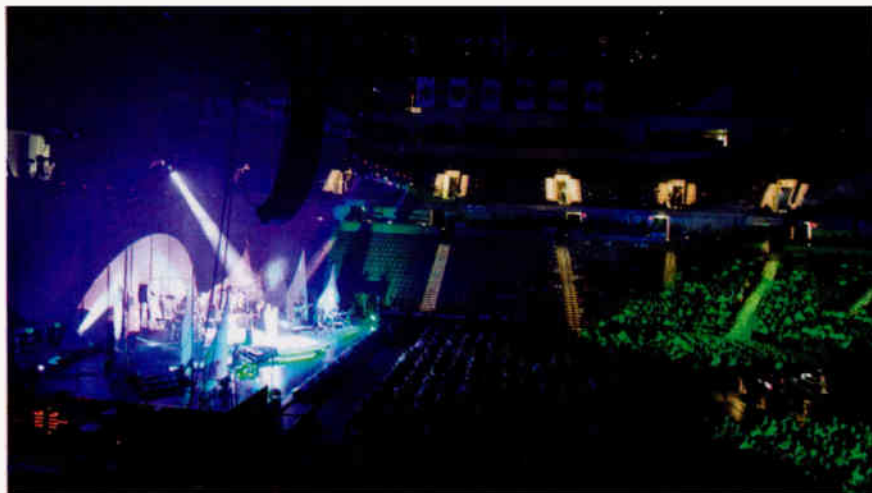
like 30 different five-minute movies."

To produce these changes, Pauley uses a TC Electronic M6000 reverb with a quad engine, essentially four units in one rackspace. "The show changes so much that what's going on is drastically different from song to song, so some of them may be big, huge breathy kind of things and some of them may be short, sweet and to the point." Pauley employs two long reverbs, a short plate and a delay on the unit.

The show is all-acoustic, with the exception of a DI bass. "I've always been of the school that if you have a good source tone and a good microphone and a good mic pre, you really don't need anything else," he says. Exhibit A are the more traditional-style "percussion toms," which Pauley mikes with Sennheiser 604s. "To me, the 604s have a more neutral sound and it seems to have a little more of the ability to get the ambience of the drums." The other instruments mainly get Sennheiser, as well. With the rock drums, Pauley calls on "rock 'n' roll" mics from Sennheiser's evolution 900 Series: a 902 for kick, 905 on the snare and 904s around the toms. The orchestral bass drum and percussion bass get an MD 441, as does the woodwind player, who changes from flutes and pipes to traditional Irish whistles. Pauley uses a Neumann 184 and a KM 84 for the acoustic guitars and the bouzouki, a large mandolin-like instrument.

A DIGITAL MIXING LIFE

Both FOH and monitors are mixed on Yamaha PM1D consoles. "It seems like it's the most user-friendly for us old analog guys, myself and Gordon Adams, the monitor engineer," Pauley explains. "We both come from the old school, where a Midas XL3 was the top of the line. Going through changes—and you have to keep up with technology—and making the transfer over from analog to digital, the 1D seemed the most intuitive, especially being able to get to any control with two keystrokes at the most, whereas some consoles you have to page through layers and layers."

Monitor engineer Gordon Adams hails from Canada, where he worked with fellow northerners Nelly Furtado and Randy Bachman of the Guess Who. On this tour for around 18 months, Adams says it's one of the best gigs he's ever had. "The women are an absolute joy to work with, as is everybody on this tour," he says. "They all understand the limitations of the wireless environment, and sometimes we're in a place where it's a challenge to get absolute clarity due to TV, radio and other outside sources.

"They understand that I can't erase the hall out of their mic into their ears, or I don't want to try because if I chop the mix down a bit, then the next day we get into a theater it'll be a very dark close mix, so they tend to leave it alone," he adds. "And because there are a lot of people onstage, there's a lot of mixes going on, so I'm glad it's not a scramble on a day-to-day basis."

Everyone onstage has Sennheiser 3000 and 5000 Series in-ears with 4061 and 4088 DPA headset mics. "Most of the people have Sensaphonic in-ear buds; I personally use Ultimate Ears UE-7s, which I had before I got this job," Adams says. The monitor engineer also points out that to get a low-end response, the bass player and drummers have speaker transducers bolted to the drum thrones and the platform on which the bass player stands. "The band is a pretty easy bunch of guys to deal with," he says. "They all have a realistic approach to what they want to hear in their monitors so I'm just changing pages; it's all saved anyway. I'm following the show more than [making] constant updates to it."

In the past, Pauley has engineered everything from rock and country to world music, but what he loves best about this gig is its challenges. "It's the first time I've been involved with something that's had so many styles and genres in one two-and-a-half-hour show," he says. "You just don't get this kind of complexity with any other show." ∎

Gaby Alter is a New York City–based writer.

New Sound Reinforcement Products

CROWN MACRO-TECH I SERIES

The Macro-Tech i Series from Crown (www.crownaudio.com) features Class-I circuitry—delivering greater power while reducing weight by more than half—as well as status, fault and load monitoring via standard Ethernet networking, and Harman Pro's HiQnet and System Architect software. The flagship MA-12000i ($6,855) offers 4,000 watts/channel at 4 ohms or 8 kW (8-ohm bridged mono); the $5,200 MA-9000i is 3,000W/channel at 4 ohms; and the $4,255 MA-5000i has 2,000W/side into 4 ohms. All have a universal power supply for worldwide use.

TECHNOMAD SHIPS ITS VIENNA 16, PARIS 16 LOUDSPEAKERS

Technomad (www.technomad.com) is now shipping new versions of its Vienna 16 and Paris 616 weatherproof outdoor loudspeakers. These upgraded Version 8 models add compression drivers and improved crossover networks, providing an added 3 dB of maximum, continuous SPL and 10 dB of dynamic range, ensuring voice intelligibility and musical output at all volume levels.

DYNACORD VARILINE VL 62

The full-range VariLine VL 62 from Dynacord (www.dynacord.com) features a neodymium, 6.5-inch woofer and a 1-inch compression driver mounted to a CAD-optimized, 90x40-degree rotatable horn for high-SPL applications where minimal footprint is desired. Specs include 150W RMS handling, 122dB max SPL and an operating bandwidth of 90-20k Hz. The VL 62's 16-ohm operation allows up to eight cabinets to be connected in parallel to any Dynacord amplifier to create large distributed systems.
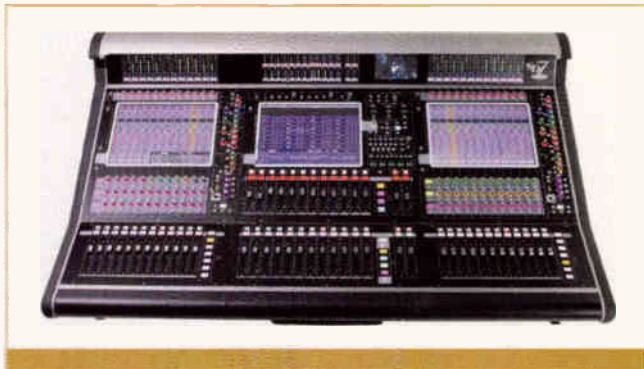
DIGICO SD7 DIGITAL CONSOLE

SD7 is the next-generation digital console from DiGiCo (www.digiconsoles.com). Powered by two redundant engines based on the latest incarnation of Field-Programmable Gate Array (Super FPGA) technology and three onboard, latest-generation Tiger SHARC effects and control processors, the SD7 has eight times the overall processing power of a D5 Live. The console features 256 processing paths at 96 kHz (128 @ 192 kHz), with 672 simultaneous optical and MADI connections, 128 buses (plus 32 matrix buses) and 32 32-band graphic EQs. Also standard is 4-band EQ with the ability to switch to dynamic EQ, plus multiband dynamic gates, compressors, delay and 4-band parametric on all 256 processing paths.

JBL AE COMPACT SERIES

Expanding its Application Engineered (AE) Series of loudspeakers, JBL (www.jblpro.com) announces new AE Compact models with eight new high-output, two-way systems, single- or dual 5.25/6.5/8-inch woofers. Two models (AC15 and AC25) have 1-inch dome tweeters; the rest have 1-inch exit compression drivers. The AC18 and AC28 models feature rotatable Progressive Transition waveguides with 90x50- or 120x60-degree dispersion. Filtered Array Technology (FAT) on models AC25, AC26 and AC28 allows independent control of LF drivers for magnitude and phase response. Multiple attachment points accommodate optional OmniMount-type or U-bracket mounts. Continuous power handling ranges from 150 to 375W. ■

"I use two X-48s as the main 96-track recording system and two more as a backup. I'm very pleased with the sound quality, the support has been great and I'm happy I went with the TASCAMs."

Kooster McAlister
Record Plant Remote
(James Blunt, Barry Manilow)

"X-48s are used to record live band rehearsals. We also record all of the live performances on the show for archival purposes using the X-48s, and they have performed perfectly and sound great as well."

Paul Sandweiss
Sound Design
(American Music Awards, Beyonce, Tony Bennett, Will i Am, Usher)

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The top names in the business rely on the TASCAM X-48 for recordings that work without fail.

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World Radio History

BY EDDIE CILETTI

Tools, My Olde Friends

Putting Together Your Own "Audio" Toolbox

Did you ever try to be creative with an unfamiliar set of tools? Like a paintbrush, a musical instrument or recording gear, amazing things can happen when tools become an extension of mind, body and soul. I see this on a daily basis, watching electronics students learn to solder and use needle-nosed pliers.

This column will show you how to string together a necessary "audio" toolkit while working on a budget. Tools made from hardened tool-grade steel alloys (plus a little respect) will ensure that your hardware friends will have a long, productive life. For example, I've had a Wiha miniature screwdriver set in daily use for 15 years, and it's still quite usable: Its steel alloy comprises a "special blend" of chrome, vanadium and molybdenum.

TURN, TURN, CAREFULLY TURN

While your tools may be made of high-quality steel, the same isn't always true for the screws and nuts that hold your beloved gear together. Combined with the use of screw guns used in manufacturing, this leads to screws that often don't want to be removed on the first try. If the driver slips out of a screw, the head can be damaged, making it twice as hard to get out.

Audio geeks need an almost mind-boggling range of screwdrivers—there are easily a half-dozen "standard" Phillips and flat-head sizes alone, plus Pozidrive, security bits and the various lengths needed for hard-to-get screws. With so many options, I suggest two multipurpose screwdrivers that cover the four most commonly used tip sizes: Made from S2-grade steel, Cooper Tools' crescent SDMB7V multipurpose tool includes Number 1 and Number 2 Phillips, ³⁄₁₆-inch and ⁹⁄₃₂-inch flat (slotted) blades, plus ¼-inch, ⁵⁄₁₆-inch and ⁷⁄₁₆-inch nut drivers. General Tools & Instruments' pocket driver includes ¹⁄₁₆-inch and ⅛-inch slotted tips, and Number 1 and Number 00 Phillips (cross-point) tips.

NEEDLE ME, PLEASE

Needle nose, long nose and even chain nose are all variants on the "electro-mechanical pliers" theme that are rarely found at a local hardware store or even at a Radio Shack. Notice that these are "just" pliers (not wire cutters), approximately 5 inches in length. The jaws are either minimally serrated (gripping grooves) or not at all. Ranging from inexpensive $4 models to better Xcelite and Klein Tools versions ($15 to $17), these are ideal for delicate electro-mechanical work, such as bending component leads and placing parts on a circuit board.

FEELING FLUSH

There are all sorts of wire and component lead cutters, and while just about anything can cut the legs off a resistor, ca-

pacitor or transistor, it's the "flush cutter" variant of diagonal pliers that really tickles my fancy. No matter what's being cut, flush cutters require less effort and, in the process, inflict minimal shock to delicate electronic components. Flush cutters also minimize the potential for after-the-fact pain—especially with wire ties. (Nothing is more annoying than messing with cabling with razor-sharp wire-tie ends, the result of using a special tool that stretches the tie until it breaks. In this case, faster is not better.)

The disadvantage of flush cutters is that a sharper blade is more vulnerable, which is one reason why it's important to choose the correct tool for the job. Having experience with cheap tools is motivation enough to invest in better ones. Studer, for example, included a set of screwdrivers and hex keys that helped establish a high standard back when I was cutting my geek baby teeth. These days, European-made tools (like Erem) and test equipment (like NTI) are more expensive due to their quality and because of the poor exchange rate.

Swanstrom is a comparable U.S.-made brand. Manufacturers that feature "induction hardening" of tool-grade steel results in a cutting-edge hardness of 62HRc-65 HRc. HRx is the Rockwell Hardness Scale, where "x" refers to the type of metal under test (b for soft metals like brass and aluminum, c for hard metals). HRc 55 to HRc 65 is the range typically preferred for tools and knives. Comparable hardness for AISI (American Iron and Steel Institute) are as follows: D2 (HRc 54), M7 (HRc 63) and M42 (HRc 66).

CUTTING AWAY THE SHEATH

I confess a penchant for simple wire-stripping tools over the universal and automatic type. This is partly due to the need to understand (and teach) the behavior of various insulation types. You might laugh, but the Jedi approach of using "The Force" will explain how some "masters" manage to get so much from their tools with what seems like so little effort. Brands such as Klein, Miller and Xcelite offer quality models in the $5 to $7 range.

HEX ON U

There are many specialized tools, but a set of hex keys (which are also known by the trade name Allen Wrenches)

A Few Online Tool Sources

Torx, Robertson (square), Tri-Wing, Torq-Set, Spanner Head and Triple Square. To my surprise, the Bondhus hex-key brand is made here in Minnesota. The company's Website (www.bondhus.com) includes a simplified metallurgy overview that's worth perusing.

ELECTRONIC FRIENDS

Here are the tools I use every day. A multimeter typically measures volts, ohms and milliamps. The Fluke 8060A also measures dB and frequency (in the audio range). I also have several "lesser" analog and digital meters; the latter do "other" interesting things like measure capacitance, inductance and transistor beta (Hfe).

A cheap oscillator, like the $60 Tenma 72-505, is great for the price. With sine distortion below 0.03 percent, a square-wave function and the ability to output +4 dBm, it does most of what you'll need at a very affordable price. The NTI Minirator MR-PRO handles more-demanding applications that require lower distortion (0.0016), precise level control from -80 dBu to +18 dBu, and numerous other cool features you'll have to go online to check out.

Similarly, NTI's Minirator MR-1 has an article's worth of features, but does two things in particular that are very helpful when working on vintage gear: It measures distortion and provides spectrum analysis. Because distortion measurements automatically include "noise," it's nice to be able to see where the noise is coming from (typically from power supply and grounding issues). An oscilloscope is also an essential tool; an entry-level, 20MHz dual-trace 'scope can be had for less than $300.

NEW OR USED?

All tools will suffer from normal wear and tear, but well-made tools can be brought back to near-new quality with a little TLC (and a knowledge of sharpening and polishing techniques). I once found a dozen high-quality, used long-nose pliers for $2 each. A little gentle grinding, filing, sanding and polishing, and they were nearly good as new.

SO WHAT ELSE WILL YOU NEED?

As you get more involved in electronic maintenance, repair and modification, you'll find lots of useful doo-dads for your collection. One classic is a "helping hands," a weighted base with pivoting arms and adjustable alligator clips that hold wire/component/connectors in place while you solder—a great item that's widely available for less than $10. A cable tester is another simple time/effort-saver. Not only is it easier to deal with than a VOM meter, but with both ends attached to the tester, you can bend the cable around to check for shorts or intermittent connections.

We'll have some more toolbox fun in upcoming issues, but in the meantime, keep your mind and (*non*-electronic) tools sharp and lightly oiled. ∎

For more geek speak, visit Eddie Ciletti online at www.tangible-technology.com.

Tools of the Trade

PRESONUS STUDIOLIVE

This 16x4x2 digital performance and recording mixer from PreSonus (www. presonus.com) features FireWire recording with JetPLL™ synchronization delivering 22 channels of recording and 18 channels of simultaneous playback. The heart of StudioLive is the Fat Channel, which is engaged by pressing any Select button. It features EQ and dynamics on every input channel, as well as on every aux, subgroup and main output. The highpass filter and 4-band semi-parametric algorithms are based on PreSonus' digital EyeQ™ equalizer. Also included in the Fat Channel are compressors, limiters and gates modeled after the company's ACP88. Other features include LED metering, 100mm faders, talkback, multitrack recording software (Mac/PC) and the ability to export to WAV file formats for compatibility with any other DAW. The unit has 16 XMAX mic preamps and two programmable 24-bit stereo DSP engines offering reverbs, delays and time-based effects.

YAMAHA RH10MS HEADPHONES

Yamaha (www.yamaha.com) has released the RH10MS ($159) pro headphones, featuring Ultrasone's patented

S-Logic™ technology. On the lighter side, the cans feature a tip o' the cap to Yamaha's legacy NS10 monitors by using white plating on the outer ear cuffs. On the technical side, S-Logic claims to offer a unique headphone listening experience by reflecting the signals off the surface of the outer ear in different directions rather than firing the transducer directly at the listener's inner ear. The effect simulates listening to speakers from several feet away, allowing listeners to perceive the same volume at significantly lower SPLs. The 265-gram (excluding the 9-foot cord) units feature an ergonomic design, a padded band for comfort during extended wear and a velour storage pouch. Specs include an 18-21k Hz frequency response, 32-ohm impedance and 96dB sensitivity.

AURALEX PERSONALIZED, FREE ROOM ANALYSIS

For those seeking expert advice on how to tame the wild acoustic space, Auralex now offers free advice that includes product recommendations and placement for customers facing the challenges of larger spaces, such as churches and gymnasiums. Personalized Room Analysis and free Large-Room Analysis forms are downloadable as PDFs from Auralex's site (www.auralex .com), or users can call Auralex directly (317/842-2600) to have a copy of either form faxed. Once all sections are filled out and forms are submitted, within two or three business days an Auralex consultant will review the information and formulate suggestions for Auralex products and their suggested placement in the room.

HARDIGG TRANSPORT CASES

Two new cases from Hardigg (www. hardigg.com)—SuperMAC and BlackBox (priced per configuration)—offer a range of features inside a tough, roadworthy enclosure. SuperMAC is the company's most compact transport container with a removable rack option. It features patented Comfort Grip handles, recessed cobalt-black hardware, molded-in lid hangers and a Lock N Load™ quick-latch system that locks racks securely for transit. BlackBox has a rugged steel frame, a 2-inch front lid and a 5-inch rear lid with edge casters, molded-in rib design for secure stacking and interlock, shock-mounts offering two inches of sway space to isolate equipment and an automatic pressure-relief valve.

DIGITAL SOUND FACTORY E-MU SAMPLES

Digital Sound Factory (www.DigitalSound Factory.com) has reissued the original E-mu Proteus sample content for use with Cakewalk's Dimension Pro and Dimension LE synths. Using the original content with the advanced parameters available in Cakewalk's Dimension, the new instrument programs are matched and tuned to the original hardware products. The E-mu Proteus Pack comprises more than 3,500 sounds that can be used with or without the synthesis options of Dimension, pro-

viding numerous ways for custom sonic creation. The Dimension LE synthesizer can be downloaded for free at www.cakewalk.com; sample sets start at $19.95.

VIRSYN MATRIX VOCODER

Promising to be the first update for VST3 compatibility in a commercially available, third-party plug-in, Version 1.1 of VirSyn's (www.virsyn.de) Matrix Vocoder ($187, Audio Units/RTAS) is now available for Mac OS 10.4 and Windows XP through the VirSyn Website. The plug-in uses VST3's new native sidechaining ability to improve handling and routing when used with all of Steinberg's latest generation of VST3-ready Cubase and Nuendo production environments. Other VST3 features include a new dynamic I/O and busing system, enhanced CPU efficiency, sample-accurate automation and more.

LAUTEN AUDIO MICS

Three new mics from Lauten Audio (www.lautenaudio.com) offer a range of features targeted for studio use. The $999 FC-357 is a solid-state, multipattern large-diaphragm condenser model, with Class-A electronics and a dual-diaphragm capsule capable of omni, cardioid and figure-8 patterns. The $1,599 ST-221 has two small-diaphragm tube mics packaged in pairs, featuring interchangeable cardioid and omni capsules, military-grade NOS tubes and high-resolution electronics. The $1,599 LT-381 has a newly designed, dual

large-diaphragm capsule; NOS military-grade pentode input and triode output circuit; and variable omni, cardioid and figure-8 patterns.

MIXCRAFT VERSION 4

Mixcraft 4 ($64.95) from Acoustica (www.acoustica.com) is affordable, Windows-based, multitrack audio (up to 192 kHz)/MIDI recording software that supports third-party VST and DirectX plug-ins, Apple Loops, ACID Loops and its own custom loop format. The included Song Kit lets users create quick demos in dozens of styles, and then mix, master and burn a CD or MP3 directly in the software. It also comes with a well-rounded arsenal of soft instruments, including a virtual Minimoog and B3 organ, a virtual analog poly synth, a 250MB quad-strike grand piano sample and a General MIDI library.
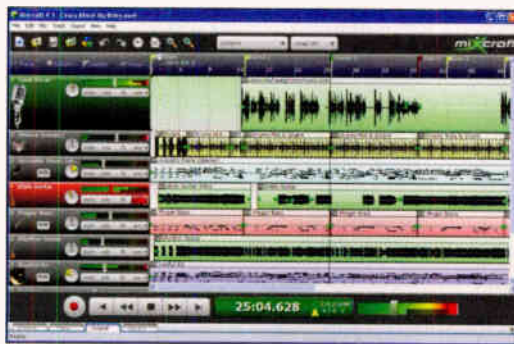
PROAVIO MINI-SAS STORAGE

The new EditBOX Mini-SAS storage line from Proavio (www.proavio.com) integrates new features including a standardized cable type, industry-standard SFF8088 interface ports with pro locking connectors, native internal Mini-SAS system architecture and an overall increase in performance by up to 20%. The EditBOX 4MS (1 TB/4x, 250 GB, $649; 2 TB/4x, 500 GB, $899) is a small-format, four-drive SAS/SATA disk array featuring a x4 SFF8088 interface port and new Mini-SAS architecture that greatly increases the signal integrity. It's capable of exceeding speeds over 225 MB/s. The EditBOX 8MS (2 TB/8x, 250 GB, $1,249; 4 TB/8x, 500 GB, $1,595) is a small-format, 8-drive

SAS/SATA disk array with a dual-x4 Mini-SAS interface that supports disk configurations up to 8 TB. It is capable of delivering an excess of 450 MB/s when configured in RAID-5.

AVLEX BARDL P SERIES MIXER

Available in 8- ($379) and 12-channel ($439) versions, Bardl P Series mixers from Avlex (www.avlex.com) are designed for desktop studio or live applications. Features include USB and S/PDIF ports, Mac/PC integration, switchable mic/line inputs (four on the 8-channel P80U; eight on the 12-channel P120U), switchable phantom power and 3-band shelving EQ. There are also contour control on groups 1, 2 and the main mix bus, as well as 4-segment LED indicators for the main/group outputs. Other features include separate headphone level control and direct output control for recording, plus dual-bus outputs and three aux outputs.

BLUECAT PEAK METER

Blue Cat Audio (www.bluecataudio.com) has released the Digital Peak Meter Pro 3 ($58.31), a redesigned version of its unique audio analysis tool. The meter is a VST and DirectX plug-in for Windows offering a new GUI, Bob Katz' K-System scales support, the ability to blend RMS and peak envelopes for the transformed output, mid-side mode, average values display, undo/redo support and Windows opacity-management support. Other features include main MIDI setting displays in the plug-in user interface, anti-aliased curves, and improved values in the MIDI settings panel and the host application.
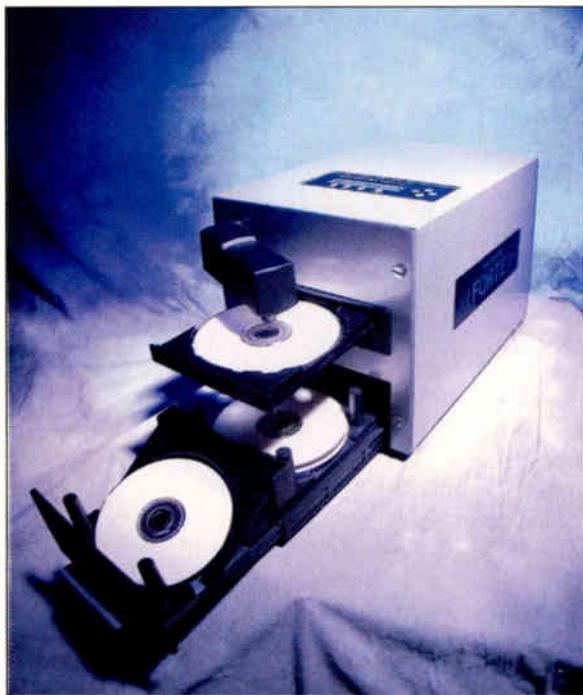
DISC MAKERS FORTE

This stand-alone duping unit from Disc Makers (www.discmakers.com) boasts an easy-to-use interface and runs without a computer. The Forte ($499) features a 20x DVD±R/40x CD-R drive, 25-disc input/output capacity, a 160GB hard drive that stores up to 31 full-size DVD images and duplication rates of seven DVDs, or 14 CDs per hour. The machine has a small footprint and houses a rugged built-in fan, professional grade robotics and advanced control features, giving users the option to duplicate CDs/DVDs in both single and multi-master modes.

SONIFEX RB-PD2 PROFANITY DELAY

Keeping the airwaves free from the effects of naughty words, the Sonifex (dist. by Independent Audio, www.independent audio.com) RB-PD2 ($2,882) stereo profanity delay is a rackmount box featuring

and handles sample rates up to 48 kHz at 24-bit. The RB-PD2 has Build, Delay, Cough and Dump features, as well as a dedicated Record mode for storing audio from either the analog or digital inputs to a linear WAV file on a Compact Flash memory card.

ZERO INTL. SOUND SOLUTIONS BOOKLET

This 20-page free guide helps readers define and treat noise problems as it applies to doors and openings. It covers steps to solve the problem and the mechanics of sound transmission, including sound transmission loss, sound transmission class and the role of gasketing in achieving the performance ratings you require. Other topics include sound trap components, head and jamb protection, automatic door bottoms and saddle/hinges. In addition, the guide details considerations when dealing with window and curtain walls and more. The text can be viewed online at www.zero international.com or downloaded as a PDF.

NUMERICAL SOUND HOLLYWOOD IMPULSE LIBRARIES

Numerical Sound's (www.numericalsound .com) Hollywood Impulse Responses (HIR, $129.95) were inspired by the ambience of 20 major Hollywood blockbuster films released from 1977 to 2006. Impulses were designed to change the perceived timbre of an individual instrument, ensemble or an entire orchestra. The user can adjust the tone of a track by selecting the ap-

IRs from the G3 set will exactly match the range of the instrument. Requirements include a program such as Altiverb, Pristine Space, Space Designer, IR-1, Acoustic Mirror, Perfect Space or SIR. Logic, Cakewalk, Samplitude, Sequoia and Nuendo all have convolution integrated into their programs, so purchasing a plug-in is required.

RAIN RECORDING SOLSTICE SPIDER EDITION DAW

This new audio workstation from Rain Recording (www.rainrecording.com) features the AMD Phenom™ 9000 Series quad-core processor, ATI Radeon™ HD 3800 Series GPU and the AMD 7 Series chipset. The Solstice Spider Edition ($2,799.95) is housed in a crimson-anodized, aluminum chassis and features a 500GB, 7,200 rpm Ultra 300 SATA II system drive with 32MB buffer, identical streaming drive, dual-layer DVD±RW/CD-RW combo drive, 10 USB 2 ports, three FireWire 400 ports, four PCI Express x16 buses, two PCI slots, RAID-readiness, two PS/2 ports, aluminum keyboard and Microsoft optical mouse. Free shipping and free third-party integration are standard.

SPECTRAPHY LE LIMITER/MAXIMIZER

The SpectraPhy LE ($59) from Crysonic (www.crysonic.com) is a look-ahead brick-wall limiter/level maximizer designed for tracking, mixing, mastering and live use. Features on this native PC VST/Native Universal Binary (Intel/PPC) Audio Units– or

an automatic audio-stretch algorithm that allows between two and 64 seconds of delay to be built up live during broadcast while maintaining the correct pitch. The delay can also be applied while playing a pre-selected audio file on a Compact Flash memory card. The unit features balanced analog and AES/EBU digital I/Os,

propriate dark, warm, flat, clear or bright impulse when mixing the wet signal in with the dry. Also included are six sets of IRs that are highpass-filtered at points of the frequency spectrum matching the range of acoustic instruments. These points are at the notes C2, G2, C3, G3, C4 and G4. For example, a solo violin tracking the

VST-format plug-in include less than 0.2ms delay; individual left/right channel limiting with linking; graphical spectrum and attack/release display; pre-smooth function to tame transients; pre- or post-output spectrum; 64-bit internal precision; 24-bit/96kHz audio support; velocity-sensitive dials; and full automation for all parameters. ∎

Native Instruments Kore 2 Plug-In Host

Hardware Control Surface, Plug-In Editing, Sound Library

The first incarnation of Native Instruments Kore was an insightful step forward in hardware/software integration, but it suffered from some design problems. (See my review in the September 2006 issue.) Kore 2 is a major overhaul, in which those issues have been decisively addressed. If you use a lot of software synths and need to manage a complex sound library, Kore 2 may be your solution.

Kore 2 combines a neat little USB-connected desktop controller box with a software-hosting environment. The hardware has eight good-feeling, endlessly rotating knobs; eight buttons; pairs of pedal and footswitch inputs, and more. The software is a mixer/router that lets you layer instruments, apply effects and build a library of complex setups (which can include third-party plug-ins).

The software can run in stand-alone mode or as a VST/DX/RTAS plug-in. Except for a couple of isolated and unrepeatable crashes, I found Kore 2.02 stable and trouble-free.

HARDWARE: OLD AND NEW

The original Kore controller (which can be used with the new software) was both an audio and a MIDI interface. Audio has been dropped from the Kore 2 controller, which makes sense: It lowers the cost, and most of the target market for this high-end device will already have multichannel computer audio I/O.

The original Kore controller had to be present in the system for the software to work—in effect, a giant dongle. In Kore 2, as in the previous versions from 1.1 on, the controller has to be present during installation but can then be set aside. This is ideal if you need to compose on your laptop while traveling. The knobs don't transmit conventional MIDI data, so they can be used only with Kore. They can control any software that can be inserted into Kore, but can't address your DAW's mixer.

Navigation buttons and an orange backlit LCD provide access to many Kore functions without touching a mouse. The panel also has start/stop/record transport buttons. The start and stop buttons work with Kore as stand-alone but don't function in plug-in mode. The record button currently does nothing.

BUNDLED SOFTWARE

Kore 2—referred to from here on simply as "Kore"—leverages Native Instruments' powerful suite of software instruments. It ships with the engines (no front panels) of Reaktor, Massive, Absynth, FM8 and other synths, and a large and varied library of presets for these. Also included is a rack of effects processors.

Using nothing but these resources, I created some rich layered sounds, but I was frustrated by the limited editing of the instruments. Each preset exposes a set of eight parameters to the Kore knobs, usually attack and release time, filter cutoff and resonance, effects wet/dry mix and a few other things. But in searching through the Lead Synth category in Kore's capable browser, I found only one or two presets in which vibrato depth was mapped to the MIDI mod wheel. I also spotted some sounds based on physical modeling that weren't tuned to concert pitch, and the tuning was not one of the editable parameters.

If you already have a couple of good soft synths, the included preset library will be a welcome addition. But it's not the kind of resource that will keep you smiling for months; it's more of a teaser for the NI product line. When I installed NI Komplete 5, I breathed a sigh of relief: All of the front panels of the installed Kore library were now available for editing. In addition, the preset libraries in the Komplete package have been updated to work well with Kore. More affordable than Komplete are the eight Kore SoundPack expansion libraries, which you can buy on the NI

Kore's bundled software includes Reaktor, Massive, Absynth and FM8.

Website and download.

The 31 built-in effects are what you'd expect: delays, chorus, reverb, EQ, dynamics control, rotary speaker simulator, frequency shifter, various distortions, etc. Also included are a MIDI file player, a MIDI arpeggiator, a MIDI transformer (useful for velocity and key splits) and a monophonic 32-step sequencer. I had no problems dragging and dropping MIDI clips from Spectrasonics' Stylus RMX into the MIDI file player.

PROFILES IN KORE AGE

The three main areas of the Kore window are the controller panel, the rack of inserts and channels, and the browser. Each can be hidden to save screen space. Unfortunately, the rack area is too narrow vertically and can't be expanded. With all but the most basic setups, constant scrolling is required.

The original Kore implementation made a hard distinction between top-level multi setups and lower-level single setups. Thankfully, that distinction has disappeared. After creating a Performance with several channels of instruments and effects, I could save it and insert it into a single channel in another Performance.

Channels are of three types: source, input and group. A Source channel contains MIDI devices, a synth and effects; MIDI devices and effects are optional. An input channel accepts audio input from the

host and effects can be used as inserts. A group channel can serve as a submixer or an aux send bus. The number of channels and sends you can use depends mainly on your CPU.

When you select a device in the rack, its knob assignments become active on the controller panel. Thus, the eight physical knobs can perform numerous functions. It is easy to step from one device to another using the hardware box: After setting up a complex Performance, you can operate it strictly from the hardware. You can set up several pages of knobs for each insert and navigate among the pages using the hardware; multiple parameters can be assigned to a single knob.

In the browser, I could search a database with thousands of sounds. You can search by type, subtype, bank or name. Sounds can be given ratings or tagged to particular projects.

The manual is thorough, dense and poorly illustrated. Terminology is tossed around without being defined. Often, the manual tells you something can be done without telling you how to do it or referring to the page where the method is explained. Fortunately, the software is very well-designed, so reading the entire manual isn't required.

HOSTED

I installed Kore in my MusicXPC laptop and used it in Steinberg Cubase 4.1, Image-Line FL Studio 8 and Ableton Live 7. I had good experiences with the first two hosts, but the compatibility of Kore 2.02 with Live 7.03 is somewhat shaky due to limitations in Live.

It's not possible to record the hardware knobs into Live's MIDI clips in Session view. The parameters "published" to the host by Kore appeared as choices in Live's little X/Y control pad, which can be used to record automation envelopes, but the abbreviations given to the parameters were quite cryptic.

Initially, Live wouldn't pass QWERTY keystrokes to Kore so certain Kore browser functions, such as searching in the browser, didn't work. NI e-mailed me a workaround, which involves creating a small text file and putting it in Live's Preferences folder.

Recording Kore's knobs into Live in Arrange view worked the first time, but when I inserted a second synth into Kore and overdubbed a few more knob moves, Live failed to record the overdub and stopped playing back the first set of knob moves. Native Instruments has published solutions to these problems in its online knowledge base. Currently, Live supports only 128 automatable controllers per plug-in (a limitation not shared by other hosts). This is not nearly enough to handle the multiple devices that may be embedded within Kore, but Kore lets you rearrange its controller list. By moving the items you need to the top of the list, you can make them available in Live.

The good news is you can use Kore live with Live as the sounds will respond to the knobs. Compatibility issues arise only when you try to record knob moves.

KORE-DIALLY YOURS

At $559.99, Kore is an ideal solution for producers who use a lot of plug-ins. You can transfer complex layered sounds from one project to another and record multi-layered automation moves quickly. I wish I had an intern to organize my sound library and assign the knobs to parameters in thousands of presets. The hardware/software integration makes Kore ideal for live use, as well.

Native Instruments, 323/467-5260, www. native-instruments.com. ∎

Jim Aikin is a regular contributor to Mix *and* EM.

World Radio History

iZotope RX Advanced Restoration Software

Easy-to-Use Modules Offer Transparent, Musical Results

RX's main interface displays the currently selected region as a curtain of FFT spectral analysis with nearby zoom-view and waveform opacity sliders.

Manufacturer iZotope is known for developing innovative, high-quality plug-ins, yet the company's recent release of RX has generated more industry buzz in a shorter period of time than all of its previous products combined. The hoopla hasn't been so much about what RX does—audio restoration, cleaning and repairs—but how it goes about doing it. iZotope's research team spent the past four years developing entirely new algorithms and procedures from the ground up, which results in some novel methods for revitalizing noisy and severely damaged audio.

RX is a stand-alone application comprising a fully integrated suite of five modules: Declipper, Declicker, Hum Removal, Denoiser and Spectral Repair. Each module is also available as its own plug-in. In addition to a base version ($349), the $1,199 extended RX Advanced edition (reviewed here) allows even more precise control over the modules with enhanced algorithms and parameters. It also features iZotope's MBIT+ dithering process and 64-bit sample-rate conversion for pro delivery. Both versions are available in the same download, meaning that you can start by purchasing the base package and unlock advanced features at any time for the difference in price. The application runs on Windows XP/x64/ Vista machines and as Universal Binary on Mac OS 10.3.9 or later. Protection is through PACE iLok or challenge/response authorization; key not included.

TESTING, TESTING

My test system was a Mac PPC dual 1.8 GHz with 4GB RAM and OS 10.4.9 running through a Digidesign 96 I/O interface via Digidesign's stand-alone CoreAudio driver Version 7.4.

RX opens to a rather large interface that's reminiscent of a widescreen LCD (though it is resizable down to 900x600, minimum) and void of any color apart from the shades of gray that divide the GUI into its primary functions. Loading an audio file brings it to life, displaying a large blue waveform superimposed onto a glowing embers-orange curtain of FFT spectral analysis in the selec-

tion region panel. Nearby sliders let users blend waveform opacity for easier viewing against the spectrogram, as well as zoom-in on the time and amplitude/frequency scales. A full-length file waveform preview is always sprawled across the top of the display for shuttling.

Workflow is streamlined and highly efficient. Five buttons call up floating windows for each RX module, providing scalable access to their many parameters and commands while keeping screen clutter to a minimum. Processes can be automated on a single file or batch-run on multiple files. This is a huge time-saver when dealing with session folders or volumes full of similar source files needing the same treatment—just set it and forget it overnight. An Undo History panel, playback level meter, transport controls with looping option and a large time-position display (hh.mm.ss.ddd, samples, frames) round out the interface offerings.

Scrolling through the menu bar reveals a few handy features not available from the main window, including a gain control; 4-band parametric EQ curve with adjustable notch, high/lowpass filters; and a Help

menu leading to a concise HTML manual. RX reads mono or stereo WAV. Broadcast WAV, AIFF, MP3 and WMA files, but can also directly import and convert audio from a video file (AVI, MPEG, WMV, DV, MOV and M4V) and save as WAV or AIFF with several resolution and dithering options.

TURN DOWN THE HEAT

One of my first sessions with RX happened to be a rescue job, where I needed to remix some tracks that a client had recorded into her DAW some years ago—apparently, before that client had discovered input limiting. Rather than simply "redrawing" the squared-off peaks of overcooked A/D conversion and analog tape distortion, the Declipper module uses advanced frequency band analysis to rebuild the audio.

Single-band mode is the best place to start as it's very fast and often succeeds on the first try. I was knocked out by the results on severely clipped bass and Rhodes parts; transients were preserved perfectly while sustained notes came out sounding clean and smooth without any weirdness whatsoever. If the clipping is more complexly

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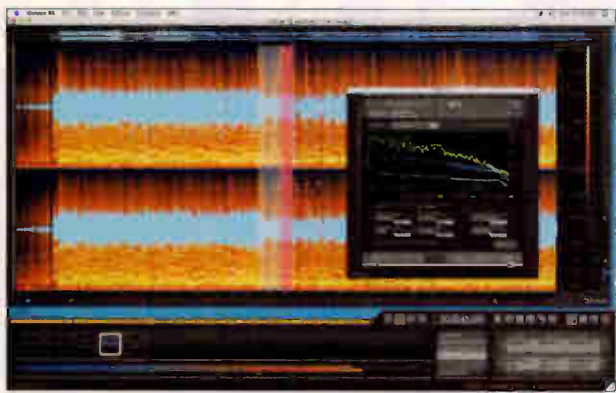
The Denoiser lets users preview subtraction in real time, shown here by the vertical red playback band.

embedded (as with analog saturation), Multi-Band mode lets users select the number of frequency bands (8/16/32/64/128) used to perform interpolations. Using a higher number of bands doesn't necessarily mean better-sounding results, though, and can actually add very unpleasant artifacts. I found that running single-band mode first to eliminate the digital peaks (appearing as extremely obvious "hair" in the spectrogram) and then auditioning various multiband passes to tweak out any remaining

analog distortion was the best approach on areas of compounded clipping.

A third mode, Multi-Resolution, made only nominal difference on 90 percent of the material as compared to the other two modes. But it did something wonderful to moderately clipped parts containing high and harmonically rich material, such as the female lead vocal and violin, where it better retained the natural room ambience. All three modes feature a histogram of waveform levels that allow you to set the clipping threshold by visually finding the audio level where the waveform's peaks are concentrated. This is quite handy.

VINYL CLEANER

Restoring an extremely rare but blemished Motown *1971 Sterling Ball Benefit* souvenir LP provided ample opportunity to test the finesse of three other RX modules. The

album was riddled with clicks, pops and scratches. I first set loose Declicker's Automatic mode to search and destroy the offenders.

Setup was simply a matter of fine-tuning its maximum click width (0.1 to 10 ms) and sensitivity controls to suit the severity of the record's condition. Ideally, these settings should remove most clicks without damaging transients in the program material. Looking at the spectrogram made this easy as I could visually identify clicks and pops of varying intensities to get an idea of their widths from the time ruler that runs along the bottom. I also chose to preview the process as "Clicks Only" to better hear what was being removed, tweaking settings to ensure that no drums were being mistaken for clicks, for instance, before hitting Apply. (This noise-solo'ed monitoring function is available in all RX modules.)

On Diana Ross' "Reach Out and Touch (Somebody's Hand)," a deep gouge traveling through several grooves created pops that at times lined up exactly on the kick during the intro. These proved too stubborn for automatic processing, so I switched over to manual mode, requiring that de-clicking be performed on each event individually.

World Radio History
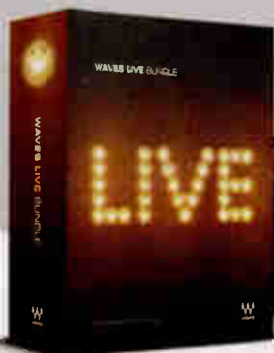
Using the zoom controls, or by moving the mouse wheel up and down, I was able to get a nice close-up view of an impulse and select exacting boundaries within which interpolation (adjustable in order, up to 400 samples) from surrounding data could occur. Like magic, each pop miraculously vanished and detected no residual effects, skewing or smearing of the kicks.

Once the larger pops were removed, it was much easier to hear smaller clicks and crackles that were still occurring in the background of the record. I found that making several passes with Declicker—each homing in on different sizes and intensities of impulses—gave far better results than trying to remove everything at once.

The Hum Removal module uses precision notch filtering to remove low-frequency buzzes and all sorts of related electrical garbage. The base hum can be set for 50- or 60 Hz, or "freely" assigned to any frequency you wish—handy for tuning into buzzes on a tape being played back at a slightly different speed from the recording speed. Up to seven harmonic filters can be enabled (including linear-phase variety in Free mode), each with independent or linked control over attenuation and sepa-

rate slopes for odd and even harmonics. I even used these bands to tune into intermittent buzzes from computer power supplies and dirty data bus drains caught on DAW recordings. Low- and highpass filters (perfect for killing vinyl rumble) with adjustable frequency and Q can further shape the curve.

To clean up any remaining dust, I turned to the Denoiser module. The noise suppression used here is by far the most advanced I've seen. The problem with tools I have used in the past (particularly early ones) was that they relied almost entirely on gating and primitive frequency carving, cutting away the "bad" portions of the audio spectrum and compensating with others. On those systems, eliminating minor tape hiss was never a big deal, though it often came at the expense of losing some clarity and "air." But removing substantial amounts of broadband noise would result in twittering, glugging and other comb-filtering artifacts. Later systems made use of more advanced audio fingerprinting or profiling techniques but still imparted a swirling, watery blur that I often found unacceptable and more distracting than the noise itself. Fortunately, RX isn't sidelined by these issues.

ADVANCED FEATURES

RX Advanced provides independent control over the reduction of both the tonal and broadband noises that I spoke of earlier, each with sliders for threshold and noise reduction. This lets users aggressively suppress tonal noise, for example, while only applying a small amount of broadband noise reduction, or vice versa. I used it to zero in on grounding hum on electric guitar while cleaning up solid-state noise coming from the analog signal processors in the guitarist's signal chain. The results were spectacular: transparent and completely natural sounding. In fact, about the only scenario that gave me trouble was having Denoiser differentiate between the spectrum of a snare drum and actual noise during a very quiet section containing an isolated rolling snare drum intro whose amplitude and spectrum must have closely matched both noise prints. After treating left and right channels with slightly different settings and much fudging around, I got an acceptable, though imperfect result.

FILLING THE GAP

A real bonus in RX is its amazing Spectral Repair module, which offers different in-

terpolation modes geared toward specific types of repairs, including catastrophies where large amounts of information have been completely lost.

The Attenuate mode was great for pulling chair squeaks, page turns and coughs out of a live chamber music and spoken word recital I was editing. I chose this mode only for noises occurring during dialog, as it allowed me to adjust the attenuation strength while being careful to preserve background ambience. Using the Time-Plus-Frequency selector tool, I precisely drew a marquee around the offending occurrences in two dimensions, even solo-previewing each selection to make sure I was catching noise and only noise. Sometimes male coughs would fall smack-dab in the same frequency range as a male speaker so it became a judgment call as to how much attenuation was applied, but I always found a balance that didn't compromise the intelligibility of the dialog or the natural feel of the ceremony. For noises largely outside the frequency range of program material, you're better off cherry-picking in a similar manner, but then using the heavy axe of Replace mode instead.

The trickiest instance came when a large stage prop squealed into and during a crucial sustained note. This time, I chose Replace mode for its ability to remove brief noises that are mixed in with dense program material over a wide frequency spectrum. It does so by examining the surrounding audio for similar source material and intelligently re-synthesizing it to fill in the gaps (up to four seconds). My initial attempt wasn't so great: The squeal occurred just prior to the note, causing the replacement to smear the transition. This happened because I had Replace set to its default so that it interpolates equally from the left and right of the noise.

There is a way around this: You can control the weighting given to material sourced before and/or after the replacement selection. In this case, I chose 100-percent weighting before the replacement, resulting in an unaffected transition. Brilliant! The advanced re-synthesis algorithms really do sound terrific, even capable of re-creating details like the vibrato on a singer's voice or changes in pitch. Of course, it's not entirely magic and replacement works best where surrounding material is similar and fairly constant.

LET'S MAKE SOME NOISE

I feel iZotope RX is the most comprehensive, customizable and best-sounding audio restoration and repair tool currently on the market. Available for less than $300 on the street, it puts RX easily within reach of any studio looking to generate extra revenue from audio-restoration sessions.

As the standard version offers so much, RX Advanced may appear relatively expensive. But to professionals working in no-compromise applications such as music recording, audio post/dialog cleaning, CD or DVD mastering, broadcasting, archiving or forensics, RX Advanced is an essential tool. I was blown away by the extreme transparency and unprecedented musical results. RX Advanced helps when all other audio tools and editing tricks fail.

Both RX and RX Advanced should be available in plug-in form by the time you read this. This is a key development as it will place the power of RX within any DAW. Anticipated are Pro Tools (RTAS, AudioSuite, HTDM), VST, Audio Units, MAS and DirectX versions. Eventually, all will ship bundled with the stand-alone version and iZotope says that current RX customers will be able to download the plug-ins free of charge.

iZotope, www.izotope.com. ∎

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Overloud Breverb Plug-In

Rich-Sounding Ambience With Minimal DSP Usage

I talian software developer Overloud is offering Breverb, a synthesized reverb plug-in that's modeled on high-end hardware reverbs costing many times its $499 retail. It includes four master algorithms: Hall, Room, Plate and Inverse. Each algorithm runs in a separate environment within the plug-in while using minimal CPU resources, and has specific sets of adjustable parameters that are relevant to the ambience that they create. Breverb runs as a native app on PCs and Macs in Audio Units, VST and RTAS formats, and uses iLok copy protection.

ALL-PRO SIGNAL CHAIN

Breverb's GUI clearly shows that incoming stereo signals are split into dry and wet (reverberation) paths. For control, there are stereo input/output faders, wet and dry level faders, pan pots and meters that surround the centralized reverb algorithm/preset selector menu. The wet signal passes through a master EQ and gate on its way to the wet/dry output mixer.

This master EQ comprises two dual-band, full-range parametric EQs with controls for gain, frequency and Q. The Q control adjusts the width of these bell-shaped filters and can also change them to 12dB-per-octave lowpass or highpass filters. The algorithm also includes a damping control (for use with halls, rooms and plates) to simulate the real-world effects of a room's wall materials and objects that absorb mostly high frequencies.

Following the EQ is a gate intended for gating reverb tails, with threshold, attack, release, hold time, shape (either linear or sigma) and slope parameters. The attack, release and hold parameters operate like any typical noise gate. Shape offers a choice of gate-attenuation curves: Linear is a straight, downward path; and sigma is an "S" shape, in which the gate closes slowly at first and then more rapidly downward. Slope controls the exact shape of this S curve—higher values mean a steeper downside.

Both the master EQ and gate are represented in the GUI as the last two in a row of five master control buttons or tabs with lighted in/out indicators. When you click

Overloud Breverb's interface lets you show/hide a customizable fader bank.

on any of these five tabs, a row of up to six knobs appears for adjusting parameters under the selected tab's name/function.

BREVERB'S REVERB, GUI

Breverb's row of five master control tabs starts with the General tab, offering up to six parameters for controlling the synthesized reverbs. Nine reverb parameters are available: time, size, decay, diffusion, shape, spread, motion, pre-delay and depth. Control parameters vary depending on a preset's algorithm—i.e., a room algorithm's general parameter set offers time, size, diffusion and decay, while an inverse effect requires time, diffusion, pre-delay, motion and depth controls.

Breverb maintains a separate table of parameter values for each of the reverb's four master algorithms and their subsequently generated presets. You can properly "scale" a parameter's range to fit the selected algorithm/preset, automate and store parameter settings and then toggle between them (when changing presets) without overwriting the other parameter sets used for the other three algorithm/presets. This is ideal for comparing two different reverbs using the A and B select buttons, or shuttling sets of parameters between presets using the A-to-B and B-to-A functions. You can automate up to 133 parameters.

In Breverb, all parameters function independently of one another. One advantage of a reverb synth like Breverb over a convolution-based reverb is that in a reverb synth, all settings are completely malleable and free of any of the natural laws of physics. You can easily create room reverb sounds that are

impossible in the physical world; because the reverb time and room size parameters are not connected, very small spaces can have very long reverberation times. Imagine a closet with a near-infinite number of reflections or a concert hall the size of a bedroom. I love it!

Pre-delay is configured in milliseconds or in musical notation for synching to session tempo. The Regen control sets pre-delay feedback of the left/right input channels, Motion sets the speed of the pre-delay modulation and Depth sets the amount of modulation.

ADVANCED MODE

To conserve screen space, you can show/hide up to six additional faders under the row of knobs or on the plug-in's right side. These six faders default to the most often tweaked parameters but can be easily reconfigured to control and/or automate any of Breverb's 37 GUI controls.

All master controls and parameters are saved with each user-named preset, and all six advanced mode faders—plus the in/wet/dry controls—are accessible via an external MIDI controller.

BREVERB IN THE STUDIO

After installing the RTAS version on my quad-core Mac for my Pro Tools HD3 Accel system, I added Breverb to a session whose DSP resources were already maxed out and found no problems after Pro Tools reshuffled its DSP resources. In general, Breverb has a very present and bright sound, and, to be heard, does not add any appreciable level to the mix. After using it for a few weeks, I found that all of its presets cut through

with ease and added a polished sheen to my mixes.

I first try all new hardware and software reverbs on drums. Percussive drum sounds are broadband and short in duration, so it's easy to hear any "boinging" or noticeable decay-looping artifacts. I used a room preset called Guitar Studio on the snare drum in a 128 bpm R&B song, which already had five other reverbs and four delays coming in and out at certain moments as effects. Breverb worked perfectly for adding a little overall ambience to the track. The Guitar Studio preset also worked for the lead vocal.

On a rock song, I modified an inverse preset called Swept Arpeggio to thicken a snare sound. Inverse patches sound unnatural, so unless you're going for a big-hair '80s snare sound, a little goes a long way. Inverse also works well on lead vocals, where it adds stereo width and size without the long-tailed reverb of a plate or hall patch.

A room patch called Chamber 1 worked smoothly on a pop ballad, and I preferred adjusting pre-delay using musical notation over using milliseconds. Using the Regen function makes pre-delay more interesting and smooths out any vocal attacks that

can distract from the effect of an otherwise smooth-sounding reverb. I used the gate to ensure that the total hang time of the reverb's tail did not wash over the bar line of a chord change. Both the gate hold and release times are separately adjustable using musical notation—an extra-cool feature that gives you precise control rather than making you guess when the gate should shut.

One of the most beautiful plate presets is A Night In Sevilla. I used this on a fingerpicked acoustic guitar solo with great results. I could not get enough of this wonderful-sounding reverb! I used the master EQ to warm up the tone of the reverb slightly to better fit my track.

By greatly enlarging the size parameter of the Cello Drama Ambience plate preset while keeping the default time at 500 ms, I created a plate the size of a skyscraper with the decay time of a small room. This was amazing on an acoustic rhythm guitar, giving it a roomy sound that wasn't washed out in long reverb.

BREVERB FOR ALL
On a kick drum, I used a plate preset called Drums Up Front. I was going for a tight ambience on the kick because, by comparison

to the rest of the kit, it sounded much too present, close and dry. I dialed the time parameter down to 200 ms and made the size at 45 percent. As with all very tight ambiences, I carefully added just enough to hear the effect while solo'ing the kick drum tracks. I find on most software reverbs, the left and right output levels for supertight ambiences are never exactly matched, and I would like to see separate level controls for the left and right outputs in Breverb. There are pan pots for left/right inputs and outputs that change the panoramic positioning, but not the level.

I liked Breverb's separate algorithms, its presets, the well-thought-out GUI and, most of all, its superb sound. And this plug-in lets you easily accomplish everything you would do using the remote control of a large, expensive hardware reverb. If you are interested in building your reverberation sounds just as you would build the sound of your mixes, then Breverb is for you.

Overloud, dist. by Ilio. 800/747-4546, www.ilio.com. ∎

Barry Rudolph is an L.A.-based recording engineer/mixer. Visit www.barryrudolph .com.

Burgin McDaniel Komit Compressor

Dial in Subtle to Bone-Crushing Dynamic Control

In audio circles, Austin, Texas, is known for *Austin City Limits*, SXSW, Robert Rodriguez, Rupert Neve Designs and now Burgin McDaniel, a new startup with a great first product called Komit ($995). Don't let the faux-Soviet-styling distract you from Komit's main intention: to provide quality gain control ranging from "Is it on?" to a flat-line distorted crush reminiscent of John Lennon's vocal on "Revolution." The vertical unit fits into any API 500 Series rack or an old-style API console's EQ slot. Burgin McDaniel also offers Treehouse, a slick-looking wooden enclosure housing two units and a Link button to use the pair in any stereo application. I used a set both in and out of the box, and they worked well in both situations.

BOTTOMS UP

The Komit's solid construction features good switches, rotary pots and a thick faceplate. At first, it took me a second to figure out that Komit's signal flows from the bottom to the top. The hard-bypass switch starts it off, and above that is a cryptic-looking ratio knob. The ratio settings are depicted around the knob as a series of circle images; the first one is perfectly round (1:1), and then each successive circle becomes ever flatter and more compressed as you turn the knob clockwise. As the ratio increases, the output level remains constant, provided that the gain knob is set to unity. This level control allows you to add quite a lot of gain over unity and to feed (or *over*-feed) the limiter stage and output, providing a nice way to add some overdriven color to the signal. The limiter is a detented switch with 11 ceiling settings from +21 dBu down to -10, plus an off position. Envelope control comes in a three-position toggle offering quick attack/release (left), program-related and automatic (middle position) or slow attack/release (right).

At the top is the most useless part of Komit: the meter. One of my units had a faulty meter and I never missed it once: It provides more confidence than clarification. This unit is made for your ears. If you know what you're looking for, or if you're up for some fun sonic exploration, Komit can take you there and beyond.

FUN FACTOR

I ran the Komits on a variety of tracks with excellent results. My first application was on a pair of omni mics placed high and behind a drum kit. The Komits were set to a 2 o'clock ratio, and about the same on the limiter with a bit of gain added to the output for some mild distortion. Although the Komit provided a lot of compression, the kit's bottom end—at 100 Hz and below—was still quite full. When A/B'd with a pair of SSL 4000 Series channel compressors set to a comparable amount of compression, the difference was stark. The console's units, while sounding great, did not nearly have the bottom-end presence that the Komits left behind after they did their work.

Komit worked very well on both acoustic and electric guitars. By playing with the three-way attack/release control, I was able to nail down a very dynamic acoustic strummed guitar part without any pumping. On electric guitars, it was just the ticket to bring a pair of full-bodied, heel-of-the-palm-muted rhythm guitar tracks up in the mix while maintaining the full body of the parts at the low end. I also added some nice extra "hair" (aka, distortion) to these parts by adding some gain via the output gain knob.

Next, I put a Komit on a snare drum. Using the three-way attack/release toggle switch, I changed the envelope of the sound quite a bit. When I set the switch to fast, the snare was flattened in the mix. My favorite setting was auto; it lets the attack into the mix, which was then quickly clamped down, giving it a tasteful, slightly gated sound that brought out the snares. Even the slow attack/release setting worked well, giving me a third option that I could audition with the rest of the kit.

I was impressed with how Komit sound-

ed on bass. It brought out the instrument in the mix while leaving its bottom intact. I was also surprised at how easy it was to dial in some great sounds. With just a few clicks of the limiter, attack switch and gain knob, I had a nice variety of sounds with which to play. I was equally pleased when I inserted Komit on a vocal track. I was able to rein in the dynamics using a combination of medium compression and the limiter as a safety net, all with a slow attack/release—perfect.

No matter what I used it on, I couldn't help but crank up the gain, even with the compressor at 1:1, just to hear how the distortion bent the sound. Taking it to the limit(er) in this fashion was delicious.

COMMIT TO KOMIT

I usually start any review wearing my skeptic's hat, but Komit quickly won me over. From the first time I put it across a track, my "wow" button was pushed: I loved being able to A/B my input without the level changing. Out of the box, I accidentally had the pair of limiters set to -10 threshold, thinking the unit was off, and put Komit across a pair of drum room mics. While unusable in this particular track, the effect of crushing the kit flat to distortion was still beautiful and opened my mind to how far you can take this unit and still have it sound interesting. From there, I started having fun with Komit, playing with its presets, using compression with and without limiting, and vice versa—and all very quickly.

Keep your eye on Burgin McDaniel and check out Komit: It runs from tasteful to terrible, all with a great vibe.

Burgin McDaniel, 512/667-8573, www.burginmcdaniel.com.   ∎

Kevin Becka is Mix's technical editor.

World Radio History

GEORGE STRAIT
IN THE COUNTRY COMFORT ZONE

By Elianne Halbersberg

Strait Facts: George Strait has more Number One hit singles than any other recording artist. "I Saw God Today," the first single from his new (and 37th) album, *Troubadour*, marked his 56th Number One hit, and the disc debuted at Number One on the *Billboard* 200 chart. Strait has sold more than 67 million records, garnering 32 Platinum or multi-Platinum certifications, second only to Elvis Presley. On April 1, 2008, XM Radio launched a new channel, Strait Country, dedicated exclusively to his music.

Tony Brown and Chuck Ainlay, Nashville legends themselves, have been producing and engineering Strait's records since the 1992 soundtrack for *Pure Country*, in which he also starred. "I went to see George in Las Vegas," Brown recalls. "Jimmy Bowen was producing George at the time. I'm backstage with [Strait's longtime manager] Irv Woolsey, and holding court is Col. Tom Parker. He convinced George to do the movie. Then Bowen left Capitol, handed me the reins and Capitol gave me 'six weeks to prepare to fail.' As it turned out, the movie wasn't big in theaters, but it was a hit on cable and rentals, every song in the movie was on the album and it sold 6 or 7 million copies."

Ainlay, meanwhile, had been engineering for Bowen. "He kind of discovered me," the engineer explains. "I was doing all the rock 'n' roll stuff in town and he found me through The Castle studio. I started mixing 80 percent of what he was doing, a lot of records every year. He did the second George Strait album and I was involved with the following one, and since then I've been involved with every record George has done. Now, I record, overdub and mix; I take on the entire project. At that time, I did overdubs or mixing. I was also working with Tony, basically everything he did, and when he took over as George's producer, he brought me in. I recorded and mixed *Pure Country*. I've had a longstanding relationship with George, and he's one of the very few that are loyal to the people around him. He will not do a session if he can't get the people he wants."

After 15 albums, Brown says the relationship hasn't changed at all. "It's so easy with him," he says. "Cutting tracks is so much fun. The band is there; there's a lot of interaction; we get vocals, background vocals and overdubs done; but when you mix you discover what's really on the tracks, the subtle things. You scope out every musician's part, and George's vocals are always so good. He's a great singer, like Sinatra."

Troubadour, like its award-winning predecessor, *It Just Comes Natural*, was recorded in Key West, Fla., at Jimmy Buffett's Shrimp Boat Sound studio. Brown says the area is conducive to Strait's voice as—unlike in Nashville—allergies don't flare. And there's the setting: boardwalk, boats, pedestrians and bicycles. Band, artist and recording team could walk to and from the studio and their hotel and have meals together.

As producer, Brown's work with Strait begins a year in advance as they look for songs. "Then we meet the day before we start tracking and every morning before we track, and a lot of times we discover what the record will be right before we go in,"
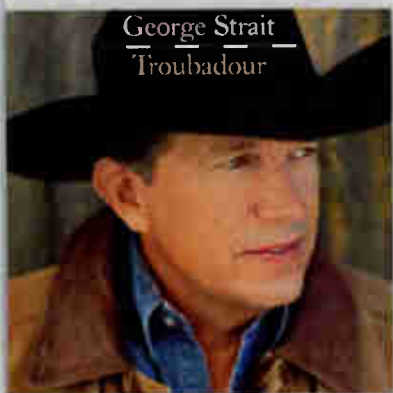
JOE SATRIANI
LESS IS MORE FOR VETERAN GUITAR HERO

By Heather Johnson

After more than two decades and a dozen studio albums, it's a challenge for any artist to continue to break new musical ground. But when you only have guitar, bass and drums to work with—no vocals, maybe a keyboard on occasion—the quest for innovation becomes even more important. One of the most skilled artists facing that predicament—world-renowned guitarist Joe Satriani—finds that he can present his ideas in a new way by delivering fewer of them.

His latest collection, *Professor Satchafunkilus and the Musterion of Rock*, released in April on Sony/BMG, contains an even 10 songs and clocks in just shy of 60 minutes. But within that compressed time-frame, funk, jazz, Middle Eastern and hard-rock music all get their due, while Satriani's knack for creating complex arrangements within a solid song structure remains intact.

"When you're making a record, you want to create a pleasurable listening experience from top to bottom," Satriani explains. "Instead of having 14 or 18 tracks that represent
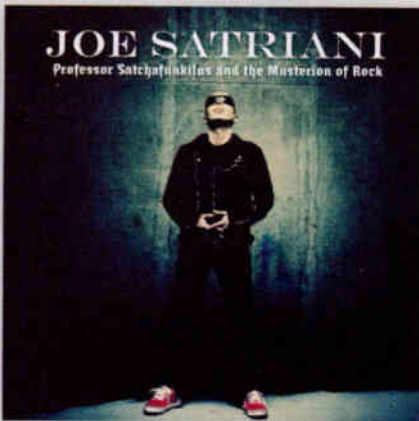
different creative paths, I decided to limit the ideas to just 10. This actually gave me license to go deeper into each new direction. So the song 'Professor Satchafunkilus' can be completely funky, syncopated and humorous, and can do it all the way, and 'Andalusia' can go all the way in another direction for seven minutes. So, thematically, I'm tightening up, but it's buying me a little more creative real

estate on the other side, which sets me free in the end."

Engineer and co-producer John Cuniberti, who has worked with Satriani for more than 20 years, had been rooting for the 10-song album for a while and was happy to see the concept to fruition. "Focusing down really allows you to create a theme and make a more interesting record," he says. "Especially with Joe, the listener gets overwhelmed. There's a lot of guitar, a lot of notes for somebody to digest. The statement can be made in 10 songs."

The process of writing, arranging and ultimately recording began in Satriani's home studio, a spaceship-like enclave containing a Pro Tools HD2 system running on an Apple G5, a set of Roland V-Drums, a couple of keyboards and, of course, a whole lot of guitar amps. "I started doing little bits of recording around '99," says Satriani. "It went from using Logic on a laptop to getting a fully dedicated Pro Tools system. The last three or four records have had quite a lot of material recorded right here in this room."

From his professionally tuned shuttle, Satriani recorded 16 or so demos, which he would later use during tracking sessions with drummer Jeff Campitelli and bassist Matt Bissonette. Satriani played drums when he was a teenager; he usually records drum patterns with the V-Drums into MIDI, creates a basic rhythm and then works out the guitar tracks. "He'll basically build up the entire arrangement and then edit those arrangements in Pro Tools," says Cuniberti. "Once that's done, he has a choice of attempting either

finished guitar parts or just using the demo guitars as a representation for later use. In the studio, there is a point where he, or we, decide which guitars we're going to keep from his demo sessions and which guitars we're going to replace."

Turns out about half of the guitar parts on the record came from those demo sessions, as well as *all* of the keyboard parts. Everything else was recorded at The Plant Studios in Sausalito, Calif., in the facility's historic Studio A, which offers a 1,200-square-foot tracking room with a circa 1972 sunburst pattern on the sidewall and a much newer SSL 9000 K sitting in the control room.

Campitelli and Bissonette played together, with a click track and Satriani's guitar demos in their headphone mix. Campitelli sat at one of three drum kits, each miked and ready to go at all times, with Bissonette facing him and Satriani observing in the control room.

"Joe doesn't like to give them a lot of direction," says Cuniberti. "We've learned over the years that it's better to hire good players and give them a lot of lead than rein them in if things aren't going in the direction you want them to go. If you start reining them in early on, you can almost feel the tension in the room, and that's the worst thing that can happen in a session. That said, there will always be *some* reining in because Joe already has a vision of what he wants."

Cuniberti recorded four to six passes each of drums and bass and comped them together afterward. "The stuff they play for Joe is very complex," he says. "Once they've

BROWNSVILLE STATION'S "SMOKIN' IN THE BOYS ROOM"

By Dan Daley

When it came out in late 1973, "Smokin' in the Boys Room" immediately became the rallying anthem for what was for many high school students their first act of rebellion against authority. And what better place to sing along between puffs on your Marlboro Red? The tiled walls of an institutional lavatory nicely approximate the generous portion of plate reverb that the record picked up when it was recorded at Media Sound on West 57th Street in New York City that fall.

In '73, the band Brownsville Station had just gone from a quartet to trio. The departure of the original bassist saw rhythm guitarist Michael Lutz take over the bass spot, and they quickly found a new balance. Lutz says the band rehearsed and gigged relentlessly in a concentrated swath of clubs and colleges between Chicago, Detroit and their base in Ann Arbor, Mich., that became, as he put it, "what Hamburg was for The Beatles."

They had formed at the end of the '60s outside of the politicized musical milieu of the Detroit/Ann Arbor scene, where bands like the revolutionary MC 5 and the psychedelic Früt of the Loom had kicked at the undercarriage of what passed for old-school culture then and at the pop sheen that was forming over Chicago (the city and the band). But Brownsville Station were still fans of the pre-revolution's music—old rock 'n' roll songs they played in clubs and parties; they weren't particularly distressed that the album that would become their biggest hit was mainly made up of cover songs, as long as they had a few of their own on there. Rock critic Lester Bangs, writing in *Rolling Stone* in 1972, when the band left Warner Bros and signed with Big Tree Records, said, "Brownsville didn't put on any badass streetpunk revolutionary airs. They were just kids from the duplexes of America, not the belly of the beast, and cared shit less about politix and just wanted to rock 'n' roll."

Switching to Big Tree was a turning point for the band. The label was owned by Doug Morris, a budding songwriter whose business instincts, honed by selling records out of the trunk of his car, were good enough to lead him eventually to the executive suite at Atlantic Records and other major labels. (He is currently the CEO of Universal Music.) Morris had assigned Eric Stevens, the son of a major Midwest record distributor that he worked with, to produce the band's first record on Big Tree, *A Night on the Town*, but wasn't happy with the results (something Bangs concurred with in his review: "…their new album ain't as good as their first one, which is mainly a production problem…"). So for the album *Yeah*, Morris entered the control room in Studio A as co-producer, along with his business partner, Dick Vanderbilt.

Drummer Henry "H-Bomb" Weck remembers how the recording process changed what had been a thrashing live band into more of a molded pop entity. "Brownsville was a hard-rockin' band live," he recalls. "I had to play hard and loud to compete against Marshall stacks with no micro-phones. Doug [Morris] was a great record producer but his background was Top 40, so he steered us toward a cleaner sound, nothing like our stage sound. His goal was to cut records that sold. And since he was also now a record executive, we had to work on his schedule, so we started recording at like 9 a.m. every day for that record."

For the sessions, which ran the better part of a week for the entire album, Weck was placed in what he refers to as a "drum cage," a carpeted fort of gobos to isolate the drums. He found it frustrating, especially after discovering that Media Sound was a converted church whose acoustics were being underutilized on this record.

For "Smokin'," Weck played a 1960s-vintage silver-sparkle Ludwig trap kit—a 22-inch kick, a snare, and two rack toms and a floor tom (12, 13 and 16 inches, respectively)—with a pair of Neumann U47 microphones overhead and Shure 57s closer to the kit. "I hit the drums so hard with those huge 3-S logs [drumsticks] that they usually kept the good mics off the snare and toms," he remembers. The song's intro had him playing a side stick, and the delayed reverb on it—the track's most noticeable effect—was created by tapping off an aux send to a Cooper Time Cube, which delayed the signal to the studio's EMT plate.

Engineer Michael Delugg recalls that he switched out the Sennheiser 421 microphones he often recorded drums with for Shure 57s after he heard Weck's heavy touch. "We got to 'Smokin'" early in the record," Delugg says. "I loved the song and the band and I kind of bonded further over it."

There were plenty of classic pieces of gear in the studio, from the 16-track Ampex multitrack deck and 24-fader Neve 8068 console the record was tracked on, to guitarist/vocalist Cub Koda's 1952 gold-top Gibson Les Paul (which, trying to make it match a rugby referee's shirt he liked, Koda and the band's road crew painted over with black and white stripes, causing them to cringe in retrospect).

Bassist Michael Lutz, who co-wrote "Smokin'" with Koda (who passed away in 2000), played a Heyner bass though a Dallas Arbiter fuzzbox and into the studio's Ampeg B-15

amp. Even with Weck in the drum fort, Lutz remembers that keeping the band together in the same room was important. "That's how we rehearsed and how we played," he says.

Staying tightly knit as a group also helped in their relationship with Morris, whom Lutz describes alternately as "astute" and "crazy." "He did have great ideas," he says, "but we realized that when we would argue with him, we were arguing not only with our producer, but also the president of our record label. It was a double-edged sword."

Fortunately, Morris left the band pretty much on their own for "Smokin'," a song that some say he cared so little for that he positioned it last on the album's B side rather than as a leading track, the usual position for singles. Delugg has a different recollection. "I think Doug saw that me and the band were having such a great time with it that he just let me have the reins on that one," he says.

"'Smokin'' is there because we were fighting to get some of our original songs on the record," says Lutz. "Aside from 'Smokin'' in the Boys Room' and 'All Night Long,' the rest of the tracks were covers, like 'Lightnin' Bar Blues' by Hoyt Axton. Doug picked good songs, but we wanted some of ours to be there, too—at least as B sides of a single so we could make some money." (It would be a DJ in Portland, Maine, that would play the track from the album and build momentum for "Smokin' in the Boys Room," prompting Morris to rush it out as a single.)

Like most recording sessions of the time, it all went down quickly. The basic track was nailed by the third take. Koda went out and cut both a harmonica and a guitar solo, and doubled both parts. "We pretty much put it together with Mickey Dee"—the band's nickname for Delugg, says Lutz. "Because Doug didn't really care about the song, we had more control over it." Delugg recorded three passes on the guitar solo, then submixed them to a single track, with a crossover from one to another in mid-solo.

Koda's lead vocal was sung into a Neumann 87 with a pad on it. "His microphone technique was pretty good; he just needed a little guidance about coming in on the spoken intro and leaning back on the choruses," says Delugg. "Then the rest of the band came in to sing on the choruses. The whole single, not counting the mix, took no more than two hours."

"It was recorded the same way it was written—fast, which is a good sign; it means we were comfortable with it," says Lutz. "We knew we had a good song, but we didn't expect it to blow up the way it did."

The mix, done up in Media Sound's remix room on the third floor, was also quick. Again, Morris set the tone according to his sales instinct. "Doug would not mix hard-left and -right," says Weck. "He was aiming for AM radio. It wasn't a mono mix, per se, but it was very down the middle. The solos, toms, cymbals and reverb are the only stereo things on the record. The snare, kick, bass and rhythm are straight up the middle. We did a lot of double-tracking, but it didn't wind up being used to widen the stereo image, but rather to beef up the sounds."

"Smokin' in the Boys Room" peaked at Number 3 in *Billboard* and Number 2 in *Cashbox* in 1974, earning the band its first Gold record and, according to Lutz, fueling a tour that saw them play 347 nights that year. The song would go on to have another incarnation, too. In June 1985, Motley Crüe recorded it on their multi-Platinum *Theater of Pain* album. It would be their first Top 40 single, peaking at Number 16 and spending 15 weeks on the U.S. charts. The cut is also on Crüe's three greatest-hits albums. But the original will always be Brownsville Station's claim to enduring fame. ■

GEORGE STRAIT

FROM PAGE 94

Brown says. "When I start a George Strait record, it becomes my life for two months. The relationship between producer and artist has to be very close. He trusts me. I call the musicians he likes, I get the engineer he wants, he cuts where he wants. George doesn't want to change anything and neither do I. It's a comfort zone that works for both of us."

It's common in Nashville for studio musicians to cut tracks while an artist is on the road, with the vocalist flying in during tour breaks. Strait, however, cuts on-site with the musicians. "We want the whole band there," says Brown. "They all play at once, and everyone inspires each other. It's magic. It's so much fun to watch them all playing. We usually cut in one week, everything except background vocals and strings. I bring it back to Nashville, work for a couple of weeks on his vocals, send them to him [in Texas] for approval, work on background vocals for four days, send those to him for approval, we mix for two weeks, he approves, we sequence the songs, master, he approves and we're done."

"We work really fast," Ainlay adds. "You have to be able to capture the first take because it happens so quickly. The musicians

recording notes

are on it from the first note and he's ready to go. He's in the moment and that's the best time to get him.

Working at Shrimp Boat Sound is a challenge because, as compared to Nashville studios, it's about the size of a postage stamp. "It's very, very confining," Ainlay describes. "The control room is on an irregular slope, the console is in the wrong place, there's very little isolation in the booth and not very good-sounding booths. It's so restrictive that we used the truck that brought the equipment to Key West as a booth and put all the guitar and steel amps along the wall of the panel truck, baffled off the amps in the truck and miked them closely.

"There's another small booth in the studio that I think was originally intended for drums," Ainlay continues. "There's no way it could sound good, so I put the drums on the floor, acoustic guitars in the room and we have had three musicians in that room at one time, and a small room with the fiddle player in it. The studio has one room and two small booths. George is in the small booth outside of the control room and he can see us and the musicians. The main room has a piano that we blanket heavily to keep the drums out of those mics; we have a synth, a B3, drums, and then the bass player and two electric guitar players are in the room. The bass we take direct, guitars in the truck, and that's the lineup. We have to turn all the air conditioners off because they're so noisy, so that gives the musicians incentive to get it on the first take! There's an office in the back of the control room where we put the upright bass, and the Leslie for the B3 is in the room with the copy machine. There are a lot of cables everywhere."

Working with Ainlay at Shrimp Boat and at Ainlay's Back Stage·studio at Sound Stage in Nashville was Jim Cooley, his assistant of six years. The two men and Brown used a plethora of gear to create the classic Strait sound: pristine, traditional and flawless. At Shrimp Boat, they relied on a Neve 8068 with sidecar "just to monitor channels 29 and up," says Ainlay. The Neve was used for toms and some guitars; also in use were discrete Neve modules: four 1081s and four 1073s. They used Martech MSS-10 mic pre's and eight channels of Sonic Lens mic pre-amps in beta form from UpState Audio. "Matt Lesko is the designer," says Ainlay, "and he hopes by next quarter to have a 2-channel version available."

Instruments were miked with DPAs. "[DPA president] Bruce Meyer sends $50,000 worth of mics for each album," says Ainlay. "We used them on piano, fiddle, acoustic guitar, overheads, snare and upright bass.

Bruce is such a George Strait fan that a number of years ago he sent me #001 of a mic that's never been used to have George sing through it, then he put it back in the vault!" Ainley also opted for a Shure 57 on snare and a large number of Audio-Technica mics: ATM25s and 35s on toms, top and bottom, snare; and an AT4051 on some acoustic guitar. "Besides Shure 57s, Audio-Technicas are the 'hammer' of the recording studio," Ainlay notes. "They always sound great, always work and never have any problems. I often use their 4060 tube mic. I love it on piano, but on George I used the DPA 4011s because I propped the piano lid open with a drumstick and blanketed it for best isolation. For vocals, Jimmy Buffett has an amazing Neumann U47 and it's George's mic of choice. George has his own U47, but he prefers this one."

Ainlay says that his heaviest EQ is on the drums, with his Neve module or Neve console. He used an Avalon 2055 on the piano and a Tube-Tech CL 1A compressor for Strait's vocal, but "it wasn't used much." He also relied on the Millennia TD-1 direct recording channel mic pre/EQ all-in-one for bass and the ADL 1000 compressor on bass and fiddle. He uses a Nuendo hard disk system with 48 channels of Apogee DA-16X converters at 24/96, maintained through the mix. He mixed down to tape on an ATR Services custom-built 1-inch 2-track at 15 ips without noise reduction.

At Back Stage in Nashville, Ainlay used a Neve SSL 9000 J, ATC 300 monitors, KRK E8 monitors for tracking and ADAM S3A monitors on Primacoustic Recoil Stabilizers. "The KRKs get plenty loud, have a great low end and seem to be nearly impossible to blow up," he says, "although George is notorious for having a fun playback party at the end of every recording session, and we punished those speakers so much that the desk cap popped off one of the woofers!" The Recoil Stabilizers, he adds, "are such an improvement in low-end definition that I disconnected my subwoofer and haven't hooked it up since. They custom-built these stabilizers for horizontal cabinets."

Strait is the antithesis of Nashville's star-making machinery, but his success speaks for itself. He does almost no interviews, eschews political and social statements in his songs, hates making videos, doesn't experiment with his sound and hasn't changed his look since releasing his debut album. "He's such a good guy," says Brown. "He's a cowboy, a family man, a recording artist, and he keeps the bar high with the songs he cuts. As far as the whole artist-relations thing, I know it frustrates the label at times because George does everything wrong—but it works!" ∎

JOE SATRIANI

played a song five times, they're pretty much done." Bissonette plays direct through a Millennia Media TD-1 direct box. Once the guitar parts are finished, Cuniberti uses his Reamp interface to get "the lively action of a bass guitar amp. A lot of the music needs some growl from the bass," he says.

The three drum kits Campitelli used include a small '60s-style kit set up in an iso booth, which they used for the title track. "We wanted a very close, dry, '70s dead drum booth sound," says Cuniberti. "No ambience, just dirty and funky." He miked this kit with classics such as a Sony C37 and Electro-Voice RE20. A larger "John Bonham" kit, set up in the middle of the room, was miked using a technique mastered by legendary producer/ engineer Glyn Johns: "One of the overhead mics is directly over the drummer's head, pointed down toward the rack tom and snare. The other mic is placed near the floor tom, pointing at the snare. They're panned hard-left and -right so you get a nice stereo spread of the drums." A kick and snare mic were then blended into the mix. A third kit, Campitelli's touring kit, was miked using Neumann KM54s for the overheads, an AKG D-12 for bass drum, a Beyer M201 for toms, and a Shure SM57 for snare drum top and bottom. All of the drums ran through Neve 1073 or Great River mic pre's before hitting the Pro Tools HD system at 24/96.

And what about those famous guitars, which included Ibanez JS1200, JS1000 and JS2PRM electrics (his signature line), a Bruce Sexauer FT-14 acoustic and a 1948 Martin 000-21? For the demo recordings, Satriani used either a Palmer or Marshall SE100 speaker simulator paired with one of his many guitar amps, including those from his signature Peavey JSX Series. In the studio, he played into either a CAD D189 or an SM57. For clean guitar parts and acoustic guitar, he used a KM54.

The expertise of Satriani's current studio team, as well as their history together (Cuniberti and Campitelli have worked with Satriani since the late 1970s; Bissonette since 1992) helped the sessions flow with few glitches, but not without surprises. For one, Satriani didn't expect quite so much of his demo work to end up on the final product. "Once we went from 16 to 12 to 11 to 10 songs, it became easier to see how these tracks didn't need to be replaced," Satriani says. "I was also pleasantly surprised that Matt, Jeff and John came up with ideas that I wouldn't have thought of. Jeff changed the idea of what to play on 'Professor Satchafunkilus,' and there are other

songs where John would come in and really make it happen with where he would put the drums, how he would record them and what parts of the kit he would tweak."

Satriani and crew spent three weeks mixing at The Plant, where Cuniberti bypassed the SSL altogether to mix exclusively "in the box." After three weeks, they moved to his home studio, affectionately dubbed Digital Therapy Labs, which offers a Pro Tools HD3 system and enough plug-ins to allow him to use the same techniques as he would during a traditional mix session.

"I haven't changed the way I mix," he says. "I use the Waves API bundle for most of the EQ, the Altiverb reverbs—with those I can get my EMT plates, my echo chambers, my halls—and various compressors depending on what's called for. All of that is bused to a Neve 8-in/2-out summing box I built and then to an SSL stereo compressor. Joe and I have grown up with Neve, API and SSL consoles, so we couldn't divorce ourselves from them."

For the three-piece instrumentals, Cuniberti referred to such three-piece classics such as The Who's *Live at Leeds* and Cream's *Live Cream* to determine how best to pan solo guitar-bass-drums. "They would pan the bass and guitar apart, which is fairly unconventional in modern music," Cuniberti says. "So I went in and started pulling stuff apart, and Joe immediately got a huge smile on his face, and said, 'That's it.'"

Cuniberti, who until recently operated Plant Mastering out of The Plant Studios, turned over the final mixes to Bernie Grundman for mastering. "Almost everything I've learned about mastering I've learned from Bernie," he says. "It was a natural choice for me to go to him, and it's fun for me to watch him work. I don't question anything he does, although I'm always curious to read his notes!"

Professor Satchafunkilus and the Musterion of Rock hit retail not long after the 20th-anniversary edition of *Surfing With the Alien*, Satriani's groundbreaking second album and the second of many solo albums that he and Cuniberti would have created together. Their relationship works even as they challenge each other's creative boundaries. "He pulls no punches and doesn't hold back," says Satriani of his engineering partner. "He says exactly what he's feeling, he's not afraid to change his mind and he's not afraid to change mine. And, of course, his engineering skills and his ears are amazing, and I've depended on that for two decades now. He makes me feel relaxed and confident, but we never seem to lose that edge where we push each other to do things better." ■

COAST

by Bud Scoppa

"The people I admire most had the guts to do this kind of record," says Jakob Dylan with quiet intensity. As he talks about his first solo album—the stark, resolutely acoustic *Seeing Things*—it's readily apparent the 38-year-old leader of The Wallflowers has had an epiphany. "This record was really about *not* having the process be part of the studio environment, but just recording performances and have that emptiness

Jakob Dylan strikes a philosophical pose in Rick Rubin's studio.

become the character sound of the recording," he explains. "The idea of exploring sonics, what instrumentation to use, what mic to use—that stuff was not gonna be allowed. The only points of discussion would be, is that a good performance and could the song itself be better?"

Dylan first addressed the central theme of *Seeing Things*—the unease of contemporary existence, but couched in timeless melodies and language—on The Wallflowers' latest album, *Rebel, Sweetheart* in 2005, but he now feels that the expert but dense production of Brendan O'Brien (Bruce Springsteen, Stone Temple Pilots) obscured the intent of the material. "This time I didn't want to get lost in the quagmire of sonics," he says, "because if it was gonna achieve what I was hoping for, with the songs being all there really was to discuss, anything else was gonna be a distraction."

That accounts for the nakedness of

Seeing Things, which contains little more than Dylan's close-miked voice and a pair of fingerpicked acoustic guitars. This is an eloquently simple, stunningly immediate record. On the vivid evidence of this album, there's no longer any question that the father did indeed pass on the gift to the son, even if the younger Dylan has taken until now to reveal it in its pure state.

Fortuitously, Dylan and his band switched labels from Interscope to Columbia (coincidentally his dad's home for most of the past five decades) just before producer Rick Rubin took the top creative post at the company, uniting the artist with the creator of Johnny Cash's celebrated *American Recordings* series, as well as Neil Diamond's similarly unadorned *12 Songs*. "Once I started discussing it with Rick," says Jake, "his quick response was, 'Cool, let's go do that.'"

Seeing Things was recorded at Rubin's West Hollywood home studio by Jason Lader, who shares Dylan's enthusiasm for capturing the moment, despite his extensive experience in the digital realm of pop music. (Gwen Stefani, Maroon 5 and Justin Timberlake are in his discography.) But the New York native began his audio education with 2-inch tape, and his varied experiences during the six years he's worked with Rubin—on projects ranging from Jay-Z's *Black Album* to the Red Hot Chili Peppers' *Stadium Arcadium*, and more pertinently the two Diamond projects—have gradually led him back to the organic side of recording. He's particularly gratified by his recent experiences co-producing an album project for Elvis Costello & The Imposters and producing the second solo LP for Rilo Kiley's Jenny Lewis.

"More and more of the work I've been doing lately has been dealing with live

by Peter Cooper

There are manuals, for sure. And aspiring producers can follow directions in learning to tune vocals, set compression ratios and manage signal chains. So from there, it's plug and play, right?

"You can't plug and play," says Steve Fishell, a Grammy-winning producer who has helmed sessions for Emmylou Harris, Little Richard, The Mavericks, Patty Griffin, Radney Foster, Pam Tillis, Gretchen Wilson and a slew of others. "There's no 'how-to' video at YouTube that explains how to handle it when an artist tells you they have a headache and don't feel like singing. Or what to do when a track is going down that is absolutely not happening and the feel is wrong."

And so Fishell has founded MPI (www.musicpi.com), which stands for Music Producers Institute and which strives to offer up several years' worth of stories, psychology and common sense in four days of study. The first session takes place June 17 to 20, 2008. It's a post-graduate course of sorts, where students convene at the Sound Emporium and walk through a recording session, from conception to mastering. Fishell's choice to work in a large, storied recording space was not incidental.

"Even with the proliferation of software and in a world where the earbud is a standard way for people to listen to things, people still crave music," Fishell says. "I think we need to keep focused on the importance of great audio. Even when a smaller budget makes it necessary to record much of a project, including vocals and overdubs, in a living room, there is nothing like tracking in a professional room like the Sound Emporium."

The Emporium's Studio B is large enough for Fishell's monthly class, which is designed for up to 10 participants, to gather around the Trident Series 80-B console, witness tracking sessions and ask questions. The recording space is 20x22 feet, with a high cathedral ceiling that allows experimentation with natural room reverb. Fishell produced Pam Tillis' Number One hit "Mi Vida Loca" in that room.

NEW YORK METRO

by David Weiss

PHOTO BRANDON RALPH

Mood lighting enhances the musical atmosphere at The Rumor Mill.

At MPI, there is discussion of what microphones to use in what situations, but Fishell's main interest is in conveying big-picture issues.

"This is about producing, and so 70 percent of it is not really technical," Fishell explains. "It's about artist psychology. It's about pre-production, arranging and what to do when the artist is having difficulty in the vocal booth. It's about how you know when the mix is finished, and it's about the importance of mastering. It's how to make in-roads, and how to make a productive pitch, and how to deal with A&R staffs. The information isn't genre-specific. I've been in the studio with Little Richard, Bill Monroe, Mavis Staples and Earl Scruggs, and with any of these people, you speak to them, find out what will make them most comfortable and whatever that is, you get it for them. Little Richard wanted to hear himself through a speaker, not headphones, when he was singing. No problem. Bill Monroe didn't want to hear anything except acoustic guitar and his duet partner, Pam Tillis', voice. Makes sense. Why? Because it's Bill Monroe."

Fishell is a steel and electric guitar player who was an integral part of Emmylou Harris' Hot Band in the 1980s. In that capacity, he watched up close as Harris and producer —CONTINUED ON PAGE 104

Producer/MPI founder Steve Fishell with former bandmate Emmylou Harris

Many of the world's great studios are meticulously designed with the latest that acoustical science and architecture has to offer—and sometimes studios just seem to design themselves.

Case in point: The Rumor Mill on Manhattan's Lower East Side is a mind-blowing, private musical environment that must be experienced to be understood. A cavernous 10,000-square-foot space with 50-foot ceilings, the facility was founded by multi-instrumentalist J. Ralph in 2001 to support his adventures in music for film, TV, commercials and, most importantly, wholly uninhibited audio explorations of The Third Kind.

Once you step into the main chamber of this ex-vaudeville theater from the turn of the last century, there's no going back: You have teleported to a land that time forgot, discreetly wired to record any and all sounds you might make into either Pro Tools HD or Ralph's vintage tape machines. "There's a tremendous focus on lighting, with a very definitive concept and layout," says Ralph. "There are pools of light everywhere, with more focused light for writing and playing different instruments. We have a cast-iron J. W. Fisk aquarium from 1840, lots of couches, oddities from around the world and countless instruments from every decade of music, including Duke Ellington's Bluthner piano. There are things that will trigger your eyes or your ears so that you want to embrace, watch, touch and play everything."

Although the space has been conducive to recording original music for such clients as Toyota,

PHOTO PETER COOPER

Nike, Coca-Cola and Volkswagen; the recent award-winning documentary *Man on Wire*; and much more, Ralph maintains that he is much more interested in The Rumor Mill's role as an incubator for exciting new artists and orchestral recordings. "For me, the biggest enjoyment is recording sound, whether it's a fishtank, a voice, footsteps or an orchestra," he says.

Although the inspiring hangar-like room itself is unquestionably Ralph's most valued piece of equipment, he has worked some other key pieces of gear into the space. "We have rare reverbs like the AKG BX-20; microphones like the RCA 44 BXs, the Neumann KM 64s and Telefunken U47; and the original BCM10 from Bearsville. We have API outboard, an RCA BA-6A limiting amplifier, which is crucial, a lot of the Purple Audio stuff, but the main things we're using are the Neve 1073s, the AKG 414 TLIIs and the U47. We also use Digidesign D-Verb: It's so gritty and full of character. The Vienna Symphonic Orchestral Library is essential to most things we write and produce.

"I work on everything with my partner, Arthur Pingrey. We have been playing together for over 10 years and we each bring something different to a recording. We also have a long-standing relationship with Bob Power, who is one of the most musical and —CONTINUED ON PAGE 104

World Radio History

MIELE FINDS A HOME AT FUDGE
ENGINEER JOINS BETTER THAN EZRA'S STUDIO

This Katrina story has a happy ending. New Orleans–born engineer Jack Miele, his wife, two dogs and a studio full of gear were displaced when waters rose to within an inch of the lowest rack in Miele's home-based Green Sound Studios. Miele and family relied on the kindness of friends until their house repairs were done, and Miele temporarily set up shop in the existing Truckfarm Studios, where Miele worked on projects with Dr. John and Grammy-winning producer John Chelew (Blind Boys of Alabama).

Then, about six months ago, Miele moved his gear again to what he hopes will be a permanent home: Better Than Ezra's Fudge Studios (www.fudgerecordingstudio.com). "It used to be the band's private studio, and it was owned by Kevin [Griffin], the lead singer," Miele explains, "but he moved to L.A., so [bandmember] Tom [Drummond], Kenny Corbett and I bought the building, and made the studio commercially available."

Miele enjoys the increased space at Fudge, as well as what he describes as a time-tested floor plan. "The entire place is built off the model of the Abbey Road B room," he says. "There's a big room with 20-foot ceilings, and the control room is on the second floor with a giant window that looks down into the big room. There's also a vocal booth underneath the staircase."

The control room centers around a modified Gamble HC-40 console, Pro Tools HD2, an Otari MTR-90 MkII, and Mackie HR824 and NS-10 main monitors. At press time, the owners had nearly completed a similarly equipped Control Room B, which also provides access to an ideally situated outdoor patio. "There's a staircase with a hatch, where you can go up to the roof patio, which has iron work all around and a barbeque grill," Miele says. "It's a great place to hang out because we're right at the corner of St. Charles and Terpsichore, and during Mardi Gras the parade passes right in front of the studio."

Since joining Fudge, Miele has had the opportunity to work with Ani DiFranco and director Jonathan Frakes (voice-over for *The Family Guy*) and,

Ani DiFranco with members of New Orleans' Rebirth Orchestra and engineer Jack Miele (front, far right). This photo was taken from the staircase that rises from Fudge's tracking room to the control room.

of course, Better Than Ezra, as well as numerous local artists. "Today I have a session with Shane Theriot," he says. "He's a great guitar player for the Neville Brothers, LeAnn Rimes and Boz Scaggs, and he's working on a solo record. We've also had Mars Volta in, working with their own engineer, Lars Stalfors. But one of the things Tom gets me most excited about is going out and finding young bands, bringing them in and producing them. It's great to work in a place where there's so much interest in young talent. We're trying to help the next generation come alive." ∎

FAB 40TH
"SGT. PEPPER" ANNIVERSARY

To mark the 40th anniversary of the making of The Beatles' iconic *Sgt. Pepper's Lonely Heart's Club Band* album, none other than Geoff Emerick is recording a complete remake; each track is from a different band. Here, Emerick is pictured working on a Cheap Trick track with assistance from Jim Beeman at Big3 Studios (St. Petersberg, Fla.).

Geoff Emerick (seated) is assisted by Jim Beeman

SPECTRUM'S SILVER
25 YEARS AND COUNTING

Jim Kalamasz is celebrating his Spectrum Recording Studios' (Miami) 25th anniversary this year, and '08 has been a very strong year for the facility. Hilary McRae (left) recorded her successful debut, *Through These Walls*, with producer/engineer/musician Zach Ziskin. McRae is the first developing artist to sign to Starbucks' HearMusic label.

Hilary McRae at Spectrum Studios

RAHN GOES ALL OUT
ERIC DARIUS AT LITTERBOX

Engineer/producer Darren Rahn

Darren Rahn recorded and produced a new album by alto sax player Eric Darius at The LitterBox in Denver. Rahn used a Studio Projects T3 mic to capture Darius' instrument. The album, *Goin' All Out*, is due out this summer on Blue Note Records.

TRAIN SESSIONS
CHIARELLI AT CAPITOL

From left: Paul Buckmaster, Rob Chiarelli, Steve Churchyard and Chandler Bridges

Rob Chiarelli produced the tracks "Someday" and "Always Midnight" for Pat Monihan and Train in Capitol Studios A and B (Hollywood) in April. Steve Churchyard engineered the sessions, which included drummer Vinnie Collaiuta, piano player Derek Nakamoto, and a string section arranged and conducted by Paul Buckmaster.

SOUTHEAST

Producer **Tony Visconti** worked on a release by **Anti-Flag** and Alejandro Escovedo at **St. Claire Studios** (Lexington, KY). **Mario McNulty** engineered both projects... At **OMG Studios** (Greenville, SC), the **Williams Riley Band** tracked with producer **Noel Golden** and engineer **Marcus Suarez**.

NORTHEAST

At **Barking Doctor Studio** (Mt. Kisco, NY), **Mick Guzauski** mixed **Michael McDonald**'s *Soul Speak* and **Griffith Frank**'s debut release for Geffen Records...Producer **Steve Cropper** and engineer **Steve Greenwell** mixed **Guy Sebastian**'s *The Memphis Album* at stevestudio (NYC)...At **Concrete Jungle Studios** (Toronto, ON), engineer **Vic Florencia** mixed a duet of **Olivia Newton-John** and **Cliff Richard**...Also in Toronto, **Ludacris** worked with producer/multi-instrumentalist **Rich Nice** at **Cherry Beach (Toronto, ON)**, producing and recording tracks for the album *Theater of the Mind*...At **Avatar (NYC)**, **R.E.M.** self-produced live recordings in Studio G. **Brett Eliason** engineered and **Justin Gerrish** assisted. Also in G, **Weezer** worked with producer **Rick Rubin**, engineer **Rich Costey** and assistant Gerrish... **George Walker Petit** engineered and mixed tracks for **Paul Carlon**'s second CD in **Legacy Studio** A with assistance from engineer **Kevin Porter**.

MIDWEST

Star Off Machine spent three months tracking in Studio A at **Catamount Recording** (Cedar Falls, IA), tracking and mixing their debut album with producer/engineer **Tom Tatman** and assistant engineer **Travis Huisman**...**Superfly TNT** tracked and mixed an upcoming albuum with engineer/producer **Brad McGrath** at **Brick City Sound** (Chicago).

NORTHWEST

At **Studio D Recording** (Sausalito, CA), the **Magic Christian** finished their new album, *Evolver*, with production by studio owner **Joel Jaffe** and **Cyril Jordan**...At **Laughing Tiger Studios** (San Rafael, CA), **Latoya London** tracked vocals for an upcoming **Prince Damons** release, with Damons producing and **Rick Vargas** engineering. **Nicci Nix** recorded background vocals with producer/engineer **Ari Rios**.

Seated: studio co-owner Brian Coombes (L), assistant engineer Joe Pierog. Standing, L-R: guitarist Tony Rombolo, singer Whitfield Crane, studio co-owner/engineer David Pierog, drummer Shannon Larkin, bassist Robbie Merrill, guitarist Lee Richards.

ROCKING HORSE STUDIO OPENS
ANOTHER ANIMAL TRACKS IN NEW SPACE

Rocking Horse Studio (Pittsfield, N.H.), a brand-new facility designed by Michael Blackmer, hosted sessions with Universal Republic Records artists Another Animal. The tracks were produced by the band and engineered by studio co-owners Brian Coombes and David Pierog.

Rocking Horse features Brazilian koa hardwood floors, birch panel and masonry walls, and 22-foot cathedral ceilings. Equipment includes a Trident Series 80B console; ADAM, Genelec and Yamaha monitors; and an extensive selection of outboard gear, and vintage and new mics.

SOUTHERN CALIFORNIA

At **The Village** (West L.A.), **Hal Willner** produced tracks for a follow-up to his 2006 *Rogue's Gallery* collection of "Pirate Ballads, Sea Songs and Chanteys." **Ghian Wright** engineered the sessions, which included vocals by **Johnny Depp**...In addition to the **Elvis Costello** sessions mentioned in this month's "L.A. Grapevine" (produced by Costello with **Jason Lader**, engineered by Lader), **Sound City Studios** (Van Nuys) hosted **Nine Inch Nails** with producer/engineer **Alan Moulder** and assistant engineer **Josh Smith**; and **Jenny Lewis** recorded and mixed a solo project with Lader engineering and Smith assisting...**Mick Guzauski** remixed **Return to Forever** at **Mad Hatter Studios** (L.A.)... Engineer **Ryan Hewitt** mixed **Buddy Guy** recordings at **Alchemy Sound** (Venice). Hewitt also visited **Sage and Sound** (Hollywood) to record **The Automatic**, and recorded **The Eulogies** at **The Pass** (Hollywood). Also at The Pass, engineer **Brandon Mason** recorded and mixed **The Zutons**...**Jason Schweitzer** mixed an alternate version of "Love in This Club" for **Usher**, featuring **Young Jeezy**, at **The Record Plant** (Hollywood). ∎

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performance," says Lader. "We did the Elvis Costello record in six days because it was 100-percent live. I've been to the other ex-.e—I made my living for three or four editing drums and tuning vocals. It's great for me to be doing the exact opposite. We actually did Jenny's and Elvis' albums to analog tape and we never left the analog realm, which was awesome. We recorded Jake's record to Pro Tools, but it was treated the same way. It was simply about getting a great feeling and a great performance."

Lader ran Pro Tools through Rubin's Neve 8088 board, which was originally housed at Muscle Shoals Sound Studio. He recorded Dylan's vocal with a Shure SM7 through the board's preamp, an old UA 1176.

"I find singers feel really comfortable with that mic," he says, "because as soon as you put one of those big, shiny tube mics in front of them, they feel like they're in a studio. There's something about the black Shure that puts them at ease, and they sound really great. That's all I used on the Elvis' and Jenny's records. Jake's voice has such a unique quality to it. If the songs and lyrics are good, and if the artist can perform, then it's easy." He miked the guitars with Neumann KM84s using UREI LA-2As, with minimal EQ. The only comping involved full sections—a verse from one take, a chorus from another—in the old-school analog manner. It was as simple as that.

After five Wallflowers albums, the three more recent employing modern technology, it appears Dylan is going in a new direction—I should say an *old* direction—and it'll be intriguing to see what transpires with the band's next project. "What appears to be your advantage in the studios now is deceiving," he says, "because they allow you to do anything that you can imagine, but all that really does is lead you down a path that gets further away from just playing music."

Lader agrees: "I think digital technology has had a negative impact on music in a lot of ways," he says. "I think people have ken it way too far. People I've worked have had me do all this stuff to fix eving and make it perfect. But then you look at what they listen to, or what they like, and it's *not* perfect. With Jakob's record, because of the live nature of things and bleeds, we were forced to leave things that you'd normally want to make better, and you actually grow to love those moments when something's a little out of tune or one note's off; those are the things that give a record personality." ■

Brian Ahern worked in the studio, noting the ways that Ahern and Harris communicated, solved problems and wound up with recorded performances that are now legendary. In 1986, he and Howie Epstein (then bass man for Tom Petty's Heartbreakers) worked up some demos on a country/rockabilly singer named Rosie Flores. The demos won Flores a contract with Reprise and earned Fishell a shot at producing major-label records. When Fishell exited Harris' band, she smiled, and said, "Go forth and do country." He's done that and more, producing albums by Indigenous, Albert Lee and others.

Fishell intends the monthly Music Producers Institute programs to offer as much to aspiring rock, pop and R&B producers as to the country-minded set. To that end, he's bringing in numerous guest speakers, including producer/engineer David Leonard (Prince, Rush, kd lang). "I asked David, 'Would you talk about your vocal chain, from the microphone to the hard drive?'" Fishell says. "He said, 'Of course, I have absolutely no secrets."

Other guest speakers at MPI will include engineer Chuck Ainlay, producer/guitarist Buddy Miller, mastering engineer Andrew Mendelson and producers Jay Joyce, Frank Rogers and Ray Kennedy. Dave Sinko, who has worked on projects with Delbert McClinton, Sam Bush, Trisha Yearwood and many others, serves as chief engineer.

"We're conducting sessions with a full band, and we're walking through the recording process, from setup to tracking to vocals—with a microphone shootout—to overdubs to comping vocals," Fishell says. "And then we'll mix and master the recording. Students see exactly what happens to a song in a world-class recording environment. It's five years of knowledge in four days. And they learn from the mistakes I've made.

"I began working in the studio around 1980, but didn't start feeling comfortable until years after that," Fishell continues. "It took me some time to feel like I was actually a producer. For the students, I want to tear down that wall of intimidation. The recording studio can make people nervous, but really it's just a tool. Once you feel you have something to offer musically, you shouldn't let that tool get in the way. Embrace it, and let it be your friend. If engineering isn't for you, find a great engineer. If it is, then learn all you can about great audio.

"Gut instinct is something that we discuss. So often, it's best to go with what your senses tell you." ■

talented producers on Earth."

"Surrounded by all kinds of instruments, an arsenal of vintage recording equipment and thousands of records, you can really feel the history," Ralph says. "It's sensory overload, but with love and welcoming, and it's so freeing that you're left with just your own thoughts and infinite possibilities."

Meanwhile just off of Fifth Avenue in a townhouse on the Teen Streets is a much smaller room called Candyland with an equally expansive sense of freedom. The founder/studio designer is an ultra-elite trumpet player named Michael Leonhart (www.myspace.com/michaelleonhart).

The product of a musical family, Leonhart was a Grammy Award–winner at age 17 and was performing and recording with Steely Dan in his early 20s. Now he spends a big chunk of his time in this apartment with 15-foot-high ceilings, a skylight and a location on a quiet but central Manhattan block that manages to feel far away from it all.

Candyland offers its own opportunities for recording that is as clean, dirty or experimental as you want to be, an outlook that's readily apparent on his latest release, *Hotel Music*, out on iTunes and 200 limited-edition hand-painted vinyl sleeves. "I said early on that I'm not going to do what's out of my range—my strength will be knowing what my weaknesses are and embracing that," says Leonhart, who readily acknowledges that recording a full drum kit is not going to happen in this residential hideaway with standard-issue walls. "So after a Steely Dan tour, I got a pair of Mackie HR 824 near-field monitors, a Neumann U87 and a Universal Audio M-610 tube preamp, and I started chipping away."

In addition to the songwriters, instrumental specialists and vocalists who work with Leonhart, the star of Candyland is the instruments and effects that line every inch of the walls and floors. "It's a collection that gets loved and used," says Leonhart. "There are 17 guitars, eight basses, one sitar, one electric sitar and 60 pedals. I have nine file cabinets divided into categories like toy instruments and serious percussion, an alligator glockenspiel, a bass melodica on loan from Donald Fagen, an MPC 3000 and two Wurlitzers that aren't even mine but they sort of live here.

"A studio designer friend of mine came in, and said, 'It's funny, but with all these instruments on the wall, you've created a nice sense of diffusion.' Actually, part of it comes from laziness and that I never tried to clean it up. The other part of it is, don't do it unless you're really going to do it 100 percent." ■

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dbx DriveRack PA

Mastering the System Controller

The DriveRack has become one of dbx's most popular processors, leading to a series of rackmount processors. The DriveRack PA is a complete system processor that can replace a rack full of gear. It incorporates a variety of system processor functions for live sound system control, which include versatile crossovers, 28-band graphic EQ, feedback elimination, stereo multiband parametric EQ, output limiting, auto-EQ with 28-band RTA and a signal generator.

START ME UP

The DriveRack PA can be powered up in a program of your choice. To set the "Initial Program," press and hold Program while

ROOM TWEAKING

When using the auto-EQ function, try different locations in the room for the measurement mic and (if possible) the loudspeakers. DriveRack PA can automatically shoot the room with pink noise, analyze the frequency characteristics of the speaker/room combination and then apply a compensating EQ curve. But DriveRack is unable to detect whether you've placed your mic (or speakers) in an area of the room where there is acoustic interference. Areas where sound-wave reflections meet and cancel each other out are called nodes. Room locations where sound waves meet and combine are called anti-node. And with poor room geometry, it's possible for a particular

sound because you've reduced the amount of phase-shift created by the filters and lowered the noise floor.

TIME IS ON YOUR SIDE

DriveRack PA has an alignment delay on each crossover output, which is useful for several purposes. One is to compensate for drivers within a loudspeaker that are not time-aligned to each other. (This can happen when the woofer's voice coil sits farther back in the cabinet than that of the HF horn.) Adding a small delay (say, a half-millisecond) to the horn can acoustically align it to the woofer output. Similarly, there are venues where full-range boxes may be flown above the stage while the subs are ground-stacked

turning the power on. The LCD will show the message "Use Wheel to Change Restart Program Number." Use the data wheel to scroll through the various program presets until you find the one desired for start-up. Then press Program again, and DriveRack PA will always boot to that program.

SAFE AND SECURE

To keep snoopers with overactive fingers from making unwanted changes to system parameters, you can set a security lockout. Pressing and holding Wizard while powering up provides access to the security function. One of two possible messages will appear: "System unlocked; all user input will be accepted," or "System locked; no user input will be accepted." Turn the data wheel to select Lock, Unlock or Filter Unlocked. Pressing Prev Page will change the unit's lock status. Pressing any other button exits the lockout function and the unit will start up in the normal manner. In some situations, you may want to leave the feedback filters unlocked so they can easily be cleared. In that case, follow the same procedure but use the data wheel to select "Feedback Filter Unlock."

low frequency to completely disappear at a node, creating a dead spot. A low frequency at an anti-node can be amplified by as much as 6 to 9dB higher than in other areas of the room, creating a hot spot.

The DriveRack PA's auto-EQ function cannot identify nodes and anti-nodes, so to compensate it may try to boost or cut a frequency drastically. If you listen from the mic's position and don't hear a change in frequency response while manually adjusting a particular frequency band, then the mic is probably sitting in a node or anti-node. To get around this problem, move the mic (or speaker) position and try the auto-EQ process again.

If you notice that the auto-EQ function boosts or cuts several adjacent frequency bands, you may need to adjust the crossover output containing those bands. For example, auto-EQ is applying cuts at 315, 400, 630, 800, 1,000 and 1,250 Hz. This might mean the level of the midrange output from the crossover is too high. Pull it down by a few dB and re-shoot the room. You may find that auto-EQ applies less equalization, which can result in a better

in front of the stage. At the listening position, the difference in arrival time from the sub can be different from that of the full-range box. Adding a bit of delay to the subs (try 1 ms per foot) can solve this problem.

Another use for the alignment delay is to delay the *entire* P.A. system to the backline. This is especially useful in smaller venues where a lot of stage sound spills into the audience. This spill will hit the listener after the sound from the P.A. system, which is usually located far downstage. Delaying the P.A. so that it hits the listener at the same time as the sound from the backline will result in a tighter mix due to decreased phase interference. Also, the overall bass response will be reinforced when the onstage bass rig is "in time" with the P.A. As a guide, delay the main outs of the DriveRack by 1 ms for every foot between the backline and the main speaker cabinets. This technique may not yield dramatic results on large outdoor stages. ∎

In addition to being Mix's *sound reinforcement editor, Steve La Cerra is the front-of-house engineer for Blue Öyster Cult.*

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Reason #6   The sound / audio quality - Rich, open, transparent. Let your ears give it a try.

So whether you are just starting out, adding channels or upgrading the system, you'll have good reason to try out Lynx Aurora converters.

STUDIO TECHNOLOGY

To see the entire list, please go to **http://www.lynxstudio.com/10reasons.**

electric keys

universal vintage electric keyboard instrument

Electric Keys puts a slice of music history at your fingertips with the most complete collection of classic and vintage electric keyboard instruments ever assembled. This massive 40GB sound library includes over 20,000 expertly crafted 24-bit 96 kHz multi-samples of legendary electric pianos, electric organs, clavinets, Wurlitzers, tape samplers, string machines, keyboard basses and other rare and exotic electric keyboard instruments. Recreate the riffs you know so well from your favorite rock, pop, funk and jazz recordings of the last four decades, or create your own unique, yet distinctly classic sound. Electric Keys turns your Mac or PC into the ultimate vintage electric keyboard instrument.

50 instruments spanning 40 years

- 40GB sound library with 20,000+ samples of classic, rare and exotic electric keyboards spanning 40 years.

- Includes classic instruments heard on countless hit recordings, plus rare models offered as a VI for the first time.

- Pristine 24-bit 96 kHz multisamples carefully recorded, assembled and customized for each instrument.

Separate multi-effects rack

- Eight simultaneous effects, including: Amp simulation, Filter, Phaser, Flanger, Chorus, UVinyl™, Delay and Reverb.

- Separate FX presets allow thousands of FX/instrument combinations.

A consummate virtual instrument

- AU, MAS, RTAS, VST, DXi, Stand-alone.

- Beautifully rendered, authentic look.

- UVI Engine for superb sound quality.

- Factory and user combi presets for unlimited layers and textures.

- Disk streaming for fast preset loading.

- 256-note polyphony and low latency.

- MIDI Learn for hands-on control.

- MachFive compatible for unified operation with other libraries.

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