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On the Cover: Back row, from left, Glenn Miller, director of buildings and grounds; Kevin Stansberry, principal; Dr. Larrie Reynolds, superintendent; Anthony Gianforaro, principal architect. Front row, from left, producer/acoustician Tony Bongiovi and producer/audio consultant Ronald Saint Germain. All surround the new API Vision at Mount Olive High School in New Jersey.

Photo: Matt Peyton.

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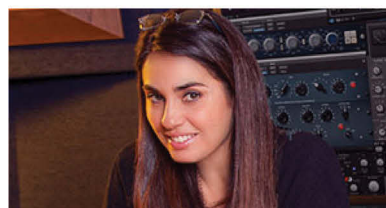
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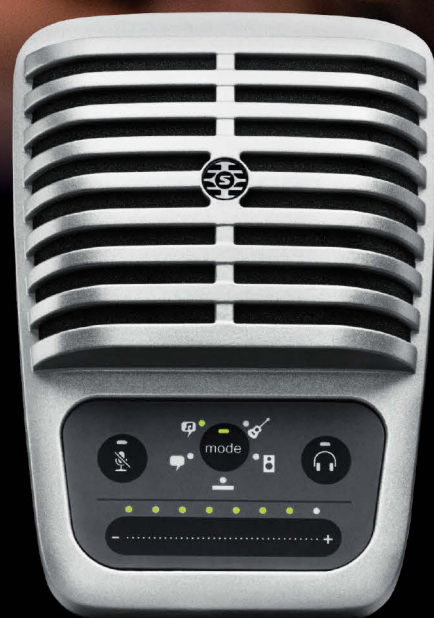
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From the Editor

I REMEMBER HIGH SCHOOL

In the winters, I arrived at school at about 6:30 a.m. for morning swim practice. After a quick cinnamon toast breakfast, first period was band, where my baritone horn and I were seated on the back riser between the trombones and tubas. Then it was English, physics, trigonometry, history—all the standard classes for a college-bound young man in small-town Indiana. For electives, I took French, ceramics and in the one nod to technology, I took a computer class in conjunction with the local college where my dad taught. Our programs were on punch cards. It was a great four years.

Flash-forward 35 years, and I find myself walking the halls of Mount Olive High School in Mount Olive, N.J., with Principal Kevin Stansberry, a gentle and well-respected educator in a line-backer's body. He took me to the 1,500-seat auditorium to show off the new LED wall for the stage. We swung by a few of the many rooms and labs devoted to robotics, where the students develop projects for national competition. We went through machine rooms old and new; not audio machine rooms, but more like metal shop on steroids if you, too, remember high school.

We went through the all-new Marauders Innovation Learning Lab, where students design, build and manufacture projects making use of the 37 3D printers in-house. We went into the closed-circuit hi-def television production studios, complete with green screen, editing facilities and sets. And we finally ended up in the brand-new recording studio, a replica of the world-famous Power Station Studio A with an API Vision console at its center.

But they didn't just model Power Station's footprint and materials. After the school had made plans and received drawings to build out a large, unused, two-story space, they brought in renowned audio producer/engineer Ron Saint Germain, who lives nearby, to serve as an audio consultant and help steer the project so that it matched the quality of the school's other endeavors. Saint Germain, in turn, went right to the source and called longtime friend and Power Station founder Tony Bongiovi. The result?

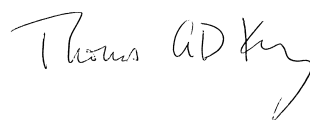
A studio that any professional would be thrilled to work in. And it's all for teenagers.

Remember, this is a public high school. There's no funny money involved. No magnet-school funds or charter-school grants. This is simply a school district that under the leadership of Superintendent of Schools Dr. Larrie Reynolds has made a commitment to technology in education. In a very big way.

Music, while being an art form, is also steeped in science, Reynolds believes emphatically. And the sound engineer plays a crucial role in any performance. As a superintendent, his goal is to prepare young minds. He doesn't expect that most of the students in the new Rock and Roll Academy will go on to be superstar performers, but he has no doubts that his students will be behind the scenes on Broadway, in Hollywood and in music-making studios around the world some day. His job, he feels, is to prepare a young mind for whatever comes their way. The background in music and recording, he says, will serve them well whether they are an engineer, a lawyer or a social worker. The method is what matters.

Yes, Mount Olive High in 2016 is a far cry from Rensselaer Central back in 1977-81. But then again, teenagers entering high school in 2016 are light-years more advanced technologically than I was back in the day. You can make beats on an iPhone or pick up a synth for a hundred bucks. It's part of the everyday world. And now, for those at Mount Olive, you can even put your stamp on a recording during lunch hour.

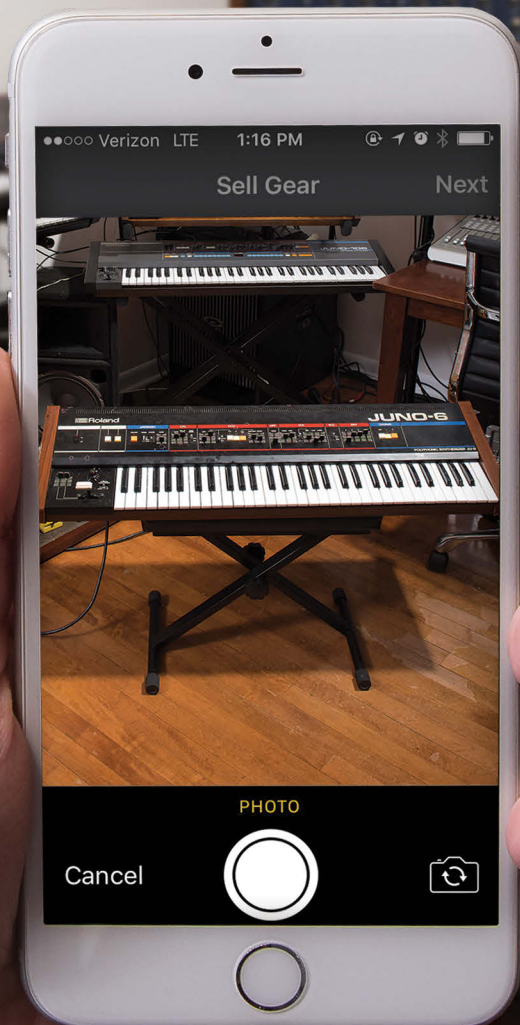
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Tom Kenny
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Technology Developer and Teacher Saul Walker to Be Honored at NYU Event



The life and professional legacy of the late API co-founder Saul Walker will be honored at a celebration to be held at 10:30 a.m. on Sunday, February 12, 2017, at New York University's Kimmel Center for University Life.

Walker, who passed away in October 2016, was revered in the audio community as the developer of API's 500 Series plug-in modular equipment system of portable "lunch box" and rackmount equipment. The first module in the series, his 550A Equalizer has served as an industry gold standard for more than 40 years.

He also pioneered the application of op-amp technology in audio system design. Walker's 2520 all-discrete op-amp provides a +30 dBm clip level (10 times the power of most audio ICs) and continues to be the mainstay of API's product line, including his 512 Microphone

Preamp and 560 Graphic EQ.

Walker began his career working for the U.S. Navy, as a developer of military electronics and rocket telemetry. In 1990, he joined Otari, where he engineered film-production consoles for facilities including Sony, Skywalker, and Universal. Late in his career, he became an adjunct professor at NYU in 2006; he taught electronics to undergraduate and graduate music technology students, who benefited from the vast knowledge he accumulated as a technology developer.

Walker's legacy carries on in his students, and through the products he designed, which have been used by broadcast TV networks; professional and private music recording and mixing studios, and even The White House.

All are welcome at the celebration of Walker's life at NYU. For more about his career, visit mixonline.com.



API 550A Equalizer



JBL Celebrates 70 Years

At this year's NAMM show, monitor developer JBL marks its 70th anniversary—definitely cause for celebration.

In its October issue, our sister publication *Electronic Musician* asked

JBL's director of technology, Mark Gander, to explain what he feels is the source of the company's long-term success: "Making innovative loudspeaker products that fulfill specific customer needs: The standard set by James B. Lansing was to push the envelope, to create the highest-performing products that delivered the finest sonic performance," Gander said.

"The transducer components, the 'engines' that drive the loudspeaker system, can be mated to different horn waveguides and other electroacoustic devices, and put into many different system configurations. The resulting systems can be specifically configured to provide the tools for each individual market customer type and application."

Watch for our feature story on JBL's technology and history in the March issue of *Mix* magazine.

Lectrosonics to Receive 2017 Academy Award for Technical Achievement



At a ceremony to be held February 11, 2017, the Academy of Motion Picture Arts and Sciences will present its Technical Achievement Award to

engineer/developers David Thomas, Lawrence E. Fisher and David Bundy for their work on the company's Digital Hybrid Wireless System.

A statement issued by the Academy recognizes that Lectrosonics has furthered "the state of wireless microphone technology by developing a method to digitally transmit full-range audio over a conventional analog FM radio link, reducing transmitter size, and increasing power efficiency."

"These three engineers have made significant contributions to location sound, enhancing the movie experience," says Gordon Moore, CTS, president of Lectrosonics.

The Technical Achievement Awards are unique in that they do not necessarily honor achievements that occurred during the past year; they're designed to show appreciation for generally significant technical contributions to the process of filmmaking.

Lectrosonics, based in Rio Rancho, N.M., has been developing wireless microphone technology since the company's inception in 1971. Parts of the Technical Achievement Award ceremony, which will be held at the Beverly Wilshire Hotel (Beverly Hills, Calif.), will be included in the Oscar® telecast on ABC-TV on February 26, 2017.



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On the Cover

Story by Tom Kenny // Photos by Matt Peyton Photography

MOUNT OLIVE HIGH SCHOOL, NEW JERSEY



Rock and Roll Academy students come together at lunch to jam in the multipurpose studio space. Note the JBL playback on the walls, and seating for roughly 200 people.

There's a nationally recognized robotics department, with associated old-style and new-style machine rooms and electronics stations. There's a high-def television station that rivals a network suite, and has been used by Fox Sports in the past. There's an all-new Innovation wing, based around "The Maker's Space" and 37 3D printers. An upcoming submersible control system. A full orchestra plays before a stage-long LED screen in the perfor-

mance hall. There's a high-def television station that's been used by Fox Sports when they needed space. And now there's a world-class recording studio, modeled after the control room in the famous Power Station Studio A and featuring an API Vision console.

And this is all part of a public high school in New Jersey! Not a magnet school, not a charter school. Simply Mount Olive High School, home of the Marauders.

By nearly all accounts, Dr. Larrie Reynolds,

superintendent of schools, has been the driving force in the growth at Mount Olive High School. He arrived 10 years ago after leaving a company he founded that provided after-school programming and services nationwide for grades K-12. He rides a motorcycle, plays keyboards in two rock bands, and would be a contender in any national competition for Coolest Superintendent.

In 2006 Reynolds sold his company and relocated from Dallas to New Jersey. He could have

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retired, but he believes earnestly in developing young minds for a better future, and he believes firmly that academia must adapt to modern life.

"The future is becoming dedicated to the cultivation of science," he says. "Typically we think of science as biology and chemistry and such. But the science of the future is of a different type. There's robotics, the idea of flying drones, underwater submersibles, and working with sounds and lights. Not too many schools even do this. That's why we invested in the LED screen for our stage, and it's why we invested in the finest sound recording equipment. We want students to be ready for whatever they want to do when they leave high school.

"The idea of artistic expression is really promoted by the technical expertise of the professionals who produce it," he continues. "I've had the opportunity to play music in various venues. Whether or not I have a good night depends on the sound. If I don't get the right mix in my monitors, it changes how I perform. Even though music is considered an art, there's a lot of science to it. A lot of that comes in behind the scenes, where an engineer can make it sound terrific, through effects and balance and clarity. It's both an art and a science."

A couple years ago, with the robotics department in place and humming along, Reynolds and Mount Olive High School Principal Kevin Stansberry looked at a large performance space at one end of the school that had lain dormant for the past decade or so. It had a relatively large footprint, with a height of roughly 50 feet. Split into two floors, it would come to house The Maker Space, or Marauder Innovation Learning Lab, with the 3D printers on the top floor, and a recording studio control room and multipurpose space (it would serve as both a studio and host the wrestling team) on the bottom.

Anthony Gianforcaro of Gianforcaro Architects, Engineers & Planners was the architect of record for the project and had drawn up plans to split the space in two. "The first challenge was to design the new floor above without having columns in the middle of the room below," he says. "The span was quite large and therefore we had to use substantial-size steel to support the new concrete floor above. The other challenge was to design the performance area to withstand wrestling. We used a real wood floor and brick half walls to surround the area."

"We used cloth seats, carpeting in the seating areas, and acoustic panels on the walls in the seating area to dampen the sound," he adds. "The fireproofing on the steel above was left exposed, which also



Stephen Thompson, Rock and Roll Academy Teacher, with senior Charles Jandura.



Brian Carlstrom, left, a junior, and senior Azalia Whitlock



Senior David Palacios on guitar



Junior Gabriel Vasquez on the drums

helped slightly to dampen the sound in the performance area. The geometry of the room was someone set by the space we had to work with. We were able to create a 'theater in the round'-type area for the performers."

But he had never built a professional recording studio. In October 2015, through friends of friends at a local church, where Reynolds led the choir and played in the band, producer/engineer Ron Saint Germain's name was offered up as a local guy who knew a thing or two about recording studios. He was brought in to consult, less than two months before the project would go out to bid, meeting the team for the first time around a conference table. He looked at the plans and noticed problems right away. He also noticed that they would be entirely in-the-box, no console. Then they took him to the raw, empty space.

"The live room was going to be what the live room was going to be," Saint Germain explains. "The studio itself is totally workable. The seating in the U shape allows you to host some 200 people comfortably, and you still have a huge performance space. And once I saw the space where the control room would be, I immediately thought of Power Station Studio A. The footprint was perfect, and we could drop it right in. The only real modification we ended up making was that we put the two iso booths off the control room, as the studio space was fixed."

So Saint Germain approached the founder of the world-famous Power Station Studios (now named Avatar), Tony Bongiovi, whom he had known for some 40 years, and asked if he would like to sell his plans and be involved. He did.

"I was in disbelief when I first walked into the building," Bongiovi recalls. "This is a high school! With video production, robotics and a real sophisticated design approach. Larrie wanted the same thing for audio, and we brought him the control room that has hosted more hits than any other facility in the world."

Saint Germain and Bongiovi brought the architects to New York and walked through Avatar to give them an idea of the design tolerances and specifics. After a lot of back and forth, they built it, on isolation springs, wall-within-

wall construction, and doors that open in, rather than out—the little things that make a difference.

"It's a smaller control room on purpose," Bongiovi says. "We originally built it in 1977 to handle the SPL of a 15-inch speaker, with a .25-second decay time. We put in the slotted absorbers to deal with low frequencies, and we made the acoustics work while maintaining a perceived symme-

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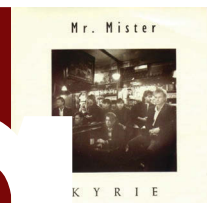


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MR. MISTER'S "KYRIE"

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Photo: Karen Hill

NATHAN EAST

Longtime Sideman Follows Grammy-Nominated Solo Debut With *Reverence*

By Barbara Schultz

Since the early 1980s, Nathan East has been a go-to session bassist for Quincy Jones, Eric Clapton, Phil Collins, Stevie Wonder, Daft Punk and so many others, thanks not only to his immense creative talent but also to his uplifting approach. By all accounts, East is one of the warmest and most focused guys you could ask for in the studio.

When, at long last, East decided to make a solo album, he paid tribute to many of his long-term musical friendships with new arrangements of

favorite songs from others' albums and tours on which he's played. Several top artists in his acquaintance, such as Clapton, Sara Bareilles and Michael McDonald, contributed to *Nathan East* (Yamaha Entertainment, 2014), which was nominated for the Best Contemporary Instrumental Album Grammy in 2015.

East and his co-producer Chris Gero also called upon some of East's fellow session aces to form the core band on *Nathan East*: Drummers Vinny Colaiuta and Ricky Lawson; guitarists including Paul Jackson, Jr., Michael Thompson

and Chuck Loeb; and keyboardists David Paich, Jeff Babko, Tim Carmon, and others. Many of the same musicians appear on *Reverence* (Yamaha), East's new solo release.

"On the first record, one of the things we did that I was happy about was, we over-recorded," East says. "We recorded 25 songs, where 12 or 13 got selected [for the first album], and we had two or three gems left that we still wanted to finish."

Another longtime friend of East, engineer Moogie Canazio, worked on both albums; he came in partway through the process on *Nathan*

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East, but on *Reverence*, he recorded nearly all of the tracks and mixed every song. Most of the basic tracking on *Reverence* was done live in United Recording Studios; Ocean Way is also credited on the album because the timeline of this project spans the ownership and name change of the studio.

"That's the studio I probably have the most history in, in L.A.," East says. "I've been logging hours there since the '80s with Phil Collins, Eric Clapton, Lionel Ritchie. Fourplay [the jazz quartet East plays in] did our first record in there. So when I walk in, it's like going home."

"We tracked in Studio B, with the 8068 console with the Neve 31102 preamp/EQs, which is my favorite," Canazio adds.

Canazio recorded the band to Pro Tools 12 at 96k/24-bit. His general approach involves setting up multiple signals for each instrument, allowing for choices or blending during the mix. For example, on drums, he uses three pairs of overhead mics: AKG C12s and 452s, and Coles 4038s.

"One is lush, one is contemporary, and the third is a balance. Obviously, I only use one pair at a time when I'm mixing, but I might change the overhead when I get to the chorus or back to the verse," the engineer explains. "If I need a little more energy into the verse, then the



L-R: Engineer Moogie Canazio, co-producer Chris Gero, and Nathan East in Canazio's Move Studio

4038s might speak a little more."

For East's Yamaha BBNE2 bass guitar, Canazio sets up three inputs: On the artist's TC Electronic Blacksmith amp, a Sennheiser 421 and a Neumann U47 FET. The third signal comes from a Radial Firefly direct box.

"I place [the mics] as close as possible, slightly off-axis of the speaker," Canazio says. "In Nathan's case, the challenge was that I have to keep his bass pumping in the [band] tracking, but I also have to

make room for his bass solos without clogging up everything. Having three sources, I could tailor it without changing the tone. In some cases, I would use all the mics, and in certain cases I would bring down the DI to get a mellower sound."

One of the magical moments at United Recording occurred when East's basses needed emergency repairs. "I sent down to Yamaha, and they turned them around in a few hours," East says. "When they brought them back, I was testing out new strings, new everything, and they were working, but it was kind of like, 'Wait, what's that? Well, it's a new song.'"

Almost accidentally, while test-playing his repaired instruments, East hit on a musical idea that became the final track on the album, "Until We Meet Again." The entire arrangement is realized by East with a gentle, emotional

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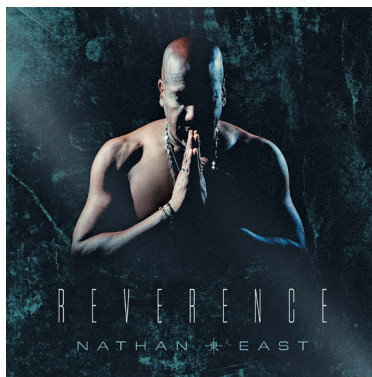
lead electric bass and a fretless rhythm part: just another facet to his wonderfully musical playing.

In addition to the performances captured in United by the core group—which, the second time around included Teddy Campbell, on drums, David Delhomme and Tom Keane on keyboards—East, Gero and Canazio did some tracking in NRG in L.A. They also traveled to Houston to record Yolanda Adams' powerhouse lead vocal on the single "Feels Like Home" in Wire Road Studios. And they traveled to Nashville: They captured additional guest and background vocals in Franklin at Yamaha's studio, and they recorded The Nashville Orchestra at Ocean Way.

"This was my first time going to Nashville to work, and I was so impressed" Canazio says. "Ocean Way is a perfect balance of everything you want to hear in a big room and they made me feel so welcome."

Canazio mixed a couple of tracks from *Reverence* in Nashville's The Tracking Room, and in L.A. in his personal facility, Move Studio, which is equipped with his Pro Tools 8 rig and an arsenal of analog outboard gear. It was during the mix that the engineer put the final touches on an older song that he and East had resurrected for this album: Earth, Wind & Fire's "Serpentine Fire."

"Twenty-five years ago, my brother [keyboardist] Marcel and I had a project called Two Faces of East that we wanted to start up. That was one



of the songs we recorded for that project," explains East. The brothers were so busy that the project lost momentum, and they set aside their recordings, including a mix that Canazio had recorded made of Nathan and Marcel East with Eric Clapton and Phil Collins of "Serpentine Fire."

"They had cut those tracks at [Fisher Lane] Farm in England in 1992," Canazio says. "They brought the tapes to L.A. and called me to join them—I think in 1994. At that time, we recorded vocals and horns,

and I mixed the song. But then it sat in a drawer for more than 20 years."

Canazio rediscovered the song when he was searching for another tape in his archives, and he played it for East and Gero; the producers were instantly keen to do something even cooler with it for *Reverence*. They asked EW&F members Philip Bailey (vocals), Ralph Johnson (percussion) and Verdine White (bass) to play on the track. "That was a great suggestion from Chris Gero," East says.

"And while the work was in progress, secretly, I went into the original 'Serpentine Fire,'" says Canazio. "I got a CD and I transferred it, trying to find places where I can use [the late] Maurice White's vocal parts. I didn't want to tell anyone at first, because I didn't know if we were going to use it. When I played it for Gero and Nathan, they were on the floor because Maurice is one of our biggest idols and working with him, even 'unilaterally' was a big treat for us." ■

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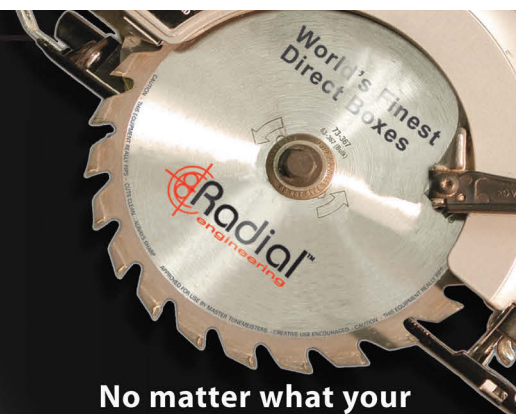
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ROSE COUSINS AND NATURAL CONCLUSION

The beauty of Rose Cousins' new album, *Natural Conclusion*, is practically on a Joni Mitchell level. She's a poetic and precise yet fearless artist with exceptional talent, and the L.A.-based production team of Joe Henry and Ryan Freeland have brought out her best on *Natural Conclusion*.

Recorded live to Pro Tools in Noble Street Studios, Toronto, the project put the Californians through the challenges of international travel with audio gear, but yielded great rewards:

"It's a great studio with great gear, but I brought some ribbon mics because a lot of places don't have many ribbon mics," Freeland says. "For TSA people who don't know, they look strange on X-rays, and I always get stopped, but it's worth it to me to have them."

Freeland took along a pair each of AEA N8 and N22s. For Cousins' voice, he put up a Neumann M49 and one of the N22s. The other N22 was used on acoustic guitar. The N8s served as room mics. All of his inputs went through the studio's collection of outboard Neve and API mic preamps.

"We basically did everything in one big room, but you end up doing



Photo: Mitch Fillman

fixes from alternate takes—sometimes you take the whole band, or sometimes just the piano and vocal. At one point we were re-jiggering upright bass parts. Some fixes are really tricky and you have to be really creative when you have bleed, but that's part of the fun for me. bleed, but that's part of the fun for me. It's always best to let me know if there's something in the take you wished were better. I can usually come up with a solution and, after all, recording is forever." —Barbara Schultz

ENTRANCE'S BOOK OF CHANGES

"As a musician who gets to write and play the music and sing and produce the album, there are so many artforms that go into it," reflects Guy Blakeslee, whose project Entrance releases the album *Book of Changes* this month. "It's an all-encompassing art project, and at the heart of it all, I'm a writer. But it's important to realize: The thing that makes you a writer is that you write."

Blakeslee's musical ideas flow easily for him, but he says that pleasing lyrics are hard-won. So, he employs a daily writing method popularized by Julia Cameron in her book *The Artist's Way*. He writes three pages "automatically" every day—pen to paper till three sheets are full.

"A lot of the lyrics, phrases, rhymes and even whole songs came from that, and it helped me to allow words to come out without me judging them before they could become something," Blakeslee says.

In the songs on *Changes*, Blakeslee's plaintive vocal is at the center of a delicate web of rock instruments and orchestrations. Ten lush songs were recorded piece by piece in more than 11 studios, while Blakeslee toured or switched between his L.A. and London residences. He plays almost every part himself, though he enlisted help from "real" drummers (Derek James, and Will Scott from Wolfmother), as well as strings and horn players, and female backing vocalists.

The studio that saw the most action was engineer Stefan Lirakis'



Photo: Amanda Charchian

Guy Blakeslee, aka Entrance

Ultrasound studio in L.A. "He created the studio and built a lot of the instruments," says Blakeslee. "It's a sprawling warehouse space overflowing with cool gadgets and has a real open feel to the room; a lot of the great drum sounds I got are from there."

"Every place we went had different gear, different instruments, different microphones," Blakeslee says. "So David Vandervelde, who mixed most of the record, helped take everything from these different places and made it sound cohesive. We mixed in Pro Tools at New Monkey Studios [Van Nuys, Calif.], which was started by ElliottSmith. David's mix was the glue that held everything together." —Barbara Schultz

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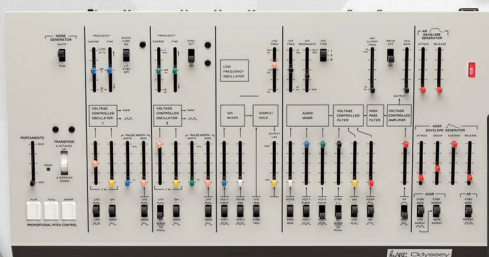
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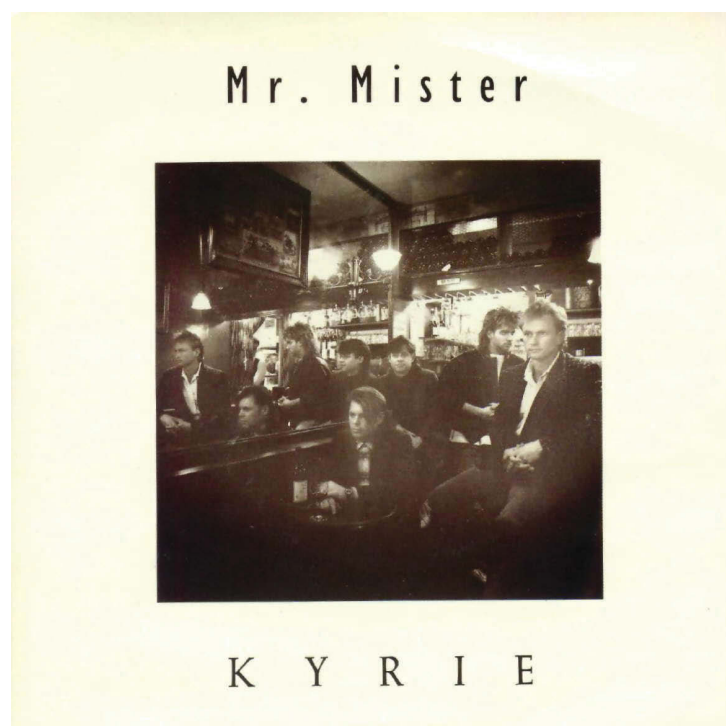
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Classic Tracks

By Robyn Flans



"KYRIE" Mr. Mister

A quintessential representation of its time is Mr. Mister's synthesizer-propelled "Kyrie" which hit Number One on *Billboard's* Hot 100 chart in March of 1986, and remained there for two weeks. With lyrics written by band outsider John Lang and music by members Richard Page and Steve George, the track also charted at Number One on the Mainstream Rock Songs chart, and was a Number 3 Adult Contemporary song as well.

However, Page recalls that he wasn't initially very keen on the idea of the name of the song. "I figured we'd be pigeonholed as a Christian band and I didn't think that's what we needed at the time, but John kept saying, 'It works so well with the melody,'" Page says. "We got into the studio and I was still sort of against it, [but] by the time we finished most of the track, there was no turning back."

Page says that the synthesizer revolution was in full swing at the time when they made "Kyrie" and the bandmembers were like kids at Christmas with their new toys. "There were a lot of new technologies happening, a lot of new synths, like polyphonic synths just started to come out. It was like, 'This is so much fun, you can program this and it will play it back and you can play something over it.' It was mind-boggling. We never really thought how we were going to reproduce it live," Page says with a laugh.

The band, which included Page, Steve George, Steve Ferris and Pat Mastelotto, cut "Kyrie" at Ocean Way Recording (Hollywood), moving between Studios A and B, and co-producing with producer/engineer Paul De Villiers. They found De Villiers through their friend singer-songwriter Marc Jordan; the bandmembers visited De Villiers in Irvine, where he was mixing concert sound for Yes, and they asked him to co-produce and record them. That was the beginning of their creative relationship.

De Villiers remembers that when he first heard "Kyrie," he thought it was complete, but he felt it could be even stronger. He set about fleshing it out on the API board in Ocean Way Studio A, and he says studio owner Allen Sides often came around to help out.

The band first attempted to track "Kyrie" entirely live, but the team felt the performance was unsuccessful, so they decided to create the song part by part, yet endeavor to make it sound live; this is the objective that De Villiers kept throughout the entire process.

"When you could sync everything up, there was a power to perfect time that none of us had ever experienced," De Villiers says. "Pat worked everything up on his beat box and then he said, 'Here are the parts.' We overdubbed all the drums independently and built up the tracks very slowly. We overdubbed the cymbals separately."

The first element they had going on was the sequenced bass line they recorded with a click. "That was on a Prophet-5 I think, which was the big synth at the time. I had just gotten one and I was so taken by it," Page says. "We laid that down and we came up with the long intro which was Steve's thing, and I did that roboto 'Kyrie' over the top. [Then] the drums—some of it was triggered, some of it was played—and guitars."

"Paul loved his AMS digital delays and reverbs," Page continues. "He had some other gadgets that kind of defined the sound and what we were doing and he used them wisely. He had some ideas about how things might be voiced."

De Villiers says his affinity for AMS came from Peter Gabriel, and Sides had beautiful compressors; he probably used some LA-2As and old Teletronix equipment. "Not much reverb, because we used the rooms so much," De Villiers says.

Page says the vocals took the longest because it was just him and George singing, and De Villiers was multitracking them in a most unique and methodical fashion. De Villiers recorded them singing together through an AKG C12 several times sans effects. A process was devised to simulate a choir, inspired by bands like Queen and Yes.

De Villiers placed X's on the ground to mark where people would be in a 30-piece choir and the duo would sing from different locations, moving from X to X.

"There would maybe be five in the front and six behind [in an actual choir]; it narrows down and a lot of weight is in the middle. I [used]

one microphone, and every take was done with that in mind,” De Villiers recalls. “I didn’t have to pan things. It took a lot of tracks and a lot of bouncing. Steve and Rich would do a track and I would say, ‘Great, move to the next X.’ ‘Great, next one.’ ‘Great, next X.’ The last one was about 20 feet away from the mic. The mic stayed in the same [place], so it was as if each individual person in the choir came out and stood in their place and sang, and then we put it all together.”

The single ends on an a cappella vocal and the album ends with a fade-out. Page explains that this was a radio-related decision.

“We had just been through this with ‘Broken Wings,’ which was well over five minutes. Everyone said no [radio stations] would play it if they saw that [it was longer than] five minutes. We tried to edit it, but we couldn’t figure out an edit. Finally one of us just said, ‘Just write four-thirty-something on the box and nobody will ever know,’ and nobody ever did,” Page says. “When the same thing came up in ‘Kyrie,’ we thought, why don’t we just drop everything out and have an a cappella ending, and it was very dramatic.”

Page says De Villiers got a really cool sound with Mastelotto’s drums... “for the time.”

Mastelotto recalls that, for him, work on the song began on a day off at the Miyako Hotel in San Francisco when he took his Linn Drum machine and a cassette of the song that Page and George had given him up to his room. His bandmates had asked if he could find something better than the samba-ish groove they had come up with.

“When I heard the melody, I instantly heard it as a Zeppelin/John Bonham, a little bit slower, thing,” Mastelotto says. “I got the tempo and chunky feel it’s in and made a little drum beat for them. The little a cappella breaks and the way the ending happens were my ideas because I had worked so much with Mike Chapman and Peter Coleman, and they had done things like ‘Heartbreaker’ and ‘Hot Child in the City,’ so I knew how much radio loved those little vocal breaks, so I suggested that.”

When the band went into the studio with De Villiers, they felt like they couldn’t get a good headphone mix, so Mastelotto suggested he lay down the drum machine and the band play guide tracks so he could put the drums on later. The Linn ended up sticking, though:

One night in the back room that Mastelotto described as “the big linoleum room,” Paul and he began to experiment. “In those days I used a Simmons SDS5, the old analog Simmons brain, and plugged my Linn drum into that,” Mastelotto recalls. “When we printed those Linn drum things, it sounded really good. We put those big UREIs in the room and I took an old Camco snare I had that had a big fat snare strainer on it and set it sideways right in front of that speaker, and Paul miked the snares underneath that. We pumped the snare drum out to those speakers until it made the snares buzz and we recorded that. We verified the takes—slowed it down a little bit and then up a little bit—so there were three passes we printed of that snare drum being activated by my Linn drum through those UREI speakers. That’s why about halfway through the song the snare drum gets a lot bigger. It sounds like it’s doubled with tom toms.”

The kick drum was sounding small, so they put it through the UREIs also. While De Villiers and Mastelotto were in the control room, two second engineers put Neumann M50 mics on big booms with wheels and pushed them away from the speakers.



“We hit a spot about 15 or 20 feet away from the speakers where both Paul and I went, ‘Whoa! Stop. Bring the microphones back about one foot,’ And we printed that,” says Mastelotto.

On the drums, De Villiers recalls using AKG C12 overhead mics, Telefunken 251s on the toms, Neumann M50s for room mics and probably a Beyer M88 on the kick. When they ended up mixing that track with Mick Guzauski, Mastelotto says he told Guzauski he wanted to turn the room up; he loved the way the room mics sounded, but they were out of sync.

“[Mick] said, ‘I can fix that for you. We just flip the tape over backwards and we put a delay on the sound you’re talking about—the room mics—and we print it to an adjacent track. Then we flip the tape back over and now it’s ahead so you use a delay to bring it back in sync,’” Mastelotto recalls. “Guzauski taught me that trick.”

Page remembers the first time he walked into Conway Studios to meet Guzauski; there were feet sticking out from under the console. “He was napping under there,” Page says. “We woke him up and he was groggy. He had this scraggly beard and he looked like a homeless guy. He said, ‘Sorry I had to take a nap. Let me hear what you got.’ We put on ‘Kyrie,’ and literally four bars in he said, ‘I’m doing this.’ It hadn’t been a sure thing that he wanted to do it, but I think he started that day.”

Page says the song was a product of the times. Today it would be recorded totally differently: “Maybe with acoustic guitar and tablas,” he says with a laugh. But he’ll leave well enough alone.

De Villiers comments that indeed the instrumentation, recording and mix is “very ’80s.”

The vocals have transcended time, though. If you’ve heard Page perform the song in Ringo Starr’s All-Star Band, Page’s vocals match the record spot on... they’re beautiful to behold. ■

Live



LEONARD COHEN

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By Barbara Schultz **26**

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STEVIE NICKS

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A stage-eye view at The Hearn, looking out at the 1,500-voice choir during the performance of "Hallelujah," live from Toronto in June 2016.



Photos: Courtesy of Zero11Zero

A SALUTE TO LEONARD COHEN

Rufus Wainwright and a 1,500-Voice Choir—Live From Toronto

By Mike Levine

The setting: Toronto's Luminato art festival. The venue: a gigantic, long-disused industrial building called The Hearn Generating Station. The performers: Rufus Wainwright and 1,500 volunteer, amateur singers led by conductor Nobu Adilman and guitarist Daveed Goldman from an organization called Choir! Choir! Choir! The production company: ZERO11ZERO/Iron Bay Films, led by director Byron Kent Wong. The challenge: Capture quality audio and video of the event with no previous re-

hearsal, limited setup and breakdown time, and heavy restrictions on gear. The song: Leonard Cohen's "Hallelujah."

The resultant video, available on YouTube and recorded on June 11, 2016, five months before the legendary songwriter and artist passed, captures not only great sound and visuals, but also the serene and emotional vibe of the event. What you don't see is how challenging the conditions were for Wong and the production team.

Choir! Choir! Choir! is a self-described "singing event," based in Toronto. It offers

weekly gatherings open to the public, in which Adilman and Goldman teach three-part harmony for pop songs. They've performed with artists such as Patti Smith, Colin Hay, and Tegan and Sara, and brought their method of teaching to other cities on tour.

"The beauty of what Choir does," Wong says, "is it manages to bring together groups of strangers—many who would say they aren't great singers—and teach them how to sing in three-part harmony together, in like an hour."

Wong's production company captured a

previous Choir! Choir! Choir! performance at Toronto's Massey Hall, so when the opportunity to shoot the Wainwright "Hallelujah" event at Luminato came up, Wong thought he knew what to expect. He soon discovered that the unexpected was going to be the norm for this project, saying, "From a technical standpoint—both visually and, more important, sonically—things got super, super complicated."

First on the list of challenges was the venue. "The Hearn is so big they say the Statue of Liberty could easily stand upright or on its side in it," Wong says. "It's a cavernous, insane space. Most of it was blocked off from the public for decades, and the city opened it up as a venue for this art festival."

In advance of the event, Wong and company scouted out the building and were thrilled with the natural sound of the huge venue. "This is the greatest reverb ever," he recalls thinking. He figured they would use plenty of mics to capture accurately both the onstage performers and the audience/choir in the huge space. "We had all these DPAs ready, we had all these Mojaves, and a bunch of ribbons." On the video side, the plan was to use seven cameras, five manned and two unmanned.

But because the old building had been unused for so long, it presented potential safety issues. The city of Toronto, which oversees the festival, was hyper-vigilant for events held there during Luminato. On the day of the show, Wong and company had set up the mics and cameras, then the city threw them a major curveball: No cable runs beyond the stage. The fear was that with so many people close to the stage, cables would present a tripping hazard.

"I said, 'Can we fly anything?'" Wong recalls. "They said, 'No.' 'So where can our microphones go?' 'The microphone cables have to be in line with the speakers, with the P.A.'"

So Wong had to take down most of the mics, ending up with only a Shure Beta 58a on Goldman's acoustic guitar (along with a DI), another on Wainwright's vocal, a spaced pair of DPA 4140s placed behind the P.A. speakers, and a Royer R-122 MKII ribbon in the center of the stage. The DPAs and the Royer faced the audience to capture the choir.

"I just put them as far as they would possibly let me put them, as high as I could possibly put them, on mic stands with sand bags," Wong says of the DPAs. "I just hoped that they weren't going to make me move them again. That was literally all we could do. I just positioned them the best I could. I hoped those preamps would give me the love that I needed."

The preamps Wong refers to were from the Universal Audio Apollo 8P interface that was at the front end of their recording rig, which also included a MacBook Pro running Pro Tools at 24-bit, 48 kHz.

"We knew this needed to be fast and quick," Wong says. "But I didn't



Rufus Wainwright sings "Hallelujah" as Nobu Adilman conducts the 1,500-member audience.

want to go to a hard disk recorder. I had to—at least for my own sake—see that tracks were going and that waveforms were being created. [Laughs] That's a risk. As you know, sometimes laptops and drives in those situations can be really dodgy. But luckily, my team on the audio side was super diligent."

Wong knew they couldn't afford any equipment malfunctions—"There were no second chances," he says. "We knew we would be able to do four takes, but there was no extra time." Another act was coming in, and they had to break down the gear immediately after the performance.

"We had to make sure that all audio from start to finish was clean, from the moment we got onstage to the moment we walked offstage," Wong says. "That was my only absolute. That and to hope that there was a really low noise floor and enough gain to actually pick up the choir."

The Apollo's preamps lived up to Wong's expectations and did a "perfect" job of translating the signals cleanly from the mics into Pro Tools.

In addition to the microphones, Wong had another source for audio. "We also made use of the onboard audio that was part of the ARRI Alexa-mini camera package," Wong explains. "All the cameras were recording audio, as we could not run code. An audio reference was a necessity. Since proximity was our friend and foe, I found grabbing parts of the chorus from the camera mics helped bring shape. The camera

mic was a Zoom H1 recorder that fed directly into the Alexa and was captured with picture."

Once the 1,500-person audience/choir had filed into the venue, Adilman and Goldman taught the crowd their parts. Wainwright and the singers performed four takes of the song, all shot and recorded by Wong's crew. Take four was indeed the keeper. But takes one through three would end up coming in handy.

"There were no second chances. We knew we would be able to do four takes, but there was no extra time. We had to make sure that all the audio from start to finish was clean."
—Byron Kent Wong



Director Byron Kent Wong also oversaw the audio capture.

When it came time to mix the audio (both for the video on YouTube and for an audio release), Wong was pleased with the quality they captured, despite the mic limitation. But when checking the individual audio tracks, they discovered a problem: unexpected bleed into the DPA mics. Event coordinators had situated the audience closer to the stage mics than had been anticipated.

“Someone was humming along, completely out of tune for most of the song,” Wong remembers with a laugh, “but not necessarily when everyone else was singing, which was really interesting. We had to work really hard to cut out all of that. And replace the air.”

They found spots from earlier takes for those sections where the humming was audible, but still, this was four takes without a click track. Because of tempo variations between the takes, it would be challenging to find replacements that fit rhythmically. But... “Daveed, the guitar player/arranger, is one of the most consistent instrumentalists I’ve ever worked with,” Wong says. “I don’t know how he does it in a room full of people, but if you lined up all the takes, they might be off by a second in total.”

On the video side, they had to work without their normal lighting (which was also restricted due to the cable-run restriction), but they still managed to capture a perfect, dreamy vibe. Overall, the production was a great success. To date, the video has received over 25 million Facebook views and 5 million YouTube views.

Wong summed up the experience. “I’m very proud of how it came out. I hardly think it’s perfect, but for what we were up against to capture the feel of the performance and make it look like that; and for what we had to work with to make it sound like that, I think we did okay. And you look at all the comments—it’s just about people marveling how strangers are coming together—especially at a very volatile time in the world.” ■

CHERUB: LIVE SOUND AND SAMPLES



Engineer Hunter Gifford mixed FOH and monitors for electro-pop/rock group Cherub on the band’s recent fall tour, using a DigiCo SD9 for the house and an iPad-controlled Behringer X32 core onstage.

“Onstage, the monitor console is sending three stereo in-ear mixes: one wired to Nick [Curtis] the drummer, and the additional two are sent to our Shure PSM 1000 wireless in-ear system—one to Jason [Huber] the bassist and the second is sent out as our ‘crew mix’ that is set up for our guitar and drum tech to monitor the show side-stage,” says Gifford.

“We are also sending six stage mixes to our DAS M12A monitors and



Hunter Gifford

an additional mix sent to a QSC KW181 sub,” Gifford continues. “In the same case that holds the X32 core and PSM1000 is a pair of Apollo 16 interfaces that connect to our rackmounted Mac Pro tower that runs our Ableton session. We also use a True Sound Precision 8 preamp for vocals

and assorted drum channels that resides in this rack.”

Gifford describes the tour as generally “self-contained” other than their P.A.s, which are house-provided. They are carrying a full mic package. “For lead vocals, we utilize the Shure ULXDQ receiver and a base of a wireless 58 that we have replaced with a Telefunken M80 capsules; essentially making wireless M80s,” he says. “Telefunkens are some of my favorite mics to work with; we have an M80 on the backing vocals and an M81 on the lead guitarist Jordan [Kelly]’s amp.”

Triggered sounds are also integral to Cherub’s live set. “In front of Jason, the true conductor of Cherub as a live band, is an Akia MPD that controls the Ableton session; he can cue tracks, start click, and send various audio samples. To his side is a set of electronic drum pads that can be set to a variety of different audio samples. The drum kit is also a trigger kit, fit with mesh heads. We are able to [add] the drum samples used in the studio to the live show experience.” —Barbara Schultz

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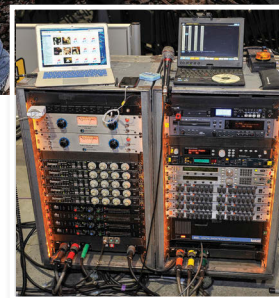
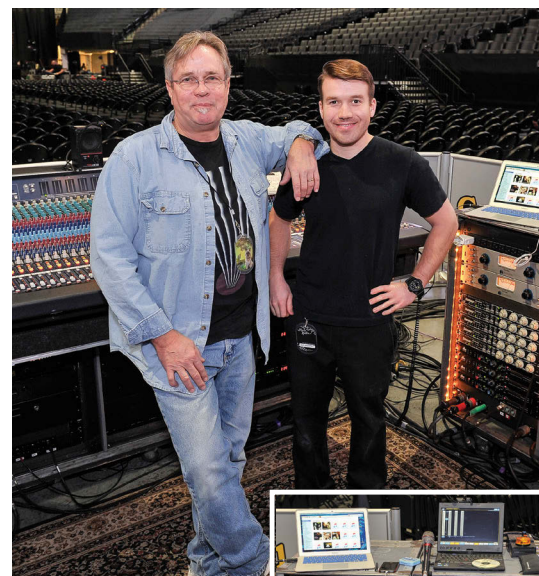
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STEVIE NICKS 24 KARAT GOLD TOUR



Stevie Nicks, the Queen of Rock 'n' Roll, performed a two-hour show at the Golden 1 Center in Sacramento, Calif., in December. The set list covered fan favorites and rarities from her 35-year solo career, along with some Fleetwood Mac staples. Also on the bill were The Pretenders, and Nicks was joined onstage by Chrissie Hynde to sing the hit "Stop Draggin' My Heart Around." Nicks' vocal mic is a Sennheiser 935.



"As one of the last analogosaurus roaming the earth, I still get a kick out of pushing faders and twisting knobs, so it's a Yamaha PM5K for me whenever the project allows for it," says **FOH engineer Dave Kob**, left, with **Clair system engineer Jeff Wuerth**. "I actually have people come up and ask me what kind of desk it is because they've never seen an actual analog console before!"

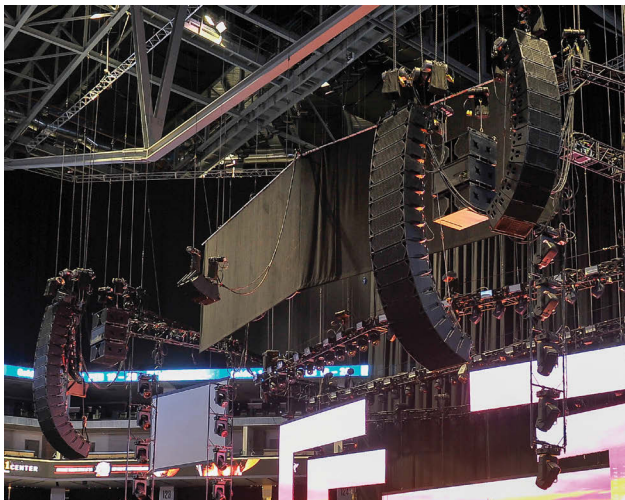
"My usual analog arsenal includes a Summit TLA 100 tube compressor on Stevie's vocal," he continues, "Empirical Labs Distressors on background vocals and bass, dbx 160As on guitarist Waddy Wachtel's acoustic and RF mic, Aphex 612 gates on drums, Bricasti M-7 for special effects and ambience 'verbs, Yamaha SPX 2000 for drum ambience, and Eventide Eclipse V4 for vocal effects."

"Mixing live sound is both proactive—the creative bits—and reactive, where you're adjusting for a multitude of unavoidable variables. I can react much more fluently when everything is laid out before me on one surface. Less usually proves to be more in live situations, so don't go digging into that tool/toy chest to fix a problem that doesn't really exist in the first place. I mix with my ears not with my eyes. The band is up there onstage playing live music, not on that LCD screen on your console. There is no plug-in that can turn a bad mix into a good one, so pay attention and mix."



"I'm mixing on a DiGiCo SD10, says **monitor engineer Dave Coyle**, left, with **P.A. tech Josh Hughes** and **monitor tech Calvin Welshans**. "Stevie's tour is different than Fleetwood Mac's in that it has more outputs. There are also six different styles of ears on the stage. So the sounds that I get from the mics have to work everywhere. The key is using the graphic EQs on the mix outputs to make the ears and wedges sound similar.

"Stevie and the two background vocalists have Future Sonics MG5pros; Carlos Rios, guitar, a Sensaphonics 3D 2max system; Darrel Smith, keyboards, Future Sonics MG6pro; Rickey Peterson, B3 Organ, Sensaphonics 2max with Shure 600 hardware and ML18 sub; Scott Crago, drums, Ultimate Ears i6; Al Ortiz, bass, JH Audio i6V2 and Clair CM22, all using Sennheiser 2050 twin receivers; and Waddy Wachtel, guitar, who uses three Clair i2am wedges."



"Our main hang consists of 16 CO-12s a side with three flown CP-218 behind it in a cardioid configuration," explains Clair systems engineer Jeff Wuerth. "The side hang is made up of 12 i3s, which assisted in eliminating the need to carry a rear hang due to the width of coverage the i3 offers. The center hang employs four CO-8s to fill the very center of the first eight to 10 rows. On the ground we use a single CP-218 in the center under the stage, which gave a bit more power where the cardioid effect of the flown subs began to fall off. Across the front of the stage we are using six CO-8s as front fills. The entire P.A. is powered with PLM 20ks riding inside the Clair StakRak. At FOH we have three LM44s that drive the system. Because of the analog desk, we are also driving the P.A. via analog out of the LMs."

"I started using a small center fill—four Clair CO8s on a matrix mix—a few years ago on Fleetwood Mac and it worked so well it's now part of my standard system," adds FOH engineer Kob. "We typically fly them at 45 to 50 feet to avoid any sight-line issues, and it's amazing how, even at a comparatively low level, they pull the left-right main system together sonically and fill in the front, center 10 to 15 rows. I also supplement the low end with one Clair BT218 CP sub under the stage DSC."

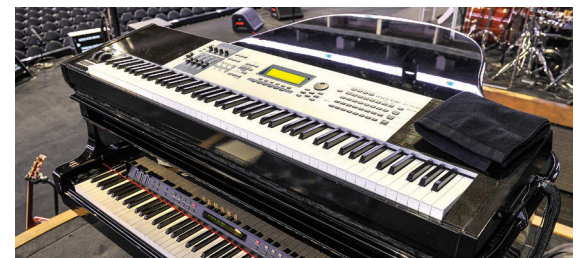
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Guitarist Waddy Wachtel uses BlackStar artist series amps with a Shure SM57 and a KSM313/NE Dual-Voice Ribbon microphone.



Drum tech Mike Rose at drummer Scott Crago's kit, which includes Shure SM-91A on kick (in) and Sennheiser E602 on kick (out); SM-57 and Beyer 201 TB on snare top and bottom; AKG C-451 EB on hi-hat; Shure Beta 181 on ride and toys; Audix D4 on rack and floor toms; two MILAB M-96 on overheads L-R.



Keyboardist Darrel Smith's setup, top, and Rickey Peterson's Hammond B3 setup, which sits stage right.

BUILD YOUR OWN STUDIO

THE \$100,000 STUDIO *By Wes Maebe*

Fixing Acoustic Problems, Adding a Classic Neve VR Legend

That time of year has come again, where Markkus Rovito and I take a look at how to improve on your current setup.

In the previous installments of BYOS, I have focused mainly on the centerpiece console, various microphone selections, monitors and outboard gear. So let's assume this year that the studio is up and running and I only need a couple of equipment upgrades; more importantly, we're going to examine the room acoustics closely.

I'm going to start with the premise that the control room and live room are in place. The studio has been running for a while now and we've gone from a small- to medium-format console. The time came to sell some of those and install a console that came up for sale. The 26.5 x 14.8-foot control room now houses a 60-channel Neve VR Legend with some cool outboard we hung on to and to which we'll add some funky bits and pieces.

The Neve was acquired, fully recapped, for \$37,000. This leaves \$63,000 for us to play with, installing some extra sonic flavors and sorting the rooms out acoustically.

Obviously I have Neve preamps coming out of my ears on the VR, but I always like to have a few different options in the bank. Four alternatives should supplement the range nicely. The API 512V (\$845.75 x 2 = \$1691.50) will provide that classic API punch, Meris 440 (\$549) can look after guitar and bass duties, the Millennia HV-35 (\$718.99) offers high-end clarity, and a newcomer, the Advanced Audio MT8016 (\$995), which was developed with Malcolm Toft and sounds absolutely amazing!

The console also offers dynamics and EQ on every channel; however, I'd like to have just a handful more. A couple of API 560s (\$803.25 x 2 = \$1,606.50), mainly to handle that in-your-face guitar punch, a pair of API 565 filter sets (\$505.75 x 2 = \$1,011.5) to help with cleaning up some of the signals, and I have to include Dave Hill's Cranesong 500 Series Insignia (\$1,299) tube EQ—this unit works miracles on pretty much everything.

The studio is pretty much set with gear as we opened a few years back, but I'd like to add an extra Meris Mercury 7 (\$549) to the mix, just because it's such a cool reverb that blends so well and is so off the wall.

To house all our 500 Series modules, I'm choosing the WesAudio Supercarrier (\$678) 10-slot rack.

With a lot more virtual reality, 360 and surround work popping up these days, it's time to bite the bullet and install a 5.1 rig. The responsibility of re-producing falls to Swiss-based loudspeaker manufacturer PSI Audio.

I recently came across the PSI speakers and was blown away by the sound, the imaging and the way they translate to other systems. Left, center, right and both surrounds will be PSI A17 M (\$1,660 x 5 = \$8,300), and the sub is an A225 Sub (\$3,884.9). Controlling the surround setup will be the Cranesong Avocet IIA (\$8999).



Neve VR Legend console

TIME FOR TREATMENT

A huge chunk of the budget will go toward the acoustic treatment and optimization of the live and control rooms. One of my fields of study in college was acoustics, so I have a basic understanding of the subject and am able to sort out certain problems, but when it comes to improving your room, it really pays to get someone in who does this for a living. For this next segment, I had to draw on Dirk Noy's vast knowledge of acoustics and everything related to the topic.

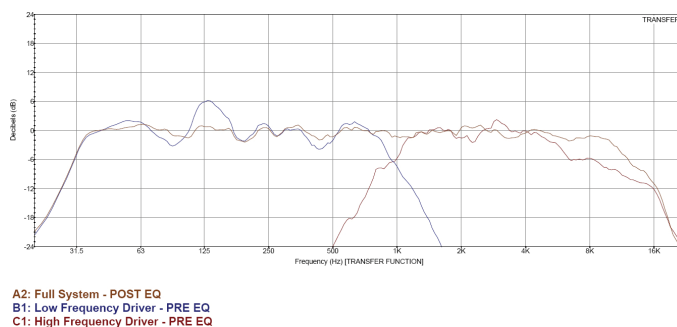
I first met Dirk at an AES student event in Switzerland and I subsequently hired him to help me rescue a bad control room when I was mixing in a residential studio in the Swiss pre Alps. Dirk works for Walters-Storyk Design Group, so I left it in his very capable hands, with me looking and listening and asking a lot of questions.

Both the control room and the live room had some treatment when they were built initially, which offered Dirk a good starting point. But undertaking acoustical measurements is a vital first step in assessing the acoustical conditions in any given space. You need to know the cause of the problem in order to prescribe the most effective remedy.

Taking an acoustical measurement of the space means capturing the Impulse Response. A loud impulse is injected into the room through an omnidirectional loudspeaker radiating spherically from a center point. A measurement microphone then records the signal over time. The direct sound will exhibit the shortest path length and will show up as the first and loudest signal at the measurement mic. Subsequent reflections off surfaces

(with longer travel paths and usually decreased loudness due to absorption in materials and air) will arrive later in time.

Reverberation Time, meanwhile, is essentially measured by timing



Impulse Response Measurement

when the sound level reaches a value of 60 dB below the initial value, defined as being the RT60 Reverberation Time. The RT60 value is also a function of frequency: Most rooms display a longer reverberation time at low frequencies than at high frequencies.

Two aspects are studied for considerations of a room's reverberation time: First, there is the absolute duration of the reverberation time in seconds (either for each individual frequency band, or as a mean value). In a very live control room, mixes will end up sounding very dry, and a super dry room will make for much wetter mixes; you will compensate either way.

The second, often neglected aspect for assessing reverberation is the linearity of the reverberation time over frequency. A space with very short reverberation time at high frequencies and very long reverberation time at low frequencies is considered to sound very unbalanced, although the mean value might even be in the correct ballpark.

The analysis of the Reverberation Time of our studio control room reveals a rather unfavorable imbalance in the Reverberation Time vs. Frequency diagram. The room supports low frequencies overly dramatically, while at the same time deadening the highs. This is not an uncommon issue: Low frequency control is a major problem in small acoustic spaces due to the length of the wave.

LOW-FREQUENCY ABSORPTION

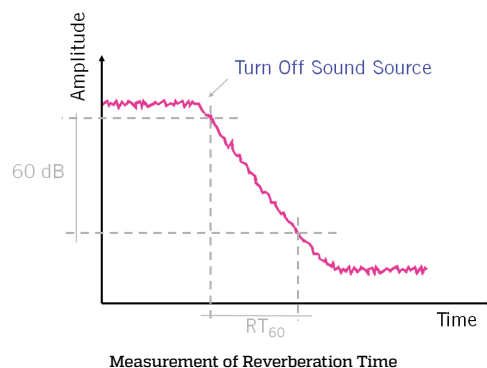
Membrane Absorbers and Helmholtz Resonators are the tools for the job. Both are suitable for frequencies below about 125 Hz. A membrane absorber is a movable rubber, wood or metal membrane mounted in a frame. At certain frequencies the membrane starts to vibrate when exposed to sound pressure, transforming energy from the sound field to heat.

Helmholtz Resonators work like a glass soda bottle that can be used as a whistle: A given closed volume (the bottle) has an opening with a particular length (of the bottle neck) and a particular cross-section (diameter of the bottle neck). Helmholtz Resonators are easily incorporated in a space where otherwise unused volumes are available (e.g., a raised platform cavity in a home theater, or a void above a suspended ceiling).

For now, we will treat the control room's problem of excessive low-frequency reverberation with the purchase of four RPG Modex Plate low-frequency membrane absorbers, each at \$802.7 (\$3,211).

Dirk's measurements showed a similar problem for the Live Room, albeit with a different cause: Standing Waves. Rooms with an equal pair of dimensions (e.g., same width and height) are likely to show a strong accumulation of modal effects; we have exactly this problem in our room.

Again, we'll treat the modal problem with the purchase of eight RPG Modex Plate low-frequency membrane absorbers at \$8,02.7 a pop (\$64,21.6). With optimized low frequency control in both spaces, the acoustician's analysis gave even more insight into the acoustical behavior:



For the Control Room, the Impulse Response showed a major reflection peak shortly after the direct sound arrives at the listening position. The bounce, it turns out, was caused by a reflection off the exterior window, creating unwanted comb filtering—the reflected sound interfering with the direct sound at the listener position. Using absorption, this situation can be greatly optimized.

When sound hits an absorptive material, some part of the acoustical energy is transformed to other types of energy (mostly heat). Examples of acoustical absorbers are all sorts of porous foams or perforated/slotted surfaces, useful in controlling unwanted reflections and consequently to decrease excessive reverberation.

An alternative method to minimize side wall reflection is to change the room geometry by angling of the walls. This will steer the reflected sound clear of the listening position to areas where it can be absorbed or dealt with in another way.

Because re-doing the walls is not possible in our room, we've decided to solve the sidewall reflection by employing a visually transparent, slotted Plexiglas panel of type RPG Deamp at a cost of \$1,606 per side (\$3,212).

And of course, these problems don't come by themselves! The live room has a similar problem, but as we don't want to add more absorption to the space, Dirk recommends upgrading the acoustics using diffusion.

Diffusion is used to distribute sound uniformly in space, and products are available in a range of shapes and sizes. One-dimensional diffusors contain depth variation in one dimension, forming linear divided wells or steps of varying depth, whereas two-dimensional diffusors offer depth variation in two perpendicular directions, thus forming a lattice of divided cells or steps of varying depth, looking a bit like a skyscraper skyline.

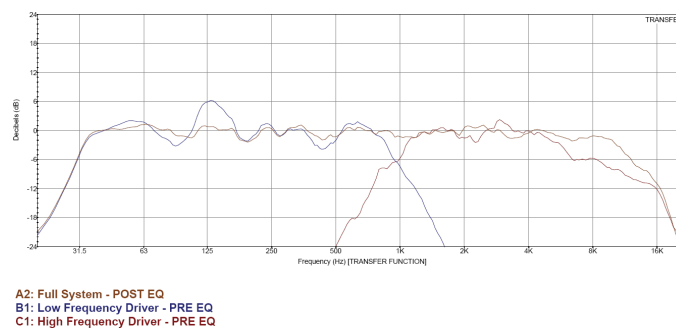
This is exactly what we need, and we're going to purchase 12x RPG Omnifusor diffusors at \$428 per item (\$5136). These will be mounted on the ceiling.

So we're done, right? Well, there's one additional step. I've asked Dirk to calibrate the monitoring system, as fine-tuning a speaker system makes a world of a difference. This bonus will cost us \$2,141 in services.

Most active monitors offer some type of onboard adjustments, but typically a dedicated outboard parametric equalizer or loudspeaker processor will be employed with much greater effect. The goal is to obtain a linear reproduction throughout the audio spectrum, and reducing energy is generally preferable to adding energy. There are many options to choose from; I've decided to go for a unit I already know, the Xilica XP-8080, coming in at \$1,542.

Finally, there's the last, most fun and utterly critical step in the system calibration process: the listening test. Sitting down in the engineer's position, listening to the audio system and the room for half an hour, and getting ready for the next mix.

I'm going to use the remaining \$351 to buy Dirk an amazing meal to say thanks for helping me put this studio together! ■



Frequency Response Measurement of a Two Way Active Audio Monitor System

THE \$35,000 STUDIO *By Markkus Rovito*

Plunging Into Surround Sound, Adding Acoustic Upgrades

Rather than presenting an entire soup-to-nuts studio this time, we're looking at a targeted upgrade to a project studio dedicated to sound design and music production. We've noticed from studio operators that despite upgrading equipment fairly regularly, the crucial area of acoustics—both monitoring and treatment—often gets overlooked. With that in mind, this upgrade scenario focuses more than half the budget to acoustics. For the remaining equipment recommendations, rather than outlining a comprehensive studio, we lean toward exciting additions and high-end supplements to a meat-and-potatoes room.

For the following configuration, we assume you already have a fairly powerful Mac or Windows computer with a free Ethernet connection. Prices listed are MSRP.

MONITORING

Genelec's Smart Active Monitoring technology is now a decade old, yet

the latest models continue to improve the overall reliability, accuracy and flexibility, while making the calibration of multichannel monitoring setups even faster.

We'll take that flexibility and run with the ability to toggle between 2.1, 5.1 and 7.1 setups, beginning with the Genelec 7360A 10-inch powered 300W SAM subwoofer (\$2,850). This powerful woofer has a 19Hz low-frequency extension and AutoCal for aligning the volume, crossover, timing and EQ to room responses. It supports up to 7.1 analog or digital surround systems, and you want to be able to accommodate surround mixing for the cherry sound design and production projects.

For the left and right main channels, the Genelec 8350A 8-inch 200W bi-amped monitors (\$2,595 each) rest on included Iso-Pod stands and employ a minimum diffraction design for ideal audio imaging. You can count on them to supply high audio output with low distortion; connect them via GLM Network, digital AES/EBU or analog XLR. Depending on your needs and budget, add three or five Genelec 8340A 6.5-inch 150W bi-

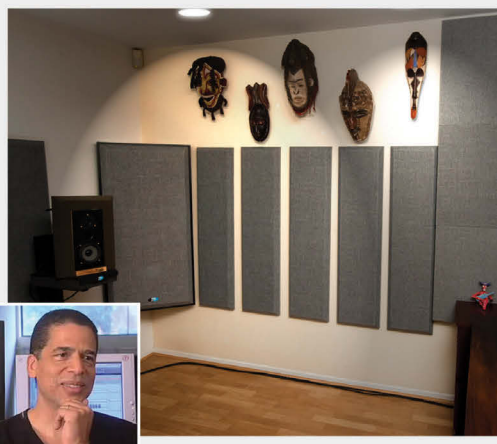
Primacoustic... better design, better



"The ease of install really allowed us to experiment with placement and with the quality of the treatments, we achieved the sonic balance we were looking for!"

~ **Tommy Lee**

Founding member - Mötley Crüe.



"Being able to fine-tune a room on site makes all the difference. The Impaler mounting system make the panels easy to install and let you make adjustments without trashing the surface. It works!"

~ **David Rideau**

Engineer/producer - Janet Jackson, Sting, TLC, George Duke and Jennifer Lopez.



"The Primacoustic is up and kicking butt at my new studio in Santa Monica. I love the way the control and tracking rooms sound now... and so does everyone that records here!"

~ **Butch Walker**

Engineer/Producer - Avril Lavigne, Fall Out Boy, Pink, Sevendust, Hot Hot Heat, Simple Plan, The Donnas.

"I love the way the control and tracking rooms sound now... and so does everyone that records here!" ~ Butch Walker

amped monitors (\$1,895 each) to round out a 5.1 or 7.1 setup. They feature the same design and sound profile of the 8350As but in a smaller size.

Finally, add the Genelec GLM 2.0 SAM Loudspeaker Management System (\$495), a hardware/software calibration and management package.

Monitoring subtotal: \$14,220 to \$18,010

ACOUSTIC TREATMENT

A studio's acoustic treatment often gets neglected even more than monitoring, so it's time to go all-out to complement your enviable new Genelecs. Assuming a rectangular studio room of approximately 12-15 feet by 16-20 feet, we'll outfit it for a surround-sound setup. Some consulting with the manufacturers is recommended.

The Real Traps Mondo Surround Kit (\$2,699) provides an excellent starting point. The kit has four Corner MondoTraps for extreme low-frequency absorption at the wall corners, six MicroTraps for the side walls or other fill-in points, and four MiniTraps for the rear and side walls. Each module is a membrane bass trap made of Fiberglas and metal that also absorbs mid and high frequencies. They are lightweight enough to mount with the included picture wire, bolts and screws, or on stands. They come in white, beige, gray or black.



Genelec 8350A monitor

To supplement the Real Traps, add four to eight Primacoustic Cumulus tri-corner bass traps (\$130 each) to capture sound 100 Hz and up in the corners where the walls meet the ceiling and/or floor. I also recommend three or four Primacoustic Stratus Studio Ceiling Clouds (\$230 each), depending on the size of your room. They use ceiling suspension hardware to hang above the listening position and reduce or eliminate reflections while enlarging the sweet spot. These also come in black, beige or gray.

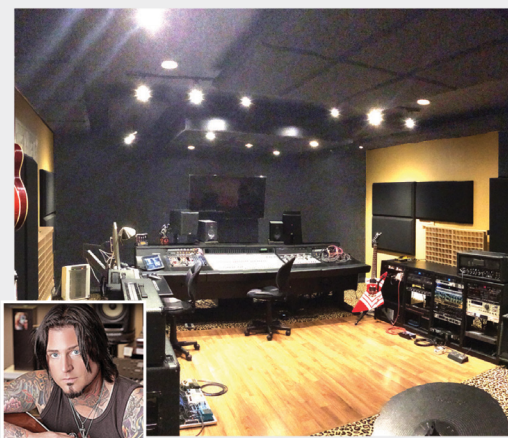
Small studios often lament the lack of a vocal booth. If you have a relatively luxurious amount of space and budget, the ClearSonic IsoPac G (\$1,725)

supplies a strike-able vocal booth of 4-feet in diameter using a combination of clear panels and Sorber baffles. It fits one vocalist and could also be used for recording instruments.

If mounting to a rear wall or other wall is an option, the Primacoustic FlexiBooth (\$449) is a 2-by-4-foot acoustic "cupboard" that unfolds to create a dry vocal zone that attenuates and separates room ambience. The most flexible and low-cost option, the Real Traps 11-pound Portable Vocal Booth (\$299) mounts to any microphone boom stand and uses two absorptive panels to create a triangular area for recording vocals, guitar amps, etc.

Acoustic Treatment subtotal: \$4,208 to \$6,384

performance, amazing results!



"When building The Leopards Nest studio, we tested a number of different acoustic treatments and chose Primacoustic. It was easy... Primacoustic did the best job and my studio sounds amazing!"
~ Jason Hook - Five Finger Death Punch.



"We've got a mixture of bass traps, diffusion and clouds and the result was phenomenal. It ended up costing less than 25% of the custom solution and it turned out very cool."
~ Keb' Mo' - Grammy winner, roots-legend.



"Not only does my room sound amazing, it's also really beautiful!!!" ~ John Rzeznik - Goo Goo Dolls.

"Not only does my room sound amazing, it's also really beautiful!!!"

~ John Rzeznik

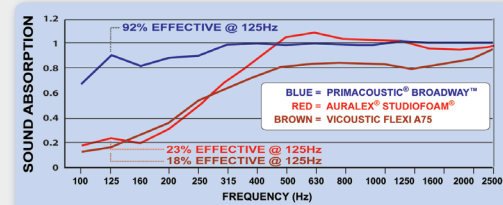
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Nektar Panorama P6 MIDI control surface

DAW/CONTROL SURFACES

Sometimes the question is not which DAW to use, but which secondary DAW to choose? After nearly three years of development, Bitwig Studio 2 (\$399) has arrived to throw a wrench in the machine. While it won't threaten Pro Tools' rule, this major update has taken a huge step toward a fully modular device architecture that should appeal greatly to sound designers and experimental producers. The 75+ Bitwig internal devices (instruments, effects, generators, "containers," etc.), as well as external plug-ins, now have modulation slots where you can load 24 new Modulators, including different types of envelopes, LFOs, sequencers and much more. This creates an incredibly powerful and flexible creative workflow to complement Bitwig's fluid interface that blends its Clip Launcher with the timeline arrangement window.

For a comprehensive MIDI control surface with rock-solid Bitwig Studio integration, look no further than the Nektar Panorama P6 (\$659). With 61 full-size weighted keys, 12 drum pads, 16 encoders, nine faders, one motorized master fader and transport controls, it's a DAW-controlling powerhouse and organizes everything on a detailed color display.

With a control script available online, the Ableton Live specialist Novation Launchpad Pro (\$399) velocity- and pressure-sensitive 64-pad multifunction controller becomes a beast for Bitwig, as well. Its pad grid will do wonders for Bitwig Studio's Clip Launcher, and its Scale mode lets you experiment with a new style of melodic composition.

DAW/control surfaces subtotal: \$1,457

MICS & RECORDING

It's never a bad time for a high-quality, large-diaphragm tube condenser microphone for a value price if you can find it. This year we did with the Lauten Audio LA-320 (\$799), a cardioid pickup mic with built-in high-pass and lowpass filters that sounds great for vocals and instruments up to 130 dB SPL.



MOTU 1248 interface

You may be set with an audio interface already, but if you need one with plenty of audio outputs for your 7.1 surround system, consider the MOTU 1248 (\$1,495). With its four mic pre's, two DIs, 8x12 analog I/O, 16 optical I/O, S/PDIF I/O, Word Clock and AVB Ethernet, Thunderbolt and USB 2 connections, it can accommodate a variety of setups and provides a 48-channel DSP onboard mixer with EQ, compression and effects controllable from a computer or wirelessly over iOS. It has enough analog outputs for your surround sound and for taking advantage of Bitwig Studio 2's new ability to control CV analog gear.

If you're serious about sound design, it may be time to step up your field recording game beyond a handheld recorder. The Sound Devices 702 (\$2,225) gives you a pristine 2-track Compact Flash recorder that captures uncompressed PCM audio at resolutions up to 24-bit/192kHz, with a removable Li-ion battery. Outfit that recorder with a Sennheiser MKH 416 compact supercardioid shotgun interference microphone for stunningly directive recordings with very low self-noise. When taking it outside, protect it with the Rode Blimp 2 (\$399) windshield and shock-mount for shotgun mics.

If you're not using USB-C yet, you will be soon enough. You always need more portable, reliable storage, as well, so pick up the Glyph Atom Portable SSD RAID 1TB solid-state drive (\$449) for either USB 3.1 (USB-C), USB 3.0 or Thunderbolt 3.

Mics & recording subtotal: \$6,616

ANALOG HARDWARE

We can't recommend a studio without some real analog signal paths. With modular synthesizers enjoying a monumental comeback, the Moog Music Mother-32 analog semi-modular monosynth (\$679) presents the perfect bridge to modular synthesis. It works as a stand-alone tabletop instrument for distinctively Moog sounds, or as a rackable module for expanding with other Mother-32s or with Eurorack systems. It has sequencer buttons that can be played like a keyboard, 32 patch points for interacting with other Eurorack gear, MIDI to CV conversion, external audio inputs, and of course, that creamy Moog filter and space-age sound. You can't go wrong by racking up three of them in the dedicated Moog 3-tier rack kit.

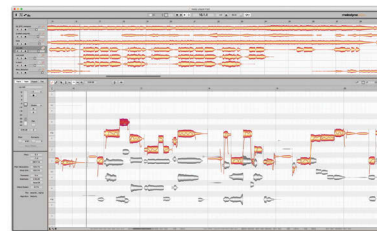
Analog hardware subtotal: \$2,167, including patch cables and rack kit

PLUG-INS: EFFECTS AND DYNAMICS

During the past year, iZotope released both the killer VocalSynth transformative vocal effects plug-in and the revolutionary Neutron mix analysis and processing plug-in. You can get them both, along with the Ozone 7 Advanced mastering suite, Nectar 2 production suite, Trash 2 distortion and RX audio repair Plug-in Pack, in the Music Production Bundle 2 (\$699), an extraordinary value for such a collection.

A sound design and editing wunderkind, Celemony Melodyne Studio 4 (\$699) lets you edit pitch-and-time correction to multiple tracks simultaneously in one window, sync click-track material with recordings made without a click, edit overtones of individual notes, and more.

What's good for the sound designer is good for the producer, so we'll add a few more marvels: Zynaptiq Morph 2 (\$179) morphs two sounds in real-time and creates completely new textures from existing material. The wonderfully bizarre and twisted Glitchmachines really should offer a bundle, but in absence of that, we'll recommend both Cataract and Quadrant (\$49 each). Cataract absolutely rips audio files from the in-



Celemony Melodyne Studio 4

side out with modulation sequencers and morphing, while Quadrant uses granular and FM modules and patching to generate sound and to process sound with unending variation.

Plug-ins—effects and dynamics subtotal: \$1,675

PLUG-INS: INSTRUMENTS

While I hope you already have some kind of definitive library like EastWest Composer Cloud or Native Instrument Komplete, some remarkable new sampled collections and emerging synths demand your attention.

Spectrasonics Keyscape (\$399) culls 36 highly desirable keyboard instruments into an enormous and thoroughly detailed sample plug-in. Along with Yamaha pianos, Rhodes, Wurlitzer and Clavinets, there are gorgeous and ancient rarities like the dolceola, dulcitone and harpsichord, all in a form that's the closest you'll get to the real thing.

For orchestral and cinematic scores, the 55GB 1K Multimedia Miroslav Philharmonik 2 collection (\$499) fulfills nearly every wish with more than 2,500 instrument sounds of strings, woodwinds, brass, percussion and more, available in all types of timbres and articulations. To boot, 38 onboard effects include ConvoRoom convolution reverb and



Softube Modular plug-in

ers, the most popular instruments to design for have proved to be old favorites like NI Massive, Sylenth and Xfer Serum. However, applying heat from behind comes Reveal Sound Spire (\$189) a multimode polymorphing oscillator synth combining the spirit of analog with the power of digital. Its powerful Unison Engine provides nine unison voices on each oscillator, which makes it a favorite for the huge leads and big basses that dominate electronic music, which is, after all, pop music these days.

Plug-ins: Instruments subtotal: \$1,187

Grand total: \$31,530 to \$37,496. If you opted for 5.1 to save some money, go out and buy an Oculus Rift and prepare yourself for the coming wave in sound design for VR. ■

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Composer John Lunn
at his home studio
in London.



COMPOSER JOHN LUNN

A Hit With *Downton Abbey*, a Career of Experimentation

BY GARY ESKOW

Every so often the theme that colors the opening credits of a television series works its way into the collective consciousness. Digging all the way back, Peter Rugolo's music for "The Fugitive," Nelson Riddle's "Route 66," and a bit later, Bill Conti's "Dynasty" show theme all made that kind of lasting impression.

We all have our favorites from this musical category, and certainly, countless film and television fans would include the music John Lunn wrote to accompany the opening credits of the fabulously successful British series *Downton Abbey*. It might surprise some that this insistent music, which features a mournful theme in $\frac{4}{4}$ against a stolid accompaniment in $\frac{3}{4}$, wasn't originally written as the opening theme.

In fact, Lunn says, the opening theme had no music written specifically for it. The music that came to be associated with it was, however, the first cue that he composed.

"There was a train running through that cue, and the music was meant to convey the insistent energy of that train," he says. "The next shot was of a telegram, while the train was still passing through the English countryside. The harmony broadened out when the magnificent shot of the house appears."

There was no doubt in anyone's mind, says Lunn, that the music he had written would be used in the title sequence. He wrote a 30-second cue based on that music, which the editor cut to, and *voilà*. It never would have happened if Lunn had been asked to score the opening scene as it came to be.

Lunn has straddled multiple musical styles for decades. The 60-year-old

composer attended Glasgow University to study 12-tone techniques, which were considered avant garde at the time. "I was very into John Cage and other American composers like Milton Babbitt," he says. "Ligeti was a big influence, as well."

At the same time, Lunn was playing bass and keyboards in Man Jumping, a band whose members were inspired by the music of Steve Reich and Philip Glass. A huge Miles Davis fan, Lunn was particularly enamored of *Bitches Brew* when he moved to London in the mid-1980s.

After taking a short course in computer music at MIT, Lunn spent a few years putting together a computer-based compositional system—in the days when those who couldn't afford a Synclavier or Fairlight were mostly on their own. In the late 1980s Lunn picked up a computer and a copy of Cubase. "I moved over to Logic 15 years ago, but I keep thinking about going back to Cubase!" he exclaims.

He ended up playing piano and double bass, conducting, and writing cues for the London Contemporary Dance Theatre and the Rambert Dance Company. "The story lines tended to be obscure and abstract," he recalls, "but there was always a narrative. I enjoyed the idea of taking a narrative and exploring it musically." It proved a good training ground.

No one associated with *Downton Abbey* had any idea the show would grab the imagination of the British public the way it did, or prove so attractive to the millions in the States. Given his success, Lunn was in the fortunate position of being hired to compose the music without competing through demos. "I had worked with Gareth Neame, the main show runner, in the past,"



Courtesy of White Bear PR

the composer says. “He sent me a script which I thought was quite good, and I signed on to the project.”

Although he played piano on all of the *Downton* cues, turning over a score to a conductor comes with a certain loss of freedom, he found. “Over the years I developed a side of my musical personality that was like Brian Eno. I became interested in music that was difficult to write down and was rooted in electronics, where I could be in complete control. Once you hand a piece over to a conductor it’s taken away from you.”

There are, Lunn says, only three studios remaining in London—Abbey Road, Angel Studios, and Air Studios—where orchestral cues like the ones recorded for *Downton Abbey* can be tracked. He worked in all three during the course of the series. However, most of his projects, including *Downton Abbey*, are mixed in Lunn’s own room, generally with no clients in attendance.

Lunn’s studio, situated in the basement of his South London home, is largely analog. About a year ago, he picked up an SSL AWS 958 console. “All my audio goes into Pro Tools,” he says. “Logic is purely used for MIDI. Some times the material that I record in Logic gets used; it’s quite often replaced.

The composer uses a Deeper 88 weighted controller, ATC SCM 20 monitors—stereo only, no surround—and is a huge fan of Bricasti reverbs. He relies heavily on an Eventide H8000, and has a ton of Neve, API and Summit outboard processors.

Lunn doesn’t limit his output to work for film and television. He recently wrote a piece for the Cardiff Singer of the World competition, a work

based on a lift from the last page of Charlotte Bronte’s novel *Villette*. A violin concerto he wrote 20 years ago is about to be performed. Success is a double-edged sword, however.

“My entire life has become more and more commercial,” he says. “I’m grateful for my success, and I’m hoping that I won’t become typecast as the *Downton Abbey* composer. The world of Milton Babbitt was interesting, but nothing pulls me back there!” ■



...No Question



Winifred Phillips at
her Kurzweil PC2X
keyboard

GAME COMPOSER WINIFRED PHILLIPS

Two Different Approaches, One Unique Vocal

BY JENNIFER WALDEN

If composition terms like “horizontal resequencing” or “vertical layering” aren’t familiar, that’s understandable. They’re not necessarily film-composing terms, but they are part of a game composer’s vocabulary.

Composing game scores requires a different way of thinking about music, and how music can support nonlinear storytelling. Award-win-

ning game composer Winifred Phillips, who penned the best-selling reference book *A Composer’s Guide to Game Music*, got her start on *God of War*, a console game published by Sony Interactive Entertainment. The *God of War* team desired a big choral sound, but Phillips added a twist, creating the entire choir for her compositions using only her voice. It’s a special skill she’s perfected.

“I wanted to show them that I had that capability, so I sent them choral pieces which were my own voice overdubbed into soprano, alto, tenor and bass,” reveals Phillips, who evidently does this often on her scores. “I ended up doing both full choir and some women’s choir for *God of War*. I also composed and sang ‘The Siren Song’ for the Desert Sirens—mini-boss characters you follow through the desert. It was fun to actually be a voice in that game.”

Phillips’ vocal abilities also came in handy when composing for *Speed Racer* (2008), published by Warner Bros. Interactive Entertainment. Researching the *Speed Racer* graphic novels and cartoon series, Phillips learned that James Bond’s car was one original inspiration for *Speed Racer*. While composing for the game, Phillips “was thinking about the romance of a muscle car and what makes it attractive to people. You have the 1950s aesthetic of *Speed Racer*, but it’s also supposed to feel very futuristic and very eclectic and weird.”

In her score, Phillips fused jazz with speed-metal and added techno



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TIPS & TECHNIQUES

From the Pros

1 Be Smart with Your Time: Listen in Solo as Little as Possible

Try not to spend too much time working with soloed instruments. You should be listening to instruments within the context of the entire mix or while listening to two or more instruments that are competing for the same frequency range. For instance, trying to EQ and compress a kick drum without the context of the bass or the rest of the track will often leave you disappointed and frustrated.

2 Use Harmonic Distortion on Low End for Laptops and Earbuds

More often than not, people listen to music on their laptop, phone, or through terrible earbuds without proper bass representation. Low-end frequencies don't tend to cut through these platforms, so you must mix accordingly for translation. Take your low-end tack—bass, 808, etc.—send it to an auxiliary channel, notch out everything but the bass with EQ, and add harmonic distortion to emphasize the sound's overtones; when you edge this aux track back into the mix, it'll translate better to laptops and such.

3 Know When to Automate

Volume automation is your friend—it can lend power to a chorus and bring out an otherwise inaudible word or phrase. But don't reach for automation too quickly, because mixing is a balancing act: as your mix changes, you'll have to keep going back to tweak your automation, which can become a hassle. Automation can also take up CPU power and slow down your DAW. If you save it for the end, it'll speed up your workflow.

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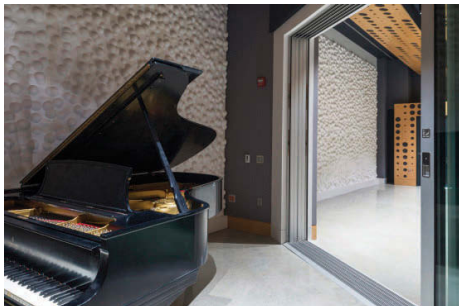
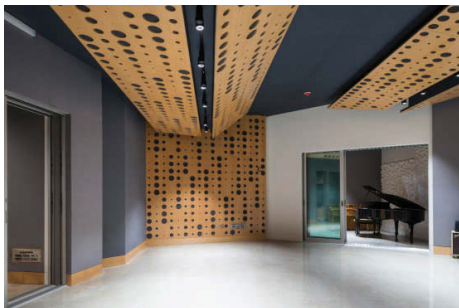
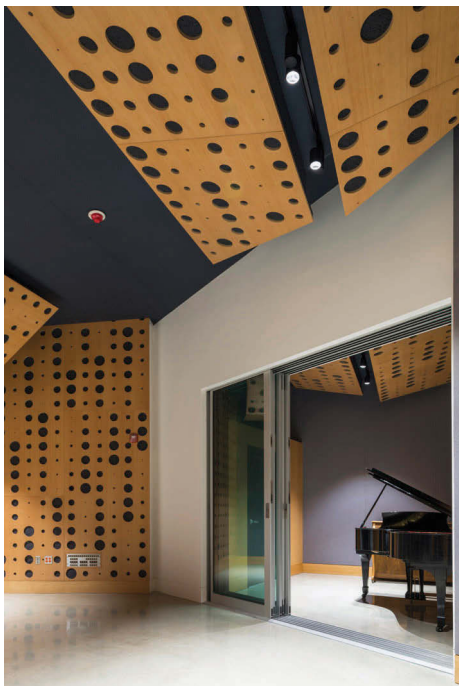
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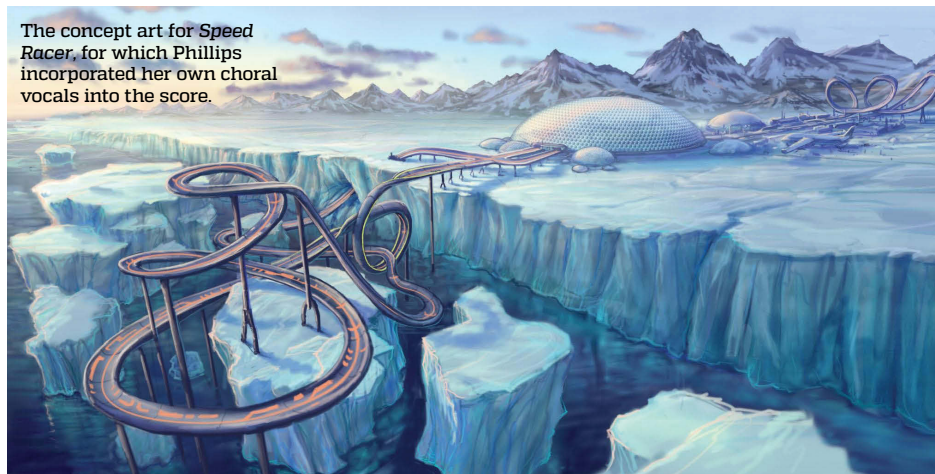


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The concept art for *Speed Racer*, for which Phillips incorporated her own choral vocals into the score.



Courtesy Sony Interactive Entertainment

and disco elements. She worked with producer Winnie Waldron, who proposed using musical sound effects to suggest speed—synths to simulate fly-bys and screeching wheels, or adding a Doppler to select sounds. “We weren’t using actual sound effects because we didn’t want to interfere with the sound design; we wanted to enhance it with the music,” says Phillips. Phillips also employed a vocoder to add a robotic vocal sound. When combined with the jazzy elements, it bolstered the future-retro vibe.

Phillips performed and recorded a choir of her own operatic open vowel sounds to add drama and tension, particularly during the final race. She also sang shout-outs and calls to action, like “faster,” “go” and “drive,” to impart the feeling of participation by a stadium crowd.

“I kept overdubbing my voice, over and over and over again in a crazy amount of tracks, until it started sounding like a large crowd. Then I worked that into the music with sounds of stamping and clapping,” says Phillips. “In a racing game, it’s hard to bring across to the player that there’s a crowd watching. In other sports games, like football or baseball, you can hear the crowd. But as a racer, you’re in the cocoon of your car. I wanted to dissolve that a bit and to have the player feel the crowd rooting them on.”

Speed Racer’s score employs a horizontal resequencing music technique, which according to Phillips’ book means that the music is dynamically pieced together based on the actions of the player. Phillips explains that in *Speed Racer*, after a player builds up a special meter by performing well, he or

she can activate “zone mode,” wherein the character is indestructible and gains a speed boost. The game engine smoothly switches from the current track to the zone mode track by cutting on the beat. “There was a marker with each beat,” explains Phillips. “The game engine used that to switch to the ‘zone mode’ track anywhere in concurrence with the player activating ‘zone mode.’”

“Zone mode” is accompanied by bright neon colors; blurred horizontal lines streak the screen’s periphery. It’s a heightened state of focus and extreme speed. Musically, “zone mode” sounds frenetic and faster than the preceding track, though both tracks are in the same tempo. Phillips achieved this by double-timing the rhythm, adding alarm sounds, and using phase filtering to create sweeps and rises.

To aid the transition, each “zone mode” track started with several kick drum hits that were in tempo with the preceding track. “That allowed a good overlap and synchronization between the two pieces of music,” she says. “Then, there would be a build, a rise that indicated you’re entering a more exciting phase. Next would be a few measures of very frantic music with alarms and double-timing rhythms to give the sense of speed and hyperactivity. When ‘zone mode’ ended, the game engine would switch back to the original track on the beat.”

Because a player can trigger “zone mode” at any time, the music needed to be reactive, but the change couldn’t feel jarring. “They had to correspond with all of the musical genres I was playing with on the *Speed Racer*

continued on p. 51



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THE BEST OF MULTICHANNEL PREAMPLIFIERS WITH I/O

BY STROTHER BULLINS

Most audio processing takes place today within a CPU. So our most relied upon hardware (other than the CPU itself) is often a comprehensive I/O unit featuring ample microphone preamps and the necessary portals for, ideally, near-zero round-trip latency.

Such I/O options are increasingly small (often 1U thick) considering their capabilities, and may feature a variety of hardware interfaces, or perhaps just one that's blazingly fast, like Thunderbolt. Either way, a modern, on-the-go audio content creator really can't go wrong with any of the following choices in I/O.



Antelope Audio's Orion32+ and Orion Studio interfaces are fully compatible with Apple Thunderbolt technology. Orion32+ features 32 channels of I/O within a compact 1U rackspace. Features include 24-bit, 192kHz performance; zero-latency monitoring; comprehensive connectivity with ADAT and S/PDIF throughput, D-Sub 25 analog I/O, etc.; and 129 dB of dynamic range via "mastering grade" monitor outputs. The Orion Studio is a 24-bit, 192kHz-capable 32-channel I/O featuring USB compatibility; fast operation; 12 commercial-quality microphone preamplifiers; 16 analog outputs; and more. Orion32+ and Orion Studio software for OS X and Windows OS features a color-coded routing matrix, four separate mixers and DSP effects integration.



Ideal for Apple Logic users, **Apogee Electronics** announced its new Element series of three Thunderbolt audio

interfaces for Mac—the 192kHz/24-bit capable Element 24, Element 46 and Element 88—last year at AES, each with a different number of analog and digital I/O. Element 24 offers 10 in, 12 out; Element 46 offers 12 in, 14 out; and Element 88 offers 16 in, 16 out. While Apogee explains that the Element series' performance is comparable to its impressive Ensemble series, but is more affordable and streamlined to best serve a broader range of potential users. The Element series 48V phantom-power ready preamps are indeed low-latency; they reportedly perform a 1.41 ms roundtrip latency at 96 kHz with a 32-buffer setting when using Apple's Logic Pro X DAW.



For those who don't need a direct connection to their CPU—or for users of the popular **Audient** iD Series who need more than two microphone preamps—the Audient ASP880 is a great-sounding, traditionally styled 8-channel microphone preamplifier with 48V phantom power, Burr-Brown A/D converters, variable input impedance, variable highpass filters, eight useful insert points, and dual DI instrument inputs. Digital outputs include ADAT, AES and S/PDIF.



Specifically built for Pro Tools users, **Avid's** PRE is an 8-channel digitally controlled preamplifier that is adjustable from its front panel or entirely

within Pro Tools, or an associated Avid controller. Each input supports XLR, DI or TRS line-level inputs. DB-25 outputs are provided for universal analog connectivity, too. All eight channels are provided insert points as well as highpass filter, phase reversal and 48V phantom power.

Affordable and well-equipped with I/O options, **Behringer's** Firepower FCA1616 is a 16 in, 16 out 24-bit/96kHz-capable multichannel preamplifier/interface featuring FireWire, USB, MIDI, ADAT, S/PDIF, etc., connectivity. Key features include four Midas-designed microphone preamplifiers with phantom power, individual pad, low-cut and high-impedance selectivity eight analog inserts, and much more. Most attractively, the unit is priced at a low \$249.99 street.



DiGiGrid IOS, an audio interface with a built-in SoundGrid DSP server for plug-in processing developed by Waves and

DiGiCo, features eight mic/line inputs, eight line outputs, dual headphone outputs, and MIDI I/O, S/PDIF, and AES ins and outs. Connectivity is via a single Ethernet cable (Cat 5e/Cat 6). Notably, IOS comes with SoundGrid Studio System software, including the SoundGrid Studio application, Stu-



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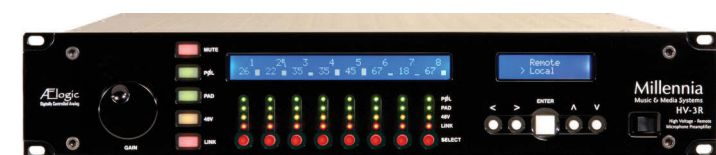
dioRack, and the eMotion ST mixer. This allows mixing and monitoring, in real time, with SoundGrid-compatible Waves and third-party plug-ins with incredibly low latency (0.8 milliseconds).



Focusrite's largest multichannel preamp in its Red Series of interfaces, the 8Pre, offers a whopping 64 ins, 64 outs and eight digitally controlled Red Evolution mic pre's with 63 dB of gain. With 16 analog inputs and 18 analog outputs, the unit also includes two front-panel instrument inputs. Further, its connectivity is impressive—options of Thunderbolt 2, dual Pro Tools | HD DigiLink, and Dante AoIP are included. The unit's software control allows recall of settings and stereo linking, as well as configuration of HPF, polarity flip and individual phantom power. The preamps (and other parameters) can be adjusted from the front panel and include Focusrite's 'Air' effect, re-creating in the analog domain the sound of the transformer-based mic preamps in the ISA range.



Grace Design's m108 is a high-performance 8-channel preamp with eight inputs and two outputs featuring USB 2.0 connectivity. Evolved from the beloved m802, its eight transformerless mic preamps feature 192kHz A/D conversion. Dual quarter-inch Hi-Z inputs for channels 1 and 2 are included plus quarter-inch stereo headphone output with dedicated volume control. Buttons for +48V phantom power, mute, phase reverse, solo, Peak Clear, setup, Group and Pan control are included on its front panel. A high-contrast OLED displays all the functionality of the eight preamp channels and associated Global settings. Notably, an Edit knob controls the m108's functions and allows navigation around the setup menu. Other features include DB-25 analog out, AES3 out, dual ADAT outputs, Word Clock I/O, RS422 MIDI I/O for Pro Tools HD control and an Ethernet jack for IP control.



Millennia Media's HV-3R is the remote-controllable version of its HV-3D 8-channel multichannel microphone preamplifier. Controllable via Eth-

ernet on Millennia's AELogic PC software, as well as via MIDI, the HV-3R has available Dante, AES and MADI output options, too. For world-class, large-channel count purposes, the HV-3R is matchless; the unit supports control of up to 792 channels (or 99 HV-3R units) simultaneously.



MOTU has long been known as a super source for multichannel preamp/interface options, and the company's 1248 is an ideal example of the kind of feature-packed units we are examining here. Featuring 32 ins, 34 outs and four built-in microphone preamps, the 1248 offers Thunderbolt, USB 2.0 and iOS connectivity (via Apple's Camera Connection Kit) for use with iPad-based DAWs such as WaveMachine Labs' Auria, making the 1248 a superb all-in-one field recording solution. Other features include a built-in DSP mixer with processing and effects, ADAT and S/PDIF I/O, AVB Ethernet networking capability and more.

PreSonus' Studio 192 USB 3.0 is the most comprehensively featured of its rackmountable interfaces with 26 ins, 32 outs, eight remote-controllable Class A microphone preamps, DSP-powered "Fat Channel" EQ and dynamics processing on all inputs, and much more. Notably, the Studio 192 includes a complete monitoring section with talkback microphone, dim and mute functions, as well as dual headphone outputs with independent source selection. For those recordists using (or considering) PreSonus' burgeoning DAW Studio One, this unit is optimized for it; Studio One Artist is included, though it works swimmingly with essentially any DAW on the marketplace. Best of all, for all that it is, the Studio 192 is affordably priced at \$899 street.



When it comes to feature-packed, high-quality audio interfaces, Germany's **RME** are true experts, having packed mind-blowing amounts of features and functionality into a 1U chassis for years now. Their latest accomplishment is the impressive Fireface UFX+, capable of handling up to 94 channels of I/O while offering USB 3.0 and super-low latency Thunderbolt connectivity. Key features include four microphone preamps with 75 dB of gain; MADI I/O; built-in TotalMix FX mixer for input, output, mix level, etc., control; and available ARC USB desktop controller. Most notably, the RME doesn't even need a CPU to capture multitrack audio; simply insert a thumb drive into its front panel DUREC USB slot for capturing of up to 76 simultaneous channels. I am currently reviewing

this unit and am already blown away by its capabilities, even though I've tapped maybe 20 percent of what it can do.



Steinberg's UR824 is a 24-bit/192 kHz-ready USB 2.0 audio interface featuring 24 ins, 24 outs, and eight D-PRE microphone preamps with dspMixFX, a latency-free DSP-powered monitoring system with REV-X reverb, Sweet Spot Morphing channel strip and various guitar amp simulations. Although Cubase and Cubasis are included, the UR824 is compatible with all major DAWs. Its two pair of ADAT optical I/O provide 16 ins and outs, which are S/MUX-compatible, 4 in and 4 out at 192 kHz.



Tascam's 24-bit/192 kHz-capable Celestonic US-20x20 offers 20 channels of analog and digital I/O paired with USB 3.0/2.0 connectivity for an affordable \$499 street. Built to serve in a number of applications, the US-20x20 operates as an audio interface, digital mixer and 8-channel digital mic preamp. The unit features Tascam's Ultra-HDDA microphone preamps with 56 dB of gain; ten channels of digital I/O via ADAT and S/PDIF connectors; word clock and MIDI I/O; and a built-in DSP mixer with parametric EQ and compression on every channel. The unit also includes a stereo reverb.

Universal Audio's Apollo 8p is arguably the sexiest 8-channel preamplifier/interface on the market, featuring eight Unison-enabled mic preamps, onboard UAD-2 QUAD Core processing, and an included bundle of award-winning UAD plug-ins (the latter being the sexy part). Apollo 8p offers 16 ins, 20 outs, and two built-in Thunderbolt ports. UA users can quickly increase the number of inputs by adding other Apollo units into the system. UA also gets bonus points for its Console 2.0 application, allowing comprehensive control of what's going on inside the Apollo 8p.



Zoom's TAC-8 is a Mac-ready 24-bit/192kHz-capable 18-in, 20-out Thunderbolt interface featuring eight microphone preamps with a wide range of uses. In standalone mode, it can be used simply as an 8-channel mic preamp and A/D or D/A converter, no CPU needed. Other features include 10 balanced TRS output jacks, dual front-panel headphone outputs with dedicated volume knobs, ADAT and S/PDIF I/O, Word Clock and MIDI I/O, and much more. ■

Strother Bullins is Technology Editor for NewBay Media's AV/Pro Audio Group.

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NEUTRIK

MIX REGIONAL: MIAMI



The Mario Ortiz All Star Band recorded live with engineer Jesus Canton and shot a music video at Big Wall Studios.

Photo: Roli Benitez

Live From Big Wall Studios

This multi-studio complex in north Miami's theater district has kept its big rooms booked by opening them up for band rehearsals and video shoots, as well as live recording. Santana, Pit Bull, Phil Collins and many others have used the studio for band rehearsals (Collins also recorded an audio book in the studio), and bands that record live at Big Wall—like the Mario Ortiz All-star Band, pictured—often track concert-style, with a film crew on hand in addition to their music recording team.

"That's one of our specialties," says studio owner/manager John "JT" Thomas. "We get some of our work from Sony, and we've also done a lot with La Banda and [Telemundo talent competition show] La Voz Kids."

Big Wall comprises two large live tracking rooms and three additional studios, all loaded with vintage and modern outboard gear and microphones, Pro Tools and Logic systems, and a wealth of musical instruments. Thomas' staff includes two house engineers, Emilio Martinez and Simon Conella, and multiple Latin Grammy winner Cesar Sogbe frequently mixes at the studio.

Thomas also uses Big Wall to realize his own projects: He frequently composes and mixes background music for ESPN and Fox Sports. While a lot of that work can be done in his personal studio, he takes advantage of Big Wall's recording space to track real drums.

"I have a studio at my house, but there are some things you can't do at your house," Thomas says.

L-R: Engineer Carlos Alvarez, vocalist Anna Maria Jopek and pianist Gonzalo Rubalcaba (also pictured at work below)



UPDATE FROM CRITERIA STUDIOS

No visit to Miami's studio scene is complete without checking in with Criteria Studios (formerly Hit Factory), the home of unforgettable recordings by Derek and the Dominos, the Bee Gees and many others. Trevor Fletcher, longtime manager, let us in on the latest sessions at the studio, which is now just one year away from celebrating its 60th anniversary.

"We just finished a project for Universal Poland vocalist Anna Maria Jopek," Fletcher says. "She collaborated with jazz great [pianist/composer] Gonzalo Rubalcaba, who both produced and played on the project. [That was] recorded live in our big room, Studio A."

At press time, other current projects at Criteria include Def Jam artist Fanny working with producer SupaDupes, and engineer Gary Noble mixing an upcoming CD for vocalist/songwriter/producer Faith Evans, with featured appearances by BadBoy artists and including archived vocals from the late Biggie. The studio also recently hosted visits from performers as diverse as DRAMS, Nick Cannon, WISIN, Jason DeRulo and Sarah Brightman.



Bay 8 Studios features an SSL AWS 900, along with Pro Tools HD and Logic.

Photo: Matthew DeFreitas



BAY 8 STUDIOS

Bay 8 is owned and operated by engineer Matthew “Formatt” DeFreitas. The Providence, R.I., native moved to Miami in 2009 after several years in Northeast studios. Bay 8 began as producer Fabio “Estefano” Salgado’s Midnight Blue Studios, which was designed by John Arthur and John Lambert. DeFreitas purchased the two-studio facility from subsequent owner/producer Marco “Infamous” Rodriguez-Diaz and dubbed his new studio Bay 8 in 2015.

Featured equipment includes an SSL AWS 900 console, Pro Tools HD and Logic Pro; an assortment of monitors from Dynaudio, KRK, Yamaha, JBL, ADAM and M-Audio; a range of plug-ins, analog outboard equipment; and a stocked mic cabinet.

“I have a hybrid setup in Studio A, which is where I normally work; I use a bit of both digital and analog,” says DeFreitas. “I use the SSL 99 percent of the time, but I also have hardware inserts that are super cool because they allow me to access hardware direct from Pro Tools.”

DeFreitas does much of his own engineering—including recent projects with Mark Johns, Xantos, and Leslie Grace with producer Tainy Marco Masís—but he also takes great pride in the collaborative way he works with his house engineers and other staffers.

“Our staff is some of the coolest and most laid-back engineers and producers; some are at different stages in their careers, but they all offer something that makes Bay 8 different,” DeFreitas says. “Bay 8’s clients expect quality and professionalism, and we are all about offering an environment to create. We all clean, we all go on runs, including myself. We are all about the experience here. I want clients to leave this facility and have a memory of a lifetime.”

SESSIONS



Alvaro Rodriguez

HISTERIA MUSIC SCORES TV WORK

Music and audio post-production company Histeria Music has two new ongoing projects: The facility will handle ADR for the Spanish and Portuguese adaptations of the third season of Netflix’s original drama/thriller series *Bloodline*.

Histeria’s Alvaro Rodríguez and Gustavo Briceño will serve as engineers

and sound designers on this project and on season three of MTV’s comedy/clip show *Ridiculousness*, which is filmed at Viacom’s Miami studios. The studio also worked on *Ridiculousness* seasons one and two.

“Working on both seasons was such a challenge due to the incredibly fast turnarounds and the difference in the approach given to each language,” says Rodríguez. “Mixing at our own studios parallel to mixing at Viacom’s audio room was key to completing this show in time.”



Pablo Reynoso (left) with Gary Vandy

MIAMI BEACH RECORDING STUDIOS

Miami Beach Recording Studios began its life as Gary Vandy’s Studio Center in the 1960s. Twenty years later, the facility became MBRS, and in 2015, producer/engineer Pablo Reynoso became a partner in this facility along with studio co-founder/producer/engineer/musician Luciano “Looch” Delgado and associate

partner/engineer/producer Gus Cuervo.

Delgado’s recent projects include *Vinyl Blvd* (Yamit Geiger with Ed Calle, Chad Bernstein and Jean Caze); while Reynoso’s latest credits comprise *Orishas*, *Yadam Gonzalez* and *Niuer*. And Cuervo recently worked with traditional Cuban music and salsa group *Conjunto Impacto* on a documentary featuring the group, which won the award for Best Foreign Language Documentary at the London International Film Festival.



AUDIO VISION STUDIOS

Engineer/producers Ron and Howard Albert (pictured), co-owners of Audio Vision Studios, have been working with their partner Steve Alaimo and Ish Ledesma on a tribute to Alaimo’s former label, TK Records, which released many seminal disco records in the 1970s. *Bringing*

It Back by the TK All Stars features seven former TK Records acts.

“The artists all had Number One records domestically and internationally,” says Ron Albert. “These are all-new vocals sung by the original artists.”

The TK All Stars include KC and the Sunshine Band, Betty Wright, Anita Ward, George McCrae and others.



Latin artist Kevin Rolland (left) and Justin Quiles

NEWLY OPENED: HOUSE OF HITS

House of Hits, a boutique penthouse studio in the art district of midtown Miami, opened six months ago. Since then, in-house mix engineer Vinny D (DeLeon) has worked on projects by rap and hip-hop artists such as Fat Joe, Trina, Zoey Dollas and Justin Quiles. From his new studio, Vinny D also mixes for remote clients from all over the world.

Tech // new products



RME ADI-2 AD/DA CONVERTER

High-end Digital Interface for Mac/PC or iOS

The ADI-2 from RME (\$2,299) boasts high-grade clocking plus battery or powered use through its half-rack design. Features include two servo-balanced analog inputs on combo XLR/ TRS jacks, two separate balanced and unbalanced outputs on XLR and TRS connectors, two individual stereo Extreme Power headphone outputs on the front, an optical SPDIF I/O that also recognizes the ADAT format, plus coaxial SPDIF (RCA) and AES I/O (XLR) via an included breakout cable. The ADI-2 Pro's USB 2.0 port is fully Class Compliant (UAC 2) for connection with compatible iOS devices and Mac OS computers. Windows 7 or up is also supported through WDM and ASIO.



BLUE MICROPHONES ELLA AND SADIE HEADPHONES

Planar and Active Dynamic Designs

The new Ella headphone from Blue (\$699.99) features planar magnetic drivers with an onboard audiophile amp and large, high-capacity cabinets. Custom 50mm x 50mm drivers are self-tensioned for exceptional response and extreme accuracy. Sadie (\$399.99) extends the innovations achieved by Blue's Mo-Fi powered headphone using matched 50mm premium dynamic drivers and a built-in amp. Both Ella and Sadie's headband features a four-point multijointed linkage system with pivoting arms to keep the headphones parallel at all times, while the earcups are shaped to achieve a superior seal for accurate bass response, improved isolation and reduced leakage.



ORACLE SUMMING MIXER

16-Channel, Hand-Built, Analog DAW Back End

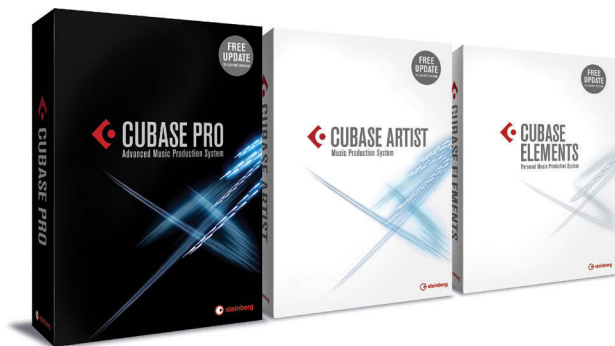
Built in the USA by Greg Wurth and Steve Firlotte of Inward Connections, the Oracle Summing Mixer (\$4,395) features a range of controls, including mono combined and channel insert switches, large L/R VU meters, large stereo bus level pot, master insert switches (A&B) and an external power supply providing plenty of AC headroom. I/O for inputs and insert send/return are on D-Sub connectors, while the Aux Left and Right Inputs, L/R Stereo Buss Inserts send/return are on TRS jacks.



CHANDLER LIMITED REDD MICROPHONE

U.S.-Built, EMI-Badged Tube Condenser

The REDD Microphone from Chandler (\$4,499) is a large-diaphragm tube condenser microphone combining mic and preamp into a single, beautifully handcrafted professional recording device. Featuring the vacuum tube-based REDD.47 Mic Amplifier circuit directly coupled to a custom handmade premium platinum membrane capsule, the REDD Microphone can be used with or without an external preamplifier. Features include nine gain selections, extended gain and punch in DRIVE mode for more tonal and coloration possibilities, plus switchable Cardioid/Omn patterns, -10dB pad, and polarity reverse.



STEINBERG CUBASE PRO 9, ARTIST 9 AND ELEMENTS 9

Three Versions Cater to Wide User Base

While Cubase Pro 9 (\$739.99) has clearly been engineered to meet the exacting standards of professional producers, composers and mixing engineers, Cubase Artist 9 (\$419.99) steps down a gear yet provides a comprehensive set of tools tailored to instrumentalists and songwriters. Cubase Elements 9 (\$130.99) is the gateway to the world of Cubase, providing a straightforward way for recording high-quality audio. All three versions introduce the new Lower Zone, allowing for a dedicated area in the Project window to be used for the mixer and other tool panels. Other features include the Sampler Track with the Kaleidoscope library featuring hundreds of samples. In Cubase Pro, Frequency is the new EQ processor with eight bands, each with the new Linear Phase mode to preserve the band's signal phase. There is also M/S support, Auto Listen to monitor adjustments, Spectrum Display, and reference keyboard. Cubase Pro 9 also comes with up to 10 marker tracks, providing users with even more freedom to specify ranges within music projects and to use these to export individual stems and group mixes.



ANTELOPE AUDIO FPGA EQ FX

Modeled BAE and Classic Console Hardware Designs

Antelope Audio has released two new EQ models based on BAE's 1023 and 1084 hardware equalizers, plus four additional classic EQs. Additional models include the VEQ-STU 089 with highpass and lowpass filters, 80Hz and 8kHz bands and presence control; VEQ-STU 169 3-band inductor-based EQ; VEQ-STU 900 classic console EQ; and the VEQ-HA32C 4-band EQ. The units are available as a free download for users of the Orion Studio, Zen Tour, Goliath, and Orion32+.



PRESONUS FADERPORT 8

Eight-Fader Controller For Your DAW

The PreSonus FaderPort 8 (\$499.95) features eight touch-sensitive, roommm long-throw, motorized faders; eight high-definition Scribble Strip displays; complete recording-transport controls; plus general session controls such as Undo/Redo, Arm All, Solo/Mute Clear, Track Management, Click On/Off with tap tempo. Session Navigator provides quick control over track scrolling, channel banking, timeline scrolling and much more. It is Mac/PC-compatible with native Studio One support and HUI and Mackie Control Universal emulation. There is also a Footswitch input for hands-free start/stop and USB 2.0 connectivity.



IK MULTIMEDIA MODO BASS

Physical Modeled Virtual Instrument

MODO BASS (299.99) is a customizable physically modeled virtual bass instrument that re-creates the sound of the electric bass and how it's played in real time. The models include the physical instrument components, human technique, and the entire sound of the signal chain with effects and amplifiers. MODO BASS contains a collection of 12 physically modeled iconic electric basses played by picking, plucking and slapping. Players can choose the type of pick-ups (up to 20), number of strings and type (round or flat-wound), the gauge, age, and the physical action height of above the fret-board. The signal chain includes seven stomp boxes and two classic bass amplifiers derived from IK's AmpliTube flagship software.

New Sound Reinforcement Products



BOSE PROFESSIONAL SHOWMATCH DELTAQ LOUDSPEAKERS

Field-Adjustable Waveguides for Portable or Install Apps

The ShowMatch line array from Bose (\$ Per Config) features DeltaQ array technology that directs more sound energy to the audience by allowing directivity, or “Q,” to vary with each array module. ShowMatch full-range array loudspeakers are available with 5-degree, 10-degree or 20-degree vertical coverage with class-leading versatility that allows J-array, constant-curvature, or DeltaQ array configurations. The system provides 145dB peak array output levels generated from four Bose EMB2S neodymium compression drivers and two 8-inch neodymium woofers with more usable low-frequency output in smaller arrays. The matching-width 18-inch ShowMatch DeltaQ subwoofer provides low-frequency extension down to 30 Hz. Integrated rigging allows mixed arrays with full-range modules or subwoofer arrays including cardioid and ground-stack configurations.



BASSBOSS SV8 MICROMAIN MONITOR

Small Drivers, Big Powersoft Sound

The SV8 Powered MicroMain (\$1,495) features 117 dB of sustained output in satellite mode and maximum output of 120 dB. The 8-inch woofer uses a rubber surround providing excellent edge damping, low distortion and smooth midrange response. The SV8 includes comprehensive DSP built into its 700-watt Powersoft amp, providing four presets designed to maximize utility. The presets allow the speaker to be used either as a full-range system, a satellite for a small subwoofer or as a main speaker with a larger subwoofer. The sturdy all-Baltic birch enclosure features integrated handles and is available in a black touring polymer coating or UV-stable white.



FISHMAN SA PERFORMANCE AUDIO SYSTEM

Portable, High-Quality Sound Reinforcement

The SA Performance Audio System consists of the SA330x (\$999.95) wide dispersion modified line array speaker system, the SA Sub subwoofer (\$549.95) and the SA Expand (\$149.95) 4-channel expander/mixer. The SA330x produces 330 watts in a wide-dispersion design and offers channel expandability via an accessory port that provides one-cable audio and power for the SA Expand. Additional features include two mic/instrument channels with combo 1/4-inch/XLR inputs, high-quality preamps, 3-band EQ on each input channel, four digital reverb effects with channel Reverb level control, 48V phantom power, Feedback-fighting Phase and Notch filters, auxiliary stereo input with level control, balanced XLR DI outputs for both input channels and Main mix, and a unique Monitor I/O for improved onstage ensemble monitoring.



ULTIMATE EARS UE 18+ PRO

High-End IEMs for Studio/Stage

The UE 18+ Pro (\$1,500) takes the excellence of the original UE 18 Pro (four-way crossover, triple bore and six drivers per monitor), and adds the True Tone drivers, which were originally introduced last year with the UE Pro Reference Remastered. The drivers

extend the frequency range by 3 kHz to enhance the upper-band frequency response. An adjusted midrange gain improves presence, altogether bringing a clear yet warm sound. The UE 18+ Pro can be plugged into any audio interface with the 1/8-inch headphone jack or included 1/4-inch adaptor. Numerous faceplate color options and even custom faceplate designs are available.

On the Cover, Continued from p. 14

try when you're in the room. I still can't believe that Power Station A is now in a high school."

"The control room is completely isolated from the surrounding spaces," adds Gianforaro. "The entire room is on a 'rubber' pad and no walls are attached to the surrounding structure. The HVAC equipment is dedicated to that space and all equipment is on isolation springs. The electrical grounding is also isolated from the building. The Maker Space is on a concrete slab, which gives us mass between the spaces."

While the room was being built, Saint Germain began putting together the equipment package, albeit with a budget that was cut considerably. He took Trevor Campbell, audio engineering teacher, around to look at SSL, Neve and a few others, then opted for a 32-frame API Vision.

"I wanted the students to be able to get sound quickly," Saint Germain says. "A microphone, preamp, fader, and you're recording, without being dependent on computers. The Vision has a very small footprint. We were originally going for 48 faders. But there was a 32-frame that had already been built. We reconfigured it in the frame and budget. They now have essentially 48 channels of audio in a school that had been recording with stereo mics. They have a console that can do 5.1, 7.1 and stereo simul-

taneously. And they need that. Trevor has put students on the console immediately and got sound with a microphone. They're so happy to get sound up." Saint Germain also selected Modern Audio Design Mad-Max near-field monitors, a personal favorite. Recording is to Pro Tools.

The new studio debuted with the start of the 2016-17 school year, as part of the introduction of the Rock and Roll Academy, a program not unlike the fictional School of Rock.

"We used to think of rock and roll as being unscholarly," Reynolds says. "You're supposed to study the classics. But this is 2016 and rock and roll is the classics. Lennon and McCartney can be every bit as important as Beethoven and Mozart. Beyond the scholarship, there is just the fun factor of doing something that you do well. We're finding that kids are coming in to school who might not have cared, but the reason they put forth the greater effort overall is that they can't wait to be in the Rock and Roll Academy. It's a life changer.

"The kids we see in Rock and Roll Academy classes are not the kids you think you'll see. The invisible kid. He's up on stage now and rocking out. It's sort of the real-life School of Rock. The kids aren't necessarily the cool kids, but they're redefining what cool is." ■

Winifred Phillips, Continued from p. 40

score," notes Phillips. "That was interesting work, especially in trying to create a sense of variety for the 'zone mode' tracks."

Vertical layering is a different approach whereby the music is composed so that it can be split into layers that are played concurrently and in synchronization with each other. Each layer is a separate audio file that can be turned on and off by triggers in the game engine. Ultimately, Phillips says, vertical layering requires a different mentality.

"You have to step away from the philosophy of composing in a linear way by building up a texture and telling a story," she explains. "Music is essentially a linear narrative. It's taking you on a journey. You are following it through moments of intensity, and then it settles down and there are hushes and pauses. When you compose that way, you can plan it out and that structure feels very comfortable. But when you start thinking about breaking a song apart into six different layers, then that kind of storytelling has to go out the window. You have to think about the music as an immense puzzle which can be taken apart and then pulled back together at any particular point."

The layers, she notes, are not simply stems, such as all percussion on one track and the strings on another. It's more like little ensembles. Each layer has to be able to stand alone and feel like a song.

Phillips, who first experienced this compositional method on an Xbox Live Arcade game called *The Maw*, admits that it's very intense. "Working with the Twisted Pixel team, I developed the music design for that project—where the music would trigger and how it would be structured. That was a very illuminating process." Later, when Phillips met with Sony Interactive Entertainment Europe to work on *LittleBigPlanet 2*, she showed them the vertical layering design she had developed and shared the philosophy behind the way it's triggered.

LittleBigPlanet 2's team had already developed a six-layer system, which was twice the size of the three-layer system used on *The Maw*.

Phillips says, "It's complicated to take a piece of music and split it into three synchronized sections that worked together but also can work alone. When you take it apart into six layers then it just gets exponentially more headache inducing at that point." Sony's latest release, *LittleBigPlanet 3*, is a platforming game that also provides players with the toolset to create their own levels, including access to all the music layers. This posed an interesting challenge for Phillips. "The LittleBigPlanet team wanted the music to be very satisfying for the player, not just when all six layers play together. That's because the player could use any one of those layers. They have that choice and we have no idea how they are going to use them," she says.

Phillips typically composes in Pro Tools 12, using Native Instruments Kontakt as a plug-in. She also has four different satellite computers running Kontakt in standalone mode, giving her access to numerous sample libraries without burdening her main system's CPU.

In addition to the Native Instruments libraries, Phillips uses several others, including the Vienna Symphonic Library, LA Scoring Strings, EastWest/Quantum Leap (Hollywood Brass), and ProjectSAM's Symphobia. Phillips also used these libraries extensively on the score for High Voltage's VR strategy game *Dragon Front*, which melds the surreal world of fantasy with the oily steel and grit of WW II.

When composing for VR games, Phillips considers how the music will affect the player's experience. In particular, she's conscious of not contributing to the problem of VIMS (visually induced motion sickness).

"One sonic issue, in regard to VIMS, is infrasound—low-frequency rumbling that's just within range of human hearing. Research has shown that people have experienced motion sickness when exposed to infrasound, even though they weren't moving at all," explains Phillips. "I've been giving the concept of music for virtual reality a lot of thought lately, and I've been writing about it quite a bit for my blog." ■

Tech // reviews

AUDIONAMIX ADX SVC

Novel Plug-in Separates Dialog From Background Noise



ADX SVC's simple, user-friendly GUI interfaces with intensive, cloud-based processing to separate speech from background noise. The Separation Options (on the right side of the GUI) affect the quality and content of the extraction.

ADX SVC (Speech Volume Control) is Audionamix's follow-up to its revolutionary ADX VVC 3 (Vocal Volume Control) plug-in released last year. VVC can separate vocals, or a melodic instrument, from a baked-in mono or stereo mix and discretely adjust its volume and panning. Similarly, SVC separates speech from background noise for discrete volume adjustment of both elements. I was completely blown away by VVC 3 when I reviewed it for *Mix*'s sister publication, *Electronic Musician*, so I was especially eager to review the new ADX SVC.

Version 1.0.0 of the cross-platform SVC is available in AAX Native (64- and 32-bit), AU and VST formats. I reviewed the AU plug-in in Digital Performer 9.12, using an 8-core Mac Pro running OS X 10.9.5.

IN THE CLOUD

Like VVC, SVC uses cloud-based processing. Access to the ADX cloud is granted by an API (application programming interface) key you receive after purchasing or renting the software. (iLok is not used.)

After instantiating SVC on a track insert, you make a selection of the audio you wish to be separated (in DP 9.12, selecting the audio is unnecessary). After activating the plug-in's Acquire button, you either perform an offline bounce or play through the selection so the plug-in can acquire the audio. Subsequently pressing the Separate button sends the data to Audionamix's ADX servers for processing.

The GUI's Separation Options should be selected before you press

the Separate button. Activating the AVAD button enables Audionamix's Automatic Voice Activity Detection algorithm during the separation, processing your selected audio only where speech is present instead of throughout. If SVC doesn't extract speech in some places, turn off the plug-in's AVAD function and run the separation process again in those spots.

Turning on SVC's Reverb option separates reverb along with the dry speech so you can maintain the wet/dry balance of the original dialog as you make subsequent changes to its gain. Activating the plug-in's HF Boost option helps SVC extract the high-frequency, noisy components of speech produced by enunciated consonants. Activating the High-Quality button yields better-sounding results at the expense of a longer wait on processing.

To help target the voice for separation, select one of three Speech Settings presets: Male, Female or Child.

You can make the separation even more precise by dragging two Pitch Range sliders to delimit the fundamental pitch range of the speech to be separated. After separation is complete, you can drag Speech and Background sliders—and automate them—to adjust the respective volumes of dialog and background noise ± 12 dB. Left- and right-channel meters show input levels to the plug-in before separation and output levels afterward.

IN POST-PRODUCTION

Even in High-Quality mode, SVC demanded virtually no local CPU resources in DP—no doubt due to all separation processing being carried out in the cloud. High-Quality separation typically took only a little longer to complete than the program length itself. The disadvantage of cloud-based processing is that if your Internet service goes down during a session, you're out of luck.

I always got better results with the AVAD button turned on; turning it off introduced phase-y, watery-sounding artifacts in any noise or reverb that remained after processing. On an adult female's dialog track, I turned on SVC's HF Boost function and deactivated the Reverb button. The track had a steady-state noise floor (from the cheap mic and preamp used by the videographer) only about 26 dB lower than the RMS level of the voice. I boosted the Speech slider around 6 dB—any higher and I would have clipped SVC's output—and lowered the Background slider 12 dB. The processed dialog sounded clear, un-

PRODUCT SUMMARY

COMPANY: Audionamix

PRODUCT: ADX SVC

WEBSITE: Audionamix.com

PRICE: \$199 purchase;
\$19.99 two-week rental

PROS: Transparently reduces steady-state noise (miraculously so when its input is attenuated after processing). Fairly effective in reducing reverb and wind noise. Inexpensive. Extremely easy to learn and use. Negligible CPU load.

CONS: Ineffective at reducing clicks. Treating wind noise causes dry dialog levels to modulate. Online processing is vulnerable to Internet outages.

changed in timbre and fullness, and free of artifacts. Background noise was greatly reduced, though still audible in the lower midrange band (more audible than when I processed the track using iZotope RX5 Advanced's De-noise plug-in). SVC did not effectively reduce loud clicks from the track.

For grins, I instantiated MOTU's Trim plug-in in the insert before SVC, so I could attenuate SVC's input enough to allow boosting the Speech slider to the max without clipping. I expected this to screw up SVC unless/until I ran its separation process again, as it had already executed its analysis and processing without Trim upstream in its signal path. Instead, I discovered something that blew my mind and that seemed to defy the laws of science: As I progressively lowered the gain in Trim, only the steady-state background noise level got reduced at SVC's output. Even with a whopping 40 dB of trim applied, the dry dialog track was just as loud (and pristine). The noise floor, on the other hand, was gone—like in a vacuum! This trick was undocumented at press time because even the folks at Audionamix were unaware of it.

Next up was an adult female's dialog track that had been recorded outdoors and was sullied with very heavy wind noise. I could attenuate the wind noise at least 7.5 dB without hearing phase-y artifacts. However, SVC's processing caused the dry dialog's level to modulate significantly. I achieved roughly the same amount of noise reduction overall using the more expensive iZotope RX5 Advanced De-

noise plug-in (which didn't modulate the dialog level). De-noise didn't attenuate the sound of strong wind gusts containing heavy low-bass energy as much as SVC, but inserting a rumble filter after De-noise took care of that. Oddly, running two SVC plug-ins in series (in the quest for greater noise reduction) overlaid an out-of-sync, sped-up, chipmunk-like voice over the dialog track on playback.

I next tested SVC on an adult male dialog track that had been recorded in an extremely reverberant room. With the Background slider plunged to -12 dB, SVC significantly reduced reverb and preamp hiss on the track. Recalling the processing I'd used during the original session, however, iZotope RX4 Advanced Denoiser and DeReverb (placed in series) achieved far greater noise and reverb reduction. Of course, RX4 Advanced is many times more expensive (and more complicated to operate) than SVC.

Interestingly, using my pre-attenuation trick (placing MOTU Trim upstream of SVC after processing) yielded poor results when treating tracks polluted with reverb or wind noise: Even minor input-level trimming made SVC sound very phase-y. But as I mentioned before, this unorthodox technique worked like a veritable miracle for reducing preamp noise (noise that's unwavering in intensity and spectral content).

My only disappointment with SVC's GUI was that the Background and Speech sliders didn't show readouts for their current positions when dragging them, making exact adjustments an aggravating task. Otherwise, the GUI was extremely easy to learn and operate.

SCORECARD

SVC is best at reducing steady-state, broadband noise. Attenuate its input with a third-party trim plug-in (after completing separation processing), and its effectiveness in that application is downright scary. For engineers on a limited budget, SVC is also a good choice for reducing reverb and wind noise on tracks, though not without a significant trade-off in the latter application. But considering its low price and mind-blowing performance in treating steady-state noise, even demanding pros who own a full suite of high-end post-production and restoration tools should consider buying SVC. ■

Contributing editor Michael Cooper is a recording, mix, mastering and post-production engineer.

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TEGELER AUDIO MANUFAKTUR CRÈME

Smooth, Transparent Hardware Bus Compressor



Crème has a dedicated EQ section with 5 LF and 6 HF frequency choices (boost only).

Tegel Audio Manufaktur's aptly named Crème is a 2-channel line-level audio processor designed to be a "finishing touch" for stereo mixes or across buses/stems. Handmade in Germany, Crème consists of a stereo equalizer and compressor processing chain with ganged sets of controls for adjusting both the left and right channels' equalizer and compressor sections together; the channels cannot be adjusted independently.

Crème is presented in a stylish, padded, wooden treasure chest adorned with Gothic-style latches and hinges. The unit itself comes in an all-steel 2U case with a built-in linear power supply, plus an internal switch for choosing between 120 or 240 VAC mains operation. The rear IEC power receptacle indicated "220-240-VAC mains only," but the unit was shipped with a U.S. power cable, so I checked that the internal switch was set to 120 VAC.

Internal construction is good, with surface-mount components on a single main circuit board and audio switched using Panasonic 12-volt relays. The main board is interconnected to the front panel's circuit board using two ribbon cables. The front panel's circuit board has control pots custom-made in Germany and Lorlin Electronics rotary switches with gold-plated contacts. The pots and switches are soldered to the board, and the controls' threaded collars are used to attach the entire board assembly directly to the unit's front panel. I noticed during normal usage that the front panel bends inward and flexes the circuit board. This lack of rigidity is because the unit's cover is not directly attached to the front panel anywhere. However, the cover is screwed to the cabinet everywhere else using small machine screws.

There is a very useful front panel switch for changing the chain order. It is easy to quickly audition Crème's process with the equalizer either before or after the compressor in the chain.

There are also front panel switches for mains on/off, master bypass and the SC Low Cut switch selects between Full (or none), 60Hz or 120Hz sidechain highpass filter frequencies. There is no rear panel sidechain access jack.

The 2-band equalizer section has four smooth rotary switch control knobs for the low- and high-frequency shelving sections. These are smooth, first-order, 6dB/octave filters with six frequency choices for each. You can only boost up to 5 dB in 1dB steps. The boost controls start at "0," which suffices for flat; there are no separate hardware bypass switches.

The low-frequency choices are: 20, 30, 60, 100, 140 and 200 Hz; the high-frequency choices are: 10, 12, 16, 18, 20 and 24 kHz.

Crème's compressor section is a soft-knee type that uses a pair of THAT Corp 2180C Blackmer Pre-Trimmed IC VCA chips. The unit also uses THAT Corp line receivers and TI line drivers—the unit forgoes transformers as the design goal is for sonic transparency.

A single, small VU meter reads the combined (summed) gain reduction of both channels but moves opposite from typical gain reduction meters. The needle rests on 0dB VU with no reduction and moves to the right with compression.

The compressor's front-panel Ratio control has 1.5, 2, 4 and 10:1 choices, and, for repeatability, the Threshold control has detents and is simply marked from 10 to 0; 0 being the highest threshold for no compression. I also liked the detents on the Output/make-up gain control. There is plenty of

TRY THIS

The left and right channels of Crème work great to lock "dynamically" a lead vocal with its double track. I split a stereo insert path I use for stereo buses as two mono inserts and set up the left channel for the lead and then routed the double track vocal to the right channel. Once I have the desired compression set on the lead vocal track, the (similarly recorded) double track vocal takes on the same dynamics.

PRODUCT SUMMARY

COMPANY: Tegeler Audio Manufaktur

WEB: tegeler-audio-manufaktur.de/

PRODUCT: Crème Bus Compressor and Mastering Equalizer

PRICE: \$1,799 MSRP

PROS: Smooth and transparent processing

CONS: Limited controls and average mechanical build.

level available, making Crème an excellent choice for tracking and/or low-level individual tracks in a mix. The Attack control has: 0.1, 0.3, 1, 3, 10 and 30ms choices, while the Release control offers 0.1, 0.3, 0.8 and 1.2 seconds, plus an Auto Release position.

STEREO MASTER PROCESSING

My first use was for a full stereo mix recorded at 44.1 kHz. I wanted to pre-condition the mix's dynamics for subsequent limiting so as not to have a single processor do all the "heavy lifting." Using the signal generator in Pro Tools 12.6.1, I confirmed that, using PSPAudioware VU 3.0.6 meter plug-ins, a 1kHz tone at 0 dB (ref -18dBFS) coming out of a stereo hardware insert from my Avid interface returned at 0 dB. With Threshold at 0, Output level at 0 and both EQ boost controls at 0, the two plug-in meters on the output and input paths matched exactly!

For this rock/pop song, I first set the SC Low Cut to Full (or none) and set the EQ before the Compressor in the chain. This particular song has deep bass, so I boosted at 200 Hz in the low frequencies by 1 dB to fatten up the bright sound of the loud lead vocal. Before doing any boosting in the high frequencies, I wanted to set up the compressor section. I chose 10ms Attack, Auto release and a 2:1 compression ratio.

With Threshold set to 2, the loud kick and bass triggered too much compression, so I switched in the SC filter to 120Hz position and saw the amount of compression decrease. Next, I tried switching the chain order so that the EQ followed the compressor. The 120Hz SC Cut and the EQ after the compressor allowed resetting both Threshold (up to almost 3) and Output level set at 2. There is no switch

to read output level, and the GR meter was showing 2dB to 4dB average compression on big vocal and track peak moments.

I boosted 18 kHz by 5 dB. This high-frequency section is my favorite part of Crème, and I could hear the change as a pleasant "openness" of the overall sound—not particularly bright, just nicer-sounding. Moving the frequency down to 12 or 16 kHz and applying boost gave me a noticeably brighter sound that this track didn't need. The 18kHz boost added a smooth, airy quality. For quick A/B checking, I wish there were separate EQ in/out switching, as I feel like I will wear out the boost rotary switches quickly cranking them back and forth between boost and 0 (or flat).

DRUM BUS AND VOCALS

I next tried Crème on a stereo drum bus that included the kick. Even with 16 dB of gain reduction on kick and snare hits, the unit remained clean-sounding. I used the 60Hz SC filter, EQ after the Compressor, Threshold at 6, Attack at 3ms and Release at 0.2ms. I boosted 12 kHz by 5 dB to make up the high-frequency dulling caused by this huge amount of gain reduction. This is the classic drum "squash" effect done in a modern-sounding way.

I also liked compressing vocals with Crème—again it is very clean—nearly surgical, transparent and unobtrusive. Heavy compression introduces no weird artifacts, and I found both lead vocals and backing vocals to be easily controlled using up to 6 dB of compression, a 10:1 ratio and a slow attack time at 30ms to keep the vocals shiny.

A GOOD POLISHER!

Crème is a worthwhile stereo bus processor with a clear and clean sound. I would rely on it for processing unobtrusively even when wound up to the extreme. I do wish it had a few more controls/options, such as the ability to cut with the equalizer, EQ section bypass switches, and a larger gain reduction meter that also read output level. But as it comes, it is a precision piece of well-engineered processing that sounds great and is enjoyable to use. ■

Barry Rudolph is an L.A.-based recording engineer and educator. Visit him at www.barryrudolph.com.

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Tech // reviews

PLACID AUDIO COPPERPHONE MICROPHONE

Personality Transducer Offers Low-Tech Chic



Engineers and music producers are always looking for that certain something in a production that sets their tracks apart from the rest. It could be a high-quality signal chain offering pristine high fidelity, or at the other end, some distortion or trash to bring personality to a recording. The Copperphone from Placid Audio falls into the latter category.

It's a dynamic, moving-coil mic offering a fixed, narrow-bandwidth output centered between 300 Hz and 3 kHz.

The microphone gets its name from its appearance; the exterior shell is a 2.5 x 6-inch, polished copper body featuring an integral metal mic mount and a Switchcraft XLR. Inside, a passive, magnetic moving-coil element is mounted in a tuned resonant chamber that all works together to produce its signature, and unique, sound.

The review unit that I received is the company's flagship model, but Placid also makes the Copperphone Mini (\$299); the Carbonphone (\$425), offering variable control over the frequency range of the mic; and the Resonator A (\$270) and Resonator B (\$270), each offering its own low-tech spin at output.

Being a one-man operation, Placid Audio also has a custom shop. On the company's website, you'll find the following offer: "Have an idea for a modification to one of our current models? Do you have a completely new idea for a one of a kind microphone? Maybe you are you looking to convert an old/broken vintage microphone with a custom or replacement circuit? Or would you simply like a personalized name plate added to your Placid Audio microphone?" If you want it, owner/designer Mark Pirro can create it for you.

DRUM TRASH

My philosophy when using odd products like this is to stretch boundaries and see what happens. If it works, fine; if not, all I've lost is time. For starters, I used the Copperphone around a drum kit to see what it would offer. After trying a couple of different placements, I found a winning position where the Copperphone gave me equal parts snare and kick attack. I carefully snuck the mic perpendicular to the right-beater side of the kick drum, pointing it at the snare body. The microphone was out of the drummer's way, looking across the kick drum from the low tom side, so there were no complaints there.

The Copperphone sound is very much like the "telephone" sound that you can get by dial-

TRY THIS

If you want to record trash vocals taken to the nines, use a low-to-high impedance adapter like the Whirlwind Little IMP, or Shure A85F, to plug the Copperphone directly into a guitar amp set for distortion. I usually run this parallel to a proper vocal mic, giving me many options later.

You can put the amp in an iso to keep it out of the clean feed, or make a commitment and place the guitar amp at the feet of the singer, miked separately in the same room (kudos to Vance Powell for that idea).

ing in lowpass and highpass filters—it instantly sounds trashy in a good way. In the body of the entire recorded kit, it worked when I just ghosted the Copperphone track in underneath the full-bandwidth tracks.

But the power here is to make the output more dynamic in the framework of the entire track. To accomplish this, I stripped out the audio between transients on the Copperphone track using Pro Tools Strip Silence. Then I batch-faded them all with a quick 10ms fade in and a 150ms fade out. Next, I muted all of the hits and then picked out select groups of transients to appear only on drum fills, accents, breaks and other choice spots.

Once I compressed the Copperphone track and tucked it into perspective (feeling more than hearing), it instantly brought that “What was that?” coolness to the track. The point is, with something as stark as the Copperphone, you have to do some work to bring finesse to the outcome.

VEHEMENT VOCALS

I’m always looking for trash on rock vocals, and in addition to my main mic, I use a Shure Green Bullet through a guitar amp recorded to an additional track to give me something to work with. The Green Bullet sounds fantastic in this application. But you need an extra room for the amp to keep it out of the clean feed, and mounting the Bullet on a stand calls for gaff tape, making positioning difficult.

The Copperphone has a proper stand mount, so putting it next to another mic on another stand, a Neumann U47 in this case, was easy. I could tuck them both together tightly behind one pop filter. Rather than an amp, I chose to run the Copperphone into two consecutive EMI V76 mic preamps to gain up the distortion, which I recorded directly to Pro Tools.

During my tests, I found that the approach of pairing the personalities of the Green Bullet and Copperphone worked very well in putting some space between these two personality mics. The lead vocal using the Green Bullet had more of a throaty sound with frequencies targeted lower than the Copperphone. So I used the Copperphone on backgrounds and doubles.

Once these tracks were mixed with the main mics, then muted dynamically, and even trashed further with Soundtoys Phase Mistress or other plug-ins, it provided me with an infinite variety of dynamic vocal options in the song. Once again, a bit of extra work made this one-trick pony more full-featured.

ACOUSTIC EXPERIMENT

Finally, I placed the Copperphone next to an Audio-Technica AT5045 to record an acoustic guitar.

PRODUCT SUMMARY

COMPANY: Placid Audio

PRODUCT: Copperphone

WEBSITE: www.placidaudio.com

PRICE: \$265

PROS: Easy to place. Affordable. Brings a unique sonic character to any application.

CONS: Not your versatile “everything” mic—this is a personality product.

To be honest, I just did this for fun’ O was not thinking that it was something I’d ever really use. However, once again, the Copperphone turned out to add that extra something that was useful when carefully mixed below the main microphone. The effect was to give the mellow guitar some extra edge, making it peek through the busy track. Mark Pirro from Placid Audio suggested that I try his mic on a piano, but before this writing I never got the chance. Believe me, I will soon because this mic brings

the fun-factor up to ten.

DO YOU NEED IT?

Placid Audio’s Copperphone microphone is an affordable, personality-plus transducer that should find a home in every mic locker. There is no other microphone like it in its category and price range. It’s easy to rely on your tried-and-true favorites when tracking and overdubbing, but having the Copperphone around makes you stretch—and that’s a great thing. So get one, or two; at this price it’s a no-brainer. ■

Mix magazine technical editor Kevin Becka also serves as an instructor and co-director of the Blackbird Academy in Nashville.



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ZYNAPTIQ ADAPTIVERB

Stunning Reverbs Like No Other

Adaptiverb uses an entirely new approach to reverb processing, and it sounds incredible. In Zynaptiq's own words, "Rather than stacking delay/allpass nodes or convolving the input with an IR, Adaptiverb employs machine learning, ray-tracing and source separation techniques to synthesize a reverb tail that automatically adapts to the audio context it is used in." As a result, Adaptiverb can produce less smearing and prevent discordant clashing of wet and dry signals when a pitched input signal's harmonies change. Using Adaptiverb, you can also create convolved ambiences, filtered delay effects, static synth pads and more.

The cross-platform plug-in is available in AAX, AU, VST and RTAS formats. I reviewed Version 1.1.0 of the AU plug-in in Digital Performer 9.12, running OS X 10.9.5 on an 8-core Mac Pro.

SIGNAL CHAIN

Adaptiverb's signal path comprises six processing blocks—some rather arcane—sequentially chained (with additional parallel signal paths) in the same order I'll discuss them (see Fig. 1).

The Input Processing section contains controls for a low-cut filter, pre-delay and high-frequency synthesis called Air (the latter adds sparkle to the input signal). The Freezer processing block freezes the reverb's input buffer (think infinite reverb). The Bionic Sustain Resynthesizer uses hundreds of adaptive oscillators that reproduce only the pitched parts of the input signal—thereby filtering out noise and transients—and generate a harmonic tail that can be adjusted using the plug-in's Sustain parameter. The Reverb section provides additional diffusion based on either ray-tracing simulations or classic allpass algorithms; according to Zynaptiq, the ray-tracing engine simulates the effects of audio "taking roughly 16,000 different paths from two virtual speakers to the listener" and produces linear amplitude and decay characteristics. The primary purpose of the Harmonic Contour Filtering processing block is to eliminate dissonance between the input signal and reverb tail by removing discordant signal components from the reverb. But you can also "hold" (freeze) the HCF effect and apply it to another source to create cross-filtered effects similar to what you would achieve using convolution. After the HCF comes the plug-in's Output section, which contains a global dry/wet mix control and a gain control for just the wet signal.

Some of Adaptiverb's processing blocks are highly signal-dependent, and its affected Freeze and HCF Hold buffers are stored with presets. As a result, the plug-in's output levels can vary dramatically, especially with percussive vs. steady-state input sources; I often

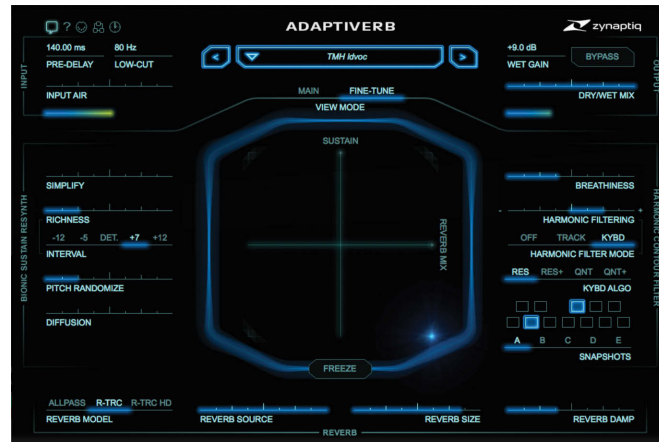


Fig. 1. The GUI for Adaptiverb, in Fine-Tune view: Controls for the Bionic Sustain Resynthesizer's adaptive oscillators (on the left side of the GUI) and Harmonic Contour Filter (right) dynamically alter the characteristics of the plug-in's unique reverbs, which use arcane ray-tracing simulations.

needed to automate the wet signal's gain control to compensate.

Adaptiverb's intensive analysis engine and complex processing together incur latency between 4,096 and 11,264 samples. For use in performance, a Live mode provides a latency-free dry signal by reporting zero latency to your host (with the tradeoff that it also defeats automatic delay compensation).

GUI CONTROLS

Adaptiverb's well-designed GUI is arranged in five sections: Meta (contains preset-management facilities), Input, Output, Reverb and Main Parameter, which has two views, Main and Fine-Tune (the latter offering an extended control set). All main parameters can be controlled by MIDI, subject to your DAW's capabilities; MIDI Learn assignments are stored per preset rather than globally.

Unlike with conventional reverbs, the GUI's Reverb section includes no controls for early reflections or frequency contouring; those controls either run totally contrary to Adaptiverb's design (as with ERs) or are controlled adaptively by the HCF. The Reverb Model control selects one of three modes: Allpass (a dual-mono, traditional reverb that simulates rooms and halls), R-TRC (a 3D-raytrace simulation in true stereo) and R-TRC HD (a high-def variation of R-TRC mode). The Reverb Source slider controls the balance of signals fed to the Reverb block from the input and Freezer blocks (minimum position) vs. the Bionic Sustain Resynthesizer (max). You simultaneously adjust the size and decay time of the reverb using the Reverb Size slider. Change the reverb's high-frequency damping using the Reverb Damp slider.

The reverb's wet/dry mix (not the plug-in's global wet/dry mix) is controlled by mouse-dragging a bright, blue dot along the horizontal axis of an X-Y field in the Main Parameter section of the GUI. The decay time for Sustain (the harmonic tail produced by the Bionic Sustain Resynthesizer) is controlled by dragging the dot along the vertical axis of the X-Y field. This construct blends the outputs of different processing blocks depending on how the Reverb Source slider is set. For example, if Reverb Source is set to its minimum value when you drag the Reverb Mix fully to the left in the X-Y field, the signal will be routed from the Input and Freezer blocks directly to the HCF (with no reverb applied). To help you grasp Adaptiverb's complexity, a toggle overlays a block diagram of its alternate signal paths on the GUI.

In its stripped-down Main view, Adaptiverb's Main Parameter section contains the X-Y field and Freeze button (in the GUI's center), plus one basic control each for the Bionic Sustain Resynthesizer (left) and HCF (right). Unlike with other reverbs, the Freeze function's infinite-reverb effect preserves the functionality of most other controls—allowing you to use it as a de facto synth-pad generator!

In the Main Parameter's Fine-Tune view, expanded controls for the Bionic Sustain Resynthesizer respectively adjust the number of oscillator frequencies used for resynthesis, randomly modulate the oscillators, amplify existing harmonics for a richer sound (selecting octave, fifth or detuned unison intervals), and add diffusion.

Controls for the HCF either suppress similarities or dissimilarities between the input and effect signals; boost residual noise (useful for producing breathy synth pads with the Freeze function); adjust the timbre of the HCF's effect; enable the HCF to track the Freeze function (retaining its current filter state); and provide a virtual keyboard that lets you choose fundamental pitches that will, depending on which of four accompanying algorithms are selected, have their harmonics resonantly bandpass-filtered

or—with greater pitch discrimination—quantized by the HCF. You can store and recall five keyboard-setup snapshots.

JAW-DROPPING QUALITY

On a haunting ballad, I fed Adaptiverb's Bionic Sustain Resynthesizer to the R-TRC (ray-traced) reverb and used the virtual keyboard to select which of the singer's notes would amplify long, ethereal reverb tails (while partially suppressing reverb on other sung notes). The shifting reverb timbres and levels produced an effect that was absolutely stunning, and unlike any I'd ever heard. Equally spectacular, I could use the HCF's Hold function to freeze the filter state for the vocal reverb, save its buffer in a custom preset, and then apply its ever-shifting, voice-like timbres to Adaptiverb reverb on a keyboard track, thereby convolving it.

By clicking the Freeze button when the singer held a vowel sound, I produced a voice-like synth pad—albeit with a fixed pitch—that I could then spatially and harmonically alter by tweaking the HCF, Reverb Damp, Size and Bionic Sustain Resynthesizer controls. I could also create phase-y doubling and echo effects by plunging the reverb's dry/wet mix to 100%-dry, killing the Bionic Sustain Resynthesizer's output, cranking the HCF's filtering, and dialing in pre-delays of various lengths.

One instance of Adaptiverb typically used 25% to 50% of my CPU resources, depending on my control settings; using an included Preview mode lessened the CPU load but incurred what I felt was an unacceptable tradeoff in sound quality on certain patches.

Adaptiverb's learning curve is fairly steep (luckily, Help balloons are provided) and there are no Undo/Redo buttons to use when you get off track. But Adaptiverb sounds so amazing, your efforts will be immensely rewarded. A portal to truly unique and exquisitely euphonic reverbs and intriguing special effects, Adaptiverb is a fantastic tool for the adventurous mix engineer and sound designer. ■

PRODUCT SUMMARY

COMPANY: Zynaptiq

PRODUCT: Adaptiverb

WEBSITE: Zynaptiq.com

PRICE: \$249

PROS: Unique. Sounds incredible. Can produce unusual effects in addition to awesome reverbs. Well-designed GUI.

CONS: Heavy CPU demand in high-resolution mode. Relatively steep learning curve. No Undo/Redo.

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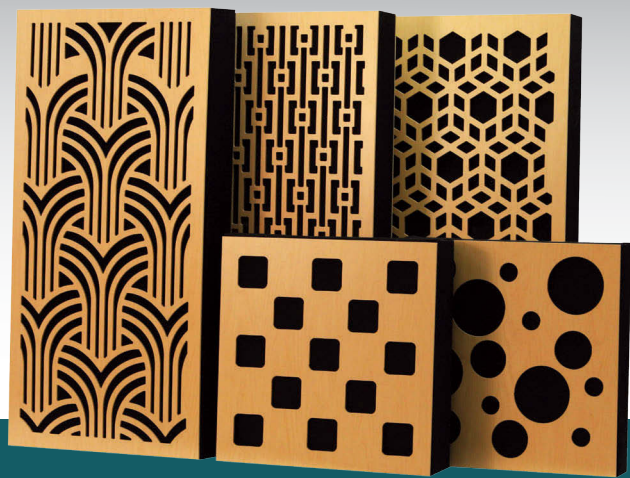
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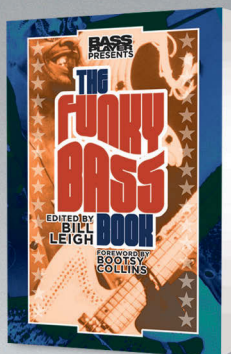
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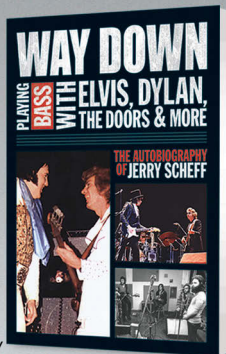
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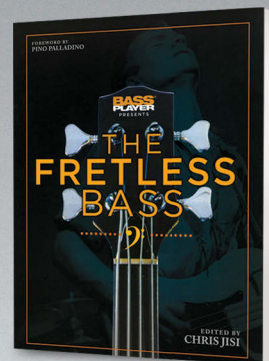
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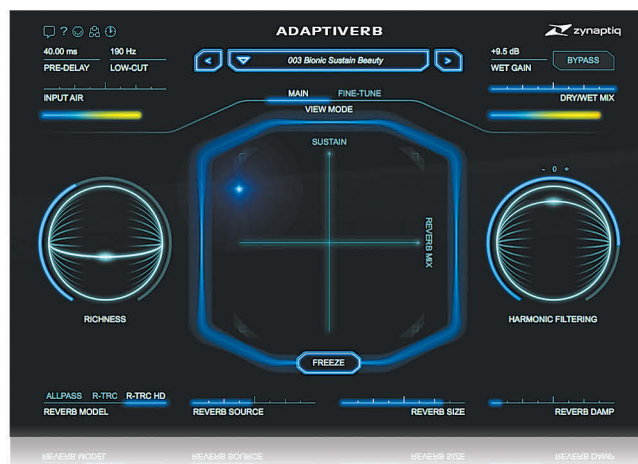
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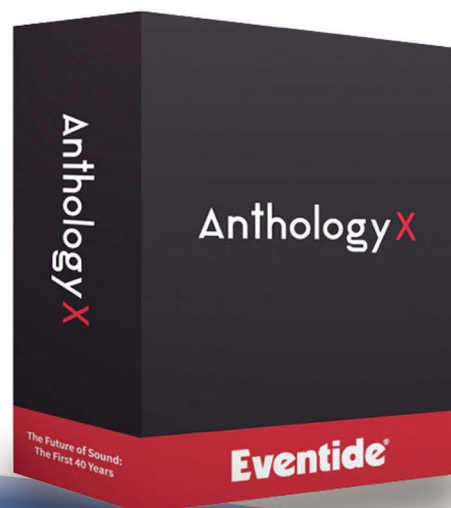
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SPOTLIGHT: Pro Tools | MTRX Interface



By Kevin Becka

Soft-announced at AES last September and now close to release is the Avid Pro Tools | MTRX Interface. This is the high-end box that many have been waiting for, but is it the “everything I/O” that fits all users? All needs?

I have always thought it odd that Merging Technologies, DAD and others have offered high-end I/O solutions that have been embraced by scoring mixers, classical and post-production engineers, and other high-enders, yet Avid has always chosen to stick to the basic architecture that made the company ubiquitous. If you look at the evolution from the 888/24, to the 192, then HD I/O over almost 20 years, it's mostly been MOTS—though significantly more capable. But not anymore. In fact, DAD (Digital Audio Denmark) makes the converters and preamps for MTRX.

The MTRX opens up a whole new world for those who want to customize their rig or just expand to new formats, configurations and capabilities. While it's not an “open” platform for outsiders, it is open to many more options for those who want to keep their gear in line with their DAW software.

It all starts with the MTRX chassis, which ships with eight empty card slots but comes chock full of I/O and more. Onboard are eight AES pairs on DB25s, dual power supplies (great idea), support for 44.1-384 kHz, plus DSD 64/DSD 128 with high precision internal clock and PLL, Word Clock/video black burst I/O via BNC connectors, AES11 input, and two 32-channel DigiLink connectors. On the audio side, you can load up to six slots with 8-channel AD or DA cards for up to 48 channels total, plus two other slots for digital I/O—more than ever available on a single Pro Tools interface.

Compare and match MTRX to an HD I/O system where you'd have to buy three interfaces, two with 16 I/Os each, plus a third for the extra eight channels, and the initial sticker shock gets easier to swallow. You can also choose DAD preamp/converter input cards that can be controlled directly from Pro Tools software. How's the quality? I've heard the DAD preamps and converters first-hand, and

they are spectacular. But what if you're in AES, or MADi-land? You don't need to buy a card because MTRX comes standard with 64 I/O channels of MADi, and an 8-line AES3 interface with 16 I/O channels. Then there are options for Dante, and 3G-SDI cards.

Also included is the DADman software, which helps expand MTRX as a monitor controller. This can be from the DADman software itself, a Pro Tools | S6, or other Eucon-enabled control surfaces. Then there's Pro | Mon 2, which offers control for monitoring, talkback and summing; and fold-down control for mono, stereo, 5.1, 7.1, 9.1 or a 64-channel audio mix. Mon 2 offers a matrix capacity of up to 1,500 x 1,500 crosspoints, so, for example, you could use it to sum stems and sources to feed monitor outputs as a 256 x 32 summing mixer, with room to spare.

But the real power of MTRX is in the cards, and there are plenty.

You can create up to a 64-channel interface in a single box, including all-digital I/O, 48 analog plus 16 digital or any combo in between. But there's much more, and here's the card breakdown.

The MTRX 8 Line Level AD Card (\$2,099); MTRX 8 DA Card (\$2,099); MTRX 2 Mic/Line AD Card with two channels of analog in-

puts and preamps (\$1,275); MTRX 8 Mic/Line Pristine AD Card with eight preamps (\$2,999); MTRX 8 AES3 I/O Card with eight AES3 I/Os (16 channels) and built-in SRC (\$1,649); MTRX Dual SDI/HD/3G Card with 2 x 16 channels of SDI/HD/3G connections (embed/de-embed) and built-in SRC (\$2,749); and the Pro Tools | MTRX Dual MADi I/O Card with 128 channels of MADi optical MADi IO (\$2,099).

So there you have it. The base unit is \$4,499 (plus cards) and offers more I/O in less space (which is great for anyone), plus an *à la carte* menu of options that covers many user's dream setups. Also on the plus side is MTRX's no-worry compatibility with Pro Tools software, which is growing at an ever-increasing rate.

So is it for you? Get out your calculator, add up the prices plus the Pros and Cons of an all-in system, and only you can make the call. From here, it looks like a giant leap in the right direction for our industry's dominant DAW. ■



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