part two

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Reverb isn't echo exactly and it's not delay, even though it's in the same family of effects. Reverb is a psycho-acoustic phenomenon. Turns out that just like our ability to tell one human face from another, our brains are really good at distinguishing the space in which sound is made. It's this amazing ability that helps keep

**REVERB** 

An Evolutionary Advantage

Part 1 of 2

### THREE TYPES OF REVERB

There are three ways to add reverb to a recording. You can mic an instrument so as to capture not only the direct sound, but also the sound it makes interacting with its environment. An example of this would be setting up microphones 20 feet away from a piano in a concert hall. But what if your piano lives with you in a small apartment and you want that concert hall sound? It used to be (up until the 1980s) that if you wanted to add artificial reverb to an instrument, you needed to use a plate or spring reverb unit. Basically these analog devices have a transducer and a pickup separated by either a plate or springs. When an electrical impulse (input) is picked up through the spring/plate it simulates the sound of reverb (sound bouncing off of walls). Pretty much all reverb you hear on popular recordings from the 1950s-1970s was made this way. Then in the 1980s with the invention of the microprocessor, companies like Lexicon came up with algorithms to simulate what happens to sound in different spaces - and viola! Digital reverb was born. Now we had the ability to dial in any type of space (rooms, halls, cathedrals) and start to play with the parameters of reverb. Today we can actually sample real spaces and use those as the algorithms for our reverb to re-create any space you can imagine!

you safe when you're crossing the street. How does reverb do that? Well, think about all the sounds that are being produced from the dozens of automobiles and people. As you are crossing the street, your brain can tell without you even looking, that the big truck it hears off to the left is still safely half a block away. So how does your

### REVERB PARAMETERS

When we add more reverb to a signal, we say it's getting "wet," and obviously as we reduce the reverb, we say it's getting "dry." It used to be, that was pretty much all we could control - the wet/dry ratio. Today there are many parameters that we use to adjust reverb. The most important is RT60 time - the time it takes for the level of reverb to drop 60dB (or basically "how big the space is"). Sound  $travels\,at\,1,\!126\,feet\,per\,second.\,\,You\,might\,not\,know$ the speed of sound but don't worry, your brain does. So if you want your piano to sound like it's in a hall 60 feet away, the first thing you do is dial in an RT60 time of about 53ms (sound travels at 1.12 feet per millisecond so divide 60 feet by 1.12). When your brain hears that it takes 53 milliseconds for the sound of the piano to hit a surface (what are called the "early reflections"), it intuitively knows that piano is in a big space.

### RE-CREATING REAL-WORLD REVERB

The problem with early spring and plate reverb devices was that they started making reverb from the instant a signal was applied. But in the real world, when you hit that piano key in the concert hall, the sound takes 53 milliseconds before it hits anything and begins to travel back. Nowadays, we can simulate this effect with "Pre-Delay." So, to recreate the feeling of more brain do it? In a word – reverb. Sounds reflect off of surfaces and get absorbed by others. And because you have two ears, your brain can calculate not only the distance and type of space the sound is in, but also its location and movement. Pretty important evolutionary trait for humans who hunt (and cross streets).

space between your initial sound sources, you would need to add more Pre-Delay. Today's digital reverbs usually will include Reverb Damping with High- and Low-Frequency Damping parameters, which allow you to shorten the reverb decay for the frequency extremes. Using Low-Frequency Damping can help create the feeling of a larger, cavernous room, while use of High-Frequency Damping can create a much warmer, intimate space. Some reverb plug-ins, like the Lexicon Pantheon, also include "Spread" and "Diffusion," which can be used to enhance the spaciousness of your reverb. Some plug-ins also include an "Echo" section, which allows you to create echoes in your reverb, if you be so bold!

# [editor's note - join us next month as we wrap up our discussion on reverb in Part 2.]

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**REVERB** An Evolutionary

Advantage

Part 2 of 2



photo by Mark J. Sebastian

### QUICK RECAP

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## SAVING "SPACE" ON THE BUS

Now that we understand the basics of what reverb is and how we can use it. it can be really easy to go overboard and start throwing reverb plug-ins on every channel. Let's pump the breaks just a second before we end up drowning the mix in a sea of endless reverberation! First thing that you need to keep in mind when you are adding reverb to your tracks is that plug-ins need a ton of CPU power to run, and the more you add, the slower your computer will run. And there is nothing worse than a slow computer when you are trying to get the "platinum record" mix. We've found that rather than slapping a new reverb plugin onto every channel you want to add a little more room to, simply place your reverb plug-in on a BUS (title it "Reverb" and have it return to the Master Bus). Then SEND every track you want reverb on to that BUS. This way you save your CPU usage, and all the instruments sent to this reverb will sound like they are in the same space, creating a superior mix (you can also set

up more than one bus if you wish to have certain instruments sound like they are in their own unique space).

### TIMING REVERB TO YOUR TRACK'S BPM

Using this little formula (60,000 / Tempo in BPM = 1 quarter note in milliseconds), you can "time" your reverb's pre-delay to fit the musical tempo of the song you are mixing. So for example, if the song has a tempo of 120 BPM then 1 quarter note lasts for 500ms (an eighth note 250ms, sixteenth note 125ms, etc). Start by plugging in the BPM for your song into the formula and jotting down the values for the 1/4, 1/8, 1/16 and 32nd notes. Then crank up the reverb send on a track until it is way too wet and then dial in a quarter note pre-delay and see if it "feels right." No? Then try the eighth note amount and listen again. Once you've got the right value for the pre-delay, lower the reverb send, forget about reverb for a while and come back to the mix later and see how ALL the tracks being sent to that reverb sound in the mix

### PRACTICAL APPLICATIONS

It's important to not get carried away using too much reverb on too many tracks. Remember, the main idea behind using reverb is that it creates the feeling of space in your mix, so if you end up throwing reverb on every track in your song, chances are you are going to have a mix that sounds like it's being played across the street at your neighbor's house party. So discretion is the key here! When adding reverb to a track, as a general rule, busy songs need less reverb and slower ballads with lots of space in the arrangement can afford to use more. If you are adding reverb to your instrument tracks, it's usually a good idea to use the same one for all your instruments, then all reverberations of the instruments will sound as if they were recorded in the same environment (this works especially well for rock bands and creating that oh-so-magically "live" sound). Different types of reverb work well with different instruments. We find that room reverbs work well with drums and guitars, and sometimes a guitar can benefit nicely from a good spring reverb (especially for that psychedelic surf sound). Vocals, on the other hand, can be much more open to different types of reverb, depending on the style of music and the overall feeling of the song itself. It should also be noted that in general, we try not to add reverb to our bass instruments (bass guitar, kick drum, etc), as it tends to muddy up the mix. Now that you know some of the basics for using reverb, you can go crazy and experiment! You never know when you will find a sound that works just right for your mix, and if you have read any of our previous articles, then you know our golden rule: If it sounds good, do it!

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## Pros and Cons Live FX vs. Plug-Ins

#### SPLIT DECISION

If you're a musician that "plugs in." then you know that the sound you hear coming out of your amp can either inspire you or make you want to hang up your guitar or bass in disgust. And yeah, this article is mainly written for electric guitarists and bassists because so much of these instruments' sonic character is attained through amps, amp modeling and effects. You know what I'm talking about - there's a thrill of getting that perfect tone - when it's right, you just can't stop playing. In this article, we will discus the pros and cons of recording live versus applying software plug-ins during post-production. And who knows, we might even discover a method that satisfies both sides of the aisle...

#### CAPTURING THE LIVE PERFORMANCE

We are so lucky now to be living in a time when amp modeling has really hit its stride and when digital effects are plentiful and cheap. In the 1980s, you'd be lucky to find an amp with anything more than spring reverb built in. Today many amp manufacturers like Vox, Fender and Line 6, just to name a few, include amp modeling circuitry and a host of digital effects like chorus, flange, echo, delay and reverb. Or you can use your favorite amp with a pedalboard to get virtually unlimited sounds. So the question that comes up all the time in the studio is: "Should I record with my effects or dry and add the effects later?"

We always answer that question with a question (because we're enigmatic and mysterious). "Do you have a sound that inspires you, that feels good and is integral to the song?" If he answer is "yes," then record that sound because it will affect your performance. And recording is largely about capturing great performances. If you aren't happy with the sound from your amp, then you can record "dry" and we can then hunt around for tones and effects that fit the mix after tracking. But let's be honest here - the best feeling in the world is when you nail a take with that perfect tone, rip off your headphones and flop down on the control room couch while the rest of the band grovels at your feet.

#### VOCALS

Okay, we said this article was about guitar and bass but we do want to mention that often



pictured: Stone Cold Fox (flip the page for a full Studio Diary with the band) / photo by Jen Painter

vocalists like to have some effects (usually can't reduce it. Recording dry often works fine reverb) on their voice when they record. But it's often the case that this effect wouldn't be appropriate later in the final mix. So we will often use though s/he is being recorded dry. That way they can perform with a big sound that inspires them, and can help wring out a few extra ounces of sexiness and emotion without being stuck with too much (permanent) reverb in the final mix.

#### THE DRY ADVANTAGE

The obvious advantage to recording an instrument without effects (dry) is that you can then apply effects to any degree using software plugins after the track is recorded. You can always add reverb, distortion, echo, etc., later but you

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when the part being recorded is an overdub and is not integral to the foundation of the song or when an idea comes into your head and you don't an "aux send" on the recording console to feed want to lose the inspiration while tinkering with reverb into the headphone mix of the singer, even sounds. Just hit record and capture the moment, then go back and dial in the right tone and effect.

#### DO YOUEQ?

 $\operatorname{EQ}$  is a bit different than most effects, in that you can continue to add or subtract EQ even if you've adjusted the tone knobs on your amp. In fact, you should get your EQ settings as close as you can prior to recording, even if you're not 100% pleased, since you can continue to tweak EQ later.

[Editor's note - read part 2 in the March print issue and online at performermag.com]

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[Editor's note - read Part 1 in the February print issue and online at performermag.com]

#### BEST OF BOTH WORLDS?

Pros and Cons

Live FX vs. Plug-Ins

Part 2 of 2

So let's say you have a sound dialed in on your rig that you are pretty happy with, but you'd like to hedge your bets. You're afraid that you might not like the direction you went in when you get to the mix down stage. Wishy-washy huh? Well, you can take the best of both worlds route. "What's that?" you say? "I can have my cake and eat it, too?" Isn't life grand? Not so fast.

#### V NOT?

You will first need something to split your signal. The poor man's method is a simple 1/4" mono "Y" cable that plugs into the output of your instrument. From here you send one signal to your pedalboard/amp to get mic'd and the other signal straight to the console. The preferred choice over a Y cable costs a bit more, though. A passive splitter like the P-Split by Lehle (\$169) looks like an indestructible metal guitar stompbox and uses high-end transformers to split the signals into two 1/4" outputs. Now I hear some of you audiophiles complaining, "But that means the dry signal is still unbalanced!" You are correct, so a compromise might be the \$25 DI20 by Behringer (both models pictured above), which although not built as sturdy as the Lehle, uses active circuitry and can handle both 1/4" and XLR inputs and outputs, giving you a 1/4" output for your amp and an XLR output for your interface/console.

#### ENDLESS POSSIBILITIES

Once you find (and pay for) a method that

works for you, you will probably find yourself using this option to record quite frequently. because there really isn't any downside. You use an extra track in your DAW for the second clean signal, but now you can experiment with this track and combine/replace it with the original. We often pan a version of this second rhythm guitar track hard to one side to increase the stereo spread. Or you can experiment with heavy compression on one of the two tracks. Try automating one track to come up in the mix during choruses to add extra punch, dynamics and excitement. The possibilities are limitless, so try it for yourself and have fun.

#### THE CAVEAT

One caveat we have found to these rules is the electric bass. Very often we will record the bass direct using a DI box, because the advantages to this often outweigh the disadvantages. For one thing, a live bass through an amp is hard to keep isolated from other mic'd instruments - bass frequencies are big and difficult to keep contained. Another reason is that we like to put drummers and bass players in close proximity to one another (often in the same iso-room) and that means drums would leak onto a mic'd bass amp track. We rarely find that performance is an issue when bassists go direct and it is relatively easy to dial in a different bass tone using plug-ins after the performance is captured.

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#### PLUG-INS

ULTRA-DI DIZO

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One downside (if you can call it that) to using software plug-ins is that there are so many great ones out there and new ones are coming out all the time. It can be hard not to feel overwhelmed Obviously, it can get quite expensive if you want to have the latest and greatest in your arsenal. Also be warned that to be able to plug your instrument into your computer interface and listen to a plug-in live requires a lot of CPU power to achieve low-latency (latency is the time it takes for a signal to get converted to digital, be processed and then be converted back to analog so that you can hear it). You will need a very fast computer (read: fast, multi-core processor and tons of RAM) especially when you start using multiple plug-ins simultaneously (and of course you'll want to).

#### I WANT CANDY!

Fortunately, many software manufacturers like Native Instruments (Guitar Rig 5) have free demo versions so you can try them with your system before you buy them. And, unlike a stompbox (which gives you just one effect), a good plug-in like Guitar Rig 5 has so much under the hood, you may feel like a kid in a candy store. Now, what would it sound like if I plugged my guitar into a vintage British tube amp with a 4x10 cab mic'd with a Sennheiser 421 and a little dry signal mixed in? That setup takes only a second to achieve with a plug-in - Oh my! Now, how about adding a stereo tape-delay and a bit of chorus ....

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# The Art of Stereo Panning



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#### **Maybellene in Mono**

Plenty of great music was recorded back in the day, which we still love today, but that due to the limitations of technology of the time was recorded in mono. Take a listen to Chuck Berry's 1955 hit "Maybellene" recorded at Universal Recording Studios in Chicago. It's a mono recording: what you hear out of your left speaker or headphone is the same as the right. When the song came out almost everyone listened to music from one speaker, in fact the first stereo headphones didn't even come out until 1958. As the music industry boomed into the 1960s, stereo recordings started to become the norm. Stereo recordings are created by panning individual tracks to different "locations" in the stereo field (or soundstage) so that when vou mix down a song, vou get different information in the left and right channel. This stereo mix can either imitate the way you would hear a song being performed by a live group or you can create a completely different reality. Either way, having instruments in different locations in this 180-degree field makes listening to a recording much more interesting as it mimics the way humans hear the world around us

#### Less Mud and Drum Panning Tips

Placing different instruments in their own locations in the stereo field is what engineers use to help make a mix less muddy. Many recording engineers pan tracks to mimic a live group as you would see them on stage. As we usually start with the drums when we begin mixing, here is how we often pan drums: starting with the stereo overhead drum mics, we usually pan them hard left and right. Then we listen to this stereo mix of the drums solo-ed and start to "place" the individual close mic'd drums to match. So for instance, with the stereo overhead tracks playing, we'll hear that the hi-hat is at 1 o'clock and so that's where we'll pan the closed mic'd hi-hat track. Now bringing the hi-hat track into the mix, we'll make minor adjustments to the panning until it sits correctly in that stereo space. We'll repeat this process for each individual drum track until everything matches the overheads. You can also pan from the musician's perspective, which would obviously mean that everything is flipped – our hi-hat would now be panned to 11 o'clock instead of 1 o'clock.

#### Guitars to 11

In rock music we almost always want guitars to be loud in the mix (at least guitarists do). And if you give a rock guitarist a loud place in the mix. you can be sure that the lead vocalist will want a loud place too. So what are we to do? How can both the vocals and guitars be loud at the same time? You guessed it - panning to the rescue. Instruments like guitars take up a lot of the sonic spectrum, they can easily over take other tracks like vocals; panning can help to keep them from overwhelming a mix. Try this: take that big guitar track that's crowding everything else out and pan it hard left. Okay, now the vocals have their space but the guitar is lost over on the left - sounds weird, huh? We need a second guitar track panned hard right to balance it out. Studio trick: have the guitarist record a second rhythm part, mimicking the first and pan this track opposite the first track. You now have all the energy but with a hole in the middle of the mix for the vocals etc.

#### Let's Move In Together

We can also place different instruments in the

same location to enhance the feeling that there is one instrument creating a more complex sound. For instance, most rock/pop mixes have the kick drum and bass guitar panned center so that these two high-energy instruments seem to be one and the same. Vocal backups are another example where often a doubled vocal part or another vocalist singing a similar melody to the lead, is placed in the same location in the mix so that to the listener it almost sounds like the lead singer has a deeper, more interesting delivery. So whenever you are trying to enhance a part, like let's say you want an organ or electric piano to add oomph to a guitar part on certain hits, we suggest you pan these instruments together.

#### LCR

No, it's not some kind of new high resolution TV - LCR stands for "Left, Center, Right" and it's another panning philosophy that many mixing engineers employ to open up the soundstage and create a spaciousness that seems wider than life. It's based on the idea of panning many instruments hard left and right in stereo pairs, kind of like we did with the guitars above, with some core instruments (vocals/kick/bass) panned center. To get stereo pairs of the same instrument, you either need 1) a performance played twice (like we did with the guitars in the earlier example) 2) a stereo output from an instrument like a piano mic'd in stereo or a stereo output from a synth, or 3) to clone a track to make an exact copy. With these stereo pairs, you can have fun putting certain effects only on one side of the pair – for example try inserting a timed delay on just the right of a stereo synth track. This approach can help keep the mix from getting muddy. [editor's note - see next month's issue for Part Two on stereo panning and mixing.]

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# The Art of Stereo Panning



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feditor's note - see last month's issue or head to performermag.com for Part One in our series on stereo panning and mixing.]

#### **BOUNCING 'ROUND THE ROOM**

It's quite easy now with modern DAWs (Digital Audio Workstations) to automate panning so that a track can "move" around as the song progresses. Depending on the style of music, bouncing an instrument from one side of the mix to the other can add excitement or grab a listener's attention. It can also be used subtly, by slowly shifting an instrument's location, to signal either a new direction in the song or to create  $an almost \, imperceptible \, uneasiness.$ 

#### **THE MID-SIDE PAN**

I won't go into how to set this up, as it's a bit complicated for the beginner, but if you already know how to do it, or are willing to put a few minutes into watching YouTube videos on the subject, we highly recommend you try using the Mid-Side miking technique the next time you are tracking acoustic guitars in a mix. The Mid-Side miking technique allows you to change the amount of "stereo-ness" in the mix after you have recorded. instead of being stuck with what you recorded using an X-Y setup. With the acoustic recorded in Mid-Side, you could have the intro playback in stereo and then narrow the field as the vocals come in to give them more presence. Or you could try the opposite by having the guitar start in mono and then slowly broaden to stereo to make the mix more interesting as the listener gets used to the progression.

#### **PANNING REVERB**

Another great way to utilize panning in your mix is to pan your reverb. By mixing in different patterns of delays in the left and right channels, some reverbs can recreate the feeling of sound bouncing around in a real space. This will help create width and depth for your tracks in the stereo mix. This should be done sparingly, though, because when overdone it can create muddiness in the mix. If time is available to you, experimenting with the panning of reverb can lead to some pretty creative sounds. But for the rest of us who have budgets to consider, we find it best to keep our reverbs nice and centered and used conservatively.

#### WHERE YOU SIT

Remember to keep checking your mix with a pair of trusted headphones. And before you finalize a mix, especially one with heavy panning, you should reference it on a couple of different systems, preferably in different spaces to make sure that your panning efforts aren't hurting you. Many people listen in less-than-perfect situations; for instance, listening in most cars usually produces an unbalanced experience with the speaker that is closest to the listener delivering the most energy. This is where LCR can be a good method, because even though instruments are hard-panned, most of the information is the same through either the left or that everything, wait for it...pans out. right channel.

#### **PARTING THOUGHTS**

Panning has some general rules (and with all general rules, feel free to break them and experiment), which generally lead to good results as proven by decades of mixes. Acoustic pianos generally sound good hard panned in stereo unless the mix is too muddy, in which case try mono and finding a location in the mix somewhere around 10 or 2 o'clock Lead vocals are almost always panned down the middle, as are bass and kick drums - although in jazz, the bass and kick can go slightly off-center. Percussion (think shakers, tambourines, hand claps, cabasas, snaps, cowbells, etc) all sound good panned fairly hard. Some percussion can go in the same location as other main rhythm instruments to  $% \left( f_{i}, f_{i},$ give them added flavor without standing out. while often a new percussion instrument that comes into the mix during a certain section, like the chorus, should be by itself, low in the mix, to change the energy level of that part.

Remember to maintain balance in your mix; if you pan a rhythm electric piano part fairly hard left, make sure you have something to help balance it out, like a rhythm guitar part, panned somewhere to the right. If you've been trying to get the mix right but it just isn't working, then try breaking some panning rules. Do something crazy - want kick drum hard left? It might just be what the song needs or at the very least get you to hear the mix differently and create a needed breakthrough so