STUDIO 101

PART 15

A Wash of Reverb

Last month, we learned that delays can transport us into canyons or back to the slapback Sixties. There's another processor to consider that can transport us to new spaces: the *reverb*.

Reverb is one of those magical pills that seems to make everything sound better, adding lush textures to almost any input. However, to get the best from a reverb processor, you need to learn how these systems work, and how you can tweak them to meet your needs. Let's take reverberation for a run around the block—reviewing the processes, types, and techniques that are available with these powerful devices.

BY DARWIN GROSSE

How reverb is created

The most common digital reverb processors have historically been based on *algorithms*: mathematical formulas that attempt to calculate the sound of a physical environment. Algorithmic reverbs were made popular by manufacturers such as Eventide and Lexicon, companies whose products still dominate much of the reverb marketplace. Algorithmic reverbs seek to find an area between beautifully-artificial and naturally-satisfying, with some of the best devices providing a reverb that goes beyond any normal environment.

At the opposite end of the spectrum is the *convolution* reverb, which uses a measurement of a real space, then recreates it in software. This is done by using a recorded sound (something like a gunshot or a sinewave sweep) that can be used to determine the reverb characteristics of a space, then applying those characteristics to any incoming audio. Audio Ease's Altiverb was the first commercially available convolution reverb, and it continues to be a standard-bearer today. But convolution programming—and the computer power necessary to run it—is now widely available for audio platforms.

It's also important to remember that reverb isn't just something that happens in a computer plug-in; it also exists in the real world, and analog reverbs using springs or metal plates are still found in guitar amps and many studios. Even today, you'll find studios that have set up a room (often a stairwell) with a speaker at one end and a few microphones at the other end. Audio is played into the speakers, reverberates through the space, and is picked up by the mics. Remember that you always have the option of doing it that old-fashioned way, if you find a space that sounds cool!

Choose your space

Once you get a reverb technology into place, the next thing to consider is the *type* of reverbs available. Many of these types will be named after natural (or imagined) spaces: "Drum Room", "Large Chamber", "Cathedral", or "Outer Space".

The type of reverb you choose is often determined by the kind of music you do. If you are doing ambient electronic music, a "Space" reverb makes a lot of sense. On the other hand, a choir will often sound appropriate within a "Cathedral" setting, and a rock vocalist or drummer will sound right in a "Room" reverb.

The key to selecting the right reverb type is to think about where you typically might hear your source material. It also helps to dig into existing recordings in the genre that you are working

Wave Arts MasterVerb is one of the best algorithmic reverbs in the world.

with to get a sense of the sound. This takes a little extra effort on your part, but learning the standards of your genre is part of the education you must provide yourself. Until you get these sounds 'in your head', it can be tricky to choose them for yourself.

Boing

Two of the most stylistically-important reverbs are *plate* reverbs and *spring* reverbs. These were devices that were popular for studios that couldn't afford a dedicated room to produce reverb, and so created a simulation through other physical means. A plate reverb uses a driver to feed audio onto a large metal plate (several feet on a side) and then senses the output—which is nicely reverberated by the vibration of the plate. Spring reverbs use a similar idea, but activate one or more stretched springs instead of a plate.

These devices weren't particularly natural-sounding; you would never hear the result and think, "Huh, that really sounds like a church sanctuary!" However, both of these devices ended up becoming signature sounds used for certain instruments, and these reverbs (both real analog and digitally emulated) remain popular today.

Plate reverbs are most often used for drum tracks. There is something about a plate reverb —a sound that tends to be bright and short—that reinforces a drum sound in a particularly useful way. Because the sound is running through a virtual chunk of metal, the sound waves move quickly through the effect, resulting in a tight and splashy sound. If you are looking for a classic drum reverb, you will often want to start by looking into a plate sound.

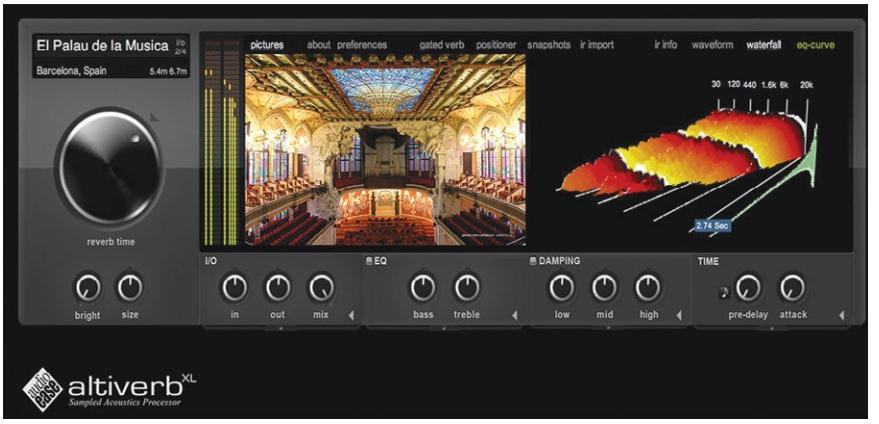
Spring reverbs, on the other hand, are often the milieu of electric guitarists; they're fairly small, and a staple feature inside many famous amps. The 'sproing' sound of this device will be actively used as an effect by the player, using hard attacks to create a popping sound that can accent the rhythm of the part. Overuse of a spring reverb will quickly sound cheesy, but used in moderation, it's a great adjunct to interesting tracks.

Getting fancy

Much like there are special cases emulating 'classic' hardware reverb types, there are also cases for 'classic' but unusual reverbs. Probably the best known of these is the *gated reverb*, made popular by many pop hits from the 1980s. A hit triggers a huge wash of reverb—which is then quickly cut off. It's still occasionally used because it provides a unique rhythmic nature to the processed sound, but it's a flavor that can easily be overused.

Similarly, the *reverse* reverb (which simulates reversed sound by ramping up the volume at the onset of incoming transients) is considered antiquated, but still has a place when you wish to imply a different rhythmic quality to the reverb sound.

In certain circumstances, you may need to have a reverb that matches a specific physical place. Older reverb units used to have "bathroom reverb" or "tile room" algorithms—and some of the algorithmic reverbs still have these presets in place. But so many of the odd or place-specific reverbs sounds are now available in convolution reverbs—to the point that you can find site recordings (called *impulse responses*) for almost everything from the inside of a trash can to a high-altitude forest. There's something for everyone!



AudioEase Altiverb—the original convolution reverb and still a fantastic plug-in.

Reverb parameters

Now we need to look at the settings available for our selected reverb. These will vary based on the particular hardware, software, and algorithm or convolution we've chosen.

Probably the most critical setting is the *delay time*—the time it takes a sound to decay into nothingness. This rather ethereal sounding concept is made concrete via a measurement called the *RT60*, which is the amount of time it takes a signal to drop 60 dB in level. This is a useful way to measure reverb time, since it will work for physical spaces, software plug-ins, or even your tiled bathroom! The decay time, combined with the type of reverb that you choose, will determine the 'shape' of the reverb you apply to your tracks. Until recently, only algorithmic reverbs could adjust decay time, but now some convolution reverbs can too.

A typical example: a small-room algorithm might have a decay time of 0.75 seconds. This means that the sound will decay quickly, and the 'sense' of the sound will be that of a confined room. Play drums through this, and you will hear something that approaches the sound of a drummer wailing away in a small club. Conversely, select a cathedral reverb type and set the decay time to 10 seconds—now, a simple violin sound will blossom into a bouquet of sound.

While the latter sounds like fun, it is also a trap: overdoing the decay time of a reverb can get you in trouble if you have anything but the sparsest of tracks. Putting a drum kit, burning guitar line, or keyboard pad through a massive reverb can initially be pretty ego-boosting... but once you start mixing tracks, you can quickly find yourself wallowing in the mud of Too Much Reverb. Finding a balance of decay time and track complexity is one of the things you must learn to do—and it can only come from practice.

Early reflection and diffusion

Most algorithmic reverbs let you tweak *early reflections (ER)* and *diffusion*. It's

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easiest to think of these in terms of being in a large room: when a sound is first played, there is the direct (dry) sound, followed by the sounds that bounce off one or two walls before getting to your ears (early reflections), then the blur of the sounds that bounce around the room until the decay is complete (the *reverb tail*).

Generally, a boost to the early reflections will make the reverb sound tight or thickening, while pushing the diffusion will create a dense and beautiful wash of sound. Early reflections are often a drummer or vocalist's best friend, while diffusion is beloved by guitar and synth players. When you are using an algorithm reverb to create a room-like locale for a mix, you need to balance the ER and diffusion settings to 'feel' right for the desired result.

Frequency damping

The final common function is *frequency damping*, which allows you to tweak the way that high frequencies decay in comparison to low frequencies. What's the point of this? Older reverb technologies—including rooms with speakers and microphones—used equipment that wasn't necessarily transparent in reproducing the sound. By damping the high frequencies, you can emulate some of this vintage vibe, reducing some of the ringing that can make some reverbs sound too artificial. It's also used to approximate a deader space (e.g. carpets and lots of people vs. tiled walls).

Similarly, if your mix is great but the reverb sounds like mud, you can damp the low frequencies to clean up the wash at the low end of things. This can be surprisingly effective when you have a lot of percussion, guitar, or bass running through the reverb; damping down the low frequencies just a little can clean things up a lot!

Mix level

If you are using are reverb as an in-line effect (it is applied directly to a track, rather than through a submix), you will need to adjust the *mix level* of the reverb to suit the application. This is simple and obvious when you work with reverb—if there's any instance where the phrase "wet/dry mix" makes sense, it's here!

Fully wet reverb mixes sound very far away—and are seldom used, since it is hard to have a usable mix that features content that sounds like it's at the other end of a coliseum. When you are using reverb as a track effect, you will seldom have a setting greater than 30% unless you are using a very short reverb decay time.

If, on the other hand, you are using your reverb as an Aux effect (using the send/return features of your DAW), you will definitely want to run it at 100% wet—then mix it into the main mix using the return volume instead of the reverb's mix level. Since many engineers use reverbs almost exclusively as send effects, you'll generally see reverbs initialize to 100% wet settings by default.

Is there an 'un-reverb'?

Adding reverb to a sound is a way to make it sound like it exists in a place. But what if you want to remove the place from a sound—is there such a thing as an 'un-reverb' (or de-reverb) effect? Unfortunately, the process of removing reverb is very complex, and efforts to create reverb removal effects have been only modestly successful. Much of the problem comes from the complexity of reverb—since a reverb takes the sound and blurs it, how might you extract a pristine sound out of the fog?

A few companies, such as iZotope (in the RX processor) and Zynaptiq (UNVEIL) have plug-ins that can attempt to tame the reverb sound embedded into a recorded track. These prove most useful on removing reverb from individual instrument tracks (such as a guitar track with too much spring reverb), but still struggle dealing with entire mixes. So, while the promise of completely fluid sound manipulation is intriguing, there are still some frontiers to be overcome!

Conclusion

Reverb is a glorious effect, and is one of the most-used tools in any production environment. Learning to use reverb effectively and creatively is key to creating professional-sounding mixes. Rather than depending on plug-in presets, exercise the controls on your favorite reverbs and learn how to make your mixes bloom. The reward will be control over the sound of your world!

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Too much reverb? Zynaptiq UNVEIL can do wonders on some material.