

technique FAQ

USING REVERB

reflected glory

FREQUENTLY ASKED QUESTIONS: REVERB

Even though reverberators are the most widely used studio effect, reverberation is still the subject of many of the reader queries which arrive at the SOS offices. **Mike Senior** answers some of the most common questions.

Q What exactly is reverb?

If you stand almost anywhere and make a noise, not only will some of the sound travel straight to your ears (direct sound), but some will also radiate out and bounce back at you from surrounding objects (reflected sound). Because most environments have numerous sound-reflecting surfaces, we are bombarded with sonic reflections of everyday noises all the time. Our brains attempt to make sense of this complexity by subconsciously grouping any very similar sounds together, and therefore sonic reflections are grouped with the natural sounds they follow. We perceive these grouped reflections as a sense of acoustic space surrounding every natural sound we hear, and it is this 'spatial halo' which is called reverberation, or reverb to its mates. If, for whatever reason, we are unable to perceptually group reflected sounds, they remain distinct and are heard as a number of individual echoes. However, even when we do subconsciously group sonic reflections, the information associated with their number, timing, direction and timbre isn't just discarded — we use it subconsciously to deduce the nature of our acoustic environment, to distinguish whether, for example, we're listening to noises in the living room or in the street.

Q Why do I need artificial reverb?

Artificial reverb allows you to add a sense of acoustic space to any audio signal. This can make recording cheaper, more controllable and more creative. It's actually very difficult to obtain quality recordings using only natural



reverberation — it requires a great deal of experience, as well as extreme care in selecting and setting up recording environments. This production style is impractical for the majority of projects, where time or money (or both!) are limited. Home recordings, particularly, often benefit from at least some artificial reverberation as even a reasonably priced reverb processor will usually provide more pleasing ambience than your average spare bedroom! Furthermore, many synthesized sounds have no ambience at all, and so require at least some reverb to make them sit comfortably with acoustic instruments.

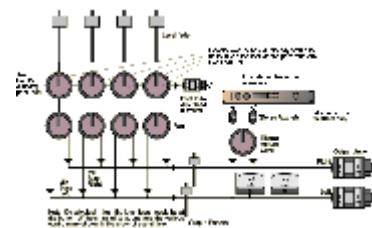
In music productions which rely heavily on overdubbing, artificial reverberation is especially useful, because it allows you wait until mixdown before deciding which acoustic spaces best suit individual parts — it's much easier to make these important decisions within the

context of a completed arrangement. When recording large ensembles, such as orchestras, you can use high-quality reverberators to blend overdubbed solos onto ensemble backing while maintaining the illusion that everything was recorded in one go, and this can significantly reduce the length of ensemble recording sessions costing thousands of pounds an hour.

Reverb can also be an inspirational creative tool, increasing the range of 'virtual spaces' you can experiment with. What's more, a reverb unit can provide reverberation treatments which would never occur naturally, but which are nevertheless useful tools for stereo mixing within popular music genres — what we hear when we listen to modern commercial records is often very different from a natural reverberant environment, for any number of artistic and commercial reasons.

Q What devices can I use to add artificial reverb to my recordings?

Most artificial reverberation in use today is implemented with digital technology, because microprocessors are well suited to this task — simulating the reflection of a sound is, at its most basic level, merely a question of storage and delayed recall. However, attaining realistic yet easily controllable simulations of the immensely complex reflections within real acoustic spaces is no mean feat, even with the best DSP, and the most convincing and flexible simulations can cost thousands of pounds. Fortunately, digital reverberators have been around since the '80s, so much of what was once 'flagship' technology is now becoming available at much more modest prices. Affordable digital reverberation comes in a variety of forms. In addition to dedicated stand-alone units, from the likes of Alesis, Lexicon, Sony and Yamaha, there are also software plug-ins which provide similar functionality within the graphical environment of your computer sequencer or DAW, and many workstations, synthesizers and multi-effects units now include reverberation amongst their feature set. However, algorithms in multi-purpose devices and 'native' plug-ins are often run on limited processor resources so their quality can be limited. Quality reverb is fundamental to most professional recordings. Consequently many readers find that a dedicated reverb unit makes a better long-term investment than a similarly priced multi-effects unit.



It's easy nowadays to think that a digital reverberator is your only option, but older analogue technologies are also worth considering. You can simulate an old reverb chamber by playing a feed from your mix through speakers in a quiet room and recording the result. Plate and spring reverbs, which use vibrations induced within metal to roughly simulate room acoustics, are great for recreating the ambiances on past classic records, even though they are often rather less than realistic.

Q How do I best set up my reverb unit with my other gear?

If you are multitracking with a mixer which has auxiliary sends on the channels, then this allows the most flexible configuration. Connect the reverberator's input to one of these auxiliary output busses, or two if your reverb has stereo inputs, and set up the reverb so that only effected or 'wet' sound is output — digital reverb units often output the original 'dry' unprocessed signal as well, so you may need to turn this off. You'll probably want to use post-fade sends for feeding reverb processors, as this ensures that the level of each channel's send remains proportional to the channel's overall level on the mix buss. Return the reverb to a mixer channel or dedicated auxiliary return, either in mono or stereo depending on the unit's output — if you have no stereo channels, use two mono channels

panned to opposite extremes. This configuration allows you to create different amounts of reverberation for each instrument by varying the channel aux send levels, but it also lets you adjust the overall reverb level from the return-channel faders. You can further process the reverb's output from the channel EQ and insert points, if you wish.

Sometimes, this setup is not practical. If you have no mixer, you may have to insert your reverberator on the way to your recorder, using only one of the outputs if you are recording to a single track. For this purpose, the amount of reverb mixed with the direct sound will have to be set carefully from the reverb unit itself. If you want to mix from a console which has no sends free, you may find that you have to insert your reverberator on the most relevant track, or possibly across an audio group if you need a little more flexibility — however, stereo channels or groups will require the use of a stereo-in, stereo-out unit if pan positions are to be preserved.

Q I want to get into editing the programs in my digital reverb. Which of the sea of parameters are most useful to adjust and what do they mean?

We have already mentioned the most basic variable within all reverb units, the ratio of direct (or 'dry') sound level to reflected (or 'wet') sound level. These two levels are usually controlled from a single Effect Ratio control. (Naturally, if you have connected your reverb unit to a mixer, you can set this to 100 percent wet and then adjust the levels of direct and reflected sound from the console's fader, as described above.) Increasing the level of the artificial reflected sound compared to the unprocessed direct sound increases the perceived distance between the sound source and the listener. By applying different levels of reverb to different instruments, you make some sounds seem closer to the listener than others, and thereby create a sense of spatial depth in your mix.

The next parameter common to most units is that of Reverb Decay Time, which is how long it takes for the reverb to drop by 60dB from its maximum level. Increasing this time increases the sense of size of your virtual room — think of the difference between a small stone church and a massive cathedral. However, an increased inside surface area in a room reduces the decay time, and this is one of the reasons why the presence of an audience 'dries out' the acoustic in a venue compared to that experienced at the soundcheck. Furthermore, the less enclosed a space is, the shorter its reverb decay time — an open field is much less reverberant than a barn.

More well-specified reverberators have additional High- and Low-frequency Damping parameters, which allow you to shorten the reverb decay for the frequency extremes. While simpler reverberators may not have independent control over these damping parameters, you are often given a choice of reverb models (for example 'Room', 'Hall' and 'Plate') which provide different preset damping combinations.

When little Low-frequency Damping is used, the simulated space seems more solidly built and sizeable — large caves, for example, have a characteristic rumble to their reverb, whereas most normal rooms have very short low-end reverb times. High-frequency Damping helps to simulate the absorbance of high-end by soft furnishings, carpets, curtains and so forth — furnished rooms usually sound 'warmer' than those which are unfurnished. However, in very large acoustic spaces the reverb time at high frequencies is also reduced by the damping effects of the air itself, which are concentrated at high frequencies. Another common parameter in reverb units is Pre-delay Time, which allows you to specify the amount of time between the start of the direct sound and the start of the first sonic reflection. Decreasing this time moves the sound source closer to the boundaries of your simulated room, but also moves it further from the listener — if you use reverb on an 'in-

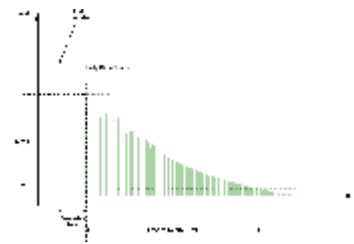
your-face' pop vocal you should not use too short a Pre-delay Time.

Even if you only adjust parameters for Direct/Effect Levels, Reverb Decay Times and Pre-delay, you have enough control to create a wide variety of useable reverb settings. A good way to find the one you need is first to decide on the type of environment within which you want your sounds to occur. Then, by considering the physical design of that imaginary space, and by applying what you know about the basic reverb parameters, you can often get pretty close to the ambience setting you're after straight away.

Q Why does my reverb unit have separate controls for 'Early Reflections' and what do these do?

The more expensive your reverberation unit, the more control you're likely to be given over the first handful of sonic reflections produced after any sound, often called the Early Reflections. These come before the complexity of the main reverberation, and so are usually distinct enough for us to subconsciously extract information about the size, proximity, location and material composition of the surfaces they have reflected from, as well as giving us an idea of the position of the sound source in relation to such surfaces. A combined pattern of early reflections can give us not only a sense of where the closest large surfaces are, but also a feeling for where we are within any given reverberant acoustic. The more detailed a simulation of this pattern of reflections is, the more realistic it becomes.

Only the most highly specified of reverberators give you control over the level, position and timbre of numerous individual initial reflections, but most mid-priced units will at least have an independent Early Reflections Level parameter — the closer a sound source is to boundaries or large reflective objects within an acoustic, the stronger the early reflections become. A Density parameter is also often provided, which varies the number of early reflections and their rate of occurrence — the more dense the early reflections, the more complex the shapes of the nearest surfaces seem. A Diffusion parameter is occasionally given as well, which is a measure of how far the early reflections spread across the stereo image — a wider stereo spread can make the ambience more noticeable for mono sources, and can also affect distance perception.



Q What are the most common mistakes when using reverb?

Using too much reverb or too long a setting smothers the timbral and rhythmic subtleties of individual parts, and can cause vibrant mixes to become flat and distant. Reverb needs to suit the music it is applied to — slowly unfolding New Age music might be fine with lots of long rich reverb, but that same effects use is unlikely to suit most fast-paced rhythmic music. Remember that reverb can help to create front-back perspective in your mix, so don't apply it with a trowel unless you want your mix to lose its sense of contrast and depth. It is also worth realising that long reverbs will exaggerate the weaknesses of budget reverberators, and that such units give their best results only when used carefully and in moderation.

There are also a few specific things to avoid for most popular genres. Stereo pad sounds probably don't need much reverb — they often have lots already and, in any case, are already designed to fill gaps in an arrangement, so adding extra reverb usually verges on overkill. Large amounts of long reverb are also less than suitable for most basses and low drums — you'll soon find your mixes disappearing into the mud if you overdo it, and many

mix engineers avoid reverb on low instruments altogether.

Q What is the best reverb setting for vocals?

As a general rule, if the intelligibility of words is important, then neither the effect level nor the reverb time should be too high. Increasing the Pre-delay time can also help to keep words clear.

Beyond that, everything depends upon the role of the singers and on the type of music. For choral recording, use longer reverb decay times with increased High-frequency Damping and decreased Low-frequency Damping in order to simulate typical choral venues. However, such a setting would be completely unsuitable for a pop lead vocal, where it would position the vocal too far away and muddy the texture.

However, our most commonly received queries concern lead vocals within popular chart styles. In addition to ensuring the clarity of the words, it is also wise to keep reverb level and decay times low — you want to keep the vocal close to the front of your mix. It's also worth keeping the reverb fairly bright, as this can help further highlight the sound. If this accentuates sibilance too much, you can always de-ess the feed to the reverberator.

Q If I don't want to use too much reverb, are there any other ways to add space and ambience to my recordings?

Before abandoning reflection-based effects completely, experiment with using only the Early Reflections part of a reverb program. If you can't isolate this on your particular unit, then you can always mock up something similar with a multitap program. Ordinary single-tap delays can also nicely thicken up sounds in much the same way as reverb, without obscuring too much detail in your mix.

Equalisation can be used to enhance the front-back perspective of your mixes — toning down a little high end can simulate the increased air-damping which affects sounds travelling from more distant sources. If you feel you just need to give a sound a stereo spread, why not try a little stereo flanging or chorus — you could even try using a fast, shallow autopanning program to slightly smear the sound across the stereo image. If you feel that an instrument is little thin without reverb, you might try compressing it a little to emphasise low-level detail. Some engineers prefer not to compromise the dynamics to this extent, instead mixing a heavily-compressed feed in with the unprocessed signal. If this doesn't go far enough, then try viciously compressing a short mono Early Reflections program (without pre-delay) and mixing a small amount of that in with your original sound for a more pronounced effect.

Q Is it better to use just one reverb program for each of my songs, or to layer a number of different ones for each mix?

In the early days of reverb technology, some engineers got into the habit of layering a number of reverb and delay effects in order to generate a richer reverb than would otherwise have been possible. However, while this particular technique generates a characteristic sound which some may wish to recreate, it is not nearly as necessary with today's digital units.

This does not mean that most commercial records only ever use one reverb nowadays — some *do* only use a single program in order to ensure uniformity of ambience, but these

projects are still in the minority. Many modern records use bizarre reverb treatments on certain instruments as a special effect, but when different algorithms aren't being used in this way, they still fulfil a definite production function. Placing instruments in different environments can increase the contrast between one and the other — if you put a vocal in a small bright room and a guitar in a large warm-sounding hall, the voice would stand out, albeit at the expense of a uniform acoustic.

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Media House, Trafalgar Way, Bar Hill, Cambridge CB3 8SQ, UK.

Telephone: +44 (0)1954 789888 Fax: +44 (0)1954 789895

Email: info@sospubs.co.uk .Website:

www.sospubs.co.uk

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