

ACOUSTIC TREATMENT

Now that we have our speakers set up, orientated and placed correctly, we can now think about how we are going to treat our room to best cope with the different issues we may have to resolve, such as: standing waves, echo, reverb, and any side reflections.

STANDING WAVES:

Standing waves are created from waves bouncing off walls. These will affect the whole frequency spectrum, however the mid and high range standing waves are less troublesome, and much easier to deal with than low frequency standing waves.

If we play a 60Hz tone and walk around our room, we may notice a change in volume as we move around. This is the doubling and cancellation of waves.

ECHO AND REVERB:

These will add to a signal as it bounces off the surfaces of a room, which will add to the tail of the sound. This can sound similar to fast fluttering or ringing and can be heard if we clap our hands as we move around a room. Try clapping near a corner to see if you can hear the difference.

SIDE REFLECTIONS:

Side reflections are when reverberated, or reflected signals have a time-delay compared to the original audio. These micro-changes in phase will cause the audio to effectively comb filter itself, as it doubles or cancels certain frequencies. This can lead to a smeared stereo image.

ACOUSTIC TREATMENT GUIDE

The majority of producers don't have the luxury of a professional studio. Most will have a small to medium sized, untreated bedroom, which will be used for mixing tracks down in.

Now is the time to get these issues sorted, lack of acoustic treatment is one of the biggest causes of frustration during the mixing process. Over the next few pages we will be seeing how we can vastly improve the acoustics of our listening environment without spending loads of money.

Following on from our last section, we have a few basic rules for acoustic treatment and room setup:

- Use the longest length of the room
- Make sure our speakers are at equal distances from the walls
- Speakers must stay away from the walls and corners
- Speakers should be facing us directly
- Speakers should be in an equilateral triangle formation with the listener
- Each side of the triangle should be equal in length

EARLY REFLECTIONS FROM THE SIDES

This problem is caused when we don't have any absorbers on our adjacent walls. This means that early reflections will bounce off these walls before reaching the listeners ear.

This extra distance that the wave has to travel will add a miniscule time delay onto the wave, which will alter its phase relationship with the direct wave, resulting in some nasty phase issues. This must be avoided by using acoustic absorbers to dampen these early reflections. To make a simple absorber you will need some lengths of wood for the frame, a roll of insulation, cloth or canvas, nails and mounts.

Too much insulation can make a room sound very 'dead', in this case try using some sound diffusers as well. The lengths of the blocks are specifically calculated to diffuse certain frequencies in a slightly more natural way.



An acoustic diffuser

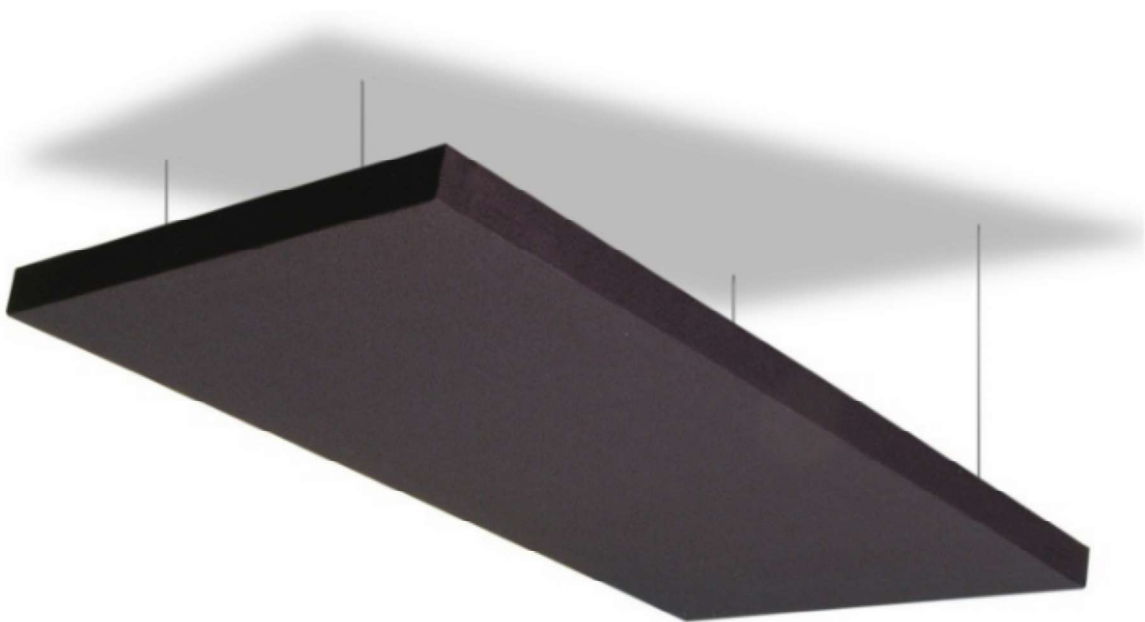


Acoustic treatment panels

EARLY REFLECTIONS FROM THE CEILING

We also need to remember that sound travels in all 3 dimensions, so we need to think about the ceiling and the floor. Flooring is quite a hard variable to control, but it helps if the room is carpeted. If it is a tiled, or wooden floor, then think about investing in a large thick rug, which should help to dampen those frequencies that are likely to bounce off a hard floor.

As for the ceiling, we can suspend an absorber similar to the one used for the walls. This should be placed in the space between the speakers and where you sit. The absorber can be placed so there is a gap between it and the ceiling. This can then be suspended by hooks as seen in the picture below.



A 'cloud' type acoustic treatment used for a ceiling

LOW-END RUMBLE & STANDING WAVES

These can be greatly reduced by using bass traps in the corners of the room. To do this, we can use any form of insulation that can be cut or fixed into all the corners of the room. These bass traps can be bought online, or we can try and make something ourselves, using slightly harder density insulation pads.

Installing more bass traps isn't going to reduce the level of the bass in our room; it is simply going to balance it. So basically we can use as much as we want without having to worry about killing off the bass in our room.

Bass frequencies have very long wavelengths, which makes them more of a structural problem that involves altering room dimensions more than anything else. The best remedy is to get the right dimensions for your room: Using 2" thick acoustic foam on the walls is only really going to solve mid and high frequency issues.



Bass traps



Acoustic panels