



Tip #33 Surround Speakers – Explained!

The surround speakers in a home theater system play an extremely important role: they convey the three-dimensional sound effects (like the sonar *pings* in a submarine's hull, the wind whipping through the desert sands, or the hustle and bustle of a crowded city street) that make a movie's soundtrack lifelike and believable. Without good surround speakers, home theater is just...plain ol' television.

When you go to a good commercial movie theater, look around at the side and rear walls before the lights go down. Mounted on those walls are lots of surround speakers, probably dozens, high above the audience's head. These multiple speakers play all the ambient information on the soundtrack, and because there are so many speakers, the listener is not aware of any one speaker. Remember, you can't point to an echo and say, "Aha! There it is!" The surround effects are simply there, all around you. (See Tech Tip 28, and also Figure 1)

The challenge with home theater is how do you get one pair (maybe two pair, if you're really lucky) of surround speakers in your living room to sound like 24 pairs in a movie theater?

The best way is with dipole surround speakers. Dipole speakers have two sets of drivers, facing opposite directions, that play out-of-phase with

each other. That is, one set of drivers is moving out ("+") when the other set is moving in ("-"). Where their output overlaps directly in front of the speaker, it cancels out. (Plus added to Minus = Zero, right?) That's good, because it makes the speaker's location very difficult to pinpoint (engineers call it "localize," see Tech Tip 31) by ear.

Instead, the sound gets away from the speaker, and is reflected all around the room before finally reaching the listeners' ears. These multiple sound reflections fool the ear into thinking that there are lots of surround speakers in the room—just like in those fancy movie theaters. (See Figure 2)

Yes, you can use "regular" speakers for surround, if you absolutely must. Just try to point them away from the listeners so their sound has a chance to reflect around the room first. Nowhere near as effective as dipoles, but not too bad.

Other Tech Tips:

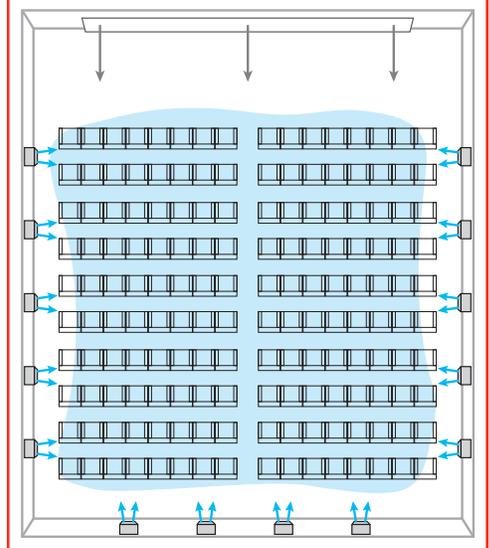
Tip 29: Spread it Around

Tip 30: All in the Family

Tip 31: 'Local' Delivery

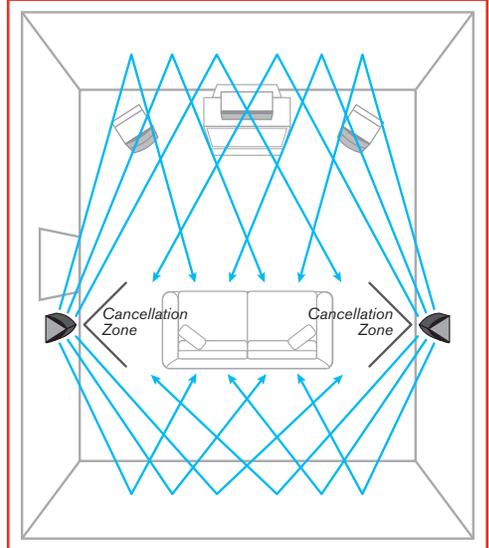
Tip 32: LCR Speaker Placement

Figure 1 Commercial Movie Theater



Multiple surround speakers cover entire audience in non-directional sound effects

Figure 2 Dipole Surrounds in Living Room



Side-mounted dipole surrounds deliver convincing, non-directional sound effects, just like the best theaters