Subject: Re: Downfiring flanking subs ??
Posted by Wayne Parham on Sun, 10 Feb 2013 18:06:52 GMT
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Flanking sub orientation doesn't matter since the sound radiated from them is omnidirectional. In fact, the problem flanking subs mitigate is caused by the omnidirectional nature of this band of frequencies coming from the mains. Self-interference from nearest boundaries causes deep notches. Since radiation is omnidirectional orientation doesn't matter.

There are three things to consider though:

First is position: With the sub cabinets placed back against the wall, the depth of the enclosure puts the acoustic center in front of the wall a couple feet. This is approximately half-way between the acoustic center of the mains and the wall. That's an important position - We want the flanking subs between the mains and the wall.

So if your subwoofer is downfiring, the acoustic center may be closer to the wall and you'll want to move it away from the wall a bit to compensate. It doesn't have to be exactly at the halfway point, and in fact is better closer to the wall but do keep this in mind. Same holds true for the floor, we want the sub between the floor and the mains.

And that brings me to the second thing to consider, which is the acoustic load provided by a nearby boundary. I'm sure you've noticed that when you place the woofer very close to the floor, its sound changes. This is because the acoustic load changes, and it becomes similar to a compression chamber. I would suggest that the woofer be spaced high enough that the boundary wasn't making a significant difference in the acoustic load. You can measure this as a change in impedance, but you can also hear it. Note though that this extra compression isn't bad - and is actually good in many cases - but we want a little distance to the boundary anyway because of its use as a flanking sub. We're not talking about a huge distance here - just a few inches, perhaps four to six.

The third thing is related to suspension and mass. Be careful that the woofer has enough suspension stiffness to support the cone without sag. Subwoofers generally have pretty loose suspensions and heavy cones, and that will tend to allow cone offset. Cone offset will make the travel asymmetrical at the extremes, which increases distortion. So you kind of have to expect a down-firing woofer will enter distortion at lower power levels than the same woofer facing forward. To know how much difference there is, you would have to measure. Some would undoubtedly be very minor, others would be a pretty big difference. It all depends on the stiffness/mass and xmax. It's about how much sag there is and how much linear travel is available.

Also over time, it can also make the suspension permanently offset, but that's usually not a problem for decades. Just sayin'.