Subject: Flanking Subs vs Helper Woofers, revisited
Posted by j0nnyfive on Mon, 04 Feb 2013 06:29:58 GMT
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Wayne,

I'm trying to think of cost-effective approaches to not only building multiple and flanking subs, but also have some serious output as well (for home theater).

It seems logical to me that one could build some subs that sacrifice low end for output. What about building flanking subs that only extended down to 40hz or so, but higher output to better match the output of the 4 pi speakers? So in the end, you would end up with:

2 or 3 low cost high output flanking subs (cover 40hz to 150hz)
1 (more expensive) high output LFE sub (cover 20-80hz or so)

Here is my rationale:

a. As bass gets lower, "feeling" replaces "hearing."
b. As our hearing goes, the importance of smoothness goes.
c. Most theaters don't have super low bass anyway.
d. Most music doesn't use super low bass anyway.

Am I on to something here?

Subject: Re: Flanking Subs vs Helper Woofers, revisited
Posted by Wayne Parham on Mon, 04 Feb 2013 16:56:20 GMT
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You can build what I would describe as a "detatched 2.5-way" speaker. Essentially it is a DI-matched two-way with a second midwoofer in a separate box, physically located as presecribed for flanking subs, i.e. just beside, behind and below the main speaker. The second "helper woofer" is connected to the mains through a passive crossover that rolls off gradually with a ~200Hz low-pass. It can be as simple as a single 5mH to 10mH coil. This approach is described in the following threads:
Helper Woofer Location

contemplate doing this approach. Most would call this a "helper woofer" configuration, and it actually preceded the "flanking sub" approach. There is very little distinction, actually, just one of semantics. The fundamental properties we're achieving are the same, smoothing the self-interference notches from nearest boundaries using multiple sound sources. But the helper woofer is usually a midwoofer that doesn't give much additional bass extension while the flanking sub is usually a traditional subwoofer placed where the detached helper woofer would be placed.

Some historical perspective might be interesting, and it connects a few dots. Two things influenced me towards development of the helper woofer / flanking subwoofer approach. The first

was an observation that line arrays do not suffer from a floor bounce notch and the second was an observation that room modes could be mitigated by multiple subwoofers. Both line arrays and multisubs are arrays of sound sources that mitigate notches using the dense interference created by multiple sound sources. Where the sound from one source is cancelled by some form of self-interference, another sound source, being in another location, is not cancelled. So the nearly complete cancellation using only a single sound source is reduced to partial cancellation using another sound source.

My first helper woofers were just truncated arrays. I used two of the same midwoofer overlapping up to ~200Hz. I also use low-midrange blended with a midwoofer, which is another technique that is quite effective. Anything that blends the 100-200Hz range with overlapping sound sources works well. But since the multisub approach also uses blended sound sources in the adjacent <100Hz range, it made sense to me to try and incorporate a hybrid approach, one that allows helper woofers to act as multisub modes. Conceptually, I could use two flanking subs and two distributed subs for stereo, and this would give a total of four sound sources in the deep bass range. So I tried using traditional subs that had clean output above 100Hz, and found it worked very well too. That's how the flanking subwoofer approach was born.

Either way works great. You can run a detached 2.5-way speaker, using high-efficiency woofers in both (main/helper) locations. Or you can run a DI-matched two-way with a traditional sub placed flanking the main speaker. Blend them in the 100Hz-200Hz range and anomalies from nearest boundaries are mitigated. Room modes at lower frequencies are mitigated with multisubs. However you slice it, what we are essentially seeking is a spatially distant array at low frequencies (<100Hz), narrowing to a closer-spaced array at low-midrange frequencies (100Hz-200Hz), gradually transitioning to a point source in the statistical region above 200Hz.

Subject: Re: Flanking Subs vs Helper Woofers, revisited
Posted by j0nnyfive on Tue, 05 Feb 2013 04:28:36 GMT
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Aha!

I had to think on this for a while. You know, I've read different posts where you have explained virtually the same thing in about 14 million ways to different people. I just want to say THANKS for your patience and willingness to teach! It is much appreciated! Audio is not my forte, but your posts have taught me a lot in such a short amount of time! You may not care for the sucking up... too bad.

Okay... let me approach this from a different angle. When you switched to your hybrid approach of using flanking subs as opposed to the plain 2.5-way helper woofers, what was your thinking in terms of output? I mean, when switching to subs, aren't you losing output? Can the 3 pi subs keep up with the 4 pi mains? Or is it that you never listen at a level loud enough that it matters? (Don't blame you there.)

Do you find the flanking subs to be the most economical in the end? I know you switched to flanking subs for a reason, you've been in this game for a long time. I'm trying to better understand your motivation. What about the drop in output? And, are your 2 distributed subs higher output? Can you blend subs and speakers with different output capabilities? Is it that since you are using the flanking subs for smoothing, they don't NEED to be as loud to do their job? Anyway, I'll leave it there. I'm leaning towards the 2.5-way for output reasons unless you think I may be making a newbie mistake (nahhhh). Thanks again!

Subject: Re: Flanking Subs vs Helper Woofers, revisited
Posted by j0nnyfive on Thu, 07 Feb 2013 00:55:27 GMT
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Aha again!

I get ya. Subs are the way to go! I kinda derped out for a couple days there. Even if output costs more, it would be worth it to me because subs aren't really "speaker specific". I can mix and match subs with speakers but if I bought 2226 helper woofers, not only would those be expensive as well, but they would be specifically tied to the other 2226 speakers. Gotcha. Don't make fun of me.
