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.