
Subject: Options in a nutshell

Posted by [Wayne Parham](#) on Fri, 01 Apr 2011 04:40:07 GMT

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It's all about the midrange, when you're talking differences between the JBL 2226 and the Eminence Omega 15 in the four Pi loudspeaker. The Omega 15 sounds very good, powerful yet still natural sounding. But it isn't as good as the JBL woofer. The 2226 uses a flux control ring, which reduces distortion. It makes the midrange sound clearer and it reduces listening fatigue.

Magnet Structures

The same kinds of things could be said of the B&C and the Eminence woofers in the three Pi speaker. The Eminence woofers are smooth and nice sounding, and they can get very loud and still maintain composure. But they aren't as good as the B&C 12PLB100 woofer, which uses a flux control ring.

I'm not going to do the "rate on a scale of 1 to 10" thing, because I don't think that will give you a clear picture. Instead, I want to give you a (very) brief explanation of what you gain with each improvement. You can also read the whitepaper below to get a little more explanation of the technologies used in these loudspeaker systems and how I recommend they be used.

High-Fidelity Uniform-Directivity Loudspeakers

Like I said above, the JBL and B&C woofers have flux stabilization rings, so their distortion is lower and midrange is clearer. The good/better/best improvements in the mains are about midrange quality and sometimes power handling. Powerful woofers like these are loafing at hifi and even home theater levels, which really helps quality because they aren't strained. So midwoofer upgrades aren't about the low bass. That can really only be improved with multisubs.

Even if you have stereo main speakers that are capable of clean, extended bass response, without multiple subs, the in-room response will be lumpy. The reason is standing waves inside the room cause peaks and dips throughout the room. Bass will be stronger at some positions than others, and it's different for every frequency.

Room modes are strongest in rooms with rigid walls (like concrete, rock, stucco or brick). Well damped rooms aren't as bad (like those with framed drywall construction and a lot of furniture) but you'll still improve response with multisubs. Put a speaker that is perfect outdoors in a room with rigid walls and you'll see peaks and valleys up to 20dB below 100Hz. Most framed drywall homes aren't this bad, but you should still expect 10dB fluctuation in the modal region.

Multisubs obviously don't help the midrange above 200Hz or so. That's where the improved midwoofers in the mains help you. But they can be used to help the lower midrange between 100Hz and 200Hz, if needed. When you put matched-directivity two-way speakers on stands to get them up to ear level, the vertical height creates a floor reflection. What's often even more troublesome is the reflection from the wall behind the speakers. Since most installations have speakers placed relatively near the wall behind them, this tends to create a self-interference notch around in the 100Hz to 200Hz region.

So I recommend placing a sub on the ground beside and slightly behind each main speaker, which are generally placed at ear level on stands. Low-pass the sub around 90Hz to 120Hz so there is still some output in the lower midrange, blending with the mains. These flanking subs will

smooth self-interference notches as well as other room modes.

The constant directivity cornerhorns don't need flanking subs, because the midhorn and woofer are acoustically close to nearest boundaries and are blended between 100Hz and 300Hz. They don't suffer self-interference notches as a result. They are tightly packed into the corner so there is no front wall or side wall reflection. Flanking subs for the two-ways are placed slightly beside and behind the mains to help smooth the wall reflection, which acts sort of like floor bounce. But the constant directivity cornerhorns don't need this, because they are so close to the boundaries they do not introduce any self-interference.

You can also install subs more distant from the mains, with low-pass frequency set lower (50Hz to 80Hz, depending on distance from mains) to prevent localization. The more distant subs are usually better at smoothing the lowest frequency room modes. If you have a troublesome lower bass peak - which is usually a result of a big above and below in frequency - then putting subs on the other side of the room is the best solution. Two to four subs placed in different locations will average the sound field and make the bass smooth throughout the room.