Subject: 3pi vs. 4pi
Posted by mike_2008 on Fri, 01 Apr 2011 02:40:36 GMT
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Wayne: I am sure that you probably answered this question previously, but I was unsuccessful in locating a previous thread.

First, I know very little about speaker building, but I do understand that the more you spend on drivers the better the sound quality.

If the Standard 4Pi with the upgraded driver is a 9 (on a 1 to 10 scale), how would you rate the following:

- Standard 4Pi Eminence Omega 15
- Standard 3Pi Eminence 12LF

I am just trying to get a sense of the cost vs. benefit. Obviously, the Eminence 12LF driver is the least expensive driver. I do understand that you recommend using multiple subs. If you used multiple subs, could you get away with the Eminence 12LF driver and still get great Home Theater results.

I appreciate your response.
Thanks

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.

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Subject: Re: Options in a nutshell
Posted by jgoodd8050 on Fri, 01 Apr 2011 19:49:29 GMT

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Wayne,

What you said about 100hz blending with subs is very helpful to me. How far away from the mains do you usually place the flanking subs?

Thanks Jeremy

Subject: Re: Options in a nutshell
Posted by Wayne Parham on Fri, 01 Apr 2011 20:30:05 GMT
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Flanking subs should be just a couple feet away. They're basically at the foot of the mains, and when blended up through the lower midrange, they'll smooth the floor bounce notch. They're sort of making a three-way speaker out of your matched-directivity two-ways, except that not being attached, you have a little more placement flexibility. You can take advantage of this to smooth a couple other self-interference notches too, like the one from the wall right behind the mains. Just move the subs a little bit behind the mains and they will help smooth that reflection notch too.

I generally put flanking subs a little bit below and behind the mains, and perhaps just to the outside (or the inside). Keep them close enough to integrate well, and not betray their position. You're going to run these up into the midrange, even if just barely, so you don't want them to be too far away. But you want them to be offset enough to provide smoothing of the self-interference notches. So put them in between the mains and any nearby reflective surfaces. Something like this:

Subject: Re: 3pi vs. 4pi
Posted by mike_2008 on Sun, 03 Apr 2011 01:07:34 GMT
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Wayne: I just want to thank you for taking the time to respond to my question with a very detailed answer.

Subject: Re: 3pi vs. 4pi
Posted by Wayne Parham on Sun, 03 Apr 2011 14:47:21 GMT
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No trouble, my pleasure.  That's what the forum is for!

Subject: Re: 3pi vs. 4pi
Posted by Matts on Sun, 03 Apr 2011 20:18:28 GMT
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I started out with "all-Eminence" Pi 4's and later upgraded to JBL/B&C Pi 4's- and to answer your first question, I'd say both of them are very equivalent in price/benefit ratio.  You don't need to rate them anything out of 10- they're both easily worth what they cost.  Spend whatever you can afford and enjoy 'em.