
Subject: 3Pi Satellite idea

Posted by [Justin Morken](#) on Fri, 20 Nov 2009 18:38:41 GMT

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I'm thinking about building a set of 3Pi speakers into 1.5cu.ft sealed boxes to use for HT and music. The Delta-12LFA models very well sealed, giving an almost ideal 2nd-order roll off @ 80hz (THX standard). They will be stand mounted (horn center @ 34") and placed directly against a wall. The baffles will be 14" wide. I'm wondering if there are any glaring problems with this idea. I understand there is no baffle-step compensation in the crossover and I the speakers should be close enough to quarter-space to make it unnecessary (I think?).

The logic for this is to achieve an acceptable WAF while retaining most of the advantages of a large two-way (I just love good horn systems!). I attached the WinISD sim (shown with subwoofer and THX crossover in place) and a Sketchup image of my concept. I'd appreciate any feedback you might have!

Thanks!

File Attachments

1) [living room.jpg](#), downloaded 412 times

2) [ISD plot.bmp](#), downloaded 372 times

Subject: Re: 3Pi Satellite idea

Posted by [Wayne Parham](#) on Fri, 20 Nov 2009 21:58:36 GMT

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I understand your desire to make the cabinets smaller. That's a worthy goal. And I think what you've described is probably pretty safe. However, I want to mention that you're not looking for crossover between subs and mains when used indoors, at least not in the traditional sense. What you want is overlap, in this case, because you want multiple sound sources in the modal range.

Multisub concept One of the most important things for getting smooth, uniform bass indoors is having multiple sound sources below ~100Hz, positioned at different places in the room. For best sound quality, you really don't want to have just one sub covering this range.

Subject: Re: 3Pi Satellite idea

Posted by [Justin Morken](#) on Sat, 21 Nov 2009 00:00:00 GMT

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Thanks for your feedback!

I've heard of the Multisub concept before, and I guess I need to break old HT habits. I think I can find a way (with my receiver) to let the tops run full range. This will at least give me -6db @ 60hz. I

know I can't have my cake and eat it too (great bass AND small enclosures) so this is one of the compromises I'll have to make. I could EQ a little more extension in - at the expense of headroom.

I'll post updates as I make progress on the project.

Subject: Re: 3Pi Satellite idea

Posted by [Wayne-o](#) on Wed, 25 Nov 2009 15:21:15 GMT

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Great Idea, just needs more subs. There has to be a way around this.

Subject: Re: 3Pi Satellite idea

Posted by [Justin Morken](#) on Wed, 25 Nov 2009 18:07:46 GMT

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Wayne,

I know you've put a lot of consideration into the driver spacing and placement in your designs. What are the trade-offs when moving the horn and woofer closer together? In a typical design this is almost always a "good thing" but I've heard you mention that you've used the driver spacing to steer the response lobes.

Subject: Re: 3Pi Satellite idea

Posted by [Wayne Parham](#) on Wed, 25 Nov 2009 21:31:40 GMT

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In general, closer spacing is a good idea. But the drivers are fairly close - you can't really get pretty closely spaced as designed. Just enough room between them to get a brace in there. Closer than that and there's not enough meat to retain strength and allow room for an internal brace, which is pretty important.

I tested with the configuration as shown in the plans, and I would probably be hesitant to deviate. The nulls are widely spaced and the forward lobe is well formed. Best not to mess with success, in my opinion.

Look how far apart the nulls are in the video contained in the link below. Also notice how smooth the response is through the arc between nulls. It's a very nice, smooth pattern. I wouldn't modify the layout unless you had measurement equipment and time to optimize. I mean you can, and I wouldn't expect adverse results from inching the tweeter closer to the woofer a smidge, but you wouldn't know unless you measured to see. And again, you need room to put the cross brace, so I'm not sure it's worth spending a lot of time to investigate.

Crossover optimization for DI-matched two-way speakers

Subject: Re: 3Pi Satellite idea

Posted by [Justin Morken](#) on Tue, 01 Dec 2009 23:05:43 GMT

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I guess I hadn't even considered bracing and baffle strength

I just looked at the blank wood between the woofer and tweeter and thought to myself "hey, they aren't touching yet!"

I'm doing my darndest to preserve as much of your design work as possible while trying to reach a better WAF. I think I may have mostly given up. I'm now considering building the plans as drawn, but adjusting the dimensions taller, narrower, and deeper so as to have a "tower" speaker. 34"H x 14"W x 16.5"D will give me almost identical volume and has well spaced resonances. I tested the original box dimensions against my new dimensions with Boxnotes and the resonances seem to be pretty comparable. The only factor I can't calculate is port placement in relation to box nodes (something you've already figured out).

You're video was very helpful. Seeing the vertical nulls spaced that far apart is pretty impressive.

Subject: Re: 3Pi Satellite idea

Posted by [Wayne Parham](#) on Wed, 02 Dec 2009 01:08:55 GMT

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Grab a copy of Martin King's spreadsheets. That will help you determine where to put the woofer and port in a tower cabinet enclosure.
