Subject: Re: 4-Pi box size ?
Posted by Wayne Parham on Sat, 12 Dec 2009 15:26:10 GMT
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always went through a design cycle of starting with PiAlign, then double checking with BoxPlot looking for alignment characteristic of all my designs, being slightly overdamped for a slow smooth rolloff. I checked box tuning by building a physical box and measuring impedance, which shows not only Helmholtz resonance but also standing wave nodes. I also later checked the boxes with Martin King's spreadsheets, and of course have done acoustic measurements of response, which is the final word.

boxes to get the curve I wanted, which has a smooth gradual rolloff slope. You can do it with a larger box tuned lower, but that gives more of an EBS shelf. Or keep tuning at 40Hz and this gives something of a B4 alignment, which is good but not what I wanted. I like the response being smoothly rolled off, and the medium size is nice for home hifi too - large, but not overwhelming.

specs that can give roughly the same response, with respect to cutoff and slope. But to do this, they are about 3dB less sensitive. The box is about the same size, but is tuned slightly differently, apprpopriate for the woofers. It is tuned to give the same characteristic gradual rolloff slope, which conjugates room lift and also is easy to blend with subs.

loudspeaker, there aren't a lot of other choices. The baffle is pretty full on that model. Still, I think it's one of my coolest looking models. Woofer/tweeter placement is chosen partially by aesthetics, but mostly for directivity and for making a nice tall forward lobe. The woofer and tweeter are placed pretty close together, leaving room for bracing between. The crossover was designed with this geometry in mind, as driver placement and crossover work together to set the position of the forward lobe and vertical nulls.

I tell people to be careful when making modifications to my designs because the physical relationship between drivers is very important. It can alter the directivity of the speaker, and sometimes even on-axis response. Different configurations are possible, of course, but crossover changes would have to be made. One of the things you get when you build or buy one of my loudspeaker designs is the R&D - you can be assured that on-axis response is good and that the polars are too.

The design effort required to make a constant directivity speaker is not trivial, it actually takes a fair amount of time to get things right. That's why I don't do much custom work - it is just too time consuming and a one-off would be extremely expensive if I charged for my time, even if I only charged half my normal rate. So I put all my time and energy into a handful of designs that I think are the best at certain goals like price point, size and intended application.

Crossover optimization for DI-matched two-way speakers