Subject: XO for OB 2-way
Posted by colinhester on Fri, 28 May 2010 14:45:19 GMT
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As luck would have it, I was clearing a garage from a rental and found a pair of Ememrald Physics CS2. Not sure what happened, but one of the CD horns is broken (a $15 fix from Parts Express0. Other than that the speakers appear to be new (still in origianl shipping boxes). Great find except the pre-programmed Behringer unit is missing. A new one will run $800, and I sure ain't gonna pay that for a freebie.

How hard would it be to come up with a passive XO for this system? It doesn't need to be dead-on, but close would be nice. I did hook a simple first order XO up just to make sure all the drivers work, and the sound lacked bass and the top end needs to be attenuated.....C

http://www.positive-feedback.com/Issue37/emerald_physics.htm

Subject: Re: XO for OB 2-way
Posted by Wayne Parham on Fri, 28 May 2010 15:32:03 GMT
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It looks like a two-way speaker with direct radiating (open baffle) midwoofer, a helper woofer and CD horn tweeter.

If so, the crossover is very similar to what you would do for a box design. The dipole sets the pattern down low and through the lower mids but up higher - where you will want to crossover to match directivity with the horn - the pattern has collapsed beyond that set by the baffle (whether dipole or monopole). The only difference between monopole and dipole at this crossover frequency range is the dipole will have rear-facing output whereas the monopole will not. But the forward facing beamwidth will be the same as a monopole. So you can design the crossover similarly, I would think.

Seems to me the biggest difference will be what happens below the crossover frequency, EQ for the bottom end, etc. Since it appears to have two woofers, I'd low-pass the bottom one so it rolls off around ~200Hz. This will leave the upper one as the midwoofer, and it can be treated similarly to other DI-matched two-way designs. Some would call this a 2.5-way system.

Here's a thread with my design approach. It has a schematic that I hope might help, maybe use it as a starting point.
Crossover optimization for DI-matched two-way speakersHere are a few more posts about the basic design philosphy of constant directivity:
Design philosophies
Phase angles, crossovers and baffle spacing
Baffle spacing, phase angles and time alignment, revisited
Matching directivity in the vertical and the horizontal planes
DI-matched two-way loudspeakers

Room gain, pressure region, modal region and reverberent region
Baffle Step
Imaging, placement and orientation
Corner Horn positioning "Sweet Spot" for listening
Making speakers "disappear"
Recommended toe in