Subject: Re: Symmetrical and asymmetrical slopes in crossovers
Posted by Wayne Parham on Wed, 30 Sep 2009 15:16:56 GMT
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This is where measurements really help you. It would be hard to make a computer model that could include all the variables required to accurately predict the polar response of a loudspeaker. Instead, simplifying assumptions are used, such as considering each driver to be a purely pistonic radiator with specific position and acoustic phase. The electrical slope is only partly responsible for phase, as there are mechanical and acoustic properties that come into play as well.

Almost all my speakers use asymmetrical slopes in the crossovers, and most have what appears to be non-contiguous crossover frequencies as well. What I mean by that is two adjacent drivers may have electrical crossover points that don't meet. One may be higher than the other, sometimes appearing to overlap and sometimes appearing to have a gap. The truth is, only the electrical transfer function is non-contiguous, hopefully, the acoustic response is smooth.

The whole thing is acoustic phase. This affects summing, and steers where the lobes and nulls form. For more information, see the posts called "Baffle spacing, phase angles and time alignment, revisited" and "Crossover optimization for DI-matched two-way speakers". Whether or not you're interested in building a DI-matched two-way loudspeaker or something else, these concepts are transferable, having relevance in other loudspeaker types.