Subject: Re: Loudspeaker phasing: WTF?
Posted by Wayne Parham on Wed, 30 Mar 2005 04:59:53 GMT
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Speakers should be in vertical alignment if there is no crossover. Once you add a crossover, the phase presented to the speaker changes. That makes a slight time difference in the arrival time of the power developed in the voice coil, which is what makes it move. Another thing that causes a difference in the arrival time is physical offset. Naturally, if one sound source is further from you than another, then its sound will be slightly delayed.It is important to know that the delay caused by the crossover is diferent than the delay caused by physical offset. Delay caused by physical offset is fixed but delay from crossover is variable, changing with respect to frequency. They don't cancel each other, so you can't align the system. But you can make it close enough to limit destructive interference that causes a sharp null at some frequency. That's what is really important.Some suggest offset of one diaphragm in respect to another in order to counteract the delay caused by the crossover. To some degree, this makes sense. I take advantage of these kinds of relationships to allow flush baffle mounting of horns of various lengths. But I have long thought it was important to make it clear that this is not time alignment.The best you can hope for is to configure the system so that two or more sound sources do not combine to form destructive interference in the target listening position. This is accomplished when sound sources are within about 120° apart, better if within 90°. You can't hope to align them perfectly, but if you can get them within +/-90° in the crossover range, then summing will be good. The idea is to prevent destructive interference from causing nulls in the target listening area.Baffle spacing, phase angles and time alignment, revisited