Subject: Re: Rationale for single driver speakers
Posted by Adrian Mack on Thu, 15 Jan 2004 08:41:11 GMT
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Hi AkhileshPhase shifts can be minimized well below audibility, so thats not a concern in a multi-way system. Comb filtering between subsystems can also be highly minimized by using steep order crossovers, controlled dispersion horns, close driver spacing, and avoiding very high crossover points (above ~5KHz or so). Fullrange drivers are good in that theres only one subsystem so theres no issue of path length differences between two sound sources which cause nulls at various frequencies and positions. But fullrange drivers become extremely "beamy" at high frequencies, so polar response is very poor (i.e: very bad off-axis response). That happens because the speaker ceases to function as an omni directional point source when the speaker itself is acoustically large compared to wavelength being produced. Sound is radiated into a continuouly smaller angle as frequency rises. Diffraction can even occur across the diaphram at these frequencies. Intermodulation distortion is also higher on a fullrange driver at the upper bounds as well, for obvious reasons. Fullrange drivers also often have difficulty reaching the highest frequencies, as well as the lowest frequencies as it needs to find a balance between cone weight and suspension stiffness. If the cone is too heavy it will extend deeper, but it will also limit its HF extension at the same time - a balance must be found and it is always a trade off. No real studies that I know of prove crossovers are audibly worse than no crossovers. Reason is, they arn't. Selection of the correct crossovers in a multi-way system, and using high quality parts in those crossovers to keep distortion low is what you want to do. And if you do, then there's nothing wrong with them. Here is a good document concerning the audibility of phase. http://www.music.miami.edu/programs/mue/Research/dkoya/title_page.htm It's long, and boring (university paper), but its good stuff. Its one of the best studies I know of. Everything into account, a good multi way system can excel in terms of distortion, polar response, bandwidth, and output capability. Adrian