Subject: Re: Line Array discussion
Posted by DanWiggins on Mon, 06 Sep 2004 14:21:15 GMT
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Josh,There's lots of programs that will do the simulation, but they tend to be quite expensive. You're probably better off rolling your own program. Here's one page with the equation for a single piston:http://www.silcom.com/~aludwig/Physics/Exact_piston/Exact_piston.htmYou want equation P7. Here's an image of the output, using the equation:http://www.silcom.com/~aludwig/Physics/Exact_piston/Cone_near_field_phase.gifIt's quite accurate (also the same equation as derived in Fundamentals of Acoustics). Examining the equation, you can see there is a linear dependency on wave number k, so at lower frequencies the problems are reduced. With arrays the issue still exists until the wavelengths are longer than the longest center-to-center distance in the array. For example, assuming an array of ten 4" diameter woofers packed with centers 5" apart, you have a maximum center-to-center distance of 50". You'll have interference patterns (which is really what's going on, in Rybaudio's images) with wavelengths less than 50" long (about 270 Hz).Now, the interference is reduced as the wavelengths approach this size; and any resulting lobes tend to be at high angles, so they really do not affect the direct field, even in a 45 degree vertical coverage (sit down/stand up test). They can affect the total power response, though, so if you are in the reverberant field of the speaker, it will affect the perceived tonal balance.Dan Wiggins