Subject: Re: Thoughts on focused arrays and the phase problem
Posted by Jim Griffin on Tue, 15 Feb 2005 19:25:55 GMT
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Dave,I'll take exception to your proposed design. A curved array is not necessary if your line array operates in the near field. Line arrays that are sometimes curved to yield good sound to a wider audience. Pro sound arrays use a J shaped curving to establish the close listeners in the near field and then fire the far field over their heads to the cheap seats in the balcony. Hence, the goal fot the J curve is to broaden the dispersion to the audience. The line array curving that you suggest is a concave shape that limits the effectiveness of a near field line array. With this approach you severely limit the sweet spot area. Such a design will localize the listener at the focal point of the line curvature for proper sound. No where else in the room will the sound be correctly focused or balanced. My solution is to design the line array or source with a flat baffle but place the listener in the near field of the sound. My white paper describes the criteria for near field operation of a line array. In the near field the sound radiates outward from the source parallel to the planes of the ceiling and floor. Thus, little sound energy impringes off of the ceiling or the floor. Effectively, the listener will hear only the sound localized in the horizonal plane wherein he is listening. You can do deep knee bends or stand on your tip-toes and you'll hear the same sound--the vertical coherent wavefront extends from the bottom of the array to the top of its active radiating area. Hence, once you have established a near field situation for the listening area, then you have no need to worry about the various distances from the drivers in the array to the listener. Take a look at Figure 2 in my white paper and you'll understand that the coherent sound front travels for a near field array. The sound doesn't overlap so you need not worry about different sound paths from the top and bottom of the array. Finally, you need to understand that our ears accurately locate sound direction in the horizontal plane because the shadowing of the head helps to discern direction. In the vertical plane sound localization is less accurate because our ears are in the same plane. The Haas effect also comes to contribute to minimize smearing. Bottom line is that curving the front baffle isn't needed for near field listening. The sound will be correctly balanced for sound staging and imaging throughout the listening room wherein the near field exists. You can listen close to the sources or farther away and still hear great sound. A slight power taper may help balance the in-room power response from the ends of the array.Jim