Subject: Comments on Open Baffle Focused Line Arrays
Posted by Jim Griffin on Fri, 17 Dec 2004 01:14:22 GMT
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Wim,Thanks for sharing your thoughts and your work with everyone. I'll say upfront that I'm not a big lover of focused line arrays. As you know, focused arrays significantly reduce the area within the listening room where you realize good sound from the array. Use of a concave or parabolic array can account for the comb lining issues associated with a line array but it will mean that the sound would be optimized at a specific listening distance from the source. Thus, if you were not positioned at the focal point of the array, then you wouldn't hear the best sound. Move your chair and your will be out of the sweet spot and sound quality degrades. The principal advantage of a focused array is that you minimize the center to center spacing combing effects of the multiple drivers. For home applications I favor near field line arrays (NFLA) which use a flat baffle. See my white paper at the link for more details on NFLA design guidelines. Flat baffle NFLA are certainly easier to produce than a focused array. A NFLA design will enable the entire listening area to covered with well balanced sound. The sweet spot will be huge and good listening can be realized throughput the room. For line sources (arrays) in the near field the radiation of sound is somewhat different from conventional point sources. In the near field a line array (or line source) radiates a cylindical column of sound in the vertical axis. This column extends along the height of the array. This means that the sound that you hear travels parallel to the floor and ceiling from the column and does not spread as it inpringes on the listener. Hence, the sound that reaches the listener's ear is based on a parallel transversal (parallel to the floor and ceiling) and effectively travels the shortest path to the ear. Bottom line: The near field sound column does not spread in the vertical axis and will be effectively uniform along the height of the speaker. Hence, in the near field you will not hear sound that comes from different path lengths associated with the individual drivers but rather a wavefront that is a composite of the sound radiated by each source. My white paper illustrates this in Figure 2 in the text. Thus, the vertical dispersion in the near field from the array extends evenly from the source to the listener. Only as the distance from the array increases would the array trend toward far field radiation with a narrow vertical radiation pattern. You already know the advantages and disadvantages of open baffle speakers. While you don't have the boxy sound of an enclosure, you do have the issue of equalization to achieve adequate sound quality. Open baffle speakers need help in the bass region to equal the SPL of drivers in boxes. Plus you have room placement issues (placement away from walls is usually necessary) that have to be considered. Jim
Near Field Line Array White Paper