Subject: Re: Line Array discussion
Posted by DanWiggins on Fri, 03 Sep 2004 20:26:24 GMT
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Well put! IMHO, line arrays (and in fact, arrays in general) should be avoided in the near-field. Far-field use is great and often quite appropriate; however, I feel the nature of the near-field within a line array results in too many compromises and, to my ear, a less than stellar result.Some of my more used references include:- Fundamentals of Acoustics by Kinsler, Frey, Coppens, and Sanders- Audio Engineering Handbook by K. Blair Brown- Underwater Acoustics by AckerMeyersound has a great little white paper describing the issues with line arrays: http://www.meyersound.com/support/papers/line_array_theory.htm . It's pretty complete in its treatment of the subject. One should note that Meyersound sells speakers specifically designed for use as line arrays - they are a VERY strong proponent of line arrays, but also caution against use in the near-field situation, and explicitly state that line arrays do NOT create cylindrical wavefronts.I also see that Art Ludwig has some good descriptors of the near-field and field calculation on his website. It can be found at http://www.silcom.com/~aludwig/Physics/Exact_piston/Exact_piston.htm . Note that he shows the chaotic nature of the near-field of a piston radiator at http://www.silcom.com/~aludwig/Physics/Exact_piston/Cone_near_field.gif - it is, IMHO, quite instructive of the nature of the beast being dealt with.One can use this equation to superimpose the output of multiple sources on an arbitary point; I wrote a small Windows program back in 1992 or so that did just that. Iterating the point through a surface (sphere or plane) allowed a visual graph of the pressure of the array over the surface. Iterating across a bandwidth and flipping images (after considerable processing time) allowed an animated image of the nature of the acoustic power on that plane. It quickly became apparent to me that working within the near-field of a radiator is loaded with problems, and that simply staying out of the near-field was, IMHO, the best solution. In SONAR or audio.Does this mean that no one should like line arrays? Of course not! I don't like 2W SET tube amps either, but I know many who do, and more power to them. The whole issue arose over a request for help on line arrays, and some general feedback about some of the issues that I feel should be considered when working with them. It's not preference - it's about understanding the definite tradeoffs one makes when working in the near-field of ANY radiator. Arrays tend to be more problematic simply because the near-field extends out so much further.Anyway, IF you had to do a near-field line array, I think Dr. Griffin's paper is a good starting point, and said so up-front. He has a good treatise on the issues at hand, and the use of a Bessel array definitely solves many of the associated problems. It does mean reducing much of the acoustic gain one gets from the line, but again that is not because of a bad implementation, it is because of the underlying physics. Rybaudio's posts confirmed that where bandwidth and power output was adjusted across the elements of the line to make an IMHO very bad situation less bad.I hope this clarifies the whole issue. Anyone is free to enjoy what they want; however, there are definite advantages and disadvantages to any particular implementation. My experience and knowledge has led me to a different set of problems (and solutions) than line arrays used near-field. Is that bad? No, it's different.There was no slight or put-down intended of line-array proponents; just a caution about some of the issues that should be considered when dealing with these complex build-ups.Dan Wiggins