Subject: Re: To: Fred and Jim comment on Line Array
Posted by Jim Griffin on Thu, 06 Jul 2006 20:42:40 GMT
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Gar,I'll let Fred address your question on comparison of a line array to the Pi-speaker design. I'll try to help you on line array dynamics and driver selection. Line arrays increase the sensitivity, dynamic range and power handling of the individual drivers in the array. The amount of sensitivity change depends on the rated sensitivity of the individual driver, the number of drivers arrayed, and the resultant array impedance. Essentially, the number of drivers arrayed increase the efficiency 10 log (N) where N is the number of drivers. For example, for 10 drivers in the array you realize a 10 dB increase in the efficiency. If you maintain the same impedance as for the individual driver, then you realize no impedance sensitivity gain. But if the array impedance is 4 ohms and the individual driver is an ohms impedance, then you get a 3 dB sensitivity increase. Bottom line on array sensitivity would be the addition of the array efficiency gain plus the impedance sensitivity change. Thus for a nominal 87 dB SPL (1 w/1m) 8 ohms driver you would achieve a 13 dB increase in sensitivity if the array is a 4 ohms nominal impedance. Thus a 100 dB SPL array source would be attained. There are caveats on spacing and such to achieve the aforementioned sensitivity increase but you get the picture than those relatively moderate sensitivity drivers have become much more formidable.Now on the dynamics side of the ledger you significantly reduce the thermal (heating effects) and mechanical compression (linear cone travel extension) as you array the drivers. The dispersal of power among the drivers yields exceptional dynamic range and linearity as you have essentially a 10 log (N) lower driver level than before. Of course power handling increases as you spread the power to all of the drivers in the connection. Those 10 arrayed drivers which are rated at 50 watts each are now 500 watts capable. Thus, turn up the power and your ears will wear out before you distort the sound. The driver selection choice for line arrays is a vast subject and it depends on your goals an well as the physics of arrays. Generally, the mid ranges in line arrays are in the 3" to 7" diameter range while in high efficiency audio 12" or even 15" drivers are often considered to be mid range drivers. Other considerations for driver selection are the smoothness of their response (ease of crossover), driver distortion, inherent sound quality, driver specs, etc. Jim