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Subject: MacIntosh XRT 29 Comments

Posted by [Jim Griffin](#) on Sun, 03 Apr 2005 17:15:15 GMT

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Actually the Mac design isn't too shabby. If you look at the owners manual it gives you details like driver spacings, line lengths, crossover frequency, etc. so you can defer a lot about this array's theoretical performance. The woofer and tweeter line lengths are long enough to enable most any normal listening room to be in the near field. That is a good thing. With the side by side mids the concern is to have them spaced close enough and use a low crossover frequency so that any M to M (side to side now) would be minimal. This would minimize any off-axis nulls in the horizontal dispersion in the frequency range covered by the mids. This spacing is 6.75" (one wavelength for the M to M centers is 2008 Hz and cancellation would occur at twice that frequency) and the crossover is at 1700 Hz. The side by side mid-woofers yield symmetrical horizontal dispersion radiation and minimizes any lobing associated with the low order (2nd and 3rd) specified crossover slopes. The tradeoff that the designer has to consider is the small diameter of the mids (closer M to M spacing) and low crossover frequency that would be dictated by this side by side configuration. The smaller mids would also limit the array's lower frequency extension as it does in this design. The vertical M to M spacing is on 4.5" centers (one WL is 3013 Hz). With the crossover at 1700 Hz you should be free from comb lines even with the second and third order crossover slopes. The T-M spacing is 3.375" (one WL at 3616 Hz) so again with the low crossover you will maintain good dispersion as sound transitions from mid woofer to tweeter lines. I'm troubled by the tweeter to tweeter spacings as anyone who has read my white paper would understand. The center to center spacings for the tweeters is 2.75" (one WL 4931 Hz and two WL 9863 Hz). Hence, you'll have the first cancellation at 9863 Hz and vertical axis comb line effects in the upper octave (10-20,000 Hz). Likely the tweeter line sensitivity in the upper octave will also show a downward slope so that the crossover would have to attenuate the lower part of the tweeter band to flatten out the overall band. Bottom line is that the tweeters are too far apart to cover the upper octave without comb lining and associated sensitivity reduction. You know I really like a line of planar or ribbon drivers instead of dome tweeters which would alleviate these tweeter line issues. You can improve this design by spacing the tweeters closer but it would require more drivers and even then you really need to get the center to center spacing within 1.35"--preferably less than one inch. If I were doing a design with dual rows of mid-woofers, I would use ribbon tweeters and crossover low enough to minimize the side by side mids effects as done by Mac. The keys are the low crossover frequency and the close spacing between the mids. The ribbons would be able to alleviate the dome tweeter issues associated with this design. Jim

Near Field Line Array White Paper

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