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Subject: Re: oops

Posted by [hitsware](#) on Sun, 05 Dec 2004 02:18:18 GMT

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"Some years ago, while designing the SCM8 dipole surround speaker (the triangular one) for B&W's original THX Home Theatre System, I was discussing with Quad's Peter Walker the problems of coping with the bass roll-off imposed by front-to-back cancellation of dipole designs. I was having a problem meeting the (then) THX bass extension with such a small enclosure, but did not want to revert to monopole in the bass (as so many do). Peter told me of a technique he used on the Quad electrostatics, which I was ashamed I hadn't also thought of, which was to engineer an underdamped bass alignment. That gave a basically rising response with decreasing frequency down to the nominal cut-off frequency, which compensates the roll-off due to dipole cancellation. This underdamped characteristic, of course, shows up in a nearfield measurement, but not in the far field. It is not apparent in the midrange panel because it is not needed. The dipole cancellation starts at a frequency defined by the smallest dimension of the panel and this is the same for all sections in a common panel size. The midrange panel operates above this frequency. So such a nearfield peak is often a deliberate part of the design of dipoles (of which panel speakers are an example). Mind you, both Peter and I went for much more modest peaks. The dipole imposes an extra roll-off rate of 6dB/octave. You can add a second-order Q=1 to a first-order at the same frequency to get close to a third-order Butterworth or, for a more extended "flat" response; a second-order Q=2 added to a first-order at twice the frequency gives something akin to a Tshebychev with a 1dB ripple. The Magnepan peak does seem a little excessive, but it all depends how it interacts with the modes of the listening room. This technique does open the debate as to what the ear actually hears. A Q of 2 has a pretty abysmal transient response and the question is whether the dipole "equalisation" ameliorates that effect in the total response. As both mechanisms are minimum-phase, I suspect and believe that that indeed happens. As it is ultimately third-order, though, the response will have an inferior low-level transient behaviour to a well-adjusted second-order. It should have some similarity to the series C (capacitor) closed-box alignments we used while I was at KEF with Laurie Fincham. There the -3dB point was lowered by putting a capacitor in series with an acoustic alignment with Q of 1. In those days we wanted to protect speakers from turntable rumble."—Mike Gough, Senior Product Manager, B&W Loudspeakers Ltd. I'd like to get away from 'alignments'(whatever that means?) and have a simple system (equation) like the sealed box equation.How about a 'Pi Aligned Open Baffle'

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