Subject: High-pass on the 4pi?
Posted by dutchswan0311 on Wed, 29 Feb 2012 18:53:48 GMT
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I have decided to stick with my original plan of using four F20 horned subs low-passed at about 80Hz. I am told that four of them grouped together will have a relatively flat EQ and will put out 130dB SPL from 21Hz to around 80Hz @ 1m. I realize I will have to delay the 4pi mains to sync up with the horned subs. My question is should I high-pass the 4pis, and if so; at what frequency? Will these subs integrate well with the 4pis as mains?

Subject: Re: High-pass on the 4pi?
Posted by Wayne Parham on Wed, 29 Feb 2012 20:08:41 GMT
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High-pass at the Helmholtz frequency of the mains. The multisub configuration is not limited to direct radiators, but can be employed with hornsubs as well. Delay on the mains is really used to match the acoustic centers, to compensate for the extra depth of a basshorn.
Helmholtz frequency of each modelYou delay the mains to match the hornsubs, to provide in-phase summing without a multi-cycle shift. But in a multisub configuration, this takes on a different meaning, since in-phase summing is non-sequiter in the modal region. What you really want is for the sound sources in the modal region to be staggered in time. It's the varying amounts of "delay" from various sources in different positions that make the multisub configuration work.

In the end, since the reflections are delayed, there is no way to get them all in-phase. That's what room modes are all about. The take-away is you will want to delay the mains to nearly match the flanking subs, but do not worry about the more distant subs. The flanking subs should actually be just behind the mains, to fill in the hole from the reflection of the nearest wall just behind them.

Also, do not "crossover" subs to mains like you might outdoors. Instead, low-pass the subs around 80Hz, which is the Schroeder frequency for your room. Blend every sound source you have in this region. Only high-pass the mains to reduce energy below their Helmholtz frequency, to prevent over-excursion. Do not high-pass them higher than that, because the goal is to have multiple sound sources below the Schroeder frequency.

Subject: Re: High-pass on the 4pi?
Posted by skywave-rider on Thu, 01 Mar 2012 18:49:26 GMT
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Wayne,
What slope is preferable for the sub low pass?

Subject: Re: High-pass on the 4pi?
Posted by Wayne Parham on Thu, 01 Mar 2012 20:33:06 GMT
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I prefer second-order for flanking subs, low-passed between 80Hz and 120Hz. This assumes the subs will be within a few feet from the mains, as described in the Speaker placement and wavefront launch and room modes, multisubs and flanking subs threads.

I like a little bit higher slope, usually third or fourth order for more distant subs,usually low-passed below 80Hz, often below 60Hz. The frther away the subs are, generally, the lower you want to cross them.

Speakers that have "built-in" helper-woofers, like 2.5-way speakers and constant directivity cornerhorns usually respond better with a first-order filter - just a single coil - allowing the helper woofer to blend with the midwoofer (or midrange) all the way up to 200Hz, sometimes as high as 300Hz. I find it useful to blend fully in the 100Hz to 200Hz range, but there is usually little or no benefit going higher than that. But with a single coil, it is inevitable that some higher-frequency energy will get through.