
Subject: Re: 4PI Plans Request

Posted by [Wayne Parham](#) on Mon, 09 Dec 2019 22:45:25 GMT

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The flanking sub low-pass recommendation of 100Hz second-order is empirical, so you can consider it a starting point and not a hard-fixed number. However, I have found that the slope is always better being gradual than it is being sharper. Fourth-order slopes are too steep. I have also found that low-pass below 80Hz is too low for flanking subs. The range of 100Hz to 120Hz and sometimes as high as 150Hz seems to work best. Much higher than that and the subs become localizeable and draw attention to themselves.

The low-pass and amplitude of flanking subs is set by simultaneous optimization of three things:

1. Amplitude level-setting the subs to the mains, so we gain bass extension at the appropriate SPL. This usually amounts to about 10dB more gain on the subs, because they are usually about 10dB less efficient than the mains.
 2. Low-pass that conjugates baffle-step. Cabinets the size of my three Pi and four Pi mains tend to have baffle step in the 100Hz to 200Hz region. Instead of employing compensation in the crossover, we use the flanking subs to provide additional SPL as BSC.
 3. Low-pass that mitigates higher-frequency room modes and SBIR from nearest boundaries. The worst anomaly usually comes from the wall directly behind the speakers, but the nearest side wall is sometimes objectionable too, as can be floor bounce. The modal region extends above 100Hz, but distant multisubs cannot be run this high without being localizeable. And the boundary interference notch from the wall behind the speakers seems to almost always be between 80Hz and 120Hz, probably because proximity to the wall behind the speakers is most convenient and/or popular in this range of a few feet. So this makes it useful to have a truncated array in the 80Hz-120Hz region, to counter the interference notches there. The flanking sub and the midwoofer in the mains form a simple two-element array.
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