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Subject: Pi Alignments compared with B4, C4 and QB3  
Posted by [Wayne\\_Parham](#) on Mon, 18 Jun 2001 05:02:36 GMT  
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I've been asked several times what Pi alignment is and how it differs from other alignments. It's essentially a simplified Thiele / Small method, setting cabinet volume directly proportional to Vas and Qts rather than being proportional to Vas and Qts<sup>2</sup>. Box tuning is by Helmholtz resonance and is proportional to 3Fts and inversely proportional to 8Qts. At the time I wrote the alignments, I calculated using a figure I called "Qd", which is the reciprocal of Qts.

Pi alignment for drivers with Qts under 0.35 tends to be slightly overdamped with response like large sealed cabinets. For drivers with Qts between 0.35 and 0.4, it's pretty much the same as a B4 alignment. Drivers with Qts above 0.4 are like C4 or QB3. In practice, the high efficiency woofers I favor in my designs have Qts in the 0.3 range. This tends to make a system that is slightly overdamped, which has smooth gradual rolloff. It is fairly insensitive to electro-mechanical parameter shifts from thermal compression or environmental conditions.

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Subject: Re: Pi Alignments compared with B4, C4 and QB3  
Posted by [James W. Johnson](#) on Tue, 19 Jun 2001 01:17:58 GMT  
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So basically the four Pis as is go really loud with very little distortion the only drawback is limited bass depth, which a subwoofer could easily fill in that void?

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Subject: Re: Pi Alignments compared with B4, C4 and QB3  
Posted by [Wayne\\_Parham](#) on Tue, 19 Jun 2001 05:35:44 GMT  
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Yes, basically, but I think the bass response sounds full even without a subwoofer in all but the largest rooms. For home theater, you might add subs but for most music, they sound great. The -10dB point is 30Hz, and since the rolloff is slow and gradual, room gain brings up the lowest bass just about right.