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Subject: Altering dimensions

Posted by [Wayne Parham](#) on Tue, 23 Dec 2008 17:51:54 GMT

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In most cases, dimensions of a bass-reflex box can be changed slightly with no ill-effects. As long as you don't significantly alter the Helmholtz frequency or go too large or too small, you can usually make some changes. The things to be careful of when doing this are as follows:

1. If the box is large, it may develop internal standing waves in the passband. If high enough, they are attenuated with stuffing but if they're down near the Helmholtz frequency they can affect box tuning and/or modify the response curve. In that case, you might want to be careful about modifying driver and port placement or changing the dimensions because placement is important to the position of the internal nodes.
2. The height of the midrange or midwoofer sets the frequency of floor bounce notch. If low to the ground, there is no notch because the self-interference reflection is high enough to be out of band. It may also be mitigated by radiator dimensions, which space out the path length differences. But in general, if the radiating diameter of the driver that generates midrange is smaller than its height from the ground, you might want to consider the effects of floor bounce. If it's a problem, you can use another overlapping driver to mitigate its effects.
3. Do not modify the physical relationships between drivers. The crossover is designed with the positions of the drivers in mind. Acoustics are manifested in three dimensions, so position on the baffle, truly position in 3D space, is important. For summing to be right, the position and orientation of the drivers must be matched with the crossover filters. Changing the distance between drivers will alter the performance of a loudspeaker. While these are general design issues, the reason I mention them is sometimes people stretch designs to make tower speakers or otherwise alter their basic layout. When that is done, attention should be paid to internal standing waves and to self-interference from boundary reflections. The distance between drivers should never be altered, as this can cause improper summing and will modify the directional characteristics of the loudspeaker. Careful attention has been given during design, and lots of measurements made to ensure the pattern is right, so be careful when making changes.