Subject: One Cubic Foot Subs
Posted by gofar99 on Fri, 16 Dec 2011 22:38:14 GMT
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Hi, Are there any variations of the Sub woofers that are roughly 1 cubic foot in size?

Subject: Re: One Cubic Foot Subs
Posted by Wayne Parham on Sat, 17 Dec 2011 00:55:35 GMT
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I don't have any in my lineup, but direct radiating subs are pretty easy to design. No internal standing waves in the passband, because the boxes are much smaller than a wavelength. So you can expect them to act just like T/S simulators say.

Basically what I'm implying and suggesting is to find a good quality subwoofer driver that models well in a one cubic foot box. I'm guessing it will probably be an 8" or 10" woofer. There are plenty of this type in the carsound realm.

Subject: Re: One Cubic Foot Subs
Posted by gofar99 on Mon, 19 Dec 2011 17:01:51 GMT
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Hi, Thanks, I have found one.... a Tang Band. 8 inch that will give an F3 of 25 in a one cubic foot vented cabinet with a reasonable level of output. Working the numbers on lots of possibles my conclusion is that to factors are quite important FS and VAS. If either is high, you can forget it for really low bass. Other TS parameters play in as well, but these two are the over-riding ones. I have also concluded there is no real substitute for size in sub woofer boxes (no surprise here as that was known a long time ago F3, efficiency and box size all work against each other). What I can get now with the 7 cubic foot subs will take a lot more power from a one cubic foot to even come close. Anyone out there got a pair of Martin Logan Decent or Depth subs they want to sell for $100?

Subject: Re: One Cubic Foot Subs
Posted by Wayne Parham on Mon, 19 Dec 2011 21:02:08 GMT
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You're so right. Hoffman's "Iron Law" (the one that says you can have two of three: deep bass, small size or efficiency) actually was a precursor to Thiele and Small's work. It's not just a seat of the pants thing, it's actually a quantifiable metric: The efficiency of a woofer system is directly proportional to its cabinet volume and the cube of its cutoff frequency.
Hoffman's Iron LawKeep us posted on your Tang Band 8" build please. Perhaps document it on the ART "Speakers" forum, if you feel so inclined. I know I'd love to see it there.

A group of small subs like that is perfect for use in a multisub configuration. It's small enough that you can place four of them in the room without taking over the room. My smallest sub is larger, at 20"x20"x20", and yours will be something like 13"x13"x13". None of my speakers are small, so I don't get too bent out of shape about size, but I do realize that a smaller sub might be attractive for some people, especially when using several in a multisub setup.

I might offer one small bit of advice. Don't push it for a max-flat alignment, like what you sometimes see when you let a simulator auto-align. Set the Helmholtz frequency a smidge below that, say maybe 10%, so there is a bit of rolloff down low. For example, if the max-flat alignment is at 25Hz, then set the actual box frequency to 22Hz. The reason for this is Thiele/Small figures are measured at very low power levels, like 1mW, and the parameters shift at higher power levels. Even at moderate levels, like just a few watts, there is a clearly measureable shift and it tends to push the system towards underdamping, which can make a tubby or even boomy sound. So back it off a bit by selecting a Helmholtz frequency that provides gradual rolloff.