Subject: Wayne, bracing restricting port flow?
Posted by Adam on Tue, 22 Jan 2002 14:16:01 GMT
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I've come across a situation where some bracing in one of my enclosures is boxing in the one (and only) 4" port. The enclosure in this picture is shaped like an "L", with the port and woofer on one side of the "L". Both chambers have to flow freely with eachother so everything acts as one box. I'm a bit concerned that my bracing is going to constrict the flow of air from the port into the enclosure and just wanted some other opinions.I know it's a difficult picture, but you can just see the port tucked into the corner at the back of the box, with the woofer just above it. You can see how the two braces are kinda forming a little box around the port.The two openings are approximately 8"x4.5" and 3.5"x16". There will also be light polyfill in the enclosure.Whadda ya think?Thanks!Adam

Subject: oops... here's the picture...
Posted by Adam on Tue, 22 Jan 2002 14:16:27 GMT
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dah

Subject: Volume = capacitance; Restriction = resistance
Posted by Wayne Parham on Tue, 22 Jan 2002 14:38:09 GMT
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92 sq. inches. Hmm. Hard to say what the effects will be. Might be interesting to model it. The things to consider are displacement and area, basically how much pressure is exerted across the hole verses how much flows through it.   The volume of each chamber acts as a capacitance, and any restrictions through the connecting hole will act as a resistance. Another thing to consider is standing waves, but only in the midbasss and midrange where the distances involved start becoming acoustically large, i.e. greater than 1/4 wavelength. Above that point you will start to see response rippling but not beneath it. At low frequencies, chamber features will be sensitive to pressure and at high frequencies, to standing waves.

Subject: Re: Volume = capacitance; Restriction = resistance

Posted by Adam on Tue, 22 Jan 2002 16:26:16 GMT

Well I don't know how to calculate/measure displacement or pressure but both chambers are around a cubic foot in volume. 2.1 cuft total, something like that.Adam

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Subject: Re: Volume = capacitance; Restriction = resistance
Posted by Wayne Parham on Tue, 22 Jan 2002 18:48:15 GMT

Displacement is the linear motion of the diaphragm times its surface area (Sd). For maximum displacement, you could calculate using Xmax as the linear motion. With this, you can calculate pressure in the chamber surrounding it. It's relatively easy to calculate what pressures would exist if the box were sealed. When the box has a hole in it, that makes it more difficult because it now acts as a resonator with an acoustic filter function. What you have is actually two acoustic filter chambers in the motor cabinet, where only one is actually wanted. The Helmholtz resonator in the main motor chamber section is one acoustic filter, and the secondary "supplemental volume" chamber forms another.The issue that concerns you, when having two chambers seperated by a restriction baffle, is that as frequency rises, the pressure source is increasingly more restricted to the second chamber. This creates an acoustic filter that becomes significant at some frequency depending on the dimensions of the constructs involved. It's a low-pass filter. That may or may not be a good thing, depending on what you expect from this design. At low frequencies, the filter function can be disregarded because static pressure will equalize between the two subchambers. Low frequency pressure changes act similarly to static pressures, and that's why you can disregard the filter function if the dimensions are large enough.See the document called "Acoustic High-Pass, Low-Pass, and Band-Stop Filters", written by Daniel Russell for more information on this subject.

Subject: Re: Volume = capacitance; Restriction = resistance
Posted by Adam on Tue, 22 Jan 2002 19:08:48 GMT

Thanks Wayne.I just went ahead and finished the thing up with glue. There is a moderate amount of bracing inside the box, but it sure as hell does the job. The front panel (a large 2'x2' piece right behind the woofer) doesn't vibrate even in the slightest at up to and including max volume, so I'll toot my own horn and say I did a damn nice job of bracing :)I also polyfilled the speaker and glued it up for good. That baby isn't coming apart. It has indeed added a quality to the response that I can't yet put my finger on; I'm too distracted by my damn suspended ceiling vibrating. Things are looking really excellent, though. I should have the CH-3's on friday, and from then on it's all down hill, for the first pair anyway.By the way, I don't know what kind of subwoofers you may have in

your house, but I ran this first glued and braced ten pi cabinet in conjunction with my normal home music sub (15" woofer 5 cubes tuning of 30 Hz) and I must say it really added warmth to the sound. The bottom fill coupled with the good midbass output from the ten pi (yes I know about the panels resonating, I'll fix it!) produced a lower few octaves that I can't say I've ever heard in a speaker before. I'm so impressed with it, that I'm thinking about purchasing four tempests (the drivers I mentioned a few days back) to augment the bottom end in the same way I did here. It really creates a sound I like a lot. I won't exactly be doing stadium concerts, so output from the four tempests shouldn't be any problem.I urge you to give it a try! I think it sounded really nice.Anyway, things are going smoothly.Adam

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Subject: Hey Wayne?
Posted by Adam on Tue, 22 Jan 2002 19:26:45 GMT
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Hey I know you said that the two chambers act as resonators in addition to the wood.While my current plan is still the expanding foam, I have a question for you. Would it be sufficient to use conventional bracing methods to make the reflector panels (or folds or whatever you want to call them) completely rigid, and then leave the backs of the speakers completely open? See, as it stands, my speakers have no top, bottom or back. As I see it, if you didn't enclose the rear of the thing, the chambers wouldn't act as resonators because the standing waves would simply dissipate into the room. So with plenty of bracing on the reflector panels and simply leaving the back of the speaker exposed, could you sucessfully solve both problems? At the cost of looks of course... Just curious.Adam

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Subject: Re: Volume = capacitance; Restriction = resistance
Posted by Wayne Parham on Tue, 22 Jan 2002 19:32:58 GMT
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Excellent! Congratulations. Looks like everything worked out and it's sounding good.

Subject: Yes, Adam
Posted by Wayne Parham on Tue, 22 Jan 2002 19:47:31 GMT
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Yes, absolutely. Preload can be applied by mechanical braces instead of filling the dead area

with expansion foam. I like the expansion foam because it makes a solid damping mass, but you can also leave that area open as long as you use adequate bracing on the panels to keep them from vibrating.

Subject: Re: Yes, Adam
Posted by Adam on Tue, 22 Jan 2002 21:11:08 GMT
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sweeeet..... Thanks!Adam