Subject: Re: PiAlign port
Posted by Adrian Mack on Sun, 14 Sep 2003 06:44:51 GMT
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Hey Wayne,I actually meant port self resonance, also reffered to as "pipe organ" resonances. Maybe you meant this too, I dont know enough on the topic yet. Programs like WinISD (which I do not like) and Unibox calculate whats called port self resonance and it tells you when the 1st port resonance occurs. Longer lengths calculate that port resonances start at a lower frequency. These port resonances have a pretty big effect on the response curve if its within the passband. The port resonances create the anomolies seen in the graph below:This person on another forum has told me that the port resonance happens when a full wavelength can fit inside the port. So for a 10" port, frequency 1320Hz is also 10" wavelength and thats when 1st port resonance occurs, and the ones after that are found by adding 1320Hz each time or multiplying the number. EG: In graph above, 1st port resonance is at 157Hz, 2nd is at 2*157=314Hz, 3rd is at 3*157=471Hz, and so on. How about half and quarter wave, I've thought they wont introduce port resonance. But I've heard they can. If that were the case though couldn't we get 1/24 wave resonance too and stuff like that, hmmm. According to graph above, 1st port resonance is largest, so for half wave would start at even lower freq, and cause even bigger anomaly. I'm not even sure if this is the right way to calculate when the first port resonance occurs, it doesn't match with what computer box programs tell me. And actually, the different box simulations dont even match each other when calculating when the 1st port resonance occur for the same port length. WinISD shows diameter has no effect when 1st port resonance occurs, but length does. Unibox shows that both have big effect. Hah... maybe this is just one of those topics where it doesn't matter and we should just keep vent lengths small for 2-way systems when the woofer is used high and use correct vent location and damping material to mimimize port resonance effects. It seems very unpredictable. The person that first got me thinking about this however believes that its as simple as the lowest freq that has its wavelength that can fit in the port is when 1st port resonance occurs, and also all that half wave stuff too meaning it starts even lower than the 1st, ick. I dont think so, or Unibox and other programs would show effect of half and quarter wave resonances and not just begining from the 1st... what do you think? I was thinking, port resonance might have something to do with standing waves, or maybe not. Apparantly port resonance is affected by port placement, proximity to enclosure walls, and damping material too according to Vance Dickasons Loudspeaker Design Cookbook. So anything is a guess really. But we do need to be able to guess somewhat espescailly for two way systems where the woofer is run to 1KHz+, if port resonance is in its bandwidth then it may cause large peaks/dips in the freq response as in graph above. If we calculate port resonance with Unibox or WinISD or something else that can, then we can keep the calculated 1st port resonance outside of bandwidth which would mean no port resonances are in the bandwidth. But all this half wave and quarter wave crap... they cant be real, they will be half and quarter of the 1st port resonance, and then we will get port resonances well below 1Khz which doesn't seem right. My example graph done in Unibox above shows that 1st port resonance is most severe. Dickason's measurements show that the 2nd, 3rd and higher are more severe than the first, they kind of "add onto each other". I think Vances would be more accurate as the simulation was done with the (very very) expensive LinearX programs and not a free downloadedable Unibox program. I personally believe 1st port resonance is the first, and theres no such thing as half wave, quarter wave resonances etc. And I think, just keep the 1st out of passband, then your fine. Vents in 2-way systems are usually real small anyway because they are tuned higher and should be able to be kept outside of passband, and then help more by correct placement and damping material. Have you got any light to shed on this subject or comments

about my findings/thoughts?PS: Sorry for another long post. You've probably heard that from a lot of people, but I guess some of mine are really really long, lol, although some of your answers are even longer :-). So I better say it again, sorry for the long post!Thanks!Adrian