Subject: PiAlign program
Posted by David Morrison on Wed, 21 Jan 2004 13:20:15 GMT
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could some one explain how to design a box use the Pialign program. I know how to enter the information. I am not not sure how to adjust the box. or what i am actualy looking at.

Subject: Re: PiAlign program
Posted by Wayne Parham on Wed, 21 Jan 2004 16:15:31 GMT
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PiAlign suggests box volume and port when driver parameters are entered. Vad, Qd and Frd are the significant values it uses; All the rest of the data is really for archiving information about a specific loudspeaker design. You can enter the midrange and tweeter for example, give the loudspeaker a filename, and it will store the information for you. But the main purpose of PiAlign is to calculate box parameters when the driver parameters are known.

Subject: Re: PiAlign program
Posted by David Morrison on Wed, 21 Jan 2004 19:57:51 GMT
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I understand the i enter the parameters and get the recomend box and tuning. I pick a port but do i match both a Q and Fre to the recomend box. better put how do you know what port to use my other boxes are based on cone area, EBP, and Xmax. Also is it possible to change the box volume for the motor cabinet. with the RF2210 i want to use 1 cu ft. also does the box volume include port and speaker. with a 9512 the sub is twice the box volume.

Subject: Re: PiAlign program
Posted by Wayne Parham on Thu, 22 Jan 2004 00:05:15 GMT
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PiAlign uses the terms Fre and Qe to describe cabinet tuning. Fre is the Helmholtz frequency and Qe expresses a ratio of cabinet volume to port area. But PiAlign also suggests a specific port and cabinet volume that reflect these values. You can substitute a different port if you wish, and just keep the cabinet tuning the same. But usually PiAlign does a pretty good job of fitting the biggest port it can into small cabinets, and chossing a reasonable size port for larger cabinets.Sometimes PiAlign "thinks" a smaller port is acceptable, sometimes it chooses a larger port. But, except in

rare cases, I usually find its port suggestions are reasonable for the cabinet size suggested. The times you might choose a different port are times when port installation is difficult or sometimes when a high-excursion driver would make port turbuulence a problem at high power levels. These situations sometimes require special port placement or size considerations. It often depends on your cabinet layout and intended use. PiAlign is a software tool that I've found extremely useful, but ultimately, the design choices are still yours to make.

Subject: Re: PiAlign program
Posted by David Morrison on Thu, 22 Jan 2004 12:59:49 GMT
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"Qe expresses a ratio of cabinet volume to port area"How can you personally interpret that.So then using a larger port I need to match the frequency and not the Q for it. Just about any sub a will be using will a al least 12" of Xmax.also is there anyway to model a larger box with the program.

Subject: Re: PiAlign program
Posted by Wayne Parham on Thu, 22 Jan 2004 22:45:24 GMT
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I wrote PiAlign and I defined the term Qe used within it. I mis-spoke because Qe is actually a ratio of port length to area, not cabinet volume. But the point is that it is an indicator of port restriction to airflow.PiAlign was designed to iterate and find solutions to the forumulas that express Pi Alignment for a loudspeaker cabinet. To perform T/S analysis of a Pi aligned cabinet or others, I suggest using something like Carlson's BoxPlot. That will show you the response curve of a speaker using whatever alignment parameters you enter into the program.

Subject: Re: PiAlign program
Posted by David Morrison on Tue, 27 Jan 2004 12:01:56 GMT
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i think i understand how the horn and vented box work together now. The vented enclosure is tuned low and the cut off of the horn is a little higher. using the peaks from the event and the horn creates a bandpass type of response that is flat broad and effecient. If the horn cutt off is lower or the vented box is tuned higher than peak in the responce is created. my next question if this is right how can you predict a peak in the box. say if the box is only going to be use for below fifty hzs. and you want more of peak below that use a larger horn bigger box ?

Subject: Re: PiAlign program
Posted by Wayne Parham on Tue, 27 Jan 2004 12:30:00 GMT
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You can find the response of a vented or sealed cabinet using BoxPlot, and that will tell you if the motor chamber is peaking. Horns can be modeled with Hornresp to see their response.

Subject: Re: PiAlign program
Posted by David Morrison on Tue, 27 Jan 2004 14:02:56 GMT
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but when I model a small horn there is no response in the bass region can one of your horns with desired cutoff be used for a box. Then adjust the tuning to get the responce you want.I know both programs and have been using Boxplot for awhile but horn responce is still new to me. But i still believe in trial and error for a box design but it helps to have a theory of how it will change then have a theory on why you got the change you did. for instance I built a fourth order bandpass that modeled good the the port was to small.

Subject: Re: PiAlign program
Posted by Wayne Parham on Tue, 27 Jan 2004 14:23:29 GMT
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You're right that a small horn isn't really suitable for low frequencies. It is either rolled off or peaky or both. But like I think you're alluding to, you can run the woofer as a direct radiator down below the frequency where its horn rolls off. This is how many Altec speakers are designed.

Subject: Re: PiAlign program
Posted by David Morrison on Tue, 27 Jan 2004 16:55:57 GMT
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Never really thought about that but what size of a horn would it take to help the response out between 50-80 Hzs. I was going to build a big box tuned low then use your folded corner horn to add in that range.

Subject: Re: PiAlign program
Posted by Adrian Mack on Wed, 28 Jan 2004 05:18:36 GMT
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Hi DavidHave been reading this thread, do you want to design a basshorn or something? With rear chamber? In terms of size, remember that you need a horn long enough to reach the desired Fc. Horn length primarily determines this and should be 1/4 wavelength of the lowest frequency to be used. Mouth size should also be of reasonable area, if a basshorn, then corner loading will obviously reduce the size needed considerably (the room will form part of the flare). Use Hornresp to determine a suitable area. Rear chamber can be vented or sealed - the system will act as a direct radiator somewhere below Fc. If you want to run your system so that direct radiator mode provides useful output then keep Fc well above Fb. If you do this, then response falls at 12db/oct below Fc until sensitivity becomes that of the driver in direct radiator mode. Below Fb, it will drop at 12db/oct again, or 24db/oct if a vented rear chamber. In particular this is a good idea if a short horn is used such as to keep size down, and this sounds like exactly what you wanted to do. Of course, the better thing to do is to simply use a longer horn with Fc at the lowest frequency you want to reach, that way you gain the most benefits out of horn loading over your whole bandwidth. Then you can reactance annul it if you wish. Also remember that if you do the short horn + rear chamber, that excursion will jump up high in the direct radiator region as acoustic impedance gets lower, you loose out benefits of the horn in direct radiator mode. So you can get acoustic output to a lower frequency, but excursion-limited power handling goes down too, hence limiting total SPL. If space is a concern though, it is one way to extend low frequency response. Adrian

Subject: Re: PiAlign program
Posted by David Morrison on Thu, 29 Jan 2004 11:08:34 GMT
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i am just looking for away to free up some range and spl for my 9512 as far as power handling and excursion i will ever use it all.i simply want a horn that will help load between 50-80 hzs. then I can tune to 35-40 hzs. I have modded the pi folded corner horn to give me the dimensions that i want i just want to know how to generally predict its responce. Also if the box is peaky at the certain frequency i have a ten band eq to use on it. when i get the boxes upload i will post them. some have longer horn, larger vented enclosures smaller, vented enclosures but try tried to keep the horn flare the same. first

Subject: Re: PiAlign program
Posted by David Morrison on Thu, 29 Jan 2004 20:40:31 GMT
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here are some mod they still need work
my mods

Subject: link doesn't work right
Posted by Adrian Mack on Fri, 30 Jan 2004 07:16:24 GMT
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It tells me that the files are inaccessable.

Subject: Re: PiAlign program
Posted by David Morrison on Fri, 30 Jan 2004 10:17:28 GMT
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try now i forgot to set the viewing settings.

Subject: Re: PiAlign program
Posted by Adrian Mack on Sat, 31 Jan 2004 01:52:12 GMT
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OK.... Let's start from the beginning. I have no idea what your trying to do - what is the brand and model of the driver your usigng? What bandwidth exactly do you want to cover? What size restrictions physically have you got which is moving you towards this direction of small horn + low tuned rear chamber? Is your plan so far basically one of Wayne's folded horn designs, and your own rear chamber?

Subject: Re: PiAlign program
Posted by David Morrison on Sat, 31 Jan 2004 10:52:37 GMT
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the speaker is a digital design 9512. I am try to get the height around forty i will get out a tape in couple days to give you a better idea. the specs were one of the first post there are two sets of specs either speak cloud be used. the second is a Rf2210yeah i want to use a bigger vented volume with a smaller horn that will hopefully work right. I planed on building the recomended box, my big box nonmodded then i modded box. I am look for bass for my living room mainly like 30-80 the box i am using now has nice lowes but mudding midbass. i mean my eq 32 hzs is cranked and the 62 is the full way down.

Subject: Re: PiAlign program
Posted by Adrian Mack on Sun, 01 Feb 2004 00:50:24 GMT
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Hi DavidI put the numbers through for the RF2210 woofer and Hornresp tells me that this woofer is not suited to a horn at all. As for the digital design 9512, there isn't enough parameters there to model its horn response. I did derive some of the missing parameters that were required, using an approximate value for Sd and something else, but they didn't model well out on a horn either. Your best bet is a bass reflex box for both of 'em, and forget about the horn. The box's that Wayne suggested will work fine. For the RF, use the bigger of his suggestions if you want response to 30Hz. And for the DD sub, Wayne's described a number of cabinets which will get you to 30Hz so just follow those suggestions. You may also consider looking at dual chamber reflex boxes. Adrian