Subject: Delta 10 and Horns, details
Posted by Adrian Mack on Sat, 15 Nov 2003 22:01:14 GMT
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I'd suggest that your front chamber is too small there. A volume of 100cc and 350cm^2 cross section area means front chamber length is only 0.28cm which is not something which will actually get built. Length=Volume/Area (L=V/A).

Remember that the air in front of the cone will also add to the final front chamber volume so you must input this into hornresp as well to get an accurate result. A CAD drawing of the cone geometry will help you determine the volume in front of the cone.

I would also increase the mouth area on that horn considering its a 100Hz flare freq. Increasing the mouth area will help to smooth the response.

As you said in your last post, increase the throat area so that distortion of the mouth geometry is low. Maximum ~5:1 ratio between driver cone area to throat area should be used, although compression drivers do have something like ~10:1.

Flat response with F3 points at ~200Hz and 700Hz can be found if S1=68, S2=2500, F12=150, VRC=10, LRC=16, VTC=600 and ATC=SD. I have not played with it much though so there may be one that offers a bit higher HF extension. Use Hornresp from http://www.dmcbean.bigblog.com.au to design your horn.

I've found that its hard to get the ~2K extension that 'DasDas' wants on most drivers, especially with a 10". Try a smaller driver if you want more response up high. Although hornresp somewhat doesn't predict the top end well because it doesn't predict the suspension controlled response, it doesn't add much more than what it predicts in my experience. The Delta 10 though does have a very large rising response curve starting at ~800Hz and up to about ~3KHz which could help to restore some of the top end if your listening directly on-axis but most of the time your probably going to be off-axis. You could also try leaving a small gap between the driver and mounting plate which can also increase the top end response. See the Edgar Midrange Horn article available for download at Erik Forkers site http://www.volvotreter.de/dl-section.htm for information on this. Also see my post http://www.audioroundtable.com/PiSpeakers/messages/12014.html for some measurement comparisons of back chambers, gaps, etc that I did on my midrange horn.

I suggest you get a copy of Speaker Workshop from http://www.speakerworkshop.com and use that to take some FR plots of the horn that you decide to build so that you can see what is happening and make changes where necessary. You will need a suitable microphone for the measurements.

Another thing to consider is phase cancellations in the high frequencies because the path lengths coming off the cone at different locations is different to the throat of the horn. This can cause you problems if you are running above 1Khz. Unless you build a phase plug (which is a fair bit of complexity and difficulty) then this will be a problem, which is why you may not be able to cross as high as you want to.

I think Wayne is planning a new Pi Speaker series with the Delta 10 horn-loaded for the new year,

so perhaps his put more time into designing a better horn for it than I have. This should get you started anyway if your planning to run it as a Tractrix horn. A hyperbolic can also be used as it is essentially the same as a tractrix expansion except that it can better load down to its flare freq, but above this point they are the essentially the same.