Subject: Horn-Loading a Delta 10
Posted by DasDas on Sat, 15 Nov 2003 04:36:54 GMT
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I want to build some new boxes for my 4way PA (mid-high), consisting of Delta 10 + 1.4" (altec 299). I already built the Dual 15 which will cover the 80-250hz area. The box I need to build must have the outside dimensions of 36" x 21 1/4" x 30" and 13 3/8" rear width. The horns I have are the Altec MR564 which is a 13x13 horn. I could use some other horn, but for now that's what i have. And that leaves me with roughly 21 inches of total height for the Mid Horn. The HF horn is a 60x40 horn, so the mid horn should be something like that. Is there anything that can be done for the Delta 10, in such space left? I already built the outside box, so all I have left to do is make the mid horn and stick it in there. Can anyone help me, or does anyone have any ideas?? BTW, I have no experience whatsoever using hornresp or designing horns. I have tried using it, but seems kinda complicated. Thanks a lot for your help

Subject: Re: Horn-Loading a Delta 10
Posted by Mike.e on Sat, 15 Nov 2003 06:51:48 GMT
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right click the image now and save it,cos i may have to free up space on my webserver.You wont get anyone Designing and CADing a horn bin for freeit takes alot of work.so either-find some one who will for $orwork it out yourselfor find an existing flare for it.(not likely)i can use hornresp,CAD basshorns etc.but thats about it!what is the exact freq range u want? 250-2k?usable freq range is up to 3.5k it says.so that isnt a bad factor!notice that the freq response chart shows a rising response above 1k or so,also remember hornresp doesnt take into acount actual response up high(theres lots of posts on this in high eff forum too)Wayne can surely comment on the directivity and such like to match the HF etc.Cheers

http://editweb.iglou.com/eminence/eminence/pages/products02/speakers/del10.htm

Subject: Re: Horn-Loading a Delta 10
Posted by DasDas on Sat, 15 Nov 2003 13:32:27 GMT
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the highest freq i will be cutting these into will be 1.8-2k, so 250-2k seems ok. Thanks for your input and help!

Subject: Re: Horn-Loading a Delta 10
Posted by Mike.e on Sat, 15 Nov 2003 20:08:16 GMT
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try inputting that hornresp and playing around.some one else can answer the directivity Qas for compression ratios i think 5:1 is max for this situationso 68cm throat is smallest u can goas i said,i do basshorns and havent fully investigated midrange.maybe Wayne can help you outCheers

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.