Subject: Midrange Horn Measurement problems
Posted by swett on Sat, 05 May 2007 01:23:19 GMT
View Forum Message <> Reply to Message

I made a prototype Pi midrange horn, but with a B&C 8PE21 driver and I have 2 problems. One is a huge dip in response at 1khz on axis. It moves to about 900hz and gets worse off-axis horizontally.The other is an odd impulse response with a second positive pulse a short time(about .2ms) after the initial pulse. This may be reflection off the back of the enclosure, which is 4" deep, but I'm not sure. I first measured the horn without an enclosure, but the 1khz dip seemed even worse, which I thought was due to backwave cancellation, but apparently not.

Subject: Impulse Response
Posted by swett on Sat, 05 May 2007 01:24:35 GMT
View Forum Message <> Reply to Message

Here is the Impulse response.

Subject: B&C 8PE21
Posted by Wayne Parham on Sat, 05 May 2007 22:43:49 GMT
View Forum Message <> Reply to Message

This horn isn't designed for 8" drivers. While I'm sure we could find some that worked well, most probably won't. Then again, this response isn't bad if you plan to use the horn below 1kHz.I found a few 10" drivers that had response like that too. One that jumps to mind is the Eminence 2510. Response looked almost just like what you found with the B&C 8PE21. I decided it would probably sound good to 1kHz, but not past that.Out of curiosity, did you measure in free air or was it done on a ground plane or against a back wall? The horn was designed to be used with boundary reinforcement, so if you measured in free air or with just a single boundary i.e. ground plane, you'll probably find response smoothes out a bit when the radiating angle is more constrained.

Subject: Re: B&C 8PE21
Posted by swett on Tue, 08 May 2007 02:54:06 GMT
View Forum Message <> Reply to Message

I simulated the horn in Hornresp before making it and didn't see any problems, so I started there. And I intended to cut the horn down and re-measure, so it made sense to start with the longest horn first.Above is a measurement of a slightly shorter(9" deep) version of the Pi horn which has been cut down, and I removed the back of the chamber. The response looks a lot better, though it may be overly smoothed due to gating. I also have some measurements of an even shorter(7.5") horn I'll post later. My impression is that the dips and peaks in the response are due to poor mouth termination?

Subject: Midhorn parameters and what changes what
Posted by Wayne Parham on Tue, 08 May 2007 16:00:27 GMT
View Forum Message <> Reply to Message

There you go! That response curve looks much better.Notches in response above 1kHz are from path length differences between different points on the cone and the throat. It is largely affected by throat size and shape and center cap size and shape. Overall response and in particular low frequency response is different between larger radiators than smaller ones. Motor strength changes response too.Radiating angle (i.e. boundary conditions) will affect overall response, generally smoothing response and slightly deepening LF output as radiating angle is decreased. When placed in a corner with the mouth edges near the walls, the mouth size is augmented by the walls. They tend to act like the part of a CD horn that angles outward, reducing mouth diffraction. In a very real sense, the room's walls become flare extensions for the horn.

Subject: Re: Midhorn parameters and what changes what
Posted by swett on Sat, 12 May 2007 21:02:38 GMT
View Forum Message <> Reply to Message

Thanks. Given the long gating(much longer than the first bounce) I'm using for this measurement, its quite flat. Should be indicative of a good in-room response. I've noticed that floor bounce can still be visible in the measurements, but it doesn't show up as a large coherent spike with the midhorn, which is an indication of its good directivity control. This measurement was with an even shorter horn(9" average length) and a 10"x16" mouth. It also has a slightly larger(5.5" dia) throat. I made some measurements with the 5" dia throat as well, but overall the larger throat measurements looked a bit better. My main concern now is with off-axis(ie: +/- 20 deg) response. Its not nearly as flat as on-axis. Its possible that will just smooth out once these are in a corner, however. Have you(or anyone else) ever experimented with transitions between the conical angle and the flat front?

Subject: With top and bottom transitions
Posted by swett on Sat, 12 May 2007 21:08:16 GMT
View Forum Message <> Reply to Message

Here is a measurement I did 20 degrees below the horn with 2" long top and bottom transitions at a 50 degree angle to the horn's axis. Not perfect, but still pretty respectable I felt. I'll post the same measurement without the transitions next.

Subject: Re: With top and bottom transitions
Posted by swett on Sat, 12 May 2007 21:11:13 GMT
View Forum Message <> Reply to Message

Here it is 20 degrees down with no 2" transitions. Its not quite a fair comparison, since this has shorter gating, but usually that makes the graph look a lot better, not worse, so hopefully it should still be useful.

Subject: Re: With top and bottom transitions
Posted by Wayne Parham on Sun, 13 May 2007 14:30:18 GMT
View Forum Message <> Reply to Message

Your horn is starting to look pretty good. That is similar response to my midhorn. If placed in a corner, the walls act like horn extensions. The horn isn't designed to be used outside, but if it were, it would need to be longer and the mouth transition would benefit from a wider exit angle, As it is, indoors, the walls do this for us.

Subject: Re: With better top and bottom transitions
Posted by swett on Sun, 13 May 2007 23:04:42 GMT
View Forum Message <> Reply to Message

Thanks. I'm hoping to use it with a 7pi cornerhorn and so far its looking a bit more compact than the standard Pi midhorn, which was a large part of the goal. If it works out well, you could consider it as an option on the regular 7pi, since its width matches up nicely at 18" with the side transitions or 16" without. Here is the same 20 degrees up measurement with more gradual transitions on the top and bottom(1" of 45 degrees, then 1" of 60 degrees). I think the dip at

450hz is floor bounce I wasn't able to window out nicely. My main concern now is that I'm losing about 3db above 900hz off-axis, both in the horizontal and vertical directions, relative to the 300-850 range. Is it worth trying a smaller dia(ie: 4.5") or 4.5" square throat from the Pi horns?

Subject: Re: With better top and bottom transitions
Posted by Wayne Parham on Mon, 14 May 2007 16:27:49 GMT
View Forum Message <> Reply to Message

Looks great. I do like having a little more extension in the lower frequencies, but it looks like you're doing a great job at making a compact horn.
