Subject: Set your goals, model a design and build it
Posted by Wayne Parham on Thu, 06 Nov 2003 04:29:57 GMT
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I like midrange horns using medium-format (8" - 12") cone drivers. To me, they sound very clear and natural. You just really can't take a modern compression driver down to 100Hz-200Hz, and that's where the larger cone-driver horns really shine. These kinds of horns are pretty simple devices really, having a low Q midrange driver and typically a simple conical flare.

Construction is straightforward. Bring four sides of a truncated pyramid back to form a square hole meeting the loudspeaker's baffle. The side of the hole sets the compression ratio and forms the throat area. The flare of the sides and their length sets the coverage angle and the expansion for the horn. You might add a final increased expansion section about 20% from the mouth, in order to maintain uniform dispersion as the horn frequency drops near the point where the mouth begins to form a diffraction orifice. But this then is a simple conical horn, with only two sections and you can easily model a horn like this with Hornresp, so grab a copy if you haven't already.

For 2" exit compression horns, you might look over at www.WoodHorn.com and see what Bill is doing. He makes some great horns, and if you're inclined to make the wood flares yourself, then maybe he'll sell you the billet aluminum throat piece. Hard to beat that part - It's durable, has an O-Ring for compression sealing and is very consistent in manufacture, being made on a metal CNC lathe.

Your coverage angle and decision to go axisymmetic or not is up to you and the coverage pattern you need. So is your choice of flair - If you want constant directivity, then just make the sides straight, perhaps with a final width expansion about 20% from the mouth. You can make an exponential or tractrix horn that's has a little bit flatter response, but at the expense of poorer off-axis performance.

Exponentials provide better response at the lower end of their response curve than tractrix, but tractrix is very popular these days and is said to be improved in the top end. Honestly, I find very little difference in these two types, and I like them both.

My preference has been a horn having constant directivity in the horizontal plane but with an exponential flare in the vertical, i.e. radial horns. I also like the axisymmetric horns best, with 90° x 40° coverage, but this is because my applications are typically home and small sound production applications, where few loudspeakers cover an entire room. Uniform wide coverage from a single loudspeaker is required in these applications, and that is something I feel my designs do very well.

Keep us posted with what you do. Maybe post some photos when you get 'em done.