Subject: Conical mid horns
Posted by Wayne Parham on Mon, 19 Jan 2009 05:09:45 GMT
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cornerhorns. I wanted a pure conical flare because it works well driven with a cone midrange and provides constant directivity. My midhorns are fairly large and designed to be snuggled into a corner, which acts as a sort of flare extension.

The front chamber is an acoustical low-pass filter, so increasing the volume of the front chamber tends to rolloff the high end sooner. The rear chamber sets the shape of the bottom end. Large chambers tend to have reduced bottom end but rolloff gradually. Smaller ones tend to boost the bottom or even peak somewhere in the lower passband, much like an undersized sealed woofer cabinet with high Q. The size and shape of the throat aperture does a lot of things, including changing compression ratio and setting path lengths. It's hard to make general statements except that higher compression generally increases efficiency, sometimes at the expense of causing ripples in response.

A phase plug would have been great for extending the upper frequency response, but I don't need the extension. My midhorns are paired with a compression horn tweeter, and they work fine up to the crossover point. In fact, the rolloff that is provided may help provide some acoustic crossover to the tweeter. In the end, I designed using measurements as my guide, and they sum beautifully on and off-axis, so I haven't had any reason to contemplate adding a phase plug.

wavefront more nearly a plane wave, and that's not what we want driving a conical horn. In this case, we want a spherical wave, and that's what is generated in the first place. So if a phase plug were to be added, it wouldn't be like the ones in a compression driver. Rather than trying to make path lengths equal across the cross-section, they would need to be made to be equal across a spherical surface boundary. The best shape would be one that first matched the path lengths from a cone shaped radiator to the square throat entry, and then further matched a spherical wavefront to the rectangular flare, making an oval shape wavefront.

In the end, I'm not sure that a phase plug would provide any benefit in this application. Again, if we wanted to extend the high frequency response, I think a phase plug would be useful but not in the midrange where the horn is designed to be used. I don't think the added complexity of a phase plug would offer anything to this design.