Subject: Waveguides verses Horns
Posted by Wayne Parham on Mon, 18 May 2009 22:01:43 GMT
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I've always liked the design principles of the kinds of horns that are now called "waveguides." If you look back through the Pi Speaker forum archives, you'll see a clear pattern of preference to horns that delivered constant directivity (especially through the horizontal) yet free from sharp edges that cause discontinuities. Sharp edges within the horn make ripples in impedance and ultimately in amplitude response.

If you look at the H290, it actually resembles a modern waveguide in most respects. The throat transitions smoothly out to the final coverage angle. It's a pretty good horn that provides uniform coverage without any discontinuities. My wood tweeter horn is pretty similar, except the mouth is radiused to reduce mouth diffraction. It is designed to be used without a baffle, so the mouth termination is a little more critical.

Waveguides verses HornsIt's not just about the horn, or waveguide as some are now calling them. It's about the whole loudspeaker. Even if the waveguide/horn is CD, without an appropriate crossover and driver placement, the pattern isn't CD. Many of the waveguides I've seen lately are implemented in a way that makes driver interference nulls fall squarely within the horn's pattern. I consider that to be a huge oversight, all but eliminating any benefits the waveguide might have otherwise offered.

Truly, the main design goal for each of my speakers is to provide smooth balanced response over a wide pattern with constant directivity. To this aim, I put emphasis on crossover design, driver placement, horn design and in the case of the cornerhorns, even the placement of the loudspeaker in the room. This is true for the multisub approach as well. It's all about making the sound smooth and imaging precise, not just at a single pinpoint spot in an anechoic environment, but also throughout a large area of the listening room.