Subject: Basshorn or Transmission Line
Posted by Wayne Parham on Tue, 07 Jun 2005 04:45:41 GMT
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Before remarking about flare shapes, I think it is important to briefly mention the fact that a room's corner expands as a conical horn from its apex, and becomes a parabolic expansion after that. If you start at the floor apex, it is conical until the ceiling is reached, and that's where expansion begins to form a parabolic shape. This forms a horn with 9dB DI, all by itself. It is the only thing large enough to provide directionality for bass frequencies. That's significant; In most cases, it has more of a positive effect than the ducts within the basshorn cabinet.Whatever shape a basshorn aproximates, one can make the observation that many basshorns use nearly straight ducts with very little flare. The room outside the horn becomes one of the most important features of the horn. Ducts inside the horn are just the initial expansion, sort of part of the throat.Some people approximate an exponential/hyperbolic expansion using two or three conical sections to make a basshorn. That's fine, but then the room itself forms the final flare, and it is always the largest part of the horn. So I think it is important to examine the horn at that level of detail. Rather than calling it an exponetial horn and modeling it as such, I think it makes some sense to at least investigate it as a series of conical or parabolic sections.Another way of looking at it is as a tapered pipe or transmission line. On casual inspection, this model appears to show some of the same features. A straight flare with shallow taper is a transmission line; They're one and the same thing. And if you look at a basshorn, that's what it is too.What brings me to this line of reasoning is the fact that all moderately sized basshorns are reactive down low. They really don't act like horns in the range they're designed to be used in. The first couple of octaves are almost always highly resonant, more like tapered pipes than horns. By the time the horn becomes acoustically resistive, it is crossed over, handed off to the midrange or midbass system.
Basshorn or Transmission Line