Subject: Re: Effects of horn loading
Posted by Wayne Parham on Thu, 22 Aug 2002 07:53:34 GMT
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When a horn is placed in constrained space, it acts similarly to a ground plane would for an antenna. It's like a mirror were presented to the mouth of the horn, and it acts as though it had a larger mouth.This is true for room boundaries and for baffle mounting. Both are "boundaries," if they are close enough. For frequencies high enough that the baffle is larger than wavelength, the baffle itself enforces half space radiation. And for those low enough that room boundaries are

cornerhorn is attractive. It forces the system to operate in eighth space. It's also a conical horn with dispersion that equals the room's dimensions. So this is a really good placement for woofers, especially when the HF horn pattern is matched.It is rare that a horn will be large enough to work properly in free space at subwoofer frequencies. That would require a very large device. Most basshorns are undersized, being acoustically small. And while half space is pretty easy to do - just set the speaker on the ground - quarter space requires the junction of two boundaries and eighth space requires three. After all, the wavelength of 25Hz is 45 feet long. So except for permanent horns that use a large structure such as the room itself for the flare, most are not nearly large enough to load properly at 25Hz.About HF rolloff in compression horns, the driver itself usually has much more output down low than it does up high. It's total output can be measured on a plane wave tube, often refered to as power response. This is different than on-axis measurements, which include directivity effects. A narrowing pattern provides acoustic EQ which will show up in an on-axis measurement but not a power response chart. Power response is what you'll see on a plane wave tube or a constant directivity horn. If you put the driver on a horn that focuses the pattern narrower and narrower as frequency goes up (collapsing directivity), then it will be acoustically equalized on axis. This sacrifices off axis response, and makes the (reverberent field) energy in the room non-uniform since more acoustic energy is produced at low frequencies.You might want to grab a copy of the "JBL Professional Sound System Design Manual." It's a really handy document, and it discusses all of this stuff and more.