Subject: Re: Unity horns???? what is a Pi Speaker horn?
Posted by Wayne Parham on Sun, 24 Apr 2005 04:38:00 GMT
View Forum Message <> Reply to Message

if that's what you mean. That's the main goal - Make sure there are no destructive nulls formed by the interaction between adjacent drivers within the coverage pattern. If this isn't done properly, then there will be a spiked dip in response within the pattern, usually somewhere within an octave

Speakers are designed so that this doesn't occur. Response is uniform over a wide horizontal arc, usually larger than the rated 90º, and through at least a 40º vertical arc. Above and below the forward lobe, HF output is greatly reduced because it is outside the pattern. There are nulls that form outside the pattern, but they are of little consequence.I have never liked the phrase "time alignment" when applied to loudspeakers. Discussions about time alignment take the same tone as Pogue carburetor discussions. It always seem to get some people real charged up, but I think it means different things to different people. True time alignment in 3D space isn't possible, it's just not the way things work.A loudspeaker is reactive by its very nature. Not only is it electrically reactive - which would make phase/time jiggle in two dimensions - but it is also acoustically and mechanically reactive, as well as having some effects that are variables in 3D space. That means it is simply not possible to be time aligned.If you make the "alignment" goal be +/-90º phase at a position or range of positions, then you've got something you can achieve. In my opinion, that's what is really important because it's the way to prevent having destructive nulls. But I don't consider +/-90º phase shift as being time aligned, although I'm sure that others do. I guess you could say it's a matter of defining what you call "alignment."You can do some things in the electrical realm that would modify phase in a productive way, and you can reduce phase shift on-axis. This may or may not be audible. What is definitely audible, however, is interactions between adjacent drivers that cause destructive summing in the crossover region. This is usually avoided on-axis, and with careful design, can also be mitigated off-axis to some degree. In my opinion, one of the best "advanced" loudspeaker design goals is exactly that: To reduce the effect of off-axis nulls by moving them far off-axis, as far outside the pattern as possible.The idea is to make a nice large forward lobe that is acousticaly pure, and to reduce sound output outside this area as much as possible. Sound radiated outside the forward lobe is contaminated with bands of nulls and side lobes, so naturally the spectral balance is poor. A listener moving in this area perceives a phasey sound. Sound radiated at large angles is usually unwanted anyway, because it serves little useful purpose, generally adding only to unwanted reflections. This is particularly true of sound radiated at large vertical angles, certainly in domestic hifi environments.That brings

models through the uniform directivity cornerhorns are designed to provide uniform 90ºx40º coverage with no nulls in the pattern. I believe this is the most useful pattern for domestic hifi environments. It's wide enough to cover the room, and relatively narrow vertical angle covers the listening area without causing ceiling slap. The horn reduces HF output at large vertical angles, and that's exactly what I want it to do. It has a nice wide horizontal coverage, which creates uniform spectral balance throughout the room.