Subject: Corner horn listening distance
Posted by The Oracle on Tue, 02 Jun 2020 09:44:43 GMT
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Hi all,

My quick measurements in my 11'10" wide room with imaginary corner horns pointing at 45 deg means they intersect 4'6" in front of the bass cabinet centre, left to right speaker plane. This point being in the centre of the room left to right.

Question - how far backwards can the listening position be from the intersection point till it's too far away?

4 feet, 6 ft, 8 ft?

Could the 45deg toe be reduced to 40 or 35deg instead to allow a further distance? I am not looking at more that 10ft from the 4' 6" intersection point.

Cheers

Subject: Re: Corner horn listening distance
Posted by Wayne Parham on Tue, 02 Jun 2020 15:53:22 GMT
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The best listening area is a few feet behind the point where the forward axes cross. A good rule of thumb is to consider the "sweet spot" to be the area between the speakers starting where the axes cross and back from that about double the distance from speakers to where the axes cross. So in your case, that would be from six feet back to about twelve feet back.
Imaging, placement and orientation

Subject: Re: Corner horn listening distance
Posted by The Oracle on Tue, 02 Jun 2020 21:13:19 GMT
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Thanks Wayne,

I interpret that distance as between 9' and up to 13 1/2' from the speaker plane then. Correct?

I currently have the listening seat 11 1/2' from the floorstander's I'm using while the Pi7's are being built. I much prefer not being close to speakers, so I could live with the 9' to 13' recommendation

here.

The toe couldn't be reduced subtlely to 42 or 40 deg as another way to increase listening distance?

I've become aware of wavefront launch from another source, and I wonder what this actually is, what it describes, and how do achieve this with Pi7's (or any other of Pi models) given I understand front wall located speakers make it harder to achieve?

I did read the one article in the FAQ section, but it didn't really enlighten me.

Cheers

Subject: Re: Corner horn listening distance
Posted by Wayne Parham on Tue, 02 Jun 2020 22:43:42 GMT
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Since your room has a front wall span of just under twelve feet across, the best area to listen to the cornerhorns in your room is in the area between about six feet back and twelve feet back from the front wall. You can sit more distant than that and it will sound very good. The tonal balance will be uniform throughout the whole room because the reverberant field is uniform. So tonal balance will sound good everywhere in the room.

What you will lose outside the "sweet spot" is stereo imaging. If you get closer to the front wall than around six feet, the left and right channels will sound artificially distant from one another. And if you get too much further from the wall than about twelve feet, it will sound more and more like a single source rather than a stereo-generated image.

There are two things in play here.

One is the wavefront launch, which is affected by reflections from nearby boundaries. It's an SBIR effect. When the sound sources are acoustically close to the boundary, the wavefront expands away from the boundary without disruption. But most speakers are placed acoustically distant, so they suffer from self-interference notches in addition to room modes. This is discussed in the following thread:
Speaker placement and wavefront launch
Another thing is the "self-balancing" effect provided by 45° toe-in. It doesn't have to be exactly 45°, but the configuration of constant-directivity-cornerhorns makes this a convenient angle. And it has been proven to work very well in another popular configuration I often embrace, DI-matched two-way mains with flanking subs.

What makes this work is the fact that on-axis SPL is louder than off-axis SPL, so by moving closer to a speaker that is heavily toed-in makes it louder by virtue of being nearer, but less loud by virtue of being off axis. These two effects oppose one another and tend to self-balance. It works best with speakers having constant or nearly constant directivity. This is the aspect that was

discussed in the thread I linked earlier:
Imaging, placement and orientation