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Subject: Cornerhorn Ruminations

Posted by [Wayne Parham](#) on Wed, 13 Jan 2010 14:56:15 GMT

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Nice looking midhorns! Congratulations!

We will have the midhorn flat pack kits back on the shopping cart in about a month or six weeks (finally!) I met with the cabinetmaker on Sunday and we discussed it at length.

You can keep stuff out of the midhorn using a grill cloth or mesh stretched across the throat. It should be as acoustically transparent as possible, of course.

The idea behind the rear facing woofer is it puts it as close to the corner apex as possible. This is also the case for the midhorn because at low frequencies, it is close enough to the side walls they act as extensions of the flare. As frequency rises, the midhorn becomes more directional and the corner isn't really important. Same with the tweeter, it is acoustically distant because of the smaller wavelengths involved, but it has directivity control through its passband and doesn't need any "assistance" from the corner like the woofer and midhorn do.

The goal, in a nutshell, is to keep the sound source acoustically close at frequencies where it is not very directional. This makes the walls, themselves, become the directivity control device. They form a large waveguide. Being acoustically close, they aren't creating reflections, they're a launch point, part of the source. At higher frequencies, the horns used will provide the directivity control and this reduces reflections. It still doesn't hurt to line the walls with absorbent material, as this will reduce reflections even further.

The corner expansion really works for us in the lower midrange region, from about 100Hz to a few hundred Hertz, 300Hz to 500Hz or so. This is the range we're looking for. Below that, room modes take over and the directivity that may have been provided from corner loading (in a larger room or outdoors) is defeated by the self-interference from room modes. That's where multi-sub's can help. Above a few hundred Hertz, the sound sources become acoustically distant from the walls, so they would start to cause early reflections if they were not directional by themselves. That's why it is really important that the midrange and tweeter be horns. They provide directivity and reduce early reflections.

As an aside, I've built cornerhorns in many varieties over the years, some with direct radiating mids and some even with direct radiating tweeters. I've even built some that had rear-firing mids and tweeters. This creates a healthy dose of reflected sound, and makes them sound very full. It is an interesting sound, full of ambience. The reverberent field is uniformly charged, so that part is right, but I think the increased early reflections make it sound "busier". It is interesting to listen to at first - a real crowd pleaser at shows - but I think it sounds much better to use horns that provide the directivity control from the midrange up, to reduce early reflections.

Towards this aim, ideally you want to set the cornerhorns on walls that are straight and lacking features that would cause reflections, things like rafters or small shelves, etc. You're using the expansion of the corner from the apex as a large horn, so the same things you'd want in a horn are what you want in the walls. There is one exception, the walls don't need to be rigid, and really

shouldn't be. We have competing priorities here - Normally, you want horn walls to be rigid, but in this case, we want the room walls to provide some damping. The perfect walls would be rigid down to the Schroeder frequency (around 100Hz to 150Hz) and then would be flexible below that, absorbing some of the bass energy and damping room modes.

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