



5 Helios CM Speaker Project Part 5 - Side Panel Doweling and Attachment, Brace

In Part 5 I outline my standard technique of locating and doweling panels to attach to the cabinet, as well as adding a shelf brace between the tweeter and woofer.

The side panels are oversized by 1/8" which results in a 1/16" overhang. The goal is to simply center the panel to the side.

I start by drilling holes in the cabinet where I want dowels, basically you can't have too many dowels so the goal is to do them w/in reason. Typically I'm looking at how the wood could move and support it there, that means corners and panel centers. Imagine the panel cupping in or out, so we want to hold those areas down with dowels to be sure they don't move. 1/4" dowels aren't very strong in shear, but are immensely strong under tension so that's how we use them.

As you can see I put dowels every 6" or so which is good for a panel like this. I use two brad point drill bits with collar stops on them, one sets the depth of the hole in the cabinet, and the other sets the depth of the hole in the panel, since the panel is thinner the depth is approximately halfway through that panel, but

going into the side the hole can be much deeper. Keep in mind any round overs or chamfers in the panel as well, you don't want a router bit cutting into the dowel etc.

I always shoot to create very little air space inside the dowel bore, so typically I cut my dowels about 1/32 inch shorter than the depth of the dowel holes. This isn't critical but something to shoot for as you get better at it.

Once holes are drilled in the cabinet side, install some dowel center punches in the holes, then locate the panel on the center punches and hit it pretty hard with a dead blow hammer. You now have the center punch locations of the center of the dowels, simply drill the other side and do a test fit. I have found that this perfectly locates the dowels essentially 100% of the time.

I initially clamped and glued the passive radiator side panel first, then I worked on the shelf brace to get that installed, then finally I installed the opposing side panel.

For the brace, the main consideration here is creating enough clearance for the passive radiator on the side panel, thus the brace has a cut out that accommodates not only the frame of the passive radiator but the excursion of the slug on the back of the cone. The brace is also centered between the waveguide and the woofer.

This brace ties together the baffle, the back, the opposing side panel and part of the passive radiator panel. The key here is that I'm breaking up these panels into smaller sizes which resonate at a lower amplitude and a higher frequency, these panels are all slightly different shapes as well which means that no two panels will resonate the same and amplify. In a future update you'll see that I add more bracing inside to further dampen the panels, but I don't do that until after some of the driver holes are cut out.

Once the brace was finalized and glued in place, the opposing panel was doweled, glued and clamped in place, then I flush cut the side panels to the cabinet.





HeliosCM Speaker Project Part 6 - Roundovers, Thumbnails and Sanding

Now that all the panel glue ups are done, and the sides are flushed, we can apply the final edge treatments to the cabinet.

All front and back edges get a 1/2" roundover in the solid oak strips. For this cut be sure to "climb cut" the "exit" areas of the cut to ensure there are no splintering issues. This simply means cutting in the direction of "clockwise" when doing a hand held for about an inch to ensure the router bit cannot push wood fibers out from the cutting surface. The rest of the cut does normally as climb cutting should only be used carefully and sparingly as it's more dangerous. You can read about climb cutting online if you'd like.

Once that cut was done, I used the large Yonico Thumbnail table top bit. This is a big and Intimidating bit but creates a very cool and different profile than the standard roundover. I have posted about this bit before, it's a real bargain the only issue is it could be sharper. So I bought 2 and had them sharpened so they cut much smoother and cleaner. Be sure to use a slower cutting speed with this bit and do the cut in 2-3 passes (which means simply run the bit at full depth but press the bit lightly against the cut for 2-3

passes until the cut is complete. You could also adjust the bit slower for 3 passes but I tend to like to set up the final depth, leave it and lock it in to prevent any variation).

Once these cuts are done it's time for sanding, lots of it! Now is the time to flush all joints and make that cabinet look perfect. I sanded the edge treatments 80-120-220 to remove any router bit marks, here I use a palm sander and carefully run the sanding pad over and under the rounded edge until it's perfectly smooth.

I also sanded the edge strips that butt up to the veneer, the one thing I hate about veneer is the constant threat of sanding through it so use care. This isn't nearly a concern when solid wood is used. Masking tape can be used to protect veneer in any critical sanding areas, once you sand through the masking tape immediately replace it with a fresh strip - it's extra work but better than trashing a cabinet at this stage by sanding through the veneer.

I also used this opportunity to fill in any defect areas in the firewood lumber with CA glue and sand those smooth.

I did a light pass with 220 then 300 on the veneer areas just to smooth those out.

For anyone that thought I was making a cutting board, this should look more like a speaker now 😊

Next up the binding post terminal plate and some driver cutouts!

