HeliosCM Speaker Project Part 7 - Binding Post Plate

As some of you may have noticed, I like to do something special with the binding post terminal on my speaker projects, granted you could drill two holes and run the binding posts through the cabinet wall and that works just fine, but I like to give people something to look at when they're looking at the back of the speaker.

Since I had fire wood lumber left over, and that's a theme on this project, I chose to make a decorative plate for the binding post out of that material.

I started by gluing a bunch of smaller strips together until I got a piece that was about 2-1/4" thick 11 inches long and about 3" inches wide, that would afford me two decorative plates in roughly 5 inch diameter when done.

After gluing the pieces together and letting them dry, I ran them through the planer and dimensioned the piece flat, then I cut it in half on my table saw, then I glued those pieces edge to edge to create a piece that was twice as wide and half as thick.

Once I felt good about how that piece was dimensioned, I cut it in half to create two square plates approximately 5 x 5 x 1" thick

I then cut a circle out of each piece, which left me with a final diameter of about 5 inches.

I then processed the decorative elements of the piece using a handheld router and a few different bits, those are easier to see if you simply look at the pictures of the process.

Careful hand sanding and filling in little cracks and imperfections with CA glue ensures a great result. The binding posts are available from Meniscus, I really like these as they are substantial and very nice quality.

HeliosCM Speaker Project Part 8 - Driver Recessed and Flush Mounting

It's not a speaker without some speaker holes! This is always the make or break part of any project, so it's key to plan carefully, measure 17 times, make practice cuts then sack up and get her done.

Lots of detailed pics attached so please browse through them, none of this is revolutionary but as with anything, the best result is in the details.

I always start by cutting test pieces on plywood, this allows me to establish the OD of the recess, the depth of the recess, and the ID of the through hole for mounting. Once I have these, I carefully document it and save these test cuts so I can use them for verification in the future. And as it goes, I already had one done for the SB23 CAC I did for the Ceramicos, and the SB29 PR from the Helios, so those were done. I now have one for the SB29 tweeters too 👌🏽

For the depth, I always take into account the gasket thickness, I measure with calipers and then set the router depth precisely using the digital measurement set on my calipers.

I avoid the temptation to make a really tight recess, as this will only result in a driver being hopelessly seized in the baffle. I shoot for a 1/32 gap around the frame, plus or minus 1/64". It feel great to have a super tight fitting flush mount until the first time you need to take it out 😩

I locate all my drivers by their hole centers, this is the location standard I use, I then draw the OD of the driver frame (using a compass) to logic check driver positions and also flush cut OD, to ensure (as a redundant confirmation) that the circle jig is set correctly.

I carefully measure these hole centers with a square and quadruple check them through the process. I center all my drivers on the baffle so that's just a matter of locating the center of the baffle.

I use a Jasper Jig to make my cuts, it works great. I use the 1/4” Amanda tool 46102-K spiral upcut bit, it cuts like a hot knife through melted butter.

Due to the delicate, splintery nature of the quarter sawn oak veneer, I made a shallow 1/8” initial cut very slowly and deliberately, and I also applied masking tape to the cut area, which I removed immediately after the first 1/8” deep cut. This resulted in a perfect, splinter free cut.

I also do each diameter cut on both speakers at the same time (consecutively), not changing the jig position ever, as that introduces an opportunity for error.

HeliosCM Speaker Project Part 9 - Additional Bracing

If you remember, when I initially glued both sides onto the cabinet, there was only a single shelf brace in the middle which was clearanced for the passive radiator on one side.

Since this isn't a very big cabinet, it wasn't going to require a lot of extensive bracing, like for example what I did in the Sorels (my last build).

What I did want to do is break up the various panels in the enclosure into different sizes and shapes. This would require less structural style bracing, and more strut like features that reshape and make-random the panel resonances. The goal here is to push the resonant frequency of panels up and lower the amplitude so they are inaudible. Lower frequency resonant panels do so more loudly and audibly, we are ok with the panels resonating so long it's at a level we cannot hear. In addition, multiple panels all the same size and shape would theoretically all resonate at the same frequency, this is bad because those panels all resonate potentially in phase and become substantially louder as they combine, just like two drivers would if they were playing the same frequency and in phase. By breaking up panels into different shapes and sizes, they will not only resonate at different frequencies but some could even be destructive to each other. Regardless, in a DIY effort this isn't always an exact science, but this is a proven method to create a non-resonant enclosure with not too much work or effort.

As you may have guessed, I am definitely not in the camp of "let your enclosure sing along with the music", the only thing I want singing is Nora Jones through the drivers themselves. 👍🏽

Once I had cut the through hole for the 10 inch passive radiator, I simply added more pieces to the enclosure to break up the panels. I have attached a number of pictures to show what I did, feel free to browse through them. These are glued in place with PVA wood glue, then seams and joints are reinforced with Loctite Power Grab adhesive to ensure that all connections are solid.

Also note that whenever possible, I always connect opposing panels to each other as their movements will cancel out (or short circuit) through the bracing, this is much more effective than simply running material on edge along a panel.