

Project Intro - Helios CM (Common Man)

[Jeff Bagby](#) and I are excited to announce a new project and a follow up from our Helios project last year! Please spend some time watching the video which goes over all the project details.

The Helios CM is the same format as the Helios, featuring an 8" woofer, 10" passive radiator, a 7" custom waveguide (based off the Satori waveguide) and an [SB Acoustics](#) 29mm tweeter.

The drivers are the SB29SDAC and the NBAC 8" woofer.

Helios CM Speaker Project Part 2 - Re-sawing Oak FireWood into Usable Lumber

In case you missed yesterday's introductory video:

<https://www.facebook.com/groups/DIYLoudspeakerProjecPad/permalink/1016956671993503/>

As discussed in yesterday's intro, I wanted to incorporate a very common material into the Helios "common man" build. What could be more common than firewood that most people use to heat their homes?

To review, this was some firewood that caught my eye at a cabin we visited. I then brought home about 20 pieces of it, each piece was quartered from approximately 10 to 12 inch long. The wood was mostly dry but I left it outside for about two years to not only dry, but also to give me time to figure out what to do with it. I knew the wood was special and I wanted to use it for a really special speaker.

I thought a little bit about how I wanted to process this lumber, I considered cutting it on a table saw sled but my blade would only cut about half way through. I ended up using a three-quarter inch resaw blade in my 14 inch bandsaw, and this worked well. Initially I cut the lumber into 1 inch thick strips, then I took the usual pieces from that and cut those in half to approximately 3/8 to 1/2" thick pieces.

Now I was left with some pretty rough and uneven pieces of wood, my goal was to get them down into the approximately 1/4-3/8" thick range, so I accomplished this by planing one side perfectly flat using my 10" wide joiner. This is a Cuttech unit with individual "helical style" carbide teeth, it did an excellent job of flattening the one side. I then ran the second side flat using my Dewalt planer which gave me flat and dimensioned-in-thickness pieces of wood.



I was left, however, with very uneven sides (bark, etc) which I then created a perfectly flat edge using my table saw sled. Once I had the one flat side, I cut the other side using my table saw.

Once I had two parallel and flat sides on each re-sawed piece, I ripped the pieces to exactly .187" wide. The width of each piece was critical, as I would be stacking these not only side to side but end to end and I wanted to eliminate any potential gaps. Once I had the ripped pieces how I liked them, I then squared up both ends to give me the final selection of pieces that I would have to use for lamination.

I expected this wood to be nice, but I was shocked at how beautiful it truly was. I'm not sure where I could just go and buy lumber like this, and though there are so many nice veneers out there, this is a unique and beautiful wood treatment that I'm very excited to continue to develop on this speaker. Stay tuned for more updates!

It's also an interesting twist, that a common and overlooked material, can achieve truly a remarkable and uncommon outcome with a little love and respect - seemed apropos as a metaphor for the common man!



Helios CM Speaker Project Part 3 - Enclosure Construction and Panel Veneer

The Helios CM speaker will be built with a base cabinet of 18mm Baltic Birch, The Baltic Birch panels are veneered with beautiful quarter sawn oak, and feature solid oak corners between the Baltic Birch panels.

The side panels are also a base of Baltic Birch, with solid oak edging, and the firewood oak will be laminated onto the outside of the panel so that the sides of the speakers will feature the firewood Lumber.

The end result is a speaker that's veneered with quartersawn oak, featuring solid oak edging and beautified with the oak firewood lumber on the sides.

There are a number of steps here but I photographed all of them. I'll try to add detail as there's a lot of pictures and a lot of steps.

The basic idea is to cut the Baltic Birch panels, veneer them, trim up the veneer, biscuit join the solid wood edging which makes up the top and bottom front and back edges and creates an assembly with the top bottom front and back. Side panels are then constructed and laminated, and attached once the firewood lumber is laminated.

I will feature the side panel construction in the next update.





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Helios CM Speaker Project Part 4 - Firewood Lumber Side Panel Lamination

This step outlines the lamination of the firewood pieces that I processed in the Part 2 update.

I started with an 18mm Baltic Birch panel that had solid oak strips glued to the edges. The glue surface should be rough and not smooth to help propagate a glue bond, so a quick pass with 80-grit is a good idea.

I chose to laminate the pieces vertically, the side panels are about 18" tall and all the firewood pieces are in the 12-15" long range, so this allowed me end to end treatments staggered every row, which also gives a more rustic look and even more contrast and variation.

I spent some time laying out pieces, initially I organized the pieces by color and look which helped create panels that all had a similar degree of variation. I wanted to avoid having one panel look dramatically different from the others, although none are anywhere near exactly the same.

My 1.87" width allowed a very even span of pieces across the panel, the two rows on each end end up being about 1/16" narrower than the rest which isn't noticeable with the eye.

I started by gluing one row at a time, starting from one side to the other. Having some deep jaw clamps is critical here, since the panel is about 14" wide I needed some clamps with jaws up to 8" deep to reach all the way to the middle. Harbor Freight has some great c-clamps for this with up to a 12" deep jaw and they are affordably priced.

I brushed a thin layer of Titebond 2 to the strips as well as the side panel, then clamped one end. I then butted up the second piece end to end and clamped those pieces end to end to force them tightly together so the butt up seam between the two pieces was tight. Then I clamp edge to edge to force the pieces together side to side to prevent any gaps there. Then once everything is in place, I clamp down. Key here is to use clamping force in every direction (x, y, z) to create gapless joints.

Since there were 4 panels, I could do one, work my way to the 4th and by the time the 4th was clamped I could start back in the first with about a 30min setup time for the glue. I was able to do all 4 panels over 2 days in about 5 hours total.

Also to note, two panels house the passive radiators so I didn't waste any wood in those areas.

Once the glue had dried on all panels, it was time to run them through the sander. If you don't have an 18" drum sander (it's awesome obviously), this could be done with a belt sander or even a palm sander though it will be a lot more work. Note that I didn't make all the strips the same thickness as I wanted to preserve the wood as much as possible and I knew I could flatten them all at the same time in the drum sander.

The drum sander made quick work of them with 120 grit paper, the sander takes off about 1/100th of an inch each pass comfortably.

Once sanding was done, I filled gaps, knots etc with clear epoxy, this is a two part "crystal clear" epoxy used for pouring over table tops, etc. Normal 2 part epoxy can be used as well, but it has a yellow tint to it. I also used CA glue to fill small holes and gaps. Once these were dry I sanded them flat with a palm sander. Note the clear epoxies are very sensitive to mix ratios, typically exactly 50/50, so be sure to measure with a graduated cylinder, you don't want to eyeball this or it won't get hard properly.

Last step was flush mounting the strips to the base panel, be sure to "climb router" the corners so avoid any chip out issues.