

Hi-fi Speakers

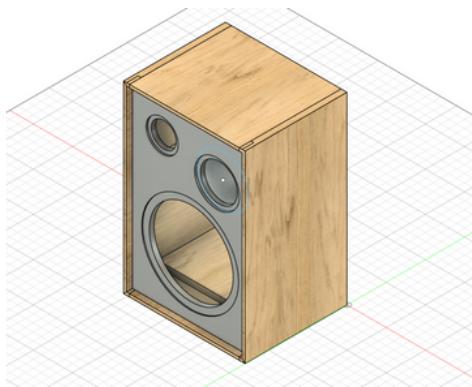
By: Leo Buckel



Creating this project has been one of my most insightful and valuable projects I have done. I have always had a strong passion for music and being a mechanical engineer I knew I needed to combine these passion into one project.

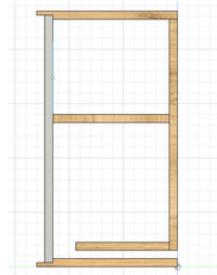
Design:

Starting the design process I knew I wanted to have a 3-way design drawing inspiration from early 90's designs like the JBL L100 and JBL 4312.



I designed it in Fusion and used WinISD to do the calculations for the total volume of the speaker cabinet and the length of the port for the optimal tuning frequency.

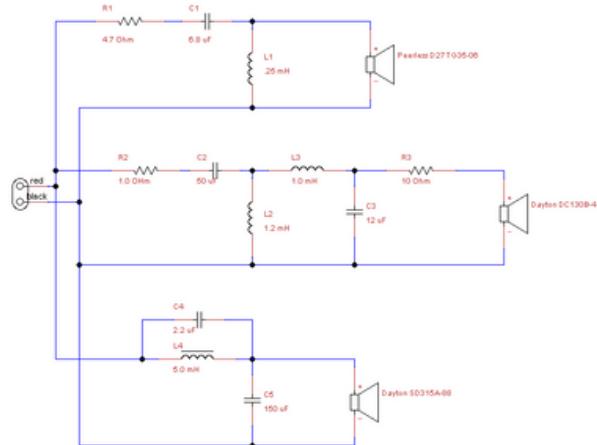
One of the perks of this design was that it could be cut out of one 4x8 ft MDF board reducing material cost.



Components:

For the drivers and crossover, I used Paul Carmody's Pit Viper design. The tweeter was a Peerless D27TG35-06, the mid-range was a Dayton DC130B-4, and the bass was a Dayton SD315A-88. The 12-inch bass gave this design a deep, resonant sound that filled the room with rich low frequencies.

Crossover design:



Putting the crossover together was a lot of fun and learn many new things. I learned how to solder and the positioning between the inductors was vital to reduce interference.

Manufacturing:

Assembling the speakers went smoothly and using the design I made, we cutout each part of the cabinet, used a router to get the front framing from the sides and top/bottom, and glued everything into place. I also routed the holes for the drivers in the front.



Then, we covered the outside with a sealer to protect it from water damage and used a white oak veneer and covered each face with it except the front which I spray painted black.



Using 6-inch PVC end caps, I made a chamber for the mid-range driver to isolate it from other drivers frequencies.

Finally I lined the inside with acoustic foam to reduce internal reflections, added the crossover, and glued the front panel with the drivers mounted.

