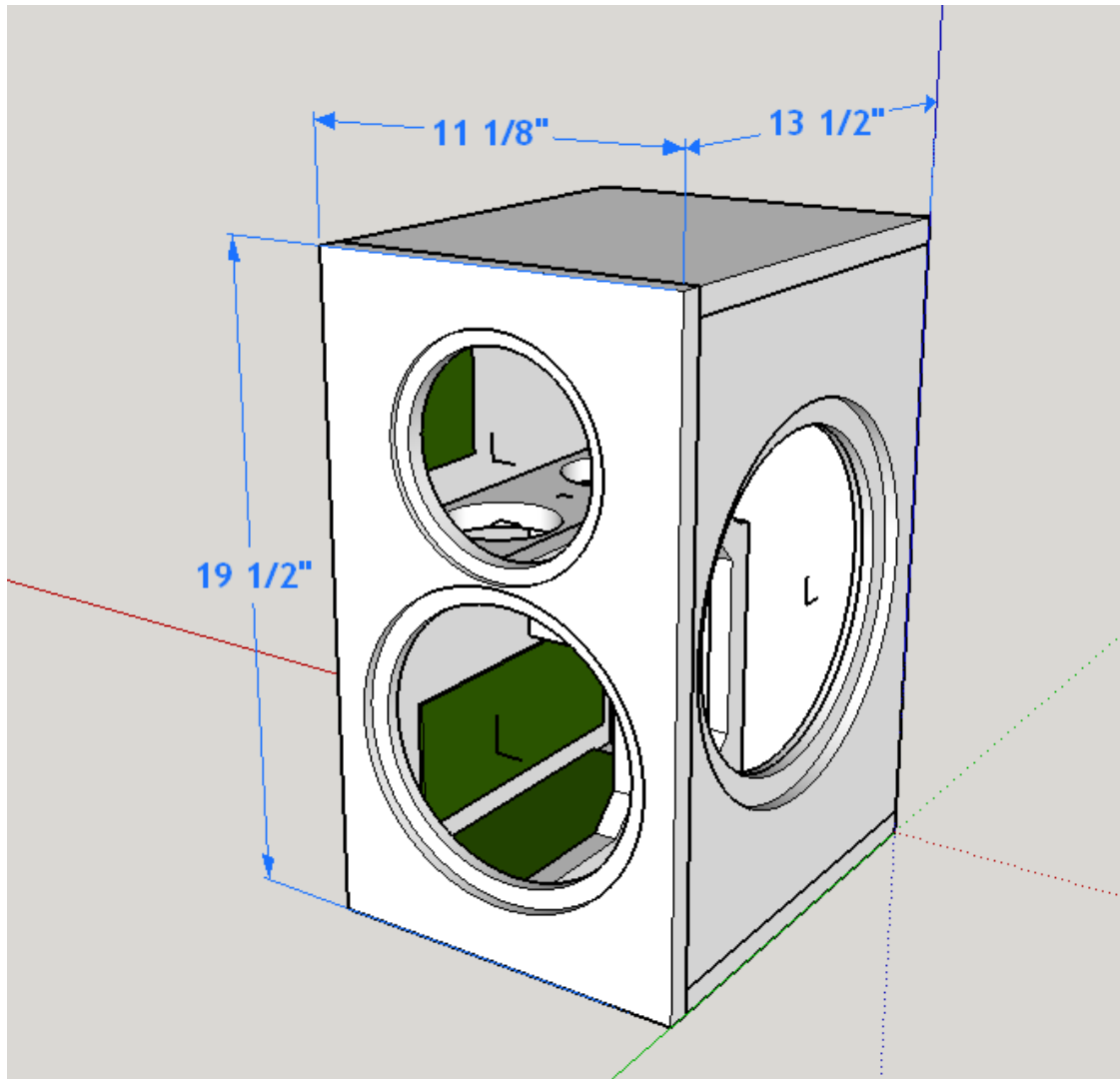


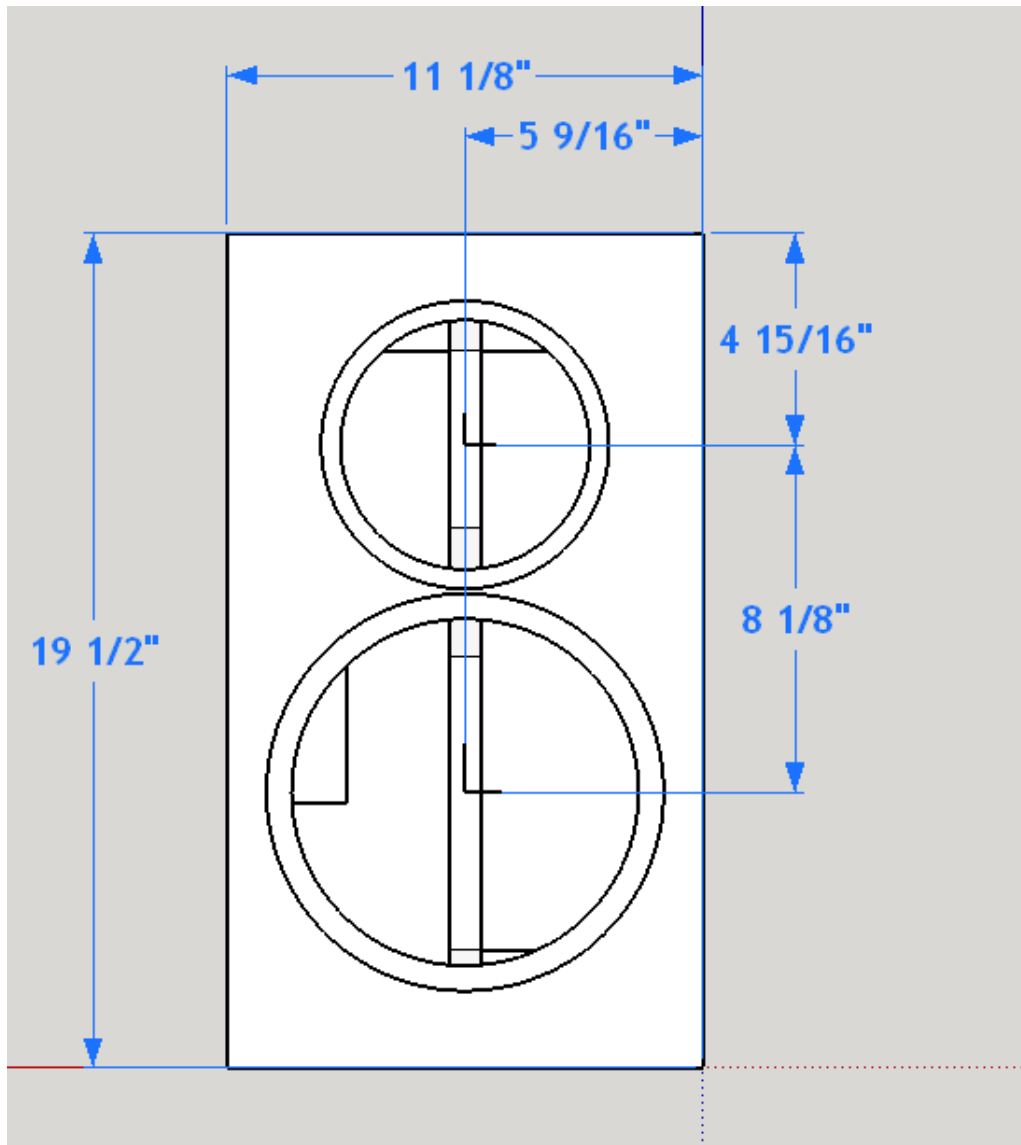


Helios Loudspeaker Plans

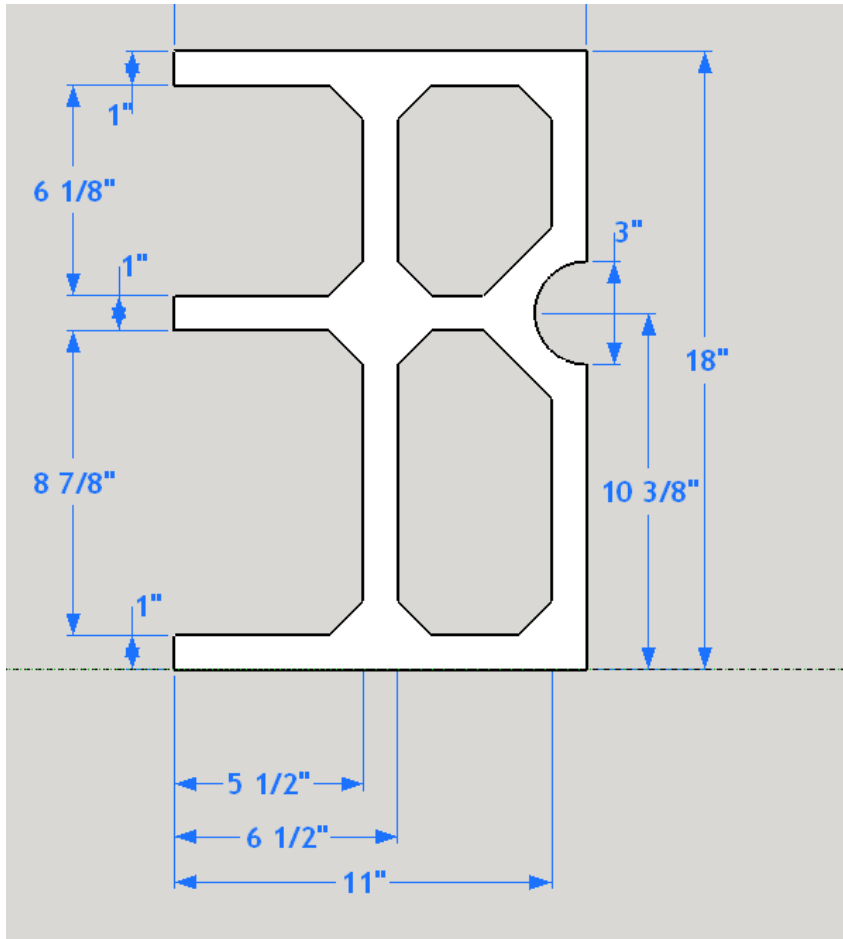


Overall speaker dimensions, with 3/4" material.



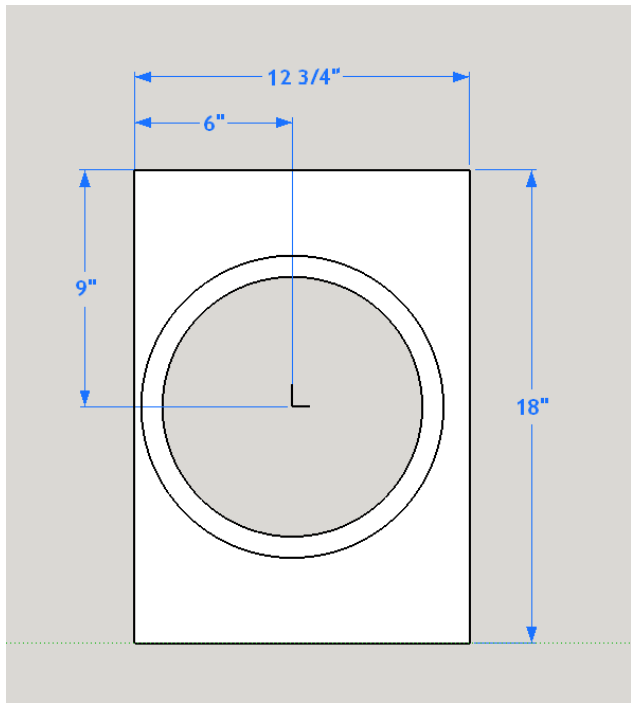


- Space between bottom of tweeter and top of woofer: 12.7mm (1/2")
- Waveguide flange diameter: 170mm (6-11/16") + machining allowance
- Waveguide cutout: 146mm (5-3/4) + machining allowance
- Waveguide flange thickness: 5mm (13/64") + allowance for gasketing material
- Woofer flange diameter: 242mm (9-33/64") + machining allowance
- Woofer cutout: 209mm (8-7/32") + machining allowance
- Woofer flange depth: 10.5mm (7/16") + allowance for gasketing material.



Vertical shelf brace, window cutout dimensions not critical, but placement of the prong that ties into the front baffle is, otherwise may interfere with frame from woofer.

Allow substantial open space for air movement within the cabinet otherwise bass tuning may be impacted. 3" circular cutout in the back is for binding post clearance.

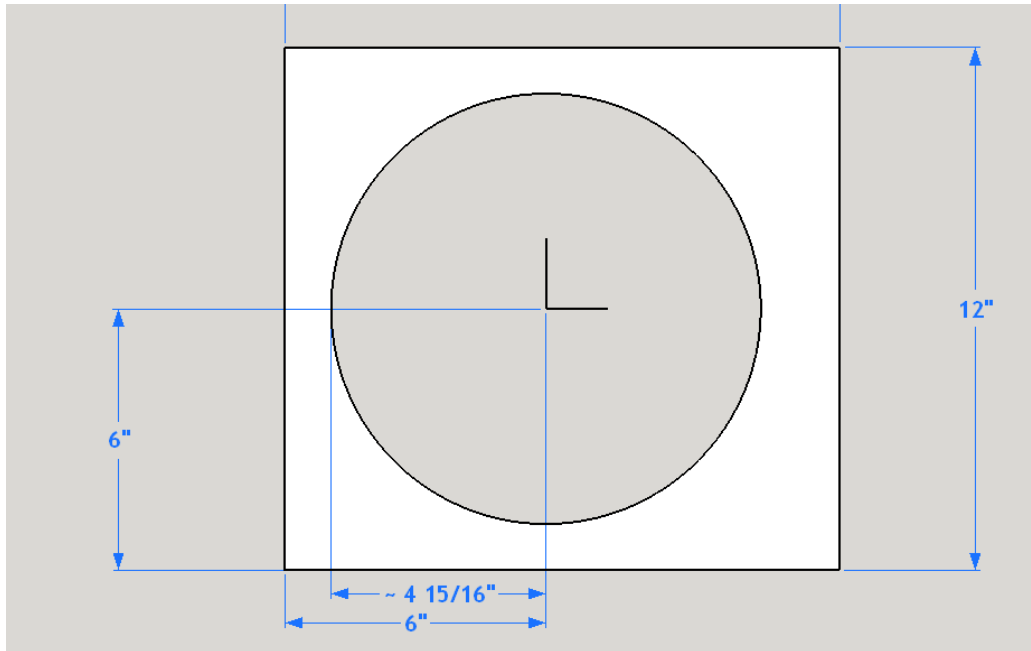


Passive radiator side panel, rebate depth $\sim 13/32$ + allowance for gasketing and finish. Note that for $3/4$ " material this doesn't leave a lot of strength for fasteners or the passive radiator frame, especially if the speaker is constructed from MDF. A second piece of $1/4$ " material should be used to make this section thicker. It doesn't need to run the full height; it just needs to back up the opening.

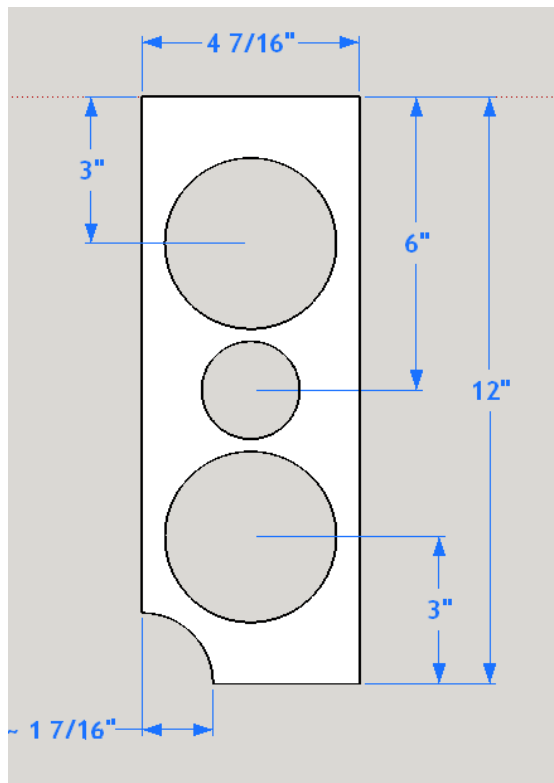
Passive radiator frame diameter: 290mm (11-7/16") + machining allowance

Passive radiator cutout: 249mm (9-13/16") + machining allowance

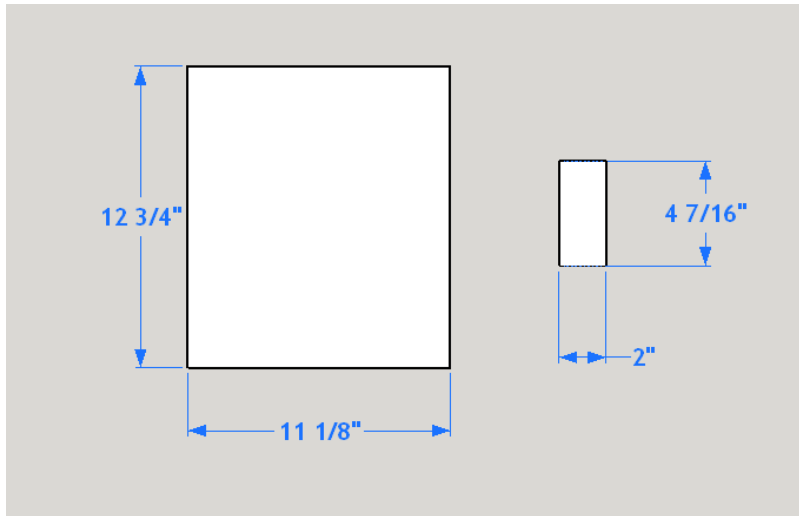
Passive radiator flange thickness: 10mm (13/32")



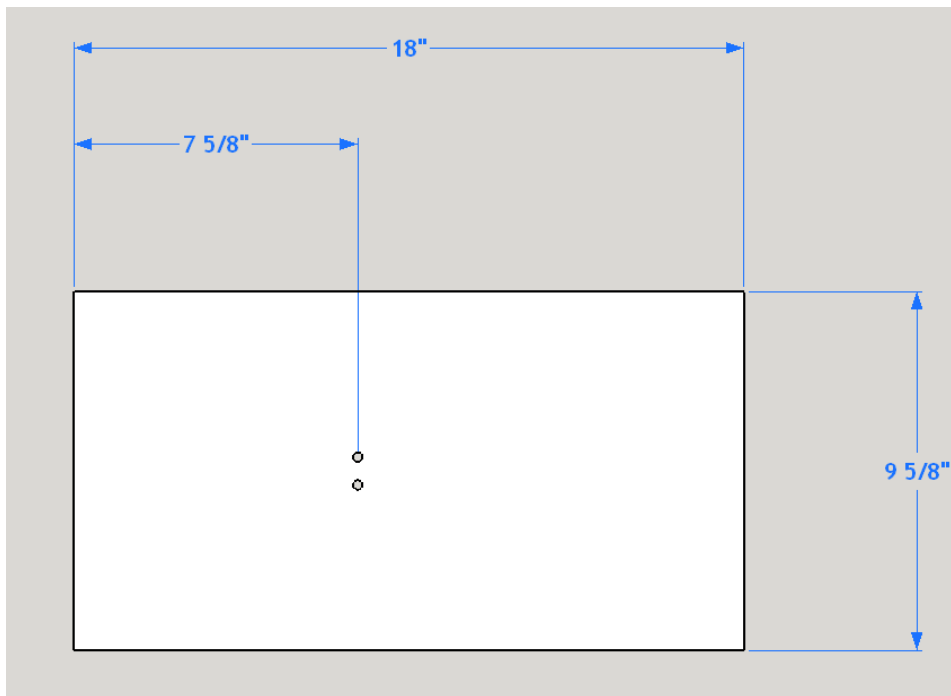
Dimensions for 1/4" backer board.



Side Shelf Brace. Again, cutouts not critical if there is substantial opening for air flow. The corner cutout is to allow binding post to sit in center of cabinet.



Dimensions for top/bottom (left) and bracing (right)



Dimension for back of speaker, note binding posts set at $\frac{3}{4}$ " center to center spacing. Hole diameter will vary with binding post

Cut list (per speaker)

1x 18", 9 5/8" (Back)

2x 12 3/4", 11 1/8" (Top/Bottom)

2x 12 3/4", 18" (Sides)

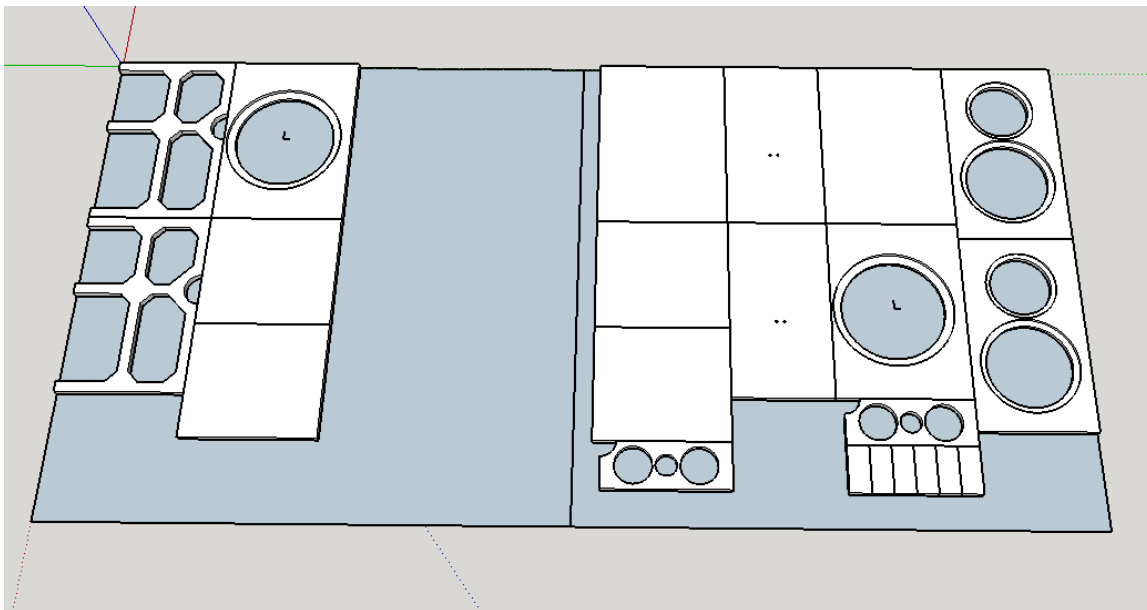
1x 19 1/2", 11 1/8" (Front)

1x 12", 18" (Brace)

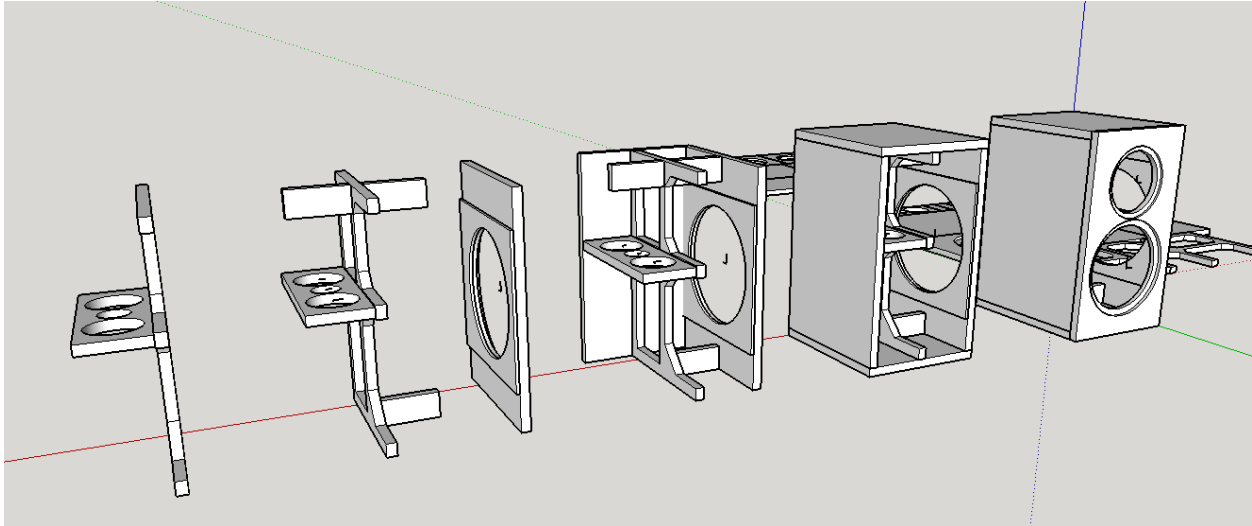
1x 12", 4 7/16" (Brace)

3x 2", 4 7/16" (Brace)

1x 12 3/4", 12" 1/4" thick material for Passive Radiator baffle

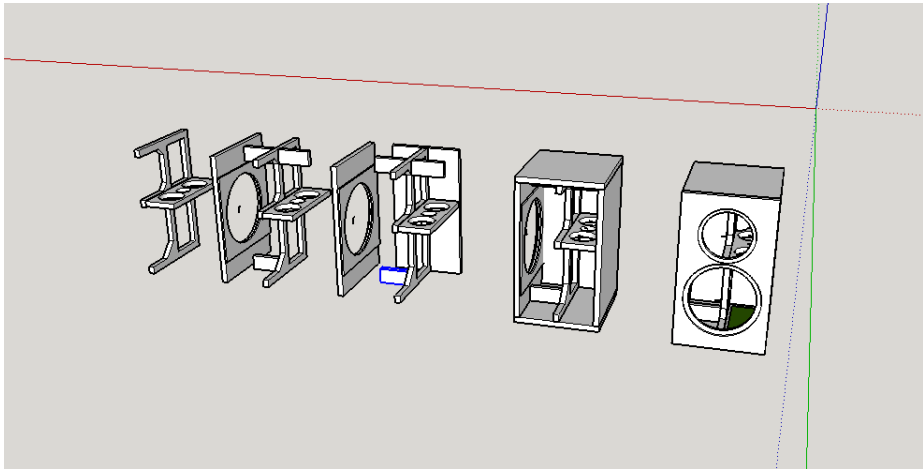


Recommended cut configuration for 48"x96"x.75" material. Note, if material isn't .75" dimensions will have to be adjusted to keep external dimensions the same. There is substantial material left over for constructing stands or, another small pair of bookshelf speakers.

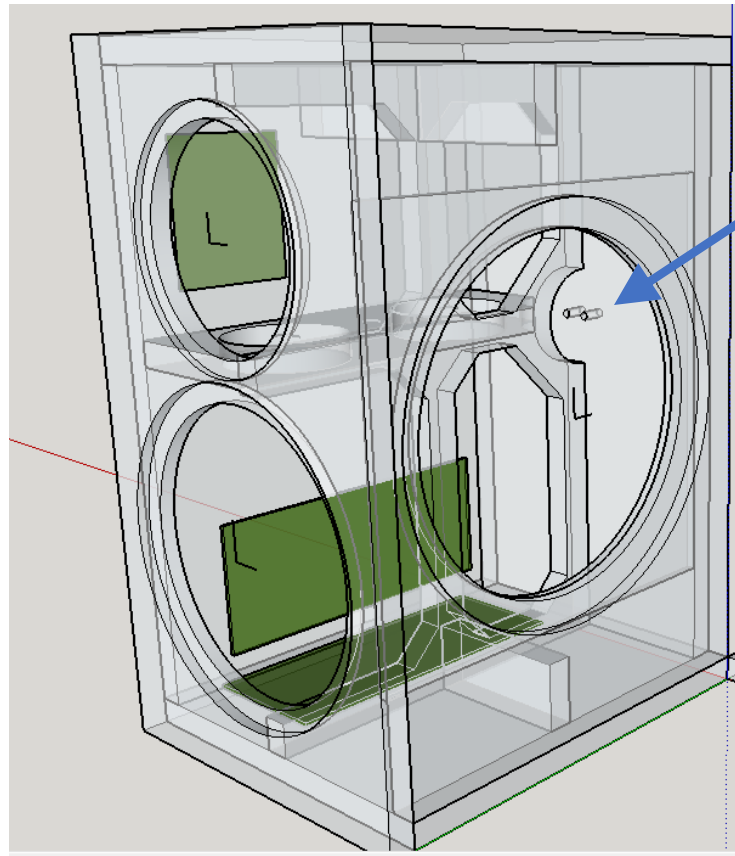


Suggested order of assembly: Starting with the braces, assemble the internal sub-structure of the speaker. Care must be made that the smaller bracing pieces are glued square, and tight with the vertical window brace, a thick glue-line may cause issues with the alignment of the back/front.

Note the passive radiator baffle backer board misses the two smaller brace pieces, again why the exact shape of the backer board isn't critical, it just needs to back up the mounting flange of the passive radiator. Given the relatively small size of the speaker the challenge of the bracing is that one side can't be included. The passive radiator (PR) hole prevents that side from being easily tied in with two shelf braces. Other bracing schemes are possible, this is a suggestion that allows for the crossovers to be installed in an area easily reachable through the woofer/tweeter and PR holes. By flipping the brace structure, and side baffles the speaker can be made in a mirror image pair.



Mirrored Assembly.



Notches in braces to allow for binding posts....

Note the possible mounting locations for crossover components (green PCB outlines) and that the cutouts in the bracing allow for the binding posts to be centered in the cabinet back. If you don't want to make those cuts the binding posts can be installed off center.