

# **BLUE LIGHT INCUBATOR PROTOTYPE**

**BLUE ANGELS**

# **Manufacturing Instructions**

**GT SENIOR DESIGN SPRING 2020**

# **Disclaimer/Warnings**

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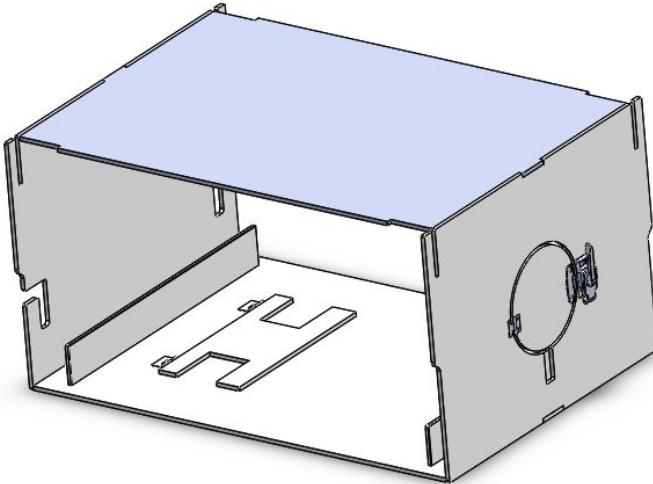
- This Prototype Has Not Yet Been Approved For Human Use.
- If a laser cutter is not available:
  - Engineering drawings can be used to make each part.
  - All corners and edges must be sanded smooth

# Table of Contents:

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- Hood Shell Assembly – Pg 1
- Door Assembly – Pg 15
- Mattress Tray Assembly – Pg 23
- Monitor Assembly – Pg 36
- Base Frame Assembly – Pg 45
- Air Duct Assembly – Pg 57

# Hood Shell Assembly



## Materials:

- acrylic glue
- Acrylic sheets (see table below)

| Hood Assembly             |               |               |              |              |
|---------------------------|---------------|---------------|--------------|--------------|
| Part                      | Actual Length | Actual Height | Sheet Length | Sheet Height |
| Top Plate                 | 71.75 cm      | 48.3 cm       | 72.25 cm     | 48.75cm      |
| Foot Plate                | 38 cm         | 52 cm         | 38.5 cm      | 52.5 cm      |
| Head Plate                | 38 cm         | 52 cm         | 38.5 cm      | 52.5 cm      |
| Base Plate                | 71.75 cm      | 49.75 cm      | 72.25 cm     | 50.25 cm     |
| Mattress Stoppers<br>(X2) | 45 cm         | 6 cm          | 45.5 cm      | 6.5 cm       |
| Tray Stand                | 24 cm         | 12 cm         | 24.5 cm      | 12.5 cm      |

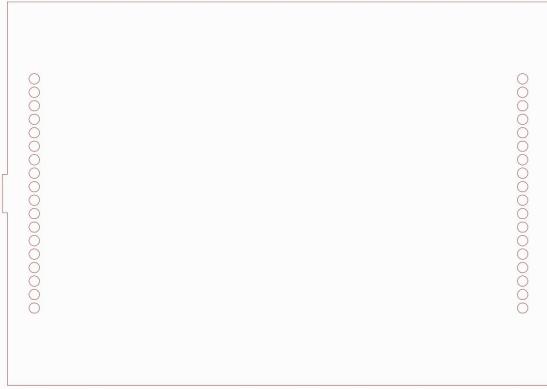
- 16 bolts and nuts for (lengths depend on component)
  - 1 small steel hinges
  - 1 locking mechanism
  - 2 acrylic hinges
  - 2 90 degree brackets

## Step: Cut Out Base Plate

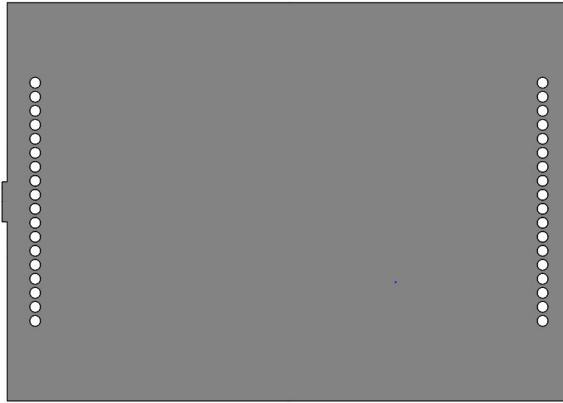
### Part/Files:

- Bottom plate SVG

1. Place acrylic sheet for the base plate in laser cutter
2. Set up bottom plate SVG on laser cutter
3. Cut base plate
4. Sand any pointed edges



Ask for real image

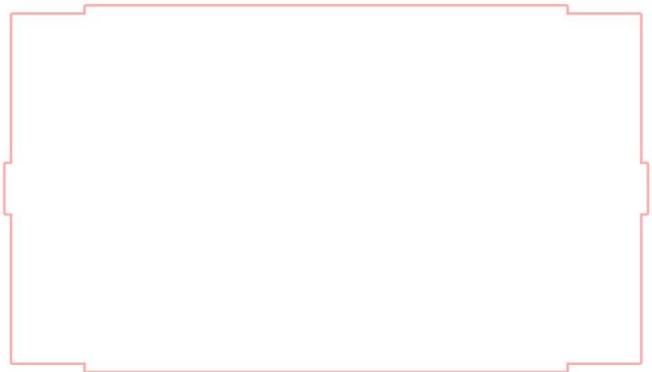


## Step: Cut Out Top Plate

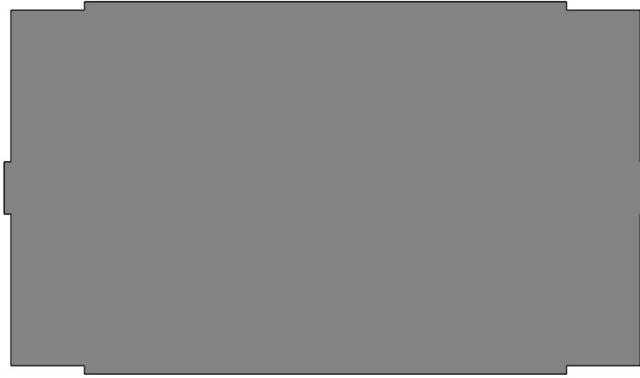
Part/Files:

- Top plate SVG

1. Place acrylic sheet for the top plate in laser cutter
2. Set up top plate SVG on laser cutter
3. Cut top plate
4. Sand any pointed edges



Ask for real image

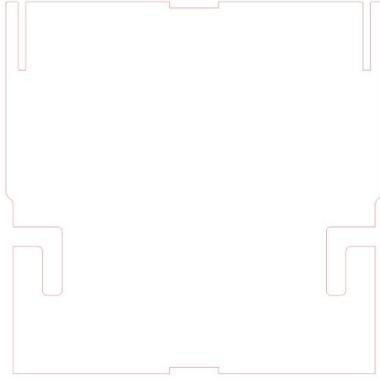


Step: Cut Out Short Head Side Plate

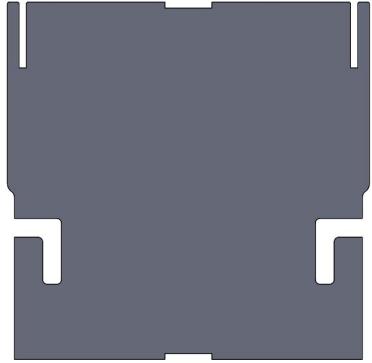
Part/Files:

- short head side SVG

1. Place acrylic sheet for the head side in laser cutter
2. Set up short head side plate SVG on laser cutter
3. Cut short head side plate
4. Sand any pointed edges



Ask for real image



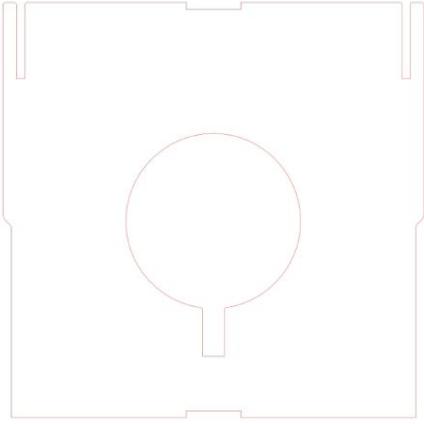
Step: Cut Out Short Feet Side

Plate

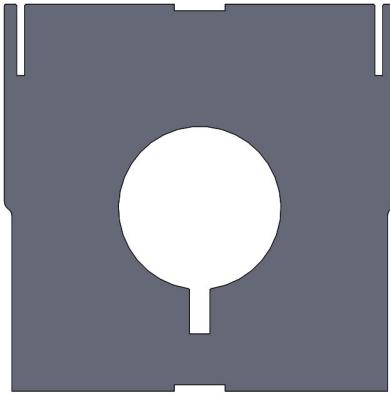
Part/Files:

- short feet side SVG

1. Place acrylic sheet for the feet side in laser cutter
2. Set up short feet side plate SVG on laser cutter
3. Cut short feet side plate
4. Sand any pointed edges
5. Save inner circles for the doors



Ask for real image

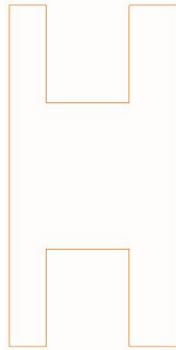


Step: Cut Tray Stand

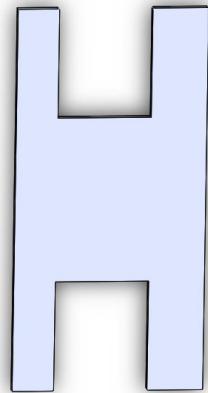
Part/Files:

- Tray Stand SVG

1. Place acrylic sheet for the tray stand in laser cutter
2. Set up tray stand SVG on laser cutter
3. Cut tray stand plate
4. Sand any pointed edges

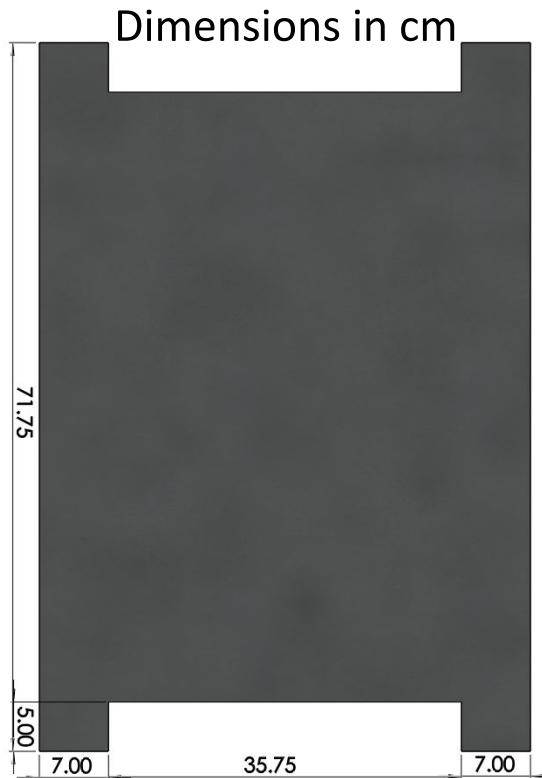
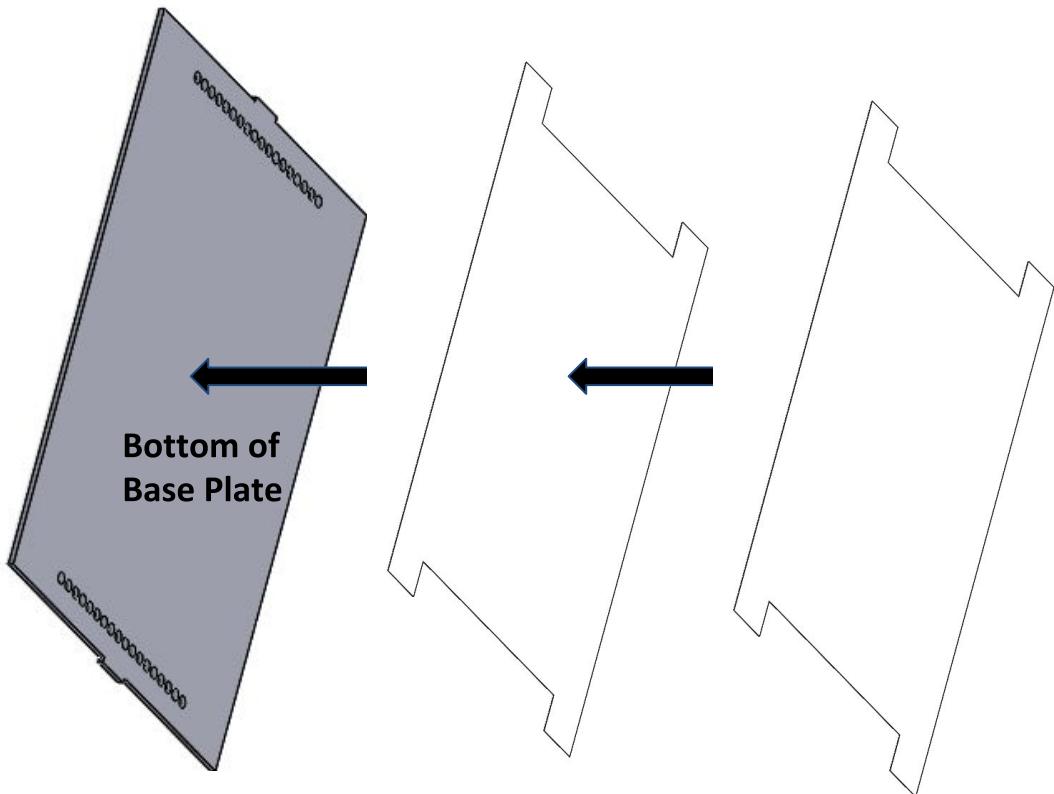


Ask for real image



Step: Attach Insulation and metal piece to Base plate

1. Cut a piece of aluminum sheet metal and neoprene insulation to the dimensions shown.
  1. Center the metal piece on to the bottom of the base plate.
  2. Center the neoprene rubber onto the metal piece. Make sure none of the holes are covered.
  3. Use self tapping screws to attach three layers together along the long edge.

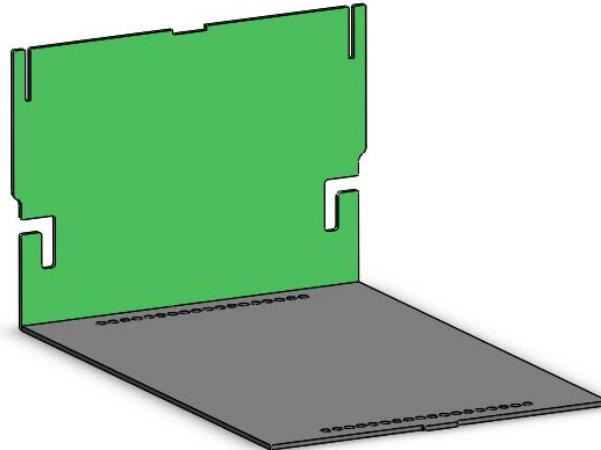


Step: Attach Short Head Side Plate To Base Plate

Part/Files:

- short head side
- Base Plate

1. Align the short head side plate (green) with base plate slot (gray)
2. Secure with acetone glue
3. Allow three days to harden



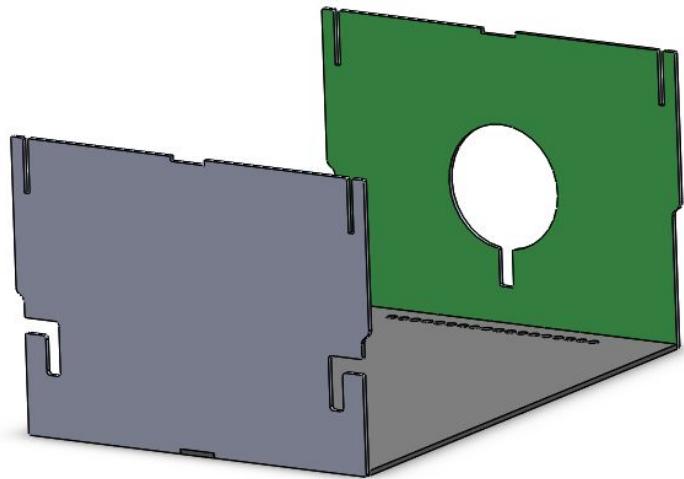
Ask for real image

Step: Attach Short Feet Side Plate To Base Plate assembly

Part/Files:

- short feet side
- base plate assembly

1. Align the short feet side plate (green) with base plate slot (gray)
2. Secure with acetone glue
3. Allow three days to harden



Ask for real image

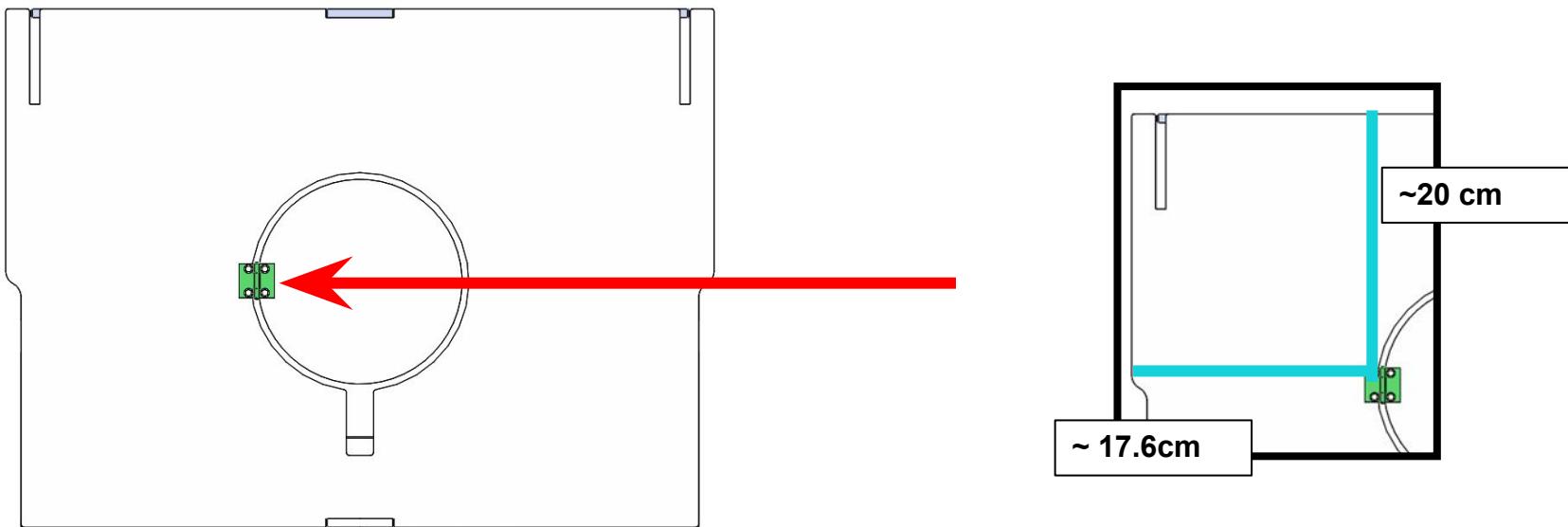
## Step: Hand Door To End Plate

### Part/Files:

- base plate assembly
- hand door
- small metal hinge

1. Align hinge on door with approximate dimensions below
2. Center hinge approximately 20 cm from the top
3. Center hinge approximately 17.6 cm from the side, adjust until tangent to the circular edge
4. Mark and drill holes
5. Insert bolts from opposite side
6. Center and attach hand door with bolts

Ask for real image

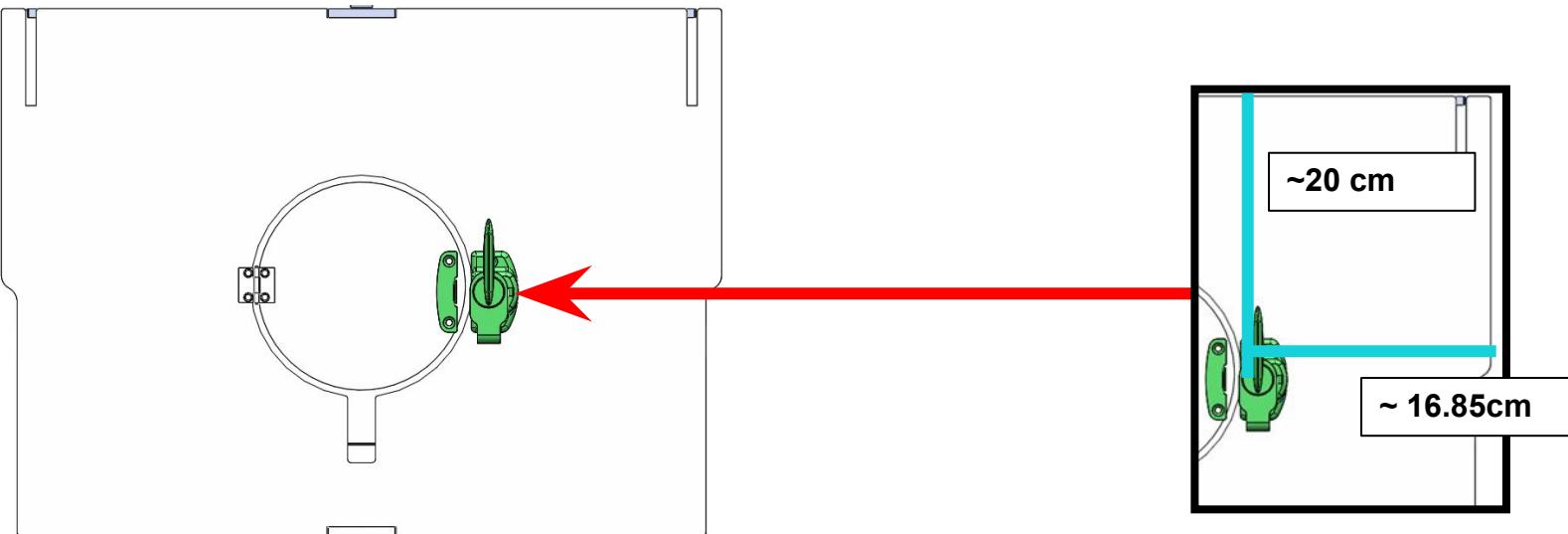


Step: Hand Door Lock To End  
Plate Part/Files:

- base plate assembly
- locking mechanism

1. Set lock on door with approximate dimensions below
2. Center Lock approximately 16.85 cm from the top
3. Adjust lock attachment until tangent to the circular edge align with latch
4. Mark and drill holes
5. Insert bolts from opposite side

Ask for real image

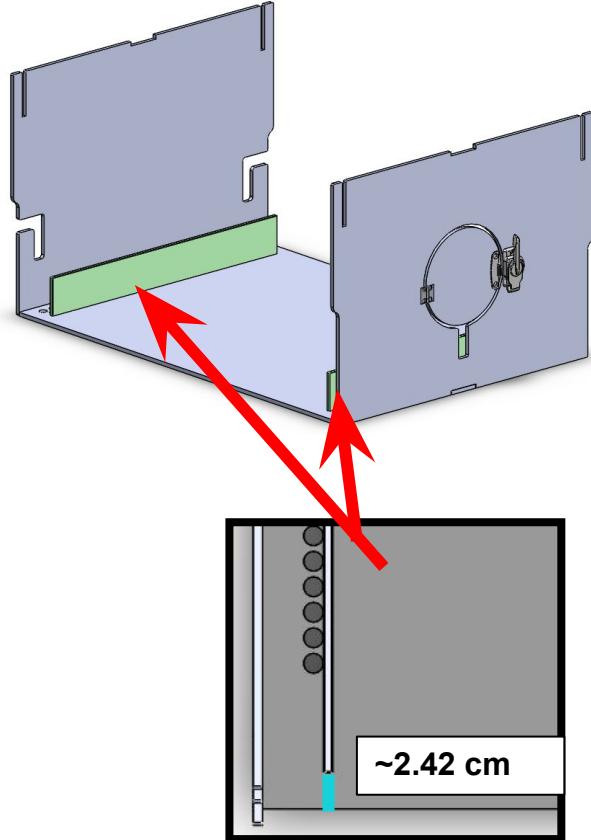


Step: Attach Mattress Stoppers  
to Base Plate assembly

Part/Files:

- Mattress Stoppers
- Base plate assembly

1. Align the Mattress Stoppers (green) with base plate slot (gray)
2. Center Mattress stopper on base plate approximately 2.42 cm from the side and tangent to the circular air vents as shown
3. Secure with acetone glue
4. Allow three days to harden



Ask for real image

## Step: Attach Hinges To Tray Stand

### Part/Files:

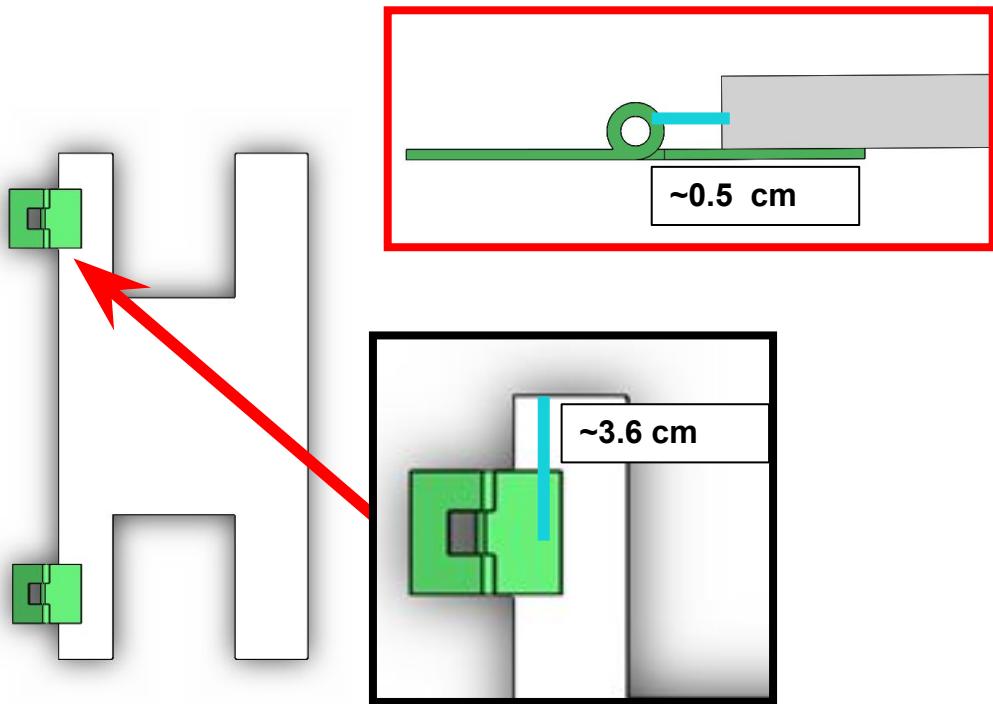
- Stand plate
- Two Acrylic Hinges

1. Align acrylic hinges on edge, as shown, centered approximately 3.6 cm from edge

2. Ensure there is room for the hinge to rotate properly (with hinge loop as shown in red image), with 0.5 cm between the hinge and the

3. Secure with acetone glue

3. Allow three days to harden



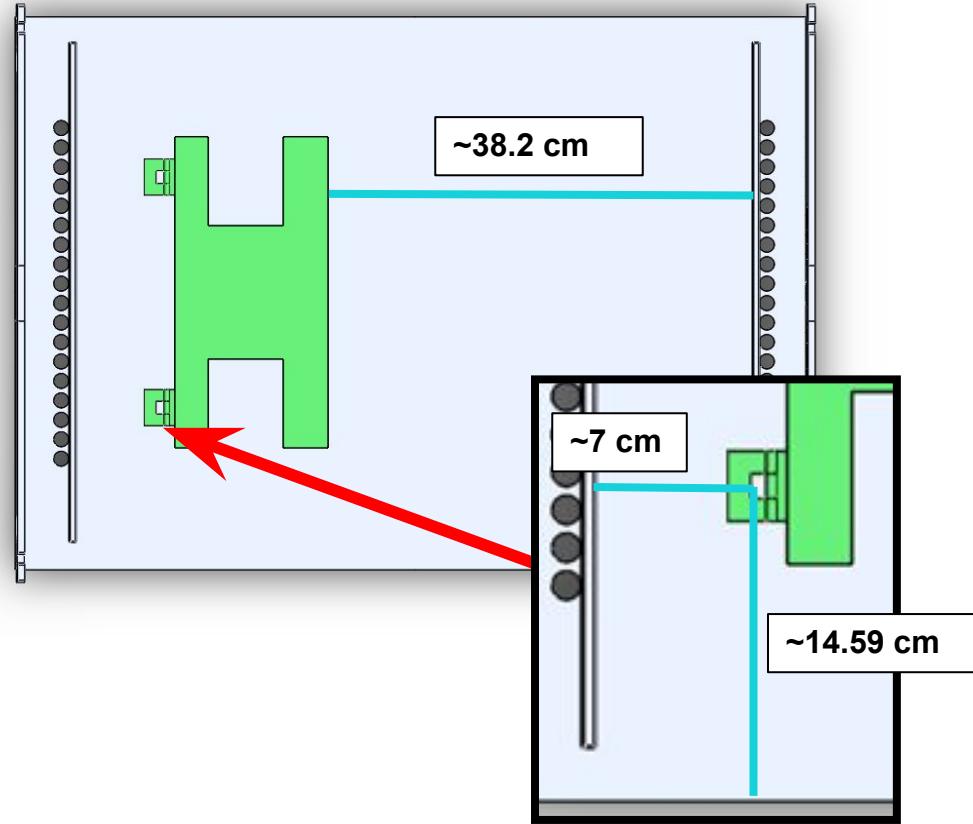
Ask for real image

## Step: Attach Mattress Stand

### Part/Files:

- Stand assembly
- Hood base assembly

1. Align acrylic hinges on edge, as shown, centered approximately 7 cm from edge mattress stopper and 14.59 cm from edge
2. Ensure there is room for the hinge to rotate properly (hinge should lay flat when in down position)
3. Secure with acetone glue
3. Allow three days to harden



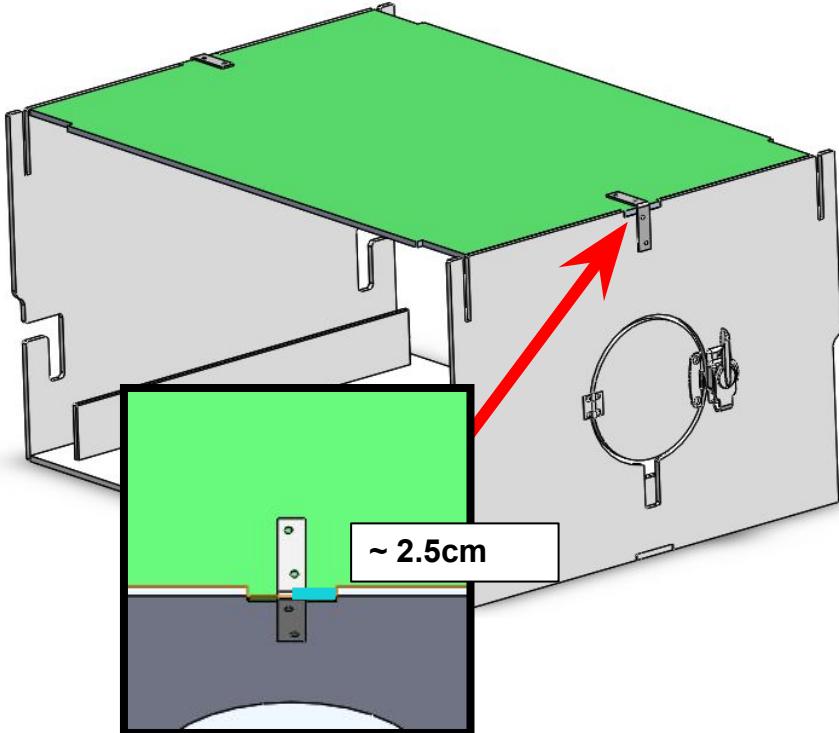
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Step: Attach Top Plate  
To Base Plate assembly

Part/Files:

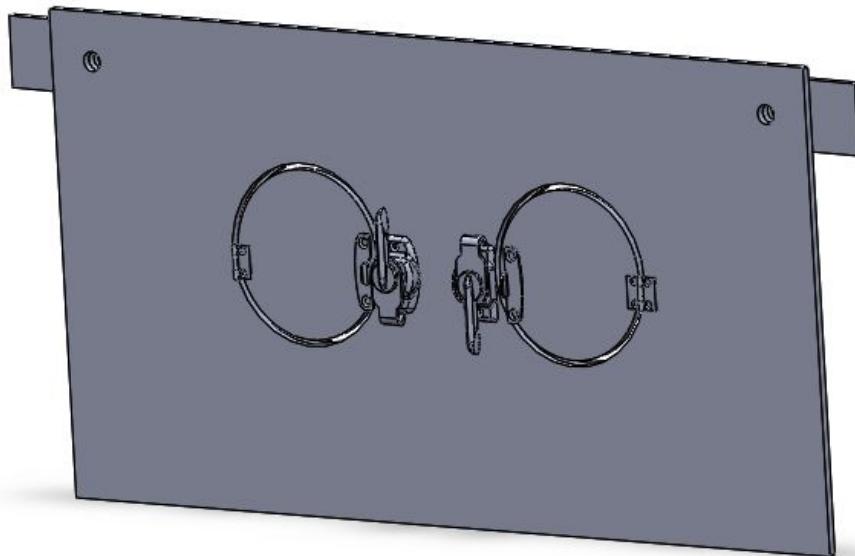
- Hood base assembly
- Top plate
- Two 90 degree brackets

1. Align the Top Plate(green) with the slotted side plates in the assembly (gray)
2. Secure with L-brackets centered 2.5 cm from edge of the tab, shown below.



Ask for real image

# Door Assembly



## Materials:

- acrylic glue
- Acrylic sheets (see table below)

| Door Assembly       |               |               |              |              |
|---------------------|---------------|---------------|--------------|--------------|
| Part                | Actual Length | Actual Height | Sheet Length | Sheet Height |
| Exterior Door (X2)  | 70.48 cm      | 37.3 cm       | 71 cm        | 37.75 cm     |
| Interior Plate (X2) | 66 cm         | 33 cm         | 66.5 cm      | 33.5 cm      |
| Lock pieces (X4)    | 10 cm         | 5.5 cm        | 10.5 cm      | 6 cm         |
| Connector (X4)      | 1.75 cm       | 3.25 cm       | 2 cm         | 3.5 cm       |

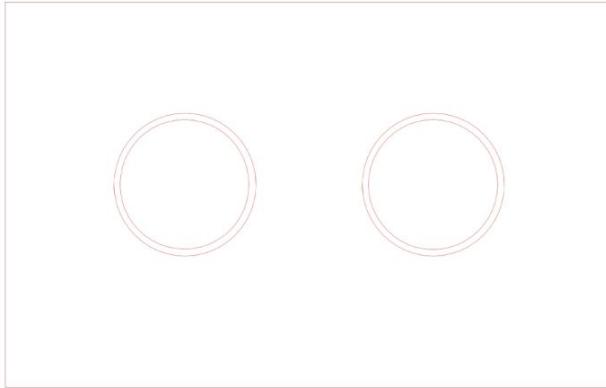
- 16 bolts and nuts for (lengths depend on component)
  - 1 small steel hinges
  - 2 acrylic hinges
  - 2 pins for locking mechanism

Step: Cut out **TWO** Long Edge Plates and Hand Doors  
(Exterior Door)

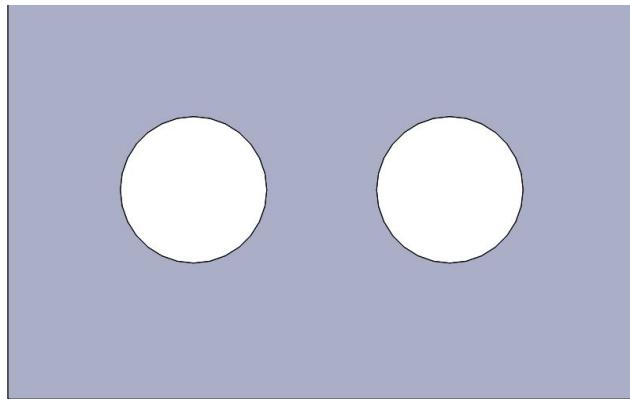
Part/Files:

- Long Edge SVG

1. Place acrylic sheet for the exterior door in laser cutter
2. Set up long edge plate SVG on laser cutter
3. Cut long edge plate
4. Sand any pointed edges
5. Save inner circles for the doors



Ask for real image

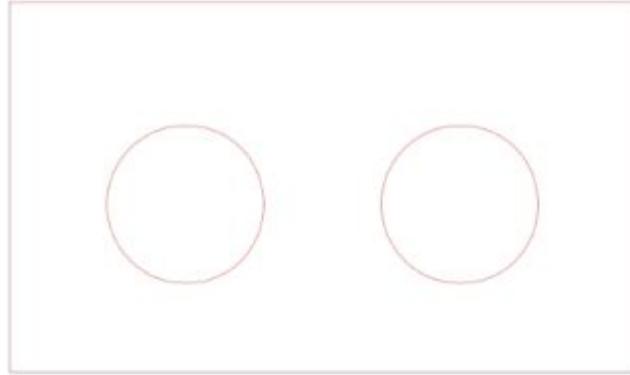


Step: Cut out **TWO** Inner Long Edge and Hand Doors (Interior Door)

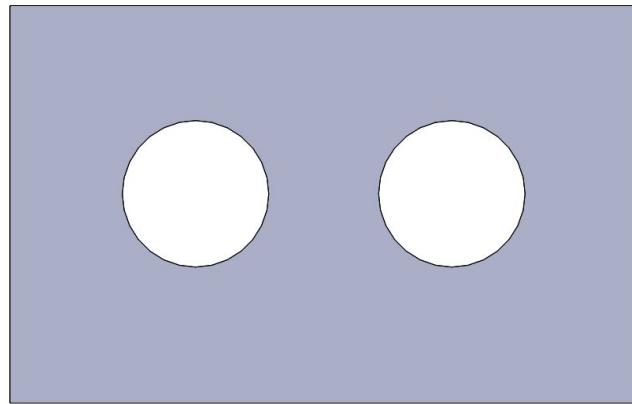
Part/Files:

- Inner Long Edge SVG

1. Place acrylic sheet for the interior door in laser cutter
2. Set up inner long edge plate SVG on laser cutter
3. Cut inner long edge plate
4. Sand any pointed edges
5. Save inner circles for later use



Ask for real image



## Step: Cut Out Connector (X4)

Part/Files:

- SVG

1. Place acrylic sheet for the connector in laser cutter
2. Set up connector plate SVG on laser cutter
3. Cut FOUR connector plate
4. Sand any pointed edges



Ask for real image

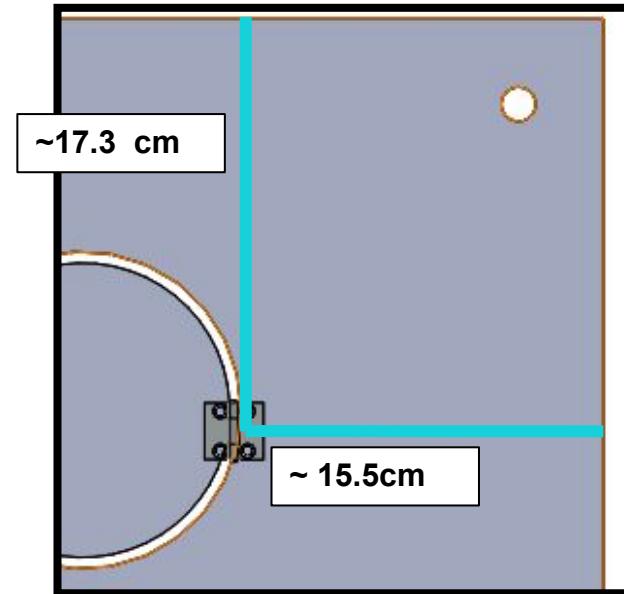
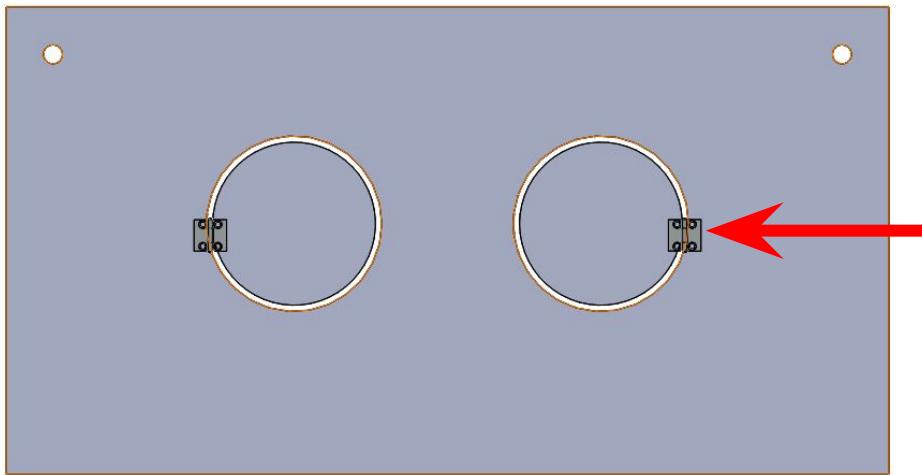


Step: Attach TWO hand doors on each long edge plate (exterior plate)

Part/Files:

- Two hinges
- Four doors
- Two long edge plate
- 16 nuts and bolts

1. Set hinge on door with approximate dimensions below
2. Center hinge approximately 17.3 cm from the top
3. Center hinge approximately 15.6 cm from the side, adjust until tangent to the circular edge
4. Mark and drill holes
5. Insert bolts from opposite side
6. Center and attach hand door with bolts

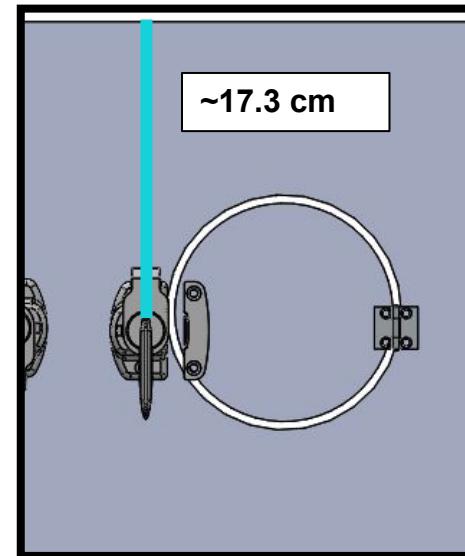
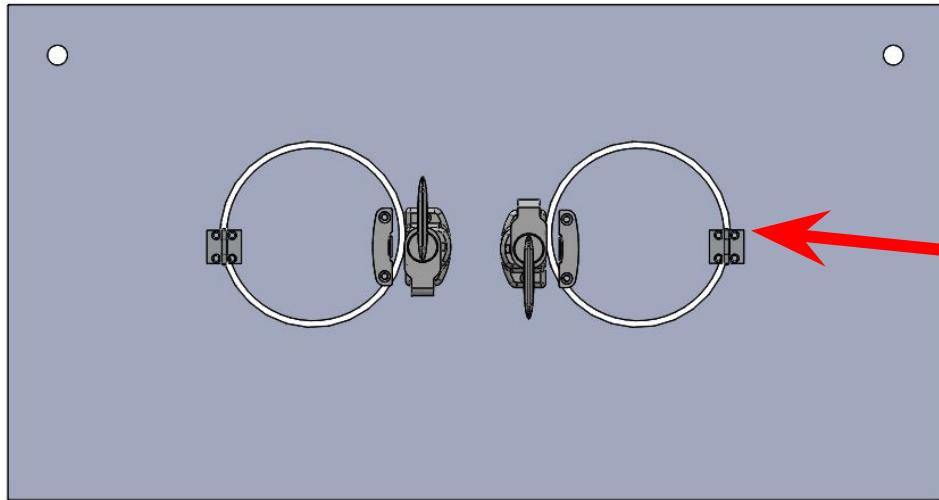


Step: Attach TWO hand doors on each long edge plate (interior plate)

Part/Files:

- four locks
- two long edge plate assemblies
- 16 nuts and bolts

1. Set lock on door with approximate dimensions below
2. Center Lock approximately 17.3 cm from the top
3. Adjust lock attachment until tangent to the circular edge align with latch
4. Mark and drill holes
5. Insert bolts from opposite side

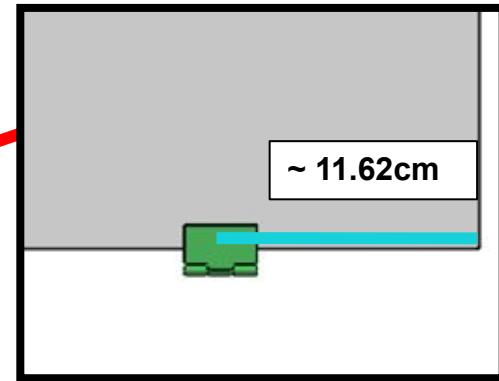
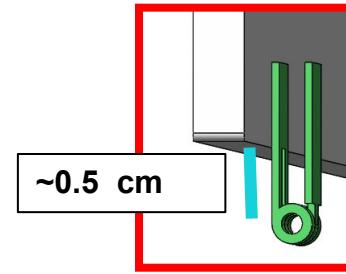
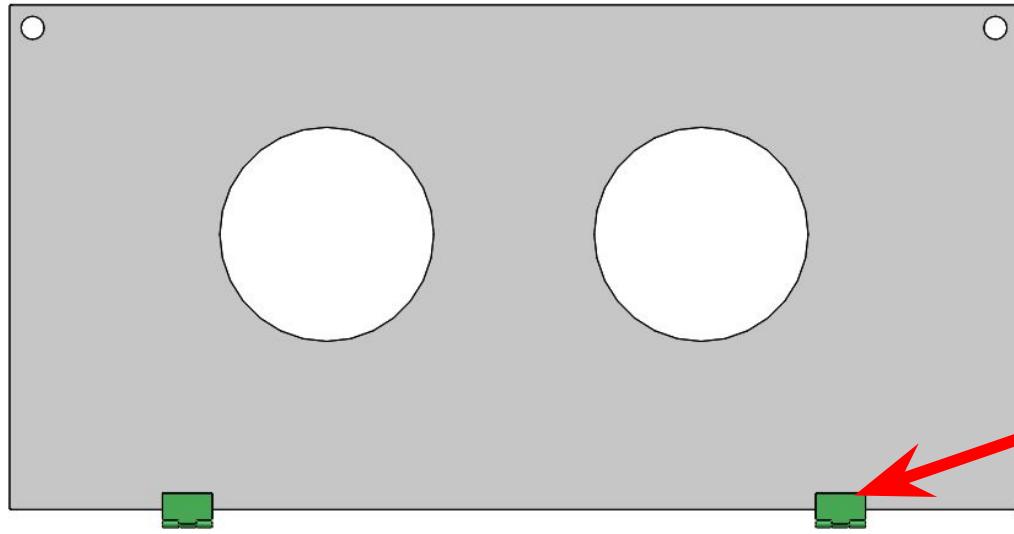


Step: Attach TWO hinges on short edge plate edge plate

Part/Files:

- Short edge (interior plate)
- Two hinges

1. Align acrylic hinges on edge, as shown, centered approximately 11.62 cm from the long edge farther from the holes
2. Ensure there is room for the hinge to rotate properly (with hinge loop as shown in red image)
3. Secure with acetone glue
3. Allow three days to harden

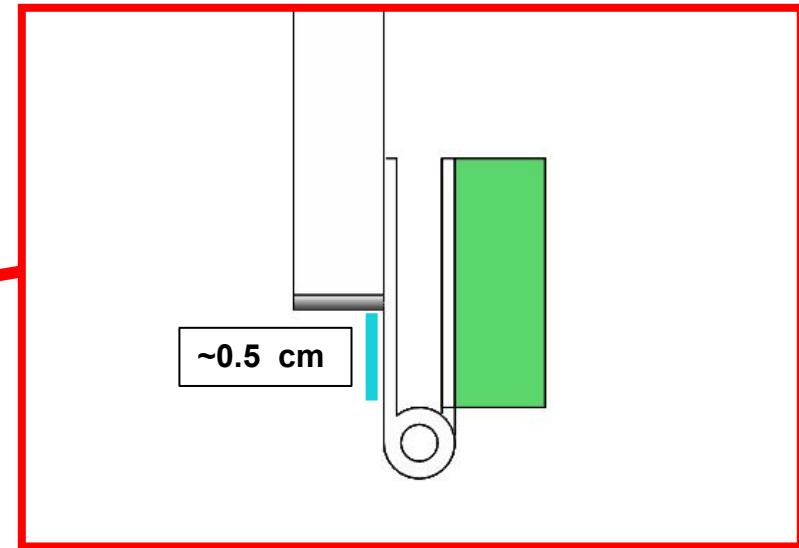
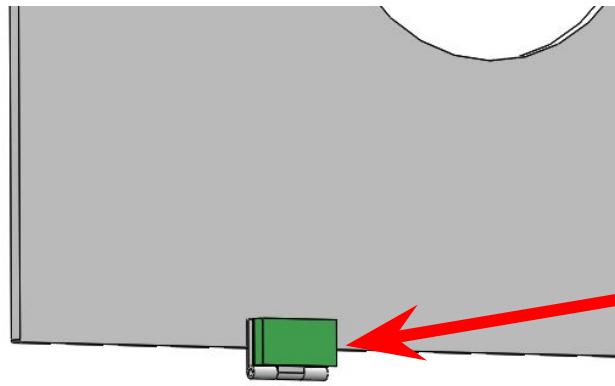


Step: Attach connectors To  
Each hinge

Part/Files:

- Short edge (interior plate)  
assembly
- Two connectors

1. Align connectors
2. Ensure there is room for the hinge to rotate properly  
(with hinge loop as shown in red image)
3. Secure with acetone glue
4. Allow three days to harden

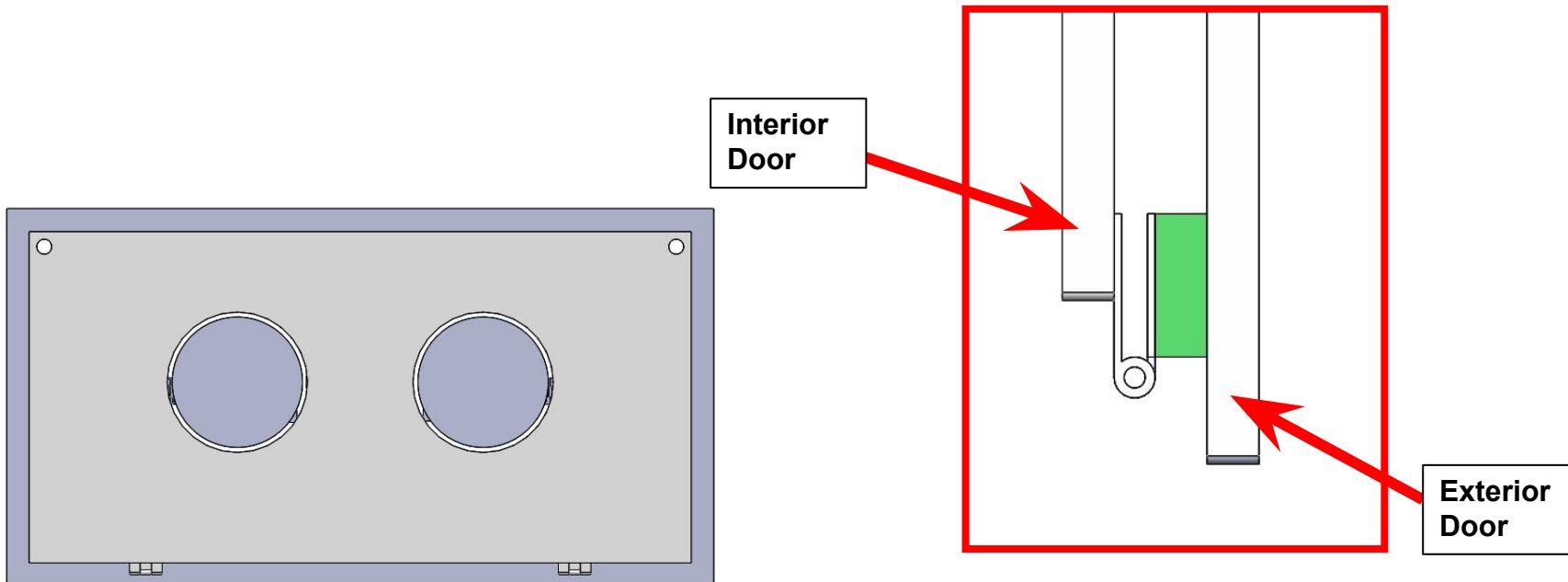


Step: Attach Interior Door to  
Exterior Door

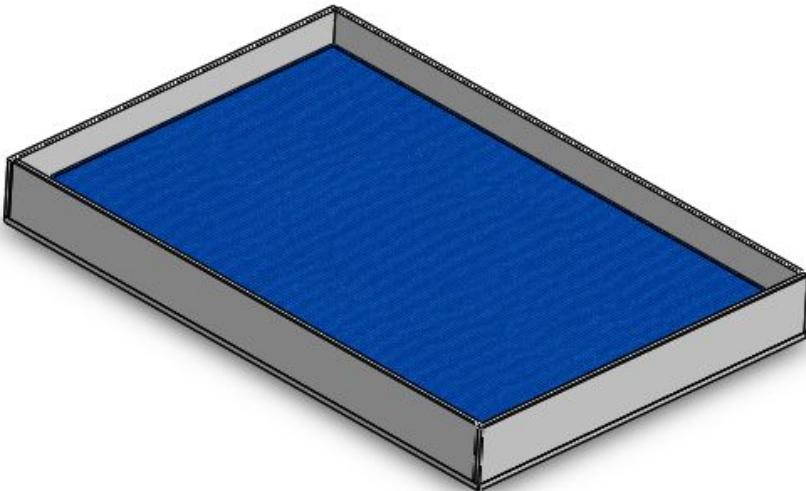
Part/Files:

- Interior

1. Align holes as shown
2. Ensure there is room for the hinge to rotate properly (with hinge loop as shown in red image)
3. Secure with acetone glue
4. Allow three days to harden



# Tray Assembly



## Materials:

- acrylic glue
- Acrylic sheets (see table below)

| Tray Assembly                 |               |               |              |              |
|-------------------------------|---------------|---------------|--------------|--------------|
| Part                          | Actual Length | Actual Height | Sheet Length | Sheet Height |
| Mattress Tray Base            | 60.5 cm       | 41.25 cm      | 61 cm        | 41.75 cm     |
| Mattress Tray Long Side (X2)  | 59.25 cm      | 6 cm          | 59.75 cm     | 6.5 cm       |
| Mattress Tray Short Side (X2) | 41 cm         | 6 cm          | 41.5 cm      | 6.5 cm       |
| Connector (X8)                | 1.75 cm       | 3.25 cm       | 2 cm         | 3.5 cm       |

Step: Cut Out Mattress Tray

Base Plate

Part/Files:

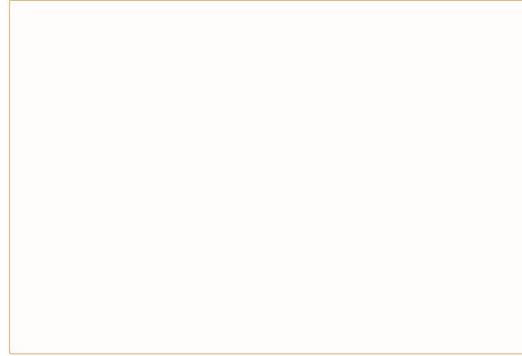
- SVG

1. Place acrylic sheet in laser cutter

2. Set up mattress tray base plate SVG on laser cutter

3. Cut mattress tray base plate

4. Sand any pointed edges



Ask for real image



Step: Cut Out Mattress Tray

Long Side Plate (X2)

Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up mattress tray long plate SVG on laser cutter
3. Cut TWO mattress tray long plate
4. Sand any pointed edges



Ask for real image



Step: Cut Out Mattress Tray

Short Side Plate (X2)

Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up mattress tray short side plate SVG on laser cutter
3. Cut TWO mattress tray short plate
4. Sand any pointed edges



Ask for real image



Step: Cut Out Mattress Stand  
Slot Plate (X2)

Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up mattress tray slot stand plate SVG on laser cutter
3. Cut TWO mattress tray slot stand plate
4. Sand any pointed edges



Ask for real image



## Step: Cut Out Connector (X8)

Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up connector plate SVG on laser cutter
3. Cut FOUR connector plate
4. Sand any pointed edges



Ask for real image



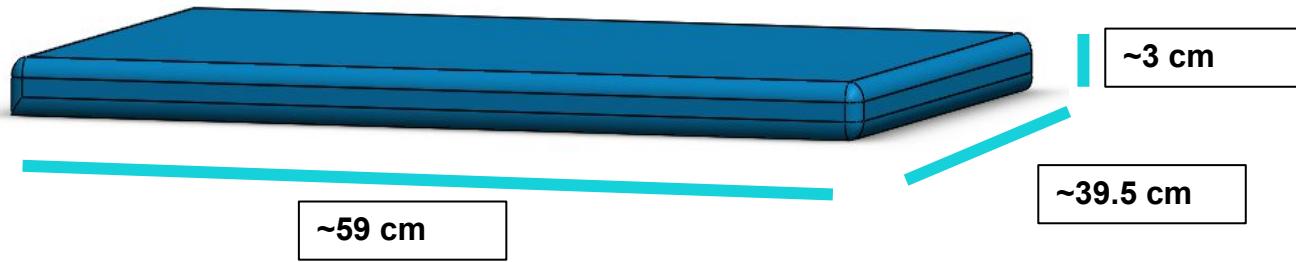
Step: Mattress

Part/Files:

- SVG

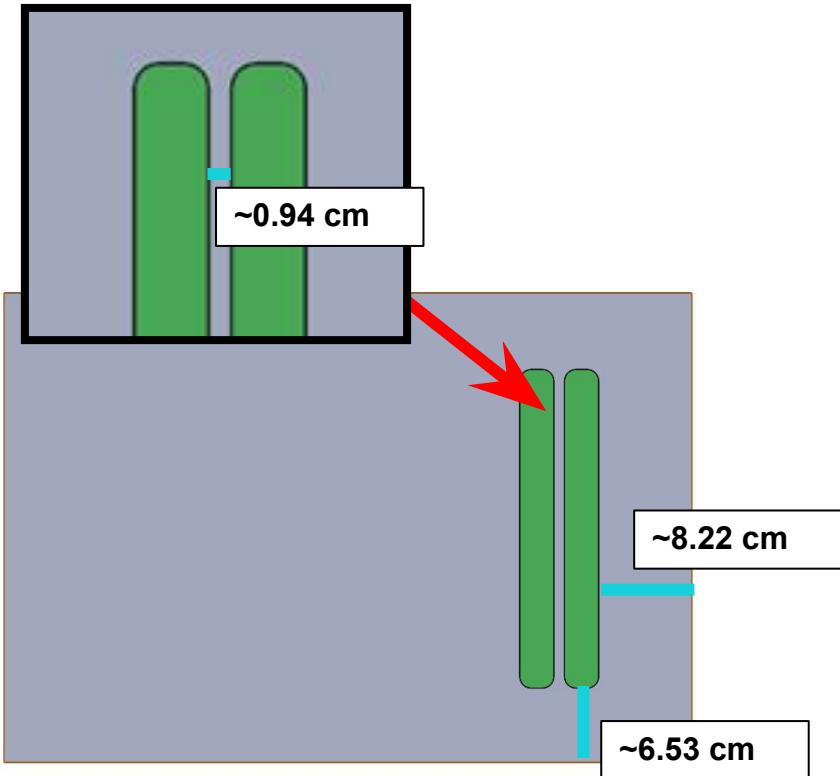
1. Mattress should have dimensions similar to those shown

Ask for real image



Step: Attach Mattress Stand  
Slots to Mattress Tray Base  
Part/Files:

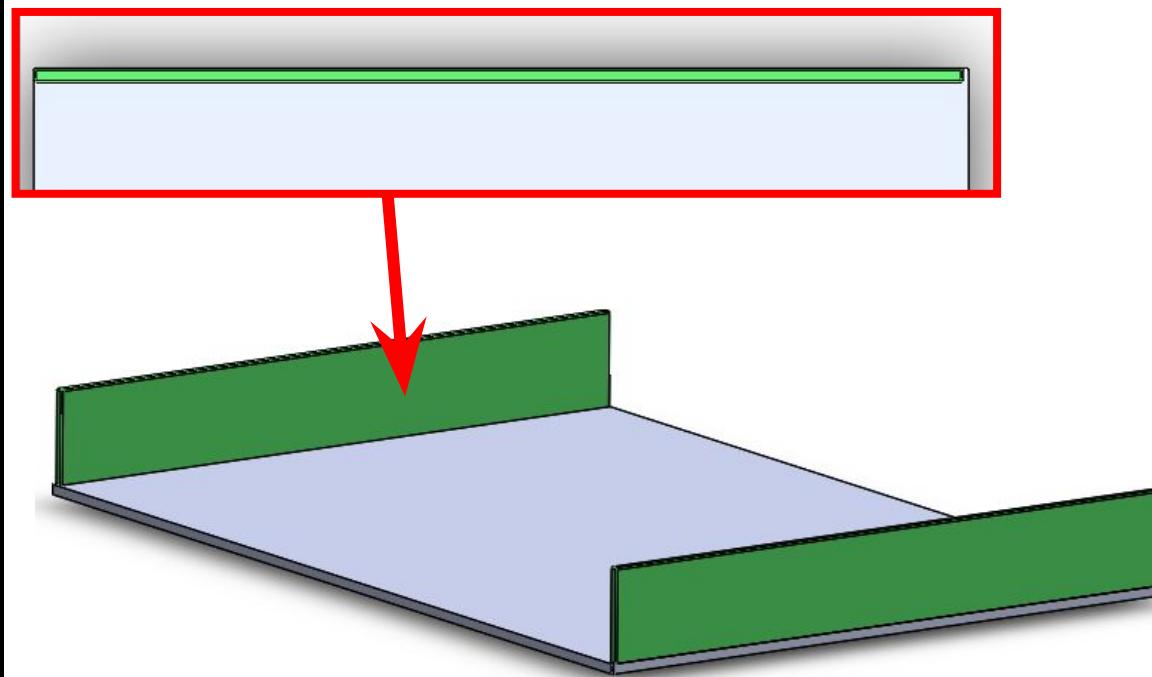
1. Insert Stand slots , as shown, with 0.94 cm between each plate
2. Secure with acetone glue
3. Allow three days to harden



Ask for real image

Step: Attach Mattress Short Side Plates Base  
Part/Files:

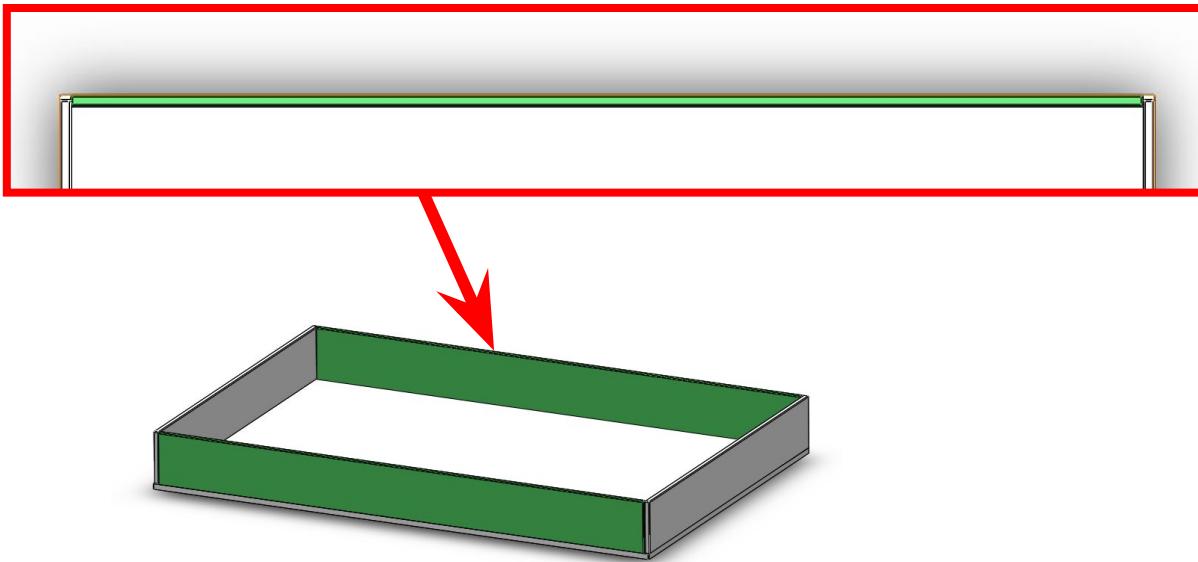
1. Align the short side plate to the short edges of the tray base plate
2. Secure with acetone glue
3. Allow three days to harden



Ask for real image

Step: Attach Mattress long Side  
Plates Base  
Part/Files:

1. Align the long side plate to the long edges of the tray base plate, between the two short end plates
2. Secure with acetone glue
3. Allow three days to harden

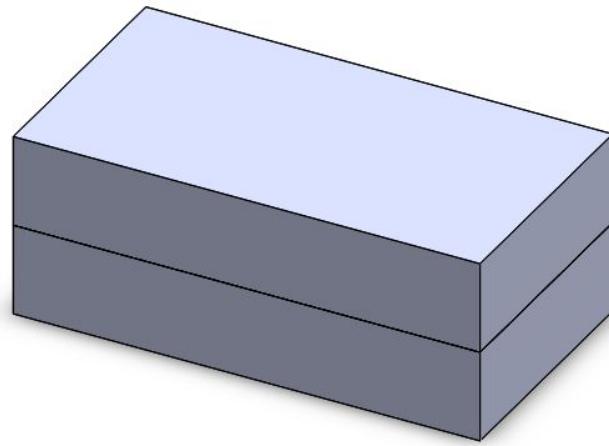


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Step: Glue Together Two Connectors to Create FOUR Double Connectors

Part/Files:

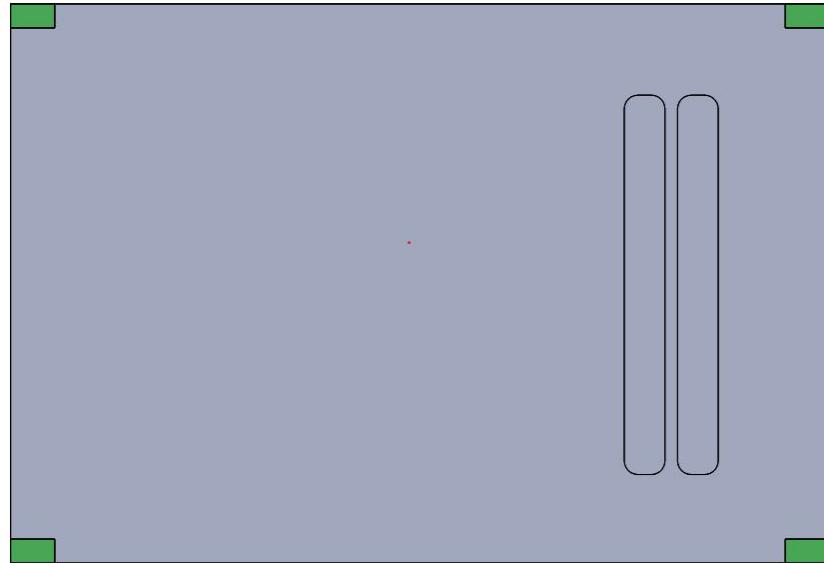
1. Secure with acetone glue
2. Allow three days to harden



Ask for real image

Step: Attach Doubled  
Connectors to Tray Base  
Part/Files:

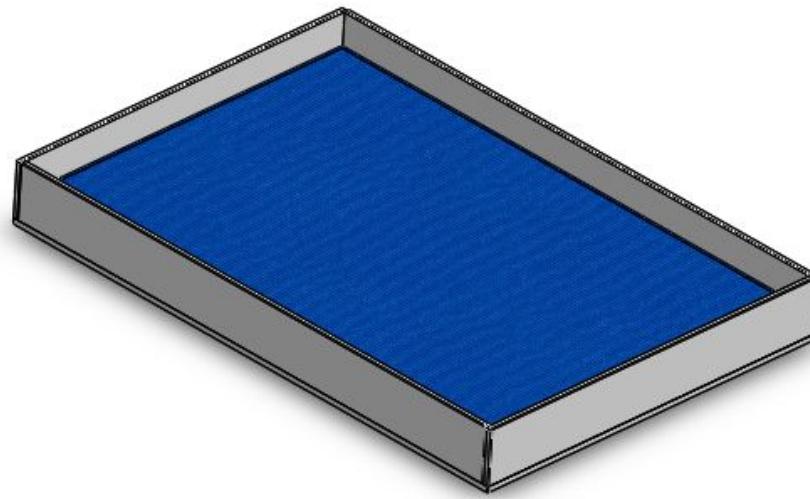
1. Align the the double connectors in the corners as shown below
2. Secure with acetone glue
3. Allow three days to harden



Ask for real image

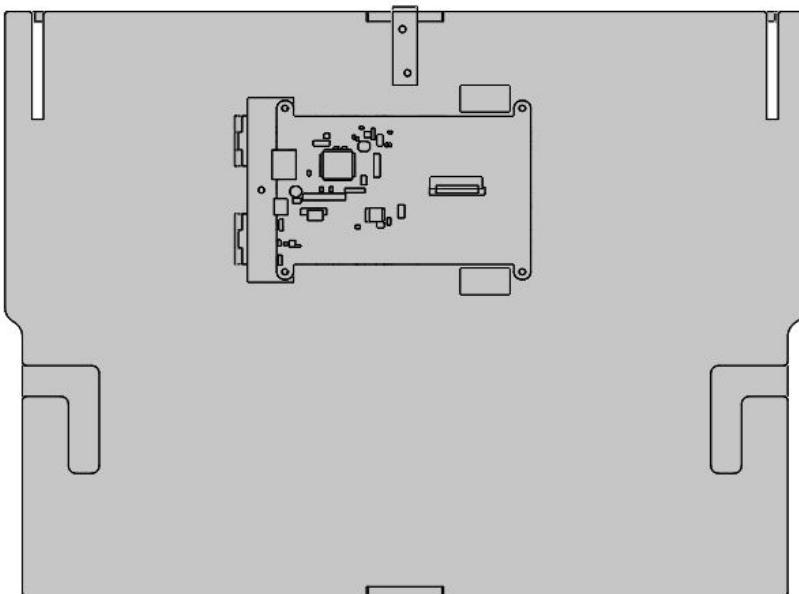
Step: Place Mattress in Tray

Part/Files:



Ask for real image

# Monitor Mount Assembly



## Materials:

- acrylic glue
- Acrylic sheets (see table below)

| Monitor Mount Assembly |               |               |              |              |
|------------------------|---------------|---------------|--------------|--------------|
| Part                   | Actual Length | Actual Height | Sheet Length | Sheet Height |
| Connector (X4)         | 1.75 cm       | 3.25 cm       | 2 cm         | 3.5 cm       |
| Monitor Mount          | 3 cm          | 12 cm         | 3.25 cm      | 12.25 cm     |

- 2 bolts and nuts for (lengths depend on component)
- 2 acrylic hinge

## Step: Cut Out Monitor Mount

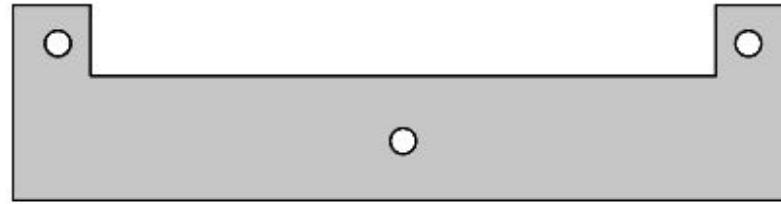
### Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up monitor mount plate SVG on laser cutter
3. Cut monitor mount plate
4. Sand any pointed edges



Ask for real image



## Step: Cut Out Connector (X4)

Part/Files:

- SVG

1. Place acrylic sheet in laser cutter
2. Set up connector plate SVG on laser cutter
3. Cut FOUR connector plate
4. Sand any pointed edges

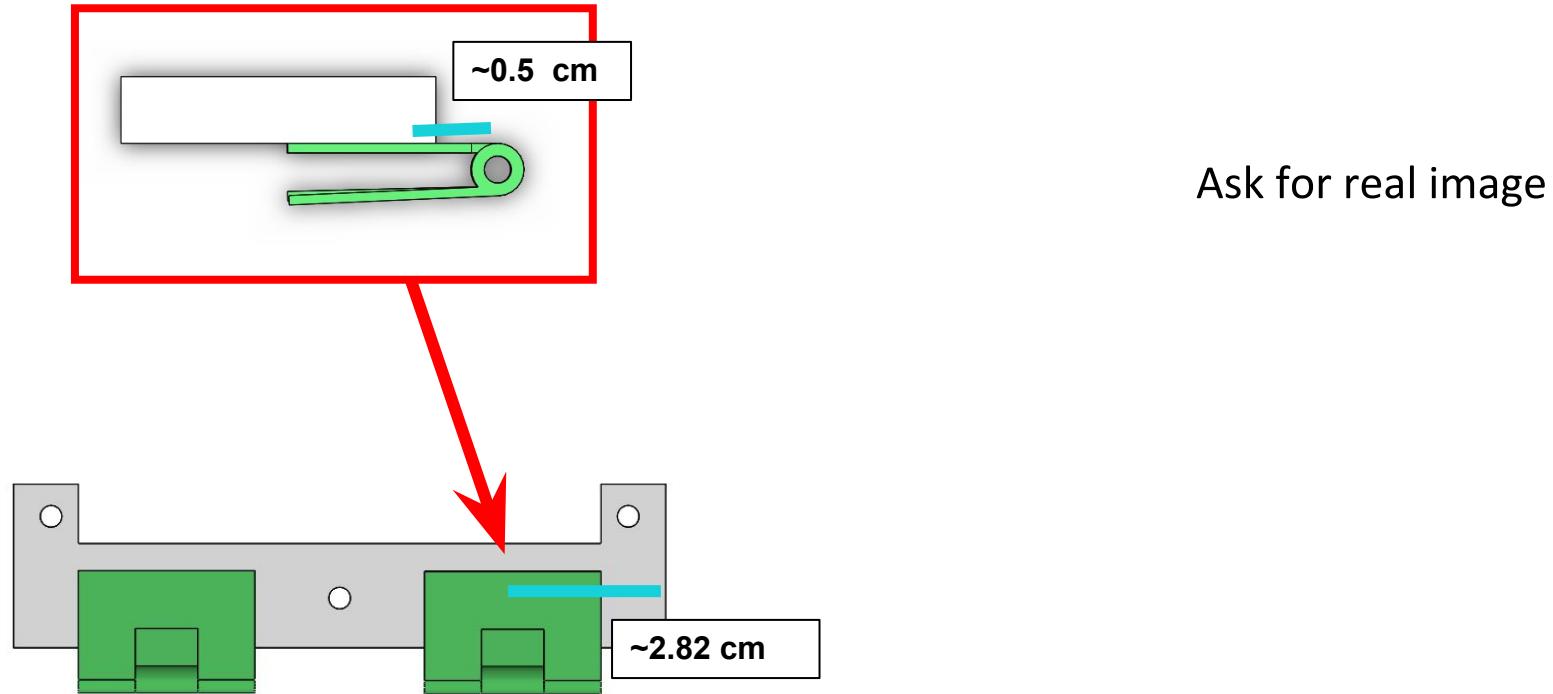


Ask for real image



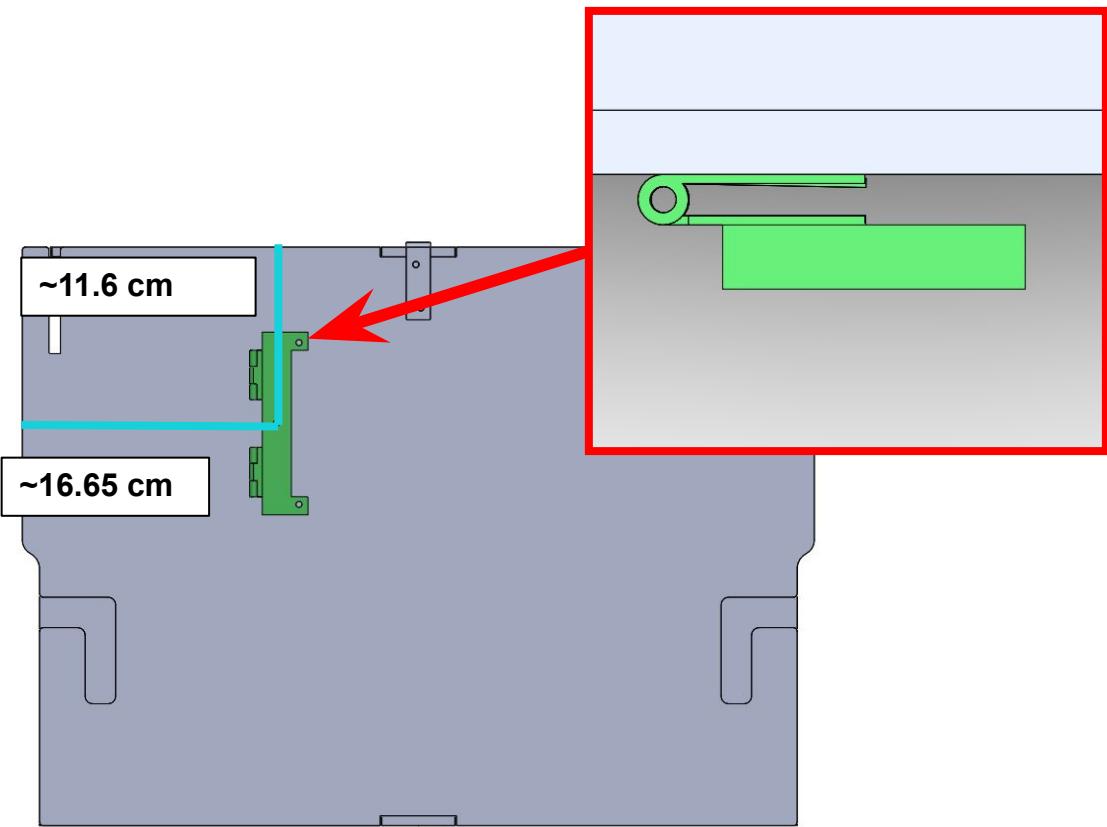
Step: Attach Hinges To Monitor Mount  
Part/Files:

1. Align acrylic hinges on edge, as shown, centered approximately 2.82 cm from edge
2. Ensure there is room for the hinge to rotate properly (with hinge loop as shown in red image)
3. Secure with acetone glue
3. Allow three days to harden



Step: Attach Monitor Mount  
Part/Files:

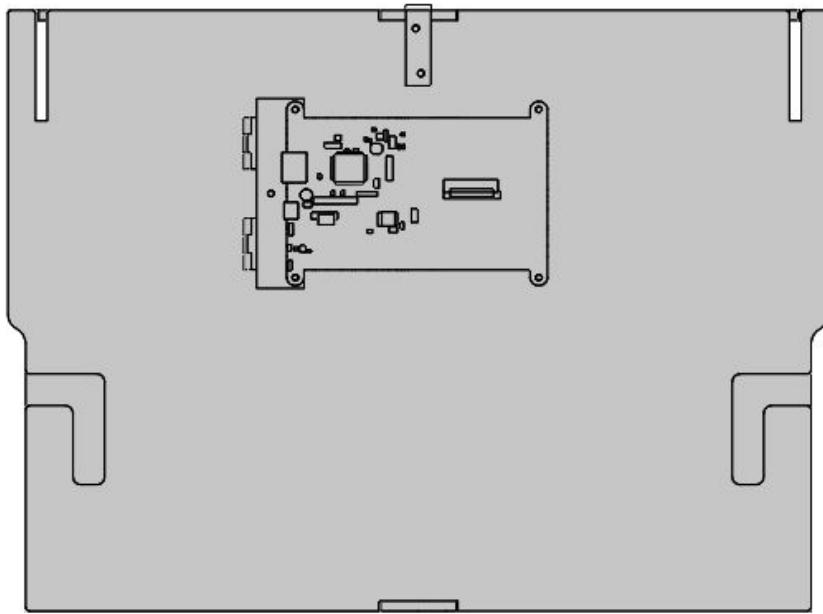
- 1. Align monitor mount, as shown, centered approximately 11.6 cm from top and 16.65 cm from left edge
  2. Ensure there is room for the hinge to rotate properly (shown in red)
  3. Secure with acetone glue
  3. Allow three days to harden



Ask for real image

Step: Attach Monitor to Mount  
Part/Files:

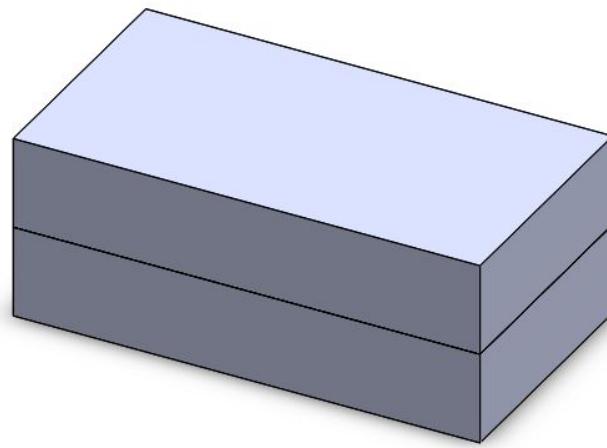
1. Use screws and bolts to attach monitor to the mount as shown



Ask for real image

Step: Glue Together Two  
Connectors  
Part/Files:  
-

1. Secure with acetone glue
2. Allow three days to harden



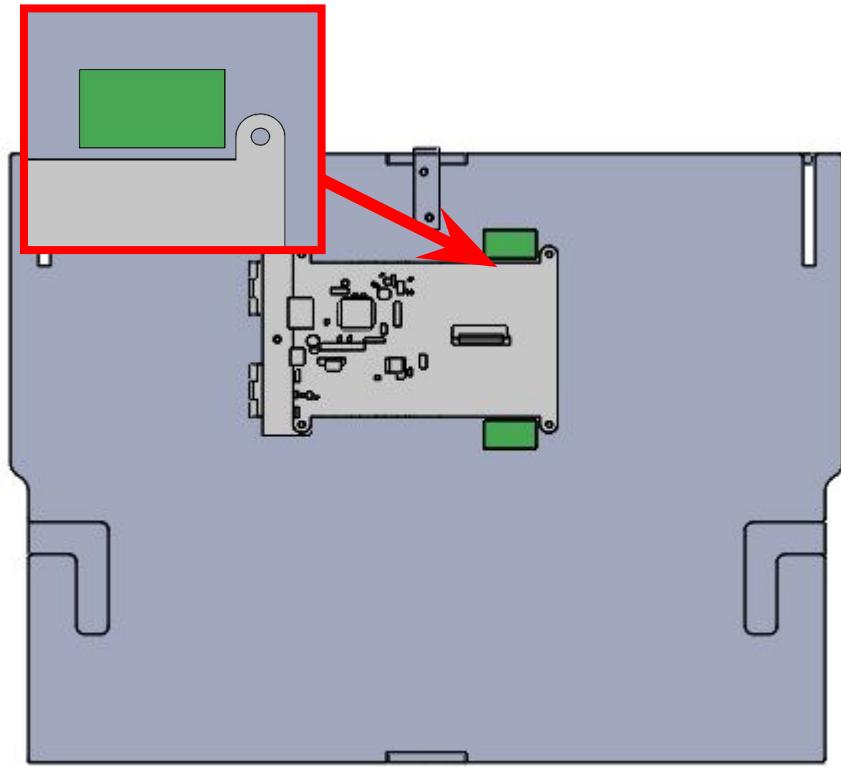
Ask for real image

Step: Attach connectors  
around monitor

Part/Files:

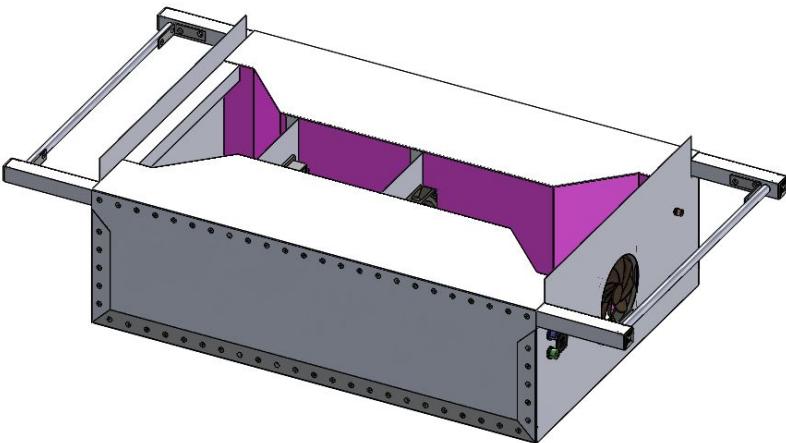
-

1. Attach double connectors above and below monitors
2. Place approximately .25 cm from the edge of the monitor as shown in red
3. Secure with acetone glue
3. Allow three days to harden



Ask for real image

# Base Assembly



## Materials:

- Square Tubes
- Circular Tubes
- Aluminum Sheet Metal
- Zinc coated Aluminum Sheets
- Corner brackets big (28)
- Corner brackets small (4)
- self tapping screw for bracket holes
- M4 bolts
- M4 nuts
- All the electronic components not used up to this point
- Appropriate screw, nuts and bolts for electrical components
- Heaters
- PVC pipe
- Press fit square plugs (4)

# Step: Assemble Bottom Frame

\*If for any reason the hood dimensions are altered, please alter frame dimensions accordingly.

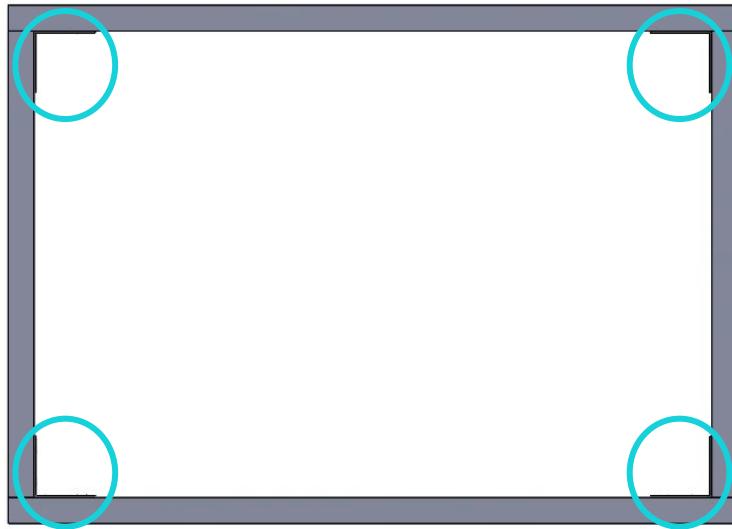
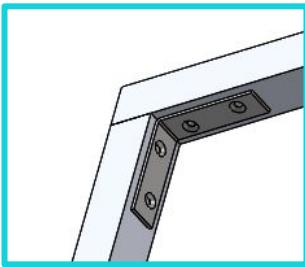
1. Cut two 71.75 cm and two 44.67 cm long square tubes.
3. Place long tubes on the outside, short tubes 90° on the inside like the image.
4. Make sure measurements match close to the image.
5. After confirming dimensions match 71.75 cm by 49.75 cm, cut two more 44.67 cm square tubes.
6. Cut two 100 cm square tubes and put aside for now.



Dimensions in cm

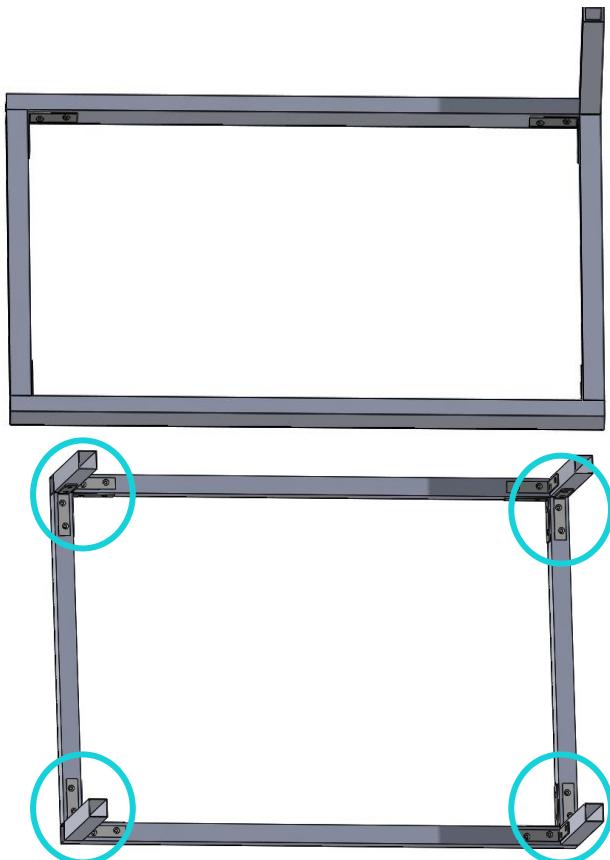
# Step: Connect with brackets

1. Place a corner bracket on each inside corner.
3. Center it on the tube.
4. Mark the screw holes on the tube and drill pilot hole for screws.
5. Use self tapping screw to attach brackets to tubes.



# Step: Assemble Column Frame

1. Cut one 16.92 cm square tube and place it on the long tube.
2. Line it up with the short tube
3. Place a 100 cm square tube on top of the tube column and check to see the total height it 22 cm.
4. After confirming height, cut three 16.92 cm square tubes.
5. Line up brackets and drill pilot hole as before to attach square tubes to the bottom frame with self tapping screws.

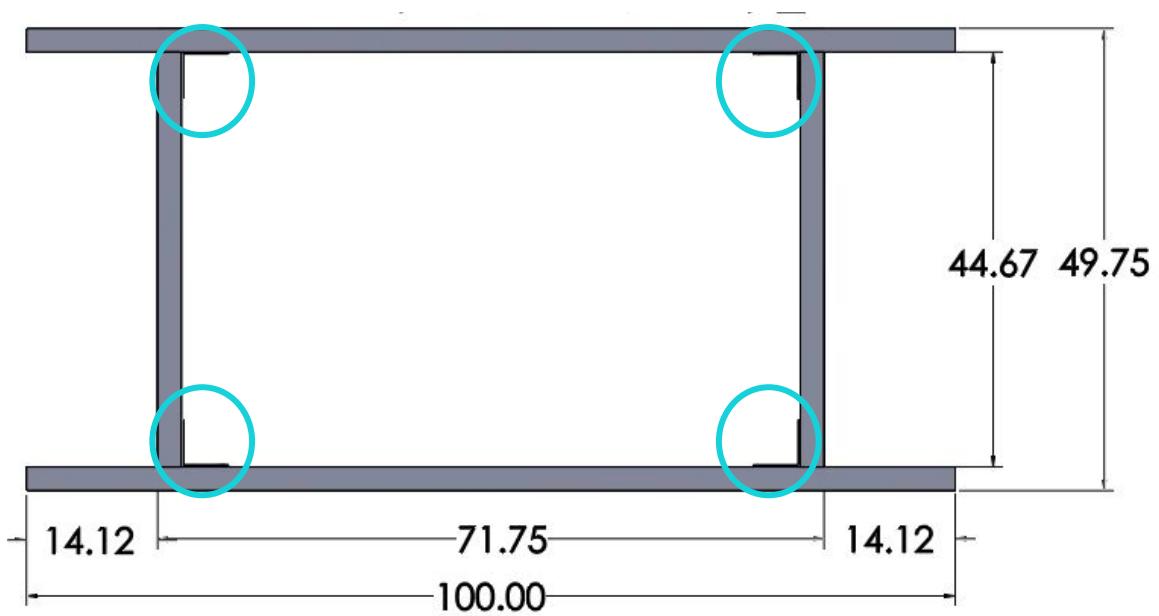


Dimensions in cm



# Step: Assemble Top Frame

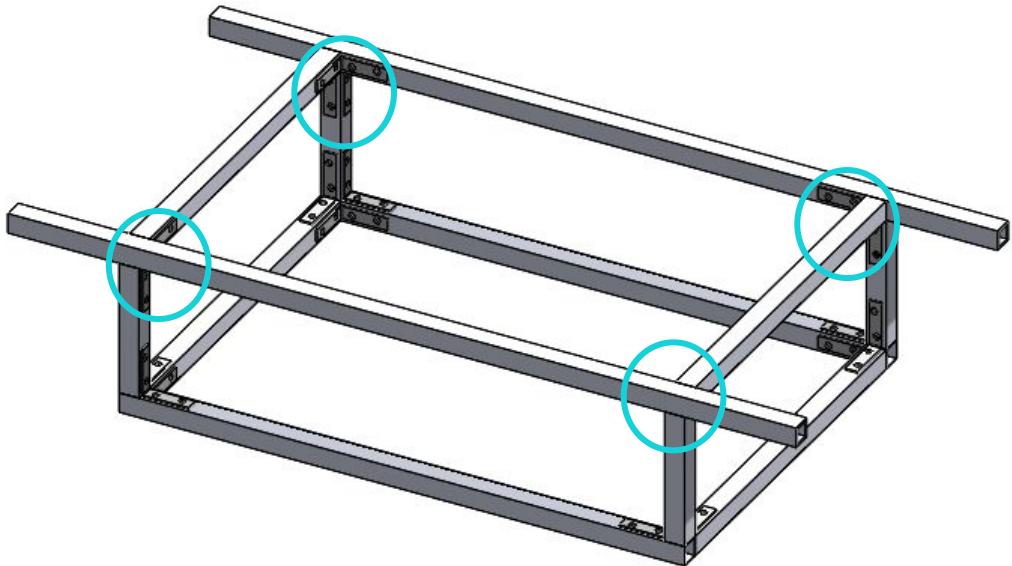
1. Place two 100 cm and two 44.67 cm long square tubes
3. Place long tubes on the outside, short tubes 90° on the inside like the image 71.75 cm apart from outside face (each short tube 14.12 cm from end of long tube).
5. Make sure measurements match close to the image.
6. After confirming dimensions match 71.75 cm by 49.75 cm, use self tapping screw to attach brackets to inside corners



Dimensions in cm

# Step: Assemble Final Frame

1. Attach the top frame just made to the column tubes.
2. Make sure columns line up with short tubes.
3. Attach top frame to column frame using the brackets and self tapping screws as before.
4. Image should be what the final frame looks like.

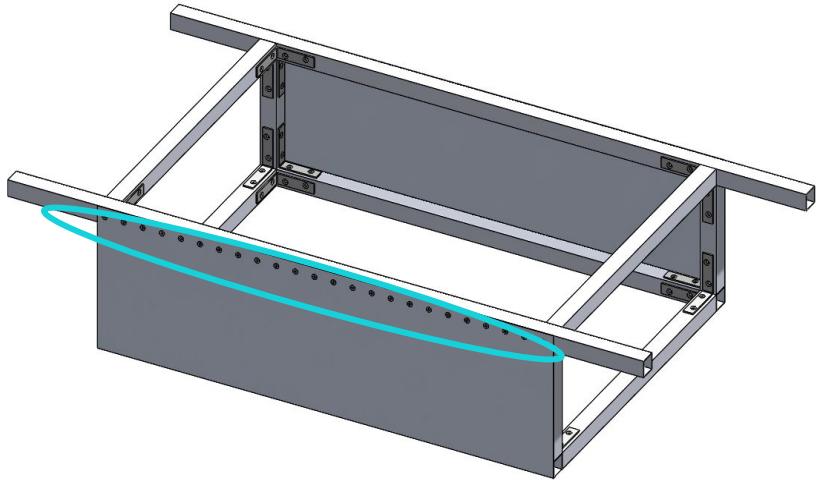
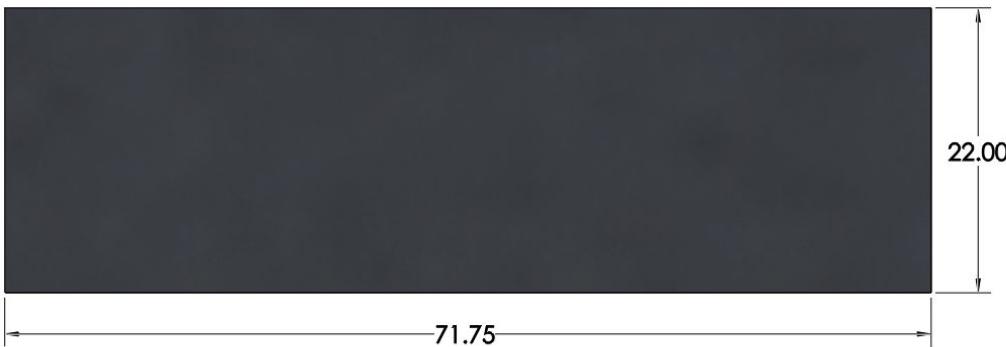


# Step: Long Side Box

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut two 71.75 cm by 22 cm from the sheet metal.
2. Add radius of minimum 0.03cm to corner (optional)
2. Make sure columns line up with short tubes.
3. Attach each to one long side of the frame using self tapping screws.  
\*Image has 24 screws spaced 3 cm apart but please use own discretion for what is appropriate. Placed 1.27 cm from edge.

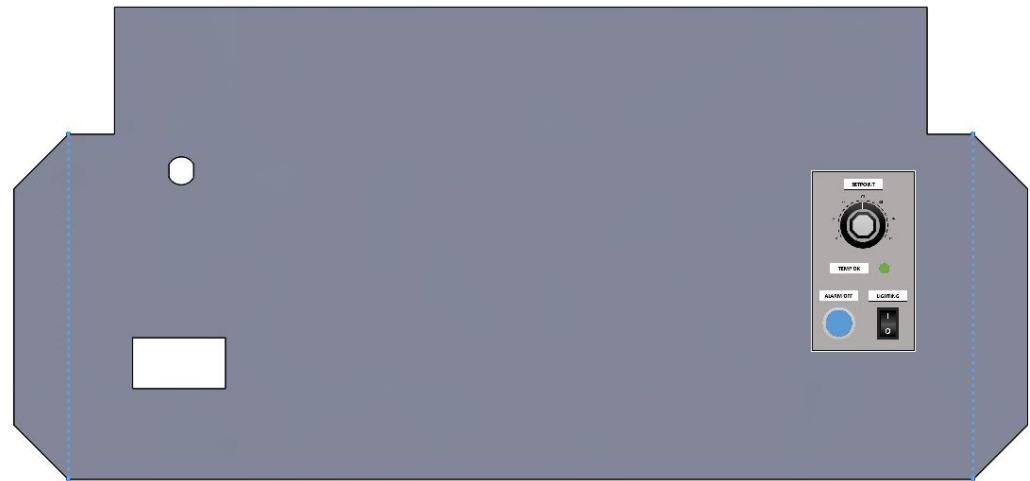
Dimensions in cm



# Step: Foot Side Box

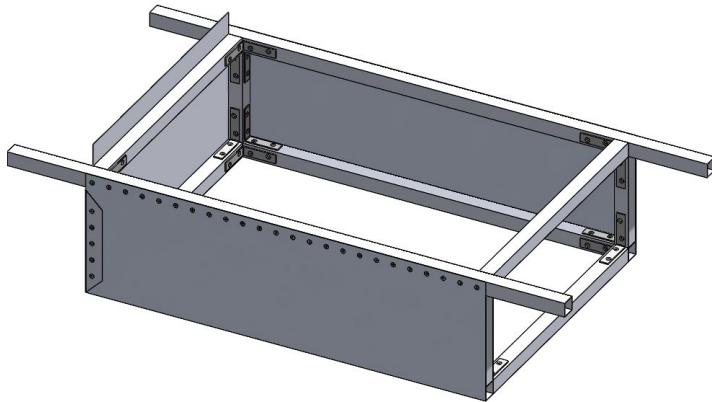
\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut one aluminum sheet with holes and cutouts as shown.  
\*Refer to drawing for dimensions.
2. Draw bend line where blue lines are (0.1 cm bend radius used here).  
\*Holes for electronics most likely will change.  
\*\* Holes for interface not included here.



# Step: Foot Side Box

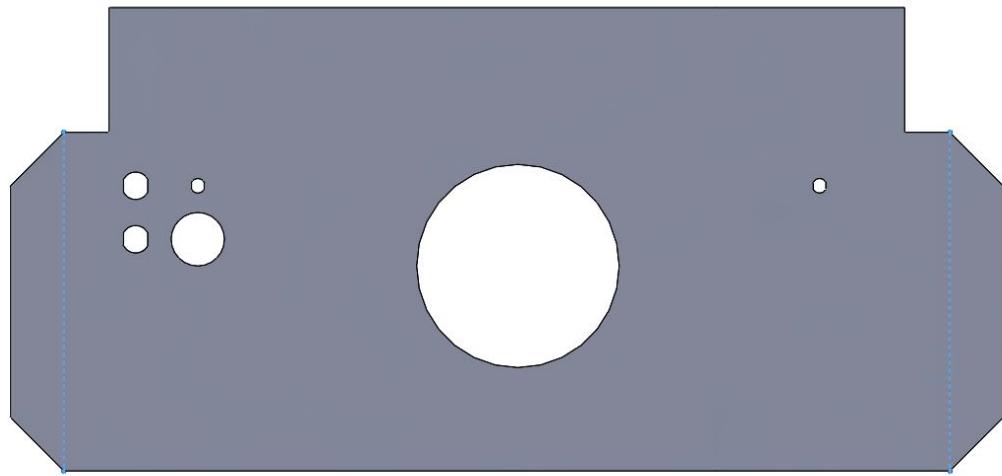
1. Either bend around the frame or if radius is known use bending tools, and screw to long side on tabs for each side with self tapping screws. (Alter tab size if needed)  
\*Image has 6 screws placed 3 cm apart



# Step: Head Side Box

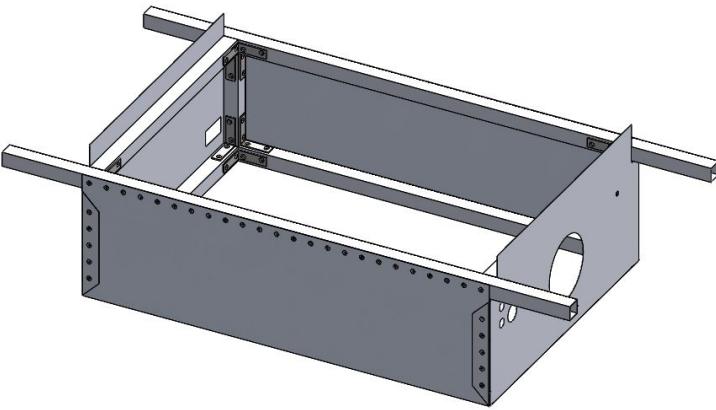
\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut one aluminum sheet with holes and cutouts as shown.  
\*Refer to drawing for dimensions.
2. Draw bend line where blue lines are (0.1 cm bend radius used here)  
\*Holes for electronics most likely will change.



# Step: Head Side Box

1. Either bend around the frame or if radius is known use bending tools, and screw to long side on tabs for each side with self tapping screws. (Alter tab size if needed)  
\*Image has 6 screws placed 3 cm apart

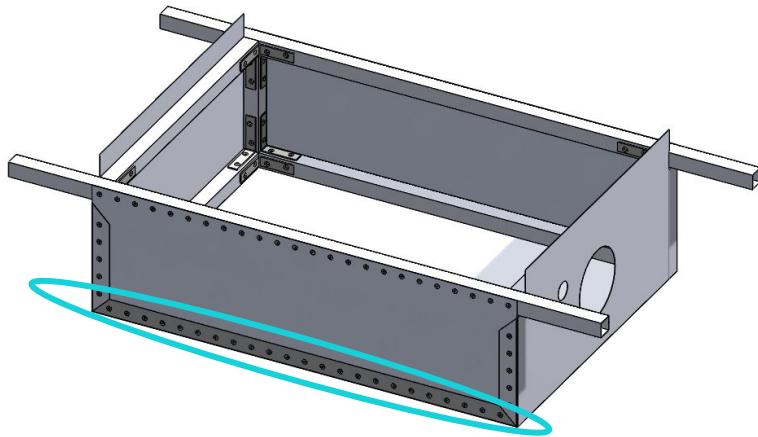
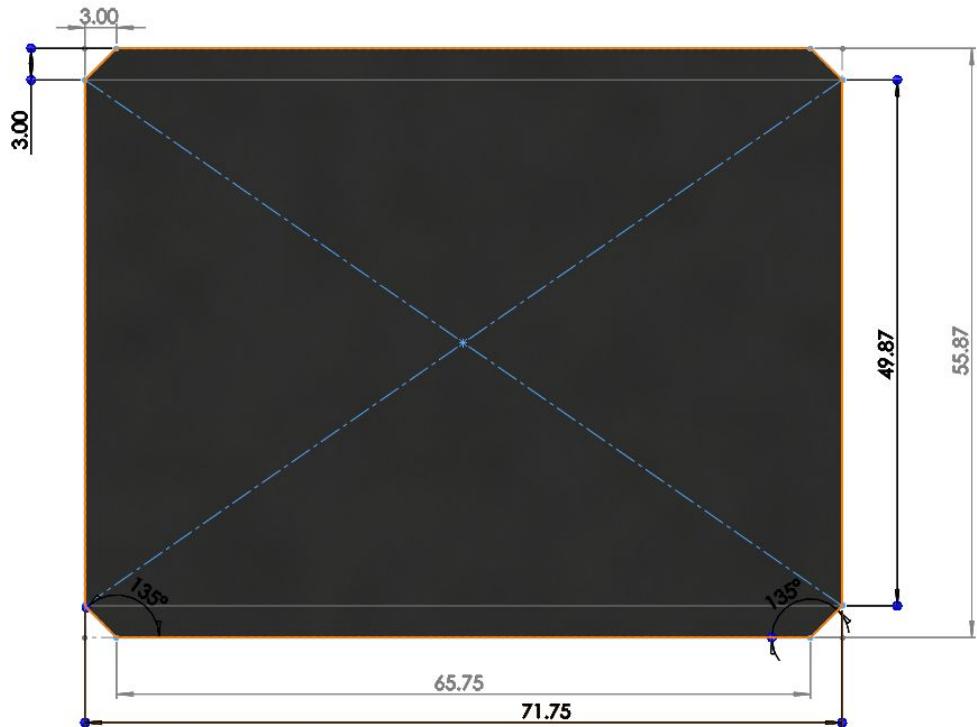


# Step: Bottom Side Box

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut metal sheet to dimensions shown in image.
2. Draw bend lines for tabs (0.1 cm radius used here, change dimensions if necessary).
3. Screw folded tabs into long side of box on each side.

Dimensions in cm



# Air Duct Assembly



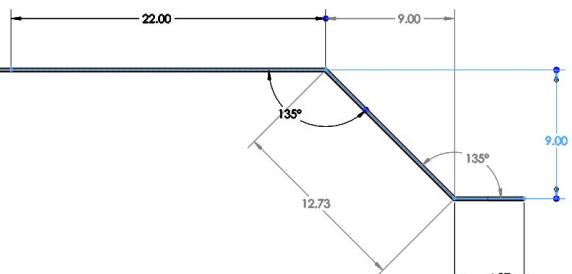
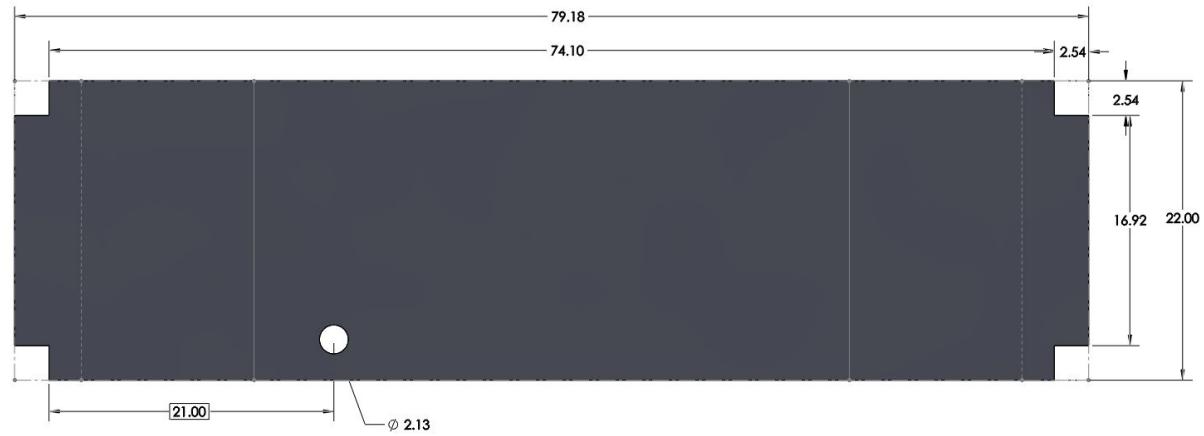
## Materials:

- Zinc coated steel metal sheet
- Both heaters
- One fan
- self tapping screws or bolts and nuts
- PVC pipe
- Neoprene Rubber Insulation
- Bolts and nuts for fan
- Bolts and nuts for heaters

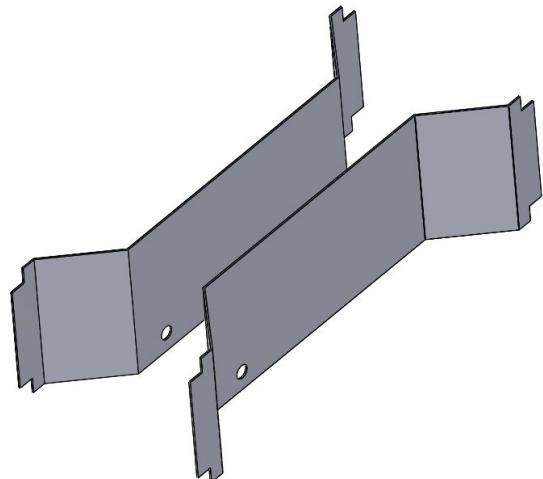
# Step: Air Duct Walls

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut zinc coated steel metal sheet to dimensions shown in image. \*Cut outs at corners will depend on tube size \*\*Make sure hole size matches PVC pipe outer radius
2. Draw bend lines for tabs shown in bottom image (0.1 cm radius used here, change dimensions if necessary).
3. Once bent, place inside frame to check dimensions.
4. Make a second one but with the hole 21 cm from right side.



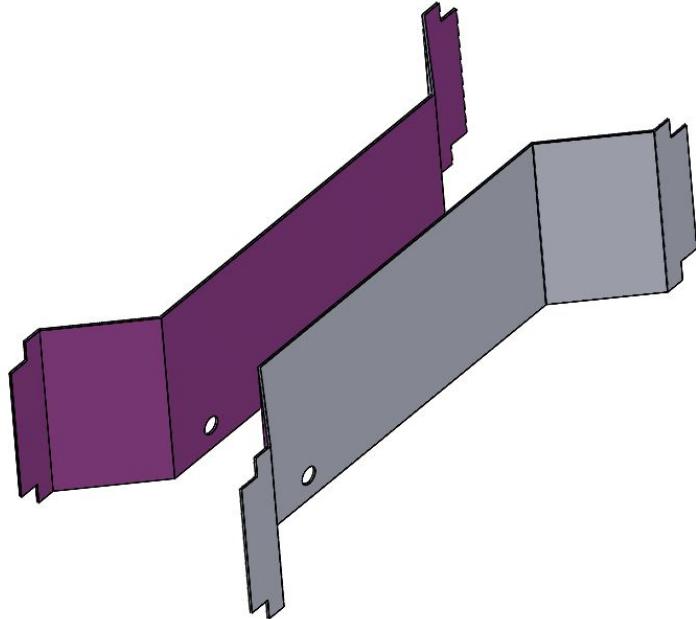
Dimensions in cm



# Step: Air Duct Insulation

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. After Air Duct walls are finished, cut the neoprene insulation to the same dimensions of the inside wall but in sections using the SVG files.
2. Attach to the inside of the wall using screws or bolts. Make sure screw heads are on the same side as the rubber.  
\*Insulation is shown in purple



# Step: Air Duct Assembly

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Place air duct walls like image, they need to be minimum 31.12 cm apart in the wide section.
2. Measure the distance in the narrow section. For these dimensions it should be around 13.12 cm.

Dimensions in cm

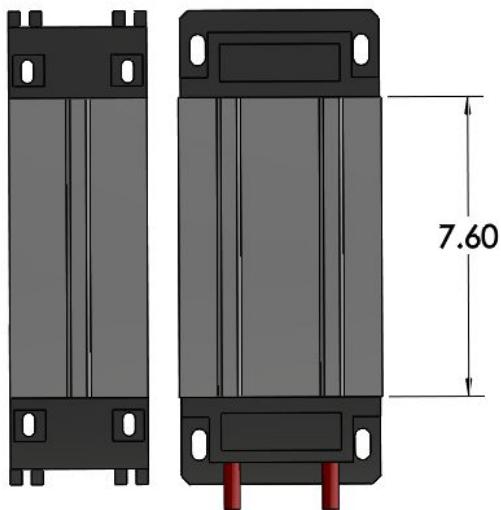


# Step: Heater Mount

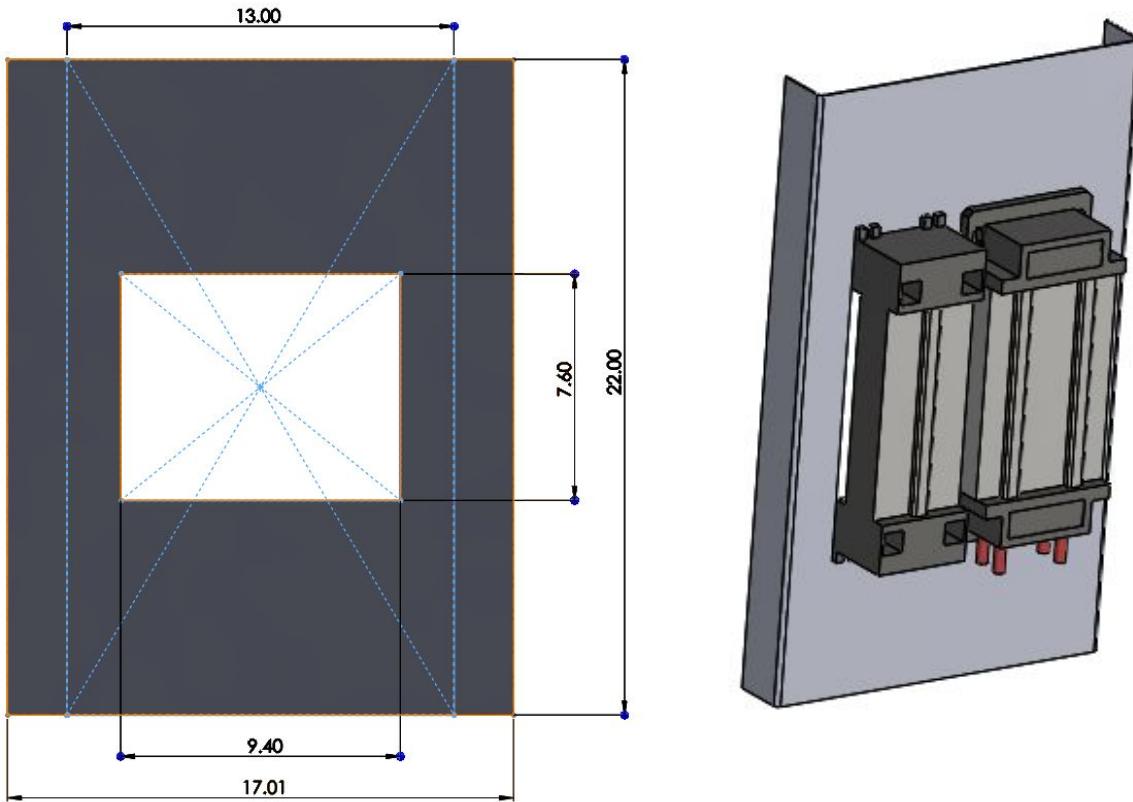
\*Dimensions will change based on heater size

1. Measure the dimensions for the grooves of both the heaters.
2. Using the steel sheet metal make a mount that will fit between the duct walls with a cut out for the heater.
3. Bend lines are 13 cm apart (to include 0.1 cm radius, adjust if needed) and 2.005 cm from vertical edge.
4. After bending place in between duct walls to check it fits.

Dimensions in cm



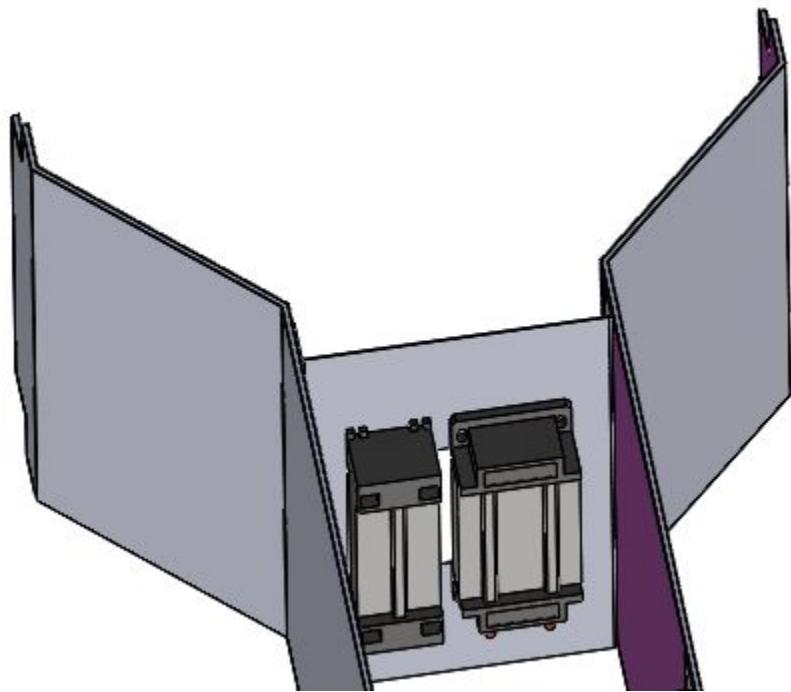
5. Attach heaters to mount with appropriate bolts.



# Step: Heater Mount

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Mount it at the end with no hole in the narrow section of the duct with same screw or bolts used to attach insulation.

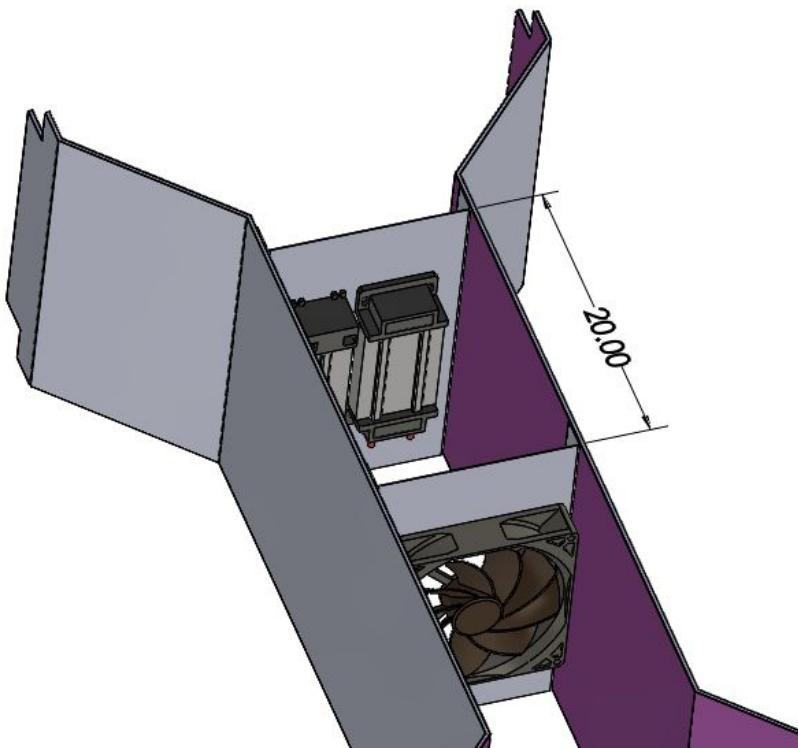
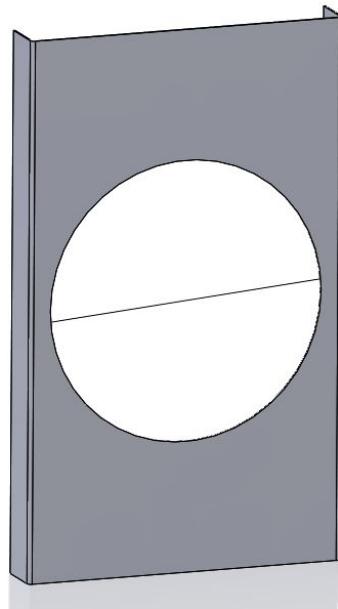


# Step: Fan Mount

\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Fan Mount will be the same but with a hole in a hole in the middle.
2. Attach fan using appropriate bolts. Make sure it is center to hole
3. Attach mount to duct walls at least 20 cm from Heater mount.

Dimensions in cm



# Step: PVC Pipe

1. Measure distance between the outside of the narrow sections. Length used here was 13.8 cm
2. Cut the PVC at that length
3. Insert PVC into holes of wall. Should be a tight fit.
4. Optional: Can seal on the outside with liquid silicone.



# Step: Air Duct into Frame

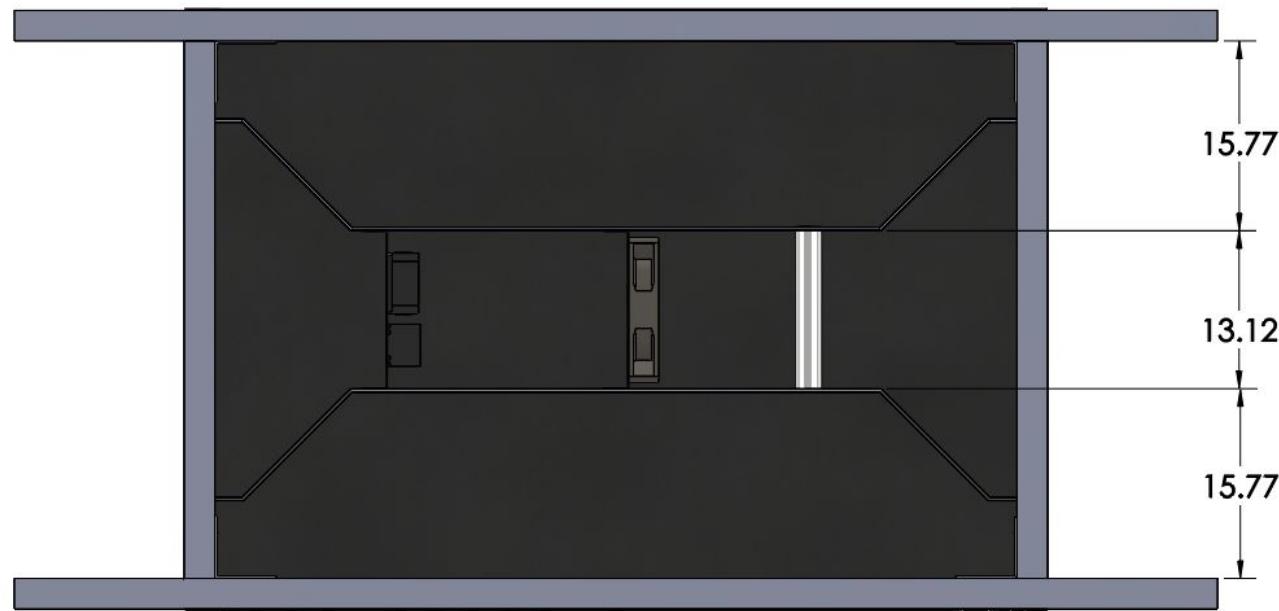
\*If for any reason the frame dimensions are altered, please alter dimensions accordingly.

1. Place air duct into frame.

2. Make sure that it is centered (very important for air holes in the hood).

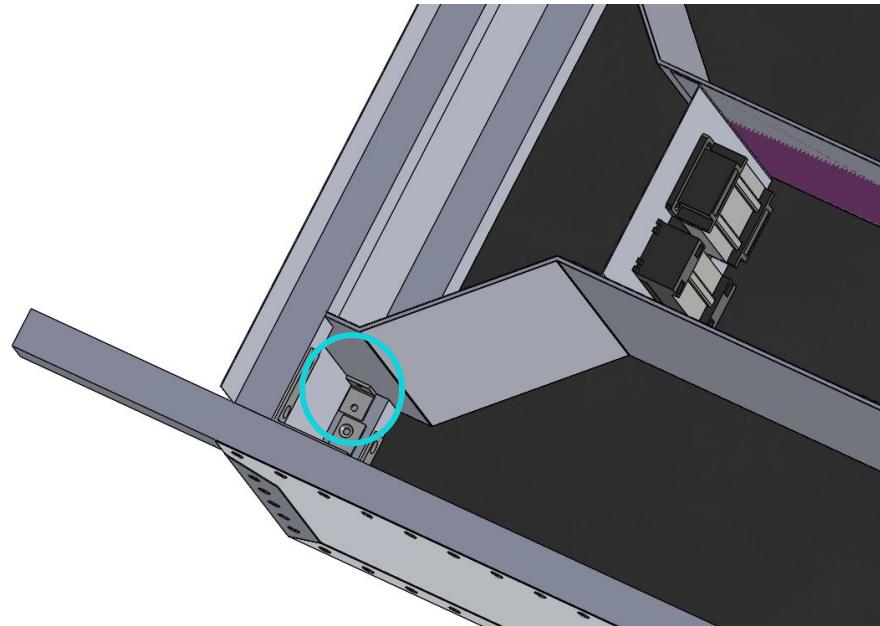
\*Dimensions shown will change based on insulation thickness.

Dimensions in cm



# Step: Air Duct into Frame

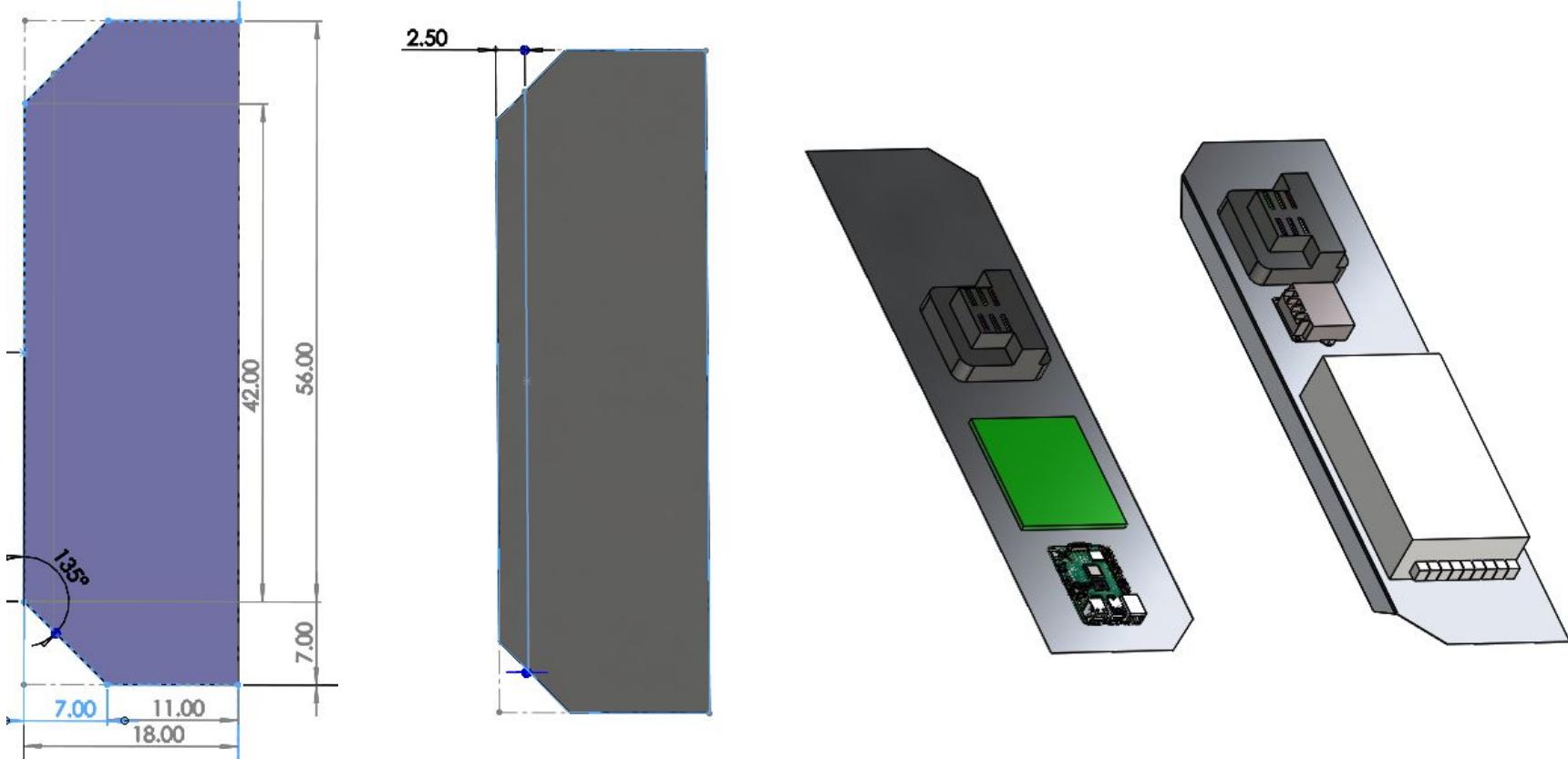
1. Use the small brackets with self tapping screws to attach duct walls to frame as shown in image
2. Repeat for each side.



# Step: Mount for Electronics

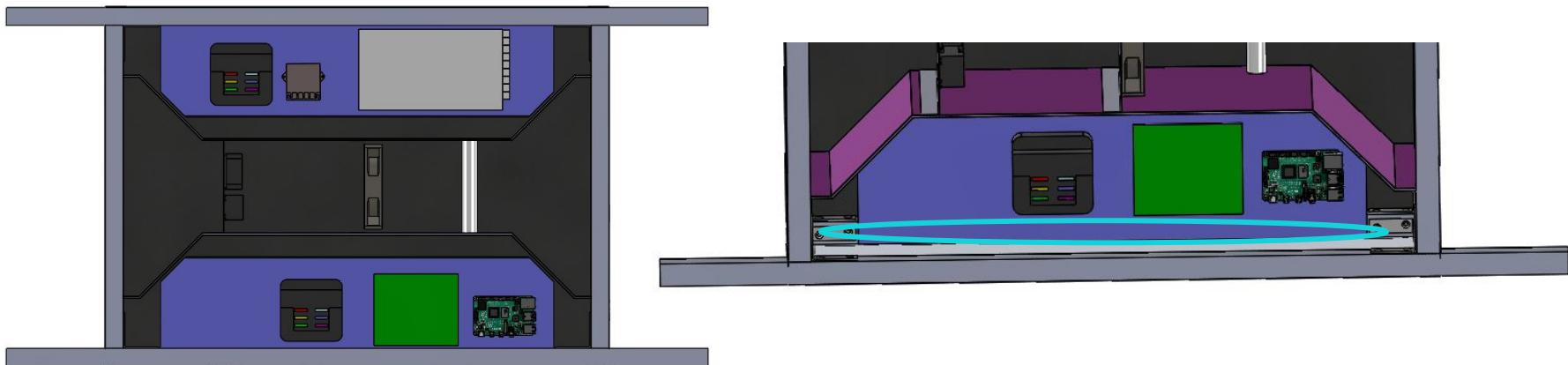
\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. Cut and bend aluminum metal sheet to dimensions shown.  
\*If tube height changes, then change dimensions.
2. Bend at blue line shown (0.1 cm radius used)
3. After bending, mount internal electronics  
\*Positions subject to change



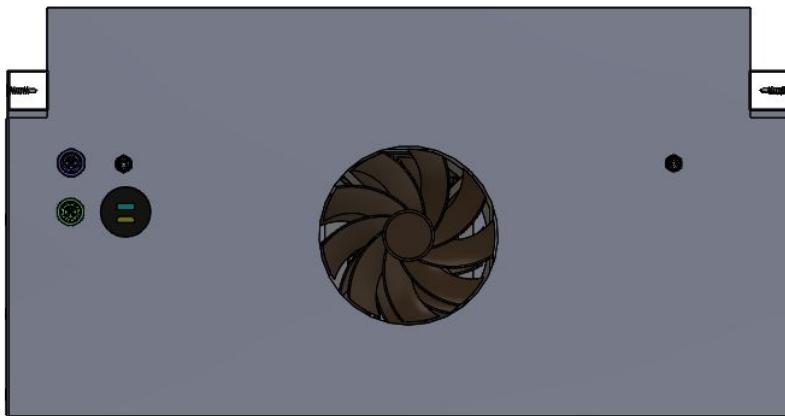
# Step: Mount for Electronics

1. Place mounts inside the frame
2. Use self tapping screws to attach the top face of the bottom frame.



# Step: Mount Foot and Head Side

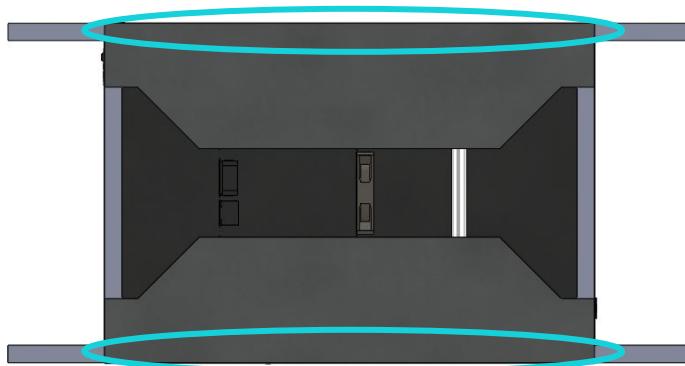
1. Mount HDMI/USB plug into circle, should be a tight fit.
  2. Mount fan using appropriate bolts.
  3. Mount switch plug and interface.
  4. Mount M12 and M8 connectors.
- \*Locations for the parts subject to change.



# Step: Roof

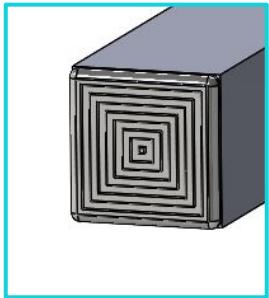
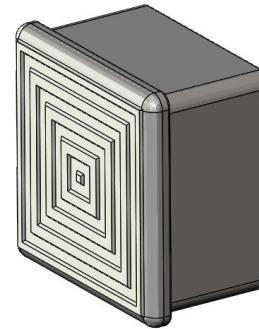
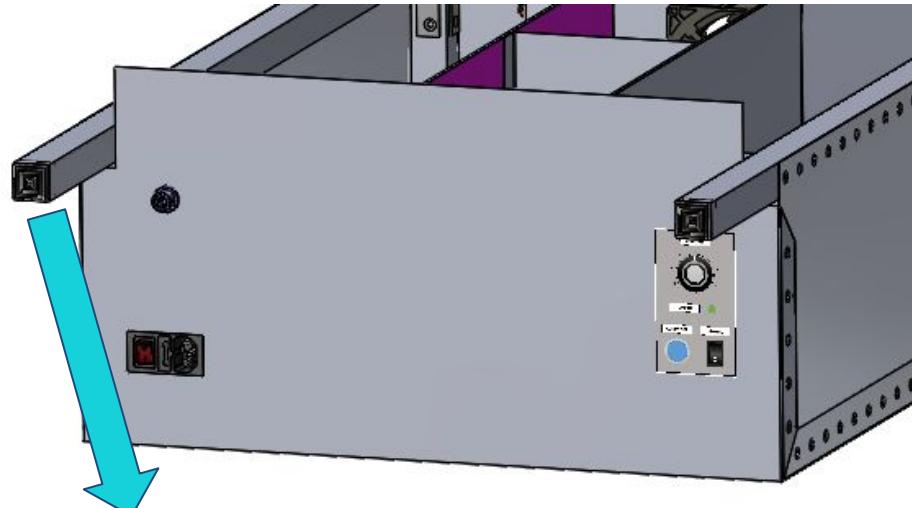
\*If for any reason the frame dimensions are altered, please alter sheet dimensions accordingly.

1. After everything is mounted and connected inside, use aluminum sheet metal to make the roof.
2. Make total of two pieces.
3. Place on top of the frame. Outside edges should line up with edge of top square tube.
4. Use self tapping screws to attach to frame indicated in image.



# Step: Square Tube Caps/Plug

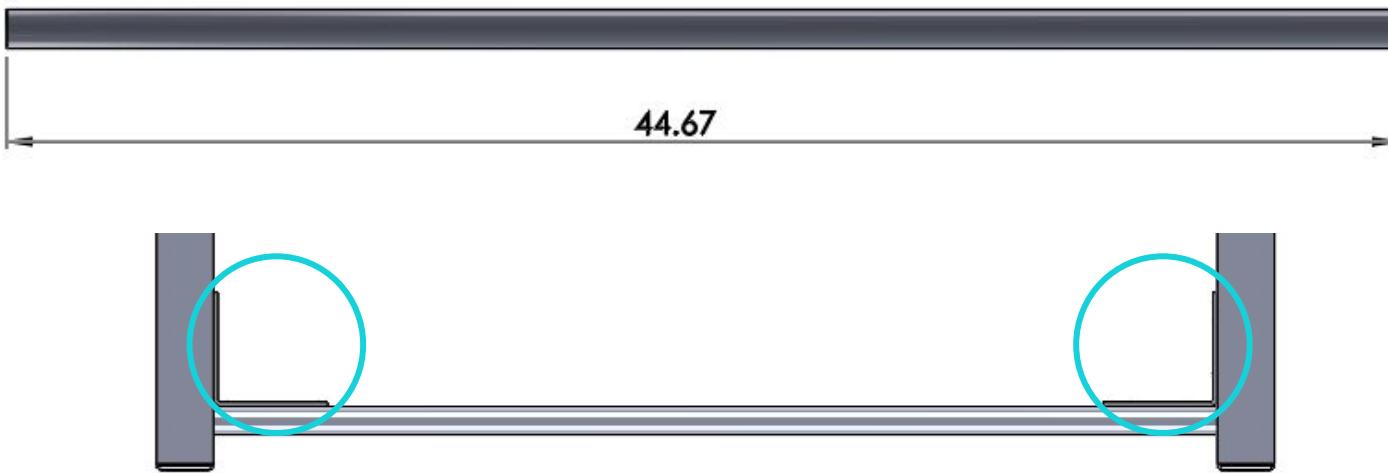
1. Attach square tube caps/plugs to the open ends of the square tubes.
2. If not using press fit plug, screws may be needed to attach



# Step: Handles

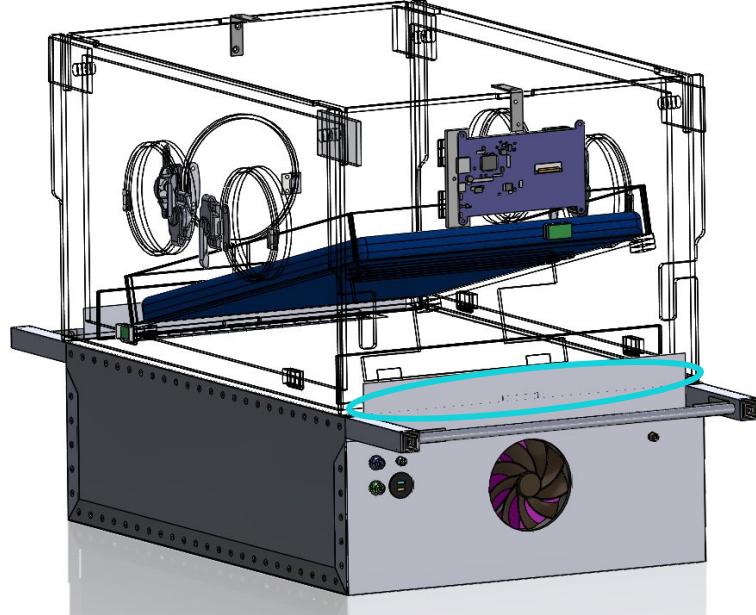
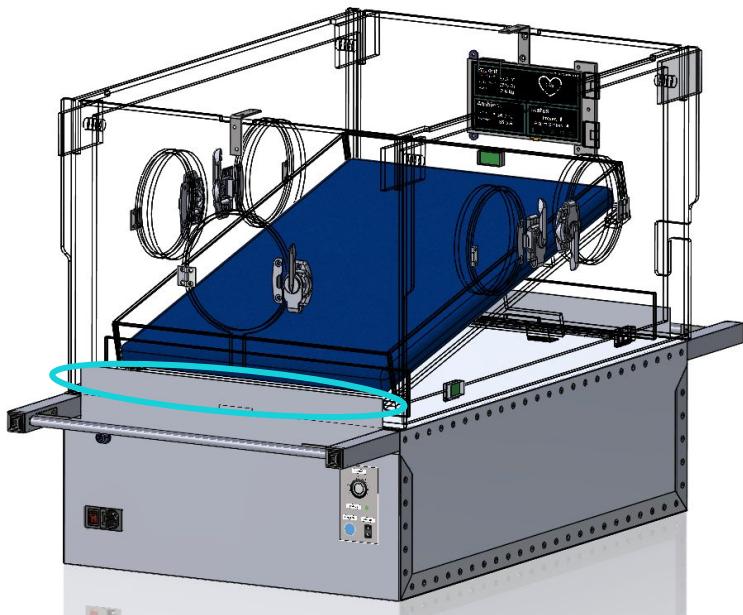
\*If for any reason the frame dimensions are altered, please alter dimensions accordingly.

1. Cut two steel circular tubes.
2. Line them up on the ends of the square tubes. Distance from the ends of the square tubes will depend on caps used on the ends. Position to what fits best.
3. Use the big corner brackets and self tapping screws to attach circular tube to square tubes.



# Step: Attach Hood to Base

1. Place hood onto the roof of the metal base. Make sure metal side with the HDMI/USB plug (head side) is on the same hood side with the vitals monitor.
2. Bolt the tabs sticking up from the short metal sides to the sides of the hood.



# Step: Final Assembly

Congratulations! You have built a complete neonatal incubator.

This is what the final assembly should look like.

