

3D solarpanels

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Short Introduction:

Welcome to the 3D solar panels Step-by-Step Guide.





In this Guide you will find: List of materials, List of tools you will need to complete this project, an assembly tutorial in pictures and drawings, parts dimensions, etc.

This manual is for one solar panel only.

Chapter 1: List of Tools






Nr. Crt.	Description	Images
1	Tape Measure	
2	Quick Square Tool	
3	Pencil	

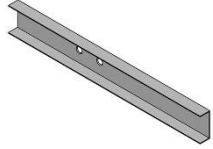
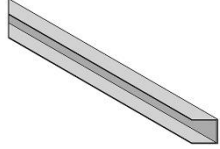
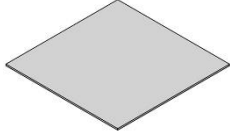
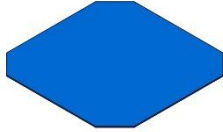
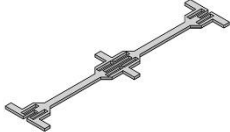
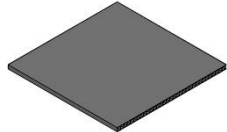
4	Drill	
5	Rosin Flux Pen	
6	Soldering Gun	
7	Caulking Gun	
8	Cable/Wire Stripper	



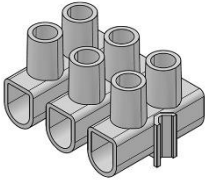
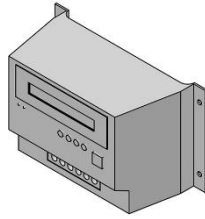
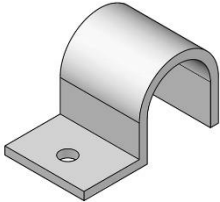
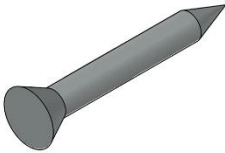
9	Hammer	
10	Diagonal cutter	
11	Hot Air Station (Optional)	
12	Ammeter/Voltmeter Digital	



Chapter 2: List of Materials

To complete/build this project you will need these materials:

Nr. Crt.	Description	Qty/Unit	Vendor	Images
1	Front & Back Base Frame 218mm x 35mm x 40mm 8 5/8" x 1 3/8" x 1 5/8"	2	-	
2	Side Base Frame 450mm x 35mm x 40mm 17 3/4" x 1 3/8" x 1 5/8"	2	-	
3	Pillar Frame 900mm x 25mm x 50mm 35 3/8" x 1" x 2"	2	-	
4	Strengthened Pillar Base Frame 168mm x 25mm x 50mm 6 5/8" x 1" x 2"	2	-	
5	Side Strengthened Pillar Base Frame 180mm x 25mm x 50mm 7 1/8" x 1" x 2"	2	-	

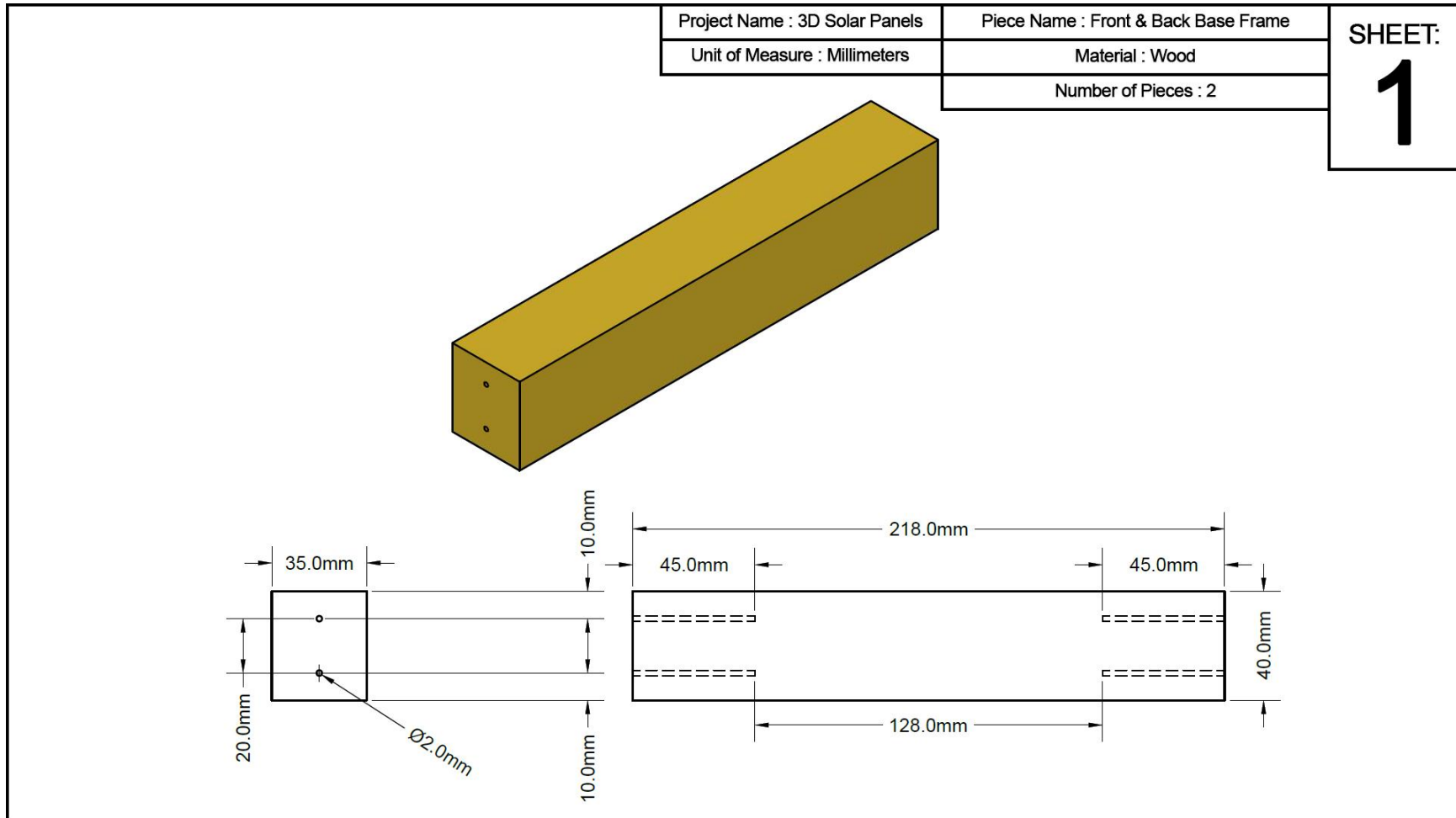
6	<p>Slider 160mm x 8mm x 20mm 6 1/4" x 1/4" x 3/4"</p>	24	-	
7	<p>Frame Enclosure 160mm x 10mm x 16mm 6 1/4" x 3/8" x 5/8"</p>	48	-	
8	<p>Glass Enclosure 159mm x 159mm x 2mm 6 1/4" x 6 1/4" x 1/8"</p>	24	-	
9	<p>Solar Cell 125mm x 125mm x 1mm 4 7/8" x 4 7/8" x 1/16"</p>	24	eBay LINK	
10	<p>Solar Cell Bus Bar 82.5mm x 17.5mm x 1mm 3 1/4" x 3/4" x 1/16"</p>	48	eBay LINK	
11	<p>Polycarbonate Sheet 150mm x 150mm x 5mm 5 7/8" x 5 7/8" x 1/4"</p>	12	-	

12	<p>Self-Tapping Screw M4x45mm 45mm x 8mm x 8mm 1 3/4" x 1/4" x 1/4"</p>	15	-	
13	<p>Self-Tapping Screw M4x80mm 80mm x 8mm x 8mm 3 1/8" x 1/4" x 1/4"</p>	20	-	
14	<p>Cable Connector Strip 27mm x 18.9mm x 14.8mm 1" x 3/4" x 5/8"</p>	1	eBay LINK	
15	<p>Solar Controller 183mm x 68mm x 120mm 7 1/4" x 2 5/8" x 4 3/4"</p>	1	Wellsee LINK	
16	<p>Cable Clamps 8.5mm x 5mm x 5mm 3/8" x 1/4" x 1/4"</p>	15	-	
17	<p>Ø1mm Nail 45mm x 2mm x 2mm 1 3/4" x 1/8" x 1/8"</p>	70	-	

16	Transparent Silicone Sealant	15	-	
17	Rosin Core Solder	70	-	

For the U-shaped Slider and the Frame Enclosure I have used some Plastic Cable Tunnel, but you can also use some aluminum sheet and bend it, and create the u-shaped form.

Chapter 3: Parts Dimensions



Project Name : 3D Solar Panels

Piece Name : Front & Back Base Frame

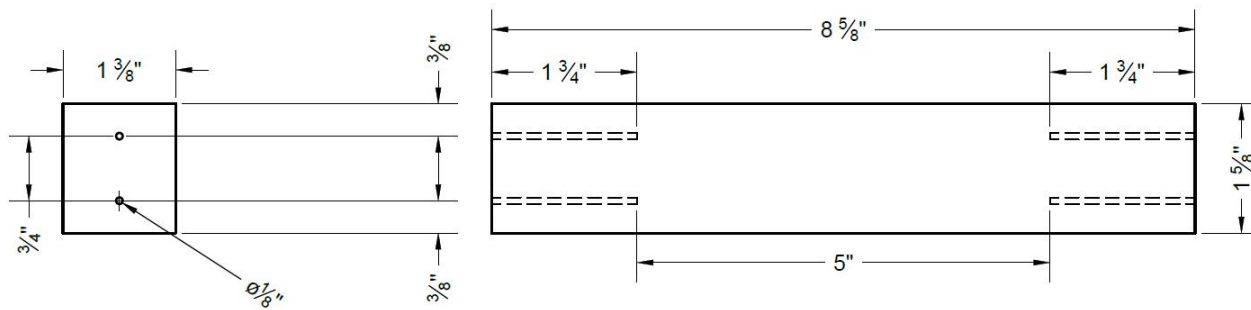
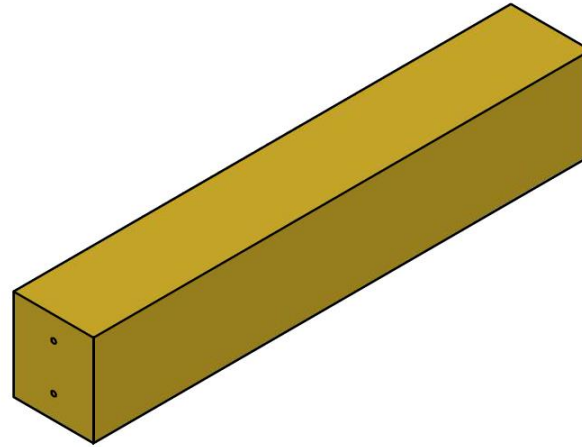
Unit of Measure : Inches

Material : Wood

Number of Pieces : 2

SHEET:

1



Project Name : 3D Solar Panels

Piece Name : Side Base Frame

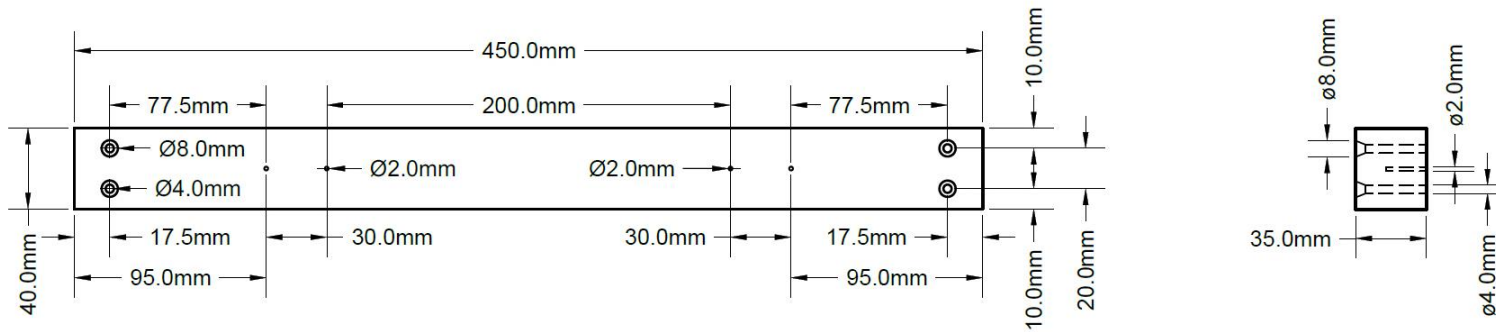
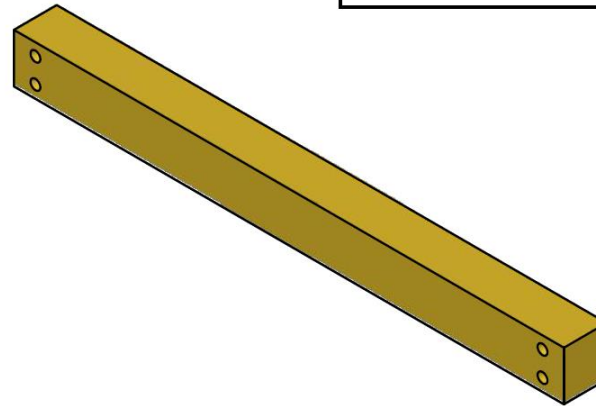
Unit of Measure : Millimeters

Material : Wood

Number of Pieces : 2

SHEET:

2



Project Name : 3D Solar Panels

Piece Name : Side Base Frame

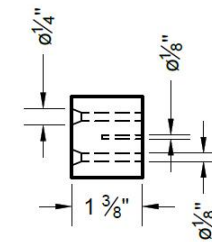
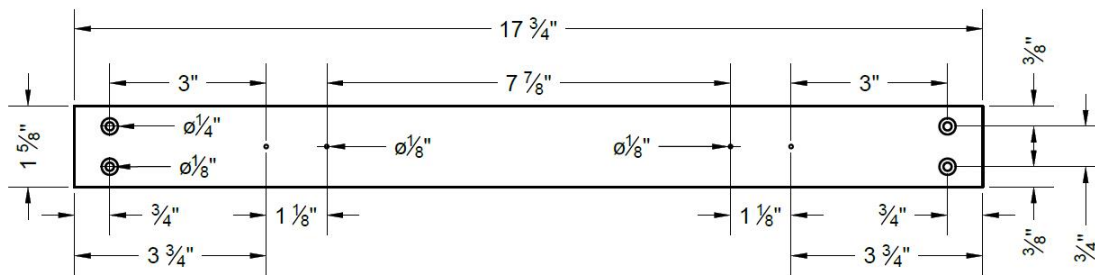
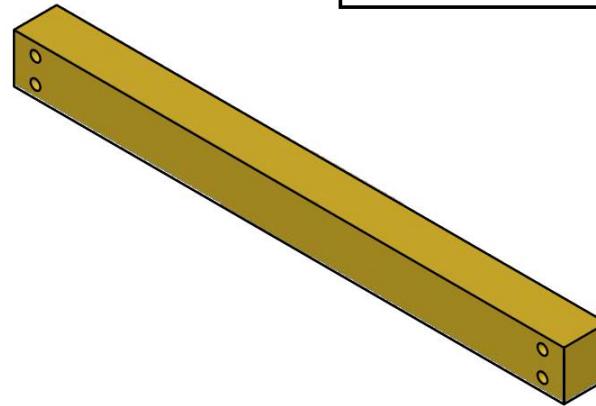
Unit of Measure : Inches

Material : Wood

Number of Pieces : 2

SHEET:

2



Project Name : 3D Solar Panels

Piece Name : Pillar Frame

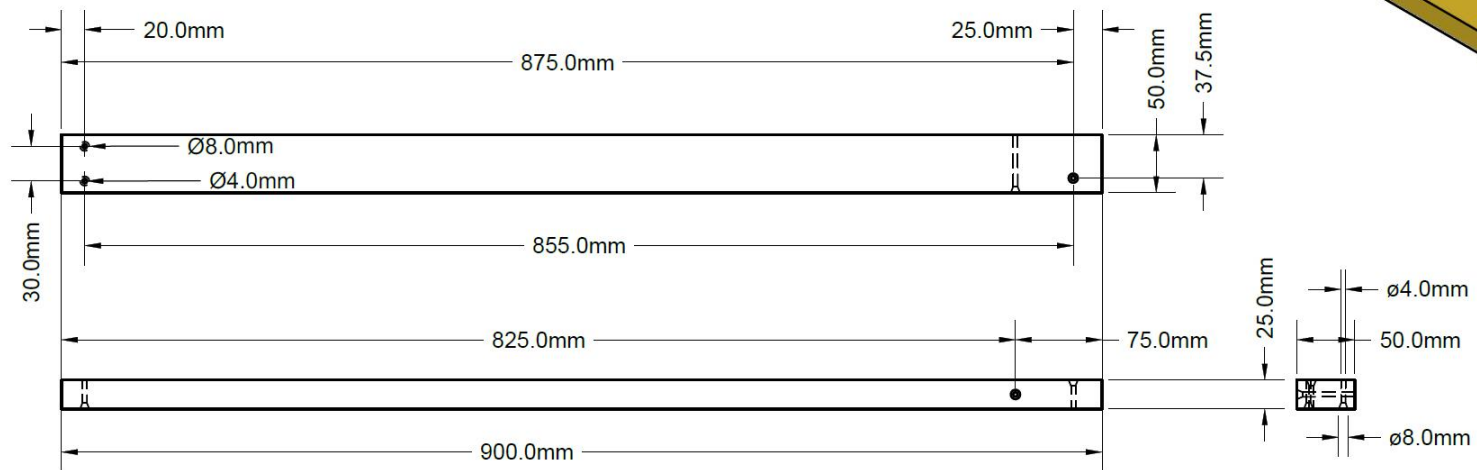
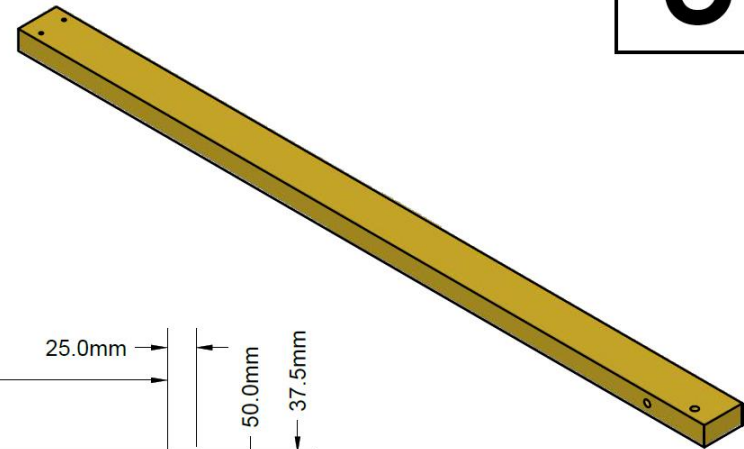
Unit of Measure : Millimeters

Material : Wood

Number of Pieces : 4

SHEET:

3



Project Name : 3D Solar Panels

Piece Name : Pillar Frame

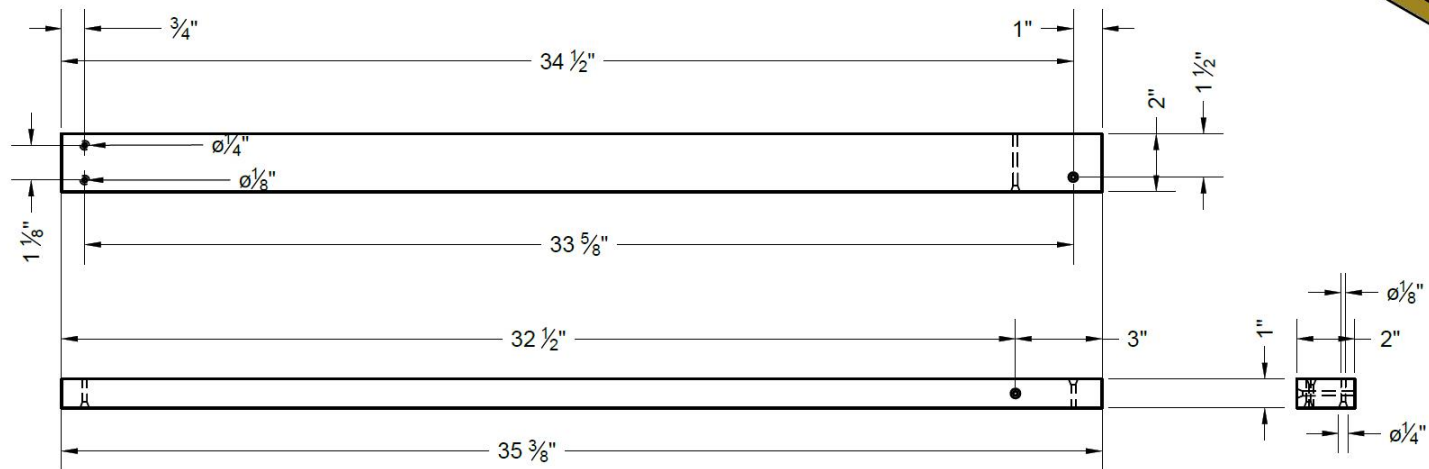
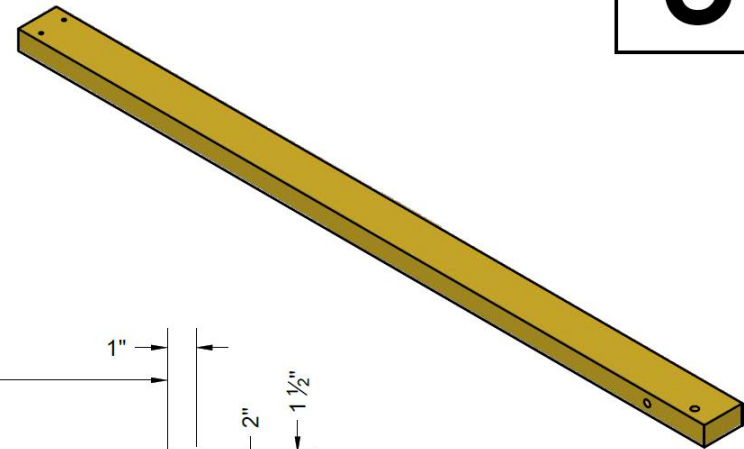
Unit of Measure : Inches

Material : Wood

Number of Pieces : 4

SHEET:

3



Project Name : 3D Solar Panels

Piece Name : Strengthened Pillar Frame

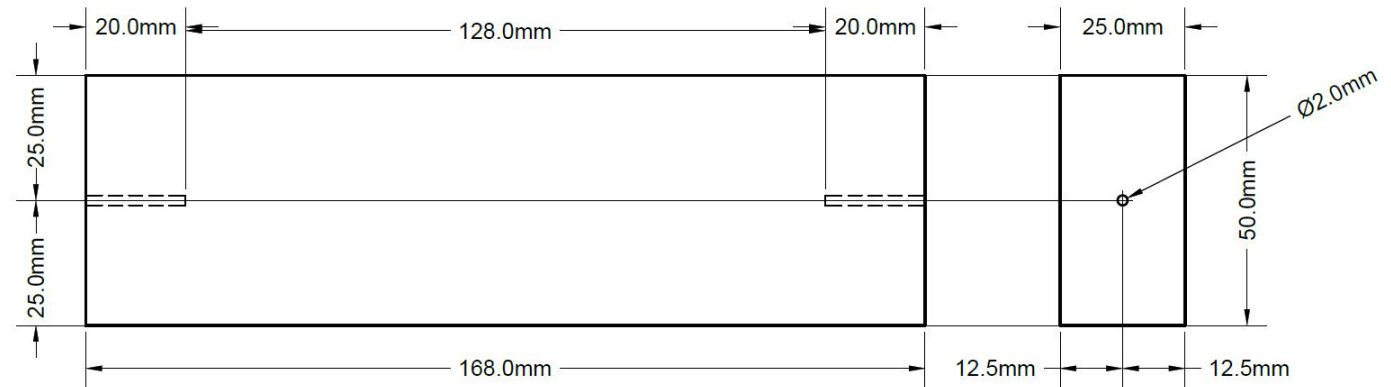
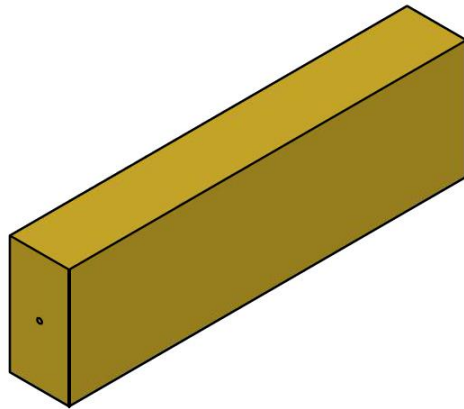
Unit of Measure : Millimeters

Material : Wood

Number of Pieces : 2

SHEET:

4



Project Name : 3D Solar Panels

Piece Name : Strengthened Pillar Frame

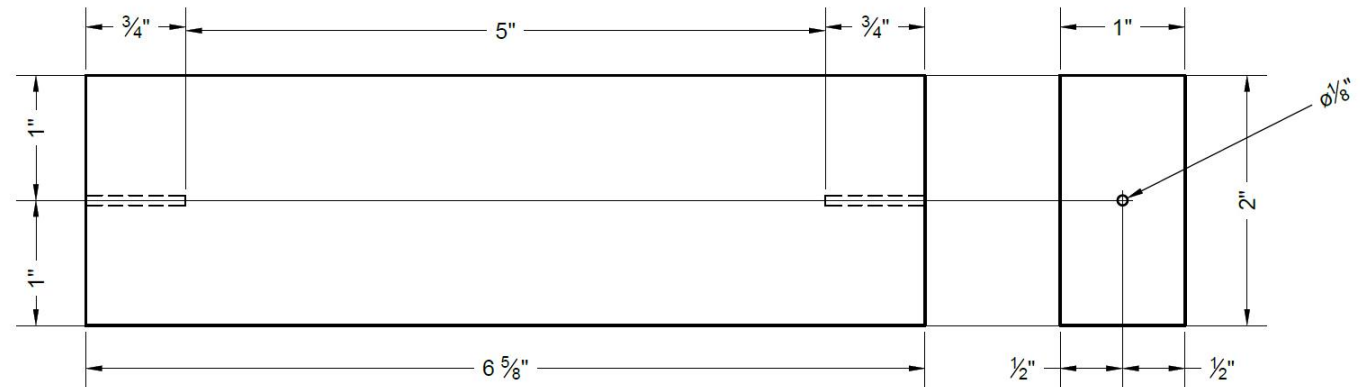
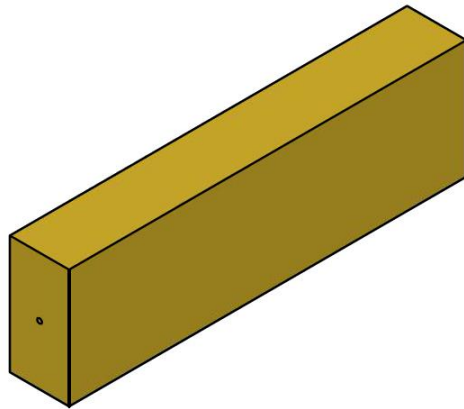
Unit of Measure : Inches

Material : Wood

Number of Pieces : 2

SHEET:

4



Project Name : 3D Solar Panels

Piece Name : Side Strengthen Pillar Frame

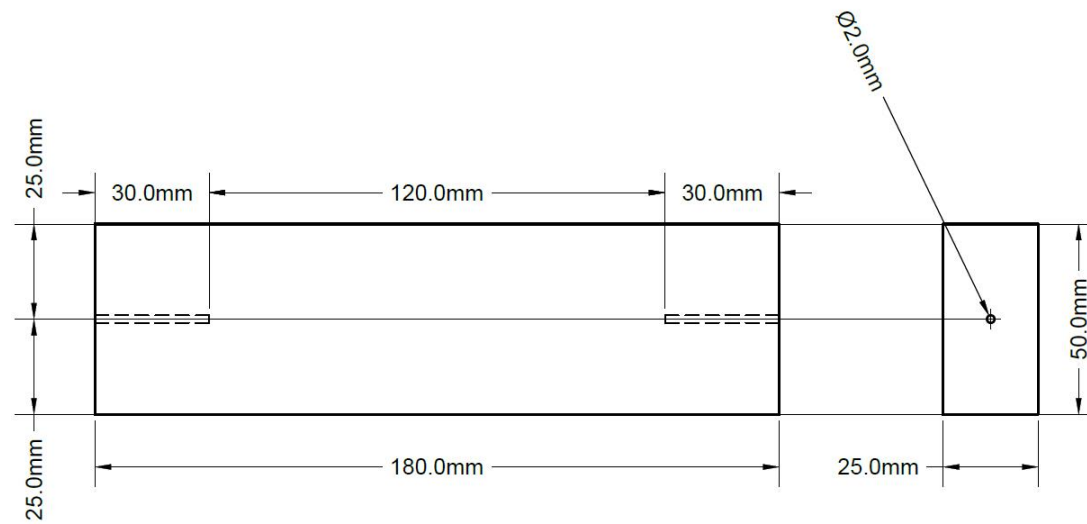
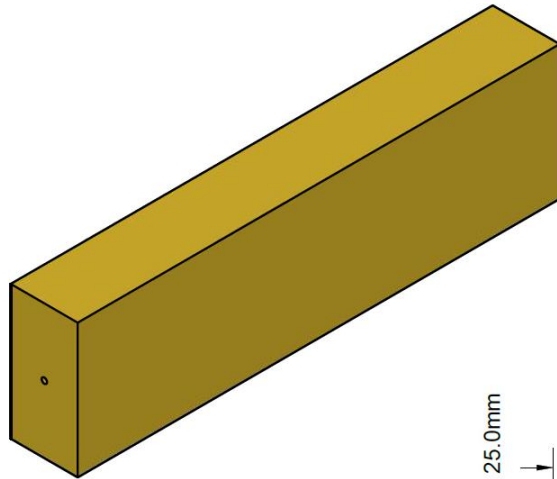
Unit of Measure : Millimeters

Material : Wood

Number of Pieces : 2

SHEET:

5



Project Name : 3D Solar Panels

Piece Name : Side Strengthen Pillar Frame

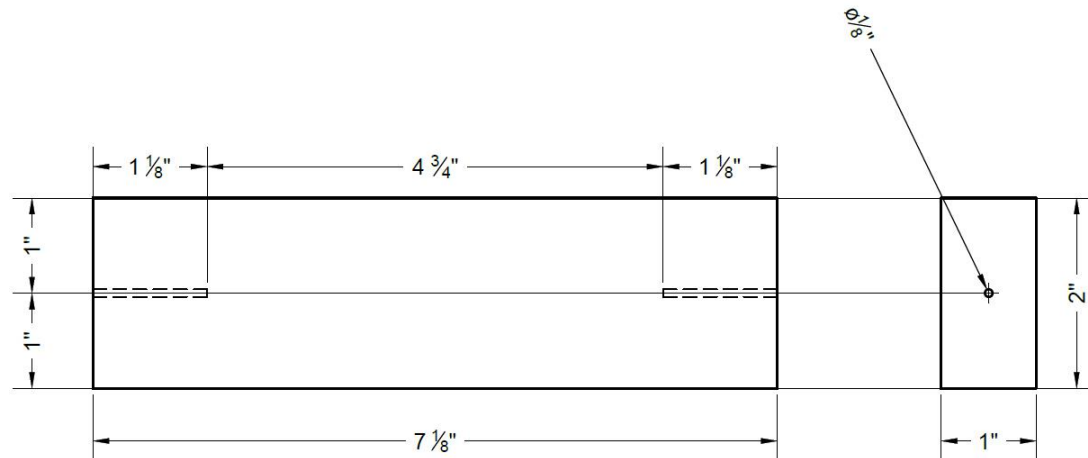
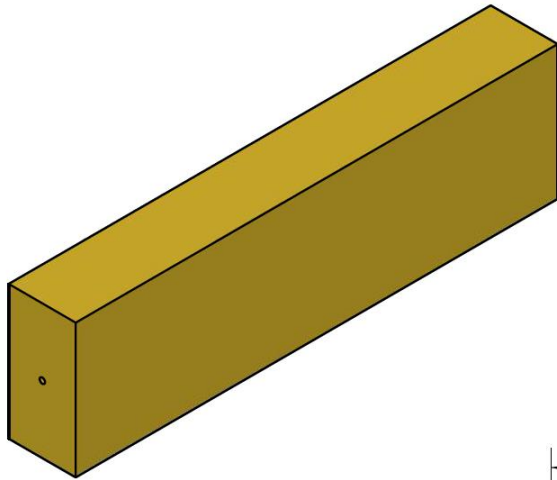
Unit of Measure : Inches

Material : Wood

Number of Pieces : 2

SHEET:

5



Project Name : 3D Solar Panels

Piece Name : Slider

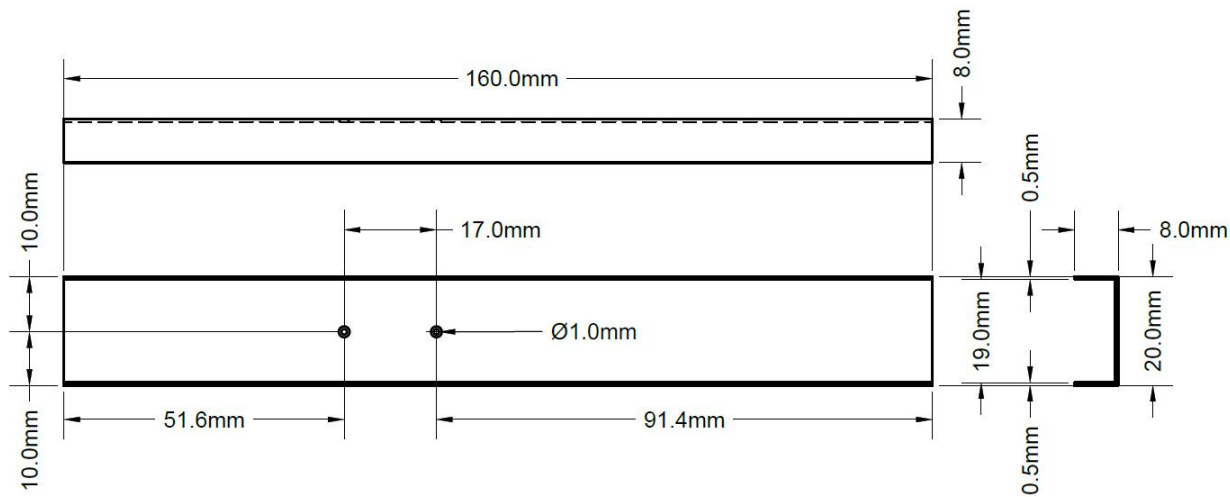
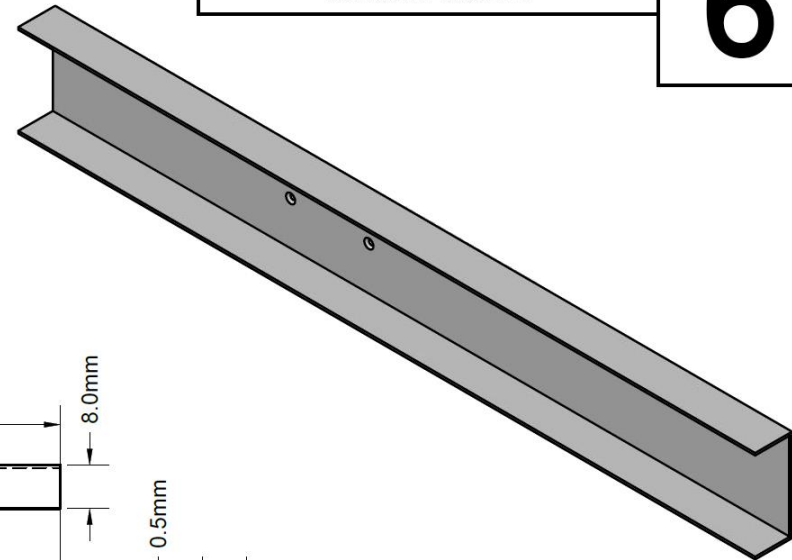
Unit of Measure : Millimeters

Material : PVC

Number of Pieces : 24

SHEET:

6



Project Name : 3D Solar Panels

Piece Name : Slider

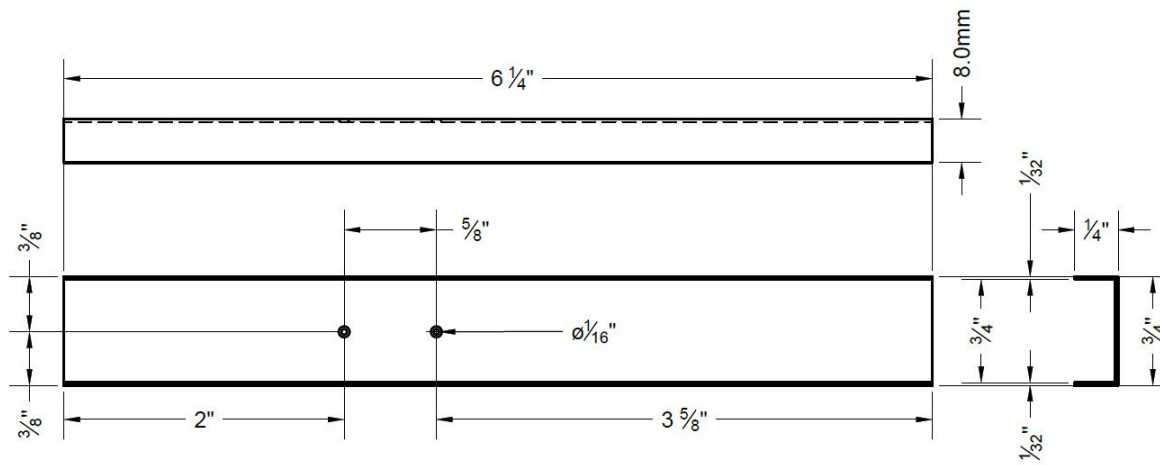
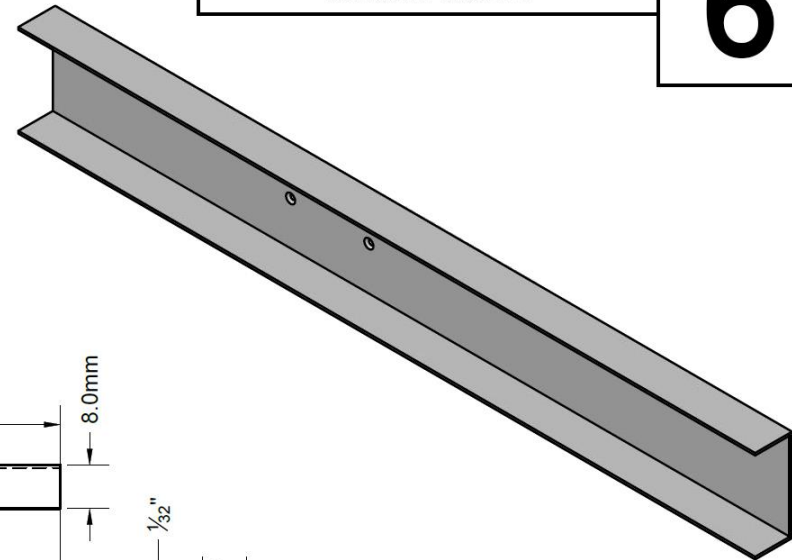
Unit of Measure : Inches

Material : PVC

Number of Pieces : 24

SHEET:

6



Project Name : 3D Solar Panels

Piece Name : Frame Enclosure

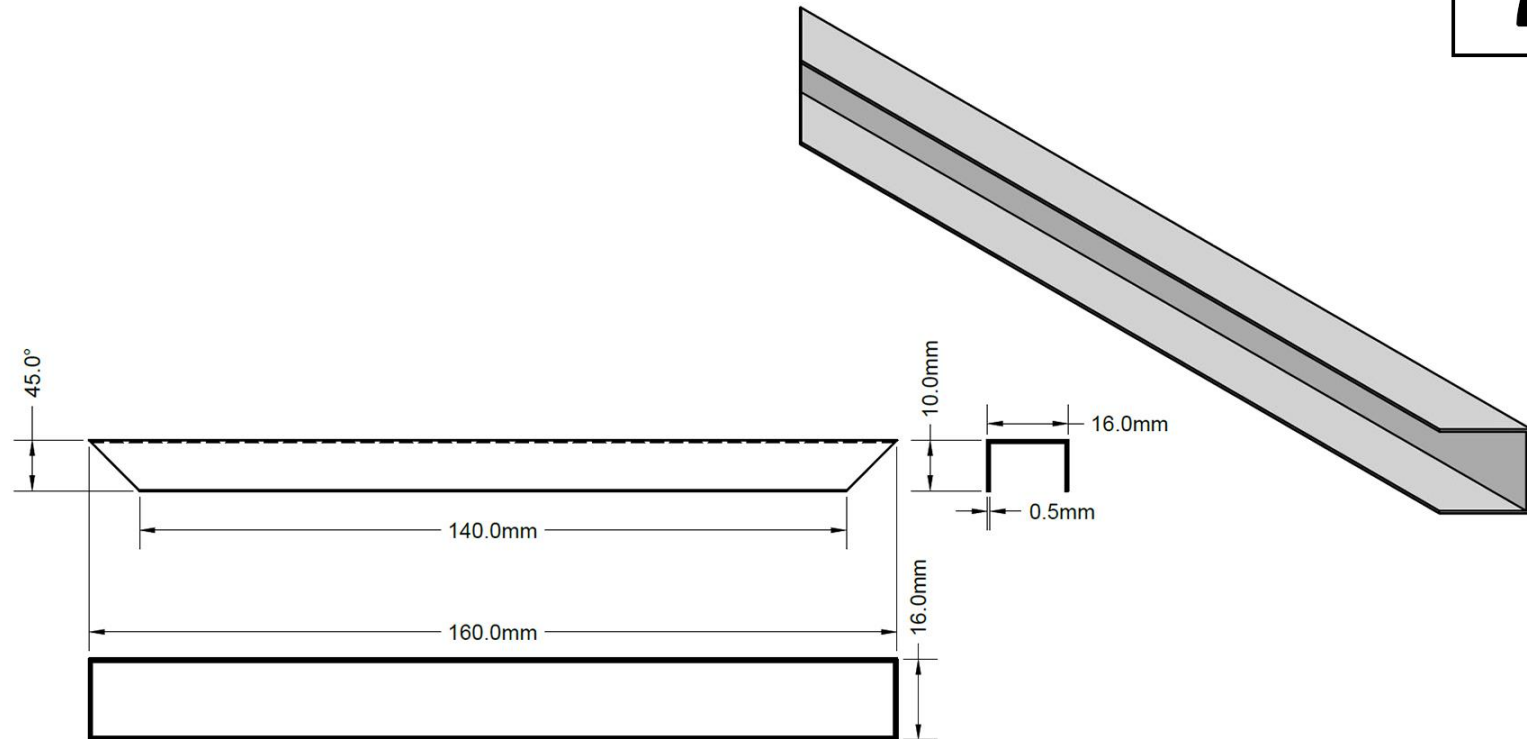
Unit of Measure : Millimeters

Material : PVC

Number of Pieces : 48

SHEET:

7



Project Name : 3D Solar Panels

Piece Name : Frame Enclosure

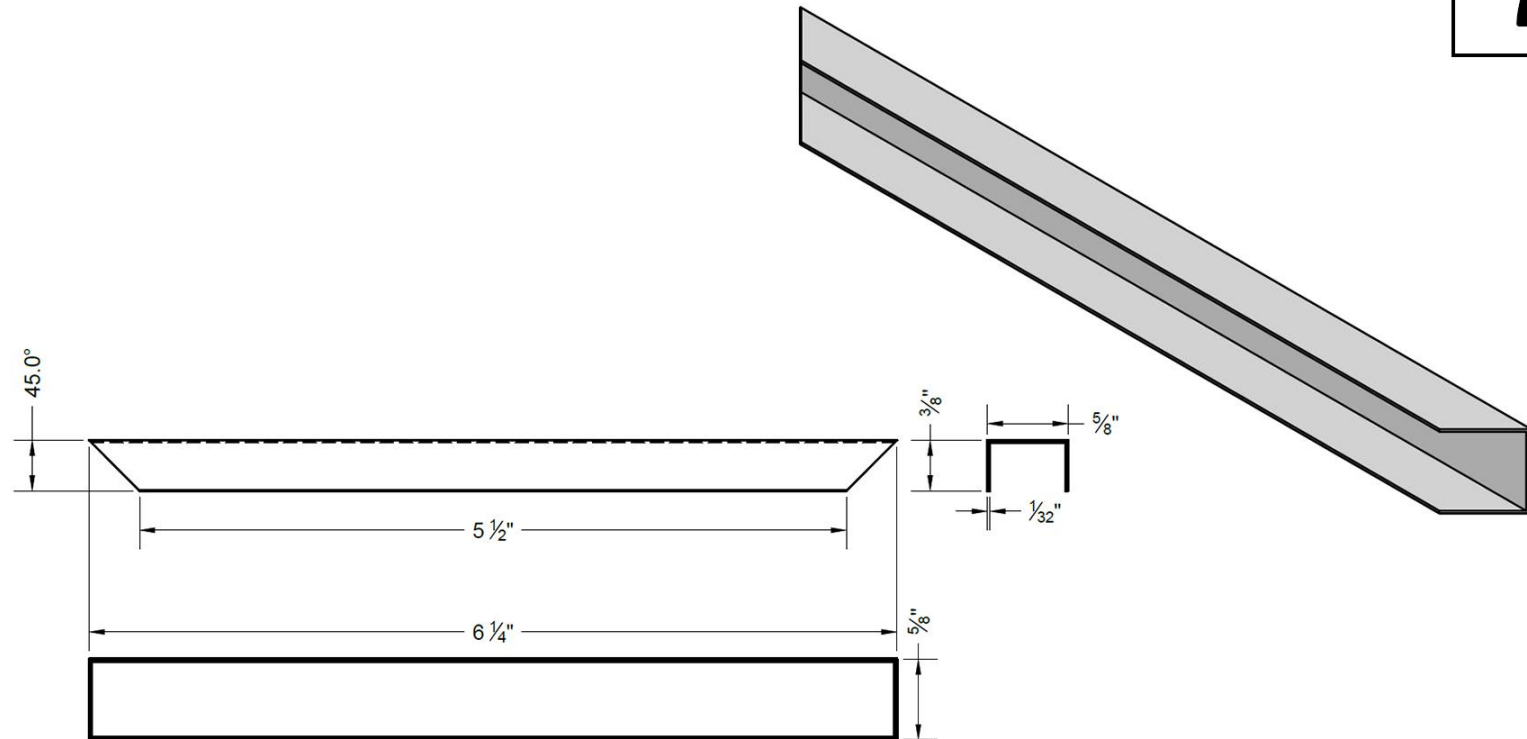
Unit of Measure : Inches

Material : PVC

Number of Pieces : 48

SHEET:

7



Project Name : 3D Solar Panels

Piece Name : Glass Enclosure

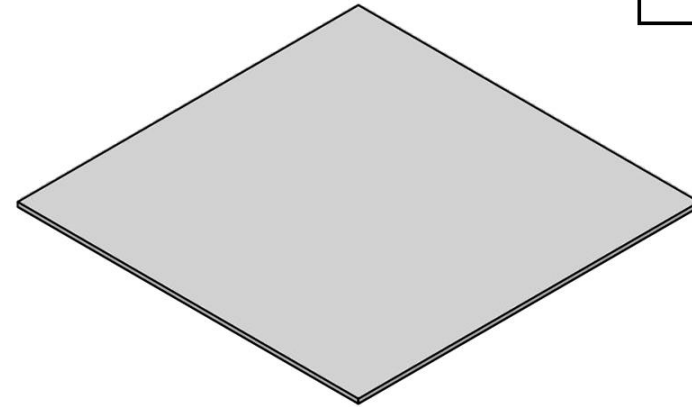
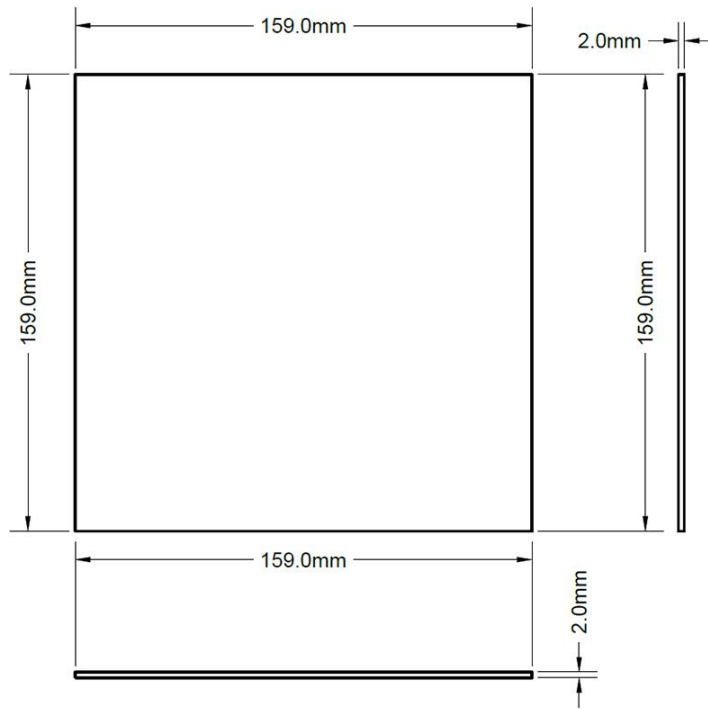
Unit of Measure : Millimeters

Material : Glass

Number of Pieces : 24

SHEET:

8



Project Name : 3D Solar Panels

Piece Name : Glass Enclosure

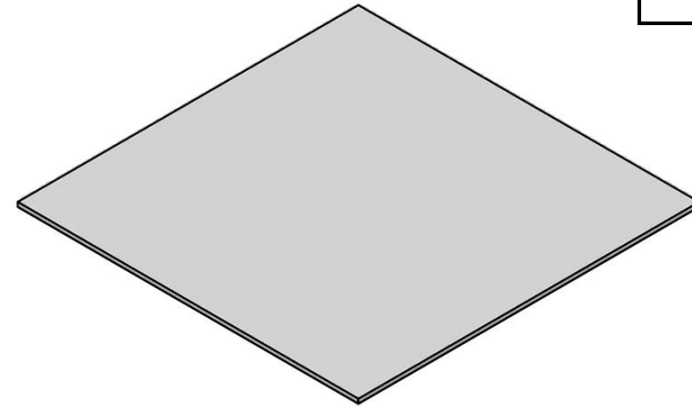
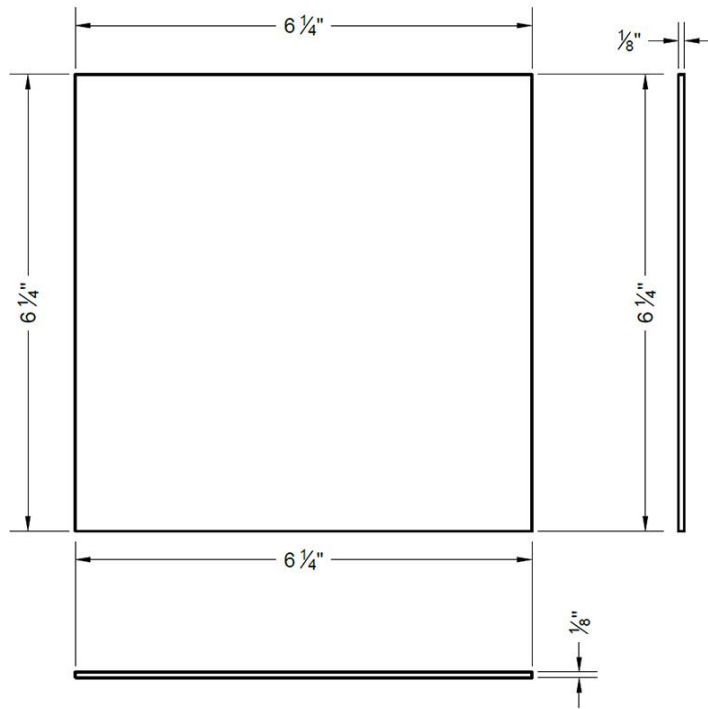
Unit of Measure : Inches

Material : Glass

Number of Pieces : 24

SHEET:

8



Project Name : 3D Solar Panels

Piece Name : Solar Cell

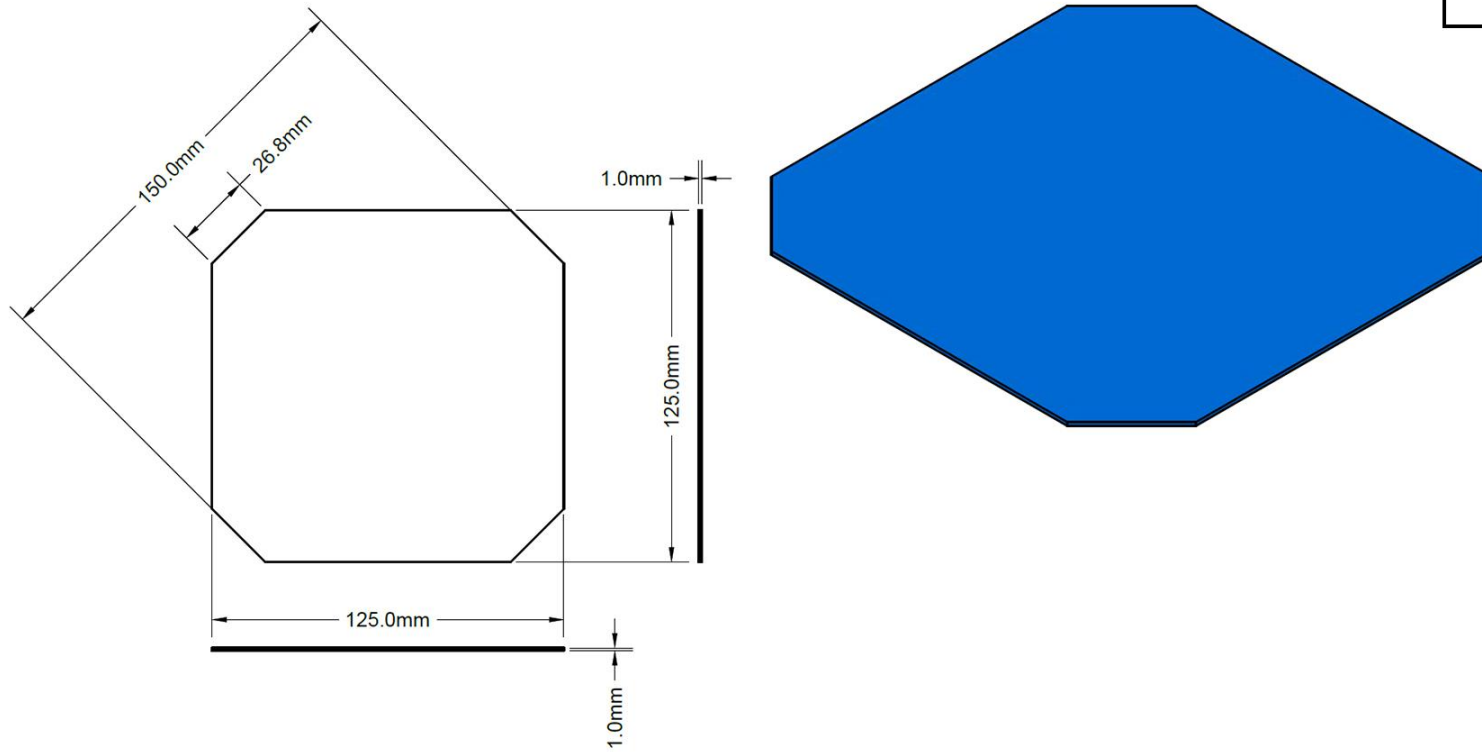
Unit of Measure : Millimeters

Material : Photovoltaic

Number of Pieces : 24

SHEET:

9



Project Name : 3D Solar Panels

Piece Name : Solar Cell

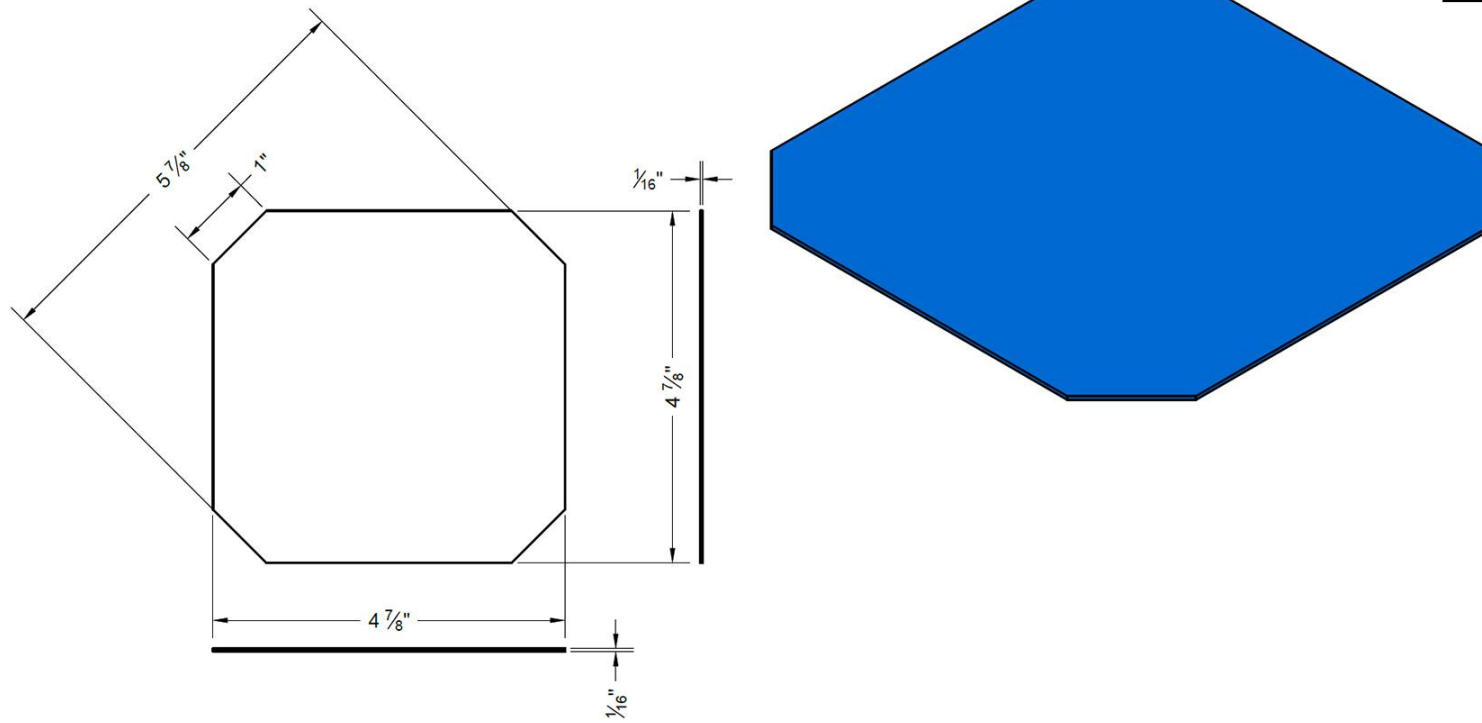
Unit of Measure : Inches

Material : Photovoltaic

Number of Pieces : 24

SHEET:

9



Project Name : 3D Solar Panels

Piece Name : Solar Cell Bus Bar

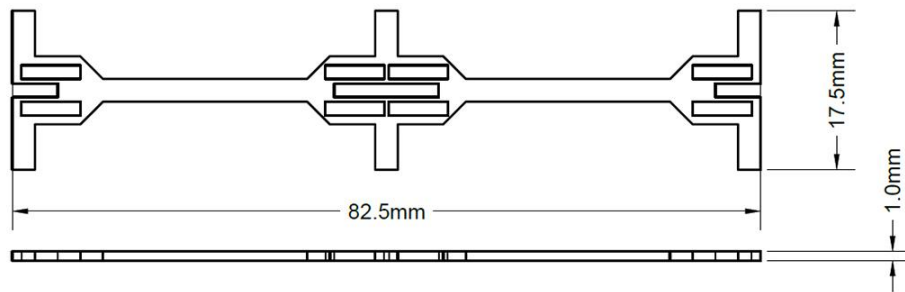
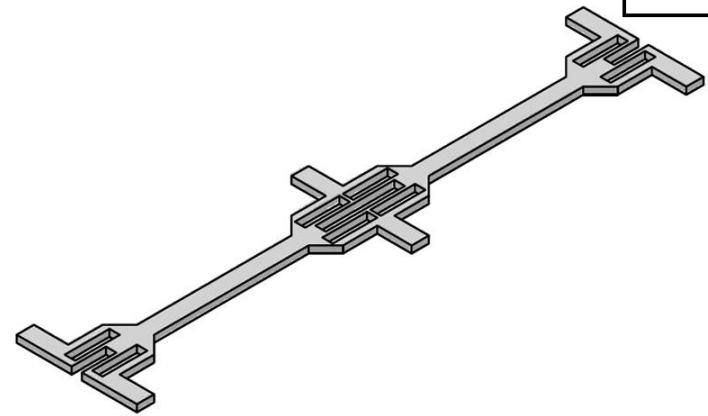
Unit of Measure : Millimeters

Material : Aluminum

Number of Pieces : 48

SHEET:

10



Project Name : 3D Solar Panels

Piece Name : Solar Cell Bus Bar

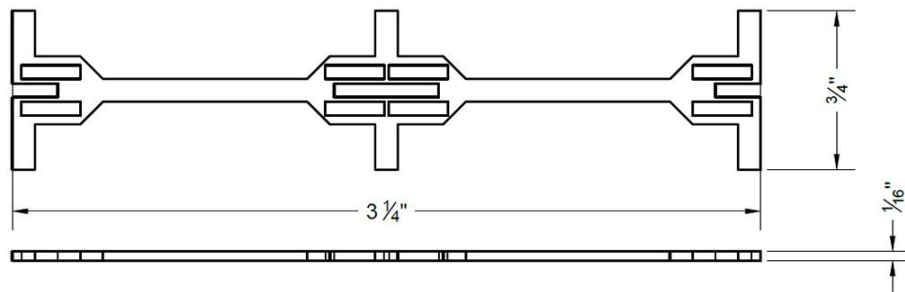
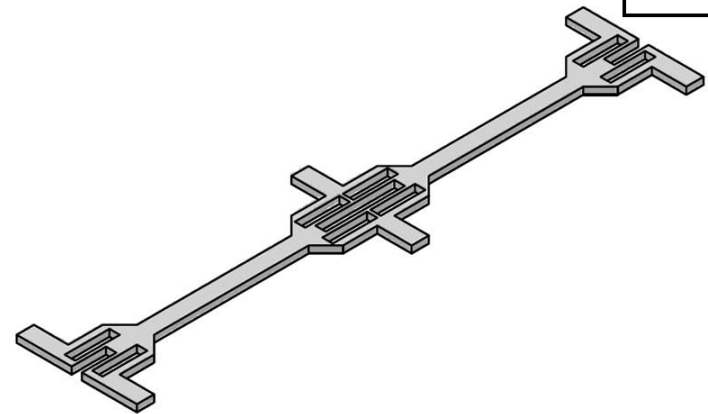
Unit of Measure : Inches

Material : Aluminum

Number of Pieces : 48

SHEET:

10



Project Name : 3D Solar Panels

Piece Name : Polycarbonate Sheet

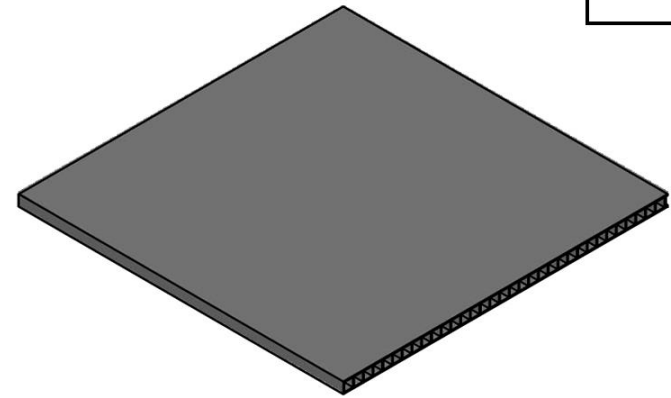
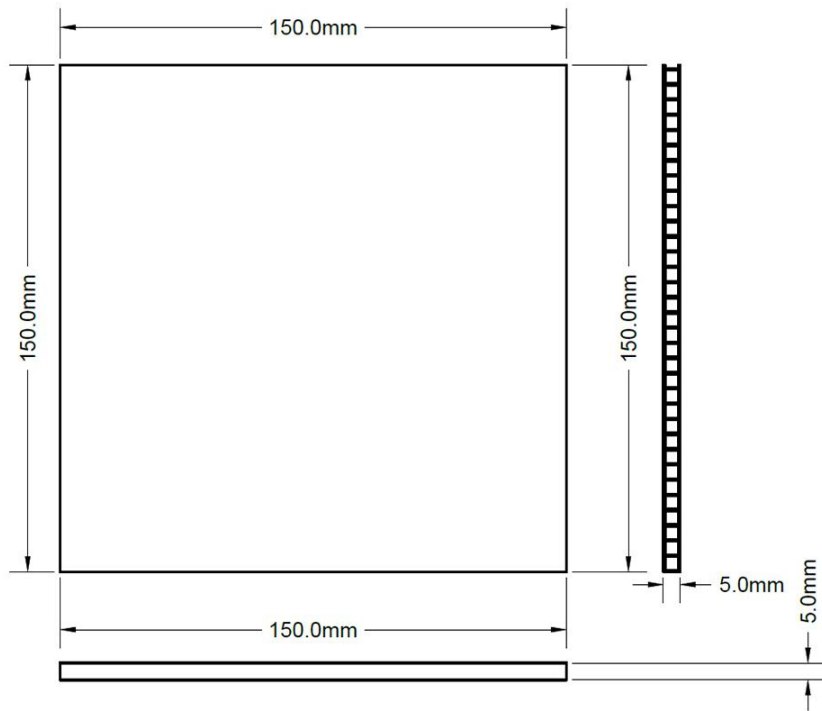
Unit of Measure : Millimeters

Material : Polycarbonate

Number of Pieces : 12

SHEET:

11



Project Name : 3D Solar Panels

Piece Name : Polycarbonate Sheet

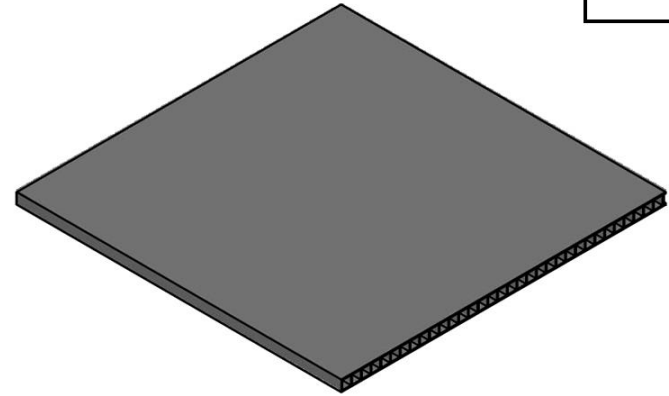
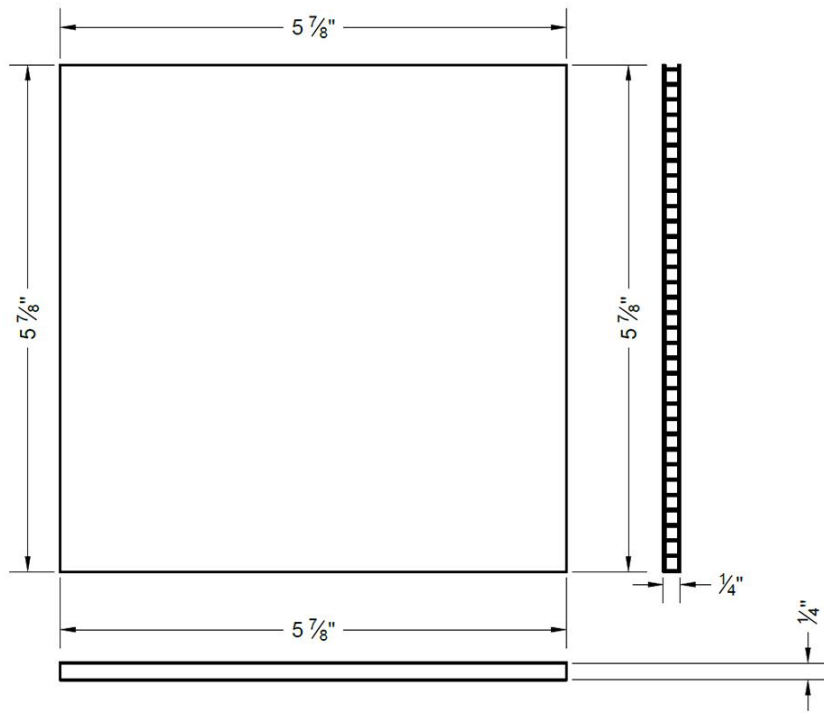
Unit of Measure : Inches

Material : Polycarbonate

Number of Pieces : 12

SHEET:

11



Project Name : 3D Solar Panels

Piece Name : Self Tapping Screw M4x45mm

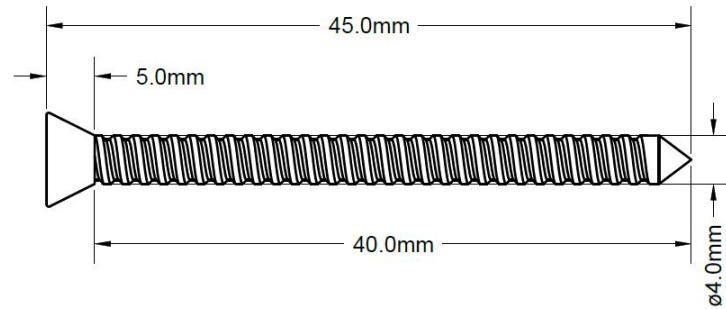
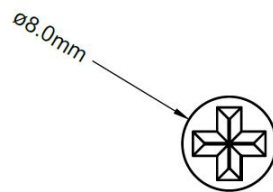
Unit of Measure : Millimeters

Material : Steel

Number of Pieces : 14

SHEET:

12



Project Name : 3D Solar Panels

Piece Name : Self Tapping Screw M4x45mm

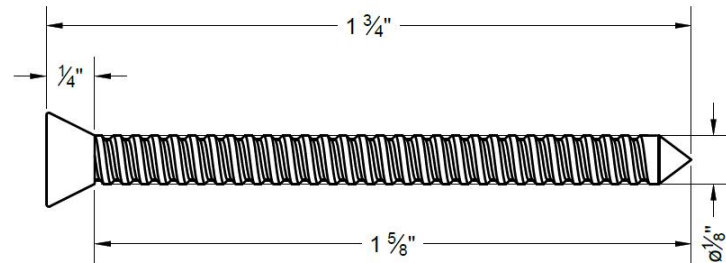
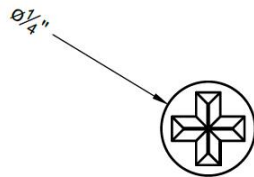
Unit of Measure : Inches

Material : Steel

Number of Pieces : 14

SHEET:

12



Project Name : 3D Solar Panels

Piece Name : Self Tapping Screw M4x80mm

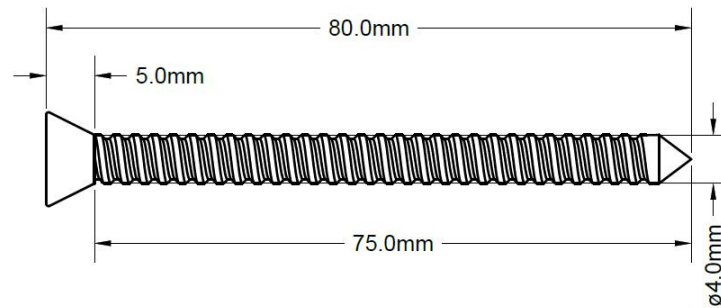
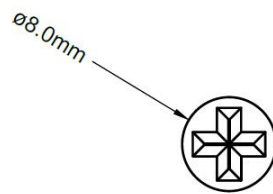
Unit of Measure : Millimeters

Material : Steel

Number of Pieces : 15

SHEET:

13



Project Name : 3D Solar Panels

Piece Name : Self Tapping Screw M4x80mm

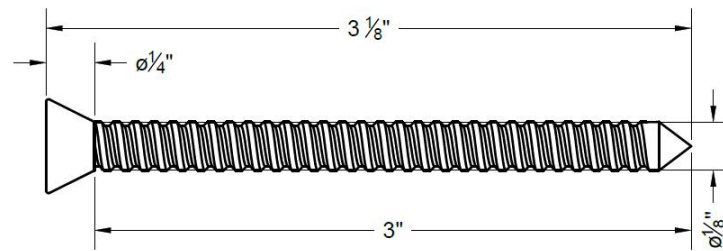
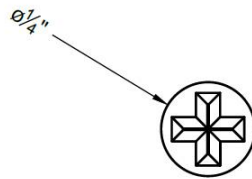
Unit of Measure : Inches

Material : Steel

Number of Pieces : 15

SHEET:

13



Project Name : 3D Solar Panels

Piece Name : Cable Connector Strip

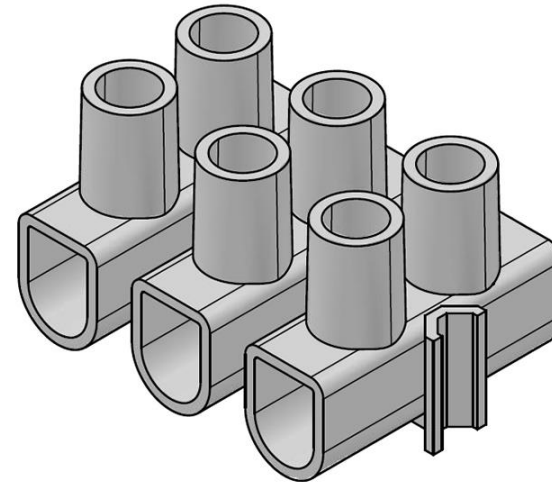
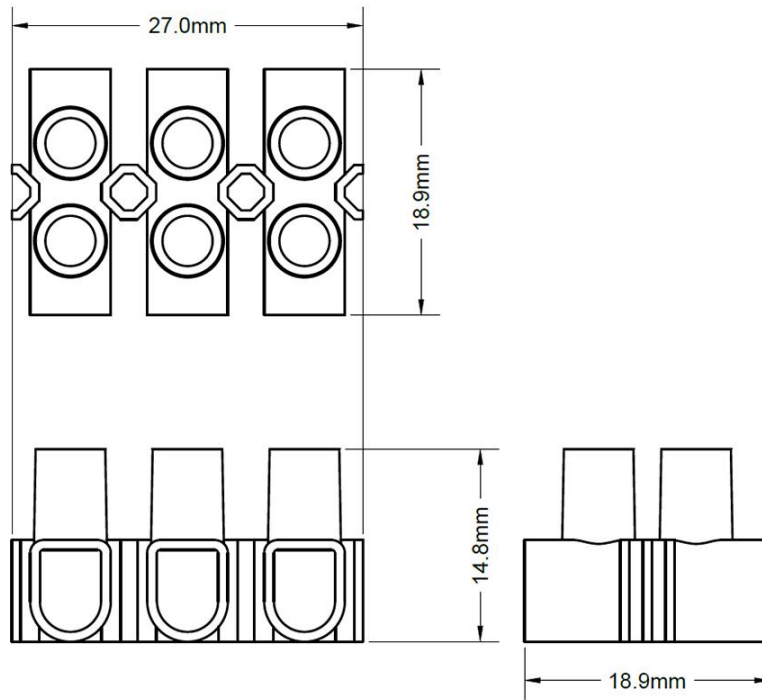
Unit of Measure : Millimeters

Material : Plastic

Number of Pieces : 1

SHEET:

14



Project Name : 3D Solar Panels

Piece Name : Cable Connector Strip

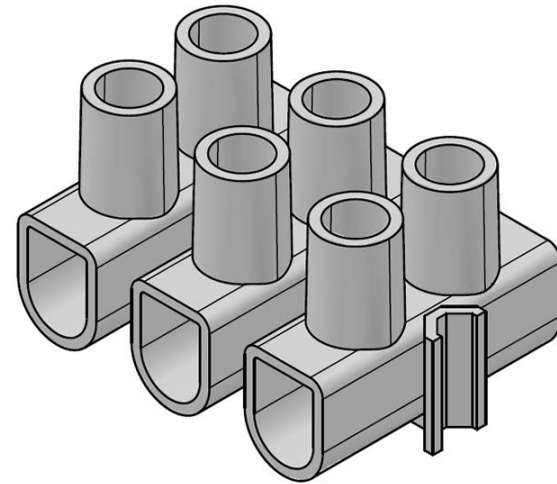
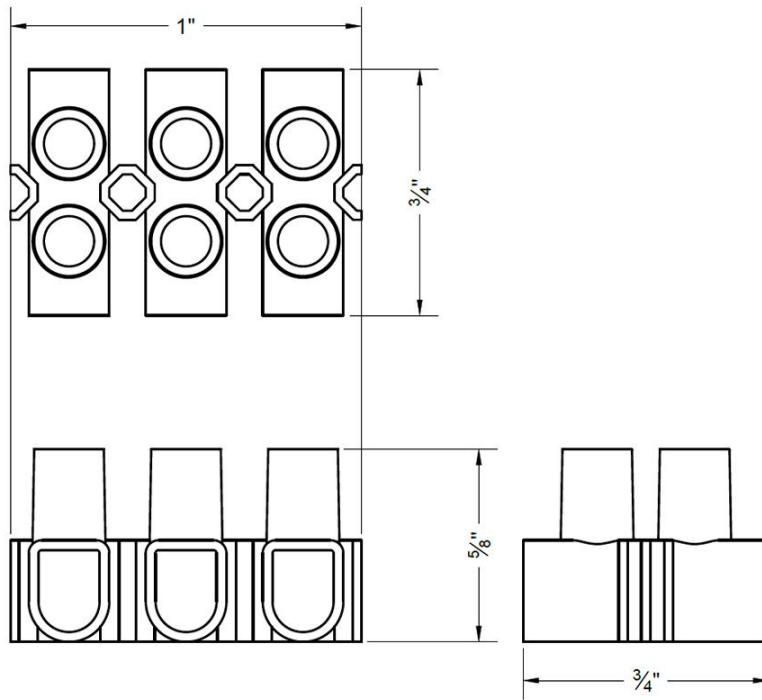
Unit of Measure : Inches

Material : Plastic

Number of Pieces : 1

SHEET:

14



Project Name : 3D Solar Panels

Piece Name : Solar Controller

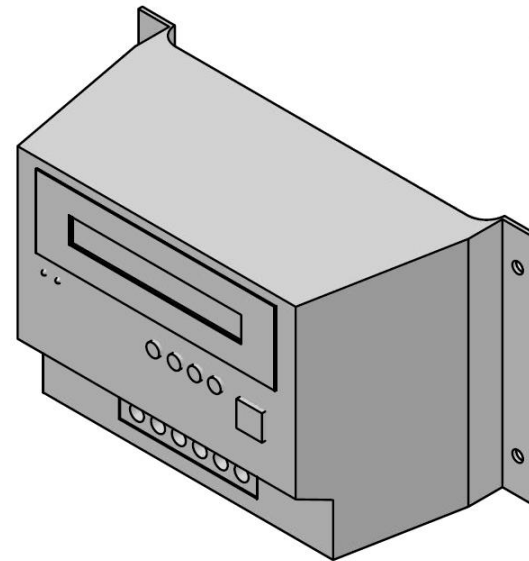
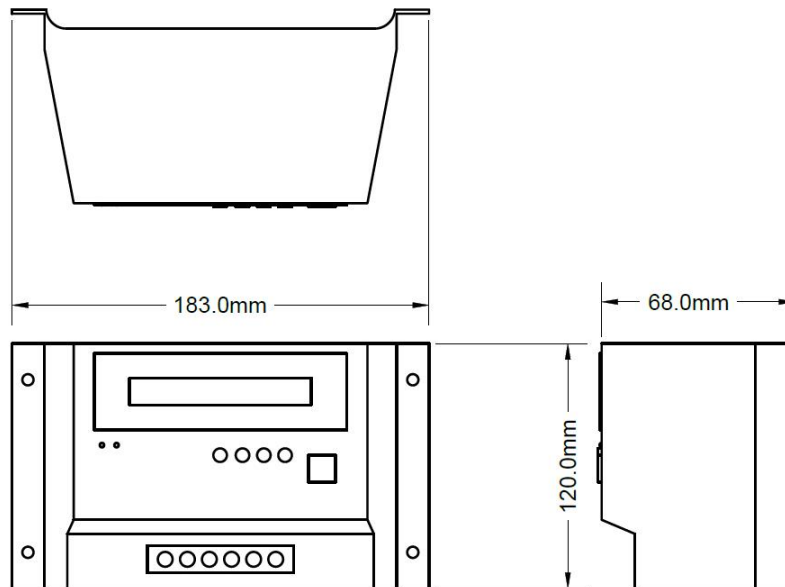
Unit of Measure : Millimeters

Material : Plastic

Number of Pieces : 1

SHEET:

15



Project Name : 3D Solar Panels

Piece Name : Solar Controller

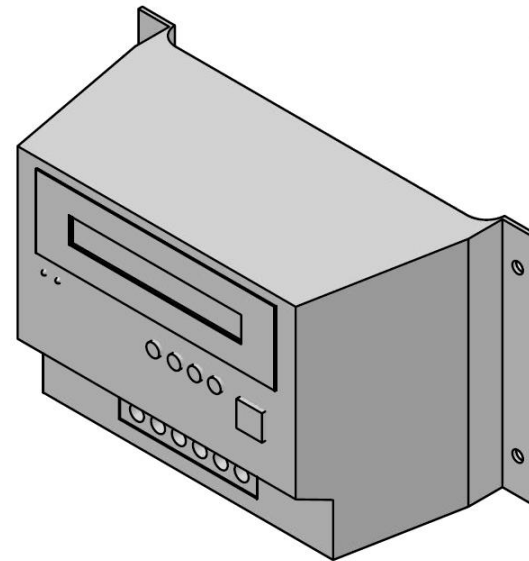
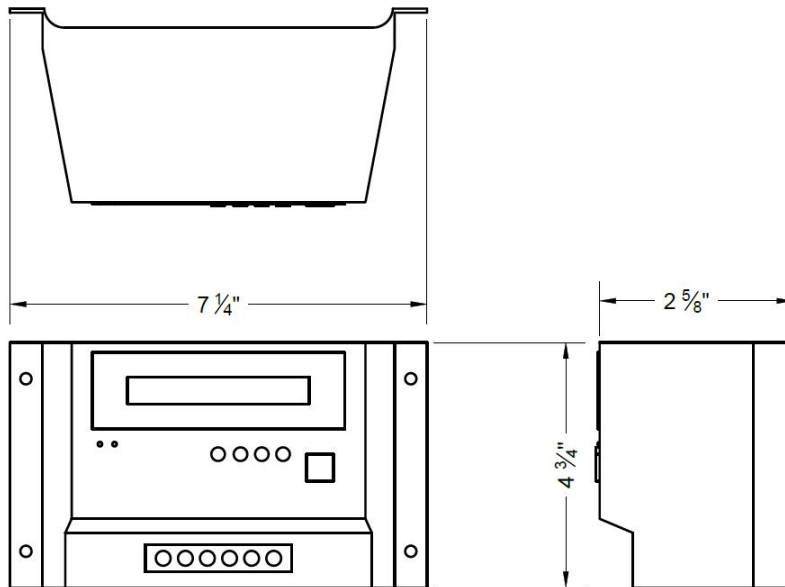
Unit of Measure : Inches

Material : Plastic

Number of Pieces : 1

SHEET:

15



Project Name : 3D Solar Panels

Piece Name : Cable Clamps

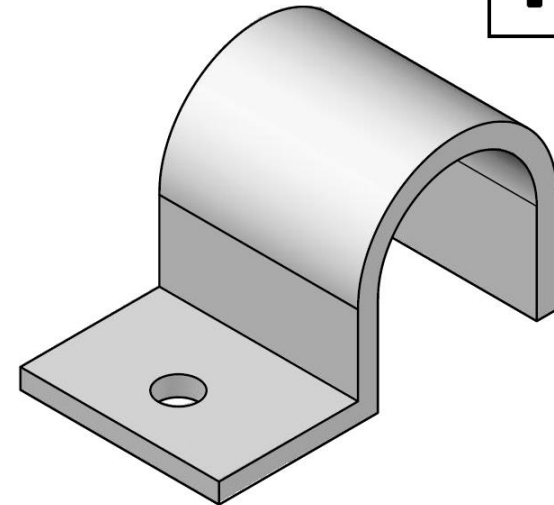
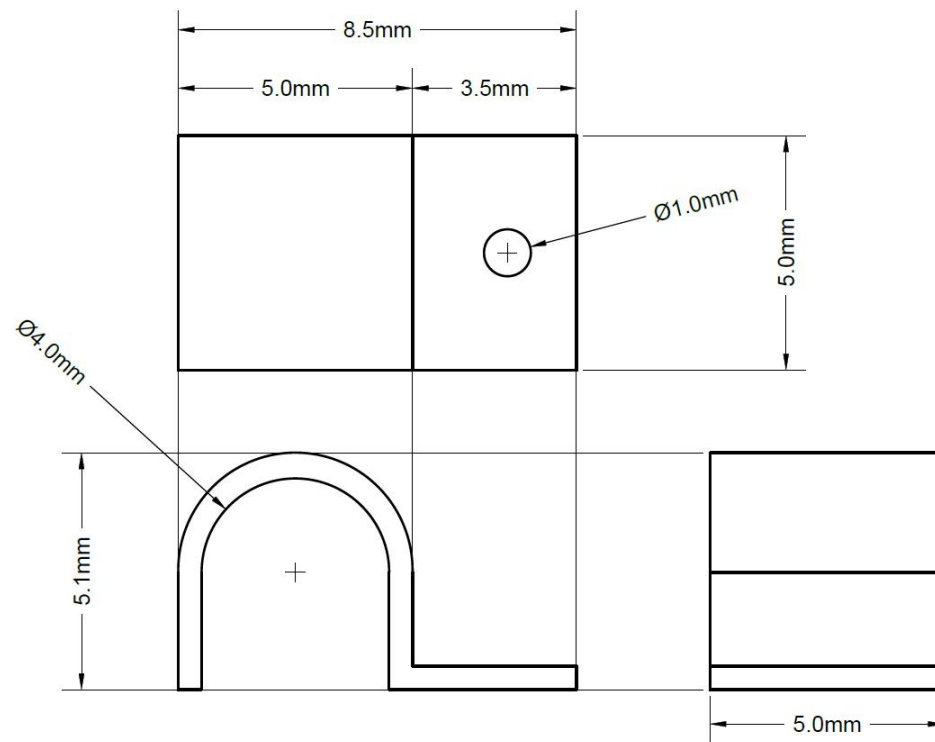
Unit of Measure : Millimeters

Material : PVC

Number of Pieces : 15

SHEET:

16



Project Name : 3D Solar Panels

Piece Name : Cable Clamps

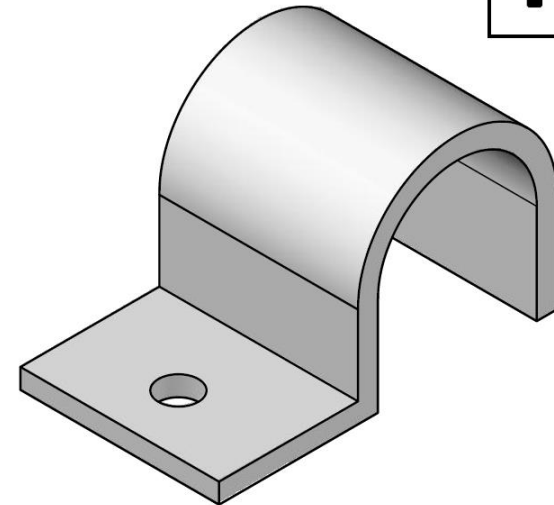
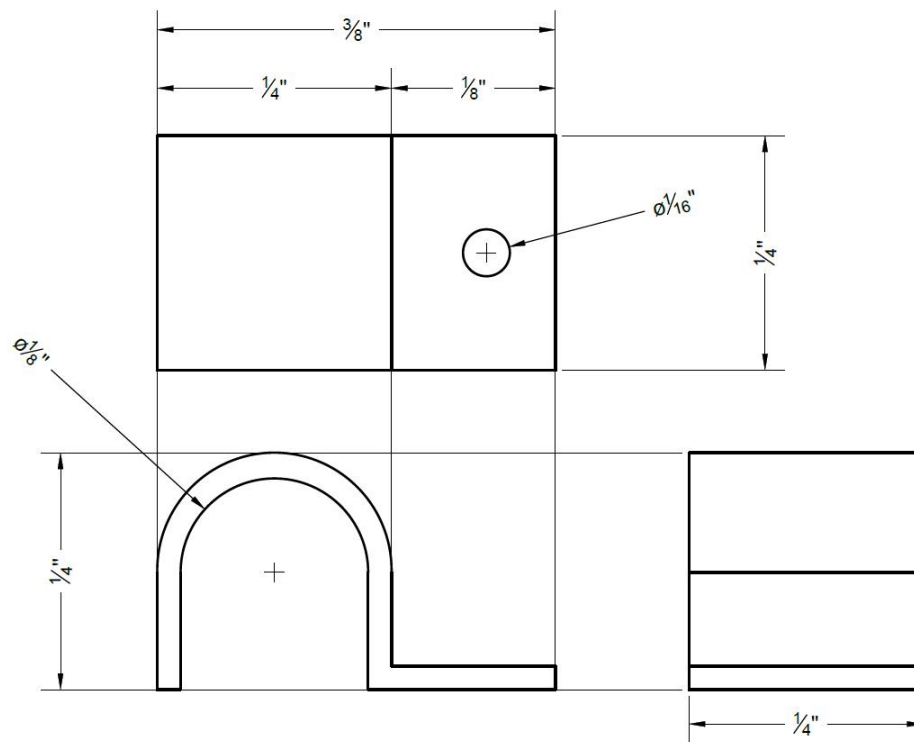
Unit of Measure : Inches

Material : PVC

Number of Pieces : 15

SHEET:

16



Project Name : 3D Solar Panels

Piece Name : $\varnothing 1\text{mm}$ Nail

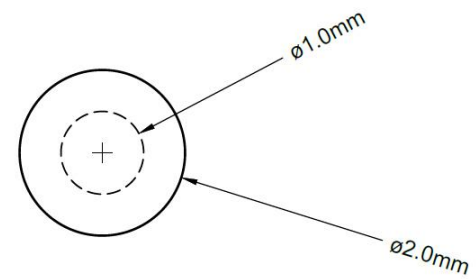
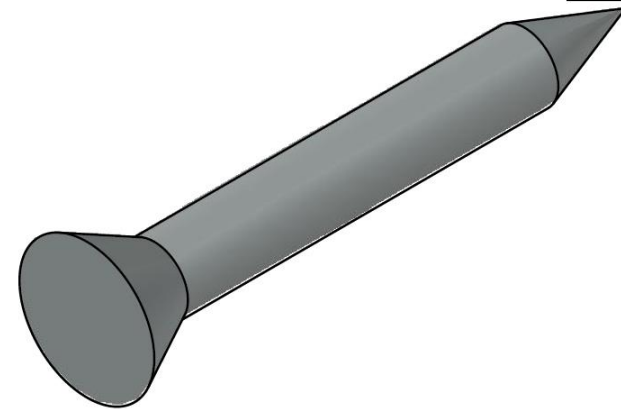
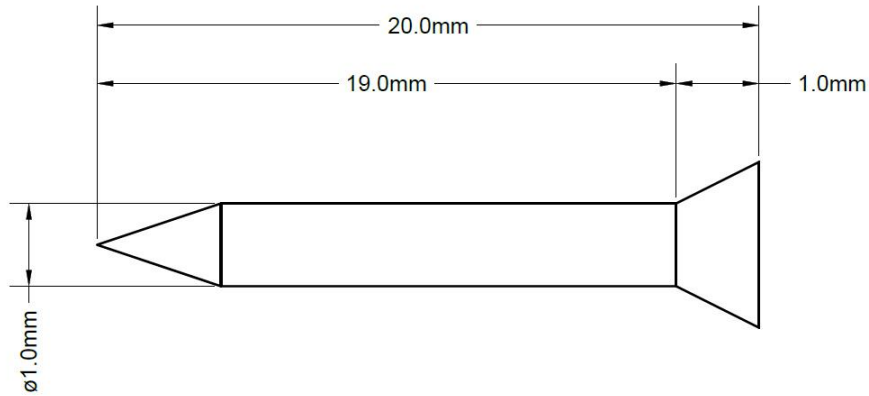
Unit of Measure : Millimeters

Material : Steel

Number of Pieces : 35

SHEET:

17



Project Name : 3D Solar Panels

Piece Name : $\varnothing 1\text{mm}$ Nail

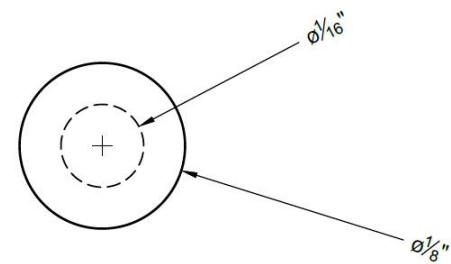
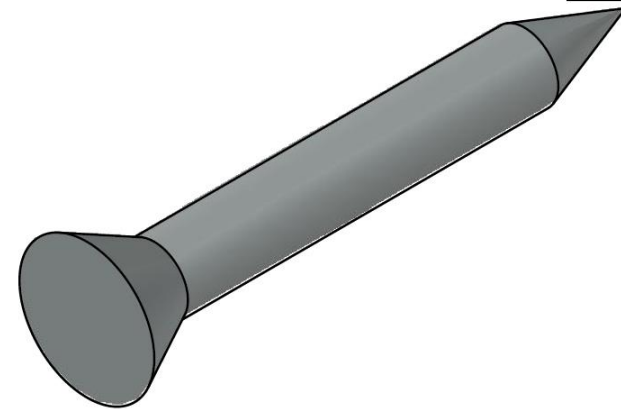
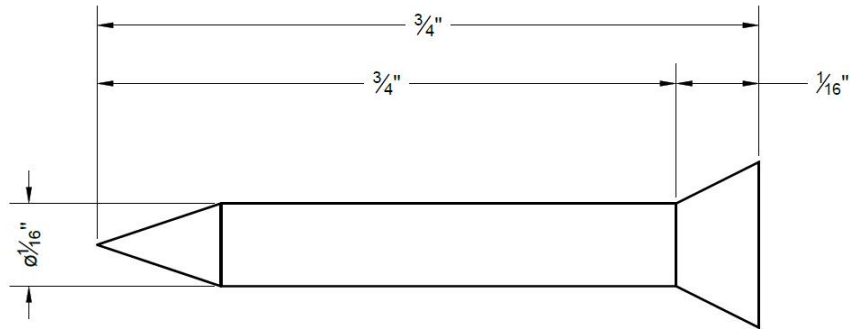
Unit of Measure : Inches

Material : Steel

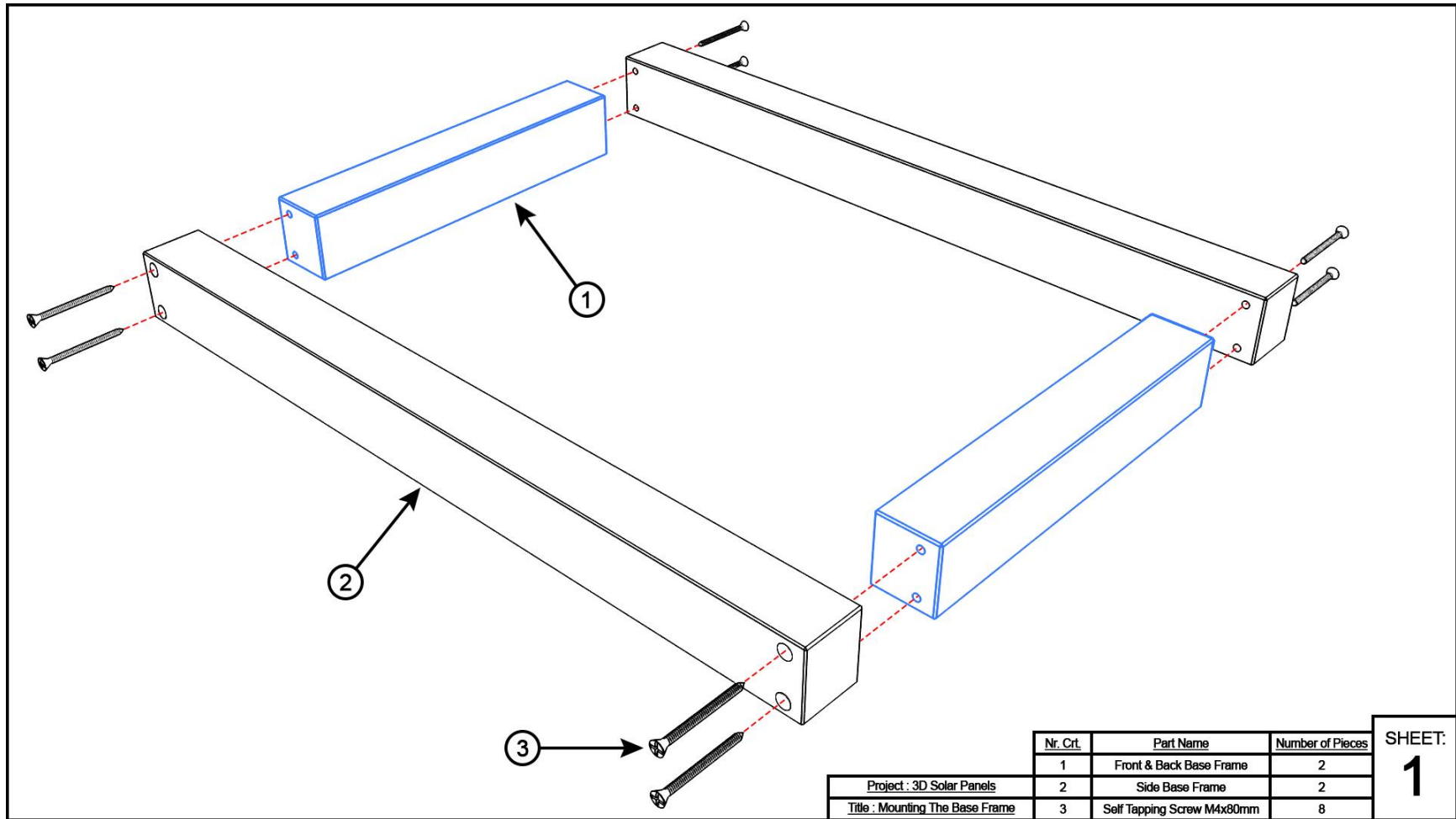
Number of Pieces : 35

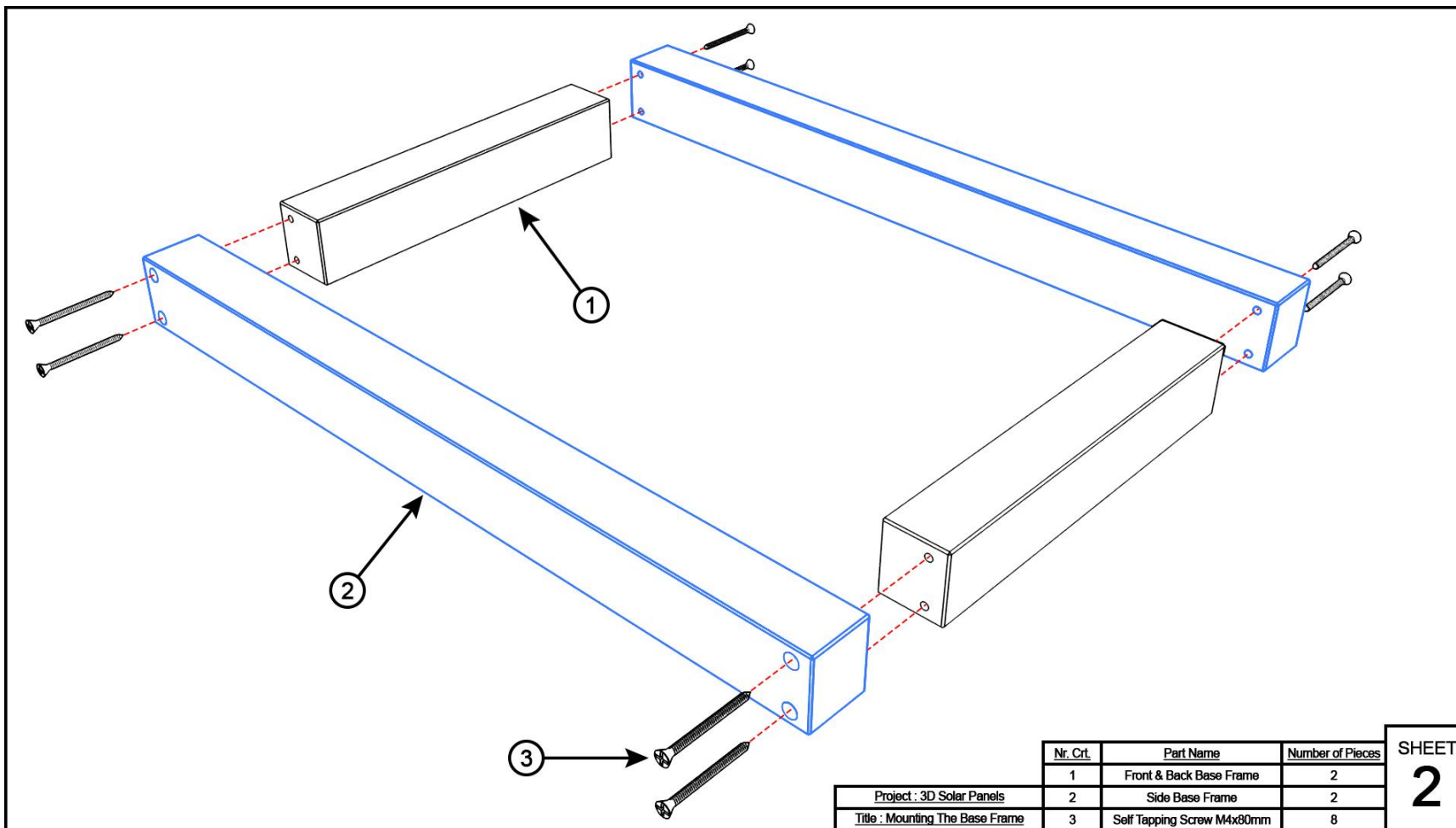
SHEET:

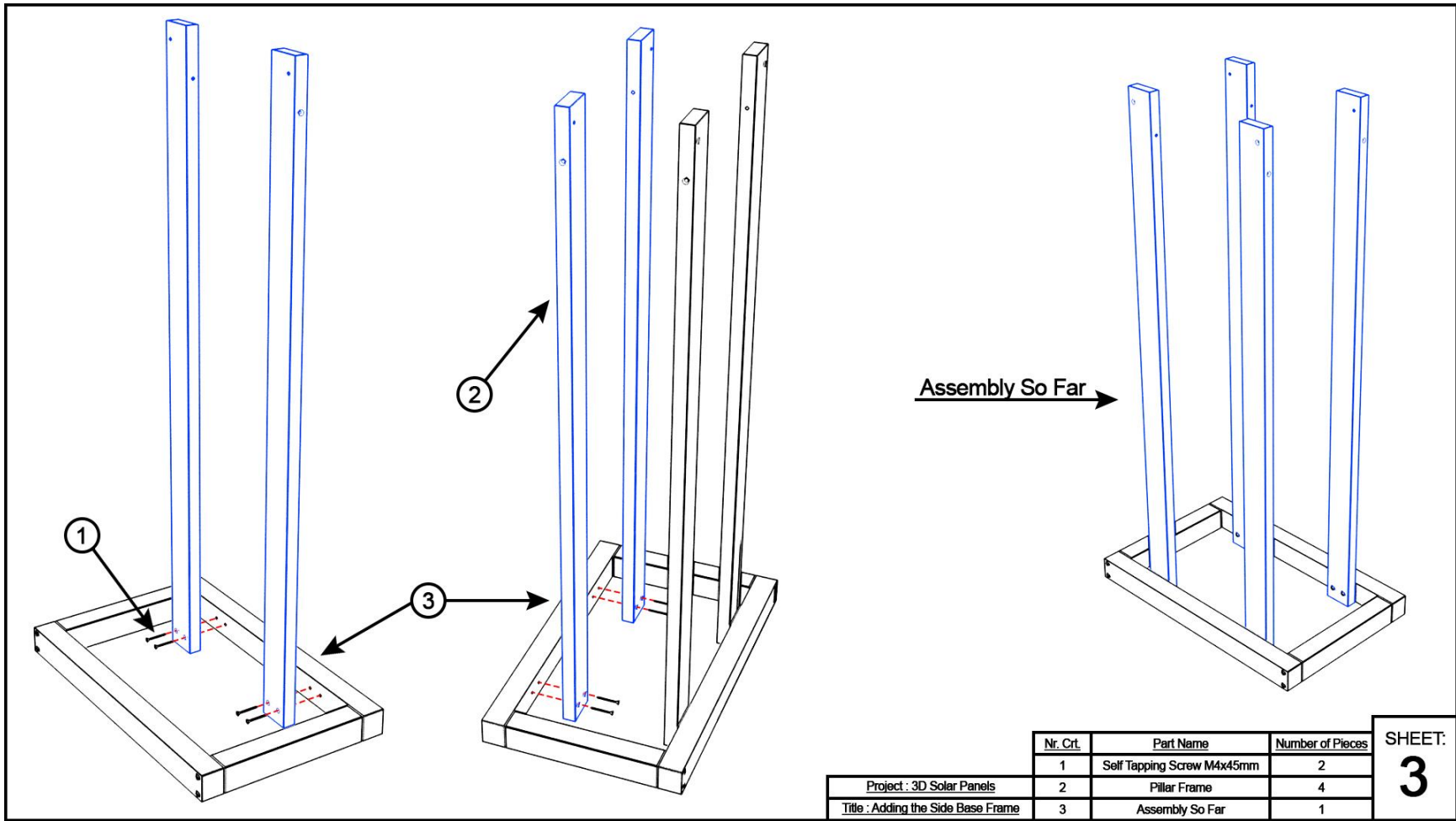
17



Chapter 4: The Assembly/Building Process In Drawings

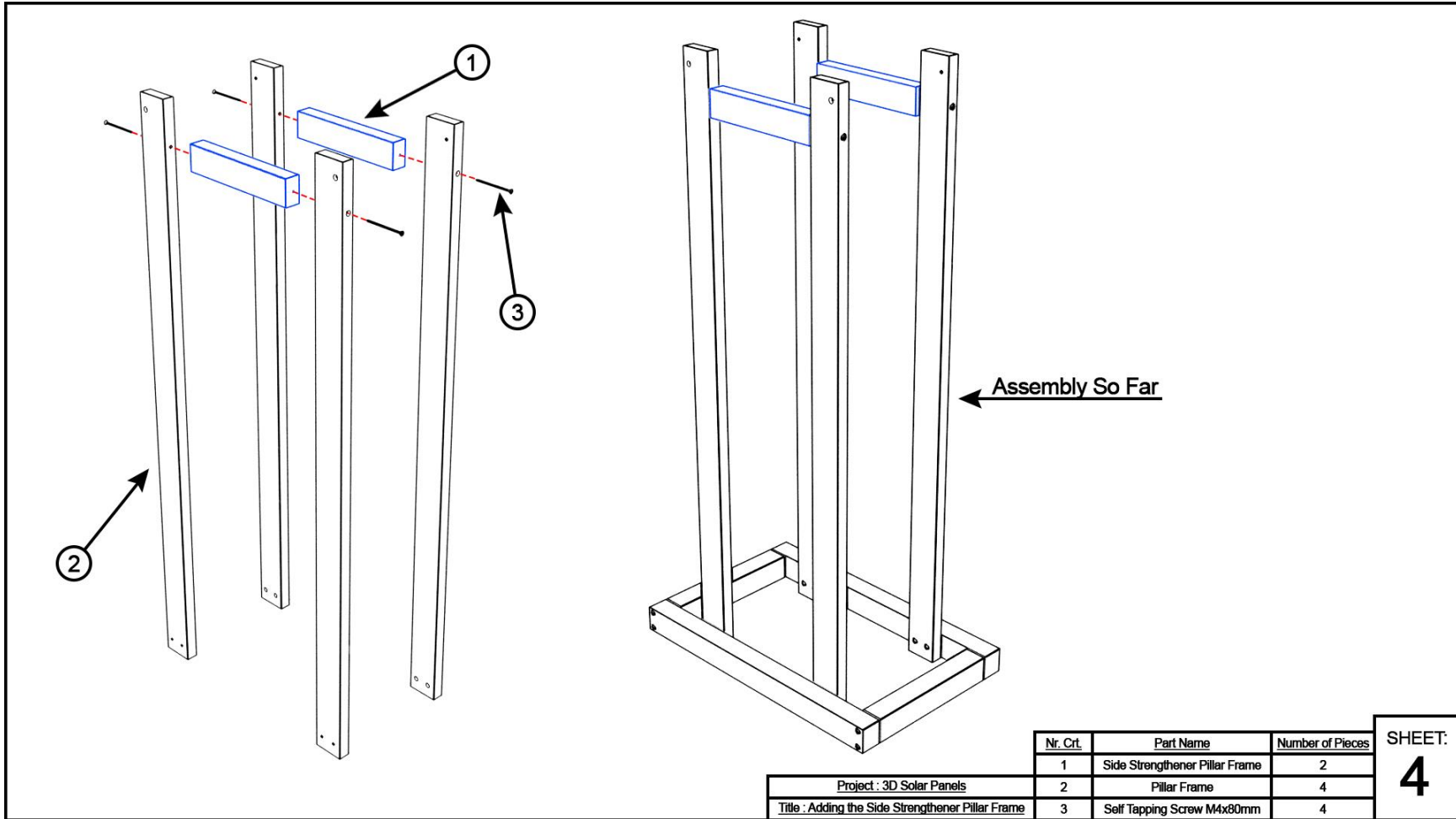


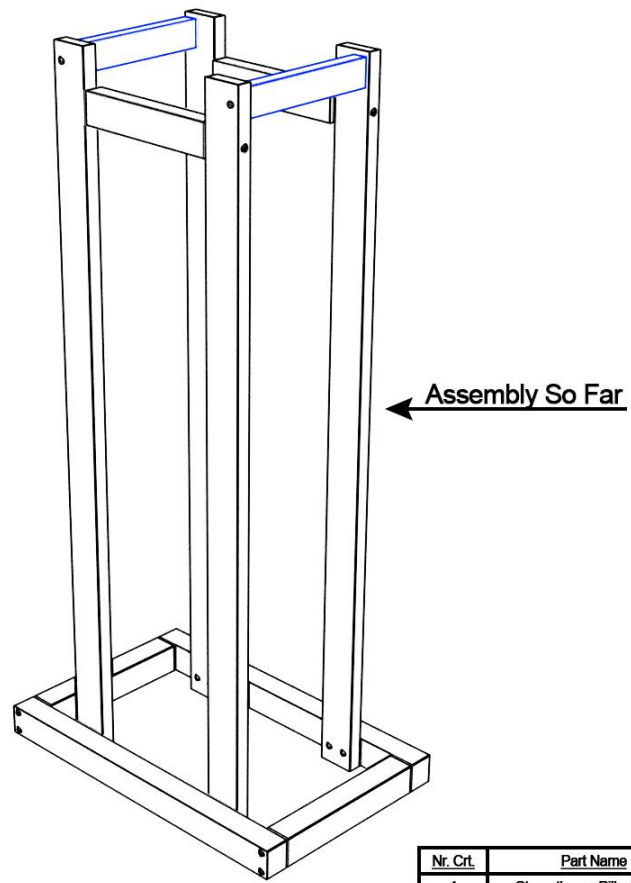
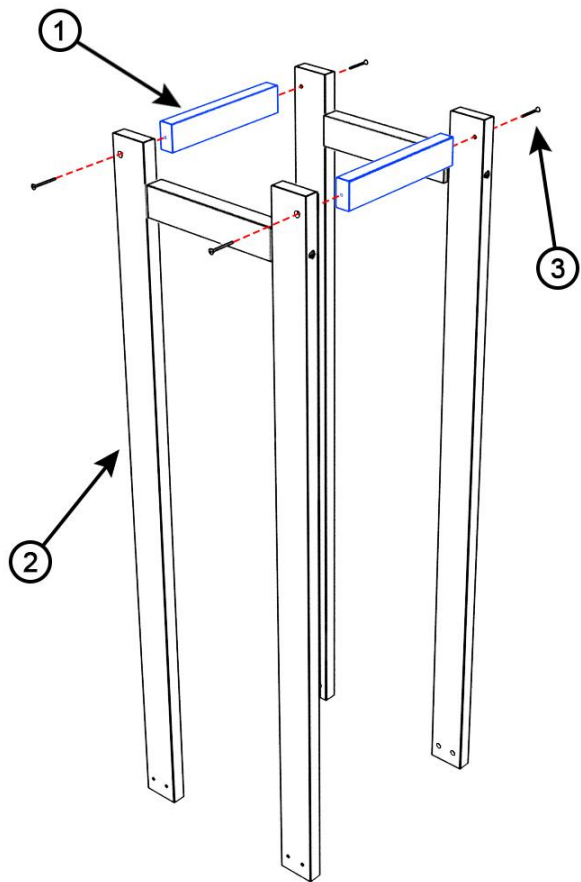




Nr. Crt.	Part Name	Number of Pieces
1	Self Tapping Screw M4x45mm	2
2	Pillar Frame	4
3	Assembly So Far	1

SHEET:
3

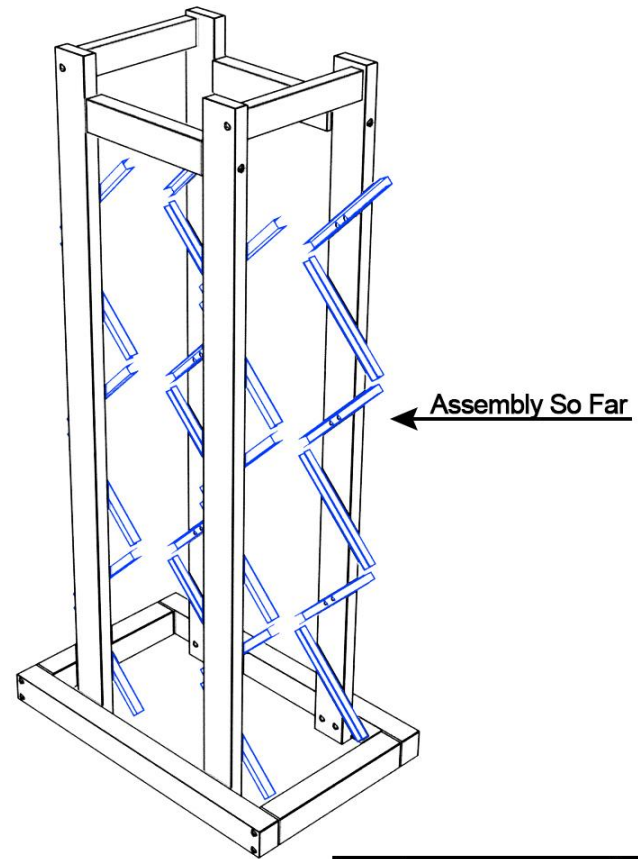
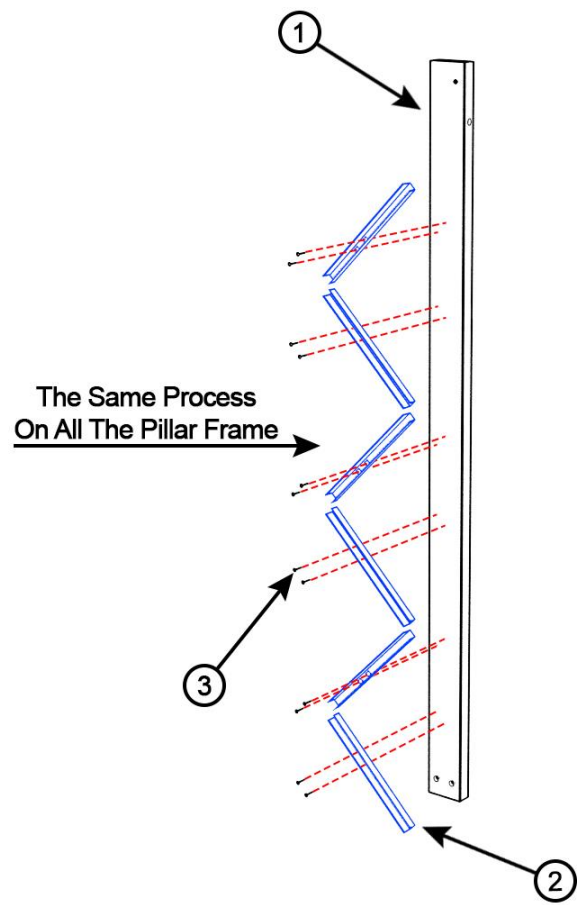




Nr. Crt.	Part Name	Number of Pieces
1	Strengthener Pillar Frame	2
2	Pillar Frame	4
3	Self Tapping Screw M4x45mm	4

Project : 3D Solar Panels
 Title : Adding The Strengthener Pillar Frame

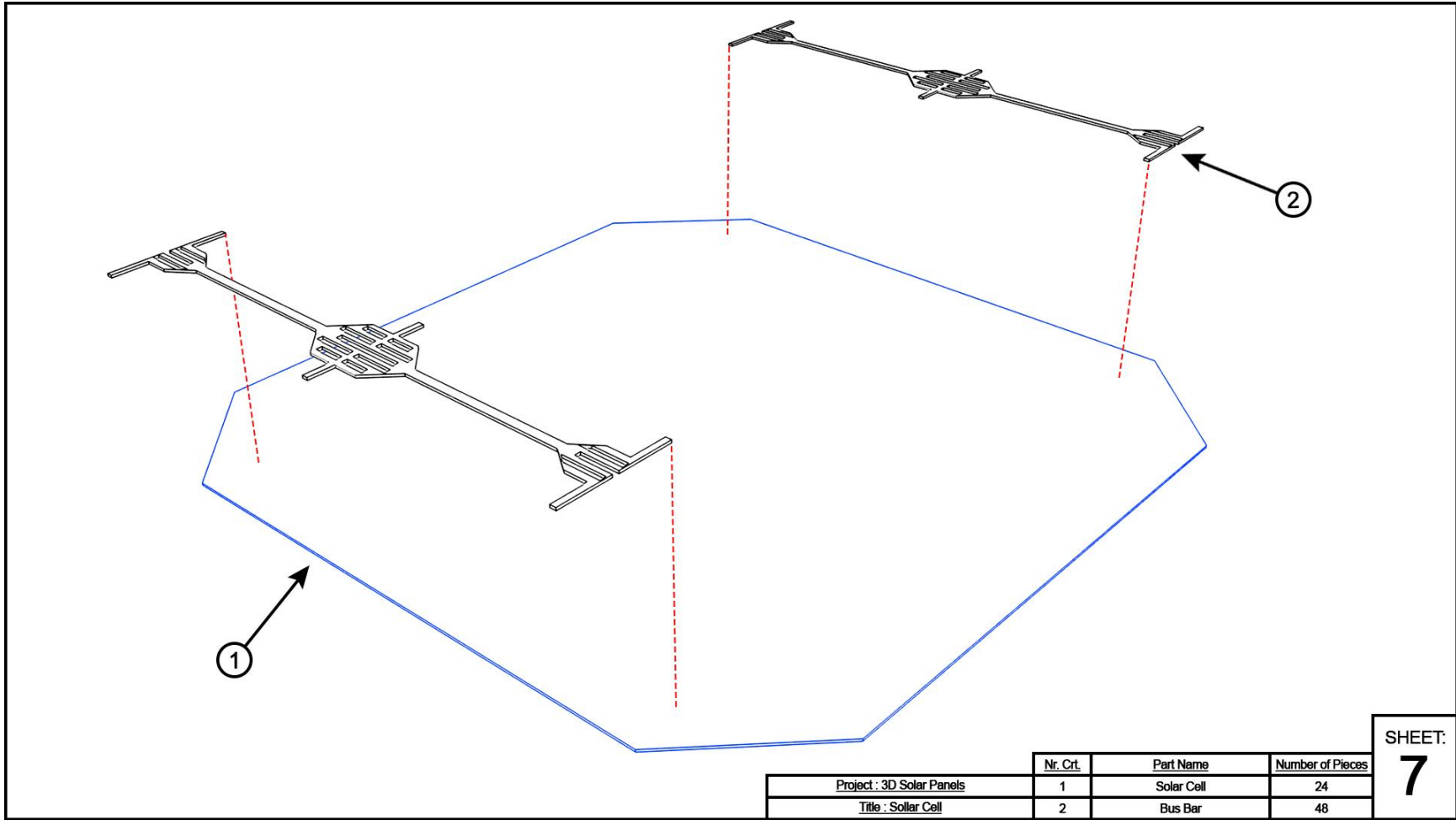
SHEET:
5



Nr. Crt.	Part Name	Number of Pieces
1	Pillar Frame	4
2	Slider	24
3	ø1mm Nail	48

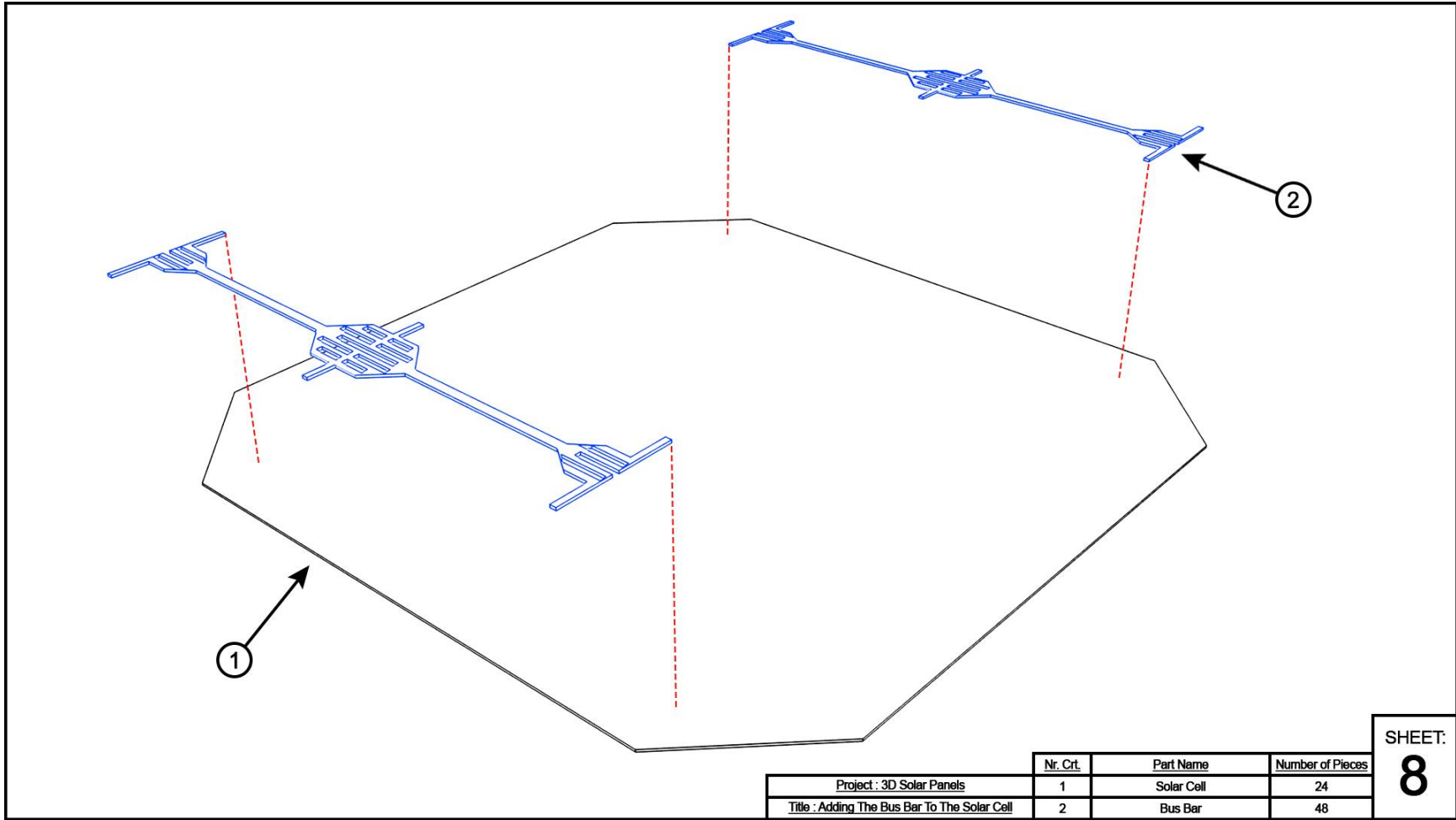
SHEET:

6



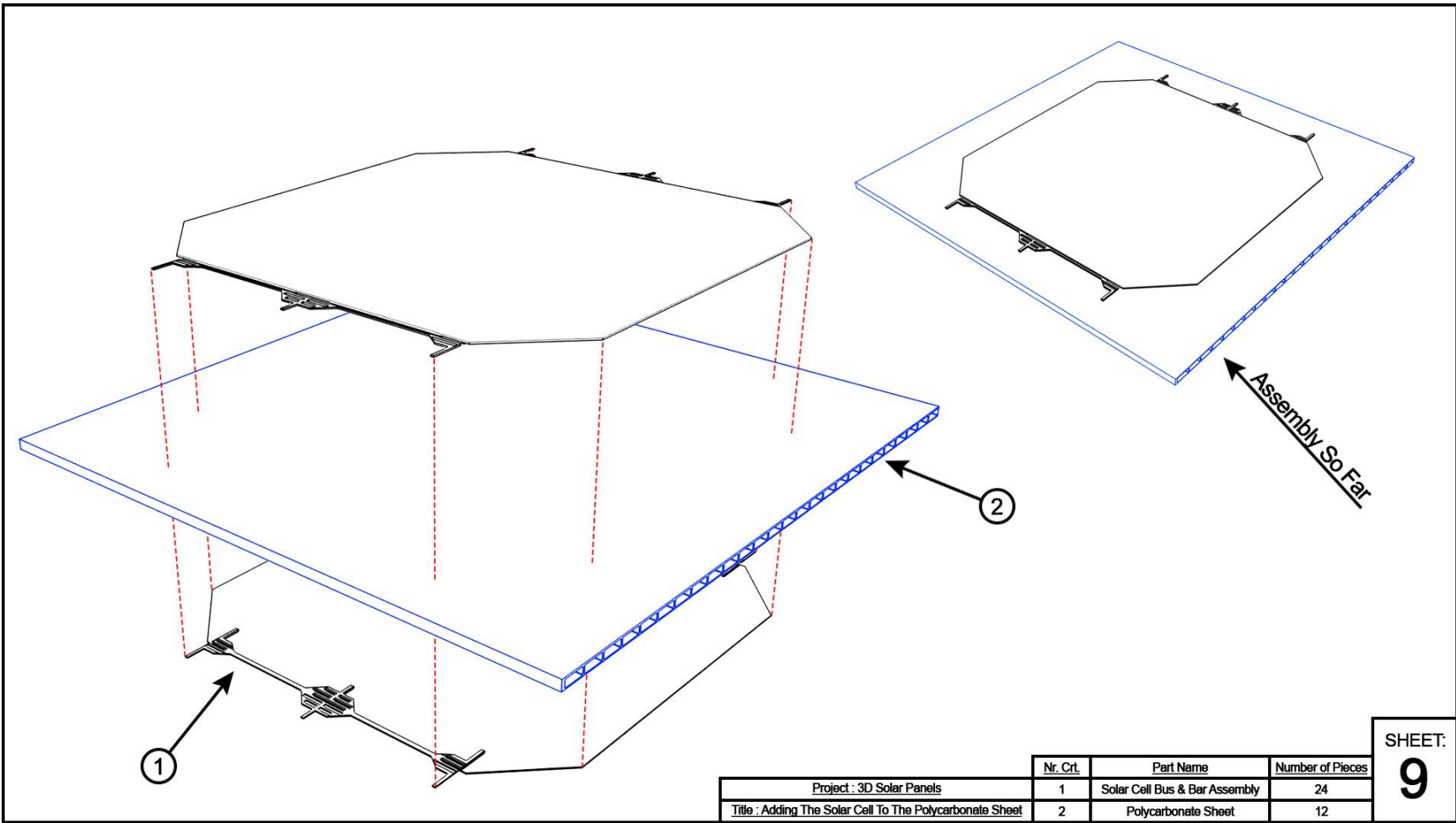
	Nr. Crt.	Part Name	Number of Pieces
Project : 3D Solar Panels	1	Solar Cell	24
Title : Solar Cell	2	Bus Bar	48

SHEET:
7



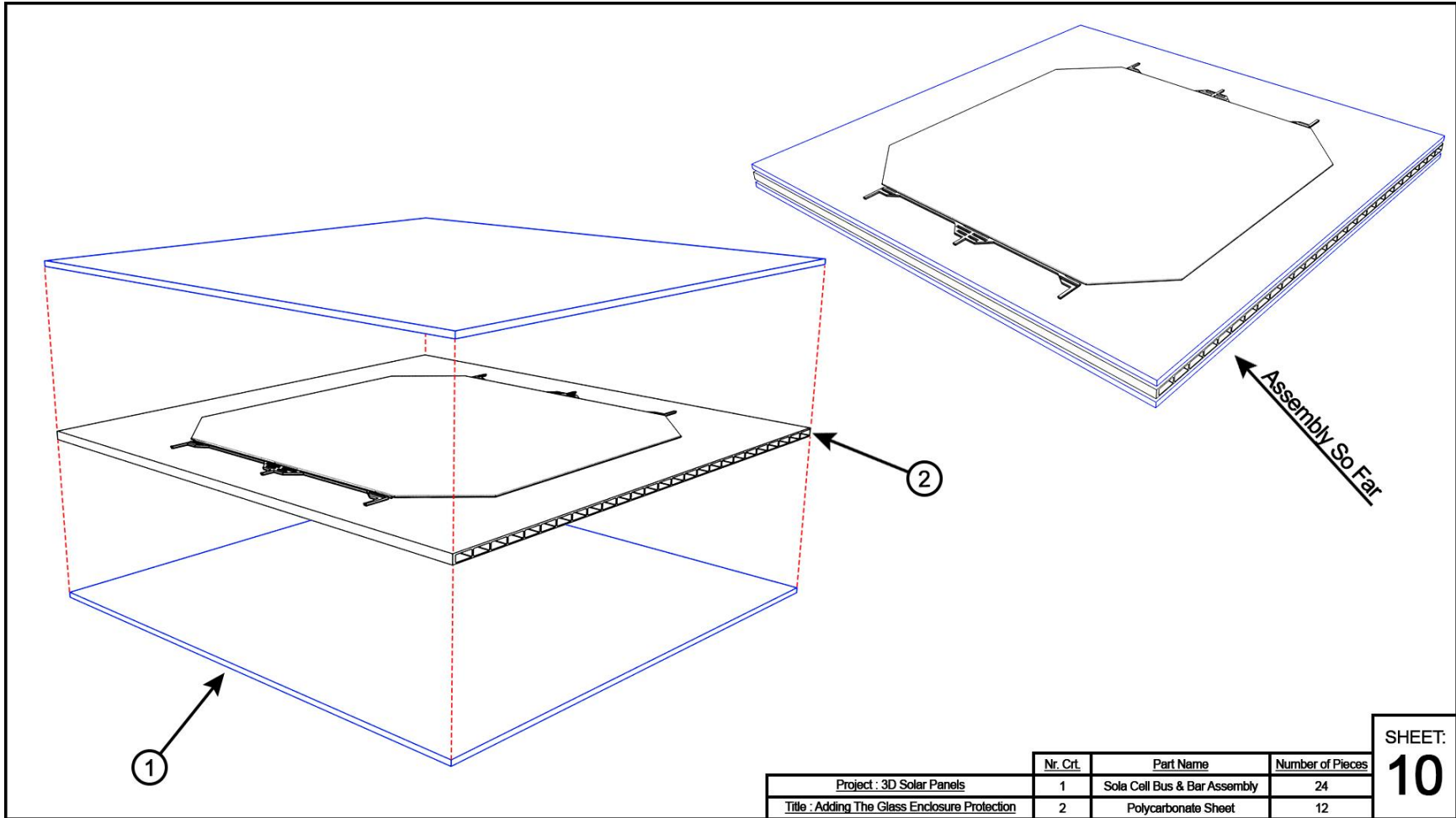
	Nr. Crt.	Part Name	Number of Pieces
Project : 3D Solar Panels	1	Solar Cell	24
Title : Adding The Bus Bar To The Solar Cell	2	Bus Bar	48

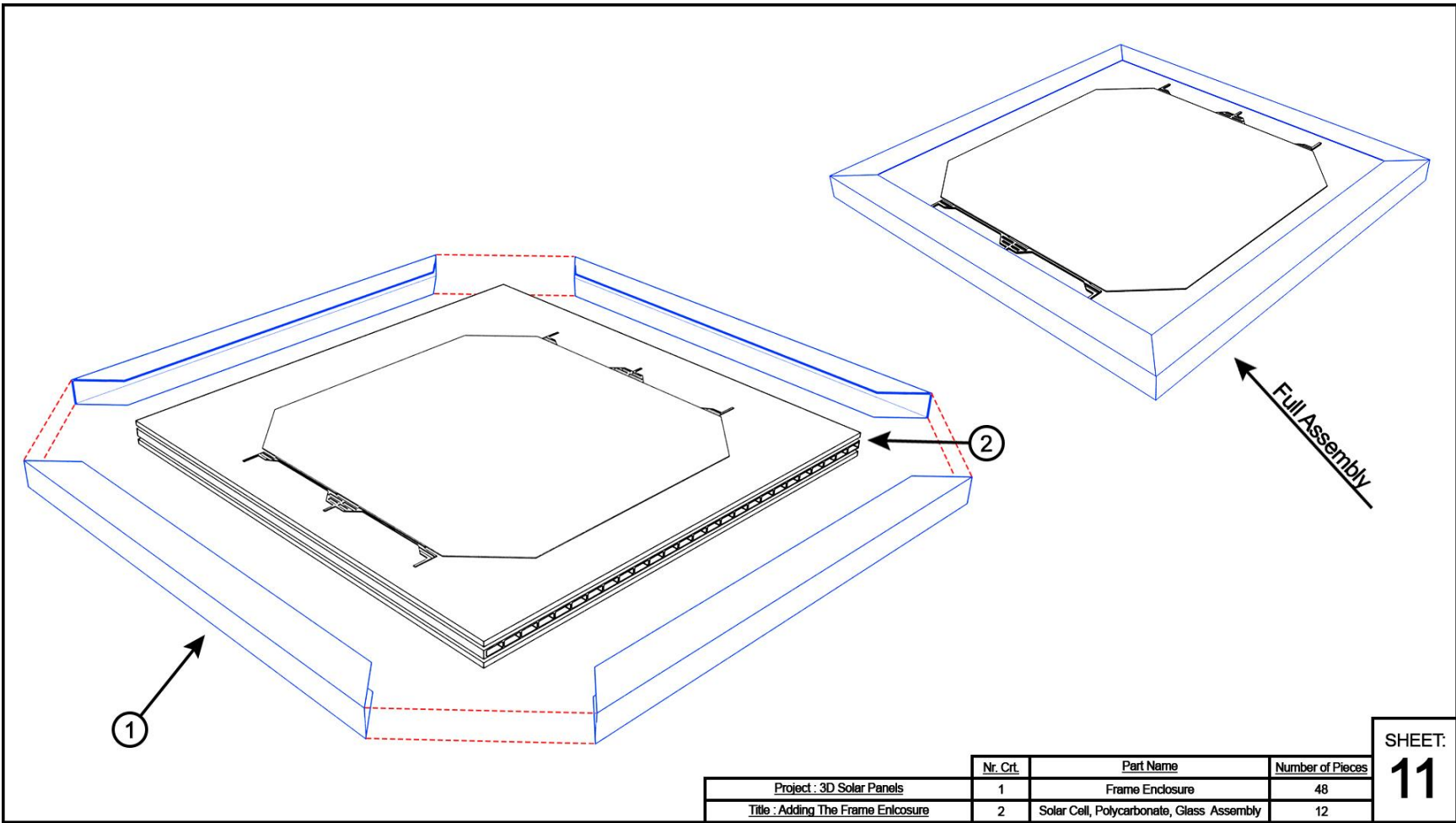
SHEET:
8

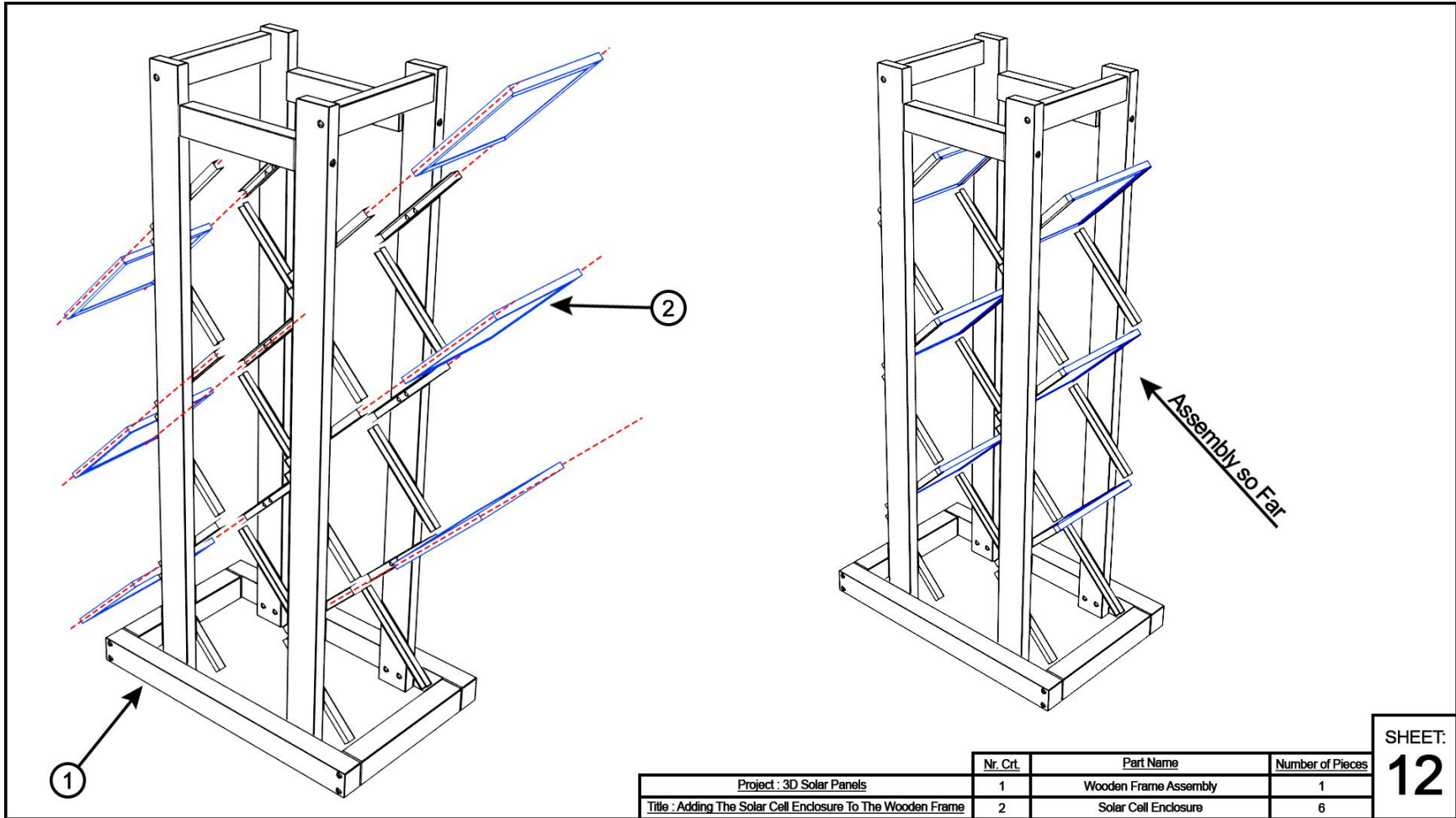


SHEET:

9

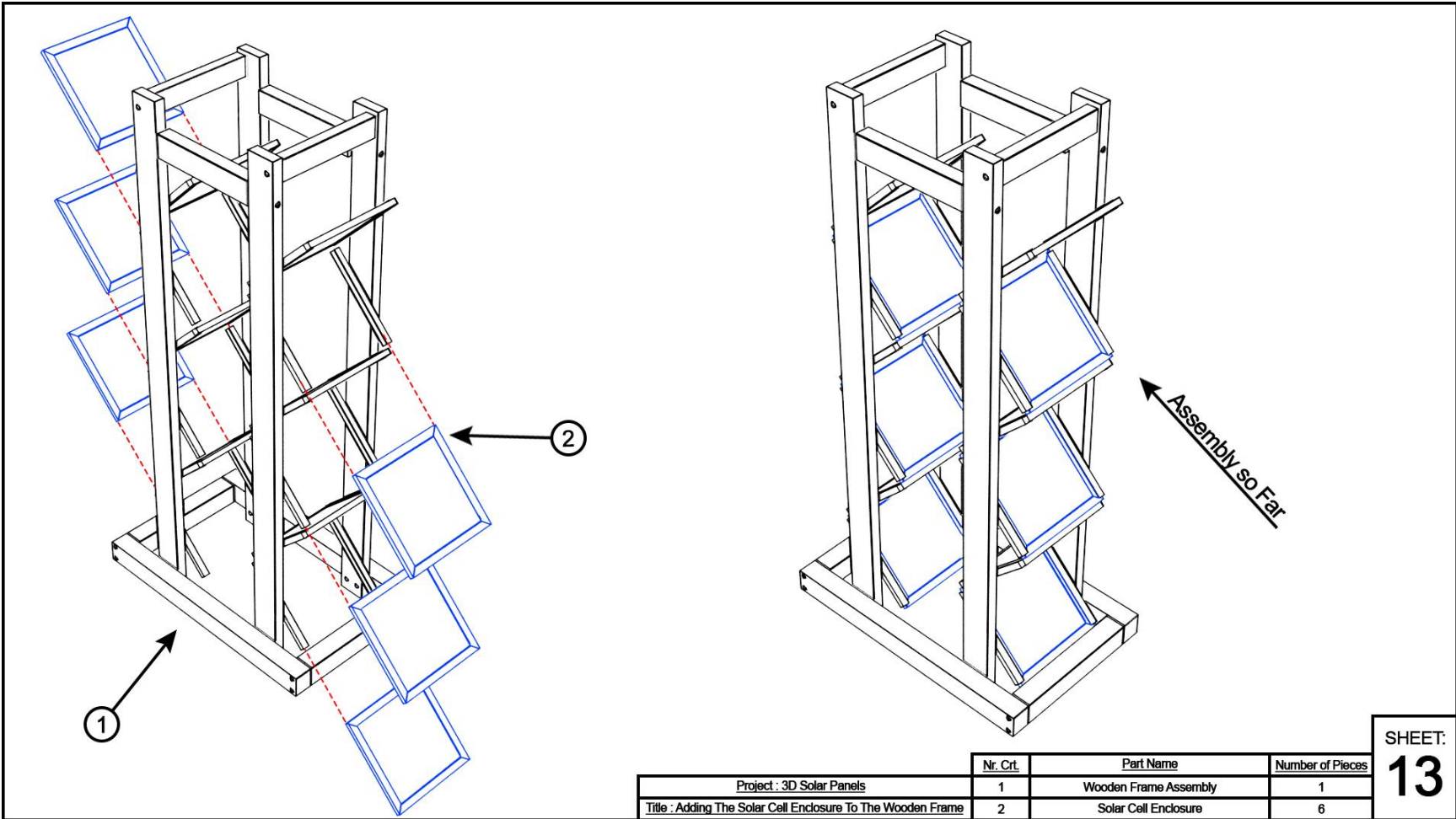






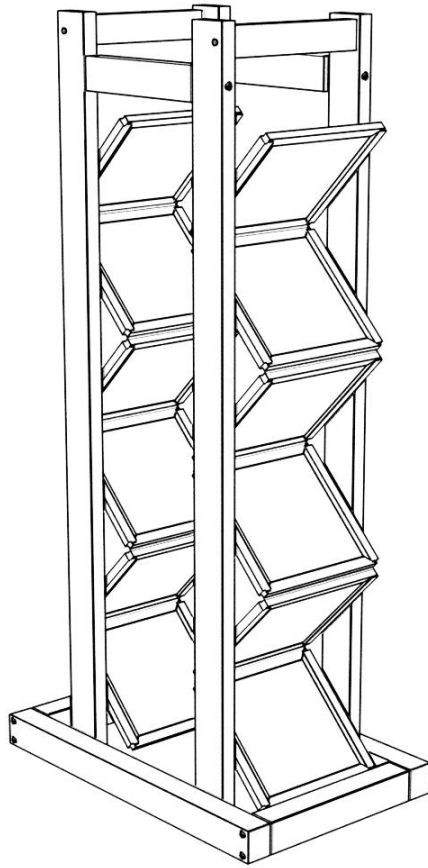
	Nr. Crt.	Part Name	Number of Pieces
Project : 3D Solar Panels	1	Wooden Frame Assembly	1
Title : Adding The Solar Cell Enclosure To The Wooden Frame	2	Solar Cell Enclosure	6

SHEET:
12



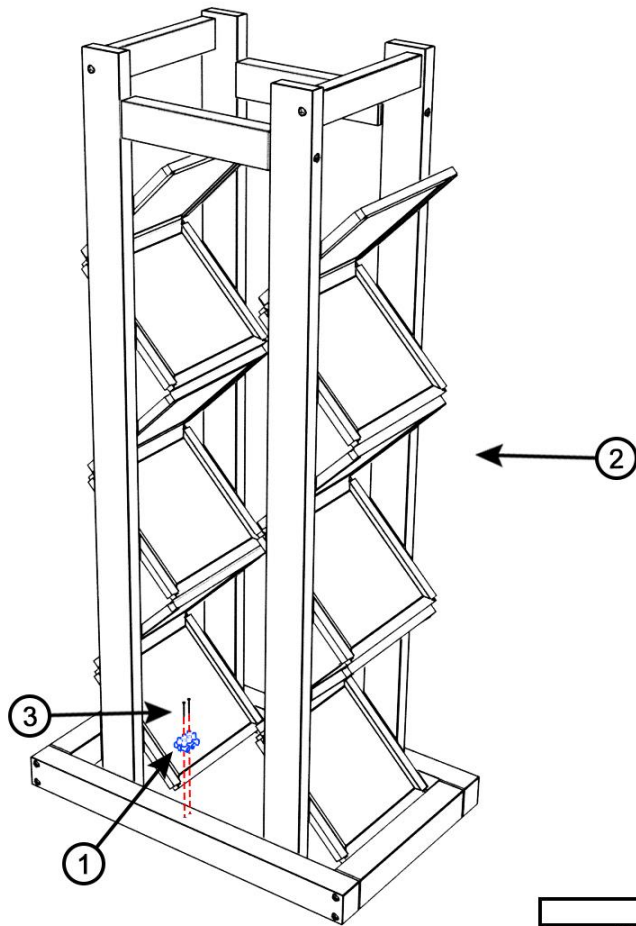
	Nr. Crt.	Part Name	Number of Pieces
Project : 3D Solar Panels	1	Wooden Frame Assembly	1
Title : Adding The Solar Cell Enclosure To The Wooden Frame	2	Solar Cell Enclosure	6

SHEET:
13

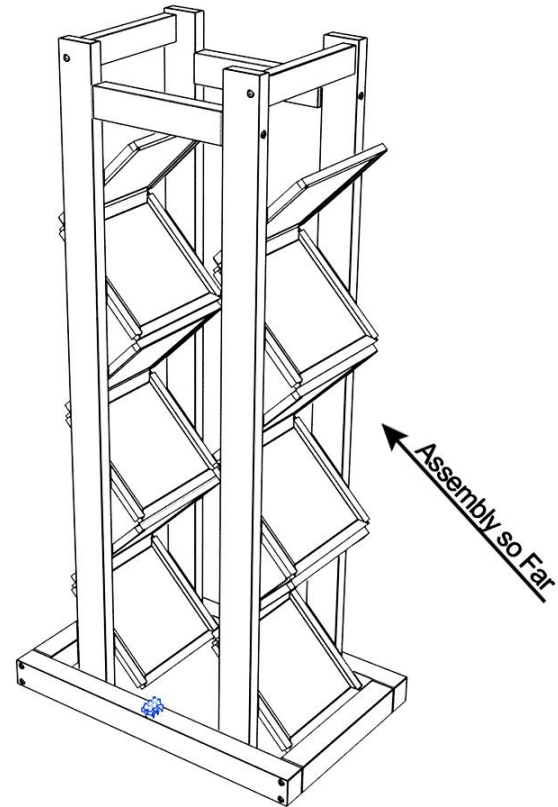


Project : 3D Solar Panels
Assembly So Far

SHEET:
14

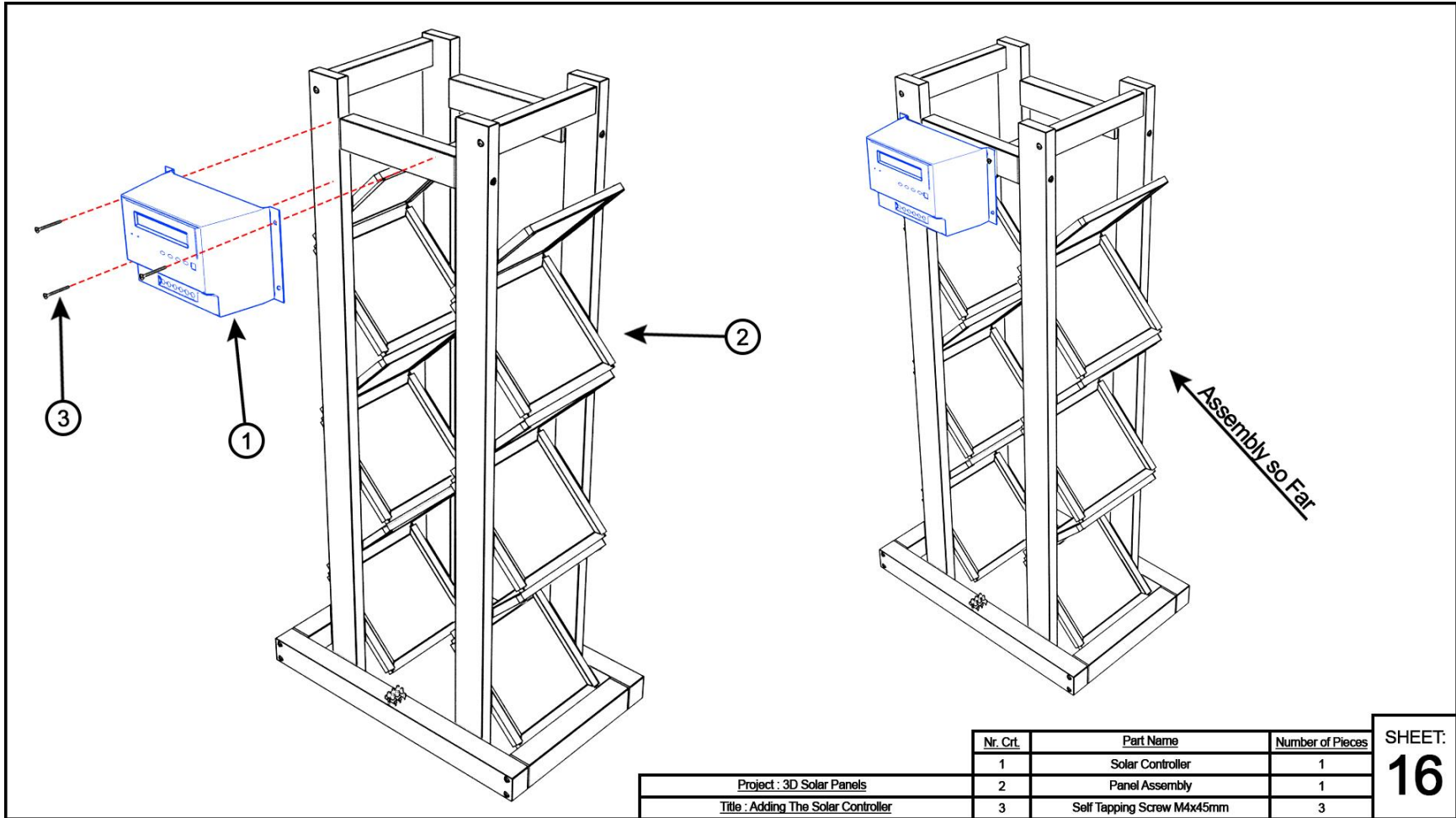


← ②



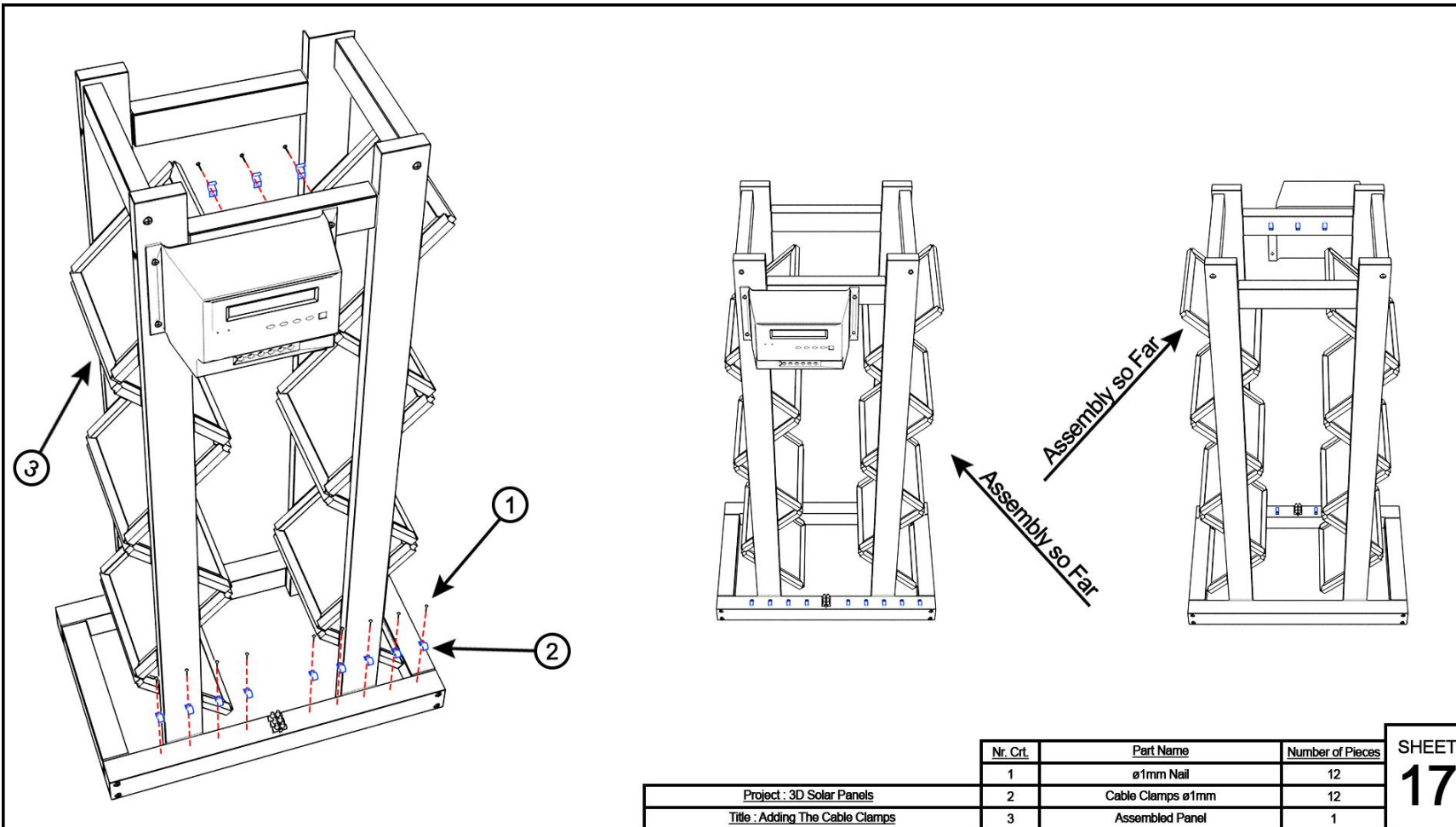
Nr. Cr.	Part Name	Number of Pieces
1	Cable Connector Strip	1
2	Panel Assembly	1
3	Self Tapping Screw M4x45mm	2

SHEET:
15



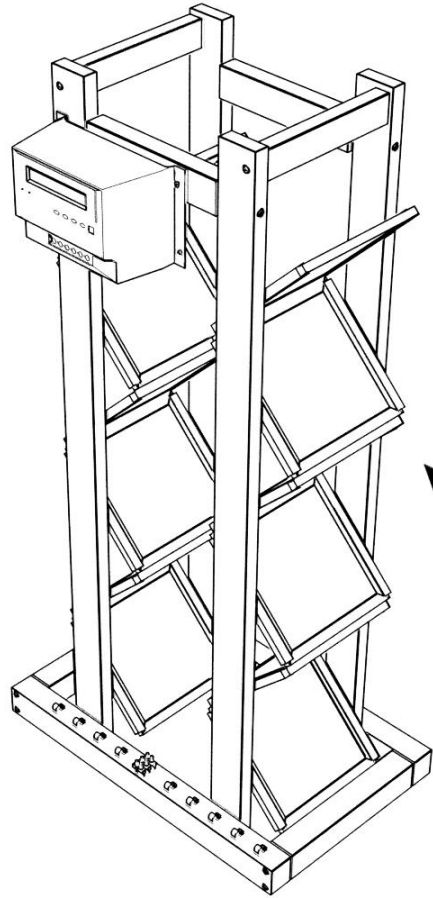
SHEET:

16



Nr. Cr.	Part Name	Number of Pieces
1	ø1mm Nail	12
2	Cable Clamps ø1mm	12
3	Assembled Panel	1

SHEET:
17



← The Full Assembly

Project : 3D Solar Panels
Title : The Full Assembly

SHEET:
18

Chapter 5: The Assembly/Building Process In Pictures

I will start by making the marks for pilot holes on the 450mm x 35mm x 40mm rectangular wood.



Drilling pilot holes in one of the sides will make the screw insertion easier and it will prevent the wood from cracking.



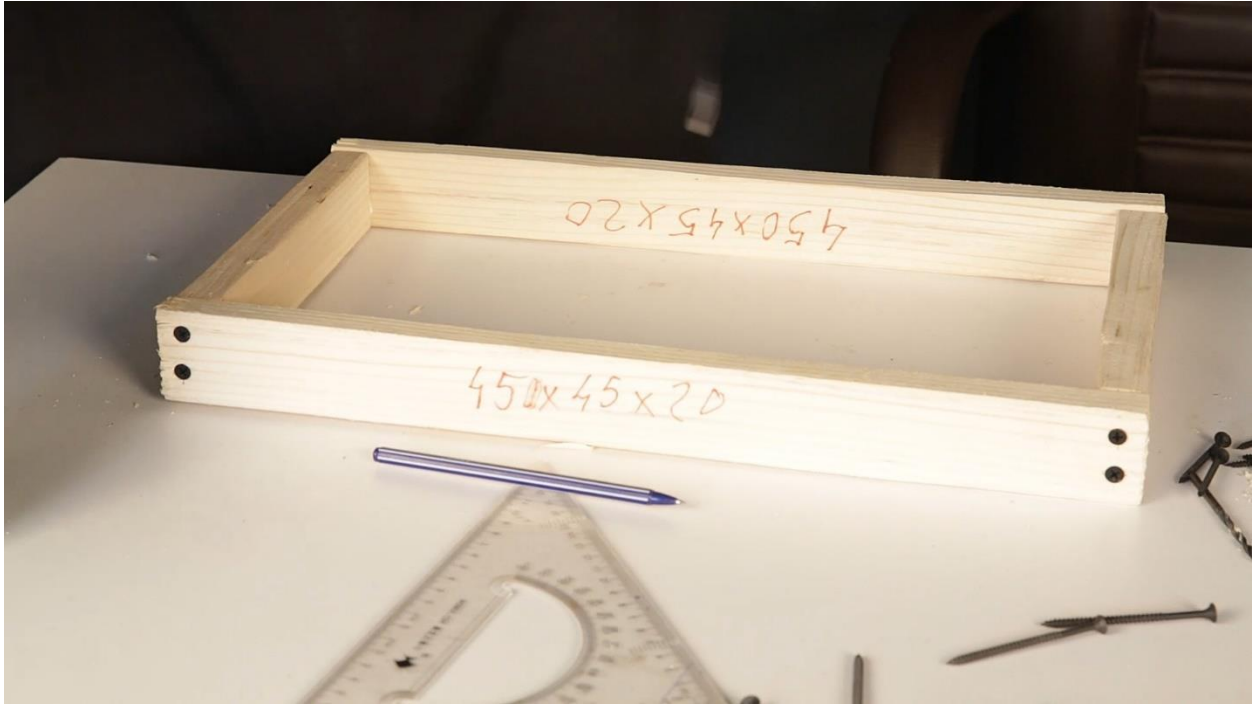
I put glue on the inside parts to make the build more sturdy.



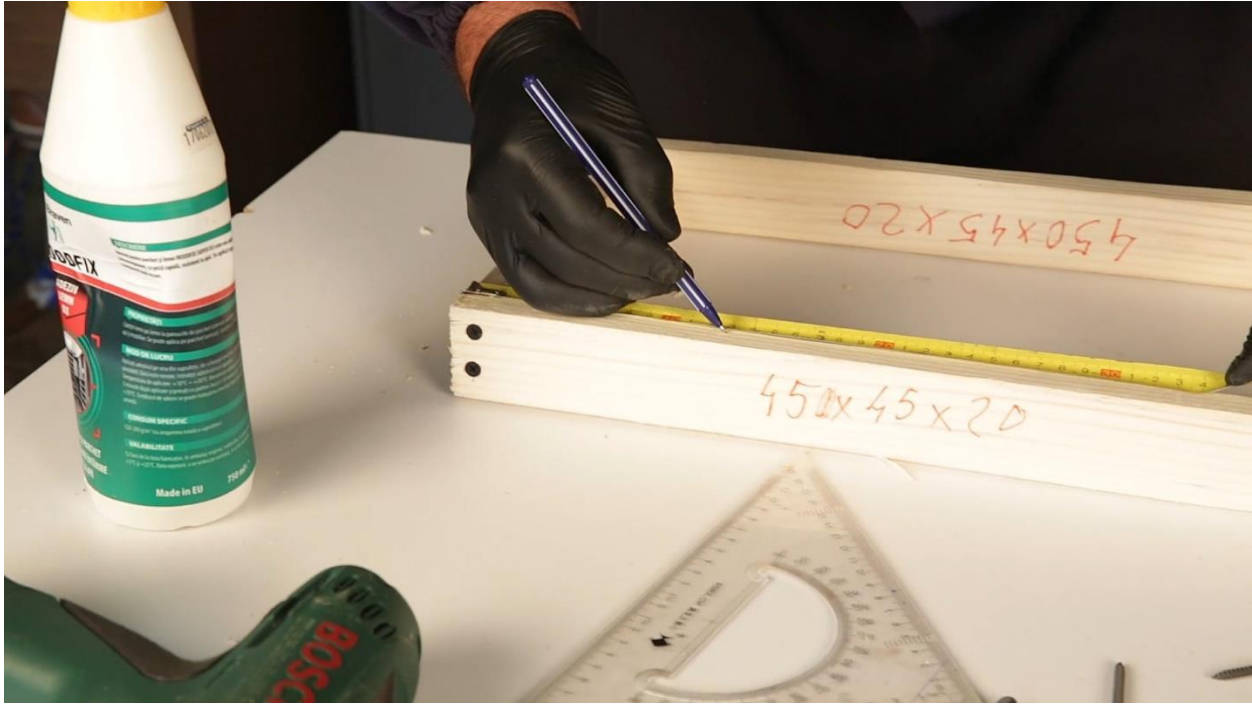
Using self-tapping screws I will assemble the frame together.



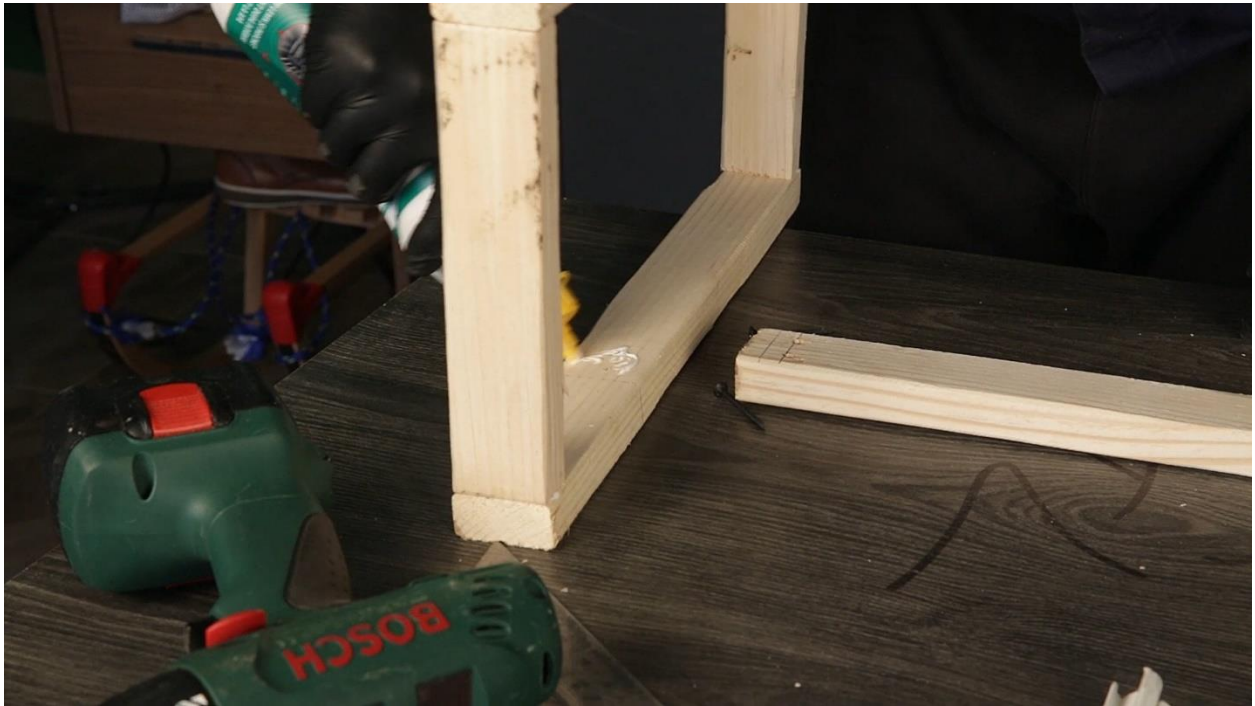




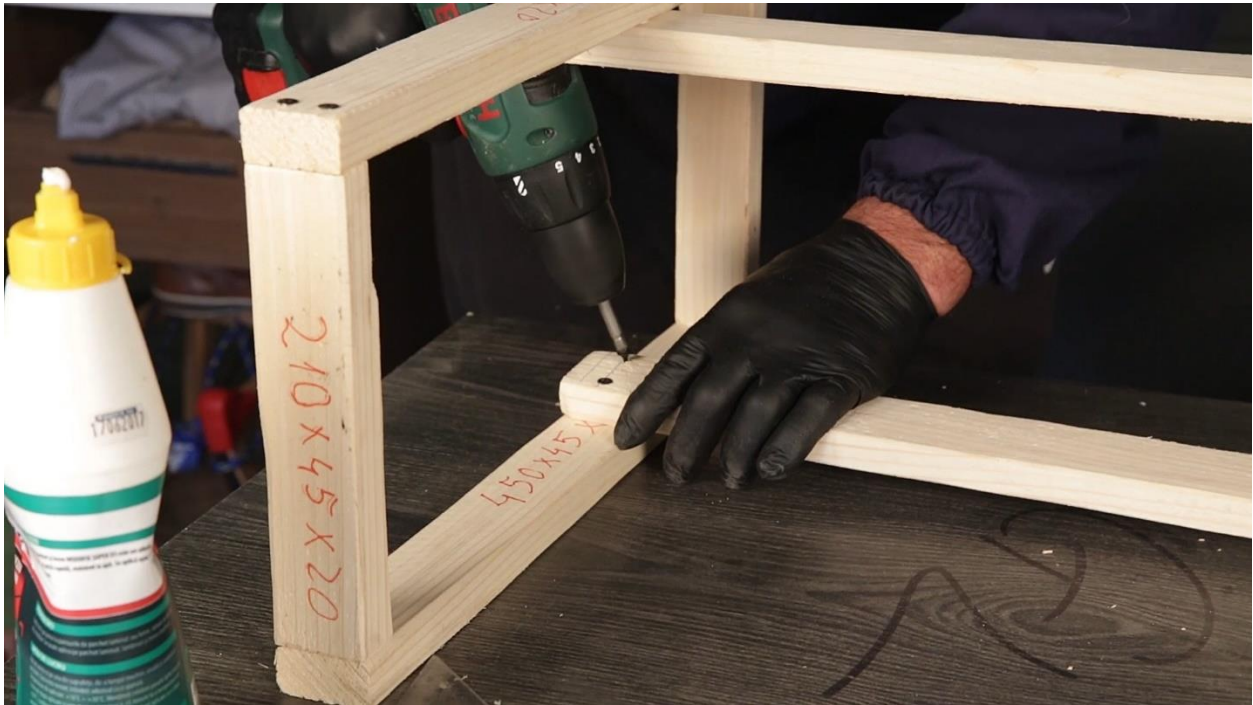
I will follow the process for the second frame and continue to assemble everything together.











I will follow the same process with the other two 900mm x 50mm x 25mm wooden rectangles.





Next I will attach the strengtheners to complete the frame.









The wood tower is now ready, this will serve as support for the solar cells which are going to be assembled next.



I will start with 2 glass sheets, make sure they are clean on the inside face, after sealing the solar module, you won't be able to clean the glass and any stain can affect the power generated by the solar cell.

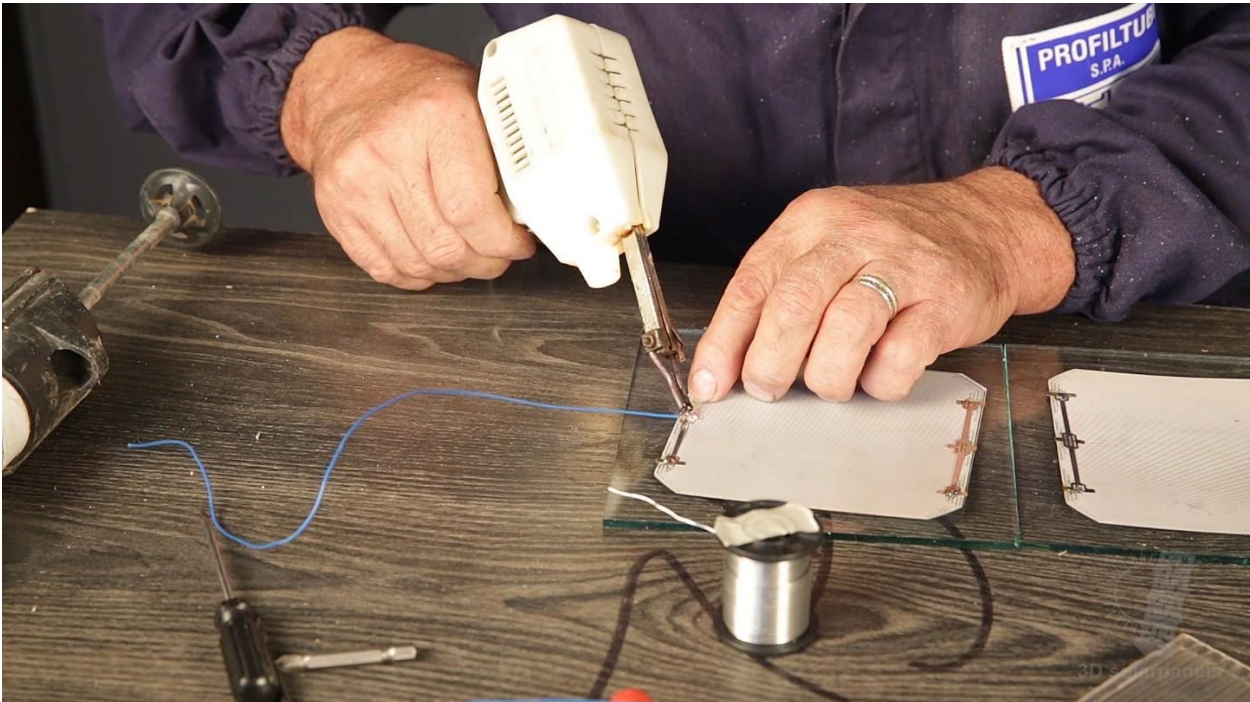


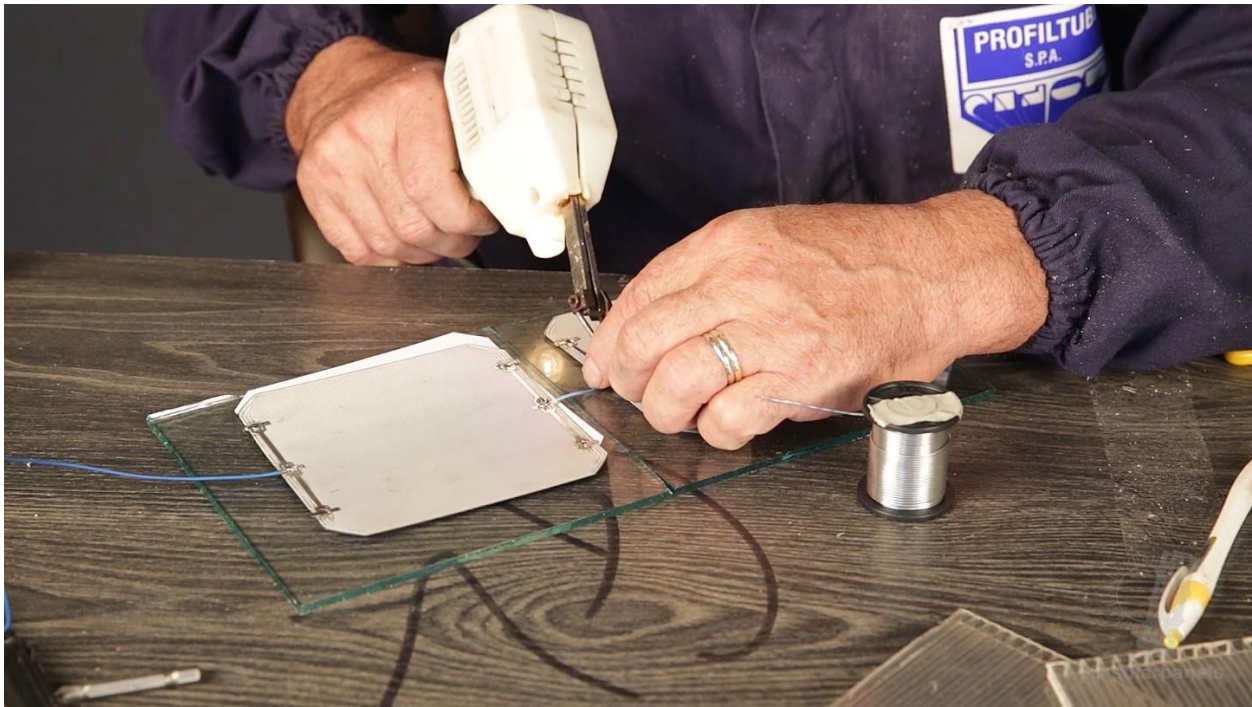
I apply flux on the contacts of the solar cells to make it easier to solder bus bar connectors.



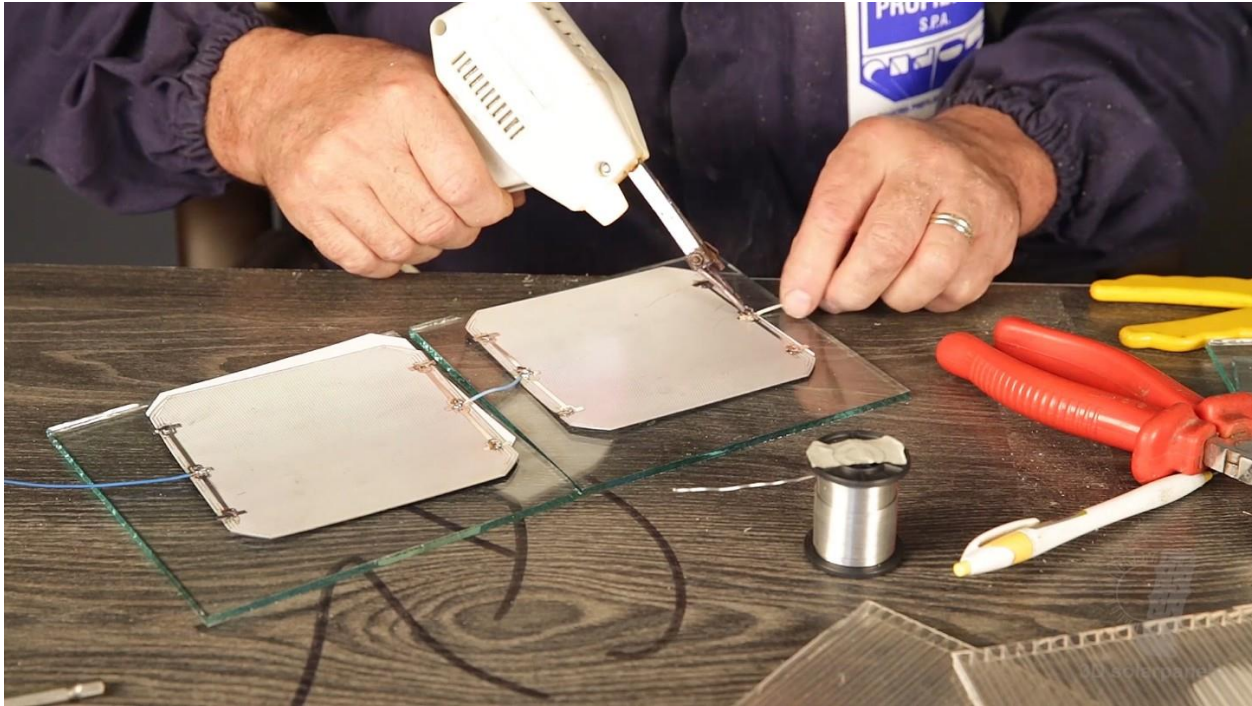
Each solar module is connected in series, both cells together will generate little over 1 volt when exposed to sunlight.

These solar cells have a small plus sign drawn on the positive side, you can use that to know how to connect the cells in series.





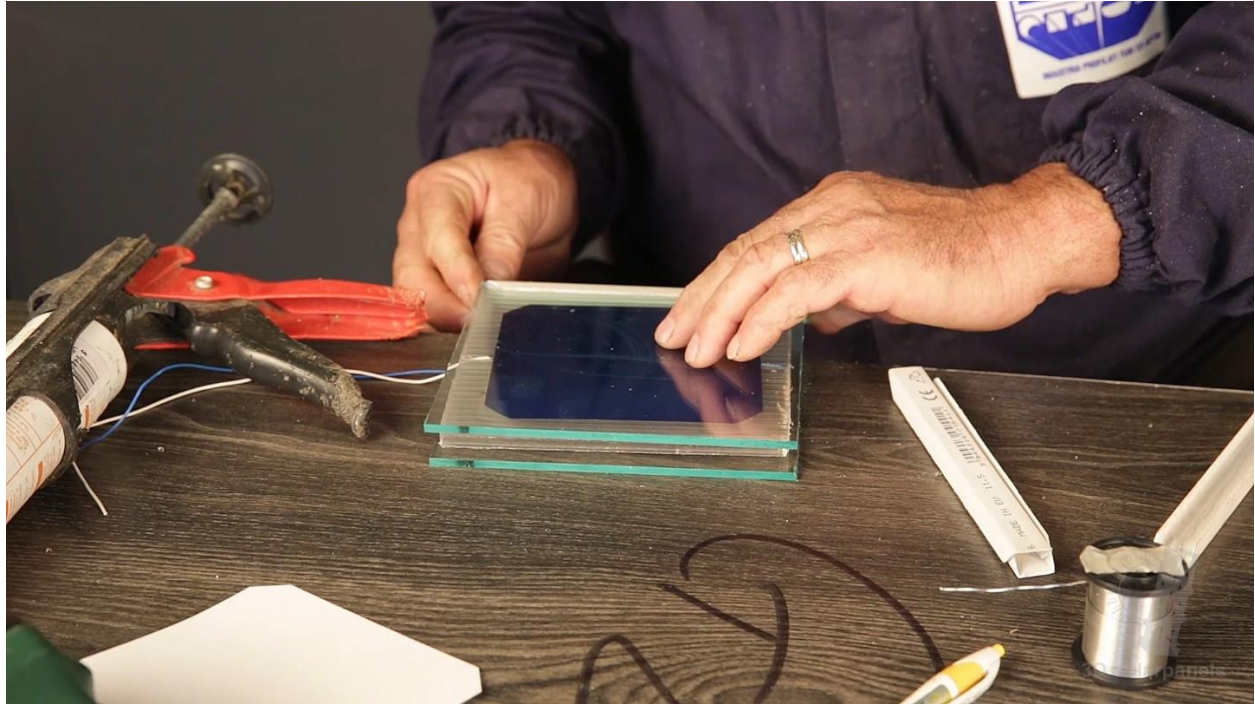
You can also expose the solar cell to a light source and use a multi-meter to determine the positive and negative leads of a cell.



I am making a cut in the polycarbonate sheet so the wire will go through easily when placing the cells back to back.



I am using this plastic cable tunnel to cover the margin of the solar cell enclosure. You can use any other U shaped profile, aluminum or plastic for this purpose. I went for the cable holder as I also use the lid to serve as a plastic rail when mounting these enclosures on the wooden tower.





I drill a hole in the last plastic piece to get the wires through.

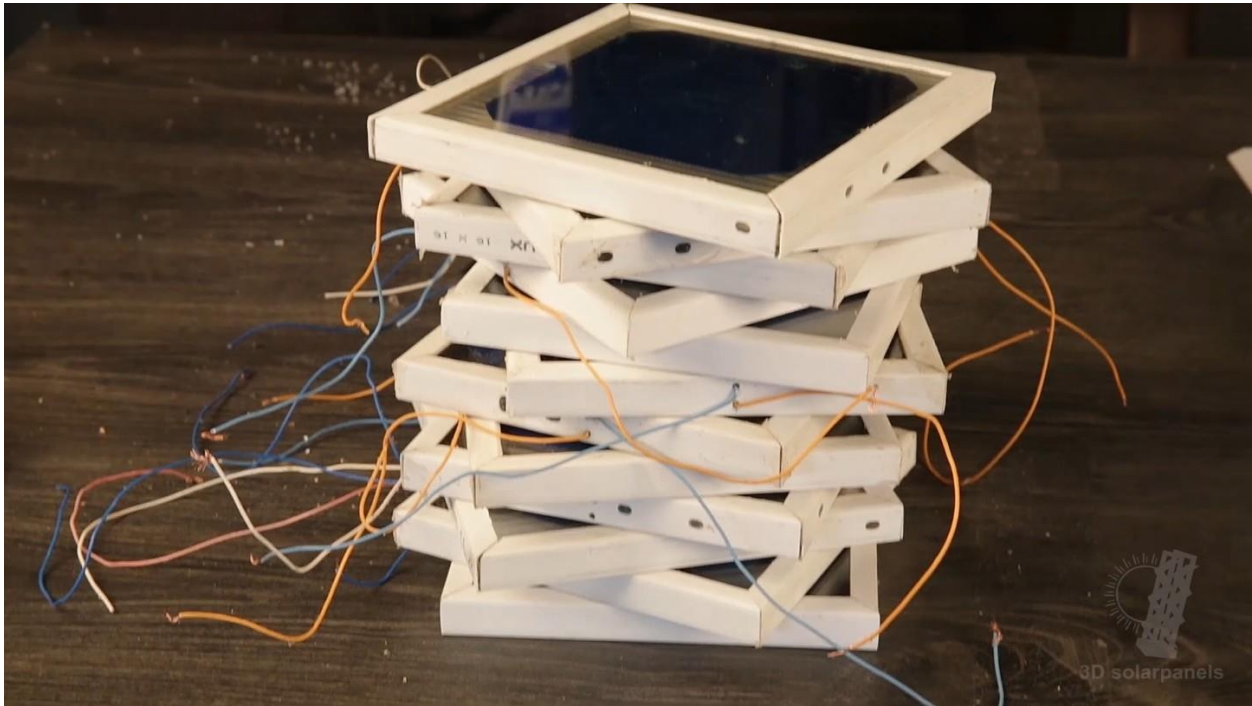


Make sure you place silicone uniformly to keep water out from the solar cell. Keeping the cell dry will ensure proper functioning and maximum voltage output from your system





This is how an enclosure looks like, the towers we are building, and have a total of 24 solar cells, so another 11 enclosures like this need to be built. All 12 enclosures are assembled now and we will move to the next step, which is placing them on the wood tower.



The cells are mounted on a 45 degree angle.

To make the assembly and replacement easy, I use the lids from the cable channels to slide the enclosure in.



To put them in place I'm using some \varnothing 1mm nails.

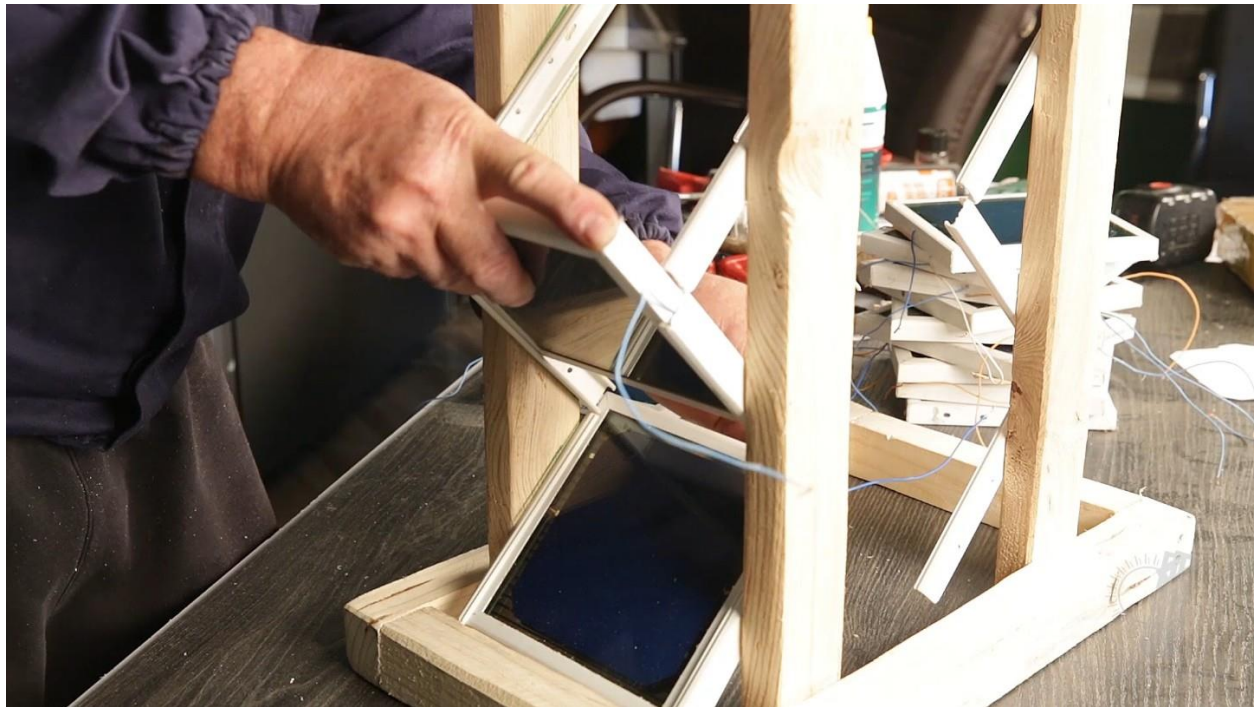




This is how the plastic sliders assembled look like.

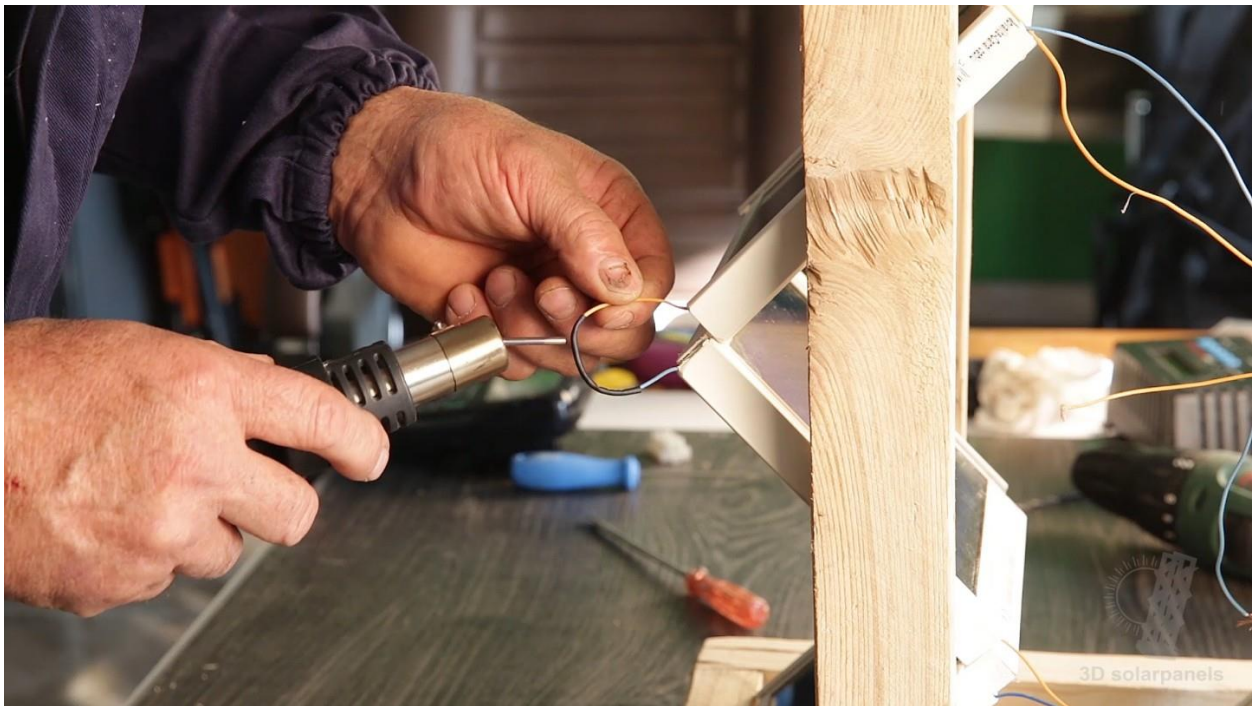


Now it's time to put the solar enclosures in place. The solar enclosures are going to be wired in series. To make this step easier, I am rotating the cells so it goes plus minus, plus, minus. Once all the modules are assembled, I start making the connection.

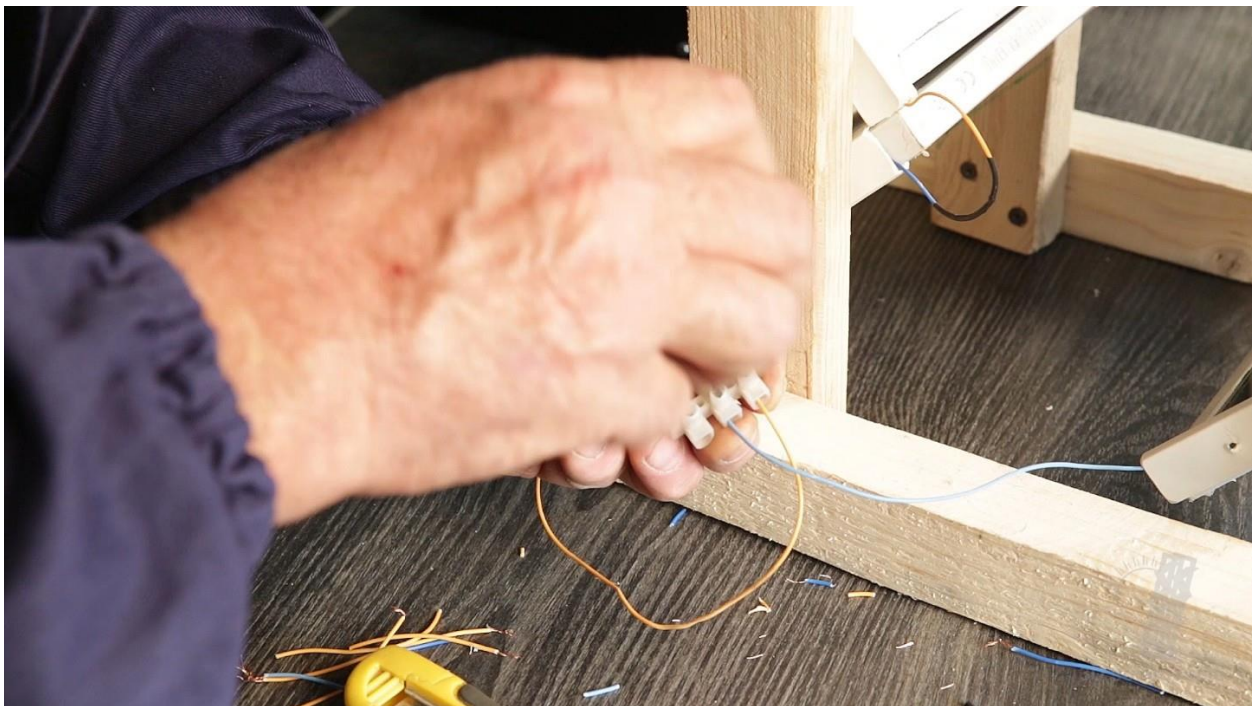
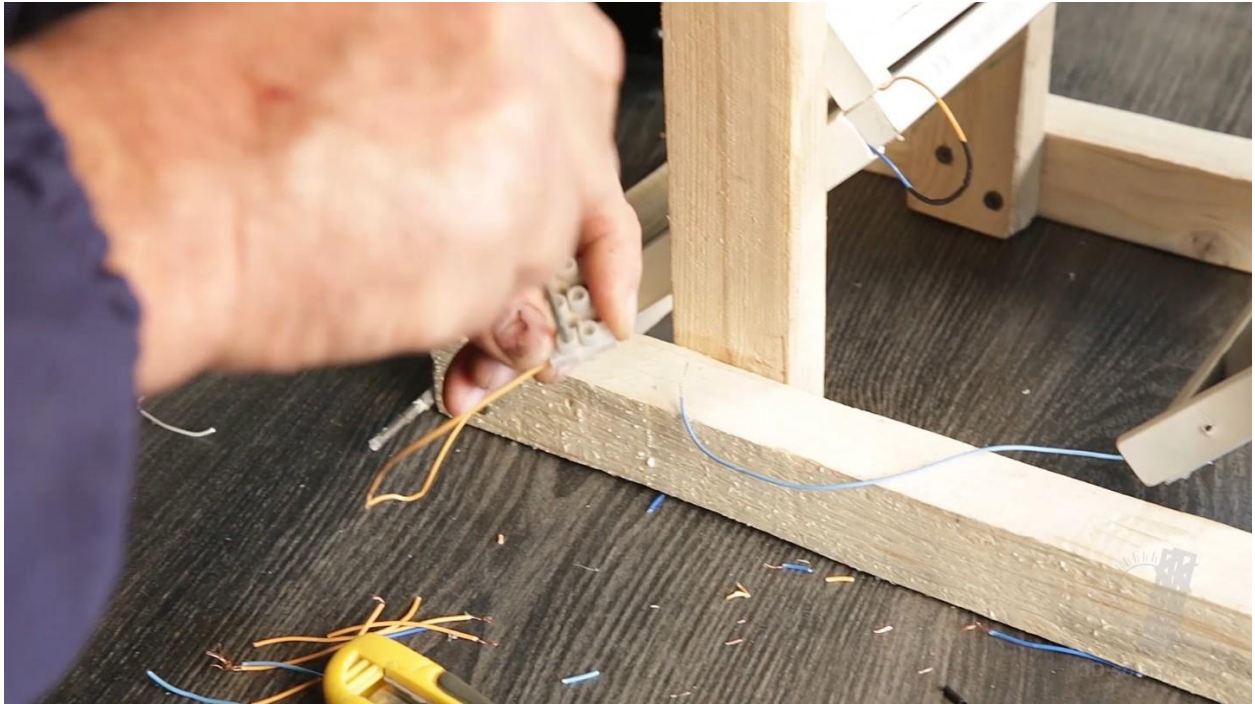




I use the hot air blower to shrink the tube, but you can also use a lighter or another heat source. I continue with the connection process until all the cells are connected.



I connect the output from the solar cells to this cable connector strip so it's easier to connect the panel to a charge controller or with other solar panels in series or in parallel, depending on what type of voltage you are looking for.





This is the charge controller that I will mount on the wooden frame.





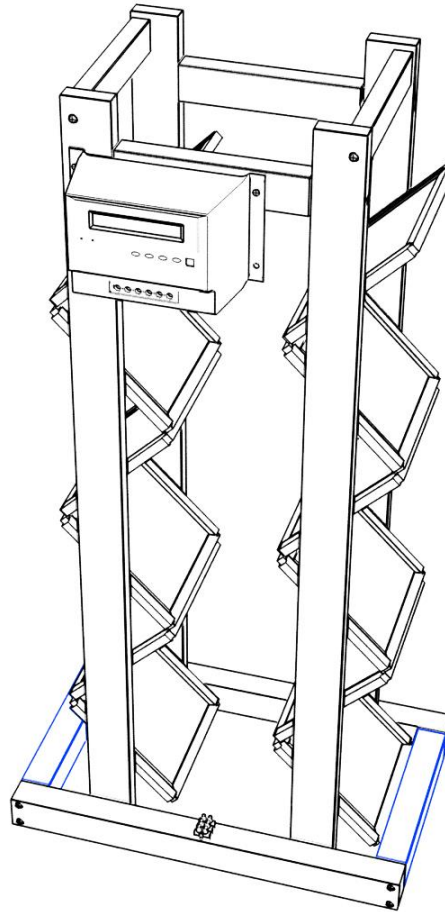


This panel is now ready to charge one of your batteries.





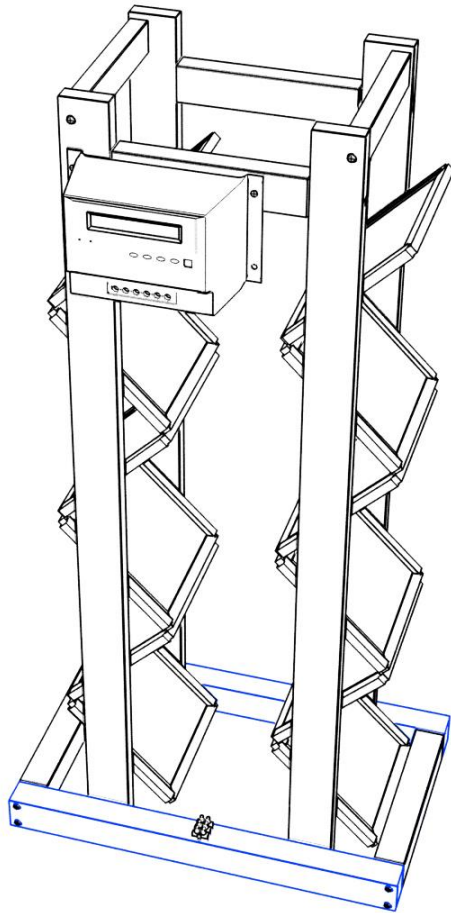
Chapter 6: Position of the Pieces Related to the Overall Assembly



Project : 3D Solar Panels
Title : Front & Back Base Frame
Position Related To The Overall Assembly

SHEET:

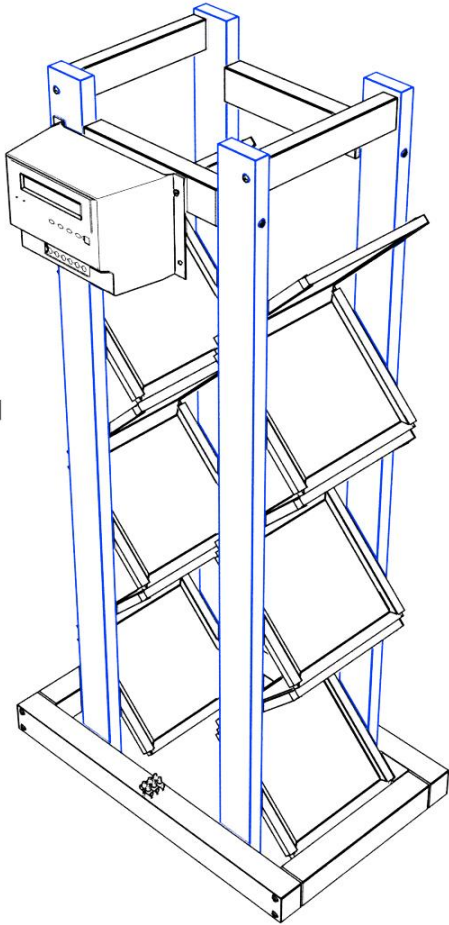
1



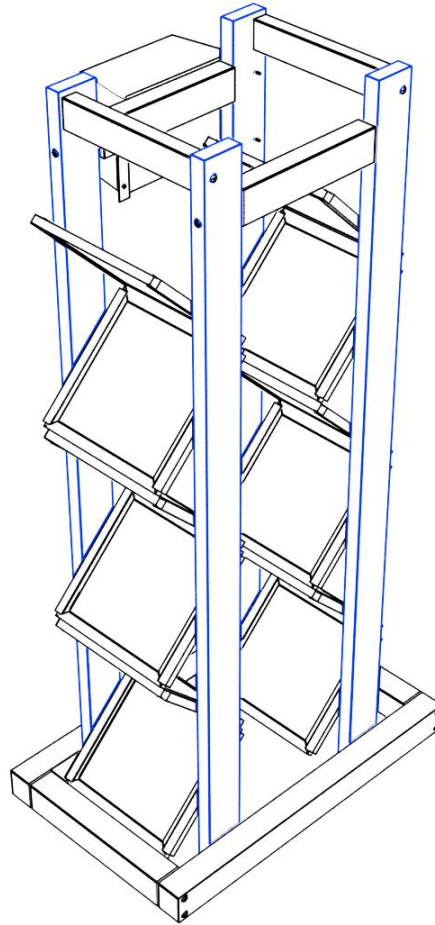
Project : 3D Solar Panels
Title : Side Base Frame
Position Related To The Overall Assembly

SHEET:
2

VIEW 1



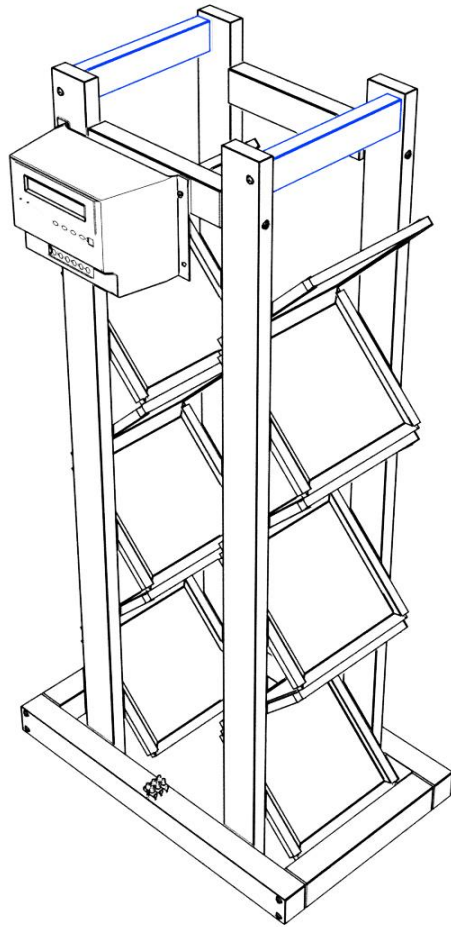
VIEW 2



Project : 3D Solar Panels
Title : Pillar Frame
Position Related To The Overall Assembly

SHEET:

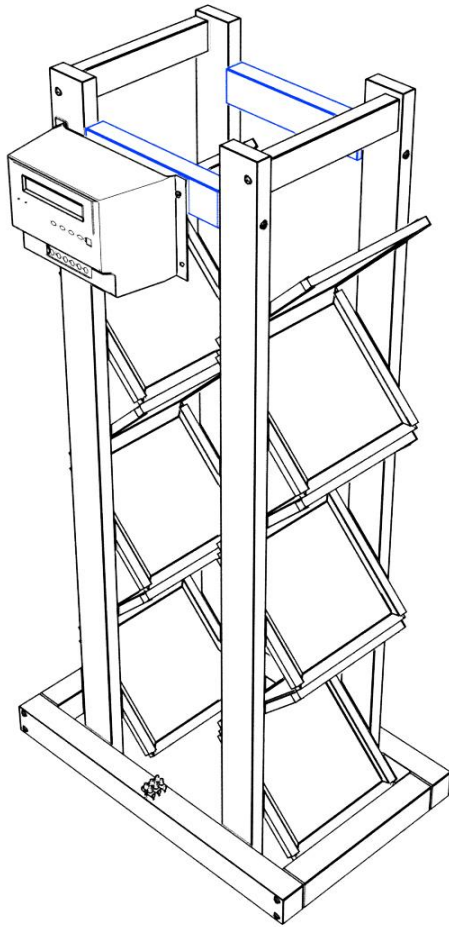
3



Project : 3D Solar Panels
Title : Strengthener Pillar Frame
Position Related To The Overall Assembly

SHEET:

4

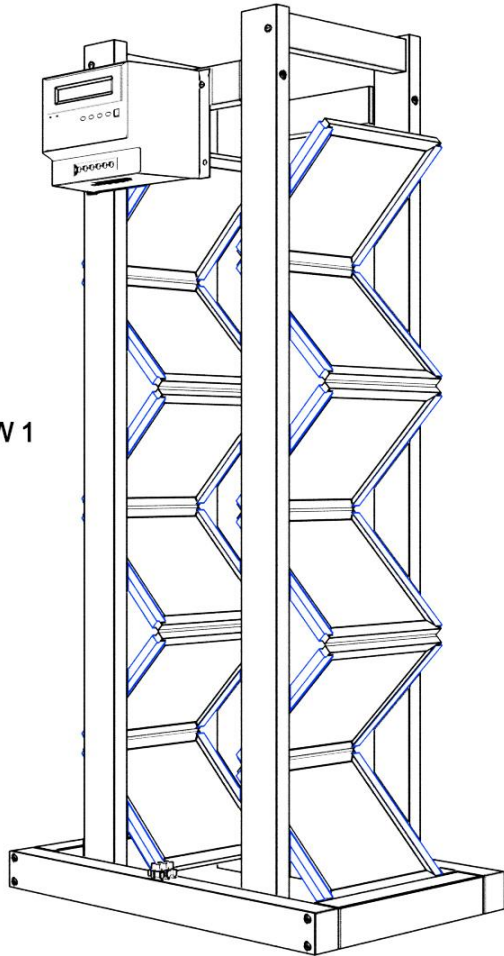


Project : 3D Solar Panels
Title : Side Strengthener Pillar Frame
Position Related To The Overall Assembly

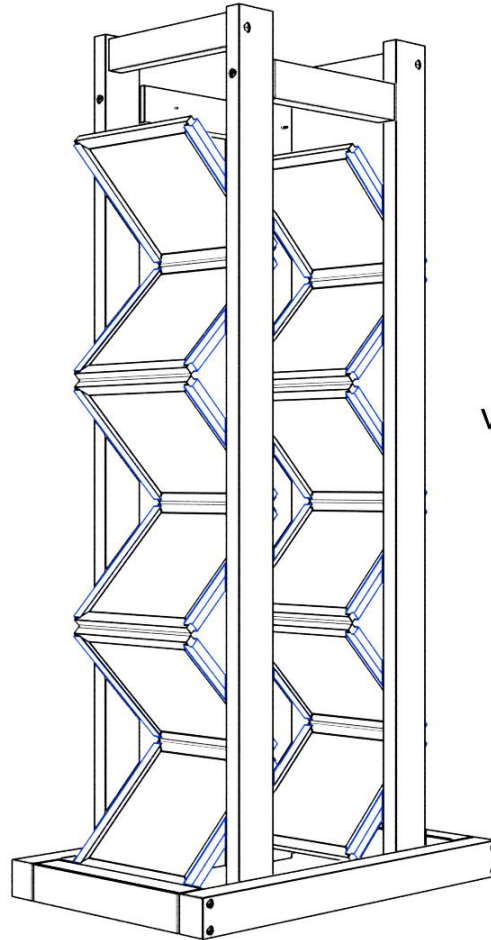
SHEET:

5

VIEW 1



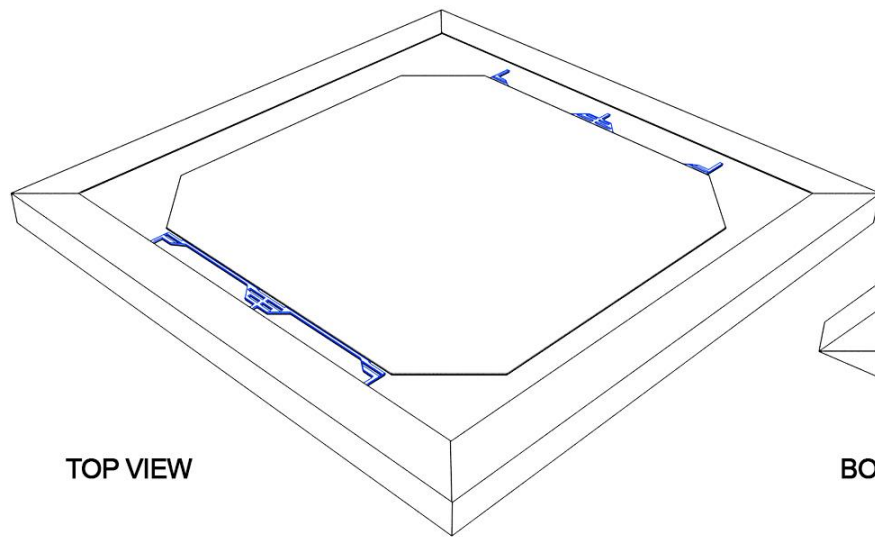
VIEW 2



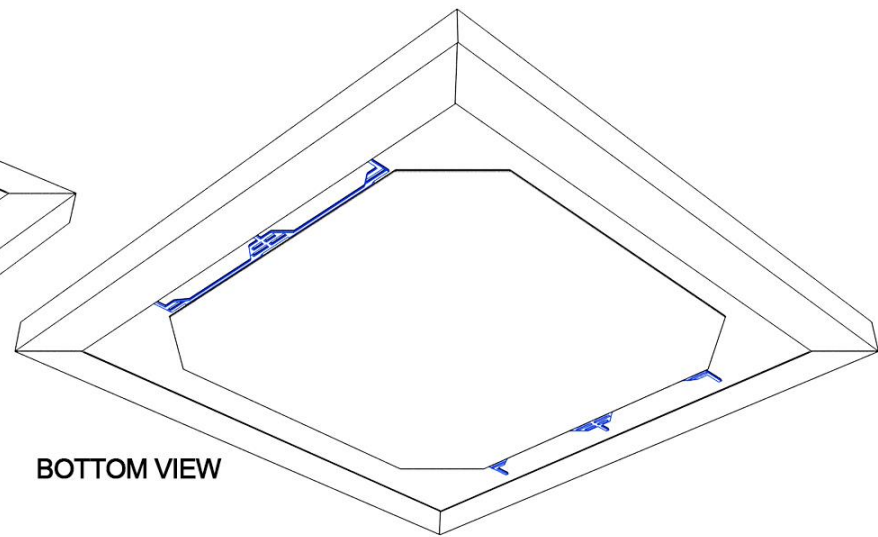
Project : 3D Solar Panels
Title : Sliders
Position Related To The Overall Assembly

SHEET:

6



TOP VIEW

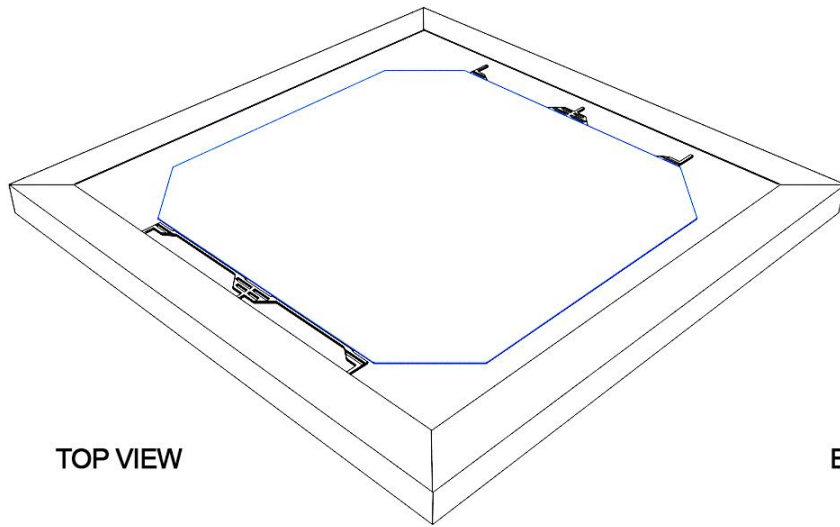


BOTTOM VIEW

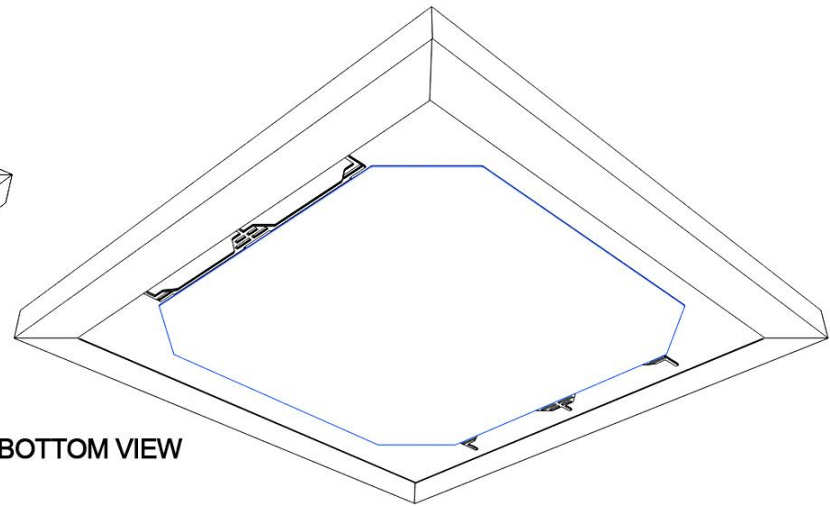
Project : 3D Solar Panels
Title : Solar Cell Bus Bar
Position Related To The Overall Solar Cell Enclosure Assembly

SHEET:

7



TOP VIEW

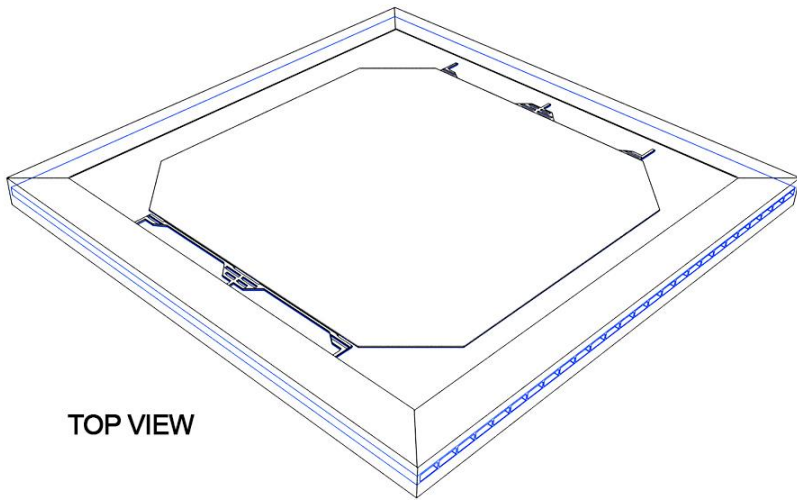


BOTTOM VIEW

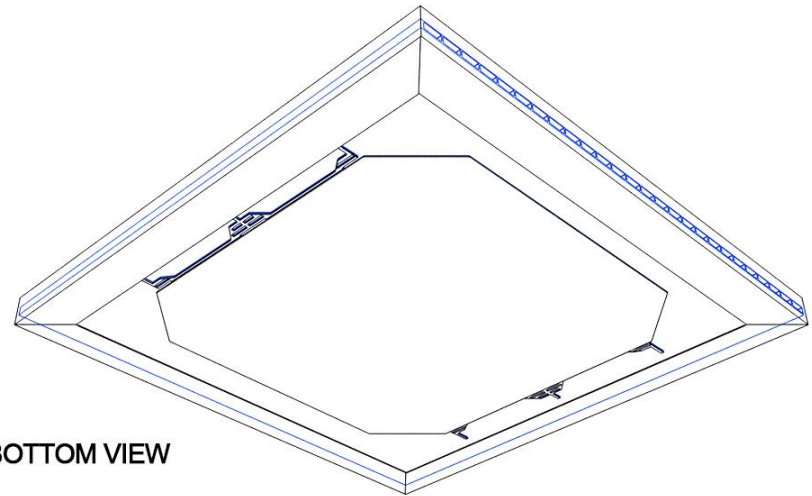
Project : 3D Solar Panels
Title : Solar Cell
Position Related To The Overall Solar Cell Enclosure Assembly

SHEET:

8



TOP VIEW

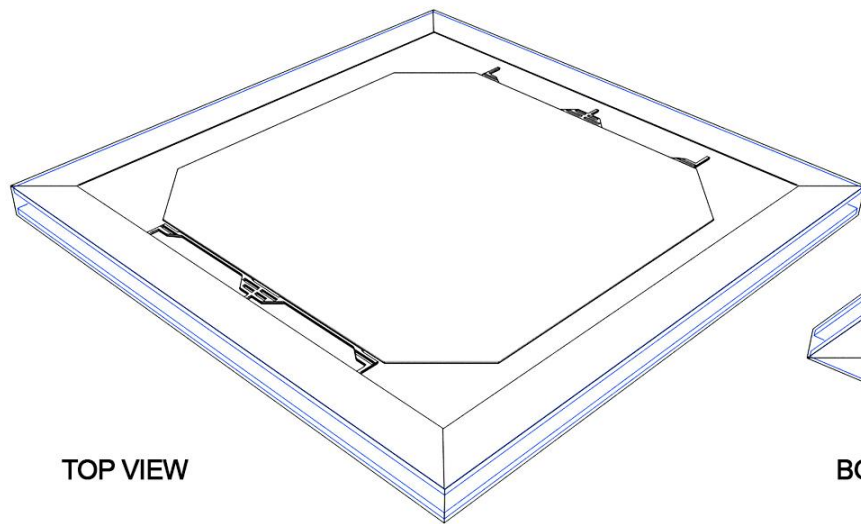


BOTTOM VIEW

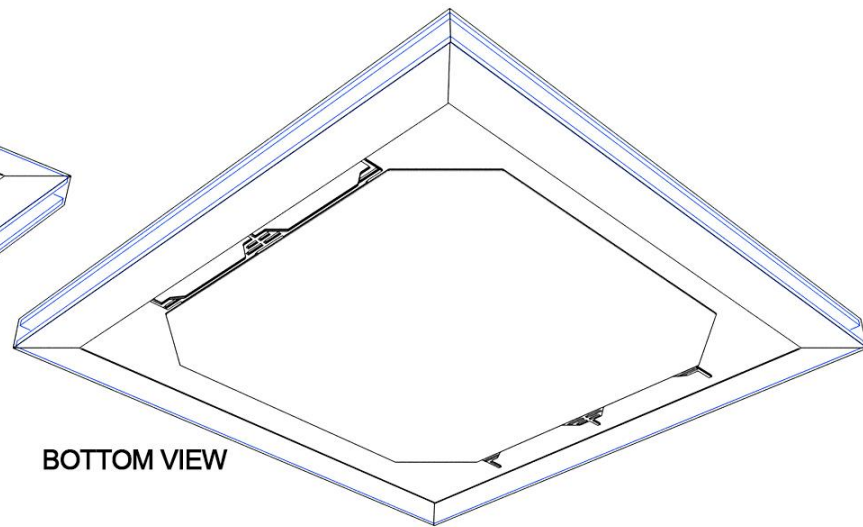
Project : 3D Solar Panels
Title : Polycarbonate Sheet
Position Related To The Overall Solar Cell Enclosure Assembly

SHEET:

9



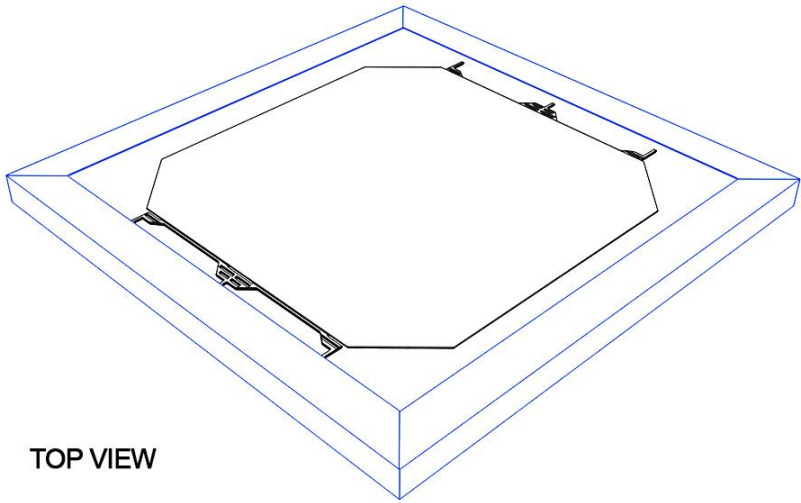
TOP VIEW



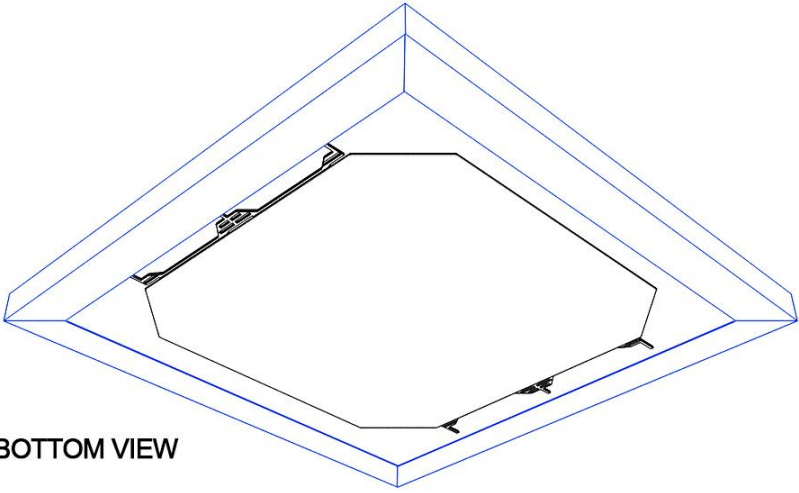
BOTTOM VIEW

Project : 3D Solar Panels
Title : Enclosure Glass Protection
Position Related To The Overall Solar Cell Enclosure Assembly

SHEET:
10



TOP VIEW

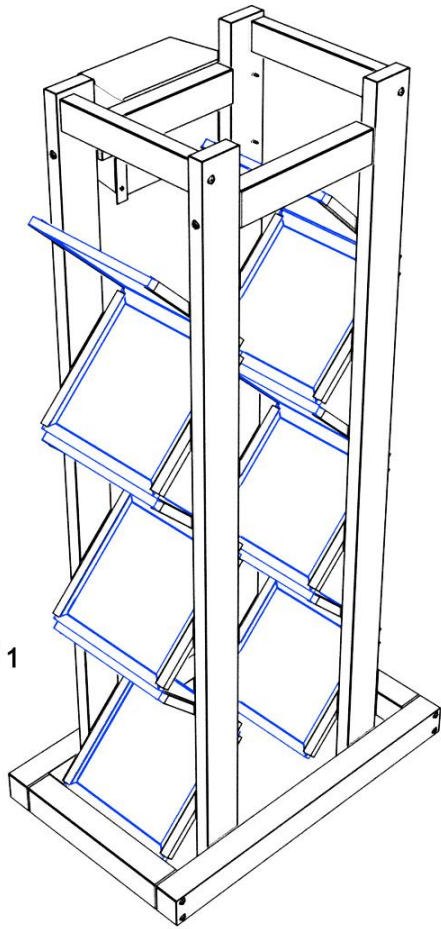


BOTTOM VIEW

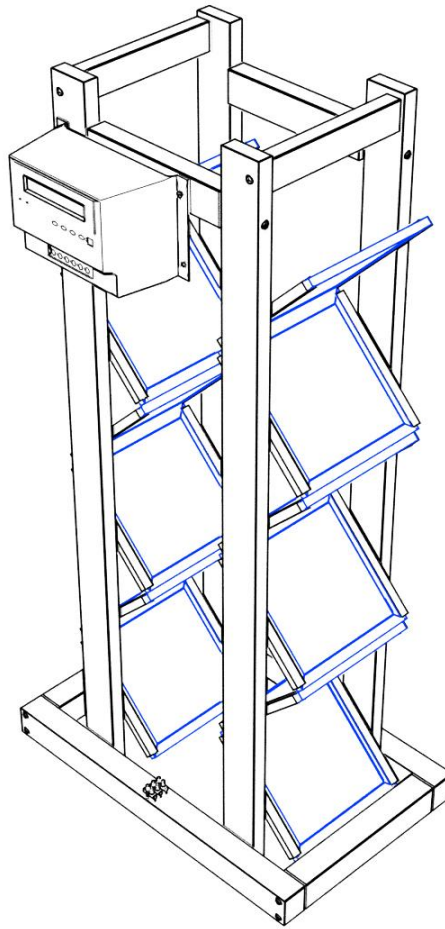
Project : 3D Solar Panels
Title : Solar Cell Enclosure Frame
Position Related To The Overall Solar Cell Enclosure Assembly

SHEET:

11



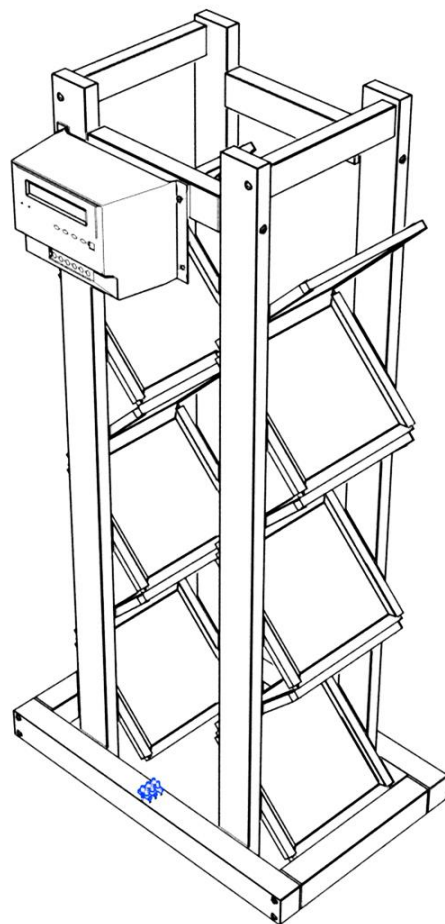
VIEW 1



VIEW 2

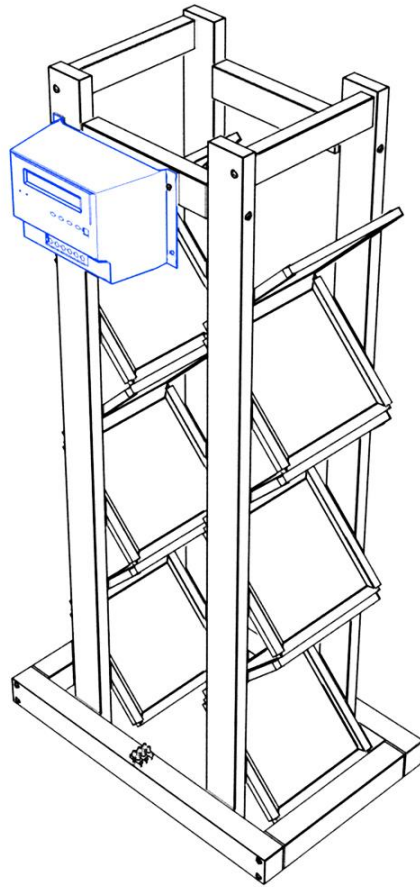
Project : 3D Solar Panels
Title : Solar Cell Enclosure
Position Related To The Overall Assembly

SHEET:
12



Project : 3D Solar Panels
Title : Cable Connector Strip
Position Related To The Overall Assembly

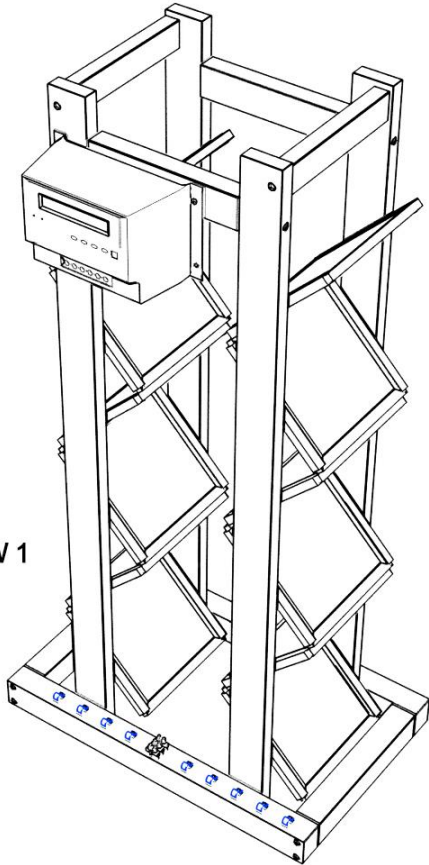
SHEET:
13



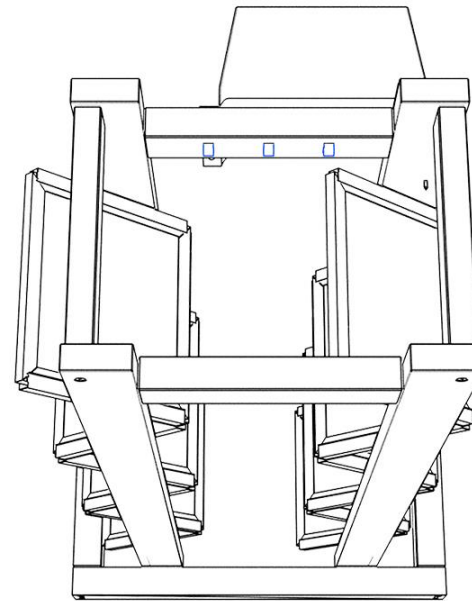
Project : 3D Solar Panels
Title : Solar Controller
Position Related To The Overall Assembly

SHEET:
14

VIEW 1

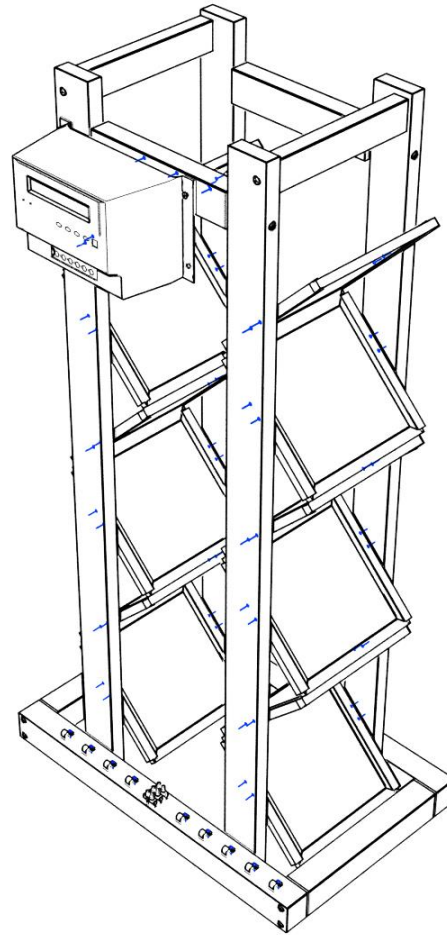


VIEW 2



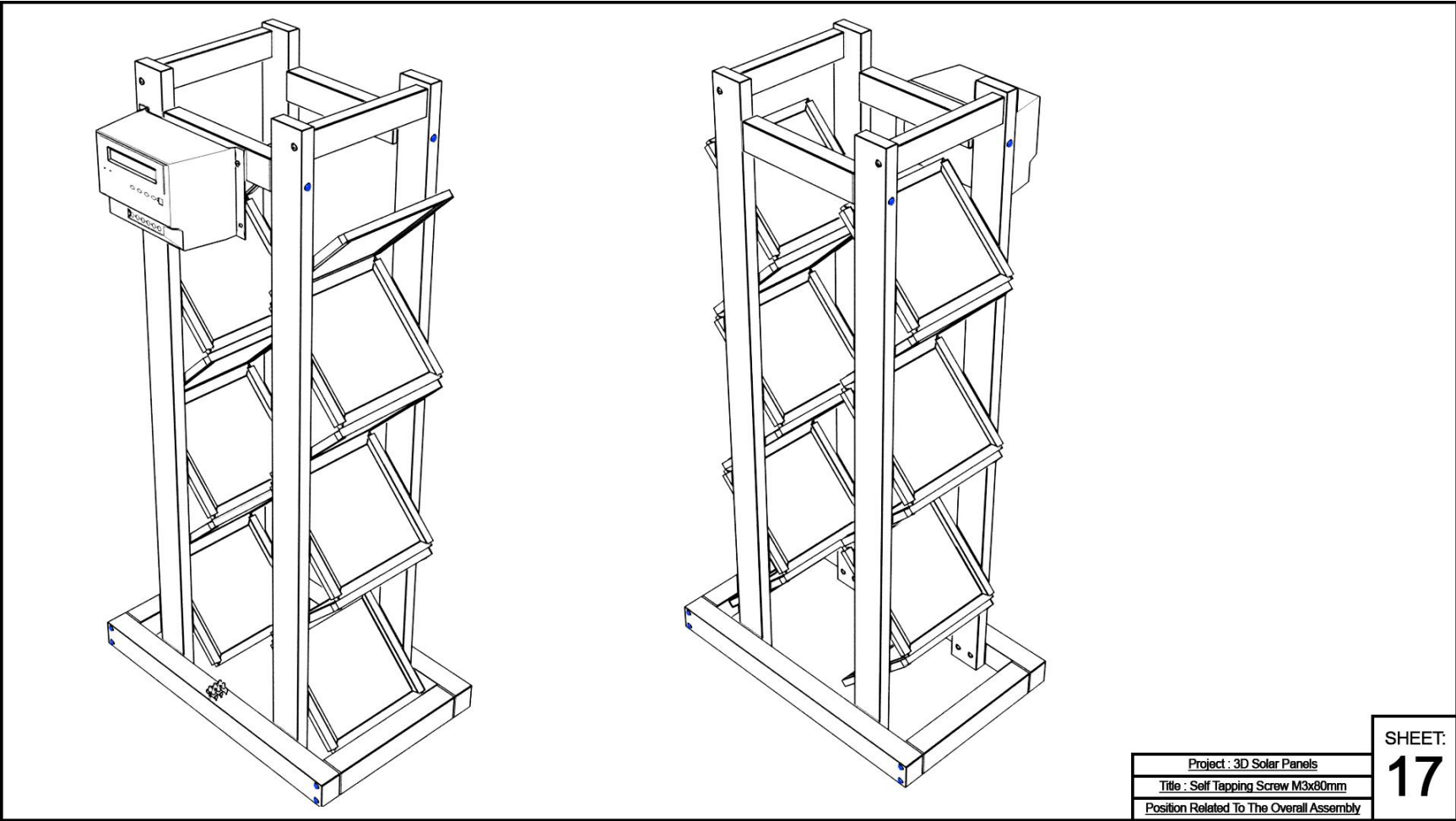
Project : 3D Solar Panels
Title : Cable Clamps
Position Related To The Overall Assembly

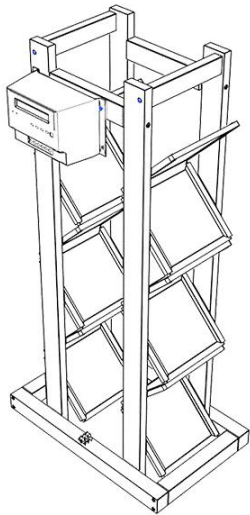
SHEET:
15



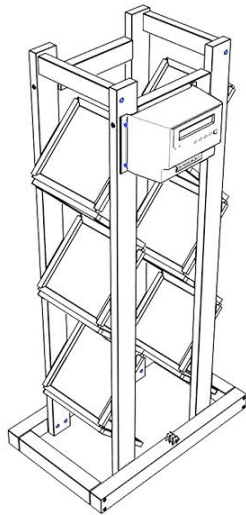
Project : 3D Solar Panels
Title : ø1mm Nail
Position Related To The Overall Assembly

SHEET:
16

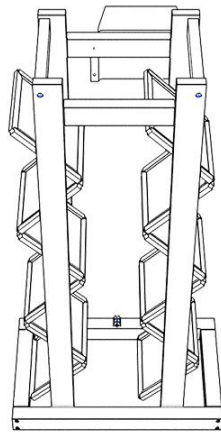




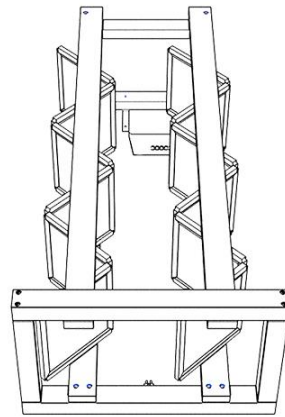
VIEW 1



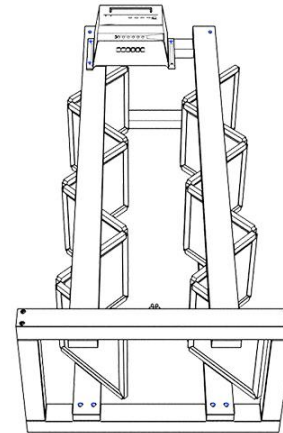
VIEW 2



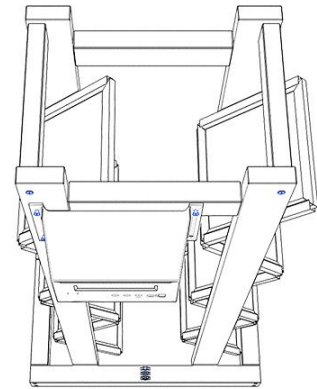
VIEW 3



VIEW 4



VIEW 5



VIEW 6

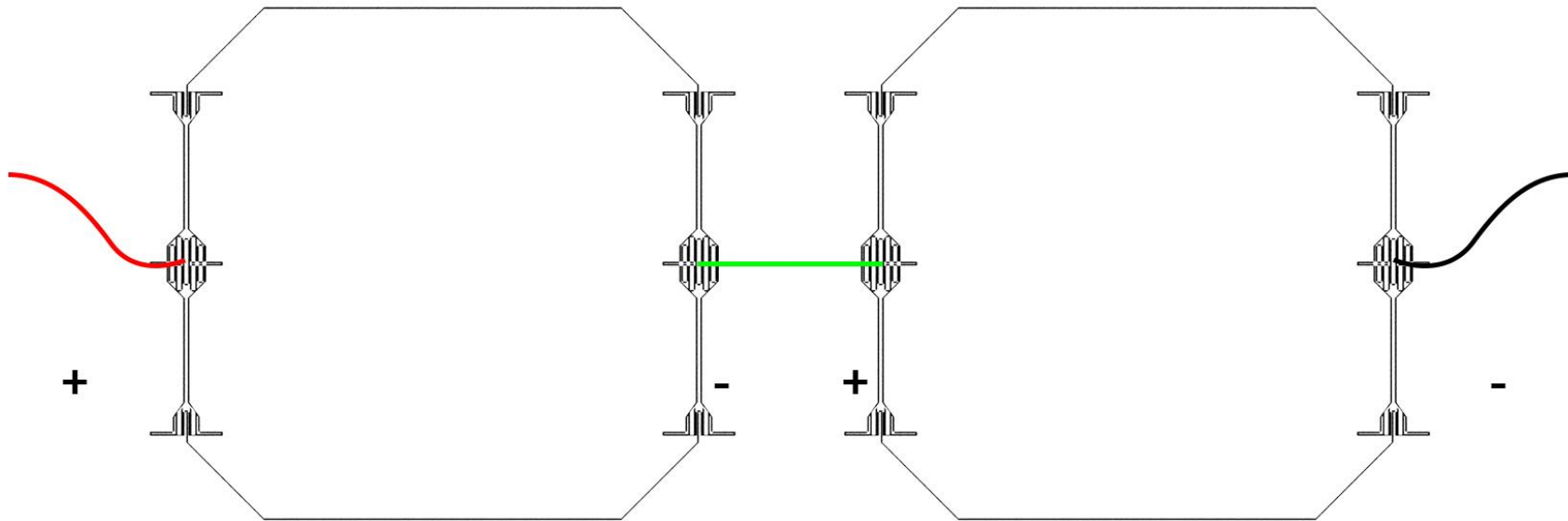
Project : 3D Solar Panels
Title : Self Tapping Screw M3x45mm
Position Related To The Overall Assembly

SHEET:
18

Chapter 7: Wiring

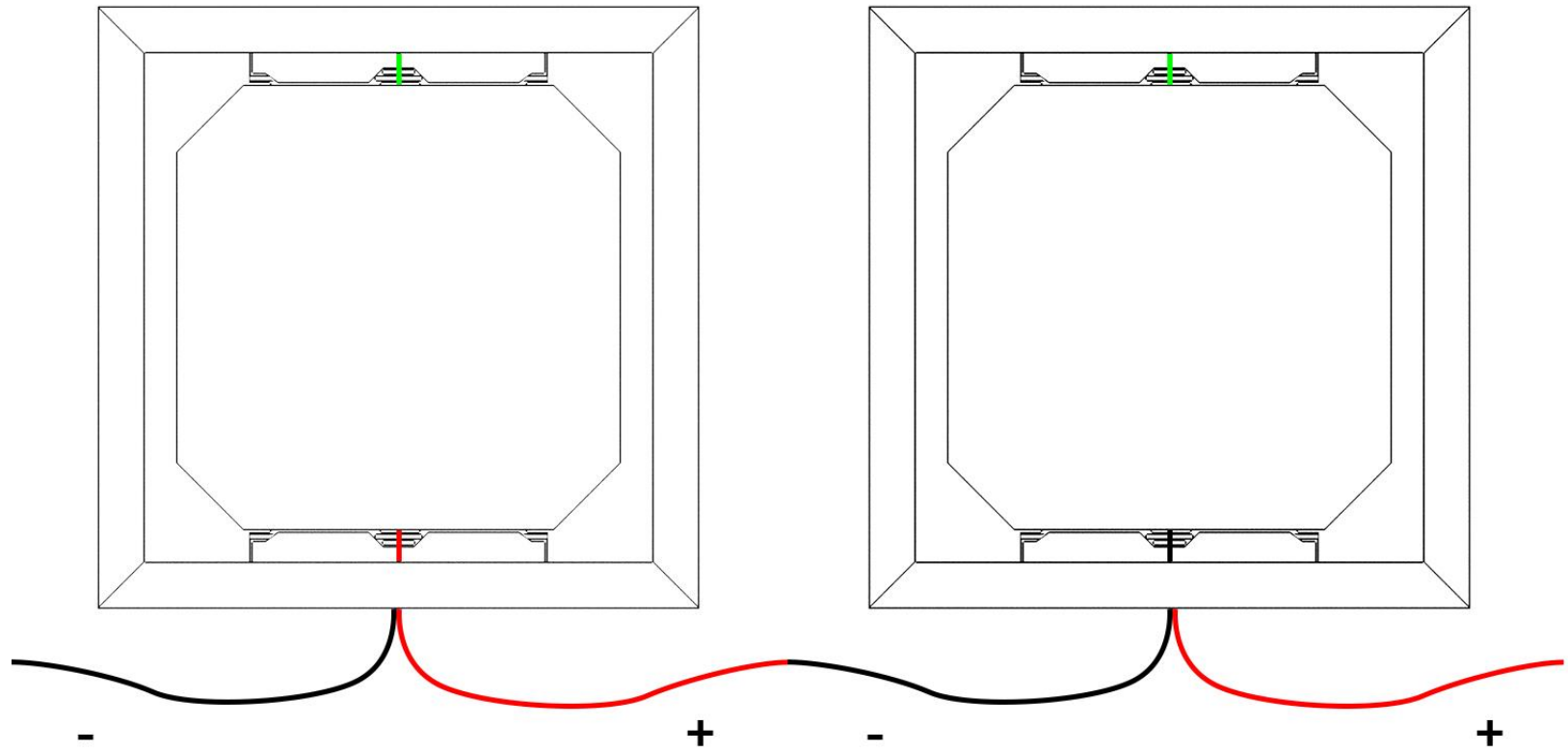
Wiring the 2 solar cells between them. Do this to all the 24 solar cells.

- Red Wire - For plus polarity
- Black Wire - For minus polarity
- Green Wire - For connecting the two cells



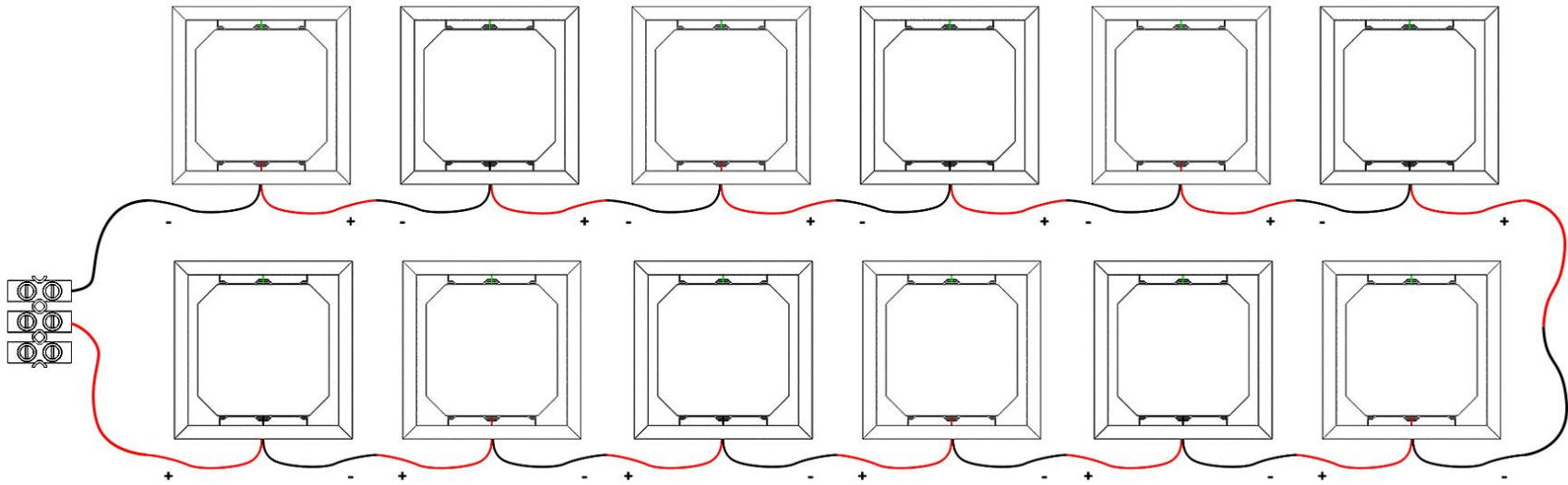
Wiring the Solar Cell Enclosure in parallel. Repeat this process for the other 10 Enclosures.

- Red Wire - For plus polarity
- Black Wire - For minus polarity
- Green Wire - For connecting the two cells

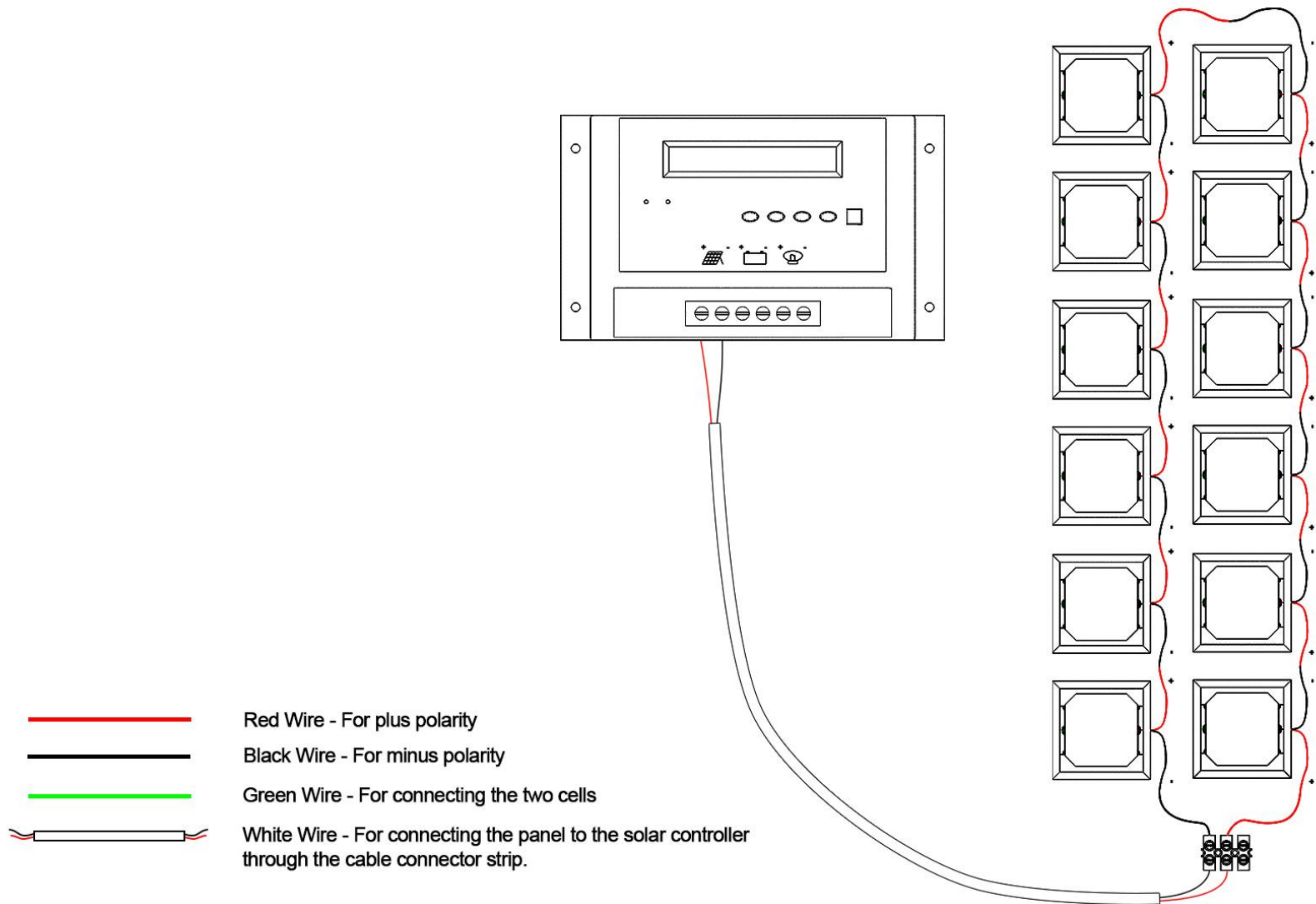


Connecting the Solar Cell Enclosures to the Cable Connector Strip.




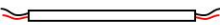
- Red Wire - For plus polarity
- Black Wire - For minus polarity
- Green Wire - For connecting the two cells

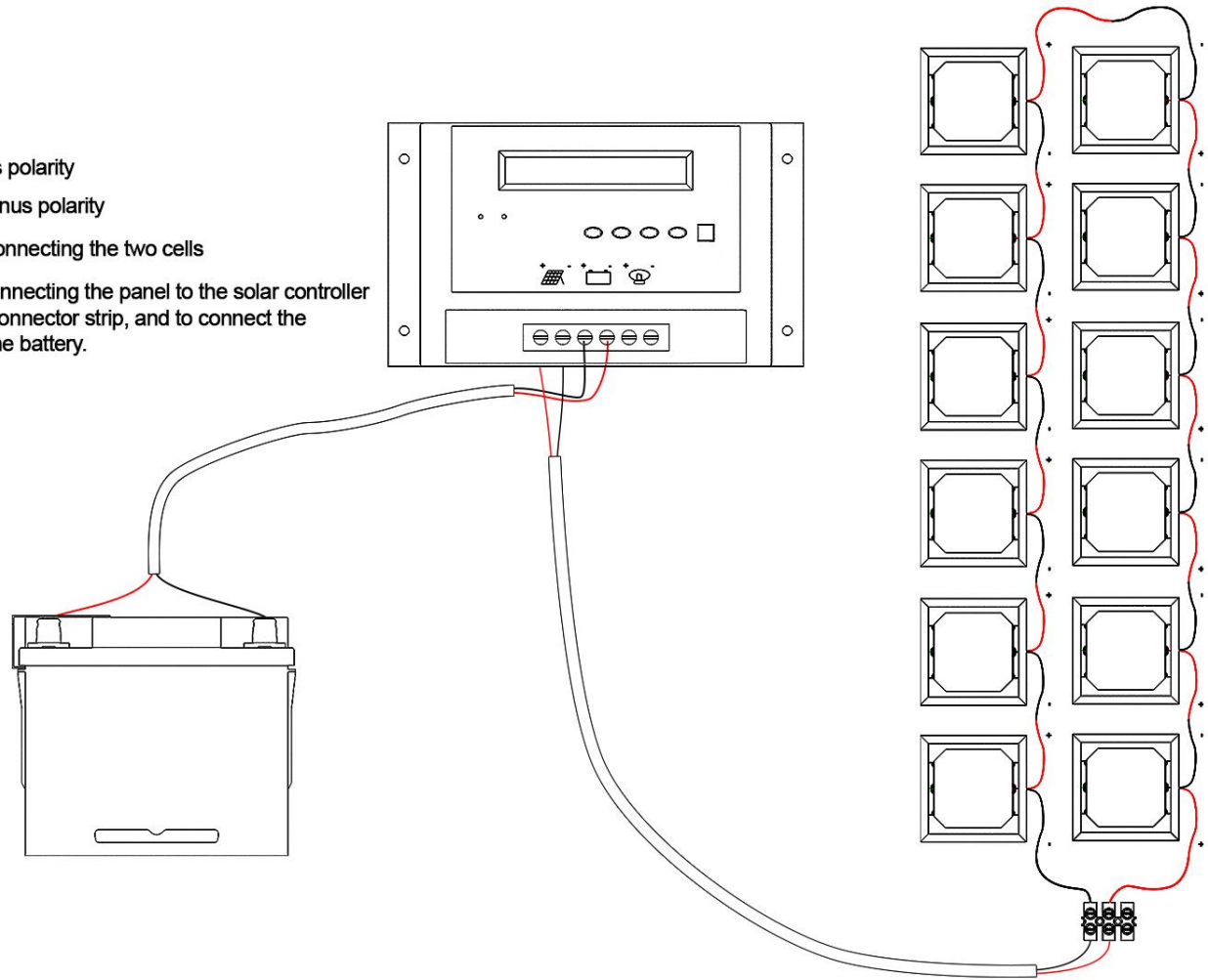


Connecting the solar cells to the solar controller.



Connecting the solar controller to the battery.

-  Red Wire - For plus polarity
-  Black Wire - For minus polarity
-  Green Wire - For connecting the two cells
-  White Wire - For connecting the panel to the solar controller through the cable connector strip, and to connect the solar controller to the battery.

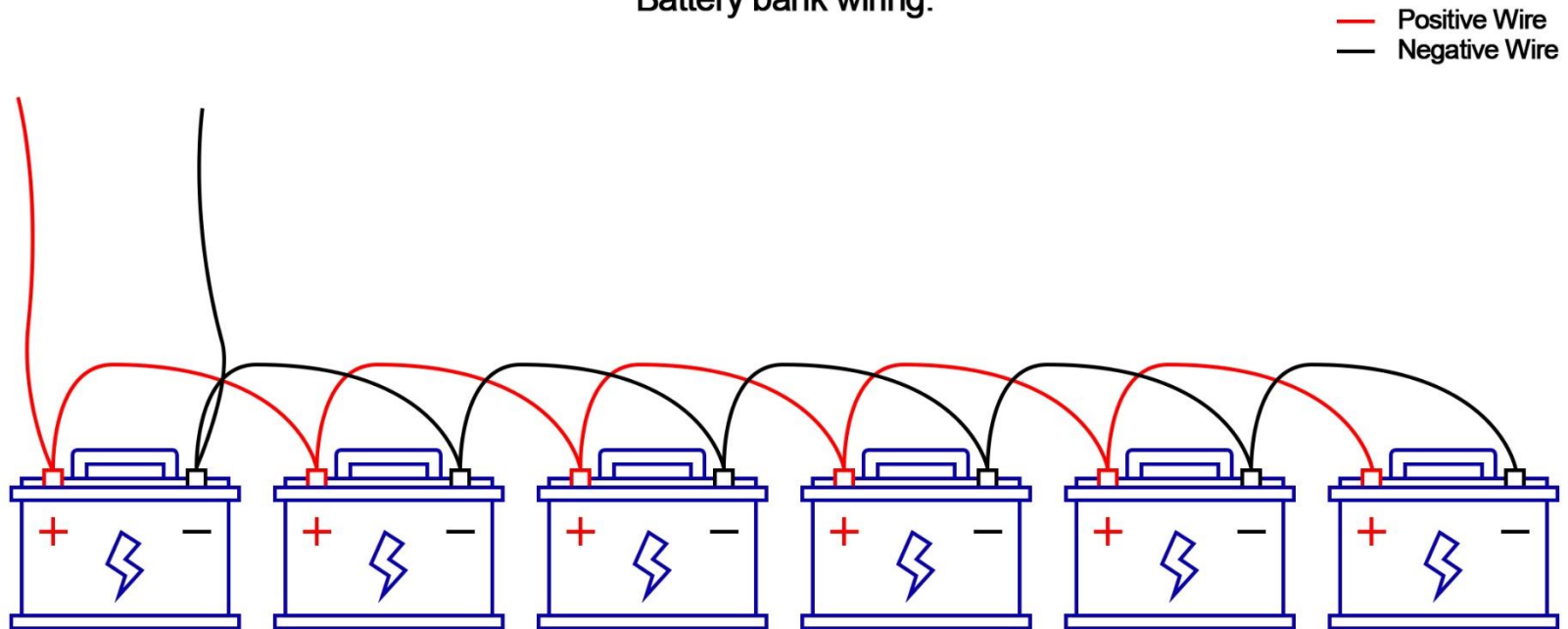


Chapter 8: Connection to the House

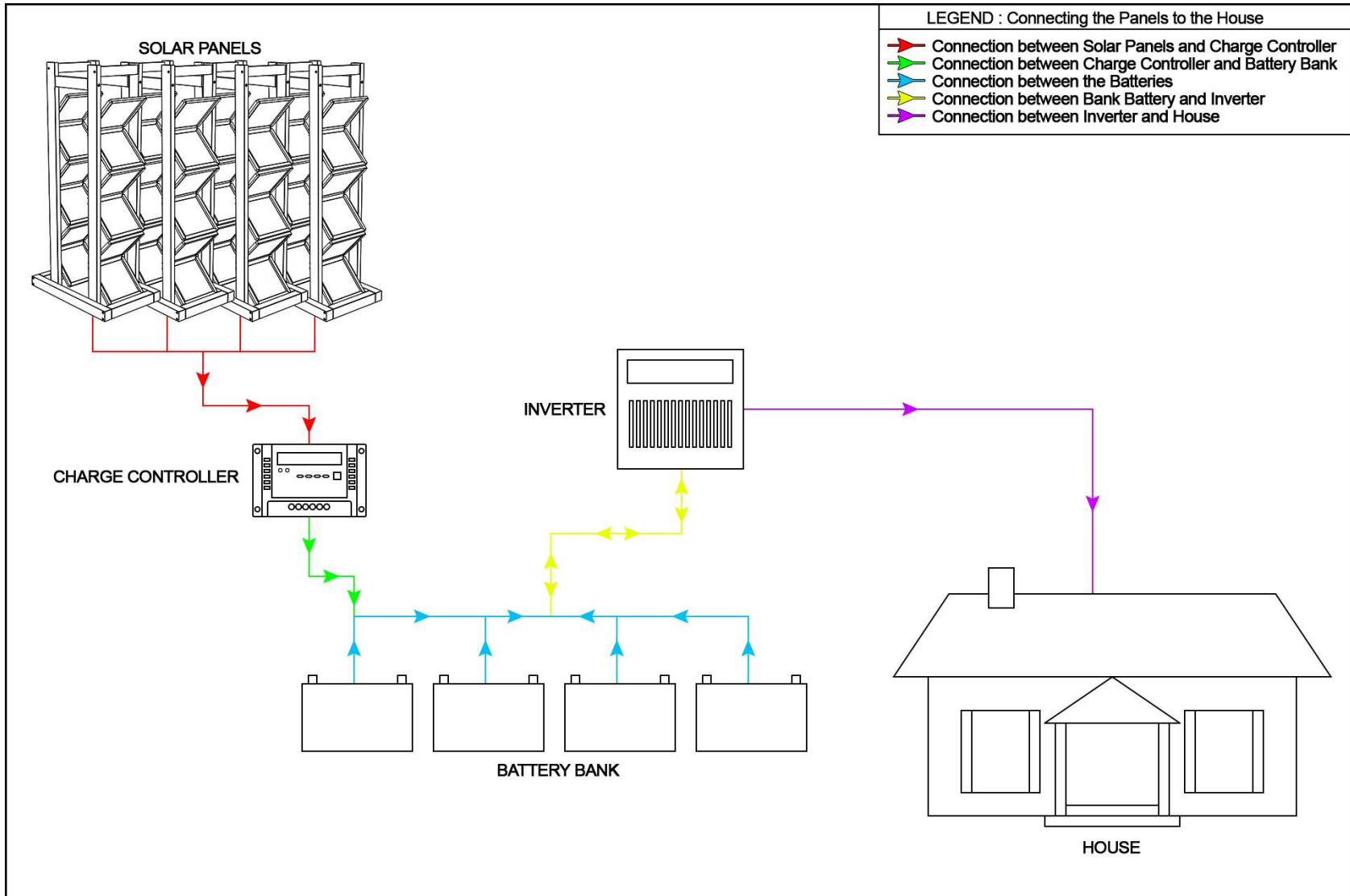
8.1 Battery Bank

The batteries are wired in parallel. This process is made by connecting the positive wire with the positive wire, and the negative wire with the negative wire. This process is made between the batteries as well. At the first or last battery leave a positive and negative wire loose as these two wires will make the connection to the Solar Controller. After this process put the batteries into an enclosure. The enclosure can be homemade or you can use a used server rack, or a battery cabinet, but I strongly recommend to make it yourself as these are expensive. Here is an example of how a server rack looks like: [LINK](#)

Battery bank wiring.



8.2 Connecting to the House



I hope that you enjoyed this Step-by-Step Guide on how to build a 3D solar panel, we will be continuing the work on this system and update this guides.

You will get notified when something new comes in and you will receive the updates for free.

I wish you the best!