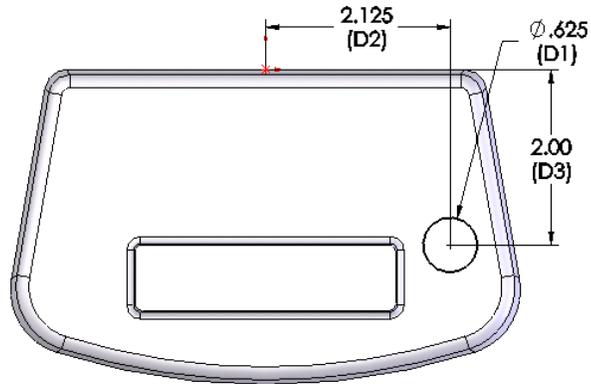


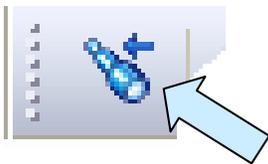


Dimension the circle at 0.625 diameter. Now, place a horizontal dimension of 2.125 inches from the origin to the center of the circle.



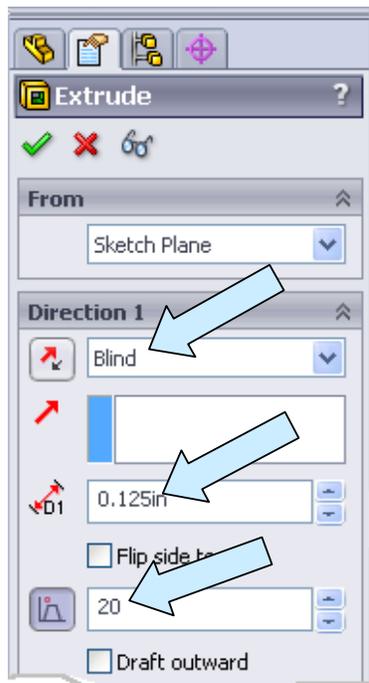
Then, place a vertical dimension of 2 inches from the origin to the center of the circle.

Your sketch should look like the illustration to the right.



Click on the PREVIOUS VIEW Icon.

Your part will rotate around to the special view that we used prior to creating the sketch.



Then, click on the EXTRUDED CUT Icon.

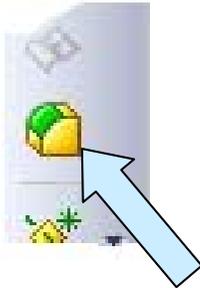
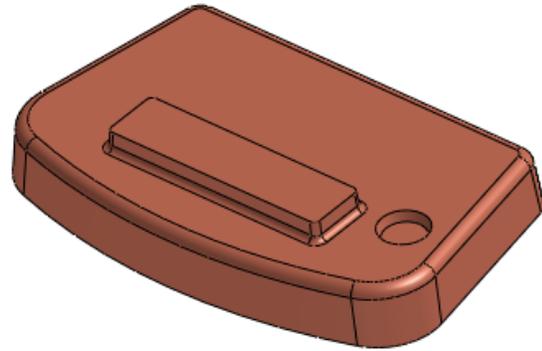


We'll use the default Blind option in the left pane. Type 0.125 for the Distance.

Click on the DRAFT Button and type 20 for the draft angle.

Then, click on the checkmark at the top of the left pane to complete the operation.

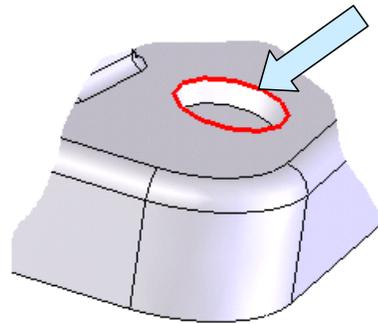
Your part should now look like this:



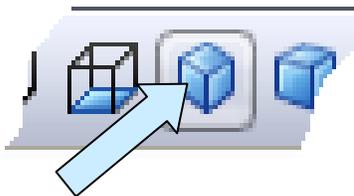
Now, click on the FILLET Icon.

We'll use the default Constant Radius Option in the left pane.

Type 0.08 for the Radius value and click on the circular edge indicated by the arrow in the illustration to the right. Then, click on the smaller circular edge at the bottom of the conical depression.



Click on the checkmark at the top of the left pane to complete the operation.



Click on the ISOMETRIC VIEW Icon.

The part rotates around so that we are looking at what will be the flat, parting line surface.



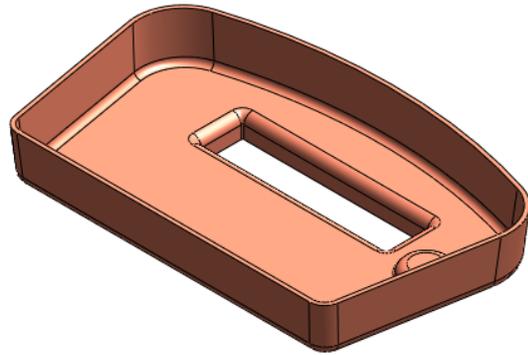
Then, click on the SHELL Icon.

Type 0.06 for the Shell Thickness.

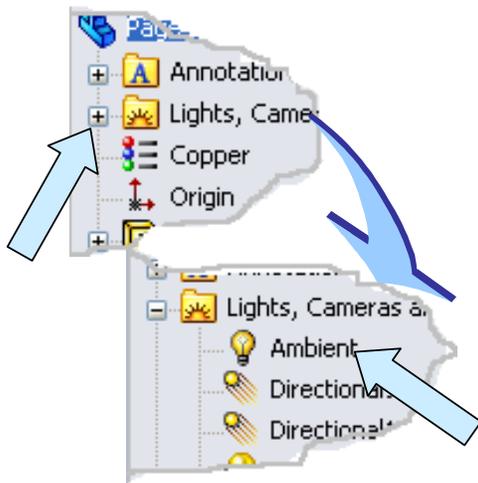
Click on the broad, top surface of the part. Then, select the hidden flat surface at the outer end of the rectangular boss. Click on the checkmark at the top of the left pane to complete the operation.



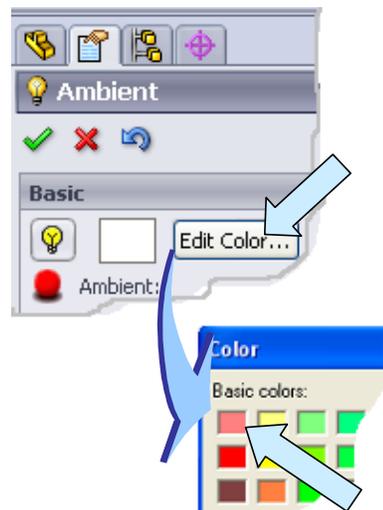
Your part should now look like this:



Before we continue on with additional features, let's suppose that we want to show the part in a pale, red color. (Note: The part has been illustrated in this lesson in a copper color for publishing purposes. Your part is probably gray at this point unless you have changed the material.)



To do this, click on the “+” sign in front of the Lights and Cameras Entry in the left pane. Then, double-click on the Ambient Entry.



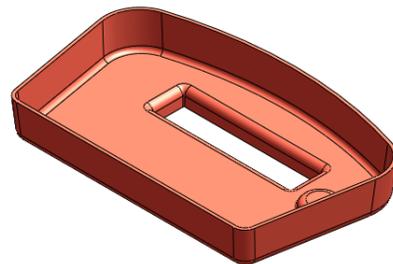
The Ambient Light Dialog fills the Left Pane.

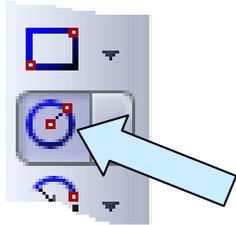
Click on the Edit Color Button and select the pale red color swatch. Then, click on the OK Button.



You can drag the brightness slider to the right (I used a value of 0.44) to get a more vibrant color. Then, click on the green checkmark at the top of the left pane.

Your part will now have a pale red color since that is the color light shining on it. (Note: We'll look at a completely different way to change the appearance of the part later in this exercise by actually changing the intrinsic color of the part.)

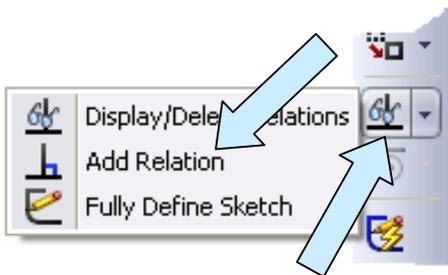




Let's drill a 0.26 diameter hole in the center of the small circular recess on the part. Click on the Top circular face of the small boss. Then, click on the CIRCLE Icon.

Create a circle centered on the circular boss.

Dimension the circle at 0.26 diameter.



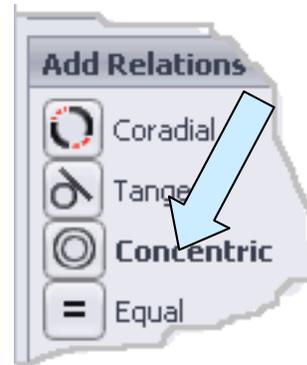
Click on the ADD RELATION Icon. Click on the circle that you just created and then on the circular edge at the top of the boss.

Then, click on the CONCENTRIC Option in the left pane. Click on the green checkmark to complete the operation.

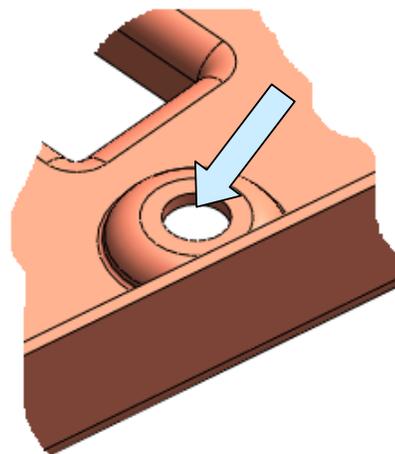


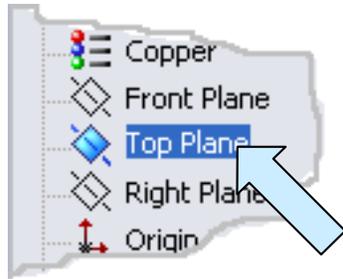
Click on the EXTRUDED CUT Icon.

We'll use the Through All Option in the left pane. Click on the checkmark to finish.



The circular boss will now have a hole at the center.

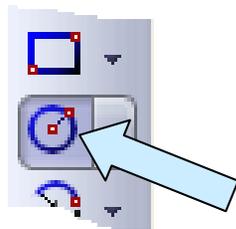




Our next task is to create four conical bosses at the corners of the part. When we get to our assembly stage, we'll press threaded inserts into these bosses. This will allow us to attach the matching back plate with machine screws.

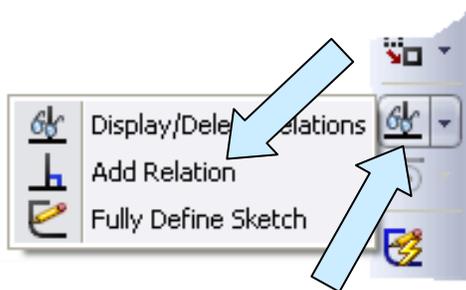
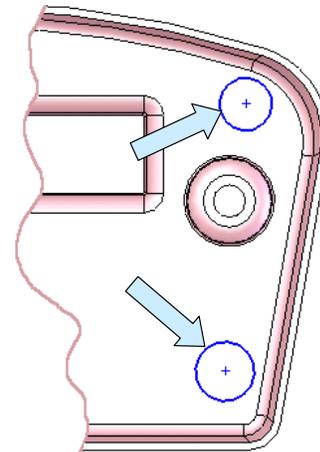
Click on the Top Plane entry in the left pane.

Next, click on the TOP VIEW Icon.



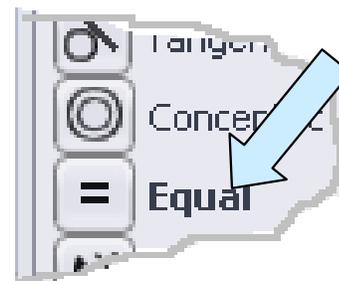
Click on the CIRCLE Icon.
Create two circles located in the right side of the part.

Place one near the top, right corner and one near the bottom, right corner as indicated in the illustration to the right.



Click on the ADD RELATION Icon.

Select the two circles and then click on the EQUAL Option in the left pane. Then click on the checkmark.

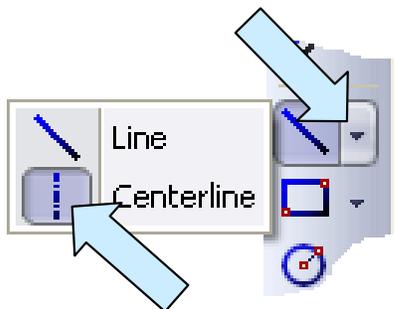
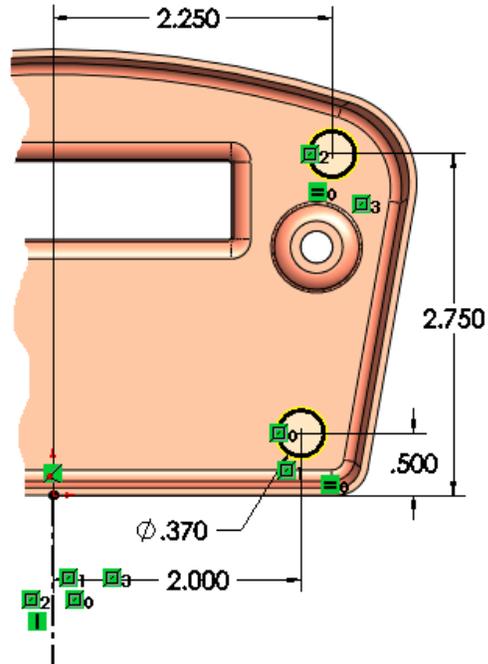




Next, dimension the lower circle at 0.370 diameter.

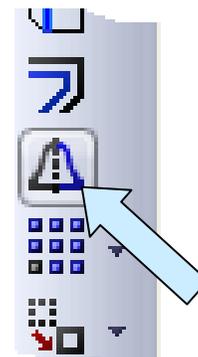
Notice that both circles rebuild to the 0.370 diameter.

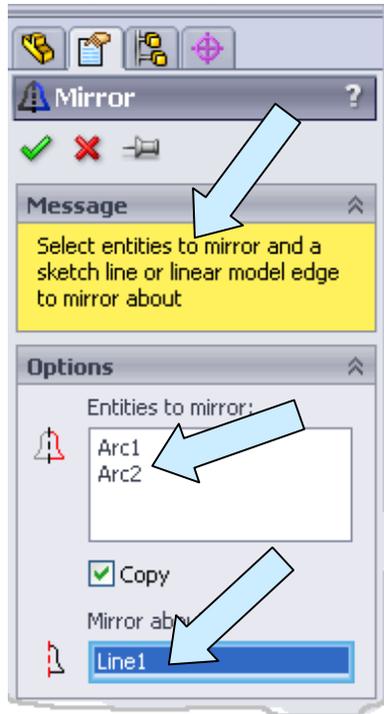
Now, create horizontal and vertical dimensions from the origin to each of the circle centers as indicated in the illustration to the right.



Next, click on the CENTERLINE Icon.
Create a vertical centerline that is connected to the origin.

Next, click on the MIRROR ENTITIES Icon.





The MIRROR Dialog now fills the left pane.

You are prompted to select entities to mirror.

Click on the two circles on the right side of the part.

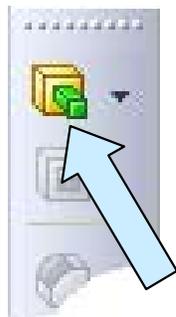
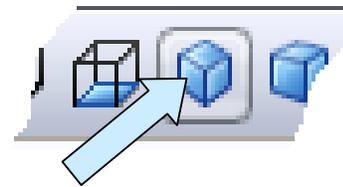
Next, click on the Mirror About Field and then on the centerline that you just constructed.

Notice that two ghost circles appear on the left side of the part.

Click on the green checkmark at the top of the left pane to complete the operation.

Two additional circles are created on the left side of the part.

Click on the ISOMETRIC VIEW Icon.



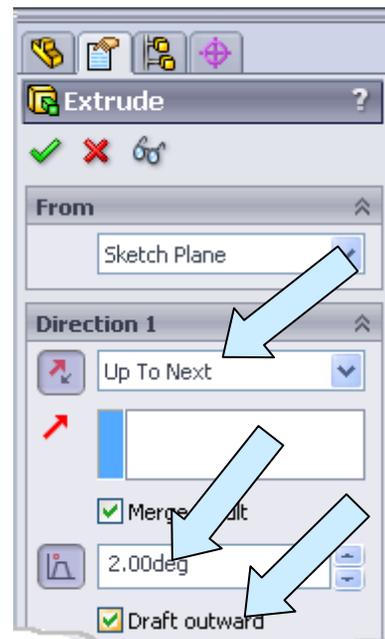
Then, click on the EXTRUDED BOSS/BASE Icon.

Click on the REVERSE DIRECTION Button.

Then, click on the Up To Next Option in the left pane. This will give our part design intent since we always want the bosses to grow into the main part.

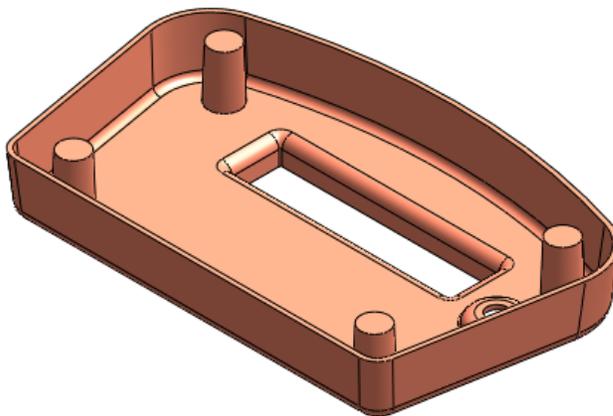
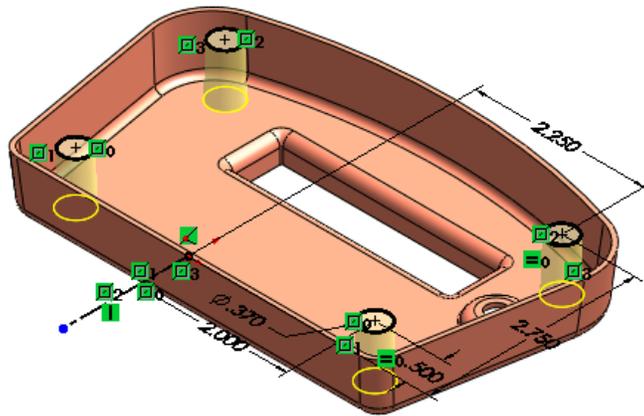
We'll want to add a slight amount of draft on these bosses, so click on the DRAFT Button. Then, type 2 for the draft angle.

Be sure to check the Draft Outward option since the bosses will grow in diameter as they approach the floor of the part.



The preview of the bosses will look like the illustration to the right.

Click on the checkmark to finish.

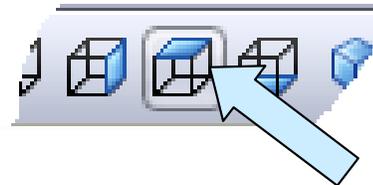


Your part should now look like this:

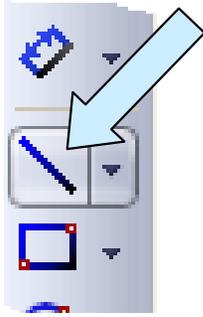
Let's add reinforcing ribs between the bosses and the sidewalls of the part.

The top surface of the ribs will lie on the same plane as the top edge of the part and top surface of the bosses. So, click on the Top Plane entry in the left pane.

Next, click on the TOP VIEW Icon.



Click on the ZOOM TO AREA Icon and select the top, right corner of the part to magnify the area.



Click on the LINE Icon. Position the cursor over the circular boss so that a centerpoint appears.

Then, position the cursor over the centerpoint and move directly upwards. A vertical inference line will follow the cursor.

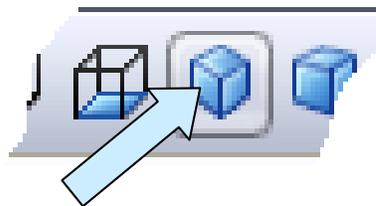
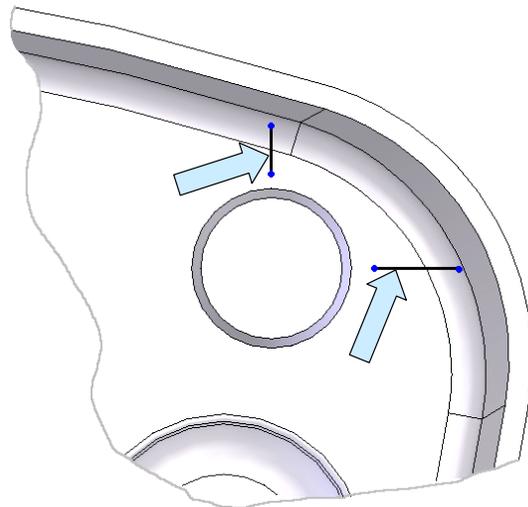
Click just above the top edge of the boss with the inference line visible to place the lower end of the line. Continue moving directly upward.

With the VERTICAL ALIGNMENT symbol visible, click below the inside edge of the part to complete the vertical line.

Create a similar short horizontal line to the right of the boss, centered on the boss.

The lines should stop short of the boss and the part wall. (This is another example of including design intent in your model. Because the line ends at an arbitrary point shy of the actual wall, SolidWorks will automatically always make the rib that is grown from this line extend up to the nearest wall. If you modify the case size later, the ribs will immediately update to the new extents!)

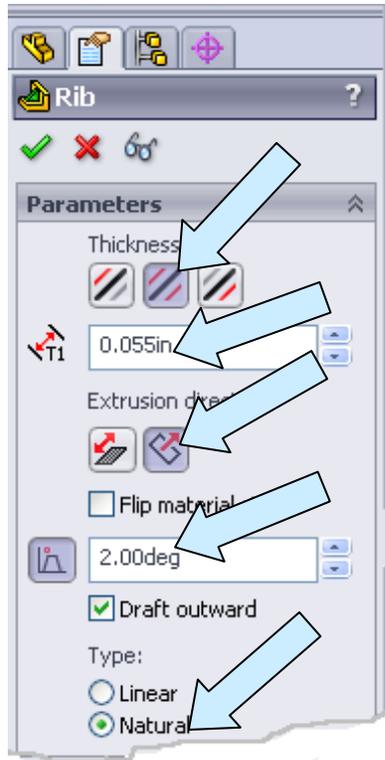
I've illustrated the two lines to the right. Create similar lines at the other three boss locations.



Then, click on the RIB Icon.

Now, click on the ISOMETRIC VIEW Icon.





The lines that we created define the centerlines of our ribs, so click on the Both Sides Button in the Thickness section of the left pane.

Let's type 0.055 for the thickness. (Our general part wall thickness is 0.060. The ribs will grow in thickness because of draft, so this will lessen sink marks on the outside surface of the part that might be caused by thicker ribs.)

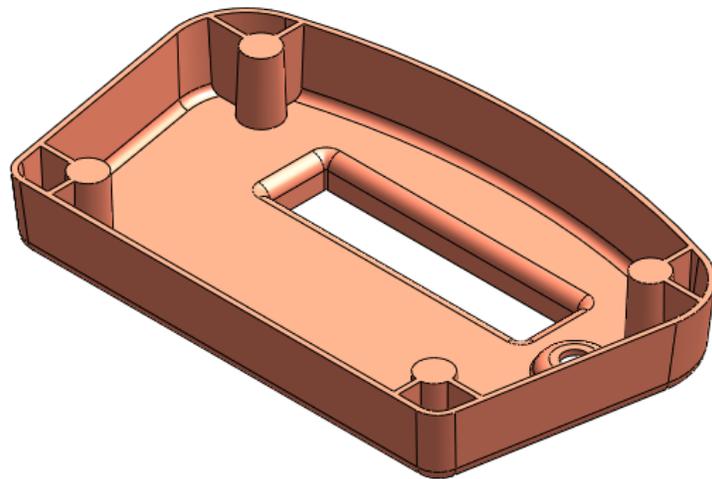
Click on the Normal to Sketch Button since we want the ribs to grow directly downward from the sketch lines.

Click on the DRAFT Button. Let's type 2 for the draft angle.

We'll use the default Natural Option at the bottom of the left pane.

Click on the checkmark to complete the operation.

Your part should now look like this:



Let's core out the four bosses.

The cores will start with a 0.260 diameter at the parting line plane and taper 2 degrees inward to the depth of the inside broad surface.



We'll start by clicking on the Top Plane entry in the left pane.

Then, click on the TOP VIEW Icon.