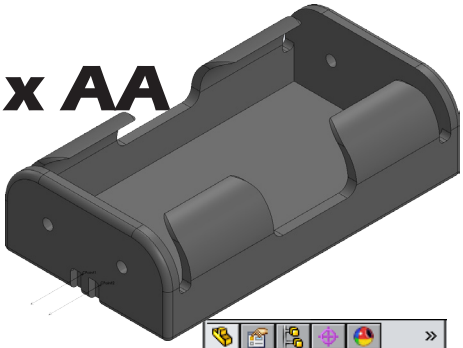
Chapter 22

Battery Holder 2 x AA



A. Front Extrude.

Step 1. Click File Menu > New, click **Part Metric** and OK.

Step 2. Click **Front Plane** in the Feature Manager and click **Sketch** from the Context toolbar, **Fig. 1**.

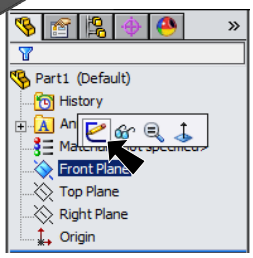


Fig. 1

Step 3. Click **Corner Rectangle** **(S)** on the Sketch toolbar.

Step 4. Draw a rectangle **away from** the Origin , **Fig. 2**.

Step 5. Click **Smart Dimension** **(S)** on the Sketch toolbar.

Step 6. Add dimensions, **Fig. 2**.

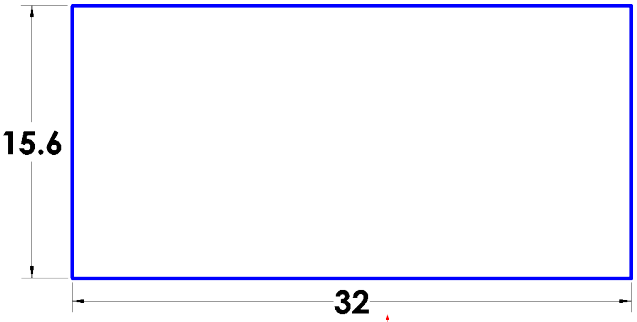


Fig. 2

Step 7. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 8. **Ctrl click** the **bottom line of rectangle** and the **Origin**. Release Ctrl key and click **Make Midpoint** from the Context toolbar, **Fig. 3**.

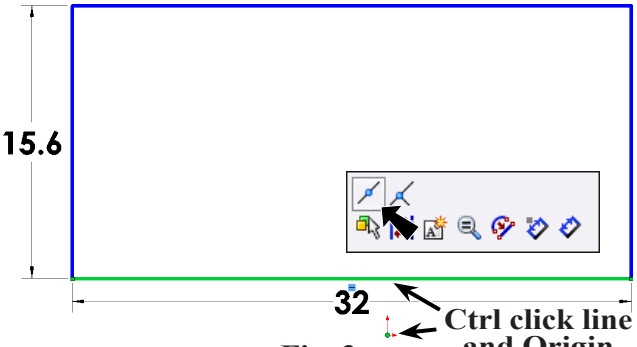


Fig. 3

Step 9. Click **Sketch Fillet** on the Sketch toolbar.

Step 10. In the Sketch Fillet Property Manager set:

Radius 7, **Fig. 4**
click **both top corners**, **Fig. 5**
click OK **twice** .

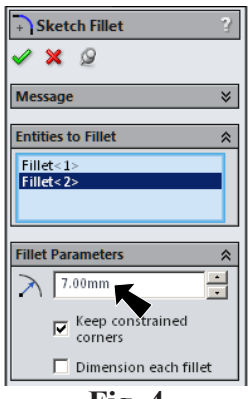


Fig. 4

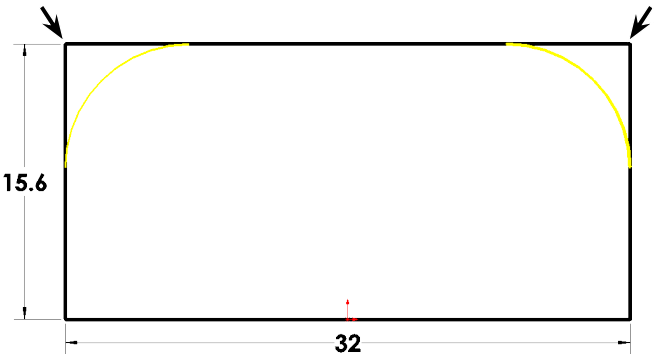


Fig. 5

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Step 11. Click **Features**

on the Command Manager toolbar.

Step 12. Click **Extruded Boss/Base**

on the Features toolbar.

Step 13. In the Property Manager set:
under Direction 1, **Fig. 6**
End Condition
Mid Plane
Depth

57
click OK .

Step 14. Click **Zoom to Fit** **(F)** on the View toolbar.

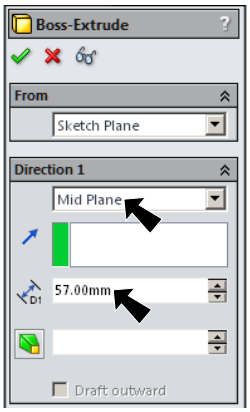


Fig. 6

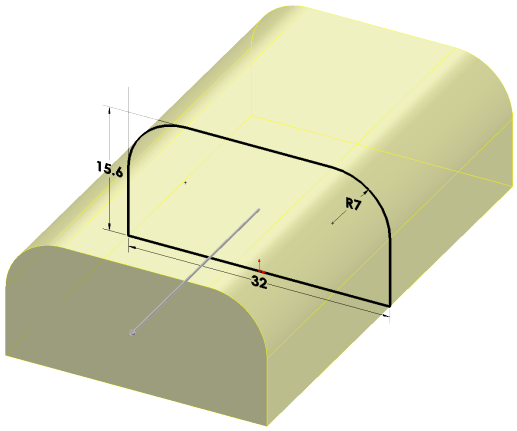


Fig. 7

B. Save as "BATTERY HOLDER 2 X AA".

Step 1. Click File Menu > Save As.

Step 2. Key-in **BATTERY HOLDER 2 X AA** for the filename and press ENTER.

C. Side Cut.

Step 1. Click **side face of holder** and click **Sketch** on the Context toolbar, **Fig. 8**.

Step 2. Click **Normal To** on the View toolbar. **(Ctrl-8)**

Step 3. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 4. Draw centerline up from the Origin , **Fig. 9**.

Fig. 8

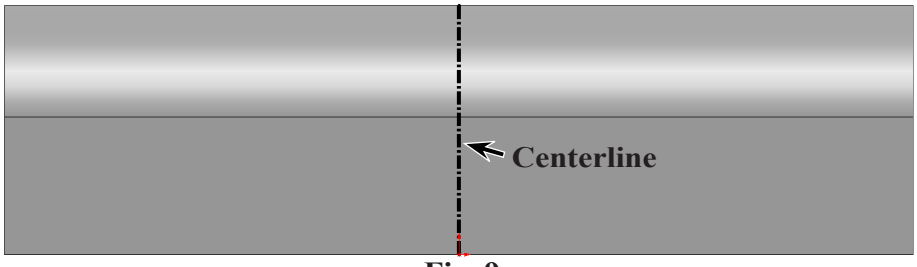


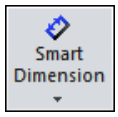
Fig. 9

Step 5. Click **Line** **(L)** on the Sketch toolbar.

Step 6. Draw **7** lines as shown in, **Fig. 10**. Keep the top lines on edge.

Step 7. **Right click graphics area and click Select** from menu to unselect Line tool.

Step 8. **Ctrl click** the **bottom horizontal lines** to select both. Release Ctrl key and click **Make Collinear** on the Context toolbar, **Fig. 11**.

Step 9. Click **Smart Dimension** 

(S) on the Sketch toolbar.

Step 10. Add dimensions, **Fig. 12**. Dimension double distance 16 distance across the centerline. To double distance dimension, click vertical line and then centerline, move the cursor to right of the centerline and click. Key-in dimension and press ENTER.

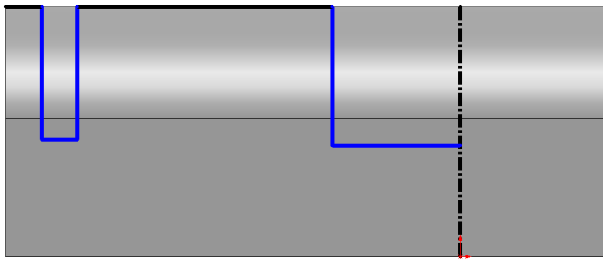


Fig. 10

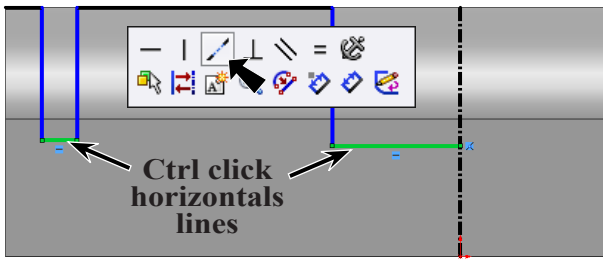


Fig. 11

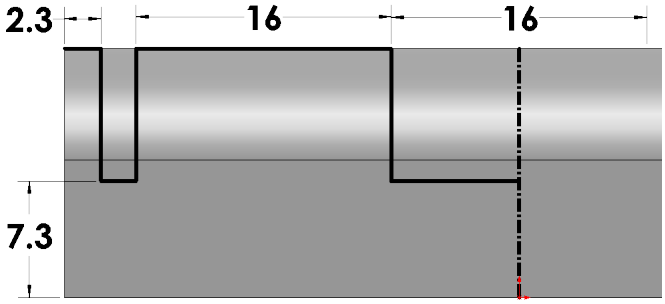


Fig. 12

Step 11. Click **Sketch Fillet** on the Sketch toolbar.

Step 12. In the Property Manager set:

Radius 1.8
Fig. 13
click the **3 corners**, **Fig. 14**
click OK .

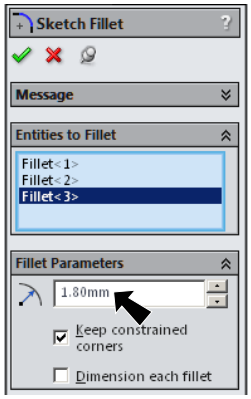


Fig. 13

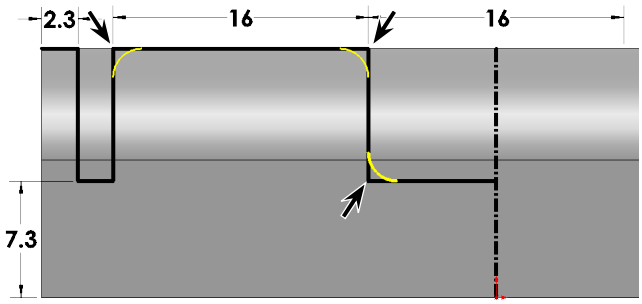


Fig. 14

Radius .8
Fig. 15
click the **two corners**, **Fig. 16**
click OK **twice** .

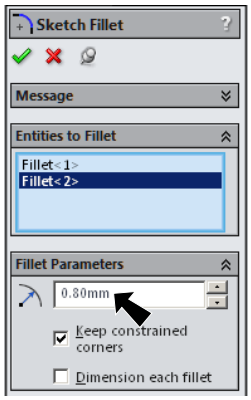


Fig. 15

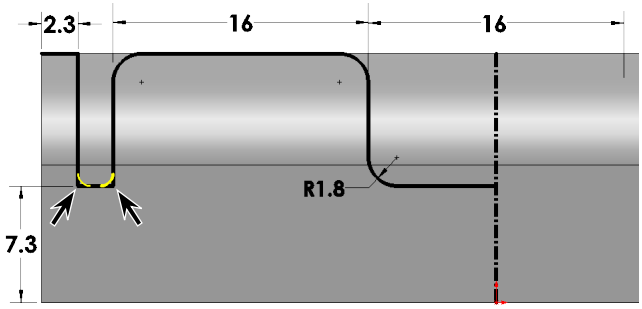


Fig. 16

Step 13. **Drag selection around sketch** to select all entities, **Fig. 17**.

Step 14. Click **Mirror Entities** on the Sketch toolbar, **Fig. 18**.

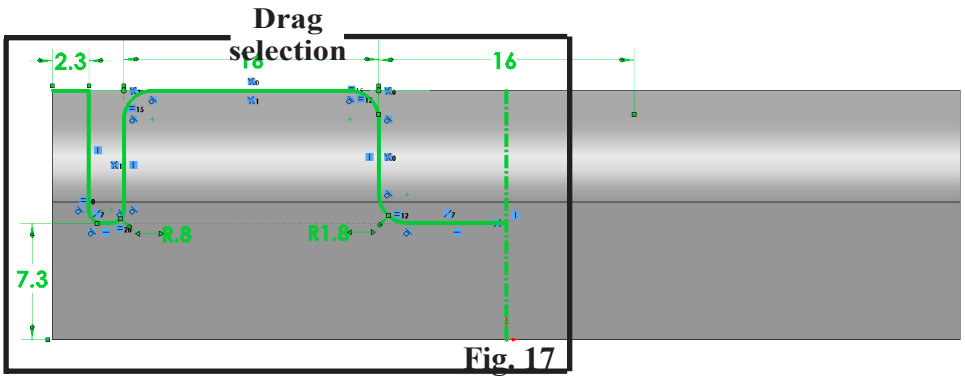


Fig. 17

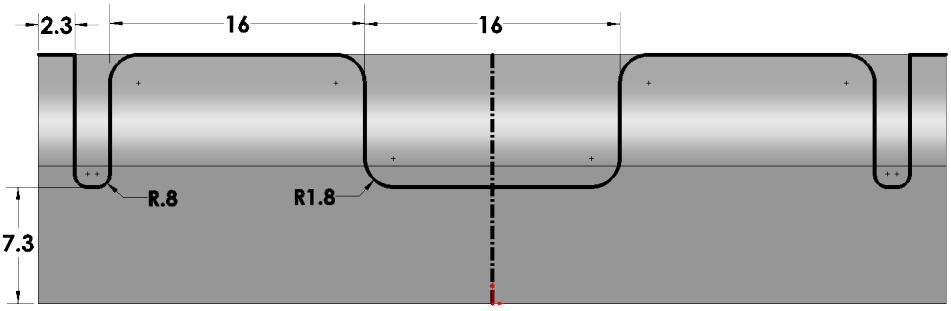


Fig. 18

Step 15. Click **Trimetric** on the Standard Views toolbar.

Step 16. Click **Features** on the Command Manager toolbar.

Step 17. Click **Extruded Cut** on the Features toolbar.

Step 18. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 19**
End Condition
Through All
check **Flip side to cut**.

The Direction arrow should point towards area to be cut away (up), **Fig. 20**.
If arrow is pointing in wrong direction, uncheck **Flip side to cut**, **Fig. 19**.

Click OK .

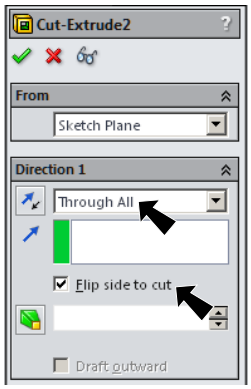


Fig. 19

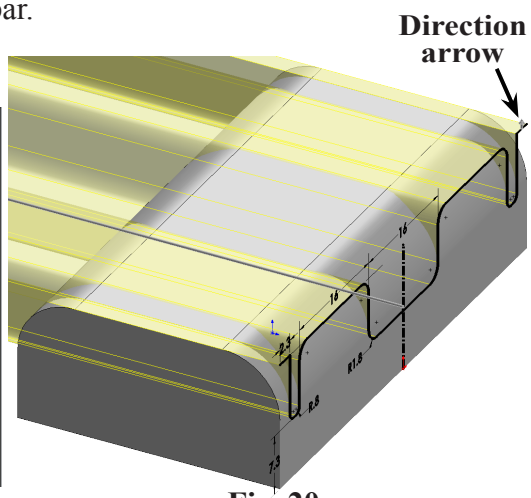


Fig. 20

Step 19. Save. Use **Ctrl-S**.

D. Inside Cut.

Step 1. Click **inside back face of holder** and click **Sketch** on the Context toolbar, **Fig. 21**.

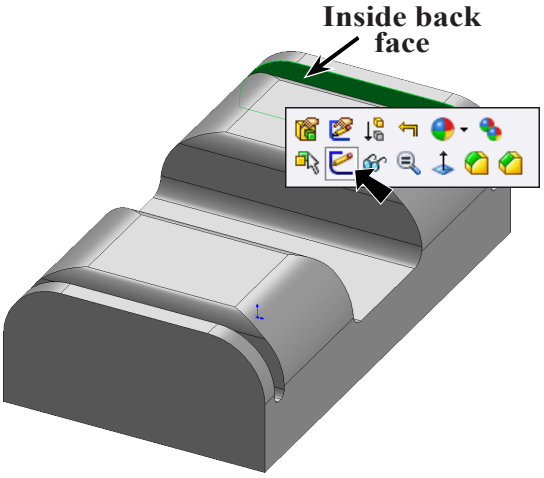


Fig. 21

Step 2. Click **Normal To** on the View toolbar. (**Ctrl-8**)

Step 3. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 4. Draw centerline up from the Origin , **Fig. 22**.

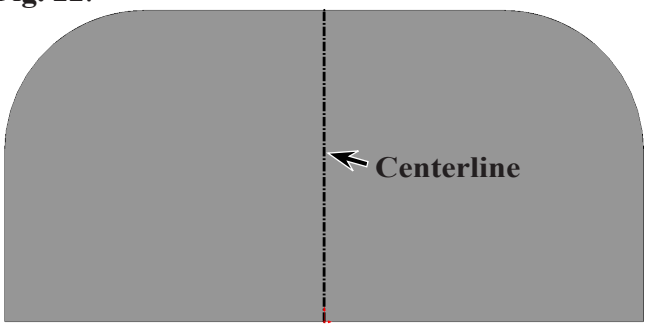
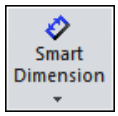


Fig. 22

Step 5. Click **Line** **(L)** on the Sketch toolbar.

Step 6. Draw the **3 lines** in **Fig. 23**.

Step 7. Click **Smart Dimension** 

(S) on the Sketch toolbar.

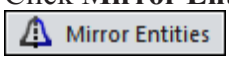
Step 8. Add dimension, **Fig. 24**.

Step 9. Click **Tangent Arc** in the **Arc flyout** on the Sketch toolbar.

Step 10. Draw an arc between Position 1 and Position 2 in **Fig. 25**. Start arc at Position 1 and swing up along path shown in **Fig. 25**.

Step 11. **Right click drawing and click Select** from menu to unselect Arc Tool.

Step 12. **Drag selection around sketch** to select all entities, **Fig. 26**.

Step 13. Click **Mirror Entities** 

on the Sketch toolbar, **Fig. 27**.

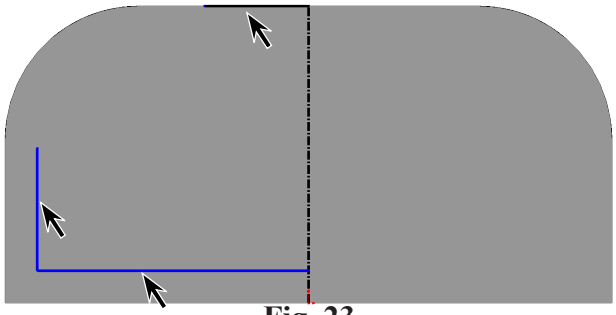


Fig. 23

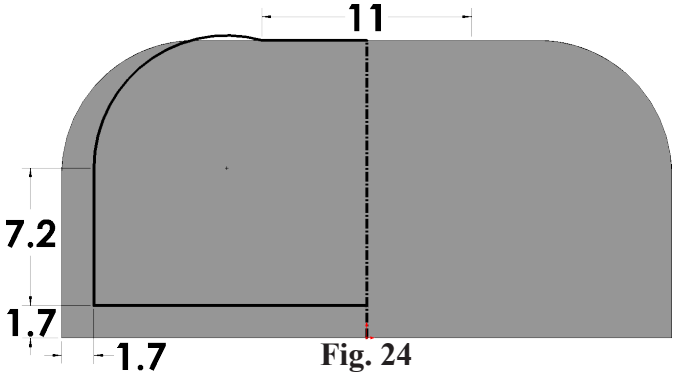


Fig. 24

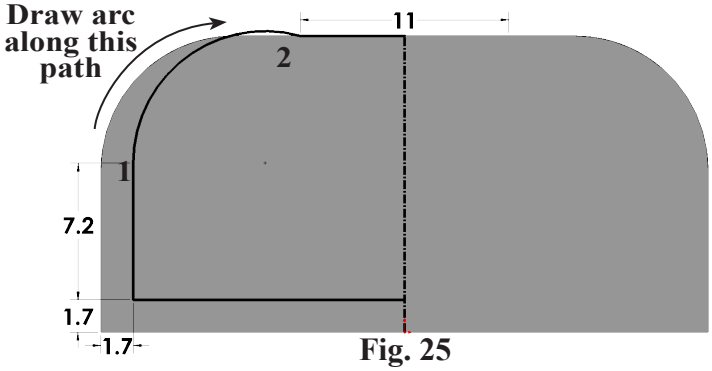


Fig. 25

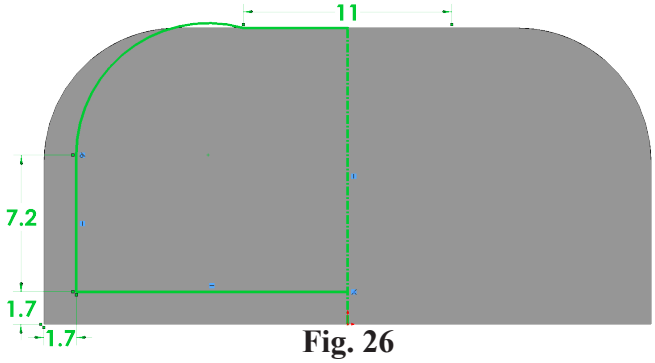


Fig. 26

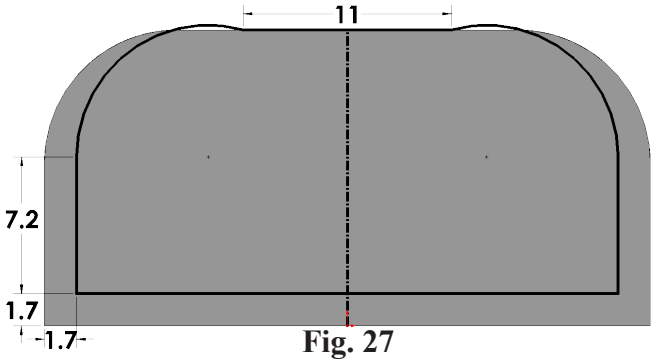


Fig. 27

Step 14. Rotate view to view **inside front face at the other end of holder**, hold down middle mouse button (wheel) and drag to rotate view, **Fig. 29**.

Step 15. Click **Features**

on the Command Manager toolbar.

Step 16. Click **Extruded Cut**

on the Features toolbar.

Step 17. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 28**
End Condition **Up To Surface**

in the **Face/Surface** box
click **inside front face of holder**, **Fig. 29**

click OK .

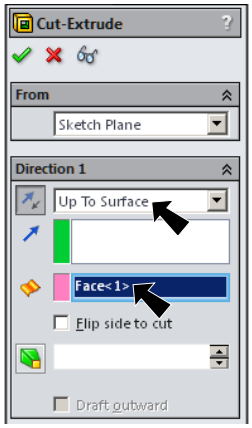


Fig. 28

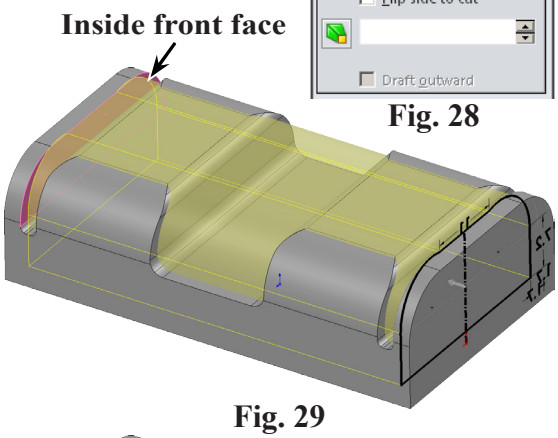


Fig. 29

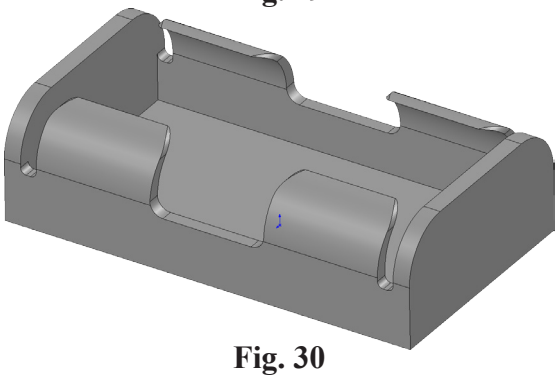
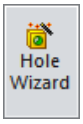


Fig. 30

Step 18. Save. Use **Ctrl-S**.

E. Screw Hole.

Step 1. Click **Top** on the Standard Views toolbar. (**Ctrl-5**)

Step 2. Click **Hole Wizard** 

on the Features toolbar.

Step 3. In the Property Manager on the Type tab set:
under Hole Type, **Fig. 31**
click **Countersink**
under Standard:
select **ANSI Inch**
under Type:
select **Flat Head Screw (100)**
under Hole Specification:
Size: #2
under End Condition
End Condition **Through All**

click **Positions tab**

at top of the Property Manager.

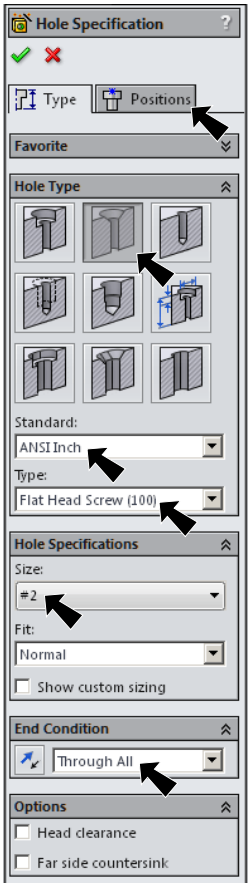


Fig. 31

Step 4. Click **inside bottom face of holder** one time as face for hole, **Fig. 32**.

Step 5. Click the **Origin** to locate hole, **Fig. 32**.

Step 6. Click OK in the Hole Wizard Property Manager.

Step 7. Save. Use **Ctrl-S**.

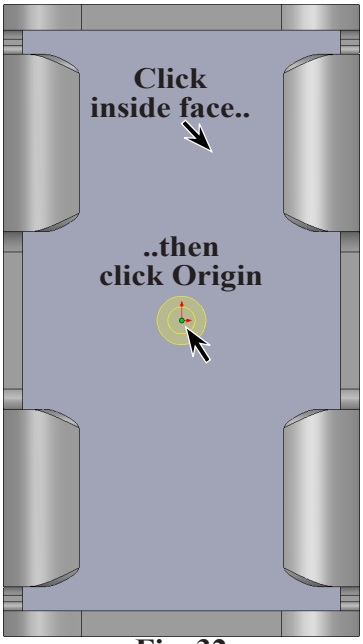


Fig. 32

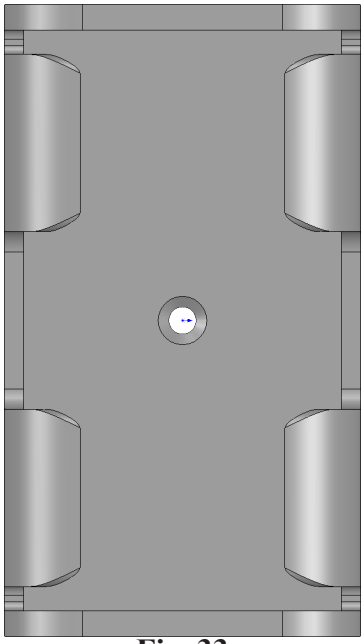


Fig. 33

F. Rivet Holes.

Step 1. Click **Trimetric** on the Standard Views toolbar.

Step 2. Click **outside front face of holder** and click **Sketch** on the Context toolbar, **Fig. 34**.

Step 3. Click **Normal To** on the View toolbar. (**Ctrl-8**)

Step 4. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 5. Draw centerline up from Origin, **Fig. 35**.

Step 6. Click **Circle** (**S**) on the Sketch toolbar.

Step 7. Draw a circle, **Fig. 36**.

Step 8. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 9. Add dimensions, **Fig. 36**.

Step 10. **Right click drawing and click Select** from menu to unselect Smart Dimension.

Step 11. **Drag selection around sketch** to select circle and centerline, **Fig. 37**.

Step 12. Click **Mirror Entities** on the Sketch toolbar, **Fig. 38**.

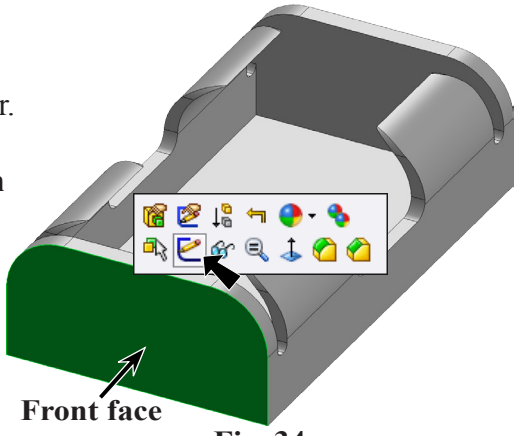


Fig. 34

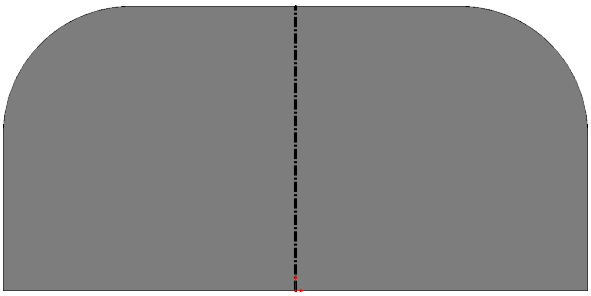


Fig. 35

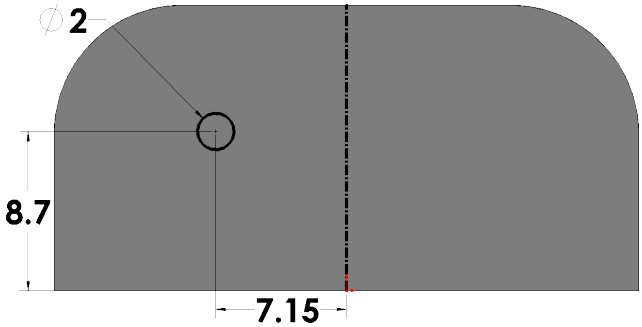


Fig. 36

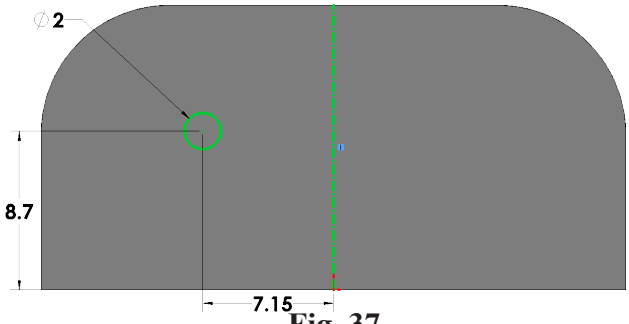


Fig. 37

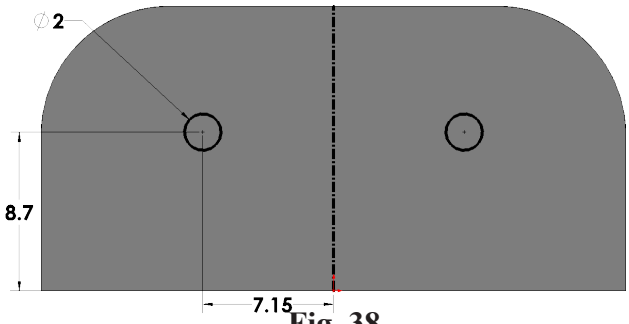


Fig. 38

Step 13. Click **Trimetric** on the Standard Views toolbar.

Step 14. Click **Features** Features on the Command Manager toolbar.

Step 15. Click **Extruded Cut** Extruded Cut on the Features toolbar.

Step 16. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 39**
End Condition
Through All
click OK .

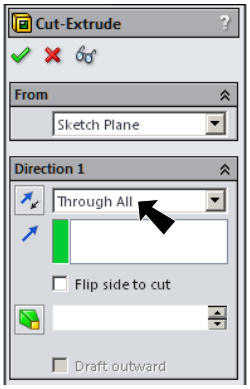


Fig. 39

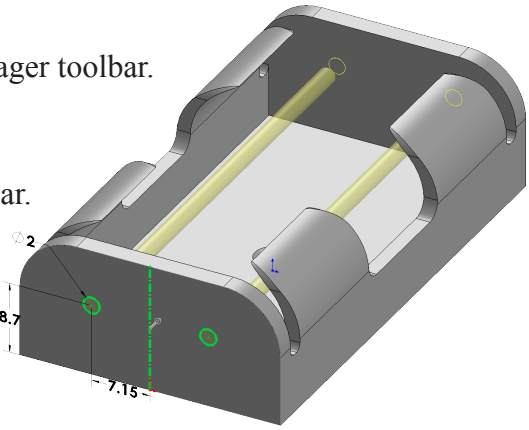


Fig. 40

Step 17. Save. Use **Ctrl-S**.

G. Wire Cutout.

Step 1. Click **outside front face of holder** and click **Sketch** on the Context toolbar, **Fig. 41**.

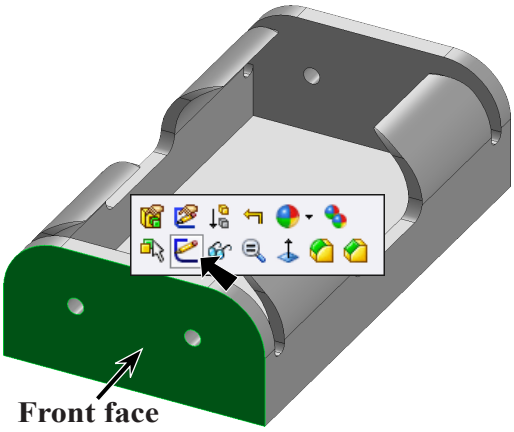


Fig. 41

Step 2. Click **Normal To** on the View toolbar. (**Ctrl-8**)

Step 3. Click **Centerline** in the **Line flyout** on the Sketch toolbar.

Step 4. Draw centerline up from the Origin , **Fig. 42**.

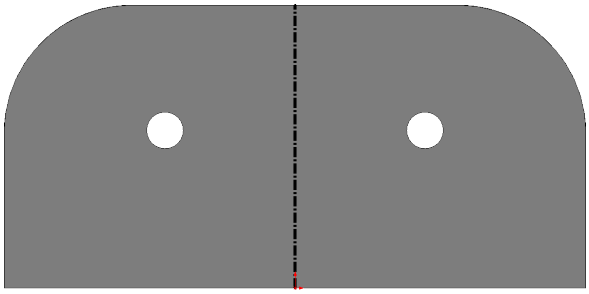


Fig. 42

Step 5. Click **Corner Rectangle** (**S**) on the Sketch toolbar.

Step 6. Draw a rectangle coincident with bottom edge, **Fig. 43**.

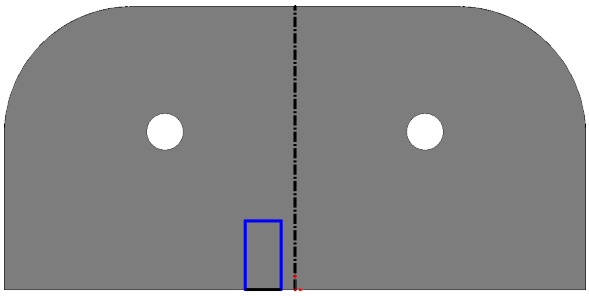
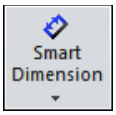


Fig. 43

Step 7. Click **Smart Dimension** 

(**S**) on the Sketch toolbar.

Step 8. Add dimensions, **Fig. 44**.

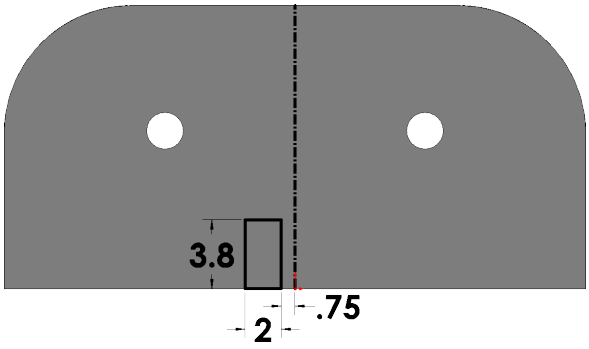


Fig. 44

Step 9. Click **Sketch Fillet** on the Sketch toolbar.

Step 10. In the Sketch Fillet Property Manager set:

Radius **.75**
Fig. 45
click **top outside corner**, **Fig. 46**
click OK **twice**
.

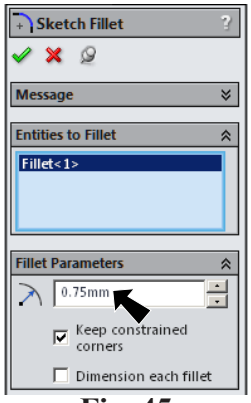


Fig. 45

Step 11. **Drag selection around sketch** to select all entities, **Fig. 47**.

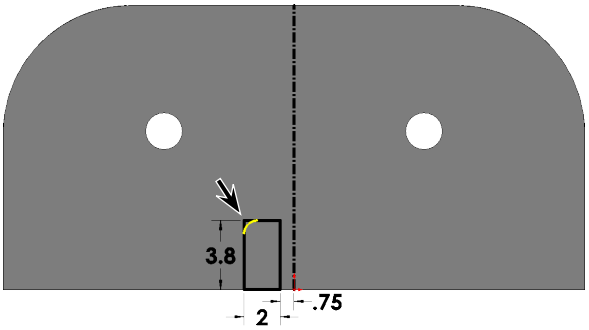
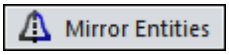


Fig. 46

Step 12. Click **Mirror Entities** 

on the Sketch toolbar, **Fig. 48**.

Step 13. Click **Trimetric** on the Standard Views toolbar.

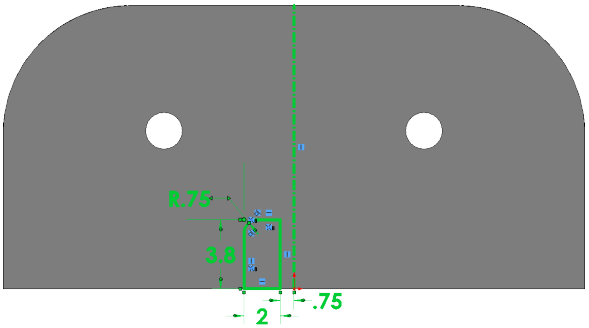
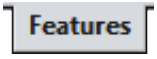


Fig. 47

Step 14. Click **Features** 

on the Command Manager toolbar.

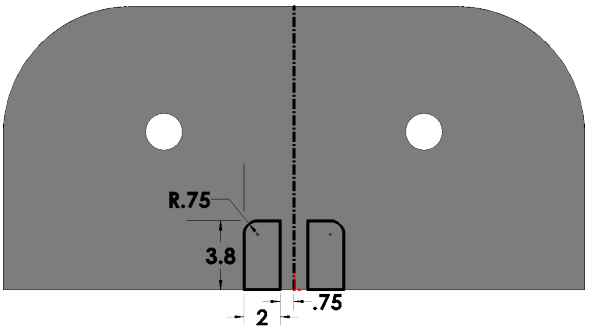


Fig. 48

Step 15. Click **Extruded Cut**

on the Features toolbar.

Step 16. In the Cut-Extrude Property Manager set:
under Direction 1, **Fig. 49**
Depth **1.25**
and click OK .

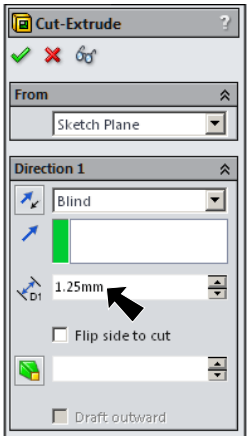


Fig. 49

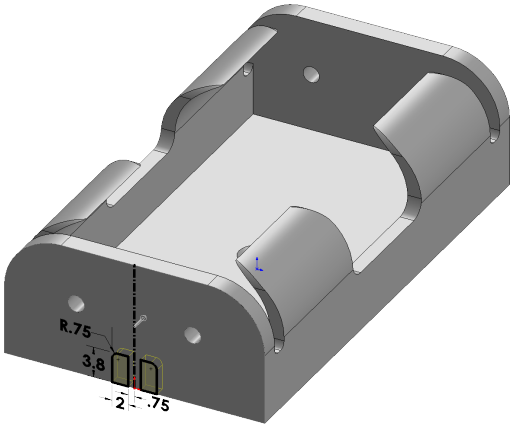


Fig. 50

H. Fillets.

Step 1. Click **Fillet**

on the Features toolbar.

Step 2. In the Fillet Property Manager:

select **FilletXpert**, **Fig. 51**
Radius **1**
click **top front edge**, **Fig. 52**
click **Internal to feature**, **15 Edges** on Fillet pop-up toolbar, **Fig. 52** and **Fig. 53**
click OK .

Step 3. Save. Use **Ctrl-S**.

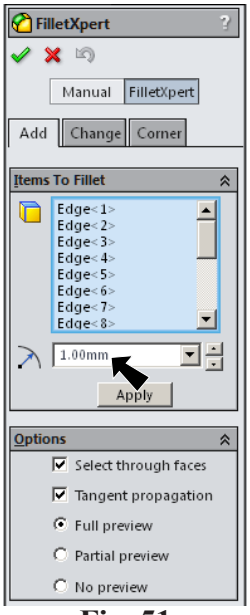


Fig. 51

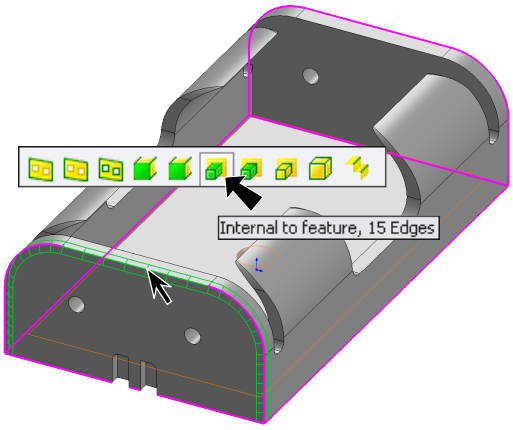


Fig. 52

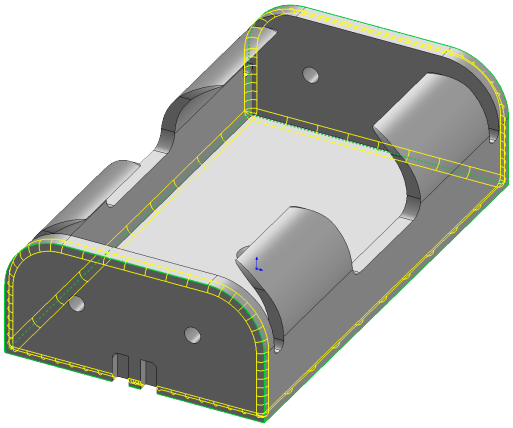


Fig. 53

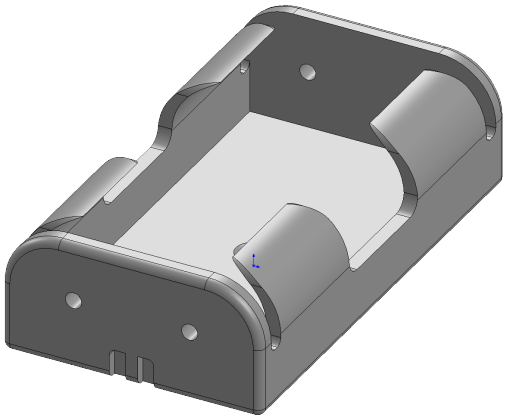


Fig. 54

I. Sketch for Electrical Routing.

Step 1. Click a **bottom face of Wire Cutout** and click **Sketch** on the Content toolbar, **Fig. 55**.

Step 2. Click **Normal To** on the Standard Views toolbar. (**Ctrl-8**)

Step 3. Click **Centerline** in the **Line flyout**.

Step 4. Draw centerline up from the Origin, **Fig. 56**.

Step 5. Click **Point** on the Sketch toolbar.

Step 6. Draw a **Point on Cutout face**, **Fig. 57**.

Step 7. Click **Smart Dimension** (**S**) on the Sketch toolbar.

Step 8. Add dimensions, **Fig. 58**.

Step 9. **Right click graphics area and click Select** from menu to unselect Smart Dimension.

Step 10. **Drag selection around sketch** to select all entities, **Fig. 59**.

Step 11. Click **Mirror Entities** on the Sketch toolbar, **Fig. 60**.

Step 12. Click **Exit Sketch** on the Sketch toolbar.

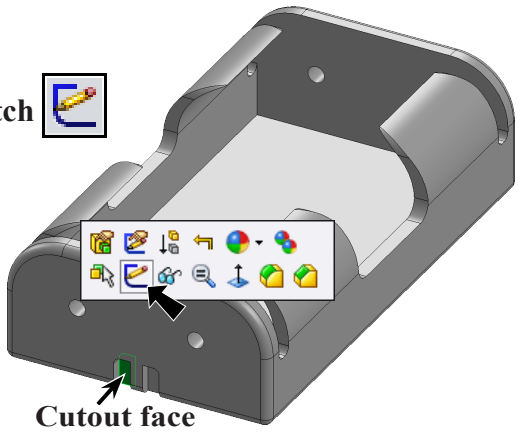


Fig. 55

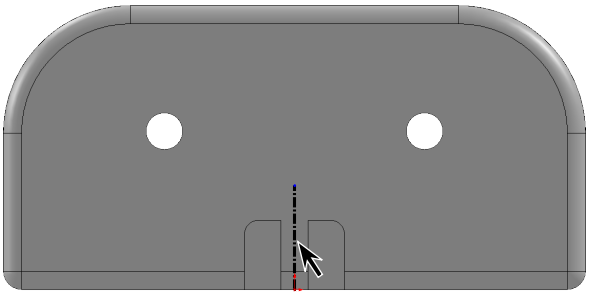


Fig. 56

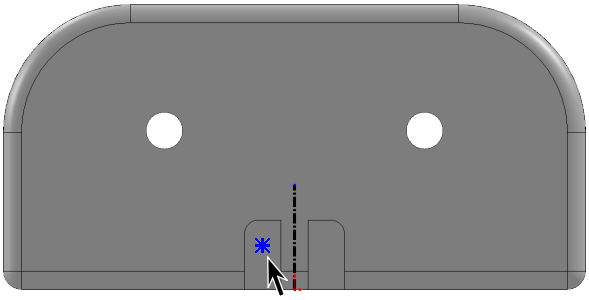


Fig. 57

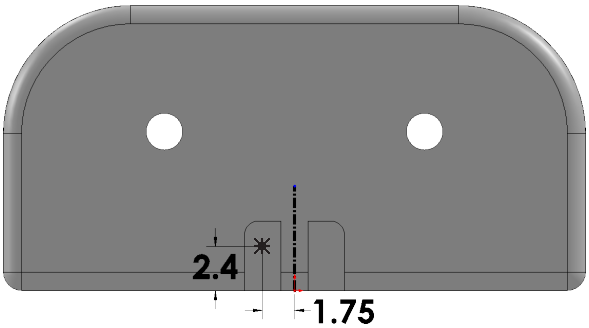


Fig. 58

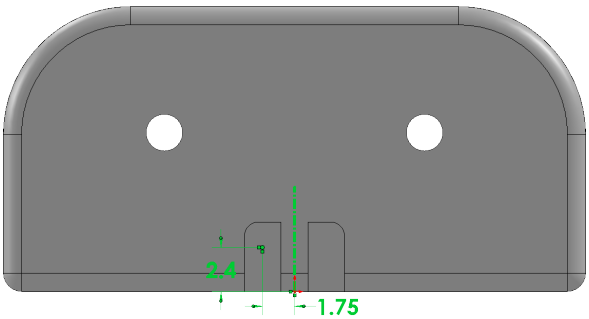


Fig. 59

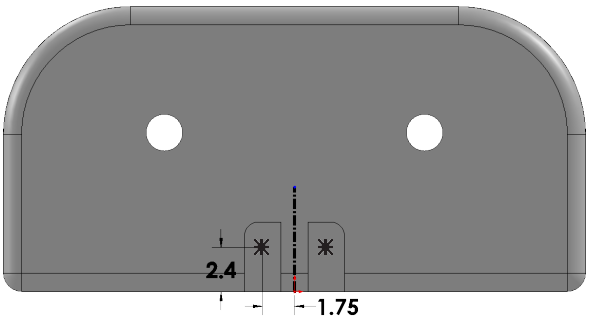


Fig. 60

J. Enable SOLIDWORKS Routing.

Step 1. If necessary, turn on SOLIDWORKS Routing, click the **flyout of Options** on the Standard toolbar and click **Add-Ins**.

Step 2. In the dialog box place a check in the check box under **SOLIDWORKS Routing Active Add-Ins** and **Start-Up**, **Fig. 61**. Click OK.

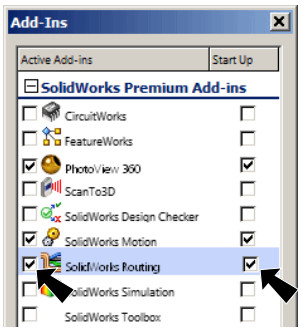


Fig. 61

K. Create C Points for Electrical Routing.

Step 1. Click **Trimetric** on the Standard Views toolbar.

Step 2. Click Routing Menu > Routing Tools > Create Connection Point.

Step 3. In the Connection Point Property Manager set:

under Selections, **Fig. 62**
click **left cutout face** and **Point**, **Fig. 63**

click **Keep Visible** and OK , **Fig. 62**. The Push Pin on allows creation of another C Point.

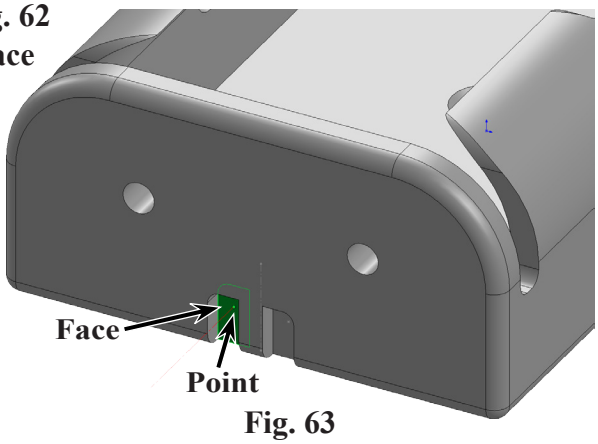


Fig. 63

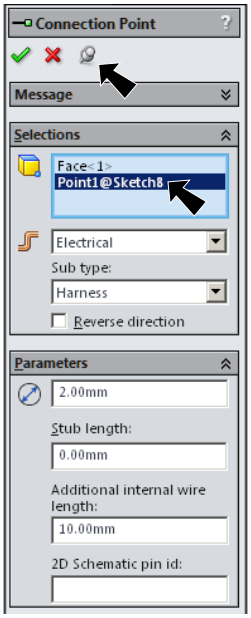


Fig. 62

Step 4. In the Connection Point Property Manager set:

under Selections, **Fig. 64**
click **right cutout face** and **Point**, **Fig. 65**

click OK and then click Cancel .

Step 5. Save. Use **Ctrl-S**.

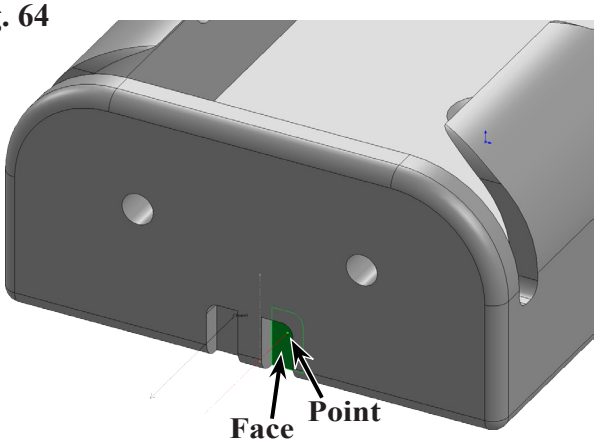


Fig. 65

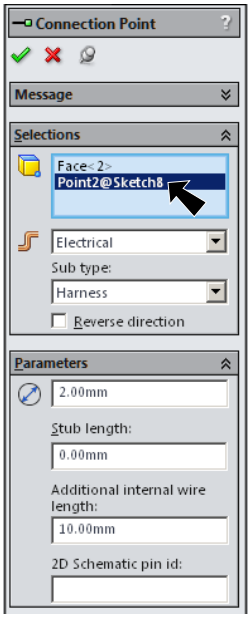


Fig. 64

L. Hide Sketch.

Step 1. **Hide Sketch8**. To hide, click **Sketch8** in Feature Manager and **Hide** on the Context toolbar, **Fig. 66**.

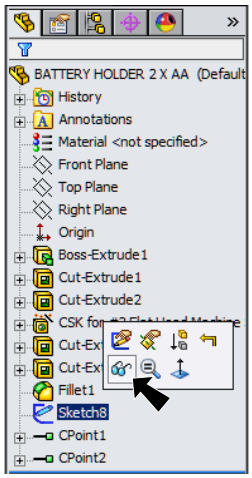


Fig. 66

M. Appearance.

Step 1. Click holder to select the part, click **Appearance Callout** on the Context toolbar and click **BATTERY...**, **Fig. 67**.

Step 2. In the Appearances Task pane, expand **Plastic**, click **High Gloss** and in the lower pane select **dark gray high gloss plastic**, **Fig. 68**. Click OK in the Property Manager.

Step 3. Save. Use **Ctrl-S**.

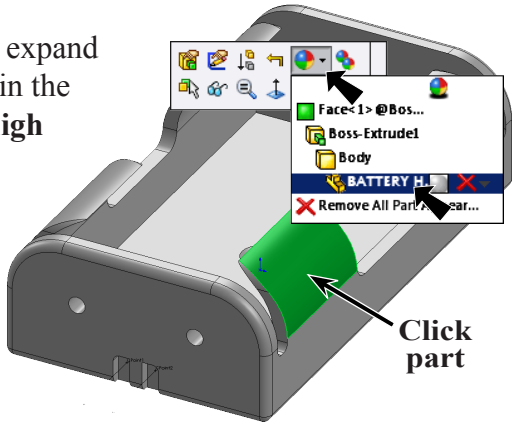


Fig. 67

Fig. 68

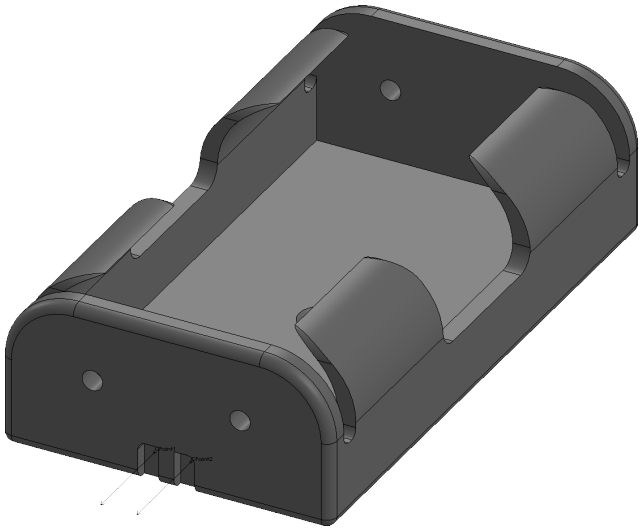


Fig. 69