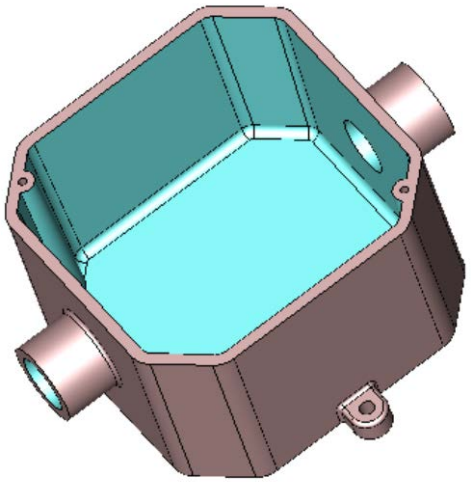
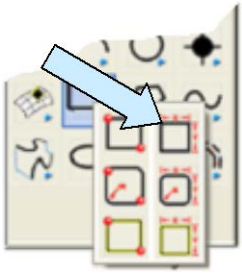
KeyCreator Lesson KC2114

Creating a Molded Junction Box



Let's construct the molded junction box illustrated to the right. The box has outside walls with zero draft and five degree draft on the inner walls. It would be molded or diecast for use as an outdoor electrical component.

We'll start with a new file in View 1. (The Top View.)

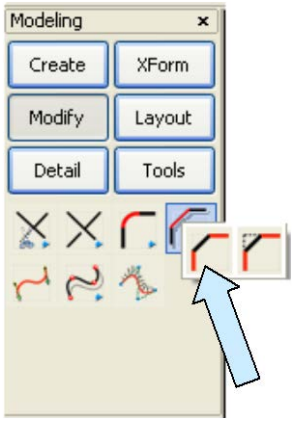


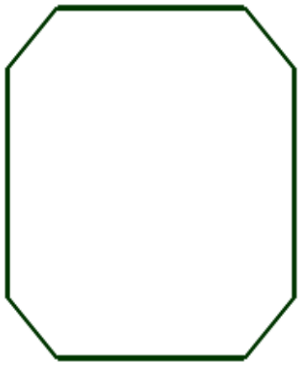
Click on the CREATE RECTANGLE BY WIDTH HEIGHT Icon. Use the MidCtr Anchor Option.

Type 4.3 for the Width and Height.
Using the KeyIn Option, hit the ENTER Key three times to center the profile on the origin.

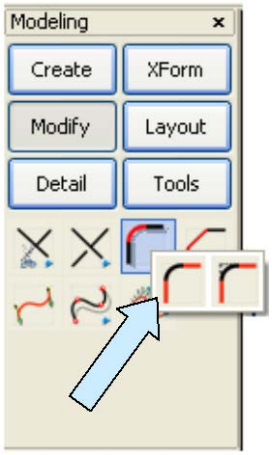
Next, click on the CHAMFER WITH TRIM Icon.
Type 0.75 for the first and second values.

Now, create a chamfer at each corner of the profile.





Your screen should look like this:



Click on the FILLET WITH TRIM Icon.

Type 0.35 for the Radius.

Now, create a fillet every line intersection.
(There should be a total of eight fillets.)

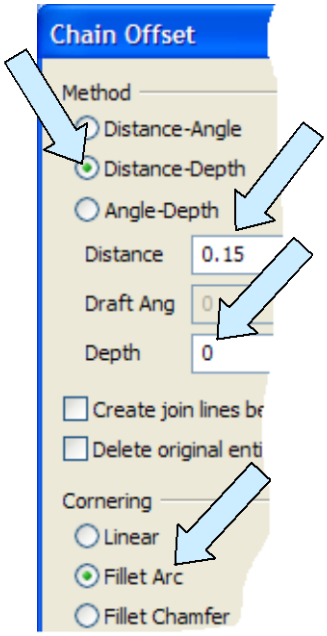
Select a new construction color.

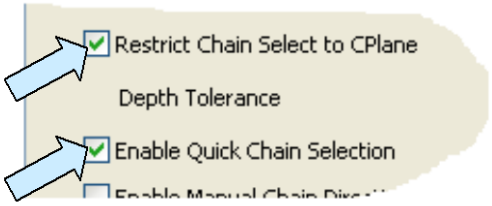
Click on the XFORM CHAIN OFFSET Icon.

A Dialog Box appears.
Click on the Distance-Depth Option.

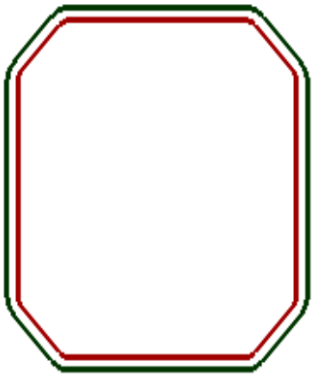
Type 0.15 for the Distance and 0 for the Depth.

Select the Fillet Arc Option and hit the ENTER Key.



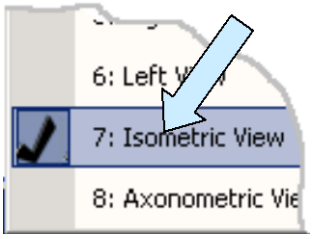


With Restrict Chain Select to Cplane and Enable Quick Chain Select enabled in TOOLS/OPTIONS/POSITIONING SELECTION/SELECT, you can move your cursor over the profile and the entire profile will highlight. Click to accept it. Then, click on the inward-facing vector.



Your screen should look like this:

Now, switch to the Isometric View. (View 7.)

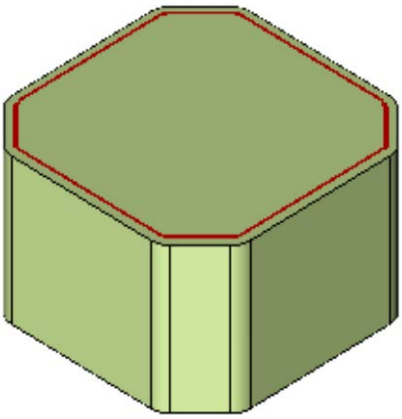


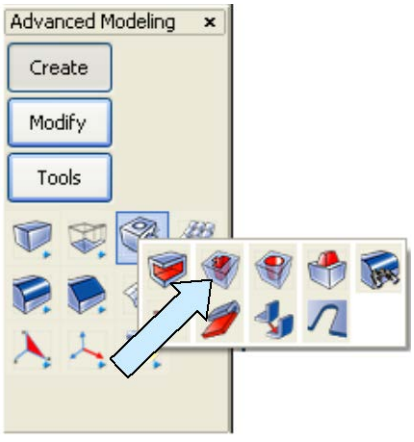
Click on the EXTRUDE Icon.
A Dialog Box appears.

Type 2.5 for the Length, use 0 for the Draft and hit the ENTER Key.

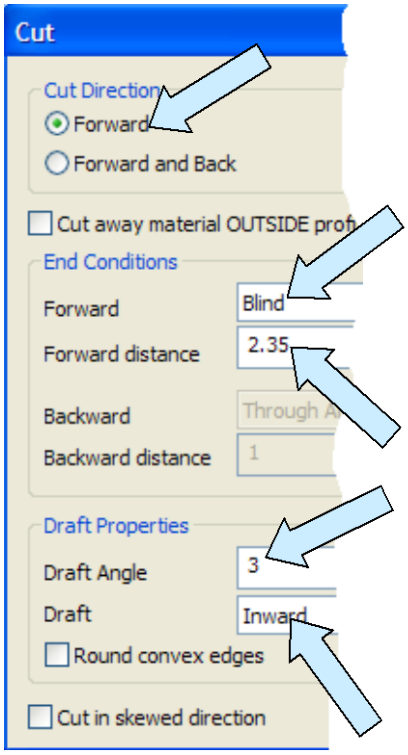
Now select the outer profile and hit the ENTER Key.
Click on the downward-facing vector.

Your screen should look like this.





Next, click on the CUT Icon.



A Dialog Box appears.

Click on the Forward Option.

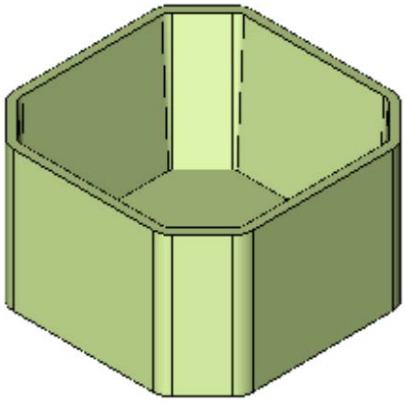
Use a Blind End Condition with a Forward Distance of 2.35 inches.

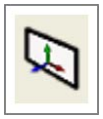
Type 3 for the Draft Angle and use the Inward Option. Hit the ENTER Key.

Click on the solid.
Select the inner profile that you created earlier with the Xform Chain Offset Function and hit the ENTER Key.

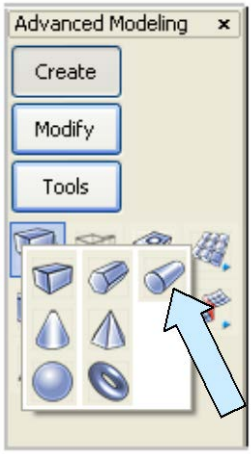
Click on the downward-facing vector.

Your model should now look like this:





Creating the side ports is easy. First, click on the CONSTRUCTION PLANE Icon. Type 2 for the construction plane.



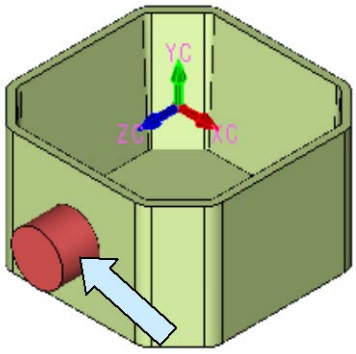
Then, click on the CYLINDER Icon.

A Dialog Box appears.

Click on the KeyIn Option.

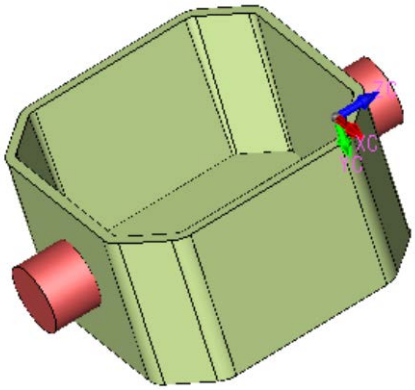
Type 0.525 for the Radius and 0.75 for the Height.
Hit the ENTER Key.

Now, click on the TwoPos Option.
Using the CtrMid Option, click on the top and bottom edges of the front face of the part.



Your screen should now look like this:

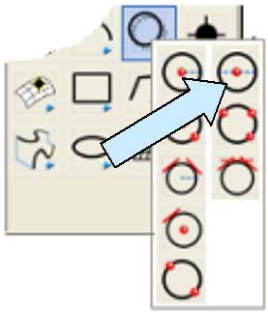
With the Cylinder Tool still active, click on the CONSTRUCTION PLANE Icon and this time, select the rear outside face of the box. (This flips the Z vector.)



Use the TwoPos Option.
Using the CtrMid Option, click on the top and bottom edges of the rear face of the part.

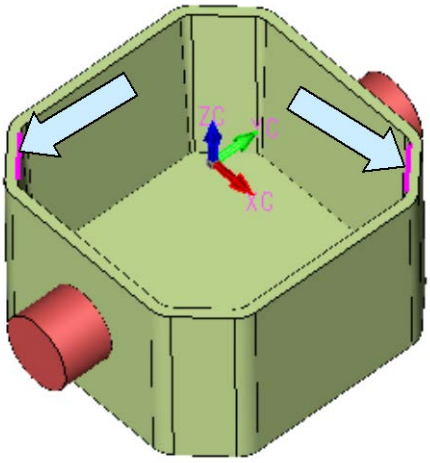
You now have ports on the front and back faces of the part.

To create the internal bosses, click on the CONSTRUCTION PLANE Icon and type 1 for the plane.



Then, click on the CREATE CIRCLE BY DIAMETER Icon.

Type 0.3 for the diameter.

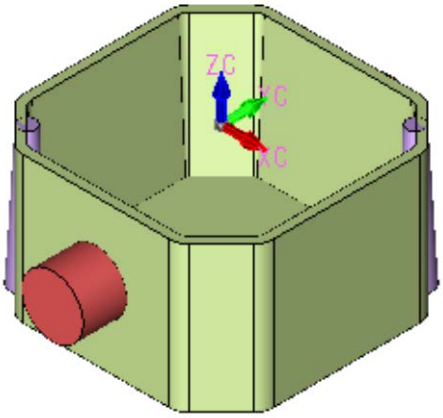


Using the CtrMid Option, click on the two inside edges indicated by arrows in the illustration to the right.

Now, click on the EXTRUDE Icon.
A Dialog Box appears. Click on the To Face Option.

Type 3 for the Draft Angle and select the Outward Option.
Hit the ENTER Key.

Now, click on the two circles and hit the ENTER Key.
Click on the downward-facing vector. Then, click on the bottom, inside face of the box.



Your screen should look like this:

Click on the TRIM SOLID TO SOLID Icon.

A Dialog Box appears. Click on the First Body Only and the Selected portion Only Options. Click on the Unite the Bodies Option and hit the ENTER Key.

Click on one of the bosses on the inner edge and then on the box. Repeat, clicking on the inner edge of the other boss and then on the box.

The bosses are now united with the box and only project into the inside cavity.

To create the mounting ears, click on the BLOCK Icon.

A Dialog Box appears. Use any anchor option.
Using the KeyIn Option, type 0.5 for the Width and Length and 0.3 for the Height. Hit the ENTER Key.

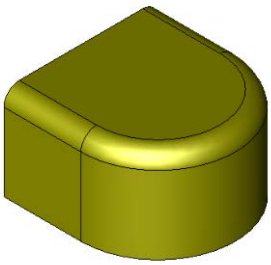
Using the Cursor Option, click to place the block to the right of the box.

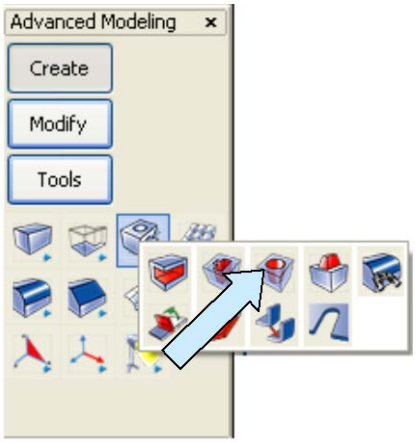
Click on the CONSTANT RADIUS BLEND Icon.
A Dialog Box appears. Type 0.25 for the Radius.

Click on the two vertical edges on the right side of the block and hit the ENTER Key. Then, click on the BACKUP Button.

Type 0.05 for the Radius and hit the ENTER Key. Click on the top, front edge of the rounded block and hit the ENTER Key.

Your construction should look like this:



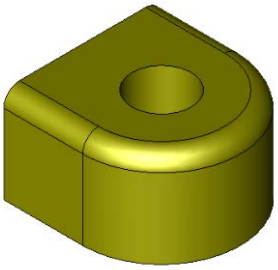


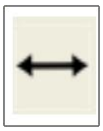
Next, click on the DRILL Icon.
A Dialog Box appears.

Select the Through Hole Option. Type 0.188 for the Diameter and hit the ENTER Key.

Click on the top face of the block.
Then, using the CtrMid Option, click on the top, circular edge of the part.

Your construction should now look like this:





Click on the GENERIC MOVE Icon. Using the CtrMid Option, click on the bottom. Left edge of the small mounting ear that you just created.

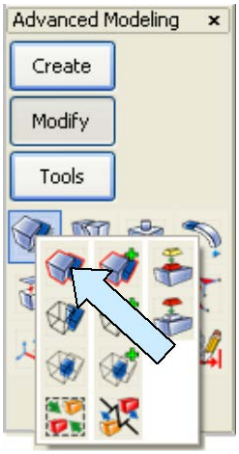
Then, using the CtrMid Option, click on the bottom, right edge of the box. (Note: You could have anchored the original small block directly on the box and worked on it there. However, it is sometimes easier to model a small feature away from the main construction and then move it into place afterward. I did this on purpose in this exercise to reinforce this point.)

Now, click on the XFORM MIRROR COPY Icon.

Click on the mounting ear and hit the ENTER Key.

Then, click on the 2 Pos Option.
Using the CtrMid Option, click on the top, front, outside edge and the top, rear outside edge of the box.

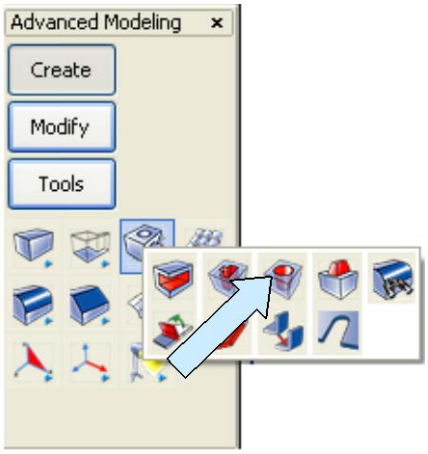
This puts a copy of the mounting ear on the left side of the box.



Now, click on the BOOLEAN UNION Icon.

Click on the box. Then click on the ALL DSP and the ALL Options. Hit the ENTER Key.

This combines the two cylinders you made earlier, the two mounting ears, and the box into one solid.



Now, click on the DRILL Icon.

A Dialog Box appears.
Select the Through Hole Option.
Type 0.75 for the diameter and hit the ENTER Key.

Click on the front face of the front, cylindrical port.
Using the CtrMid Option, click on the circular edge.

This drills both ports.

Click on the BACKUP Button.
Select the BLIND HOLE Option.
Type 0.108 for the diameter, 0.5 for the depth and hit the ENTER Key.

Click on the top rim face of the box.
Then, using the CtrMid Option, click on the circular edge of each inside boss to make the device mounting holes.

To complete your project, you can use the CONSTANT RADIUS BLEND tool with a radius of 0.05 to add blends at the root of each mounting ear and at the root of each cylindrical port.

Your completed part should look like this: