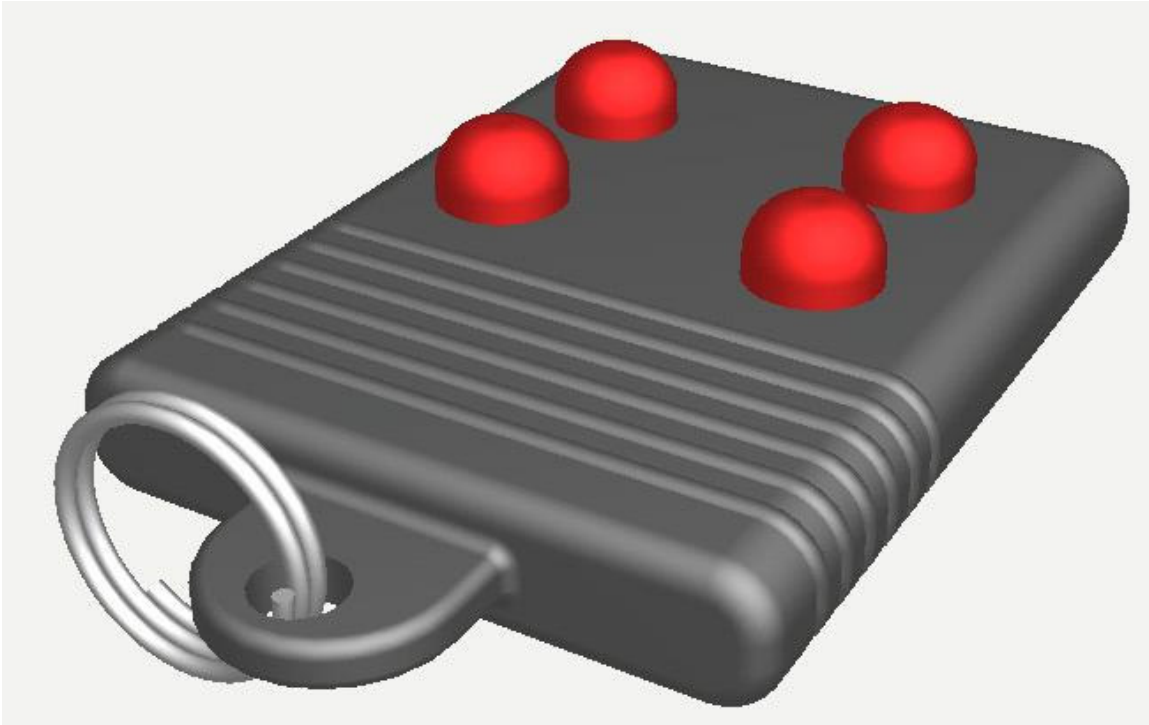


# FOB Tutorial

## Pro/DESKTOP 8

Assembly, Sweep, Helix

Prepared by Anthony Rossi



**What you should familiar with before starting this tutorial.**

- Windows and PCs
- Pro/Desktop GUI
- Sketching Tools
- Extrude
- Dimensioning

**What you will learn by completing this tutorial.**

- **Assembly Constraints**
  - **Mate**
  - **Center Axis**
  - **Align**
- **Sweep**
- **Along path**
- **Helical**
- **Adding color to components**

This tutorial has been designed to introduce students to some of the fundamentals of **Pro/DESKTOP 8**. The goal of this project is to design one complex and two simple parts, and to complete an assembly. Good luck!

## Conventions of this Tutorial

Since most people who attempt this tutorial will have had adequate exposure to **Pro/DESKTOP**, there are minimal descriptions of operations and concepts. When features are introduced, instructions will use keyboard shortcuts. These will be shown as capital letters within brackets [**\*\***]. Feature commands (**extrude**, **revolve**, etc.) will also be shown in brackets but with the **Control key** or **Alternate key** followed by a **plus sign (+)** as a preface, and multiple key strokes separated by a comma.

Example, to create an extrusion using keys rather than the icon, one would first press down the **Alt key**, then while holding it, press and release the **R** key once, then press and release the **E** key, and finally release the **Alt Key**.

In notation form, extrusion looks like this: [**Alt + R, E**].

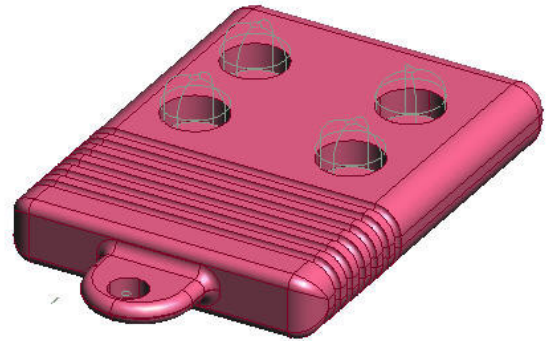
Sequential operations will be indicated by commands separated by an arrow [**>**]. For example, the following command "**[C] > Drag a circle**" means - type the letter "**C**" key on your keyboard to select the circle sketching tool, and then drag a circle.

## Set Up

There are a few things you will need to do to get your computer ready for this tutorial. This project has been done in **INCHES**. The first thing you will need to do is make sure that the unit of measurement on your computer is set to inches.

### *1. Open Pro/DESKTOP*

- Start > Programs > PTC Pro/DESKTOP 8.
- From the file menu > go to Tools > Options.
- Select the Units tab > change the units to Inches in both fields > OK.

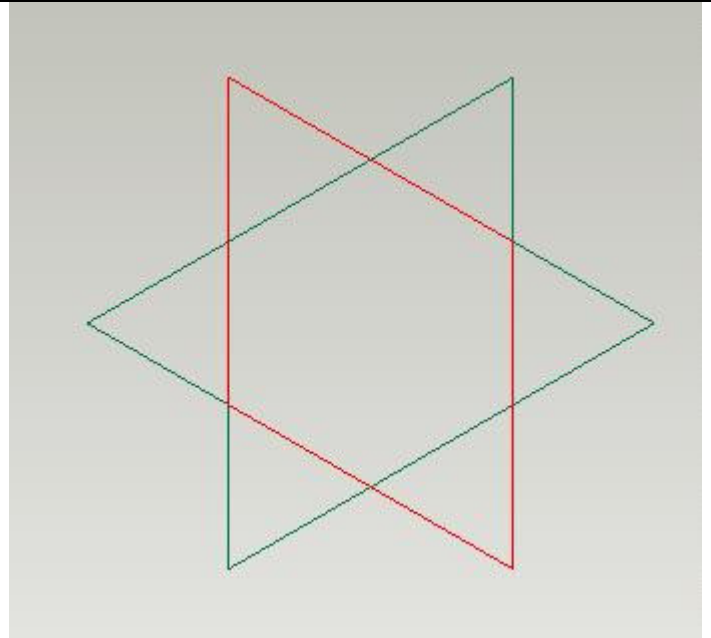


## Component 1 - Main Body

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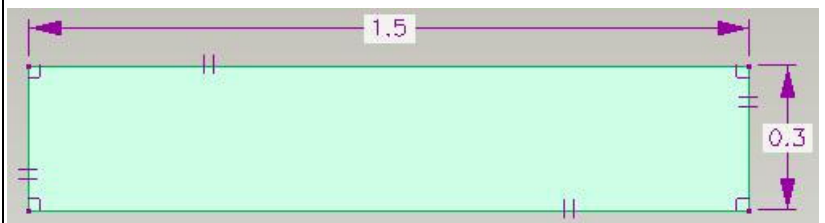
### Select workplane

- Right click the Frontal workplane in the Workplane Browser
- Select New Sketch
- Name this Body



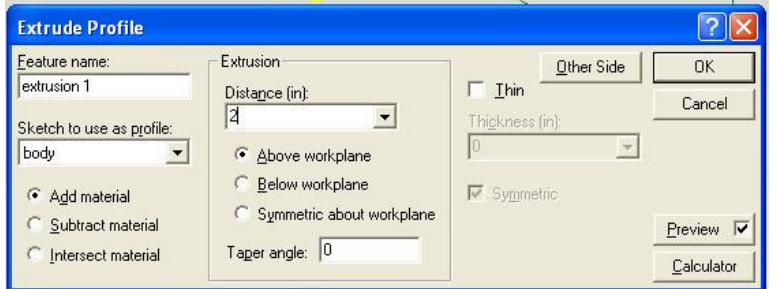
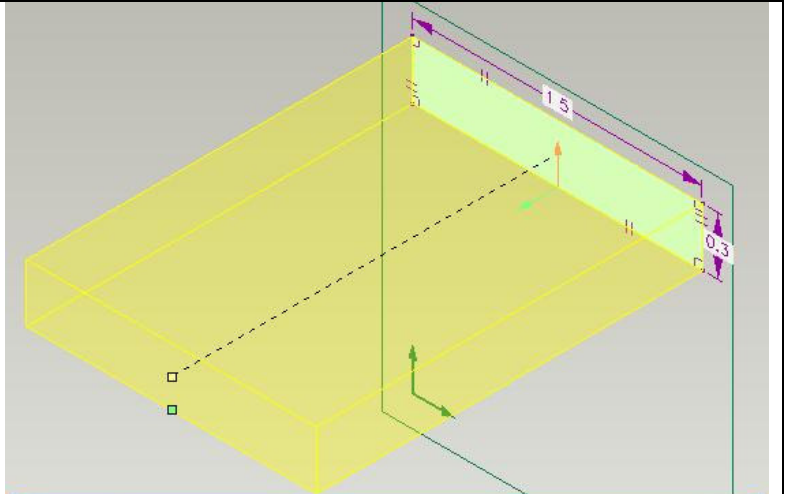
### Sketch for body

- [R] > Sketch rectangle
- [Z] > Dimension as shown



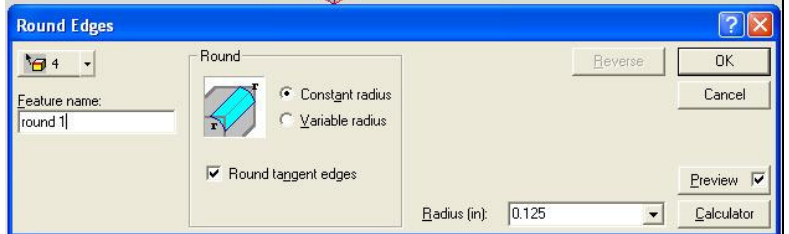
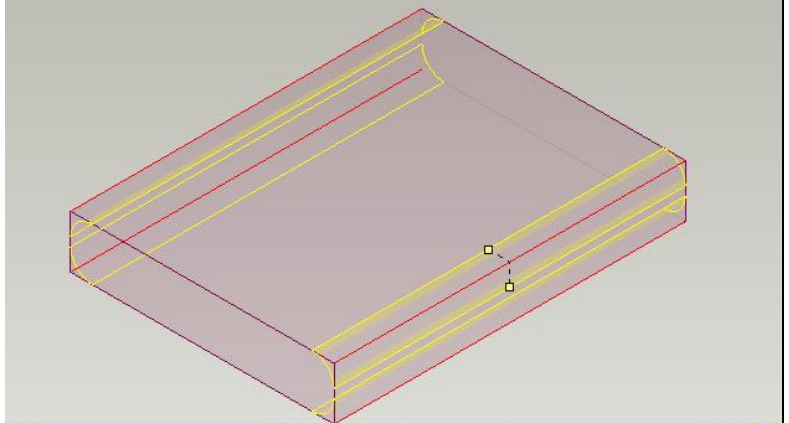
### Extrude Profile

- [Alt + R, E]
- Add Material
- Above Work Plane
- Distance: 2"
- OK



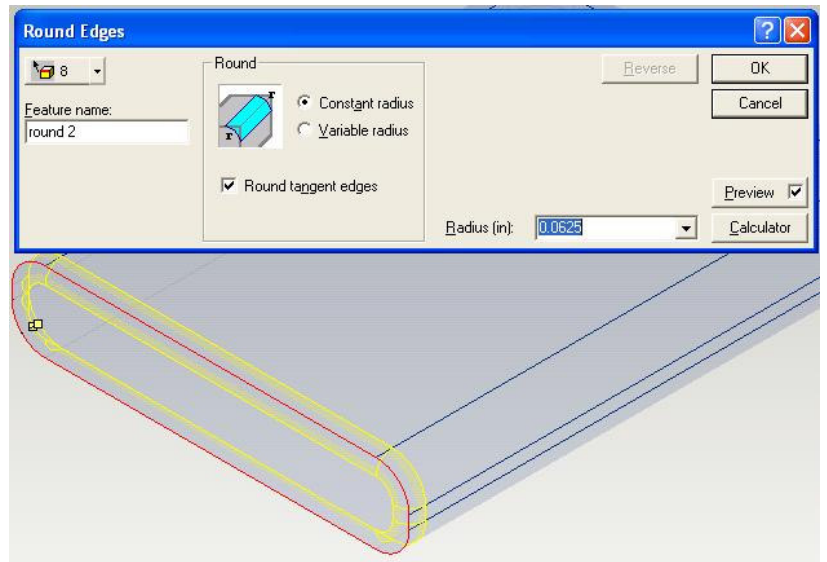
### Round Edges

- [Alt + R, O]
- Constant Radius
- Radius = 0.125"
- Select the 4 Edges that run the length of the body
- OK



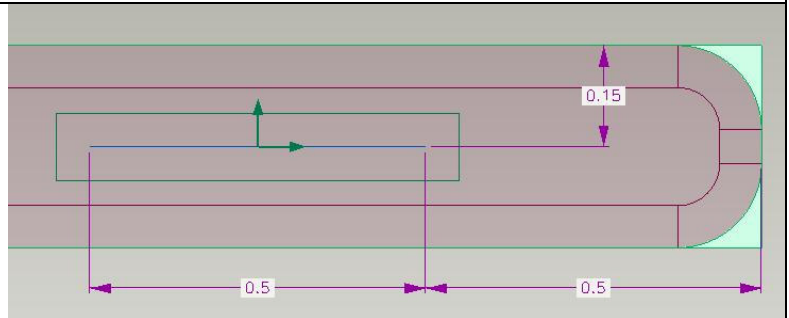
### Round Top End

- [Alt + R, O]
- **Constant Radius**
- Radius = **0.0625"**
- Select all **Edges** of **front end** of body
- **OK**



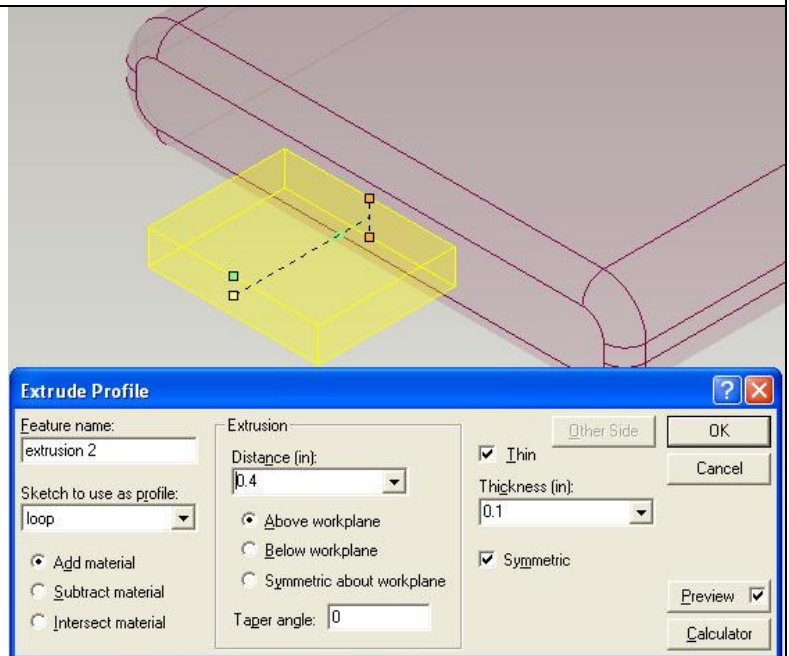
### Add a new Sketch to a face

- [F] > Select front face of body
- Right click > **New Sketch** > Name it **loop**
- [S] > Sketch a **Straight Line** 0.5" long, dimensioned as shown.



### Extrude the loop

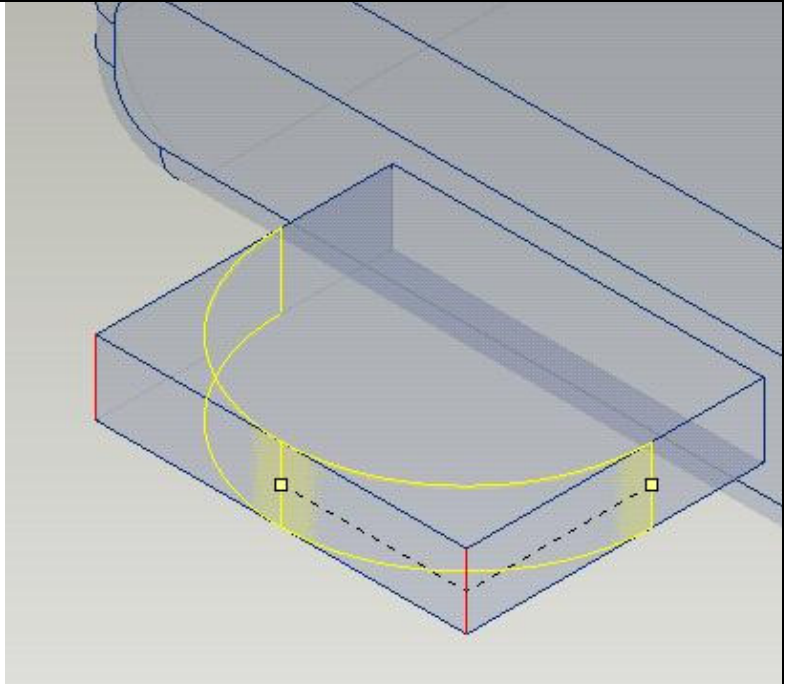
- [Alt + R, E]
- Add material
- Above Workplane
- Distance: **0.4"**
- Check **Thin**
- Thickness: **0.1"**
- **OK**



### Round Edges on Loop

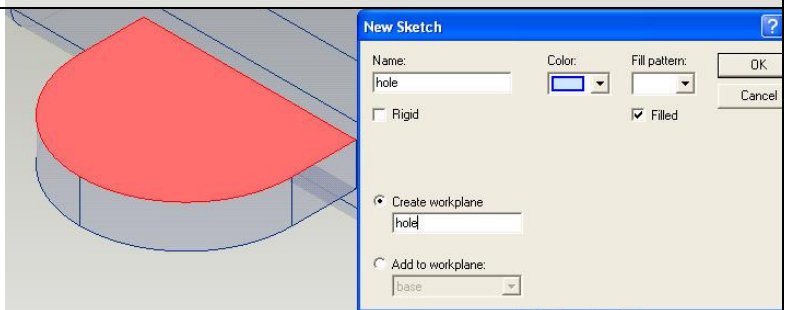
- [Alt + R, O]
- Constant Radius
- Radius = 0.25"
- Select vertical **Edges** of Loop
- OK

**Note:** See image to right to indicate which edges to select.



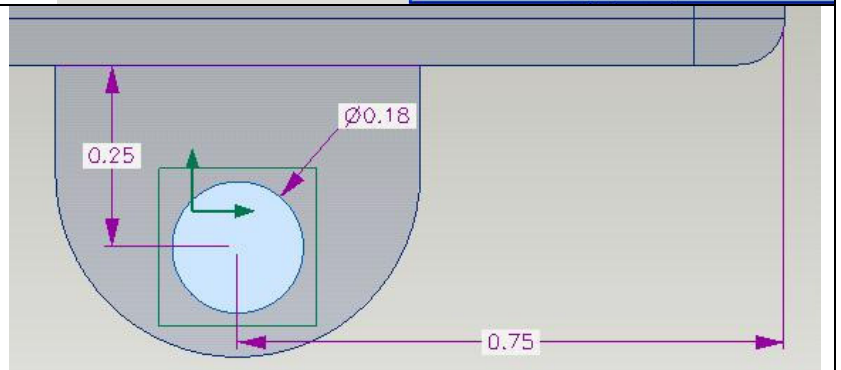
### Add a new Sketch to a face

- [F] > Select face on top of Loop
- Right click > **New Sketch** > Name it hole



### Sketch this valid profile

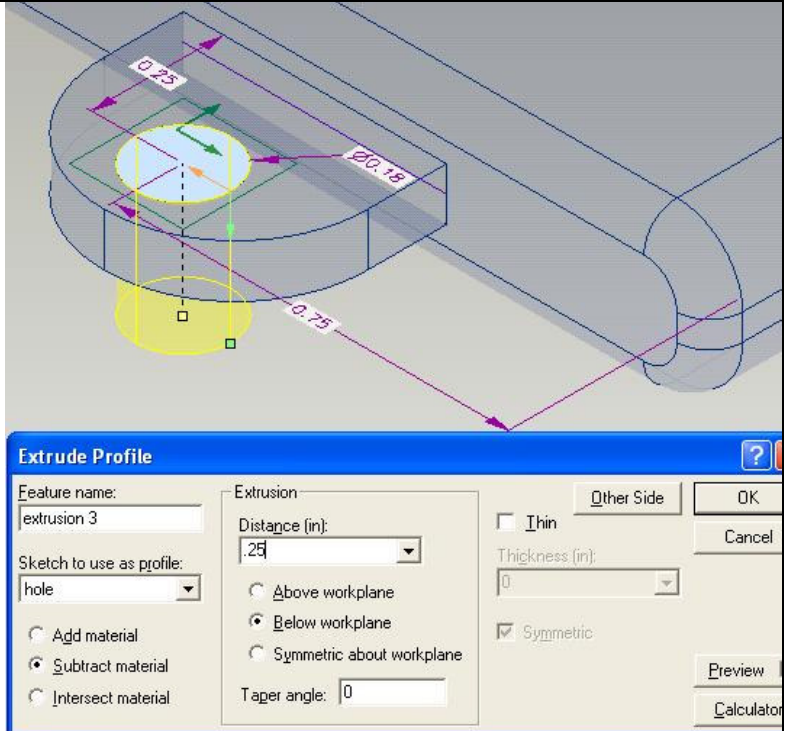
- [C] > Sketch a 0.18" diameter circle
- Dimension as shown



### Extrude Hole

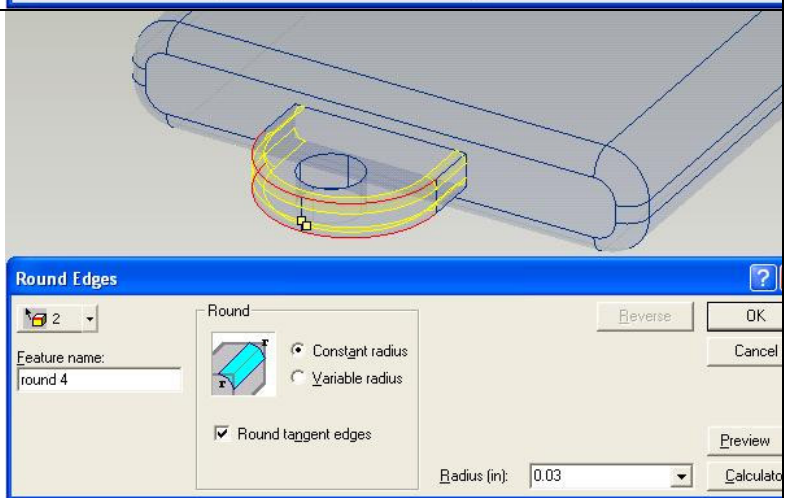
- [Alt + R, E]
- Subtract Material
- Below Workplane
- Distance of 0.2"\*
- OK

\*Note: Distance of extrusion not critical in this step, since the extrusion will pass thru entire solid.



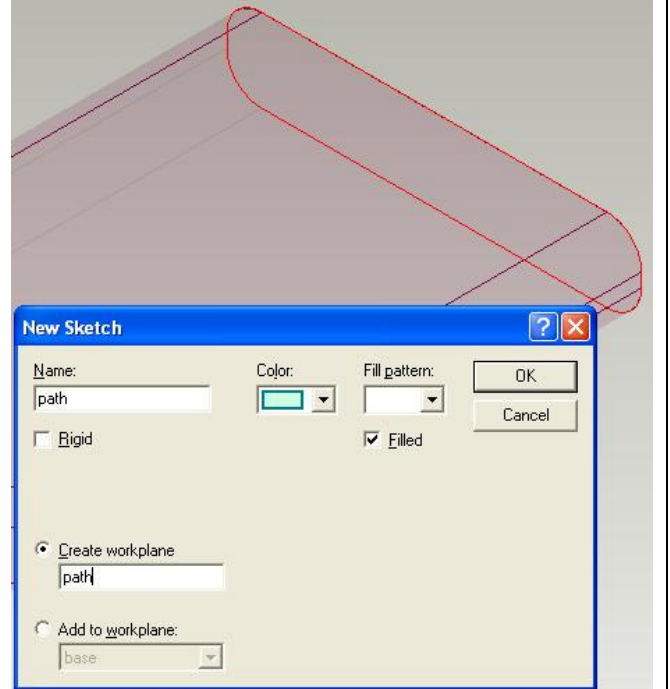
### Round Edges on Loop

- [Alt + R, O]
- Constant Radius
- Radius = 0.03"
- Select shown Edges of Loop
- OK



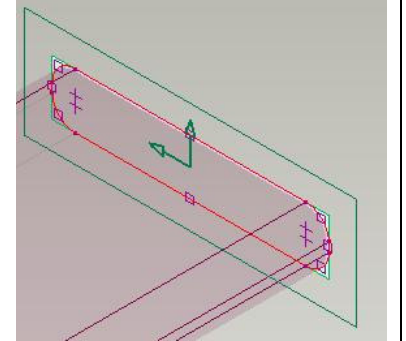
### Add a new Sketch to a face

- [F] > Select back face of body
- Right click > **New Sketch** > Name it **path**, as well as the **workplane**



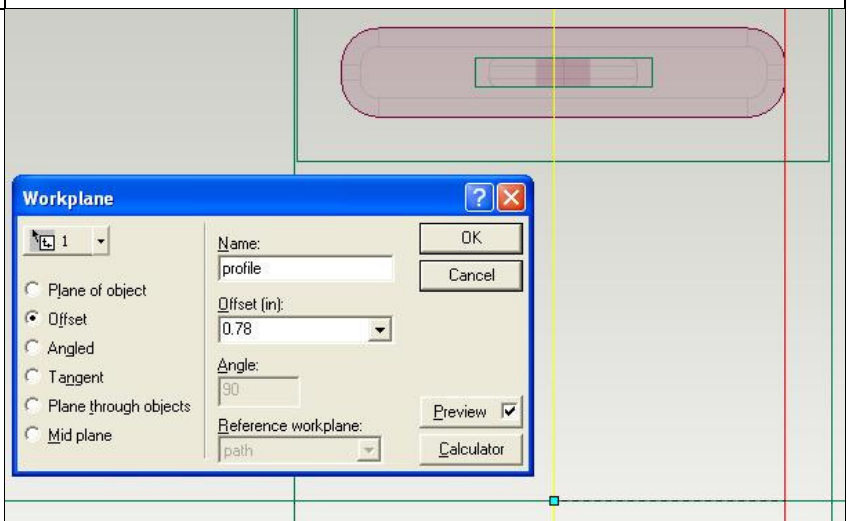
### Project lines into new sketch

- With the face still highlighted, [Alt + L, P] to create the sketch



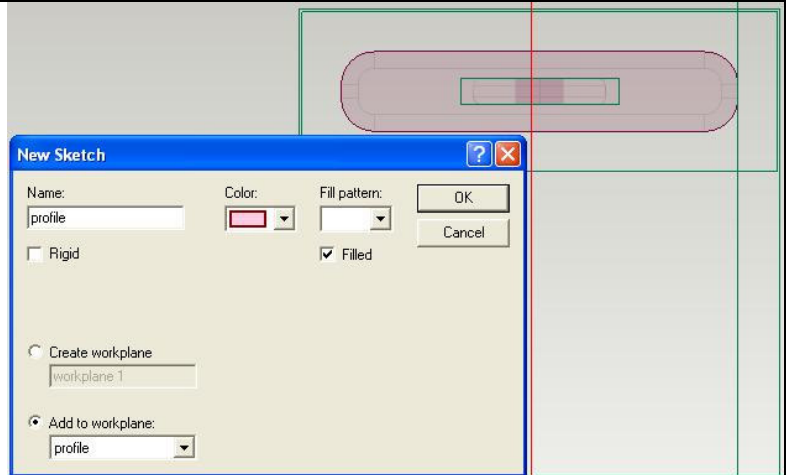
### Create New Workplane

- [Shift + S] to view the current workplane
- [Alt + K, W] to create a new workplane
- Select **Offset**
- Using the handle, left click and drag the new workplane to the center of the body
- Name this Workplane "profile"
- OK



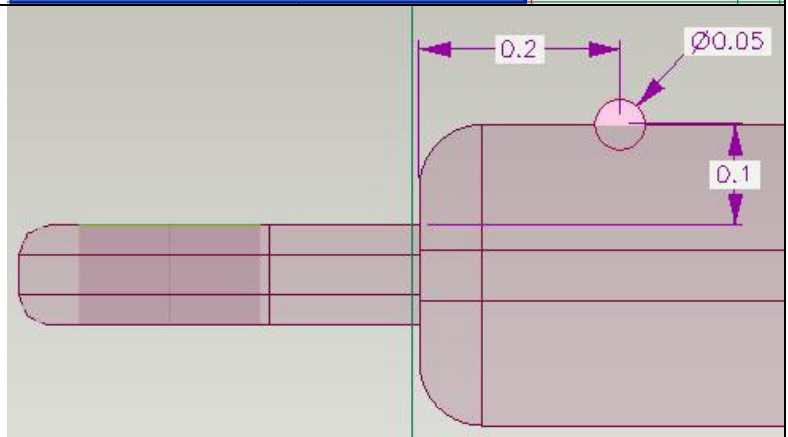
### Add New Sketch to Workplane

- [W] > Left click the newly made workplane to select it
- Right click > **New Sketch** > Name it **profile**
- **OK**



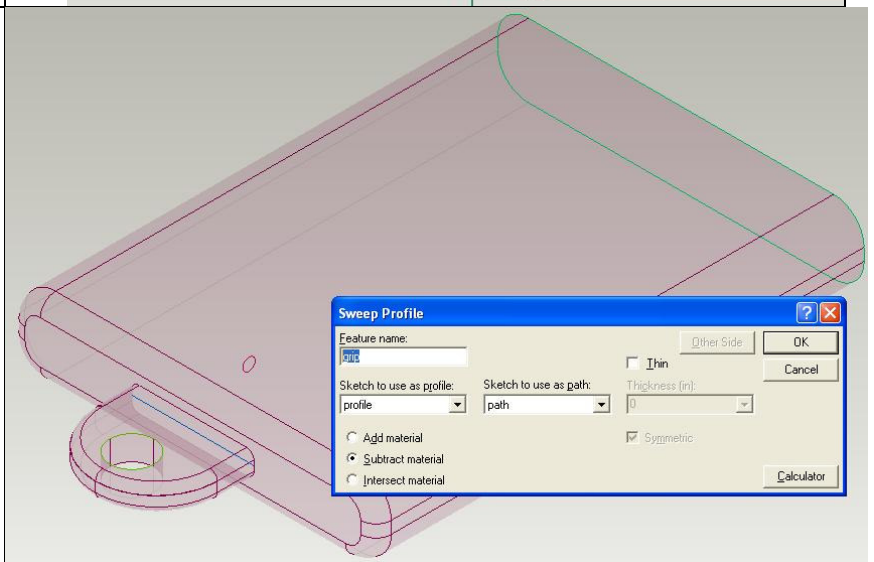
### Sketch this valid profile

- [Shift + W] to view current workplane
- [C] > Sketch a circle
- [Z] > Dimension as shown



### Sweep first Grip

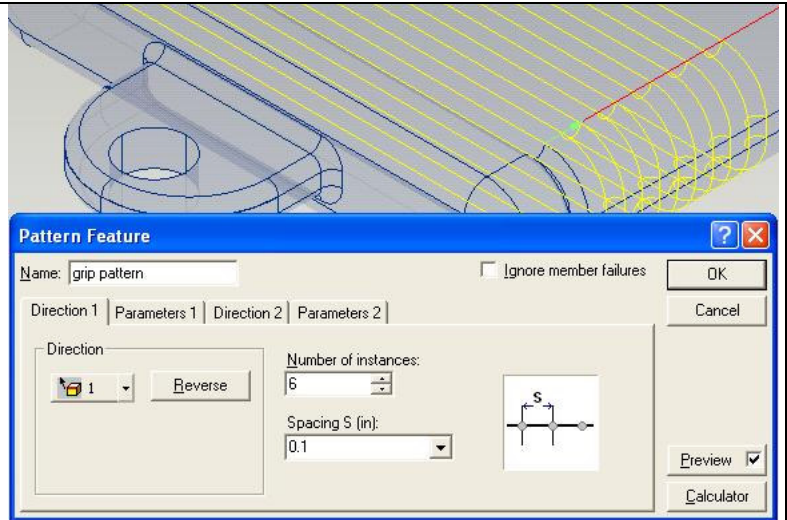
- [Alt + R, S, S]
- Select **grip profile** as sketch to use as **profile**
- Select **grip path** as sketch to use as **path**
- **Subtract Material**
- Name this feature "**grip**"
- **OK**



### Create Multiple Grips

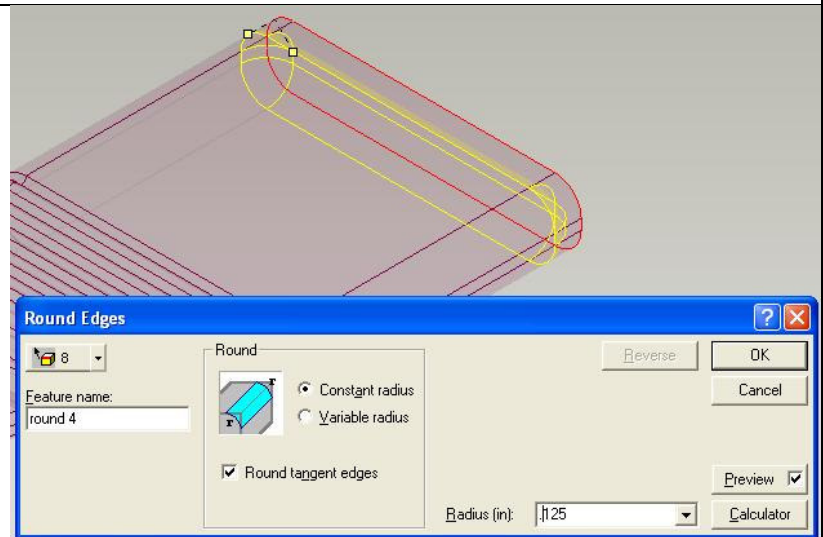
- [A] > Select grip
- [Alt + R, A]
- Direction > **Edges** > Select the shown edge
- Number of Instances: **6**
- Spacing: **0.1"**
- **OK**

\*Note: if the preview shows the additional grips in the wrong direction, click the button labeled "Reverse"



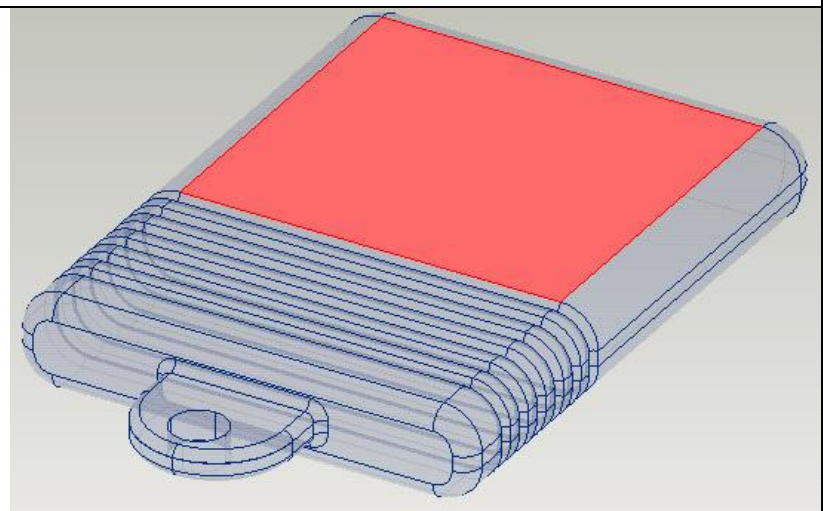
### Round Bottom Edges on Body

- [Alt + R, O]
- Constant Radius
- Select rear **Edges** of **Body**
- Radius = 0.125"
- **OK**



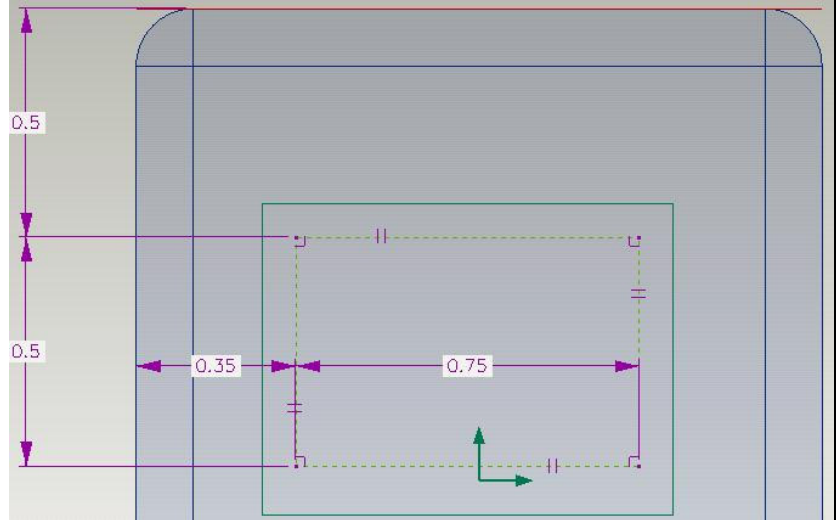
### Add a new Sketch to face

- [F] > Select face on top of **Body**
- Right click > **New Sketch** > Name it **buttons**
- **OK**



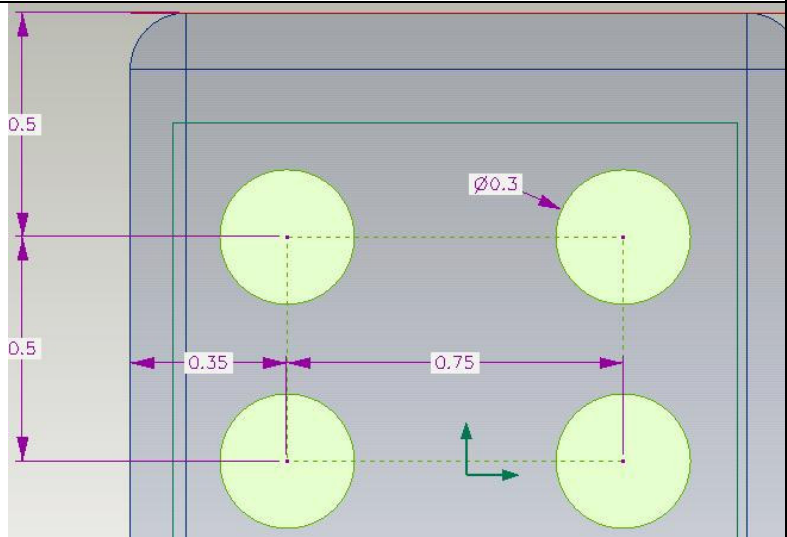
### Sketch construction lines

- [R] > Sketch a rectangle close to the middle of the solid
- [Z] Dimension as shown
- [L] Select all lines of rectangle > [Ctrl + G] to make them **construction lines**



### Complete Sketch

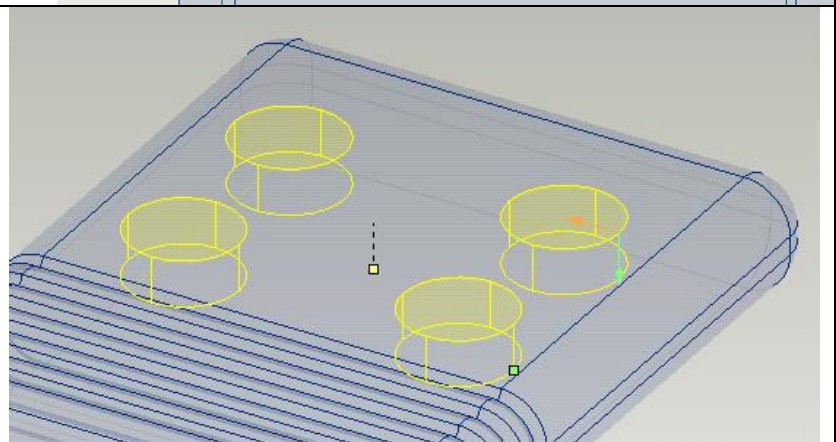
- [C] > Sketch a circle at each corner of rectangle
- [Z] Dimension one **circle** to be 0.3" in diameter
- [L] Select all **circles** > [Alt + C, Q] to make equal radius



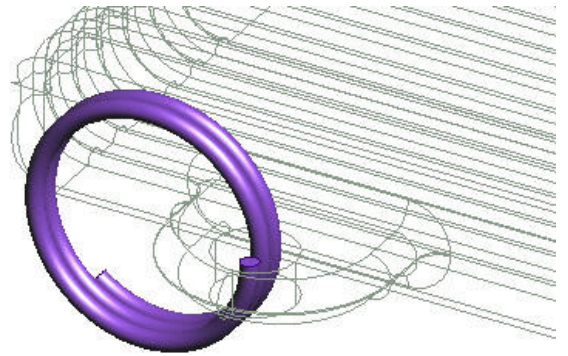
### Extrude Buttons

- [Alt + R, E]
- Subtract Material
- Below Workplane
- Distance of 0.125"
- OK

[Alt + F, S] > Save this design as "remote"

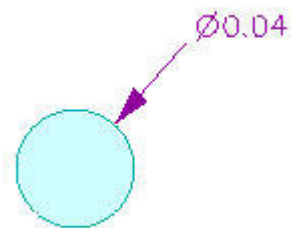


## Component 2 - Ring



### Sketch this valid profile

- **[Ctrl + N]** Open a new design file
- **[C]** > Sketch a circle
- **[Z]** > Dimension circle to be **0.04"**
- Name this sketch **"ring"**



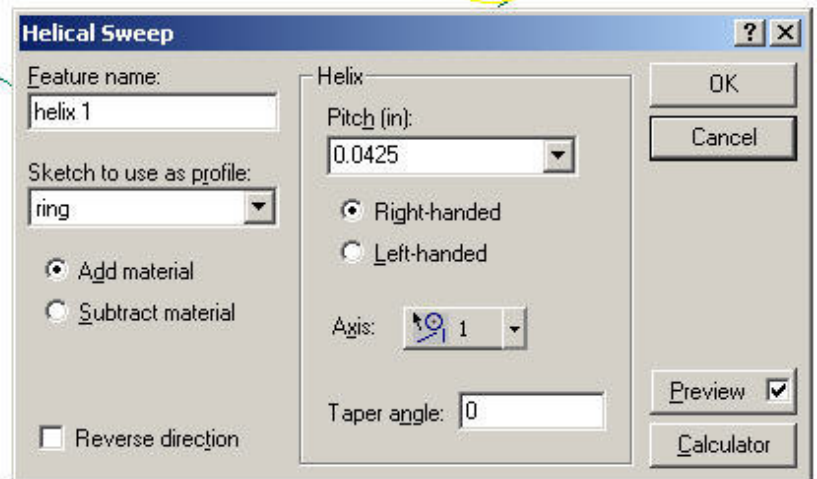
### Constrain Sketch

- **[S]** > While holding shift, sketch a straight line from the center of the circle to the left, then from the end of that line straight up
- **[Z]** Dimension the lines as shown
- **[L]** > select both lines > **[G]** to make them **construction lines**

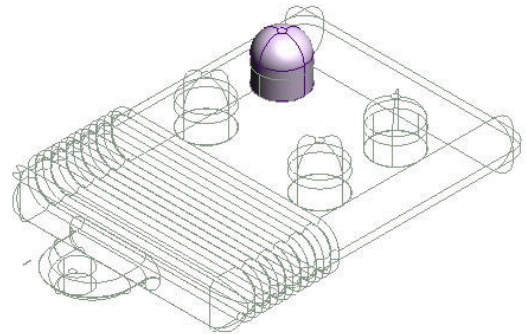


### Create Helix

- [Alt + R, S, H]
- Select **ring** as sketch to use as **profile**
- Select the vertical **line** to use as the **axis**
- **Add Material**
- Pitch: **0.0425"**
- **OK**
- [Alt + F, S] > Save this design as "ring"

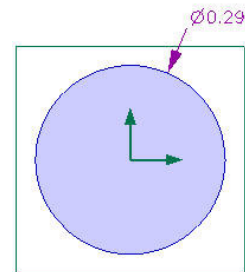


## Component 3 - Button



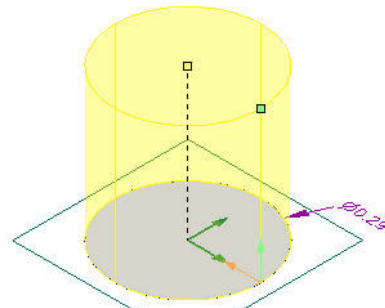
### Sketch this valid profile

- [Ctrl + N] Open a new design file
- [C] > Sketch a circle
- [Z] > Dimension circle to be 0.29"
- Name this sketch "Button"



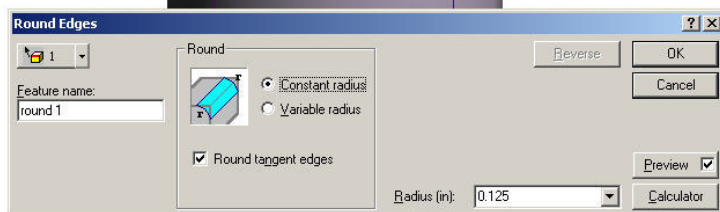
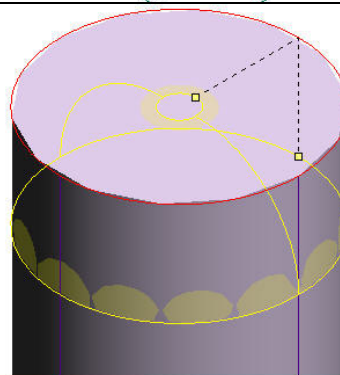
### Extrude Buttons

- [Alt + R, E]
- Add Material
- Above Workplane
- Distance of 0.3"
- OK



### Round Edges on Loop and Body

- [Alt + R, O]
- Constant Radius
- Radius = 0.125"
- Select top Edge
- OK
- [Alt + F, S] > Save this design as "button"



# Assembly



## Insert Remote and Ring

- [Ctrl + N] to open new design
- [Alt + A, A] > Select "remote.des"
- OPEN > [Ctrl + F] to fix component
- [Alt + A, A] > Select "ring"
- Separate two components so that ring is visible



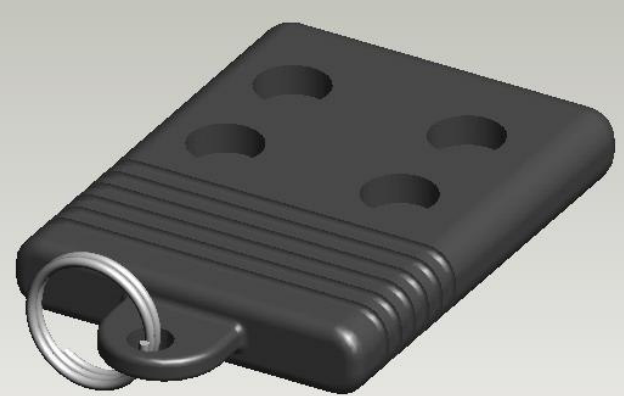
## Constrain Assembly (Align)

- [F] > While holding shift, select both flat face of ring and top surface of loop
- [Alt + A, L] to Align faces



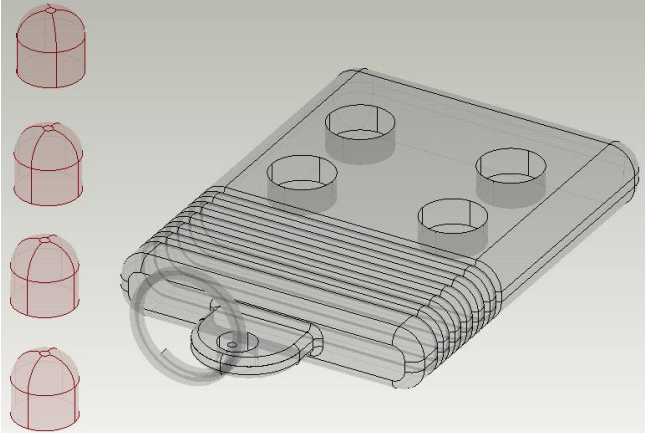
## Move Component

- [P] > Select and drag ring into the position shown



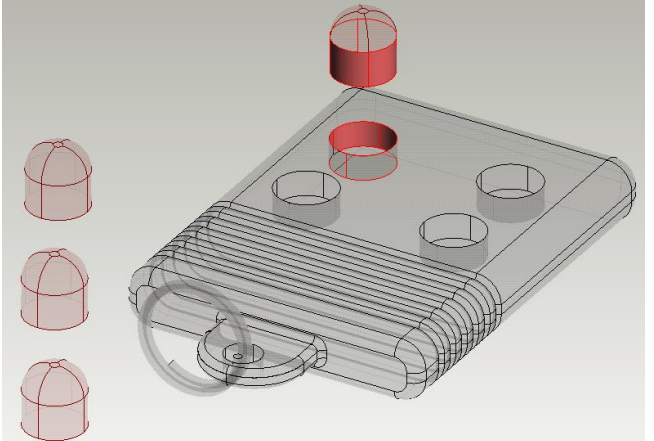
### Insert Component (Button)

- [Alt + A, A] > Select "button.des"
- OPEN
- Repeat until four buttons are on the screen



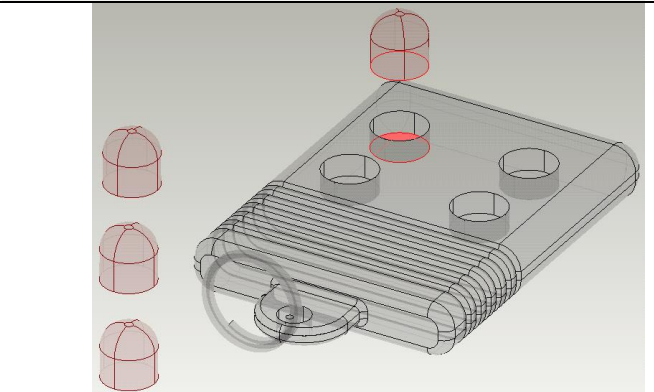
### Constrain Assembly (Align)

- [F] > while holding shift, select cylindrical face of button and inside cylindrical face of button hole
- [Alt + A, X] to Center Axis



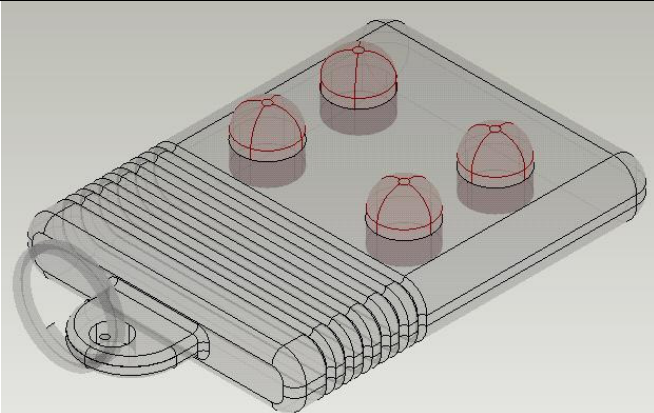
### Constrain Assembly (Mate)

- [F] > while holding shift, select both bottom of one of the buttons and bottom surface of one of the holes
- [Alt + A, M] to Mate



### Constrain Assembly (Mate, Align)

- Repeat this process for each of the buttons, so that the resulting assembly matches shown model
- [Alt + F, S] > Save this design as "FOB"

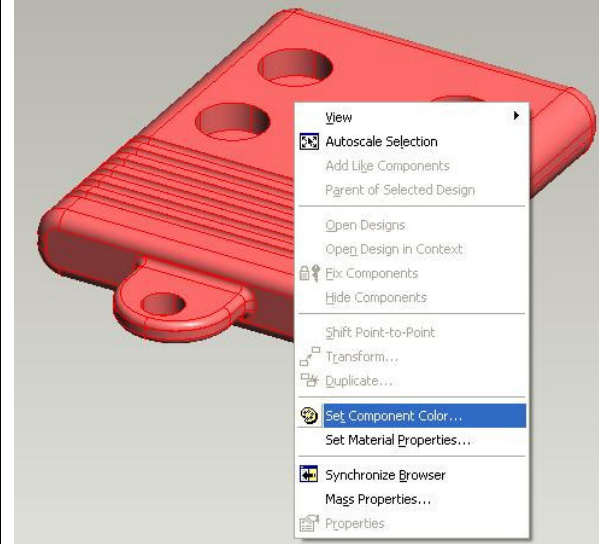


**\*NOTE ON ADDING COLOR TO COMPONENTS\***

*Color was added to the components in this section for aesthetics. It is not necessary to add such detail. However, if a different color is desired, follow these steps to do so. This process can be used at anytime during an assembly or design.*

**Select part**

- [P] > Left click desired part to select it
- Right click to view option menu
- Select **Set Component Color**



**Select Color**

- Left click desired color
- Click **Add to Custom Colors**
- OK

**\*Note:** Use of the bar on far right-hand side can be used to further exact the color shade

