Introduction

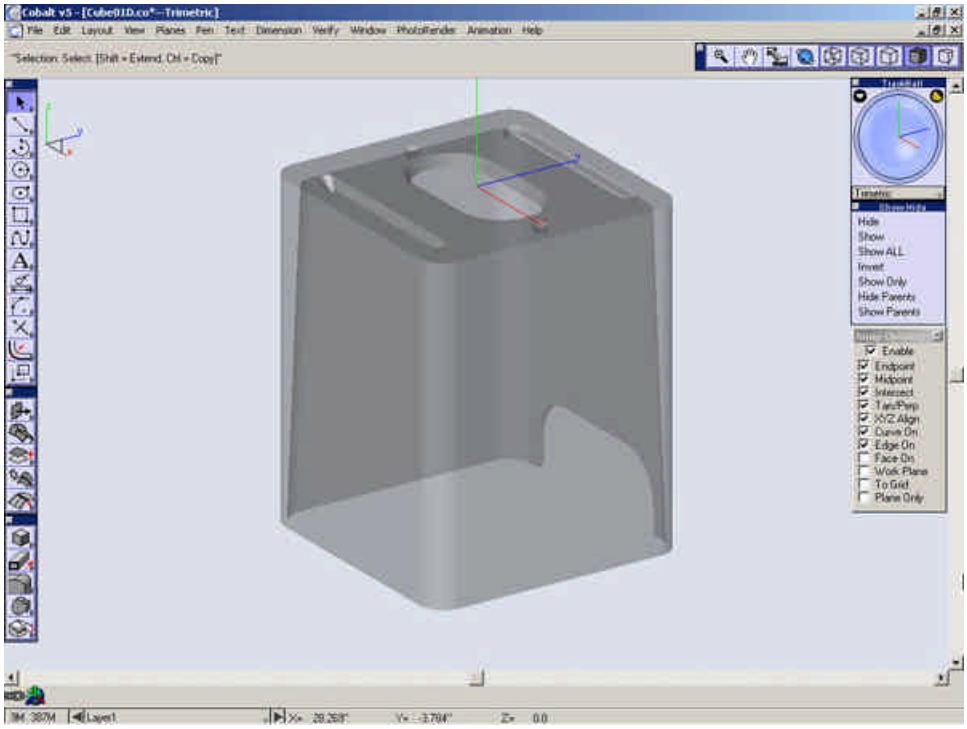
This tutorial describes how to use Ashlar-Vellum software to create a model of the Apple G4 Cube. This is not intended to represent the idea that Apple used Ashlar-Vellum software to create the Cube (in fact, I have no clue what they used). It is intended to provide documentation for the user to learn the tools provided in Ashlar-Vellum software to do product design.

The complete tutorial covers close to 35 tools within the application as well as many concepts to help make your work more efficient. At the end of each section you will be asked to save the file (which is just good practice to develop). At the beginning of the next section there will be a file available to download that represents the model up to that point. If you get lost, or the tutorial gets complicated you can skip to the next tutorial and get the most recent file. I don't recommend this, but it's an option if you need to.

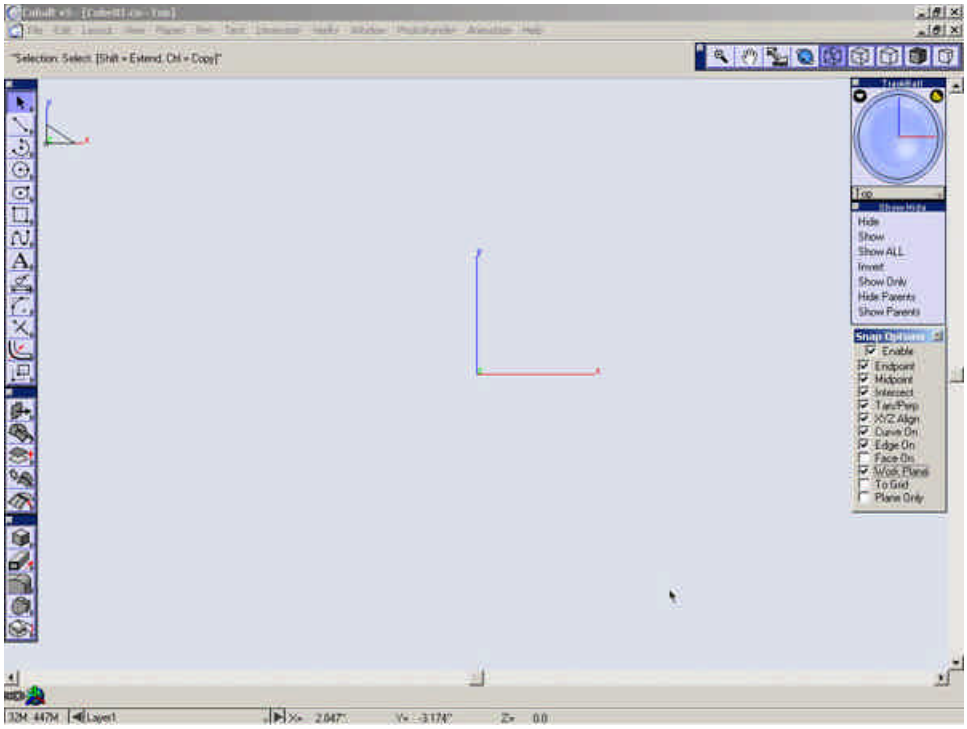
This tutorial was created in Cobalt v5 using a 467mhz Dell with 512 mb of RAM (There is something a little funny about building a Mac on a PC, something about the irony.) This model is built using inches for the units. If your default units are millimeters, you may want to change them to inches in ***File>Preferences***.

Most of the tutorials are for creating the five different parts of the model, with the last tutorial dedicated to lighting and rendering. So, without further adieu, lets get started.

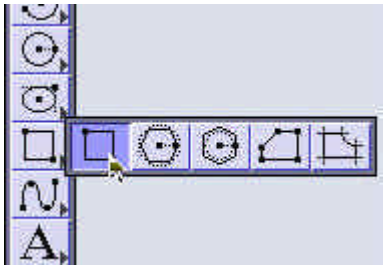
Building the Outer Case 2



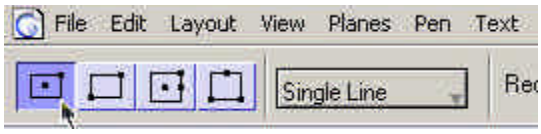
Begin a new file and save the save the file (Cube01.co).



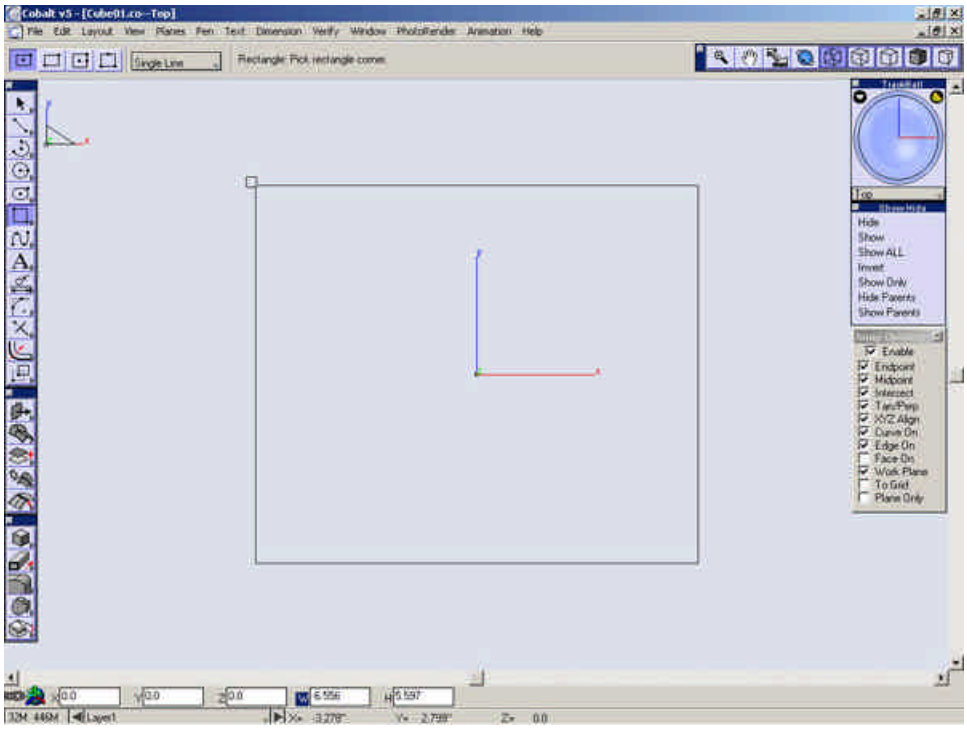
Select the **Rectangle** Tool.



Select the "**Polygon by Center and Point On**" option.



Create a square with the center at the origin.



Type **7.75** for both the **W** and **H** fields (Width and Height).

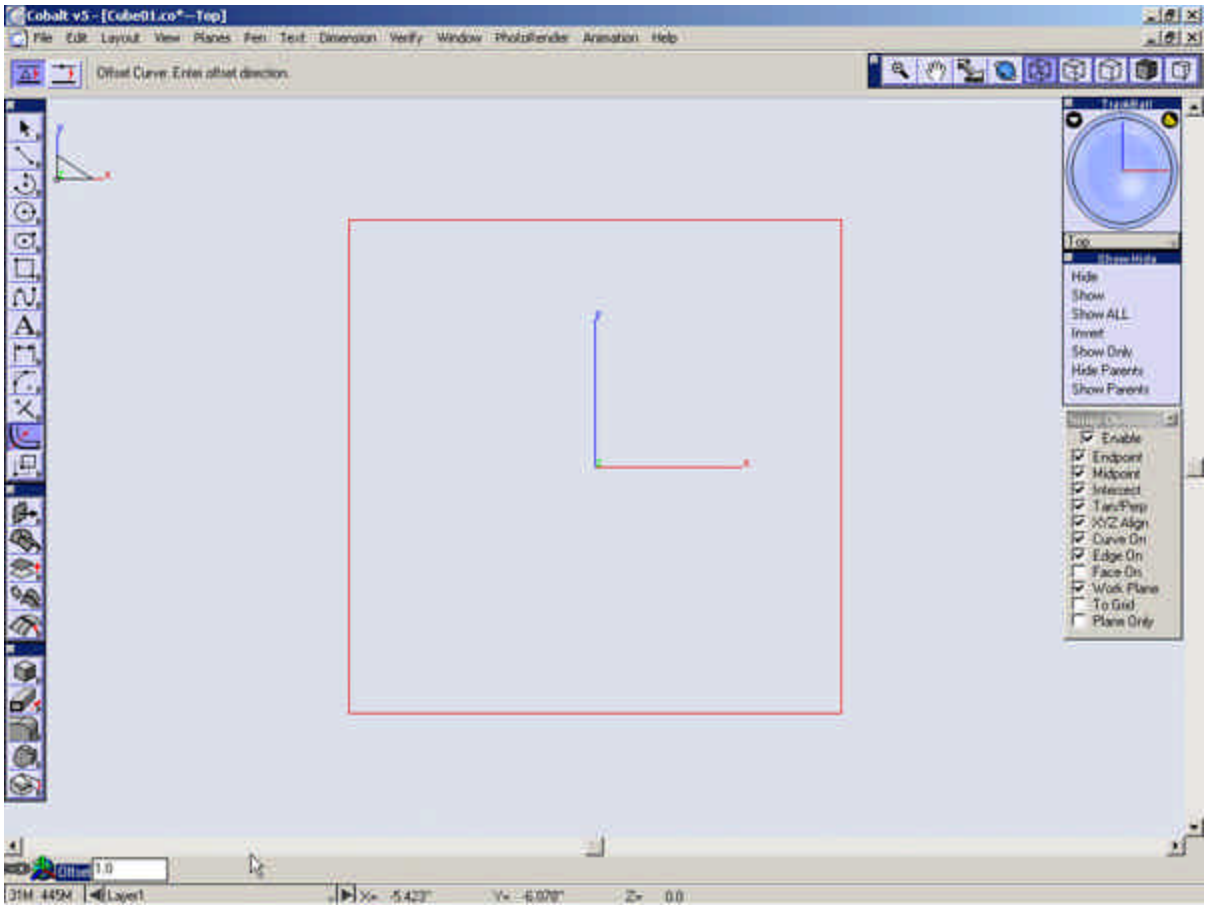
Select the **Offset Curve** tool.

*Chain Select** the four sides of the square.

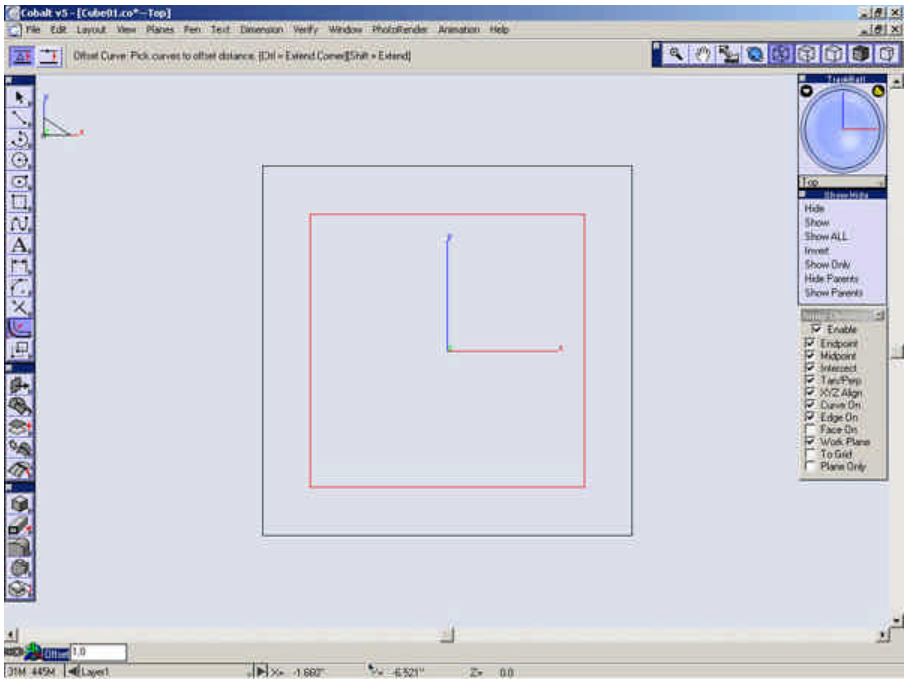
**P.C - hold the Shift key while selecting the first line and afterwards, with the Shift key still held down press the ~ (tilde) key to automatically select all of the lines connected in the chain.*

Mac - you must hold the Shift key while you select the first line and press Command+~ (tilde), while holding the Shift key to select the lines connected in the chain.

*TIP: set the **select chain** keyboard shortcut to be "z". When shift is held down, pressing the "z" key will select the chain.*

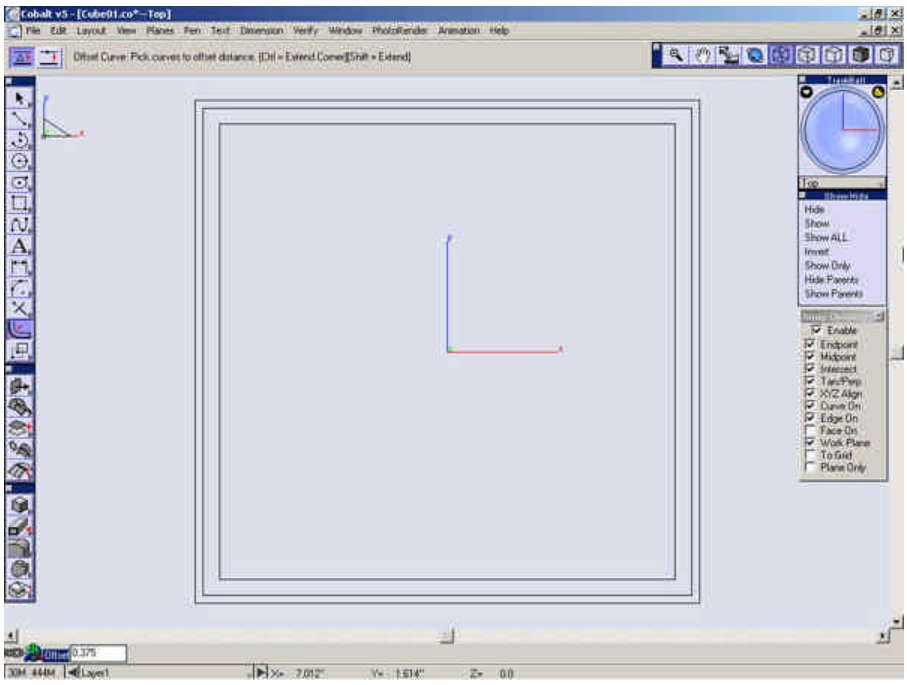


Select inside the square to set the offset direction.



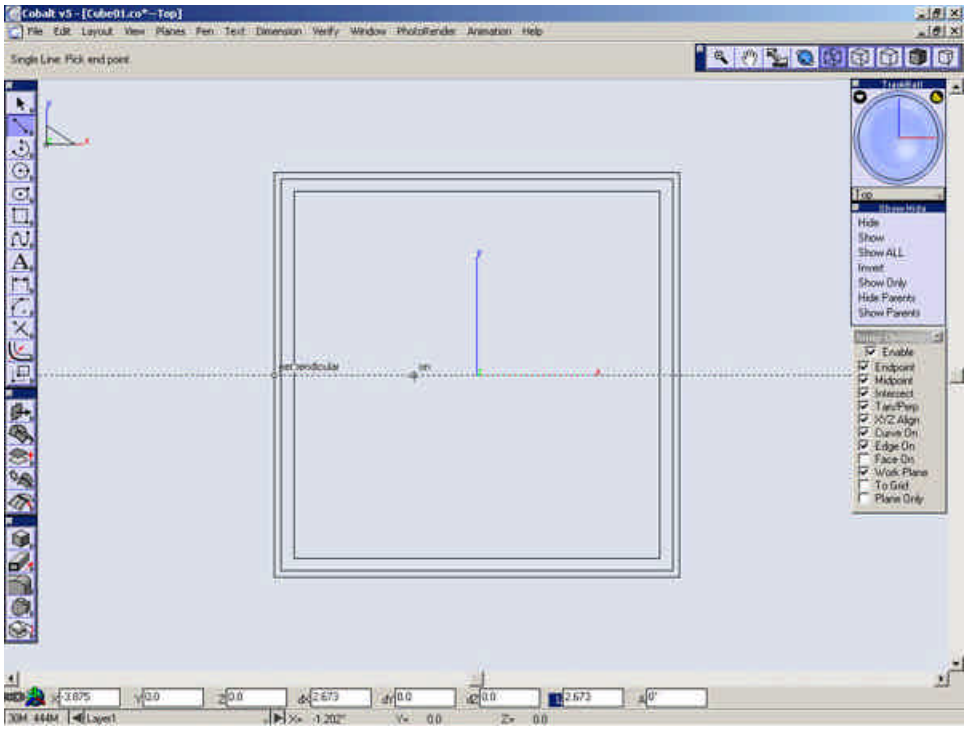
Type **.125”** into the offset field and press **Enter**.

Chain select the outside square again and offset it **.375”** inward.

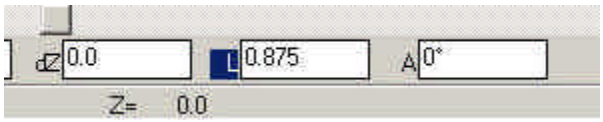


Select the **Line** tool.

Draw a line from the midpoint of the leftmost line towards the origin of the drawing.

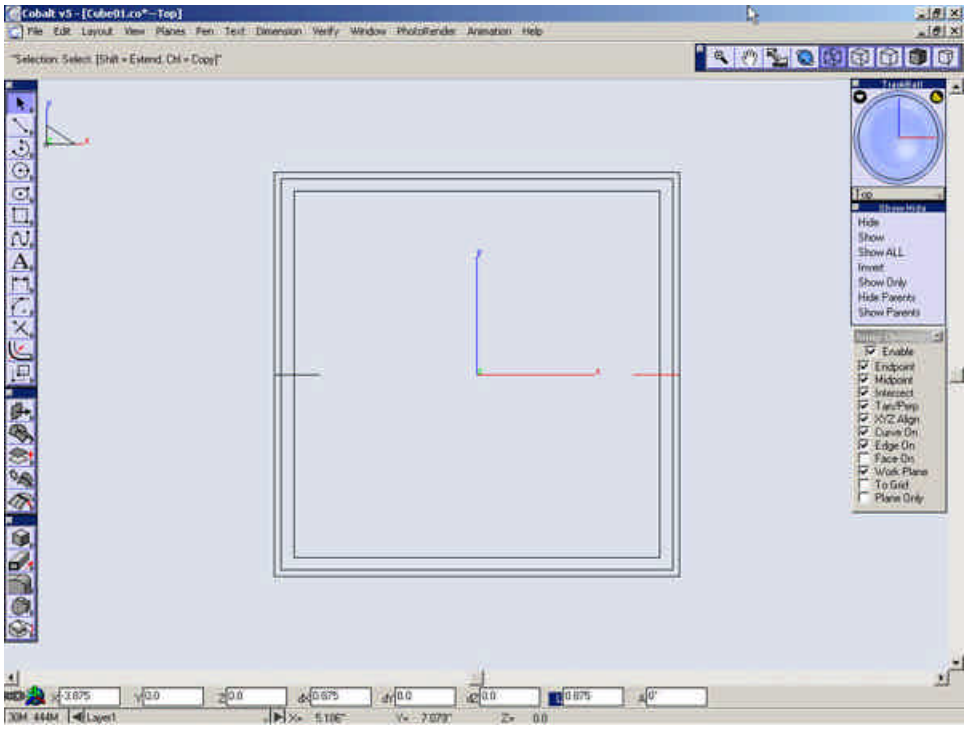


Enter **.875** for the **L** field (Length)

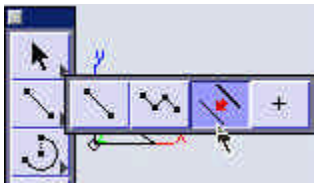


Select the **Select** tool.

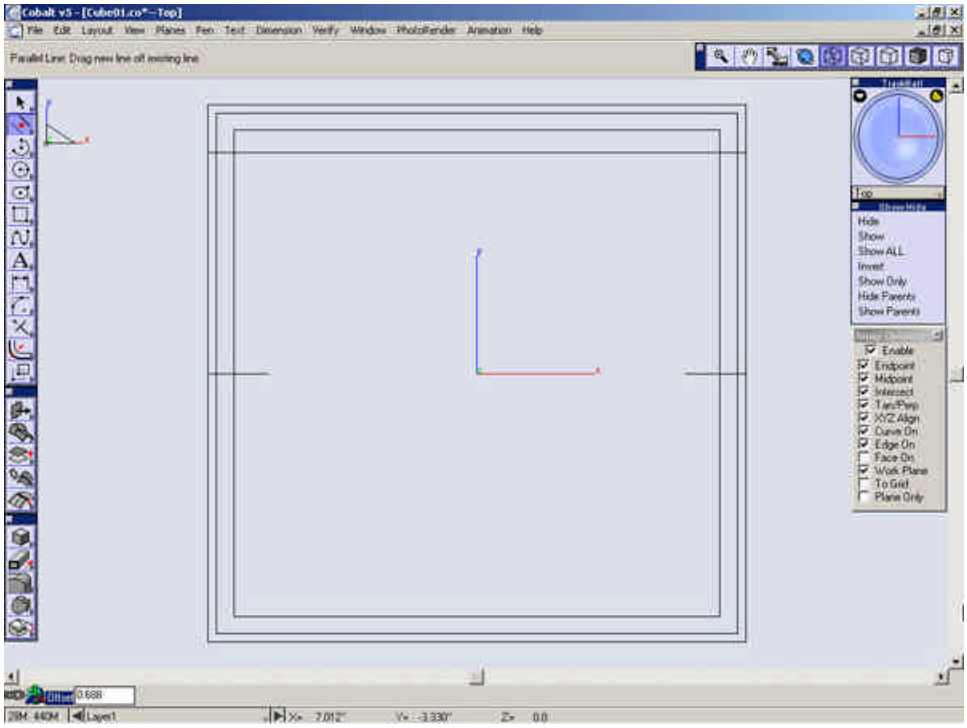
While holding **CTRL** on Windows (**Option** on Macintosh), select and drag a copy of the line to the other side of the square.



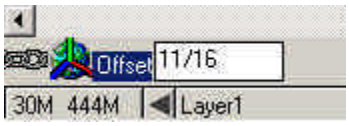
Select the **Parallel Line Tool**.



Drag the top most line downward from its current position.

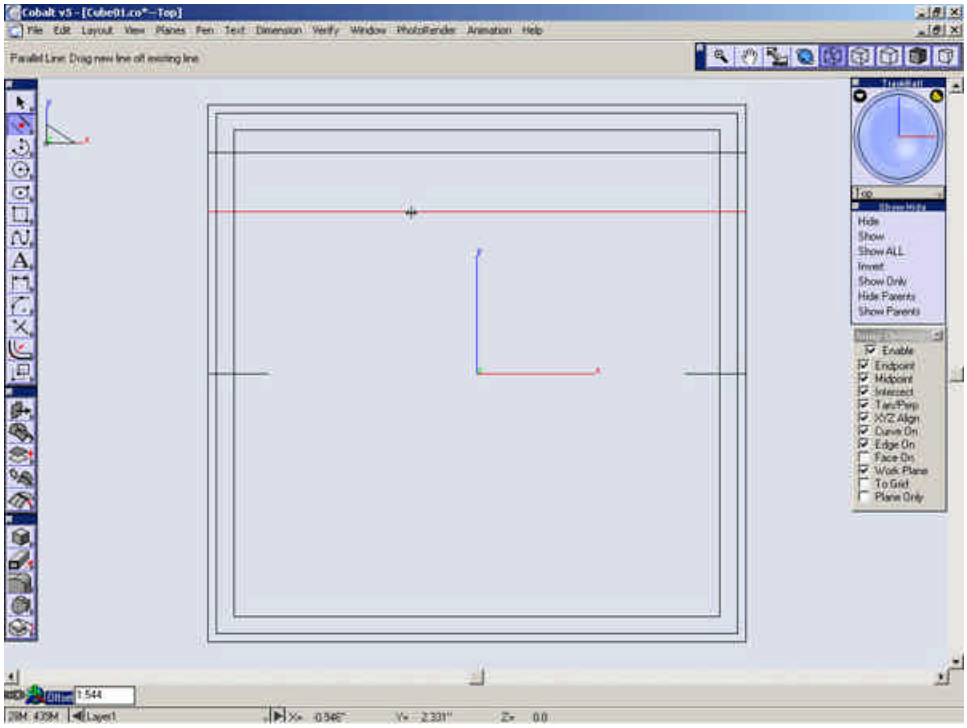


Type **11/16”** into the offset field and press **Enter**.



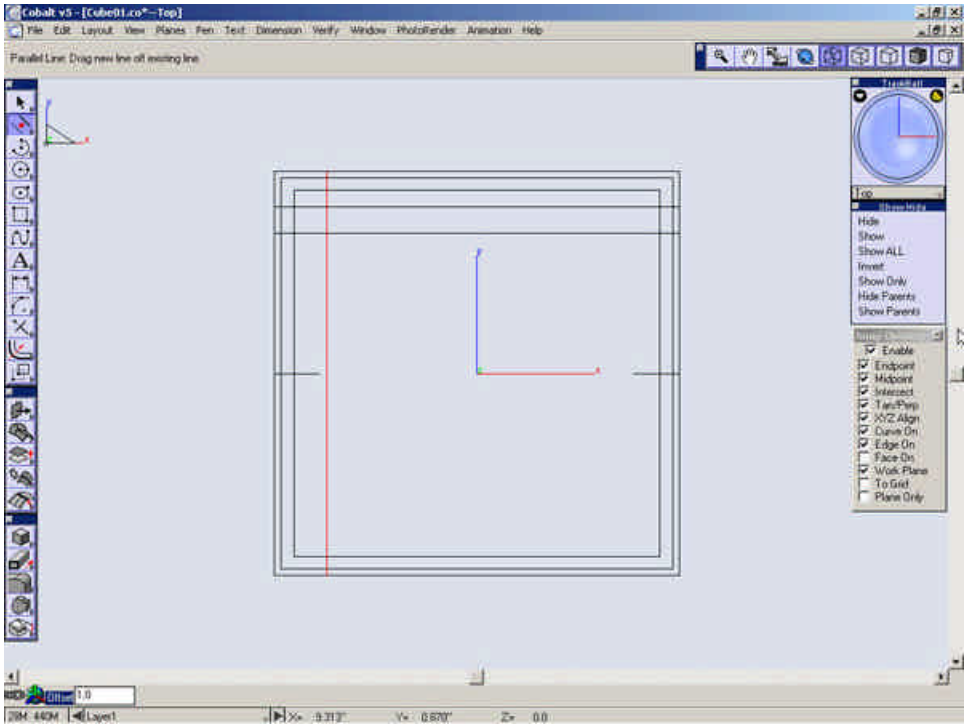
Tip: All numeric fields within Ashlar-Vellum software allow mathematical calculations. For instance, I don't know of hand that 5/64" = 0.078125, but if I just type in 5/64", it'll figure it out for me.

Drag a line off the one you just created downward.

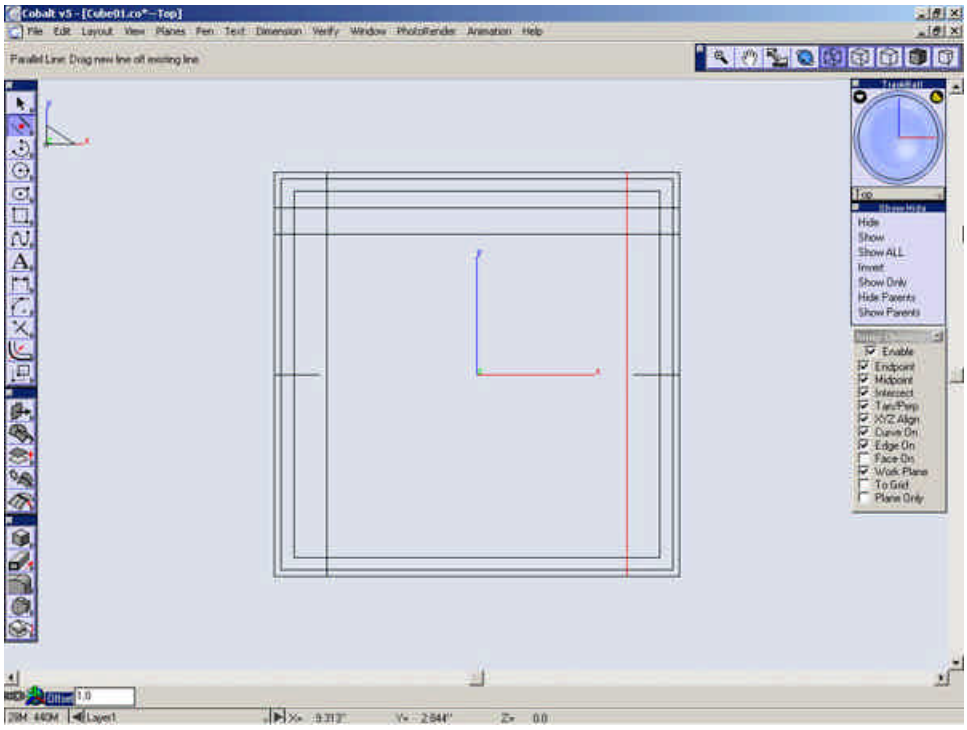


Type **.5”** into the offset field.

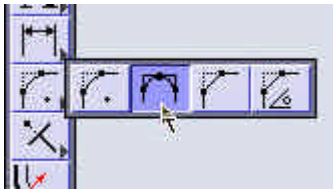
Drag a line off the leftmost line inward **1”**.



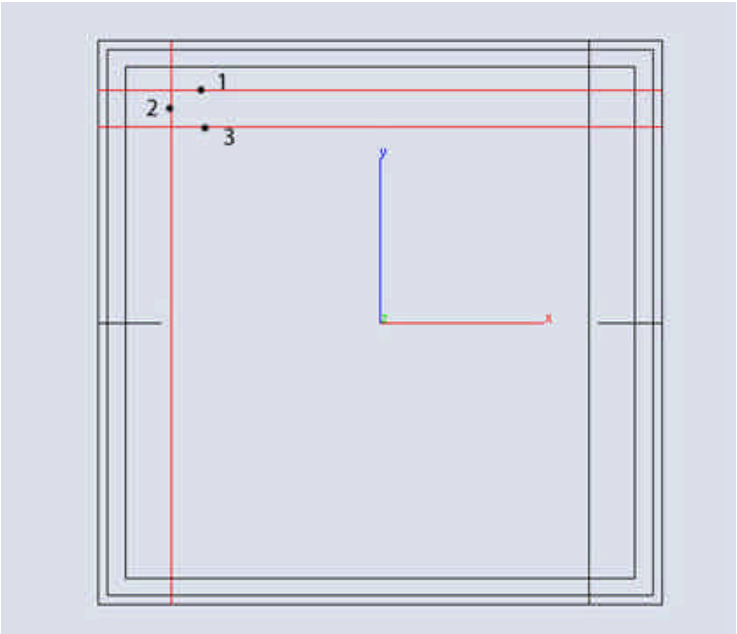
Drag a line off the rightmost line inward **1”**.



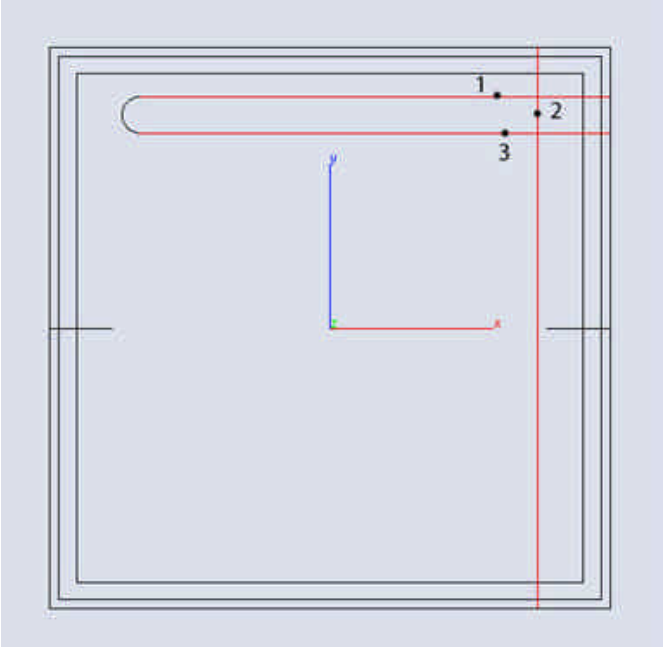
Select the **3-Entity Fillet** tool.



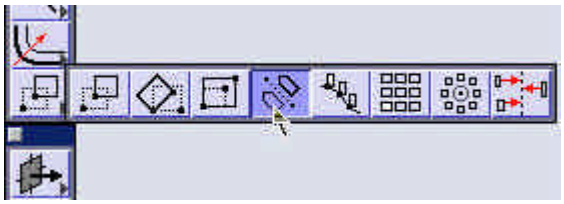
Select the 3 lines at the points shown below.



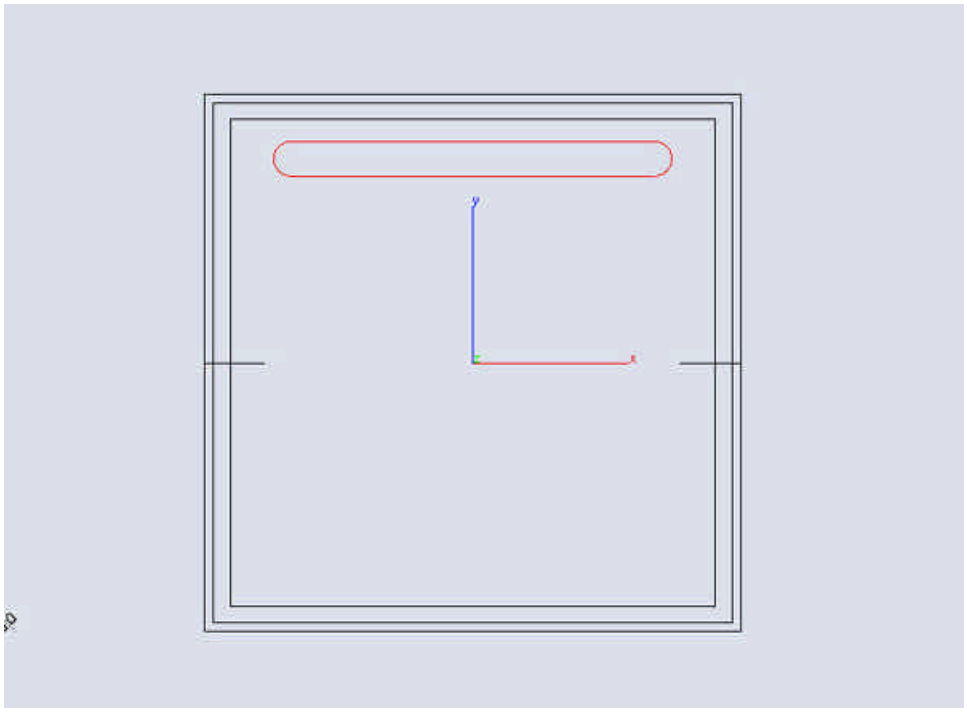
Repeat this on the 3 lines at the other end as shown below.



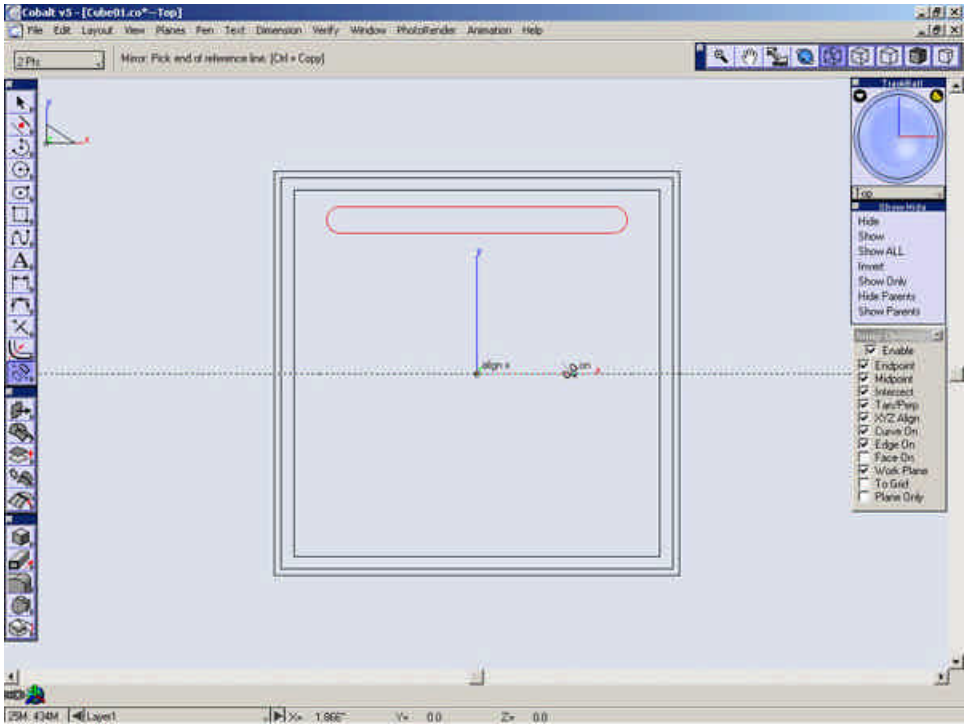
Select the **Mirror** tool**.**



Chain select the oval shape just created.

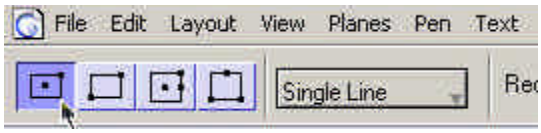


While holding **CTRL** (**Option** on a Macintosh), click in the origin and then at a point to the left or right along the X-axis.

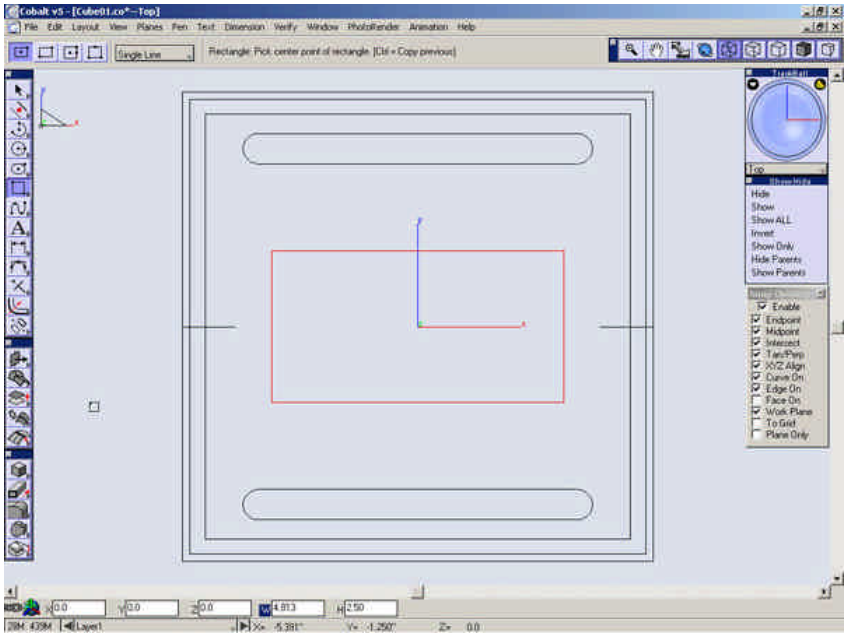


Select the **Rectangle** tool.

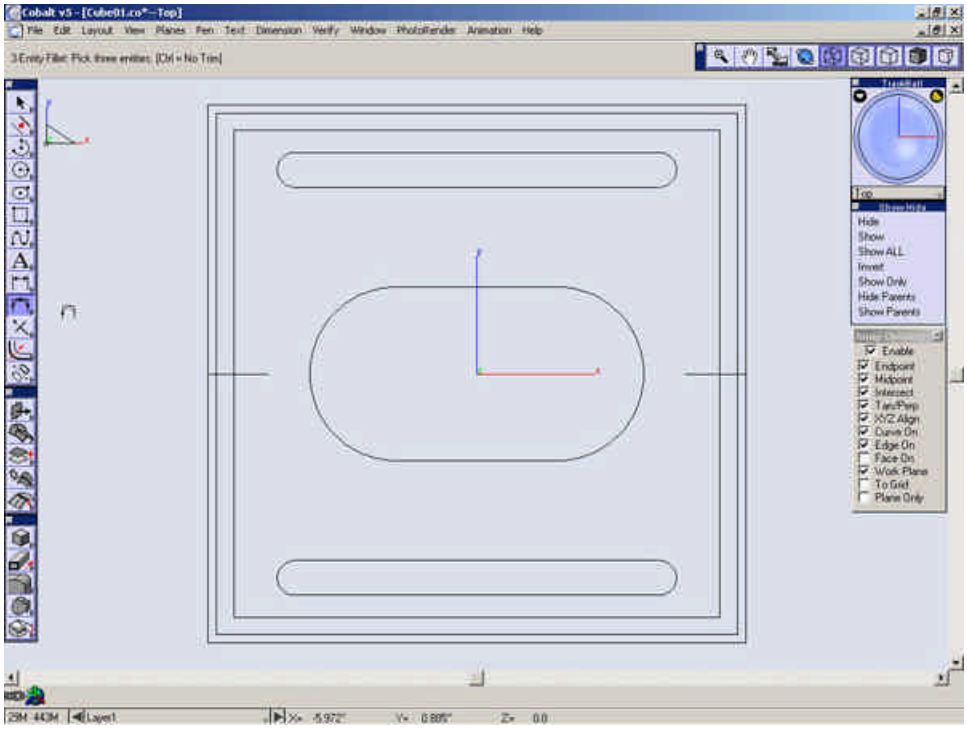
Look at the message line to ensure that the **"Polygon by Center and point on"** option is selected.



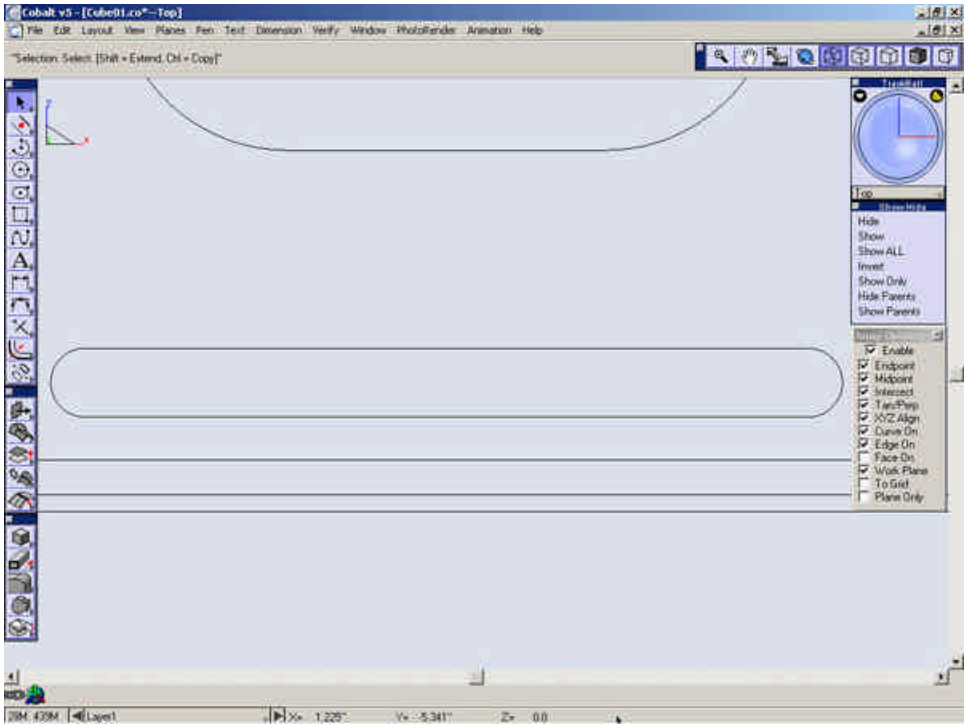
Select the origin for the center and create a rectangle **"W= 4 13/16" L=2 1/2"**.



Select the **3-Entity Fillet** tool and round the edges of the rectangle as we did earlier.

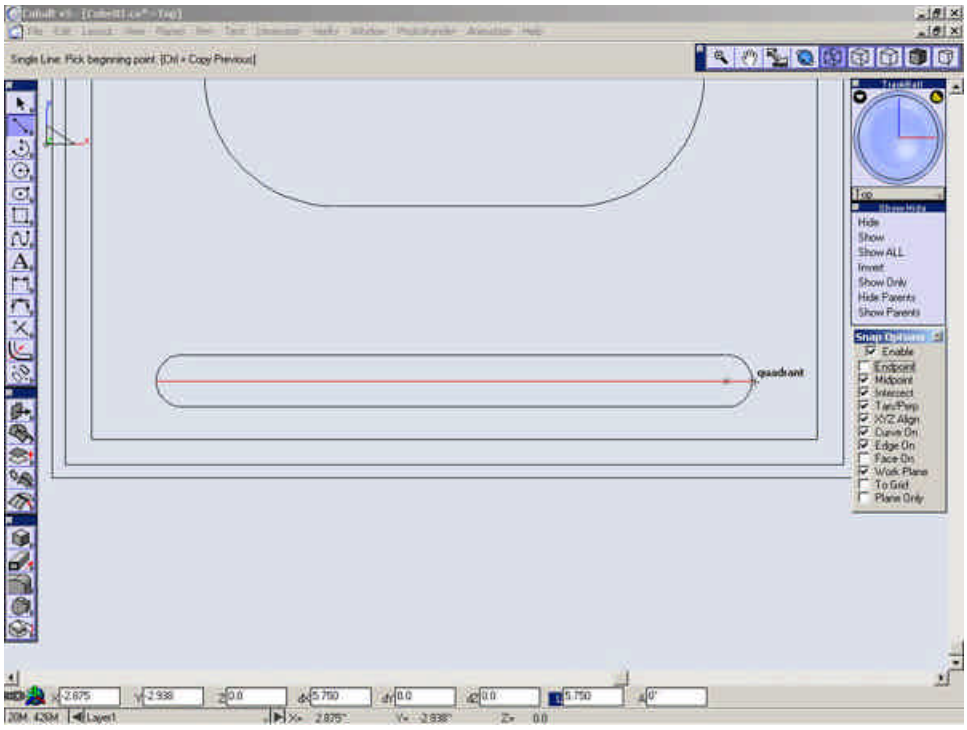


Zoom in on the lower section of the drawing.

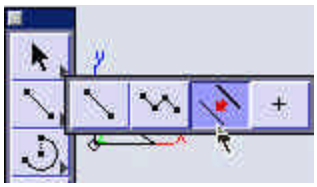


Select the **Line** tool.

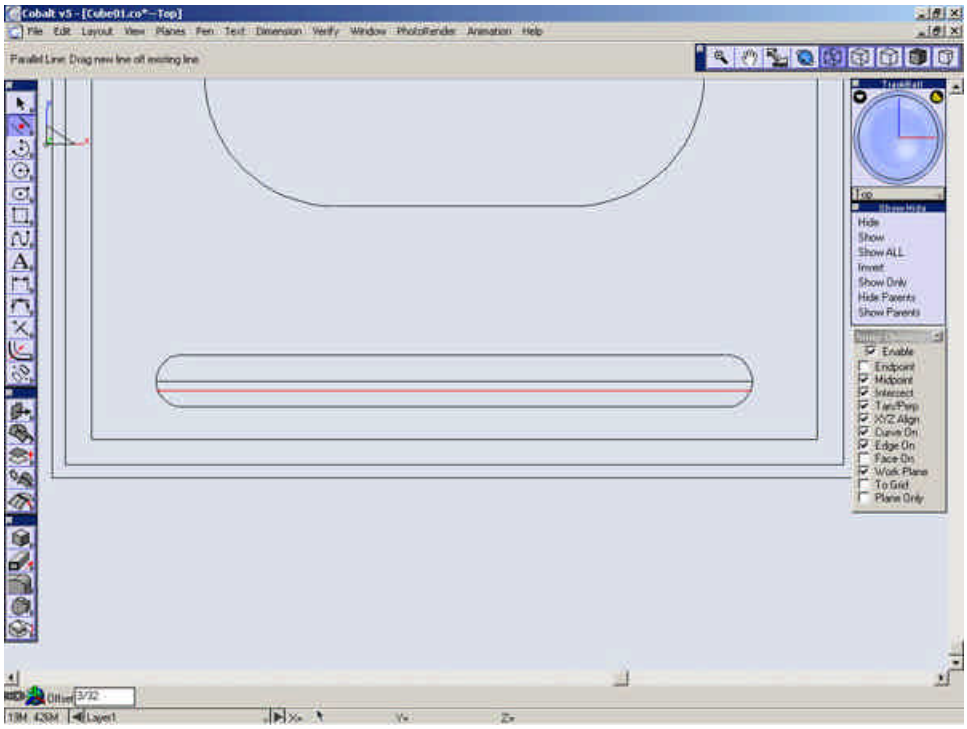
Draw a line from one edge of the oval shape to the other.



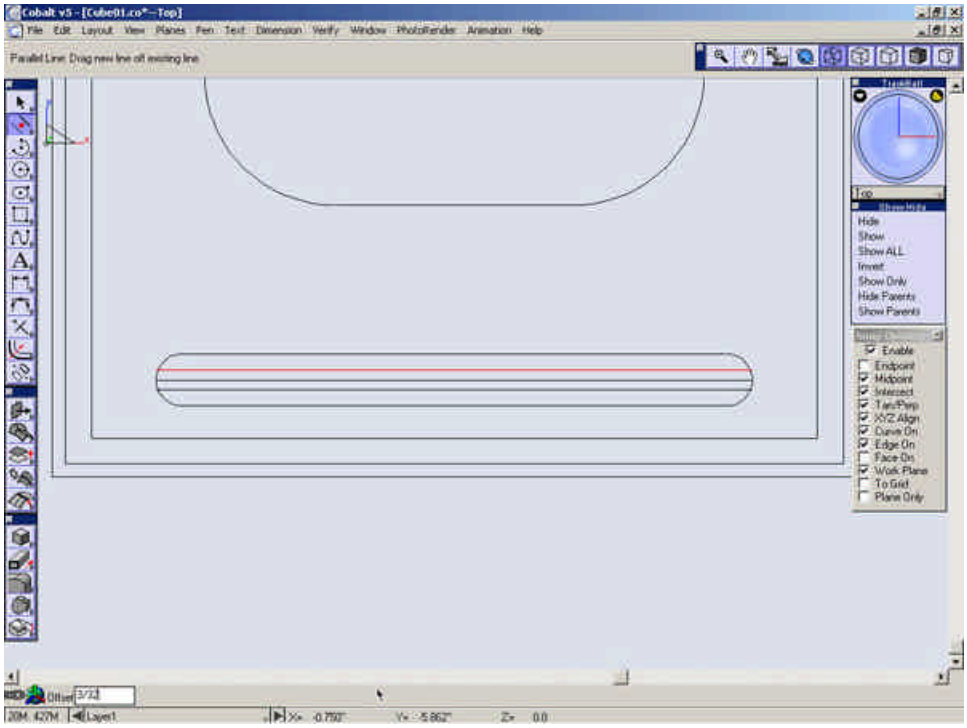
Select the **Parallel Line** tool.



Drag a line downward from the line you just created **3/32”**.



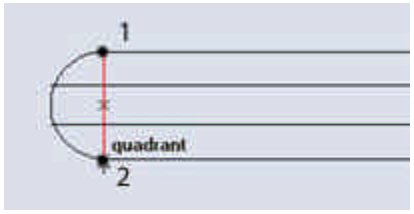
Drag another line up from the original line **"3/32"**.



Delete the original line.

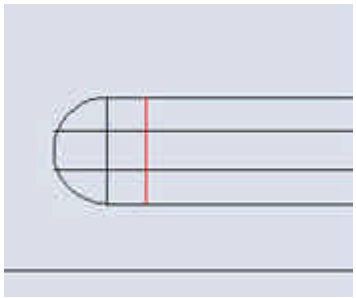
Select the **Line** tool.

Draw a line at the points shown below.

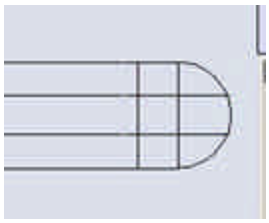


Select the **Parallel Line** tool.

Drag a line off the one just created to the right **3/16”**.



Repeat this process on the other end of the oval.



Delete the two lines shown below.

Select the **3-Entity Fillet** tool.

Round the ends of this as we have done before.

Zoom Out to see the whole drawing.

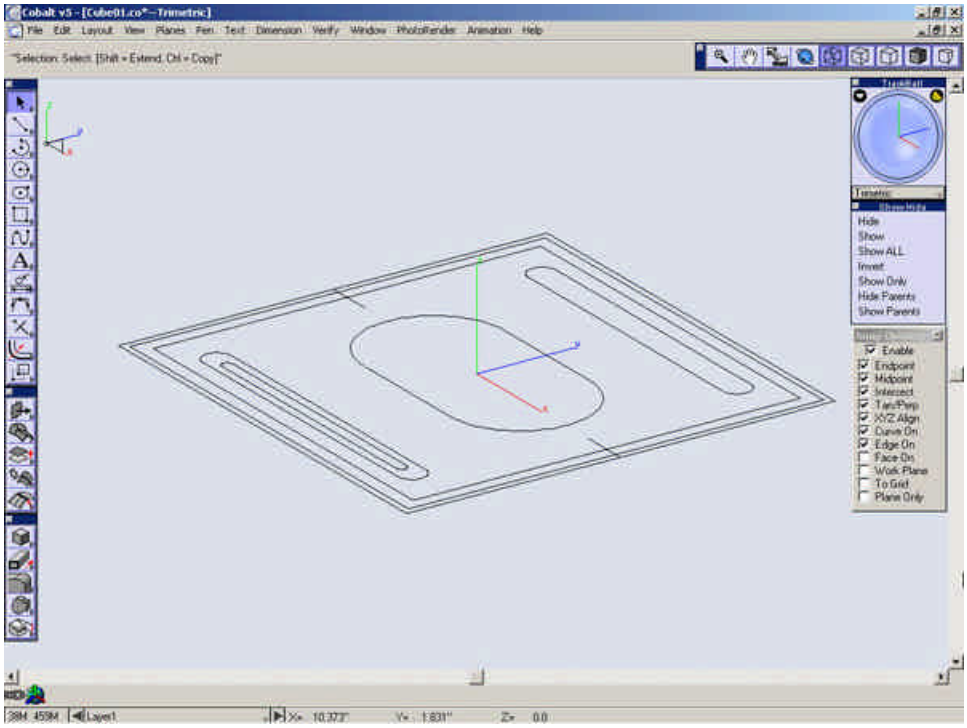
Save the File.

Click below to proceed to the next step.

Building the Outer Case 3

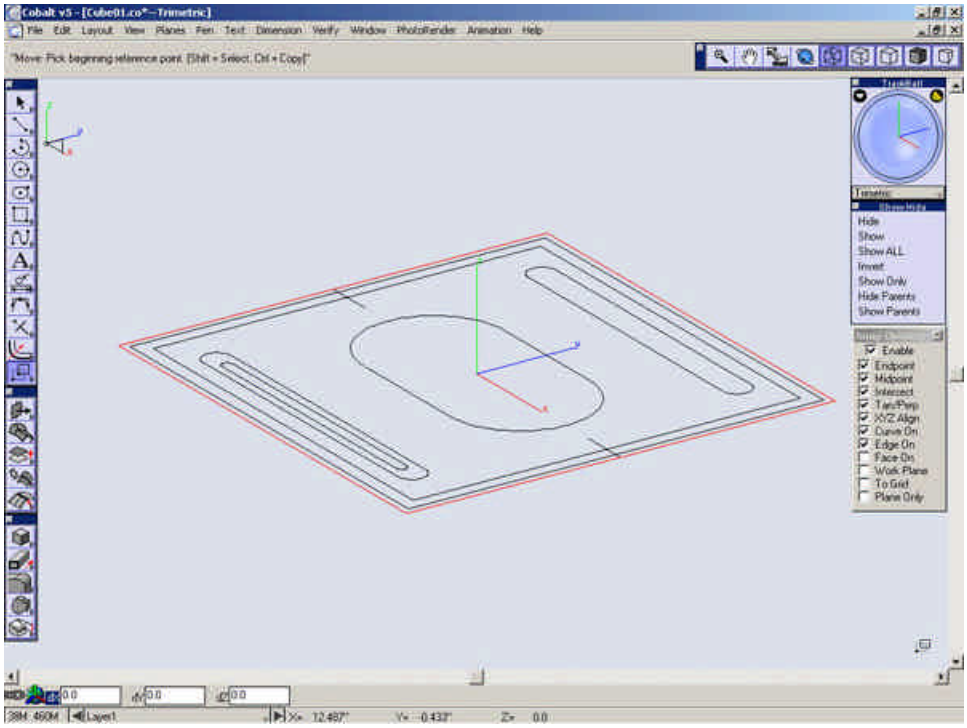
Building the Outer Case 3

Change to the **Trimetric** view. Ensure that the **Work Plane** snap is off.

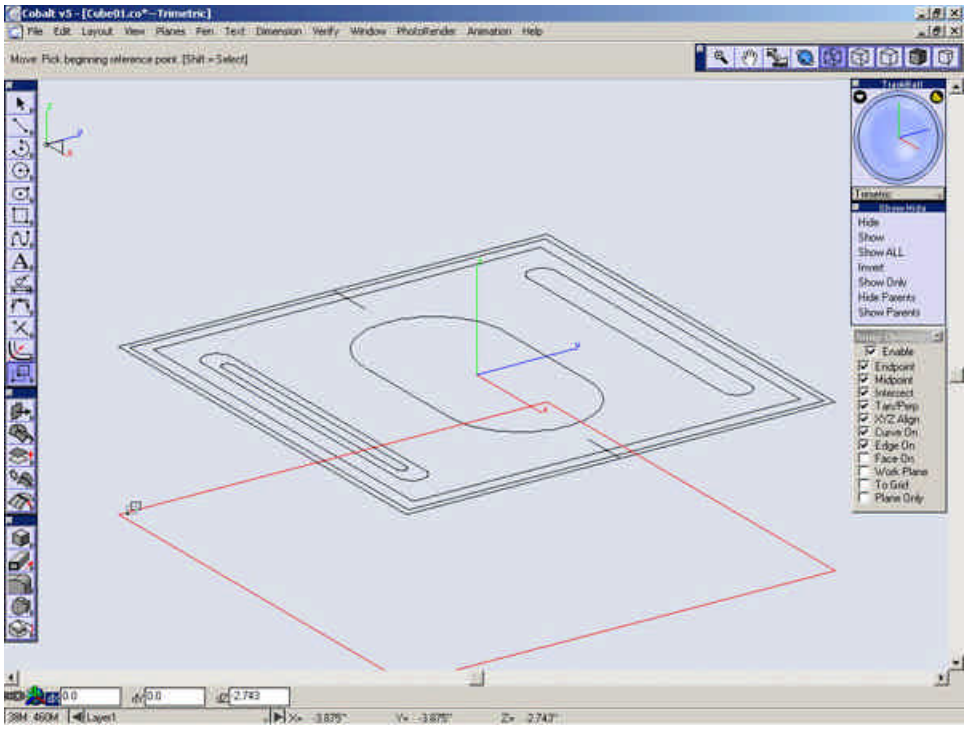


Select the **Move** Tool.

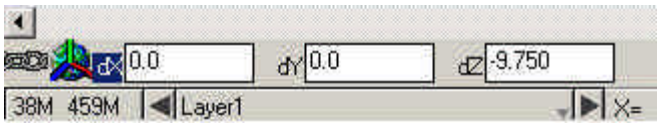
Select the outside square.



While holding **CTRL** (**Option** on Macintosh) move a copy of the square down along the Z-axis.

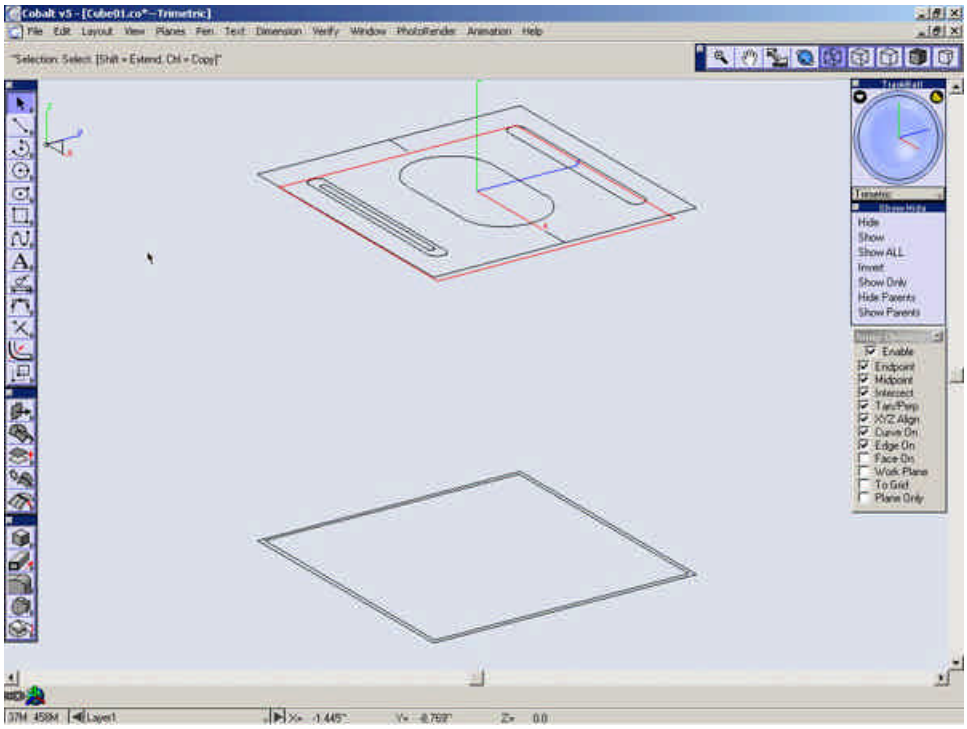


Enter **–9.75** into the **dZ** field (distance along the Z) and press **Enter**.



Move the next outermost square **-9.75"** ***without*** holding **CTRL** (**Option** on Macintosh).

Move the innermost square down **5/16”** ***without*** holding **CTRL** (**Option** on Macintosh) .



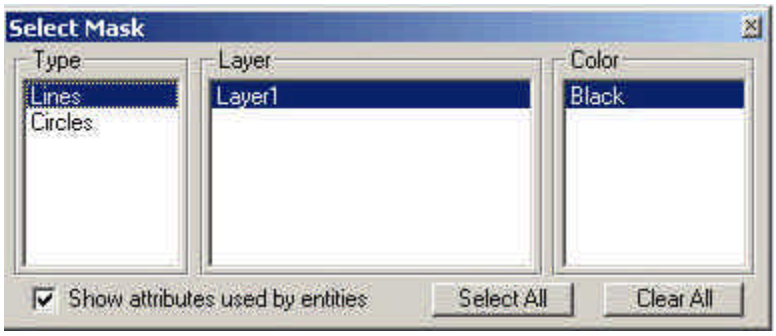
Select the **Ruled Surface** tool.

Switch to **Shaded** Mode.

Open the Select Mask(***Window>Select Mask***) and highlight only “**Lines**”.

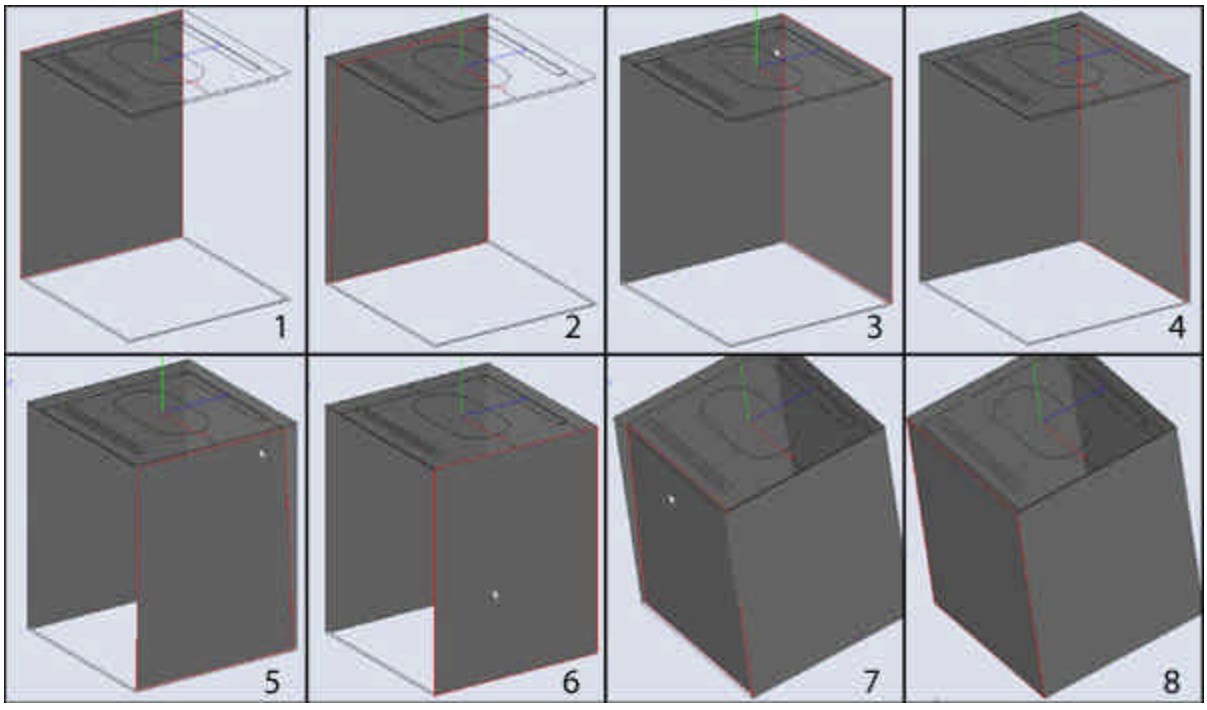
Tip: The select mask is a tool implemented to make selecting objects faster. Once you get a complicated model created, you may have 1000's of entities in

your model. Selecting them can get difficult when there are 4 or 5 entities overlapping each other. In this case, we are about to create many surfaces, since Ashlar-Vellum software allows the user to select surface edges as defining geometry, selecting the lines that also happen to lie in place with the surface edges will bring up an ambiguity box asking you which object to select. With the select mask set as shown, the program will only select the lines in the model.



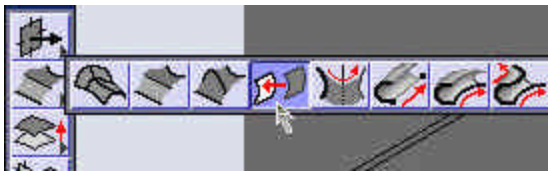
Select the edges as shown below to create surfaces for the sidewalls of the outside and the inside of the outer case.(There will be 8 of these total)

Tip: It may help to rotate the view to help select the correct edges.



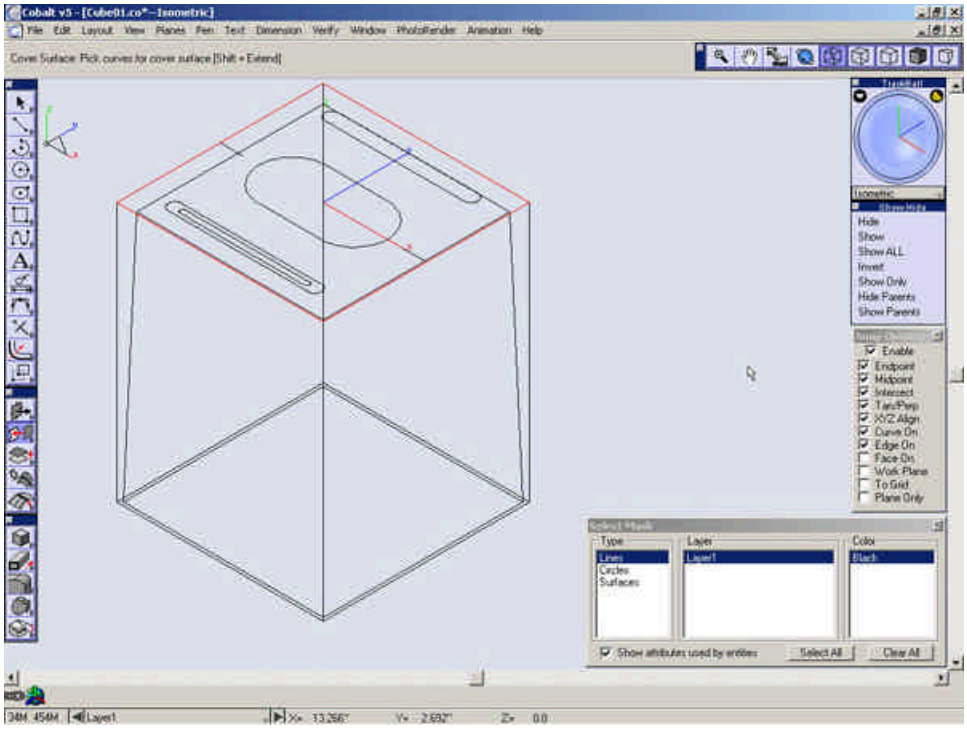
Change back to **Trimetric** view.

Select the **Cover Surface** tool.

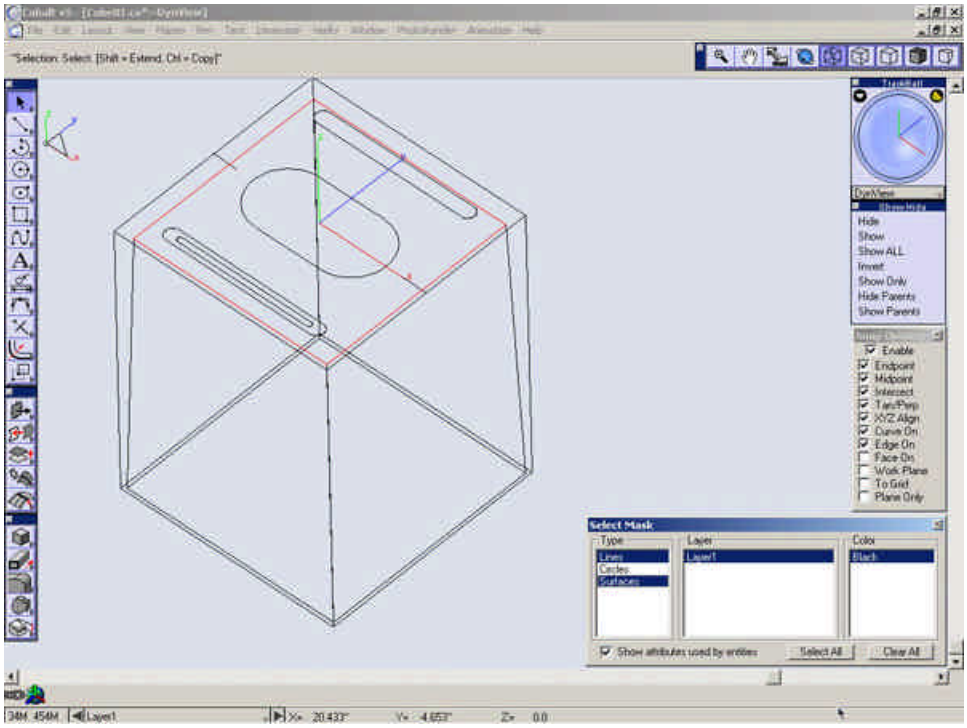


Switch back to wireframe mode to make it easier to select the lines.

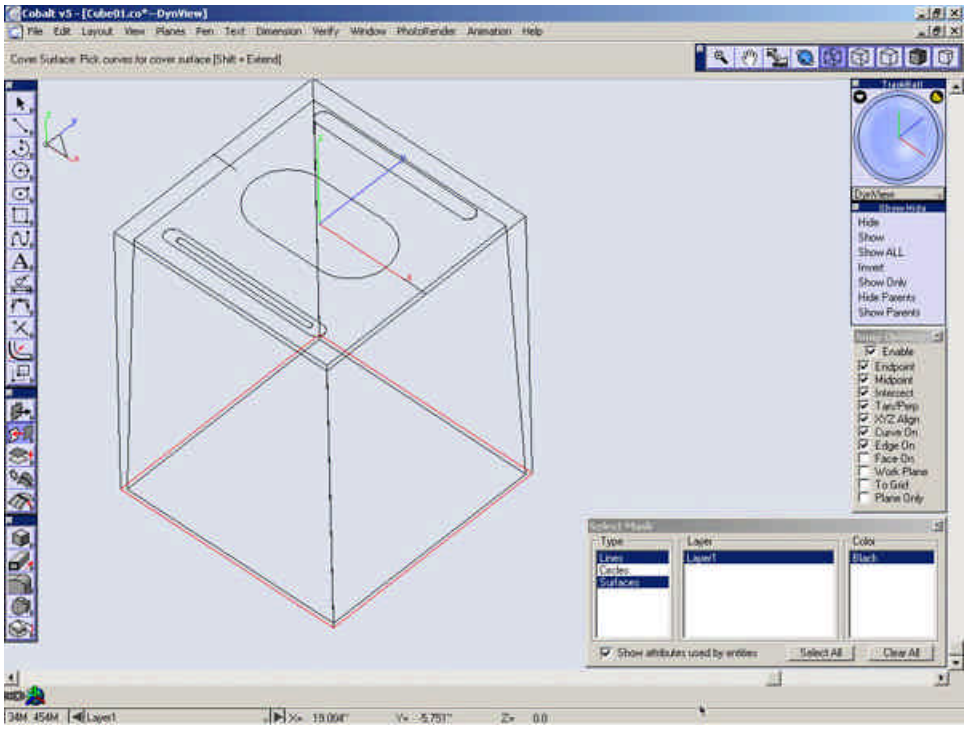
Make a cover surface for the top of the model.



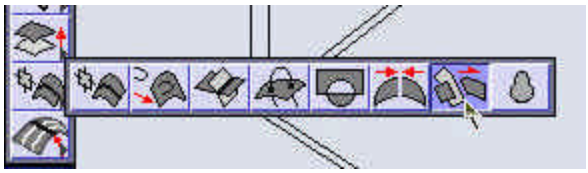
Make another from the innermost square.



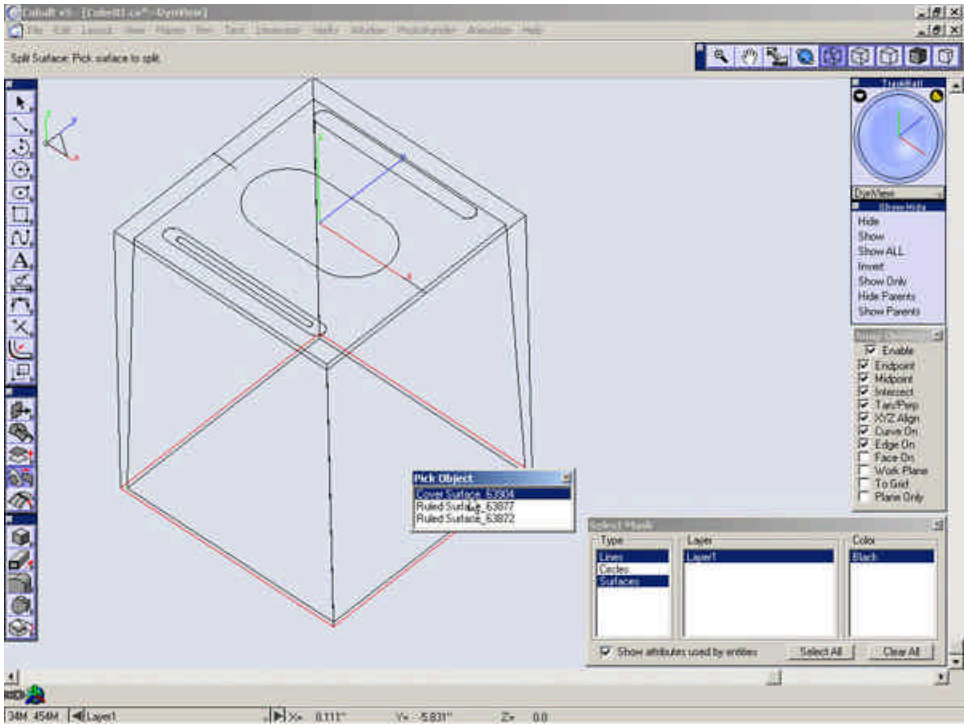
Create another surface form the bottom outermost square.



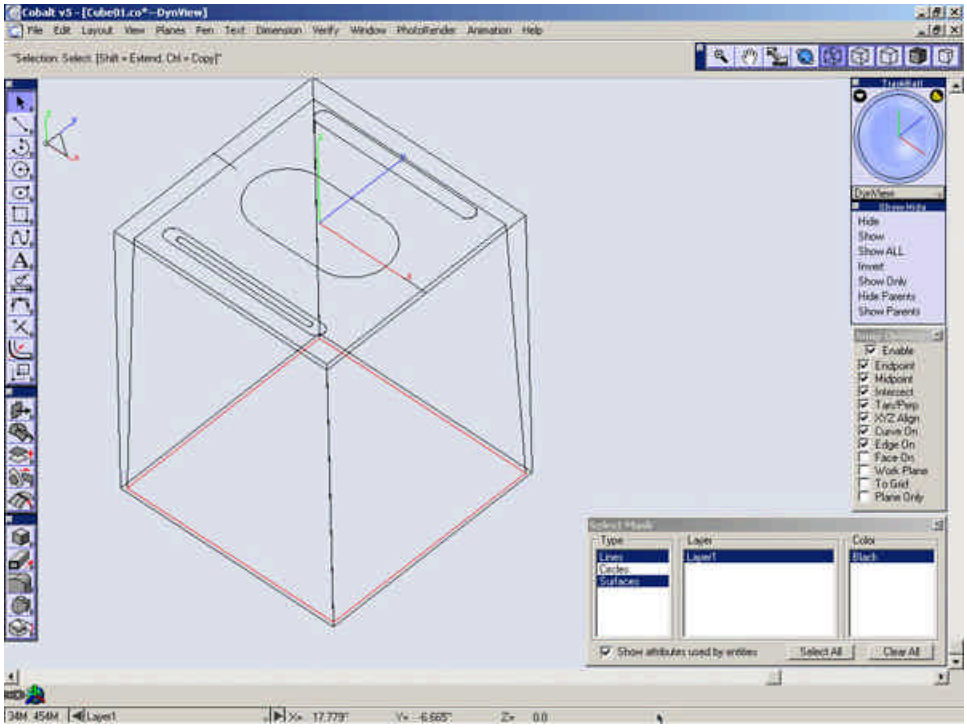
Select the **Split Surface** tool.



Select the bottom surface you just created.



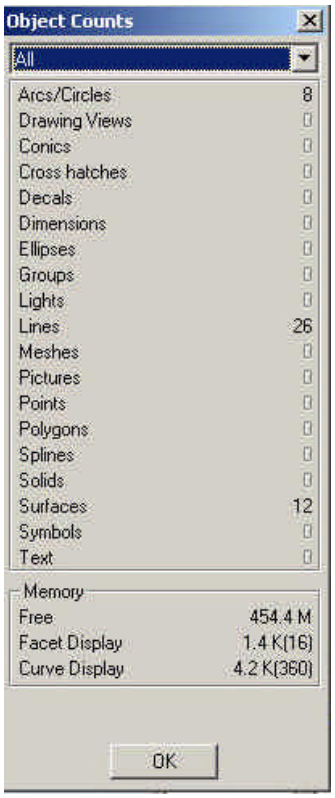
Select the inside square at the bottom of the case.



You should now have 6 surfaces

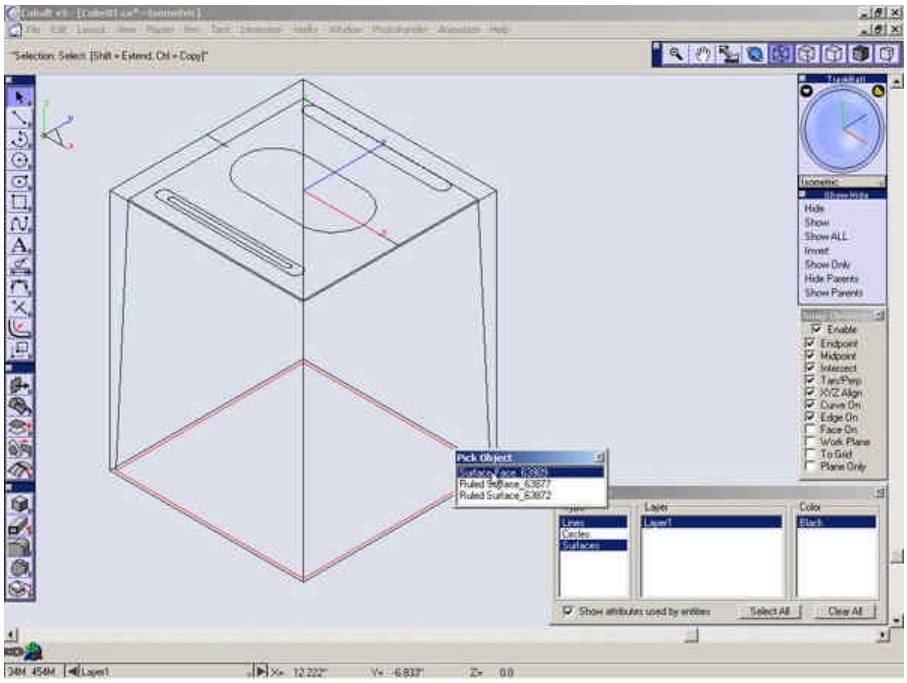
a. 2 Skinned Surfaces (Outside and Inside Walls)
b. 1 Cover Surface (The top)
c. 1 Cover Surface (The middle)
d. 2 Surface Faces (Created from the bottom cover surface that was split.)

Open the **Object Counts** dialog from the Verify Menu. Look to ensure that you do in fact have just 6 surfaces.



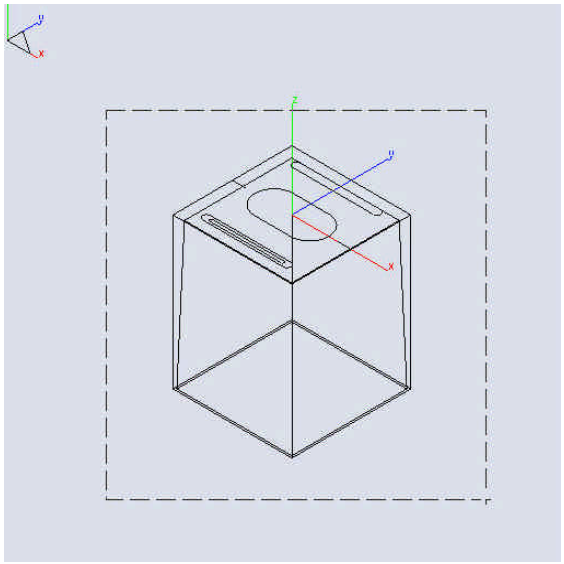
Close the **Object Counts** dialog.

Select the inside surface of the surface we split and delete it.

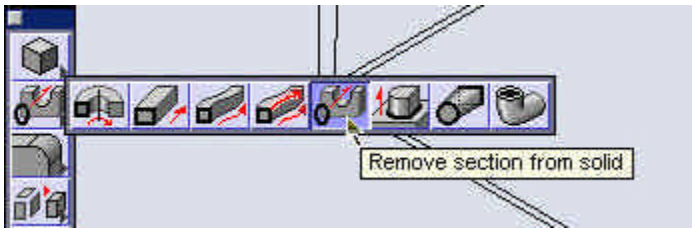


Select the **Stitch Solid** tool.

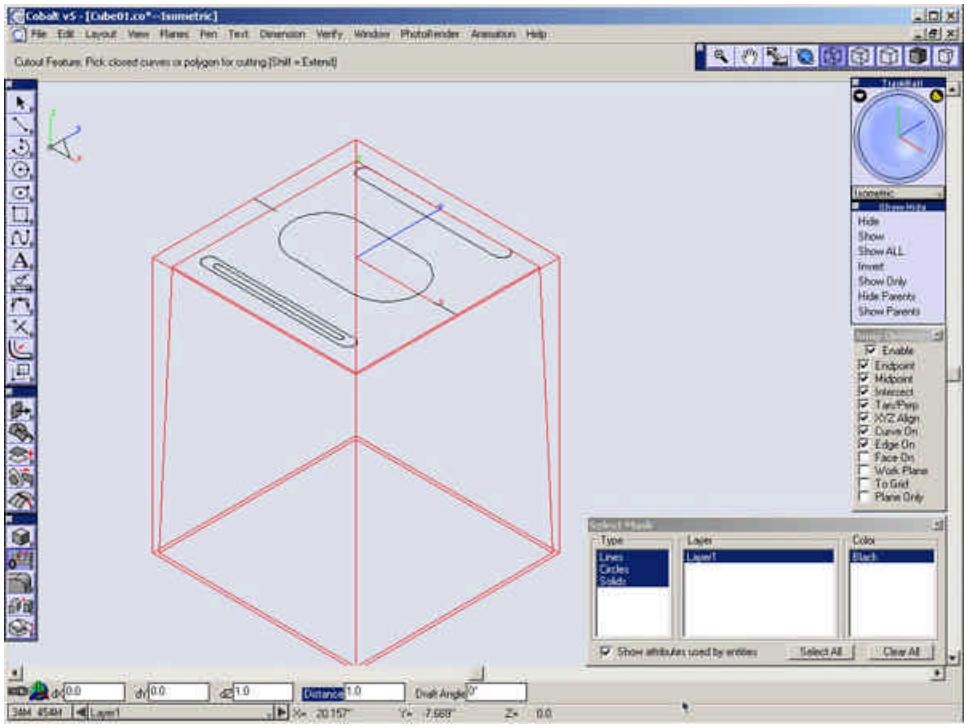
Draw a selection box over all surfaces to stitch them together into a solid. If the select mask is open, ensure that all types of objects can be selected.



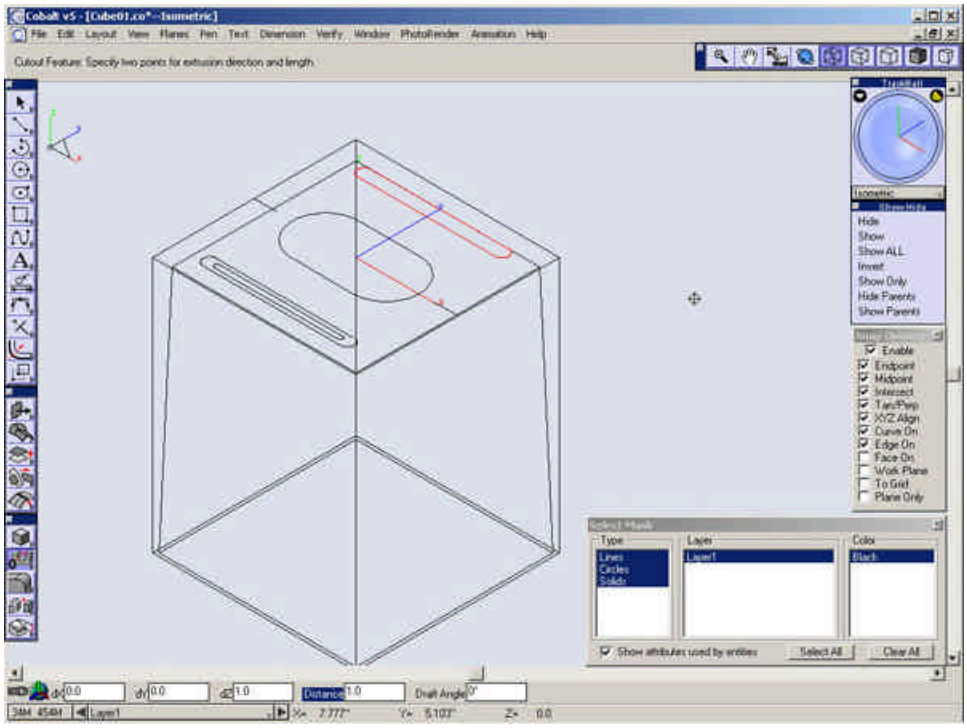
Select the **Cutout Feature** tool.



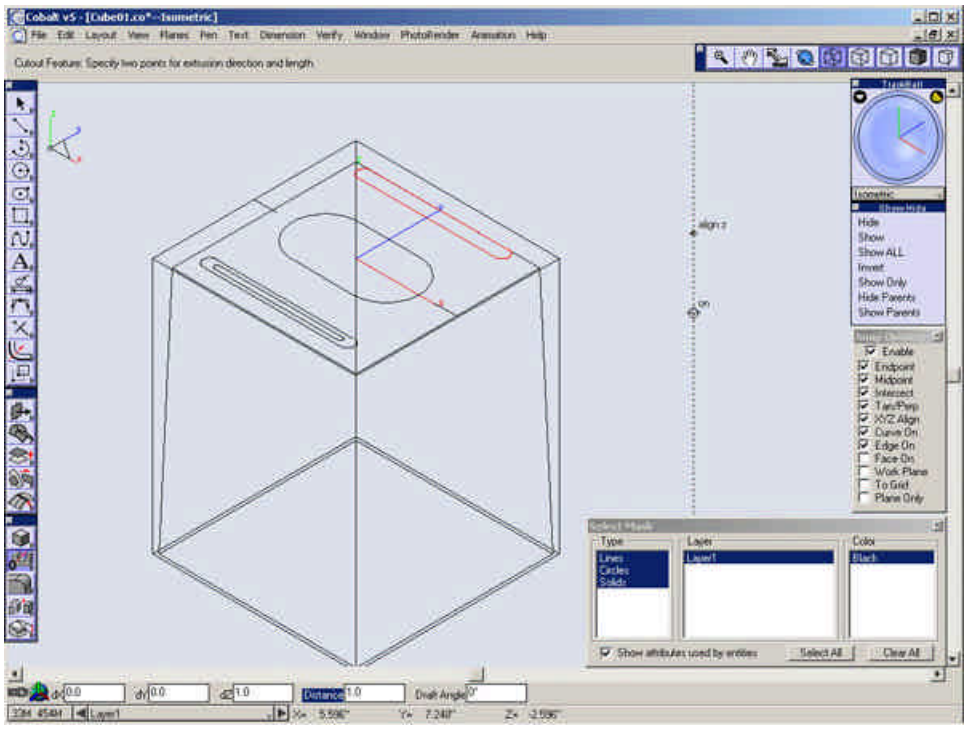
Select the "Stitch" Solid.



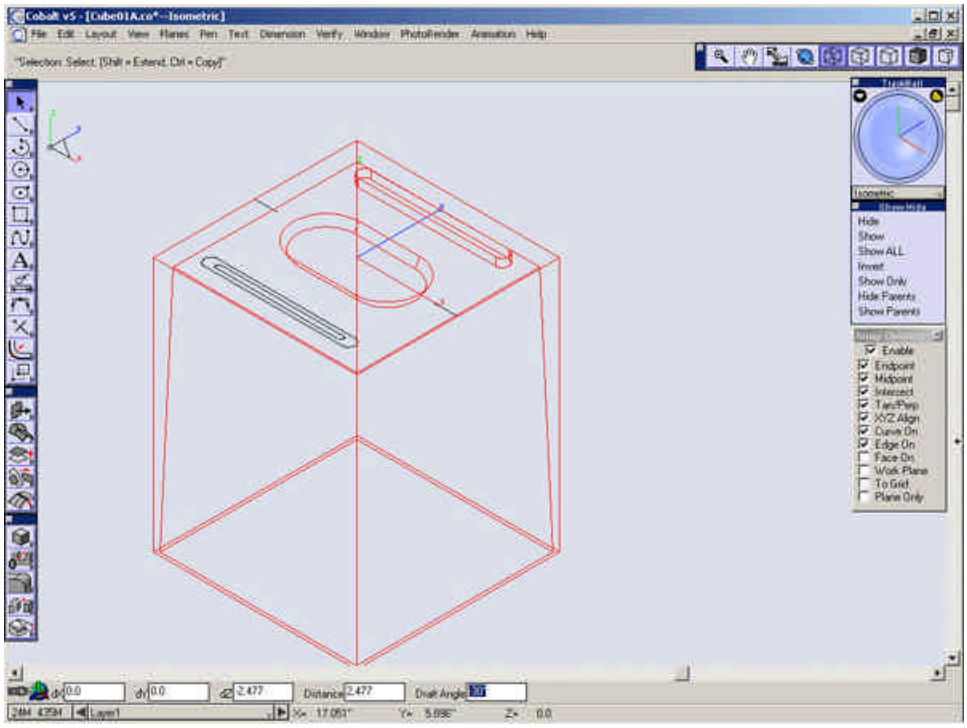
Chain Select the oval towards the rear of the model.



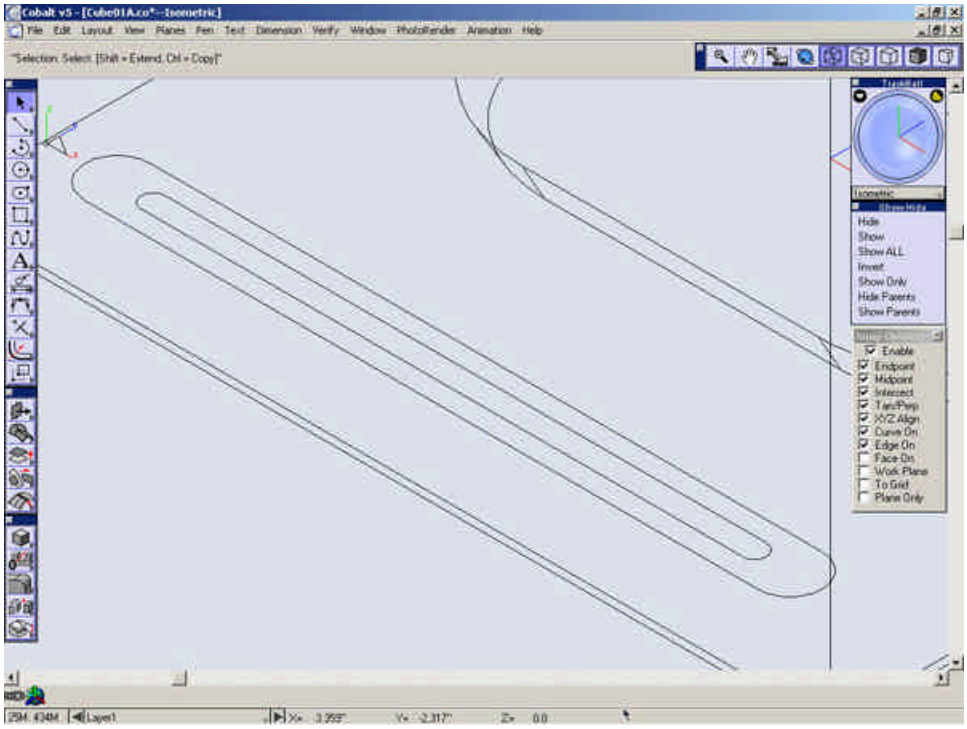
Make sure the **Work Plane** Snap is unchecked. Select one point is space then a second point down in the Z-direction to define the direction of the cutout.



Repeat this procedure with the same solid outer case and the oval shape in the middle of the model. This time, after you define the direction of the cutout, change the value in the **Draft Angle** field to **–30.**



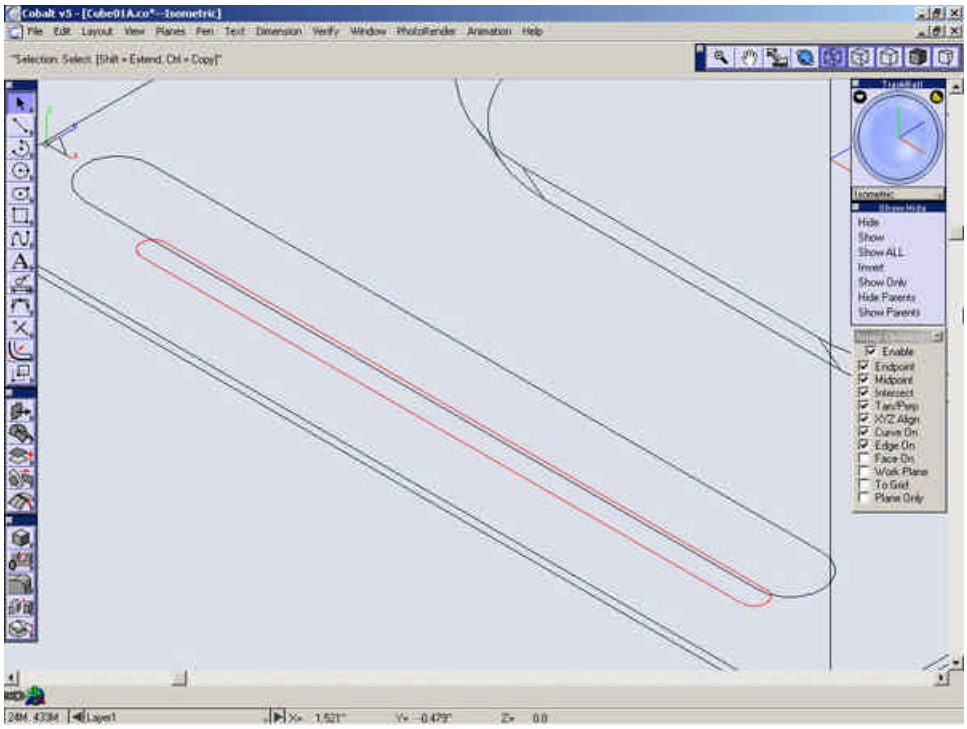
Zoom in on the other two oval shapes near the front of the model.



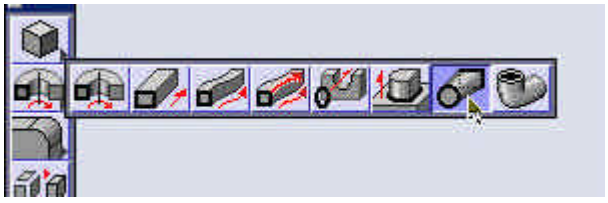
Select the **Move** tool.

Chain Select the inside oval shape.

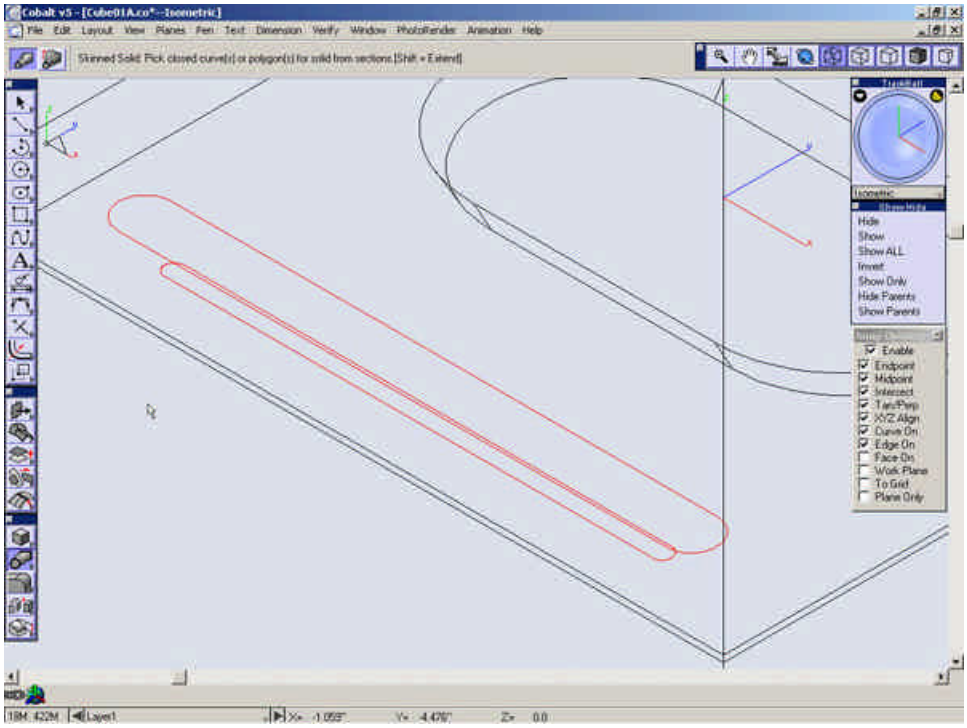
Move it down **"5/16"** in the Z-direction.



Select the **Skinned Solid** tool.



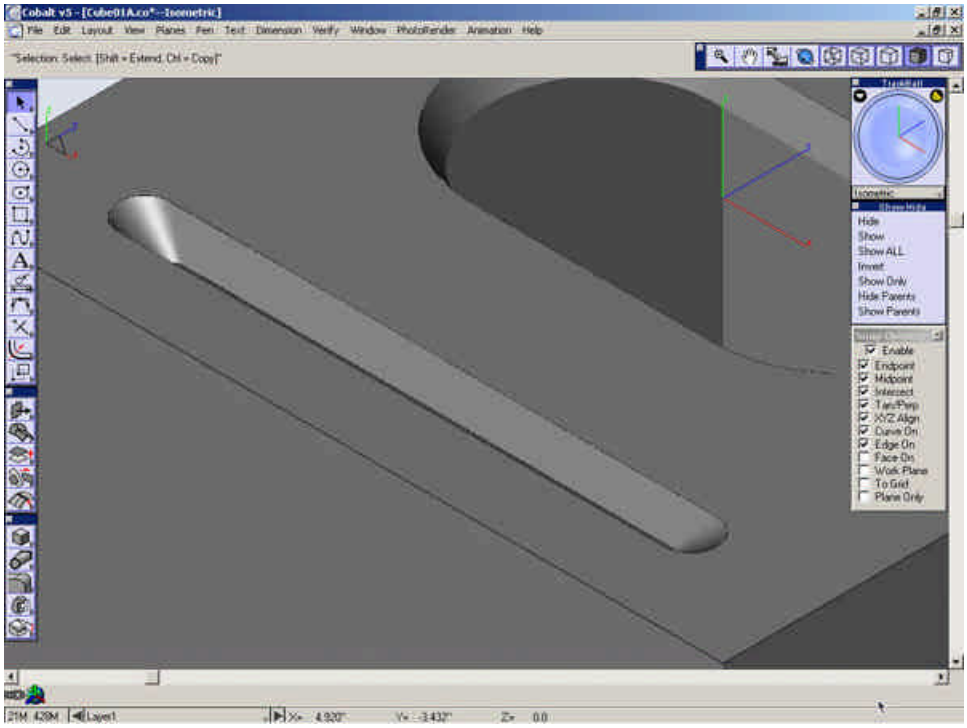
Select the two oval shapes for the profiles.



Select the **Subtract Solid** tool.

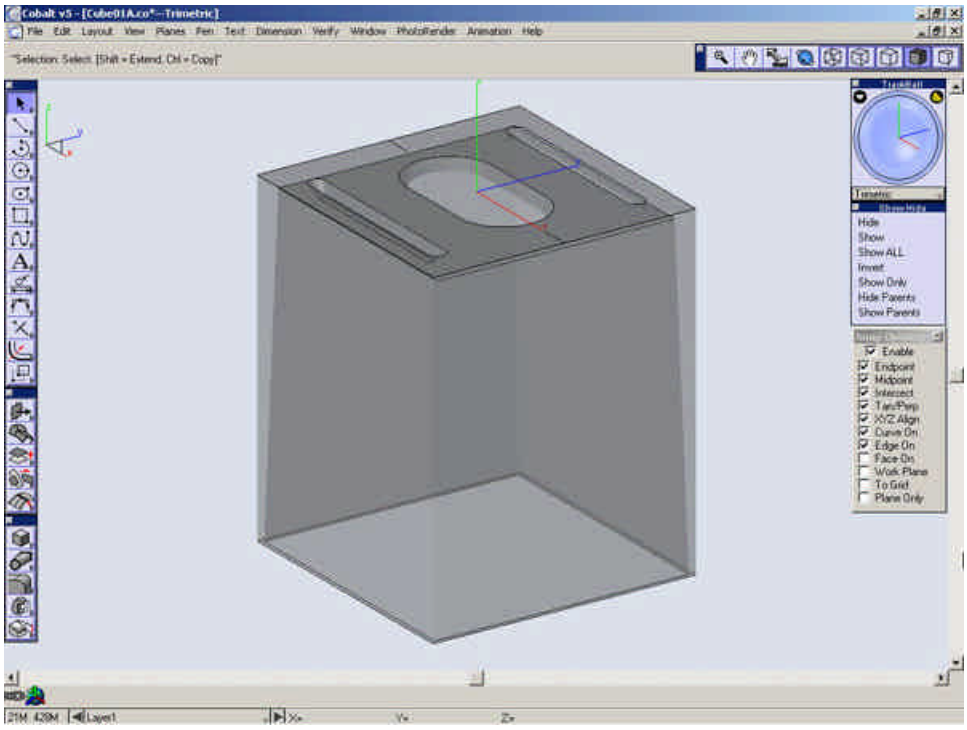
Select the large outer case first, then select the smaller section (the skinned solid) we just created.

Select shaded mode to see the results better.



Zoom All.

Right Click (Option-Click on Macintosh) on the case and select **Transparency.**



Save your file.

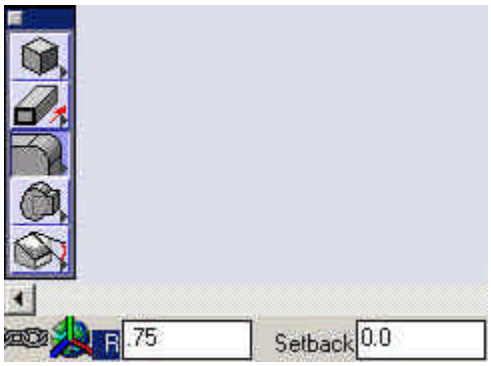
Click below to proceed to the next step.

Building the Outer Case 4

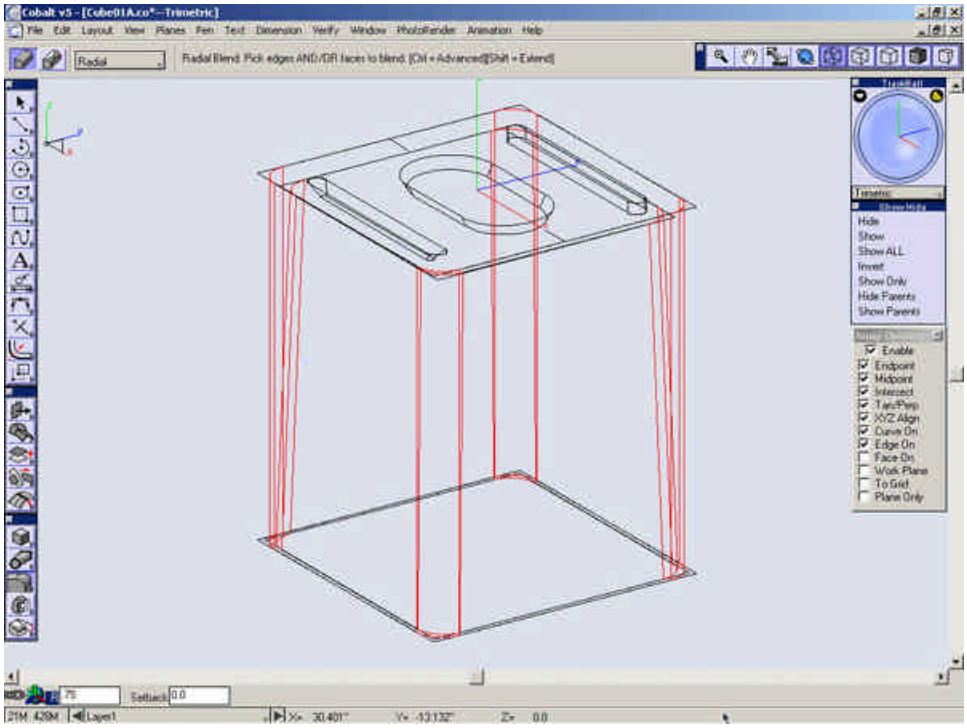
Creating the Outer Case 4

Switch back to wireframe.

Select the **Radial Blend** Tool and set the **R** (radius) value to **.75**.

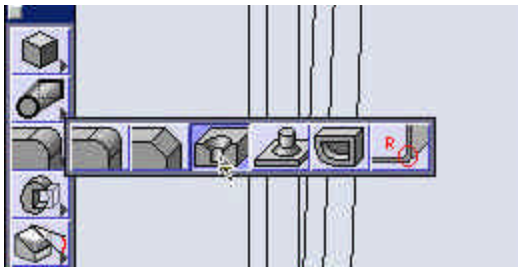


Select the four outside corner edges and the four inside corner edges to blend them (One at a time or all 8 edges at once.)



Zoom in on the top face.

Select the **Hole** tool.

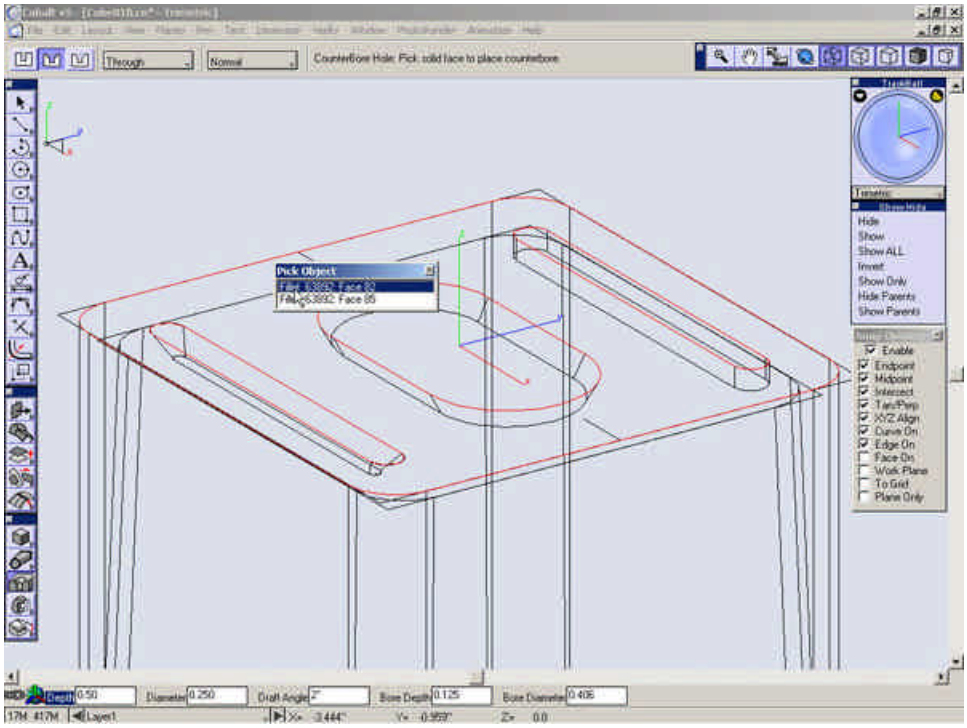


Select the **Counter bore** option and **Through** for the depth.

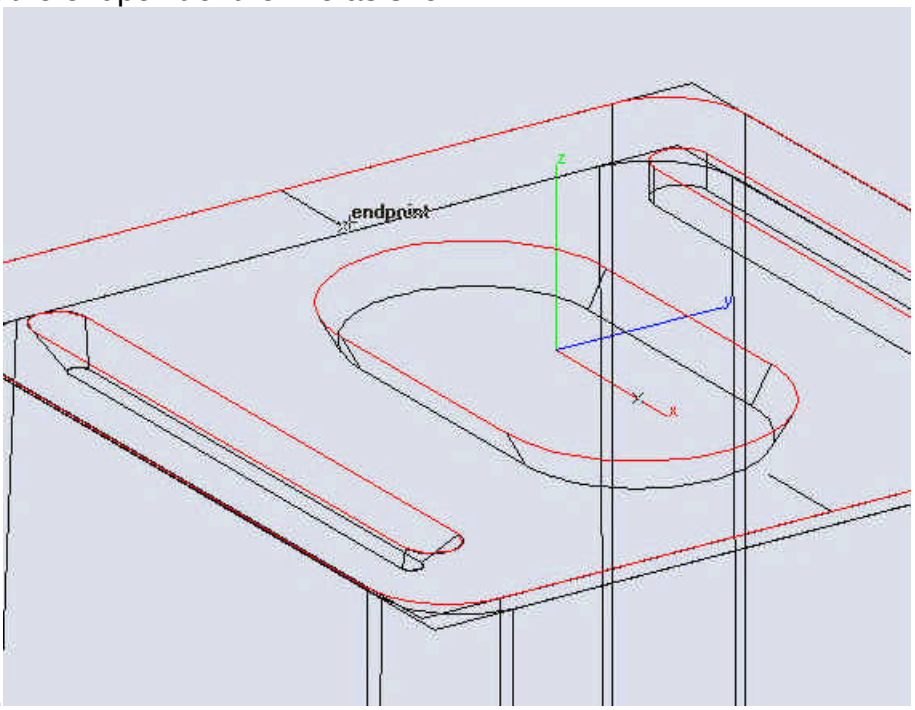
Set the fields to the following: (We don't have to worry about the first "Depth" field since we set the option in the message window to "Through".)

Diameter = **1/4"**
Draft Angle = **2"**
Counter bore Diameter = **13/32”**
Depth = **1/8”**

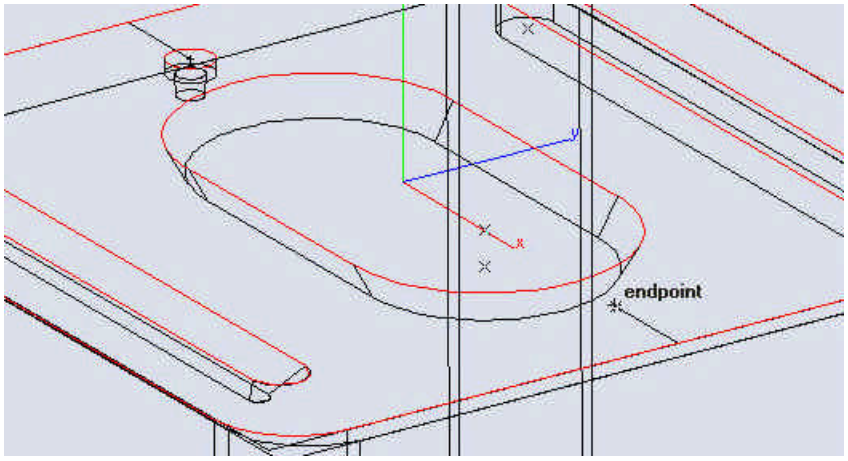
Select the top face of the case.



Select the endpoint of the line as shown below.



Repeat this for the endpoint of the other line to create another hole.

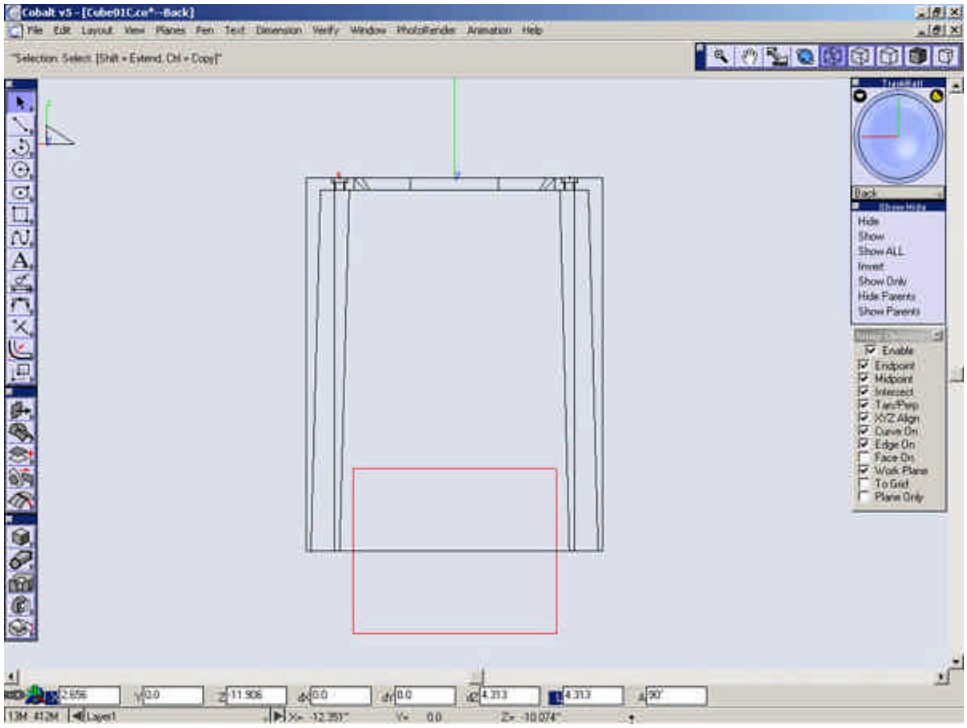


Switch to the **Back** View and Zoom All.

Turn the **Work Plane** snap ON.

Select the **Rectangle** Tool.

Draw a rectangle with the center at the midpoint of the bottom of the case. **W = 5 5/16” L = 4 5/16**

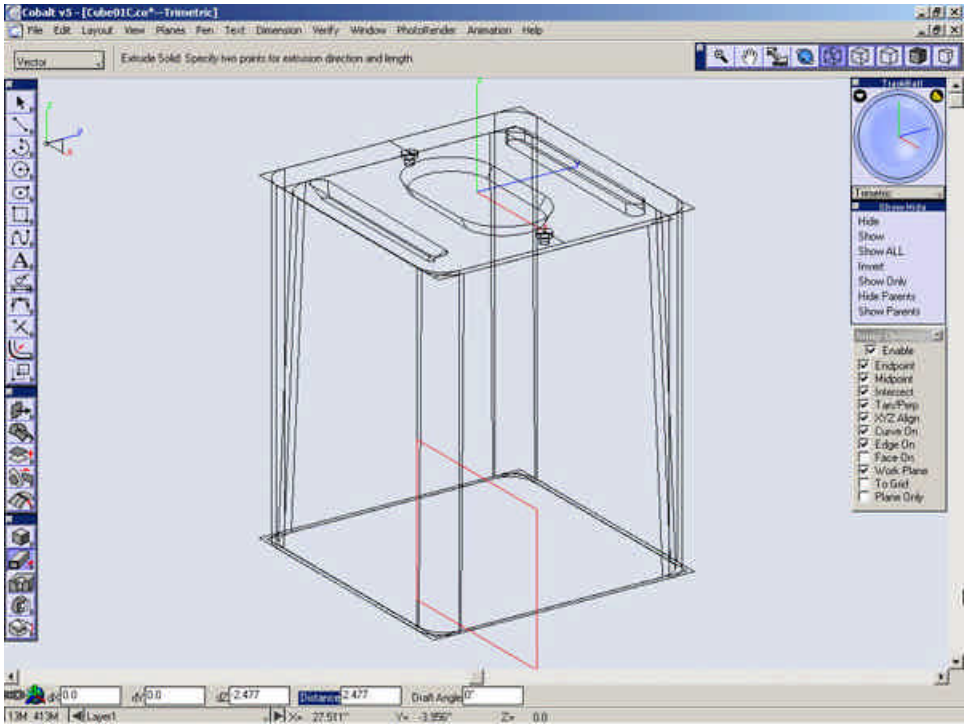


Switch to **Trimetric** View.

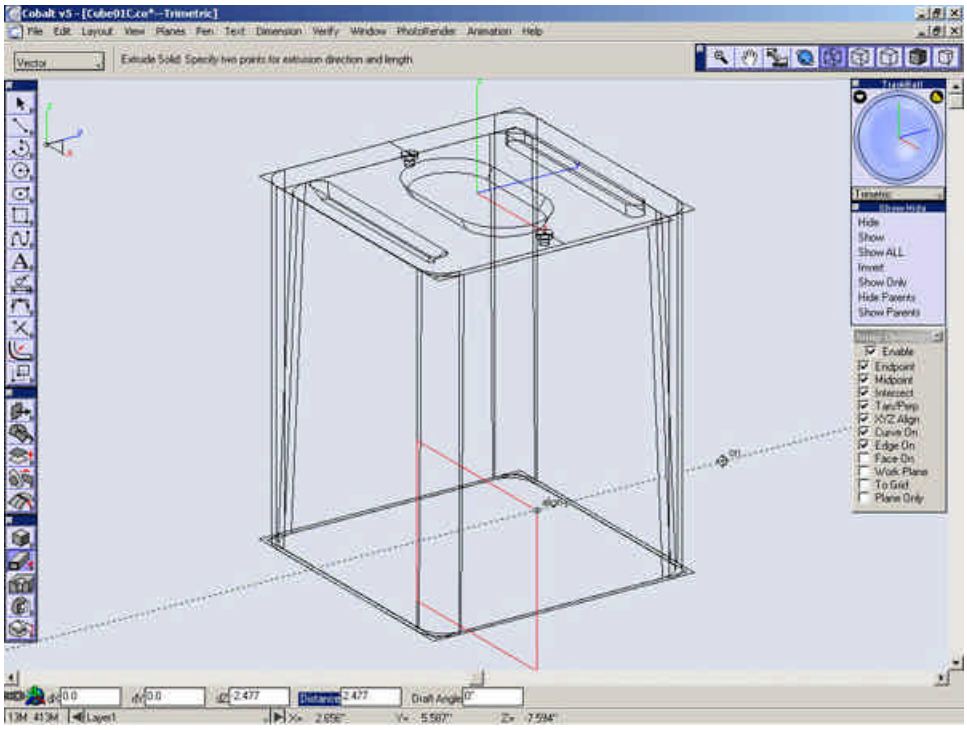
Turn the **Work Plane** snap OFF.

Select the **Extrude Solid** tool.

Select the Rectangle that was just created.

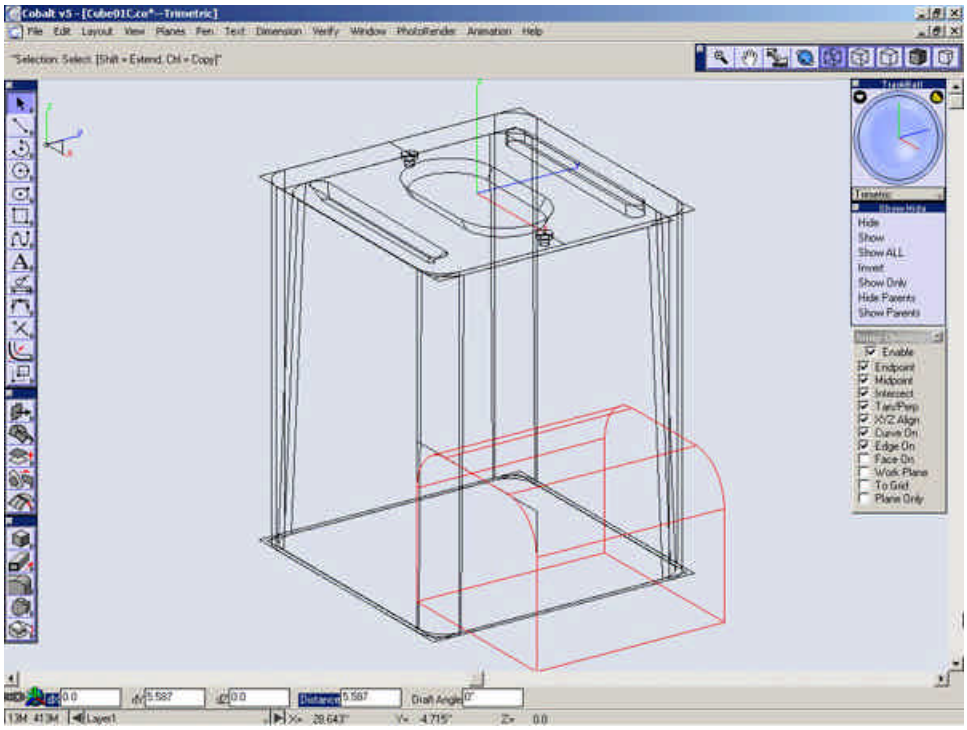


Extrude the rectangle back along the Y-Axis.

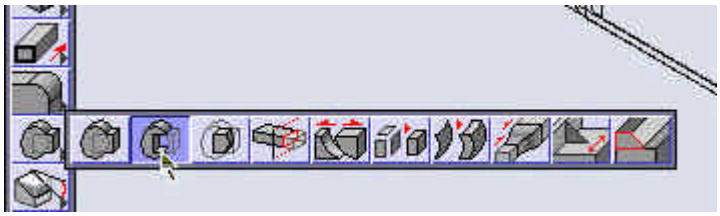


Select the **Radial Blend** tool and set the **Radius** to **1.25**".

Select the top two edges of the block.



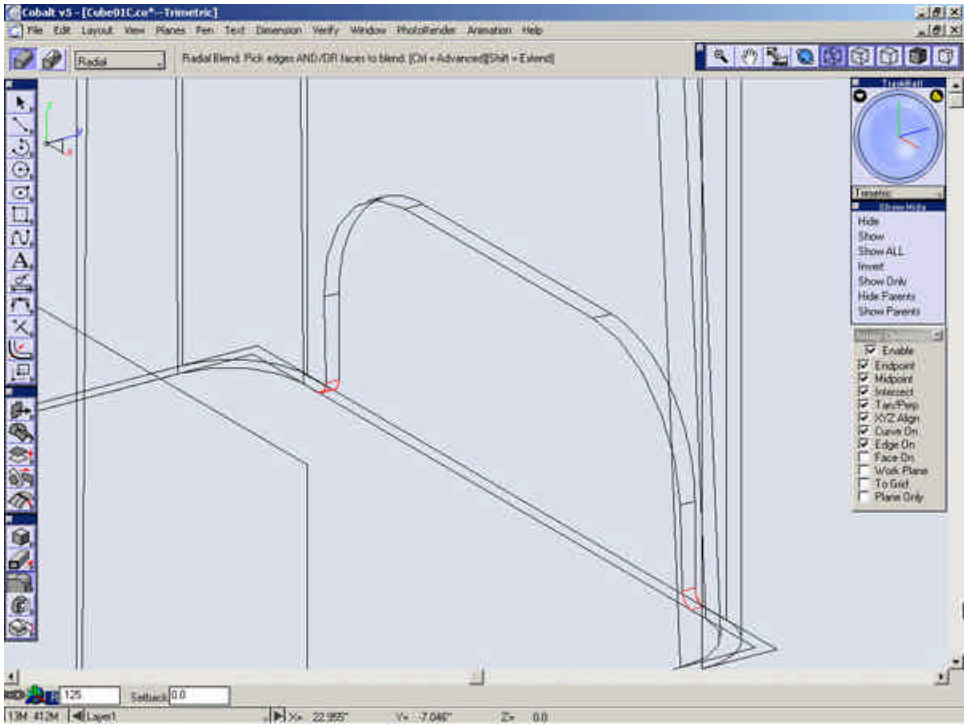
Select the **Subtract Solid** tool.



Select the case first then the blended block.

Zoom in on the lower area of the outer case and select the **Radial Blend** tool again and set the **Radius** to **.125”**.

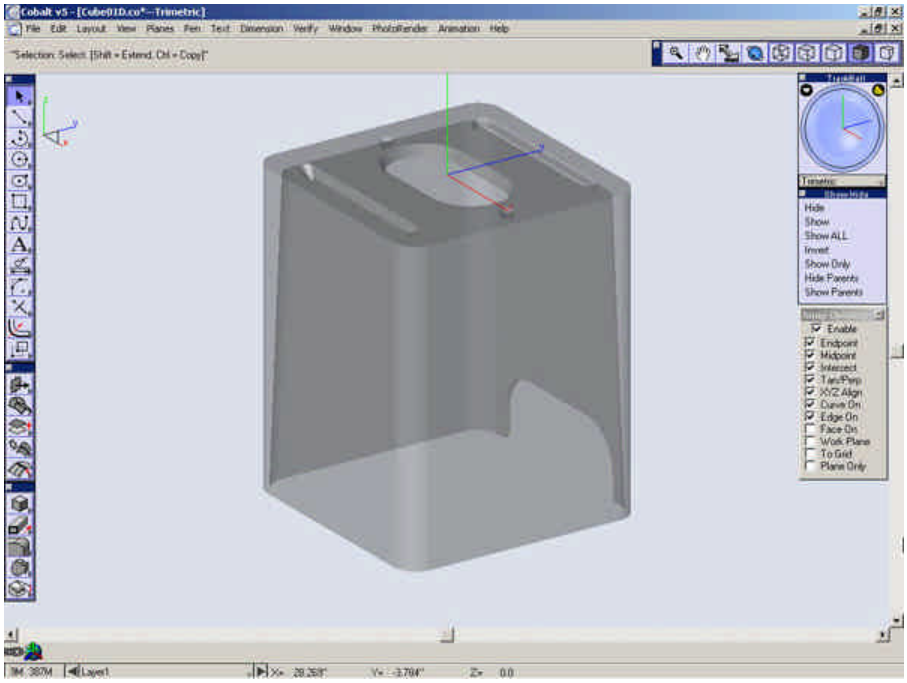
Select the bottom edges of the case to blend them.



Zoom all.

Select the case with the **Select Tool** and select **Show Only** from the Show-Hide Palette.

Switch to shaded mode.



Save the file.

This completes the modeling of the outer case.

Using the Layer Manager and Building the Posts

Posts

This small section describes how to create the aluminum posts on the top of the model. We have already made room for them when we built the outside case.

Now seems a good time to discuss better organization of our model. Ashlar-Vellum provides the user with layers in which to organize their work. These layers are all controlled through the layer manager. With the Layer Manager the user can create, edit, move and perform many other functions to layers within the model.

Open the Layer Manager by selecting ***Layout>Layer Manager***.

You will notice that the layer named "Layer 1" has a small pencil icon next to it. This is the indication that "Layer 1" is the current layer. While "Layer 1" is current, all geometry created is put on Layer 1. Since we are beginning a new part to our model it is a good time to make a new layer for it to go one. (Putting separate parts on different layers is by no means mandatory, but it does make the model drastically easier to manage.)

Select the "Create a new Layer" icon.

Right-click (Option-Click) on the new layer (Layer 2) and select **Rename**.

Rename the layer to "Posts."

Rename "Layer 1" to "Outside Case."

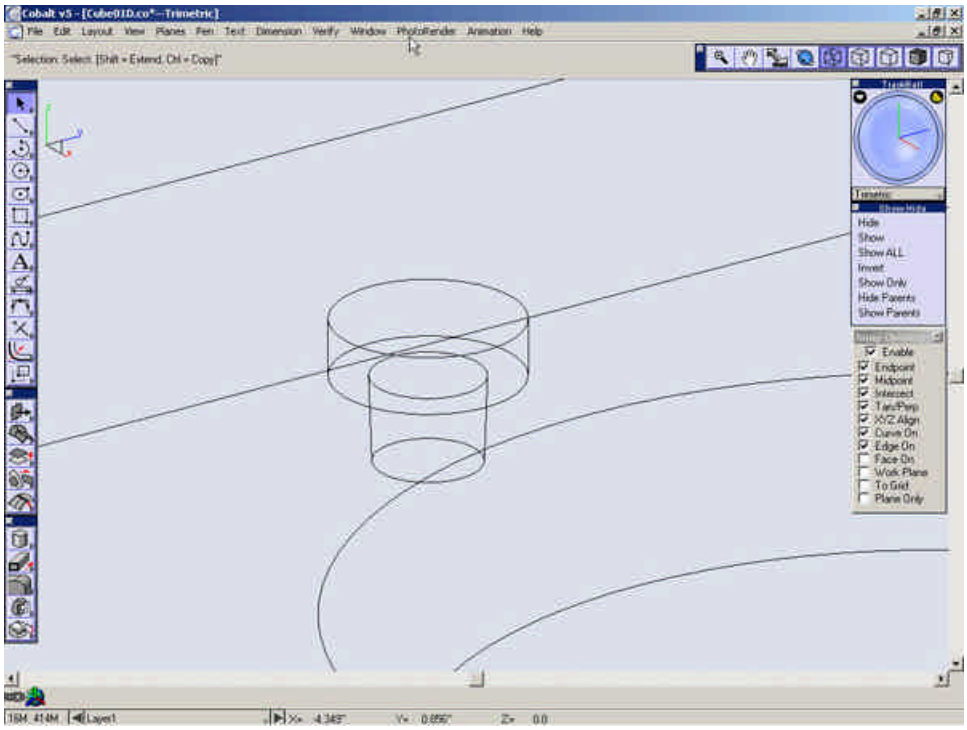
Make the "Posts" layer current by clicking in the leftmost box.

That is all that we need so with Layer Manager for awhile so we can just close it to free up space on the screen.

Building the Posts

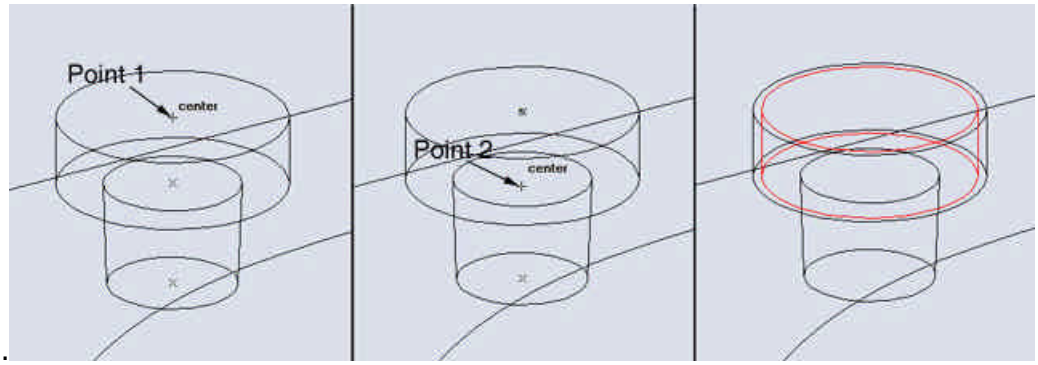
Building the Posts

Zoom in on the hole on the left side of the case and ensure that the **Work Plane** snap is off.



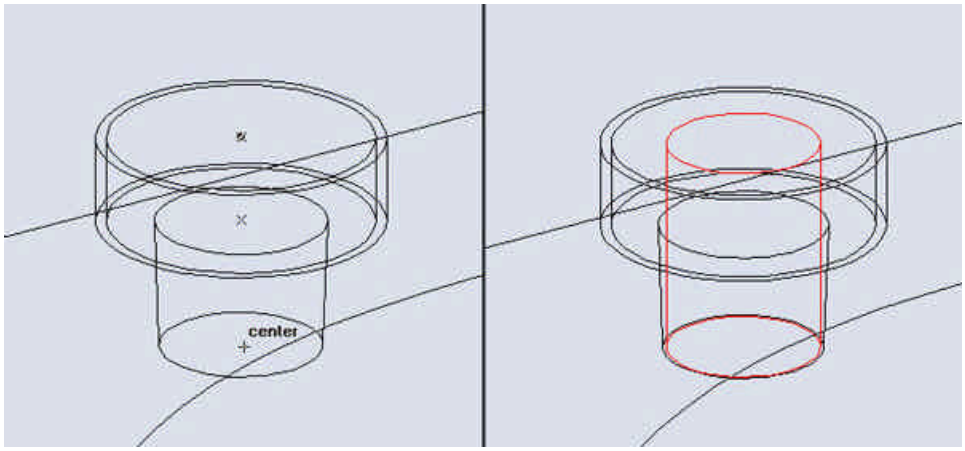
Select the **Cylinder Primitive** tool. Enter **3/8”** for the **D** field (Diameter).

Select the center of the top of the counter bore for the start of the cylinder and the center of the bottom of the counter bore for the end.



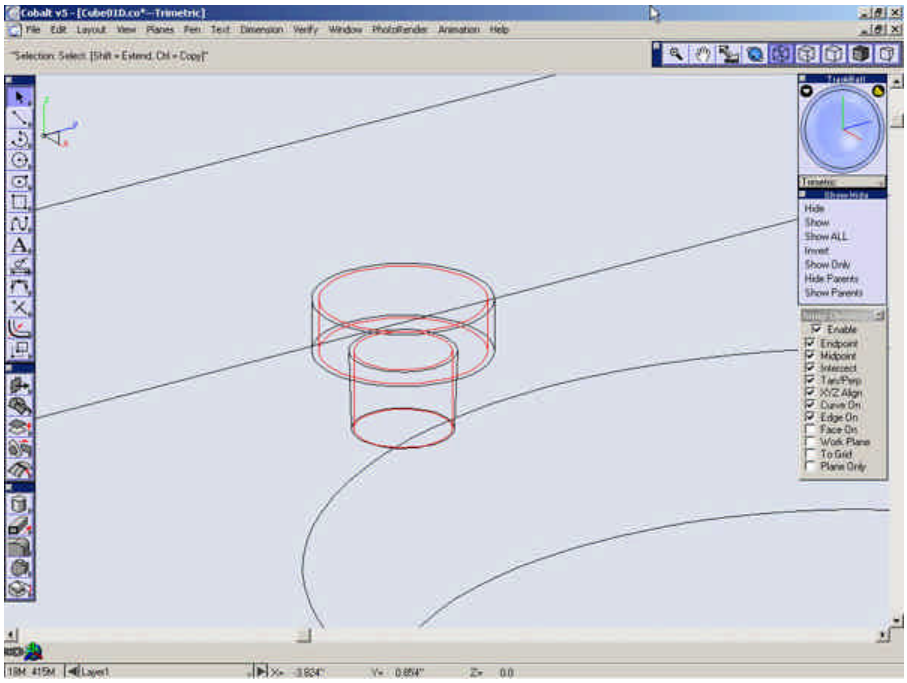
Create another cylinder with the same start point and place the endpoint at center of the bottom of the hole.

Change the diameter to **7/32"**

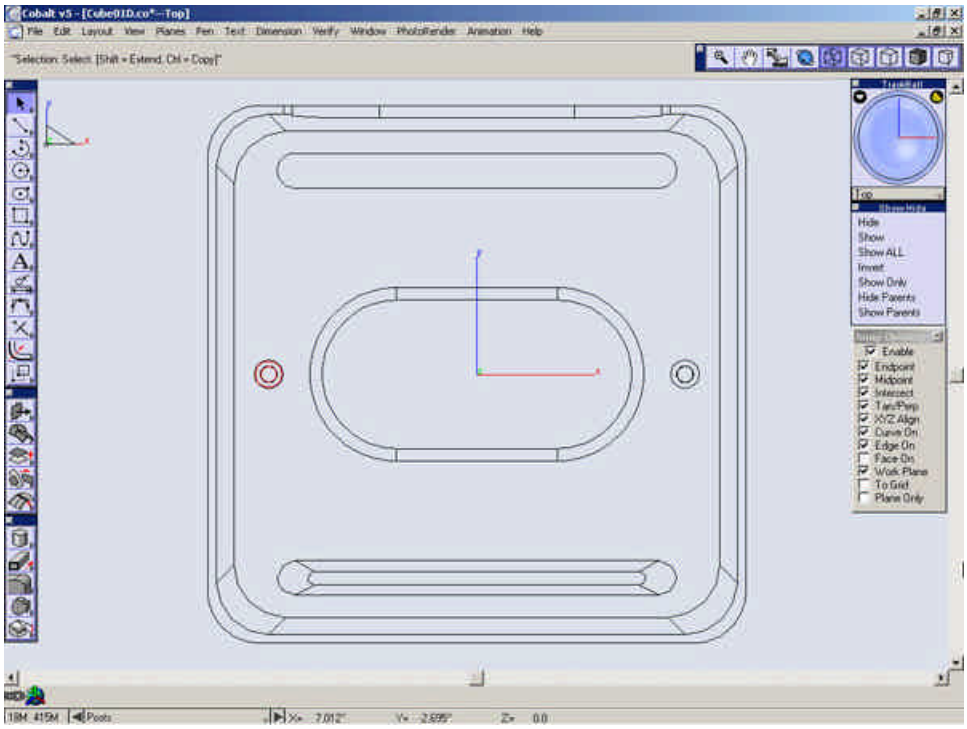


Select the **Union Solid** tool.

Union the two cylinders.



Go to the **Top** View and **Zoom All** and turn the **Work Plane** snap on



Select the **Select** Tool.

Select the post you just created and drag a copy of it to the center of the other hole.

Save your file.

Creating the Inside Case

Building the Inside Case

This section describes how to create the inside case of the model. To do this, we will use one of the many advantages of the Ashlar-Vellum modeling environment. All geometry and all parts within the model are created in the same window. There isn't a separate part and assembly mode. This makes it very easy to reference geometry on existing parts.

From time to time, we will be referencing and building new geometry based on the outer case. Even though we need the outer case available, we do not necessarily want the case around all the time. A solution could be to use the outer case when we need then open the layer manager, turn off the the outer case layer then close the layer manager to get it out of the way. Luckily, Ashlar-Vellum Software has provided a much more efficient solution, the Show-Hide Palette.

The Show-Hide palette allows the user to quickly hide individual objects temporarily. Moreover, it takes up minimal space on the screen so that it can be left open.

Click below to proceed to then next step.

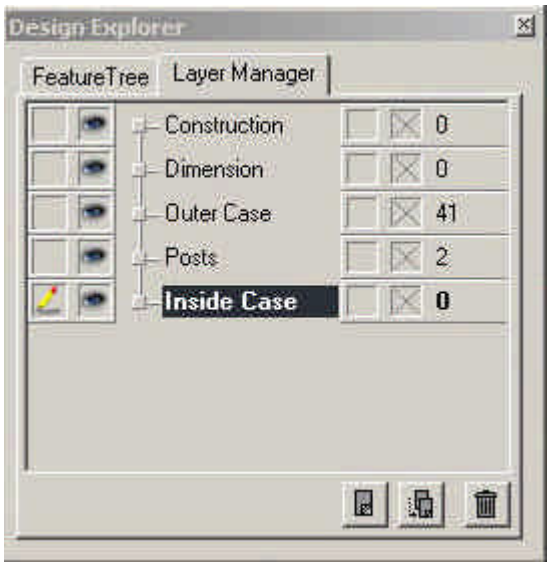
Building the Inner Case

Building the Inside Case

Since we will be once again creating a new part to our model, we will create a new layer for it to be put on.

Open Layer Manager.

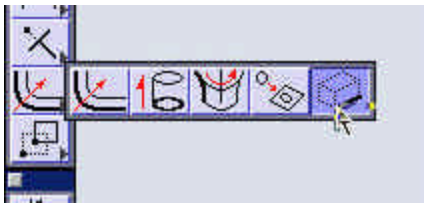
Create a New Layer. Rename it "Inside Case", make it current and turn off the "Posts" Layer.



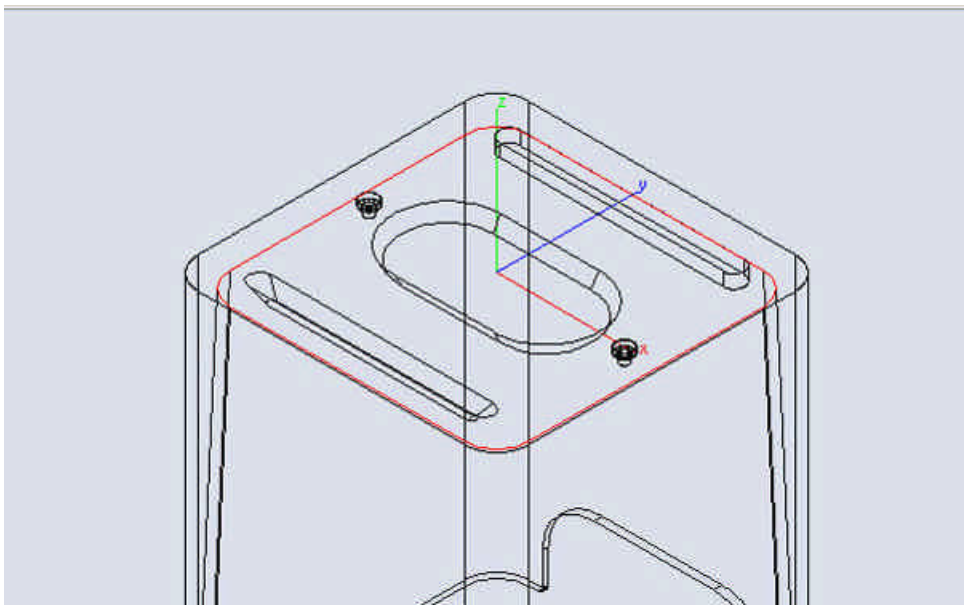
Close the Layer Manager.

Go to the **Trimetric** View.

Select the **Explode Edge** tool.

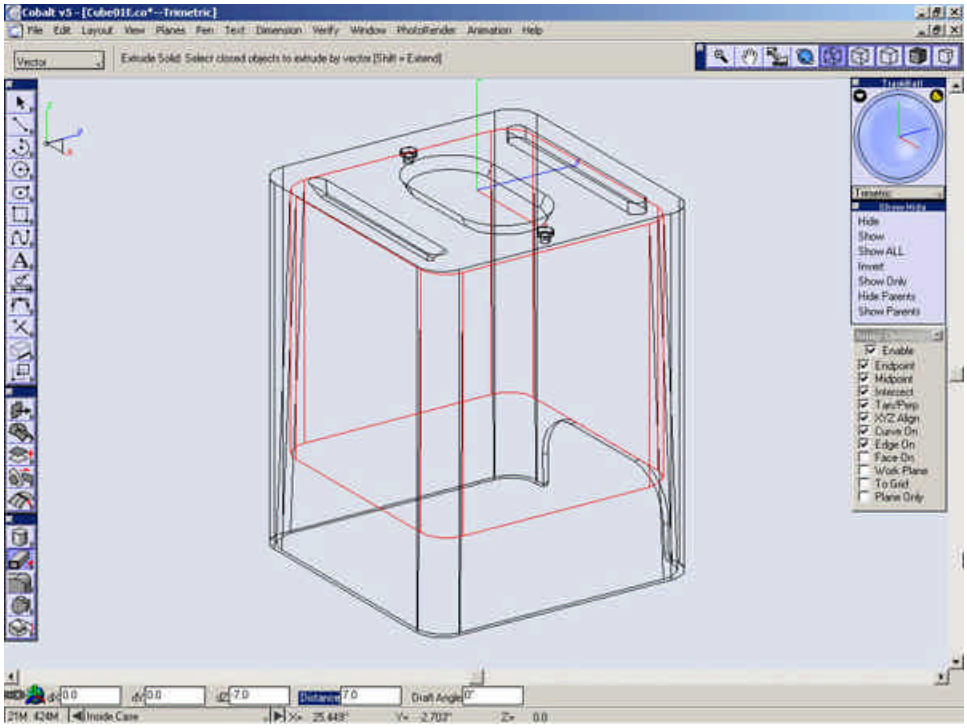


While holding Shift, explode the inside edges of the bottom of the Top section of the case as shown below.



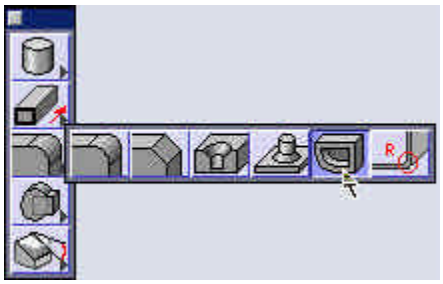
Select **Extrude Solid** tool.

Select the exploded lines and extrude them down **7”**.

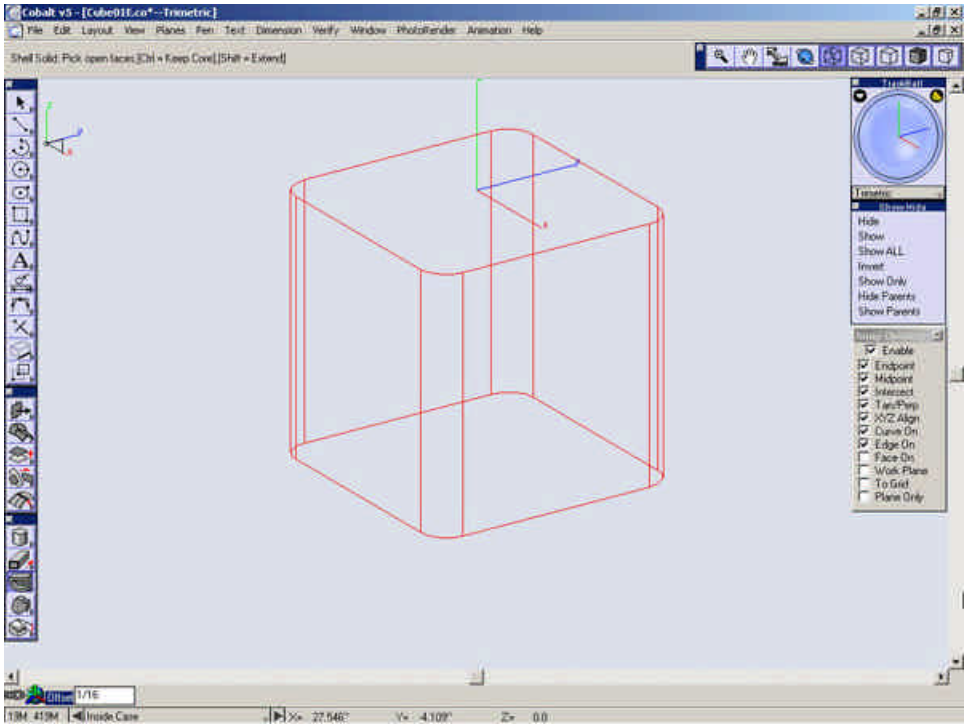


Hide the Outer Case.

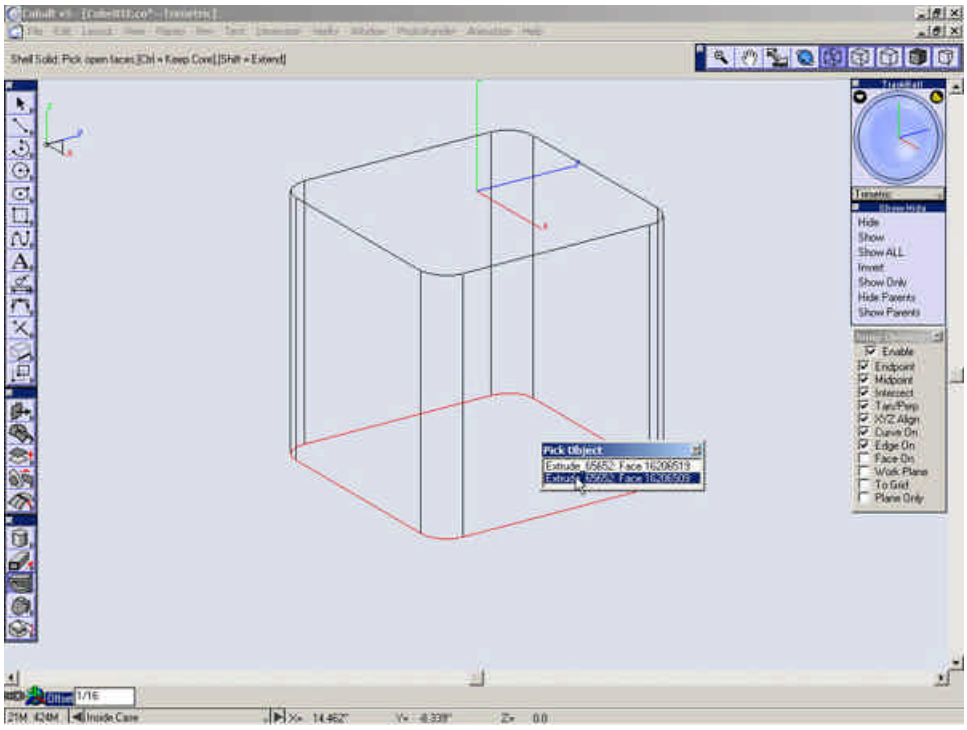
Select the **Shell Solid** tool.



Set the Offset value to **1/16”** and select the Extrusion.

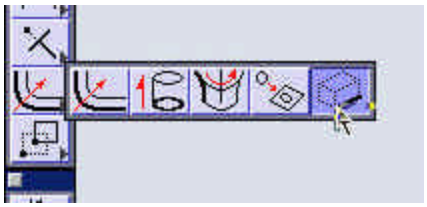


Select the bottom face to be open.

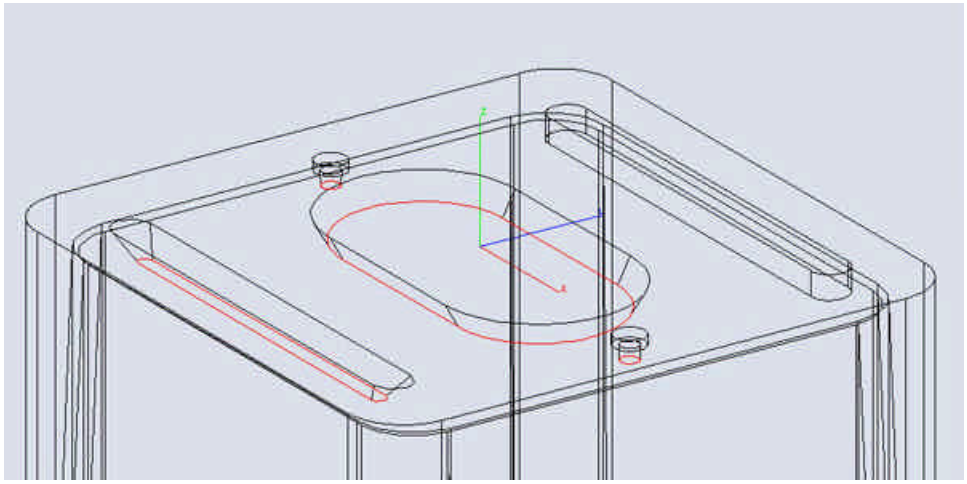


Show the outer case.

Select the **Explode Edge** tool.



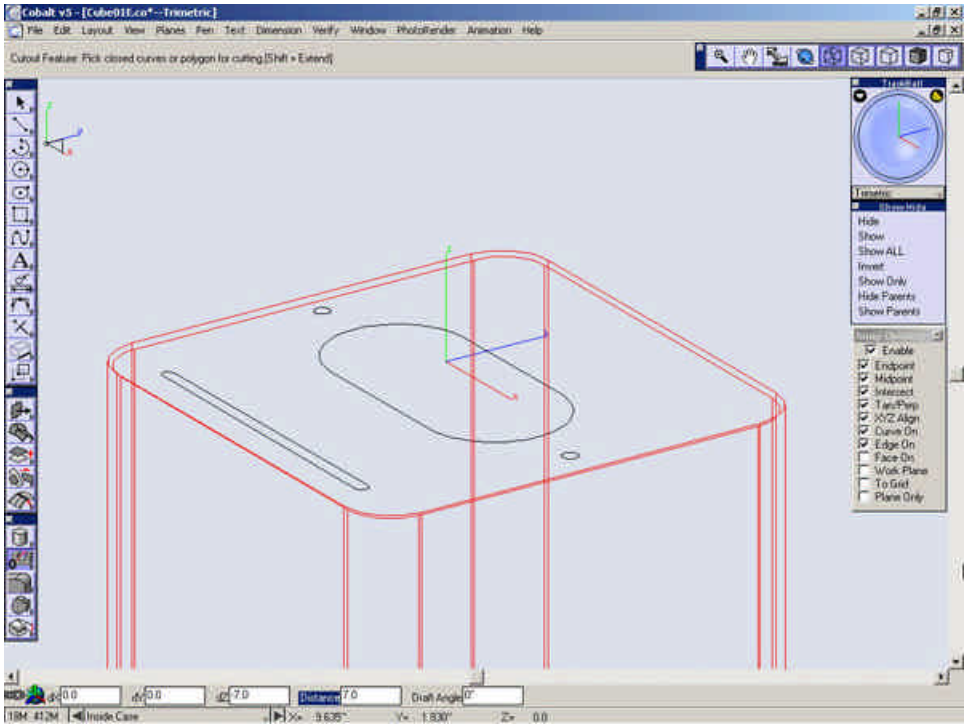
Zoom in and explode the edges shown below.



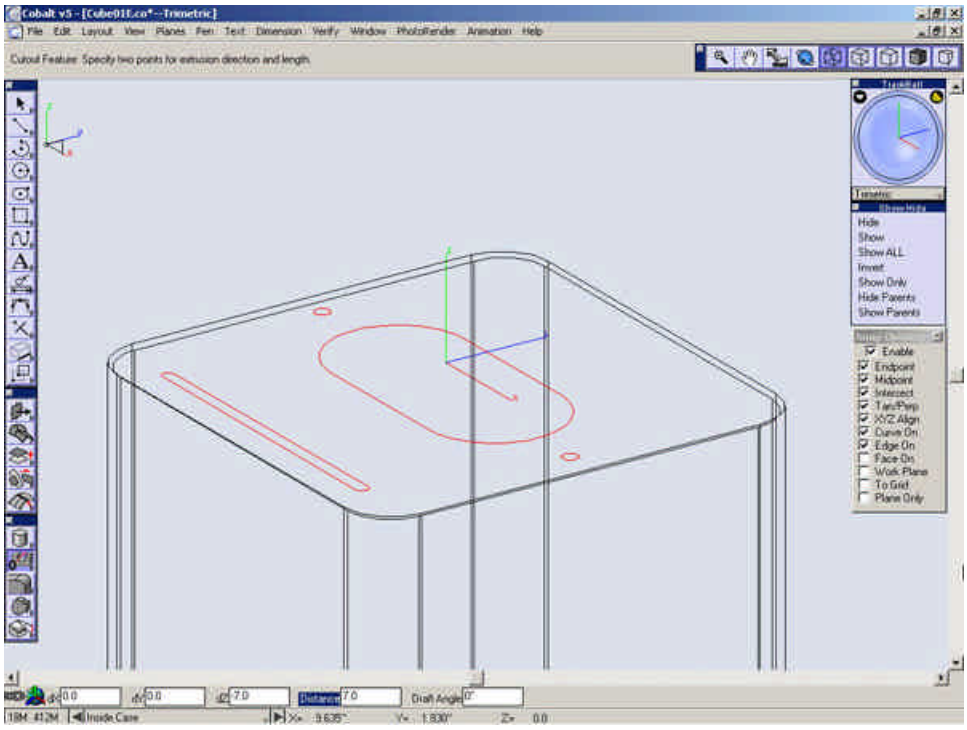
Hide the Outer Case.

Select the Cutout Feature Tool.

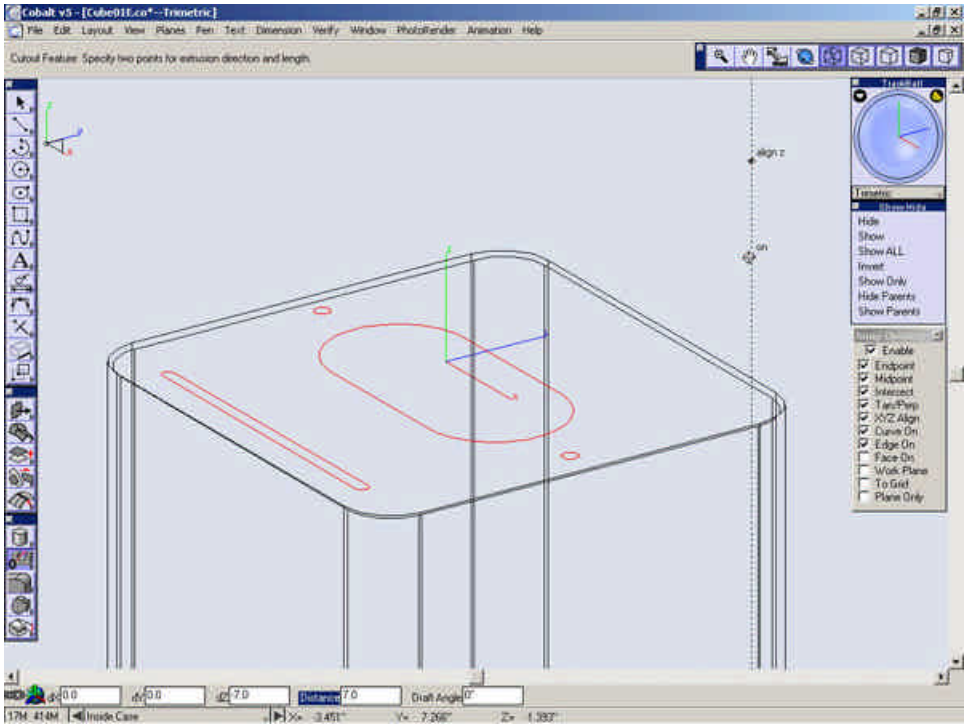
Select the inner case.



Select the edges you just exploded.



Choose a point in space and another point down along the Z-axis.



Click below to proceed to the next step.

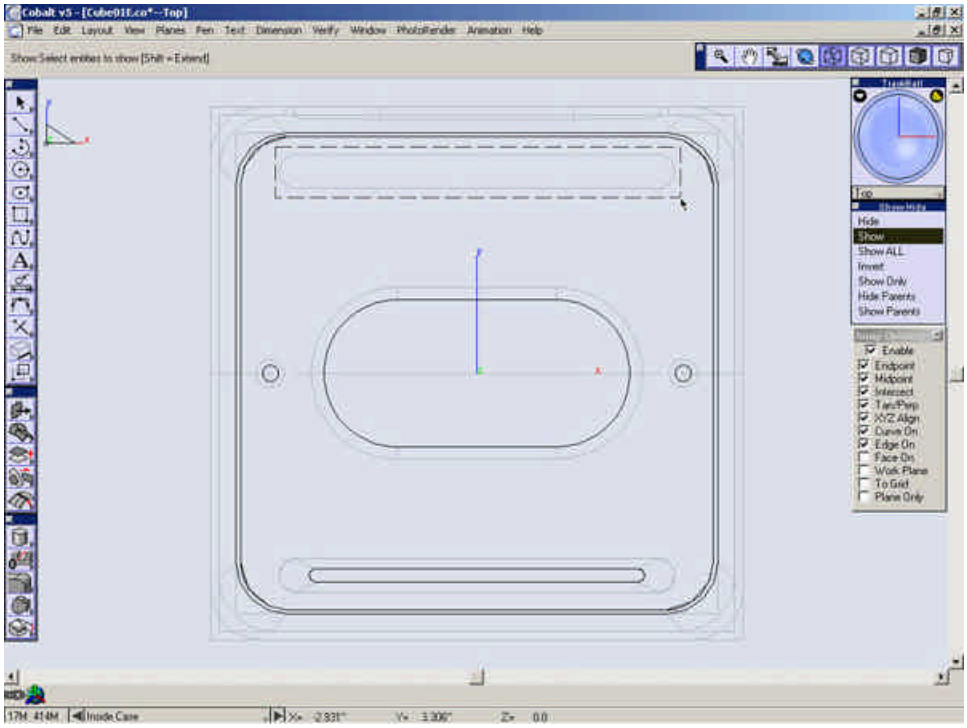
Building the Inside Case 2

Building the Inside Case 2

Go to the Top View.

Select Show from the Show-Hide Palette.

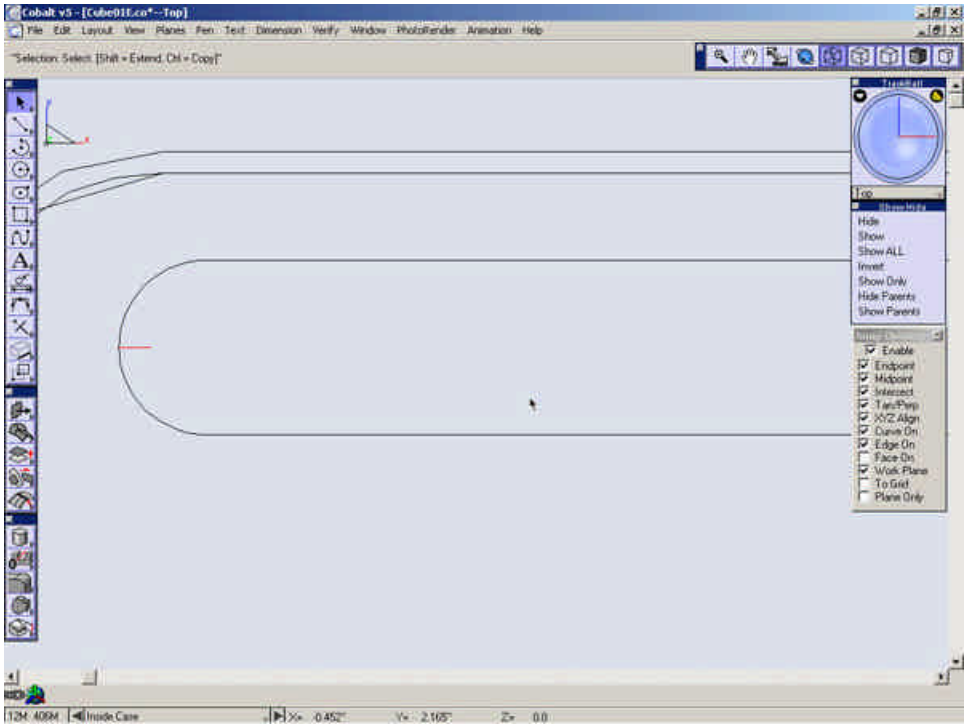
Select the lines and arcs that make up the oval towards the top of the screen.



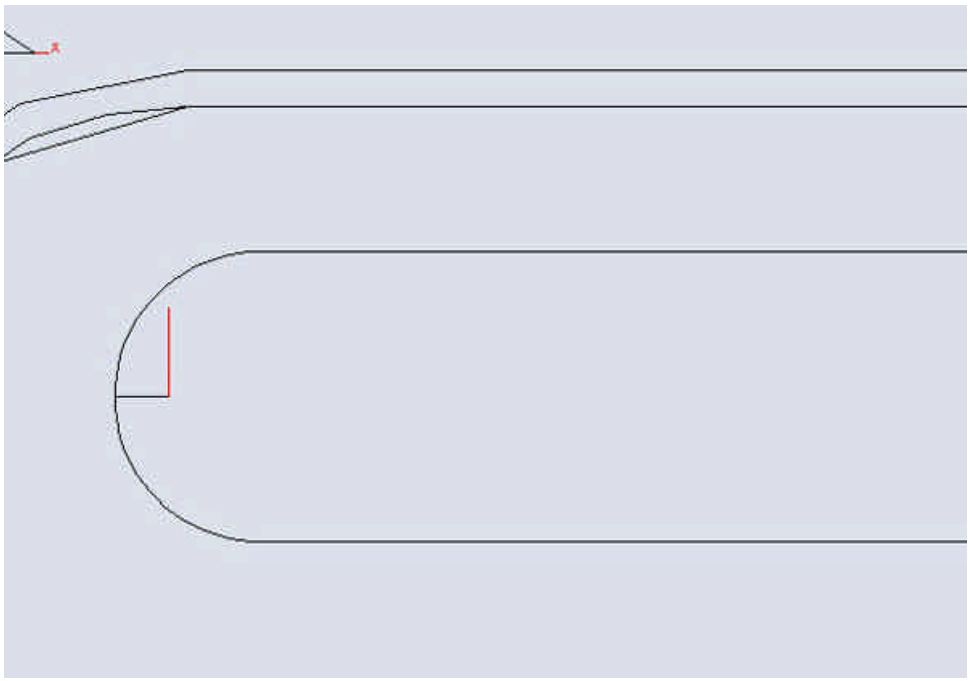
Zoom in on the upper oval.

Select the Line Tool and turn on **Work Plane** snap.

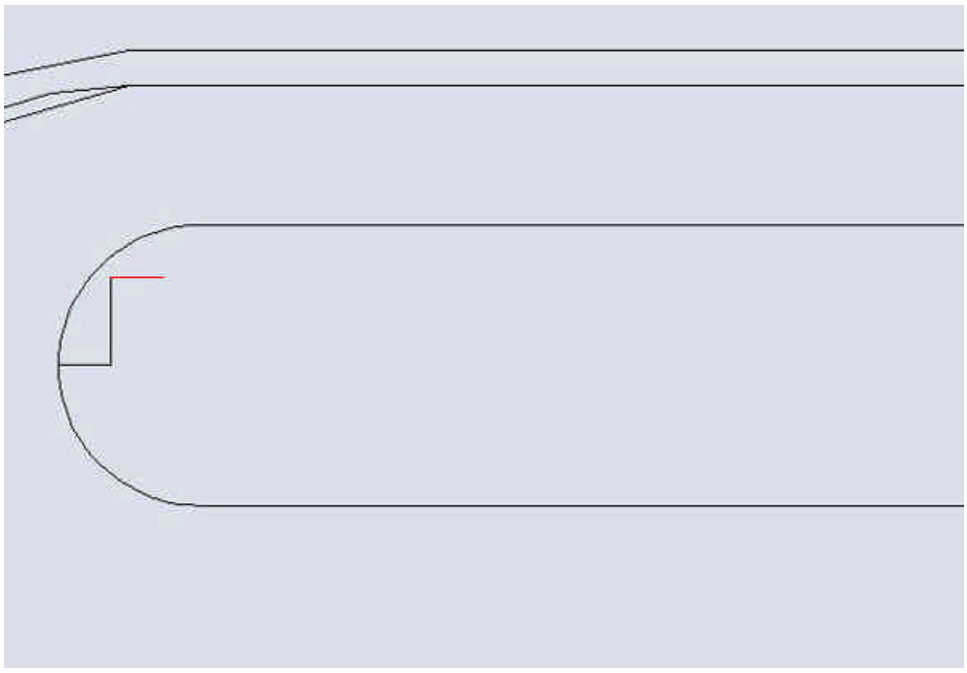
Create a line from the left quadrant to the right **3/32”**.



Draw a line from the endpoint of that line up **5/32”**.

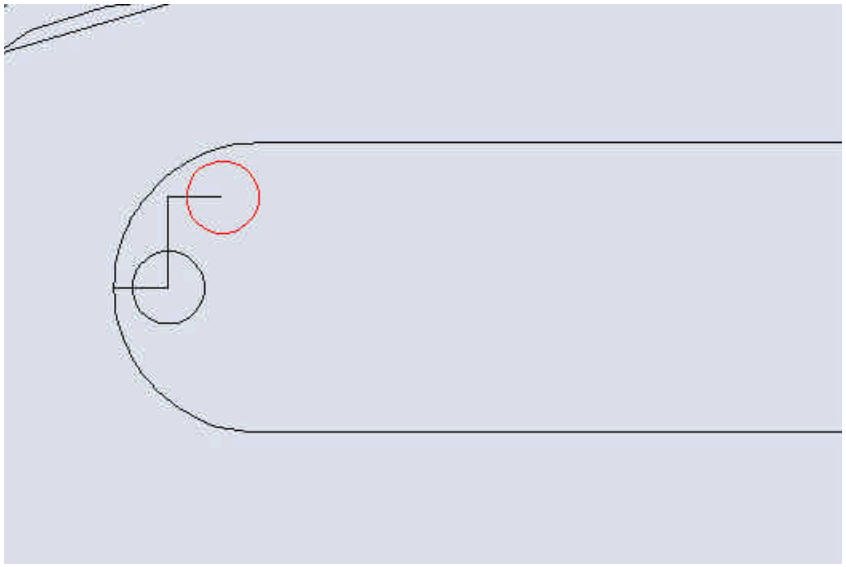


Draw a line from the endpoint of that line to the right **3/32”**.

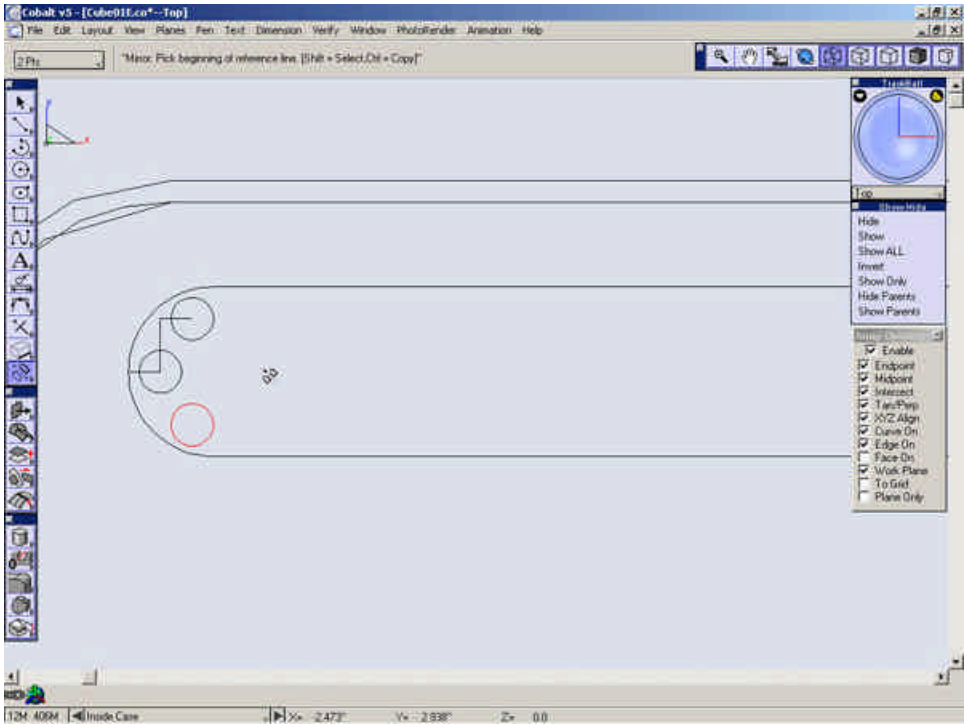


Select the circle tool.

Create two circles with diameter **1/8”** at the points shown below.



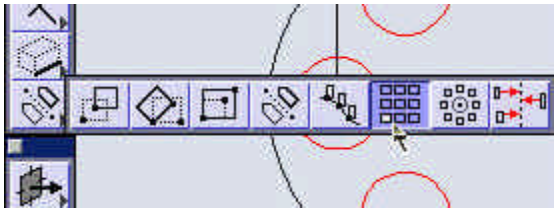
Mirror a copy of the top circle to the other side.



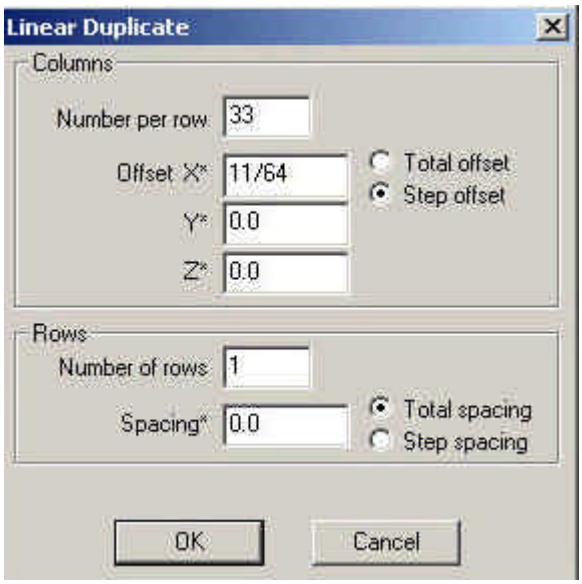
Select the **Select** Tool.

Select the three circles.

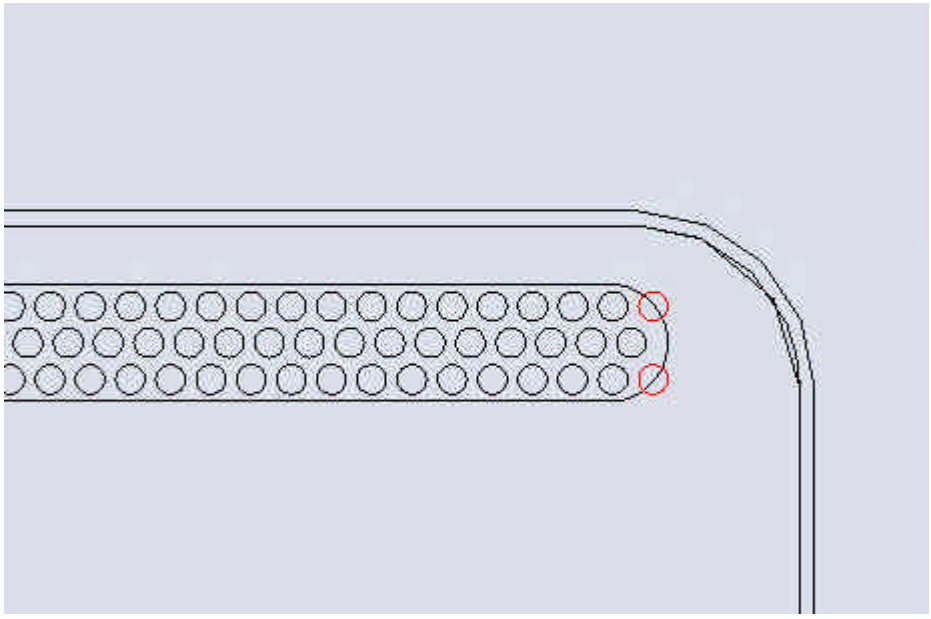
Select the Linear Duplicate tool.



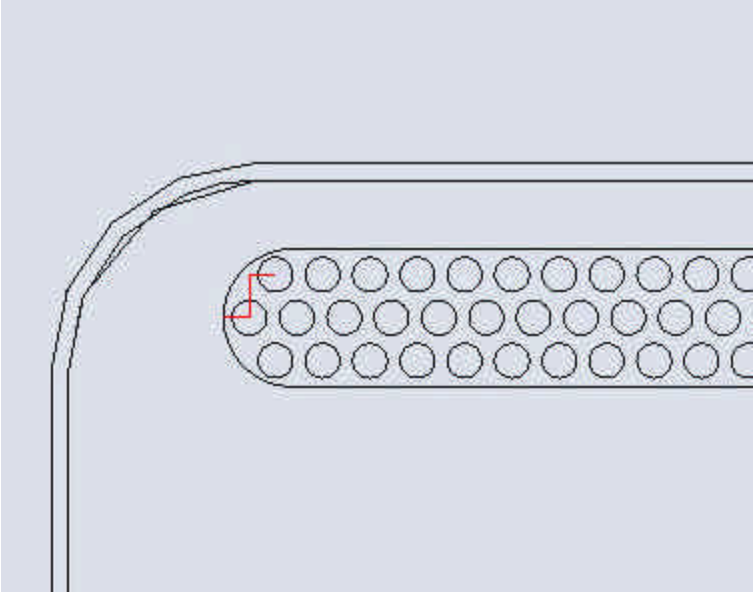
Fill in the values in the window as shown below and select OK.



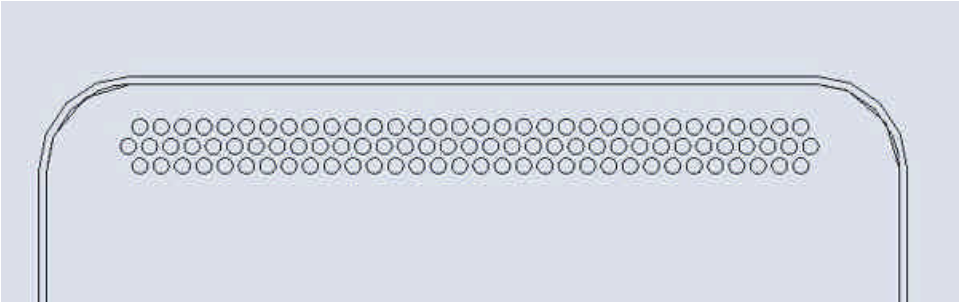
Delete the two circles that extend beyond the oval.



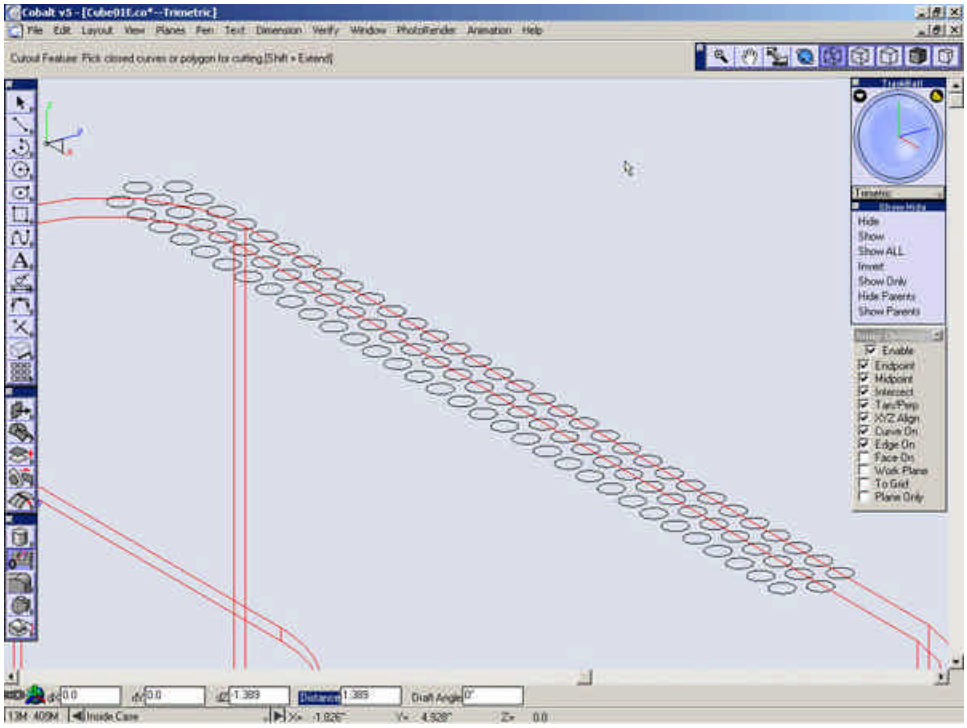
Delete the small lines that you created.



Hide the oval shape.

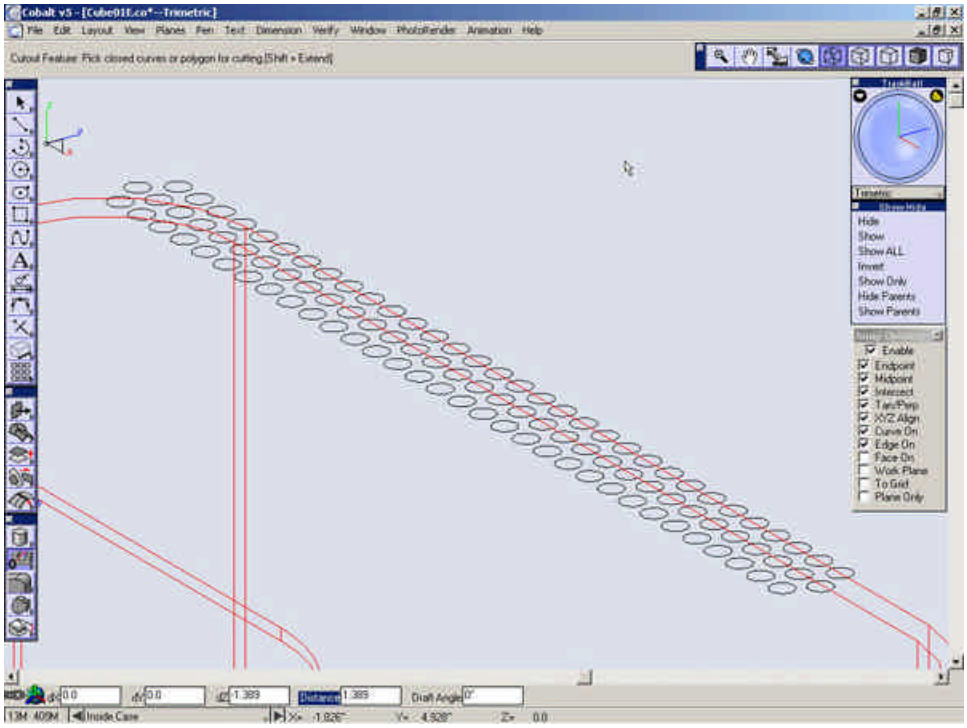


Go to the Trimetric View and Zoom in on the circles.



Select the Cutout Feature Tool and turn off the **Work Plane**.

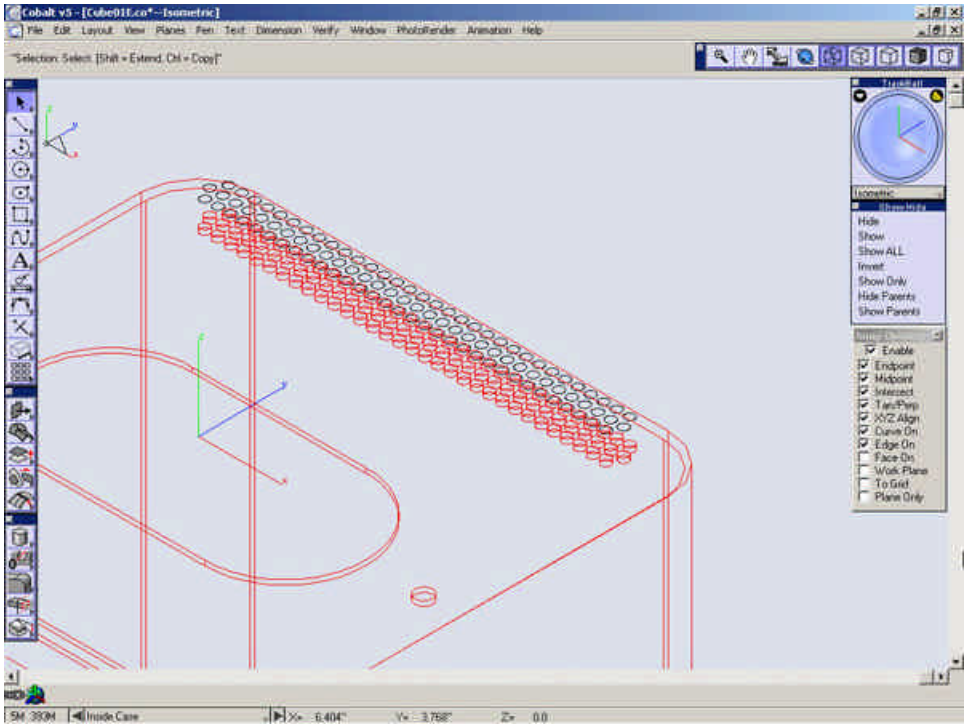
Select the inside case.



Select all of the circles that were created.

Note: Be sure not to have circles on top of each other, otherwise, this function will not, work. If you receive an error, check to make sure you do not have circles over lapping each other.

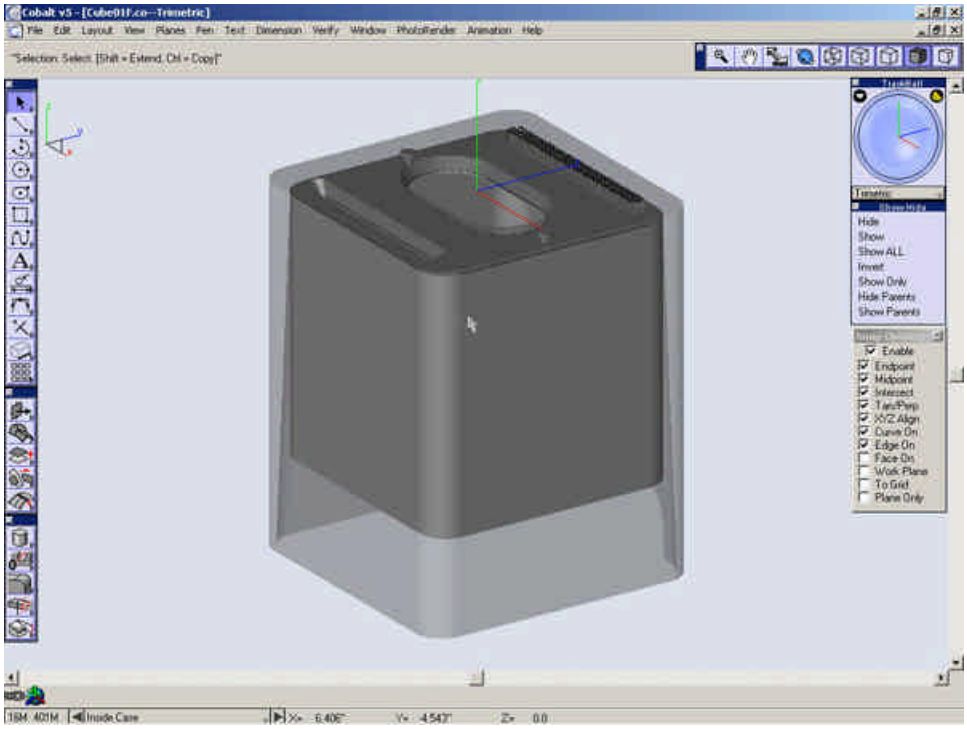
Select a point in space and then another point down along the Z-axis.



Show the outer case and turn on the posts layer.

Zoom all.

Shade the view.



Save the File.

Click below to proceed to the next step.

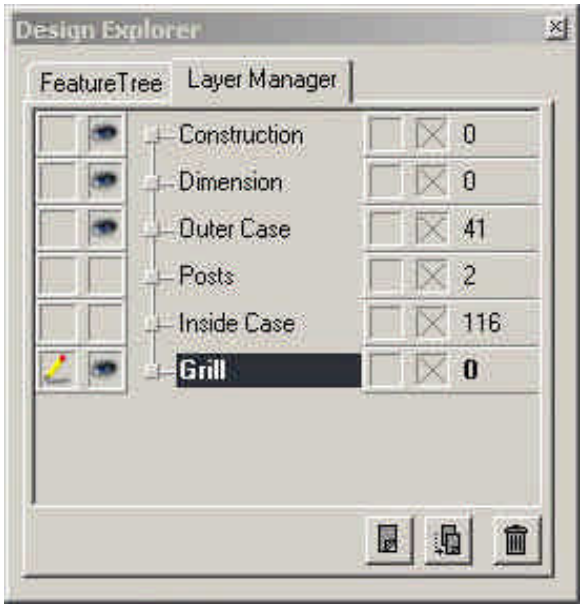
Creating the Grill

The Grill

Open the **Layer Manager**.

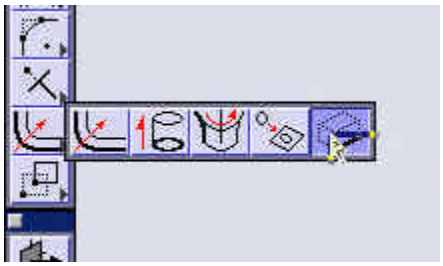
Create a New Layer, Rename it "**Grill**" and make it current.

Turn off layers "Posts" and "Inner Case".

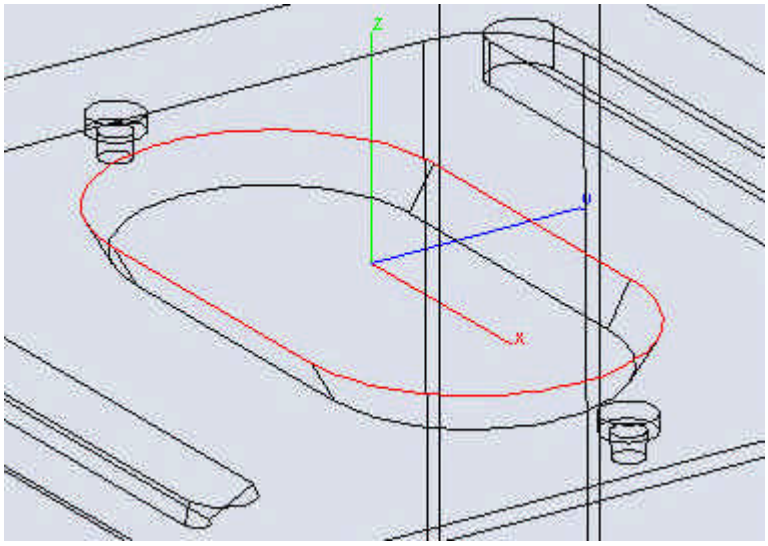


Close the **Layer Manager**.

Select the **Explode Edge** Tool.



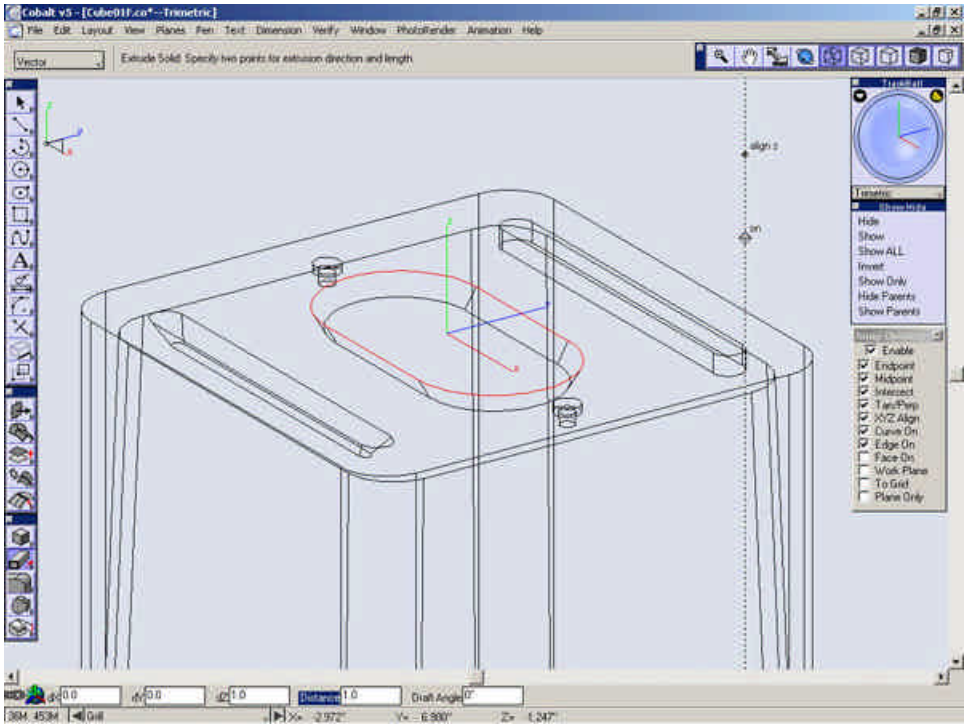
Explode the edges shown below.



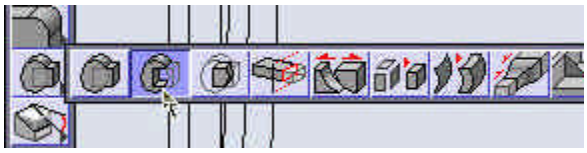
Select the **Extrude Solid** tool.

Select the exploded geometry the was just created.

Extrude them down **5/16”** down the **Z-axis**.

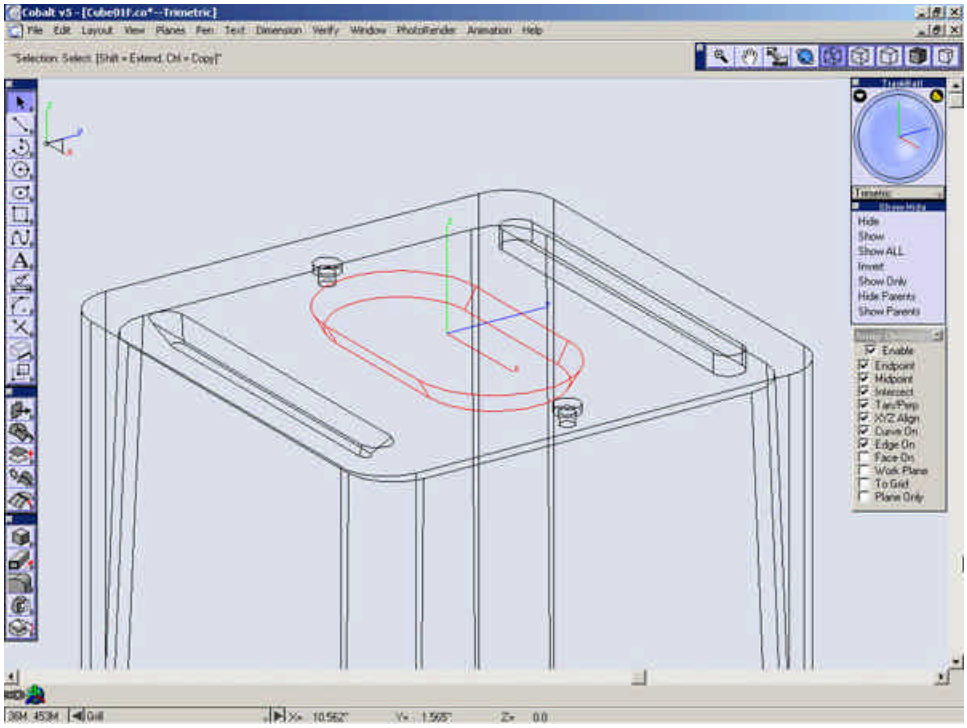


Select the **Subtract Solid** tool.



Select the Extrusion that was just created.

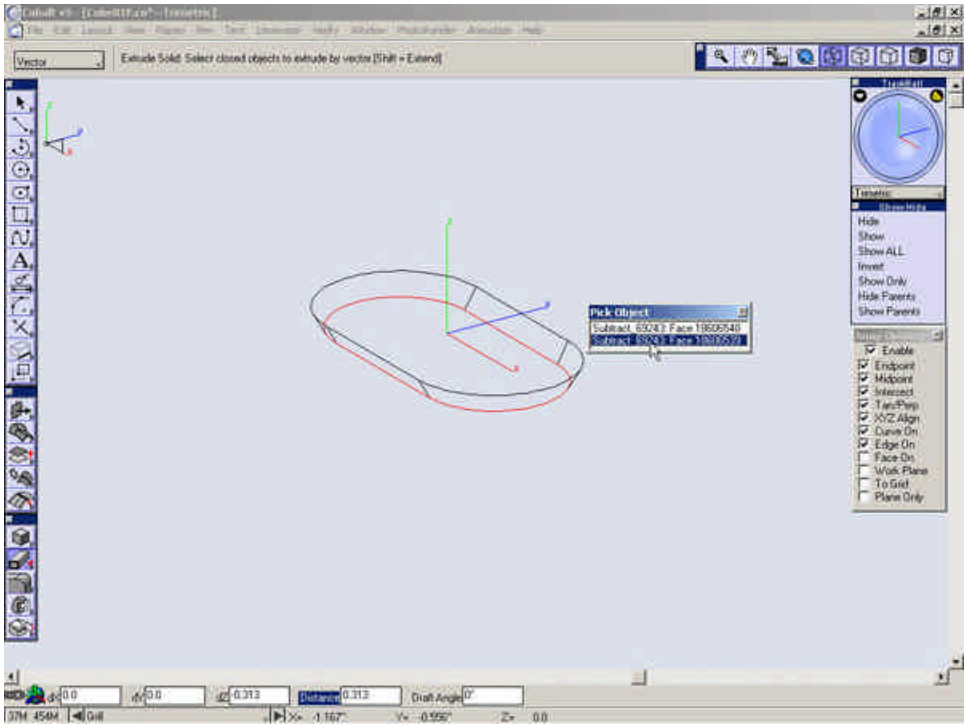
While holding **CTRL (Option on a Macintosh)**, select the outer case.



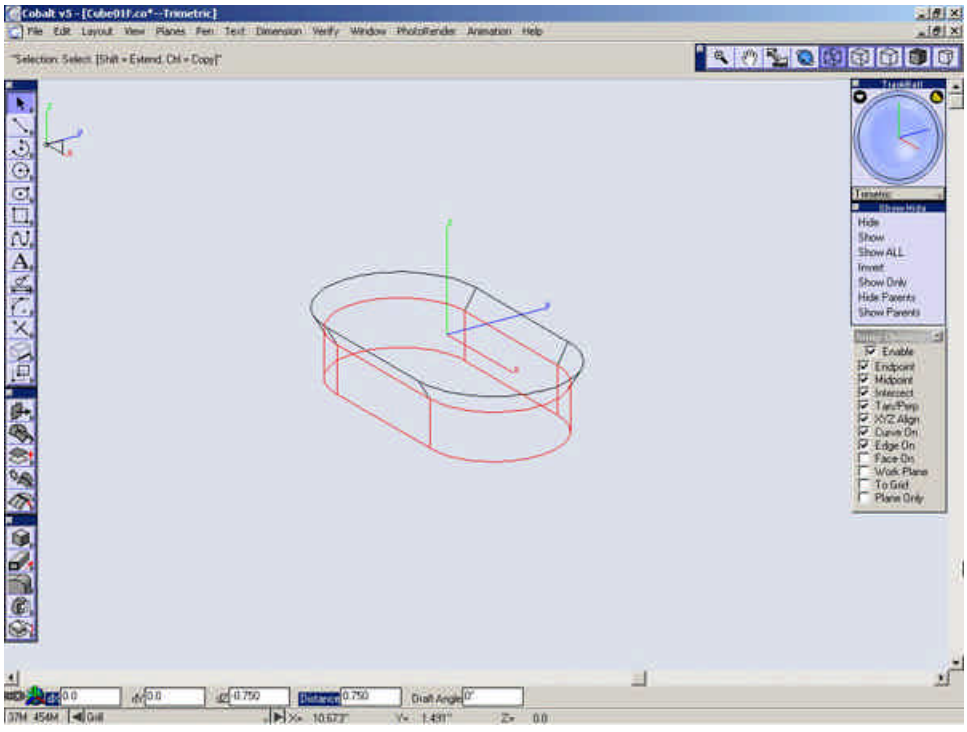
Hide the outer case.

Select the **Extrude Solid** tool.

Select the bottom face of the solid.

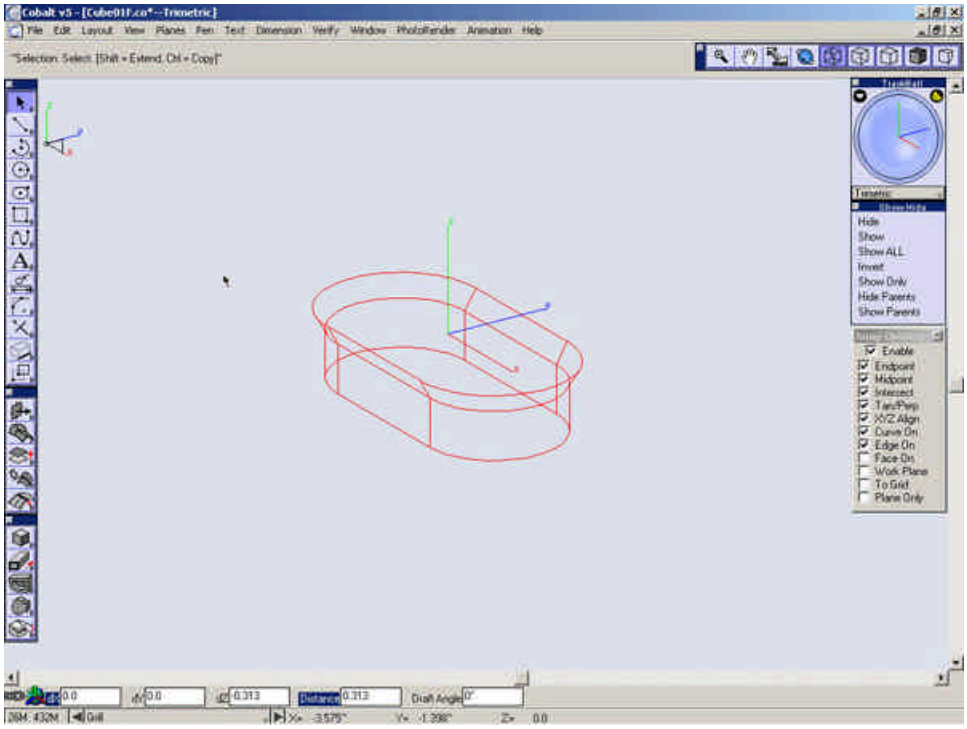


Extrude the face down **.75”** in the **Z**-direction.



Select the **Union Solid** Tool.

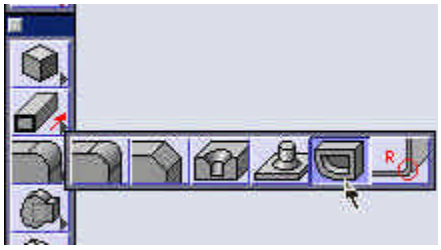
Select the two solids in the Drawing Window.



Select the **Select** Tool.

Select the “Union” Solid just created, **Copy** it and **Paste** it in its same location.

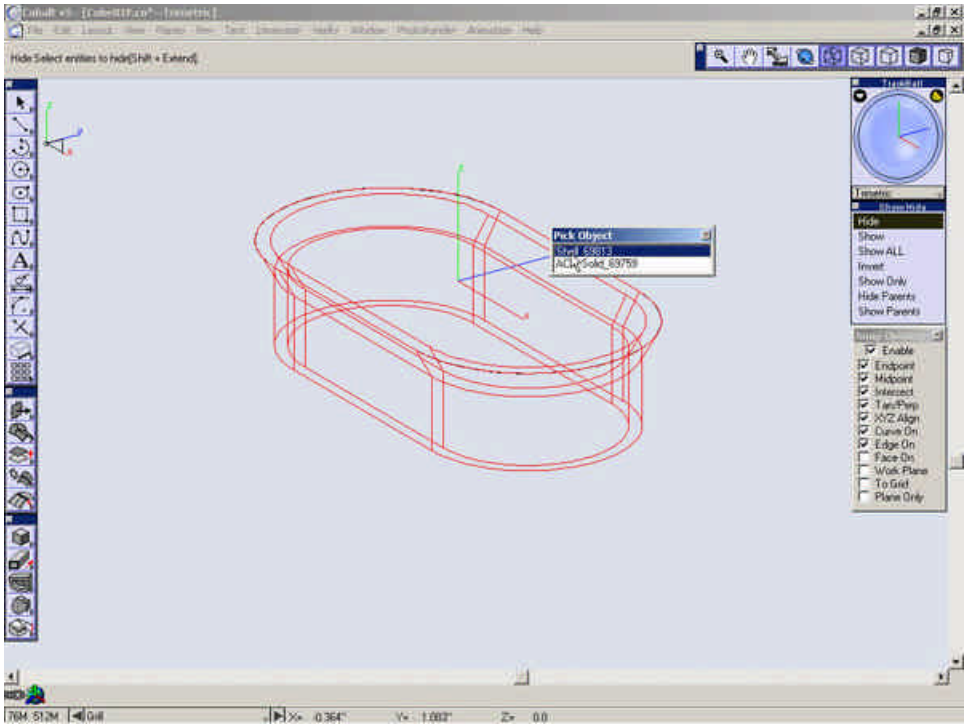
Select the **Shell Solid** Tool.



Set the Offset value to **.125** and select the “Union” to shell it.

While holding **Shift**, select the top and bottom faces of the “**Union**” to be open.

Hide the “Shell” solid that was recently created.



Save your file.

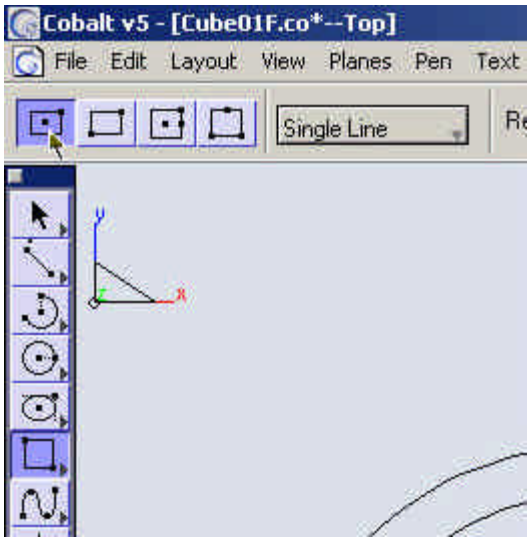
Click below to proceed to the next step.

[Building the Grill 2]

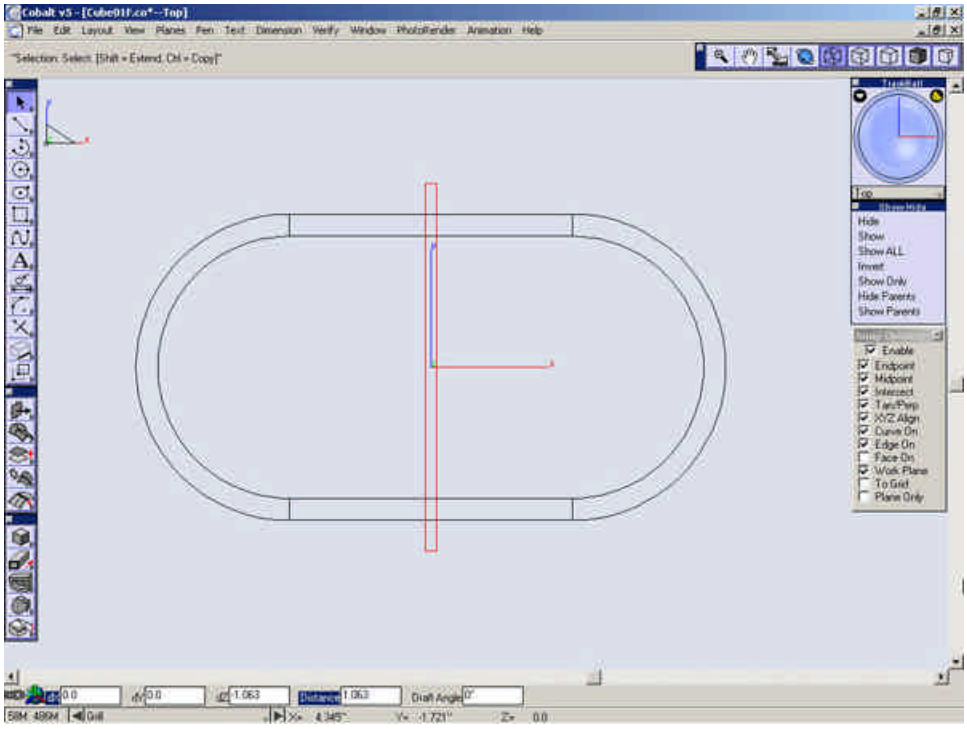
Building the Grill 2

Go to the **Top** View and turn the **Work Plane** snap on.

Select the **Rectangle** Tool. Set the creation option to **“Polygon by Center and point on.”**



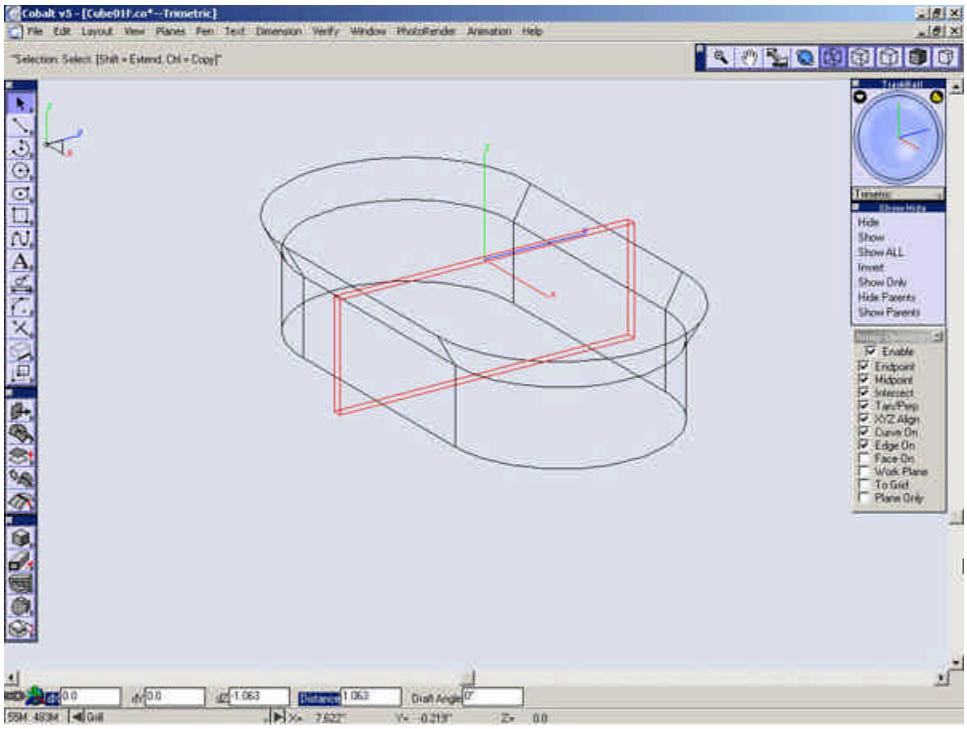
Create a rectangle with the center at the origin **W = 3/32" H = 3"**.



Go to the **Trimetric** view and turn the **Work Plane** snap off.

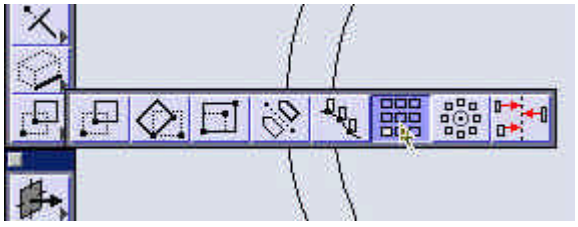
Select the **Extrude Solid** Tool.

Select the rectangle and extrude it down **1 1/16”**.



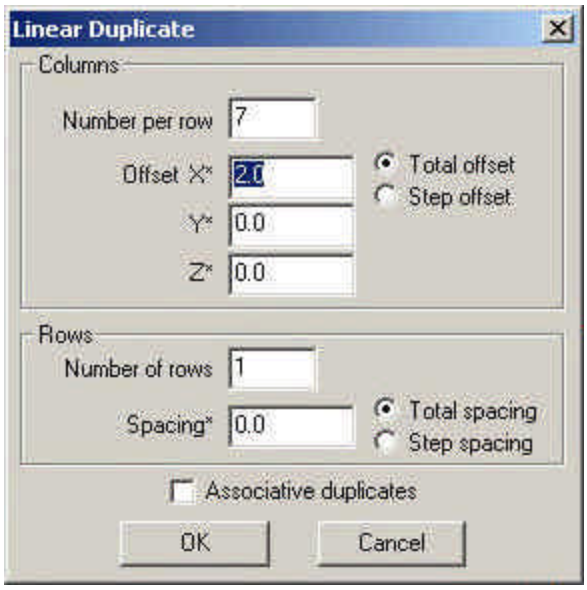
Go to the **Top** view and turn of the **Work Plane** snap.

Select the **Linear Duplicate** tool.

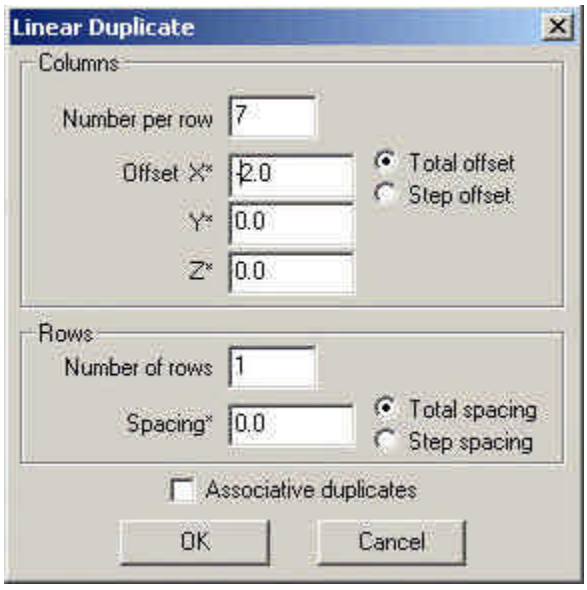


Select the “Extrude”.

Set the values in the linear duplicate dialog as shown below.

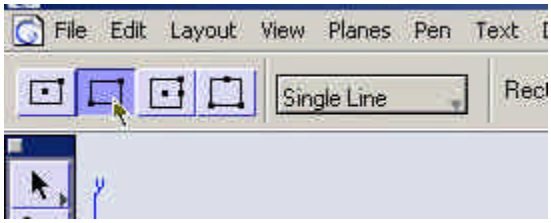


Repeat this procedure, but change the Dx value to **–2”.**

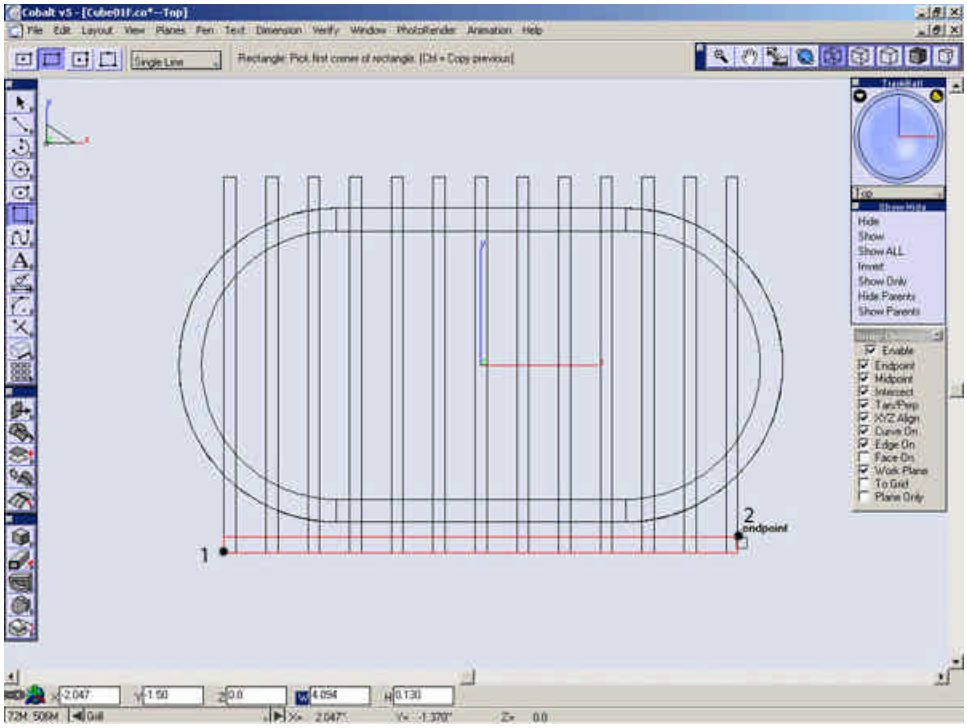


Select the **Rectangle** tool.

Select the **“Polygon by diagonals”** option.



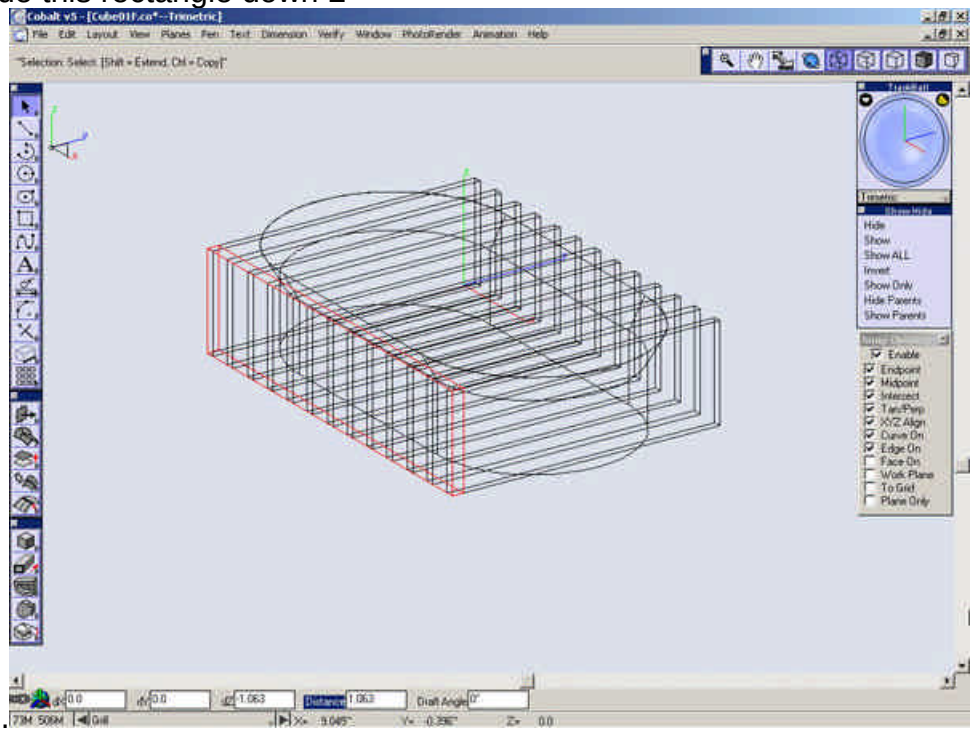
Create a rectangle at the points shown below.



Go to the **Trimetric** view.

Select the **Extrude Solid** tool.

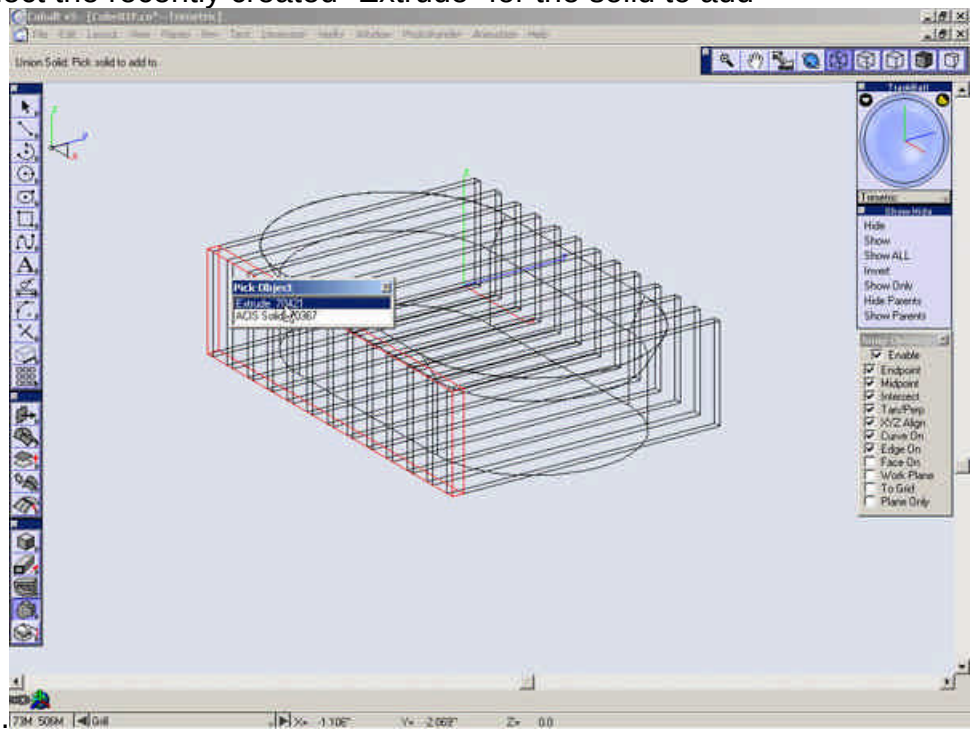
Extrude this rectangle down **1**



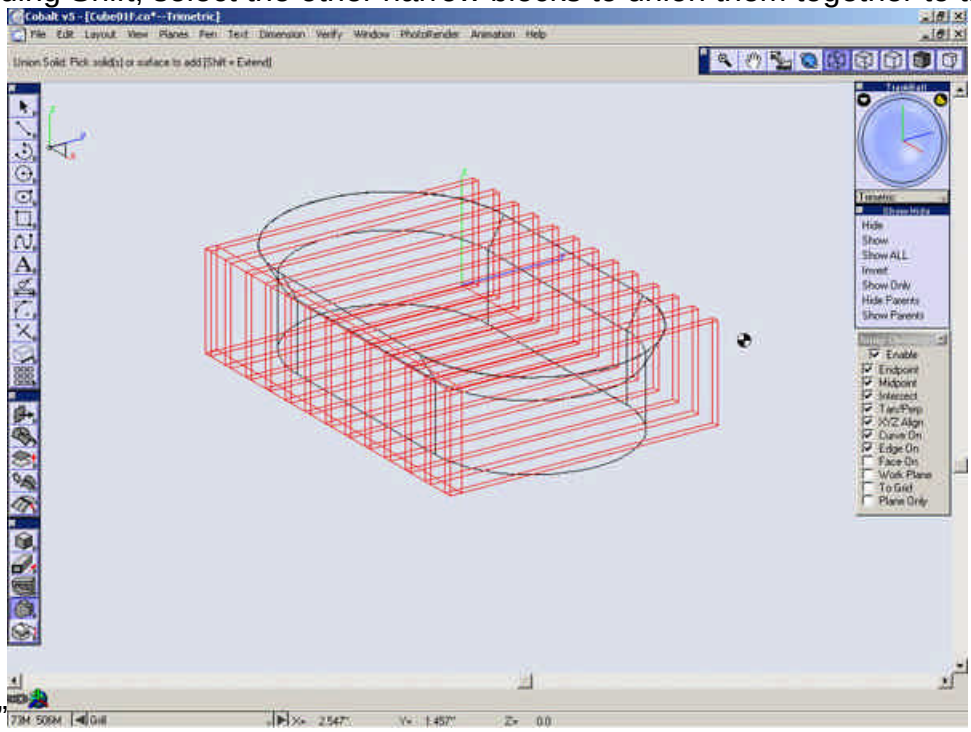
1/16”.

Select the **Union Solid** Tool.

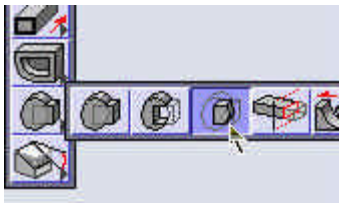
Select the recently created “Extrude” for the solid to add too.



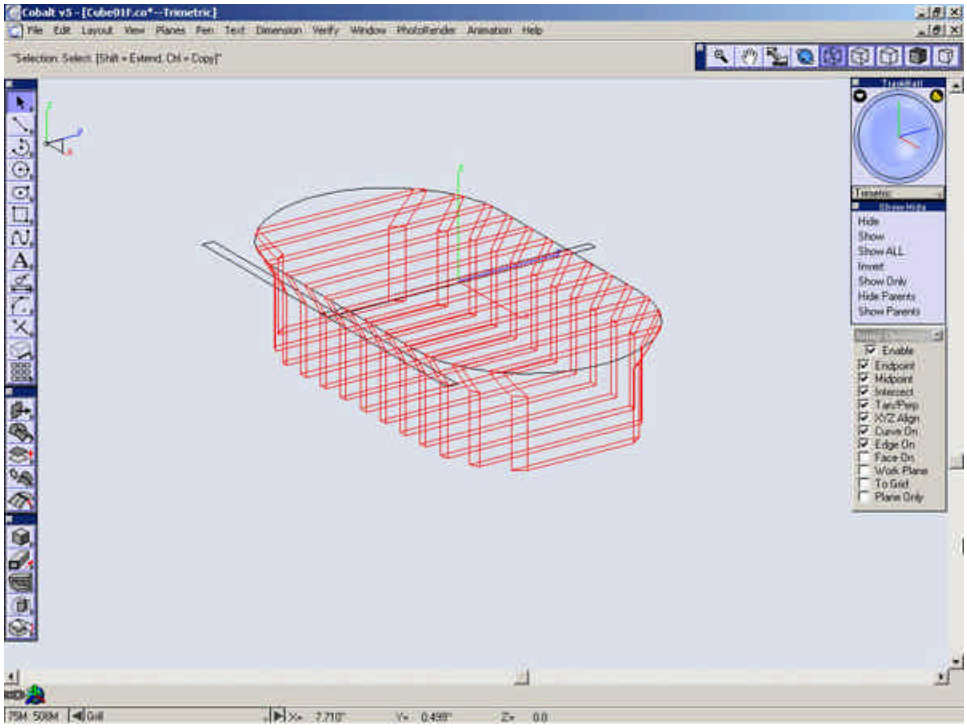
While holding Shift, select the other narrow blocks to union them together to the “Extrude.”



Select the **Intersect Solid** tool.



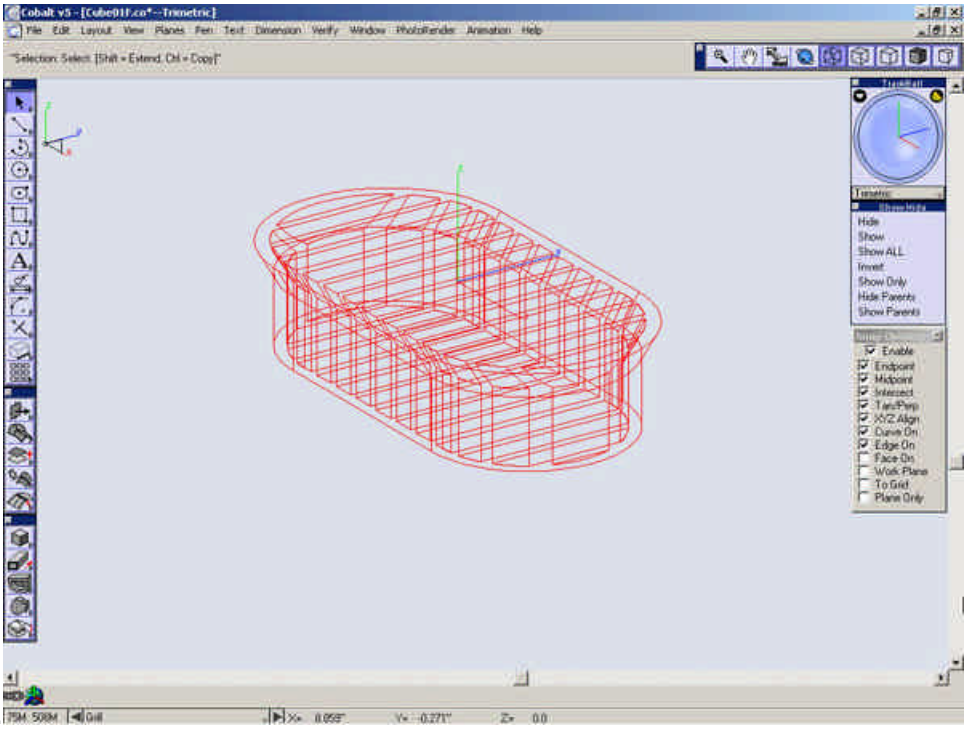
Select the two solids in the drawing area to intersect them.



Show the “Shell” Solid that was hidden earlier.

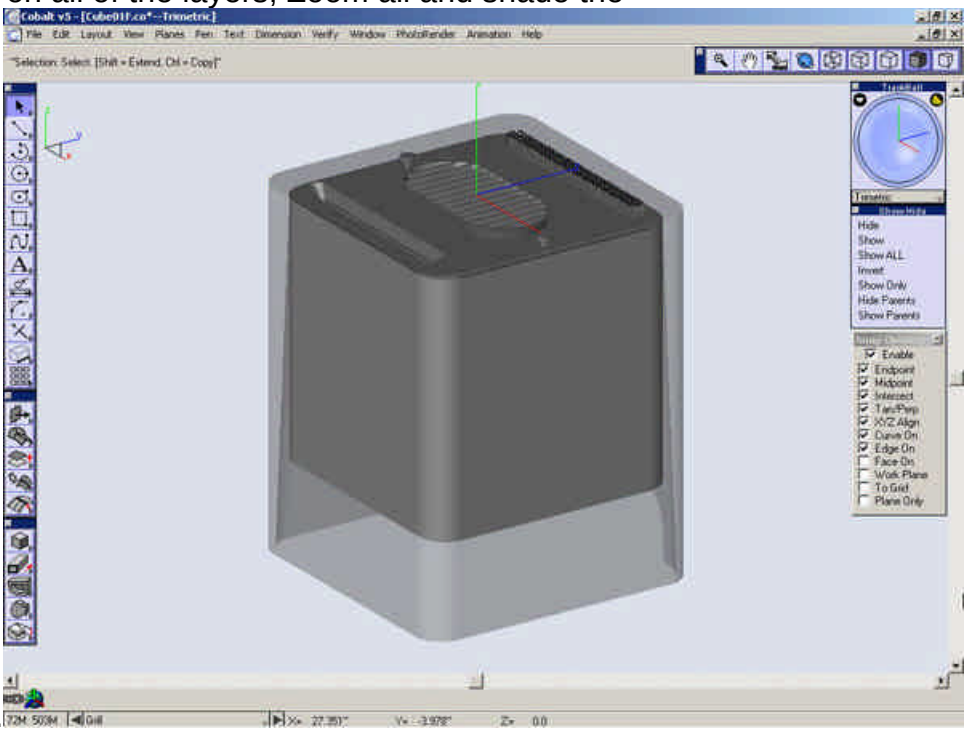
Select the **Union Solid** tool.

Union the “Shell” solid with the “Intersect” solid.



Show only the new “Union” solid.

Turn on all of the layers, Zoom all and shade the view.



Save your file.

Click here to proceed to the next section.

Creating the apple

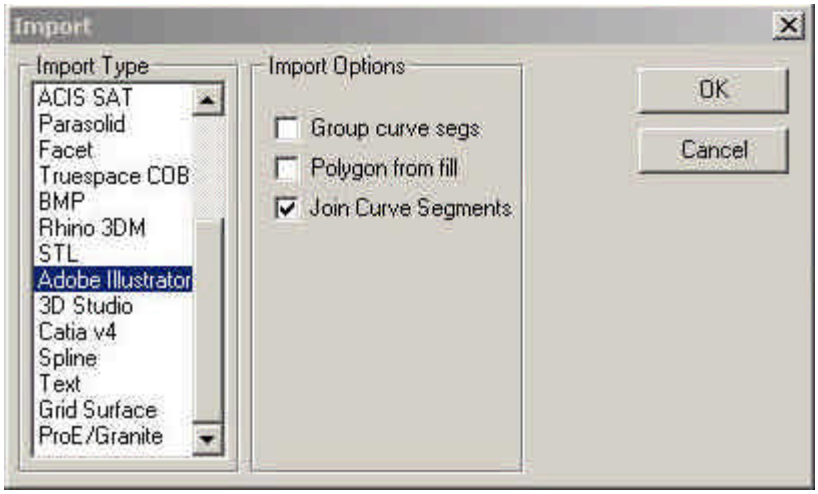
Creating the Apple

This section describes using geometry imported from another program to create solids withing our model. In this particular case, we will be using an Illustrator file.

*Note: When importing Illustrator files, ensure that the file is in a **Version 8** format, otherwise it may not import properly.*

Go to the **Top** View.

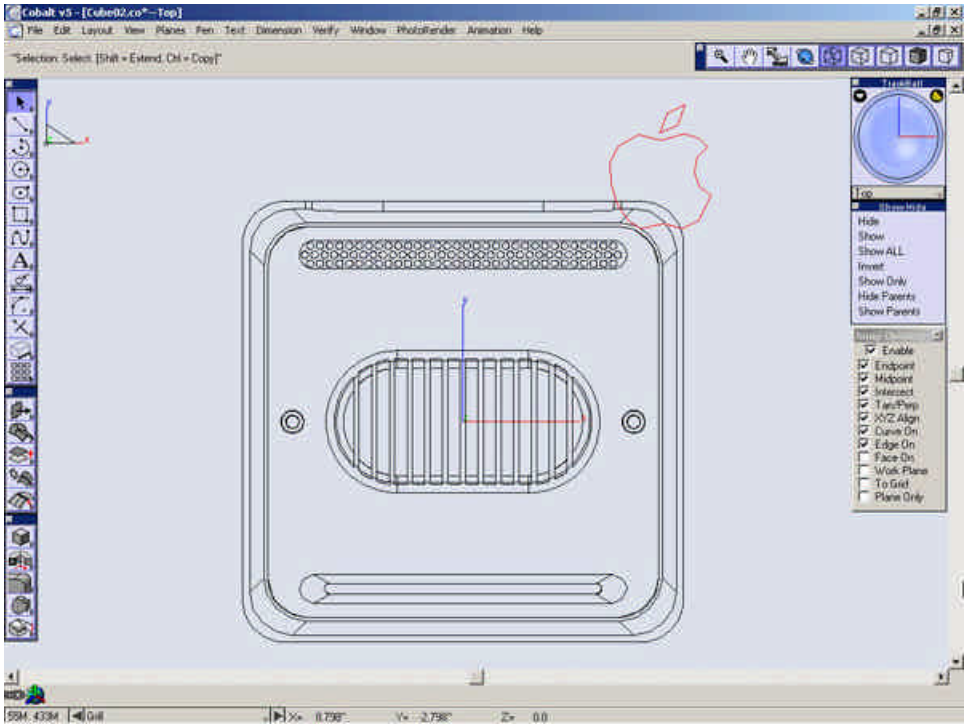
Import the file “apple.ai” by selecting ***File>Import***. Set the import type to Adobe Illustrator and set the options as shown below.



Select OK. Locate and open the file "apple.ai."

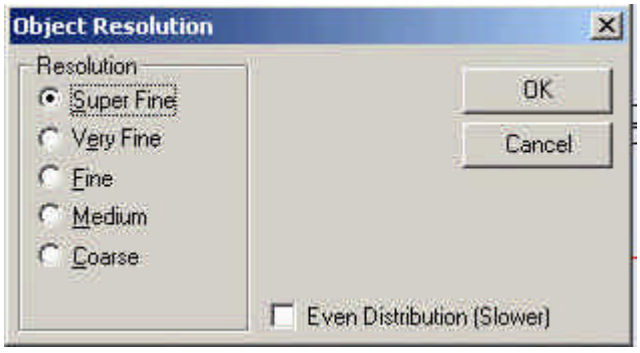
Select the **Select** Tool.

Select the imported geometry.



Select ***Edit>Change Resolution***.

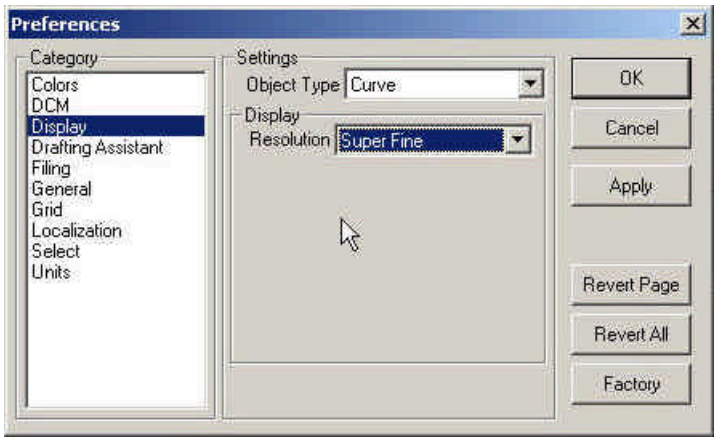
Set Resolution to Super Fine.

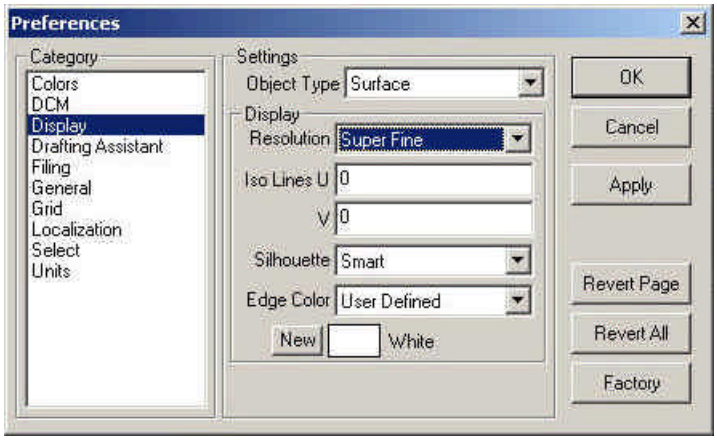


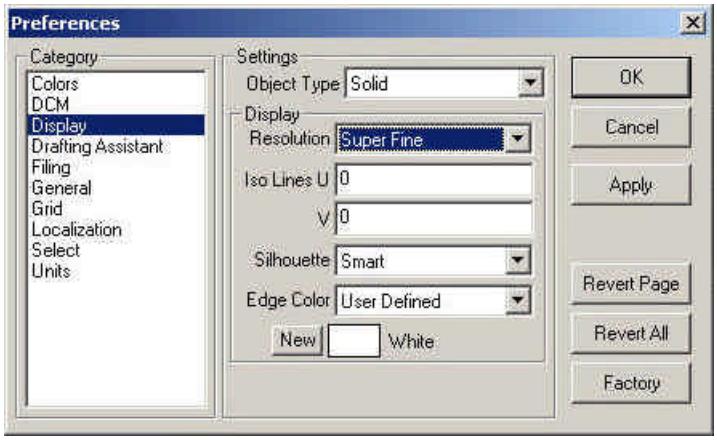
This will only change the resolution of the selected geometry. In order to change the resolution for all geometry that will be created, it is necessary to change the settings in the preferences.

Choose ***File>Preferences***.

In the Display Category, change all types to Super Fine.





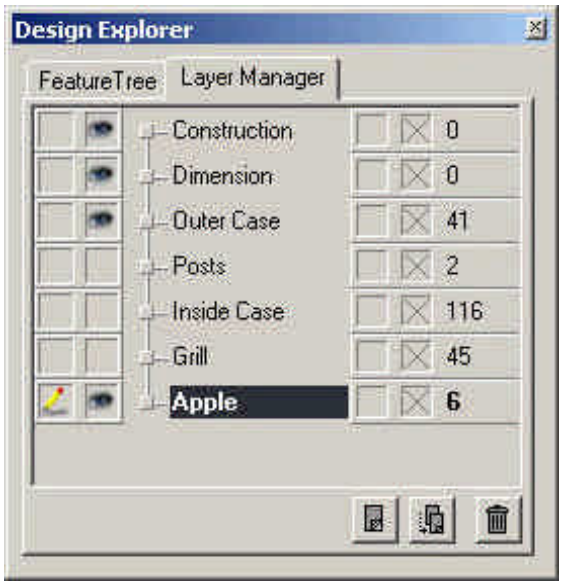


Open the **Layer Manager**.

An imported Illustrator file gets imported into its own new layer.

Rename Layer 1 to “**Apple**” and make it current.

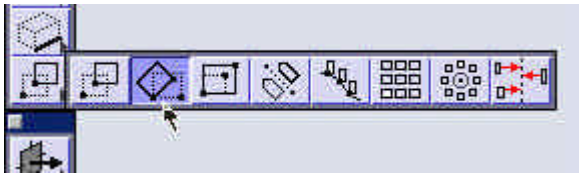
Turn off layers “**Posts**”, “**Inside Case**” and “**Grill**.”



Close **Layer Manager**.

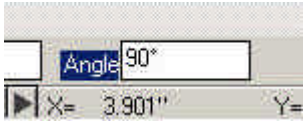
Go the **Trimetric** View.

Select the **Rotate** Tool.

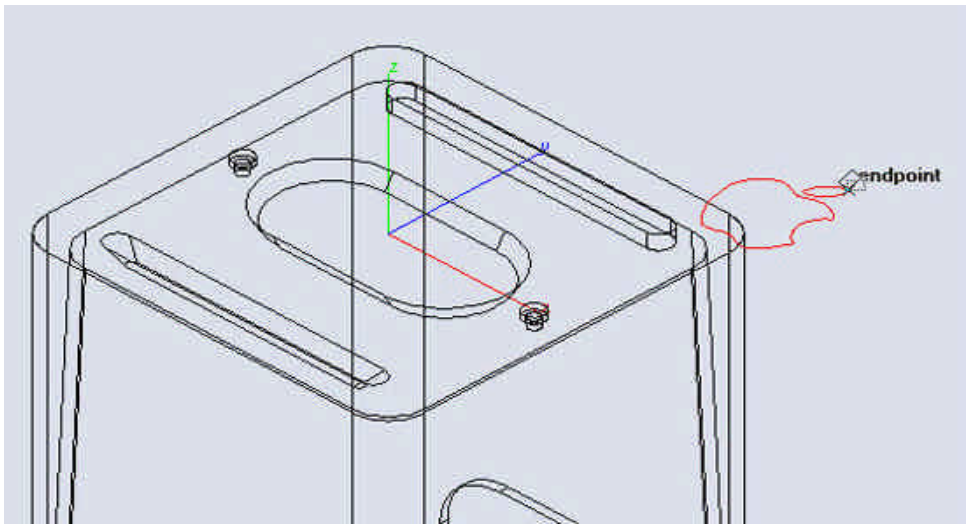


Select the "**Rotate by angle option**" and about the **X-axis**.

Enter **90** into the Angle field.



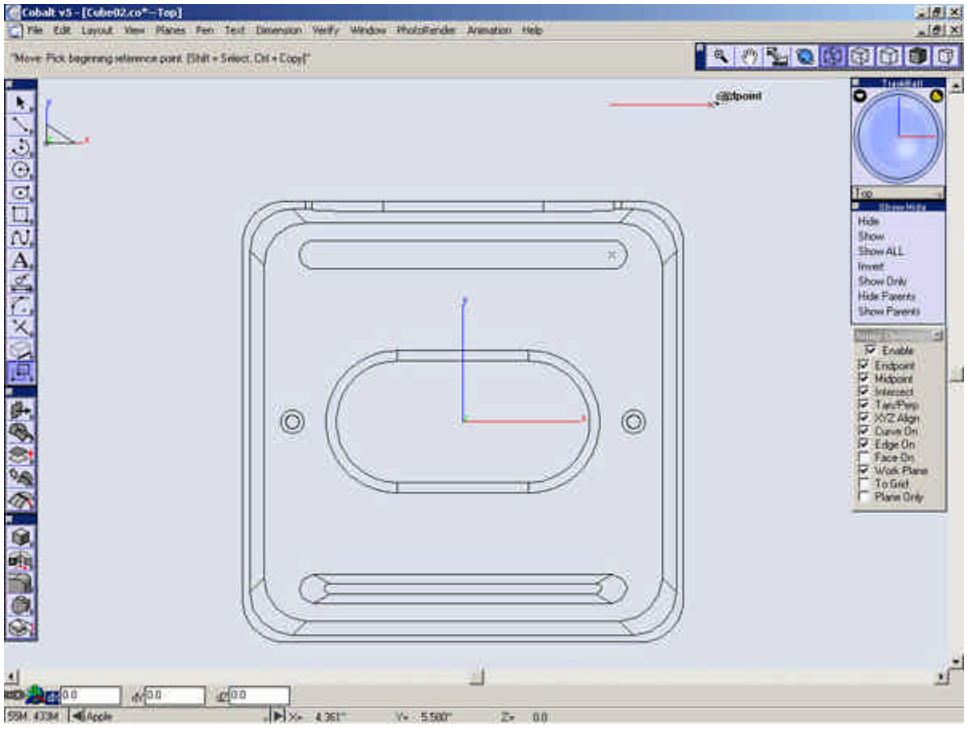
Select a point on the apple geometry.

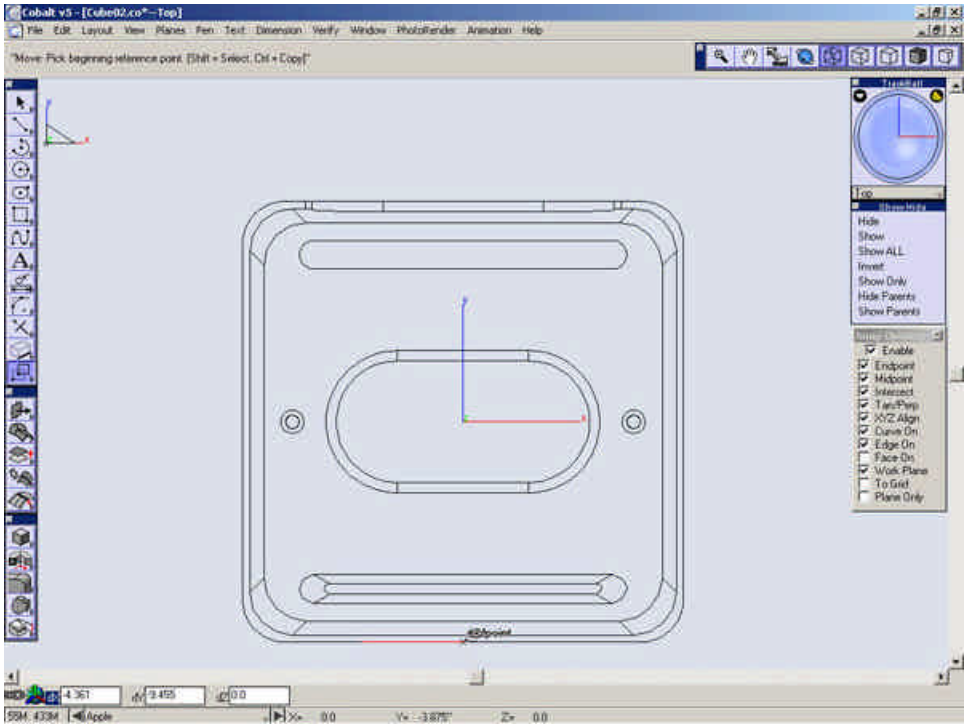


Go to the **Top** view and turn on the **Work Plane** snap.

Select the **Move** Tool.

Move the apple geometry to the front of the outer case.

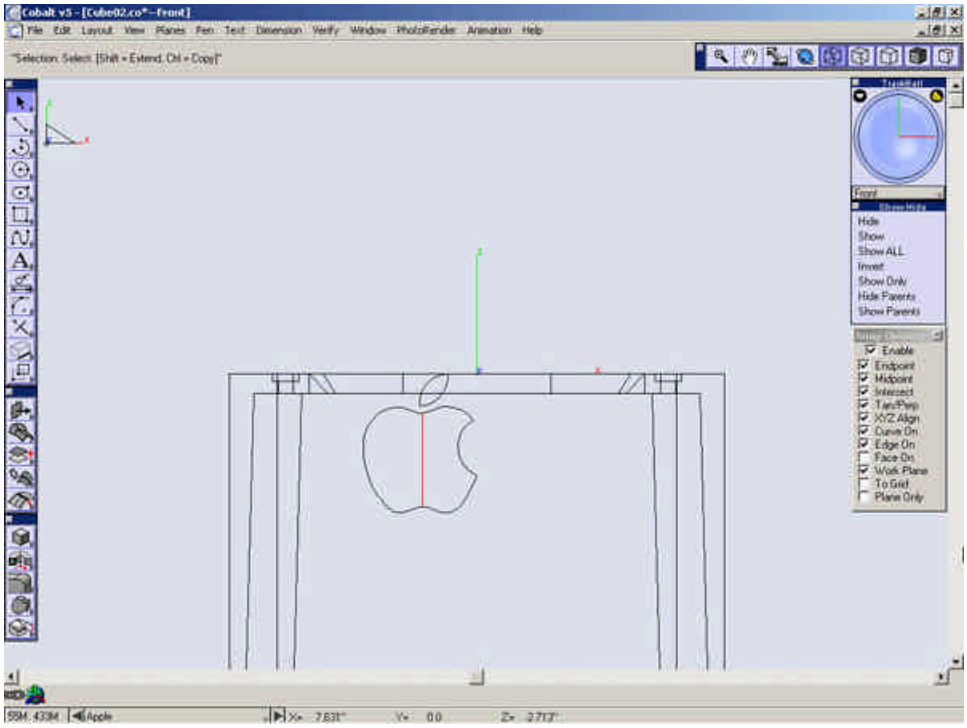




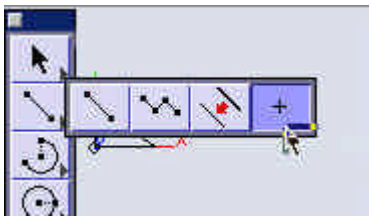
Go to the **Front** view.

Select the **Line** Tool.

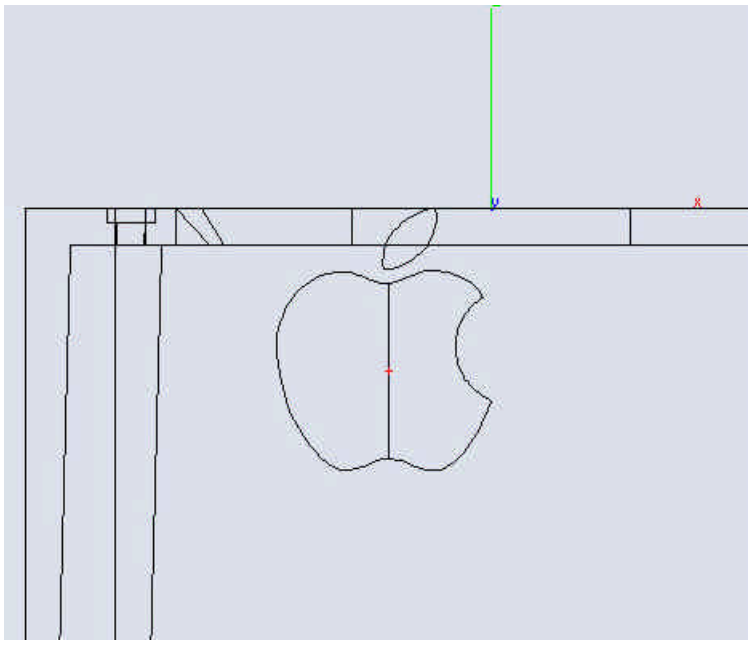
Draw a line as shown below.



Select the **Point** tool.

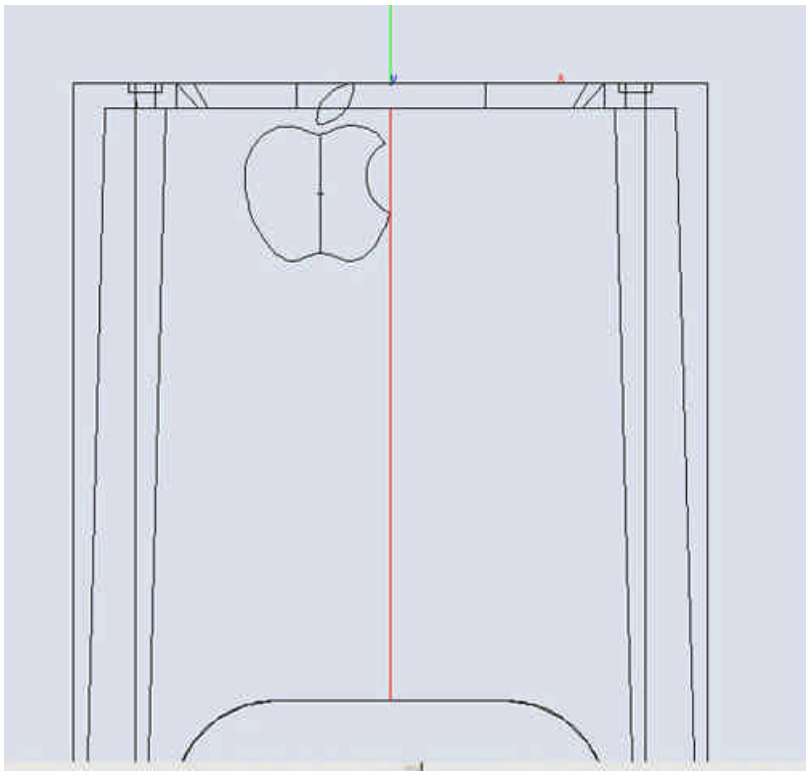


Place a point at the midpoint of the line

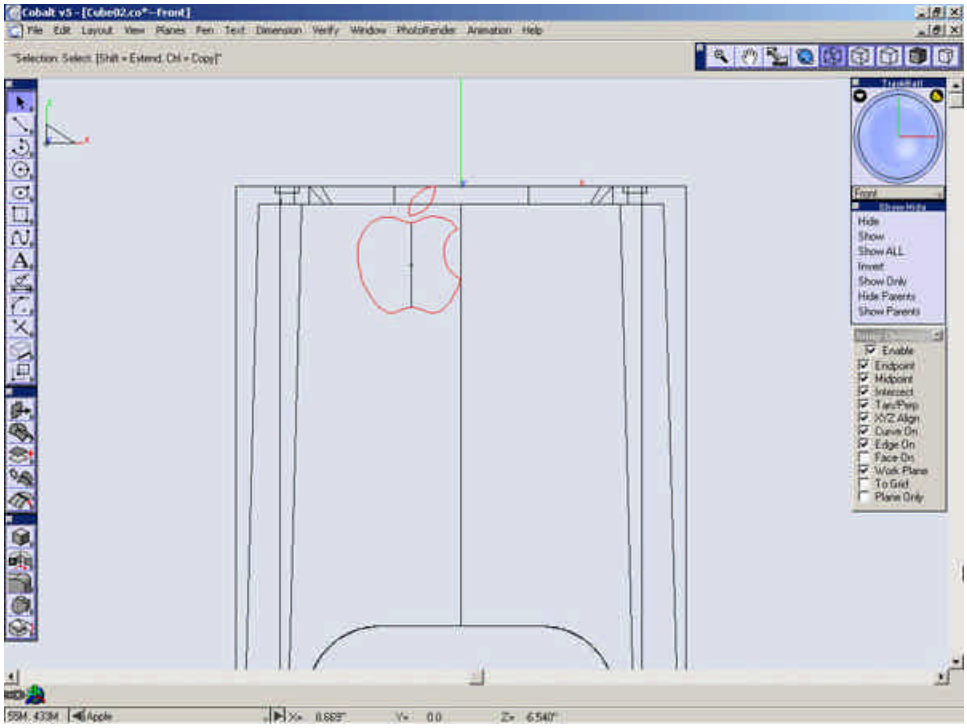


Select the **Line** tool.

Draw another line as shown below.

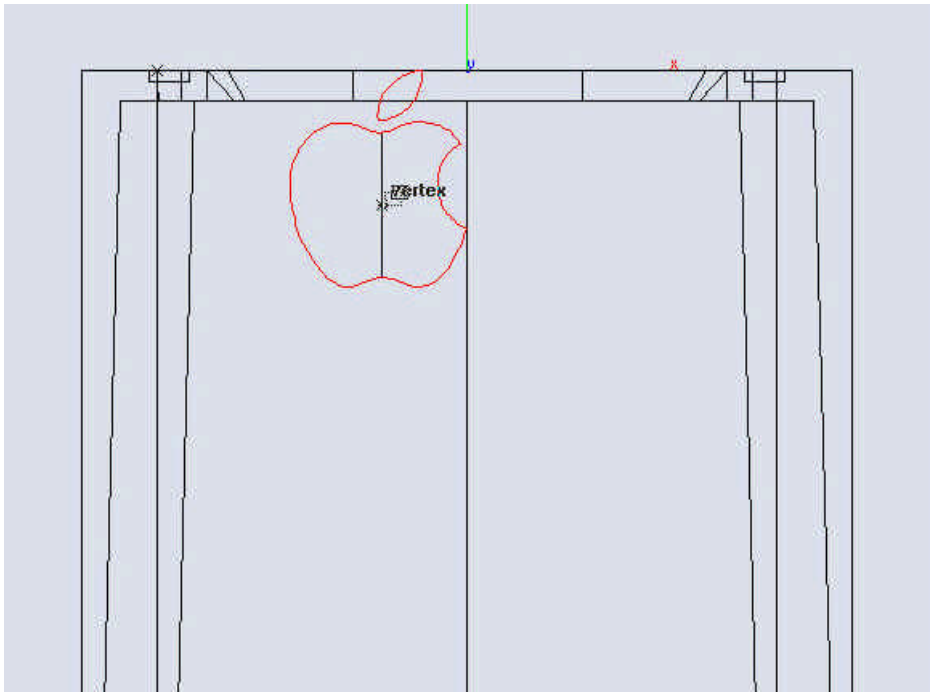


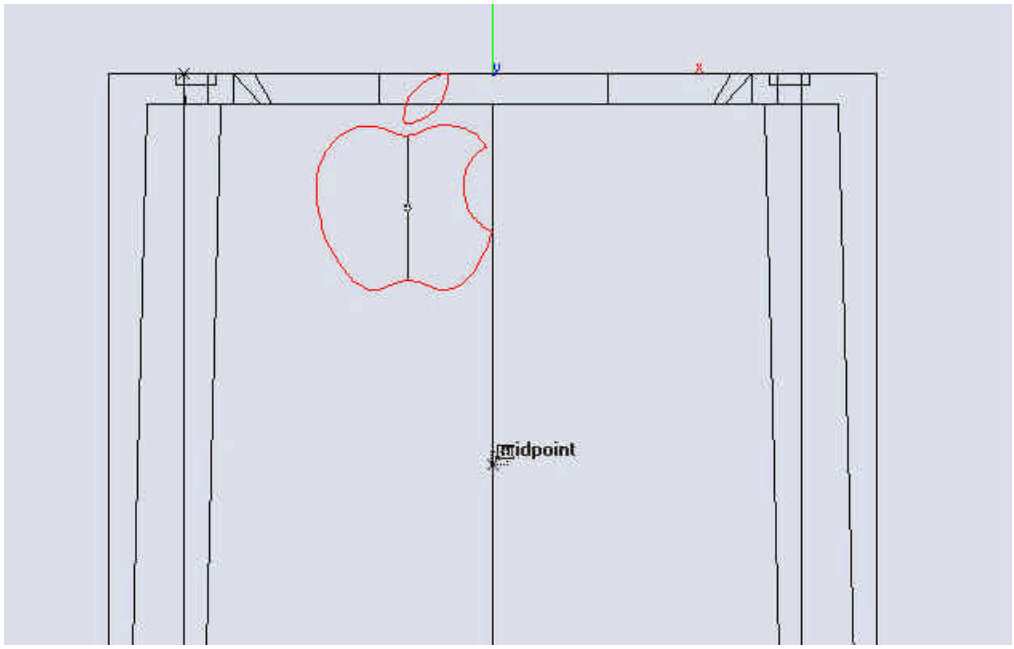
Select the apple geometry.



Select the **Move** tool.

Select the point in the middle of the apple geometry for the first reference point and the midpoint of the long line for the second point.

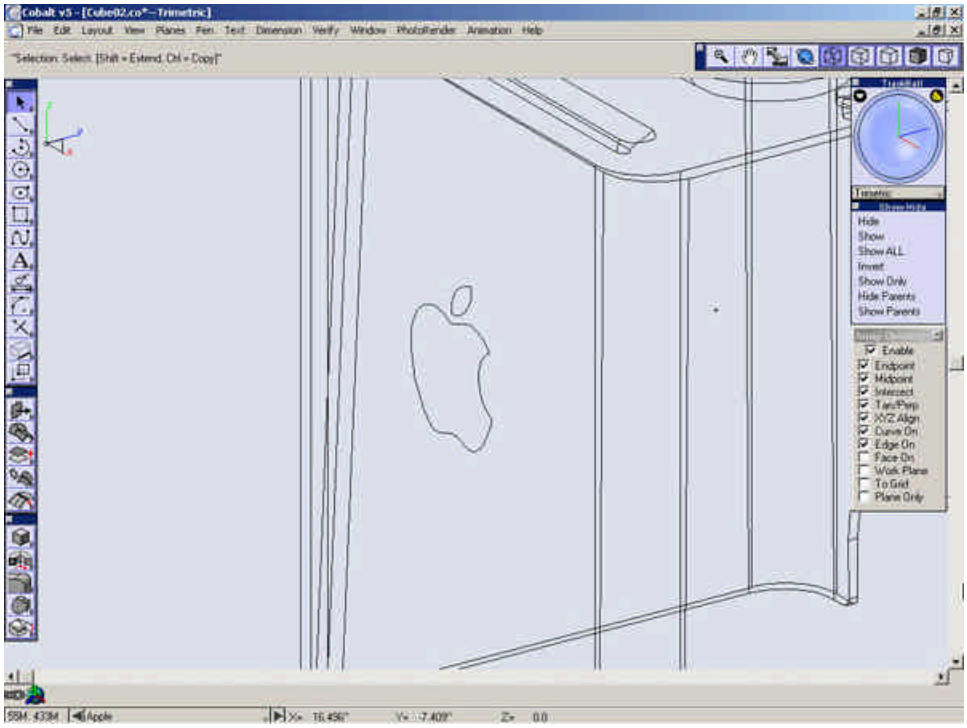




Delete both of the two lines that were previously created.

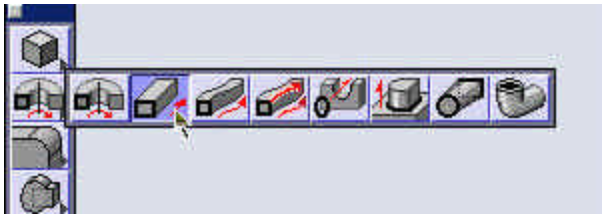
Click below to proceed to the next step.

Creating the Apple 2

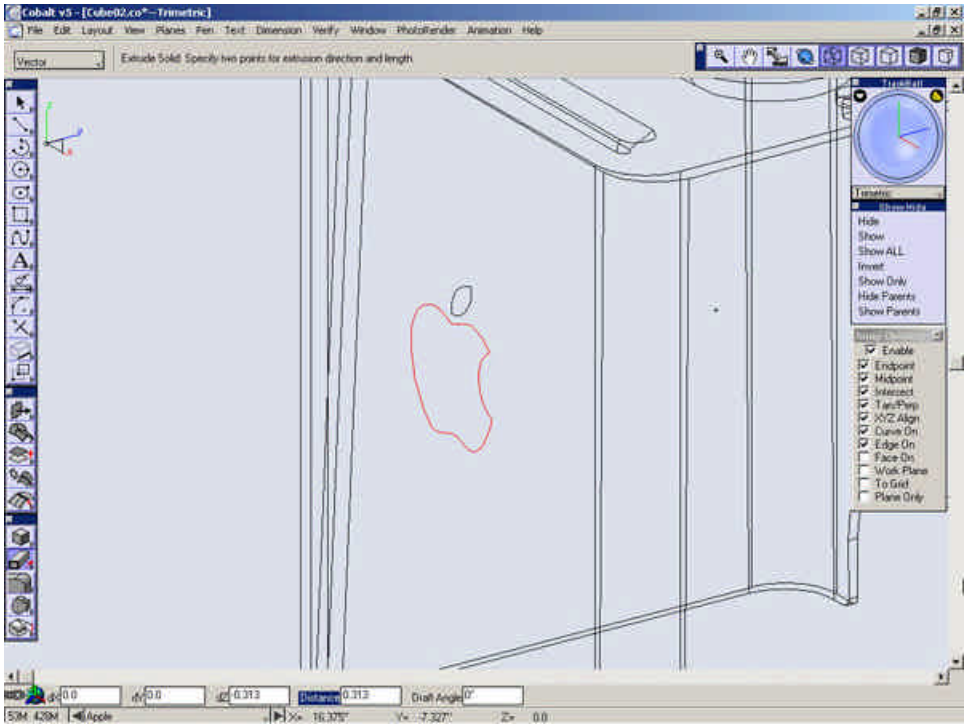


Go to the **Trimetric** view.

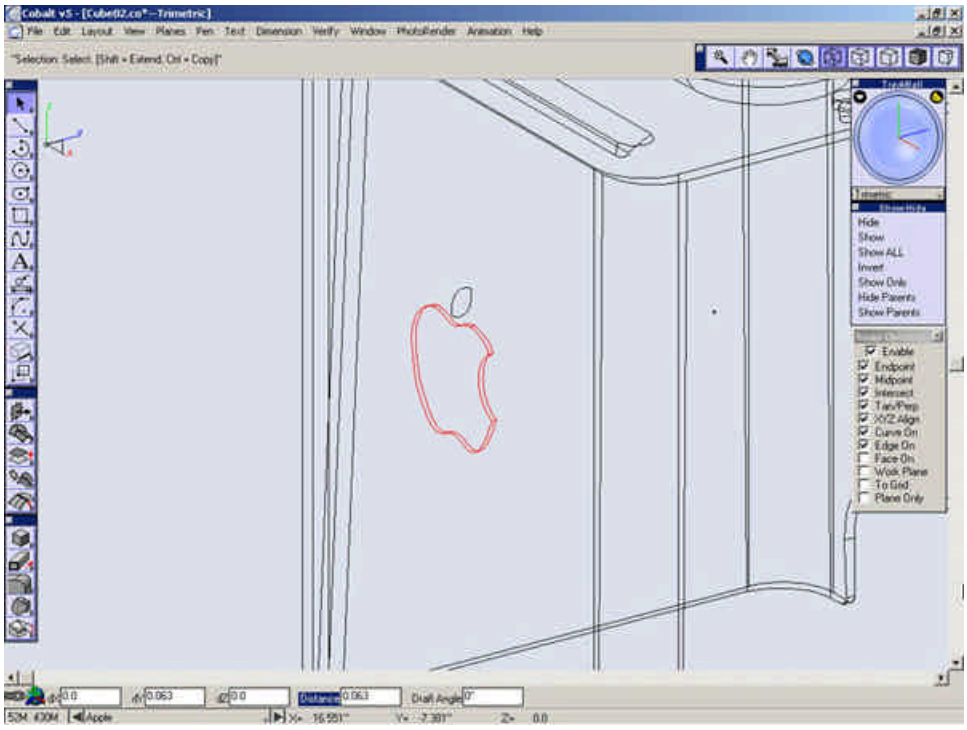
Select the **Extrude Solid** tool.



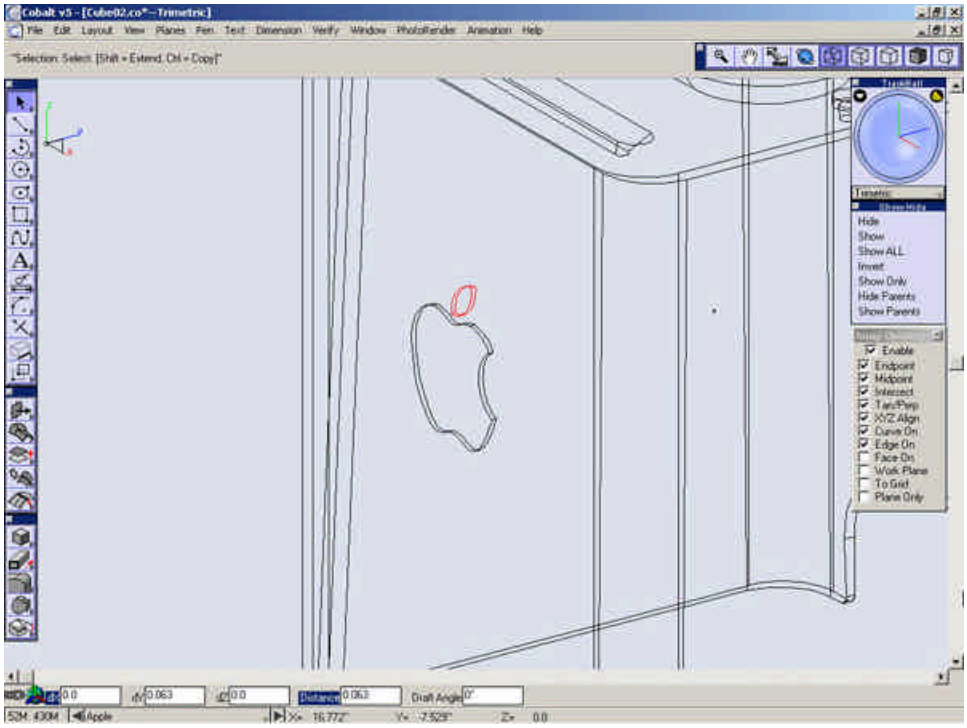
Select the main body of the Apple.



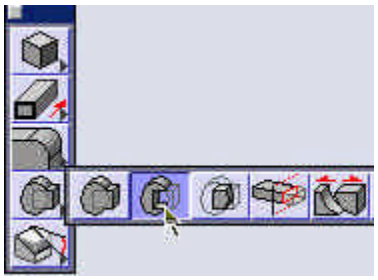
Extrude this geometry back **1/16”**.



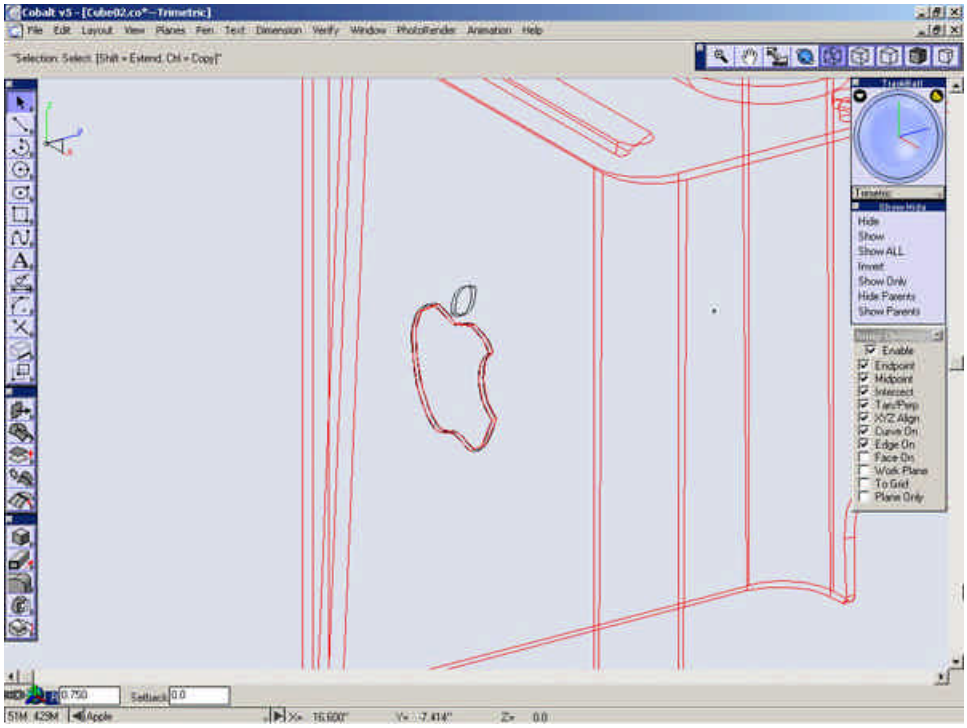
Repeat this for the smaller portion of the apple.



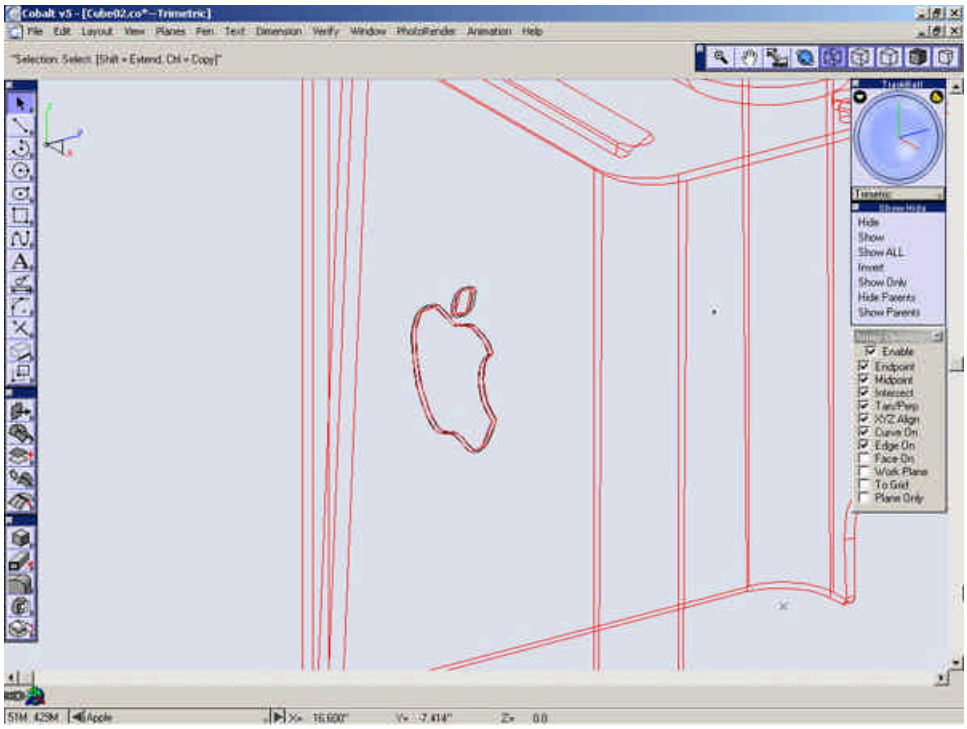
Select the **Subtract Solid** tool.



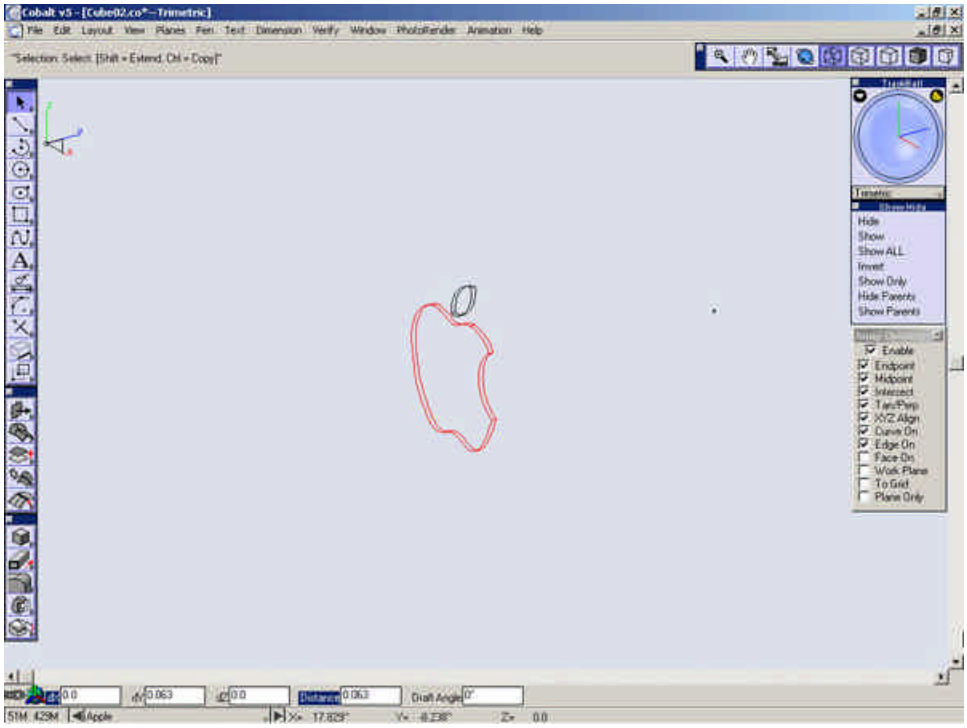
Select the outer case and while holding **CTRL** (**Option** on a Macintosh), select the main body of the apple.



Repeat the extrude and subtract procedure for the smaller portion of the apple geometry.



Hide the outer case.

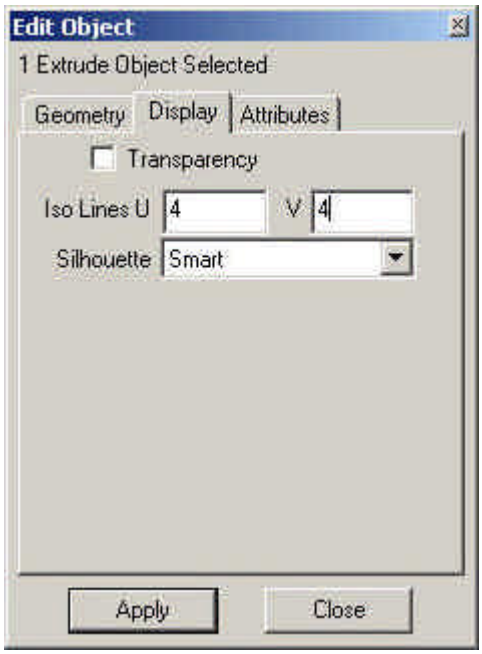


Select the **Select** Tool.

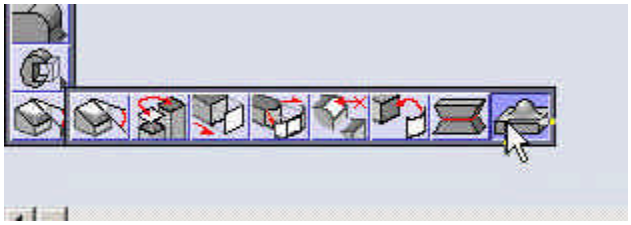
Select the main body of the apple extrusion.

Go to ***Window>Edit Objects***.

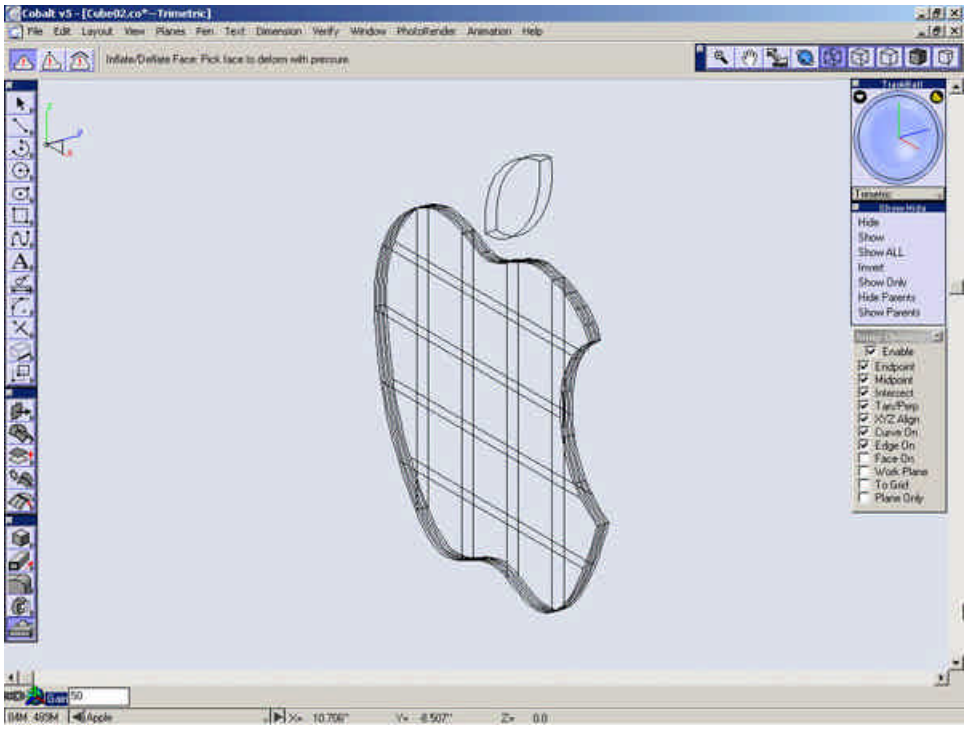
Under the Display tab set the **U** and **V** both to 4.



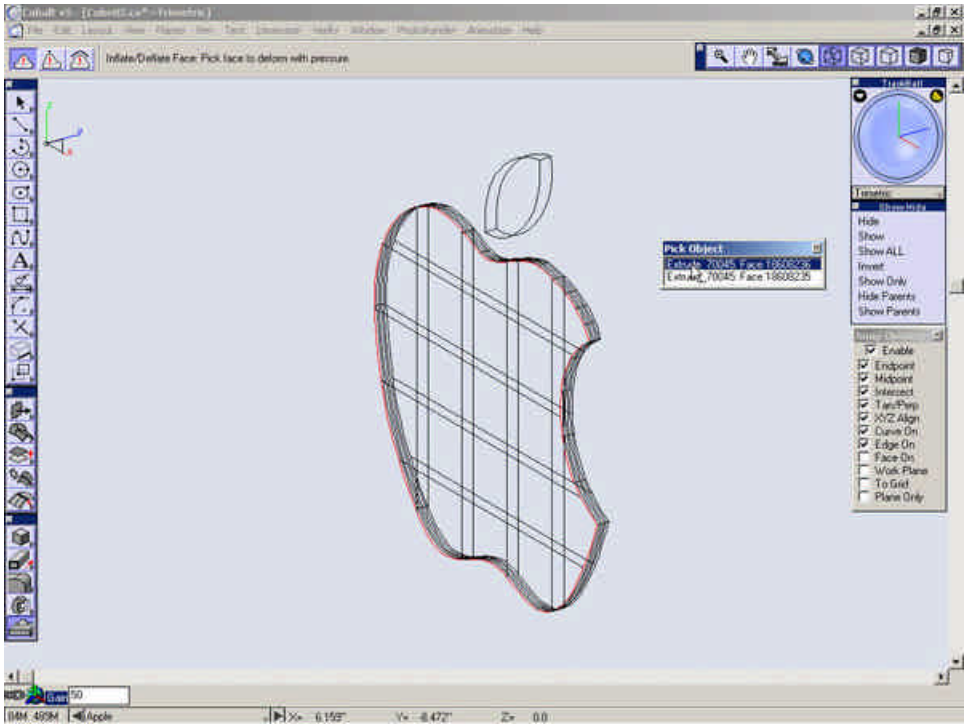
Select the **Deform Face** tool.



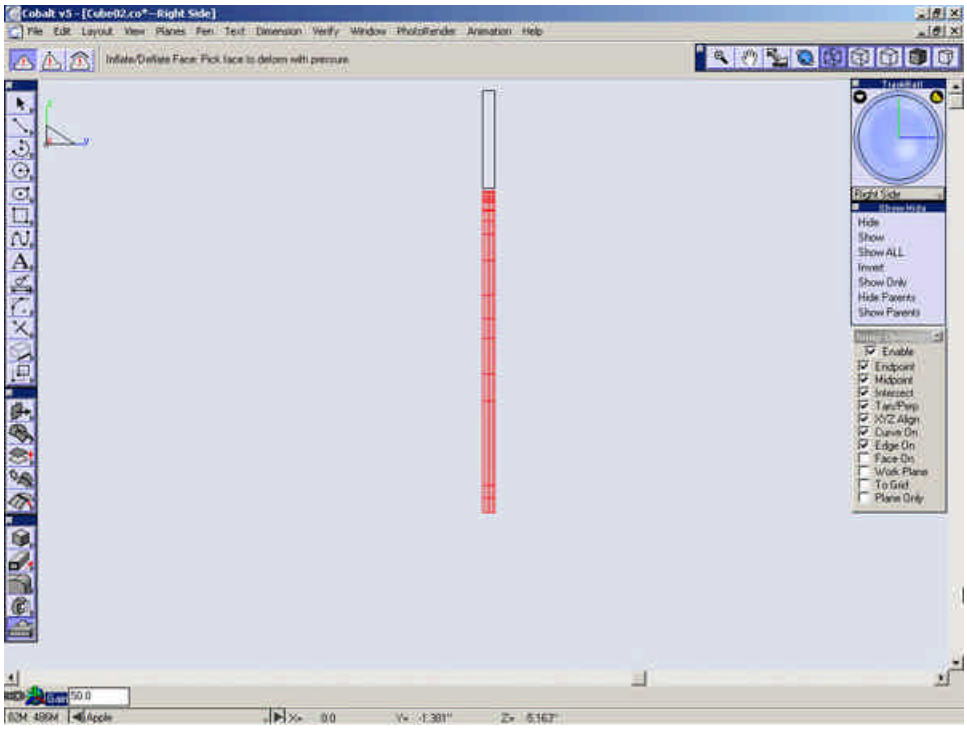
Select the **Inflate/Deflate** option and Change the Gain to **50**.



Select the front face of the main part of the apple extrusion.

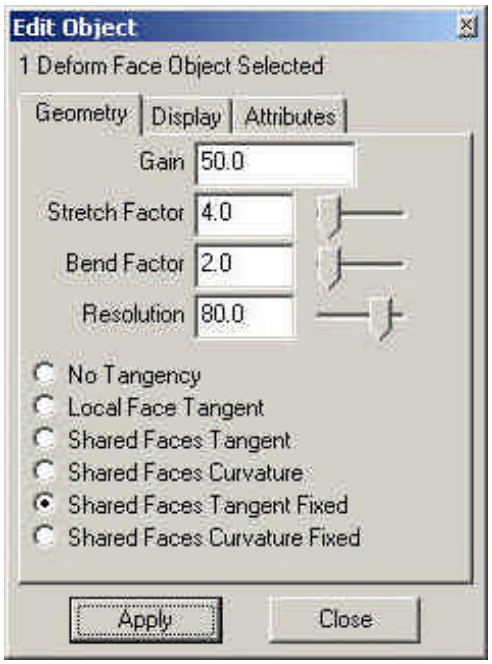


Go to the **Side** view and zoom in on the apple extrusions.

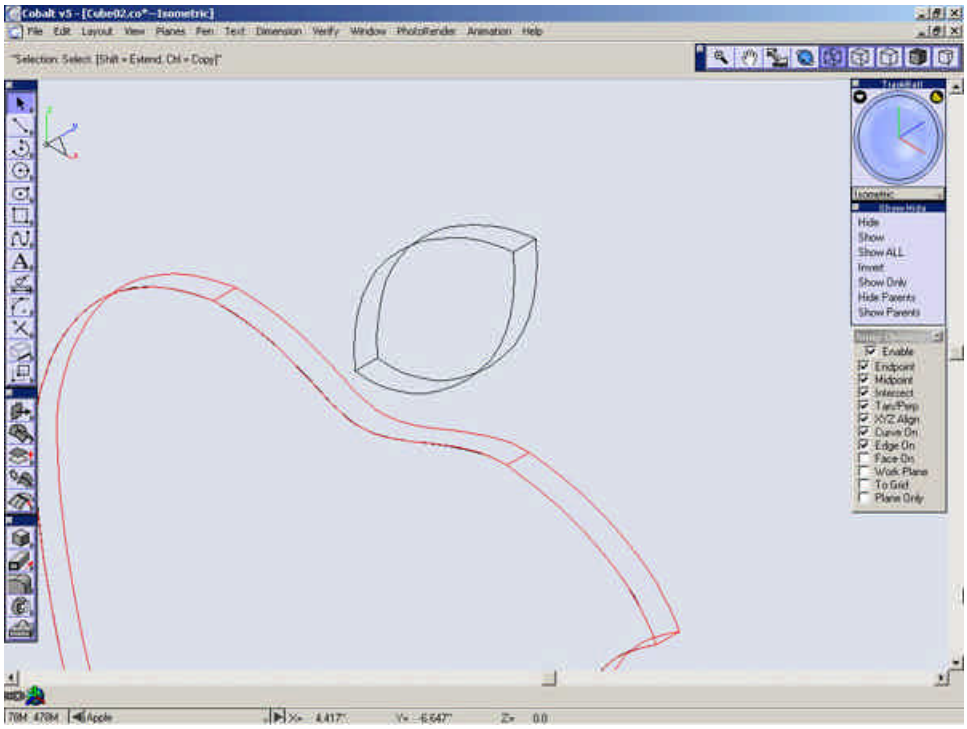


If not already open, re-open the **Edit Objects** dialog and select the **Geometry** tab.

Set the values as shown below.



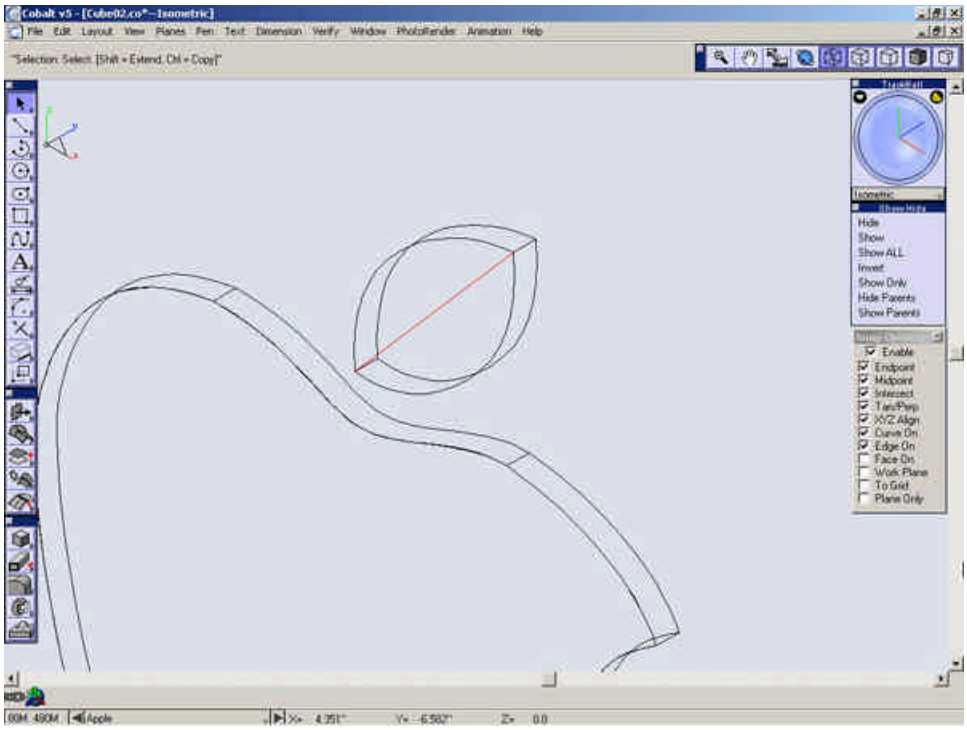
Go to the **Trimetric** view and set the **U** and **V** of the part back to 0.



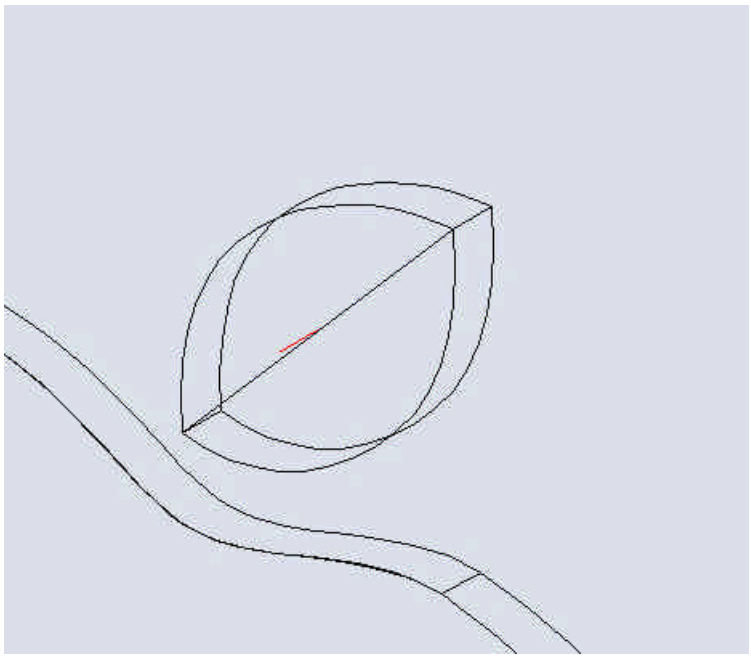
Zoom in on the smaller portion of the apple extrusion.

Select the **Line** tool.

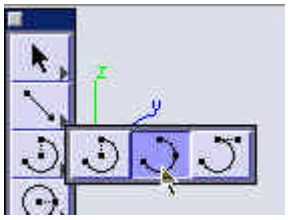
Draw a line from one corner of the front face to the other corner of the front face.



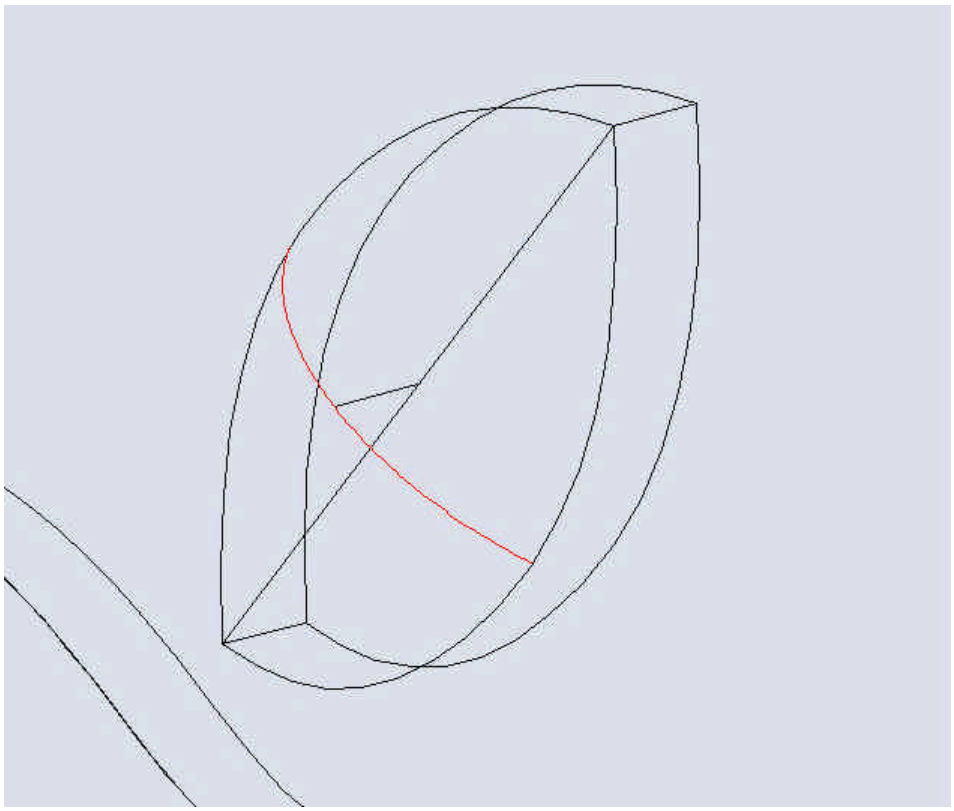
Create another line for the midpoint of the new line out along the Y-axis **1/16”**.



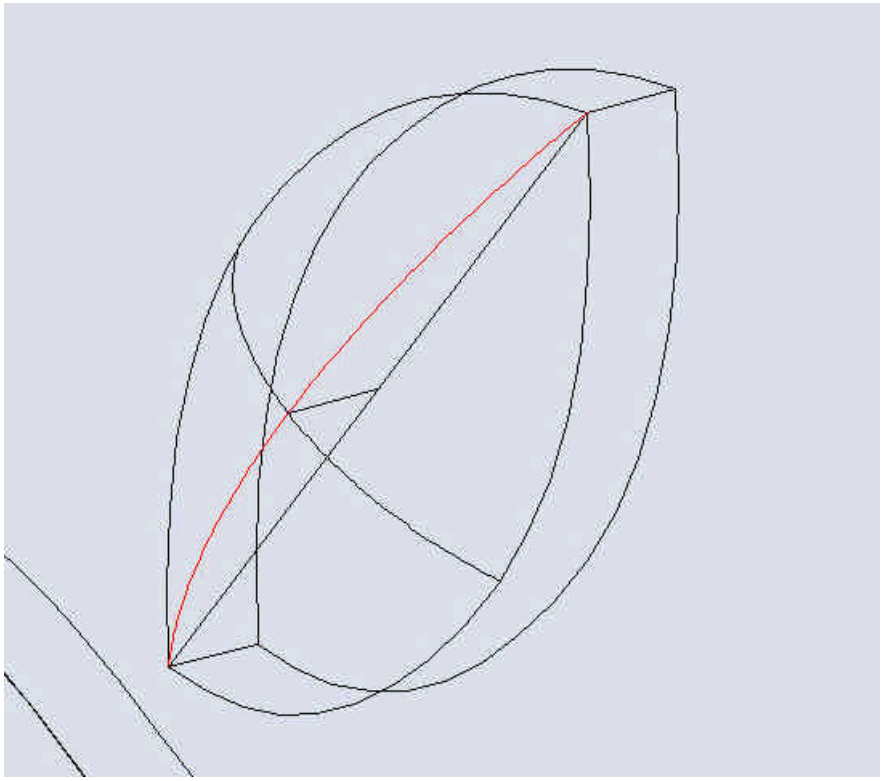
Select the 3-Point Arc tool.



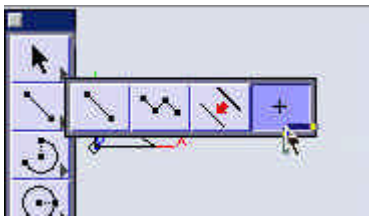
Create a 3-Point Arc at the 3 points shown below.



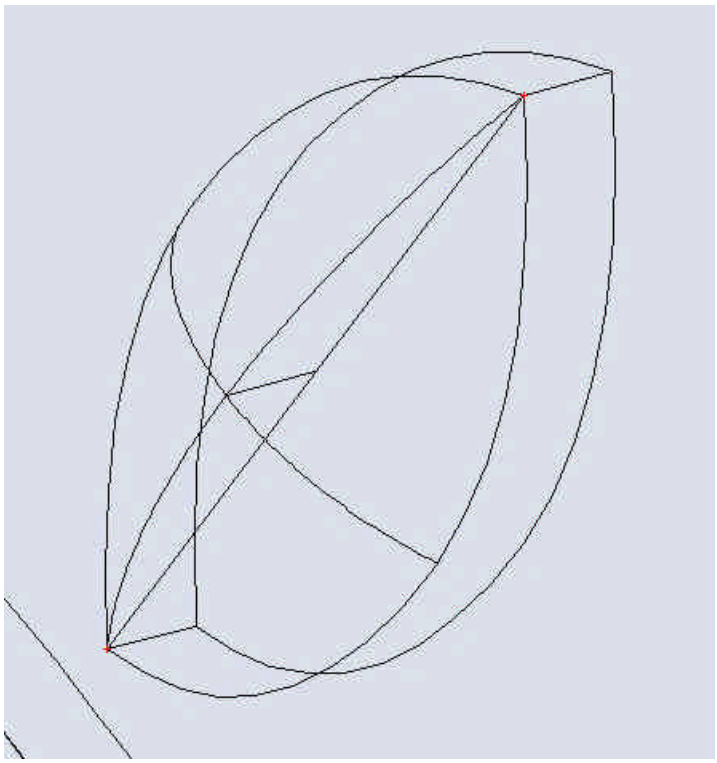
Create another 3-Point Arc as shown below.



Select the **Point** tool.

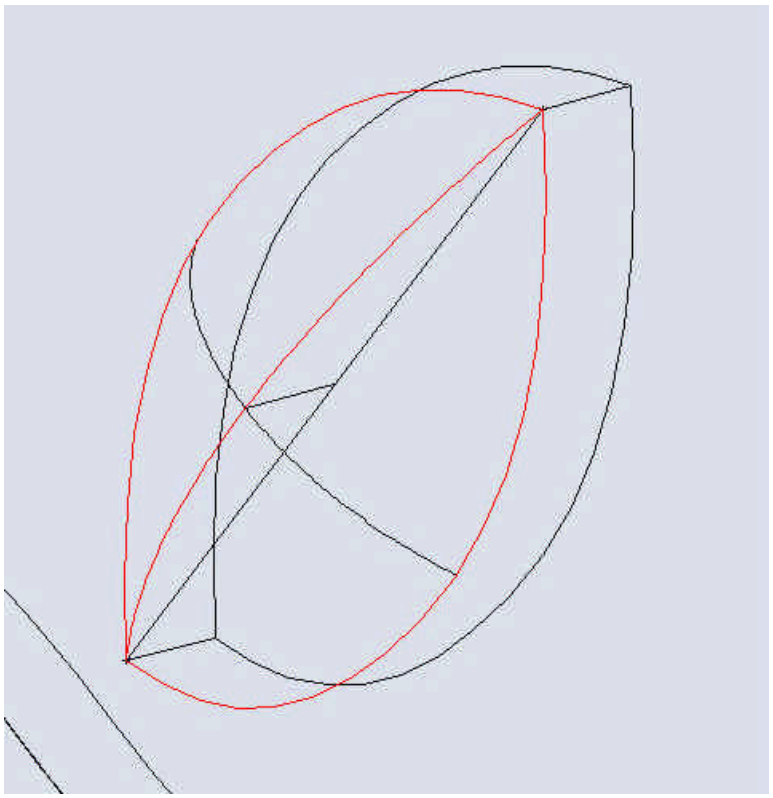


Place points at the two corners of the front face as shown.



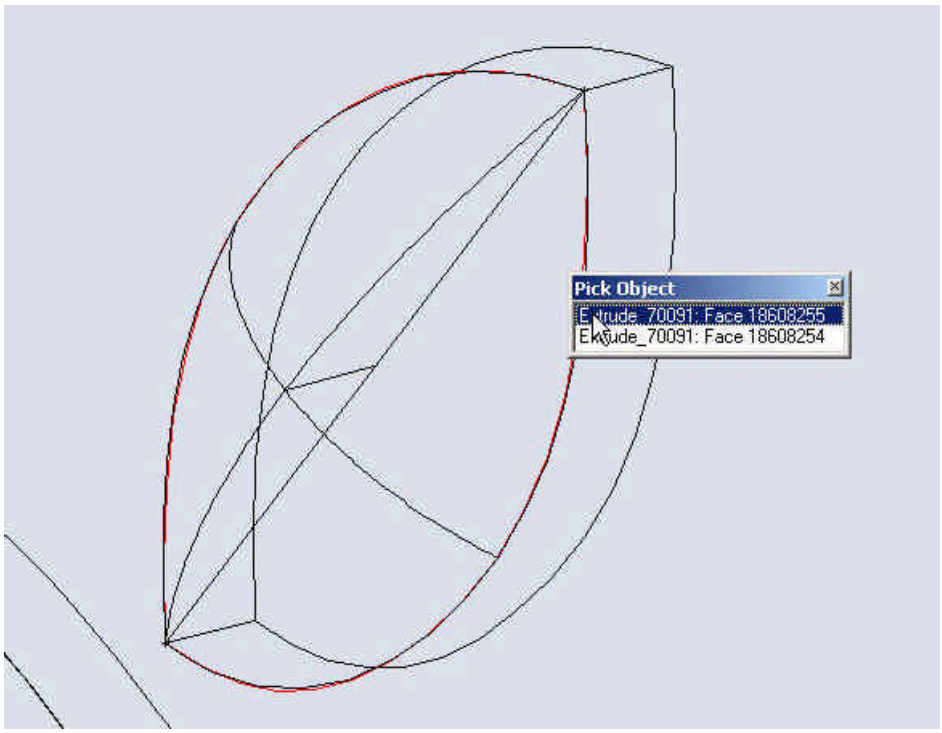
Select the **Net Surface** tool.

Select the geometry as shown below.

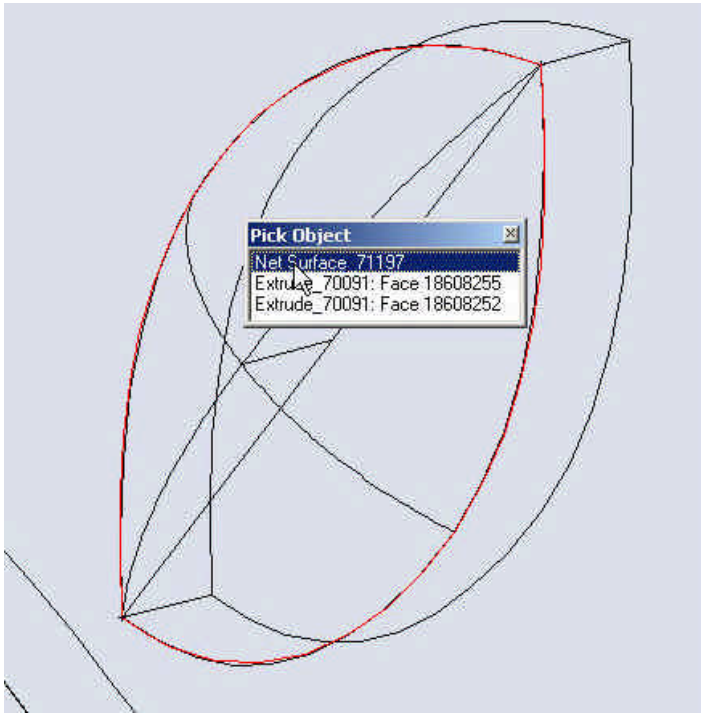


Select the **Replace Face** tool.

Select the front face of the smaller portion of the apple extrusion.



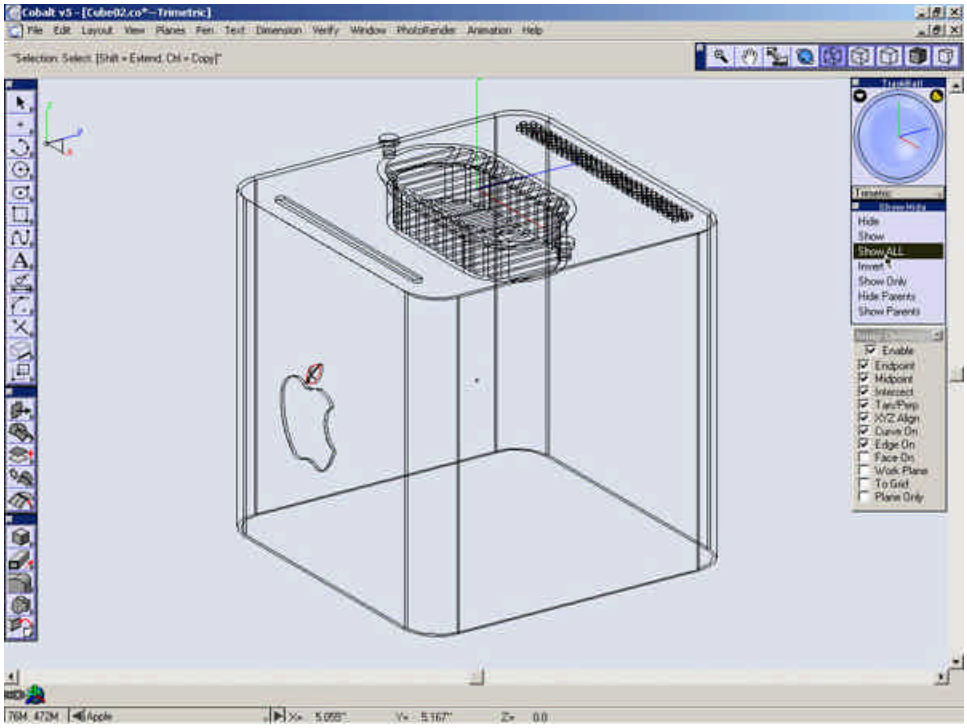
Select the " Net Surface".



Open the **Layer Manager**.

Turn on all Layers.

Select **Show All** from the **Show-Hide** palette.



Zoom All.

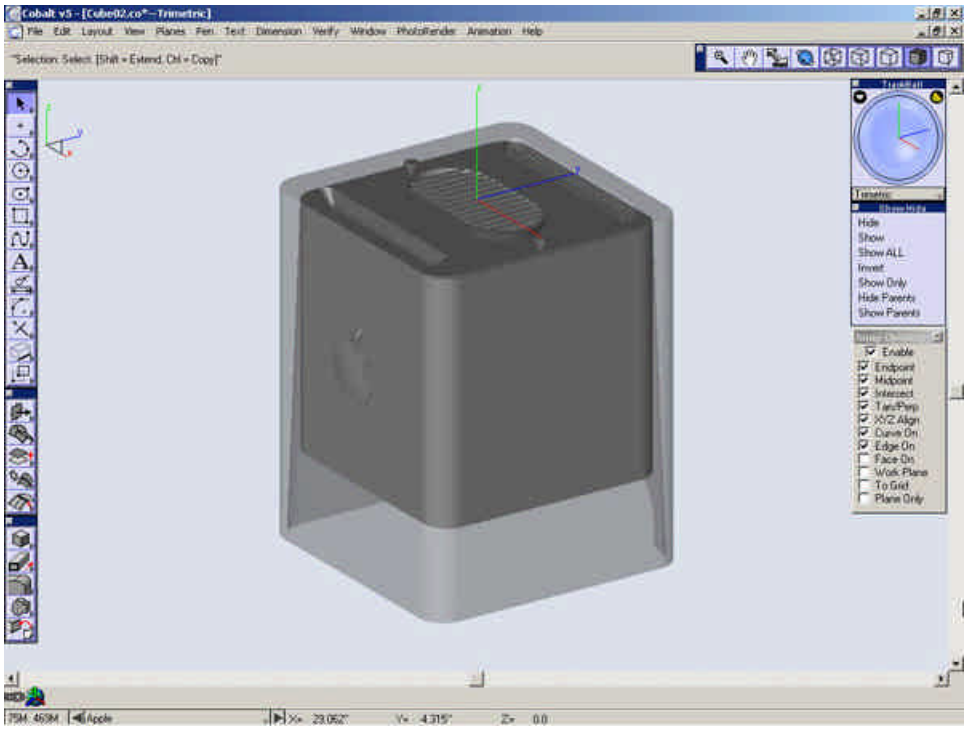
Open the Select Mask.

Highlight only Solids in the Type Field.

Double-Click on the **Select** Tool to Select All.

Select **Show Only** from the Show-Hide palette.

Shade the view.



Save the File.

This is the last section concerning modeling our cube. The rest of our tutorial focuses on applying materials to the parts in our model and setting up scene with lighting and rendering a final image.

Click below to proceed to the next section.

Materials, Lighting, and Rendering

Lighting and Rendering

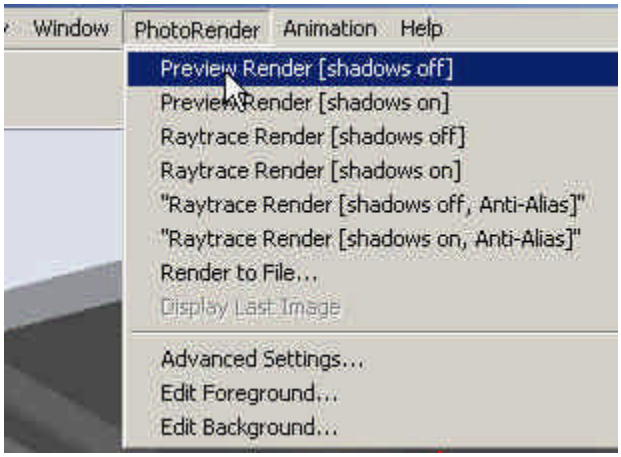
This last section brings our model together to create a rendered image. This is a power of Ashlar-Vellum software that can be pulled together with a model to create a very powerful presentation piece to sell your idea or reassure our client

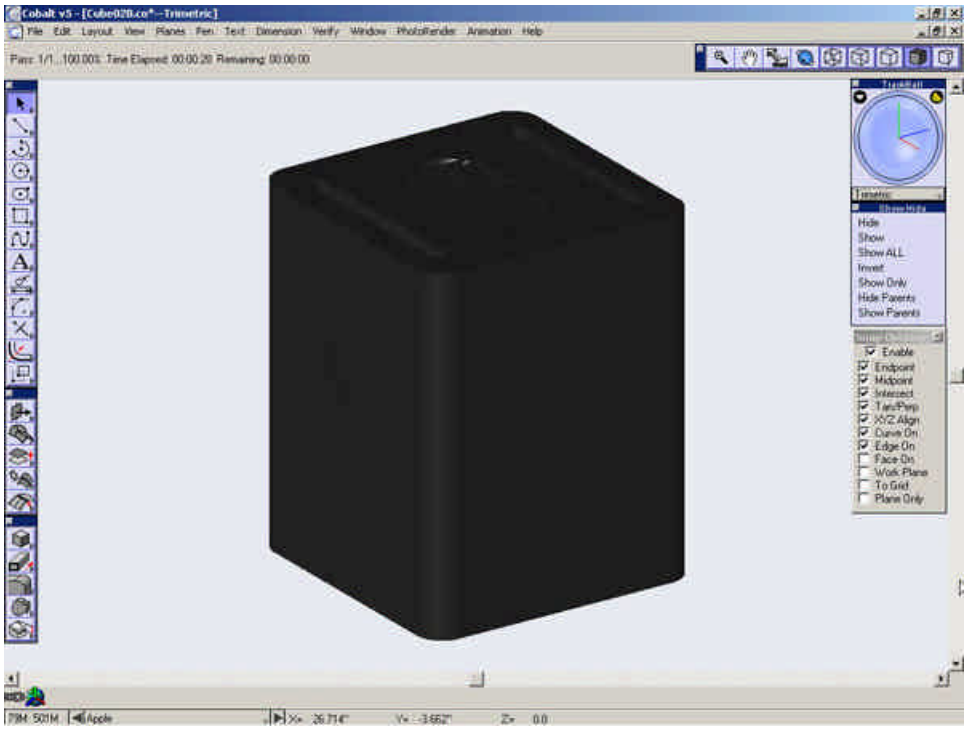
that they chose the right designer for the job. In contrast, a poorly rendered image can hurt your idea just as a good one can sell it. The basics of rendering that are most important to the final image are materials, lighting, scene, and perspective.

These attributes alone can make a noticeable difference in the final image, but pieced together can create create a surprising realistic and effective piece (I think its that whole Gestalt thing making that happen.)

The best way to see the power of what can be done is to see it before and see it after. So to begin with, lets render the current view to see how it looks right now.

Render the Current View. **PhotoRender>Preview no shadows**.

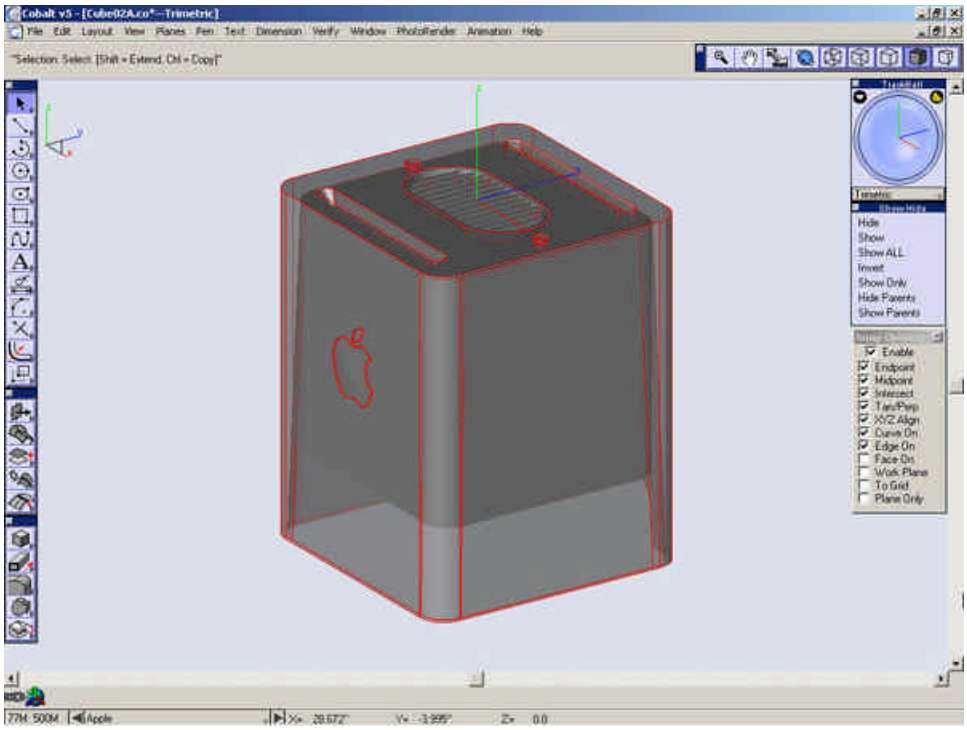




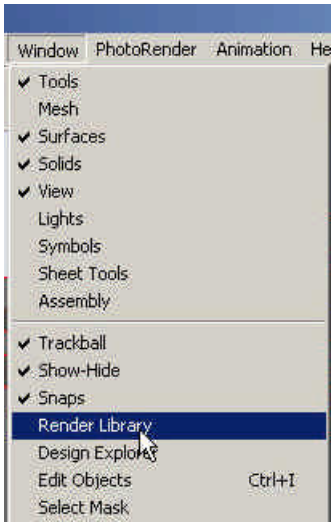
Not too impressive. It basically looks like a big block of nothing. Well, we are about to change all of that.

There are many ways to set the material of an object in your model. The first (and easiest) is to select a pre-built material from the **Render Library** provided by the Ashlar-Vellum software.

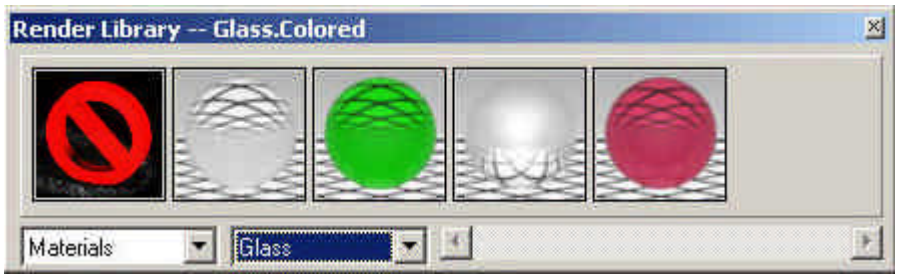
Select the Outside Case.



Open the **Render Library**.



Select “**Materials**” and “**Glass**” from the drop-down menus.



Right-Click (**Option**-Click on a Macintosh) on the “**Glass.Clear**” material and select “**Apply Material to selected object**.”

That's all there is to it. Select what you want, and put in on there. Even though Ashlar-Vellum software provides a great variety of materials, it is often times necessary to make something a little more custom. One way to accomplish this is to create a material from scratch.

Click below to proceed to the next step.

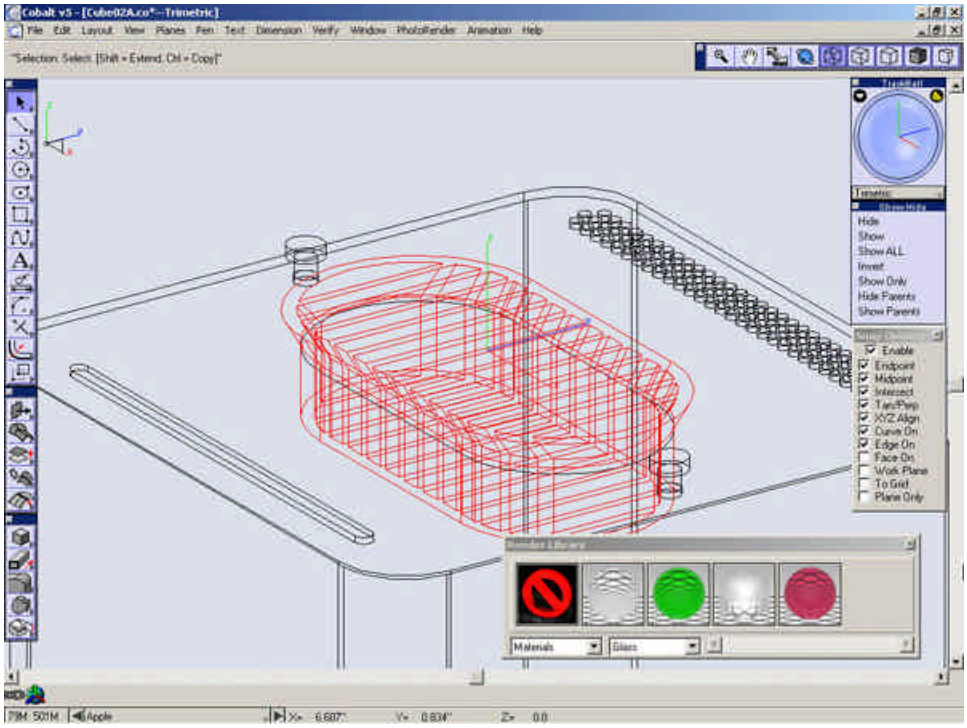
Lighting and Rendering 2

Lighting and Rendering 2

Turn off the “**Outside Case**” layer.

Zoom in on the Grill.

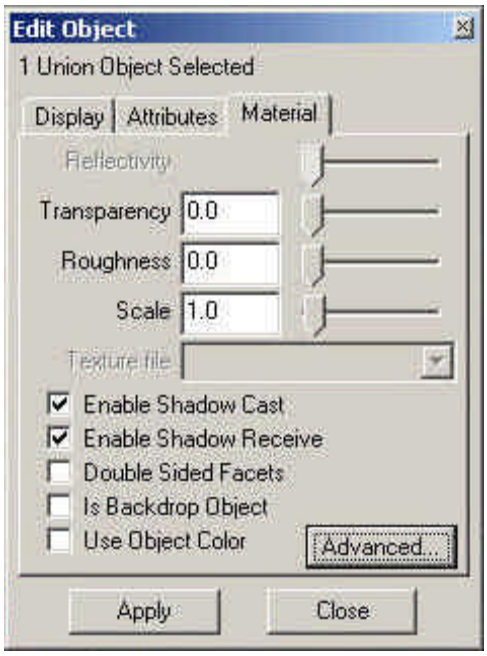
Select the Grill



Open the Edit Objects dialog.

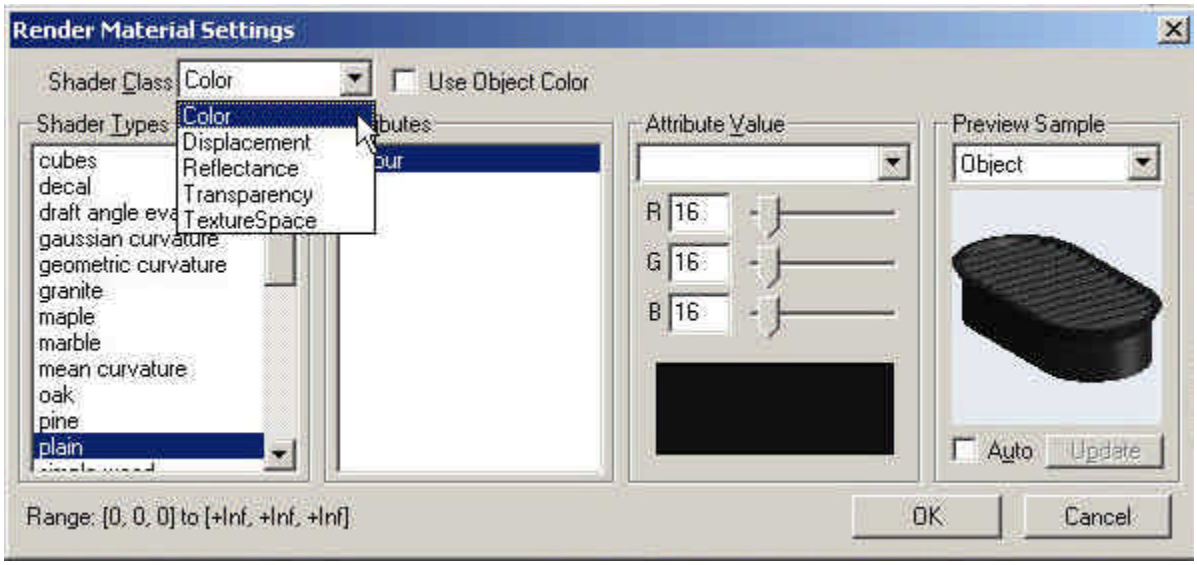
Under the Material tab uncheck "**Use Object Color**" and select **Apply**. The settings provided under the material tab in the Edit Objects dialog are very good for piecing together a very quick material. But in order to take advantage of all that the rendering within Ashlar-Vellum software has to offer, it is necessary to get into the advanced Render Material Settings.

Select "**Advanced.**"

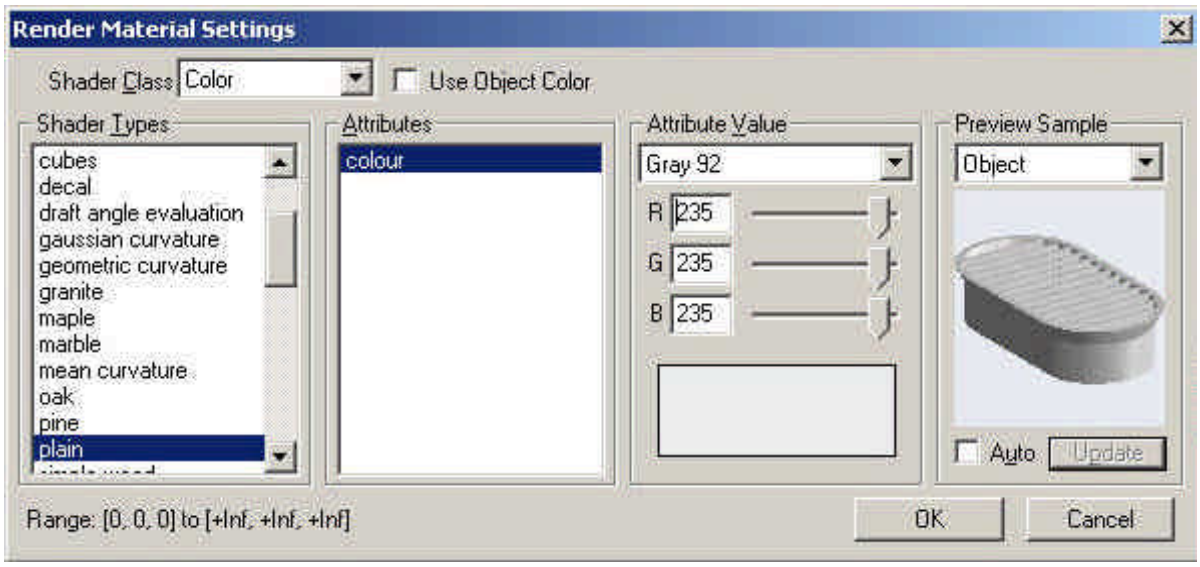


Look at the dialog.

It uses 5 main properties (shown in the Shader Class.)



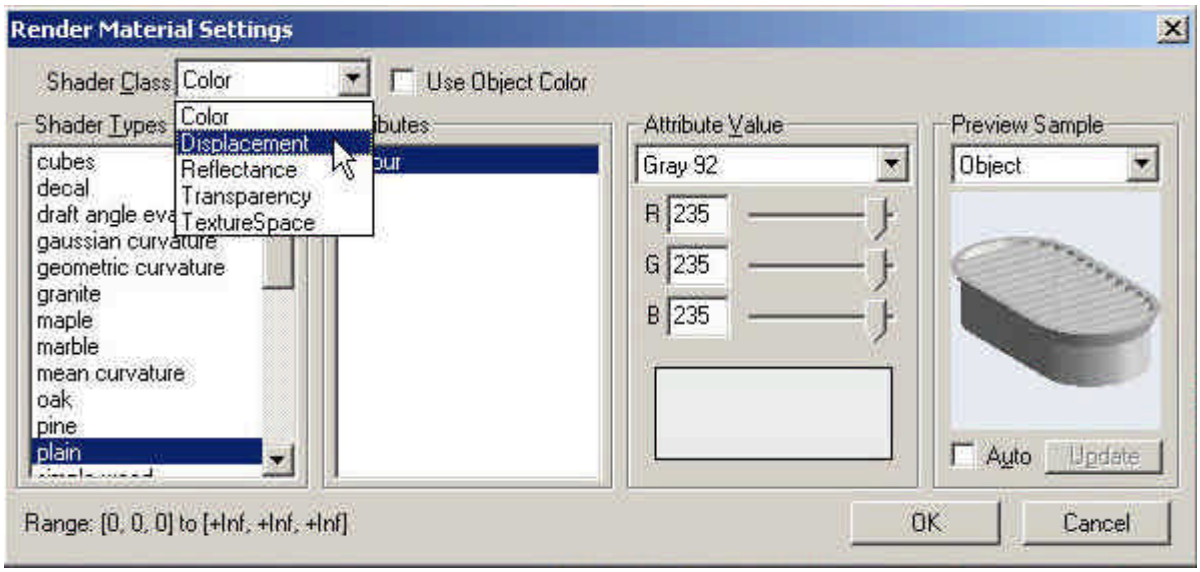
First, select the **Color** shader type.



Leave the Shader Type as **plain** and set the attribute to Gray 92. You could also just type the RGB values in to their respective fields (235,235,235.)

Select Update under the thumbnail preview.

Go to Displacement.

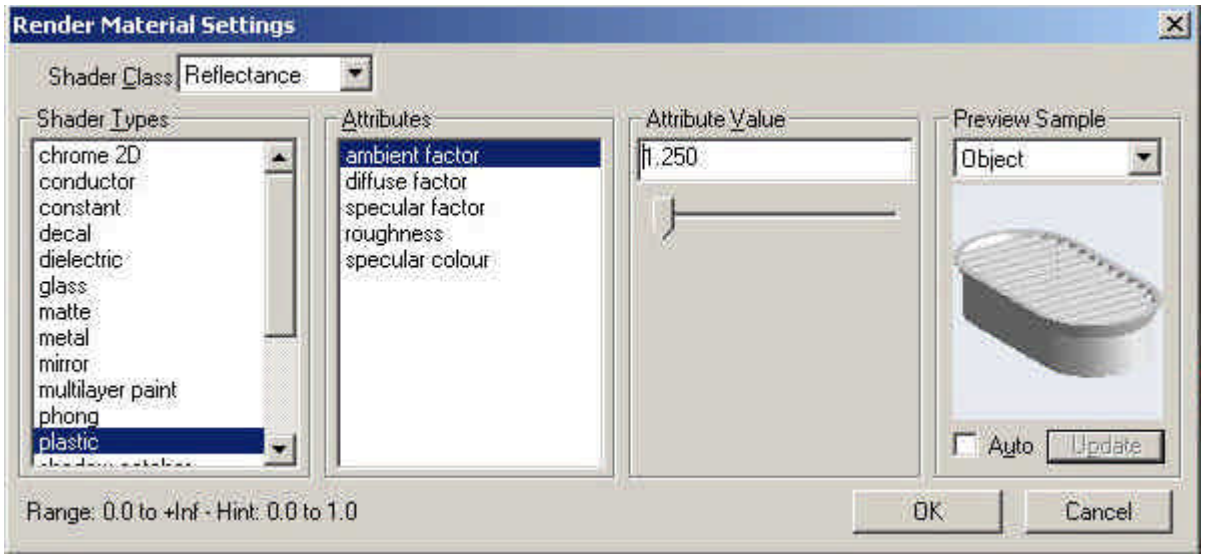


Set it to **None**.

Update Preview.

Select Reflectance.

From the best I can tell the grill piece on the actual computer is metal. I for one would like to thank them for making the piece from actual metal. Too many times in design and production, I have seen products made from plastic that imitates metal or some composite material such as carbon fiber. This only gives a feel of lack of quality in any such product. I understand that it could have been a cost reduction or some other factor that led to the decision to make the product out of some imposter material, but that decision robs the product of its experience. One of the many beauties of metal is that it is indeed metal. Its malleability, its conductivity, the way it holds heat as well as retains its coolness. its tactile interaction with the hand. These are things that plastic cannot replace. Don't mistake me; I'm not anti-plastic, merely pro-metal. I strongly believe there is a place for plastic. It has many qualities itself the metal cannot imitate or replace. But the place for plastic is definitely not to replace and mock the good name of metal.



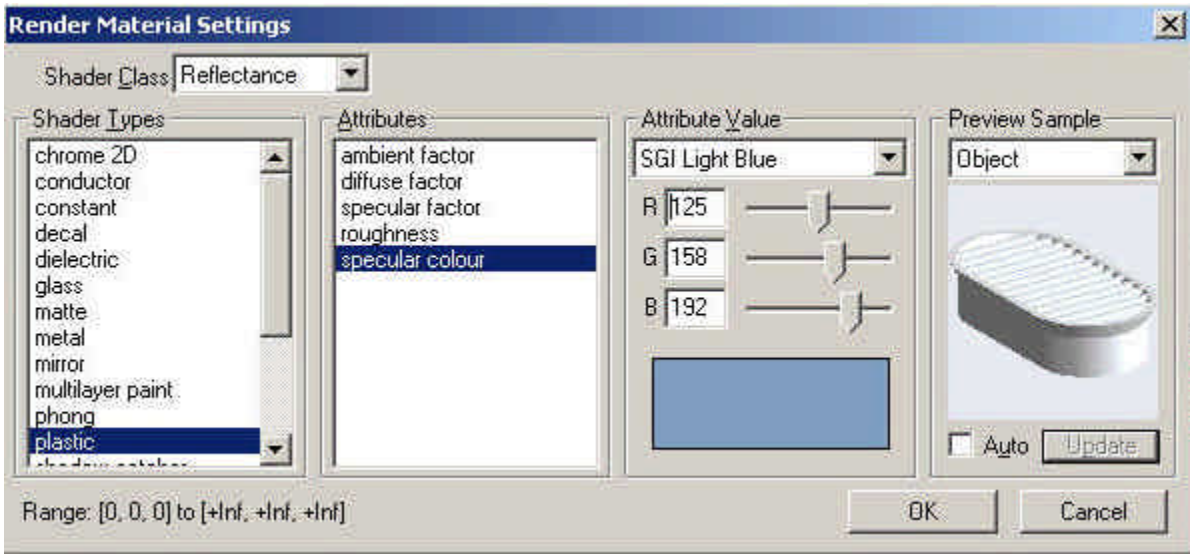
Let me step from my pulpit so that we can get back to why you are here. As I previously stated the grill on the actual computer is metal. But what we are attempting here is to give the appearance of metal. As this may contradict my small sermon, remember that this is just a rendering not the actual piece. The setting we choose here is intended to give the soft reflection of the piece in the real world. The Metal setting, (which seems to make sense for this piece) gives a very hard highlight and a bit of a mirror reflection on the piece. The Plastic Shader type is much softer and more appropriate for this piece. Set the Shader Type to Plastic.

Set the values as following:

a. Ambient Factor 1.25
b. Diffuse Factor 1.0
c. Specular Factor 1.0
d. Rough 0

e. Specular Color- SGI Light Blue. (This will make the highlight a softer cooler color and feel.)\

Select Update to see how our changes have affected our piece.



Select **OK** to close the Render Material Settings dialog with our changes.

Select **Apply** in the Edit Objects Dialog.

We will create another material from scratch to apply to the Inside Case.

Select the Inside Case.

Deselect "**Use Object Color**" in the Edit Objects dialog and select Apply.

Go into the advanced **Render Material Settings** for this object.

Select the color as **Gray 92**.

Set the Displacement to **None**.

Set the Reflectance to **Phong** and use the following values for the Attributes.

a. Ambient Factor 1.5
b. Diffuse Factor .75
c. Specular Factor .85
d. Exponent 10(Default)
e. Specular color (Default)

Select **OK** in the Render Material Settings dialog.

Click below to proceed to the next step.

Lighting and Rendering 3

Lighting and Rendering 3

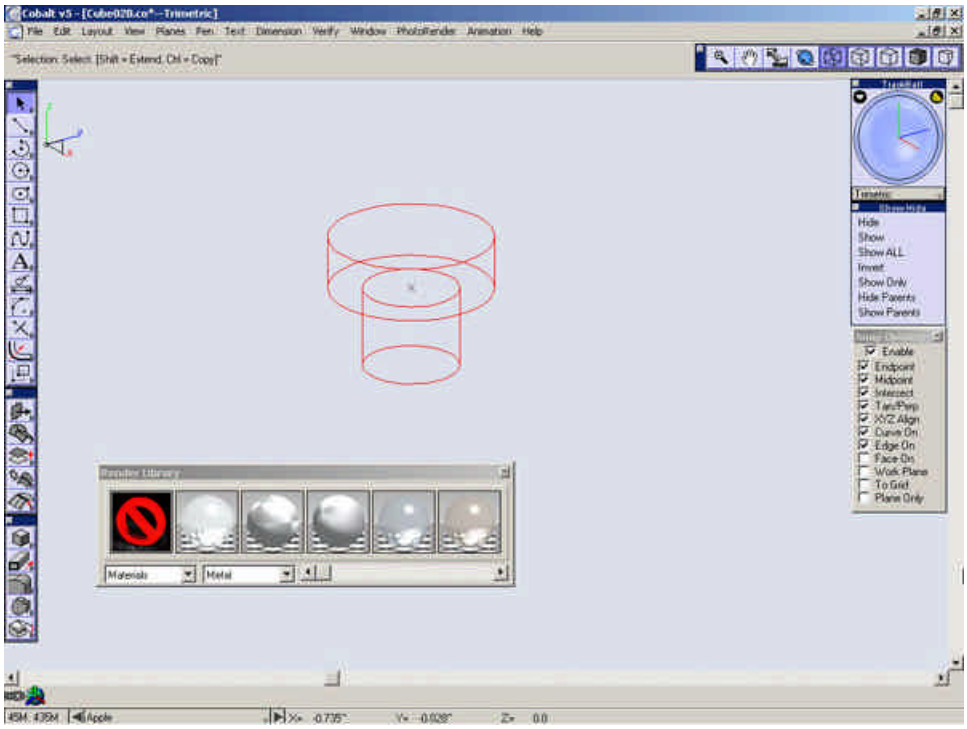
Yet another way to get a material for apart just like we want it is to apply and edit an existing material provided from the Ashlar-Vellum software. At some point you may see a material in the Render Library that is very close to the effect that you are trying to achieve. For instance, you like the way it reflects, you just need it be a different color. Next we will set a render library and adjust certain attributes to achieve the effect we need.

Hide the “Inside Case” and “Grill” layer.

Zoom in on the leftmost post.

Select the **Select** Tool.

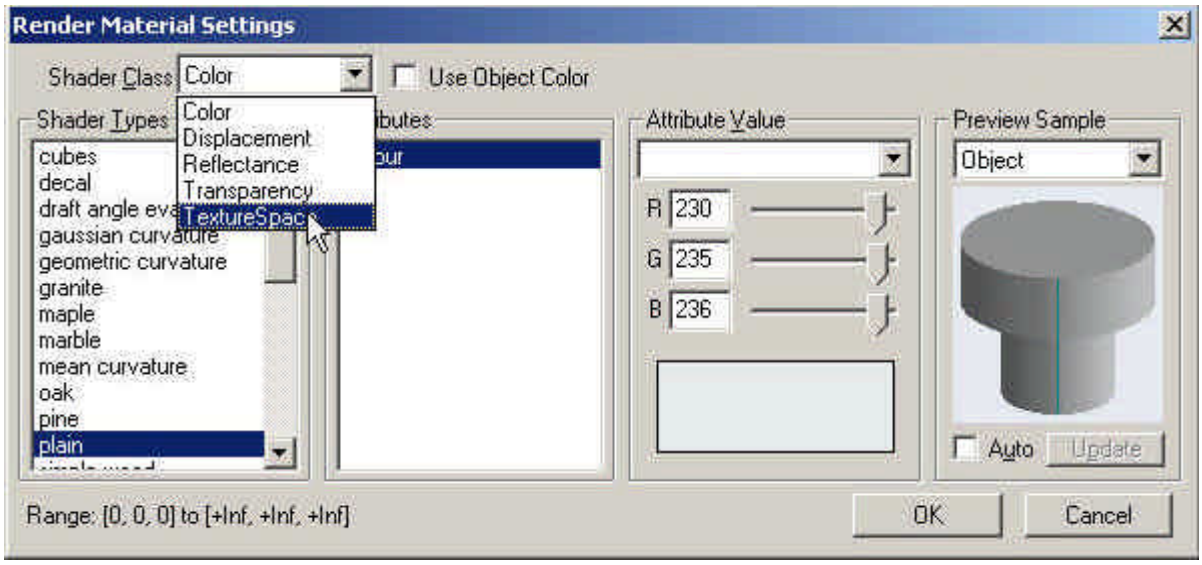
Select the Post.



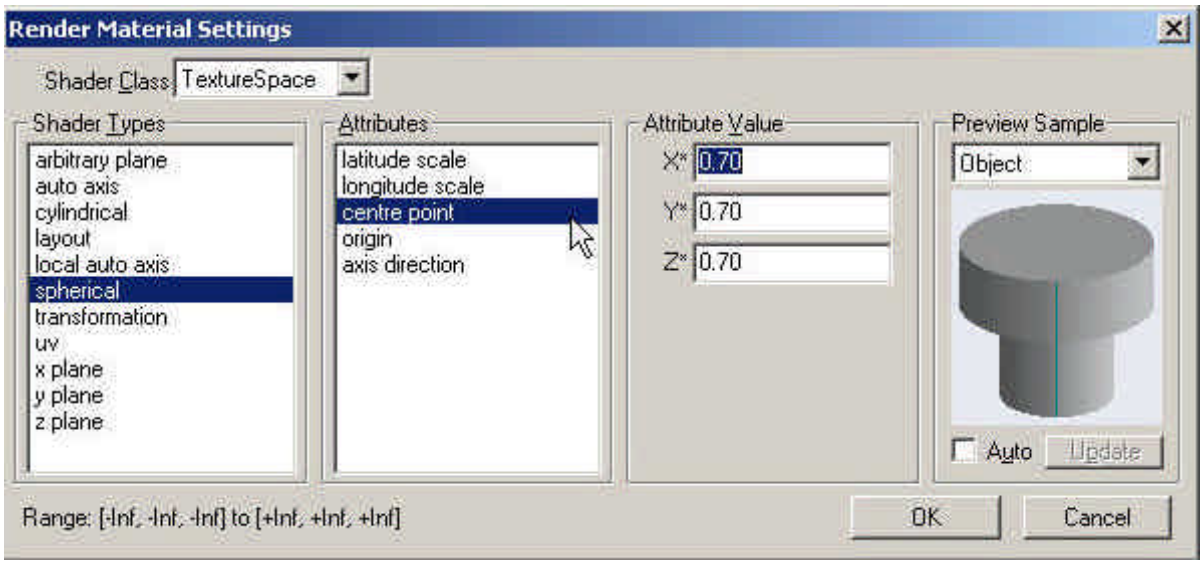
Select “**Metal**” from the drop-down list in the Render Library.

Drag the material **“Metal.Aluminum(L.Brushed)”** to the post.

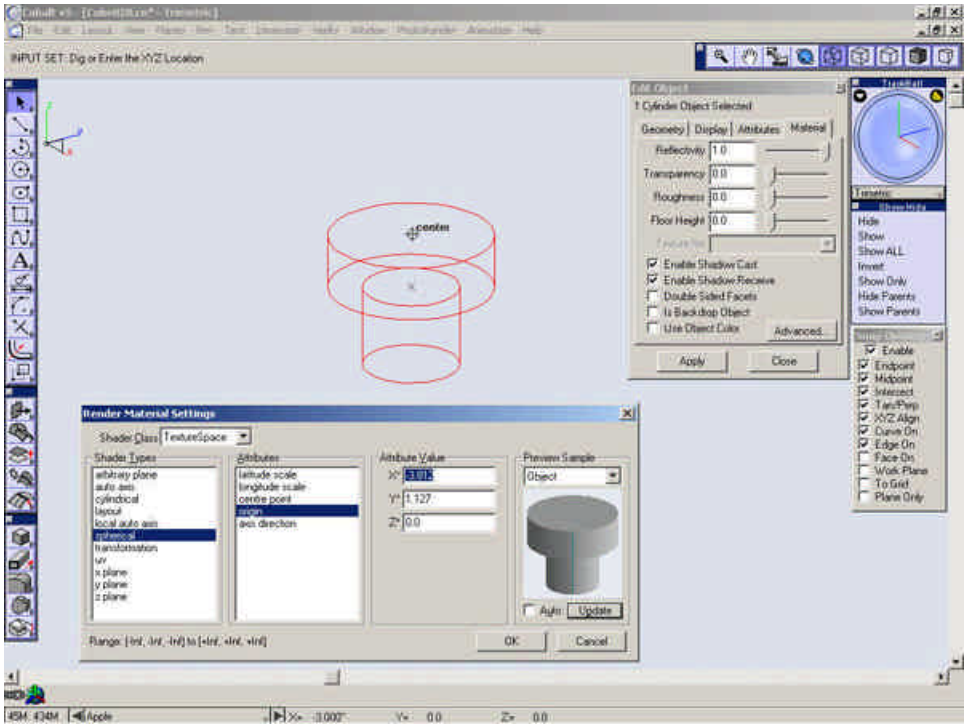
Open the Render Material Settings for this object and go to the “TextureSpace” Shader Type.



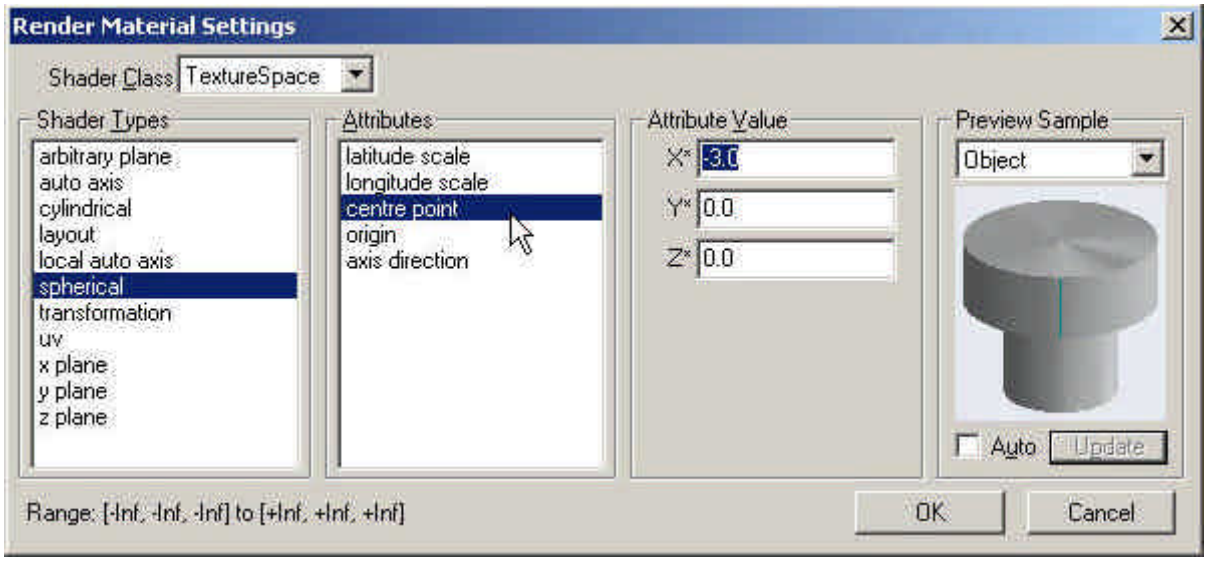
Select the **center point** Attribute.



Select the center of the top face of the post.



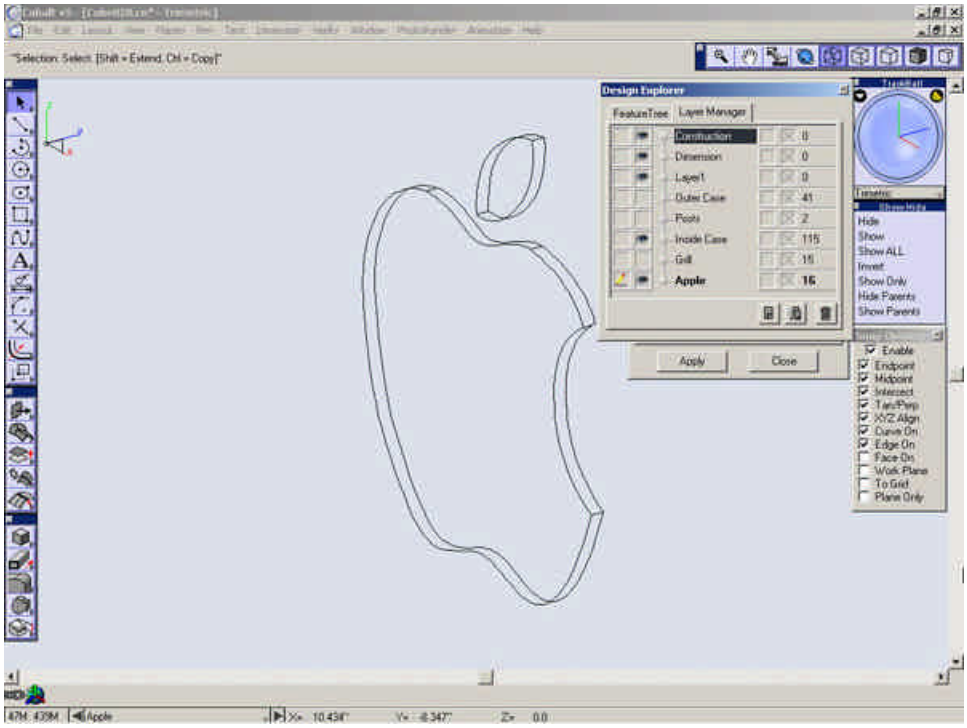
Select Update. By changing this attribute we are able to give the effect of the spun aluminum that the actual piece.



Zoom in on the other post and repeat this procedure.

Hide the “**Posts**” Layer.

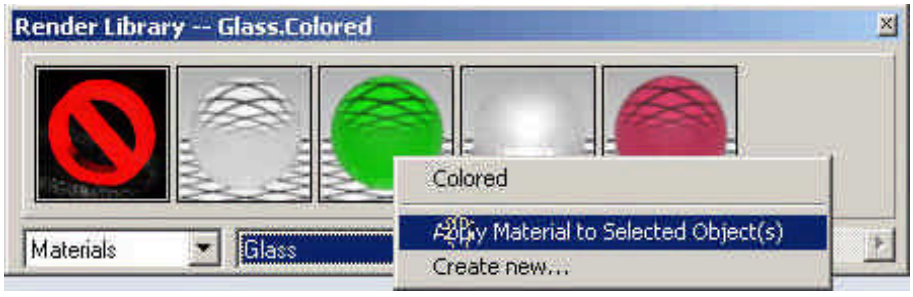
Zoom all.



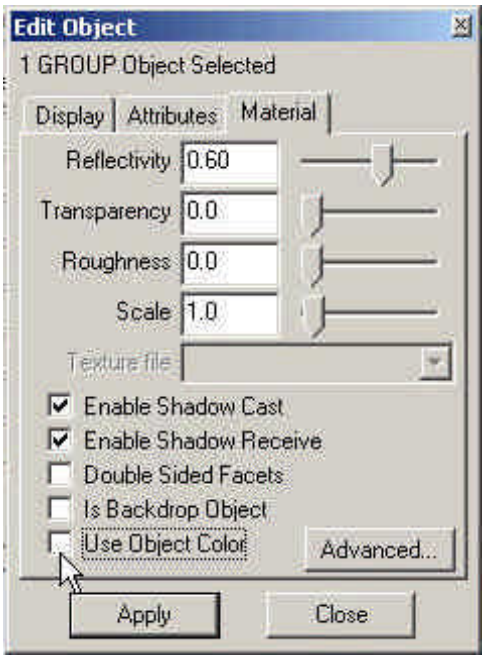
Select the main part of the Apple.

In the Render Library, set the material to “Glass”

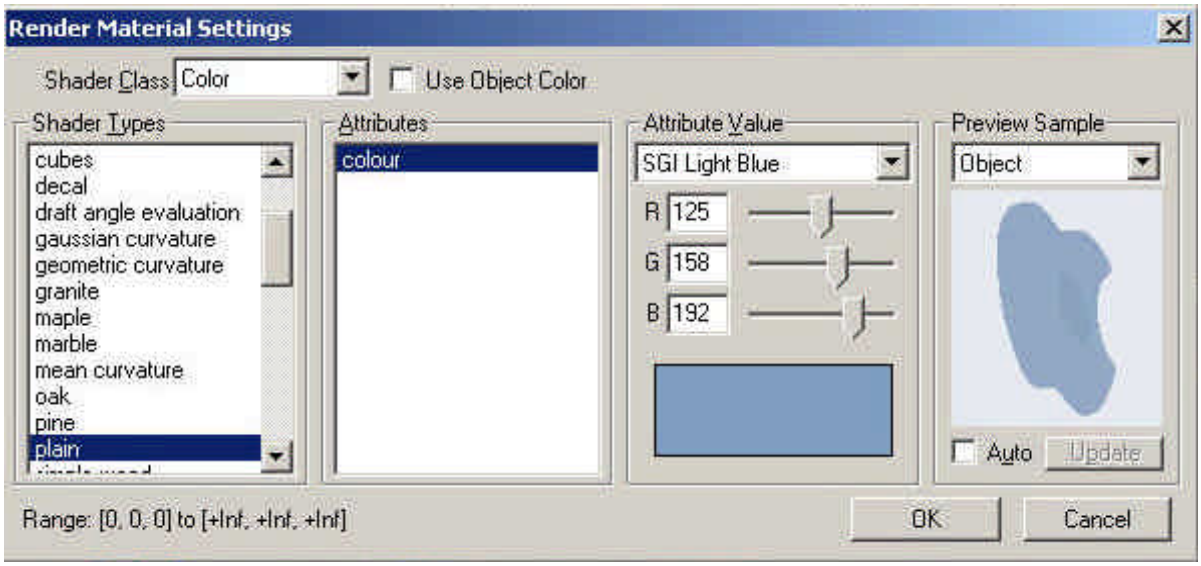
Apply the “Glass.Colored” material to the main part of the apple.



In the Edit Objects dialog, deselect “**Use Object Color**” and select **Apply**.



Change the Color to **SGI Light Blue** and Select OK.

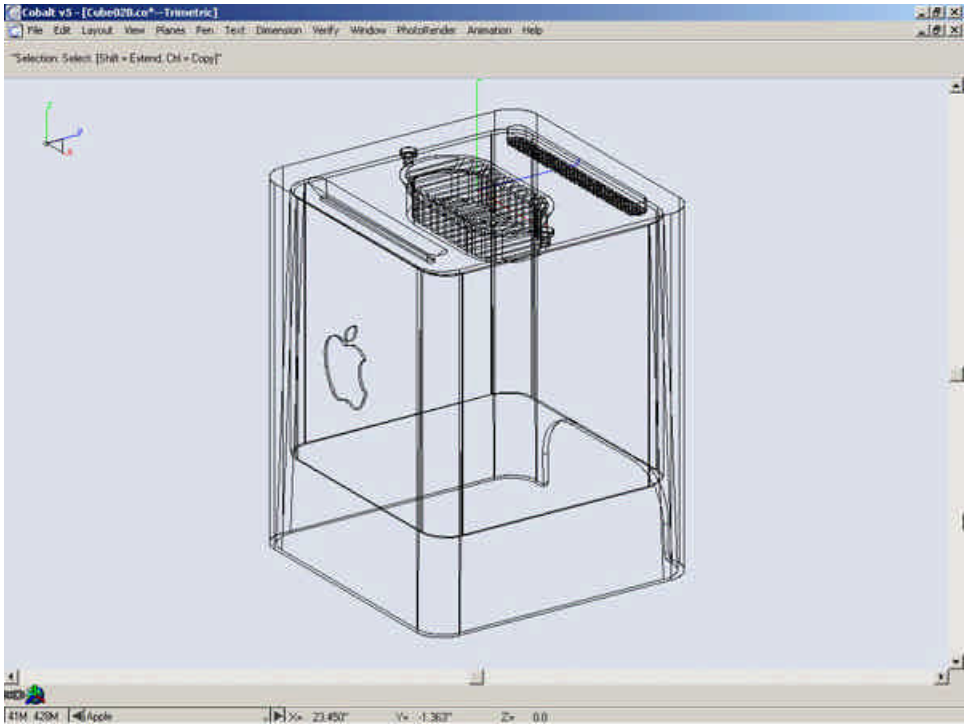


Repeat this for the Smaller portion of the Apple.

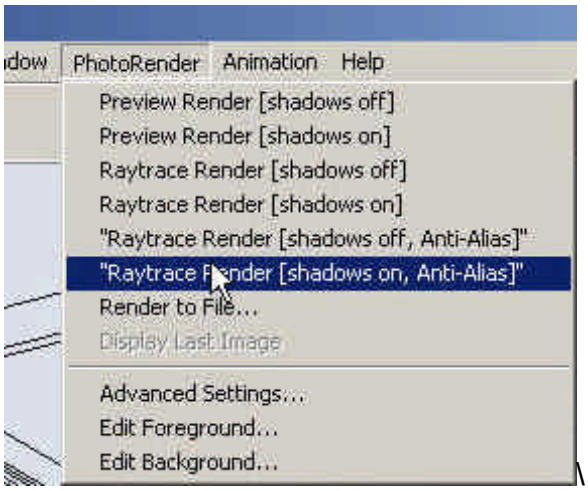
Turn on all Layers.

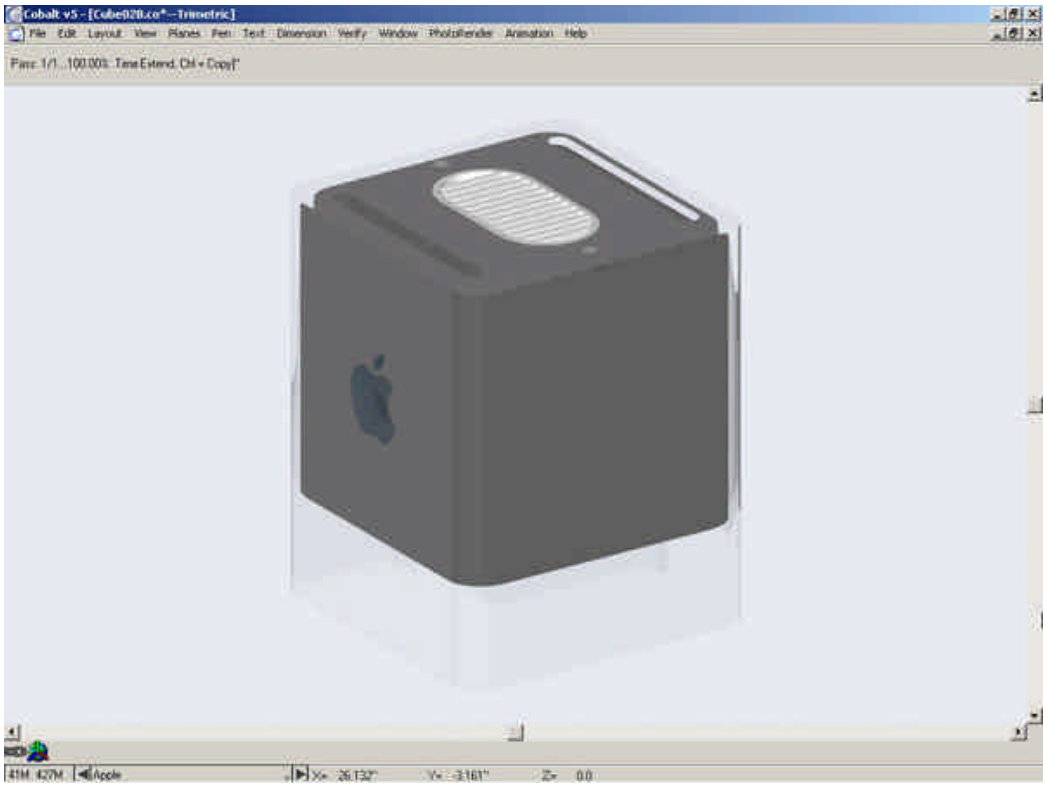
Zoom All.

Select Window>Hide all tools.



Select PhotoRender>Raytrace Render [shadows on, anti-alias].



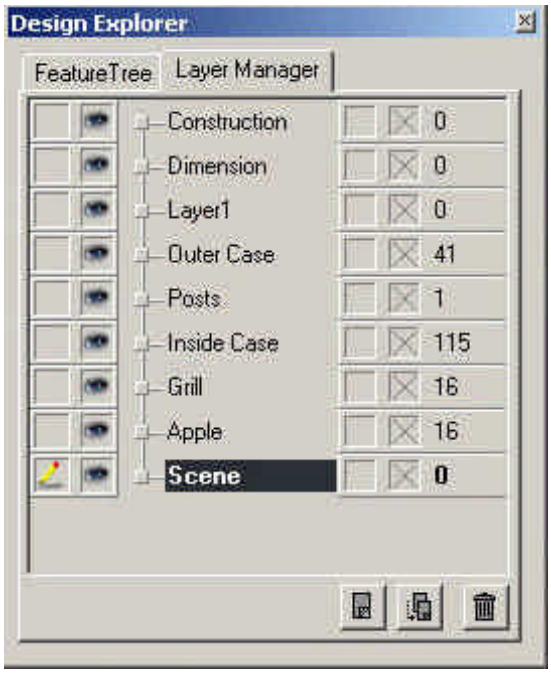


This definitely makes a noticeable difference in out model. Although not complete, the materials do help our image. The next part of the process concerns setting up the scene with lighting and other objects to complete the image.

Lighting and Rendering 4

Show all tools.

Create a new layer, rename it “**Scene**” and make it current.



Close the Layer Manager.

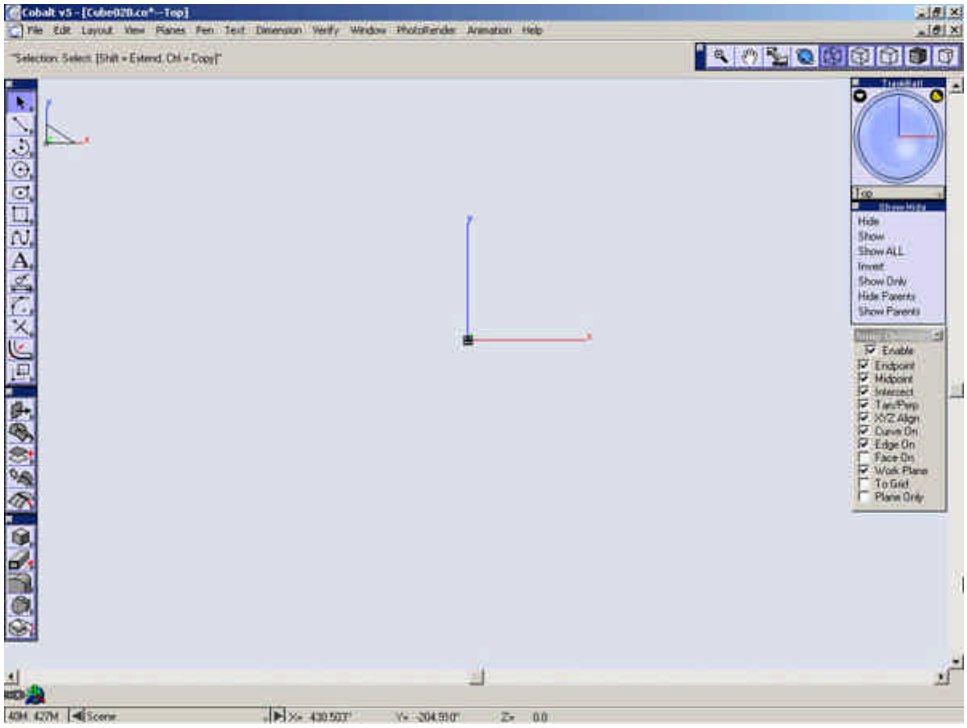
The first part of our scene will be a floor that the model sits on. This will give it shadows from the lighting and something in the environment for the model to reflect off of.

Close the **Render Library** and **Edit Objects** Dialog.

Go to the **Top** view.

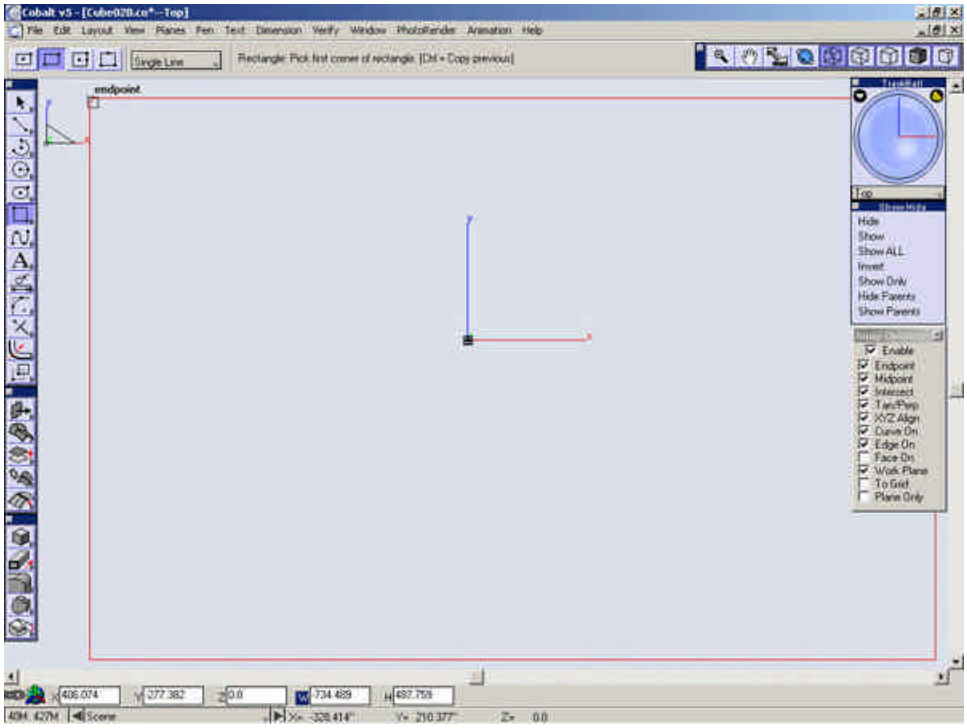
Turn on the **Work Plane** Snap.

Zoom way out on the model.



Select the rectangle tool.

Create a rectangle from one corner of the drawing area to the other.

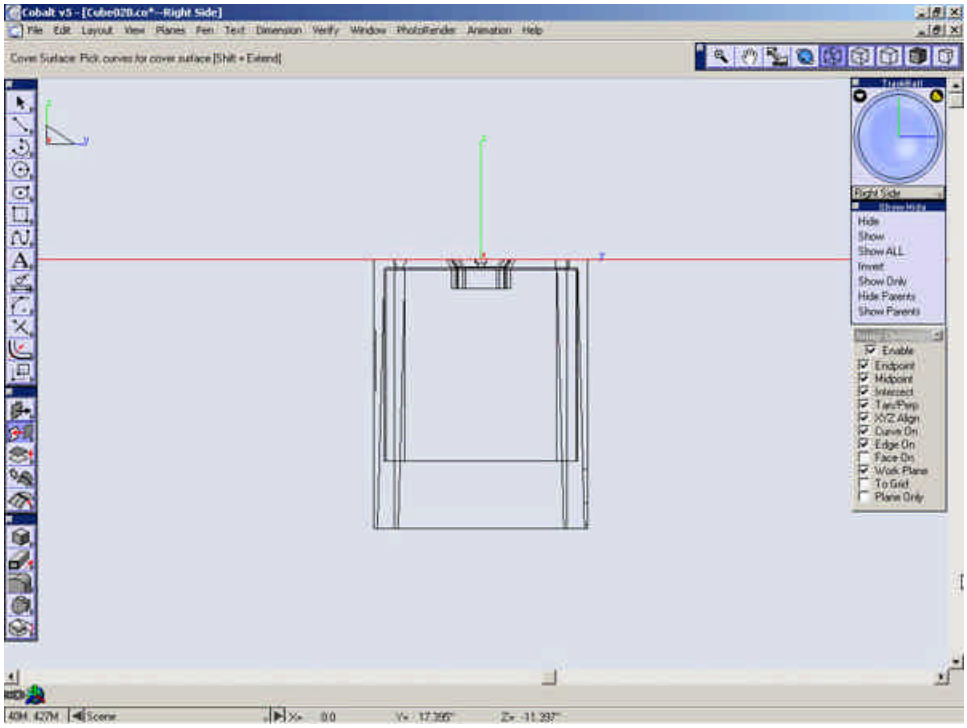


Select the **Cover Surface** tool.

Create a cover surface from the rectangle.

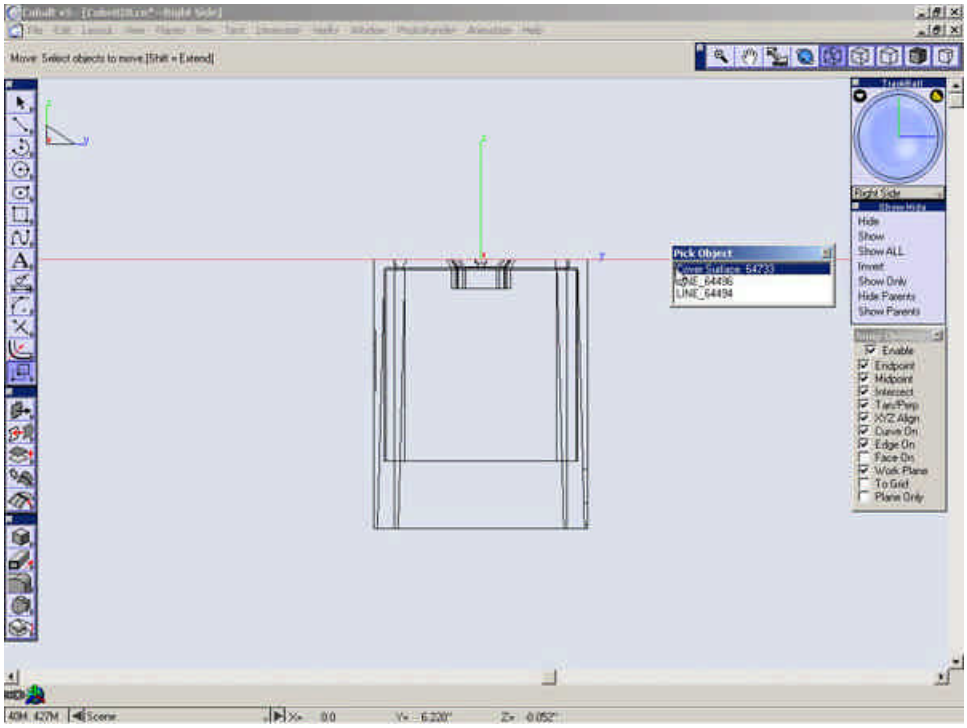
Go to the **Right Side** view.

Zoom out enough so that you can see all of the outside case. As you can see, right now our floor is above our model. This will not be a good thing for the rendering, so we need to move it down.

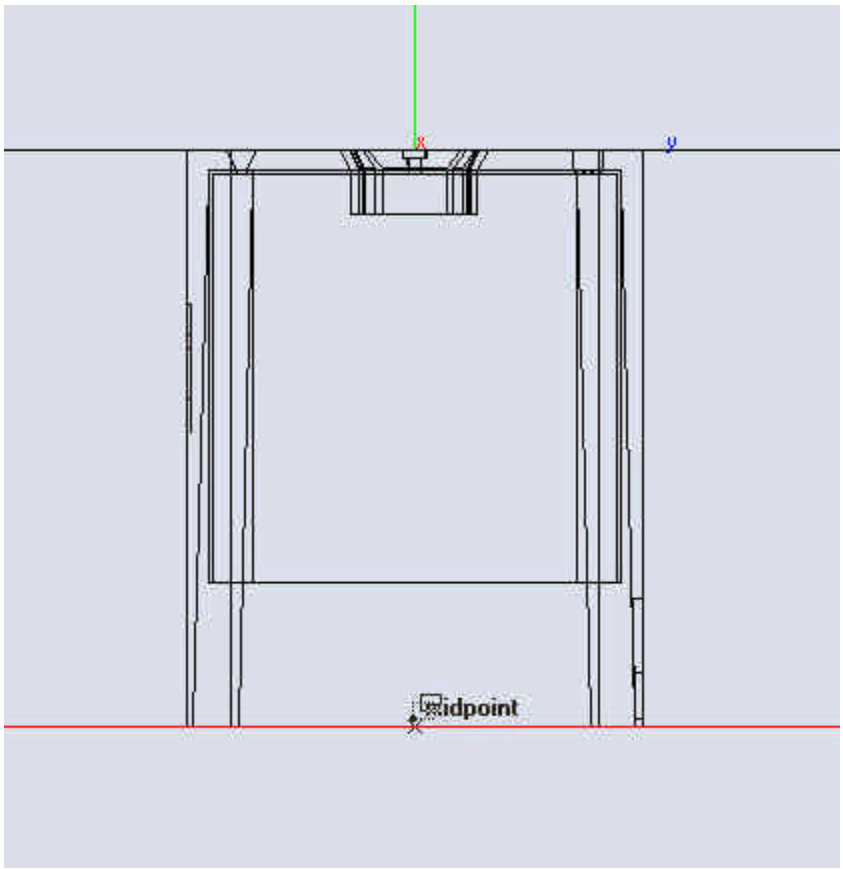


Select the Move Tool.

Select the Cover Surface.



Move the surface to the bottom of the outer case.

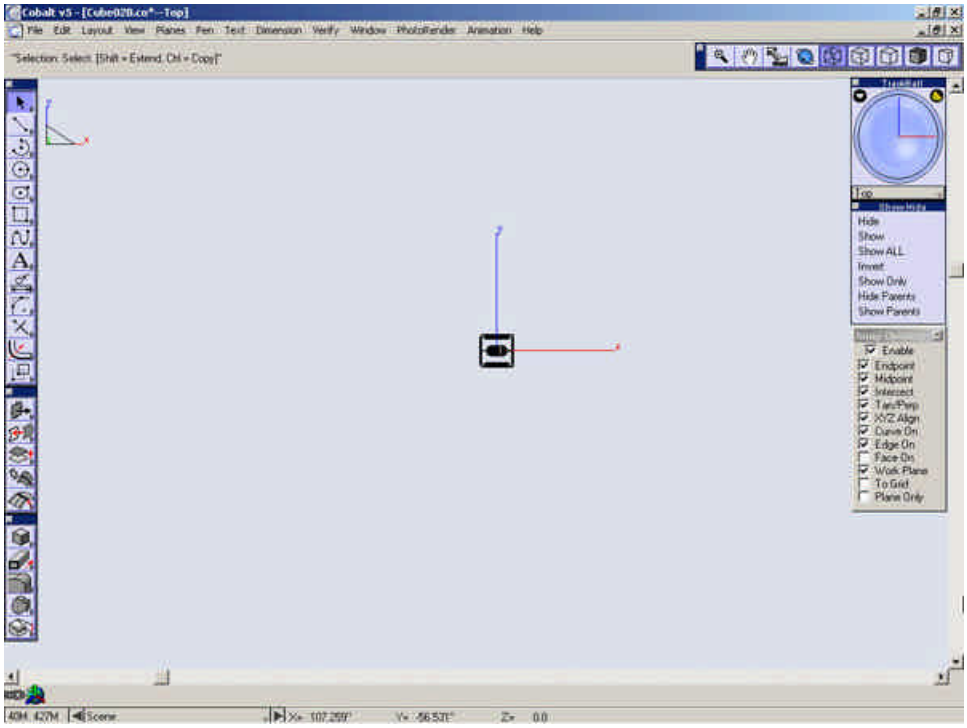


Hide the lines that make up the rectangle.

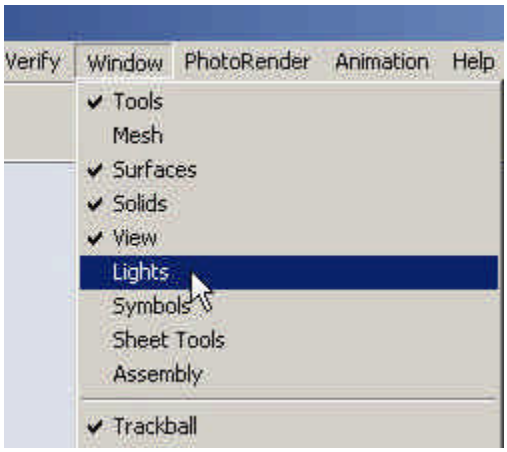
This completes our floor. This is about as simple as environment objects can get for setting up a scene, but it is quite amazing how much difference something so simple can make with an object such as this. A simple studio scene like this fits quite well with the content. It's clean and simple, something I believe the company who makes this product tends to carry out with many of their products and imaging.

Go to the **Top** view.

Zoom in a little on the model.

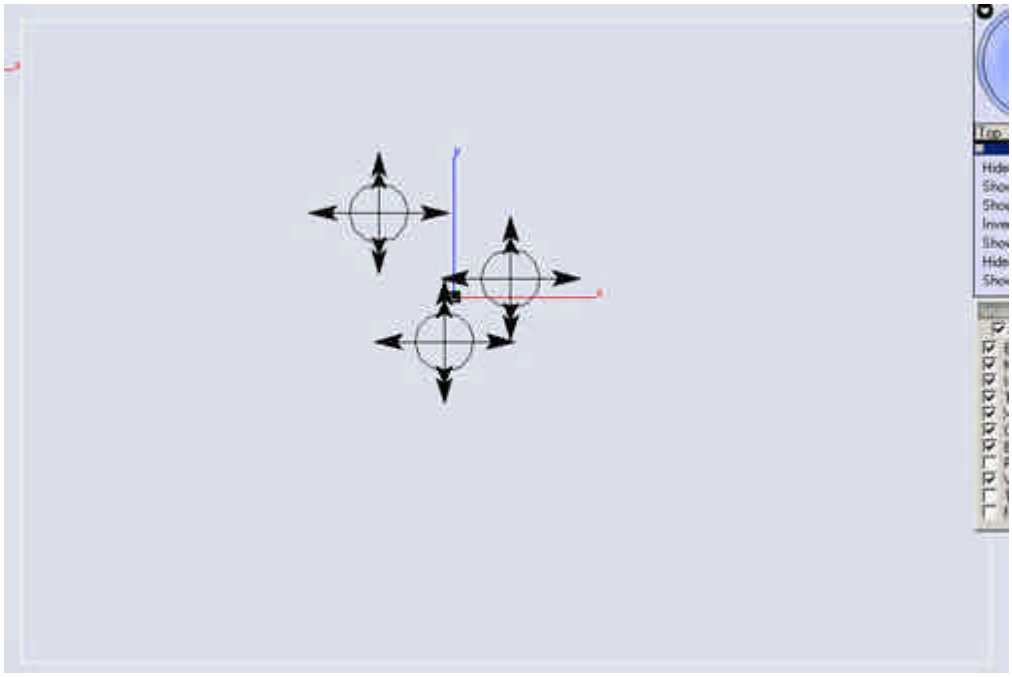


Open the **Lights** tool palette.



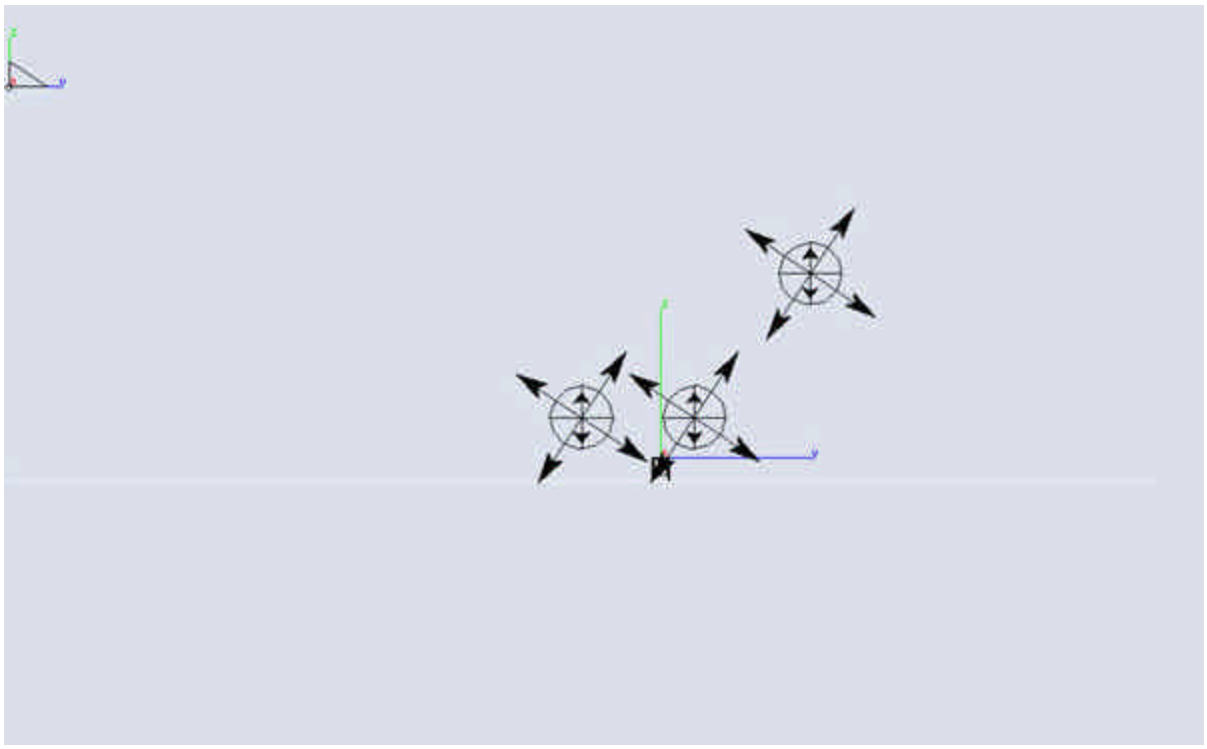
Select the **Point Light** Tool.

Place three lights close to shown below.



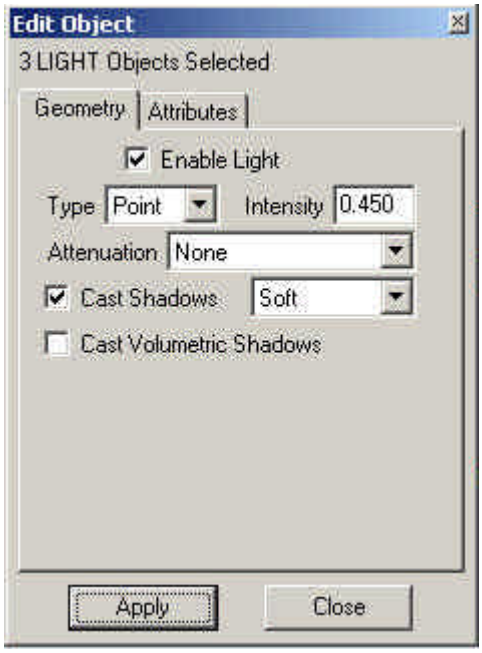
Select the **Select** tool.

Go to the **Right Side** view and move the lights up a little.



Select all three lights and open the Edit Objects dialog.

Change the shadow type to “**Soft**” and the Intensity to **.45.**



Go to **Trimetric** View.

Zoom all.

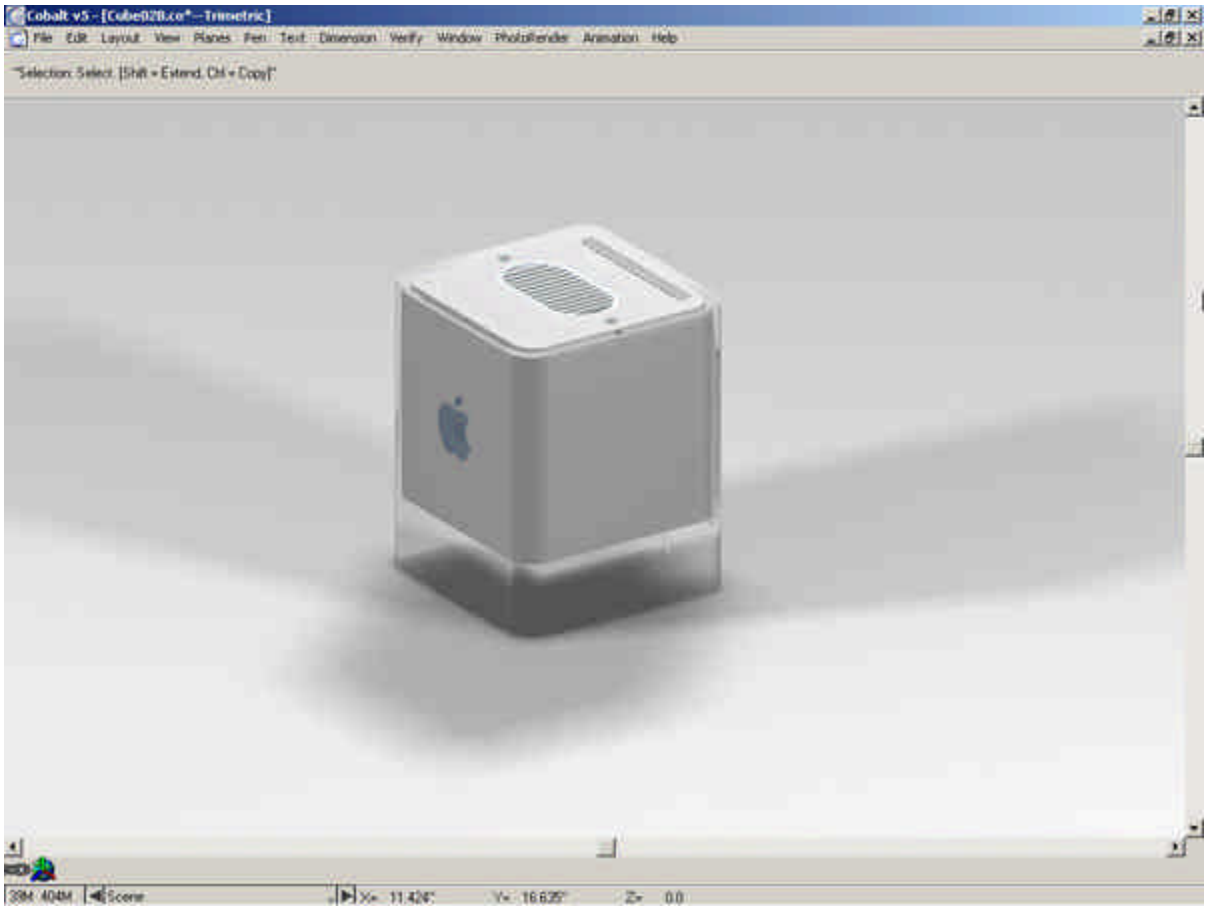
Select the " Cover Surface" (the Floor).

Deselect “**Use Object Color**” and open the advanced **Render Material Settings**.

Change the Color to “**Gray 96**”

Zoom in on the Main model.

Render the View.



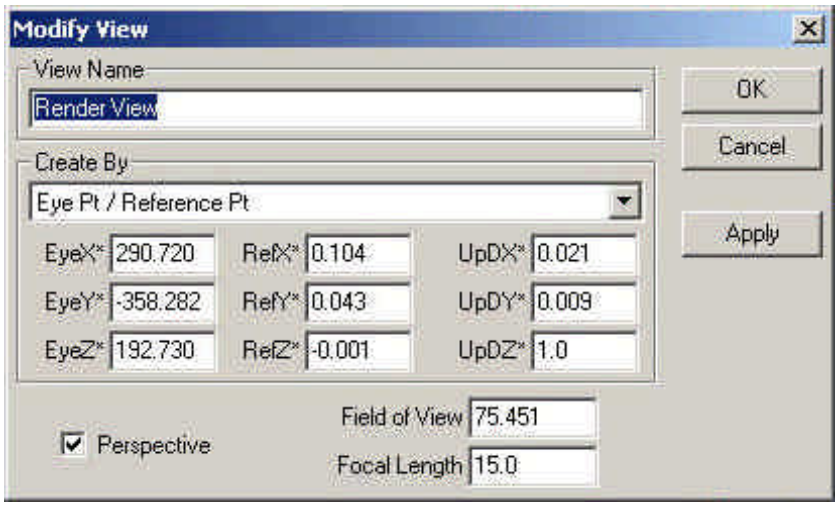
This image really seems to be coming together now. The last piece of the puzzle is the perspective and the view. These attributes can add a sense of scale to the rendering as well as dramatic effects. Giving a rendering of a car some extreme perspective can give it a sense of speed and power. This final aspect it what makes a rendering not look like it came from an MCAD software package. It adds more art to the engineering, allowing the user to give an emotion to an image as well as communicate information.

There is no one set standard on how to provide the proper perspective or view. It is a matter of opinion and a lot of trial and error to get it set the way you desire. I can however inform you of the tools we provide to do it.

The view can be rotated with the Trackball.

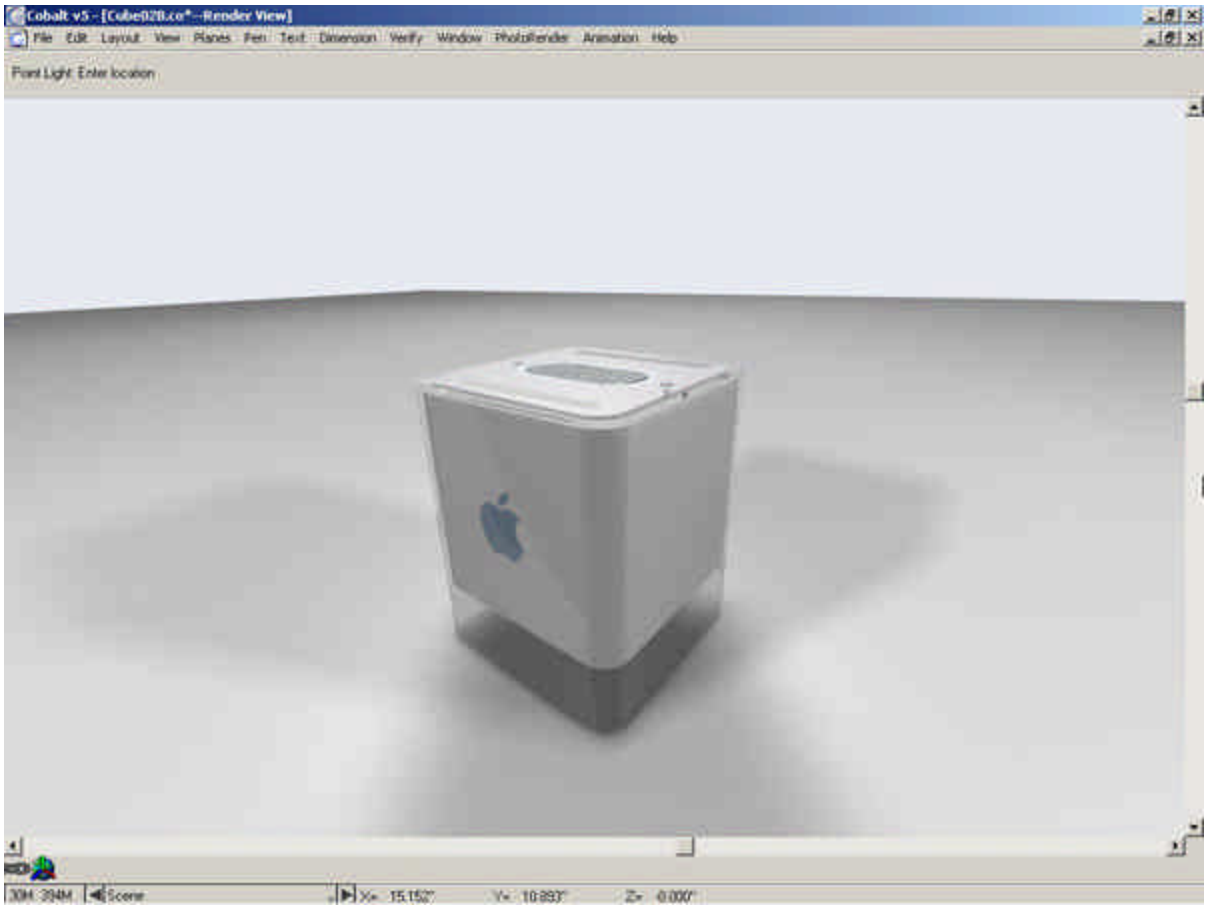
Perspective is toggled on or off with the icon at the right of the view palette.

You can double-click on this icon to open a **Modify View** dialog to allow the user to numerically alter the perspective as well as the view.



Save your file.

Set the view how you would like it and select **PhotoRender>Raytrace Render [no shadows, anti-alias]**, or if you would like to save the rendering select Render to File.



This completes this tutorial. You have now covered over 30 tools within the Ashlar-Vellum software, as well as concepts to help you efficiently create geometry, manage your model and produce quality renderings with future projects that you work on.

Congratulations and Good Luck.

Tutorial by Nathan Mitchell 12/30/2002