SHORT SHARP TRAINING (monthly) issue 1101

Welcome to this issue of the Vector-workout CPD Manual. This manual is designed to work like a user group meeting. There is a main workshop topic, then extended movies showing tips or techniques and an area for beginners.

Workshop Topic
Modeling and Creating Drawings for a Joinery Unit

This is a case study on making a joinery unit. We will model the joinery unit quickly, to create a concept drawing. Then, we will create a detailed model that will give use all the parts to make the unit. We will use classes to control visibility, and we will use viewports and sheet layers to create the panel drawings.

Extended Podcast 120 - Click here

Space labels in the new Vectorworks 2011 spaces.

Extended Podcast 121 - Click here

How to draw lines, based on survey data, without using the Property Line

Beginners Corner 27 - Click here

What is a layer plane and screen plane?

For more Vectorworks training information, or to purchase more copies of this book, please email jon@archoncad.co.nz

Contents

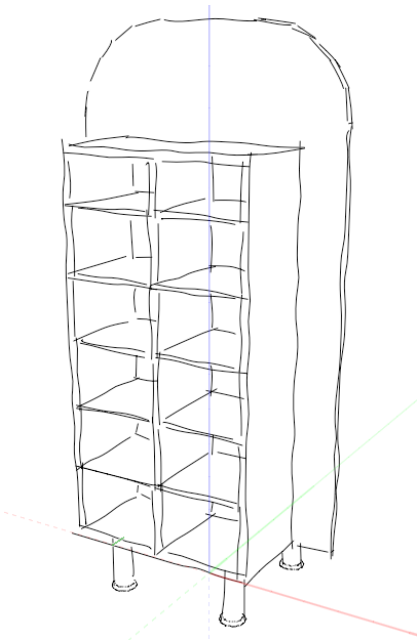
Creating a Joinery Unit - Introduction

Vectorworks can be used to design your 3D objects. You do need to have a small amount of 3D skill for this, but you do not need to be a expert. Anyway, I will be showing you some cool 3D tricks.

It might seem odd to make a complete 3D model for the concept, then throw it away to make the final project. This is not a waste. The concept model uses several quick and dirty tricks, and these will not give us the drawings we need for the manufacture of the unit. So, we will have to make some new parts to show the manufacturer the exact parts they need to make.

I will be using Vectorworks 2011 for the images, but you will find that almost all of these notes apply from Vectorworks Version 12 to 2011.

Step 1 - Concept Model



We need a quick conceptual model to test out our ideas. In Vectorworks 2009 and earlier, I would have used rectangles and extrusions to make this model. In Vectorworks 2010, I would try to use the Protrusion/cutout tool, and working planes.

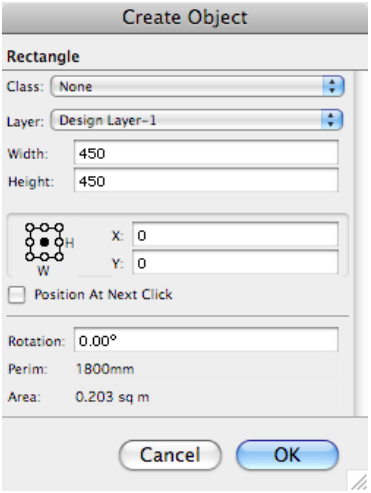
In Vectorworks 2011, it is much easier to draw if you use the Push/Pull tool. This allows you to start with a large solid block and cut out the parts you want. You can achieve similar methods with earlier versions of Vectorworks, but they use view dependent methods, so you have to be very careful of the view.

Building the Main Part

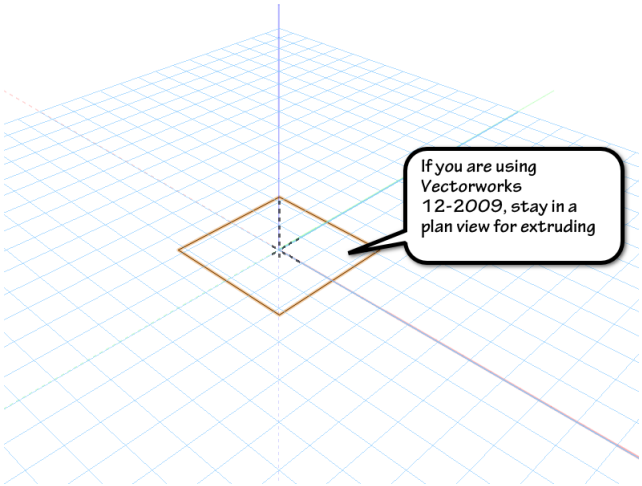
movie
cad574.mov

- Go to the Basic tool set.
- Double click on the **Rectangle** tool.

- Enter the size for the base of our unit, **450x450mm (18x18")**.
- Turn off **Position At Next Click**.
- Set the **X and Y** coordinates to **0 and 0.**
- Set the box position (the grid of 9 dots) to the centre.
- Click on the **OK** button.



This will place the rectangle in the middle of the design layer for you.



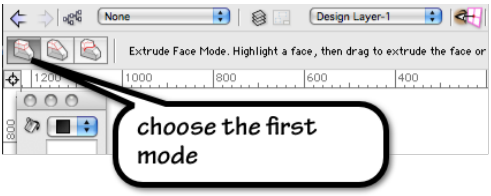
If you are using Vectorworks 12-2009, leave your drawing in a plan view and extrude the rectangle using the Extrude... command from the model menu.

If you are using Vectorworks 2010-2011, you can change to an isometric or perspective view, and use the Protrusion/Cutout or Push/Pull tool it is now called in Vectorworks 2011.

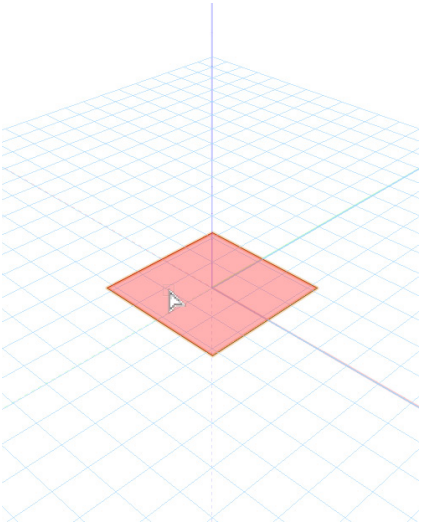
- Go to the **3D Modeling** tool set.
- Click on the Protrusion/Cutout or **Push/Pull** tool.

movie
cad575.mov

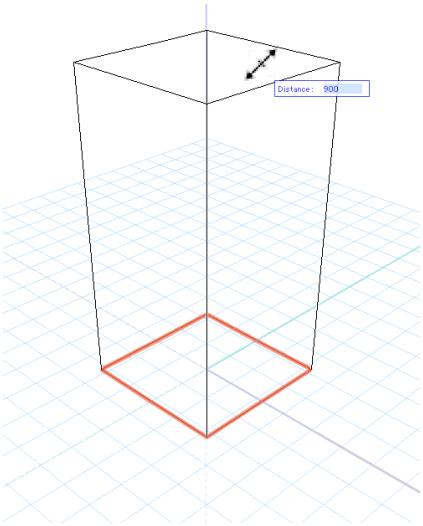
- Go to the Tool bar.
- Click on the first mode.



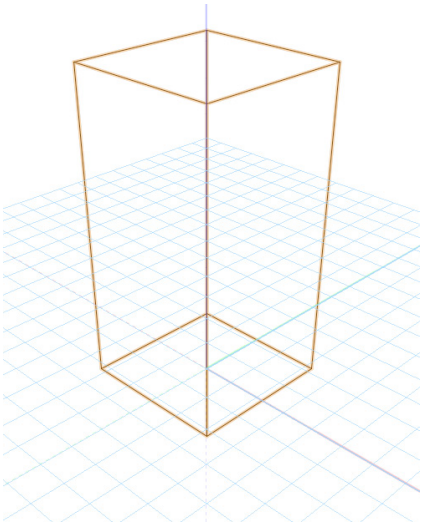
- Move your cursor to the rectangle. The rectangle will highlight red.



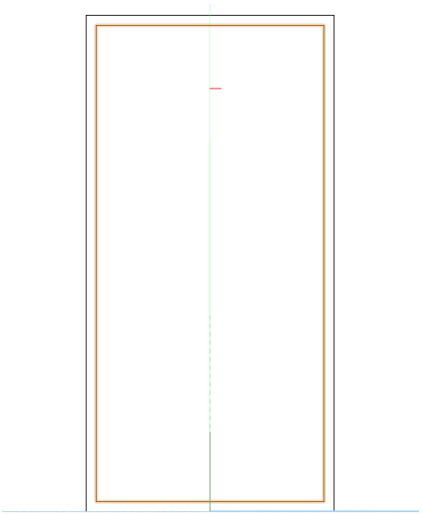
- Click once.
- Move the cursor up the screen, you will see a wireframe extrusion.
- Use the floating data bar to control the height. Use the tab key and type in the distance, or if you have the correct settings, type on the numeric keypad and the distance will be entered directly into the floating data bar.



- Click once to confirm, or hit the enter key once. This will complete the extrusion .

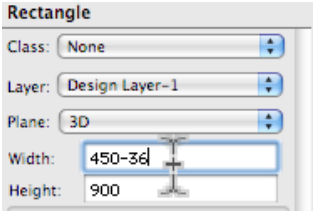


- With pre-2011 Vectorworks, change to a front view and trace a rectangle over the front of the unit.

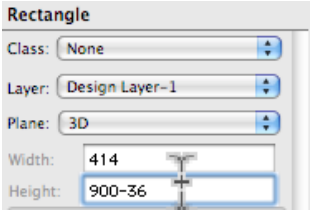


movie
cad576.mov

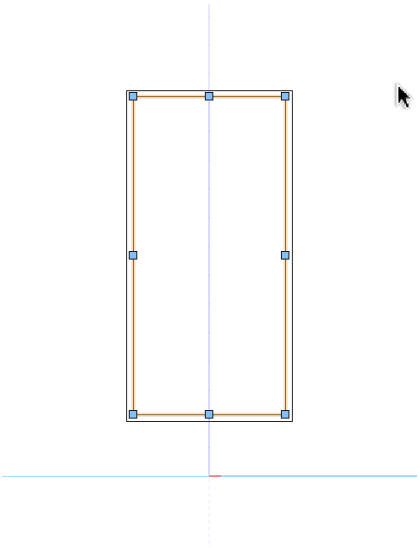
- Set the box position, the grid of nine dots, to the center.
- Use the Object Info palette to subtract **36mm (1.5")** from the width of the rectangle.



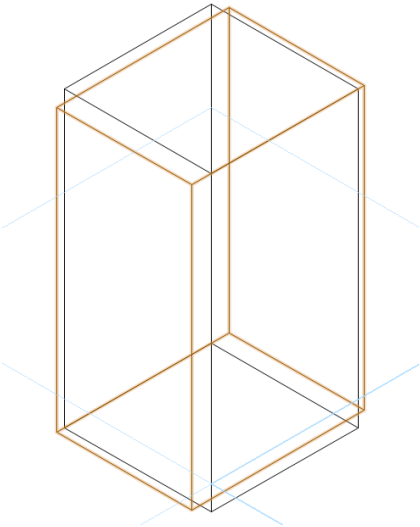
- Use the Object Info palette to subtract **36mm (1.5")** from the height of the rectangle.



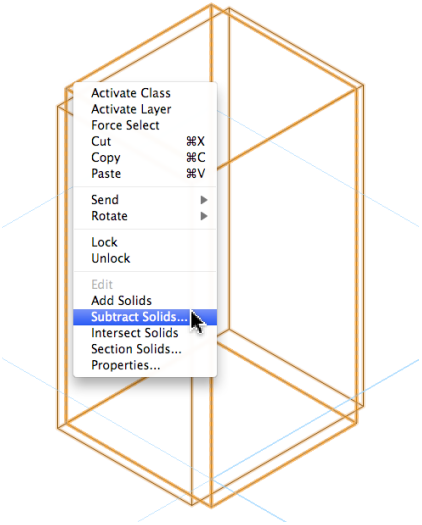
- The rectangle should end up 18mm (3/4") smaller all round.



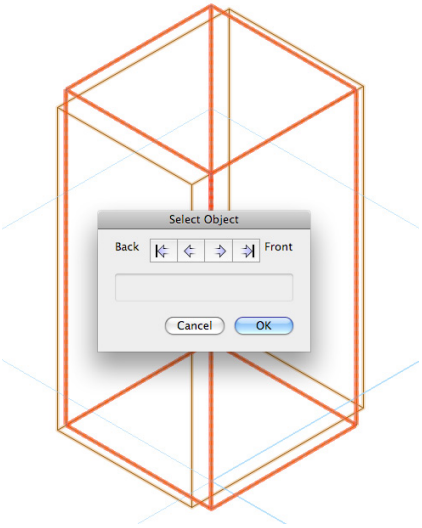
- Extrude the rectangle, using the Extrude command from the Model menu.
- Make sure the new extrusion is bigger than the base object.
- Select both objects.



- Right mouse click on the edge of one of the extrusions, and choose **Subtract Solids...**

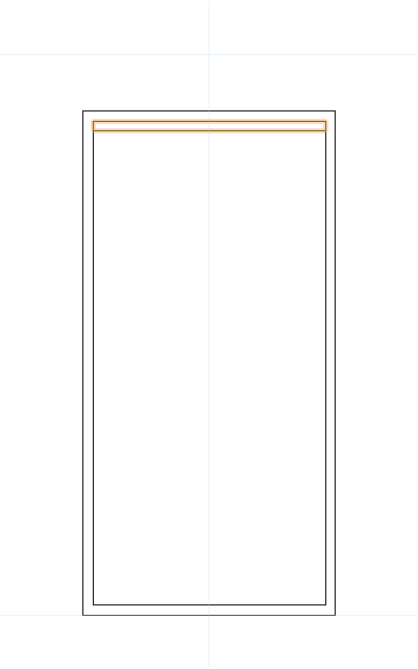


- Ensure that the base object is the one highlighted.
- Click on the **OK** button.

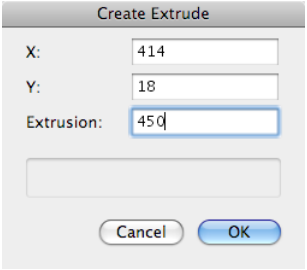


- Change to a **Front** view.
- Use the rectangle tool to draw the rectangle the shape you need.

movie
cad577.mov

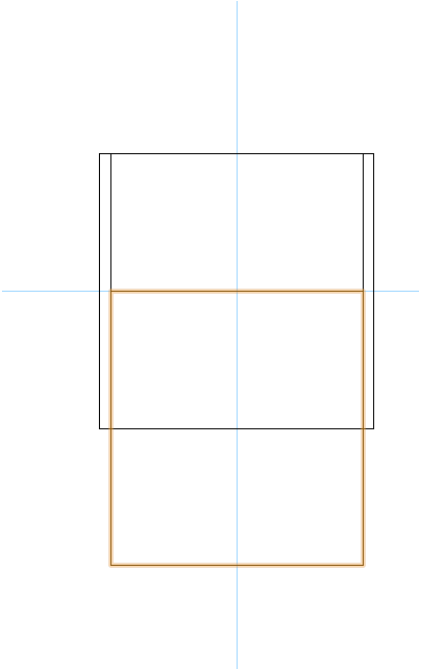


- Use the **Extrude...** command from the Model menu to create the correct length for the shelf. If you get it wrong, you can edit in the next step, so don't worry.
- Click on the **OK** button.

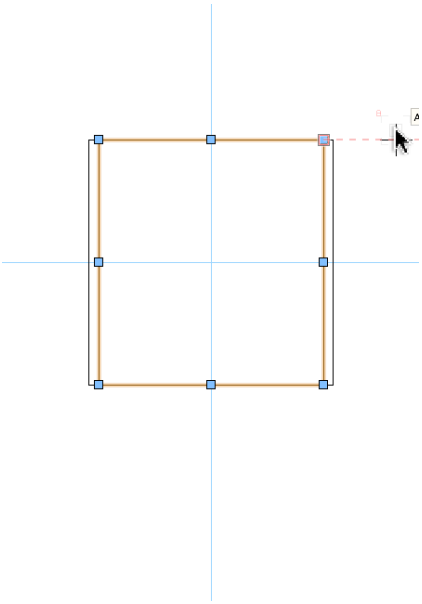


- Change to a Plan or Top/Plan view.

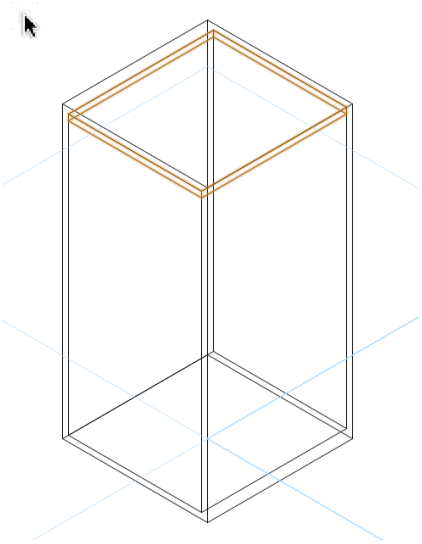
- Check the position of the extrusion in plan.
- Use the 2D Selection tool to move the extrusion to the correct length.



- This is where you can change the length of the extrusion, by using the interactive scaling mode.



- Make sure the shelf is still selected. You can skip some of the next steps, but you need the instruction on moving and duplicating the shelf.



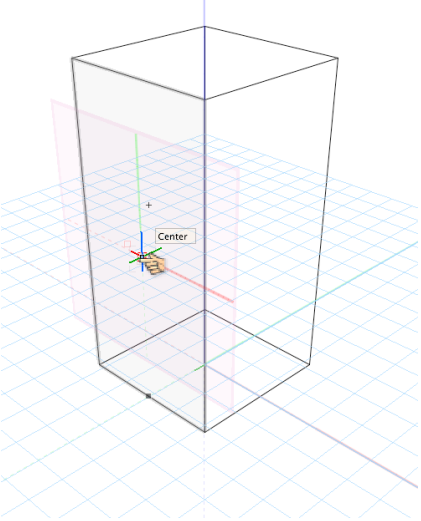
If you are using Vectorworks 2011, there is a different and more immediate

way to create the hole in the cabinet. This technique might have a lot of instructions, but I find it quicker and more fun to model using working planes and the Push/Pull tool.

- Go to the **3D Modeling** tool set.
- Click on the **Set Working Plane** tool.

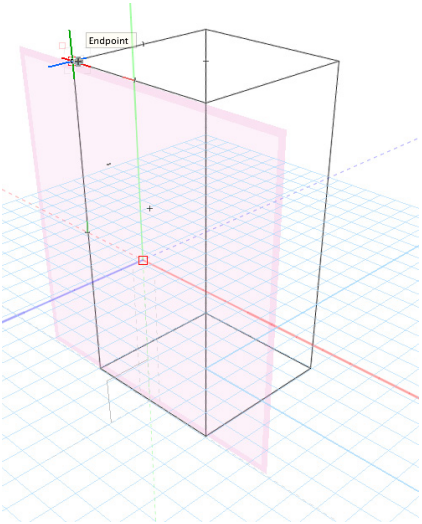
movie
cad578.mov

Move the cursor to the face of the cabinet.

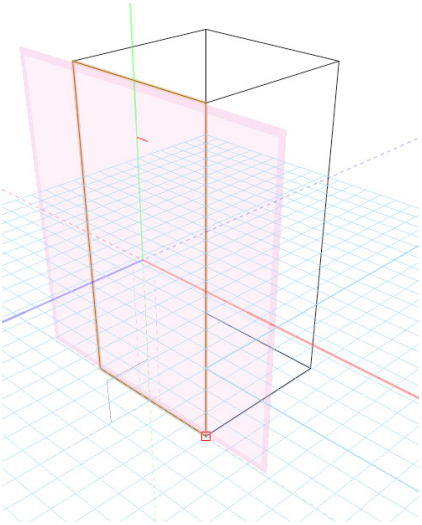


- You will see faces of the cabinet highlight, make sure you click on the correct face.
- Click once. This creates a working plane on the cabinet. We can use this working plane to draw a rectangle for the cutout.
- Go to the **Basic** tool set.
- Click on the Rectangle tool.

- Start the rectangle at the top left of the cabinet on the working plane.
- Click once.

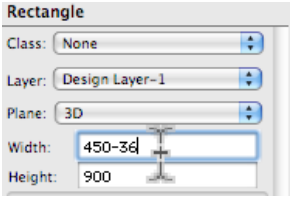


- Move to the bottom right of the cabinet on the working plane.
- Click once.

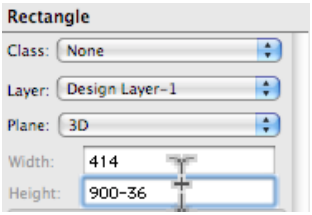


- Set the box position, the grid of nine dots, to the center.

- Use the Object Info palette to subtract **36mm (1.5”)** from the width of the rectangle.

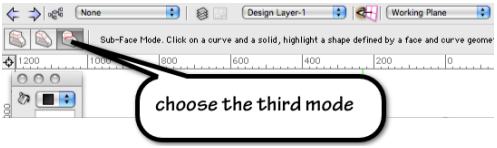


- Use the Object Info palette to subtract **36mm (1.5”)** from the height of the rectangle.

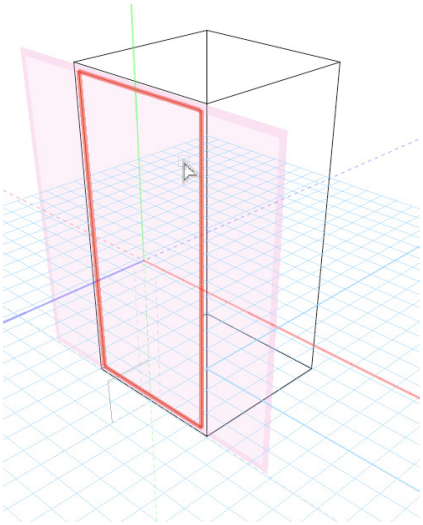


- The rectangle should end up 18mm (3/4”) smaller all round.
- Go to the **3D Modeling** tool set.
- Click on the **Push/Pull** tool.

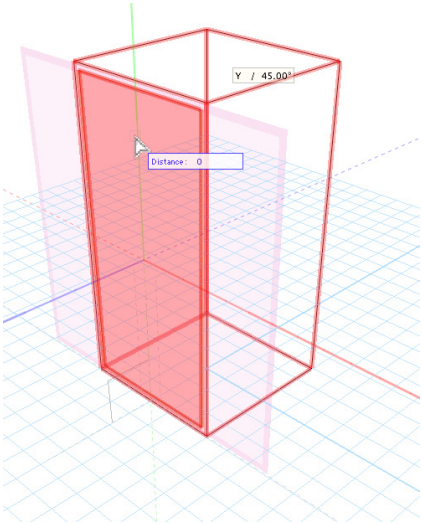
- Go to the **Tool** bar.
- Click on the **third** mode.



- Click once on the rectangle.

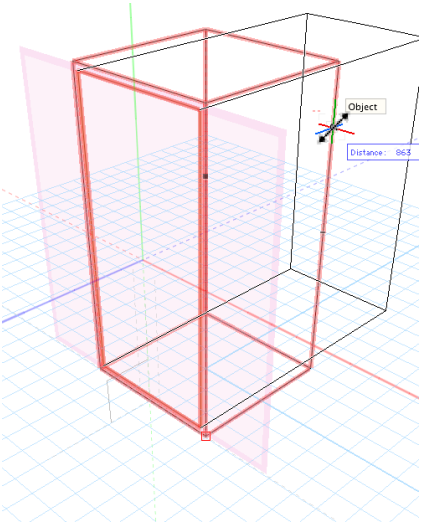


- Click once on the outside of the cabinet.
- When you move the cursor back to the rectangle, it will highlight in red.
- Click on the rectangle to start the subtraction.

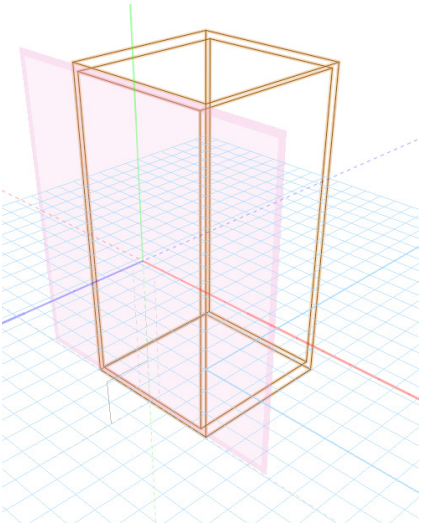


- Move the cursor so the wireframe preview shows the hole going all the

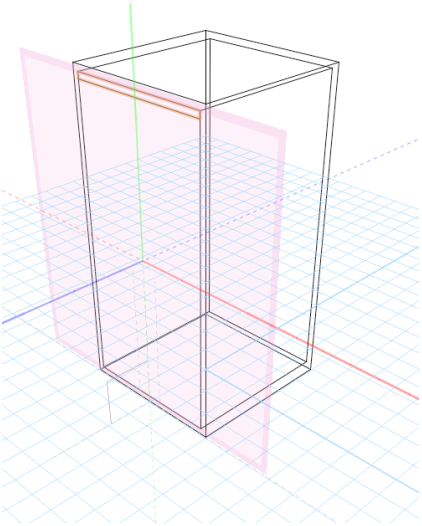
way through the cabinet.



- Click to finish.

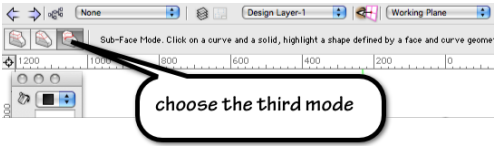


- Use the same technique of drawing a rectangle on the working plane, to create a shelf. Remember that you can use the data bar to control the thickness of the shelf, and use the inside of the cabinet to snap to.

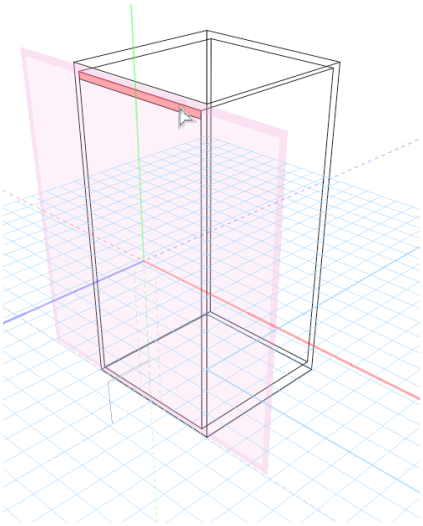


- Go to the **3D Modeling** tool set.
- Click on the **Push/Pull** tool.

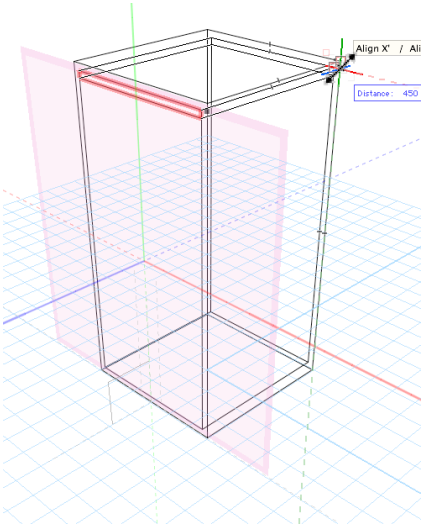
- Go to the **Tool** bar.
- Click on the **third** mode.



- Click once on the rectangle to start the extrusion.



- Click once on the outside of the cabinet.



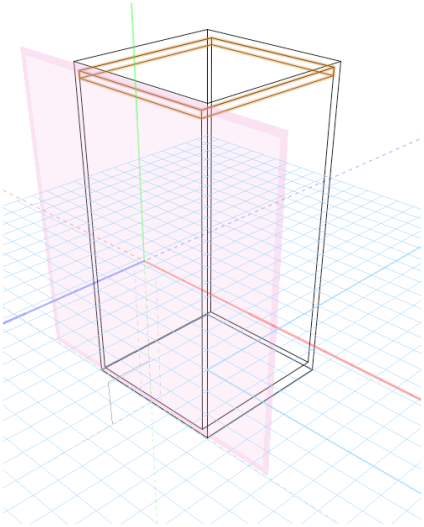
- This will create the extrusion the correct length.

Creating the Shelves

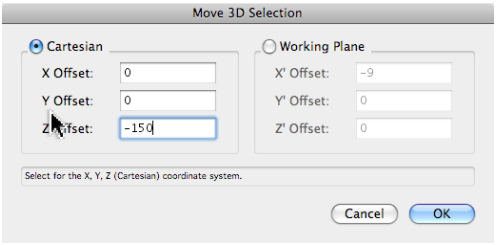
If you are using pre-2011 Vectorworks, read on. The instructions here are same for all versions of Vectorworks.

- Make sure the first shelf is selected.

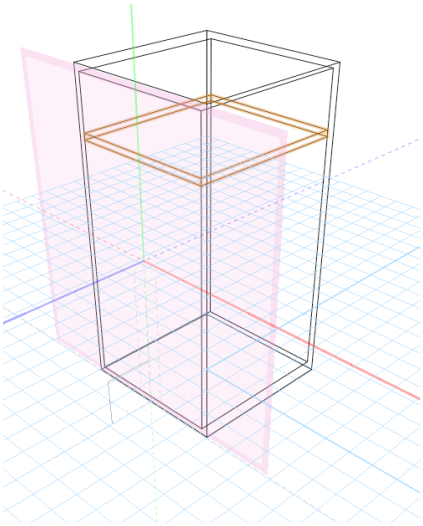
movie
cad579.mov



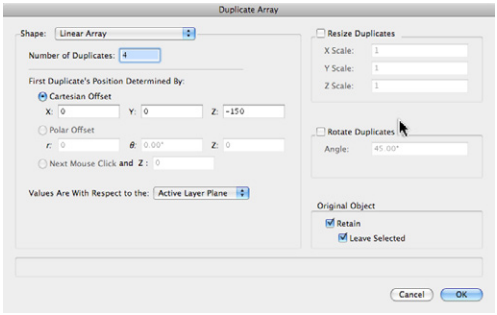
- Go to the Menu bar.
- Choose **Move > Move 3D...**
- Move the shelf down (the Z Offset) by **150mm (6")**.



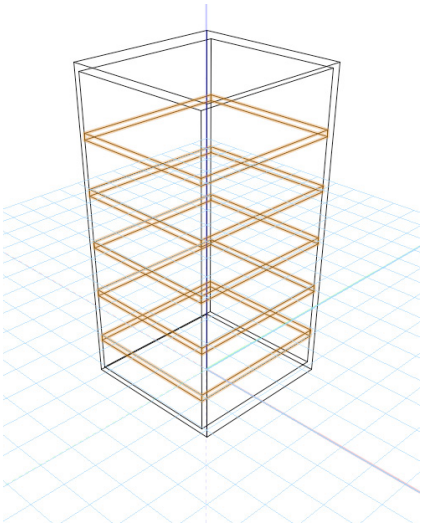
This will position the top shelf for us.



- Go to the Menu bar.
- Choose **Edit > Duplicate Array...**
- Choose **Linear Array**.
- Set the Number of Duplicates to **4**.
- Set the **Z** offset to **-150mm (-6")**.
- Click on the **OK** button.



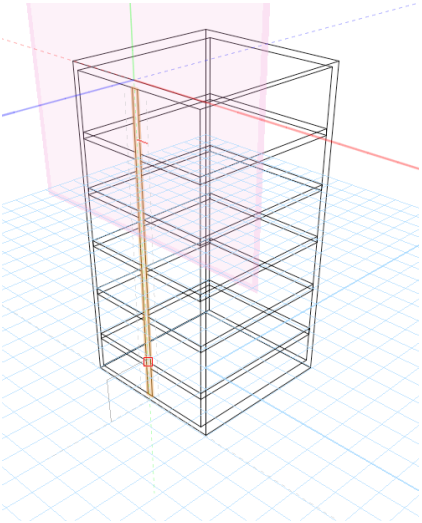
Now you have all shelves. If you want move shelves, undo the last command and use more shelves with less offset.



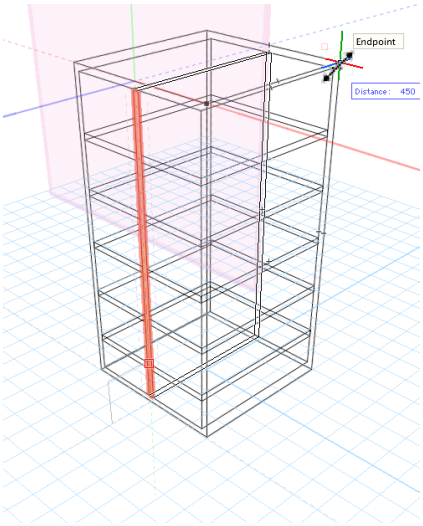
Create The Central Divider

movie
cad580.mov

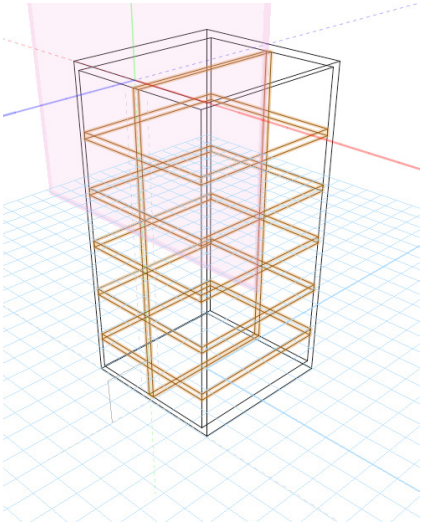
- If you are using pre-Vectorworks 2011, change to a front view.
- Use the rectangle tool to draw the middle divider.
- Extrude the middle divider **18mm (3/4")**.
- Change to a plan view to make sure that the divider is in center of the cabinet.
- If you are using Vectorworks 2011, use the working plane to draw the rectangle in the center of the cabinet.



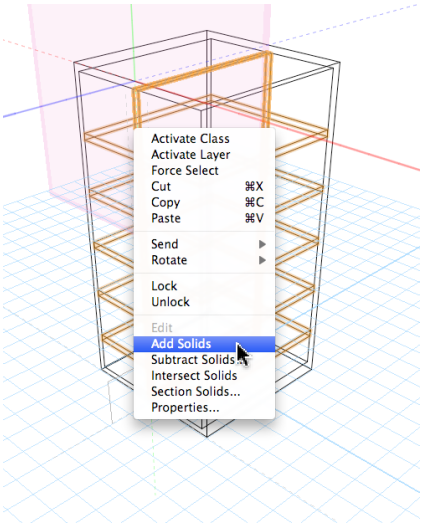
- Use the **Push/Pull** tool to extrude the divider.



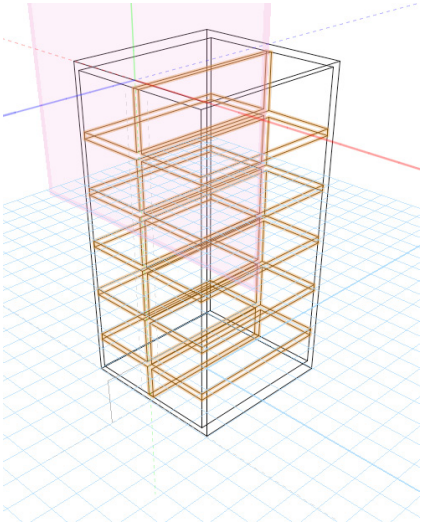
- In all versions of Vectorworks, select all the shelves and the divider.



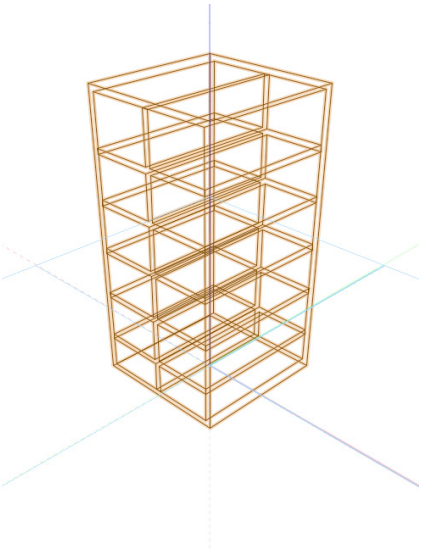
- Right-click on a shelf or a divider. Choose **Add Solids**.
- If you do not see Add Solids, then go to the menu bar and choose **Model > Add Solids**.



This adds all the shelves and divider into one solid object. When you texture this object the shelves and divider all have the same texture. If you want separate textures in the shelves, or on the shelves and divider, do not add them together.

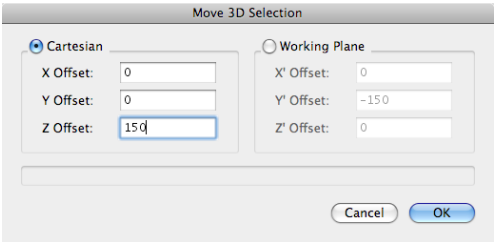


- Select the cabinet and the middle parts.



movie
cad581.mov

- Go to the Menu bar.
- Choose **Modify > Move > Move 3D...**
- Set the **Z** offset to **150mm (6”)**.
- Click on the **OK** button.

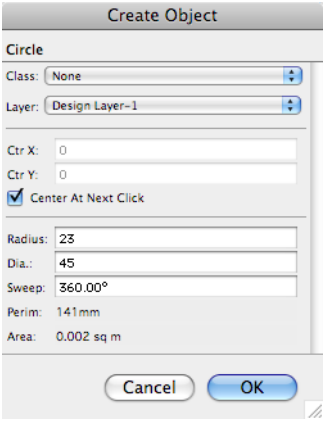


Making The Feet

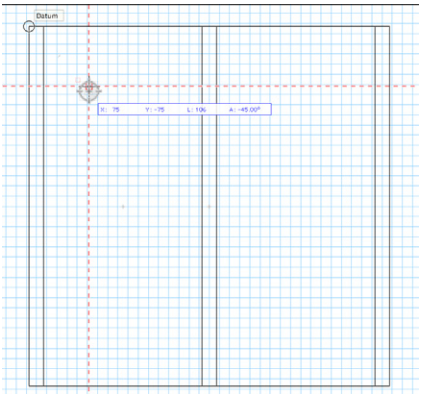
The instructions here will suit all versions of Vectorworks, but it is not the only way to create the feet. With Vectorworks 2011, you use working planes to make it easier, or more immediate to create the models, and you can carry out all these instructions in perspective.

movie
cad582.mov

- Change to a **Plan** view.
- Double click on the **Circle** tool.
- Set the dimensions for the circle.
- Turn on **Center at Next Click.**
- Click on the **OK** button.

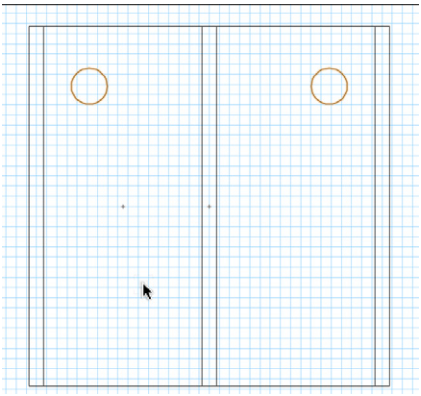


- Move to the top left corner of the cabinet.
- Set a Floating datum (hit the G key).
- Hit the tab key until you get into the floating data bar.
- Enter the offsets X and Y. I've used **75mm (3")**.
- Click once to place the circle.

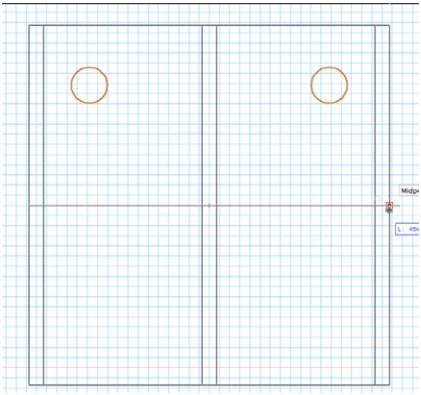


- Extrude the circle **150mm (6")** to make the foot.
- Go to the **Basic** tool set.
- Click on the **Mirror** tool.
- Go to the **Tool** bar, ensure you have the mirror and duplicate mode (the second mode).

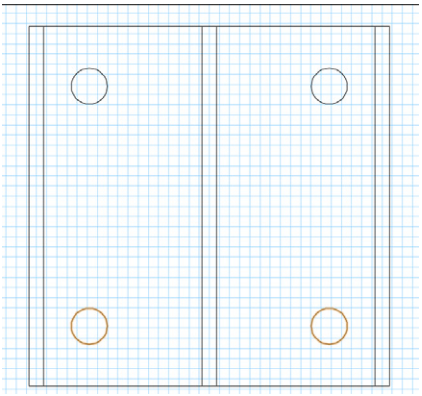
- Use the mid-point on the cabinet at the top and the bottom to define the mirror plane.



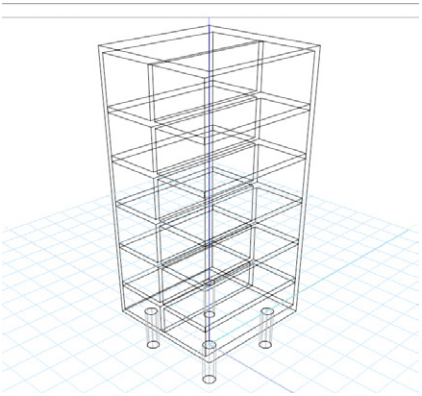
- Ensure both feet are selected.
- Use the mid-point on the cabinet at the left and right to define the mirror plane.



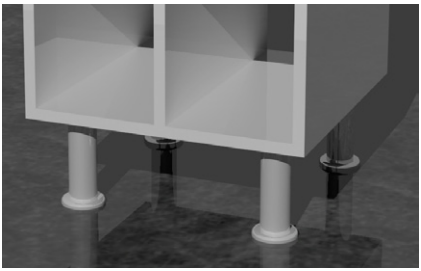
You will end up with 4 feet.



Check your design in 3D to ensure all the feet have been correctly located. With Vectorworks 2011, you can carry out these steps in 3D, but you have to be careful where you snap on the cabinet. Checking your work after completion is vital.



If you put more effort into the foot design before you mirror the feet, then they all look more complex.



Step 2 - Drawings and Preparation

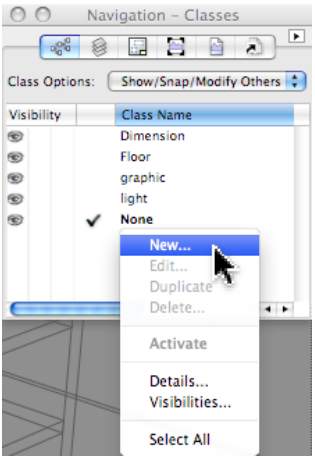
Before we make the drawings, there are objects in the model that would be better if we could turn on and off. For example, when we create the plan view of the cabinet, we might want to use dashed hidden line rendering, to show the dividers in plan. But if we don't hide the feet, they will show up too.

Create Classes

If you have Vectorworks Architect, Landmark or some other Designer version, use the Navigation palette to create a new class.

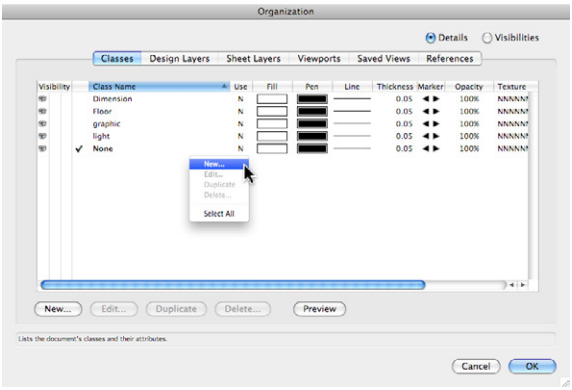
- Go to the Navigation palette.
- Right-click.
- Choose **New...**

movie
cad583.mov

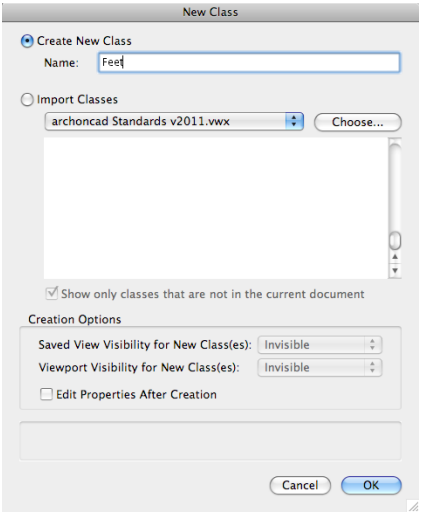


If you have Vectorworks Fundaments, then use the **Organization...** command from the Tool menu.

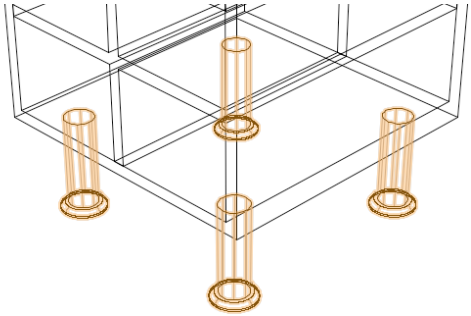
- Right-click.
- Choose **New...**



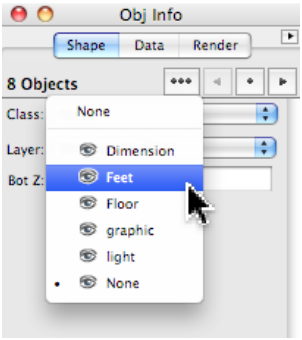
- Name the class. Use a name that makes sense, and describes the objects, or materials you want to use.
- Click on the **OK** button.



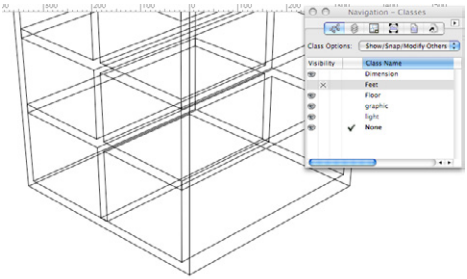
- If you are using the Organization dialog box, you will have to click on the OK button to close it.
- Select all the feet.



- Use the **Object Info palette** to assign the feet to the correct class.



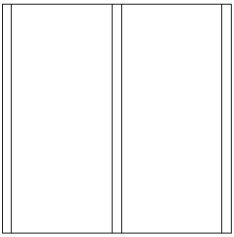
- Create more classes for other object that you want to control. You might notice that I have several classes for floors, lights and other information. I've added these classes because I have also created a floor for the display stand, added a light and created an image prop for a graphic on the top of the unit.
- Now you can control the visibility of the feet using the Navigation palette, and you can use the class settings in viewports to show the feet in some viewports, but not in others.

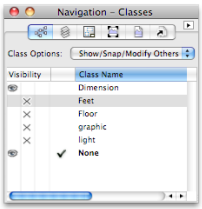


Plan Viewport

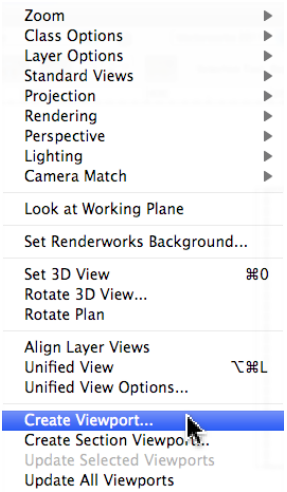
movie
cad584.mov

- Change you view to a Top/Plan view. Please don't use top, Top/Plan will remove any perspective.
- Any objects you do not want in the viewport should be assigned to classes, and the classes made invisible.

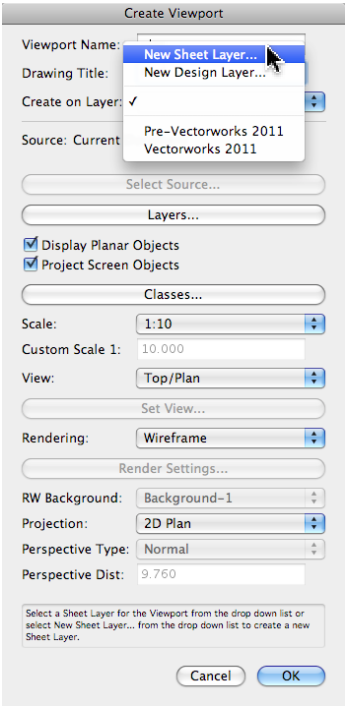




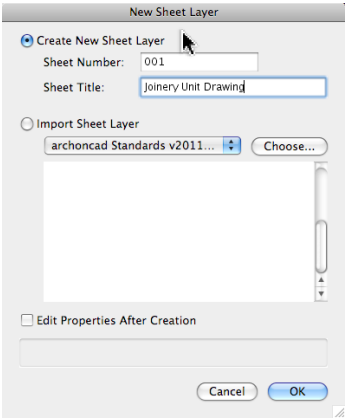
- Go to the Menu bar.
- Choose **View > Create Viewport...**



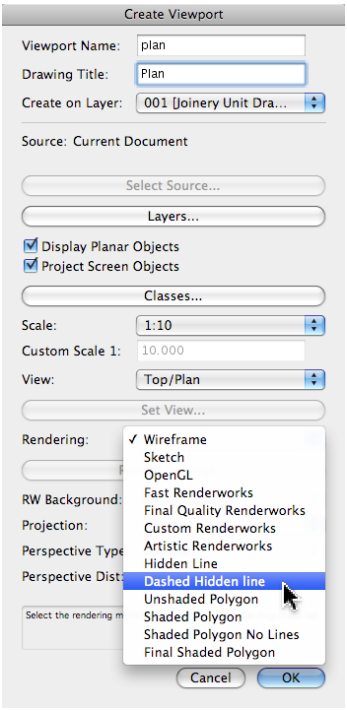
- When the dialog box opens, click on the pop-up menu to create a **New Sheet Layer...**



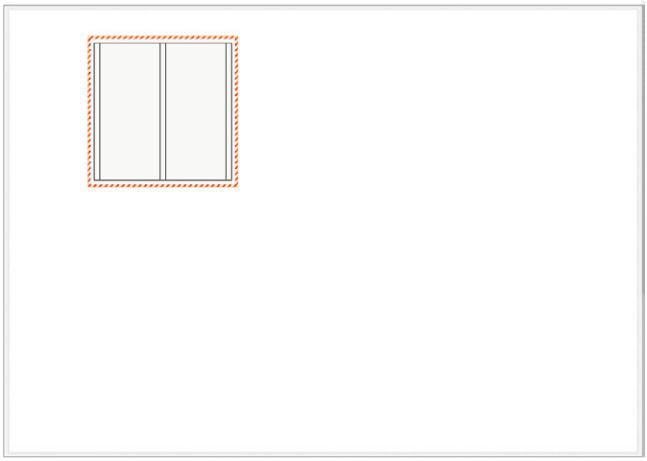
- Number and Name the sheet layer.
- Click on the **OK** button.



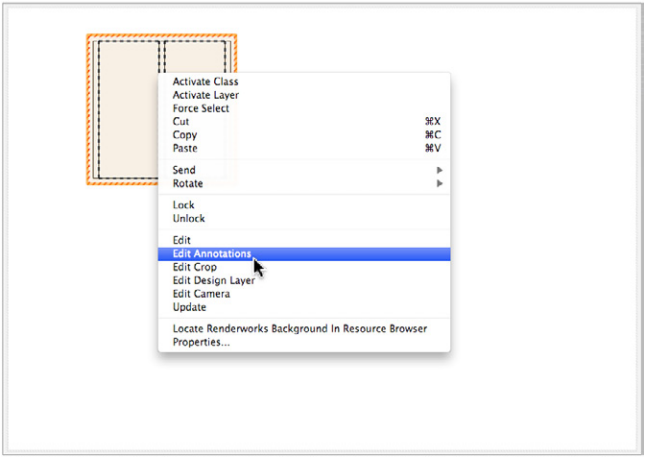
- Enter the viewport name.
- Enter the **Drawing Title**. Be careful with this one, this is the name that the drawing label will use when to annotate the viewport.
- Check the scale of the viewport.
- Change the Rendering to **Dashed Hidden Line**.
- Click on the **OK** button.



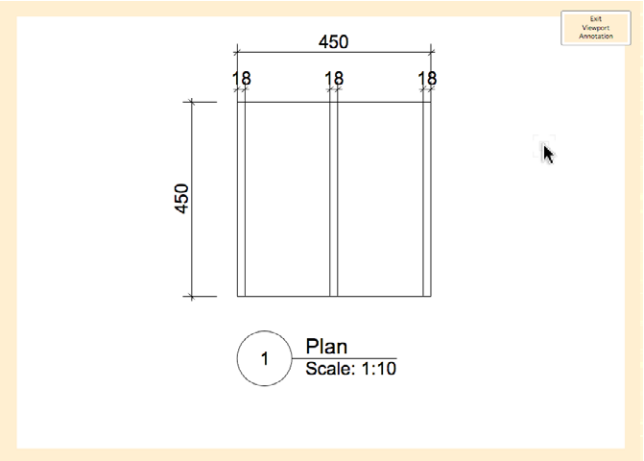
- The viewport arrives on the sheet layer, in the middle.
- Use the **Selection** tool to move the viewport to a better location on the page.



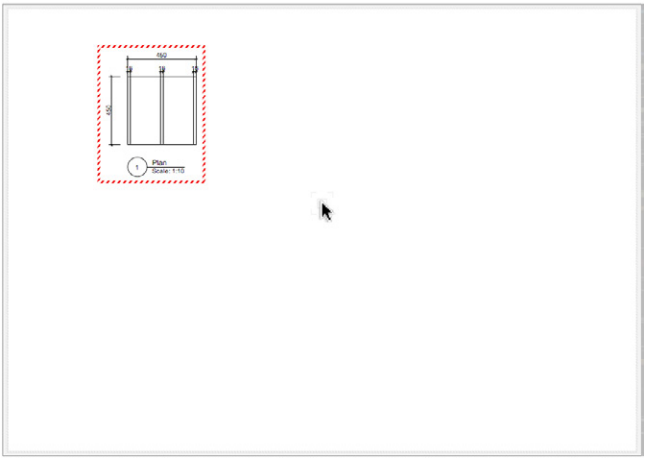
- Right-click on the viewport, make sure you right click on the edge of a line in the viewport.
- Choose **Edit Annotations**.



- Annotate and dimension the plan.



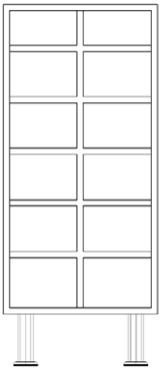
- To exit the annotations, click on the Exit Viewport Annotation button at the top-right of the drawing area.

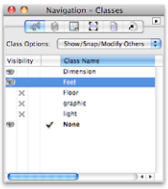


Front Elevation

movie
cad585.mov

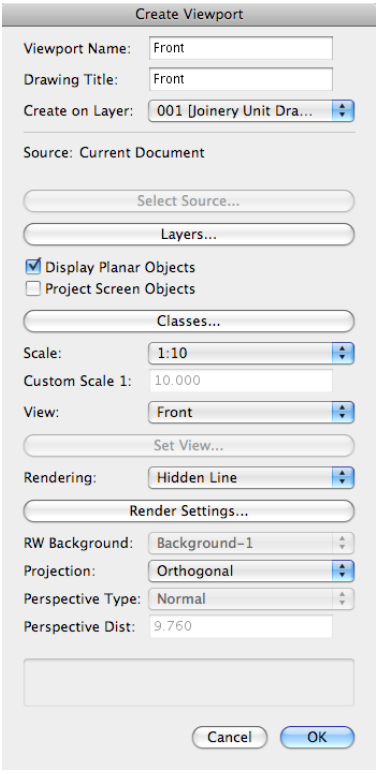
- Change layers back to the design layer for your cabinet model. If you have forgotten how to do this, use the Active Layer button on the View bar, or double click on the design layer on the Navigation palette.





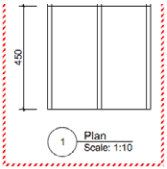
- Go to the Menu bar.

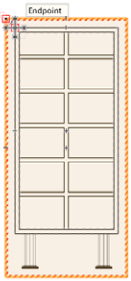
- Choose **View > Create Viewport...**
- Enter the name of the viewport.
- Enter the **Drawing Title**. Be careful with this one, this is the name that the drawing label will use when to annotate the viewport.
- Check the sheet layer. It should be the same as the last viewport. If not, click on the Create on Layer pop-up menu, and choose the correct sheet layer.
- Check the scale of the viewport.
- Change the Rendering to **Dashed Hidden Line**.
- Click on the **OK** button.



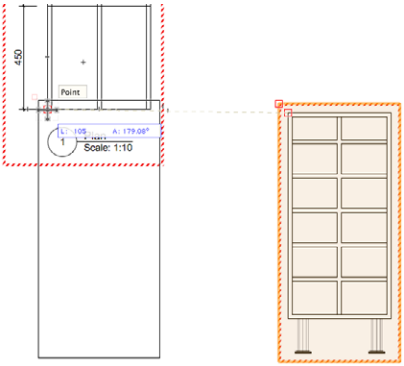
The viewport will arrive in the middle of the drawing. We would really like to move the viewport to line up with the plan view.

- Go to the **Basic** tool set.
- Choose the **Selection** tool.
- Move the cursor to a corner of the elevation. I always use the top left, but any corner will do.
- Click and drag the viewport.

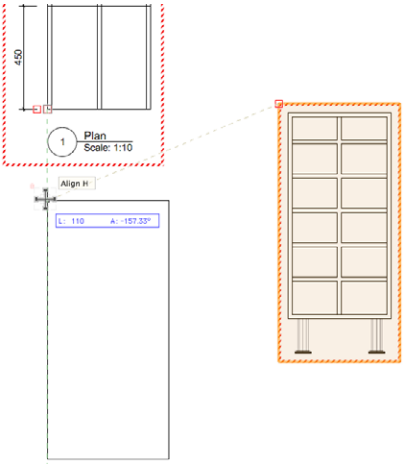




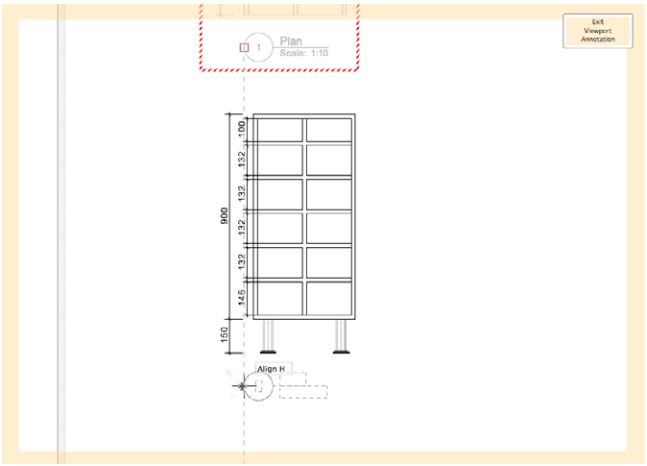
- Move to the plan viewport.
- Move the cursor to a corner of the plan. Choose a point that will line up with the elevation viewport.
- Don't let go of the mouse button yet.



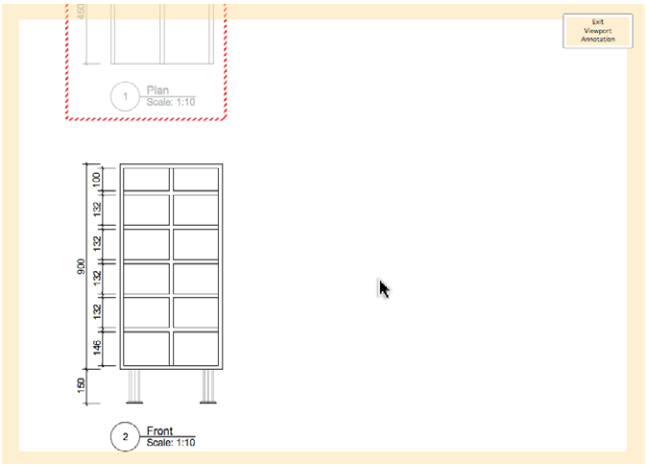
- Move the cursor down, but make sure you keep the elevation viewport lined up with the plan.
- Release the mouse button.



- Right click on the viewport.
- Choose Edit Annotations...
- Add dimensions, notes and a label. If you have the correct Vectorworks preference, you can see the other information while you are in the annotation area, and use the other label to line up with.



- When you have completed all the annotation, click on the Exit Viewport Annotation button at the top-right of the drawing area.

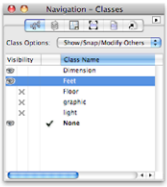


Side Elevation

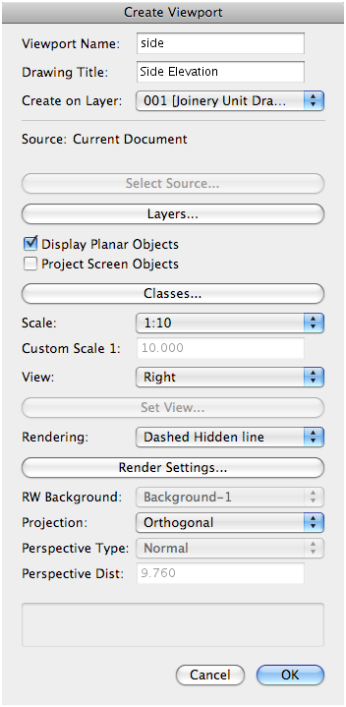
movie
cad586.mov

- Use the Navigation palette or the Active Layer button on the View bar to change back to the design layer.

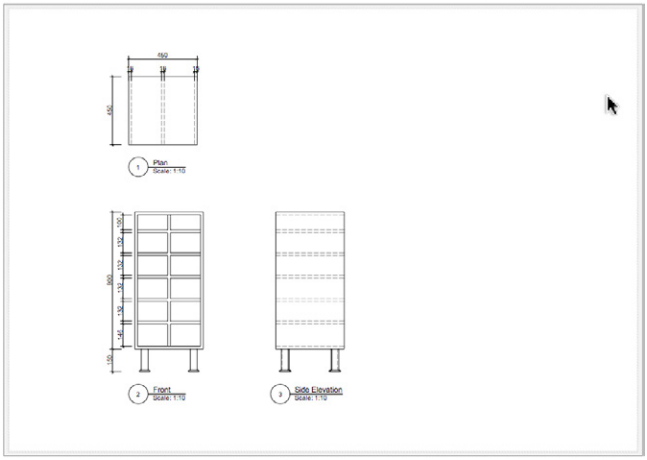
- Change to a **Right** view.
- Remember to turn on all the classes you need. I have classes for the dividers, feet, lights and floor. I need to turn off the lights and floor, but I need the dividers and feet turned on.



- Go to the **Menu** bar.
- Choose **View > Create Viewport...**
- Enter the name of the viewport.
- Enter the **Drawing Title**.
- Check the sheet layer.
- Check the scale of the viewport.
- Change the Rendering to **Dashed Hidden Line**.

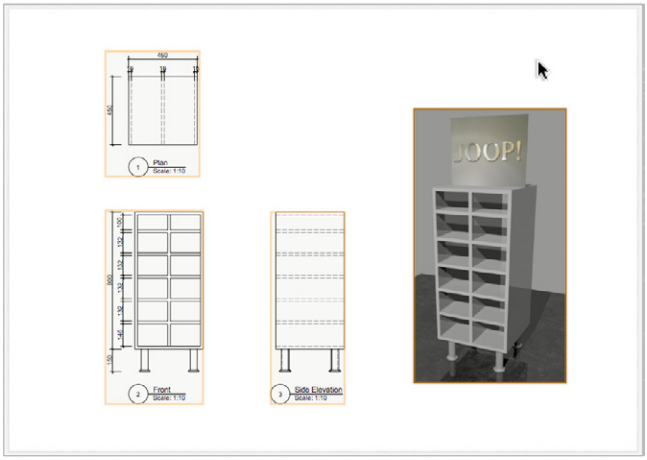


- Click on the **OK** button.
- Use the **Selection** tool to move the viewport to line up with the front elevation.



If you have Renderworks, you can create a rendered viewport with textures. If you do not have Renderworks, you can use OpenGL rendering, but you can not add textures or an image prop.

If you are a subscriber, we have covered making image props in June 2010 (issue 1006). If you are not a subscriber, you can find a manual on creating textures here (http://www.archoncad.co.nz/manuals/manuals/short.html)



Edit The Model

One of the great things about using a 3D model with viewports to create the drawings, is that you can edit the model, and update the viewports easily.

This allows you to create a quick model, see how it looks on the drawings, and then update, edit, or re-model the cabinet completely. The you just need to go back to the drawings, and update the viewports. You might have to edit the annotations, but you do not have to completely re-create the viewports.

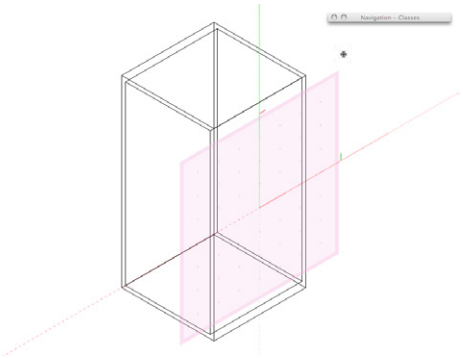
Return To The Design Layer

cad587.mov

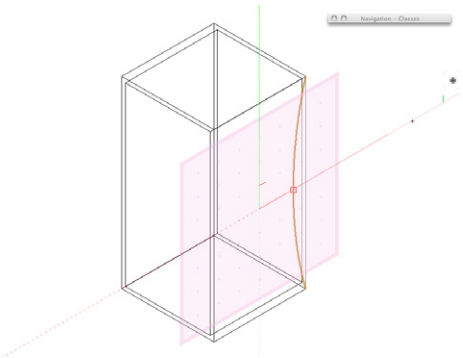
- Use the Navigation palette or the Active Layer button on the View bar to change back to the design layer.
- Change to a **Right Isometric** view.

Edit the Model

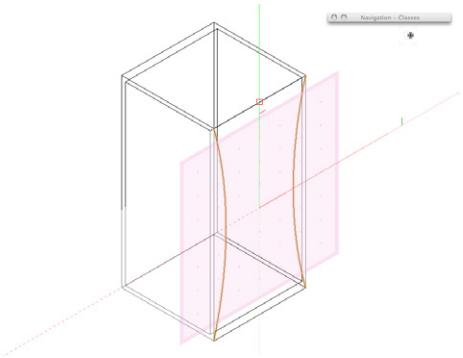
- If you are using Vectorworks 2010 or 2011, go to the 3D Modeling tool set.
- Click on the **Set Working Plane** tool.
- Move to the face of the cabinet, click once. You might notice that in this view, there are no dividers shown. I have assigned the dividers to a class, and I have made the class invisible. I found that this made it lot easier to find the face of the cabinet.



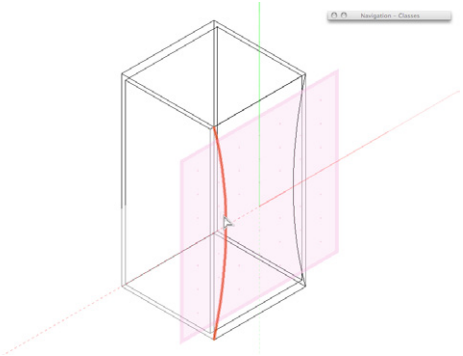
- If you have Vectorworks 2010, use the NURBS Curve tool to draw a curve on the face of the working plane.
- If you have Vectorworks 2011, you can use the Arc tool to draw the curve on the face of the working plane.



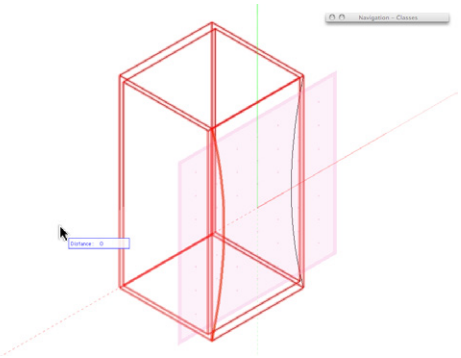
- Use the Mirror tool to mirror the curve to the other side of the cabinet.



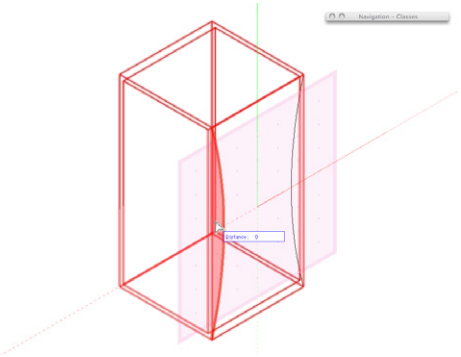
- If you are using Vectorworks 2010 and 2011, you can use the Protrusion/ Cutout or Push/Pull tool.
- Use the third mode (sub-face mode) and on Vectorworks 2010, make sure the minus sign is activated.
- Click on the curve.



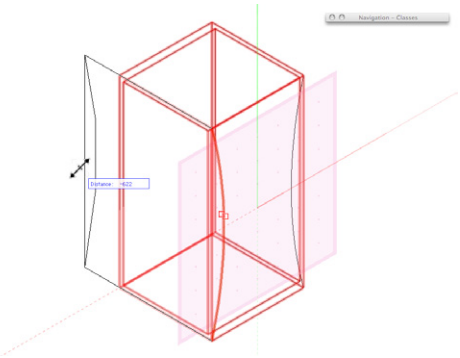
- Click on the cabinet.



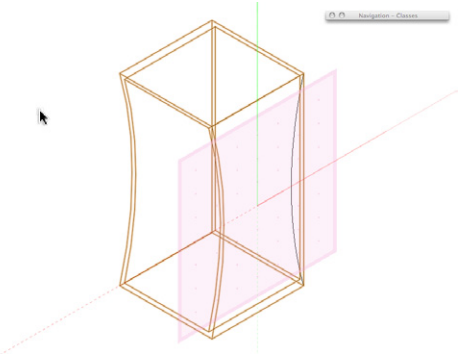
- Move back to the curve. In Vectorworks 2011, the whole curve will highlight. In Vectorworks 2010, you will see a small green or red dot in the center of the curve, that is what you need to click on.
- Click and drag the curve into the cabinet.



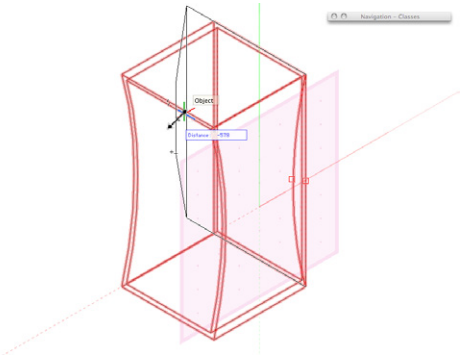
- Make sure you go right through the cabinet.

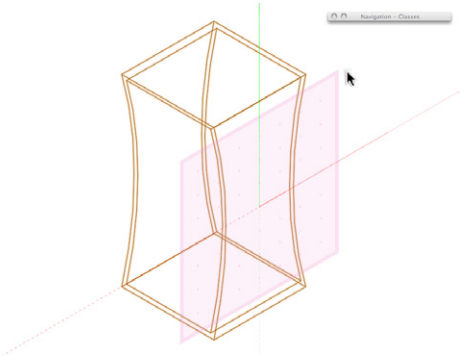


- Click to finish.
- If you are using Vectorworks 2010 and 2011, you can use the Protrusion/ Cutout or Push/Pull tool.
- Use the third mode (sub-face mode) and on Vectorworks 2010, make sure the minus sign is activated.
- Click on the curve.

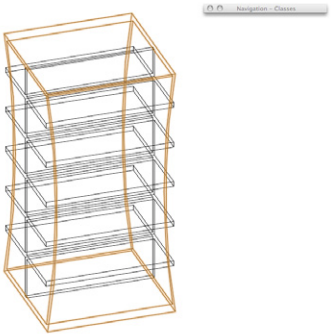


- Move back to the curve. In Vectorworks 2011, the whole curve will highlight. In Vectorworks 2010, you will see a small green or red dot in the center of the curve, that is what you need to click on.
- Click and drag the curve into the cabinet.
- Make sure you go right through the cabinet.



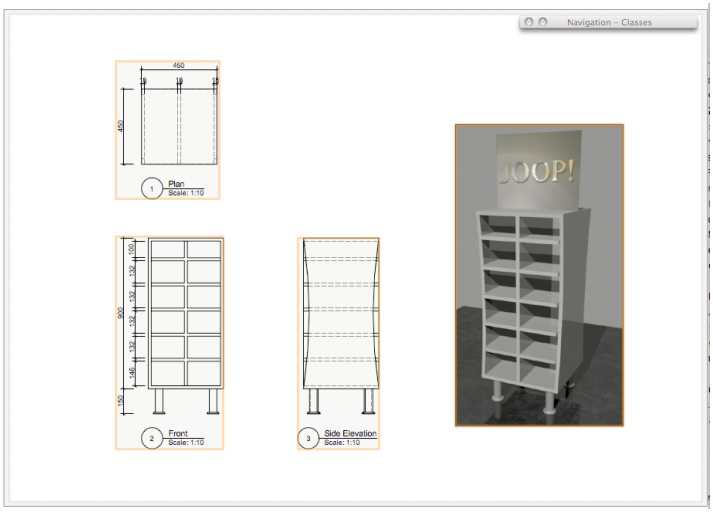


- Click to finish.
- If you are using pre-Vectorworks 2010, you can still edit the cabinet, but instead of using the Push/Pull or Protrusion/Cutout tool, you will have to use solid modeling. Create the curves a extrusions. Select the curves and cabinet.
- Go to the **Menu** bar.
- Choose **Model > Subtract Solids...** Make sure you are subtracting the curves from the cabinet, not the other way around.
- Edit the dividers if you want. You could use the Split tool to



Return to the sheet layer (drawing)

- Go to the **Menu** bar.
- Choose **View > Update all Viewports**. If you have any rendered views, it might take a while to update all the rendered views.



Thank you

Thank you for subscribing. I trust that you have enjoyed working through this manual, and that it has been informative and constructive.

For more information, please visit this web site: http://www.archoncad.co.nz/. If you just want someone to help you learn Vectorworks, carry out some Vectorworks contract work, or you want someone to make Vectorworks easier, contact me, as this is a service that I offer: jon@archoncad.co.nz.

Thank you again,
Jonathan Pickup
January 2011