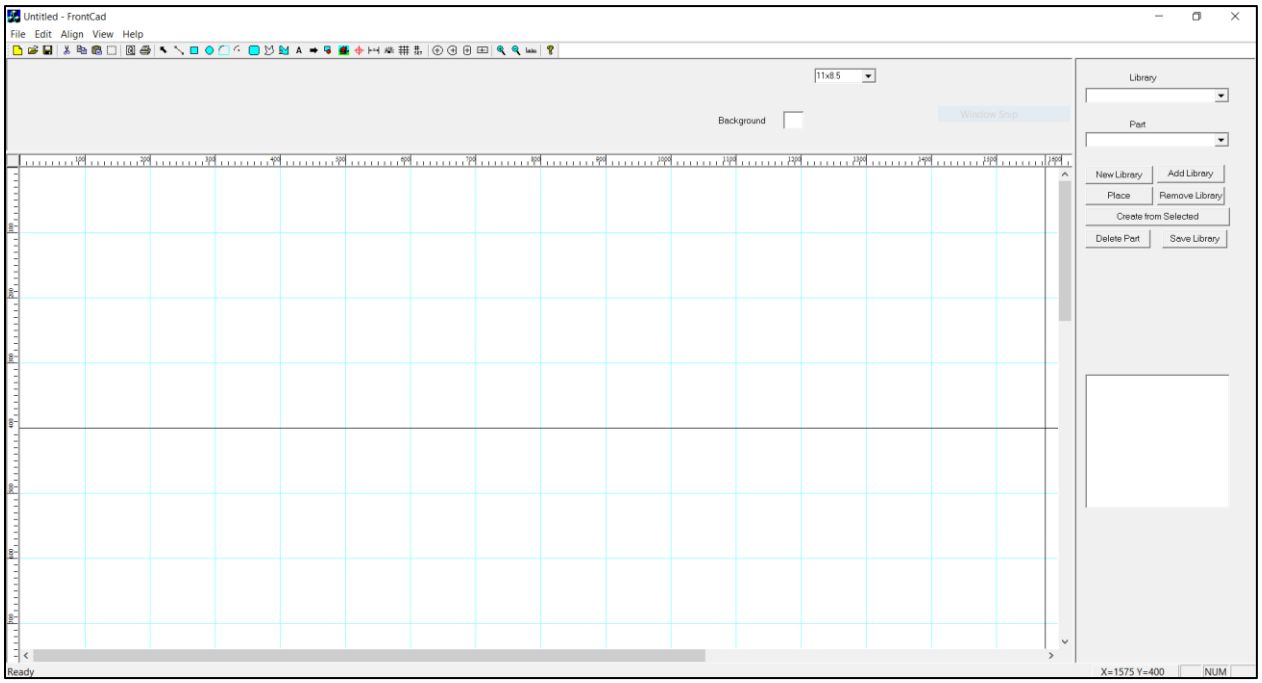
Let's Make a Front Panel using FrontCAD

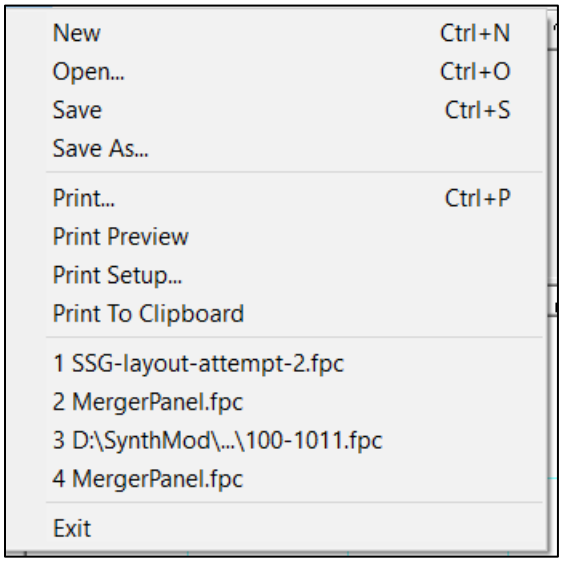
By Jim Patchell

FrontCad is meant to be a simple, easy to use CAD program for creating front panel designs and artwork. It is a free, open source program, with the code being compilable by the MicroSoft Visual Studio 2015 Community Edition. I think that what sets my program apart is the flexibility it has with setting the colors of objects. It also has tools that allow you to align objects, and make the dimensions of objects the same. But you need to keep in mind that this is a DIY project. The program WILL crash. As I locate the places where it crashes, I try to fix them. If you are doing some editing for a long period of time, and it hasn't crashed, this is a good indication that it is time to save your work.

Also, it should be noted that the files are saved in an ASCII format. You can, in theory, edit the files with a text editor, but, I would discourage this because if you make a mistake, FrontCad will not be able to load the file any more.



FrontCad will look pretty much like this when you start up the program. Starting in the Upper left hand corner, we have the Menu Bar.



FILE

The file Menu is pretty normal. The New command will clear the workspace and allow you to start fresh. New is unforgiving. If you haven't saved your data, it will be gone.

Open allows you to load in one of your previous works.

Save allows you to save to save your data.

Save As allows you to create an new file to save the data to.

And then we have the Print Options.

Print allows you to print to any of the printers you have installed on your computer.

Print Preview allows you to see before hand how your work will be positioned on the page.

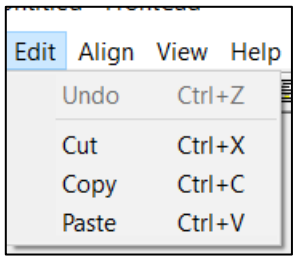
Print Setup allows you to configure and select the printer to use.

Print To Clipboard is a very handy command. This will print your drawing to the clipboard so that it can be imported by many other graphic programs, such as Microsoft Paint. I personally find this very useful for when I am making an illustration for something I am writing.

Next, there is a list of previously opened drawing. FrontCad will display the last four drawings to be worked on.

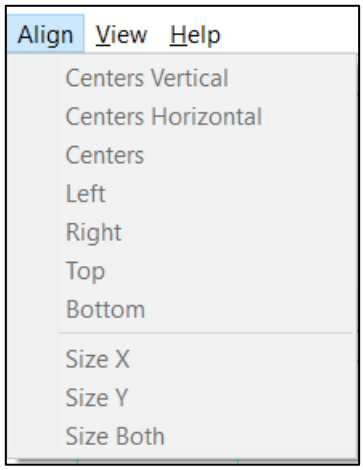
And then Exit is pretty self-explanatory.

Edit Menu



The edit menu is pretty straight forward. The only thing you need to aware of is that the Undo command does not work. Well, it is not even implemented. Another thing you need to be aware of is that Cut and Copy only do so to the custom clipboard that is in the program. So, if you copy something in this program and try to paste it into some other program, you will find that you get nothing. This is because all objects in this program are stored in a vector format. And no other program understands the way I have implemented it. If you do want to copy stuff from this program to another, use the Print To Clipboard function in the File menu. This actually does use the real clipboard.

Align Menu

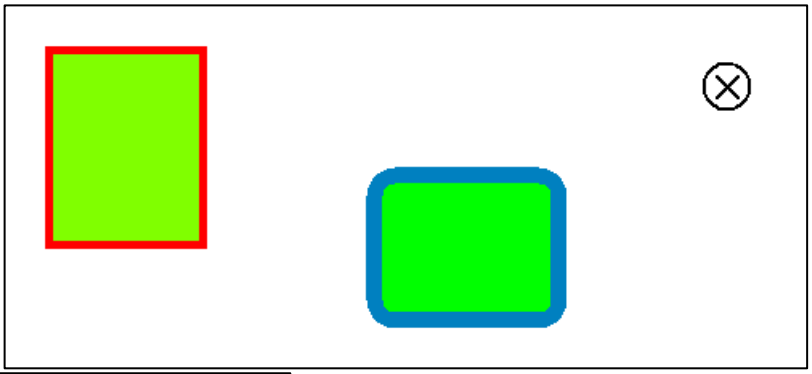


The Align Menu contains a lot of very handy tools. With these operations, you almost don't have to worry where you put objects. You can get the lined up and resized perfectly. We will go into a bit later on exactly how you use these functions, but I will at least tell you what they do.

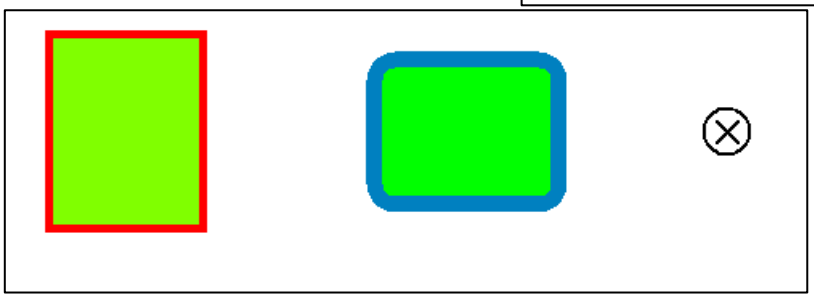
Centers Vertical

This operation makes the center y coordinate the same for all objects. For example:

Lest Say You have this situation. You have a rectangle, rounded rectangle and a hole, but you want the center of the vertical to all be the same. You select the objects and the last object you select will be the one that the others are matched to.



So after you do the operation the drawing will now look like this.



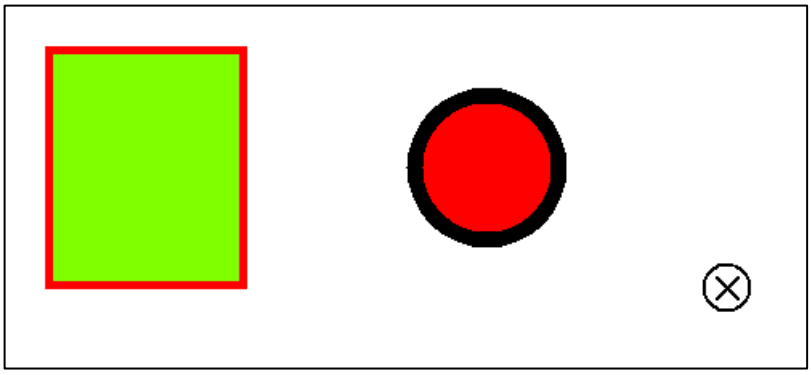
It is as easy as that. Functions like this help you to create drawings that are neat and tidy with little effort. Paint just cannot do things like this.

Centers Horizontal

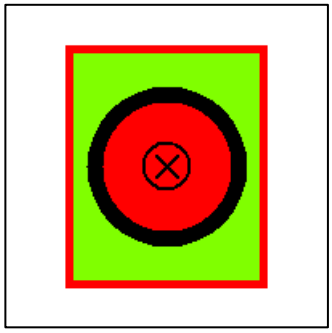
Likewise you can also align the X coordinates of several objects. This will make nice neat columns.

Centers

The Centers operation does both at once. You can do this to make objects concentric with each other.



Again, this sure makes things a lot easier when you are trying



to get nice symmetric looking designs.

Left is used to align the left edges of the objects.

Right is used to align the right edges of the objects.

Top is used to align the top edges of the objects

Bottom is used to align the bottom edges of the objects.

Below the separator are located the sizing commands. These commands can be used to set the sizes of objects to be the same.

Size X

This command makes the horizontal dimensions the same. Again, we use the horizontal size of the last item selected to set the size of the earlier selected objets.

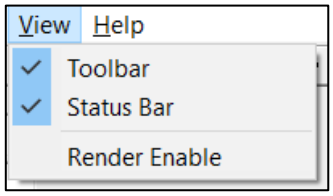
Size Y

This command is used to set the vertical dimensions to be the same.

Size Both

And this command makes the X and Y dimensions identical.

View Menu

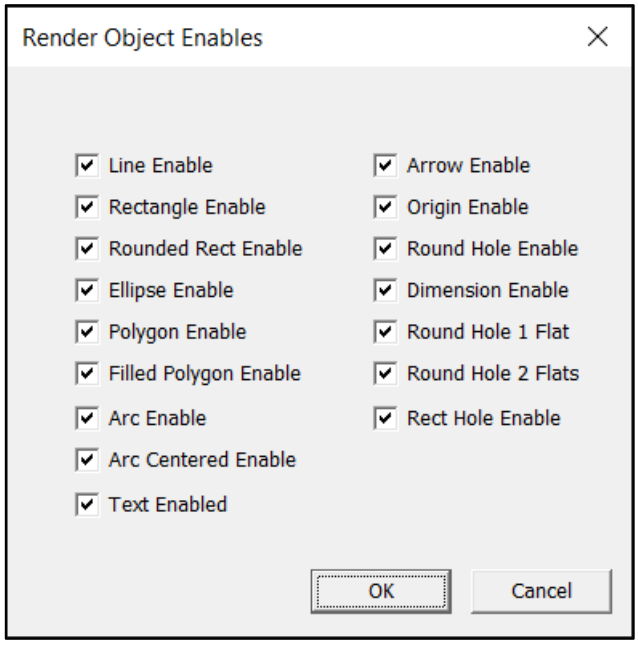


Toolbar

This option allows you to hide or show the tool bar. I would not recommend hiding the toolbar, because you really always need to see that.

Status Bar

You can hide this if you want. I still have not implemented the code for using this, partly because for me, the status bar is kind of useless anyway.

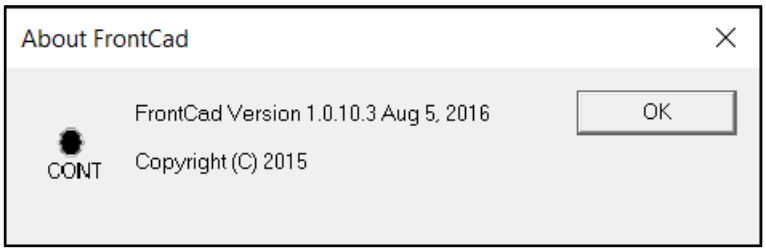


Render Enable

This option will bring up the following dialog box. You can choose which objects are hidden while rendering. This affects both the screen and the printer. You can only select a class of objects to hide, and cannot hide individual objects. By default, all objects are enabled.

One of the quirks you should note, at the moment, the program cannot tell the difference between a Polygon and a Filled Polygon.

And that now brings us to the final menu item which is the **Help** menu item. The only entry in the help menu is **About**. This will bring up the help dialog which will display the version and build date of the program. This is only important for making sure you have the latest version.



The next thing we will examine will be the toolbar. This is where you will be doing most of the commands from for making FrontCad do the things you want it do. We will look at these buttons from left to right.

 Pushing this button will clear the workspace, **WITHOUT** asking you if you want to save.

 This button allows you to open a previously saved document.

 This button saves the current document.

 This button will cut the selected objects to the clipboard.

 This button will copy the selected objects to the clipboards.

 This button will paste the contents of the clipboard to the drawing.

 This button will select a region. It can be used in several ways. You can use this to select a group of objects that you want to cut, copy, save as a library object, or move. You can also use this to mark a region you want to print to the clipboard.

 This button is for placing what I call the “Print Rectangle”. The print rectangle will not render when you print the document, but it will define where on the sheet of paper what you have drawn will appear.

This button is used to print the document. If there is no selection window and no Print Rectangle, then the document will be printed relative to the upper left hand corner.

This button is used to activate the select tool. While in this mode, you can select or deselect objects. If there is more than one object under the cursor, FrontCad will ask you to select the object you are interested in.

This button activates the Draw Line tool. Parameters that you can change will appear in the Utility Pane (see below). You can change the line color and width.

This button activates the Draw Rectangle tool. Parameters that you can change will show up in the Utility Pane. Parameters you can change are Outline Width, Line Color and Fill Color.

The button activates the Draw Ellipse tool. Parameters are the same as the Rectangle.

This button activates the Draw Arc as defined by a Rectangle tool. So the first thing you do is to define the rectangle that is going to contain the Ellipse that the arc is going to be a part of. Then you will define the start position and end position of the arc. When you define the start and end, you do not have to click on the circle that the arc will be a part of. In this way, you can define the arc angle with a rather high amount of precision. You can set the color of the arc and the width of the line of the arc.

This button activates the Draw Arc as defined by its center and rectangle. Pretty much it is identical to the above arc tool.

This button activates the Draw Rounded Rectangle. There is an extra parameter that is used to define the rectangle that the corner arcs will occupy.

This button activates the Draw Polygon tool. This type of polygon has a transparent interior. The polygon will complete when you click on the starting point the second time.

This button activates the Draw Polygon with a filled interior. This polygon does not have a transparent interior. Other than that, it is the same as the above polygon.

This button is for drawing Text. This is a very complicated tool, and it will be covered in more detail later.

This button is for drawing arrow heads. The arrow heads are just simple triangles, but you can set their size with a set of parameters.

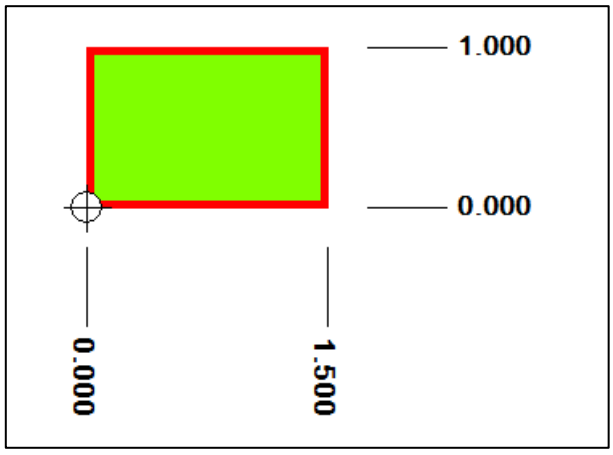
This button is for placing Library Objects onto the drawing. It will allow you to place the currently selected object in the Library Pane onto the drawing.

This button is for placing a bitmap onto the drawing. You can open any .bmp file place. FrontCad will ask for a bitmap file for each object placed on the drawing.. One thing to keep in mind is that if the path to the bitmap selected changes, the bitmap will no longer show up on the

drawing.. So if you are going to place bitmaps on the drawing, it is best, probably, to copy the bitmap to the same directory that the front panel is going to be in so that the bitmap will always be with the front panel.

This button is for activating the Place Origin tool. You only need an origin if you are going to place dimensions on the drawing. This object will tell the dimensioning tool where (0,0) is. You should note that there should only be one origin on a drawing. FrontCad will use the first Origin it finds when calculating dimensions, however, you really don't have any way of really knowing exactly which origin is going to be used. Generally, you want to place this in the lower left hand corner, as up in the vertical position increases the Y coordinate in the positive direction and to the right increases the X coordinate in the positive direction.

This button activates the Place Dimension Tool. The picture in the icon is a little misleading. The dimensions actually look just a bit different.

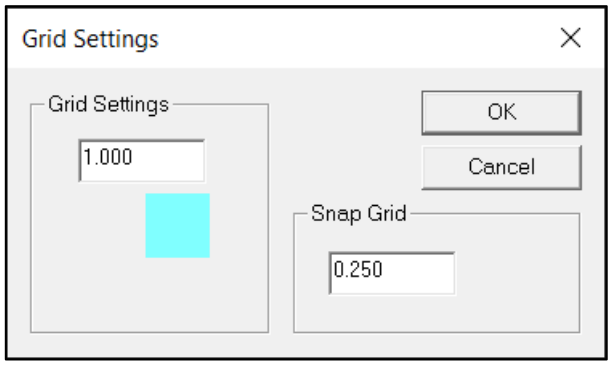


The type of dimensioning I use in the program marks a dimension relative to the origin. You should not the origin object in the lower left hand corner of the rectangle. When you draw a dimension, the direction that you move the mouse will determine whether you are marking a vertical or horizontal distance. If you move the mouse horizontally, you are marking a vertical position and if you move the mouse vertically, you are marking a horizontal position.

This button is used to activate the pot scale wizard. This is used to create a library part that can then be placed on the drawing.

This button is used to toggle the grid on or off.

This button is used to set the snap grid parameters. When you push this button the following dialog box will show.



There are two settings. In the Grid Settings, is the size of the grid that will be drawn in the work space and the color of the grid lines.

In the Snap Grid box, this is the dimension to which objects will snap when they are drawn.

Do not worry too much about the snap grid. Even if the grid will not allow you to place objects

exactly where you want them, there are other less tedious methods to get objects where they need to be.

This button is used to activate the Place Round Hole tool. It provides a reference at the hole center.

This button is used to activate the Place Round Hole with one flat side tool. It provides a reference at the hole center (if that hole were a complete circle).

This button is used to activate the Place Round Hole with two flat sides tool. It provides a reference at the hole center (if that hole were a complete circle).

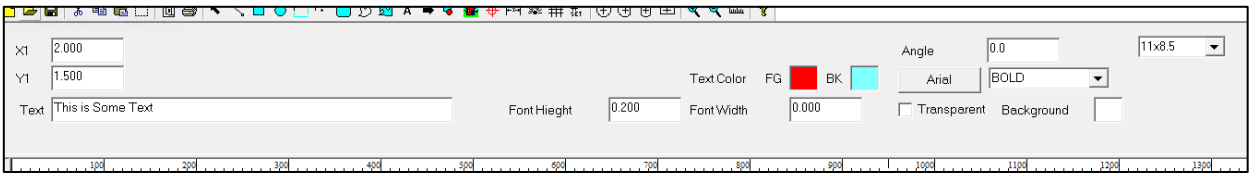
This button is used to activate the Place Rectangular Hole tool. This tool provides a reference to the center of the rectangle.

This button is used to zoom in the display.

This button is used to zoom out the display.

This button is used to toggle the Rulers on or off

Utility Pane

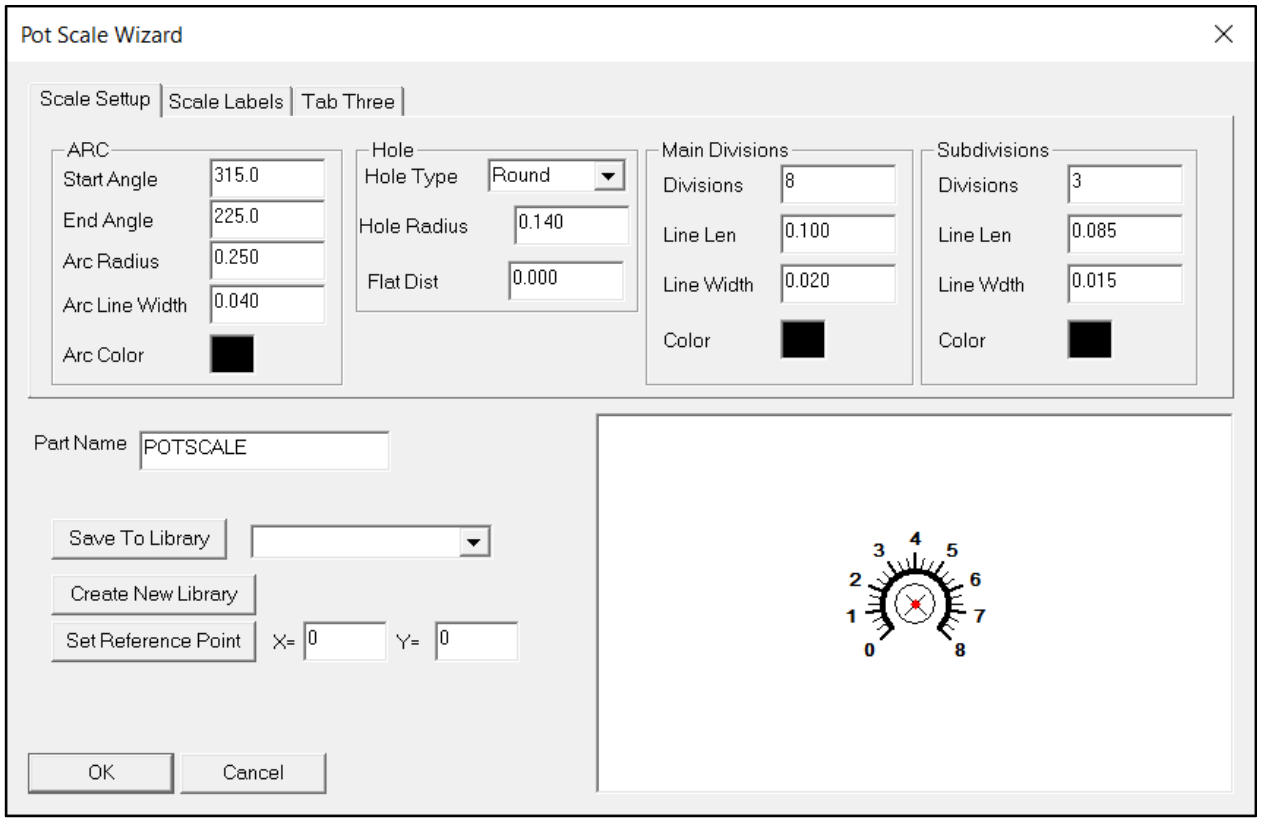


The Utility Pane contains the information that you can edit on an object. The example above is what you will see if you were to use the Select Tool to select a text string on the drawing. As you can see, you can set just about every parameter there is to set for text. You will see something similar when you are in the draw mode. The one thing you will not see for text is the X1 and Y1 edit boxes which is the position of the text on the drawing. In draw mode, just change the controls the way you want them and then click on the drawing area where you want to place the object. If you have selected the object, it depends on the type of object as to what you need to do. For an Edit Box, after you are done editing the text, just hit the return key and the changes will show up. Most of the other control the change will happen as soon as you make the change.

Pot Scale Wizard

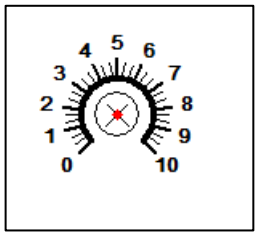
Now, we need to talk about the pot scale wizard. Drawing pot scales, by hand, is a pain in the ass, if not the hand. That is why there is a tool that will automate this function. At the moment, there is really only one style that is produced, but I am sure with the options available you should be able to make something that is somewhat unique.

We start the process by clicking on the Pot Scale Wizard button on the tool bar.

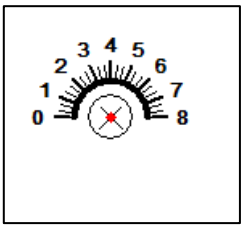


One of the nice things about this Wizard is that as you change the parameters, you can see how the pot scale will change. One of the bad things is that I have no scale on the display. So, until you place it on your drawing, you have no idea how big this thing really is.

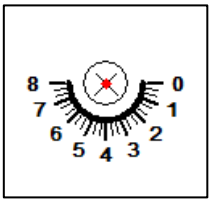
For example, we want 10 divisions instead of 8. Go to the box labled Main Divisions and change the Divisions parameter to 10. This is what you will get:



Also, pots come in a wide variety of rotation angles. If you notice, there is a red dot in the center of the symbol. This is the reference point. When you place or move this object, this is the point you will be moving. Also, it is where we measure the angle of the arc from. Zero degrees points directly to the right from this point. Ninety degrees points directly up, one hundred degrees points directly to the left, and two hundred seventy degrees points directly down. Also, arcs are drawn in a counter clockwise direction. For example, if you set the start angle to 0 degrees and the end angle to 180 you will get this.

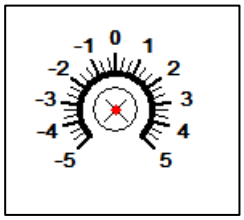


On the other hand, if you set the start angle to 180 degrees and the end angle to 0 degrees, this is what you get.

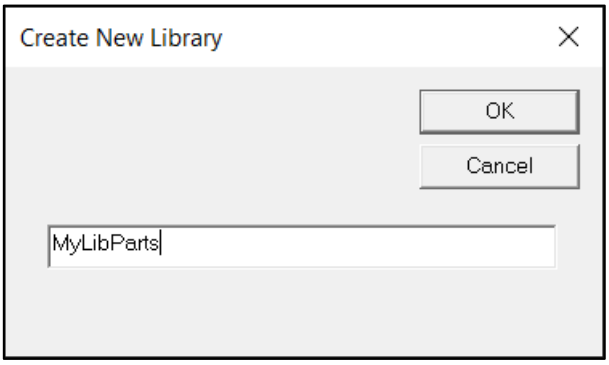


To change the labels around the scale, select the second tab that is labeled Scale Labels. Here you have three tools to change the font, the label itself, and the distance and rotation of the text from the tick.

The actual labels can have any sort of text in them you want. In the Change Label tool there are three controls. On the top, there is a slider that can be used to select the index of the label you want to change. Right below that is the actual text that will appear on the scale, and below that is a box that contains the index of the label. Let us say we want to create a scale that goes from -5 to +5. Starting at index 0, click the center box labeled Label and type in the text "-5". Hit the return key to cause the display to update. Not only does the sample change, but you will notice that the index advances from 0 to 1, so that you are ready to change the next label.



Now, to use this symbol, we need to put it into a library. First thing we need to do is give the part a name. You will notice that the default name is "POTSCALE". This is fine, but, this is the name the wizard gives all pot scales, to lets change it to "POTSCALE_5_0_5".



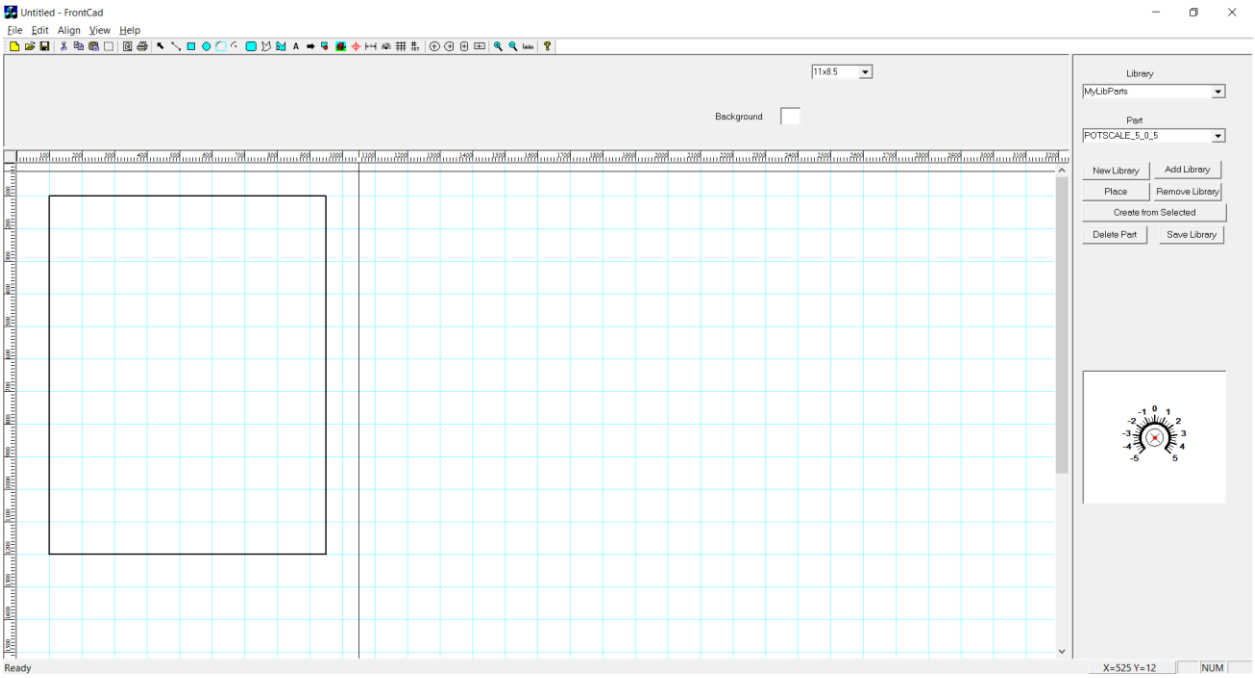
Next, the library needs to be selected. If this is your first time, you probably have no libraries so we will need to create one. Click on the Create Library button. When the dialog box shows up, enter "MyLibParts: into the edit box. Then click OK.

You will notice now that the combo box next to the "Save To Library" button now has the name of the library the part is in. Press this button, and then click OK. When we get back to the main view in FrontCad, you will notice that the Library Pane will look like this.

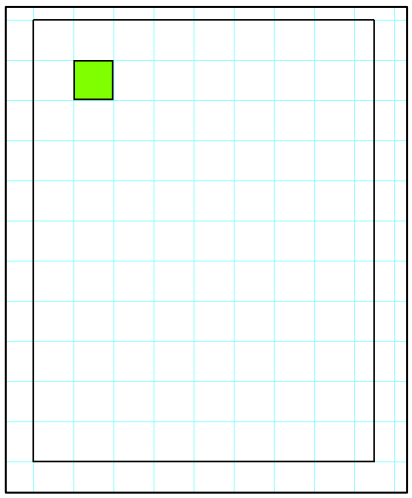
If you want to keep this Library permanently you will need to save it to a file. To do this, click on the **Save Library** button in the library pane. Later, if you want to use this library, you will need to reload the library by using the **Add Library** button.

Now that we have all of the preliminaries out of the way, we can actually now start making a drawing.

The first thing we need to do is to select the size of the paper we want to make our drawing on. In the upper left corner of the Utility Pane you will find a combo box labeled sheet size. Currently, the two selections are 11x8.5 and 14 x 8.5 (Letter and Legal respectively). Pick one of these. Next, click on the place print rectangle button in the tool bar.  Place this object onto the work space. I would not place it directly in the upper left hand corner, rather, place it at the 1x1 coordinate.



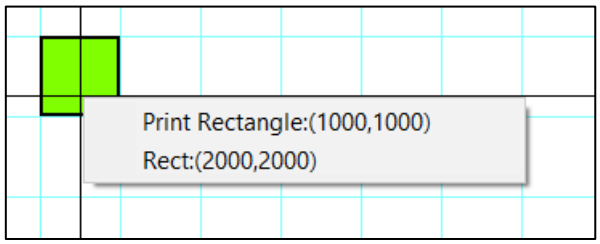
You should then have something like the above. Notice, that to fit everything in the view, I have set the zoom factor down a notch. If you place all of your objects within this rectangle, when you print, you should get exactly what you see on the computer screen.



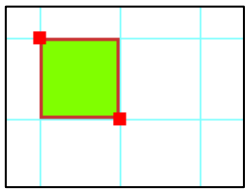
What I like to do next is to place a rectangle that will actually represent the material that the front panel will be made from. For me, that is a panel that is 8.75 inches tall and 2.25 inches wide. To do this, click on the Draw Rectangle button on the toolbar. You now need to decide what colors you want the boarders and interior to be.

Now as you can see, the rectangle I placed is not 8.75x2.25. I will now show you how to get that rectangle to be exactly the size you want it to be. To do this, click on the selection tool in the tool bar and then select the rectangle we just placed by clicking anywhere inside that rectangle.

When you do click on the rectangle, you will bet a Context Menu pop up because the point you have clicked in is inside two different objects. One object is the rectangle we just placed, and the other is the print rectangle. You can see that tye types of object is listed as well as the reference point it is located at. This is meant to help you differentiate between the objects when tere are a lot of them.



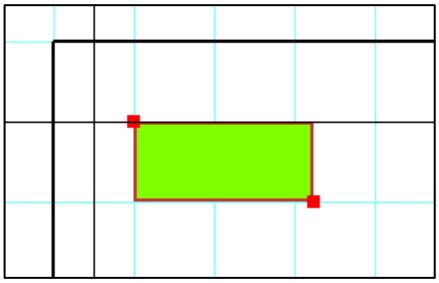
Click on the second (Rect(2000,2000)) item in the list. If your drawing is different, adjust your section appropriately.



When the rectangle is selected it will look like this.

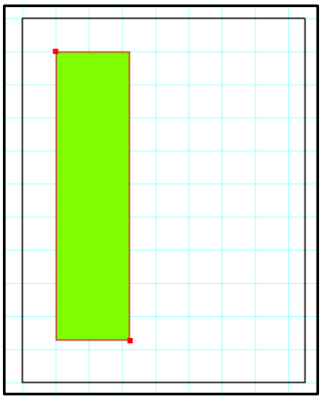
And also, you will notice that the Utility Pane changes like this.

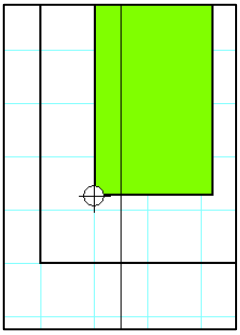
We now have the coordinates for the two corner points, the ones that have the little rectangles on them. You can do one of two things. You can use the mouse pointer to drag these corners and then visually check the coordinates to see if the thing is the right size or not, or, you can just edit the text boxes in the utility pane.



Using X1,Y1 as a reference, add 2.25 to X1 and enter this value (4.25) into the X2 box and then hit the return key. The rectangle will now look like this.

Next, add 8.75 to Y1 and enter that value (10.75) into Y2. Hit the return key and now the drawing should look like this.



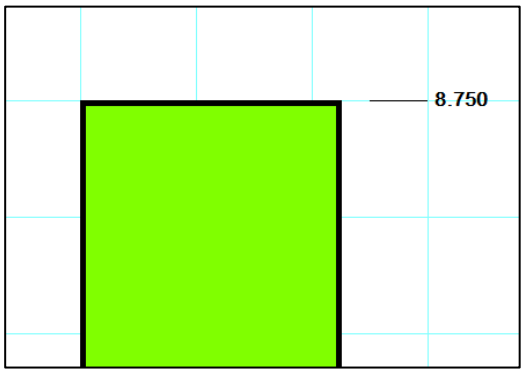


The next thing we want to do is to set the origin. We do this by placing an origin object onto the drawing. Select the place origin object button in the tool bar and place an origin object on the lower left hand corner of the rectangle that represents our front panel.

This, pretty much, is the hard part. Now, you just need to decorate the panel. The first decoration we are going to start with are dimensions. The dimensions are a

good check to make sure you have drawn things correctly. Dimensions are referenced to the origin object. This way, when you go to fabricate your panel, you know exactly how much you need to measure.

So, click on the place dimension button on the toolbar. Go to the top right hand corner of the panel and ¼ inch (0.250) away from the right edge, click the mouse. Now move the mouse about ½ inch to the right and click again. The result should look like this:



Please note that there is a bug in the place origin tool. Every now and then, even though it looks like it is in the correct place, it is off a little bit. If, for instance, your dimension ended up saying 8.74 rather than 8.75, this would be the reason. Try selecting the origin and then moving it. You will also have to delete the dimension and put it down again to see if you fixed the problem.

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