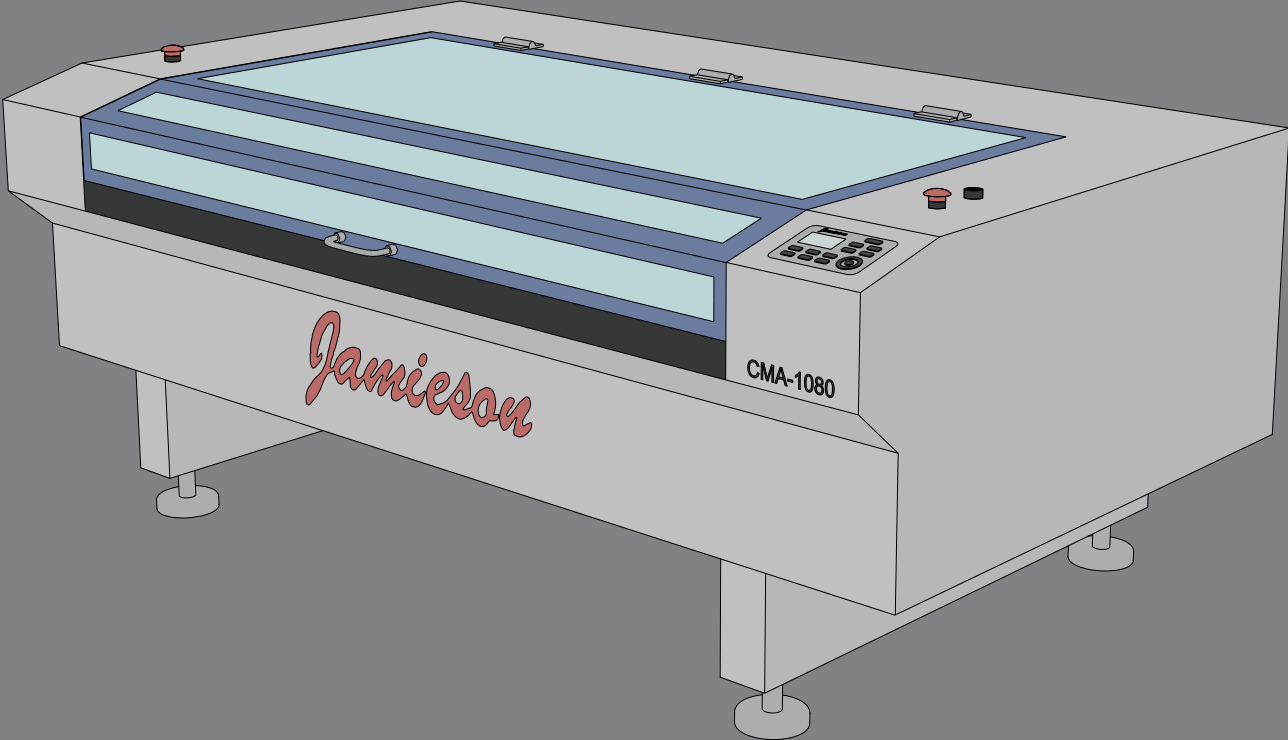


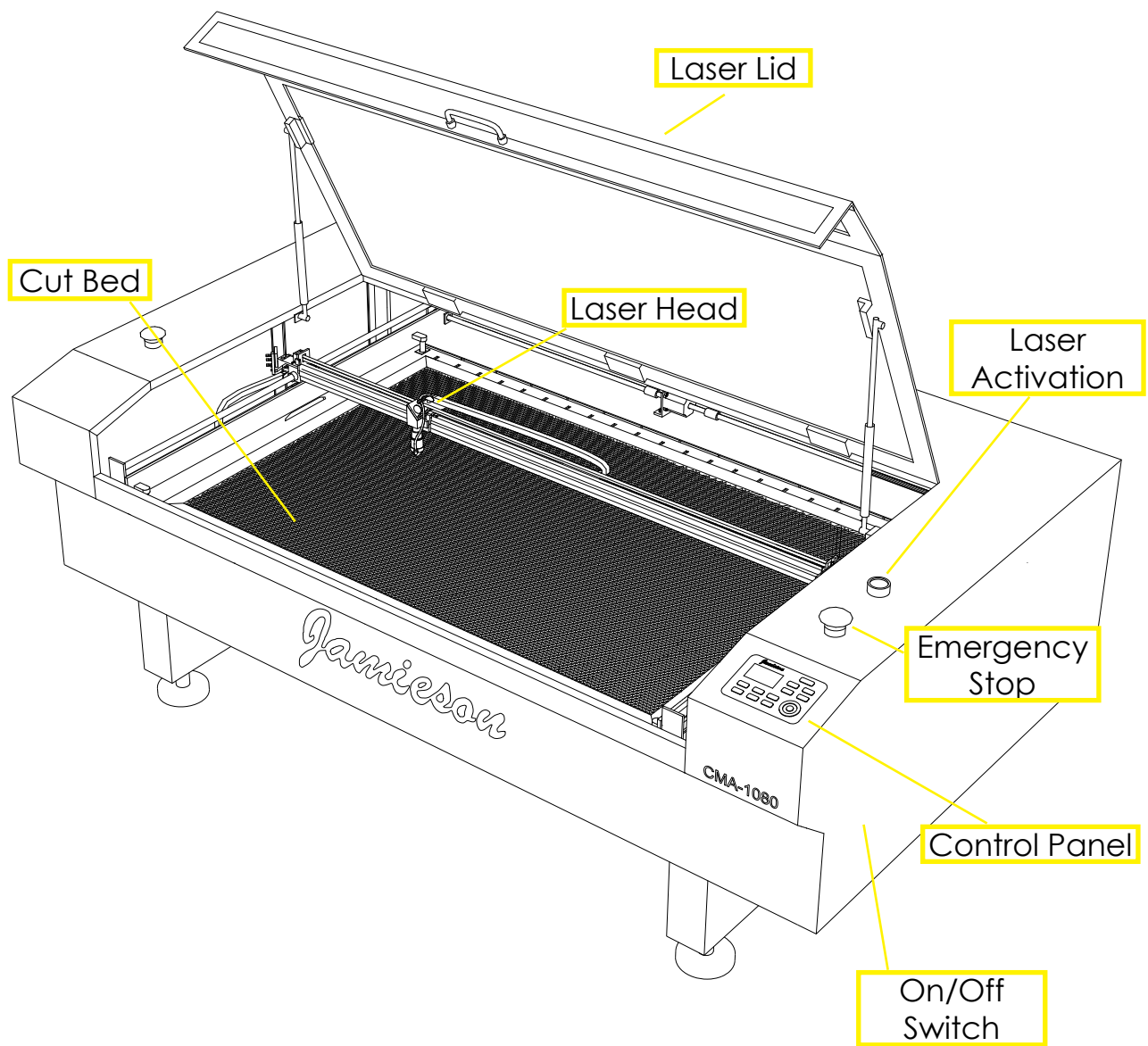
UMass Amherst Digital Fabrication Lab

Jamieson CMA-1080 Laser Cutter

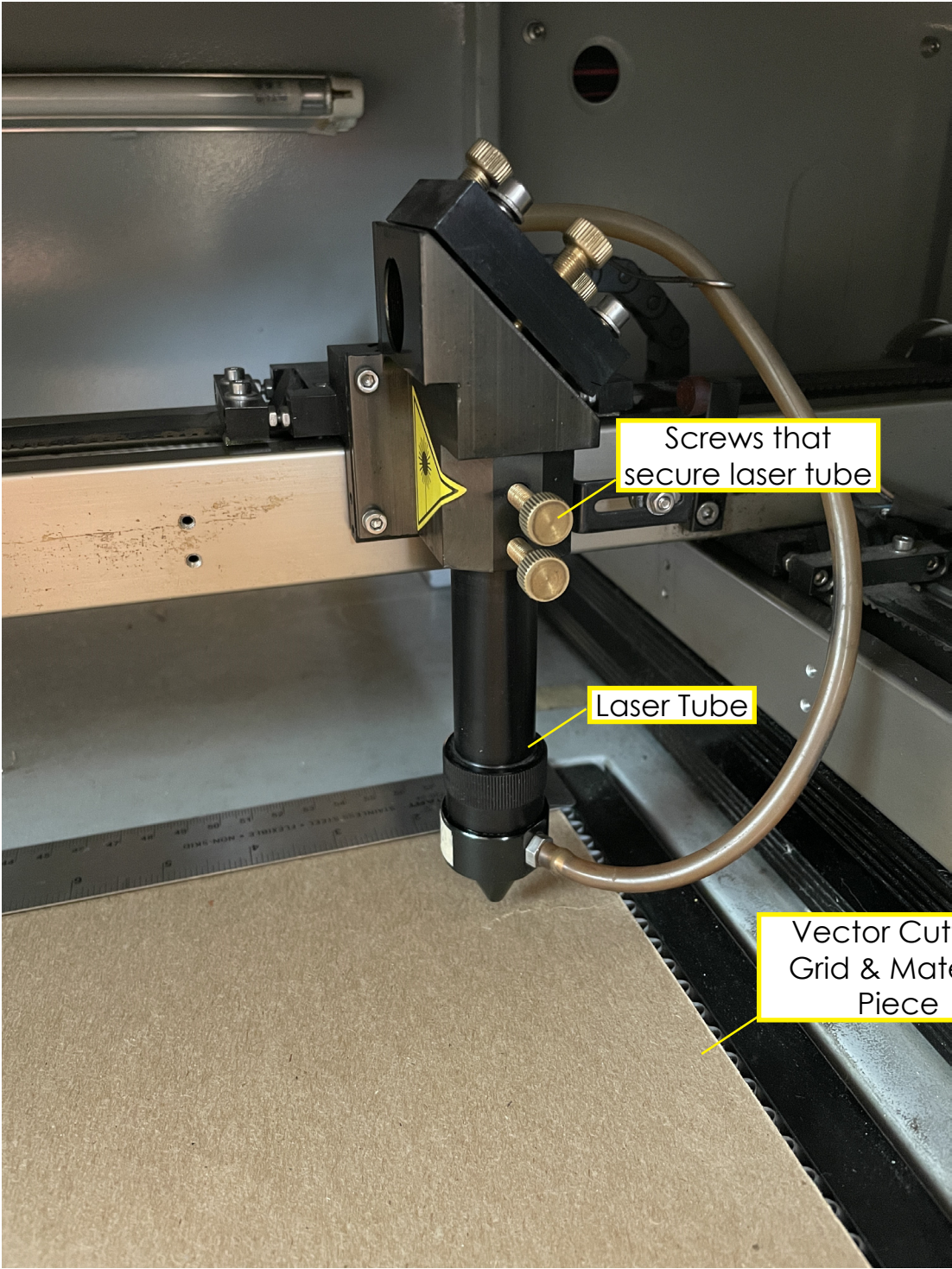


Jamieson CMA-1080 Laser Cutter: Summary

The Jamieson CMA - 1080 CO2 Laser Summary uses a laser to cut and etch flat materials up to 1/4" thick. The laser is reflected through small mirrors and lenses which move around on small gantries. Through adjustments in the laser quality, speed, and power different affects can be created. However, the most common uses are for cutting and etching materials either through vector linework or raster images



Jamieson CMA-1080 Laser Cutter: Summary



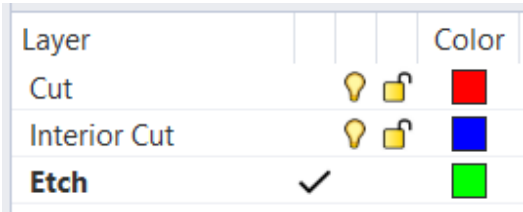
Lab users cutting files on the machine shouldn't have to touch anything other than these parts.

Jamieson CMA-1080 Laser Cutter: Formatting

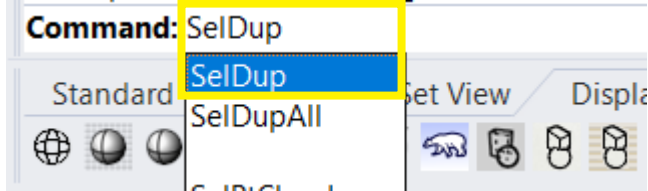
STEP ONE: File Prep

To prepare files for the Jamieson laser cutter you need to setup your file in either Rhino or AutoCAD (or another CAD software). Start by creating different layers and giving them distinct names and colors. Some common layer types would be interior cuts, exterior cuts, and engraving. *You can expand on this list to include light engraving and dark engraving. Your various layer types will depend on what kind of file you're cutting.

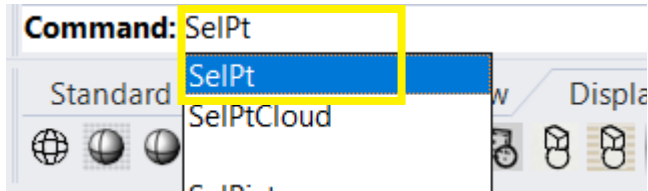
Label your layers and set distinct colors in Rhino/ AutoCAD



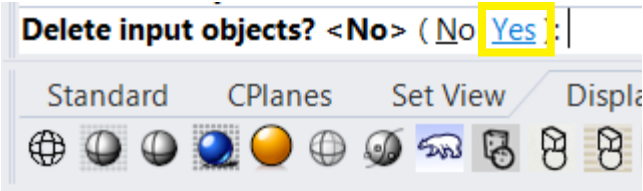
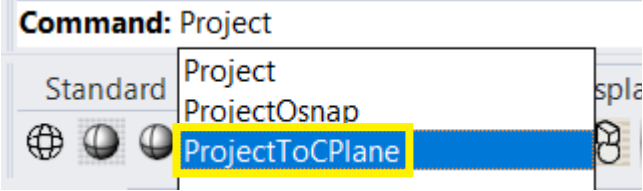
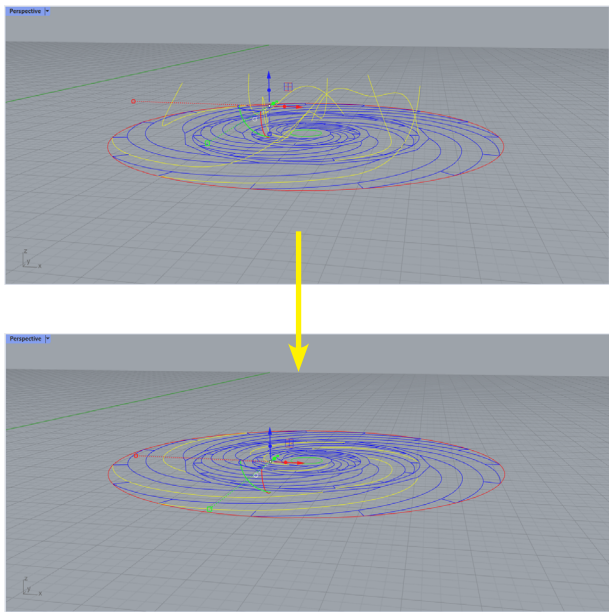
Check your file for any duplicates and delete them



The machine will not accept any files with points so select any points and delete them



The machine will also not accept files that have a z-value so you can use 'Setpt' or 'Project to CPlane' to make sure all your linework is planar

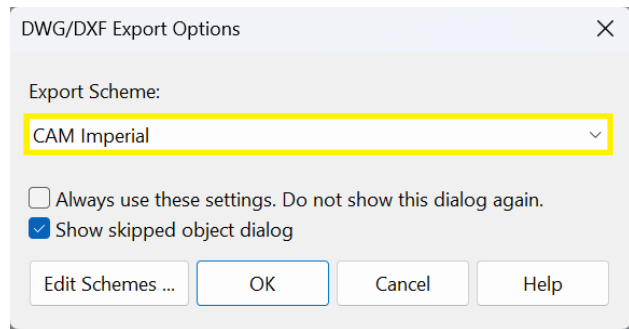
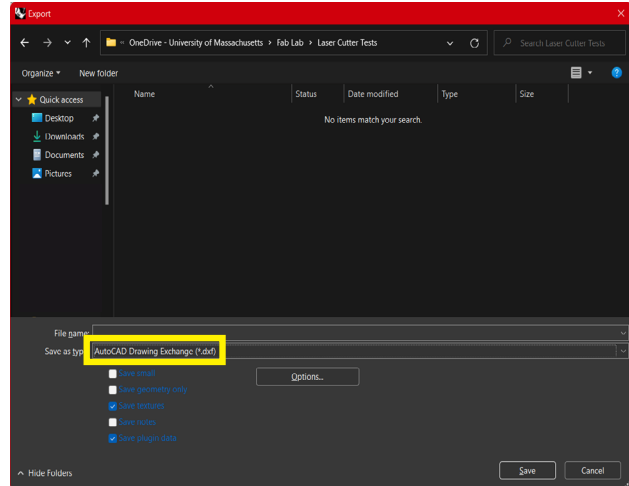
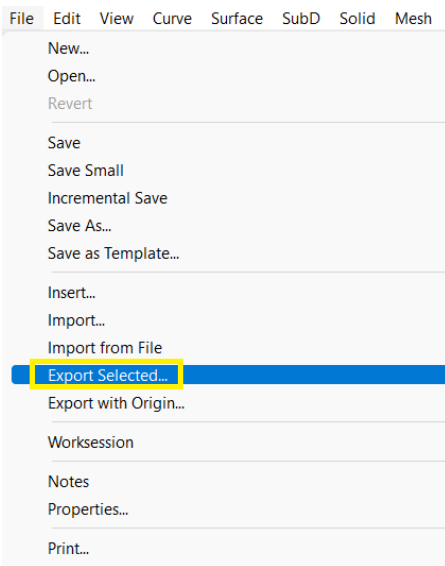


Jamieson CMA-1080 Laser Cutter: Formatting

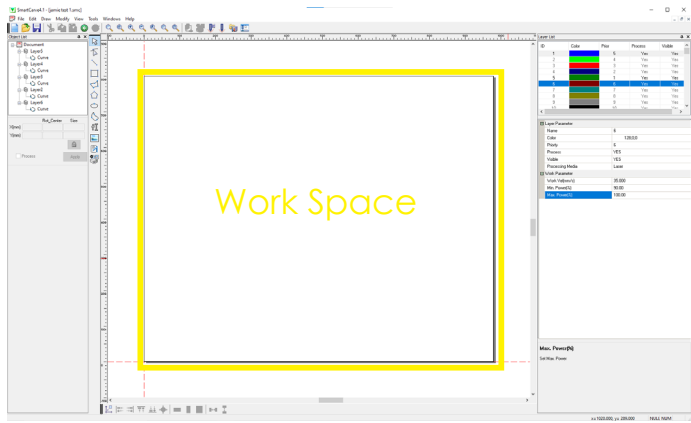
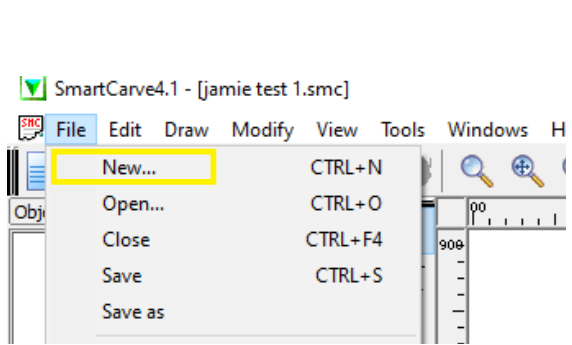
STEP TWO: Exporting your File

The Jamieson laser cutter uses a dedicated program called *Smart Carve*. To import your file into this program you must export as a .dxf file

Export your linework to an AutoCAD Drawing Exchange file, a .dxf file and set the Export Scheme to CAM Imperial



When you open *SmartCarve*, you first need to select *File* and *New*. This will create a new work space/artboard for you to import your file.

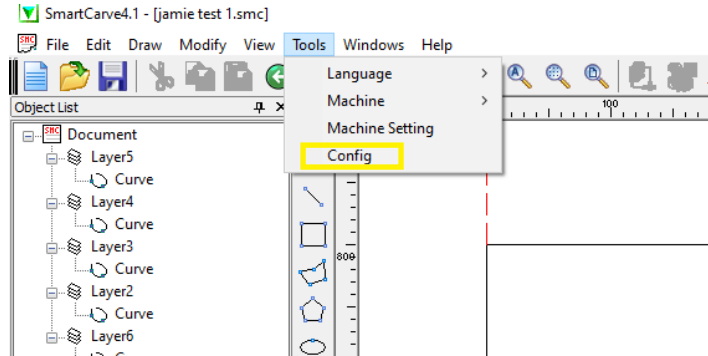


Jamieson CMA-1080 Laser Cutter: Formatting

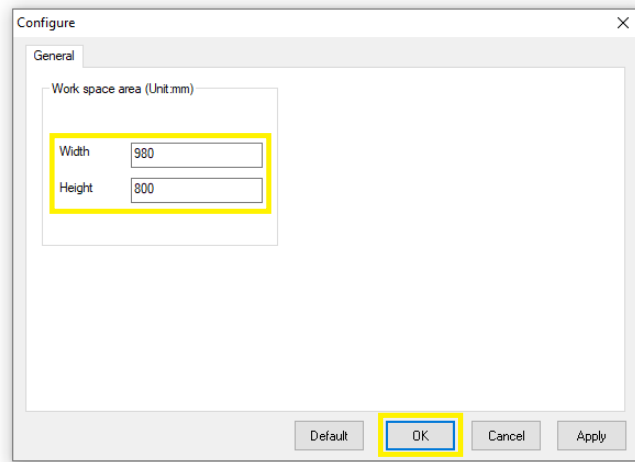
STEP THREE: Setting up your file in SmartCarve

Next you need to set up your work space size and import your file.

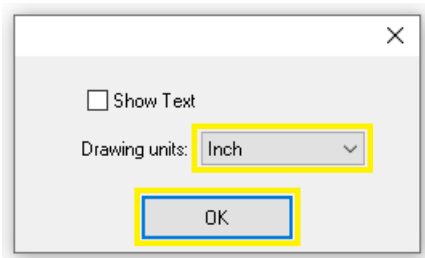
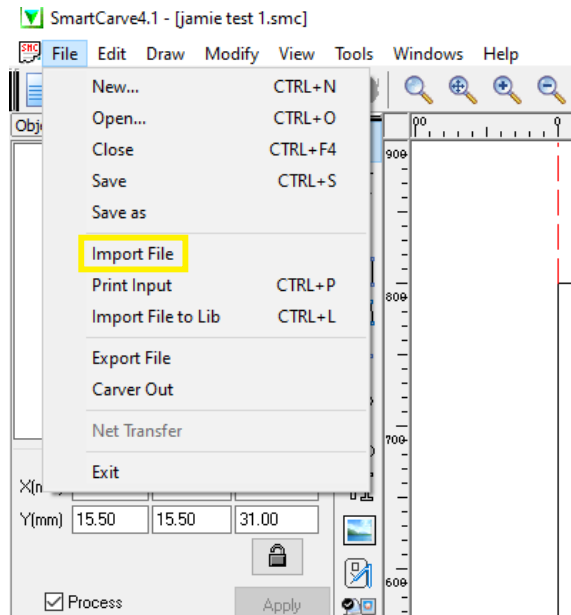
To set up your work space, go to *Tools* and select *Config*



The Jamieson machine works in mm units. The print bed is **980mm x 800mm** so in the work space area you need to confirm that these are the values listed and click *OK*



Once you confirm your work space size you can import your file. To do this go to *File* and *Import File*. This will open another dialogue box asking the drawing units of your original file. Select the units you used and click *OK*

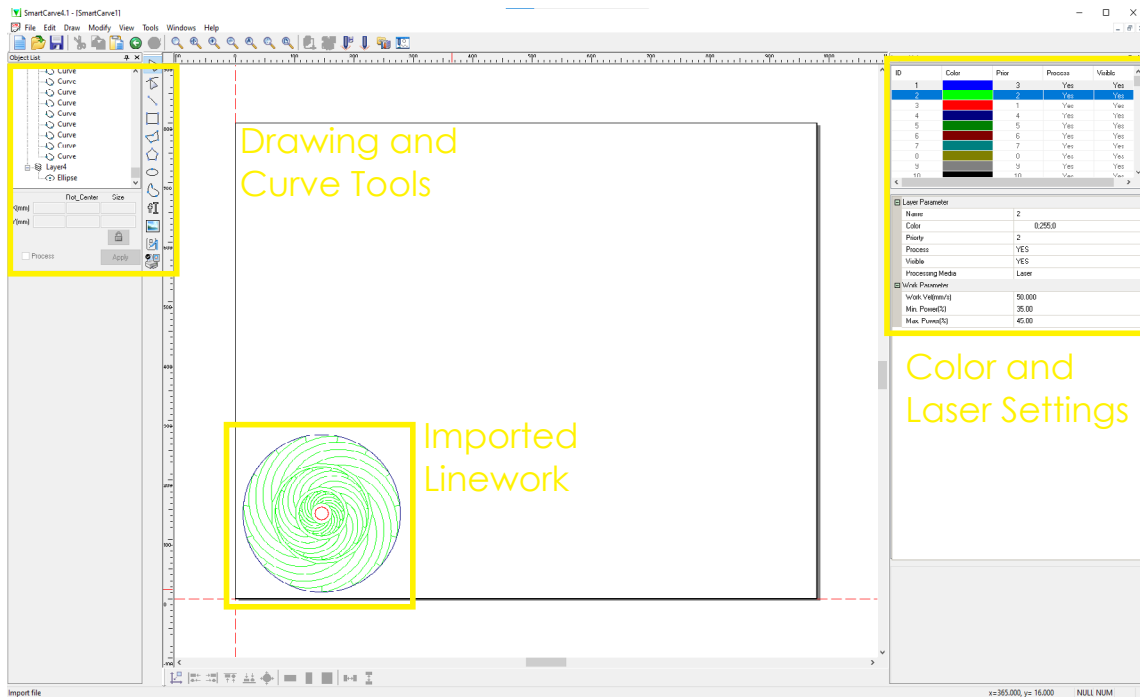


Jamieson CMA-1080 Laser Cutter: Formatting

STEP THREE: Setting up your file in SmartCarve

Next you will orient your linework on the work space and set up which layers will be doing what operations (i.e. cut or engraving)

When you import your linework it should snap down to the bottom left (0,0) point. It is usually a good idea to nudge it slightly inwards so there is 1/2"-1" border around your work. On the right side of the program you will find the layer color and laser settings.



When you import your work into SmartCarve it will assign your various layers to a new color and priority(order). As you can see in the settings window there are any number of colors and layers you can assign. It is recommended you keep to 2-3 layers as this will keep your file smaller.

ID	Color	Prior	Process	Visible
1	Blue	5	Yes	Yes
2	Green	4	Yes	Yes
3	Red	3	Yes	Yes
4	Dark Blue	2	Yes	Yes
5	Light Green	1	Yes	Yes
6	Dark Red	6	Yes	Yes
7	Teal	7	Yes	Yes
8	Olive	8	Yes	Yes
9	Grey	9	Yes	Yes
10	Black	10	Yes	Yes

Layer Parameter	
Name	6
Color	128,0,0
Priority	6
Process	YES
Visible	YES
Processing Media	Laser

Work Parameter	
Work Vel(mm/s)	35,000
Min. Power(%)	90,00
Max. Power(%)	100,00

Jamieson CMA-1080 Laser Cutter: Formatting

STEP THREE: Setting up your file in SmartCarve

In this window you will set your order of operations, normally engraving and interior cuts first and exterior cuts last. You will also set the speed and power settings for your various layers.

When you import your file into SmartCarve you may notice that the colors are different than your Rhino/AutoCAD file. This is okay as long as your layers still contain all their desired linework.

By adjusting the number in the priority input you can change the order of operations. i.e. changing the priority to 1 will cause that layer to be lasered first.

ID	Color	Prior	Process	Visible
1	Blue	5	Yes	Yes
2	Green	4	Yes	Yes
3	Red	3	Yes	Yes
4	Dark Blue	2	Yes	Yes
5	Dark Green	1	Yes	Yes
6	Dark Red	6	Yes	Yes
7	Teal	7	Yes	Yes
8	Olive	8	Yes	Yes
9	Grey	9	Yes	Yes
10	Black	10	Yes	Yes

Layer Parameter	
Name	6
Color	128:0:0
Priority	6
Process	YES
Visible	YES
Processing Media	Laser
Work Parameter	
Work Vel(mm/s)	35.000
Min. Power(%)	90.00
Max. Power(%)	100.00

At the bottom of this window you'll find the speed and power settings, these are represented as mm/s and percentages respectively. You will also see this machine uses variable power so there is a min and max value. You can find these settings on the provided settings sheet.

ID	Color	Prior	Process	Visible
1	Blue	5	Yes	Yes
2	Green	4	Yes	Yes
3	Red	3	Yes	Yes
4	Dark Blue	2	Yes	Yes
5	Dark Green	1	Yes	Yes
6	Dark Red	6	Yes	Yes
7	Teal	7	Yes	Yes
8	Olive	8	Yes	Yes
9	Grey	9	Yes	Yes
10	Black	10	Yes	Yes

Layer Parameter	
Name	6
Color	128:0:0
Priority	6
Process	YES
Visible	YES
Processing Media	Laser
Work Parameter	
Work Vel(mm/s)	35.000
Min. Power(%)	90.00
Max. Power(%)	100.00

ID	Color	Prior	Process	Visible
1	Blue	5	Yes	Yes
2	Green	4	Yes	Yes
3	Red	3	Yes	Yes
4	Dark Blue	2	Yes	Yes
5	Dark Green	1	Yes	Yes
6	Dark Red	6	Yes	Yes
7	Teal	7	Yes	Yes
8	Olive	8	Yes	Yes
9	Grey	9	Yes	Yes
10	Black	10	Yes	Yes

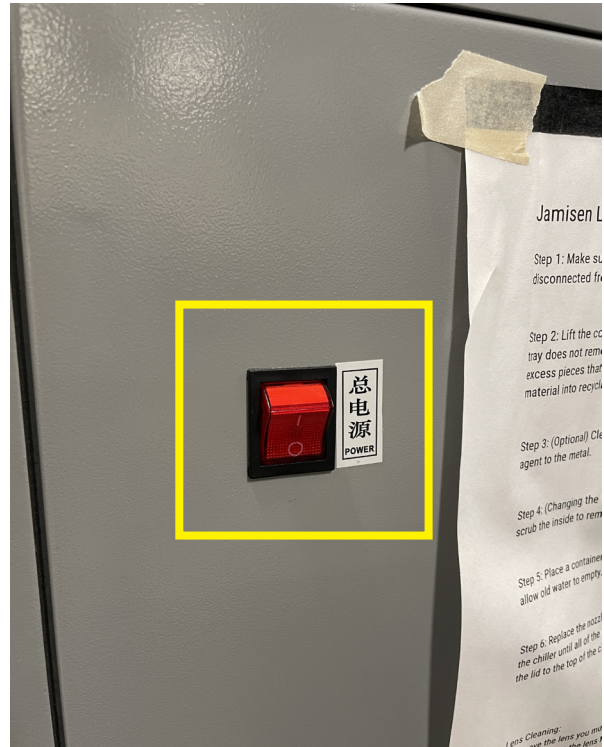
Layer Parameter	
Name	6
Color	128:0:0
Priority	6
Process	YES
Visible	YES
Processing Media	Laser
Work Parameter	
Work Vel(mm/s)	35.000
Min. Power(%)	90.00
Max. Power(%)	100.00

Jamieson CMA-1080 Laser Cutter: Printing

STEP FOUR: Preparing the Machine to Cut

You are now ready to prepare the machine to run your file.

First you will turn on the machine with the *Red Switch* on the side of the machine. It will first run through a brief calibration cycle before it is ready to cut.



This will turn on the laser cutter as well as turn on the water chiller located next to the machine. If the chiller does not turn on, ask for help.

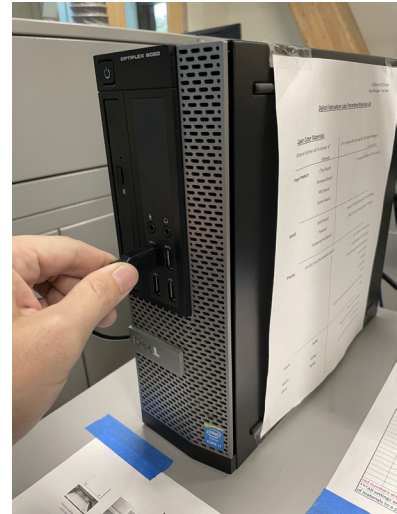


Jamieson CMA-1080 Laser Cutter: Printing

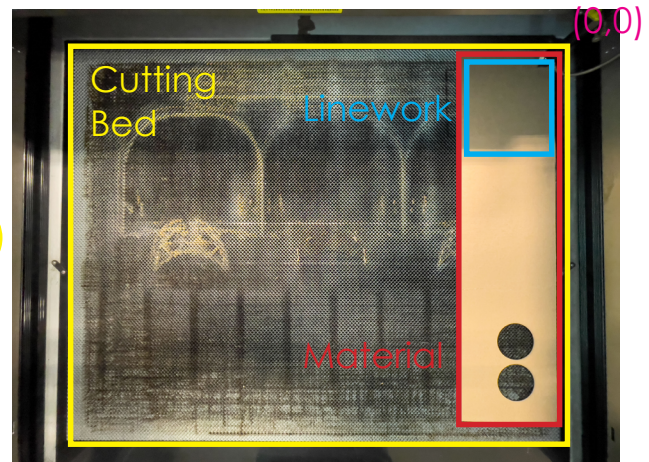
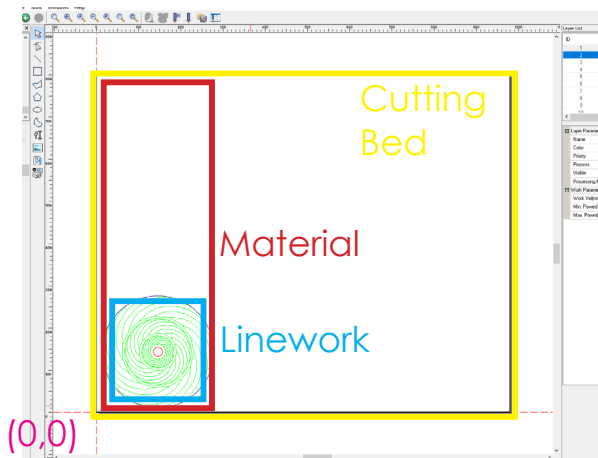
STEP FOUR: Preparing the Machine to Cut

There are a few quirks to this machine to keep in mind before you cut.

After you turn on the machine and before you run your file you will need to unplug the USB wire which runs to the Jamieson and then plug it back in. This reconnects the machine to the SmartCarve software



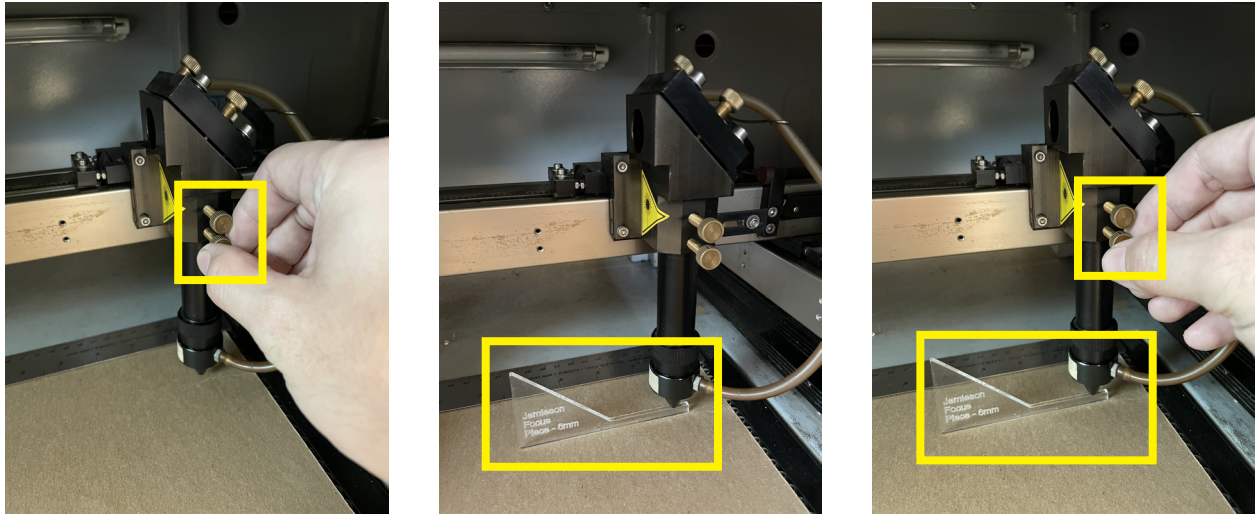
Another note is that the x-y directions shown on the SmartCarve software are different from the x-y directions on the Jamieson print bed. When orienting your work for the machine you need to keep in mind that the bed is rotated 180 degrees compared to the software.



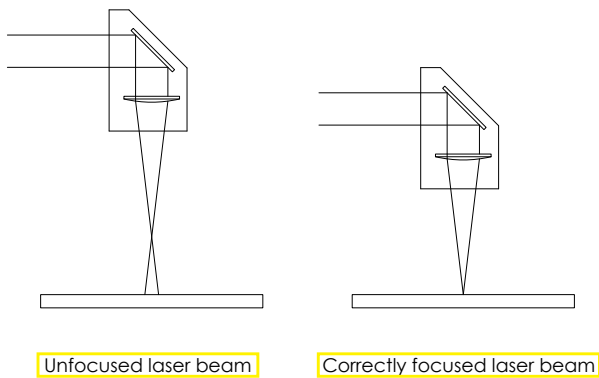
Jamieson CMA-1080 Laser Cutter: Printing

STEP FOUR: Preparing the Machine to Cut

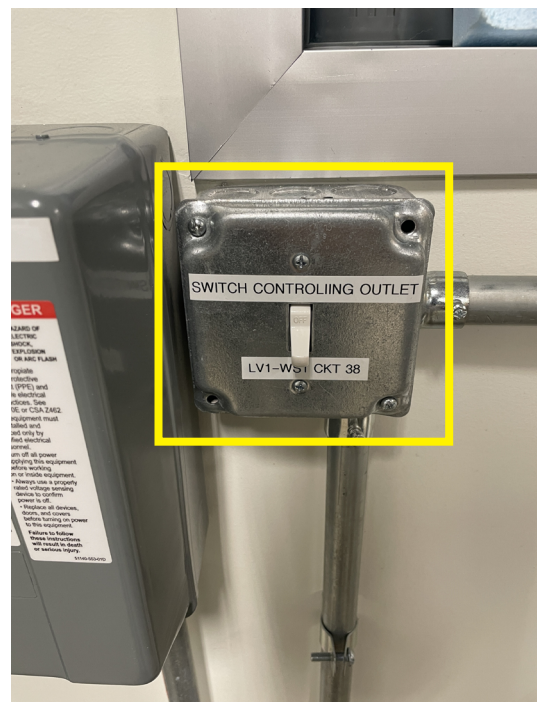
Next you need to focus the laser lens.



Unscrew the two screws holding the lens column. Lower it down so it sits on the Lens Focus Piece, re-tighten the screws, and slide the focus piece out from under the lens. This will correctly focus the laser beam. *Be sure not to adjust any other screws but the two for the lens column.



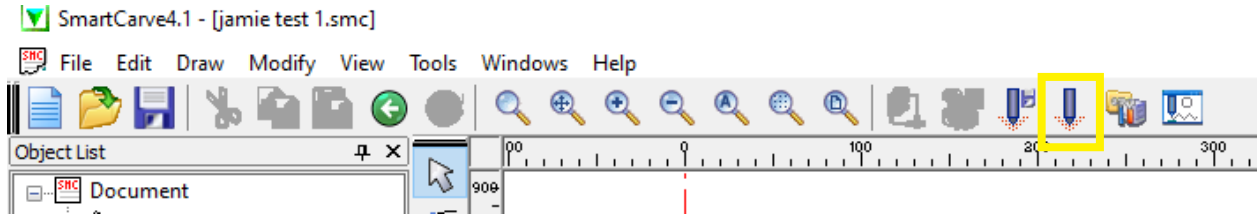
Next you need to make sure you turn on the compressor. The switch is on the wall to the left of the machine. This will send compressed air directed at the lens focus point to cool the cut.



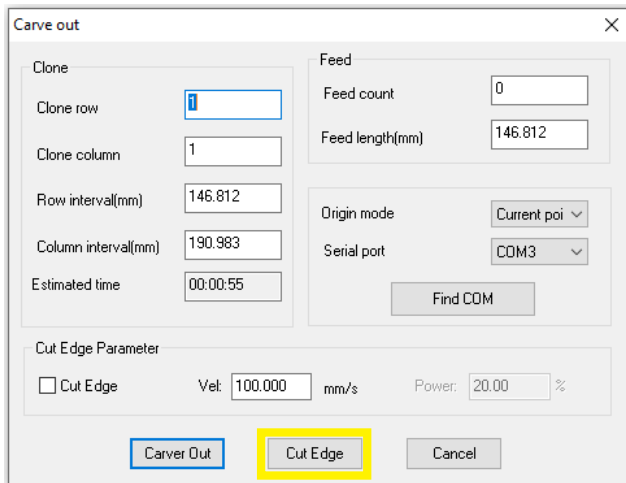
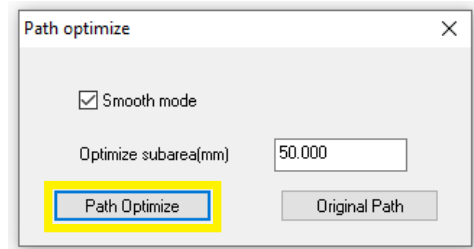
Jamieson CMA-1080 Laser Cutter: Printing

STEP FIVE: Sending your File to Cut

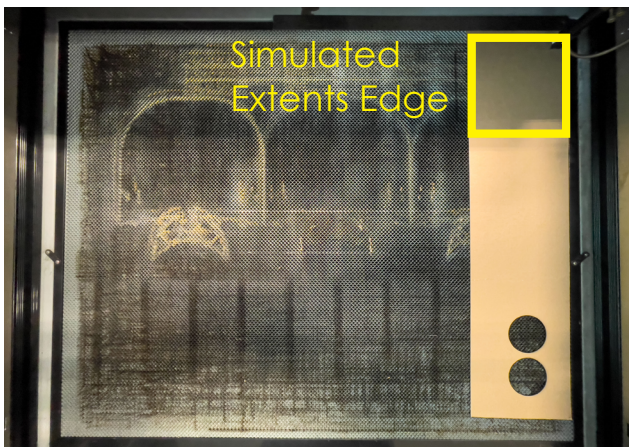
You are now ready to cut your file.



Go back to the computer and on the top tool bar select the tool *Carve Out*. This will open the *Path Optimize* window which will prompt you to select which type of path to follow. Select the *Path Optimize* option.



This will open the *Carve Out* window, which provides some details of the file to be cut, including the time estimate. At the bottom is the *Cut Edge* button. Clicking this will have the machine run a simulated rectangle around the extents of your file. This is useful for making sure that your linework will fall on your material.



Jamieson CMA-1080 Laser Cutter: Printing

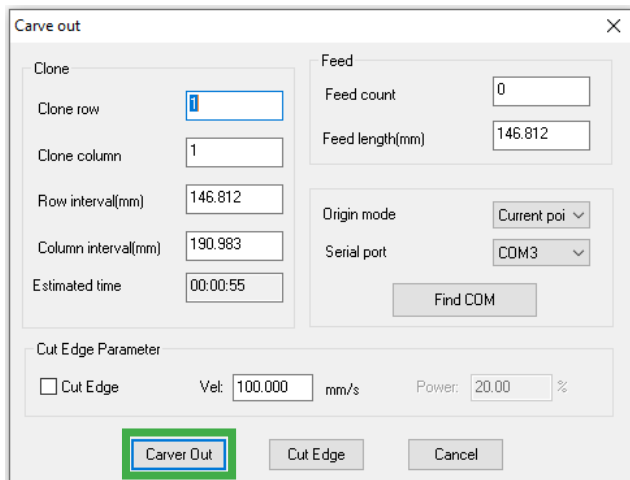
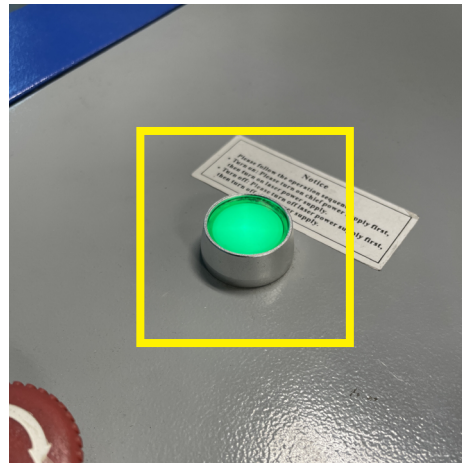
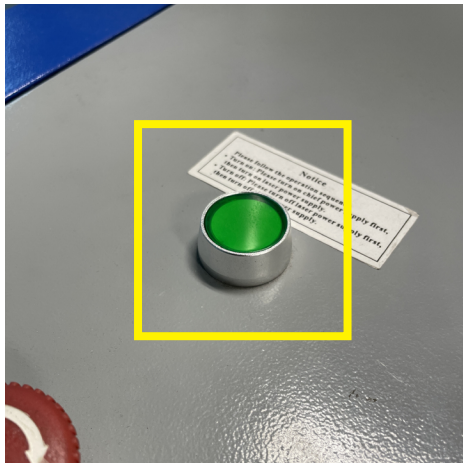
STEP SIX: Cutting your File

Make sure everyone in the lab has safety glasses on, activate the laser and begin your cut.



When running the laser cutter make sure that everyone in the lab has safety glasses on.

Make sure that the lid is closed and the compressor is on. You can then press the *Green Button* on the top of the machine, this is a safety switch which allows the laser to activate.



You can now go back to the Carve Out window on the computer and select *Carver Out*. This will start your file.

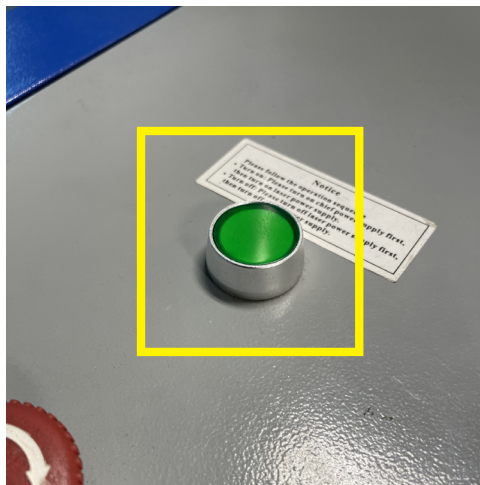
Jamieson CMA-1080 Laser Cutter: Printing

STEP SIX: Cutting your File

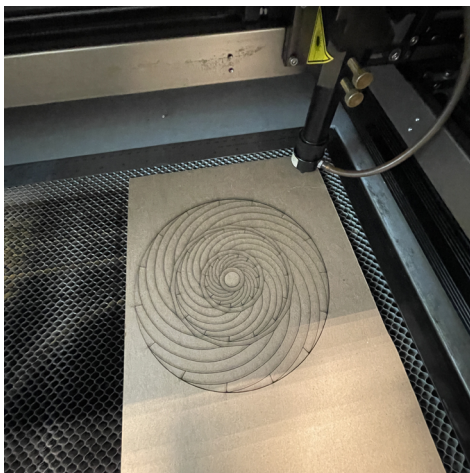
While your file is cutting you can use the control panel to pause, stop, and restart the file.



While the file is running, you can see the timer on the control screen. You can also click the STOP button to pause the file and the ESC button to end the file early if needed.



Before you collect your work piece and open the lid make sure to deactivate the laser using the green button.

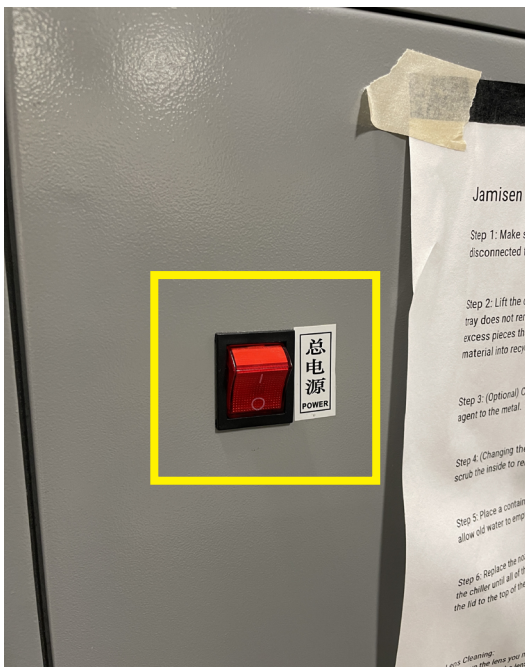


You can now collect your file from the machine.

Jamieson CMA-1080 Laser Cutter: Closing Out



If you are done cutting for awhile you can turn off the compressor



And if you are done using the machine you can turn it off.

Jamieson CMA-1080 Laser Cutter: Troubleshooting

Problem:

Cause:

When you open up your file in SmartCarve and your linework has slight alterations and changes to it

You may have exported in the wrong format or used a different exporting scheme

Jamieson CMA-1080 Laser Cutter: Troubleshooting

Solution:

Make sure you are exporting as a .dxf file. Also make sure you are using the export scheme CAM Imperial. Other schemes may alter your linework.

Jamieson CMA-1080 Laser Cutter: Troubleshooting

Problem:

Cause:

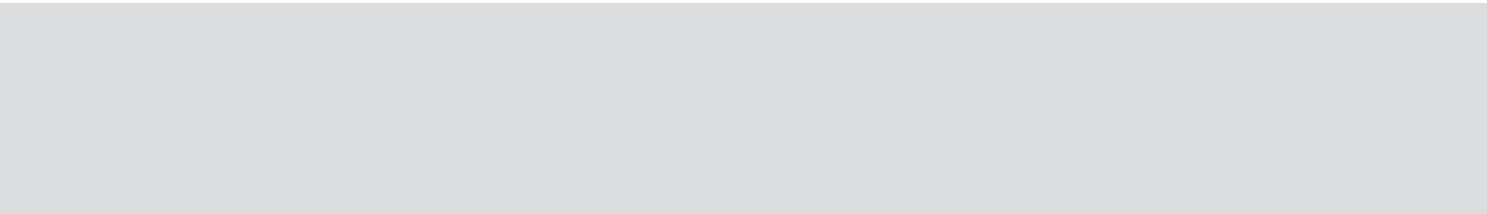
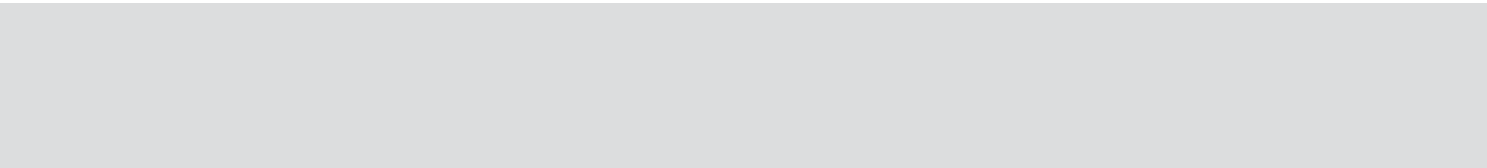
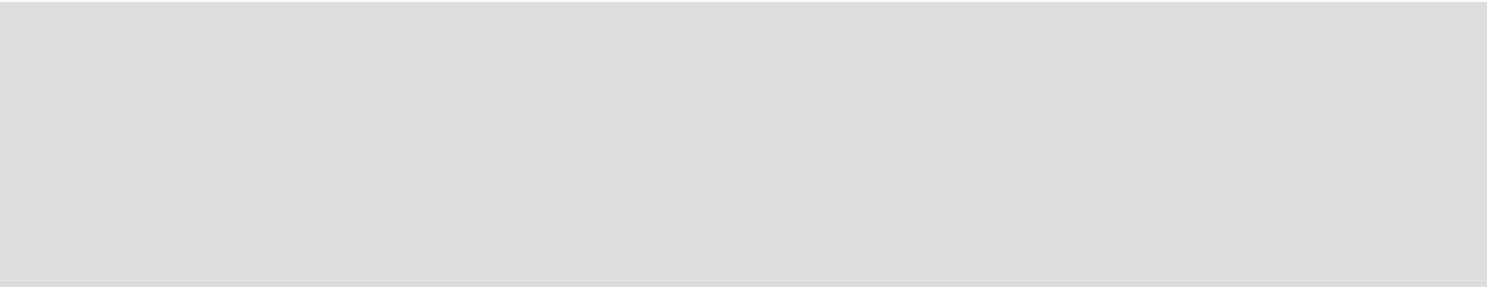
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Jamieson CMA-1080 Laser Cutter: Troubleshooting

Solution:



Jamieson CMA-1080 Laser Cutter: Quick Step Guide

- ___ Organize and Label Layers by Laser Cutter Operation (“cut”, “etch”)
- ___ Set scale and prepare linework in Rhino or AutoCAD
- ___ Export file as a **.dxf** and **CAM Imperial**
- ___ Open SmartCarve and start a new file
- ___ Check that the workspace is **980mm x 800mm**
- ___ Import your file and select the correct drawing u
- ___ Arrange your linework on the workspace
- ___ Set the **Priority** and **Speed and Power** settings for each of your layers
- ___ Turn on the laser cutter and let it run through its calibration
- ___ Make sure the water chiller also turns on with the laser cutter
- ___ Unplug the **USB** and plug it back in
- ___ Add your material to the laser cutter bed, use a ruler to align it
- ___ Click the **Carve Out** button
- ___ Click **Path Optimize**
- ___ Flip the switch on the wall to turn on the **Compressor**
- ___ Click the **Cut Edge** button to trace the extents of your file
- ___ If your work piece is aligned turn **ON** the **Green Activation button**
- ___ Put on **Safety Glasses**
- ___ Click the **Carver Out** button to start your file
- ___ Turn **OFF** the **Green Activation button** when your cut is done