

Engraving Images with a Laser Cutter

IDeATe Laser Micro Part 5

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1. Using Adobe Illustrator to create vector files

Download the image of the fern frond from Canvas. This picture was taken by Carl Davies and is made available under the Creative Common License. (I tried to take a picture of a fern in my garden but the picture was too busy to use.)

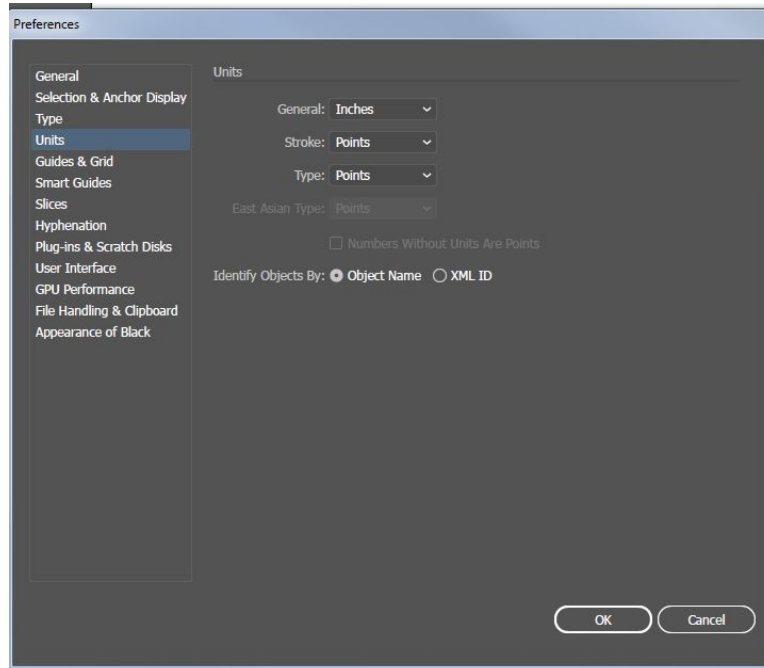
<http://www.scienceimage.csiro.au/image/3465/>

Note that it is a jpeg (bitmapped image) which we are going to turn it into a vector image. You can do everything in this handout using Inkscape, which is free open source software. There is separate module on Canvas with all of the handouts if you prefer to use Inkscape. If it isn't obvious how to do a particular step, use what I call "Google Help." That is, search for something along the lines of "Inkscape change stroke color" and you will find many tutorials explaining the process.

1.1 Setting up an Illustrator Artboard

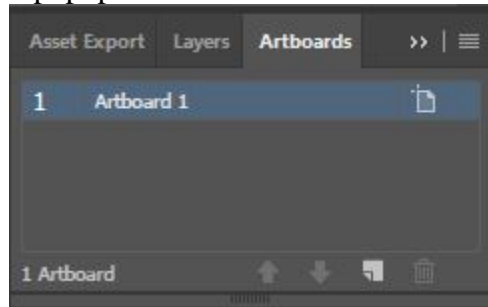
Open Adobe Illustrator and select **File** → **New** → **Custom** → **Create**. Accept the defaults for the custom file. We will change the size, orientation, *etc.* using the Artboard tool in a few minutes.

Since we've been using inches for the units for all our files, let's set the units to Inches through the Preferences window. Select **File** → **Preferences** → **Units**.

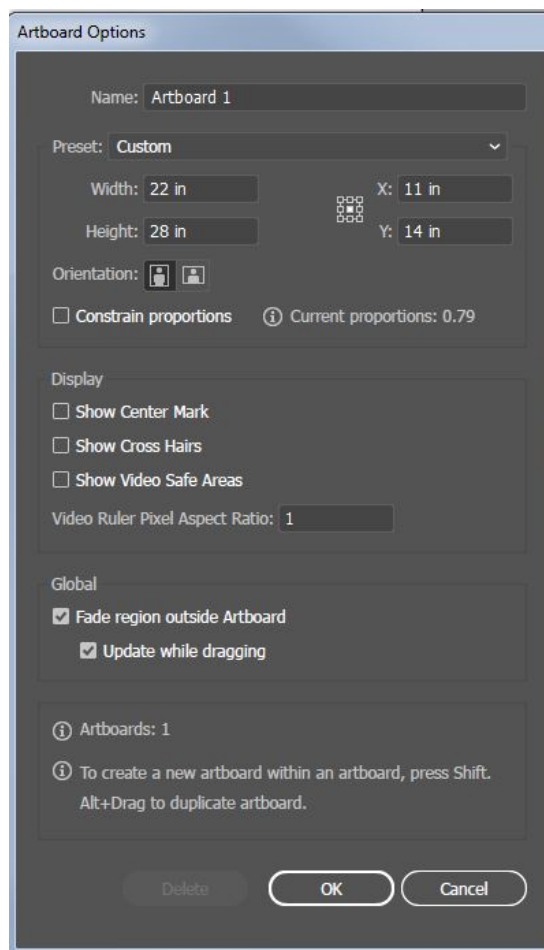


While you have the Preferences window open, look at all the other settings you can change in your preferences.

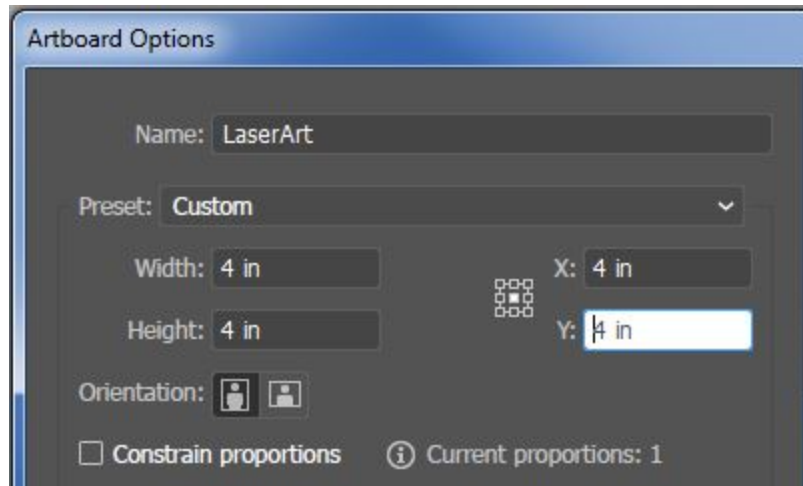
Next, we'll change the size of the Artboard for this project. Usually, you size the artboard to match the dimensions of the paper you will be printing on. We'll make ours match the size of the piece of wood we will use for this project. Open the Artboard window by selecting **Window** → **Artboards**. You should have a popup window that looks like:



Click on the icon that looks like a document to the right of the artboard name. You should get the following window:

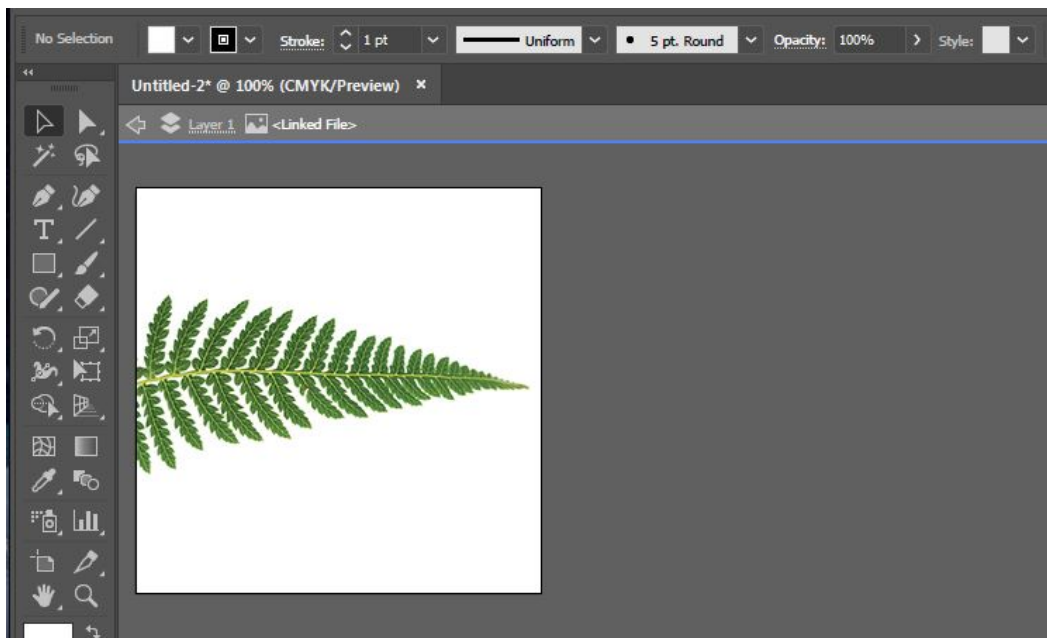


For this exercise, let's call the Artboard "LaserArt" and set the size to 4 inches by 4 inches. The rest of the settings are fine for now.

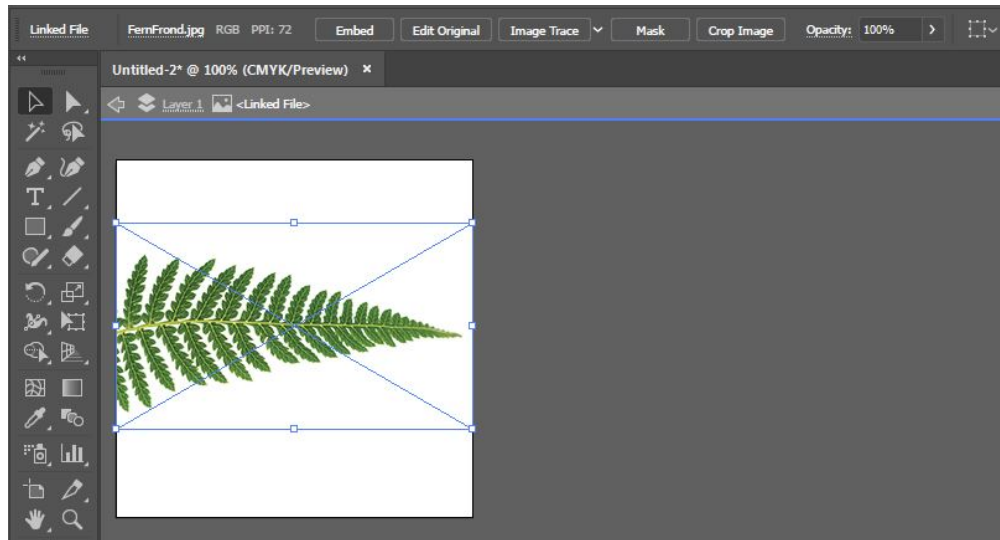


1.2 Inserting an image into Illustrator

Drag the image of the fern frond from your desktop onto the artboard. (Instead of dragging, you can select **File** → **Place** and navigate to your file.) You can use your mouse to move the image until it is in the center of the artboard. When you have it in place, press Enter.

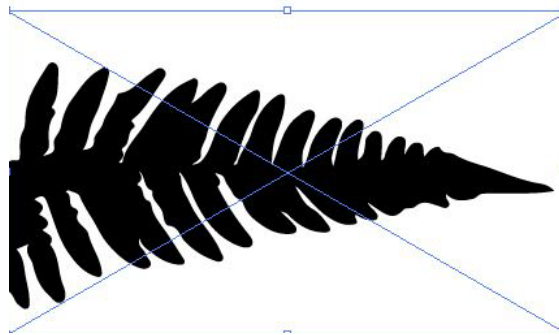


Now click on the image to select it. You can tell it is selected both because a blue outline with handles appears over the image and because the options in the toolbar change. Compare the toolbar options above with the toolbar options below.

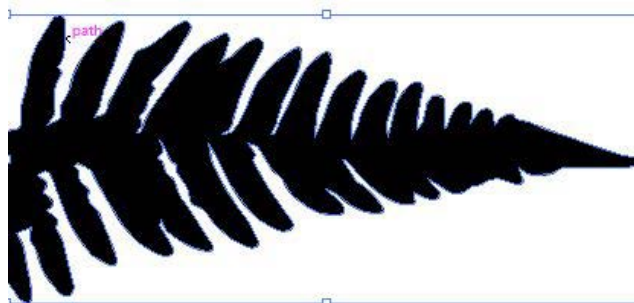


1.3 Creating vector paths from an image

Click on the **Image Trace** pulldown to see the different tracing options. Illustrator has several of converting images into vectors. They vary in the number of colors they include in the vector file and the level of detail that they trace. We will use **Silhouettes** option in this lab, because I want the laser to cut out the fern. You could come back later and try some of the other options in order to etch some of the detail instead. Select **Image Trace** → **Silhouettes**. If you don't like the result, press CTRL z and try something different. Your image should look like:



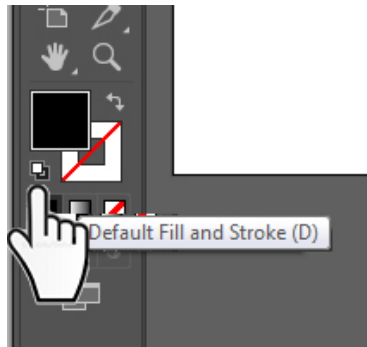
Illustrator has converted the bitmap image into vector shapes but keeps the image as a unit. The toolbar should now have an **Expand** button Select **Expand**:



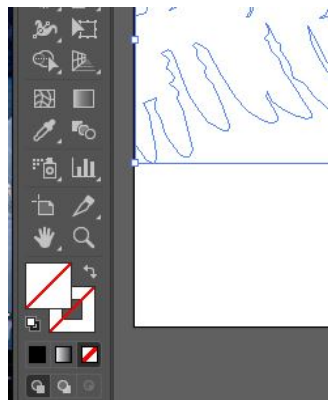
You should now be able to see the vector Illustrator created that outlines the shape of the fern.

Since we selected Silhouette, we know we have a single vector that outlines the image. If you use a different trace option, you may have to modify the regions defined by the vectors. That would make this tutorial too long, by Lynda.com has good tutorials on image tracing in Illustrator. You can also find many tutorials on the web.

Next, we need to convert the vector into a line that the laser cutter can follow. Use your mouse to select the path that defines the outline. The Fill and Stroke options are at the bottom of the left-hand toolbar. I put a large hand cursor in the screen shot below so you can see which button you need to select.



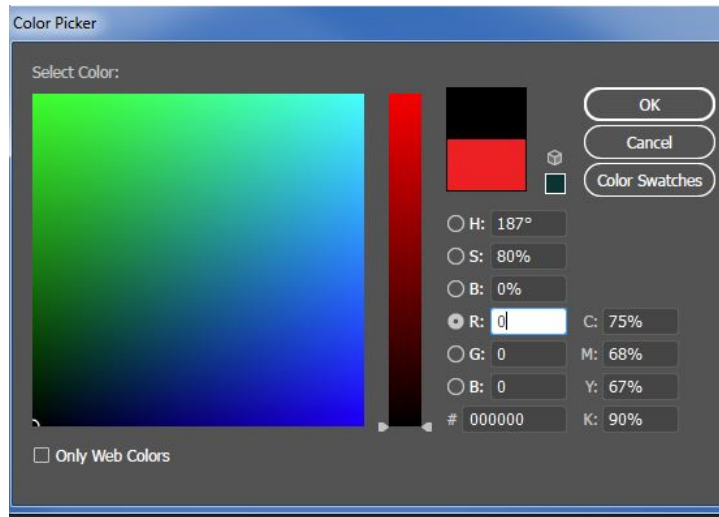
To change the fill color to none, click on the fill square (the large black square in the screen shot above), then click on the **small** white box with a red diagonal through it. This should change the fill color to none:



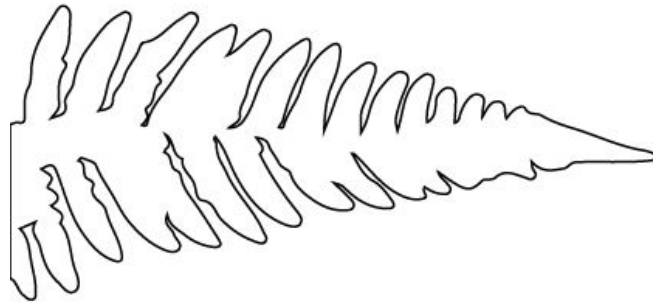
Next, change the stroke color by clicking on the Stroke Square – the one that is behind the Fill square. Once the Stroke Square selected, it pops in front:



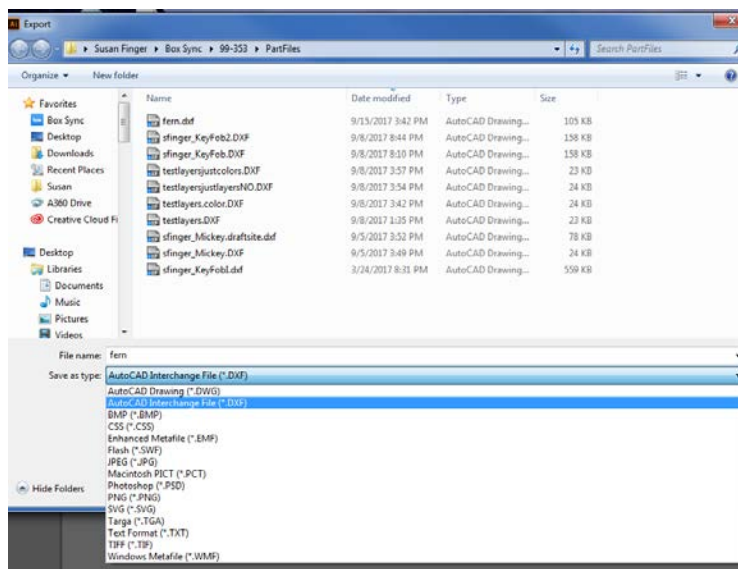
Double click on the Stroke Square to bring up the Color Picker window. Make the stroke color Black:



Your image should look like:



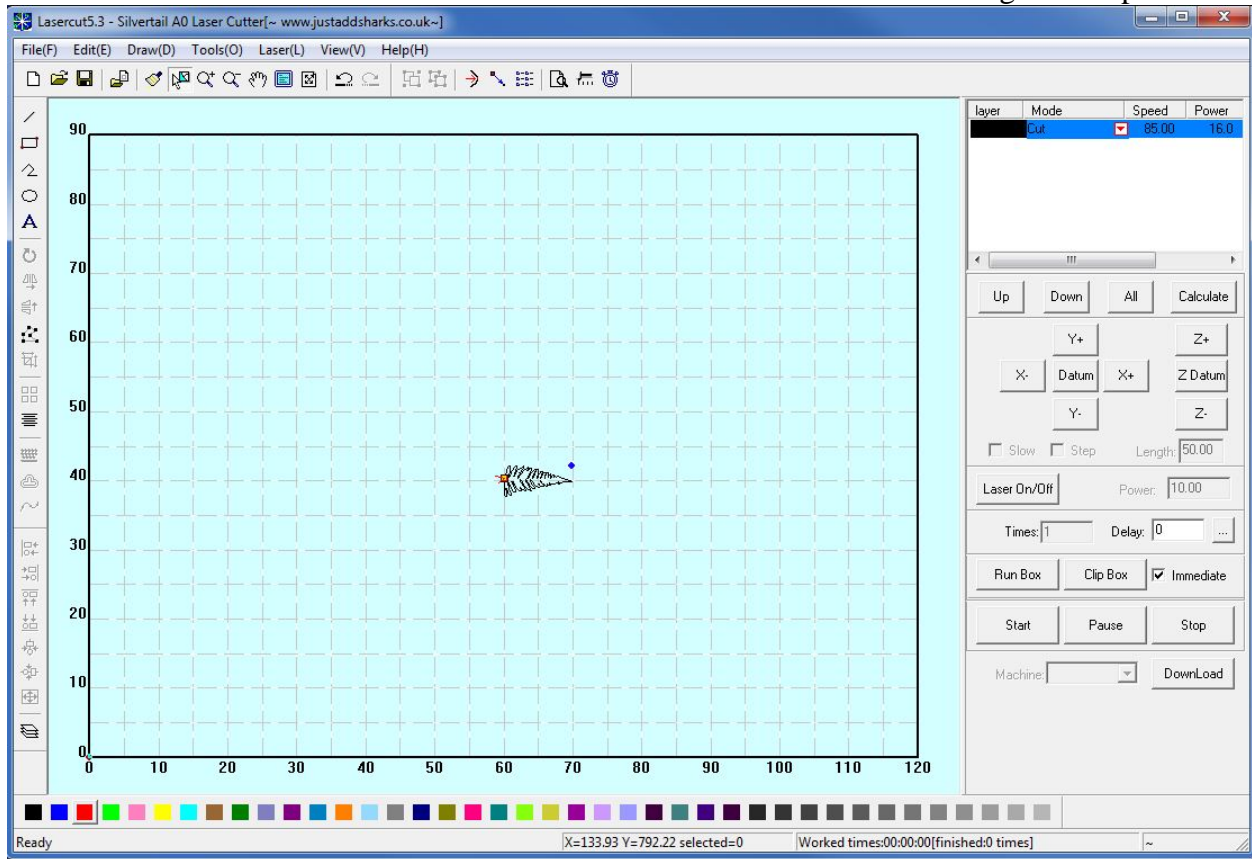
Now, you can export your file as a DXF file. **File** → **Export** → **Export As**. Select DXF.



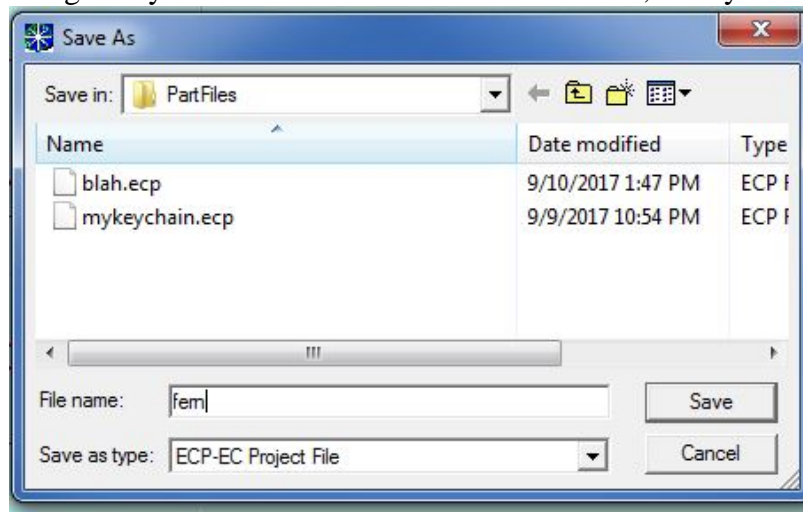
In the next screen, be sure the units are **Inches** and save the file.

1.4 Preparing your file with the LaserCut5.3 demo software

Now, you can **import** the DXF file into the LaserCut5.3 software. Sometimes you need to fix the colors in LaserCut5.3. To change the color of a line, select the line and then click on one of the color boxes at the bottom of the window. Set the outline color to **Cut** in the right-hand panel:



If you are running the demo version of LaserCut5.3, select **File** → **Exit**. You will be asked if you want to save the changes to your file. Click **Yes**. In the next screen, save your file as an ECP file



When you get to the laser cutter, you can open your ECP file directly in LaserCut5.3. Once your file is ready in LaserCut5.3, click the **Download** button to send the file to the laser cutter.

2. Preparing an image for laser engraving

For laser engraving, we want etch an image rather than cut an outline. This means we will turn the image into a bitmap of 0s and 1s. The laser will skip over the areas that have 0s and butn the areas that have 1s. For this process, we will use Photoshop, which works with bit mapped images. Gimp is the open source equivalent of Photoshop. Everything in this tutorial can be done with Gimp rather than Photoshop, although you may need to use Google Help for a few of the steps.

2.1 Convert the image to bitmap

Open with the jpg fern image in Photoshop. Convert the image to grayscale by selecting **Image** → **Mode** → **Grayscale**. If it asks to flatten the layers say yes, then click **Yes** to discard the color information.



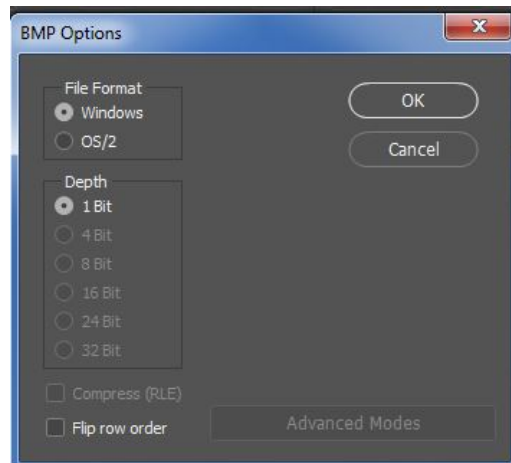
Next, save the image as a bitmap, **Image** → **Mode** → **Bitmap**. In the bitmap options, set the Resolution 72 pixels/inch.



If you zoom in, you can see that the image is just a bunch of dots.

2.2 Saving the image as a bitmap

Select **File** → **Save As** and select **BMP** as the file type. In the save options set the Depth to 1 bit.

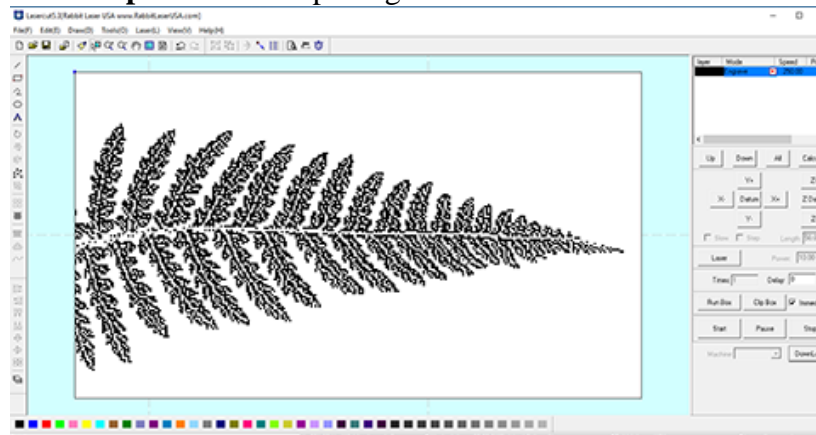


Now you have a bitmap image that can be opened on the laser cutter.

2.3 Setting up the bitmap image for laser cutting

Note: You *cannot* use the demo version of LaserCut3.5 for bitmap images. You must use the computers connected to the laser cutters to import bitmaps.

Open LaserCut3.5 and **import** the bitmap image of the fern.



You can find the right speed and power settings for the material you are using and the depth of etching that you want by looking at the samples on the walls in the laser cutter room. This is the etching that I did of the fern on a scrap piece of cardboard:

