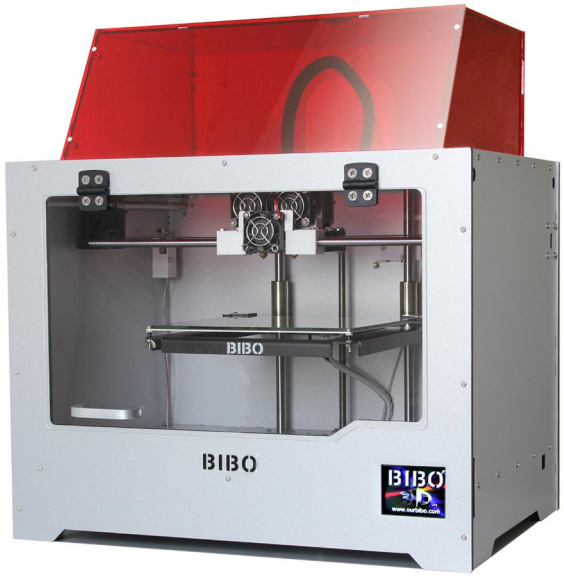
# BIBO 3D PRINTER LASER ENGRAVING

## ---Operation Manual




## SHAOXING BIBO AUTOMATIC EQUIPMENT CO., LTD.

V1.2K

**Please operate the machine strictly according to this operation manual !**

## 1. Precautions

[★★★ Make sure you read and understand the steps detailed in this guide]


**The laser is dangerous and children should not be permitted to use the laser. Avoid all eye exposure to beams from the laser. This includes unintentional or accidental exposures -- be careful to keep the beam away from eyes and faces. Please let the cover be fixed on the printer during laser engraving. There is no laser safety glasses gift, and please buy it locally and wear it.**

**Laser class: 3B , Wavelength: 405nm , Power: 500mw, DC 12V**

**The laser can only be powered by DC 12v batteries or DC 12V fan connector.**

**Please don't let the laser run continuously more than one hour.**

**Please be careful for human electrostatic especially in winter when touching laser.**

**In our workshop, we have antistatic control worktable and antistatic bracelet now. Before this, we also met some problems because of electrostatic.**

**But for printer users, it is hard to have the antistatic devices as us. The easiest way is that we can touch the metal part nearby by hand first before touching laser. So the electrostatic usually will be gone before touching laser.**

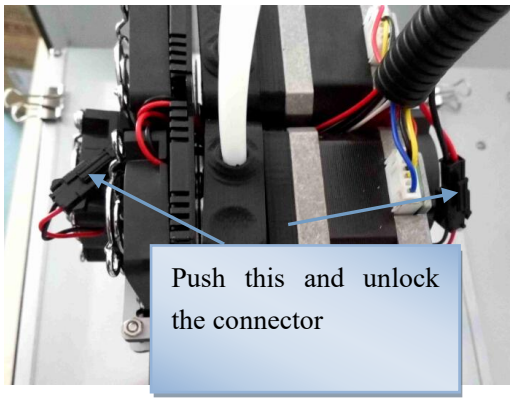
Before repairing or making any alterations to the Bibo 3D printer it is essential that the machine is turned off and the power cord is unplugged.

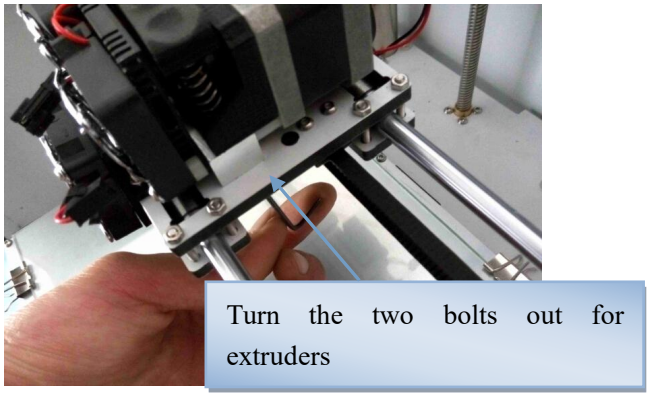
Do not leave the machine unattended when in operation.

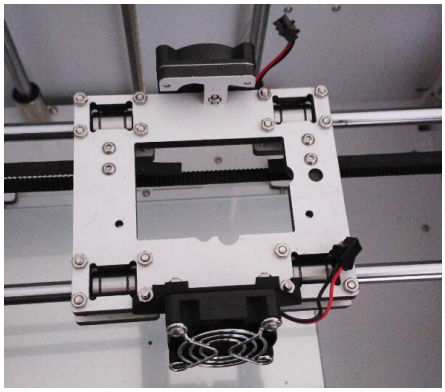
## 2. Initial Hardware Installation

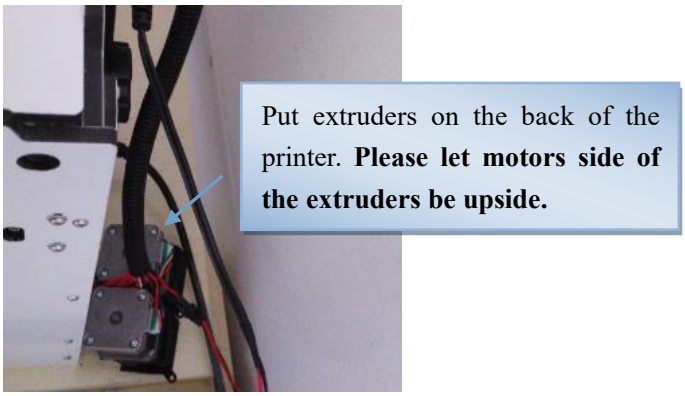
The installation video is here:
https://drive.google.com/file/d/1gvXy-V96yjJZhvN4I4LxdHCSrCdm6jVg/view?usp=sharing

The first step is to unlock the cooling fan connector to extruders, then take the extruders off the X-carriage to the back of the printer as the photo below:

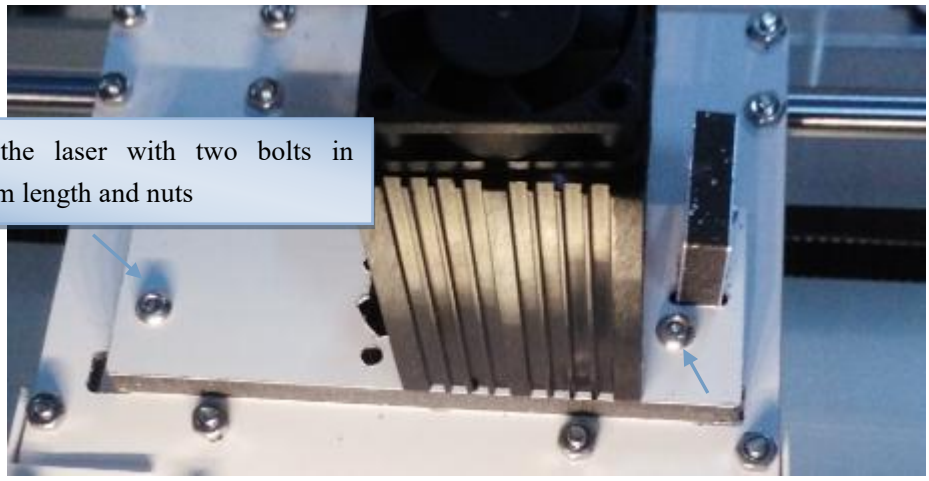


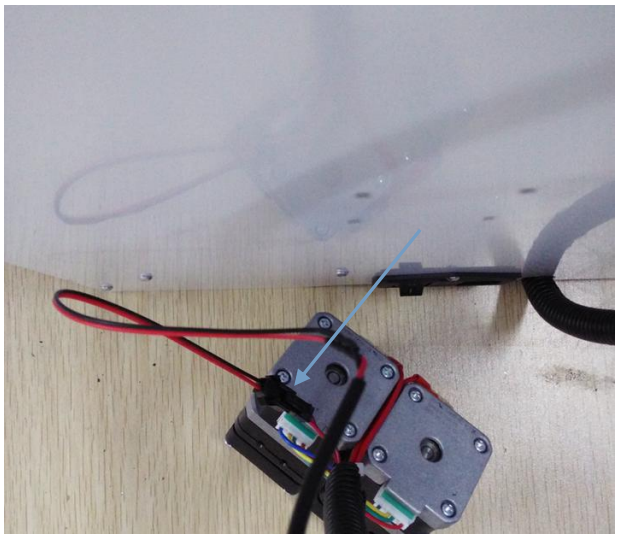






The second step is to fix the laser on the X-carriage:

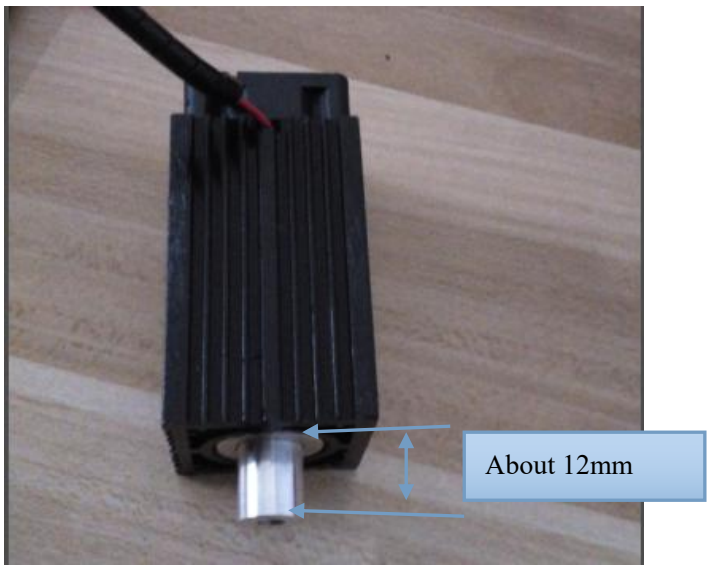


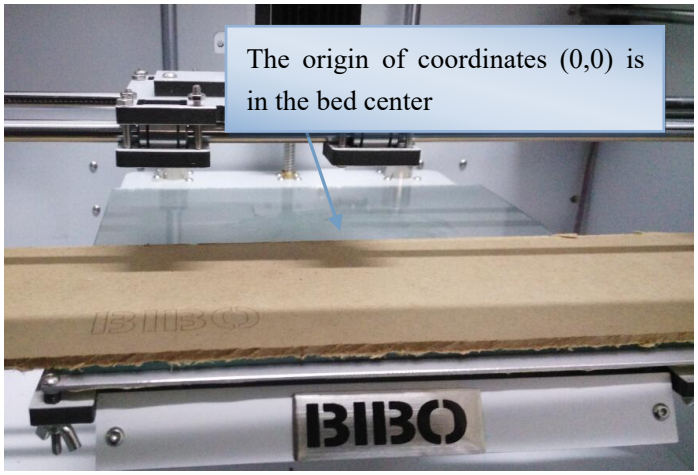
The third step is to connect the back cooling fan wire male connector on the extruder with the laser engraving module wire female connector:



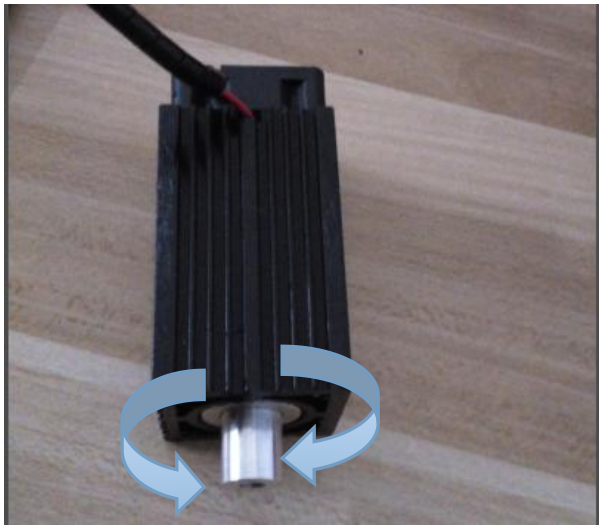
## 3. Laser focus

**The Laser we sent has already been focused.**






Please put **a thin yellow paper which we sent to you** on the **glass build plate center**. Then use repetier-host or screen on machine to let coordinate in **Z axis be 40 mm** (that means build plate moves down 40mm after home z axis) and **turn on the fan**(Laser is connected with cooling fan's wire. **For touch screen, fan menu is under settings menu**). You will see there is a small blue point on the paper and smoke too. Now the laser is focused.
If not, please turn off the fan (Laser) first, then you can rotate the end of laser in one direction about 180 degree, Then turn on the fan (laser), see the laser blue point is bigger or smaller. Now Turn off the fan (laser) again, if the blue point is bigger, you should rotate the end of laser in opposite direction. If smaller, that means the direction you rotated just now is right. If you rotate the end of laser again, the blue point can't be smaller and already have the smoke on yellow paper, that means you focus it already, and this is also the aim we want. Remember, when rotate the laser end, please turn off the fan (laser) first.



After finding the focus, you can laser engrave yellow paper at Z40 coordinate. If the object you want to engrave is 10mm in thickness, then you can engrave it at Z50 coordinate. So please add the object thickness to Z axis coordinate when you want to engrave it.

## 4. Generate g-code for laser

1. Download Inkscape 1.0 (version 1.0) from https://inkscape.org/en/download/
Or copy the inkscape 1.0 version install document from SD card we sent to you. Then install it on your computer.

3. Open the Plug-in file named “BIBO 3D printer Laser Tool” in SD card. You can also download it here: https://drive.google.com/file/d/1iut4aQgjW3gK1f_LGKoJntPgCXAlZ7ML/view?usp=sharing

This plug-in will convert a path object in inkscape into a G Code file for use in the printer. Copy laser.inx and laser.py to \Inkscape\share\Inkscape\extensions folder where you installed the inkscape. Once these files are there and you **restart inkscape** ,it will show up under the “extensions” tab in inkscape.

Drawing Text

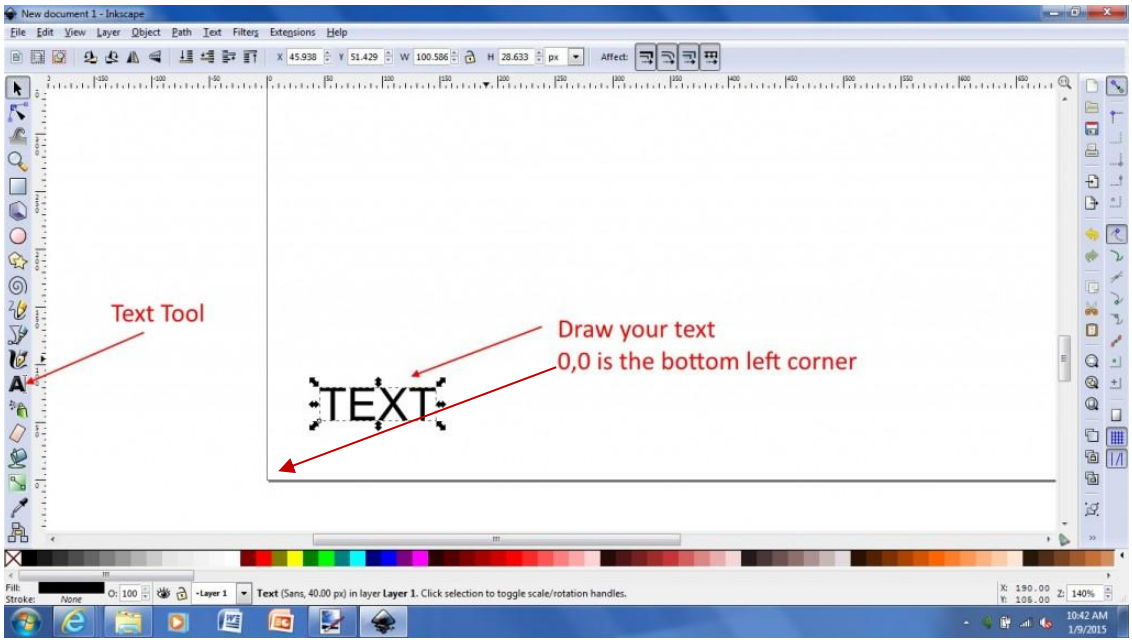
Engraving text into materials is a very common need for the laser upgrade. **Our printer engrave area is 214*186 mm, the same as printing area. The origin of coordinates (0,0) is in the bed center. For four corner of glass build plate coordinate is below(if facing the printer):**

**Left front (-107,93) Left back (-107,-93) Right front (107,93) Right back (107,-93)**

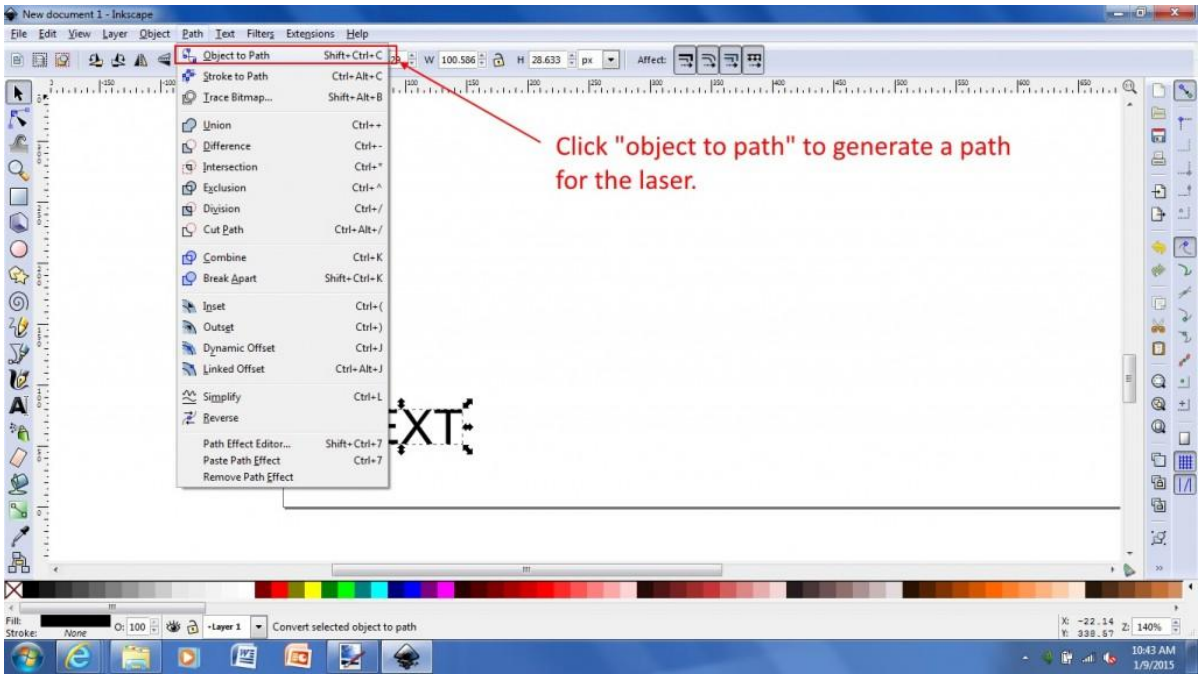
**So when drawing or place some photoes in inkscape, please let them be in the center (bottom left corner in inkscape) , not bigger than coordinate mentioned above.**

Here is how to accomplish this.

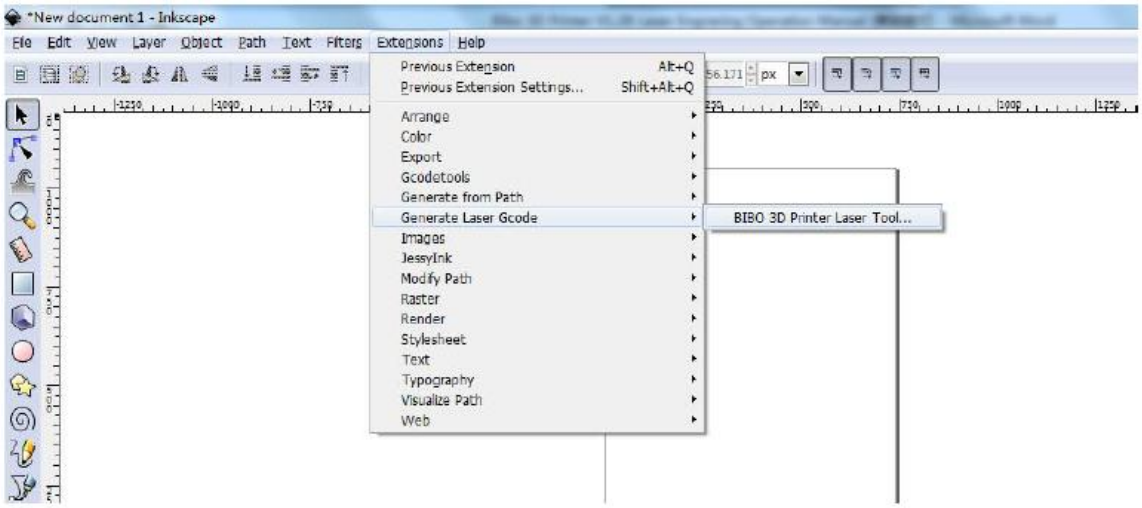
**Step 1:** Use the TEXT tool in inkscape to draw your text. The bottom left corner is you 0,0 location of you machine.



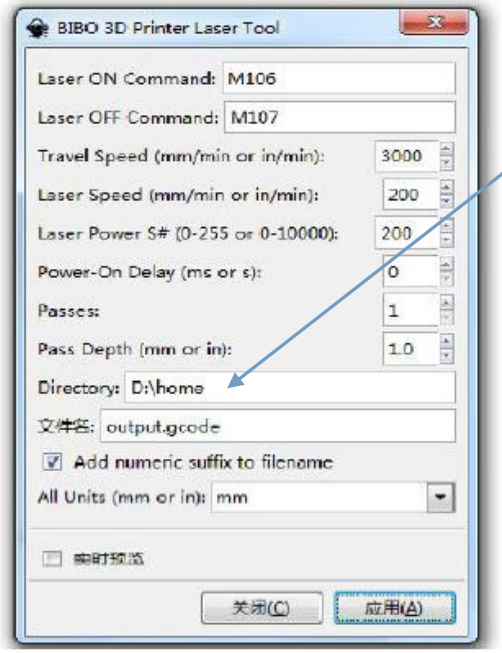

**Step 2:** You need to convert the object into a path. All items drawn in inkscape are a vector object. You can convert them into a "path" that will actually "draw" the object. The laser then takes this path to generate the G Code.




**Step 3:** Under "Extensions" click on "Generate G Code" and "BIBO 3D printer Laser Tool".




**Step 4:** Fill out the Laser Tool Dialog.

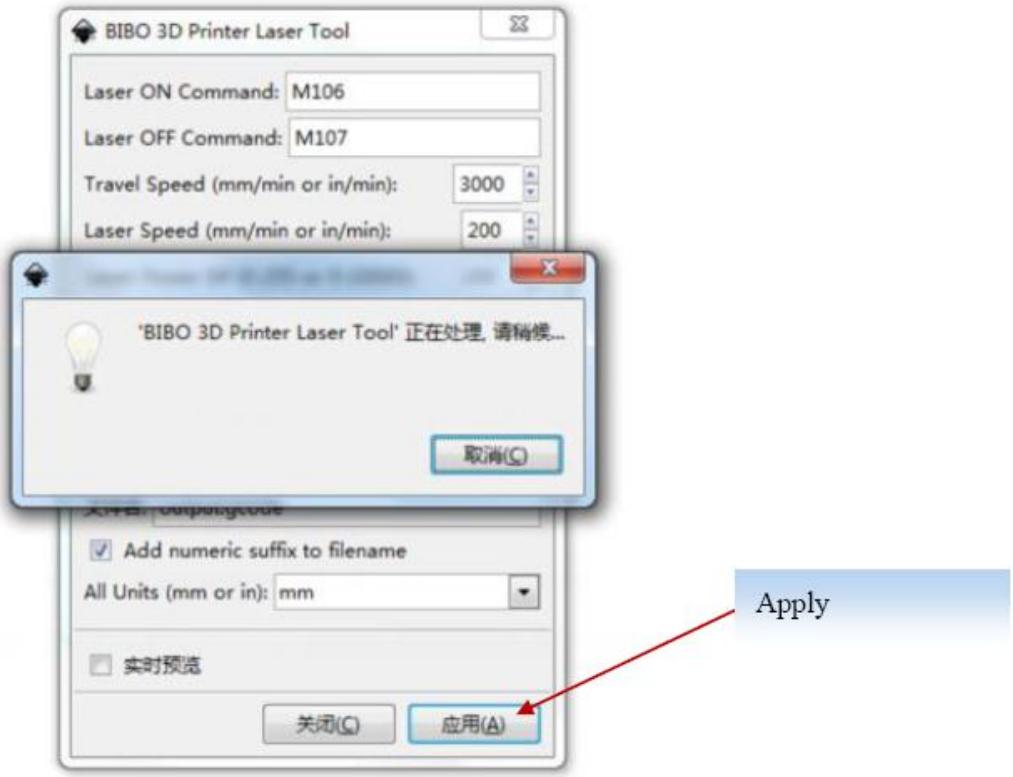



Please fill out the directory you want to store the gcode file on your printer. For example, D:\

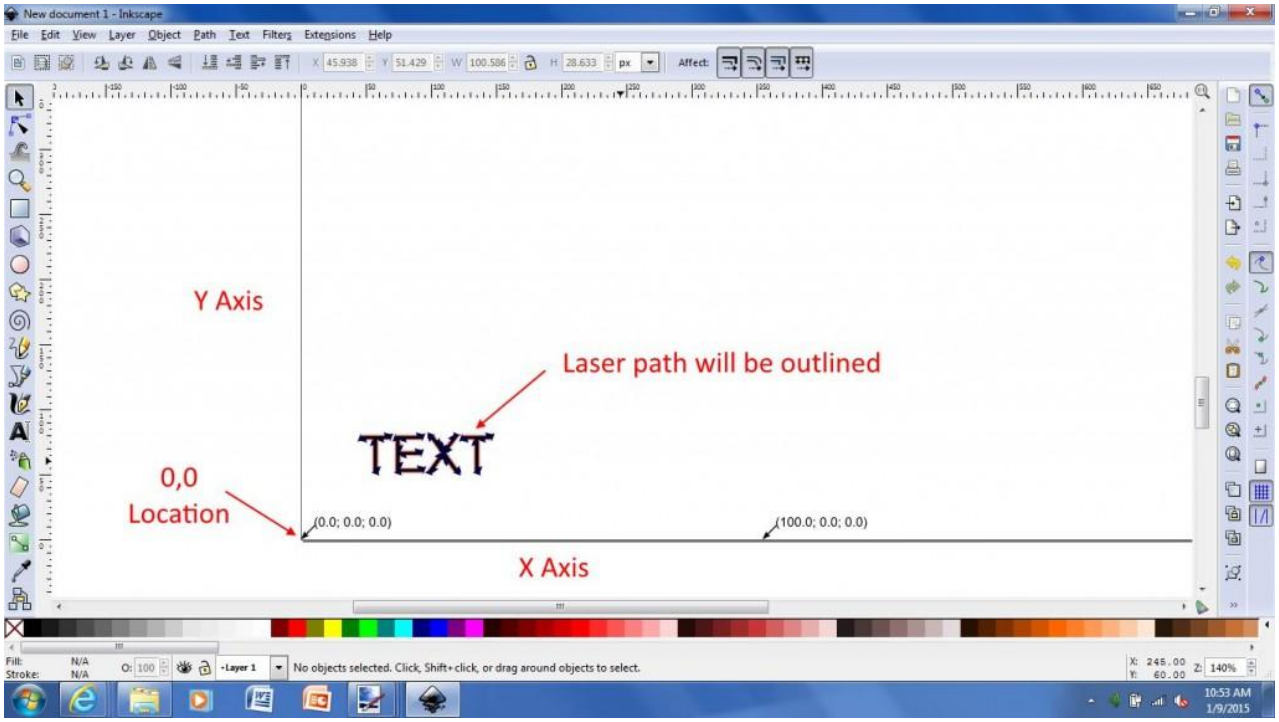
The parameter of Laser speed and Laser power is very important. If laser engrave is not strong enough, you can slow down the laser speed or increase Laser power.

With 500mw Laser in full power, engraving on colored paper, the laser speed can be 500mm/min to 600mm/min. If on density wood board, the laser speed also can be 500mm/min. You can try to laser a small laser engraving test on the material you want to engrave to see the performance, then adjust the parameter for better performance. Usually, BIBO **3D printer's laser can do engraving on paper(colored paper is better), wood, leather, acrylics, and many other materials, but can't engrave on metal and glass.**

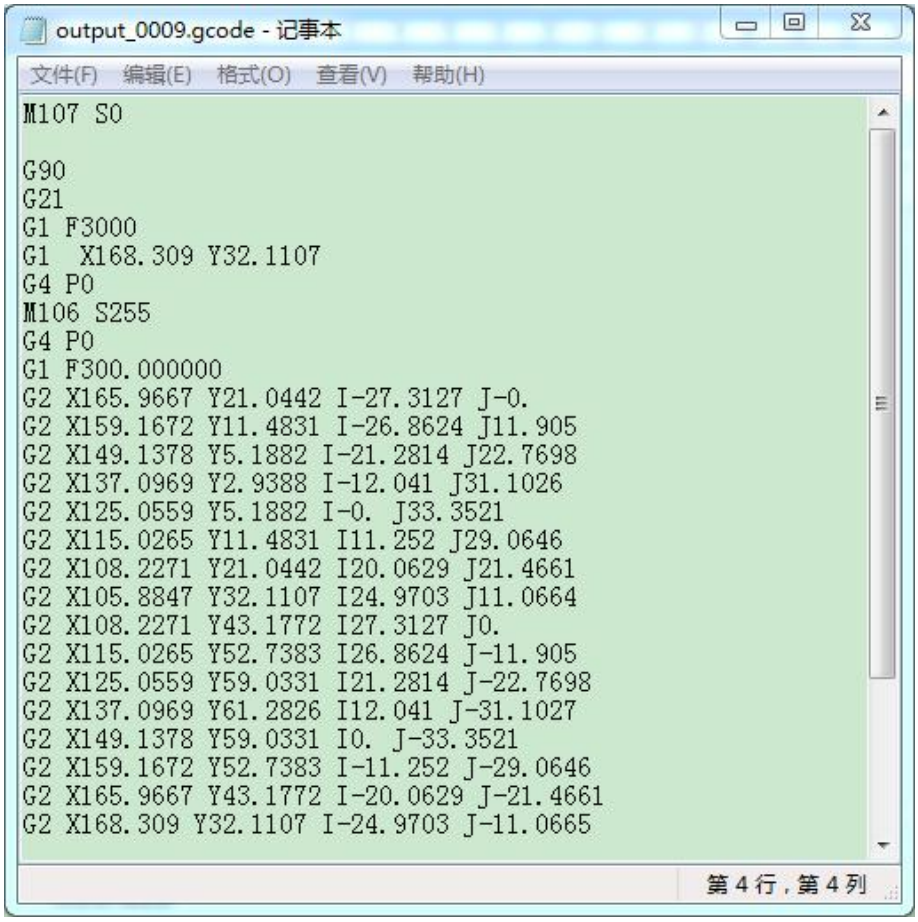
**Step 5:** When finished filling out the form, click APPLY to start.




**Step 6:** The laser path will be outlined and the code will be generated in the location provided in the tool.



Here is an example of the G Code file produced.



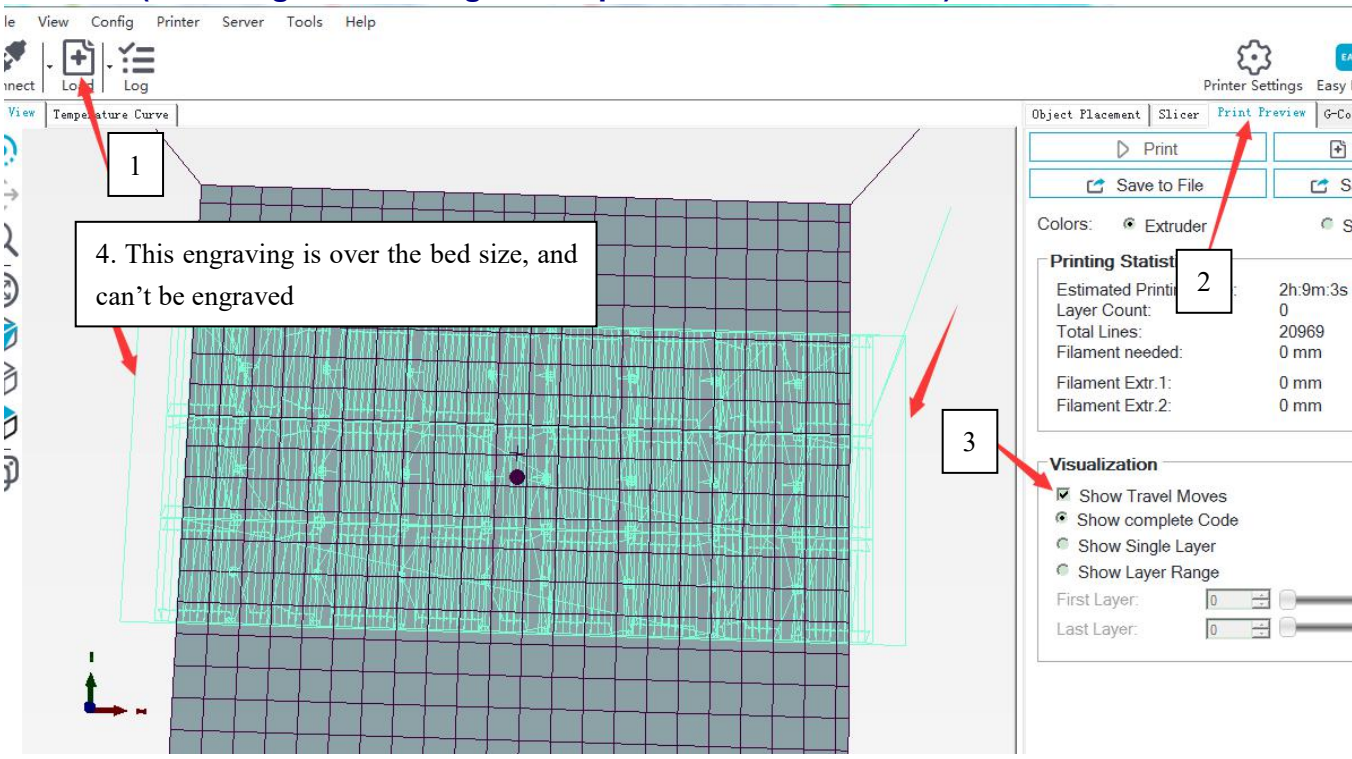

**Now add**

G28 X0 Y0

Before the first line M107 S0 as the photo below:

To use Laser engraving, **this step to add one command(Home x and y axis) is necessary for BIBO 3D printer. The origin of coordinates is in the center of the build plate.**

**You can also load the gcode to repetier host (repetier host should be configured first according to chapter 6 of our printer manual) for some big area engravings. Then check the engraving area whether over the bed size (It is dangerous to engrave or print over the bed area):**

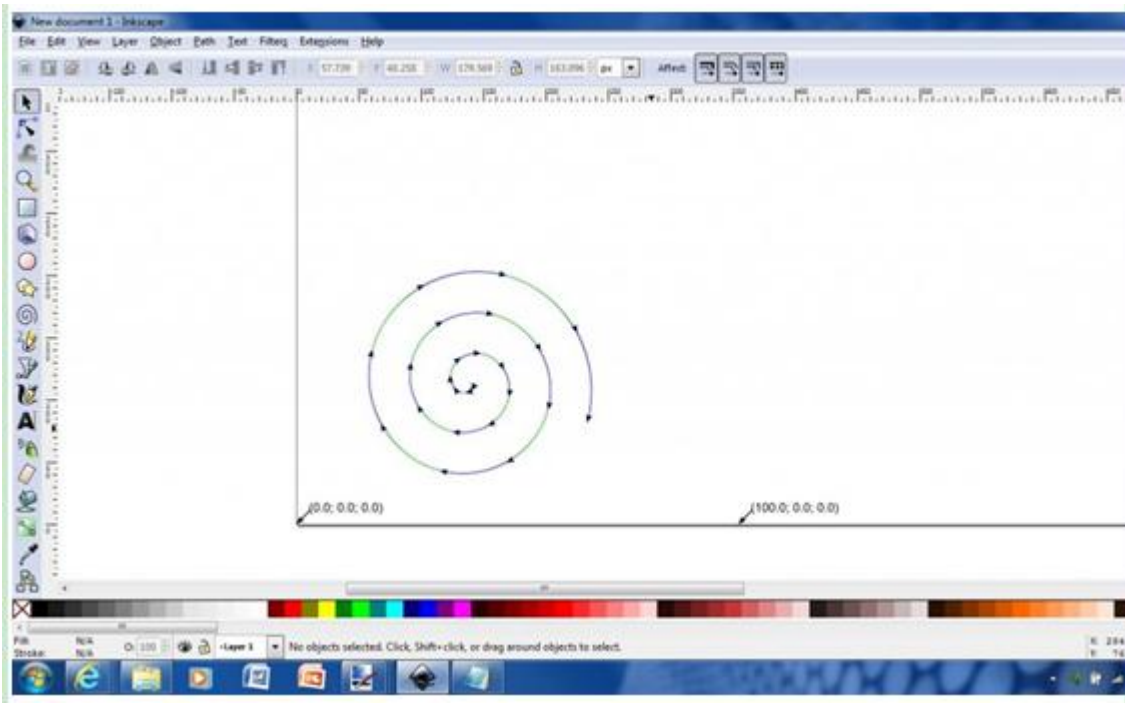



Everything is now finished, just copy this gcode to a SD card, then use BIBO 3D printer to print from SD card for laser engraving. PS. use repetier-host or screen on printer to let coordinate in Z axis be 40 mm first, that means build plate moves down 40mm after home z axis. If the object you want to engrave is 10mm in thickness, then you can engrave it at Z axis be 50mm coordinate. So please add the object thickness to Z axis coordinate when you want to engrave it.

**During laser engraving, when you pause or stop the engraving, please turn off the fan (laser) to protect the laser for a long life. Usually, please don't let the laser run continuously more than one hour.**

## Drawing Other Objects

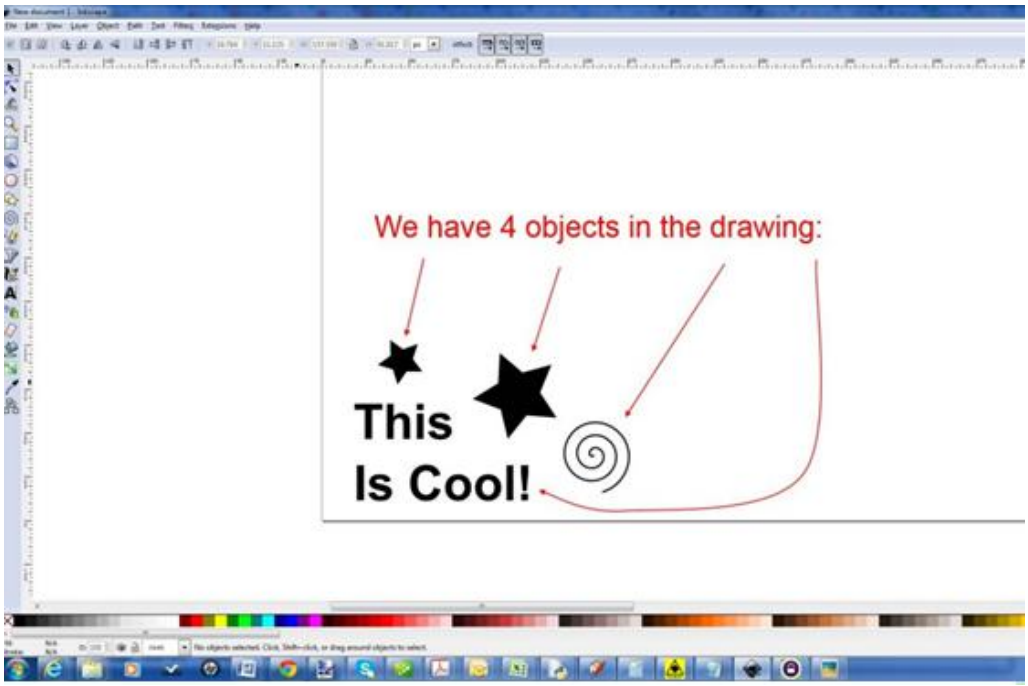
Similar to the text, you can draw anything you want with the other tools. Just do the same as the first part Laser Text's steps to convert it to G Code for the laser. Here is an example of a swirl:



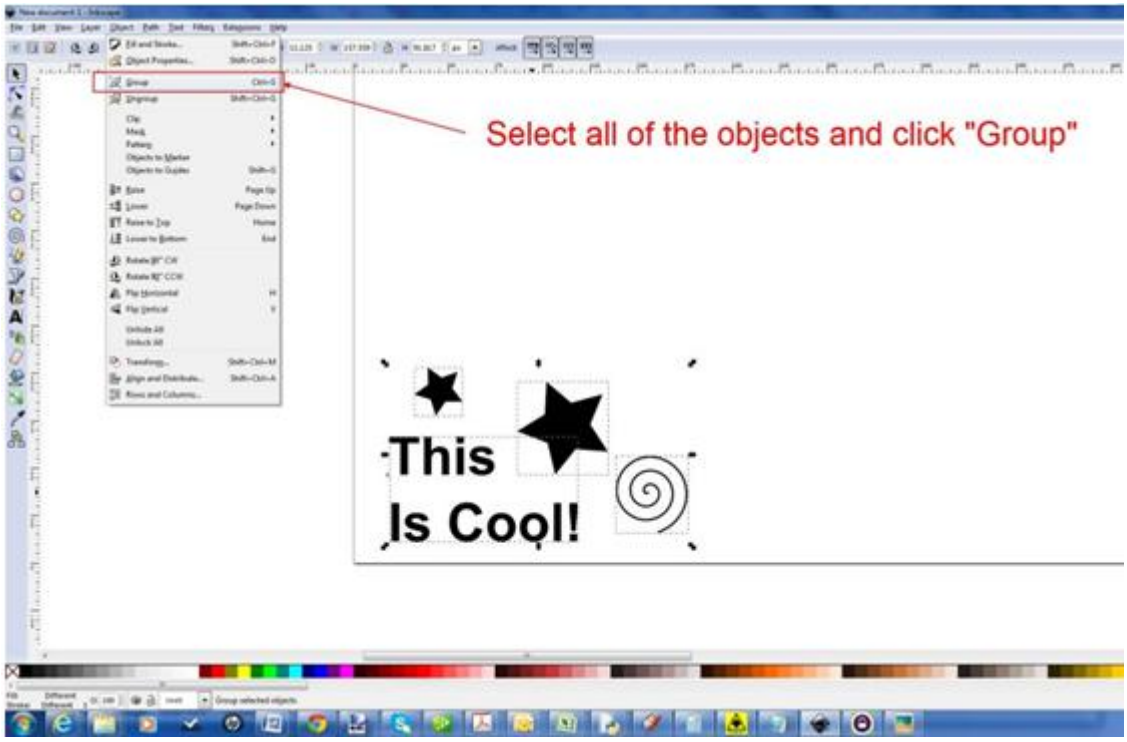
## Drawing Multiple Objects

In order to draw multiple objects in the same toolpath, you must first group all of the objects and convert to path before generating. Here is an example:

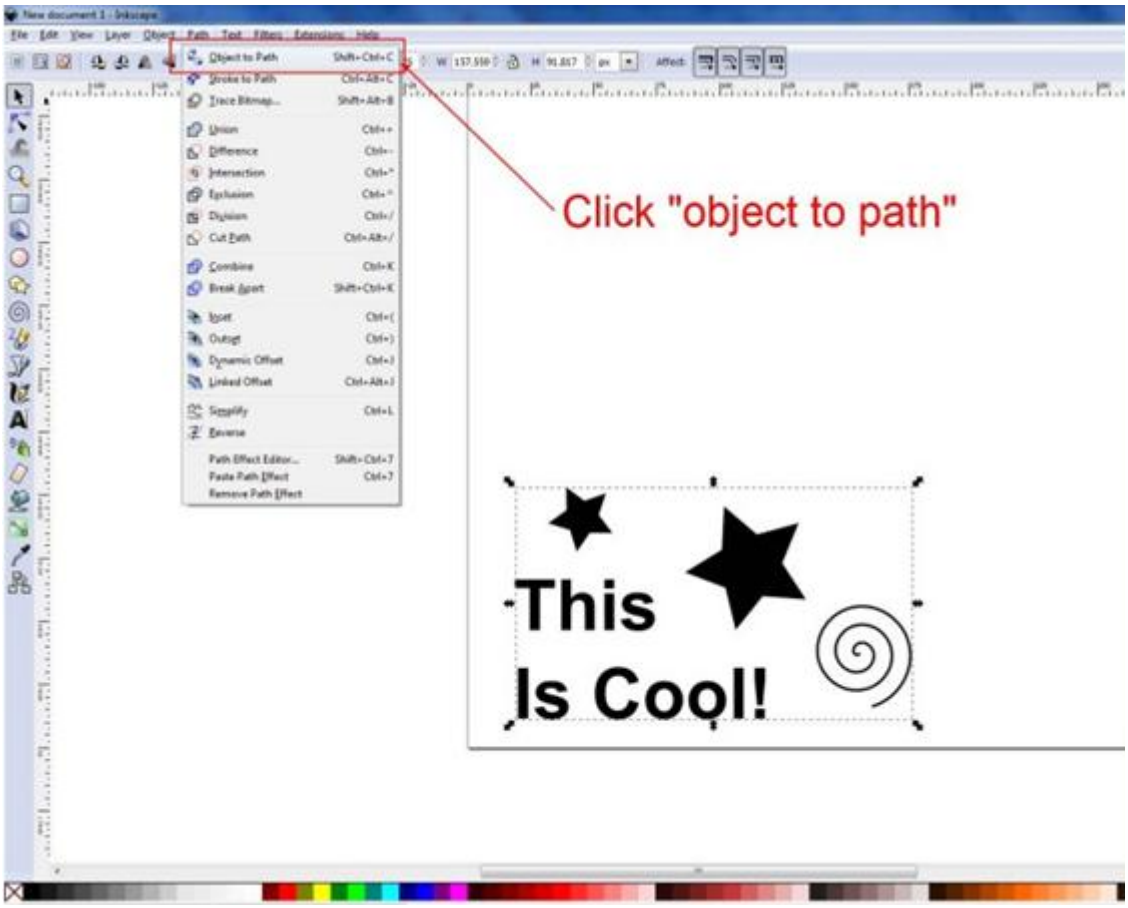
**Step 1:** Draw your separate objects.



**Step 2:** Group your objects.




**Step 3:** Turn them all into a path.

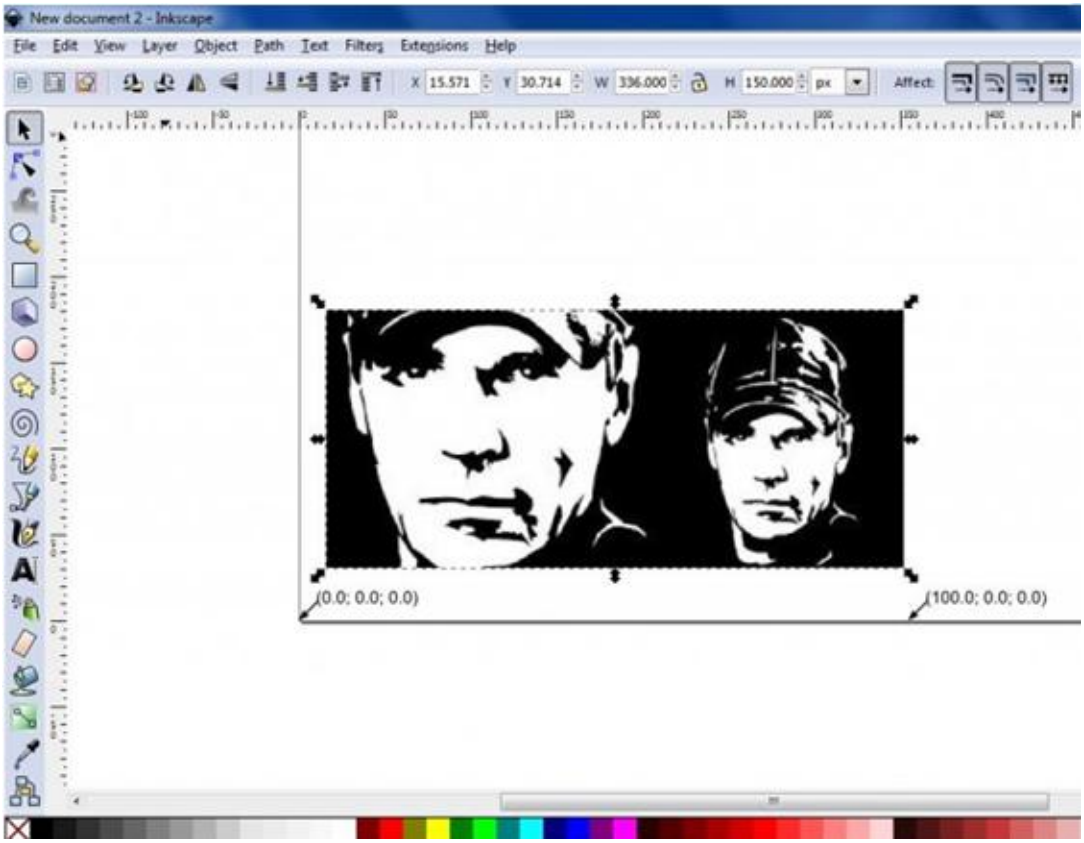



**Step 4:** Start the Laser Tool converter and do all the same as the first part Laser Text's steps.

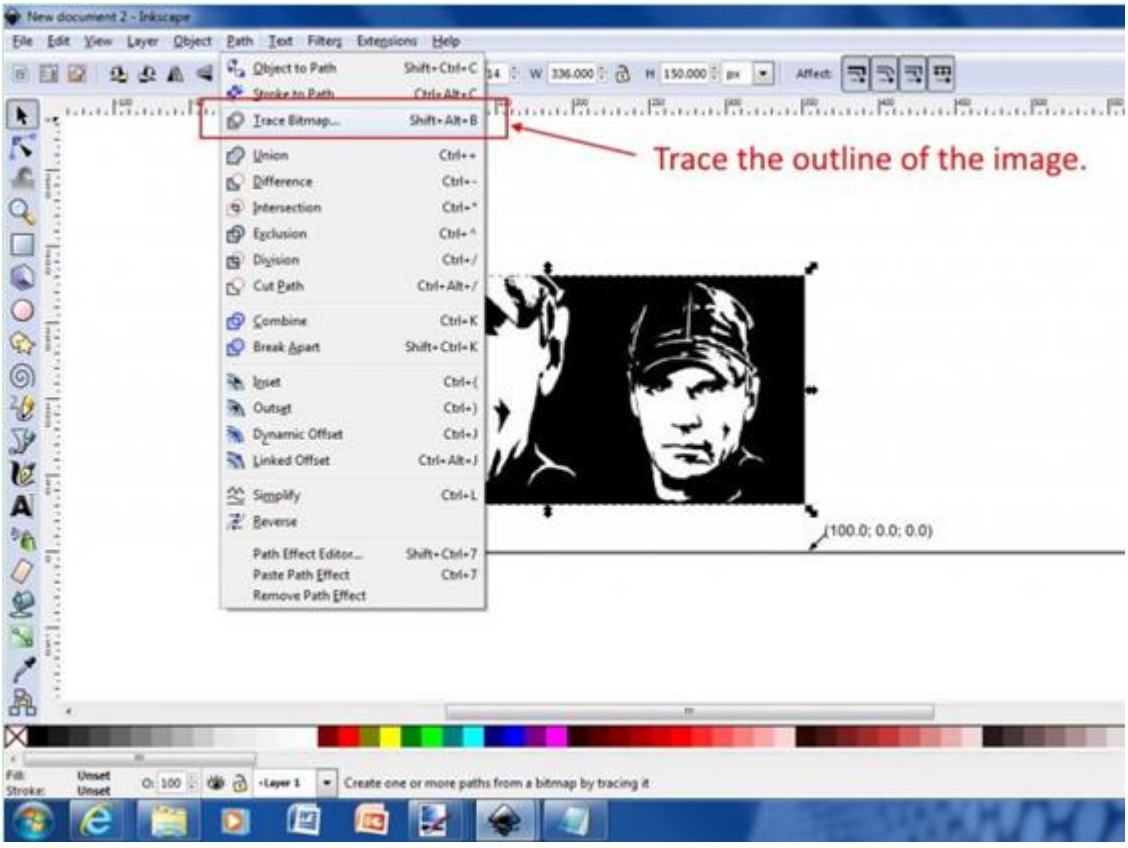
### Importing Black and White Pictures

A cool thing to engrave are black and white "high contrast" images that only have two colors. Here are the steps to engrave them.

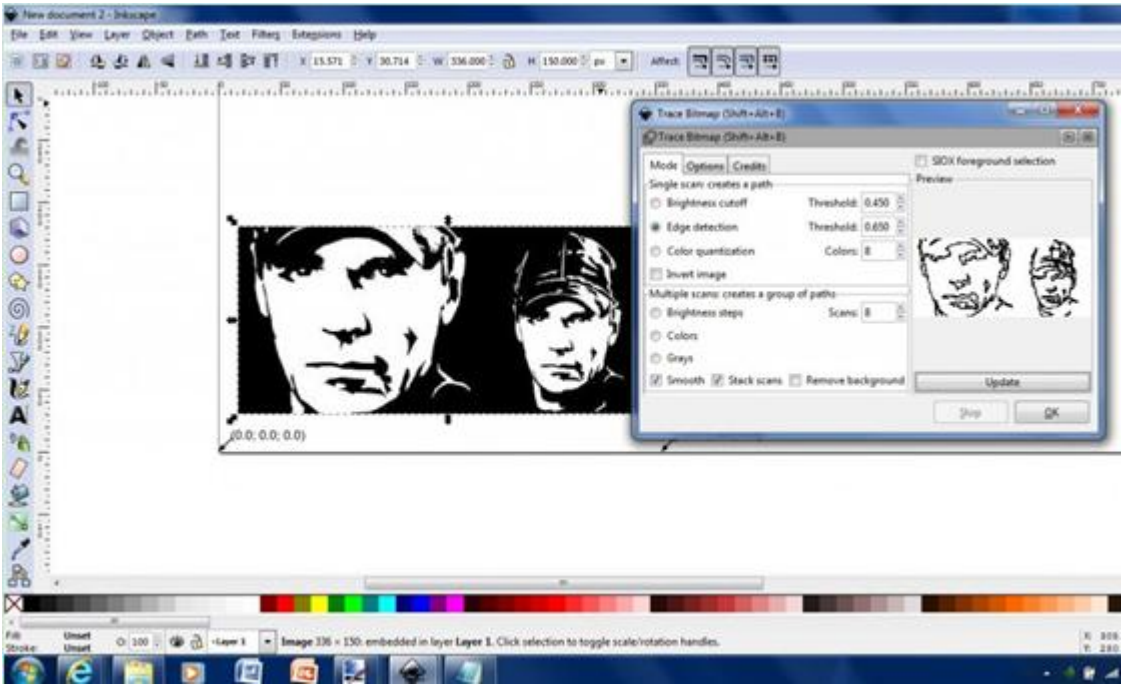
**Step 1:** Import your image on "file -> Import". Note it is two colors.



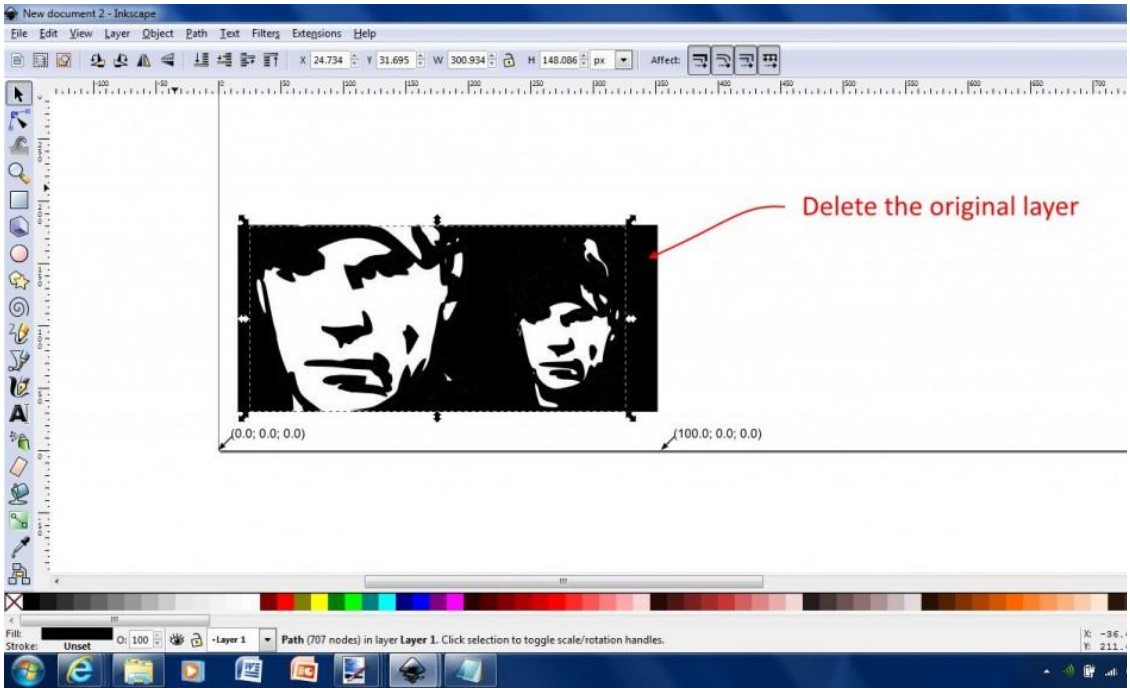

**Step 2:** Trace the outline of the image to get the path for the laser.



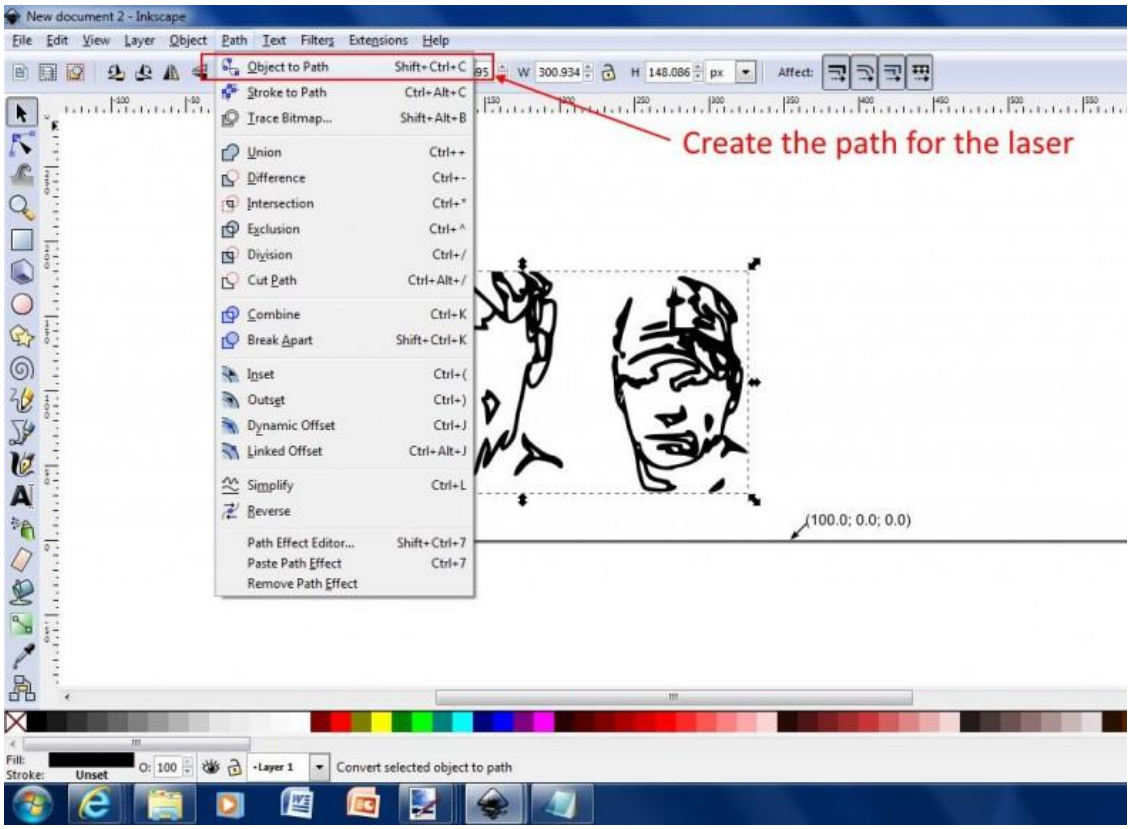
**Step 3:** Using edge detection, update the image and press “OK” to apply the changes.



**Step 4:** Delete the original layer underneath the new edge detected layer.




**Step 5:** Select “object to path” to create laser path.




**Step 6:** Generate your laser G Code file by entering your parameters and pressing “Apply”. The laser path will be outlined. And add one line commands in the gcode generated as the first part laser text’s steps.