

P.L.E.D Instruction Manual

Precision. Grace. Beauty. Fire.



Big Scary Laser

**Do not look Into beam
with remaining eye**

Introduction

PLED is a revolutionary new design for CNC based laser engraving machines. It allows its users to construct a working laser engraver for as little as \$700 which is far below the asking price of commercially available units. It has 2 main components. The operator first uses the PLED program on the PC to choose, size, and position an image. The second component is the gantry which the user then selects a wood plaque of their liking, places it square on the engraving grid, and aligns the laser. The engraving programs begins, and an engraved image comes to life on the plaque. The engraving procedure in this document will outline how to perform an engraving using the PLED.

Required Equipment and Expertise

PLED is designed to be constructed by the user. The microcontroller, wiring, laser, motors, and gantry components need to be properly assembled before performing the engraving procedure. This requires an intermediate to advanced knowledge of electromechanical construction. The engraving procedure itself is simple enough for any adult to learn to operate. With that being said, please follow all safety warnings detailed in this document to the fullest extent. Failure to do so may result in permanent blindness and severe injury.

Before performing the engraving procedure, perform a check to ensure the following components are present and assembled in a sturdy manner:

- (2) NEMA 17 bipolar stepper motor
- (2) Cylindrical 4 wire rotary encoder
- (2) SainSmart TB 6560 stepper motor driver
- (1) 445 nm laser diode
- (1) Laser shielding hood
- (1) 445 nm laser safety glasses
- (1) FlexMod p3 laser driver
- (1) Assembled mechanical gantry
- (1) Tiva C TM4C123GH6PM microcontroller
- (1) UART to USB serial adapter cable
- (1) Wood plaque with width and length not exceeding 14.4 inches
- (1) 12 VDC laser power adapter
- (1) 24 VDC stepper motor power adapter

The PLED gantry construction instructions can be sent by request to zachary.garrard@gmail.com and will not be outlined in the user manual.

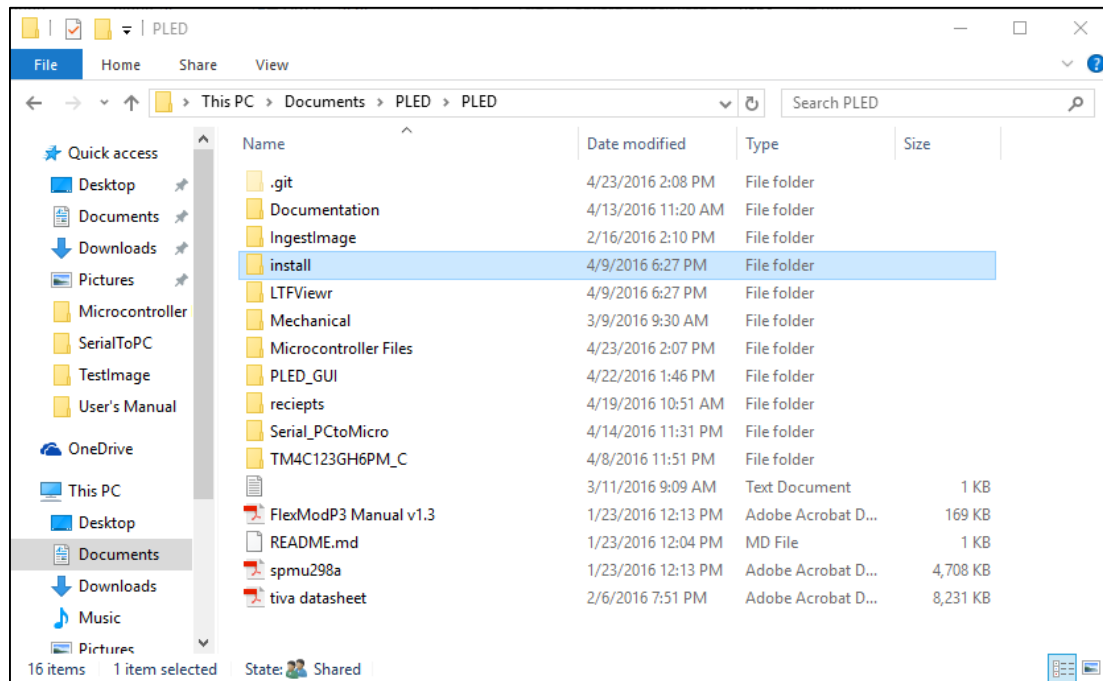
Safety and Warning Information

In this manual you will find important safety information. Failure to follow all safety guidelines may result in blindness or permanent injury. Any sections containing the warning symbol indicate the use of 445 nm laser safety glasses rated OD4 or higher are required before proceeding. Additionally, do not touch the PLED gantry or laser when the device is in operation. **Remember, it only takes one beam to the eye to never enjoy seeing again.**



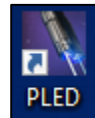
Software Installation

1. Installation of the PLED software is easy. If you have obtained the PLED folder from the pled team, open it and find the “Install” folder as shown in the image below:



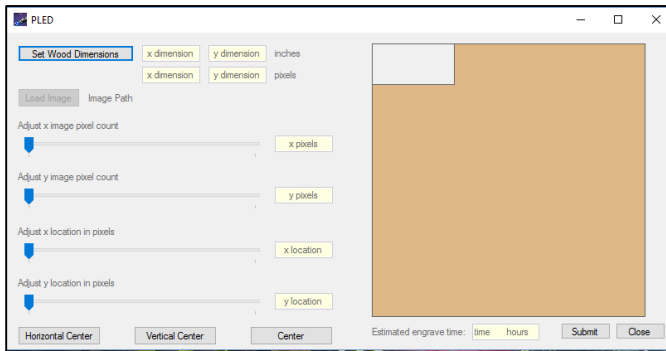
Open the folder and double click on the “install” batch file.

2. In the batch script you will be prompted to install all of the new folders. Type “A” to finish the installation. You will now have a shortcut to PLED.exe placed on your desktop and the installation is complete.

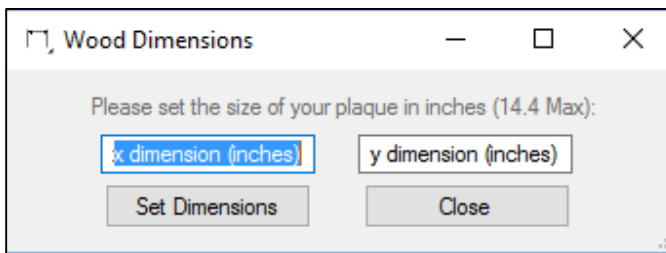


Engraving Procedure

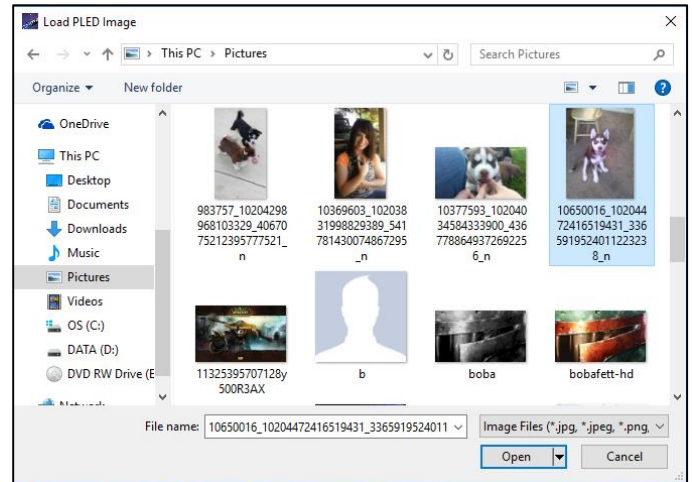
1. Choose the perfect picture! If you are putting forth the effort to buy a nice piece of wood and are willing to wait 5 hours to engrave, you want to make sure your picture is worth the effort. Once you have find the right picture, open PLED.exe on the PC. You will see the window open as shown below:



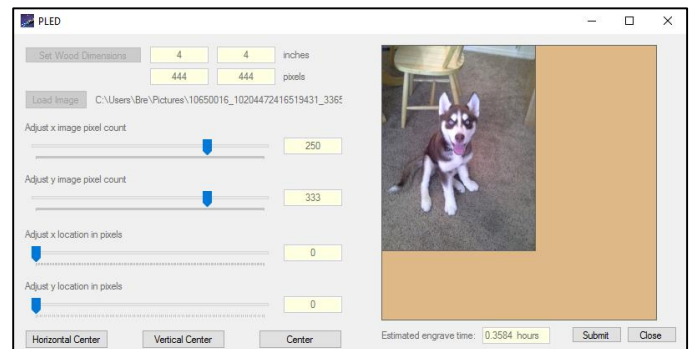
2. Begin by selecting the dimensions of the wood plaque you have chosen. You do this by clicking on “Set Wood Dimensions”, then entering the X axis width and Y axis length of the plaque. Click Set Dimensions” to continue.



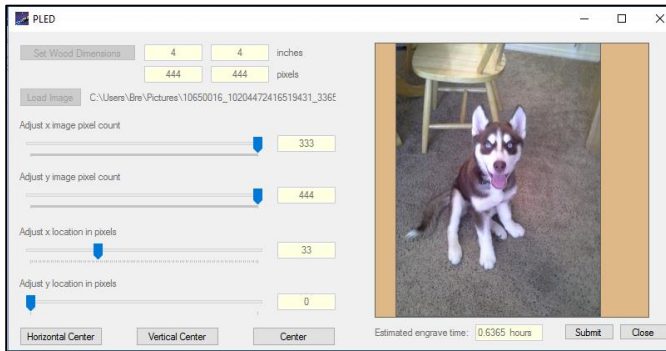
3. Click the “Load Image” button and select your image. Select “Open” to finish importing the image.



4. Scale the image vertically or horizontally by clicking and dragging the “Adjust x image pixel count” slider bar or the “Adjust y image pixel count” slider bar. Changes will be displayed in the preview window to the right.



5. Position your image on the wood plaque. This can be done manually by clicking and dragging the “Adjust x location in pixels” slider bar or “Adjust y location in pixels” slider bar. Additionally you can horizontally, vertically, or absolutely center the image automatically by selecting one of the three alignment buttons below. All changes will update immediately in the preview window on the right.



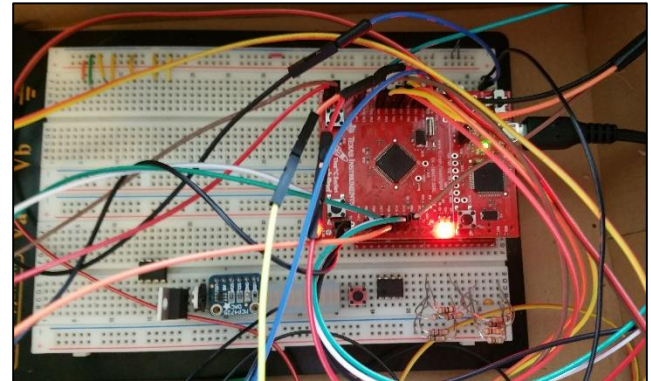
6. Insert your wooden plaque into the drawing area in the gantry as shown in the image below. Be sure to align the wood by assuring it is flush with the measuring guides to ensure your graphic will be engraved on the plaque as you set in the engraving program.



7. Plug in the 12 VDC laser power adapter. The standby point of the laser will come on to assist in laser alignment. Move the laser to the upper left hand corner of the plaque as shown in the image below. Use the focusing ring on the laser to obtain the smallest laser point possible for best engraving results.



8. Plug in the 24 VDC stepper motor power adapter and plug in the microcontroller. Ensure that the LED on the microcontroller is red, indicating it is active.



9. Place the hood over the PLED, making sure that the wires are running out the back and have free range of motion. Optionally, you may turn on a small office fan to aid with ventilation of smoke build up.



10. Return to PLED.exe on the PC and click “Submit”. The program will begin the engraving process and you will see an estimated engraving time. While the unit is engraving, please follow all common safety practices by wearing protective 445 nm laser safety glasses when opening the hood. After the engraving is complete, be sure to close PLED.exe and turn off the power supply to save power. We hope you are pleased with your engraving.

