

EAS 360
Instructions Project

“Step by Step Guide for Operating a CNC Laser Cutter”

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10/11/2023

Introduction

Laser Cutters are very crucial tools when it comes to manufacturing parts out of wood, plastics, or creating etchings on metals. From engraving designs on a wooden/ metal piece, to creating very intricate wooden models/parts that friction fit into a 3D object, laser cutters/ printers have proven to be a go to method. Although it can be a simple machine to use, Laser cutters are a very expensive and dangerous piece of equipment in any lab and they must be operated with the utmost care and precaution. This document provides a comprehensive startup guide to the highly customized laser cutter in our AIAA laboratory for the club members. There are step by step instructions, accompanied by visual representations to help better follow and learn the whole process. Through this guide you will be able to learn how to:

- Properly set up the laser cutter before use.
- How to operate the water cooling line of the cutter.
- Connect/disconnect crucial components (vacuum air pump, compressed air line)
- Exercise caution near the machine.
- Properly line up work pieces on the bed of the cutter.
- Remove the workpiece safely.
- Adjust the bed height for an optimal cut.

Hazards

Before we jump into the whole process and instructions, there are certain safety measures that need to be taken in order to operate the machine. As most typical laser cutters work with high power CO2 lasers, it is undoubtedly hazardous to the eye and can burn your skin in direct contact. The high temperature of the laser can also cause a fire if not used with proper knowledge. Besides, the fumes released during the cutting/ engraving process contain toxic contaminants that can cause cancer or other respiratory diseases.

Precautions

Given the safety hazards indicated in the above section, and a number of other related potential risks, it is a requirement to abide by some general safety rules. Most of these rules are very easy to follow and will allow you to operate a laser cutter without any harm. The following is a list of safety measures you must take:

- Do not tamper with any of the manufacturer safety features.
- Do not look directly into the laser. If you have to (although not recommended), use specific goggles meant for high beam lasers to do so.
- Make sure the lid is correctly sealed, so that the fumes do not escape into the room.

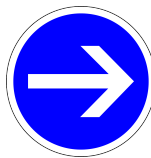
- Make sure you have the vacuum system running before you hit print, in order to exhaust out the air contaminants.
- Do not use highly flammable materials.
- Do not leave the laser cutter unattended while it's on.
- Make sure the material has cooled, before you remove it from the bed after printing.
- Always have a functioning fire extinguisher nearby.
- Regularly check the exhaust system so clear clogs.

These should help prevent any unfortunate events while operating the machine.

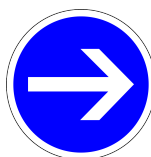
Conditions

- Must have prior experience with laser cutting.
- Must have experience with the laser cutting software LaserCAD.
- Must have the software installed on the computer.
- If new to laser cutting, must follow the instructions presented by team captains or the cutting specialist.

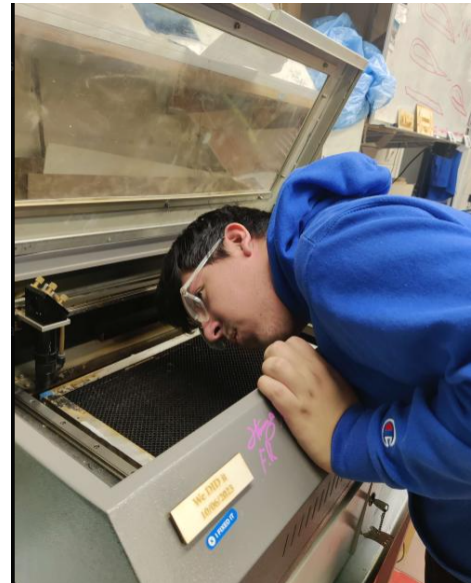
Step 1: Turn Laser Cutter water supply on by turning the red knob until it is vertical.



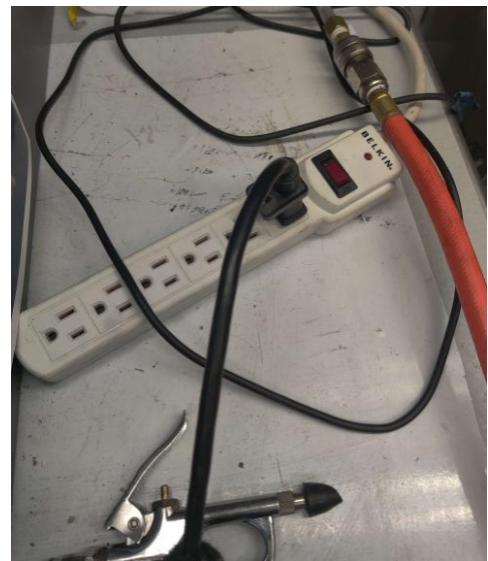
Step 2: Connect the compressed air tube to the Laser Cutter nozzle



Step 3: Turn the compressed air valve counter-clockwise (Adjust valve until you hear a slight hissing sound within the the hood of the laser cutter)



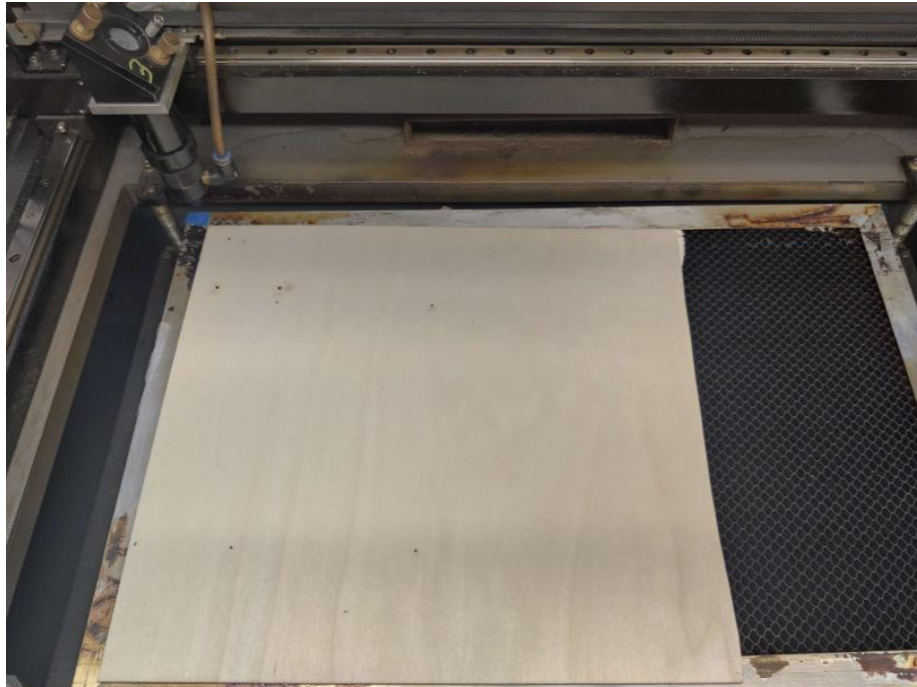
Step 4: Connect a vacuum cleaner and its pipe to the Laser Cutter



Step 5: Open the hood of the Laser Cutter



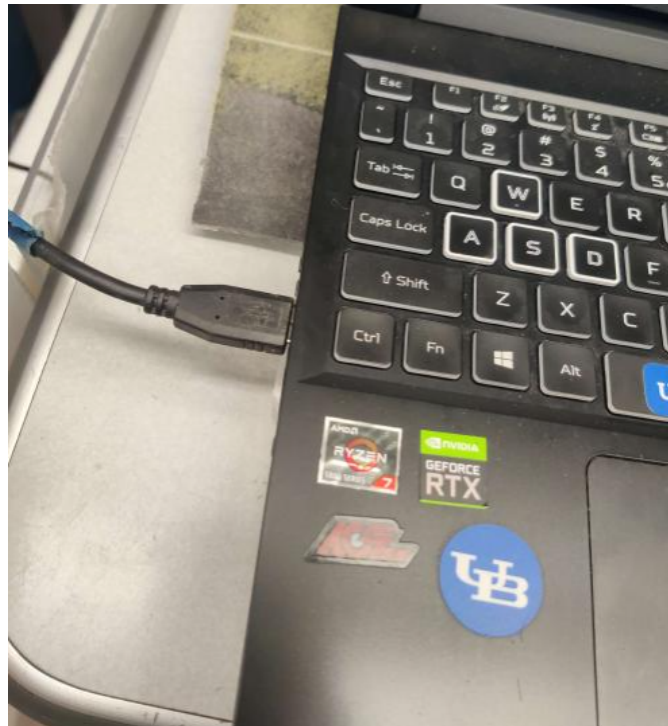
Step 6: Place 3mm birch plywood on the bed. Make sure the plywood is aligned to the sides of the black bed



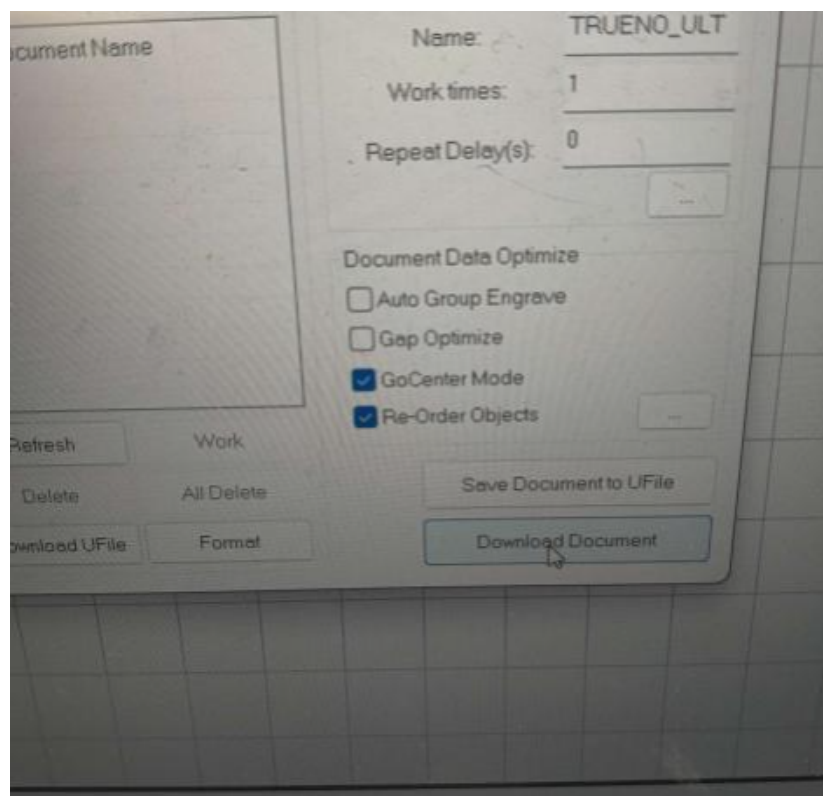
Step 7: Turn on Laser Cutter by turning the red “STOP” knob clockwise



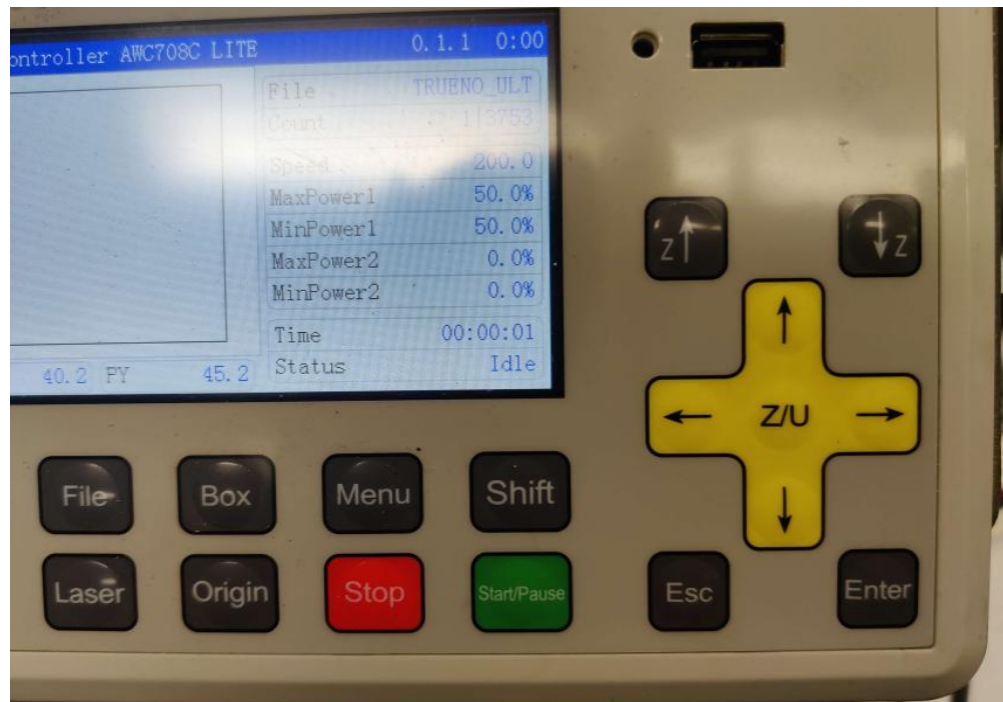
Step 8: Plug in Laser Cutter USB cable to personal laptop or PC



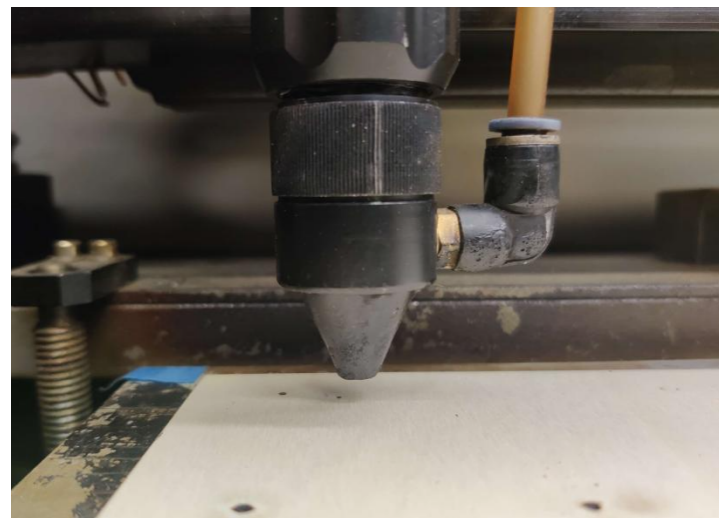
Step 9: Upload .DXF file to the Laser cutter from the LASERCAD software on your computer. You should hear a beeping sound from the cutter after doing so.



Step 10: Adjust Laser Cutter nozzle to pinpoint origin position of the cut by using the YELLOW arrow keys in the main interface. Make sure the origin is on the plywood surface.



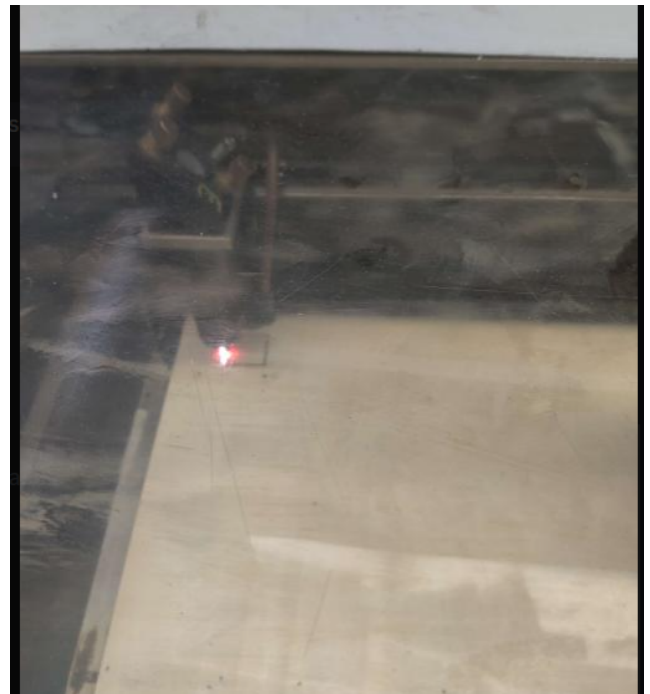
Step 11: Open the front hatch of the Laser Cutter and use the belt to adjust bed height from the nozzle. This adjusts the focal length of the laser. (Typically 3 mm from the work surface)



Step 12: Close the hood and wear protective goggles *BEFORE* starting the cut.



Step 13: Press the *GREEN* button on the control panel to start the laser cut.



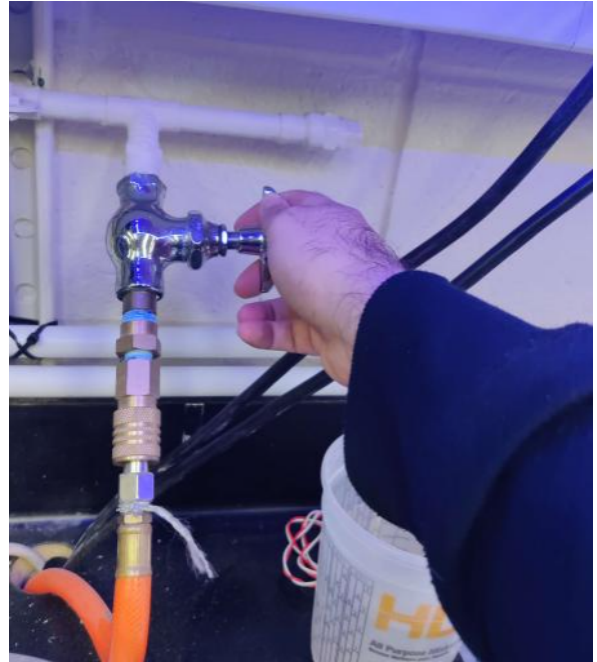
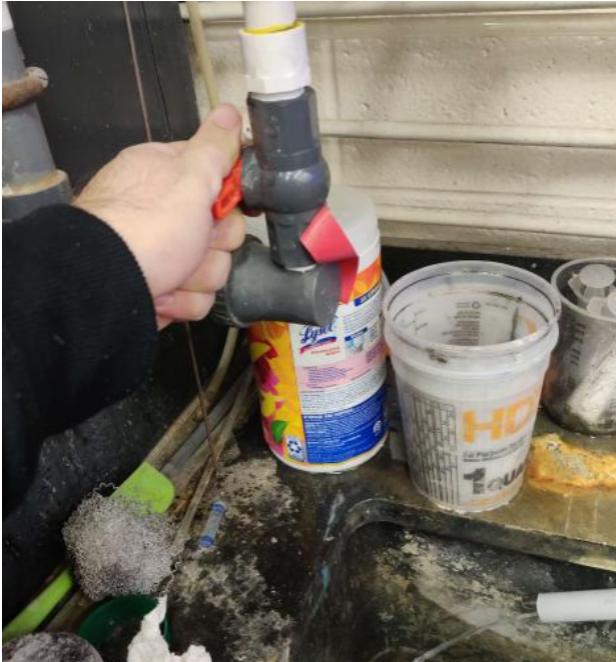
Step 14: After the laser cut, WAIT for any lingering fumes to clear out before turning OFF the machine by PRESSING the red knob



Step 15: Open the hood and carefully remove your work piece.



Step 16: Turn off the water and air supply valves.



Step 17: Disconnect the Air nozzle and the vacuum plug.

