

**College for Creative Studies**  
**Alfred Taubman Center-Model Shop**  
**Laser Usage Guide**

**ILS12.75**

Work Area - 48 x 24 in (1219 x 610 mm)



## LASER CUTTER USER GUIDE

### Introduction

The College for Creative Studies Model Shop is equipped with 1 ILS12.150D Universal Laser System. This machine uses a CO2 laser to engrave and cut a variety of materials. A list of acceptable materials appears later in this document. Please remember that the information in this document pertains to the correct and safe use of this machine. All references to safety and usage must be adhered to; failure to do so could result in permanent injury. Anyone not following these guidelines will forfeit any future use of this equipment. Policies and recommended procedures within this document may change and it is the user's responsibility to stay current with latest revisions.

### Safety

- Always check in with shop personnel before operating laser to be certain that any routine maintenance or required inspection has been performed from previous user/cutting operations.
- Only qualified personnel are allowed access to the laser room and operation of the laser.
- Any exposure to direct or reflected laser beams can be hazardous.
- Exposure to the laser beam can cause burns and severe eye damage. Never disable access door sensors or try to operate the laser cutter with access doors open. Laser damage can occur faster than human reaction time. One tenth of a second is sufficient to cause eye damage.
- **Never leave the laser cutter unattended while it is operating. Most of the materials used with the laser cutter are combustible and can ignite when in contact with the laser beam. If a fire should start inside the machine turn power switch off, turn off the exhaust system, turn off compressed air; leave the laser room and alert shop staff immediately.**
- The laser cutter uses high voltage. Never touch or tamper with the exposed wiring inside the machine.
- **Always operate the laser cutter with the exhaust system on. Smoke produced by cutting in all cases can be harmful. Almost all of this smoke is expelled safely when the exhaust system is on. If the amount of smoke being produced seems abnormal stop using the machine and check with shop staff.**
- Do not stare at the light produced while the machine is cutting.

- Do not bring any type of flammable liquid into the laser room.
- **Food and beverages** are not allowed in the laser room.
- Unless a demonstration is taking place only the laser technician and two students are allowed in the laser room at a time.
- **Do not attempt to bypass any safety features. All doors must be closed when laser is cutting.**

### **Laser Usage Policies**

- **No storage is allowed in the laser room. The laser room is not a storage area for student projects.**
- **Clean up after you are done this includes the floor, work desks, computer desk top and laser.**
- Do not store any work on desk top, a folder structure has been set up for storage this can be found on the desk top. Any work not located within this structure provided will be deleted.
- When laser is in operation pay close attention to how material reacts during the process. Some materials will distort from the laser process which could impact with the laser head while it is in motion. This will cause damage to the laser.
- Always operate the laser cutter with compressed air on. This will assist laser cutting and help cool the focus lens.
- **You cannot cut PVC, Polycarbonate (Lexan), Vinyl, Fiberglass, Carbon Fiber, Printed Circuit Board these materials can damage the laser and emit hazardous fumes when burned. You must know the material you are using to avoid machine or health damage.**

## Starting up the Machine

- Turn on the machine (black switch top of laser)
- Turn on the exhaust (switch on the wall behind laser)
- Turn on the compressed air. (Red gate valve on wall behind laser) The compressed air keeps the focusing lens cool during cutting as well as blows debris away from the cutting area (thin light weight material may require lower air pressure to avoid blowing material out of cutting position)
- **These 3 steps must always be complete before proceeding**

## Basic Laser Operation

### (Cutting/Etching)

1. **Laser room computer is not a work station have your files ready to cut/etch.**
2. All work files will be stored in the “New Jobs” section of the “Place LASER file here” folder on the desktop located in the upper middle portion of the desktop.
3. Create new folder in the new jobs folder with your 1<sup>st</sup> and last name i.e. “Billy Bob”
4. Place your work files in your created folder
5. All file names must include 1<sup>st</sup> and last name i.e. “Billy Bob” and if needed something short to identify file.
6. Any files, folders, jobs, etc. not stored in above folder/file structure will be deleted.
7. Open your Adobe Illustrator file
8. Open AI laser template (located on the desktop in the top right corner)
9. Copy and paste all lines you want from your AI file to the AI laser template file
10. Change all lines weights to .01
11. Change the line color to the appropriate color. If the specified colors are not selected when you go into the laser cutter software it will not recognize your lines. This is where most people have trouble setting up the laser cutter.

<b>Red is for cutting</b>	Red must be	R 255	G 0	B 0
<b>Blue is for single line engraving</b>	Blue must be	R 0	G 0	B 255
<b>Black is for multi pass etching</b>	Black must be	R 35	G 31	B 32
12. To send to laser ----File----Print----Print
13. Start UCP (Icon located on the desktop in the top right corner)
14. Open lid of laser cutter.

15. Place material on cutter bed. If using a thin wood, leather or plastic use double stick tape to secure material to the cutter bed or substrate material. Be aware that using a substrate material can sometimes excessively burn the backside of your project due to heat buildup.
16. If material is to be cut to the edge of your material, place outer edges of material 1in in from edge of cutter bed in both X and Y axis (or use one of the placement jigs)
17. If using placement jig carefully remove jig without moving your material
18. Close lid
19. If cutting to the edge of your material you must change the location of your pattern. To do so click on the "Relocate View" button on the right hand portion of the UCP UI. Type in the X, Y coordinates with the same values as you did in step 15
20. Click settings
21. Set material type and thickness
22. Click apply
23. Click ok
24. Click on green start button
25. You must be present while laser is cutting. Failure to do so may result in loss of your laser cutter privileges.
26. Laser operation can be paused (pause button) or restarted as needed (resume).
27. If material starts to lift from bed and is in danger of hitting the cutter head hit E-stop and contact shop staff immediately
28. If material catches fire hit E-stop, turn off compressed air and exhaust system, contact shop staff immediately.
29. If cutter bed gets heavy with smoke hit the pause button in UCP (Located next to the play button you pressed in step 23) continue cut after smoke has cleared repeat as necessary.
30. Wait for smoke to clear then remove your parts from the bed as well as all scrap left behind.
31. **CLEAN UP YOUR MESS. Failure to do so may result in loss of your laser cutter privileges**

### One Touch Photo

1. Open One Touch Photo (Icon is located on upper right desktop)
2. Make adjustments in Photoshop as needed before loading into "One Touch Photo"
3. Load jpeg
4. Minor adjustments can be performed here, but again use Photoshop for the majority of editing
5. Select apply (set material and material thickness) if etching material thicker than .5" a warning will appear. This refers to the maximum cut depth of this laser. **You must** enter the material thickness correctly and accept the warning (ok).
6. Select save then print/ok

7. Open UPC icon (Icon is located on upper right desktop)
8. Open lid of laser cutter.
9. Place material on cutter bed. If using a thin wood, leather or plastics use double stick tape to secure material to the cutter bed
10. If material is to be cut to the edge of your material, place outer edges of material 1in in from edge of cutter bed in both X and Y axis (or use one of the placement jigs)
11. If using placement jig carefully remove jig without moving your material
12. Close lid
13. If cutting to the edge of your material you must change the location of your pattern. To do so click on the "Relocate View" button on the right hand portion of the UCP UI. Type in the X, Y coordinates with the same values as you did in step 15
14. Click settings set material type
15. Set material thickness
16. Click apply
17. Click ok
18. Click on green start button
19. Watch Laser while it is cutting. You must be present while machine is cutting. Failure to do so may result in loss of your laser cutter privileges
20. If material starts to lift from bed and is in danger of hitting the cutter head hit E-stop and contact shop staff immediately
21. If material catches fire hit E-stop, turn off compressed air and exhaust system, contact shop staff immediately.
22. If cutter bed gets heavy with smoke hit the pause button in UCP (Located next to the play button you pressed in step 23)
23. Wait for smoke to clear then remove your parts from the bed as well as all scrap left behind.
24. CLEAN UP YOUR MESS. Failure to do so may result in loss of your laser cutter privileges

## Terminology

**Vector and Raster engraving-** These terms apply to how the laser will cut your drawing, understanding them is very important in achieving the results you desire. Vector cutting/engraving means that the laser will follow each line from beginning to end. This method of cutting is advantageous when you are cutting out parts because it produces a smooth clean cut at a fast speed.

Raster engraving means that the laser will move back and forth firing 1 dot at every pixel in your drawing. This method should not be used to cut out parts but is the only way to engrave solid areas, text and intricate patterns and textures.

**Compressed Air**- This refers to the pressurized stream of air used to assist the laser cut as well as cool the focus lens

**Focus Lens**- This is the lens that focuses the laser beam onto the material you are cutting. It is important that this lens is focused correctly to achieve accurate cuts and reduce the risk of damage to the machine. It is also important to keep this lens clean because a dirty lens will retain more heat and eventually melt and crack (These are very expensive, be good to them)

## **Preset Material Database**

Below is a list of materials that can be used on this laser. Each material has a basic preset as a starting point which can be further adjusted as required to control the desired end product.

### **Laser Tile**

Light, Medium, Dark

### **Fabric**

Cotton, Felt, Film w/Heat Activated Backing, Tackle Twill, Wool

### **Foam**

Foam Core

### **Glass**

Alkali -Alumino-Silicate Glass, Soda-Lime Glass

### **Metal**

Will not cut or etch base material must be coated or anodized (Markable)

### **Natural**

Cork, Leather, Mat Board, Mother of Pearl,

Paper- Construction Paper - Copier Paper

Stone- Granite, Marble - Soft, Hard

## **Vellum**

## **Wood**

Soft, Medium, Hard, Very Hard

## **Plastic**

ABS, Acetal Copolymer (Delrin), Nylon 6/6, Polycarbonate

Acrylic – Cast, Continuous Cast, Extruded

Engravers Plastic – Micro Surface - Deep Engraving, Metallic Surface, Non Metallic Surface

## **Polyester**

Mylar

PETG

## **Rubber**

Latex, Low Odor, Laser Rubber, Silicone Rubber