

LASER CUTTER TRAINING MANUAL

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PURPOSE

Hello there! In this manual you will learn the basics of how to use the laser cutter in the makerspace, a Dremel Digilab LC40. This document will also include important safety information, additional resources, and some guidance on how to prepare files for the laser cutter



Warning!!!!

The laser cutter uses a high intensity beam for engraving and cutting, do not look

directly at beam when engraving reflective material, eye damage may occur.

Please ask a staff member to accompany you when using the laser cutter even after you get certified.

Using the laser cutter with prohibited materials may result in excessive smoke and/or fire and may be unsafe (see page 12 for prohibited materials). Never leave the laser cutter on its own while you are using it.

Make sure to read the general safety warnings on the next page BEFORE continuing your training.

If you have any questions regarding the laser cutter or the training, please ask the staff for assistance.

General Safety Warnings

The following are precautions or safety measures that must be followed.

- NEVER engrave or cut any unknown material. Only engrave materials recommended by the manufacturer. Refer to tables of allowed and prohibited materials.
- While operating, avoid body contact with earthed or grounded surfaces, such as pipes, radiators, or ranges.
 - Increase risk of electric shock if grounded
- Do not abuse the cord. Keep cord away from heat, oil, sharp edges, or moving parts.
- Never operate the laser cutter system without constant supervision of the cutting and engraving process. Be alert and attentive during the process.

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- Be careful removing work pieces from the laser cutter. Touching hot work pieces before they cool down may result in burns.
- Do not let familiarity gained from frequent use of laser cutters allow you to become complacent and ignore laser cutter safety principles.
- Make sure BOFA fume extractor is on before use of laser.
- Never leave the laser cutters side when laser is operating.

DOCUMENT ORGANIZATION

The document is organized as follows ...

- Part 1: General Knowledge and Background
- Part 2: Procedure / Certification
 - 2.1 Machine Setup
 - 2.2 File Setup
 - 2.3 Machine Operations
- List of Prohibited Materials

Part 1: General Knowledge and Background

Click the links provided to gain some general knowledge on the machine before making an appointment.

- [Quick Tutorial](#)
- [Detailed Tutorial](#)

Part 2: Procedure / Certification

2.1 Machine Setup

The following are tasks that must be done before operating the laser cutter.

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The following steps require an appointment to the makerspace with staff supervision

1. Make sure that the coolant connections and laser tube are leak-free.
2. Check BOFA air vacuum is plugged in and running



3. On your personal USB, have the design of choice in PDF Format
 4. Open a new tab in any browser and type in the **IP Address of the Laser Cutter Provided**
 - **IP Address:** 169.254.187.175
- **Before moving on, email makerspace@utrgv.edu to make an appointment or talk to staff.**

2.2 File setup

The following section will include information on how to prepare a file for laser cutting. This section can be done individually but the **file must be approved by a staff member before cutting.**

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Use the links provided below to set up the image in SolidWorks.

- [Link for Image](#)
- Convert the Image to PDF format and refer to the general operations section to finish the p4567roject.

2.3 Machine Operations

The following section provides a general course of action to properly set up the machine and start the cutting process.

If you have any questions along the steps, don't, hesitate to ask.

General Operations

Once the laser cutter program is open in the browser the user can now prepare the project. The following is the procedure for operating the LC40.

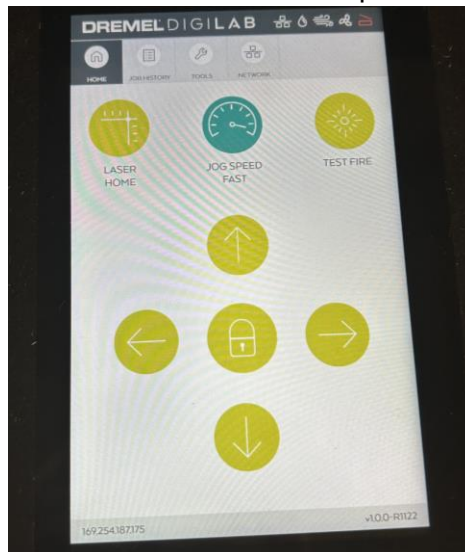
1. Prepare material

- Place material in the laser cutter and manually adjust the height of the laser head to be slightly above the material.

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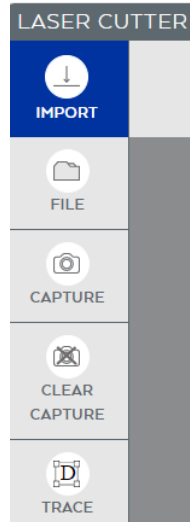


- Using the LC40 screen move the laser head on top of the material.



- Enter the drop-down menu in the top left corner of the application and click capture to start the capture of the material in the laser cutter.

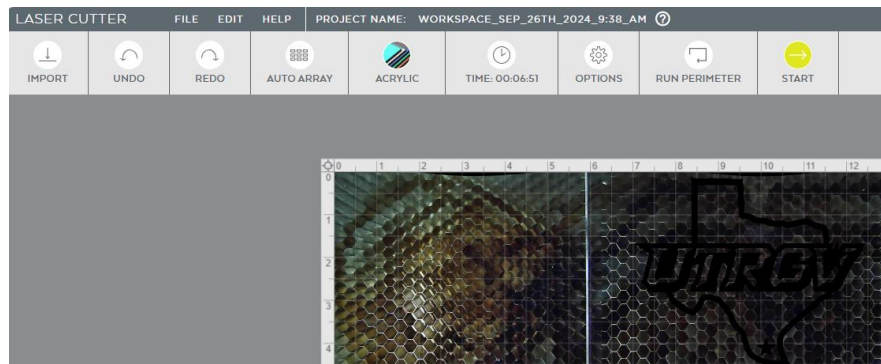
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- **Before moving on, call a Staff Member to check your setup.**

2. Prepare Design

- There are 3 options for importing the PDF.
 - i. Import Everything (both engrave and cut)
 - ii. Import Engrave Only
 - iii. Import Cut Only
- Place the design over the material capture on the screen and adjust to the size of the users liking.
- Make sure at the top of the application the type of material in the laser cutter is selected.



- **Before moving on, call a Staff Member to check your setup.**

3. Cut

- At the top right, click START to begin the process.
- Go to the LC40 display and check all requirements.
- Start the process
- **Be present and attentive throughout the whole cutting/engraving process!**

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4. Have Fun!

- Mess around with the settings since there are various options for how the engraves and cuts can come out.
- Once the user is ready for the cutting process press the send to cutter option and head over to the laser cutter and watch the process.

Final Product



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Prohibited Materials

The following is a list of materials that are not to be used with LC40 Laser Cutter under any circumstances:

Table 2 Dremel LC40 Laser Cutter Prohibited Materials	
ABS	Painted material, varnished materials
Beryllium oxide	Particleboard, paneling
Carbon	Polycarbonate
Chlorinated plastics	Polychloroprene (CR or chloroprene rubber, marketed under the brand name of Neoprene)
Coated carbon fiber	Polypropylene foam, Polypropylene sheet
Coated materials	Polystyrene foam
Epoxy based or phenolic resins	Polyurethane, Polyurethane foam
Fiberglass	Polyvinyl chloride (PVC) Found in many common products such as but not limited to; flooring, siding, piping, roofing membranes, credit cards, toys, flexible tubing.
Fluorine based plastics: PTFE (Teflon)	POM Delrin/acetyl
Fluorinated ethylene propylene (FEP)	Rubber
Galvanized metal	Styrofoam
HDPE (High Density Poly Ethylene)	Wood that has been: • Coated • Fumigated • Pressure treated • Stained
Leather, Artificial or Chrome tanned leather	
Materials containing: • Astanine • Bromine • Chlorine • Fluorine • Formaldehyde (excluding plywood listed in Table 1) • Flame-retardants • Halogens • Iodine	
Mirrored surfaces	
Nylon	

While the Dremel LC40 Laser Cutter can cut and etch a variety of materials, some materials such as most metals, cannot be marked and will give less than desirable results. Other materials may not have acceptable finish quality.