

Laser Training

Contact adam@makeitlabs.com if you have questions about, or problems with the laser.

Safety

- The plastic windows on the machine will protect you from laser radiation. However, wearing safety glasses is never a bad idea.
- Do not look into the sides of the machine while it is operating.
- Do not operate the machine if any access panels are open.
- Do not let the machine run unattended. **If we catch you doing this, you will be barred from ever using it again.** Ask someone to watch it if you need to leave for a minute.
- Always make sure the air assist and exhaust are functioning.
- Do not lean on the bed, it is fragile.
- Pay attention to the laser head when moving the gantry or adjusting table height so that it does not crash.
- If something seems wrong, stop what you are doing and contact Adam, Ian, Rob, or Paul.

Material Selection

What can be cut:

- Woods up to 3/8" (thicker may be possible, do a test cut). Generally if it can't be cut in a single pass, multiples won't help due to carbon buildup
- Acrylic (thick pieces can be cut with multiple passes)
- Leather
- Fabrics
- Most plastics
- Cardboard/Paper (watch very carefully for smoldering/fire).
- Chocolate

When in doubt, research online and chlorine test!!!

What can be engraved:

- All of the above
- Glass
- Stone
- Metal (may require CerMark or other prep first)
- Meat (please don't engrave yourself)
- Most anything safe to put in the laser

What should **never** go in the laser:

- PVC
- Vinyl
- Anything with chlorine compounds in it
- Highly reflective materials
- Fiberglass
- Polycarbonate/Lexan
- Polystyrene foam
- Polypropylene foam
- HDPE
- Coated carbon fiber
- Galvanized Metal
- Pressure treated wood

Some materials can be used in the laser, but can be difficult to get good results with and may leave a goopy mess. ABS is a chief example of this.

Using LaserCut 5.3

- RTFM
- All dimensions are in mm. Table markings are cm.
- Single color bitmaps for engraving
- Vector art for cutting (Inkscape is free and on the laser PC)
- Ctrl+shapes makes them proportional (squares vs. rectangles, circles vs. ovals)
- Don't mess with machine settings (there is one that needs modified for Rotary)

Setting up the Laser

- Keep the work piece away from the sides if possible (Laser can travel to the outside of the honeycomb)
- Badly warped pieces will cut poorly and may snag on the autofocus plunger.
- Slightly warped pieces may be weighted down provided the head will not crash into the weights
- Silly putty is a great hold down tool
- Drop the table an inch or so before checking dimensions
- Use the "test" button to check the extents of the job
- **Note: If engraving, the head will overshoot this box on the left and right!**
- Use autofocus whenever possible
- Make sure chiller is turned on and air assist and exhaust are functional

Cutting / Engraving

- Cutting follows the path of the line (vectors)
- Engraving scans from side to side like a dot matrix printer (raster)
- “Penline” effect can be created by doing a high speed, low power cut
- Place material on eggcrate to avoid reflection marks
- 4 safeties on laser
 1. Left side of lid
 2. Right side of lid
 3. Chiller flow
 4. RFID Lockout box
- Gantry will move with any of these disabled, but laser will not fire
- Yellow “Laser” button will fire a quick test pulse
- Use lowest power setting that will make it through material
- For engraving, start at low power and increase as needed. Multiple passes also work

Rotary Attachment

- RTFM
- Y axis Pulse Unit Setting (File->Machine-Options, Worktable) should be 0.018238
After changing, click “Save”, “OK”, then download the CFG file to the machine.
- Place something between fixture and bed to protect honeycomb
- Use gantry to align fixture, then position dead center over rotary
- Turn off machine, plug in Rotary, flip switch, turn on machine.
- Level object using screw on the fixture, autofocus z-axis on object

Maintenance

Most of the maintenance will be handled by the resource managers, however, you may need to clean the lens and/or mirrors if the power level seems to be dropping.

Read the “Maintenance Schedule” document in the binder for detailed instructions on how to clean each component.

- Be careful not to misalign the mirrors. Aligning the laser is out of the scope of this training and needs to be done by a resource manager.
- Be gentle with the assembly attached to the focal tube. If you are careful, the autofocus will not need to be re-adjusted after re-assembly
- Either acetone or alcohol can be used to clean. One may work better than the other depending on what has been recently cut.
- DO NOT SCRUB! Swirl gently with the cotton swab. Let the solvent do the work.
- After replacing the focal tube, lift the z-axis all the way up, and slide the tube down until the autofocus switch is pressed, then tighten the tube in the housing.
- Make sure everything has evaporated before firing the laser.