

This deck is not a stand alone training and does not take the place of the workshop

Several slides reference demo's that are given in workshop.

From Design to Cutting

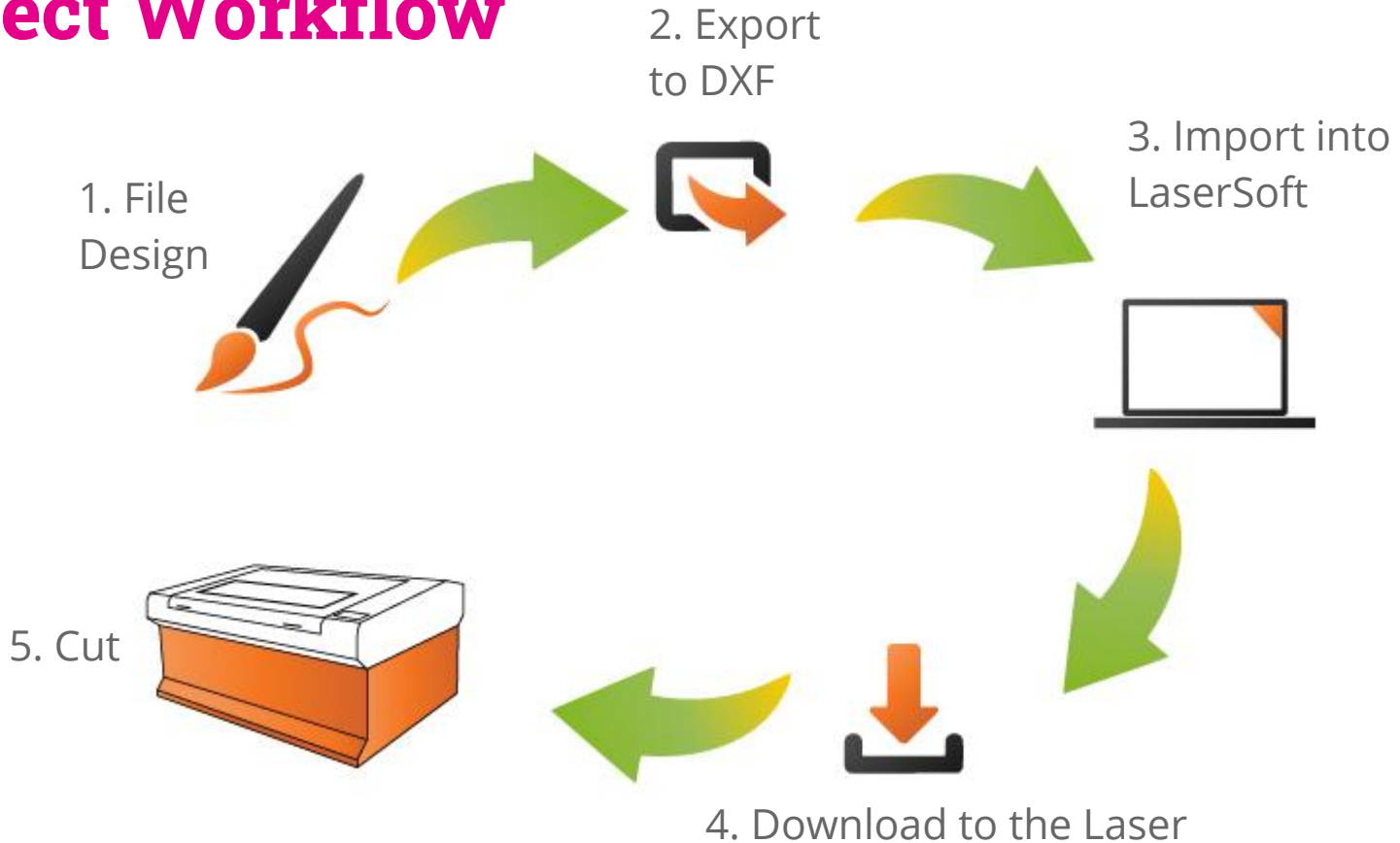


Ace Makerspace Remote Laser Training



Laser Cutting Concepts

Project Workflow

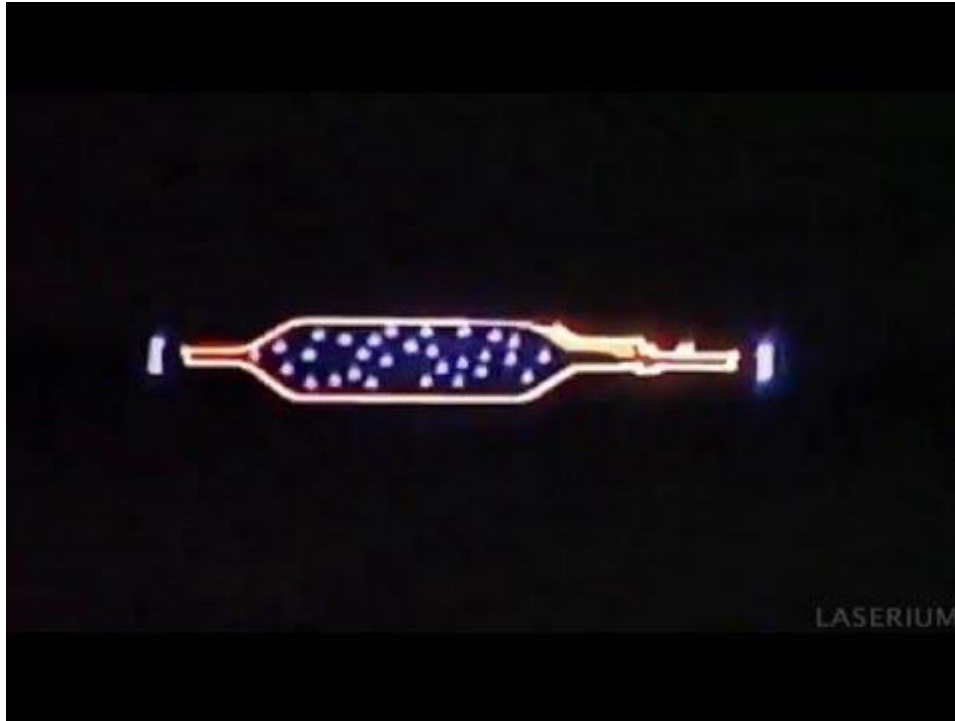


Session workflow

1. Startup - Use the checklist and make sure everything is working/filter uses etc.
2. Zero the bed
3. Position materials
4. Use the focus tool to drop the bed to the start focus point
5. Test fire a dot. Measure, note measurement, check for roundness in the dot - adjust as need - will need to do more adjustments the thicker the material.
6. Set up test cut file - using best-known power and speed settings do the first test cut
7. Test cut - Use troubleshooting tips and adjust speed, power, and focus until you get the results you desire. RECORD YOUR SETTINGS!!
8. Import your art into LaserSoft and apply the settings you just determined
9. Download the art to the laser
10. Verify positioning by using origin and running the box
11. Cut - pay attention especially during long runs
12. Shut down - Use the shutdown checklist

**These steps
outline what you
do in a laser
work session.
You will learn
how to do these
things in this
course.**

How Lasers Work



Click square for
video

Laser Machines and Peripherals

Air Assist Compressor



Pushes compressed air to the laser head for clean cutting and fire suppression

Vortex Vent Fan



Vents air from room

Path of exhaust for cutting smoke

Rooftop exhaust

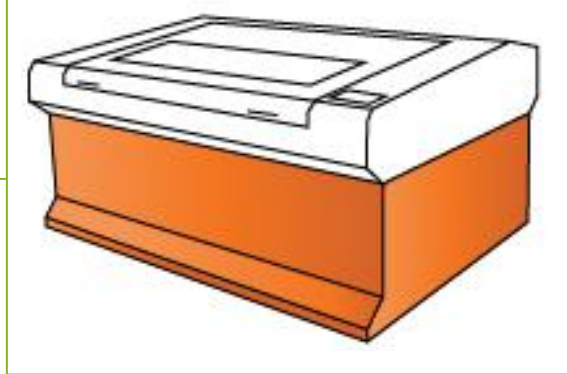


Chiller



Cools water and it flows around the laser tube and prevents it shattering

Laser Cutter



Pulls smoke from the laser, filters it then exhaust it outside

Exhaust Blower and Filter Box



Machine Parts

Laser Head



Lid

Master Switch/
Emergency cut off

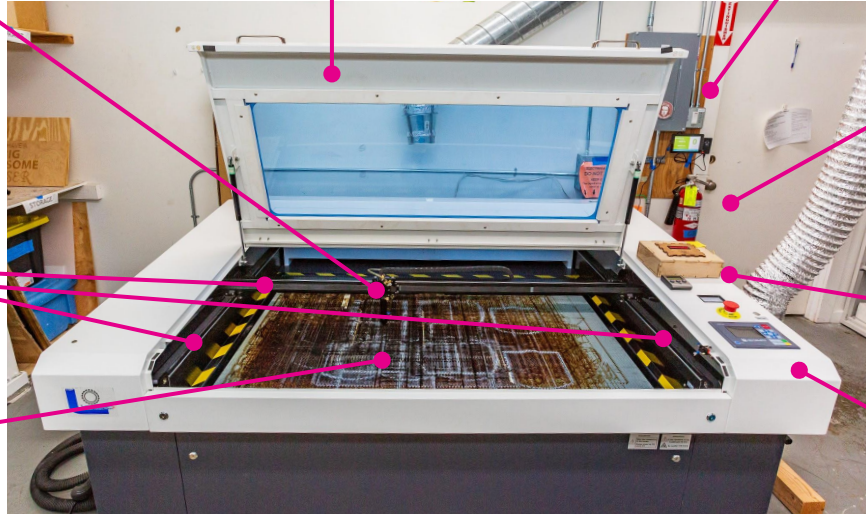
C02 Fire
Extinguisher

Fob Box

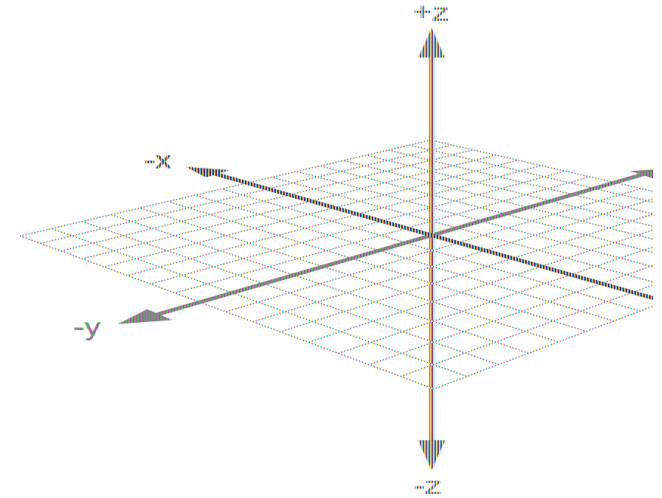
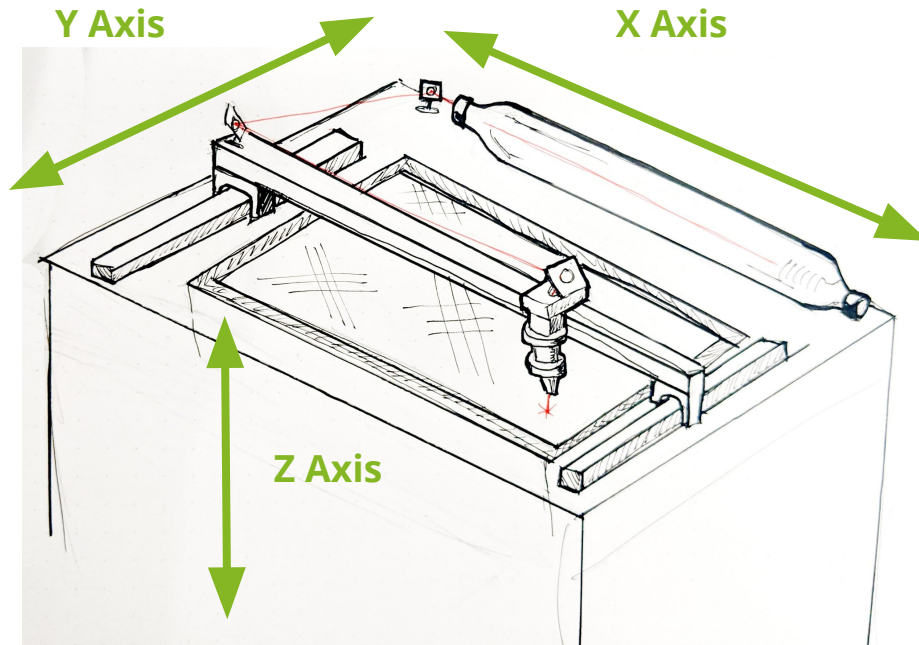
Keypad

Gantry / Rails

Bed

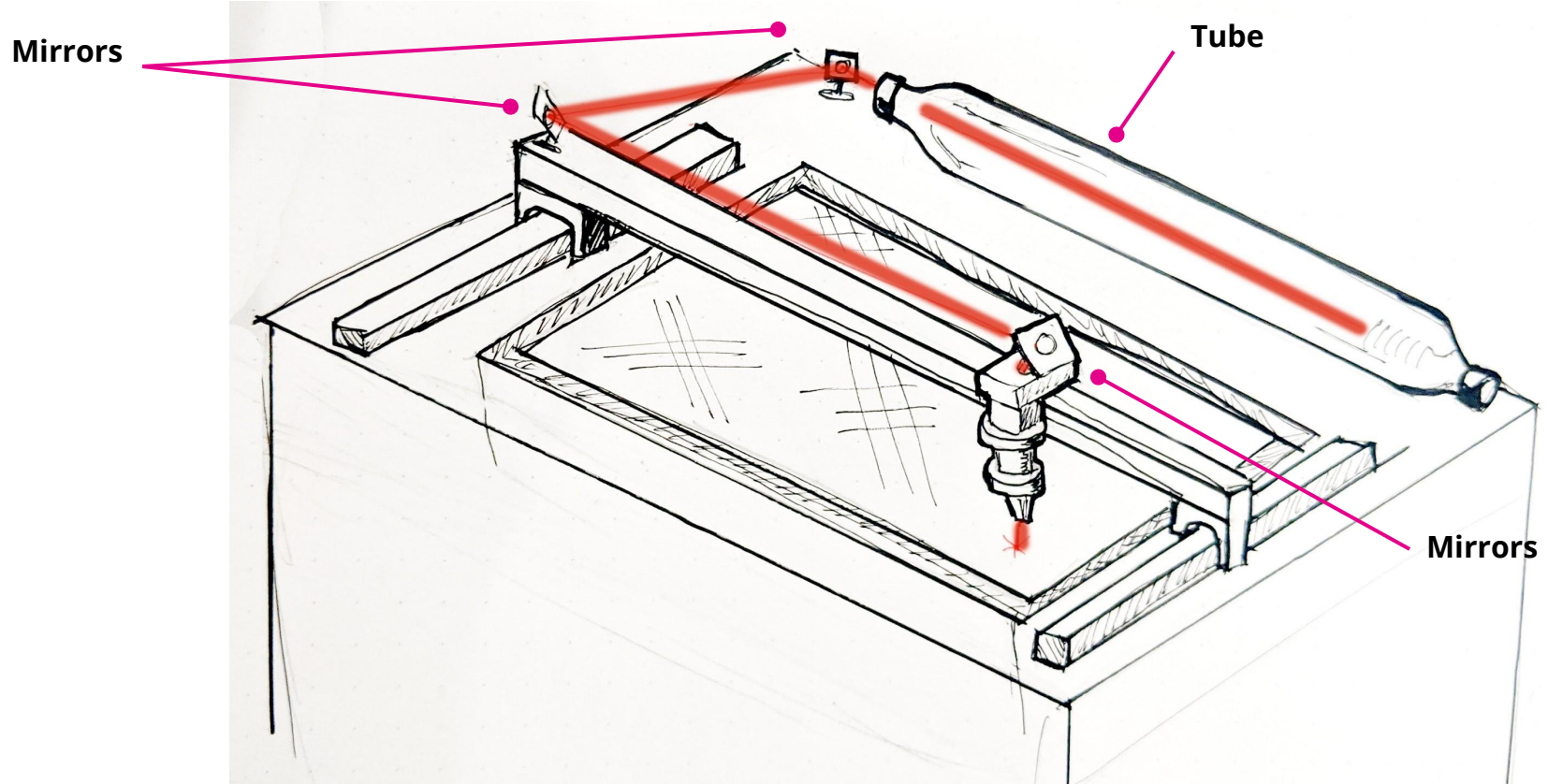


XYZ



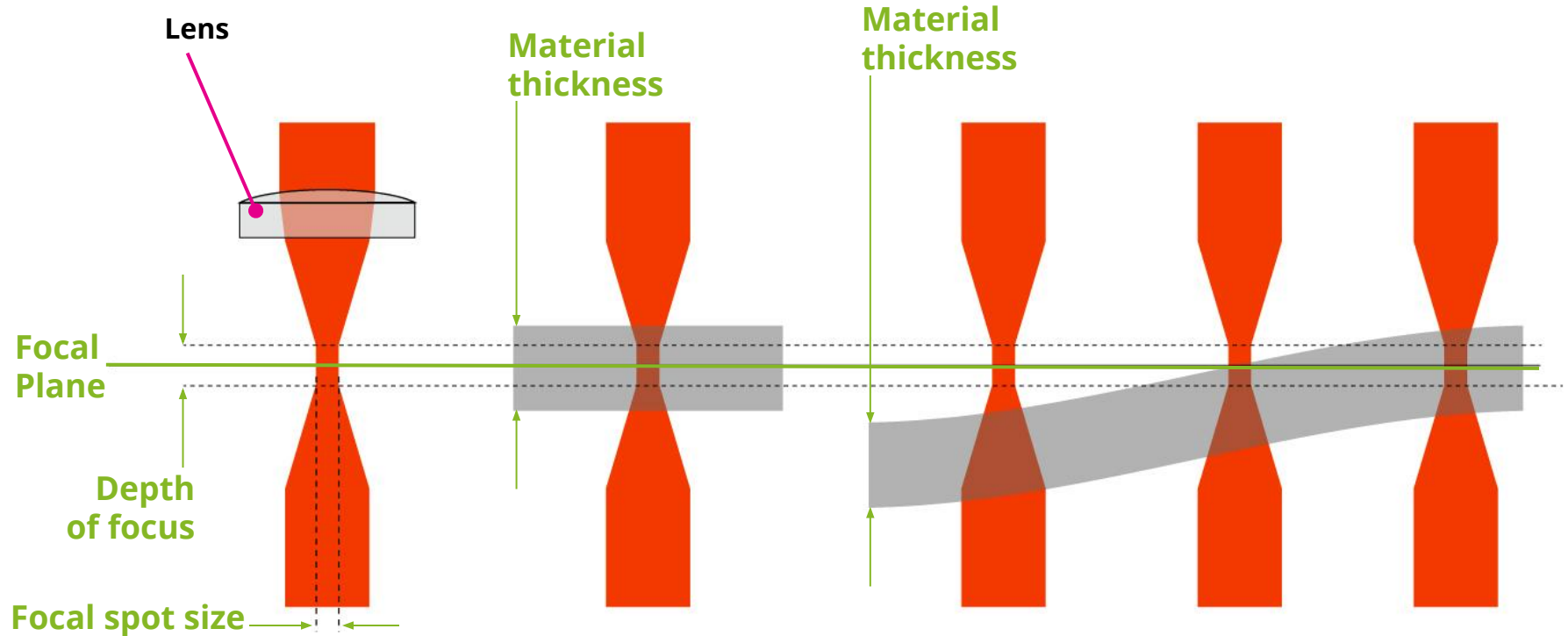
- The center rail moves on the Y Axis
- The Laser Head moves on the X Axis
- The Bed moves on the Z-Axis

Mirror Mirror

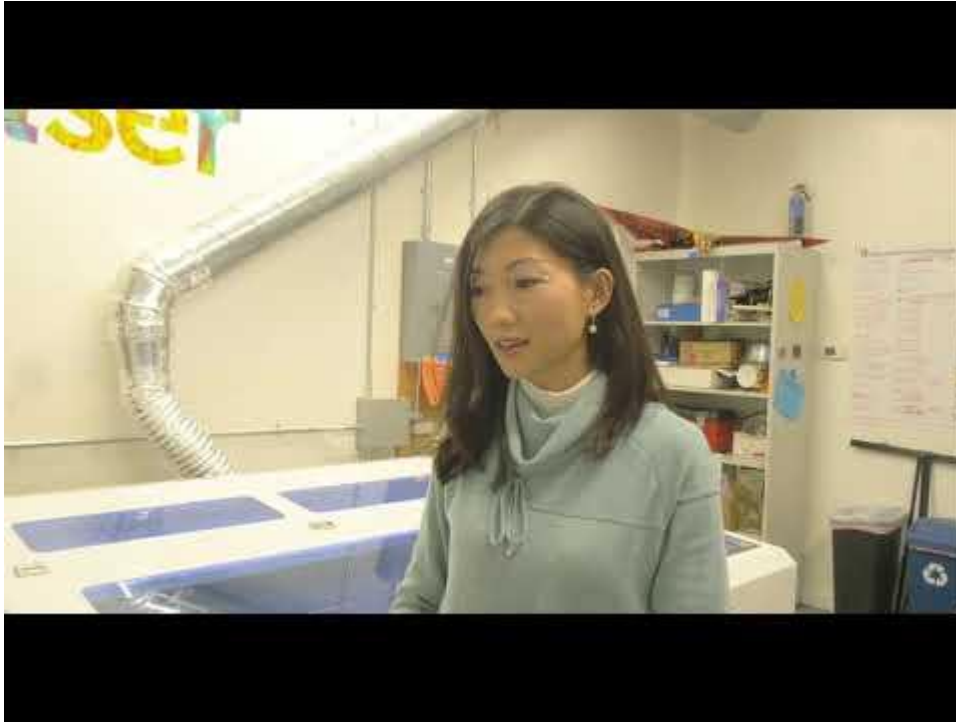


Focus and flatness

[Video Demo Link](#)



Tips on getting materials flat



Lots of tips and
Demos

Please note that the filter
section of this video is out of
date.

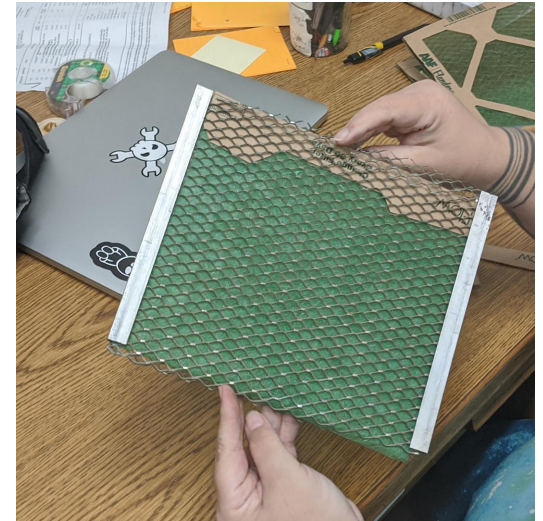
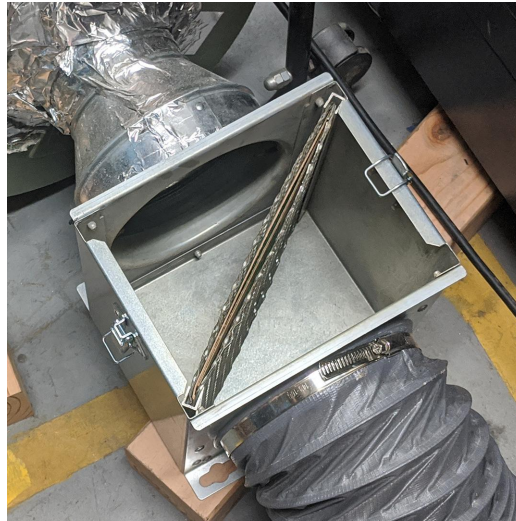
Focus, Speed, Power and Materials

All laser cutting is getting a good focus on the center of the material, then moving enough fire over it at the right rate of speed to get a good cut. When test cutting through try these adjustments.

- Kerf is too wide = adjust focus or drop power
- Not cutting though = slow it down OR add more power
- Burning away details = Speed it up or reduce power
- Burning away small part = break them to a separate layer and drop the power
- Not cutting all the way though in spots = materials are not flat

Filter Box and Draw Testing

<https://wiki.acemakerspace.org/how-to-change-the-filter-before-the-blower/>



Key Pad

Tips

- When in doubt ESC
- Avoid Reset
- Origin is home
- Box = Box



Laser Program Features and Etiquette

Billing

- Bills are due 15 Days after we send them
- Extensions must be asked for but always get them
- Billed for firing time only
- Try to get a photo of the fob box with the dollar amount

Certification

- Certification is required
- The laser will not fired if you are not fobbed in AND certified
- You must pass the Knowledge Check to qualify for certification

Calling Dibs

First Book Your Spot

Then Call Dibs in Slack

Materials

Okay Materials

- Wood
- Paper
- Acrylic
- Craft foam
- Most fabric and leather
- Other things on the big list

Dangerous Materials

- Things that release toxic gas when burned or light into melty balls of fire

Use Common sense

- Check to see what your material is made of
- Google it

Troubleshooting

- Check the Binders
- Check the wiki
- Check Slack
- Google is your friend
- Find a mentor

Reporting when things go wrong

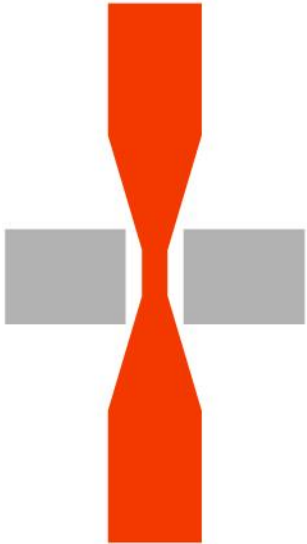
- /Asset
- Down Signs
- Who to contact in an emergency

Materials and Cutting

Cutting vs Etching vs Gassing yourself

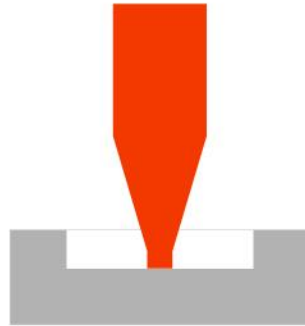
Cutting

Burns through the material



Etching

Burns material off the surface of the material



Unlike cutting, etching is done by scanning

You are burning things and need to be mindful of smoke and filter and not taking chances with unknown materials

Different materials burn differently



Start Up

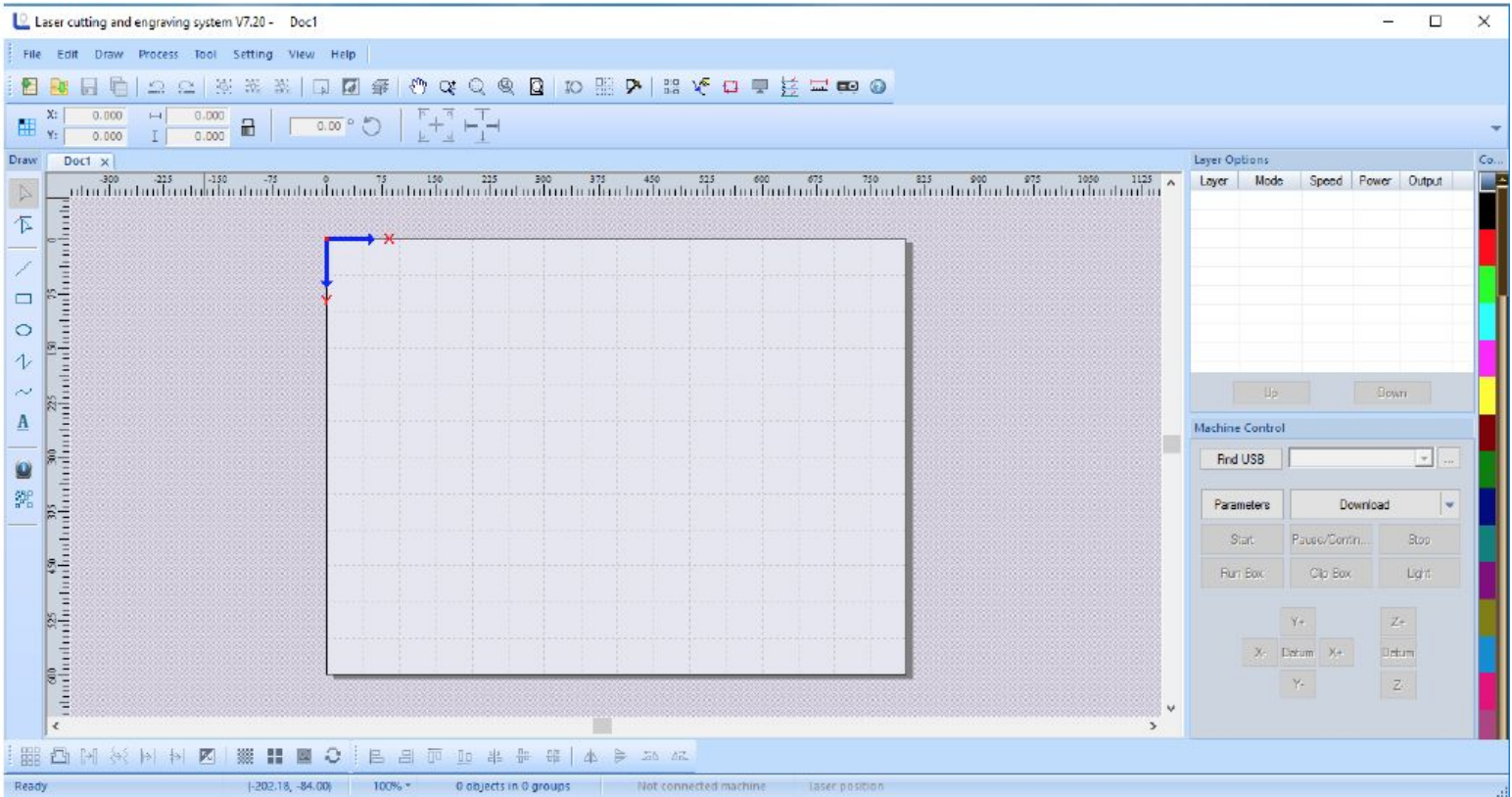
- Ensure door to hallway is closed and Honeywell filter is turned on.
- Turn on system via switch on wall.
 - Confirm chiller is on, pumping water, and water level is in the green zone.
 - Confirm air compressor is running and air is coming out of air assist nozzle
- Use your fob to authorize access
- Check that the temperatures are in the right ranges (chiller approx. 17 degrees or lower and laser approx 20 degrees or lower)

Shut Down

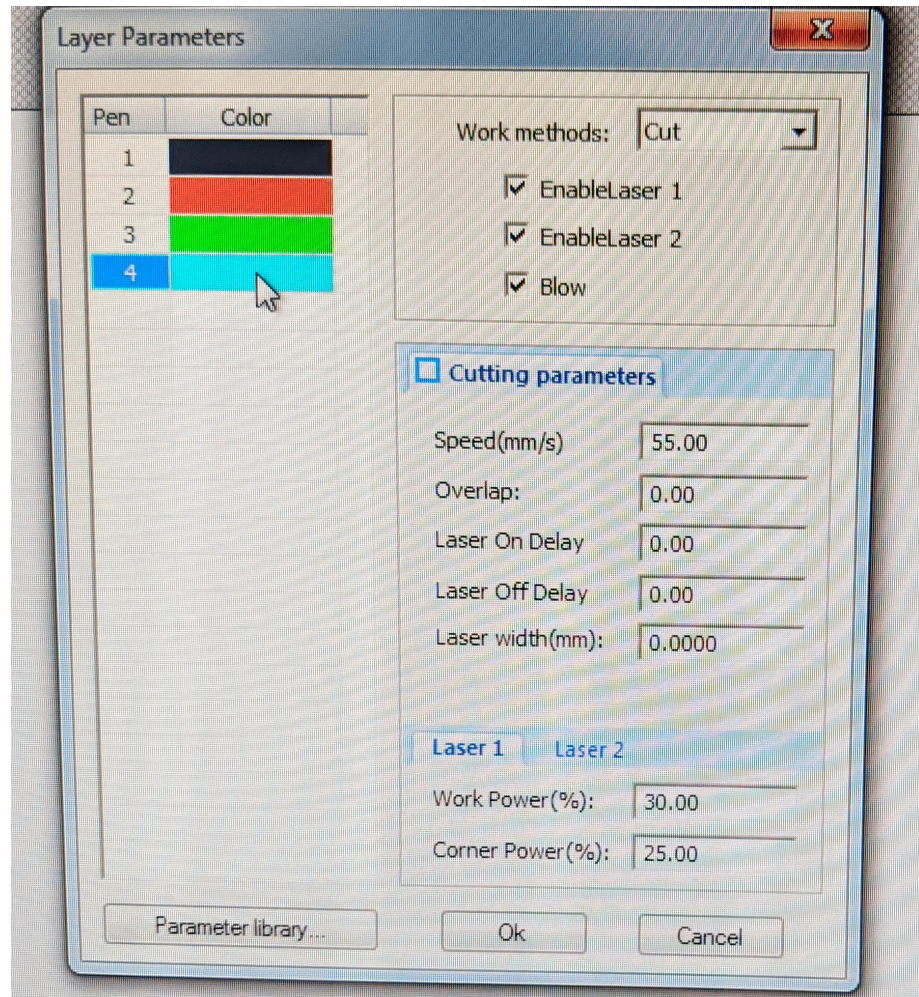
- Move the laser head to the very back
- Log off- Fob out
- When done, turn off main switch to power down system
- Remove any bits and scraps from the laser bed - shop vac available
- Clean up any waste material you may have generated.
- Use shopvac next to laser and vacuum underneath honeycomb.
- Carefully wipe down the interior of the laser after each use using a dry cloth. NEVER USE SPRAY CLEANERS or solvents or scratchy things. (Okay to use a damp cloth as long as it is water only.)
- DO NOT TURN OFF THE COMPUTER
- If the room is stinky it is okay to leave the honeywell on.

Using LaserSoft

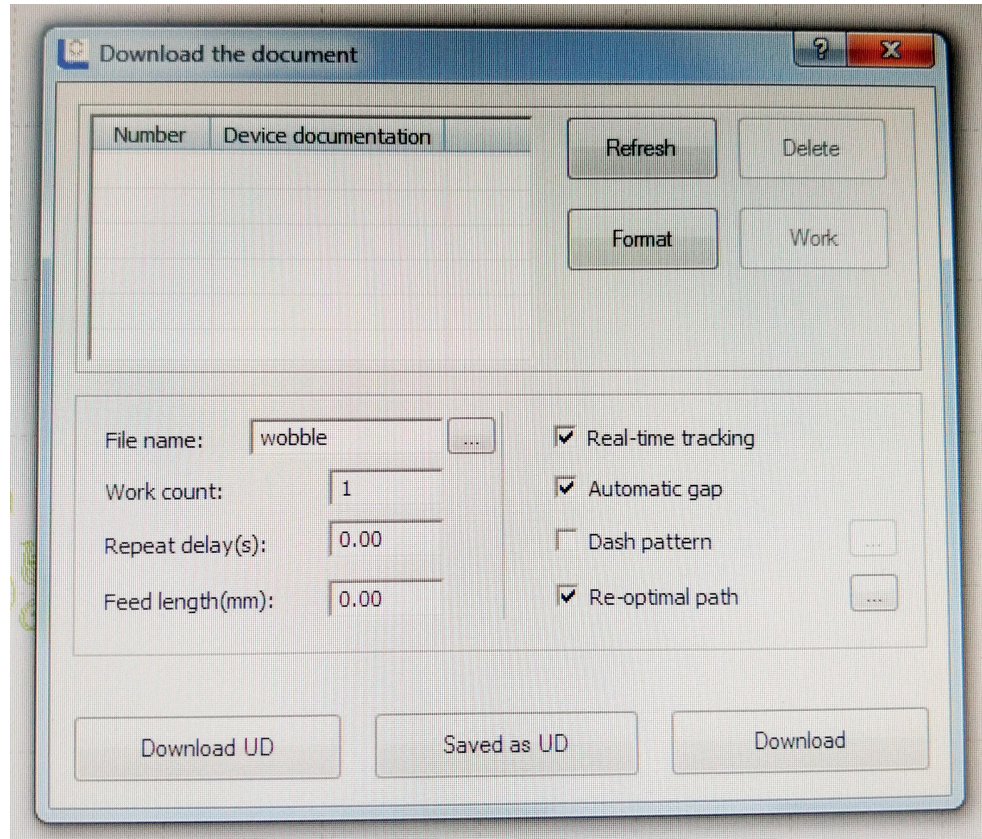
Workspace anatomy



Layer Options



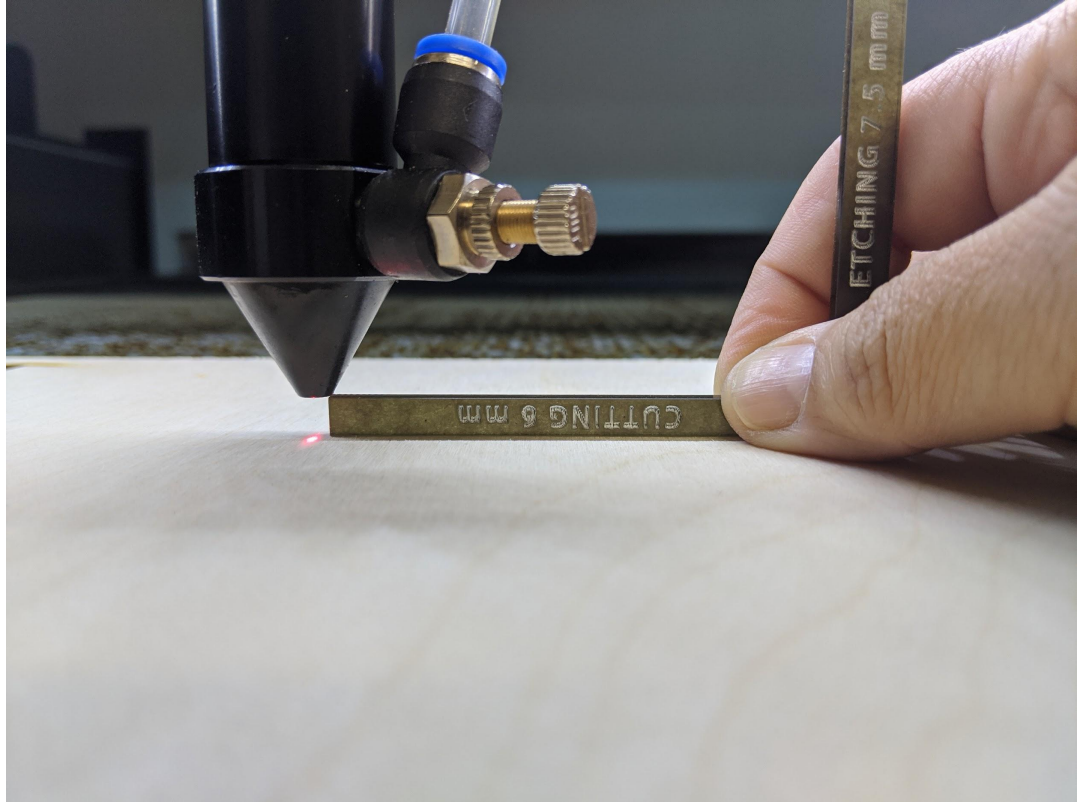
Downloading



Test Cutting

Materials set up

- Zero the Bed and check the focus
- Place your material and focus
- Fire a test dot and check for roundness



Prepare test art in context

- In LaserSoft, use a 1 to 3 centimeter area to create a cut shape
- Make it contextually relevant to your art (straight lines, big curves, etc)
- If etching add a shape for that on a new layer

File Preparation Using Adobe® Illustrator

Setting yourself up in Adobe[®] Illustrator

- Create a document relative to your material size or the bed of the laser
 - Bed Size 1300 mm x 900mm
- Work in millimeters

The basics

- Use millimeters for the stroke
- Do not use groups
- RGB colors

Control is in the layers

- How to get object to import with layer groups.
- Use different colors in RGB formulas to distinguish what items go on what layers when importing into LaserSoft

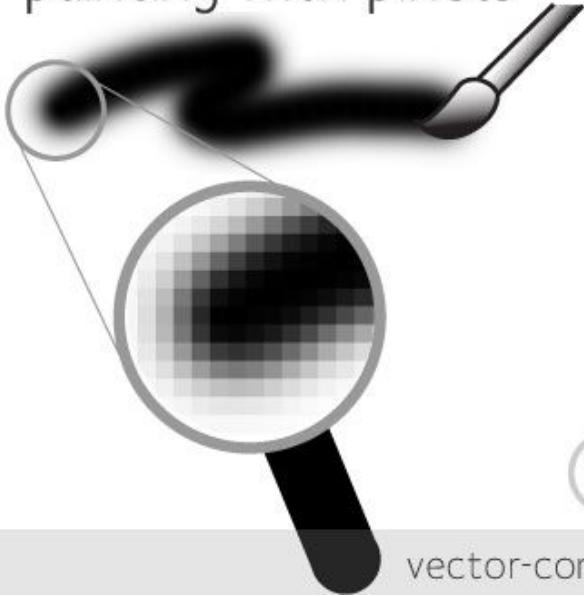
Tour of a production file with photos

Reasons to split art onto layers

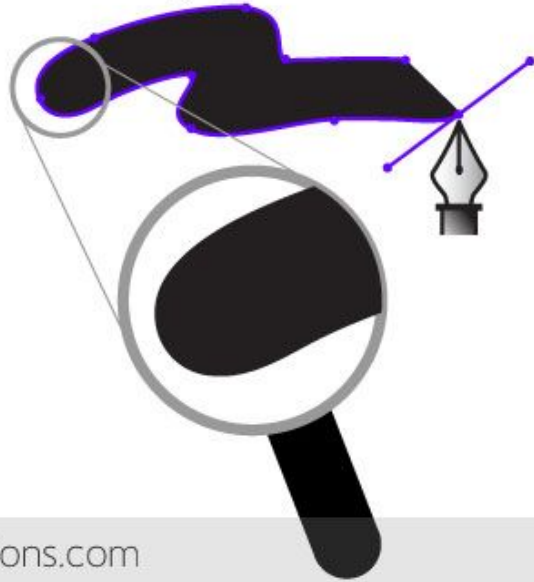
- Control the order they are cut or etched
- Smaller objects often need less power than long cuts
- Avoid material distortion by cutting large objects last

Raster Files

painting with pixels



drawing with vectors



vector-conversions.com

See: <https://www.instructables.com/How-to-Laser-Engraving-Photo/>

Working with Type

Lobster

Make any typeface a stencil

Lobster

Creating Art out of line weights

Live Demonstration in Illustrator

Tracing photographs

Live Demonstration

Sketching for Laser and tracing

[Cutting Video](#)



COMING
SOON

Adobe[®] Illustrator + LaserSoft (Demonstrations)

Homework

Create a file

Deliverables:

1. Illustrator Art File
2. 1 DXF File
3. A description of your intended materials
 - a. How thick is it
 - b. What is it

Extra resources

Links

<https://www.instructables.com/Its-Easy-Just-Have-a-Try/>