

Laser Cutting & Engraving & design in Illustrator

Open Lab @ Alumni

By the end of this workshop, you should be able to:

- ❑ Create or import a design in Illustrator that is suitable for laser cutting / engraving
 - Make cut lines the correct stroke weight
 - Increase contrast in most images to be engraved (trial and error)
- ❑ Describe how to select an appropriate material for a given job
 - Based on safety (fumes, fire hazard)
 - Based on capabilities of laser (thickness, hardness, reflectivity)
- ❑ Explain the process of finding the best settings for cutting or engraving using trial and error
- ❑ Enter material-specific laser settings in Illustrator
- ❑ List all personal safety hazards involved in using the laser cutter
- ❑ Locate and explain the use of the fire extinguisher
- ❑ Turn laser, fan, and pump on/off
- ❑ Focus laser
- ❑ Send project from Illustrator to laser cutter
- ❑ Clean up any detritus or sawdust inside the laser cutter
- ❑ Describe how to reserve the equipment and for how long
- ❑ Explain the Open Lab laser on-site policy
 - You must stay and observe the laser the entire time it is running to prevent uncontrolled fire

Overview

- Design in Adobe Illustrator
- Choose material
- Set up the laser cutter
 - Power on
 - Focus
- Choose & enter material-specific laser settings
- Send job to laser
- Cut & engrave
- Clean up

Designing in Adobe Illustrator for laser

- Setting up artboard size
- Must use inches as unit
- Stroke width for cutting less than or equal to .001 inches
 - Everything thicker is engraved
- Importing an image
 - For engraving
 - How to invert colors
 - How to change saturation
 - Engraving photographic images involves trial & error
 - For cutting
 - How to use the Image Trace tool
- Layers are good for keeping yourself organized
- How to use clipping masks

Criteria for choosing material

Cutable materials:

- Wood: $\frac{1}{4}$ " or less in thickness
 - We stock different kinds of $\frac{1}{4}$ " and $\frac{1}{8}$ " plywood
- Acrylic: $\frac{3}{8}$ " or less in thickness
 - We stock $\frac{1}{8}$ " and $\frac{1}{16}$ " in several colors / opacities
- Cardstock
- Other thin, not-so-dense things like leather, fabric, cork...

Engravable materials:

- Most things
- Hard metals can only have colored material "engraved" onto its surface

Materials safety

THINGS THAT MUST NOT GO IN THE LASER CUTTER EVER

- Anything that will produce toxic gas if lasered (PVA)
- Things under pressure (cannisters)
- Mirrors facing the laser

Modifying your design for your piece of material

When possible, choose a piece of material that has been used already.

- Position your design where there is space on the material
- Place your design near edges/corners to leave areas of reusable material

Setting up the laser cutter

Power on 3 things

- Laser
- Exhaust filter
- Air handler

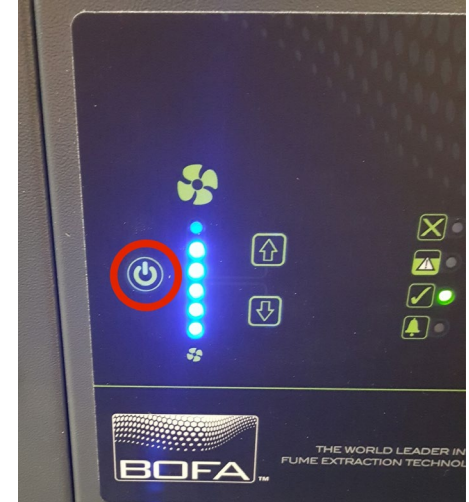
Focus laser



Laser



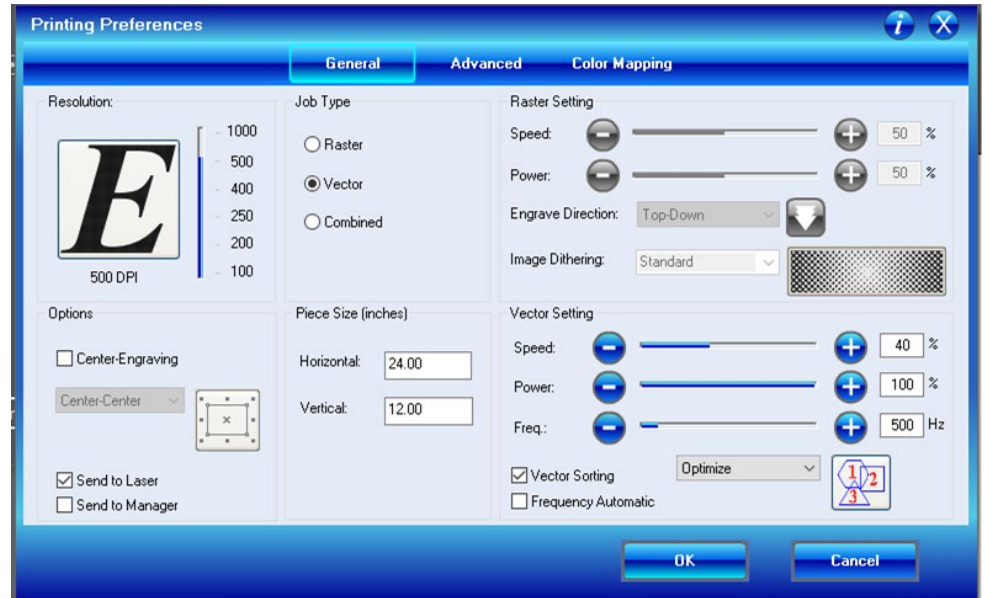
Air Handler



Exhaust Filter

Material-specific cutting & engraving settings

- Look up material in appendix of Epilog manual to determine settings
 - 50 W Epilog Zing
 - Baseline settings to start with - your mileage may vary
- Enter settings in Illustrator print dialog box
 - 24" x 12" bed size
 - "Raster" = engrave
 - "Vector" = cut
- Illustrator bug - click through settings and ok twice



Laser safety

- Always watch the laser cutter during your job, especially when it is cutting. Do not leave laser running unattended.
- Don't stare directly at laser for sake of your eyes.
- Fire
 - Tiny fires: don't worry too much; this is normal. Keep an eye on it.
 - Small fires: open the door. Opening the door immediately stops the laser from firing. Breeze will usually blow out the fire.
 - Large fires: use fire extinguisher

How to use a fire extinguisher



Sending job to laser

- Hit print in Illustrator
- Hit green button on Epilog Zing
 - Can rerun the same job



Cleaning up

- Open door, take your product.
- Small scraps: throw away
- Large scraps: put back on shelf for reuse
- Remove cutting block and dump out bits into trash

Reserving the laser for use

- <http://teaching.pitt.edu/open-lab/> > [Start Here](#) or [Reserve Equipment](#)
- How to estimate how much time you need

Project

- In Illustrator, design a 4 in² or less object
 - Use both cutting and engraving
- Make yourself a folder in Desktop/Open Lab computer file sharing/users/
 - Save your .ai file in your folder
- Choose your material
- Cut and engrave your design on your material using the laser