Laser Cutter Operating Instructions
Prepared by Evan Finkle and Ben Snell

SIGN IN TO LOG
Signing in gives us a more accurate idea of usage so we can perform regular maintenance on internal components.

CLEAN OPTICS BEFORE USE
(Do not clean lens after use—when it is warm it can crack due to fast temperature change)
Thoroughly clean each side of the lens and mirror
Apply the solution to the swab and/or the lens itself and gently roll over the surface
Allow optics to dry before replacing

CHANGE AND ORIENT BED
Choose the correct bed ('acrylic' bed for acrylic or unmarked bed for all other materials)
Push bed back until it hits the top and left guides
Ensure duct fits snugly against the intake vents on the back wall for best suction and tighten knobs

If the ventilation duct isn't aligned, then do these steps:
Pull out bed and loosen knobs at far end of each side
Pull out the duct on the bed's backside until fully extended
Re-insert bed gently aligning it with the top and left guides
Ensure ducts fit snugly against the intake vents
Tighten the Knobs to hold the duct in place

TURN ON
1. Compressor (in back room; turn red knob up)
2. Ventilation System (next to laser cutter; pull red switch out)
3. Laser cutter (lower right side of machine)
Note: The purpose of the compressor is to put a positive pressure in the lens housing, which keeps particulate away from the lens. The ventilation system is used to suction the material onto the bed, pull the fumes away from the lens, and keep the flames down.

OPEN FILE
Log in to computer with your username and password
Open YOUR PRE-PREPARED 2D vector file in Illustrator
Ensure canvas is 32” x 18” length by width
RGB color space
All lines must be 0.001” stroke
All lines and fill must be RGB red or RGB blue
Go to File > Print > Print (Control+P) and use all default settings (PLS6.75, Portrait) as long as the preview (in relationship to its orientation) is in the upper left corner to ensure an accurate placement on your cut surface
Go to Desktop > ucp to open Laser Interface Viewer
(Other programs to use to create vector-files include Rhino, CorelDRAW, AutoCAD, SolidWorks, and etc. However, files from these programs must be imported into Illustrator to be read by the laser cutting software.)

PLACE MATERIAL
Ensure the material you are using is approved for use (see below)
Material must be no more than 32” by 18”
Place on bed and align with top left corner
If material is paper or is bending, secure it in place with masking tape on its edges (make sure to remove tape when finished)

**FOCUS LASER Z AXIS**
From drop down menu on the right side of the UCP Driver, change from Basic View to Focus View
Ensure your material covers the entirety of your cut or raster
Click a point near the center of the image
On the laser’s User Control Panel, select Z, then move cursor to thousandths place
Lower the bed by pressing the down arrow
Place focusing stick on top of the work piece and against the box containing the optics from which the laser emanates so the notch rests below the bottom of the box
On the panel click the up arrow until the tool just begins to tip away from the box
Return the tool and close the lid to the laser cutter

**CHECK AIR PRESSURE**
Should be at least 30 psi (this gauge is located on the left side of the printer on its bottom left corner)

**CHOOSE SETTINGS**
**Do not be afraid to make a small test cut for every piece. Most stock materials vary from piece to piece so feel free to test small areas to get settings just right. Burned edges, or inconsistent cuts can only come from two places: incorrect leveling, or incorrect power settings. Presets are not law, and equally are not 100% accurate; they are suggestions of what has worked for others in the past.**
On computer in the UCP driver, go to Settings
Use the sample settings if material is present
If there are no samples present for your material, check http://tinyurl.com/lasercutrecs
Select only one color at a time and click Set for each one after inputting the correct power, speed, and PPI (pulses per inch)
Click Apply and Ok

**LASER CUT**
Click the green play button on the computer
Watch the beginning of the cut carefully to ensure there is no excessive flaming or smoking
Be present for its entirety of the cut
To pause a cut, press the red pause button (and press again to resume)
To cancel a cut, press the red pause button and open lid
(In an emergency, the laser will shut off if the lid is opened—fire extinguisher is next to machine)
When complete, allow a minute (especially for acrylic) for fumes to evacuate the chamber and for the material to cool before opening the lid

**CLEAN UP**
Remove all loose material from the bed (including small cut-off bits and tape residue)
Turn off the laser cutter, blower, and compressor (turn knob up)
You will continue to hear a hissing sound after the compressor turns off

**SIGN OUT**
Close the Laser Interface Viewer and log out on the computer
Sign out on the log
Approved Materials
- chipboard (thickness up to 1/8”)
- corrugated cardboard (thickness up to 1/8”)
- museum board
- basswood (thickness up to 1/4”)
- plexiglass, lucite, or acrylic (thickness up to 1/2”)
If you have questions about whether a material is appropriate, assume it is not and contact a monitor or staff member.

Emergency Procedure
In case of emergency (i.e. fire),
- close emergency exhaust valve
- open laser door
- turn off laser, compressor, and blower
- remove material, if possible
- use fire extinguisher, if necessary
- call 4-111

General Information
NEVER leave laser running without supervision; it is a potentially dangerous machine, and materials will catch fire easily and quickly

NEVER open laser lid when in use unless there is an emergency

NEVER cut or engrave glass, metal, foamcore, lexan, or anything toxic when burned

STOP immediately if any material begins to deteriorate by melting, catching fire, or producing unusual smoke; some materials produce toxic fumes when under the laser

Acrylic is acceptable but smells awful; if you use it warn others in the room

ALWAYS check that material is flat on table

ALWAYS clean up after use and check that you don't leave material on the table

ALWAYS check for no excessive flaming or smoking of material

ALWAYS turn off laser, blower, and compressor

NEVER clean optics directly after use; cleaning a warm or hot lens can crack it

Files should not be stored on the computer and may be deleted without notice

DO NOT use laser cutter computer for working on vector files; this computer is restricted to opening and cutting files

If other students are waiting to use the laser cutter, limit your use to 30 MINUTES
Adobe Illustrator Settings
- Artboard of width 32” and height 18”
- RGB color space
- stroke of width .001”
- raster images may be made grayscale and should have a fill, but not a stroke value
- RGB values of all approved colors

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Technical Support
Larry McLaughlin
Engraving Systems
P: 860-316-2750
Cell: 860-913-7696

To find out more information about this laser cutter, see
http://www.ulsinc.com/products/pls675/