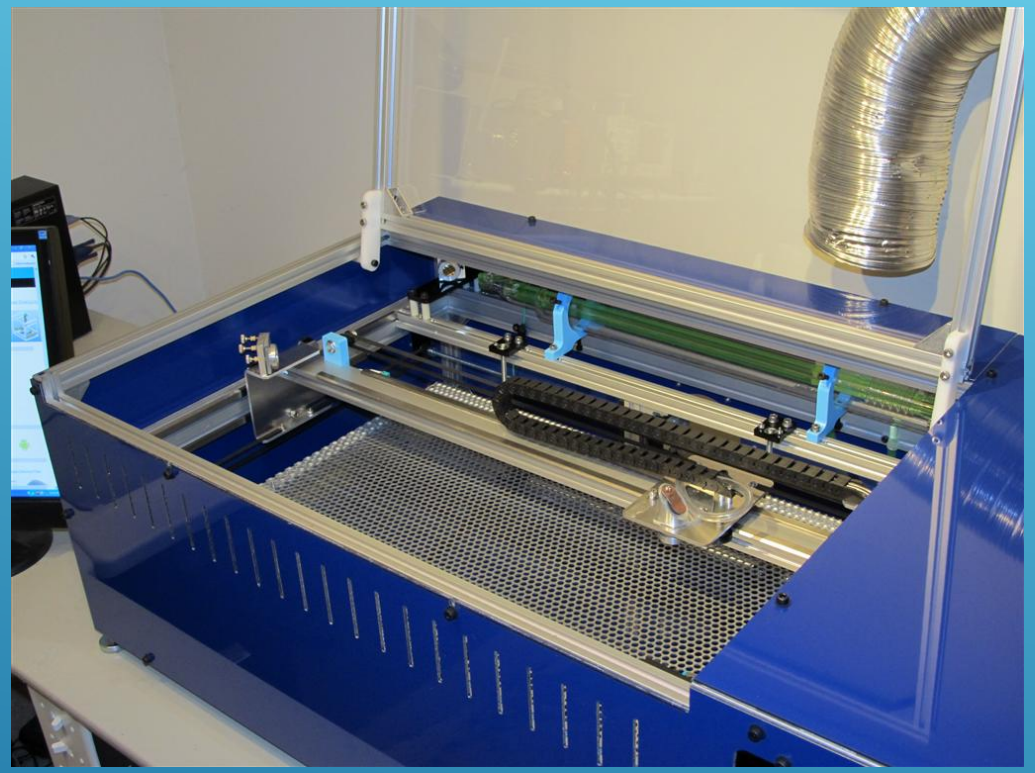
FREESIDE LASER 101

Basic Use and Safety

- The Laser
- Safety
- Capabilities
- Toolchains
- Machine Setup
- Vector Engraving and Cutting
- Raster Engraving



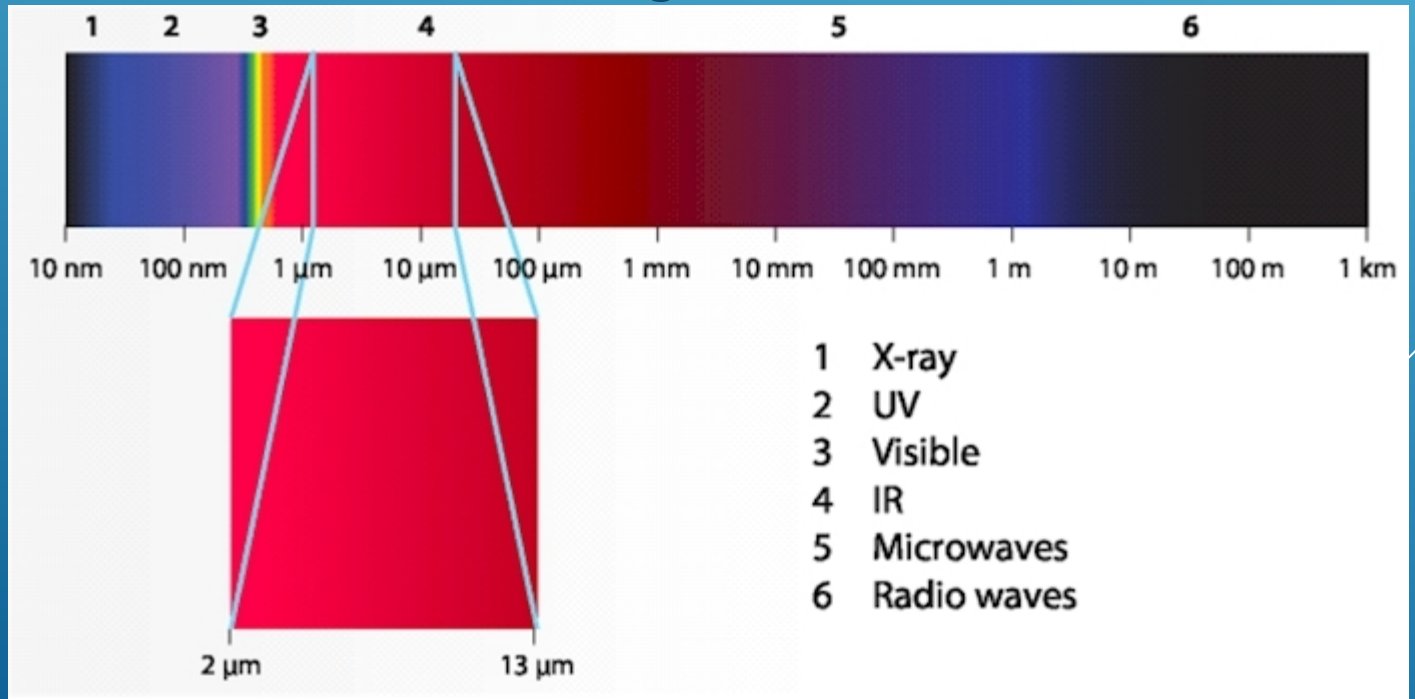
THE LASER

THE LASER

- 40 Watt CO2, Water Cooled, Air Assisted, Flying Optic Laser Engraver
- Originally built by member, Brian Cribbs
- Owned by Freeside thanks to donations from a handful of members
- Open source plans (BuildLog.net)
- Essentially a 2 axis CNC plotter
- Cost to replace: Around $2000

THE LASER

- The laser doesn’t melt or burn through the material. It vaporizes it! Burning and melting that occurs is a side effect of the heat.
- Infrared: 10,600nm/1,060um
- Most materials transparent to visible light are opaque at this wavelength
- Lenses are Germanium or Zinc Selenide
- Mirrors are a special silvered material, not glass



SAFETY

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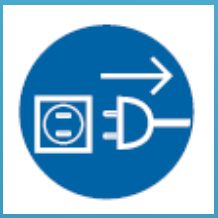
- Eye Protection
  - For you and anyone else in the workshop!
  - Sunglasses or shaded recommended for operator and laser observers when cutting some material (point of lasing can be very bright)
- The e-Stop switch should be ON (pressed in) any time the laser is not running a job
- The laser is invisible to the naked eye.
- Never leave the laser (or any CNC machine) unattended while in operation
- Ensure proper ventilation while cutting
- Do not bypass any interlocks or safety controls on the laser
- Do not turn on the laser unit until the PC is fully booted, the parallel port is connected, and MACH3 is started and in the foreground



SAFETY

- Do not engrave or cut any plastics containing Chlorine
  - This includes ***MOST*** vinyl and all **PVC**
  - Check Wikipedia first for know plastics to see formula
  - Test unknown plastics (Phone cases, notebook covers, anything you didn't buy as known, raw material) with the copper flame test **DEMO**
- Chlorine fumes are very poisonous and will also damage the optics and corrode the electronics


Legend 36EXT
www.epiloglaser.com
Legend 36EXT

Cause of fire:

Machine not cleaned of debris

SAFETY

- Materials may catch fire while being cut or engraved
  - E-stop!
  - Use the spray bottle of distilled water for small flare-ups
  - Use the fire extinguisher
    - Lock out the laser and alert membership that it is down after a large fire
  - Don’t try to engrave a Bic Lighter. If you engrave a laptop or cell phone, remove the battery first!

CAPABILITIES

- About a 10.5x20 inch working envelope, 12x24 bed
- Cutting
  - Thin wood (some plywoods with more than 3 layers can give it some issues)
  - Paper and cardboard
  - Plastics (acrylic cuts very well) up to ½”thick
  - Fabrics
- Engraving
  - Dark stone
  - Ceramic
  - Glass
  - Leather

CAPABILITIES

- Metal
  - Will NOT cut any metal
  - Will mark anodized aluminum
  - Can mark certain metals with a special coating applied (kind of a ceramic glaze) CerMark

UPGRADES

- Metal Bed (DONE!)
  - Won’t wear out
  - Magnetic hold down for thin material
- Rotary Attachment
  - Engrave round objects like wine glasses, bottles, etc.
- Milliamp Meter (DONE!)
  - Better than arbitrary power dial settings
- Temperature Gauges (DONE!)
  - For coolant temperature
- Flow Meter (Installed, nothing monitoring it yet)
  - Also for monitoring coolant
- Visible Laser Diodes
  - For aiming the head
- Radiator/Fan
  - Better coolant needed in the summer

TOOLCHAINS

- CamBam
- Mach3
- Inkscape
- Others
  - Sketchup
  - OpenSCAD
  - MakerCase

MACHINE SETUP

FRONT PANEL


Unlock
Lock
Set Power
40 watt CO2 Laser Engraver
Owner: Freeside
Zone: CNC
Do Not Hack
Usage: Training Required. See Wiki
Laser Engraver
http://wiki.freesideatlanta.org/fs/Laser_Cutter

TOP PANEL

VECTOR ENGRAVING AND CUTTING

RASTER ENGRAVING