

Cutting by Laser

by Eric Brine

I own a very unusual tool



What it does

- A laser heats up a precise spot to vaporize and burn the material found there.
- By controlling the power and the speed of the head, this can result in a mark, or it may cut straight through the material.

Purpose of the panel

To give an idea of

- What it is.
- What it can do.
- What it can't do.
- What kind of work is required to use it.

Two modes

- Vector mode:

The laser head fires and moves continuously to create smooth lines and cuts.

- Raster mode:

The laser head is moved in increments as little as $1/1000^{\text{th}}$ of an inch then fires a pulse to engrave.

Vector mode



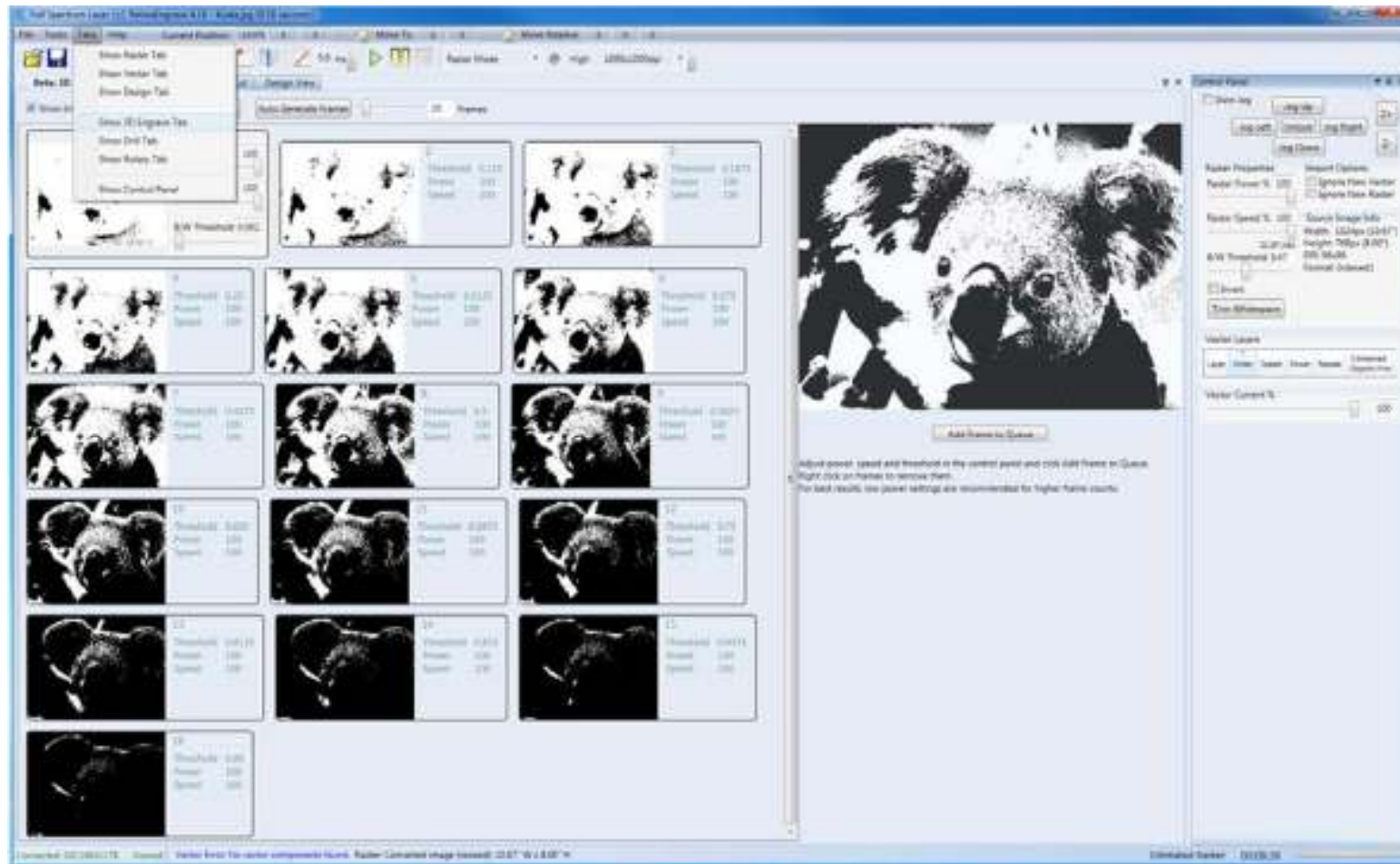
Raster mode



Raster + Vector



3d engraving



3d objects?



Angled cuts

Angled cuts are possible by holding the material at an angle.

My laser cutter isn't really big enough to do that without taking out the bottom.

Power

- An office laser pointer draws 1mW of power.
- My laser cutter draws 40W.

That's 40,000 times more!

- And that's a low-end ("hobby") laser cutter.
An upgrade to a 90W laser is available.
- The power will affect what materials the laser can cut, how thick the material to cut can be, and how fast it can cut it.

Materials (40W)

- Wood
- Plastic (e.g. acrylic)
- Leather
- Fabric
- Paper
- Foam (kinda)
- Granite (engraving only)
- Not metal (but it can engrave anodized metal)

Prep for raster engraving

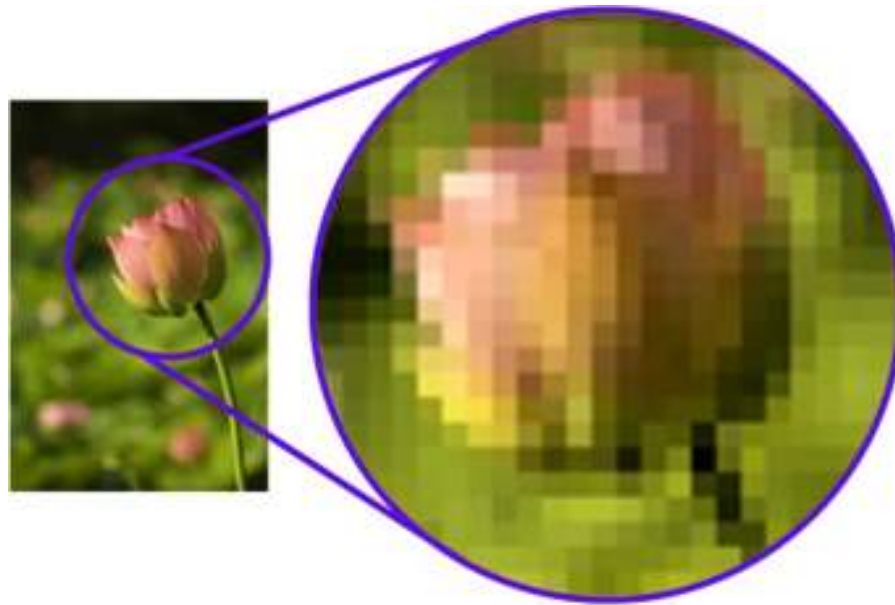
- All you need is a picture

Prep for raster engraving

- All you need is a picture
- ... and some luck.
 - Not everything looks great engraved.
 - Experimenting with power, speed and resolution settings can improve the outcome.

Prep for vector engraving/cutting

- Need a vector image!
- Most images you encounter (jpeg, gif, png, bmp) are raster images (bitmaps). For example,



Vector images

- Vector image are composed of shapes with associated properties (e.g. colour).
- The laser cutter head will follow the lines of these shapes rather than assembling the shapes from lots of little dots.

Creating vector images

- I use CorelDRAW to create and edit vector images. (Adobe's tool is Illustrator.)
- It also features a tool to convert raster images into vector images.
 - It's a guessing process, so touch ups are likely needed.
 - If this fails, tracing over the original bitmap is pretty easy (just not as quick).

Tips

- Thicker materials can be cut by repeatedly tracing the same vector. There are limits.
- Material is burned away, so your piece can be a little smaller than expected unless you compensate. This is particularly true for materials that melt (e.g. foam).
- There is a flame (whose size varies by material), so marks will be left on neighbouring surfaces. Cut from the back or cover the surface with tape to keep it clean!
- Soot can be cleaned using dry TP or paper towels.

Components of the machine

- Laser tube and mobile head.
- Water cooling system
- Air jet to clear cutting area
- Exhaust system to pull gases and materials out

Contact info

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Ask me anything!