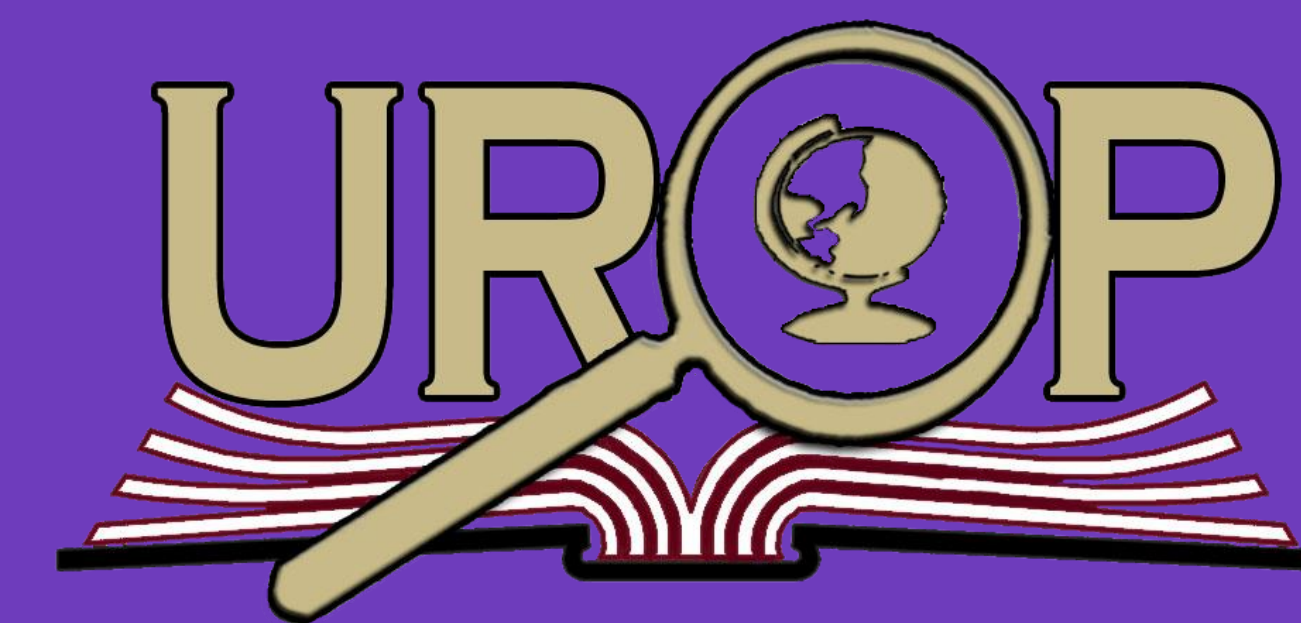




Reverse Engineering the Epilog Zing Laser Cutter

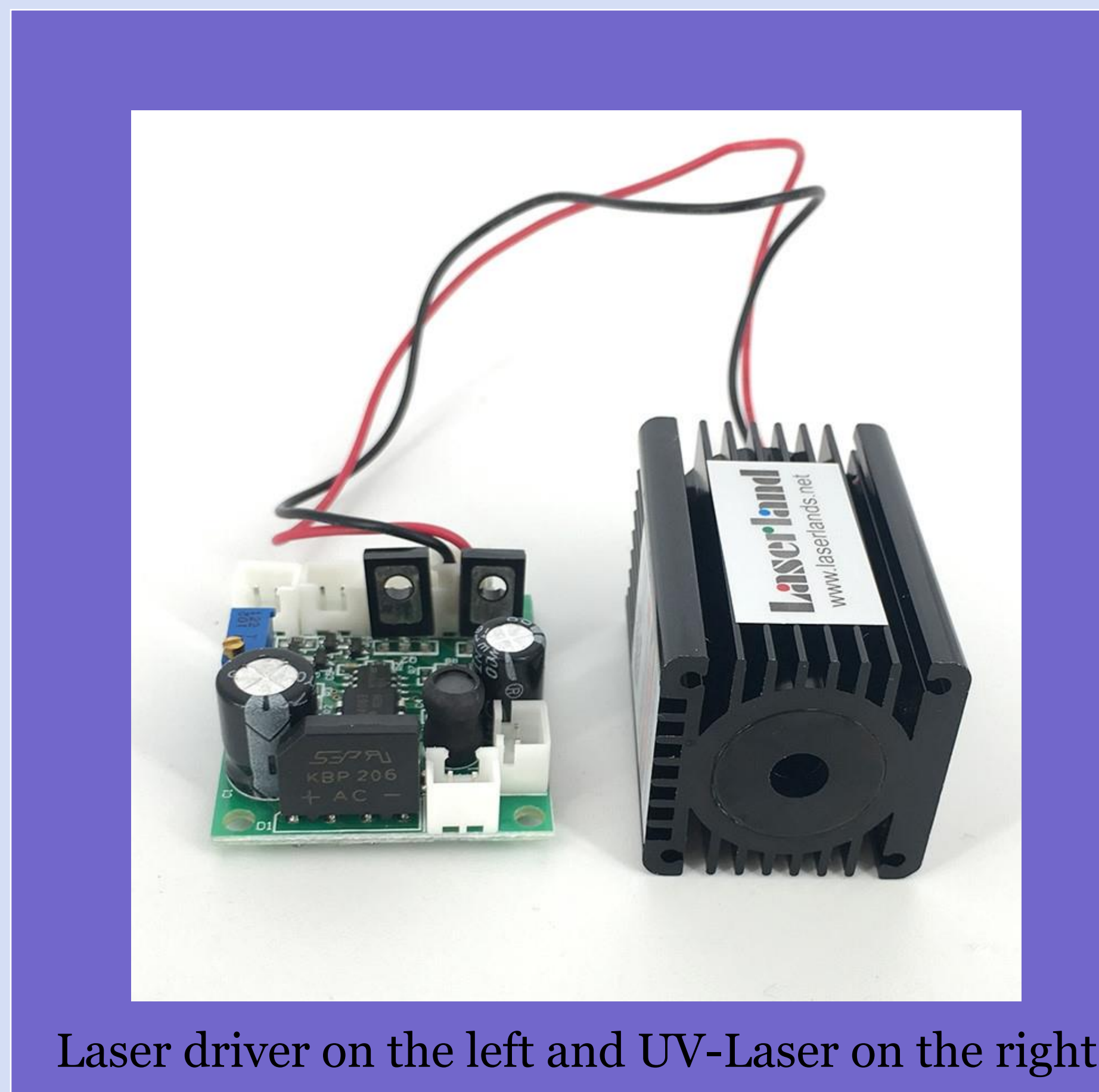


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Introduction

A laser cutter is a computer numerical control machine that uses a focused laser beam to cut and etch materials into geometric patterns created by a designer via computer-aided design software. The Epilog Zing Laser utilizes a red laser to cut materials. However, it is a media device that has become obsolete. Thus, the purpose of this project is to propose and document a method of repurposing it for a new and creative function. We explored how to replace the Epilog Zing's standard red laser with a UV laser that creates designs on UV-sensitive paper. UV-sensitive paper is coated with light-sensitive chemicals that react to UV radiation. The parts of the paper that are exposed turn blue, while the non-exposed parts remain white. Placing the paper in water develops the image and the development of the image is stopped by a water and hydrogen peroxide solution.



Laser driver on the left and UV-Laser on the right

Results

We are still in the process of reverse-engineering the Epilog Zing Laser Cutter. Currently, we are using a power supply unit (PSU) to reduce the 48 volts of electricity within the laser cutter to 12 volts. These 12 volts will power the laser driver that provides current to the UV laser. In addition, we are utilizing an Arduino microcontroller board to remove the signals from the laser cutter's data cable that aren't valid pulse width modulation (PWM). **Our preliminary results lead us to believe that we will be able to produce a functional laser cutter that creates artistic images on UV-sensitive paper with a UV laser.** Evidence from this work suggests that outdated technology such as the Epilog Zing Laser Cutter can be remodeled to perform a new function.



UV - Sensitive Paper

Methods

- 1) Removed the side panels of the Epilog Zing Laser Cutter
 - a) Traced the electrical wiring and identified which wires powered each component of the laser cutter
 - b) Measured the voltage of each wire
 - c) Cleaned the focus lenses
 - d) Calibrated the red laser
- 2) Downloaded Linux onto the computer used to communicate directions to the laser cutter
- 3) Created a Scalable Vector Graphics (SVG) file of two horizontal lines with Gram Design Language
 - a) Utilized software developed by students at MIT to communicate directions from the computer to the laser cutter
 - b) Used the SVG file to test-run the laser
- 4) Milled a circuit board with a Carbide 3D CNC milling machine
 - a) Used printed circuit board (PCB) design software to create a schematic diagram of the circuit board and its components



Epilog Zing laser cutter

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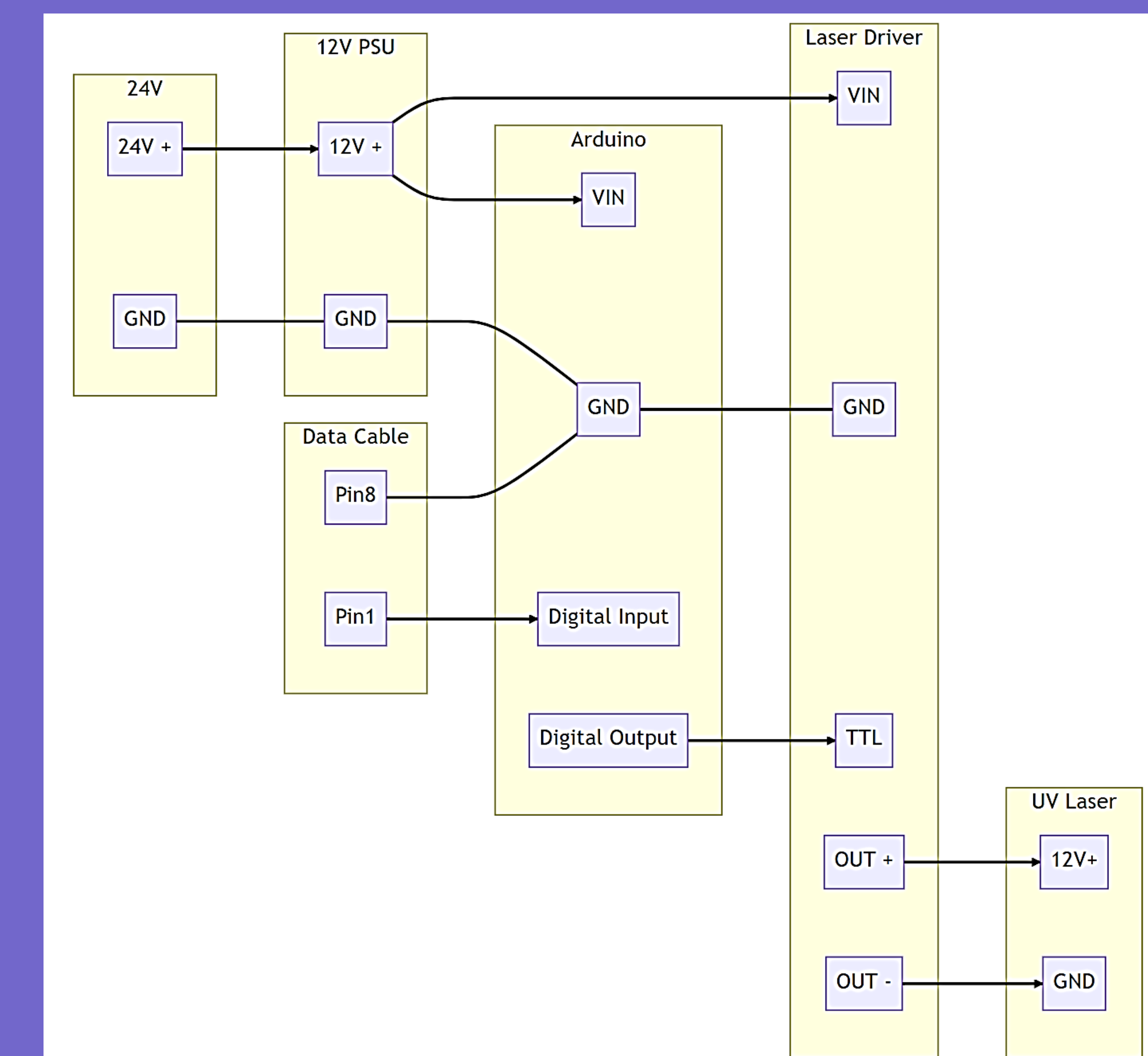


Diagram of the components utilized to power the UV Laser

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