Introduction

The goal of this project is to design and build a DIY monochromatic laser projector for displaying vector graphics. The functional principle behind this is very similar to that of a cathode-ray tube television where the image is created by a scanning, magnetic field directed electron beam, where a beam of electrons is used to excite the phosphor coating on the inside of the glass. Because the human visual system lags behind by a few microseconds, meaning that the brain continues to perceive an object even if that object stopped reflecting light towards the retina (Persistence of Vision), instead of distinguishing between each dot on the screen, we perceive it as a whole image.

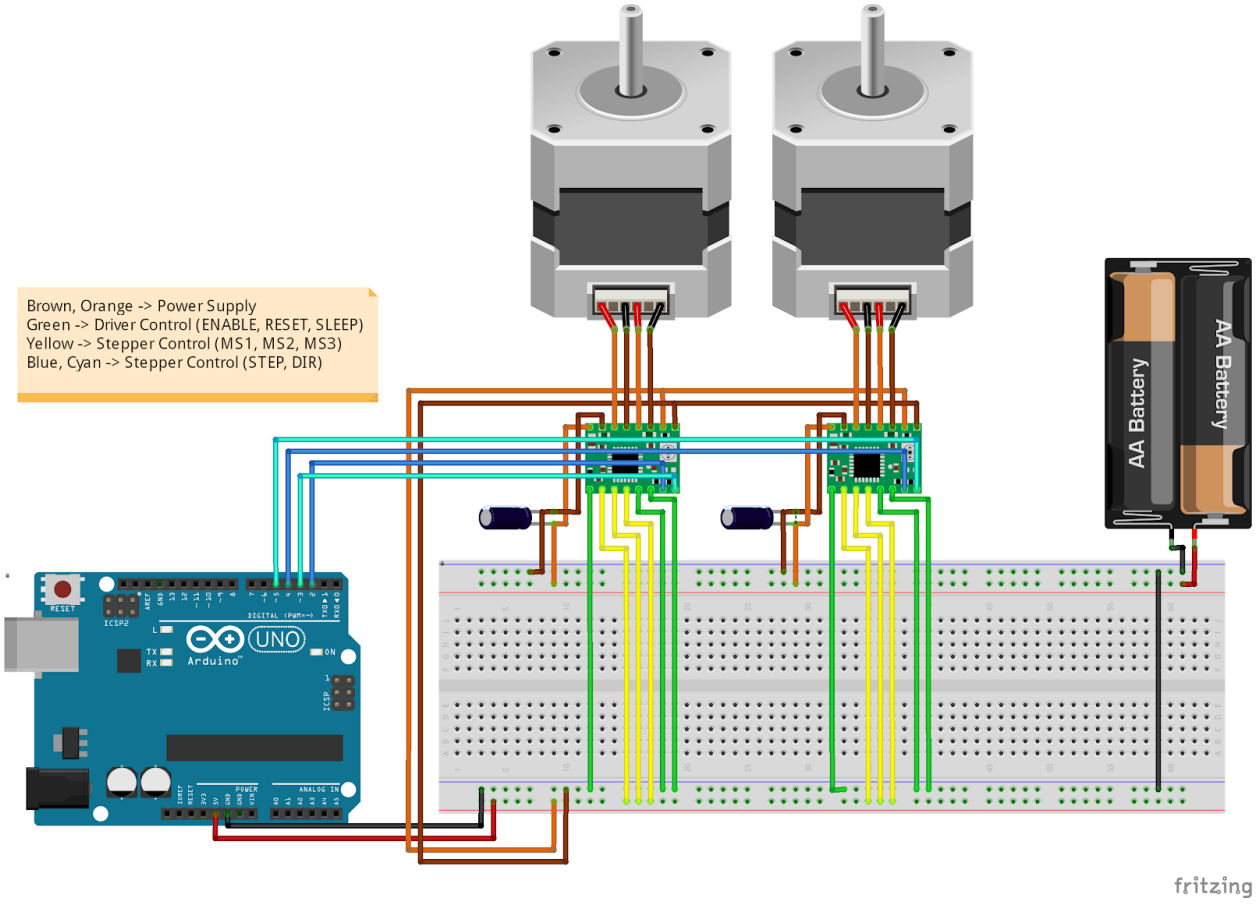
Two characteristics factors that differentiates this system from a cathode-ray tube is that the medium of projection will be a plain white wall and that the projector has only one monochromatic beam. Instead of scanning the projection plane from left to right and from top to bottom, the way the beam will generate an image will resemble the way a CNC cutter operates. The beam will “draw” (read “follow”) a path on the projection plane after which it will shut off and jump to the next shape. Doing that in rapid succession, preferably at 30FPS (one frame completes when the beam has “drawn” all the shapes in that frame), will create the illusion of the image (thanks to Persistence of Vision).

The inspiration for this project came after watching this video where the arcade game Asteroids is being emulated using a commercial laser projector (ILDA Laser Projector).

Mechanical design

Talk about how an usual laser projector uses Mirror Galvos instead of motors

Electronics design



The A4988 Stepper Driver was chosen for its simple but powerful interface alongside with its high step granularity.

Bill of materials

Product	**Quantity**
Arduino Uno	1
NEMA 17 Stepper Motor	2
Stepper Driver A4988	2
30x30x3mm Sized Mirror	2
12V/3A Power Supply	1
3D Printed Mirror Holders	2
5V Red Laser Diode Module	1
Electrolytic Capacitor 100μF	2