Elab Project Proposal: Magnetometer with Display

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I use 3 hall effect sensors oriented perpendicular with each other to measure the magnetic field in 3 directions, and display the outputs using 7-segment LEDs. Arduino is used to interpret the outputs from the sensors. On the display, field strengths are shown in decimals for 3 directions. The first step is having the sensors stay stationary, and three 7-segment LED displays show the field strengths for each direction. The second step is mounting the sensors on two servo motors, and adding an option to reset the direction, so that one may choose their own coordinate system when making measurements. The servo motors allow the device rotate in the azimuthal direction and the latitudal direction. I will test the device by measuring the magnetic field of a magnet.

I. IMPLEMENTATION

Week 1: Connect hall effect sensors and LEDs to Arduino on breadboard. Make sure that the LEDs display the outputs from the sensors correctly

Week 2: Build the mount and add the two servo motors.

Week 3: Add option to reset direction, make sure that the displays match the chosen coordinate system

Week 4: Debug and perform tests, prepare for presentation

II. LIST OF PARTS

(3) Hall Effect Sensors from Elab 37-in-1 kit
(3) 7-segment LED displays
(1) Arduino Mega
(1) mount made with Makeblock parts
(2) servo motors

III. DATASHEET OF PARTS

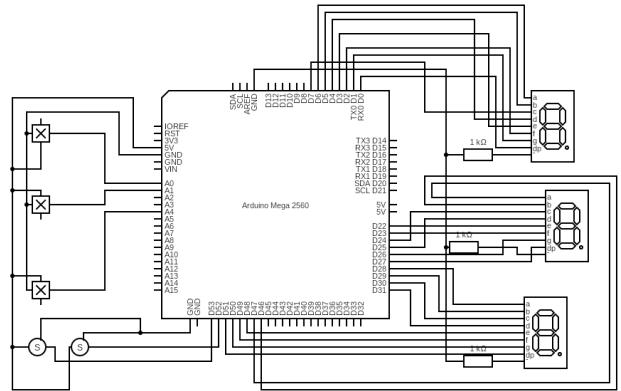Arduino Mega: https://docs.arduino.cc/static/4a7c7ca5a5e6a633d7f6ccbd3aee8560/A000067-datasheet.pdf
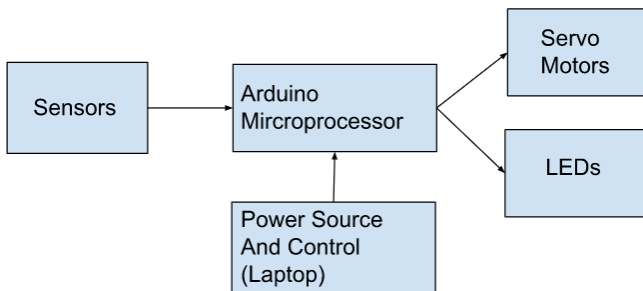

FIG. 2. Circuit Schematics

FIG. 1. Block Diagram