

Blueness Assay Electrical Setup
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Electrical Components

Component	Description
SWI12-9-N	AC adapter, 9V 1.2A 10.8W max output
WanTai 42BYGH207	3.0 kg-cm 4 Bipolar Stepper Motor, 9V, 400 mA/phase
Arduino Uno	Arduino Uno MCU board
Adafruit 1438	Adafruit Motor/Stepper/Servo Shield for Arduino v2.3, 5-12VDC in, 1.2 A/channel (2-channel) continuous, 3.0 A peak Motor drive supplied by Toshiba TB6612FNG chip

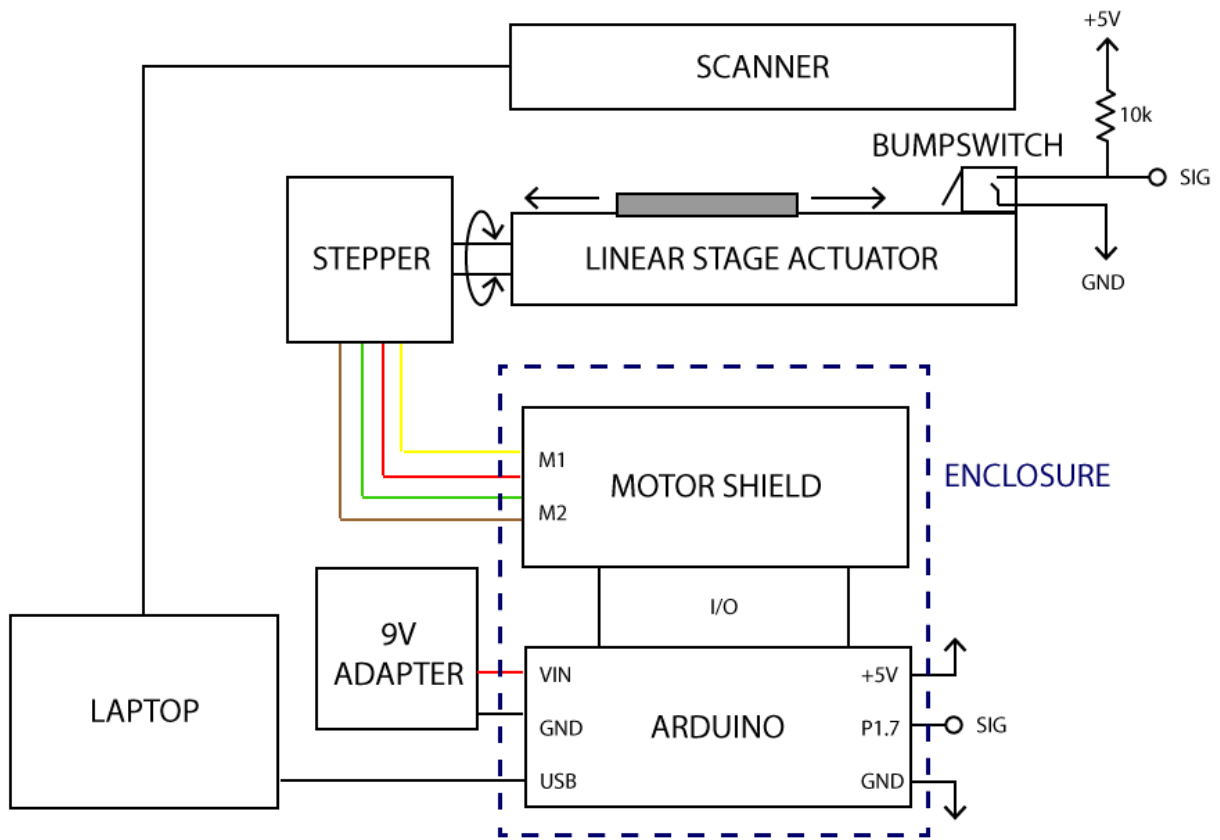
Sources

- **McMaster 70235K44:** AC adapter, 9V 1.2A 10.8W max output, used to power Adafruit Motor Shield, which drives the stepper motor.
- **Standard USB A-B cable:** powers the Arduino Uno board and its onboard ATmega328P.

Loads

- **WanTai 42BYGH207 Bipolar Stepper Motor**
 - 9 VDC rating
 - 800 mA = 400 mA current draw per phase x2 phases
 - Used to drive a 404XR Parker linear stage
- **Arduino board**
 - 9~20 VDC rating
 - 50 mA current draw
 - ~50 mA – Arduino Uno board power consumption
 - 0.5 mA – bump switch power consumption (5 V through 10k resistor, signal pin connected to digital pin 7)

Block diagram



The laptop runs the Python watcher program **blueness_main.py**, which alternatively sends serial commands to the Arduino and retrieves images from the scanner. The linear actuator is driven by a stepper motor controlled by the Arduino with the **blueness_LinearAct.ino** program. The bump switch serves as a limit switch used to reset the stepper motor whenever the program is run. The 96-well plate to be analyzed is moved underneath the scanner by the linear stage actuator to image each column in turn.