

Gauntlet Mark II

This project and the PCB being designed for it is to create a second Gauntlet for my right arm.

Overview

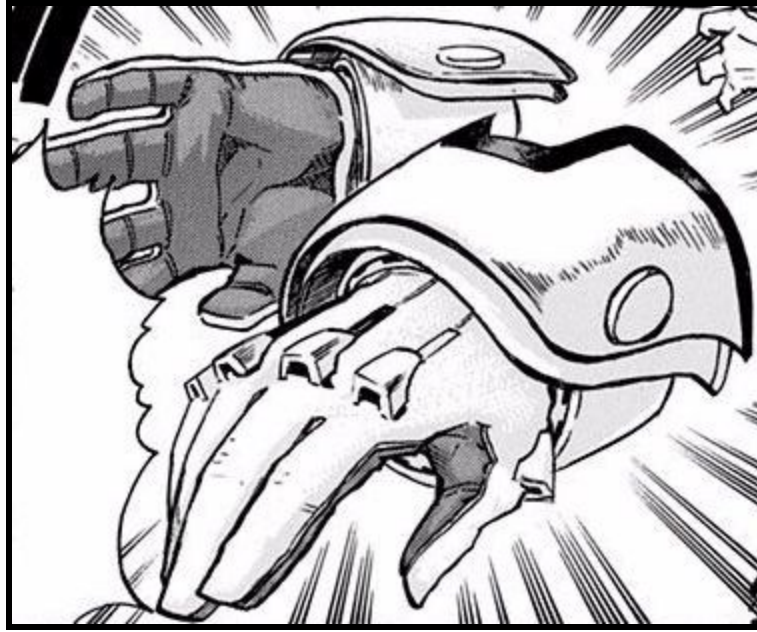
This Gauntlet would be a multifunctional apparatus to serve as:

1. Turn and Brake Indicators for biking and rollerblading
 2. Quad - [] knuckle-mounted [LEDs]
 3. Palm-mounted [water] projector
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Hardware

The hardware supporting these functions are as follows:

1. [Adafruit Neopixel 12-LED Rings](#)
 - a. Mounted on palm and back of hand
 - b. Orange for turn signaling
 - c. Red for braking
 - d. Green for shooting water
2. [5mm Super Bright Green LEDs](#)
 - a. Simple parallel circuit with standard 5mm green LED bulbs
3. [Cheap \\$15 Full-Auto Squirt Gun](#)
 - a. Uses a sector gear to pull back a spring loaded piston
 - b. After sector gear disengages, piston forces water from the cylinder out through tube to nozzle
 - c. Self - contained system with piston auto retract once power is removed
 - d. Intend to reroute water line to spigot on palm
 - e. Easy, 2-wire control
4. [12V 10mm Stroke Solenoid](#)
 - a. Retracts cowl shielding the knuckle LEDs



- b.
- c. Example / Inspiration picture for cowl

5. [Flex Sensors](#)

- a. Either purchase or create DIY sensors
- b. 4 mounted on fingers (centered along proximal interphalangeal joint),
- c. 1 additional mounted on cuff on outer surface of wrist

6. Glove

- a. Rivet Neopixel and water nozzle to palm of glove
- b. Vertical cut along back of glove for interior access, laced up afterwards
- c. Pockets along proximal interphalangeal joints to insert flex sensors

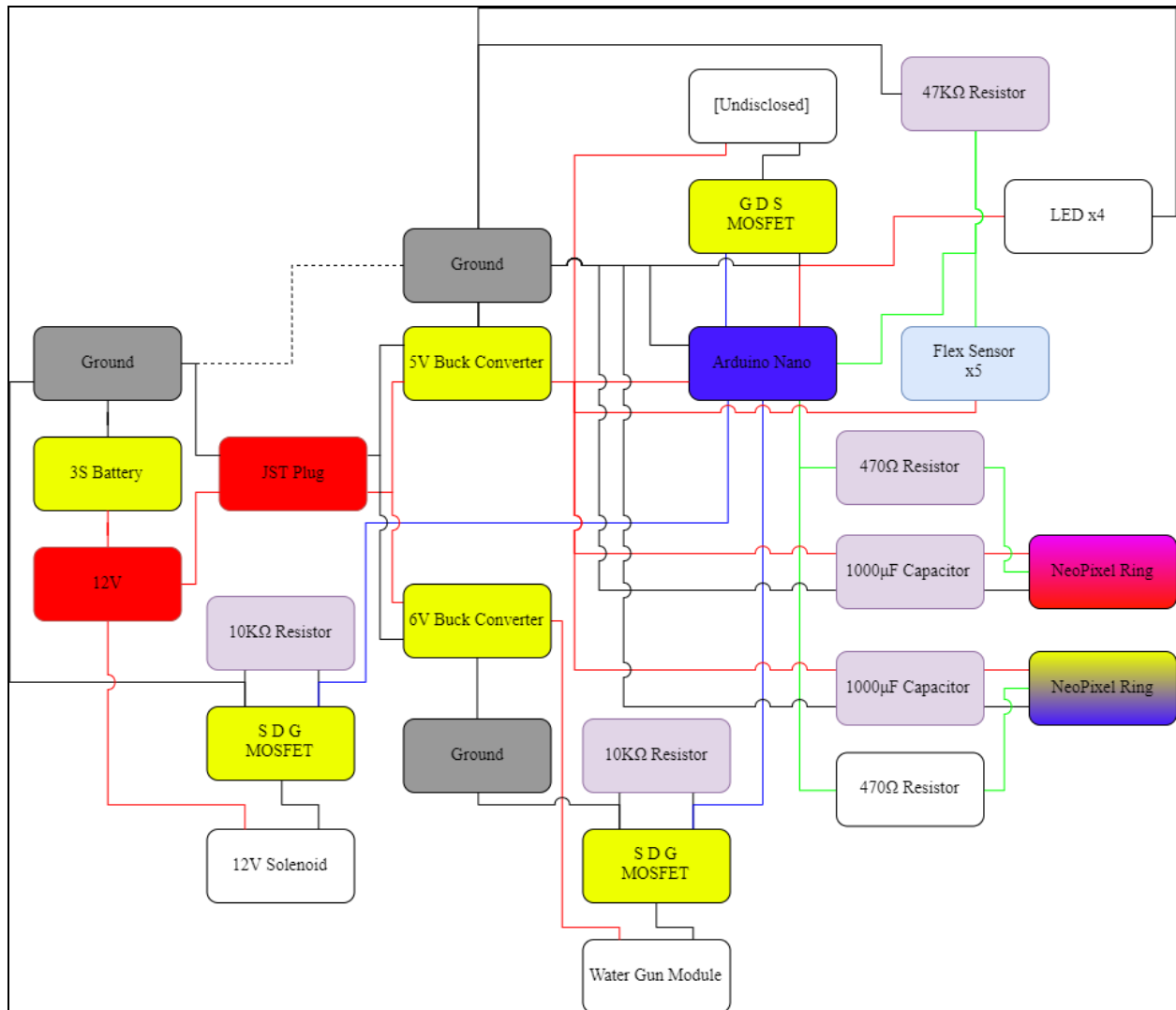
Board Functionality

- The PCB for Gauntlet Mk II. will mainly function as a breakout board for an Arduino Nano. A buck converter will also sit on the same board to power all systems.
- 5 Analog Pins will be used as specified:
 - 1. Flex Sensor - Index proximal interphalangeal
 - 2. Flex Sensor - Middle proximal interphalangeal
 - 3. Flex Sensor - Ring proximal interphalangeal
 - 4. Flex Sensor - Pinky proximal interphalangeal
 - 5. Flex Sensor - Wrist
- 7 Digital Pins will be used as specified:
 - 1. MOSFET for Solenoid Cowl Retract
 - 2. MOSFET for water gun motor control
 - 3. [Undisclosed]

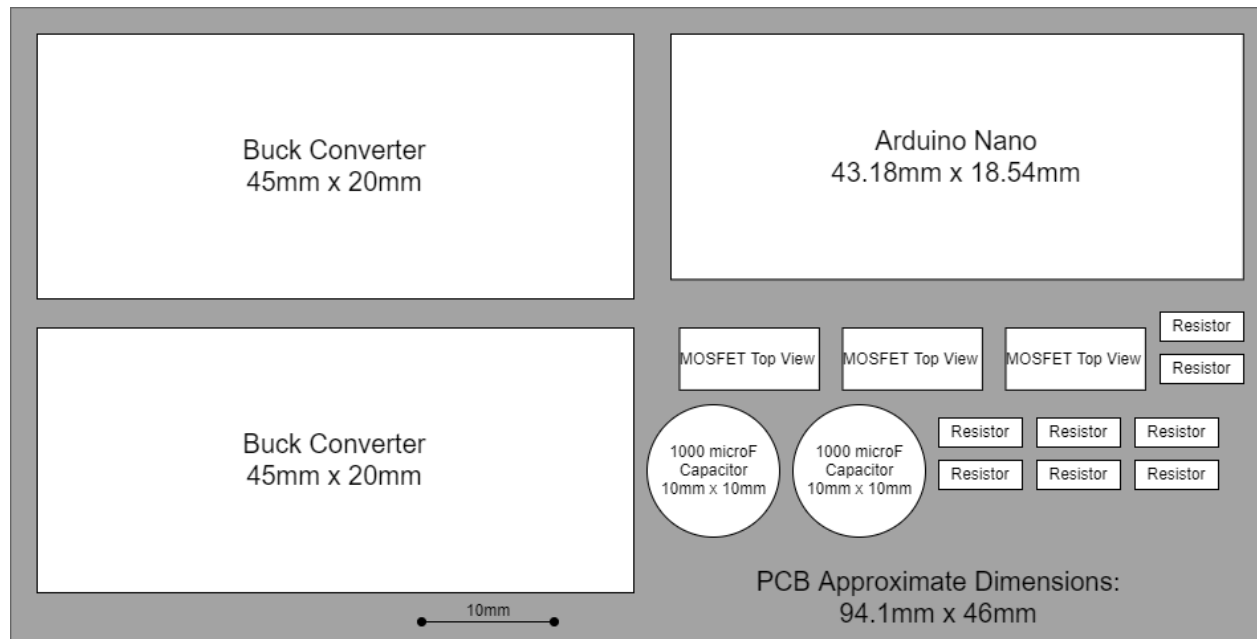
- 4. [Undisclosed]
- 5. Neopixel Ring 1 Output
- 6. Neopixel Ring 2 Output
- 7. Data out to R.E.G.A.L.I.A.

- In addition, 5V and GND will be connected to the buck converter's output pins

Functional Block Diagram



Mechanical Block Diagram



The Mechanical Block Diagram was created using the following dimensions:

Arduino Nano (43.18 mm × 18.54 mm [1.70 in × 0.73 in])

https://en.wikipedia.org/wiki/List_of_Arduino_boards_and_compatible_systems

Buck Converter x2 (45 * 20 * 14 mm (with potentiometer))

https://smile.amazon.com/gp/product/B01GJ0SC2C/ref=ppx_yo_dt_b_asin_title_o07_s00?ie=UTF8&psc=1

1000 µF Capacitor x2 (10mm x 10mm)

<https://www.sparkfun.com/products/8982>

Resistor x8 (6.3mm x 2.2mm)

<https://www.mikroe.com/ebooks/components-of-electronic-devices/resistor-dissipation>

MOSFET x3 (10.54 mm x 4.69 mm)

<https://www.digikey.com/products/en?keywords=%20IRLB3034PBF>

<https://components101.com/mosfets/irf830-mosfet-datasheet-pinout-equivalents>