

# Quadruped 'RC' Robot

## Wiring Diagrams



# CAUTION

Lithium batteries can be extremely dangerous, if not handled and cared for properly. This design does not include any form of current limiting circuit, like a fuse. So, care must be taken to ensure that the wiring guidelines are followed accurately, that checks are made for short-circuits, and that battery polarities are marked, and they are inserted the correct way round. Failure to do so, could result in an explosive fire.



**Charging Practices:** Always remove batteries from your project to charge them. Use a charger, designed for the battery used, and from a trusted supplier. Choose a flat, non-flammable surface to charge on, away from flammable materials. Never leave unattended when charging. Don't charge overnight. Monitor charging to ensure charge characteristics are as expected. Only pair batteries with similar characteristics. Do not overcharge, or leave charging for prolonged periods. This increases the risk of damage and fire.



**Battery care & maintenance:** Stop using a battery if it is swollen, damaged, dented or leaking. Never charge a damaged battery. Never allow a Lithium battery to discharge below 3.2 volts, as cell damage will occur. Avoid extreme temperatures. Do not charge or store batteries in very hot or cold environments. Don't cover batteries whilst charging, as this can trap heat, causing overheating.

**In case of fire:** Get out and stay out. If a fire starts, leave immediately, and call the fire brigade. For low voltage Lithium batteries, water is a safe extinguisher.

**Built-in Monitoring:** Most of my project designs include code, and circuitry, to monitor battery voltage, whilst in use. This code then seeks to alert the operator, when the battery has reached a critical low voltage, before shutting down power consuming circuitry; including the micro. Time should therefore be spent on calibrating this feature, as a precaution, for good battery management and maintenance.

Carefully dispose of batteries that damaged, or discharged below their critical voltage.



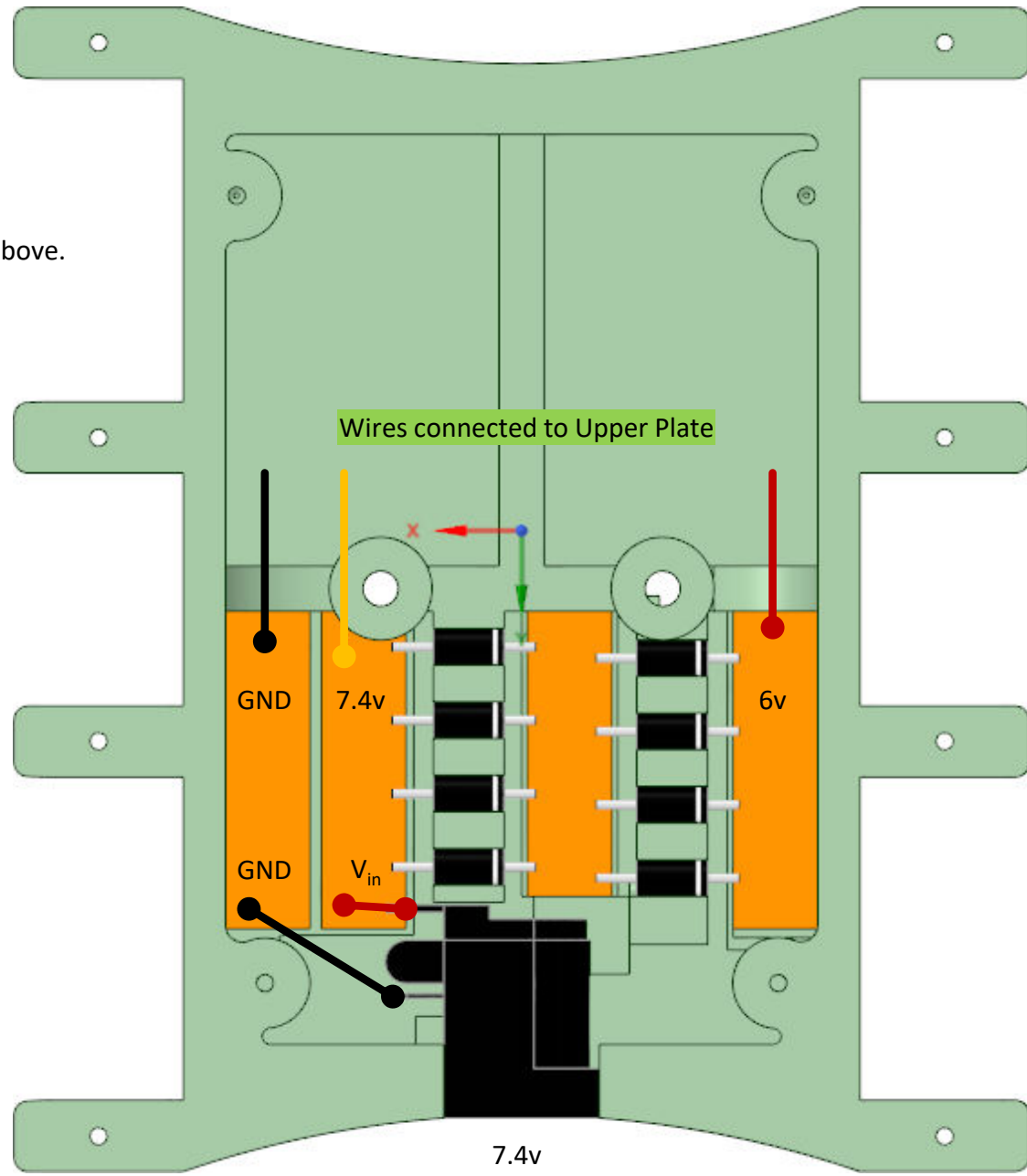
# Hand Tools & Consumables



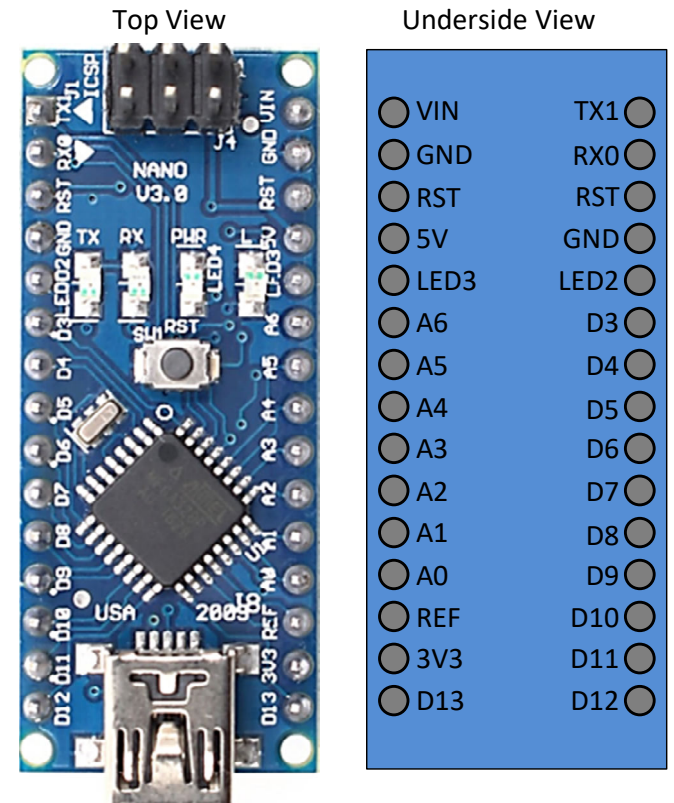
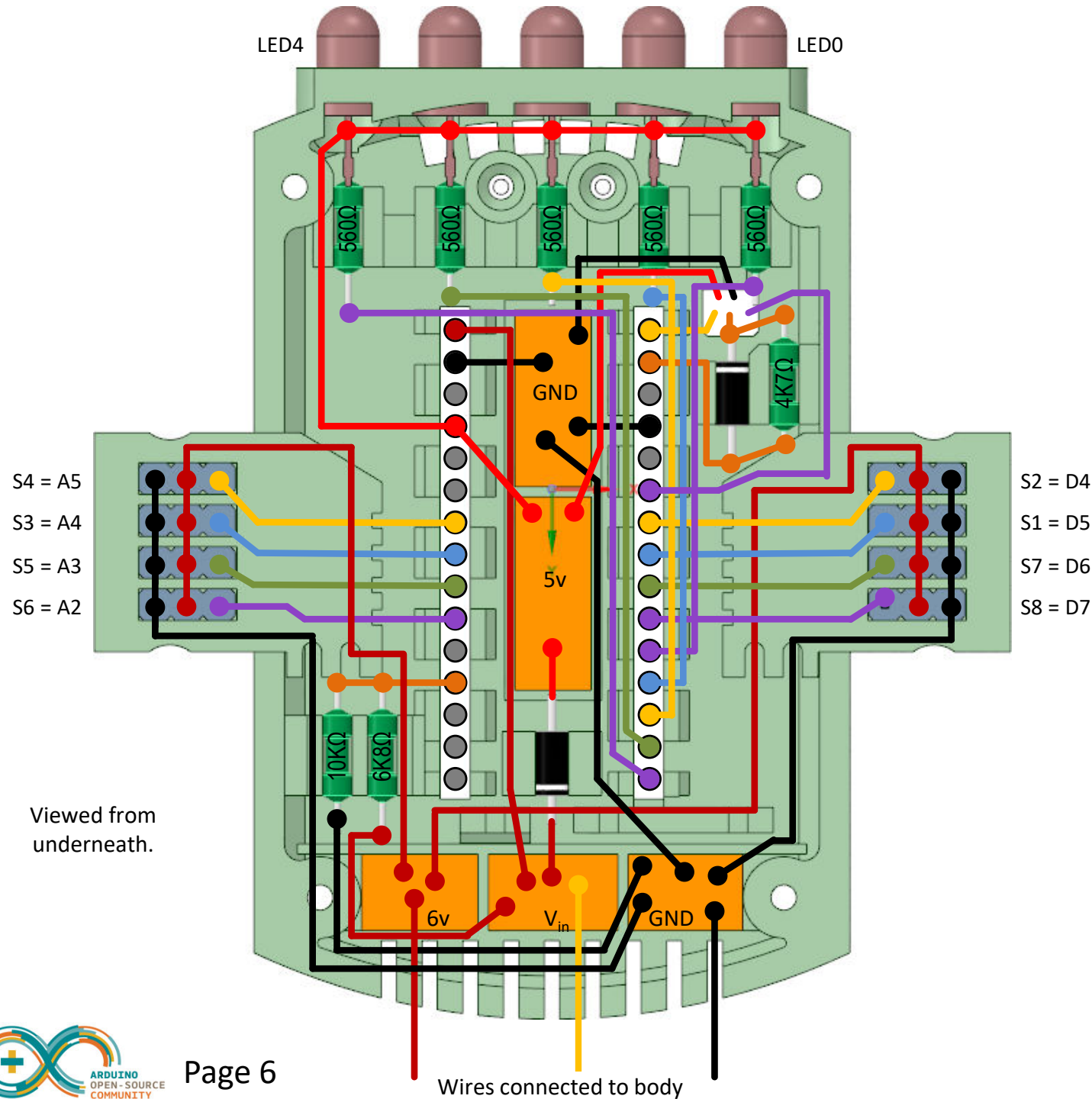


# Quadruped 'RC' - Body Wiring

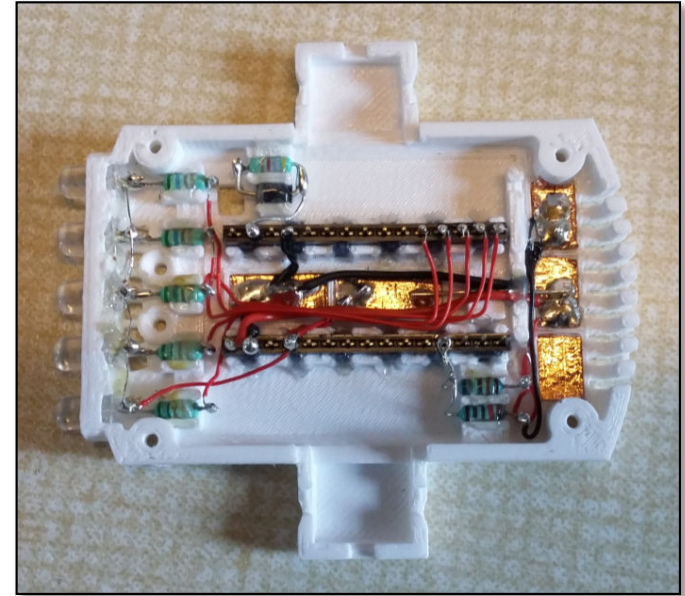
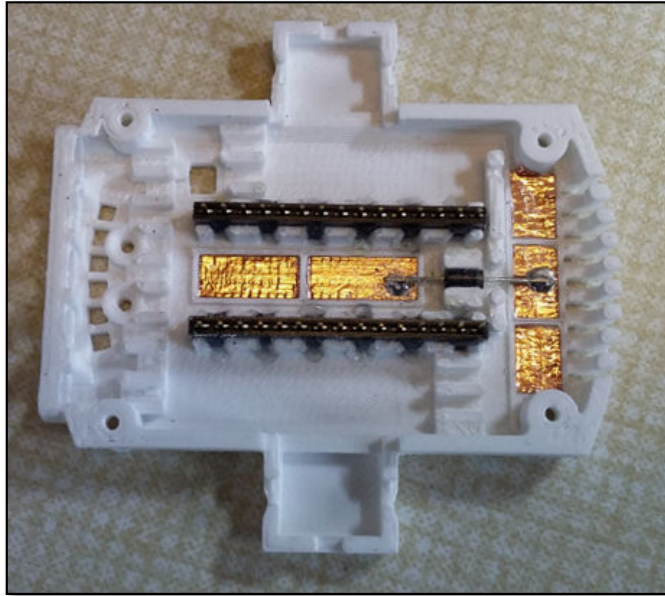
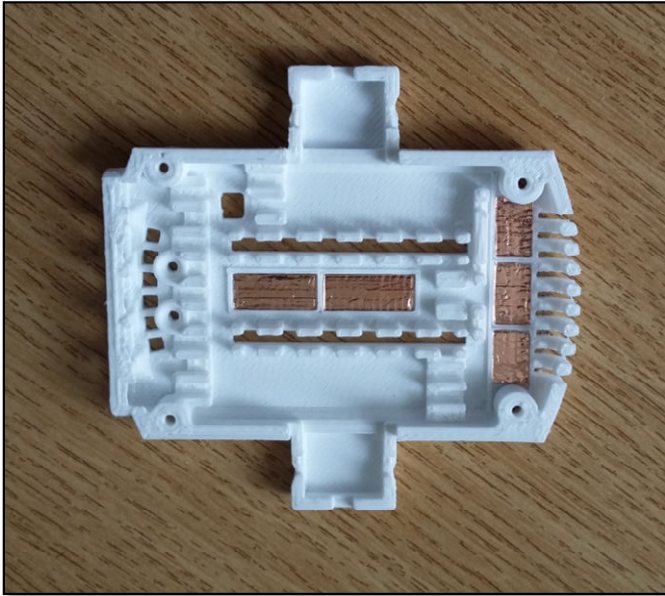
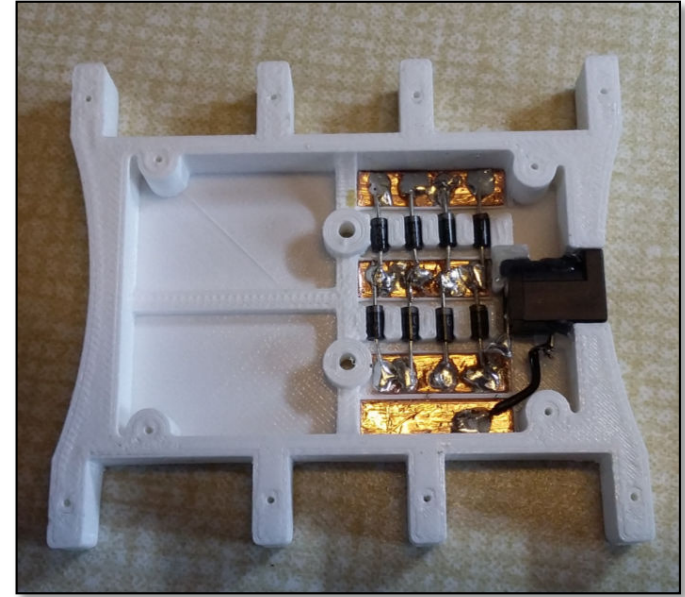
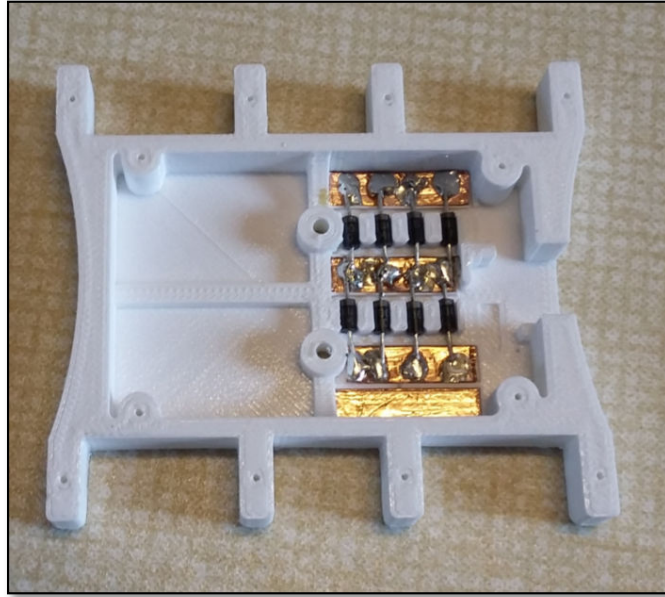
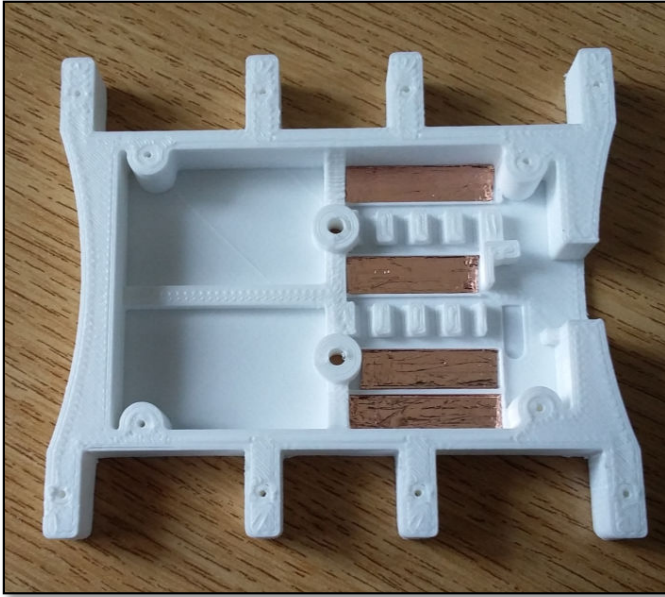
Viewed from above.



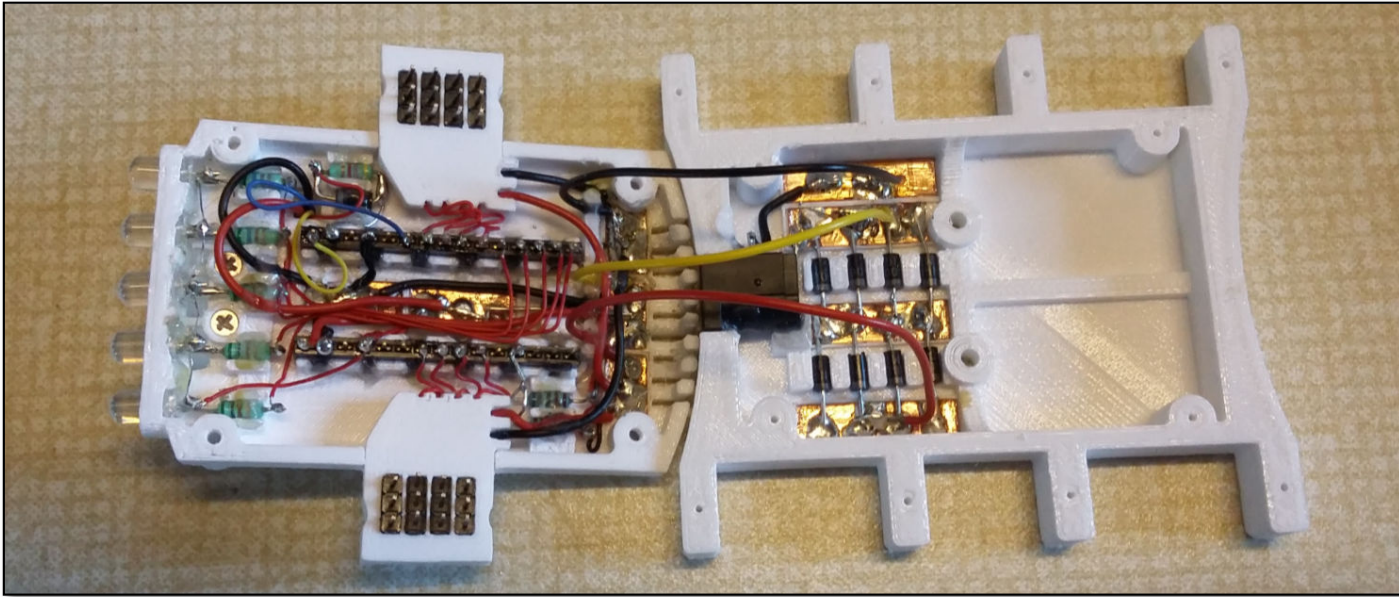
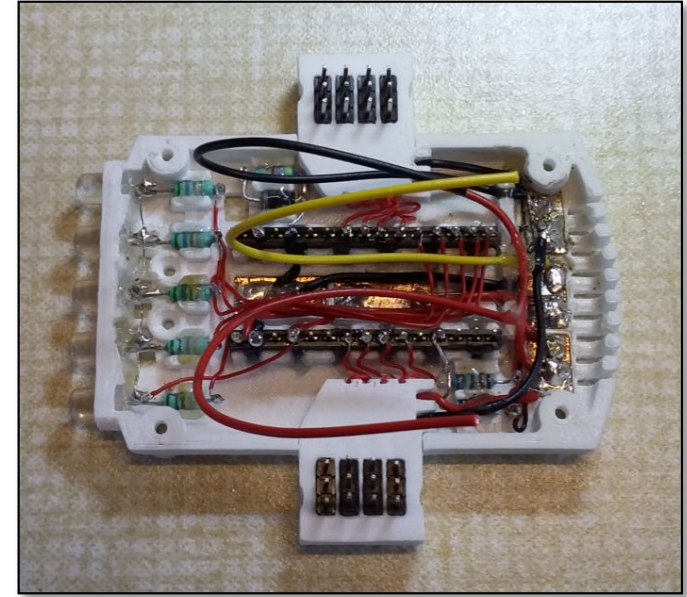
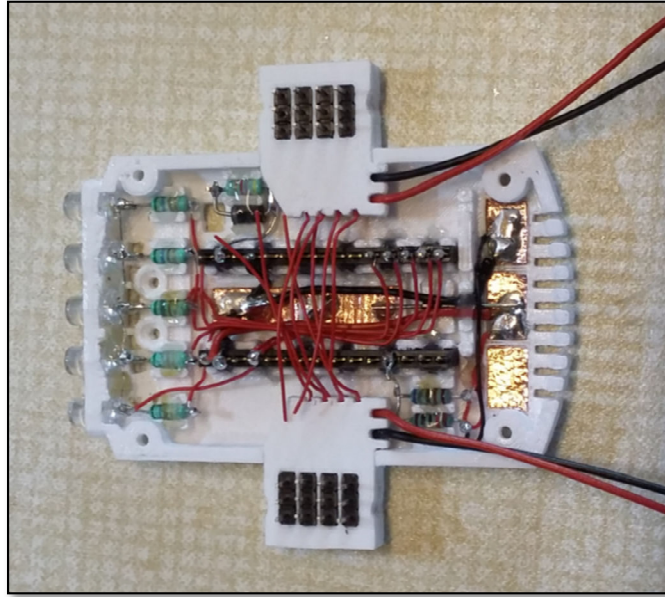
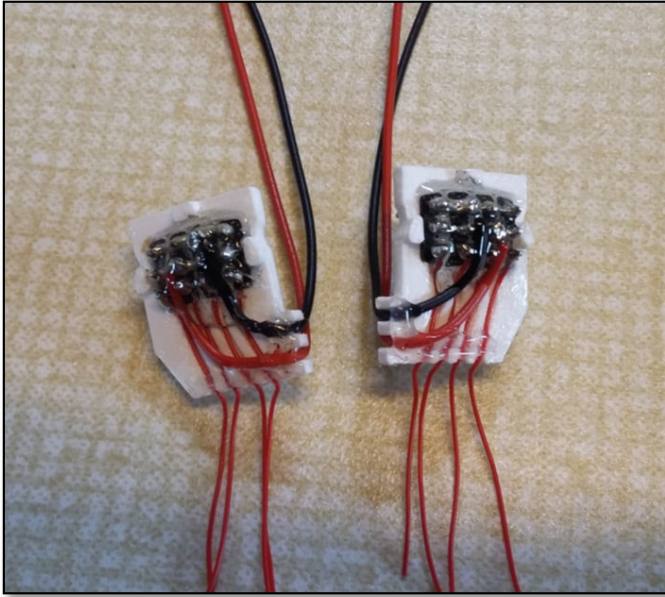
# Quadruped 'RC' Cover Wiring



# Build Images:

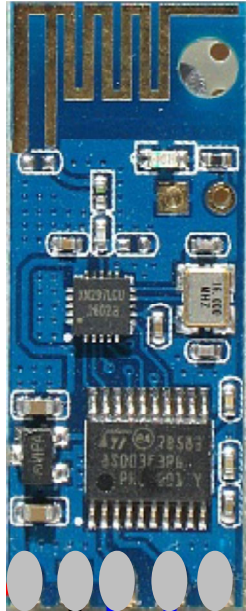


## Build Images:



# BalanceBot Nunchuk Controller Wiring

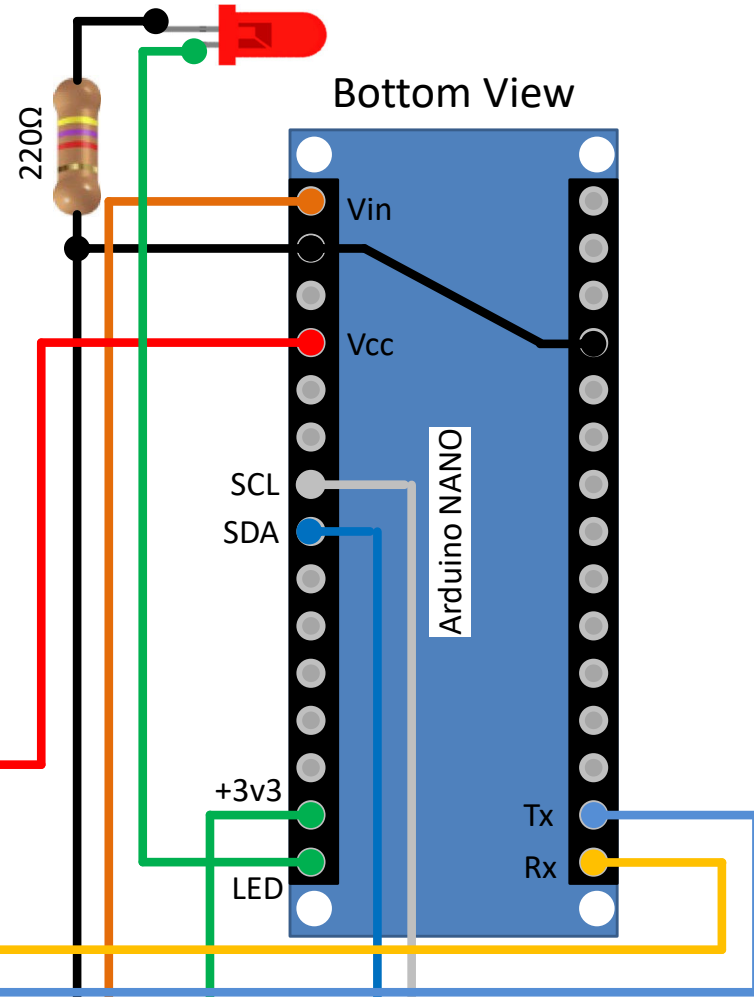
Top View



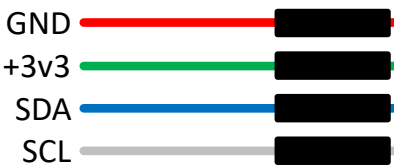
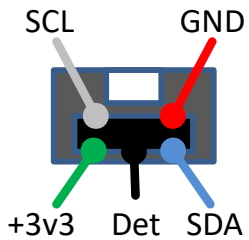
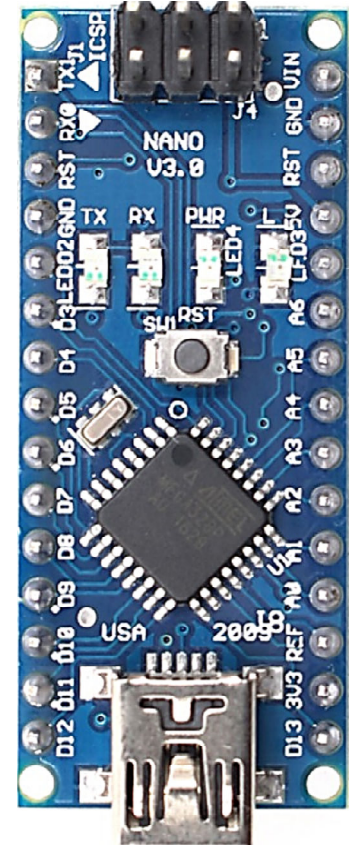
Bottom View



Bottom View



Top View



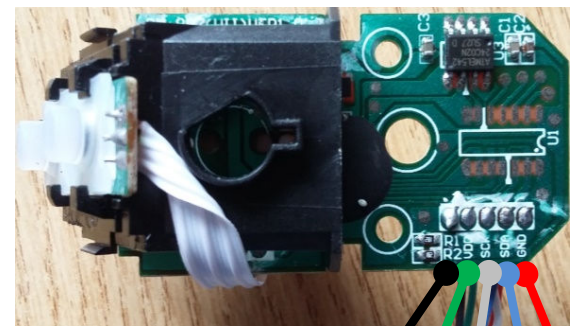
Nunchuk Controller



+9v



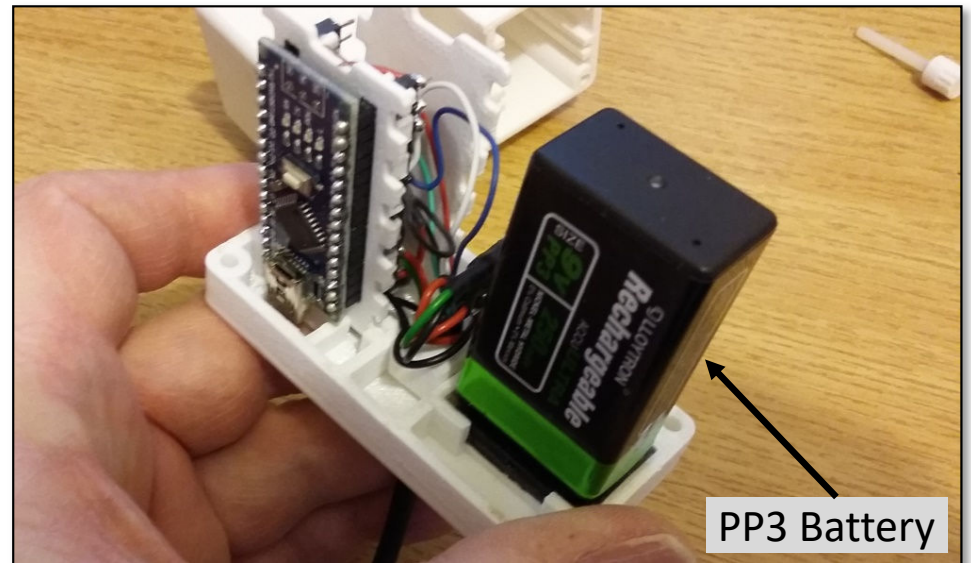
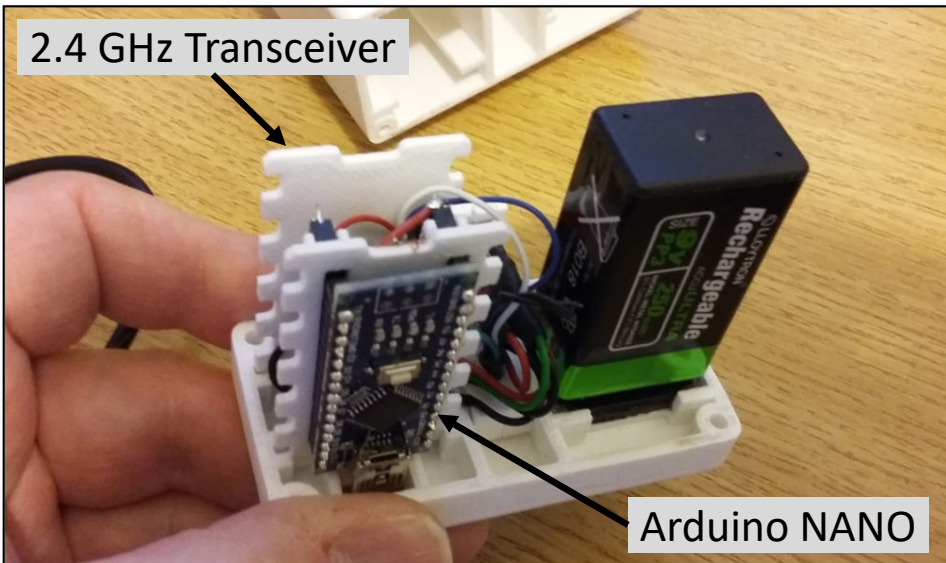
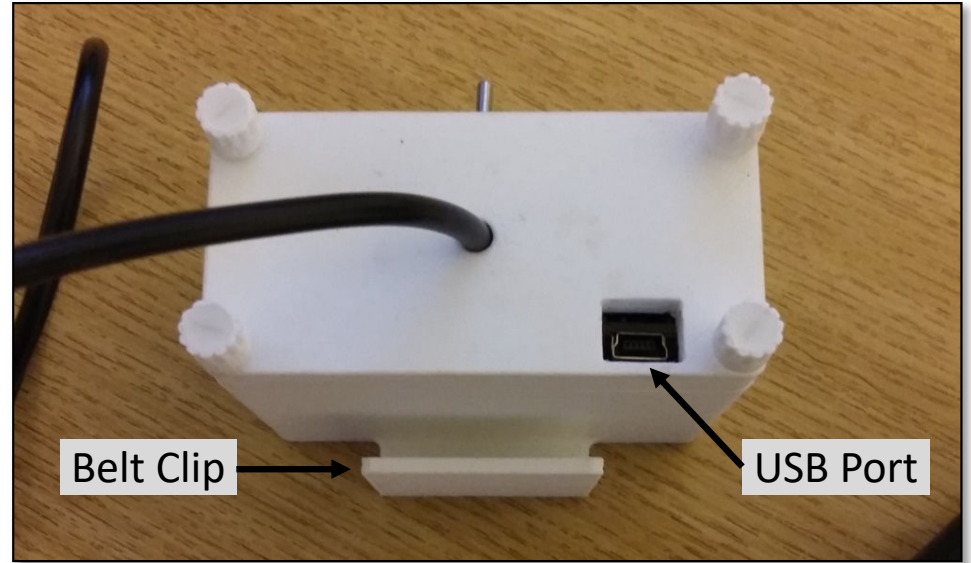
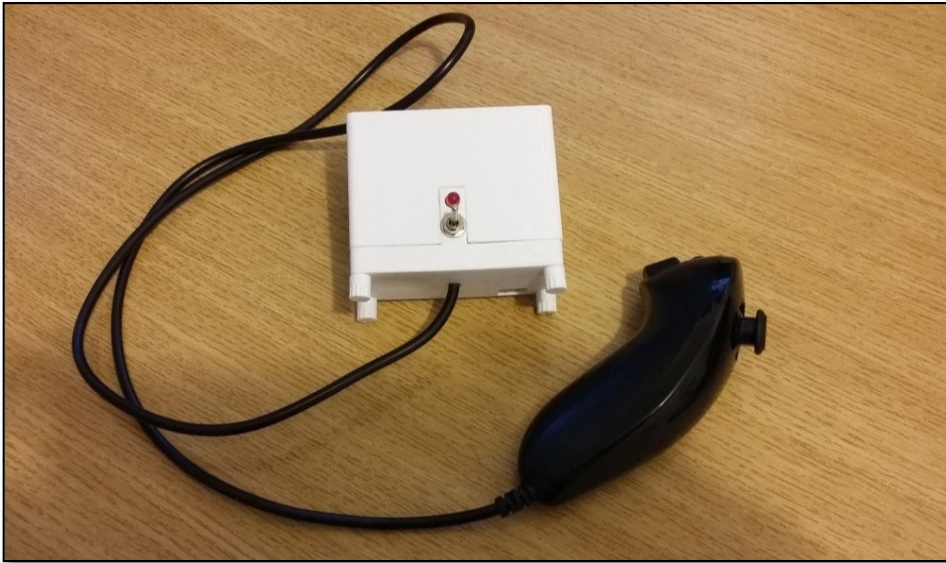
ON/OFF Power Switch



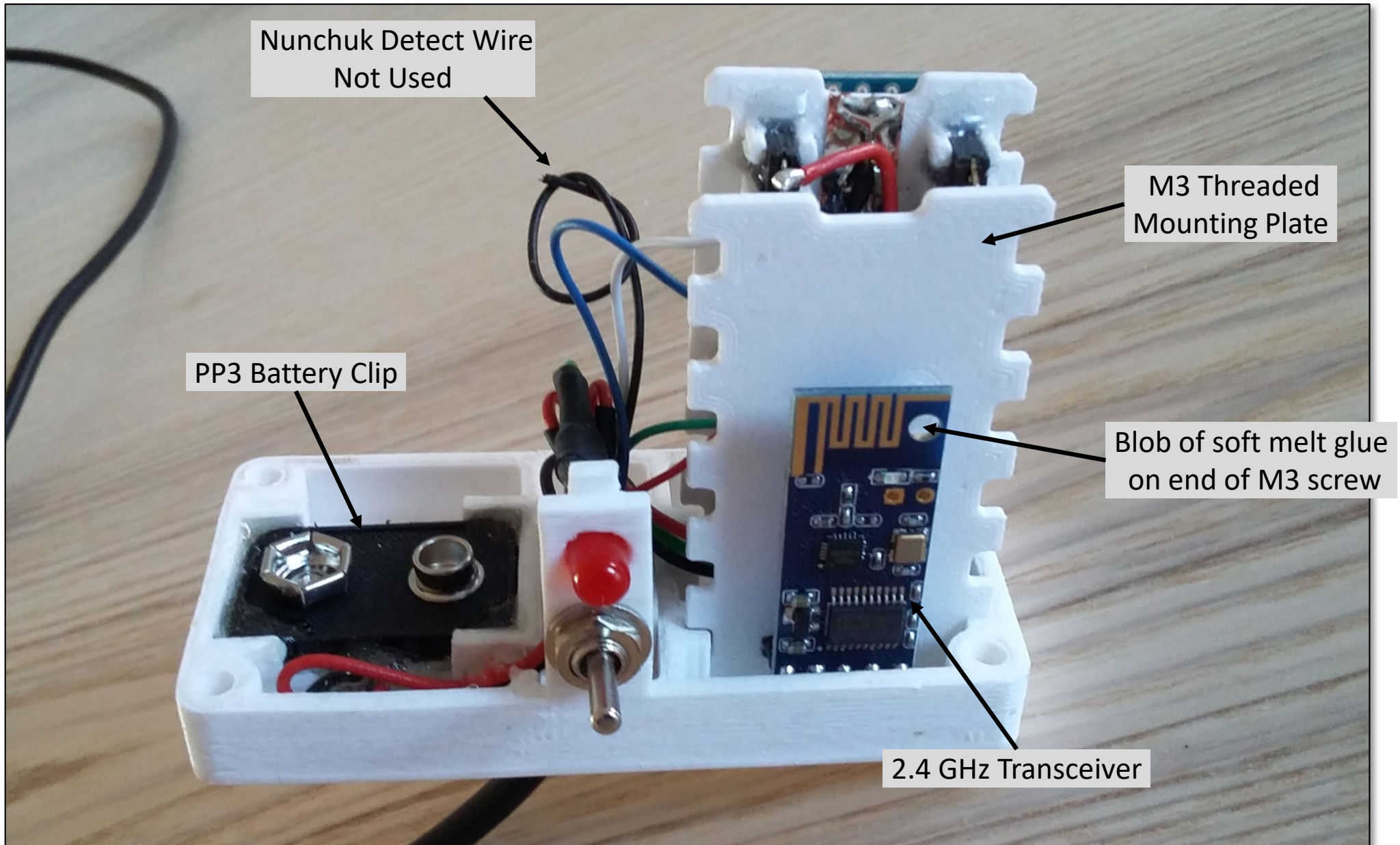
Nunchuk Controller



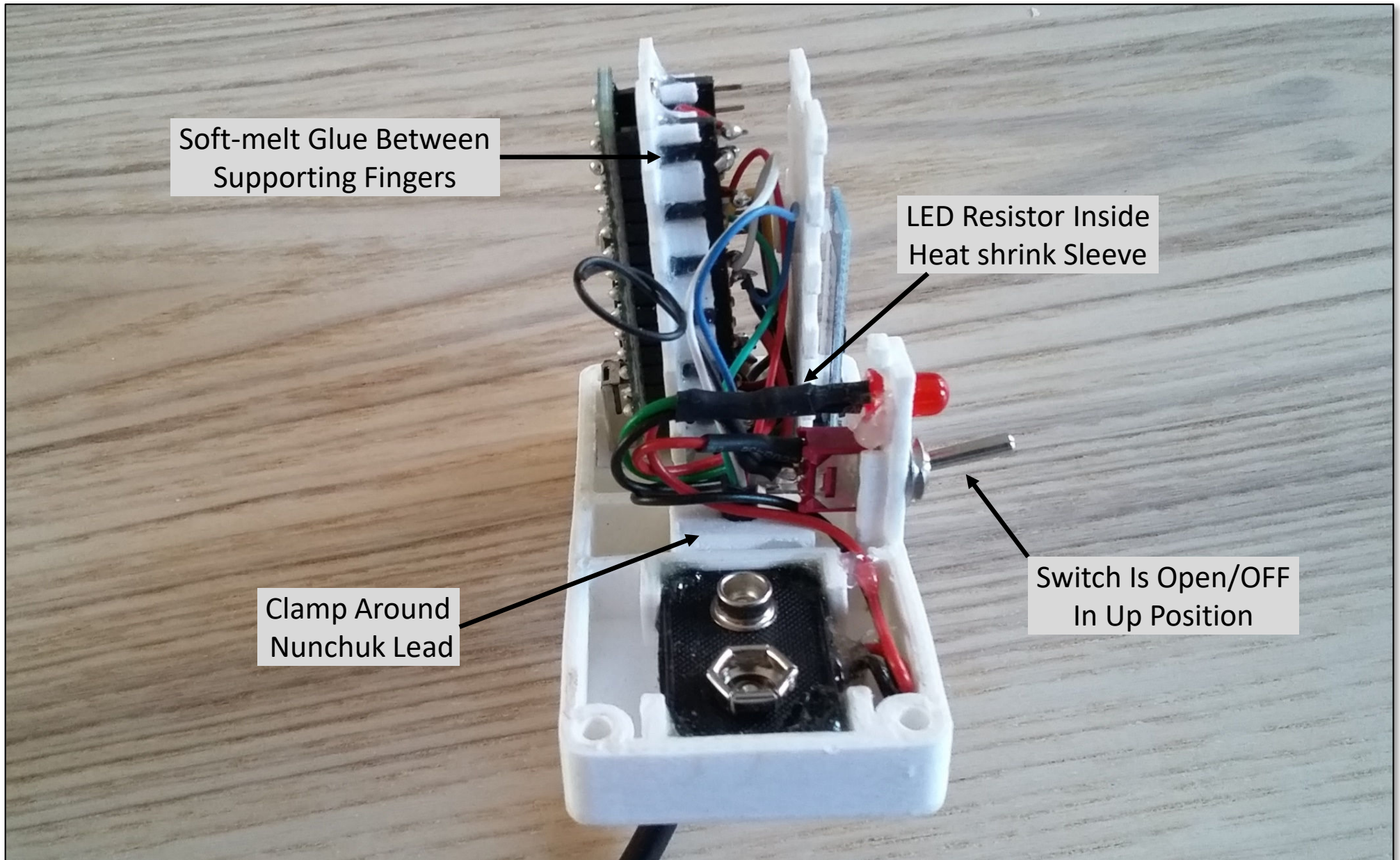
# Nunchuk Controller Images

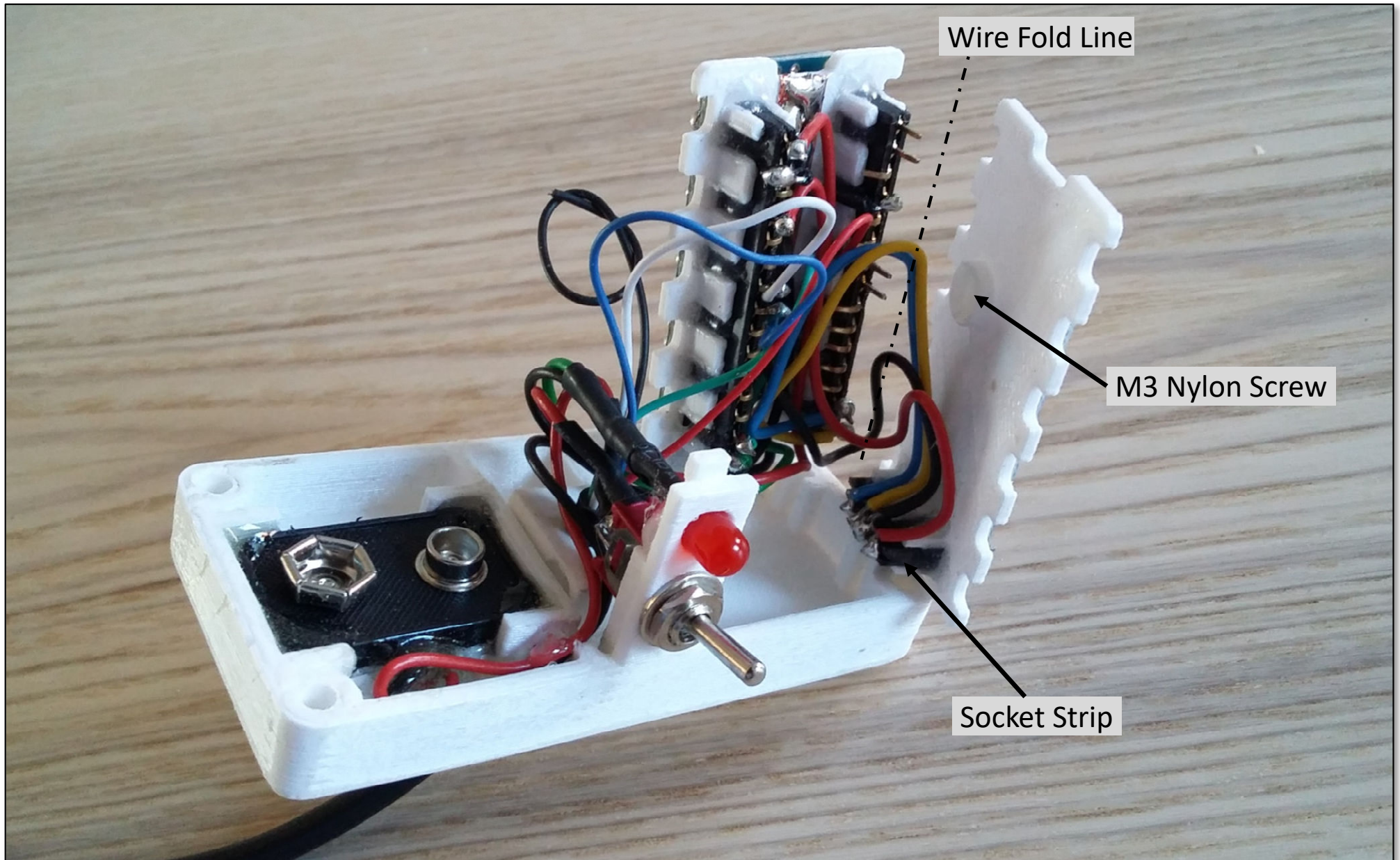


## Nunchuk Controller Images

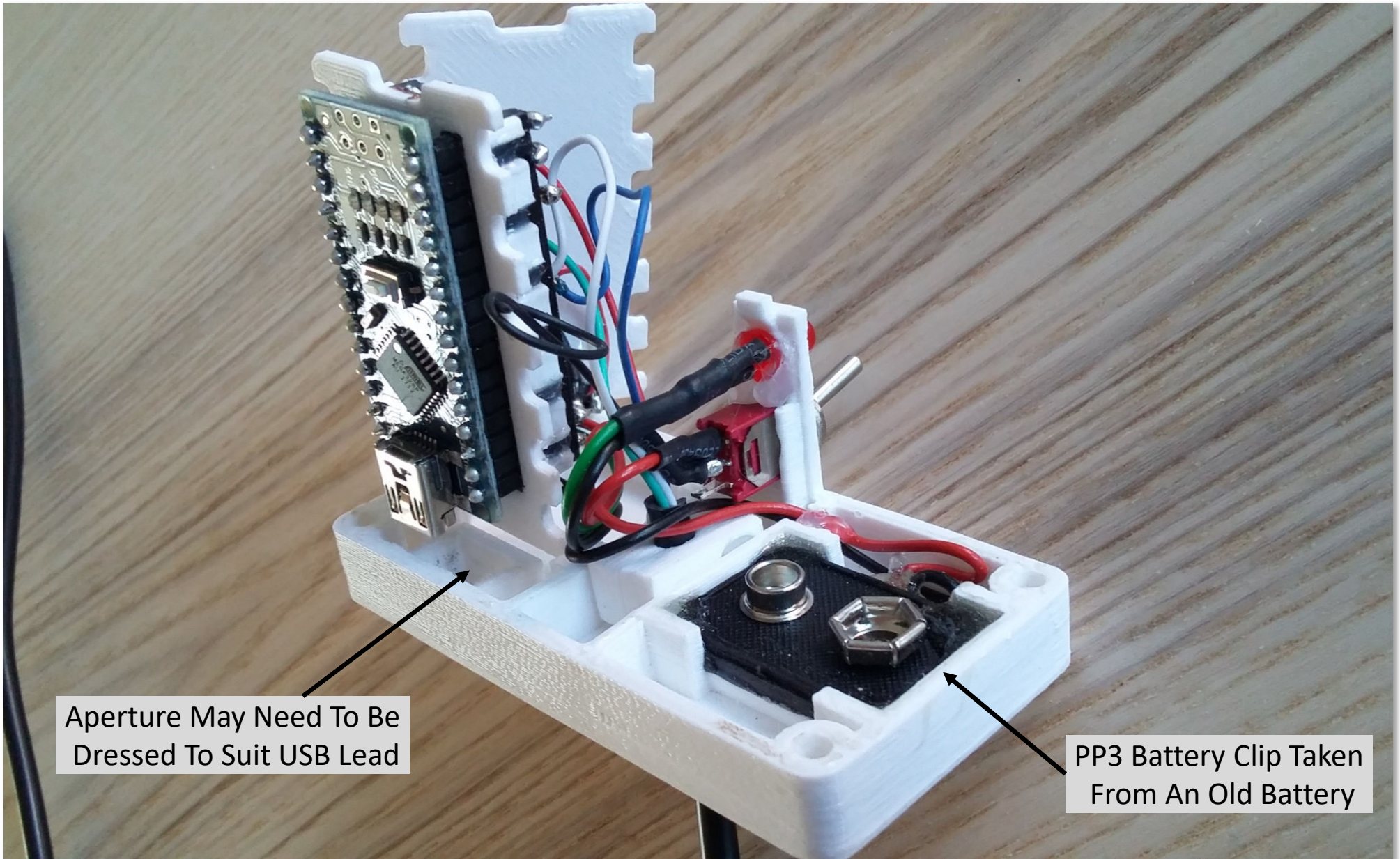


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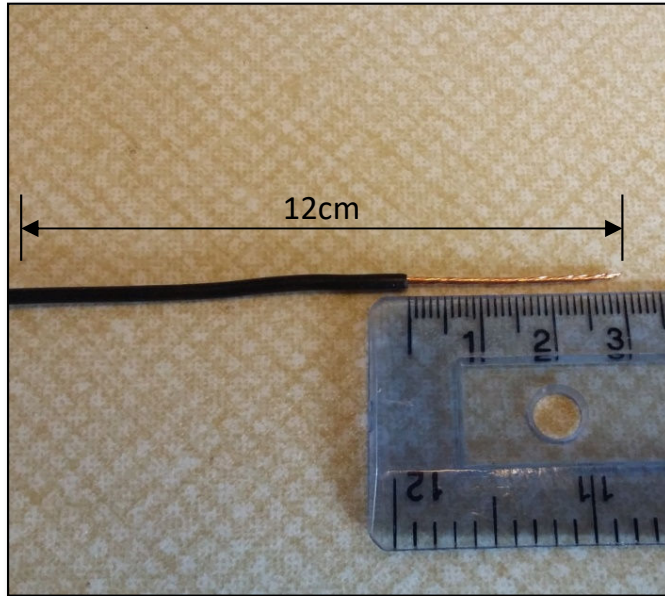
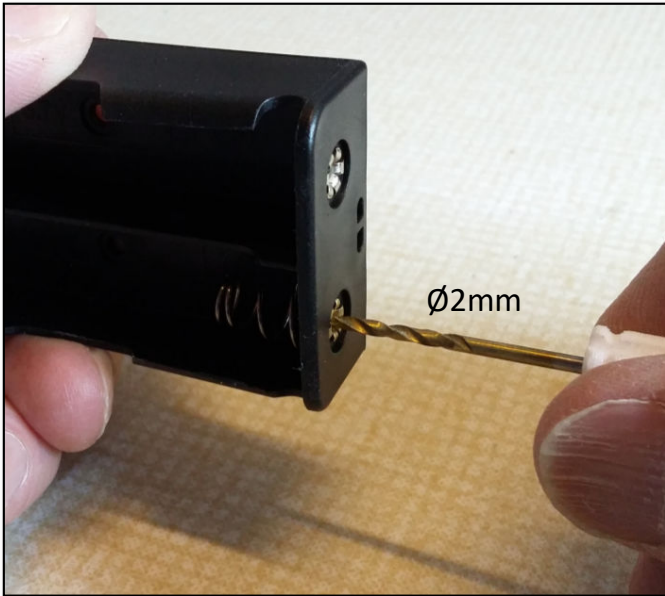
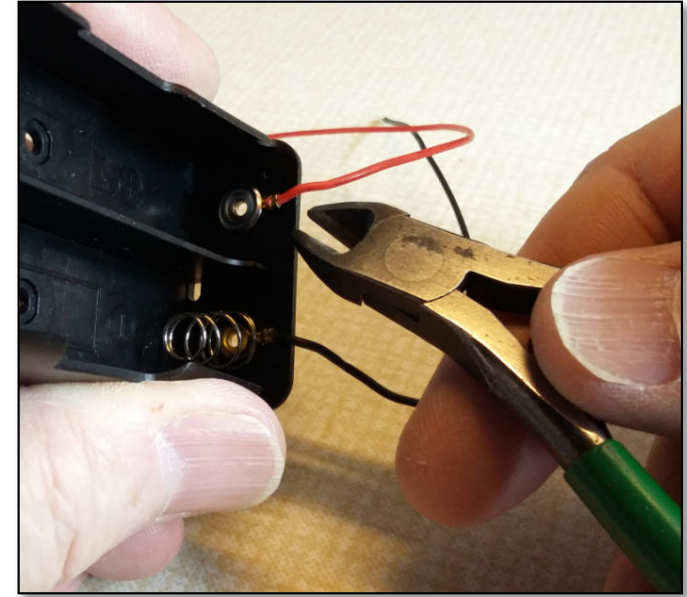
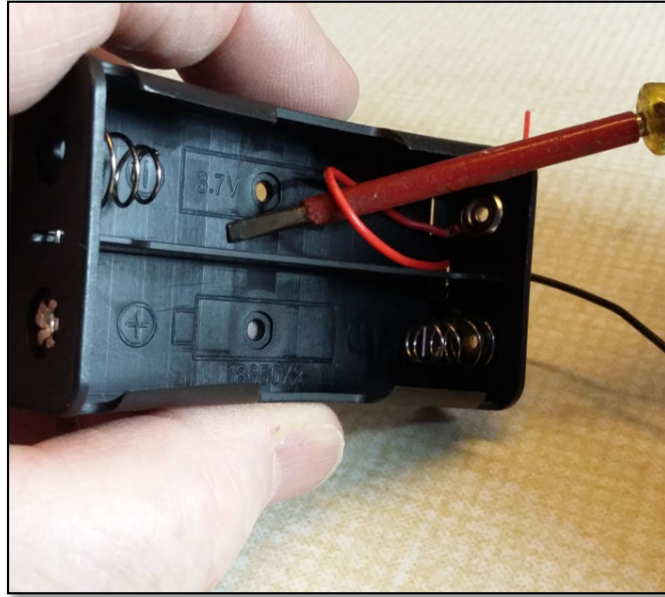
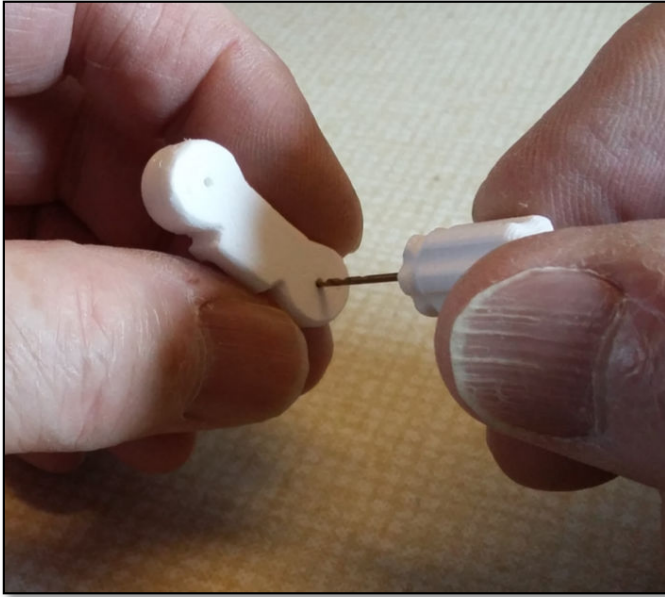




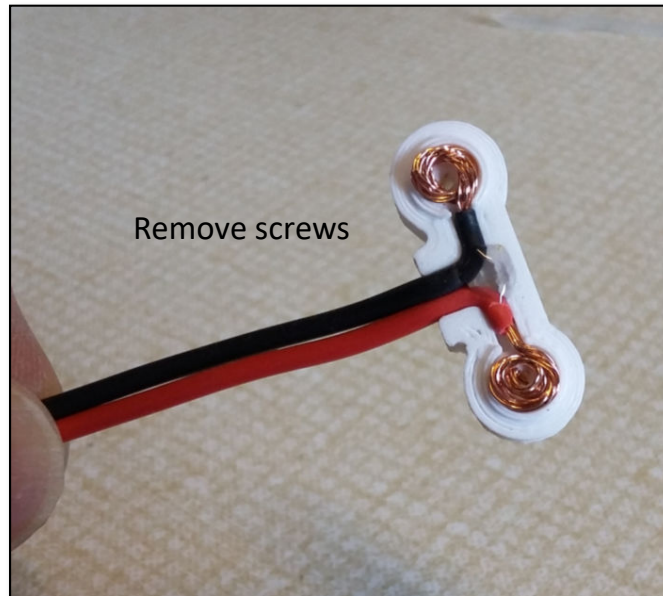
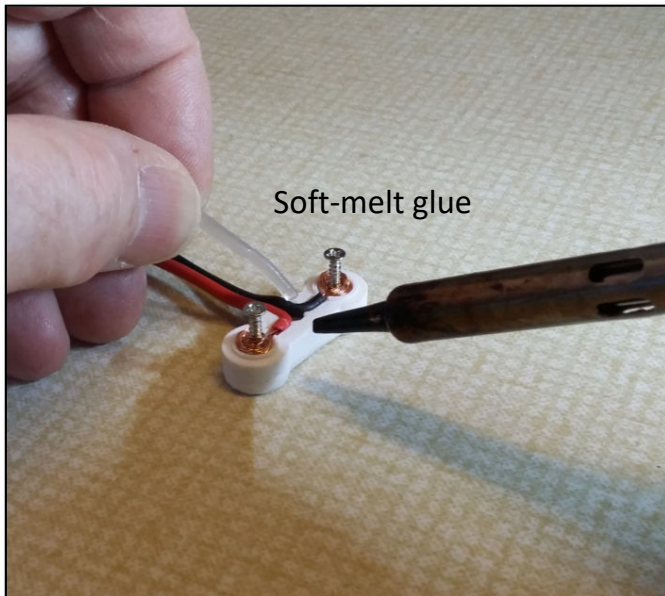
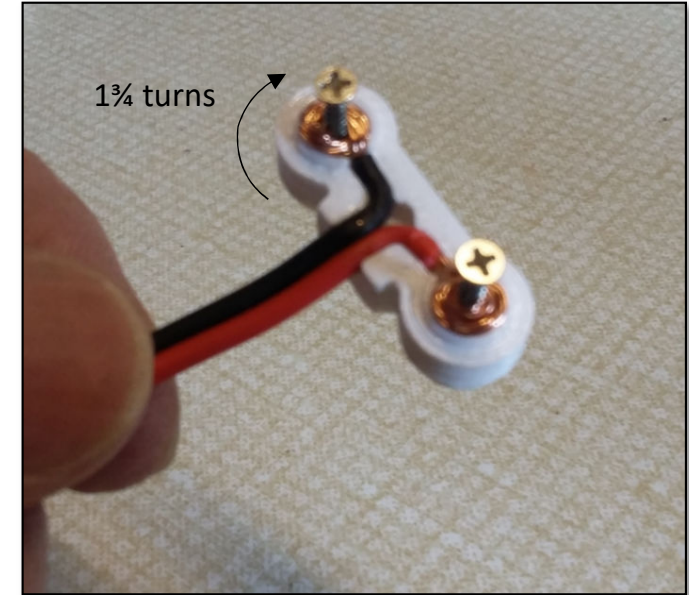
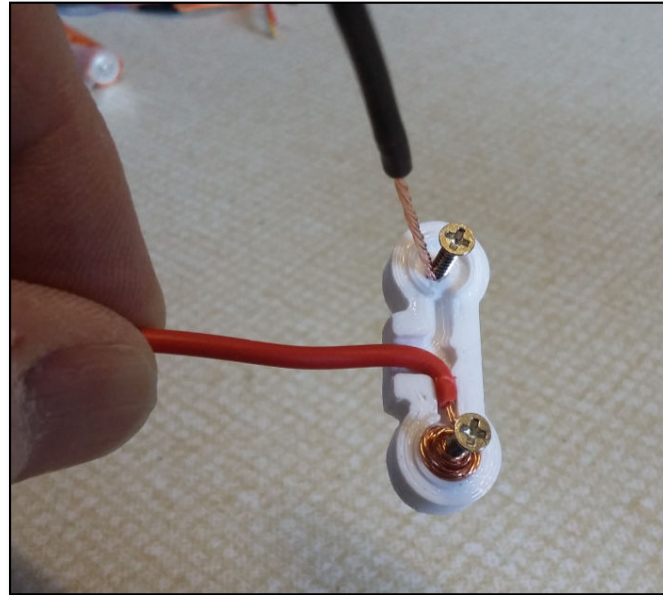
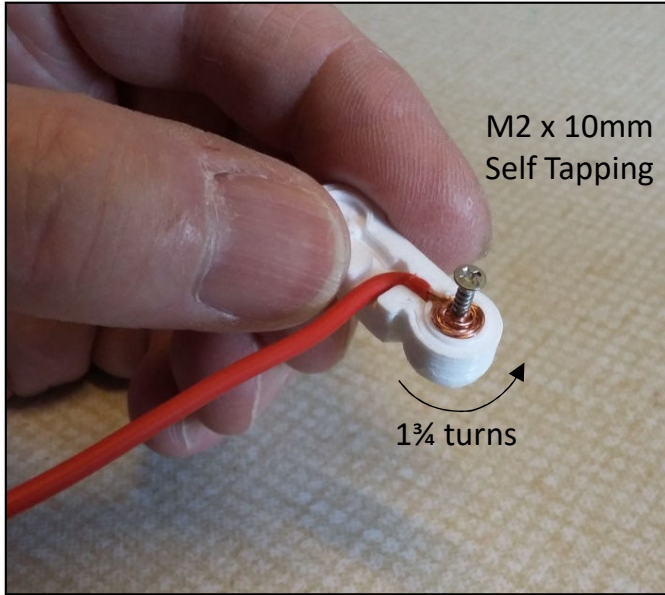
## Nunchuk Controller Images



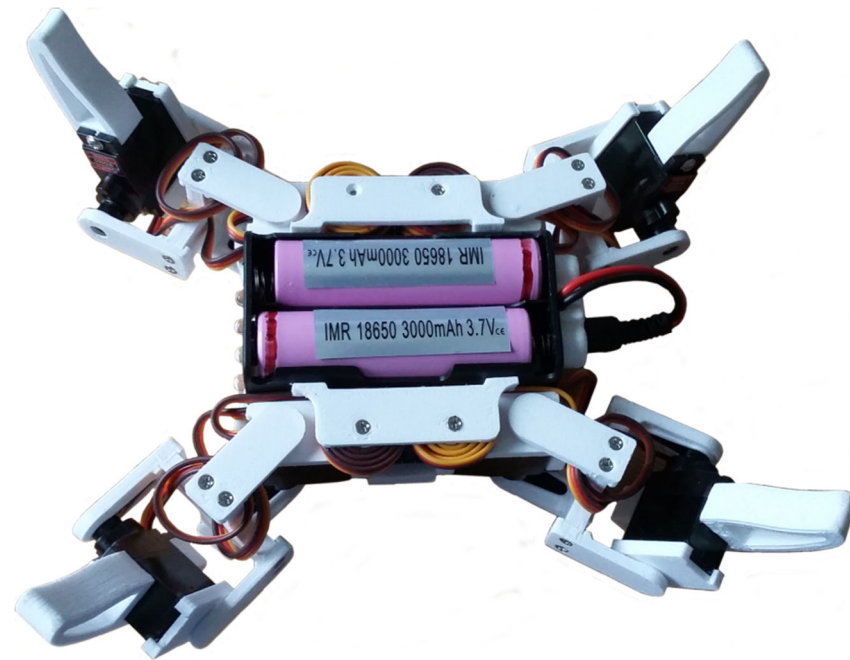
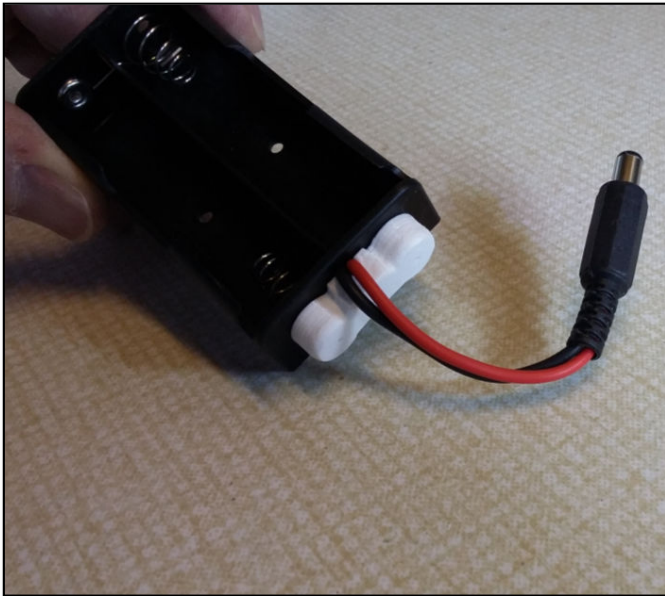
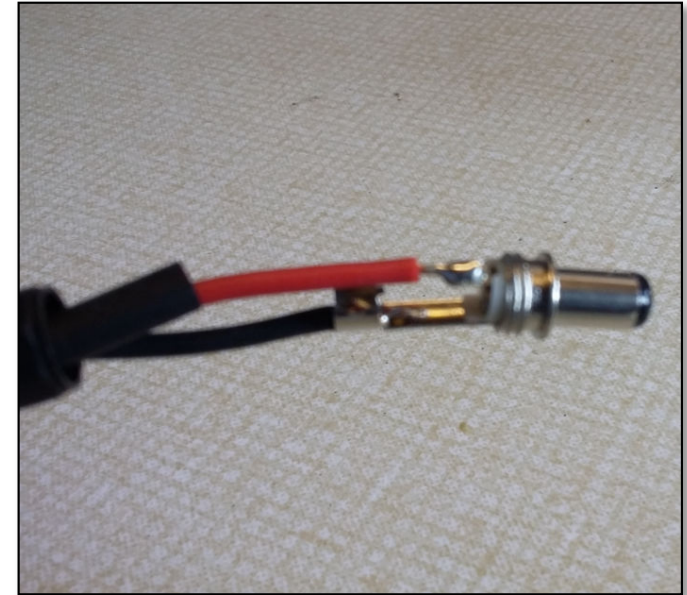
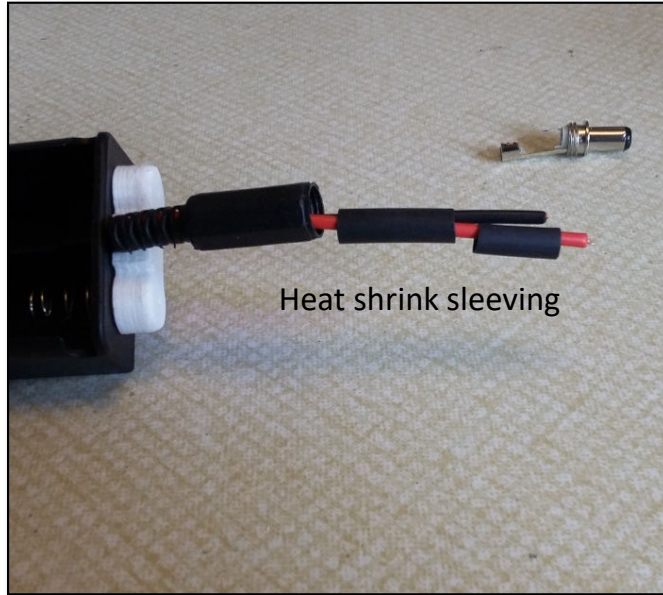
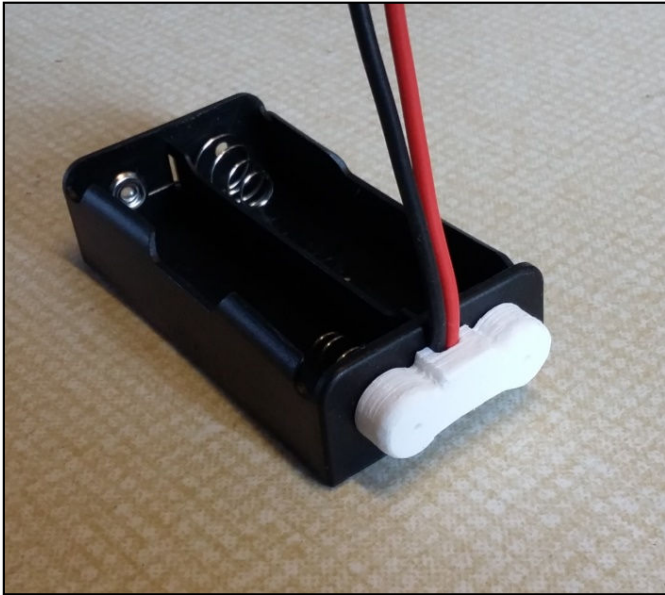
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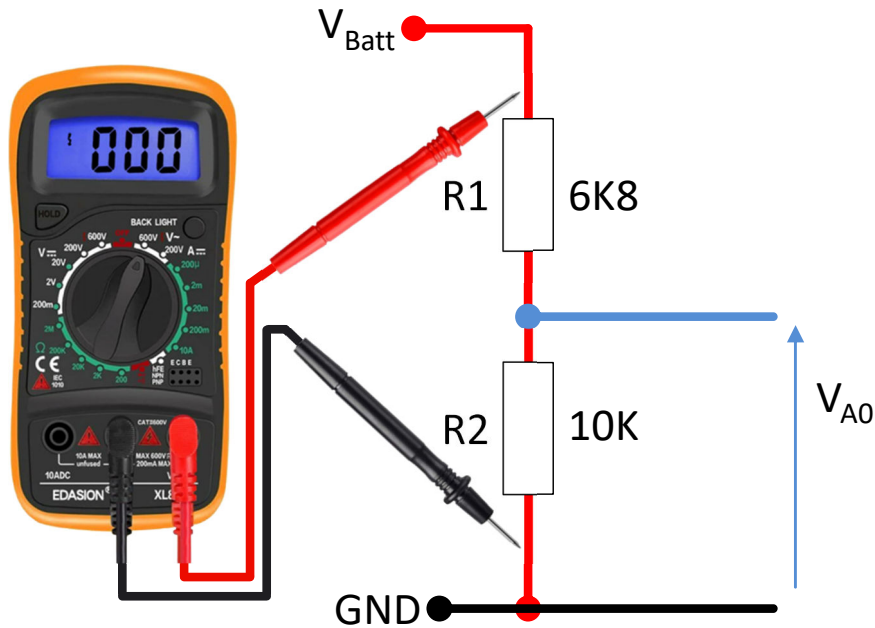
## Battery Box Images:



# Battery Box Images:



# Quadruped Battery Monitor (Protection)



$$V_{A0} = \frac{V_{Batt} \times R2}{R1 + R2}$$

$$V_{A0} = \frac{V_{Batt} \times 10K}{16K8}$$

$$V_{FSD} = 8.4 \text{ volts}$$

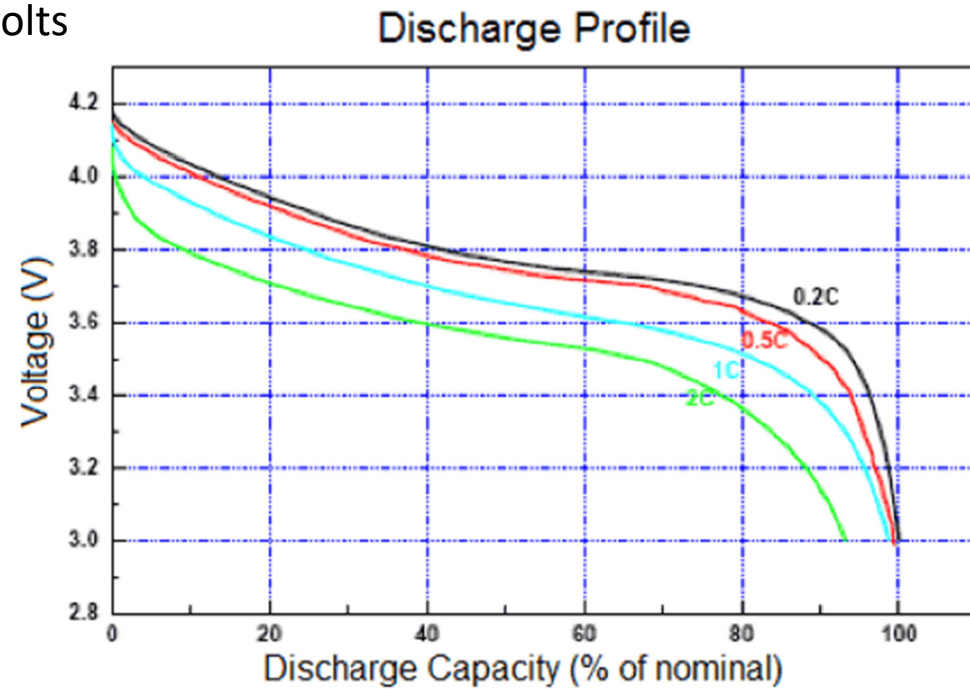
$$V_{A0D} = \frac{V_{A0} \times 1023}{5}$$

$$V_{A0D} = \frac{V_{Batt} \times 0.5952 \times 1023}{5}$$

Two cells in series gives a nominal 7.4v constant discharge voltage. To prevent damage, stop using once the following conditions are reached:

- 3.70 + 3.00 = 6.70v (one battery fades early)
- 3.30 + 3.30 = 6.70v (both batteries fade together)

Hence  $V_{A0D} = 804$  @  $V_{Batt} = 6.60v$



Discharge: 3.0V cutoff at room temperature.

