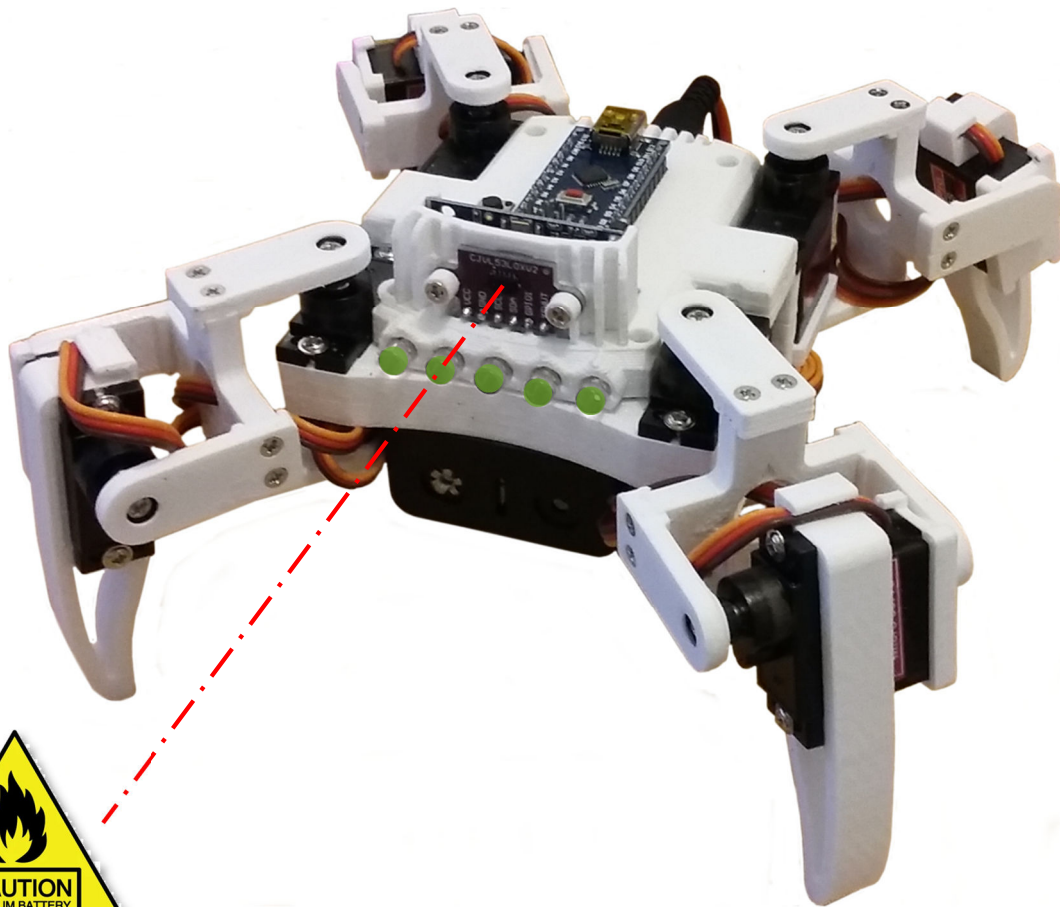


Quadruped 'LTOF' Robot

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.



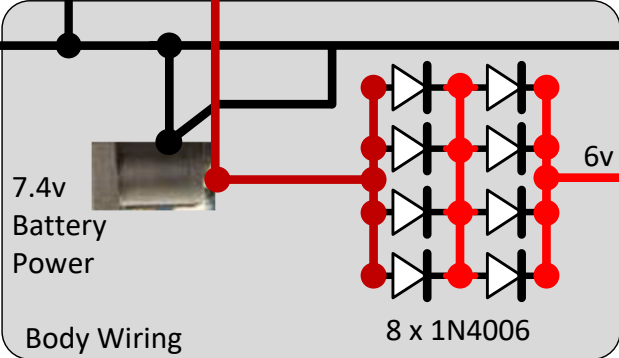
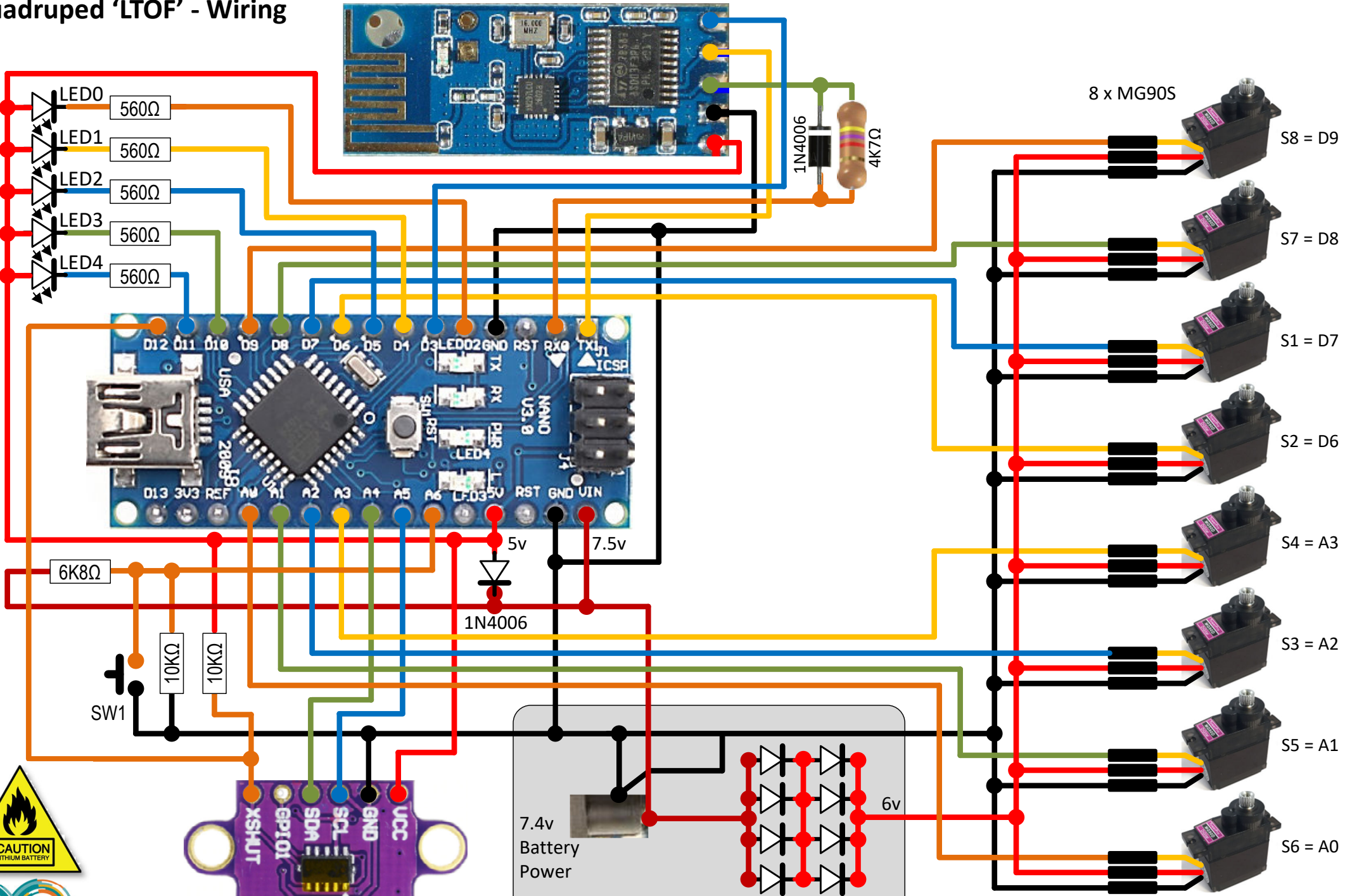
Carefully dispose of batteries that damaged, or discharged below their critical voltage.

Hand Tools & Consumables



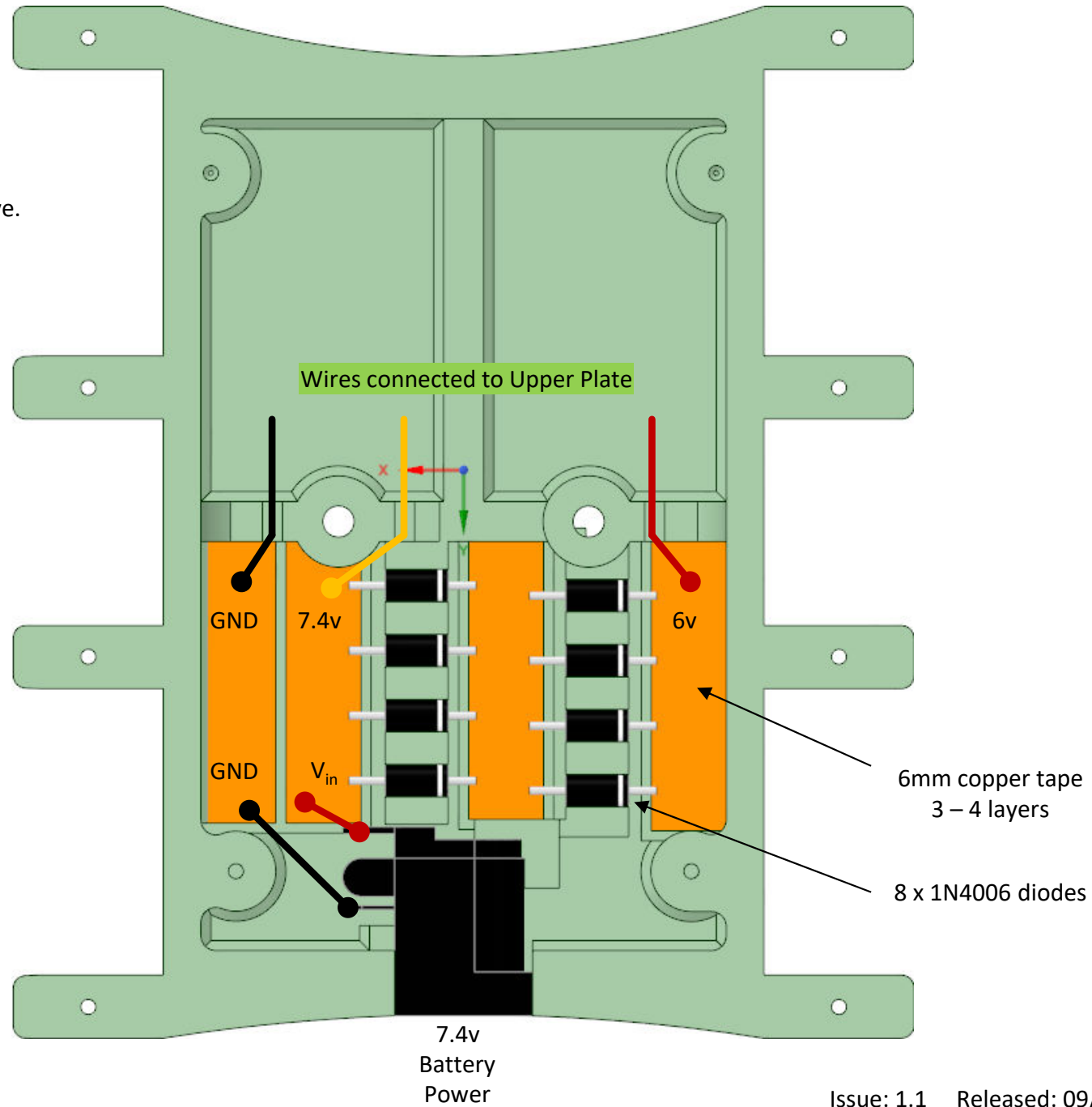
Quadruped 'LTOF' - Wiring

2.4GHz Wireless Transceiver

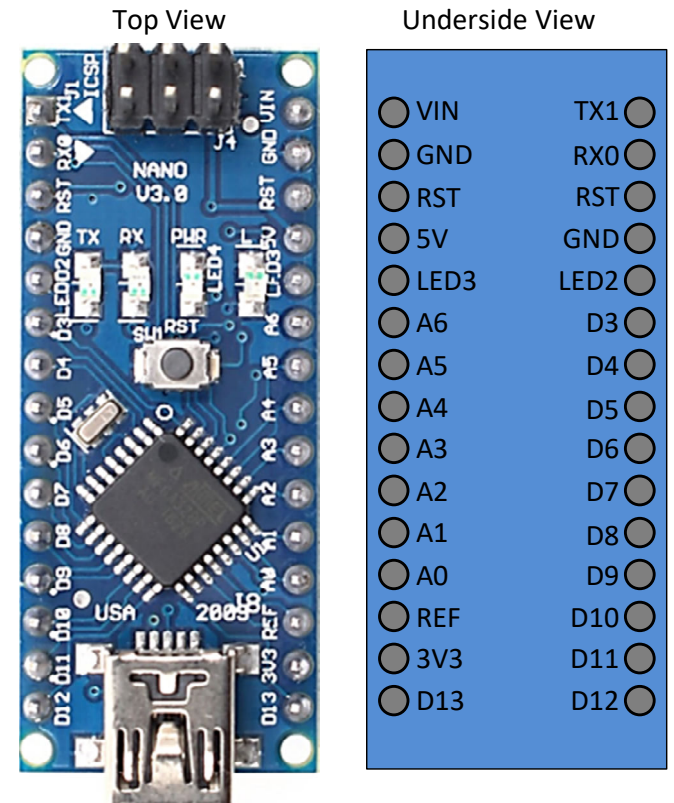
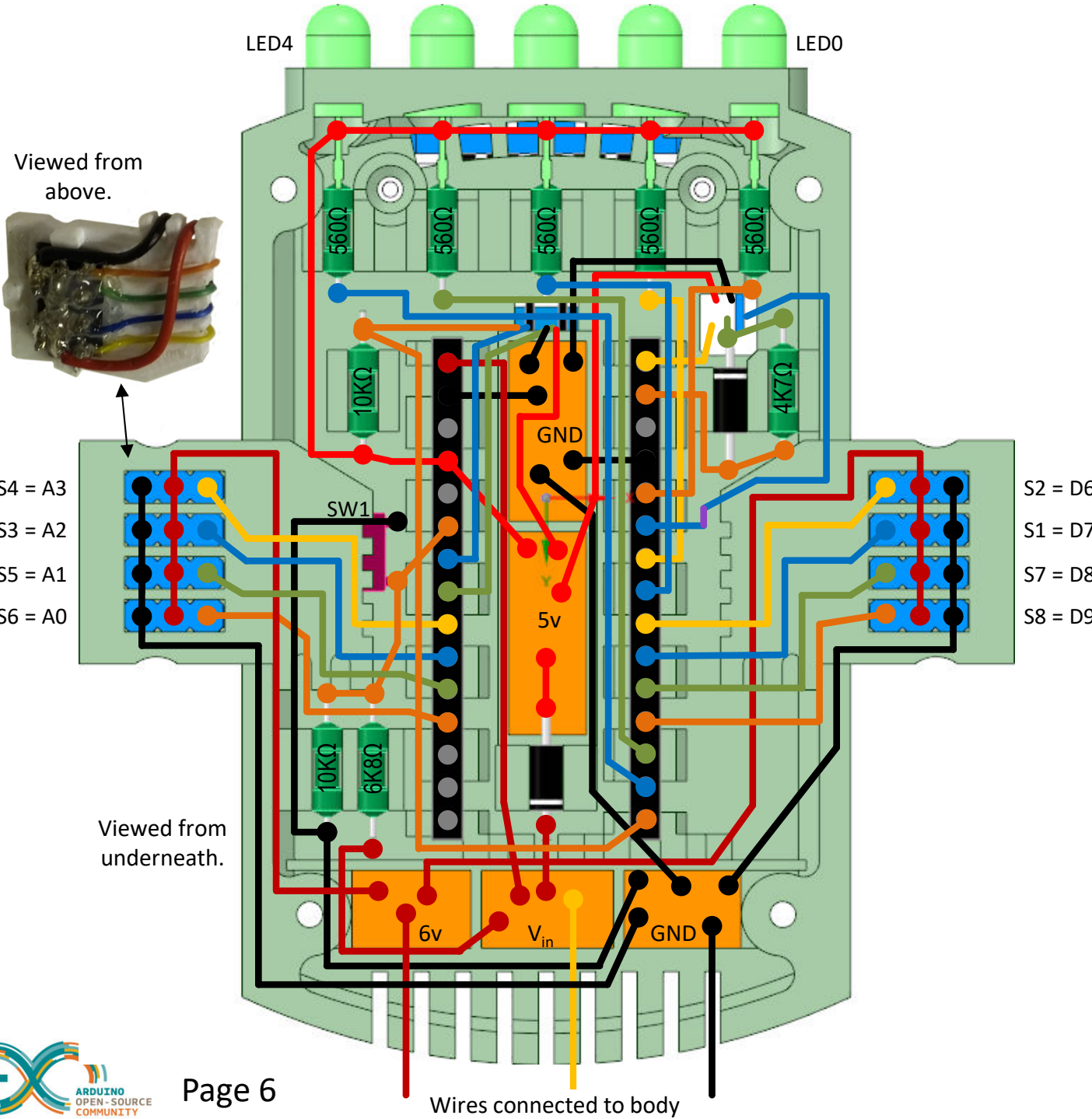


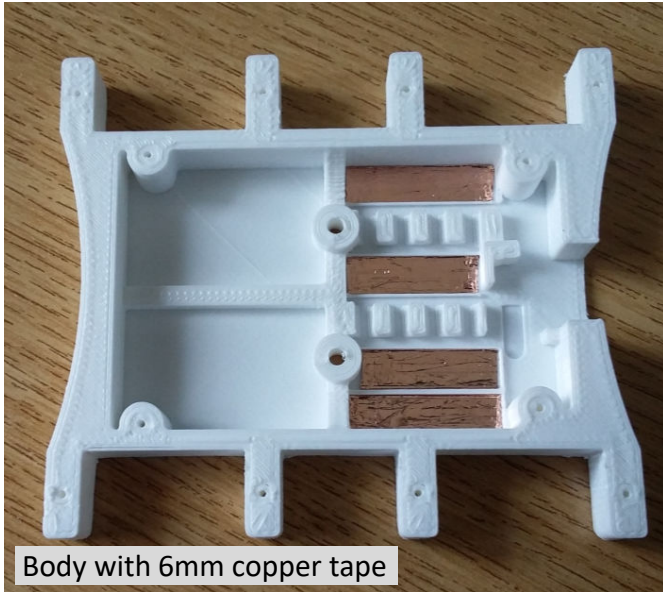
Quadruped 'LTOF' - Body Wiring Plan

Viewed from above.

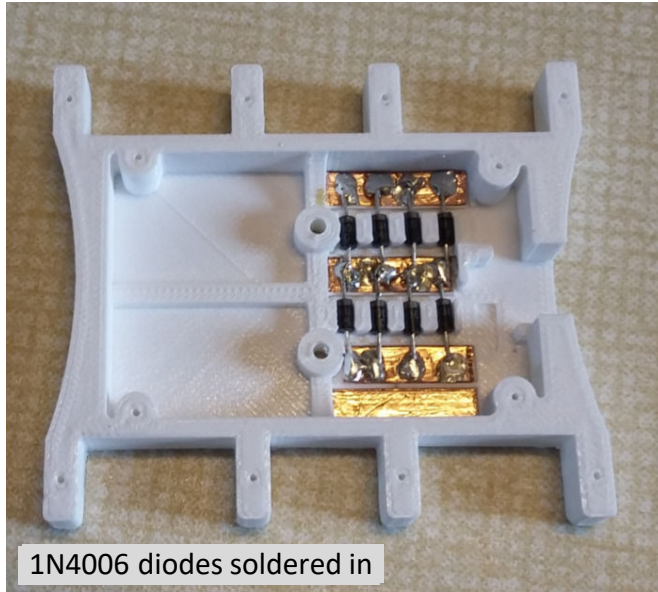


Quadruped 'LTOF' Cover Wiring Plan

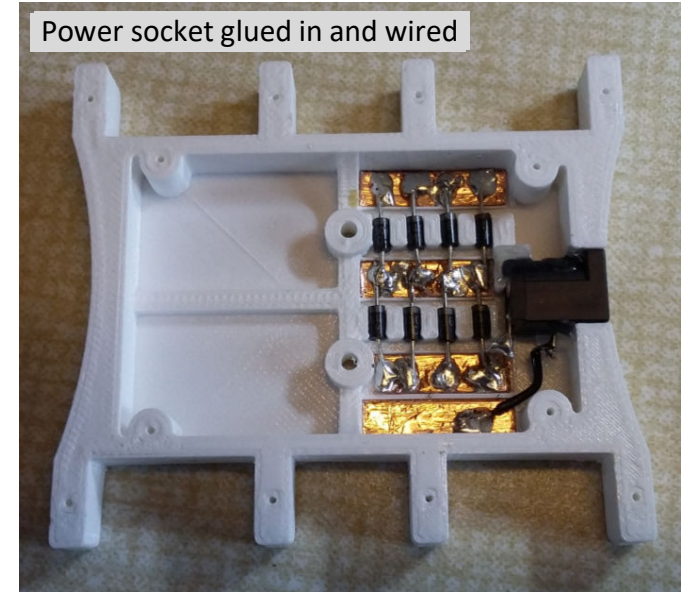




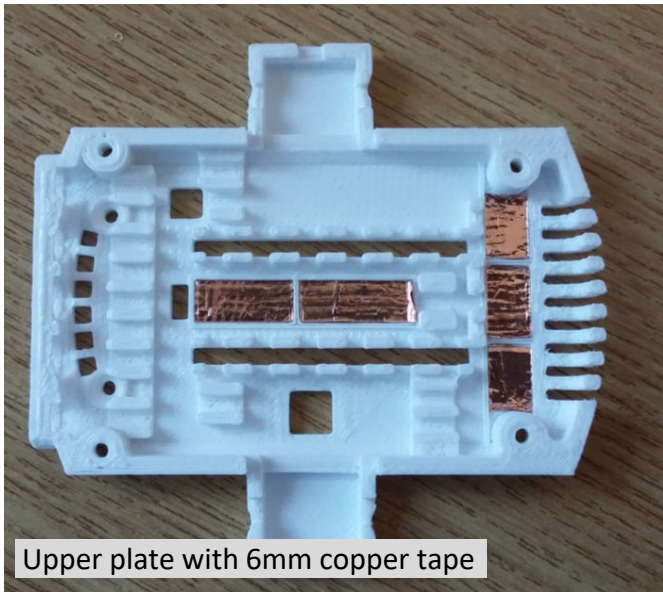
Body with 6mm copper tape



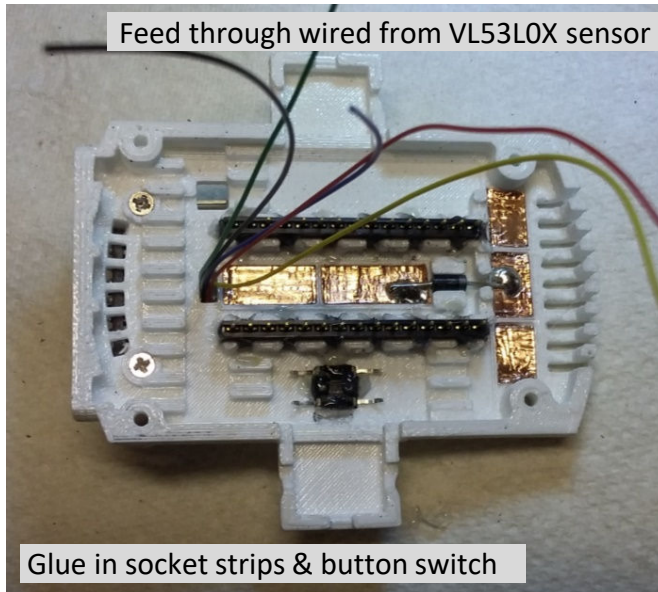
1N4006 diodes soldered in



Power socket glued in and wired

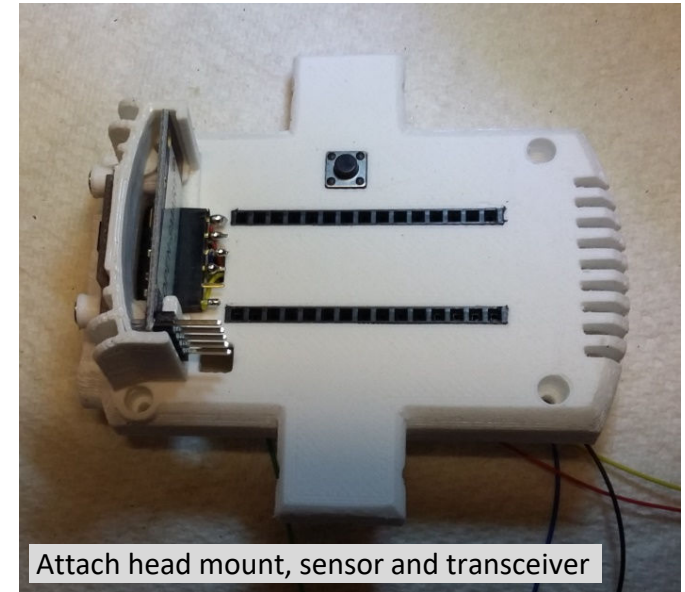


Upper plate with 6mm copper tape

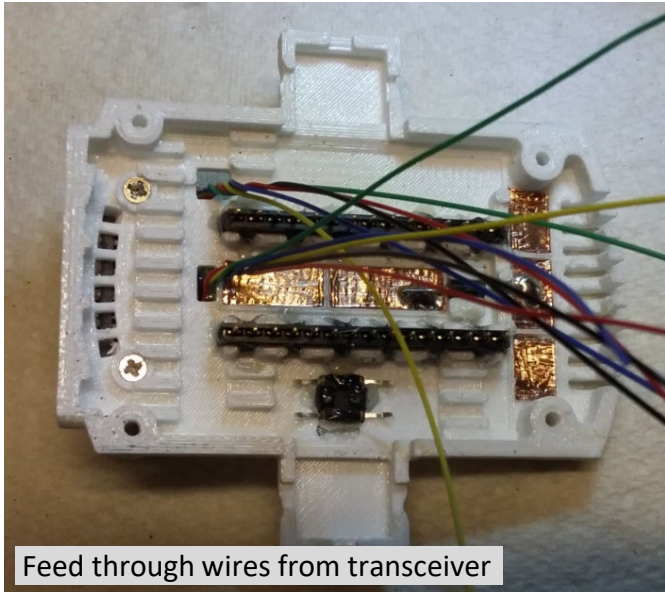


Feed through wired from VL53L0X sensor

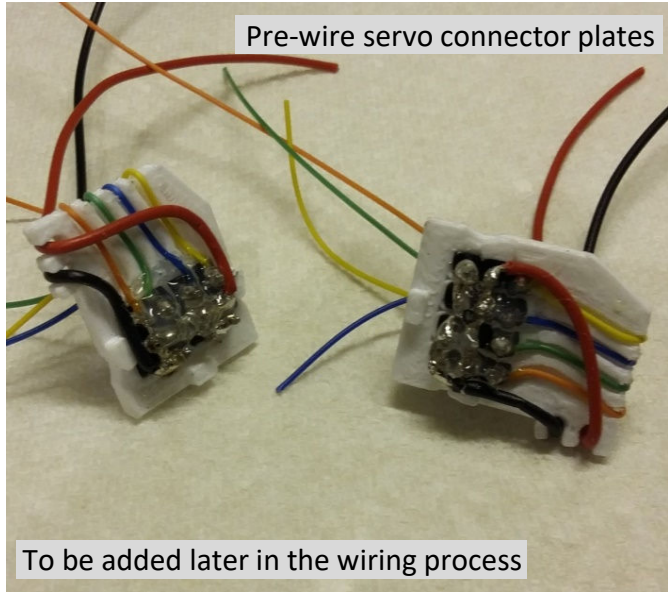
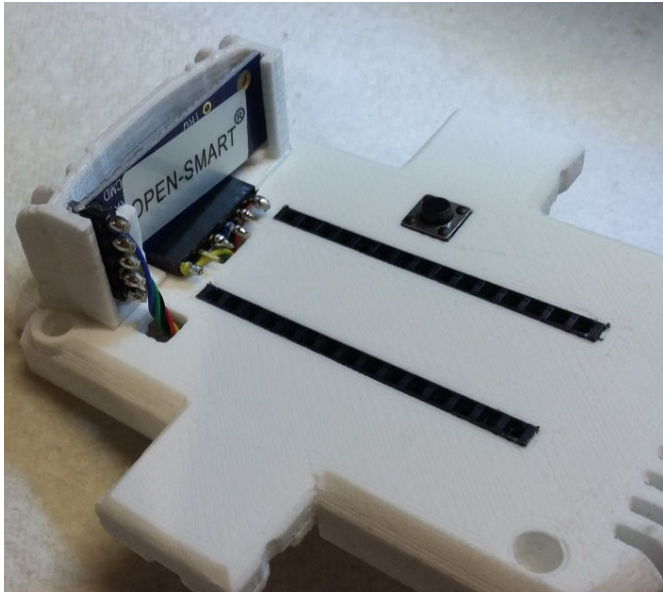
Glue in socket strips & button switch



Attach head mount, sensor and transceiver

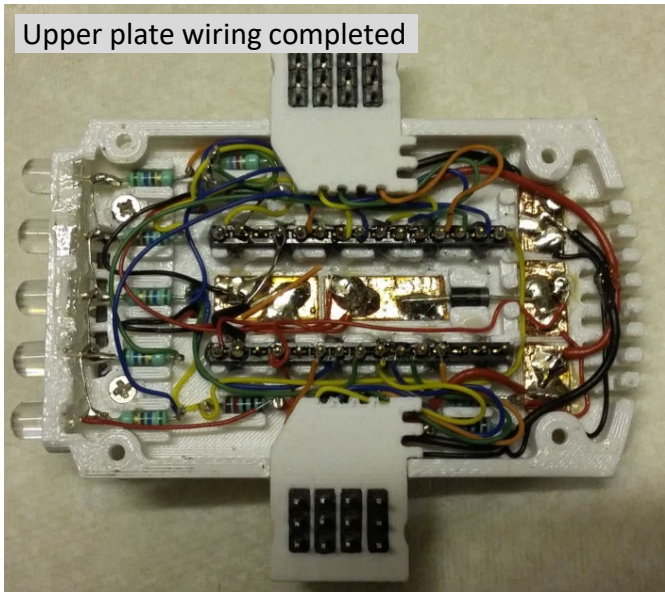


Feed through wires from transceiver

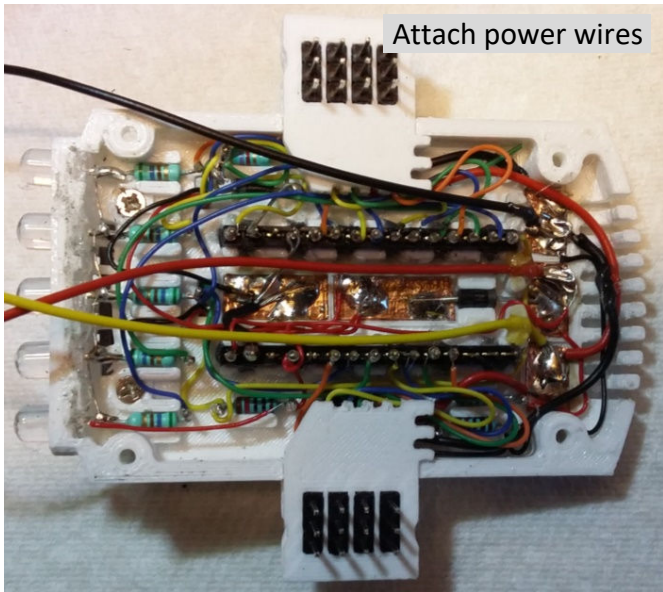


Pre-wire servo connector plates

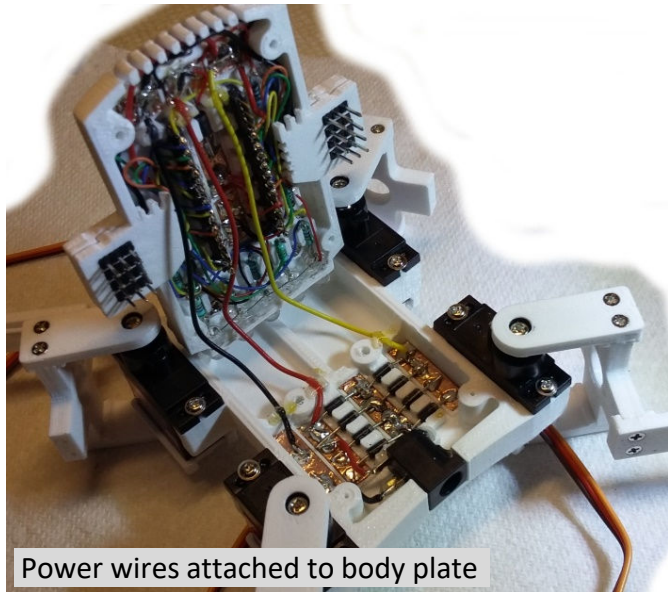
To be added later in the wiring process



Upper plate wiring completed



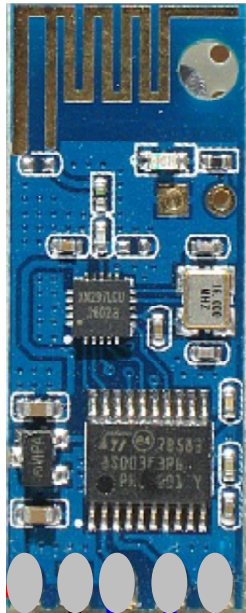
Attach power wires



Power wires attached to body plate

BalanceBot Nunchuk Controller Wiring

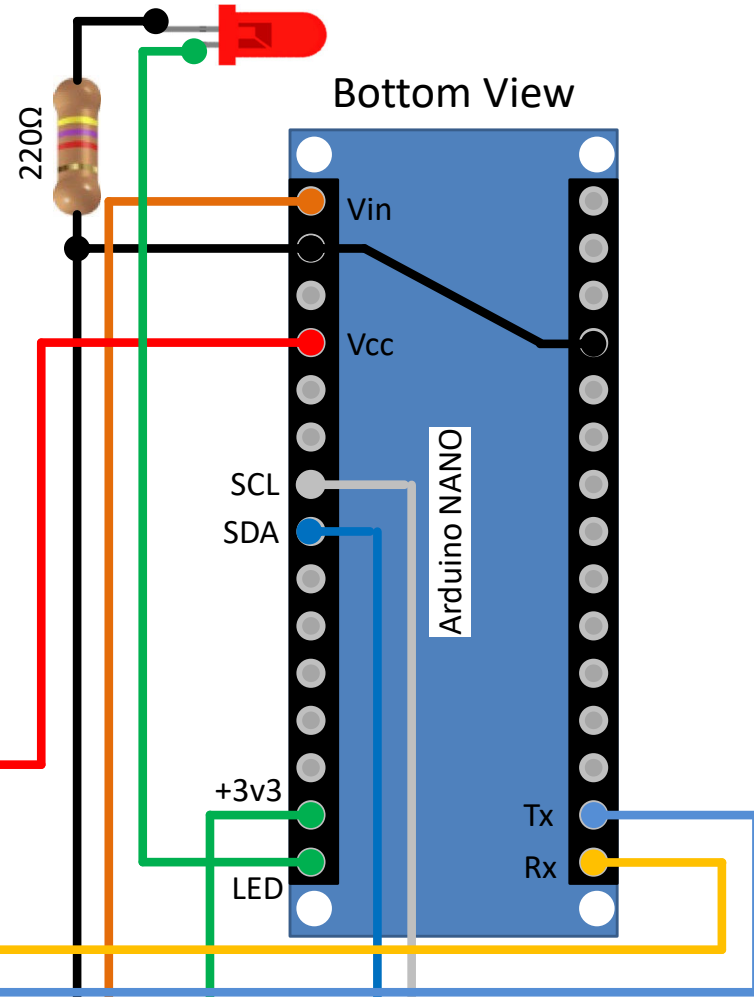
Top View



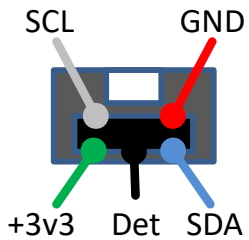
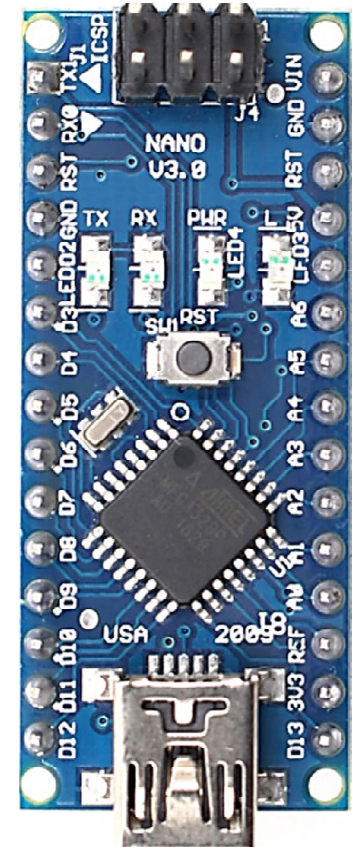
Bottom View



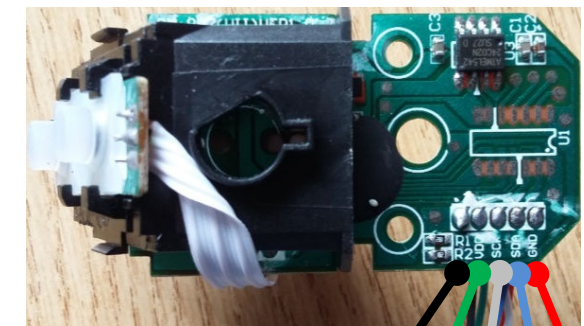
Bottom View



Top View

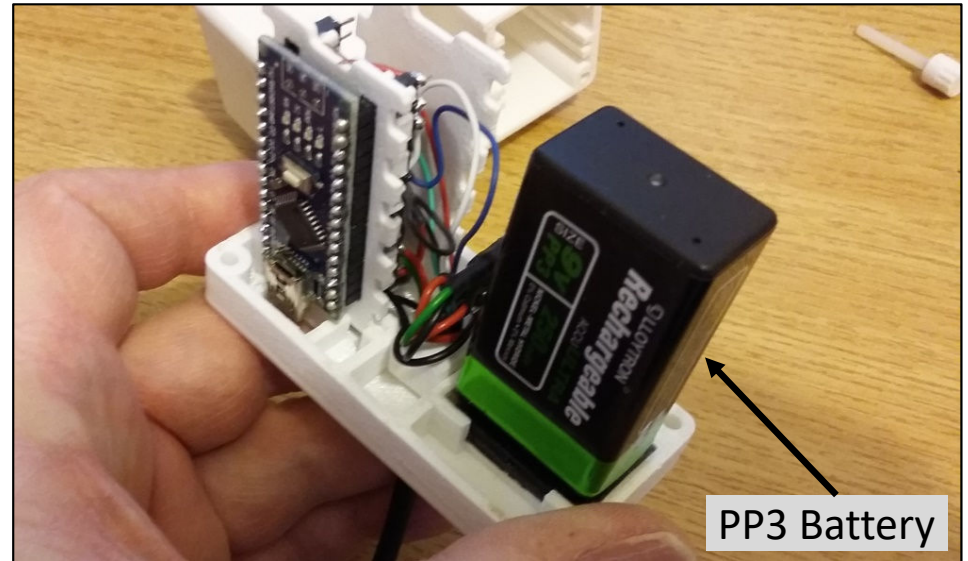
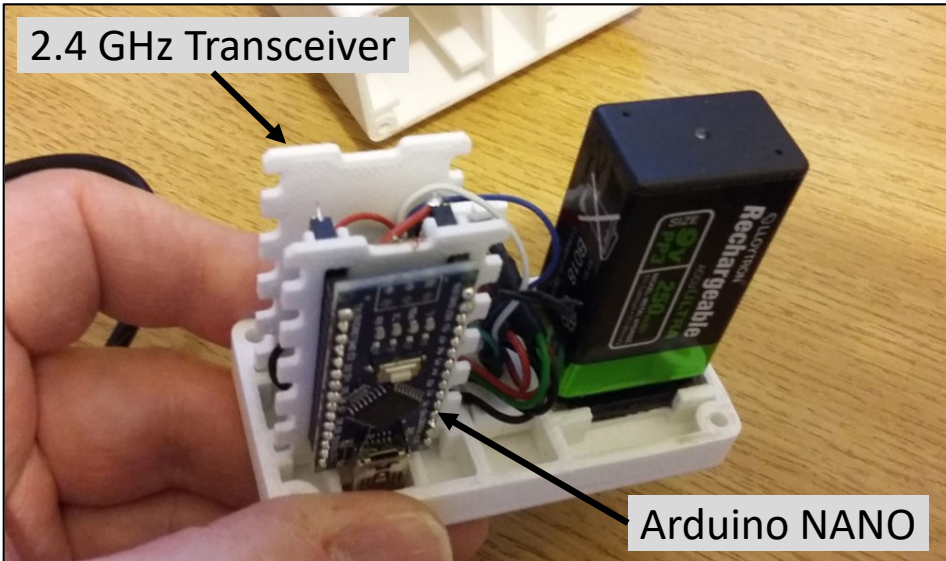
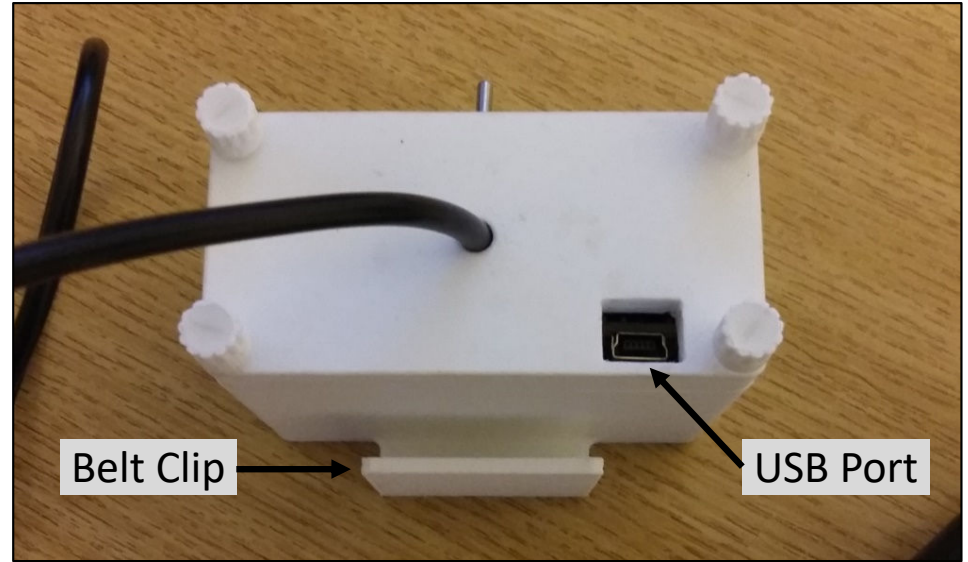
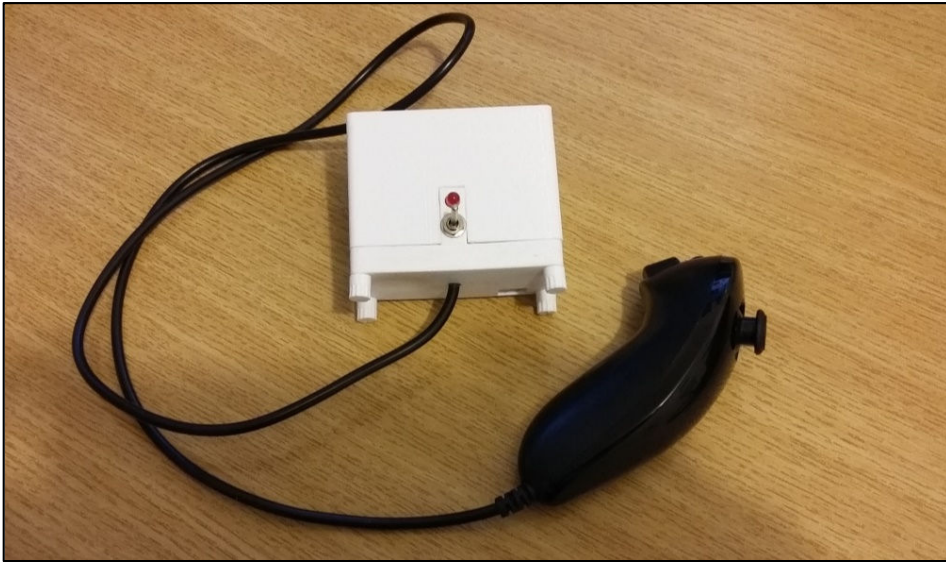


ON/OFF Power Switch

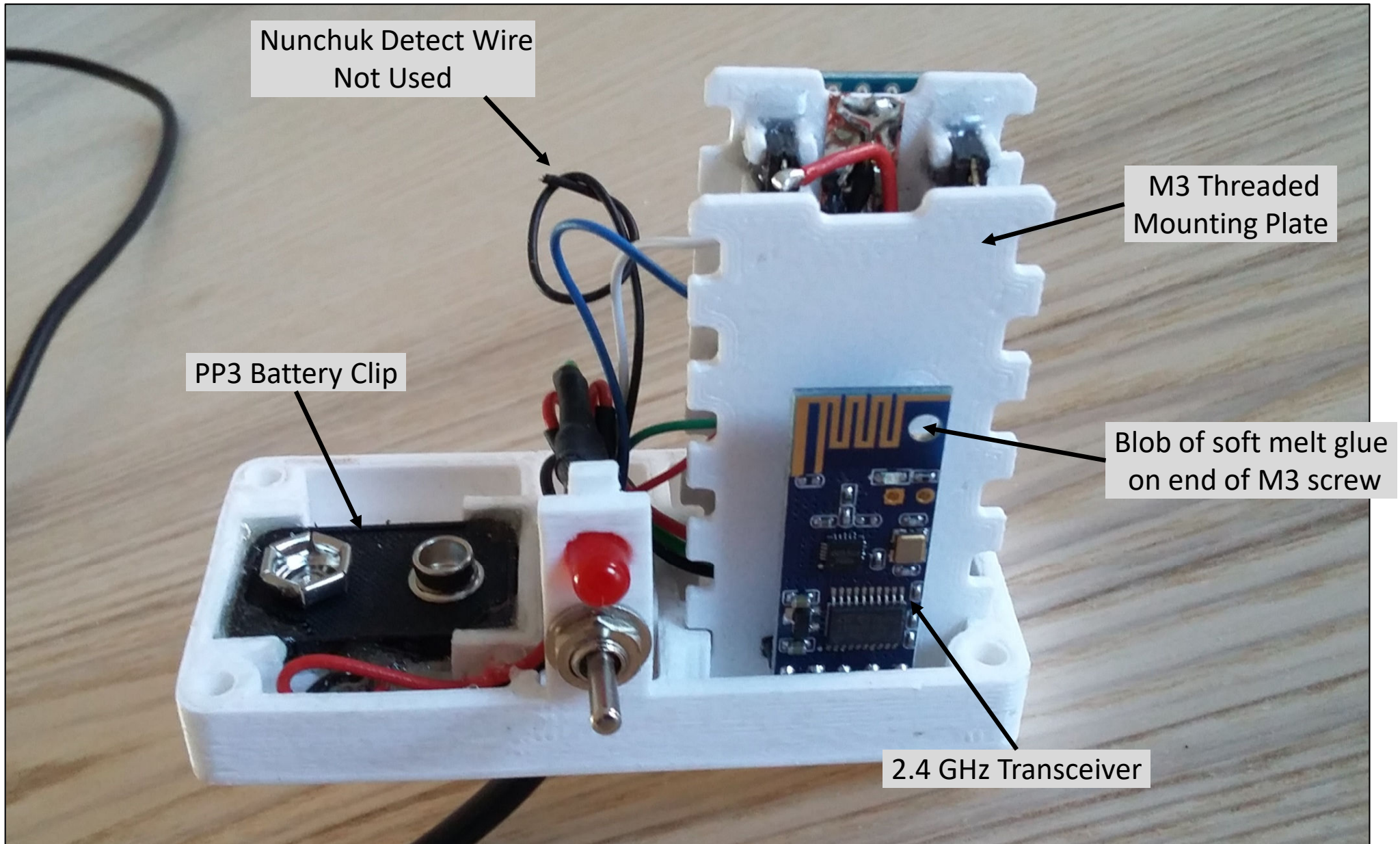


Nunchuk Controller
Det VDD SCK SDA GND

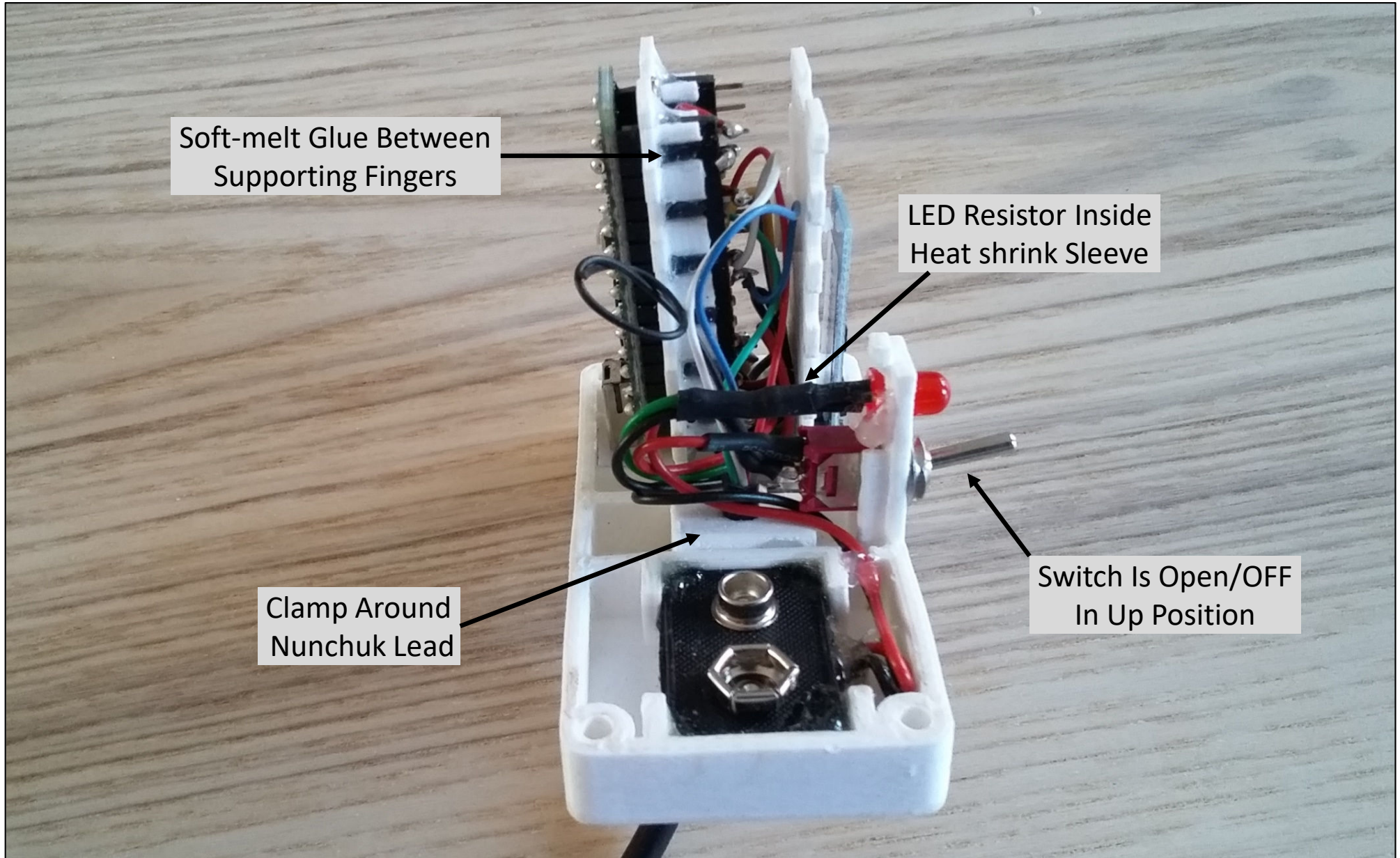
Nunchuk Controller Images

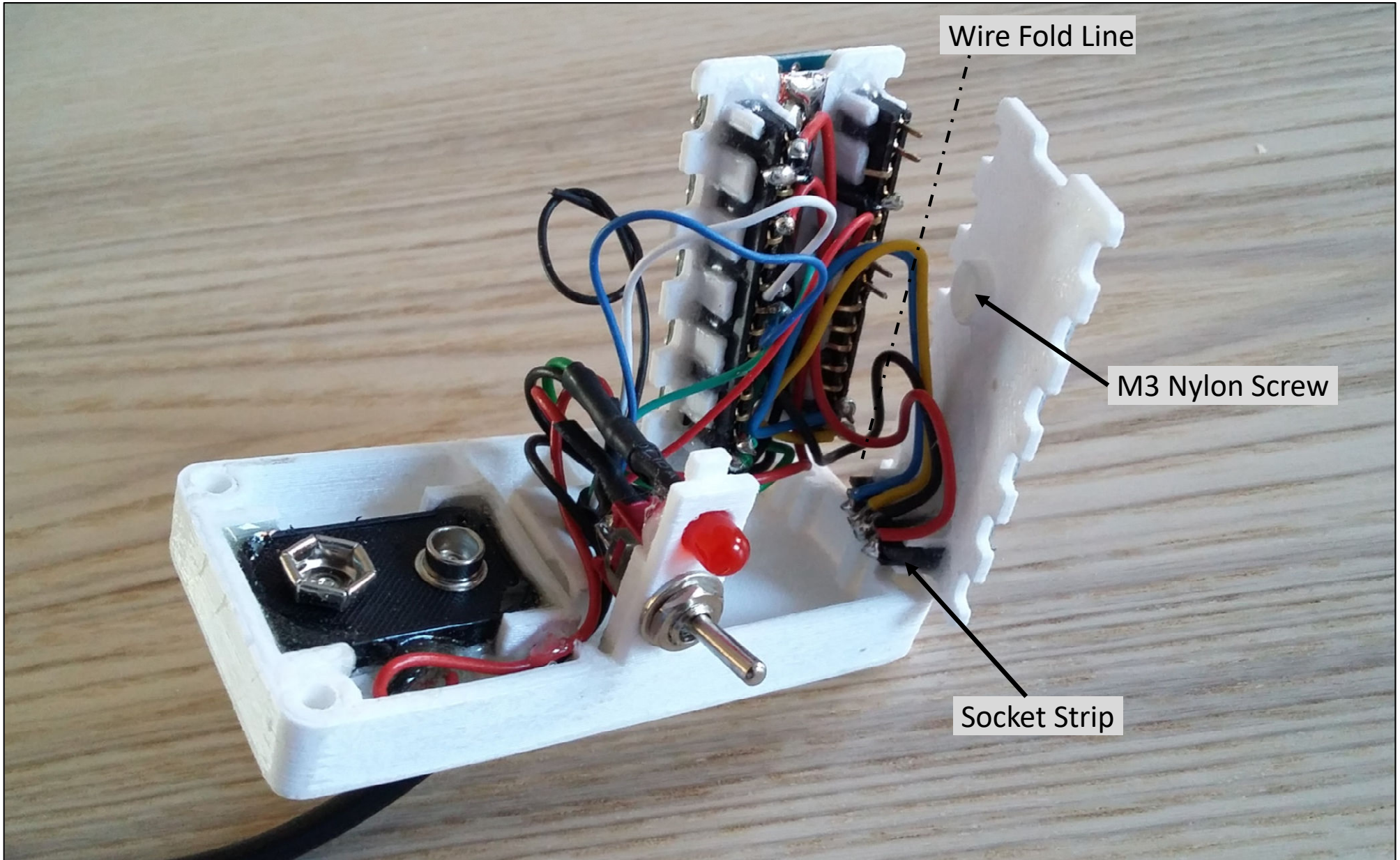


Nunchuk Controller Images

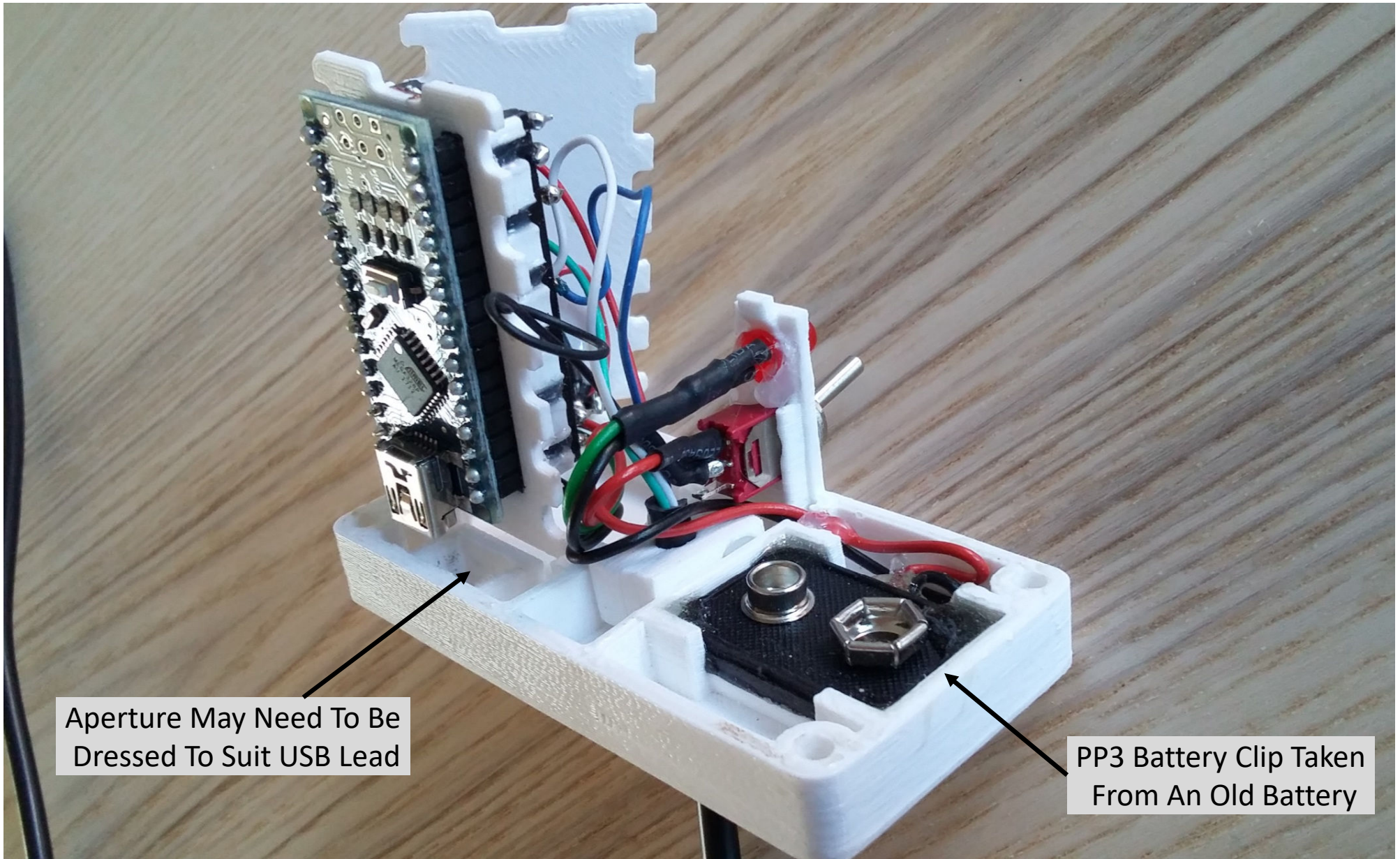


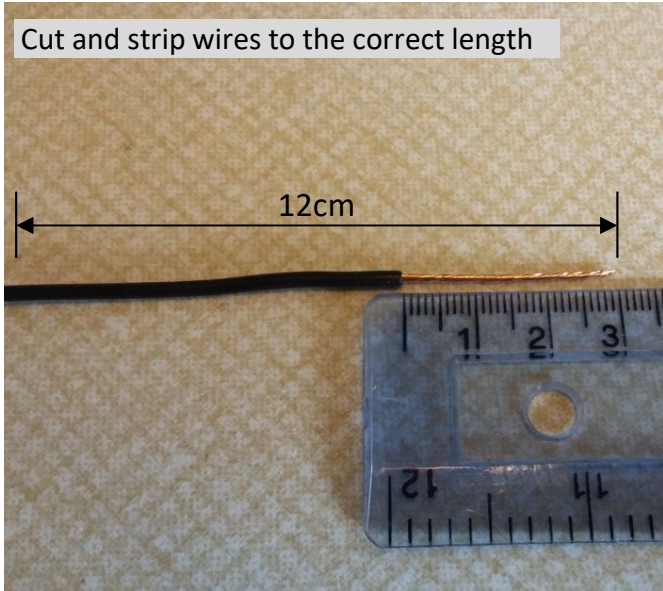
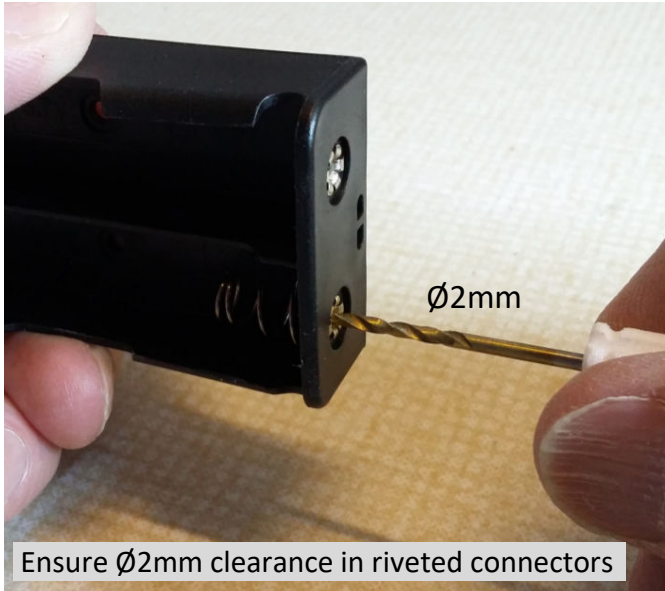
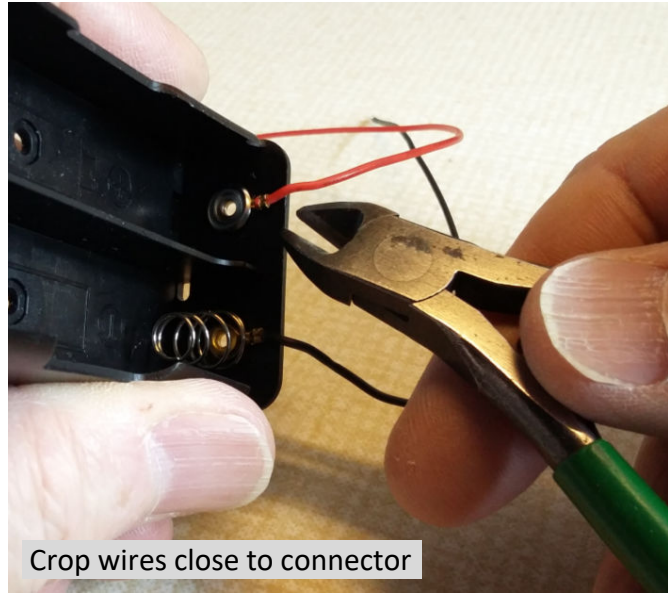
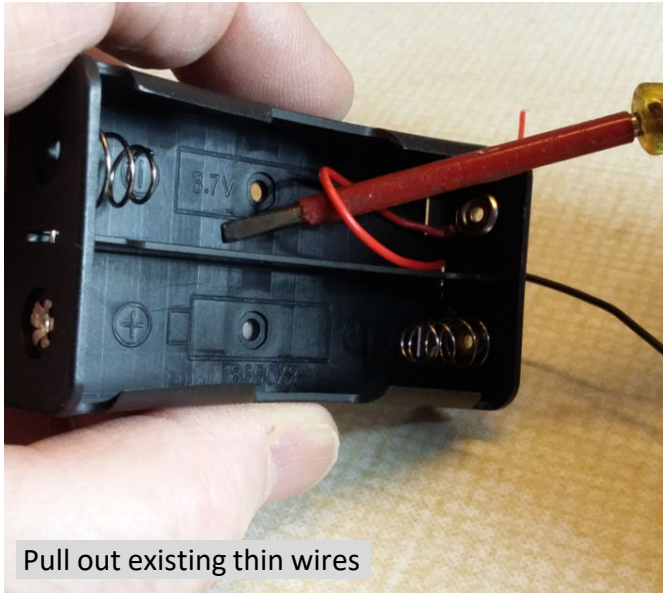
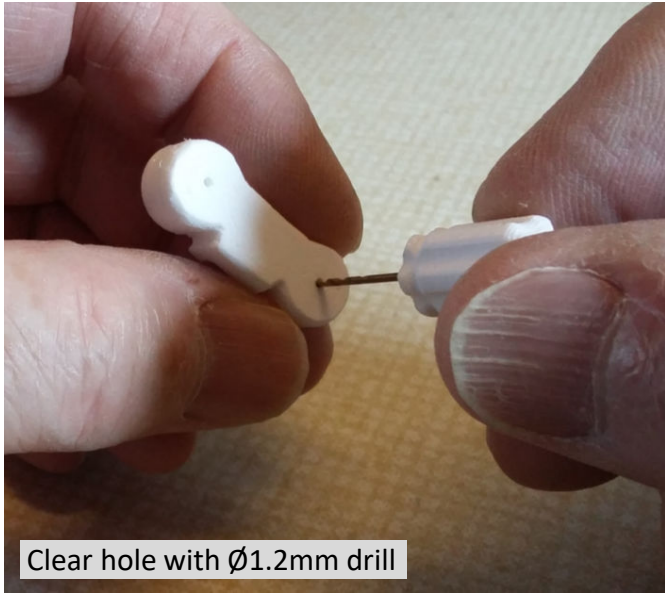
Nunchuk Controller Images

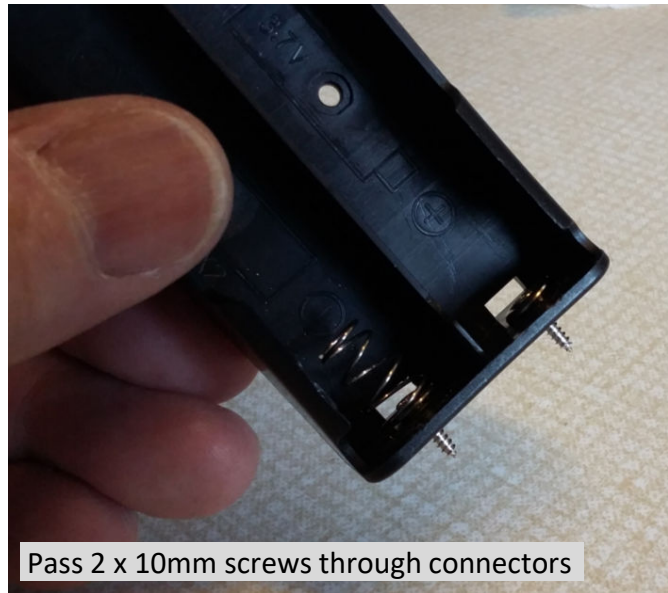
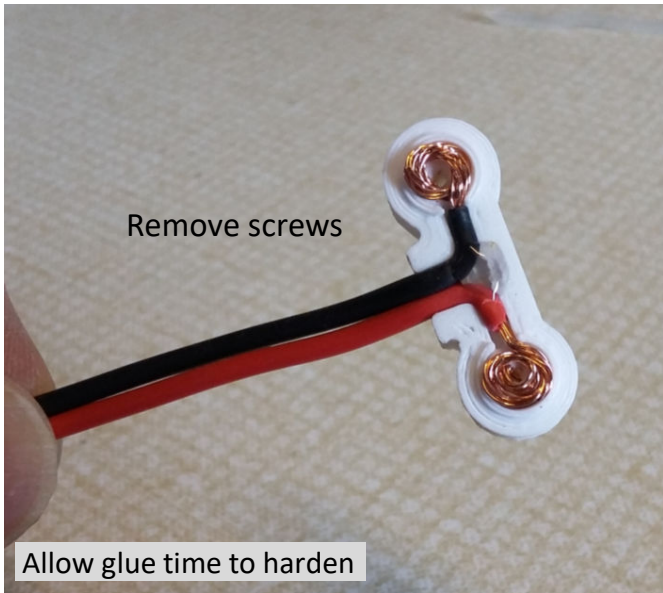
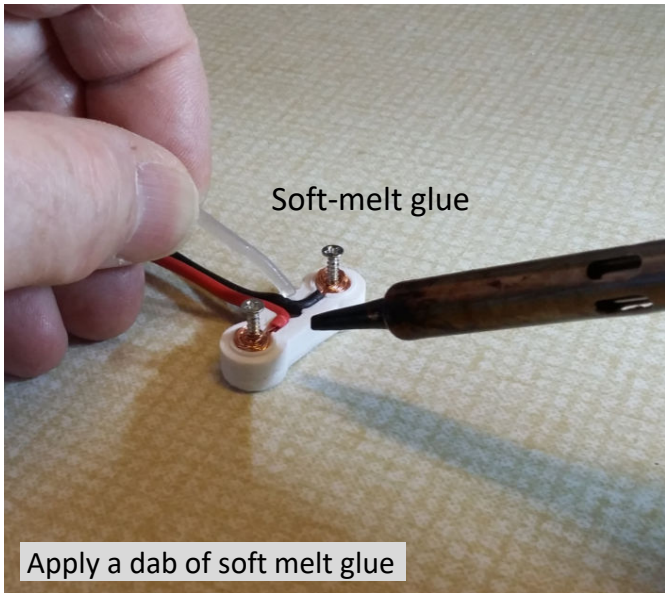
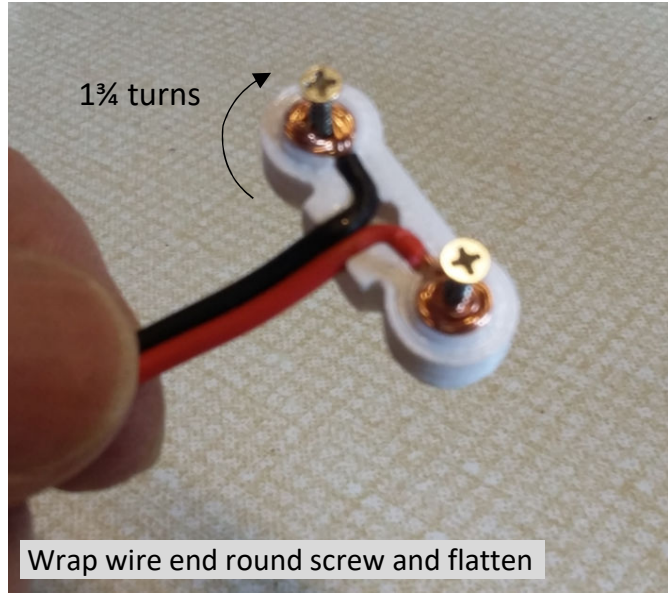
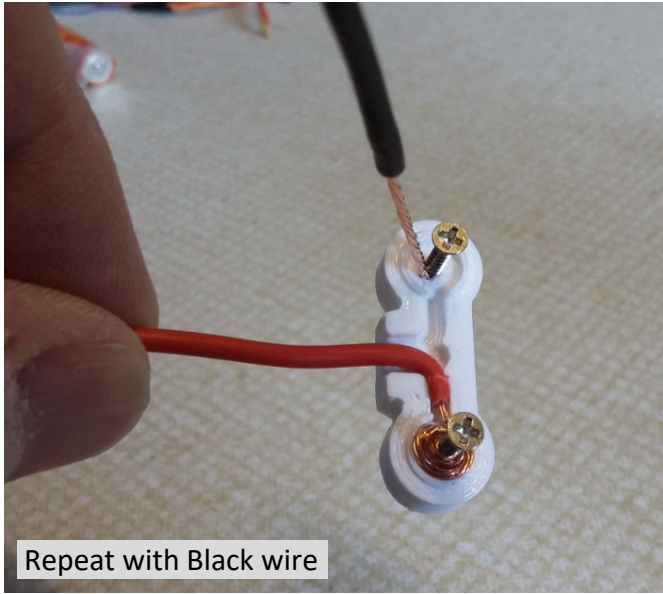
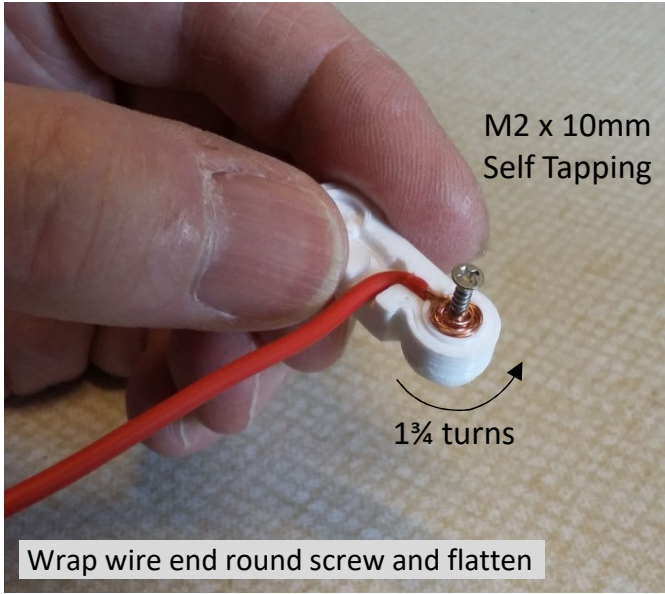


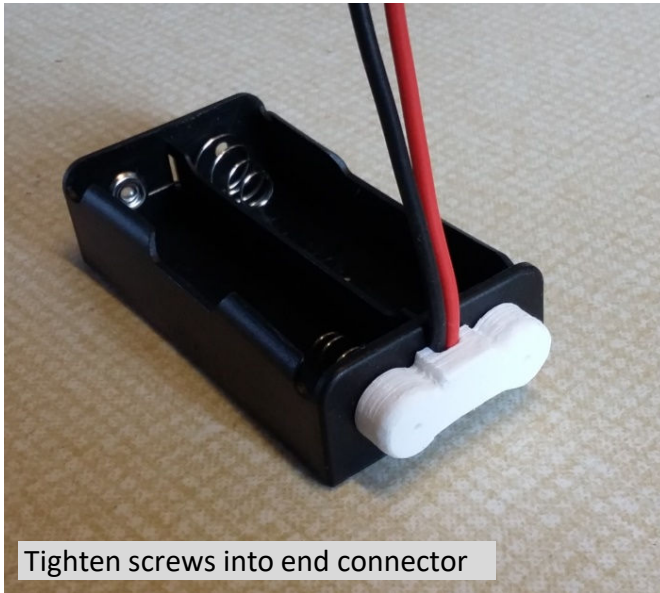


Nunchuk Controller Images

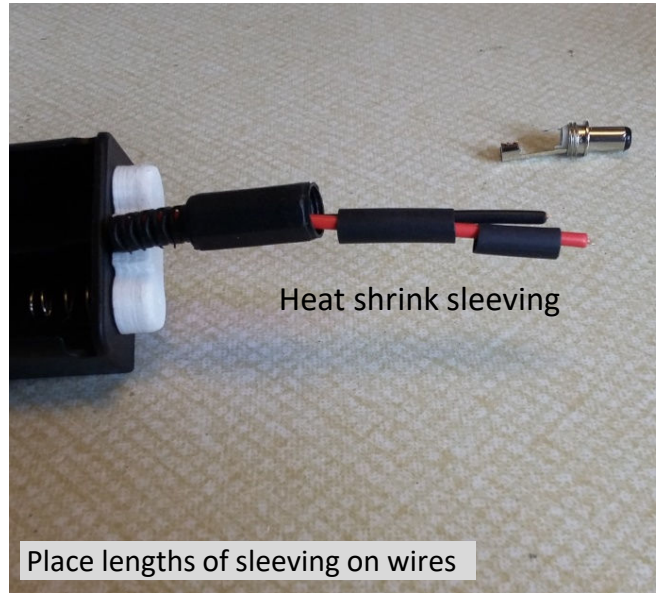






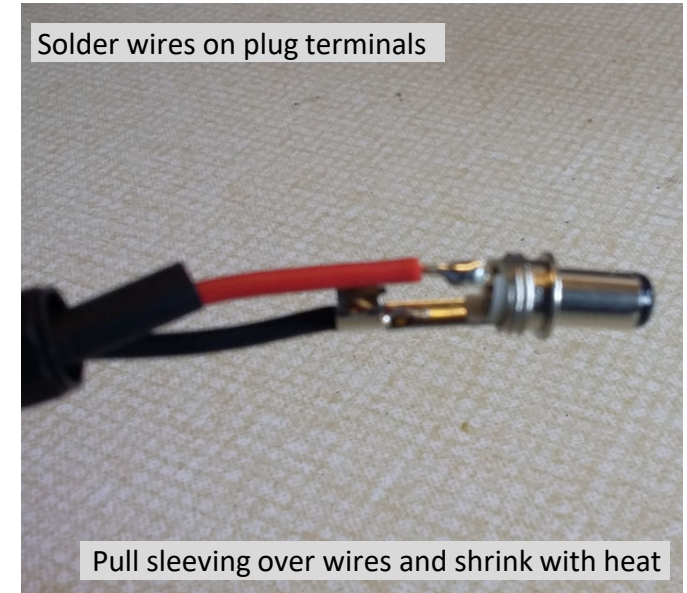


Tighten screws into end connector



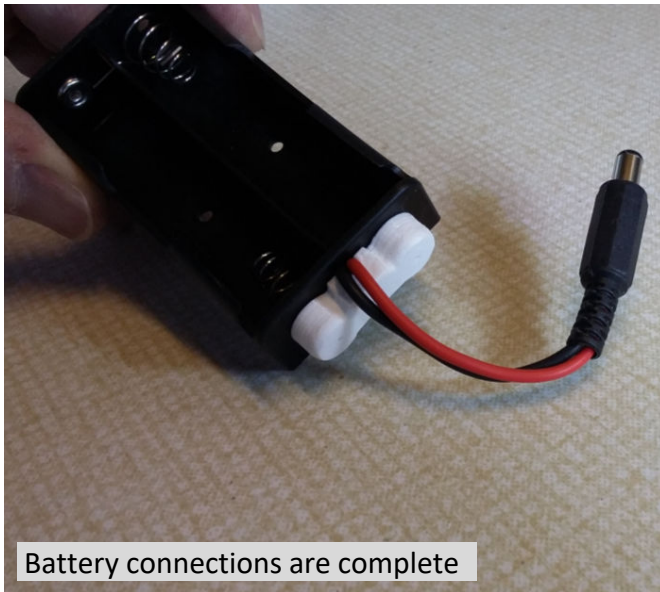
Heat shrink sleeving

Place lengths of sleeving on wires

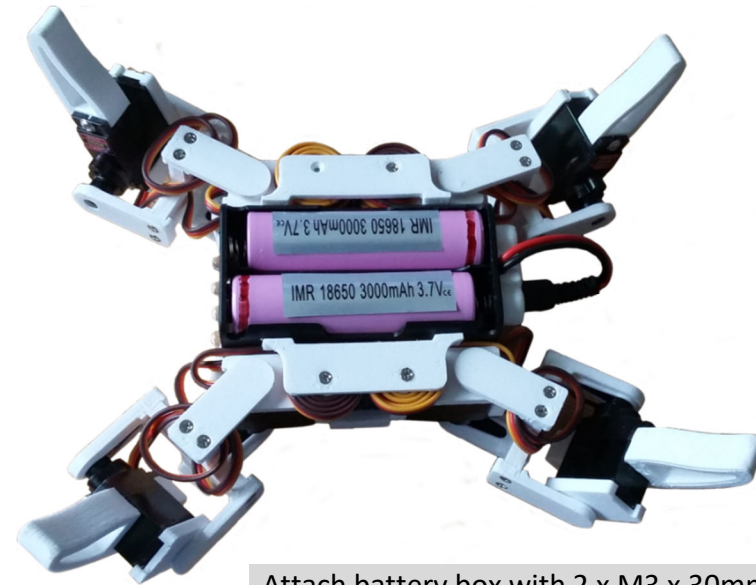


Solder wires on plug terminals

Pull sleeving over wires and shrink with heat

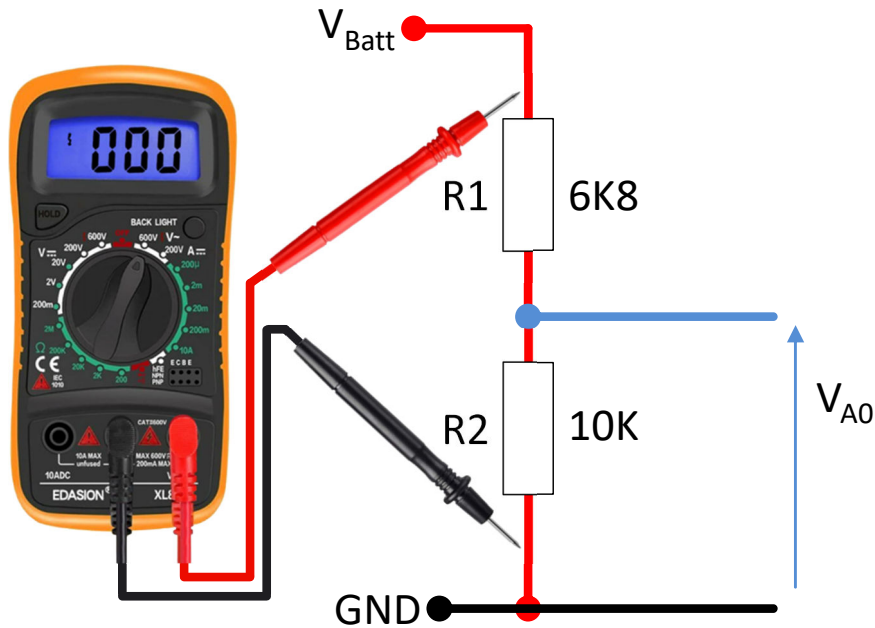


Battery connections are complete



Attach battery box with 2 x M3 x 30mm nylon screws

Quadruped Battery Monitor (Protection)



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

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

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

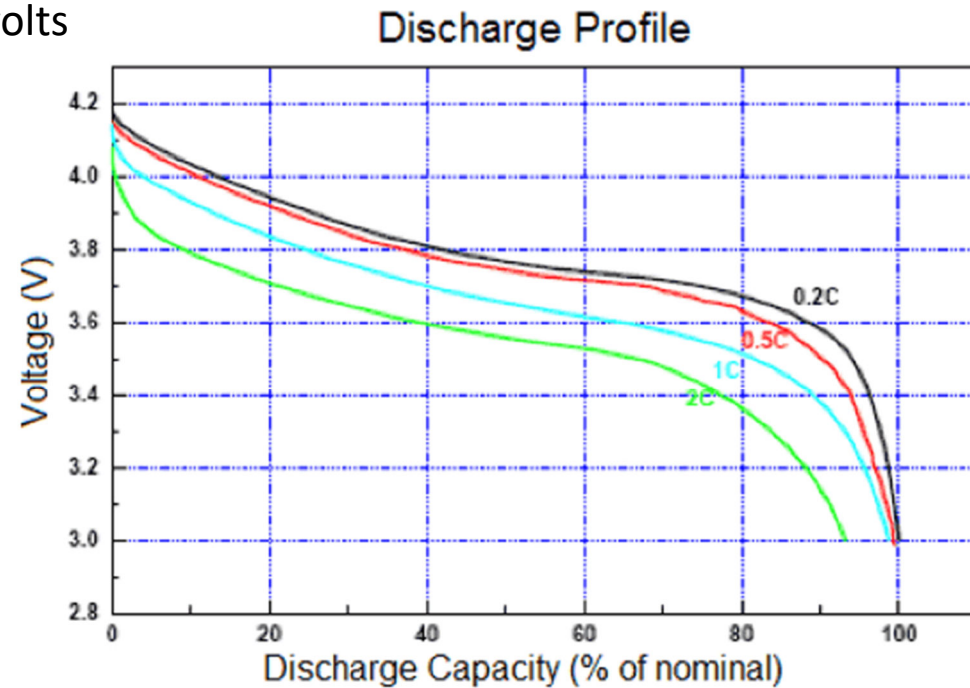
$$V_{A0D} = \frac{V_{A0} \times 1023}{5}$$

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

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.

