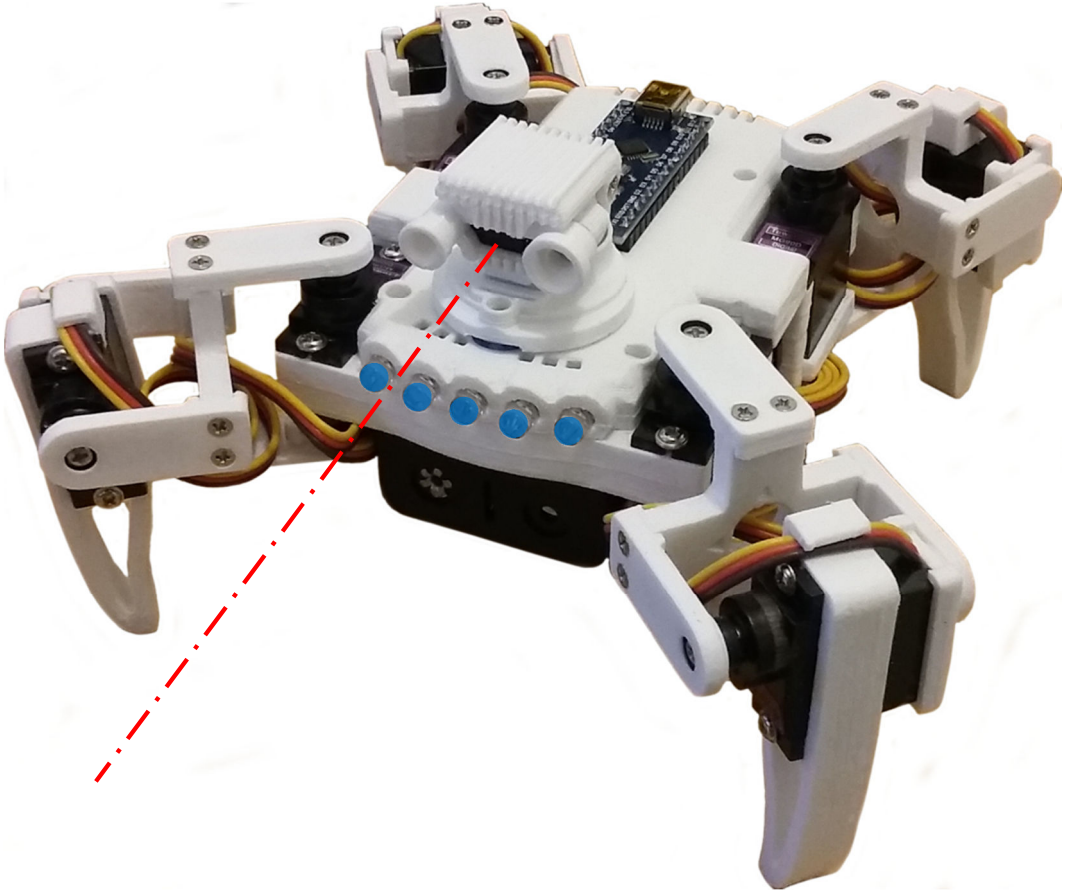
Autonomous Quadruped Robot

Wiring Diagrams



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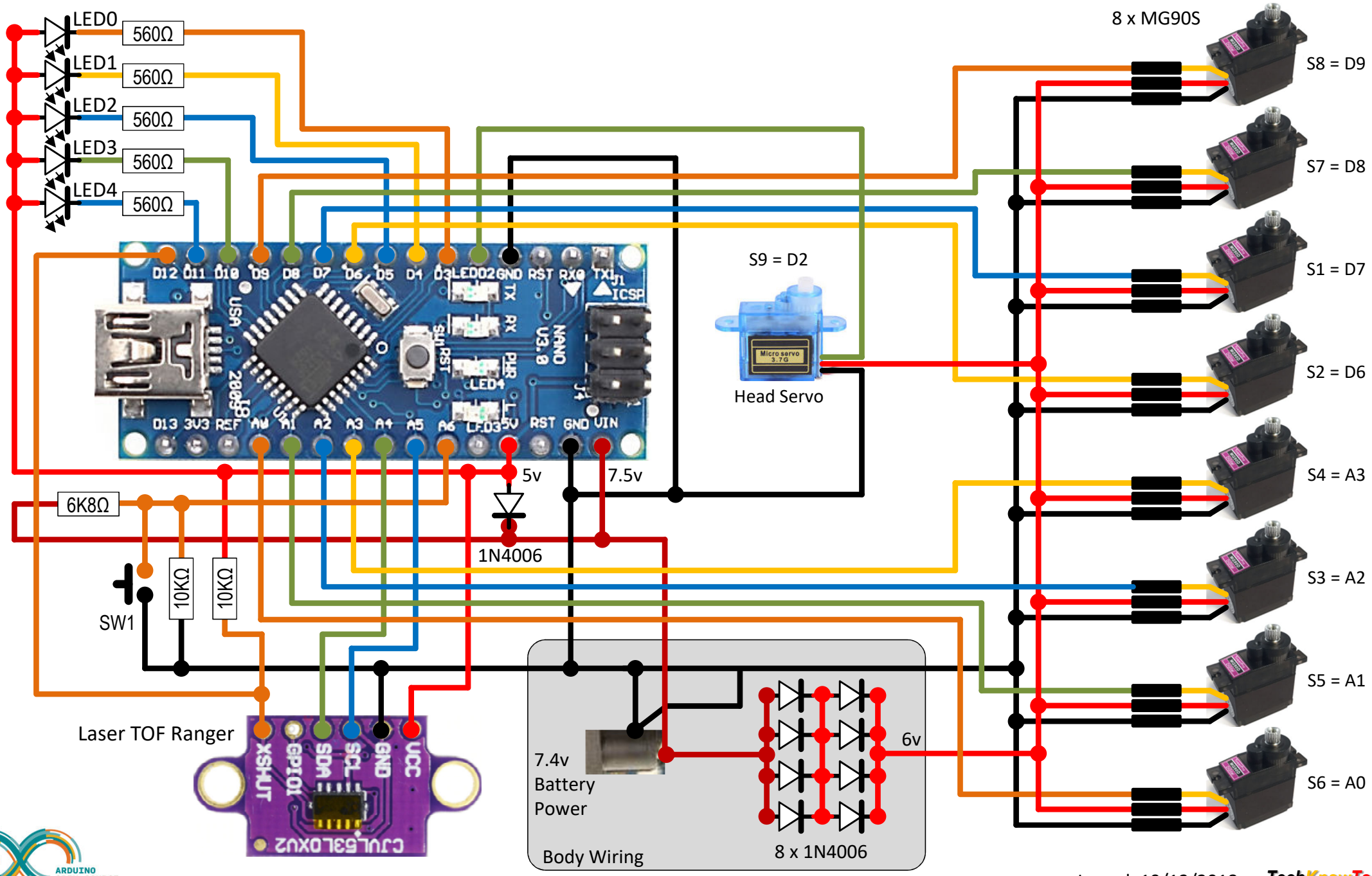
Quadruped 'Auto' – Wiring Plan



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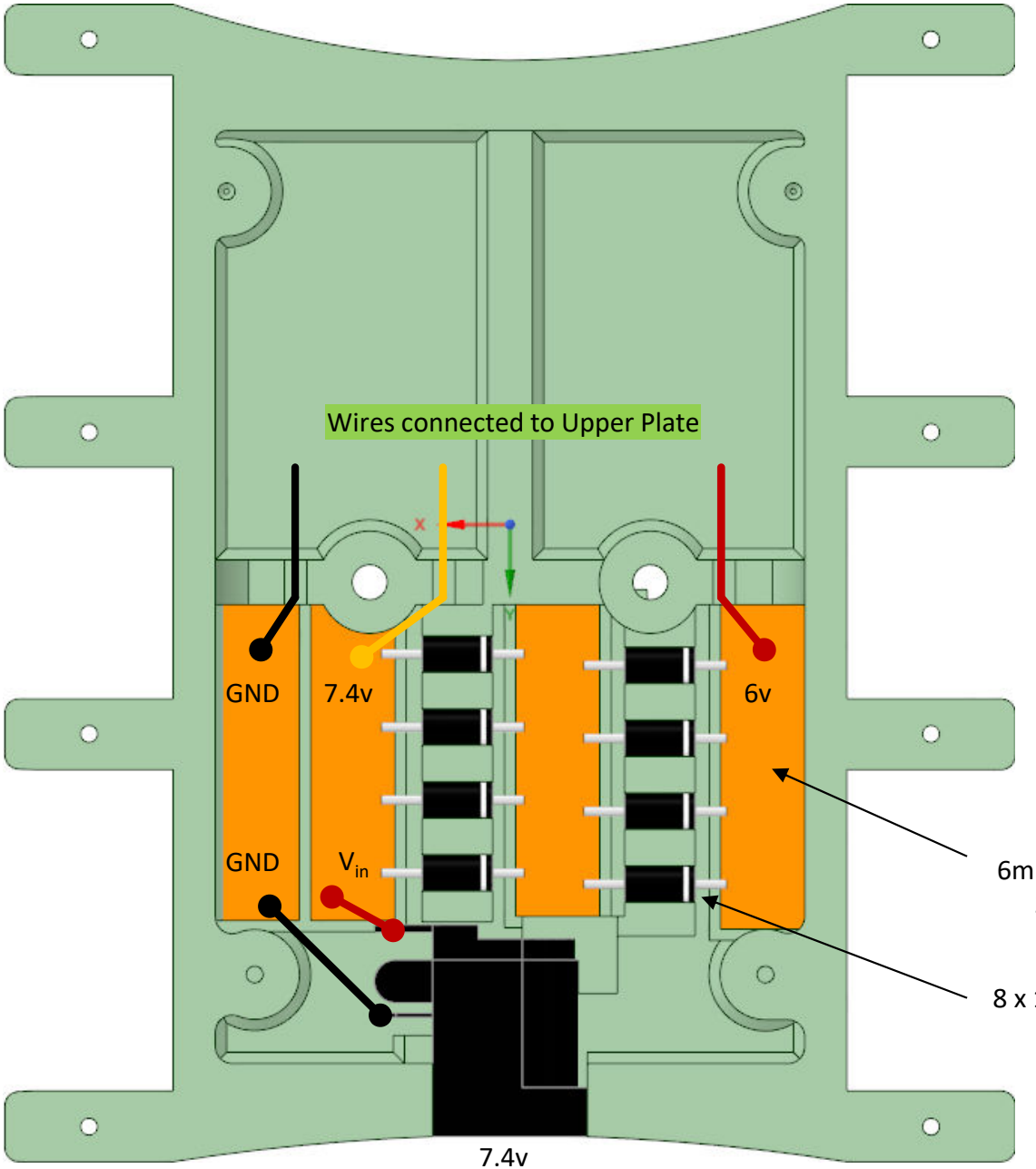
Quadruped ‘Auto’ - Body Wiring Plan



Viewed from above.

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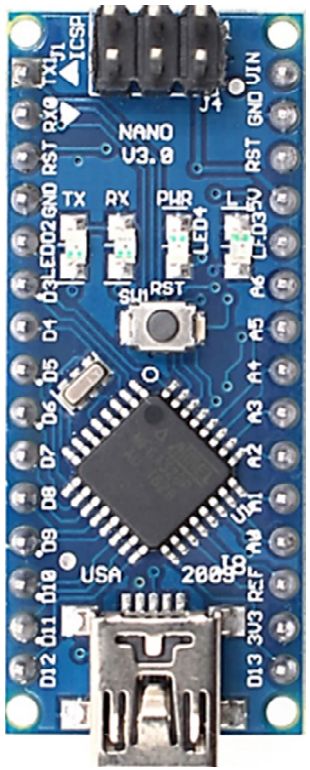
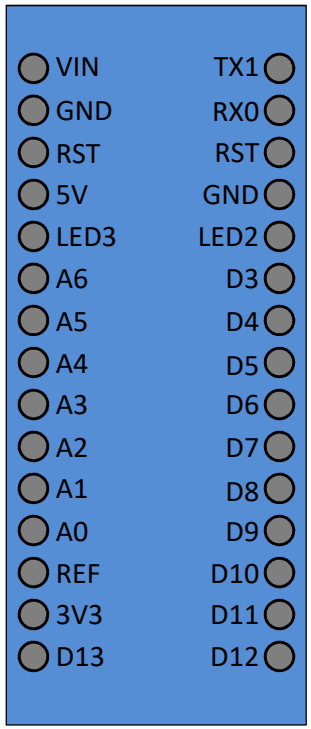
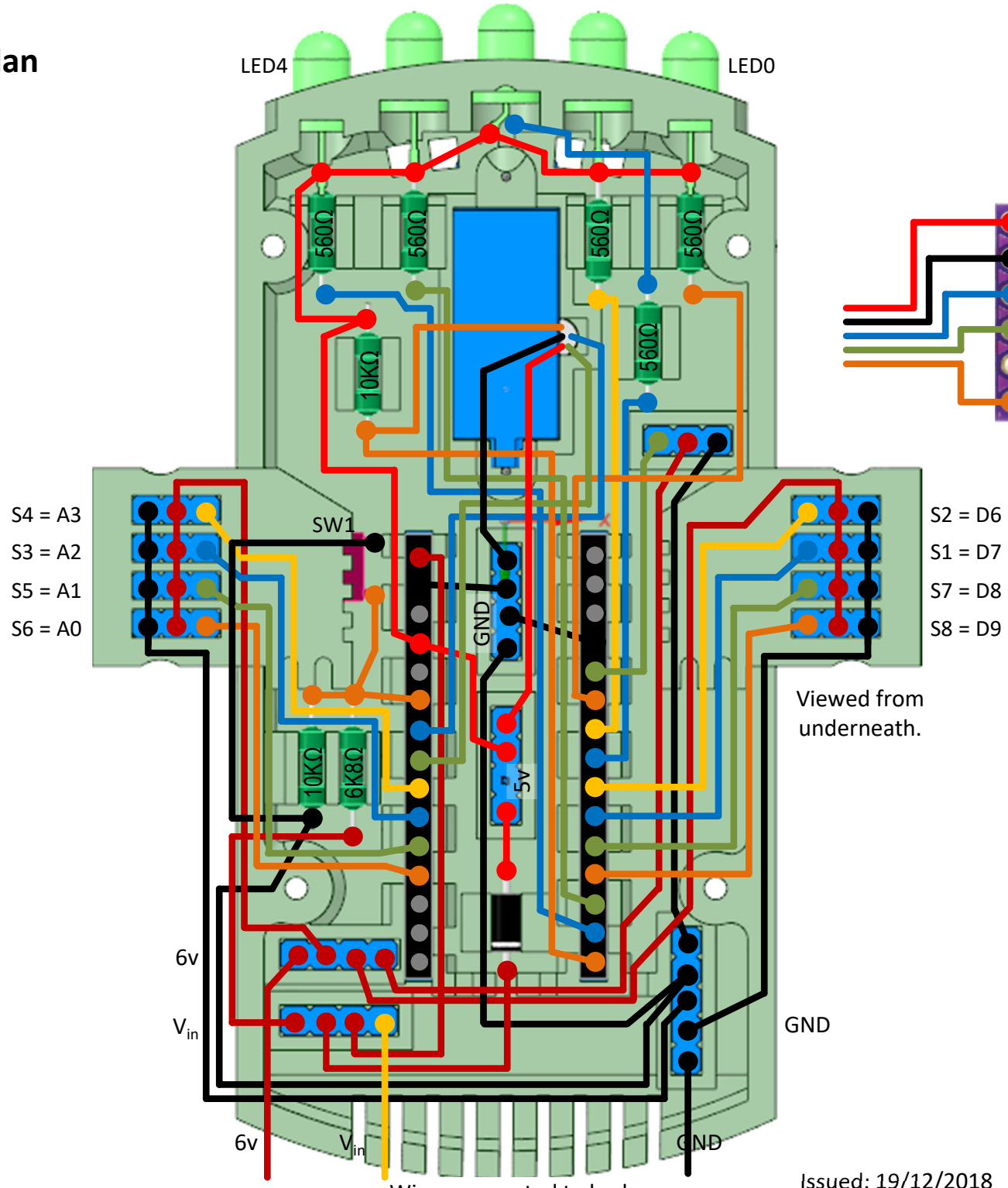
Quadruped ‘Auto’ Cover Wiring Plan

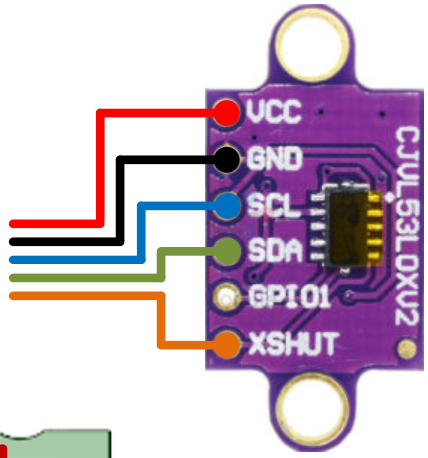
Top View



Underside View







Viewed from underneath.

Wires connected to body

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Hand Tools & Consumables

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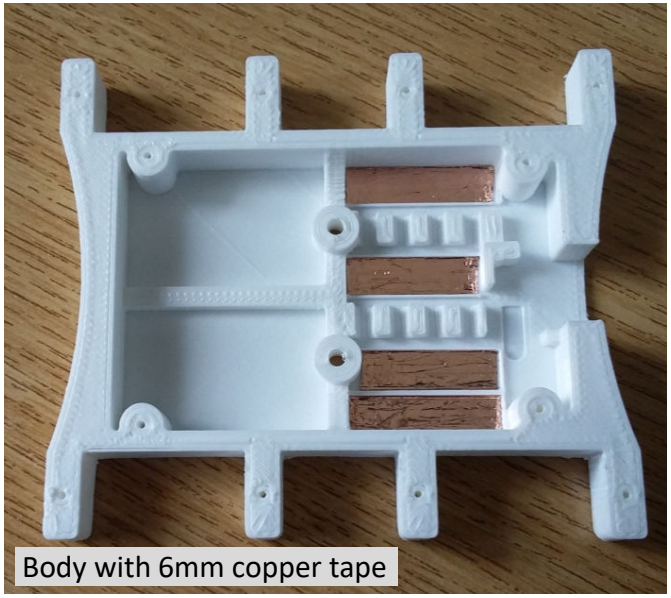
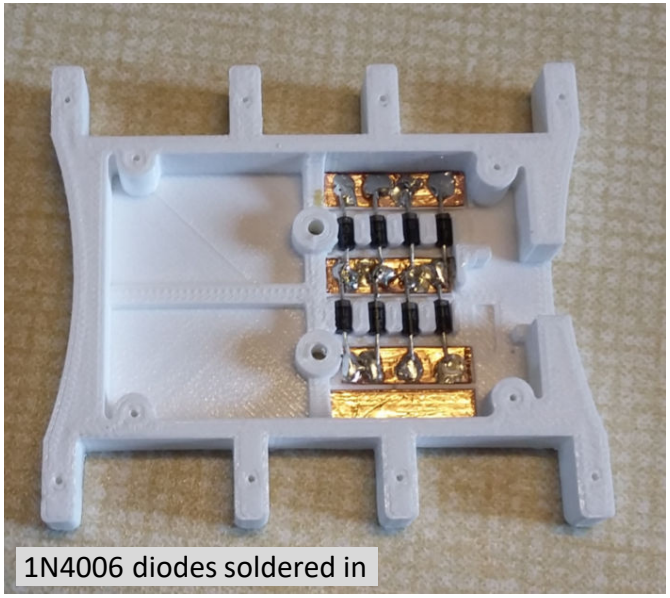
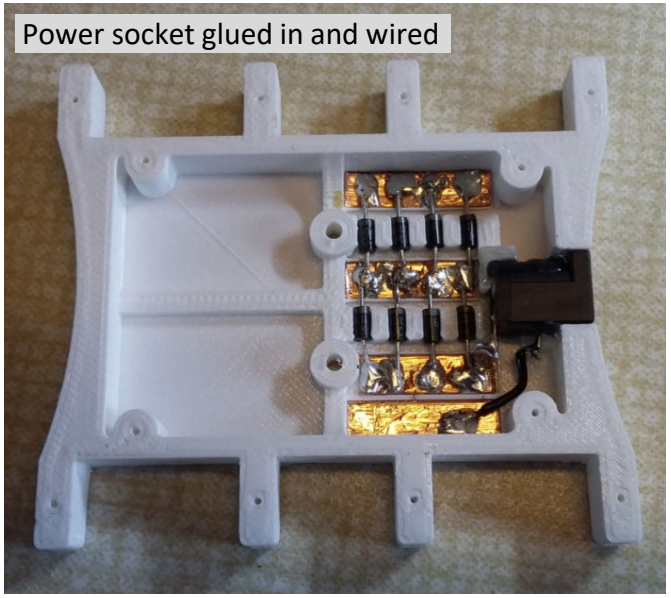


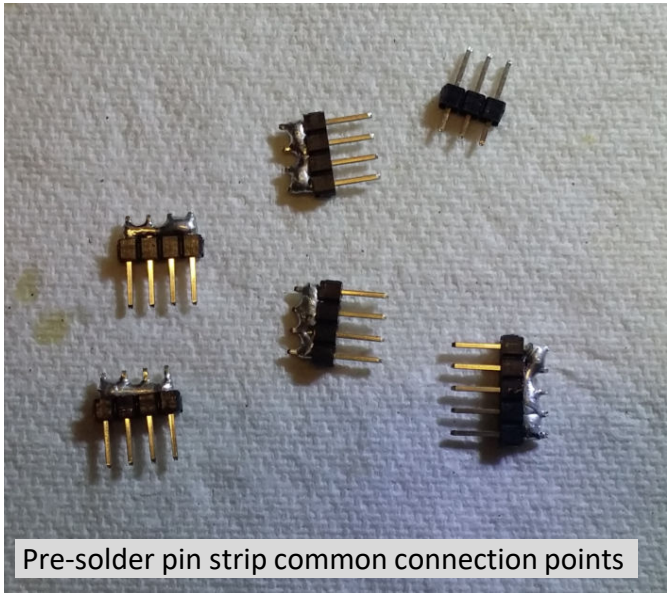
Body with 6mm copper tape



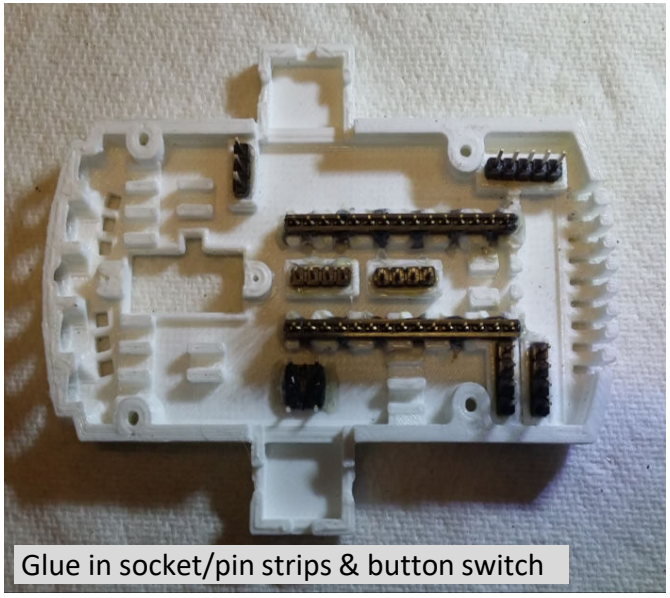
1N4006 diodes soldered in



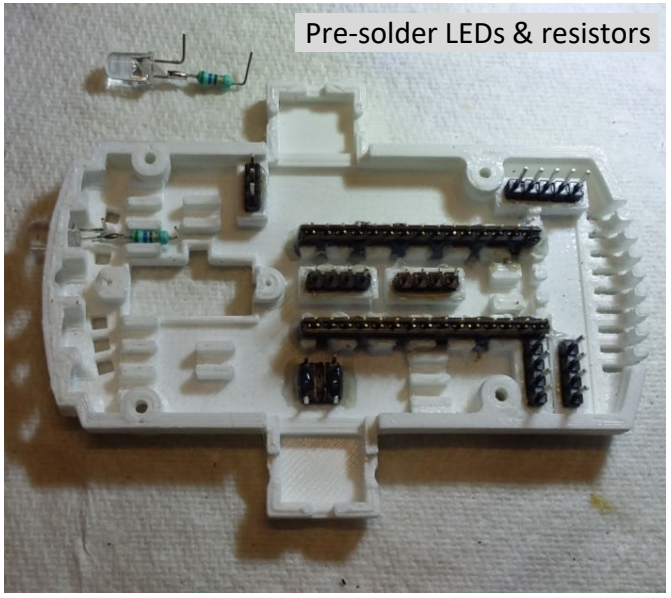
Power socket glued in and wired



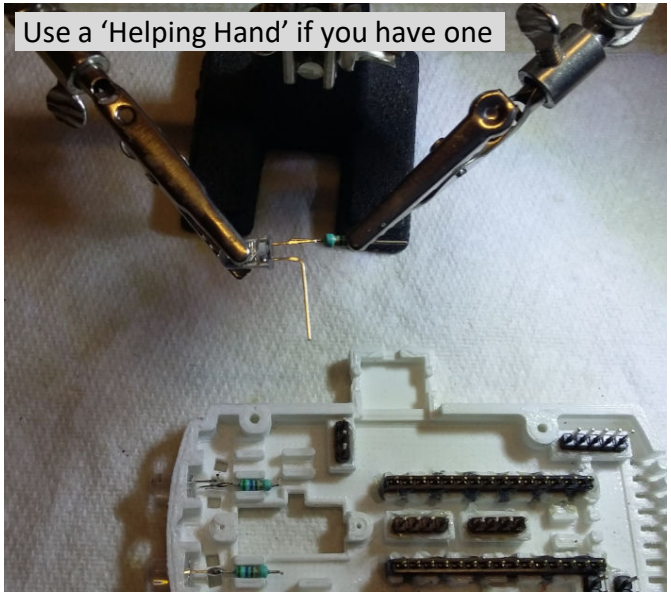
Pre-solder pin strip common connection points

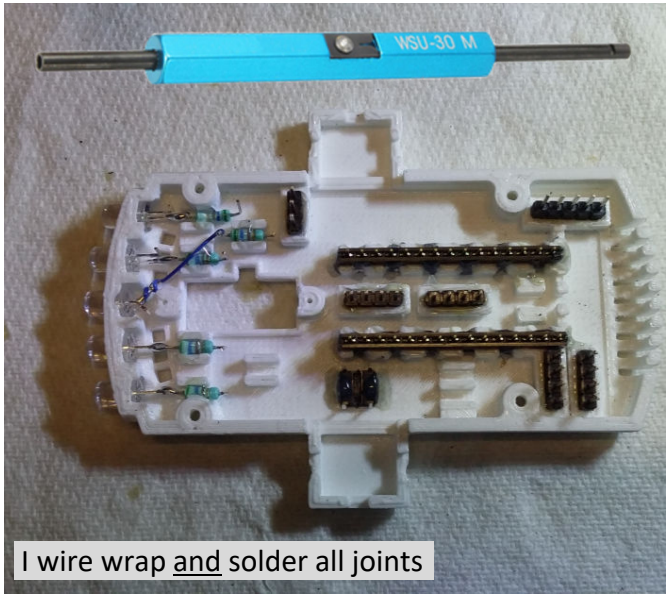


Glue in socket/pin strips & button switch

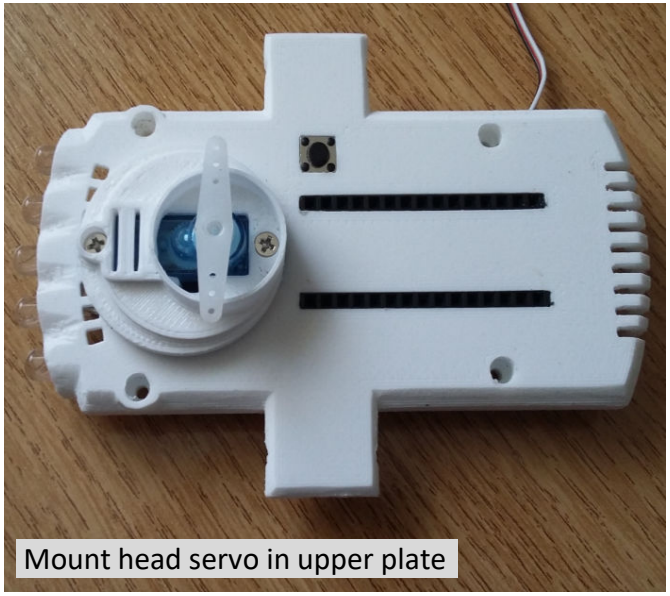


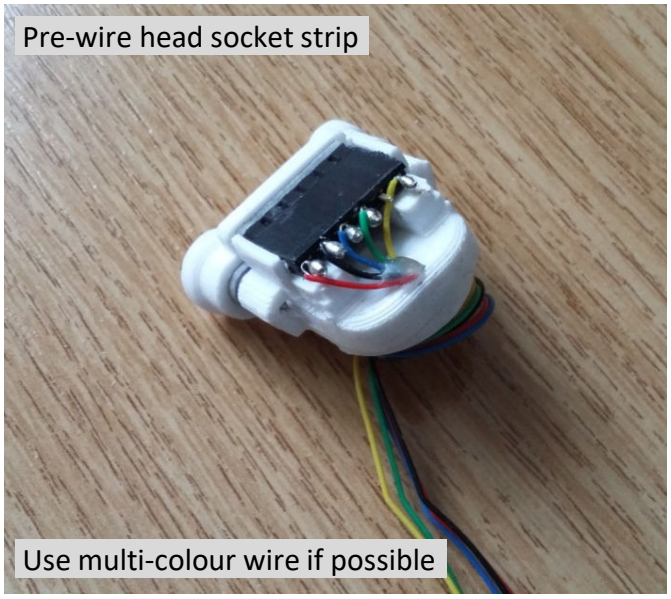
Pre-solder LEDs & resistors


Use a ‘Helping Hand’ if you have one

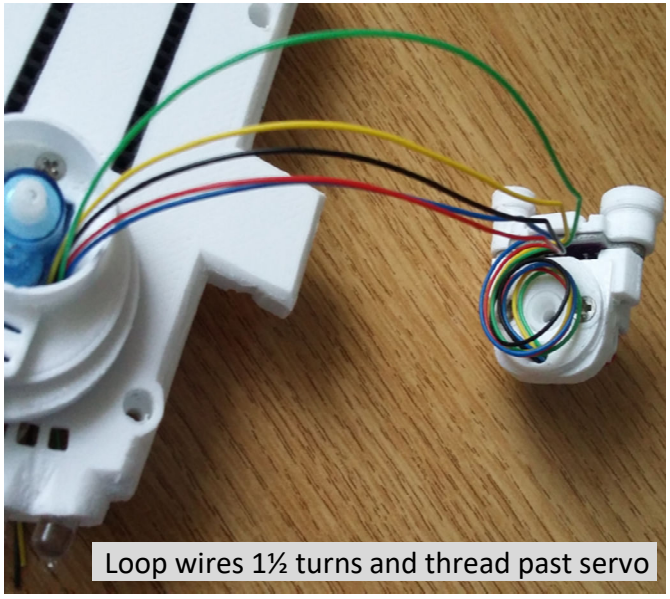


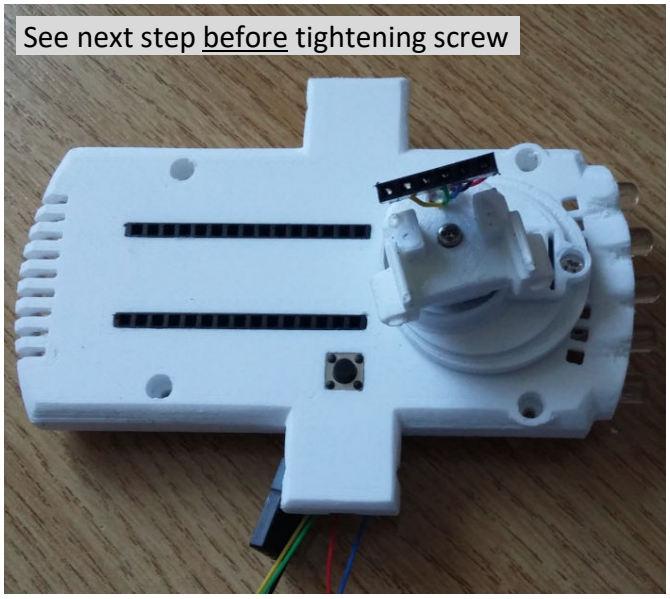
I wire wrap and solder all joints

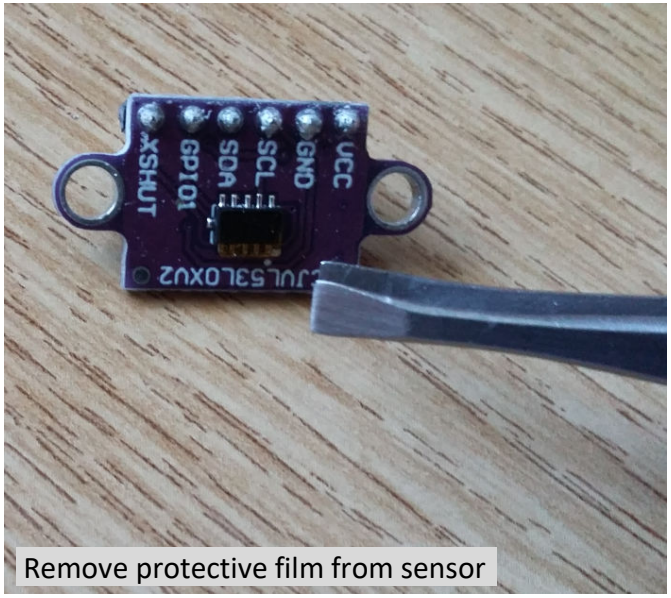

Mount head servo in upper plate


Pre-wire head socket strip

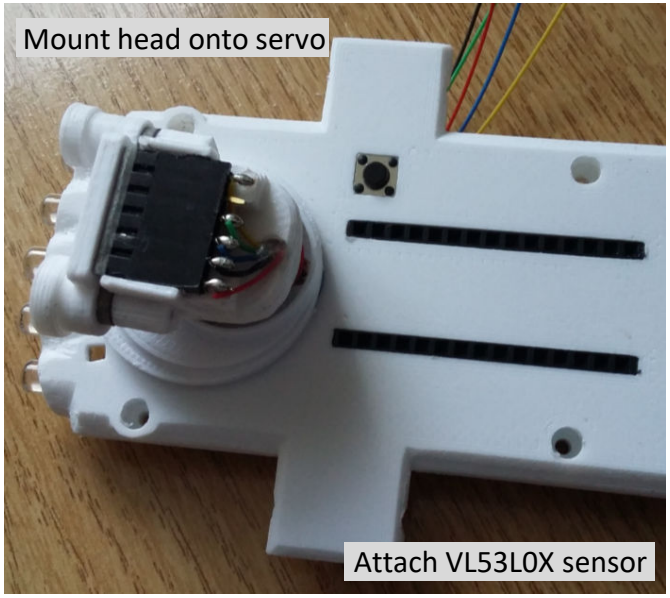
Use multi-colour wire if possible


Loop wires 1½ turns and thread past servo

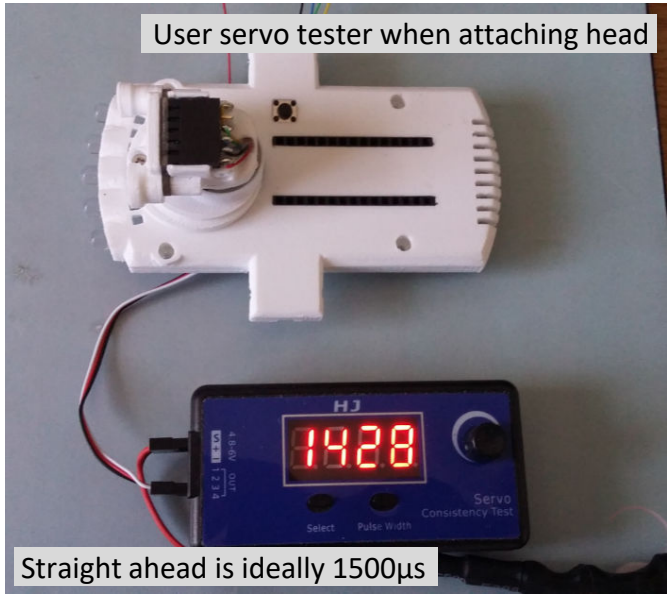

See next step before tightening screw



Remove protective film from sensor

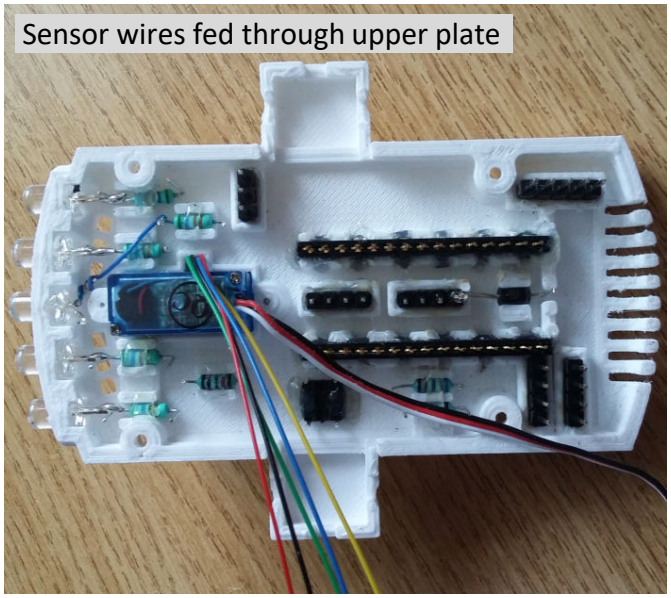

Mount head onto servo

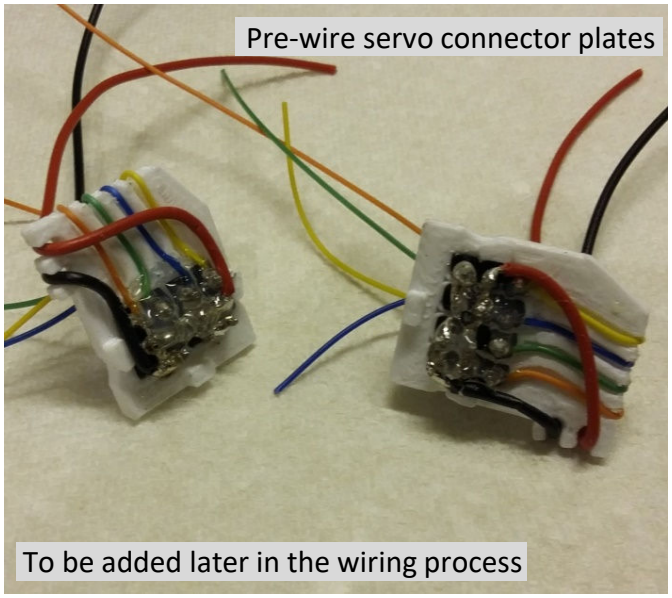
Attach VL53L0X sensor



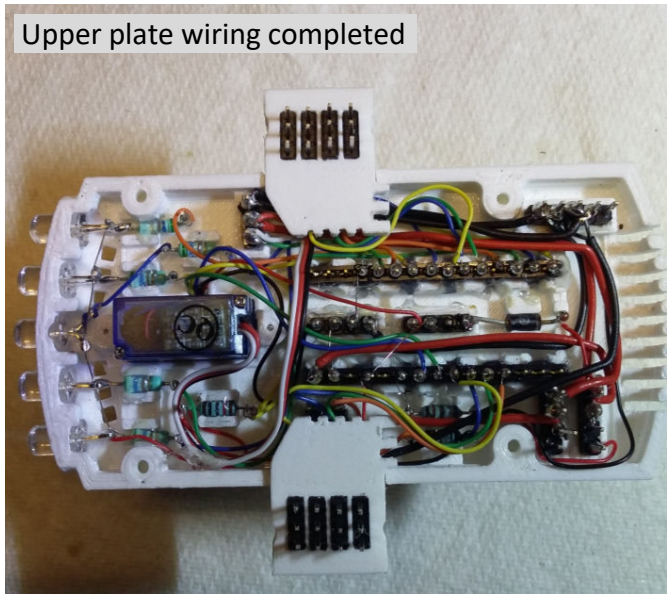
User servo tester when attaching head

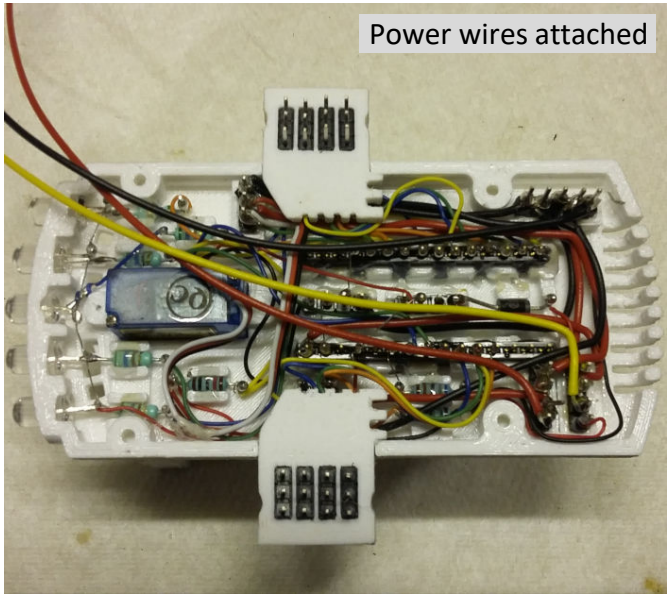
Straight ahead is ideally 1500µs

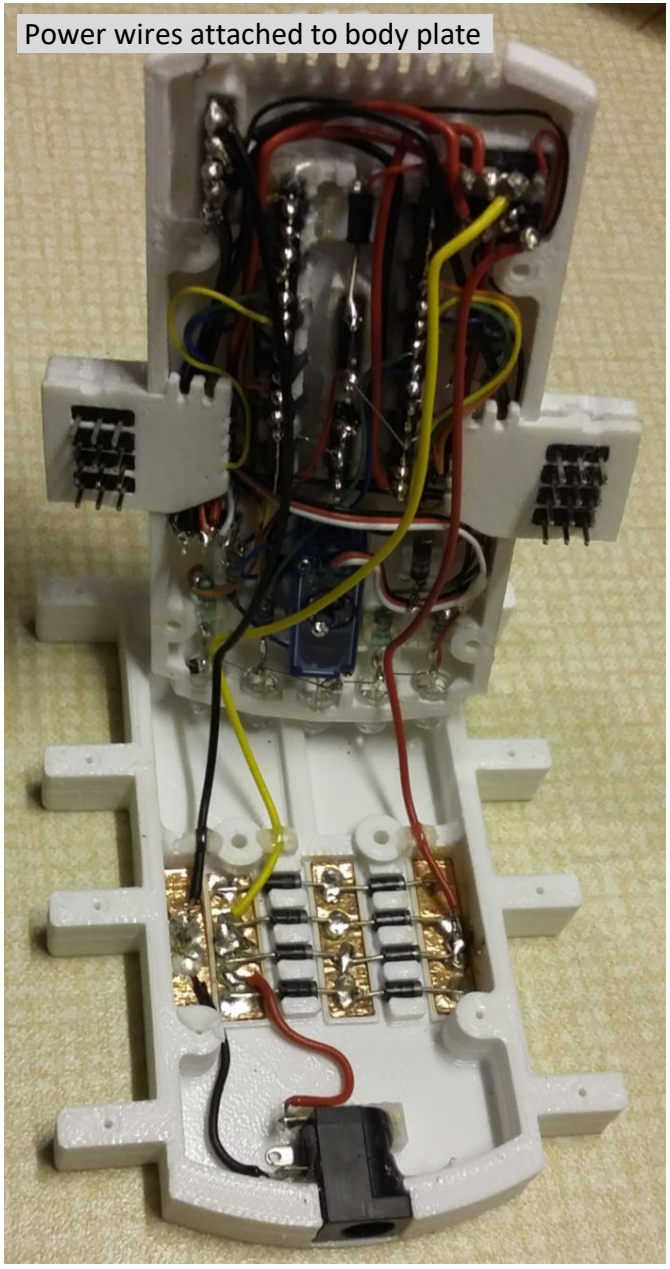

Sensor wires fed through upper plate

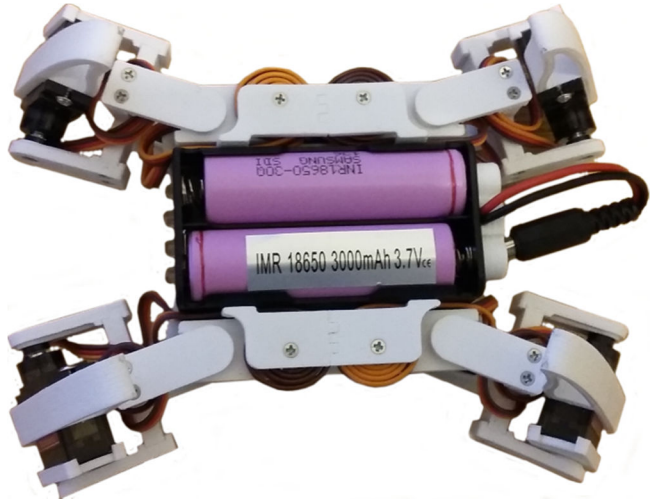

Pre-wire servo connector plates

To be added later in the wiring process

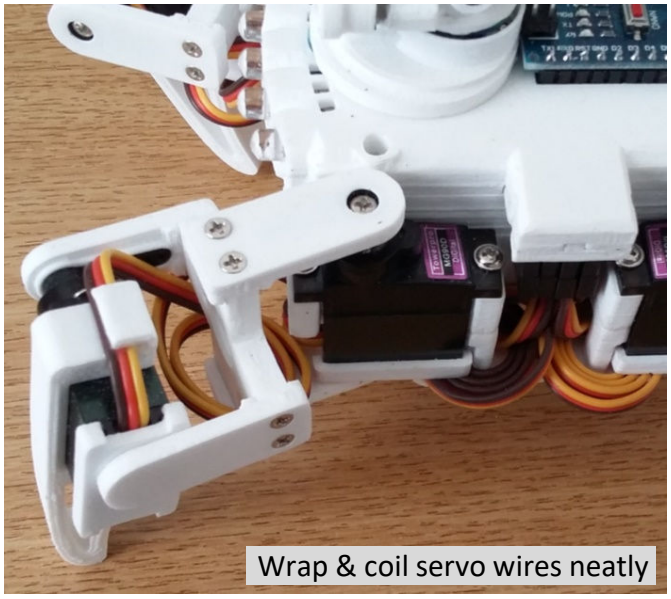

Upper plate wiring completed

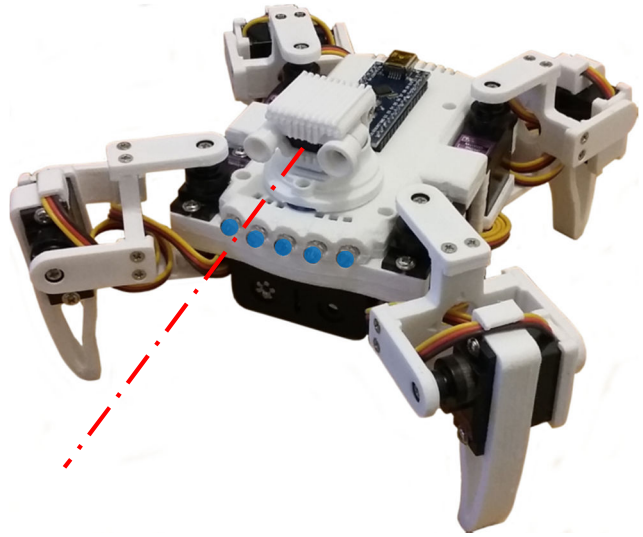




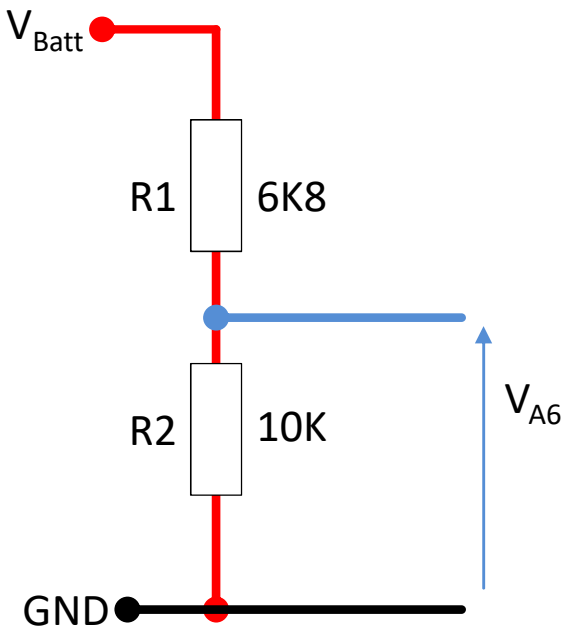


Cover plates protect wire coils





Quadruped Battery Monitor (Protection)



$$V_{A6} = \frac{V_{Batt} \times R2}{R1 + R2}$$

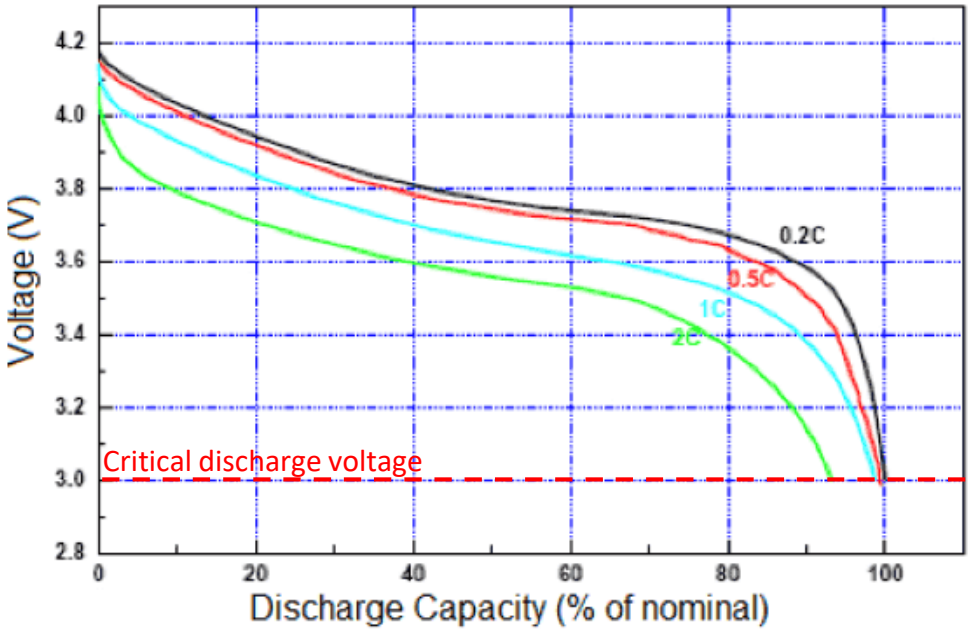
$$V_{A6} = \frac{V_{Batt} \times 10K}{16K8}$$

V_{FSD} = 8.4v @ V_{A6} = 5v

$$V_{A6D} = \frac{V_{A6} \times 1023}{5}$$ voltage read by 10-bit ADC

$$V_{A6D} = \frac{V_{Batt} \times 0.5952 \times 1023}{5}$$

18650 Lithium Battery
Discharge Profile



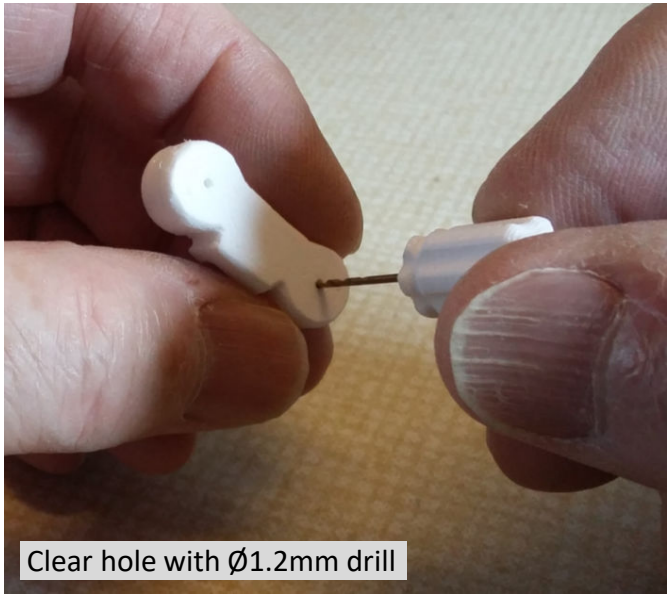
Discharge: 3.0V cutoff at room temperature.

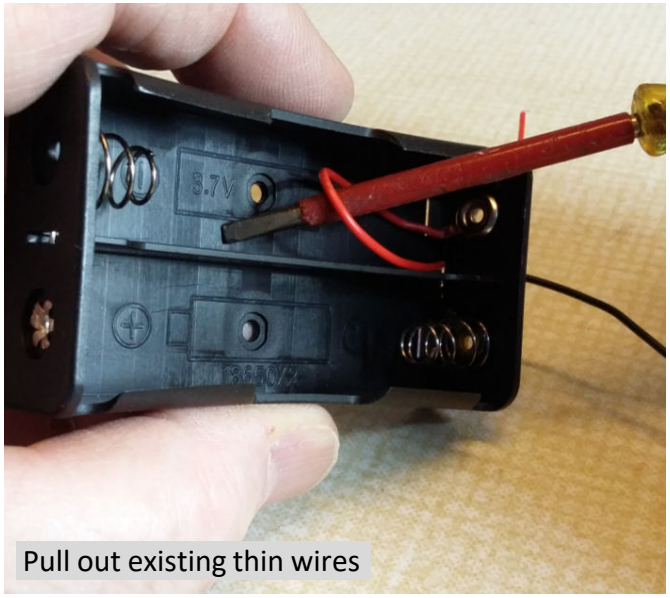
Two cells in series gives a nominal 7.4v constant discharge voltage. To prevent damage, stop using once the following conditions are reached:

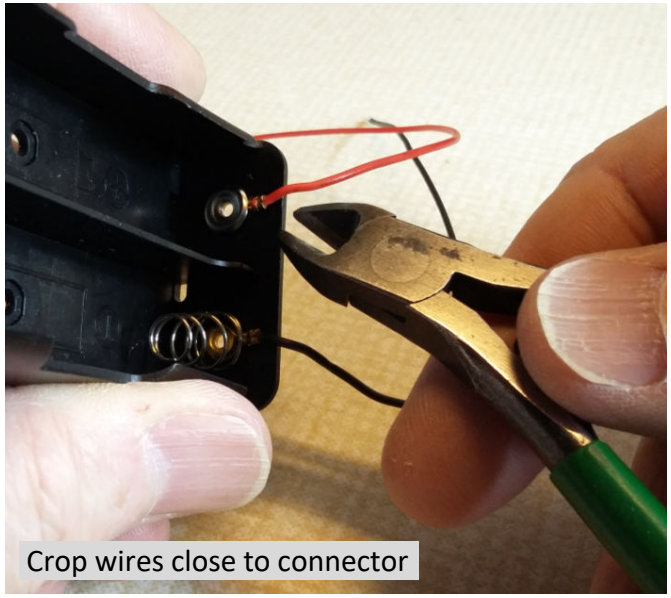
3.60 + 3.00 = 6.60v (one battery fades early)
3.30 + 3.30 = 6.60v (both batteries fade together)

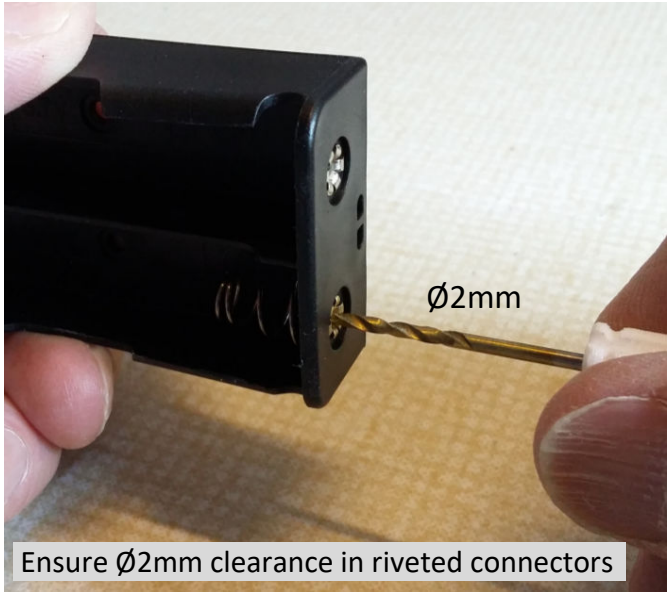
Hence V_{A6D} = 804 @ V_{Batt} = 6.60v

The code will shut down when the value drops to 804.

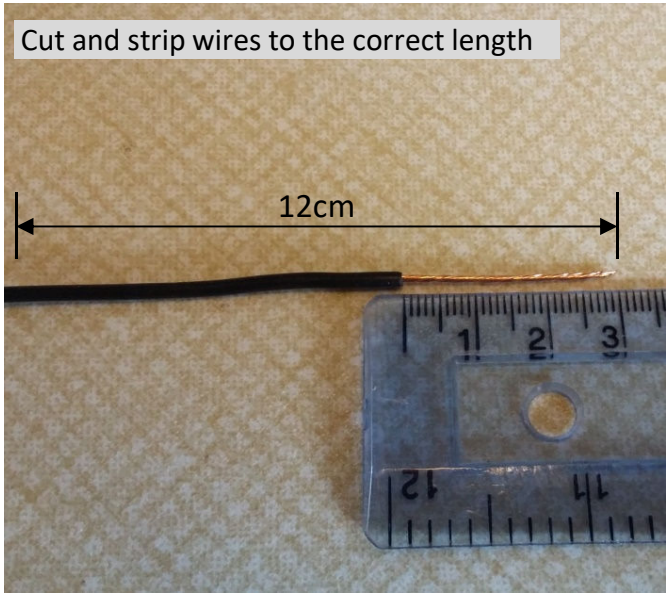

Clear hole with Ø1.2mm drill


Pull out existing thin wires

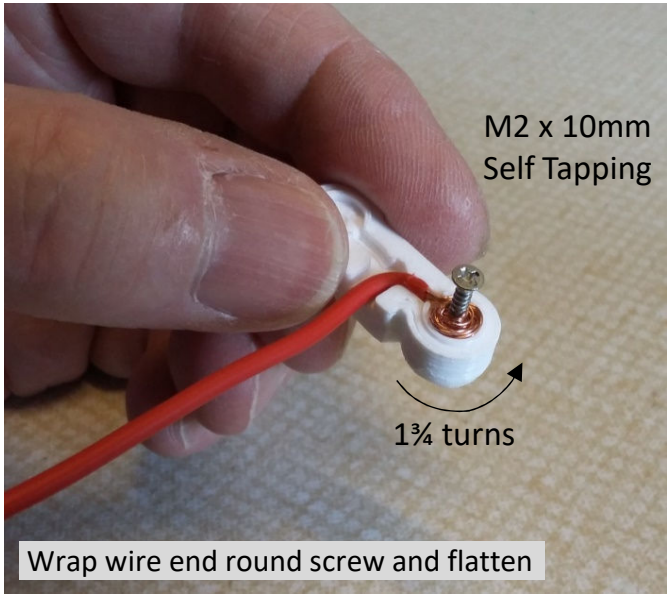

Crop wires close to connector



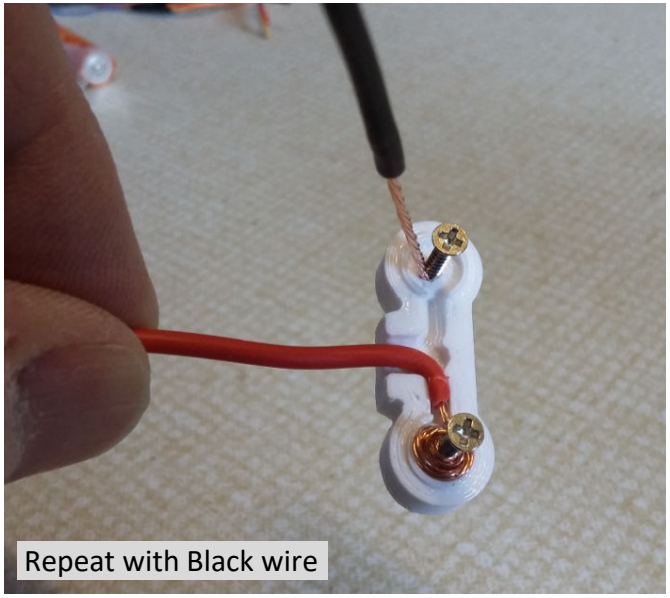
Ensure Ø2mm clearance in riveted connectors

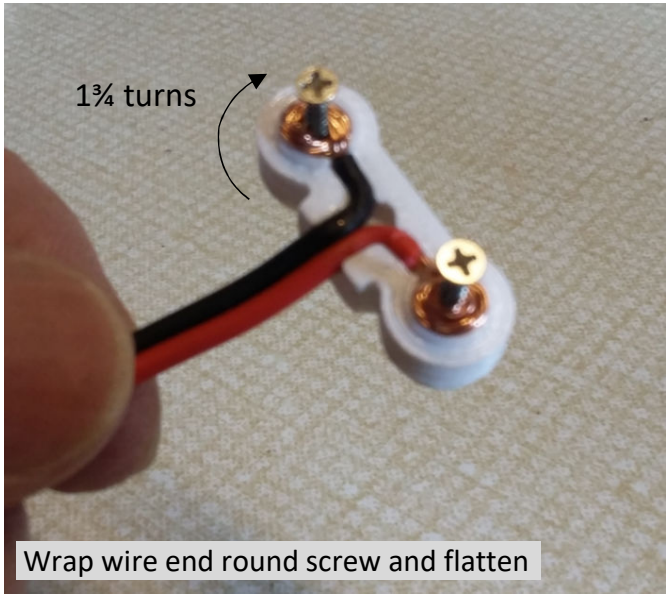



Trap wire end with Ø2mm screw

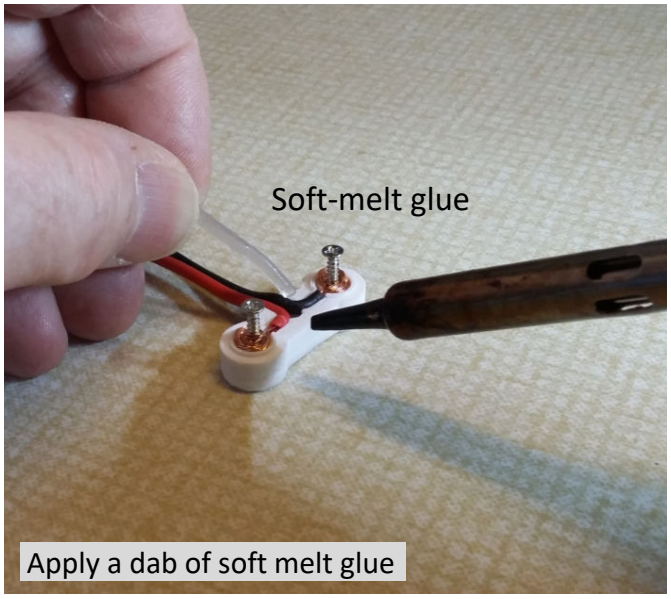


Wrap wire end round screw and flatten

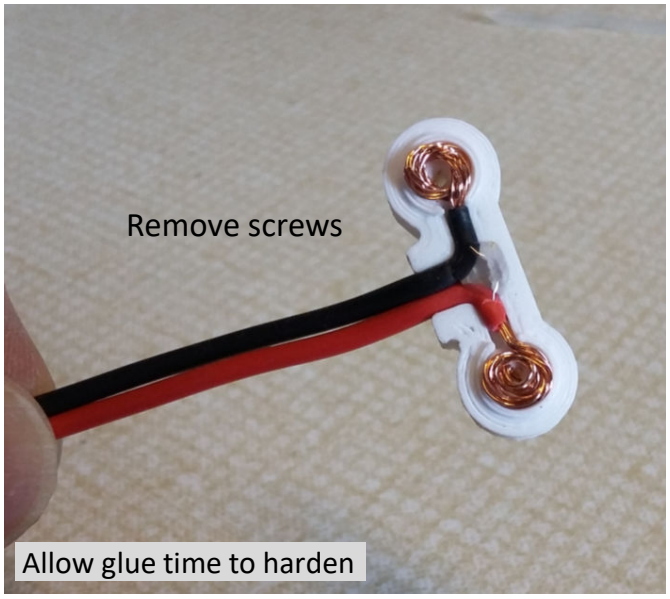

Repeat with Black wire



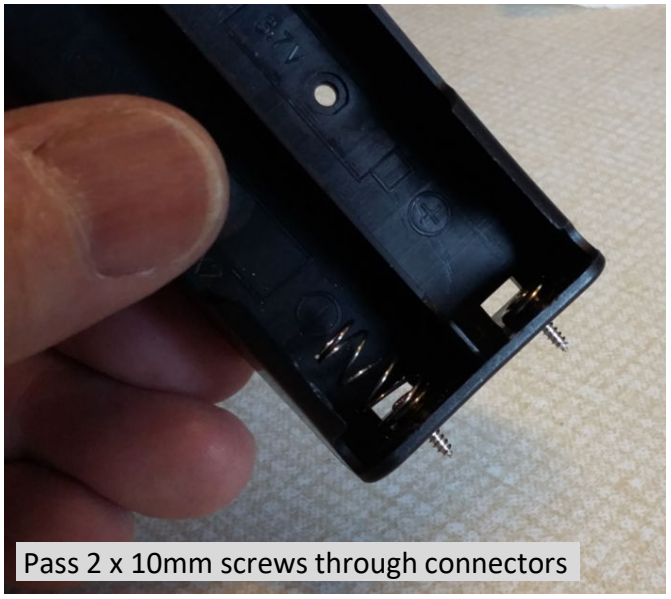
Wrap wire end round screw and flatten

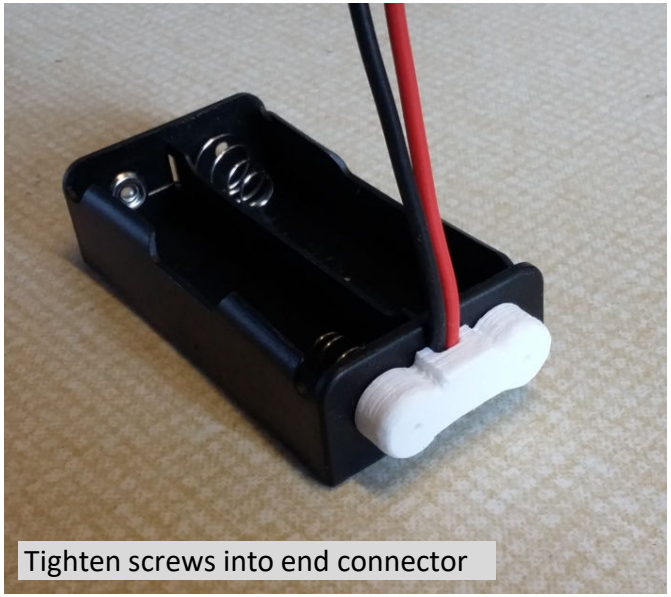


Apply a dab of soft melt glue

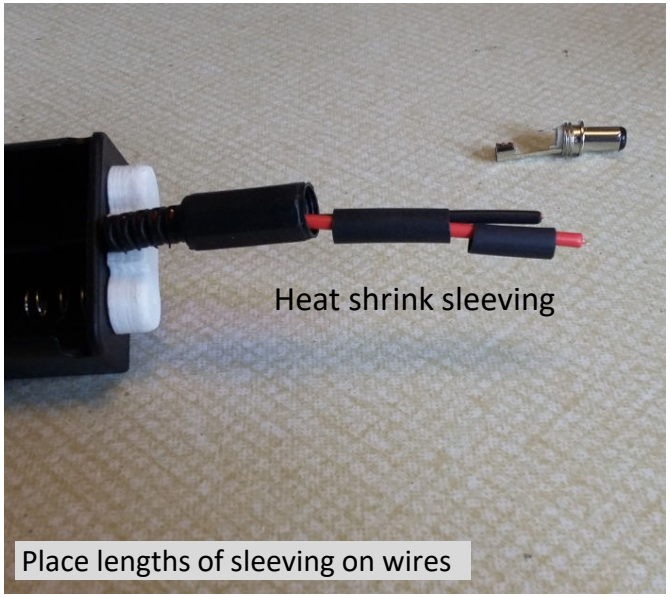


Allow glue time to harden


Pass 2 x 10mm screws through connectors

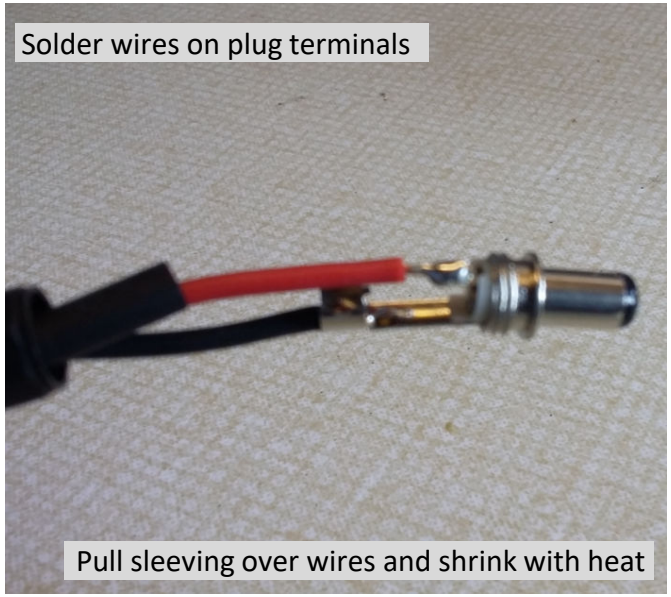


Tighten screws into end connector



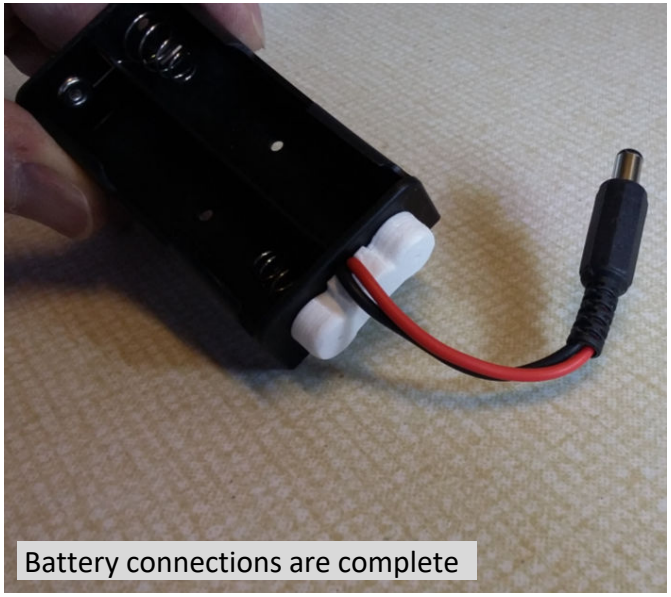
Heat shrink sleeving

Place lengths of sleeving on wires

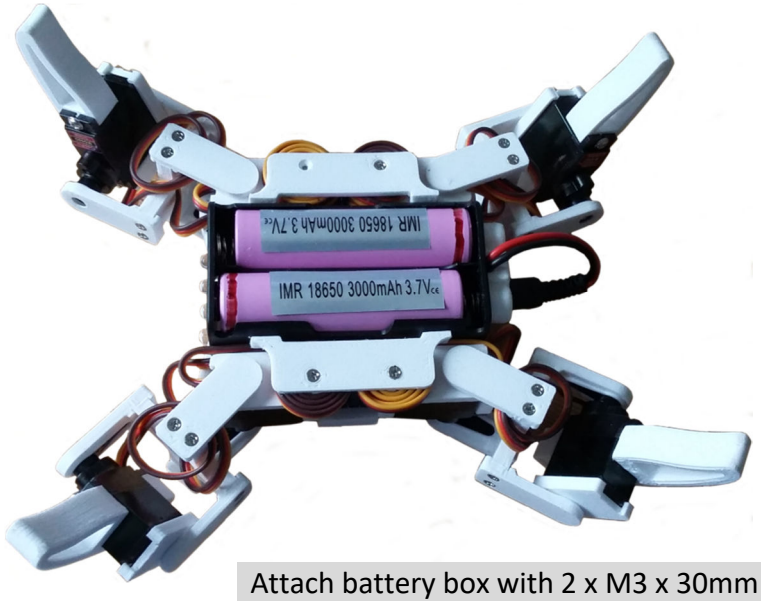


Solder wires on plug terminals

Pull sleeving over wires and shrink with heat



Battery connections are complete



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