

Swarm Robot Assembly Instruction

Components:

1. 3D printed robot base 2. Motor Holder 3. [2 M2 x 6 mm Screws](#) 4. [2 Metal Balls](#)



4. Battery
6.0x12x20mm
100mAh 3.7V

5. [Switch](#)

6. PCB

7. [2 Motors](#)



8. Wheels ([O-ring](#) + 3D-printed part)



9. [Crimps](#), [connectors for Power Connector](#)/[Touch Connector](#)



10. [Capacitive touch flexible circuit](#)



Tools:

1. [Black/Red](#) Wires (Use these ones not anything else!) 2. [Wire Stripper](#)



3. Wire holder (Very handy)

4. Wire Cutter



5. Screwdriver

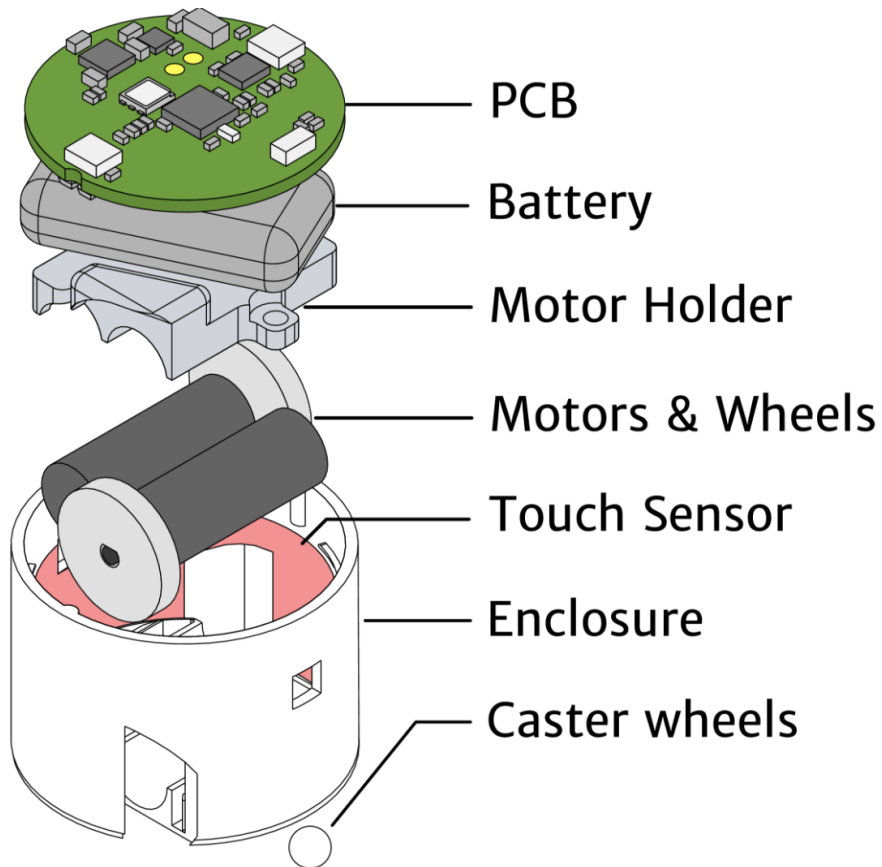


6. [Crimp tool](#) (For Power/Touch Connector)

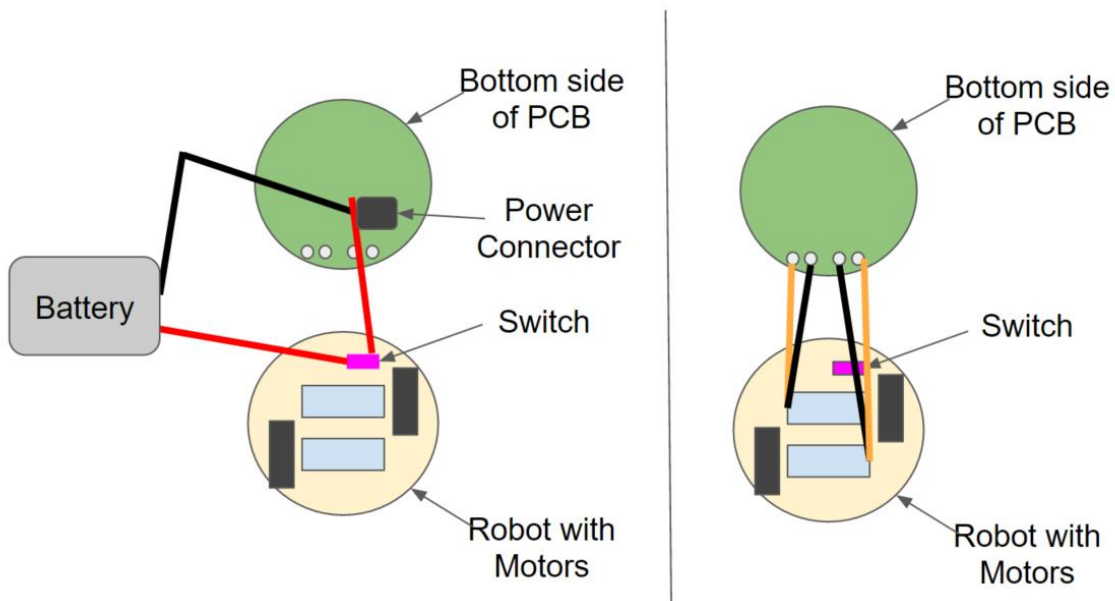
7. Heat Tubes [Use smallest one]



Overall Structure:



Overall Wire Connection:

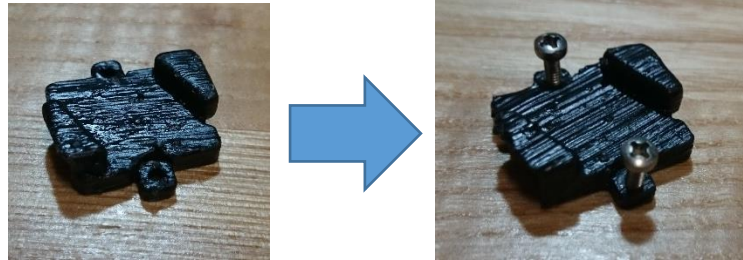


Assembly Preparation:

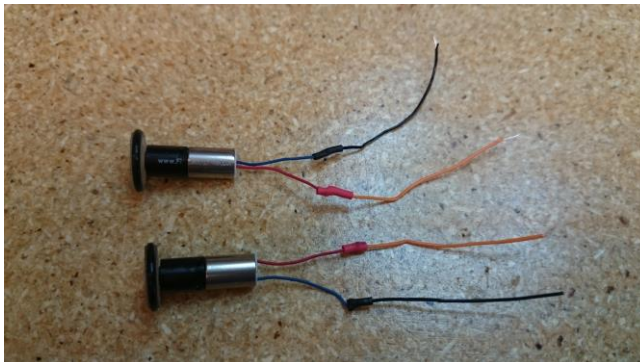
1. [15 secs] If not available, print the robot motor holder from the Formlabs Printer with the **BLACK** resin. (stl. file is in google drive/Swarm Bots/Assembly folder)

Rinse the parts and remove the support structures. Make sure that the surface where the motors will rest on is smooth for the motor holder.

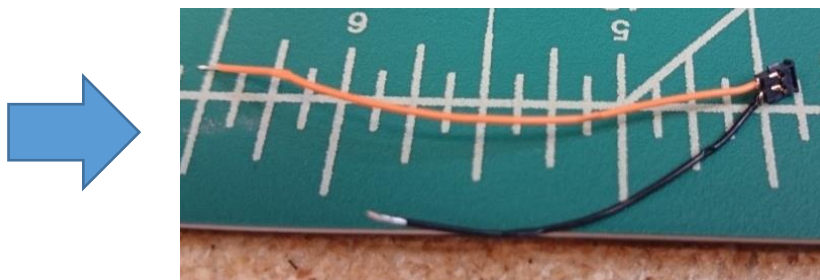
Insert and screw in the screws halfway as shown below.



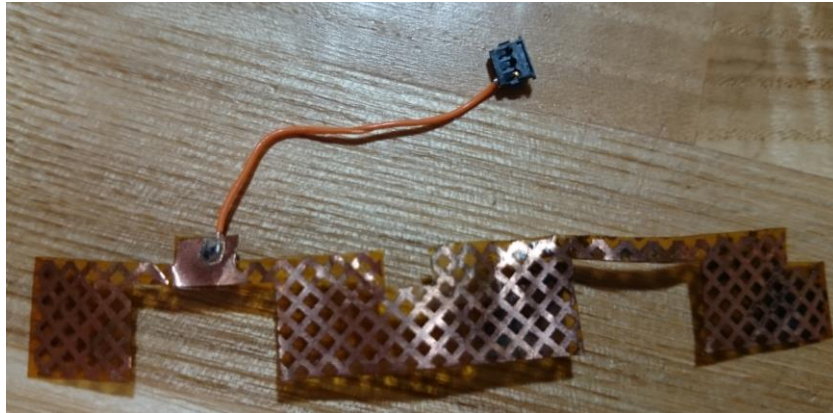
2. [3 min] Extend the wires of the motor with wires of length 1 inch. (Add heat shrink to cover the exposed soldered part of the wire)



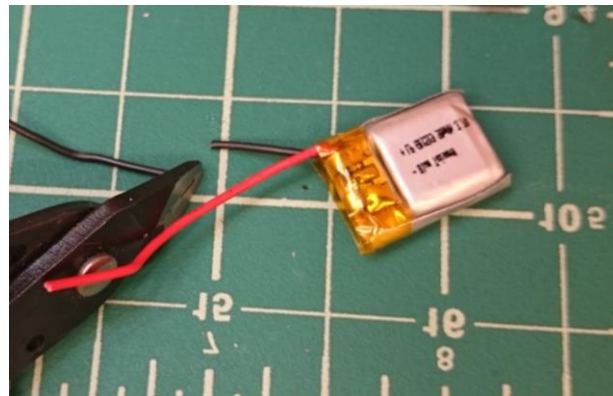
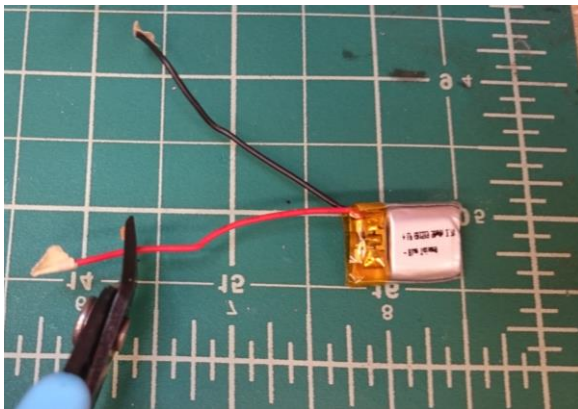
3. [5 min] Make the Power Connector using the tools below. (Black wire: 1 in , Red wire: 2 in)
For specific instruction on making the connector (Ask Mathieu or Lawrence)



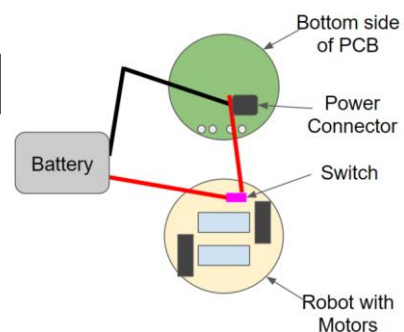
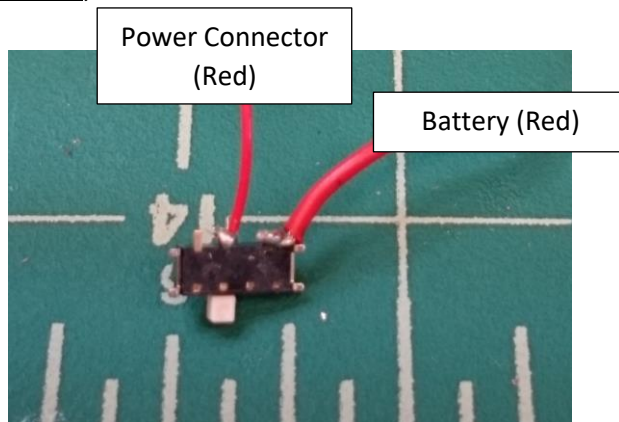
4. [3 min] Using the same tools as above, make the Touch connector as below. (wire length: 1 in)



5. [15 sec] Trim the battery wires. (Red wire = 1 ½ in (about ¾ of the original length), Black wire = ½ in (about ¼ of the original length)).



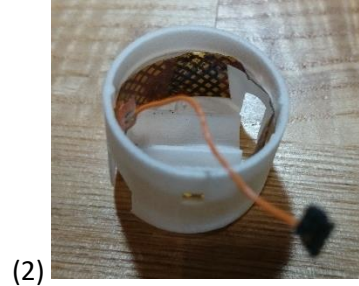
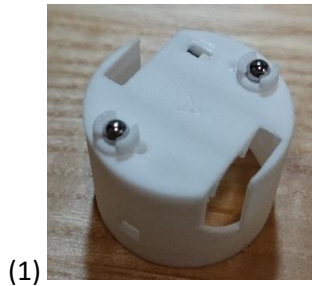
6. [3 min] Solder the red wire of the battery and red wire from the power connector onto the switch as shown. And solder the two black wires to each other. (***Before soldering, add in the heat shrink**).



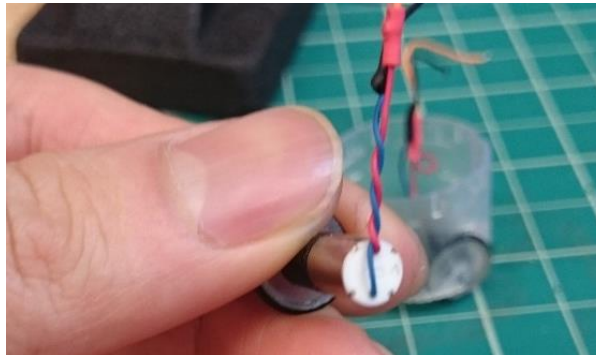
7. [15 sec] Add the wheels (O-ring + 3d printed part) to the motors. If the fit is not very tight, **superglue** the wheels to the motor.

Assembly Steps:

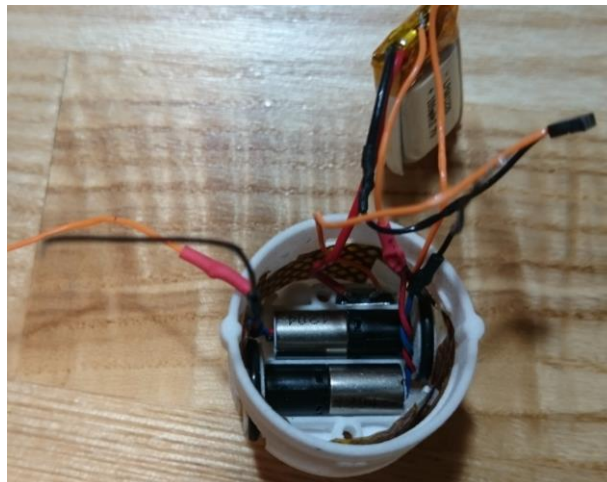
1. [10 secs] Insert two metal balls in the slots on the bottom of the 3D printed robot base as shown below on the left.



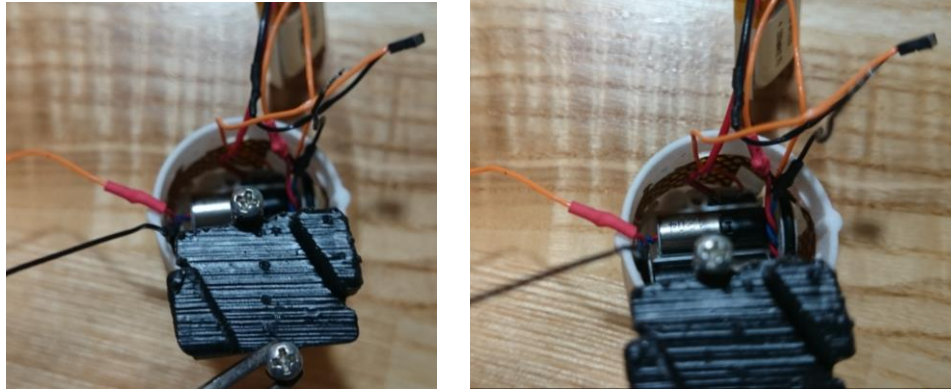
2. [1 min] Insert the touch circuit in the robot base as shown above on the right. Make sure the copper side faces outward and that the circuit is not interfering with the wheel hole, and is below the chamfer.
3. [15 sec] Wind the motor wires as below to prevent it from interfering with the other motor. Position the motor so the wires align vertically.



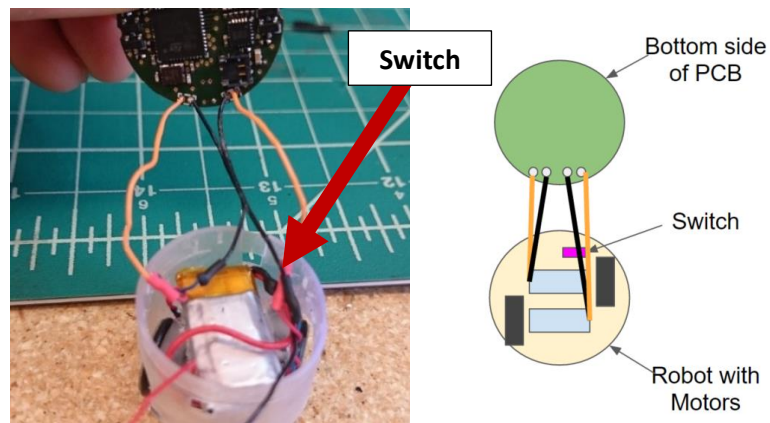
4. [1 min] Place the motors on the slots of the base and insert the switch into the robot base as shown. (Make sure the switch is in the right orientation, the metal side should be closer to the motors)



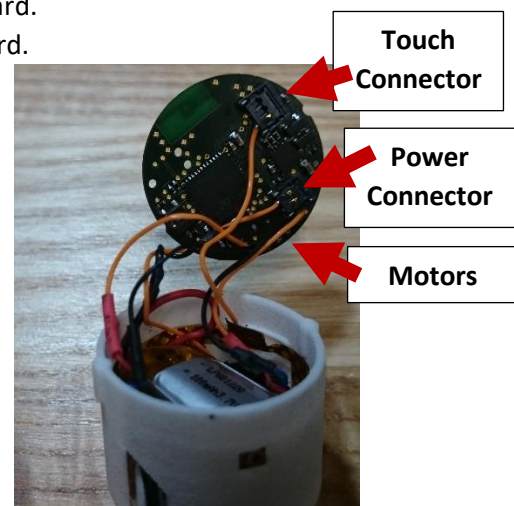
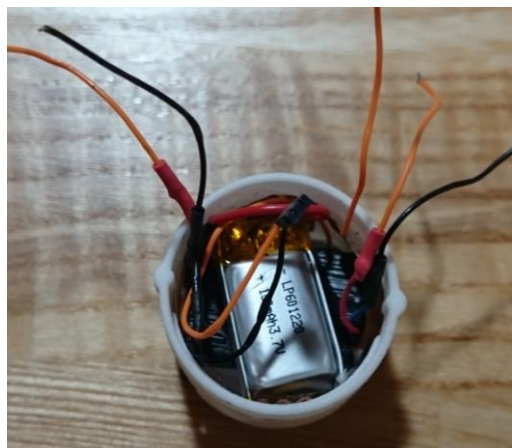
5. [1 min] Place the 3D printed motor holder + M2 screws on top of the motor and screw onto the robot base. (Make sure it is tight enough such that motors don't spin around when you spin the wheels but don't over-tighten as it may ruin the threads)
Make sure the motor holder is in the right orientation. On the side where the switch is, there should be a slight edge to hold the switch in place.



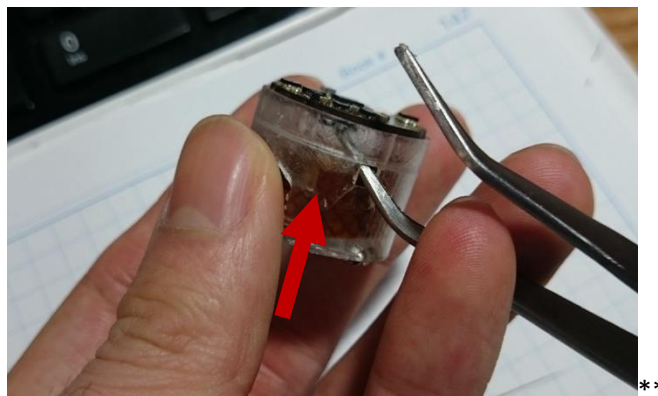
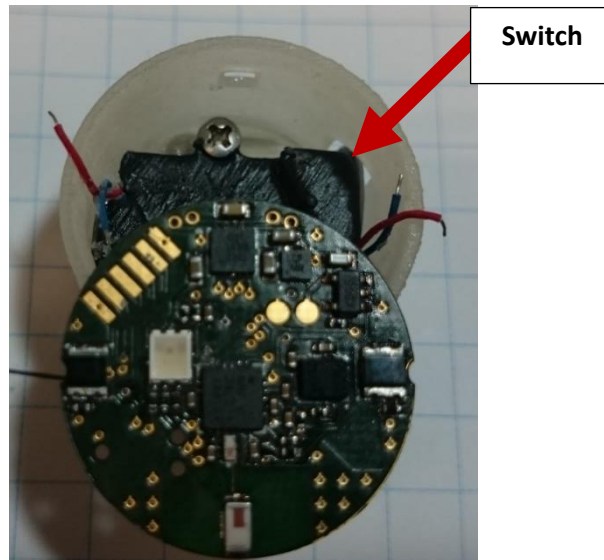
6. [15 sec] Double check that the robot is primary resting on the wheels rather than the castor wheels (metal balls).
7. [2 min] Solder the motor wires onto the PCB board as shown



8. [30 sec] Place the battery on top of the motor holder.
Connect the Power connector (2 sockets) to the PCB board.
Connect the touch connector (3 sockets) to the PCB board.



9. Evenly distribute the wires inside such that they are below the PCB chamfer and place the PCB board as shown below.



**To remove the PCB, use the thin long tool to push it up using the holes on the side.