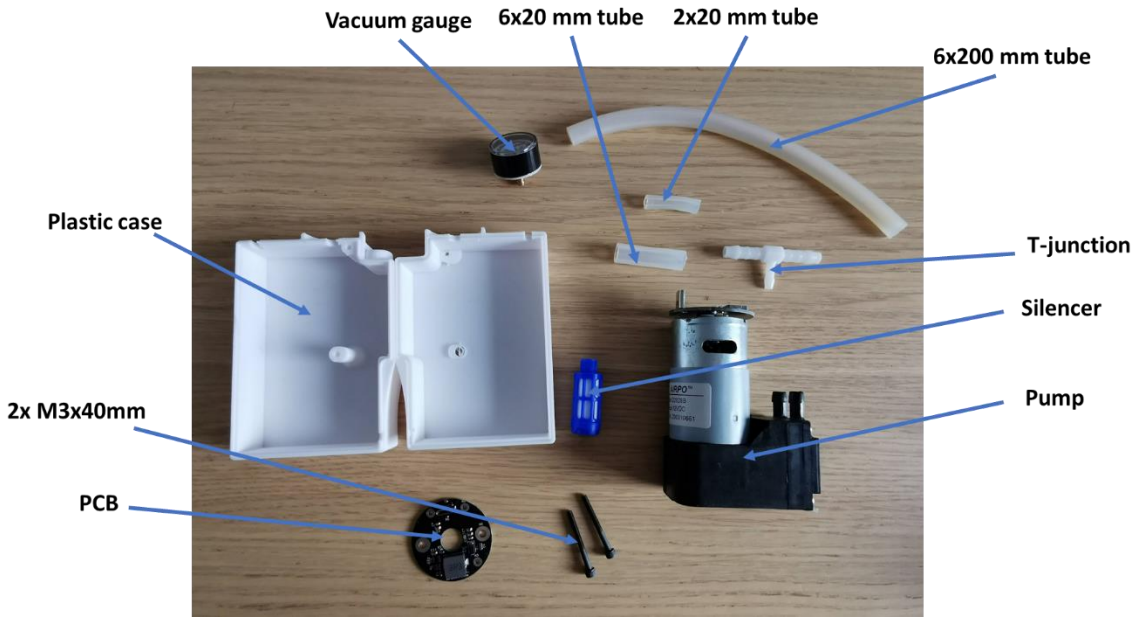
WaterScope System Assembly Instructions v1.0

Pump assembly

The following components/tools are required to assemble the WaterScope pump:

- Vacuum gauge
- Silicone tubing: 6x20mm, 2x20mm, 6x200 mm
- Plastic T junction – 6-4-6 mm
- Plastic pump silencer
- 2x M3x40mm screws
- PCB
- 12V vacuum pump
- Soldering iron
- M3 hex screwdriver



1. Solder PCB to the pump making sure the USB-C connector is parallel to the pump

2. Assemble the T-Junction with the smaller silicone tubes and the vacuum gauge

3. Insert assembled T-junction and silencer on the pump as shown:

4. Insert pump in right hand side of the enclosure and feed T-junction through the enclosure opening:

5. Close enclosure and screw in M3 screws and insert long tubing.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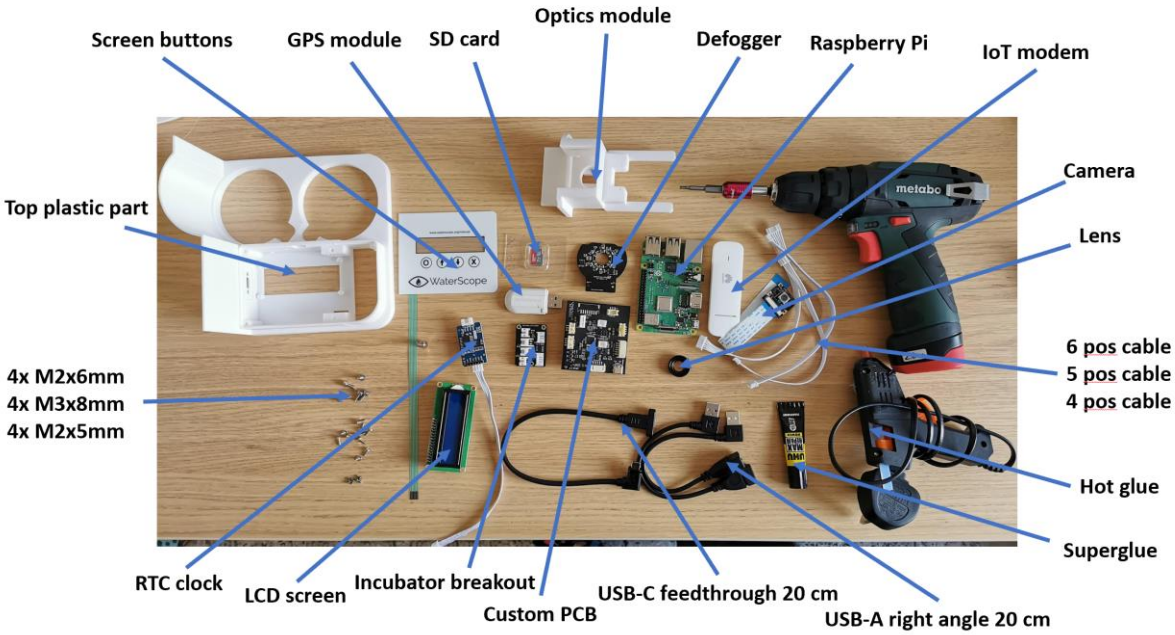
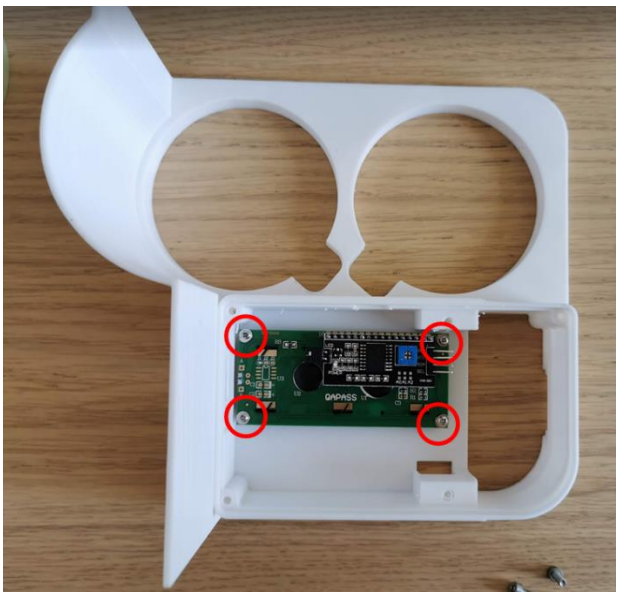
Optics module assembly

The following components are required to assemble the WaterScope optics module:

- **Screen:** LCD screen, screen buttons module
- **Auxiliary:** IoT module, GPS Module, SD Card, Lens
- **Cables:** 4/5/6 position JST PH cables, USB-C feedthrough 20 cm, USB-A right angle 20 cm
- **PCBs:** Defogger, RTC clock, Raspberry Pi, Main PCB, Incubator breakout, Camera
- **Plastic parts:** top plastic part, optics module
- **Screws:** 4x M2x6mm (self-threading), 4x M3x8mm, 4x M2x5mm
- **Tools:** Electric screwdriver (Philips head/M3 hex head), hot glue gun, superglue, double-sided tape

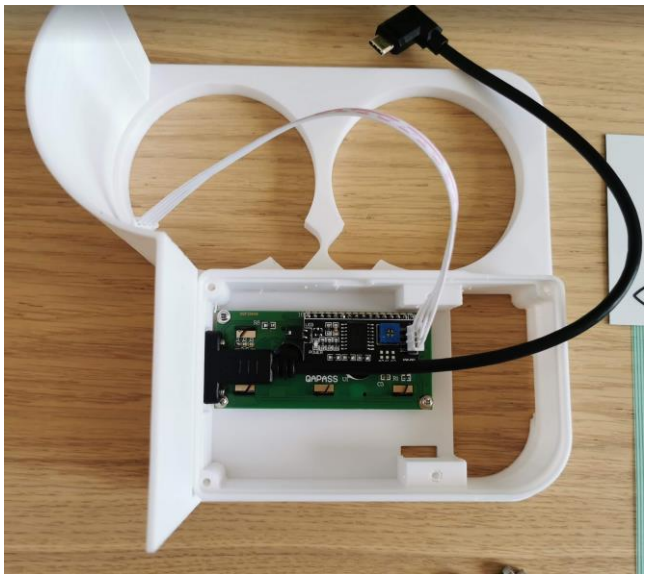


1. Screw in LCD screen with 4 self-threading M2 screws

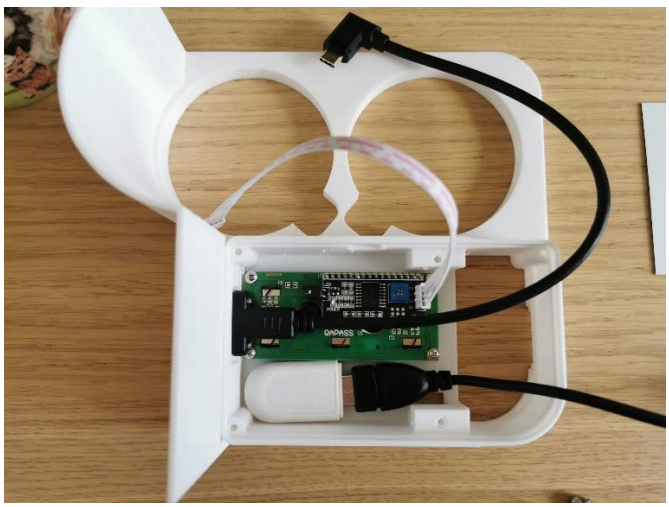


2. Insert 4 position cable and bend the connector gently to 90 degrees:

3. Mount USB-C feedthrough with 2x M3 screws (Note: Carefully screw in the screws as cross-threading can happen)



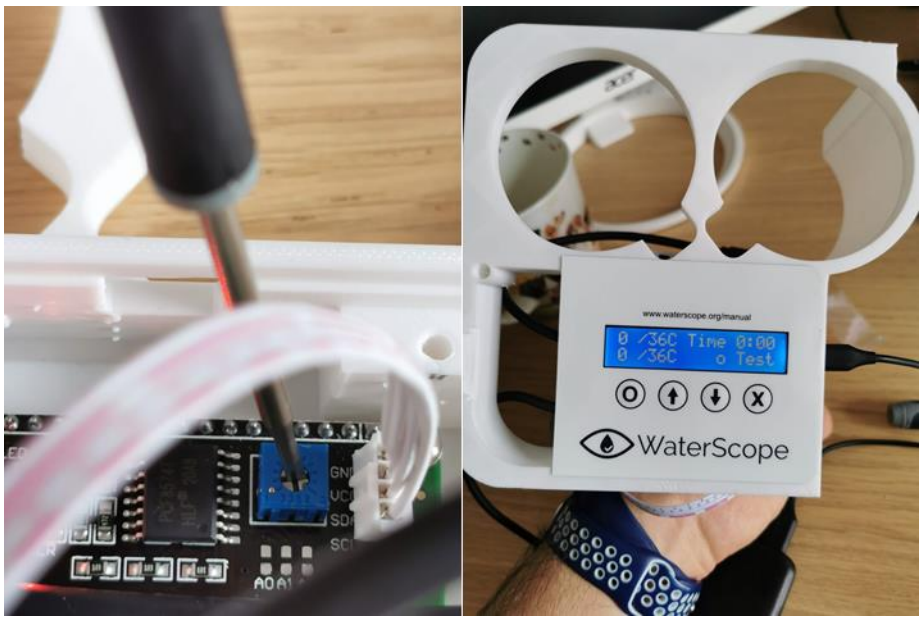
4. Mount GPS module using double sided tape.



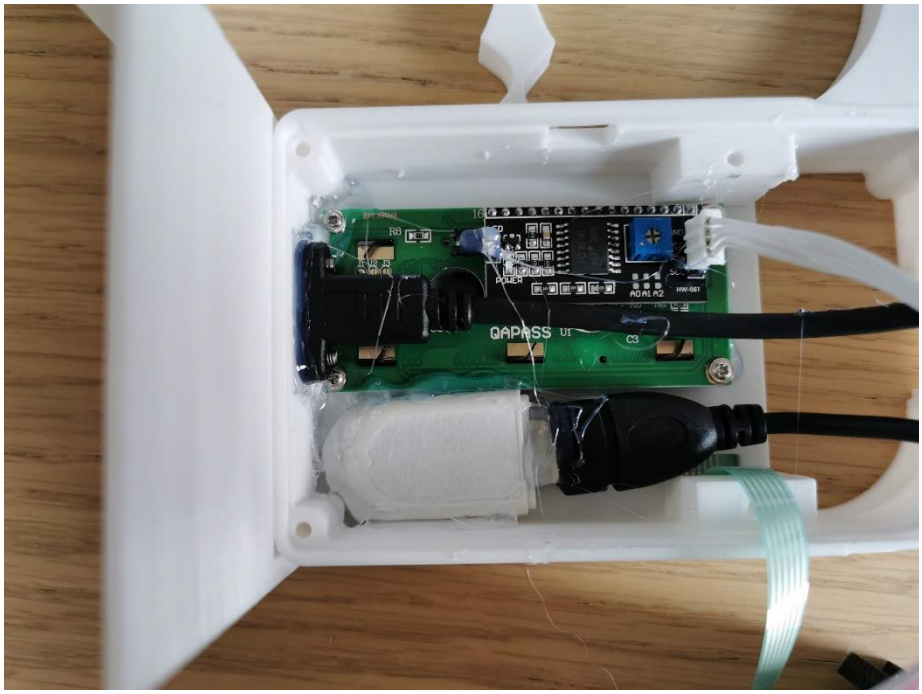
5. Peel of screen backing tape and stick to the front.

6. Connect LCD screen + test buttons as shown below, and plug in to power bank.

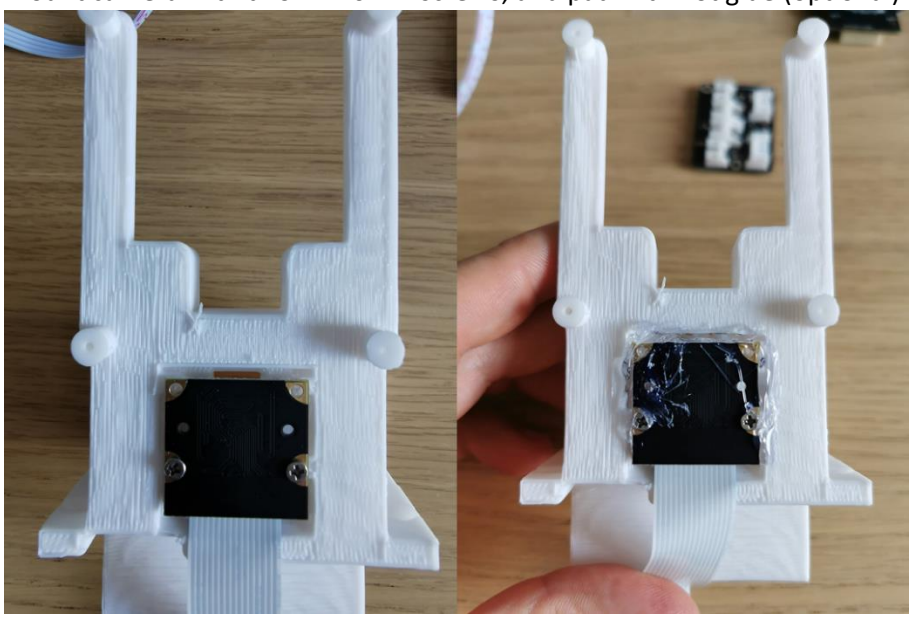
7. Adjust screen contrast using a screwdriver and the blue potentiometer at the back and test the buttons.



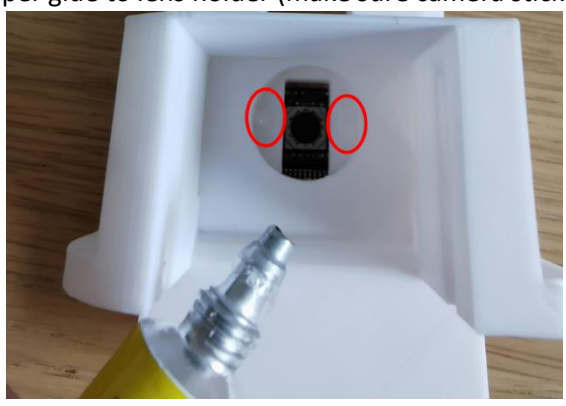
8. Add hotglue around screen, GPS module, USB-C feedthrough and GPS module



9. Mount camera with two M2x6mm screws, and pad with hot glue (optional)

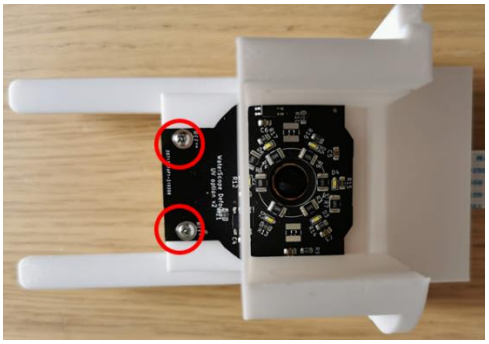


10. Add two droplets of super glue to lens holder (make sure camera sticker is removed)

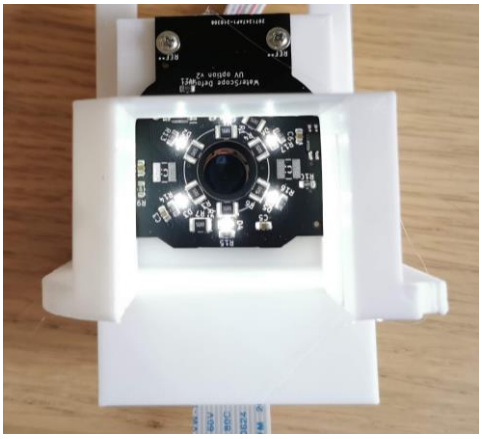


11. Fix lens in place and place firmly using a lens cloth or gloves until its flat and glued

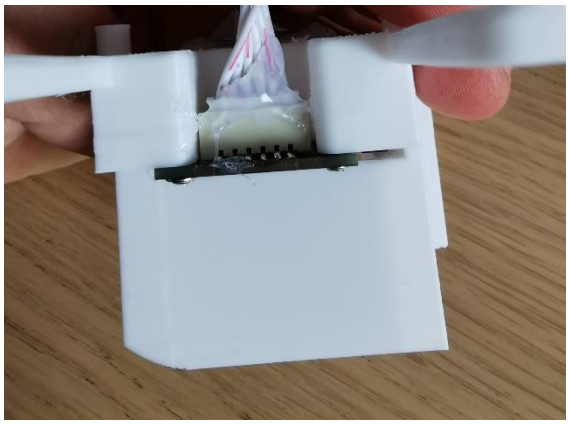
12. Mount defogger using two M2x6mm self-threading screws.



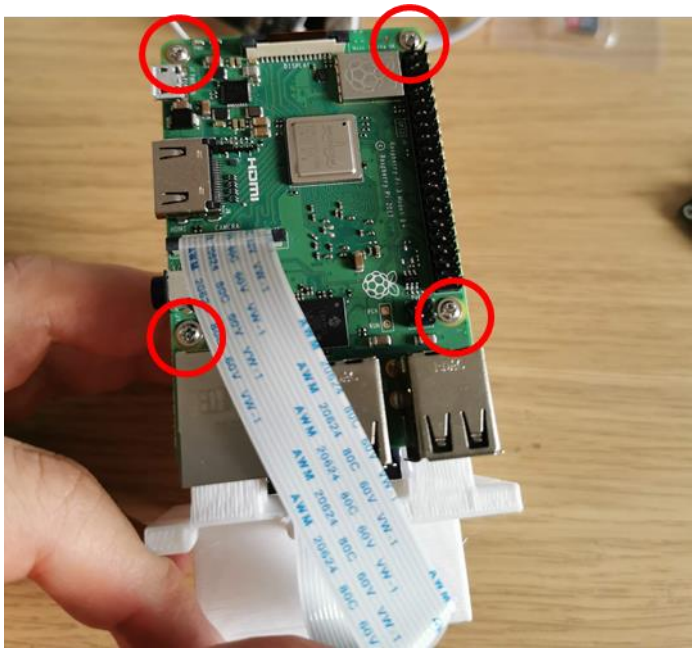
13. Plug in defogger with the 6 position connector and test that it flashes.



14. If defogger works, add hot glue to the connector (optional)



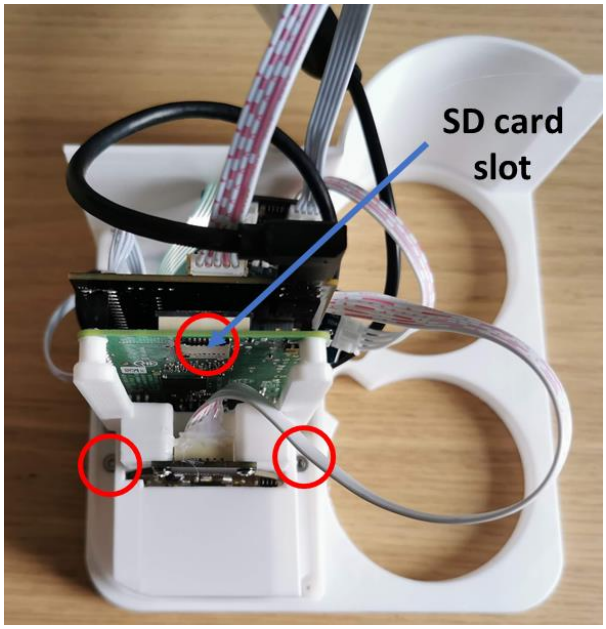
15. Mount Raspberry Pi using 4 screws (M2x6mm self threading) and connect camera FPC



16. Attach main PCB to the RPi and connect the screen, screen buttons, defogger and incubator cables

17. Screw in incubator breakout board on the other side of the RPi with M2x6mm self-threading screw.

18. Screw in assembled optics module to screen module with 2x M3x8mm screws

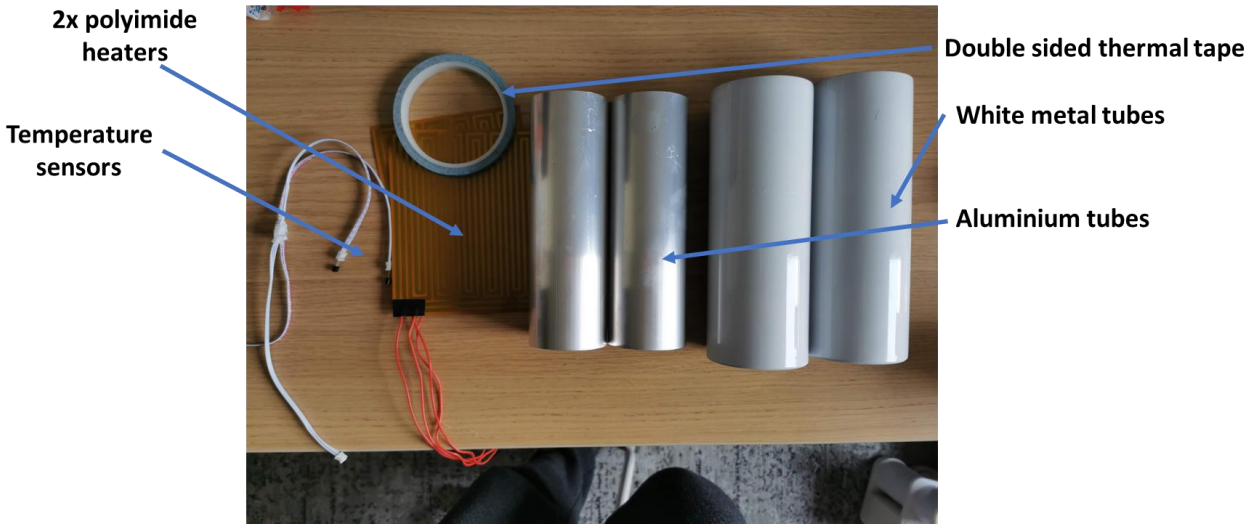


19. Flash SD card with latest software (separate instructions) and insert into SD card slot.
20. Perform a QC/calibration routine (separate instructions)

Incubator assembly

The following parts are required for the incubator assembly:

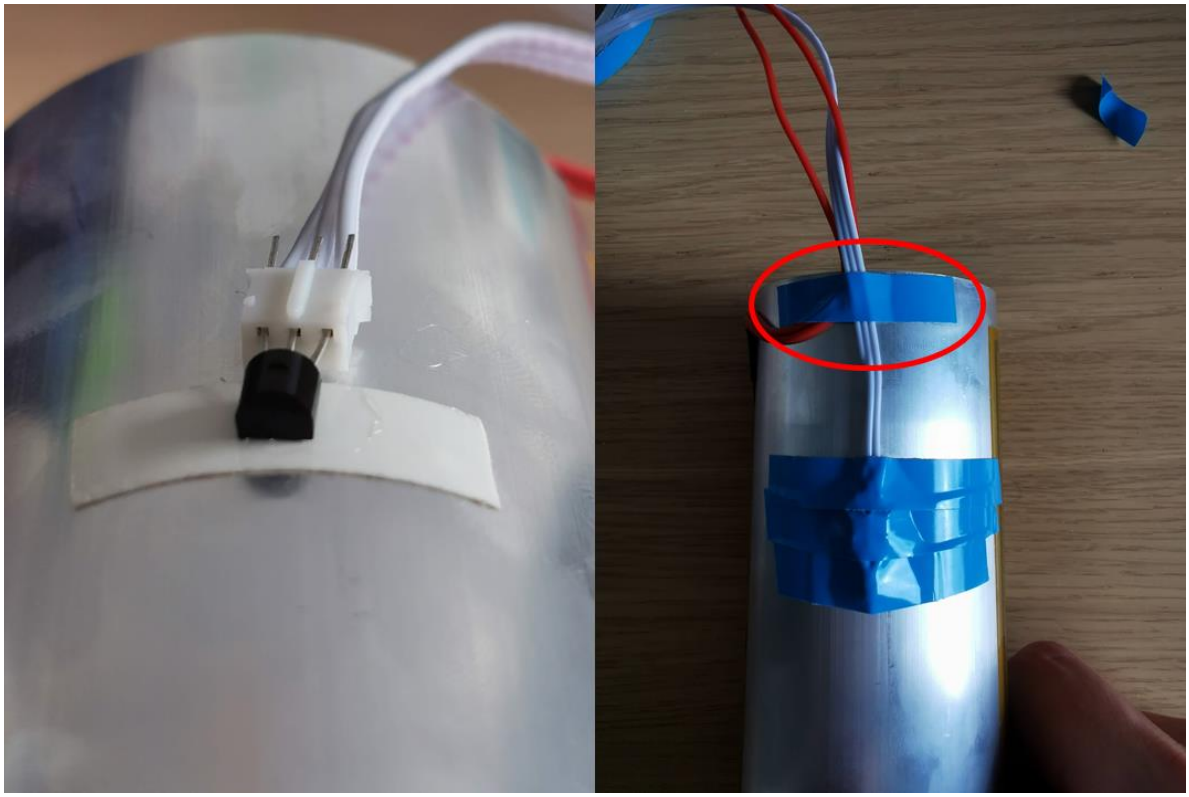
- 2x white metal tubes
- 2x aluminium tubes
- 2x temperature sensors
- 2x polyimide heaters
- Double sided thermal tape



1. Tape the polyimide heaters to the aluminium tubes leaving approximately 1cm gap from the top of the tube. Make sure the cables are in the top right corner

2. Place a thin strip of double sided thermal tape 6 cm away from the top

3. Attach thermal sensor with flat side down to the double sided thermal tape and tape over to secure properly.

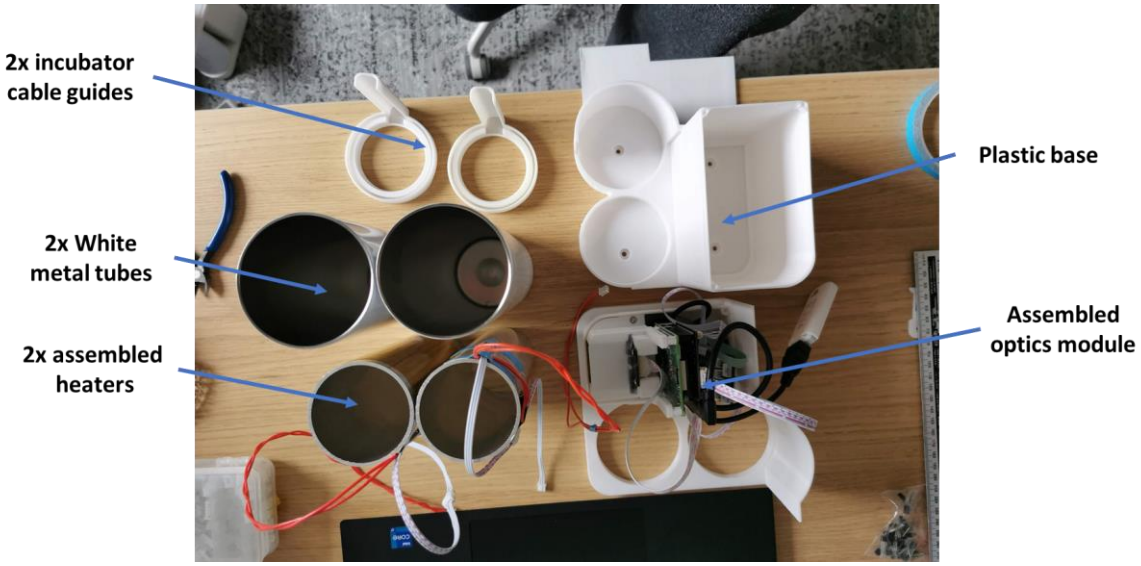


4. Secure heater cables and sensor cables together with a thin strip of tape at the top of the aluminium tube
5. Attach magnets to lid and base with superglue. (ensure the polarity is correct)

Complete system assembly

Prepare the following components from the previous steps for the complete system assembly:

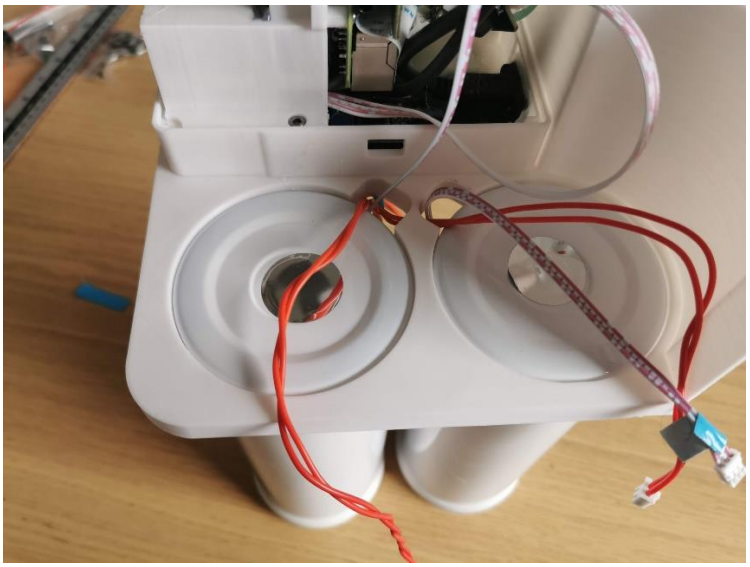
- Assembled optics module
- Assembled incubator tubes
- Plastic system base
- 2x Incubator cable guides
- 2x white metal tubes



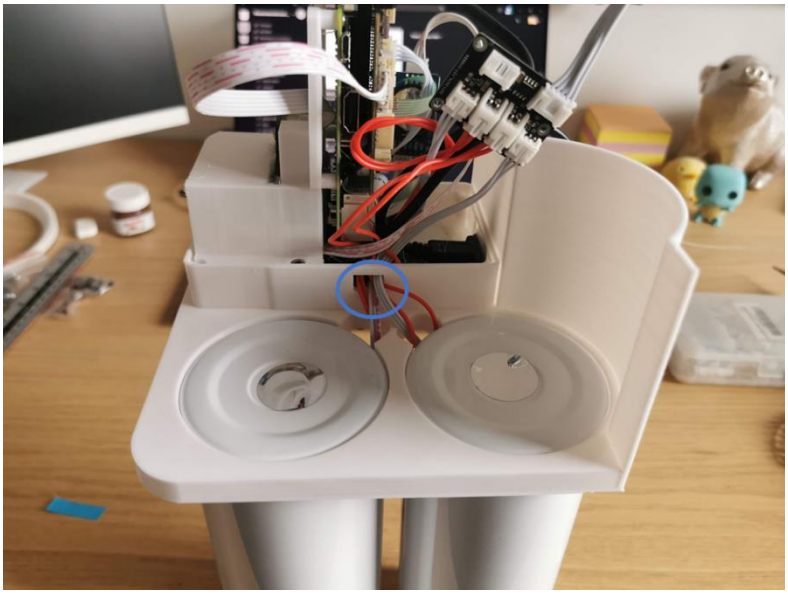
1. Insert aluminium tubes into the cable guides and align the cables carefully so that they are not pinched

2. Add the incubator tubes to the cable guides make sure that the cables are not pinched.

3. Insert assembled white tubes into the optics module channels

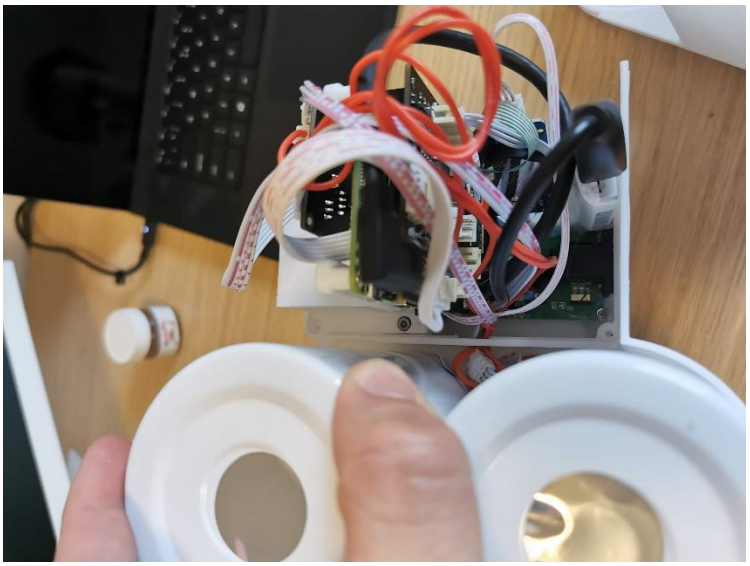


4. Feed cables through the highlighted hole while keeping the incubator sensor/heater connection in pairs and connecting them to the incubator breakout board.



5. Feed incubator tubes further down until the cable guides align with the optics module holes.

6. Compact cables together (using cable ties)

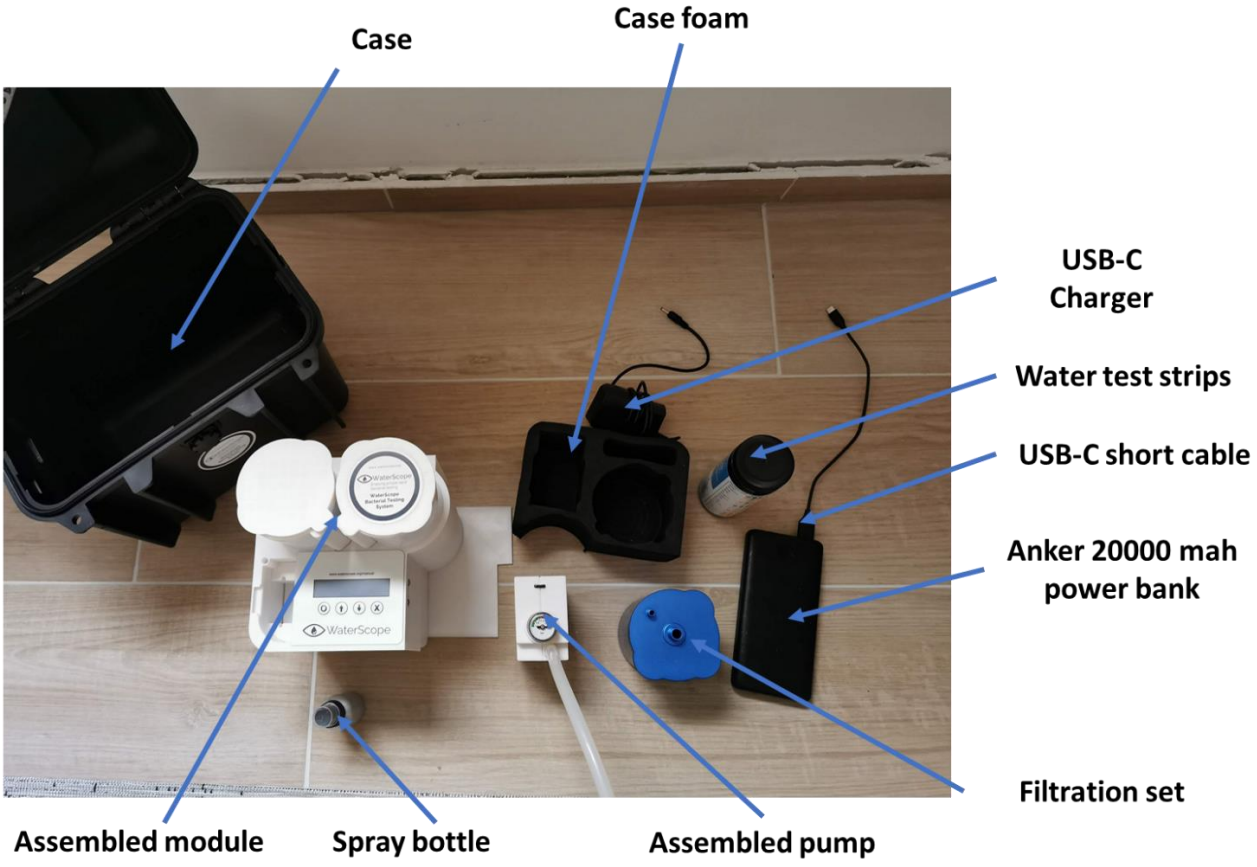


7. Insert optics module into the base making sure that no cables are pinched


8. Screw in optics module to base module using 3xM3 screws

Case assembly

In order to assemble the case, the following components are needed



1. Put everything together as shown:

2. Apply stickers as appropriate (TBD)
3. Run QC/testing routine (separate instruction)
4. Package for shipment