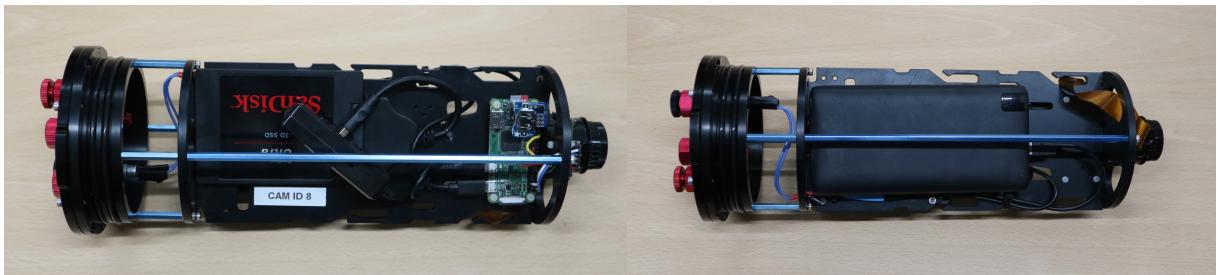
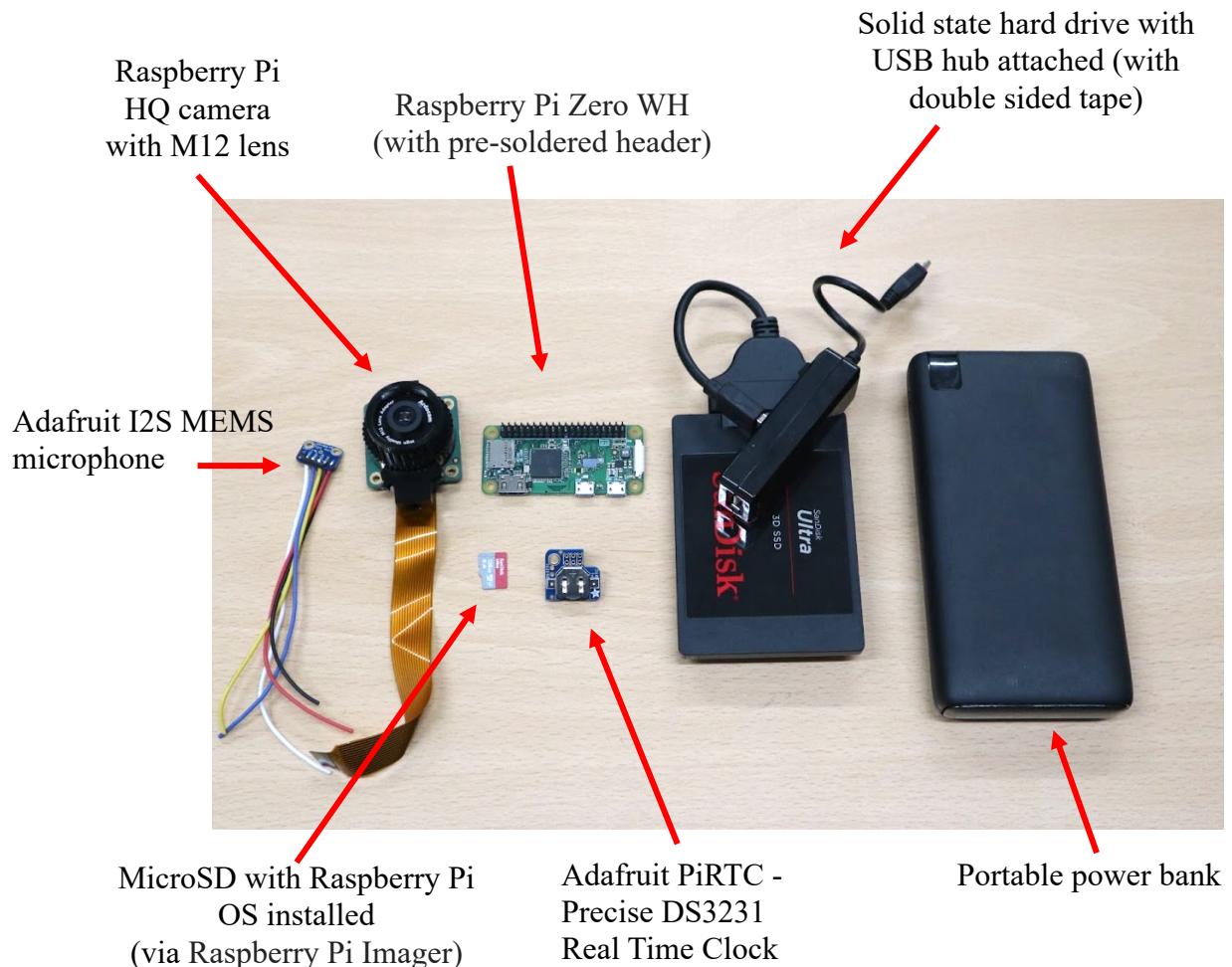


# Underwater stereo camera build guide



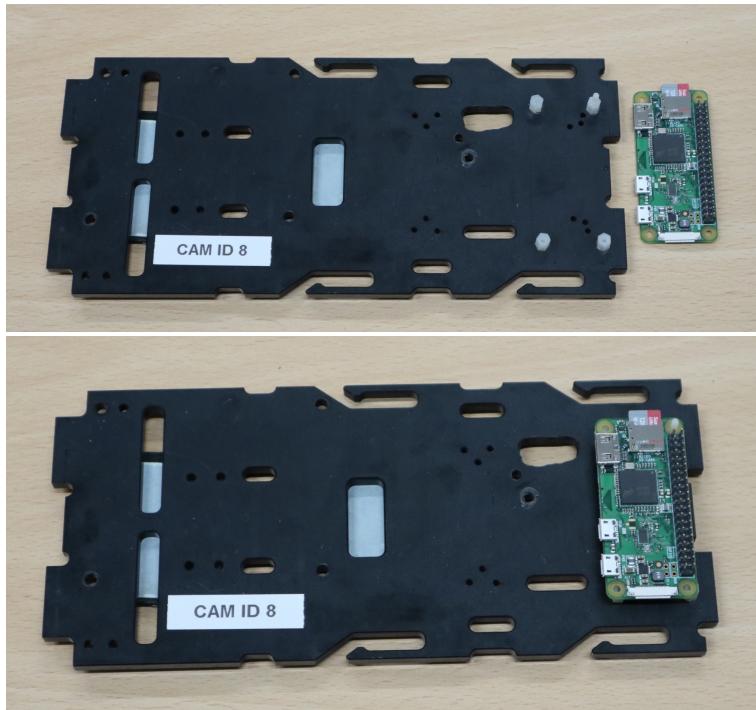
## Main components



The camera was built on the Blue Robotics components tray (<https://bluerobotics.com/store/watertight-enclosures/locking-series/wte4-etrav-r1/>).

It requires several additional holes to be drilled into it to screw on components. Otherwise, components could be stuck down with heavy-duty double-sided tape).

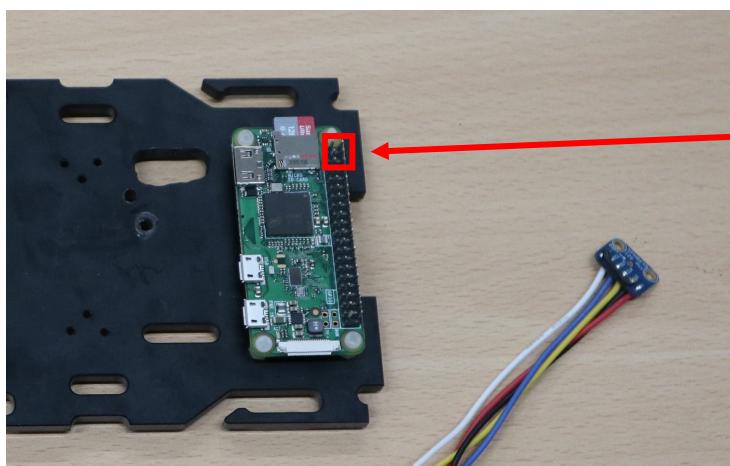
## Step 1: Attaching the Raspberry Pi to tray



We used stand-offs from the White Nylon Screw and Stand-off Set – M2.5 Thread (Pi Hut) to screw the Pi to the components tray.

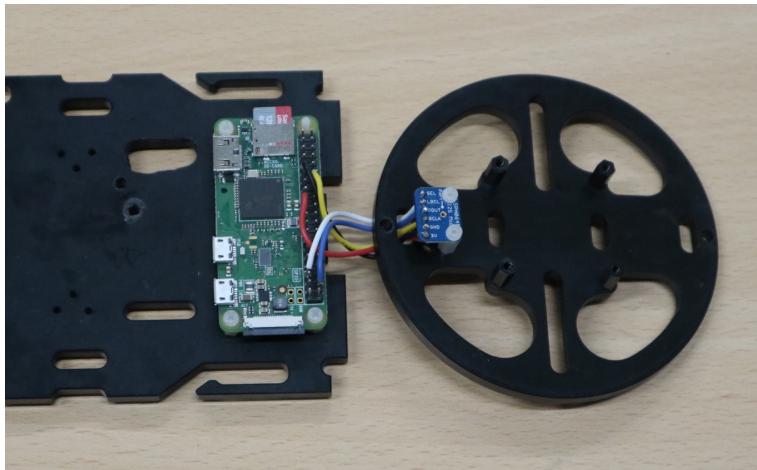
## Step 2: Attaching the microphone (optional)

The microphone needs to be soldered to the Raspberry Pi's headers. A guide for this can be found at <https://learn.adafruit.com/adafruit-i2s-mems-microphone-breakout/>. However, do not use the first six pinouts as these will be used for the real time clock. For example, the microphone needs to attach to the 3.3v pinout at point 1 but there is another 3.3v pinout at point 17 that can be used instead ([https://pinout.xyz/pinout/io\\_pi\\_zero](https://pinout.xyz/pinout/io_pi_zero)).



Do not use these six pins for this step.  
Equivalent pins are available (see  
[https://pinout.xyz/pinout/io\\_pi\\_zero](https://pinout.xyz/pinout/io_pi_zero)).

The microphone is attached to the front panel of the Blue Robotics tray and so soldered wires should run through the pre-cut slot. Make sure it is not positioned too high up so that it still fits within the dome.



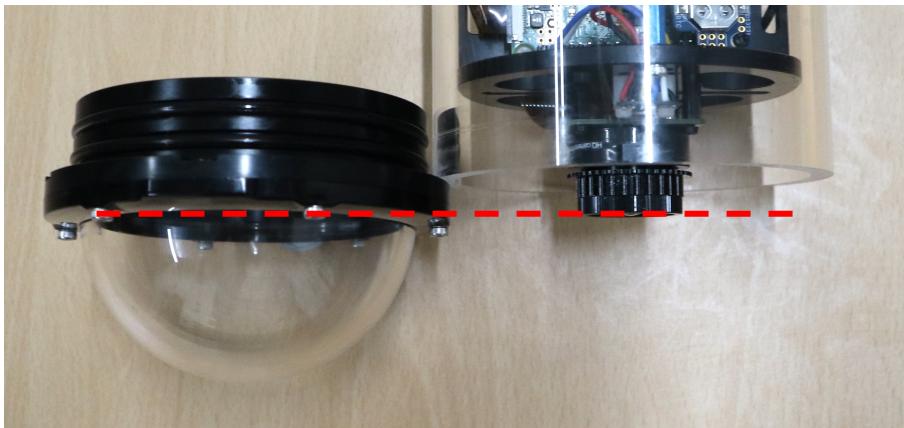
### **Step 3: Attaching the real time clock**



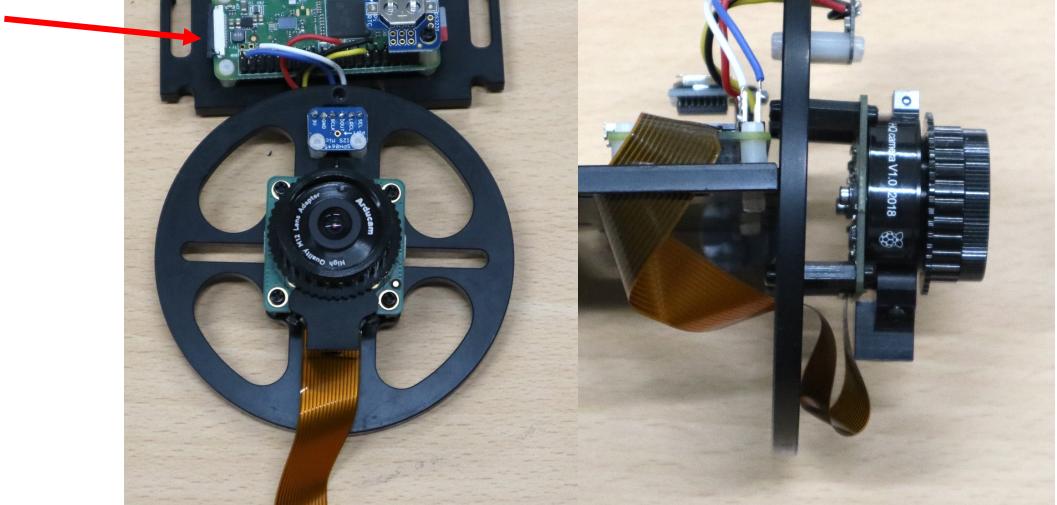
The real time clock slots onto the six pinouts highlighted in step 2. It can be attached with a screw.

### **Step 4: Attaching the camera**

The camera sits in the middle of the front panel. Screw holes are already included on the tray. It is important that the camera sits inline with the dome edge – this can be achieved using stand-offs. If a flat port is used the camera will need to move backwards and sit closer on the front panel.



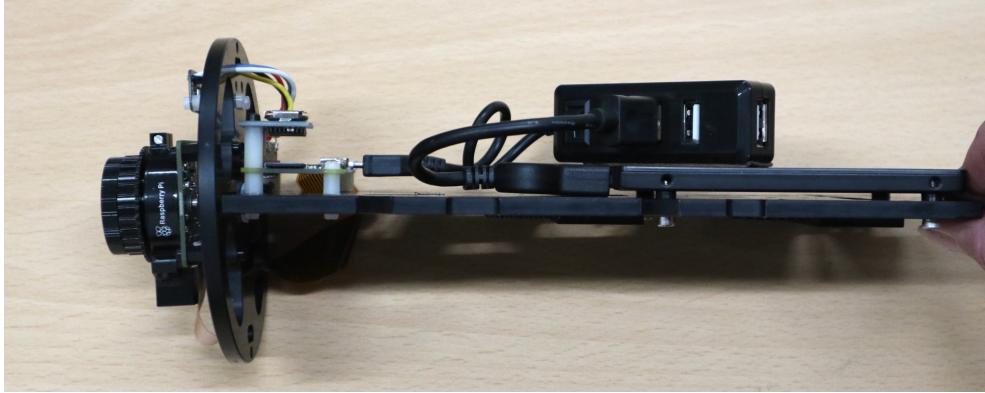
The camera ribbon connects to the Pi here.



## **Step 5: Attaching the hard drive**

The hard drive is screwed onto the tray. It plugs into the USB hub which is then plugged into the Pi. Spacers are used to lift the hard drive slightly off the tray.

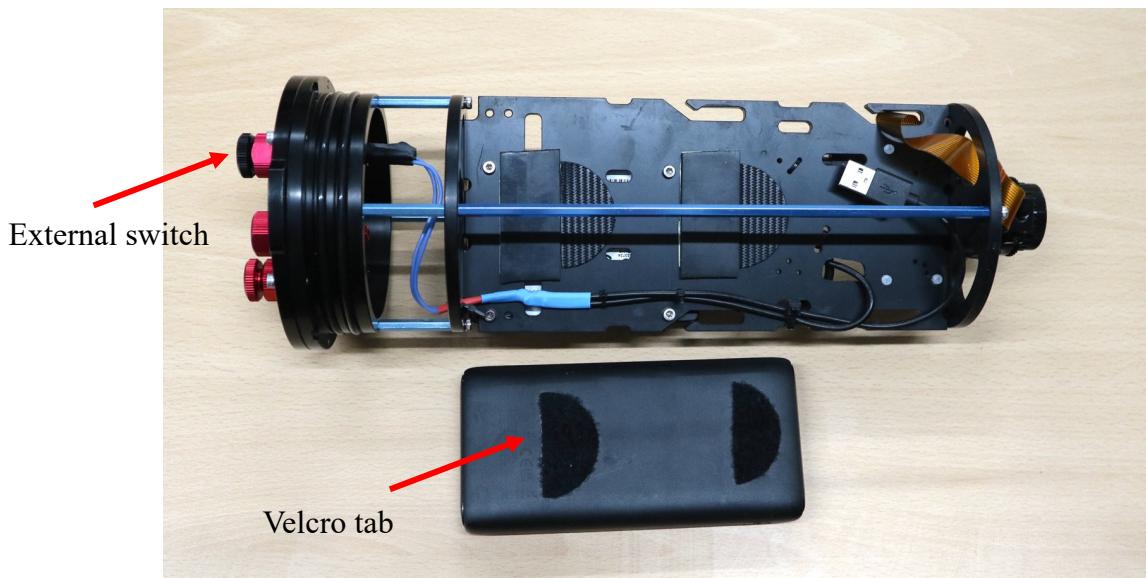


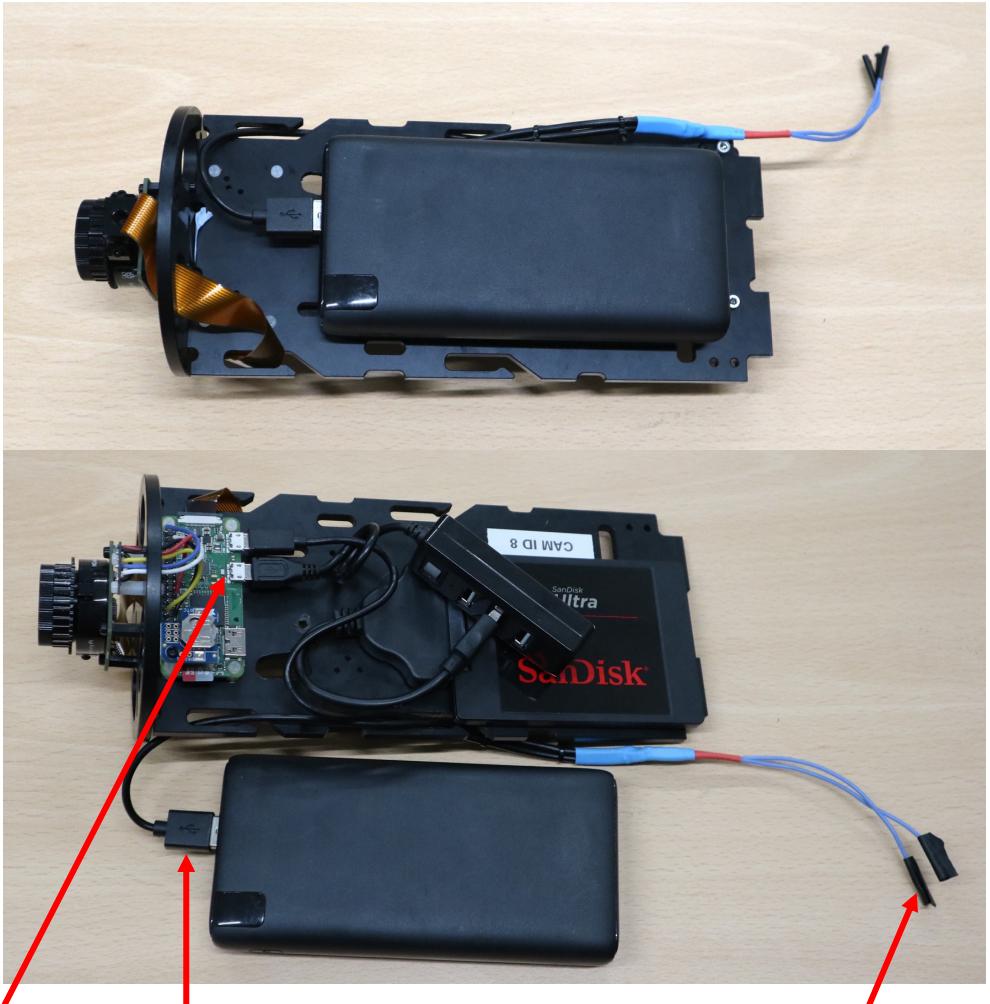


A mouse and keyboard can also be temporarily plugged into the USB hub to modify code. A monitor can be plugged into the Pi's HDMI port. We used a HDMI adapter to use a MacBook as the Pi's monitor when out in the field.

### **Step 6: Attaching the battery**

The portable power bank is attached to the tray using heavy duty Velcro tabs. This means that it can be easily removed to charge. Small amounts of neoprene strip (leftovers from strips used to attach the camera to the metal rig) were also attached to lift the battery off the tray. The battery is connected to the Pi via the Blue Robotics switch (<https://bluerobotics.com/store/comm-control-power/switch/switch-10-5a-r1/>). This step requires soldering to attach the switch to the micro USB but allows the camera to be turned on from outside the tube (i.e. just prior to deployment).





Switch plugs into Pi here      Other end of switch plugs in here

Attaches to external switch

## **Step 7: Adding the remainder of Blue Robotics enclosure**

The rest of the enclosure is screwed on via the long blue hex standoffs.

The assembly instructions for the Blue Robotics enclosure can be found here:

<https://bluerobotics.com/learn/watertight-enclosure-assembly-guide/>

This camera is now ready to slide into the acrylic tube.

The watertight seal can be pressure tested prior to deployment following these instructions: <https://bluerobotics.com/learn/using-the-vacuum-test-plug/>. We recommend the Silverline over the plastic mightyvac.

