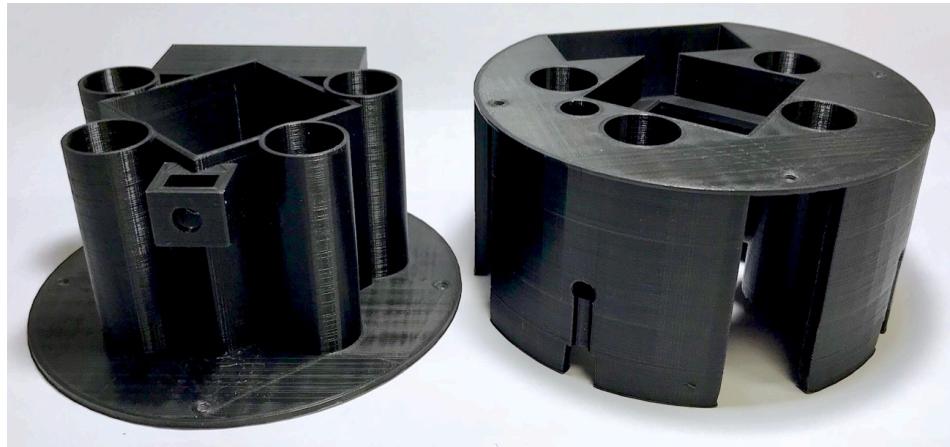
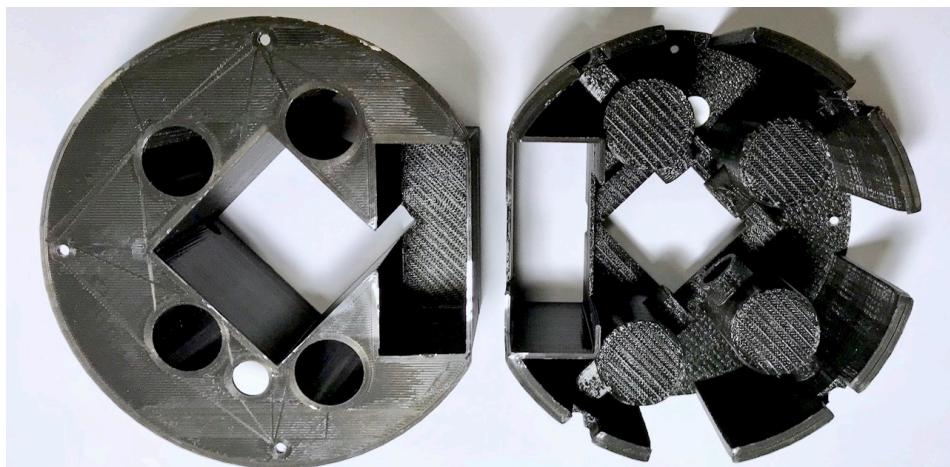


Step-by-step instructions for assembling the MicrobeMeter Version 1.0

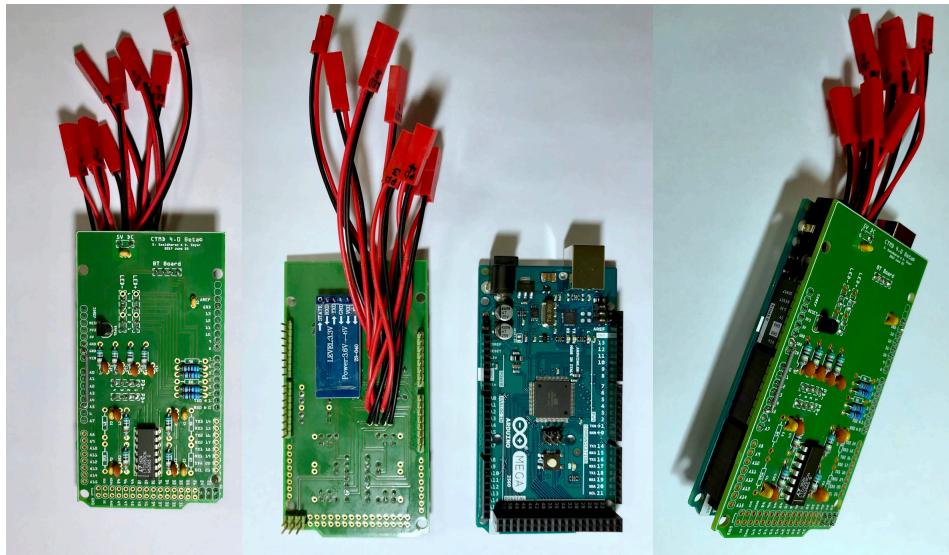
Note: Comments on each image panel refer to individual parts of the image, as counted from left-hand side to the right-hand side.



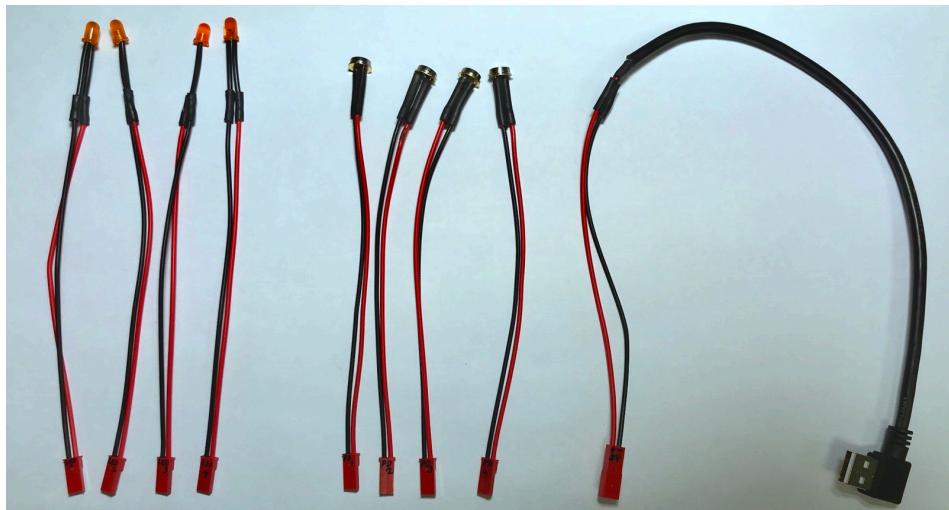
1. The first and second images show the top and bottom parts of the 3D-printed casing of the MicrobeMeter, respectively.



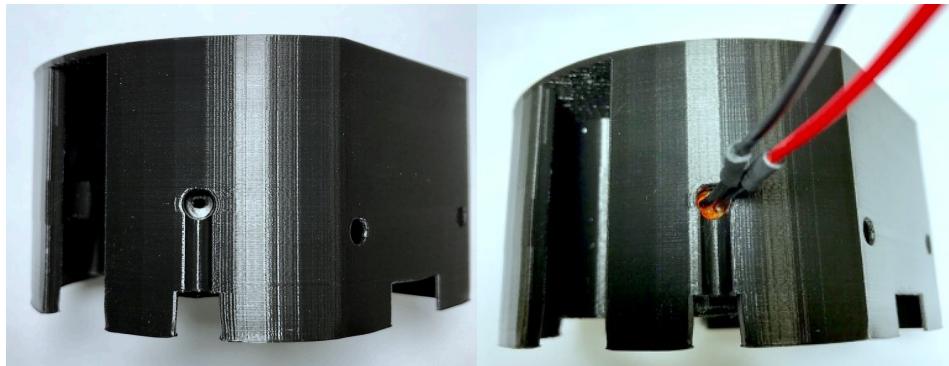
2. The first and second images show the inside of top and bottom parts of the 3D-printed casing of the MicrobeMeter, respectively.



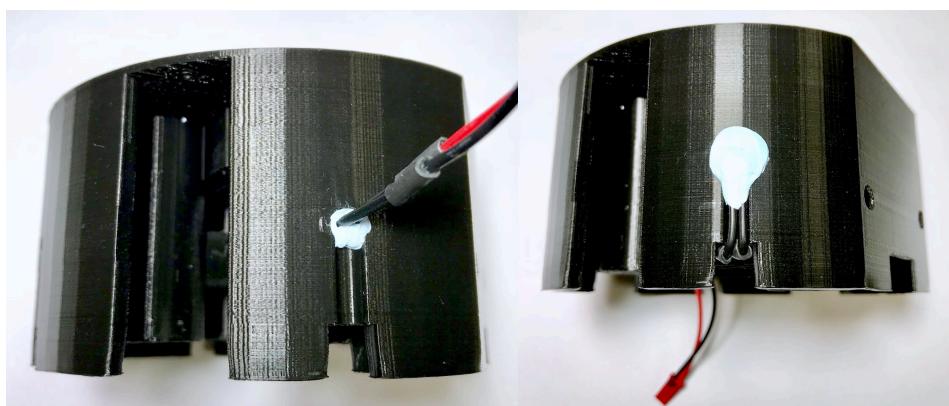
3. The first two images show the top and bottom views of the electronic circuit board (or ‘shield’) of the MicrobeMeter. The top-view shows all the components of the circuit except the Bluetooth module, which is visible in the bottom-view. The JST connectors are for connecting to the LEDs, photodiodes, and the USB A cable (see below for details). The third image shows Arduino Mega, while the fourth image shows the Arduino Mega attached to the MicrobeMeter shield.



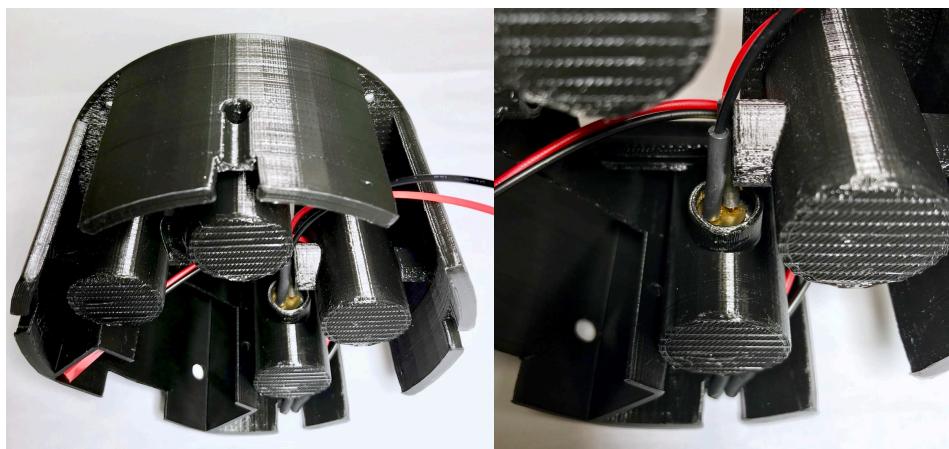
4. The first four components are LEDs soldered to the JST male connectors. The legs of LEDs are shielded using plastic sleeves and heat-shrinks to avoid short-circuiting. The second set of four components are photodiodes soldered to the JST male connectors. The legs of photodiodes are shielded using heat-shrinks. The last component is a USB A cable assembly soldered to a JST female connector. The soldered regions are shielded using heat-shrinks.



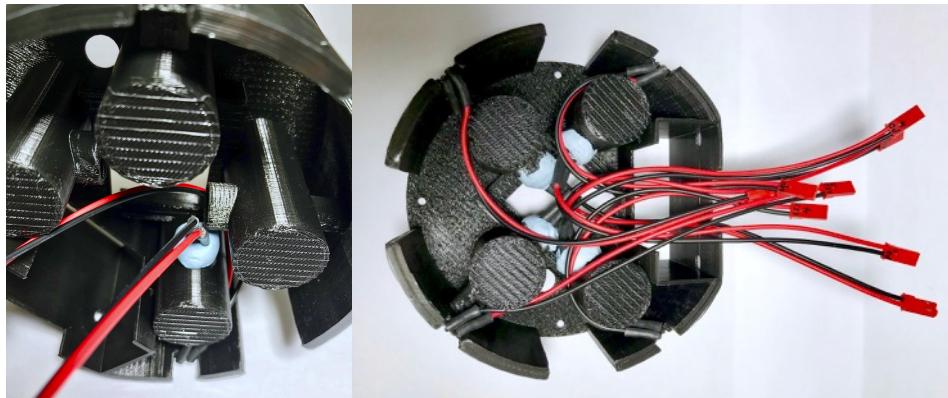
5. The first image shows the port for a single LED at the bottom part of the casing, while the second image shows an LED being tightly inserted into the port. Please make sure that the port is clean, and LED is inserted all the way to the bottom of the port.



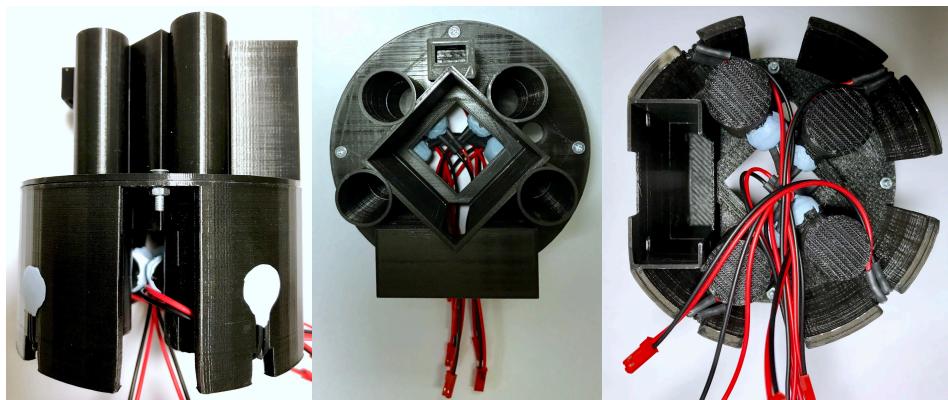
6. The LED is fixed into place within the port using a suitable adhesive (like Blu-Tack), so to avoid any movement (first image). The legs of the LED are then bend downwards into the designed groove, and secured using more adhesive.



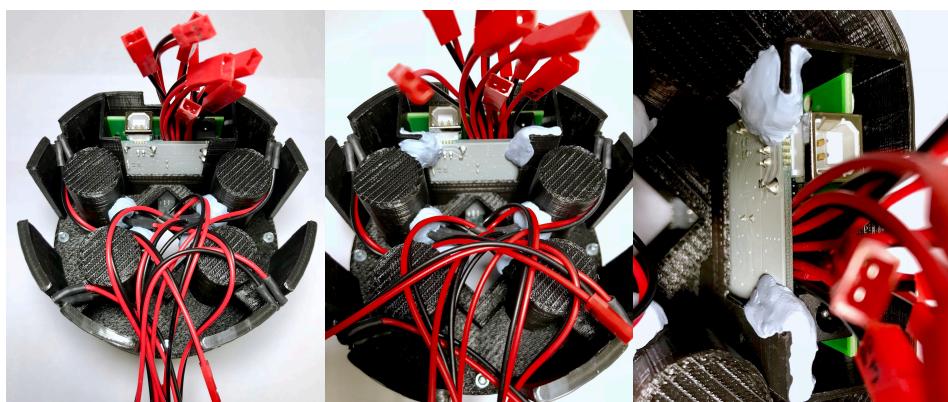
7. The photodiode ports are opposite to the LED ports. The images show a photodiode placed in a port. Please make sure that the port is clean, and photodiode is inserted all the way to the bottom of the port.



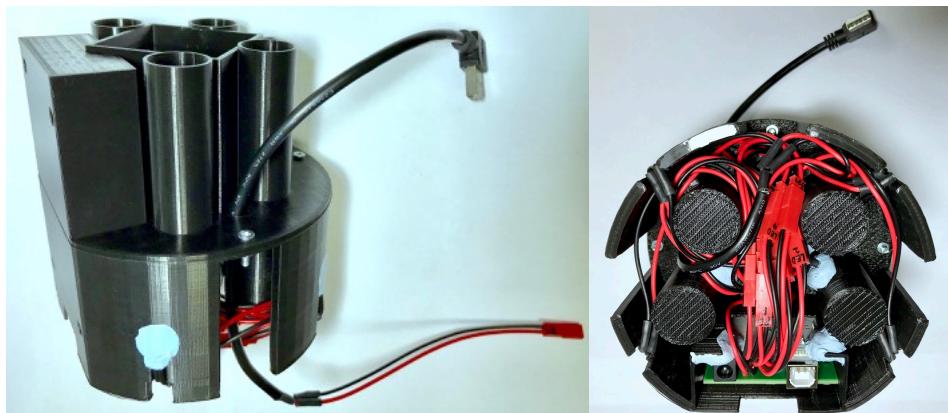
8. The photodiode is fixed into the port using a suitable adhesive (such as Blu-Tack), so to avoid any movement (first image). The second image shows the inside view of the bottom part of the casing after fixing all LEDs and photodiodes.



9. The top part of the casing is attached to the bottom part using three M3 screws and nuts. The first image shows a close-up view of a pair of screw and nut. The second and third images show the top and bottom view of the whole assembled MicrobeMeter casing, respectively.



10. The Arduino Mega, with its MicrobeMeter shield connected, is inserted into the rectangular port of the casing from the bottom as shown in the first image. The Arduino Mega is then attached to the casing using a suitable adhesive, as shown in the last two images.



11. The USB A cable assembly is inserted from the top to the bottom of the casing through a hole as shown in the first image. The second image shows all the JST male and female ports connected together and squeezed into the gaps. Please make sure that JST ports are tightly connected.



12. A pair of M6 screw and nut is placed in the port at the top of the battery holder (the rectangular port at the centre of the casing) as shown in the first image. With the battery in place, this screw should be tightened to keep the battery from moving. The second image shows the battery with three layers of insulation tape stuck on one corner to avoid the screw scratching the battery. The screw should be loosened prior to inserting the battery. Once the battery is inserted, the screw should be tightened lightly (be careful not to overtighten) and the USB A port should be connected to the battery as shown in the last image. Note that the MicrobeMeter does not have a power switch. Therefore, the USB A port should be detached from the battery to save electricity when not in use.



13. First image shows the fully assembled MicrobeMeter with Hungate tubes inserted into each port. The MicrobeMeter can be kept in a plastic jar for further protection as shown in the last two images. Such a plastic jar can also facilitate usage of the MicrobeMeter with a shaking incubator, if the jar diameter fits well with incubator holding bays.

Enjoy the MicrobeMeter!

Send us your feedback, data, or comments: <https://humanetechnologies.co.uk/contact>