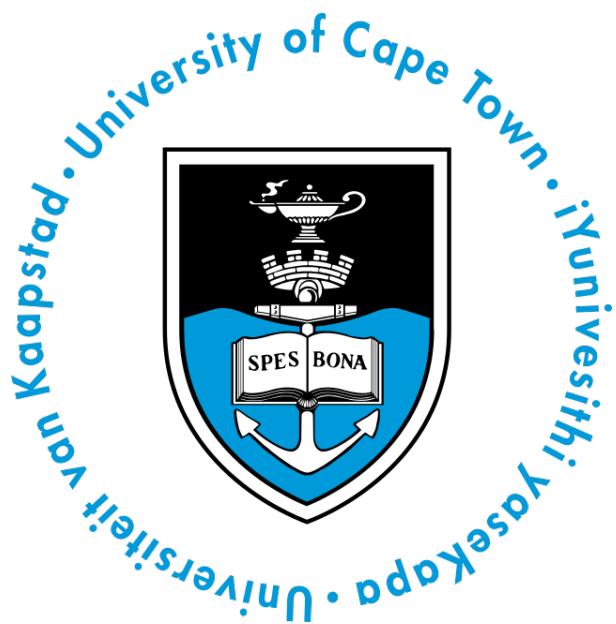


# Micro-mouse Assembly Document

2025



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# 0 Introduction:

## What is a Micro-Mouse?

In short, it is a maze-solving robot. Watching the [Veritasium video](#) will give you a clearer understanding of what a micro-mouse is, however it is important to note that your micro-mouse will likely (almost certainly) be much slower than the ones featured in the video. Nonetheless, let the video serve as inspiration for your project.

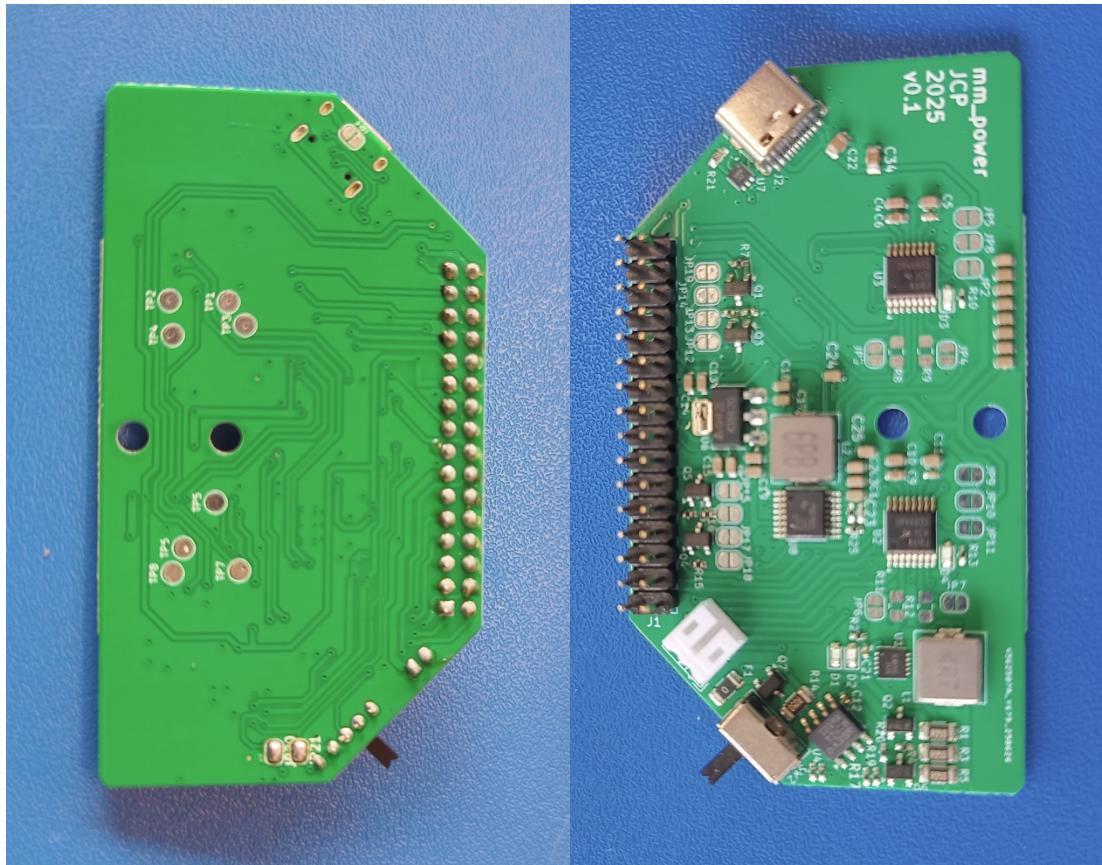
The 2025 UCT micro-mouse is made of up 5 electronic modules that produce the overall system. We will begin by assembling each submodule before putting it all together. There will be additional information in areas if one wanted to modify their mouse further, but not required for operation.

Module	Description
The motherboard	The motherboard is responsible for connecting all the PCBs together. It is the base board that all other modules will slot onto and provides the structure of the robot.
The processor	The processor board is the processing element of the mouse. It has an <b>STM32L476</b> microcontroller onboard, a significant upgrade in performance compared to the 2 <sup>nd</sup> year STM32F051. It is a 100-pin package and has 78 output pins that are available to use. Most of these have already been dictated by the required interconnections between the micro-mouse's supplementary modules.
The sensor	This module has 4 photo diode and LED elements as well as provisions for 3x micro-sensors as well as an optional I2C screen.
The power	This module is responsible for powering the entire system. It contains 2x dual H-bridges, USB charging, External load control, and battery sensing.
Micro-sensors	The micro-sensors are the ToF distance elements that provide information via I2C.
Debugger	The debugger was created to interact with the Processor better.

# 1. Powerboard

There is an assembly video – It was made to support this document.

1. Solder JP20 and JP21 shorted on the underside of the PCB. This connects the I2C pullups.
2. Solder the battery connector onto the PCB
3. Solder the 2x16 header on the top of the PCB.



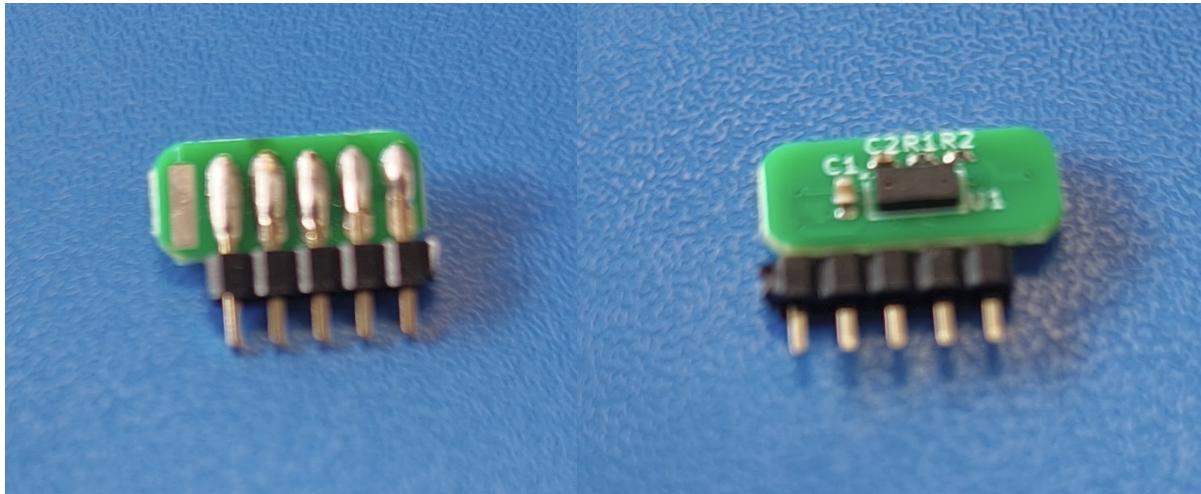
Additional Information:

## 2. Micro-Sensor

There is an assembly video – It was made to support this document.

1. Solder the header onto the microsensor. **!!orientation matters!!**

**Note: There is a pin 1 indicator on the silk and its on the top and NOT populated**



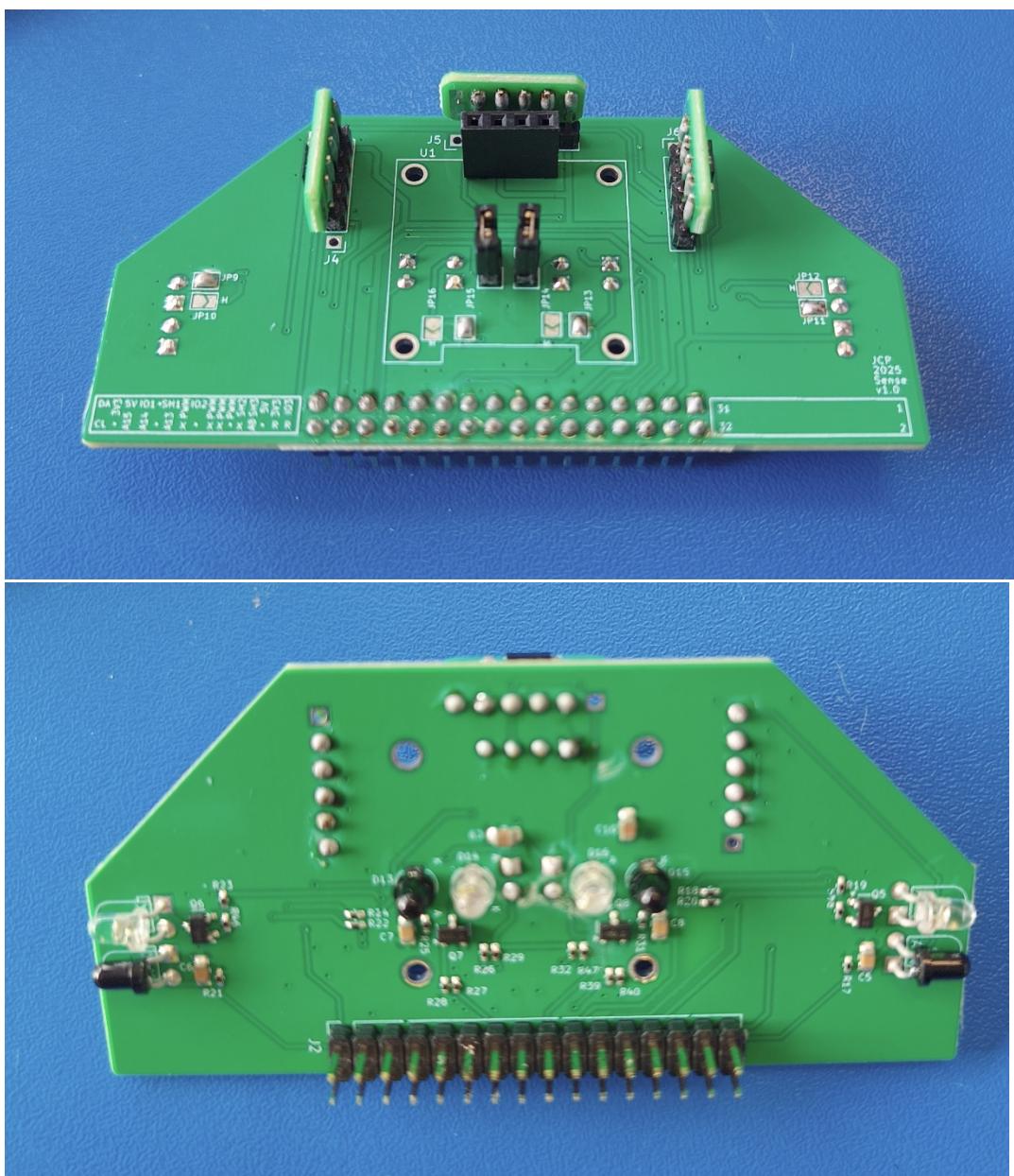
Additional Information:

### 3. Sensor

There is an assembly video – It was made to support this document.

1. Solder the 4 jumpers on the top of the PCB. You are soldering the one NOT associated with the "H" symbol.
2. Solder the 2x16 pinheader which is responsible for connecting to the motherboard
3. Solder the 3 micro-sensor PCBs onto the mouse.
  - a. Pay attention to them aiming outwards
  - b. Being on the correct side of the PCB

**Note: The 1x04 Socket and jumpers in the image below are not needed in your design.**



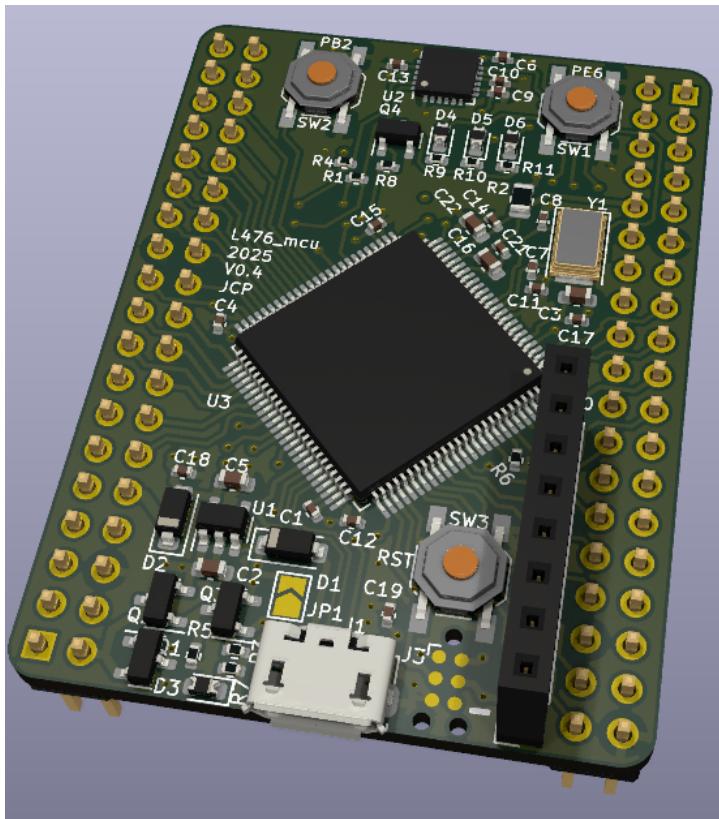
Additional Information:

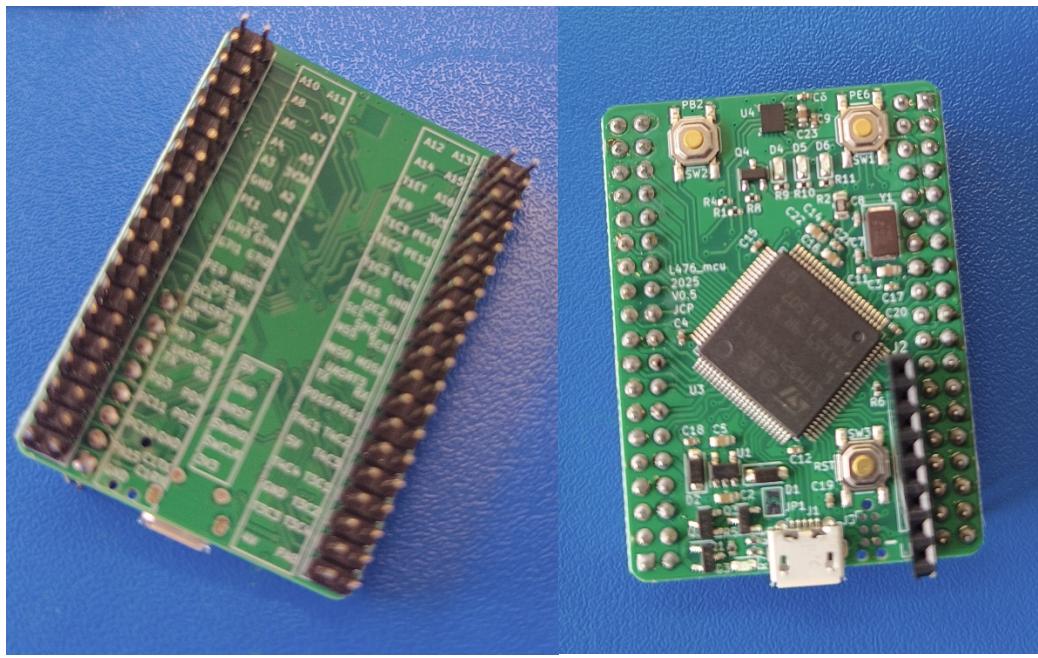
There is provisioning for an OLED which was outside of the budget of 2025.

## 4. Processor

There is an assembly video – It was made to support this document.

1. Solder the 2x19 headers onto each side of the Processor board.
2. Solder the socket onto the top side of the Processor board for the programmer.





Additional Information:

## 5. Debugger

There is an assembly video – It was made to support this document.

1. Solder the 90 degree 1x9 header onto the board. (If you want simplicity, you only need to solder 8 pins. The SWO is not implemented and reduces confusion)
2. Solder the sockets onto the top side for the ST-Link debugger component.

[Image of completed debugger board](#)

Additional Information:

## 6. Motherboard

There is an assembly video – It was made to support this document.

1. Solder the 4 Resistor pads shorting them together. It may help to use a few strands of wire ([watch video](#))
2. Solder the 2x19 sockets (black) on the top side where the processor board will eventually be seated.
3. Solder the 2x16 socket (blue) on the top front for the sensor PCB to be seated.
4. Solder the 2x16 socket (blue) on the **BOTTOM** rear for the power PCB to be seated.

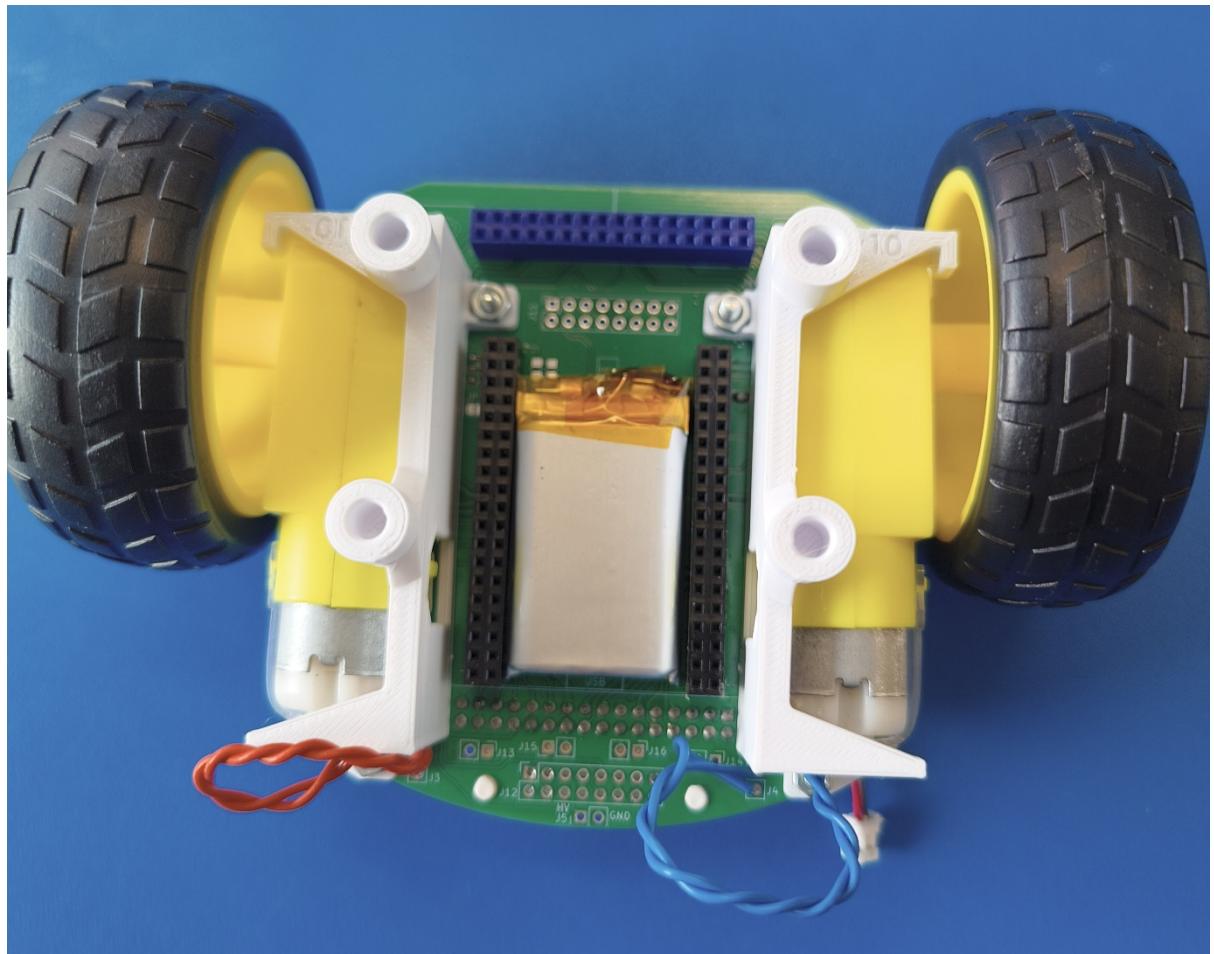
[Image of completed Motherboard](#)

Additional Information:

## 7. Integration

There is an assembly video – It was made to support this document.

1. Solder some wire onto the motor connections
2. Clean up the 3D print motor bracket
3. Cut the front section of the motor off with a pair of pliers
4. Insert the cut side of the motor first into the bracket, then put the wires through the slot in the motor bracket and press the motors into the bracket
5. Solder the motor wires to the corresponding places on the motherboard.
6. Inset a bolt through the motherboard facing up and through a motor bracket proceed to put a nut on the bolt with the nut making contact with the motor bracket.
7. Do this for the other 5 bolt holes for the motor bracket.
8. Push the battery cable through the larger hole between the processor connectors.
9. Connect the battery to the power board.
10. Correctly insert the power board.
11. Correctly insert the Processor board.
12. Correctly insert the Sensor board.



Additional Information:

