

CUBOTino micro: The World's smallest Rubik's cube solver robot

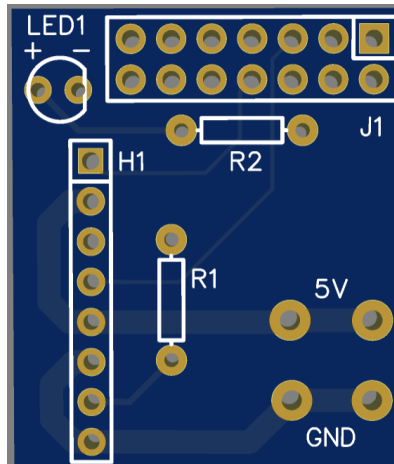
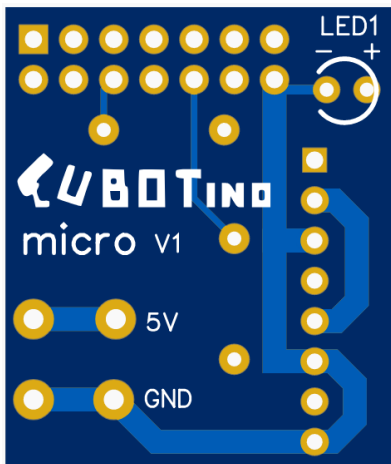
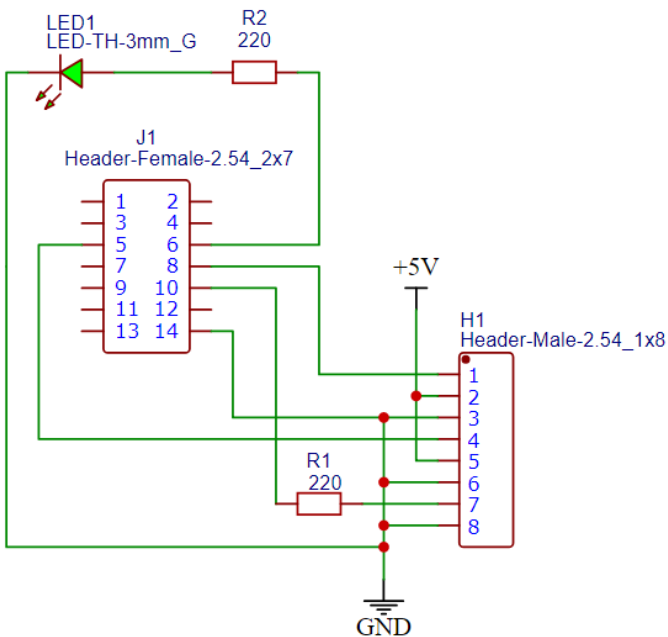
Connections board

The Connections_board is a simple passive board, that serves as a hub for the Servos and the Led connections.



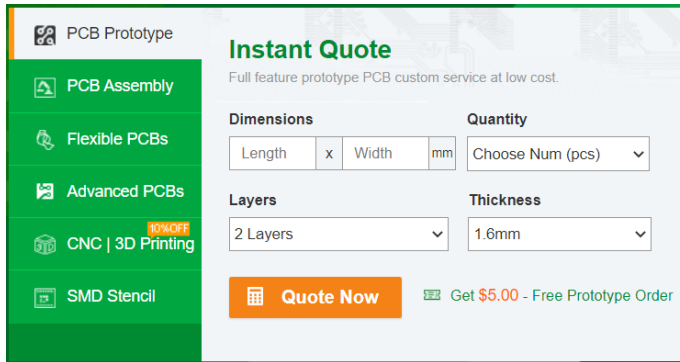
has offered their sponsorship to this project; This means:

- It makes me happy 😊
- I got the motivation to learn how to design a (simple) board.
- It makes possible to easily add:
 - a LED for the ACT function, by considering the Raspberry Pi led is quite hidden.
 - a couple of soldering pads for the power supply cables.
- You can decide whether making the board by yourself, order it to [PCBWay](https://www.pcbway.com) or to place the order to another board manufacturer (I hope you'll order to PCBWay).



A) Order the board:

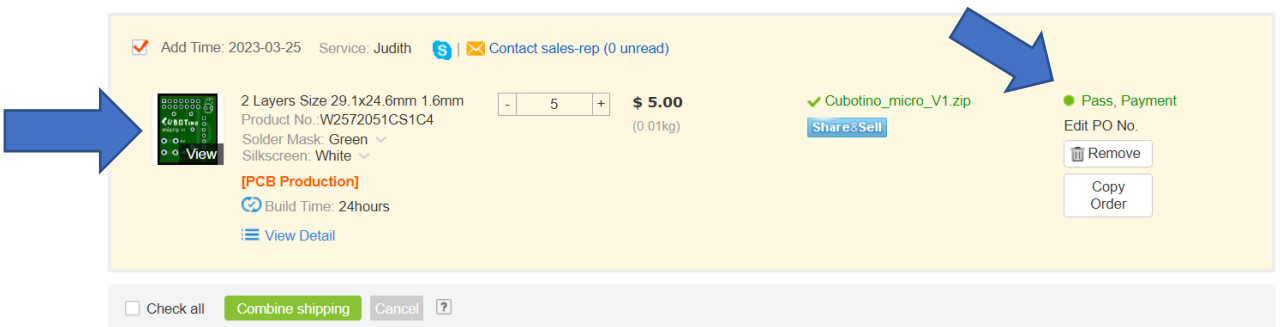
- a. At [PCBWay.com](https://www.pcbway.com) enter the board dimensions: Length=29, Width=29 mm, 2 layers, 1.6mm thickness



- b. Check the Quote.
c. Minimum ordering quantity is 5 pieces.
d. Leave all the other parameters at default.
e. Solder mask colour up to your preference (be aware some colours are more expensive).
f. Select the transportation courier (I'm testing the "Global Standard")
g. Save to chart.
h. Make or login your account.
i. Drop the "Cubotino_micro_V1.zip" file.
j. Submit the order (files get analysed):



- k. Wait until approval (ca 10 minutes).



< Add new item

Subtotal(1 Items): **US \$ 5.00**

All Total: **US \$ 5.00**

[Proceed to checkout](#)

- l. Proceed to checkout:
i. Check the address.
ii. Select the transportation.
iii. Make the payment.

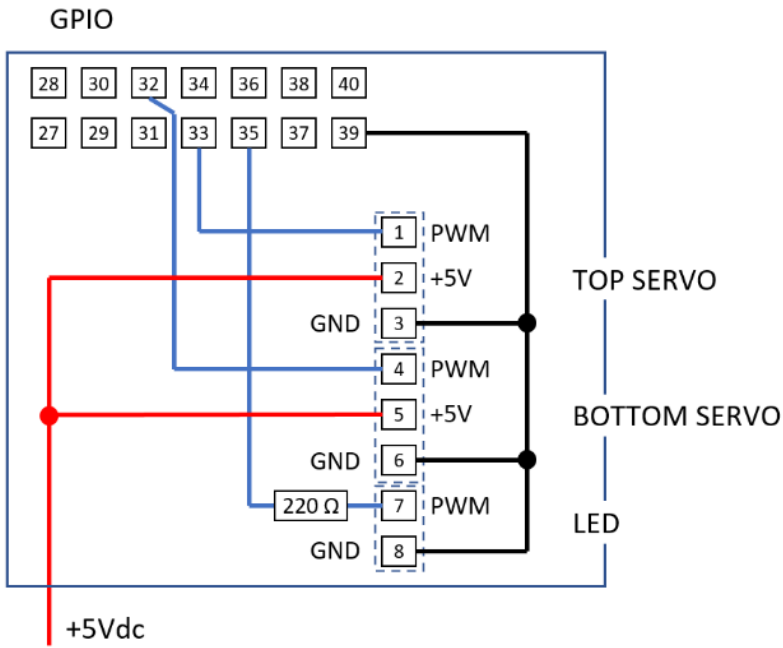
B) Assemble the ordered board:

Suggested soldering order:

1. Solder the resistors (R1=220ohm, R2=220 or 330ohm).
2. Solder the 1x8 male header, right angled, with terminals pointing to the board centre.
3. Solder the 2x7 header:
 - A 2x7 header can be obtained by grinding of some plastic from a 2x8.
 - A 2x7 header can be made by using 2 strips of 1x7 header.
4. The GND of the board is provided by the GPIO pin 39. The additional pads can be used as hub.
5. The +5Vdc of the board is provided by the soldered wire.
6. Solder the 3mm led; For the led you can choose the soldering side:
 - Opposite to the connectors, to be used with the Cover version having the hole. This solution makes the led well visible, at the same side of the display.
 - At the connector side. The led will be less visible.

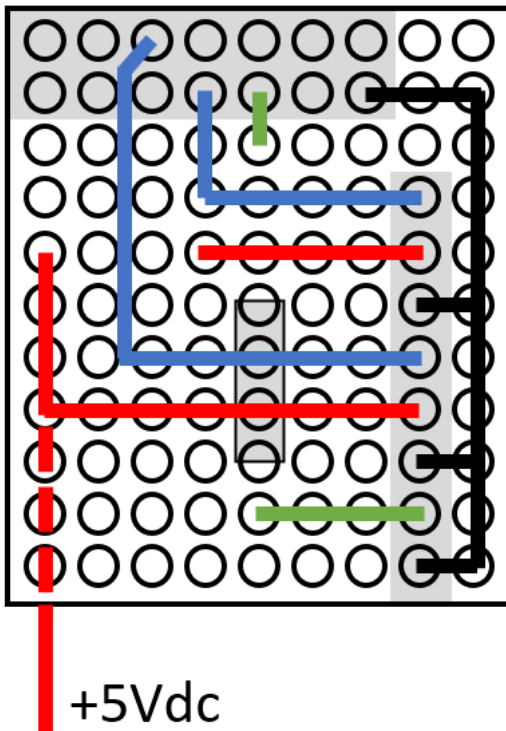
Note: The ACT-led function needs to be later activated; See tuning chapter.

C) Make the board by yourself:

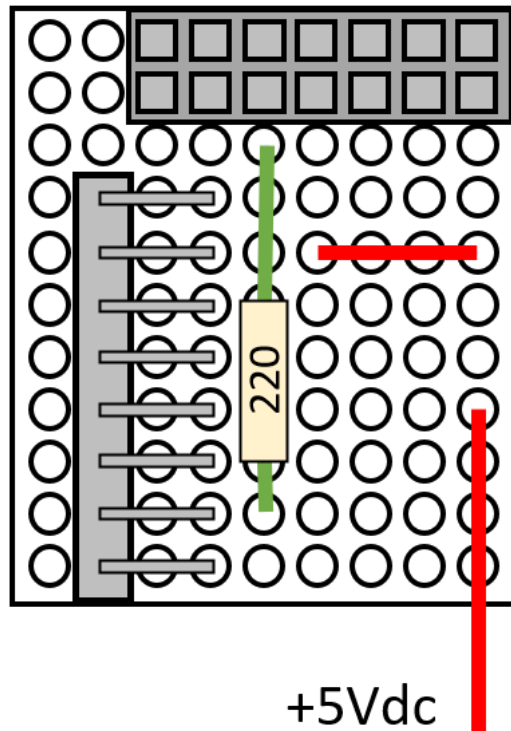


You can make it by your own via a (perfbboard) prototyping board.

Bottom view



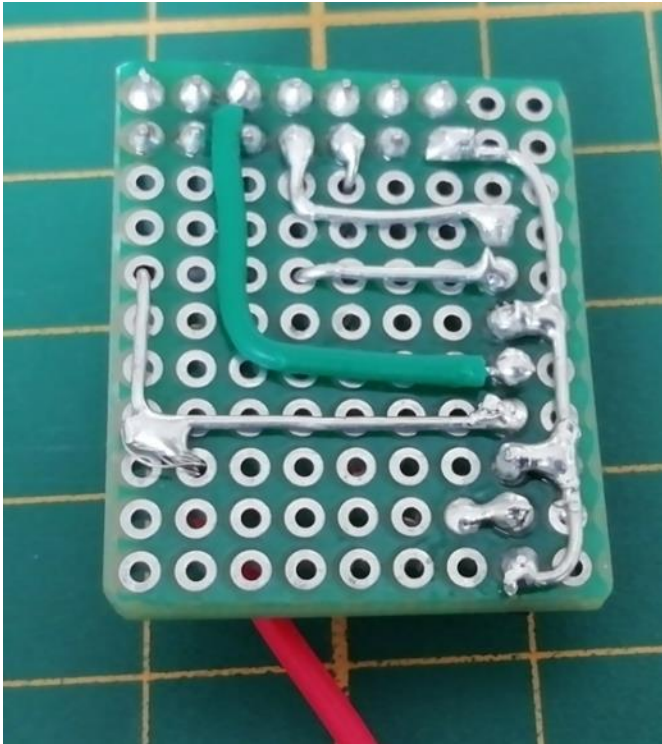
Top view



A few notes:

7. The perfboard can be of a single side type.
8. Board dimension (WxH) is about 24mm x 29mm (9x11 holes).
9. Suggested to use a 2x7 header, yet a 2x6 will also work:
 - A 2x7 header can be obtained by grinding of some plastic from a 2x8.
 - A 2x7 header can be made by using 2 strips of 1x7 header.
10. Position the 2x7 header at the corner hole of the board and solder it.
11. Position the 220ohm resistor before placing the 1x8 male header.
12. Position the 1x8 male header, right angled, and solder it.
13. Use an insulated wire to connect GPIO pin32 and header pin 4; This to ensure proper insulation between the GPIO pins 31 and 33.
14. The GND of the board is provided by the GPIO pin 39.
15. The +5Vdc of the board is provided by the soldered wire.

Bottom view



Top view



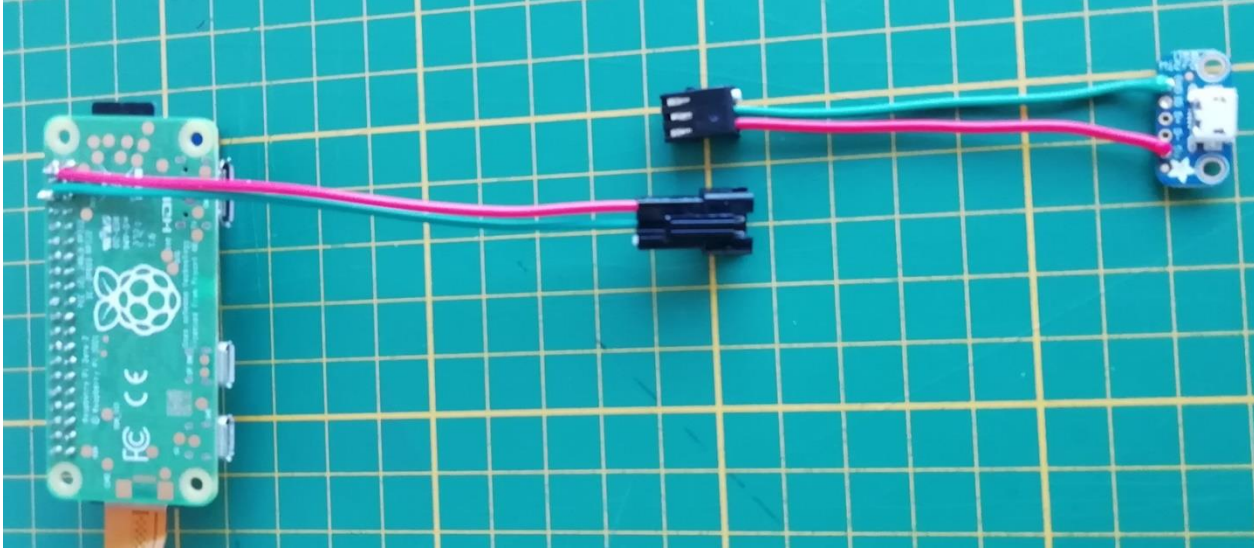
Power supply wiring

Because of:

- the chosen display (small and integrating two buttons) occupying the GPIO power pins
- keeping the robot size small

the power supply cables are directly soldered to the Raspberry Pi; This is also the case for the Connections_board.

Use a couple of wire with at least 0.5mm^2 cross section, coupled to a connector for wires:

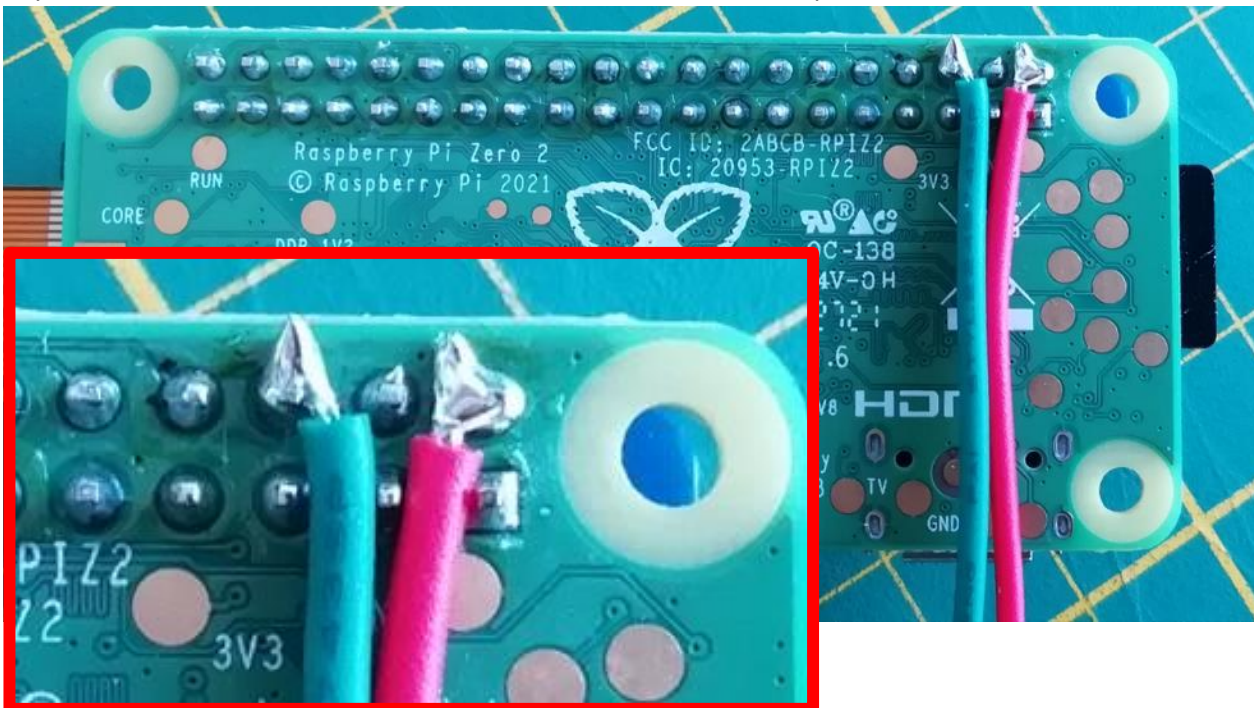


For the Raspberry Pi: Cable length of about 8 to 10cm

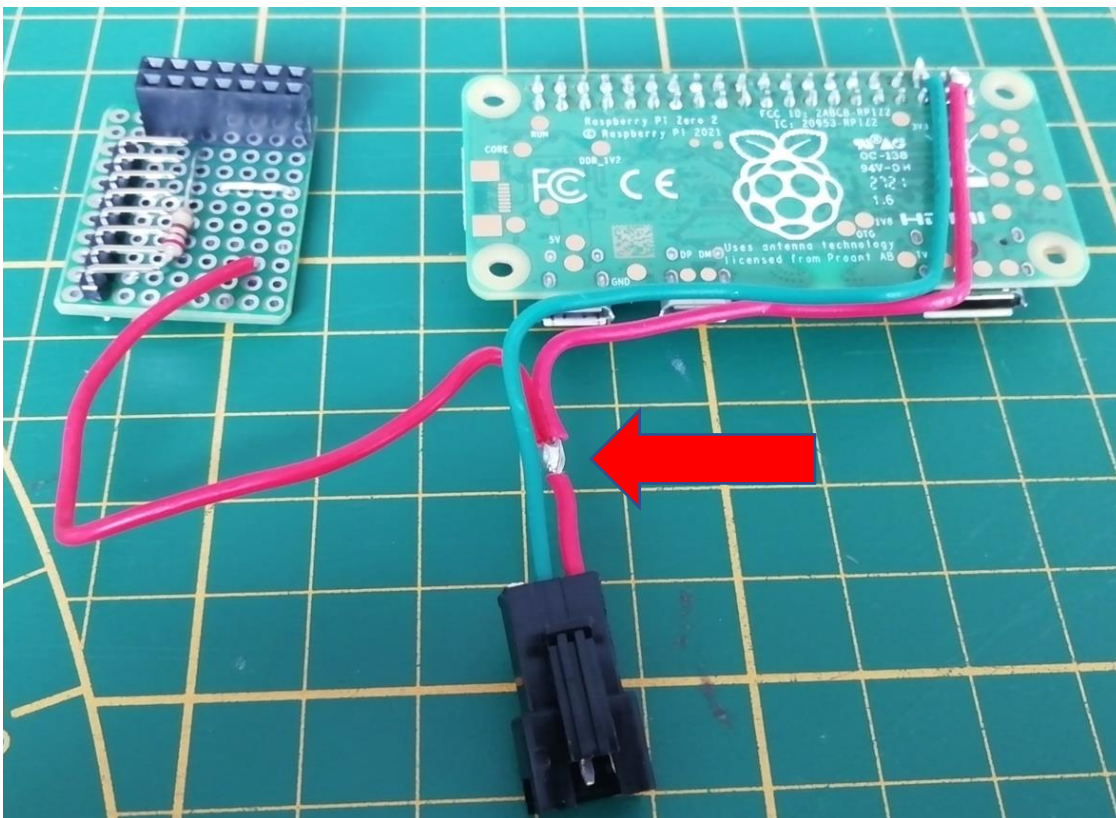
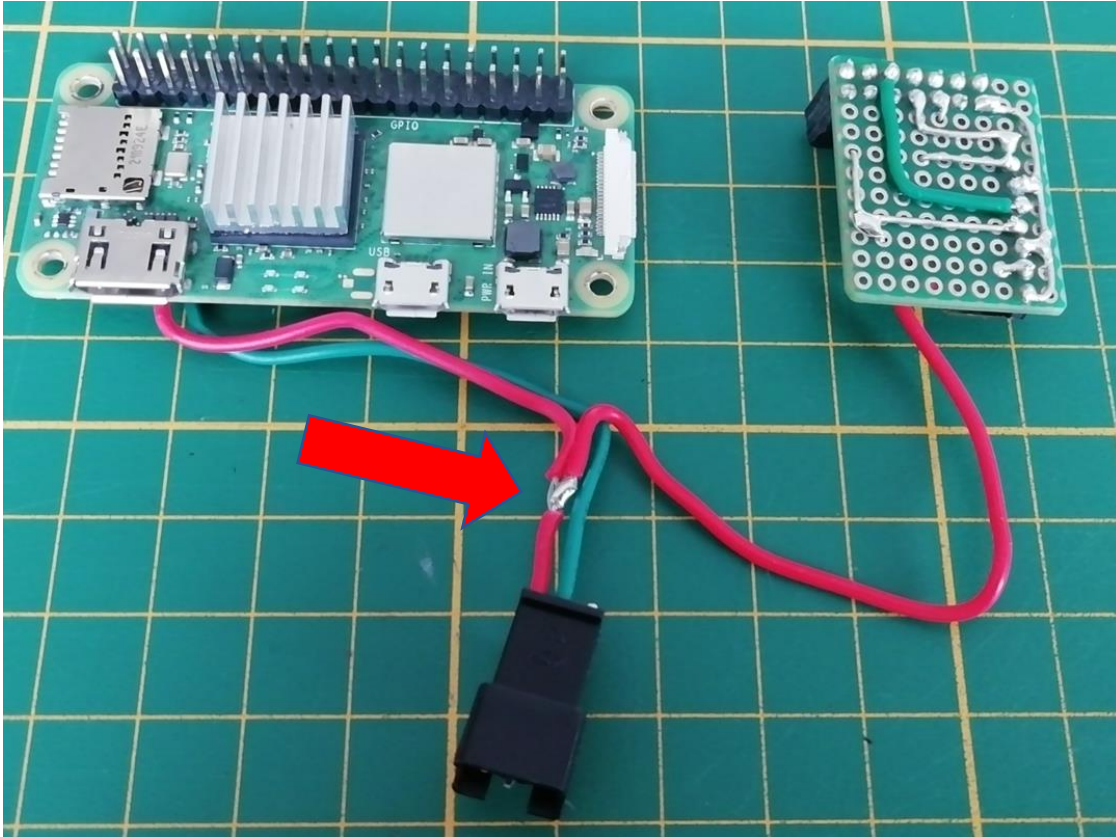
Positive → Pin2, or Pin4, or Pin2 & Pin4

Negative → Pin6

Pay attention to have the cable insulation in between the odd GPIO pins



Solder the Connections_board positive wire to the positive wire, close to the power supply connector.
For the Connections_board consider 8~9cm of wire



For the microUSB breakout board: Cable length of about 6cm.

