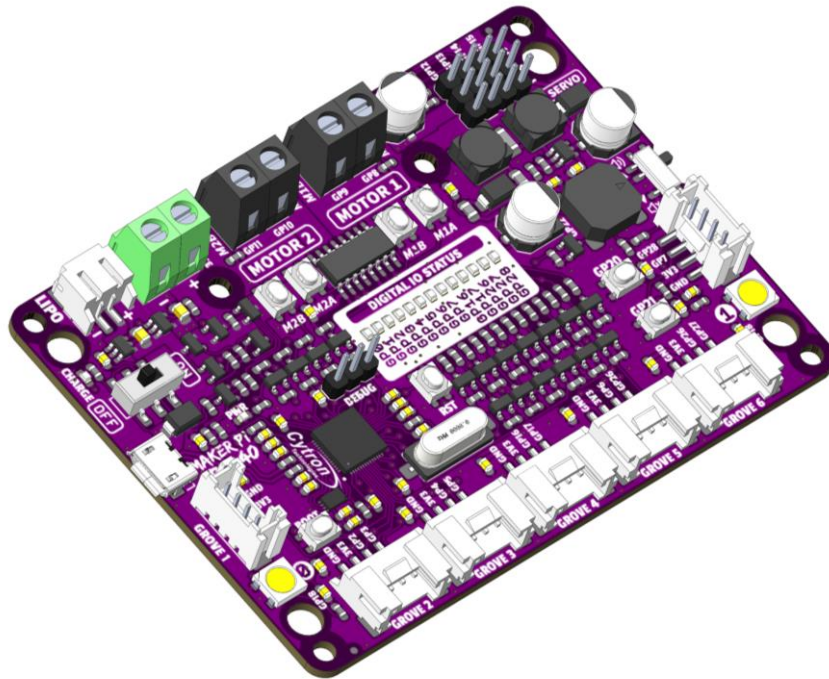




# **MAKER PI RP2040**

## **Simplifying Robotics with Raspberry Pi® RP2040**



## **Datasheet**

Rev 1.2  
January 2022

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# 1. BOARD LAYOUT & FUNCTION

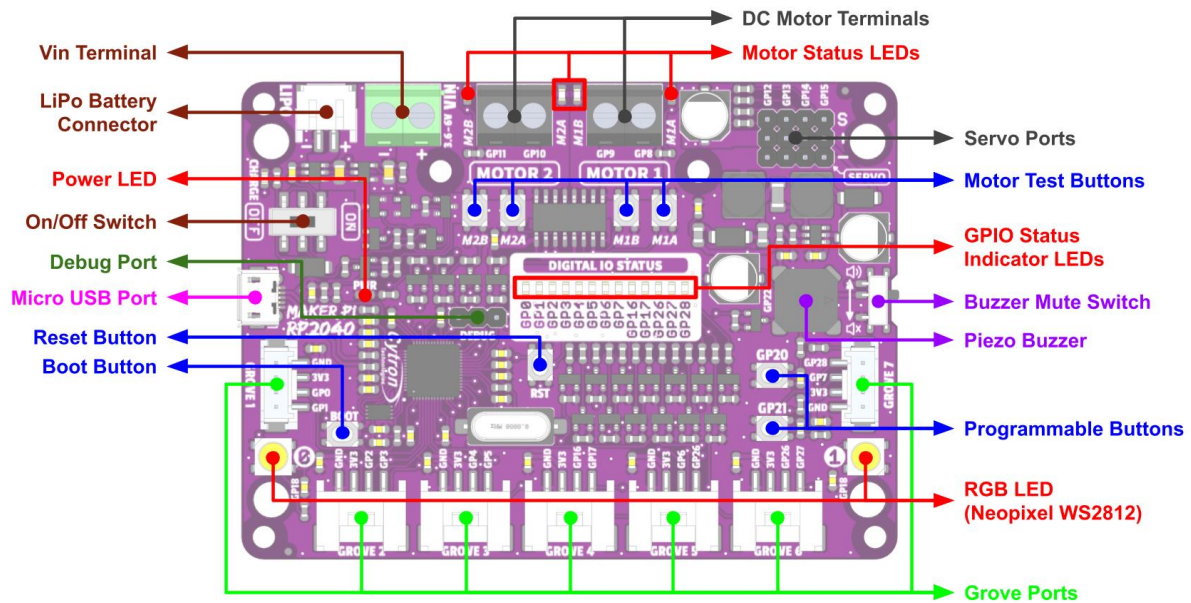


Figure 1: MAKER-PI-RP2040 Board Functions

| Function                      | Description                                                                                                                                                                                                                                                                                        |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Vin Terminal</b>           | Connect to any power source within 3.6 - 6V.                                                                                                                                                                                                                                                       |
| <b>LiPo Battery Connector</b> | Connect to Single Cell LiPo / Li-Ion Battery<br>The battery is rechargeable via USB.<br><br>* The battery is protected from overcharged and over discharged. If the board cannot be turned on when the battery is connected, please charge the battery to activate the battery protection circuit. |
| <b>Power LED</b>              | Turn on when powered up.                                                                                                                                                                                                                                                                           |
| <b>On/Off Switch</b>          | Turn on/off the power.                                                                                                                                                                                                                                                                             |
| <b>Debug Port</b>             | Debugging port of the RP2040.                                                                                                                                                                                                                                                                      |
| <b>Micro USB Port</b>         | Used for upload programs from PC.<br>Can also be used to power up the board.                                                                                                                                                                                                                       |
| <b>Reset Button</b>           | Press to reset the RP2040.                                                                                                                                                                                                                                                                         |
| <b>Boot Button</b>            | Press and hold this button while resetting the RP2040 will enter the bootloader mode. Used to load the Micropython/Circuitpython or custom C/C++ firmware.                                                                                                                                         |

| Function             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------|------|------|------|--------|--------|---|---|--------|------|------|-----|---|---|--------|------|------|-----|---|---|---|--------|------|------|---|---|---|--------|------|------|---|---|---|---|--------|------|------|-----|---|---|--------|------|------|-----|---|---|----|--------|------|------|-----|---|----|--------|------|------|-----|---|---|---|--------|------|------|---|---|----|--------|---|------|---|------|---|----|--------|---|------|---|------|----|--------|---|------|---|------|---|---|--------|------|------|---|---|----|--------|---|---|---|------|
| Grove Ports          | Connect to external Grove modules.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | <table><tr><th>Grove Port</th><th>GPIO</th><th>PWM</th><th>SPI</th><th>I2C</th><th>UART</th><th>Analog</th></tr><tr><td rowspan="2">1</td><td>0</td><td>PWM0-A</td><td>SDI0</td><td>SDA0</td><td>TX0</td><td>-</td></tr><tr><td>1</td><td>PWM0-B</td><td>CSn0</td><td>SCL0</td><td>RX0</td><td>-</td></tr><tr><td rowspan="2">2</td><td>2</td><td>PWM1-A</td><td>SCK0</td><td>SDA1</td><td>-</td><td>-</td></tr><tr><td>3</td><td>PWM1-B</td><td>SDO0</td><td>SCL1</td><td>-</td><td>-</td></tr><tr><td rowspan="2">3</td><td>4</td><td>PWM2-A</td><td>SDI0</td><td>SDA0</td><td>TX1</td><td>-</td></tr><tr><td>5</td><td>PWM2-B</td><td>CSn0</td><td>SCL0</td><td>RX1</td><td>-</td></tr><tr><td rowspan="2">4</td><td>16</td><td>PWM0-A</td><td>SDI0</td><td>SDA0</td><td>TX0</td><td>-</td></tr><tr><td>17</td><td>PWM0-B</td><td>CSn0</td><td>SCL0</td><td>RX0</td><td>-</td></tr><tr><td rowspan="2">5</td><td>6</td><td>PWM3-A</td><td>SCK0</td><td>SDA1</td><td>-</td><td>-</td></tr><tr><td>26</td><td>PWM5-A</td><td>-</td><td>SDA1</td><td>-</td><td>ADC0</td></tr><tr><td rowspan="2">6</td><td>26</td><td>PWM5-A</td><td>-</td><td>SDA1</td><td>-</td><td>ADC0</td></tr><tr><td>27</td><td>PWM5-B</td><td>-</td><td>SCL1</td><td>-</td><td>ADC1</td></tr><tr><td rowspan="2">7</td><td>7</td><td>PWM3-B</td><td>SDO0</td><td>SCL1</td><td>-</td><td>-</td></tr><tr><td>28</td><td>PWM6-A</td><td>-</td><td>-</td><td>-</td><td>ADC2</td></tr></table> | Grove Port | GPIO   | PWM  | SPI  | I2C  | UART   | Analog | 1 | 0 | PWM0-A | SDI0 | SDA0 | TX0 | - | 1 | PWM0-B | CSn0 | SCL0 | RX0 | - | 2 | 2 | PWM1-A | SCK0 | SDA1 | - | - | 3 | PWM1-B | SDO0 | SCL1 | - | - | 3 | 4 | PWM2-A | SDI0 | SDA0 | TX1 | - | 5 | PWM2-B | CSn0 | SCL0 | RX1 | - | 4 | 16 | PWM0-A | SDI0 | SDA0 | TX0 | - | 17 | PWM0-B | CSn0 | SCL0 | RX0 | - | 5 | 6 | PWM3-A | SCK0 | SDA1 | - | - | 26 | PWM5-A | - | SDA1 | - | ADC0 | 6 | 26 | PWM5-A | - | SDA1 | - | ADC0 | 27 | PWM5-B | - | SCL1 | - | ADC1 | 7 | 7 | PWM3-B | SDO0 | SCL1 | - | - | 28 | PWM6-A | - | - | - | ADC2 |
|                      | Grove Port                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | GPIO       | PWM    | SPI  | I2C  | UART | Analog |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 0          | PWM0-A | SDI0 | SDA0 | TX0  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1          | PWM0-B | CSn0 | SCL0 | RX0  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2          | PWM1-A | SCK0 | SDA1 | -    | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3          | PWM1-B | SDO0 | SCL1 | -    | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 4          | PWM2-A | SDI0 | SDA0 | TX1  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 5          | PWM2-B | CSn0 | SCL0 | RX1  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 16         | PWM0-A | SDI0 | SDA0 | TX0  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 17         | PWM0-B | CSn0 | SCL0 | RX0  | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 6          | PWM3-A | SCK0 | SDA1 | -    | -      |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 26         | PWM5-A | -    | SDA1 | -    | ADC0   |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 26         | PWM5-A | -    | SDA1 | -    | ADC0   |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 27         | PWM5-B | -    | SCL1 | -    | ADC1   |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| 7                    | 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | PWM3-B     | SDO0   | SCL1 | -    | -    |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
|                      | 28                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | PWM6-A     | -      | -    | -    | ADC2 |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| RGB LEDs (WS2812)    | User programmable WS2812B RGB LED. Connected to GP18.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Programmable Buttons | Accessible from the user program. Connected to GP20 and GP21                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Piezo Buzzer         | Can be used to play tone or melody. Connected to GP22.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Buzzer Mute Switch   | Used to mute the piezo buzzer.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| GPIO Status LEDs     | LED indicators for RP2040 GPIOs on Grove Ports.<br>Turn on when the GPIO state is high.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Motor Test Buttons   | Press to test the functionality of the motor driver.<br>Motor will run at full speed. <ul style="list-style-type: none"><li>MxA : Forward*</li><li>MxB : Backward*</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Servo Ports          | Connectors for 4 x RC servo motors.<br>Signal is connected to GP12, GP13, GP14 and GP15.<br>V+ voltage is equal to power source voltage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| Motor Status LEDs    | Turn on when the motor is running. <ul style="list-style-type: none"><li>MxA : Forward*</li><li>MxB : Backward*</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |
| DC Motor Terminals   | Connect to the motor terminal.<br>Motor voltage at full speed is equal to power source voltage.<br>Motor direction is dependent on the polarity. <ul style="list-style-type: none"><li>M1A : GP8</li><li>M1B : GP9</li><li>M2A : GP10</li><li>M2B : GP11</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |        |      |      |      |        |        |   |   |        |      |      |     |   |   |        |      |      |     |   |   |   |        |      |      |   |   |   |        |      |      |   |   |   |   |        |      |      |     |   |   |        |      |      |     |   |   |    |        |      |      |     |   |    |        |      |      |     |   |   |   |        |      |      |   |   |    |        |   |      |   |      |   |    |        |   |      |   |      |    |        |   |      |   |      |   |   |        |      |      |   |   |    |        |   |   |   |      |

Table 1: MAKER-PI-RP2040 Board Functions

\* Actual motor direction is dependent on the motor connection.  
Swapping the connection (MxA & MxB) will reverse the direction.

## 2. SPECIFICATIONS

| No | Parameters                                                    |                                       | Min          | Max | Unit |
|----|---------------------------------------------------------------|---------------------------------------|--------------|-----|------|
| 1  | Power Input Voltage (USB, LiPo or VIN) *                      |                                       | 3.6          | 6   | V    |
| 2  | Digital Input Voltage                                         | Low Level                             | -0.3         | 0.8 | V    |
|    |                                                               | High Level                            | 2.0          | 3.6 | V    |
| 3  | Digital Output Voltage                                        | Low Level                             | 0            | 0.5 | V    |
|    |                                                               | High Level                            | 2.6          | 3.3 | V    |
| 4  | Analog Input Voltage                                          |                                       | 0            | 3.3 | V    |
| 5  | Vmotor & Vservo (Only USB is connected)                       |                                       | VUSB - 0.4   |     | V    |
| 6  | Vmotor & Vservo (Only either one of LiPo or VIN is connected) |                                       | VLiPo or VIN |     | V    |
| 7  | Vmotor & Vservo (USB and LiPo are connected)                  |                                       | VUSB - 0.4   |     | V    |
| 8  | Vmotor & Vservo<br>(USB and VIN are connected)                | VIN < VUSB                            | VUSB - 0.4   |     | V    |
|    |                                                               | VIN > VUSB<br>and<br>VIN - VUSB < 0.6 | VIN - 0.4    |     | V    |
|    |                                                               | VIN - VUSB > 0.6                      | VIN          |     | V    |
| 9  | Maximum DC Motor Current (Per Channel)                        | Continuous                            | -            | 1   | A    |
|    |                                                               | Peak (< 5 seconds)                    | -            | 1.5 | A    |
| 10 | DC Motor Driver PWM Frequency                                 |                                       | -            | 20  | kHz  |
| 11 | Total +3V3 Output Current (Grove Ports)                       |                                       | -            | 300 | mA   |
| 12 | Operating Temperature                                         |                                       | -20          | 85  | °C   |
| 13 | USB VID & PID<br>(CircuitPython & Arduino Core)               | VID                                   | 0x2E8A       |     |      |
|    |                                                               | PID                                   | 0x1000       |     |      |

Table 2: MAKER-PI-RP2040 Absolute Maximum Ratings

\* Voltage for the DC motor and servo is equal to power input voltage.

- \* *It's not recommended to connect both LiPo and VIN at the same time.  
Although it's perfectly safe to do so.*

### 3. MOTOR DRIVER TRUTH TABLE

| Input A<br>(GP8 / GP10) | Input B<br>(GP9 / GP11) | Output A<br>(M1A / M2A) | Output B<br>(M1B / M2B) | Motor     |
|-------------------------|-------------------------|-------------------------|-------------------------|-----------|
| Low                     | Low                     | Low                     | Low                     | Brake     |
| High                    | Low                     | High                    | Low                     | Forward*  |
| Low                     | High                    | Low                     | High                    | Backward* |
| High                    | High                    | Hi-Z (Open)             | Hi-Z (Open)             | Coast     |

Table 3: Motor Driver Truth Table

\* Actual motor direction is depending on the motor connection.  
Swapping the connection (MA & MB) will reverse the direction.

### 4. DIMENSION

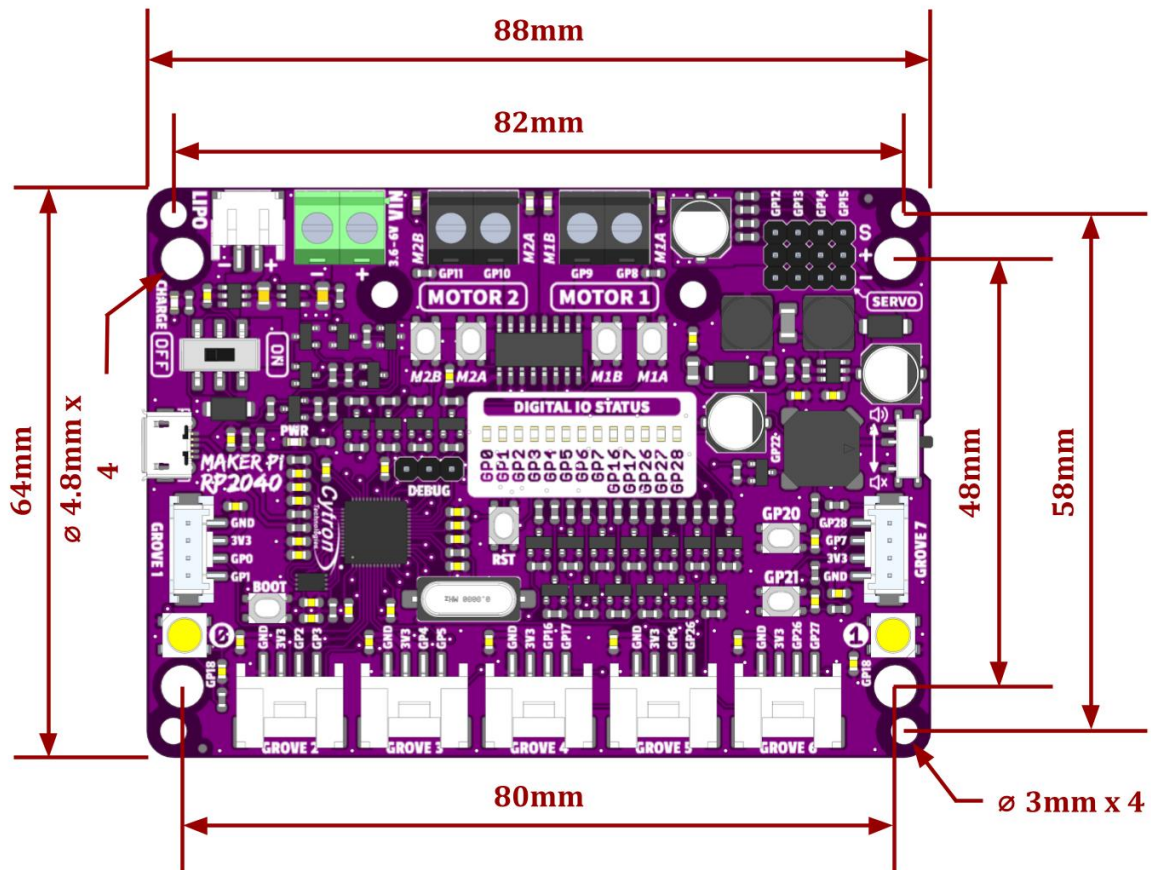


Figure 2: MAKER-PI-RP2040 Dimension

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