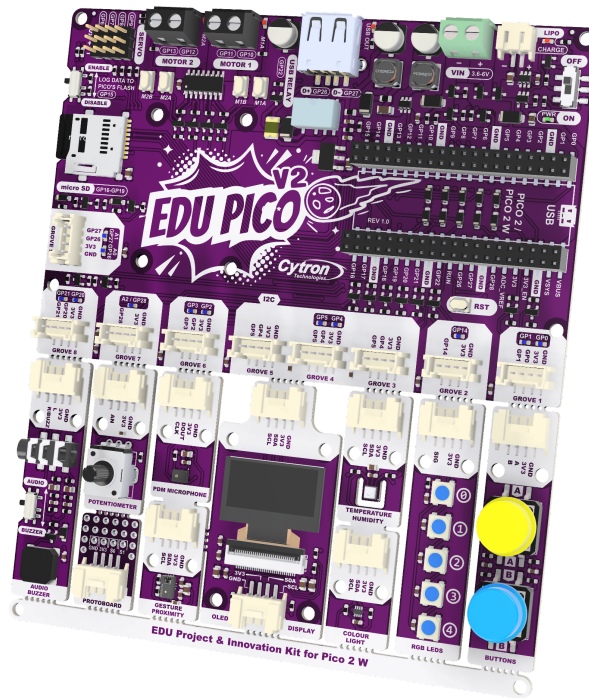




EDU PICO V2

EDU Project & Innovation Kit for Pico 2 W



Datasheet

Rev 1.1
June 2026

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1. INTRODUCTION

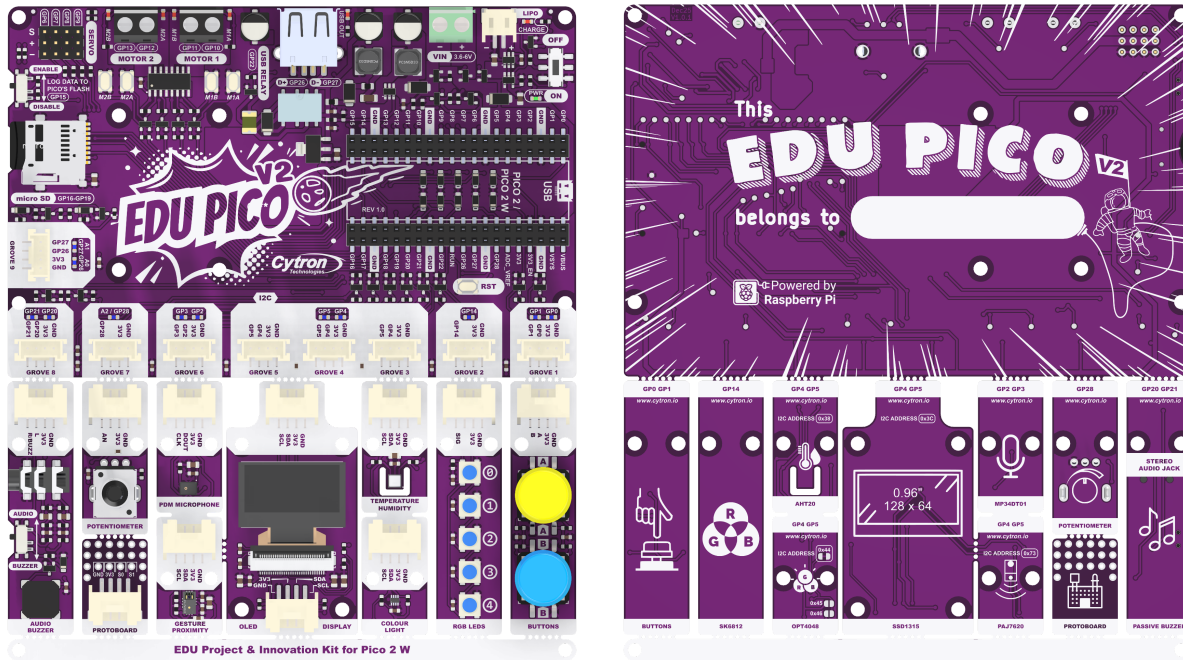


Figure 1: EDU-PICO2 Front View (Left), Back View (Right).

EDU PICO V2 is designed to work seamlessly with the Raspberry Pi Pico 2 W microcontroller. The board comes with various built-in modules and sensors, such as:

- OLED display
- Temperature and humidity sensor
- Gesture and proximity sensor
- Colour and light sensor
- RGB LEDs
- Push buttons
- Potentiometer
- Buzzer and stereo audio jack
- PDM microphone
- Dual channel motor driver
- Servo ports
- USB relay
- Micro SD card socket

Besides, it can be powered by USB, 1-cell LiPo/Li-ion battery (with built-in charger), or external power source within 3.6 - 6V range. For more information on the board features can refer to the [Board Layout & Function](#) section.

Please check the parts and components according to the packing list. If there are any parts missing, please contact us at sales@cytron.io immediately.



Figure 2: Included Items.

No.	ITEMS	QUANTITY
1	EDU PICO V2 Board	1
2	Step-by-step Guidebook (English)	1
3	Raspberry Pi Pico 2 W (not available in EDU-PICO2-NB variant)	1
4	USB Micro B Cable	1
5	Grove 4 Pin Buckled 20cm Cable	8
6	Micro Servo with Servo Horns	1
7	DC2-6V Miniature Motor with 20cm Wire	1
8	Mini Phillips Head Screwdriver	1
9	DIY 4 Blades 56mm Motor Propeller (Blue)	1
10	USB LED Light Stick (Blue)	1
11	Cable Tie 100mm	5
12	Self adhesive Round Velcro 10mm (Hook and loop pairs)	27

Table 1: EDU-PICO2 Packing List

3. BOARD LAYOUT & FUNCTION

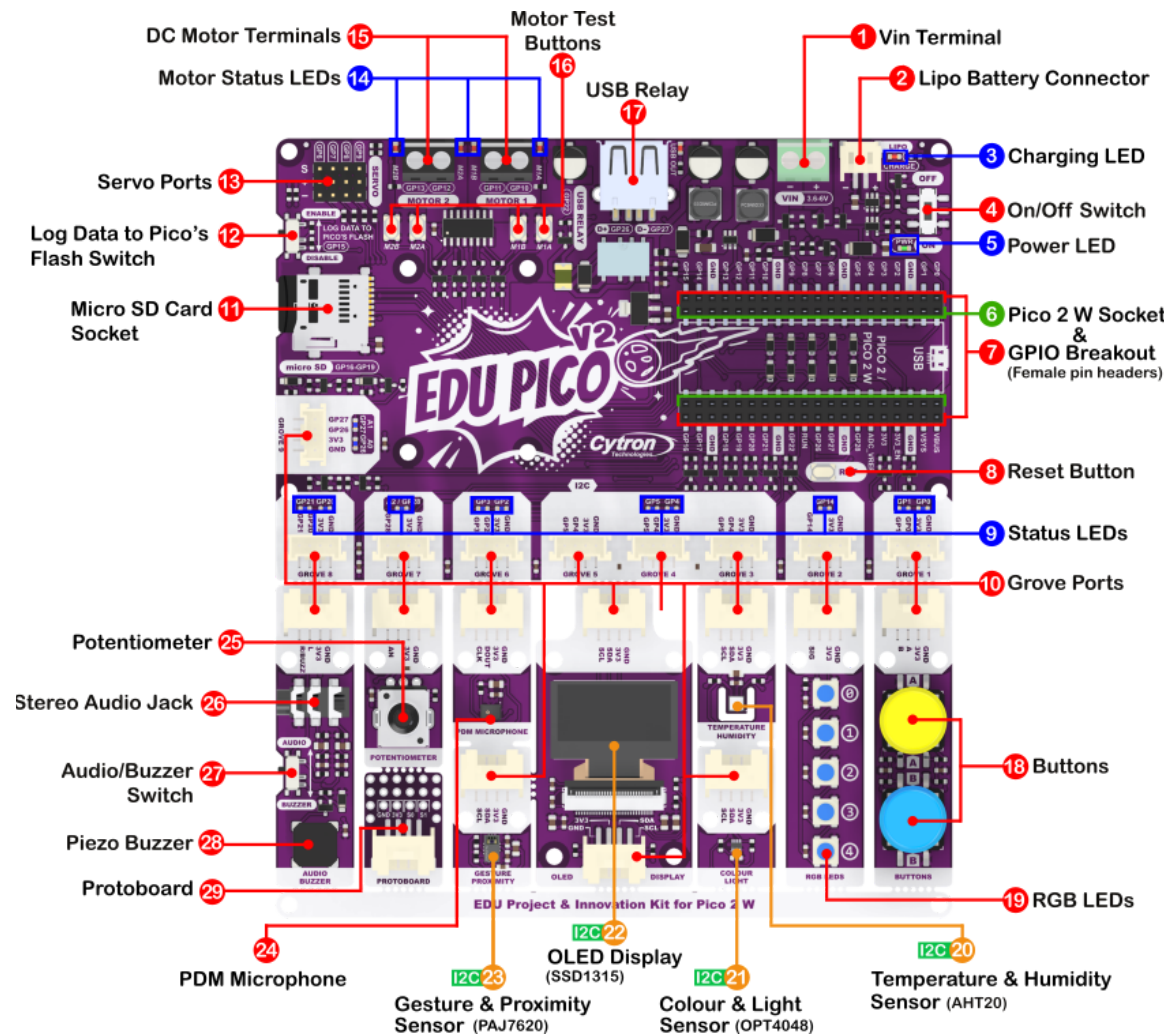


Figure 3: EDU-PICO2 Board Function

Function	Description																																				
1. Vin Terminal	- Terminal block for external power input connection (Vin) - Supported voltage range: 3.6 V–6 V. - Fits wires up to 18 AWG																																				
2. LiPo Battery Connector	- JST-PH 2-pin connector for LiPo or Li-Ion battery. - Connect to single cell LiPo or Li-Ion battery. - The board comes with a built-in charger, and the battery is rechargeable via the USB port of the Raspberry Pi Pico 2 / Pico 2 W. <i>* 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.</i>																																				
3. Charging LED	- LED Indicator for the LiPo or Li-Ion battery charging status. - Turns on when the battery is charging and off when the battery is full. This LED might also flicker if the battery is not connected, it's normal. <i>* But if it flickers frequently or turns on even when the battery is not connected, it's an indication the board has not received enough power from the USB port.</i>																																				
4. On/Off Switch	Turn on or off the power, including the Pico 2 / Pico 2 W.																																				
5. Power LED	Turn on when powered up																																				
6. Pi Pico Socket	2×20 female pin headers to mount the Pico 2 / Pico 2 W onto the board (inner rows). - Refer to the silkscreen for correct orientation.																																				
7. GPIO Breakout	The outer rows are used to break out the Pico 2 / Pico 2 W GPIO pins.																																				
8. Reset Button	Push button to reset the Pico 2 / Pico 2 W.																																				
9. Status LEDs	- LED indicators for the Pico 2 / Pico 2 W GPIOs on the Grove ports. - Turn on when the GPIO state is high.																																				
10. Grove Ports	4-pin, 2.0mm pitch Grove connector - The Grove Ports are already connected to the adjacent 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><th>Connected Module</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><td rowspan="2">Buttons</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>x</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td rowspan="2">RGB LEDs</td></tr><tr><td>14</td><td>PWM7-A</td><td>SCK1</td><td>SDA1</td><td>-</td><td>-</td></tr></table>	Grove Port	GPIO	PWM	SPI	I2C	UART	Analog	Connected Module	1	0	PWM0-A	SDI0	SDA0	TX0	-	Buttons	1	PWM0-B	CSn0	SCL0	RX0	-	2	x	-	-	-	-	-	RGB LEDs	14	PWM7-A	SCK1	SDA1	-	-
Grove Port	GPIO	PWM	SPI	I2C	UART	Analog	Connected Module																														
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	<table><tr><td rowspan="2">3, 4, 5</td><td>4</td><td>PWM2-A</td><td>SDIO</td><td>SDA0</td><td>TX1</td><td>-</td><td rowspan="2">AHT20, PAJ7620, OPT4048, SSD1315</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">6</td><td>2</td><td>PWM1-A</td><td>SCK0</td><td>SDA1</td><td>-</td><td>-</td><td rowspan="2">PDM Microphone</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">7</td><td>x</td><td>-</td><td>-</td><td>-</td><td>-</td><td>-</td><td rowspan="2">Potentiometer</td></tr><tr><td>28</td><td>PWM6-A</td><td>-</td><td>-</td><td>-</td><td>ADC2</td></tr><tr><td rowspan="2">8</td><td>20</td><td>PWM2-A</td><td>-</td><td>SCL0</td><td>-</td><td>-</td><td rowspan="2">Audio & Buzzer</td></tr><tr><td>21</td><td>PWM2-B</td><td>-</td><td>SDA0</td><td>-</td><td>-</td></tr><tr><td rowspan="2">9</td><td>26</td><td>PWM5-A</td><td>-</td><td>SDA1</td><td>-</td><td>ADC0</td><td rowspan="2">USB-A Port</td></tr><tr><td>27</td><td>PWM5-B</td><td>-</td><td>SCL1</td><td>-</td><td>ADC1</td></tr></table>	3, 4, 5	4	PWM2-A	SDIO	SDA0	TX1	-	AHT20, PAJ7620, OPT4048, SSD1315	5	PWM2-B	CSn0	SCL0	RX1	-	6	2	PWM1-A	SCK0	SDA1	-	-	PDM Microphone	3	PWM1-B	SDO0	SCL1	-	-	7	x	-	-	-	-	-	Potentiometer	28	PWM6-A	-	-	-	ADC2	8	20	PWM2-A	-	SCL0	-	-	Audio & Buzzer	21	PWM2-B	-	SDA0	-	-	9	26	PWM5-A	-	SDA1	-	ADC0	USB-A Port	27	PWM5-B	-	SCL1	-	ADC1
3, 4, 5	4		PWM2-A	SDIO	SDA0	TX1	-	AHT20, PAJ7620, OPT4048, SSD1315																																																															
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11. Micro SD Card Socket	• SPI-based Micro SD card interface. • Allows the Pico to read from and write to a Micro SD card. Pin connection: <table><tr><th>GPIO</th><th>SD Card (SPI)</th></tr><tr><td>GP16</td><td>SDO</td></tr><tr><td>GP17</td><td>CSn</td></tr><tr><td>GP18</td><td>SCK</td></tr><tr><td>GP19</td><td>SDI</td></tr></table>	GPIO	SD Card (SPI)	GP16	SDO	GP17	CSn	GP18	SCK	GP19	SDI																																																												
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GP19	SDI																																																																						
12. Log Data to Pico's Flash Switch	• Onboard slide switch internally connected to GP15. Switch position and GP15 logic state: <table><tr><td>Enable</td><td>Pulled LOW</td></tr><tr><td>Disable</td><td>Pulled HIGH</td></tr></table> • This switch is intended to be used during data logging together with a boot.py configuration to prevent filesystem write conflicts. It is needed when the board is powered via USB only. Refer to this link for more information. • Enabling this switch at startup with this setup boot.py file makes the Pico 2 filesystem read-only to your computer and writable by CircuitPython. Refer to this tutorial for more information. <i>* You can also repurpose this switch for other functions.</i>	Enable	Pulled LOW	Disable	Pulled HIGH																																																																		
Enable	Pulled LOW																																																																						
Disable	Pulled HIGH																																																																						
13. Servo Ports	• Connectors for 4 x RC servo motors. • The signal pins are connected to GP6, GP7, GP8 and GP9. • V+ voltage is equal to power source voltage.																																																																						

Function	Description								
14. Motor Status LEDs	- Red LEDs to indicate which motor is running - Turn on when the motor is running - MxA : Forward* - MxB : Backward* * Motor direction depends on wiring. Swapping MxA and MxB reverses the direction.								
15. DC Motor Terminals	- Terminal block for Motor connection. - Motor voltage at full speed is equal to power source voltage. - Locked-Antiphase Mode Motor Control (Dual-PWM) - Fits wires up to 18 AWG <table><tr><td>M1A</td><td>GP10</td><td>M2A</td><td>GP12</td></tr><tr><td>M1B</td><td>GP11</td><td>M2B</td><td>GP13</td></tr></table> * Actual motor direction is dependent on the motor connection. Swapping the connections (MxA & MxB) will reverse the direction.	M1A	GP10	M2A	GP12	M1B	GP11	M2B	GP13
M1A	GP10	M2A	GP12						
M1B	GP11	M2B	GP13						
16. Motor Test Buttons	- Press to test the functionality of the motor driver. - The motor will run at full speed. - MxA : Forward - MxB : Backward								
17. USB Relay	5V USB output controlled by a relay connected to GP22. - Overcurrent protection for current draws greater than 500 mA. - The D+ and D- pin is connected as follow: <table><tr><td>D+</td><td>GP26</td></tr><tr><td>D-</td><td>GP27</td></tr></table>	D+	GP26	D-	GP27				
D+	GP26								
D-	GP27								
Grove Modules									
18. Buttons	2x programmable push buttons connected to the following GPIO pins: <table><tr><td>Button A</td><td>GP0</td></tr><tr><td>Button B</td><td>GP1</td></tr></table> - Buttons are pulled HIGH by default and go LOW when pressed.	Button A	GP0	Button B	GP1				
Button A	GP0								
Button B	GP1								
19. RGB LEDs	5x addressable RGB LEDs in series. SK6812-based RGB LEDs, compatible with WS2812B - Connected to GP14.								

Function	Description				
20. Temperature & Humidity Sensor	- I2C-based Temperature and Humidity sensor AHT20. - I2C address: 0x38. <i>* For accuracy, it is recommended to measure data every 2 seconds to reduce temperature rises due to high measurement frequency.</i>				
21. Colour & Light Sensor	- I2C-based Light and Colour Sensor OPT4048. - I2C address: 0x44.				
22. OLED Display	- I2C-based 0.96Inch 128x64 OLED white display SSD1315 - I2C address: 0x3C.				
23. Gesture & Proximity Sensor	- I2C-based Gesture and Proximity sensor PAJ7620 - I2C address: 0x73. Pin connection (I2C): <table border="1"> <tr> <td>SDA</td><td>GP4</td></tr> <tr> <td>SCL</td><td>GP5</td></tr> </table>	SDA	GP4	SCL	GP5
SDA	GP4				
SCL	GP5				
24. PDM Microphone	- MEMS audio sensor omnidirectional digital microphone MP34DT01 - PDM output. Pin connection: <table border="1"> <tr> <td>DOUT</td><td>GP2</td></tr> <tr> <td>CLK</td><td>GP3</td></tr> </table>	DOUT	GP2	CLK	GP3
DOUT	GP2				
CLK	GP3				
25. Potentiometer	Onboard analog potentiometer connected to GP28 (ADC2).				
26. Stereo Audio Jack	- Non amplified audio output. - Can be connected to an earphone or amplified speaker. Pin connection: <table border="1"> <tr> <td>Right Channel</td><td>GP20</td></tr> <tr> <td>Left Channel</td><td>GP21</td></tr> </table>	Right Channel	GP20	Left Channel	GP21
Right Channel	GP20				
Left Channel	GP21				
27. Audio/Buzzer Switch	Used to switch between left channel audio out and the piezo buzzer.				
28. Piezo Buzzer	- Programmable piezo buzzer, can be used to play tone or melody. - Internally connected to GP8.				
29. Protoboard	- Protoboard with Grove port. - Only the pins near the Grove port pins are connected.				

Table 2: EDU-PICO2 Board Functions

4. RASPBERRY PI PICO PINOUT DIAGRAM

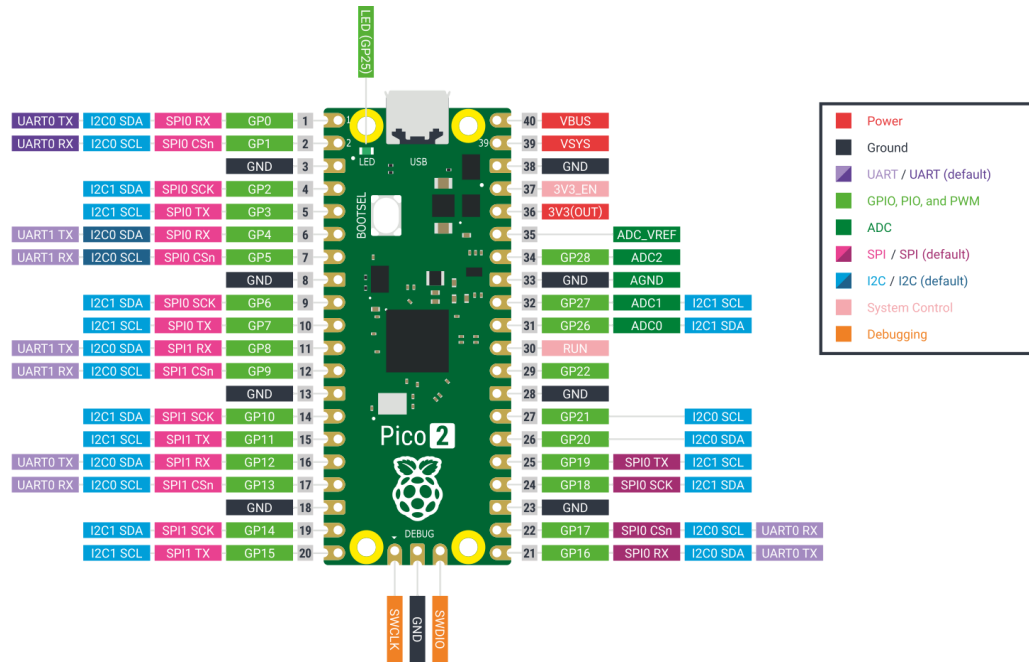


Figure 4: Raspberry Pi Pico 2 Pinout Diagram

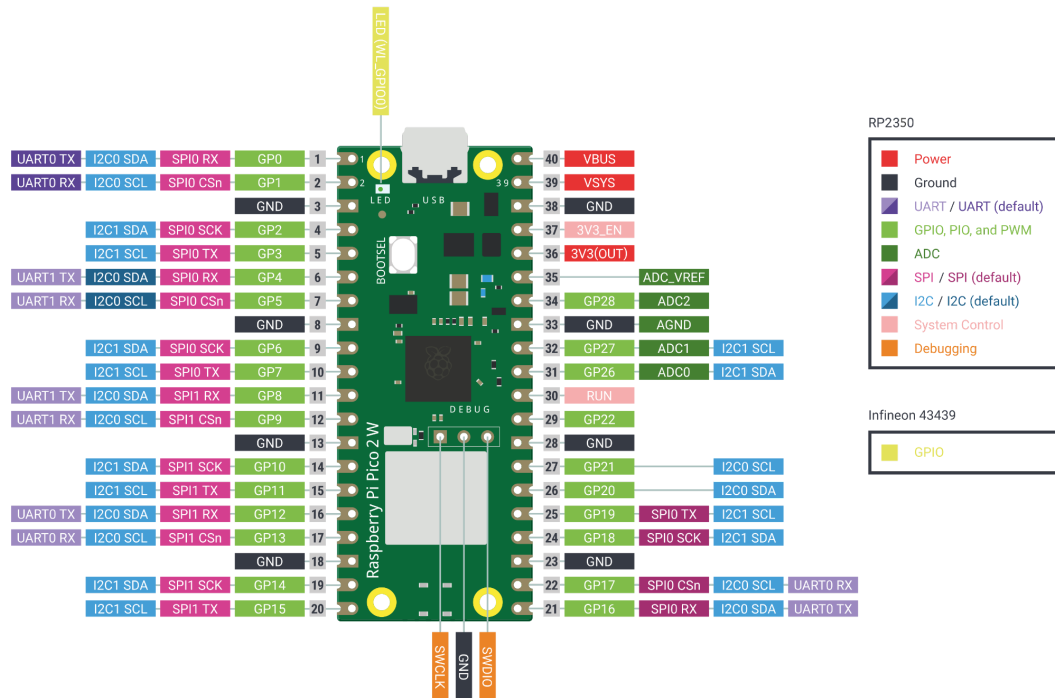


Figure 5: Raspberry Pi Pico 2 W Pinout Diagram

5. PRODUCT SPECIFICATION

Absolute Maximum Rating of EDU-PICO2:

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	5.5*	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 (USB and VIN are connected) Note: USB and VIN can be connected at the same time. While this is electrically safe, it is not recommended for normal operation.	VIN < VUSB	VUSB - 0.4		V
		VIN > VUSB and 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	USB Relay Output Voltage		-	5	V
12	USB Relay Output Current		-	500	mA
13	Total +3V3 Output Current (Grove Ports)		-	300	mA
14	Operating Temperature		-20	85	°C

Table 3: EDU-PICO2 Absolute Maximum Ratings

* Only Pico 2 / Pico 2 W boards with RP2340-A4 stepping support 5 V-tolerant digital GPIO pins.

6. MOTOR DRIVER TRUTH TABLE

Input A (GP8 / GP10)	Input B (GP9 / GP11)	Output A (M1A / M2A)	Output B (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 4: Motor Driver Truth Table

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

7. DIMENSION

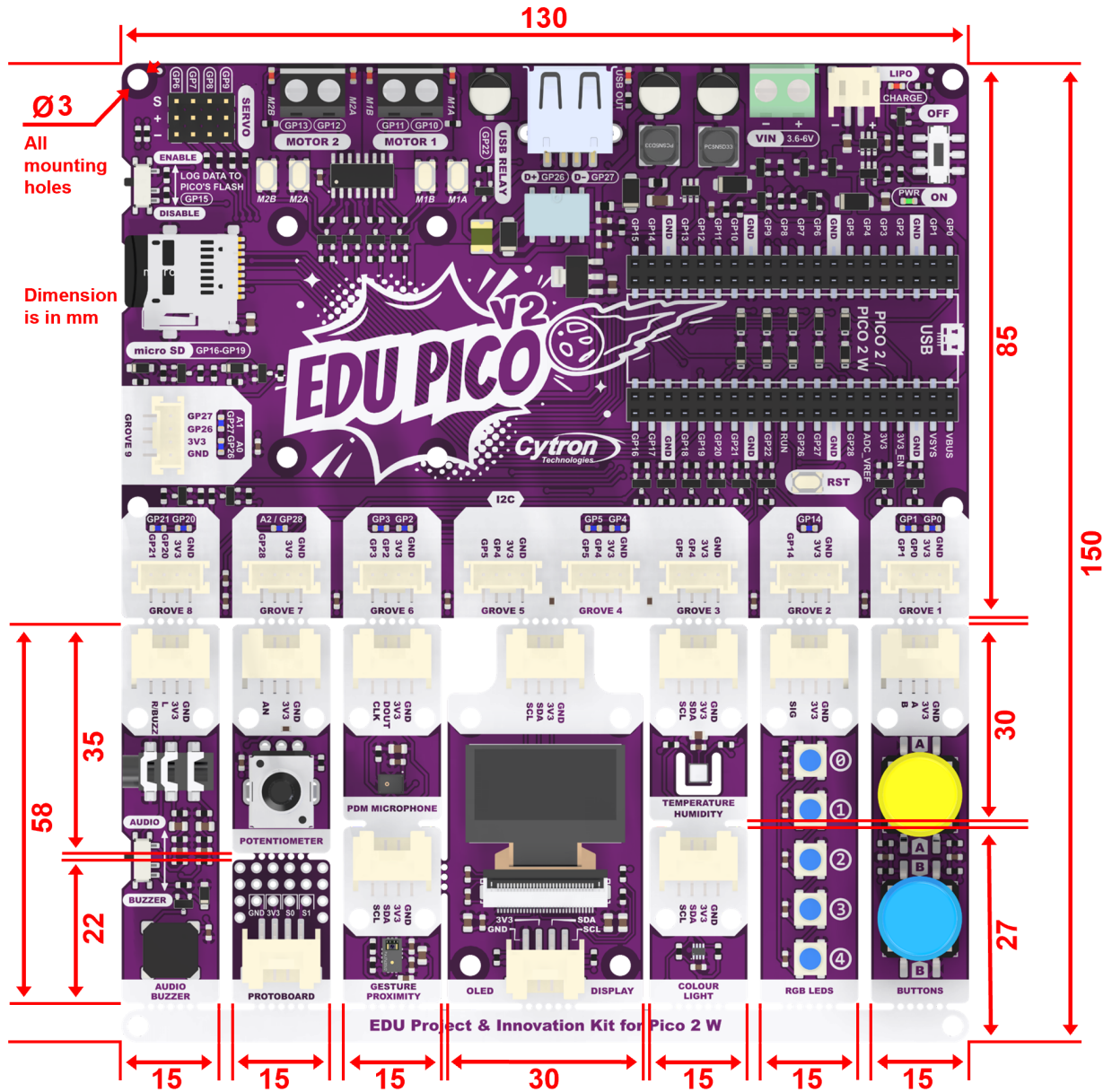


Figure 6: EDU-PICO2 Dimension (mm)

Prepared by:

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