Compact Robotics Board for Raspberry Pi Pico

www.kitronik.co.uk/5329

Kitronik

The Compact Robotics Board enables the Raspberry Pi Pico (connected via pin header) to drive 4 motors (or 2 stepper motors) and 8 servos. Coupled with 27 other I/O expansion points, and Power and Ground connections this means the Pico can very easily become the core of a whole variety of robotics projects.
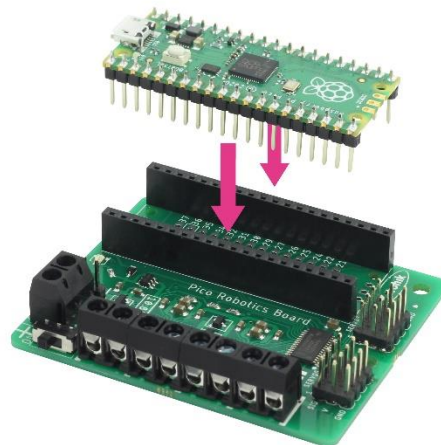
The Robotics Board features 2 Dual H-Bridge Motor Driver ICs (capable of driving 2 standard motors or 1 stepper motor each) and 8 servo outputs (capable of driving standard and continuous rotation servos), all controlled from the Pico using the **I2C protocol on GP8 and GP9** via a 16-channel driver IC. The IO break out provides connections to all the unused pins on the Pico. The 27 available I/O pins allow other input devices, for example, sensors, or output devices, such as ZIP LEDs, to be added to the board.
(Note: The default I2C address can be adjusted– see Page 3 for details).
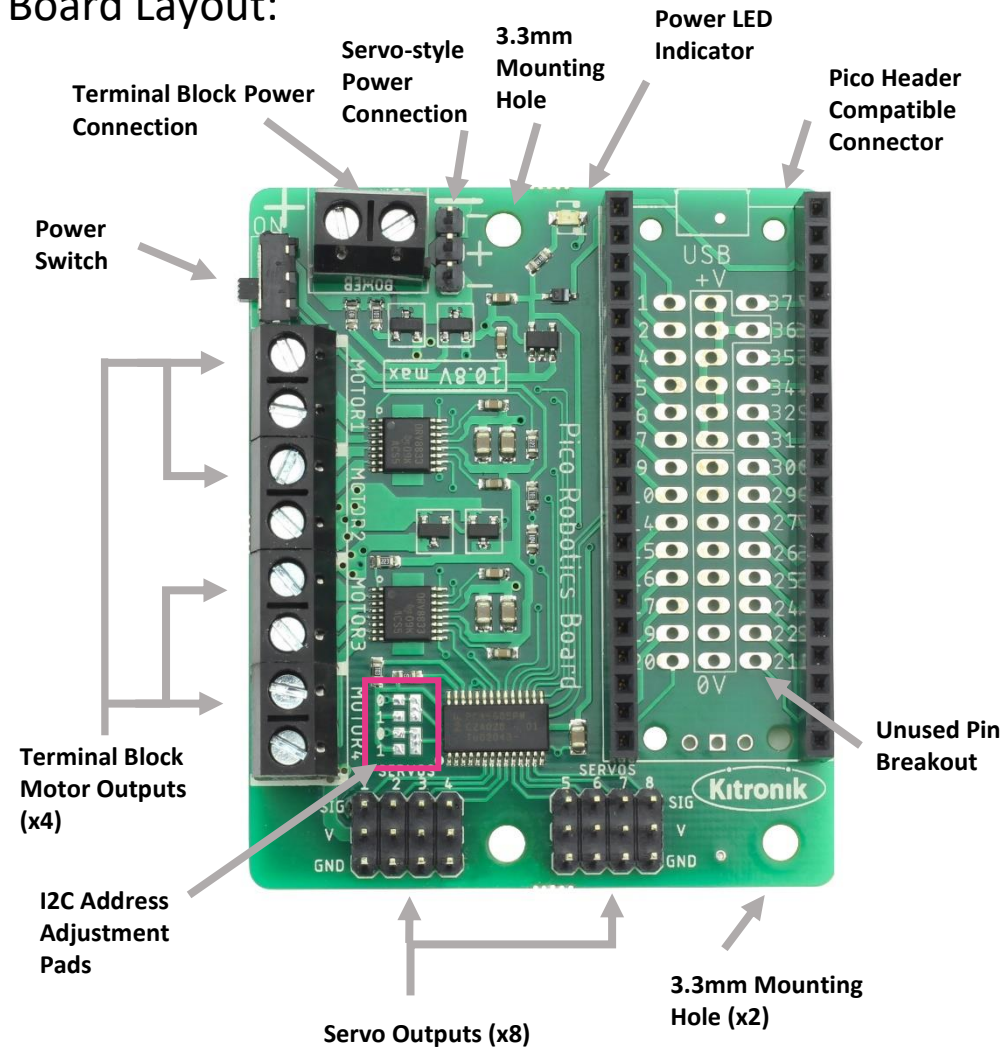
Power is provided via either a terminal block or servo-style connector, the supply is then controlled by an on/off power switch to the board. There is a green LED to indicate when the board is turned on. The board then produces a regulated 3.3V supply which is fed into the 3V and GND connections to power the connected Pico, removing the need to power the Pico separately. The 3V and GND pins are also broken out on the additional header, which means external devices can also be powered **(see Page 3 for the electrical specifications)**.

Inserting a Pico:

To use the Robotics Board, the Pico should be inserted firmly into the dual row pin socket. This will give access to all the board functions and each pin broken out. Ensure the Pico is inserted with the USB connector at the same end as the power connectors on the Compact Robotics Board.

Board Layout:

Terminal Block Power Connection

Servo-style Power Connection

3.3mm Mounting Hole

Power LED Indicator

Pico Header Compatible Connector

Power Switch

Terminal Block Motor Outputs (x4)

I2C Address Adjustment Pads

Unused Pin Breakout

Servo Outputs (x8)

3.3mm Mounting Hole (x2)

Examples: For some further ideas of what you could do with the Robotics Board, go to:
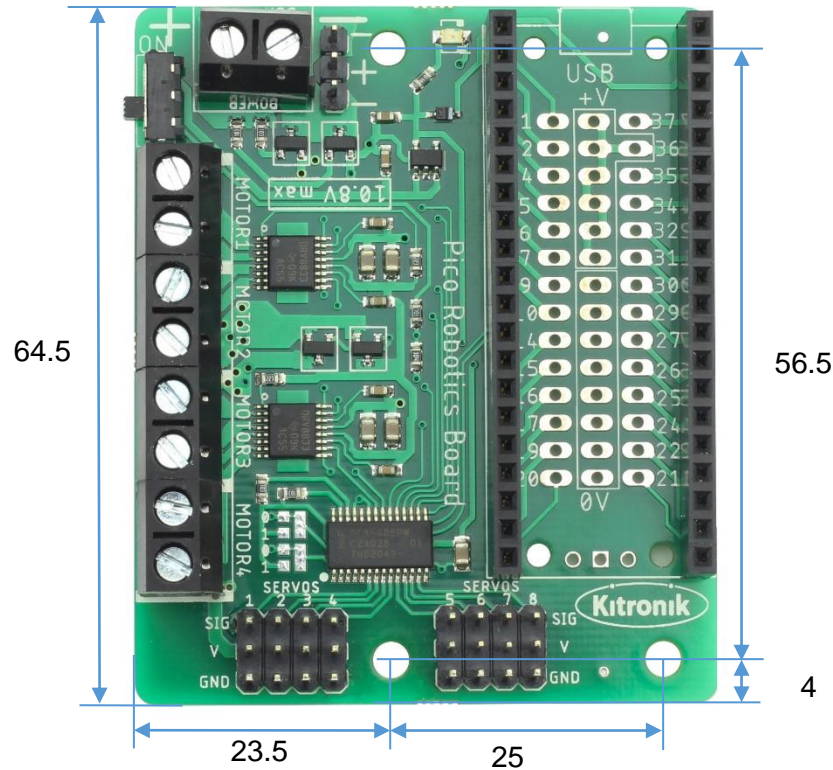http://www.kitronik.co.uk/5329

Compact Robotics Board for Raspberry Pi Pico

www.kitronik.co.uk/5329

Board Dimensions:

(All measurements are given in mm)

64.5

56.5

4

23.5

25

(Dimensions +/- 0.8mm)

Mounting holes are 3.3mm Diameter (M3 clearance)

Python Class and Example Code

An example MicroPython class and example code showing its use is available in the Kitronik GitHub at:

https://github.com/KitronikLtd/Kitronik-Pico-Robotics-Board-MicroPython

A CircuitPython version is available at:
https://github.com/KitronikLtd/Kitronik-Pico-Robotics-Board-CircuitPython

Note: Pin breakout labels are Pico pin number, not GPIO number.

10

53.5
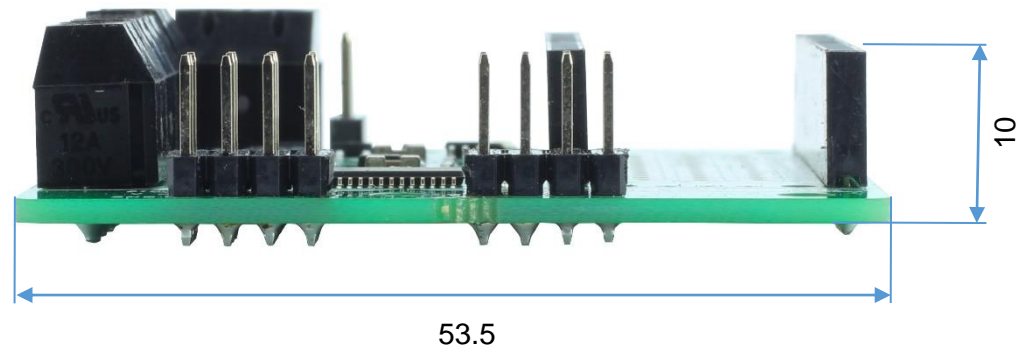
# Compact Robotics Board for Raspberry Pi Pico

Electrical Information

Operating Voltage (Supply via Terminal Blocks or Servo Power Connector)	+3.0V – 10.8V (Recommended: 6.0V – 10.8V)
Regulated Voltage Supply (for Pico)	+3.3V
Max 3V3 current output (on expansion pads)	100mA
Servo and Motor Voltage	Operating Voltage
Max Input Current (All Servos and Motors)	10A
Servo Output Connections	8 (Provides operating voltage to servos)
Motor Output Connections	4 [2 stepper motors] (1.5A max current draw per motor)
External Connections	All spare Pico IO Pins, 3V3 (P36) and GND – Numbered for Pico pin, not GPIO channel

Changing default I2C address:

The default I2C address for the Robotics Board is set to 0x6C, but by using the adjustment pads A0 & A1, it is possible to change it to one of 0x6D, 0x6E or 0x6F. The picture to the right shows pads A0 & A1. Each one is made up of a long pad connected to one of the driver IC address pins, a small pad connected to 3.3V (marked '1'), and a small pad connected to GND (marked '0'). The address is determined by whether the long pads are connected to 3.3V or GND (binary '1' or binary '0'). As standard, the long pads for both A0 & A1 are connected to GND, setting the last two bits of the address to '00'. By cutting the small link track (marked in red), and soldering a connection from the long pad to the '1' pads, the address is changed. See table on right for address setup.

The Pico pins GP8 and GP9 are used for the I2C bus
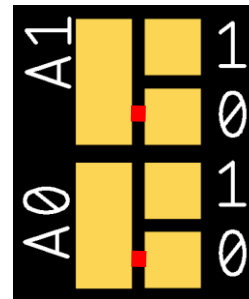
Address	A1	A0
0x6D	0	1
0x6E	1	0
0x6F	1	1