

Introduction of Cokoino 4WD Robot Hat

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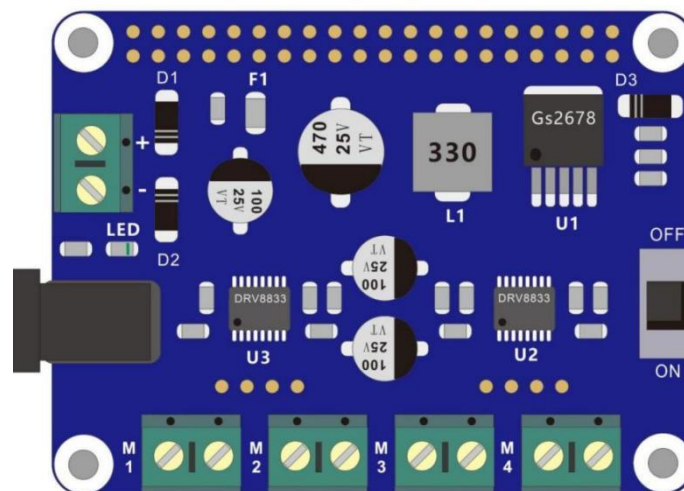
1. Overview

Cokoino 4WD Robot HAT is a Raspberry Pi power and motor driver board suitable for Raspberry Pi 4B/3B/3B+/3A+/2B/1B+/1A+/Pi Zero/Pi Zero W. It is equipped with a PWM voltage management IC GS2678, which can support up to 7-12V input, rated output voltage of 5.1V, and maximum output current of 4A. It can support Raspberry Pi to work without the adapter. Simply connect a 7-12V battery pack to the board, which is more convenient for Raspberry Pi use.

At the same time, it is equipped with two Dual-H Bridge Current Control Motor Driver DRV8833 onboard, which can independently control the speed and steering of four DC motors at the same time. Therefore, it is more recommended for use on 4WD cars developed for Raspberry Pi.

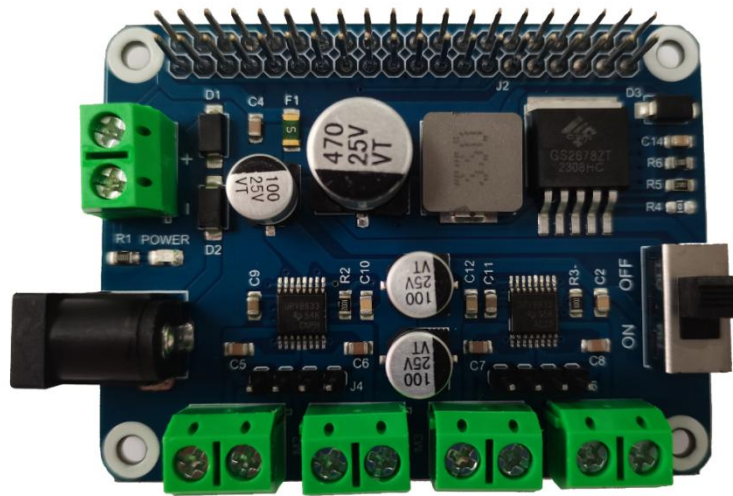
2. Appearance

2.1 2D image

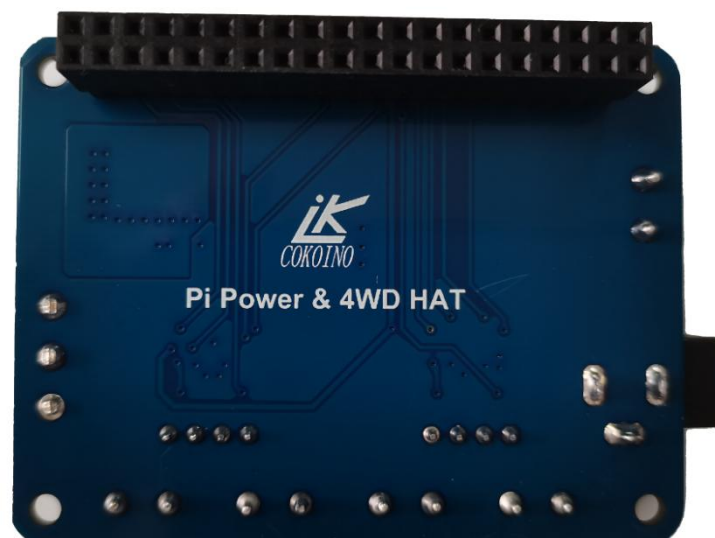


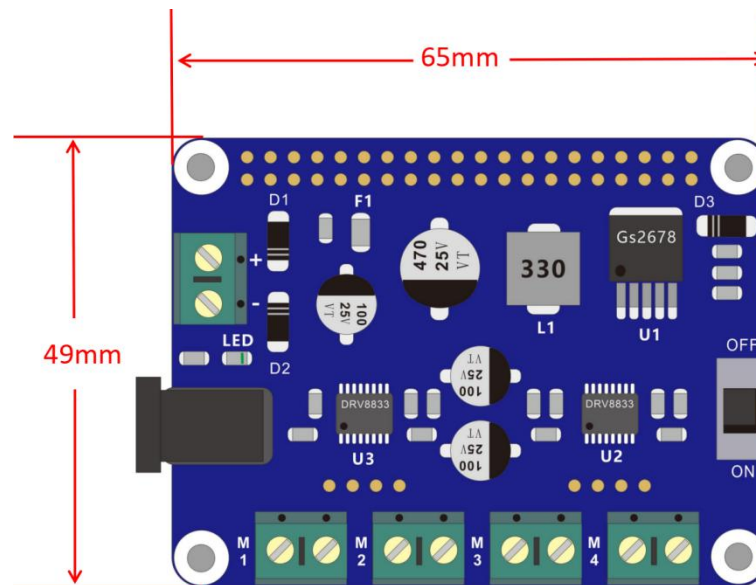
2.2 Physical pictures

Top



Bottom

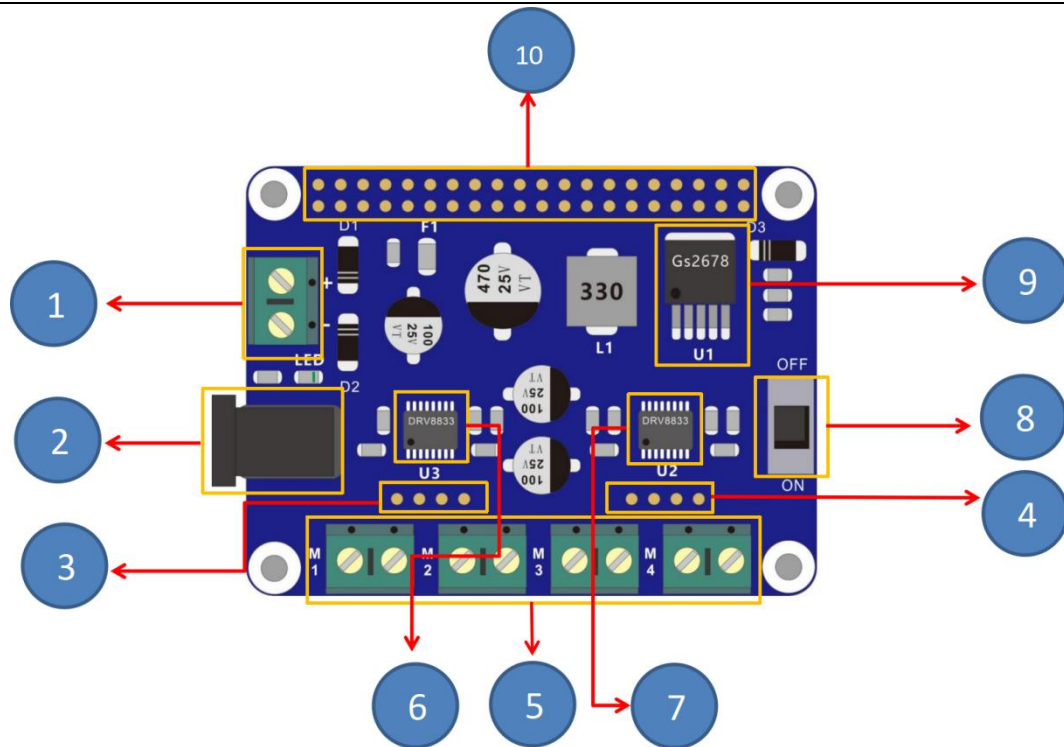




3. Resource Introduction

The Cokoino 4WD Robot HAT is suitable for Raspberry Pi 4B/3B/3B+/3A+/2B/1B+/1A+/Pi Zero/Pi Zero W, using a plastic long needle double row female. The row female corresponds to the insertion of Raspberry Pi, and the long needle corresponds to the signal of each pin of Raspberry Pi.

For the main components and functions of the Robot Control Board, please refer to the following table.

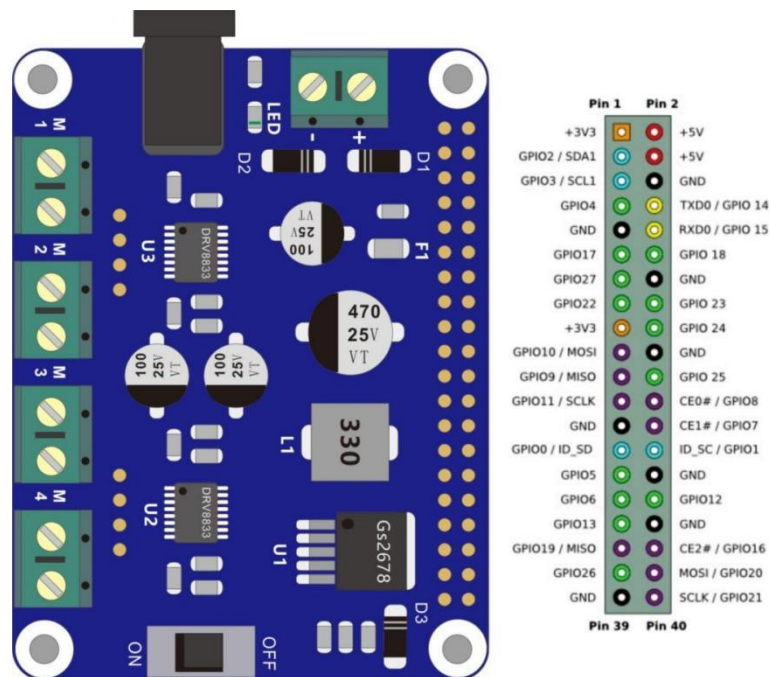


No.	Component	Function
1	Power port(terminal)	Power input 2pin port, pay attention to the positive and negative when connecting the external power supply, power supply range: 7-9V DC
2	Power port(DC port)	Power input DC port, power supply range: 7-9V DC
3	Motor interface (row pin)	2.54 * 4 pin row pin, corresponding to circuit M1, M2 motor interface
4	Motor interface (row pin)	2.54 * 4 pin row pin, corresponding to circuit M3, M4 motor interface
5	Motor interface (terminal)	KF301 two pin terminals, corresponding to circuit M1, M2, M3, M4 motor interface

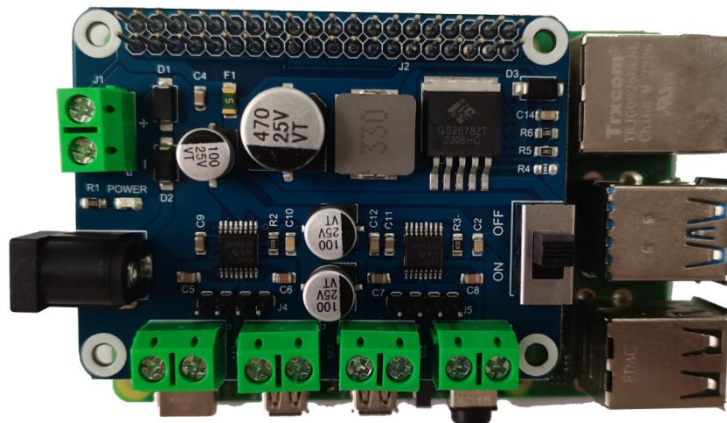
6	DRV8833	It is motor driver chip that can drive two DC Motors
7	DRV8833	It is motor driver chip that can drive two DC Motors
8	Power Switch	Turn to ON to power on, turn to OFF to power off
9	GS2678	GS2678 is an asynchronous DC buck converter with PWM voltage management IC and pulse width modulation output (PWM). The input voltage range can be from a minimum of 3.6V to a maximum of 32V, the output voltage can be adjusted from 0.8V-23V, and the output current can reach up to 5A
10	RaspberryPi interface	Plastic long needle double row female, the row female is connected to the row pin interface of the Raspberry Pi, and the long needle is used to expand the pins of the Raspberry Pi to the top of the Cokoino 4WD Robot HAT

4. Interface Definition

4WD Robot HAT has 40 pins, pin distribution relative to Raspberry Pi



Taking Raspberry Pi 4B as an example, plug 4WD Robot HAT onto Raspberry Pi 4B as shown in the following figure.



5. Specification

5.1 DRV8833 Specification

DRV8833 Dual H-Bridge Motor Driver

1 Features

- Dual-H-Bridge Current-Control Motor Driver
 - Can Drive Two DC Motors or One Stepper Motor
 - Low MOSFET ON-Resistance: HS + LS 360 mΩ
- Output Current (at $V_M = 5\text{ V}$, 25°C)
 - 1.5-A RMS, 2-A Peak per H-Bridge in PWP and RTY Package Options
 - 500-mA RMS, 2-A Peak per H-Bridge in PW Package Option
- Outputs can be in Parallel for
 - 3-A RMS, 4-A Peak (PWP and RTY)
 - 1-A RMS, 4-A Peak (PW)
- Wide Power Supply Voltage Range: 2.7 to 10.8 V
- PWM Winding Current Regulation and Current Limiting
- Thermally Enhanced Surface-Mount Packages

2 Applications

- Battery-Powered Toys
- POS Printers
- Video Security Cameras
- Office Automation Machines
- Gaming Machines
- Robotics

3 Description

The DRV8833 device provides a dual bridge motor driver solution for toys, printers, and other mechatronic applications.

The device has two H-bridge drivers, and can drive two DC brush motors, a bipolar stepper motor, solenoids, or other inductive loads.

The output driver block of each H-bridge consists of N-channel power MOSFETs configured as an H-bridge to drive the motor windings. Each H-bridge includes circuitry to regulate or limit the winding current.

Internal shutdown functions with a fault output pin are provided for overcurrent protection, short-circuit protection, undervoltage lockout, and overtemperature. A low-power sleep mode is also provided.

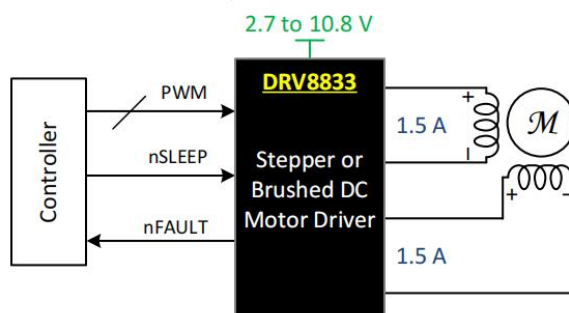
The DRV8833 is packaged in a 16-pin WQFN package with PowerPAD™ (Eco-friendly: RoHS & no Sb/Br).

Device Information⁽¹⁾

PART NUMBER	PACKAGE	BODY SIZE (NOM)
DRV8833	TSSOP (16)	5.00 mm × 4.40 mm
	HTSSOP (16)	5.00 mm × 4.40 mm
	WQFN (16)	4.00 mm × 4.00 mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Simplified Schematic



6. Safety and notes

The maximum output current of 4WD Robot HAT is 4A. Please do not use it to drive high-power motors. If the power of the entire circuit is too high and the current exceeds 4A, the F1 fuse on the board will blow.

Before using 4WD Robot HAT, Raspberry Pi, and some other modules to build a circuit, be sure to check if there are any problems with the circuit connection, especially if there is a short circuit between 3.3V and GND, and if there is a short circuit between 5V and GND? If powered on in a short circuit state, it may cause damage to some components on 4WD Robot HAT and Raspberry Pi, thus preventing them from working properly.

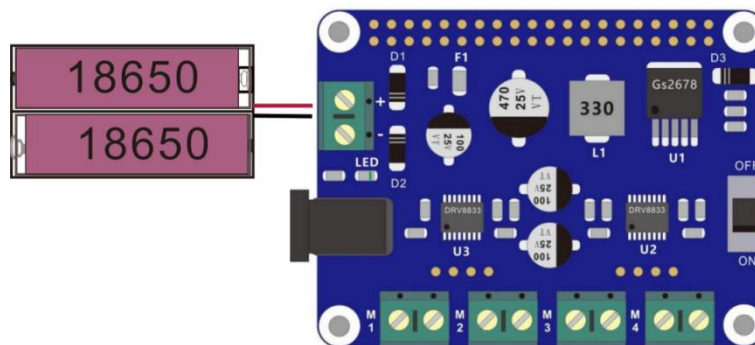
7. Introduction to Use

7.1 Power supply

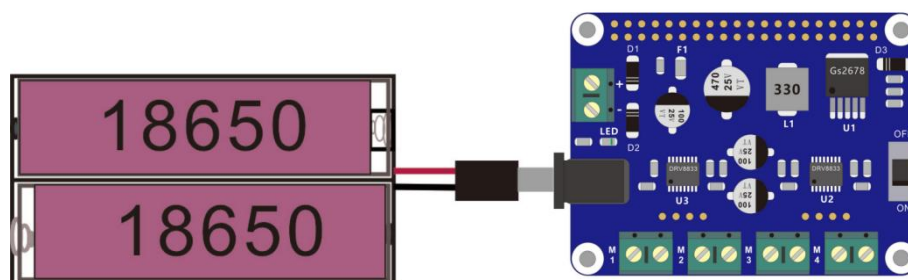
The 4WD Robot HAT board provides two power supply ports, one is a DC socket sub interface and the other is a 2-pin terminal. Any power supply port connected to a 7-12V battery or adapter can support the operation of the board, and can be matched with different types of batteries (such as AA batteries, 18650 batteries), battery packs, or adapters, making it convenient for users to use.

Taking the 18650 battery as an example, use a battery box to power the Pi Power & 4WD HAT as shown in the following figure:

18650 battery box connected to 2-pin terminal for power supply



18650 battery box connected to DC socket for power supply



7.2 Pin Description

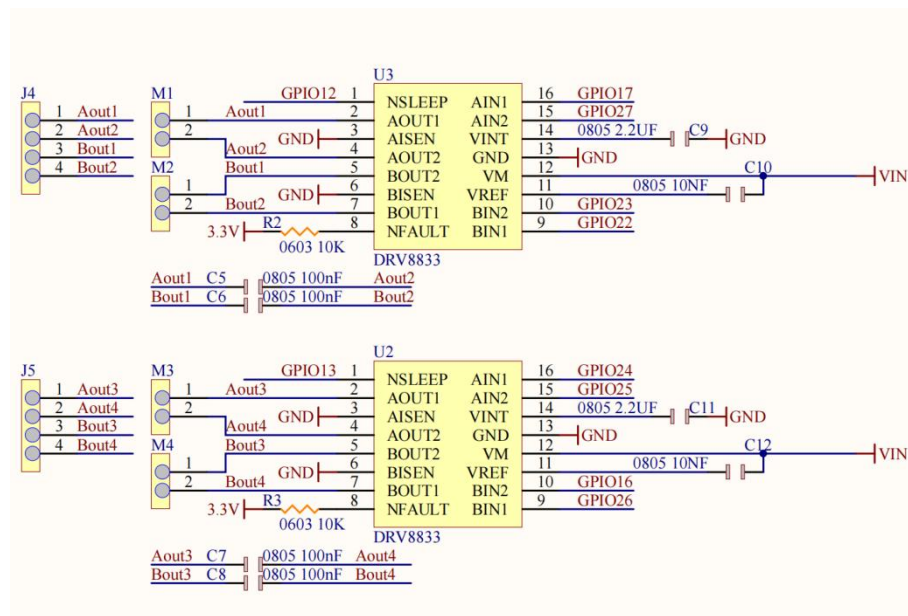
The 40 pins on the 4WD Robot HAT board correspond one-to-one to the 40 pins on the Raspberry Pi. Therefore, after inserting the 4WD Robot HAT onto the Raspberry Pi, the Raspberry Pi signal can be extended and used on the 4WD Robot HAT. It

should be noted that Pi Power&4W HAT has already occupied some signal pins for driving the motor chip DRV8833

Pi Power&4W HAT occupy the pins of Raspberry Pi as shown in the table below

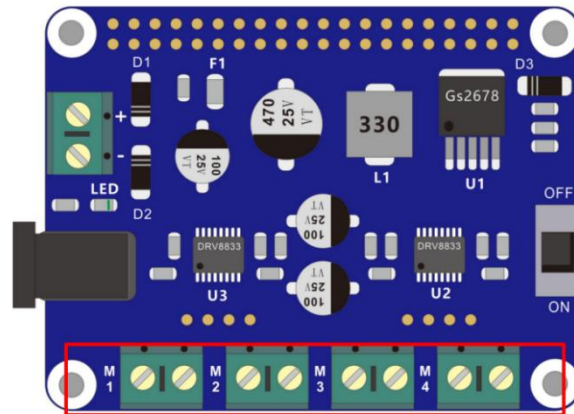
Pi Power & 4W HAT	Raspberry Pin
DRV8833#1 NSLEEP	GPIO12
DRV8833#1 AIN1	GPIO17
DRV8833#1 AIN2	GPIO27
DRV8833#1 BIN1	GPIO22
DRV8833#1 BIN2	GPIO23
DRV8833#2 NSLEEP	GPIO13
DRV8833#2 AIN1	GPIO24
DRV8833#2 AIN2	GPIO25
DRV8833#2 BIN1	GPIO26
DRV8833#2 BIN2	GPIO16

The schematic diagram of the Drv8833 circuit driven by the Raspberry Pi IO port signal is as follows



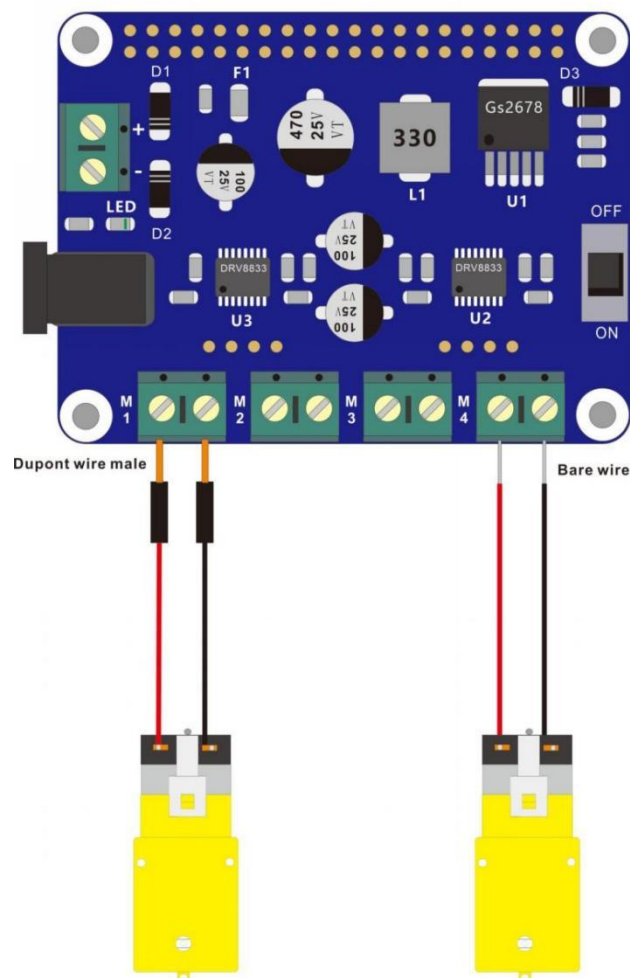
7.3 DC motor interface

The 4WD Robot HAT board supports driving 4 DC motors and is distributed with two types of motor interfaces, one is a 2-pin terminal interface and the other is a row pin interface. The 2-pin terminal interface is marked as follows:

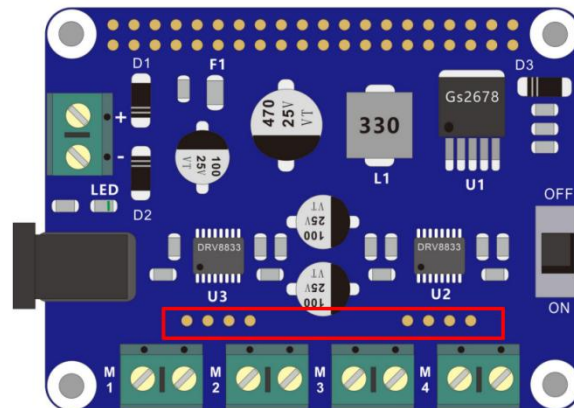


2-pin wiring terminal, suitable for DC motors with DuPont wire male or bare wire at the end of the wires

Taking TT motor as an example, as shown in the diagram below, the interface of Pi Power & 4WD HAT connect motors which the wire end are DuPont wire male or bare wire.

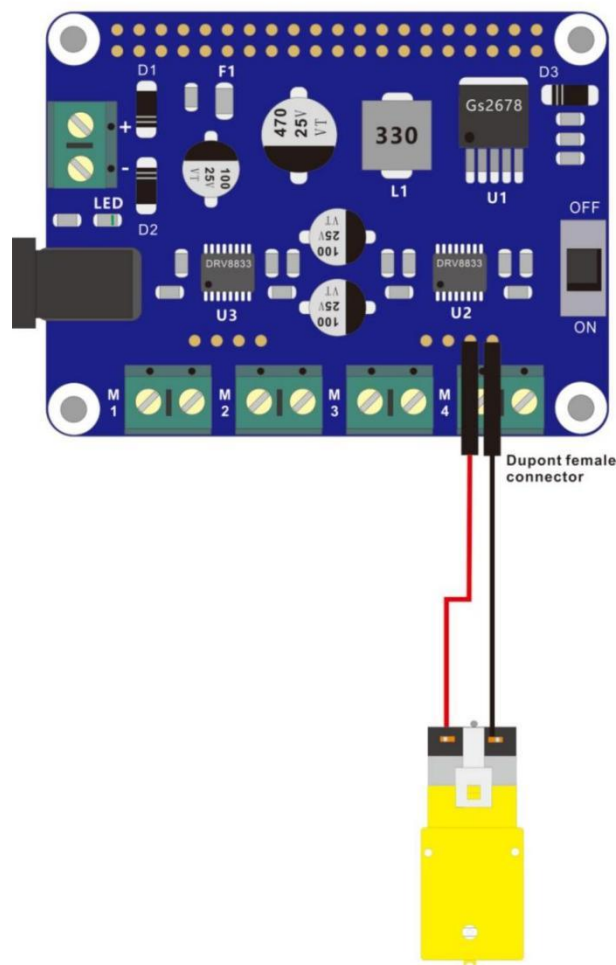


Another type of motor interface is row pin, suitable for connect the motors which end of the connection wire are DuPont female connectors.



row pin interface for DC motor, suitable for DC motor with DuPont female connector at the end of the connecting wire

Taking TT motor as an example, as shown in the figure below, 4WD Robot HAT row pin interface connect the TT motor which the end of connecting wire are DuPont female connector.



THANK YOU for reading this document!

We will make every effort to make changes and correct errors as soon as feasibly possible and publish a revised version.

Thank you again for choosing Cokoino products.

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