BMduino-Shield
Dual-channel Motor Driver

BMP73T102
User Guide

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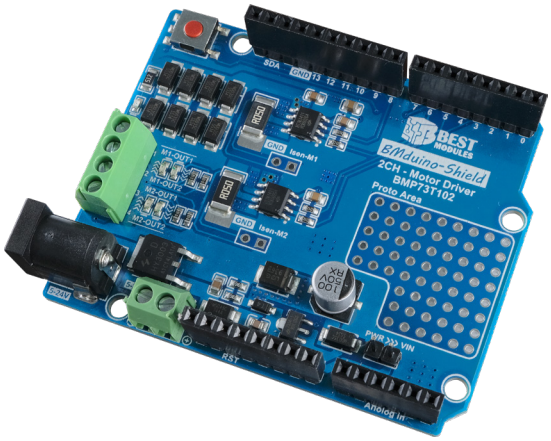
www.bestmodulescorp.com

Contents

Introduction

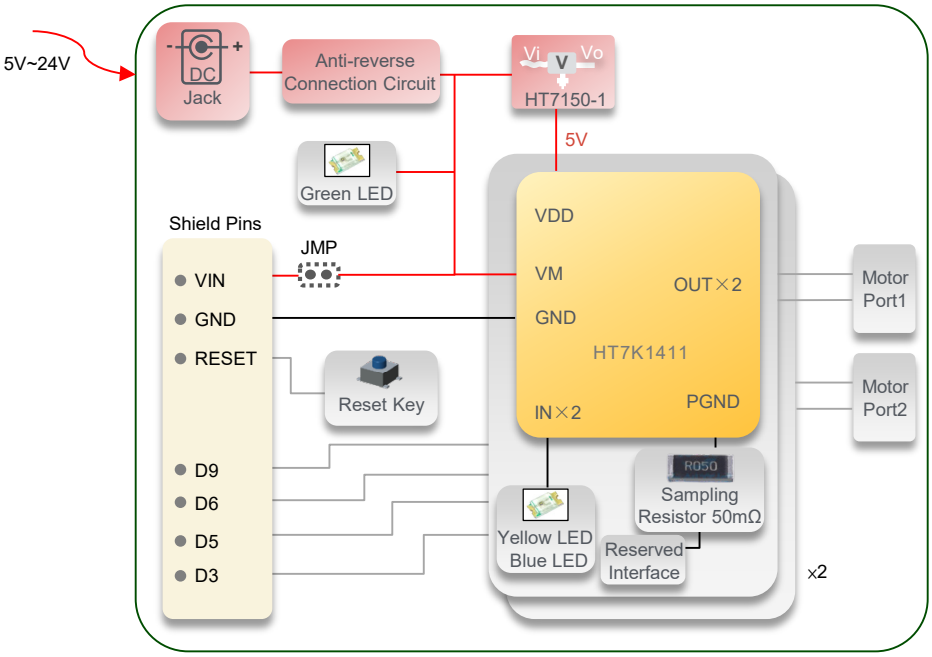
The BMP73T102 is a shield board for dual-channel motor driver from Best Modules, which is developed using a motor driver device, the HT7K1411.The shield board can drive two DC motors or a two-phase four-wire stepper motor. The shield board has an external power supply with anti-reverse connection circuit, which has the functions of controlling the motor Forward, Reverse Brake and Standby. The shield board includes integrated LED indicators, to indicate power supply and DC motor status. The shield board can be directly plugged in-and-out of the BMduino UNO, and controlled directly by pins to implement motor drive. The shield board is suitable for use in smart cars, electric curtains and other products.



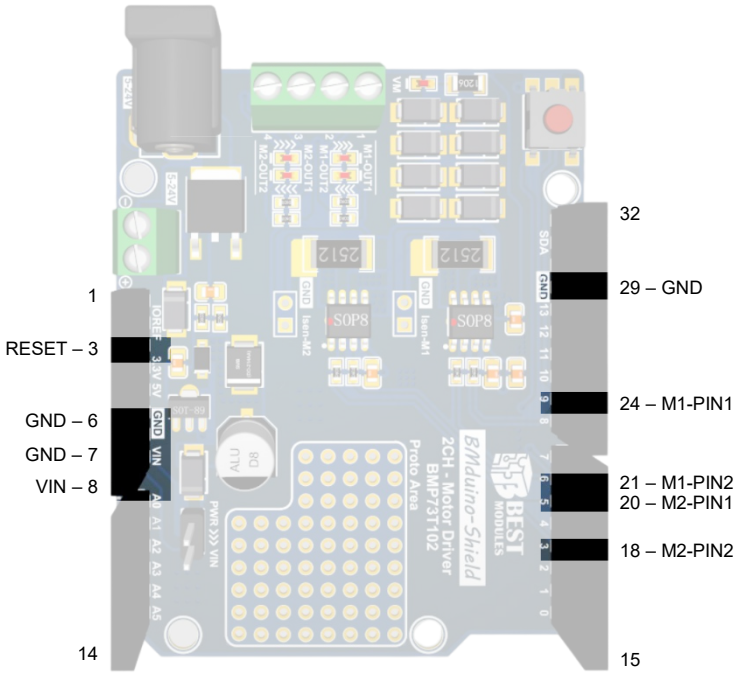
Features

- Operating voltage: 5V~24V
- Standby current: <5mA @ 24V
- Motor driver
  - Driver device: HT7K1411
  - Drive two DC motors or a two-phase four-wire stepper motor
  - Operation modes: Forward, Reverse, Standby and Brake
  - Maximum single load current: 1.2A (Ta=25℃, T_{cMAX}=60℃)
  - Maximum total load current: 2.4A (Ta=25℃, T_{cMAX}=70℃)
  - Protection functions: Under Voltage Protection, Over Current Protection, Thermal Shutdown Protection and Output Short Circuit Protection
- RESET key to reset the BMduino UNO development board
- Communication interfaces:
  - BMduino interface, can be directly plugged in-and-out of the BMduino UNO development board for use
  - Communication mode: I/O control
- Provides Arduino Lib support
- Board size: 67.00mm×53.34mm×23.20mm

Block Diagram

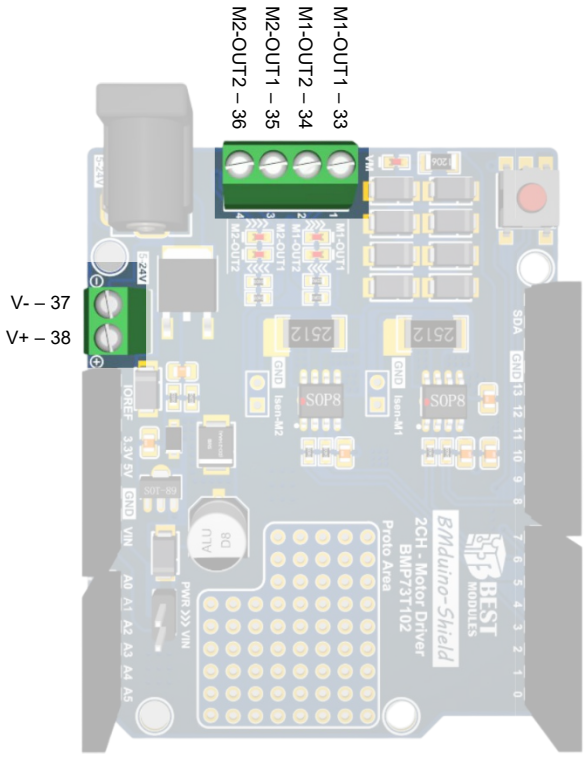


Pin Description



BMduino-Shield pins:

Pin	Function	BMduino Pin	Description
3	RESET	RESET	Reset BMduino UNO development board
6&7&29	GND	GND	Negative power supply, ground
8	VIN	VIN	Development board power supply pin, the shield board can power the BMduino UNO through the VIN pin by connecting a jumper to PWR>>>VIN
18	M2-PIN2	D3	DC motor 2 control pin 2, connects an internal 220kΩ pull-down resistor
20	M2-PIN1	D5	DC motor 2 control pin 1, connects an internal 220kΩ pull-down resistor
21	M1-PIN2	D6	DC motor 1 control pin 2, connects an internal 220kΩ pull-down resistor
24	M1-PIN1	D9	DC motor 1 control pin 1, connects an internal 220kΩ pull-down resistor



Power supply pins and motor pins:

Pin	Function	Description
33	M1-OUT1	DC motor 1 control pin 1/Stepper motor interface A+
34	M1-OUT2	DC motor 1 control pin 2/Stepper motor interface A-
35	M2-OUT1	DC motor 2 control pin 1/Stepper motor interface B+
36	M2-OUT2	DC motor 2 control pin 2/Stepper motor interface B-
37	V-	Motor negative power supply, ground
38	V+	Positive power supply

Technical Specifications

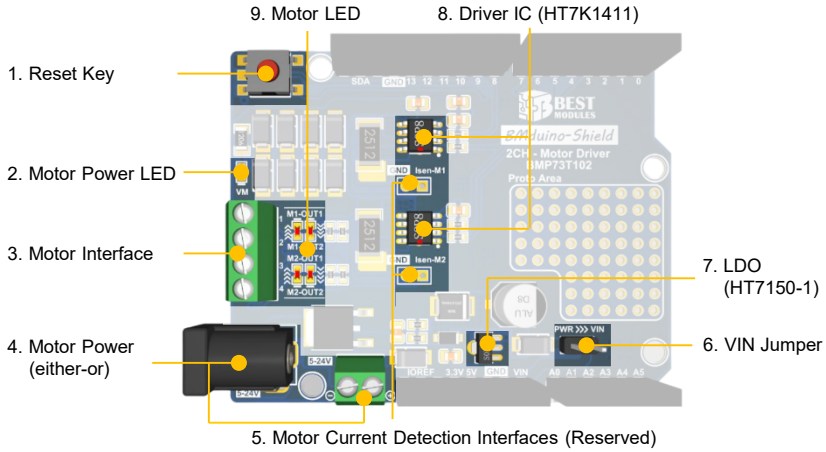
Recommended Operation Conditions

Ta=25°C

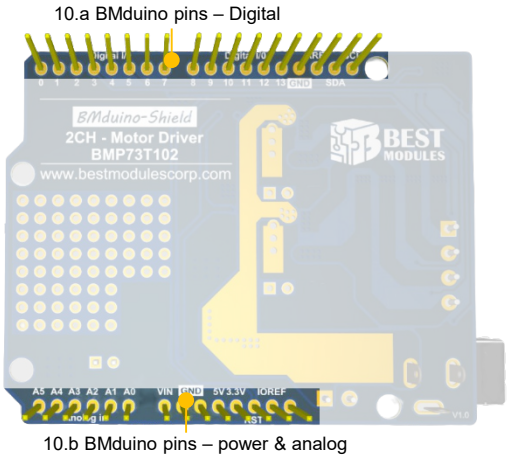
Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{DD}	Operating Voltage	—	5	—	24	V
I_{DD}	Operating Current	V_{DD}=24V	—	—	5	mA

Note: When the shield board operating current is large, the temperature will rise to a relatively high level. Special care must be taken to avoid skin contact which might cause burning injuries when using the shield board. A heat sink can be used to increase the radiation area. A fan can also be used to provide air flow to reduce the surface temperature.

Hardware Overview



PCBA Front View



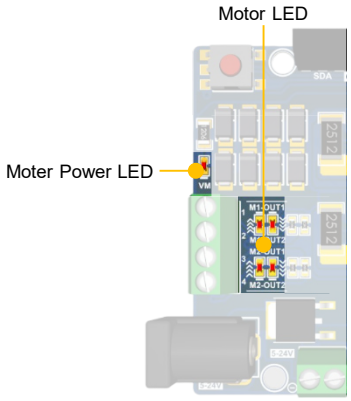
PCBA Back View

Power Supply

- Shield board power supply
  - ♦ Select either DC JACK or power terminal, voltage range: 5V~24V.
- BMduino UNO development board power supply
  - ♦ Select the power supply mode using the VIN Jumper

VIN Jumper	BMduino UNO Power Supply
Short	The shield board provides the BMduino UNO power supply using the VIN pin
Open	The shield board does not provide the BMduino UNO power supply (BMduino UNO needs to be powered independently)

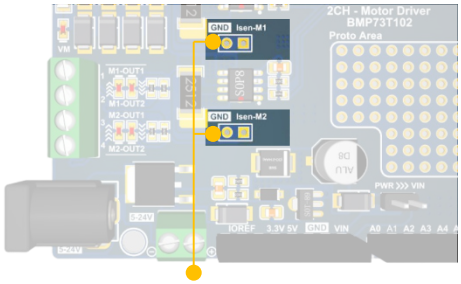
LED Indicators



- VM (red LED): power supply indicator, which is illuminated when an external power is connected.
- DC motor X (X=1, 2) indicators:

Operation Mode	Current Direction	LED Indicator Status	
	MX-OUT1 ⬅➡ MX-OUT2	(Blue LED)	(Yellow LED)
Forward	➡➡➡	On	Off
Reverse	⬅⬅⬅	Off	On
Standby	—	Off	Off
Brake	—	On	On

Current Pins



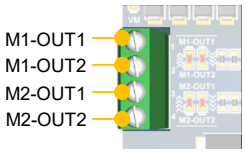
Motor Current Detection Interfaces
(Reserved)

The Current pins, Isen-M1 and Isen-M2, correspond to channel 1 and channel 2 respectively. The users can calculate the corresponding channel current value through the voltage value on the current pins.

Channel n Current Value (A)=Isen-Mn Voltage Value (V)/0.05 (Ω)

Motor Driver

- Driver device: HT7K1411
- Maximum single load current: 1.2A (Ta=25℃, TcMAX=60℃)
- Maximum drive current: 2.4A (Ta=25℃, TcMAX=70℃)
- DC motor interface:
  - ♦ Operation modes: Forward, Reverse, Standby and Brake.



DC Motor Interface

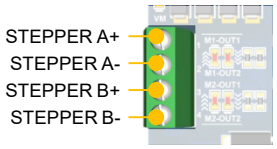
● DC Motor 1 Operation Modes

Operation Modes	M1-PIN1 (D9)	M1-PIN2 (D6)	Current Direction M1-OUT1 ⬅➡ M1-OUT2
Forward	H	L	➡➡➡
Reverse	L	H	⬅⬅⬅
Standby	L	L	—
Brake	H	H	—

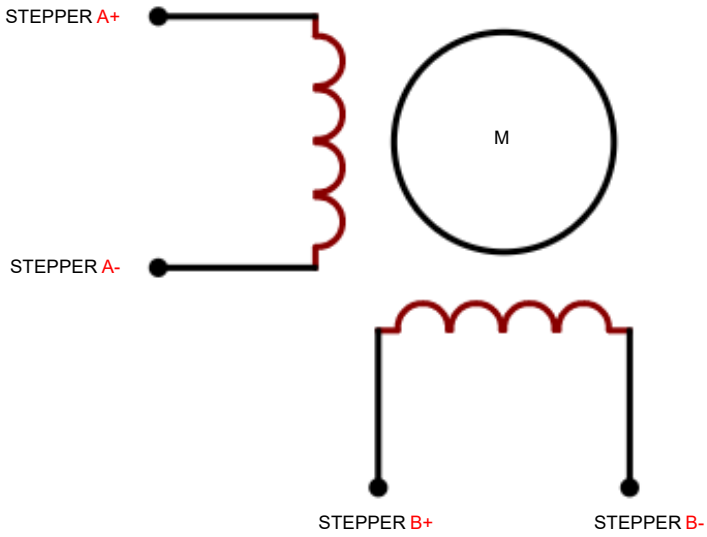
● DC Motor 2 Operation Modes

Operation Modes	M2-PIN1 (D5)	M2-PIN2 (D3)	Current Direction M2-OUT1 ⬅➡ M2-OUT2
Forward	H	L	➡➡➡
Reverse	L	H	⬅⬅⬅
Standby	L	L	—
Brake	H	H	—

- Stepper motor interface:
  - Stepper motor drive modes: full-step drive, half-step drive
  - Operation modes: Forward, Reverse, Standby and Brake

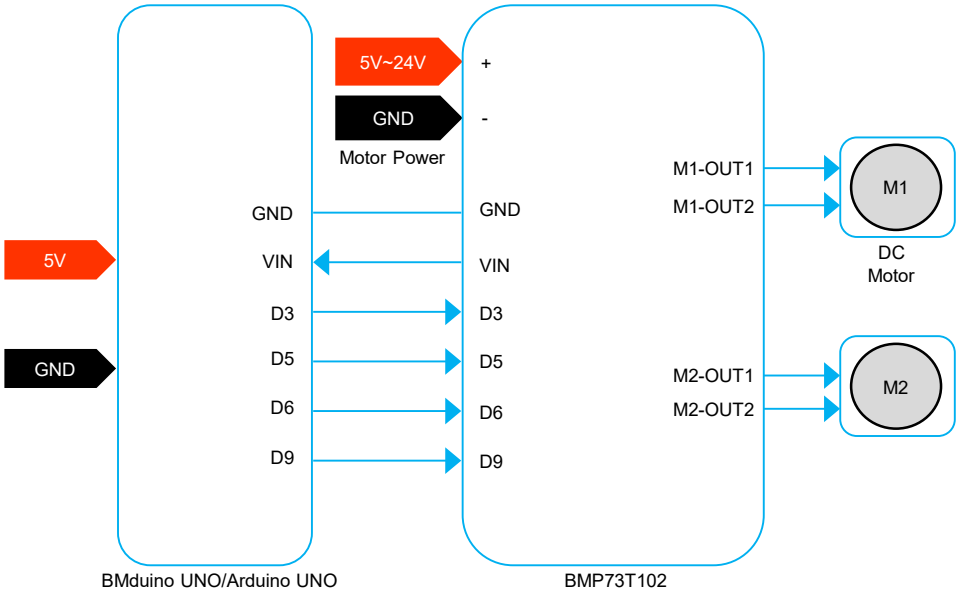


Stepper Motor Interface

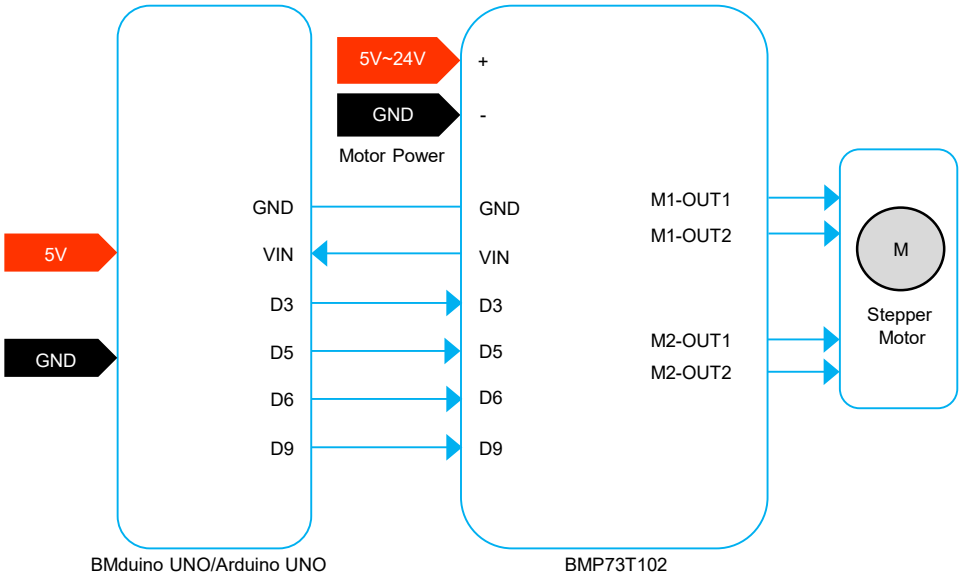


Stepper Motor Interface Connection

Application Circuit

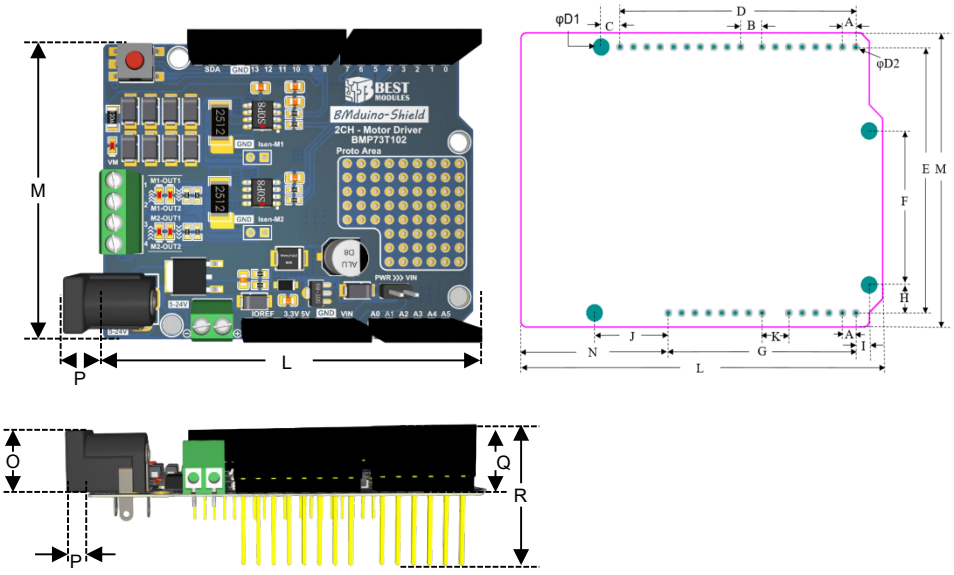


DC Motor Connection Diagram



Stepper Motor Connection Diagram

Dimensions



Dimension Information

Symbol \ Unit	mm	inch
A	2.540	0.100
B	4.064	0.160
C	3.556	0.140
D	44.70	1.760
E	48.26	1.900
F	27.94	1.100
G	35.56	1.400
H	5.080	0.200
I	2.540	0.100
J	13.97	0.550
K	5.080	0.200
L (Board Length)	67.00	2.638
M (Board Width)	53.34	2.100
N	26.40	1.039
O	11.00	0.433
P	4.00	0.158
Q	11.0	0.433
R	23.20	0.913
D1	3.200	0.126
D2	0.800	0.031

Dimension List