Motor Shield V2.0

Note
This document works for Motor Shield V2.0/2.½.2.

The Motor Shield is a driver module for motors that allows you to use Arduino to control the working speed and direction of the motor. Based on the Dual Full-Bridge Drive Chip L298, it is able to drive two DC motors or a step motor. The Motor Shield can either be powered by Arduino directly or by an external 6V~15V power supply via the terminal input. This module can be used for the development of micro robots and intelligent vehicles, etc

Version

Revision	Descriptions	Release
v1.0	Initial public release	NA
v2.0	Enable +5V Pin of Arduino/Seeeduino to power motor	2013-2

Features

- Standard Arduino UNO Shield pin out
- Based on L298 full bridge IC
- Drive 2 DC Motor or 1 Stepper
- External power input available
- Led indicators
- Heat sink for better performance
- Arduino library

Specifications

Spec	Value
Operating Voltage	5V
External Power	6-15V
Output Current	2.0A Max @ Each Channel
PWM Range	0-100%
Output	2 Channels, 4 Ports

Platforms Supported

Compatibility

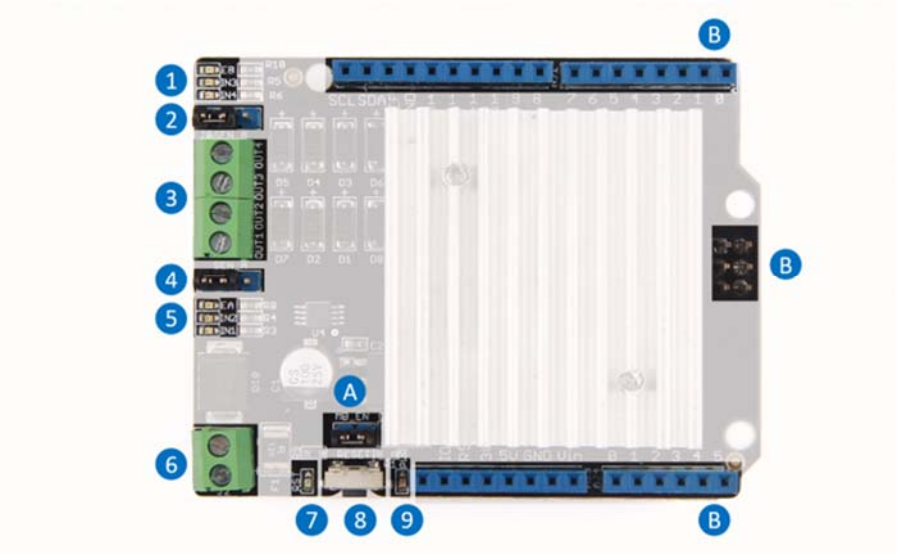
We have produced a lot of extension boards that can make your platform board more powerful, however not every extension board is compatible with all the platform boards, here we use a table to illustrate how are those boards compatible with platform board.

Note
Please note that "Not recommended" means that it might have chance to work with the platform board however requires extra work such as jump wires or rewriting the code. If you are interested in digging more, welcome to contact with techsupport@seeed.cc.

Click to see full

	Arduino Uno Seeeduino v4.2	Arduino Mega Seeeduino Mega	Zero(m0) LoraWan	Arduino Leonardo Seeeduino Lite	Arduino 101	Arduino Due 3.3v	Intel Edison 5v	Linkit One
2.8'' TFT Touch Shield V2.0	bmp nonsupport	bmp nonsupport	Not recommended	bmp nonsupport	Not recommended	Not recommended	Not recommended	Not recommended
Base Shield V2	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Camera Shield	Only Pin234567	Hardware Serial OK	Not recommended	Not recommended	Yes	Hardware Serial OK	No	No
EL Shield	Yes	Yes	No	Yes	No	No	No	No
Energy Shield	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
GPRS Shield	Not recommended	Not recommended	Yes	Yes	Yes	Not recommended	Yes	No need
Motor Shield V2.0	Yes	Stepper motor only	No	Yes	Stepper motor only	Stepper motor only	No	No
Music Shield V2.0	Yes	Yes	Not recommended	Yes	Yes	Yes	Yes	Yes
NFC Shield V2.0	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Protoshield Kit for Arduino	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
RS232 Shield	Yes	Yes	No	Yes	No	No	No	No
Relay Shield V3.0	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SD Card Shield V4.0	Yes	Yes	Not recommended	Yes	Yes	Yes	No	No
Seeed BLE Shield V1	Yes	Not recommended	Not recommended	Yes	No need	Not recommended	Not recommended	No need
W5500 Ethernet Shield	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wifi Shield(Fi250) V1.1	Not recommended	Not recommended	Not recommended	Yes	Yes	Not recommended	No need	No need
Wifi Shield V2	Yes	Not recommended	Not recommended	Yes	Yes	Not recommended	No need	No need
XBee Shield V2	Yes	Not recommended	Not recommended	Yes	Yes	Not recommended	Not recommended	Not recommended

Hardware Overview



1.Channel 1 indicator, include 3 leds

- EB - channel 1 enable, high active
- IN3 - status of OUT3
- IN4 - status of OUT4

2.Channel 1 Sense - Please connect the left 2 pins together for normal usage.

Note that it's a high level application for sense the current, please refer to datasheet and schematic for more information.

3.OUTPUT - There're 2 channels, each channel has 2 output

- Channel 0 - OUT1, OUT2
- Channel 1 - OUT3, OUT4

4.Channel 0 Sense

5.Channel 0 indicator, include 3 leds

- EB - channel 0 enable, high active
- IN1 - status of OUT1
- IN2 - status of OUT2

6.External Power Input, range 6-15V

7.Reset indicator - turn red when Reset button is pressed

8.Reset button - pressed to reset the shield and Arduino

9.Power indicator - turn green when power in, either internal or external

A. Power switch

- Connect - Get power from Arduino
- Disconnect - Get power from External sources

B. Standard Arduino shield pin out

Digital Pin Used

Arduino Pin	Function
D0	Not Used
D1	Not Used
D2	Not Used
D3	Not Used
D4	Not Used
D5	Not Used
D6	Not Used

Arduino Pin	Function
D7	Not Used
D8	**OUT1**
D9	**Enable of Channel0**
D10	**Enable of Channel1**
D11	**OUT2**
D12	**OUT3**
D13	**OUT4**

Note
D8~D13 are used by Motor Shield. Please don't use those pins to avoid conflict.

Analog Pin Used

Arduino Pin	Function
D0	Not Used
D1	Not Used
D2	Not Used
D3	Not Used
D4	Not Used
D5	Not Used

Note
Not Used means you can use those pins freely.

Getting Started

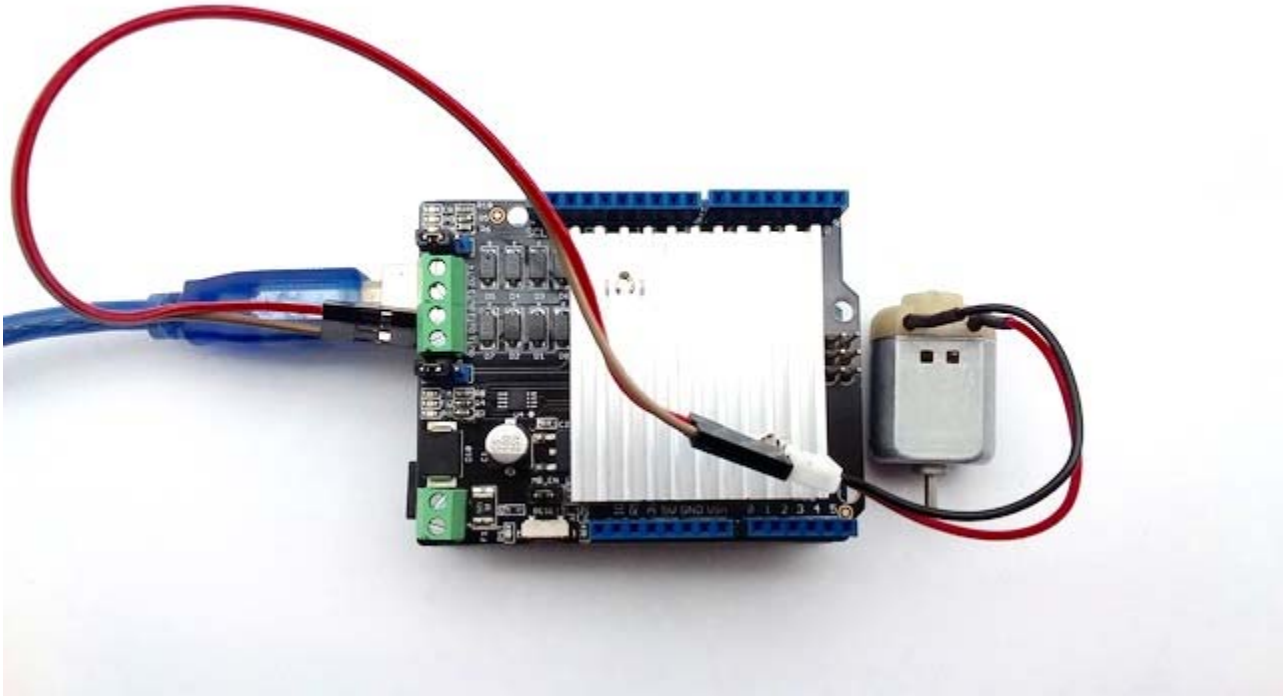
Drive a DC motor

Connection

Here we will show you how this Motor Shield works via a simple demo. First of all, you need to prepare the below stuffs:

Seeeduino V4	DC Motor	Motor Shield
		

- Set **SEN_A** and **SEN_B**, connect the left 2 pins together with a jumper.
- Connect **MB_EN** together with a jumper, as we are not going use an external power.
- Connect DC motor to Chanel 0 (OUT1 and OUT2).
- Plug Motor Shield into Arduino.
- Connect Arduino to PC via a USB cable.



Software

- Click below button to download the motor shield library.
- Please follow how to install an arduino library procedures to install the library.

Download the Arduino Library of Motor Shield V2

- Upload the code to Seeeduino V4.

```
// Demo function:The application method to drive the DC motor.
// Author:Loovee (luweicong@seeed.cc)
// 2016-3-11

#include "MotorDriver.h"

MotorDriver motor;

void setup()
{
    // initialize
    motor.begin();
}

void loop()
{
    motor.speed(0, 100);            // set motor0 to speed 100
    delay(1000);
    motor.brake(0);                 // brake
    delay(1000);
    motor.speed(0, -100);           // set motor0 to speed -100
    delay(1000);
    motor.stop(0);                  // stop
    delay(1000);
}
// END FILE
```

- Then you will find your motor move (1s), stop (1s), move back (1s), stop (1s), and loop.

If nothing happens, please make sure:

- We have uploaded the code successfully
- The motor is connected properly
- The led indicators blink right

Drive a Stepper

Connection

Here we will show you how this Motor Shield works via a simple demo. First of all, you need to prepare the below stuffs:

Seeeduino V4	Stepper Motor	Motor Shield
		

- Set **SEN_A** and **SEN_B**, connect the left 2 pins together with a jumper.
- Connect **MB_EN** together with a jumper, as we are not going use an external power.
- Find the pin definitions of you stepper, and connect it to the OUTPUT of the shield. As below:

Stepper	Motor Shield
A+	OUT1
A-	OUT2
B+	OUT3
B-	OUT4

- Plug Motor Shield into Arduino.
- Connect Arduino to PC via a USB cable.

Software

Copy below code to Arduino IDE and upload it to Seeeduino V4, then you will find your stepper move.

```
/*
 * Stepper test for Seeed Motor Shield V2
 * loovee @ 15 Mar, 2016
 */

#include <Stepper.h>

// change this to the number of steps on your motor
#define STEPS 200

```

```
// create an instance of the stepper class, specifying
// the number of steps of the motor and the pins it's
// attached to
Stepper stepper(STEPS, 8, 11, 12, 13);

// the previous reading from the analog input
int previous = 0;

void step(int steps)
{
  digitalWrite(9, HIGH);
  digitalWrite(10, HIGH);
  stepper.step(steps);
  digitalWrite(9, LOW);
  digitalWrite(10, LOW);
}

void setup()
{
  // set the speed of the motor to 30 RPMs
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);
  digitalWrite(9, LOW);
  digitalWrite(10, LOW);
  stepper.setSpeed(30);
}

void loop()
{
  step(1000);
  step(-1000);
}

// END FILE
```

If nothing happens, please double check if you have connected the wire right.

Library APIs

DC Motor APIs:

begin

Description

```
void begin();
```

speed

Description

```
1void move(int motor_id, int speed);
```

- motor_id - 0 - Chanel 0 - 1 - Chanel 1 - speed: -100~100, the larger the faster, 0 for stop

stop

```
1void stop(unsigned char motor_id);
```

brake

```
1void brake(unsigned char motor_id);
```

Stepper

Note that we use the library provided by Arduino IDE to drive a stepper.

There's something need to be modified, please refer to the examples.

FAQs

Q1: The purpose of the jumper MB_EN

A1: You can see a power jumper(MB_EN) on the motor shield. If you move it, the Arduino can provide power to Shield, but the shield(if the shield has connected to a external power) can't provide power to Arduino.

If the jumper exists, one can provide power to the other under two situation:

- USB to Arduino: if no external power connected to Shield separately, the Arduino will provide power to Shield via VCC pin.
- External Power connected to Shield：If shield has a separate power, the voltage would through a rectifier(78M05) first, and then provide power to Arduino. At this situation, no current of Arduino could through Arduino to Shield via 78M05.

So the purpose of this jumper is a choice whether you would wanna use shield to provide power to Arduino or not.

Q2: Is there a pin conflict between the SD card shield (103030005) and the Motor shield (105030001) on Arduino UNO? How to use them together?

A2: There is a pin conflict between Motor shield and SD card shield in digital pins D11,D12,D13 of the Arduino Uno. So you cannot stack them together with the Arduino Uno board. Here is the solution to use them together.

- Step 1.Stack the SD card shield to the Arduino.
- Step 2.Modify the library of Motordriver.h as follows.

```
1/******Pins definitions*************/
2#define MOTORSHIELD_IN1    8
3#define MOTORSHIELD_IN2    7
4#define MOTORSHIELD_IN3    6
5#define MOTORSHIELD_IN4    5
6#define SPEEDPIN_A         9
7#define SPEEDPIN_B         10
```

Q3.Do not stack the motor shield but make connections separately as follows from the Arduino using jumper wires.

A3: Here is the connection.

Arduino	Motor shield
5V	5V
GND	GND
D5	D13
D6	D12
D7	D11
D8	D8
D9	D9
D10	D10

Resources

- **[Eagle]** Motor Shield V2.0 Eagle File
- **[Eagle]** Motor shield V2.1 Eagle File
- **[PDF]** Motor Shield 2.0 schematics
- **[PDF]** Motor Shield 2.1 schematics
- **[PDF]** Motor Shield 2.2 schematics
- **[Library]** Motor Shield Library
- **[Datasheet]** L298 Datasheet
- **[Datasheet]** 78M05 Datasheet

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