



ARDUINO 1 MOTOR SHIELD L293

The **L293D Motor Shield** is a popular add-on board for Arduino that allows you to control DC motors, stepper motors, and other high-current devices. It uses the **L293D motor driver IC**, which can drive up to two DC motors or one stepper motor. Below is a guide to help you understand and use the L293D Motor Shield with Arduino.

Features of the L293D Motor Shield

1. **Dual H-Bridge Driver:** Can control two DC motors or one stepper motor.
 2. **Voltage Range:** Works with motors operating at 4.5V to 36V.
 3. **Current Capacity:** Up to 600mA per channel (peak current up to 1.2A).
 4. **PWM Support:** Allows speed control of motors using PWM signals.
 5. **Built-in Diodes:** Protects the circuit from back EMF generated by motors.
 6. **Compatibility:** Works with Arduino Uno, Mega, and other 5V/3.3V logic boards.
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Pinout of the L293D Motor Shield

The motor shield typically has the following connections:

- **Motor A:** Controls one DC motor (pins: M1 and M2).
 - **Motor B:** Controls another DC motor (pins: M3 and M4).
 - **Power Supply:**
 - VCC: Connects to the external power supply for motors (4.5V–36V).
 - GND: Ground connection for the motor power supply.
 - **Arduino Pins:**
 - D4, D5, D6, D7: Used to control the direction and speed of the motors.
 - D9, D10: PWM pins for speed control.
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Wiring the L293D Motor Shield

1. Connect the Motors:

- Attach Motor A to M1 and M2.
- Attach Motor B to M3 and M4.

2. Power Supply:

- Connect the external power supply (e.g., a 9V battery or 12V adapter) to the VCC and GND terminals.
- Ensure the Arduino is powered separately or via USB.

3. Arduino Connection:

- Plug the motor shield directly onto the Arduino Uno or Mega.

Example Code: Controlling Two DC Motors

Here's a simple Arduino sketch to control two DC motors:

```
cpp
Copy
// Define motor control pins
#define MOTOR_A1 4 // Motor A direction pin 1
#define MOTOR_A2 5 // Motor A direction pin 2
#define MOTOR_B1 6 // Motor B direction pin 1
#define MOTOR_B2 7 // Motor B direction pin 2
#define PWM_A 9 // PWM pin for Motor A speed
#define PWM_B 10 // PWM pin for Motor B speed

void setup() {
  // Set motor control pins as outputs
  pinMode(MOTOR_A1, OUTPUT);
  pinMode(MOTOR_A2, OUTPUT);
  pinMode(MOTOR_B1, OUTPUT);
  pinMode(MOTOR_B2, OUTPUT);
  pinMode(PWM_A, OUTPUT);
  pinMode(PWM_B, OUTPUT);
}

void loop() {
  // Move Motor A forward at full speed
  digitalWrite(MOTOR_A1, HIGH);
```

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```
digitalWrite(MOTOR_A2, LOW);  
analogWrite(PWM_A, 255); // Full speed  
  
// Move Motor B backward at half speed  
digitalWrite(MOTOR_B1, LOW);  
digitalWrite(MOTOR_B2, HIGH);  
analogWrite(PWM_B, 128); // Half speed  
  
delay(2000); // Run for 2 seconds  
  
// Stop both motors  
digitalWrite(MOTOR_A1, LOW);  
digitalWrite(MOTOR_A2, LOW);  
digitalWrite(MOTOR_B1, LOW);  
digitalWrite(MOTOR_B2, LOW);  
  
delay(2000); // Wait for 2 seconds  
}
```

Key Notes

1. **PWM Control:** Use `analogWrite()` to control the speed of the motors (0 = off, 255 = full speed).
 2. **Direction Control:** Use `digitalWrite()` to set the direction of the motors (HIGH/LOW combinations).
 3. **Power Supply:** Ensure the external power supply matches the voltage requirements of your motors.
 4. **Heat Dissipation:** The L293D can get hot under heavy loads. Consider adding a heatsink if necessary.
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Applications

- Robotics projects (e.g., wheeled robots, robotic arms).
- Controlling fans, pumps, or other high-current devices.
- Stepper motor control for precise movements.

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