Biped Patrol
Hardware Testing

This document gives instructions for connecting various hardware for testing.

Required Hardware:

- Arduino Mega
- Electromagnet Module
- IRF540N MOSFET
- Buzzer Module
- RGB LED
- Geared DC Encoder Motors & Motor Driver Module (L298)
- GY-87/HW-290 Sensor Module

Arduino Mega

The Arduino Mega is a microcontroller board based on the ATmega2560. It has 54 digital input/output pins (of which 14 can be used as PWM outputs), 16 analog inputs, 4 UARTs (hardware serial ports), a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. You can find more details about the board here.

Figure 1: Arduino Mega

Connecting Electromagnet Module to Arduino Mega

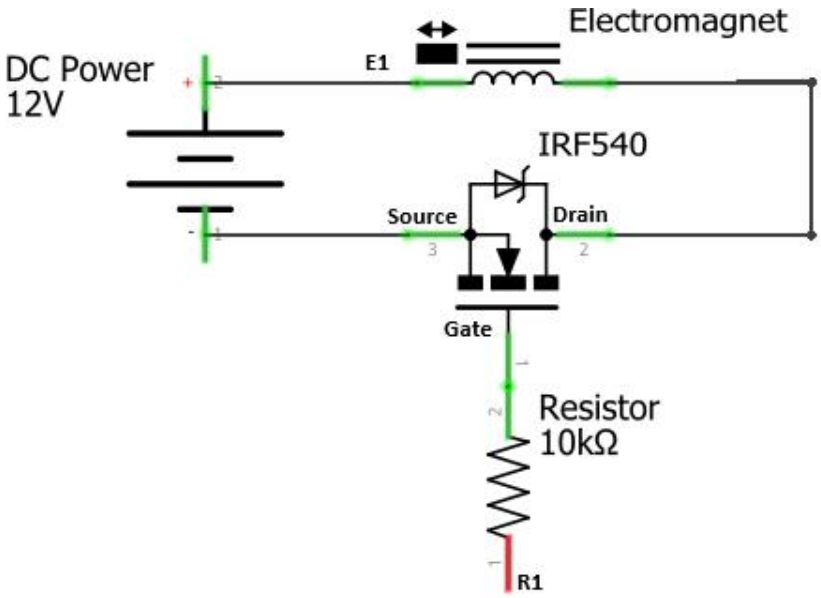


Figure 2: Electromagnet and MOSFET Connection Circuit

Make the connections of the circuit as given in Figure 2 and Table 1

Electromagnet Circuit	Arduino Mega
R1	Arduino Pin 51
Source	GND
E1	12V

Table 1: Electromagnet Pin Connection Table

Connecting Buzzer Module to Arduino Mega

You will find a buzzer module as shown in Figure 3 in your kit.

Figure 3: Buzzer Module

Buzzer Module has 3 pins, VCC, GND, I/O. The buzzer module doesn't require an external power supply and can be powered by the Arduino easily. The connection table is as follows:

Buzzer Module	Arduino Mega
VCC	Arduino VCC
Source	Arduino pin 31
GND	Arduino GND

Connecting RGB Led to Arduino Mega

You have been given 2 RGB Leds in the kit provided to you.

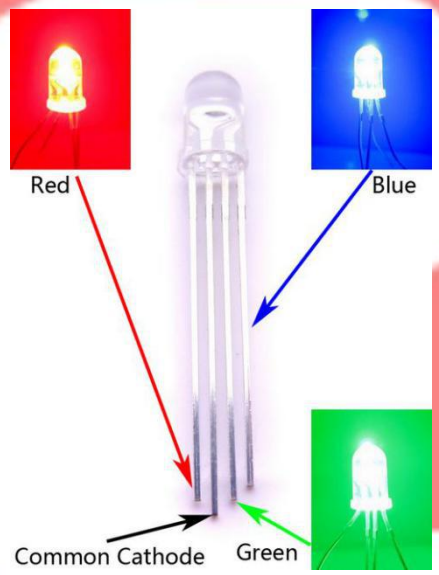


Figure 4: RGB Led

The connection table for testing RGB Led is follows:

RGB LED	Arduino Mega
Red	Arduino pin 43
Common	Arduino pin 45
Green	Arduino pin 47
Blue	Arduino pin 49

Making Power Distribution Circuit for Motor

The following hardware is required for making power distribution board.

Required Hardware:

- Perf Board / General Purpose PCB
- DC Jack(Male)
- Li- Po Battery Connector
- Li- Po Battery
- Wire
- Soldering Iron and Solder wire
- Terminal Block / Connector
- Switch (Optional) **(Not in kit)**

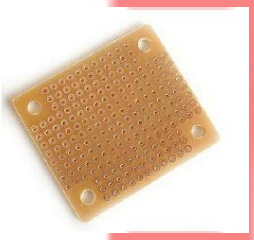


Figure 5: Perf Board

Figure 6: DC Jack (Male)

Figure 7: Terminal Connector

Figure 8: Switch

Figure 9: Li-Po Battery Connector

Circuit Diagram

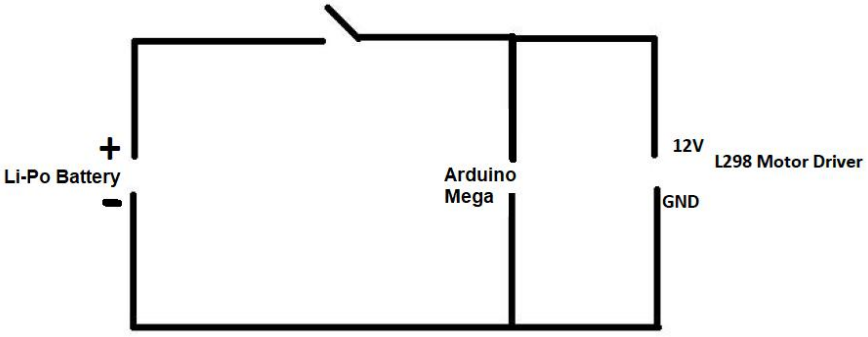


Figure 10: Circuit Diagram of Power Distribution Circuit

Connection Instructions

1. First study the circuit diagram as shown in Figure 10.
2. Solder the wires to jack as shown in Figure 11. Solder red wire (Positive) to the tip and black wire (Negative) to the sleeve of the jack.

Figure 11: DC Jack Connections

3. Solder wires to Li-Po Battery Connectors as shown in Figure 12.
4.

Figure 12: Li-Po Battery Connector

5. Cut the perf board 50x50mm
6. Solder the Terminal Connectors and Switch (not provided in kit) to the perf board
7. After finishing the connections, board and the connections look like Figure 13

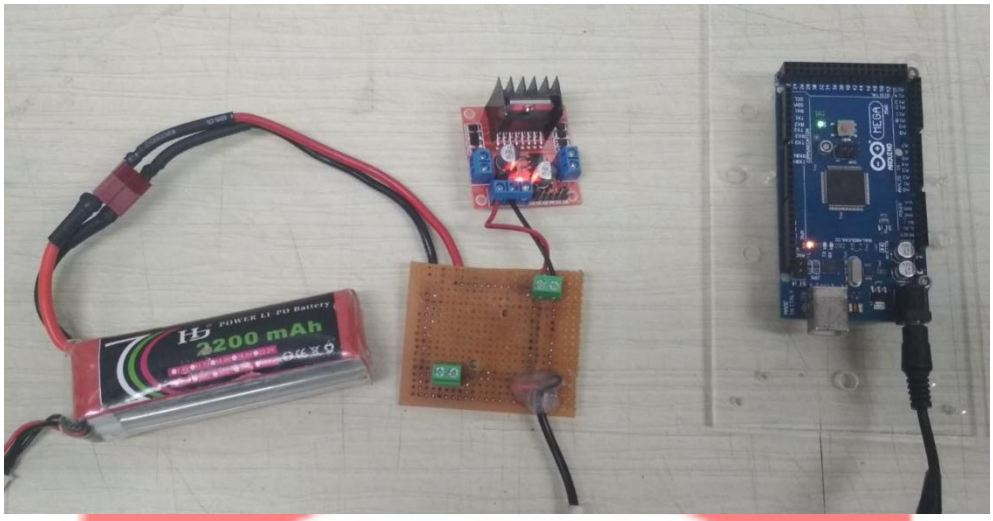


Figure 13: Motor Board Connection

The 12V and GND terminals on the L298 are connected to the +ve and -ve terminals from the battery supply.

Making Motor Connections

Make the connections of motor as per the following connection table(s). Use the motor connectors provided to you to connect the motors to the L298 motor driver.

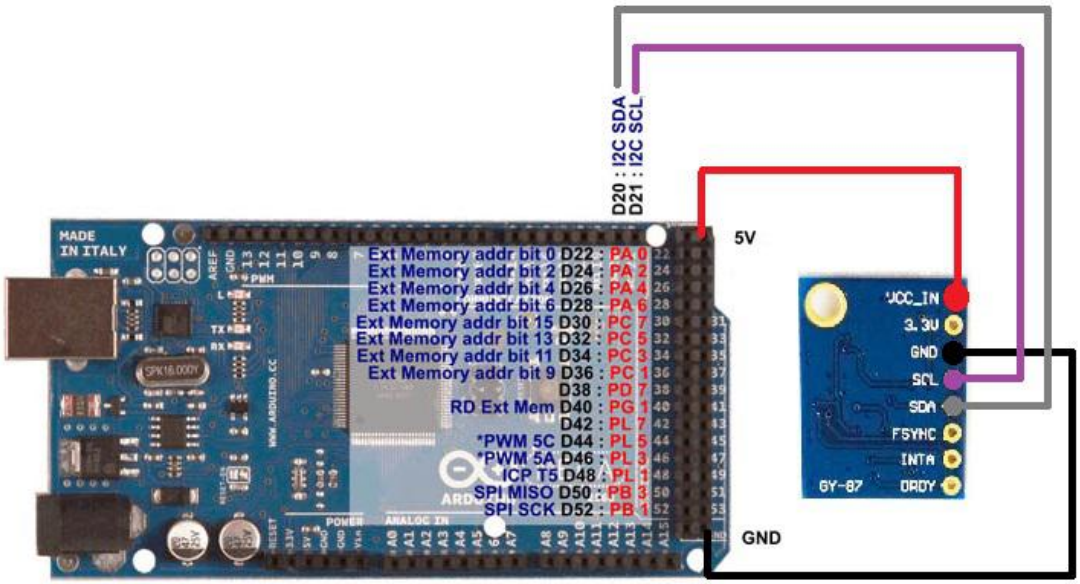
L298 Motor Driver	Arduino Mega
ENA	Arduino Pin 10
IN1	Arduino Pin 13
IN2	Arduino Pin 9
ENB	Arduino Pin 6
IN3	Arduino Pin 7
IN4	Arduino Pin 4

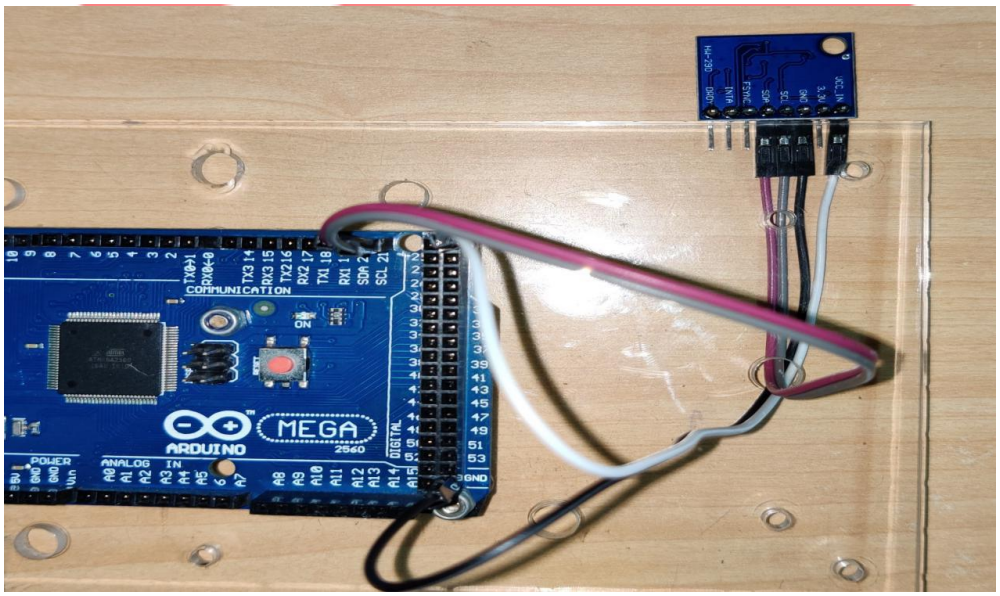
Motor 1	L298N	Motor 2	L298N
5V	5V	5V	5V
GND	GND	GND	GND
M1	OUT1	M1	OUT4
M2	OUT2	M2	OUT3

Connecting GY-87 Sensor Module to Arduino Mega

GY-87 Sensor Module can be easily connected to the Arduino Mega through following connection table:

GY-87 or HW-290 Sensor Module	Arduino Mega
VCC_IN	Arduino VCC
GND	Arduino GND
SCL	SCL (Arduino Pin 21)
SDA	SDA (Arduino Pin 20)





After connection follow the instructions given in the Hardware Testing Video for proceeding with the testing process.