Assembling Hardware for Testing

This file contains instructions for connecting hardware for testing.

Required Hardware:

1. Atmega2560 Development Board
2. XBee module
3. Motor with Quadrature Encoder with perf board
4. L298 Motor Driver
5. MPU6050 sensor module
6. Li-Po battery
7. Female to Female Connecting Cables

Connection Instructions:

1. First take Atmega2560 Development Board with one of the XBee modules placed at XBee module slot as shown in Figure 1.

Note: For connecting XBee to the microcontroller, place the jumpers in XBEE mode in Atmega2560 Development board.

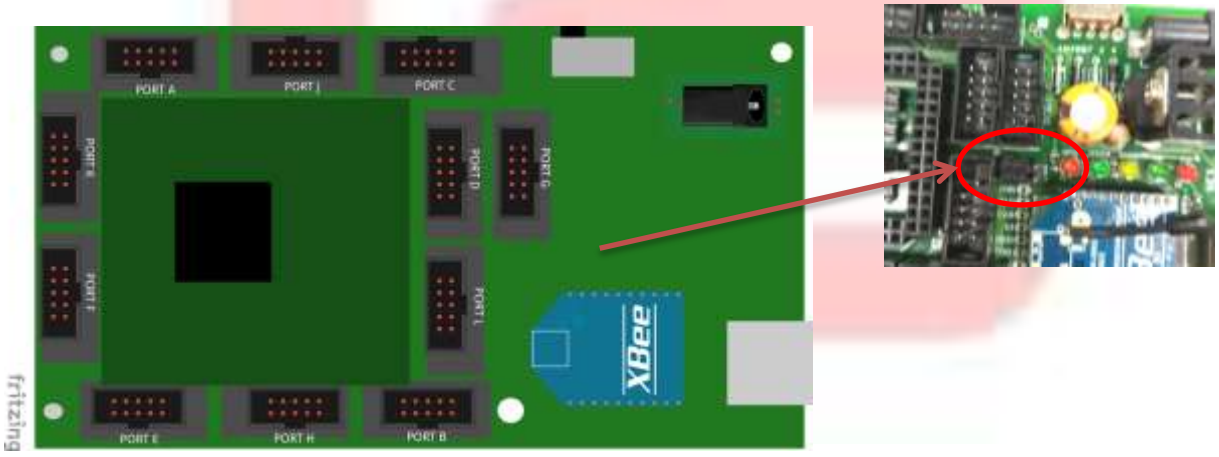
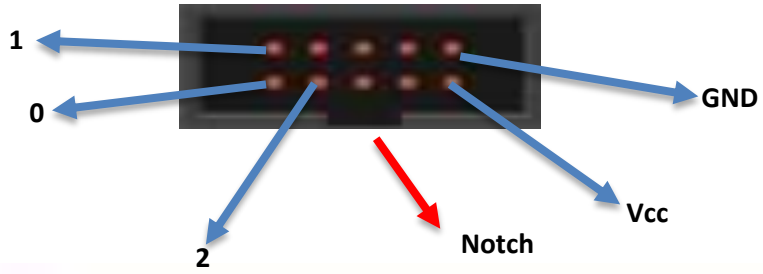


Figure 1: Atmega2560 Development board with XBee

NOTE:



This figure shows the order of numbering pins in a port. Please note that the pins in a port are numbered according to the positions of the notch. Please be careful while numbering pins in PORTA, PORTK and PORTF as you are likely to make mistake because the position of notch on these ports are different compared to other ports.

2. Then take motor with quadrature encoder board and connect M+ and M- cables to MA 1 and MA 2 connectors of L298 module. Similarly connect M+ and M- of second motor to MB1 and MB2 connectors of L298 module. After this the motor connection will be as shown in Figure 2.

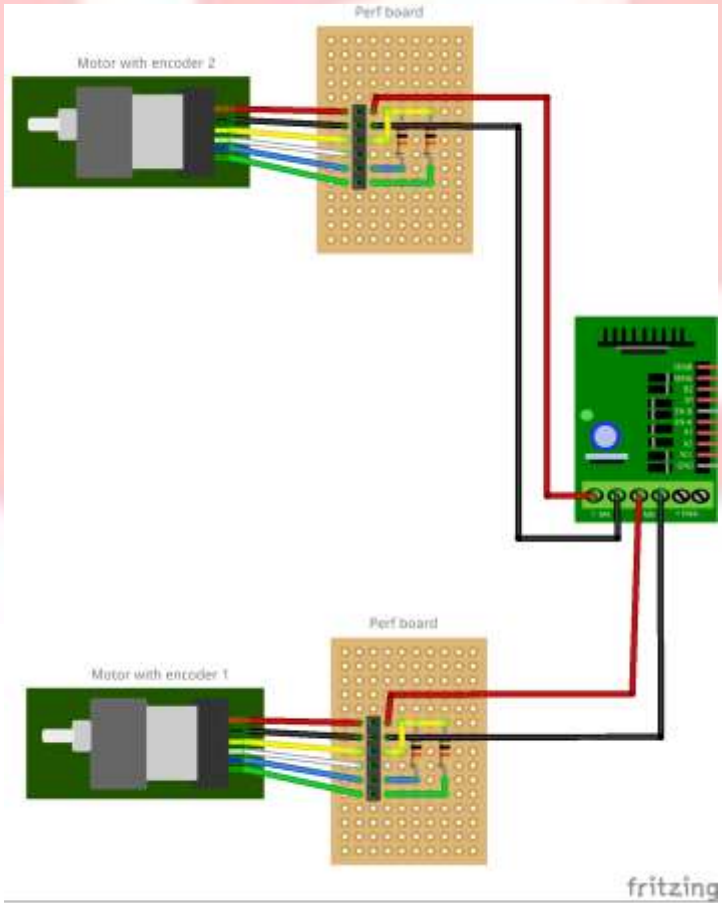


Figure 2: Motor connection with L298 module

3. Now connect remaining connections of both motors with quadrature encoder boards to Atmega2560 development board as explained in Table 1:

(Here M1_Xx stands for motor one board and M2_Xx stands for motor two board.)

Table 1: Motor connection to Atmega2560 Board

Motor with Quadrature Encoder	**Atmega2560 Development Board**
M1_Ch-A	PORT D2
M1_Ch-B	PORT D3
M1_Vcc	PORT K Vcc
M1_GND	PORT K GND
M2_Ch-A	PORT E4
M2_Ch-B	PORT E5
M2_Vcc	PORT C Vcc
M2_GND	PORT C GND

After making above connections, setup will look like Figure 3.

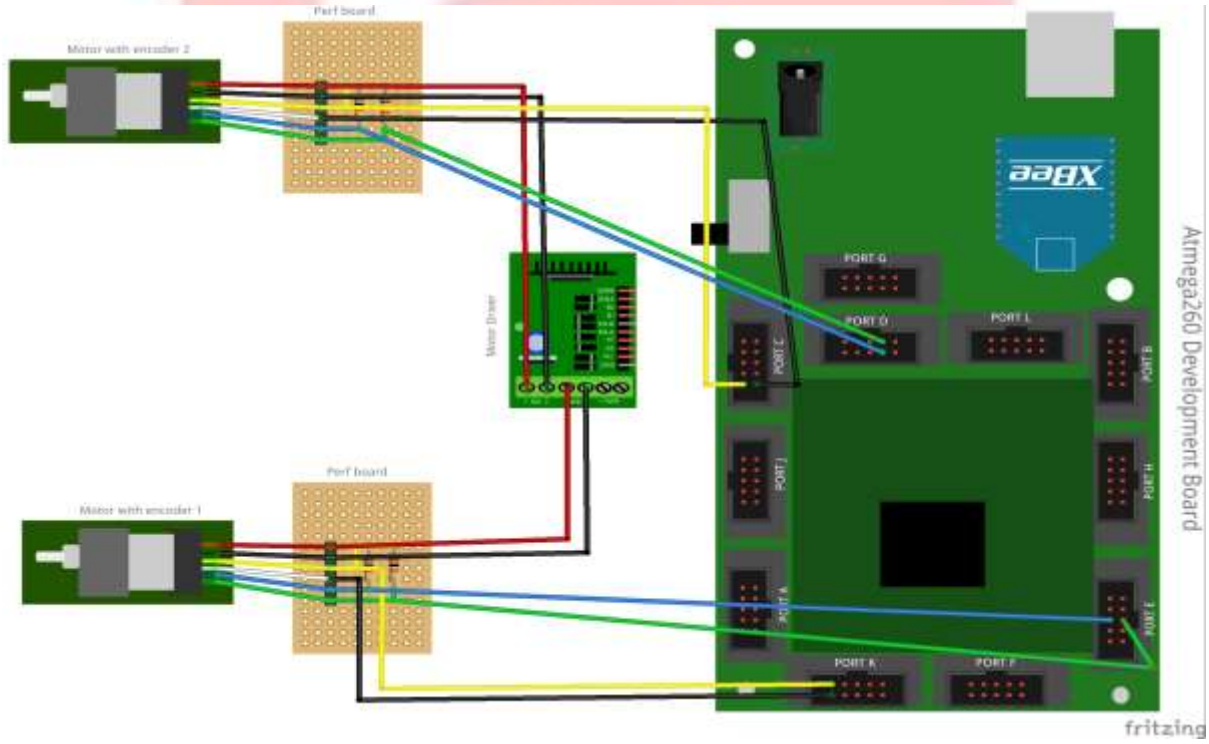


Figure 3: Connection for quadrature encoder with Atmega2560 Development Board

4. Then connect the pins of L298 motor driver to controller as explained in Table 2:

Table 2: Connection of L298 motor driver with Atmega2560 Development Board

L298 motor driver	**Atmega2560 Development Board**
EN-A	PORT H4
A1	PORT A0
A2	PORT A1
B1	PORT A2
B2	PORT A3
EN-B	PORT H3

After connection your board should look like Figure 4.

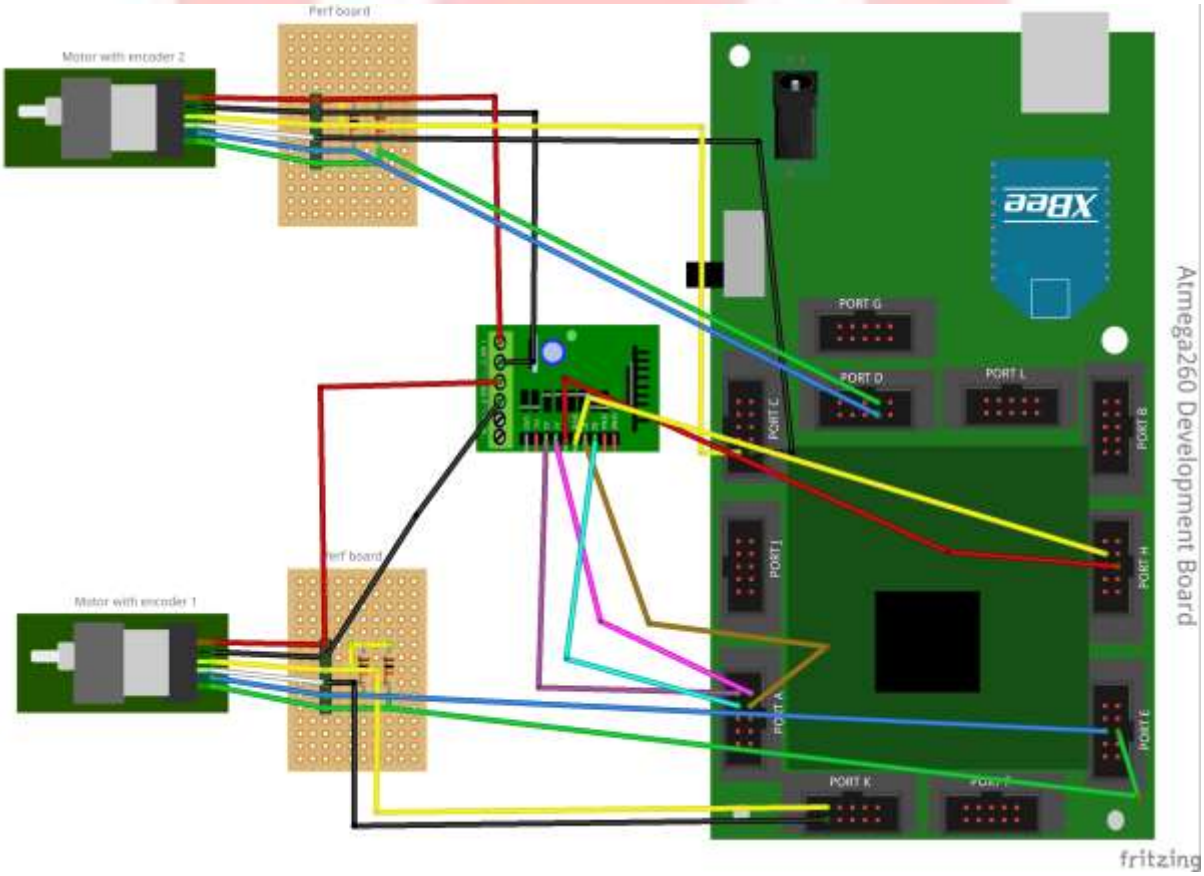


Figure 4: Connection of L298 module with Atmega2560 Development Board

5. Now connect the MPU6050 sensor to Atmega2560 Development Board as listed in Table3:

Table 3: Connection of MPU6050 with Atmega2560 Development Board

MPU6050	**Atmega2560 Development Board**
Vcc (PIN 1)	PORT B Vcc
GND (PIN 2)	PORT B GND
SCL (PIN3)	PORT D0
SDA (PIN4)	PORT D1

After connection your board should be as shown in Figure 5.

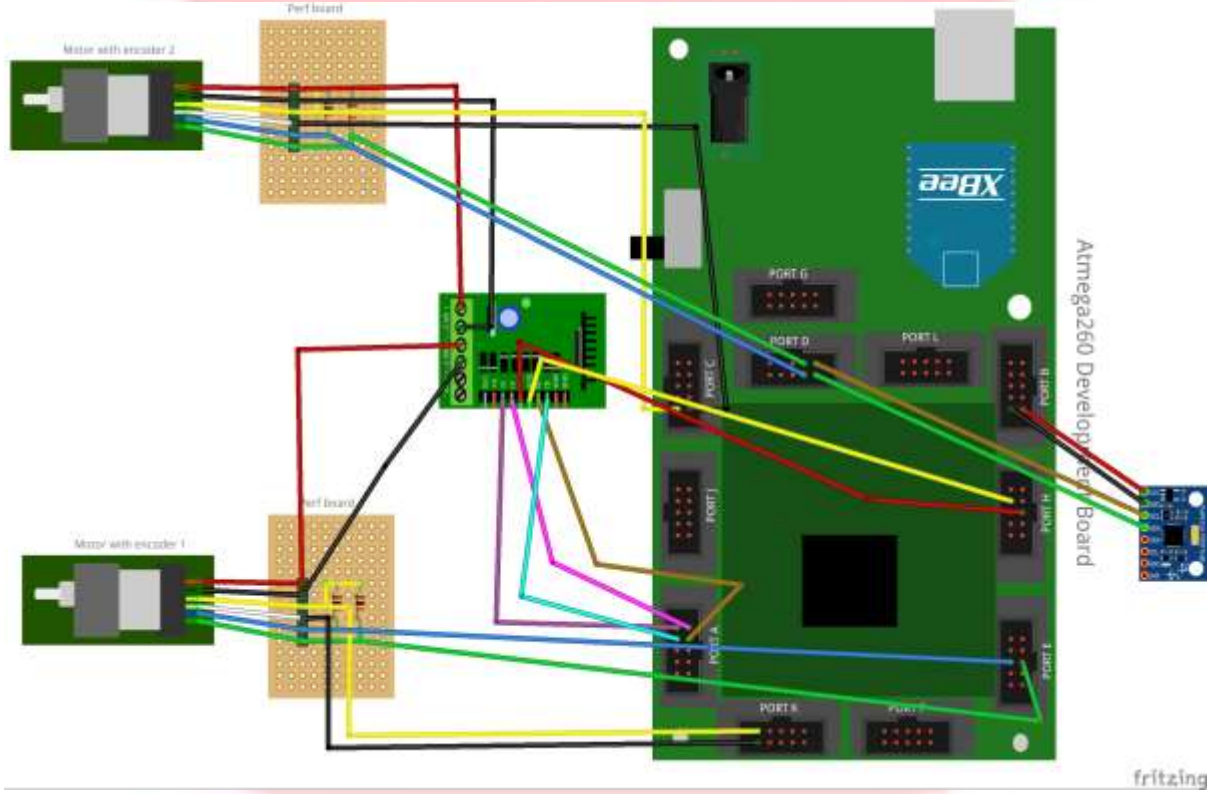


Figure 5: Connection of MPU6050 with Atmega2560 Development Board

6. Now power up the board by connecting Li-Po battery to L298 and Atmega2560 development board. For L298 board power is supplied by connecting battery to + and - connector. For Atmega2560 battery has to be connected through DC jack as shown in Figure6.

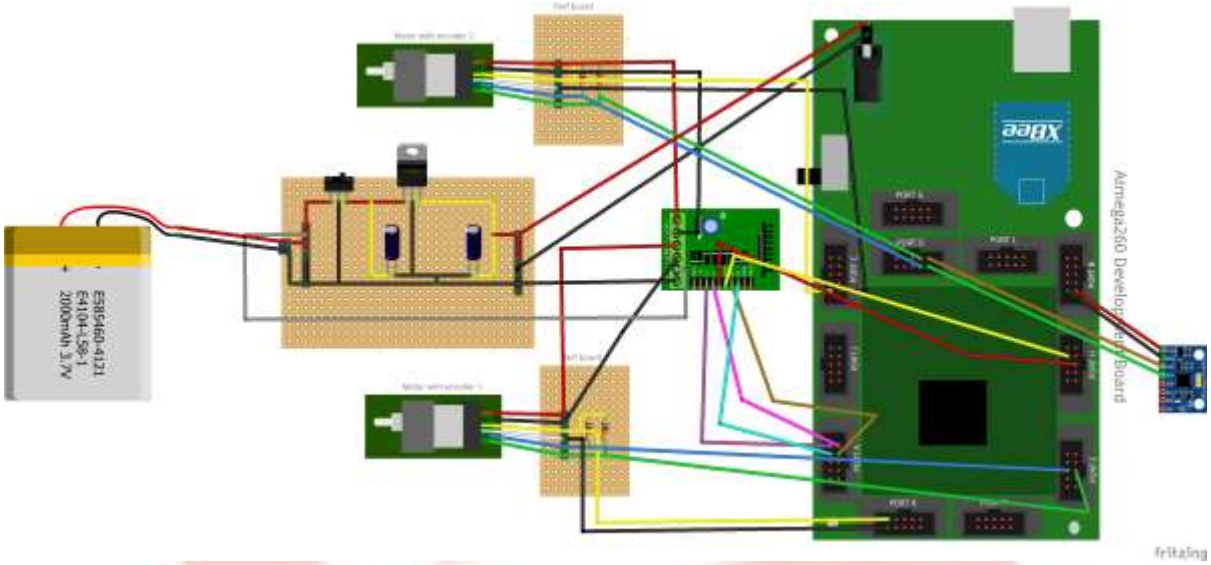


Figure 6: Power connection for testing

7. Now follow further instructions provided in *Testing hardware.pdf* for testing hardware.

Submission Preparation:

1. Draw the schematic for the hardware connections and save it as <Team_ID>_*hardware_testing_schematic.pdf* . Draw schematic using tools like Eagle or Fritzing or by hand.

2. Take the single image of hardware testing setup and save it as <Team_ID>_*hardware_testing_setup.jpg*

3. Now put <Team_ID>_*hardware_testing_schematic.pdf* and <Team_ID>_*hardware_testing_setup.jpg* in <Team_ID>_*hardware_testing* folder.

Now follow instructions in *Task2_Read_me.pdf* for submission.