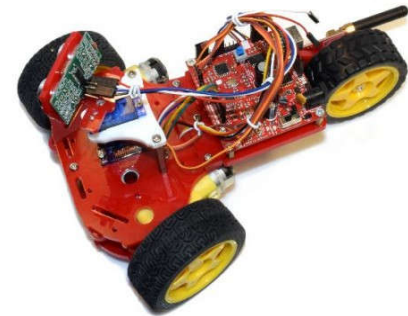
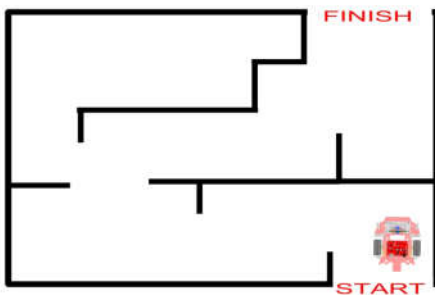
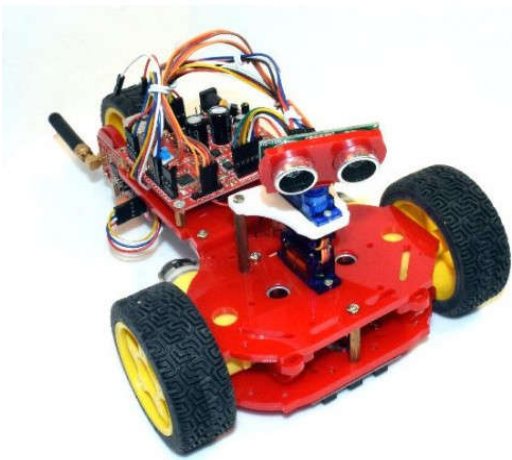


# BATMOBOT rev1.0

AN ENTRY LEVEL MOBILE ROBOT



**BATMOBOT Maze**  
SOLVING THE OBSTACLES

**BATMOBOT PS2 Controlled**  
UHF WIRELESS CONTROLLED

A complete programmable robot kit with wireless controller. With Ultrasonic Sensor for Distance detection you can add more sensors and/or actuator to enhance the robot even more. It is more lightweight, rechargeable li-ion batteries included and its easy to use. Compatible in Arduino programming language.

#### FEATURES:

- Built-in IC ATMEGA168 with 16KB Flash Memory.
- Programmable MCU inside
- With A3966 dual full-bridge PWM Motor driver.
- Directly upload using the USB cable.
- With PS2 Controller and UHF Wireless controlled available.

#### GENERAL SPECIFICATIONS:

- Power Input:** 7 to 9VDC
- External Input:** 9 to 10VDC Adaptor Charger
- On Board Peripherals:**
  - 2CH DC Motor Driver 6V 1.5A
  - 3CH IR Line Sensor CNY70 sensor, 10mm range.
- PCB Dimensions:** 62mmx67mm.
- Weight:** 0.613 kg
- Height:** 150 cm

# P-BOT JUNIOR Board rev2.0

## MAJOR PARTS PRESENTATION

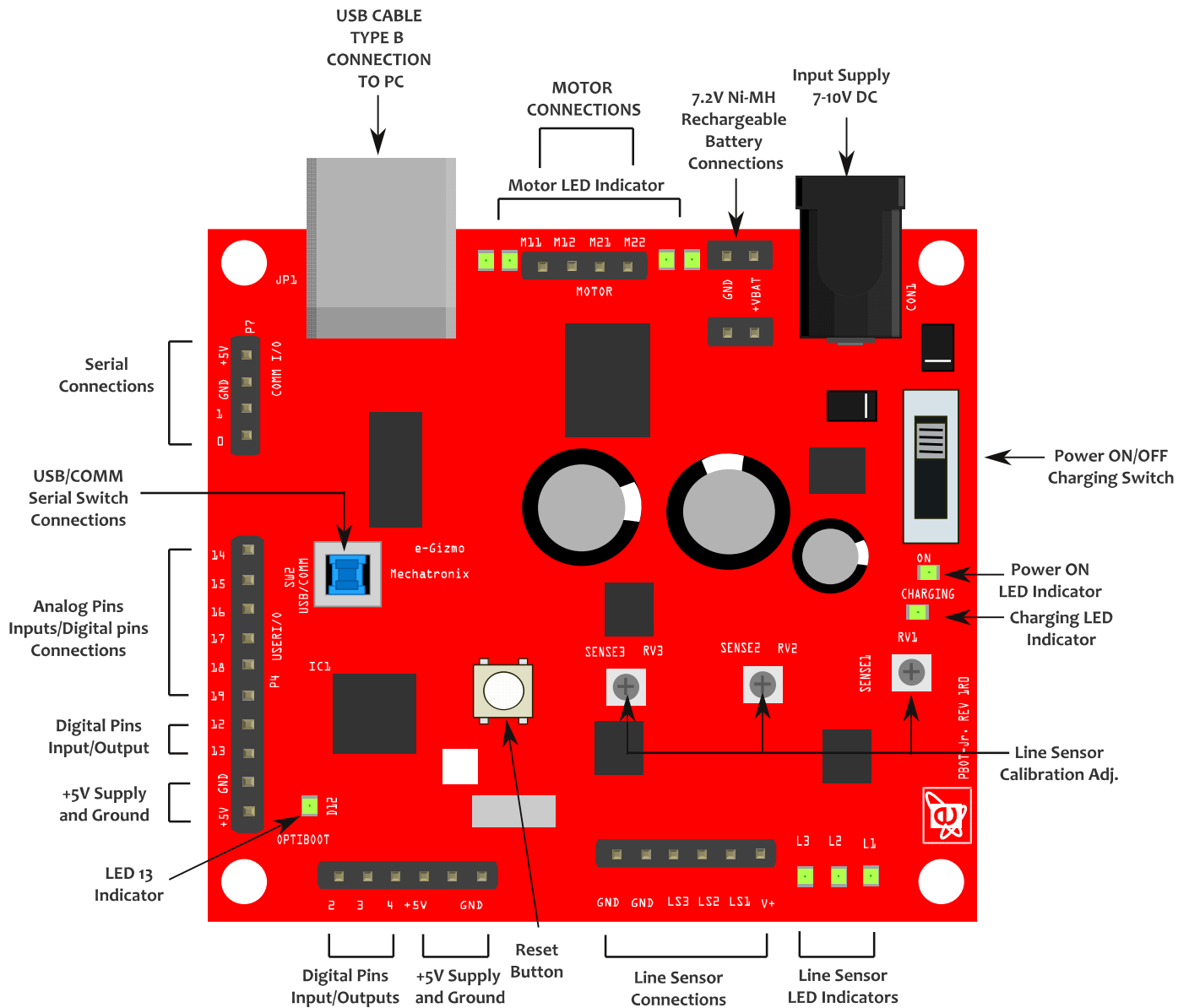


FIGURE 1: PBOT JUNIOR MAJOR PARTS

**Table 1. P3 Motor Connections**

PIN	Descriptions
M11	Motor 1 Direction
M12	Motor 1 Run (Left Motor)
M21	Motor 2 Run (Right Motor)
M22	Motor 2 Direction

**Table 2. P6 Line sensor Connections**

PIN	Descriptions
GND	Ground 0V
GND	Ground 0V
LS3	Line sensor 3 (Right)
LS2	Line sensor 2 (Center)
LS1	Line sensor 1 (Left)

PIN	Descriptions
RV1	Sense 1 Line sensor Adjustment
RV2	Sense 2 Line sensor Adjustment
RV3	Sense 3 Line sensor Adjustment

**Table 3. P7 Serial and Power Connections**

PIN	Descriptions
0	Digital 0/ Receiver pin
1	Digital 1/Transmitter pin
GND	Ground 0V
+5V	Power Source 5V

**SW2 USB / COMM Selection**

**Table 4. P4 Digital I/Os and Power Connections**

PIN	Descriptions
14	Digital I/O pin 14, Analog 0
15	Digital I/O pin 15, Analog 1
16	Digital I/O pin 16, Analog 2
17	Digital I/O pin 17, Analog 3
18	Digital I/O pin 18, Analog 4
19	Digital I/O pin 19, Analog 5
12	Digital I/O pin 12, MISO
13	Digital I/O pin 13, SCK
GND	Ground 0V
+5V	Power Source 5V

**Table 5. P5 Digital I/Os pin and Power Connections**

PIN	Descriptions
2	Digital I/O pin 2
3	Digital I/O pin 3, PWM
4	Digital I/O pin 4
+5V	Power Source 5V
NC	Open pin, Ground 0V
GND	Ground 0V

**Table 6. LED Indicators**

PIN	Descriptions
D3	Charging
D4	Power ON
D5	Motor 11 LED Indicator
D6	Motor 12 LED Indicator
D7	Motor 21 LED Indicator
D8	Motor 22 LED Indicator
D9	L1 LED Indicator
D10	L2 LED Indicator
D11	L3 LED Indicator
D12	Optiboot LED Indicator

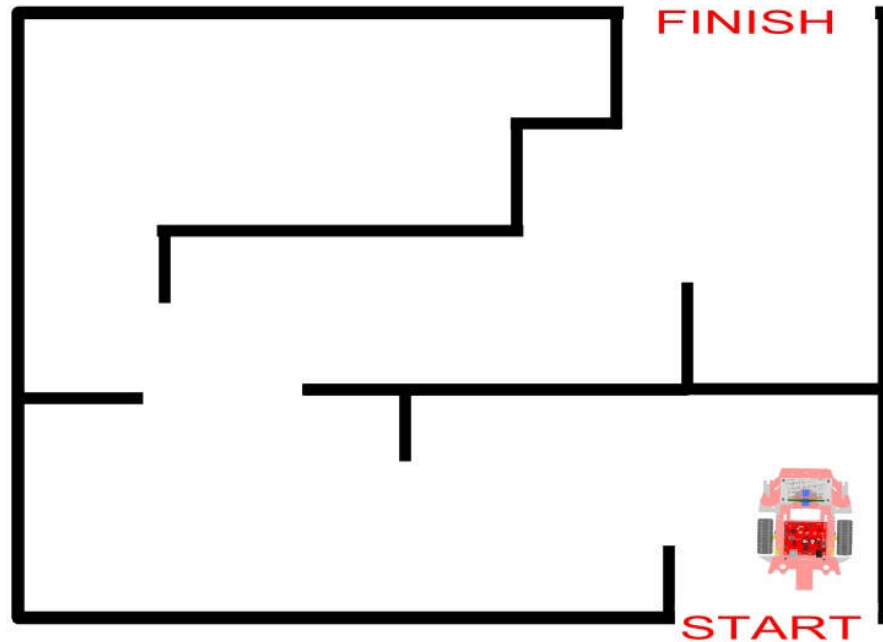
**Table 7. Power Connections  
P1 & P2 Battery Connections**

PIN	Descriptions
GND	Ground 0V
+VBAT	Input Voltage 7-8VDC

**CON1 External Supply  
7 to 9VDC Adaptor**

**JP1 USB Connection  
Connection to PC for Uploading the codes**

**SW1 Power ON/OFF/Charging Switch**



### MAZE SOLVER

**NOTE:**

*THE BATMOBOT HAS NO LINE SENSOR FOR LINEFOLLOWER. AND ITS NOT RECOMMENDED TO USE IT FOR SUMO/LINE FOLLOWING. ONLY FOR THE SPECIFIC APPLICATION GIVEN.*

### DEFINE MOTOR PINS

The U3 Motor Driver A3966 Dual Full-Bridge PWM are designed to drive both windings of two-phase bipolar stepper motor. For each bridge, the Logic inputs on the Enable input turns off all four output drivers of that H-Bridge.

The direction of motor are depends on the logic output, if it is in HIGH state (forward) or LOW state (Reversed). On the other hand there is also a pin controls for the speed of motors, using the Pulse Width Modulation (PWM) pins and that is ranges from 0 = full speed and 255 = full stop.

The Motor left pin assignment in Motor 1 Direction is D8 and Motor 1 Run is D9 while the Motor Right pin assignment in Motor 2 Direction D11 and Motor 2 Run is D10. Example line code for assigned motor pins.

#### LEFT MOTOR 1 PINS

```
#define MOTOR_1_DIRECTION 8
#define MOTOR_1_SPEED 9
```

#### RIGHT MOTOR 2 PINS

```
#define MOTOR_2_SPEED 10
#define MOTOR_2_DIRECTION 11
```

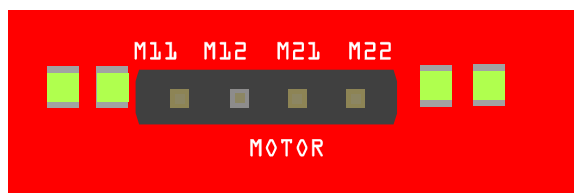


Figure 2: Motor Connections

### DEFINE LINE SENSOR PINS (LINE ARRAY NOT INCLUDED)

The 3 channel Line sensor P6 has an analog comparator to change analog voltage appear as its input into a single bit digital logic signal.

The reference voltage is fed to the positive input of the comparator. If the analog input fed through the input exceeds the refer voltage, the comparator output switches to logic low or else, it assumes a logic HIGH state.

The sensitivity of the three comparators can be independently set by adjusting their reference voltage through their corresponding adjustable trimmers.

3-Channel analog comparator is a typical analog interface cricuit. It can be used as well with other sensors with 0~5VDC output range functioning as a single bit ADC.

#### LINE SENSOR PINS

```
#define LEFT_LINE_SENSOR 5
#define CENTER_LINE_SENSOR 6
#define RIGHT_LINE_SENSOR 7
```

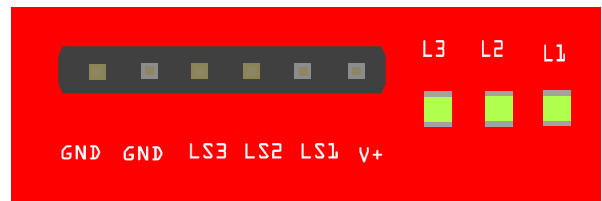
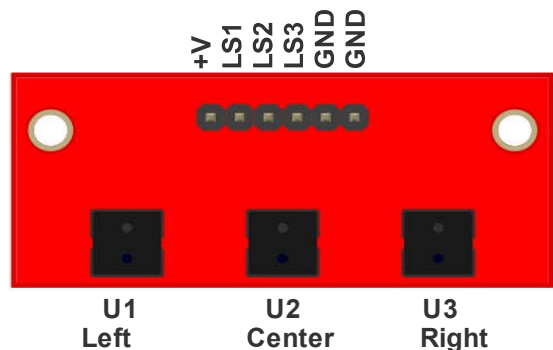


Figure 3: Line Sensor Connections



### DEFINE SERVO PINS

The Pbot Junior standard has additional servo motor SG-90 for turning the Distance sensor from looking to the left side view, center/front view and right side view. This is usually used for sumo fighting to overlook and avoiding block objects for obstacles/Maze solver.

The servo pin is connected to the Digital 4. Using this type of mobile robot its #include <Servo.h> library from Arduino IDE softwares for making it easy to used and understand the codes.

### SERVO LIBRARY

```
#include <Servo.h>
```

### CREATE SERVO OBJECT TO CONTROL

```
Servo MYSERVO;
```

### ATTACH SERVO PIN (SETUP)

```
MYSERVO.attach(2);
```

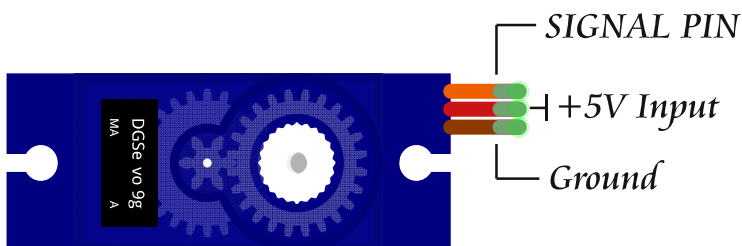


Figure 4: Servo Motor pin outs

### DEFINE US-100 PINS

Ultrasonic Sensor or US-100 is a type of sensor that can measure the distance of an object by using the sound waves. It measures distance by sending out a sound wave at a specific frequency and the sound bounce back to the receiver to listen.

### ULTRASONIC DISTANCE SENSOR PINS

```
int TRIGPIN = 18;
int ECHOPIN = 19;
float DISTANCE;
float DURATION;
```

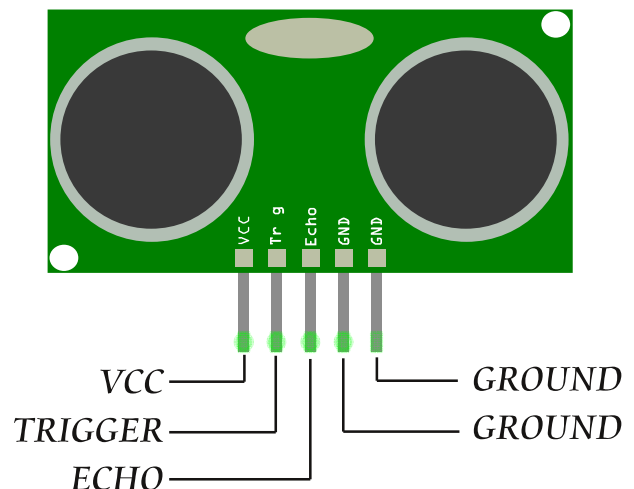
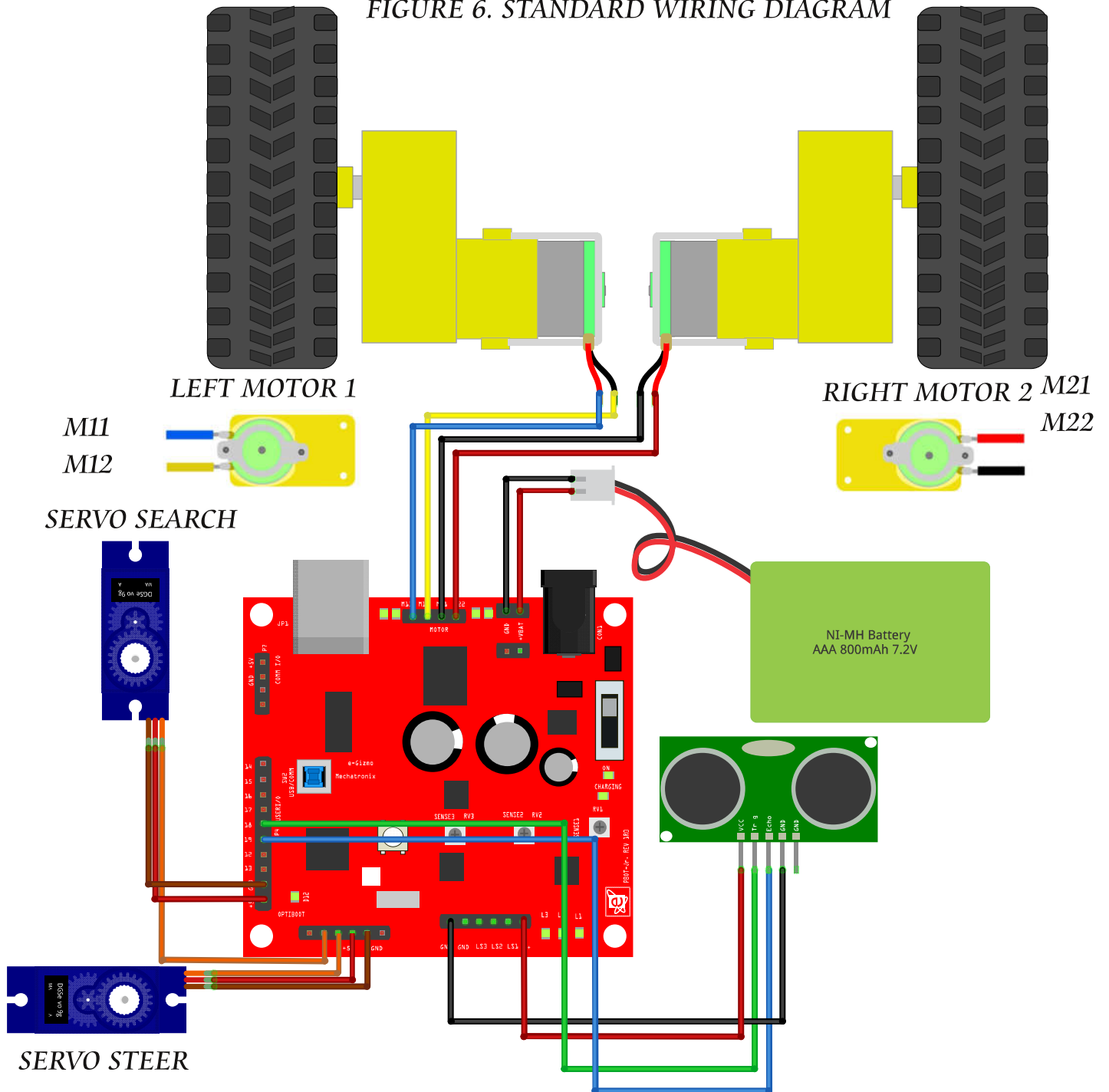


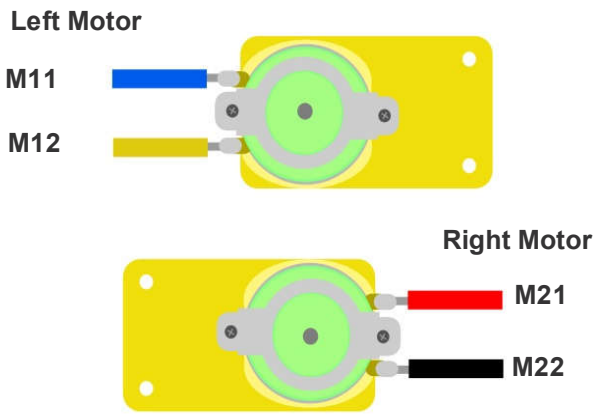
Figure 5: US-100 pin outs

### SAMPLE CODES TO UPLOAD

1. BATMOBOT\_MAZE\_2018.ino
2. BATMOBOT\_MOTOR\_TEST\_2018.ino
3. BATMOBOT\_PS2\_CONTROLLED\_2018.ino

FIGURE 6. STANDARD WIRING DIAGRAM

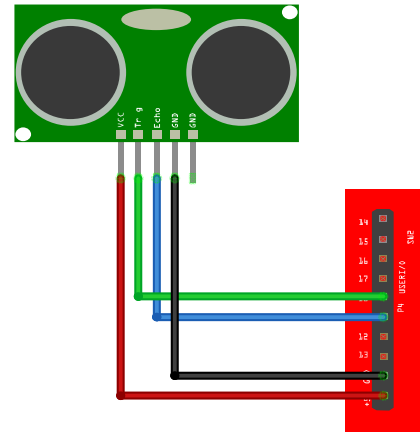




**LEFT MOTOR**  
 BLUE wire to M11  
 YELLOW wire to M12

**RIGHT MOTOR**  
 BLACK wire to M21  
 RED wire to M22

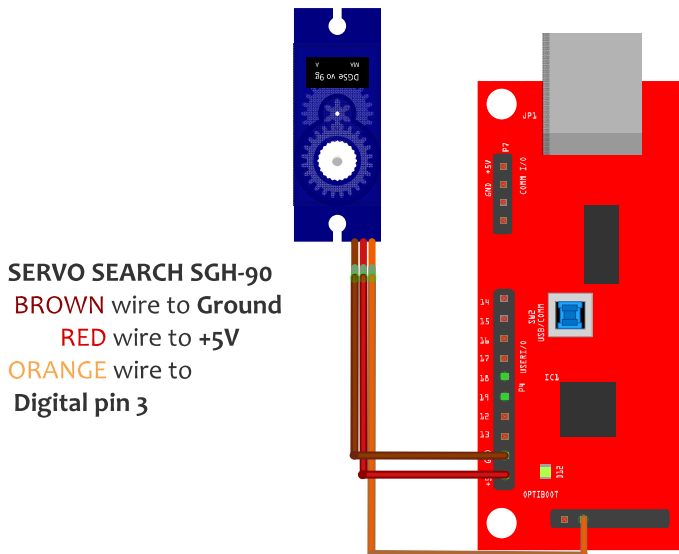
Figure 7. 6VDC Motor Wirings



**US-100 Distance Sensor**  
 RED wire to +5V  
 GREEN wire to Digital pin 18  
 BLUE wire to Digital pin 19  
 BLACK wire to Ground

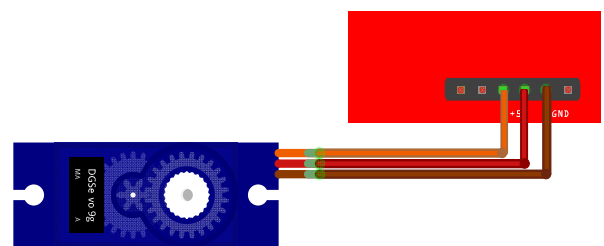
Figure 9. US-100 Wirings

### SERVO SEARCH



**SERVO SEARCH SGH-90**  
 BROWN wire to Ground  
 RED wire to +5V  
 ORANGE wire to Digital pin 3

Figure 8. Servo Search Wirings



**SERVO STEER SG-90**  
 BROWN wire to Ground  
 RED wire to +5V  
 ORANGE wire to Digital pin 4

Figure 10. Servo Steer SG-90 Wirings

## SAMPLE CODES TO UPLOAD

BATMOBOT\_PS2\_CONTROLLED.ino

### DEFINE UHF RX STD ONLY PINS

The Multi-channel Data Receiver Only (UHF TX Standard) is designed as a UART wireless cable replacement operating in 9600 bps. Frequency Range: 431.1MHz - 437.3MHz. Channel Separation 400KHz. The distance range up to 200meter without obstructions. .

### UHF RX MODULE PINS

#### UHF STD RX ONLY

RED wire to +5V

BLACK wire to Ground

GREEN wire to Digital pin 0 or RXD

BLUE wire to Digital pin 1 or TXD

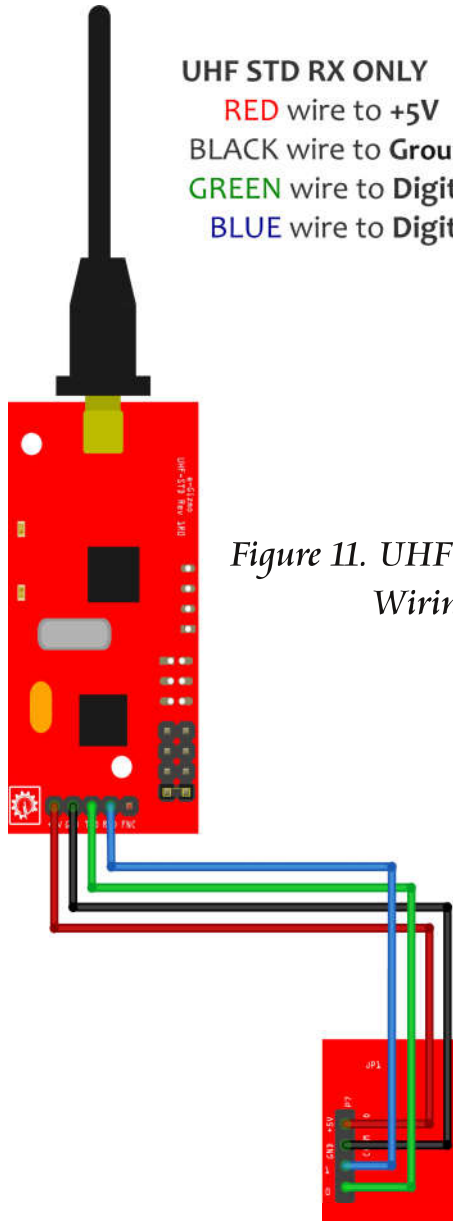






Figure 11. UHF STD RX Only Wirings

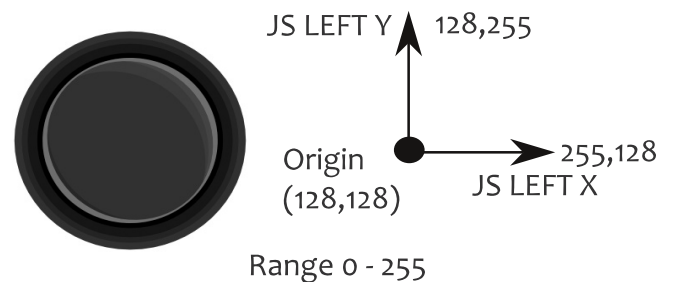


### DEFINE PS2 CONTROLLER BUTTONS

With the PS2 controller it has modified to interface the UHF STD TX for Universal Wireless controlled.

#### MOTORS:

-  UP = FORWARD / JS LEFT Y
-  DOWN = BACKWARD / JS LEFT Y
-  LEFT = TURN LEFT / JS LEFT X
-  RIGHT = TURN RIGHT / JS LEFT X



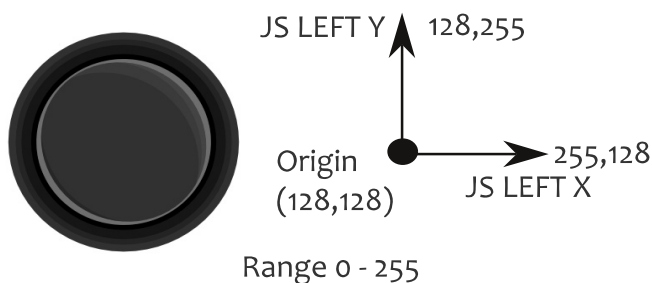
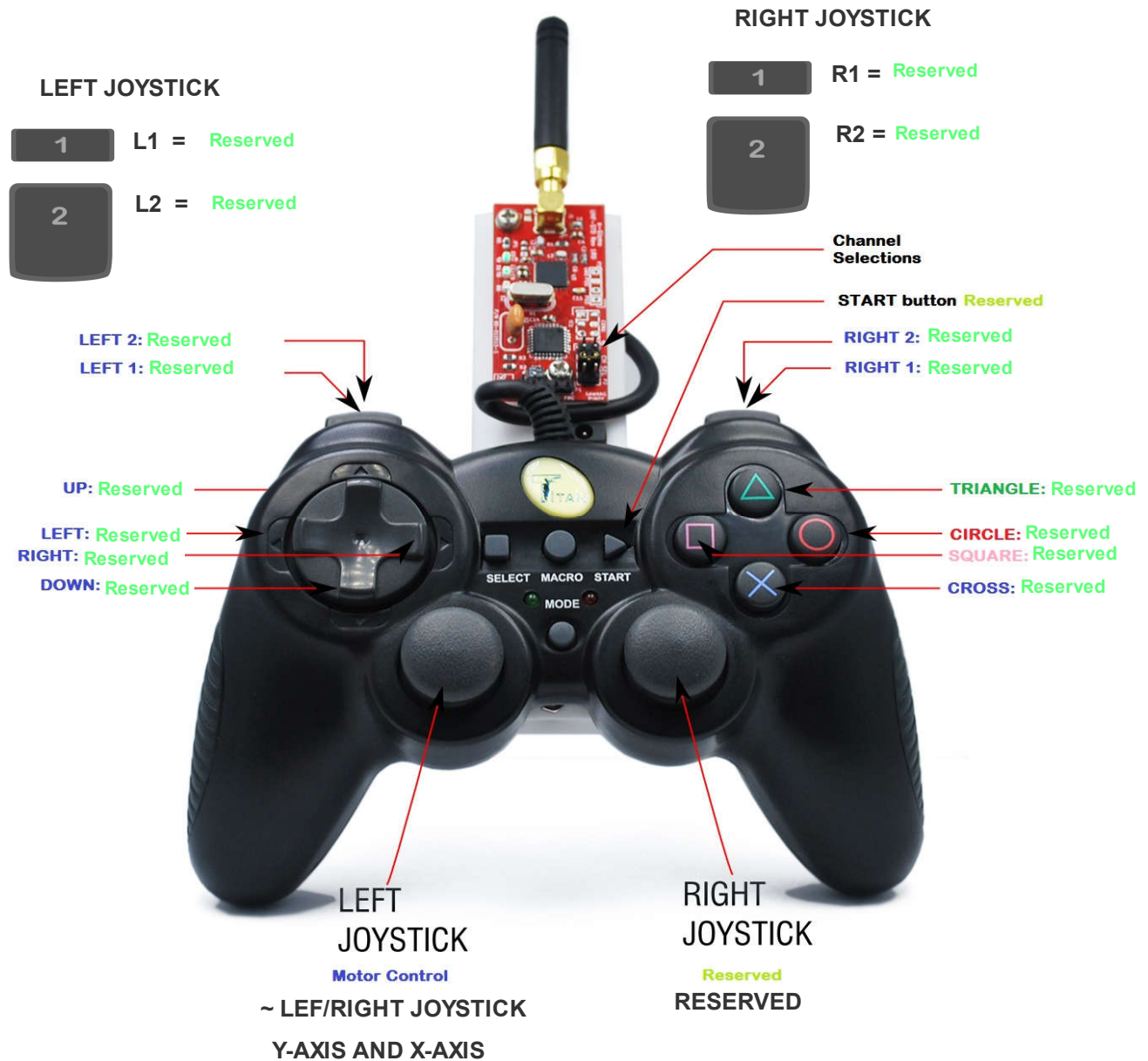


Figure 12. PS2 Controller Button Functions Wiring