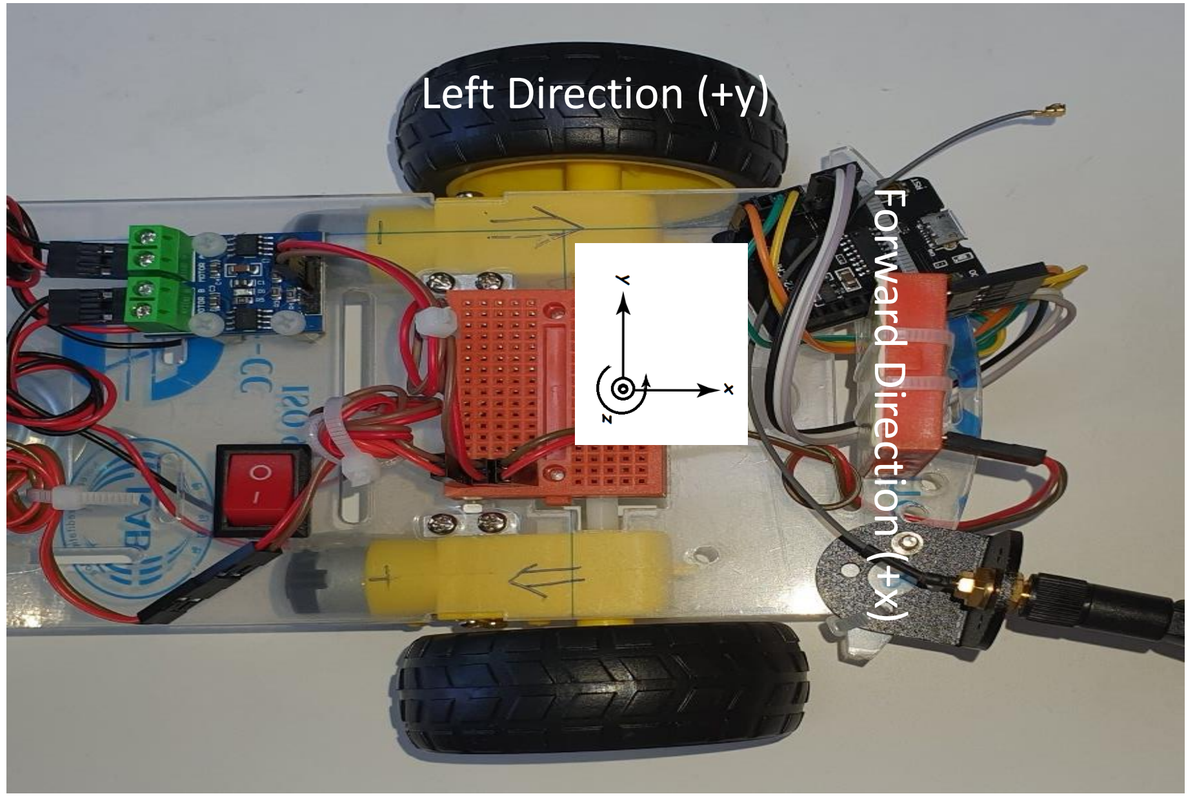
DC MOTOR & 2WD CAR MOVEMENT



7/19/2023

Sangwon Lee

List

- ❑ Finding CCW Rotation Side (Reference Rotation)
- ❑ View of TT Motor
- ❑ Marking Rotation and Movement Direction
- ❑ Mount TT Motor on 2WD ESP32CAM Robot
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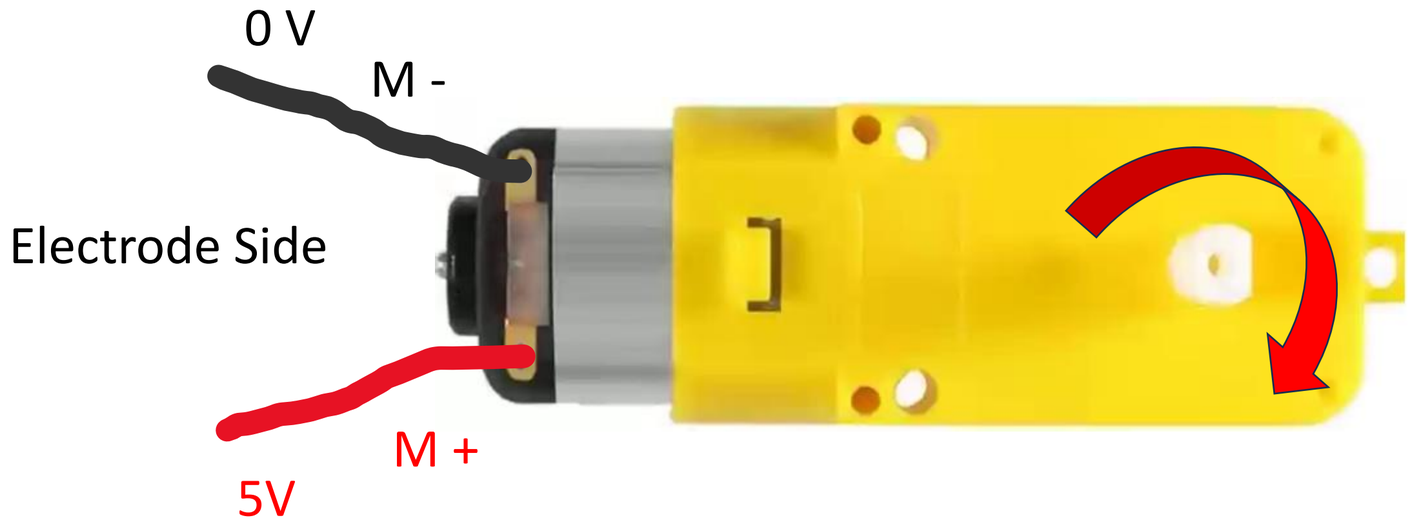
- ❑ Backward Movement and Coding
- ❑ Counter-Clock-Wise Rotation Coding
- ❑ Clock-Wise Rotation and Coding
- ❑ Streaming Video Vertical Flip

Finding CCW Rotation Side

CW rotation means -> This is the back side of TT motor.



This is the Front Side of TT motor.

View of TT Motor

LEFT SIDE

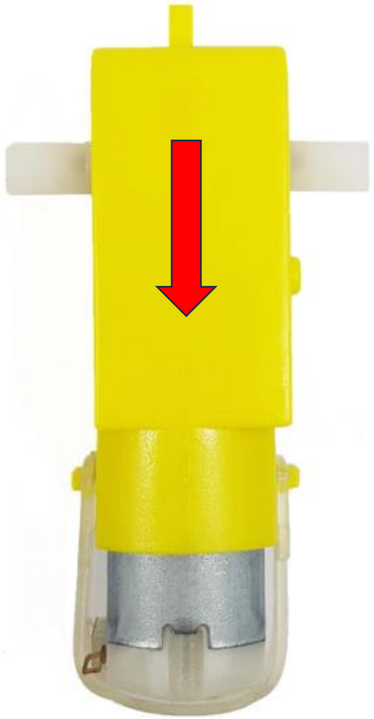
FRONT VIEW

RIGHT SIDE

BACK SIDE

Marking the Rotation and Movement Direction

❑ For the default normal supply voltage (M+ to 5V, M- to 0V)



LEFT SIDE

FRONT VIEW

RIGHT SIDE

BACK SIDE

Mount TT Motor on 2WD ESP32CAM Robot (1)

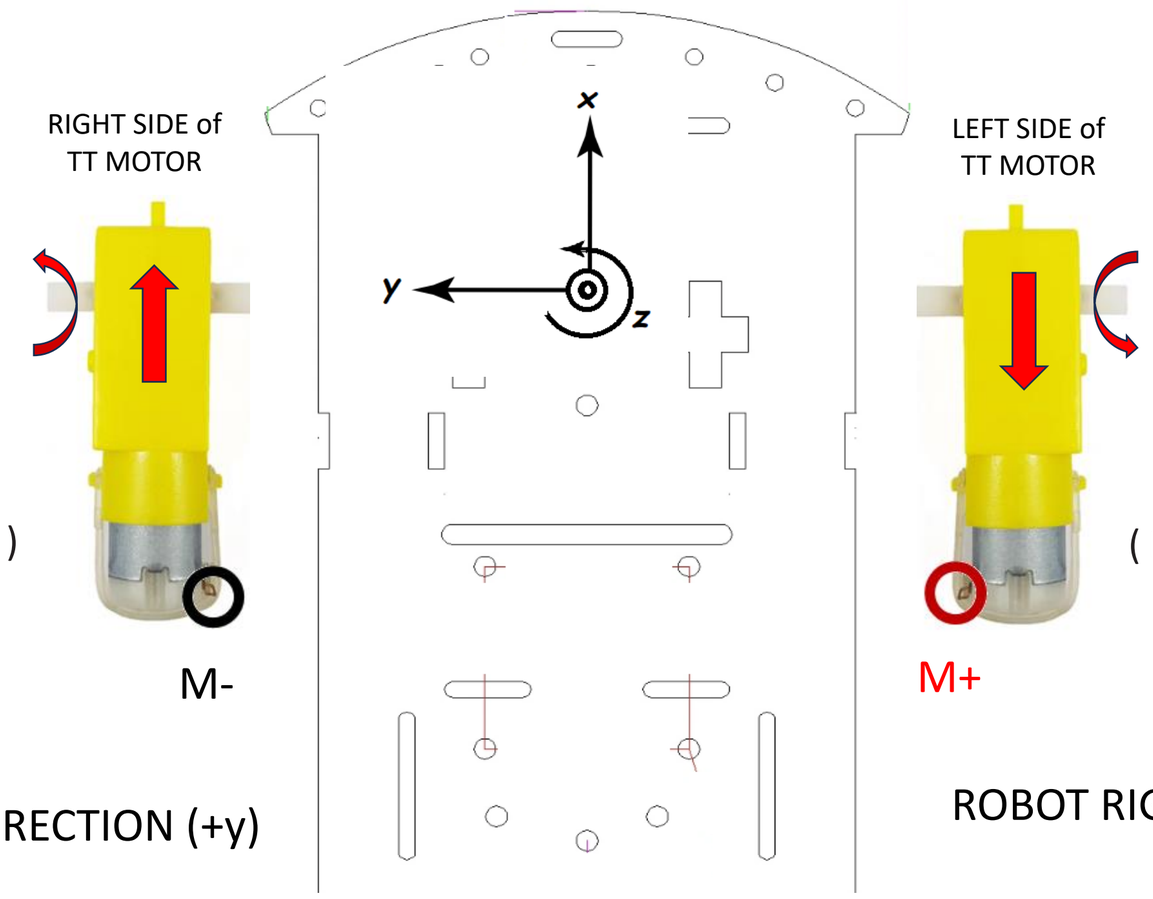
Reverse Bias

Normal Bias

ROBOT FRONT DIRECTION (+x)

RIGHT SIDE of TT MOTOR

LEFT SIDE of TT MOTOR



LEFT MOTOR

(M+ to 5V, M- to 0V)

M-

RIGHT MOTOR

(M+ to 5V, M- to 0V)

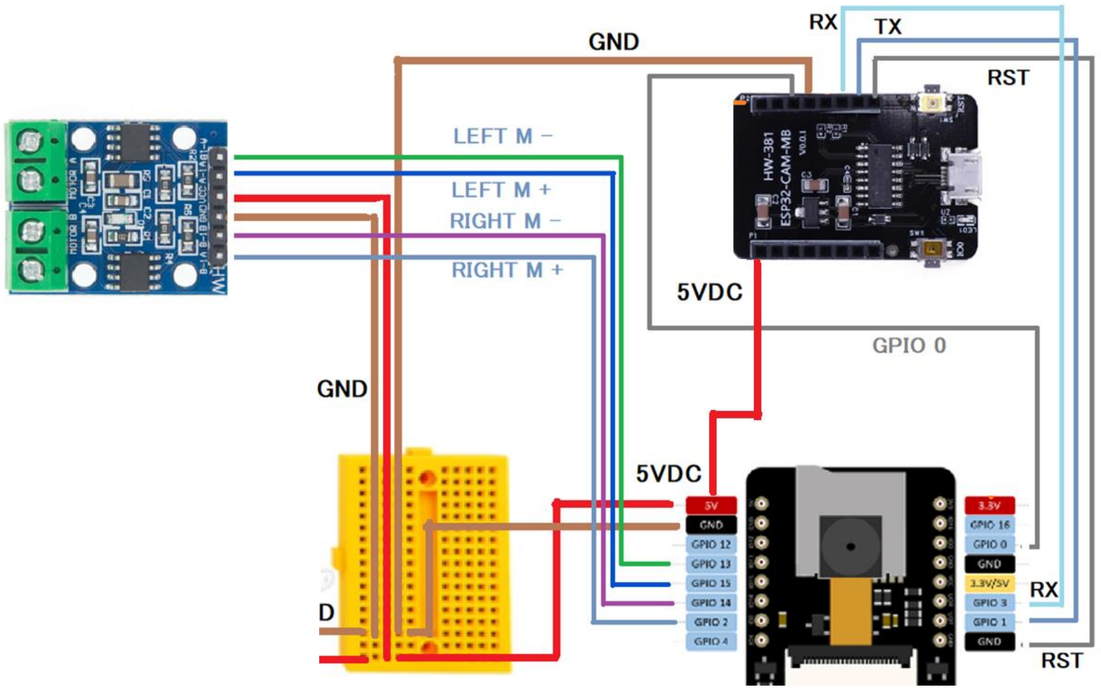
M+

ROBOT LEFT DIRECTION (+y)

ROBOT RIGHT DIRECTION (-y)

ROBOT FRONT DIRECTION (-x)

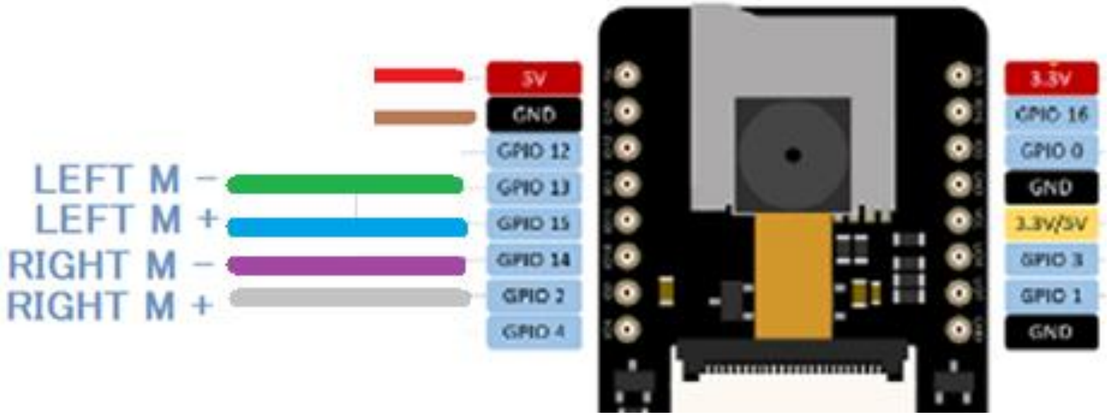
Mount TT Motor on 2WD ESP32CAM Robot (2)



- ❑ LEFT MOTOR + => GPIO15
- ❑ LEFT MOTOR - => GPIO13
- ❑ RIGHT MOTOR + => GPIO02
- ❑ RIGHT MOTOR - => GPIO14

```
#define MOTOR_1_PIN_1    15
#define MOTOR_1_PIN_2    13
#define MOTOR_2_PIN_1    2
#define MOTOR_2_PIN_2    14

#define LEFT_M0     15
#define LEFT_M1     13
#define RIGHT_M0    2
#define RIGHT_M1    14
```



Forward Movement

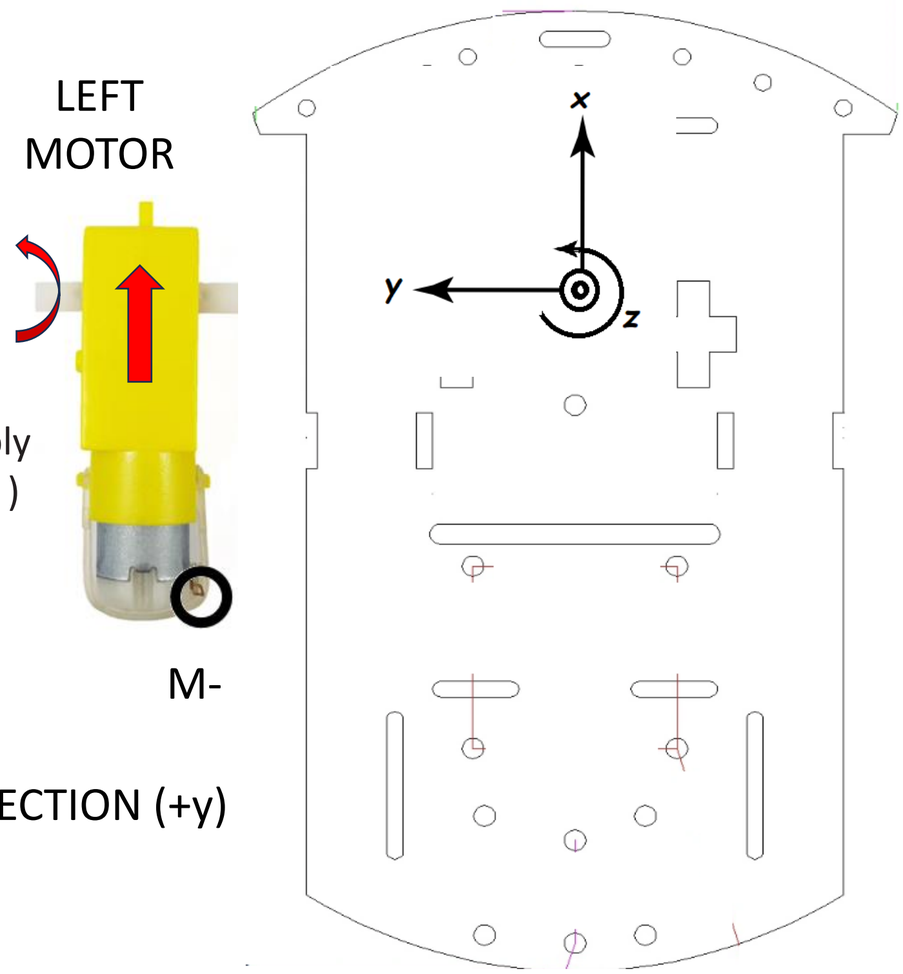
Reverse Bias

Normal Bias

ROBOT FRONT DIRECTION (+x)

LEFT MOTOR

RIGHT MOTOR



Normal Voltage Supply
(M+ to 5V, M- to 0V)

Reverse Voltage Supply
(M+ to 0 V, M- to 5V)

M-

M+

ROBOT LEFT DIRECTION (+y)

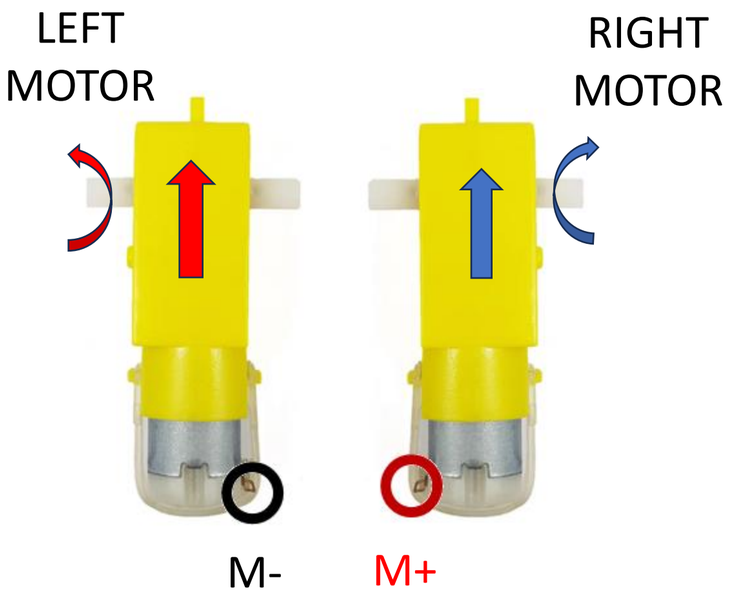
ROBOT RIGHT DIRECTION (-y)

ROBOT FRONT DIRECTION (-x)

Forward Movement Code

Reverse Bias

Normal Bias



Normal Voltage Supply
(M+ to 5V, M- to 0V)

Reverse Voltage Supply
(M+ to 0 V M- to 5V)

```
if(!strcmp(variable, "forward")) {
  Serial.println("Forward");
  digitalWrite(MOTOR_1_PIN_1, 1);  // Normal Voltage
  digitalWrite(MOTOR_1_PIN_2, 0);
  digitalWrite(MOTOR_2_PIN_1, 0);  // Reverse Voltage
  digitalWrite(MOTOR_2_PIN_2, 1);
 }


void robot_fwd()
{
 digitalWrite(LEFT_M0,HIGH);  // Normal Voltage
 digitalWrite(LEFT_M1,LOW);
 digitalWrite(RIGHT_M0,LOW);  // Reverse Voltage
 digitalWrite(RIGHT_M1,HIGH);
 move_interval=250;
 previous_time = millis();
}
```

Backward Movement

Reverse Bias

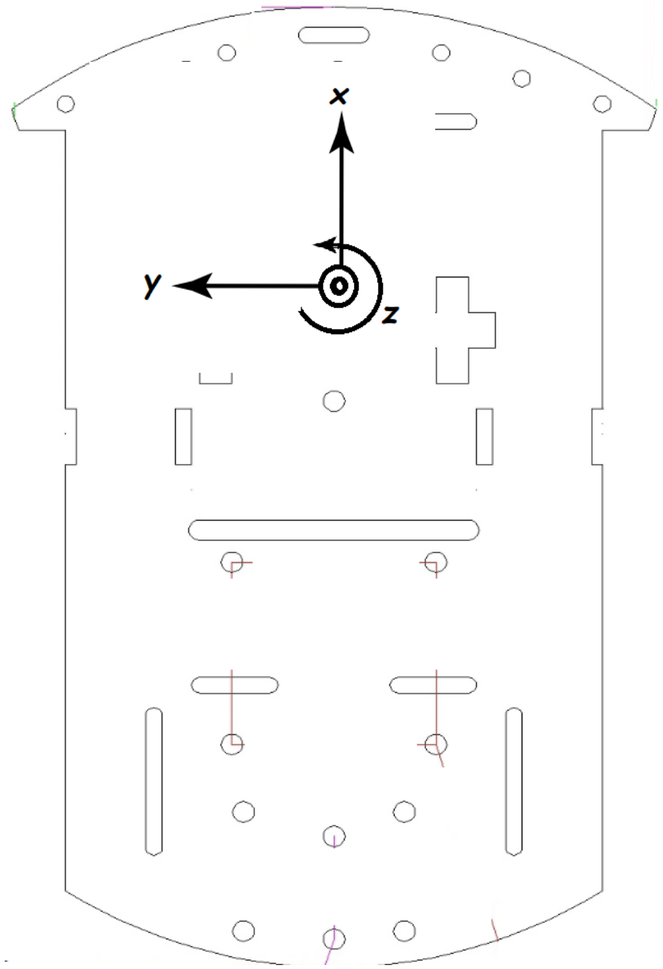
Normal Bias

ROBOT FRONT DIRECTION (+x)

LEFT MOTOR

Reverse Voltage Supply
(M+ to 0 V, M- to 5V)

M-



RIGHT MOTOR

Normal Voltage Supply
(M+ to 5V, M- to 0V)

M+

ROBOT LEFT DIRECTION (+y)

ROBOT RIGHT DIRECTION (-y)

ROBOT FRONT DIRECTION (-x)

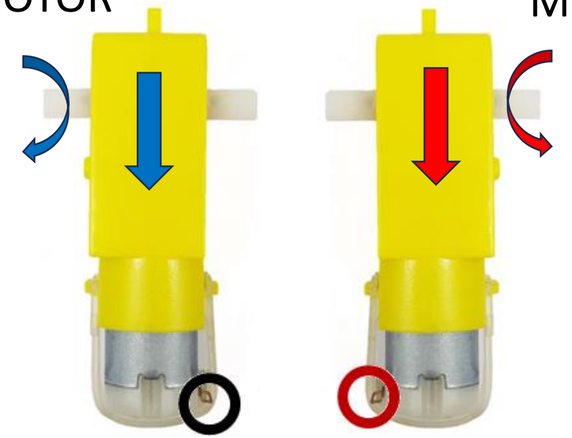
Backward Movement Code

Reverse Bias

Normal Bias

LEFT MOTOR

RIGHT MOTOR



M-

M+

Reverse Voltage Supply
(M+ to 0 V M- to 5V)

Normal Voltage Supply
(M+ to 5V, M- to 0V)

```
if(!strcmp(variable, "forward")) {
  Serial.println("Forward");
  digitalWrite(MOTOR_1_PIN_1, 0);  // Reverse Voltage
  digitalWrite(MOTOR_1_PIN_2, 1);
  digitalWrite(MOTOR_2_PIN_1, 1);  // Normal Voltage
  digitalWrite(MOTOR_2_PIN_2, 0);
 }
```

```
void robot_fwd()
{
 digitalWrite(LEFT_M0, LOW);  // Reverse Voltage
 digitalWrite(LEFT_M1, HIGH);
 digitalWrite(RIGHT_M0, HIGH);  // Normal Voltage
 digitalWrite(RIGHT_M1, LOW);
 move_interval=250;
 previous_time = millis();
}
```

CCW Rotation

Reverse Bias

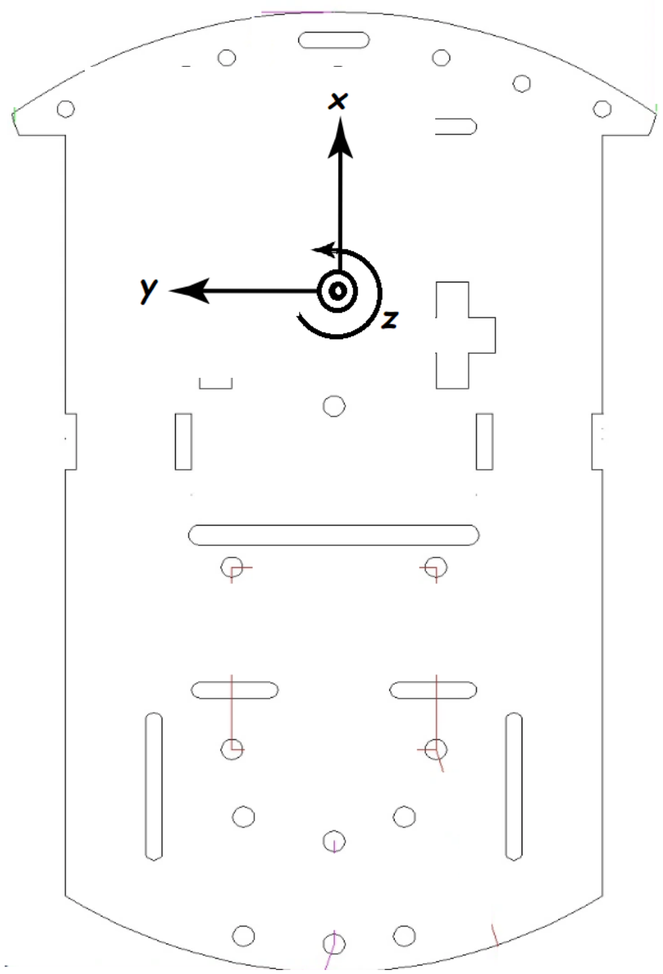
Normal Bias

ROBOT FRONT DIRECTION (+x)

LEFT MOTOR

RIGHT MOTOR

Reverse Voltage Supply
(M+ to 0 V, M- to 5V)



Reverse Voltage Supply
(M+ to 0 V, M- to 5V)

M-

M+

ROBOT LEFT DIRECTION (+y)

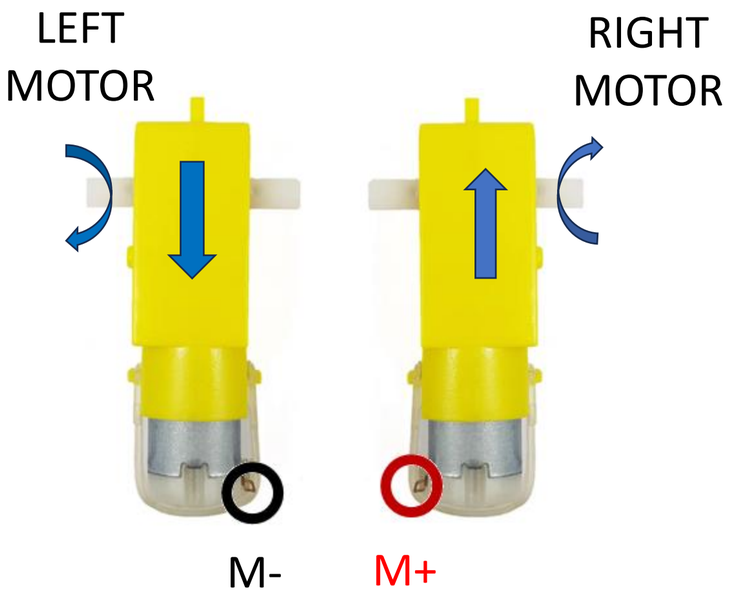
ROBOT RIGHT DIRECTION (-y)

ROBOT FRONT DIRECTION (-x)

CCW Rotation Code

Reverse Bias

Normal Bias



Reverse Voltage Supply
(M+ to 0 V M- to 5V)

Reverse Voltage Supply
(M+ to 0 V M- to 5V)

```
if(!strcmp(variable, "forward")) {
  Serial.println("Forward");
  digitalWrite(MOTOR_1_PIN_1, 0);  // Reverse Voltage
  digitalWrite(MOTOR_1_PIN_2, 1);
  digitalWrite(MOTOR_2_PIN_1, 0);  // Reverse Voltage
  digitalWrite(MOTOR_2_PIN_2, 1);
 }


void robot_fwd()
{
 digitalWrite(LEFT_M0, LOW);  // Reverse Voltage
 digitalWrite(LEFT_M1, HIGH);
 digitalWrite(RIGHT_M0, LOW);  // Reverse Voltage
 digitalWrite(RIGHT_M1, HIGH);
 move_interval=250;
 previous_time = millis();
}
```

CW Rotation

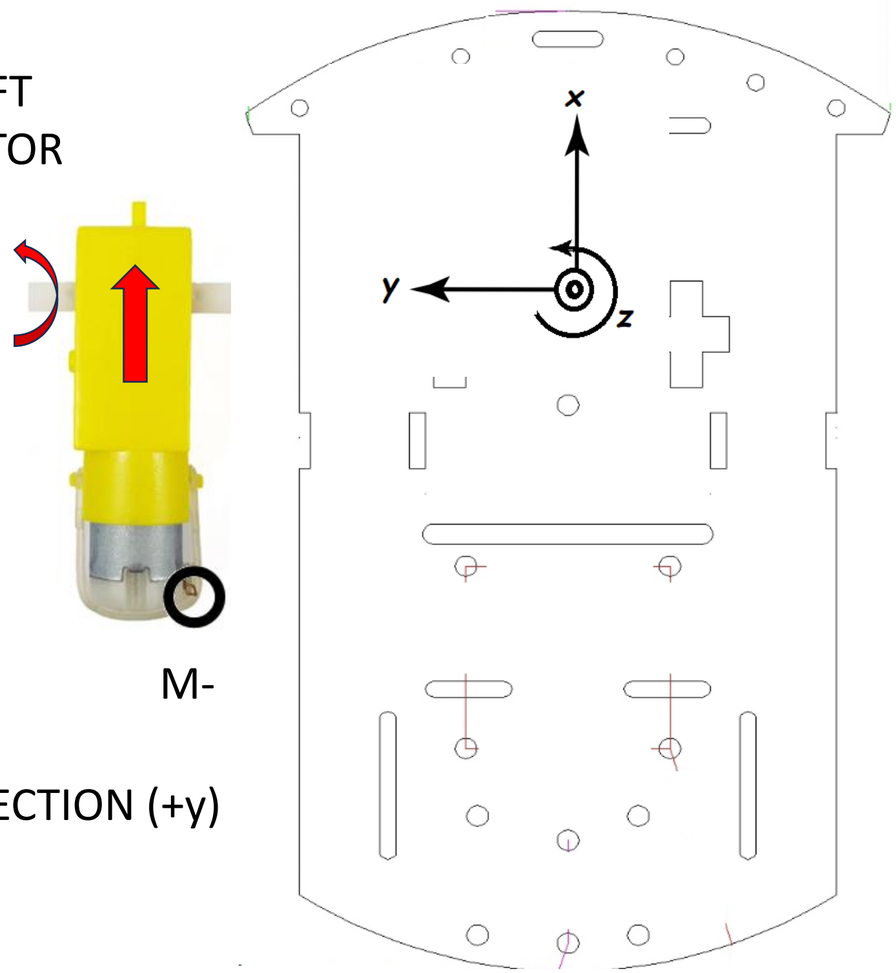
Reverse Bias

Normal Bias

ROBOT FRONT DIRECTION (+x)

LEFT MOTOR

RIGHT MOTOR



Normal Voltage Supply
(M+ to 5V, M- to 0V)

Normal Voltage Supply
(M+ to 5V, M- to 0V)

M-

M+

ROBOT LEFT DIRECTION (+y)

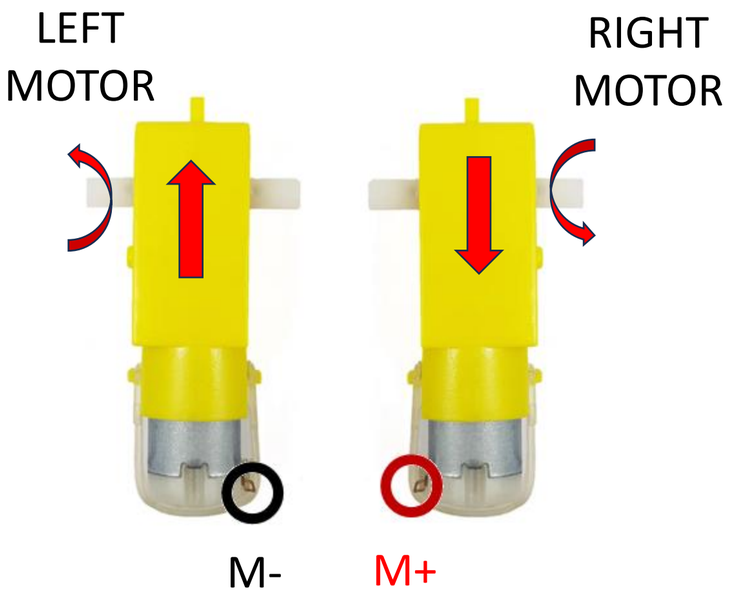
ROBOT RIGHT DIRECTION (-y)

ROBOT FRONT DIRECTION (-x)

CW Rotation Code

Reverse Bias

Normal Bias



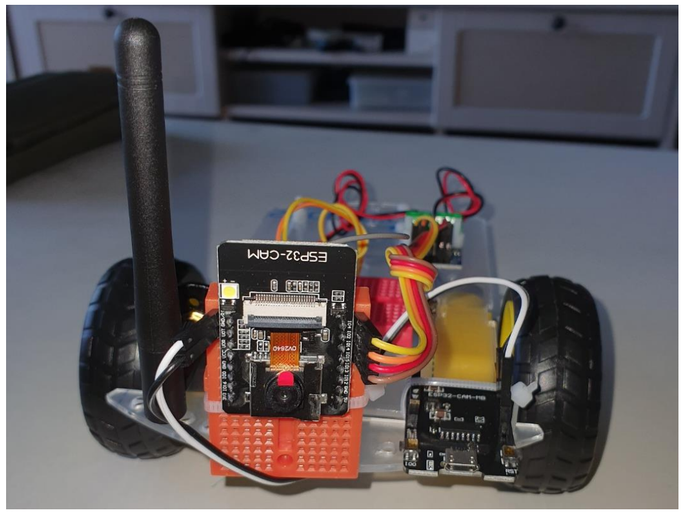
Normal Voltage Supply
(M+ to 5V, M- to 0V)

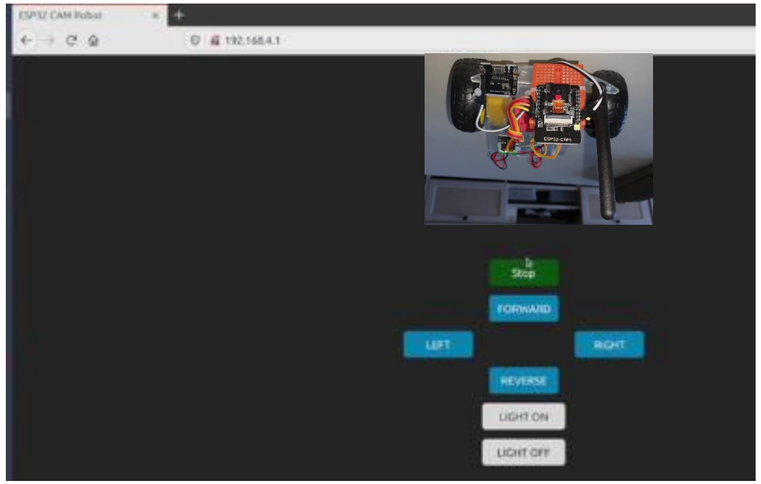
Normal Voltage Supply
(M+ to 5V, M- to 0V)

```
if(!strcmp(variable, "forward")) {
  Serial.println("Forward");
  digitalWrite(MOTOR_1_PIN_1, 1);  // Normal Voltage
  digitalWrite(MOTOR_1_PIN_2, 0);
  digitalWrite(MOTOR_2_PIN_1, 1);  // Normal Voltage
  digitalWrite(MOTOR_2_PIN_2, 0);
 }


void robot_fwd()
{
 digitalWrite(LEFT_M0, HIGH);  // Normal Voltage
 digitalWrite(LEFT_M1, LOW);
 digitalWrite(RIGHT_M0, HIGH);  // Normal Voltage
 digitalWrite(RIGHT_M1, LOW);
 move_interval=250;
 previous_time = millis();
}
```

Vertical Flip

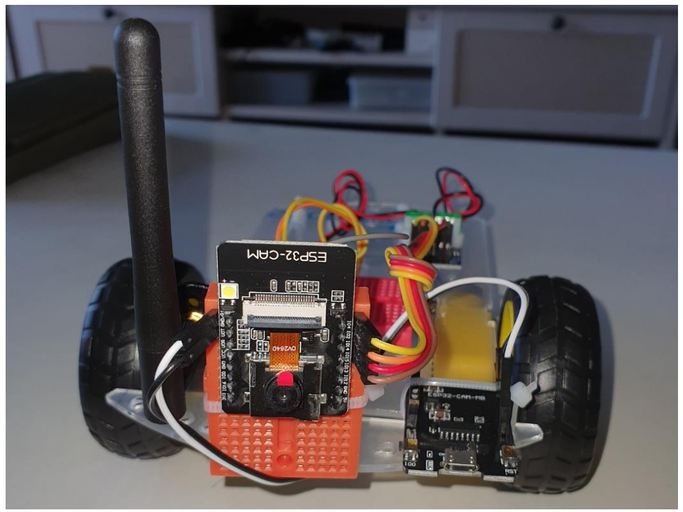




At “esp32cam-robot.ino”

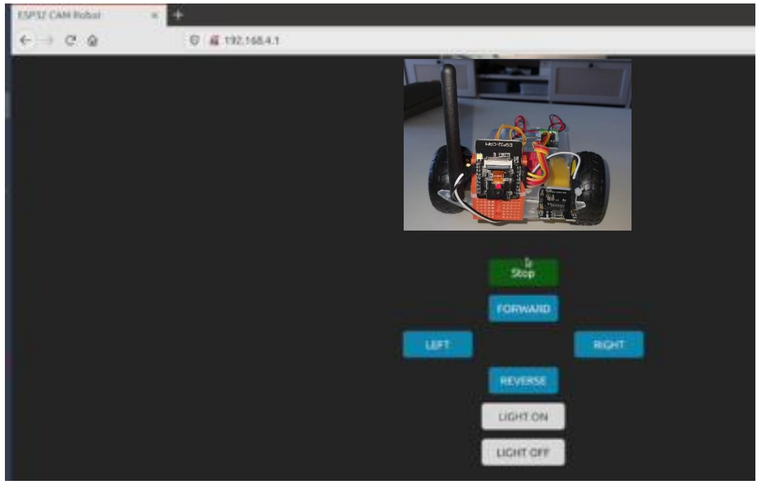
```
//drop down frame size for higher initial frame rate
 sensor_t * s = esp_camera_sensor_get();
 s->set_framesize(s, FRAMESIZE_QVGA);
 s->set_vflip(s 0);                                    // original code was “s->set_vflip(s, 1);”
 s->set_hmirror(s, 1);
```

ESP32CAM ROBOT



Target

RandomNerdTutorial.com



Dronebotworkshop.com