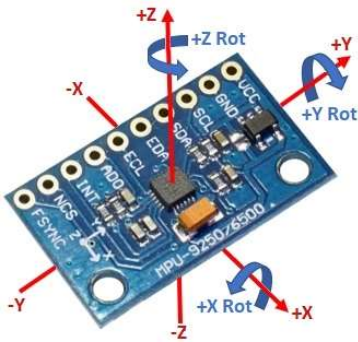


# MPU6050\_light library test



9/16/2023

Sangwon Lee

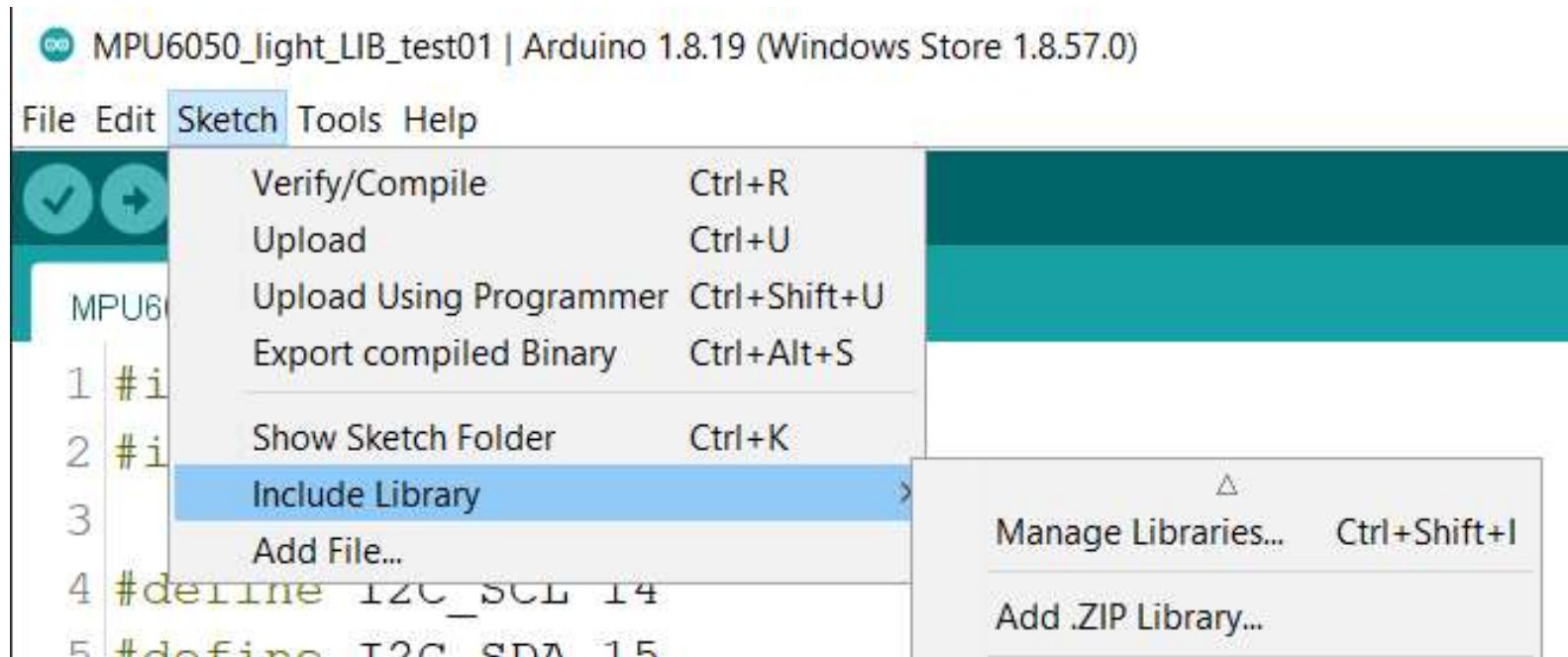
```
COM6

rst:0x1 (POWERON_RESET),boot:0x13 (SPI_FAST_FLASH_BOOT)
configsip: 0, SPIWP:0xee
clk_drv:0x00,q_drv:0x00,d_drv:0x00,cs0_drv:0x00,hd_drv:0x00,wp_drv:0x00
mode:DIO, clock div:1
load:0x3fff0018,len:4
load:0x3fff001c,len:1216
ho 0 tail 12 room 4
load:0x40078000,len:9720
ho 0 tail 12 room 4
load:0x40080400,len:6352
entry 0x400806b8
MPU6500 ADDR SCAN PROCESS starts !!
Found address: 104 (0x68)
0x75: MPUxxxx ID = 68
MPU6500 initialization is finished.
ACx = 0.00 ACy = 0.00 ACz = 1.00 GYx = -1.15 GYy = 0.21 GYz = -0.05 temp = 25.82
ACx = 0.00 ACy = -0.00 ACz = 1.00 GYx = -1.13 GYy = 0.19 GYz = -0.05 temp = 25.92
ACx = 0.00 ACy = -0.00 ACz = 1.01 GYx = -1.11 GYy = 0.18 GYz = -0.05 temp = 25.78
<
Autoscroll Show timestamp Newline 115200 baud Clear output
```

## Contents

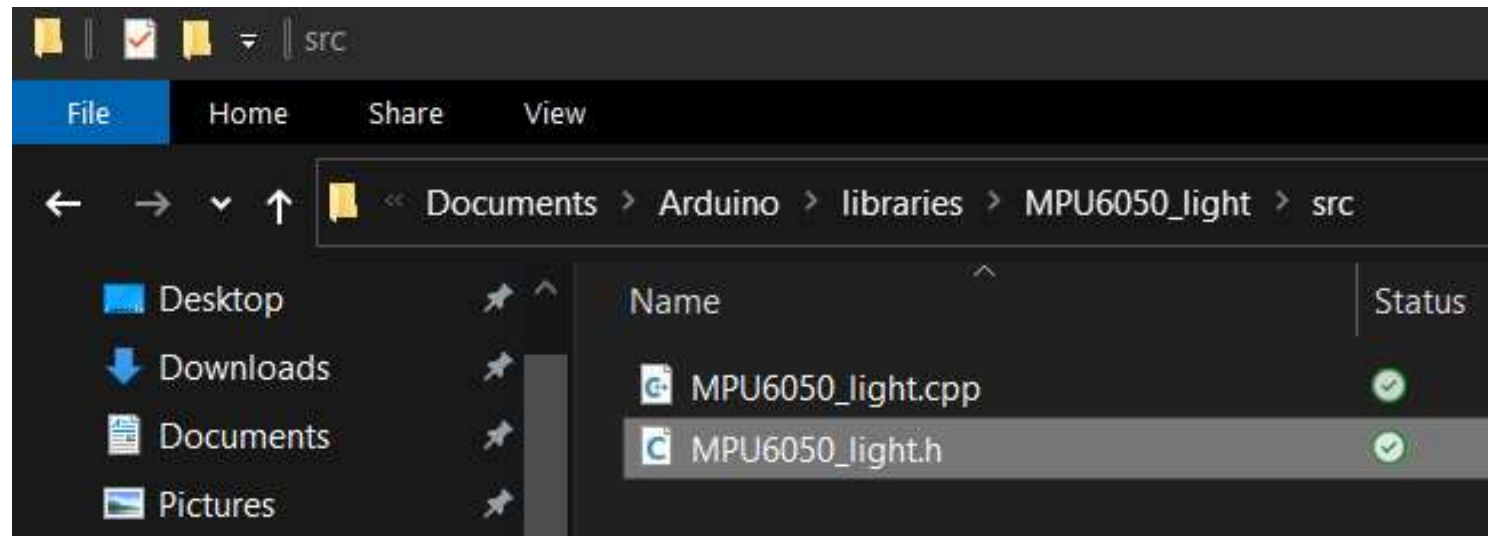
- ☐ Install MPU6050\_light library
- ☐ Functions
- ☐ Connection
- ☐ Test Code Review
- ☐ Test on Serial Monitor
- ☐ Rotation and Output Values
- ☐ Problem

## Install MPU6050\_light Library



- Sketch > Include Library > Add .ZIP Library...
- Select MPU6050.zip

## Install MPU6050\_light Library



- Check folder ( Documents > Arduino > libraries > MPU6050\_light > src

## Functions

```
uint8_t MPU6050::begin(TwoWire &w, int gyro_config_num, int acc_config_num);
```

```
uint8_t MPU6050::writeData(byte reg, byte data);
```

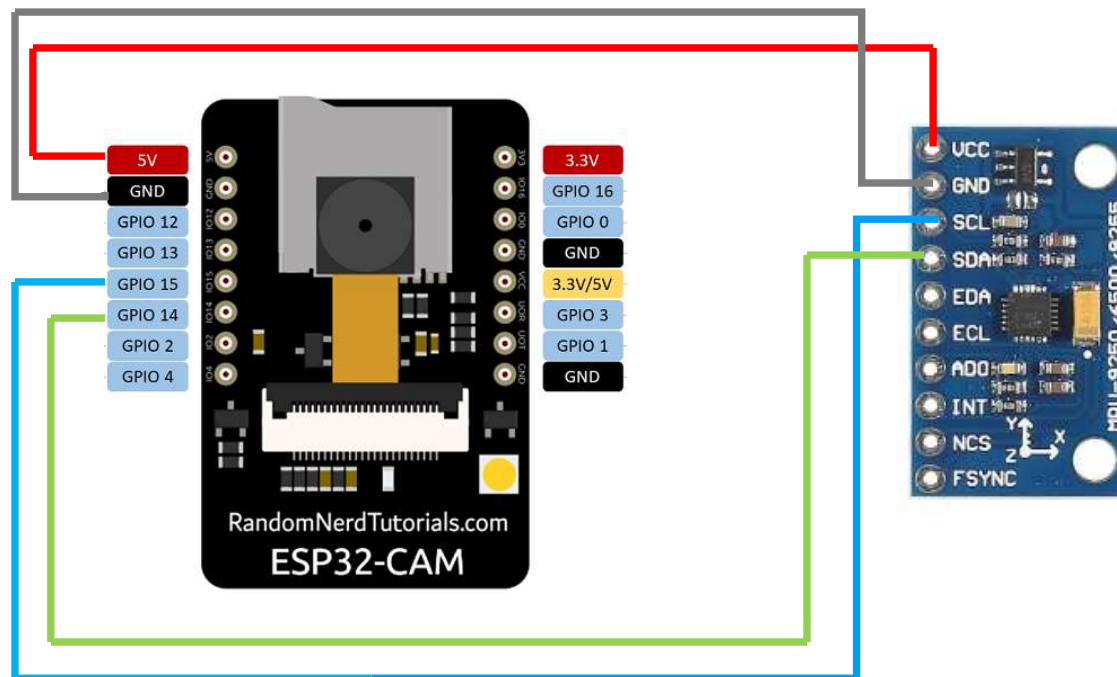
```
byte MPU6050::readData(byte reg);
```

```
void MPU6050::fetchData(); // read 14 bytes raw data
```

```
void MPU6050::update(); // call MPU6050.fetch() and raw data conversion
```

```
float getABCD() { return ABCD; }; // after calling MPU6050.fetchData()
```

## Connection between ESP32-CAM and MPU6500



## Test Code Review 1

```
1 #include <MPU6050_light.h>
2 #include <Wire.h>
3
4 #define I2C_SCL 14
5 #define I2C_SDA 15
6 #define I2C_Freq 100000
7
8 int mpu6500_addr = 0;
9
10 TwoWire I2C_MPU6500 = TwoWire(0); // For alternative I2C pin allocation
11 MPU6050 mpu6500; // New MPU6050 object construction
12
13 void setup() {
14
15     uint8_t tmp_reg_val;
16
17     Serial.begin(115200);
18     Serial.println(" MPU6500 ADDR SCAN PROCESS starts !! ");
19 }
```

## Test Code Review 2

```
20 I2C_MPU6500.begin(I2C_SDA, I2C_SCL, I2C_Freq); // Initialize the alternative I2C pin
21
22 for(int i = 8; i < 126; i++)
23 {
24     I2C_MPU6500.beginTransmission(i);
25     if (I2C_MPU6500.endTransmission() == 0)
26     {
27         Serial.print("Found address: ");
28         Serial.print(i, DEC); Serial.print (" (0x");
29         Serial.print(i, HEX); Serial.println (")");
30         mpu6500_addr = i;
31     }
32 }
33
34 mpu6500.setAddress(mpu6500_addr); // setting new i2c address
35 byte status = mpu6500.begin(I2C_MPU6500, 0, 0); // Initialize mpu6050 i2c object
36 tmp_reg_val = mpu6500.readData(0x75); // WHOAMI device ID verify
37
38 Serial.printf(" 0x75: MPUxxxx ID = %02x \r\n", tmp_reg_val);
```



## Test Code Review 3

```
42  mpu6500.upsideDownMounting = false;
43  mpu6500.calcOffsets();
44  Serial.println("MPU6500 initialization is clear.");
45
46 }
47
48 void loop() {
49
50  mpu6500.update();
51
52  Serial.printf("ACx = %5.2f ", mpu6500.getAccX());
53  Serial.printf("ACy = %5.2f ", mpu6500.getAccY());
54  Serial.printf("ACz = %5.2f ", mpu6500.getAccZ());
55
56  Serial.printf("GYx = %5.2f ", mpu6500.getAngleX());
57  Serial.printf("GYy = %5.2f ", mpu6500.getAngleY());
58  Serial.printf("GYz = %5.2f ", mpu6500.getAngleZ());
59
60  Serial.printf("temp = %3.2f ", mpu6500.getTemp());
61  Serial.println(" ");
62
63  delay(50);
64
65 }
```

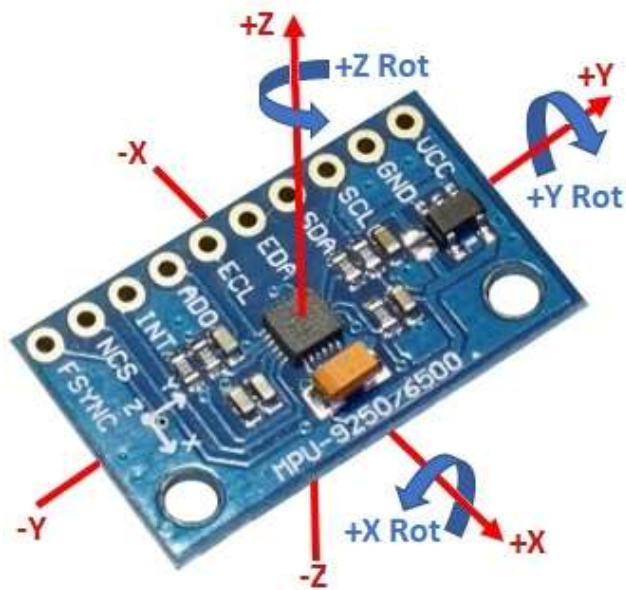
## Serial Monitor Display

```
MPU6500 ADDR SCAN PROCESS starts !!  
Found address: 104 (0x68)    I2c address is 0x68  
0x75: MPUxxxx ID = 68      MPU6050 device ID is 0x68  
MPU6500 initialization is finished.  
ACx = 0.00 ACy = 0.00 ACz = 1.00 GYx = -1.15 GYy = 0.21 GYz = -0.05 temp = 25.82  
ACx = 0.00 ACy = -0.00 ACz = 1.00 GYx = -1.13 GYy = 0.19 GYz = -0.05 temp = 25.92  
ACx = 0.00 ACy = -0.00 ACz = 1.01 GYx = -1.11 GYy = 0.18 GYz = -0.05 temp = 25.78  
ACx = -0.00 ACy = 0.00 ACz = 1.00 GYx = -1.08 GYy = 0.18 GYz = -0.05 temp = 25.82  
ACx = -0.00 ACy = -0.00 ACz = 0.99 GYx = -1.07 GYy = 0.18 GYz = -0.05 temp = 25.82  
ACx = -0.00 ACy = -0.00 ACz = 0.99 GYx = -1.04 GYy = 0.18 GYz = -0.05 temp = 25.87  
ACx = -0.00 ACy = -0.00 ACz = 1.00 GYx = -1.02 GYy = 0.18 GYz = -0.05 temp = 25.87  
ACx = 0.01 ACy = 0.00 ACz = 1.00 GYx = -1.00 GYy = 0.17 GYz = -0.05 temp = 25.87
```

☐ Autoscroll ☐ Show timestamp

Newline ▼ 115200 baud ▼ Clear output

## X rotation and output

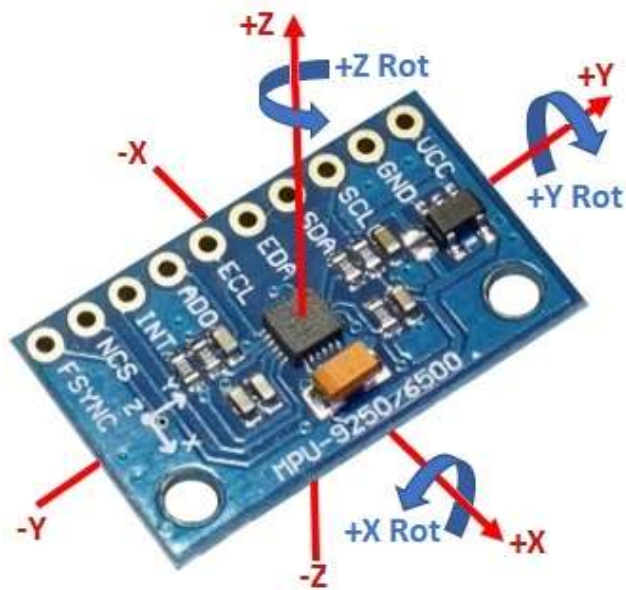


+X CCW rotation -> angle increment

+X CW rotation -> angle reduction

|       |       |       |      |       |      |
|-------|-------|-------|------|-------|------|
| GYx = | 90.05 | GYy = | 0.21 | GYz = | 0.05 |
| GYx = | 89.03 | GYy = | 0.19 | GYz = | 0.05 |
| GYx = | 88.01 | GYy = | 0.18 | GYz = | 0.05 |

## Y rotation and output

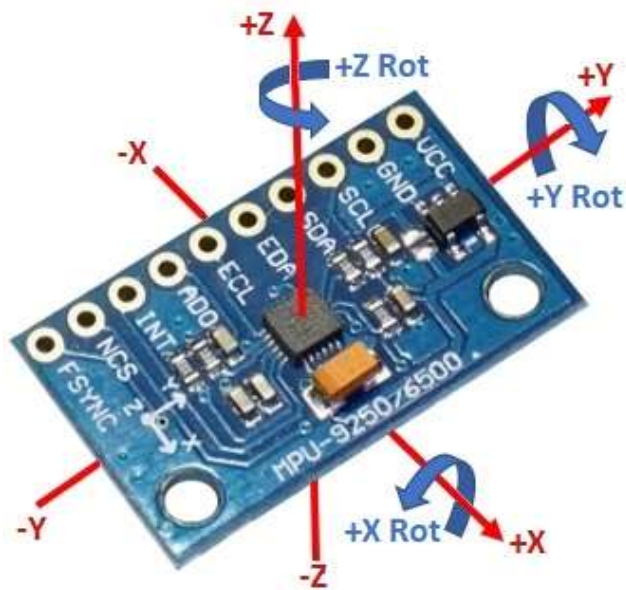


+Y CCW rotation -> angle increment

+Y CW rotation -> angle reduction

|       |       |       |       |       |       |
|-------|-------|-------|-------|-------|-------|
| GYx = | -1.15 | GYy = | 92.31 | GYz = | -0.05 |
| GYx = | -1.13 | GYy = | 78.19 | GYz = | -0.05 |
| GYx = | -1.11 | GYy = | 82.78 | GYz = | -0.05 |

## Z rotation and output



+Z CCW rotation -> angle increment

+Z CW rotation -> angle reduction

|       |      |       |      |       |       |
|-------|------|-------|------|-------|-------|
| GYx = | 1.08 | GYy = | 1.02 | GYz = | 99.15 |
| GYx = | 1.07 | GYy = | 0.18 | GYz = | 82.05 |
| GYx = | 1.04 | GYy = | 0.18 | GYz = | 87.08 |

## Problems

- ❑ After calling `webserver()` or `websocket()`, `'MPU6050.update()'` causes system reset due to the memory overflow.