Step 0. What is MPU6050?

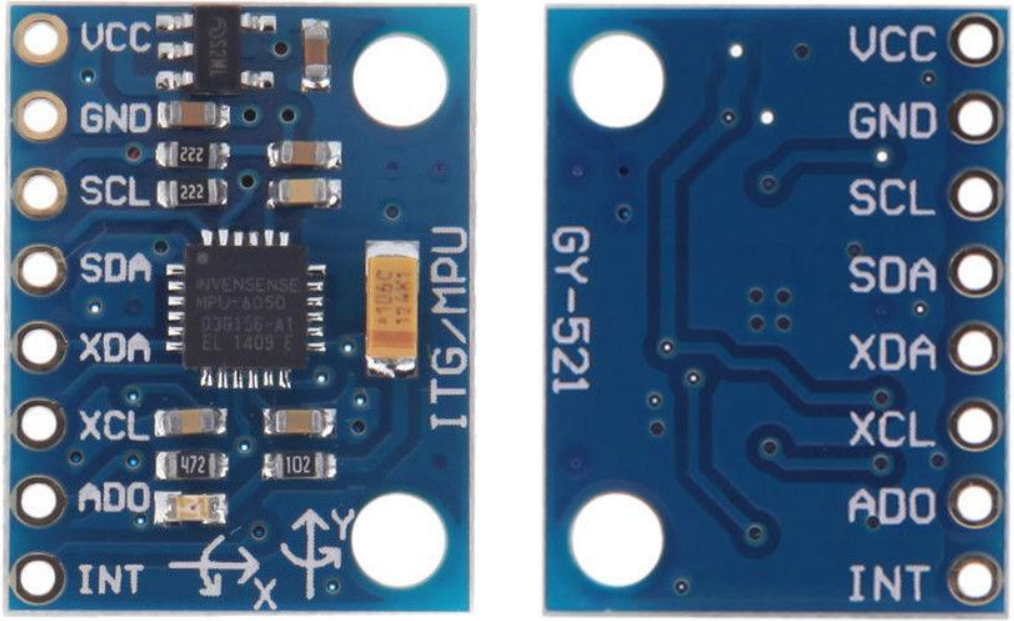
The MPU 6050 is the world's first integrated 6-axis MotionTracking device that combines a 3-axis gyroscope, 3-axis accelerometer, and a Digital Motion Processor™ (DMP) all in a small 4x4x0.9mm package. With its dedicated I2C sensor bus, it can directly accepts inputs from an external 3-axis compass to provide a complete 9-axis MotionFusion™ output.

In short: I2C accelerometer and gyroscope.

Product Specificationt:
https://www.invensense.com/wp-content/uploads/2015/02/MPU-6000-Datasheet1.pdf

Register Map and Descriptions
https://invensense.tdk.com/wp-content/uploads/2015/02/MPU-6000-Register-Map1.pdf

Board GY-521 with MPU6050 (https://playground.arduino.cc/Main/MPU-6050):



Documentation

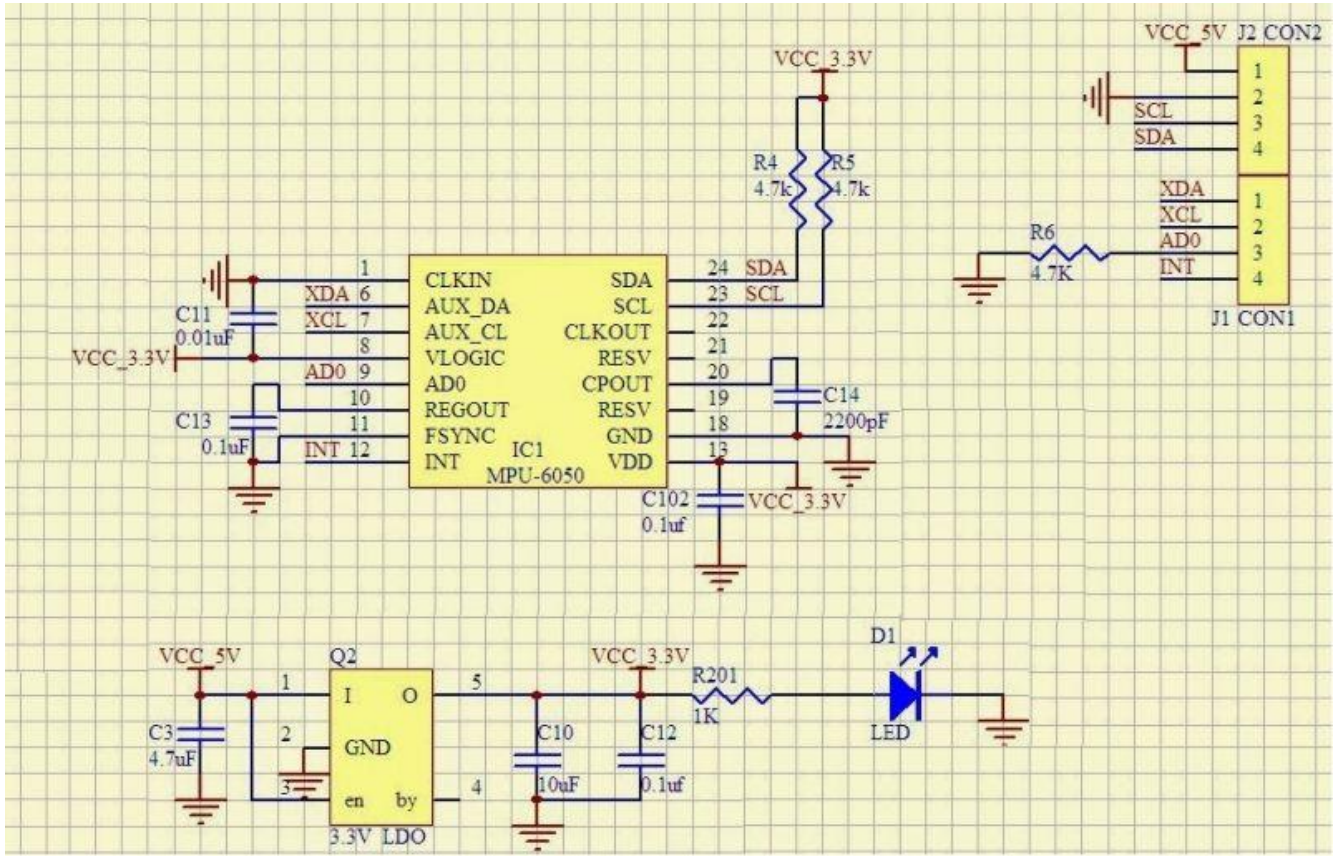
GY-521 board general information

https://artofcircuits.com/product/6dof-gy-521-mpu6050-3-axis-gyro-and-3-axis-accelerometer

Tutorial about gpio programming
http://derekmolloy.ie/kernel-gpio-programming-buttons-and-leds/

Register map in compact format with links
https://www.i2cdevlib.com/devices/mpu6050#registers

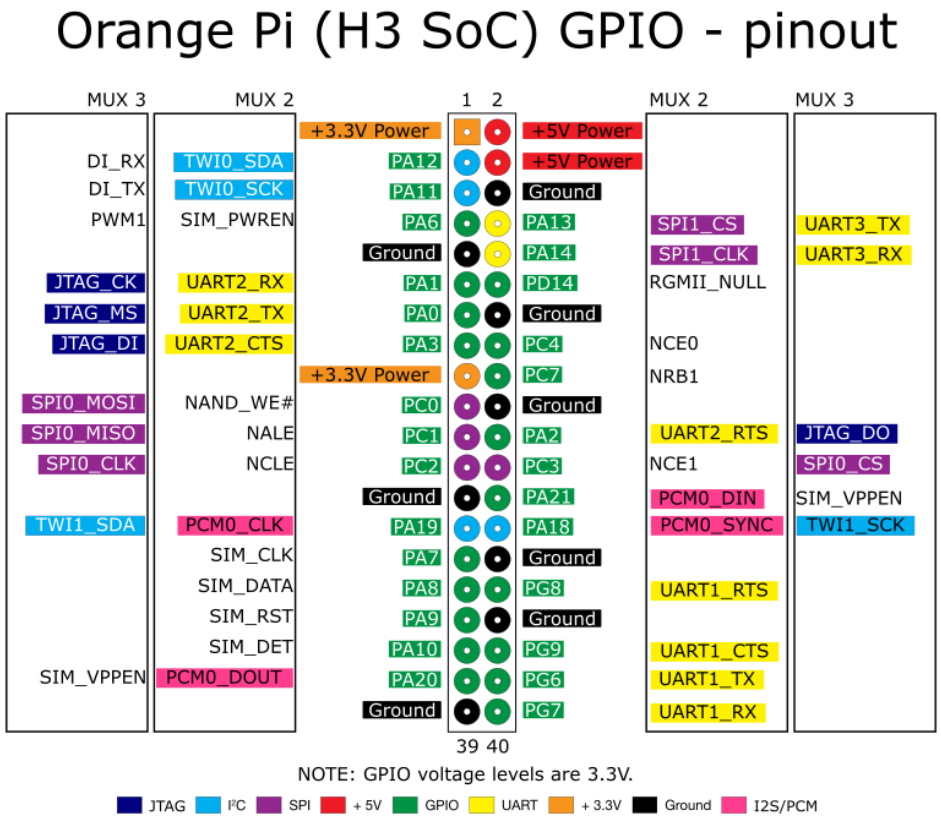
GY-521 board schematic



Connection to OrangePI One

GY-521

VCC	<- +5V Power
GND	<- Ground
SCL	<- TWI0_SCK
SDA	<-> TWI0_SDA
XDA	<-> n/c
XCL	-> n/c
AD0	<- Ground
INT	-> PA6



Detect device

- $ sudo apt-get install i2c-tools

- $ i2cdetect -y 1

```
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- 68 -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
```

Reading WHO_AM_I register

- I2C Bus address: 1
- Device address: 0x68
- Register WHO_AM_I address: 0x75 (117 dec)

- $ sudo i2cget -y 1 0x68 0x75

- Return: 0x68

Power on

- i2cset -y 1 0x68 0x6B 0x01

https://openest.io/en/2020/01/21/mpu6050-accelerometer-on-raspberry-pi/

Reading Temperature registers

- Register TEMP_OUT_H address: 0x41 (65)
- Register TEMP_OUT_L address: 0x42 (66)

- $ i2cget -y 1 0x68 0x41 **w**

- Return: TEMP_OUT (Signed 16-bit Register Value)

- Convertion to degrees C:

$$t = TEMP_OUT / 340 + 36.53$$