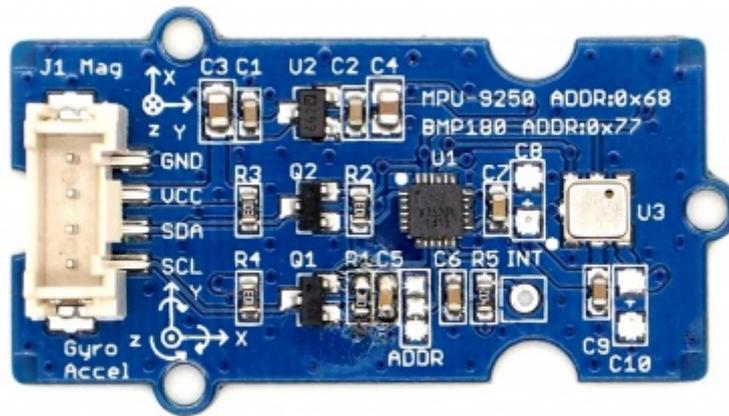


Grove - IMU 10DOF

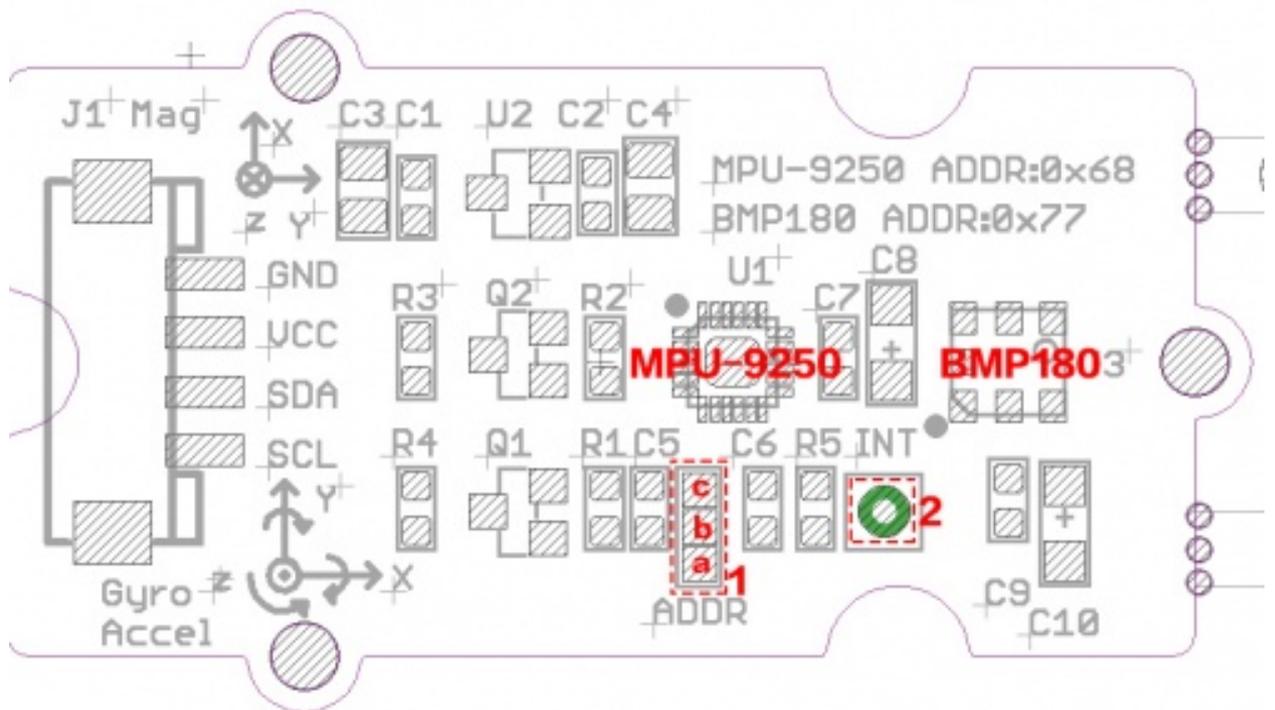


Grove - IMU 10DOF is a combination of [Grove - IMU 9DOF](#) and [Grove - Barometer Sensor \(BMP180\)](#). This module is based on MPU-9250 and BMP180, the MPU-9250 is a 9-axis MotionTracking device that combines a 3-axis gyroscope, 3-axis accelerometer, 3-axis magnetometer and a Digital Motion Processor(DMP), and BMP180 is a high precision, ultra-low power digital pressure sensors for consumer applications. This module is very suitable for the application of smartphones, tablets and wearable devices.

Specification

- I2C interface
- MPU-9250 I2C address selectable
- Low Power Consumption
- 400kHz Fast Mode I2C for communicating with all registers
- Digital-output X-, Y-, and Z-Axis angular rate sensors (gyroscopes) with a user-programmable full-scale range of ± 250 , ± 500 , ± 1000 , and $\pm 2000^\circ/\text{sec}$
- Digital-output 3-Axis accelerometer with a programmable full scale range of $\pm 2g$, $\pm 4g$, $\pm 8g$ and $\pm 16g$
- Digital-output magnetometer with a full scale range of $\pm 4800\mu\text{T}$
- Digital-output barometer with range of $300 \sim 1100\text{hPa}$ ($+9000\text{m} \sim -500\text{m}$ relating to sea level)
- Dimensions: 25.43mm x 20.35mm

Interface Function

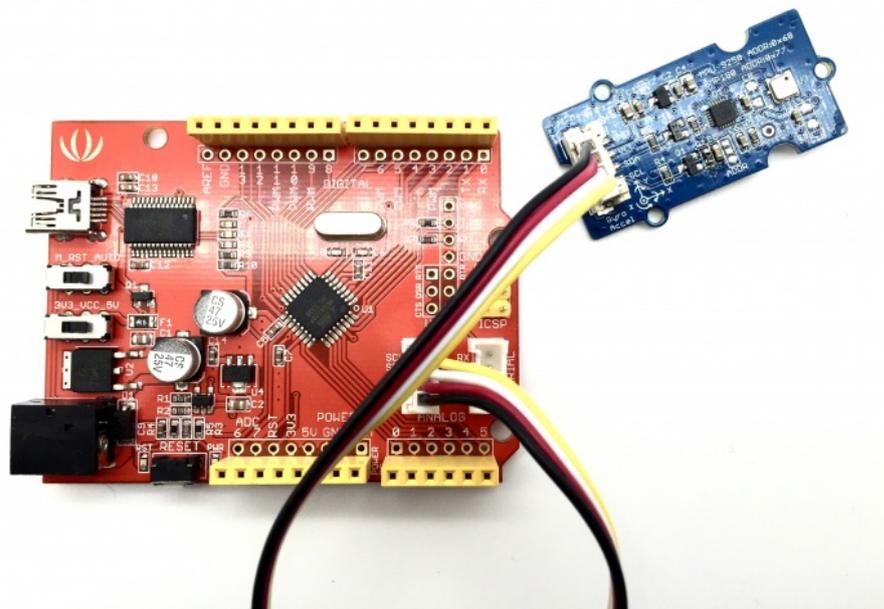


- 1 : MPU-9250 I2C address select Pad, default connected a and b address is 0x68, if connect b and c address is 0x69
- 2 : MPU-9250 interrupt pin, the interrupt should be configured, available interrupt sources are: motion detection, fifo overflow, data ready, i2c master error

Usage

We will provide an example here to show you how to use this sensor.

Hardware Installation



Software Setup

- 1) Download the library from https://github.com/Seeed-Studio/IMU_10DOF
- 2) Unzip it into the libraries file of Arduino IDE by the path
- 3) Open the code directly by the path: File -> Example -> IMU_10DOF_Test
- 4) Upload the code. Note that you should select the correct board type and COM port.

You can see:

```
Initializing I2C devices...
Testing device connections...
MPU9250 connection successful

calibration parameter:
0.00      0.00      0.00

Acceleration(g) of X,Y,Z:
0.32,0.31,0.90
Gyro(degrees/s) of X,Y,Z:
-4.28,-1.14,0.29
Compass Value of X,Y,Z:
2.34,11.72,26.66
The clockwise angle between the magnetic north and X-Axis:
78.69
The clockwise angle between the magnetic north and the projection of the positive X-Axis in the horizontal plane:
157.28

Temperature: 23.30deg C
Pressure: 101430 Pa
Relative Humidity: 1.0010
Altitude: -8.74 m

calibration parameter:
```

Orientation of Axes

The diagram below shows the orientation of the axes of sensitivity and the polarity of rotation.

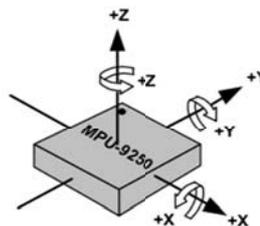


Figure 4. Orientation of Axes of Sensitivity and Polarity of Rotation for Accelerometer and Gyroscope

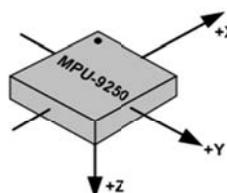


Figure 5. Orientation of Axes of Sensitivity for Compass