Overview

Hummingdrone 10-DOF IMU module is able to sense and measure 10 different parameters for movement and orientation tracking. Sensors used on this module are:

- LSM9DS1 9-DOF IMU
- BMP280

LSM9DS1 has a 3-axis accelerometer, a 3-axis gyroscope and a 3-axis magnetometer (digital compass) inside.

- Accelerometer: ±2/±4/±8/±16 g
- Gyroscope: ±245/±500/±2000 dps
- Magnetometer: ±4/±8/±12/±16 gauss

For more information LSM9DS1

BMP280 barometric pressure sensor is used for measuring atmospheric preassure to calculate altitude. It can also measure the temperature.

- Pressure measurement sensitivity: ±1 hPa
- Temperature measurement sensitivity: ±1.0°C

For more information BMP280

The module supports **I2C** and **SPI** interfaces.

It has a **logic level shifter** inside. Hence can be connected to both 3.3V and 5V logic level boards. For example: Raspberry Pi is a 3.3V logic level board while Arduino Uno is a 5V board. This module is able to be wired to both without a need for any external components.

Pin Descriptions

Power Pins:

- **Vin** – Sensors used on the module are 3V sensors, so the module has a regulator on it. This regulator lets us connect 3V to 5V input voltage to Vin pin. You should choose the same voltage level as your microcontroller while powering up your module. For example: If you are working with an Arduino Uno which has 5V logic level, you should connect 5V to Vin pin.
- **3V3** - You can feed the module with 3V3 trough this pin or you can get a 3V3 output from it while Vin is connected to a power source.
- **GND** - Ground pin

SPI Pins:

- **SCK** - SPI clock pin
- **SDO** - LSM9DS1 and BMP280 MISO pin
- **SDA** - LSM9DS1 and BMP280 MOSI pin
- **CSAG** - LSM9DS1 accel and gyro chip select pin (also known as SS / CS)
- **CSM** - LSM9DS1 magneto chip select pin
- **CSB** - BMP280 chip select pin

I2C Pins:

- **SCK** - I2C clock pin
- **SDA** - I2C data pin

Other Pins:

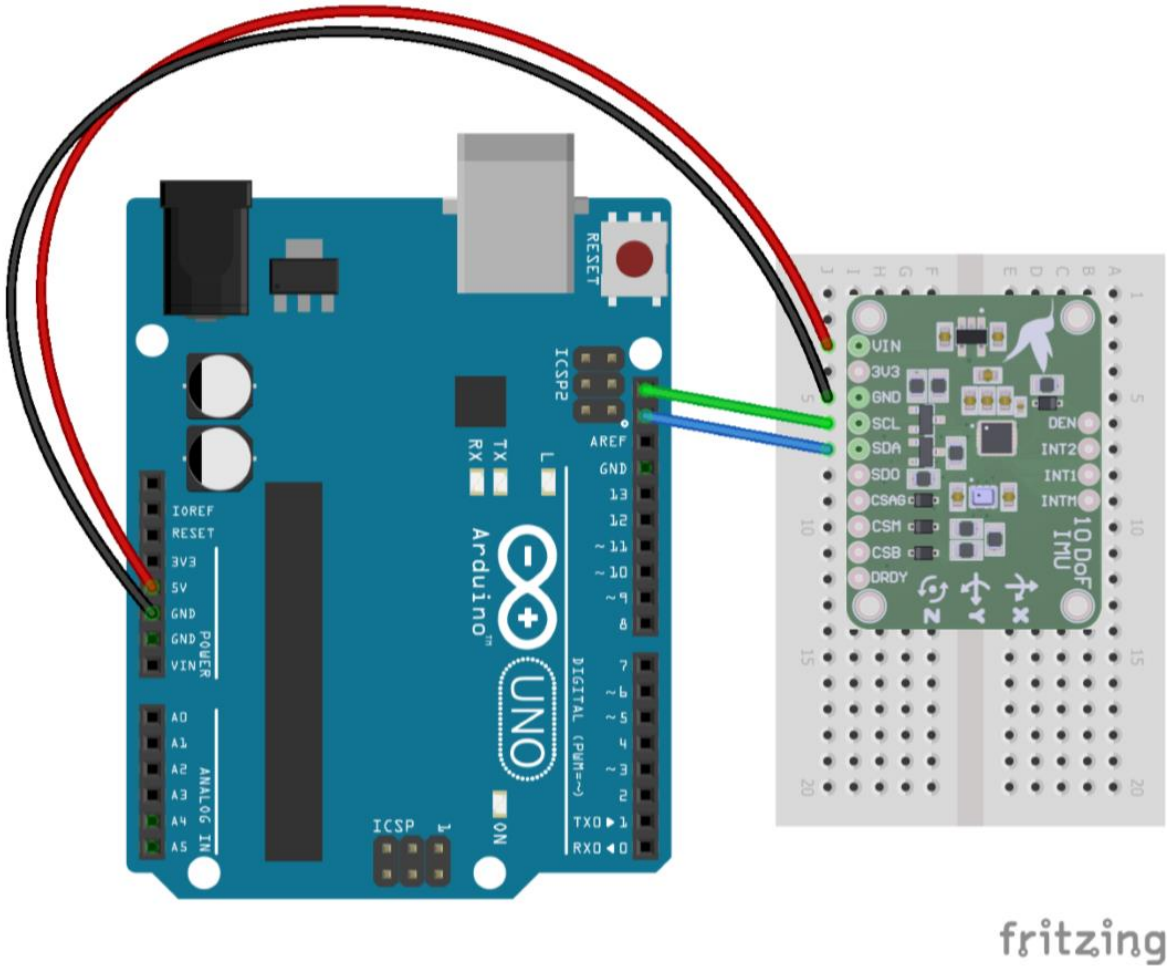
- **DRDY** – Accel and gyro data ready pin
- **DEN** – Accel and gyro enable/disable pin
- **INT1 & INT2** - Accel and gyro interrupt pins
- **INTM** – Magneto interrupt pin

For more information about all of the pins:

LSM9DS1
BMP280

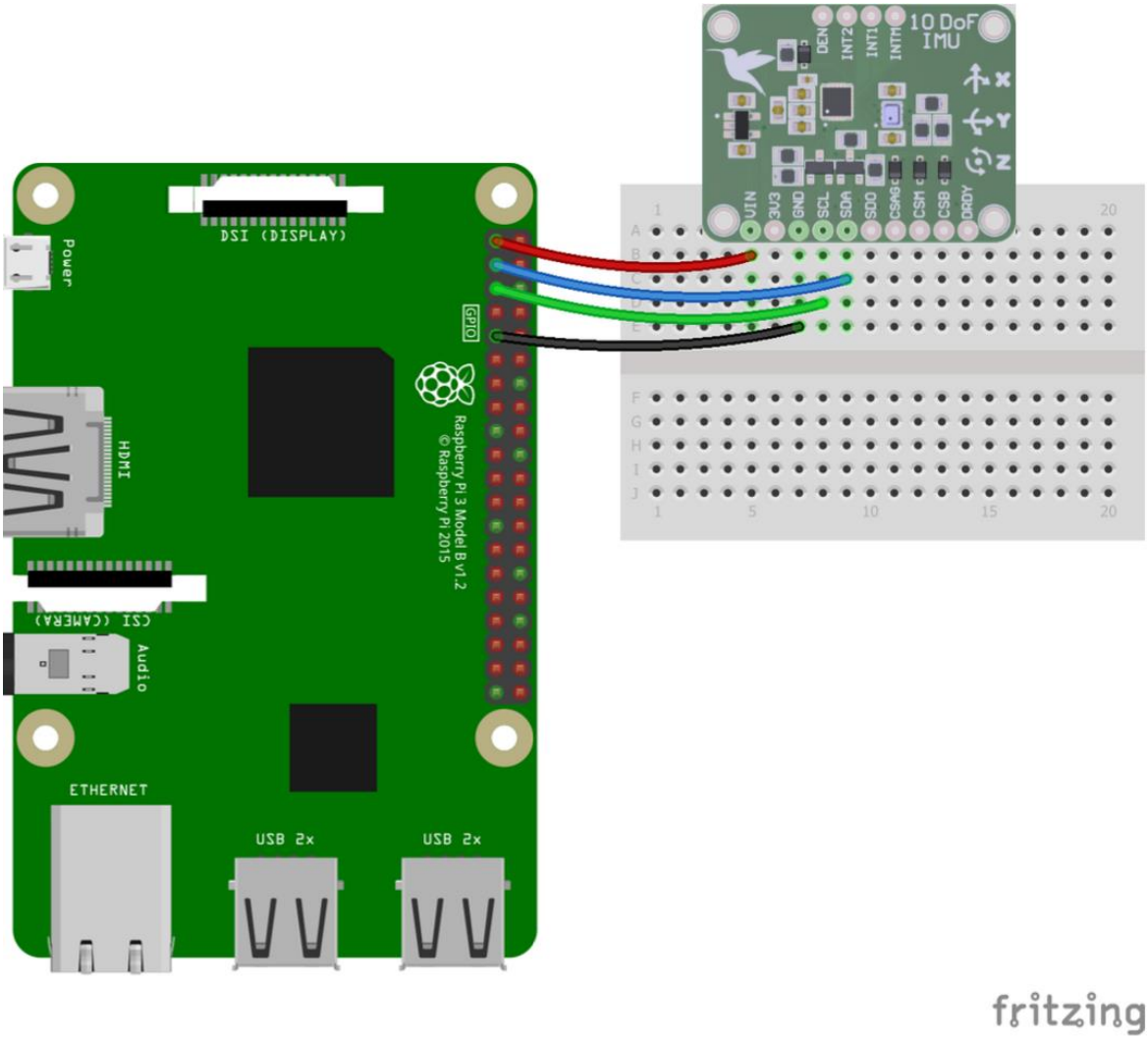
Wiring Diagrams

Arduino I2C



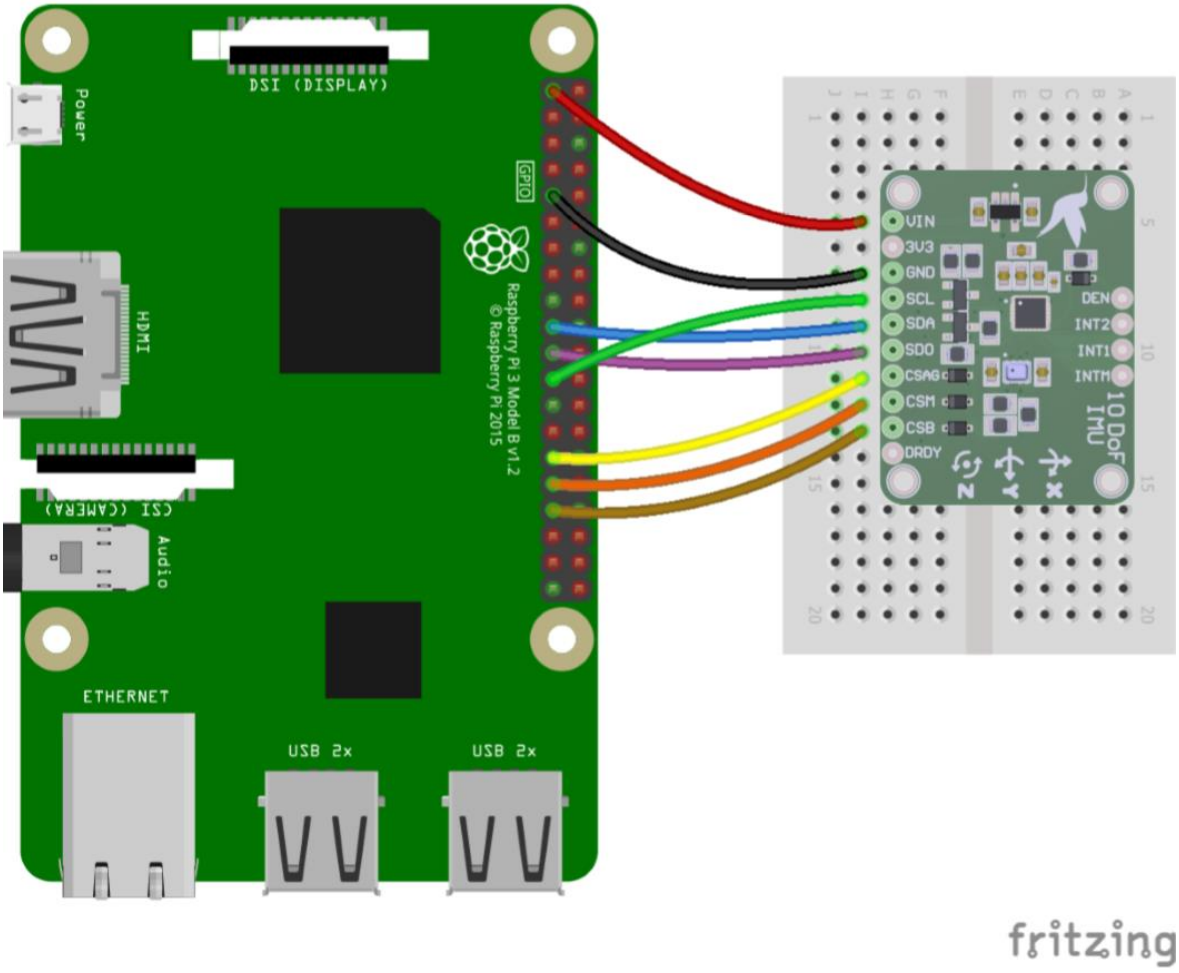
- **Vin** is connected to a **5V** power output on Arduino.
- **GND** is connected to **GND** on Arduino.
- **SCL** is connected to **SCL** on Arduino. Also for UNO **A5** pin can be used.
- **SDA** is connected to **SDA** on Arduino. Also for UNO **A4** pin can be used.

Raspberry I2C



- Connect RPi **3V3** pin to **Vin** pin on module.
- Connect RPi **GND** pin to **GND** pin on module.
- Connect RPi **SCL** pin to **SCL** pin on module.
- Connect RPi **SDA** pin to **SDA** pin on module..

Raspberry Pi SPI



- Connect RPi **3V3** pin to **VIN** pin on module.
- Connect RPi **GND** pin to **GND** pin on module.
- Connect RPi **SCLK** pin to **SCL** pin on module.
- Connect RPi **MOSI** pin to **SDA** pin on module.
- Connect RPi **MISO** pin to **SDO** pin on module.
- Connect RPi **GPIO5** pin to **CSAG** pin on module.
- Connect RPi **GPIO6** pin to **CSM** pin on module.
- Connect RPi **GPIO13** pin to **CSB** pin on module.

Technical Details

Dimentions: 33mm x 25mm x 1.6mm, Weight: 5g

Libraries

BMP280 Arduino library: Adafruit_BMP280_Library

LSM9DS1 Arduino library: SparkFun_LSM9DS1_Arduino_Library

BMP280 Raspberry Pi library: Adafruit_CircuitPython_BMP280

LSM9DS1 Raspberry Pi library: Adafruit_CircuitPython_LSM9DS1