10 DOF Sensor (SKU:SEN0140)

From Robot Wiki

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Introduction

At the beginning,the inertial measurement unit is an electronic device that measures and reports on a craft's velocity, orientation, and gravitational forces, using a combination of accelerometers,gyroscopes, and magnetometers. Now IMUs are commonly used in the Human-computer interaction(HCI), navigational purposes and balancing technology used in the Segway Personal Transporter as we all known.

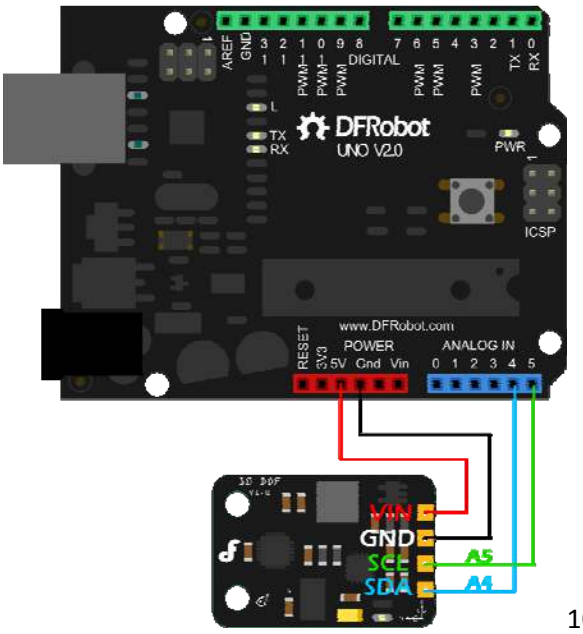
Applications

- Aircraft
- Balancing robots
- Indoor inertial navigation
- Altimeter
- Human–computer Interaction (HCI)

Specification

- Wide power input range from 3 to 8 volts
- Low noise LDO regulator
- Low cost IMU
- Interface: I2C
- M3x2 mounting holes for easily fixing in your mobile platforms,robots,HCI or UAVs
- LED power indication
- Integrate 10 dof sensors
    - Adxl345 accelerometer
    - ITG3200 gyro
    - HMC5883L Compass
    - BMP085 pressure sensor
- Compact size design and easy-to-use
- Compatible with Arduino controllers
- Electricity gold PCB
- Size: 26x18mm

Connection Diagram



10 Dof Connection Diagram

Example Code

Please download the libraries for the all the IMU sensors first!

```
#include <Wire.h>
#include <FreeSixIMU.h>
#include <FIMU_ADXL345.h>
#include <FIMU_ITG3200.h>
#include <HMC5883L.h>


float angles[3]; // yaw pitch roll
float heading;

short temperature;
long pressure;

// Set the FreeSixIMU object
FreeSixIMU sixDOF = FreeSixIMU();

HMC5883L compass;
// Record any errors that may occur in the compass.
int error = 0;

void setup(){

  Serial.begin(9600);
  Wire.begin();

  delay(5);
  sixDOF.init(); //init the Acc and Gyro
  delay(5);
  compass = HMC5883L(); // init HMC5883
```

```
  error = compass.SetScale(1.3); // Set the scale of the compass.
  error = compass.SetMeasurementMode(Measurement_Continuous); // Set the meas
urement mode to Continuous
  if(error != 0) // If there is an error, print it out.
    Serial.println(compass.GetErrorText(error));

  bmp085Calibration(); // init barometric pressure sensor

}

void loop(){

  sixDOF.getEuler(angles);

  temperature = bmp085GetTemperature(bmp085ReadUT());
  pressure = bmp085GetPressure(bmp085ReadUP());

  getHeading();
  PrintData();

  delay(300);
}

void getHeading(){
  // Retrive the raw values from the compass (not scaled).
  MagnetometerRaw raw = compass.ReadRawAxis();
  // Retrived the scaled values from the compass (scaled to the configured sc
ale).
  MagnetometerScaled scaled = compass.ReadScaledAxis();

  // Values are accessed like so:
  int MilliGauss_OnThe_XAxis = scaled.XAxis;// (or YAxis, or ZAxis)

  // Calculate heading when the magnetometer is level, then correct for signs
of axis.
```

```
  heading = atan2(scaled.YAxis, scaled.XAxis);

  float declinationAngle = 0.0457;
  heading += declinationAngle;

  // Correct for when signs are reversed.
  if(heading < 0)
    heading += 2*PI;

  // Check for wrap due to addition of declination.
  if(heading > 2*PI)
    heading -= 2*PI;

  // Convert radians to degrees for readability.
  heading = heading * 180/M_PI;
}

void PrintData(){

  Serial.print("Eular Angle: ");
  Serial.print(angles[0]);
  Serial.print("  ");
  Serial.print(angles[1]);
  Serial.print("  ");
  Serial.print(angles[2]);
  Serial.print("  ");
  Serial.print("Heading: ");
  Serial.print(heading);
  Serial.print("  ");
  Serial.print("Pressure: ");
  Serial.print(pressure, DEC);
  Serial.println(" Pa");
}
```

Open the arduino IDE serial monitor, you will get: