Grove - Single Axis Analog Gyro

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Wiki: http://www.seeedstudio.com/wiki/Grove_-_Single_Axis_Analog_Gyro

Bazaar: http://www.seeedstudio.com/depot/Grove-Single-Axis-Analog-Gyro-p-1451.html

Document Revision History

Revision	Date	Author	Description
1.0	Sep 21, 2015	Victor.He	Create file

Contents

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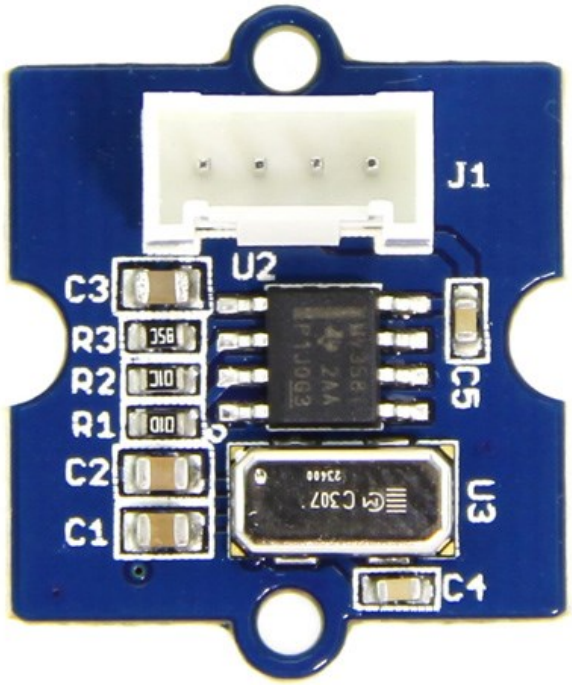
1. Introduction

The Grove – Signal Axis Analog Gyro is based on an angular velocity sensor (Murata-ENC-03R) that uses the phenomenon of Coriolis force. It can only measure the X-axis angular velocity, which is different from other 3-Axis gyro, but with a higher speed. It can be used for the position control and attitude control like the self-balanced 2WD.



2. Feature

- Input Voltage: 3.3V/5V
- Standard Grove Interface
- Light Weight
- High Speed
- Measure X-axis Angular Velocity

3. Demonstration

3.1 With Arduino

The module detects one-axis rotation with analog signal.

High-pass filter and low-pass filter circuit are applied to reduce the temperature drift and suppress the output noise.

Before the measurement of the angular velocity, a reference value(the sensor output at Angular Velocity=0) is required.

This value is 1.35V in default. But in order to get more accurate reference values, before the measurement, a calibration is necessary.

In this calibration, the output voltage when angular velocity =0 been sampled 200 times,

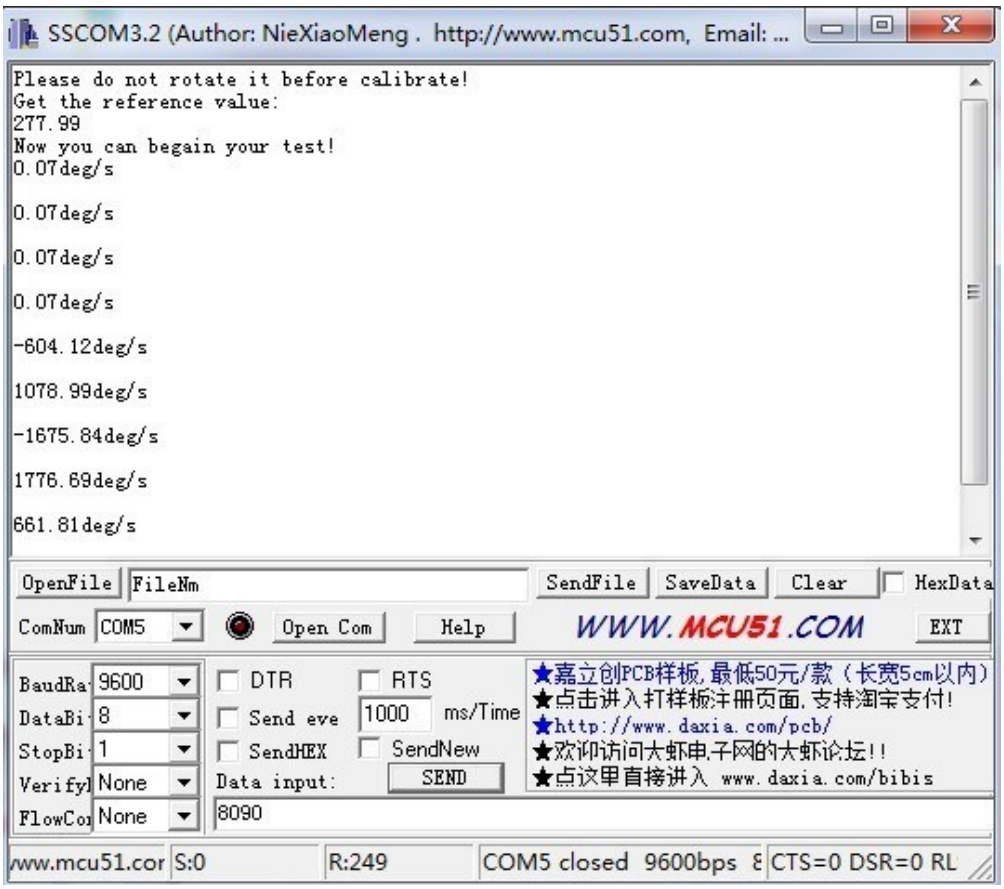
and then the average of these data will be treated as the reference value.

1. Connect it to A0 port of Grove - Base Shield, of cause any pin of the analog pins would be OK.
2. Plug the Grove - Base Shield into Arduino/Seeeduino and connect them to PC using a USB cable.
3. Upload the below code. Please click here if you do not know how to upload.

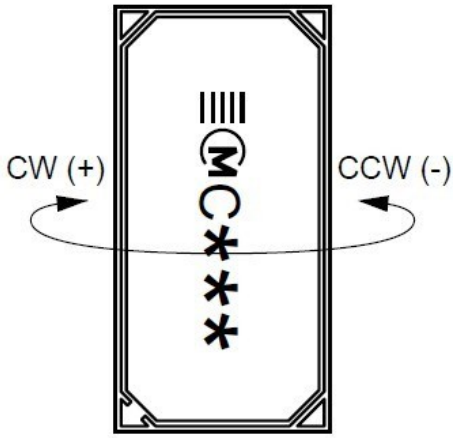
```
int sensorPin = A0;           // select the input pin for the sensor

float reference_Value=0;

int sensorValue = 0;          // variable to store the value coming from
the sensor

void setup() {

    int i;
    float sum=0;
    pinMode(sensorPin, INPUT);
    Serial.begin(9600);
    Serial.println("Please do not rotate it before calibrate!");
    Serial.println("Get the reference value:");

    for(i=0;i<1000;i++)
    {
        // read the value from the sensor:
        sensorValue = analogRead(sensorPin);
        sum += sensorValue;
```

```
        delay(5);
    }
    reference_Value = sum/1000.0;
    Serial.println(reference_Value);
    Serial.println("Now you can begin your test!");
}

void loop()
{

    double angularVelocity;
    sensorValue = analogRead(sensorPin);
    angularVelocity =((double)(sensorValue-
reference_Value)*4930.0)/1023.0/0.67; //get the angular velocity
    Serial.print(angularVelocity);
    Serial.println("deg/s");
    Serial.println(" ");
    delay(10);
}
```

4. Now, it is time to the calibration. Put the sensor on your desk horizontally, and then press the Reset button on the Seeeduino, and then open the serial tool:



5. As you see the "Now you can begin your test", that means the calibration done. You can use the sensor now. Rotating direction can reference the following picture:



3.2 With Raspberry Pi

1. You should have got a raspberry pi and a grovepi or grovepi+.
2. You should have completed configuring the development environment, otherwise follow here.
3. Connection. Plug the sensor to grovepi socket A0 by using a grove cable.
4. Navigate to the demos' directory:

```
cd yourpath/GrovePi/Software/Python/
```

To see the code

```
nano grove_single_axis_analog_gyro.py      # "Ctrl+x" to exit #
```

```
import time
import grovepi

# Connect the Grove Single Axis Analog Gyro to analog port A0
# SIG,NC,VCC,GND
sensor = 0

grovepi.pinMode(sensor,"INPUT")

# calibration
print "calibrating..."
```

```
sum = 0
errors = 0
for x in range(0, 100):
    try:
        # Get sensor value
        v = grovepi.analogRead(sensor)
        sum += v
        #time.sleep(.05)
    except IOError:
        print "Error"
        errors += 1

if errors == 100:
    print "unable to calibrate"
    raise SystemExit

reference_value = sum / (100 - errors)

print "finished calibrating"
print "reference_value =", reference_value

# ready
while True:
    try:
        # Get sensor value
        sensor_value = grovepi.analogRead(sensor)

        # Calculate angular velocity (deg/s)
        velocity = ((float)(sensor_value - reference_value) * 4930.0) /
1023.0 / 0.67

        print "sensor_value =", sensor_value, " velocity =", velocity
        time.sleep(.5)

    except IOError:
        print "Error"
```

5. Run the demo.

```
sudo python grove_single_axis_analog_gyro.py
```

4. Resource

Grove - Signal Axis Analog Gyro Eagle File

Signal Axis Analog Gyro datasheet

Demo code on github

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