# 3D accelerometer and 3D magnetometer– LSM303DLHC
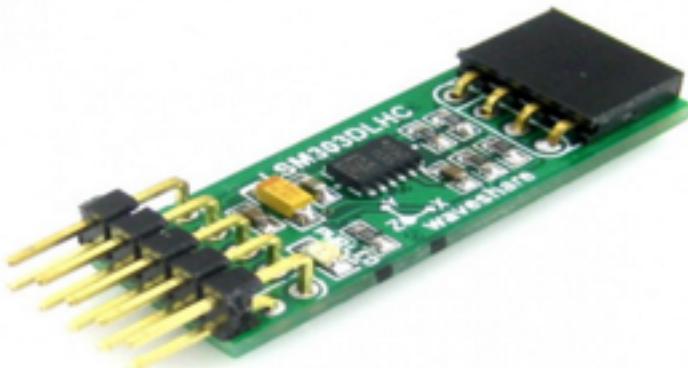
The LSM303DLHC module is an based on ST sensor IC LSM303DLHC which features a 3D digital linear acceleration sensor and a 3D digital magnetometer (compass) sensor on single chip. The accelerometer can be used for tilt compensation of compass heading, thus provides an accurate heading (angle from north) readings even at non zero tilt angle.

The sensor provides 16 bit digital data output via I2C interface It also include embedded temperature sensor for temperature compensation and more accurate readings. The sensor can be supplied by either 3.3V or 5V.

The sensor have countless applications starting from land and flight navigation, motion control and guidance, tracking, motion activation, pedometers, positioning and free fall detection.

Usage Notes

For accurate heading readings you should use a tilt compensated and calibrated method for calculating headings.

Features

- 3 magnetic field channels and 3 acceleration channels
- Configurable magnetometer sensitivity from ±1.3 to ±8.1 gauss magnetic field fullscale
- Configurable accelerometer sensitivity ±2g/±4g/±8g/±16g selectable full-scale
- 16 bit data output
- I2C serial interface
- Analog supply voltage 3.3 V to 5 V
- Power-down mode/ low-power mode
- 2 independent programmable interrupt generators for free-fall and motion detection
- Embedded temperature sensor
- Logic level shifter included

Applications

- Tilt compensated compass
- Map rotation
- Position detection
- Vehicle (robot)motion guidance and control
- Motion-activated functions
- Free-fall detection
- Pedometer
- Display orientation
- Gaming and virtual reality input devices
- Impact recognition and logging
- Vibration monitoring and compensation

Connection with Arduino

LSM303	Arduino
Vcc ----------------------→5V	
GND -------------------→GND	
SDA -------------------→PIN (A4)	
SCL -------------------→ PIN (A5)	

Example Arduino code LSM303

```
#include <Wire.h>

#include <LSM303.h>

LSM303 compass;

void setup() {

  Serial.begin(9600);

  Wire.begin();

  compass.init();

  compass.enableDefault();

  compass.m_min = (LSM303::vector<int16_t>){-32767, -32767, -32767};

  compass.m_max = (LSM303::vector<int16_t>){+32767, +32767, +32767};

}

void loop() {

 compass.read();

 float heading = compass.heading();

  Serial.println(heading);

 delay(100); }
```

The result:
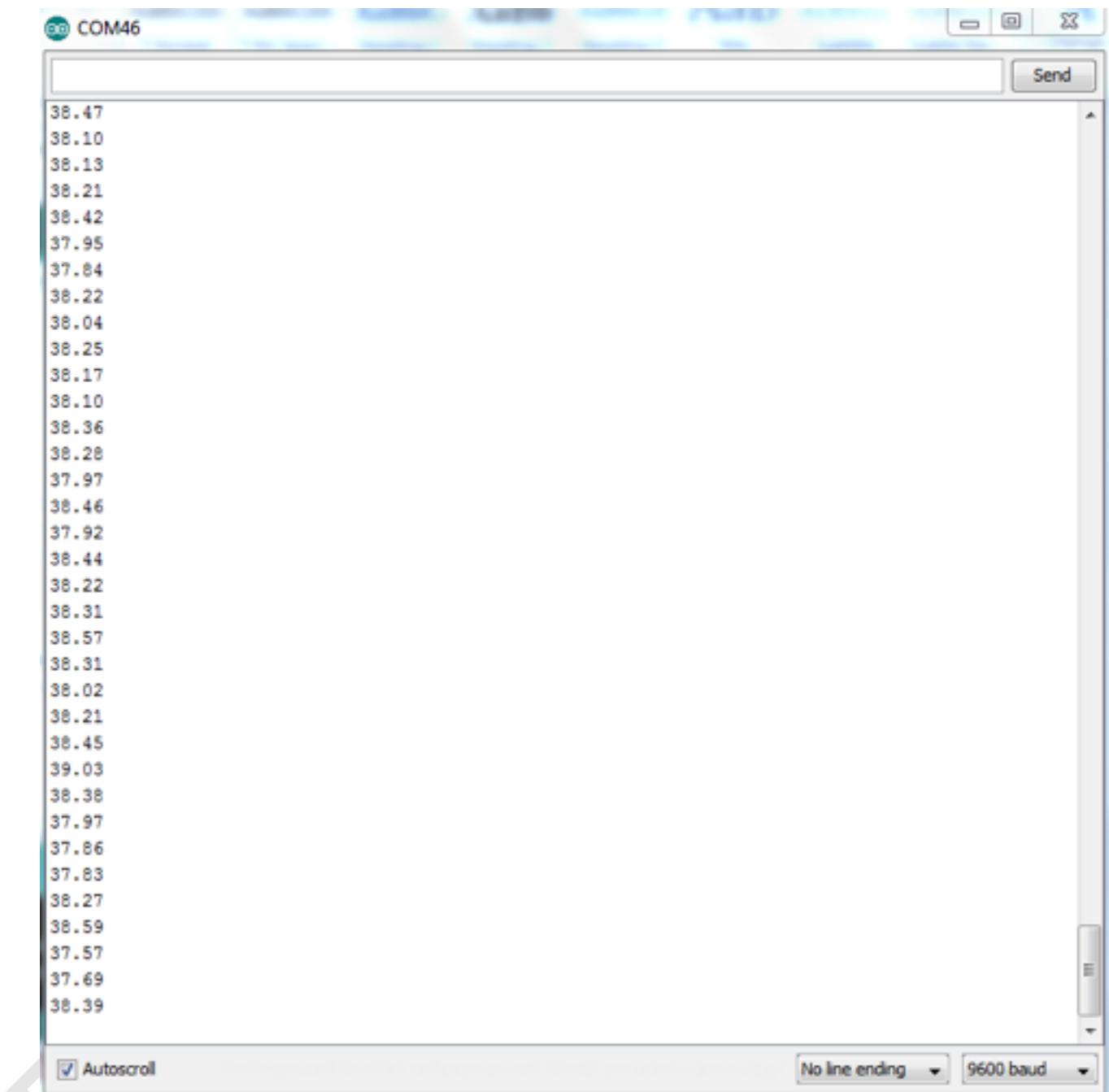
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