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# **Adafruit LSM303DLH Magnetometer Library Documentation**

*Release 1.0*

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**Oct 25, 2021**



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Adafruit CircuitPython module for the LSM303DLH's 3-axis magnetometer



# CHAPTER 1

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## Dependencies

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This driver depends on:

- [Adafruit CircuitPython](#)
- [Bus Device](#)

Please ensure all dependencies are available on the CircuitPython filesystem. This is easily achieved by downloading the [Adafruit library and driver bundle](#).





## CHAPTER 2

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### Installing from PyPI

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On supported GNU/Linux systems like the Raspberry Pi, you can install the driver locally [from PyPI](#). To install for current user:

```
pip3 install adafruit-circuitpython-lsm303dlh_mag
```

To install system-wide (this may be required in some cases):

```
sudo pip3 install adafruit-circuitpython-lsm303dlh_mag
```

To install in a virtual environment in your current project:

```
mkdir project-name && cd project-name
python3 -m venv .env
source .env/bin/activate
pip3 install adafruit-circuitpython-lsm303dlh_mag
```



## CHAPTER 3

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### Usage Example

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```
import time
import board
import adafruit_lsm303dlh_mag

i2c = board.I2C() # uses board.SCL and board.SDA
sensor = adafruit_lsm303dlh_mag.LSM303DLH_Mag(i2c)

while True:
    mag_x, mag_y, mag_z = sensor.magnetic

    print('Magnetometer (gauss): ({0:10.3f}, {1:10.3f}, {2:10.3f})'.format(mag_x, mag_
    ↪y, mag_z))
    print('')
    time.sleep(1.0)
```



## CHAPTER 4

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### Documentation

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API documentation for this library can be found on [Read the Docs](#).



## CHAPTER 5

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### Contributing

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Contributions are welcome! Please read our [Code of Conduct](#) before contributing to help this project stay welcoming.





## CHAPTER 6

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### Documentation

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For information on building library documentation, please check out [this guide](#).



## 7.1 Simple tests

Ensure your device works with these simple tests.

Listing 1: examples/lsm303dlh\_mag\_simpletest.py

```
1 # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2 # SPDX-License-Identifier: MIT
3
4 """ Display magnetometer data once per second """
5
6 import time
7 import board
8 import adafruit_lsm303dlh_mag
9
10 i2c = board.I2C() # uses board.SCL and board.SDA
11 sensor = adafruit_lsm303dlh_mag.LSM303DLH_Mag(i2c)
12
13 while True:
14     mag_x, mag_y, mag_z = sensor.magnetic
15
16     print(
17         "Magnetometer (gauss): ({0:10.3f}, {1:10.3f}, {2:10.3f})".format(
18             mag_x, mag_y, mag_z
19         )
20     )
21     print("")
22     time.sleep(1.0)
```

## 7.2 Fast Data Reading Example

Fast readings example

Listing 2: examples/lsm303dlh\_mag\_fast.py

```

1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  """ Read data from the magnetometer and print it out, ASAP! """
5
6  import board
7  import adafruit_lsm303dlh_mag
8
9  i2c = board.I2C() # uses board.SCL and board.SDA
10 sensor = adafruit_lsm303dlh_mag.LSM303DLH_Mag(i2c)
11
12 while True:
13     mag_x, mag_y, mag_z = sensor.magnetic
14     print("{0:10.3f} {1:10.3f} {2:10.3f}".format(mag_x, mag_y, mag_z))

```

## 7.3 Compass Example

Magnetic compass example

Listing 3: examples/lsm303dlh\_mag\_compass.py

```

1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  """ Display compass heading data five times per second """
5  import time
6  from math import atan2, degrees
7  import board
8  import adafruit_lsm303dlh_mag
9
10 i2c = board.I2C() # uses board.SCL and board.SDA
11 sensor = adafruit_lsm303dlh_mag.LSM303DLH_Mag(i2c)
12
13
14 def vector_2_degrees(x, y):
15     angle = degrees(atan2(y, x))
16     if angle < 0:
17         angle += 360
18     return angle
19
20
21 def get_heading(_sensor):
22     magnet_x, magnet_y, _ = _sensor.magnetic
23     return vector_2_degrees(magnet_x, magnet_y)
24
25
26 while True:
27     print("heading: {:.2f} degrees".format(get_heading(sensor)))
28     time.sleep(0.2)

```

## 7.4 adafruit\_lsm303dlh\_mag

CircuitPython driver for the LSM303DLH's magnetometer.

- Author(s): Dave Astels, Bryan Siepert

### 7.4.1 Implementation Notes

#### Hardware:

- Adafruit Triple-axis Accelerometer+Magnetometer (Compass) Board - LSM303 (Product ID: 1120)
- Adafruit FLORA Accelerometer/Compass Sensor - LSM303 - v1.0 (Product ID: 1247)

#### Software and Dependencies:

- Adafruit CircuitPython firmware: <https://circuitpython.org/downloads>
- Adafruit's Bus Device library: [https://github.com/adafruit/Adafruit\\_CircuitPython\\_BusDevice](https://github.com/adafruit/Adafruit_CircuitPython_BusDevice)

**class** `adafruit_lsm303dlh_mag.LSM303DLH_Mag` (*i2c*)

Driver for the Driver for the LSM303DLH's 'magnetometer.

**Parameters** `i2c` (*I2C*) – The I2C bus the device is connected to.

#### Quickstart: Importing and using the device

Here is an example of using the `LSM303DLH_Mag` class. First you will need to import the libraries to use the sensor

```
import board
import adafruit_lsm303dlh_mag
```

Once this is done you can define your `board.I2C` object and define your sensor object

```
i2c = board.I2C() # uses board.SCL and board.SDA
sensor = adafruit_lsm303dlh_mag.LSM303DLH_Mag(i2c)
```

Now you have access to the `magnetic` attribute

```
mag_x, mag_y, mag_z = sensor.magnetic
```

#### `mag_gain`

The magnetometer's gain.

#### `mag_rate`

The magnetometer update rate.

#### `magnetic`

The processed magnetometer sensor values. A 3-tuple of X, Y, Z axis values in microteslas that are signed floats.



## CHAPTER 8

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### Indices and tables

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