
Adafruit LSM9DS0 Library Documentation

Release 1.0

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Contents

1	Dependencies	3
2	Installing from PyPI	5
3	Usage Example	7
4	Contributing	9
5	Documentation	11
6	Table of Contents	13
6.1	Simple test	13
6.2	adafruit_lsm9ds0	14
6.2.1	Implementation Notes	14
7	Indices and tables	17
	Python Module Index	19
	Index	21

CircuitPython module for the LSM9DS0 accelerometer, magnetometer, gyroscope.

CHAPTER 1

Dependencies

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

Installing from PyPI

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-lsm9ds0
```

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

```
sudo pip3 install adafruit-circuitpython-lsm9ds0
```

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-lsm9ds0
```


CHAPTER 3

Usage Example

```
import time
import board
import busio
import adafruit_lsm9ds0

i2c = busio.I2C(board.SCL, board.SDA)
sensor = adafruit_lsm9ds0.LSM9DS0_I2C(i2c)

while True:
    accel_x, accel_y, accel_z = sensor.acceleration
    mag_x, mag_y, mag_z = sensor.magnetic
    gyro_x, gyro_y, gyro_z = sensor.gyro
    temp = sensor.temperature
    print('Acceleration (m/s^2): ({0:0.3f}, {1:0.3f}, {2:0.3f})'.format(accel_x, accel_
↪y, accel_z))
    print('Magnetometer (gauss): ({0:0.3f}, {1:0.3f}, {2:0.3f})'.format(mag_x, mag_y,
↪mag_z))
    print('Gyroscope (degrees/sec): ({0:0.3f}, {1:0.3f}, {2:0.3f})'.format(gyro_x, gyro_
↪y, gyro_z))
    print('Temperature: {0:0.3f}C'.format(temp))
    time.sleep(1.0)
```


CHAPTER 4

Contributing

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

CHAPTER 5

Documentation

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

6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/lsm9ds0_simpletest.py

```
1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  # Simple demo of the LSM9DS0 accelerometer, magnetometer, gyroscope.
5  # Will print the acceleration, magnetometer, and gyroscope values every second.
6  import time
7
8  import board
9  import busio
10
11 # import digitalio # Used with SPI
12
13 import adafruit_lsm9ds0
14
15 # I2C connection:
16 i2c = busio.I2C(board.SCL, board.SDA)
17 sensor = adafruit_lsm9ds0.LSM9DS0_I2C(i2c)
18
19 # SPI connection:
20 # from digitalio import DigitalInOut, Direction
21 spi = busio.SPI(board.SCK, board.MOSI, board.MISO)
22 gcs = DigitalInOut(board.D5)
23 xmcs = DigitalInOut(board.D6)
24 sensor = adafruit_lsm9ds0.LSM9DS0_SPI(spi, xmcs, gcs)
25
26 # Main loop will read the acceleration, magnetometer, gyroscope, Temperature
27 # values every second and print them out.
```

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```

28 while True:
29     # Read acceleration, magnetometer, gyroscope, temperature.
30     accel_x, accel_y, accel_z = sensor.acceleration
31     mag_x, mag_y, mag_z = sensor.magnetic
32     gyro_x, gyro_y, gyro_z = sensor.gyro
33     temp = sensor.temperature
34     # Print values.
35     print(
36         "Acceleration (m/s^2): ({0:0.3f}, {1:0.3f}, {2:0.3f})".format(
37             accel_x, accel_y, accel_z
38         )
39     )
40     print(
41         "Magnetometer (gauss): ({0:0.3f}, {1:0.3f}, {2:0.3f})".format(mag_x, mag_y, mag_
↪z)
42     )
43     print(
44         "Gyroscope (degrees/sec): ({0:0.3f}, {1:0.3f}, {2:0.3f})".format(
45             gyro_x, gyro_y, gyro_z
46         )
47     )
48     print("Temperature: {0:0.3f}C".format(temp))
49     # Delay for a second.
50     time.sleep(1.0)

```

6.2 adafruit_lsm9ds0

CircuitPython module for the LSM9DS0 accelerometer, magnetometer, gyroscope. Based on the driver from: https://github.com/adafruit/Adafruit_LSM9DS0

See examples/simpletest.py for a demo of the usage.

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6.2.1 Implementation Notes

Hardware:

- Adafruit 9-DOF Accel/Mag/Gyro+Temp Breakout Board - LSM9DS0 (Product ID: 2021)
- FLORA 9-DOF Accelerometer/Gyroscope/Magnetometer - LSM9DS0 (Product ID: 2020)

Software and Dependencies:

- Adafruit CircuitPython firmware for the ESP8622 and M0-based boards: <https://github.com/adafruit/circuitpython/releases>
- Adafruit's Bus Device library: https://github.com/adafruit/Adafruit_CircuitPython_BusDevice

class adafruit_lsm9ds0.LSM9DS0

Driver for the LSM9DS0 accelerometer, magnetometer, gyroscope.

accel_range

The accelerometer range. Must be a value of: - ACCELRange_2G - ACCELRange_4G - ACCELRange_6G - ACCELRange_8G - ACCELRange_16G

acceleration

The accelerometer X, Y, Z axis values as a 3-tuple of m/s² values.

gyro

The gyroscope X, Y, Z axis values as a 3-tuple of degrees/second values.

gyro_scale

The gyroscope scale. Must be a value of: - GYROSCALE_245DPS - GYROSCALE_500DPS - GYROSCALE_2000DPS

mag_gain

The magnetometer gain. Must be a value of: - MAGGAIN_2GAUSS - MAGGAIN_4GAUSS - MAGGAIN_8GAUSS - MAGGAIN_12GAUSS

magnetic

The magnetometer X, Y, Z axis values as a 3-tuple of gauss values.

read_accel_raw()

Read the raw accelerometer sensor values and return it as a 3-tuple of X, Y, Z axis values that are 16-bit unsigned values. If you want the acceleration in nice units you probably want to use the accelerometer property!

read_gyro_raw()

Read the raw gyroscope sensor values and return it as a 3-tuple of X, Y, Z axis values that are 16-bit unsigned values. If you want the gyroscope in nice units you probably want to use the gyroscope property!

read_mag_raw()

Read the raw magnetometer sensor values and return it as a 3-tuple of X, Y, Z axis values that are 16-bit unsigned values. If you want the magnetometer in nice units you probably want to use the magnetometer property!

read_temp_raw()

Read the raw temperature sensor value and return it as a 16-bit unsigned value. If you want the temperature in nice units you probably want to use the temperature property!

temperature

The temperature of the sensor in degrees Celsius.

class adafruit_lsm9ds0.**LSM9DS0_I2C** (*i2c*)

Driver for the LSM9DS0 connected over I2C.

class adafruit_lsm9ds0.**LSM9DS0_SPI** (*spi, xmcs, gcs*)

Driver for the LSM9DS0 connected over SPI.

CHAPTER 7

Indices and tables

- `genindex`
- `modindex`
- `search`

a

`adafruit_lsm9ds0`, 14

A

`accel_range` (*adafruit_lsm9ds0.LSM9DS0 attribute*),
14
`acceleration` (*adafruit_lsm9ds0.LSM9DS0 attribute*), 14
`adafruit_lsm9ds0` (*module*), 14

G

`gyro` (*adafruit_lsm9ds0.LSM9DS0 attribute*), 15
`gyro_scale` (*adafruit_lsm9ds0.LSM9DS0 attribute*),
15

L

`LSM9DS0` (*class in adafruit_lsm9ds0*), 14
`LSM9DS0_I2C` (*class in adafruit_lsm9ds0*), 15
`LSM9DS0_SPI` (*class in adafruit_lsm9ds0*), 15

M

`mag_gain` (*adafruit_lsm9ds0.LSM9DS0 attribute*), 15
`magnetic` (*adafruit_lsm9ds0.LSM9DS0 attribute*), 15

R

`read_accel_raw()` (*adafruit_lsm9ds0.LSM9DS0 method*), 15
`read_gyro_raw()` (*adafruit_lsm9ds0.LSM9DS0 method*), 15
`read_mag_raw()` (*adafruit_lsm9ds0.LSM9DS0 method*), 15
`read_temp_raw()` (*adafruit_lsm9ds0.LSM9DS0 method*), 15

T

`temperature` (*adafruit_lsm9ds0.LSM9DS0 attribute*),
15