
Adafruit LSM9DS1 Library Documentation

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CircuitPython module for the LSM9DS1 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

Usage Example

See `examples/lsm9ds1_simpletest.py` for a demo of the usage.

CHAPTER 3

Contributing

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

CHAPTER 4

Building locally

To build this library locally you'll need to install the `circuitpython-build-tools` package.

```
python3 -m venv .env
source .env/bin/activate
pip install circuitpython-build-tools
```

Once installed, make sure you are in the virtual environment:

```
source .env/bin/activate
```

Then run the build:

```
circuitpython-build-bundles --filename_prefix adafruit-circuitpython-lsm9ds1 --
↳library_location .
```

4.1 Sphinx documentation

Sphinx is used to build the documentation based on rST files and comments in the code. First, install dependencies (feel free to reuse the virtual environment from above):

```
python3 -m venv .env
source .env/bin/activate
pip install Sphinx sphinx-rtd-theme
```

Now, once you have the virtual environment activated:

```
cd docs
sphinx-build -E -W -b html . _build/html
```

This will output the documentation to `docs/_build/html`. Open the `index.html` in your browser to view them. It will also (due to `-W`) error out on any warning like Travis will. This is a good way to locally verify it will pass.

5.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/lsm9ds1_simpletest.py

```
1  # Simple demo of the LSM9DS1 accelerometer, magnetometer, gyroscope.
2  # Will print the acceleration, magnetometer, and gyroscope values every second.
3  import time
4  import board
5  import busio
6  import adafruit_lsm9ds1
7
8  # I2C connection:
9  i2c = busio.I2C(board.SCL, board.SDA)
10 sensor = adafruit_lsm9ds1.LSM9DS1_I2C(i2c)
11
12 #SPI connection:
13 # from digitalio import DigitalInOut, Direction
14 # spi = busio.SPI(board.SCK, board.MOSI, board.MISO)
15 # csag = DigitalInOut(board.D5)
16 # csag.direction = Direction.OUTPUT
17 # csag.value = True
18 # csm = DigitalInOut(board.D6)
19 # csm.direction = Direction.OUTPUT
20 # csm.value = True
21 # sensor = adafruit_lsm9ds1.LSM9DS1_SPI(spi, csag, csm)
22
23 # Main loop will read the acceleration, magnetometer, gyroscope, Temperature
24 # values every second and print them out.
25 while True:
26     # Read acceleration, magnetometer, gyroscope, temperature.
27     accel_x, accel_y, accel_z = sensor.acceleration
```

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```

28     mag_x, mag_y, mag_z = sensor.magnetic
29     gyro_x, gyro_y, gyro_z = sensor.gyro
30     temp = sensor.temperature
31     # Print values.
32     print('Acceleration (m/s^2): ({0:0.3f},{1:0.3f},{2:0.3f})'.format(accel_x, accel_
↪y, accel_z))
33     print('Magnetometer (gauss): ({0:0.3f},{1:0.3f},{2:0.3f})'.format(mag_x, mag_y,
↪mag_z))
34     print('Gyroscope (degrees/sec): ({0:0.3f},{1:0.3f},{2:0.3f})'.format(gyro_x, gyro_
↪y, gyro_z))
35     print('Temperature: {0:0.3f}C'.format(temp))
36     # Delay for a second.
37     time.sleep(1.0)

```

5.2 adafruit_lsm9ds1

CircuitPython module for the LSM9DS1 accelerometer, magnetometer, gyroscope. Based on the driver from: https://github.com/adafruit/Adafruit_LSM9DS1

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

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5.2.1 Implementation Notes

Hardware:

- Adafruit 9-DOF Accel/Mag/Gyro+Temp Breakout Board - LSM9DS1 (Product ID: 3387)

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_lsm9ds1.LSM9DS1`

Driver for the LSM9DS1 accelerometer, magnetometer, gyroscope.

accel_range

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

acceleration

The accelerometer X, Y, Z axis values as a 3-tuple of m/s^2 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_4GAUSS - MAGGain_8GAUSS - MAGGain_12GAUSS - MAGGain_16GAUSS

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 12-bit signed 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_lsm9ds1.**LSM9DS1_I2C** (*i2c*)

Driver for the LSM9DS1 connect over I2C.

class adafruit_lsm9ds1.**LSM9DS1_SPI** (*spi, xgcs, mcs*)

Driver for the LSM9DS1 connect over SPI.

CHAPTER 6

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