Adafruit LSM9DS0 Library Documentation

Release 1.0

Tony DiCola

Dec 05, 2018

Contents

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

Usage Example

See examples/lsm9ds0_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-lsm9ds0 --
↪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.

CHAPTER 5

Table of Contents

5.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/lsm9ds0_simpletest.py

```
# Simple demo of the LSM9DS0 accelerometer, magnetometer, gyroscope.
# Will print the acceleration, magnetometer, and gyroscope values every second.
import time

import board
import busio
# import digitalio # Used with SPI

import adafruit_lsm9ds0

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

#SPI connection:
# from digitalio import DigitalInOut, Direction
# spi = busio.SPI(board.SCK, board.MOSI, board.MISO)
# gcs = DigitalInOut(board.D5)
# xmcs = DigitalInOut(board.D6)
# sensor = adafruit_lsm9ds0.LSM9DS0_SPI(spi, xmcs, gcs)

# Main loop will read the acceleration, magnetometer, gyroscope, Temperature
# values every second and print them out.
while True:
    # Read acceleration, magnetometer, gyroscope, temperature.
    accel_x, accel_y, accel_z = sensor.acceleration
    mag_x, mag_y, mag_z = sensor.magnetic
```

(continues on next page)

(continued from previous page)

```
    gyro_x, gyro_y, gyro_z = sensor.gyro
    temp = sensor.temperature
    # Print values.
    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))
    # Delay for a second.
    time.sleep(1.0)
```

5.2 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.

- Author(s): Tony DiCola

5.2.1 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/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_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 6

Indices and tables

- genindex
- modindex
- search

Python Module Index

a

Index