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# **Adafruit FXAS21002C Library Documentation**

***Release 1.0***

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CircuitPython module for the NXP FXAS21002C gyroscope.



# 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-fxas21002c
```

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

```
sudo pip3 install adafruit-circuitpython-fxas21002c
```

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-fxas21002c
```



## CHAPTER 3

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### Usage Example

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```
import time
import board
import adafruit_fxas21002c

i2c = board.I2C() # uses board.SCL and board.SDA
sensor = adafruit_fxas21002c.FXAS21002C(i2c)

while True:
    gyro_x, gyro_y, gyro_z = sensor.gyroscope
    print('Gyroscope (radians/s): ({0:0.3f}, {1:0.3f}, {2:0.3f})'.format(gyro_x, ↵
↵gyro_y, gyro_z))
    time.sleep(1.0)
```



## CHAPTER 4

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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 5

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### Documentation

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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/fxas21002c\_simpletest.py

```
1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  # Simple demo of the FXAS21002C gyroscope.
5  # Will print the gyroscope values every second.
6  import time
7  import board
8  import adafruit_fxas21002c
9
10
11 # Create sensor object, communicating over the board's default I2C bus
12 i2c = board.I2C() # uses board.SCL and board.SDA
13 sensor = adafruit_fxas21002c.FXAS21002C(i2c)
14 # Optionally create the sensor with a different gyroscope range (the
15 # default is 250 DPS, but you can use 500, 1000, or 2000 DPS values):
16 # sensor = adafruit_fxas21002c.FXAS21002C(i2c, gyro_range=adafruit_fxas21002c.GYRO_
17 ↪ RANGE_500DPS)
18 # sensor = adafruit_fxas21002c.FXAS21002C(i2c, gyro_range=adafruit_fxas21002c.GYRO_
19 ↪ RANGE_1000DPS)
20 # sensor = adafruit_fxas21002c.FXAS21002C(i2c, gyro_range=adafruit_fxas21002c.GYRO_
21 ↪ RANGE_2000DPS)
22
23 # Main loop will read the gyroscope values every second and print them out.
24 while True:
25     # Read gyroscope.
26     gyro_x, gyro_y, gyro_z = sensor.gyroscope
27     # Print values.
```

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```

25     print(
26         "Gyroscope (radians/s): ({0:0.3f}, {1:0.3f}, {2:0.3f})".format(
27             gyro_x, gyro_y, gyro_z
28         )
29     )
30     # Delay for a second.
31     time.sleep(1.0)

```

## 6.2 adafruit\_fxas21002c

CircuitPython module for the NXP FXAS21002C gyroscope. Based on the driver from: [https://github.com/adafruit/Adafruit\\_FXAS21002C](https://github.com/adafruit/Adafruit_FXAS21002C)

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

- Author(s): Tony DiCola

### 6.2.1 Implementation Notes

#### Hardware:

- Adafruit Precision NXP 9-DOF Breakout Board - FXOS8700 + FXAS21002 (Product ID: 3463)

#### Software and Dependencies:

- Adafruit CircuitPython firmware for the supported boards: <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_fxas21002c.FXAS21002C` (*i2c*, *address*=33, *gyro\_range*=250)  
Driver for the NXP FXAS21002C gyroscope.

#### Parameters

- **i2c** (*I2C*) – The I2C bus the device is connected to
- **address** (*int*) – The I2C device address. Defaults to 0x21
- **gyro\_range** (*int*) – Device range. Defaults to 250.

#### Quickstart: Importing and using the device

Here is an example of using the `FXAS21002C` class. First you will need to import the libraries to use the sensor

```

import board
import adafruit_fxas21002c

```

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_fxas21002c.FXAS21002C(i2c)

```

Now you have access to the `gyroscope` attribute

```

gyro_x, gyro_y, gyro_z = sensor.gyroscope

```

**gyroscope**

Read the gyroscope value and return its X, Y, Z axis values as a 3-tuple in radians/second.

**read\_raw()**

Read the raw gyroscope readings. Returns a 3-tuple of X, Y, Z axis 16-bit signed values. If you want the gyroscope values in friendly units consider using the gyroscope property!



## CHAPTER 7

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### Indices and tables

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