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# **AdafruitADXL34x Library Documentation**

***Release 1.0***

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A CircuitPython driver for the ADXL34x family of accelerometers



# 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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### Usage Example

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```
import time
import board
import busio
import adafruit_adxl34x
i2c = busio.I2C(board.SCL, board.SDA)
accelerometer = adafruit_adxl34x.ADXL345(i2c)
while True:
    print("%f %f %f"%accelerometer.acceleration)
    time.sleep(1)
```



## CHAPTER 3

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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.



### 4.1 Zip release files

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-adxl34x --
↳library_location .
```

### 4.2 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/adxl34x\_simpletest.py

```
1 import time
2 import board
3 import busio
4 import adafruit_adxl34x
5 i2c = busio.I2C(board.SCL, board.SDA)
6 accelerometer = adafruit_adxl34x.ADXL345(i2c)
7 while True:
8     print("%f %f %f"%accelerometer.acceleration)
9     time.sleep(1)
```

### 5.2 Motion detection

Use the accelerometer to detect motion.

Listing 2: examples/adxl34x\_motion\_detection\_test.py

```
1 import time
2 import board
3 import busio
4 import adafruit_adxl34x
5
6 i2c = busio.I2C(board.SCL, board.SDA)
7
8 accelerometer = adafruit_adxl34x.ADXL345(i2c)
9 accelerometer.enable_motion_detection()
```

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```

10 # alternatively you can specify the threshold when you enable motion detection for
    ↳more control:
11 # accelerometer.enable_motion_detection(threshold=10)
12 while True:
13     print("%f %f %f"%accelerometer.acceleration)
14
15     print("Motion detected: %s"%accelerometer.events['motion'])
16     time.sleep(0.5)

```

## 5.3 Freefall detection

Use the accelerometer to detect when something is dropped.

Listing 3: examples/adxl34x\_freefall\_detection\_test.py

```

1 import time
2 import board
3 import busio
4 import adafruit_adxl34x
5
6 i2c = busio.I2C(board.SCL, board.SDA)
7
8 accelerometer = adafruit_adxl34x.ADXL345(i2c)
9 accelerometer.enable_freefall_detection()
10 # alternatively you can specify attributes when you enable freefall detection for
    ↳more control:
11 # accelerometer.enable_freefall_detection(threshold=10,time=25)
12 while True:
13     print("%f %f %f"%accelerometer.acceleration)
14
15     print("Dropped: %s"%accelerometer.events["freefall"])
16     time.sleep(0.5)

```

## 5.4 Tap detection

The accelerometer can also be configured to detect taps.

Listing 4: examples/adxl34x\_tap\_detection\_test.py

```

1 import time
2 import board
3 import busio
4 import adafruit_adxl34x
5
6 i2c = busio.I2C(board.SCL, board.SDA)
7
8 accelerometer = adafruit_adxl34x.ADXL345(i2c)
9 accelerometer.enable_tap_detection()
10 # you can also configure the tap detection parameters when you enable tap detection:
11 # accelerometer.enable_tap_detection(tap_count=2,threshold=20, duration=50)
12 while True:

```

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```

13     print("%f %f %f"%accelerometer.acceleration)
14
15     print("Tapped: %s"%accelerometer.events['tap'])
16     time.sleep(0.5)

```

## 5.5 adafruit\_adxl34x

A driver for the ADXL34x 3-axis accelerometer family

- Author(s): Bryan Siepert

Based on drivers by K. Townsend and Tony DiCola

### 5.5.1 Implementation Notes

**Hardware:** <https://www.adafruit.com/product/1231>

**Software and Dependencies:**

- Adafruit CircuitPython firmware for the supported boards: <https://github.com/adafruit/circuitpython/releases>
- Adafruit's Bus Device library: [https://github.com/adafruit/Adafruit\\_CircuitPython\\_BusDevice](https://github.com/adafruit/Adafruit_CircuitPython_BusDevice)

**class** `adafruit_adxl34x.ADXL343` (*i2c*, *address*=83)  
Stub class for the ADXL343 3-axis accelerometer

**class** `adafruit_adxl34x.ADXL345` (*i2c*, *address*=83)  
Driver for the ADXL345 3 axis accelerometer

#### Parameters

- **`i2c_bus`** (*I2C*) – The I2C bus the ADXL345 is connected to.
- **`address`** – The I2C device address for the sensor. Default is 0x53.

#### **`acceleration`**

The x, y, z acceleration values returned in a 3-tuple in  $m/s^2$ .

#### **`data_rate`**

The data rate of the sensor.

#### **`disable_freefall_detection()`**

Disable freefall detection

#### **`disable_motion_detection()`**

Disable motion detection

#### **`disable_tap_detection()`**

Disable tap detection

#### **`enable_freefall_detection(*, threshold=10, time=25)`**

Freefall detection parameters:

#### Parameters

- **`threshold`** (*int*) – The value that acceleration on all axes must be under to register as dropped. The scale factor is 62.5 mg/LSB.

- **time** (*int*) – The amount of time that acceleration on all axes must be less than `threshold` to register as dropped. The scale factor is 5 ms/LSB. Values between 100 ms and 350 ms (20 to 70) are recommended.

If you wish to set them yourself rather than using the defaults, you must use keyword arguments:

```
accelerometer.enable_freefall_detection(time=30)
```

**enable\_motion\_detection** (\*, *threshold=18*)

The activity detection parameters.

**Parameters** **threshold** (*int*) – The value that acceleration on any axis must exceed to register as active. The scale factor is 62.5 mg/LSB.

If you wish to set them yourself rather than using the defaults, you must use keyword arguments:

```
accelerometer.enable_motion_detection(threshold=20)
```

**enable\_tap\_detection** (\*, *tap\_count=1, threshold=20, duration=50, latency=20, window=255*)

The tap detection parameters.

#### Parameters

- **tap\_count** (*int*) – 1 to detect only single taps, and 2 to detect only double taps.
- **threshold** (*int*) – A threshold for the tap detection. The scale factor is 62.5 mg/LSB. The higher the value the less sensitive the detection. This changes based on the accelerometer range.
- **duration** (*int*) – This caps the duration of the impulse above `threshold`. Anything above `duration` won't register as a tap. The scale factor is 625  $\mu$ s/LSB.
- **latency** (**double tap only**) (*int*) – The length of time after the initial impulse falls below `threshold` to start the window looking for a second impulse. The scale factor is 1.25 ms/LSB.
- **window** (**double tap only**) (*int*) – The length of the window in which to look for a second tap. The scale factor is 1.25 ms/LSB.

If you wish to set them yourself rather than using the defaults, you must use keyword arguments:

```
accelerometer.enable_tap_detection(duration=30, threshold=25)
```

#### events

`events` will return a dictionary with a key for each event type that has been enabled. The possible keys are:

Key	Description
tap	True if a tap was detected recently. Whether it's looking for a single or double tap is determined by the <code>tap</code> param of <a href="#">enable_tap_detection</a>
motion	True if the sensor has seen acceleration above the threshold set with <a href="#">enable_motion_detection</a> .
freefall	True if the sensor was in freefall. Parameters are set when enabled with <a href="#">enable_freefall_detection</a>

#### range

The measurement range of the sensor.

**class** `adafruit_adxl34x.DataRate`

An enum-like class representing the possible data rates. Possible values are

- `DataRate.RATE_3200_HZ`
- `DataRate.RATE_1600_HZ`
- `DataRate.RATE_800_HZ`
- `DataRate.RATE_400_HZ`
- `DataRate.RATE_200_HZ`
- `DataRate.RATE_100_HZ`
- `DataRate.RATE_50_HZ`
- `DataRate.RATE_25_HZ`
- `DataRate.RATE_12_5_HZ`
- `DataRate.RATE_6_25_HZ`
- `DataRate.RATE_3_13_HZ`
- `DataRate.RATE_1_56_HZ`
- `DataRate.RATE_0_78_HZ`
- `DataRate.RATE_0_39_HZ`
- `DataRate.RATE_0_20_HZ`
- `DataRate.RATE_0_10_HZ`

**class** `adafruit_adxl34x.Range`

An enum-like class representing the possible measurement ranges in +/- G.

Possible values are

- `Range.RANGE_16_G`
- `Range.RANGE_8_G`
- `Range.RANGE_4_G`
- `Range.RANGE_2_G`



## CHAPTER 6

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### Indices and tables

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