
AdafruitTSL2591 Library Documentation

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CircuitPython module for the TSL2591 high precision light sensor.

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-tsl2591
```

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

```
sudo pip3 install adafruit-circuitpython-tsl2591
```

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-tsl2591
```


CHAPTER 3

Usage Example

See `examples/tsl2591_simpletest.py` for a demo of the usage.

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/tsl2591_simpletest.py

```
1  # SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
2  # SPDX-License-Identifier: MIT
3
4  # Simple demo of the TSL2591 sensor. Will print the detected light value
5  # every second.
6  import time
7
8  import board
9  import busio
10
11 import adafruit_tsl2591
12
13 # Initialize the I2C bus.
14 i2c = busio.I2C(board.SCL, board.SDA)
15
16 # Initialize the sensor.
17 sensor = adafruit_tsl2591.TSL2591(i2c)
18
19 # You can optionally change the gain and integration time:
20 # sensor.gain = adafruit_tsl2591.GAIN_LOW (1x gain)
21 # sensor.gain = adafruit_tsl2591.GAIN_MED (25x gain, the default)
22 # sensor.gain = adafruit_tsl2591.GAIN_HIGH (428x gain)
23 # sensor.gain = adafruit_tsl2591.GAIN_MAX (9876x gain)
24 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_100MS (100ms, default)
25 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_200MS (200ms)
26 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_300MS (300ms)
27 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_400MS (400ms)
```

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```
28 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_500MS (500ms)
29 # sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_600MS (600ms)
30
31 # Read the total lux, IR, and visible light levels and print it every second.
32 while True:
33     # Read and calculate the light level in lux.
34     lux = sensor.lux
35     print("Total light: {0}lux".format(lux))
36     # You can also read the raw infrared and visible light levels.
37     # These are unsigned, the higher the number the more light of that type.
38     # There are no units like lux.
39     # Infrared levels range from 0-65535 (16-bit)
40     infrared = sensor.infrared
41     print("Infrared light: {0}".format(infrared))
42     # Visible-only levels range from 0-2147483647 (32-bit)
43     visible = sensor.visible
44     print("Visible light: {0}".format(visible))
45     # Full spectrum (visible + IR) also range from 0-2147483647 (32-bit)
46     full_spectrum = sensor.full_spectrum
47     print("Full spectrum (IR + visible) light: {0}".format(full_spectrum))
48     time.sleep(1.0)
```

6.2 adafruit_tsl2591

CircuitPython module for the TSL2591 precision light sensor. See examples/simpletest.py for a demo of the usage.

- Author(s): Tony DiCola

6.2.1 Implementation Notes

Hardware:

- Adafruit TSL2591 High Dynamic Range Digital Light Sensor (Product ID: 1980)

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

```
adafruit_tsl2591.GAIN_HIGH = 32
    High gain (428x)

adafruit_tsl2591.GAIN_LOW = 0
    Low gain (1x)

adafruit_tsl2591.GAIN_MAX = 48
    Max gain (9876x)

adafruit_tsl2591.GAIN_MED = 16
    Medium gain (25x)

adafruit_tsl2591.INTEGRATIONTIME_100MS = 0
    100 millis
```

adafruit_tsl2591.**INTEGRATIONTIME_200MS** = 1
200 millis

adafruit_tsl2591.**INTEGRATIONTIME_300MS** = 2
300 millis

adafruit_tsl2591.**INTEGRATIONTIME_400MS** = 3
400 millis

adafruit_tsl2591.**INTEGRATIONTIME_500MS** = 4
500 millis

adafruit_tsl2591.**INTEGRATIONTIME_600MS** = 5
600 millis

class adafruit_tsl2591.**TSL2591** (*i2c, address=41*)

TSL2591 high precision light sensor. :param busio.I2C i2c: The I2C bus connected to the sensor :param int address: The I2C address of the sensor. If not specified the sensor default will be used.

disable ()

Disable the device and go into low power mode.

enable ()

Put the device in a fully powered enabled mode.

full_spectrum

Read the full spectrum (IR + visible) light and return its value as a 32-bit unsigned number.

gain

Get and set the gain of the sensor. Can be a value of:

- GAIN_LOW (1x)
- GAIN_MED (25x)
- GAIN_HIGH (428x)
- GAIN_MAX (9876x)

infrared

Read the infrared light and return its value as a 16-bit unsigned number.

integration_time

Get and set the integration time of the sensor. Can be a value of:

- INTEGRATIONTIME_100MS (100 millis)
- INTEGRATIONTIME_200MS (200 millis)
- INTEGRATIONTIME_300MS (300 millis)
- INTEGRATIONTIME_400MS (400 millis)
- INTEGRATIONTIME_500MS (500 millis)
- INTEGRATIONTIME_600MS (600 millis)

lux

Read the sensor and calculate a lux value from both its infrared and visible light channels. Note: lux is not calibrated!

raw_luminosity

Read the raw luminosity from the sensor (both IR + visible and IR only channels) and return a 2-tuple of those values. The first value is IR + visible luminosity (channel 0) and the second is the IR only (channel 1). Both values are 16-bit unsigned numbers (0-65535).

visible

Read the visible light and return its value as a 32-bit unsigned number.

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