AdafruitTSL2591 Library Documentation

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Contents

1 Dependencies **3**

2 Installing from PyPI **5**

3 Usage Example **7**

4 Contributing **9**

5 Documentation **11**

6 Table of Contents **13**

6.1 Simple test 13

6.2 `adafruit_tsl2591` 14

6.2.1 Implementation Notes 14

7 Indices and tables **17**

Python Module Index **19**

Index **21**

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.

CHAPTER 6

Table of Contents

6.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/tsl2591_simpletest.py

```
# SPDX-FileCopyrightText: 2021 ladyada for Adafruit Industries
# SPDX-License-Identifier: MIT

# Simple demo of the TSL2591 sensor.  Will print the detected light value
# every second.
import time
import board
import adafruit_tsl2591

# Create sensor object, communicating over the board's default I2C bus
i2c = board.I2C()  # uses board.SCL and board.SDA

# Initialize the sensor.
sensor = adafruit_tsl2591.TSL2591(i2c)

# You can optionally change the gain and integration time:
# sensor.gain = adafruit_tsl2591.GAIN_LOW (1x gain)
# sensor.gain = adafruit_tsl2591.GAIN_MED (25x gain, the default)
# sensor.gain = adafruit_tsl2591.GAIN_HIGH (428x gain)
# sensor.gain = adafruit_tsl2591.GAIN_MAX (9876x gain)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_100MS (100ms, default)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_200MS (200ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_300MS (300ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_400MS (400ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_500MS (500ms)
# sensor.integration_time = adafruit_tsl2591.INTEGRATIONTIME_600MS (600ms)

```

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```
# Read the total lux, IR, and visible light levels and print it every second.
while True:
    # Read and calculate the light level in lux.
    lux = sensor.lux
    print("Total light: {0}lux".format(lux))
    # You can also read the raw infrared and visible light levels.
    # These are unsigned, the higher the number the more light of that type.
    # There are no units like lux.
    # Infrared levels range from 0-65535 (16-bit)
    infrared = sensor.infrared
    print("Infrared light: {0}".format(infrared))
    # Visible-only levels range from 0-2147483647 (32-bit)
    visible = sensor.visible
    print("Visible light: {0}".format(visible))
    # Full spectrum (visible + IR) also range from 0-2147483647 (32-bit)
    full_spectrum = sensor.full_spectrum
    print("Full spectrum (IR + visible) light: {0}".format(full_spectrum))
    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.

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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 supported boards: https://circuitpython.org/downloads
- 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.

Parameters

- **i2c** (*I2C*) – The I2C bus the device is connected to
- **address** (*int*) – The I2C device address. Defaults to `0x29`

Quickstart: Importing and using the device

Here is an example of using the *TSL2591* class. First you will need to import the libraries to use the sensor

```
import board
import adafruit_tsl2591
```

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_tsl2591.TSL2591(i2c)
```

Now you have access to the *lux*, *infrared visible* and *full_spectrum* attributes

```
lux = sensor.lux
infrared = sensor.infrared
visible = sensor.visible
full_spectrum = sensor.full_spectrum
```

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.

CHAPTER 7

Indices and tables

- genindex
- modindex
- search

Python Module Index

a

adafruit_tsl2591, 14

Index

A

adafruit_tsl2591 (*module*), 14

D

disable() (*adafruit_tsl2591.TSL2591 method*), 15

E

enable() (*adafruit_tsl2591.TSL2591 method*), 15

F

full_spectrum (*adafruit_tsl2591.TSL2591 attribute*), 15

G

gain (*adafruit_tsl2591.TSL2591 attribute*), 15
GAIN_HIGH (*in module adafruit_tsl2591*), 14
GAIN_LOW (*in module adafruit_tsl2591*), 14
GAIN_MAX (*in module adafruit_tsl2591*), 14
GAIN_MED (*in module adafruit_tsl2591*), 14

I

infrared (*adafruit_tsl2591.TSL2591 attribute*), 15
integration_time (*adafruit_tsl2591.TSL2591 attribute*), 15
INTEGRATIONTIME_100MS (*in module adafruit_tsl2591*), 14
INTEGRATIONTIME_200MS (*in module adafruit_tsl2591*), 14
INTEGRATIONTIME_300MS (*in module adafruit_tsl2591*), 14
INTEGRATIONTIME_400MS (*in module adafruit_tsl2591*), 14
INTEGRATIONTIME_500MS (*in module adafruit_tsl2591*), 15
INTEGRATIONTIME_600MS (*in module adafruit_tsl2591*), 15

L

lux (*adafruit_tsl2591.TSL2591 attribute*), 16

R

raw_luminosity (*adafruit_tsl2591.TSL2591 attribute*), 16

T

TSL2591 (*class in adafruit_tsl2591*), 15

V

visible (*adafruit_tsl2591.TSL2591 attribute*), 16