
Adafruit MPR121 Library Documentation

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Contents

1	Dependencies	3
2	Usage Example	5
3	Contributing	7
4	Building locally	9
4.1	Sphinx documentation	9
5	Table of Contents	11
5.1	Simple test	11
5.2	adafruit_mpr121	13
5.2.1	Implementation Notes	13
6	Indices and tables	15
	Python Module Index	17

Adafruit CircuitPython module for the MPR121 capacitive touch breakout board.

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 usage in the `examples/mpr121_simpletest.py` file.

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-mpr121 --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.

5.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/mpr121_simpletest.py

```
1  # Simple test of the MPR121 capacitive touch sensor library.
2  # Will print out a message when any of the 12 capacitive touch inputs of the
3  # board are touched. Open the serial REPL after running to see the output.
4  # Author: Tony DiCola
5  import time
6  import board
7  import busio
8  # Import MPR121 module.
9  import adafruit_mpr121
10
11 # Create I2C bus.
12 i2c = busio.I2C(board.SCL, board.SDA)
13
14 # Create MPR121 object.
15 mpr121 = adafruit_mpr121.MPR121(i2c)
16
17 # Note you can optionally change the address of the device:
18 #mpr121 = adafruit_mpr121.MPR121(i2c, address=0x91)
19
20 # Loop forever testing each input and printing when they're touched.
21 while True:
22     # Loop through all 12 inputs (0-11).
23     for i in range(12):
24         # Call is_touched and pass it then number of the input. If it's touched
25         # it will return True, otherwise it will return False.
26         if mpr121[i].value:
27             print('Input {} touched!'.format(i))
```

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```
28 time.sleep(0.25) # Small delay to keep from spamming output messages.
```

Listing 2: examples/mpr121_piano.py

```
1 # MPR121 piano demo.
2 # Listens to the first 7 inputs of the MPR121 and plays a middle scale note
3 # when an input is touched. Note only one note is played at a time!
4 # For use with microcontrollers or computers with PWM support only!
5 # Author: Tony DiCola
6 # Modified by: Carter Nelson
7
8 import board
9 import busio
10 import pulseio
11
12 # Import MPR121 module.
13 import adafruit_mpr121
14
15
16 # Configure PWM buzzer and other state:
17 BUZZER_PIN = board.D9
18 TONE_ON_DUTY = 2**15 # Duty cycle of tone when turned on, a square wave.
19 TONE_OFF_DUTY = 0 # Duty cycle of tone when turned off, 0 or no signal.
20 NOTE_FREQS = [261, # Input 0 = 261 hz = middle C
21               294, # Input 1 = middle D
22               329, # Input 2 = middle E
23               349, # Input 3 = middle F
24               392, # Input 4 = middle G
25               440, # Input 5 = middle A
26               493, # Input 6 = middle B
27               0,   # Input 7 = nothing (set to a frequency in hertz!)
28               0,   # Input 8
29               0,   # Input 9
30               0,   # Input 10
31               0]  # Input 11
32
33
34 # Create I2C bus.
35 i2c = busio.I2C(board.SCL, board.SDA)
36
37 # Create MPR121 class.
38 mpr121 = adafruit_mpr121.MPR121(i2c)
39 # Note you can optionally change the address of the device:
40 #mpr121 = adafruit_mpr121.MPR121(i2c, address=0x91)
41
42 #pylint: disable-msg=no-member
43 # Setup buzzer PWM output.
44 buzzer = pulseio.PWMOut(BUZZER_PIN, duty_cycle=TONE_OFF_DUTY, frequency=440,
45                          variable_frequency=True)
46 #pylint: disable-msg=no-member
47
48 last_note = None
49 while True:
50     # Get touched state for all pins
51     touched = mpr121.touched_pins
52     # If no pins are touched, be quiet
```

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```

53     if True not in touched:
54         last_note = None
55         buzzer.duty_cycle = TONE_OFF_DUTY
56         continue
57     # Get index of touched pin
58     note = touched.index(True)
59     # Play note if pin is different and has a defined note
60     if note != last_note and NOTE_FREQS[note] != 0:
61         last_note = note
62         buzzer.frequency = NOTE_FREQS[note]
63         buzzer.duty_cycle = TONE_ON_DUTY

```

5.2 adafruit_mpr121

CircuitPython driver for the MPR121 capacitive touch breakout board.

See usage in the examples/simpletest.py file.

- Author(s): Tony DiCola

5.2.1 Implementation Notes

Hardware:

- Adafruit 12-Key Capacitive Touch Sensor Breakout - MPR121 (Product ID: 1982)
- Adafruit 12 x Capacitive Touch Shield for Arduino - MPR121 (Product ID: 2024)

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_mpr121.MPR121` (*i2c*, *address=90*)
Driver for the MPR121 capacitive touch breakout board.

baseline_data (*pin*)

Return baseline data register value for the provided pin (0-11). Useful for debugging.

filtered_data (*pin*)

Return filtered data register value for the provided pin (0-11). Useful for debugging.

is_touched (*pin*)

Return True if the specified pin is being touched, otherwise returns False.

reset ()

Reset the MPR121 into a default state ready to detect touch inputs.

touched ()

Return touch state of all pins as a 12-bit value where each bit represents a pin, with a value of 1 being touched and 0 not being touched.

touched_pins

A tuple of touched state for all pins.

```
class adafruit_mpr121.MPR121_Channel (mpr121, channel)
    Helper class to represent a touch channel on the MPR121. Not meant to be used directly.

    raw_value
        The raw touch measurement.

    release_threshold
        The release threshold.

    threshold
        The touch threshold.

    value
        Whether the touch pad is being touched or not.
```

CHAPTER 6

Indices and tables

- `genindex`
- `modindex`
- `search`

a

adafruit_mpr121, [13](#)

A

`adafruit_mpr121` (*module*), 13

B

`baseline_data()` (*adafruit_mpr121.MPR121 method*), 13

F

`filtered_data()` (*adafruit_mpr121.MPR121 method*), 13

I

`is_touched()` (*adafruit_mpr121.MPR121 method*), 13

M

`MPR121` (*class in adafruit_mpr121*), 13

`MPR121_Channel` (*class in adafruit_mpr121*), 13

R

`raw_value` (*adafruit_mpr121.MPR121_Channel attribute*), 14

`release_threshold` (*adafruit_mpr121.MPR121_Channel attribute*), 14

`reset()` (*adafruit_mpr121.MPR121 method*), 13

T

`threshold` (*adafruit_mpr121.MPR121_Channel attribute*), 14

`touched()` (*adafruit_mpr121.MPR121 method*), 13

`touched_pins` (*adafruit_mpr121.MPR121 attribute*), 13

V

`value` (*adafruit_mpr121.MPR121_Channel attribute*), 14