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# **Adafruit MPR121 Library Documentation**

*Release 1.0*

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Adafruit CircuitPython module for the MPR121 capacitive touch breakout board.



# 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-mpu121
```

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

```
sudo pip3 install adafruit-circuitpython-mpu121
```

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-mpu121
```



## CHAPTER 3

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### Usage Example

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



## 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/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

```

## 6.2 adafruit\_mpr121

CircuitPython driver for the MPR121 capacitive touch breakout board.

See usage in the examples/simpletest.py file.

- Author(s): Tony DiCola

### 6.2.1 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](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 7

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### Indices and tables

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