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# AdafruitPN532 Library Documentation

*Release 1.0*

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CircuitPython driver for the [PN532 NFC/RFID Breakout](#) and [PN532 NFC/RFID Shield](#)



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](#).

## 1.1 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-pn532
```

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

```
sudo pip3 install adafruit-circuitpython-pn532
```

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-pn532
```





## CHAPTER 2

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### Usage Example

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Check `examples/pn532_simpletest.py` for usage example



## 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.



## CHAPTER 4

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### Documentation

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For information on building library documentation, please check out [this guide](#).



## 5.1 Simple test

Ensure your device works with this simple test.

Listing 1: examples/pn532\_simpletest.py

```
1  """
2  This example shows connecting to the PN532 with I2C (requires clock
3  stretching support), SPI, or UART. SPI is best, it uses the most pins but
4  is the most reliable and universally supported.
5  After initialization, try waving various 13.56MHz RFID cards over it!
6  """
7
8  import board
9  import busio
10 from digitalio import DigitalInOut
11 #
12 # NOTE: pick the import that matches the interface being used
13 #
14 from adafruit_pn532.i2c import PN532_I2C
15 #from adafruit_pn532.spi import PN532_SPI
16 #from adafruit_pn532.uart import PN532_UART
17
18 # I2C connection:
19 i2c = busio.I2C(board.SCL, board.SDA)
20
21 # Non-hardware
22 #pn532 = PN532_I2C(i2c, debug=False)
23
24 # With I2C, we recommend connecting RSTPD_N (reset) to a digital pin for manual
25 # hardware reset
26 reset_pin = DigitalInOut(board.D6)
27 # On Raspberry Pi, you must also connect a pin to P32 "H_Request" for hardware
```

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```

28 # wakeup! this means we don't need to do the I2C clock-stretch thing
29 req_pin = DigitalInOut(board.D12)
30 pn532 = PN532_I2C(i2c, debug=False, reset=reset_pin, req=req_pin)
31
32 # SPI connection:
33 #spi = busio.SPI(board.SCK, board.MOSI, board.MISO)
34 #cs_pin = DigitalInOut(board.D5)
35 #pn532 = PN532_SPI(spi, cs_pin, debug=False)
36
37 # UART connection
38 #uart = busio.UART(board.TX, board.RX, baudrate=115200, timeout=100)
39 #pn532 = PN532_UART(uart, debug=False)
40
41 ic, ver, rev, support = pn532.get_firmware_version()
42 print('Found PN532 with firmware version: {0}.{1}'.format(ver, rev))
43
44 # Configure PN532 to communicate with MiFare cards
45 pn532.SAM_configuration()
46
47 print('Waiting for RFID/NFC card...')
48 while True:
49     # Check if a card is available to read
50     uid = pn532.read_passive_target(timeout=0.5)
51     print('.', end="")
52     # Try again if no card is available.
53     if uid is None:
54         continue
55     print('Found card with UID:', [hex(i) for i in uid])

```

## 5.2 adafruit\_pn532

This module will let you communicate with a PN532 RFID/NFC shield or breakout using I2C, SPI or UART.

- Author(s): Original Raspberry Pi code by Tony DiCola, CircuitPython by ladyada

### 5.2.1 Implementation Notes

#### Hardware:

- Adafruit PN532 Breakout
- Adafruit PN532 Shield

#### 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)

**exception** `adafruit_pn532.adafruit_pn532.BusyError`  
Base class for exceptions in this module.

**class** `adafruit_pn532.adafruit_pn532.PN532` (\*, *debug=False*, *reset=None*)  
PN532 driver base, must be extended for I2C/SPI/UART interfacing

**SAM\_configuration()**  
Configure the PN532 to read MiFare cards.



**call\_function** (*command, response\_length=0, params=[], timeout=1*)

Send specified command to the PN532 and expect up to *response\_length* bytes back in a response. Note that less than the expected bytes might be returned! Params can optionally specify an array of bytes to send as parameters to the function call. Will wait up to *timeout* seconds for a response and return a bytearray of response bytes, or None if no response is available within the timeout.

**get\_firmware\_version** ()

Call PN532 GetFirmwareVersion function and return a tuple with the IC, Ver, Rev, and Support values.

**mifare\_classic\_authenticate\_block** (*uid, block\_number, key\_number, key*)

Authenticate specified block number for a MiFare classic card. Uid should be a byte array with the UID of the card, block number should be the block to authenticate, key number should be the key type (like MIFARE\_CMD\_AUTH\_A or MIFARE\_CMD\_AUTH\_B), and key should be a byte array with the key data. Returns True if the block was authenticated, or False if not authenticated.

**mifare\_classic\_read\_block** (*block\_number*)

Read a block of data from the card. Block number should be the block to read. If the block is successfully read a bytearray of length 16 with data starting at the specified block will be returned. If the block is not read then None will be returned.

**mifare\_classic\_write\_block** (*block\_number, data*)

Write a block of data to the card. Block number should be the block to write and data should be a byte array of length 16 with the data to write. If the data is successfully written then True is returned, otherwise False is returned.

**ntag2xx\_read\_block** (*block\_number*)

Read a block of data from the card. Block number should be the block to read. If the block is successfully read a bytearray of length 16 with data starting at the specified block will be returned. If the block is not read then None will be returned.

**ntag2xx\_write\_block** (*block\_number, data*)

Write a block of data to the card. Block number should be the block to write and data should be a byte array of length 4 with the data to write. If the data is successfully written then True is returned, otherwise False is returned.

**read\_passive\_target** (*card\_baud=<sphinx.ext.autodoc.importer.MockObject object>, timeout=1*)

Wait for a MiFare card to be available and return its UID when found. Will wait up to *timeout* seconds and return None if no card is found, otherwise a bytearray with the UID of the found card is returned.

## 5.3 adafruit\_pn532.i2c

This module will let you communicate with a PN532 RFID/NFC shield or breakout using I2C.

- **Author(s): Original Raspberry Pi code by Tony DiCola, CircuitPython by ladyada,** refactor by Carter Nelson

**class** `adafruit_pn532.i2c.PN532_I2C` (*i2c, \*, irq=None, reset=None, req=None, debug=False*)  
Driver for the PN532 connected over I2C.

## 5.4 adafruit\_pn532.spi

This module will let you communicate with a PN532 RFID/NFC shield or breakout using SPI.

- **Author(s): Original Raspberry Pi code by Tony DiCola, CircuitPython by ladyada,** refactor by Carter Nelson

**class** `adafruit_pn532.spi.PN532_SPI` (*spi, cs\_pin, \*, irq=None, reset=None, debug=False*)

Driver for the PN532 connected over SPI. Pass in a hardware or bitbang SPI device & chip select digitalInOut pin. Optional IRQ pin (not used), reset pin and debugging output.

`adafruit_pn532.spi.reverse_bit` (*num*)

Turn an LSB byte to an MSB byte, and vice versa. Used for SPI as it is LSB for the PN532, but 99% of SPI implementations are MSB only!

## 5.5 `adafruit_pn532.uart`

This module will let you communicate with a PN532 RFID/NFC shield or breakout using UART.

- **Author(s):** Original Raspberry Pi code by Tony DiCola, CircuitPython by ladyada, refactor by Carter Nelson

**class** `adafruit_pn532.uart.PN532_UART` (*uart, \*, irq=None, reset=None, debug=False*)

Driver for the PN532 connected over Serial UART

## CHAPTER 6

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### Indices and tables

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