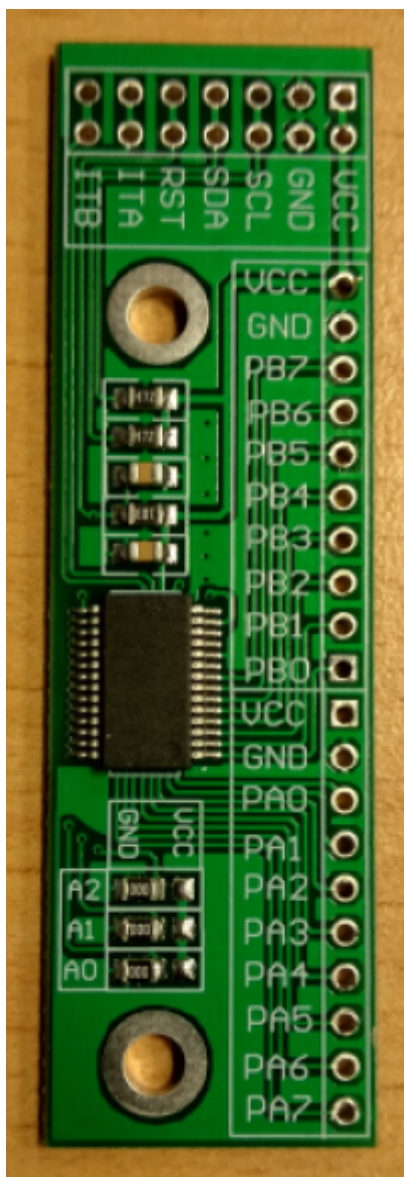


# Usage GPIO with I2C I/O expander

There is no GPIO on external I/O port of **ODROID-H2**. But, You can use GPIO with I2C I/O expander.



16 Port I2C GPIO Board Header Pin			
VCC	Power Supply Input (1.8V ~ 5.0V)		
GND	Ground		
SCL	I2C Serial Clock Input		
SDA	I2C Serial Data Input/Output		
RST	MCP23017 Reset (Active Low)		
ITA	Interrupt Output for Port A (PA0 ~ PA7), Output Configurable		
ITB	Interrupt Output for Port B (PB0 ~ PB7), Output Configurable		
I2C Address configuration			
A0	A1	A2	I2C Address
GND	GND	GND	0x20 (Default)
GND	GND	VCC	0x22
GND	VCC	GND	0x24

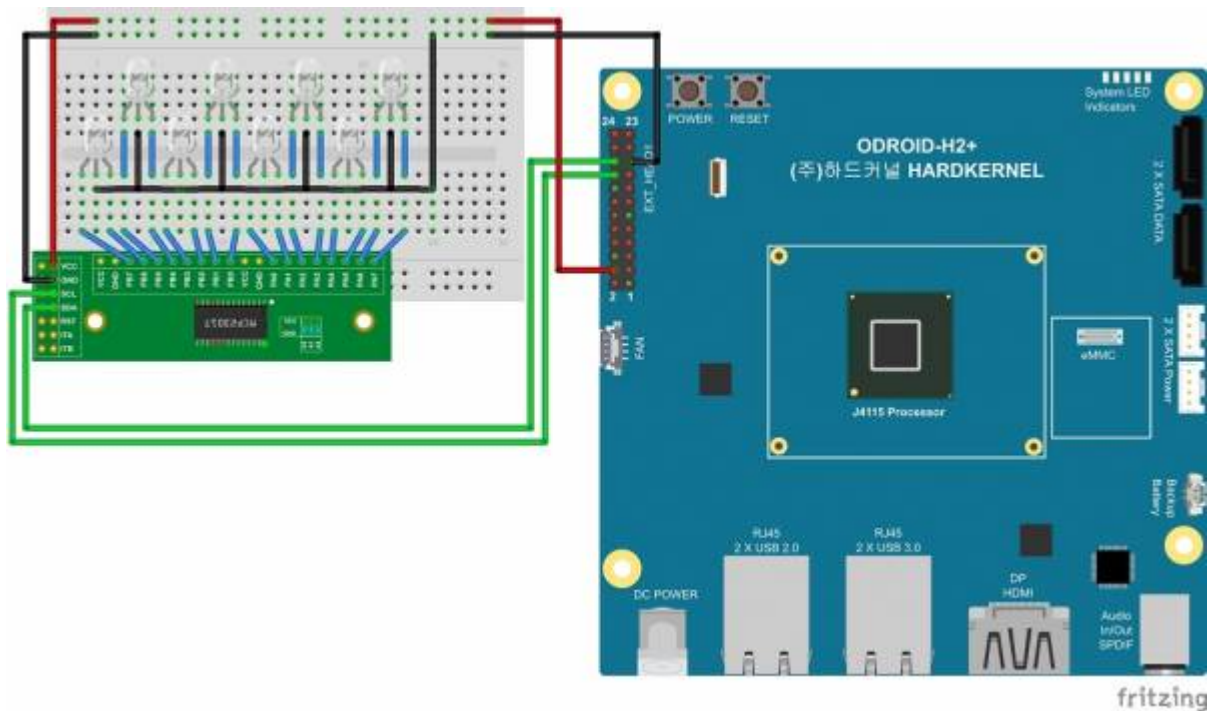
GND	VCC	VCC	0x26
VCC	GND	GND	0x28
VCC	GND	VCC	0x2A
VCC	VCC	GND	0x2C
VCC	VCC	VCC	0x2D

## An LED example with MCP23017 I2C GPIO expander

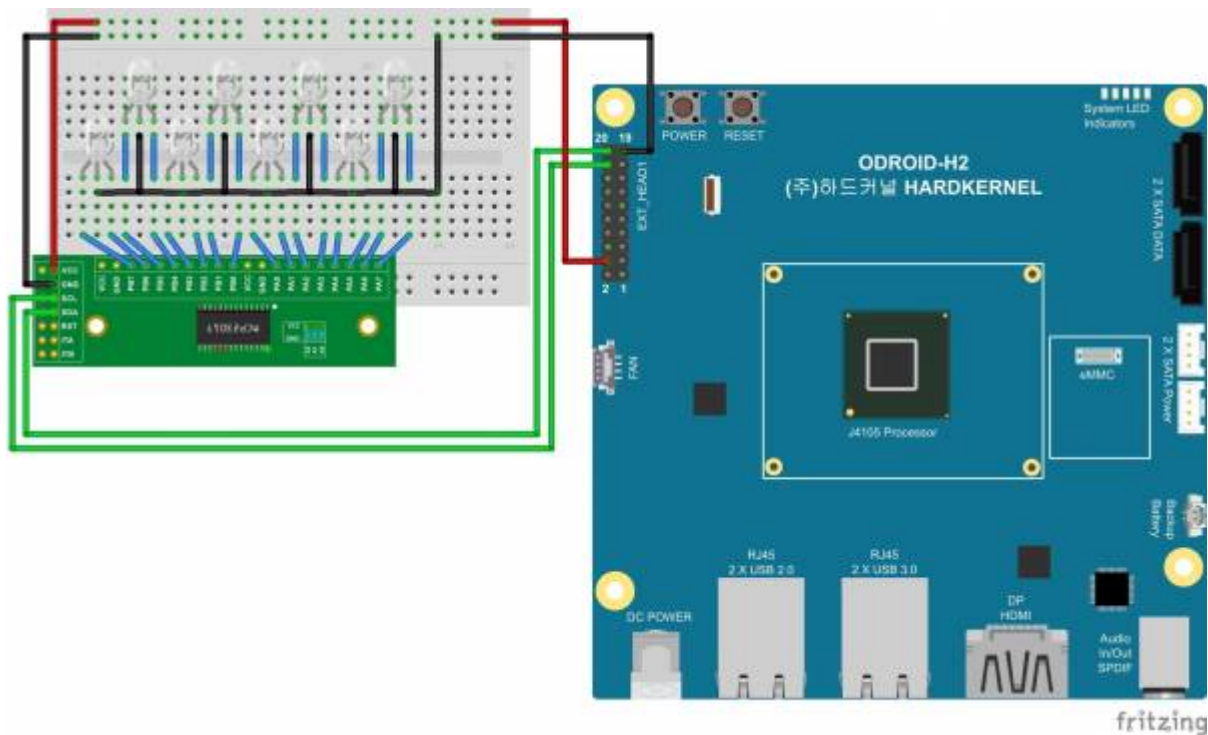
### Wiring

We're going to make an LED example with the GPIO expander([MCP23017 Datasheet](#)).

## H2+



## H2



[Download fritzing](#)

- MCP23017 board part

i2c\_io\_expander.fzpz

- ODROID-H2+ part

odroid-h2plus.fzpz

- ODROID-H2 part

odroid-h2.fzpz

- fritzing parts(H2)

i2c\_io\_expander.fzz

- fritzing parts(H2+)

h2plus\_i2c\_io\_expander.fzz

### Connection Check

If you have done the wiring well, you can see the device as the following commands.

```
sudo apt install i2c-tools
```

- If you're using an older kernel than 4.18, tap the "Old kernel version".

## kernel 4.18 or higher

When you have wired the GPIO expander to Pin #18(SCL) and #20(SDA).

```
sudo i2cdetect -y -r 2
```

When you have wired the GPIO expander to Pin #13(SCL) and #15(SDA).

```
sudo i2cdetect -y -r 3
```

## Old kernel version

When you have wired the GPIO expander to Pin #18(SCL) and #20(SDA).

```
sudo i2cdetect -y -r 5
```

When you have wired the GPIO expander to Pin #13(SCL) and #15(SDA).

```
sudo i2cdetect -y -r 6
```

## Install & build python packages

```
sudo apt install git python3-dev libi2c-dev python3-smbus
```

If you got this error.

```
E: Unable to locate package python3-smbus
```

Build the python3-smbus package.

```
git clone https://github.com/tkurbad/python3-smbus.git
cd python3-smbus
python3 setup.py build
python3 setup.py install
```

## Get source code

```
git clone https://github.com/hardkernel/16port_i2c_gpio.git
```

## Run led\_example

```
chmod +x mcp23017.py
```

```
./mcp23017.py -h
odroid@odroid:~/work/mcp23017_python$ ./mcp23017.py -h
Usage: mcp23017.py I2CBUS blink
       mcp23017.py I2CBUS -w GPIO [1|0]
       mcp23017.py I2CBUS -r GPIO
```

#### Options:

```
-h, --help    show this help message and exit
-w, --write   Write HIGH or LOW to GPIO
-r, --read    Read from GPIO
-a, --all     All off or on
```

- If you're using an older kernel than 4.18, tap the "Old kernel version".

## kernel 4.18 or higher

When you have wired the GPIO expander to Pin #18(SCL) and #20(SDA).

```
sudo ./mcp23017.py 2 blink
sudo ./mcp23017.py 2 -w 0 1
sudo ./mcp23017.py 2 -r 5
```

When you have wired the I/O expander to Pin #13(SCL) and #15(SDA).

```
sudo ./mcp23017.py 3 blink
sudo ./mcp23017.py 3 -w 0 1
sudo ./mcp23017.py 3 -r 5
```

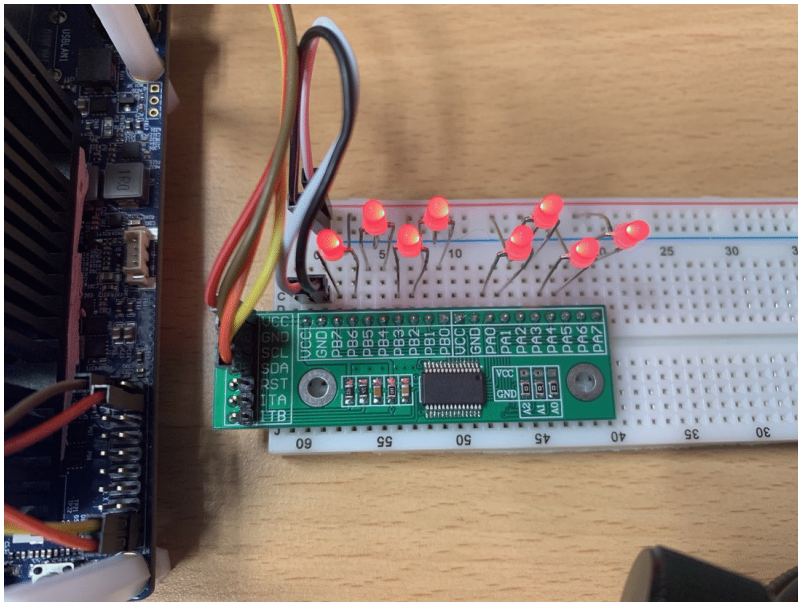
## Old kernel version

When you have wired the GPIO expander to Pin #18(SCL) and #20(SDA).

```
sudo ./mcp23017.py 5 blink
sudo ./mcp23017.py 5 -w 0 1
sudo ./mcp23017.py 5 -r 5
```

When you have wired the I/O expander to Pin #13(SCL) and #15(SDA).

```
sudo ./mcp23017.py 6 blink
sudo ./mcp23017.py 6 -w 0 1
sudo ./mcp23017.py 6 -r 5
```

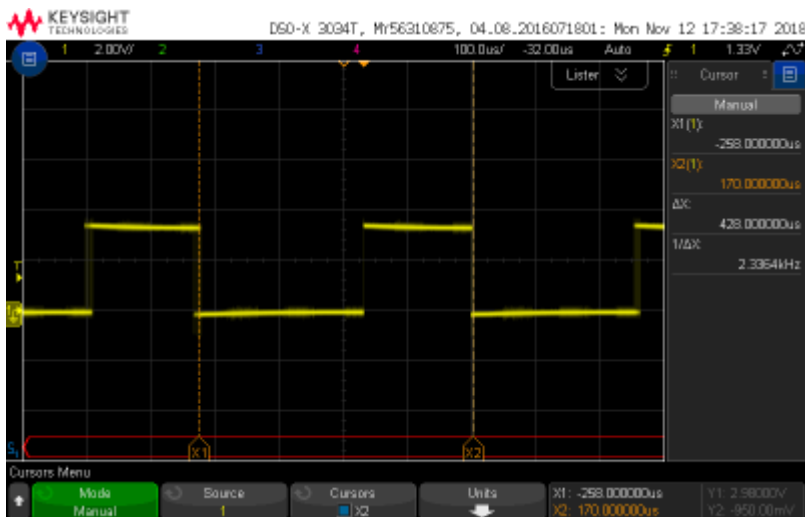


## Changing the I2C speed

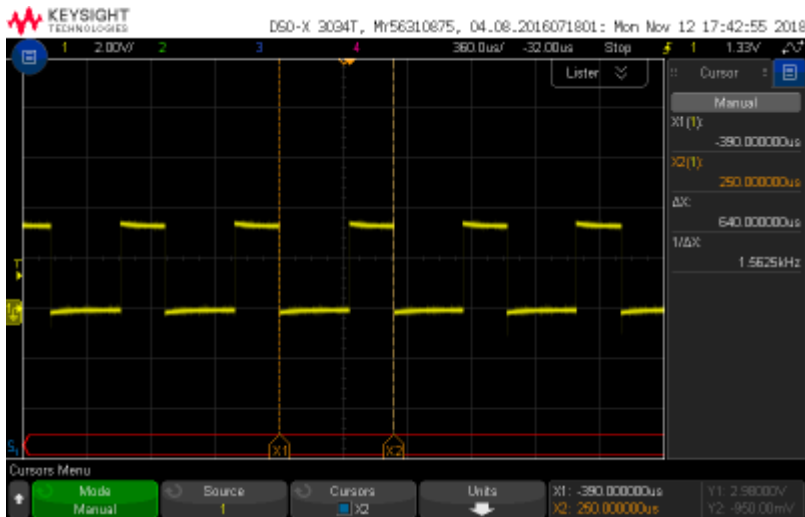
- [How to change I2C speed on BIOS](#)

## GPIO toggle frequency on mcp23017

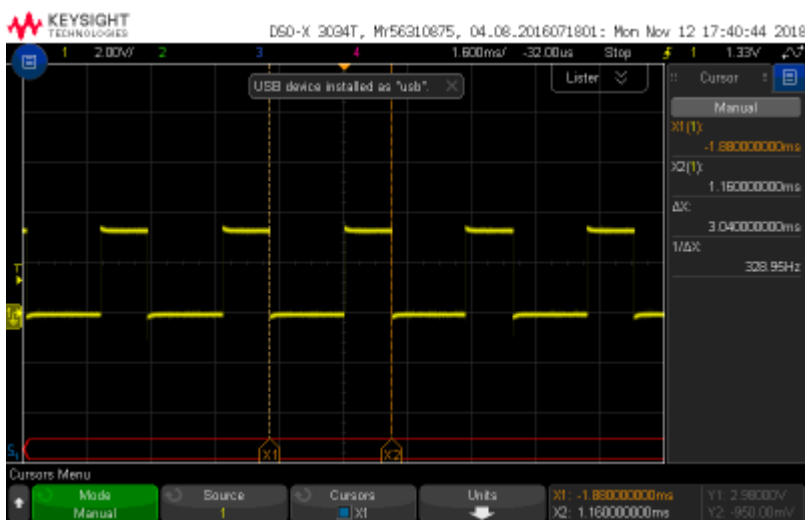
### 1MHz I2C Speed



### 400kHz I2C Speed



### 100kHz I2C Speed



### GPIO output current

Output Low : 8.0mA  
Output High : 3.0 mA

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