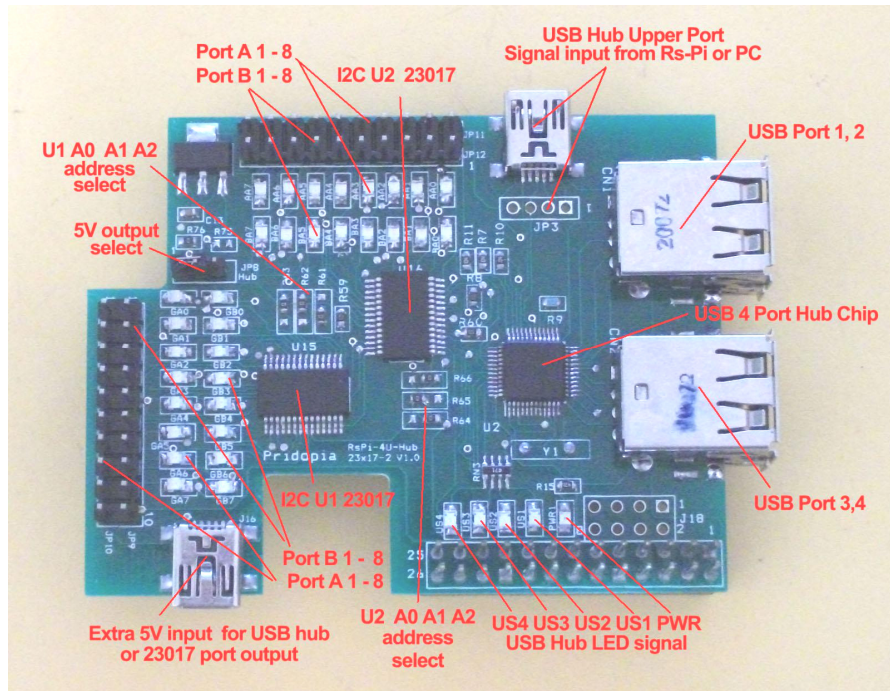


Rs-Pi-4 USB hub & 23017x2 User Manual



1. J16 Mini USB 5V input
2. J18 Rs-Pi V2 GPIO output
3. JP10 GA0 ~ GA7, GND, Vcc U15 Port A
4. JP9 GB0 ~ GB7, GND, Vcc U15 Port B
5. JP11 AA0 ~ AA7, GND, Vcc U16 Port A
6. JP12 BA0 ~ BA7, GND, Vcc U16 Port B
7. R61, R62, R63 (for U13 Address select A0, A1, A2)
8. R64, R65, R66 (for U14 Address select A0, A1, A2)
9. U15 (21) 23017 -1 Port A, B
10. U16 (22) 23017-2 Port A, B
11. JP8 Power input select (J16) for USB hub or GPIO output to PIN 10
12. J18 for RS-Pi V2 GPIO connector (got 4 more GPIO pin)

Enable USB hub function.

* use the Mini USB to USB cable we provide plug in one of the Raspberry Pi USB port to this 4 Port USB hub board Mini USB connector upper of the JP3

1. Make sure you I2C driver are enable

To enable it all you need to do is comment out a line by putting # in front
`sudo nano /etc/modprobe.d/raspi-blacklist.conf`

```
COM37 - PuTTY
# blacklist spi and i2c by default (many users don't need them)
#blacklist spi-bcm2708
#blacklist i2c-bcm2708

[ Read 4 lines ]
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C
^X Exit      ^J Justify   ^W Where Is  ^V Next Page  ^U UnCut Text ^T
To Spell
```

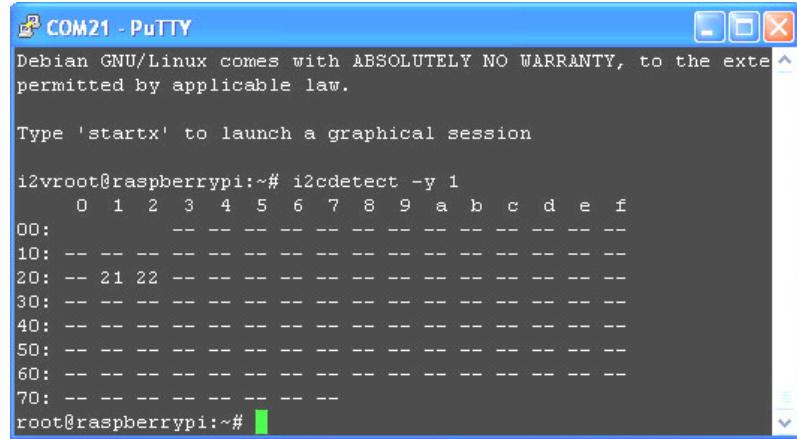
2. Add i2c-dev in /etc/modules by use
`sudo nano /etc/modules`

```
COM37 - PuTTY
# /etc/modules: kernel modules to load at boot time.
#
# This file contains the names of kernel modules that should be load
ed
# at boot time, one per line. Lines beginning with "#" are ignored.
# Parameters can be specified after the module name.

snd-bcm2835
spi-bcm2708
i2c-bcm2708
i2c-dev
rtc-1307
tmp102

[ Read 12 lines ]
^G Get Help  ^O WriteOut  ^R Read File  ^Y Prev Page  ^K Cut Text   ^C
^X Exit      ^J Justify   ^W Where Is  ^V Next Page  ^U UnCut Text ^T
To Spell
```

If you already install I2c driver , then
`i2cdetect -y 0` `i2cdetect -y 1`
if Rs-Pi-v2 you need change 0 to 1

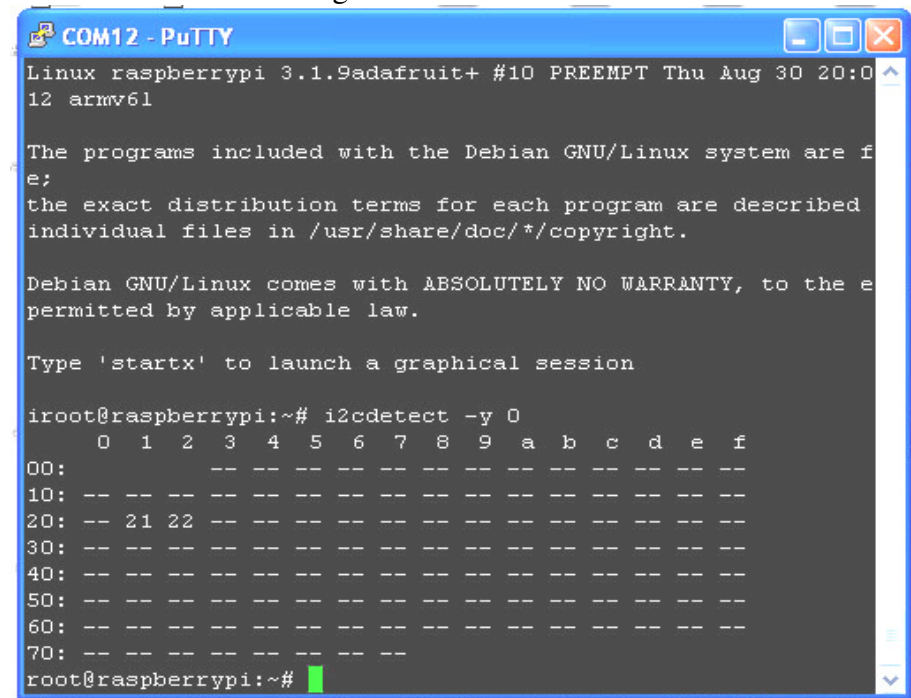


```
COM21 - PuTTY
Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent permitted by applicable law.

Type 'startx' to launch a graphical session

i2vroot@raspberrypi:~# i2cdetect -y 1
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
20:  -- 21 22 --  --  --  --  --  --  --  --  --  --  --  --
30:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
50:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
60:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
70:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
root@raspberrypi:~#
```

You should see something like



```
COM12 - PuTTY
Linux raspberrypi 3.1.9adafruit+ #10 PREEMPT Thu Aug 30 20:0
12 armv6l

The programs included with the Debian GNU/Linux system are f
e;
the exact distribution terms for each program are described
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the e
permitted by applicable law.

Type 'startx' to launch a graphical session

iroot@raspberrypi:~# i2cdetect -y 0
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
20:  -- 21 22 --  --  --  --  --  --  --  --  --  --  --  --
30:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
50:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
60:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
70:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
root@raspberrypi:~#
```

i2c bus detect status 21 & 22 -> 23017 x2

you can change this address

Next install the python-smbus python module:

```
sudo apt-get install python-smbus
```

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

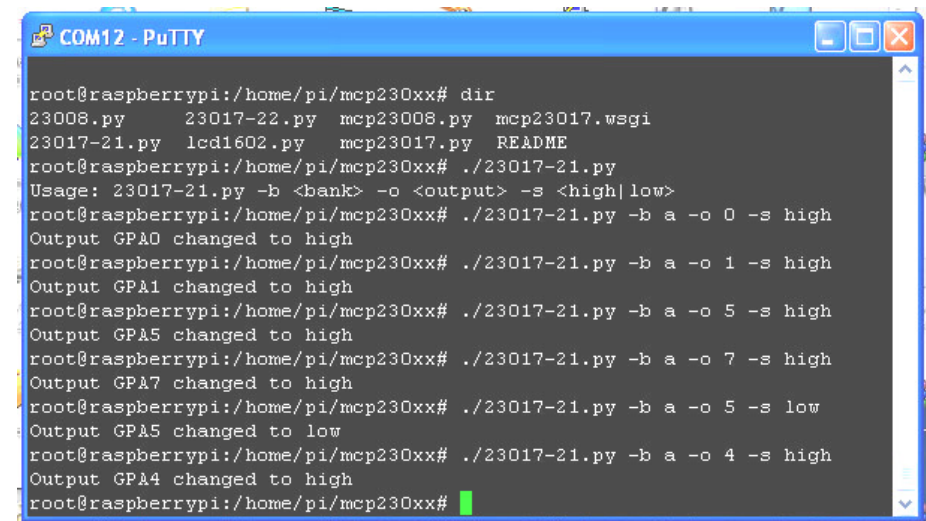
Now you are ready to use the i2c with python.

Some 23017 program information

<http://nathan.chantrell.net/20120524/python-tools-for-the-mcp23017-io-expander/>

<http://nathan.chantrell.net/20120602/raspberry-pi-io-expander-board>

<http://learn.adafruit.com/mcp230xx-gpio-expander-on-the-raspberry-pi/hooksing-it-all-up>



```
COM12 - PuTTY
root@raspberrypi:/home/pi/mcp230xx# dir
23008.py  23017-22.py  mcp23008.py  mcp23017.wsgi
23017-21.py  lcd1602.py  mcp23017.py  README
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py
Usage: 23017-21.py -b <bank> -o <output> -s <high|low>
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 0 -s high
Output GPA0 changed to high
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 1 -s high
Output GPA1 changed to high
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 5 -s high
Output GPA5 changed to high
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 7 -s high
Output GPA7 changed to high
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 5 -s low
Output GPA5 changed to low
root@raspberrypi:/home/pi/mcp230xx# ./23017-21.py -b a -o 4 -s high
Output GPA4 changed to high
root@raspberrypi:/home/pi/mcp230xx#
```

use 23017-21.py set each bit to be High or Low

or use led-21.py and led-22.py led chaser program, can download from our web site

```

COM22 - PuTTY
Output test for MCP23017
 8  7  6  5  4  3  2  1
A1 [0] [0] [0] [0] [0] [0] [0] [1]
A2 [1] [0] [0] [1] [0] [0] [1] [0]
B1 [0] [0] [0] [0] [0] [0] [0] [1]
B2 [0] [0] [0] [0] [0] [0] [1] [0]

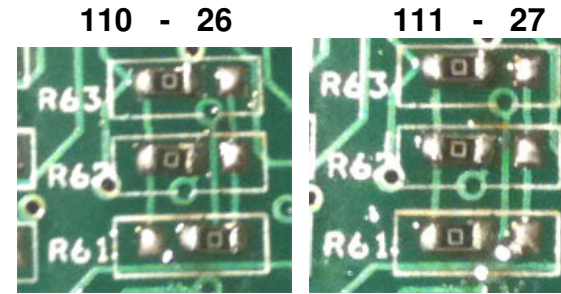
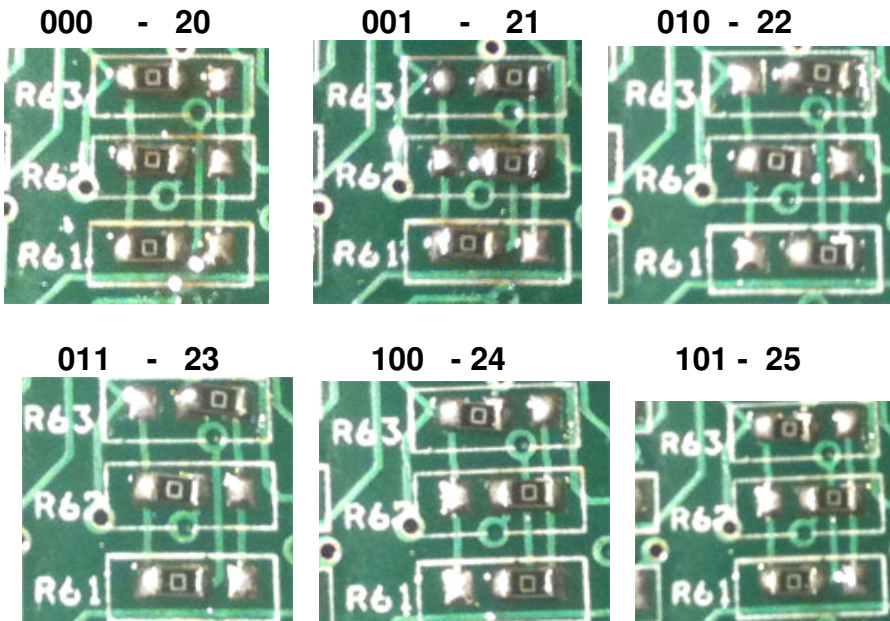
Enter the Bank ( A-B ), Port ( 1-2 ) and LED number ( 1-8 )
Type RES to Reset.
Example "A21" or "a21" will Toggle Bank A, Port 2, LED 1.
>

```

23017-2port-s-v103.py display all 32 GPIO status

A0, A1, A2 address

* right side GND low - 0 * left side Vcc High - 1



<https://pypi.python.org/pypi/RPi.GPIO> GPIO library

GPIO library - RPi.GPIO-0.5.3a.tar.gz

Install python , library and run the test program

```

# sudo apt-get install python-dev
# wget http://www.pridopia.co.uk/pi-pgm/RPi.GPIO-0.5.3a.tar.gz
# gunzip RPi.GPIO-0.5.3a.tar.gz
# tar -xvf RPi.GPIO-0.5.3a.tar
# cd RPi.GPIO-0.5.3a
# sudo python setup.py install
# sudo python xxx.py (xxx is your python program name)

```

Download test program on our web site Python & C

Python

<http://www.pridopia.co.uk/pi-23017-2-lp.html>

C code

<http://www.pridopia.co.uk/pi-i2c-23017x2-2803x2.html>

New Pridopia scratch interface software you can download from our web site

<http://www.pridopia.co.uk/rs-pi-set-scratch.html>

Command "i2"+ "address(20-27)" + "a" +"bit(1 to 8)" for Port A

Command "i2"+ "address(20-27)" + "b" +"bit(1 to 8)" for Port B

Command "bit"+ "address(20-27)" + "a" +"bit(8 to 1)" for Port A

Command "bit"+ "address(20-27)" + "b" +"bit(8 to 1)" for Port B

i221a1 --> i2c address 21 Port A bit 1 ON/OFF
i222b4 --> i2c address 22 Port B bit 4 ON/OFF

bit22b01010101 --> address 22 port B from bit 8 to 1
output --> 01010101

bit21a01010101 --> address 21 port A from bit 8 to 1
output --> 01010101

bit21aoff --> address 21 Port A all OFF/clear
bit21boff --> address 21 Port B all OFF/clear
bit22aoff --> address 22 Port A all OFF/clear



U1 to U2 i2c 23017 address 21,22