



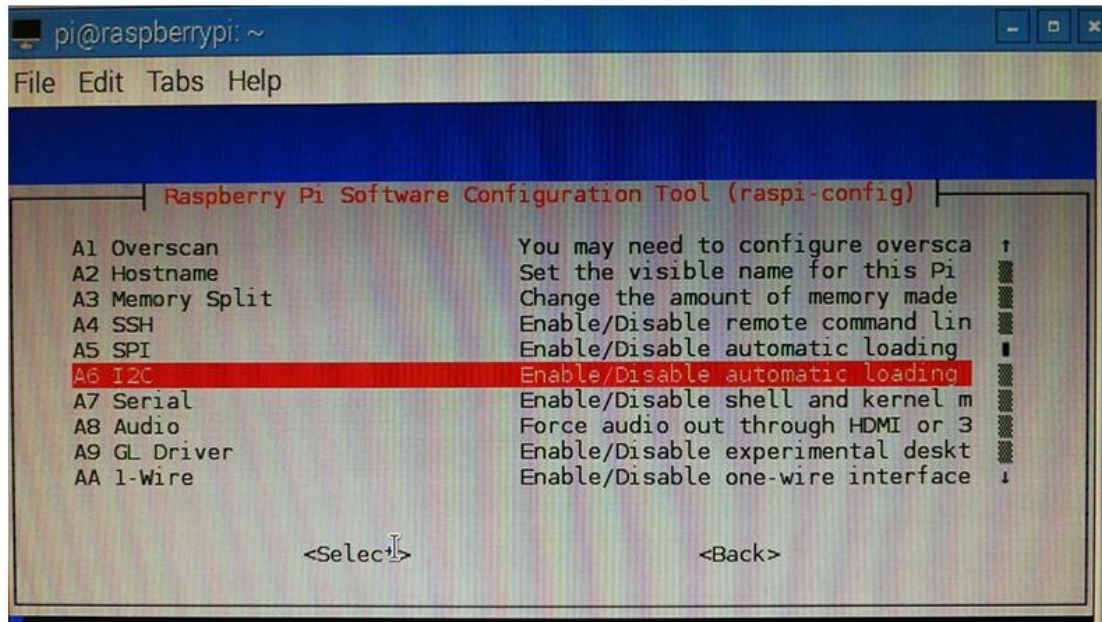
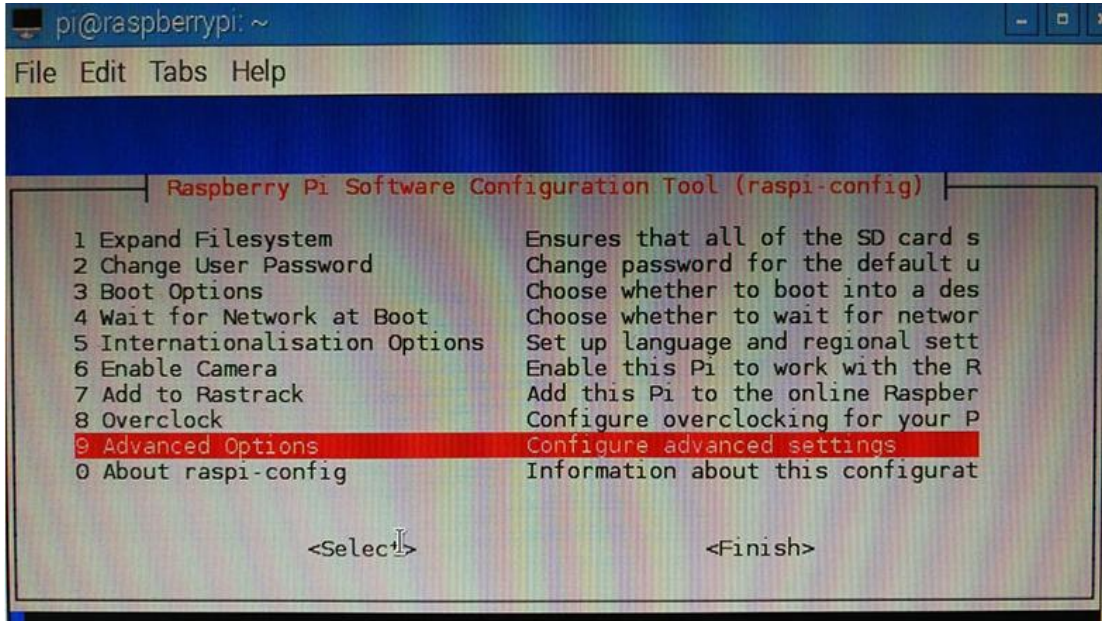
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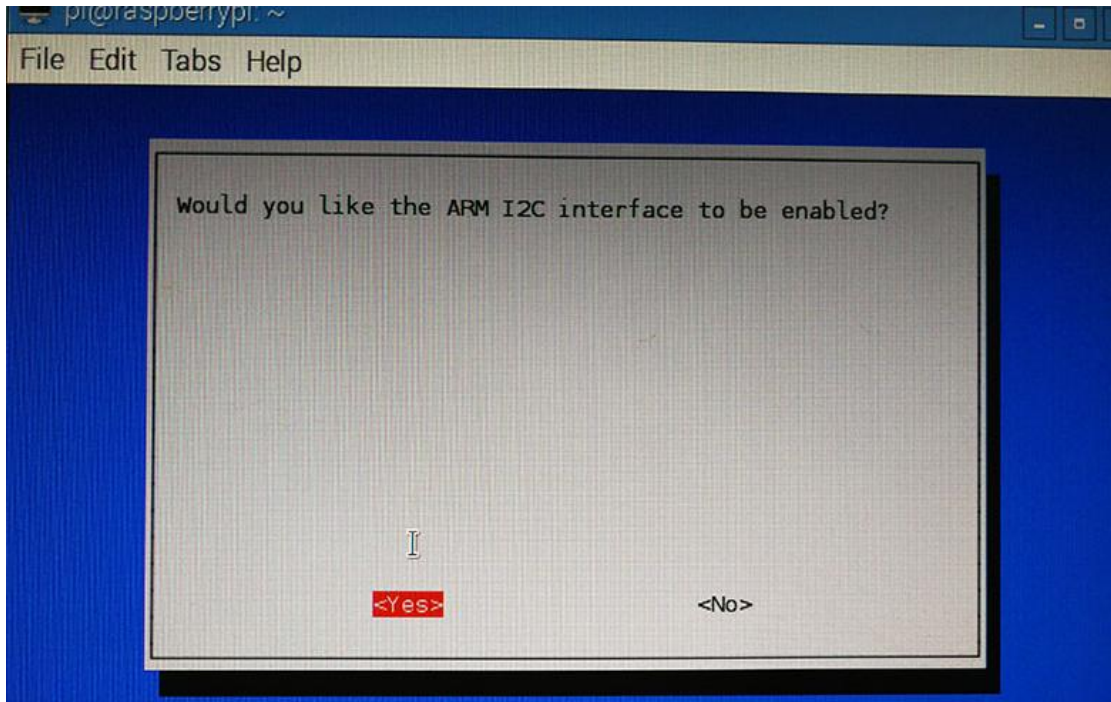
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# How to get Geekworm UPS HAT battery capacity and voltage by using the I2C tools

Open the I2C device:

`sudo raspi-config`



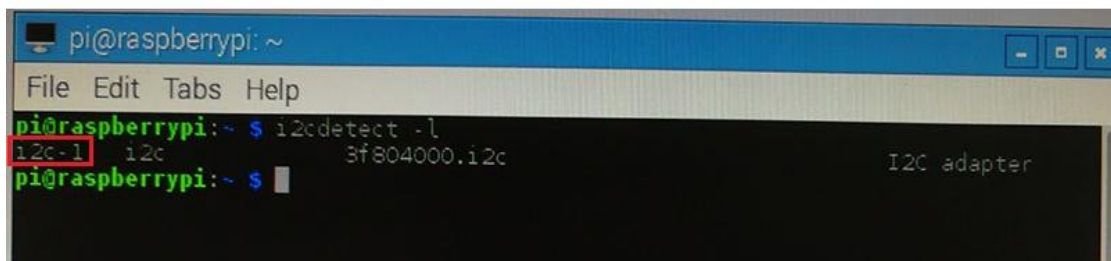


## Install the I2C-tools:

`sudo apt-get install i2c-tools`

To check the installation, please run command:

`sudo i2cdetect -l`

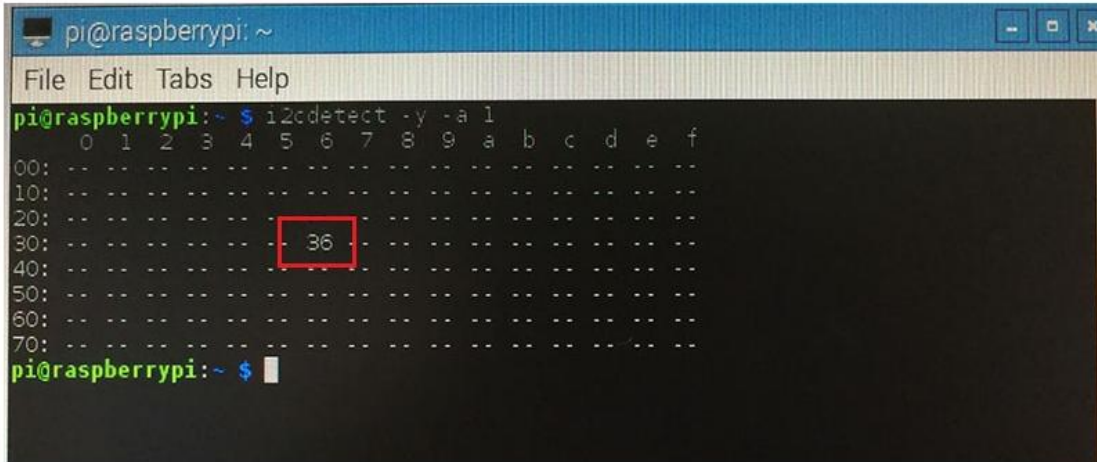


Install python-smbus (Optional, If use the I2C-tools, it could not be installed):

`sudo apt-get install python-smbus`

## How to get the I2C device address (Optional):

`sudo i2cdetect -y -a 1`

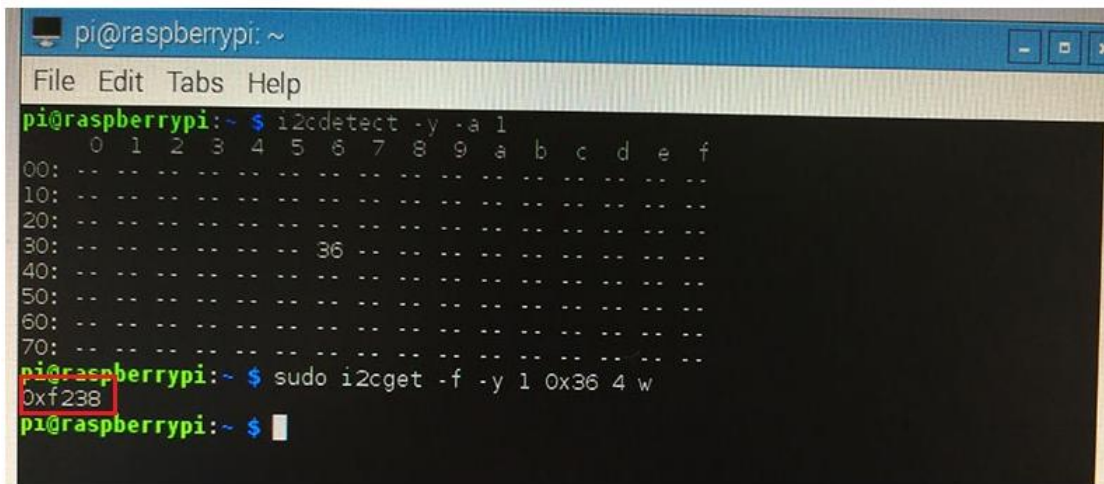


```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~$ i2cdetect -y -a 1  
 0 1 2 3 4 5 6 7 8 9 a b c d e f  
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
30: -- -- -- -- 36 -- -- -- -- -- -- -- -- -- -- --  
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
pi@raspberrypi:~$
```

So "0x36" is the address of I2C device;

## How to read the battery capacity:

```
sudo i2cget -f -y 1 0x36 4 w
```



```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~$ i2cdetect -y -a 1  
 0 1 2 3 4 5 6 7 8 9 a b c d e f  
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
30: -- -- -- -- 36 -- -- -- -- -- -- -- -- -- -- --  
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
pi@raspberrypi:~$ sudo i2cget -f -y 1 0x36 4 w  
0xf238  
pi@raspberrypi:~$
```

So "0xf2e8" is the capacity. (Hexadecimal ,swap between the high byte and low byte; )  
We will get "0x38f2" after we swap the high byte and low byte of the "0xf238".

Then, please turn "0x38f2" into a decimal number,  $0x38f2 = 14578$ (Decimal number)  
And then,  $14578/256=56.94$   
56.94 is the percentage of the electricity, that means the battery capacity is 56.94%.

## How to read the voltage:

```
sudo i2cget -f -y 1 0x36 2 w
```





```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~$ i2cdetect -y -a 1  
00: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
30: -- -- -- -- -- -- 36 -- -- -- -- -- -- -- -- -- --  
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
60: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
70: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --  
pi@raspberrypi:~$ sudo i2cget -f -y 1 0x36 4 w  
0xf238  
pi@raspberrypi:~$ sudo i2cget -f -y 1 0x36 2 w  
0x80b9  
pi@raspberrypi:~$
```

“0x80b9” is the voltage, then swap the high byte and low byte, it will be “0xb980”;

Please convert “0xb980” to a decimal number, it will be 47488.

Calculate the voltage:  $47488 * 78.125 / 1000000 = 3.71V$

PS: 78.125 is a fixed value(Don't change it);

The 3.71V is the current voltage value

## FAQ

The battery chip need a continuous learning process during reading the battery capacity, we suggest that the battery should be fully charged at first, and then put off the electricity fully. Repeat like that after many times, the battery capacity will be gradually accurate.

Note: When you trying, **DON'T** remove the battery plug , If you do, you need to retry again.

## Contact to US

Please email to [szbhzc@gmail.com](mailto:szbhzc@gmail.com) if you have some questions.

## How to get the capitivity and voltage via driver

Please refer to here:

<http://www.raspberrypiwiki.com/index.php/File:UserManual.pdf>