Bitify

Tinkering with the Raspberry Pi and other geeky stuff

Wednesday, 6 November 2013

Interfacing Raspberry Pi and MPU-6050

I wanted to interface my Pi to a Six-Axis Gyro + Accelerometer sensor and the one I settled on was based on a MPU-6050 chip. I went for this board mainly because I could get it cheap on eBay and wasn't worried about the cost if I broke it.

Set up (for Rasbian)

It's an I^{2}C board so first you need to install the relevant Linux drivers, here's how. Open the file for editing (needs sudo)

```
sudo vi /etc/modules
```


Found on eBay for a few quid

add the following lines to the bottom of the file, save it and reboot the Pi

```
i2c-bcm2708
i2c-dev
```

Now check the blacklists file

```
sudo vi /etc/modprobe.d/raspi-blacklist.conf
```

and make sure that the following lines start with a # (a comment) if they are present, if not don't worry

```
#blacklist spi-bcm2708
```

```
#blacklist i2c-bcm2708
```

Connecting the sensor

To connect the sensor you need to use the GPIO pins on the Pi, the important pins are

- Pin 1 - 3.3V connect to VCC
- Pin 3 - SDA connect to SDA
- Pin 5 - SCL connect to SCL
- Pin 6 - Ground connect to GND

these need to be connect as shown in the image.

Once you have the board connected you can test to see if the Pi has detected it. This is done with the following command to install the i2c tools

Pin connections

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

and then either

```
sudo i2cdetect -y 0
```
(for a Revision 1 board like mine)

or

```
sudo i2cdetect -y 1
```
(for a Revision 2 board)

then you should see output showing any I^{2}C devices that are attached and their addresses
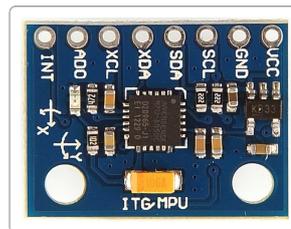
```
     0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:          -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- 68 -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- --
```
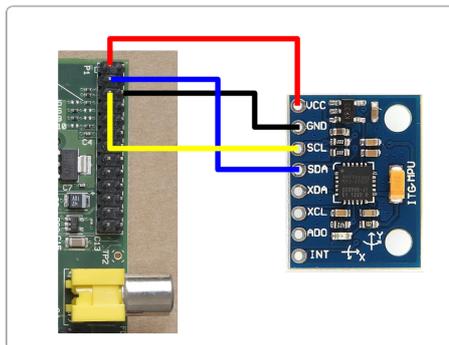
This shows that the Pi has detected the sensor with an address of 0x68 (hexadecimal), this address is needed to interact with it. Enter the following command and you should get an output of 0x68 on screen if everything is working properly.
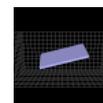
```
sudo i2cget -y 0 0x68 0x75
```

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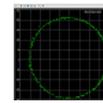
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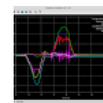
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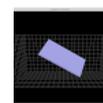
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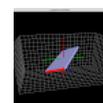
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GY80 (L3G4200D, ADXL345, HMC5883L, BMP085) Python library for Raspberry Pi
A while back I bought a GY80 board, which comprises of: L3G4200D - Three axis Gyroscope ADXL345 - Three axis accelerometer HMC5883L - C...

Temperature logging with a DS18B20 and a Raspberry Pi
I wanted to do some temperature logging so I hooked up a DS18B20 temperature sensor to a Raspberry Pi. About the DS18B20 Dallas DS18B...

This command talks to the device whose address is 0x68 (the sensor) and retrieves the value in the register 0x75 which has a default value of 0x68 the same value as the address.

Next time I'll show how to use Python to read data from the sensor.

Posted by Andrew Birkett at 20:16   G+1 +20 Recommander ce contenu sur Google

Labels: MPU-6050, Raspberry Pi, Raspbian

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28 comments

Add a comment as Julien Louette

Top comments

Mukut Mukherjee 2 months ago · Shared publicly
Hey....can u tell me is it possible to use this sensor to balance objects like robots? If possible then how?

+1   [1] · Reply

Ibis Fernandez 6 months ago · Shared publicly
Hi! Thanks for this tutorial, I'm so fired up after reading this, am wondering how would i go about connecting multiple accelerators? Would this be possible with say, 15 sensors?

[1] · Reply

Andrew Birkett 6 months ago
Yes you can add multiple sensors as long as they have different I2C addresses. Some sensors can be configured but some can't, I don't think this one can but I'm not 100% sure.

Andrew Birkett 2 years ago · Shared publicly
Sufiyan

I'm not sure why you aren't seeing the device listed in the i2c address. I can only guess that you have either a bad connection or the device itself is faulty.

[1] · Reply

Şenol Alan 1 year ago *+1*
Thank you very much for tutorial. But I have some problem.
I get such a output, When I run the i2cdetect -y 1 code

0 1 2 3 4 5 6 7 8 9 a b c d e f

Ricardo Casimiro 4 months ago · Shared publicly
Hi, how I connect 4 mpu6050 and read the data at once?

[1] · Reply

Andrew Birkett 4 months ago
I don't know I have never tried, I think you can run multiple n a master / slave configuration. You'll have to check the datasheet.

Ricardo Casimiro 4 months ago
well, I review a post to how to communicate 4 mpu with raspberry, ad0 = vcc and other ad0 = gnd and other two, change the address (i dont remember, but I think 0x68 and 0x69)

Gustavo Humeres Garcés 7 months ago · Shared publicly
 i have a problem when i execute sudo i2cget y-1 0x68 0x75. error: read failed.
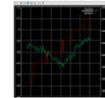
[1] · Reply

Andrew Birkett 7 months ago
Your command is wrong but that might just be a typo is the comments, the command should be sudo i2cget -y 1 0x68 0x75
If that is just a typo see the comment below as Geoffrey had the same issue.

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carlos giovanni soto garcia 1 year ago · Shared publicly

I recently bought a sensor with a BMP085 Digital Pressure sensor on it so I thought I'd write a post on how to read the data from the R...

Labels

1-wire (1)

ADXL345 (1)

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gnuplot (3)

GY80 (1)

HMC5883L (3)

L3G4200D (1)

MPU-6050 (6)

OpenGL (2)

Python (8)

Raspberry Pi (8)

Raspbian (4)

temperature (1)

Blog Archive

► 2014 (2)

▼ 2013 (7)

  ► December (1)

  ▼ November (6)

About Me

Andrew Birkett

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Good post Andrew, however following all steps you have mentioned at the moment when I run ´sudo i2cdetect -y 0' this message appears:
/usr/local/sbin/i2cdetect: 1:/usr/local/sbin/i2cdetect: Syntax error: word unexpected (expecting ')')

I hope you can help me!

+1   ☐ 1 · Reply

Geoffrey Noel 1 year ago - Shared publicly
Hi Andrew and thank you for this tutorial.
I try to get info from a MPU-6050 but I'm facing issues.
When I run the "i2cdetect -y 1" command I got the same output as you with 68 so my MPU-6050 is detected
but when running "i2cget -y 1 0x68 0x75" I got "Error: Read failed".

+2   ☐ 1 · Reply

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Andrew Birkett 1 year ago
I'm not able to test my setup at the moment so I'm not sure if the LED should flash when using the i2cdump command. The output you got from the command doesn't look right to me, again I can't be sure as I don't have my PI to hand. I think you a connection issue or a faulty device, double check all you connections and voltages level on the 3.3v pin if you can.

Geoffrey Noel 1 year ago
I bought a new MPU and now it's working. I guess the first one was faulty.
Thanks you for your help, your tutorial is really helpful =)

Poul Dürr Pedersen 2 years ago - Shared publicly
just a comment I encountered on the last command "sudo i2cget -y 0 0x68 0x75"
-this again goes for the revision 1 board.
for the revision 2 board it is: "sudo i2cget -y 1 0x68 0x75"

☐ 1 · Reply

Andrew Birkett via Google+ 2 years ago (edited) - Shared publicly
#RaspberryPi

☐ 1 · Reply

View all 3 replies

Andrew Birkett 1 year ago
+Kashif Iftikhar Hi, It's in the next article, here http://blog.bitify.co.uk/2013/11/reading-data-from-mpu-6050-on-raspberry.html

Kashif Iftikhar 1 year ago
Thanks, got it :-)

Duncan Bailey 2 months ago - Shared publicly
Hi,

Do you know if there's a way to reorientate the axes for the accelerometer, through software as oppose to mounting it in the desired orientation? I'm intending to have the weight vector of my project to be distributed equally across the 3 axes if that makes sense.

☐ 1 · Reply

Laurence Towning 1 year ago - Shared publicly
Awesome tutorial, think I have an unique error though
when I try to run sudo i2cget -y 1(got a b+) 0x68 I get Error: Read Failed
I have 2 other I2c devices plugged and they both show 0x00 when i use i2c detect I've also got a UU on 30B if that is relevant, though it doesn't effect the other 2 devices .
Anyone have any ideas?

☐ 1 · Reply

Andrew Birkett 1 year ago
See Karda Yürür post on my other blog which describes how you have to pull the ADO pin down to 0V http://blog.bitify.co.uk/2013/11/reading-data-from-mpu-6050-on-raspberry.html?google_comment_id=z120ijowpvbnjpgrt04cg33pzviuxjrg40s&google_view_type#gpluscomments

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Andrew G 2 years ago
Hi Andrew, Love your blog and I'm glad I found it. I am looking at useing the MPU-6050 to do the setup on my sons F1 RC car (aka wheel alignment etc) Looking forward to getting my teeth into it so to speak.

speak!

Andrew Birkett 2 years ago
Let me know how you get on, it would be great to see what you get working.

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