Bitify

Tinkering with the Raspberry Pi and other geeky stuff

Wednesday, 6 November 2013

Interfacing Raspberry Pi and MPU-6050

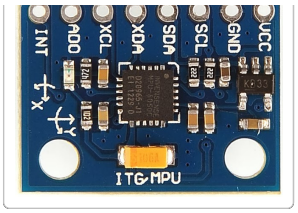
I wanted to interface my Pi to a Six-Axis Gyro + Accelerometer sensor and the one I settled on was based on a

It's an I²C 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
```

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

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



Found on eBay for a few quid

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

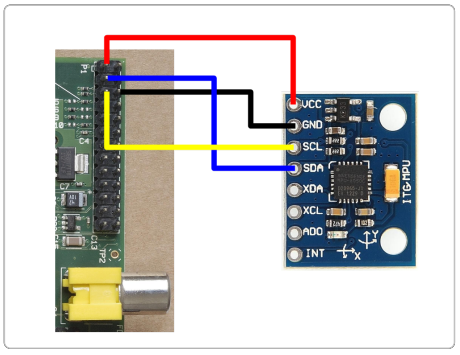
```
#blacklist spi-bcm2708

#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.



Pin connections

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

```
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 I²C 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
```

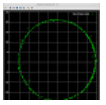
Search

Search

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 thi...

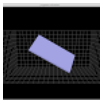
Reading data from the MPU-6050 on the Raspberry Pi

In a previous post I showed how to connect an Accelerometer & Gyro sensor to the Raspberry Pi, in this post I'll show some simple P...



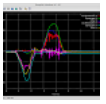
Connecting and calibrating a HMC5883L Compass on the Raspberry Pi

Here is how to connect a HMC5883L Compass to the Raspberry Pi, calibrate it and read the data. Connecting the compass is simple enough, fo...



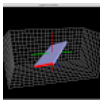
3D OpenGL visualisation of the data from an MPU-6050 connected to a Raspberry Pi

In this post I'll show how to serve the data over http and display a 3D representation in OpenGL extending on a previous blog post det...



Using a complementary filter to combine Accelerometer and Gyroscopic data

This post shows how to combine data from the accelerometer and gyroscope using a complementary filter to produce a better readings from the...



Pitch, Roll and Yaw using MPU6050 & HMC5883L (with tilt compensation and complementary filter)

Combining the data from an MPU605 and a HMC5883L to give tilt compensated pitch, roll and yaw. Pitch, roll and yaw (with tilt compensati...

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

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 +23 Rekomendasikan ini di Google

Labels: MPU-6050, Raspberry Pi, Raspbian

32 comments

Add a comment as Bramantio Yuwono

Top comments

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.

BTW I couldn't reply directly to your post as I think you google+ setting don't allow replies.

1 · Reply

Şenol Alan 2 years 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

Read more

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

1 · Reply

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Andrew Birkett 2 years 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 2 years ago
Thanks, got it :-)

Ibis Fernandez 1 year 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 1 year 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.

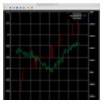
Jon Turner 3 months ago
Even if the same address, you can access them all by using a multiplexer. Adafruit has a great 8-subaddress module (TCA9548a) for around $10.00. I have a number of 4 channel voltage detectors I am reading, all on the same address, connected through the multiplexer.
https://learn.adafruit.com/adafruit-tca9548a-1-to-8-i2c-multiplexer-breakout/overview

Mukut Mukherjee 10 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?

+3 1 · Reply

cosmosjs ee 6 months ago - Shared publicly
Nice easy tutorial! thanks.

sensor to a Raspberry Pi. About the DS18B20 Dallas DS18B...



Interfacing a BMP085 Digital Pressure sensor to the Raspberry Pi
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...

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Ricardo Casimiro 1 year ago - Shared publicly
Hi, how I connect 4 mpu6050 and read the data at once?

1 · Reply

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Ricardo Casimiro 1 year 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)

Jon Turner 3 months ago
Impossible to read them all at the same time, even if on different addresses (they are not ... they

Gustavo Humeres Garcés 1 year ago - Shared publicly
i have a problem when i execute sudo i2cget y-1 0x68 0x75. error: read failed.

1 · Reply

Andrew Birkett 1 year 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.

Geoffrey Noel 2 years 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".
I don't know why.
Do you know where the problem could come from ?

+2 1 · Reply

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Andrew Birkett 2 years 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 2 years 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 =)

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

Duncan Bailey 11 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

carlos giovanni soto garcia 1 year ago - Shared publicly
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!

+2 1 · Reply

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 1 · Reply

Marlon Cárdenas 1 month ago

try with: "sudo i2cdetect -y -r 1 0x68 0x75"

on my sons F1 RC car (aka wheel alignment etc) Looking forward to getting my teeth into it so to 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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