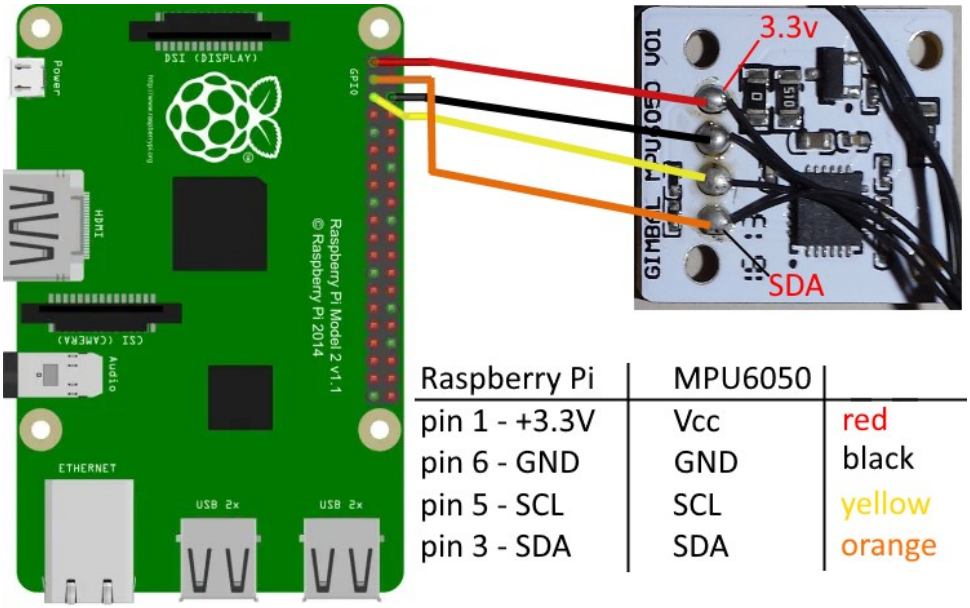
MPU650 test tool for raspberry Pi

Background information

https://invensense.tdk.com/wp-content/uploads/2015/02/MPU-6000-Datasheet1.pdf
https://invensense.tdk.com/wp-content/uploads/2015/02/MPU-6000-Register-Map1.pdf
https://www.raspberry-pi-geek.de/ausgaben/rpg/2017/08/3-achsen-lage-und-beschleunigungssensor-mpu6050/
https://github.com/Blokkendoos/mpu-calibration

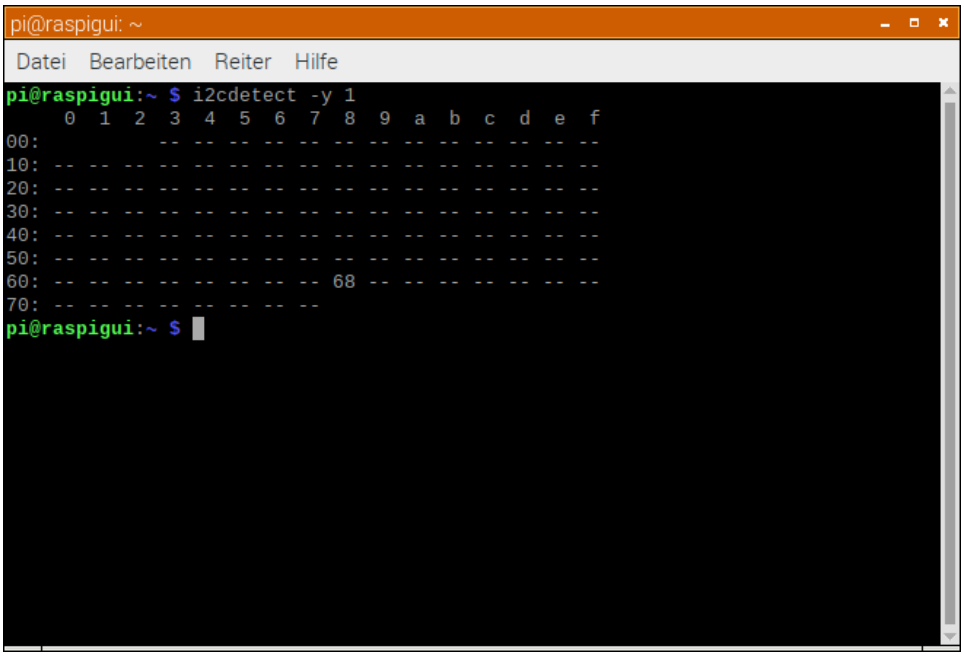
Preparations

Enable I2C: **`sudo raspi-config`** > Interface Options > I2C > Yes
Connect MPU and check wiring.



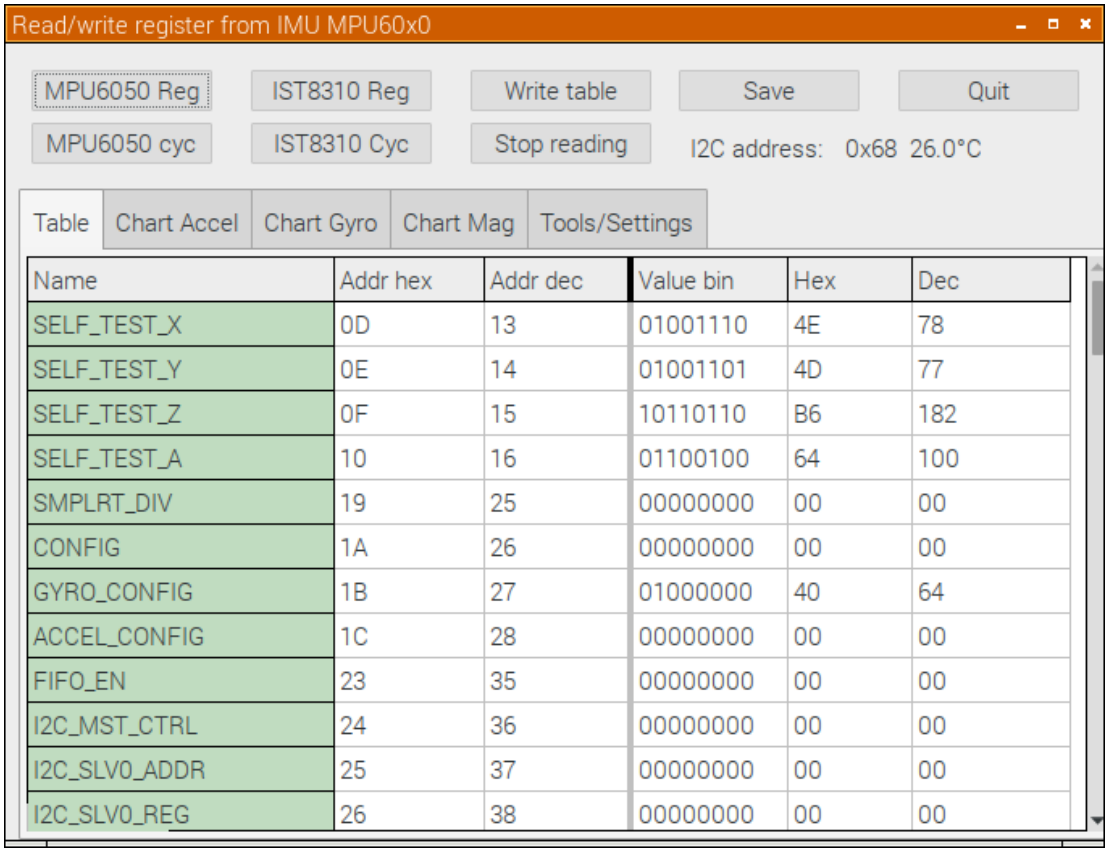
Raspberry Pi	MPU6050	
pin 1 - +3.3V	Vcc	red
pin 6 - GND	GND	black
pin 5 - SCL	SCL	yellow
pin 3 - SDA	SDA	orange

Check if MPU6050 is available: **`i2cdetect -y 1`** > should be appear at address 0x68



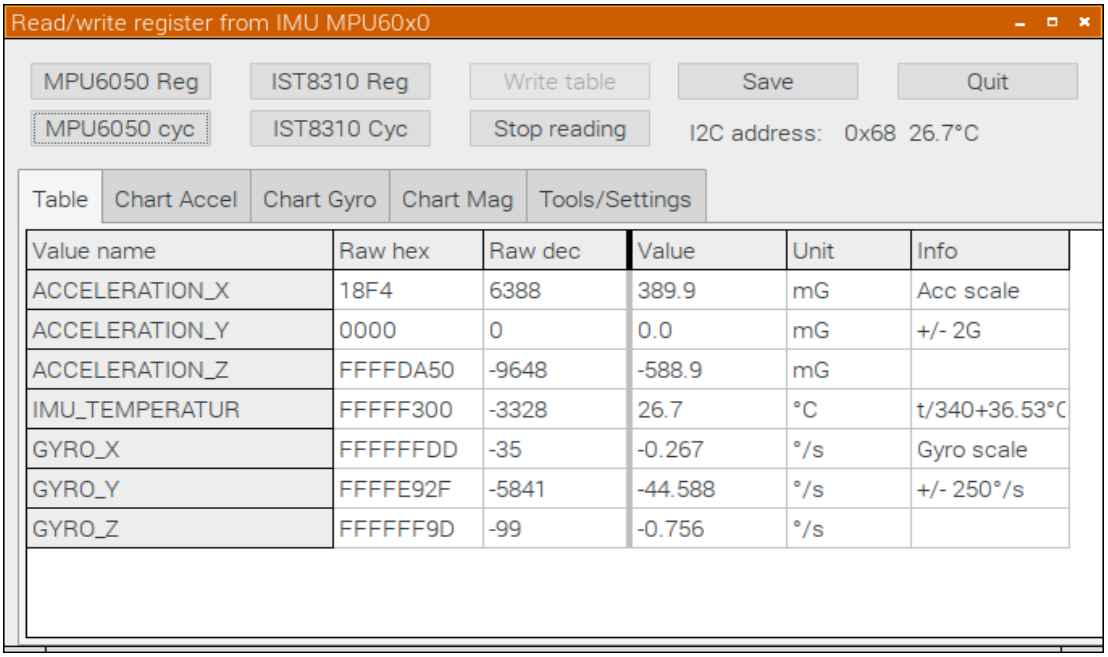
IMU_test

This is a test tool to check and learn something about the Motion Processing Unit MPU6050.
One can read all register and save the settings to a CSV file just as test.



Name	Addr hex	Addr dec	Value bin	Hex	Dec
SELF_TEST_X	0D	13	01001110	4E	78
SELF_TEST_Y	0E	14	01001101	4D	77
SELF_TEST_Z	0F	15	10110110	B6	182
SELF_TEST_A	10	16	01100100	64	100
SMPLRT_DIV	19	25	00000000	00	00
CONFIG	1A	26	00000000	00	00
GYRO_CONFIG	1B	27	01000000	40	64
ACCEL_CONFIG	1C	28	00000000	00	00
FIFO_EN	23	35	00000000	00	00
I2C_MST_CTRL	24	36	00000000	00	00
I2C_SLV0_ADDR	25	37	00000000	00	00
I2C_SLV0_REG	26	38	00000000	00	00

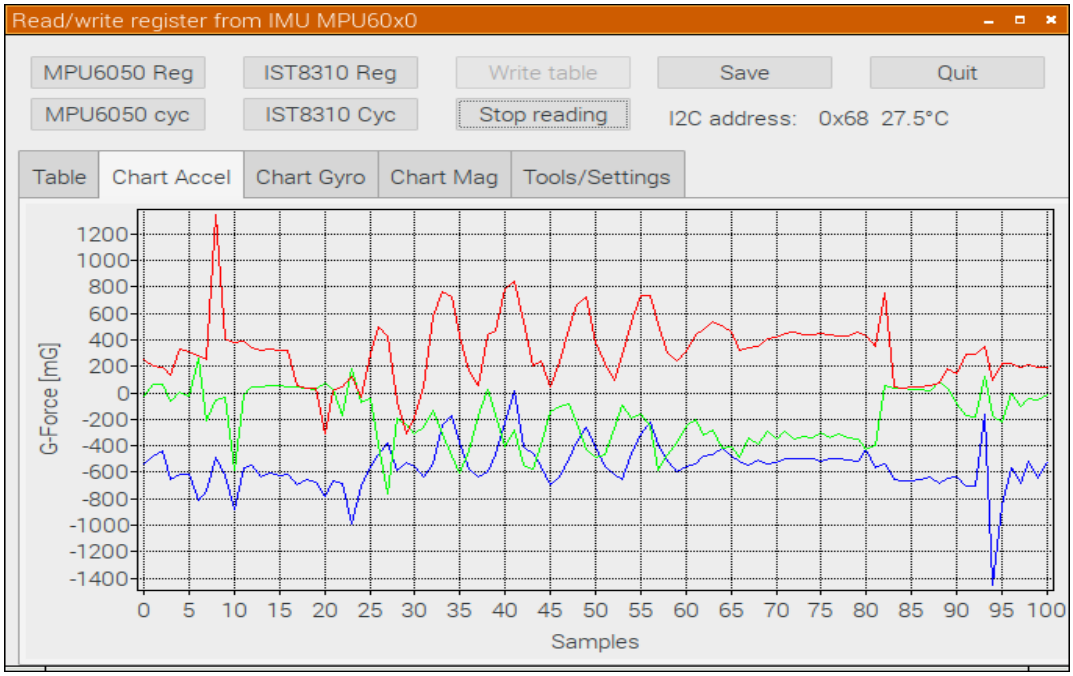
It's also possible to cyclic read the Accelerometer, Temperature and Gyroscope values.



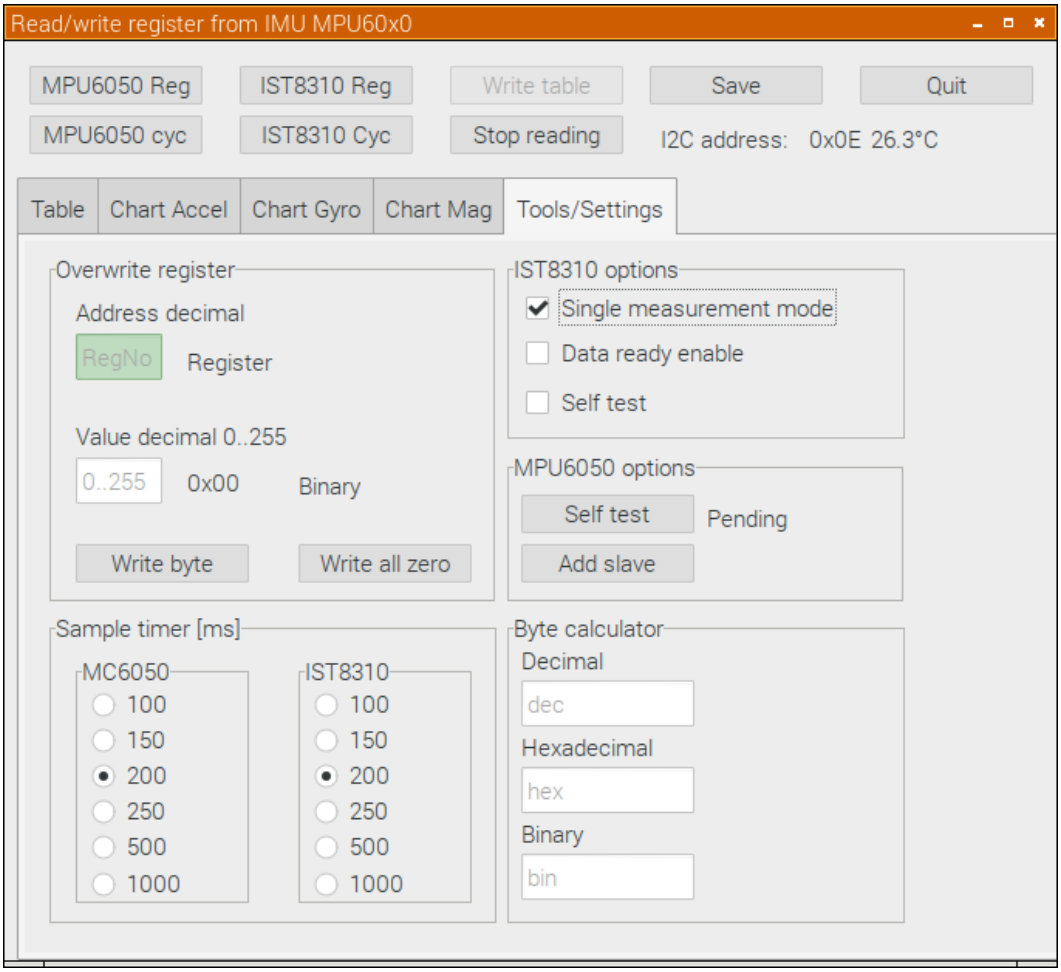
Value name	Raw hex	Raw dec	Value	Unit	Info
ACCELERATION_X	18F4	6388	389.9	mG	Acc scale
ACCELERATION_Y	0000	0	0.0	mG	+/- 2G
ACCELERATION_Z	FFFFDA50	-9648	-588.9	mG	
IMU_TEMPERATUR	FFFFF300	-3328	26.7	°C	t/340+36.53°C
GYRO_X	FFFFFFDD	-35	-0.267	°/s	Gyro scale
GYRO_Y	FFFFE92F	-5841	-44.588	°/s	+/- 250°/s
GYRO_Z	FFFFFF9D	-99	-0.756	°/s	

You will also see the current scale setting for Accelerometer and Gyroscope in Info column.

The same can be seen in a rolling chart.



For testing and settings it is possible to write into a register or overwrite all write-able with zero.



Some options, settings and special actions are on the Tools/Settings page too.

Some terminal commands – good to know:

Read a byte from MPU: **`i2cget -y 1 0x68 0x75`** (Who am I, it's own address)
Read a word from MPU: **`i2cget -y 1 0x68 65 w`** (result comes as big endian)
Write a byte to MPU register: **`i2cset y 1 0x68 107 0`** (wake-up command)
Read temperature cyclic (raw): **`watch -n 0.5 'i2cget -y 1 0x68 65 w'`**

`Read ADC PCF8591:` **`i2cget -y 1 0x48 0x42`** `(channel AIN2)`