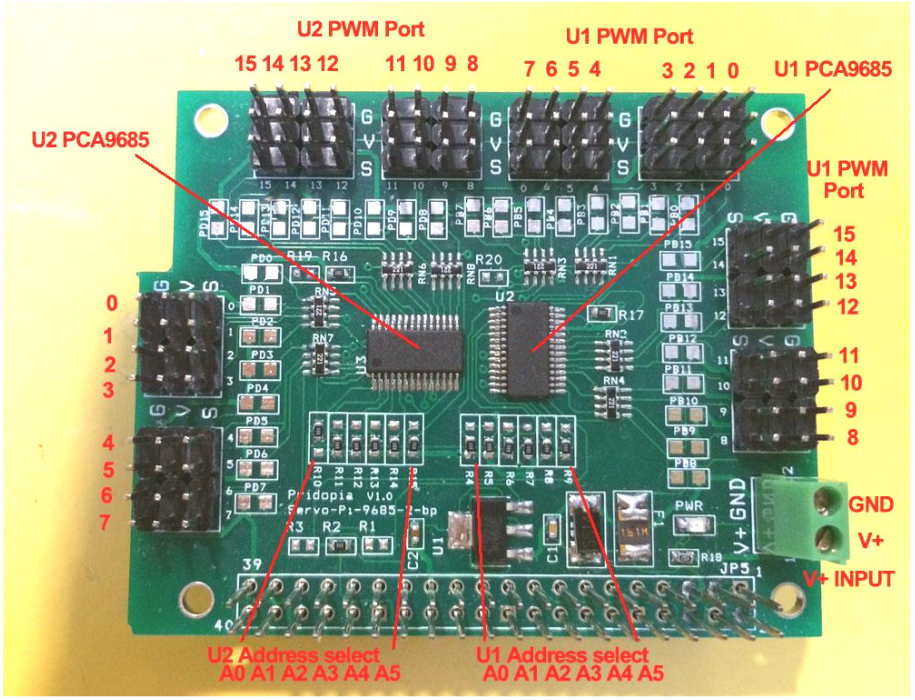
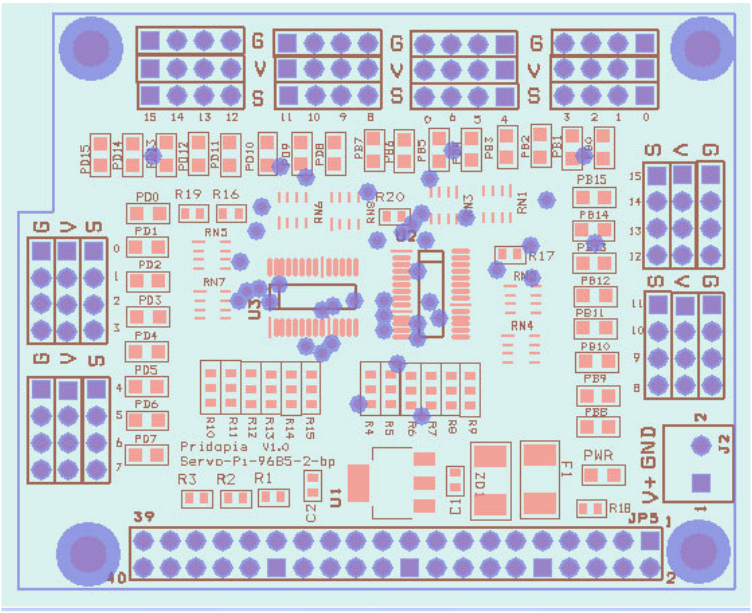
Raspberry Pi - I2C 32 Channel PWM / Servo Board





The PCA9685 is an I2C-bus controlled 16-channel LED controller optimized for LCD Red/Green/Blue/Amber (RGBA) color backlighting applications. Each LED output has its own 12-bit resolution (4096 steps) fixed frequency individual PWM controller that operates at a programmable frequency from a typical of 40 Hz to 1000 Hz with a duty cycle that is adjustable from 0 % to 100 % to allow the LED to be set to a specific brightness value.
All outputs are set to the same PWM frequency.

PCA9685 also has a built-in oscillator for the PWM control.
However, the frequency used for PWM control in the PCA9685 is adjustable from about 40 Hz to 1000 Hz as compared to the typical 97.6 kHz frequency of the PCA9635. This allows the use of PCA9685 with external power supply controllers. All bits are set at the same frequency.

3. U2 PCA9685 (PWM Port 0 ~ 15)
4. R4,R5,R6,R7R8,R9(for U2 Address select A0,A1,A2,A3,A4,A5)
5. U3 PCA9685 (PWM Port 0 ~ 15)
6. R10,R11,R12,R13,R14,R15(for U3 Address select A0,A1,A2,A3,A4,A5)
7. Red power-good V+ LED
8. 1.6A PolySwitch Fuse for V+ input protect.

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

GPIO library - RPi.GPIO-0.5.6.tar.gz

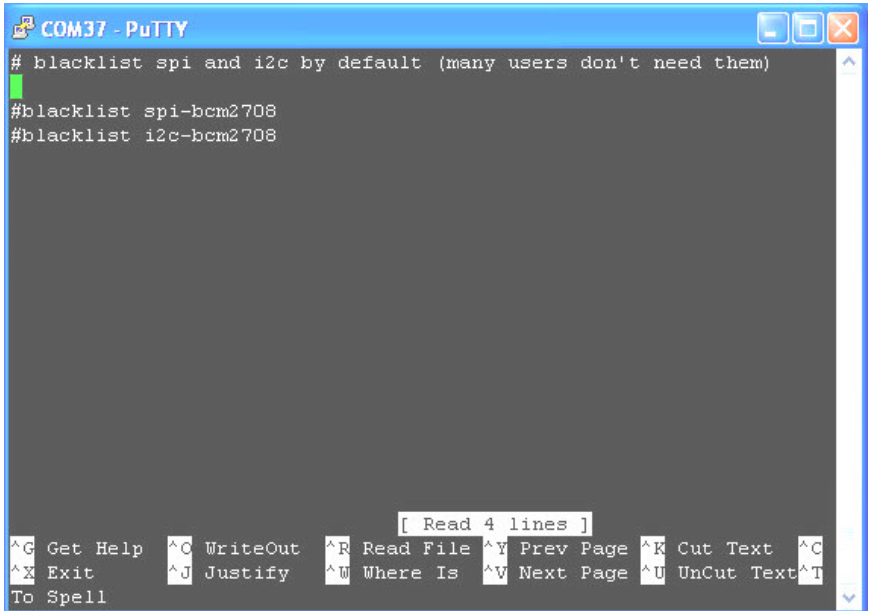
Install python , library and run the test program

```
# sudo apt-get install python-dev
# wget http://www.pridopia.co.uk/pi-pgm/RPi.GPIO-0.5.6.tar.gz
# gunzip RPi.GPIO-0.5.6.tar.gz
# tar –xvf RPi.GPIO-0.5.6.tar
# cd  RPi.GPIO-0.5.6
# sudo python setup.py install
```

```
1.Make sure you I2C driver are enable
```

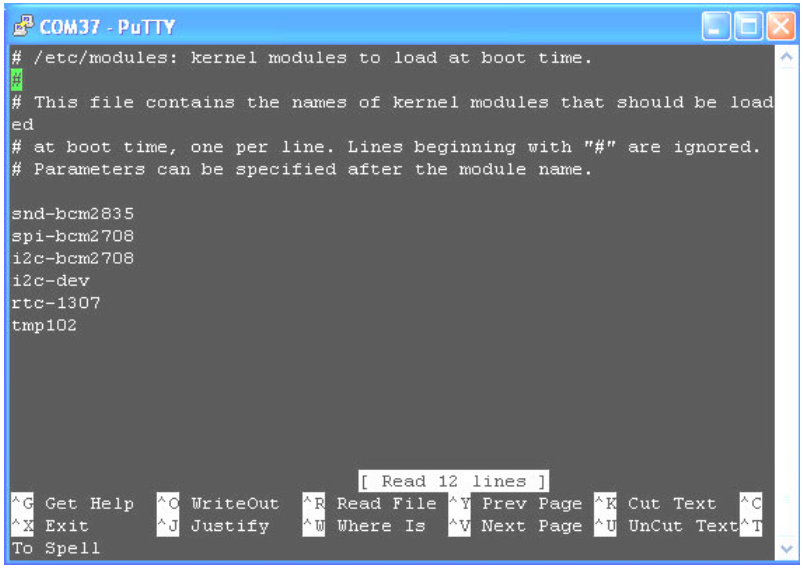
To enable it all you need to do is comment out a line by putting # in front

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



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

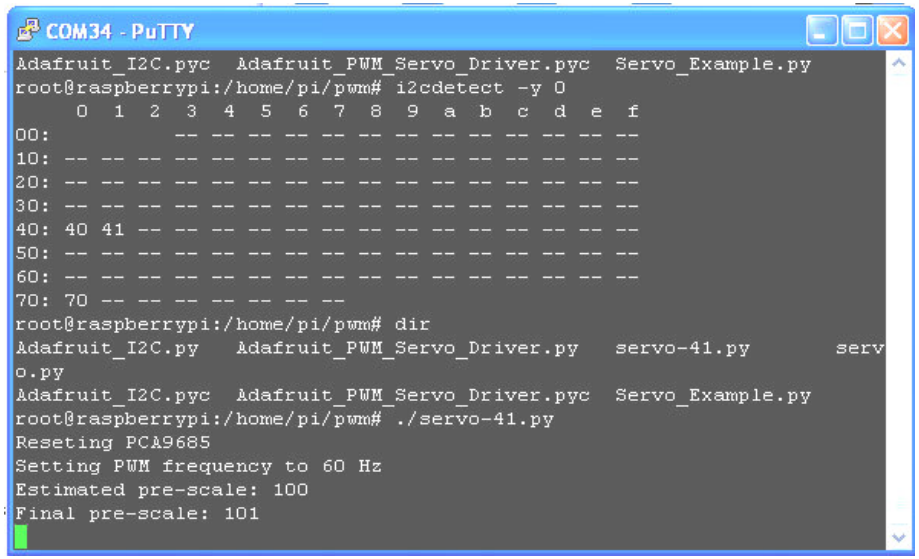
sudo nano /etc/modules



If you already install I2c driver , then

i2cdetect -y 0 i2cdetect -y 1

if Rs-Pi-v2 you need change 0 to 1



in i2cdetect you can found 2 device in system (40,41)

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 9685 test code information

http://learn.adafruit.com/adafruit-16-channel-servo-driver-with-raspberry-pi/using-the-adafruit-library

Download test code from our web site
http://www.pridopia.co.uk/pi-9685-2-bp.html

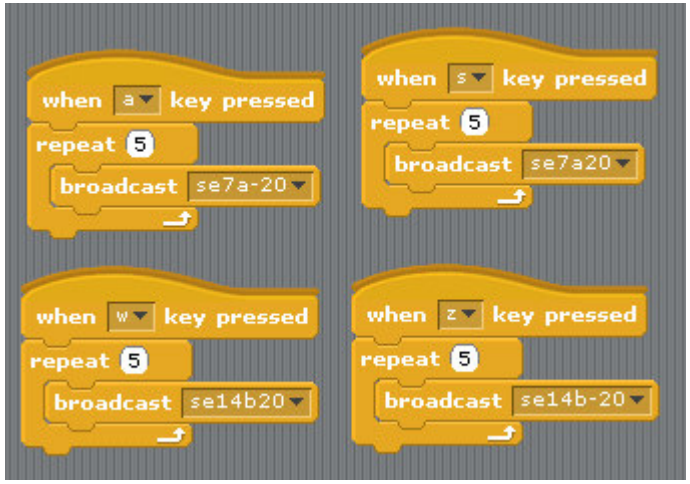
Test Program

servo-40.py servo-41.py pwm

servo-4041.py

New Scratch GPIO control program
http://www.pridopia.co.uk/rs-pi-set-scratch.html

(1) PWM Servo Motor demo



Command "SE"+ "PWM (0-15)" + "a" +"angle" for Address 41

Command "SE"+ "PWM (0-15)" + "b" +"angle" for Address 40

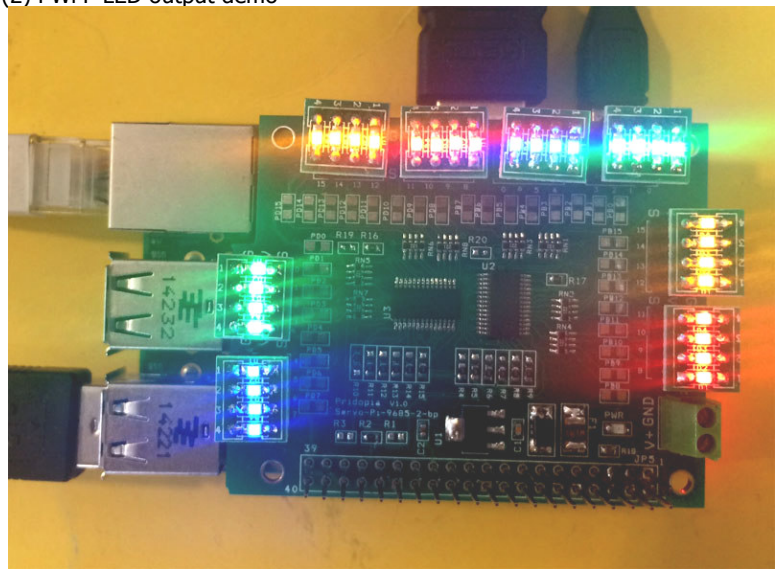
se7a20 --> channel 7 servo move 20 angle address 41

se7a-20 --> channel 7 servo move -20 angle address 41

se14b20 --> channel 14 servo move 20 angle address 40

se14b-20 --> channel 14 servo move -20 angle address 40

(2) PWM LED output demo



LED Scrolling Command PWMLED41S0E15D4True

PWMLED"Address" S[Start channel] E[End channel] D[Delay / Timing] [True/False]

Address 40, 41, 42, 43, 44

Start channel & **E**nd channel 0 ~ 15 16 channel

D 1,2,3,4,5 (1 ~ 100) Delay Timing

LED Brightness control Command

PWMLED "Address" "B" "0 ~ 1000"

PWMLED41B1000

Stop command

"PWMLED41STOP"