



MotoPiduino : Arduino Shield與 Raspberry Pi 的橋樑

Motoduino lab

www.motoduino.com

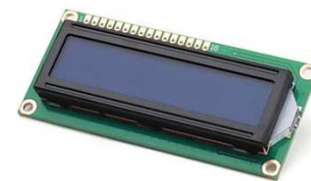


Raspberry Pi 與 Arduino Shield 橋樑



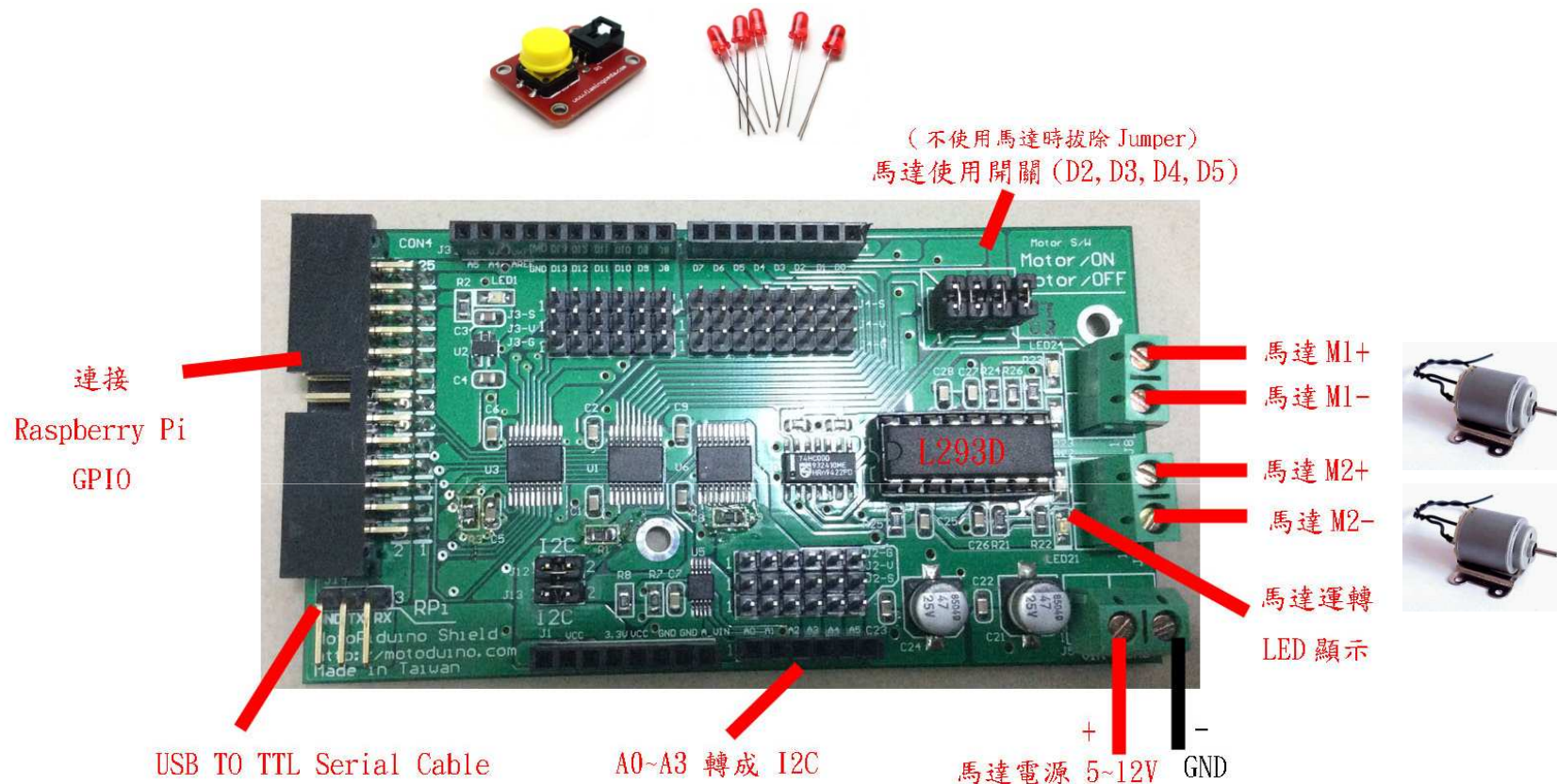
3.3V

MotoPiduino



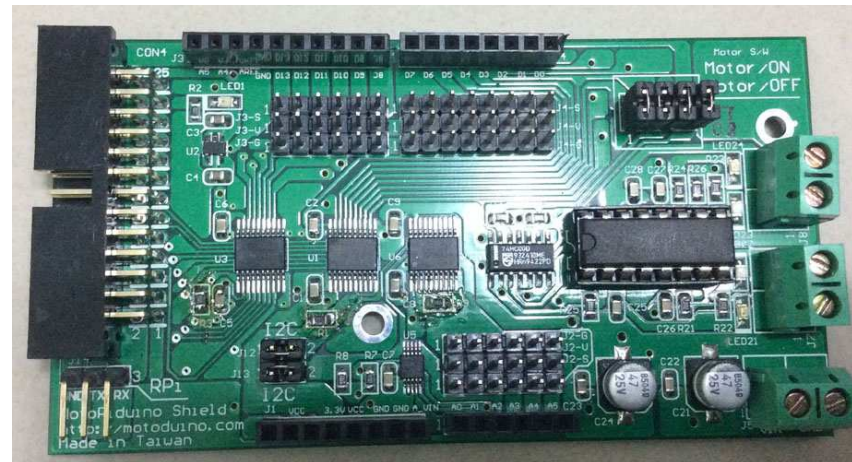
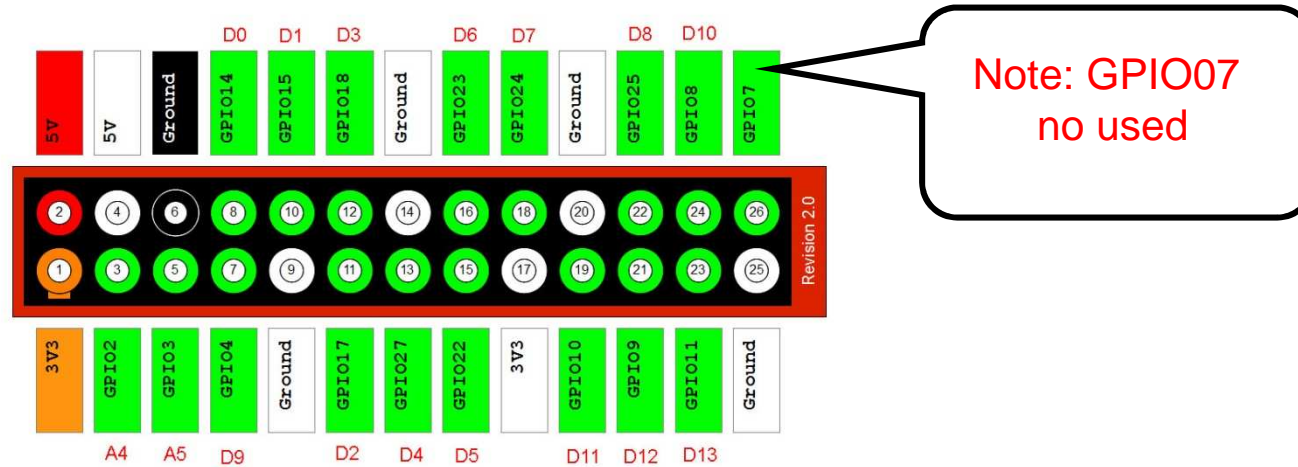
5.0V

MotoPiduino 腳位說明

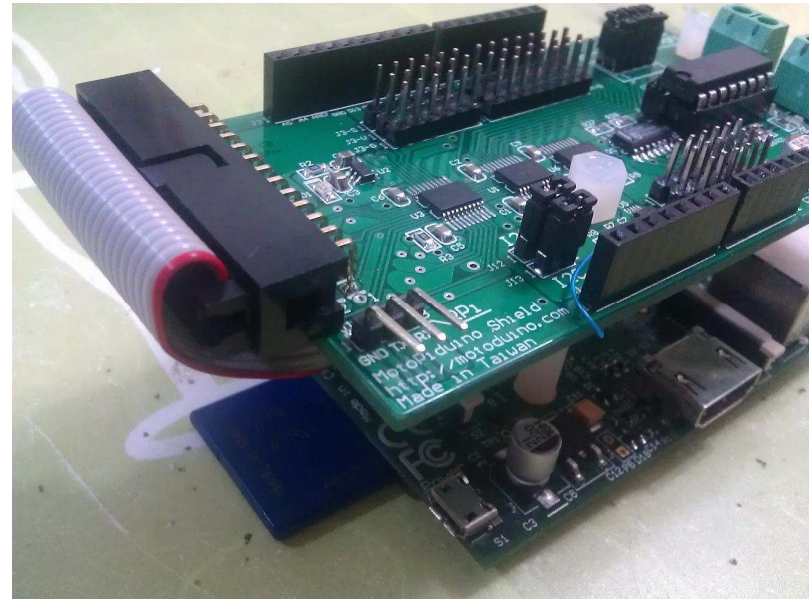
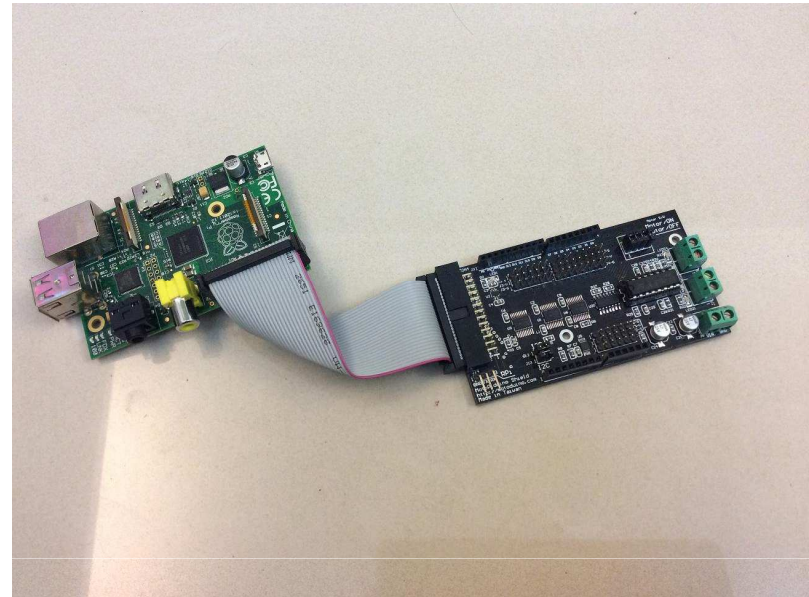
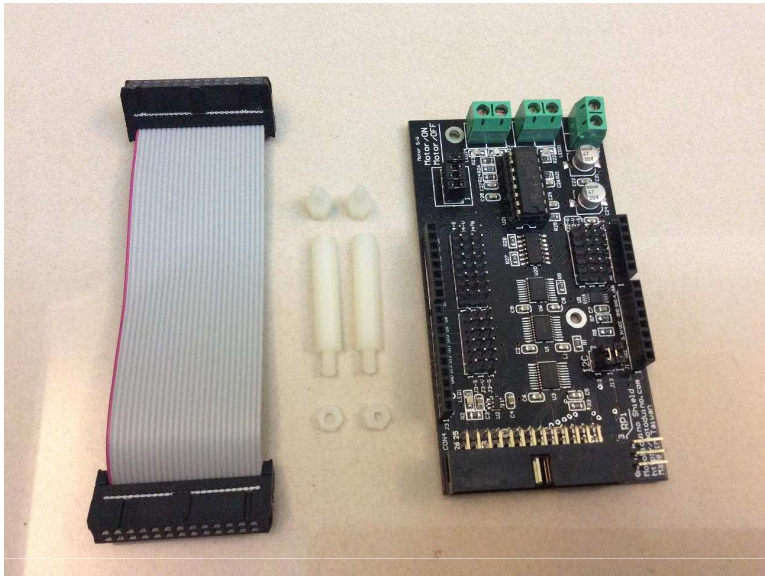




MotoPiduino – Pin Mapping



MotoPiduino 與 Raspberry Pi 結合



ADC Issue

- Raspberry Pi 沒有 Analog-to-Digital (ADC)

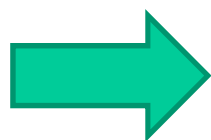
A0

A1

A2

A3

Analog



I2C





Raspberry Pi – I2C Enable

```
sudo nano /etc/modules
```

```
#加入底下兩行
```

```
i2c-bcm2708
```

```
i2c-dev
```

```
#安裝I2C tools
```

```
sudo apt-get install python-smbus
```

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

```
#修改raspi-blacklist.conf
```

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

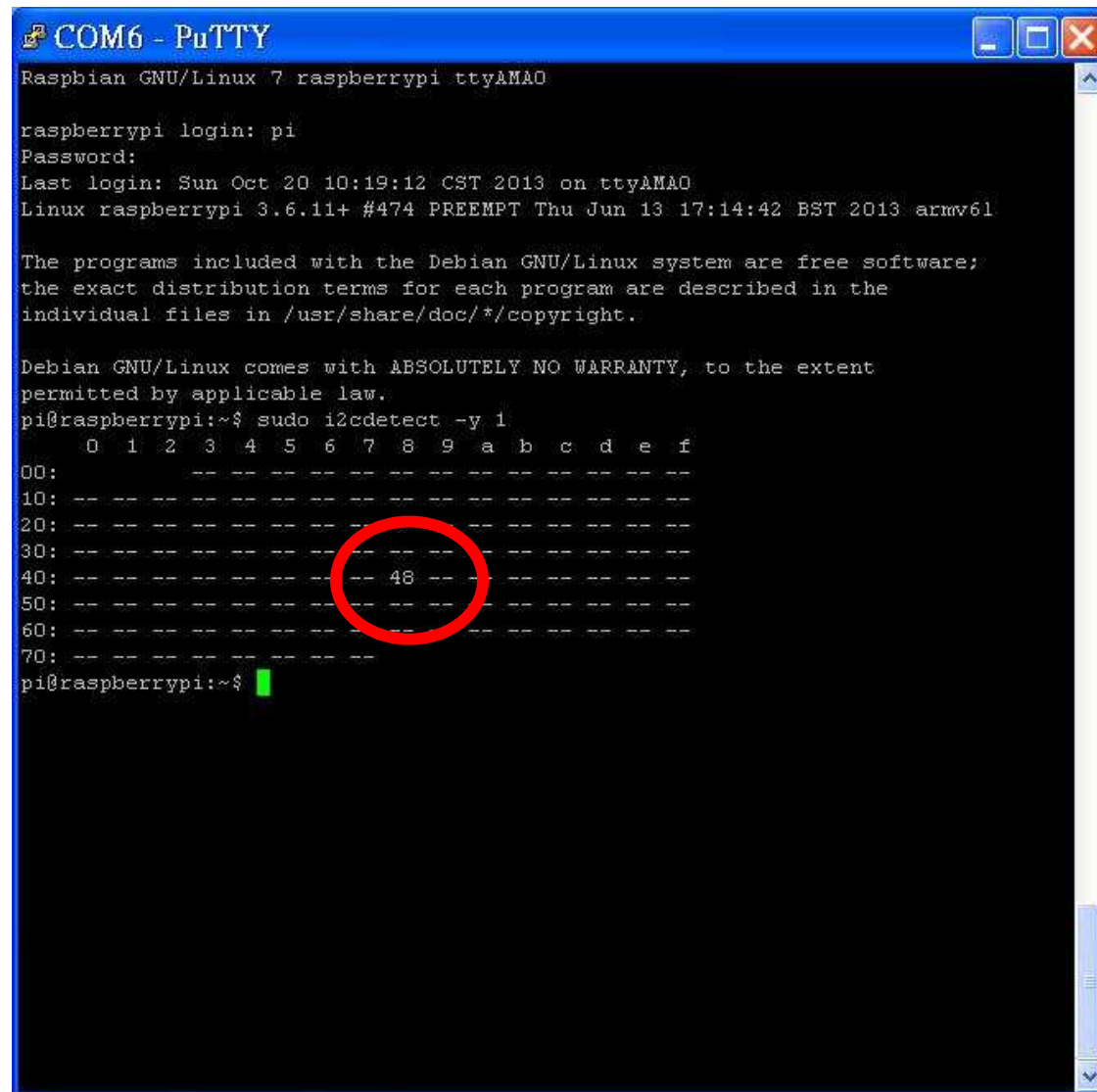
```
blacklist spi-bcm2708 ← 前面加個 #
```

```
blacklist i2c-bcm2708 ← 前面加個 #
```

```
#Check連接的裝置
```

```
sudo i2cdetect -y 1
```

Motoduino – I2C



```
COM6 - PuTTY
Raspbian GNU/Linux 7 raspberrypi ttyAMA0

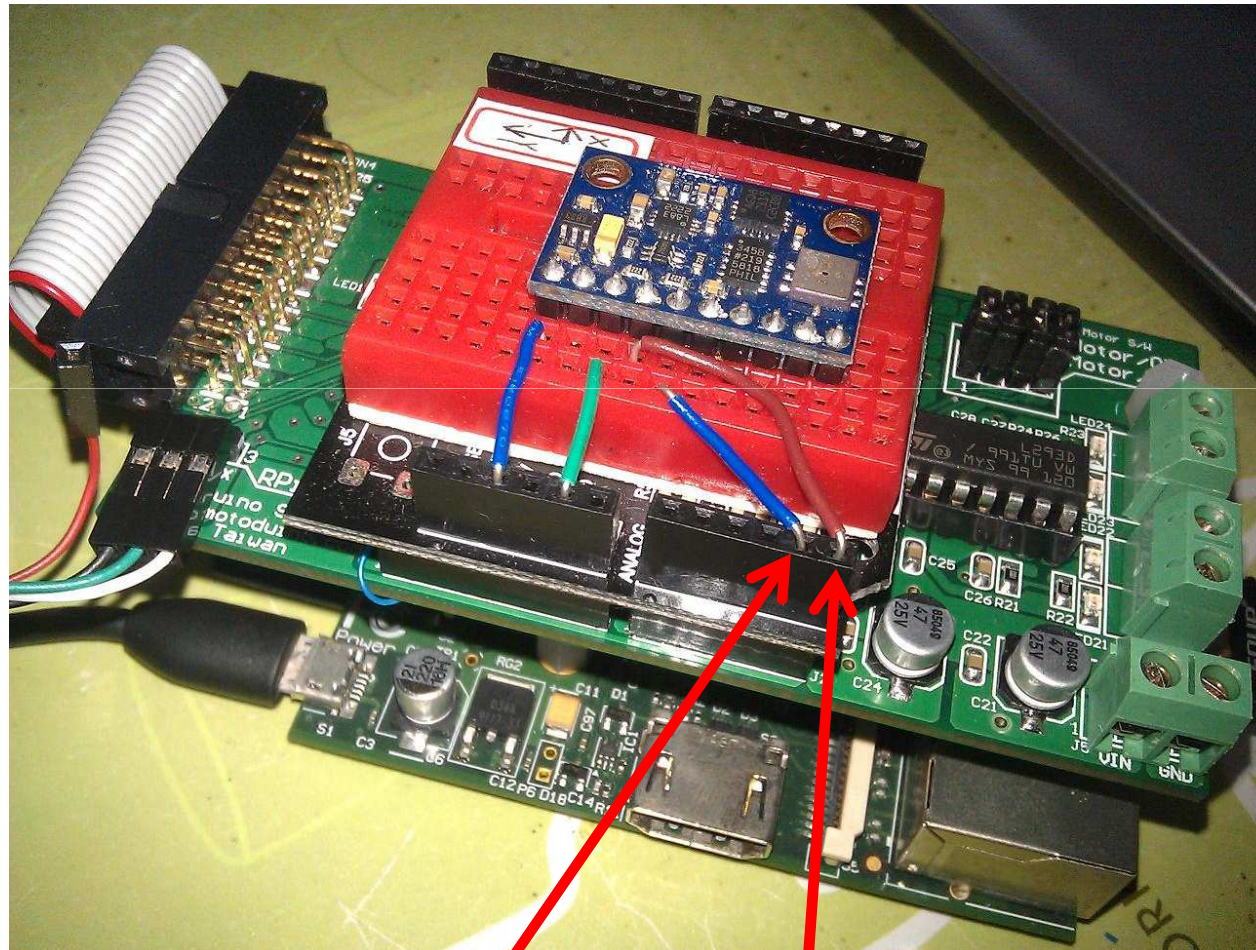
raspberrypi login: pi
Password:
Last login: Sun Oct 20 10:19:12 CST 2013 on ttyAMA0
Linux raspberrypi 3.6.11+ #474 PREEMPT Thu Jun 13 17:14:42 BST 2013 armv6l

The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
pi@raspberrypi:~$ sudo i2cdetect -y 1
   0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
10:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
20:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
30:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
40:  --  --  --  --  --  --  48  --  --  --  --  --  --  --  --
50:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
60:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
70:  --  --  --  --  --  --  --  --  --  --  --  --  --  --  --
pi@raspberrypi:~$
```




Motoduino – I2C (9DOF)



A4 (SDA)

A5 (SCL)

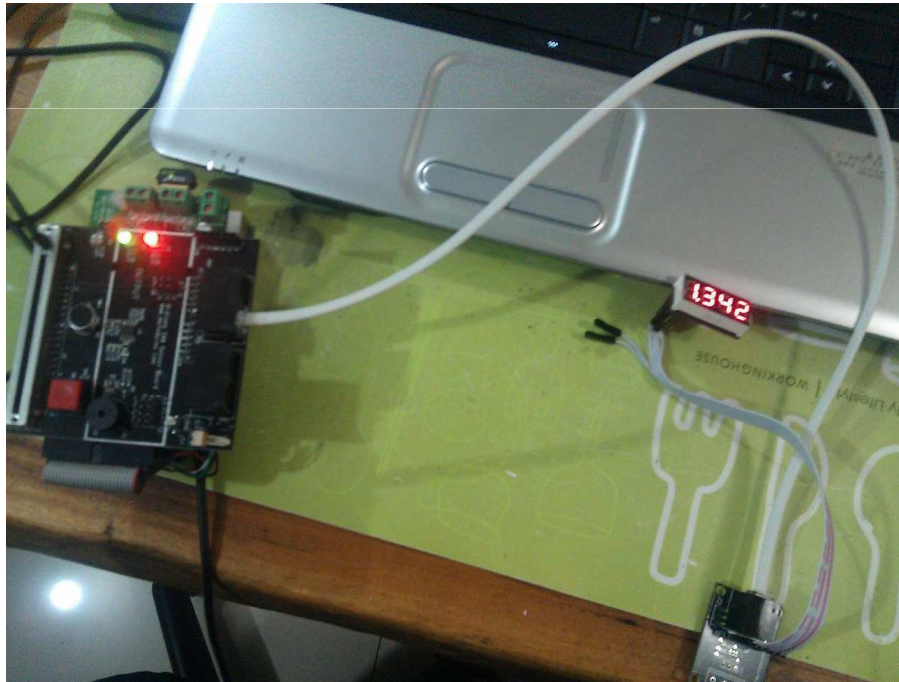
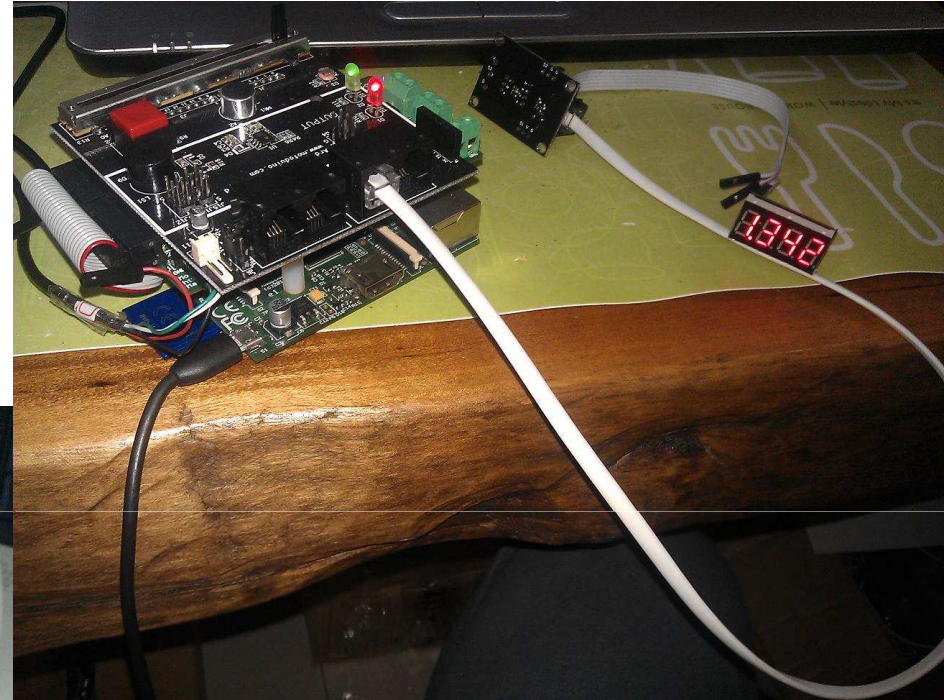


I2C Devices Detection

```
COM6 - PuTTY
drwxr-xr-x 10 pi pi 4096 Aug 22 11:01 wiringPi
pi@raspberrypi:~$ ls a-l
ls: cannot access a-l: No such file or directory
pi@raspberrypi:~$ ls -al
total 216
drwxr-xr-x 9 pi pi 4096 Aug 22 10:13 .
drwxr-xr-x 4 root root 4096 Aug 6 15:34 ..
-rw----- 1 pi pi 1819 Oct 20 10:36 .bash_history
-rw-r--r-- 1 pi pi 220 May 26 00:35 .bash_logout
-rw-r--r-- 1 pi pi 3243 May 26 00:35 .bashrc
drwxr-xr-x 2 pi pi 4096 May 26 01:47 Desktop
drwxr-xr-x 3 pi pi 4096 Aug 6 15:42 ledsign
-rw-r--r-- 1 pi pi 5781 Feb 3 2013 ocr_pi.png
-rw-r--r-- 1 pi pi 675 May 26 00:35 .profile
drwxrwxrwx 5 pi pi 4096 Sep 20 20:50 projects
drwxrwxr-x 2 pi pi 4096 Mar 10 2013 python_games
drwxr-xr-x 2 root root 4096 Aug 6 17:43 spitest
drwxr-xr-x 8 pi pi 4096 Mar 28 2013 WebIOPi-0.6.0
-rw-r--r-- 1 pi pi 155808 Mar 28 2013 WebIOPi-0.6.0.tar.gz
drwxr-xr-x 10 pi pi 4096 Aug 22 11:01 wiringPi
pi@raspberrypi:~$ ls
Desktop ocr_pi.png python_games WebIOPi-0.6.0 wiringPi
ledsign projects spitest WebIOPi-0.6.0.tar.gz
pi@raspberrypi:~$ ls
Desktop ocr_pi.png python_games WebIOPi-0.6.0 wiringPi
ledsign projects spitest WebIOPi-0.6.0.tar.gz
pi@raspberrypi:~$ sudo i2cdetect -y 1
 0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: -- -- -- -- -- -- -- -- -- -- -- -- -- --
10: -- -- -- -- -- -- -- -- -- -- -- -- -- --
20: -- -- -- -- -- -- -- -- -- -- -- -- -- --
30: -- -- -- -- -- -- -- -- -- -- -- -- -- --
40: -- -- 53 -- -- -- 48 -- -- -- -- -- --
50: -- -- -- -- -- -- -- -- -- -- -- -- -- --
60: -- -- -- -- -- -- -- -- -- -- -- -- -- --
70: -- -- -- -- -- -- -- -- -- -- -- -- -- --
pi@raspberrypi:~$
```

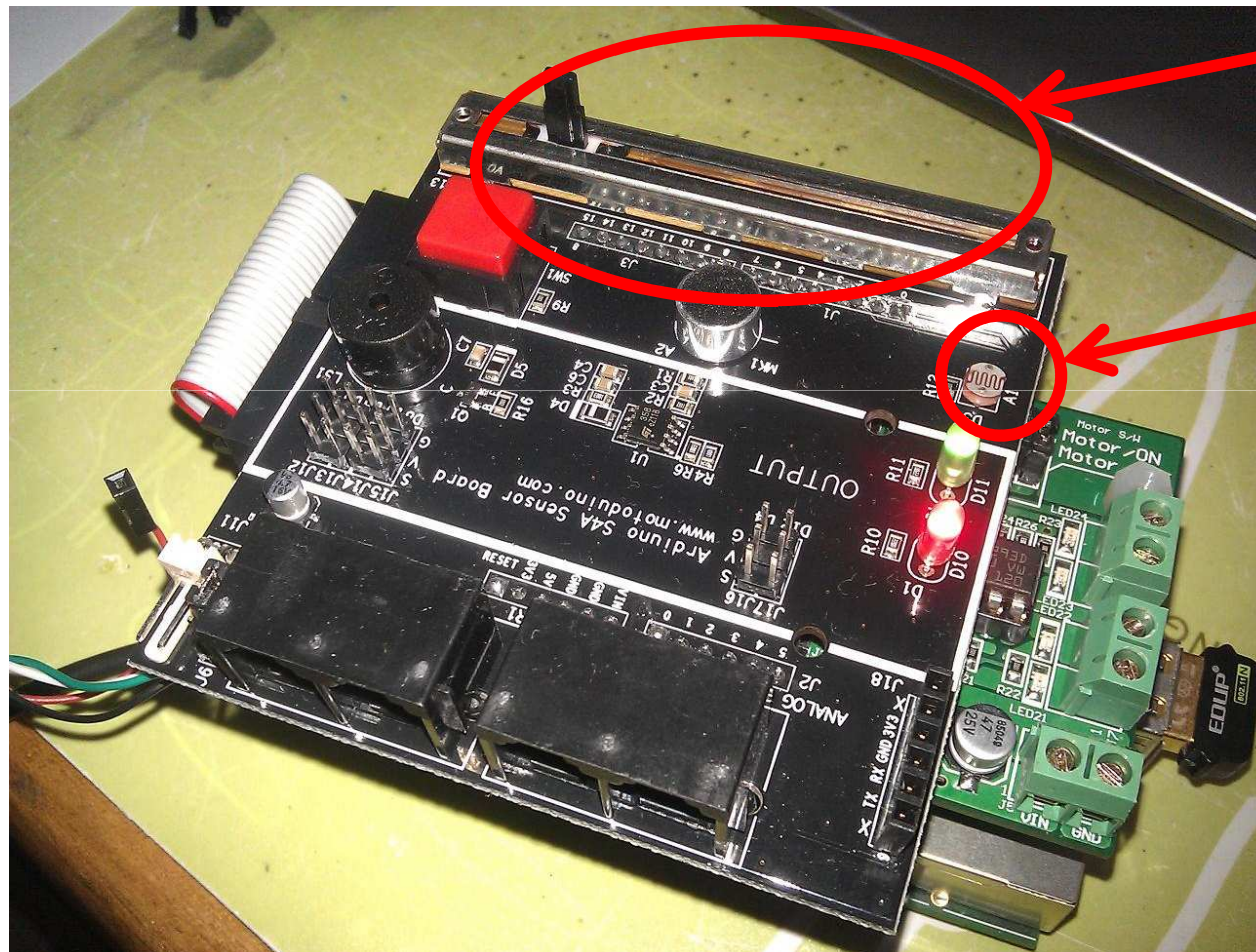



I2C-LED Example





Analog to I2C



可變電阻
(A0)

光敏電阻
(A1)

I2C – ADS1015

- <https://github.com/adafruit/Adafruit-Raspberry-Pi-Python-Code>

The screenshot shows the GitHub repository page for `adafruit / Adafruit-Raspberry-Pi-Python-Code`. The repository has 111 commits, 1 branch, and 0 releases. The commit history is displayed, with the commit `Adafruit_ADS1x15` by `ladyada` highlighted. A red arrow points from this commit to the right, where a detailed view of the commit is shown. The commit message is "Added improvements from Pedvide" and it was authored 6 months ago. The commit includes the following files:

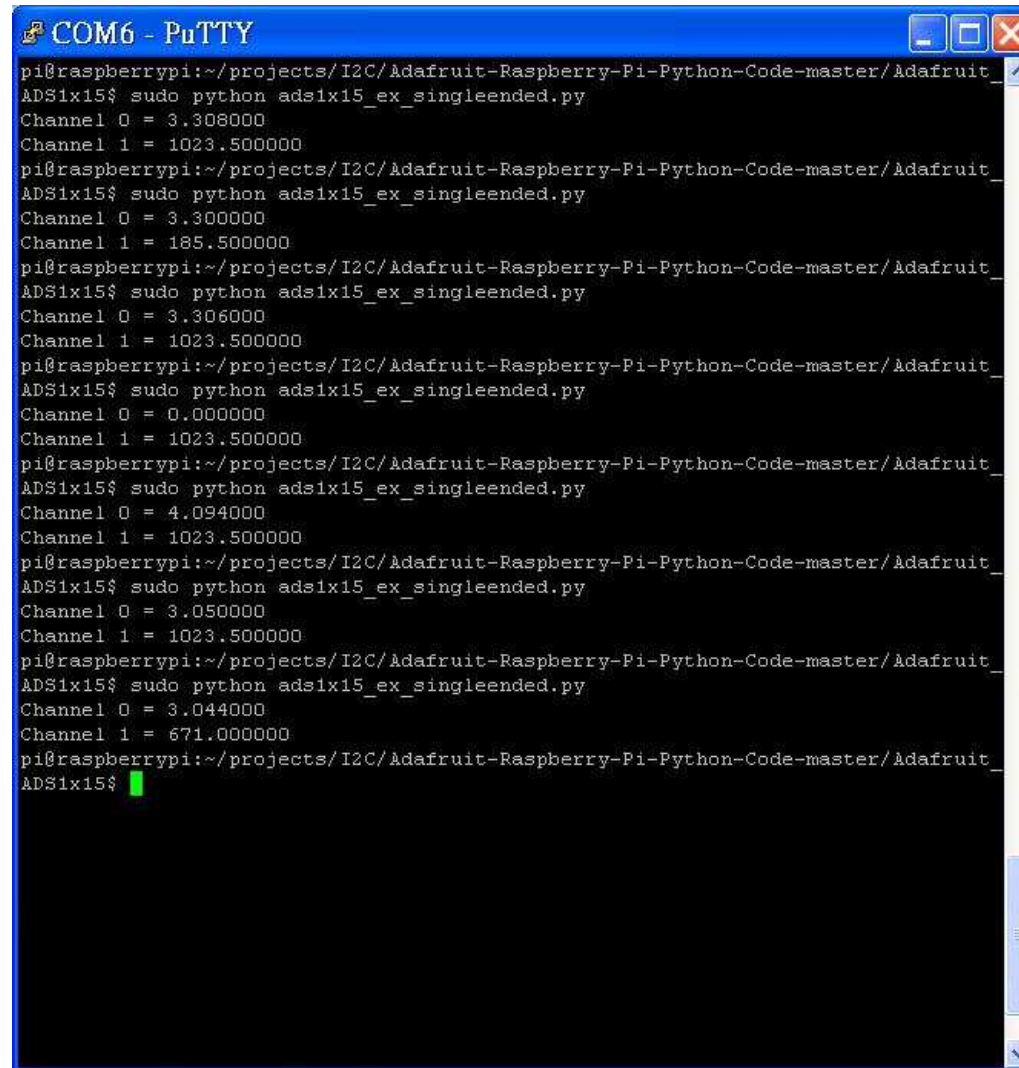
File	Commit Message
<code>Adafruit_ADS1x15.py</code>	Added improvements from Pedvide
<code>Adafruit_I2C.py</code>	First commit
<code>ads1x15_ex_comparator.py</code>	Added improvements from Pedvide
<code>ads1x15_ex_differential.py</code>	Added improvements from Pedvide
<code>ads1x15_ex_singleended.py</code>	Added improvements from Pedvide



Ads1x15_ex_singleended.py

- `#!/usr/bin/python`
- `import time, signal, sys`
- `from Adafruit_ADS1x15 import ADS1x15`
- `def signal_handler(signal, frame):`
- `print 'You pressed Ctrl+C!'`
- `sys.exit(0)`
- `signal.signal(signal.SIGINT, signal_handler)`
- `#print 'Press Ctrl+C to exit'`
- `ADS1015 = 0x00 # 12-bit ADC`
- `#ADS1115 = 0x01 # 16-bit ADC`
- `# Initialise the ADC using the default mode (use default I2C address)`
- `# Set this to ADS1015 or ADS1115 depending on the ADC you are using!`
- `adc = ADS1x15(ic=ADS1015)`
- `# Read channel 0 in single-ended mode, +/-4.096V, 250sps`
- `volts = adc.readADCSingleEnded(0, 4096, 250) / 1000`
- `Print "Channel 0 = %.6f" % (volts)`
- `# To read channel 1 in single-ended mode, +/- 1.024V, 860 sps use:`
- `volts1 = adc.readADCSingleEnded(1, 1024, 860)`
- `print "Channel 1 = %.6f" % (volts1)`

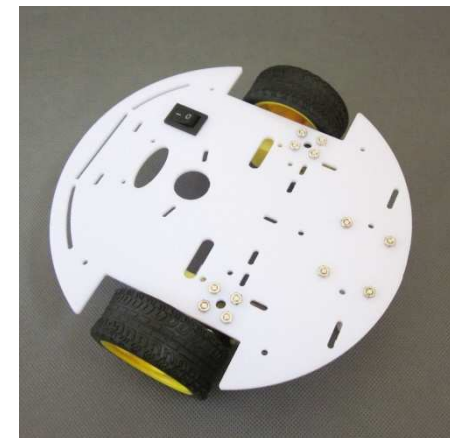
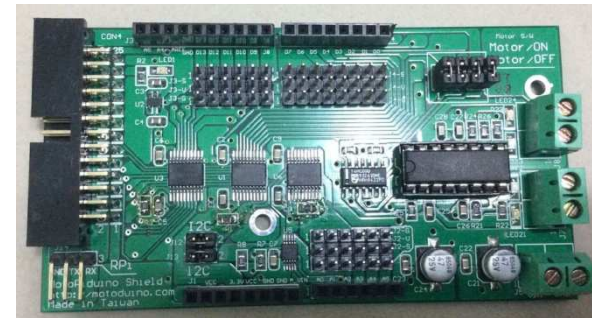
Ads1x15_ex_singleended.py - Result



```
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 3.308000
Channel 1 = 1023.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 3.300000
Channel 1 = 185.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 3.306000
Channel 1 = 1023.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 0.000000
Channel 1 = 1023.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 4.094000
Channel 1 = 1023.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 3.050000
Channel 1 = 1023.500000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$ sudo python ads1x15_ex_singleended.py
Channel 0 = 3.044000
Channel 1 = 671.000000
pi@raspberrypi:~/projects/I2C/Adafruit-Raspberry-Pi-Python-Code-master/Adafruit_ADS1x15$
```

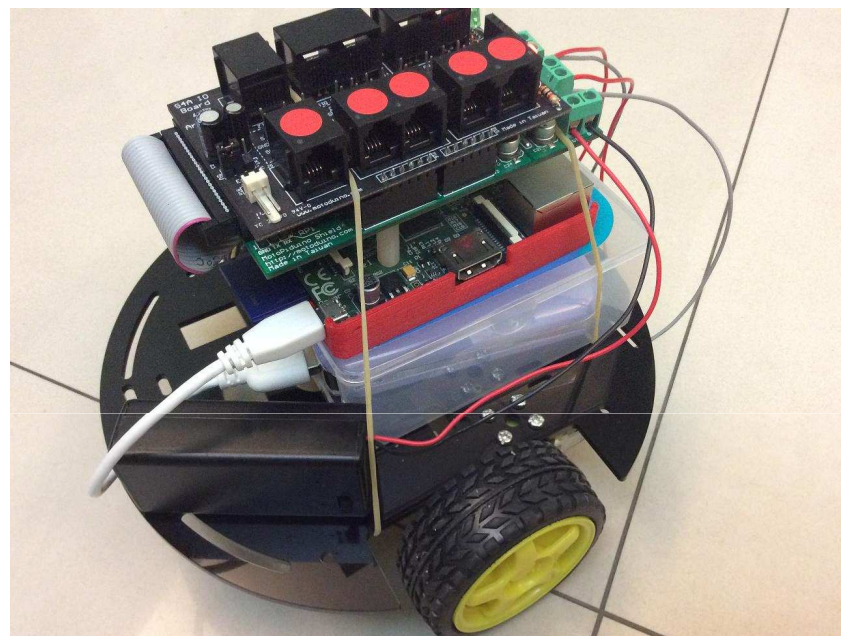
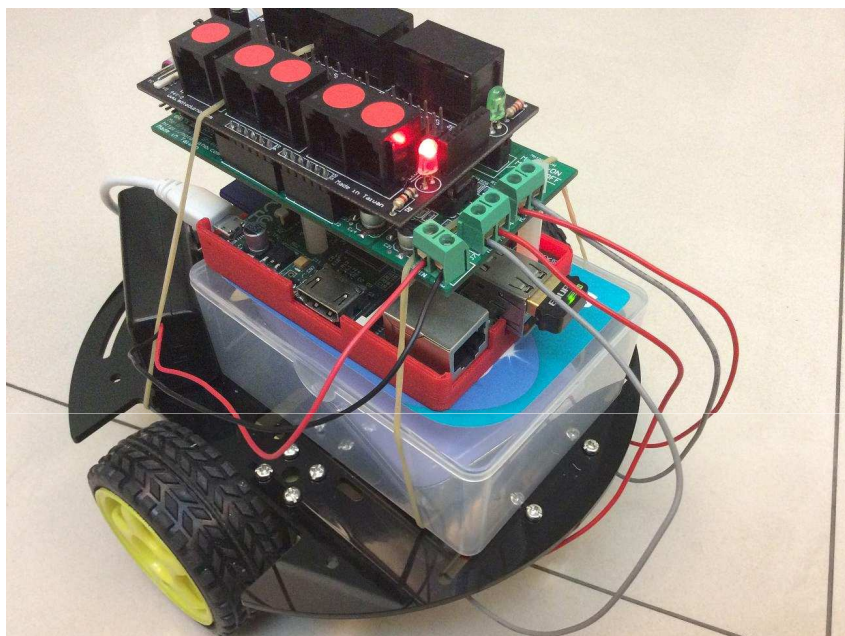


遙控車配件 (MotoPiduino)





遙控車外觀 (MotoPiduino)



<http://sinocgtchen.blogspot.tw>

Motoduino Lab 介紹

- 長期與學校老師合作推動科普教育，利用啟發及娛樂方式激發孩子的科學創意潛能，並配合設計實驗用週邊感測元件
- 著重在創意學習，利用實做把自己的創意實現出來。
- 使用開源方式持續分享給自造者/創客
- 提供基礎開發平台及套件，並提供多種創意應用實例，與有興趣開發者互動討論。