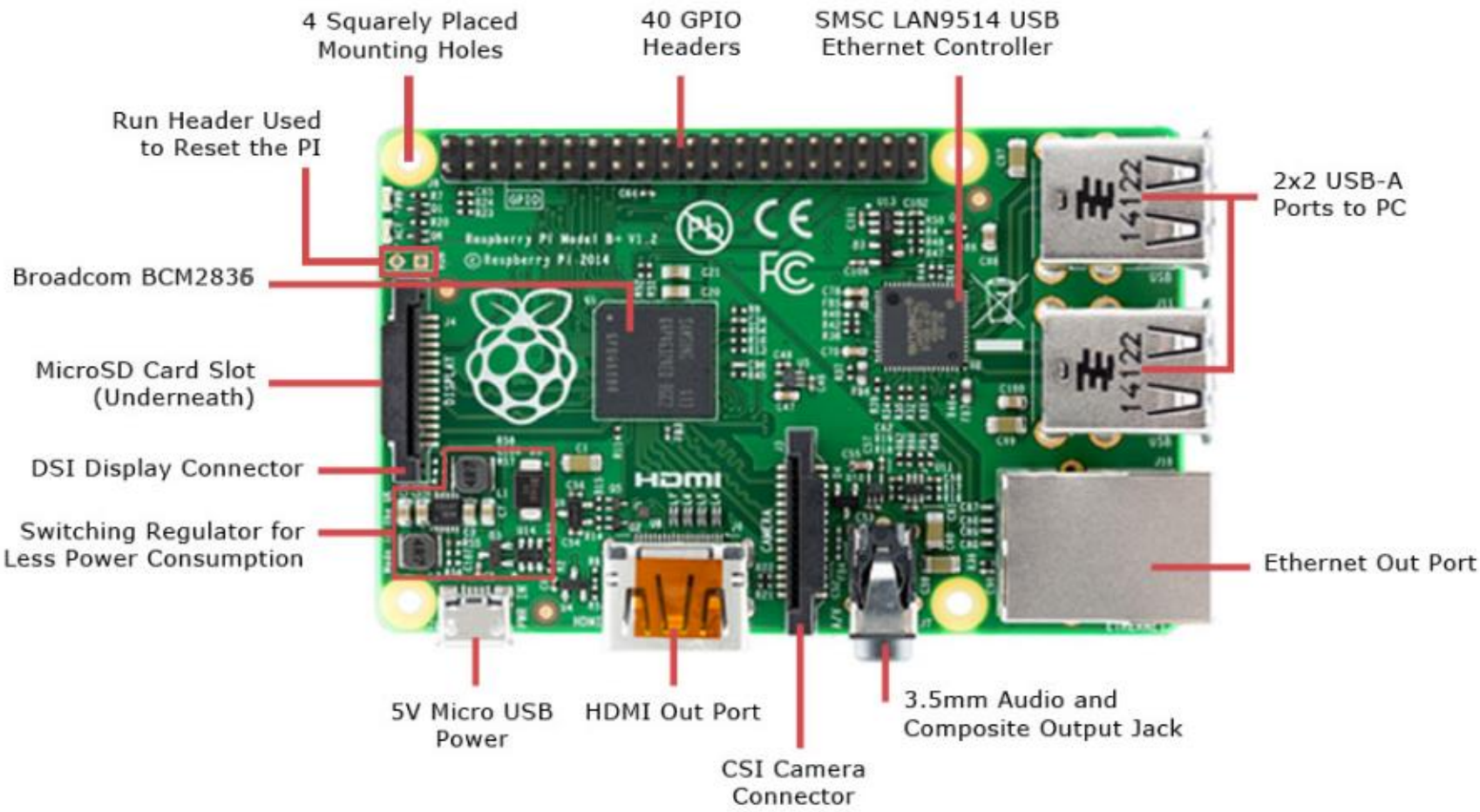
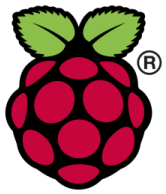
Raspberry Pi

入門體驗

Author: Nick Lee


4 Squarely Placed Mounting Holes
40 GPIO Headers
SMSC LAN9514 USB Ethernet Controller
Run Header Used to Reset the PI
2x2 USB-A Ports to PC
Broadcom BCM2836
MicroSD Card Slot (Underneath)
DSI Display Connector
Switching Regulator for Less Power Consumption
Ethernet Out Port
5V Micro USB Power
HDMI Out Port
CSI Camera Connector
3.5mm Audio and Composite Output Jack

Raspberry Pi 3 Model B+ vs Arduino

		
	Micro-computer	Micro-controller
	Has OS Run your program along with many others	No OS Run your program ONLY
	Python, NodeJS, Ruby, Java, C, C++, etc.	C++
	Knowledge of Linux required	Program and debug on Windows
GPIO pins	Digital only	Analog and digital
Processor	BCM2837 (Broadcom)	ATmega (Atmel)
Speed	1.4 GHz, quad-core	8-16 MHz
RAM	1 GB	32-256 KB

Media Center, Music Player

LibreELEC
RuneAudio
Volumio

OSMC

Settings
- ↳ System info
- ↳ Services
  - ↳ Control (Web interface)
- ↳ Add-on browser
  - ↳ Install from repository

My OSMC
- ↳ Network
- ↳ Services

懷舊遊戲機

RetroPie
Recalbox

Lakka

Keys: Arrows, Enter, Backspace, Escape

Main Menu
- ↳ Information
  - ↳ Network Information
  - ↳ System Information

Settings
- ↳ WiFi
- ↳ Service

SSH login: root, root

Online Updater
- ↳ Content Downloader
  - ↳ DOS

Scan Directory

Load Content
- ↳ Downloads
- ↳ Playlists

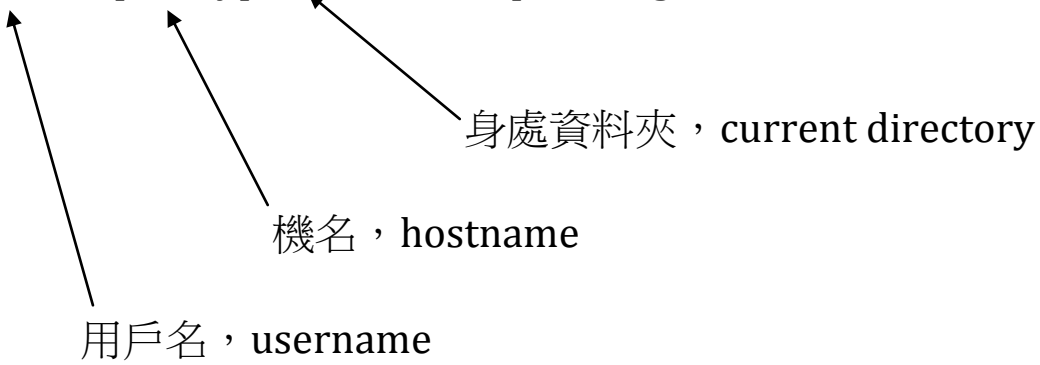
Raspbian

Wheezy
Jessie
Stretch

Buster

SSH login: pi, raspberry

pi@raspberrypi:~ $ sudo raspi-config



如何找出 **IP** 地址？

1. Router：登入**路由器**管理介面（通常是 192.168.?.1），查看 **DHCP 使用者列表**之類。

2. *hostname*.local：電腦需要支援 **multicast DNS**

3. Network scan：下載一個**網絡掃描軟件**，掃吓內聯網有什麼電腦、什麼 IP。

   掃描軟件可試吓 Advanced Port Scanner 或 Angry IP Scanner，或 Fing 手機應用程式。

4. Plug n Pi：下載 **Plug n Pi** 手機應用程式，以 **USB 線**連接手機及樹莓批，手機就可查看樹莓批的 IP 地址。

   手機必須是 Android。樹莓批必須裝有 Plug n Pi Server 軟件。

VNC

On a PC within the same network:

1. Download **RealVNC viewer**
2. Connect to Pi's IP address

You may find the desktop resolution very small. To make it bigger, you may create a new desktop:

$ **`vncserver -geometry 1000x800`**

Take note of the **IP address:display number** printed out, e.g. 192.168.0.103:1

Connect to that <IP address:display number>.

For more tips on using Raspberry Pi:

`https://www.raspberrypi.org/documentation`

ls

list

ls	What things are there?
ls -l	Give me more details.
ls -a	Show me the hidden stuff (those starting with a dot).
ls –l -a	Chain two options together to double the benefits.
ls –la	You may also chain them like this.
ls –tl	Sort by date.
ls *directory*	What is in that directory?
man ls	Explain this command.
ls --help	Another way to explain this command. But the output overflows the page, what can I do?

cd

change directory

cd *directory*	Go to a directory.
cd ..	Go up a level. Double-dot means the parent directory.
cd .	Stay in the same directory. Single-dot means the current directory. In practice, you never do this. It is here for educational purposes only.
cd ~	Go back to home directory. The tilde (~) means home directory.
cd	Go back to home directory. Equivalent to **cd ~**.

pwd

print working directory

pwd	Where am I?

cp

copy

cp *oldfile newfile*	Make a copy of *oldfile*, and name it *newfile*.
cp -r *olddir newdir*	Copy an entire directory. "-r" means "recursive". That is, copy sub-directories, and their sub-directories, and their sub-directories, and so on. Type **cp --help** or **man cp** to review the options.

mv

move or rename

mv *oldfile newfile*	*oldfile* now becomes *newfile*.
mv *file dir*	Move file to directory.

rm

remove

rm *filename*	Delete a file.
rm -r *directory*	Delete a directory. "-r" means "recursive". That is, delete sub-directories, and their sub-directories, and their sub-directories, and so on.

mkdir

make directory

mkdir *directory*	Create a new directory.

rmdir

remove directory

rmdir *directory*	You can only remove an empty directory. Delete everything inside first, or use **rm -r**.

nano

a text editor

nano	When you want to write something, bring up a text editor.
nano *filename*	Edit an existing file. Two shortcuts you need to know, for now: Ctrl-O to save Ctrl-X to exit

more or **less**

show text content, or show output page-by-page

less *filename*

Display file content.

If content is longer than one page:

- Use ← ↑ ↓ → **[Page Up/Down]** to navigate
- Type **q** to quit.

ls --help | less

Display the preceding command's output in a page-by-page manner.

"|" is called a "pipe". We will see more of it later.

If you have trouble typing the "|":

1. Enter **sudo raspi-config**
2. Select **Internationalisation options**
3. Select **Change Keyboard Layout**, this may take a while.
4. Linux should have detected the keyboard for you. Press **[enter]**.
5. Then, it asks for Keyboard Layout. Default is English (UK). DO NOT trust that. You should select **Other**, then **English (US)**, then **English (US)** again.
6. Finally, it asks a few more questions. Press **[enter]** to skip all of them.
7. **Finish** and **reboot**.

sudo reboot, sudo halt -h

Reboot and shutdown

sudo reboot

"sudo" means "superuser do".
You cannot reboot the machine as an ordinary user. You must turn yourself into a *superuser* first.

sudo halt -h

To shutdown the machine, you also have to be a superuser.

Type **halt --help** or **man halt** to review the options.

DO NOT unplug the power until Raspberry Pi is completely shut down. The SD card may be corrupted if power is pulled prematurely.

Pay attention to the **blinking lights** on Raspberry Pi. Wait until only **one steady red light** is left and all other lights are dead. That's when you can unplug the power safely.

How do you turn it on again? Just re-plug the power.

A Simplified UNIX Family Tree