



第一次亲密接触 - 环境搭建

主讲人：曹家英



第一部分：树莓派底层硬件

- 1. 树莓派介绍
- 2. 树莓派环境搭建
- 3. 树莓派与命令行
- 4. 相关知识扩展
- 5. 树莓派基础外设操作
- 6. 树莓派Buildroot SDK环境搭建



环境搭建基本流程

Windows下搭建

MAC OS下搭建

无显示设备下搭建

备份Image



环境搭建基本流程



环境搭建基本流程

最终目标：可以通过电脑进行远程访问

下载Image地址：<https://www.raspberrypi.org/downloads/>

烧录工具Win与MAC各不相同后面会介绍。

下载系统镜像文件



烧录镜像文件到TF卡



修改树莓派配置



开启SSH

实现远程桌面




最简单的搭建方式：

1. 下载NOOBS
2. 将安装包解压到SD卡中
3. 为树莓派接上显示屏，键盘鼠标
4. 上电。

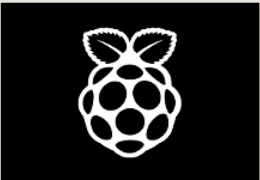


环境搭建基本流程——Image下载


BLOGDOWNLOADSCOMMUNITYHELPFORUMSEDUCATION

DOWNLOADS

Raspbian is our official operating system for **all** models of the Raspberry Pi.
Download it here, or use **NOOBS**, our easy installer for Raspbian and more.




NOOBS




RASPBIAN

Third Party Operating System Images


Third party operating system images for Raspberry Pi are also available:




UBUNTU MATE




SNAPPY UBUNTU CORE



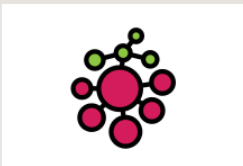
WINDOWS 10 IOT CORE



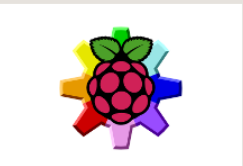
OSMC




LIBREELEC




PINET



RISC OS



WEATHER STATION



ICHIGOJAM RPI

Windows下搭建



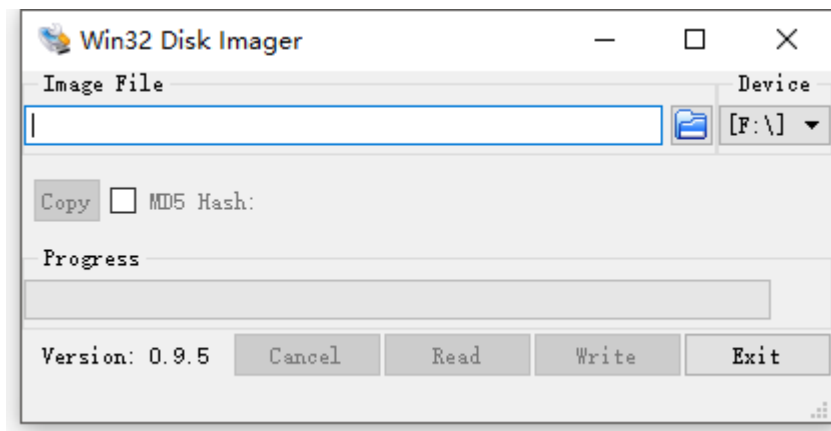
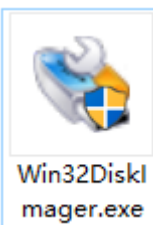
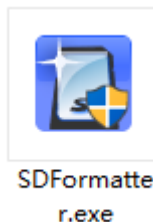
Windows下搭建——准备

准备工作:

一台Windows电脑
SD卡及读卡器
树莓派及电源
显示器, 键盘鼠标

准备软件:

SD Formatter : SD卡格式化软件
Win32DiskImager : Image烧录软件
Xshell : SSH远程登录工具
VNC Viewer : VNC远程桌面工具
树莓派Image镜像包





Windows下搭建——格式化

1. 格式化SD卡

确认该盘符
是否为SD卡盘符



选择格式化

2. 格式化后可以发现SD卡恢复原有大小 既可以说明SD卡格式化成功

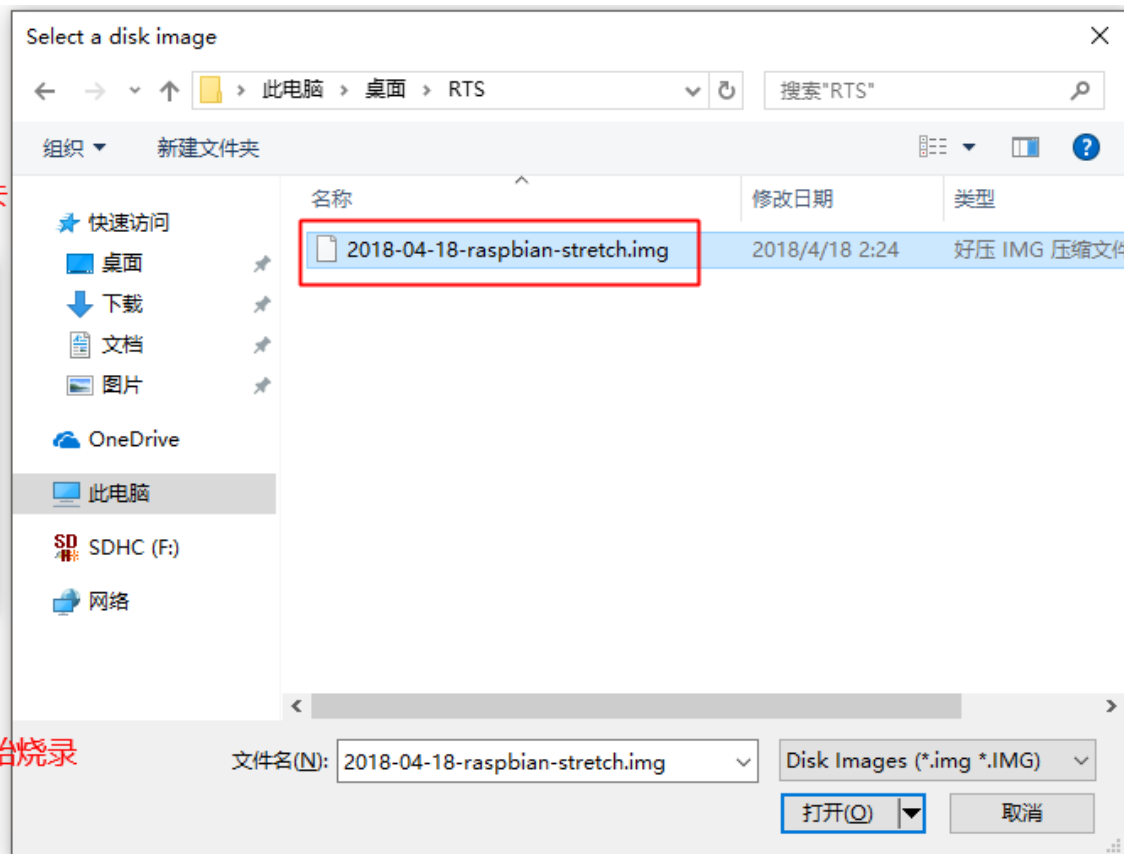
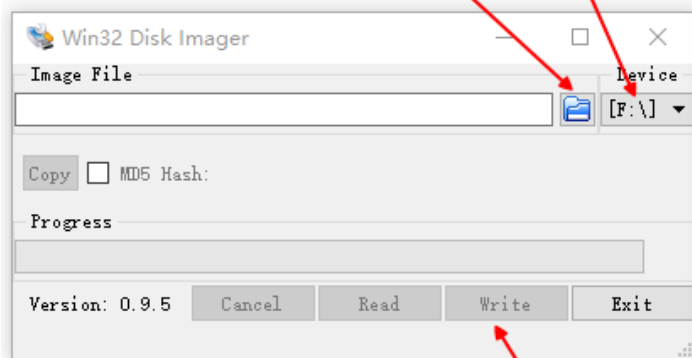




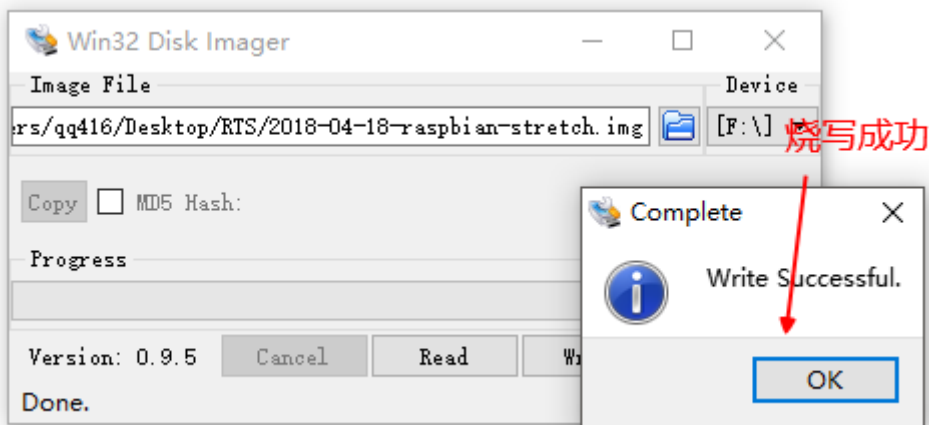
Windows下搭建——烧录

3. 打开Win32 Disk Image进行烧录

选择官网下载后解压出来的.img文件
确认Device设备为SD卡盘符
点击Write开始烧写
等待烧写成功



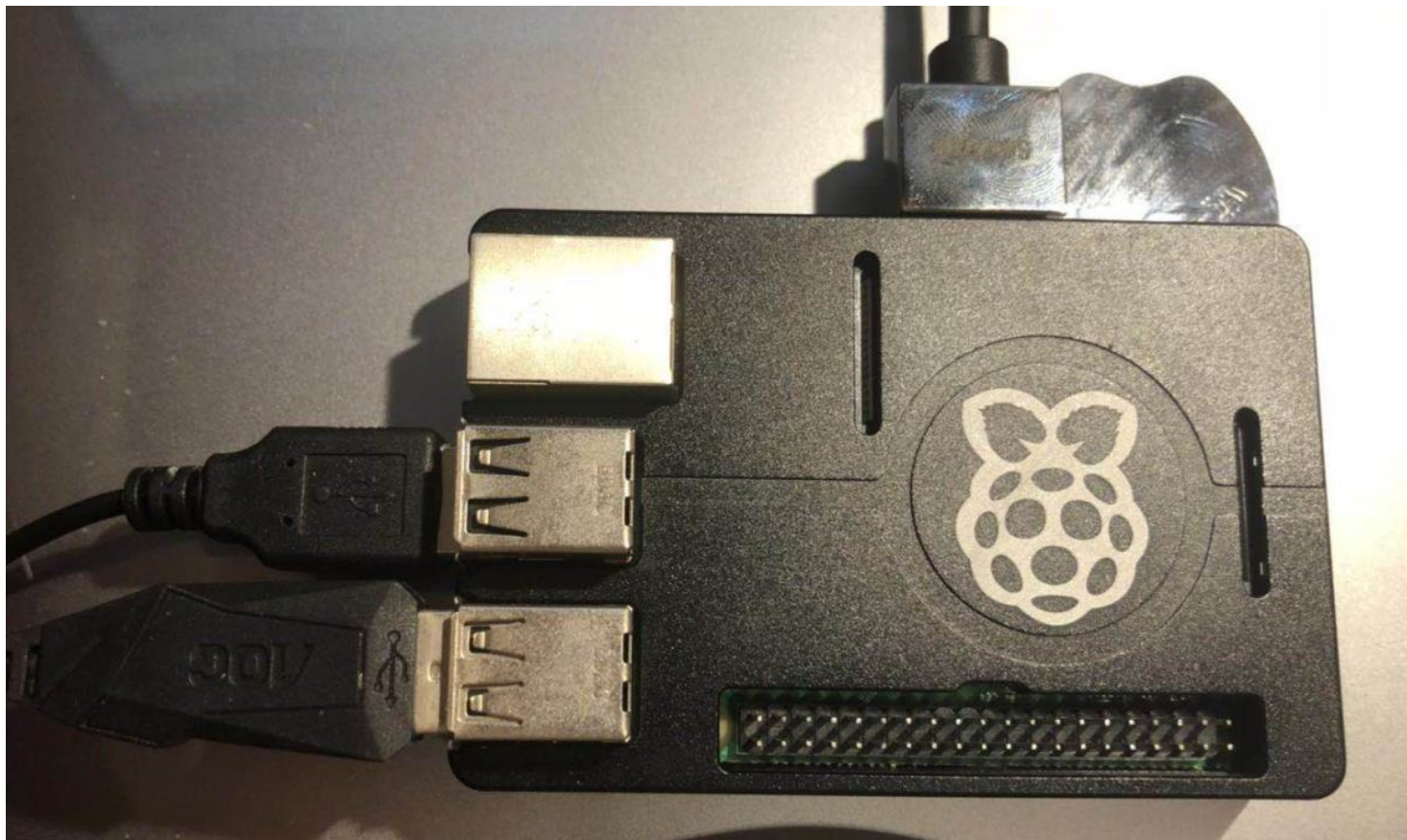
点击Write开始烧录





Windows下搭建——开机配置

4. 将显示器鼠标键盘接在树莓派上
接通电源上电，稍等树莓派会进入系统。
5. 进行配置：
 - a. 为树莓派连接网线或下面步骤配置WIFI
 - b. 基本的配置都可以在raspi-config中配置
在命令行中输入：`sudo raspi-config`



```
pi@raspberrypi: ~  
File Edit Tabs Help  
pi@raspberrypi:~ $ ls  
Desktop Downloads Pictures python_games Videos  
Documents Music Public Templates  
pi@raspberrypi:~ $ sudo raspi-config
```



Windows下搭建——开机配置

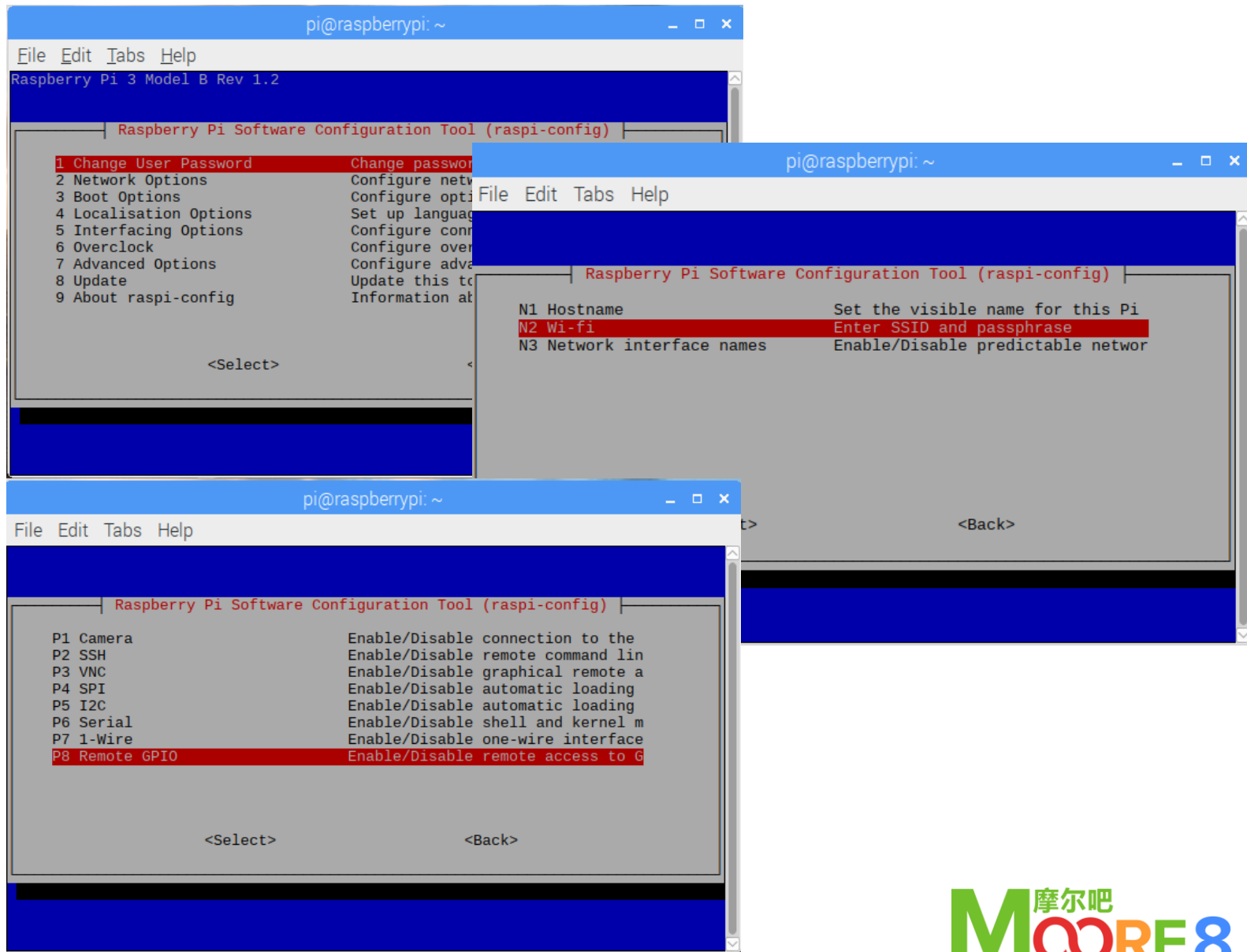
6. 如右图，首先修改用户密码
选择1，输入密码即可

7. 配置WIFI，
选择2，选择N2，国家选择China。
输入SSID及密码。
(也可以点击右上角网络图标配置)

8. 接口配置：
选择5，将SSH，VNC打开

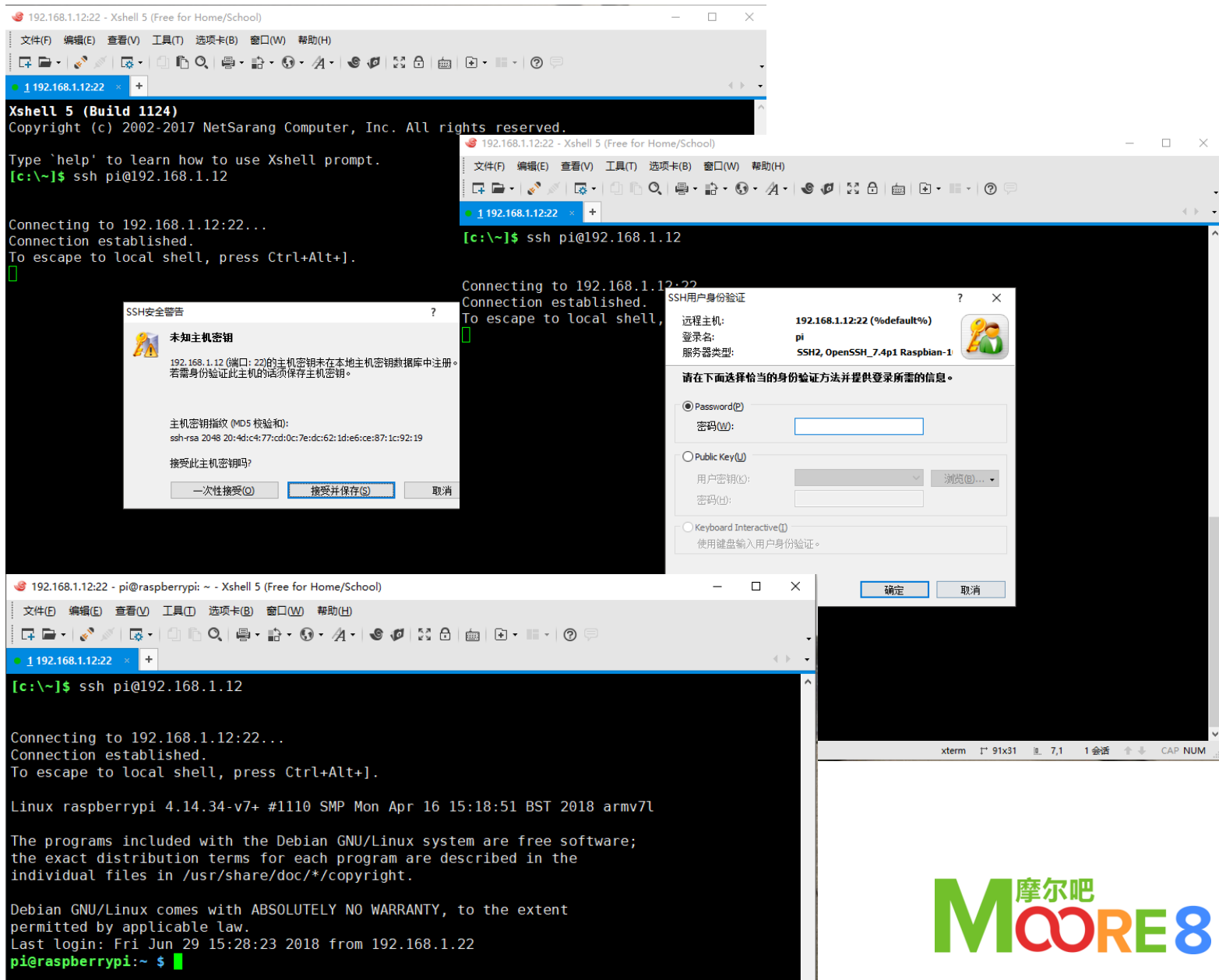
9. 选择Finish重启系统

10. 重启后使用“ifconfig” 查看Ip地址



Windows下搭建——远程命令行连接

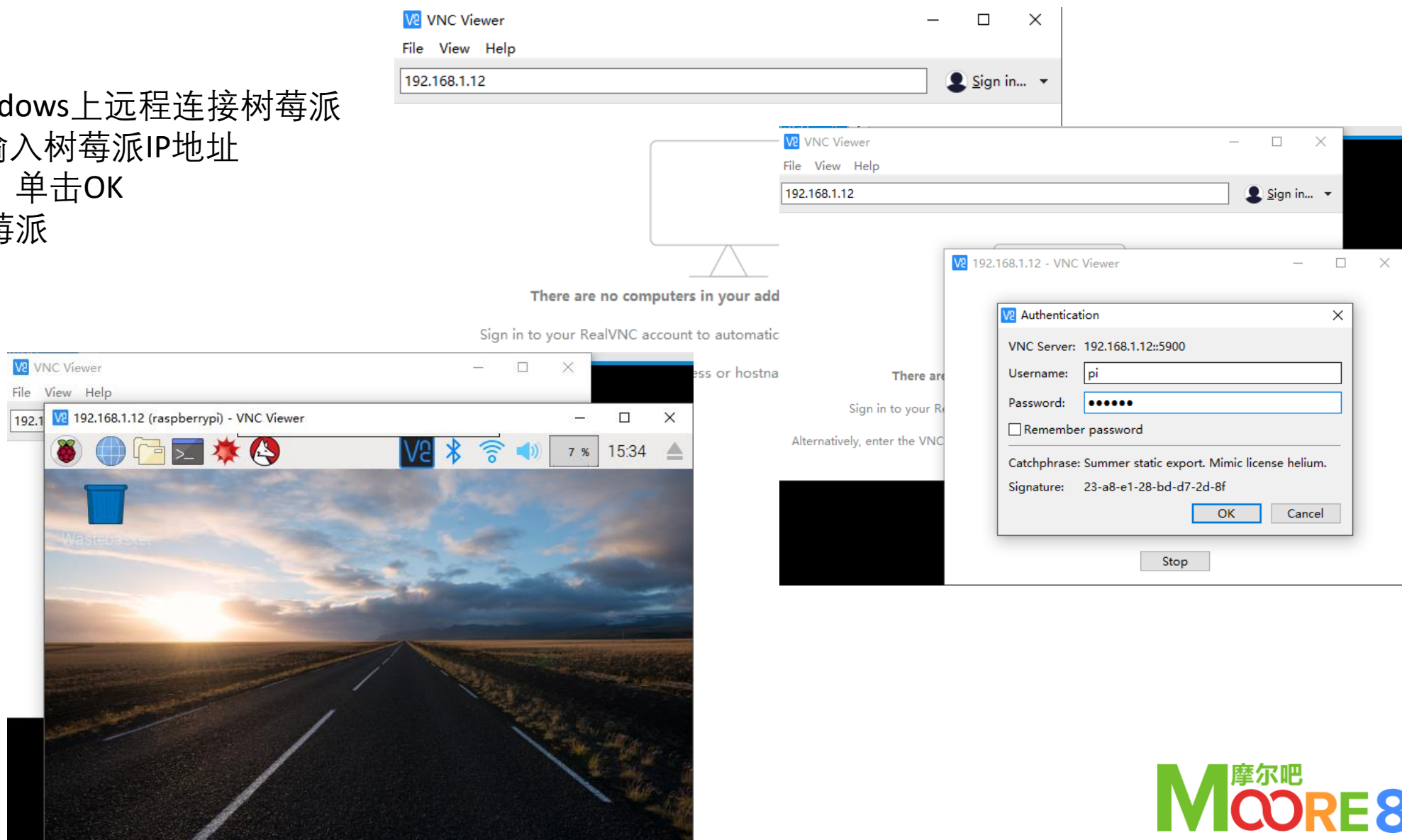
使用Xshell在Windows上远程连接树莓派
打开Xshell输入“ssh pi@树莓派IP地址”
在SSH安全警告中选择“接受并保存”
输入密码
远程连接树莓派





Windows下搭建——远程桌面连接

使用VNC Viewer在Windows上远程连接树莓派
打开VNC Viewer输入树莓派IP地址
输入用户名密码，单击OK
远程桌面连接树莓派



MAC OS下搭建



MAC OS下搭建——准备

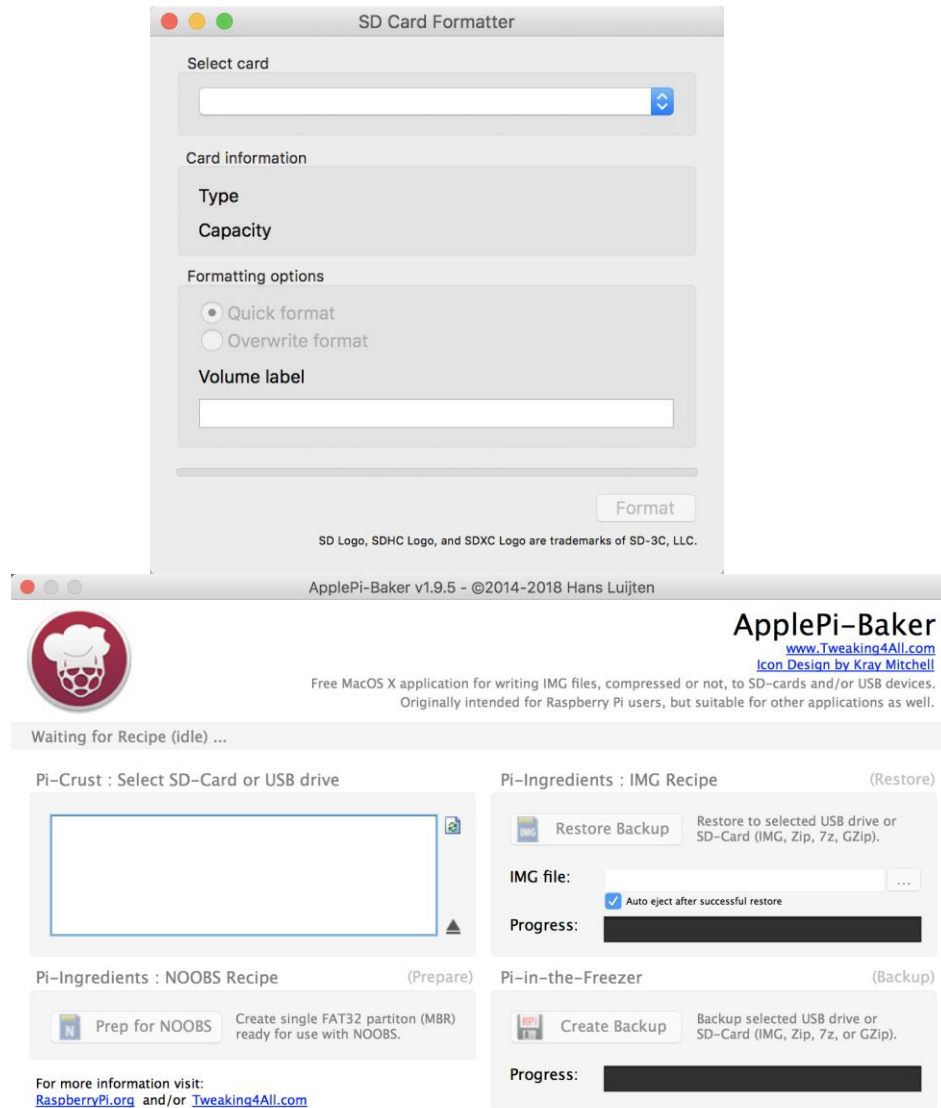
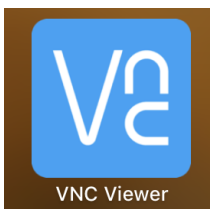
准备工作:

一台MAC电脑
SD卡及读卡器
树莓派及电源
显示器, 键盘鼠标

准备软件:

SD Card Formatter : SD卡格式化软件
ApplePi-Baker : Image烧录软件
VNC Viewer : VNC远程桌面工具
树莓派Image镜像包

1. MAC OS下\使用brew cask 进行软件的安装:
2. 官网: https://brew.sh/index_zh-cn.html
3. 安装软件:
 1. brew cask install sdformatter
 2. brew cask install applepi-baker
 3. Brew cask install vnc-viewer





MAC OS下搭建——格式化

MAC 格式化

选择好需要格式化的设备
点击Format

The screenshot shows the SD Card Formatter application window. It has a title bar with three colored buttons (red, yellow, green) and the text "SD Card Formatter". The window is divided into several sections:

- Select card:** A dropdown menu showing "disk2: Generic MassStorageClass Media" with a blue arrow button on the right.
- Card information:** A section containing a table with the following data:

Type	SDHC
Capacity	15.80 GB

To the right of the table is the SDHC logo.
- Formatting options:** A section with two radio buttons: "Quick format" (selected) and "Overwrite format".
- Volume label:** A text input field containing the word "boot".
- Format button:** A button labeled "Format" located at the bottom right of the window.
- Footer:** A line of small text at the bottom stating "SD Logo, SDHC Logo, and SDXC Logo are trademarks of SD-3C, LLC."



MAC OS下搭建——烧录

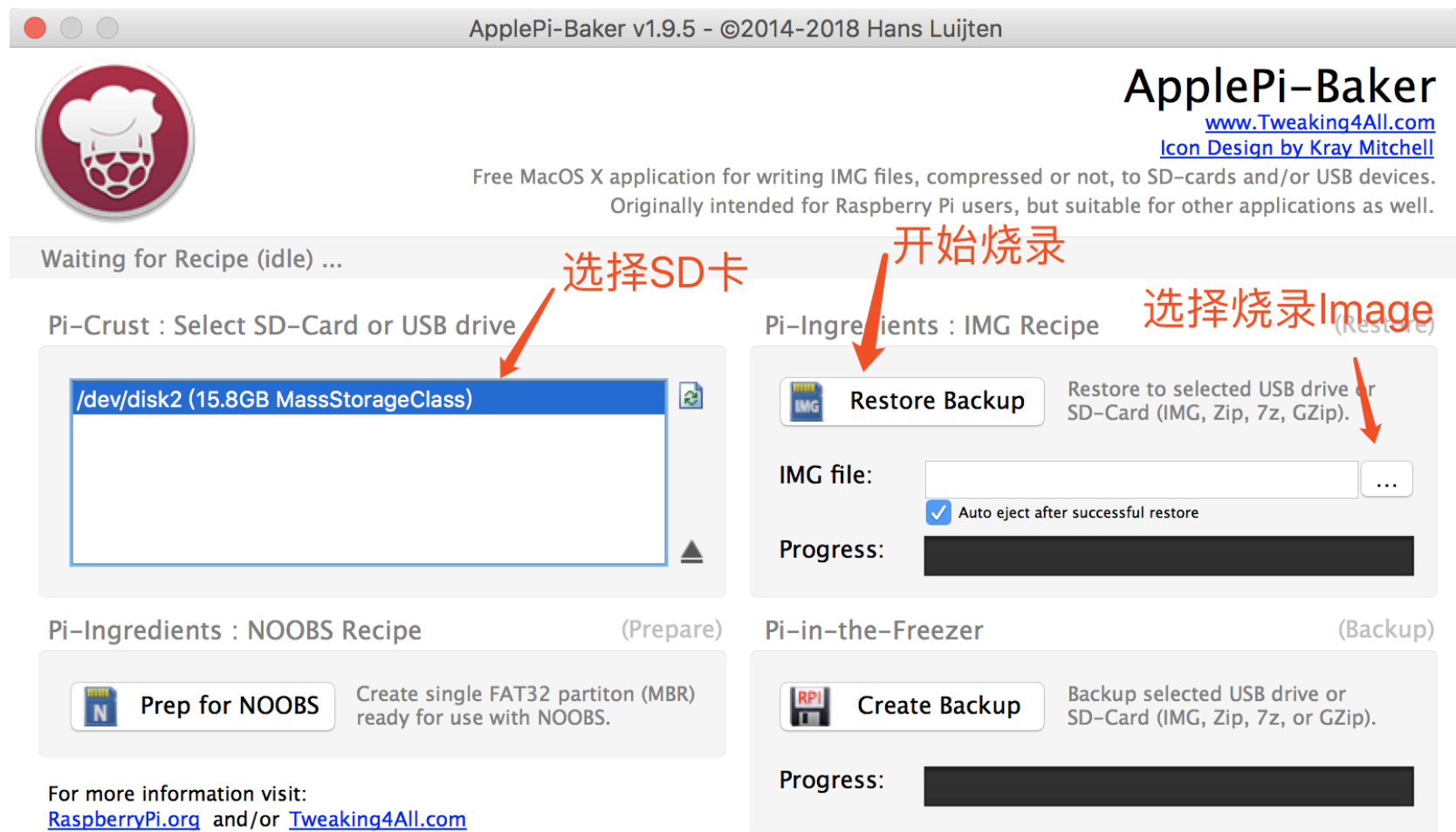
MAC 烧录

打开ApplePi-Baker

选择烧录的SD卡

选择image

点击Restore Backup开始烧录



无显示设备下搭建



无显示设备下搭建

开启SSH:

更新日志: http://downloads.raspberrypi.org/raspbian/release_notes.txt

开启SSH 方法, 再log中有记录: 创建一个ssh文件在/boot 目录下

配置WIFI方法:

在/boot 目录下创建wpa_supplicant.conf文件, 并编辑:

ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev

update_config=1

country=CN

network={

ssid="SSID"

psk= " Password"

Priority = 4

}

```

1 ctrl_interface=DIR=/var/run/wpa_supplicant GROUP=netdev
2 update_config=1
3 country=CN
4
5 network={
6   ssid="ASUS"
7   psk= "1.2.3.4."
8 }
9

```

wpa_supplicant.conf [+]

6,10

```

[ 12:30上午 ] [ caojiaying@MAC:/Volumes/boot ]
$ touch ssh
[ 12:30上午 ] [ caojiaying@MAC:/Volumes/boot ]
$ touch wpa_supplicant.conf
[ 12:30上午 ] [ caojiaying@MAC:/Volumes/boot ]
$ ls -al
total 42401
drwxrwxrwx@ 1 caojiaying  staff      2560  6 30 00:30 .
drwxr-xr-x@ 7 root        wheel      224  6 30 00:15 ..
drwxrwxrwx  1 caojiaying  staff       512  6 30 00:15 .fsevents
-rwxrwxrwx  1 caojiaying  staff    18693  8 21 2015 COPYING.linux
-rwxrwxrwx  1 caojiaying  staff    1494  11 18 2015 LICENCE.broadcom
-rwxrwxrwx  1 caojiaying  staff    18974  9  7 2017 LICENSE.oracle
drwxrwxrwx  1 caojiaying  staff       512 10 14 2017 System Volume Information
-rwxrwxrwx  1 caojiaying  staff    15660  5 15 2017 bcm2708-rpi-0-w.dtb
-rwxrwxrwx  1 caojiaying  staff    15456  5 15 2017 bcm2708-rpi-b-plus.dtb
-rwxrwxrwx  1 caojiaying  staff    15197  5 15 2017 bcm2708-rpi-b.dtb
-rwxrwxrwx  1 caojiaying  staff    14916  5 15 2017 bcm2708-rpi-cm.dtb
-rwxrwxrwx  1 caojiaying  staff    16523  5 15 2017 bcm2709-rpi-2-b.dtb
-rwxrwxrwx  1 caojiaying  staff    17624  5 15 2017 bcm2710-rpi-3-b.dtb
-rwxrwxrwx  1 caojiaying  staff    16380  5 15 2017 bcm2710-rpi-cm3.dtb
-rwxrwxrwx  1 caojiaying  staff   50248  8 11 2017 bootcode.bin
-rwxrwxrwx  1 caojiaying  staff     187  1  1 1980 cmdline.txt
-rwxrwxrwx  1 caojiaying  staff     1590  9  7 2017 config.txt
-rwxrwxrwx  1 caojiaying  staff     6688  8 11 2017 fixup.dat
-rwxrwxrwx  1 caojiaying  staff     2594  8 11 2017 fixup_cd.dat
-rwxrwxrwx  1 caojiaying  staff     9834  8 11 2017 fixup_db.dat
-rwxrwxrwx  1 caojiaying  staff     9830  8 11 2017 fixup_x.dat
-rwxrwxrwx  1 caojiaying  staff      145  9  7 2017 issue.txt
-rwxrwxrwx  1 caojiaying  staff  4381216  8 11 2017 kernel.img
-rwxrwxrwx  1 caojiaying  staff  4581064  8 11 2017 kernel7.img
drwxrwxrwx  1 caojiaying  staff    10240  9  7 2017 overlays
-rwxrwxrwx  1 caojiaying  staff         0  6 30 00:30 ssh
-rwxrwxrwx  1 caojiaying  staff  2868132  8 11 2017 start.elf
-rwxrwxrwx  1 caojiaying  staff   666404  8 11 2017 start_cd.elf
-rwxrwxrwx  1 caojiaying  staff  5007204  8 11 2017 start_db.elf
-rwxrwxrwx  1 caojiaying  staff  3952100  8 11 2017 start_x.elf
-rwxrwxrwx  1 caojiaying  staff         0  6 30 00:30 wpa_supplicant.conf
[ 12:30上午 ] [ caojiaying@MAC:/Volumes/boot ]
$

```



无显示设备下搭建

树莓派上电后会自动开启SSH 并链接WIFI

通过nmap搜索IP地址

nmap安装: `brew install nmap`

在终端输入 `nmap 192.168.1.0/24`

nmap 会列出所有网络中的设备。

可以看出我们要的IP地址为 192.168.1.21

这样就可以通过SSH或VNC进行远程链接。

```
$ nmap 192.168.1.0/24
Starting Nmap 7.70 ( https://nmap.org ) at 2018-06-30 00:38 CST
Nmap scan report for RT-AC66U_B1-BD48 (192.168.1.1)
Host is up (0.012s latency).
Not shown: 992 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
53/tcp    open  domain
80/tcp    open  http
515/tcp   open  printer
3333/tcp  open  dec-notes
8443/tcp  open  https-alt
9100/tcp  open  jetdirect
9998/tcp  open  distinct32

Nmap scan report for Synology (192.168.1.2)
Host is up (0.012s latency).
Not shown: 992 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
80/tcp    open  http
139/tcp   open  netbios-ssn
443/tcp   open  https
445/tcp   open  microsoft-ds
3261/tcp  open  winshadow
5000/tcp  open  upnp
5001/tcp  open  complex-link

Nmap scan report for RPi3B-1 (192.168.1.17)
Host is up (0.012s latency).
Not shown: 997 closed ports
PORT      STATE SERVICE
22/tcp    open  ssh
5000/tcp  open  upnp
5900/tcp  open  vnc

Nmap scan report for MAC (192.168.1.21)
Host is up (0.00031s latency).
All 1000 scanned ports on MAC (192.168.1.21) are closed

Nmap done: 256 IP addresses (4 hosts up) scanned in 9.98 seconds
```

备份lamge



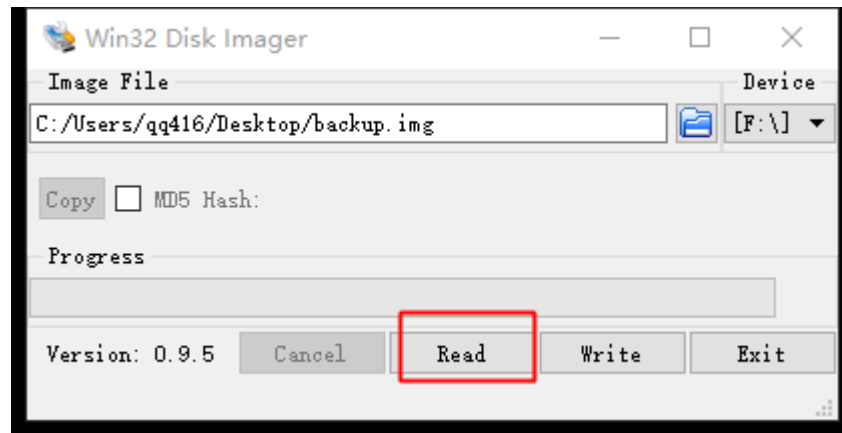
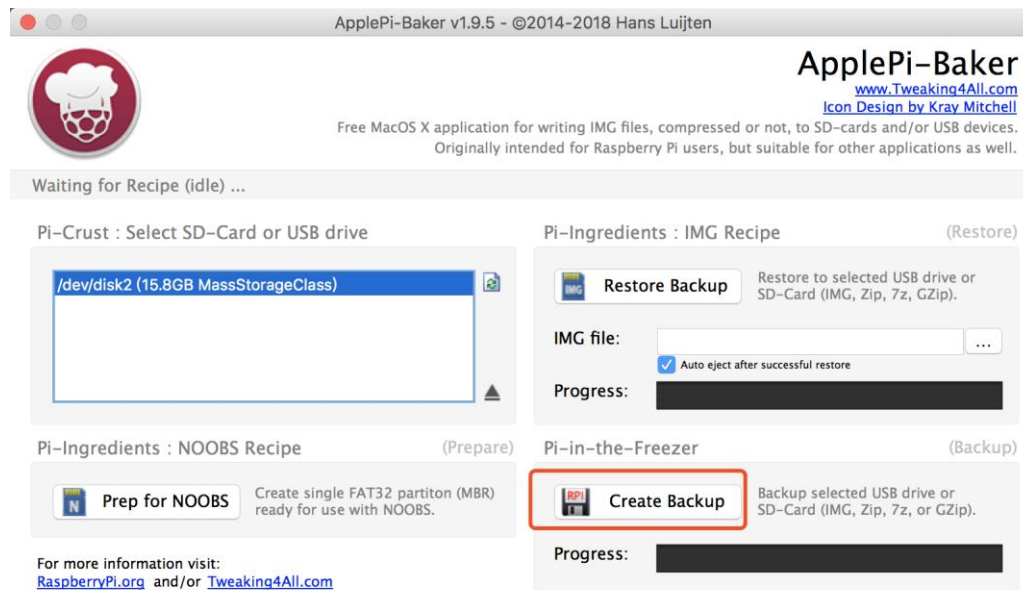
备份image

Mac OS:

备份 image 使用 ApplePi-Baker create Backup
点击 Create Backup 输入存储名及目录
格式选择 IMG files
点击 Save

Windows:

首先需要新建文件重命名为 ***.img
选择打开这个文件
点击 Read 开始备份



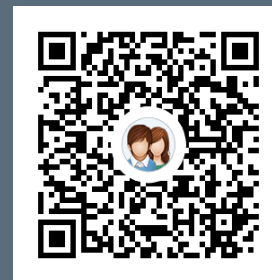


感谢您的观看

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