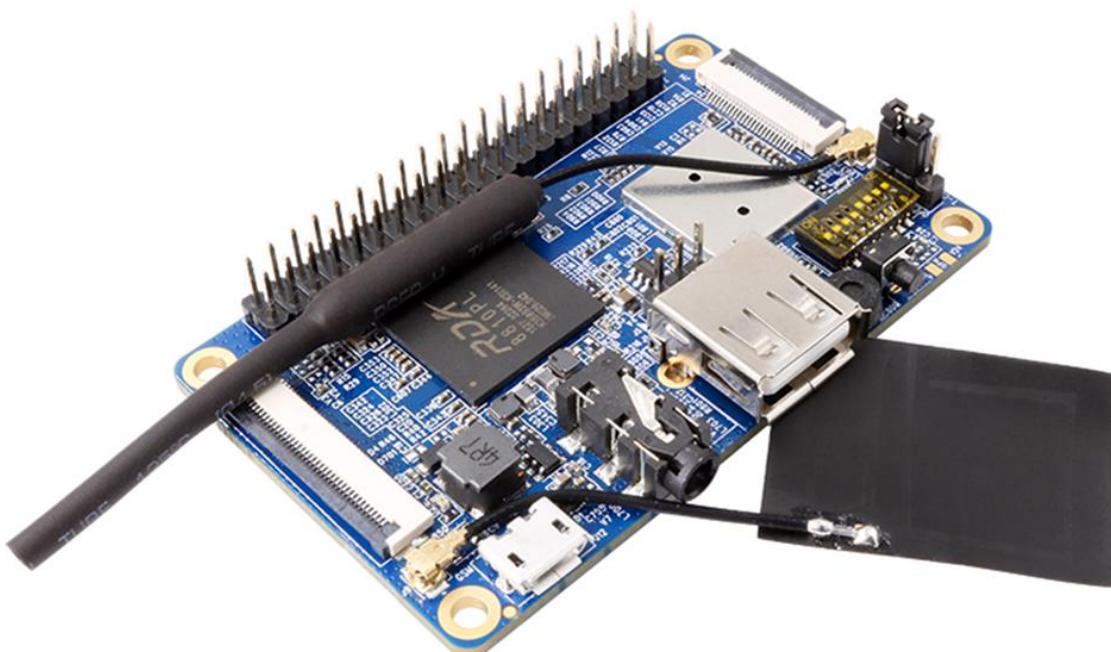




Orange Pi 2G-IOT

User Manual





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I. Orange Pi Introduction

1. What is Orange Pi 2G-IOT?

It's an open-source single-board computer. It can run Android 4.4, Ubuntu, Debian, Raspberry Pi image. It uses the RDA8810 Soc, and has 256MB LPDDR2 SDRAM.

2. What can I do with Orange Pi 2G-IOT?

You can use it to build...

- A computer
- A wireless server
- Games
- Music and sounds
- HD video
- A speaker
- Android
- Scratch
- Pretty much anything else, because Orange Pi 2G-IOT is open source.

3. Whom is it for?

Orange Pi 2G-IOT is for anyone who wants to create with technology— not just consuming. It's a simple, fun, useful tool and you can use it to take control of the world around you.

4. Hardware specification

Hardware specification	
CPU	ARM Cortex-A5 32bit
GPU	Separate graphic processor, Vivante's GC860 support OpenGL ES 1.1/2.0 support OpenVG 1.4 support DirectFB support GDI/DirectShow 30M Triangle/s, 250M Pixel/s
Memory (SDRAM)	Integrated 256MB LPDDR2 SDRAM



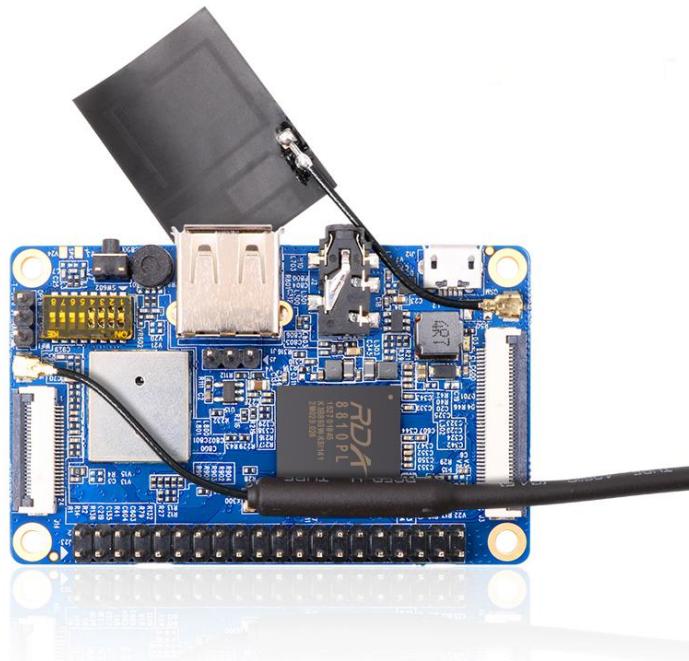
Onboard Storage	TF card / Integrated 500MB 8Bit 1.8V 4K SLC Nand Flash
Onboard WIFI+BT	RDA5991, WIFI+BT
2G model	The four frequency single card GSM/GPRS Dedicated accelerators SIM card
Video Input	A CSI input connector Camera: Supports 8-bit YUV422 CMOS sensor interface Supports CCIR656 protocol for NTSC and PAL Supports SM pixel camera sensor Supports video capture solution up to 1080p@30fps
Audio Input	MIC, 3.5 mm Jack
Video Outputs	LCD
Audio Output	3.5 mm Jack、 FM、 SPEAK (Optional)
Power Source	USB OTG input can supply power Battery input can supply power (Optional)
USB 2.0 Ports	One USB 2.0 HOST, One USB 2.0 OTG
Buttons	Power Button(SW602)
Low-level peripherals	40 Pins Header, compatible with Raspberry Pi B+
GPIO(1x3) pin	UART, ground.
LED	Power led
Supported OS	Android, Ubuntu, Debian, Rasbian

Interface definition

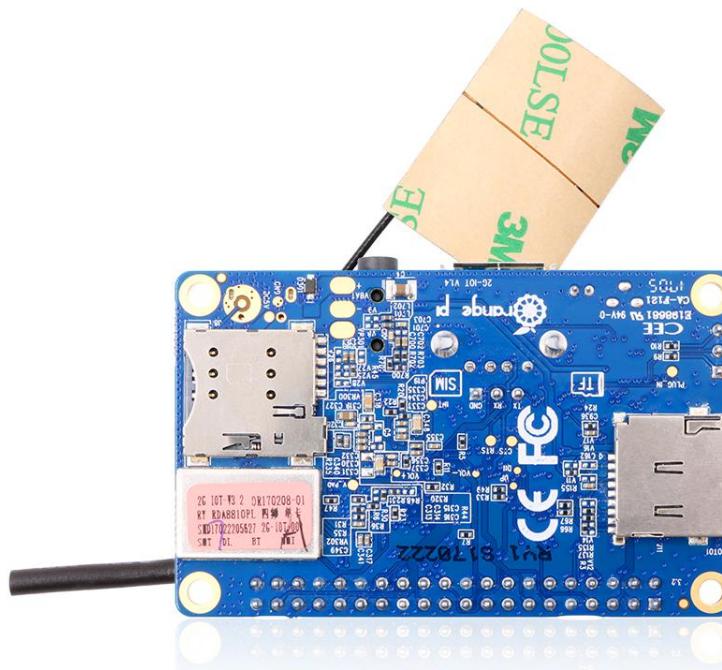
Product size	67mm × 42mm
Weight	35g
Orange Pi™ is a trademark of the Shenzhen Xunlong Software CO., Limited	



Top view

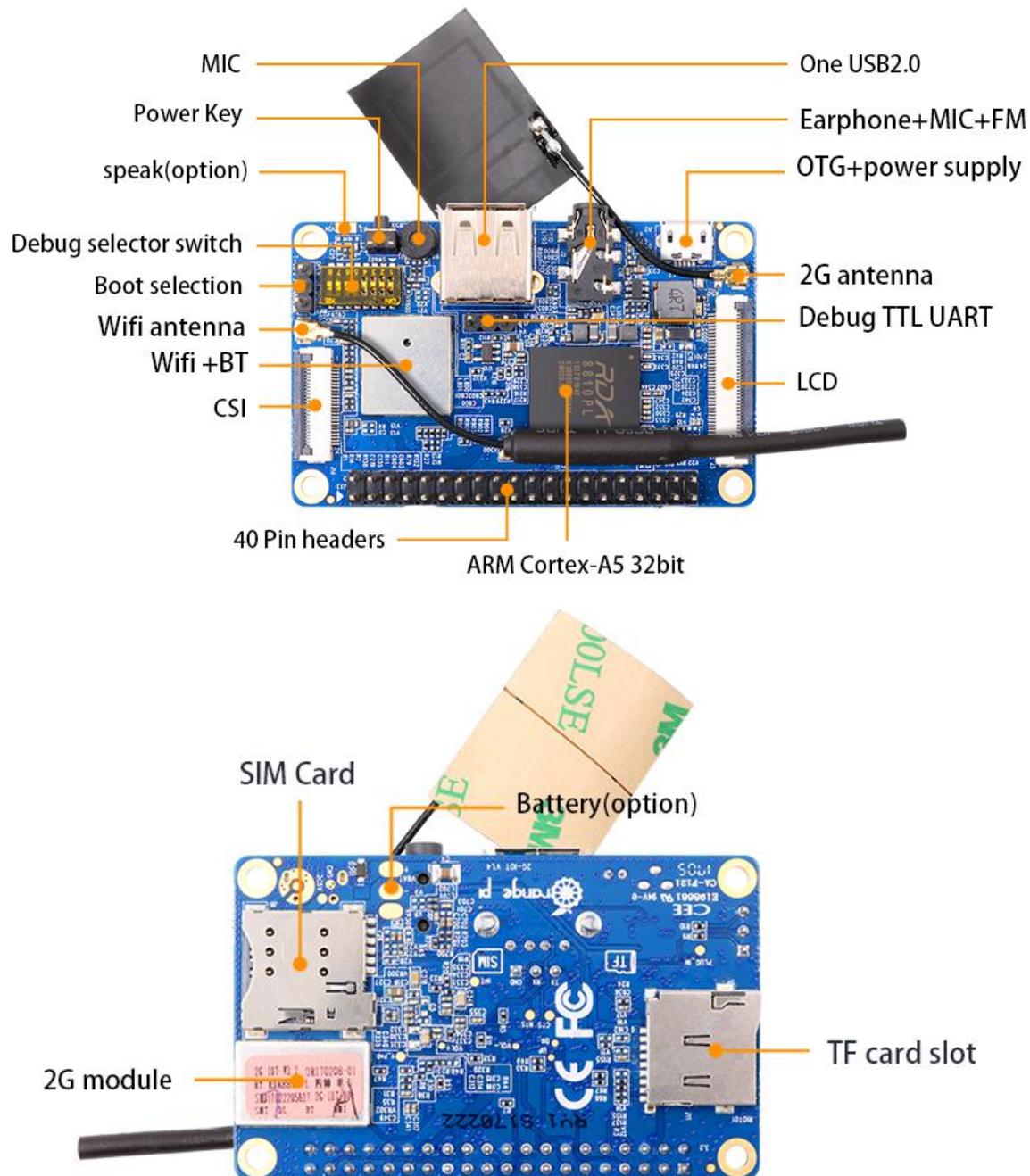


Bottom view





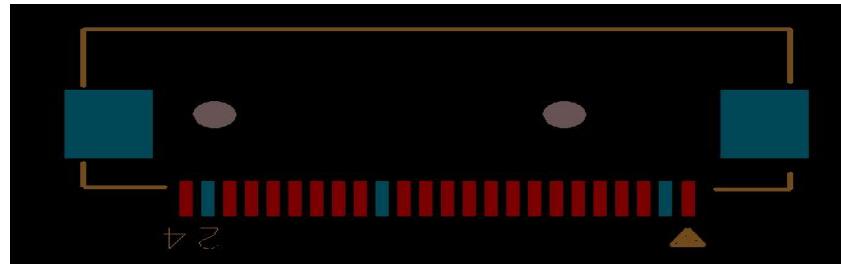
Interface instructions:



5. GPIO Specifications



The CSI Camera Connector is a 24-pin FPC connector which can connect external camera module with proper signal pin mappings. The pin of CIS connector can be defined as follows. The connector marked with "CON 1" on the Orange Pi 2G-IOT is camera connector.



OrangePi 2G-IOT-CSI

CON1-P01	NC	
CON1-P02	GND	
CON1-P03	TWI2-SDA	PE13
CON1-P04	VCC-CSI	
CON1-P05	TWI2-SCK	PE12
CON1-P06	CSI-RESET#	PE15
CON1-P07	CSI-VSYNC	PE3
CON1-P08	CSI-STBY-EN	PE15
CON1-P09	CSI-HSYNC	PE2
CON1-P10	VDD1V8-CSI	
CON1-P11	VCC-CSI	
CON1-P12	CSI-D7	PE11
CON1-P13	CSI-MCLK	PE1
CON1-P14	CSI-D6	PE10
CON1-P15	GND	
CON1-P16	CSI-D5	PE9
CON1-P17	CSI-PCLK	PE0
CON1-P18	CSI-D4	PE8
CON1-P19	CSI-D0	PE4
CON1-P20	CSI-D3	PE7
CON1-P21	CSI-D1	PE5
CON1-P22	CSI-D2	PE6
CON1-P23	GND	
CON1-P24	AFVCC-CSI	



II. Using Method

You can configure your Orange Pi in a very short period of time and use it according to the following steps. You need to fulfill the several steps before booting your Orange Pi.

1. Step 1: Prepare Accessories Needed

The first time you use the Orange Pi, you need at least some parts for the following:

No.	Items	Requirements and Instructions
1	TF card	8GB min.; class 10 (the class indicates how fast the card is). Branded TF cards which are much more reliable are the good choice
2	Power adapter	At lease 5V/2A high quality power adapter, OTG could use as power supply.
3	Keyboard and mouse	Any keyboard and mouse with USB port is applicable; Keyboard and mouse are high-power, so a USB concentrator is required.
4	TTL to USB cable	Support debug log in.
5	Audio cable (Optional)	You can select an audio cable with 3.5mm jack to feel stereo audio.
6	SIM Card (Optional)	Support 2G SIM card



TF card



DC power adapter

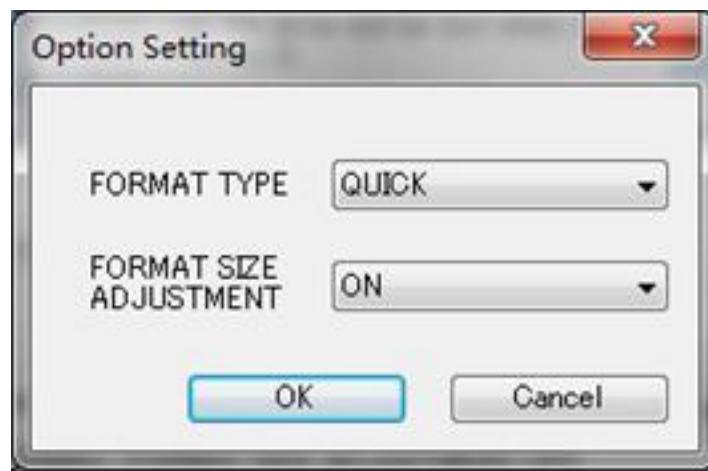
2. Step 2: Prepare a TF Card

In order to be able to us Orange Pi normally, you must first install the operating system into the TF card or Nand. The following instructions will teach you how to write the operating system image file to the Windows and Linux Platform. For now this board could support boot from TF card with Android and Linux distro, and could support boot from Nand with Android. It will illustrate about how to write image into Nand.

1) Writing image into a SD card on Windows:



- a. Inserting the TF card into the computer, the capacity of the card must be larger than the operating system image, usually requires 8GB or bigger capacity.
- b. Formatting the TF card.
 - i. Download tools for formatting TF card, such as TF Formatter, could be download from
https://www.sdcard.org/downloads/formatter_4/eula_windows/
 - ii. Unzip the downloaded files, and run *setup.exe*
 - iii. In the *options settings* option set the format type option to quick formatting. *Logical size adjustment* option to open "(ON)"



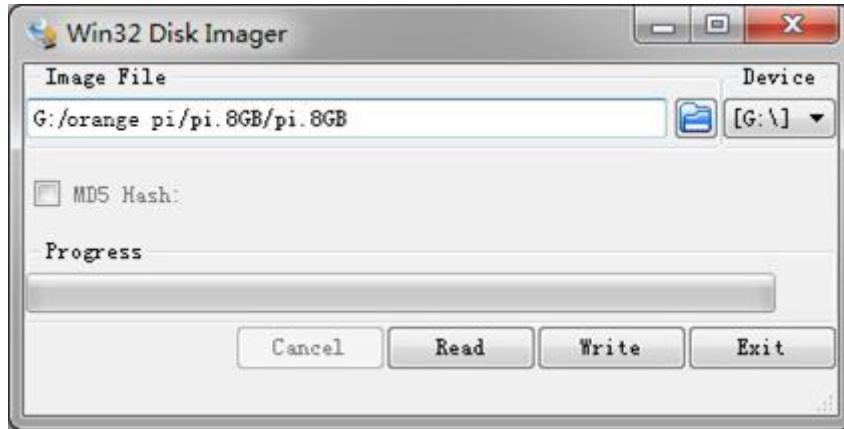
- iv. Make sure the inserted TF card codes are in accordance with the chosen codes.
 - v. Click the "Format" button.
- c. Download the operating system image file from the download page, the page address is as follows: <http://www.orangepi.cn/downloadresourcescn/>
 - d. Unzip the downloaded file (in addition to the Android system, this method can be



used to burn to write, the Android system need another burn, the following will introduce).

- e. Right click the downloaded file, select "Unzip file" to write image to TF card.

- i. Download tools to write image, such as **Win32 Diskimager**,
<http://sourceforge.net/projects/win32diskimager/files/Archive/>.
- ii. Select the path of image file that has been unzipped.



- iii. Click the "Write" button and wait for the image writing.
- iv. After the image is written, click the "Exit" button.

2) Writing image into a SD card on Linux:

- a. Inserting the TF card into the computer, the capacity of the card must be larger than the operating system image, usually requires 8GB or bigger capacity.
- b. Formatting the TF card.
 - i. Run **fdisk -l** command to make sure TF disk.
 - ii. Run **umount /dev/sdxx** to uninstall all partitions of TF Card.
 - iii. Run **sudo fdisk /dev/sdx** command. Use director to delete all partitions of TF Card, and then us **n** command to add a new partition, finally use **w** command to save and exit.
 - iv. Run **sudo mkfs.vfat /dev/sdx1** command to format the TF card partition set up last step to FAT32 form(according to your TF card disk to replace x). Or you could skip this step since command in Linux will format TF card automatic.
- c. Download the image OS from download page:
<http://www.orangepi.cn/~downloadresourcescn/>
- d. Unzip the downloaded file and right click it, select " Unzip file"
- e. Write image into TF card
 - i. Run **sudo fdisk -l** command to make sure the TF card disk
 - ii. Make sure the image file **hash key** is the same as download page offered(optional) :
sha1sum [path]/[imagename]



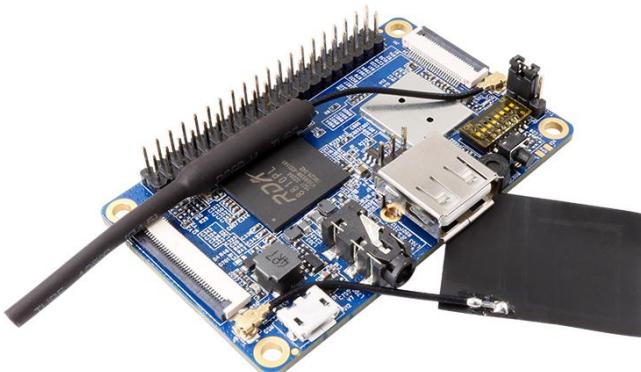
Here will be output some number which should be same as the image page line of "SHA-1"

iii. Run ***umount /dev/sdxx*** command to uninstall all partitions in TF Card

iv. Run the command of ***sudo dd bs=4M if=[path]/[imagename] of=/dev/sdx*** to write image file and wait for it finished. You can run ***sudo pkill -USR1 -n -x dd*** command to check the procedure.

3. Step 3: Start your Orange Pi

- Insert the TF card with written image into the TF card slot



- Make sure the toggle switch is showing like the following, booting from SD card.

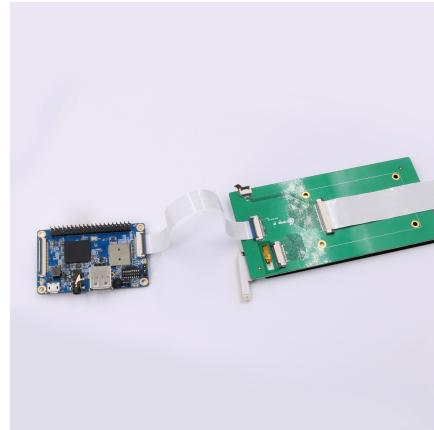


- Insert the keyboard or mouse into the USB port.
- Connect wifi antenna and base-band antenna



- Connect LCD and Camera





- Connect TTL cable, you could refer to the Debug method in this instruction.

Android and Linux use different Baud rate, please note the Baud rate setting.

Android Baud rate is 921600, Linux Baud rate is 115200.

Serial port uses TTL to USB cable to connect.



- It is the power input interface on the right side for connecting a 5V and at least 2A or bigger than 2A power adapter. Avoid using smaller power GSM mobile phone charger, it is not able to output 2A even if it marked "5V/2A".





If the above steps are successful, the OrangePi will start in a few minutes. The monitor Graphical interface of display system. It may take a long time to start the first time, please wait patiently. The next time will boot very fast.

4. Step 4: Turn off your Orange Pi correctly

You can use the shutdown button on the interface to safety close the Orange Pi. You can also close the system by entering command in the shell:

```
sudo halt  
or  
sudo shutdown -h
```

It will be safety to turn off the Orange Pi. If directly use the power button to shut down the system may damage the file system on TF Card. After the system is closed, the power can be cut off by more than 5 seconds' press. If all the above steps run, then your Orange Pi could shut down.

5. Initialize settings for your Linux system

You need to make some basic settings when it is you first time to use Linux on Orange Pi 2G-IOT, like wifi setting, audio setting, user setting.

1) Wifi setting on serial port

In the use of serial login system, enter the login password the system will prompt you to use the OrangePi_Settings tool to make some basic setting, including wifi setting. You could use the following command in the order line:

```
sudo OrangePi_Settings  
> wifi settings
```

This setting include the functions of WIFI statue setting, wifi searching and connect to AP. You could use this method to set wifi.

2) Use ssh to connect wifi

You need to use two cellphones if you want to use this function. Please refer to this:

Orange Pi 2G-IOT is defaulted to connect the hotspot of OrangePi, the password is OrangePi. Use another cellphone's hotspot function, setting the hot spot name as OrangePi, password as OrangePi. It will connect to OrangePi hotspot default after booting the system. After that, use another cellphone to connect the hotspot, and use "wifi assistant" to check the IP of Orange Pi 2G-IOT.

After getting the IP of Orange Pi 2G-IOT, you could use SSH remote login in Linux



PC or Windows PC. Command as following:

```
ssh orangepi@192.168.xxx.xxx
```

Password: orangepi

After enter the system via ssh, run the following command to connect to router:

```
sudo OrangePi_Settings
```

6. Write Android into Nand

Orange Pi 2G-IOT is supported boot from Nand, and also supported update Android in Nand.

1) Boot Android from NAND

Switching the boot mode into NAND via short jumper cap.



Power it on, Orange Pi 2G-IOT will boot from NAND.

2) Update Android in NAND

- Short jumper cap to switch the system to boot from NAND, set toggle switch into 1234 UP, 5678 Down like the following:





3) Install writing tool on Windows

For now Nand writing tool could only support working on Windows, you could download the tool from official website: <http://www.orangepi.org/downloadresources/>

The screenshot shows the official Orange Pi website at www.orangepi.org/downloadresources/. The navigation bar includes links for Home, News, Model, Resources (which is currently selected), partners, Forum, and Community. Under the Resources menu, there are options for Quick Start, Downloads, GitHub, and Wiki. The main content area displays download links for various Orange Pi models and their respective software versions. A red arrow points to the 'Downloads' link in the Resources menu.

Orange Pi 2G-IoT

- Android-Tcard updated 2017-04-22 [Download Now](#)
- Ubuntu Server updated 2017-04-01 [Download Now](#)
- Android SDK source Code updated 2017-04-17 [Download Now](#)
- Android-Nand updated 2017-04-22 [Download Now](#)

Orange Pi Zero Plus2 H3

- Android updated 2017-03-30 [Download Now](#)
- Ubuntu Server Xenial updated 2017-03-30 [Download Now](#)
- Debian Desktop Jessie updated 2017-03-30 [Download Now](#)
- Ubuntu Desktop updated 2017-03-30 [Download Now](#)

General Tools

- USB update tools for Linux 64bits OS (LiveSuitV306_For_Linux64.zip) [Download Now](#)
- burn TF/SD card BATCH-TOOL (PhoenixCard_V310_20130618.rar) [Download Now](#)
- USB update tools for linux 32bits (LiveSuitV306_For_Linux32.zip) [Download Now](#)
- USB update tools for Macintosh (LiveSuit_ForMac.zip) [Download Now](#)
- USB update tools for Windows OS (PhoenixSuit1.0.6.rar) [Download Now](#)
- USBDriver adb/mtp driver (USBDriver.rar) [Download Now](#)
- OrangePi-2G-IOT Nand Update tools [Download Now](#)

4) Install USB driver on Windows

Unzip the tool file, install the USB driver, here is the path:

`*/OrangePi_2G-IOT_Toolschain/USB_Driver/USB-driver/`

You should install it according to your PC, if your PC is 32bit, then install x86 USB driver, if it is 64bit, then is x64 USB driver.

5) Download Android Nand image

Here is the link for Orange Pi 2G-IOT Nand version image:

<http://www.orangepi.org/downloadresources/>

The screenshot shows the same download resources page as before. A red arrow points to the 'Android-Nand' download link, which is highlighted with a yellow box. The page layout is identical to the previous screenshot, displaying download links for various Orange Pi models and general tools.

Orange Pi 2G-IoT

- Android-Tcard updated 2017-04-22 [Download Now](#)
- Ubuntu Server updated 2017-04-01 [Download Now](#)
- Android SDK source Code updated 2017-04-17 [Download Now](#)
- Android-Nand updated 2017-04-22 [Download Now](#)

Orange Pi Zero Plus2 H3

- Android updated 2017-03-30 [Download Now](#)
- Ubuntu Server Xenial updated 2017-03-30 [Download Now](#)
- Debian Desktop Jessie updated 2017-03-30 [Download Now](#)
- Ubuntu Desktop Xenial updated 2017-03-30 [Download Now](#)

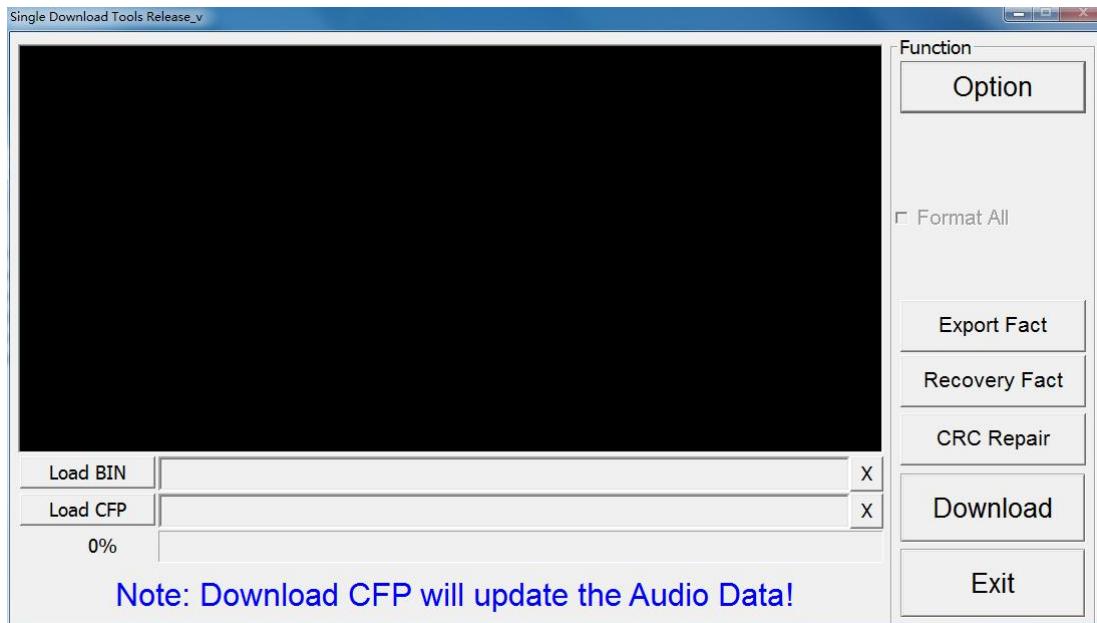
Orange Pi Zero Plus2 H5



6) Use writing tool

Use writing tool to write NAND:

*/OrangePi_2G-IOT_Toolschain/OrangePi_2G-IOT_NandUpdate_Tools/OrangePi_2G-IOT_Update.exe.

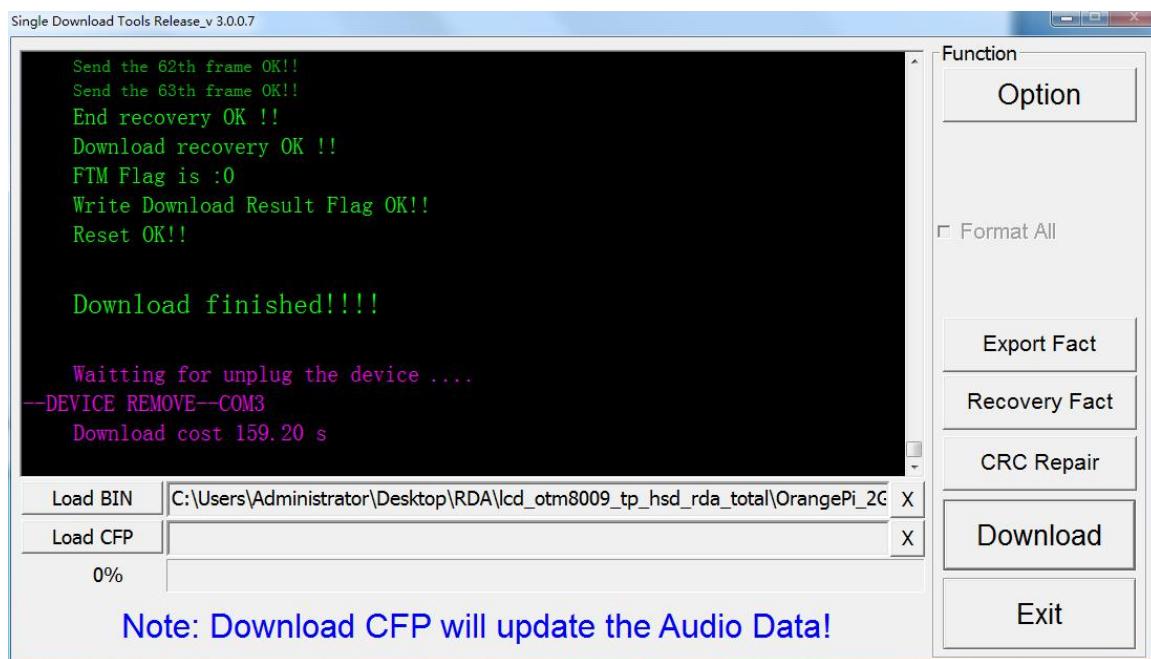


Click “load BIN” to import the image of NAND version into writing tool. After that, click Download button to download the image. Meanwhile, the tool is waiting for the download link of Orange Pi 2G-IOT.

7) Download Image

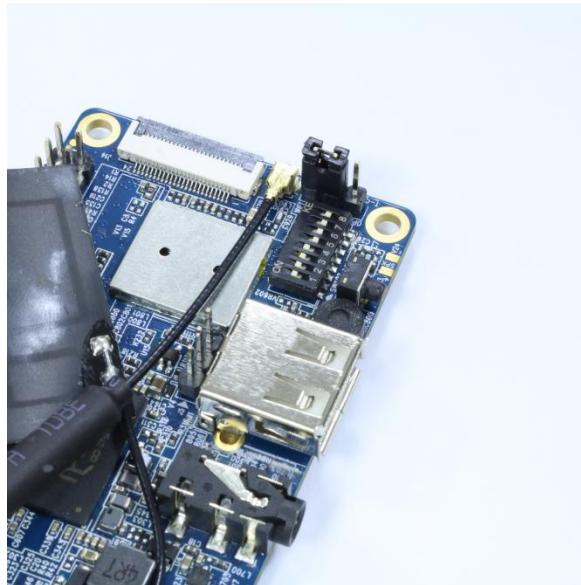
Prepare an Android USB to DC cable, first connect to the OTG port of Orange Pi 2G-IOT, then push on the power button for 5s, and connect the cable to the Windows PC. Meanwhile, the screen will indicate that connect successful and downloading. It will take around 3min to finished downloaded, after that, reboot the system and then the system will run on the update Android.

Note: If it could not download, please check the shorting cap and switch.



7. Android in no screen ADB mode

- ADB setting: Set the toggle switch into 1234 “UP”, 5678 “Down”, the system will switch into adb model, in this model, the USB is unable.



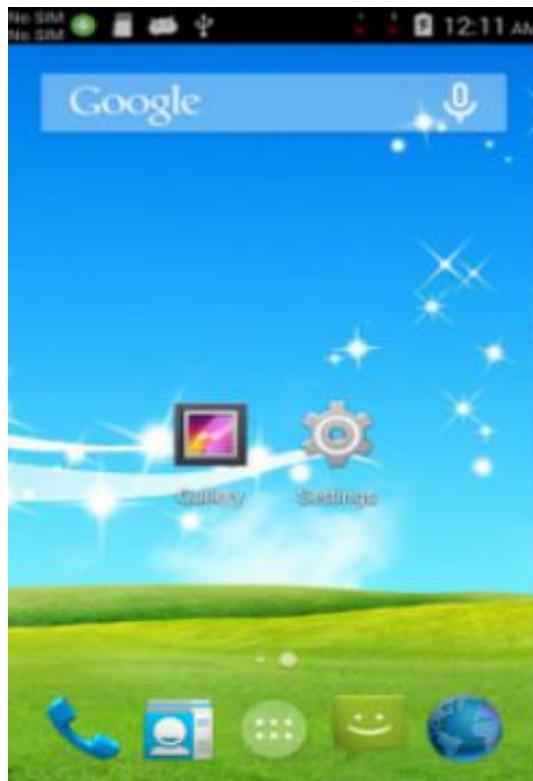
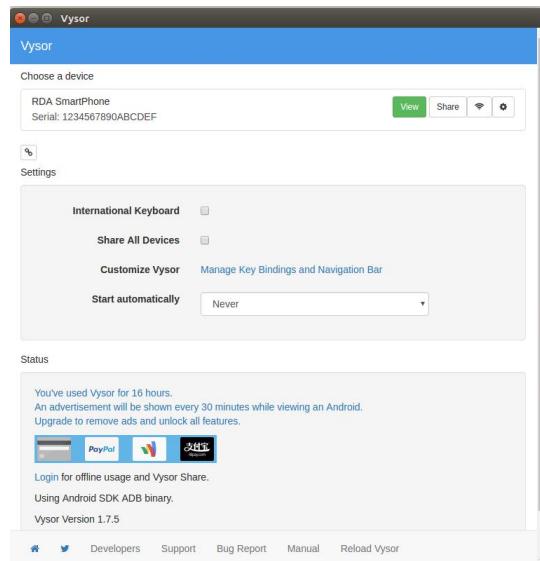
- Connect to the OTG port of Orange Pi 2G-IOT with the USB to DC cable, the other side connect to PC, push the power button and then the system will be Android.
- If the PC haven't set on adb, then please refer to the teaching method of Ubuntu and



Windows adb in internet. Use adb command in the PC terminal to connect the adb:
adb shell

- After connect to OrangePi 2G-IOT via adb, you could refer to the adb debug method from the internet to enter into Orange Pi 2G-IOT

We would recommend you use Plug-in unit in Chrome browser, this tool could enter Android via adb:





8. Universal software configuration

1) Change default account

- The default log-in account and password is orangepi/orangepi or root/orangepi. It is recommended to modify the default orangepi account to your own account for secure sake. Take changing into Zhangsan as a sample. Steps are as follows:
- a. Use root account to login Orange Pi
 - b. \$ usermod -l zhangsan orangepi

Change account of orangepi into Zhangsan

```
@orangePI:~$ usermod -l zhangsan orangepi
```

- c. \$ groupmod -n zhangsan orangepi

Change group

```
@orangePI:~$ groupmod -n zhangsan orangepi
```

- d. \$ mv /home/orangepi /home/zhangsan

Change directory of original orangepi

```
@orangePI:~$ mv /home/orangepi /home/zhangsan
```

- e. \$ usermod -d /home/zhangsan orangepi

Set this directory into orangepi user's home directory

```
@orangePI:~$ usermod -d /home/zhangsan zhangsan
```

- f. \$ cat /etc/passwd

It should be shown as following:

```
pulse:x:112:121:PulseAudio daemon,,,:/var/run/pulse:/bin/false  
zhangsan:x:1001:1001:orangePI,,,:/home/zhangsan:/bin/bash
```

After the modification of the above steps, you could use the new account Zhangsan to log in.

2) System source configuration

This instruction will take Ubuntu as an example:

- a. Open the source file

```
$ sudo vi /etc/apt/sources.list
```

```
root@curry:/home/curry# vim /etc/apt/sources.list  
root@curry:/home/curry#
```

- b. Edit source file

Replace the source file with your favourite source. Take an example of Ubuntu 16.04 on Zhonkeda source:

```
deb http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial main multiverse  
restricted universe
```



```
deb http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-backports main
multiverse restricted universe
deb http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-proposed main
multiverse restricted universe
deb http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-security main multiverse
restricted universe
deb http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-updates main multiverse
restricted universe
deb-src http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial main multiverse
restricted universe
deb-src http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-backports main
multiverse restricted universe
deb-src http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-proposed main
multiverse restricted universe
deb-src http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-security main
multiverse restricted universe
deb-src http://mirrors.ustc.edu.cn/ubuntu-ports/ xenial-updates main
multiverse restricted universe
```

Note: xenial is the version of the code name in this source, if the other version of Ubuntu needs to replace the corresponding version code which can be found on the internet.

3) Enter the system via SSH

You could refer to the previous charter 5. 2)Use SSH to connect Wifi.

4) Modify the size of ext4 file system

It could promote system performance via expanding the rootfs partitions of file system after writing image, which could avoid the problems caused by insufficient space.

Expanding rootfs partitions on TF card of PC:

Using GParted to adjust the size:

Select the specified letter, right-click the corresponding letter, select "change the size" to adjust into the desired size, click "adjust the size", close the dialog box and click "apply to all operations", select the "apply" to complete the expansion operation.

a. Expand file system

- i. Boot to Linux, umount /dev/sdb1 and /dev/sdb2, if it prompts disk busy, then use fuser to clean the using disk(we will recommend using another Linux booting disk to lead the system).

- ii. Use fdisk /dev/sdb to adjust the partition size, after into it, enter p, and keep in mind about the initial position of needed extending size partition.

- iii. Enter d to delete the partition need to change the size(my file system is /dev/sdb2, which is the 2 partition).

- vi. Enter n to build a new partition, make sure the initial position is the same as you deleted, and enter the number as you desire.

- v. Enter w to save the partition data.

- vi. Use the following command to check the file system(make sure it is a right



file system)

e2fsck -f /dev/sdb2

vii. Adjust the partition size

resize2fs /dev/sdb2

viii. It could mount a disk partition, you could check whether it has changed.

b. Shrink file system

i. Boot to Linux, umount /dev/sdb1 and /dev/sdb2, if it prompts disk busy, then use fuser to clean the using disk(we will recommend using another Linux booting disk to lead the system).

ii. Use the following command to check the file system(make sure it is a right file system)

e2fsck -f /dev/sdb2

iii. Modify the size of file system(Use resize2fs)

resize2fs /dev/sdb2 900M

The "s"after the number represents specifying the size of file system via the sectors(every sector calculated by 512 bite). You could also specify it into K(KB), M(MB), G(GB), etc.

vi. Use fdisk /dev/sdb to adjust the partition size, after into it, enter p, and keep in mind about the initial position of needed extending size partition. You need to first delete the partition then build a new one because the fdisk could not modify the size dynamic(you need to calculate the size, it have to enough to contain the file system adjusted in last step).

v. Enter d to delete the partition need to change the size(my file system is /dev/sdb2, which is the 2 partition).

vi. Enter n to build a new partition, make sure the initial position is the same as you deleted, and enter the number as you desire. Besides, if it is bootable partition you want to change, note that need to keep the bootable mark in case cannot boot.

The above illustration is using fdisk and resize2fs to modify partition and file system, you could also use gparted. Gparted has graphical interface and it could help you to re-size file system at the same time of re-sizing partition. Goarted is much easier to use and reduce the chance to make mistake. For now our offial Lubuntu and Raspbian could not use it.



III. Source Code Compilation of Android and Linux

Hardware: Orange Pi development board*1, Card reader*1, TF card*1, power supply*1



Software: Linux host computer, which hard disk space at least 50G (to meet a fully compiled need)

Linux host computer needs:

Version 2.7.3 of Python;
Version 3.81-3.82 of GNU Make;
JDK 6;
Version 1.7 or higher version of Git.

1. Install JDK

- Download and install JDK, you will get jdk-6u31-linux-x64.bin after downloaded:

```
root@curry:/home/curry/tools# ls
1_arm-linux-gnueabihf-gcc           java1.6_environment.sh  jdk-6u31-linux-x64.bin
arm-linux-gcc-4.5.1-v6-vfp-20120301.tgz  jdk1.6.0_31          opt
root@curry:/home/curry/tools#                                     Download from website
```

- Modify the permission of jdk-6u31-linux-x64.bin, which has no executable authority

```
root@curry:/home/curry/tools# chmod 755 jdk-6u31-linux-x64.bin
root@curry:/home/curry/tools# ll jdk-6u31-linux-x64.bin          Modify permission
-rwxr-xr-x 1 curry curry 85581913 7月 7 15:34 jdk-6u31-linux-x64.bin*
```

- ./jdk-6u31-linux-x64.bin

```
root@curry:/home/curry/tools# ./jdk-6u31-linux-x64.bin
```

- It will generate a folder



```
root@curry:/home/curry/tools# ls
1_arm-linux-gnueabihf-gcc      java1.6_environment.sh  jdk-6u31-linux-x64.bin
arm-linux-gcc-4.5.1-v6-vfp-20120301.tgz  jdk1.6.0_31          opt
```

- Enter at terminal

Note that JAVA_HOME is the name of the current directory, you need to fill in according to your own storage directory.

```
root@curry:/home/curry/tools# ls
1_arm-linux-gnueabihf-gcc      java1.6_environment.sh  jdk-6u31-linux-x64.bin
arm-linux-gcc-4.5.1-v6-vfp-20120301.tgz  jdk1.6.0_31          opt
```

```
$ export JAVA_HOME=~/jdk1.6.0_31
$ export PATH=$PATH:$JAVA_HOME/bin
$ export CLASSPATH=.:$JAVA_HOME/lib
$ export JRE_HOME=$JAVA_HOME/jre
```

```
root@curry:/home/curry/tools# export JAVA_HOME=/home/curry/tools/jdk1.6.0_31
root@curry:/home/curry/tools# export PATH=$PATH:$JAVA_HOME/bin
root@curry:/home/curry/tools# export CLASSPATH=.:$JAVA_HOME/lib
root@curry:/home/curry/tools# export JRE_HOME=$JAVA_HOME/jre
```

- Command line input jav and press tab to see whether it can auto completion (java), which indicates whether it installed successfully and check whether the java is version 1.6.

2. Install Platform Supported Software

```
$ sudo apt-get install git gnupg flex bison gperf build-essential \
zip curl libcurl4-openssl-dev libncurses5-dev:i386 x11proto-core-dev \
libx11-dev:i386 libreadline6-dev:i386 libgl1-mesa-gl:i386 \
libgl1-mesa-dev g++-multilib mingw32 tofrodos \
python-markdown libxml2-utils xsltproc zlib1g-dev:i386
$ sudo ln -s /usr/lib/i386-linux-gnu/mesa/libGL.so.1
/usr/lib/i386-linux-gnu/libGL.so
```

3. Download the Source Package and Unzip it

Download website: <http://www.orangepi.org/downloadresources/>

Downloaded source package

```
$ tar -xf RDA8810_trunk.tar.gz
```

Unzip the file you will get the trunk directory, enter it via the terminal.

4. Android source code compiler

Enter in the command line:

```
$ cd /trunk
$ source build/envsetup.sh
$ lunch
```

- Select slt-userdebug if boot Android of Linux from TF card



Hardware targets selects NollecA9V2VV8810P_ext4

- Select etu-userdebug if boot Android from Nand

Hardware targets select NollecA9V2VV8810P

Select slt-userdebug

Hardware targets select NollecA9V2VV8810P_ext4

\$ make -j the value after # is the process of simultaneous compilation, host dependent configuration

\$ cd /trunk/out/target/product/slt-NollecA9V2VV8810P_ext4

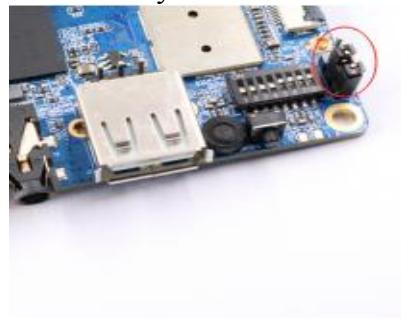
Insert U disk into computer and check whether the TF card has mounted(make sure the TF card has been formatted before this).

Use mount tool to check the U disk mount node number, suppose it is /dev/sdc

Execute the following command to run Android SD card image:

```
sudo dd if=bootloader.img of=/dev/sdc bs=512 seek=256 count=4096 && sync  
sudo dd if=modem.img of=/dev/sdc bs=512 seek=12544 count=8192 && sync  
sudo dd if=boot.img of=/dev/sdc bs=512 seek=20736 count=16384 && sync  
sudo dd if=recovery.img of=/dev/sdc bs=512 seek=37120 count=20480 && sync  
sudo dd if=system.ext4.img of=/dev/sdc bs=512 seek=57600 count=512000 && sync  
sudo dd if=vendor.ext4.img of=/dev/sdc bs=512 seek=569600 count=512000 && sync
```

Insert the written image into Orange Pi and connect the Jumper Cap like the following, you could boot into Android system.



5. Compile Linux source Code

Input the following in the command line, enter to the RDA8810 trunk directory

\$ cd /trunk

\$ source build/envsetup.sh

\$ lunch

Select slt-userdebug

Hardware targets select NollecA9V2VV8810P_ext4

compile uboot

\$ make bootloader -j the value after # is the process of simultaneous compilation, host dependent configuration

Compile kernel

\$ make bootimage -j



Update the image, please write down original image into SD card, the execute the following:

```
$ cd /trunk/out/target/product/slt-NollecA9V2VV8810P_ext4
```

Insert U disk into computer and check whether the TF card has mounted(make sure the TF card has been formatted before this).

Use mount tool to check the U disk mount node number, suppose it is /dev/sdc

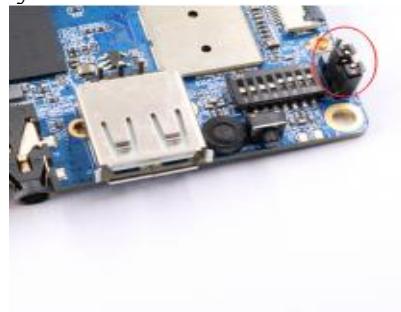
Execute the following command to run Linux SD card image

```
sudo dd if=bootloader.img of=/dev/sdc bs=512 seek=256 count=4096 && sync
```

```
sudo dd if=modem.img of=/dev/sdc bs=512 seek=12544 count=8192 && sync
```

```
sudo dd if=boot.img of=/dev/sdc bs=512 seek=20736 count=16384 && sync
```

Insert the written image into Orange Pi and connect the Jumper Cap like the following, you could boot into Android system.

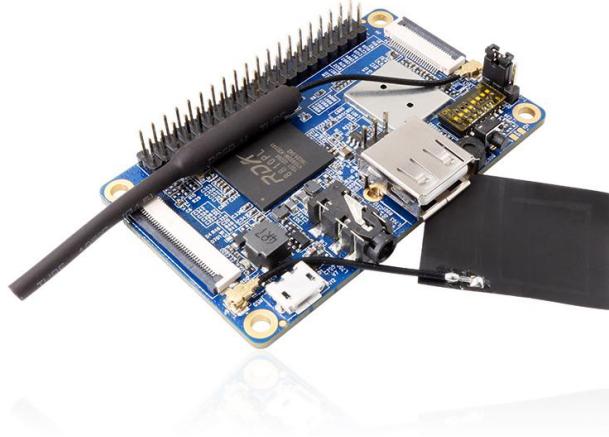




IV. Orange Pi Driver development

In order to help developers more familiar with Orange Pi, this instruction will make a brief illustration on device driver module and application program.

Hardware: Orange Pi development board*1, Card reader*1, TF card*1, power supply*1



1. Device driver and application programming

1) Application Program (app.c)

```
#include <stdio.h>
#include <sys/types.h>
#include <sys/stat.h>
#include <fcntl.h>
#include <string.h>

int main(int argc, char *argv[])
{
    int cnt, fd;
    char buf[32] = {0};
    if(argc != 2)
    {
        printf("Usage : %s </dev/xxx>\r\n", argv[0]);
        return -1;
    }

    fd = open(argv[1], O_RDWR);
    if(fd < 0)
    {
        printf("APP Error : open device is Failed!\r\n");
        return -1;
    }
    read(fd, buf, sizeof(buf));
    printf("buf = %s\r\n", buf);
    close(fd);
    return 0;
}
```



2) Driver Program (OrangePi_misc.c)

```
#include <linux/kernel.h>
#include <linux/module.h>
#include <linux/fs.h>
#include <linux/miscdevice.h>
#include <linux/init.h>
#include <asm-generic/uaccess.h>

static int orangepi_open(struct inode *inodp, struct file *filp)
{
    return 0;
}

static ssize_t orangepi_read(struct file *filp, char __user *buf, size_t
count, loff_t *offset)
{
    char str[] = "Hello World";
    copy_to_user(buf, str, count);
    return 0;
}

static struct file_operations tOrangePiFops = {
    .owner = THIS_MODULE,
    .open = orangepi_open,
    .read = orangepi_read,
};

static struct miscdevice OrangePi_Misc = {
    .minor = 255,
    .name = "orangeprimisc",
    .fops = &tOrangePiFops,
};

static int __init OrangePi_misc_init(void)
{
    int ret;
    printk("func : %s, line : %d\r\n", __func__, __LINE__);
    ret = misc_register(&OrangePi_Misc);
    if(ret < 0){
        printk("Driver Error : misc_register is Failed!\r\n");
        return -1;
    }
    return 0;
}

static void __exit OrangePi_misc_exit(void)
{
    int ret;
    printk("func : %s, line : %d\r\n", __func__, __LINE__);
    ret = misc_deregister(&OrangePi_Misc);
    if(ret < 0){
        printk("Driver Error : misc_register is Failed\r\n");
    }
}

module_init(OrangePi_misc_init);
module_exit(OrangePi_misc_exit);
```



2. Compile device driver

Copy the OrangePi_misc.c to the */trunk/kernel/driver/misc:

Enter to */trunk/kernel/driver/misc

Modify Makefile on currently file, shown as following:

```
43 obj-$(CONFIG_SPEAR13XX_PCIE_GADGET) += spear13xx_pcie_gadget.o
44 obj-$(CONFIG_VMWWARE_BALLOON) += vmw_balloon.o
45 obj-$(CONFIG_ARM_CHARLCD) += arm-charlcd.o
46 obj-$(CONFIG_PCH_PHUB) += pch_phub.o
47 obj-y += ti-st/
48 obj-$(CONFIG_AB8500_PWM) += ab8500-pwm.o
49 obj-y += lis3lv02d/
50 obj-y += carma/
51 obj-$(CONFIG_USB_SWITCH_FSA9480) += fsa9480.o
52 obj-$(CONFIG_ALTERA_STAPL) += altera-stapl/
53 obj-$(CONFIG_MAX8997_MUIC) += max8997-muic.o
54 obj-$(CONFIG_WL127X_RFKILL) += wl127x-rfkill.o
55 obj-$(CONFIG_SENSORS_AK8975) += akm8975.o
56 obj-$(CONFIG_SUNXI_VIBRATOR) += sunxi-vibrator.o
57 obj-$(CONFIG_SUNXI_BROM_READ) += sunxi_brom_read.o
58 obj-$(CONFIG_NET) += rf_pm/
59 obj-$(CONFIG_ORANGEPI_MISC) += OrangePi_misc.o
```

Re-modify Makefile

There is Kconfig on the same sibling folders with Makefile. Each Kconfig respectively describes the the source directory file related kernel configuration menu. In the kernel configuration making menuconfig, it read from the Kconfig config menu and the user configuration saved to the config. In the kernel compile, the main Makefile by calling this.Config could know the user's configuration of the kernel.

Kconfig is corresponding to the kernel configuration menu. Add a new driver to the kernel source code, you can modify the Kconfig to increase the configuration menu for your drive, so you can choose whether the menuconfig driver was compiled or not.

```
config SUNXI_BROM_READ
    tristate "Read the BROM infomation"
    depends on ARCH_SUN8I
    default n
    ---help---
        This option can allow program access brom space by the file node.

config ORANGEPI_MISC
    tristate
    default n
```

Modify Kconfig

Back to the source code directory /trunk:

\$ make bootimage

Make sure it have already finished make-engineer-configuration before execute this command, if not, please refer to last section about Linux source code compilation.

Update the new generated module file into Linux system.

It will show on *cd

/trunk/out/target/product/slt-NollecA9V2VV8810P_ext4/obj/KERNEL/out/target/product/slt-NollecA9V2VV8810P_ext4/obj/KERNEL/modules/lib/modules/3.10.62-rel5.0.2/ generated corresponding .ko file, it is the module that generated after OrangePi_misc.c compilation.



Insert U disk (please note the SD card should have written image) if the SD card is mounted to the directory system of /dev/sdc, then SD card will mount to rootfs, which is /dev/sdc7, and mounted to rootfs partition automatic.

The second partition is the rootfs partition



Copy the directory file:

```
/trunk/out/target/product/slt-NollecA9V2VV8810P_ext4/obj/KERNEL/out/target/product
/slt-NollecA9V2VV8810P_ext4/obj/KERNEL/modules/lib/modules/3.10.62-rel5.0.2/
into:
/media/*/lib/modules/
```

3. Compiling method of application

Check whether there is the cross compiler, if not, then download and install it.

```
$ arm-linux-gnueabihf-gcc -v
```

```
root@curry:/home/curry/lichee# arm-linux-gnueabihf-gcc -v
Using built-in specs.
COLLECT_GCC=arm-linux-gnueabihf-gcc
COLLECT_LTO_WRAPPER=/usr/lib/gcc-cross/arm-linux-gnueabihf/4.8/lto-wrapper
Target: arm-linux-gnueabihf
Configured with: ..../src/configure -v --with-pkgversion='Ubuntu/Linaro 4.8.4-2ubuntu1-14
ugurl=file:///usr/share/doc/gcc-4.8/README.Bugs --enable-languages=c,c++,java,go,d,fort
+ --prefix=/usr --program-suffix=-4.8 --enable-shared --enable-linker-build-id --libexe
-without-included-gettext --enable-threads=posix --with-gxx-include-dir=/usr/arm-linux-
de/c++/4.8.4 --libdir=/usr/lib --enable-nls --with-sysroot=/ --enable-clocale=gnu --ena
ebug --enable-libstdcxx-time=yes --enable-gnu-unique-object --disable-libmudflap --disa
sable-libquadmath --enable-plugin --with-system-zlib --disable-browser-plugin --enable-
enable-gtk-cairo --with-java-home=/usr/lib/jvm/java-1.5.0-gcj-4.8-armhf-cross/jre --en
-with-jvm-root-dir=/usr/lib/jvm/java-1.5.0-gcj-4.8-armhf-cross --with-jvm-jar-dir=/usr/
/java-1.5.0-gcj-4.8-armhf-cross --with-arch-directory=arm --with-ecj-jar=/usr/share/jav
ar --disable-libgcj --enable-objc-gc --enable-multiarch --enable-multilib --disable-sjl
with-arch=armv7-a --with-fpu=vfpv3-d16 --with-float=hard --with-mode=thumb --disable-w
hecking=release --build=x86_64-linux-gnu --host=x86_64-linux-gnu --target=arm-linux-gnu
m-prefix=arm-linux-gnueabihf- --includedir=/usr/arm-linux-gnueabihf/include
Thread model: posix
Version number
gcc version 4.8.4 (Ubuntu/Linaro 4.8.4-2ubuntu1-14.04.1)
root@curry:/home/curry/lichee#
```

While compiling the application, you will fill that you need the cross compiler arm-linux-gnueabihf-gcc, download and install it.

```
curry@curry:~/tools/1_arm-linux-gnueabihf-gcc$ ls
gcc-linaro-arm-linux-gnueabihf-4.9-2014.07_linux.tar.xz
curry@curry:~/tools/1_arm-linux-gnueabihf-gcc$
```

Downloaded package file



Unzip the downloaded file and enter the directory

```
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ tar -xf gcc-linaro-arm-linux-gnueabihf-4.9-2014.07_linux.tar.xz
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
gcc-linaro-arm-linux-gnueabihf-4.9-2014.07_linux  gcc-linaro-arm-linux-gnueabihf-4.9-2014.07_linux.tar.xz
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ cd gcc-linaro-arm-linux-gnueabihf-4.9-2014.07_linux/
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
arm-linux-gnueabihf  bin  lib  libexec  share
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
```

Unzip the package file
Enter to current directory to check files

Check the information after entering bin directory

```
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ cd bin/
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
arm-linux-gnueabihf  bin  lib  libexec  share
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
arm-linux-gnueabihf-addr2line  arm-linux-gnueabihf-dwp  arm-linux-gnueabihf-gcc-ranlib  arm-linux-gnueabihf-tdd
arm-linux-gnueabihf-ar  arm-linux-gnueabihf-dledit  arm-linux-gnueabihf-gcov  arm-linux-gnueabihf-tld
arm-linux-gnueabihf-as  arm-linux-gnueabihf-g++  arm-linux-gnueabihf-gdb  arm-linux-gnueabihf-on
arm-linux-gnueabihf-c++  arm-linux-gnueabihf-gcc  arm-linux-gnueabihf-gfortran  arm-linux-gnueabihf-objcopy
arm-linux-gnueabihf-c++filt  arm-linux-gnueabihf-gcc-4.9.1  arm-linux-gnueabihf-gprof  arm-linux-gnueabihf-objdump
arm-linux-gnueabihf-cpp  arm-linux-gnueabihf-gcc-a  arm-linux-gnueabihf-ld  arm-linux-gnueabihf-pkg-config
arm-linux-gnueabihf-ct-ng.config  arm-linux-gnueabihf-gcc-nm  arm-linux-gnueabihf-ld.bfd  arm-linux-gnueabihf-pkg-config-real
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ ls
```

Find out the tool for compiling

pwd shows the path and export it into the whole project

```
curry@curry:/tools/1_arm-linux-gnueabihf-gcc$ pwd
/home/curry/tools/1_arm-linux-gnueabihf-gcc$ cd bin/
curry@curry:/home/curry/tools/1_arm-linux-gnueabihf-gcc$ pwd
/home/curry/tools/1_arm-linux-gnueabihf-gcc$ vim /etc/environment
```

Indicate the path
Environment variables

\$ ll /etc/environment shows that the file can only read, need to modify permissions
\$ chmod 755 /etc/environment

```
root@curry:/home/curry/tools/1_arm-linux-gnueabihf-gcc$ ll /etc/environment
-rw-r--r-- 1 root root 151 8月 4 15:24 /etc/environment
root@curry:/home/curry/tools/1_arm-linux-gnueabihf-gcc$ chmod 777 /etc/environment
root@curry:/home/curry/tools/1_arm-linux-gnueabihf-gcc$ ll /etc/environment
-rwxrwxrwx 1 root root 151 8月 4 15:24 /etc/environment
root@curry:/home/curry/tools/1_arm-linux-gnueabihf-gcc$
```

Only read, needs to modify permission
After modified permission
Modify permission

Add the path to the whole environment variable

```
PATH="/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/local/games:/usr/local/bin/games:/home/curry/tools/1_arm-linux-gnueabihf-gcc$ vim /etc/environment
```

Add path

Compile the application with cross compiler

\$ arm-linux-gnueabihf-gcc app.c -o aq

There will be an ap application generated in the directory, copy it to the development board file system(on the rootfs directory of /home/orangepi/)

\$ cp aq /media/*/home/orangepi/

4. Running driver and application

Removed the SD card and inserted it into the development board and power on.



You need to switch to root users and load module driver module to the development board first.

\$ insmod /lib/modules/orangepi.ko

```
orangeipi@orangeipi:~$ su root ← Switch to super user
Password: ← Load driver module
root@orangeipi:/home/orangepi# insmod /lib/modules/3.4.39/orangePi misc.ko
```

\$ lsmod To check whether it is loaded

```
root@orangeipi:/# lsmod ← Check the loaded module
Module           Size  Used by
8189fs          935152  0
OrangePi misc   1315   0 ← Check the character device driver
```

\$ ll /dev/orangepimisc(Miscellaneous equipment automatically generated device files, the specific look at the driver code)

```
root@orangeipi:/home/orangepi# ll /dev/orangepimisc ← View details of the
crw----- 1 root root 10, 41 Jan 1 1970 /dev/orangepimisc character device
```

Executive application (note the use of the application, check the code for specify)

\$./aq /dev/orangepimisc



V. Using Debug tools on OrangePi

Hardware: Orange Pi development board*1, Card reader*1, TF card*1, power supply*1, TTL to USB cable*1



TTL to USB cable



1. Operations on Windows

In order to get more debugging information in the project development process of using OrangePi, OrangePi default support for serial information debugging. For developers, you can simply get the serial port debugging information with the materials mentioned above. The host computer using different serial debugging tools are similar, basically can reference with the following manual for deployment. There are a lot of debugging tools for Windows platform, the most commonly used tool is putty. This section takes putty as an example to explain the deployment.



Android Baud rate set as 961200

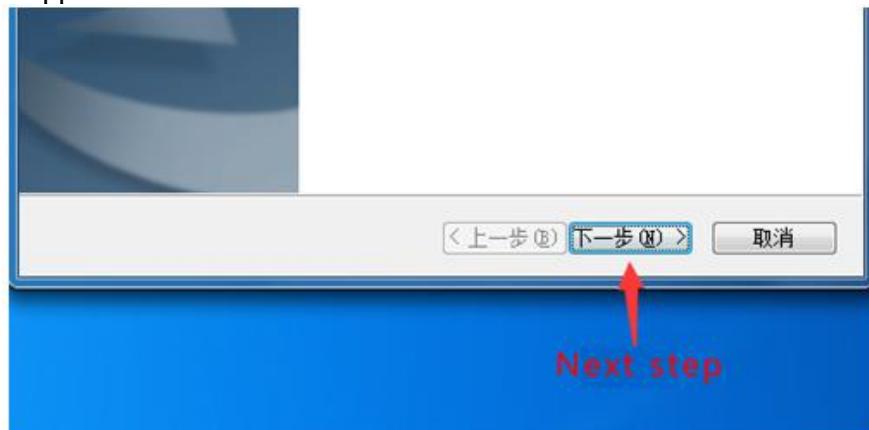
Linux Baud rate set as 115200

1) Install USB driver on Windows

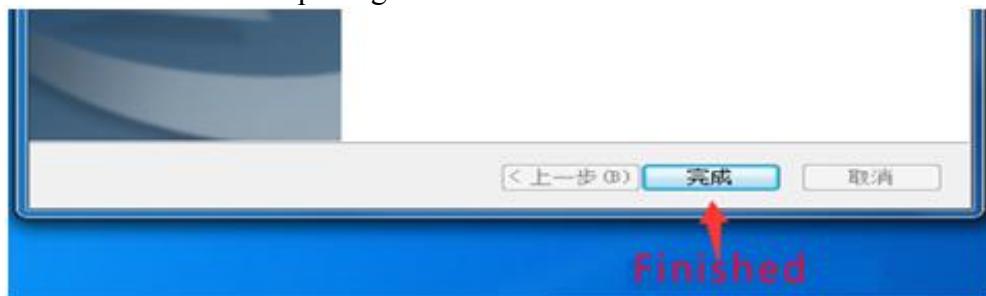
- Download and unzip the latest version of driver:
PL2303_Prolific_DriverInstaller_v130.zip

PL2303_Prolific_DriverInstaller_v130	2010/7/15 10:41	应用程序	3,099 KB	Unzipped program
PL2303_Prolific_DriverInstaller_v130	2016/8/3 9:20	WinRAR ZIP 压缩...	2,316 KB	Downloaded package
releasenote	2010/7/22 10:14	文本文档	2 KB	

- Choose application installation as Administrator



- Wait for installation completing



2) Install putty on Windows

- Download putty installation package

putty	2016/1/21 9:56	文件夹	Unzipped file
puTTY.xp510.com	2016/8/3 9:29	WinRAR 压缩文件	914 KB

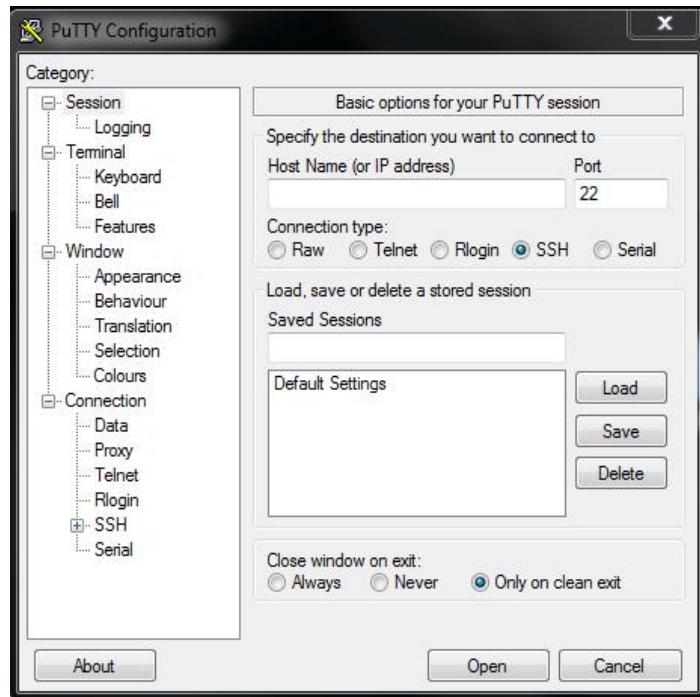
- Unzip and install it



636网址导航	2015/5/4 14:21	Internet 快捷方式	1 KB
putty中文版1.0v	2016/1/20 17:13	应用程序	604 KB
XP510下载须知	2015/5/4 14:21	文本文档	2 KB
软件使用说明	2015/5/13 9:23	360 se HTML Do...	1 KB

Click to install

- Open it after installed, shown as below:



3) Connect style

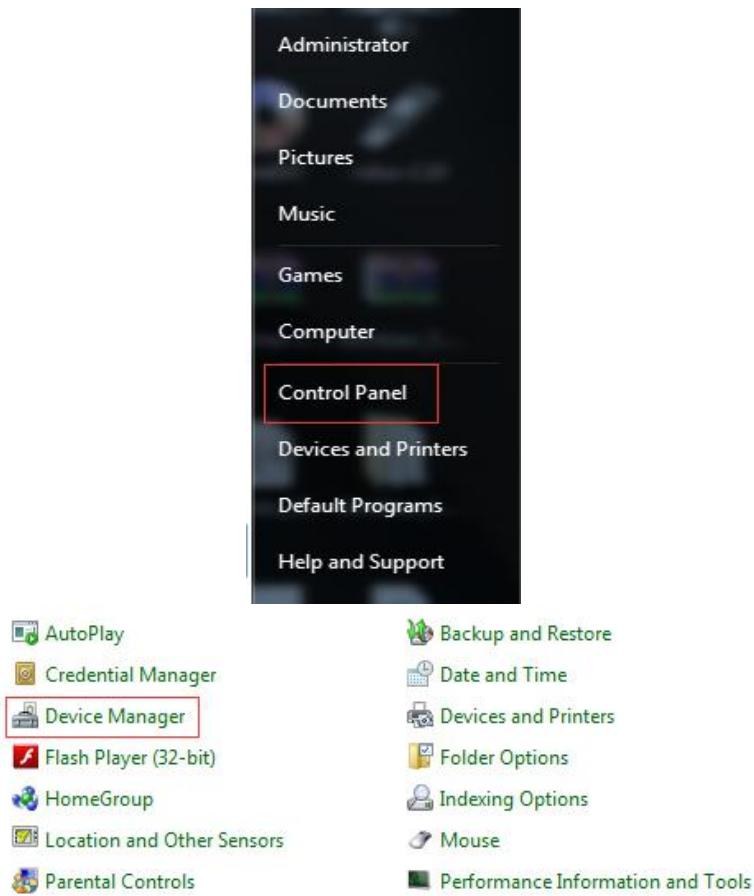
Use the TTL to the serial port cable, one end connected to OrangePi, the other end connected to PC





4) Equipment information acquisition

- Select *control panel* on Start menu

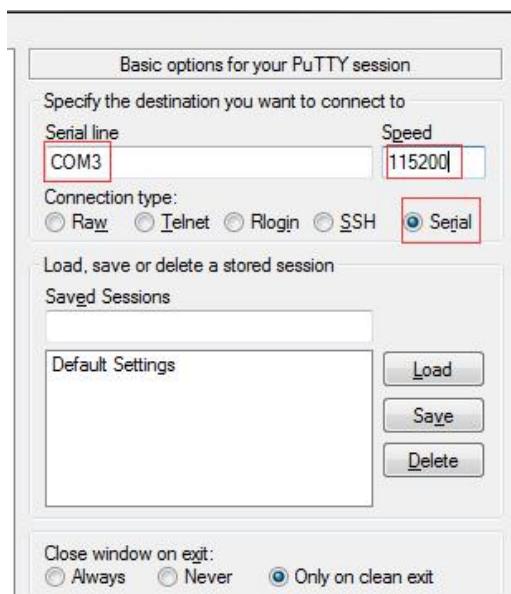


- Click on the *device manager* to check the *port number*





5) Putty configuration



Serial port should set to the corresponding port number (COM5), the speed should set to 115200

6) Start debug

Power Orange Pi on and boot it, the serial port will automatic print out debug log.

```
[mmc]: *****SD/MMC 0 init OK!!!!*****  
[mmc]: erase_grp_size : 0x1WrBlk*0x200=0x200 Byte  
[mmc]: secure_feature : 0x0  
[mmc]: secure_removal_type : 0x0  
[ 1.606]sunxi flash init ok  
[ 1.627]start  
dry_disp_init  
init_clocks: finish init_clocks.  
enable power vcc-hdmi-33, ret=0  
dry_disp_init finish  
reading disp_rsl.fex  
FAT: Misaligned buffer address (76e93030)  
8 bytes read in 7 ms (1000 Bytes/s)  
display resolution 4, type 4  
display output attr: type 4, used 1, channel 0, mode 4  
reading disp_rsl.fex  
FAT: Misaligned buffer address (76e93030)  
8 bytes read in 6 ms (1000 Bytes/s)  
could not get output resolution for 'cvbs_channel'  
display output attr: type 2, used 1, channel 1, mode 11  
boot_disp.auto_hdmi=1  
boot_disp.hdmi_mode_check=1  
boot_disp.output_type=3
```



2. Operations on Linux

There are Minicom and Kermit serial debugging tools for Linux, this section will take Kermit as an example to have an illustrate.

1) Install Kermit

- Install the Kermit by execute command:

```
$ sudo apt-get install ckermit
```



```
Terminal
$ sudo apt-get install ckermit
```

- Configure Kermit

```
$ sudo vi /etc/kermit/kermrc
```



```
Terminal
$ sudo vi /etc/kermit/kermrc
```

d lines:

```
set line      /dev/ttyUSB1
set speed    115200
set carrier-watch off
set handshake none
set flow-control none
robust
set file type bin
set file name lit
set rec pack 1000
set send pack 1000
set window   5
```

A
d



```
root@orange-All-Series: /home/orange
; This is /etc/kermit/kermrc
; It is executed on startup if ~/.kermrc is not found.
; See "man kermit" and http://www.kermit-project.org/ for details on
; configuring this file, and /etc/kermit/kermrc.full
; for an example of a complex configuration file

; If you want to run additional user-specific customisations in
; addition to this file, place them in ~/.mykermrc

; Execute user's personal customization file (named in environment var
; CKERMOD or ~/.mykermrc)
;

if def \$CKERMOD assign _myinit \$CKERMOD
if not def _myinit assign _myinit \v(home).mykermrc

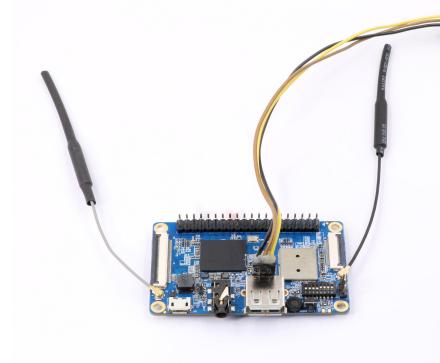
xlf exist \m(_myinit) (
    echo Executing \m(_myinit)... ; If it exists,
    take \m(_myinit)             ; print message,
                                ; and TAKE the file.
)

set line      /dev/ttyUSB1
set speed    115200
set carrier-watch off
set handshake none
set flow-control none
robust
set file type bln
set file name llt
set rec pack 1000
set send pack 1000
set window   5
c
```

Add this lines

2) Connect method for debug

Use the TTL to the serial port cable, one end connected to OrangePi, the other end connected to PC



3) Equipment information acquisition

\$ ls /dev/ (Input command in the PC terminal to check the device number of TTL to the serial cable)



```
root@orange-All-Series:/home/orange# ls /dev
autofs          i2c-4           psaux    sda7     tty21   tty47    tty513  uhid
block          i2c-5           ptmx     sda8     tty22   tty48    tty514  uinput
bsg             input          pts      sda9     tty23   tty49    tty515  urandom
btrfs-control  kmsg          ram0     serial   tty24   tty5    tty516  v4l
bus             log           ram1     sg0     tty25   tty50    tty517  vboxusb
cdrom          loop0          ram10    sg1     tty26   tty51    tty518  vcs
char            loop1          ram11    shm     tty27   tty52    tty519  vcs1
console         loop2          ram12    snapshot  tty28   tty53    tty520  vcs2
core            loop3          ram13    snd     tty29   tty54    tty521  vcs3
cpu             loop4          ram14    sr0     tty3    tty55    tty522  vcs4
cpu_dma_latency loop5          ram15    stderr   tty38   tty56    tty523  vcs5
cuse            loop6          ram2     stdin   tty31   tty57    tty524  vcs6
disk            loop7          ram3     stdout  tty32   tty58    tty525  vcsa1
dri             loop-control  ram4     tty     tty33   tty59    tty526  vcsa2
cryptptfs       lp0           ram5     tty8    tty34   tty6    tty527  vcsa3
fb0              mapper        ram6     tty1    tty35   tty60    tty528  vcsa4
fd               mcelog        ram7     tty10   tty36   tty61    tty529  vcsa5
full            me10          ram8     tty11   tty37   tty62    tty530  vfclo
fuse            mem           ram9     tty12   tty38   tty63    tty531  vga_arbiter
hidraw0         memory_bandwidth  random  tty13   tty39   tty7    tty532  vhcl
hidraw1         ndctl0        rfkill   tty14   tty4    tty8    tty533  vhost-net
hidraw2         net           rtc     tty15   tty40   tty9    tty534  video0
hpvt            network_latency  rtc0    tty16   tty41   ttyprintk  tty535  zero
hwrmg           network_throughput  sda   tty17   tty42   tty50    tty536  tty57
i2c-0            null          sda1   tty18   tty43   tty51    tty58
i2c-1            parport0      sda2   tty19   tty44   tty50    tty59
i2c-2            port          sda5   tty2    tty45   tty51    tty60
i2c-3            ppp           sda6   tty20   tty46   tty52    tty61
root@orange-All-Series:/home/orange#
```

Serial number

- It can be seen from the figure that TTL to the serial port cable is identified as `ttyUSB0`, configure the `/etc/kermit/kermrc` file, update the serial port information.
\$ sudo vi `/etc/kermit/kermrc`
- Set the value of setline into `/dev/ttyUSB0`

```
root@orange-All-Series:/etc/kermit - vim
: CKERMOD or -./mykermrc
:
:
:if def $CKERMOD assign _myinit $CKERMOD
:if not def _myinit assign _myinit \v(home).mykermrc
:
:if exist \m(_myinit) (
:echo Executing \m(_myinit)... : If it exists,
:take \m(_myinit) : print message,
: : and TAKE the file.
:
set line      /dev/ttyUSB0
set speed    115200
set carrier-watch off
set handshake none
set flow-control none
robust
set file type bin
set file name lit
set rec pack 2000
set send pack 1000
set window 5
c
```

Set serial number

4) Start debug

- Input command in the host computer terminal, enter the Kermit mode:
\$ sudo kermit –c



```
kermit (v1.0/kermit) - VIM
:CKERMOD or -/mykermod)
:
(if def \${CKERMOD} assign _myinit \${CKERMOD}
if not def _myinit assign _myinit \${/home}.mykermc
:
if exist \${_myinit} (           ; If it exists,
    echo executing \${_myinit}...   ; print message,
    take \${_myinit}               ; and TAKE the file.
)
:
set line      /dev/ttyUSB0
set speed    115200
set carrier-watch off
set handshake none
set flow-control none
robust
set file type bin
set file name ltt
set rmc pack 1000
set send pack 1000
set window 5
c
```

- Power it on and boot Orange Pi, the serial port will automatic print debug log, the account and password are root/orangepi and orangepi/orangepi

```
root@orange-All-Series:/home/orange
Connecting to /dev/ttyUSB0, speed 115200
Escape character: Ctrl-\ (ASCII 28, FS): enabled
Type the escape character followed by C to get back,
or followed by ? to see other options.

HELLO! BOOT0 is starting!
boot0 commit : 8
boot0 version : 4.0
set pll start
set pll end
rtc[0] value = 0x00000000
rtc[1] value = 0x00000000
rtc[2] value = 0x00000000
rtc[3] value = 0x00000000
rtc[4] value = 0x00000000
rtc[5] value = 0x00000000
DRAMC IS FOUR
DRAM BOOT DRIVE INFO: V1.1
the chip id is 0x00000001
```