



Orange Pi PC User Manual

< V0.9.1 >





What's Orange Pi PC?

It's an open-source single-board computer. It can run Android 4.4, Ubuntu, Debian, Raspberry Pi Image, as well as the Banana Pi Image. It uses the AllWinner H3 SoC, and has 1GB DDR3 SDRAM.

What can I do with Orange Pi PC?

Build...

A computer

A wireless server

Games

Music and sounds

HD video

A speaker

Android

Scratch

Have much more functions, because Orange Pi PC is open source.

Whom is it for?

Orange Pi PC 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.



Hardware specification

| | |
|-----------------------|--|
| CPU | H3 Quad-core Cortex-A7 H.265/HEVC 4K |
| GPU | Mali400MP2 GPU @600MHz, Supports OpenGL ES 2.0 |
| Memory (SDRAM) | 1GB DDR3 (share with GPU) |
| Onboard Storage | TF card (Max. 64GB) / MMC card slot |
| Onboard Network | 10/100M Ethernet RJ45 |
| 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 |
| Video Output | Supports HDMI output with HDCP Supports HDMI CEC Supports HDMI 30 function Integrates CVBS Supports simultaneous output of HDMI and CVBS |
| Audio Output | HDMI and 3.5mm Jack |
| Power Source | DC input, USB OTG input don't supply power |
| USB 2.0 Port | Three USB 2.0 HOST, one USB 2.0 OTG |
| Button | Power Button(SW4) |
| Low-level peripherals | 40 Pins Header, compatible with Raspberry Pi B+ |



| | |
|---------------|--|
| GPIO(1x3) pin | UART, ground. |
| LED | Power led & Status led |
| Key | IR, POWER |
| Supported OS | Android, Ubuntu, Debian, Rasberry Pi Image |

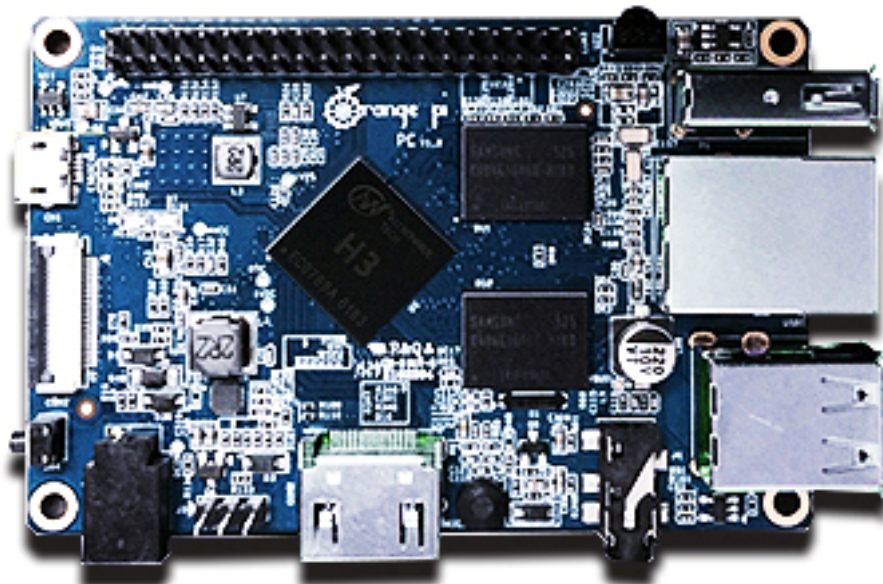
Cosmetic Specification

| | |
|--------------|-------------|
| Product size | 85mm × 55mm |
| Weight | 38g |

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Hardware

Top view



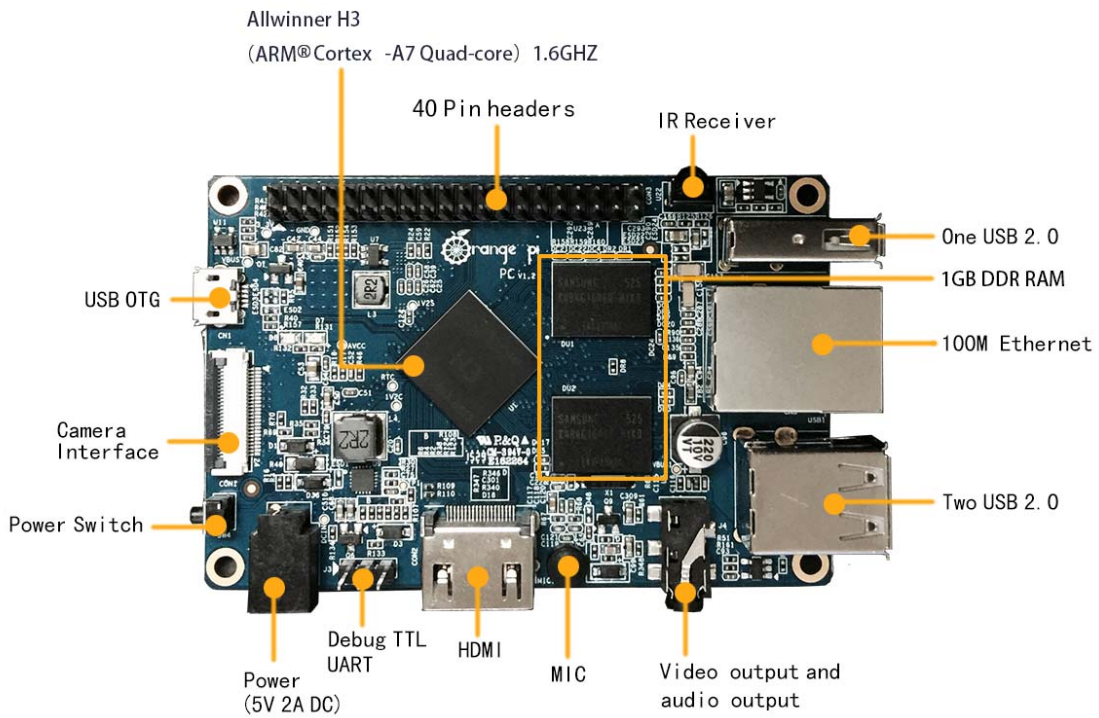
Bottom view



Interface instructions



Top view



Bottom view



Using method

You can use your Orange Pi PC quickly if you follow the following steps, it takes only three steps to boot your Orange Pi PC.

Step 1 Necessary Accessories



Following accessories are required if it is the first time you use Orange Pi PC.

| No. | Items | Requirements and Instructions |
|-----|---|--|
| 1 | TF card | <ul style="list-style-type: none">• 4Gb min.; class 4 (the class indicates how fast the card is).• Branded TF cards which are much more reliable are the good choice. |
| 2a | HDMI to HDMI cable or HDMI to DVI cable | <ul style="list-style-type: none">• HDMI to HDMI cable is used to connect HD TV or HD monitor;• HDMI to DVI cable is used to connect DVI monitor. |
| 2b | AV video cable | A standard AV video cable can be used to connect stimulated monitor if a HDMI monitor is unavailable. |
| 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 | Ethernet cable/USB WiFi(Optional) | Network is optional, It makes more convenient to mount and upgrade software in your Orange Pi PC. |
| 5 | DC power adapter | 5V,2V min. high qualified power adaptor, OTG can not used a power supply. |
| 6 | Audio cable (Optional) | <ul style="list-style-type: none">• You can select an audio cable with 3.5mm jack to feel stereo audio. |



HDMI to HDMI cable



HDMI to DVI cable



AV video cable



TF card



DC power adapter

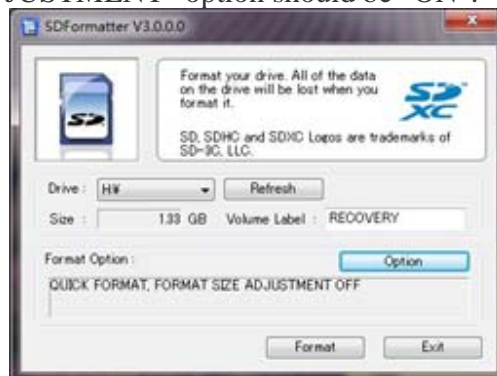
Step 2 Prepare TF card for Orange Pi PC

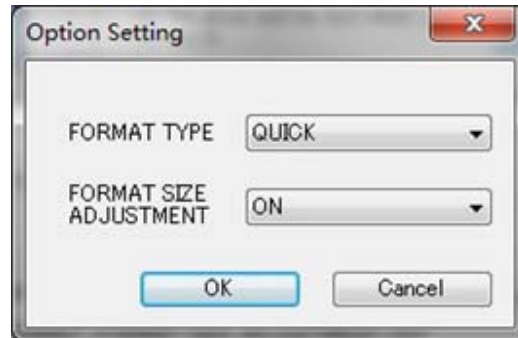
Operation System (OS) should be installed in a TF card before using an Orange Pi PC. In the following we will tell you how to program an OS image file into a TF card Under Windows and Linux OS.

How to Program an OS into a TF card?

Windows:

1. Insert your TF card into your computer. The capacity of a TF card should be larger than OS image, generally 4GB min.
2. Format the TF card.
 - i. Download a format tool of TF card, such as **TF Formatter**. You can download it from the following link, https://www.sdcard.org/downloads/formatter_4/eula_windows/.
 - ii. Unzip the downloaded file and run the setup.exe to install the tool on your machine.
 - iii. In the "Options" menu, set "FORMAT TYPE" option to "QUICK", and "FORMAT SIZE ADJUSTMENT" option should be "ON".





iv. Make sure the inserted TF card codes are in accordance with the chosen codes.

v. Click the “Format” button.

3. Download the OS image from the website, the Website is <http://www.orangepi.org/downloadresour> the [ces/](http://www.orangepi.org/downloadresour)

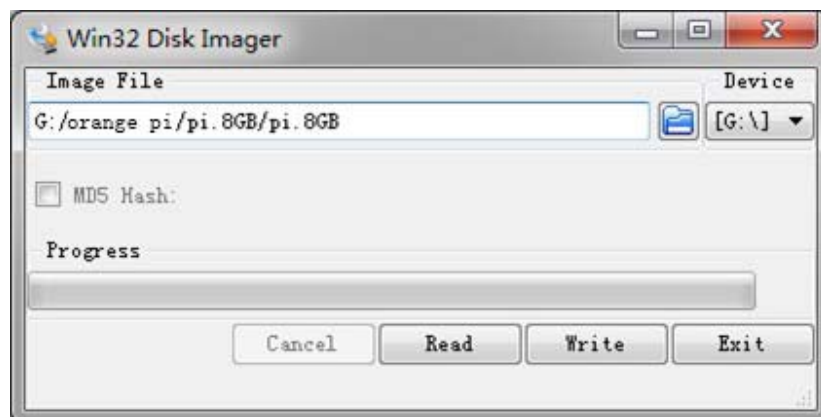
4. Unzip the downloaded file to get the OS image (**except android os image**).

5. Program the image file into the TF card.

i. Download a tool, such as **Win32 Diskimager**, the website is

<http://sourceforge.net/projects/win32diskimager/files/Archive/>

ii. Open the unzipped image file.



iii. Click “Write” button. Please wait a moment until the image is written.

IV. Click “Exit” button after image is written.

Linux:

1. Insert your TF card into your computer. The capacity of TF should be larger than the OS image, generally 4GB min..



2. Format the TF card.
 - i. Run `fdisk -l /dev/sdx` command to confirm the TF card code.
 - ii. Run `umount /dev/sdxx` to un-mount all the partitions of the TF card.
 - iii. Run `sudo fdisk /dev/sdx` command to configure TF card. Use `o` command to delete all partitions of TF card and use `n` command to add a new partition. Then use `w` command to save and exit.
 - iv. Run `sudo mkfs.vfat /dev/sdx1` command to format the new generated partition of TF card as FAT32.

(`x` should be replaced according to your TF card code)

You can also skip this step under Linux, because `dd` command under Linux will format TF card automatically.

3. Download the OS image from the Website

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

4. Unzip the downloaded file (**except android os image**).

5. Write the image file into the TF card.

- i. Run `fdisk -l /dev/sdx` command to confirm the TF card code.
- ii. Please make sure the hash key of image file is in accordance with the downloaded one (optional).

`sha1sum [path]/[imagename]`

A series of numbers will be output and it is the same as the “SHA-1” on the downloaded image page.

- iii. Run `umount /dev/sdxx` to un-mount all the partitions of the TF card.
- iv. Run `sudo dd bs=4M if=[path]/[imagename] of=/dev/sdx` command to write image file to TF card. Please wait a moment until the image written. If 4M is not applicable, please use 1M instead, although it will take much more time. You can use `sudo pkill -USR1 -n -x dd` command to check progress.

How to write an **Android OS image** into your TF card?

It is impossible for Android image file to be written into TF card by using `dd` command under Linux or by using Win32 Diskimager under Windows. PhoenixCard is applicable. (Note : If your laptop card slot cannot burn the TF card, you can use the TF card reader.)

1. Download the Android OS image and **PhoenixCard**.

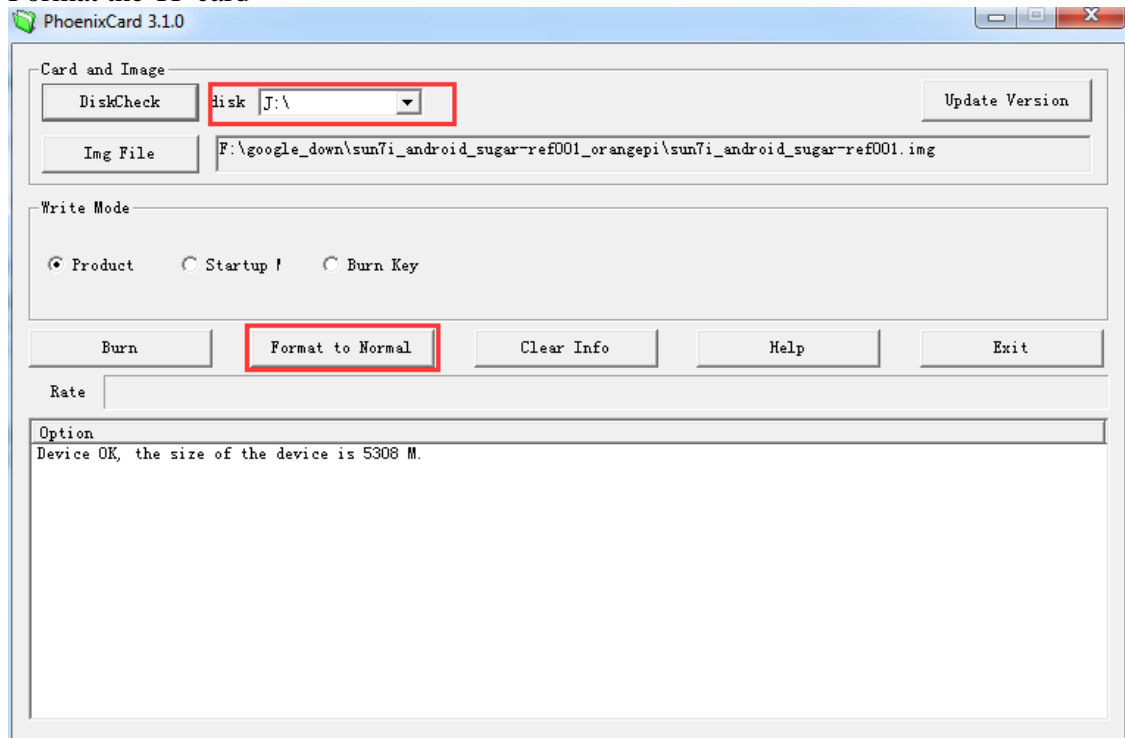
Download **PhoenixCard** from

https://drive.google.com/file/d/0B_VynIqhAcB7NTg2UkRDdHRWX2s/edit?usp=sharing

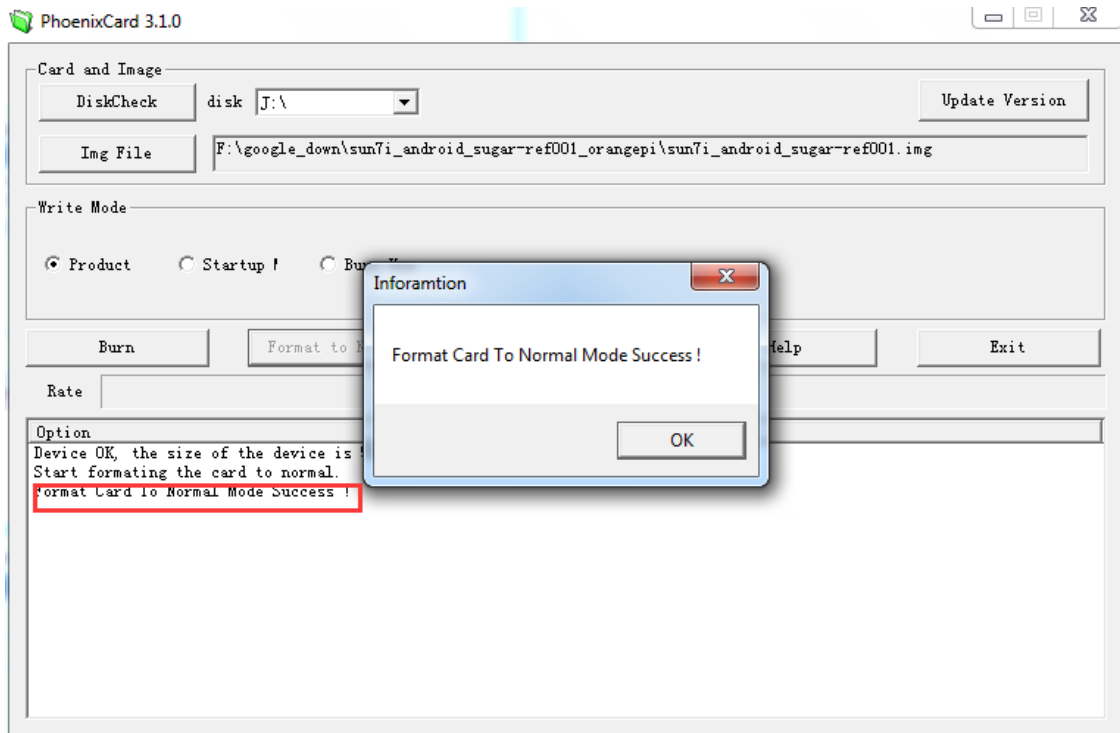


Download Android OS image from
<http://www.orangepi.org/downloadresources/>

2. Format the TF card

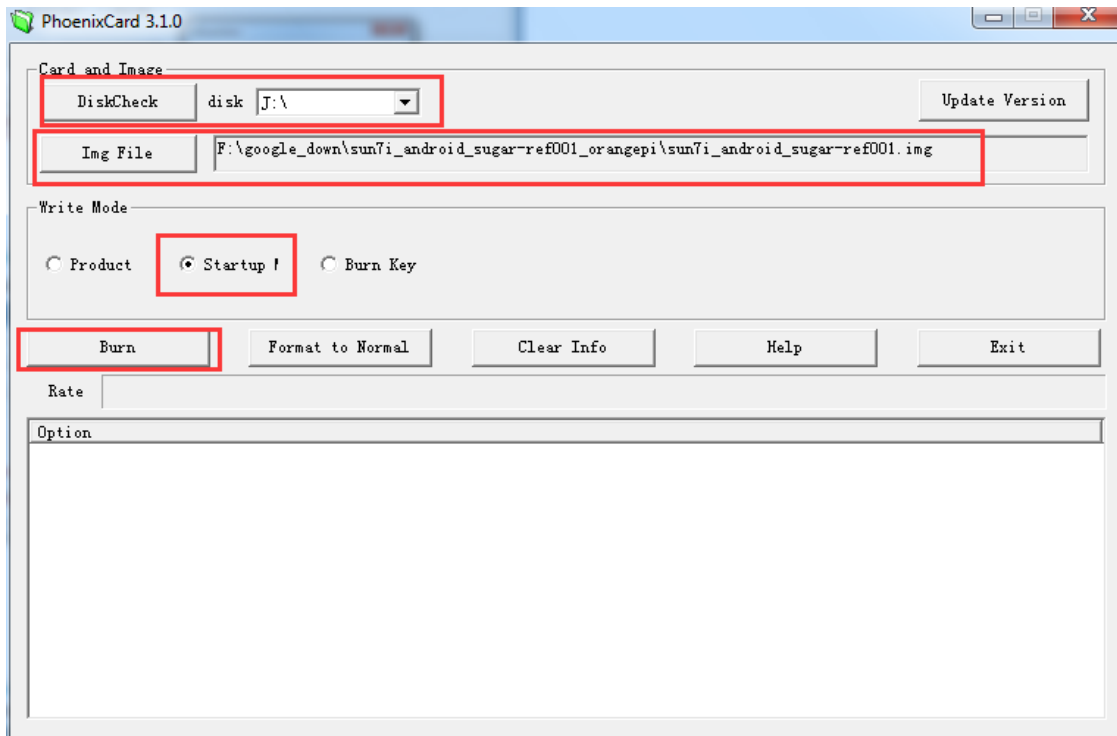


3. Please make sure the inserted TF card is in accordance with the chosen, click “restore” button for TF card format.

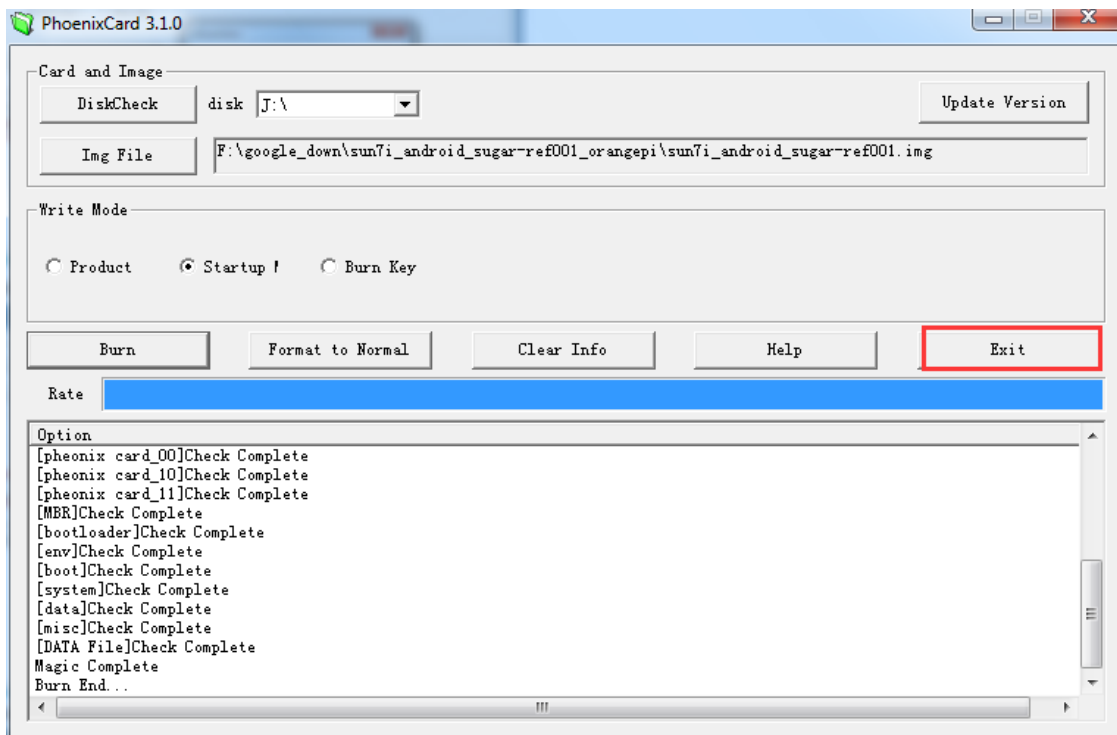


Successfully to format the TF card to normal, click the “OK” button.

4. Then burn the Android OS image to your TF card. Please pay attention to the following with red marks.



Click the “Burn” button.

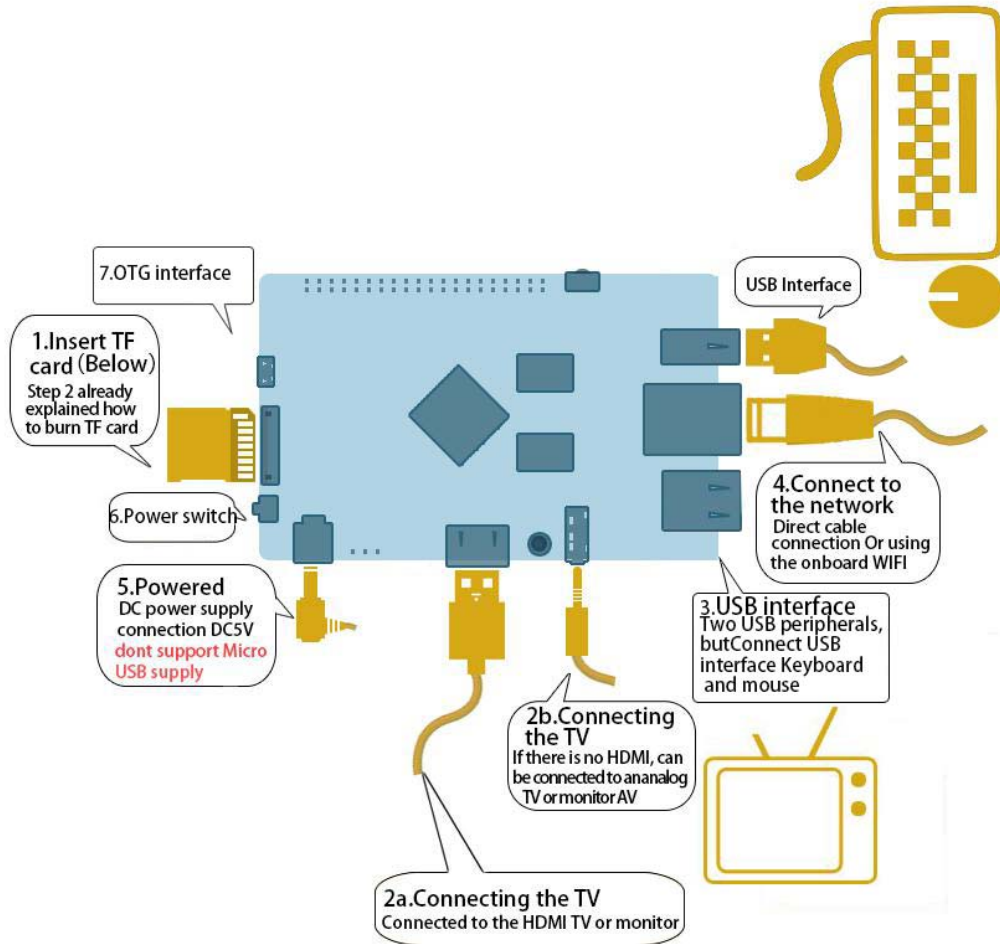


Burn Android OS image to TF card successfully. Click “Exit”.

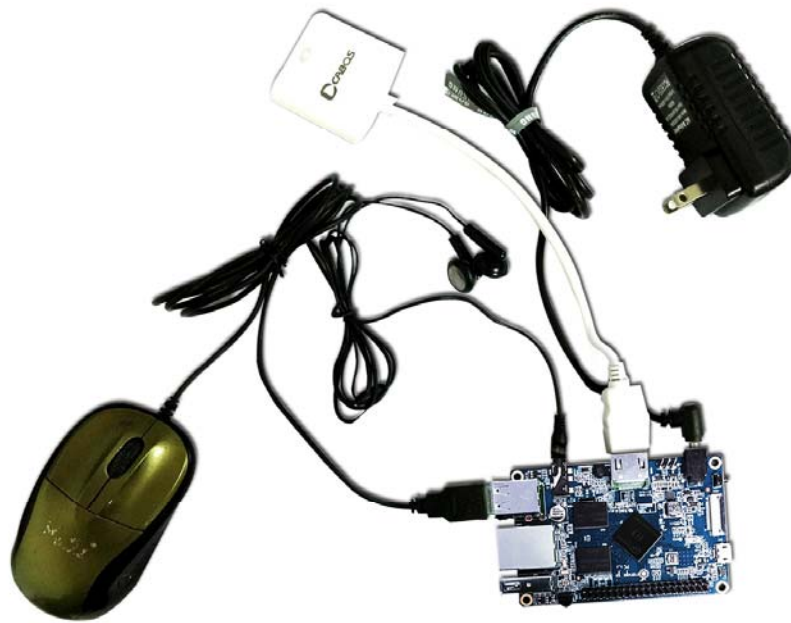


Step3: Boot your Orange Pi PC

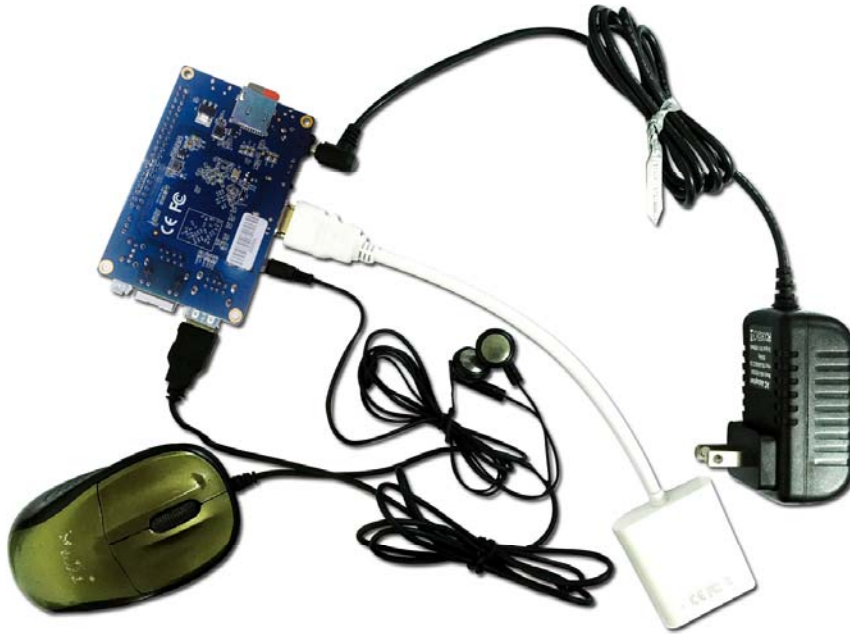
According to diagram below, you can easily boot your Orange Pi PC.



Hardware connection sketch map



Hardware real objects picture-top view



Hardware real objects picture-bottom view

1. Insert the TF card with written-image into the TF card slot on the left edge of the board.
2. In the middle of lower edge of the board is the HDMI Type A (Full sized) port which is used to your Orange Pi PC, HDMI TV or monitor.

If you don't have a monitor with HDMI or DVI port, you can output audio and video to stimulated TV or monitor with the help of Yellow AV port in the middle of the upper part of the board and audio port on the right side of the board

3. Plug the USB port of the keyboard and mouse into the USB port on the right edge of the board.
4. Ethernet connector is in the middle of the three USB ports, you can link your Orange Pi PC with cable network



5. On the right side of the Lower part of the board is the power input port, 5V 2A min. power adapter is applicable. Please do not use low-powered GSM cellphone charger, even though it is marked"5V 2A".

Note : Micro USB OTG cannot be used as a power supply, which will freeze the board. Only a DC power port can be used to supply power.

If everything in the above-mentioned steps goes very well, the Orange PC will booted in a few minutes. The screen will display the OS GUI(Graphical User Interface). The first boot of a new OS will take a long time. So be patient! Subsequent boots will be much quicker.

Step 4 Turn off your Orange Pi PC

You can turn off your Orange Pi PC safely with the help of "OFF" button on the screen. Also you can input command

sudo halt

or

sudo shutdown -h.

in the shell to turn off the system.

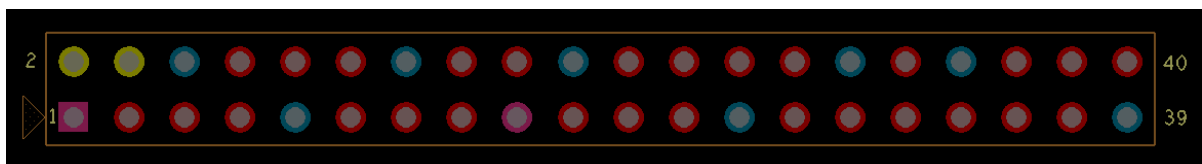
In this case, your Orange Pi PC will be turned off safely, I you just turn off the power supply, it will damage the system of TF card. You'd better press the Power button for 5 seconds at least to cut off the power.

. If everything goes very well, you can use orange pi pc now.

GPIO specification

Orange Pi PC 40-pin GPIO

A 40-pin GPIO interface on the Orange Pi PC is the same as Model A and Model B of Raspberry Pi. The picture below is GPIO pin define of Orange Pi PC.



| | | |
|------------------|----------|------|
| Orange_Pi-PC(H3) | | |
| CON3-P01 | VCC-3V3 | |
| CON3-P02 | VCC-5V | |
| CON3-P03 | TWI0-SDA | PA12 |

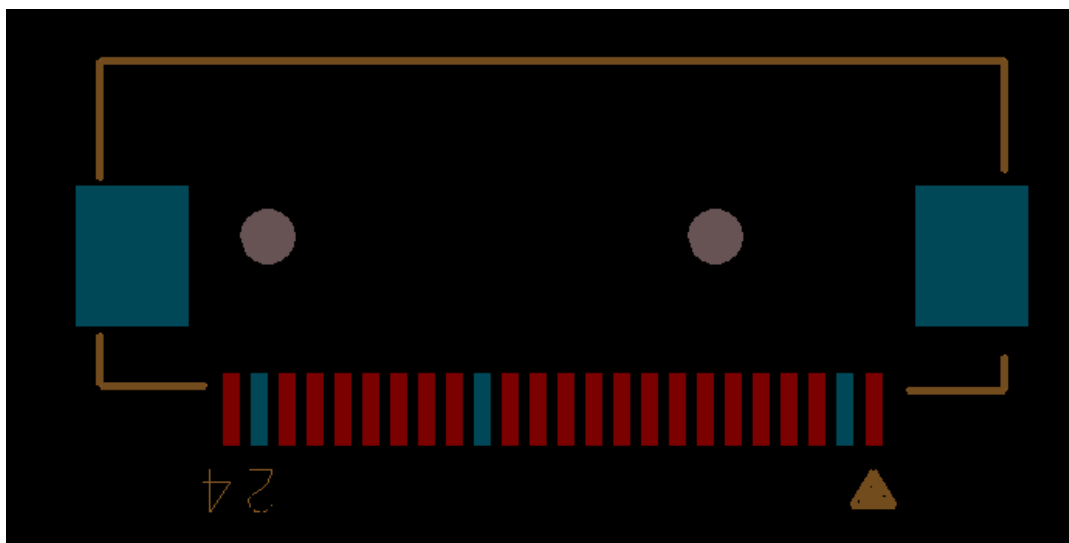


| | | |
|----------|-----------|------|
| CON3-P04 | VCC-5V | |
| CON3-P05 | TWI0-SCK | PA11 |
| CON3-P06 | GND | |
| CON3-P07 | PWM1 | PA6 |
| CON3-P08 | UART3_TX | PA13 |
| CON3-P09 | GND | |
| CON3-P10 | UART3_RX | PA14 |
| CON3-P11 | UART2_RX | PA1 |
| CON3-P12 | PD14 | PD14 |
| CON3-P13 | UART2_TX | PA2 |
| CON3-P14 | GND | |
| CON3-P15 | UART2_CTS | PA3 |
| CON3-P16 | PC4 | PC4 |
| CON3-P17 | VCC-3V3 | |
| CON3-P18 | CAN_RX | PC7 |
| CON3-P19 | SPI0_MOSI | PC0 |
| CON3-P20 | GND | |
| CON3-P21 | SPI0_MISO | PC1 |
| CON3-P22 | UART2_RTS | PA2 |
| CON3-P23 | SPI0_CLK | PC2 |
| CON3-P24 | SPI0_CS0 | PC3 |
| CON3-P25 | GND | |
| CON3-P26 | PA21 | PA21 |
| CON3-P27 | TWI1-SDA | PA19 |
| CON3-P28 | TWI1-SCK | PA18 |
| CON3-P29 | PA7 | PA7 |
| CON3-P30 | GND | |
| CON3-P31 | PA8 | PA8 |
| CON3-P32 | UART1_RTS | PG8 |
| CON3-P33 | PA9 | PA9 |
| CON3-P34 | GND | |
| CON3-P35 | PA10 | PA10 |
| CON3-P36 | UART1_CTS | PG9 |
| CON3-P37 | PA20 | PA20 |
| CON3-P38 | UART1_TX | PG6 |
| CON3-P39 | GND | |
| CON3-P40 | UART1_RX | PG7 |

Specification of CSI Camera Connector

CSI Camera Connector

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 PC is camera connector.



OrangePi PC-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 | |