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, Rasberry 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+

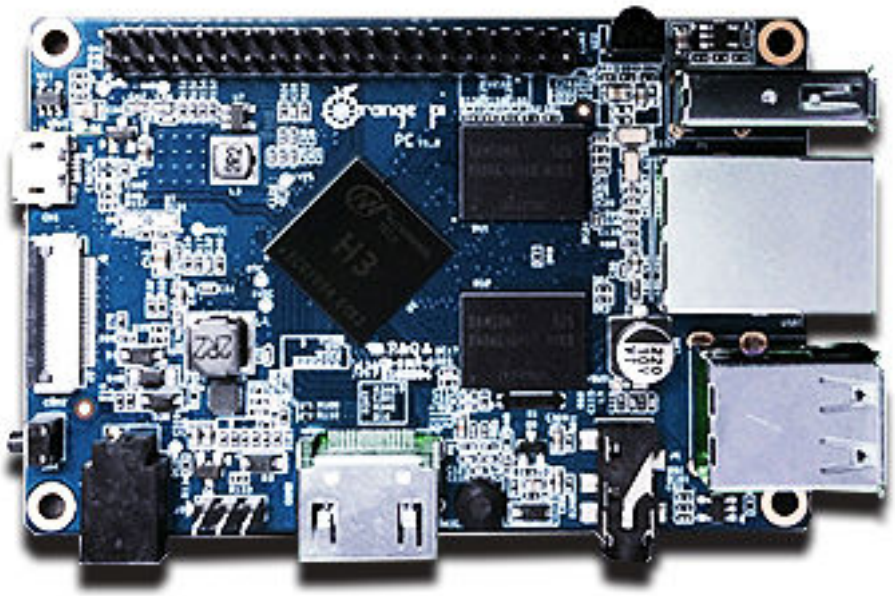
GPIO(1x3) pin	UART, ground.
LED	Power led & Status led
Key	IR, POWER
Supported OS	Android, Ubuntu, Debian, Rasberry Pi Image

Cosmetic Specification

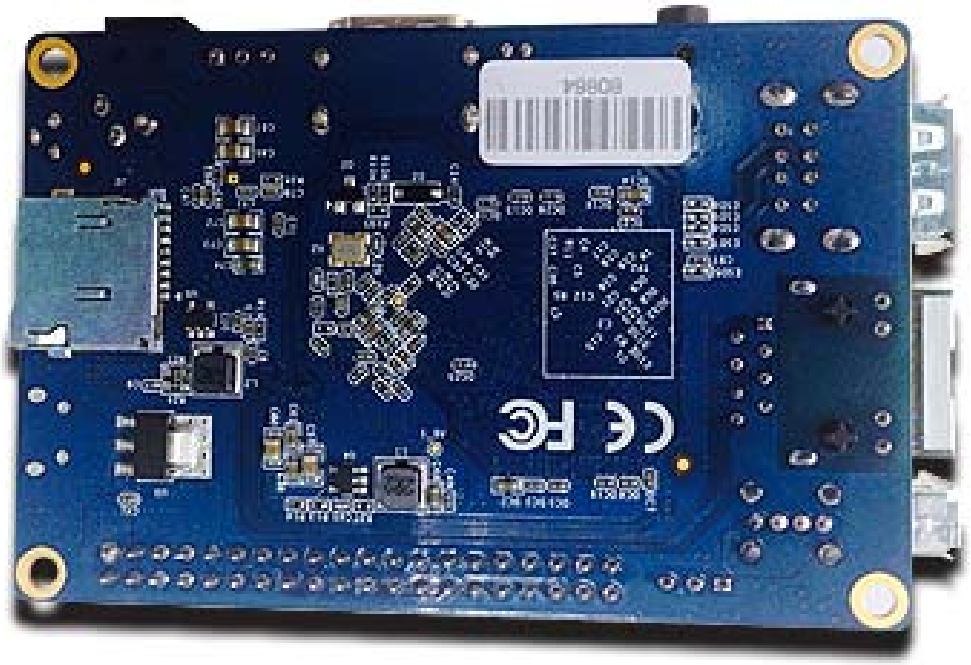
Product size	85mm × 55mm
Weight	38g

Hardware

Top view

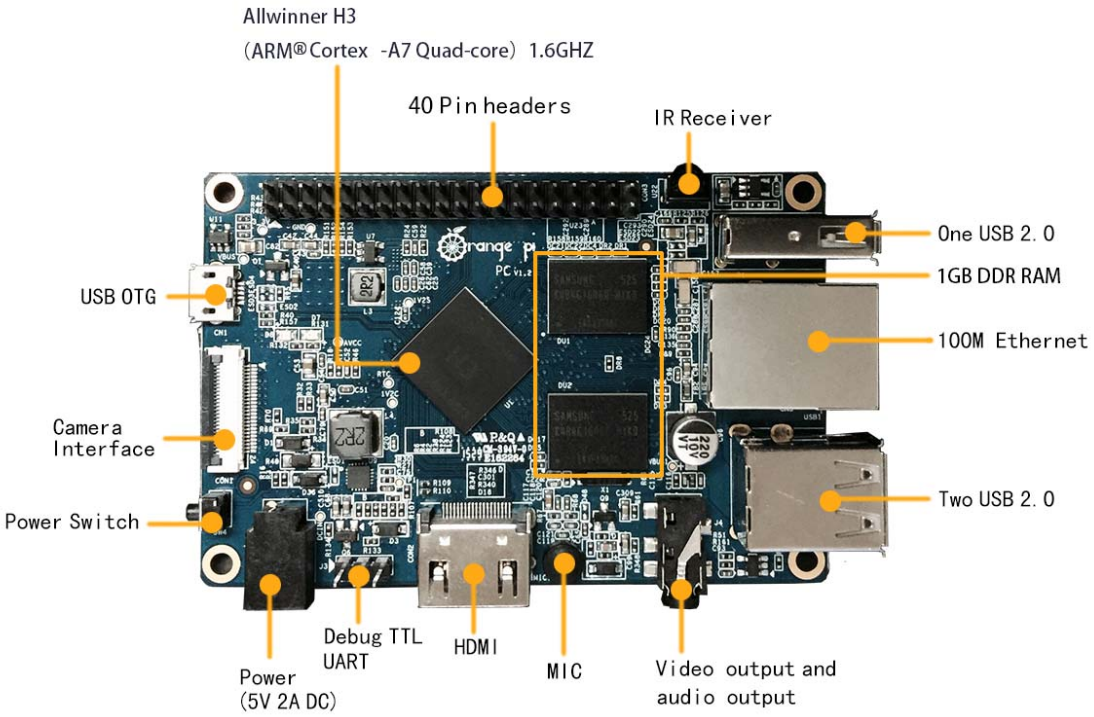


Bottom view

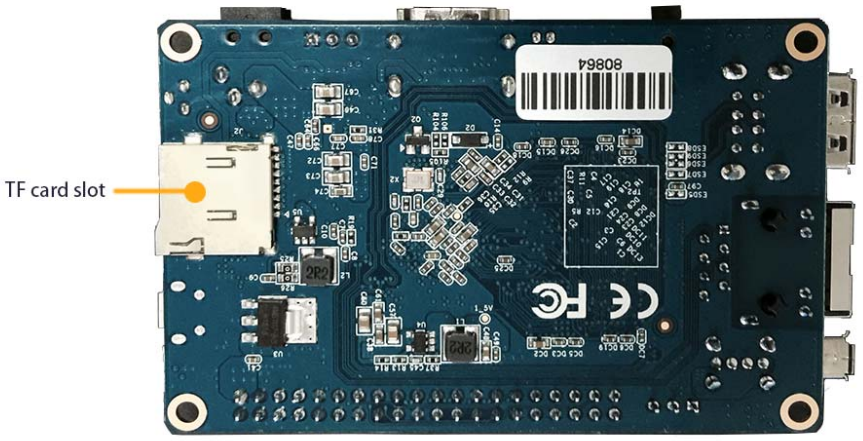


Interface instructions

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	• 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	• 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)	• 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?

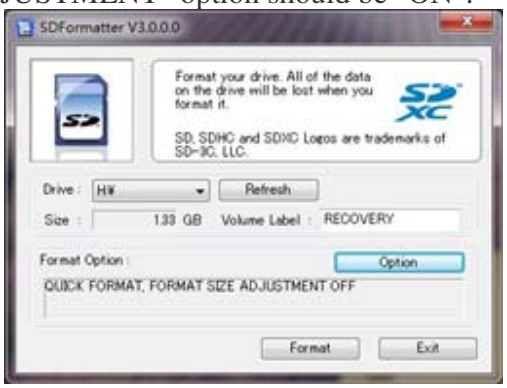
Windows:

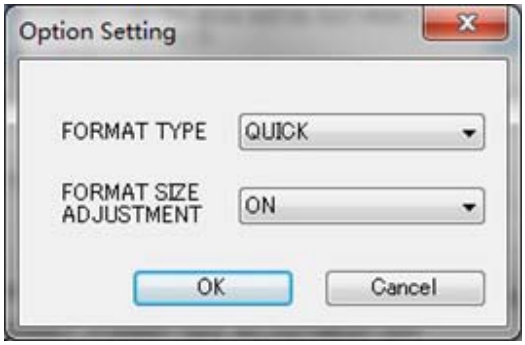
1. Insert your TF card into your computer. The capacity of a TF card should be larger than OS image, generally 4GB min.
2. Format the TF card.

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.

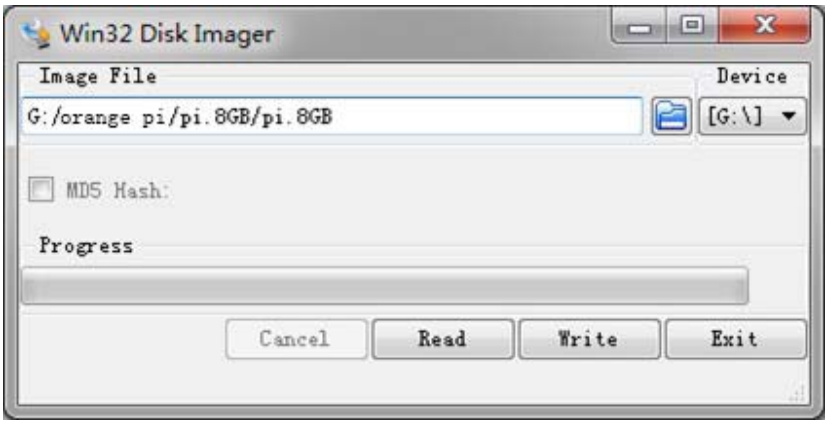
3. Download the OS image from the website, the Website is http://www.orangepi.org/downloadresour the ces/

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?

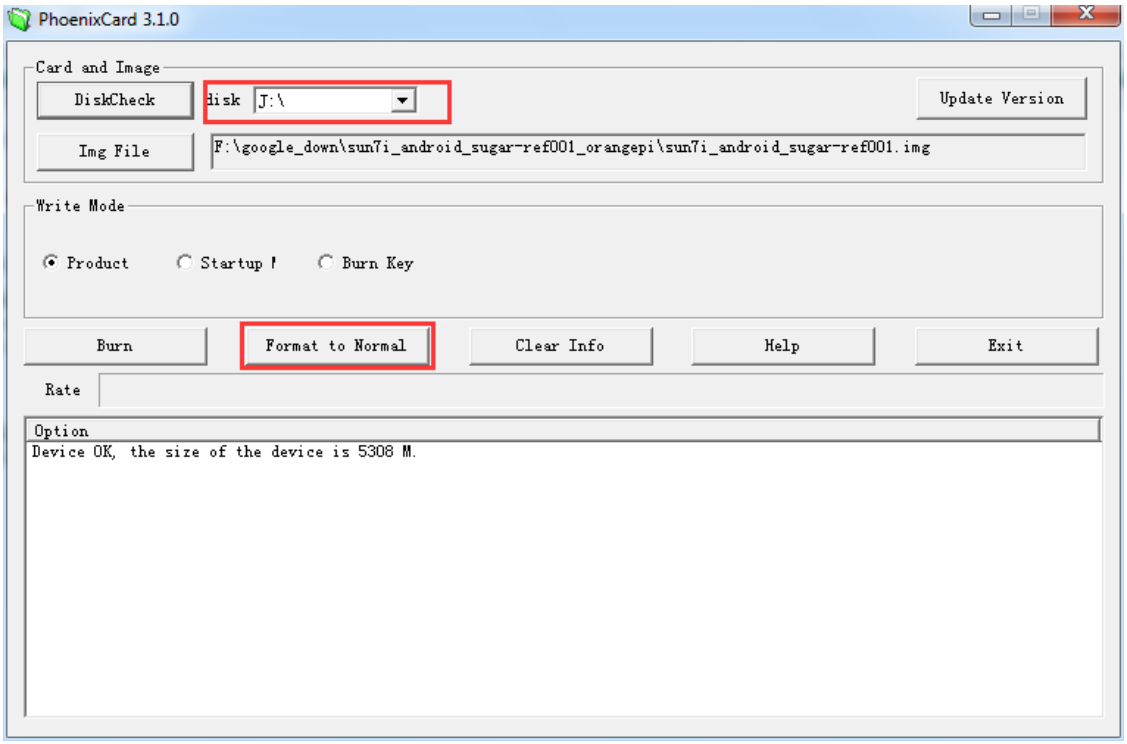
It is impossible for Android image file to be written into TF card by using dd command under Linux or by using Win32 Diskimager under Windows. PhoenixCard is applicable. (Note : If your laptop card slot cannot burn the TF card, you can use the TF card reader.)

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

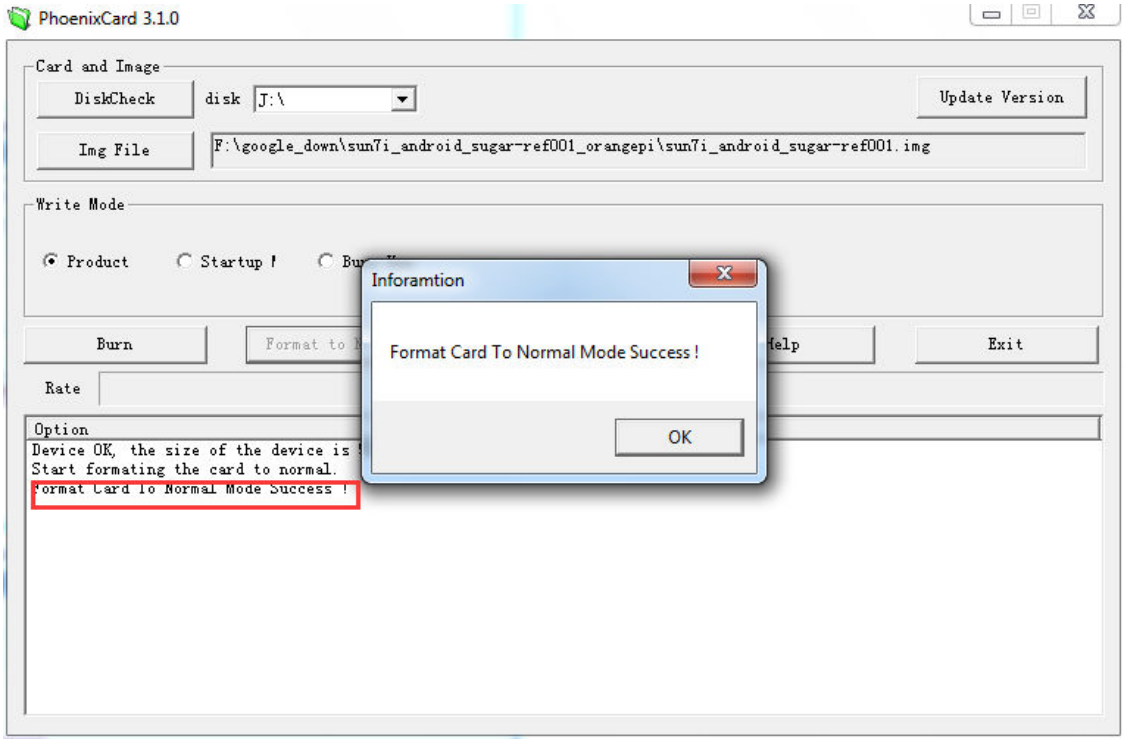
   Download **PhoenixCard** from
   https://drive.google.com/file/d/0B_VynIqhAcB7NTg2UkRDdHRWX2s/edit?usp=sharing

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

2. Format the TF card

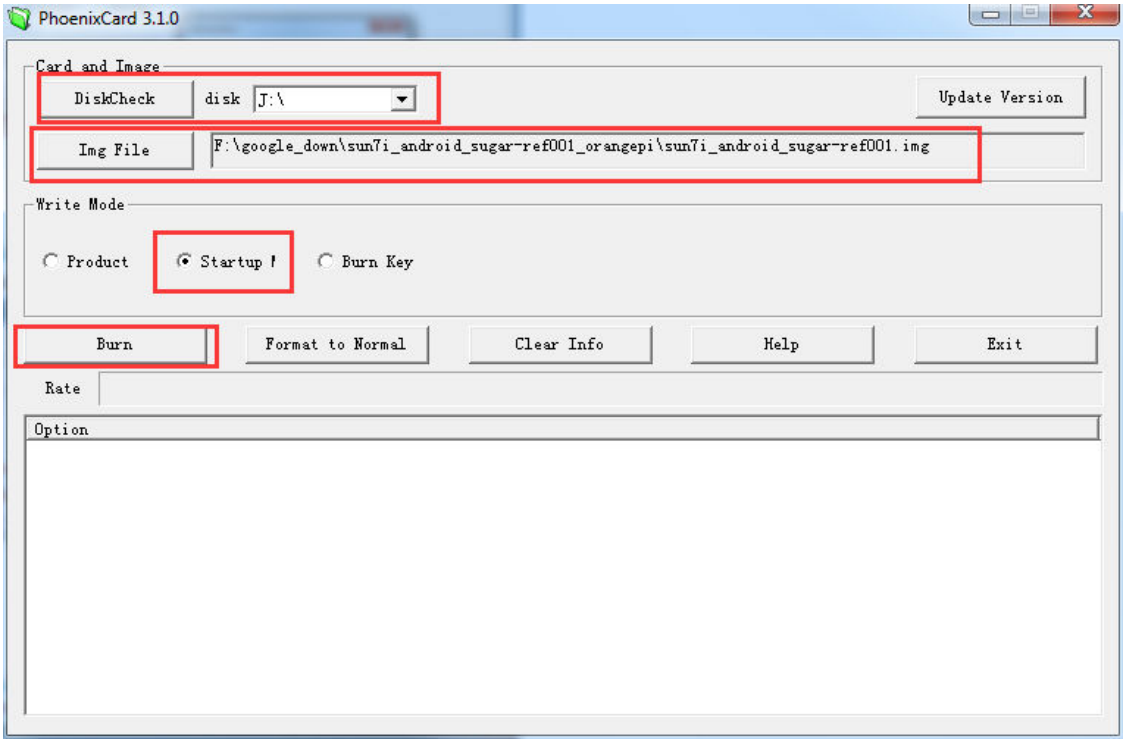


3. Please make sure the inserted TF card is in accordance with the chosen, click “restore” button for TF card format.

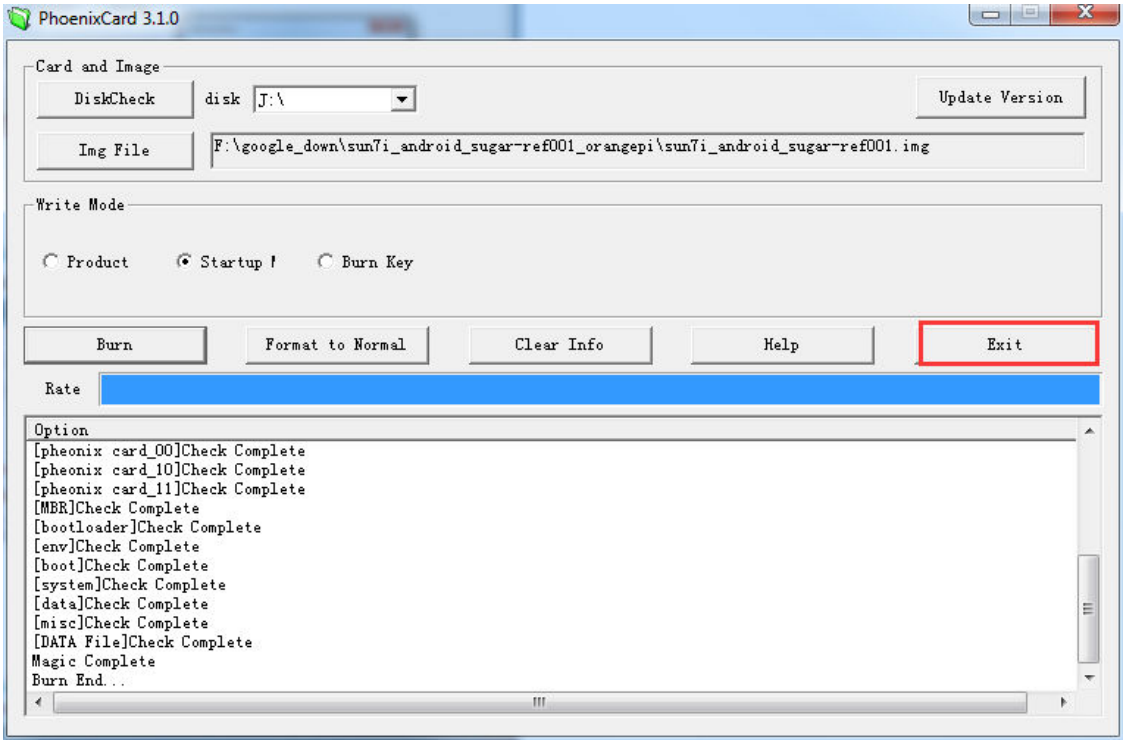


Successfully to format the TF card to normal, click the “OK” button.

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



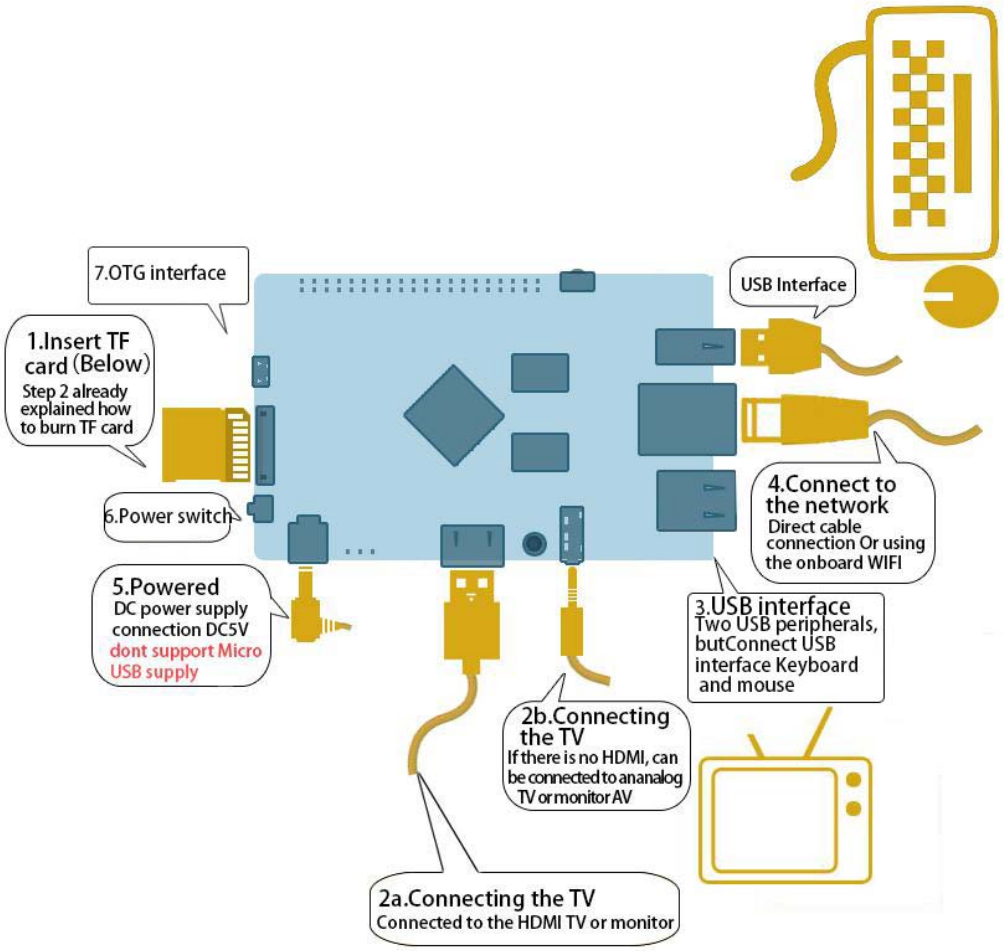
Click the “Burn” button.



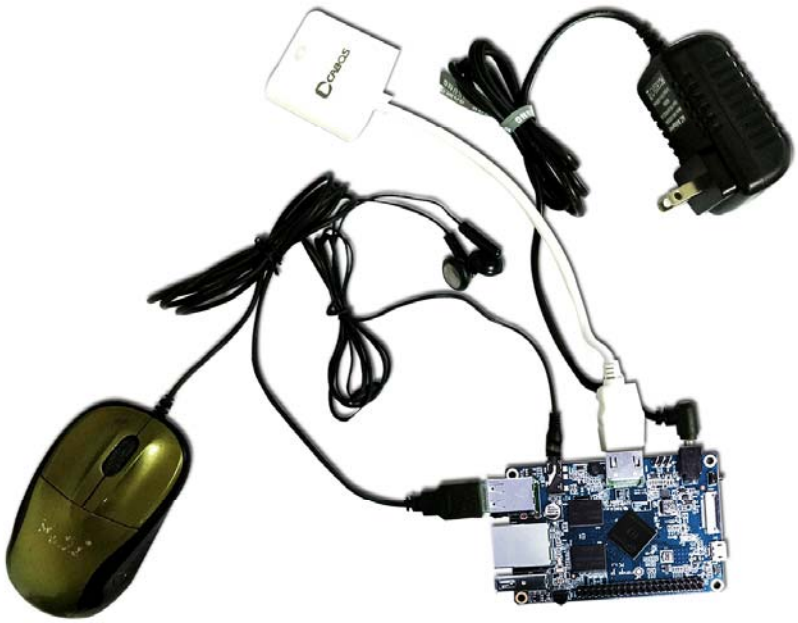
Burn Android OS image to TF card successfully. Click “Exit”.

Step3: Boot your Orange Pi PC

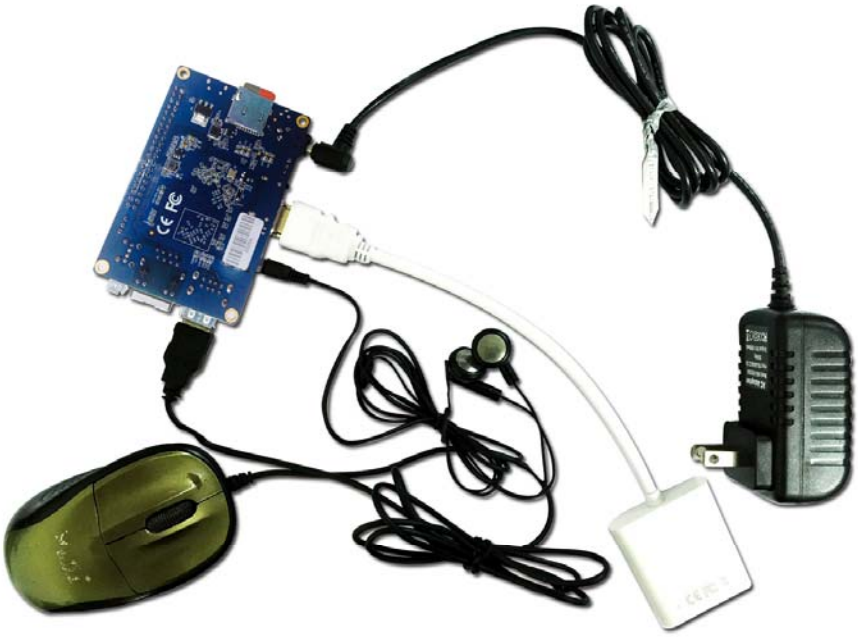
According to diagram below, you can easily boot your Orange Pi PC.



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.

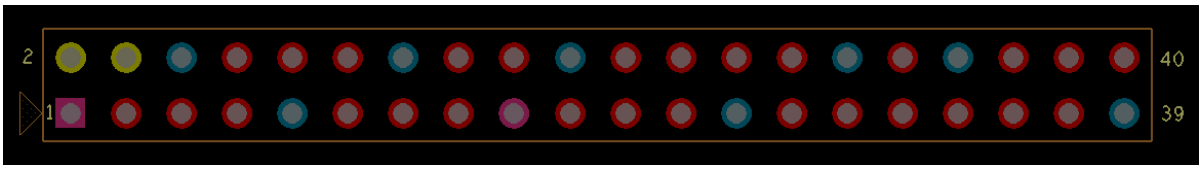
In this case, your Orange Pi PC will be turned off safely, I you just turn off the power supply, it will damage the system of TF card. You'd better press the Power button for 5 seconds at least to cut off the power.

. **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.



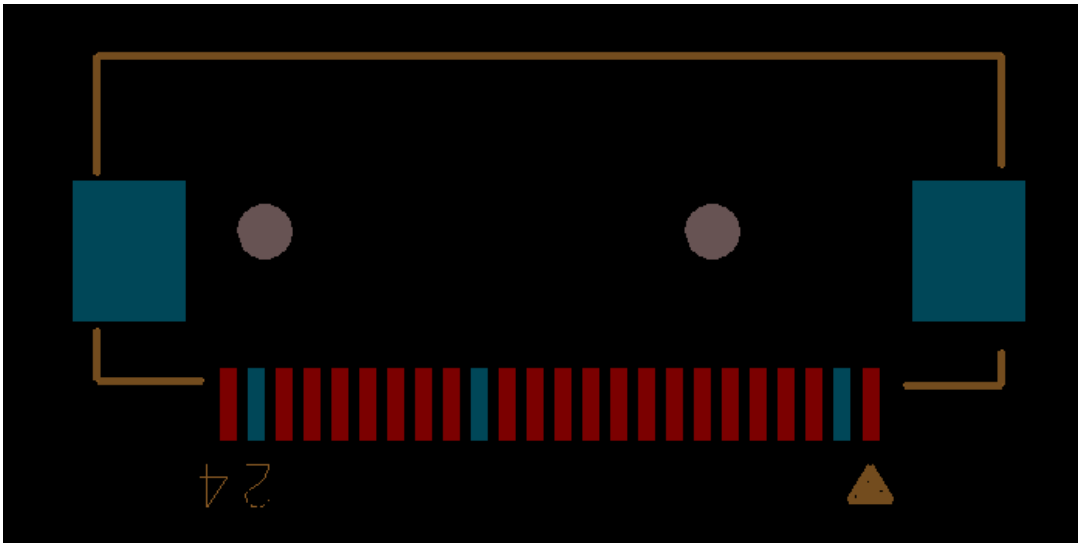
Orange_Pi-PC(H3)		
CON3-P01	VCC-3V3	
CON3-P02	VCC-5V	
CON3-P03	TWI0-SDA	PA12

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	