Orange Pi mini 2
User Manual

<Version: V0.9 >

What's Orange Pi mini 2？

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 Mini 2?

Build…

A computer

A wireless server

Games

Music and sounds

HD video

A speaker

Android

Scratch

Pretty much anything else, because Orange Pi Mini 2 is open source.

Who's it for?

Orange Pi Mini 2 is for anyone who wants to start creating with technology – not just consuming it. It's a simple, fun, useful tool that you can use to start taking 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 (shared 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 Outputs	Supports HDMI output with HDCP Supports HDMI CEC Supports HDMI 30 function Integrated CVBS Supports simultaneous output of HDMI and CVBS
Audio Output	3.5 mm Jack and HDMI
Power Source	DC input can supply power, but USB OTG input don't supply power
USB 2.0 Ports	Four USB 2.0 HOST, one USB 2.0 OTG
Buttons	Power Button(SW4), Recovery Button(SW2), Uboot Button(SW3)
Low-level peripherals	40 Pins Header,compatible with Raspberry Pi B+

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

Interface definition

Product size	93mm × 60mm
Weight	45g

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Hardware

Top view:
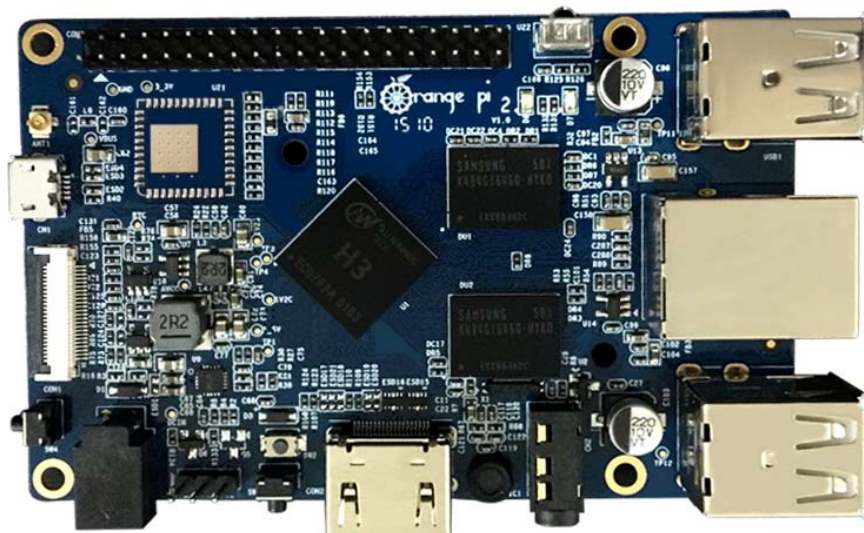
Bottom view:

Interface:

Top view

Allwinner H3
(ARM®Cortex -A7 Quad-core) 1.6GHZ

40 Pin headers

IR Receiver

USB OTG

Camera
Interface

Power Switch

Debug TTL
UART

HDMI

The upgrade key

Power
(5V 2A DC)

MIC

Output video and
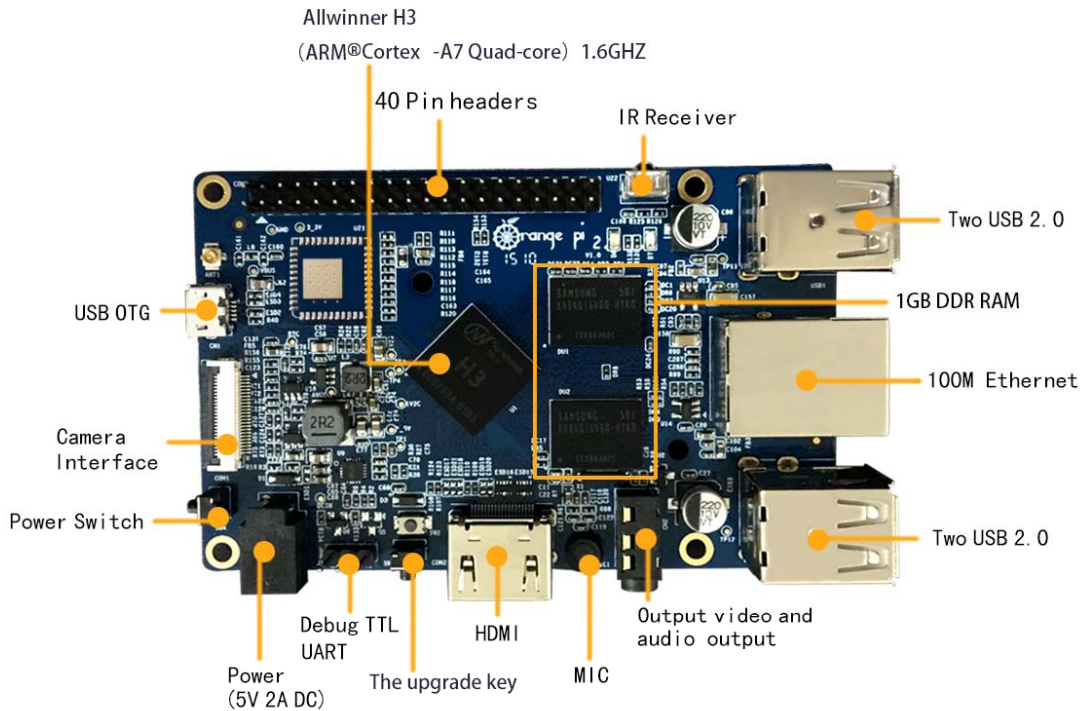audio output

Two USB 2. 0

1GB DDR RAM

100M Ethernet

Two USB 2. 0

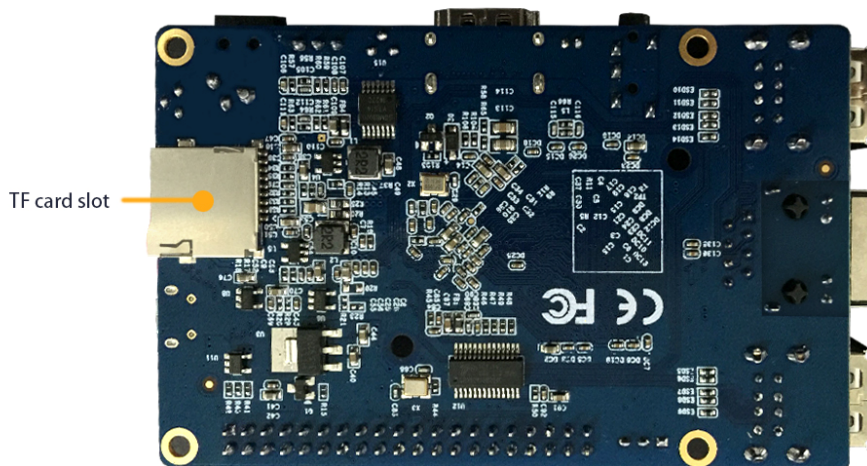## Bottom view

TF card slot
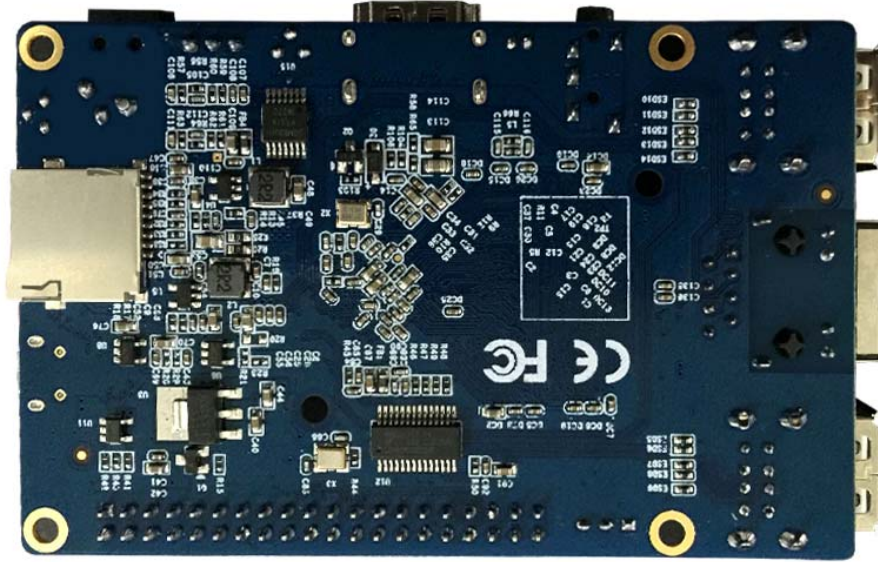
Use method

By following this short quick start guide, you can use your Orange Pi Mini 2 in just a few minutes. There are three steps to boot your Orange Pi Mini 2.

Step 1: Get what you need

To enjoy the use of your Orange Pi Mini 2, you will need at least the accessories in the table below.

No.	Item	Minimum recommended specification & notes
1	TF card	• Minimum size 4Gb; class 4 (the class indicates how fast the card is). • We recommend using branded TF cards as they are more reliable.
2a	HDMI(Full sized) to HDMI / DVI lead	• HDMI to HDMI lead (for HD TVs and monitors with HDMI input). OR HDMI to DVI lead (for monitors with DVI input).
2b	AV video lead	• A standard AV video lead to connect to your analogue display if you are not using the HDMI output.
3	Keyboard and mouse	• Any standard USB keyboard and mouse should work. • Keyboards or mice that take a lot of power from the USB ports, however, may need a powered USB hub. This may include some wireless devices.
4	Ethernet cable/USB WiFi(Optional)	• Networking is optional, although it makes updating and getting new software for your Orange Pi Mini 2 much easier.
5	DC power adapter	• A good quality, DC power supply that can provide at least 2.0A at 5V is essential. While the USB OTG input cann't be used.
6	Audio lead (Optional)	• You can choose a 3.5mm jack audio led to connect to audio port to get stereo audio.

HDMI to HDMI lead   HDMI to DVI lead   AV video lead

TF card   DC power adapter

## Step2: Prepare your TF card for the Orange Pi Mini 2

In order to enjoy your Orange Pi Mini 2, you will need to install an Operating System (OS) onto a TF card. Instructions below will teach you how to write an OS image to your TF card under Windows and Linux.

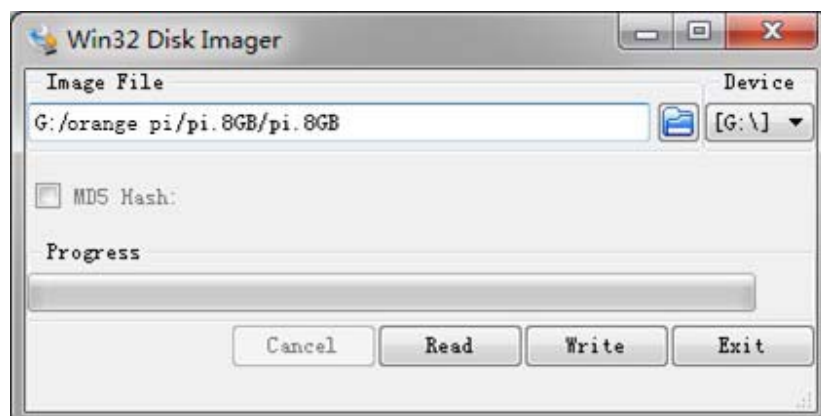How to write an OS image (except Android OS image) to your TF card?

Windows:

 1. Insert your TF card into your computer. The size of TF card should be larger than the OS image size, generally 4GB or greater.
 2. Format the TF card.
  i. Download a TF card format tool such as **TF Formatter** from https://www.sdcard.org/downloads/formatter_4/eula_windows/.
  ii. Unzip the download file and run the setup.exe to install the tool on your machine.
  iii. In the "Options" menu, set "FORMAT TYPE" option to "QUICK", "FORMAT SIZE ADJUSTMENT" option to "ON".
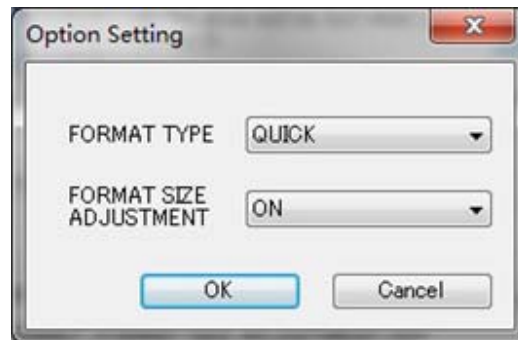
iv. Check the TF card you inserted matches the one selected by the tool.

v. Click the "Format" button.

3. Download the OS image from the Downloads webpage.

i. Website:http://www.orangepi.org/downloaded/download.html

4. Unzip the download file to get the OS image (exclude android os image, android os image need other burn mode.).

i. Right click on the file and choose "Extract all".

5. Write the image file to the TF card.

i. Download a tool that can wirte image to TF card, such as **Win32 Diskimager** from:

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

ii. Open the unzipped image file.

iii. Click "Write" button. Wait patiently to successfully complete

writing.

Linux:

1. Insert your TF card into your computer. The size of TF should be larger than the OS image size, generally 4GB or greater.
2. Format the TF card.
    i. Run *fdisk −l /dev/sdx* command to check the TF card node.
    ii. Run *umount /dev/sdxx* to unmount all the partitions of the TF card.
    iii. Run *sudo fdisk /dev/sdx* command to configure TF card. Use *o* command to delete all partition of TF card and use *n* command to add one new partition. Use *w* command to save change.
    iv. Run *sudo mkfs.vfat /dev/sdx1* command to format the new created partition of TF card as FAT32.
    (*x* should be replaced according to your TF card node)
    You can also jump this step under Linux, because write image command *dd* under Linux will format the TF card automatically.

3. Download the OS image from the Downloads webpage.
    i. Website:http://www.orangepi.org/downloaded/download.html

4. Unzip the download file to get the OS image (exclude android os image, android os image need other burn mode).
    i. Run *unzip [downloaded filename]* command.

5. Write the image file to the TF card.
    i. Run *fdisk −l /dev/sdx* command to check the TF card node.
    ii. Verify if the hash key of the zip file is the same as shown on the downloads page (optional).

    sha1sum [path]/[imagename]
    This will print out a long hex number which should match the "SHA-1" line for the TF image you have downloaded

    iii. Run **umount /dev/sdxx** to unmount all the partition of the the TF card

    iv. Run **sudo dd bs=4M if=[path]/[imagename] of=/dev/sdx** command to write image file to TF card. Wait patiently to successfully complete writing. Please note that block size set to 4M will work most of the time, if not, please try 1M, although 1M will take considerably longer.You can use **sudo pkill –USR1 –n –x dd** command to check progress

How to Write an Android OS image to your TF card?

Android OS image can not use the **dd** command under the Linux nor the **Win32 Diskimager** under Windows, you need to use PhoenixCard to make the TF card.
(Note : If the laptop card slot can not burn the TF card, you can use the TF card reader.)

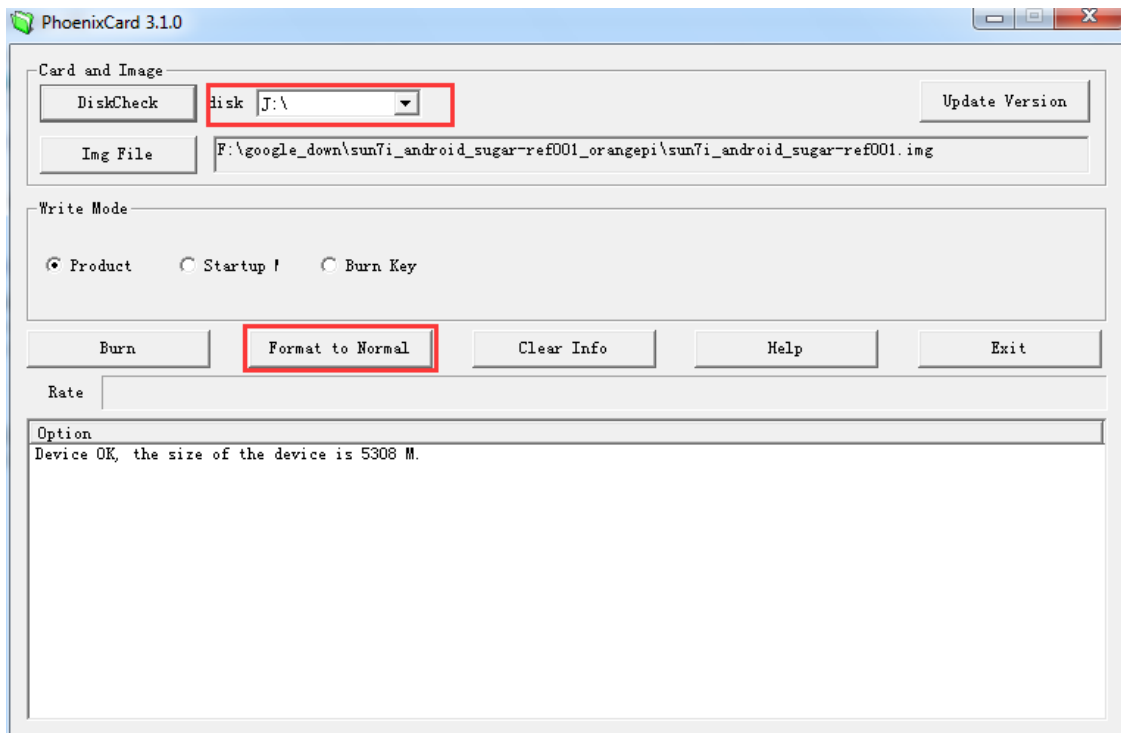1. Download the Android image and **PhoenixCard**.

    Download **PhoenixCard** from:
    https://drive.google.com/file/d/0B_VynIqhAcB7NTg2UkRDdHRWX2s/edit?usp=sharing
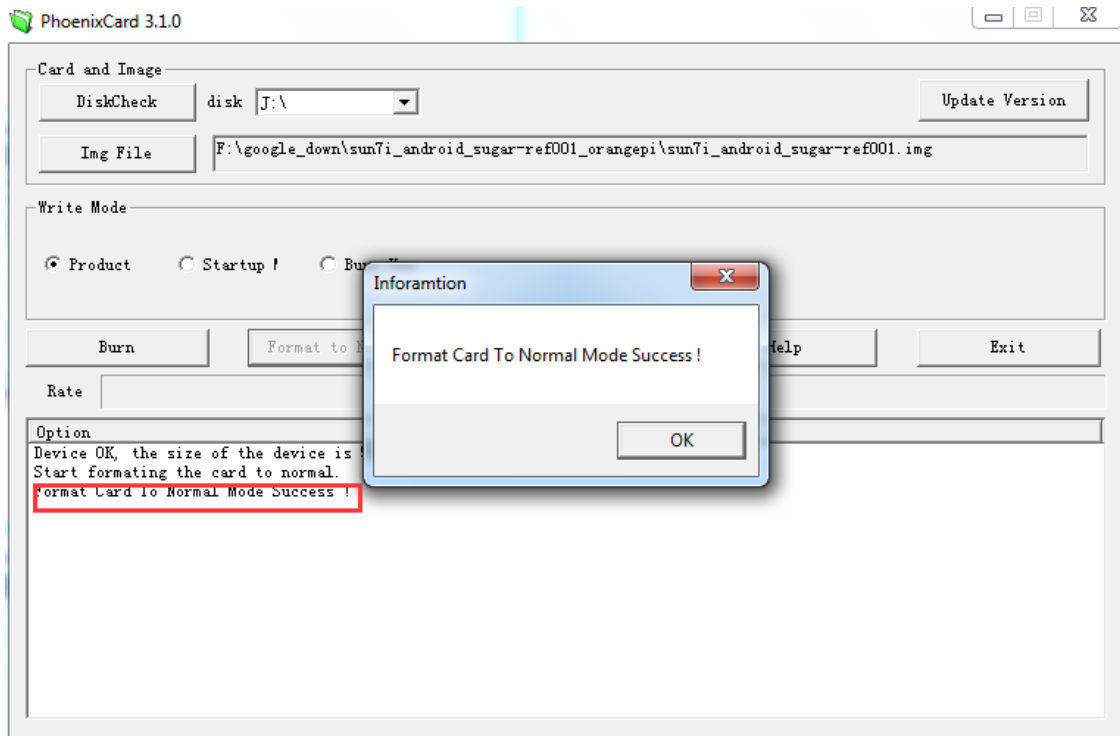
    Download Android OS image from:
    http://www.orangepi.org/downloaded/download.html

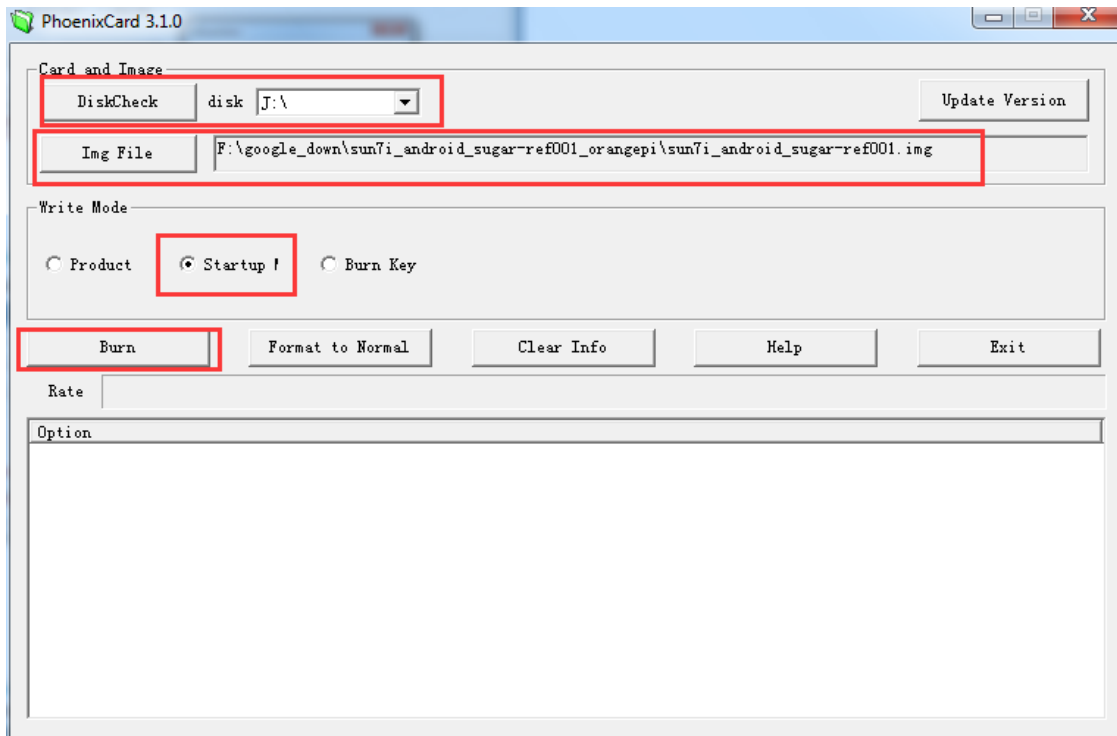2. Format the TF card to Normal.

3. Check the TF card you inserted matches the one selected by the tool. Click "Format to Normal".
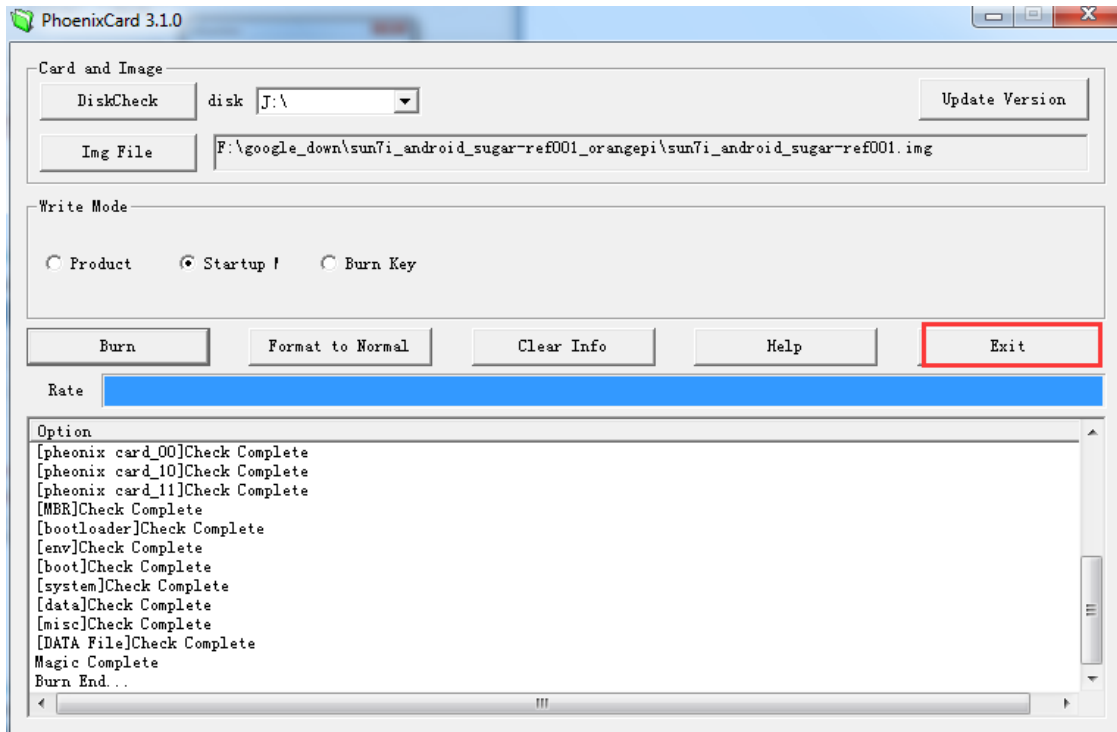
Successfully to format the TF card to normal, click the "OK" button.

4.   Then burn the Android OS image to your TF card. Pay attention to those
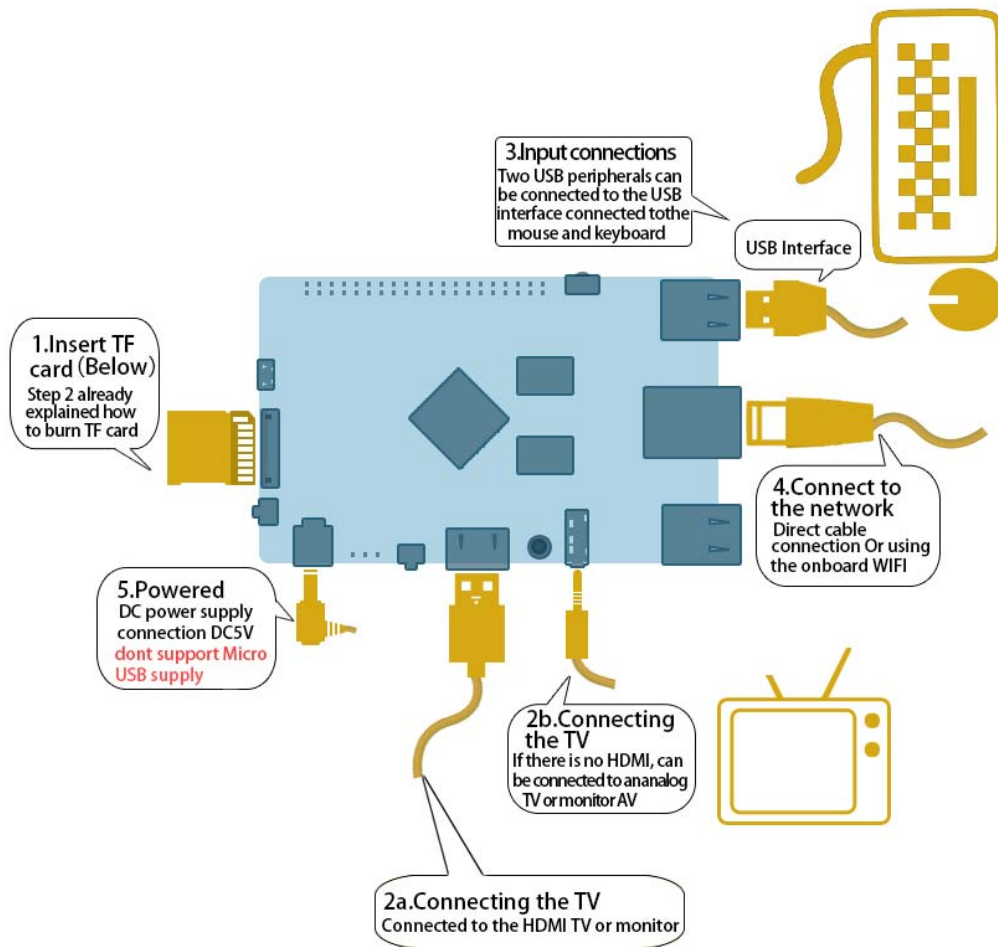   red tag options.

Click the "Burn" button.

Burn Android OS image to TF card successfully. Click "Exit".

Step3: Set up your Orange Pi Mini 2

According to the set up diagram below, you can easily set up your Orange Pi Mini 2.

Hardware connect sketch map

Hardware connect physical map-top view

Hardware connect physical map-bottom view

1. Insert the written-image TF card into the TF card slot on the left edge of the downside of the board.

2. On the bottom edge in the middle of the board is the HDMI Type A (Full sized) port. Just connect any HDMI Type A cable from the board to your TV or HDMI Monitor.

   If you don't have a TV/Monitor with a HDMI or DVI-D port you can use the AV jack located on the very right of the bottom edge.

3. Plug a USB keyboard and mouse into the USB slots located on the right edge.

4. Just between the four USB ports on the right edge is the ethernet

connector for anyone who wants to plug the Orange Pi Mini 2 into a wired network.

5. Finally, on the very left of the bottom edge is the DC power connector. Plug in a regulated power supply that is rated at 5V ± 5% and at least 1500mA (or 2.0A). Any number bigger than 1500 mA will also work.

Note：Avoid using OTG USB as power input, because it does not work. Only the DC power can make the board work.

If all goes well, the Orange Pi Mini 2 will boot in a few minutes. The screen will display the OS GUI(Graphical User Interface). The first boot of a new OS can sometimes take a long time. Be patient! Subsequent boots are usually much quicker.

Step4: Shut down your Orange Pi Mini 2
   You can use the GUI to shut down the Orange Pi Mini 2 safely.
Also you can run the command in the terminal:
sudo halt
or
sudo shutdown -h.
   This will shut down the PI safely, (just use the power key to turn off might damage the TF-cards file system). After that you can press the power key for 5 seconds to turn it off.

If all is well ,so you can use orange pi Mini 2 now.

GPIO specification

Orange Pi Mini 2 40-pin GPIO

Orange Pi Mini 2 has a 40-pin GPIO header that matches that of the Model A and Model B Raspberry Pi. Following is the Orange Pi Mini 2 GPIO Pinout:
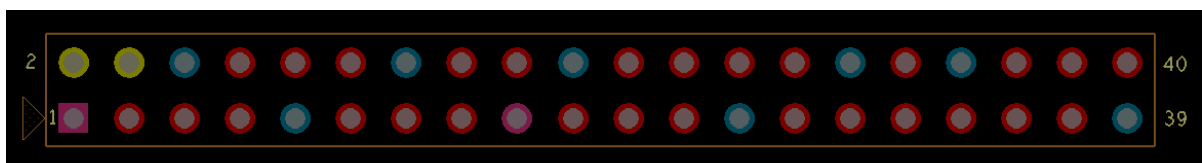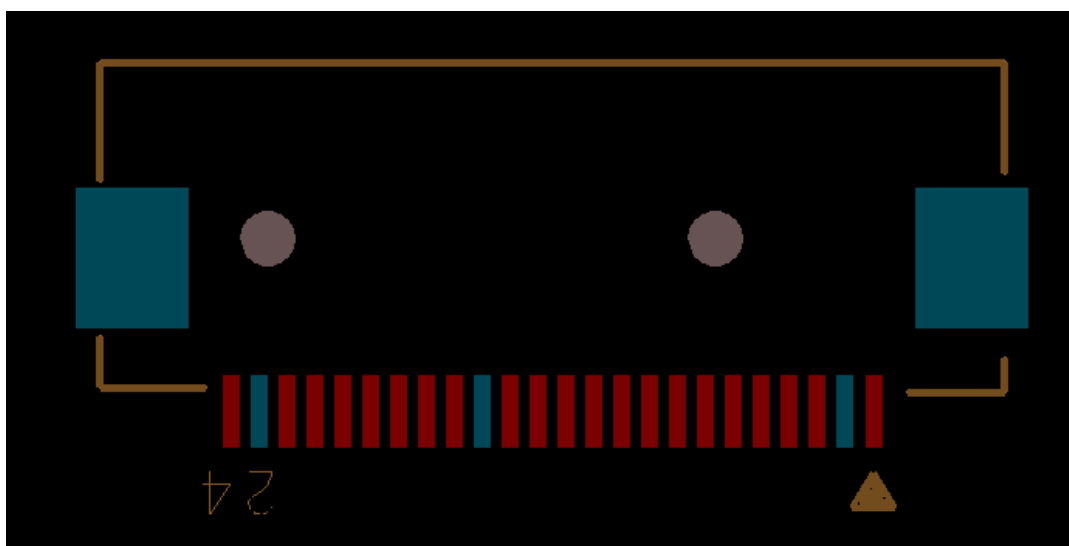
Orange_Pi-Mini 2(H3)		
CON3-P01	VCC-3V3	
CON3-P02	VCC-5V	
CON3-P03	TWI0-SDA	PA12
CON3-P04	VCC-5V	
CON3-P05	TWI0-SCK	PA11
CON3-P06	GND	
CON3-P07	PWM1	PA6
CON3-P08	UART3_TX	PA13
CON3-P09	GND	
CON3-P10	UART3_RX	PA14
CON3-P11	UART2_RX	PA1
CON3-P12	PD14	PD14
CON3-P13	UART2_TX	PA2
CON3-P14	GND	
CON3-P15	UART2_CTS	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

CSI Camera Connector specification:

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 definitions of the CSI interface are shown as below. This is marked on the Orange Pi Mini 2 board as "CON1".

OrangePi Mini
    2-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	