

# Android

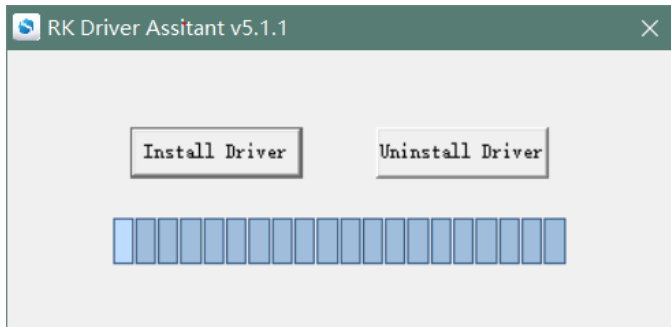
## Prepare

1. Double male USB data cable for image download or adb debug.
2. MicroUSB cable or usb to ttl cable if you need console debug message print, default baudrate is 1500000.
3. Windows or Linux PC.
4. Download the latest android image, and confirm that the md5 checksum is correct before flashing.

## Install Image with Usb Download Tool

### Windows

1. Download and install Rockchip USB driver

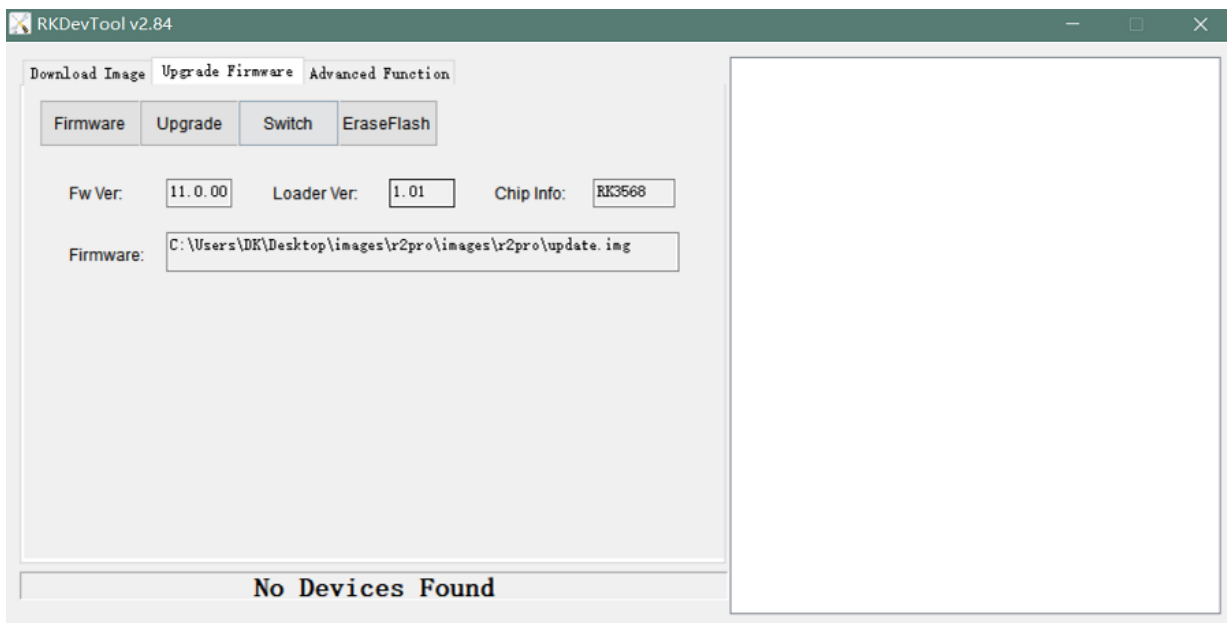


2. Download Rockchip USB Download Tool

This tool defaults language is Chinese. you can change it to English after extract the package. Open RKDevTool\_Release\_v2.84/config.ini with an text editor (like notepad). The starting lines are:

```
#Language Selection: Selected=1(Chinese); Selected=2(English)
[Language]
Kinds=2
Selected=1
LangPath=Language\
```

3. Open RKDevTool.exe, Switch to the “upgrade firmware” page. Press the “firmware” button to open the image file to be upgraded. The upgrade tool displays detailed firmware information.



4. Disconnect power adapter, connect dual male usb cable from the top usb host port to PC.
5. There have two usb download mode for image upgrade.

- **Uboot Usb Download Mode (loader mode)**

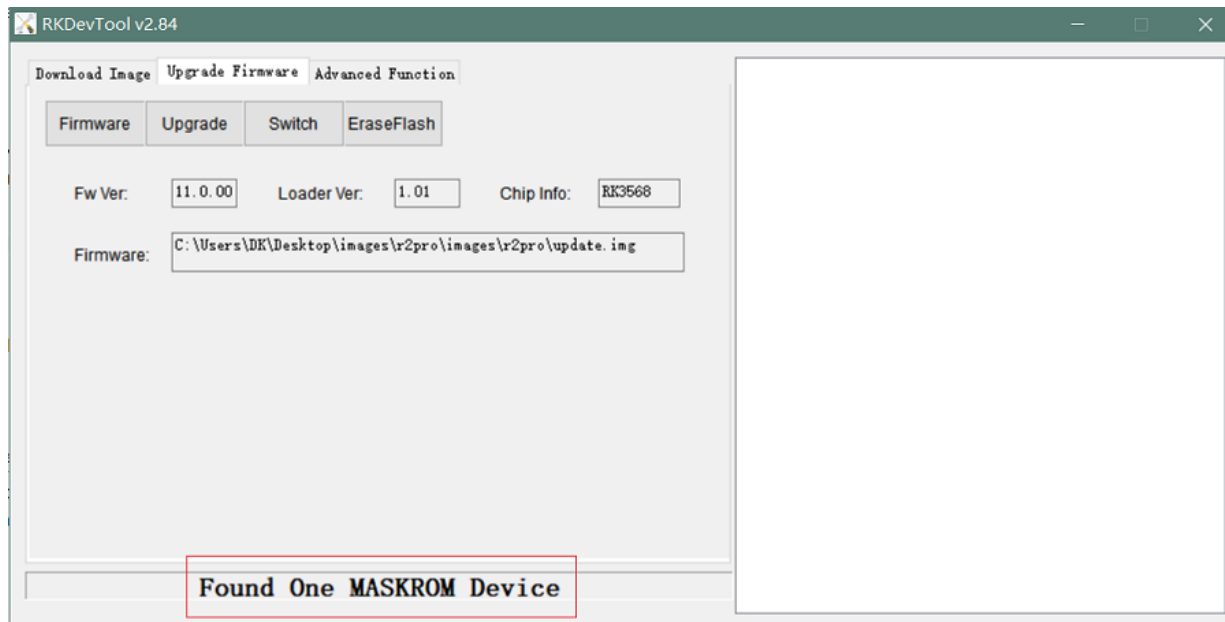
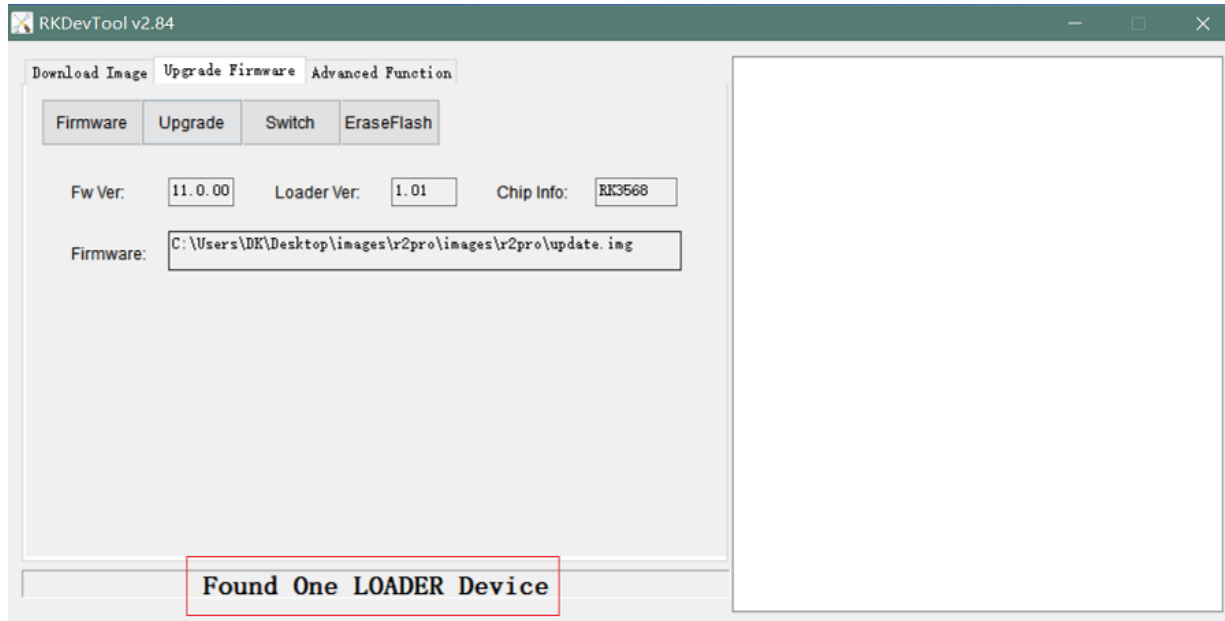
It's supposed to use this way if board already flashed a bootable uboot before.

▪ **Maskrom Usb Download Mode(maskrom mode)**

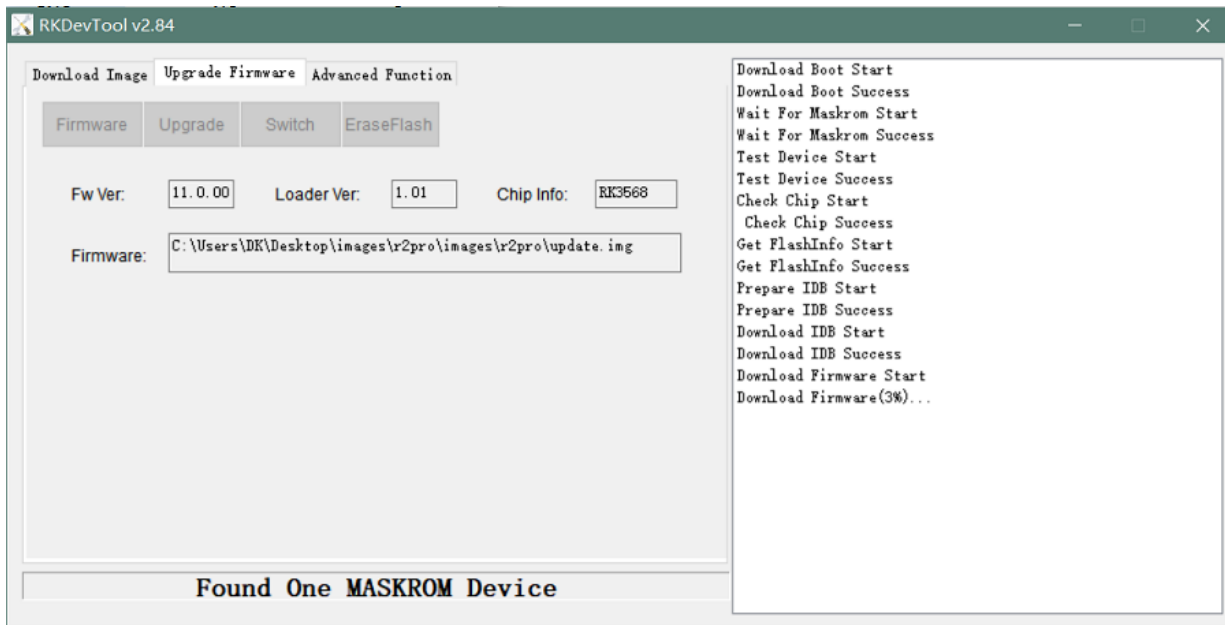
Press the Recovery button or Maskrom button beside 3pin uart header and hold, connect the power adapter or press the RST button if power adapter already connected, about two seconds later, release the button. PC will Identify the device if RK usb driver installed correctly.



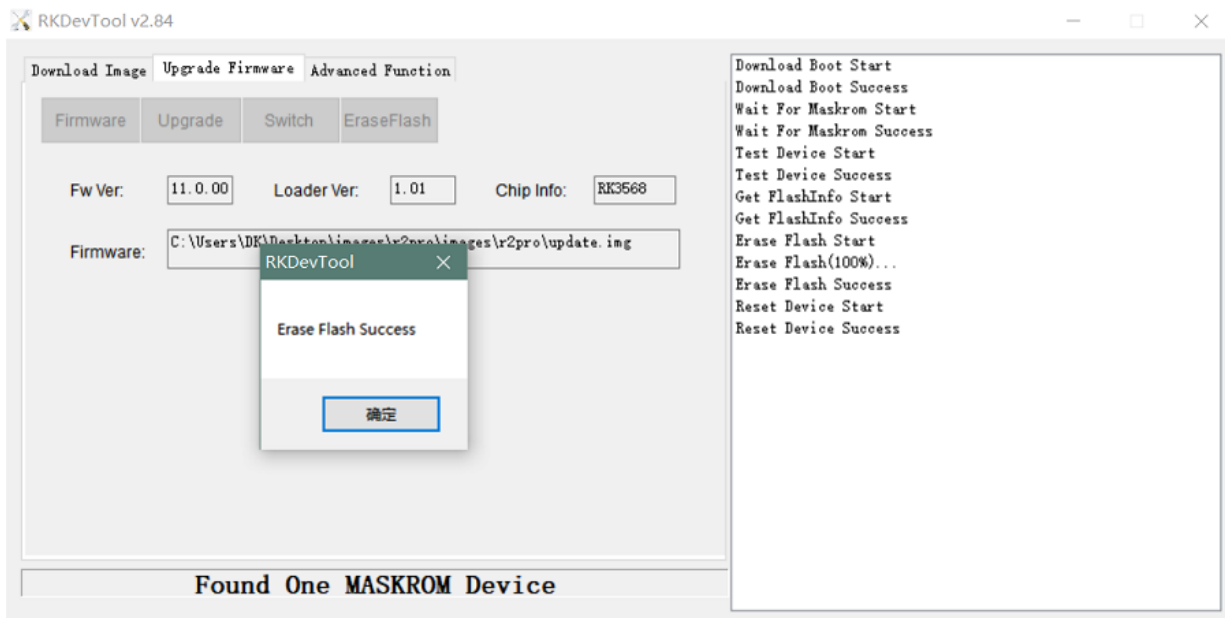
The download tool also show the download mode if device connected.



6. Press the “upgrade” button to start the upgrade.



7: If the upgrade fails, you can try to erase the Emmc by pressing the EraseFlash button first, and then upgrade image again.



## Linux

1. Download Linux USB Download Tool, And install it into the system as follows commands:

```
$ unzip Linux_Upgrade_Tool_xxxx.zip
$ cd Linux_UpgradeTool_xxxx
$ sudo mv upgrade_tool /usr/local/bin
$ sudo chown root:root /usr/local/bin/upgrade_tool
$ sudo chmod a+x /usr/local/bin/upgrade_tool
```

2. Check the windows download processes, enter the right usb download mode and upgrade image firmware with this command:

```
$ sudo upgrade_tool uf update.img
```

```
sudo upgrade_tool uf update.img
Program Data in /home/dangku/.config/upgrade_tool
Loading firmware...
Support Type:RK3568   FW Ver:b.0.00   FW Time:2022-03-29 17:39:17
Loader ver:1.01 Loader Time:2022-03-29 17:29:32
Download Image Total(3268594K),Current(1438754K)
```

3: If the upgrade fails, try erasing the emmc and upgrade again.

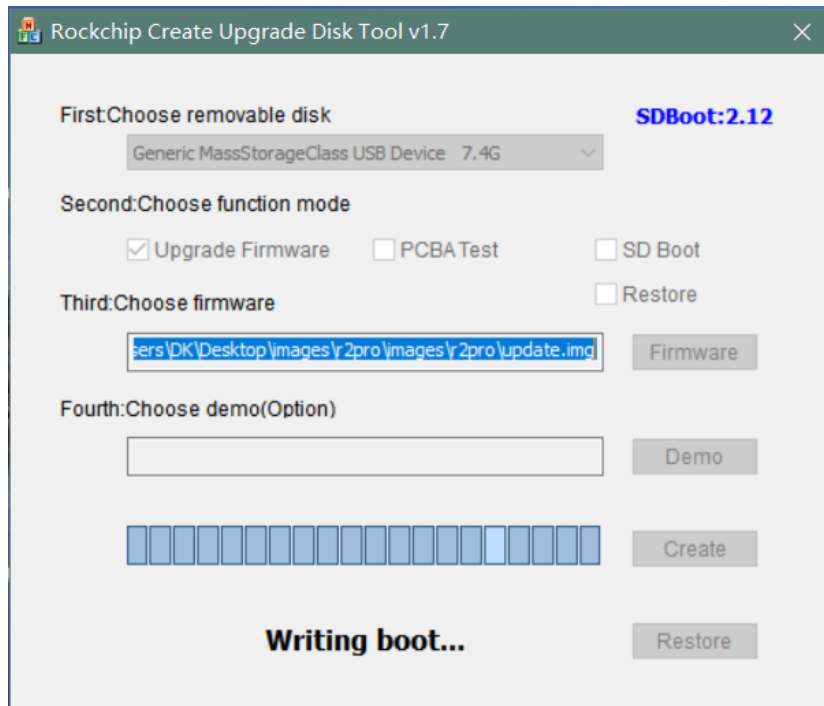
```
$ sudo upgrade_tool ef update.img
```

```
sudo upgrade_tool ef update.img
Program Data in /home/dangku/.config/upgrade_tool
Loading loader...
Erase flash ok.
```

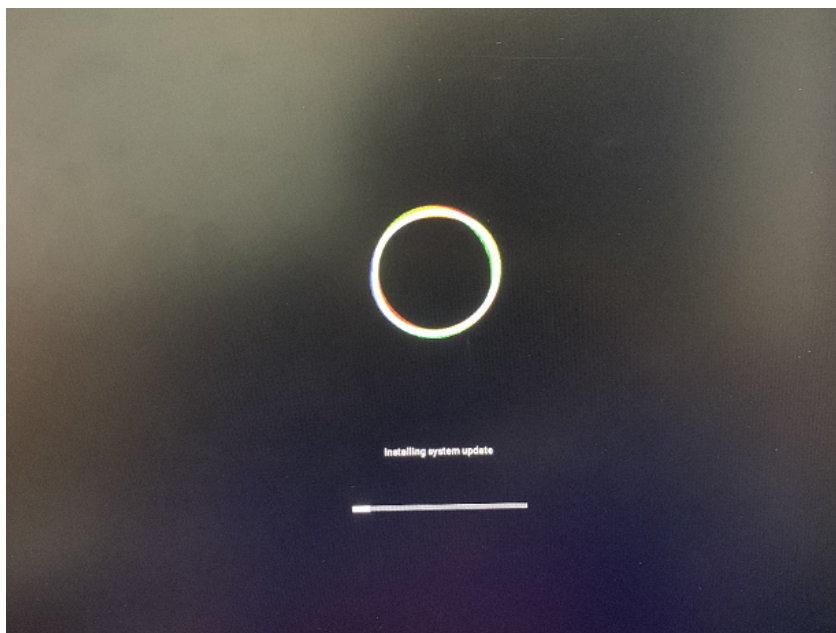
```
# upgrade again
$ sudo upgrade_tool uf update.img
```

## Install Image with SDcard

1. Download Rockchip SDDiskTool.
2. Insert microSD card to Windows PC, 8GB sdcard size at least.
3. Run SD\_Firmware\_Tool, check the "Upgrade Firmware" box and select the correct removable disk device, Choose firmware image, then Click Create button to make it and wait until it is finished



4. Safely remove the microSD card, insert it into the R2pro board, power on the board, it will start upgrading automatically.



5. After the upgrade, you can see the following info on screen, remove the microSD card and the board will restart automatically to complete the whole process of firmware update.

```

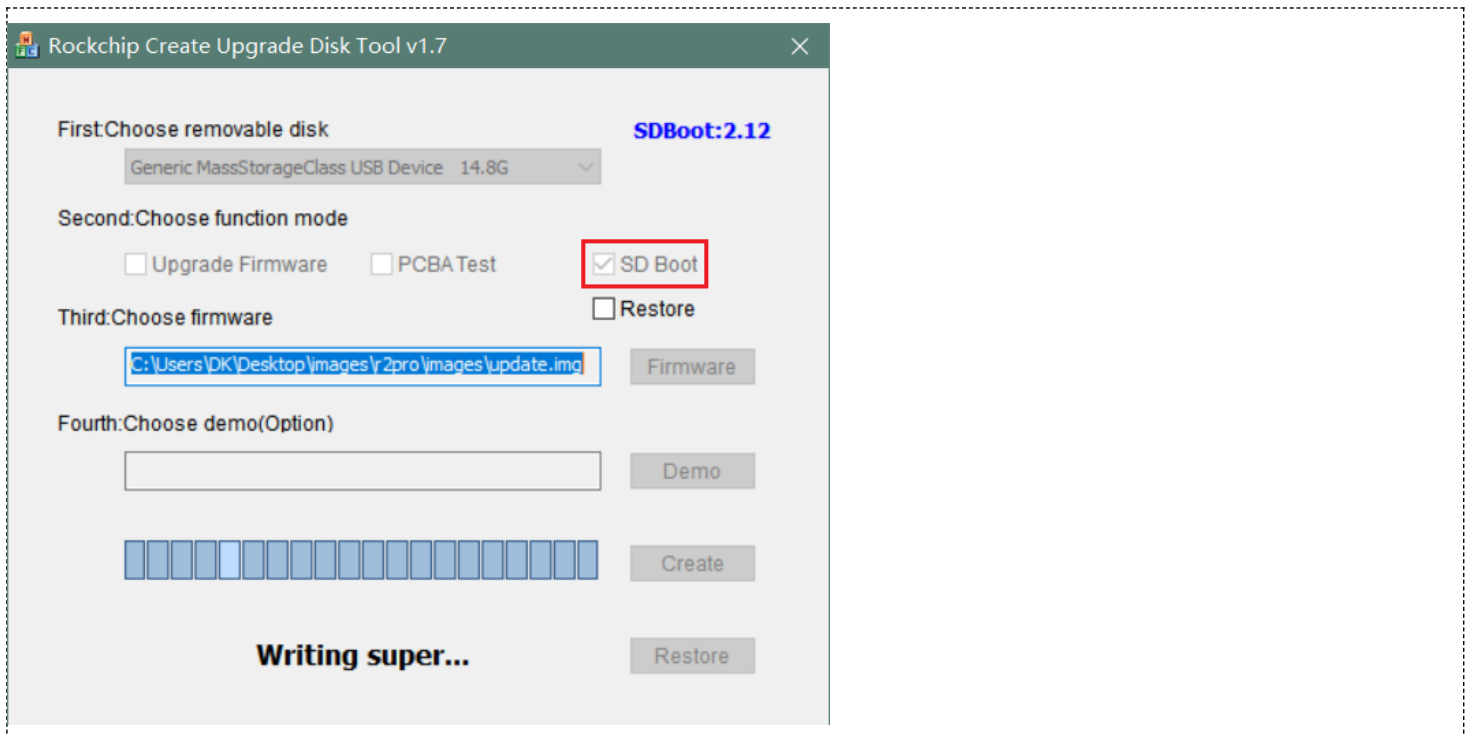
RKA_File_Check entry.name=boot DONE!
dtbo checking...
RKA_File_Check entry.name=dtbo
RKA_File_Check entry.name=dtbo DONE!
vbmeta checking...
RKA_File_Check entry.name=vbmeta
RKA_File_Check entry.name=vbmeta DONE!
recovery checking...
RKA_File_Check entry.name=recovery
RKA_File_Check entry.name=recovery DONE!
baseparameter checking...
RKA_File_Check entry.name=baseparameter
RKA_File_Check entry.name=baseparameter DONE!
super checking...
RKA_SparseFile_Check entry.name=super
INFO:Start to check super,offset=0x1d9000,size=I64u
RKA_SparseFile_Check entry.name=super Done!
Finish to upgrade firmware.
SD upgrade ok.
prksdboot->do_rk_mode_update Successful!
Doing Actions succeeded.please remove the sdcard.....

```

## Boot Android from SDcard

Create a sdcard for android boot is almost the same as create a firmware upgrade sdcard, only one difference is select "SD Boot" mode instead of "Upgrade Firmware". This process lasts about 8 minutes, then safely remove the SDcard, insert it into the r2pro board and power on.

One thing to note is that make sure emmc is empty, you must erase it if flashed before. We recommend that use emmc for android boot because it is faster and more stable.



## Build Android Source Code

1. Get Android source code

```
$ git clone https://github.com/BPI-SINOVOIP/BPI-Rockchip-Android11 --depth=1
```

or you can get the source code tar archive from BaiduPan(pincode: 8888) or GoogleDrive

2. Build the Android Source code

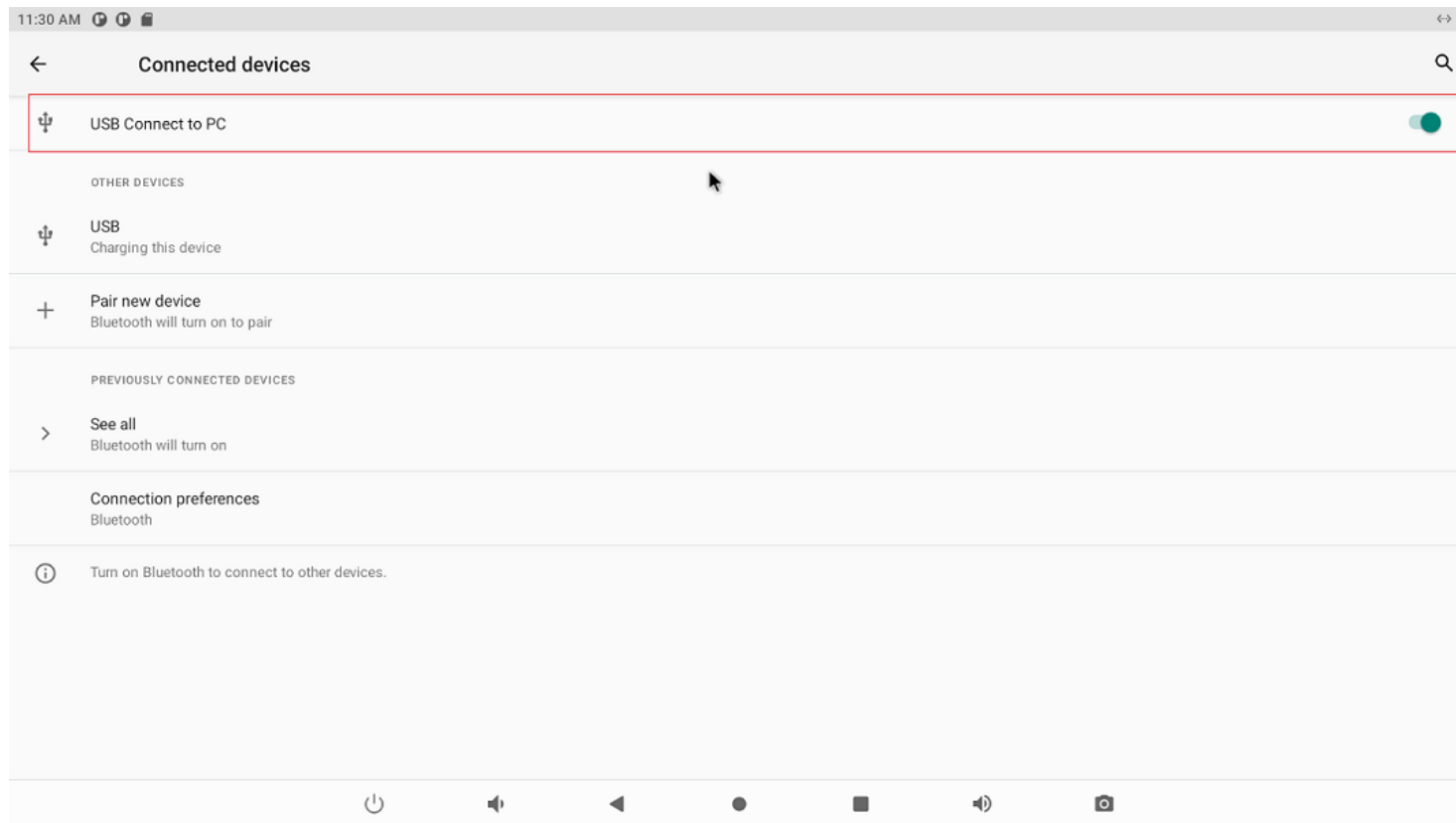
Please read the source code README.md

## USB OTG Mode Switch

The top usb port is a usb 3.0 otg port, but without hw id pin, it only can be used as host or peripheral. The release image set host mode default, but you can change it in Settings

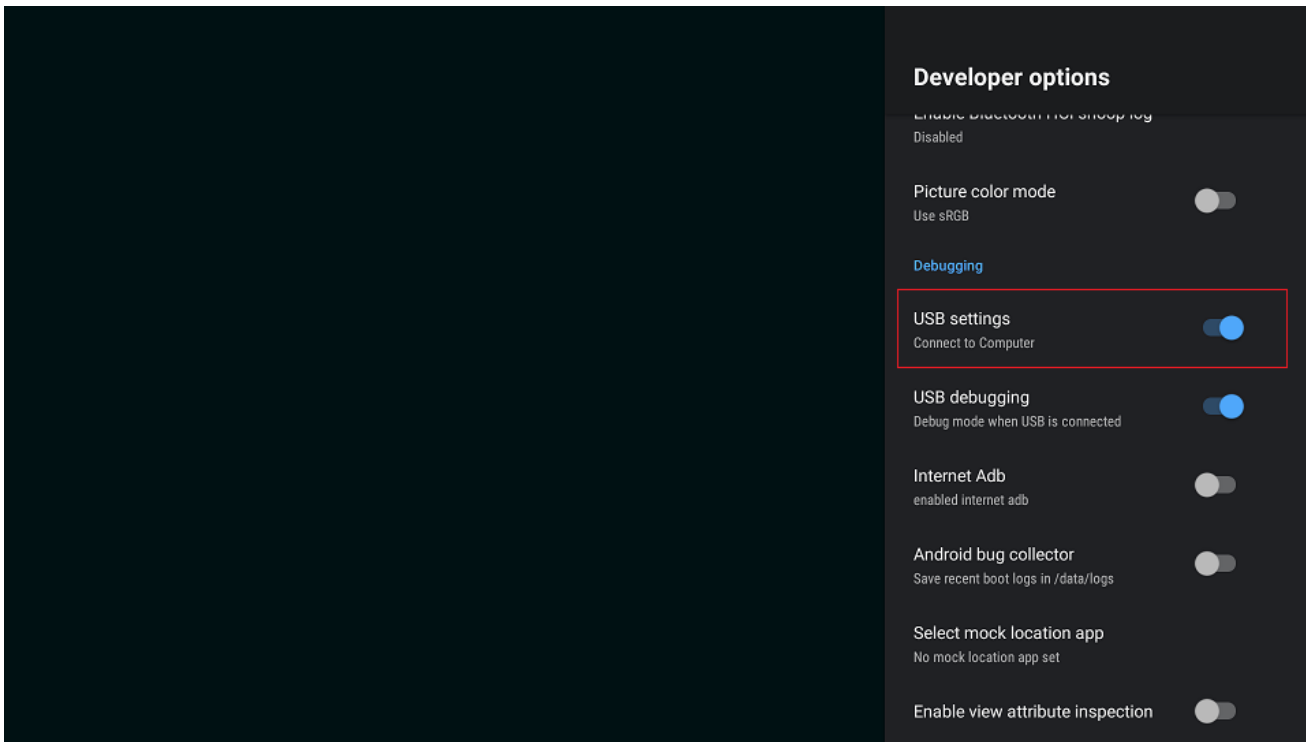
### 1. Tablet variant image

Settings->Connected devices->USB Connect to PC, switch on is peripheral mode and switch off is host mode.



### 2. Box variant image

Go to Settings->Device Preferences->About, tap "Build" seven times to enable "Developer options" preference. Then back to Settings->Device Preferences->Developer options. Switch on is peripheral mode and switch off is host mode.



## Dual Display

## Touch Panel

R2Pro hw design only have one group TP io, CN7, CN8, CN9 are all connect to it, so only one interface Touch Screen can be used at the same time. you can enable or disable it in dtb

```

&i2c1 {
    status = "okay"
}

```

## Custom Android Boot Logo

## IR Custom

## Wlan&BT

CN13 M.2 KEY E Slot is used for connect Wlan&BT adapter, the following WiFi Cards are tested and supported in default image

```

RTL8822CE WIFI/BT (PCIe+USB)
RTL8822BE WIFI/BT (PCIe+USB)
RTL8852BE WIFI/BT (PCIe+USB)
RTL8822CS WIFI/BT (SDIO+UART)
AP6256 WIFI/BT (SDIO+UART)

```

## Install Google Play with Magisk

1. Download Magisk app
2. Download MagiskGapps package
3. Download device id app
4. Copy download apps and package to SDcard and plugin it to Bananapi R2pro.
5. Follow the process in the video to Install Google Play store.

Another way, you can build the android source code with OpenGApps google play include.

1. Download the android source code
2. Apply this patch to enable build OpenGApps

```

diff --git a/device/rockchip/rk356x/bananapi_r2pro/BoardConfig.mk b/device/rockchip/rk356x/bananapi_r2pro/BoardConfig.mk
index 3f17d3c0cc..bd8d1b3213 100755
--- a/device/rockchip/rk356x/bananapi_r2pro/BoardConfig.mk
+++ b/device/rockchip/rk356x/bananapi_r2pro/BoardConfig.mk
@@ -45,7 +45,7 @@ SF_PRIMARY_DISPLAY_ORIENTATION := 0
TARGET_ROCKCHIP_PCBAEST := false
BOARD_HAS_FACTORY_TEST := false

-BOARD_HAVE_OPENGAPPS := false

```

```
+BOARD_HAVE_OPENGAPPS := true  
# increase super partition size for system, system_ext, vendor, product and odm  
# must be a multiple of its block size(65536)
```

3. Create /vendor/opengapps folder
4. Download OpenGApps aosp\_build project to /vendor/opengapps/build
5. Create /vendor/opengapps/sources folder, download OpenGApps projects to /vendor/opengapps/sources/
6. Build the source code and flash the output image.
7. Install device id app and register your device for google play certification, more info please refer to the video above.

## Linux

The below steps is to flash linux release image into BPI-R2PRO

### Prepare

1. Double male USB data cable for image download into EMMC
2. MicroUSB cable or usb to ttl cable if you need debug, default baudrate is 1500000.
3. Windows or Linux PC.
4. Download the Linux Release Image Linux Release Image, and confirm that the md5 checksum is correct before flashing.

Note: The below picture is for BPI-R2PRO's Debug Connecting, the blue usb cable is Double male USB data cable for image download, the white MicroUSB cable is linux serial console, please install CH340E's USB convert serial driver.





### Install Whole Image with Usb Download Tool

## Windows Driver install

1. Download and install Rockchip USB driver

File:Driver install.PNG

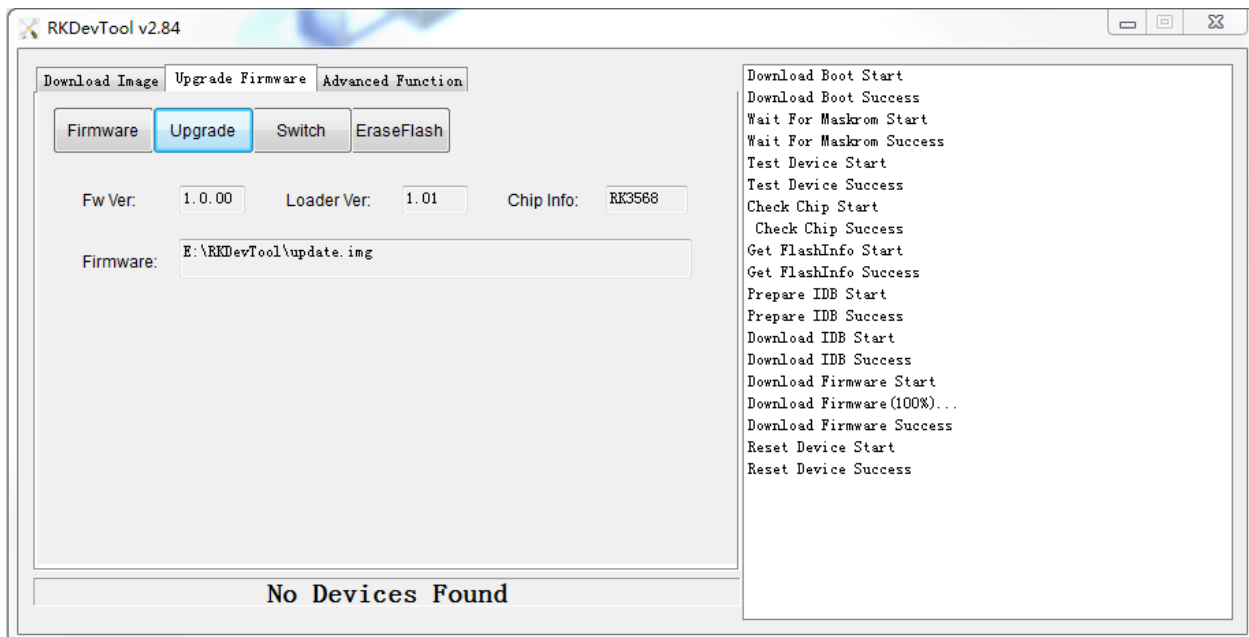
2. Download Rockchip USB Download Tool for EMMC upgrade

This tool defaults language is Chinese. you can change it to English after extract the package. Open RKDevTool\_Release\_v2.84/config.ini with a text editor (like notepad). The starting lines are:

```
#Language Selection: Selected=1(Chinese); Selected=2(English)
[Language]
Kinds=2
Selected=2
LangPath=Language\
```

3. Open RKDevTool.exe, Switch to the “upgrade firmware” page. Press the “firmware” button to open the image file to be upgraded. The upgrade tool displays detailed firmware information.

Note: Because Linux's release image is very large, So you need wait for a long time when Software open and analysis the image file.



4. Disconnect power adapter, connect dual male usb cable from the top usb host port to PC.
5. There have two usb download mode for image upgrade.

- **Uboot Usb Download Mode (loader mode)**

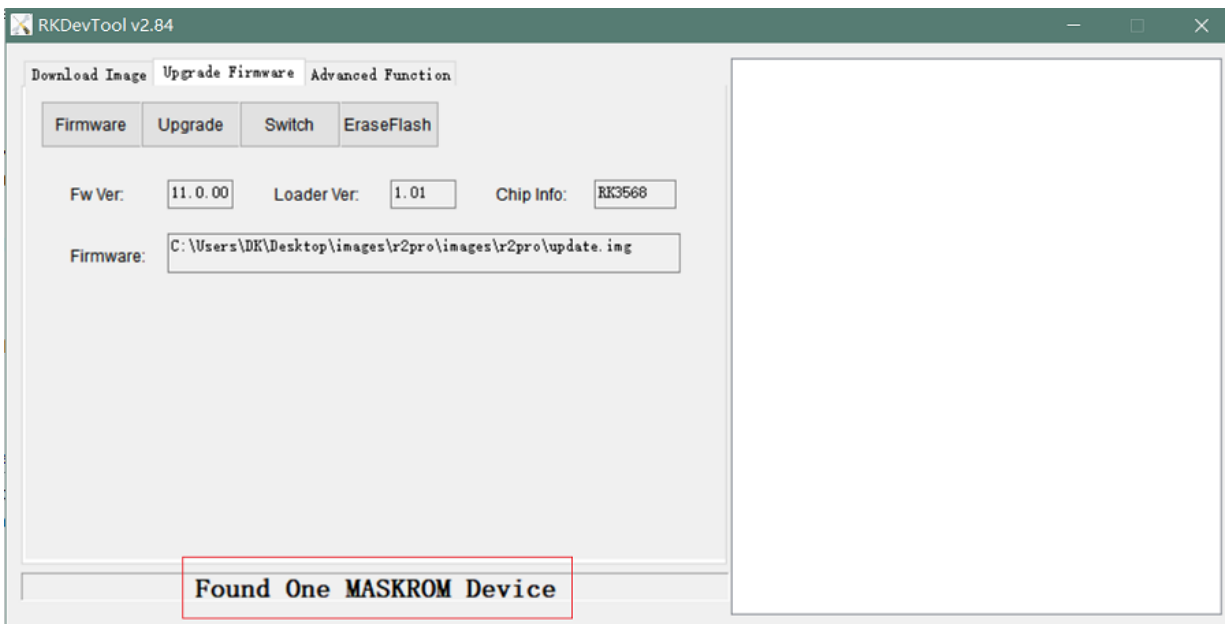
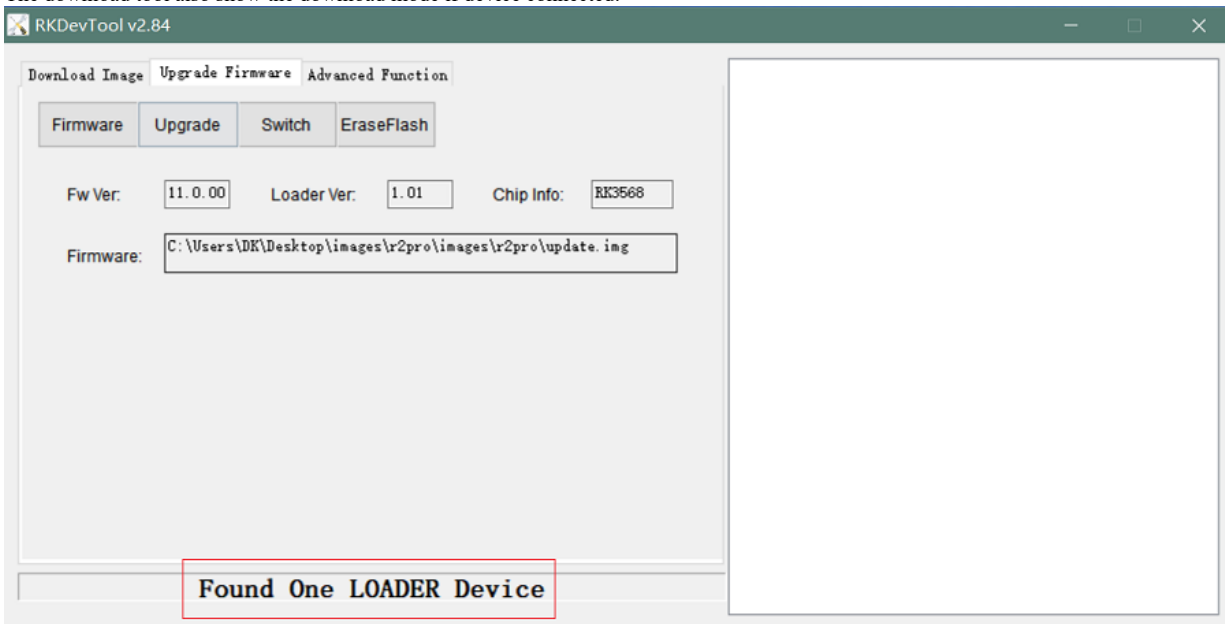
It's supposed to use this way if board already flashed a bootable uboot before.

- **Maskrom Usb Download Mode**

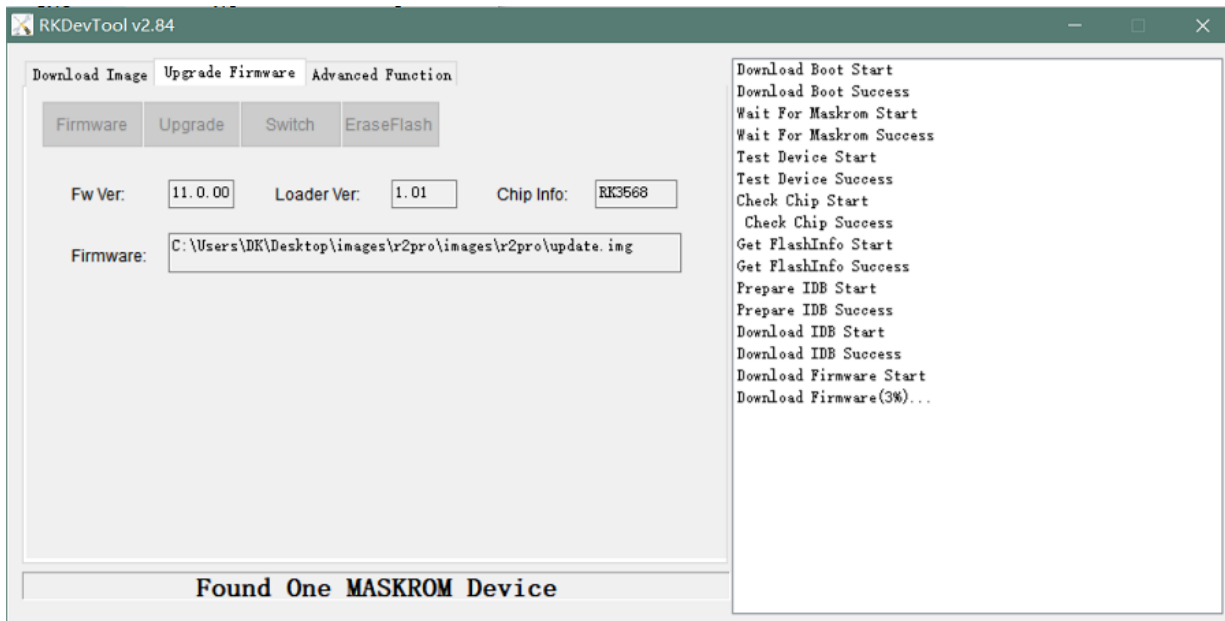
Press the Recovery button or Maskrom button beside 3pin uart header and hold, connect the power adapter or press the RST button if power adapter already connected, about two seconds later, release the button. PC will Identify the device if RK usb driver installed correctly.



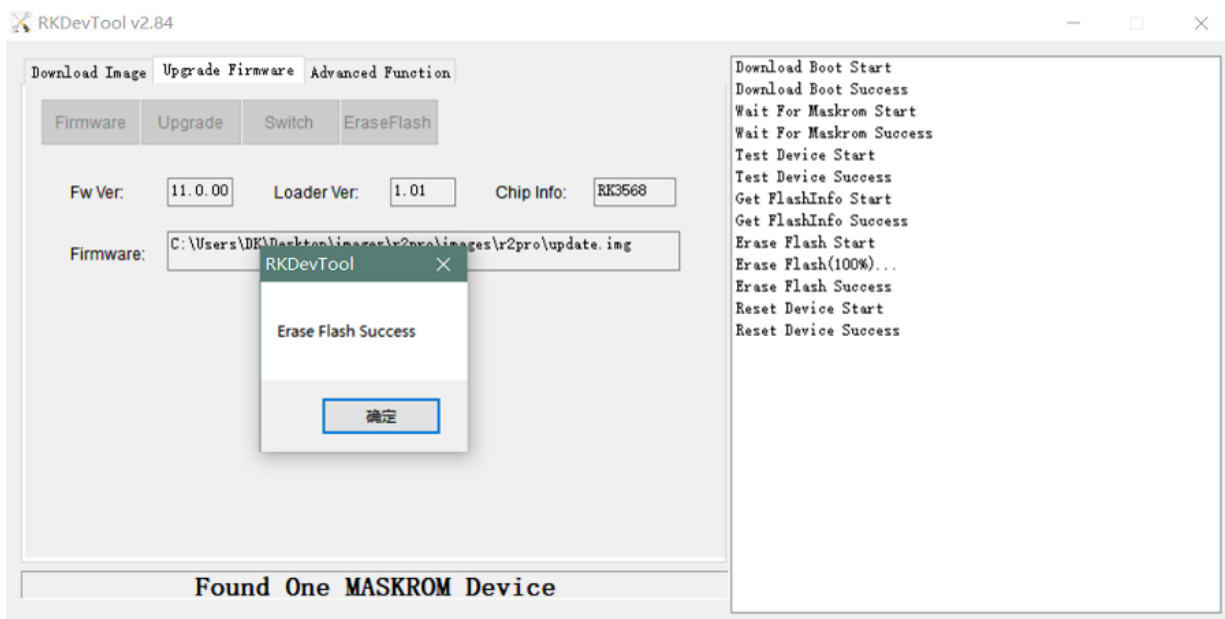
The download tool also show the download mode if device connected.



6. Press the “upgrade” button to start the upgrade.



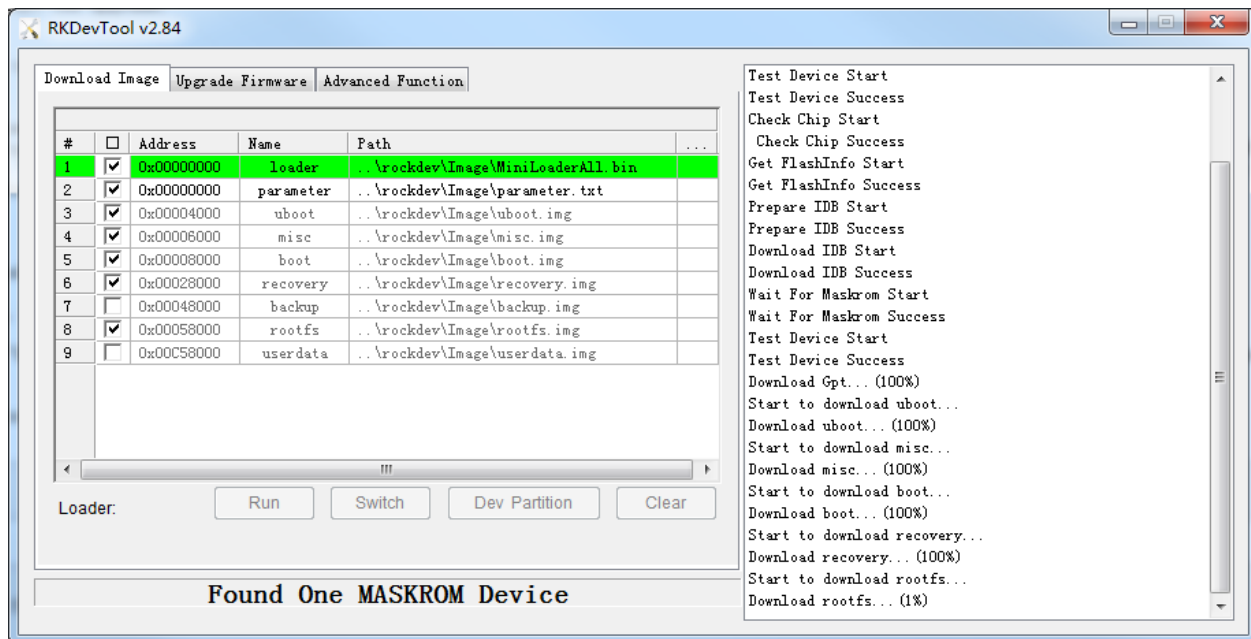
7: If the upgrade fails, you can try to erase the Emmc by pressing the EraseFlash button first, and then upgrade image again.



## Install Separate Images with Usb Download Tool

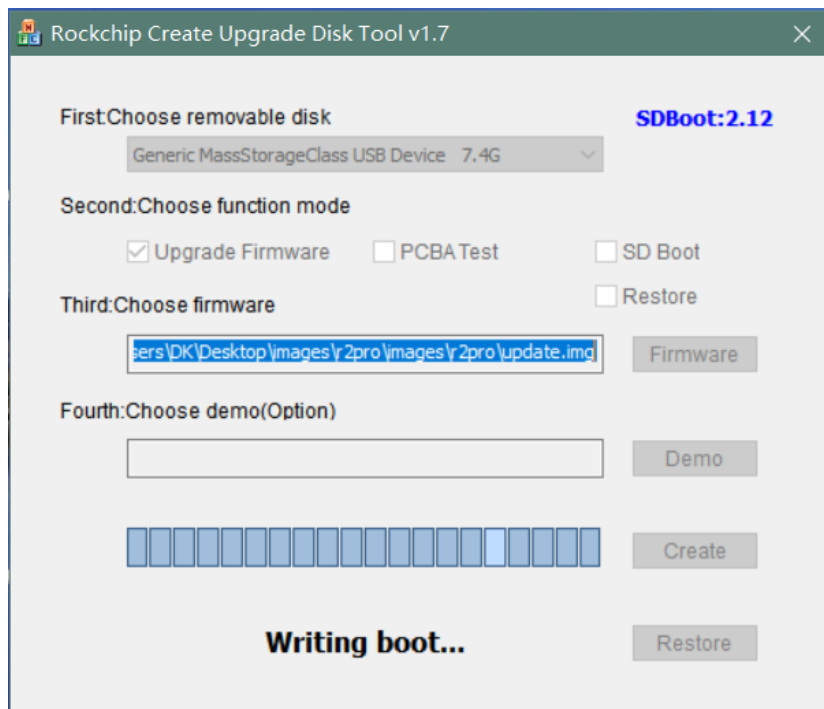
1. Download Rockchip USB Download Tool for EMMC upgrade 2. Open RKDevTool.exe, Switch to the “Download Image” page. The upgrade tool displays detailed all firmware image information. Then all image file is ready, you may push "run", the upgrade process begin.

Note: Because Linux's release package, Example: Ubuntu-22.04-Desktop-EMMCBoot-rockdev-M7531SW-DSA.zip, unzip it into the same folder "Update-EMMC-Tools" inside.



## Install Image with SDcard

1. Download Rockchip SDDiskTool.
2. Insert microSD card to Windows PC, 8GB sdcard size at least.
3. Run SD\_Firmware\_Tool, check the "Upgrade Firmware" box and select the correct removable disk device, Choose firmware image, then Click Create button to make it and wait until it is finished



4. Safely remove the microSD card, insert it into the R2pro board, power on the board, it will start Linux System.

## Build Linux BSP Source Code

1. Get Linux source code

```
$ git clone https://github.com/BPI-SINOVOIP/BPI-R2PRO-BSP.git
```

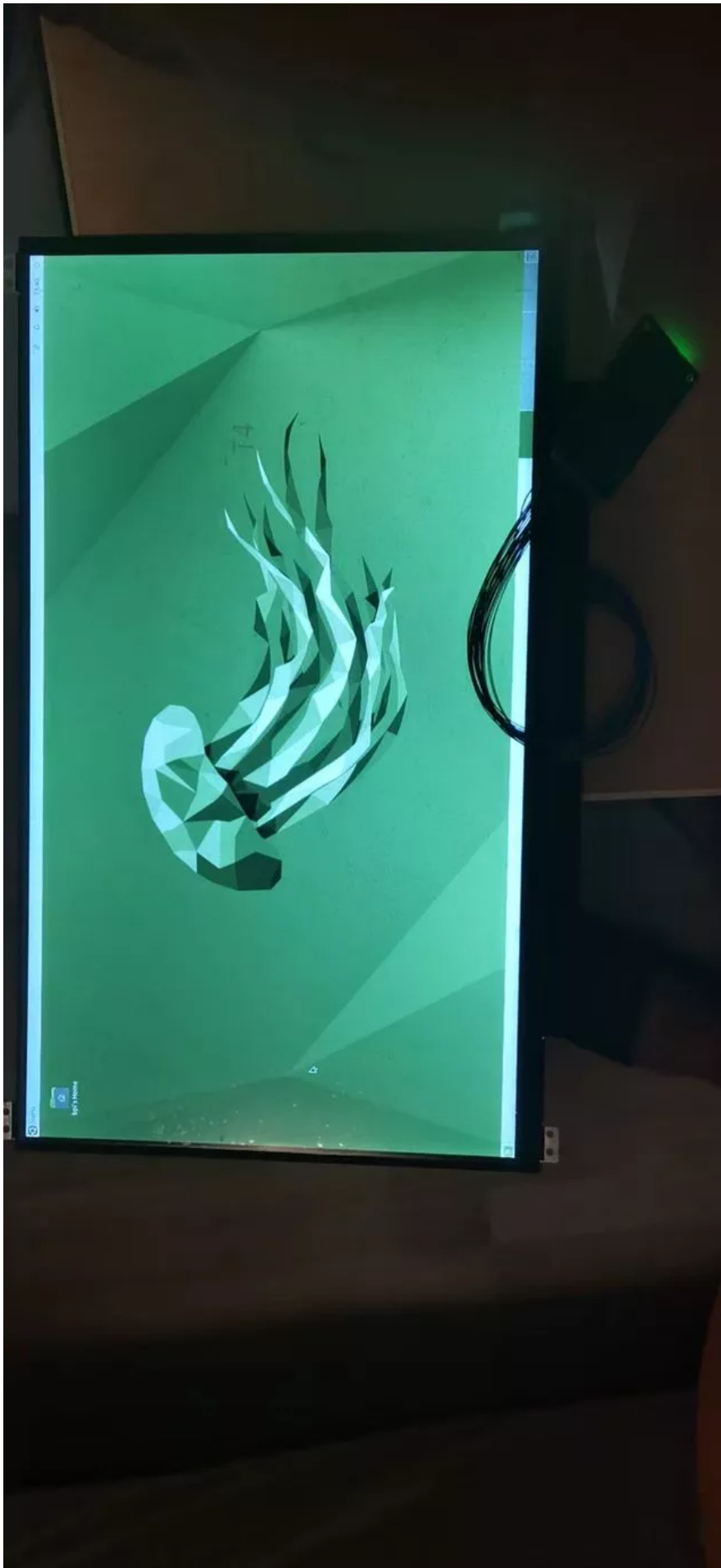
2. Build the Linux BSP Source code

## Dual Display

Note: All linux Image support dual display HDMI and eDP together, eDP only support 1920x1080.  
Note: HDMI Display



Note: eDP panel Display



## Wlan&BT

CN13 M.2 KEY E Slot is used for connect Wlan&BT adapter, default image support RTL8822CE(PCIE+USB) and RTL8822CS(SDIO+UART).