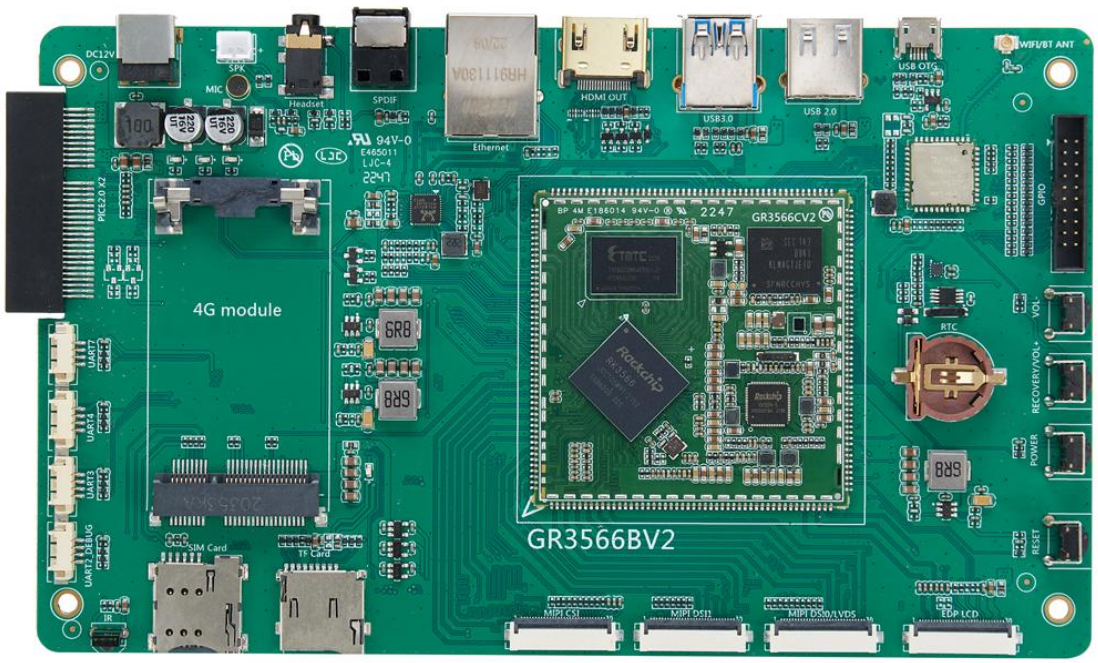
GR3566 Development Board Linux User Manual



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Release Notes

Version	Date	Author	Description
Rev.01	2022-12-08	RXS	Revision

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Catalog

Chapter 1 Build Linux Development Environment

For compile efficiency, we recommend users install Ubuntu OS in PC, not virtual machine. In the development, we use Ubuntu 20.04, 64 bit system. Users can keep the same version as ours.

1.1 Computer Hardware and System Requirements

The SDK development environment is developed and tested on the Ubuntu system. We recommend compiling with Ubuntu 20.04. Other Linux distributions may require corresponding adjustments to the packages.

Hardware Requirements:
64 bit system, the hard disk space is more than 120G. If you do multiple builds, more hard drive space will be required.

Software Requirements:
Ubuntu 20.04 system, Ubuntu official download address:
http://www.ubuntu.com/download/desktop/

1.2 Install Linux Source Code Dependency Package

Note: All development of this document is based on ubuntu 20.04 64-bit system, which will not be declared in the future.

Dependency Package Software and 64-bit system patch packages：

git, ssh, make, gcc, libssl-dev, liblz4-tool, expect, g++, patchelf, chrpath, gawk, texinfo, chrpath, diffstat, binfmt-support, qemu-user-static, live-build, bison, flex, fakeroot, cmake, gcc-multilib, g++-multilib, unzip, bzip2, expat, gpgv2, device-tree-compiler, ncurses-dev, libgucharmap-2-90-dev, cpp-aarch64-linux-gnu, g++-aarch64-linux-gnu

Install the required packages with the command：

sudo apt-get update
sudo apt-get upgrade
sudo apt-get install git ssh make gcc libssl-dev liblz4-tool expect g++ patchelf chrpath gawk texinfo chrpath diffstat binfmt-support qemu-user-static live-build bison flex fakeroot cmake gcc-multilib g++-multilib unzip bzip2 expat gpgv2

device-tree-compiler ncurses-dev libgucharmap-2-90-dev cpp-aarch64-linux-gnu g++-aarch64-linux-gnu

It is recommended to install the above software packages one by one, so that you can find out which installation was failed.

Install JDK Manually：

Detailed steps to manually install jdk8 on Ubuntu:

Step 1: Run the following command:

```
sudo add-apt-repository ppa:openjdk-r/ppa
sudo apt-get update
sudo apt-get install openjdk-8-jdk
```

Step 2: Restart the system

Step 3: Check the current java version

```
root@david:/usr/lib/jvm# java    -version
```

Until now, jdk8 is successfully installed.

1.3 Install Cross Compile Tool

The cross compile tool chain has been integrated into the source package, and no manual installation is required. Cross compile toolchain path: (in Linux source code)

prebuilts/gcc/linux-x86/aarch64

Chapter 2 Compile Linux Source Code Package

GR3566 development board has eMMC on board.

Notice: Take general permission to compile when compling images. When done, new images will be generated: uboot.img, boot.img, update-linux.img, update-ubuntu.img

- uboot.img: bootloader, to guide kernel.
- boot.img: Kernel image, which includes resource image
- update-linux.img: Linux QT file system image
- update-ubuntu.img: Ubuntu system image

2.1 Install Linux Source Code Package

Copy Linux source code packages into user catalogue from cloud which name is: g3566-linux-xxxxxx.tar.gz.xx. Download all files g3566-linux-xxxxxx.tar.gz.xx. Please don't put all files into files system root catalogue, which will happen management permission issue.

Source code unzip example method: execute the following command under user authority:

```
cat g3566-linux-xxxxxx.tar.gz.* | tar -zxvf
```

After the decompression is completed, the g356x-linux folder will be generated. The whole Linux file system will be placed in the g356x-linux directory. Now, the Linux source code packages installation are complete.

Note: The source code package name may be different according to the release date. Please refer to the cloud version.

2.2 Compile Source Code

2.2.1 Choose Compile Items

Please note that when compiling the image, please must use ordinary permissions to compile. Please choose the items need to compile and use the following command:

```
./build.sh BoardConfig-rk3566-evb2-lp4x-v10.mk
```

Notice: Take the above command to compile Linux source code when computer restart every time

2.2.2 One-click Compile Command

After choosing compile items, execute ./build.sh command in Linux source code root directory to compile the full source code. After the compilation is completed, update-linux.img and update-ubuntu.img will be generated in rockdev catalog. update-linux.img is Linux QT system image. update-ubuntu.img is Ubuntu system image.

```
./build.sh
```

2.2.3 Compile uboot

Run the following command in source code root directory, it will auto compile and pack uboot:

```
./build.sh uboot
```

After the compilation is completed, uboot.img will be stored in the uboot directory.

2.2.4 Compile Kernel

Execute the following command in the linux source code root directory to compile and package kernel.

```
./build.sh kernel
```

After the compilation is completed, the boot.img will be generated in kernel catalog.

2.2.5 Compile Buildroot

Execute the following command in the linux source code root directory to compile and package Rootfs.

```
./build.sh rootfs
```

After the compilation is completed, the rootfs.ext4 will be generated in output/rockchip_rk3566/images in buildroot catalog.

2.2.6 Re-package Linux QT and Ubuntu Images

After compiling the whole source code using one-click compile command and modify, compile uboot or kernel, users can take the package command to re-package the complete update image.

```
./build.sh updateimg
```

Executing the command will package the modified uboot.bin or boot.img into the update-linux.img and update-ubuntu.img images.

2.2.7 Compile Debian Image

1. Building base Debian system

```
cd debian
```

```
sudo apt-get install binfmt-support qemu-user-static live-build
sudo dpkg -i debian/ubuntu-build-service/packages/*
sudo apt-get install -f
cd -
```

2. Compile Debian Image

```
./build.sh debian
```

After compilation, in debian/ catalog, it will generate: linaro-bullseye-alip-xxxxx-1.tar.gz (xxxxx is the build date)

3. Package Debian Update Image

```
./build.sh updateimg
```

Execute the command, update-linux.img which was generated in rockdev catalog is the update image in Debian.

FAQ:

If you have the following questions during compile:

```
noexec or nodev issue /usr/share/debootstrap/functions: line 1450:
..../rootfs/ubuntu-build-service/bullseye-desktop-arm64/chroot/test-dev-null:
Permission denied E: Cannot install into target '/rootfs/ubuntu-build-
service/bullseye-desktop-arm64/chroot' mounted with noexec or nodev
```

How to solve:

```
mount -o remount,exec,dev xxx yyy
(其中xxx 是工程目录路径，yyy是挂载，点然后重新编译)
```

The xxx is the source code root directory, yyy is mount point. Recompile it.

Chapter 3 Program Linux QT and Ubuntu Images

3.1 Upgrade Firmware in Ubuntu Environment

Upgrading the firmware in the Ubuntu environment refers to upgrading the GR356 firmware through corresponding commands when the PC is Ubuntu system.

How to do it:

1. Connect the power adapter to the GR3566 board
2. Connect the micro usb cable to the PC
3. Connect the serial cable to connect to the PC
4. Open the serial port terminal and the command line terminal on the PC
5. Power on the GR3566 board. The board will boot.
6. Hold down the vol+/recovery keys of the board at the same time, and press the reset key to make the board into upgrade mode.
7. In PC command line terminal, do the following:

sudo ./upgrade_tool uf update-linux.img (Update the whole Linux image)

Since update-ubuntu.img is big, please use AndroidTool to update it in windows OS.

Or update uboot, boot and other firmware separately.

```
sudo ./upgrade_tool di uboot uboot.img
sudo ./upgrade_tool di -b boot.img
sudo ./upgrade_tool di -recovery recovery.img
sudo ./upgrade_tool di -p paramater.txt
sudo ./upgrade_tool di -rootfs rootfs.img
```

Note:
According to the above compilation introduction, the corresponding images will be generated in rockdev catalog. Ubuntu download tools are in tools/linux/Linux_Upgrade_Tool catalog.

3.2 Upgrade Firmware in Windows

3.2.1 Install RK USB Driver

Steps:

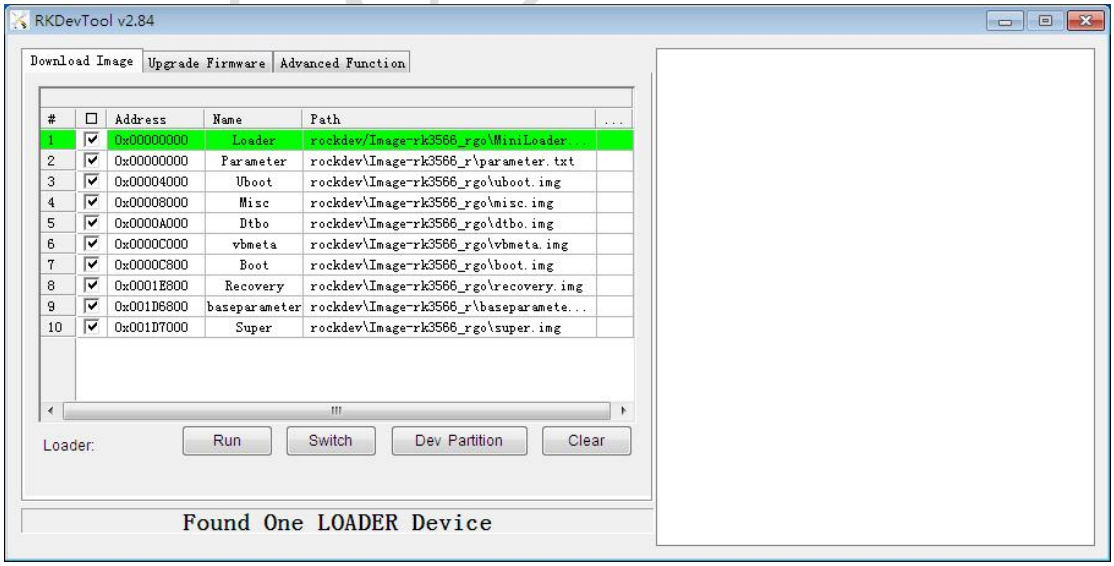
1. Run DriverInstall.exe in DriverAssitant_v5.1.2 to install drivers.

Notice:

1) Supports xp, win7_32, win7_64, win8_32, win8_64, win10_32, win10_64 OS.
2) If old version was installed before, uninstall the old one and install new one.
3) In XP OS, after the driver is installed, it will hint that a new device is found when connect to Rockchip ADB device. When install driver, choose install automatically. The installation will be done successfully.

3.2.2 Connect Device

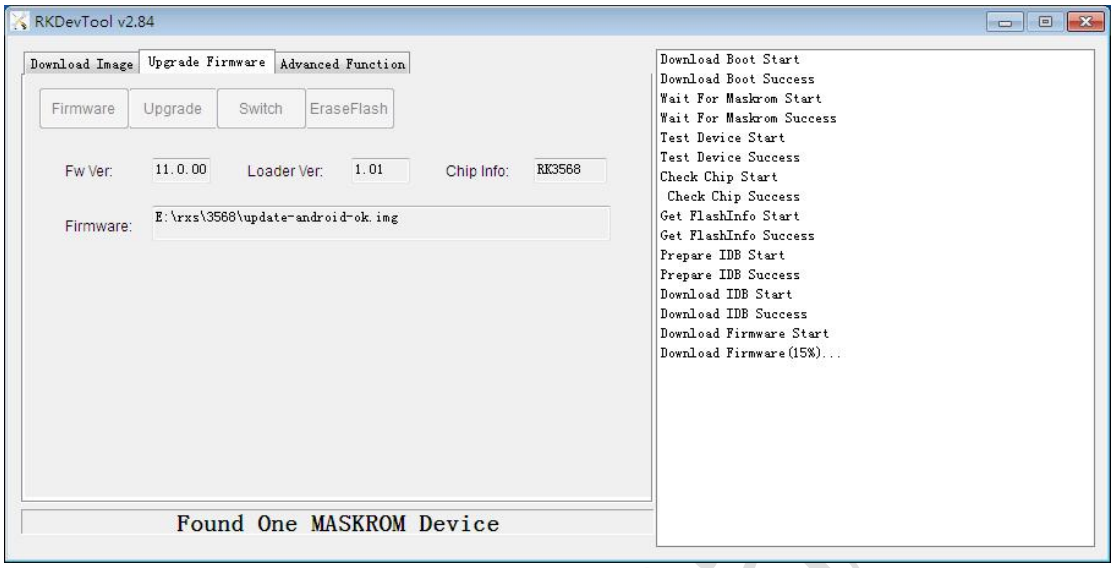
Run RKDevTool.exe in RKDevTool folder. It will show as the following picture:



1) When there are no firmwares(images) in eMMC of the development board or

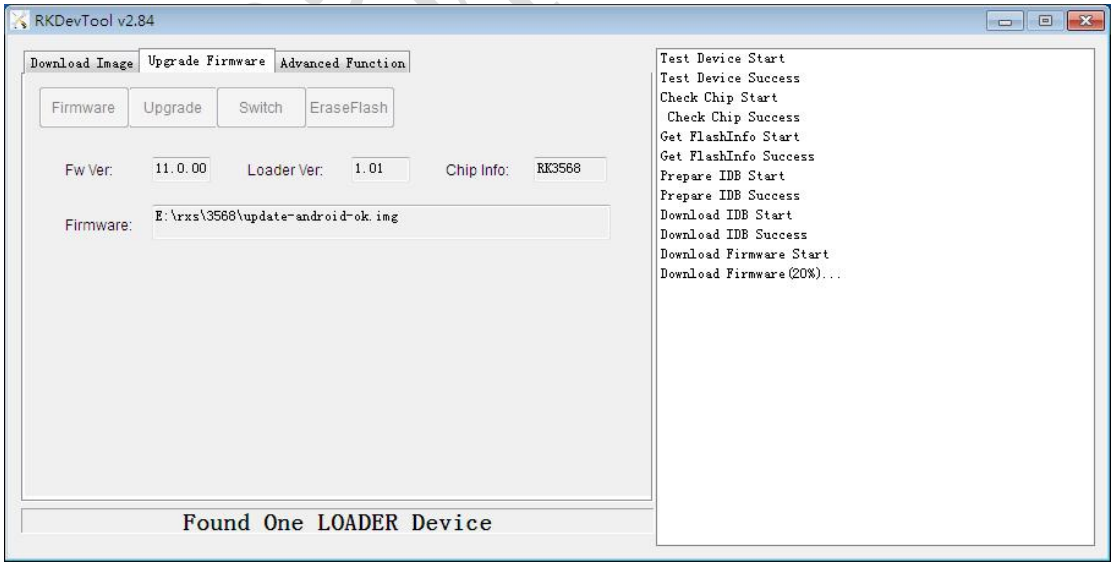
system on module

Connect development board and PC(with windows OS) by micro usb cable. Power on the board. It will enter into MASKROM mode, waiting to be updated. like the followings pic.



2) When there are firmwares(images) in eMMC of the development board or system on module

Connect power adapter to development board, power on. Connect development board and PC(with windows OS) by micro usb cable. Hold down vol+/recovery key, then press reset key to reboot the board. Release vol+/recovery key about 5 seconds. The board will enter LOADER mode, waiting to burn and update, like the following pic.

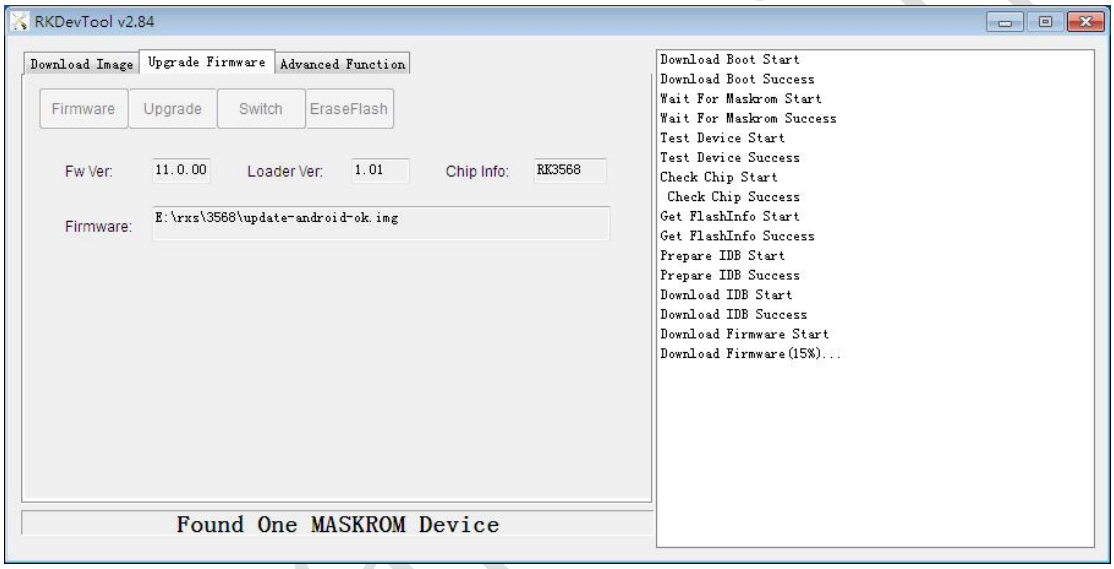


3.2.3 Upgrade Firmware by RKDevTool

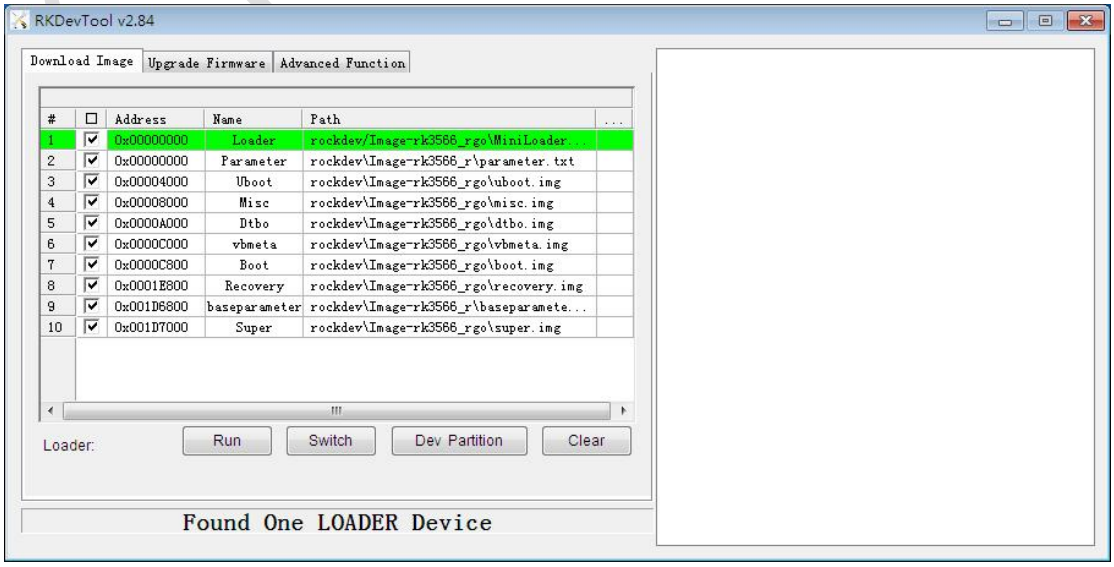
After installation of the above steps, firmwares can be update as needed. Users can choose update each firmware separately, like uboot, boot, rootfs and so on. Or update the whole image update-linux.img or update-ubuntu.img.

Run RKDevTool.exe in RKDevTool folder.

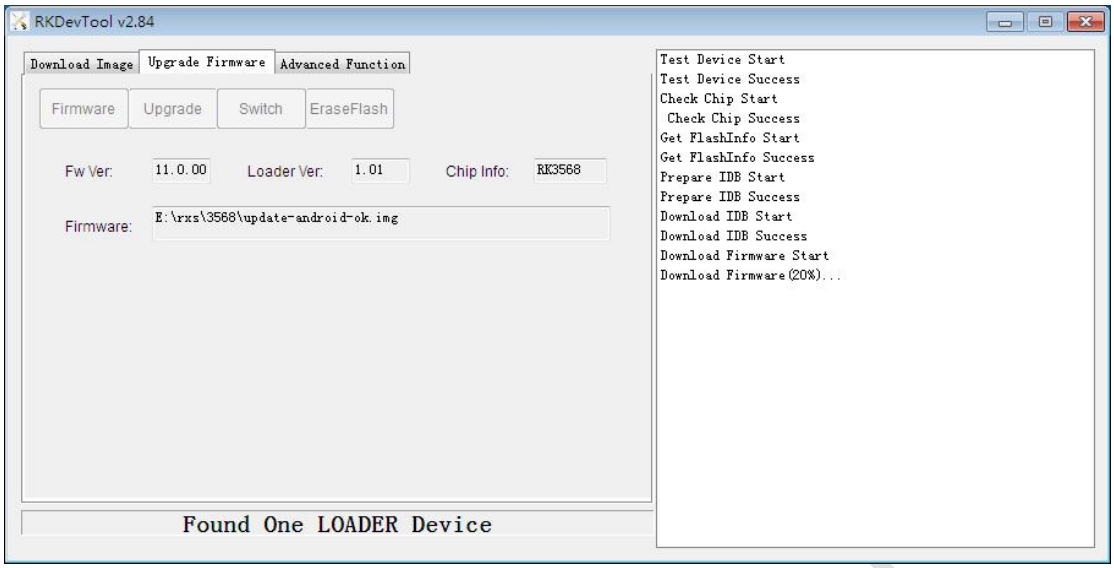
MASKROM mode:
When update for the first time in Maskrom mode, it needs to update the whole image update-linux.img or update-ubuntu.img. Choose update-linux.img or update-ubuntu.img, click upgrade.



LOADER mode(board has images)
update each firmware separately: select the firmwares needed to be updated, click run.



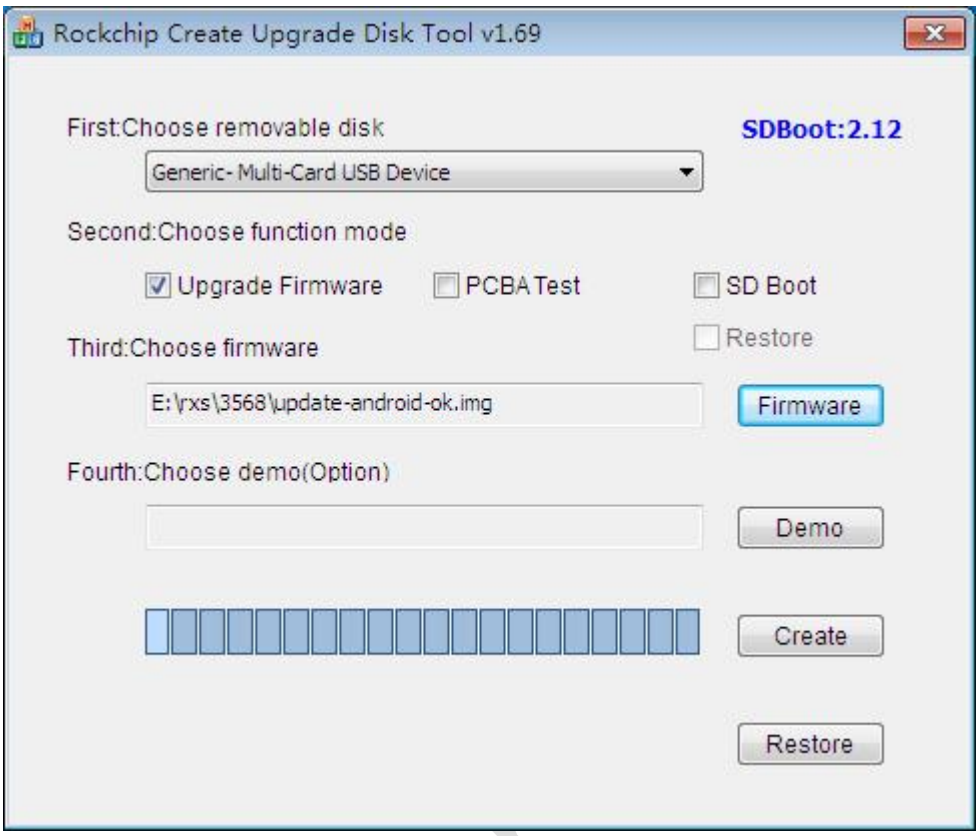
Or update the whole image update-linux.img or update-ubuntu.img. Choose update-linux.img or update-ubuntu.img, click upgrade.



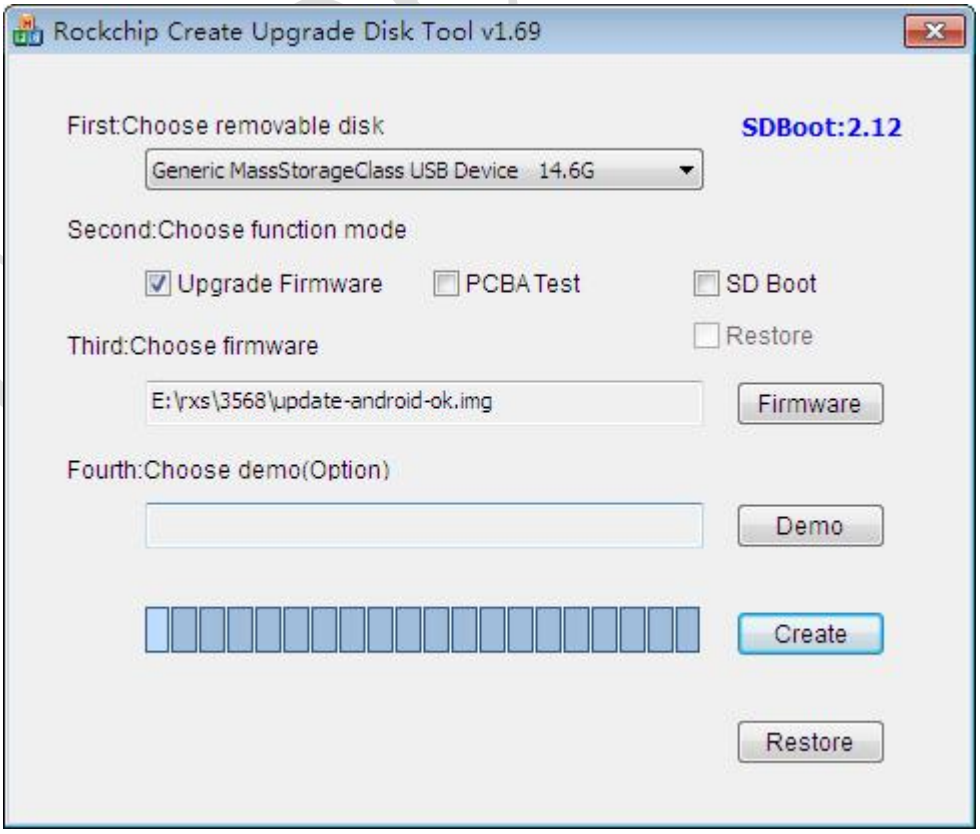
3.3 TF Card Offline Update Firmware

SD Card Boot means when the board is powered on, it will search boot code from SD card in priority, then guide bootloader. SD Card Boot has two functions now: SD card update and SD card running. The following steps describe SD card update.

Tools: SD_Firmware_Tool.exe
Process:
1) Run SD_Firmware_Tool.exe in PC,as following pic:

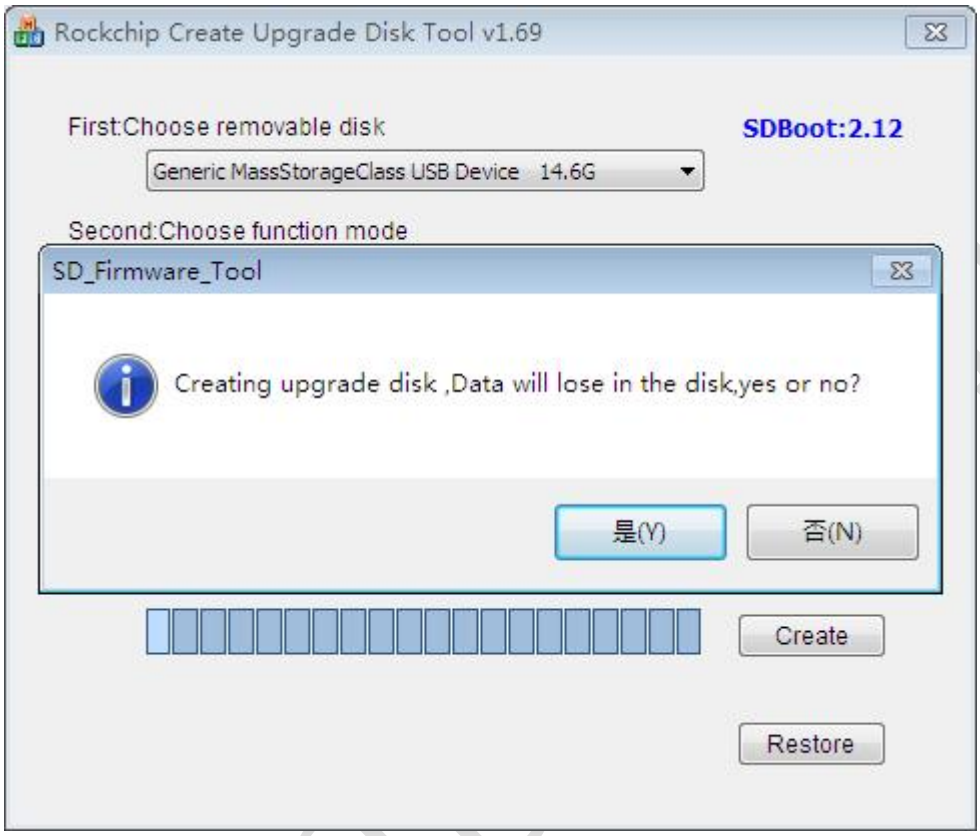


2) Put TF card in card reader, connect to PC. It will detect TF card, as pic down below:

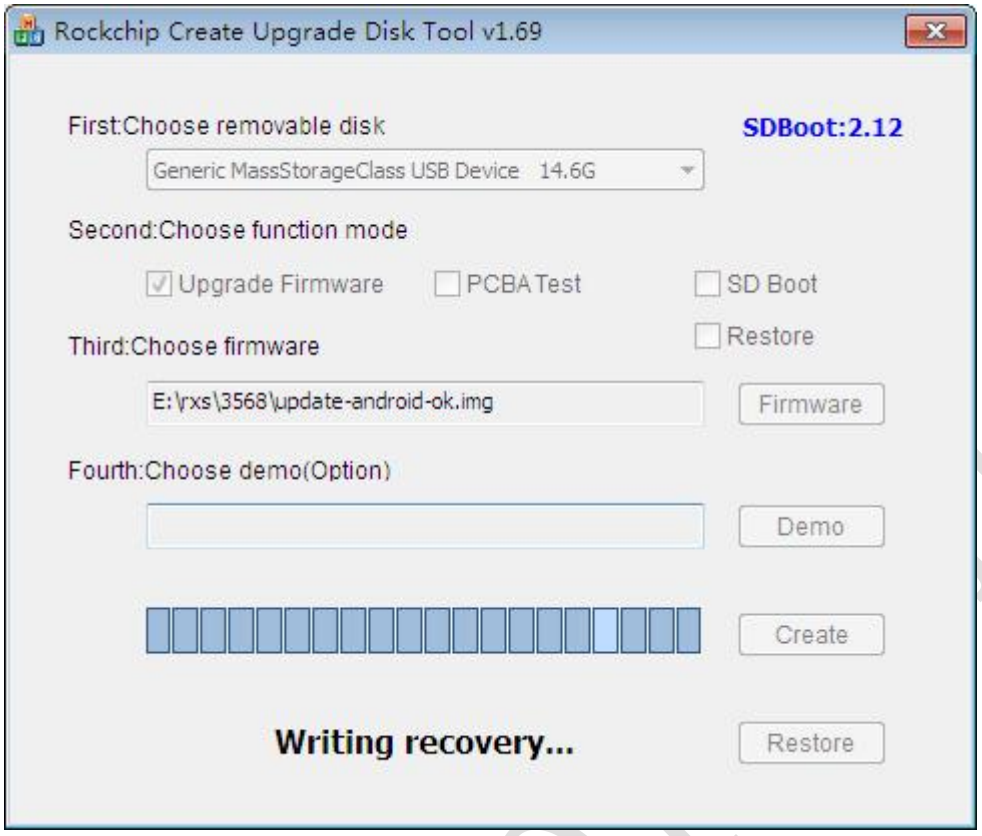


3) Choose *Upgrade Firmware* in Choose function mode. Choose the firmware needs to be updated(Here it means packaged update-linux.img)

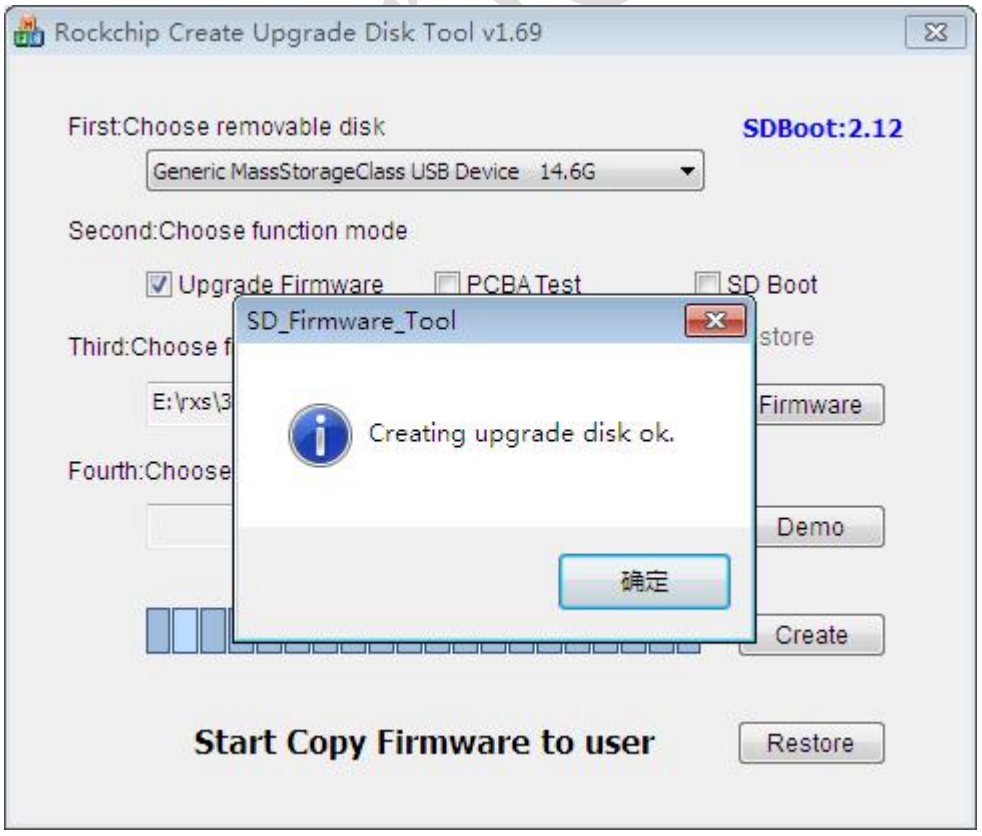
4) Click create to start upgrading. When click create, it will pop out a dialog and ask if it needs to format TF card. Choose Yes, start to upgrade.



Upgrading:



5) Upgrade done.



6) Pull out the successfully burned TF card, insert it into the development board, then power on the development board. It will upgrade automatically. After the upgrade, the following message will be print.

```
[      35.025659] IDBlockWriteData 1040 1 ret= 0
[      35.025663] IDBlockWriteData 1001 26b ddd01200
[      35.289755] IDBlockWriteData 1041 26b ret= 0
[      35.289759] IDBlockWriteData 1000 1 ddd01000
[      35.290141] IDBlockWriteData 1040 1 ret= 0
[      35.290147] IdBlockReadData 1000 26c dde80000
[      35.360082] IdBlockReadData 1040 26c ret= 0
[      35.360326] return ret = 0
```

If the development board is connected to the LCD, you can see the progress bar in the LCD. After the progress bar is finished, several lines of string messages will be displayed at the bottom of the LCD.

7) Power off, pull out the TF card, power on again, you can see the upgrade is complete.

Chapter 4 Product Portfolio

4.1 System on Module Series

G4418 System on Module (Samsung 4418)
G6818 System on Module (Samsung 6818)
G3288 System on Module(Rockchip RK3288 Stamp Hole Version)
GR3288 System on Module(Rockchip RK3288 Gold Finger Version)
G3399 System on Module (Rockchip RK3399 Stamp Hole Version)
GR3399 System on Module (Rockchip RK3399 Gold Finger Version)
G3566 System on Module (Rockchip RK3566)
G3568 System on Module (Rockchip RK3568)
G30 System on Module (Rockchip PX30)
M9 SOM(Qualcomm 8916, 8953)

4.2 Development Board Series

G4418 development board (Samsung S5P4418)
G6818 development board (Samsung S5P6818)
G3288 development board (Rockchip RK3288 stamp hole)
GR3288 development board (Rockchip RK3288 Immersion Gold MXM)
G3399 development board (Rockchip RK3399 stamp hole)
GR3399 development board (Rockchip RK3399 Immersion Gold MXM)
G3566 development board (Rockchip RK3566 stamp hole)
G3568 development board (Rockchip RK3568 stamp hole)
M9 development board(Qualcomm 8916, 8953)

4.3 Single Board Computer (SBC) Series

G4418 single board computer (Samsung S5P4418)
G6818 single board computer (Samsung S5P6818)
G3128 single board computer (Rockchip RK3128)
G3399 single board computer (Rockchip RK3399)

Instructions: More information of specifications and other products, please pay attention to website or contact us directly.
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