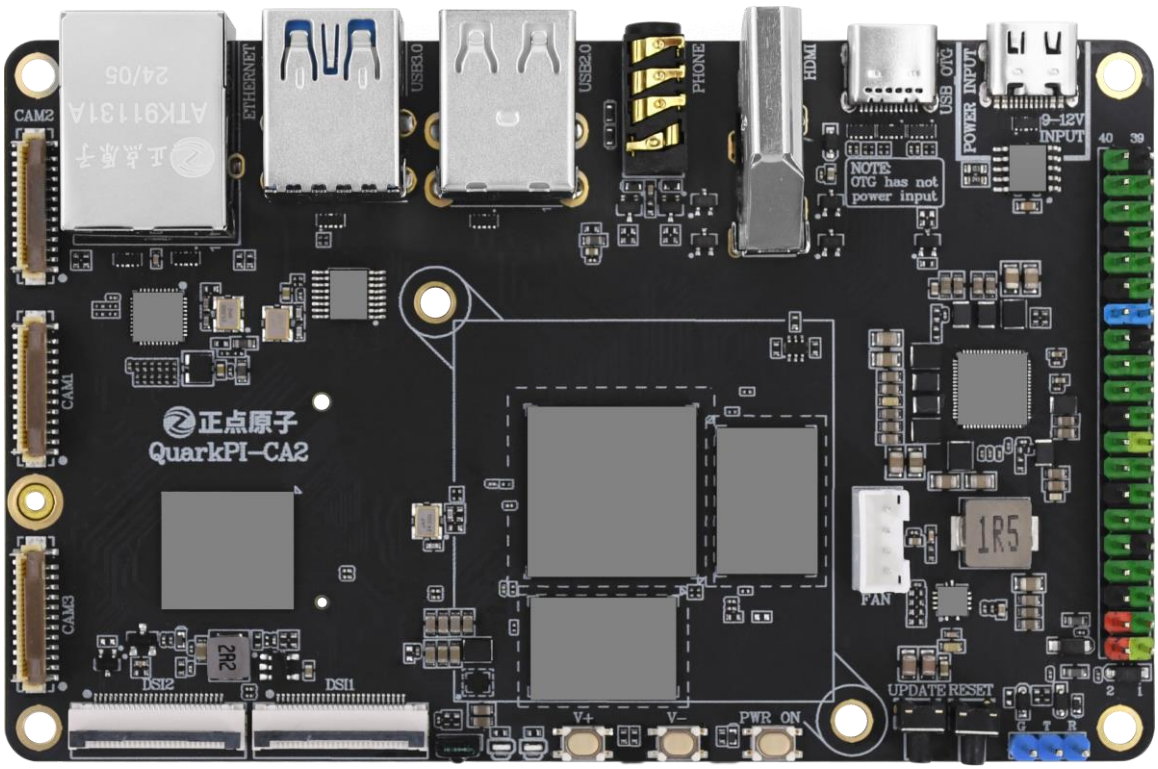
QuarkPi-CA2

Factory Image Flashing manual

V1.0



ALIENTEK

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Disclaimer

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In order to get the latest version of product information, please regularly visit the download center or contact the customer service of Taobao ALIENTEK flagship store. Thank you for your tolerance and support.

Revision History:

Version	Version Update Notes	Responsible person	Proofreading	Date
V1.0	release officially	ALIENTEK	ALIENTEK	2025.03.07

Catalogue

Chapter 1. Installing RKDevTool on Windows

First, install the burning tool RKDevTool. This tool is a Windows-based burning software provided by Rockchip.

1.1 Installing Rockchip USB Driver

Locate the Rockchip USB driver installation package from the downloaded online disk materials. The path is: Development Board CD-ROM A Drive - Basic Materials -> 04_tools -> RKTools -> Windows -> DriverAssitant_v5.12.zip. It supports operating systems such as XP, Win7_32, Win7_64, Win10_32, and Win10_64; Decompress the DriverAssitant_v5.12.zip file. After successful decompression, it will look like the following picture:

Figure 1.1-1 The contents after extracting DriverAssistant_v5.12.zip

Simply double-click the DriverInstall.exe file and follow the steps shown in Figures 1.1.2 to 1.1.4 to install the Rockchip USB driver:

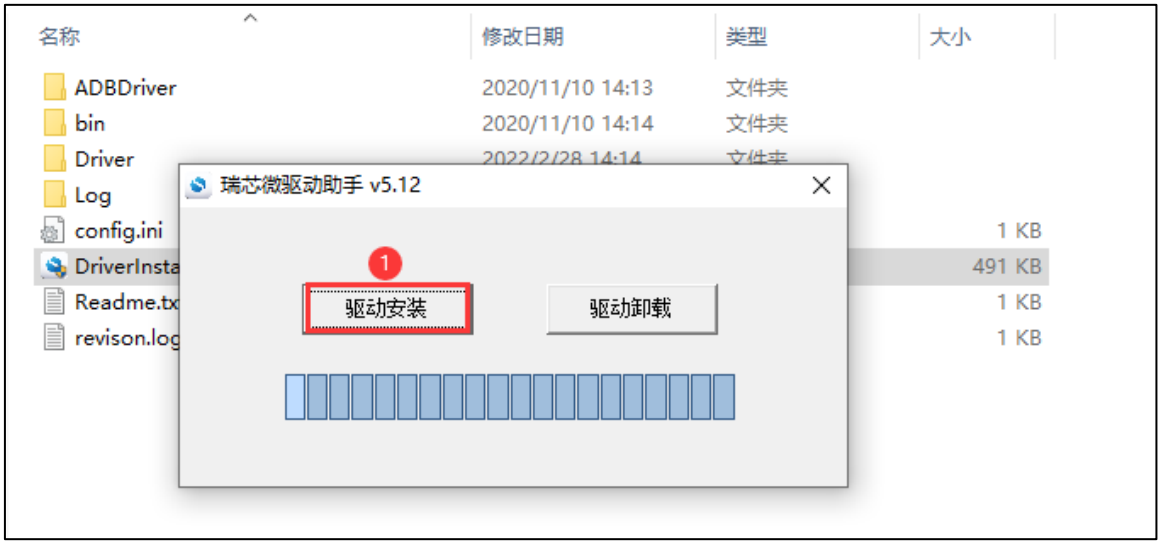

Figure 1.1-2 Install Rockchip USB driver (1)

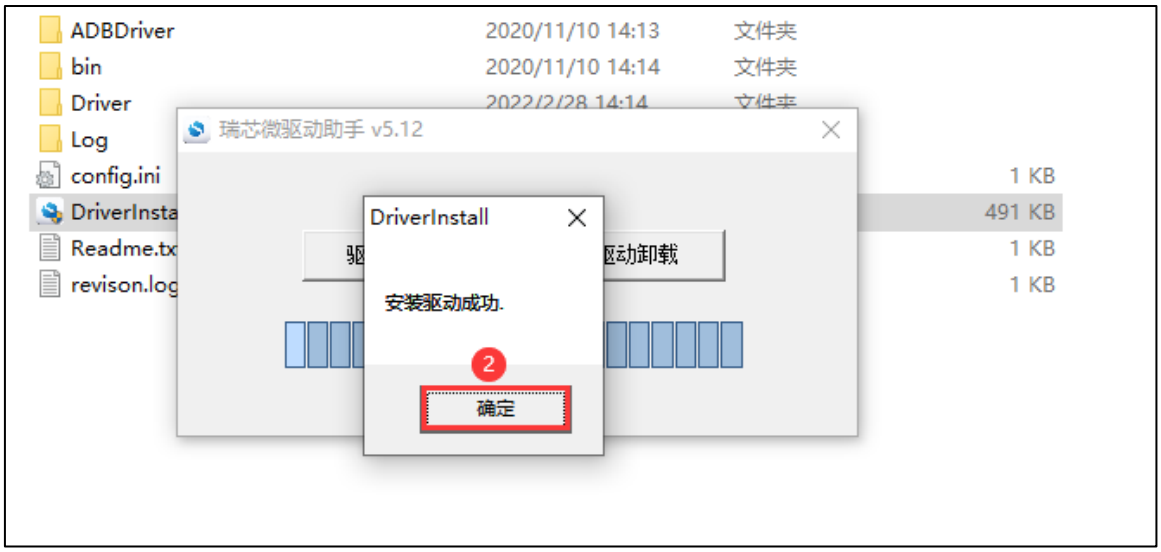

Figure 1.1-3 Install Rockchip USB driver (2)

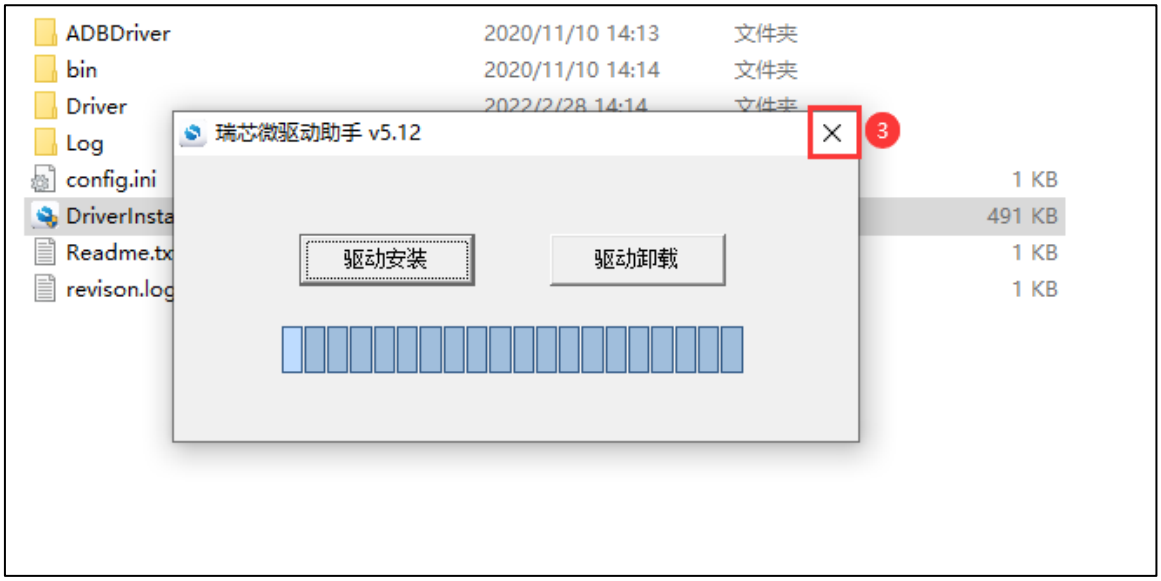

Figure 1.1-4 Install Rockchip USB driver (3)

At this point, the Rockchip USB driver installation is complete!

1.2 Install the RKDevTool tool

Find the RKDevTool tool from the downloaded online disk materials. Its path is: Development board optical disc A drive - Basic materials -> 04_tools -> RKTools -> Windows -> RKDevTool_Release_v2.92.zip. Unzip the RKDevTool_Release_v2.92.zip file, and after unzipping, a folder named "RKDevTool_Release_v2.92" will be obtained. The content of this folder is as shown in the following picture:

Figure 1.2-1 The contents of the "RKDevTool_Release_v2.92" folder

Double-click the RKDevTool.exe executable file in this directory to open RKDevTool (Rockchip Microchip Development Tool), as shown in the following picture:

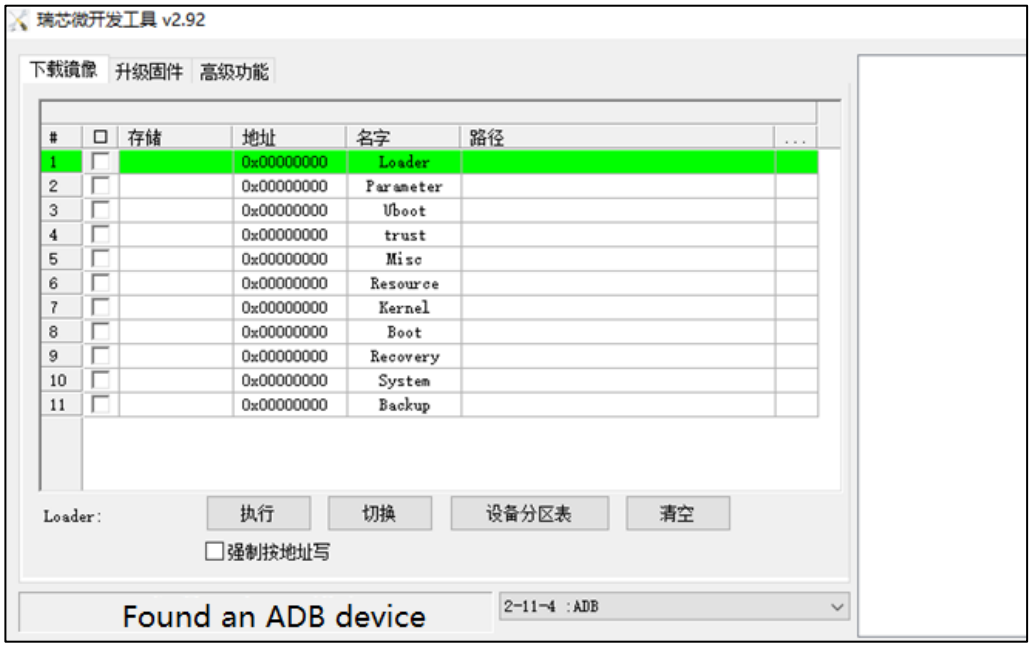

Figure 1.2-2 Rockchip Development Tools Interface

Chapter 2. Hardware Connections of the Card Computer

This chapter introduces the hardware connections of the QuarkPi-CA2 card computer.

2.1 Hardware Connection of Card Computer

Prepare the QuarkPi-CA2 card computer, power adapter, two USB cables, and a USB-to-serial module (you need to prepare the USB-to-serial module yourself). Insert the power adapter into the TYPE-C PD power interface of the development board; connect the TYPE-C0 interface of the development board to our computer via a USB cable, then connect the debugging serial port pin of the card computer to the USB-to-serial module and to the computer.

The schematic diagram of the hardware connection of the development board is as follows:

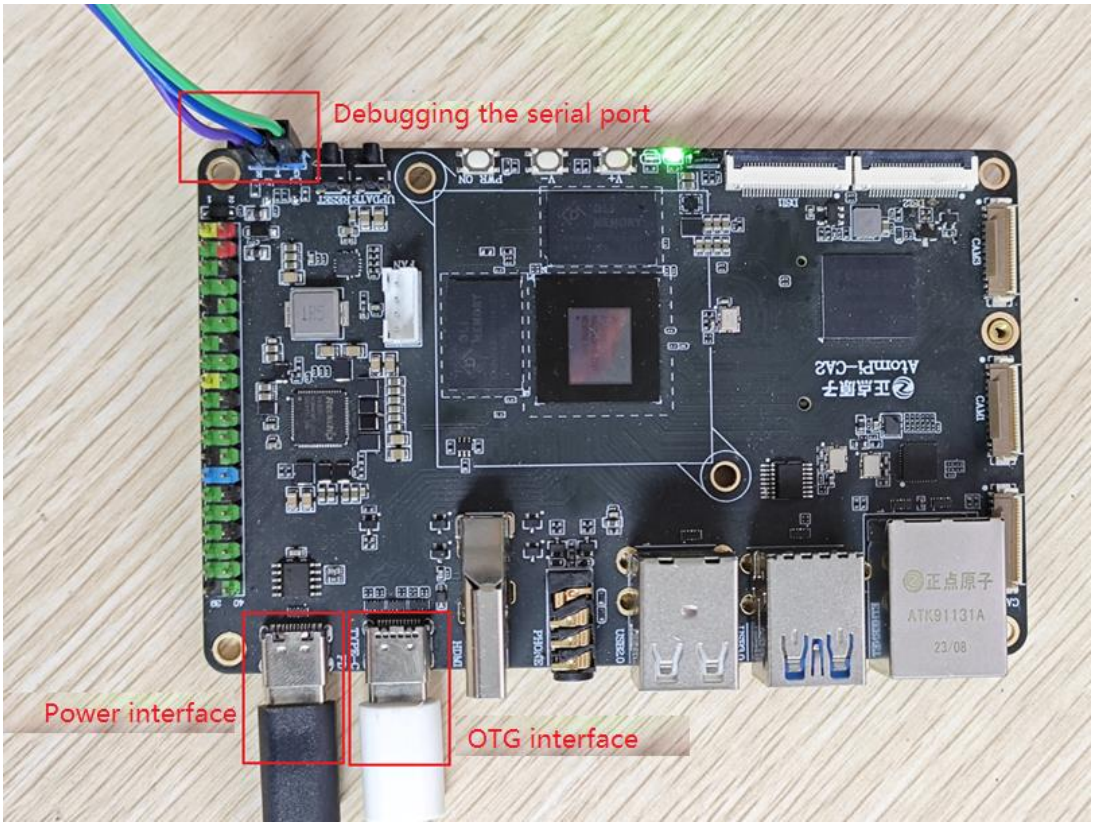

Figure 2.1-1 Hardware connection diagram of the development board

Chapter 3. How the Development Board Enters the Programming Mode

There are two types of programming modes: Loader mode and Maskrom mode.

If the development board has been programmed with firmware, it can enter either the Loader mode or the Maskrom mode; if the development board has not been programmed with firmware, or the firmware has been erased or damaged, then it can only enter the Maskrom mode. We usually program in the Loader mode.

3.1 Method to Enter Loader Mode

Connect the power adapter and programming cable to the development board. Press and hold the V+ (volume+) button on the development board, then power on or reset the board. At this point, the programming tool will prompt: A LOADER device has been detected, indicating that the development board is now in Loader mode. Then release the V+ button. As shown in the following figure:

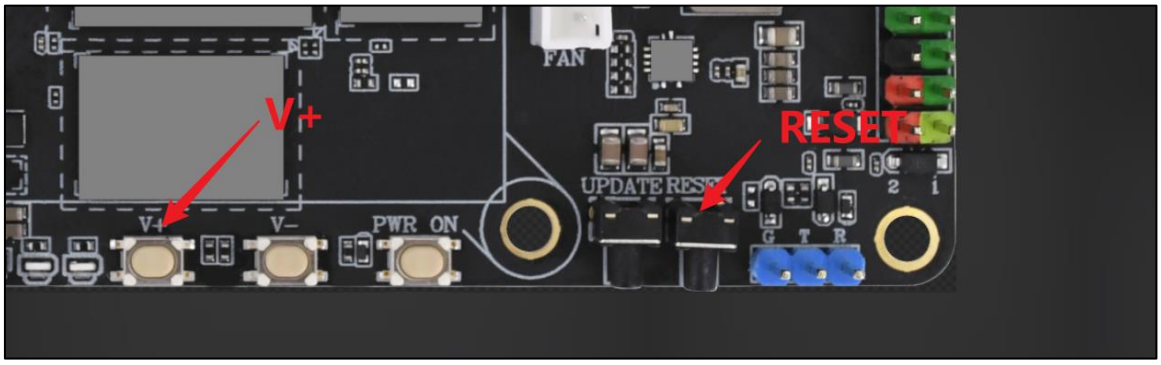

Figure 3.1-1 The "V+" button and the "RESET" button

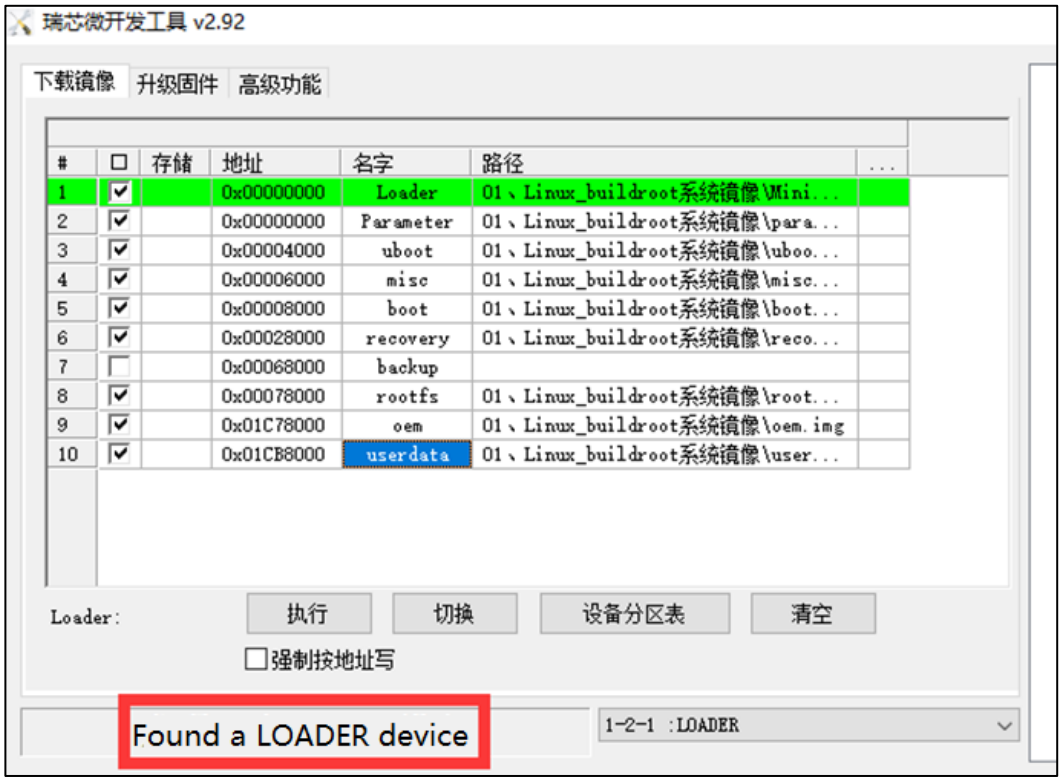

Figure 3.1-2 Enter Loader Mode

3.2 Method to Enter Maskrom Mode

Connect the power adapter and programming cable to the development board. Press and hold the UPDATE button on the development board (as shown in Figure 3.2.1) without releasing it. Power on or reset the development board. At this time, the programming tool will prompt: A MASKROM device has been detected, indicating that the development board is now in Maskrom mode. Then release the UPDATE button. As shown in the following figure:

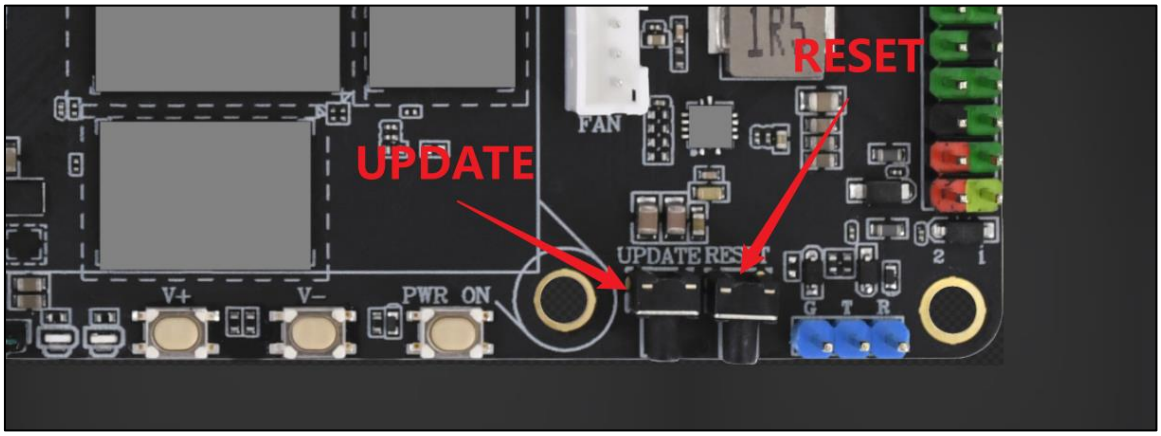

Figure 3.2-1 UPDATE button and RESET button

Figure 3.2-2 Enter Maskrom mode

3.3 Failure Resolution Methods

① If entering the Loader mode fails, please confirm whether the development board has been burned with firmware (the firmware has not been erased).

② Check if the Rockchip USB driver is installed. You can also try uninstalling and reinstalling it.

③ You can try re-plugging the USB burning cable or changing the USB port of the computer.

Chapter 4. Burning the Linux buildroot system image

First, read Chapter 1 and Chapter 2, install the burning tool RKDevTool, and complete the hardware connection of the development board.

4.1 Burn the Linux buildroot system image

The development board data disk provides users with the compiled Linux buildroot system image. The path is: Development board optical disc A drive -> Basic data -> 07_System_images -> 02, Buildroot Linux system image. As shown below:

Figure 4.1-1 Buildroot Linux system image

4.1.1 Linux Buildroot image

Go to the installation directory of the RKDevTool tool (that is, the directory where the RKDevTool.exe executable file is located), and then open the burning tool RKDevTool as shown below:

Figure 4.1-2 Rockchip development tools

Import the configuration file following the operation steps shown in Figures 4.1.3 to 4.1.5:

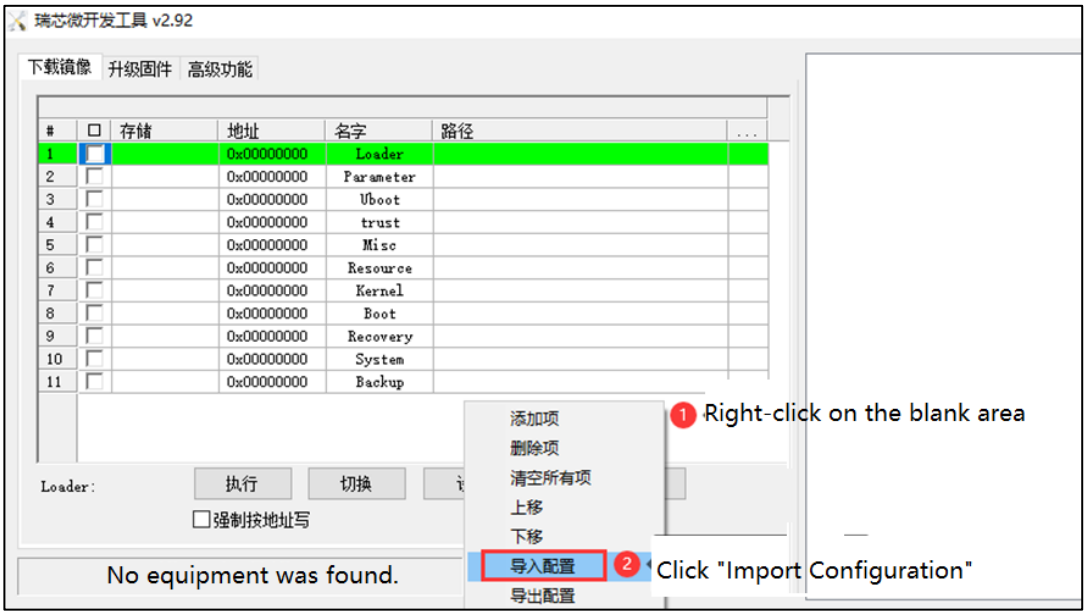

Figure 4.1-3

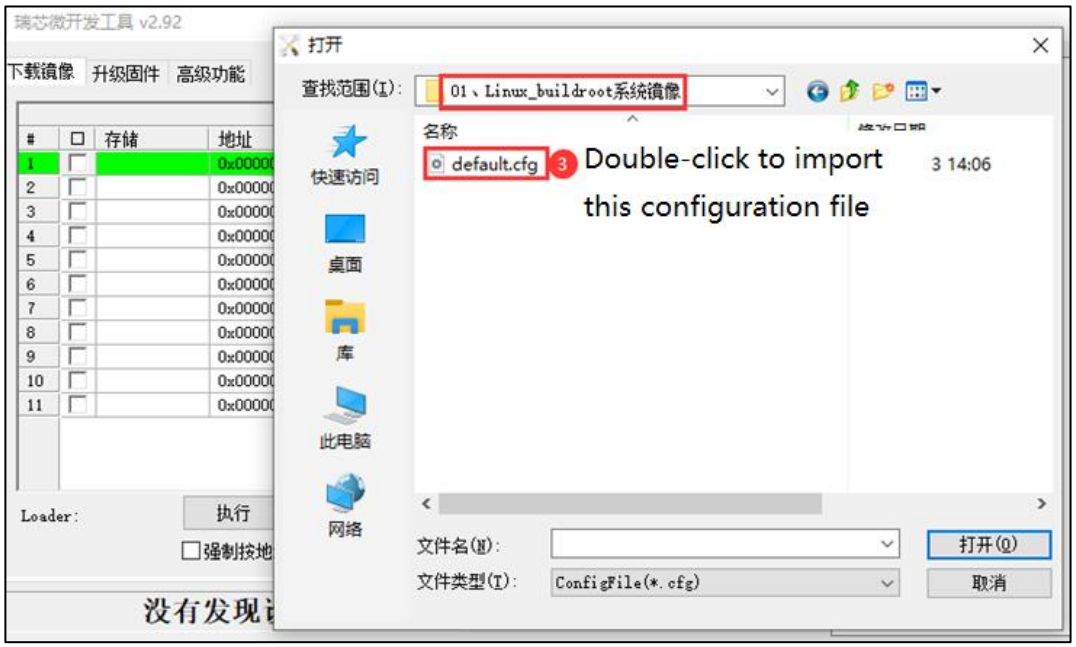

Figure 4.1-4

Figure 4.1-5 Import configuration successful.

Modify the image path to the actual file path, as shown in the following figure:

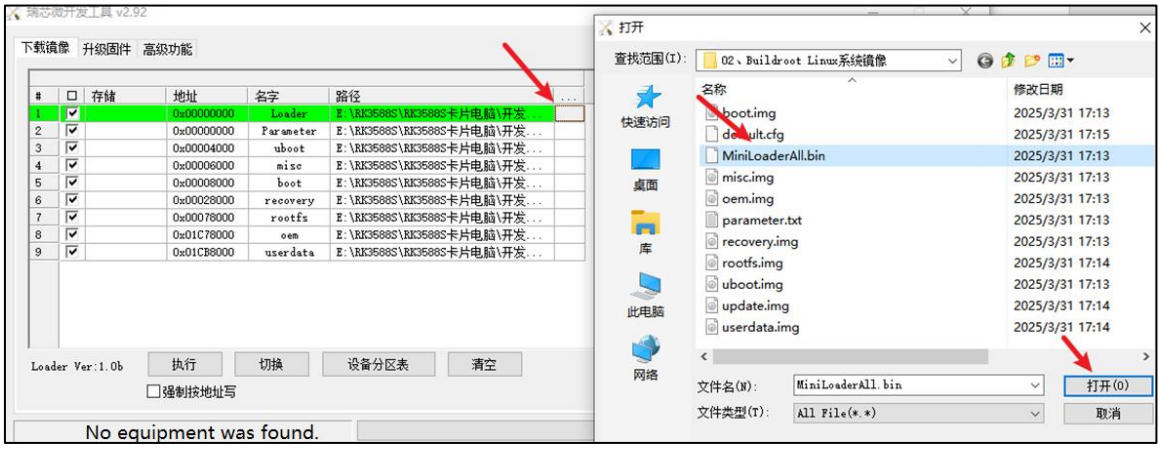

Figure 4.1-6 Modify path

The development board enters the Loader (refer to Section 3.1) or Maskrom (refer to Section 3.2) burning mode, then click the "Execute" button to burn the image, as shown in the following figure:

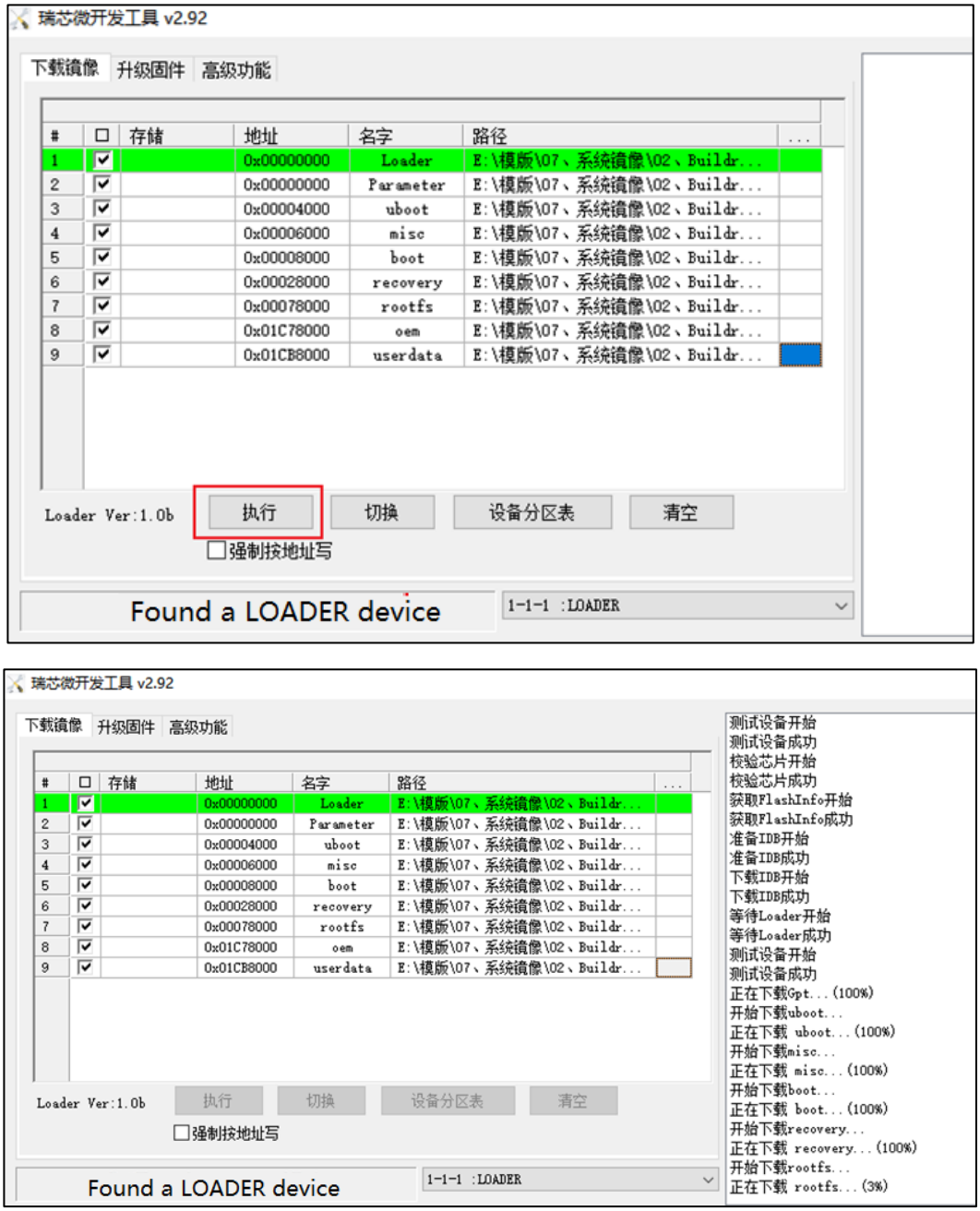

Figure 4.1-7 Burn the image

After the burning process is completed, the card computer will automatically restart and enter the Linux buildroot system, as shown in the following picture.

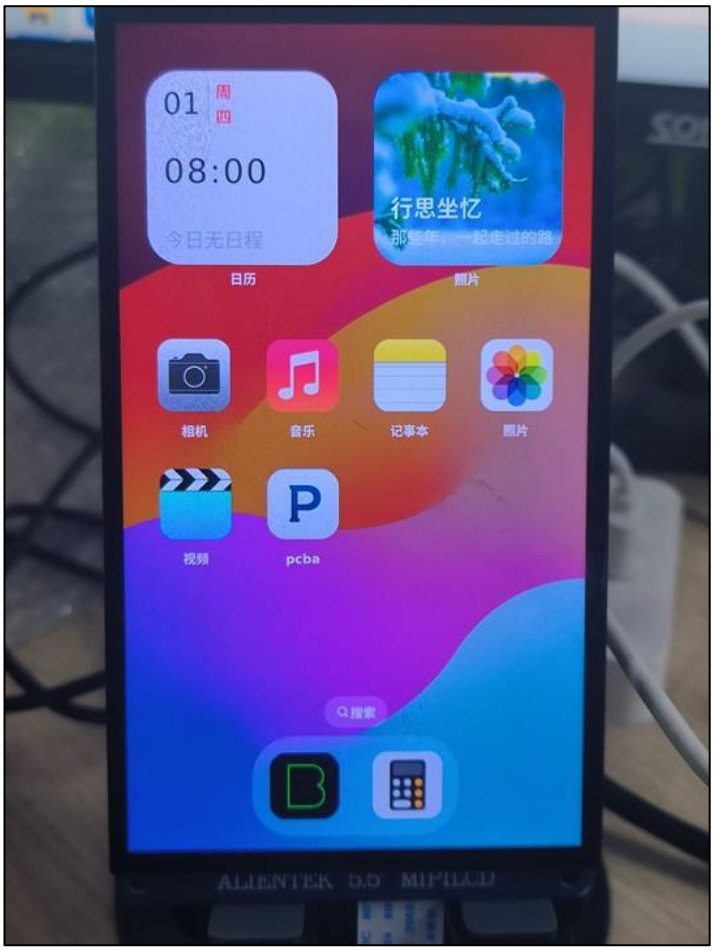

Figure 4.1-8 Linux Buildroot system

Chapter 5. Burning the Android 12 System Image

Before proceeding, please read Chapter 1 and Chapter 2, install the burning tool RKDevTool, and complete the hardware connection of the development board.

5.1 Burning the Android 12 System Image

The development board's data disk provides the compiled Android 12 system image for users. The path is: Development board optical disc A drive - Basic data -> 07_System_image -> 03, Android 12 system image. As shown below:

名称	修改日期	类型	大小
baseparameter.img	2025/3/31 15:14	光盘映像文件	1,024 KB
boot.img	2025/3/31 15:14	光盘映像文件	39,408 KB
config.cfg	2025/3/31 17:35	CFG 文件	6 KB
default.cfg	2025/3/31 15:36	CFG 文件	6 KB
dtbo.img	2025/3/31 15:14	光盘映像文件	1 KB
MiniLoaderAll.bin	2025/3/31 15:14	BIN 文件	473 KB
misc.img	2025/3/31 15:14	光盘映像文件	48 KB
parameter.txt	2025/3/31 15:14	文本文档	1 KB
recovery.img	2025/3/31 15:14	光盘映像文件	74,196 KB
super.img	2025/3/31 15:15	光盘映像文件	1,609,902...
uboot.img	2025/3/31 15:14	光盘映像文件	4,096 KB
update.img	2025/3/31 15:50	光盘映像文件	1,729,633...
vbmeta.img	2025/3/31 15:15	光盘映像文件	4 KB

Figure 5.1-1 Android 12 image

Go to the installation directory of the RKDevTool tool (that is, the directory where the RKDevTool.exe executable file is located), and then open the burning tool RKDevTool as shown below:

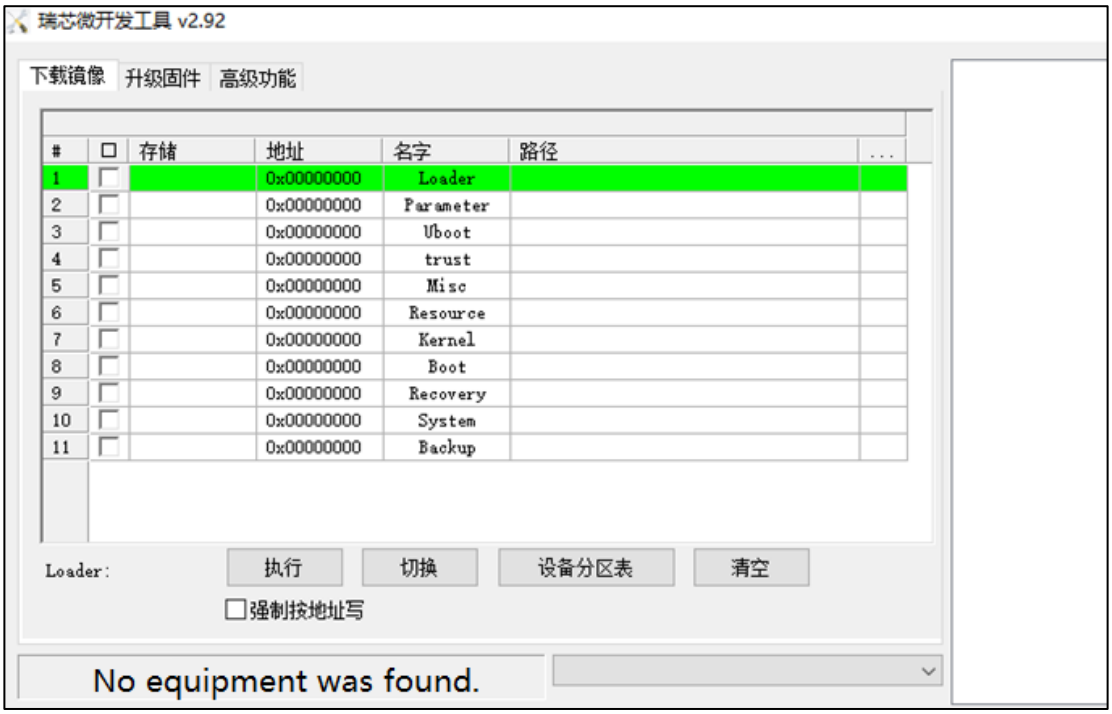

Figure 5.1-2 Rockchip development tools

Import the configuration file following the operation steps shown in Figures 5.1.3 to 5.1.5:

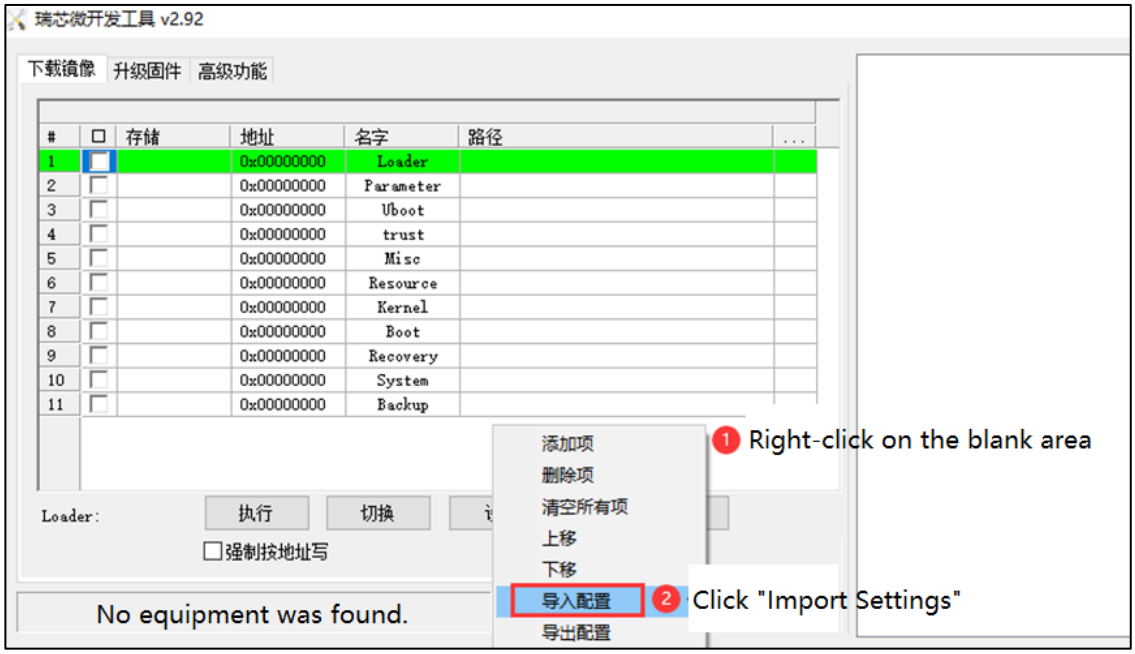

Figure 5.1-3

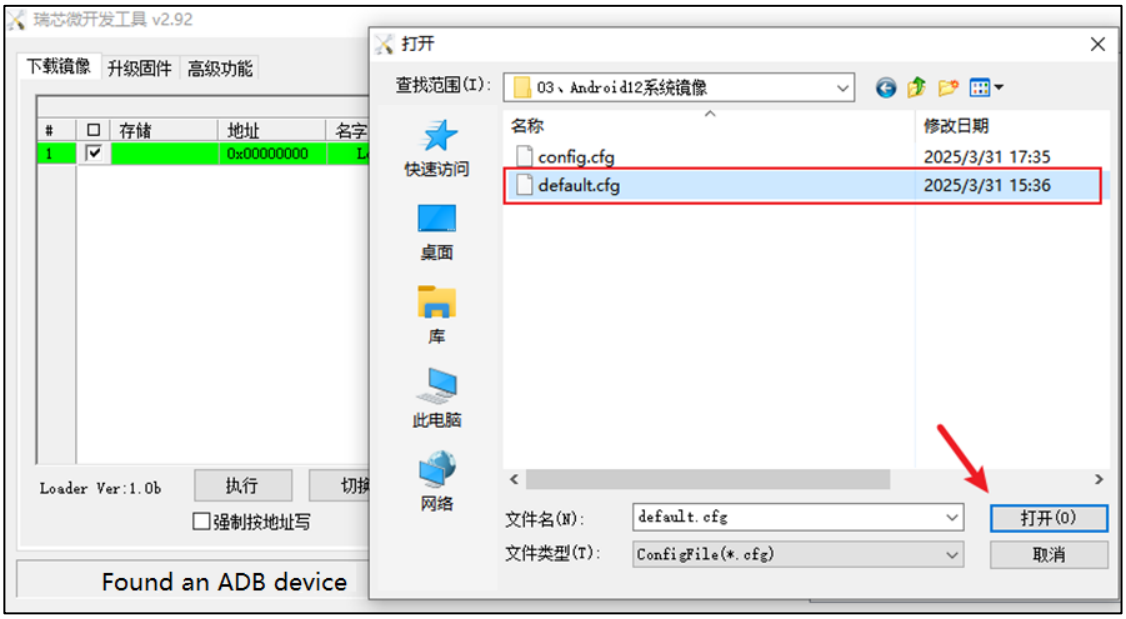

Figure 5.1-4

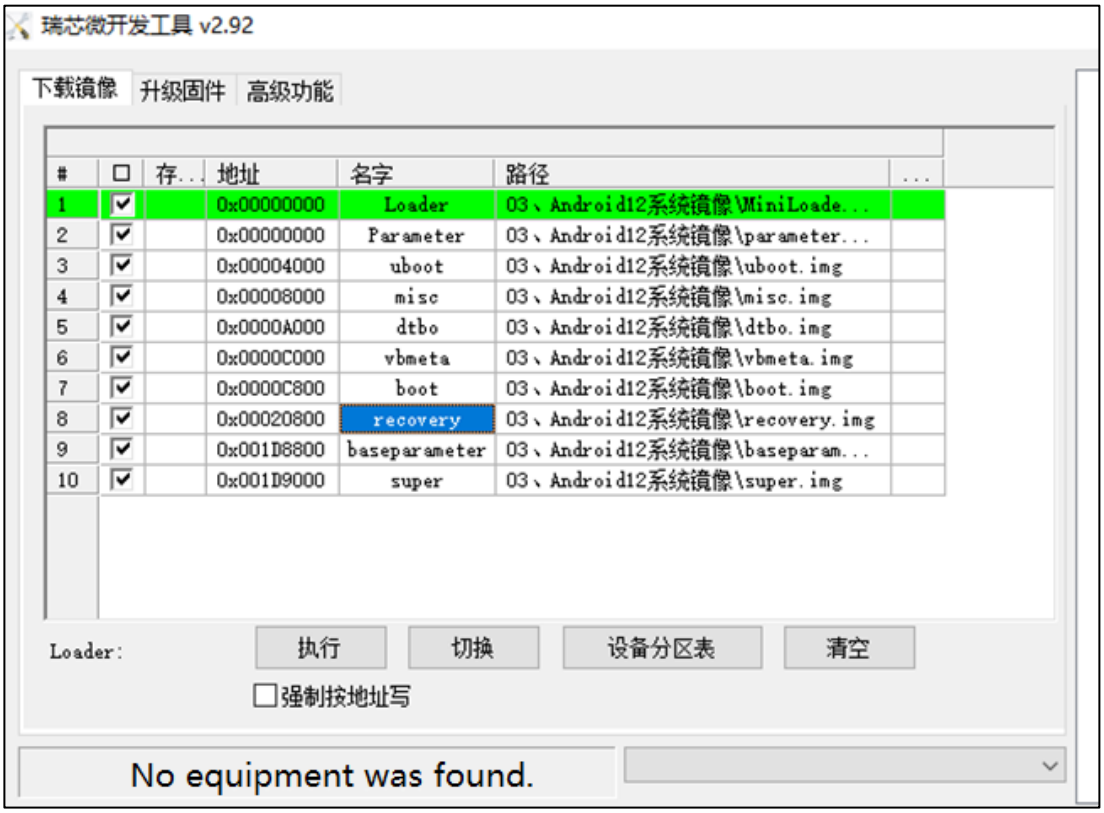

Figure 5.1-5 Import configuration successful.

Then modify the actual file paths of each partition image as shown in the following figure:

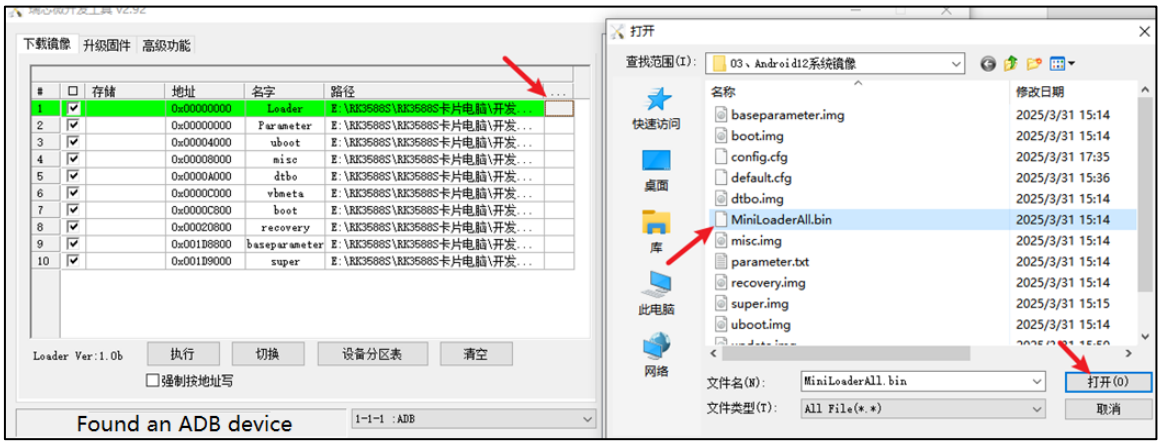

Figure 5.1-6 Modify the partition image path

The development board enters the Loader (refer to Section 3.1) or Maskrom (refer to Section 3.2) burning mode, then click the "Execute" button to burn the image, as shown in the following figure:

Figure 5.1-7 Burn the image

After the burning process is completed, the card computer will automatically restart and enter the Android system, as shown in the following picture:

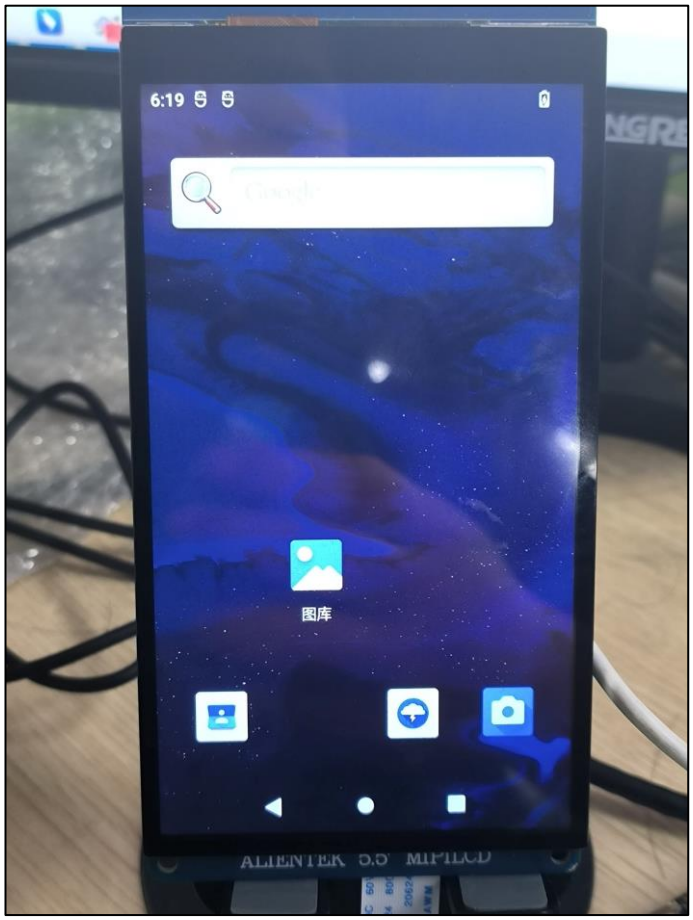

Figure 5.1-8 Android 12 system

Chapter 6. Burning the Android 13 system image

First, read Chapters 1 and 2, install the burning tool RKDevTool, and complete the hardware connection of the development board.

6.1 Burn the Android 13 system image

The development board data disk provides users with the compiled Android 13 system image. The path is: Development board optical disc A drive - Basic data -> 07_System_image -> 04, Android 13 system image. As shown below:

Figure 6.1-1 Android 13 image

Go to the installation directory of the RKDevTool tool (that is, the directory where the RKDevTool.exe executable file is located), and then open the burning tool RKDevTool as shown below:

Figure 6.1-2 Rockchip development tools

Import the configuration file following the operation steps shown in Figures 6.1.3 to 6.1.5:

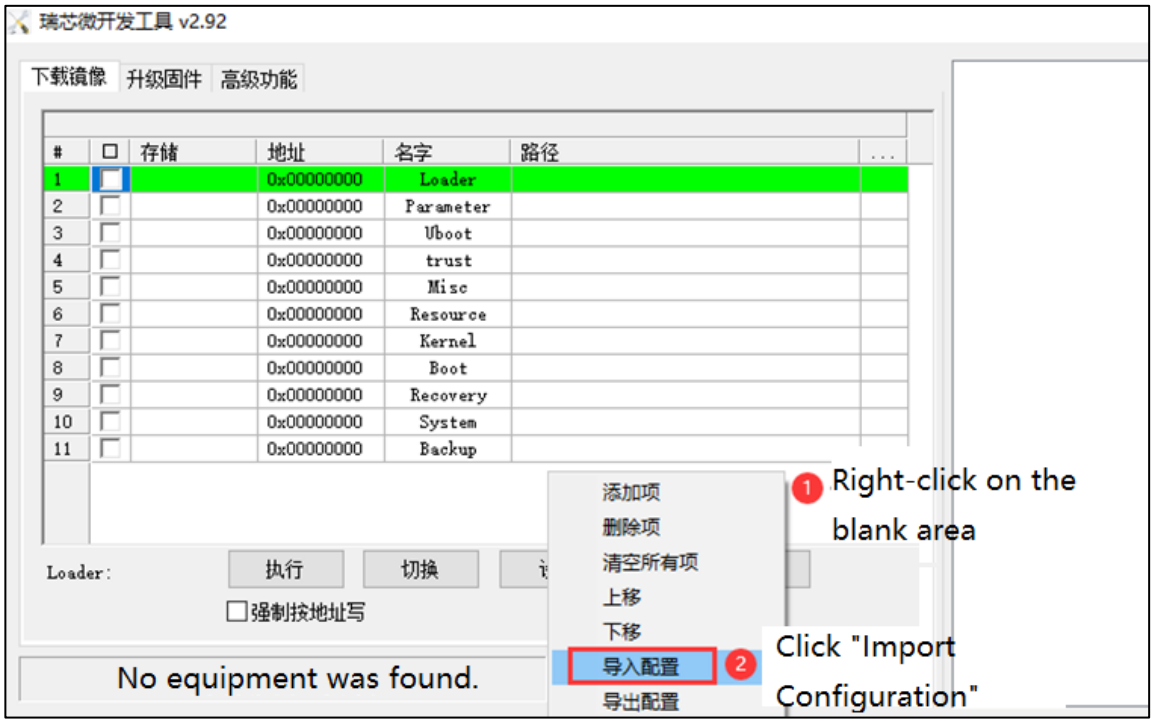

Figure 6.1-3

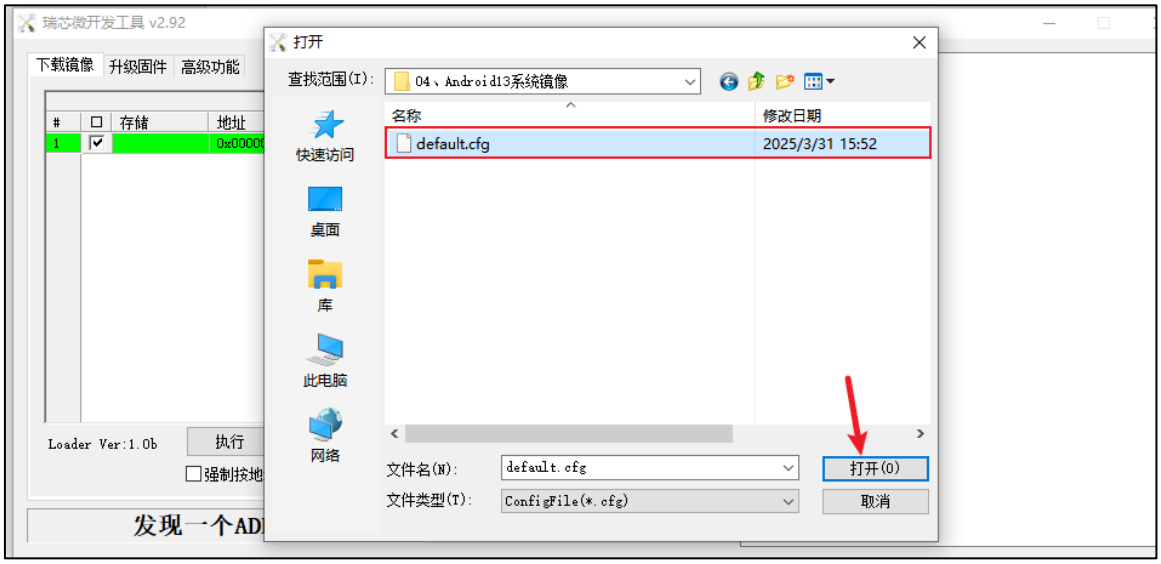

Figure 6.1-4

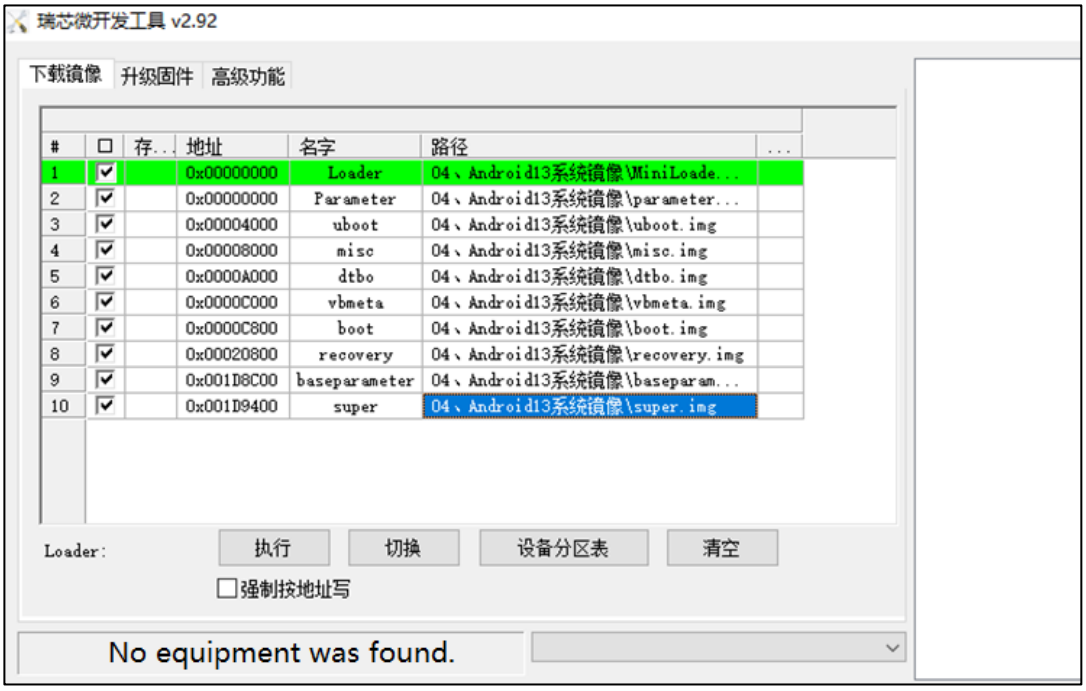

Figure 6.1-5 Import configuration was successful.

Then, modify the path of each partition image to the actual file path.

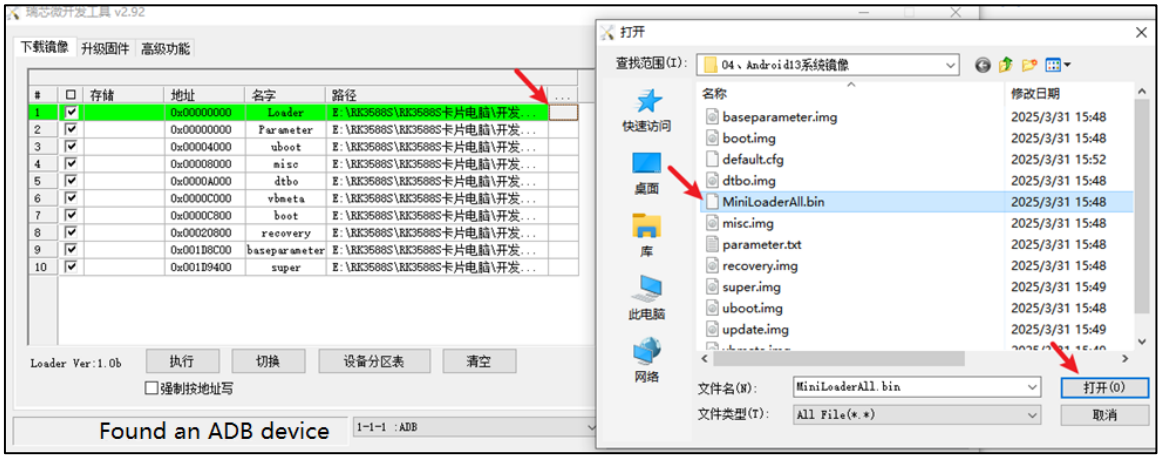

Figure 6.1-6 Modify path

The development board enters the Loader (refer to Section 6.1) or Maskrom (refer to Section 6.2) burning mode, then click the "Execute" button to burn the image, as shown in the following figure:

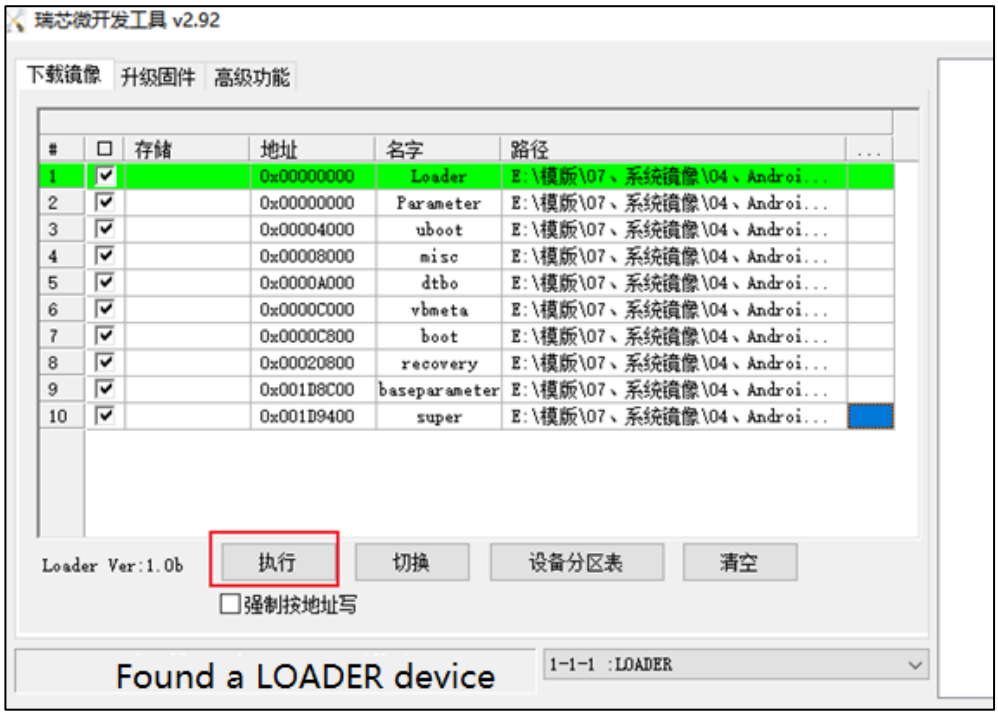

Figure 6.1-7 Burn the image

After the burning process is completed, the development board will automatically restart and enter the Android system, as shown in the following picture:

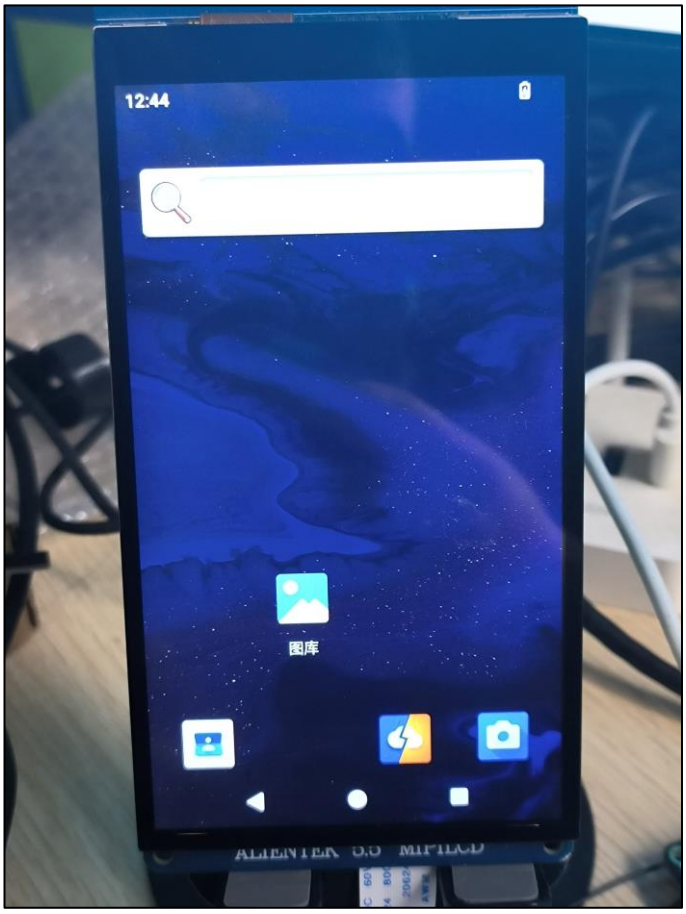

Figure 6.1-8 Android 13 system

Chapter 7. Burning the Debian 11 System Image

Before proceeding, please read Chapter 1 and Chapter 2, install the burning tool RKDevTool, and complete the hardware connection of the development board.

7.1 Burning the Debian 11 System Image

The development board's data disk provides the compiled Debian 11 system image for users. The path is: Development Board Optical Disk - Basic Data -> 07_System_Image -> 01, Debian 11 System Image, as shown below.

Figure 7.1-1 Debian 11 image

Go to the installation directory of the RKDevTool tool (that is, the directory where the RKDevTool.exe executable file is located), and then open the burning tool RKDevTool as shown below:

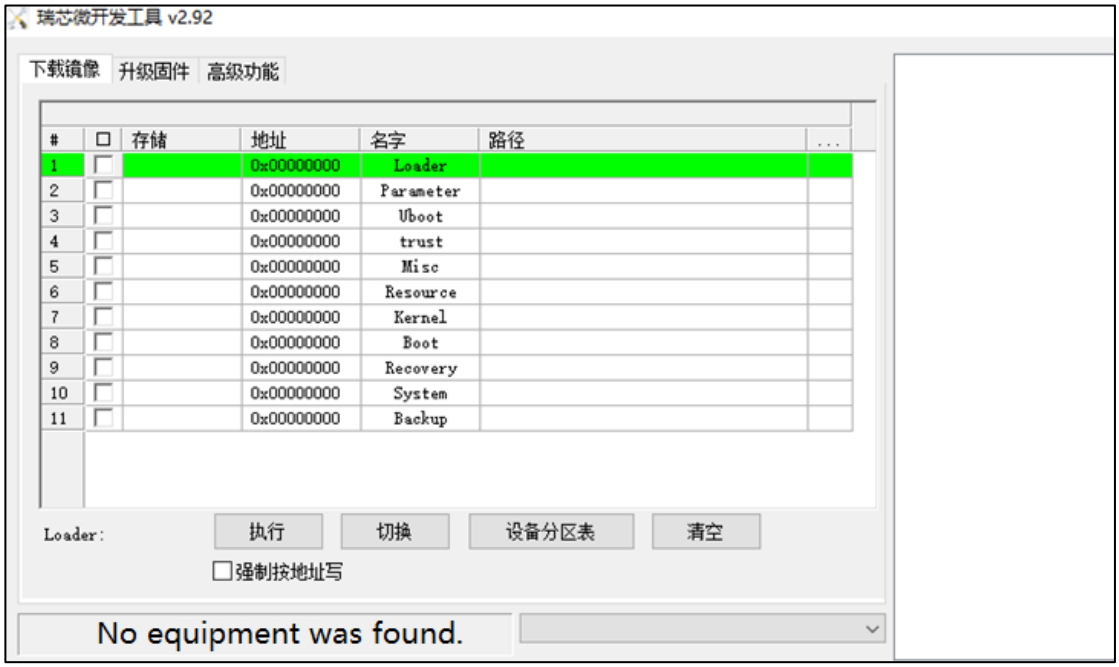

Figure 7.1-2 Rockchip development tools

Follow the operation steps shown in Figure 7.1.3, Figure 6.1.3 to Figure 7.1.5, and Figure 6.1.5 to import the configuration file:

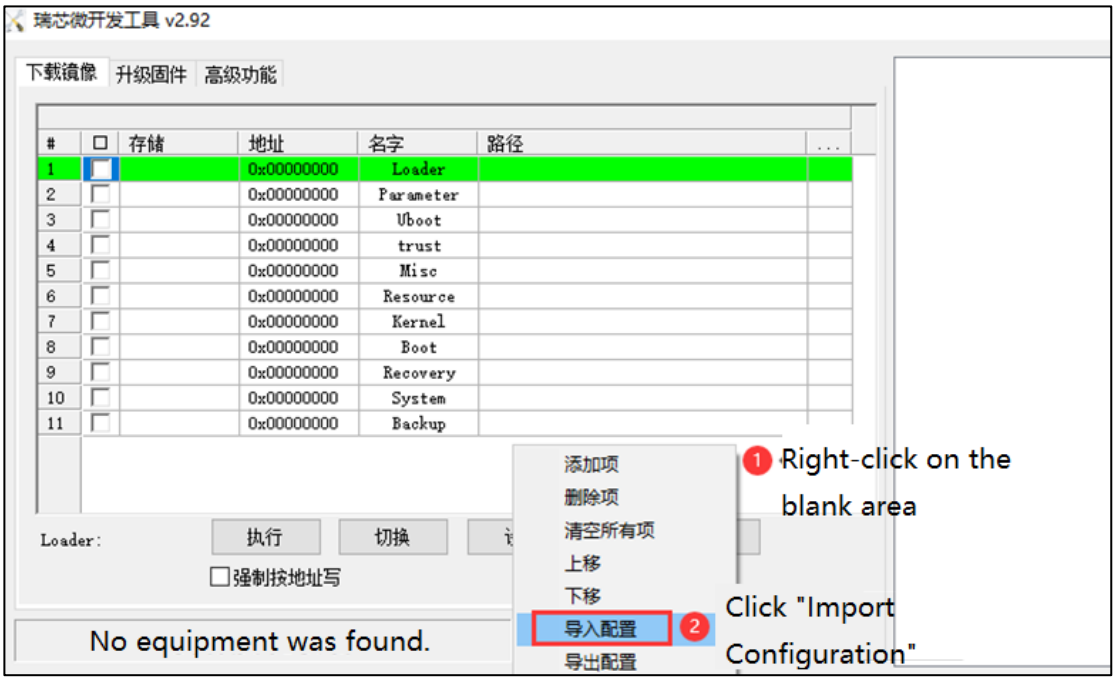

Figure 7.1-3

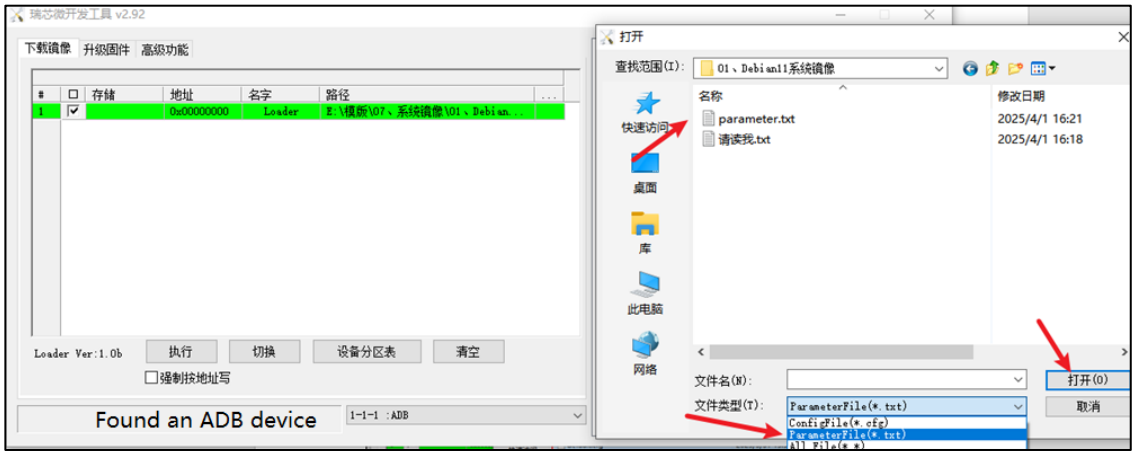

Figure 7.1-4

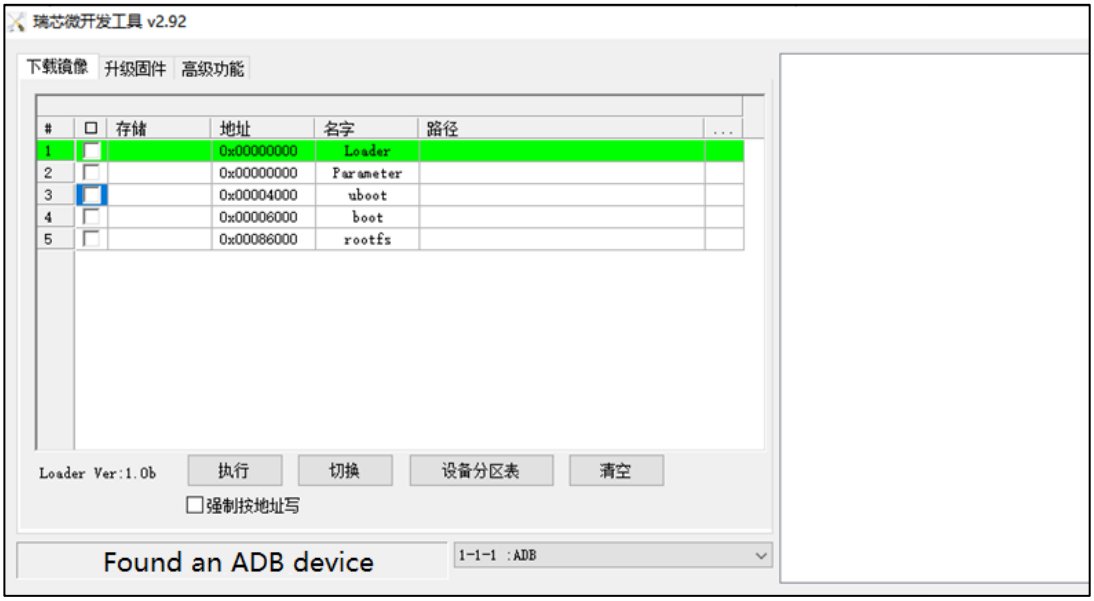

Figure 7.1-5 Import configuration successful.

Then select and modify the path of each partition image to the actual file path.

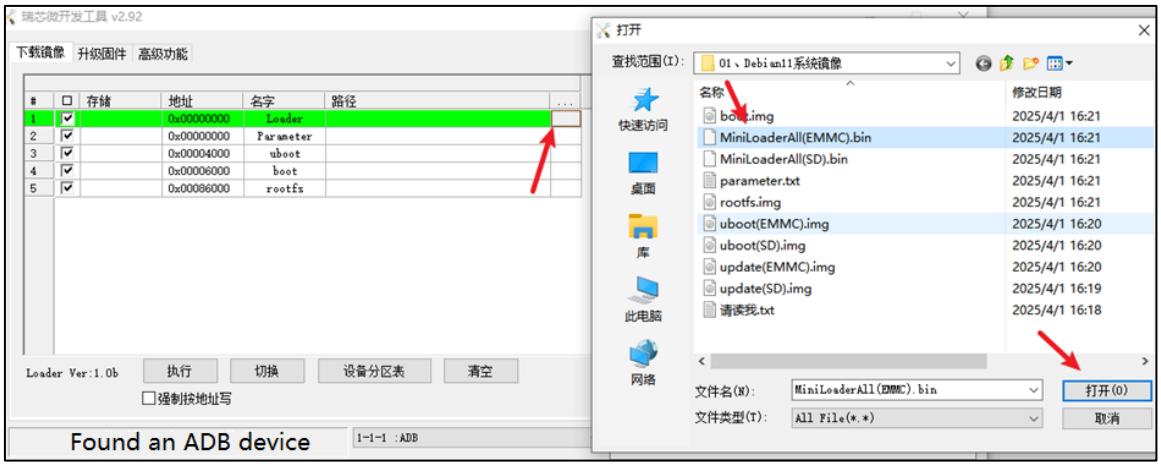

Figure 7.1-6 Modify path

The development board enters the Loader (refer to Section 6.1) or Maskrom (refer to Section 6.2) burning mode, then click the "Execute" button to burn the image, as shown in the following figure:

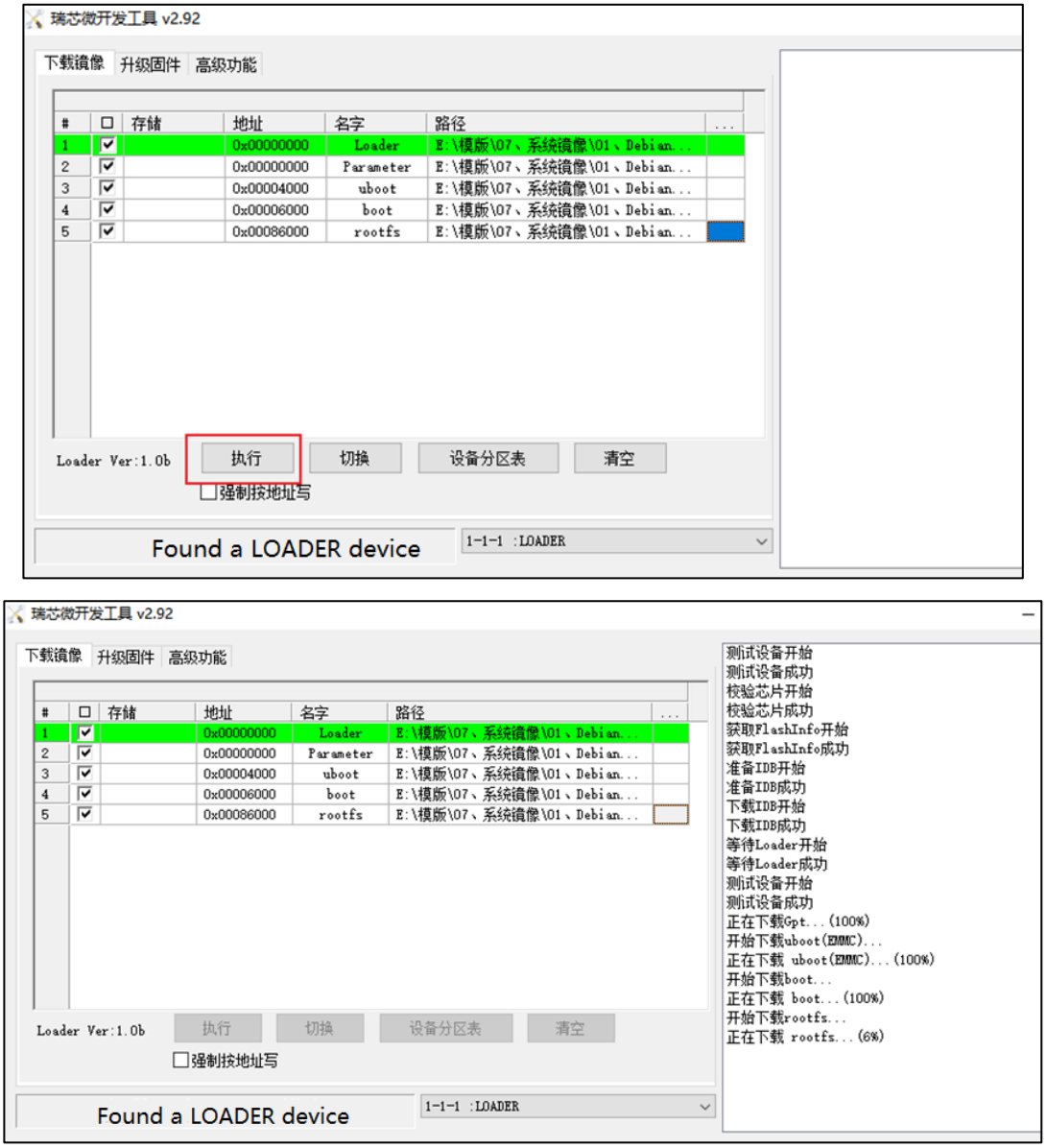

Figure 7.1-7 Burn the image

Since the card computer is by default not enabled for MIPI screen, after the burn process is completed, the startup information of the Debian 11 system can be seen from the debugging serial port (a USB-to-serial port module needs to be prepared by yourself), as shown in the following figure:

```
[  OK  ] Started Getty on tty1.
         Starting Light Display Manager...
[  OK  ] Started Serial Getty on ttyFIQ0.
[  OK  ] Reached target Login Prompts.
[  OK  ] Started Network Time Service.
[  OK  ] Started Light Display Manager.
[  OK  ] Started Hostname Service.
[  OK  ] Started OpenBSD Secure Shell server.
         Starting Network Manager Script Dispatcher Service...
[  OK  ] Started Network Manager Script Dispatcher Service.
[    6.782438] rk_gmac-dwmac fe1c0000.ethernet eth0: PHY [stmmac-1:01] driver [YT8531 Gigabit Ethernet] (irq=POLL)
[    6.784276] dwmac4: Master AXI performs any burst length
[    6.784311] rk_gmac-dwmac fe1c0000.ethernet eth0: No Safety Features support found
[    6.784329] rk_gmac-dwmac fe1c0000.ethernet eth0: IEEE 1588-2008 Advanced Timestamp supported
[    6.784469] rk_gmac-dwmac fe1c0000.ethernet eth0: registered PTP clock
[    6.784759] rk_gmac-dwmac fe1c0000.ethernet eth0: configuring for phy/rgmii-rxid link mode
[    6.785626] 8021q: adding VLAN 0 to HW filter on device eth0
[    6.902414] mali fb000000.gpu: Loading Mali firmware 0x1010000
[    6.904247] mali fb000000.gpu: Mali firmware git_sha: 221d2b3e5f4cf47df6227ccb24c82c4e4baa986e
         Starting Authorization Manager...
[  OK  ] Started Authorization Manager.
[  OK  ] Started Bluetooth management mechanism.
[  OK  ] Reached target Multi-User System.
[  OK  ] Reached target Graphical Interface.
         Starting Update UTMP about System Runlevel Changes...
[  OK  ] Finished Update UTMP about System Runlevel Changes.
[  OK  ] Finished Set console font and keymap.
[    7.461886] rk-pcie fe190000.pcie: PCIe Link Fail, LTSSM is 0x3, hw_retries=0
[  OK  ] Created slice User Slice of UID 1001.
         Starting User Runtime Directory /run/user/1001...
[  OK  ] Finished User Runtime Directory /run/user/1001.
         Starting User Manager for UID 1001...
[  OK  ] Started User Manager for UID 1001.
[  OK  ] Started Session c1 of user quark.
[    8.554941] systemd-journald[272]: File /var/log/journal/aa2e68b4237b6180be86138067d91345/user-1001.journal corrupted or uncleanly shut down, rena
         Starting Bluetooth service...
[  OK  ] Started Bluetooth service.
[  OK  ] Started Manage USB device functions.
[    8.953387] ttyFIQ ttyFIQ0: tty_port_close_start: tty->count = 1 port count = 2
[    9.162783] dwc3 fc000000.usb: device reset
[    9.220575] android_work: sent uevent USB_STATE=CONNECTED
[    9.226611] android_work: sent uevent USB_STATE=CONFIGURED
[    9.798494] rk_pcie_establish_link: 131 callbacks suppressed
[    9.798504] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.825149] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.851878] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.881830] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.911875] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.938493] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3

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quarkpi-ca2 login: [    9.965203] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[    9.991831] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[   10.018587] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[   10.045253] rk-pcie fe190000.pcie: PCIe Linking... LTSSM is 0x3
[   11.405185] rk-pcie fe190000.pcie: PCIe Link Fail, LTSSM is 0x3, hw_retries=1
[   12.425139] rk-pcie fe190000.pcie: failed to initialize host
```