

Ingenic®

USBCloner Tool Description Document V2

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1 Overview

USBCloner burning tool (hereinafter referred to as burning tool) is a burning tool developed based on QT Integrated development environment. This document mainly introduces the driver installation, tool introduction, instructions, and FAQs of the burning tool. Please check this document before using the burning tool.

1.1 Release history

Date	Version	Description
2016.07	V1	Release first version
2023.01	V2	Configuration UI changes and FAQ updates

1.2 Download Method

Method	Description
SDK Project	Run the following command in the project directory: source build/envsetup.sh && get-burner
FPT Link	Download the latest version http://ftp.ingenic.com.cn/DevSupport/Tools/USBBurner/cloner-latest-ubuntu.tar.gz http://ftp.ingenic.com.cn/DevSupport/Tools/USBBurner/cloner-latest-windows.zip Or enter a link in the browser and select version download: http://ftp.ingenic.com.cn/DevSupport/Tools/USBBurner/

1.3 Name Rules

The name rule of the burning tool: cloner-**version**-**system type**_**release version**. **Compression type**

Definition	Rule	Description
Version Number	1.x.x	The first paragraph is the design version, the number 1 is the first version, the number 2 is the second version, and so on
	x.1.0	The number of the second segment is the version to be released, and the number of the third segment to be released is 0.
	x.x.1	The third digit is the minor version number of the internal test.
System Type	windows	Tools running on windows
	ubuntu	Tools running on ubuntu
Release Version	release	Released version, fully tested version
	alpha	Internal test version, updated at any time with minor changes
Compression	zip	Decompress on windows

Type	tar.gz	Decompress on ubuntu. The decompress command is tar xvf clanner-* .tar.gz.
------	--------	--

Tool and Driver Directory	Description
cloner-x.x.x-windows_release	Directory of burning tools
cloner-win32-driver	Directory of drivers for burning tools in Windows system

Tool Directory	Description
cloner	Interface program, you can modify the configuration parameters through the interface
core	The programming program is called by the interface program and run separately with parameters.
ddrs	Storage directory of memory parameter configuration files for each platform
configs	Storage directory of configuration files at the platform level
firmwares	Directory of firmware burning on each platform
security	Safe burning KEY storage directory for each platform
securitytool	Secure Signature and KEY successful tool storage directory for each platform
scripts	Script storage directory
docs	Burning tool description document storage directory
log	Burning log storage directory
lib	ubuntu system compatible dependent library file storage directory
bin	Storage directory of clonghs and core programs in ubuntu system
adb	adb programs and related drivers in ubuntu and windows systems

configs/	Description
platforms.cfg	Configure the platform name, current board level, version number, and debug switch.
spiflashinfo.cfg	NOR parameter configuration
nandinfo.cfg	NAND parameter configuration
rules.cfg	Define rules and SN_ADD rules. For more information, see 4 burning policy section.
sn_device.cfg	The SN_DEVICE policy configuration file. For more information, see 4 burning policy section.
mac_device.cfg	The MAC_DEVICE policy configuration file. For more information, see 4 burning policy section.
x1000、x2000...	Store board-level configuration files in the platform Name Directory

firmwares/	File Name	Description
x1000、x2000...	config.cfg	Firmware running address, GPIO configuration, frequency configuration, etc.

	spl.bin	In the first phase, the firmware is burned to initialize the memory.
	uboot.bin	The second stage is to burn firmware and storage devices.
	spl_sec.bin	Phase I secure burning firmware
	uboot_sec.bin	Phase II secure burning firmware

ddrs/	Description
ddr.cfg	Memory Type Index
DDR2、DDR3...	Memory parameters file directory

1.4 Run Method

System Type	Description
Windows	Double-click cloner.exe
Ubuntu	Open the terminal command line and run ./cloner

1.5 Peration Flow

Step	Description
1	If you are Windows system environment, first install the driver, see 2 driver install and uninstall section
2	Run the burning tool. For different systems, see 1.4 run method section.
3	Select the corresponding platform and board-level configuration, see 3.2.1 INFO section
4	Modify the burning policy configuration. For more information, see 3.2.2 POLICY and 4 Burn Policy section .
5	Click Save to save the configuration parameters to the configuration file.
6	Click Start to wait for the device to access
7	Press and hold the BOOT + RESET key of the burning device to enable the device to enter the burning mode.
8	After the device is found, it starts to burn. The burning progress is displayed in the main window of the tool.

1.6 Burning Progress

Supports simultaneous burning of less than 10 devices and displays the burning progress in the main window.

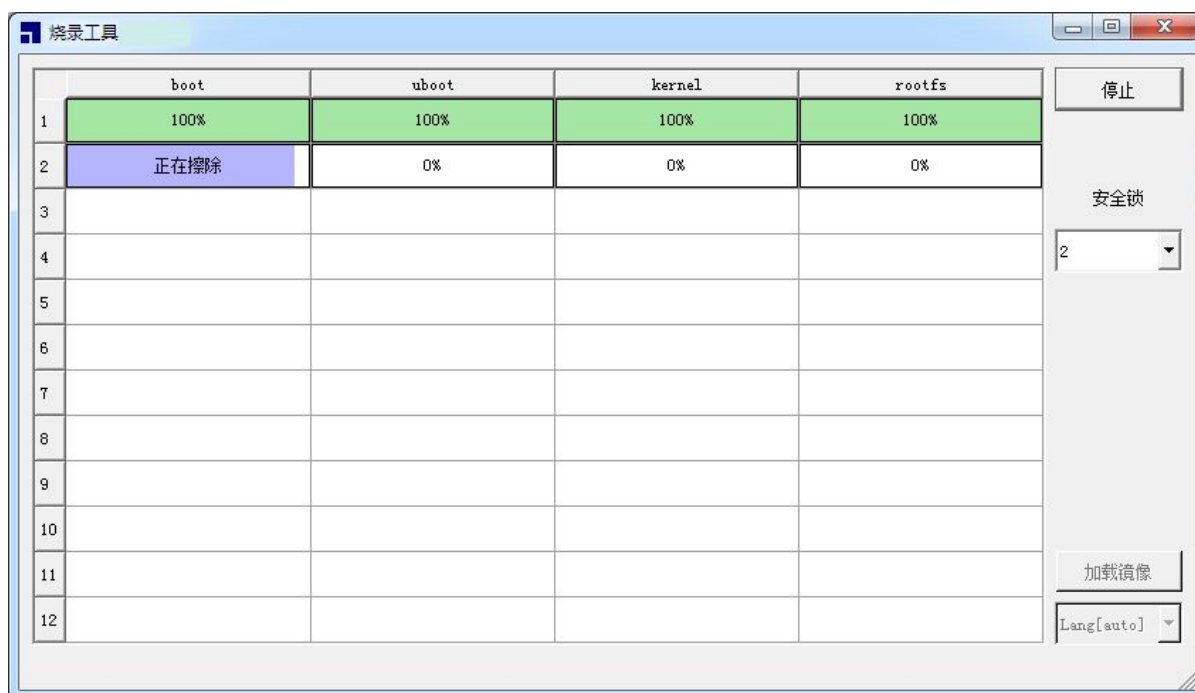


Figure 4-4 Burning progress

Status	Description
Burning	The burning progress bar is blue, showing a percentage or status prompt.
Failed to burn	The burning progress bar is red, showing a percentage or status prompt. See 5 FAQ section to analyze causes
Burning completed	The burning progress bar is green, showing 100%

1.7 Burning Log

Burn logs include tool logs, burn logs, and device logs. When a burning problem occurs, provide the terminal and device logs to the development and maintenance personnel.

a. Tool logs

After the burning is completed, "board config-date. log" is generated in the log directory of the burning tool. for example:

x1000_sfc_nor_16mb-2020-11-20.log	Explain
-----------------------------------	---------

2020-11-20 13-24-01 port:0 policy0 write ret: ok policy1 write ret: ok policy2 write ret: ok all policy completed	Burning date and time. USB port 0 corresponds to the first line of the progress bar. The first row and the second column of the progress bar are completed. The first row and the third column of the progress bar are burned by the kernel. rootfs burning completed in the fourth column of the first row of the progress bar. All policies have been burned.
--	--

b. Burning log

System Type	Description
Windows	After running the tool, the core.exe process is printed in the terminal (black window).
Ubuntu	Print on the terminal command line of the running tool, for example: cong thread= 0x7ff5c14bc700 socket interaction test 0 socket listen ret=1 core connected!!! ...

c. Device log

System Type	Description
Windows	The debugging serial port of the burning device is connected to the host, and serial port tools such as putty and CRT are run on the host.
Ubuntu	The serial port of the programming device is connected to the host. On the terminal command line, run: sudo minicom

1.8 Factory Burn

In order to prevent production line workers from misoperation and causing unnecessary losses, it is recommended that technicians set the "safety lock" in the main window of the tool to a high level after configuring the parameters. you can restrict configuration modification. if you need to modify the configuration, you need to change the security lock to "0" and enter the password with **special English characters " !@# "**. or package the burning configuration into an ingenic file, only ingenic files can be loaded for burning on the production line.

Security locks refer to [3.1.2](#) section.

For more information about making ingenic files, see [3.2.2.2](#) section .

For more information about how to load images, see [3.1.1](#) section .

2 Driver Install And Uninstall

The burning tool is available in Ubuntu and Windows. You do not need to install a driver when using the burning tool in Ubuntu. This topic describes how to install and uninstall the driver on Windows system.

2.1 Install The Driver

The burning device is connected to the USB port of the host through the USB cable. Press and hold the Boot key, and then press the Reset key to make the device enter the burning mode. If the driver of the burning tool has not been installed on the host, open the device manager to check that the new device is marked with an exclamation mark, indicating that no suitable driver has been found.

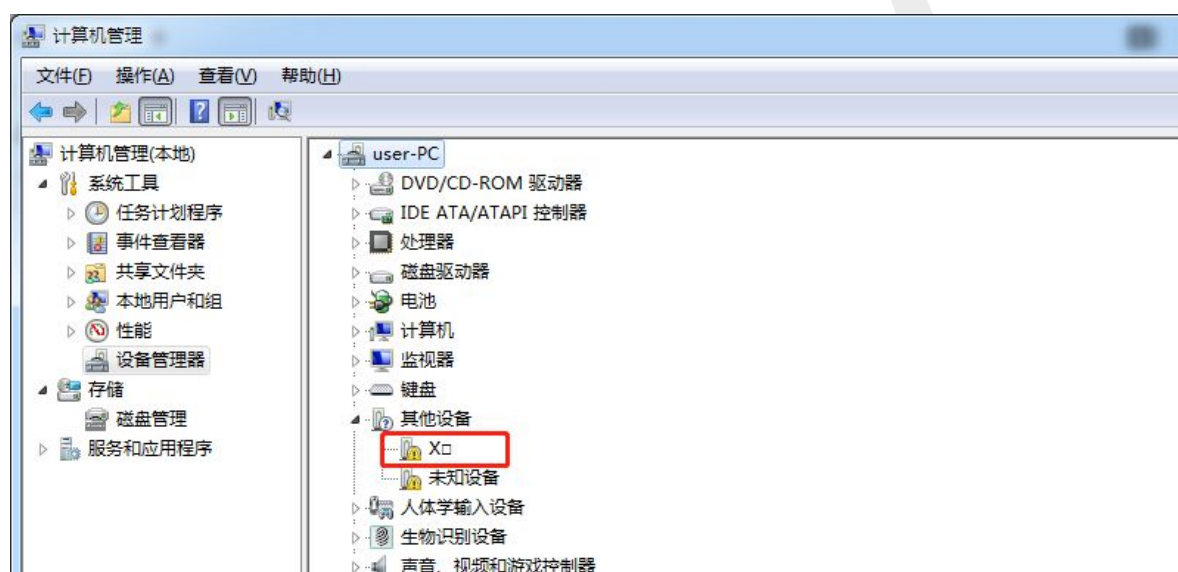


Figure 2-2 devices not identified by device manager

To manually install the burning driver, follow these steps:

Step	Operation	Result
1	Select the "X port" device from other devices and right-click	Pop-up options menu
2	Select the "Update Driver ...(P)" option in the menu	The search driver software window appears.
3	Check "Include subfolders (I)"	Traverse subdirectories when installing drivers
4	Click the "Browse (R)" button	The select folder window appears
5	Select the directory where the cloner-win32-driver is located	Select the driver software directory
6	Click OK	Close the select folder window
7	Click Next	Indicates that the driver is being installed.
8	The driver directory has been installed or changed for the first time.	The Windows security prompt window appears.

9	Check "always trust... software (A) " and click the" install "button.	Continue installation
10	After the driver is installed, click close.	Prompt installation completed, close the window

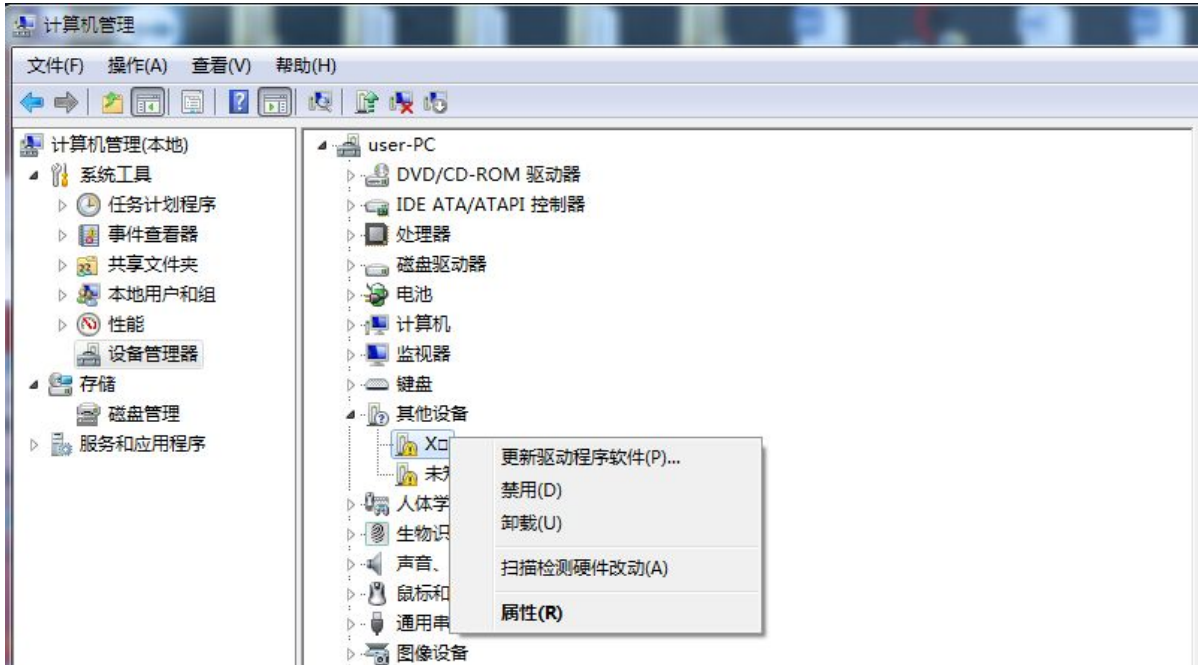


Figure 2-3 Step 1: Update the driver software



Figure 2-4 Step 2: Select browse computer to find driver software

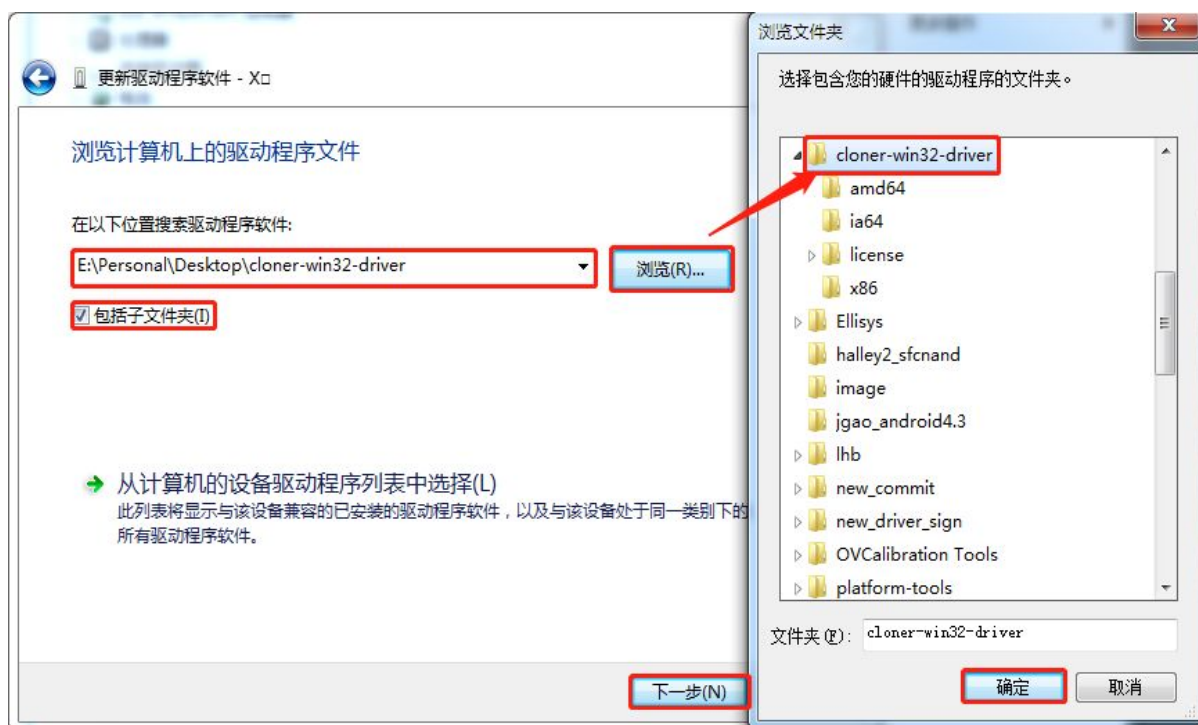


Figure 2-5 Step 3-7: Select the driver Directory



Figure 2-6 step 8-9: Check always trust to continue installation

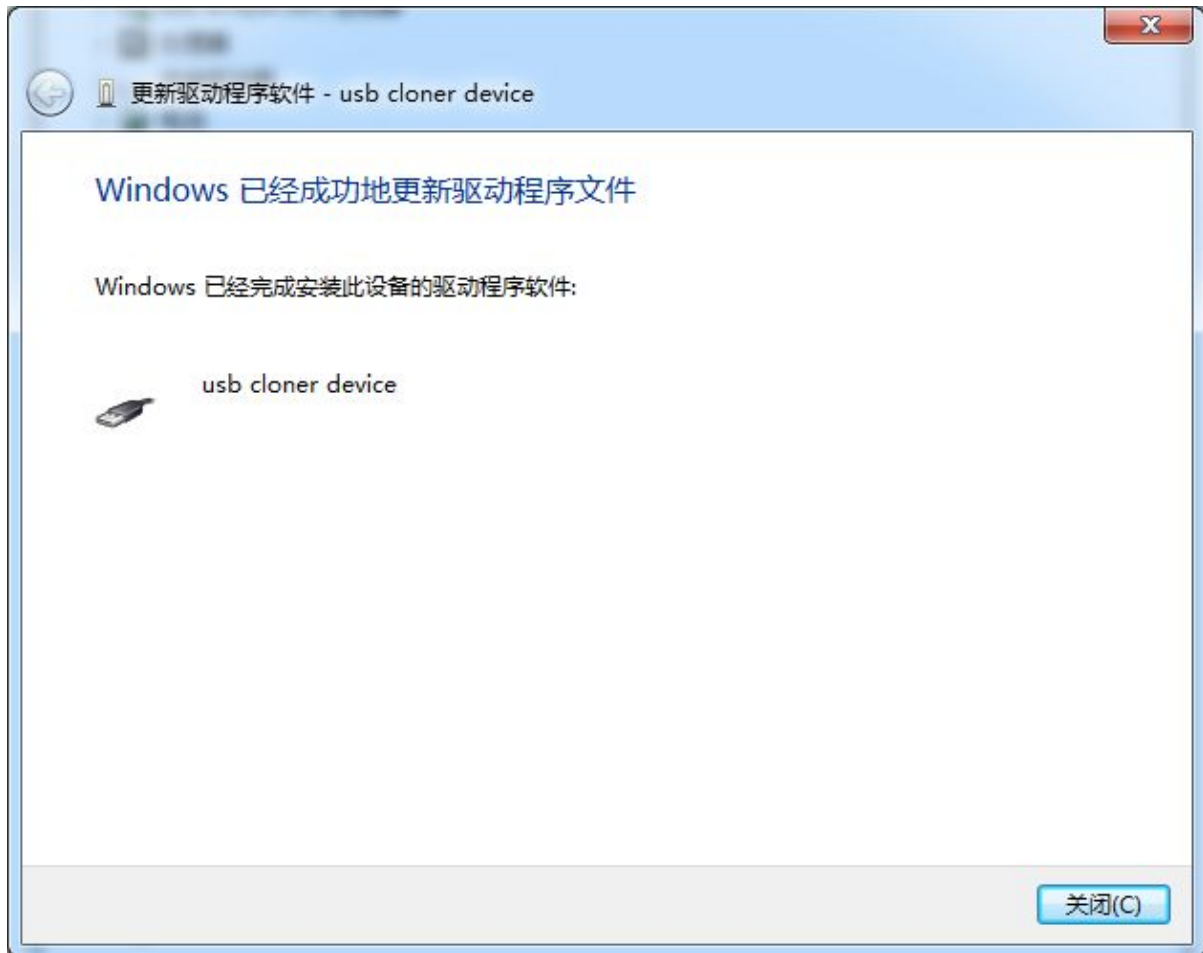


Figure 2-7 Step 10: install the driver

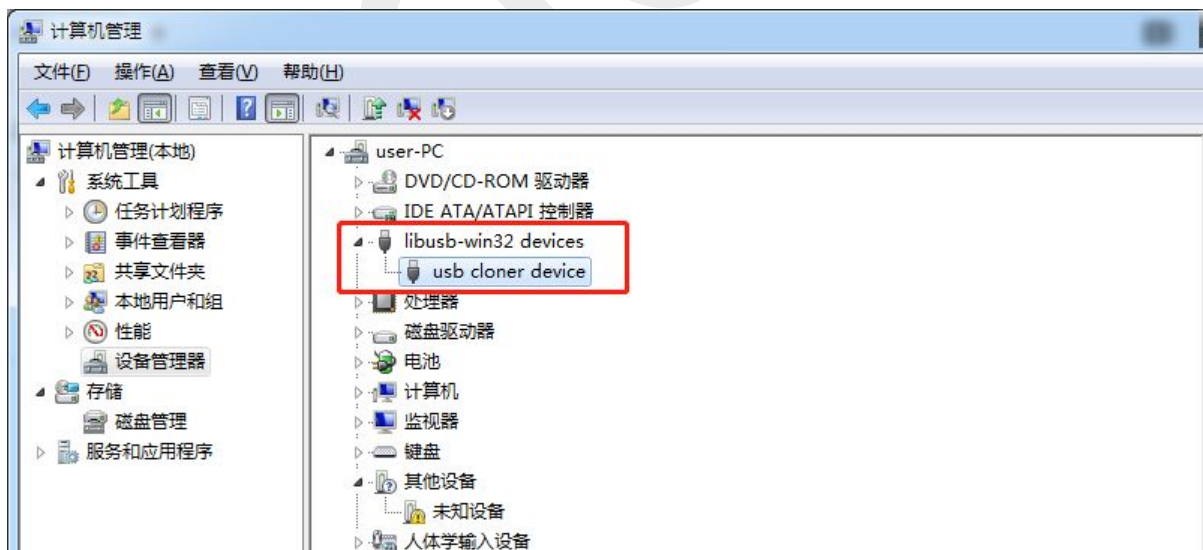


Figure 2-8 display of burning device in Device Manager

2.2 Uninstall The Driver

Step	Operation	Result
1	Select the "usb claughdevice" device from other devices and click the right mouse button.	Pop-up options menu
2	Select the uninstall (U) option in the menu	The confirm device uninstallation window appears.
3	Check the delete driver file for this device option	The driver files C:\Windows\System32\ will be deleted when uninstalling
4	Click OK	The prompt is being uninstalled, and the window is automatically closed after completion.

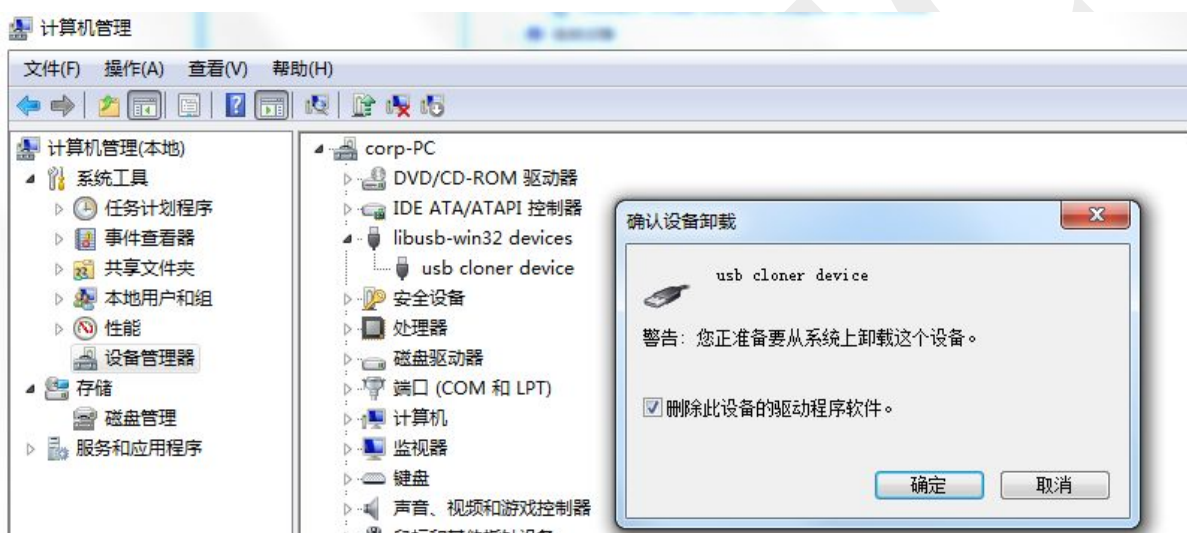


Figure 2-11 uninstall the driver

3 UI Introduction

3.1 Main Window

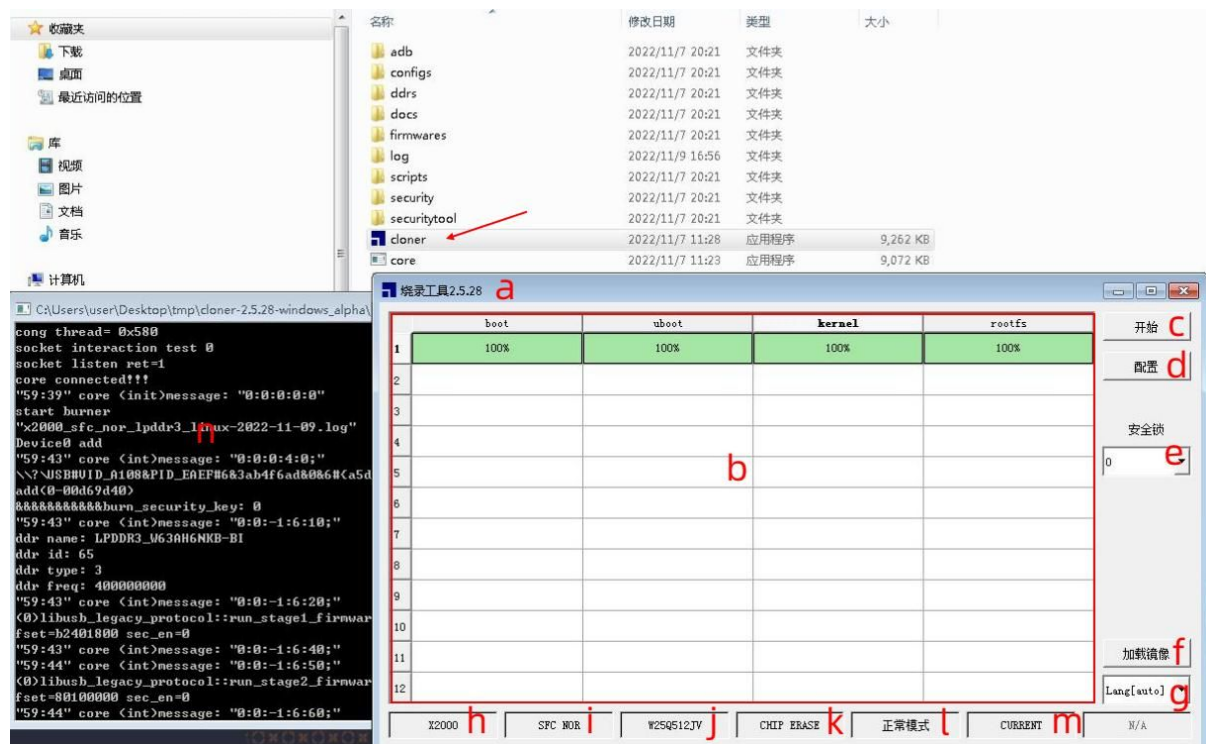


图 3-1 主界面

CH	Function	Option	Description
a	Version number		The version number of the burning tool, see 3.1 main window for the actual version number
b	Burning schedule		Each burning device occupies a row, and the first column of the boot label shows the burning firmware running phase. if an error occurs during the boot phase, please refer to the FAQ section 6 to analyze the cause. the second column and the following are the completion progress of the burning policy.
c	Start button		Click and wait for the device to enter the burning mode.
d	Configure button		In the dialog box that appears after clicking, set the burning parameters.
e	Safety lock	0	Modifiable configurations (default)
		1	Only policy configurations can be modified.
		2	Configure button hiding
		3	Hide the configuration button and the load image button
f	Load Images		Click to load the configuration parameters and images in the ingenic file.

g	Language		Adaptive system language and Chinese and English
h	Platform		Chip model
i	Storage		Storage media
j	NOR model		This parameter is displayed only when you select SPI NOR or SFC NOR.
k	Erase ways	No erase	Do not erase
		Part erase	Erase by partition
		All erase	Chip erase
l	Burning mode		Standard mode and security mode are available.
m	Config path	CURRENT	The current directory configuration file of the burning tool is being used.
		REMOTE	Using a configuration file in a remotely specified path
		TMP	The configuration file is being generated by the "load image" function to the. tmp directory hidden in the current path of the burning tool.
n	print		Burning tool printing terminal window

3.1.1 Load Image

In the production process, the most common method is to load the image to burn. after the burning configuration is completed, a burning image package is generated (see [3.2.2.2 Image generation section](#)). then, the image package and the new burning tool are packaged to the factory. the factory operator only needs to click the "load image" button on the main window of the tool to load the image package to burn. as shown in the following figure.

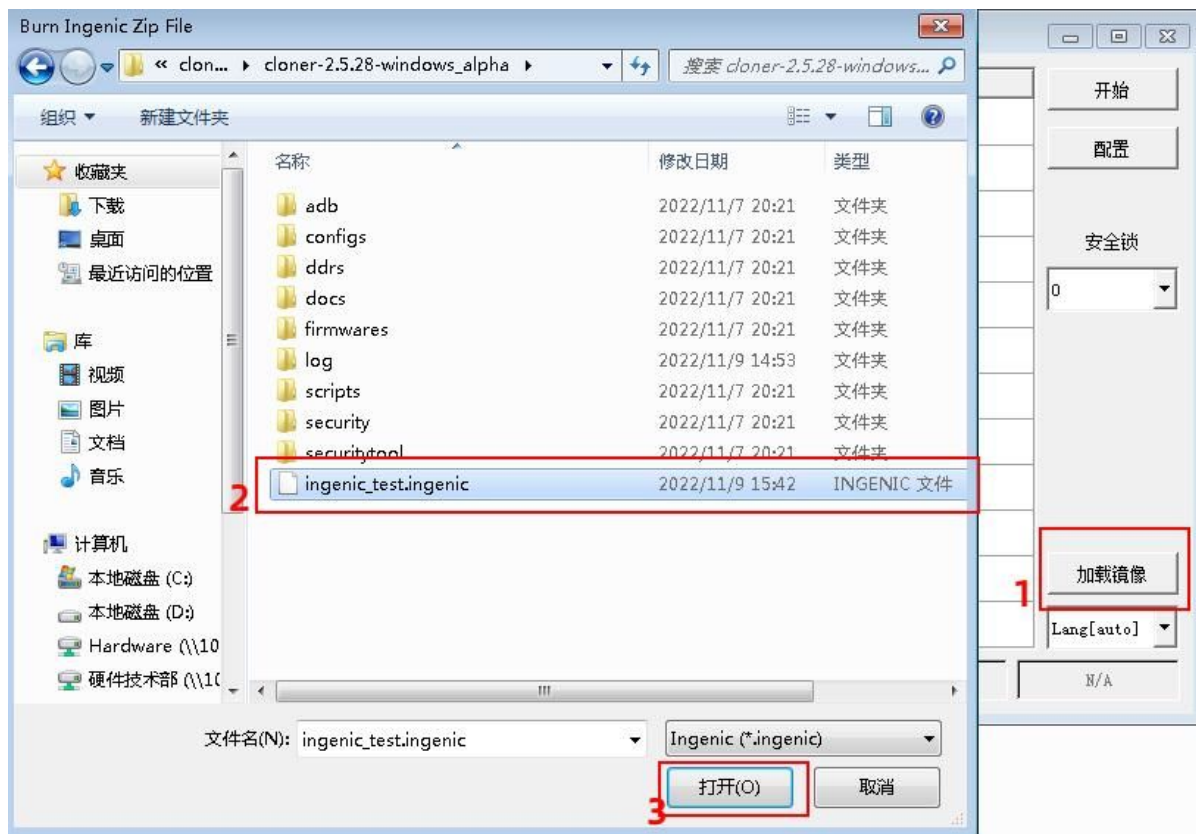


Figure 3-2 select ingenic pakeage

After the image is loaded, the tmp folder appears in the directory of the burning tool, as shown in the following figure.

adb	2022/11/7 20:21	文件夹	
configs	2022/11/7 20:21	文件夹	
ddrs	2022/11/7 20:21	文件夹	
docs	2022/11/7 20:21	文件夹	
firmwares	2022/11/7 20:21	文件夹	
log	2022/11/9 14:53	文件夹	
scripts	2022/11/7 20:21	文件夹	
security	2022/11/7 20:21	文件夹	
securitytool	2022/11/7 20:21	文件夹	
tmp	2022/11/9 15:46	文件夹	
cloner	2022/11/7 11:28	应用程序	9,262 KB
core	2022/11/7 11:23	应用程序	9,072 KB
ingenic_test.ingenic	2022/11/9 15:42	INGENIC 文件	58,708 KB
msvc100.dll	2022/1/20 10:08	应用程序扩展	412 KB
msvcr100.dll	2022/1/20 10:08	应用程序扩展	753 KB
qm_cn.qm	2022/8/30 17:21	QM 文件	35 KB
README	2022/1/20 10:08	文件	1 KB

Figure 3-3 tmp path after loading the burning Image

Note: After the image is loaded, the tmp hidden folder is generated in the directory of the burning tool. before the image is generated, the tmp folder must be deleted. otherwise, the image may be inconsistent with the expected packaging configuration file.

3.1.2 Safety lock

After loading the burning Image package, the security lock of the main window is set to "2" by default, and the configuration button is hidden. for other levels, see [3.1 main window](#) section. To prevent factory personnel from modifying the burning configuration. to modify the password, enter a **special English character** "**!@#**", as shown in the following figure.



图 3-4 safety lock

3.2 Configuration Dialog

Click the "config" button on the main window to pop up the configuration dialog window. switch the platform board configuration update the parameters in the tab, and click save after modification.

3.2.1 INFO Tab Page

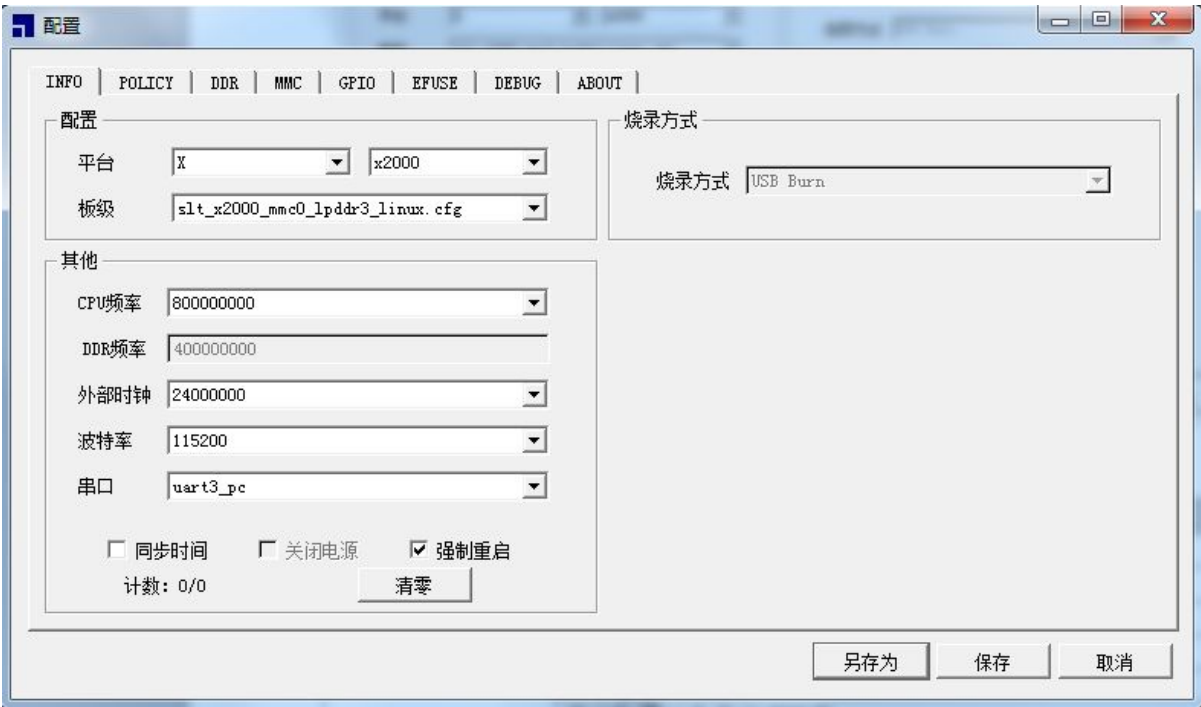


Figure 3-5 INFO Page

Function	Description
Config group	Select the CPU platform
	Select the corresponding FLASH configuration at the board level
Misc group	CPU frequency
	DDR frequency
	External crystal oscillator clock frequency
	Serial port configuration and baud rate
	Force restart after burning
	Supply power off after burning
	Synchronize local time to device rtc
	Number of burning and number of successful burning, reset button
Burn Way	Default USB burning mode

3.2.2 POLICY Tab Page

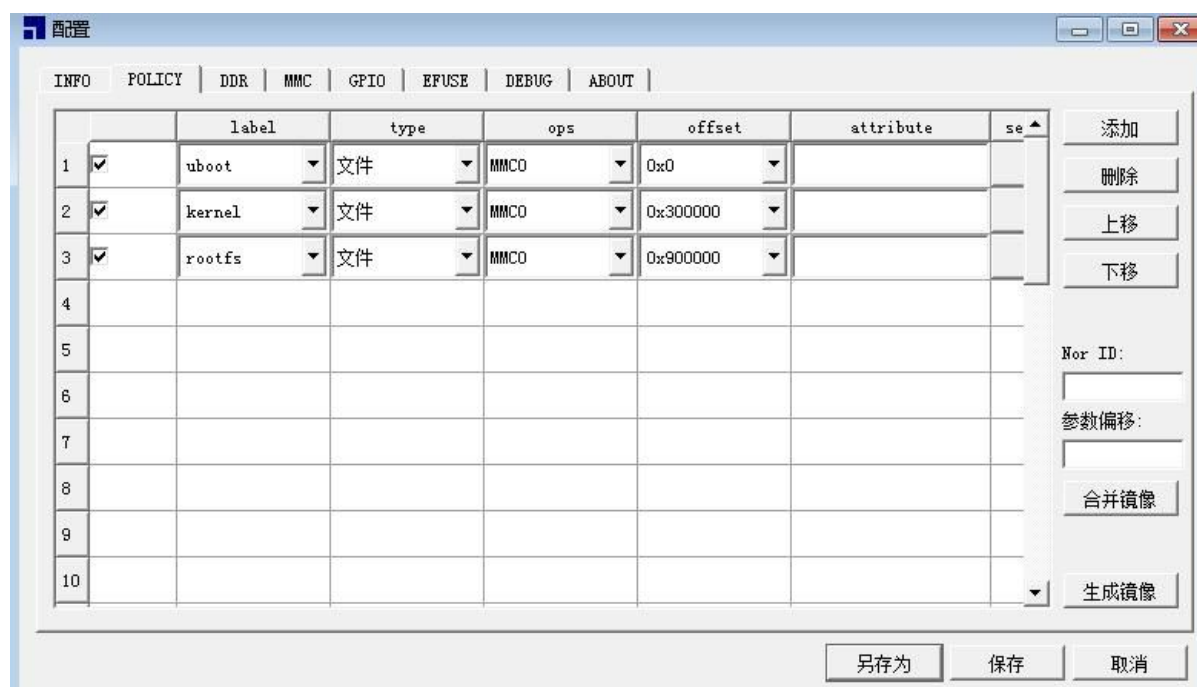


Figure 3-6 Policy Page

Policy Function	Option	Description
CheckBox		Whether to activate the current policy
label		The policy name, which is displayed in the relevant columns of the progress bar on the main interface.
type	FILE	Burn files
	INPUT	User input
	OEM_NP_OTP	Custom features
	I2C	Configure the value of the i2c register
	EPD	Firmware matching, function not implemented
	SNDEVICE	Read the serial number from the sn_device.cfg file
	SN_ADD	Configure the start sequence number in the policy, and automatically increase (+1) after successful burning.
	MAC_ADD	Configure the starting mac address in the policy, and automatically increase (+1) after successful burning.
	MACDEVICE	Read mac addresses from the mac_device.cfg file in sequence
	SCANNER GUN	Scanner input
	SQL	Custom function to obtain SN and MAC from database

	READ	Use the options option to read from the storage media.
ops	MEMORY	Read and write memory data, can read and write a controller register
	NAND_RAW	Write raw data to the parallel NAND flash
	NAND_OOB	Write data to the parallel NAND OOB area
	NAND_IMAGE	Write data to the parallel NAND through ZONE management
	MTD_RAW	Write raw data to the parallel NAND through MTD management
	MTD_UBI	Write UBI data to parallel NAND through MTD management
	MMC0	Read and write data to eMMC,SD card or SD NAND device under MSC0 controller
	MMC1	Read and write data to eMMC, SD card or SD NAND device under MSC1 controller
	MMC2	Read and write data to eMMC, SD card or SD NAND device under MSC2 controller
	I2C	Write data to the slave device over the I2C bus
	EFUSE	Writes data to the specified segment of EFUSE.
	REGISTER	Write data to the register address
	SFC_NOR	Read and write data to the SPI NOR FLASH through the SFC controller
	SFC_NAND	Read and write data to the SPI NAND FLASH through the SFC controller
	SFC_NAND_SN_WRITE	Write serial numbers to the specified area of the SPI NAND through the SFC controller
	SFC_NAND_MAC_WRITE	Write the MAC address to the specified area of the SPI NAND through the SFC controller
	SFC_NAND_LICENSE_WRITE	Write SPI NAND to the specified area of the LICENSE through the SFC controller
	SFC_NAND_SN_READ	Read the serial number to the specified area of the SPI NAND through the SFC controller
	SFC_NAND_MAC_READ	Read MAC to the specified area of the SPI NAND through the SFC controller
	SFC_NAND_LICENSE_READ	Read SPI NAND to the specified area of the LICENSE through the SFC controller
	SPI_NAND	Read and write data to SPI NAND through MTD management
	SPI_NOR	Read and write data to SPI NOR through MTD management

offset		The starting address of the burning partition.
attribute		Displays the settings, such as the path of the image selected during file burning.
settings		Click the "..."button and the corresponding settings box will pop up according to the options in different types.

Function	Description
Add/delete	Add and remove policy configurations
up/down	Select a row to adjust its position and modify the burning order.
Merge images	Merge the selected burned images into one image file. For more information, see 3.2.2.1 sections.
Generate images	Mark all the configuration and selected image files to be burned as files with the ingenic suffix. For more information, see 3.2.2.2 sections.

3.2.2.1 Merge Images

The merge Image function is to merge the image files check in the POLICY page into one image file. When merging, fill DDR ID and FLASH information to a specified location. The specific operations are as follows:

1. Select image
On the POLICY page, select the image file to be merged.

2. Nor ID
Before merging images, fill in the NOR information and partition information parameters at the end of the SPL Image. On the SFC NOR information page, query the supported NOR parameters. Enter the value in the ID list, as shown in the following figure:

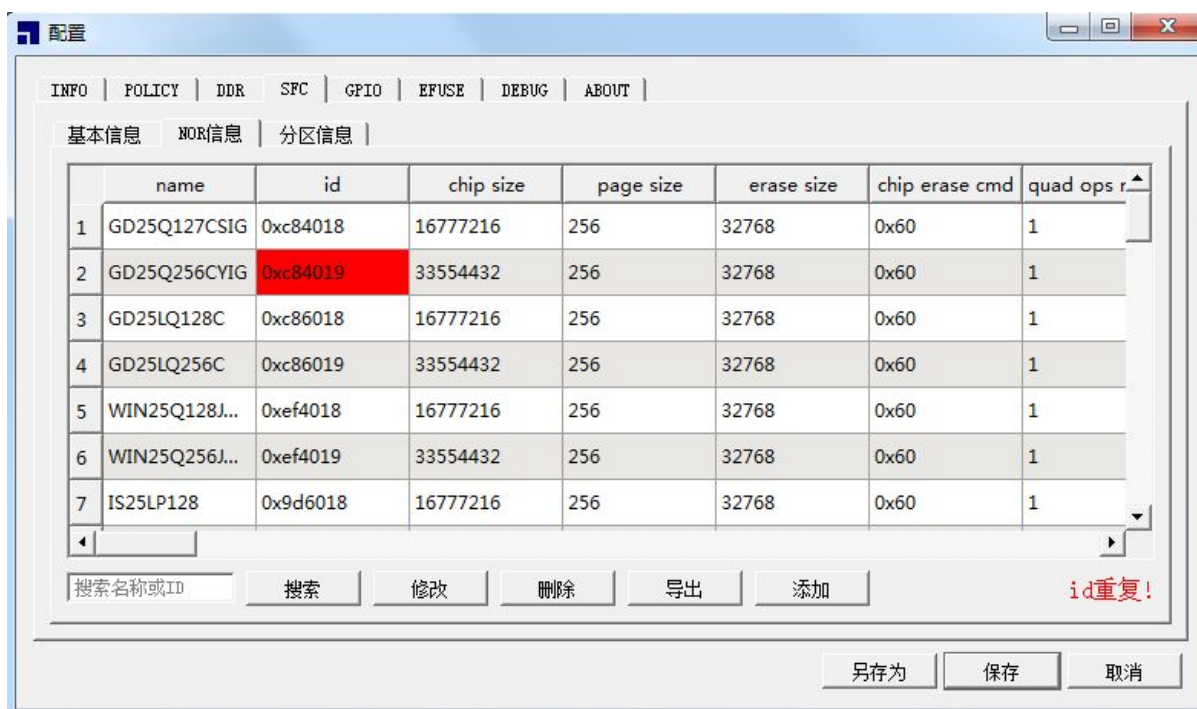


Figure 3-7 search NOR ID

3. Parameter offset

Before merging images, neither information and partition information parameters are filled into the offset address at the end of the SPL Image.

the **CONFIG_SPIFLASH_PART_OFFSET** defined in the board-level header file in the u-boot/include/configs/ directory must be consistent, otherwise, the startup fails. for example:

Platform	Board-level header file	Offset
X1000	halley2.h	0x3C00
X2000	halley5.h	0x5800

4. Merge images

Click merge images. the image.bin file is generated in the selected image directory.

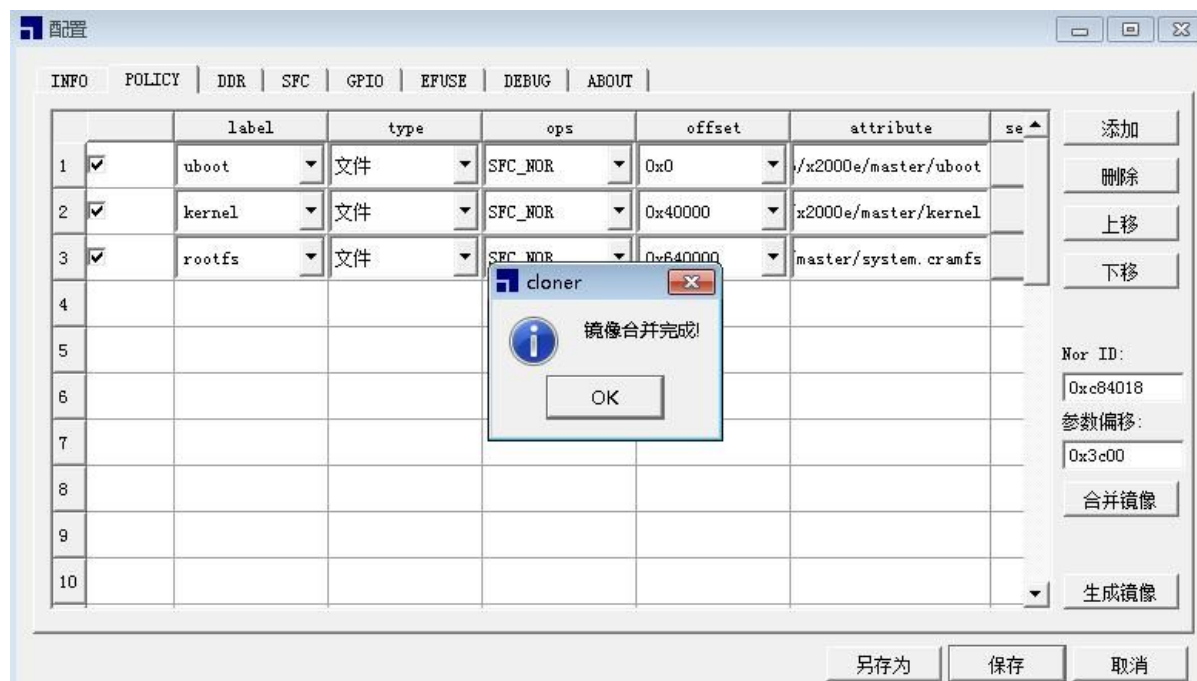


Figure 3-8 image merging completed

3.2.2.2 Generation Image

The image generation function is to package the current configuration file and the image file selected on the POLICY page into a .ingenic suffix file. when using the image, click the "load image" button on the mainwindow to select the ingenic file. at this time, the configuration file used by the burning tool is updated to the tmp directory generated by ingenic decompression. The procedure is as follows:

Step	Description
1	Select the corresponding platform and board-level configuration
2	Modify the burning policy configuration
3	Click Save
4	Click generate image
5	Select the path and file name to save the ingenic file
6	Click "save" to automatically close the prompt window after the image is generated

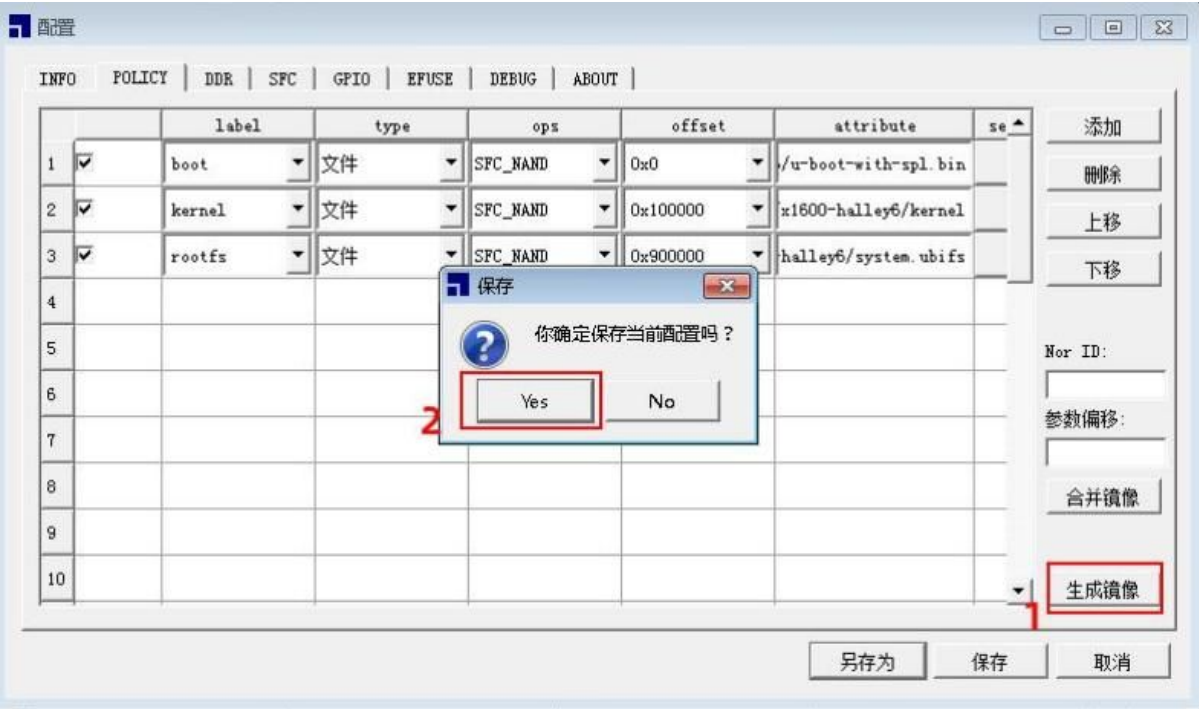


Figure 3-9 generation image

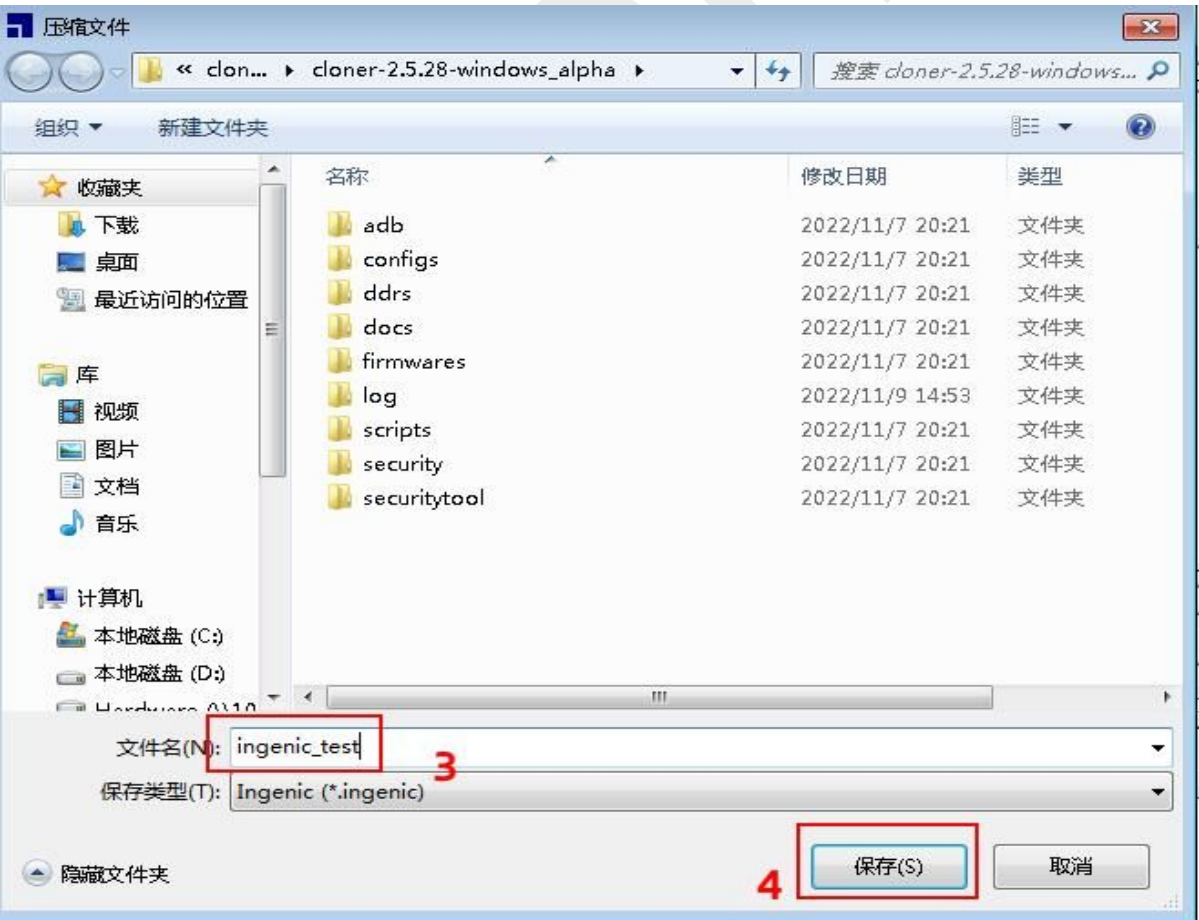


Figure 3-10 Save the ingenic file

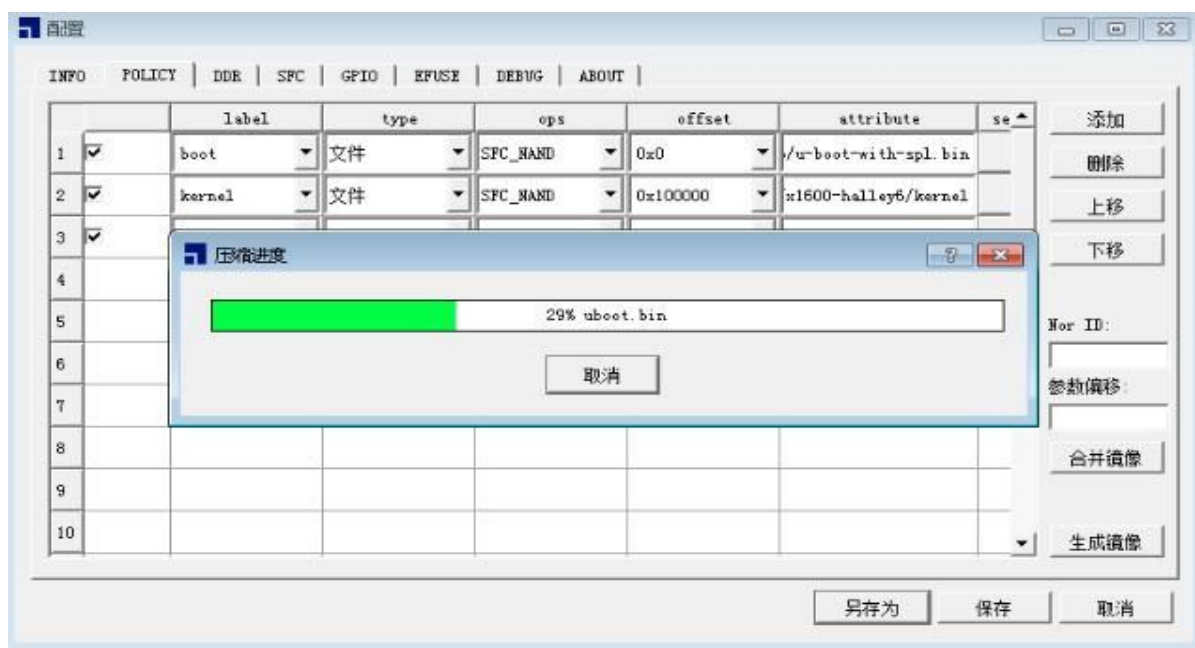


Figure 3-11 Image generation progress

3.2.3 SFC Tab Page

3.2.3.1 base info tab page

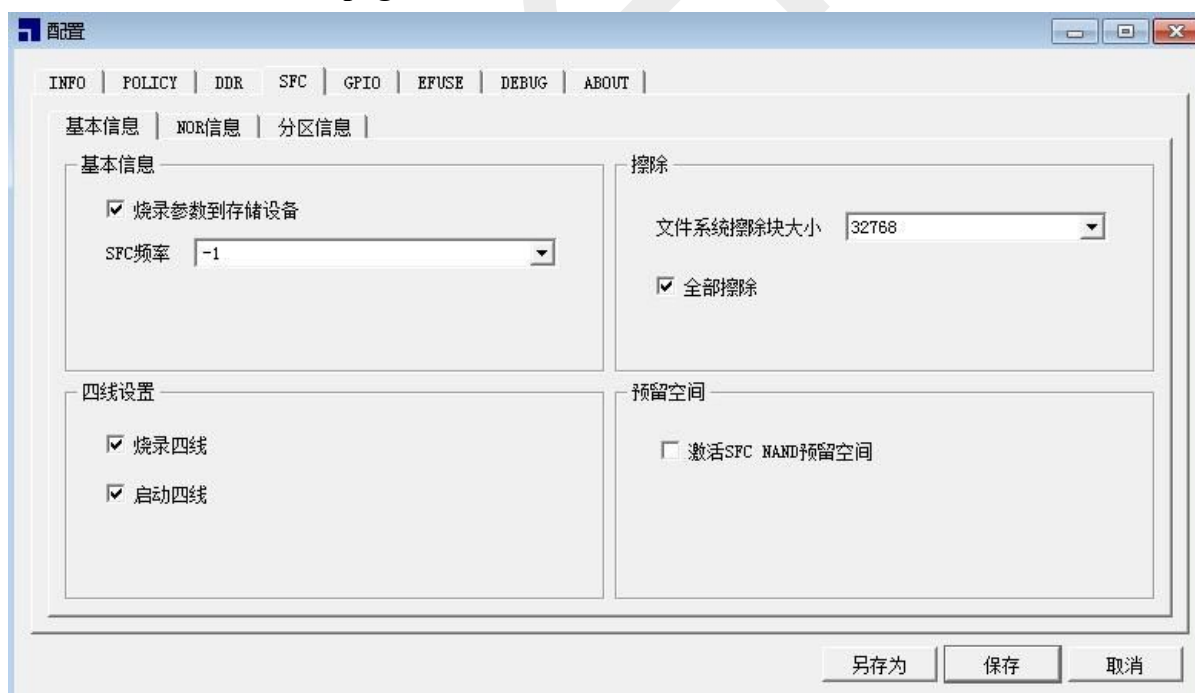


Figure 3-12 SFC tab page

Function	Option	Description
Base Info	Burn parameters to the storage device	Check the "Download parameters to flash" after will written the FLASH information and partition information to the specified location.

	SFC frequency	Select SFC burning frequency. by default select -1 to use the default frequency defined in the uboot burning board-level header file.
Erase	File system erase block size	This parameter is the block size parameter when using the FLASH read/write wipe command in the file system, which must be consistent with the file system production command parameter.
	Erase All	If you select this option, the FLASH will be erased before burning. otherwise, the FLASH will be erased by partition.
Quad settings	burn quad	When selected, the four-line read/write mode is used for burning. otherwise, the single-line burning mode is used.
	boot quad	Four-wire read/write mode is used when u-boot loads the kernel at startup.
Reserved space	Enable SFC NAND reserved space	If this option is selected, the FLASH reserved area cannot be erased in both burning and startup. The area is defined in u-boot and kernel code. Data in the region can only be read and written through specific interfaces.

3.2.3.2 NOR Tab Page

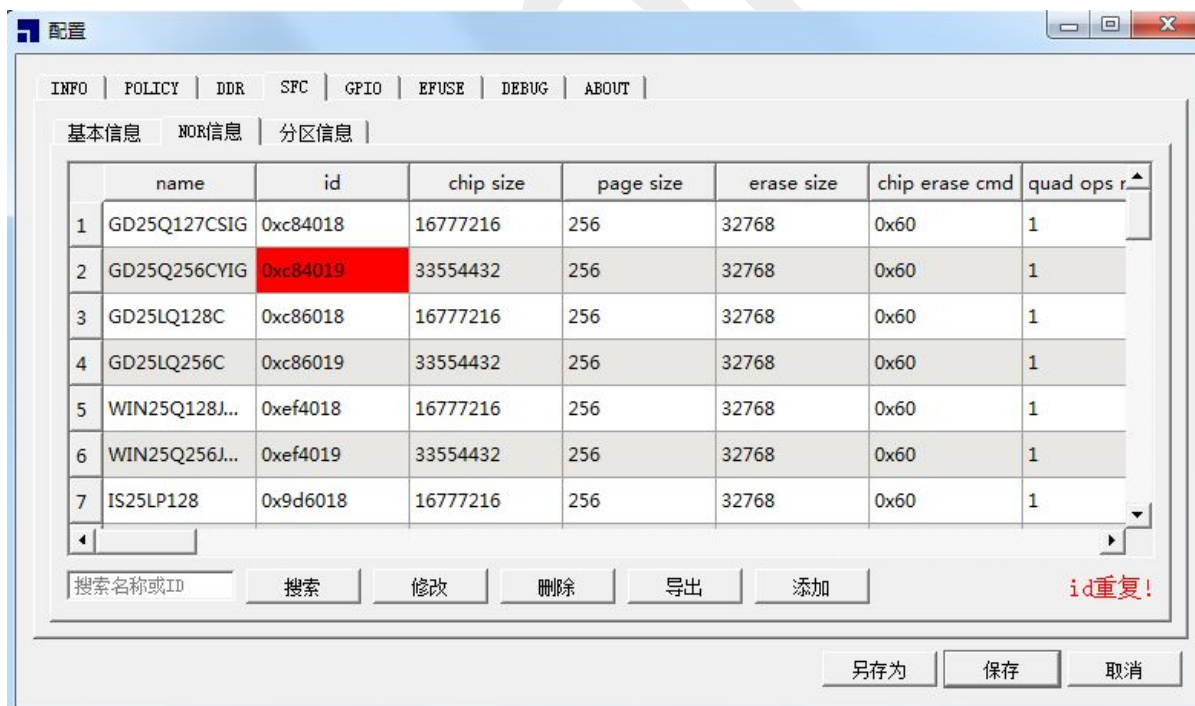


图 3-13 NOR Info Tab Page

Note: The ID is duplicate in the parameter list. after confirming the actual model, delete or modify other duplicate parameters. otherwise, the burning may fail or be repeated due to parameter errors.

3.2.3.3 Add and Modify NOR Information

add or modify the NOR information interface, as shown in the following figure.

spi nor base info		spi nor timing info	
name:	GD25Q256CYIG	tCHSH:	5
id:	0xc84019	tSLCH:	8
chip size:	33554432	tSHSL_RD:	20
page size:	256	tSHSL_WR:	20
erase size:	32768		
chip erase cmd:	0x60		
quad ops mode:	1		
address ops mode:	0		
block erase time:	200		

Figure 3-14 add/modify NOR information window

Note:

Add NOR parameters see "[SPINOR parameter description documentation.pdf](#)".

Add NAND parameters see "[SPINAND parameter description documentation.pdf](#)".

3.2.3.4 Export NOR Information

Select the NOR parameter row to export and click export. the exported NOR parameter files **norinfo.h** and **norinfo.json**, are exported to the NOR information window.



Figure 3-15 export NOR information

3.2.3.5 Partition Information Tab Page

add and modify and delete partition information for the partition page.

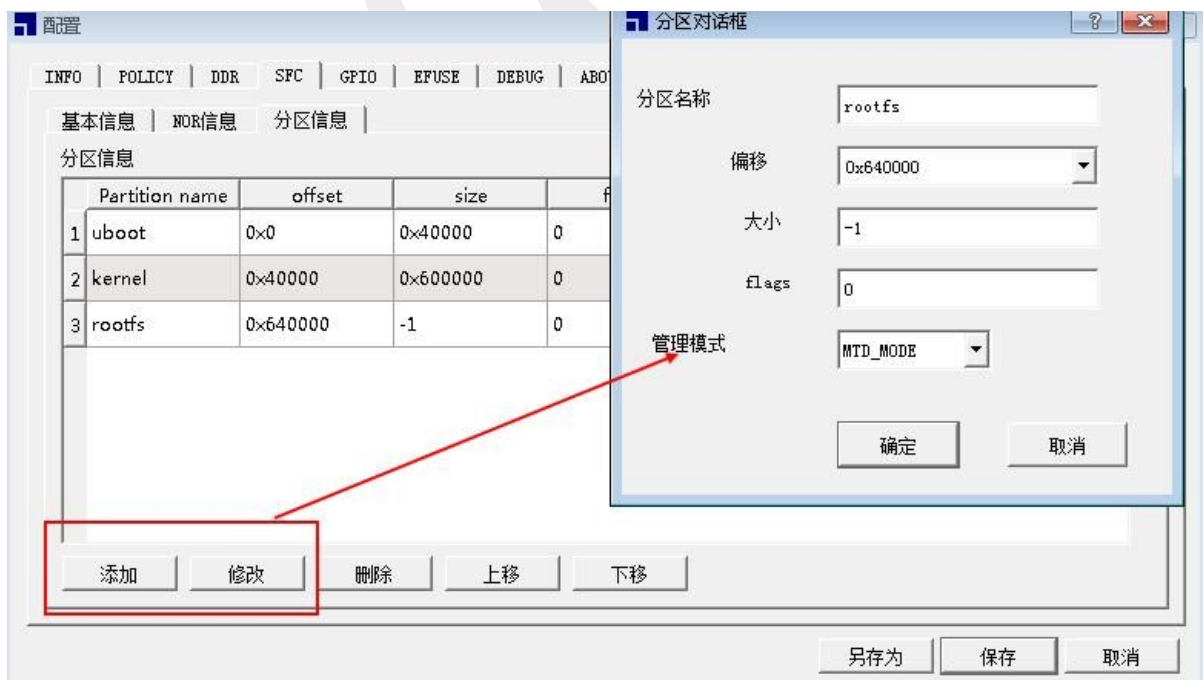


Figure 3-16 Add/modify partition information

Function	Option	Description
Partition name		The partition name. Note that the OTA configuration must be consistent with the partition name in the code.
Offset address		Partition offset addresses must be aligned by erase block size
Partition size		The partition size must be aligned according to the erase block size. when -1 is configured, the remaining space from the partition offset address to the end of FLASH
FLAG	0	Read and write permissions
	1	Write-only permissions
	2	Read-only permissions
Management Mode	MTD_MODE	During burning, the entire partition is erased before the original data is written to FLASH.
	MTD_D_MODE	During burning, the data size is erased by block before writing the data to FLASH.
	UBI_MANAGER	Write UBI file system to FLASH through UBI management during burning

3.2.4 MMC Tab Page



Figure 3-17 MMC tab page

Function	Options	Description
----------	---------	-------------

Force erase	Erase before burning	Select full or partial
	All	Erase all eMMC or SD card before selecting and burning
	Part	When you select this option, you need to set the range of 16 decimal digits.
Enhanced partition	User-enhanced partitioning	When the storage method is changed from MLC or TLC to SLC, the storage space will be reduced exponentially.
	Add general enhanced partitions	A maximum of four physical partitions can be added. the starting address of each partition is 0x 0, which reduces the read and write performance. Generally, it is not used and can be considered when multiple CPUs are used.

3.2.5 NAND Tab Page

When you select the NAND configuration, the NAND tab appears in the configuration window, which contains the Nand information, partition management, Erasure, MTD, and NAND function pin tabs.

3.2.5.1 NAND Tab Page

The NAND Information tab displays several common NAND parameters. You can add, modify, delete, and filter NAND information based on keywords, as shown in the following figure.



Figure 3-18 NAND tab page

3.2.5.1.1 Add and Modify NAND Parameter

Click the add or modify button. a parameter modification window appears. please refer to the specific FLASH manual to fill in.

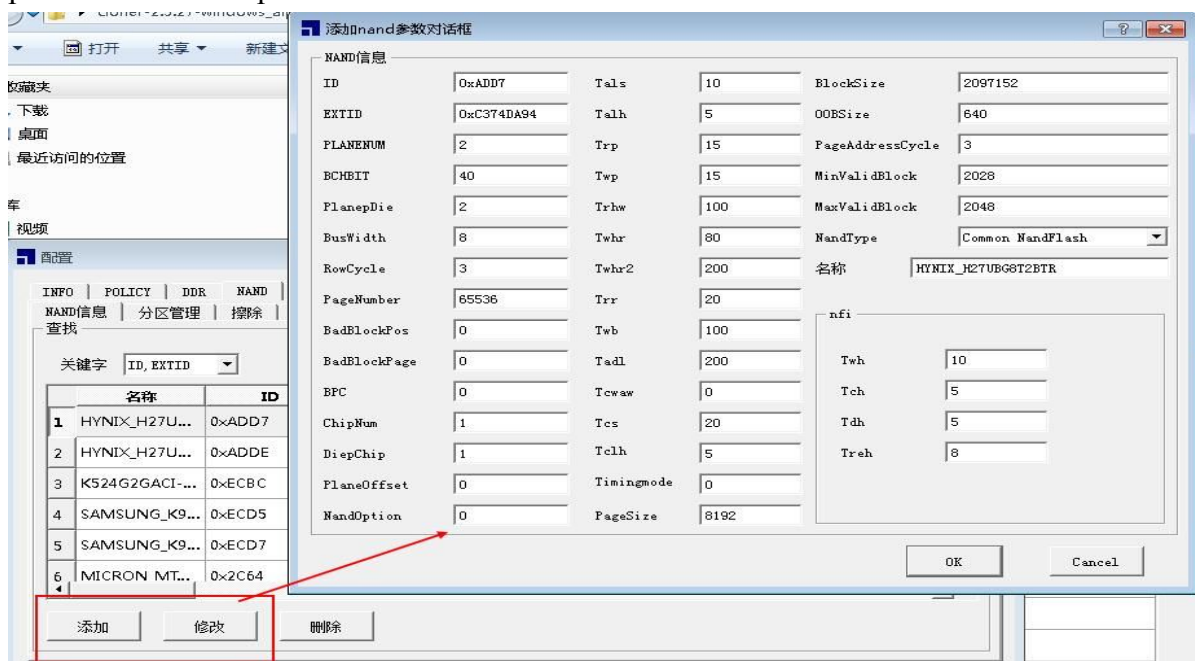


Figure 3-19 NAND add/modify window

3.2.5.2 NAND Partition Tab Page

On the partition management page, configure the partition information and graphically display the total capacity of the partition.



Figure 3-20 NAND partition management tab page

3.2.5.2.1 Add and Modify Partition

Add and update partition information, as shown in the following figure.

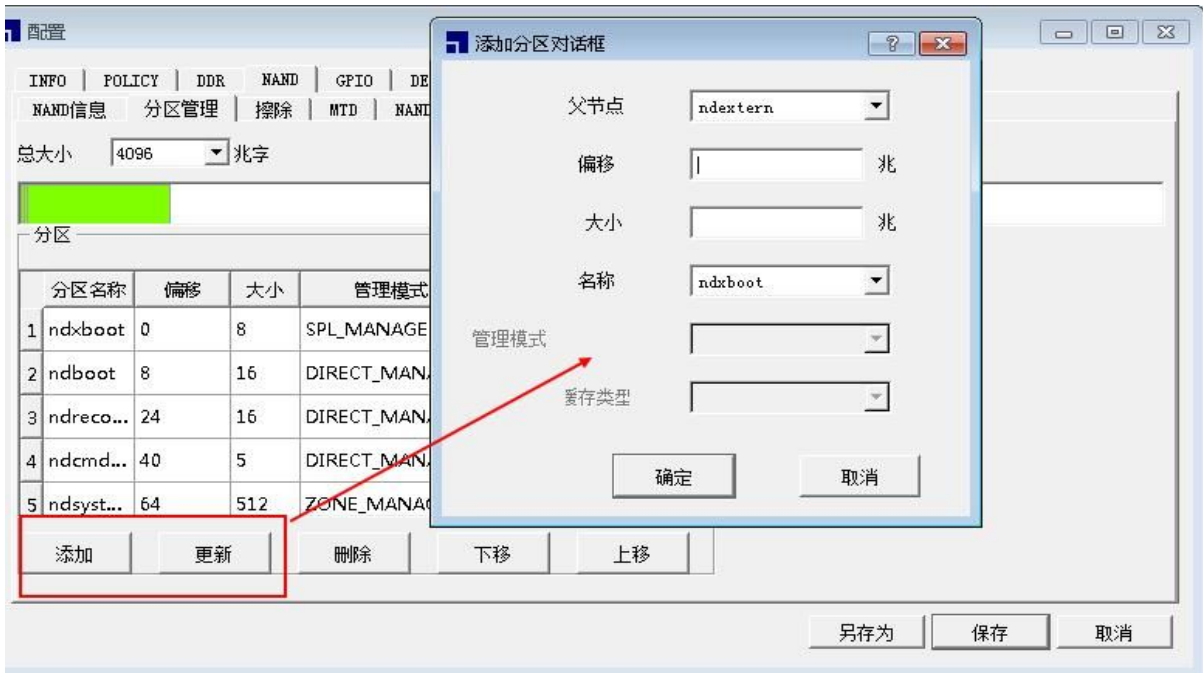


Figure 3-21 add/update partition window

Function	Options	Description
Father node		The primary partition on which the current subpartition depends. If it is None, it indicates the current primary partition.
Offset		The actual offset of the current primary partition or the offset of the subpartition from the primary partition of the parent node.
Size		Current partition size
Name		The name of the current partition. You can select an existing partition or enter it yourself.
Management Mode	SPL_MANAGE	Used to manage XBOOT/UBOOT partitions
	DIRECT_MANAGER	Used to manage NDBOOT and RECOREY partitions
	ZONE_MANAGER	Used to manage NDSYSTEM partitions
Cache type	Cached	
	UnCached	

3.2.5.3 NAND Erase Tab Page

The NAND Erase tab contains the erase method and whether to erase partitions. Generally, you can choose not to erase or force full erase (nand developers may use factory erasure or normal erasure). In order to keep a partition when upgrading the system, you can cancel the check box of the partition that you do not want to erase when you select force full erase. As shown in the following figure.

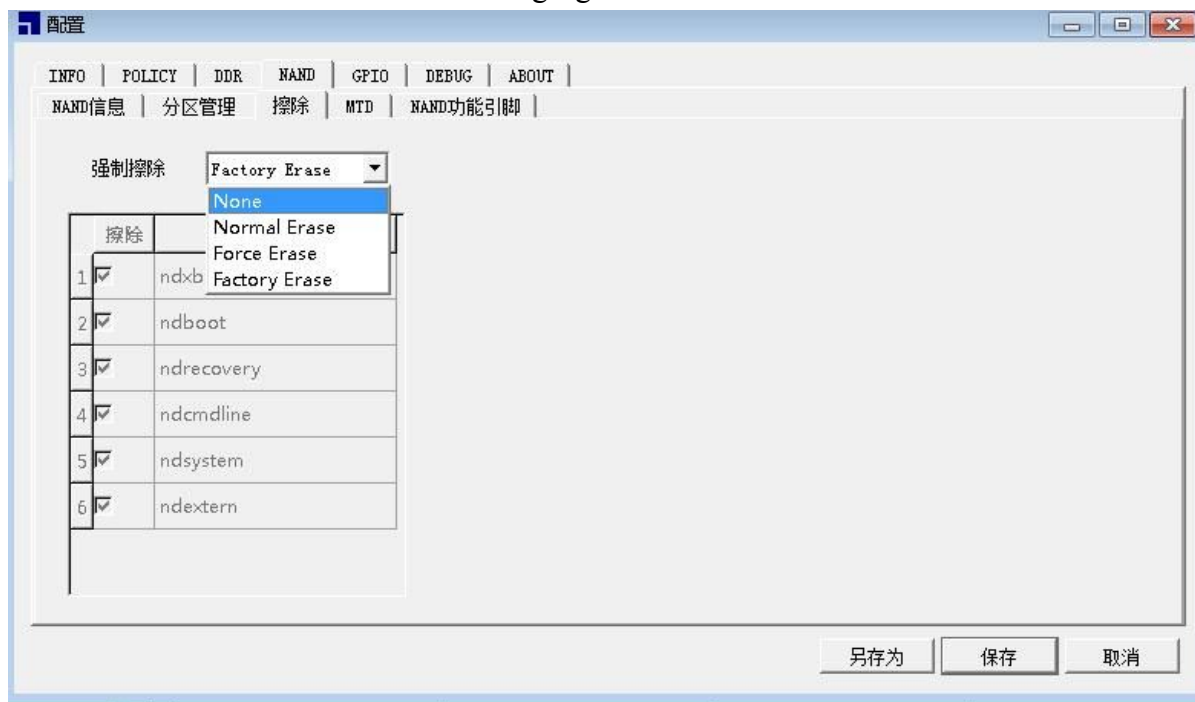


Figure 3-22 NAND erase tab page

Function	Option	Description
Force erase	None	No erase
	Normal erase	Skip bad blocks erase
	Force Erase	Skip bad blocks erase
	Factory Erase	Skip bad blocks erase

3.2.5.4 MTD Manager Tab Page

The MTD tab includes partition tables and erasure methods. we recommend that you set the size of the last UBI management partition to -1, indicating that the partition size is the remaining space from the current partition to NAND. As shown in the following figure.

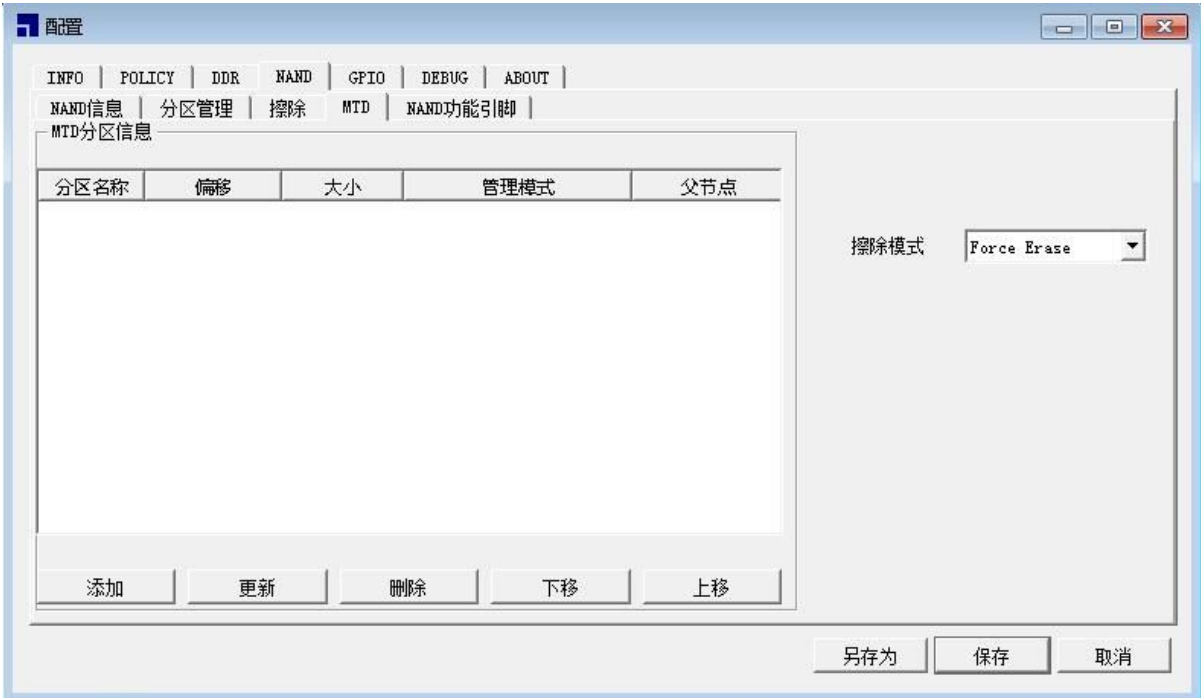


Figure 3-23 MTD tab page

Function	Options	Description
Add		Add new partition information
Update		Modify the information of the selected partition.
Delete		Delete the selected partition
Up/Down		Adjust the position of the selected partition
Erase mode	None	No erase
	Force Erase	Full erase includes factory bad blocks
	Factory Erase	Full erase skipping bad blocks

3.2.5.4.1 MTD Add Partition

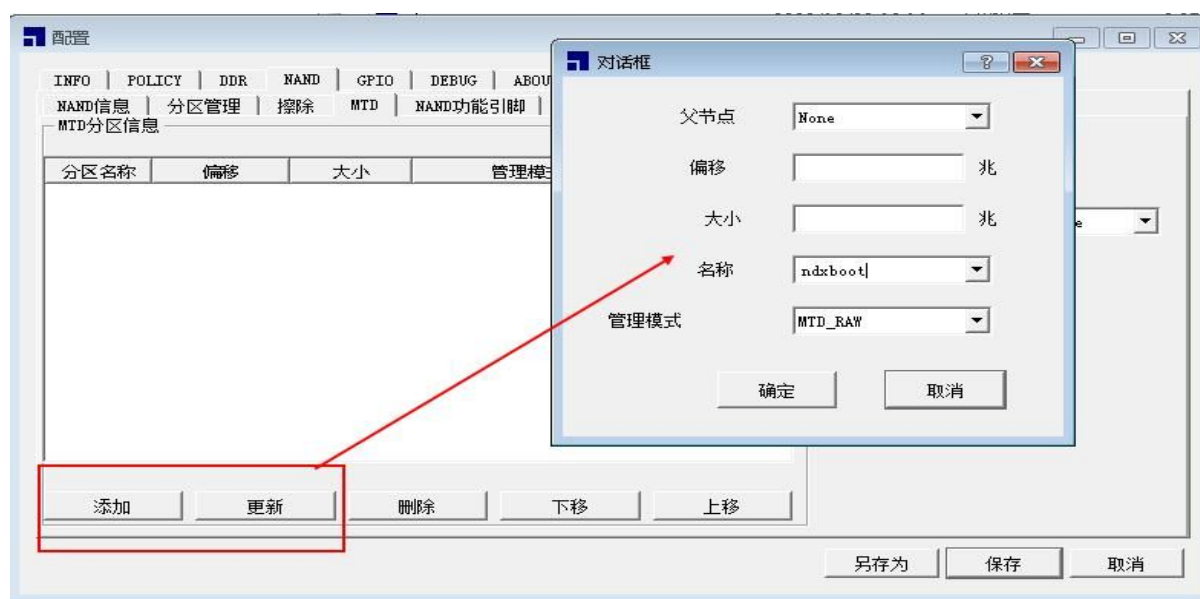


Figure 3-24 add partition information

Function	Option	Description
Father node		The primary partition on which the current subpartition depends. If it is None, it indicates the current primary partition.
Offset		The actual offset of the current primary partition or the offset of the child partition from the primary partition of the parent node.
Size		Current partition size
Name		The name of the current partition. You can select an existing partition or enter it yourself.
Management Mode	MTD_RAW	Manage RAW data through MTD
	MTD_UBI	Manage UBI data through MTD

3.2.5.5 NAND Function PIN

Configure the driving capability of the NAND pin, as shown in the following figure.

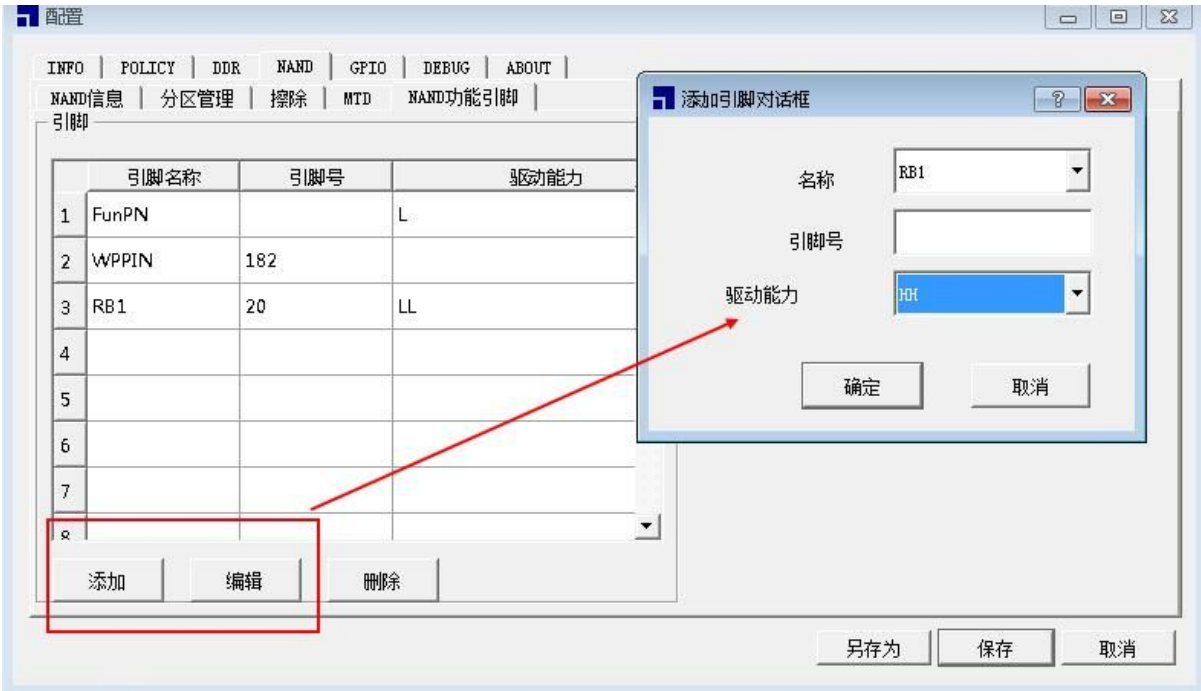


Figure 3-25 NAND pin function settings

Function	Description
Add	Add a new pin setting
Modify	Modify the selected pin settings
Delete	Delete the selected pin settings

PIN Setting Window	描述
Name	Pin Name
PIN Number	Pin GPIO, "-1" indicates not used
Drive Strength	"L" indicates low level, "H" indicates high level,HH, H, L, LL respectively correspond to the four parameters of the driving capability of the pin 0~3

3.2.6 DDR Tab Page

DDR parameters are display, **user are not recommended to modify.**

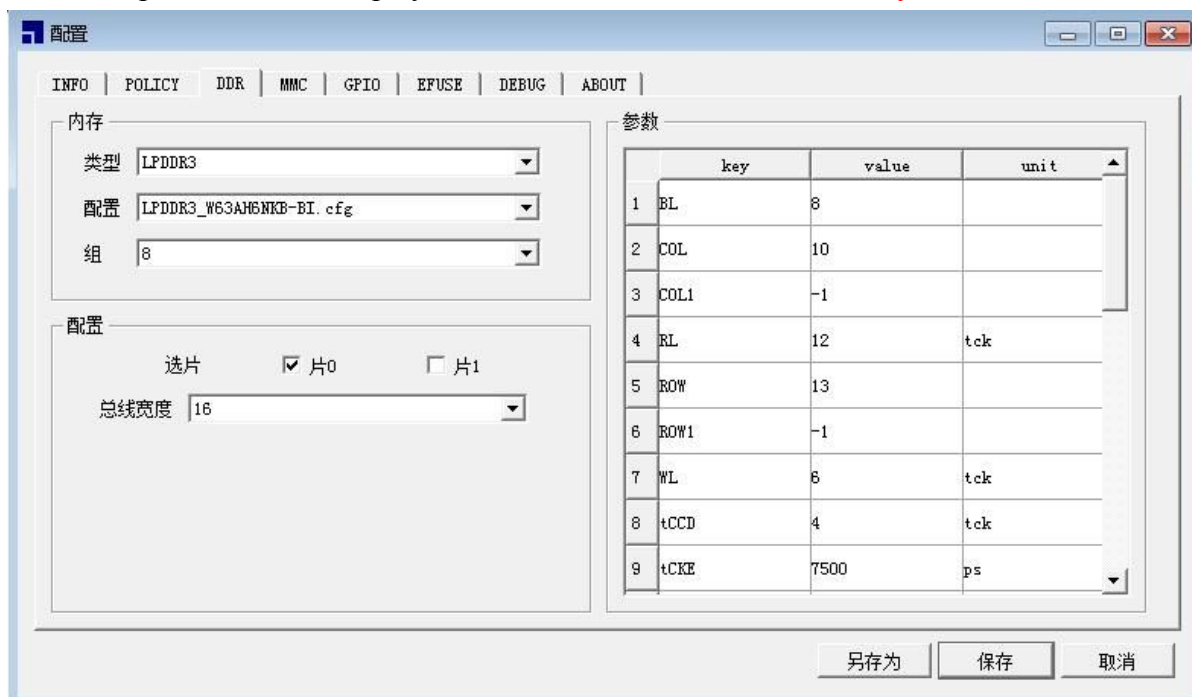
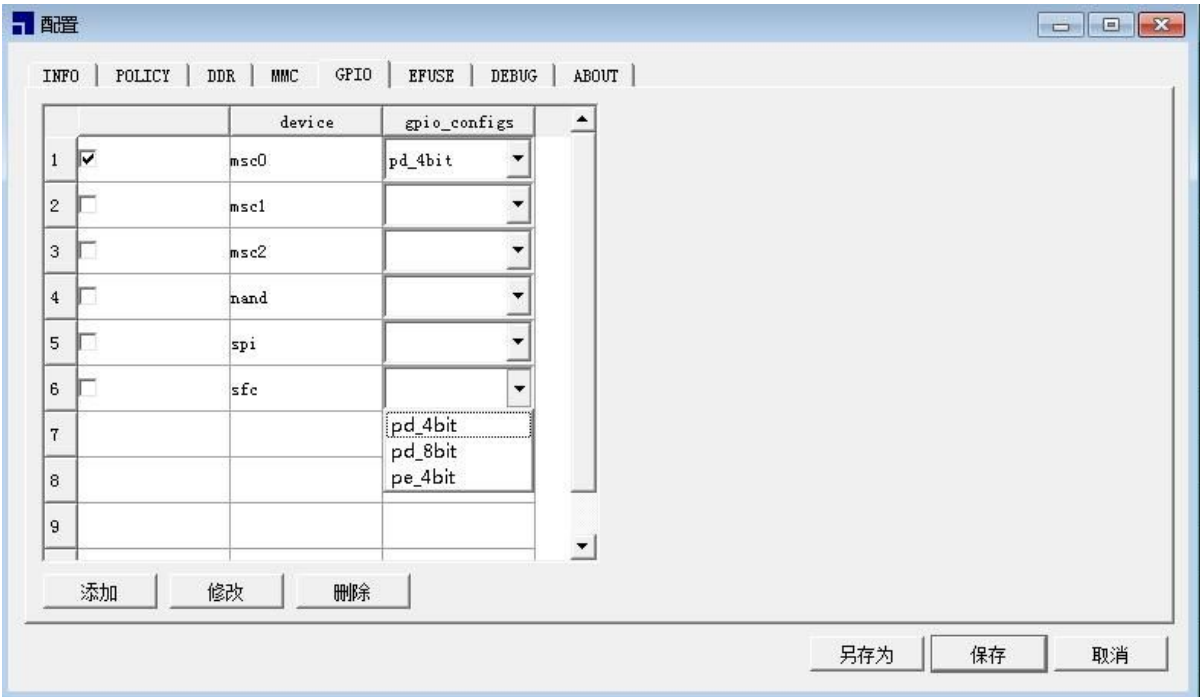


图 3-26 DDR configuration page

Function	Description
Type	Memory Type
Config	Parameter file named after memory model
Bank	How many groups of storage arrays are there? Refer to the memory Manual. How many BA address lines are there, For example, BA0-BA2, $2^3=8$, which can be 8 groups
Chip	There may be multiple pieces of memory sharing the same piece selection line, select according to the actual situation
Bus width	Number of DQ data lines in memory
Parameters	Refer to the memory manual and JEDEC Manual

3.2.6 GPIO Tab Page



3.27 GPIO Tab Page

Function	Description
Add	Add GPIO configuration
Modify	Modify the selected GPIO configuration
Delete	Delete the selected GPIO configuration

Add/Modify Window	Description
Device Name	The name displayed in the device column in The GPIO configuration table.
Pin Name	The options displayed in the gpio_configs column in The GPIO configuration table
GPIO Group	For example, GPIO PA to PD groups
Function	Refer to the GPIO section of PM Manual to describe GPIO pin functions.
Pins	Input the enable pin of hexadecimal number. The enable bit is 1 and the non-enable bit is 0.

3.2.7 EFUSE Tab Page

This interface contains "security", "enable IO" and "EFUSE segment table" as shown in the following figure.

Note: EFUSE can only be written once. please learn more about the secure burning function and use it with caution!



Figure 3-28 EFUSE tab page

Function	Options	Description
Safe burning	Burning key	Burn USERKEY and RSAKEY HASH to the corresponding EFUSE segment
	Activate security mode	Set the EFUSE PRT field to activate the security mode.
Enable pin		When writing EFUSE, you need to configure AVDEFUSE enable GPIO.
Enable pin status	low active	
	high active	
EFUSE field table		Refer to the EFUSE section of the PM Manual. No modification is recommended.

3.2.8 DEBUG Tab Page

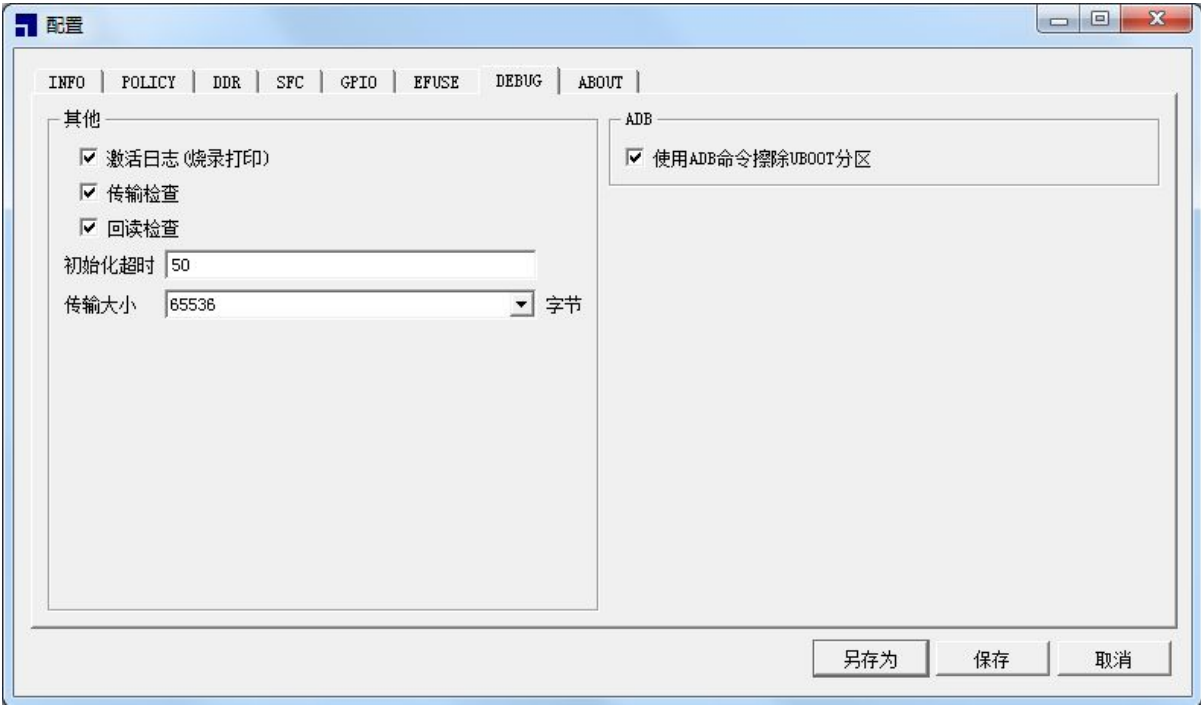


Figure 3-29 DEBUG tag page

Function	Description
Enable log	Control serial port printing in the burning process, less printing can improve the burning speed
Transmission check	The burning tool transmits data to the device through USB and then checks CRC
Read back	Whether the comparison of read-back data after burning data to FLASH is incorrect
Initialization timeout	Configure the maximum duration for initializing FLASH
Transmission size	The size of data transmitted by USB at a time during burning
ADB	Use the ADB command to erase UBOOT and restart it to enter the burning mode.

3.2.8.1 ADB erase

First, the device needs to support the ADB function. Then, select "use ADB command to erase the UBOOT partition" and use ADB command to erase the UBOOT partition of the device. After the device is restarted, it will enter the USB burning mode because there is no SPL boot.

Note: To prevent misoperation of erasing UBOOT partitions, the ADB erasure function is hidden. You need to manually modify the configuration file to enable the secondary function.

Edit configs/platform.cfg,erase_uboot = 1 enabled, erase_uboot = 0 disabled.

3.2.9 ABOUT Tab Page



Figure 3-30 ABOUT

Function	Description
Copyright Statement	Copyright Statement of Ingenic USB burning tool
Update Check	Check and download the latest version of the burning tool when connected to the Internet
Automatically check for updates	Check the latest version each time you run the burning tool

4 Burn Policy

The default configuration is provided under the board-level configuration of the burning tool. You can change the configuration according to the actual situation and save it as a new board-level configuration. For example, the corresponding board-level configuration under the X2000 platform should be selected according to the storage devices in the following table actually used by the halley5 development board:

Storage Media	Board Config
eMMC	x2000_mmc0_lpddr3_linux.cfg
SD card	x2000_mmc2_lpddr3_linux.cfg
SPI NOR	x2000_sfc_nor_lpddr3_linux.cfg
SPI NAND	x2000_sfc_nand_lpddr3_linux.cfg

4.1 Read Data

This operation is used for development and debugging to check and copy data in the storage medium.

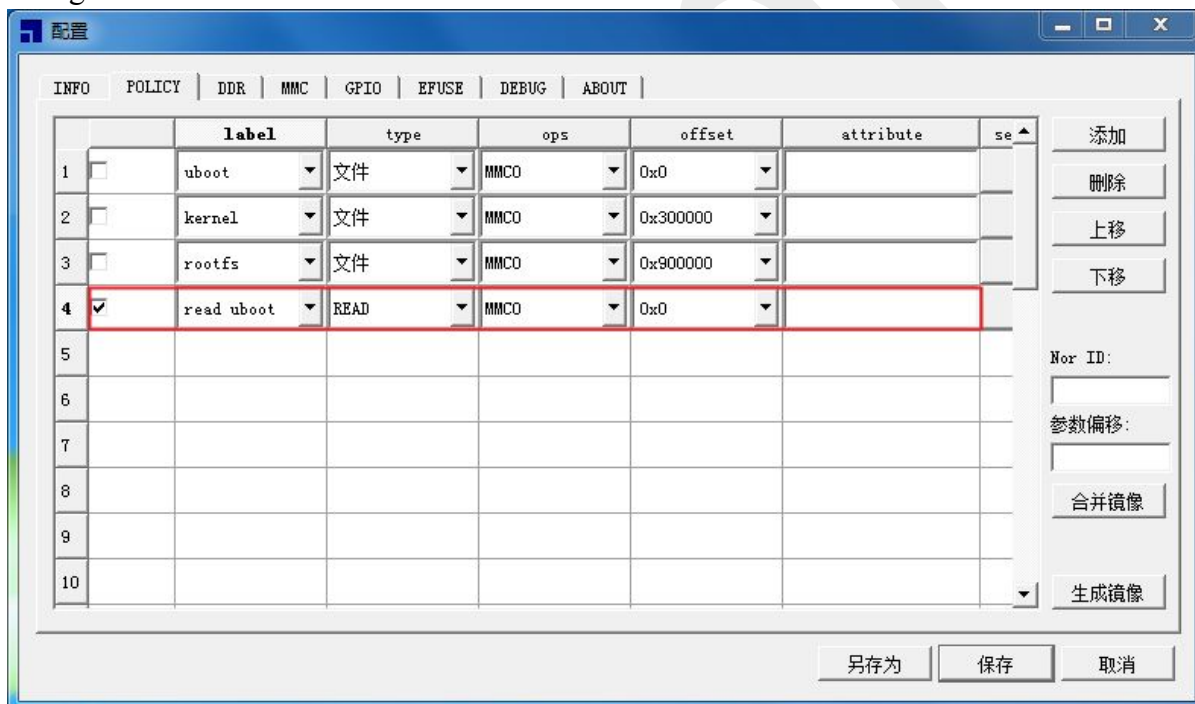


Figure 4-1 Read data configuration

Step	Operation	Result
1	Click "config" button	The configuration window appears.
2	Select a platform and board-level configuration for the device	Update configuration window
3	Click the POLICY tab	Switch to the policy configuration page
4	Click "add" button	Add a new policy to the policy table
5	Configure the new policy TYPE and select the READ option	Read operation

6	Configure the new policy OPS and select the appropriate storage device	From which device
7	Configure the new policy OFFSET and enter the OFFSET address	Read from device offset configuration
8	Configure a new policy LABEL and enter a policy name	Display policy name
9	Optional. Click "..." in the settings column to select the path to save the file	<p>1. The path of the configuration file. The data read each time is appended to the specified file.</p> <p>2. The file path is empty. Data read each time is written to the default read_from_flash.bin file in overwrite mode.</p>
10	Click "Save" button	Close the configuration window and save the configuration file
11	Click "Start" button	Read data and save it to a local file

4.2 File Type

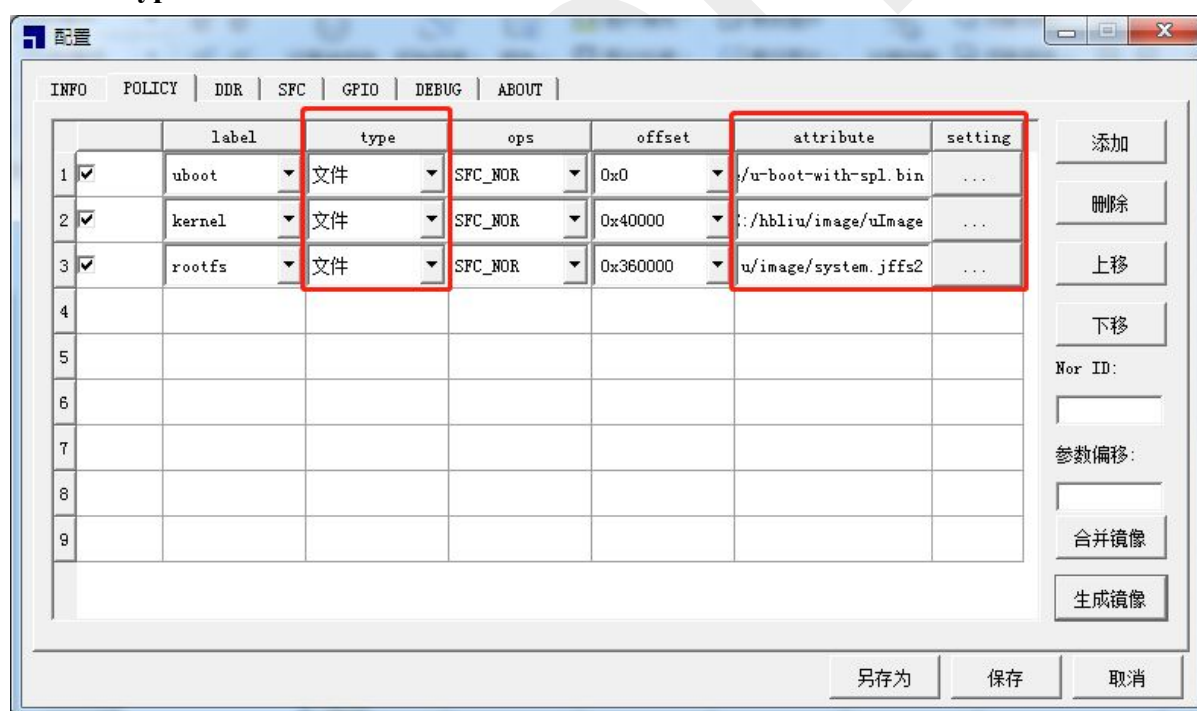


Figure 4-2 Burn file configuration

Step	Operation	Result
1	Click the "config" button	Pop up the configuration window.
2	Select a platform and board-level configuration for the device	Update configuration window
3	Click the POLICY tab.	Switch to the policy configuration page

4	Select the check box	Activate the default file policy
5	Click "... " in the settings column	The file selection window appears.
6	Select the file to be burned and click the Open button.	The path of the burned file is displayed in the policy attribute.
7	Click the "Save" button	Close the configuration window and save the configuration file.
8	Click the "Start" button	The device enters the burning mode and starts to burn

4.3 Burn SN

4.3.1 SN_ADD



Figure 4-3 SN_ADD configuration

Add a burning serial number, follow these steps.:

Step	Operation	Result
1	Click configure	The configuration window appears.
2	Select a platform and board-level configuration for the device	Update configuration window
3	Click the POLICY tab.	Switch to the policy configuration page
4	Click the Add button.	Add a policy to the policy table
5	Select the check box	Activation policy
6	Select the SN_ADD type	Switch policy type

7	Enter the policy name "sn add"	The name is displayed on the progress bar of the main interface.
8	Enter the offset address	Write to storage device location
9	Click "..." in the settings column.	The serial number setting window appears.
10	Configure the serial number and the number of burn requests as required.	Configure the data written to the storage device
11	Click Save	Close the configuration window and save the configuration file.
12	Click the Start button.	The device enters the burning mode. After the burning is successful, the serial number of the next burning will be increased by 1 in hexadecimal.

In configs/rules.cfg, you can configure serial number rules:

prefix (prefix) 0 (index) = Ss (regular expression): 1 (number of bits)

rules.cfg definition	Description
[sn] prefix0=Ss:1 prefix1=0-9:1 prefix2=0-9a-zA-Z:1 prefix3=0-9a-zA-Z:2 prefix4=0-9a-zA-z:1 prefix5=0-9z-yZ-Y:4 prefix6=0-9:1 prefix7=0-9a-cA-C:1 prefix8=0-9:2 serial0=0-9a-fA-F:4 portfix0=	SN rule definition The first character in the prefix can contain uppercase and lowercase letters. The second character prefix allows you to enter a number from 0 to 9. You can enter numbers and any letters for each character with the third prefix. The prefix can contain digits and any letters. The 6th character prefix allows you to enter numbers and any letters. Prefix 7-10 characters allow you to enter numbers and uppercase letters z and y The 11th character prefix allows you to enter a number from 0 to 9. The 12th character prefix allows you to enter numbers and uppercase letters from a to c. The prefix 13-14 characters allow you to enter two digits from 0 to 9. The serial number allows you to enter a four-digit hexadecimal number. Suffix rules

4.3.2 Scanning Gun

4.3.3 Input

The operation is basically the same as that of the scanner. the scanner is used as an example.

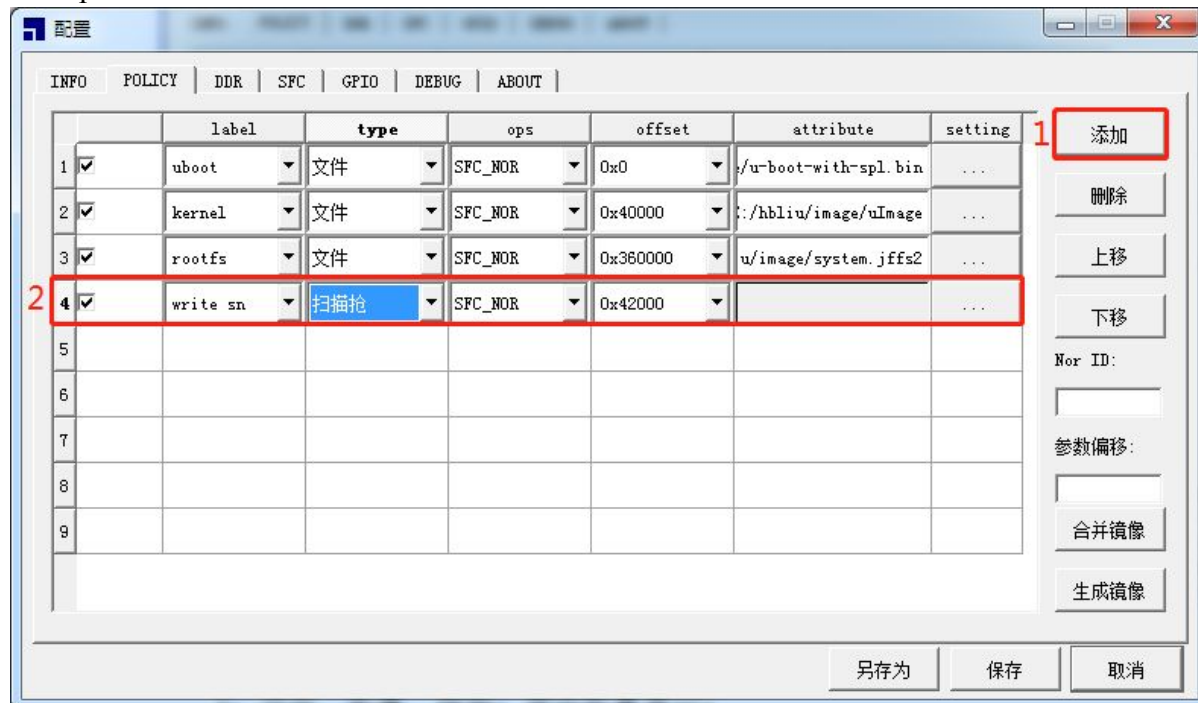


Figure 4-4 scanner gun configuration

Step	Operation	Result
1	Click configure	The configuration window appears.
2	Select a platform and board-level configuration for the device	Update configuration window
3	Click the POLICY tab.	Switch to the policy configuration page
4	Click the Add button.	Add a policy to the policy table
5	Select the check box	Enable policy
6	Select the scanner type	Switch policy type
7	Enter the policy name "scanner"	The name is displayed on the progress bar of the main interface.
8	Enter the offset address	Write to storage device location
9	Click Save	Close the configuration window and save the configuration file.
10	Click the Start button.	The device enters the burning mode, and an input window pops up when the scanner policy is fired
11	The scanner is aimed at the bar code or QR code.	Obtain data and display it in the input window

12	Click OK	Barcode data is burned to the storage device
----	----------	--

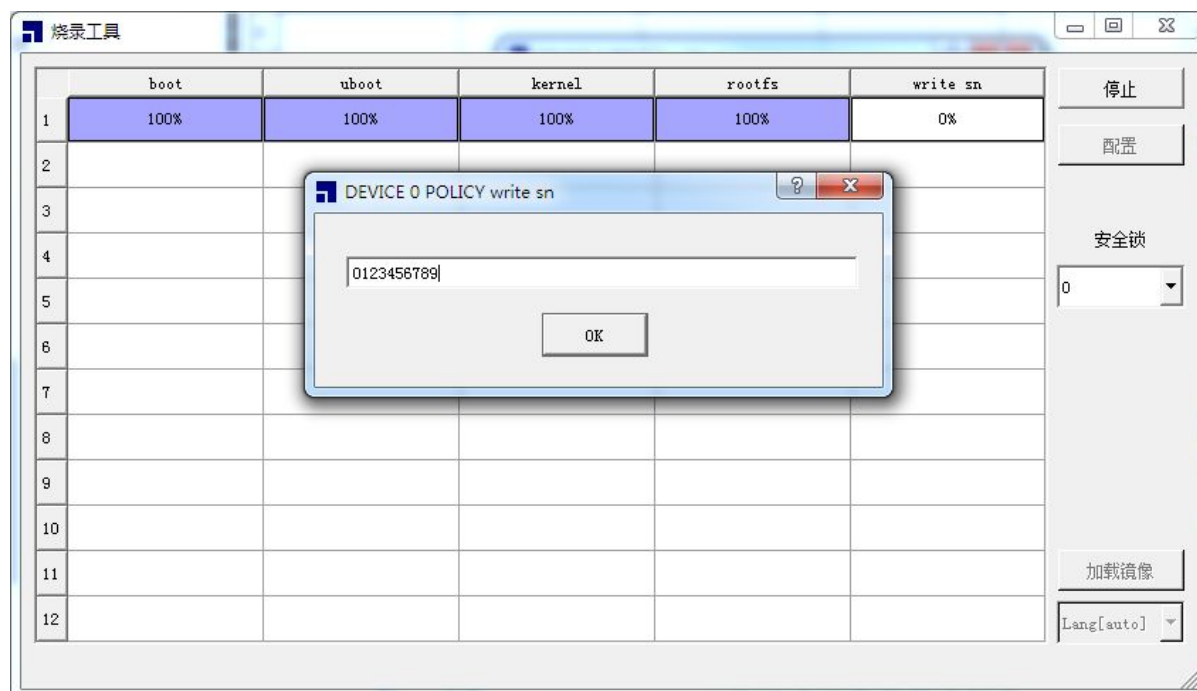


Figure 4-5 scanner input

4.3.4 SNDEVICE

Select "SNDEVICE" in the burning tool policy to read the serial number from the file in two ways:

1. If you do not specify a file, the serial number under the corresponding index is read from the sn_device.cfg file by default.
2. Specify a file with a serial number and continuously burn the same serial number to different devices.

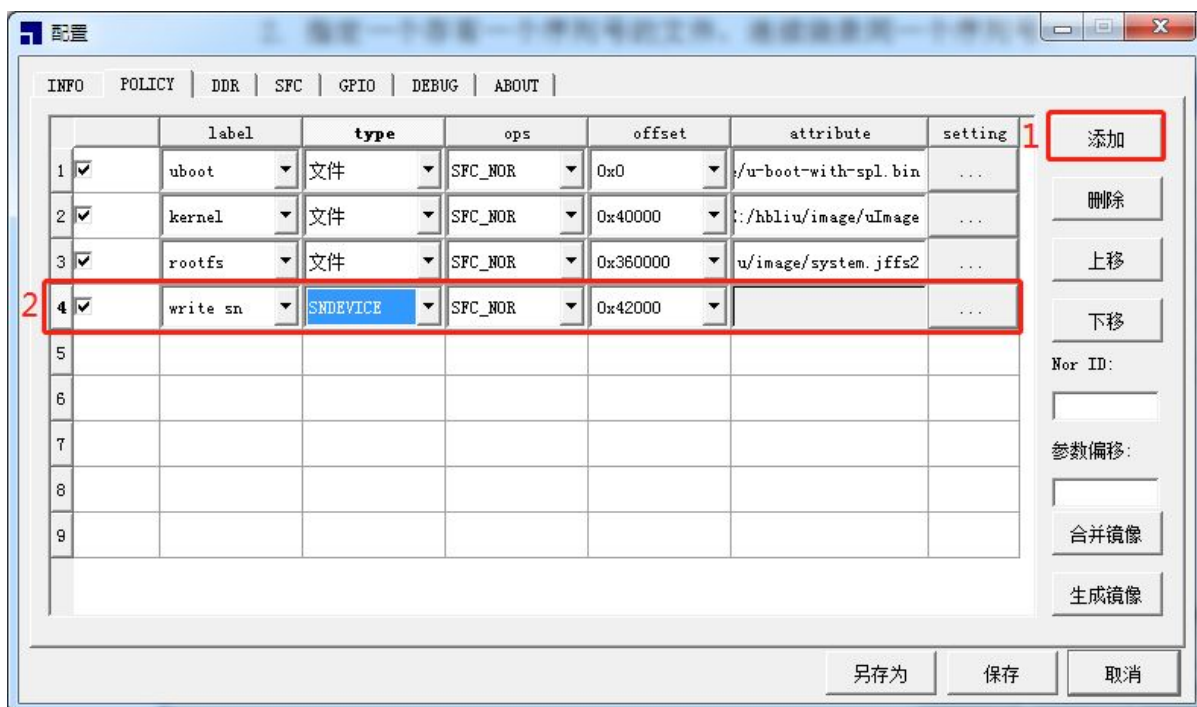


Figure 4-6 SNDEVICE configuration

The first method reads the serial number in the sn_device.cfg file in the configs directory by default.

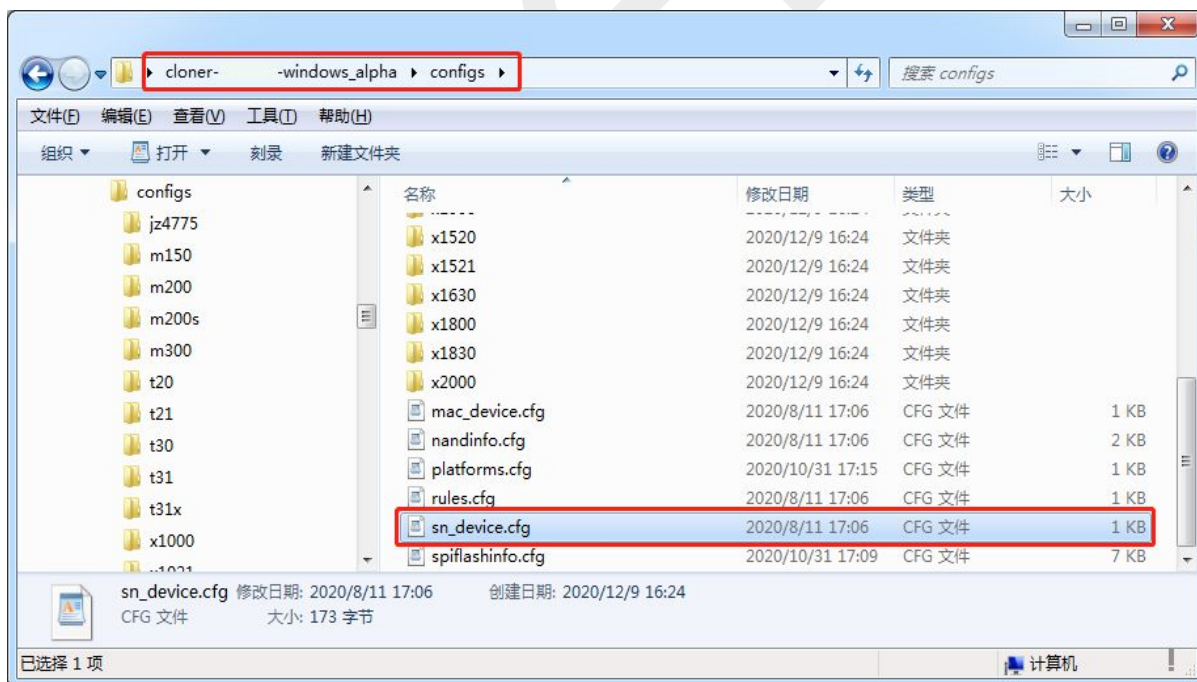


Figure 4-7 sn_device.cfg path

sn_device.cfg Content	Description
[device] index=0 #length=0x8	[device] 0 corresponds to the value of [device0]. If the recording succeeds, 1 is added.
[device0] value="12345678 "	Optional. The length is used as the prefix of the serial number. Example: 812345678 [device0] 12345678 is string

4.4 Burn MAC

4.4.1 MAC_ADD



Figure 4-8 MAC_ADD configuration

Step	Operation	Result
1	Click configure	The configuration window appears.
2	Select a platform and board-level configuration for the device	Update configuration window
3	Click the POLICY tab.	Switch to the policy configuration page
4	Click the Add button.	Add a policy to the policy table
5	Select the check box	Activation policy
6	Select the MAC_ADD type	Switch policy type
7	Enter the policy name "mac add"	The name is displayed on the progress bar of the main interface.

8	Enter the offset address	Write to storage device location
9	Click "..." in the settings column.	The mac address setting window appears.
10	Enter the MAC address and the number of times that can be burned.	Configure the data written to the storage device
11	Click Save	Close the configuration window and save the configuration file.
12	Click the Start button.	The device enters the burning mode. After the burning is successful, the serial number of the next burning will be increased by 1 in hexadecimal.

4.4.2 MACDEVICE

The operation is basically the same as that of SNDEVICE. See [4.3.4 SNDEVICE](#).

4.5 Burn SFC NAND Reserved Space

SFC NAND the area of reserved space. Assume that the NAND reserved space of 128MB Bytes is located.

Available Space	Reserved Space		
125M Bytes	1M Bytes	1M Bytes	1M Bytes
DATA	LICENSE	SN	MAC

Read and write reserved space operation steps:

1. Select the "activate SFC NAND reserved space" option on the SFC page.



Figure 4-9 activate reserved space

2. reserved space read/write configuration。

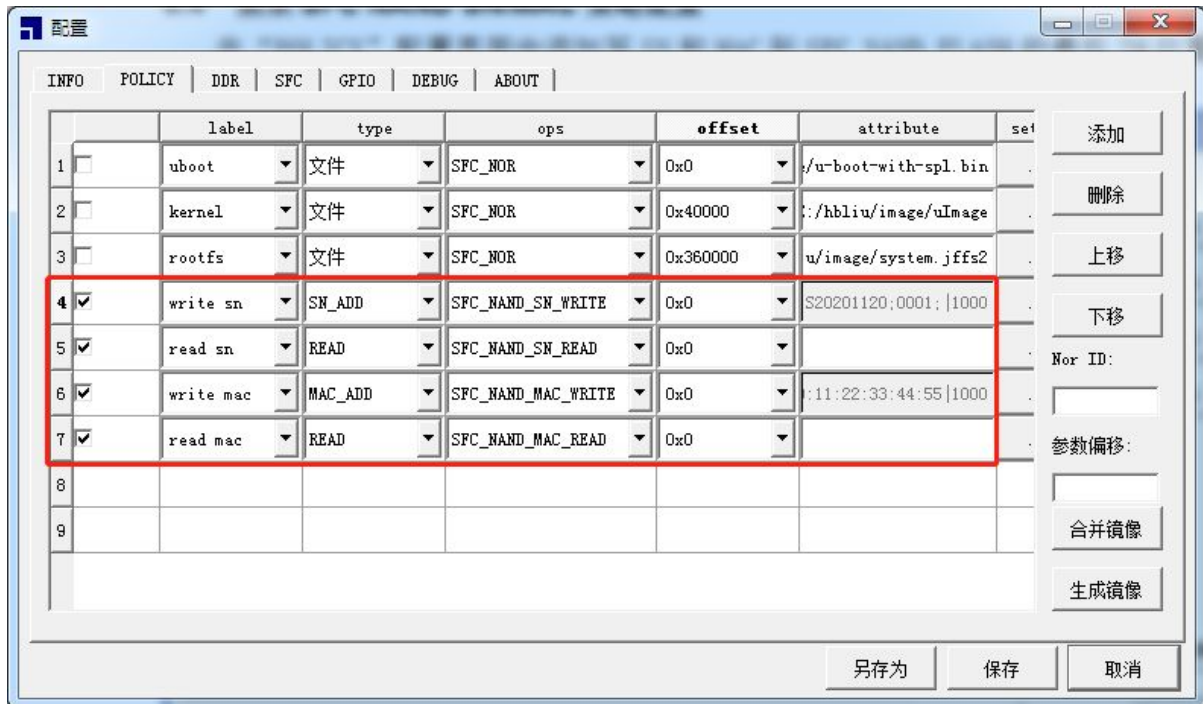


Figure 4-10 Reserved space read/write configuration

Step	Write Operation	Result
1	Select the SFC_NAND_SN_WRITE option.	Write data to the storage device to reserve space
2	Select the data input type, for example: SN_ADD.	Refer to Chapter 4.3 Burning serial number

Step	Read Operation	Result
1	Select the SFC_NAND_SN_READ option.	Read storage device reserved space data
2	Select the READ type	Read back the results to the progress bar of the main interface or save them to a file

4.6 Burn EFUSE

Only the x1000/x1600/x2000/x2500 series platforms support the EFUSE burning function.

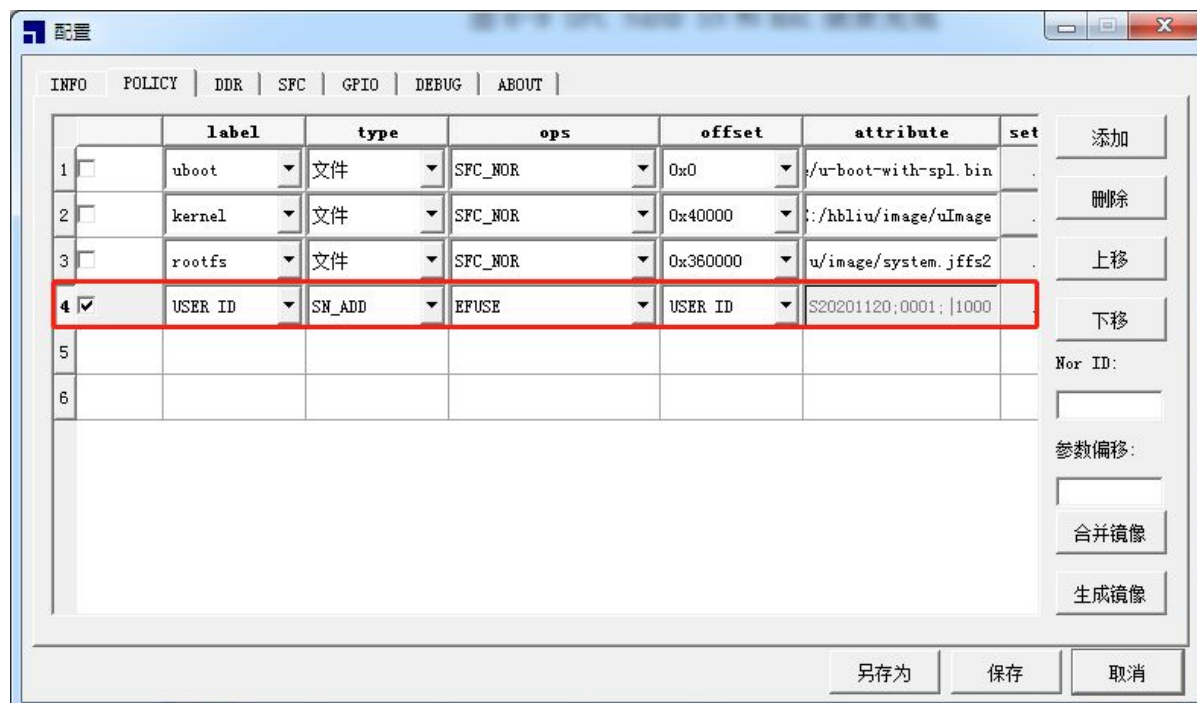


Figure 4-11 EFUSE configuration

Step	Write Operation	Result
1	Select the EFUSE option	Write data to the specified segment of EFUSE
2	Select the data input type, for example, SN_ADD.	Refer to Chapter 4.3 Burning serial number
3	Offset select EFUSE segment name	The list of EFUSE segment names is automatically filled in the offset address and policy name options.

Step	Read Operation	Result
1	Select the EFUSE option	Read data from EFUSE
2	Select the READ type	Read back the results to the progress bar of the main interface or save them to a file.
3	Offset select EFUSE segment name	The list of EFUSE segment names is automatically filled in the offset address and policy name options.

5 FAQs

No.	Phase	Problem	Solution
1	Driver	Windows driver signature is invalid during system driver installation	<ol style="list-style-type: none"> For more information, see 2 driver install and uninstall. Uninstall the original driver and restart the computer before reinstalling the driver. Search for the "force disable driver signature authentication" method of the corresponding Windows version on the Internet, and reinstall the driver after disabling it.
2	Run	The tool failed to run.	<ol style="list-style-type: none"> Unplug all USB devices End the Clapper and core processes Re-run the clanner program
3	BOOT	Device not detected	<ol style="list-style-type: none"> If the ubuntu system confirms that the tool does not have the execution permission, try to run <code>sudo ./clanner</code>. Check whether the burning device is in the burning mode. <ol style="list-style-type: none"> The ubuntu system runs <code>lsusb</code> on the command line to check the device id. The windows system checks whether there is a burning device in the Device Manager. Whether there is a virtual machine running on the computer, turn off the virtual machine or check whether there is a burning device in the virtual machine USB device
4		DETECTED ERR	<ol style="list-style-type: none"> The CPU model of the selected platform is inconsistent with that of the burning device. CPU operation exception after the burning device enters the burning mode Abnormal USB communication, restart the device or change the USB cable, change the USB port of the computer
5		NEED ERR	<ol style="list-style-type: none"> Abnormal USB communication, restart the device or change the USB cable, change the USB port of the computer
6		GINFO SEND ERR	<ol style="list-style-type: none"> Abnormal USB communication, change USB cable, change computer USB port
7		STAGE1 RUN ERR	<ol style="list-style-type: none"> Abnormal USB communication, change USB cable, change computer USB port

8		STAGE1 NOT READY	<ol style="list-style-type: none"> 1. DDR parameter or frequency problem, reduce CPU and DDR frequency 2. DDR chip pin short circuit, open circuit, or resistance mismatch 3. The serial port configuration is incorrect, and the probability is relatively small. 4. FLASH GPIO configuration error, the probability is small 5. If the firmware problem is burned, contact the tool maintenance personnel.
9		STAGE2 RUN ERR	<ol style="list-style-type: none"> 1. DDR parameter or frequency problem, reduce CPU and DDR frequency 2. Abnormal USB communication, change USB cable, change computer USB port
10		STAGE2 NOT READY	<ol style="list-style-type: none"> 1. If the firmware problem is burned, contact the tool maintenance personnel.
11		STAGE2 POLICY ERR	<ol style="list-style-type: none"> 1. If the firmware problem is burned, contact the tool maintenance personnel.
12		STAGE2 FLASH INFO	<ol style="list-style-type: none"> 1. Please contact the tool maintenance personnel for the problem of burning tools
13		FLASH NO SUPPORT	<ol style="list-style-type: none"> 1. The NOR FLASH model is not supported. Please refer to the sfc nor parameter configuration documentation. pdf document to add NOR FLASH parameters or contact the tool maintenance personnel. 2. Read FLASH ID errors, reducing the frequency of SFC
14		STAGE2 CONFIG ERR	<ol style="list-style-type: none"> 1. If the firmware problem is burned, contact the tool maintenance personnel.
15		STAGE2 INIT ERR	<ol style="list-style-type: none"> 1. The board-level selection is incorrect. Check whether the FLASH type is consistent with the actual FLASH type. 2. FLASH welding problem, read ID all 0xffff 3. FLASH GPIO configuration error 4. The NAND FLASH model is not supported. 5. Reduce the frequency of the FLASH controller 6. Refer to the specific FLASH manual to compare TIMING parameters 7. eMMC, SD card power supply, or DATA0 communication problems 8. WDT or MCU control CPU restart or power off

16		ERASING	<ol style="list-style-type: none"> 1. NOR FLASH the erasing timeout, modify the initialization timeout on the DEBUG page 2. NOR FLASH erase timeout, modify the NOR parameter block erase time 800ms
17	Burning	INIT ERR	<ol style="list-style-type: none"> 1. The burning file does not exist.
18		CRC ERR	<ol style="list-style-type: none"> 1. USB signal quality problem, check the eye diagram 2. If the firmware problem is burned, contact the tool maintenance personnel.
19		EIO ERR	<ol style="list-style-type: none"> 1. The burned file exceeds the FLASH partition size. 2. Reduce the frequency of the FLASH controller 3. Read-back check error
20		PERM ERR	<ol style="list-style-type: none"> 1. FLASH initialization failed or write protection status
21		DISCONNECT	<ol style="list-style-type: none"> 1. USB disconnection of burning device 2. Write-back read check error
22	security	SEC EN ERR	<ol style="list-style-type: none"> 1. Firmware burning timeout
23		SEC INIT ERR	<ol style="list-style-type: none"> 1. No configuration AVDEFUSE enable IO
24		SEC RC ERR	<ol style="list-style-type: none"> 1. No write CHIPKEY or write failed
25		SEND KU ERR	<ol style="list-style-type: none"> 1. CHIPKEY is zero 2. NKU protection bit is set 3. Invalid NKU. The firmware signature key does not match. 4. RIR verification failed. Check the EFUSE TIMING configuration. 5. Check whether the power supply of the AVDEFUSE is delayed.
26		SEND UK ERR	<ol style="list-style-type: none"> 1. CHIPKEY is zero 2. USERKEY protection bit is set 3. RIR verification failed. Check the EFUSE TIMING configuration. 4. Check whether the power supply of the AVDEFUSE is delayed.
27		SECBOOT EN ERR	<ol style="list-style-type: none"> 1. Check whether the power supply of the AVDEFUSE is delayed.