

**Ingenic®**

**USBCloner The Burn tool documentation**

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**北京君正集成电路股份有限公司**  
**Ingenic Semiconductor Co., Ltd.**

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USBCloner The Burn tool documentation

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## 1 Overview

USBCloner is a new programming tool ingenic code architecture developed based on the programming tool, this document describes the driver installation process, USBCloner burning tool burn step and burn operation notices, please use USBCloner to view this document before burning tools, to avoid unnecessary problems.

### 1.1 Operating environment support

USBCloner supported the systems as follows:

- 1) Windows XP、Win7 and above version (32bit,64bit);
- 2) Ubuntu12.04 and above version (32bit, 64bit).

### 1.2 The burn tool package

There are two versions for different platform :

- 1.cloner-x.x.x(version number)-windows\_release.zip
- 2.cloner-x.x.x(version number)-ubuntu\_release.tar.gz

### 1.3 The composition of burn tool

**The burning tool is mainly composed of the following:**

- 1) Cloner is the interface program of burning tool. Users can configure burning parameters through the interface.
- 2) Core is the burning program of burning tool, which is called by cloner program and can be run separately.
- 3) DDR directory is the memory model and parameter configuration supported by each platform.
- 4) The configs directory is the burning configuration file of each platform board level.
- 5) The firmwares directory is used to burn firmware programs for each platform.

### 1.4 Special instructions on line use

In order to prevent the production line workers from misoperation and causing unnecessary losses, it is suggested that the "safety lock" level in the main interface of the tool be set to "1" or "2" after the parameters are configured. Configuration modification can be restricted. If you need to modify the configuration, you need to change the security lock to "0" and enter the password "! @ #" (English characters). Or package the burning configuration as an ingenic file, and only the ingenic file burning can be loaded in the production line.

Please refer to the factory burning section for the introduction of safety lock and ingenic file making and loading operation.

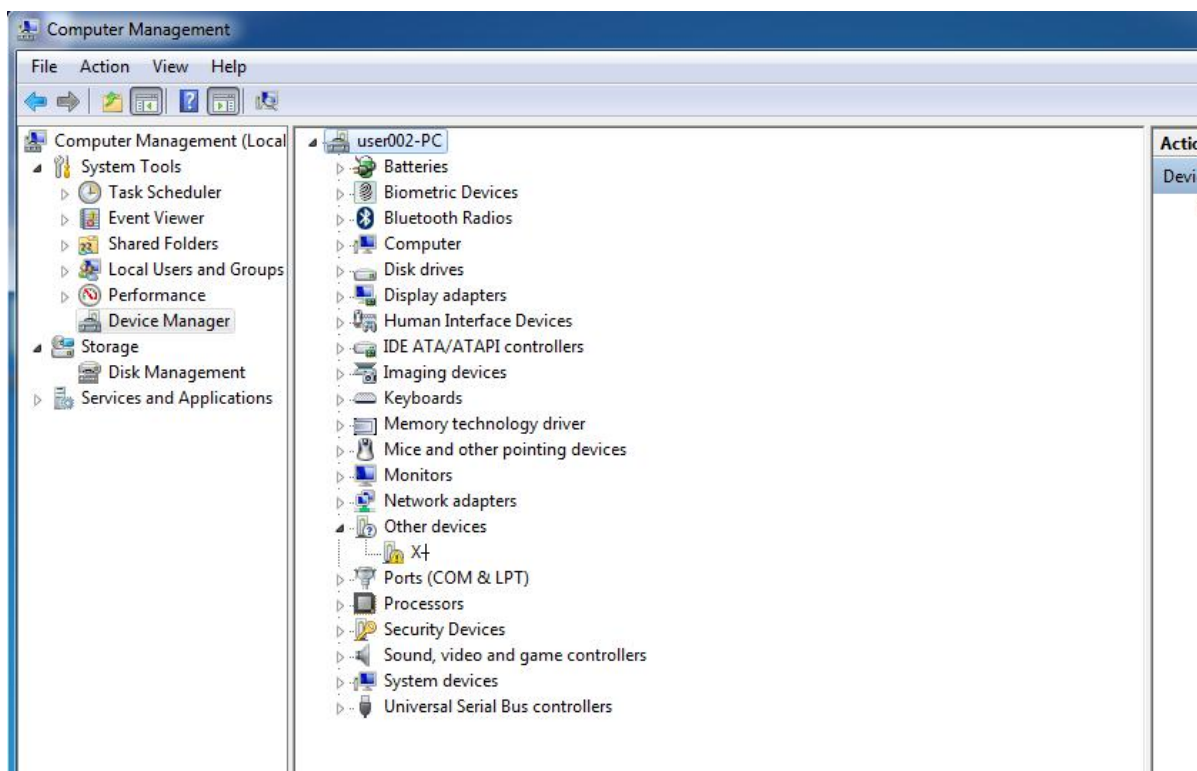
## 2 Install the driver

USBCloner has Linux and Windows version, users don't have to install the driver of USBCloner on LINUX. Therefore, this section will only introduce installation on Windows 7, and there's maybe a little difference between the first installation and the driver updating.

It's worth mentioning that users should disable Secure Boot under UEFI and disable the driver mandatory signature on Windows 10. Users can easily find the detailed instructions online.

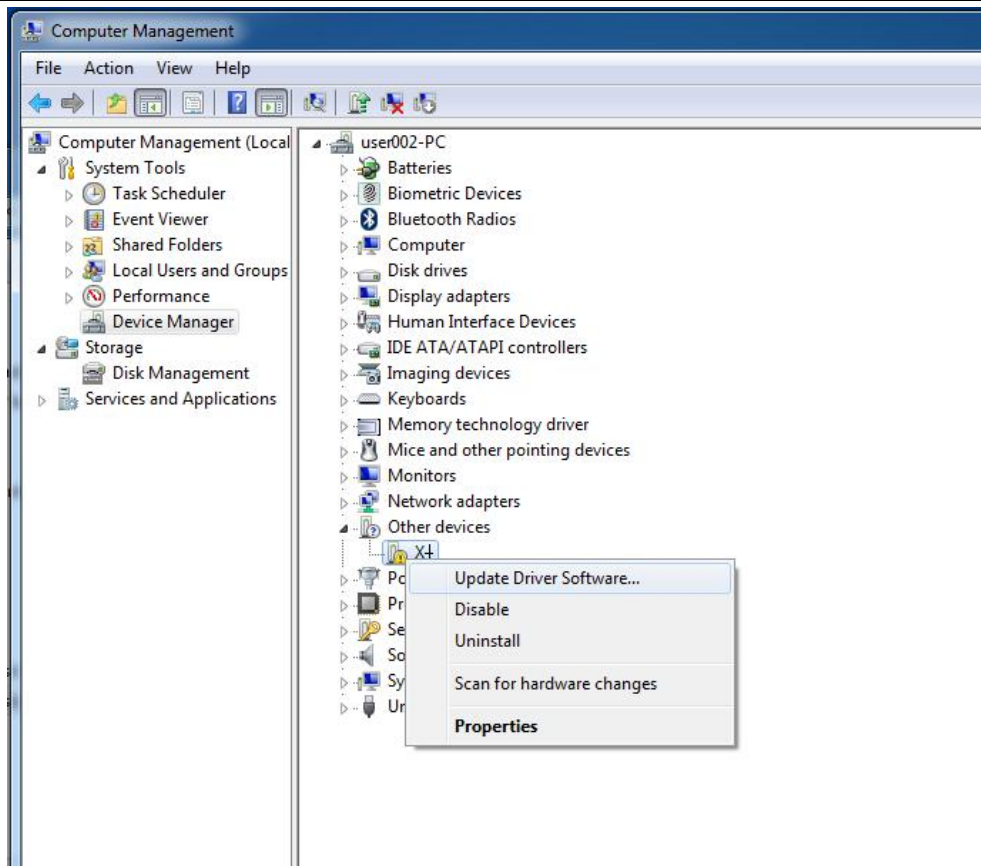
### 2.1 First installation

Please connect the device to the PC, and make sure it's under USB boot mode (by pressing the USB boot key and the reset key). Then the desktop will pop up a dialog with a wizard of installation, or users check the device manager as shown in the Figure 2-1.



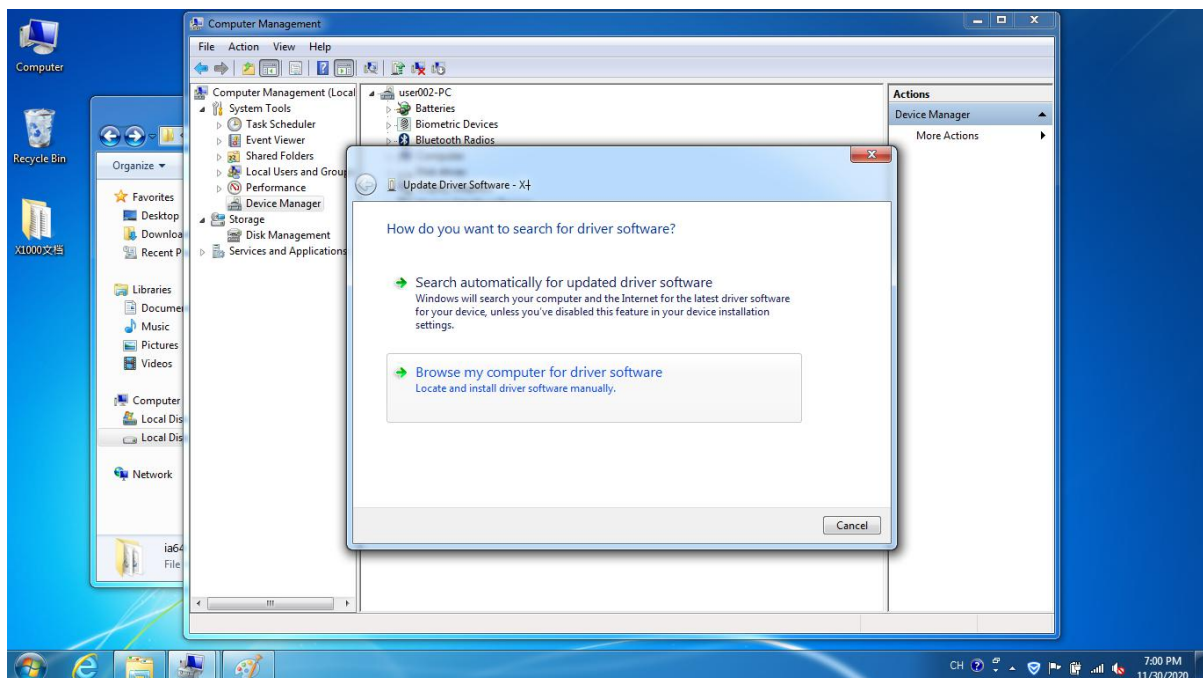
**Figure 2-1 device identification**

Right click on this unknown device and select "update driver software" as shown in the Figure 2-2.



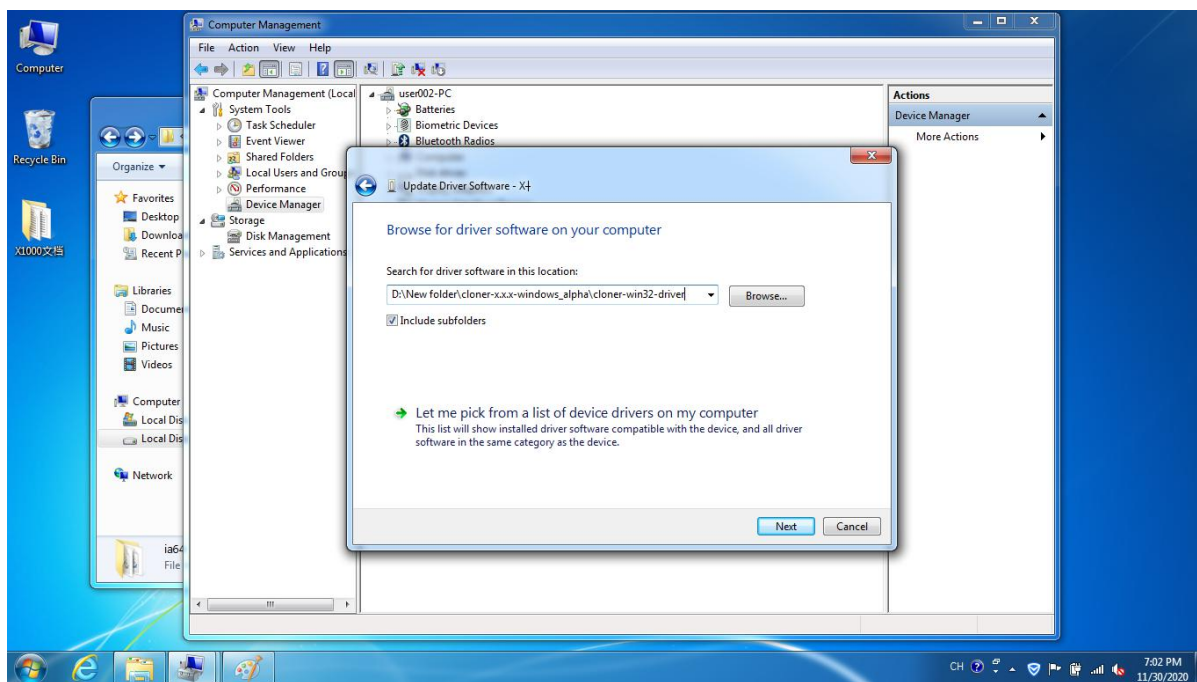
**Figure 2-2 driver software update**

Select “browse my computer for driver software” as shown in the Figure 2-3.



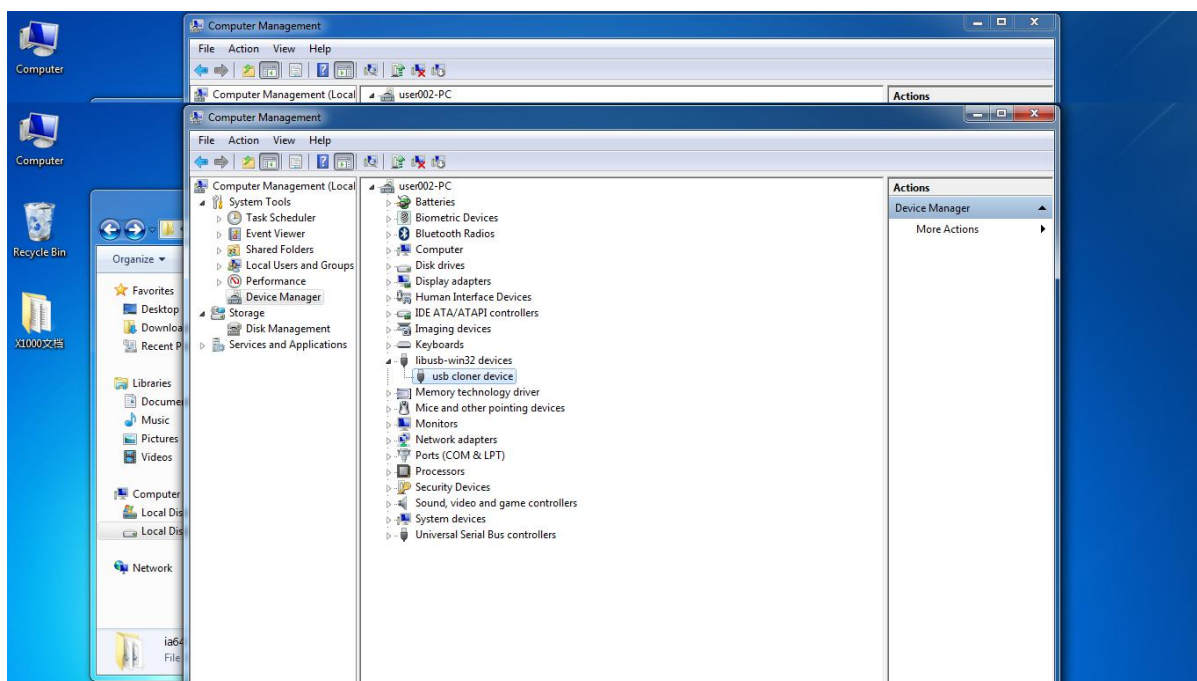
**Figure 2-3 driver software selection**

Then filling the cloner-win32-driver directory in the path.



**Figure 2-4 filling the driver path**

Then click “next” and “yes” to drive the installation successfully, as shown in the Figure 2-5.



**Figure 2-5 drive installation complete**



### 3 Interface introduction

#### 3.1 Start burning tools under Ubuntu

Execute `./cloner` in the terminal. The Ubuntu version is mostly used in the R & D stage. In the factory, the windows system is the main system, so the following is the windows 7 system environment.

#### 3.2 Start burning tools under Windows

Double click the `cloner.exe` application under the burn tools directory, and when you start, the effect is shown in Figure 3-1.

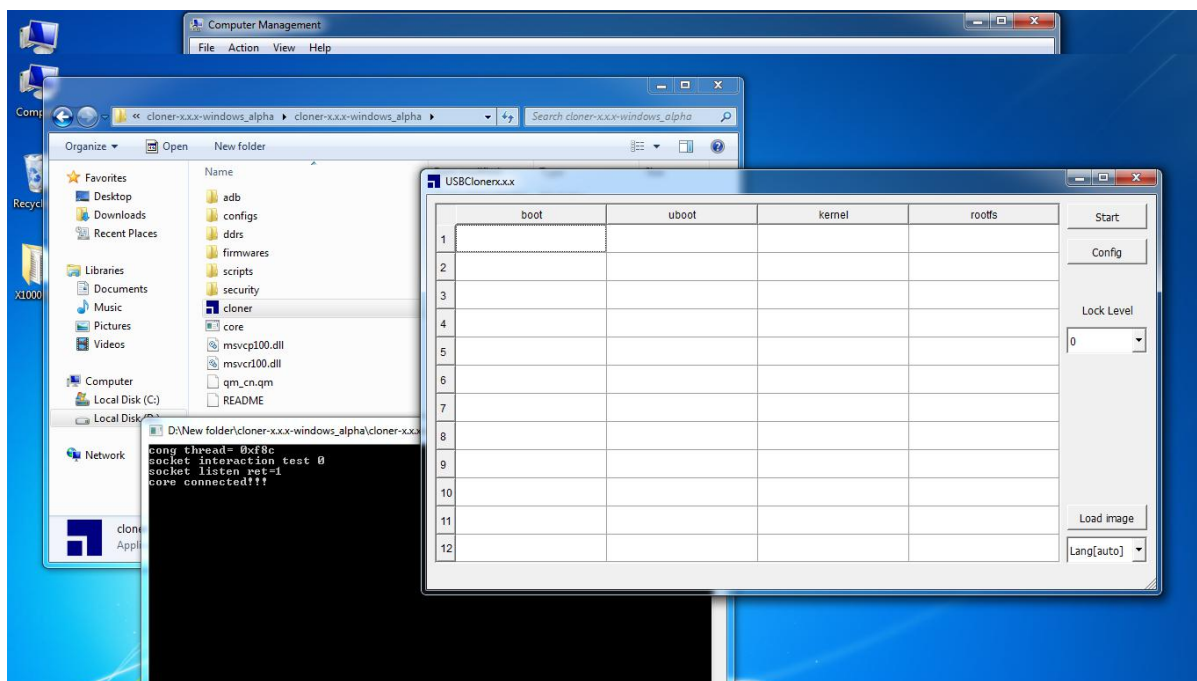


Figure 3-1 start USBCloner burn tool

#### 3.3 Main interface

After you open the USBCloner burn tool, the interface is shown in Figure 3-2.

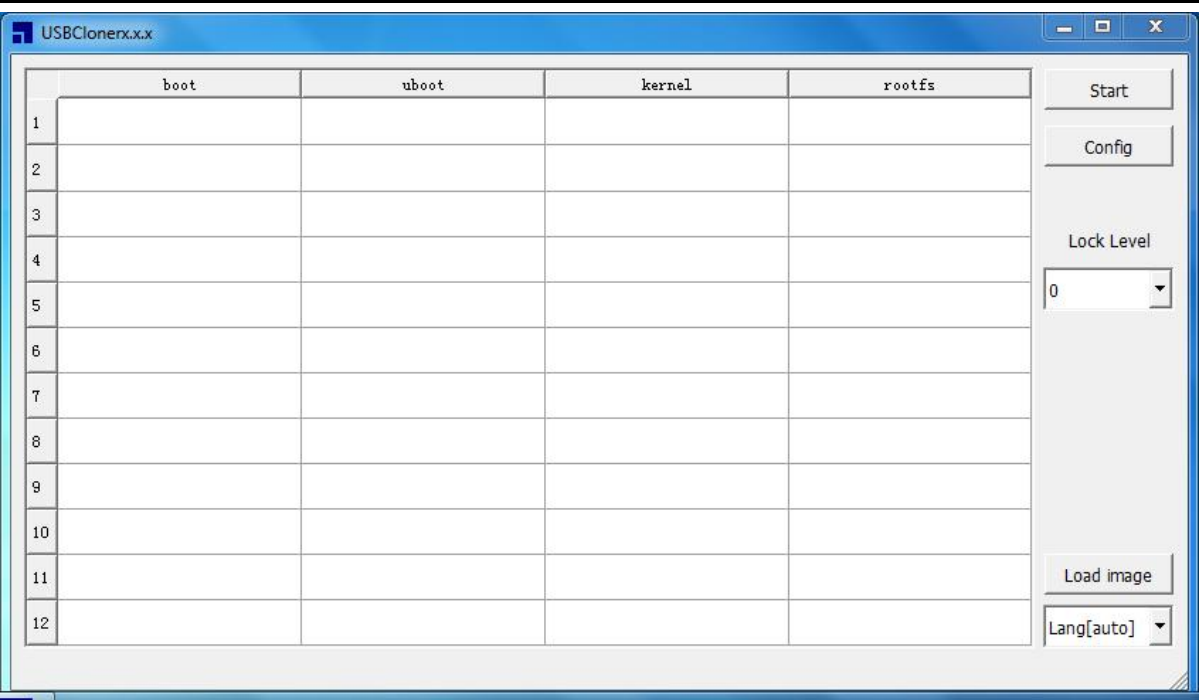


Figure 3-2 the main interface of the burn tool

The version number, security lock, start, configuration, load image button and burning progress list of burning tool are displayed in the main interface, as shown in Figure 3-2.

**x.x.x** —— burning tool version number.

**Start** —— click the start button and wait for the device to enter the burning mode to start burning.

**Configuration** —— click the configuration button to set the burning parameters in the pop-up dialog box.

**Security lock** —— prevent configuration modification

[0] —— modifiable configuration (default)

[1] —— only policy configuration can be modified

[2] —— configuration cannot be modified

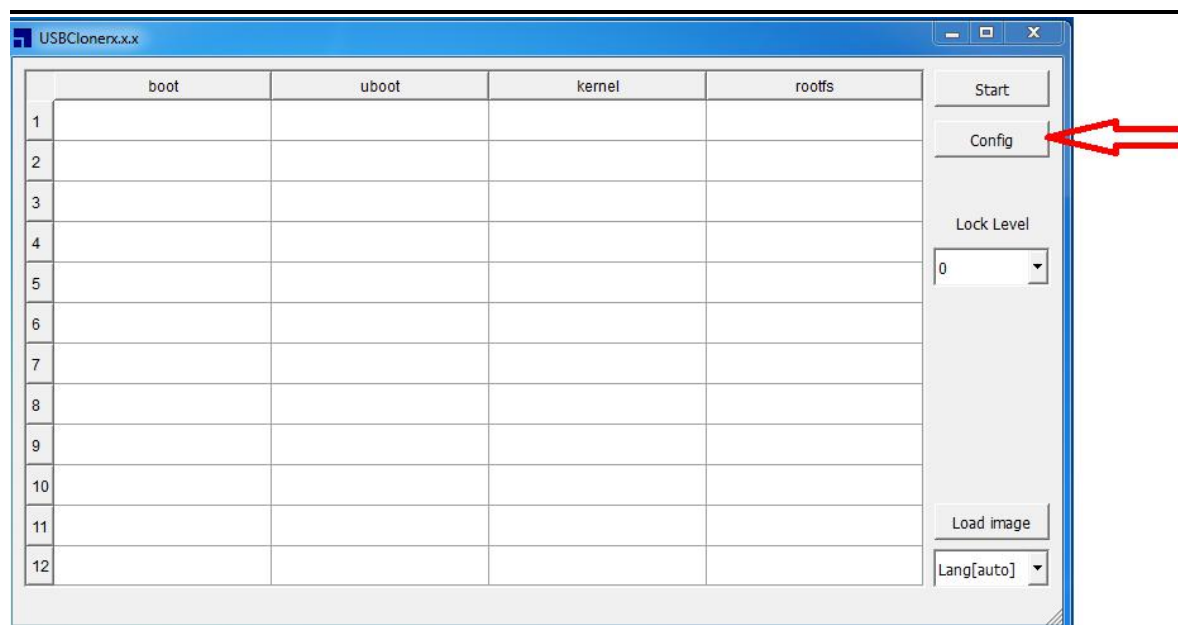
**Load image** —— click load image to load configuration parameters and image in ingenic file.

**Lang [auto]** —— burning tool interface language, including adaptive system language, Chinese and English.

**Strategy table** —— each device occupies one line, and the first column boot is fixed to download and burn firmware progress, **if errors occur during the boot phase, refer to Chapter 8 to analyze common causes of errors.** after the second column is the burning strategy. The completion progress is displayed when burning.

### 3.4 Configuration interface

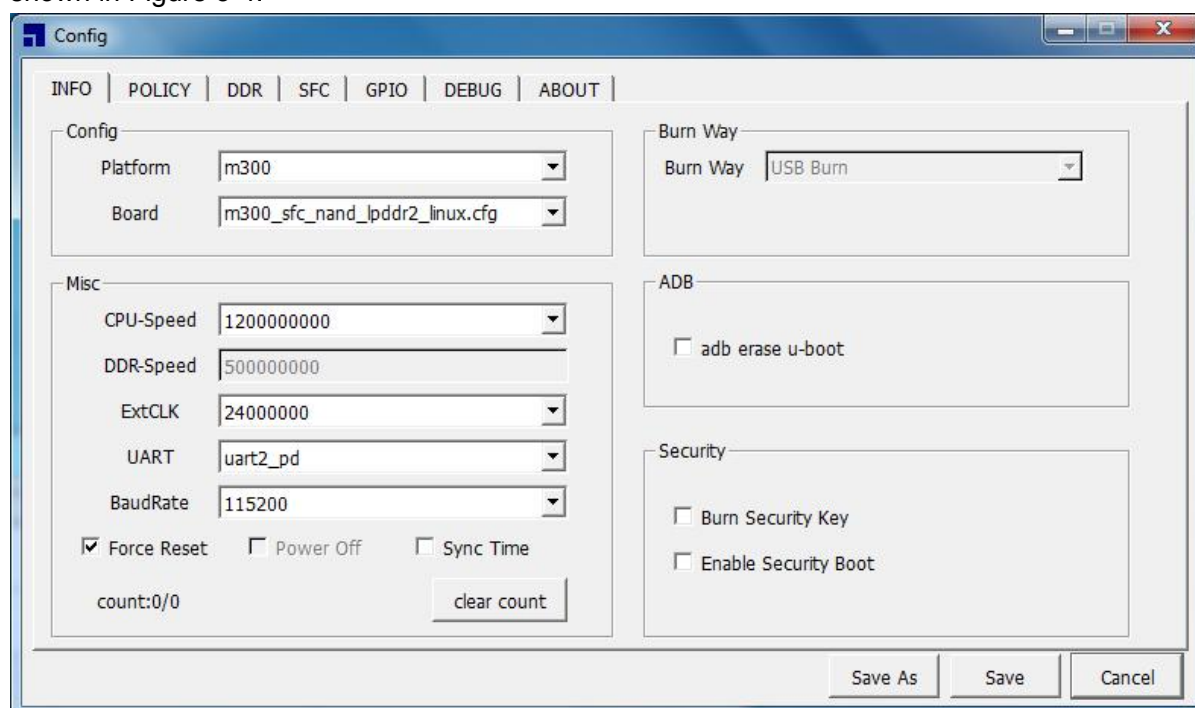
If you need to reconfigure some of the options, click the configure button on the main interface, as shown in Figure 3-3.



**Figure 3-3 Configuration operation of burning tool**

## 3.4.1 INFO

In the info interface, there are some important basic information and function options, as shown in Figure 3-4.



**Figure 3-4 INFO configuration interface**

### Function description:

**Configure group boxes** — Select the type of chip supported and the board level configuration type supported by the current board

**Other group boxes** — Set the CPU frequency, DDR frequency, external clock, serial number, baud rate, and after the completion of the call, whether to forcibly restart, turn off the power and

synchronize the time, and will display the statistics before burning

**Burn mode group box**——Default USB burn mode

**Security group box** ——burn KEY to EFUSE , activation EFUSE SECURITY BOOT MODE position.

Check this box carefully. Please learn more about the safe start function first.

**ADB** —— use the ADB command to erase uboot and enter burn mode after restart.

### 3.4.2 POLICY

Click the policy tab, and select the burn image file, as shown in Figure 3-5.

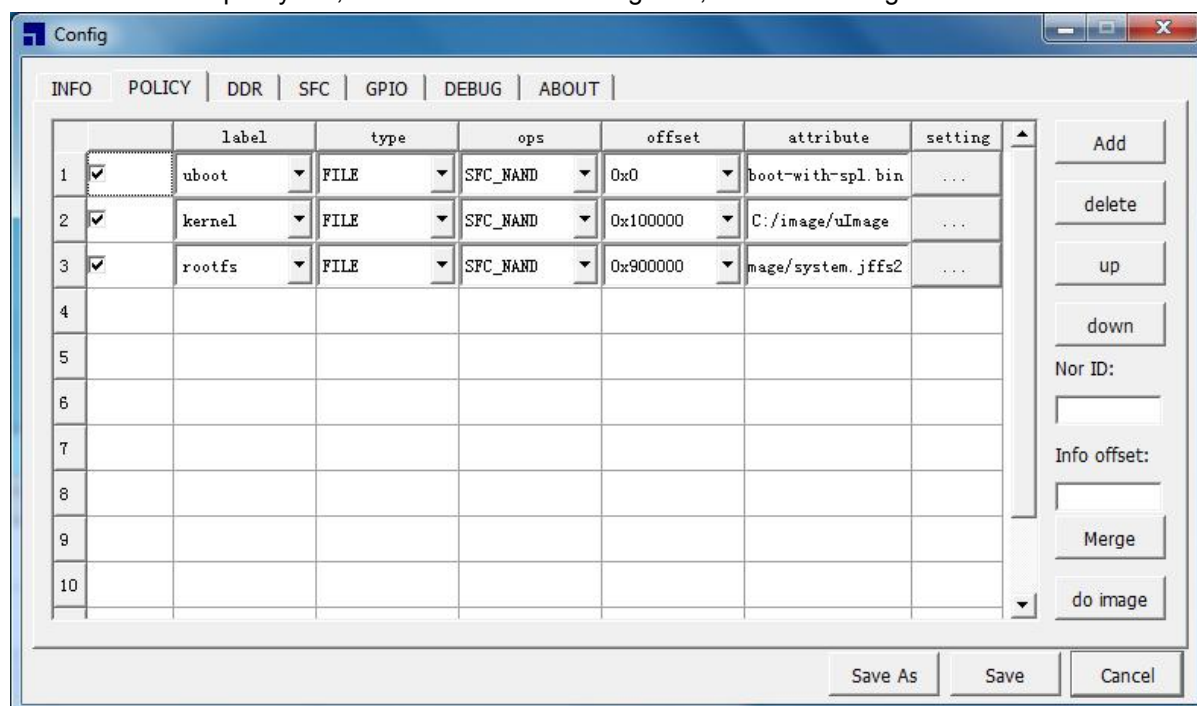


Figure 3-5 POLICY configuration interface

**Function description of policy interface:**

【1】 **Add / Remove** —— adds and removes policy configurations.

【2】 **Move up / Move down** —— select a line strategy to adjust its position and modify the burning order.

【3】 **Merge image** —— merges the selected burn image into one image file.

(1) **Description of configuration options of merge image function:**

① **Nor ID:** it belongs to the configuration option of the “merge image” function. Before merging the image, if you want to merge the nor information parameters into the uboot image, fill in the ID to be merged into the NOR flash in the uboot image. You can use nor flash ID to query from the ID list in “SFC” interface / “norinfo” interface, as shown in Figure 3-6. (refer to 3.4.7.2 “norinfo” interface for details)

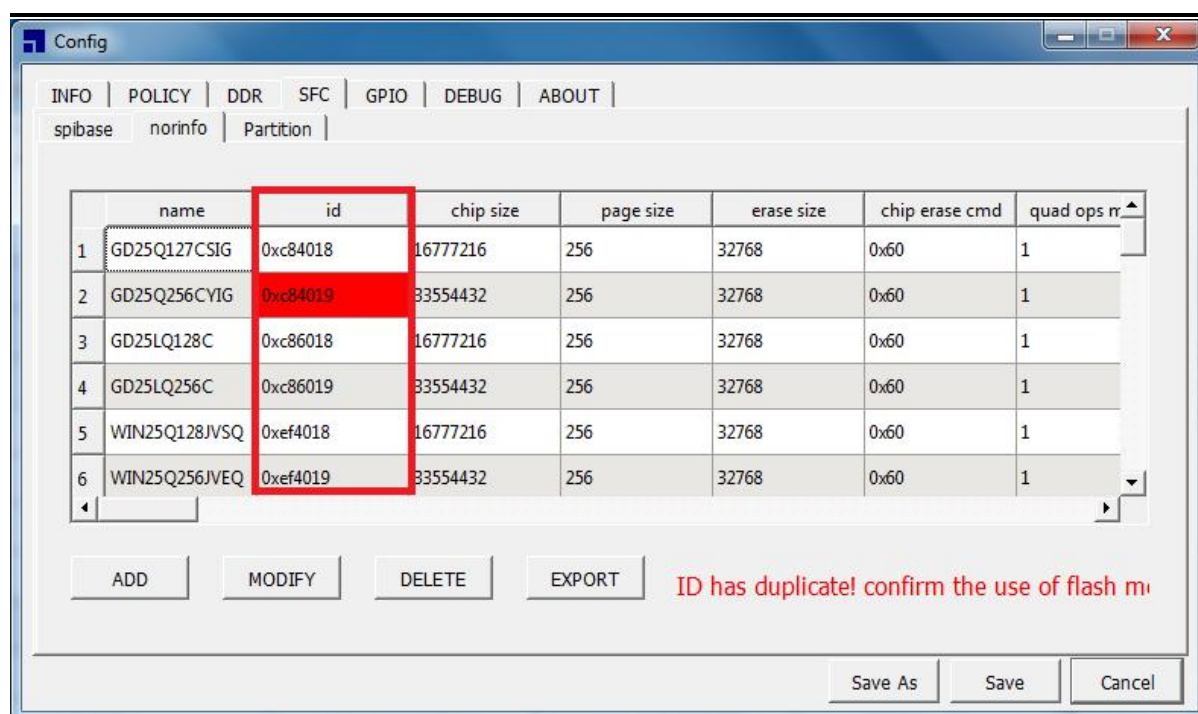


Figure 3-6 NOR ID query interface

② **Parameter offset:** it belongs to the configuration option of “merge image” function. Before merging image, if you want to merge nor information parameters into uboot image, set the offset of nor parameter in uboot image to be merged into uboot image.

Note: the offset parameter is defined in the board level header file of uboot. Refer to macro **CONFIG\_SPIFLASH\_PART\_OFFSET** is shown in Figure 3-7, and the parameter offset is 0x3c00. (for the actual offset address, please refer to the macro definition in the board level header file)

```
531 #define CONFIG_SPIFLASH_PART_OFFSET 0x3c00
```

Figure 3-7 Screenshot of offset address macro definition

## (2) Merge image operation:

① If you want to add nor parameter information to the uboot image, you must first check the uboot image, fill in the “**Nor ID**” and “**Parameter offset**” configuration options, then check other images, and finally click “**merge image**” to add the nor parameter to the uboot image, and merge the selected image into a large image file.

Query and select id from the ID list in “**SFC**” interface / “**norinfo**” interface, as shown in Figure 3-6.

View the parameter offset address definition in the board level header file of uboot, as shown in Figure 3-7.

Check uboot image, fill in “**Nor ID**”, fill in “**Parameter offset**”, check other images to be merged, and click “**merge image**”, as shown in Figure 3-8.

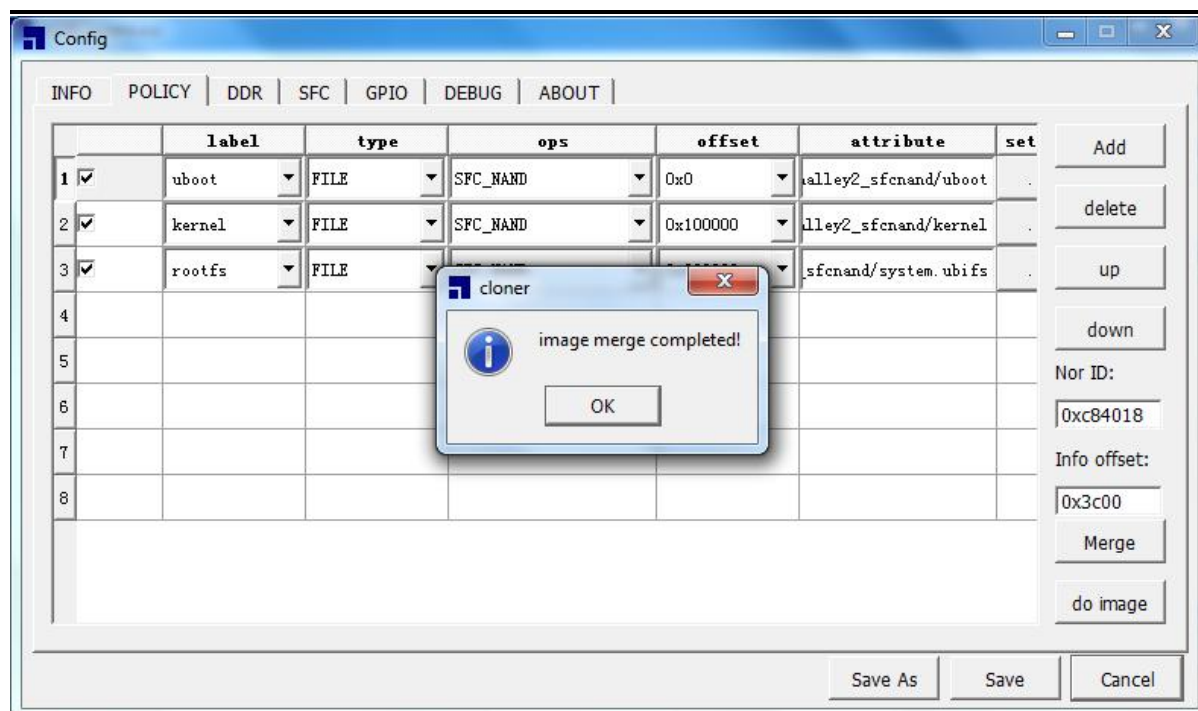


Figure 3-8 merge image operation with nor parameter

② If you do not add nor parameter information to the uboot image, directly check the image you want to merge, and finally click merge image to merge the selected image into a large image file.

Check the image you want to merge and click merge image, as shown in Figure 3-9.

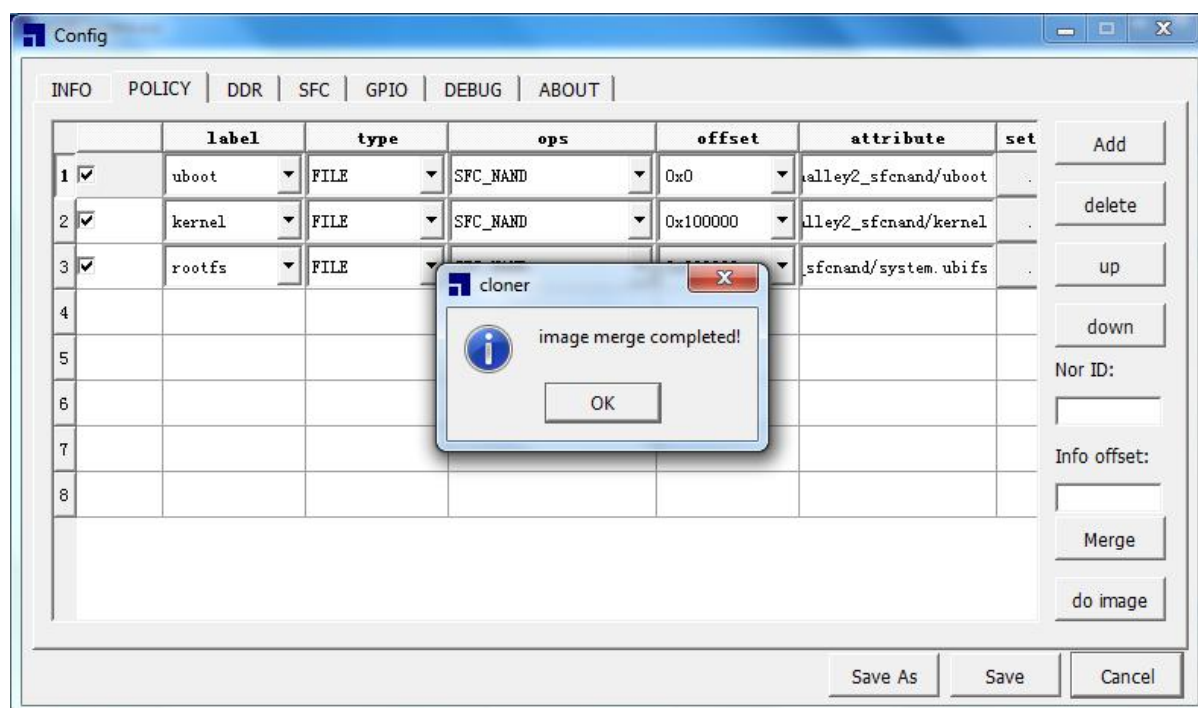


Figure 3-9 merge image operation without nor parameter

【4】 **Generate image** —— print all configuration and selected image files to be burned into



the file with the suffix of ingenic. (refer to 5.2.1 to generate burning image package for specific steps)

**【5】Strategy table** —— In the policy table, you can modify the policy name, type, option, offset, configuration properties and select the image to burn.

(1) **“Check box”** —— whether to activate the current policy.  
 (2) **“label”** —— the name of the policy, which is displayed in the relevant column of the progress bar in the main interface

(3) **“type”** —— select the burning mode, such as:

[FILE] —— burning files

[INPUT] —— user input

[OEM\_NP\_OTP] —— reserved

[I2C] —— configure I2C register value in policy

[EPD] —— firmware matching (reserved)

[SNDIVIDE] —— from Sn in order\_device.cfg Read the serial number from the file

[SN\_ADD] —— configure the starting serial number in the policy, and automatically increase after burning successfully

[MAC\_ADD] —— configure the initial MAC address in the policy, and automatically increase after burning successfully

[MACDEVICE] —— from Mac in order\_mac\_device.cfg Read MAC address in file

[SCANNER GUN] —— scanning gun input

[SQL] —— get SN and MAC from database (to be improved)

[READ] —— complete the reading operation from the storage medium with the option in "options"

(4) **“ops”** —— select the setting corresponding to the current media to be burned, such as:

[MEMORY] —— write data to memory

[NAND\_RAW] —— write raw data to NAND (to be implemented)

[NAND\_OOB] —— write data to NAND OOB area (to be implemented)

[NAND\_IMAGE] —— write data to NAND through Zone Management

[MTD\_RAW] —— write raw data to NAND through MTD management

[MTD\_UBI] —— write UBI data to NAND through MTD management

[MMC0] —— read and write data to the device under the msc0 controller

[MMC1] —— read and write data to the device under the msc1 controller

[MMC2] —— read and write data to the device under the msc2 controller

[I2C] —— write data to slave device through I2C bus

[EFUSE] —— write data to EFUSE (X1000 platform)

[REGISTER] —— write data to register address

[SFC\_NOR] —— read and write data to SPI nor flash through SFC controller

[SFC\_NAND] —— read and write data to SPI NAND flash through SFC controller

[SFC\_NAND\_SN\_WRITE] —— write the serial number to the specified area of SPI NAND through SFC controller

[SFC\_NAND\_MAC\_WRITE] —— write Mac to the specified area of SPI NAND through SFC controller

[SFC\_NAND\_SN\_READ] —— read the serial number to the specified area of SPI

NAND through SFC controller

[SFC\_NAND\_MAC\_READ] —— read Mac to specified area of SPI NAND through 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

(5) “offset” —— burning the partition

(6) “attribute” —— displays the setting result, for example, the path of the image selected during file burning

(7) “settings” —— click the “...” button to pop up the corresponding setting box according to the options in different “type”

### 3.4.3 DDR

If you need to re select the DDR type, click the DDR tab on the configuration screen. Select the DDR type and configuration file according to your own circumstances, as shown in figure 3-10.

If you modify the DDR type, click the DDR check box to make changes (such as change from DDR3 to LPDDR), change the DDR model, and click the DDR type check box to modify it. According to their use of the type of DDR, banks, and buswidth chip.

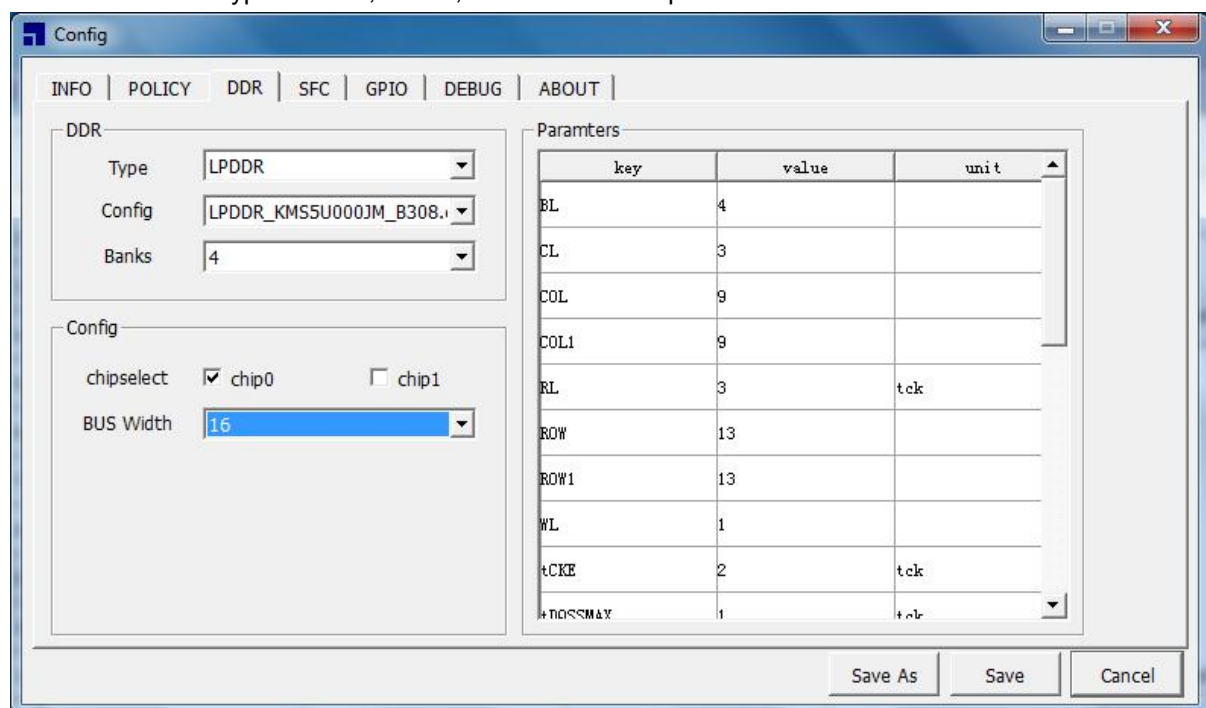


Figure 3-10 DDR configuration interface

**Type** —— memory type

**Configuration** —— parameter file named by memory model

**Group** —— bank

**Chip selection** —— number of memory packages

**Bus width** —— number of memory IO pins

**Parameter table** —— refer to DDR manual for modification of parameters



### 3.4.4 NAND

If NAND configuration is selected at the board level, the "NAND" tab will be displayed in the configuration window, including "NandInfo", "ZoneManager", "Erase", "Mtd" and "Nand\_function\_pin" tabs, as shown in Figure 3-11.

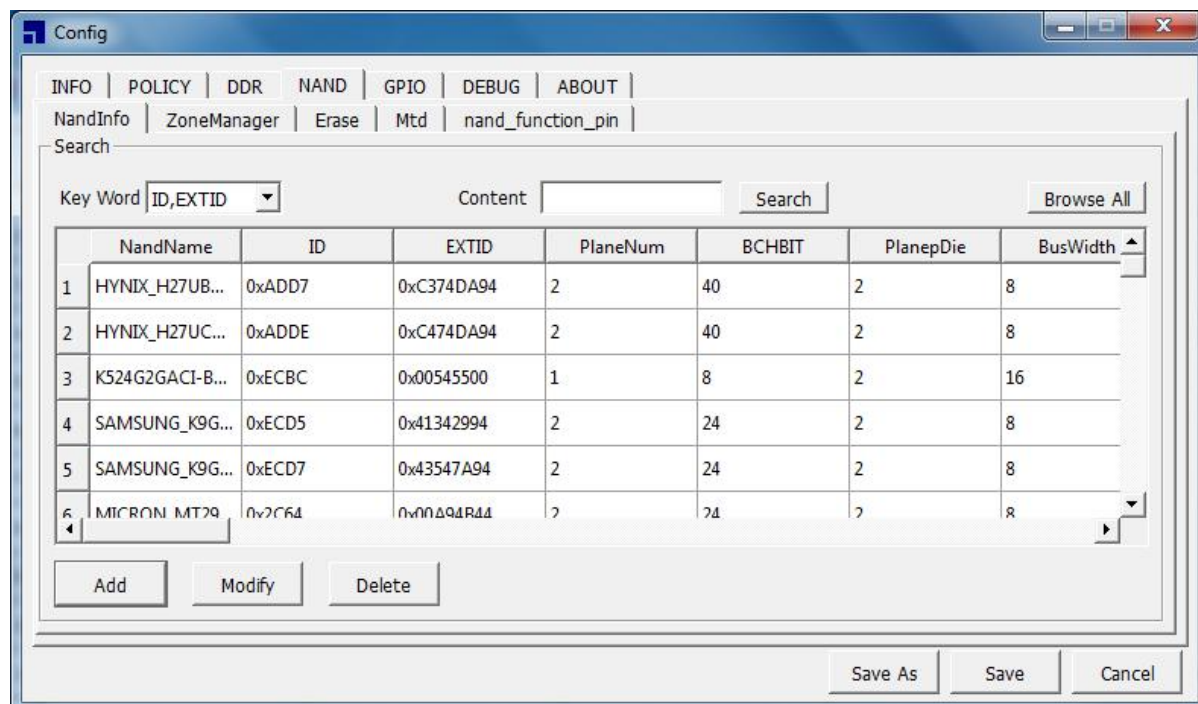


Figure 3-11 NAND configuration interface

#### 3.4.4.1 Nand INFO

Among them, the "NandInfo" tab shows several common Nand parameters, several common Nand information such as name, ID, etc.. In this tab, you can show all existing several NAND information, can also query according to the keyword query and display some out of several NAND information, a parameter can also add new NAND or delete one not to use NAND style or modify a NAND.

You can perform the following actions on the NAND information:

“Add”——Click to add new NAND information

“delete”——Deletes the currently selected NAND information

“modify”——Modify the NAND information in the current

Among them, the relevant parameters of NAND find NAND related manual, modify.

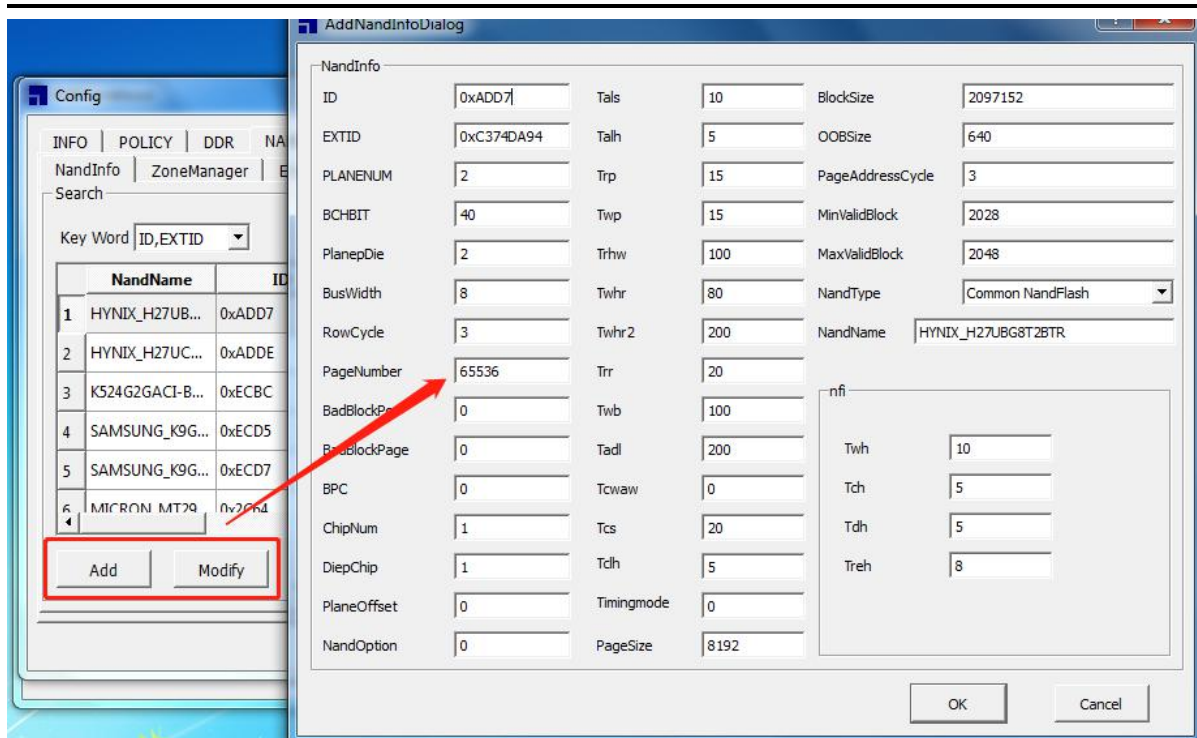


Figure 3-12 sets up the NAND information

### 3.4.4.2 ZoneManager

The elements contained under the “**ZoneManager**” tab include the total capacity of the section NAND (in units of MB), and the partition management table, as shown in Figure 3-13.

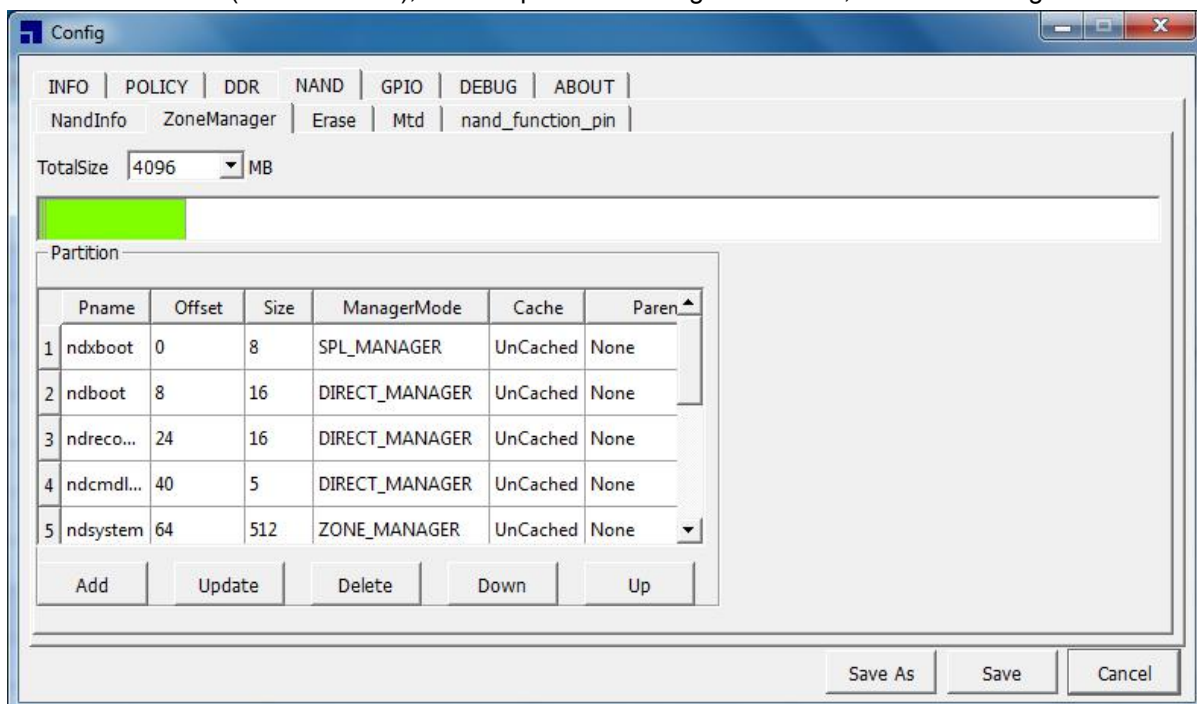


Figure 3-13 zongmanager partition interface

#### Setting instructions:

“**TotalSize**”—— Capacity of this section NAND

partition:

“Add”——Add a new partition

“Update”——Modify the currently selected partition information

“Delete”——Deletes the currently selected partition

“Up”、“Down”——Adjust the current selected partition location

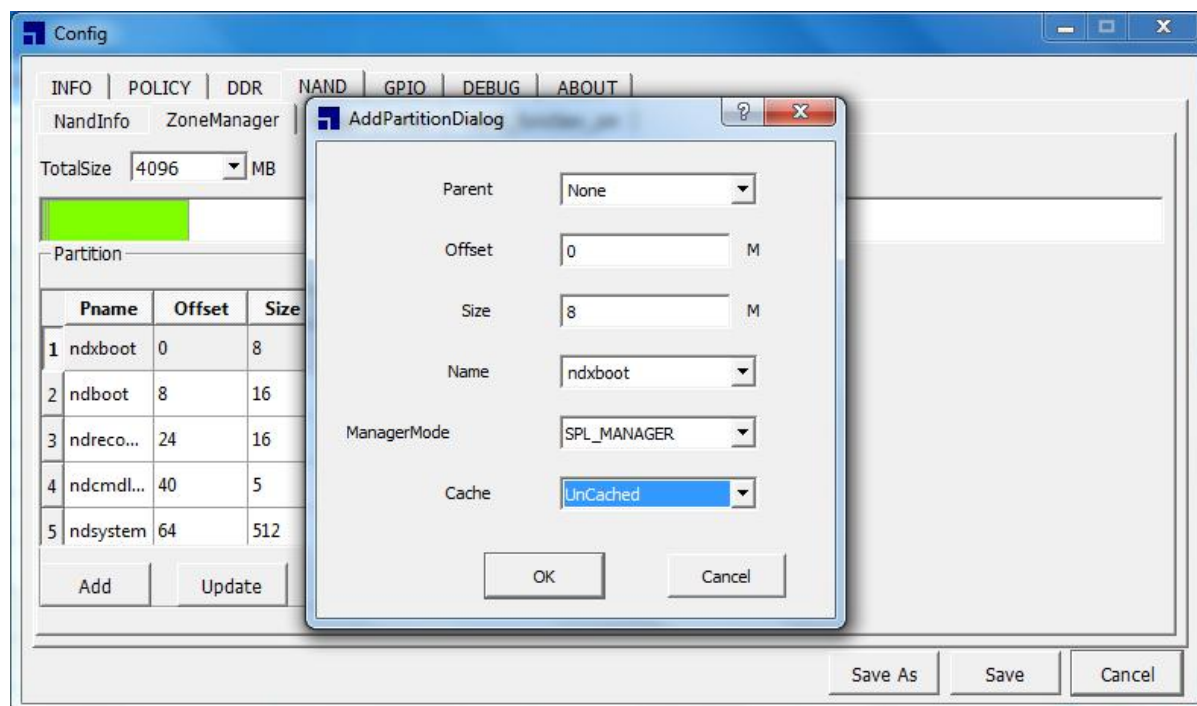


Figure 3-14 partition information settings

#### Add partition parameters:

“Parent”——Select the subarea to which the current partition depends. If you choose None, you represent the current partition as the primary partition

“Offset”——The actual offset of the primary partition or the relative offset of the subarea

“Size”——Set partition size

“Name”——Sets the partition name, which you can choose to have or fill in by yourself

“ManagerMode”——The optional management method when the parent node selects the None setting for the primary partition.

“DIRECT\_MANAGER”—— for managing xboot/uboot partitions

“SPL\_MANAGER”—— used to manage ndboot and record partitions

“ZONE\_MANAGER”—— used to manage ndsystem partitions

“Cache”——When the parent node selects the None settings for the primary partition, select the cache type of "Cached" or "UnCached".

#### 3.4.4.3 Erase

Under the erase tab, the erase mode and the partition options that are available are available. As shown in Figure 3-15.

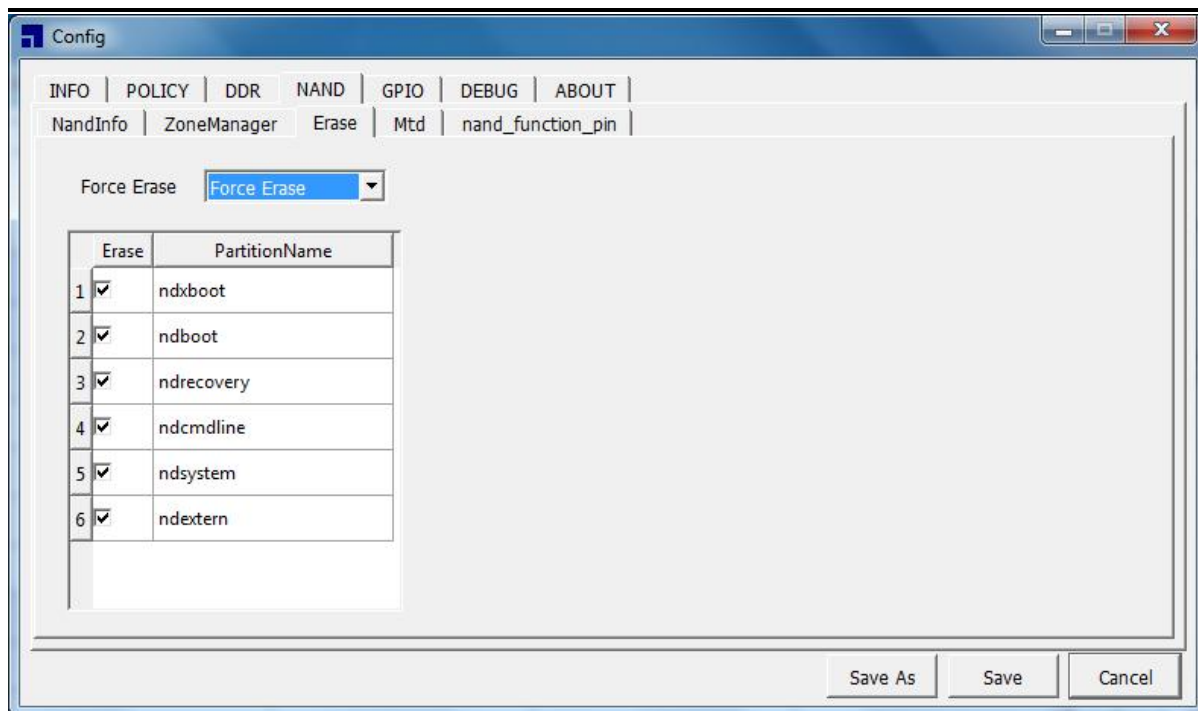


Figure 3-15 configuring NAND erase

Erase mode selection: divided into four kinds:

“None”

“Normal erase”

“Force Erase”

“Factory Erase”

Generally choose not to rub or wipe all mandatory (NAND developers may use the factory and erase erase routine), when choosing compulsory full wipe, the check box below the partition table is bright, you can configure the. This is in order to upgrade the system may want to leave a partition, if you do not want to wipe one of the partitions, you can remove the hook to save.

#### 3.4.4.4 MTD

The “Mtd” tab contains the partition table of the MTD, and the MTD erase modes are: None, Force, Erase, and Factory Erase, as shown in Figure 3-16.

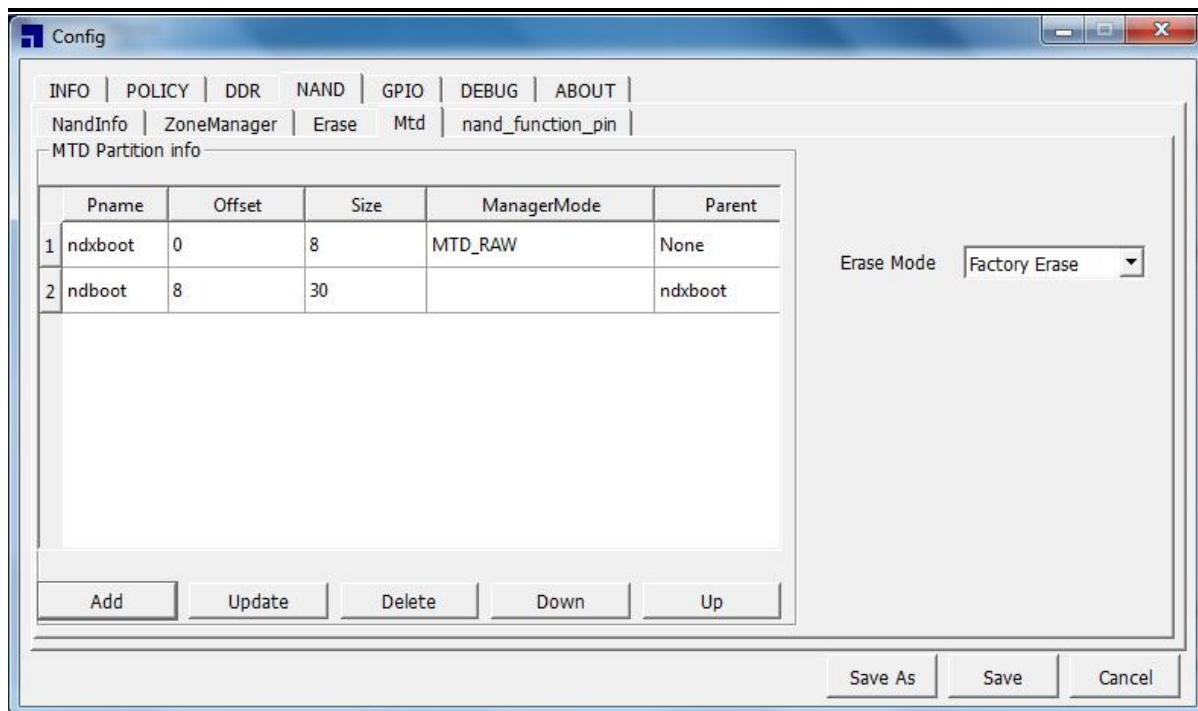


Figure 3-16 MTD partition table

**Setting instructions:**

“**Add**”——Add new partition information

“**Update**”——Modify the currently selected partition information

“**Delete**”——Deletes the currently selected partition

“**Up**”、“**Down**”——Adjust the location of the current selected partition

“**Save**”——Click save the partition table of the current MTD

“**Erase Mode**”——Select erase mode

[None] —— do not erase

[Force Erase] —— force erase(Erase factory bad block)

[Factory Erase] —— Factory erase(Block skipping when erasing)

**Recommendation:** when partitioning, the last UBI volume in each partition uses the -1 representation."-1" represents all the remaining space after the current offset.

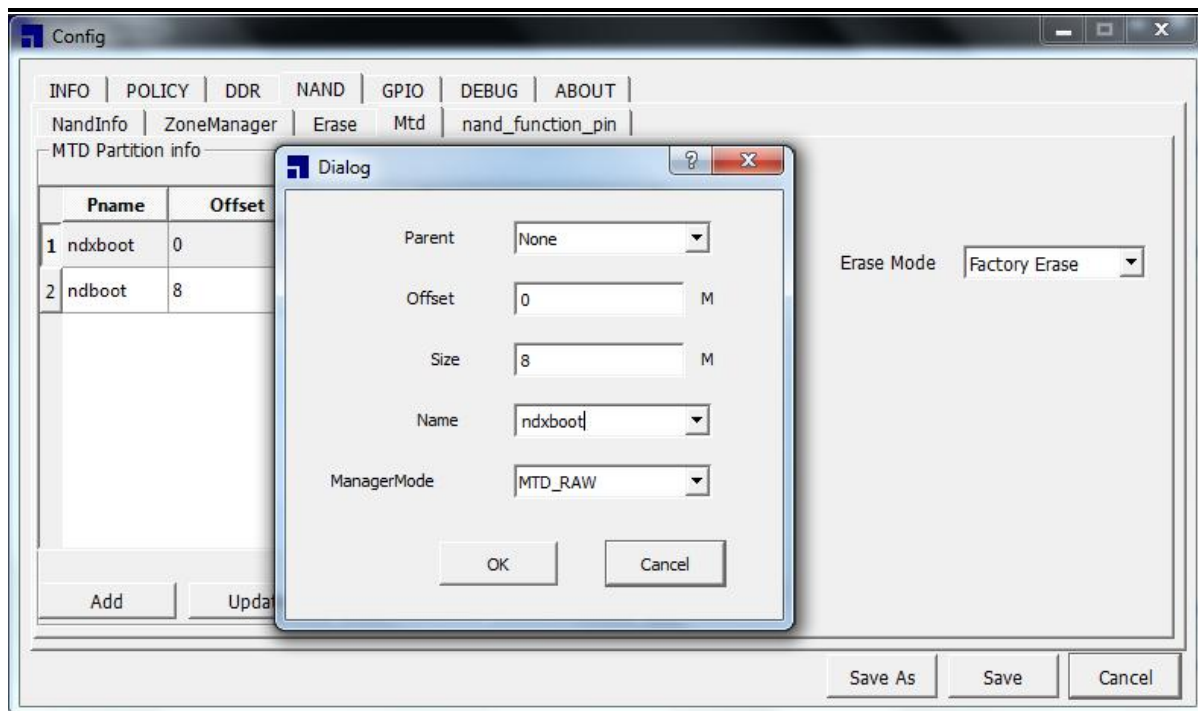


Figure 3-17 adding partition information

**Explain:**

**“Parent”**——Select the primary partition that the current partition depends on. If None is selected, the current partition is the primary partition

**“Offset”**——The actual offset of the primary partition or the relative offset of the subarea

**“Size”**——Set partition size

**“Name”**——Sets the partition name, which you can choose to have or fill in by yourself

**“ManagementMode”** —— the management mode that can be selected for the current primary partition

[MTD\_RAW] —— manage raw data through MTD

[MTD\_UBI] —— manage UBI data through MTD

**3.4.4.5 Nand\_function\_pin**

Set the drive capability of the corresponding pin on the NAND chip as shown in Figure 3-18.



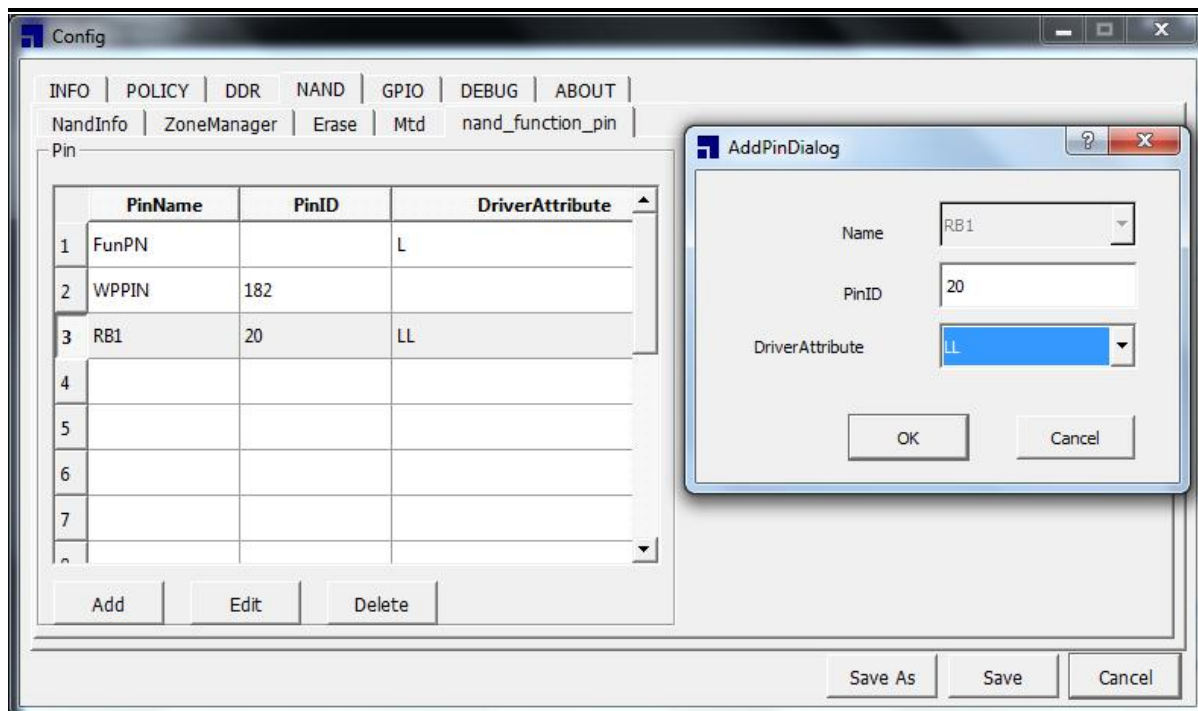


Figure 3-18 Nand function pin setting

**nand\_function\_pin Interface Button Function Explain:**

“Edit” —— Modify the selected pin settings

“Delete” —— Removes the current selection of pin settings

“Add” —— Add new pin settings

**AddPinDialog Interface Explain:**

“Name” —— NAND pin name

“Pin” —— NAND pin corresponds to GPIO, "- 1" means not used

“Drive capability” —— "L" means low level, "H" means high level, HH, h, l, ll correspond to four parameters of pin driving ability 0 ~ 3

**3.4.5 MMC**

If the recording medium is MMC, then select the **"MMC"** tab, according to their needs, before burning is erased, whether the card is configured before burning, as shown in figure 3-19.

Notice that when you select the part to erase. You need to add erase interval information to the table under the current interface, and the start address and the end address format must be filled out in strict accordance with the **16 Decimal system**, otherwise the save will not succeed.

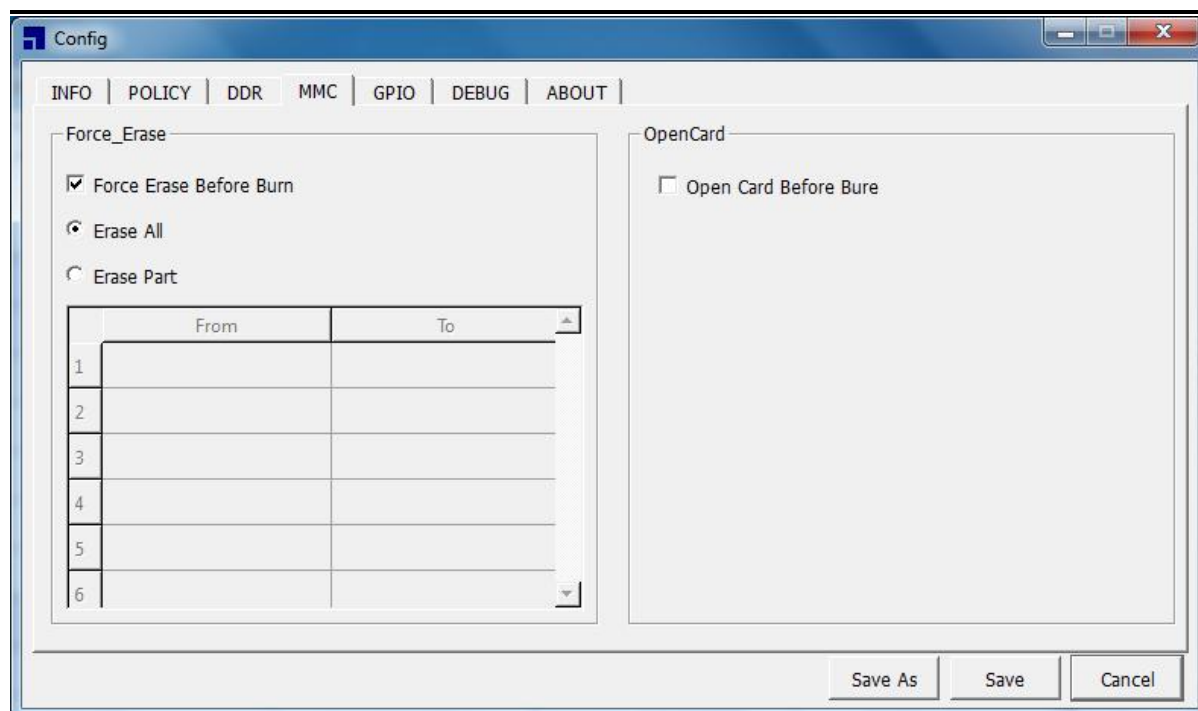


Figure 3-19 MMC configuration interface

### 3.4.6 GPIO

If you need to reconfigure GPIO, click the “GPIO” tab on the configuration screen. According to their own needs, configure GPIO related parameters, such as their burning is mmc0, then the mmc0 hook, as shown in Figure 3-20.

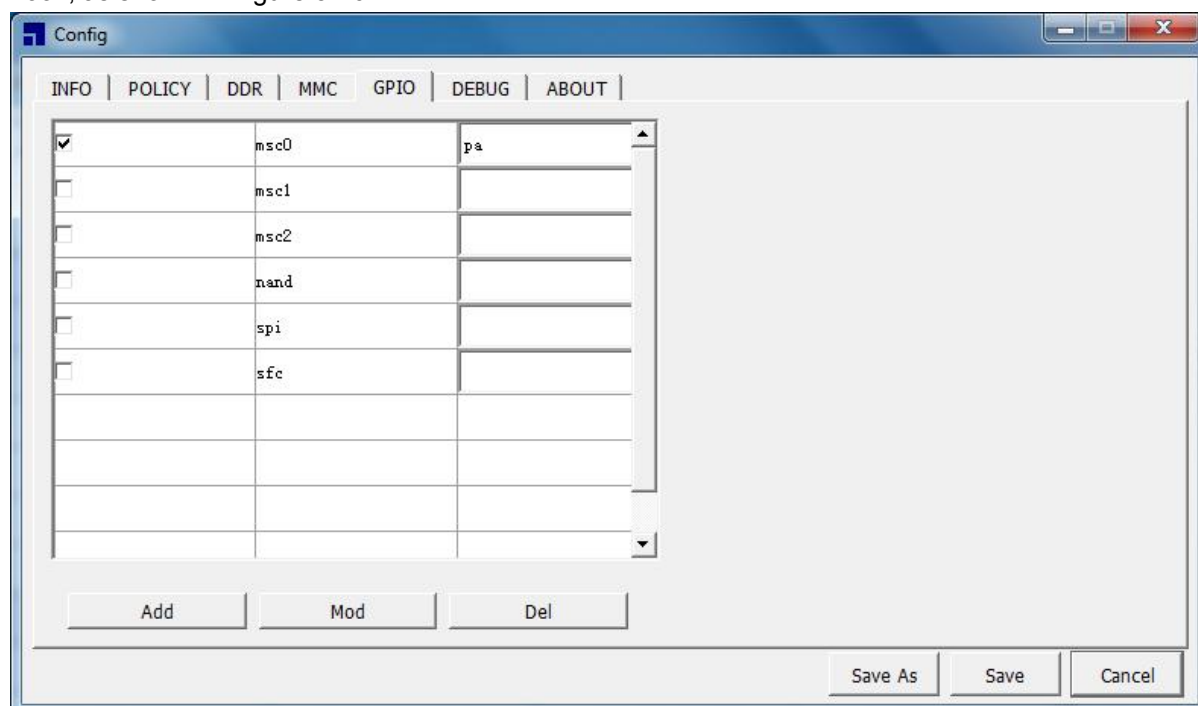


Figure 3-20 GPIO configuration interface

If the product design does not refer to the GPIO used by the storage media on the demo board, you need to reconfigure the GPIO. Click the drop-down list in the GPIO table and select



the appropriate option. The parameters corresponding to the configuration name are in firmwares/X1000{platform name} in the burning tool directory config.cfg In the document, as follows:

```
[gpio]
dev0_config0_0="msc0,pa_4bit,0,1,0x00fc0000"
dev0_config1_0="msc0,pa_8bit,0,1,0x00fc00f0"
dev0_config2_0="msc0,pe,4,0,0x30f00000"
dev0_config3_0="msc0,pa,0,1,0x03f00000"
    msc0 —— function name
    pa —— pin name
    0 —— GPIO A is 0, B is 1, and so on.
    1 - function 1 refer to GPIO chapter of CPU PM manual for corresponding functions.
    0x03f00000 —— pin 20 to 25bit is 1
```

The 20th to 25th bits of GPIO a group are configured as function1 msc0 function.

## 3.4.7 SFC

If SFC NOR or SFC NAND configuration is selected for board level configuration, the “**SFC**” tab will be displayed in the configuration window. If SFC NOR is configured at board level, this interface contains “**spibase**”, “**norinfo**” and “**Partition**”, as shown in Figure 3-21. If SFC NAND is configured at board level, only “**spibase**” and “**Partition**” are included in this interface, as shown in Figure 3-21.

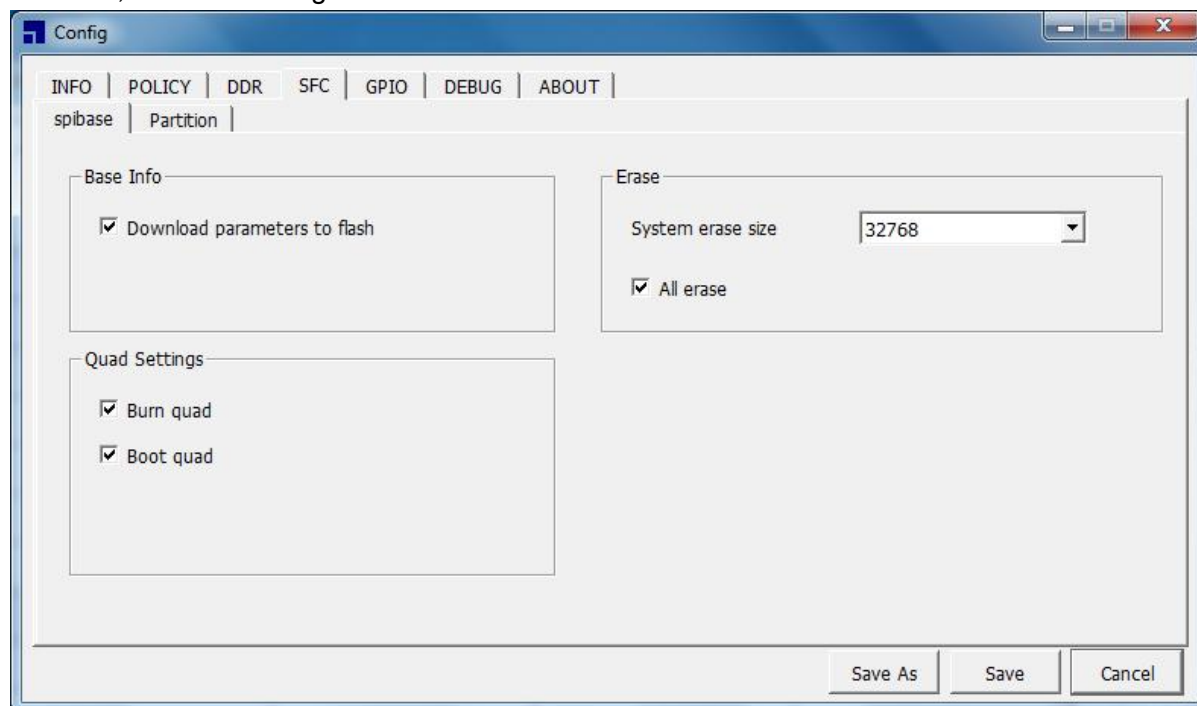


Figure 3-21 SFC configuration interface

### 3.4.7.1 Spibase

#### [Base info]

“**Download parameters to flash**” —— if checked, flash information and partition information will be written to the specified location of flash

**[Erase]**

“**System erase size**” —— this parameter is the block size parameter when reading and writing flash through the command in the file system

“**All erase**” —— check and erase all flash before burning, otherwise erase by partition

**[Quad Settings]**

“**Burn quad**” —— use four line read and write mode when burning

“**Boot quad**” —— u-boot uses four wire read-write mode when loading kernel

**3.4.7.2 norinfo**

Several supported nor information displayed under the "nor information" tab can be added, modified or deleted, as shown in Figure 3-22.

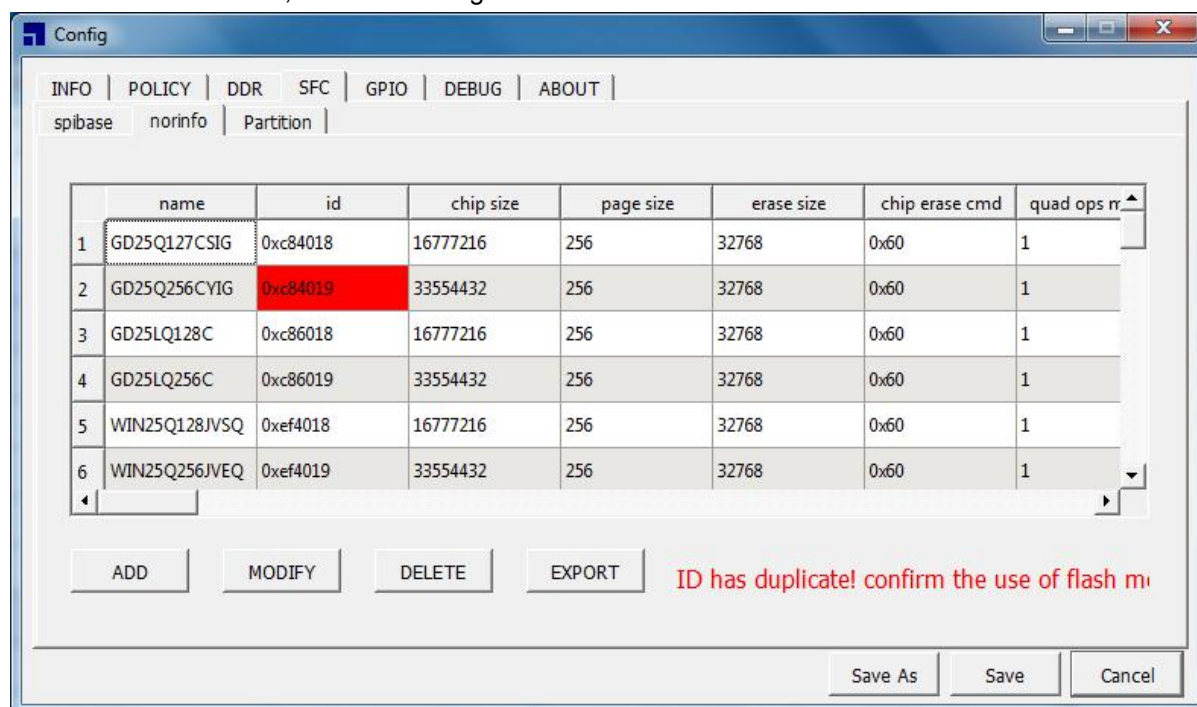
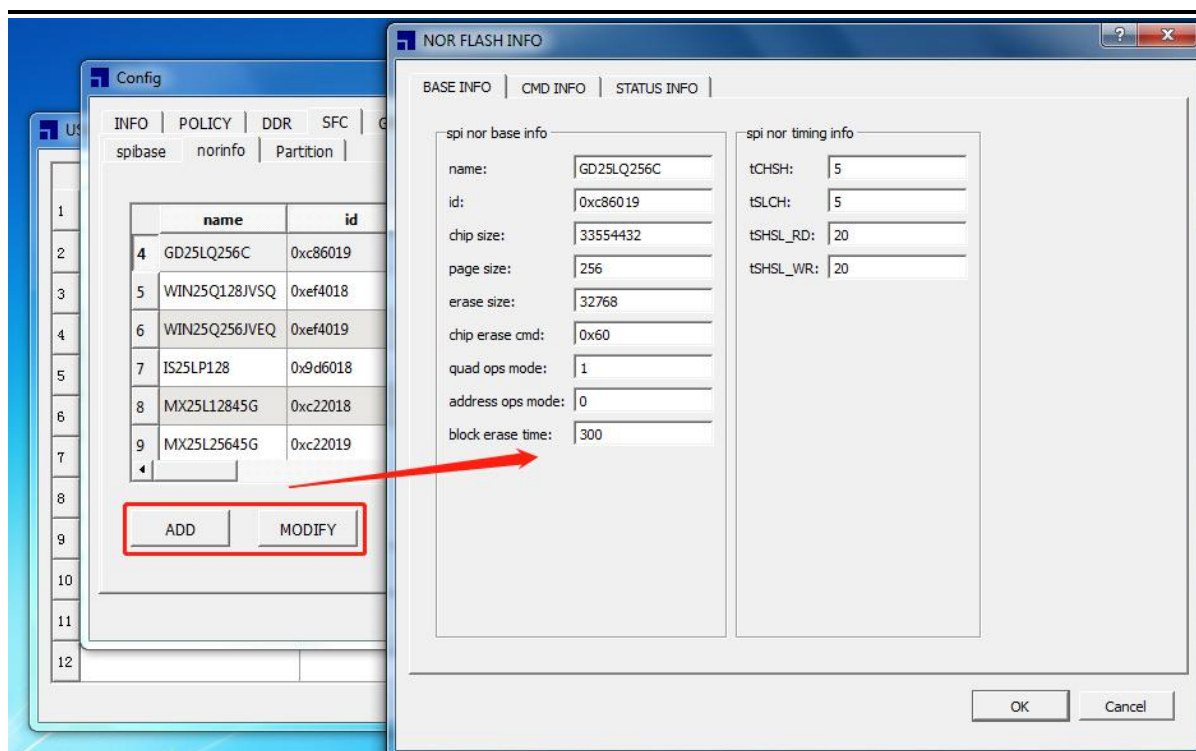


Figure 3-22 nor information

Note: the red font indicates duplicate ID. please confirm the flash model used by the device and delete other duplicate parameters. Otherwise, burning failure or repeated burning may occur due to parameter errors.

**Description of interface function buttons:****Add/modify/export nor information**

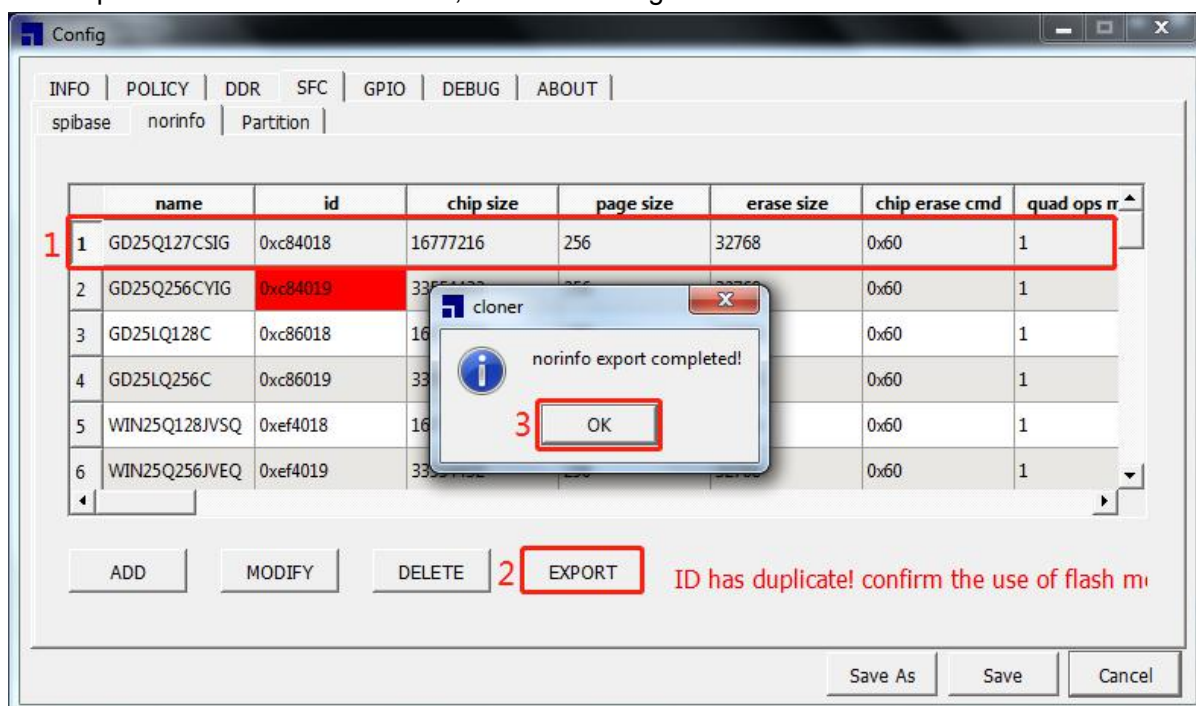
Add or modify nor information interface, as shown in Figure 3-23.



**Figure 3-23 add/modify nor information interface**

Note: Please refer to the parameter instructions in the Nor information interface 《sfc nor 参数配置说明文档.pdf》

Export nor information interface, as shown in Figure 3-24.



**Figure 3-24 export nor information interface**

Note :Export nor parameter file norinfo.h to the directory of burning tools

### 3.4.7.3 Partition

The SFC nor/nand partition table displayed under the partition tab, as shown in Figure 3-25.

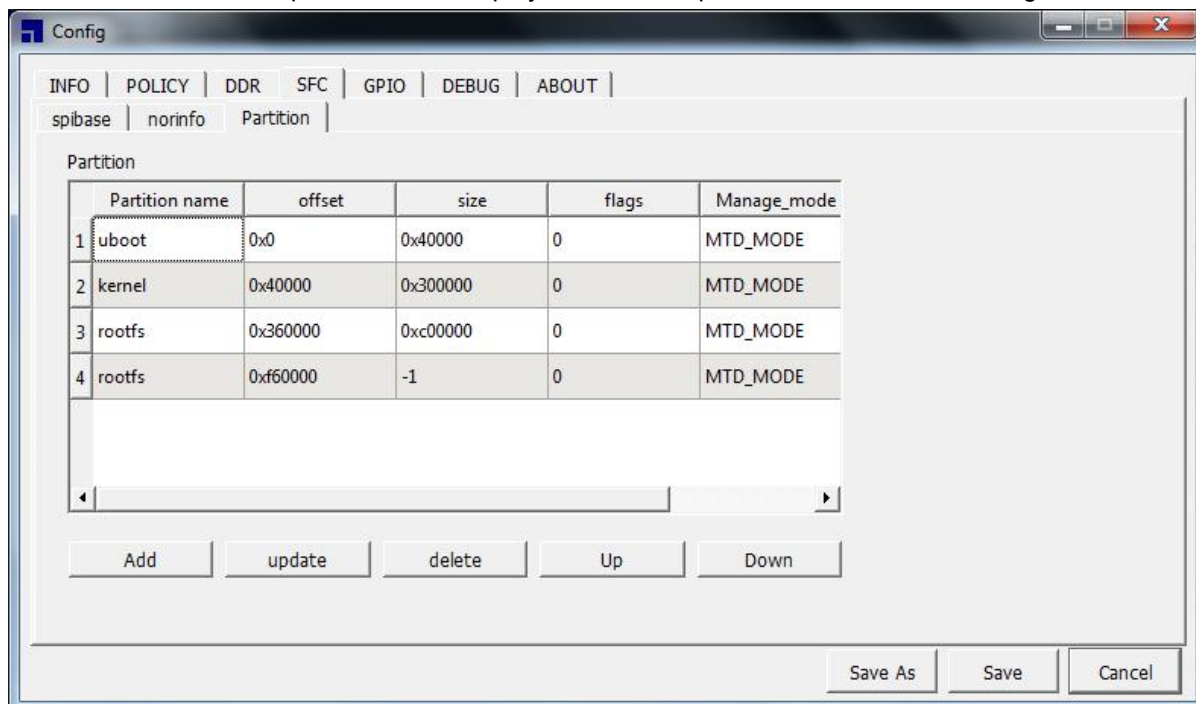


Figure 3-25 partition

You can add, modify, or delete partition information as needed. The offset address must be aligned according to the size of the erase block, as shown in Figure 3-26.

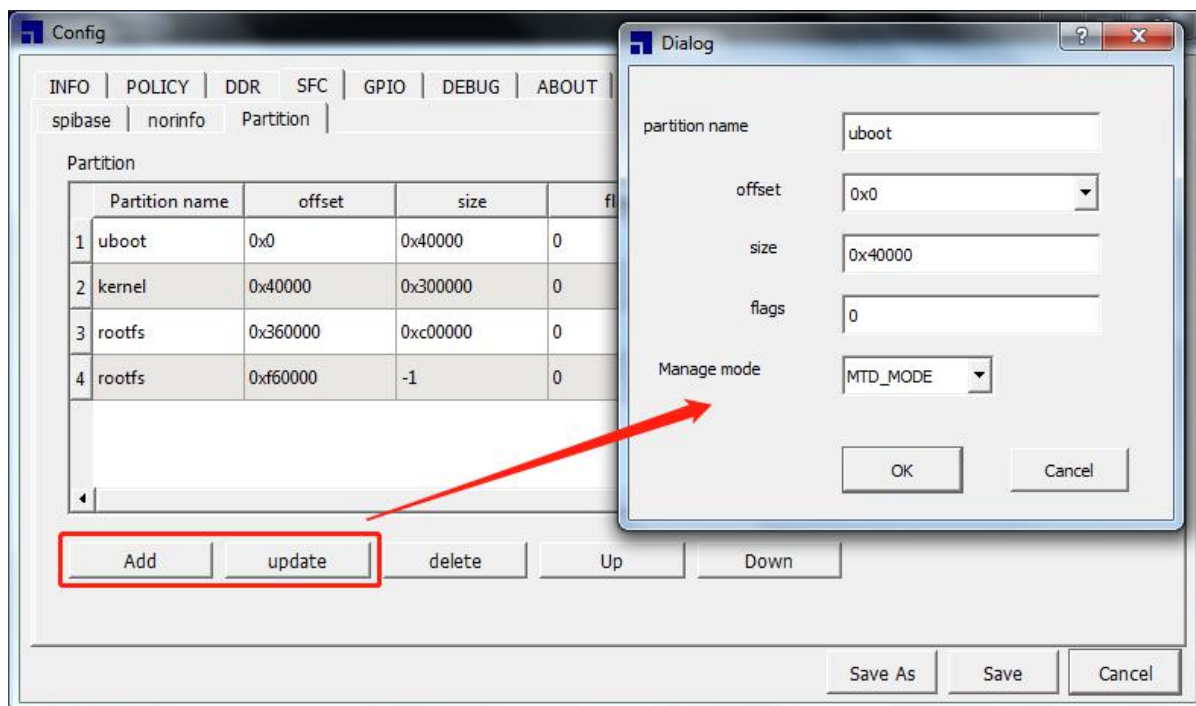


Figure 3-26 adding or modifying partition information

**Partition name** —— the partition name should be consistent with the partition name in

the code during OTA configuration

**Offset address** —— the offset address of the partition must be aligned according to the size of the erase block

**Partition size** —— the size of the partition must be aligned with the size of the erase block, "- 1" indicates the remaining space size from the offset address of the partition to the end of flash

Flag -- 0 is read-write permission, 1 is write only permission, 2 is read-only permission

**Management mode** ——

[MTD\_ Mode] —— erase the whole partition before writing the original data to flash

[MTD\_ D\_ Mode] —— write the data to flash after erasing the data size by block

[UBI\_ Manager] —— write UBI file system to flash through UBI management during burning

## 3.4.8 DEBUG

Debug the tab interface, as shown in Figure 3-27.

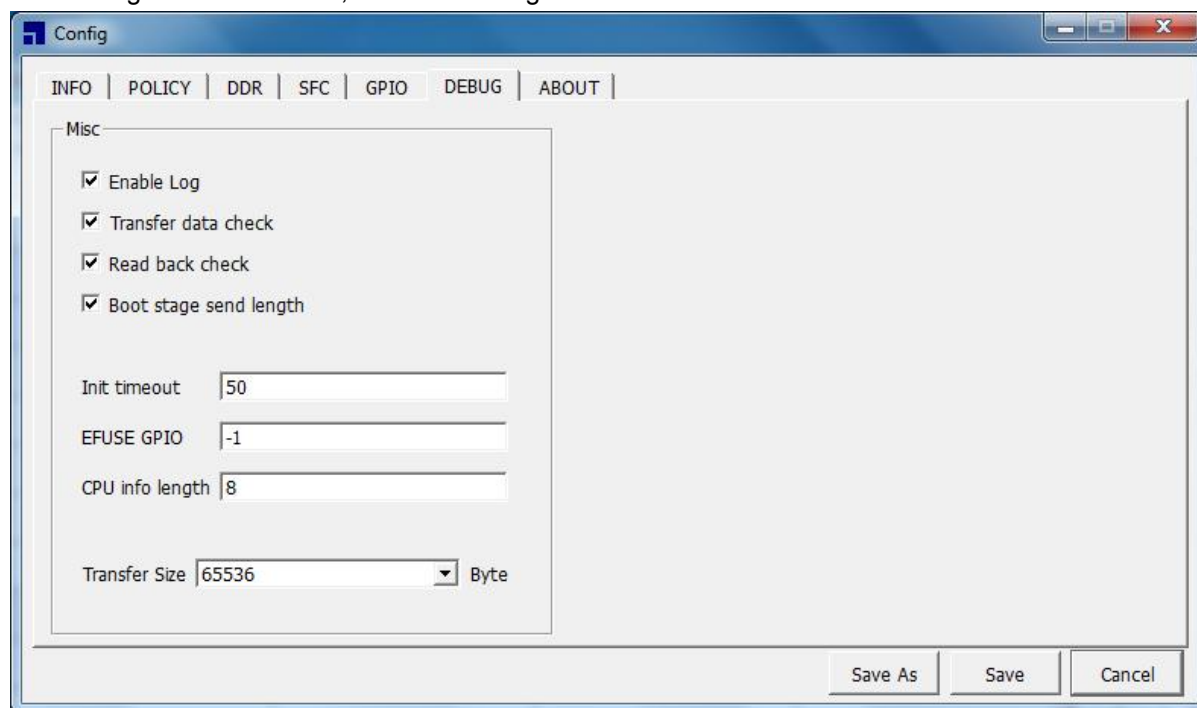


Figure 3-27 configuration debugging information

**Enable log** —— control the serial port printing in the burning process. Less printing can improve the burning speed

**Transfer data check** —— CRC check after the burning tool transfers data to the device through USB

**Read back check** —— read back data comparison after burning data to flash

**Send data length in boot phase** —— the length of CPU info to be obtained when burning boot phase

**Init timeout** —— configure the maximum duration of flash initialization

**EFUSE GPIO** —— when writing EFUSE, you need to configure AVDEFUSE to enable GPIO

---

**CPU info length** —— the length of CPU info obtained

**Transfer size** —— the size of data transferred at a time during burning



## 4 Modify and add configuration

### 4.1 New DDR type added

For the newly added DDR2 type, it is necessary to use ddrs in ddrs/ddr.cfg Add the model to the file and create a DDR2 folder in the same level directory. For example:

```
[ddrs]
ddr0=DDR3
ddr1=LPDDR
ddr2=LPDDR2
ddr3=LPDDR3
ddr4=DDR2 // Add this line
```

### 4.2 New DDR parameter added

For example, if the parameter configuration of a new m14d5121632a DDR2 model is added, a configuration file named DDR model needs to be created in the ddrs/DDR2 directory of the burning tool. Please refer to DDR manual for specific DDR parameters. As shown in Figure 4-1.

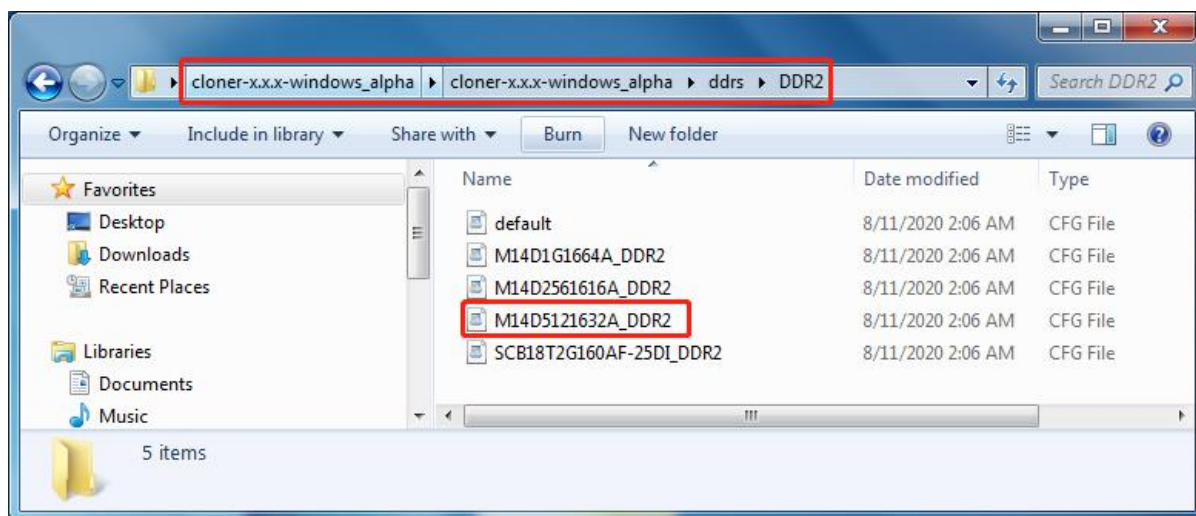


Figure 4-1 add DDR configuration file

After adding the configuration file, restart the burning tool and display the new configuration in the "**config**" column of DDR, as shown in Figure 4-2.

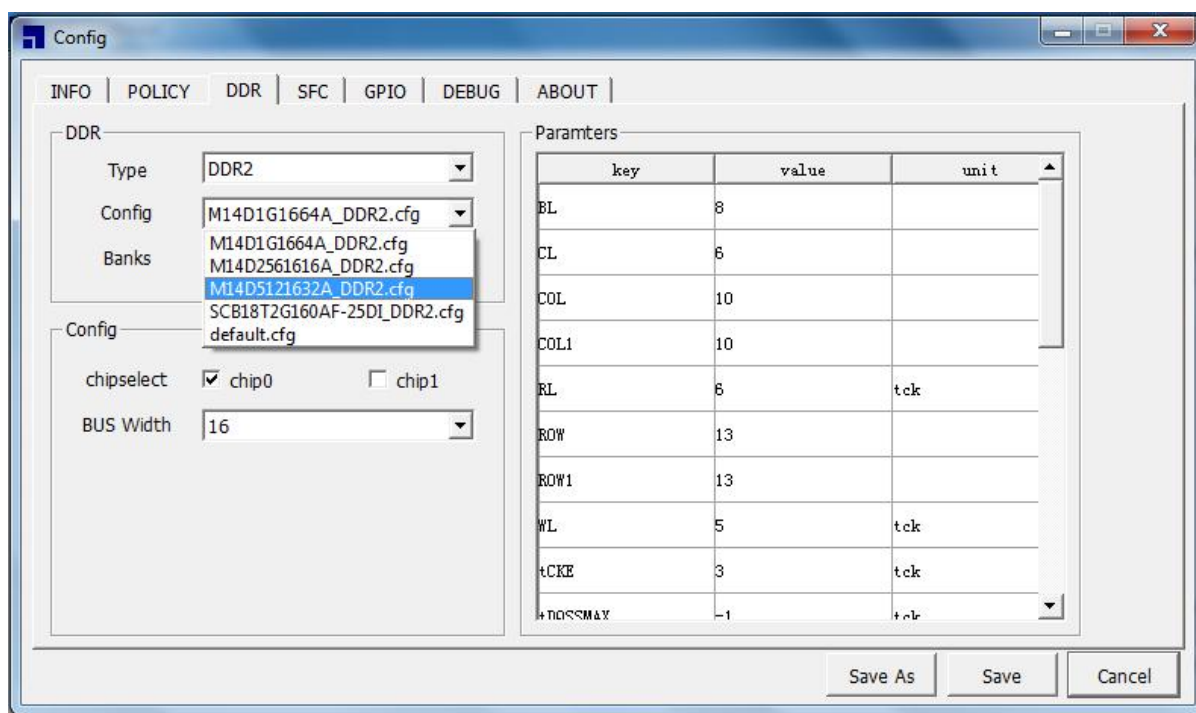


Figure 4-2 add DDR configuration options

### 4.3 Newly added burning firmware

Editing and burning tool firmwares/jz4775{platform name}/config.cfg File, add DDR2 type SPL burning firmware. For example:

```
[spl]
ddr0="0, spl_ddr3. bin"
ddr1="1, spl_lpddr. bin"
ddr2="2, spl_lpddr2. bin"
ddr3="3, spl_ddr2. bin"    //Add the line
```

Then, compile and generate SPL in the u-boot source code copy ddr2.bin firmware to firmwares/jz4775 directory, as shown in Figure 4-3.



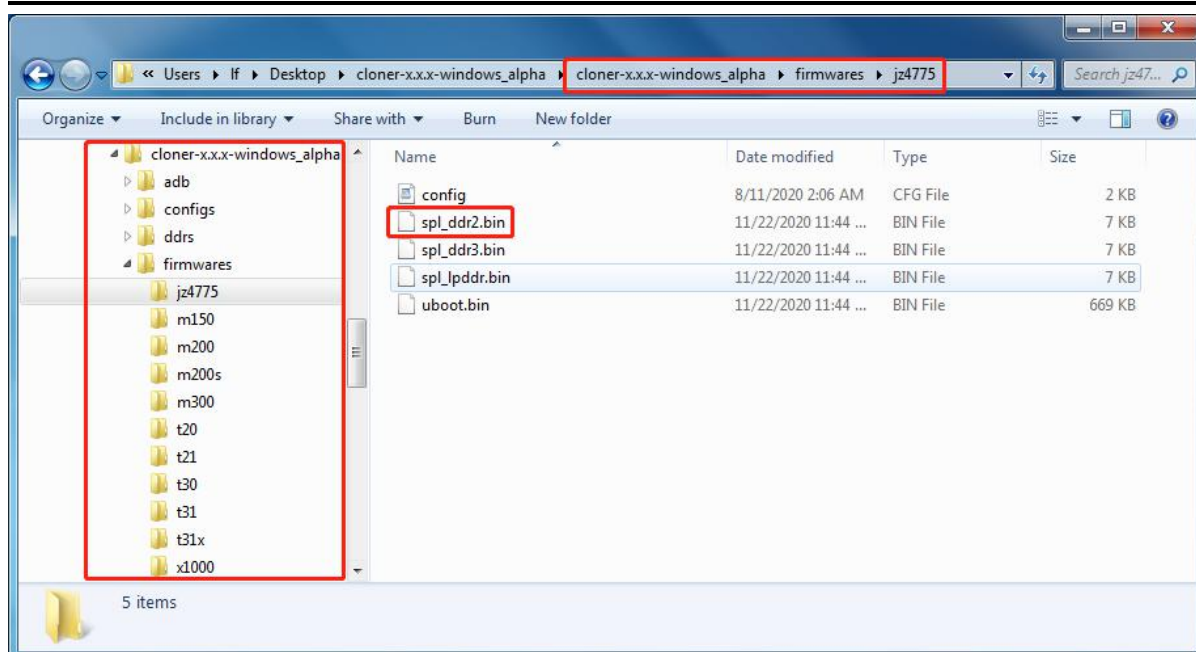


Figure 4-3 adding SPL burning firmware

#### 4.4 New CPU and DDR frequencies

If you need to change the frequency of the burned CPU and DDR during the burning process, there is no suitable CPU and DDR frequency pairing at the moment. Then, manually add a new configuration in the burning tool is also a new frequency division relationship.

Method:

Newly added CPU and DDR frequency configuration requires editing and burning tool firmwares/X1000{platform name}/config.cfg. For example:

```
[freq_limit]
```

```
cpu_and_ddr_freq_limit0="600000000,200000000"
```

```
cpu_and_ddr_freq_limit1="400000000,100000000" // Add the line
```

When you restart the burn tool, you will have more of this CPU frequency option, as shown in Figure 4-4.

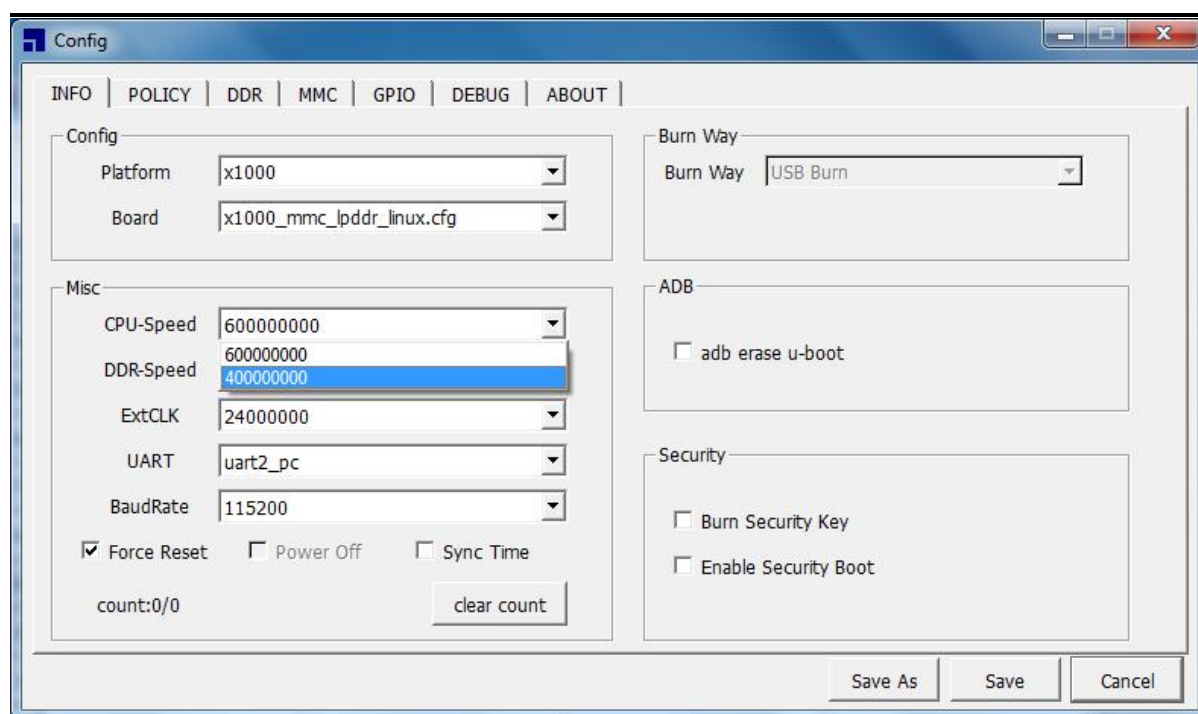


Figure 4-4 burn tool new CPU and DDR frequency

#### 4.5 New GPIO configuration group

Add GPIO configuration, edit burning tool firmwares/X1000{platform name}/config.cfg For example:

```
[gpio]
dev5_config0_0="sfc,pa_6bit,0,0x11,0xfc000000"
dev5_config1_0="sfc,pa_4bit,0,0x11,0x3c000000" // Add the line
```

After restarting the burning tool, the new options will be displayed in the GPIO configuration table, as shown in Figure 4-5.

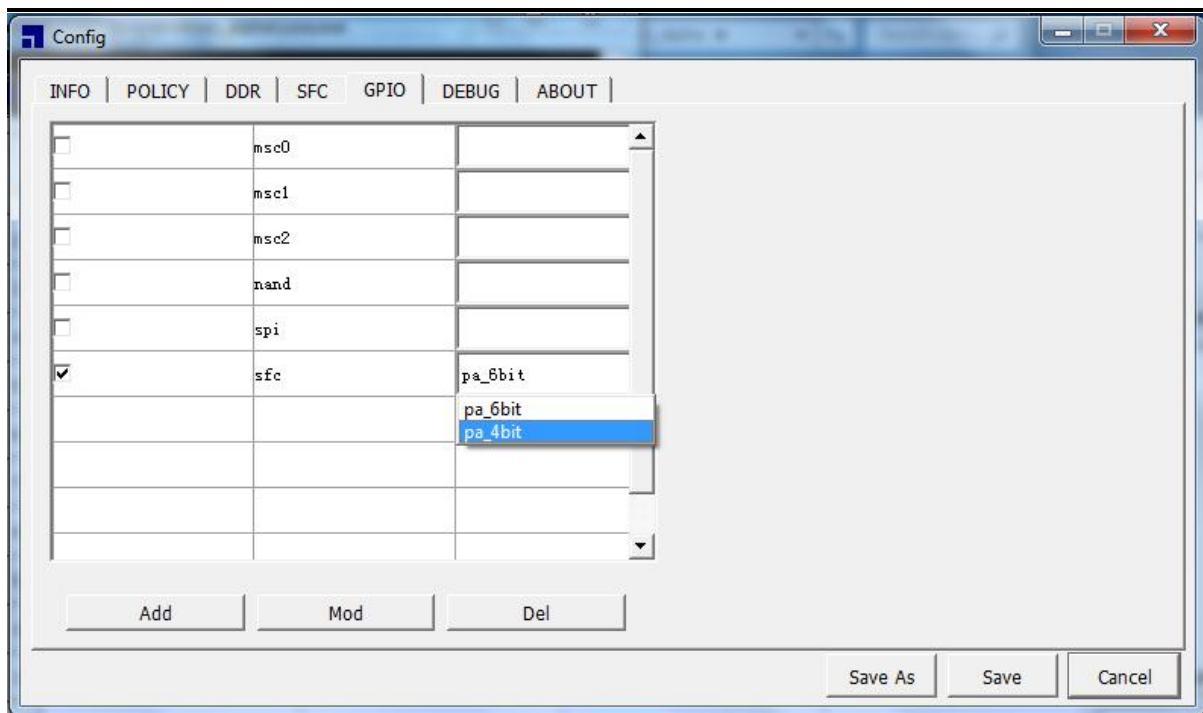
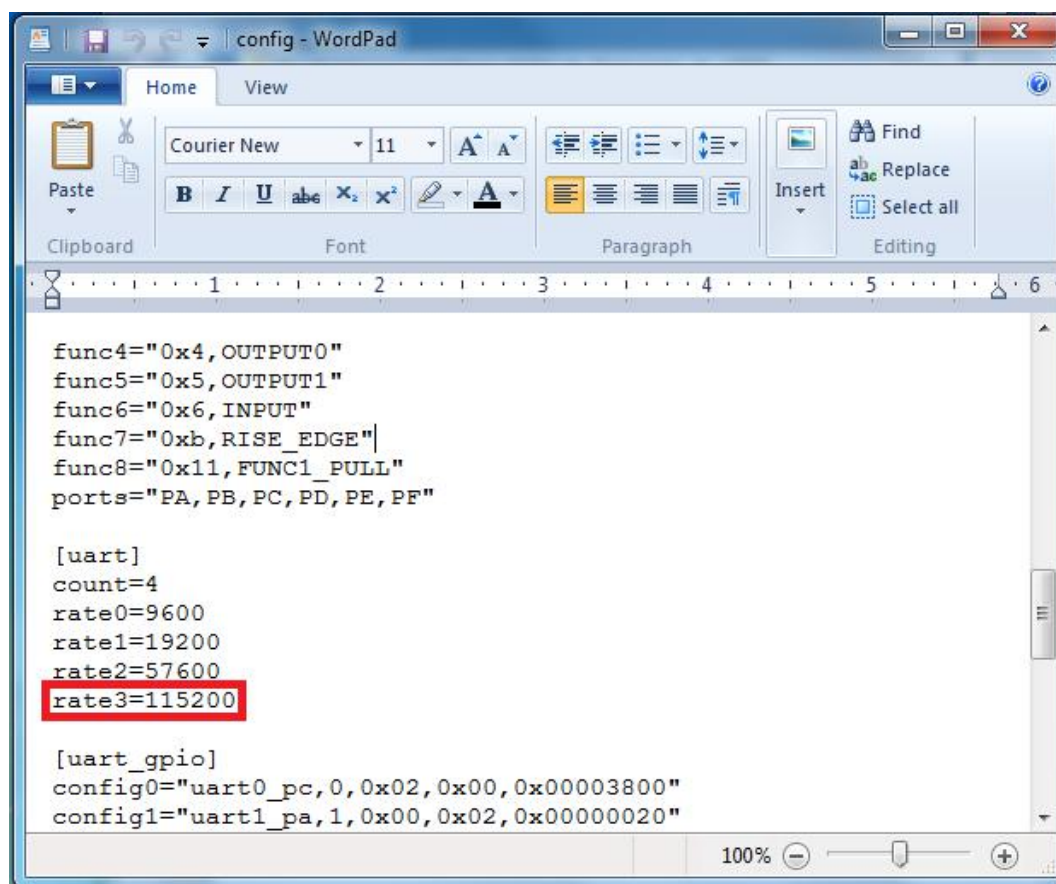


Figure 4-5 adding GPIO configuration

#### 4.6 New serial baud option

If the write process 9600, 57600, 115200 of the four baud rate are not hardware needed, so we can add a new baud rate, the corresponding chip type open file or directory under the firmwares directory of the configuration file, find the UART field. The new baud rate method is shown in Figure 4-6.



**Figure 4-6** adds UART baud rate configuration

After you restart the burn tool, add new configuration to the baud rate drop-down option, as shown in Figure 4-7.

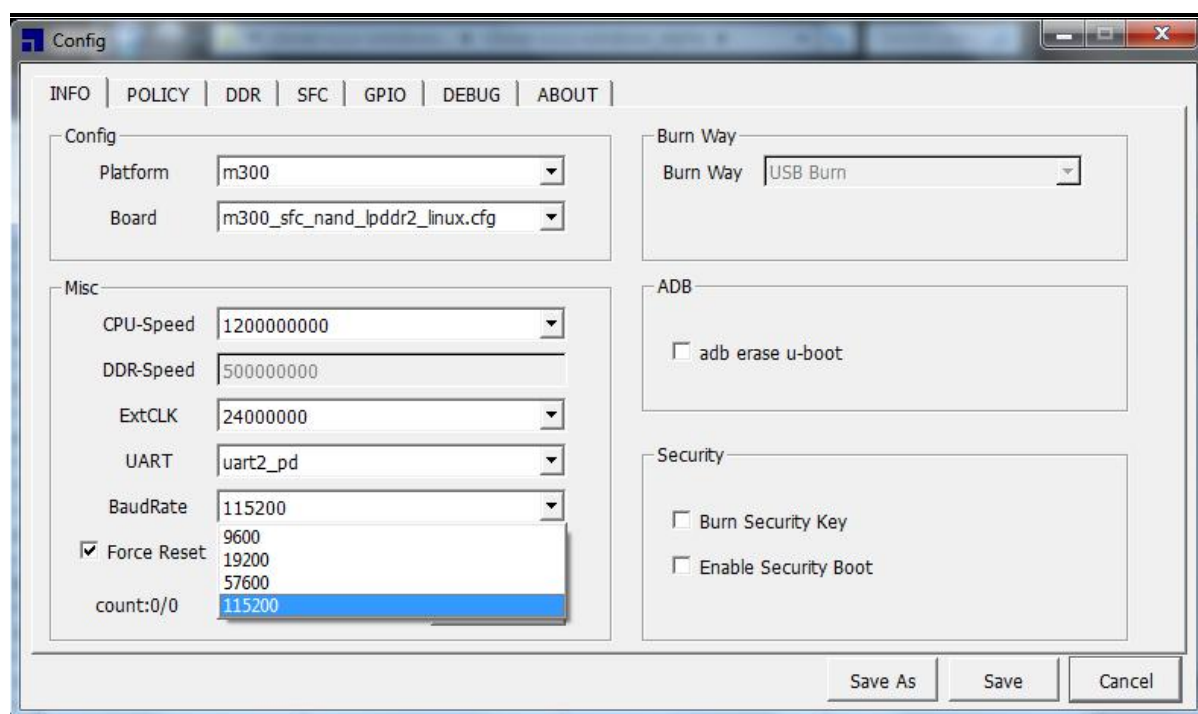


Figure 4-7 USBCloner adds UART baud rate

#### 4.7 New external crystal oscillator option

Currently burn tools support 12M, 24M, 48M external crystal oscillator, if the development board requires the external crystal does not have, you can re add. If a board requires an external crystal oscillator is 26M, then we must first open the firmwares directory under the corresponding chip type, directory config.cfg file, to find the extclk field. After adding a new, the count value should be added. As shown in Figure 4-8.

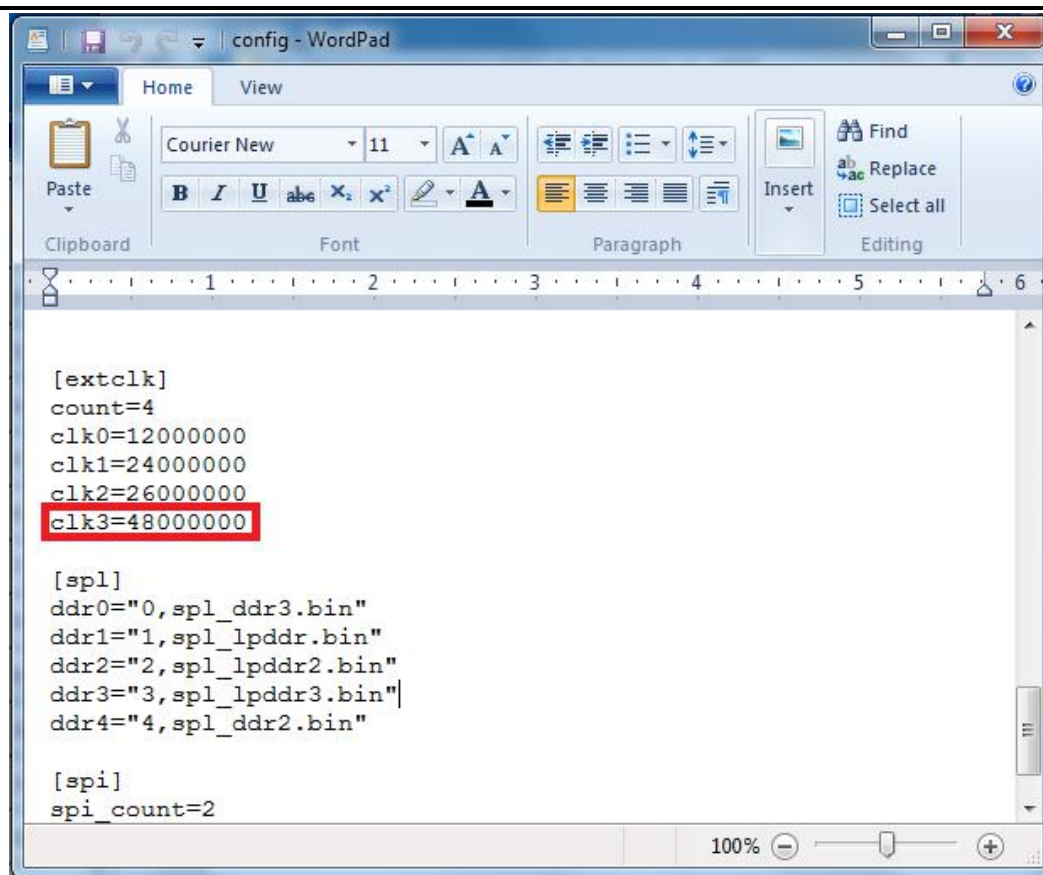


Figure 4-8 new external crystal oscillator options

Restart the burn tool and add the effect after the external crystal oscillator, as shown in Figure 4-9.

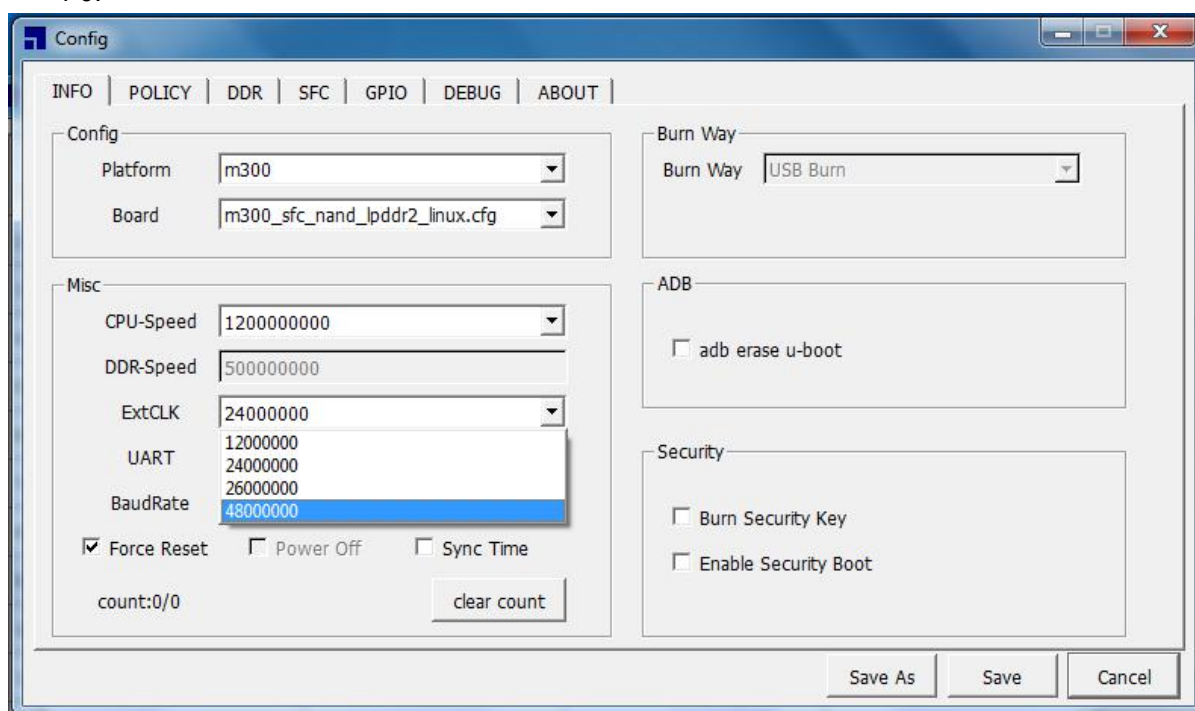




Figure 4-9 burning tool adds external crystal oscillator option

#### 4.8 Save as profile

Click the "save as" button in the configuration window, enter the name of the new configuration file and click **"save"**, as shown in Figure 4-10.

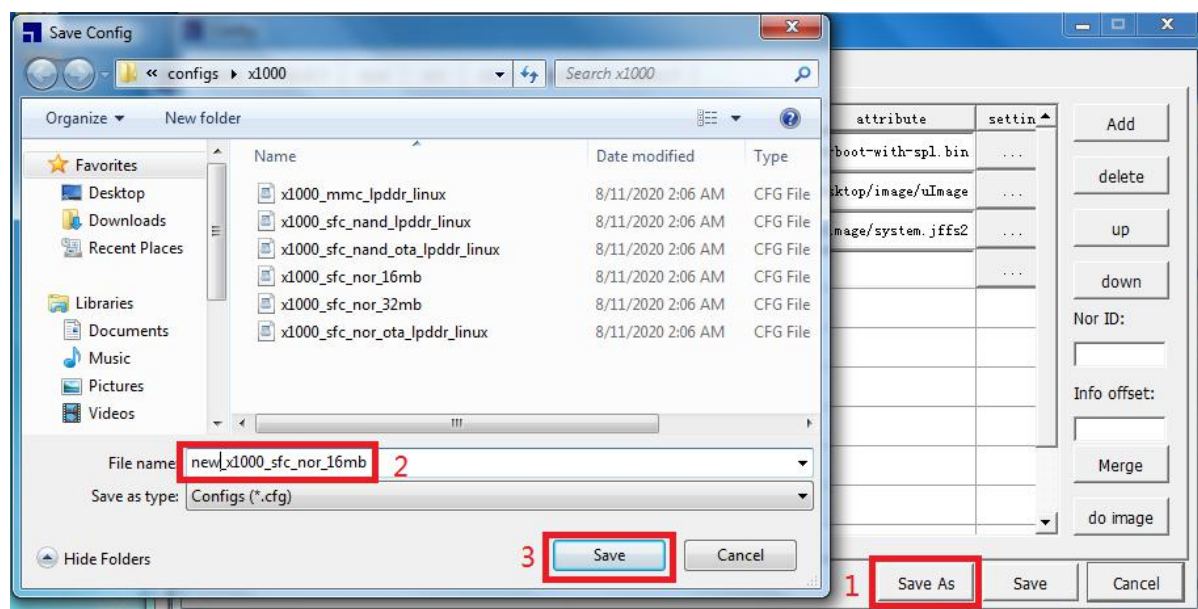


Figure 4-10 Save as profile

When you open the configuration window again, use the new configuration file, as shown in Figure 4-11.

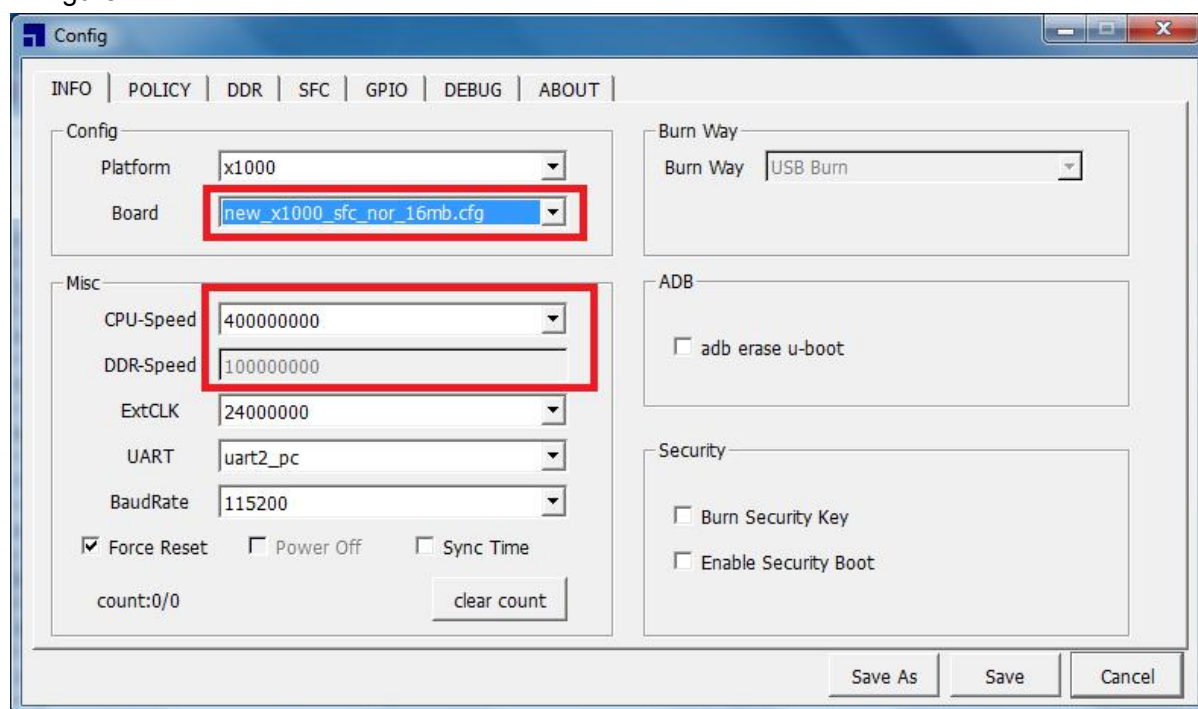


Figure 4-11 select new configuration

## 5 Burning operation

### 5.1 Basic operation

1. 打开“配置”窗口，选择与设备对应的“平台”和“板级”配置。
2. 选择烧录镜像路径，如需修改默认策略配置，请参阅“界面介绍”章节。
3. 点击“保存”按钮，保存配置。
4. 点击“开始”按钮，设备进入 USB B00T 模式后开始烧录。

1. Open the **"config"** window and select the **"platform"** and **"board"** configurations corresponding to the device.

2. Select the burning image path. If you need to modify the default policy configuration, please refer to the **"Interface introduction"** chapter.

3. Click the **"save"** button to save the configuration.

4. Click the **"start"** button, and the device will start burning after entering the USB boot mode.

### 5.2 Factory burning

#### 5.2.1 Generate burning image package

After configuration, click the "generate image" button in the "policy" tab, as shown in Figure 5-1.

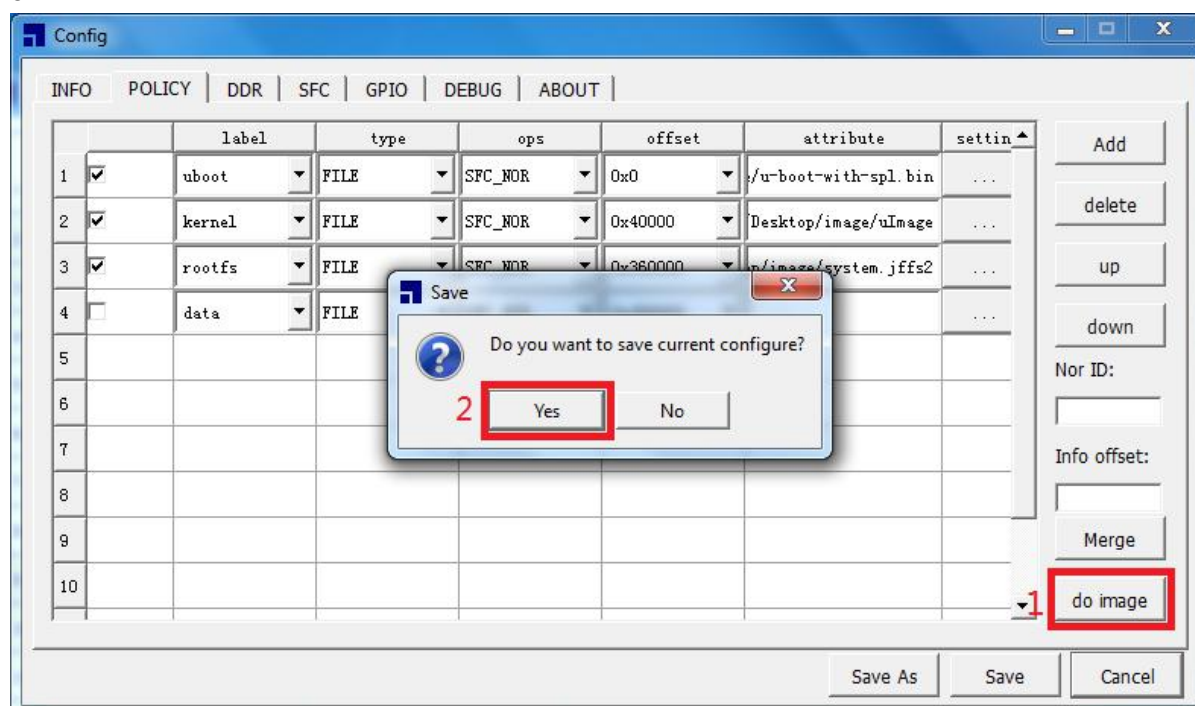
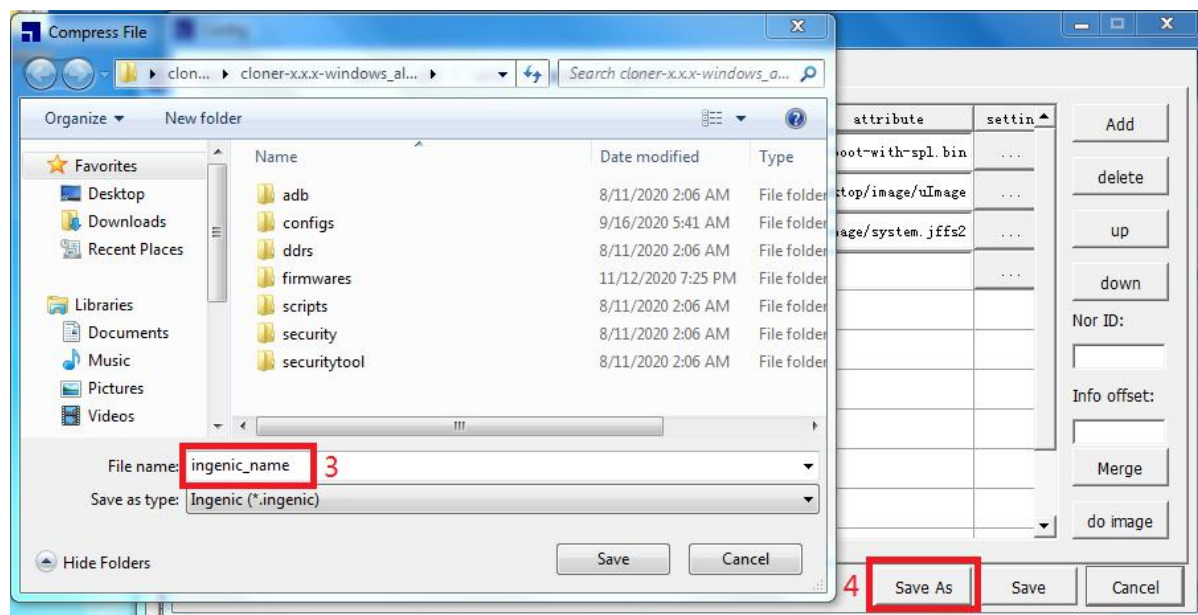


Figure 5-1 image generation

After confirming to save the configuration, a window will pop up to save the image with. Ingenic as the suffix. Select the path, enter the image name, and click save, as shown in Figure

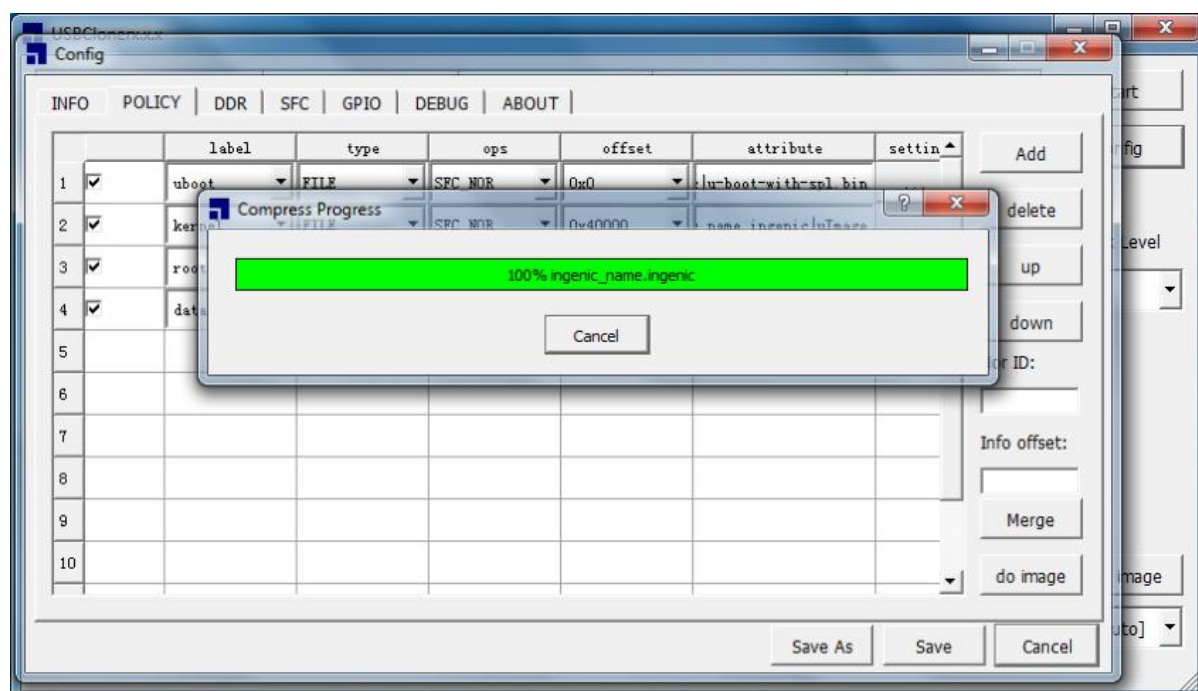


5-2.



**Figure 5-2 save ingenic image window**

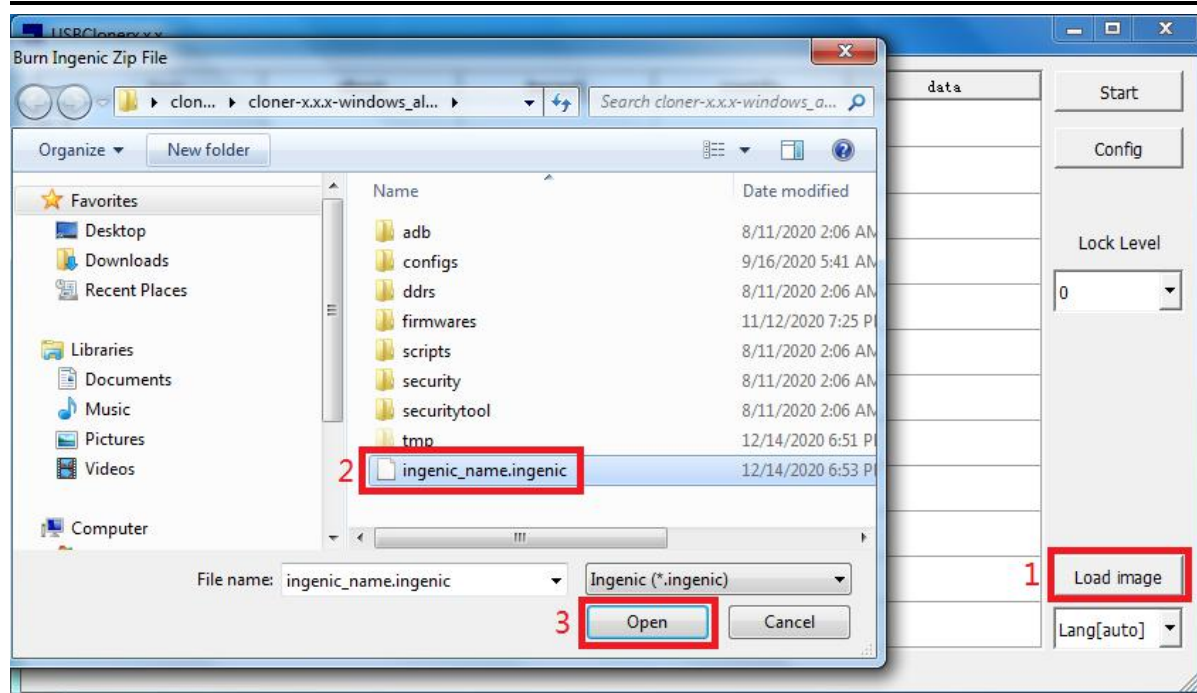
Click **"save"** to display the packing image progress bar, as shown in Figure 5-3.



**Figure 5-3 package image progress bar**

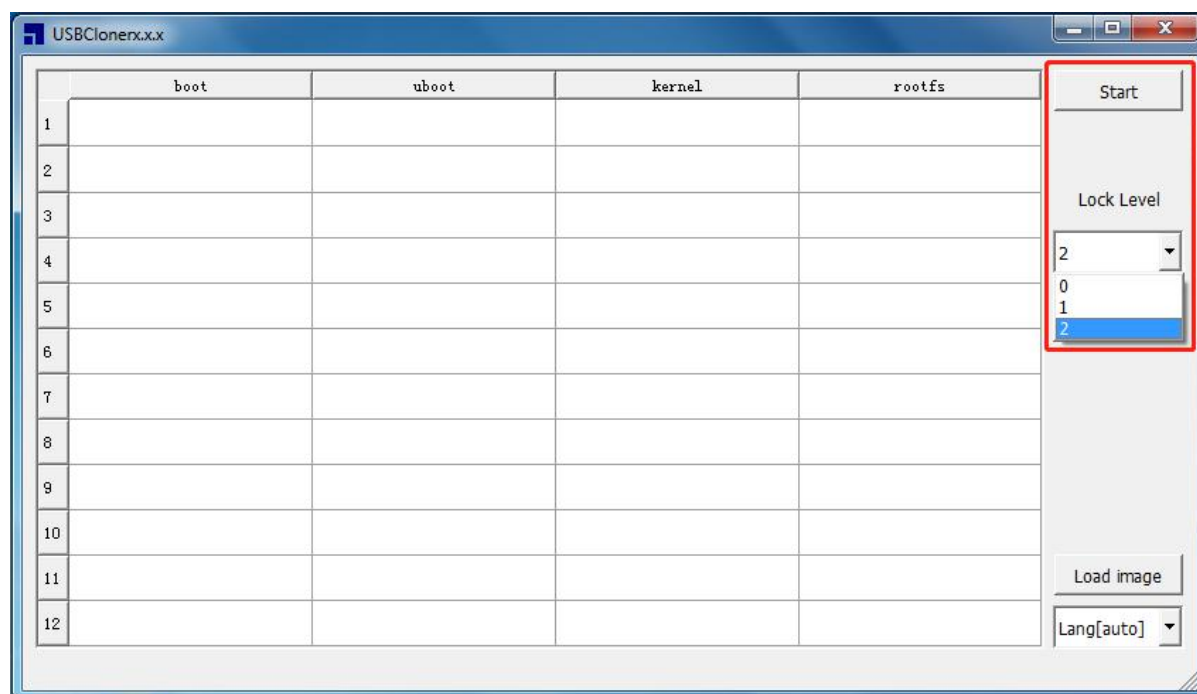
## 5.2.2 Loading burning image package

After generating the burning image package, re open the burning tool and click the **"load image"** button on the main interface. As shown in Figure 5-4.



**Figure 5-4 loading burning image package**

After loading the burning image package, the security lock of the main interface is set to "2" high security level by default, and the configuration button is hidden to prohibit factory personnel from modifying parameter operation. As shown in Figure 5-5.



**Figure 5-5 main interface display after loading burning image package**

### 5.3 burning progress

The burning tool supports multiple devices burning at the same time, and the progress display is shown in Figure 5-6.

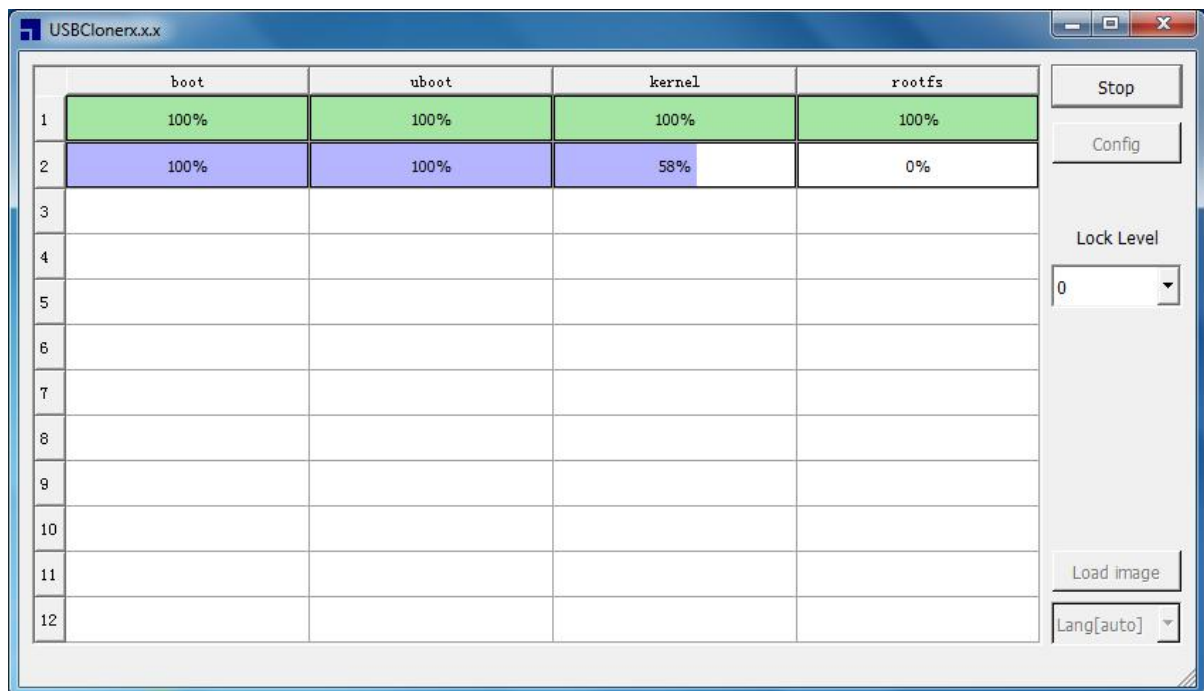


Figure 5-6 burning progress

The above figure shows that there are two devices burning. The first line is burning completion status, and the second line is burning status.

### 5.4 log burning

After burning, a log file named "board level configuration name date" is generated in the log directory of the burning tool. For example:

```
x1000_sfc_nor_16mb-2020-11-20.log
```

```
2020-11-20 13-24-01
```

```
port:0
```

```
policy0 write ret: ok
```

```
policy1 write ret: ok
```

```
policy2 write ret: ok
```

```
all policy completed
```

```
2020-11-20 13-25-42
```

```
port:0
```

```
policy0 write ret: ok
```

```
policy1 write ret: ok
```

```
policy2 write ret: ok
```

---

all policy completed

### 6 Method for opening burning tool under Linux system

Unzip the USBCloner programming tool package, and then enter the USBCloner programming tools directory, the first to give permission to execute "**cloner**" and "**core**" file, then the implementation of **./cloner** in the terminal, using the method of similar methods and the use of windows, please refer to.

## 7 Common policy configuration

### 7.1 Burning common image file policy configuration

In the "POLICY" configuration interface, select the "File" type, click the "..." button, and select the image file path. As shown in Figure 7-1.

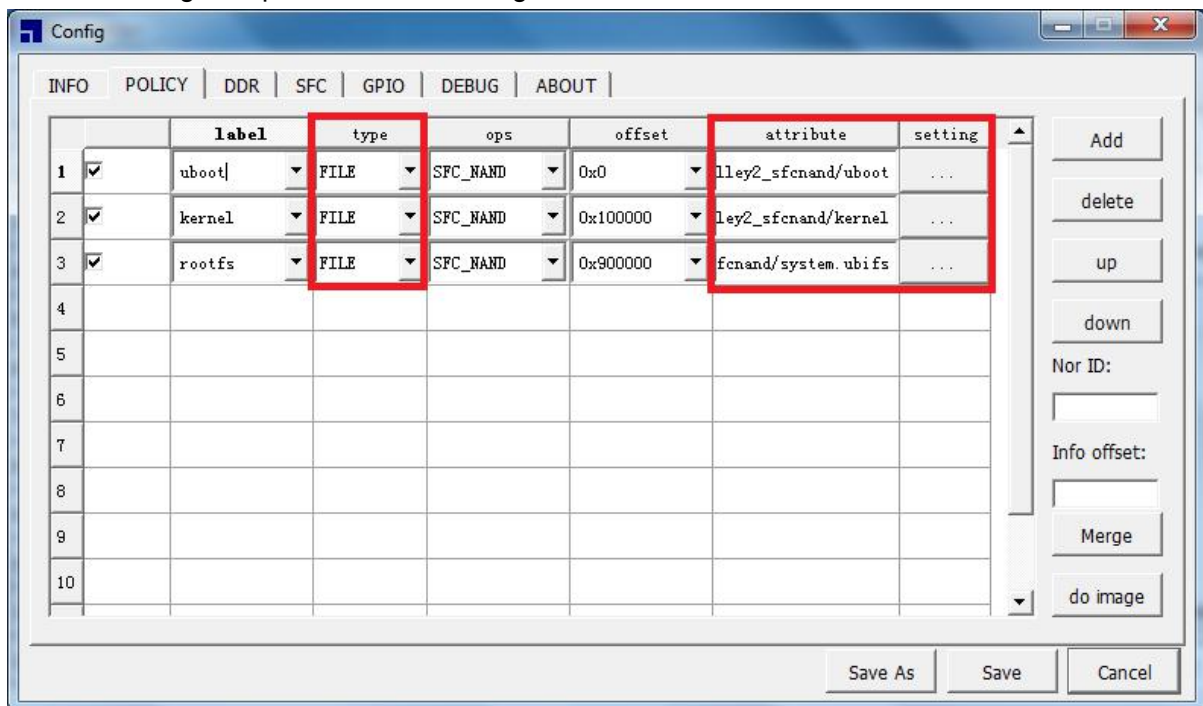
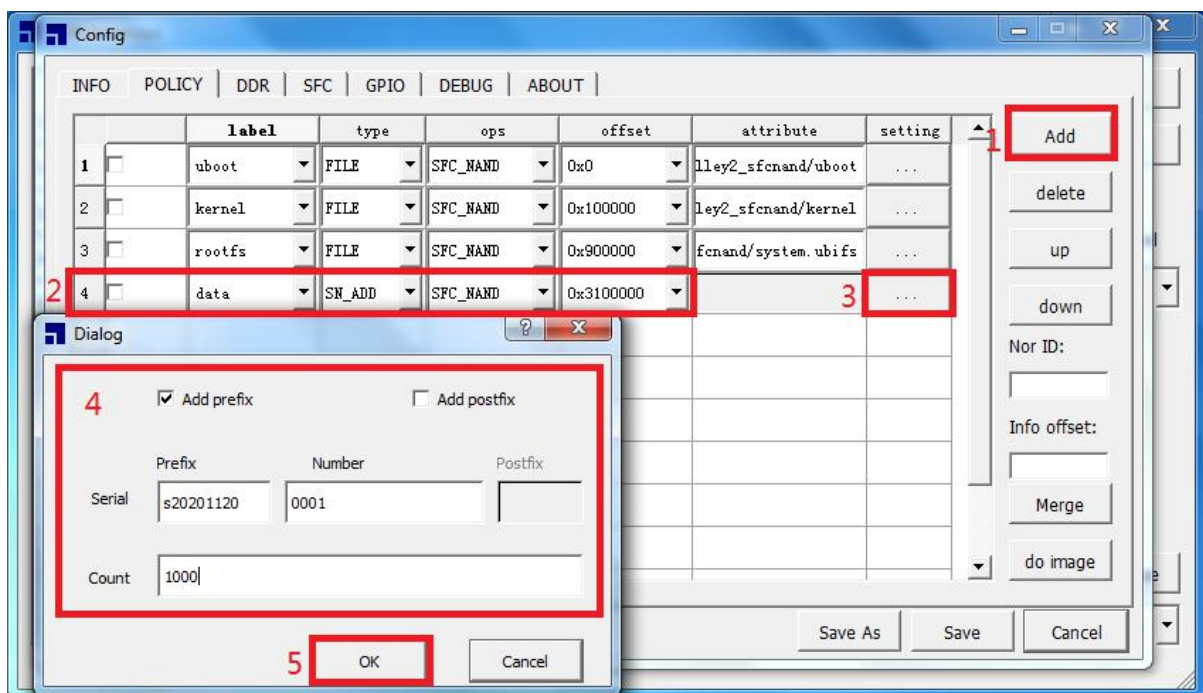


Figure 7-1 profile type policy

### 7.2 Burning serial number policy configuration

Add "SN" to the "POLICY" configuration interface "Add" type. As shown in Figure 7-2.



**Figure 7-2 configuration of burning serial number****Operation steps of adding burning serial number:**

1. Click the **"config"** button to open the configuration window.
2. Select the appropriate platform and board level configuration for the equipment.
3. Click **"POLICY"** to switch to the policy interface.
4. Click the **"Add"** button to add a new policy to the strategy table.
5. Check the box to activate the strategy.
6. Enter a policy name, such as **"write sn"**.
7. Select **"SN\_ADD"**.
8. Enter the offset address.
9. Click the **"..."** button in the setting column to open the serial number setting window.
10. Check the prefix and suffix according to the requirement.
11. Input the initial value of serial number and the maximum burning times.
12. Click "save" to close the configuration window.

**In the burning tool configs/rules.cfg Configurable serial number rules in:**

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

**For example:**

[sn]

prefix0=Ss:1 —— the first character of the prefix allows the input of uppercase and lowercase letters s

prefix1=0-9:1 —— the second character of the prefix allows you to enter a number from 0 to 9

prefix2=0-9a-zA-Z:1 —— the third character of the prefix allows the input of numbers and any letters

prefix3=0-9a-zA-Z:2 —— characters 4-5 of prefix allow input of numbers and any letters

prefix4=0-9a-zA-z:1 —— the sixth character of the prefix allows the input of numbers and any letters

prefix5=0-9z-yZ-Y:4 —— prefix characters 7-10 allow input of numbers and case letters Z and Y

prefix6=0-9:1 -- the 11th character of the prefix allows you to enter a number from 0 to 9

prefix7=0-9a-zA-C:1 —— the 12th character of the prefix allows you to enter numbers and upper and lower case letters from a to C

prefix8=0-9:2 —— prefix characters 13-14 allow two digits from 0 to 9

serial0=0-9a-fA-F:4 —— the serial number allows the input of four hexadecimal numbers

Portfix0 = —— suffix has no restriction rule

After successful burning, the serial number will be automatically increased by 1 and saved to the configuration file.

**7.2.1 scan gun acquisition serial number policy configuration**

Add a new policy of **"SCANNER GUN"** type in the **"POLICY"** configuration interface. As shown in Figure 7-3.



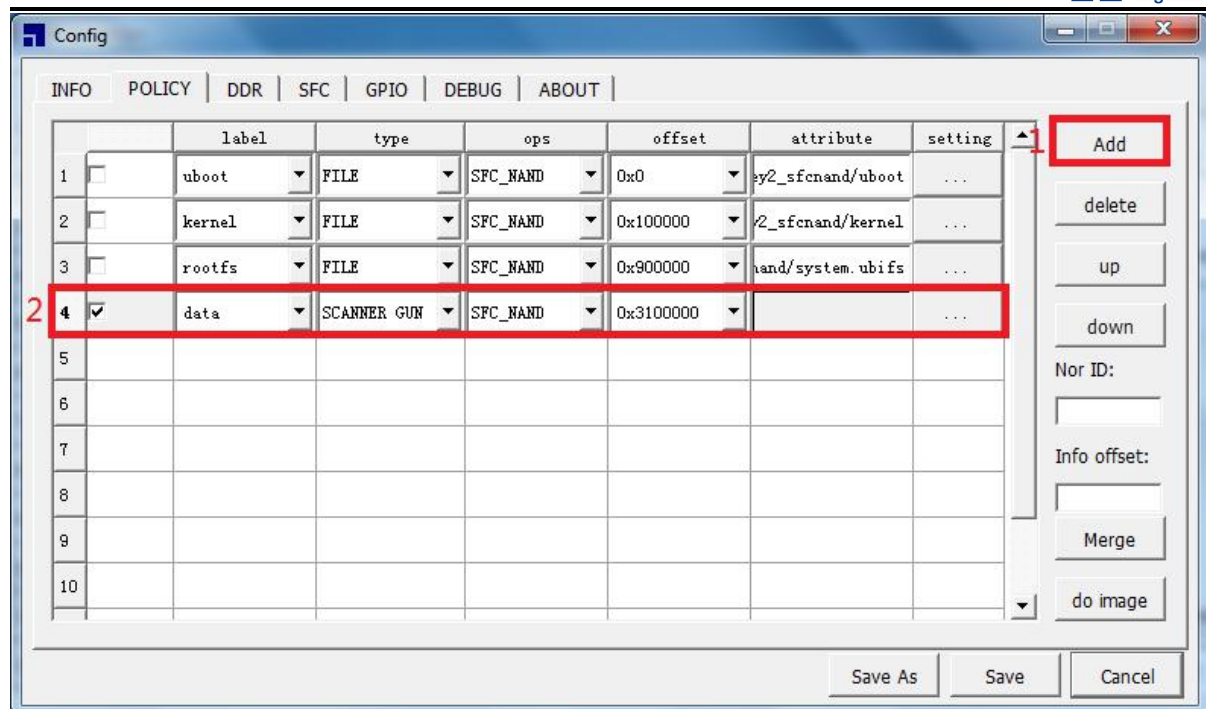


Figure 7-3 scan gun strategy configuration

#### When adding burning, use scanning gun to obtain serial number

1. Click the **"config"** button to open the configuration window.
2. Select the appropriate platform and board level configuration for the equipment.
3. Click **"POLICY"** to switch to the policy interface.
4. Click the **"Add"** button to add a new policy to the strategy table.
5. Check the box to activate the strategy.
6. Enter a policy name, such as **"write sn"**.
7. Select the **"SCANNER GUN"** type.
8. Enter the offset address.
9. Click "save" to close the configuration window.

In the burning mode of acquiring the serial number with the scanning grab, a window will pop up when the scanning gun strategy position is burned. At this time, the barcode or QR code is scanned with the scanning gun, and the acquired serial number is automatically input into the window edit box. Click "OK" or press enter to continue burning. As shown in Figure 7-4.

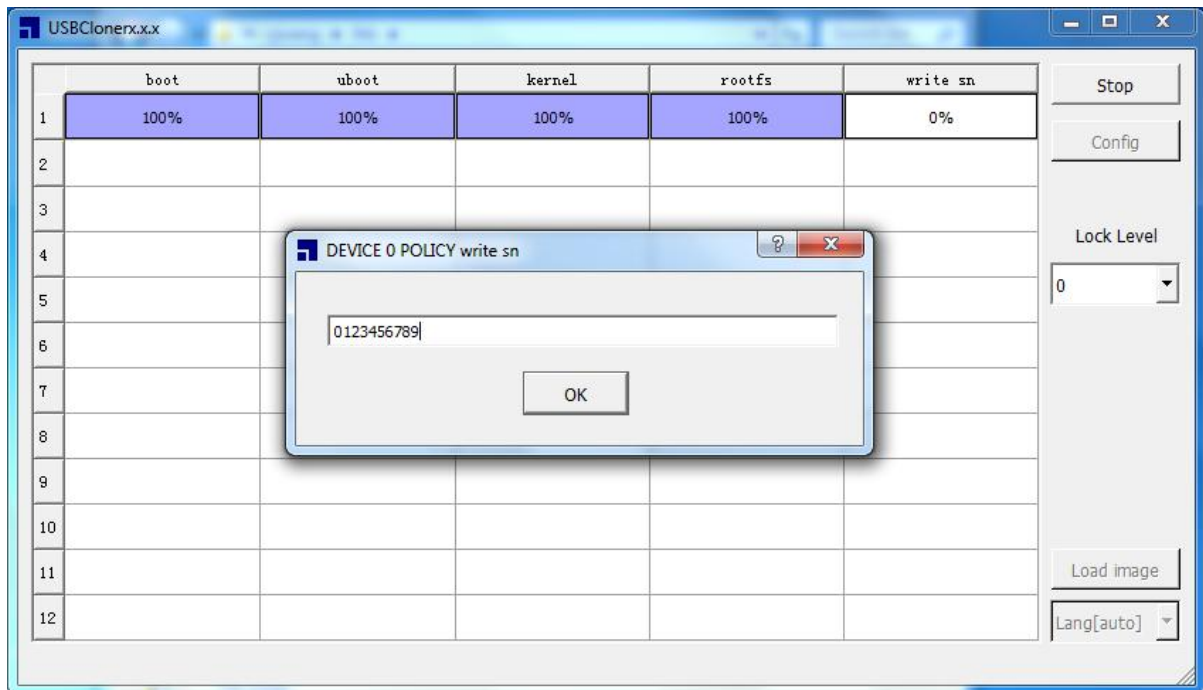


Figure 7-4 input serial number of scanning gun

## 7.2.2 burning of serial number read from file

In the burning tool strategy, "SNDEVICE" is selected to read the serial number from the file in two ways:

1. Read SN by sn\_device.cfg Different serial numbers are recorded continuously.
2. Specify a file with a serial number and burn the same serial number continuously.

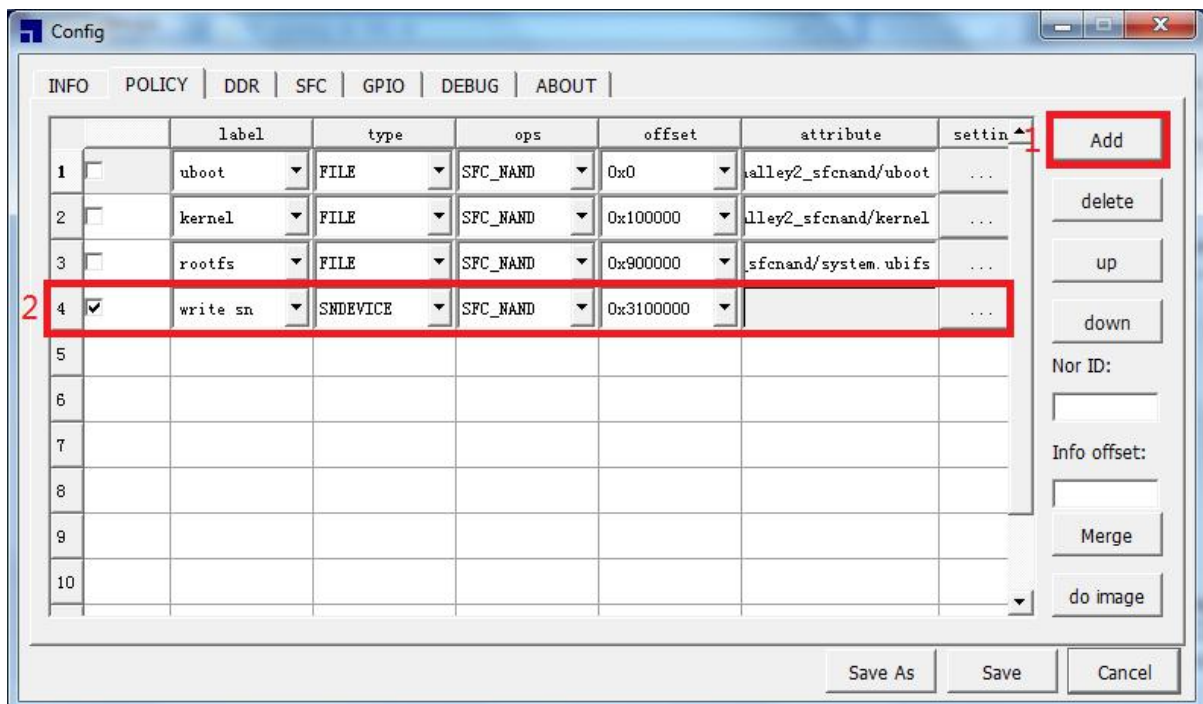
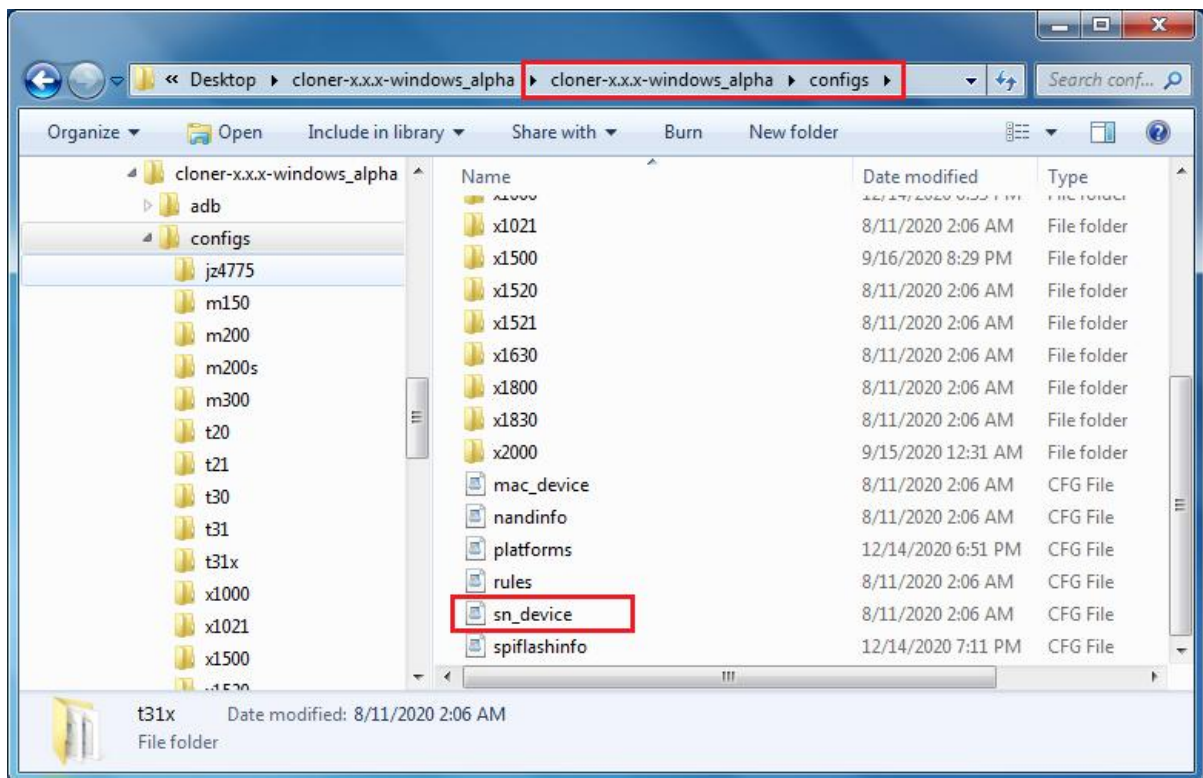


Figure 7-5 read SN by sn\_device.cfg to configure

The first method reads Sn in the configs directory by sn\_device.cfg The serial number in the file is shown in Figure 7-6



**Figure 7-6 serial number configuration file path**

Sn\_device.cfg The contents of the document are as follows :

```
[device]
```

```
index=0    //Burn index, add 1 after burning successfully
```

```
[device0]
```

```
value="111111111;1222121212;aaaaaaaa;"    //serial number
```

```
[device1]
```

```
value="1111111112;1222121212;aaaaaaaa;"
```

```
[device2]
```

```
value="1111111113;1222121212;aaaaaaaa;"
```

### 7.3 configuration of burning MAC address policy

Add "SN" to the "POLICY" configuration interface "Add" type. As shown in Figure 7-7.

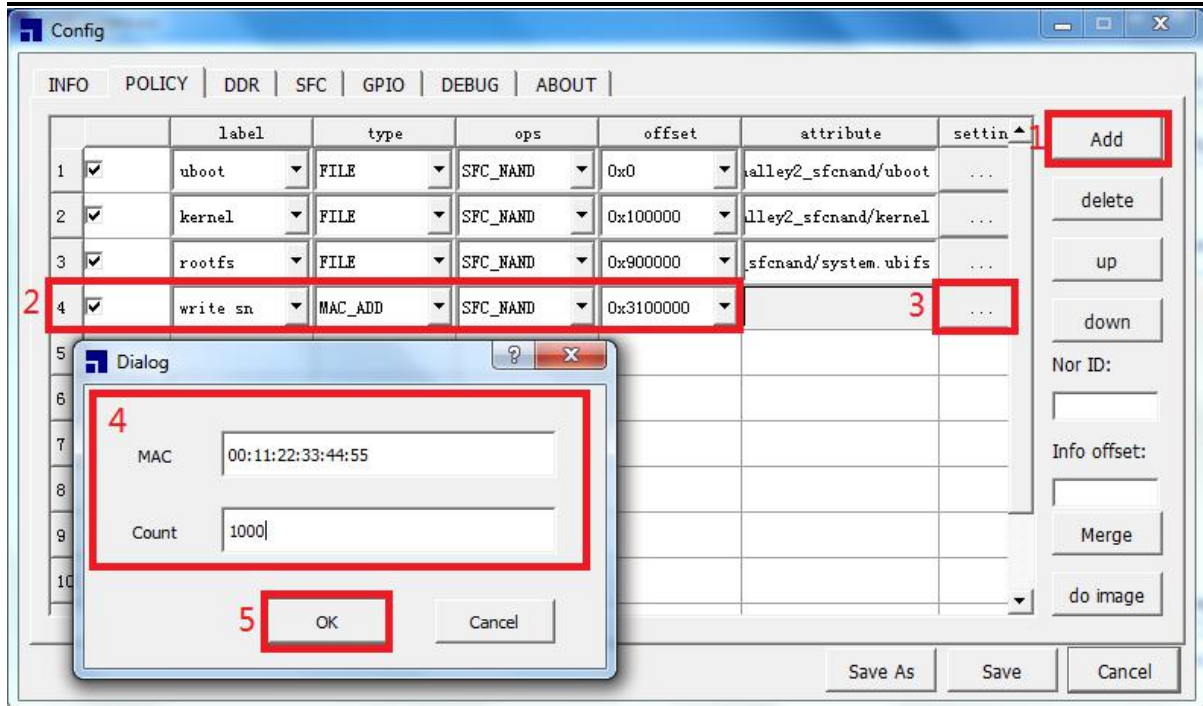


Figure 7-7 burning MAC policy configuration

#### Add burning MAC policy operation steps:

1. Click the "config" button to open the configuration window.
2. Select the appropriate platform and board level configuration for the equipment.
3. Click "POLICY" to switch to the policy interface.
4. Click the "Add" button to add a new policy to the strategy table.
5. Check the box to activate the strategy.
6. Enter a policy name, such as "write mac".
7. Select "MAC\_ADD".
8. Enter the offset address.
9. Click the "..." button in the setting column to pop up the MAC setting window.
10. Input MAC initial value and maximum burning times.
11. Click "save" to close the configuration window.

After successful burning, Mac will automatically add 1 and save it to the configuration file.

#### 7.4 burning SFC NAND SN/MAC policy configuration

在“POLICY”配置界面中添加写 SN 和 MAC 到 SFC NAND FLASH 的最后 2M 位置策略配置，如图 6-8 所示。

Add the last 2M location policy configuration of writing SN and MAC to SFC NAND flash in the "POLICY" configuration interface, as shown in Figure 7-8.

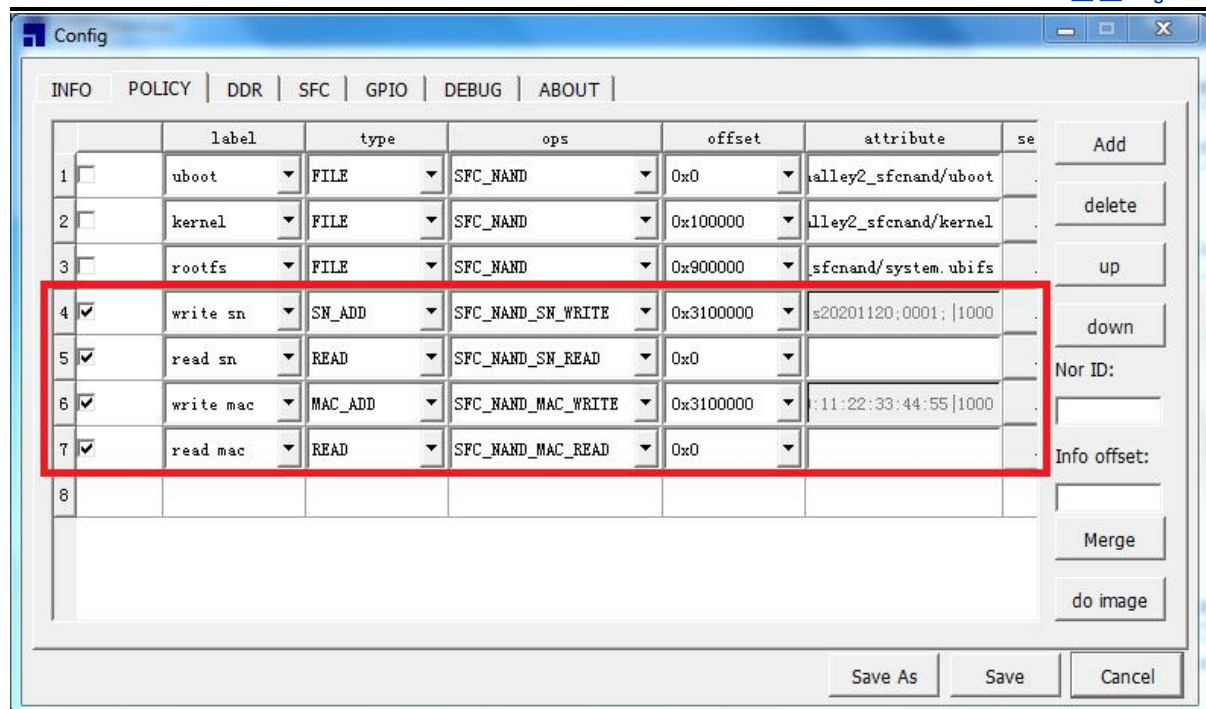


Figure 7-8 SFC NAND write Sn/Mac policy

#### Operation steps of adding burning SFC NAND to write Sn policy:

1. Click the "config" button to open the configuration window.
2. Select the appropriate platform and board level configuration for the equipment.
3. Click "POLICY" to switch to the policy interface.
4. Click the "Add" button to add a new policy to the strategy table.
5. Check the box to activate the strategy.
6. Enter a policy name, such as "write sn".
7. Select "SN\_ADD".
8. Select "SFC\_NAND\_SN\_WRITE" option.
9. Click the "..." button in the setting column to open the SN setting window.
10. Input the initial value of Sn and the maximum burning times.

#### Operation steps of adding burning SFC NAND reading Sn policy:

11. Click the "Add" button to add a new policy to the strategy table.
12. Check the box to activate the policy.
13. Enter a policy name, such as "read sn".
14. Select the "READ" type.
15. Select "SFC\_NAND\_SN\_READ" option.

#### Steps for adding and burning SFC NAND write MAC policy:

16. Click the "Add" button to add a new policy to the strategy table.
17. Check the box to activate the policy.
18. Enter a policy name, for example, "write mac".
19. Select "MAC\_ADD".
20. Select "SFC\_NAND\_MAC\_WRITE" option.
21. Click the "..." button in the setting column to pop up the MAC setting window.
22. Input MAC initial value and maximum burning times.

### Steps for adding and burning SFC NAND read MAC policy:

23. Click the **"Add"** button to add a new policy to the strategy table.
24. Check the box to activate the policy.
25. Enter a policy name, such as **"read mac"**.
26. Select the **"READ"** type.
27. Select **"SFC\_NAND\_MAC\_READ"** option.

### Save policy

Click **"save"** to close the configuration window.

**Note:** the configuration offset address is invalid. MAC is fixed at the last 2M of flash, and Sn is fixed at the last 1M of flash

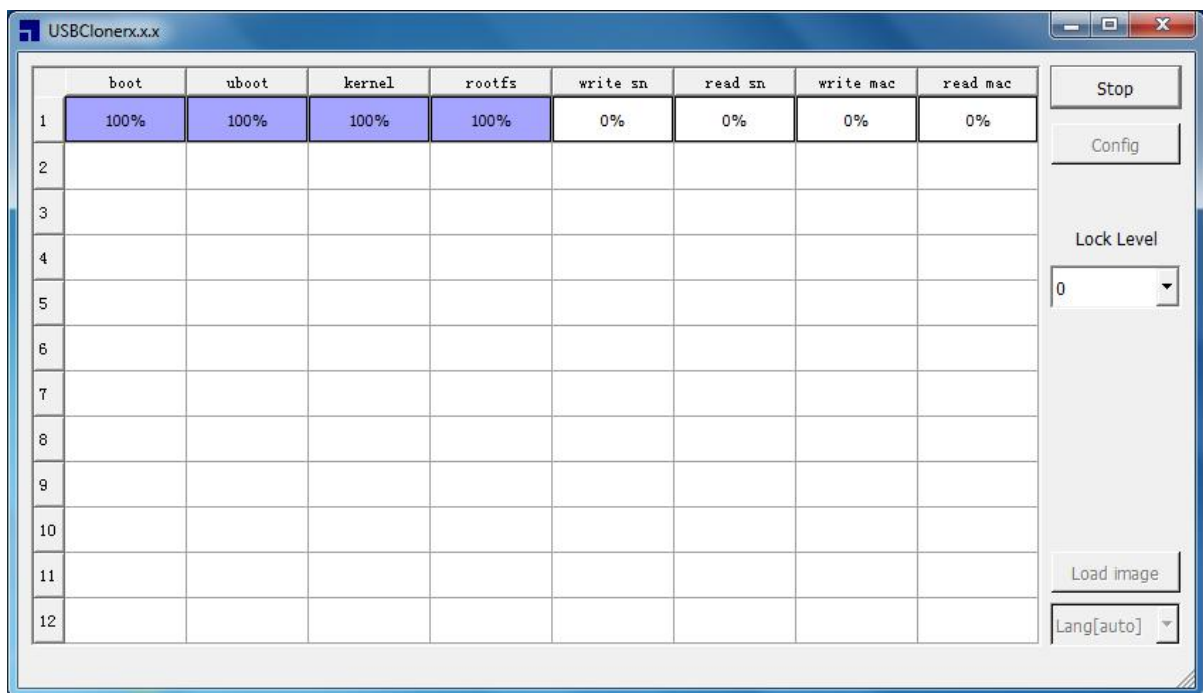


Figure 7-9 SFC NAND SN and MAC burning completed

After successful burning, Sn and Mac will automatically add 1 and save to the configuration file.

## 7.5 burning EFUSE policy configuration

Add the burn SN to EFUSE policy in the **"POLICY"** configuration interface, as shown in Figure 7-10.



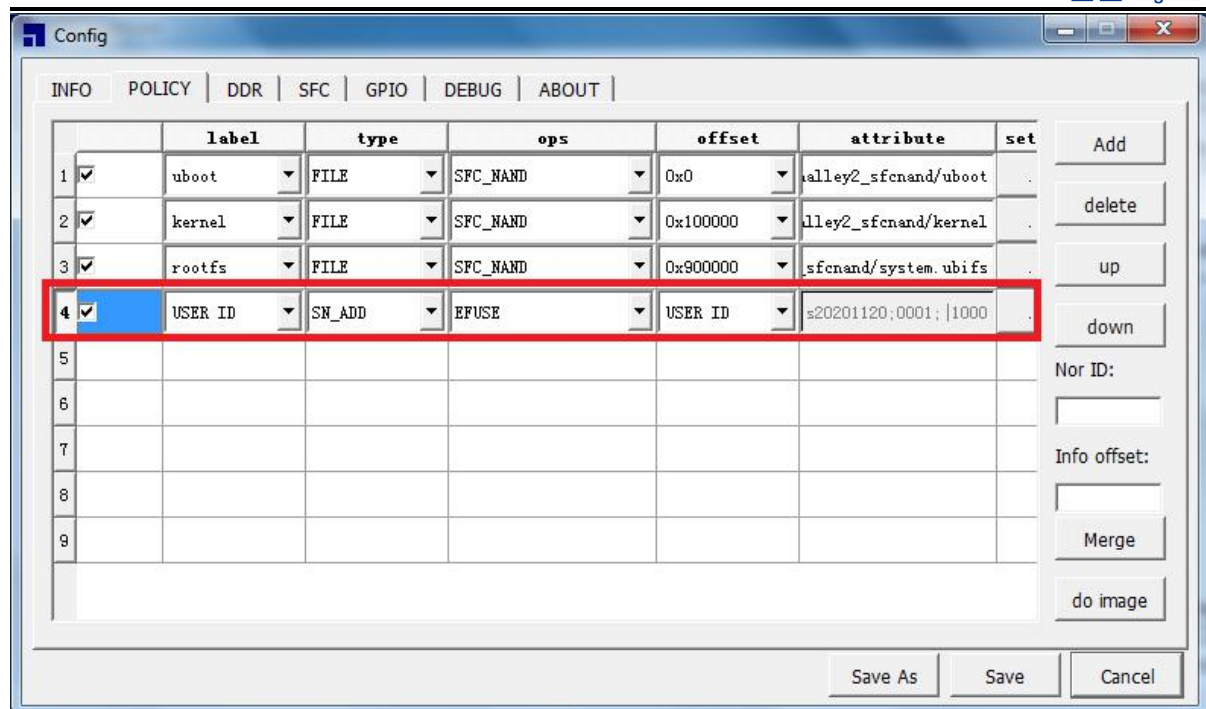


Figure 7-10 burn EFUSE configuration

Note: at present, m200 / X1000 platform supports EFUSE configuration function

#### Add burning SN to EFUSE user ID segment policy operation steps:

1. Click the "Config" button to open the configuration window.
2. Select the appropriate platform and board level configuration for the equipment.
3. Click "POLICY" to switch to the policy interface.
4. Click the "Add" button to add a new policy to the strategy table.
5. Check the box to activate the strategy.
6. Select the "EFUSE" option.
7. Select "USER ID" for the offset address, and the tool will automatically fill in the policy name.
8. Select "SN\_ADD".
9. Click the "..." button in the setting column to open the SN setting window.
10. Input the initial value of Sn and the maximum burning times.
11. Click "Save" to close the configuration window.

## 8 Common problem

Several common mistakes and troubleshooting methods

### 8.1 Windows drive installation failed

If the environment for using the usbcloner burning tool is windows, the usbcloner driver failed to install, then consult the second chapter of the document to make sure that the process is not error free. If there is no error in the process, make sure that the board is in the boot mode. If it is Window8 system, the installation process prompted because there is no driver signature certification and reported wrong, you need to restart the computer process, set "disable drive signature, certification



enforcement.

If the board driver has not been installed successfully, then open the device manager to see if there is a device we suggest that if you press the recording button, but the recognition is unknown device, you need to re confirm the record key is correct, press and re burn.

## 8.2 Ubuntu burn tool interface failed to start

In the Ubuntu environment, start the burn tool, the interface failed to start, and print ConnectionRefusedError error in the terminal. Then you can check it in two ways:

1. PC machine CPU utilization is too high, resulting in core program startup delay, cloner can not establish connection with core.
2. In the current environment, there is another core process that can be rerun using the kill command after it terminates.

## 8.3 The interface progress shows 0% (windows down) failure

The use of usbcloner in the windows programming tool, when you open the burn tool and click the "start" button, then press the recording key board, if the reaction interface at this time, but the schedule is 0%, please check the drive Windows system used is not installed or more new USBCloner. Methods see chapter second.

## 8.4 The progress of the interface is shown as Boot phase 10% failure

When using the burn tool to burn, if the progress on the interface shows up to 10%, the burn fails. At this point, you can check whether the type of chip selected in the configuration does not match the type of chip on the current board. The inspection and configuration methods are available in Chapter third.

## 8.5 The progress of the interface is shown as Boot phase 20% failure

When using the burn tool to burn, if the progress on the interface shows up to 20%, the burn fails. Please check whether the board configuration in the configuration is inconsistent with the current board type. Check and configure methods see Chapter third.

## 8.6 The progress of the interface is shown as Boot phase 40% failure

When using the burn tool to burn, if the progress on the interface shows up to 40%, the burn fails. Check that the DDR of the current board is consistent with the current DDR type configured in the burning tool.

If so, please check the configuration of DDR programming tools, banks and buswidth are correct selection.

If these parameters are correct, verify that the values for row, col, and row1, col1 parameters, are configured correctly.

If these values are correct, check the CPU in the burning tool, and whether the DDR frequency is too high or too low.

Basic rule: the frequency of DDR3 should not be lower than 150M, the frequency of LPDDR and LPDDR2 should not exceed 200M (these frequency ranges are only used in the burning configuration, and the frequency range in uboot is not discussed).

For specific checks and changes to configuration methods, refer to the burn tool guide.

### **8.7 Interface progress is shown for Boot phases 50%, 70%, and 75% failures**

When using the burn tool to burn, if the progress on the screen shows that 50%, 70% or 75% is red, the burn fails. Then check the configuration of ddr. If the configuration of DDR is correct, then consider whether a virtual machine with USB can be opened if the burning tool is running.

### **8.8 The progress of the interface is shown as Boot phase 85% failure**

When using the burn tool to burn, if the progress on the interface shows up to 85%, the burn fails. Then, make sure that the burning medium is nand.

If it is NAND, please make sure that the current NAND model is configured in the burning tool. If it is configured, then make sure its parameters are correct. If some of the parameters in the NAND are correct, check that the partition configuration for NAND is correct.

For specific checks and modifications, see Chapter third.

### **8.9 The interface progress is shown as Boot phase 100%, but the file 0% is burned**

The use of burning burning tools, if the interface to display the progress of 100%, but the file is shown in 0%, and "INIT\_FAILED" is displayed on the progress bar, so this time, we must check the recording file path configuration is correct, the path here refers to the PC on the directory and file name right.

### **8.10 Other errors**

If you are in the use of burning tools, encountered in the above chapters did not refer to the error, or these errors are not resolved in accordance with the above investigation method, you can contact our technical support staff at any time.