

# UNISOC Research Download User Guide

<b>Applicable chipset</b>	Common
<b>Applicable OS</b>	N/A
<b>Keyword</b>	Research Download

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## Revision History

Version	Date	Notes
V1.0	2019/6/24	初稿
V1.1	2019/12/3	更新格式

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# 1 Overview

## 1.1 ResearchDownload Introduction

### 1.1.1 Introduction

ResearchDownload is for developer to develop and debug and used to write the mobile software into the mobile device through the serial port or USB. It supports downloading to multiple mobile devices at the same time. Connect the mobile device correctly to the serial port and switch it to boot mode, ResearchDownload will automatically start downloading. After downloading into one mobile device is completed, manually replace the mobile device with another, and ResearchDownload will automatically detect the mobile device and start downloading again.

### 1.1.2 File Composition

ResearchDownload consists of the files described in below table :

Type	File
*.exe	ResearchDownload.exe
	CmdDloader.exe
*.dll	BMAFrame10.dll
	BMPlatform10.dll
	Channel9.dll
	PortHound.dll
	ProcessFlow.dll
	LiveUpdatesDLL.dll
	SecBinPack10.dll
Configuration file	ResearchDownload.ini
	BMFileType.ini
	BMError.ini
	BMTimeout.ini
	BMAConfig.xml

	Channel.ini
	MCPTType.ini
	ProcessFlowSetting.ini
	PhaseCheck.ini
	CmdDloader.ini
	LiveUpdatesDLL.ini
	SprdMes.ini
Resource file	Rdl_bkmark.bmp

table 1.1 File Composition

## 1.2 Environment

### 1.2.1 Hardware environment

Hardware	basic requirements
PC Memery	4G and above
PC hard disk	4G and above free space
PC USB Port	At least one USB port
Cable	Uart or usb cable

table 1.2 Hardware Configuration

### 1.2.2 Software environment

Before using the download tool, you must first install the download driver. The software environment requirements are as follows:

Software	basic requirements
OS	Windows 7 and above
USB driver	2.0.0.131 and above

table 1.3 Software Configuration

## 2 Quick Start

### 2.1 GUI Descriptions

#### 2.1.1 Main GUI

Launch ResearchDownload.exe , shows the main user interface ( "ResearchDownload – R22.19.2601" and "R22.19.2601" is tool version info ,The version number will be continuously upgraded, which is based on the actual tool interface. )

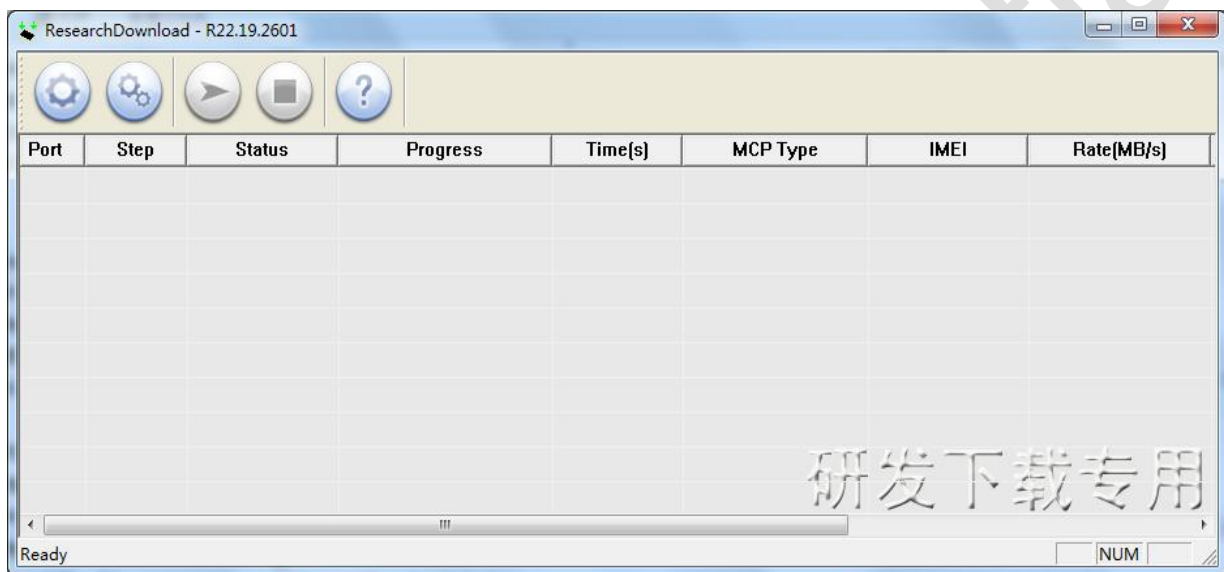





photo 2.1 Main GUI

#### 2.1.2 Toolbar

The function of each shortcut icon of the toolbar is as follows:

Icon	Description
	Select the downloading packet file
	Set the downloading parameters
	Start downloading



	Stop downloading
	Version information

table 2.1 Toolbar

### 2.1.3 Status Area

The area below the toolbar is the status window, which is used to display the status of the port, the status of the download, the result, etc.

Port	Step	Status	Progress	Time[s]	MCP Type	IMEI	Rate[MB/s]
3	System	Downloading...		22	—	867400020316612	Avg:4.82, Peak:11.50

photo 2.2 Status Area


Column	Description
Port	Port number
Step	Current file name or operation
Status	Current operation status
Progress	Download progress: <ul style="list-style-type: none"> <li>• <b>Waiting</b> indicates no mobile device is detected.</li> <li>• <b>Inprogress</b> indicates downloading is ongoing.</li> <li>• This column turns green when downloading is complete and red when an error occurs.</li> </ul>
Time(s)	Cost time (second), each download
MCP Type	Show MCP Type info
IMEI	Show device' s IMEI info
Rate[MB/s]	Show download rate, Avg is the average rate,Peak is the highest rate

table 2.2 Status Area




## 2.2 Quick Start

**Step1 :** Open pac file

Click  button and select a pac file.

**Step2 :** Set download parameter

Click  button will show the bellow settings windows,

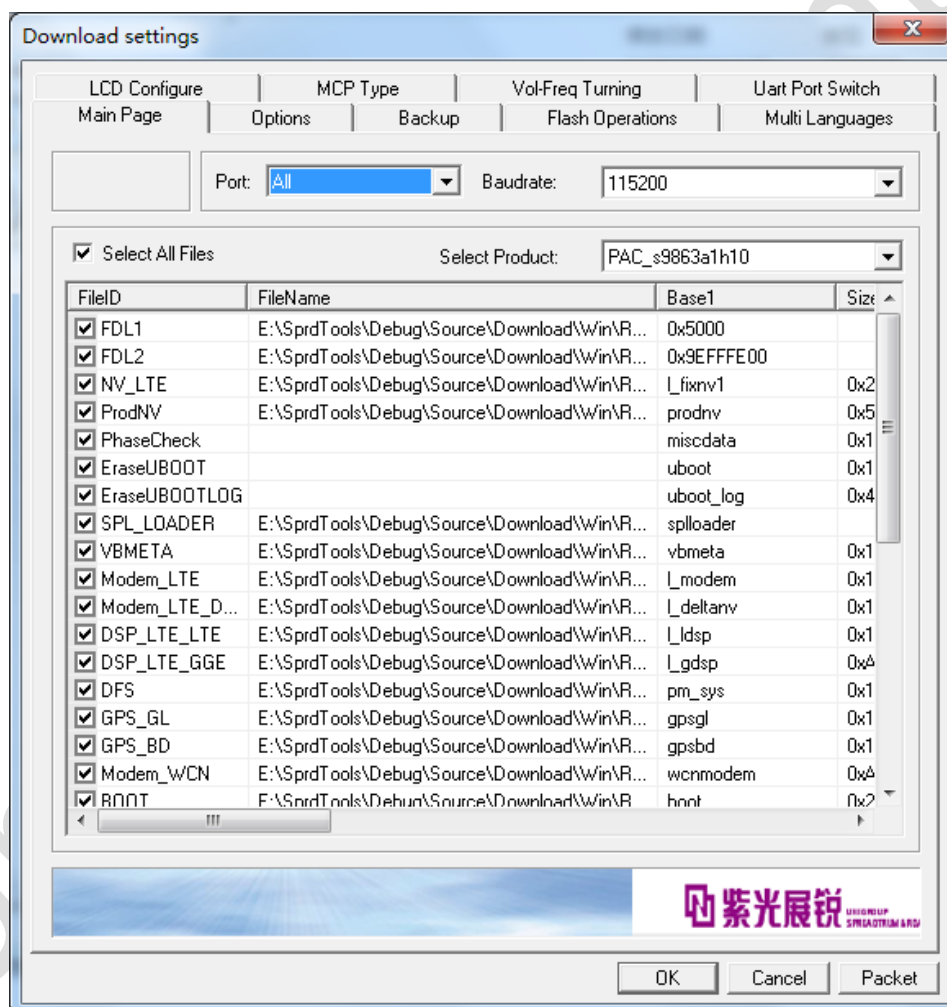



photo 2.3 Settings

**Step3 :** Start download

Click  button , then will automatically detects the available serial port and start to download.

Port	Step	Status	Progress	Time[s]	MCP...	IMEI	Rate[MB/s]
31	System	Downloading...	<div><div></div></div>	39	—	867400020316612	Avg:8.72, Peak:14.05

photo 2.4 Downloading progress

#### **Step4** : Completing download

The downloading result is displayed in the status window , Green is "Passed" , Red is "Failed" .


Port	Step	Status	Progress	Time[s]	MCP...	IMEI	Rate[MB/s]
31	UBOOTLoader	Finish	Passed	59s	—	867400020316612	Avg:10.15, Peak:14.14

photo 2.5 download pass

Port	Step	Status	Progress	Time[s]	MCP...	IMEI	Rate[MB/s]
31	FDL2	Unplugged	Failed: User cancel	3s	—	—	Avg:0.00, Peak:0.00


photo 2.6 download failed

#### **Step5** : Stop download

Disconnect the mobile device from the serial port. In continuous downloading mode, if there are more mobile devices to be downloaded, connect it to the serial port and download tool automatically starts downloading again. Click  to stop download.

## 3 Operation Guide

### 3.1 Settings

Click  icon can enter settings windows

#### 3.1.1 Main Page Setting

Select "Main Page" page ,Can enter the Main Page settings interface ,The Main Page Settings window is used to set the parameters for the download, including the rate of the port, as well as the files and download addresses to be downloaded. The interface description is shown in the following table.

Element	Description
<b>Port</b> drop-down list box	Serial port setting
<b>Baudrate</b> drop-down list box	Baud rate setting
<b>Select Product</b> drop-down list box	Product to be downloaded
File list diagram	<ul style="list-style-type: none"><li>• <b>FileName</b>: Double-click this column to type the file path or click ... to select the file.</li><li>• <b>Base1</b>: downloading address</li><li>• <b>Size1</b>: file size. <b>Empty</b> indicates that the file size is automatically calculated by ResearchDownload during downloading.</li></ul>
<b>Select All File</b> check box	Select all the files.
<b>Packet</b> button	Pack the downloaded files

table 3.1 Main Page settings

##### 3.1.1.1 Port Settings

The Port drop-down list box lists all the usable serial ports. You can select one serial port or All.

The baud rate can be 57600, 115200, 230400, 460800, or 921600. The default option is 115200. If you select the baud rate that not matches the mobile device, the serial port may not be

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opened or downloading cannot be performed.

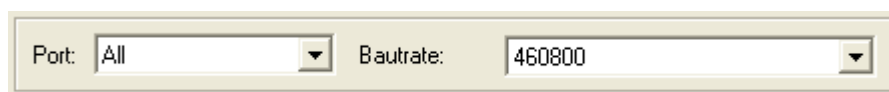
A screenshot of a 'Port Settings' dialog box. It contains two controls: a 'Port' dropdown menu set to 'All' and a 'Baudrate' dropdown menu set to '460800'.

photo 3.1 Port Settings

### 3.1.1.2 Product Settings

The configuration file presets the available products and you can select the matched product to determine the downloading addresses of files.

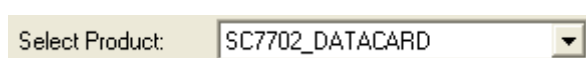

A screenshot of a 'Product Settings' dialog box. It features a 'Select Product:' label followed by a dropdown menu currently displaying 'SC7702\_DATACARD'.

photo 3.2 Product Settings

### 3.1.1.3 Select File

Check the files to be downloaded in the FileID column. Double-click the FileName column to type the file path in or click ... to select the file.

A screenshot of a table titled 'Select Download File'. The table has four columns: FileID, FileName, Base1, and Size1. The first row shows 'FDL1' checked in the FileID column, 'E:\test\7702\fdl1.bin' in the FileName column, and '0x40000000' in the Size1 column. The FileName cell is highlighted with a blue border, indicating it is selected for editing.

FileID	FileName	Base1	Size1
<input checked="" type="checkbox"/> FDL1	E:\test\7702\fdl1.bin	...	0x40000000

photo 3.3 Select Download File



Note :

The file name is \*.bin and is released with the program. Generally, the first FDL(1) and FDL2 (if exist) and shall be downloaded. The FileName column cannot be null.

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### 3.1.2 Options Settings

Select the "Options" tab in the settings window to enter the Options settings interface. The related functions in this function page require FDL module to support.

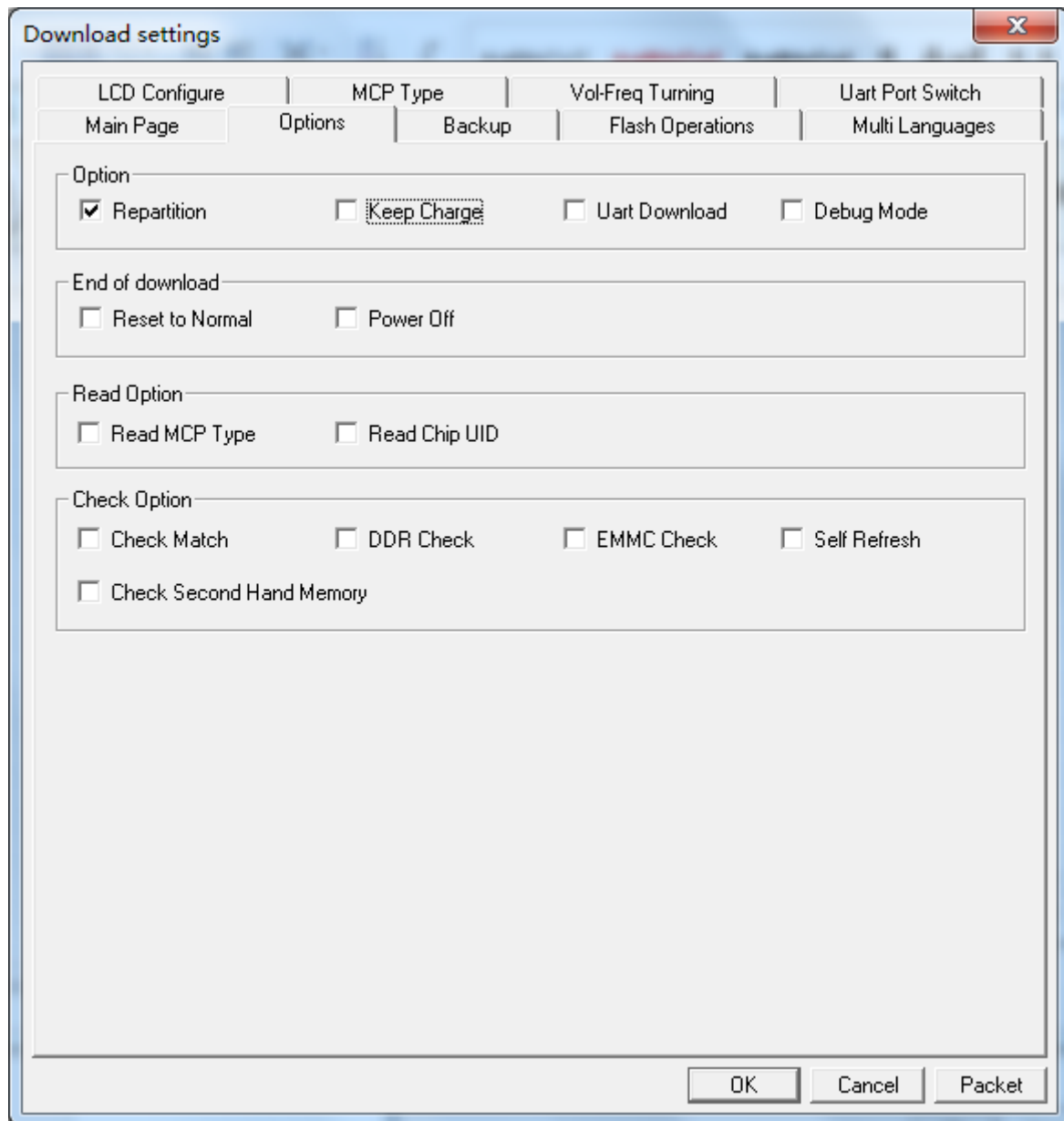


photo 3.4 Options Settings

### 3.1.2.1 Repartition

Just valid for Nand/EMMC Flash product, when write flash, this options must be checked , otherwise an "Incompatible partition" error will occur. If just read flash data to PC , Allow to not select this option.

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### **3.1.2.2 Keep Charge**

Keep V-charge via USB cable.

### **3.1.2.3 Uart Download**

Download via Uart cable.

### **3.1.2.4 Debug Mode**

On/Off kernel log, when you select this option, after downloading ,device' s kernel log will be set level=7. If you want to close the kernel log, do not check this option, and select the PhaseCheck download item in the Main Page. After re-downloading, the Kernel Log will be automatically closed.

### **3.1.2.5 Reset to Normal**

If select this option, device will be reset to normal mode after finish download

### **3.1.2.6 Power Off**

If select this option, device will be power off after finish download

### **3.1.2.7 Read MCP Type**

If select this option, download tool will read device MCP Type info and show in status area. MCP Type info is Configured at MCPTYPE.ini file.

### **3.1.2.8 Read Chip UID**

If select this option, download tool will read chip uid info from device.

### **3.1.2.9 Check Match**

This feature requires FLD2 support, it use for version check.

### **3.1.2.10 DDR Check**

This option is used to implement DDR check after downloading FDL1 and requires FDL1

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support.

#### **3.1.2.11 EMMC Check**

This option is used for download integrity checking of emmc type items and requires FDL2 support. After this function is enabled, for the uncompressed type of partition, after downloading, FDL2 will automatically read out the downloaded partition contents in the process of verifying the comparison to ensure the integrity of the downloaded data.

#### **3.1.2.12 Self Refresh**

This option is used to implement DDR self-refresh after downloading FDL1.this requires FDL1 support.

#### **3.1.2.13 Check Second Hand Memory**

This option is used for second-hand material inspection. It is only used for production line download station. Default it is disabled.

#### **3.1.2.14 Auto Comparison**

This feature needs to be used in conjunction with the readflash feature in Flash Operations. , Automatically compare the read partition data with the original data of the corresponding partition in the pac file , If the inconsistency will prompt "xxx partition data is abnormal." error , If third-party comparison software information is configured, third-party comparison software will be called to implement comparison function.

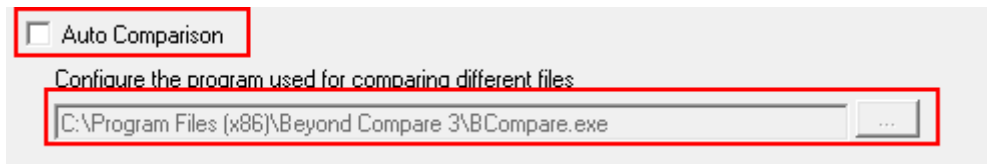


photo 3.5 Auto Comparison

UI	Descriptions
Auto Comparison	If select this option , Indicates whether the readback partition data will be automatically compared with the corresponding partition in the original pac file.
Select the third-party comparison software	This option is only valid if the Automatic comparison option is checked. Use third-party comparison software to achieve comparison function

table 3.2 Auto Comparison settings

### 3.1.3 Backup Settings

Select the "Backup" tab in the settings window to enter the Backup settings interface.



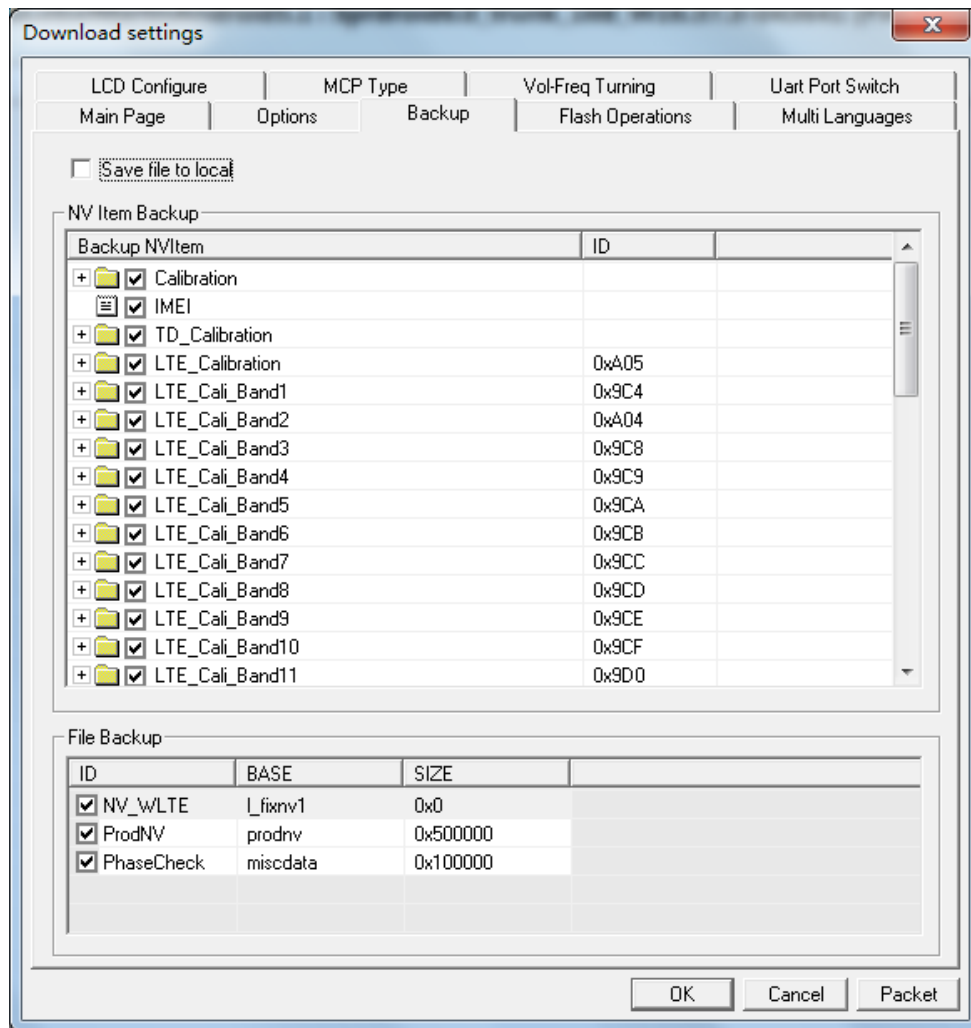


photo 3.6 Backup Settings

### 3.1.3.1 File Backup

File Backup list backup partition , if it is selected, then download tool will backup those partition

### 3.1.3.2 NVItem Backup

NVItem Backup area list NV backup ID info , if select backup nv partition in File Backup , download tool will auto backup nv data. NV is raw binary data. It use NV Item ID to index the data. Some import data and configure data is stored in the NV, such as RF calibration, IMEI, and etc.. So when upgrade the software of SPRD devices, the download tool need to backup some of NV Item ID' s data. The backup process is as below:

- a. Read NV image data (d0) from the device

- 
- b. Find NV Item ID that need backup in the d0
  - c. Find NV Item ID that need backup in the NV image file (d1)
  - d. Replace the data found in d1 with data found in d0.
  - e. Download the merged d1 data to device.

#### **3.1.3.3 Save file to local**

If user select this option , Download tool will auto save back file to PC local, Backup file name will include device's SN info.

#### **3.1.4 Flash Operations Settings**

this settings is used for reading and erasing and write flash ,Select "Flash Operations" tab can enter Flash Operations settings interface.

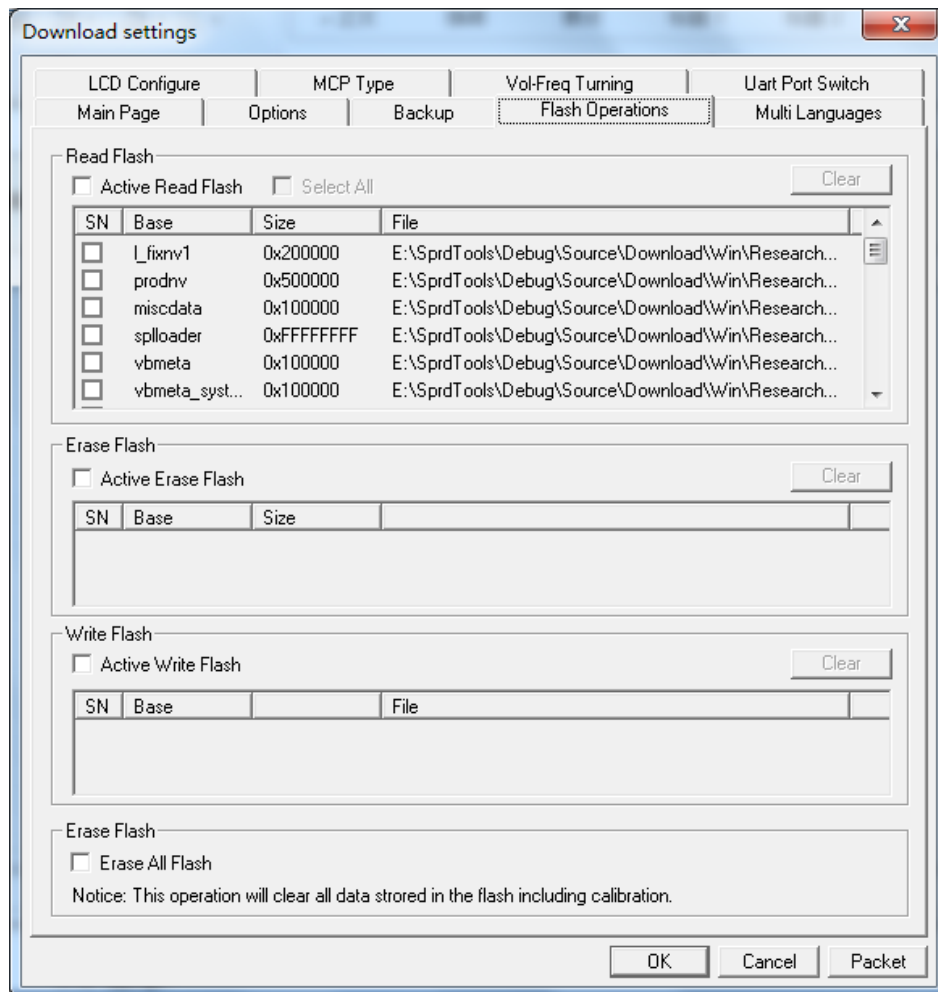


photo 3.7 Flash Operation Settings

#### 3.1.4.1 Read Flash

This function is used to read the partition data of the Flash in the mobile phone and save it to the file on the PC side. After the pac file is loaded by default, the readback information configuration is automatically generated according to the download sequence in pac. Check "Active Read Flash" and check the partition you want to read. You can also customize the Flash address, size, and saved file path. If you just read back the contents of the phone, in order to ensure the integrity of the data back to the phone, you can not select the "Repartition" option in the Options tab.

Element	Description
Active Read Flash	<b>Active the read flash function</b>
Active Erase Flash	<b>Active the erase flash function</b>
Active Write Flash	<b>Active the write flash function</b>
SN	Serial Number, it have check or un-check state
Base	The flash address or partition ID
Size	Read size
File	Save to local file path
Clear	Clear the SN-Base-Size-File list
Erase All Flash	To erase all flash; some products maybe not support.

table 3.3 Flash Operation Settings

#### 3.1.4.2 Erase Flash

This function is used to erase the partition data of the Flash in the mobile phone , select "Active Erase Flash" to active configuration, if erase all partition , size can set 0.

#### 3.1.4.3 Write Flash

This function is used to write the file to the partition data of the Flash in the mobile phone, Select "Active Write Flash" to active configuration

#### 3.1.4.4 Erase All Flash

This configuration item is used for erase all flash. This function is used cautiously and will erase the entire flash data. If user set backup option, Read back the backup partition first, then erase the entire flash

#### 3.1.5 Multi-Language Settings

It is used to set the supported languages in NV file specially. You can double click the icon ball to set default language(Red icon). If the NV file selected in the Main Page tab does not contain

multi-language information, the page will be empty. Select "Multi-Languages" tab can enter Multi-Languages settings interface.

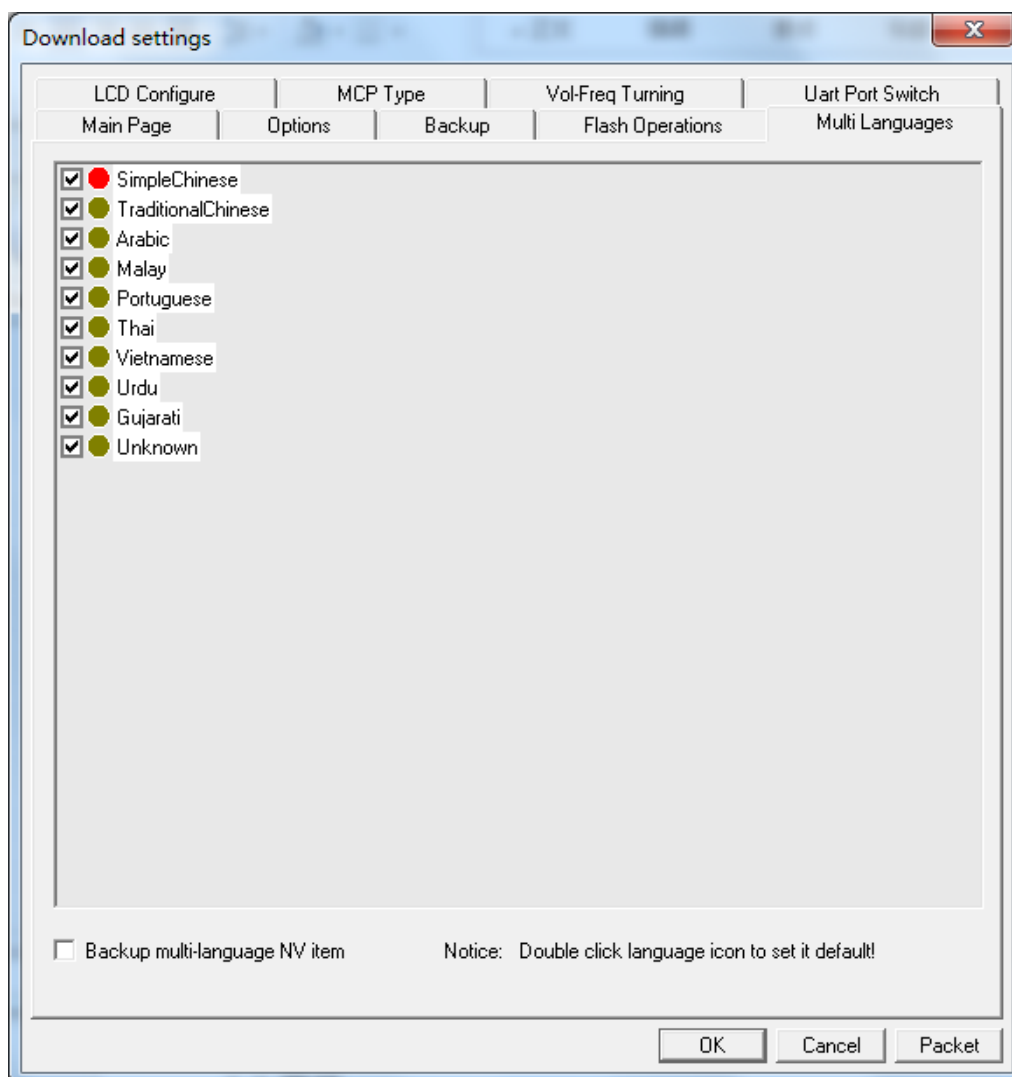


photo 3.8 Multi-Language Settings



Note :

"Multi-Language NV Item" option is used fir select to backup the multi-language NV item or

not , If the NV file is not set or included supported language information, this page will be empty.

---

### 3.1.6 LCD Configure Settings

It is used to set the supported LCD in PS or UserImg file specially. select "LCD Configure" tab can enter LCD Configure settings interface.

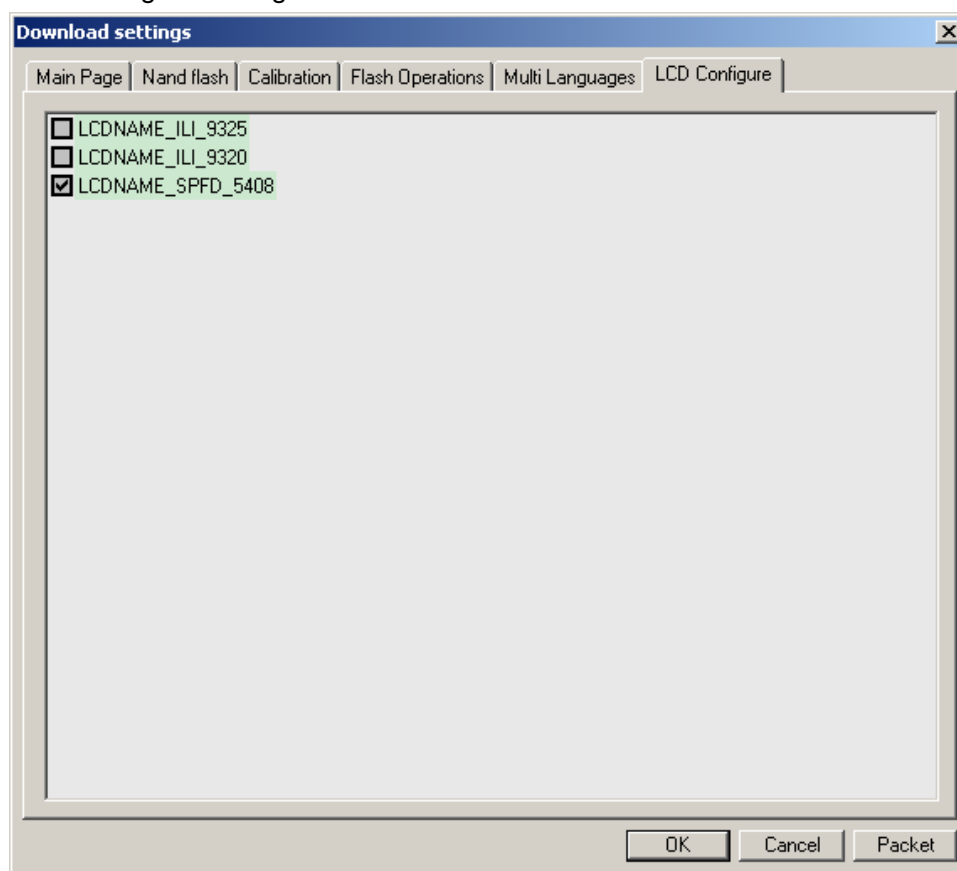


photo 3.9 LCD Configure Settings



Note :

If the PS or UserImg file is not set or included LCD information, this page will be empty.

---

### 3.1.7 MCP Type Settings

This page is used to set if check the MCP type in downloading process. Check "Check MCP Type" to check the MCP type if matched the checked MCP type if the list. The MCP types are configured in the file MCPTType.ini. You can add MCP types in this file. Select "MCP Type" tab can enter MCP Type settings interface.

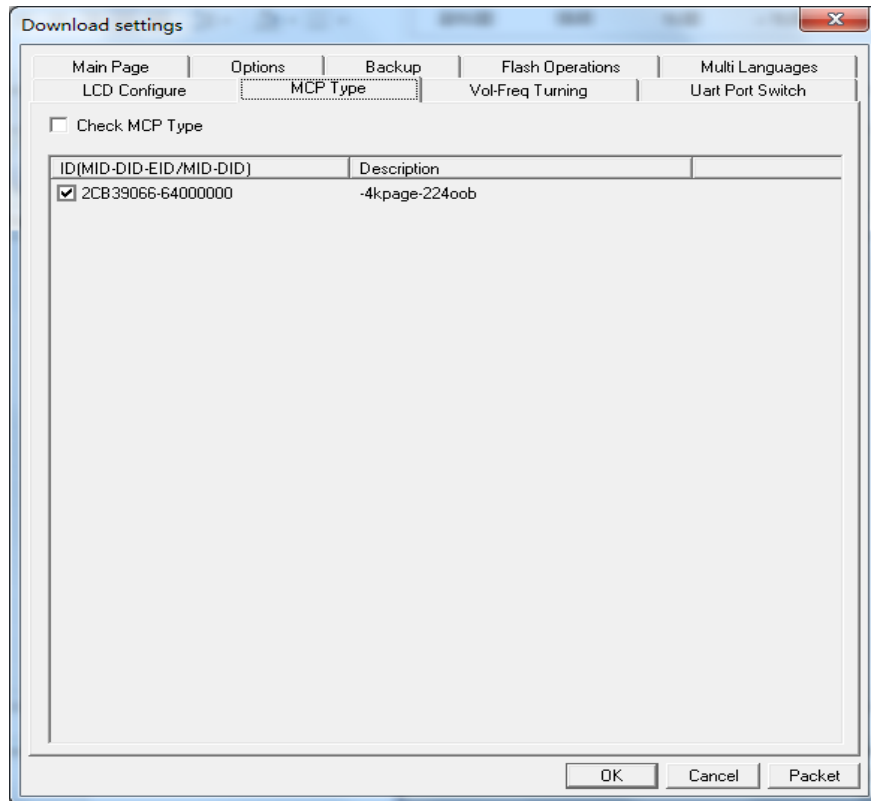


photo 3.10 MCP Type Settings

### 3.1.8 Vol-Freq Tunning Settings

This page is used to configure voltage and frequency for SPL Loader file. And the configure result will modify the SPL loader file. So if necessary, please backup this file before modify the parameters. select "Vol-Freq Tunning" tab can enter Vol-Freq Tunning settings interface.

Download settings

Main Page
Options
Backup
Flash Operations
Multi Languages

LCD Configure
MCP Type
Vol-Freq Tuning
Uart Port Switch

CLK CA7 CORE (100000000 - 2000000000)
1300000000

DDR FREQ (100000000 - 800000000)
614000000

CLK CA7 AXI (100000000 - 800000000)
400000000

CLK CA7 GDB (100000000 - 400000000)
200000000

CLK CA7 AHB
192M

CLK CA7 APB
64M

CLK PUB AHB
153M

CLK AON APB
128M

DCDC ARM (600 - 1500)
1000

DCDC CORE (600 - 1500)
900

DCDC MEM (600 - 3000)
0

DCDC GEN (600 - 4000)
2100

DEBUG 0
0x3FFFFFF1

This config will modify spl file,  
please backup this file first if necessary!

OK
Cancel
Packet

photo 3.11 Vol-Freq Tunning Settings 1



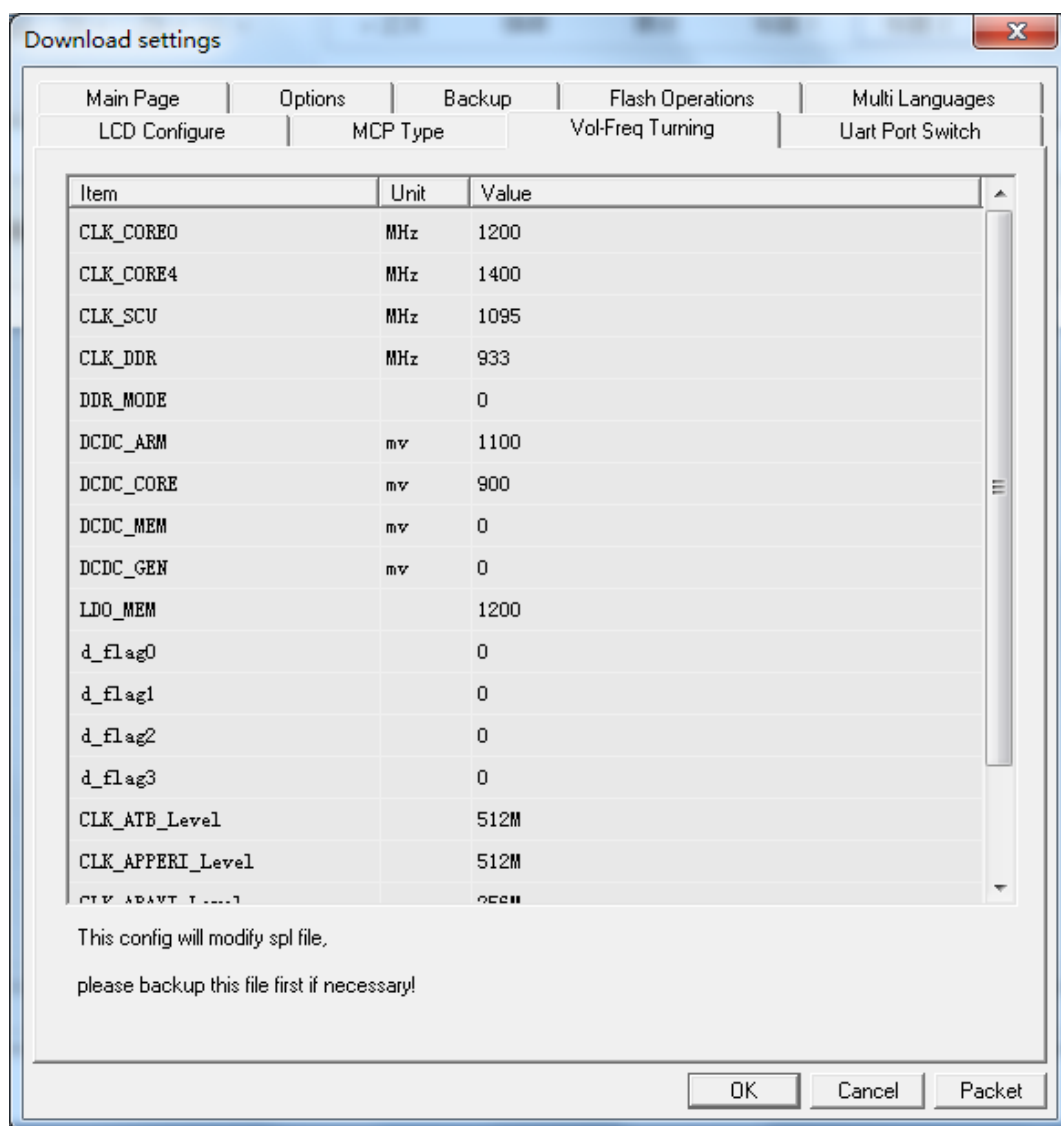


photo 3.12 Vol-Freq Tuning Setting 2

### 3.1.9 Uart Port Switch Settings

This page is used to configure uart port info for UBOOTLoader file. And the configure result will modify the UBOOTLoader file. So if necessary, please backup this file before modify the parameters. select "Uart Port Switch" tab can enter Uart Port Switch settings interface.

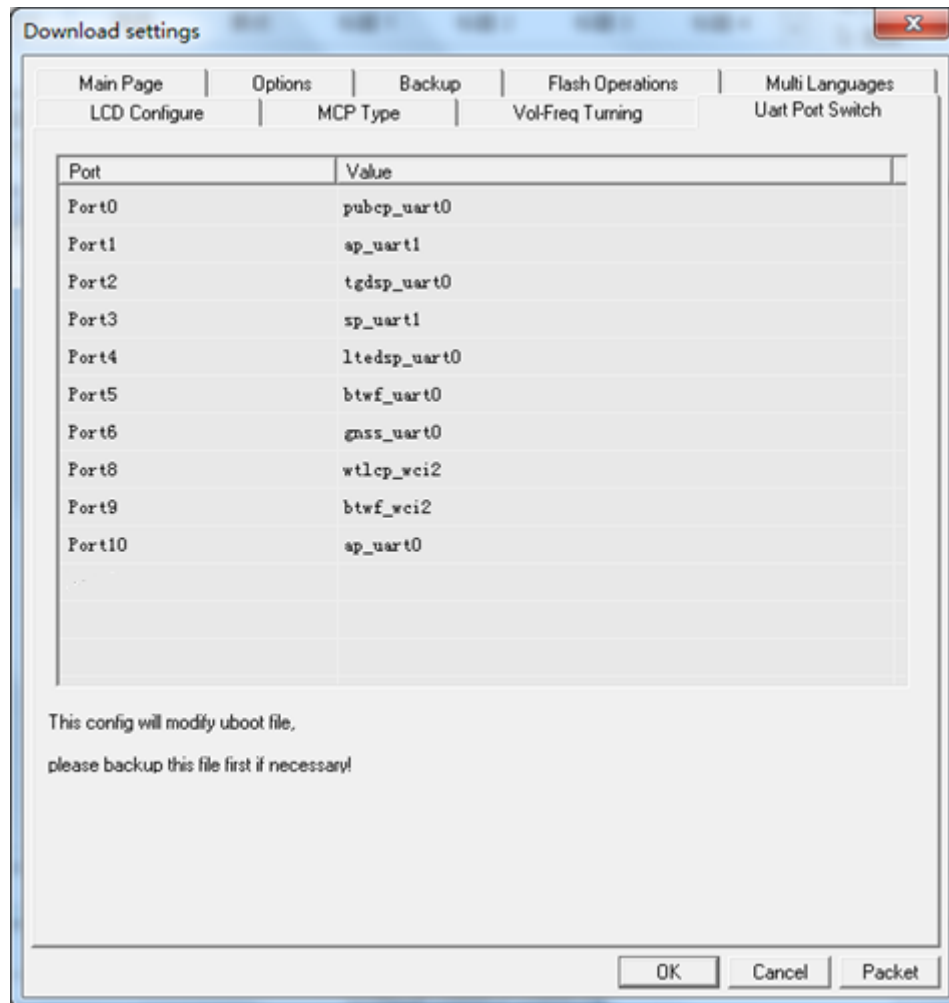


photo 3.13 Uart Port Switch Settings

## 3.2 Generate pac file

Click "Packet" button will show packet settings windows as below:

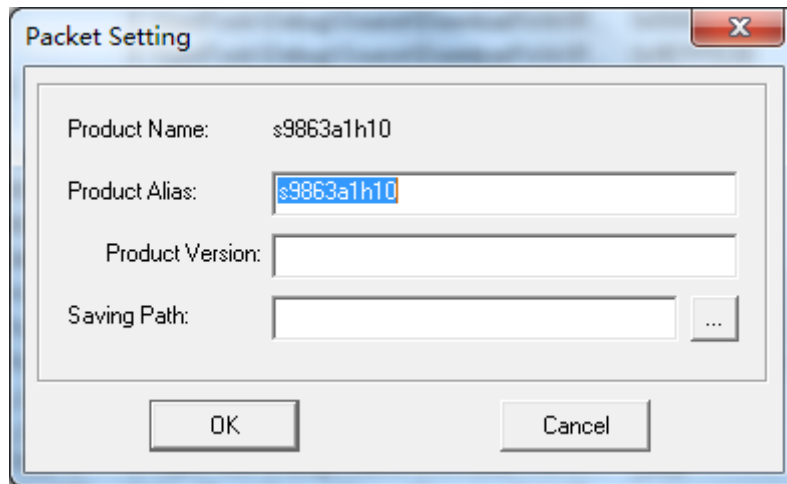


photo 3.14 Packet Settings

Item	Descriptions
Product Alias	Used to set the product alias for the generated pac file
Product Version	Used to set the version information of the generated pac file.
Saving Path	Save the newly generated pac file

table 3.4 Packet Settings

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## 4 CmdDloader Application

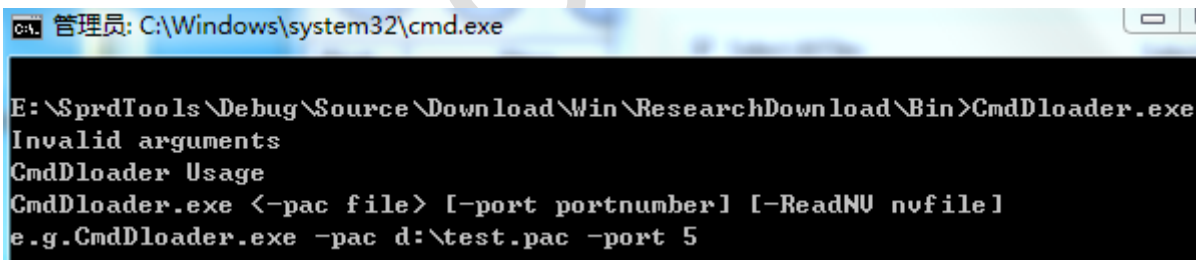
### 4.1 OverView

CmdDloader is a Windows command line application, mainly used for command line download in Windows environment. Support Windows 7 and above Windows operating system. The application needs to be based on the download tool software. The entire download process is actually the download tool in the background. The CmdDloader application is mainly responsible for launching the download application, monitoring the download progress and results.

### 4.2 Operation Guide

#### 4.2.1 Parameter format

Launch application in command line window, Command parameter format as below:

A screenshot of a Windows command prompt window. The title bar shows '管理员: C:\Windows\system32\cmd.exe'. The command prompt shows the following text:

```
E:\SprdTools\Debug\Source\Download\Win\ResearchDownload\Bin>CmdDloader.exe
Invalid arguments
CmdDloader Usage
CmdDloader.exe <-pac file> [-port portnumber] [-ReadNU nvfile]
e.g.CmdDloader.exe -pac d:\test.pac -port 5
```

photo 4.1 Parameter

CmdDloader.exe <-pac PacFile> [-port ComPort] [-c]

e.g. CmdDloader.exe -pac D:\SC7702\_sc7701.pac -port 195



Note :

- -pac PacFile : input pac file, e.g. -pac d:\test.pac
- -port ComPort : input port number
- -c : This command is optional. When this parameter is input, the CmdDloader application will clear the download process before performing the download.
- If the port information is not specified, the application will automatically find a suitable download port. The WaitDUTTimeout configuration item in CmdDloader.ini allows you to set the timeout you want to look for a valid device. For 0, unlimited wait until a suitable download port is found.

## 4.2.2 CmdDloader demo

### 4.2.2.1 Download pass

Output Download Passed in the command window indicates that the download is successfully completed. The successful download example is as follows:

```
E:\SprdToolSpace\Debug\Source\Download\Win\ResearchDownload\Bin>CmdDloader.exe -
pac D:\SC7702_sc7701_128X160BBAR_32MB_384K_B3.pac -port 195
!!*****!!
Pac : D:\SC7702_sc7701_128X160BBAR_32MB_384K_B3.pac
Port : 195
!!*****!!
Successfully connected to Dloader.

Loading pac file ...
Load PAC file successfully!
Detecting download device [COM195] ...
Waiting
FDL          Checking baudrate
FDL          Connecting
FDL          Downloading...          <100%>
FDL          Checking baudrate
FDL          Connecting
FDL          Change Baud
FDL2         Downloading...          <100%>
_BKF_NU      Reading Flash          <100%>
NU           Downloading...          <100%>
BootLoader   Downloading...          <100%>
UserImg      Downloading...          <100%>
MMIRes       Downloading...          <100%>
DSPCode      Downloading...          <100%>
DSPCode2     Downloading...          <100%>
FLASH        Erasing flash
KernelImg    Downloading...          <100%>
Erase FS      Erasing flash
Download Passed, Elapsed Times = 34s
```

photo 4.2 CmdDloader download pass

### 4.2.2.2 Download fail

Download failure will display an error message that the download failed.

```

|*****|
Pac : D:\SC7702_sc7701_128X160BAR_32MB_384K_B3.pac
Port : 195
|*****|
Successfully connected to Dloader.

Loading pac file ...
Load PAC file successfully!
Detecting download device [COM195] ...
Waiting
FDL      Checking baudrate
FDL      Connecting
FDL      Downloading...      <100%>
FDL      Checking baudrate
FDL      Connecting
FDL      Change Baud
FDL2     Downloading...      <100%>
_BKF_NV  Reading Flash      <100%>
NV        Downloading...      <100%>
BootLoader Downloading...      <100%>
UserImg   Downloading...      <100%>
MMIRes     Downloading...      <100%>
[ERROR] DownLoad Failed: User cancel, Elapsed Times = 18s

```

photo 4.3 CmdDloader download fail