Turbo Writer Tool User Guide

V2.01.008

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Support Chips:

N329 Series; N9H2X Series

Support Platforms:

Windows

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Table of Contents

1. Introduction

1.1. ISP Introduction

N329/N9H2X series have two boot flows – one is Normal mode; the other is Recovery mode. If user wants to do ISP (In System Programming) through USB, the system should be set to Recovery mode.

The boot flow descriptions are as follows

- **N3290X**
  - Normal mode boot flow
    - ✓ SD card 0 boot → NAND boot → SPI boot → SD card 1 boot → USB boot
  - Recovery mode boot flow
    - ✓ USB boot
- **N3291X**
  - Normal mode boot flow
    - ✓ SD card 0 boot → SPI boot (GPA[15:12]/NAND) → NAND CS 0 boot→ NAND CS1 boot → SPI boot (GPD[15:12]) → SD card 1 boot → SD card 2 boot → USB boot
  - Recovery mode boot flow
    - ✓ USB boot
- **N3292X**
  - Normal mode boot flow
    - ✓ SD card 0 boot → NAND CS 0 boot→ NAND CS1 boot → SD card 1 boot → SD card 2 boot → USB boot
  - Recovery mode boot flow
    - ✓ USB boot
- **N9H20**
  - Normal mode boot flow
    - ✓ SD card 0 boot → NAND boot → SPI boot → SD card 1 boot → USB boot
  - Recovery mode boot flow
    - ✓ USB boot
- **N9H26**
  - Normal mode boot flow
    - ✓ SD card 0 boot → NAND CS 0 boot→ NAND CS1 boot → SD card 1 boot → SD card 2 boot → USB boot
  - Recovery mode boot flow
    - ✓ USB boot

1.2. Turbo Writer Introduction

Turbo Writer can program the images into specific flash or download to SDRAM and run. This document will tell user how to program the Linux kernel into N329/N9H2X demo board NAND flash and SD Card by Turbo Writer. Here we describe the files within the Turbo Writer folder.

- **[Turbo Writer Version History – ChangeLog.txt]**

  All Turbo Writer tool and Turbo Writer firmware change history is listed in this file.

- **[Turbo Writer program – Turbowriter.exe]**

  Turbo Writer PC Tool execution file.

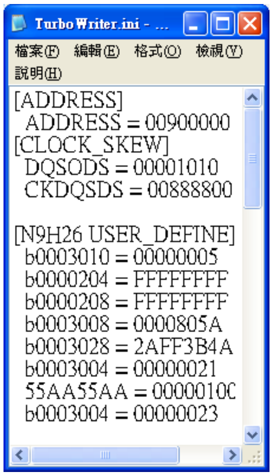
- **[Turbo Writer extra support NAND ID – NAND ID.ini]**

  User can add new NAND ID that Turbo Writer doesn’t support without modifying Turbo Writer firmware.
  Ex. If user wants to add H27UAG8T2A to Turbo Writer NAND list without modifying Turbo Writer firmware, he can add the following information into NAND ID.ini.

[1stID]	[2ndID]	[3rdID]	[4thID]	[5thID]	[Page per Block]	[Block per Flash]
AD	D5	94	25	44	128	1024

- **[Turbo Writer Configuration for Boot Code Header – TurboWriter.ini]**

  IBR supports some user-defined items in Boot code header about boot code executing address, DRAM clock skew setting, Register writing function, and delay function. After confirming the flash content is for booting, IBR will do corresponding operation according to the boot code header before reading boot code to destination address. Using the boot code header, user can change clock setting, dram setting, engine clock, and so on. The file TurboWriter.ini is for NAND, SD, SPI flash and SPI flash raw data.



```
[ADDRESS]
  ADDRESS = 00900000
[CLOCK_SKEW]
  DQSODS = 00001010
  CKDQSDS = 00888800

[N9H26 USER_DEFINE]
  b0003010 = 00000005
  b0000204 = FFFFFFFF
  b0000208 = FFFFFFFF
  b0003008 = 0000805A
  b0003028 = 2AFF3B4A
  b0003004 = 00000021
  55AA55AA = 0000010C
  b0003004 = 00000023
```

- [ADDRESS]

  Boot code execution address. It can be modified if necessary. Generally, it is the execution address of Loader (SD/NAND/SPI). For N9H20K5 (32MB DRAM), the execution address is 0x900000. For N9H20K3 (8MB DRAM), the execution address is 0x700000. For N9H20K1 (2MB SDRAM), the execution address is 0x180000. N3290X has 3 kinds of chips, for N32905 (32MB DRAM), the execution address is 0x900000. For N32903 (8MB DRAM), the execution address is 0x700000. For N32901 (2MB SDRAM), the execution address is 0x180000. The execution address of N3291X is 0x900000.

- [CLOCK_SKEW]

  DQSODS /CKDQSDS values

- [N3290 USER_DEFINE],
  [N3291 USER_DEFINE],
  [N3292 USER_DEFINE],
  [N9H20 USER_DEFINE],
  [N9H26 USER_DEFINE]

  Register writing / delay function
  Register writing function Format:

  Address = Value

  Ex. Set REG_CKDQSDS to 0x00CCDD00
  B0003034 = 00CCDD00

  Delay function Format:

  55AA55AA = Delay time (micro second)

  Ex. Set Delay 1 second
  55AA55AA = 000F4240

- Currently we support 5 kinds of user define, [N3290 USER_DEFINE] for N3290X, [N3291 USER_DEIFNE] for N3291X, [N3292 USER_DEFINE] for N3292X, [N9H20 USER_DEFINE] for N9H20K1/N9H20K3/N9H20K5, and [N9H26 USER_DEFINE] for N9H26K5.

[Note1] N3292X/N9H26K5 DRAM initialization and detection are removed from IBR. So if Boot code execution address is DRAM, user needs to add DRAM initialization to the [N3292 USER_DEFINE]/[N9H26K5 USER_DEFINE] field to initialize DRAM.

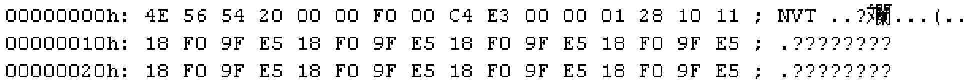
- **[Turbo Writer Firmware - .bin]**

Turbo Writer is connected to Turbo writer firmware which loaded from PC to N329/N9H2X series by USB boot. When Turbo Writer connects to USB boot, Turbo Writer will send the corresponding binary file (Turbo writer firmware) to N329/N9H2X series and connects to Turbo writer firmware according to USB boot PID. If USB port is full speed, then user should backup the file FA9X_musb.bin/ N9H2X_musb.bin, rename the file FA9X_musb_FullSpeed.bin/ N9H2X_musb_FullSpeed.bin into FA9X_musb.bin/ N9H2X_musb.bin to work.

- ✧ N3290X → FA93_musb.bin/FA93_musb_FullSpeed.bin
- ✧ N3291X → FA95_musb.bin/FA95_musb_FullSpeed.bin
- ✧ N3292X → FA92_musb.bin/FA92_musb_FullSpeed.bin
- ✧ N9H20 (M9H20K1/N9H20K3/N9H20K5) → M9H20_musb.bin/N9H20_musb_FullSpeed.bin
- ✧ N9H26 (N9H26K5) → N9H26_musb.bin/N9H26_musb_FullSpeed.bin

Turbo writer firmware binary file includes

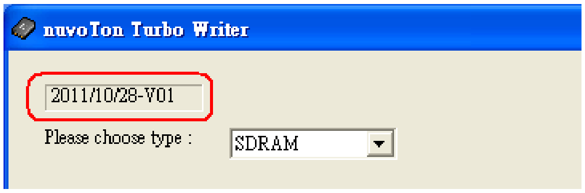
- ✧ Turbo Writer firmware marker : 0x2054564E
- ✧ Turbo Writer firmware executing address : 0x000F00000
- ✧ Turbo Writer firmware size : 0xE3C4
- ✧ Turbo Writer firmware version : 0x11102801 → 2011/10/28 V1
- ✧ Turbo Writer firmware code starts from offset 0x20.



```
00000000h: 4E 56 54 20 00 00 F0 00 C4 E3 00 00 01 28 10 11 ; NVT ..?濔...(..
00000010h: 18 F0 9F E5 18 F0 9F E5 18 F0 9F E5 18 F0 9F E5 ; .????????
00000020h: 18 F0 9F E5 18 F0 9F E5 18 F0 9F E5 18 F0 9F E5 ; .????????
```

- **[Turbo Writer Firmware version]**

Turbo Writer firmware version is located at Turbo writer firmware binary file and it can be seen from Turbo Writer Tool as follows.



2011/10/28-V01

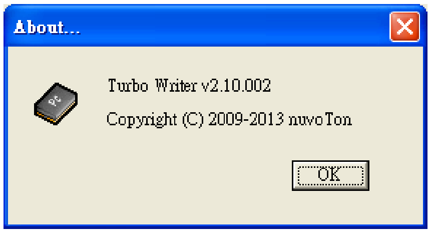
Please choose type : SDRAM

Figure 1 Turbo Writer Firmware version

[Note2] The Turbo Writer Firmware version for N3290X/N9H20 has another meaning about DRAM size.
For example
The version number 2011/10/28-V01 → the DRAM size is 2MB.
The version number 2011/10/28-V03 → the DRAM size is 8MB.
The version number 2011/10/28-V05 → the DRAM size is 32MB.

- **[Turbo Writer Tool version]**

Turbo Writer PC tool version can be seen from Turbo Writer Tool as follows.



Turbo Writer v2.10.002
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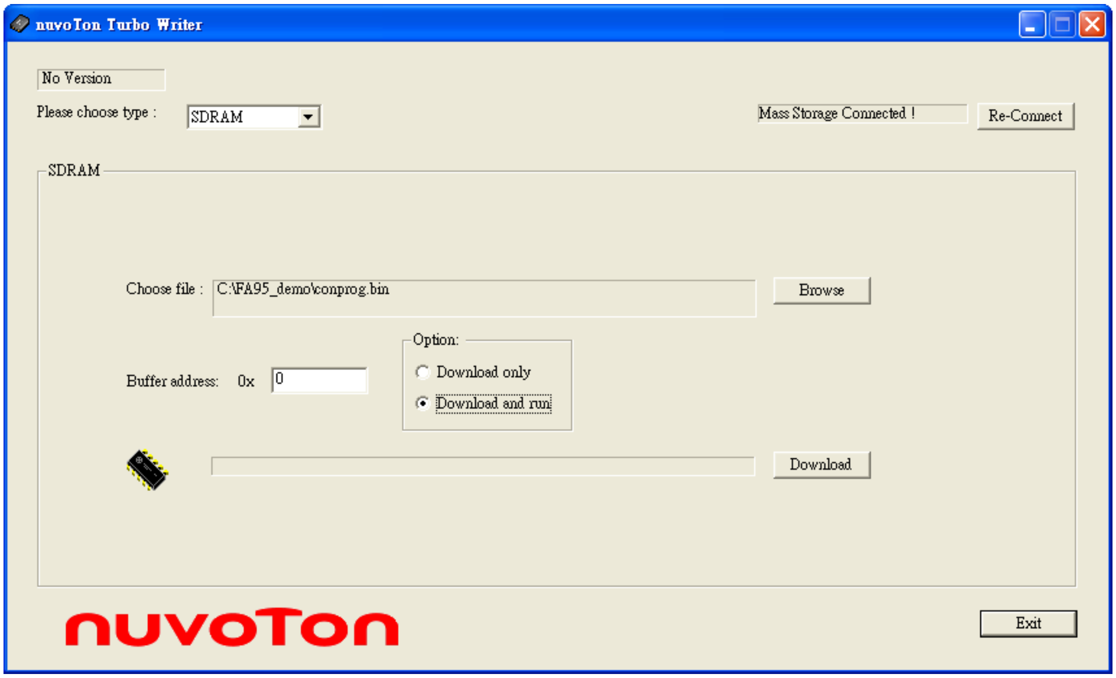
Figure 2 Turbo Writer Tool version

1.3. SDRAM

Turbo Writer SDRAM mode can download the Linux kernel and then execute it. The Linux kernel file is **ConProg.bin**.

- ConProg.bin –
  - ✧ Browse the file "ConProg.bin"
  - ✧ Set the buffer address: **0x0**
    - ✓ Linux runs at 0x0.
  - ✧ Select the Option: **Download and run**
  - ✧ Press the button "Download and run".



nuvoTon Turbo Writer

No Version

Please choose type : SDRAM

Mass Storage Connected !

SDRAM

Choose file : C:\FA95_demo\conprog.bin

Buffer address: 0x 0

Option:

○ Download only

● Download and run

Figure 3 Download ConProg.bin to SDRAM and Run

1.4. Preliminary Definition

Image Type

Turbo Writer defines five image types. The detailed descriptions are as follows.

- **System image**
  - Required image – ID is 0x03
  - Nand/ SD/SPI Loader
  - Loaded and Executed by Internal Boot Code (IBR)
  - Execution address is defined in TurboWriter.ini, N9H20 has 3 kinds of chips, the execution address of N9H20K5 (32 MB DRAM) is 0x900000, N9H20K3 (8 MB DRAM) is 0x700000, N9H20K1 (2 MB DRAM) is 0x180000. N3290X has 3 kinds of chips, for N32905 (32MB DRAM), the execution address is 0x900000. For N32903 (8MB DRAM), the execution address is 0x700000. For N32901 (2MB SDRAM), the execution address is 0x180000. The execution address of N3291X is 0x900000.

Other images are loaded by Nand/ SD/SPI Loader

- **Execute image**
  - Optional image – ID is 0x01
  - NvtLoader for SD/Nand/SPI
  - Loader will load image to execution address and run it.
- **Logo image**
  - Optional image – ID is 0x04
  - Logo binary file for display
- **Data image**
  - Optional image – ID is 0x00
  - Data image for user
- **RomFS**
  - Optional image – ID is 0x02
  - Linux RomFS

Example

In the following sections, we use N3291X demo flow to describe how to use Turbo Writer. Here, we use three image types.

- **System image**
  - NAND/ SD/SPI Loader
    - **NANDLoader_0120.bin**
    - **SDLoader_0119.bin**
    - **SpiLoader_GWTFM9563B.bin**
  - Execution address is 0x900000
  - TurboWriter.ini

- **[N3291 USER_DEFINE] can’t be set, if not necessary**
- **Ex. With [N3291 USER_DEFINE]**

```
[Address]
        Address = 00900000                  → Nand/ SD/SPI Loader executing address
[CLOCK_SKEW]
        DQSODS = 00001010                   → Not use in N3291X/N3292X/N9H26
        CKDQSDS = 00AAAA00                  → Not use in N3291X/N3292X/N9H26
[N3291 USER_DEFINE]
         B0003034 = 00CCDD00                → Set CKDQSDS to 0x00CCDD00
```

- Ex. Without [USER_DEFINE]

```
[Address]
        Address = 00900000                  → Nand/ SD/SPI Loader executing address
[CLOCK_SKEW]
        DQSODS = 00001010                   → Not use in N3291X/N3292X/N9H26
        CKDQSDS = 00AAAA00                  → Not use in N3291X/N3292X/N9H26
[N3291 USER_DEFINE]
```

- **Execute image**
  - NvtLoader for NAND/SD/SPI
    - **NVT_NAND_GW9563_0120.bin for NAND**
    - **NVT_SDU0_GW9563_0120.bin for SD**
    - **Conprog.bin for SPI**
  - Execution address
    - **For N32905 (32 MB SDRAM), 0x800000 for NAND/SD. For N32903 (8 MB SDRAM), 0x600000 for NAND/SD. For N32901(2 MB SDRAM), 0x40000 for NAND/SD. For N9H20K5 (32 MB SDRAM), 0x800000 for NAND/SD. For N9H20K3 (8 MB SDRAM), 0x600000 for NAND/SD. For N9H20K1(2 MB SDRAM), 0x40000 for NAND/SD.**
    - **0x000000 for SPI**
- **Logo image**
  - Logo binary file for display
    - **NuvotonLogo_480x272.bin**
  - Display buffer address is 0x500000

Our demo Booting flow from IBR to Linux is as follows.

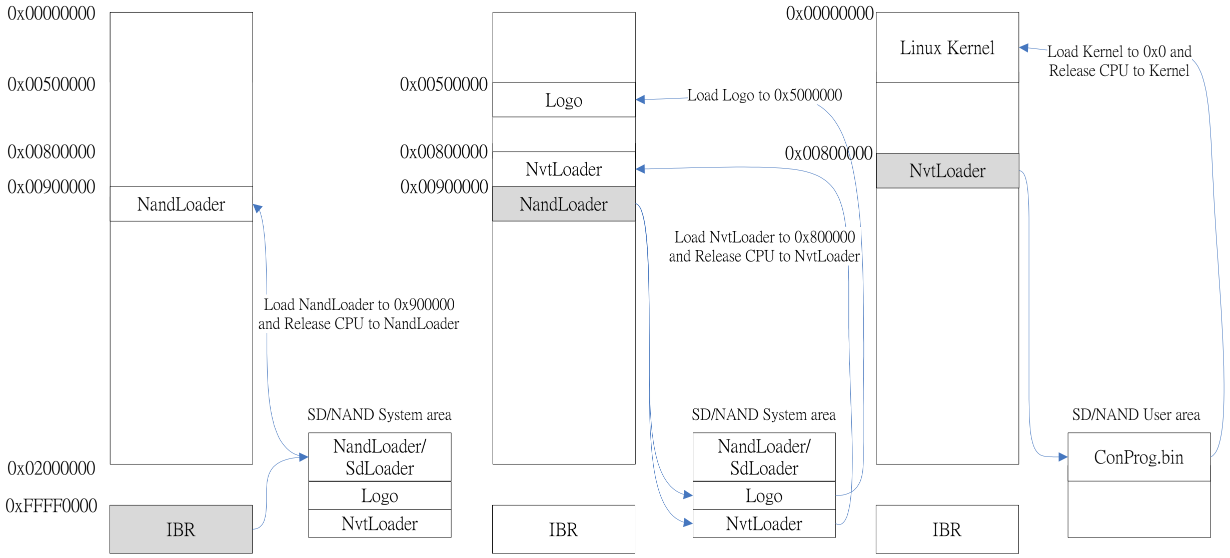
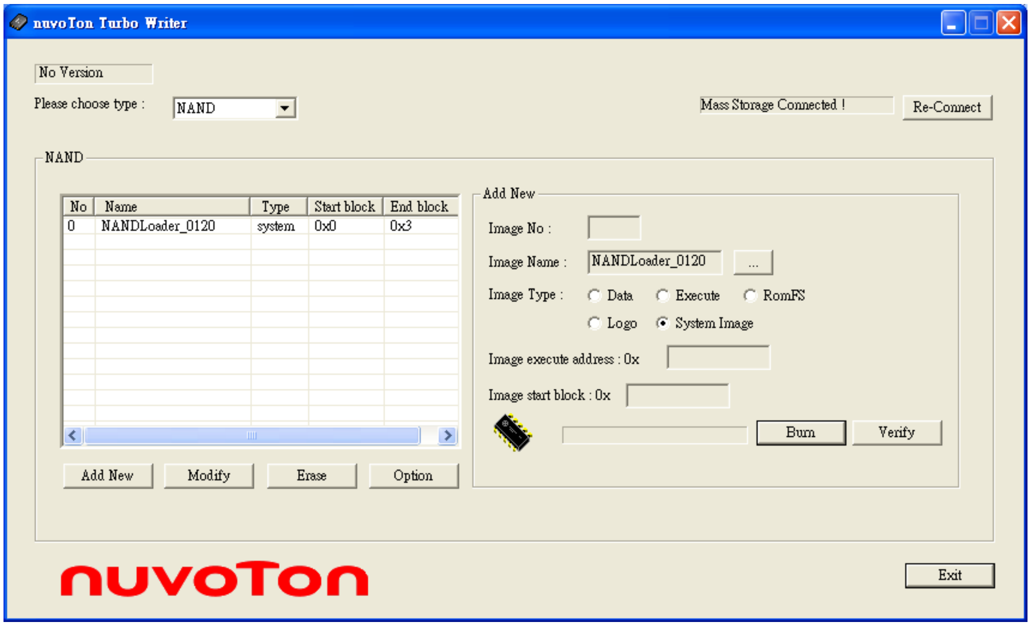


Figure 4 Demo booting flow for NAND

1.5. NAND Flash

Turbo Writer for NAND flash is as follows.

- NAND Loader –
  - Choose the type “NAND”
  - Set Image type “System Image”
  - Browse the file “NANDLoader_0120.bin”
  - Press the button “Burn”



nuvoTon Turbo Writer

No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3

Add New

Image No :

Image Name : NANDLoader_0120

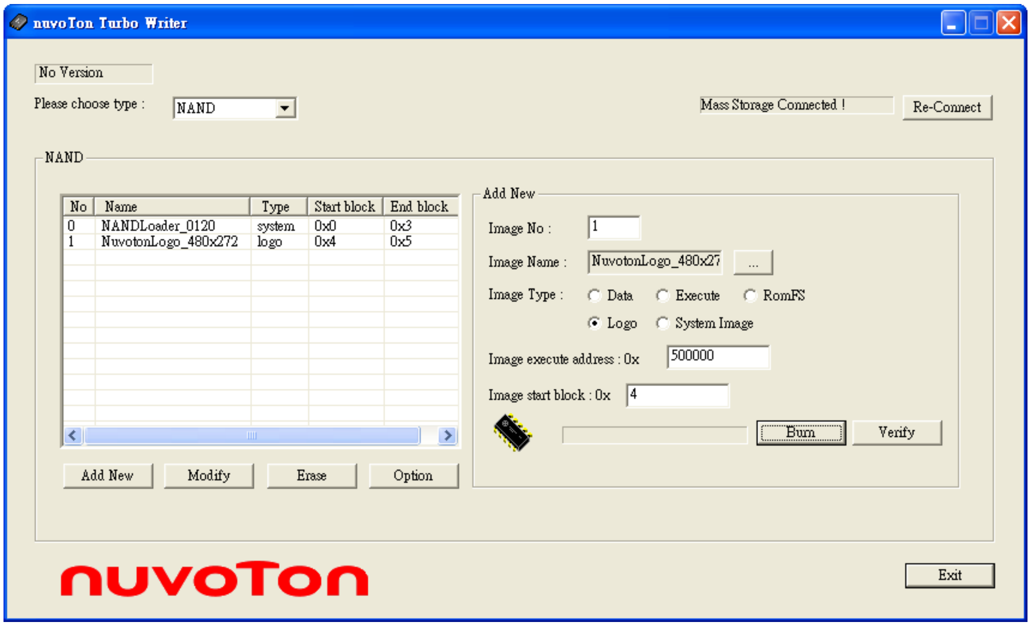
Image Type : ○ Data ○ Execute ○ RomFS ○ Logo ● System Image

Image execute address : 0x

Image start block : 0x

Figure 5 System image – NAND Loader

- Logo –
  - Set Image type “Logo”
  - Image number “1”
  - Browse the file “NuvotonLogo_480x272.bin”
  - Set the image execute address: **0x500000**
  - Set the start block number: **0x4**
    - ✓ Because the burned NAND Loader occupies block 0~3, so we could select block 4 to burn the logo file.
  - Press the button “Burn”



nuvoTon Turbo Writer

No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3
1	NuvotonLogo_480x272	logo	0x4	0x5

Add New

Image No : 1

Image Name : NuvotonLogo_480x27

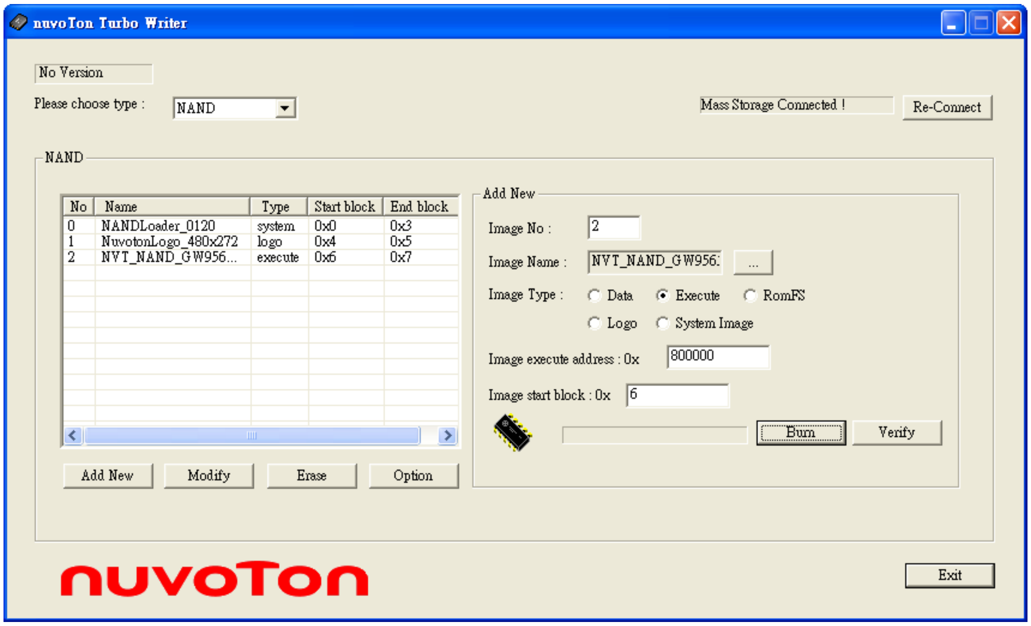
Image Type : ○ Data ○ Execute ○ RomFS ● Logo ○ System Image

Image execute address : 0x 500000

Image start block : 0x 4

Figure 6 Logo image

- NVT Loader–
  - Image number “2”
  - Set Image type “Execute”
  - Browse the file “NVT_NAND_GW9563_0120.bin”
  - Set the executed address: **0x800000**
  - Set the start block number: **0x6.**
    - ✓ Because the burned NAND Loader and logo occupied block 0~5, so we could select block 6 to burn execute image
  - Press the button “Burn”



nuvoTon Turbo Writer

No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3
1	NuvotonLogo_480x272	logo	0x4	0x5
2	NVT_NAND_GW956...	execute	0x6	0x7

Add New

Image No : 2

Image Name : NVT_NAND_GW956:

Image Type : ○ Data ● Execute ○ RomFS ○ Logo ○ System Image

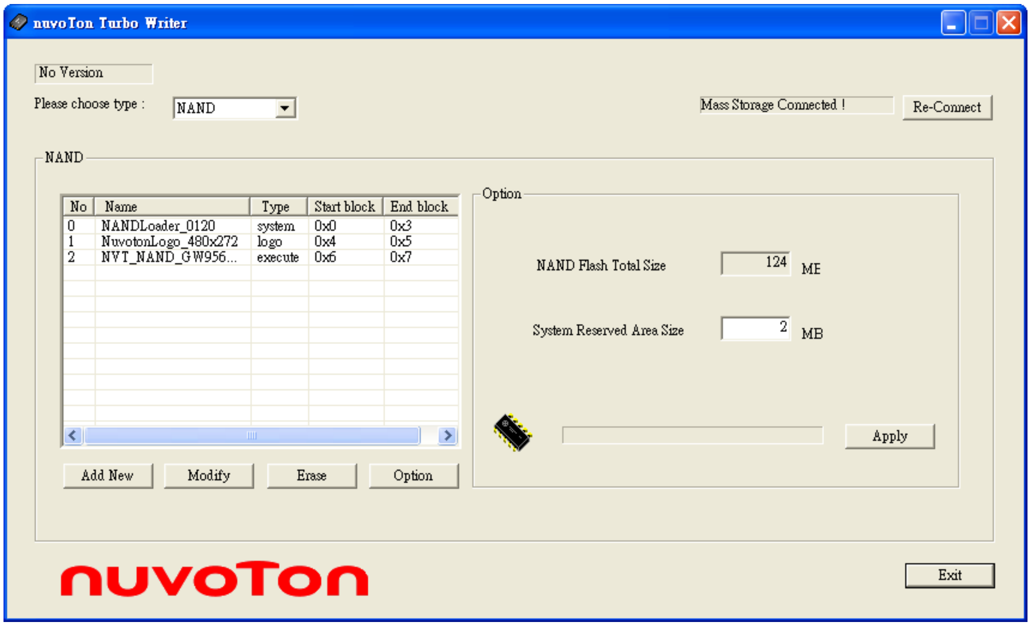
Image execute address : 0x 800000

Image start block : 0x 6

Figure 7 Execute image - NvtLoader

- Option button –

User clicks down the button option, UI will show as follows. It includes the information of total size, user could set the system reserved area size, and presses the button of apply to take effect.



nuvoTon Turbo Writer

No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3
1	NuvotonLogo_480x272	logo	0x4	0x5
2	NVT_NAND_GW956...	execute	0x6	0x7

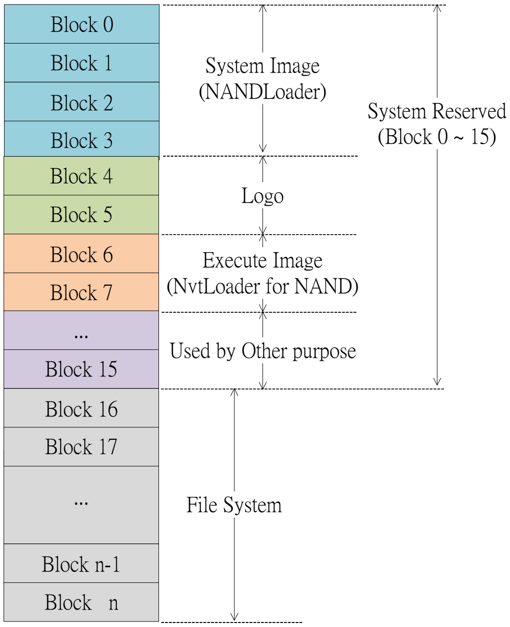
Option

NAND Flash Total Size 124 ME

System Reserved Area Size 2 MB

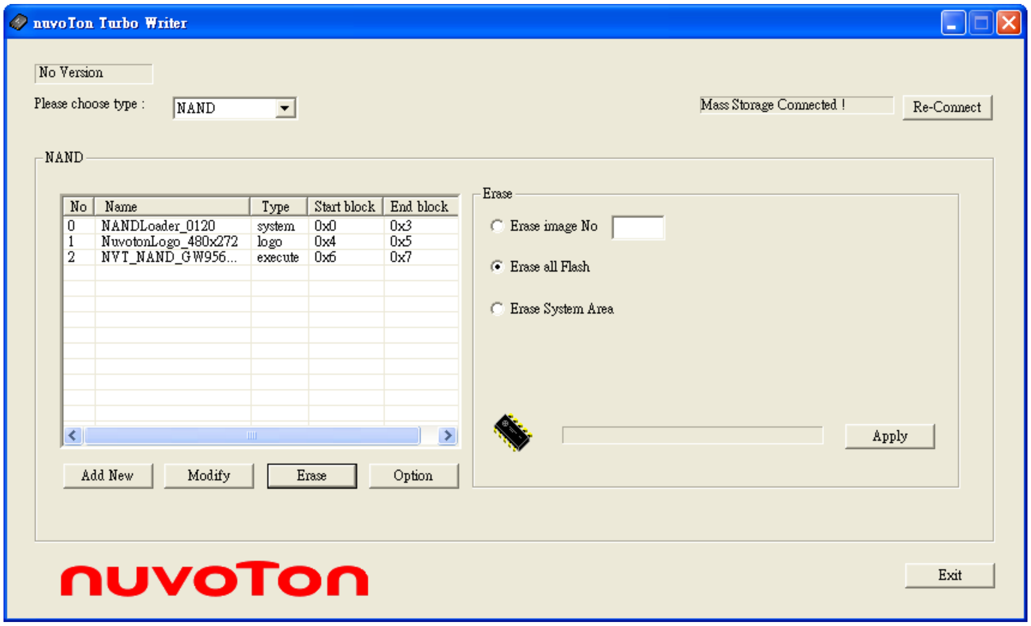
Figure 8 Reserved System Area Size

- Flash memory map after above step –



+Figure 9 NAND flash memory map

- Erase button –
  - System Reserved Area Size
    - ✓ User clicks down the button option, UI will show as follows. It includes the information of total size, user could set the system reserved area size, and presses the button of apply to take effect.



No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3
1	NuvotonLogo_480x272	logo	0x4	0x5
2	NVT_NAND_GW956...	execute	0x6	0x7

Erase

○ Erase image No

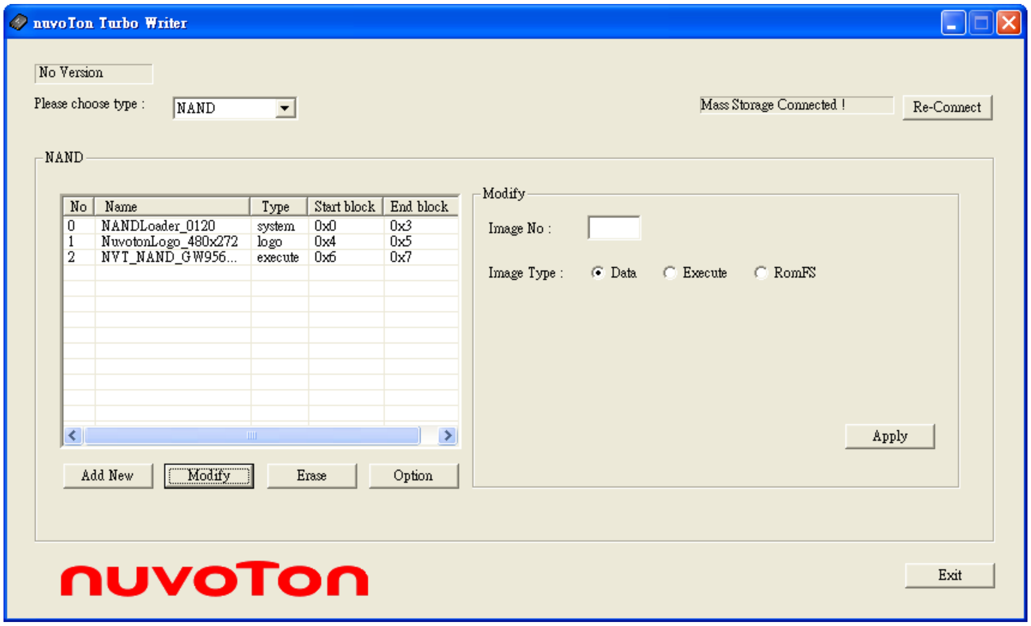
● Erase all Flash

○ Erase System Area

Figure 10 Erase

- Modify button –

User clicks down the button of Modify, UI will show two options including Image No, and Image Type. User could set Image No., modify its Image Type, and click down the button of Apply to take effect.



No Version

Please choose type : NAND

Mass Storage Connected !

NAND

No	Name	Type	Start block	End block
0	NANDLoader_0120	system	0x0	0x3
1	NuvotonLogo_480x272	logo	0x4	0x5
2	NVT_NAND_GW956...	execute	0x6	0x7

Modify

Image No :

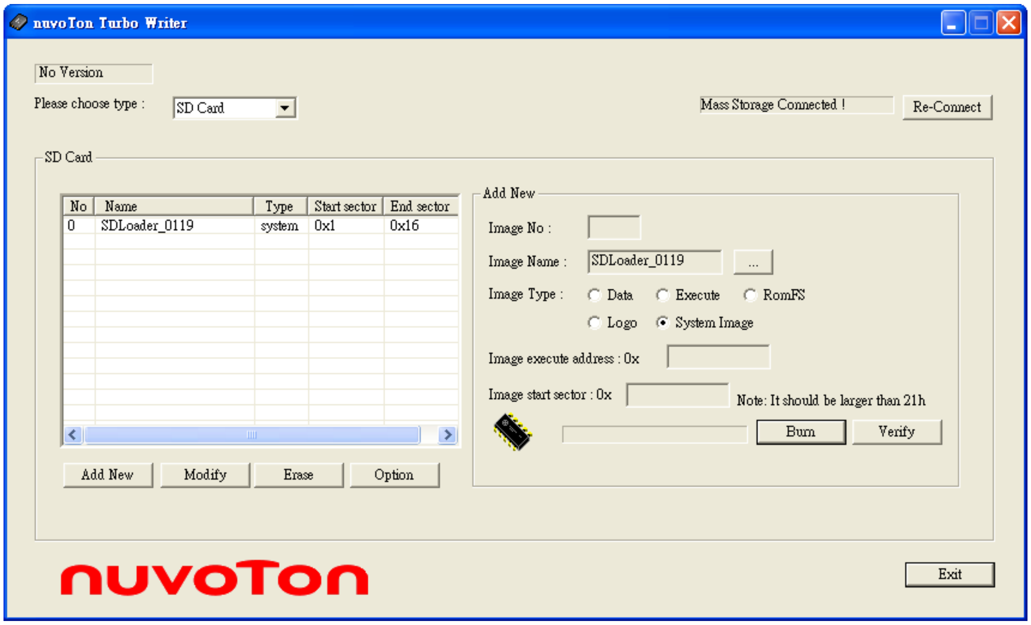
Image Type : ● Data ○ Execute ○ RomFS

Figure 11 Modify image type

1.6. SD Card

Turbo Writer for SD Card is as follows.

- SD Loader –
  - ✧ Insert SD Card
  - ✧ Choose the type "SD"
  - ✧ Set Image type "System Image"
  - ✧ Browse the file "SDLoader_0119.bin"
  - ✧ Press the button "Burn"



No Version

Please choose type : SD Card

Mass Storage Connected !

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16

Image No :

Image Name : SDLoader_0119

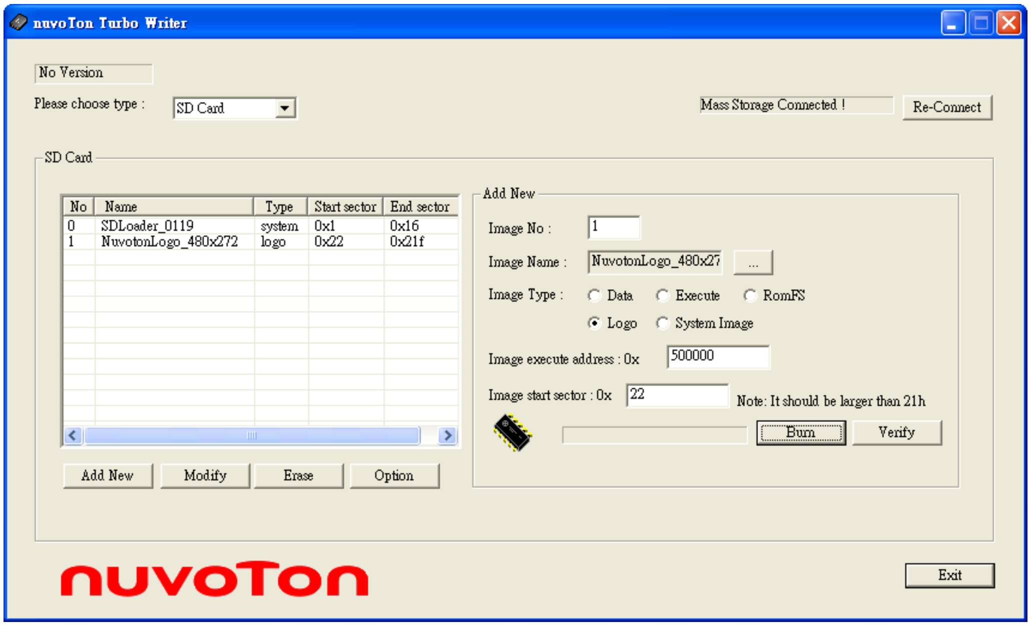
Image Type : ○ Data ○ Execute ○ RomFS ○ Logo ● System Image

Image execute address : 0x

Image start sector : 0x Note: It should be larger than 21h

Figure 12 System image – SD Loader

- Logo –
  - ✧ Set Image type "Logo"
  - ✧ Image number "1"
  - ✧ Browse the file "NuvotonLogo_480x272.bin"
  - ✧ Set the image execute address: **0x500000**
  - ✧ Set the start block number: **0x22**
  - ✧ Press the button "Burn"



nuvoTon Turbo Writer

No Version

Please choose type : SD Card

Mass Storage Connected !

SD Card

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16
1	NuvotonLogo_480x272	logo	0x22	0x21f

Add New

Image No : 1

Image Name : NuvotonLogo_480x27

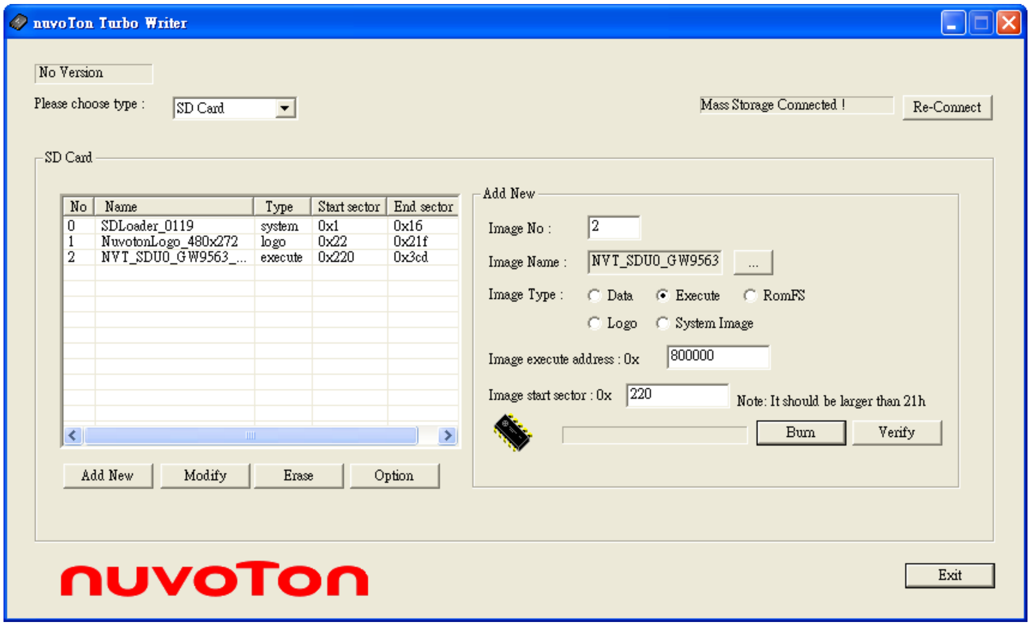
Image Type : ○ Data ○ Execute ○ RomFS ● Logo ○ System Image

Image execute address : 0x 500000

Image start sector : 0x 22 Note: It should be larger than 21h

Figure 13 Logo image

- NVT Loader–
  - ✧ Image number “2”
  - ✧ Set Image type “Execute”
  - ✧ Browse the file “NVT_SDU0_GW9563_0120.bin”
  - ✧ Set the executed address: **0x800000**
  - ✧ Set the start block number: **0x220.**
  - ✧ Press the button “Burn”



nuvoTon Turbo Writer

No Version

Please choose type : SD Card

Mass Storage Connected !

SD Card

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16
1	NuvotonLogo_480x272	logo	0x22	0x21f
2	NVT_SDU0_GW9563_...	execute	0x220	0x3cd

Add New

Image No : 2

Image Name : NVT_SDU0_GW9563

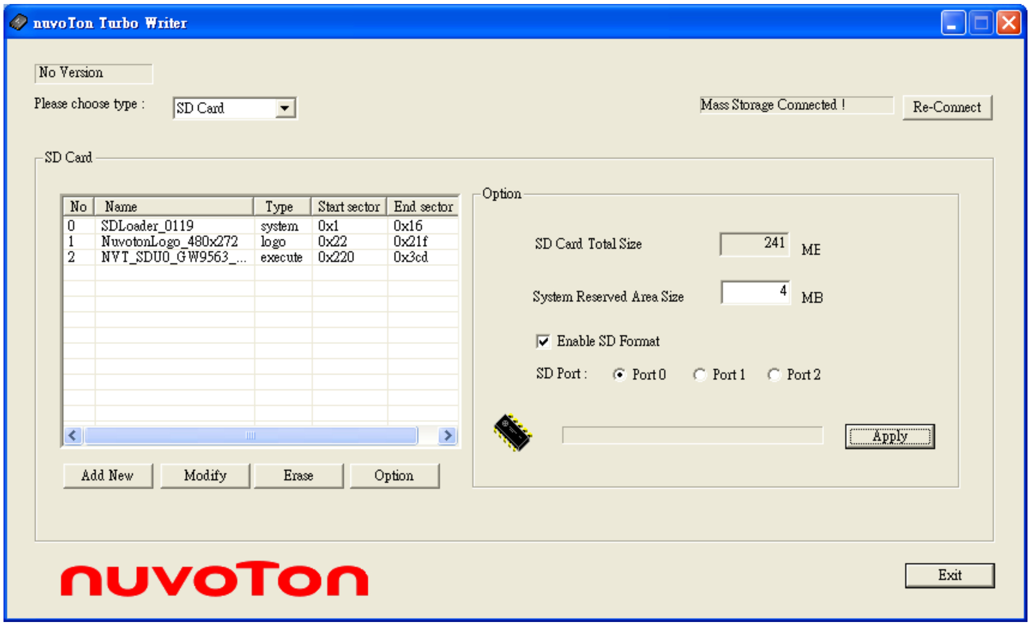
Image Type : ○ Data ● Execute ○ RomFS ○ Logo ○ System Image

Image execute address : 0x 800000

Image start sector : 0x 220 Note: It should be larger than 21h

Figure 14 Execute image - NvtLoader

- Option button –
  - ✧ User clicks down the button option, UI will show as follows.
    - ✓ System reserved area size
    - ✓ Enable SD Format
      - ◆ Turbo Writer formats SD card as one partition disk
      - ◆ If NvtLoader wants to formats SD card as multi- partition disk, user can uncheck this check box
    - ✓ SD Port
      - ◆ User can select the SD port that he wants to control.



nuvoTon Turbo Writer

No Version

Please choose type : SD Card

Mass Storage Connected !

SD Card

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16
1	NuvotonLogo_480x272	logo	0x22	0x21f
2	NVT_SDU0_GW9563_...	execute	0x220	0x3cd

Option

SD Card Total Size 241 MB

System Reserved Area Size 4 MB

☑ Enable SD Format

SD Port : ● Port 0 ○ Port 1 ○ Port 2

Figure 15 Option for SD

- Flash memory map after above step –

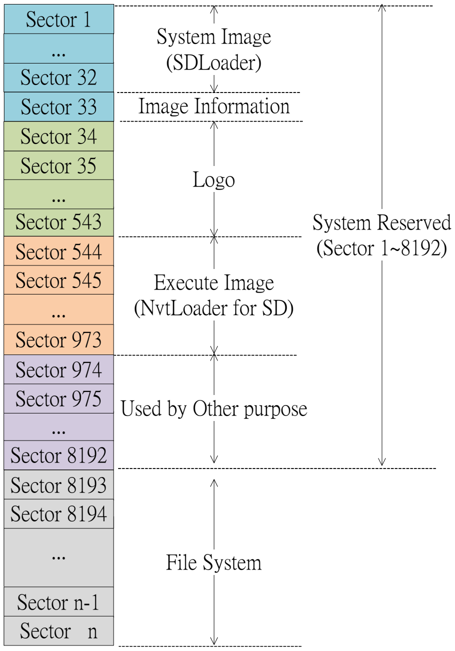
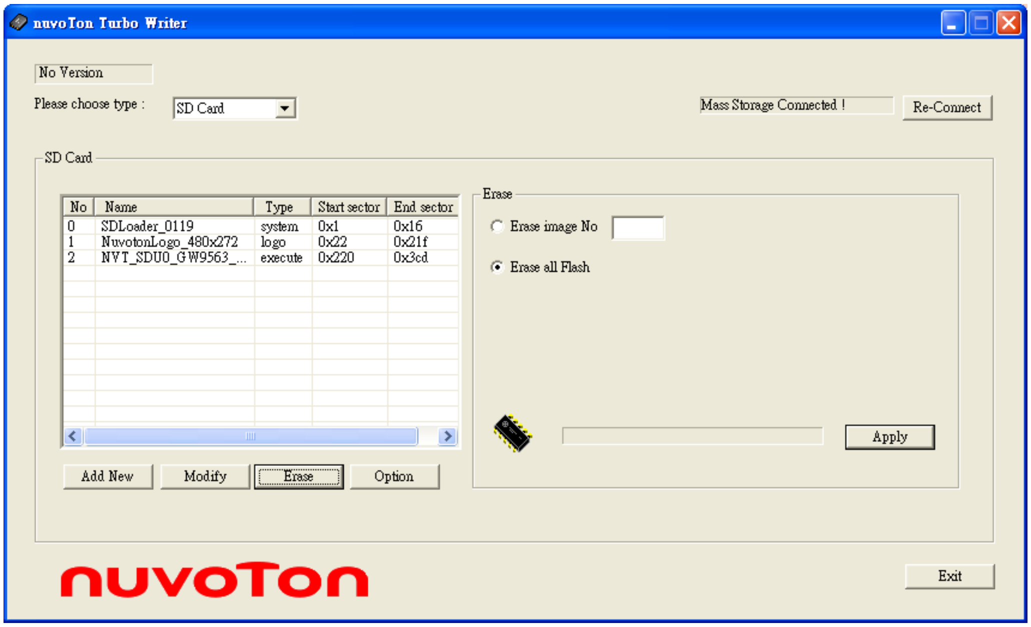


Figure 16 SD Card memory map

- Erase button –

User clicks down the button of Erase, UI will show two options including Erase image No and Erase all Flash. User should select the one of two options, and click down the button of Apply to take effect.



No Version

Please choose type : SD Card

Mass Storage Connected !

SD Card

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16
1	NuvotonLogo_480x272	logo	0x22	0x21f
2	NVT_SDU0_GW9563_...	execute	0x220	0x3cd

Erase

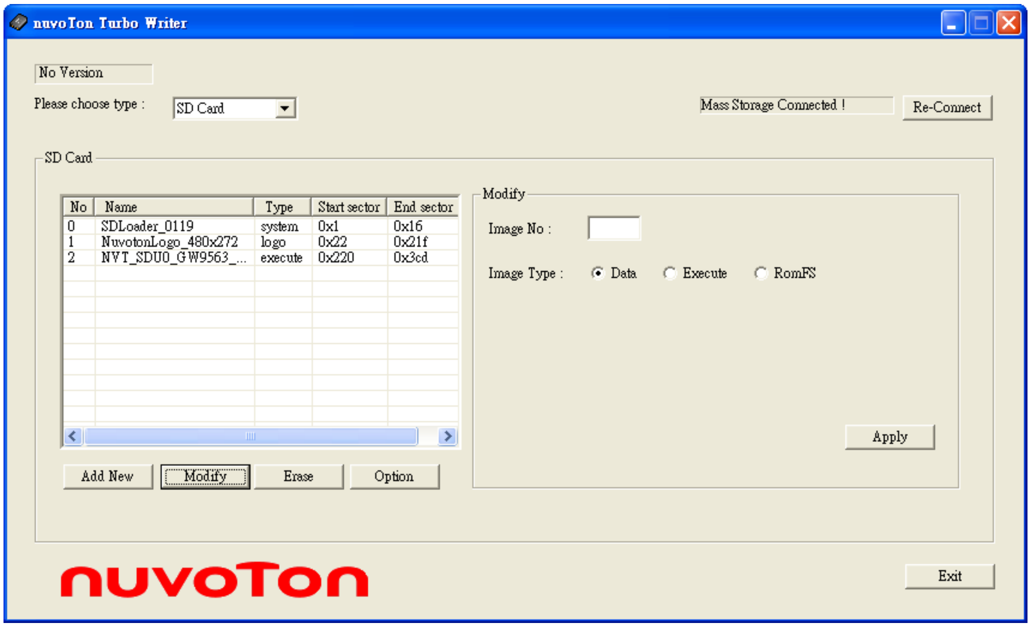
○ Erase image No

● Erase all Flash

Figure 17 Erase

- Modify button –

User clicks down the button of Modify, UI will show two options including Image No, and Image Type. User could set Image No., modify its Image Type, and click down the button of Apply to take effect.



No Version

Please choose type : SD Card

Mass Storage Connected !

No	Name	Type	Start sector	End sector
0	SDLoader_0119	system	0x1	0x16
1	NuvotonLogo_480x272	logo	0x22	0x21f
2	NVT_SDU0_GW9563_...	execute	0x220	0x3cd

Image No :

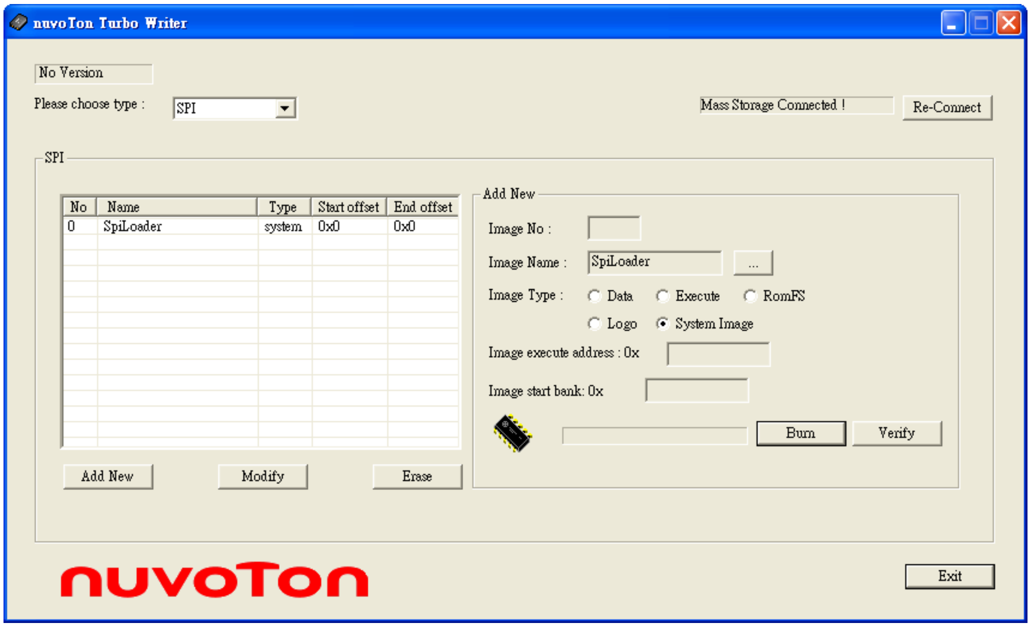
Image Type : ● Data ○ Execute ○ RomFS

Figure 18 Modify image type

1.7. SPI Flash

Turbo Writer for SPI Flash is as follows.

- SPI Loader –
  - Choose the type "SPI"
  - Set Image type "System Image"
  - Browse the file "SpiLoader.bin"
  - Press the button "Burn"



No Version

Please choose type : SPI

Mass Storage Connected !

SPI

No	Name	Type	Start offset	End offset
0	SpiLoader	system	0x0	0x0

Add New

Image No :

Image Name : SpiLoader

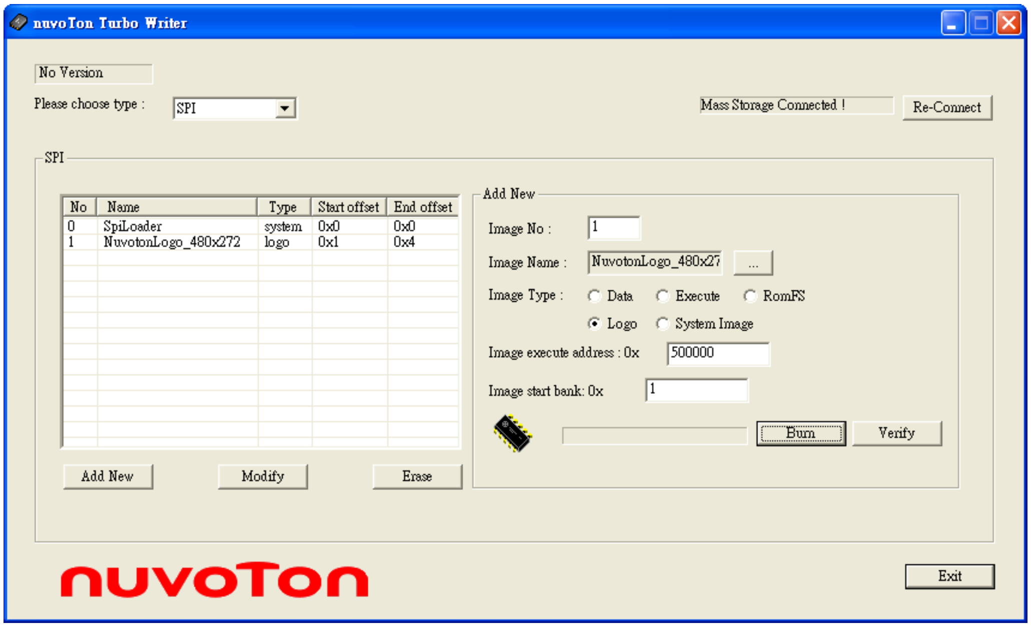
Image Type : ○ Data ○ Execute ○ RomFS ○ Logo ● System Image

Image execute address : 0x

Image start bank: 0x

Figure 19 System image – SPI Loader

- Logo –
  - Set Image type “Logo”
  - Image number “1”
  - Browse the file “NuvotonLogo_480x272.bin”
  - Set the image execute address: **0x500000**
  - Set the start block number: **0x1**
  - Press the button “Burn”



No Version

Please choose type : SPI

Mass Storage Connected !

SPI

No	Name	Type	Start offset	End offset
0	SpiLoader	system	0x0	0x0
1	NuvotonLogo_480x272	logo	0x1	0x4

Add New

Image No : 1

Image Name : NuvotonLogo_480x27

Image Type : ○ Data ○ Execute ○ RomFS ● Logo ○ System Image

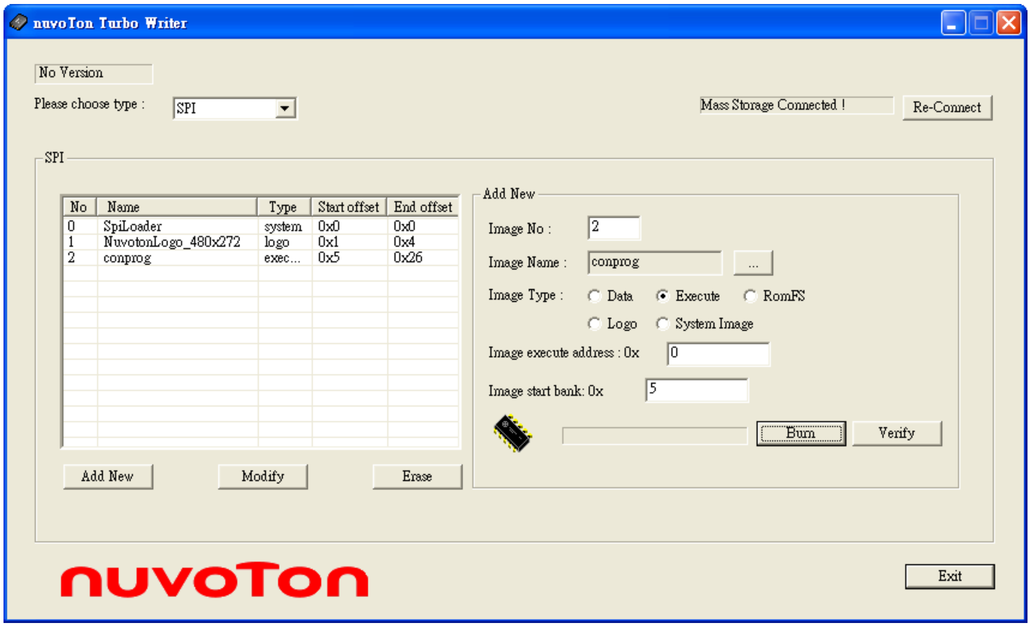
Image execute address : 0x 500000

Image start bank: 0x 1

Figure 20 Logo image

- Linux Kernel Image–
  - Image number “2”
  - Set Image type “Execute”

- Browse the file “conprog.bin”
- Set the executed address: **0x0**
- Set the start block number: **0x5.**
- Press the button “Burn”



No Version

Please choose type : SPI

Mass Storage Connected !

No	Name	Type	Start offset	End offset
0	SpiLoader	system	0x0	0x0
1	NuvotonLogo_480x272	logo	0x1	0x4
2	conprog	exec...	0x5	0x26

Add New

Image No : 2

Image Name : conprog

Image Type : ○ Data ● Execute ○ RomFS ○ Logo ○ System Image

Image execute address : 0x 0

Image start bank: 0x 5

Figure 21 Execute image – Linux Kernel

- Flash memory map after above step –

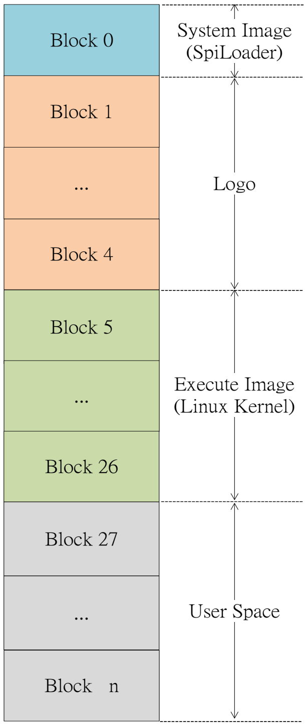
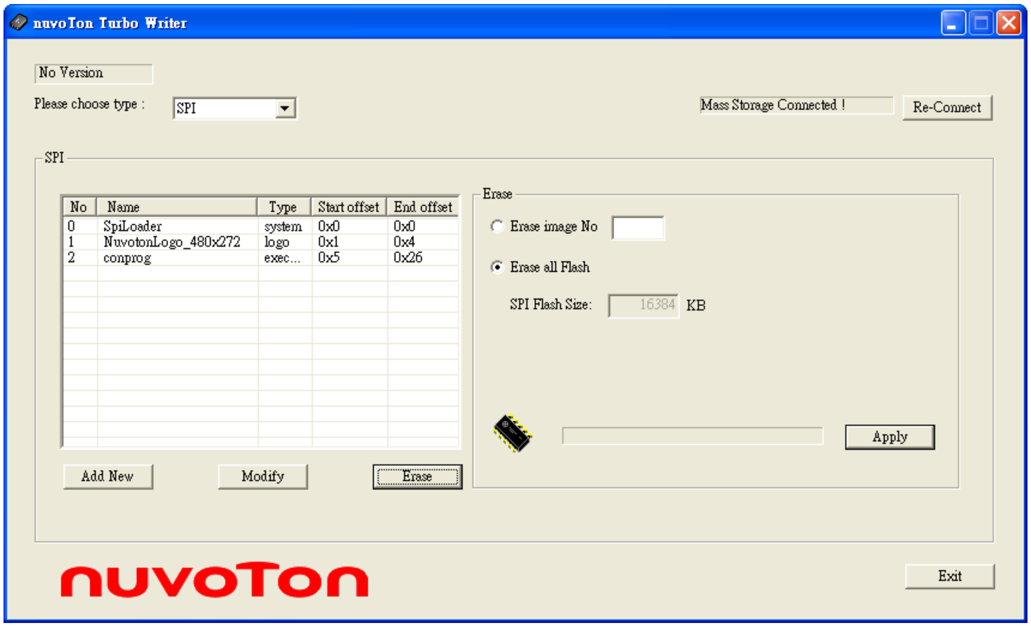


Figure 22 SPI Card memory map

- Erase button –
  - ✧ User clicks down the button option, UI will show as follows.
    - ✓ SPI Flash size
    - ✓ Two options including Erase image No and Erase all Flash.
      - ◆ Select one of two options, click down the button of Apply to take effect.



No Version

Please choose type : SPI

Mass Storage Connected !

No	Name	Type	Start offset	End offset
0	SpiLoader	system	0x0	0x0
1	NuvotonLogo_480x272	logo	0x1	0x4
2	conprog	exec...	0x5	0x26

○ Erase image No

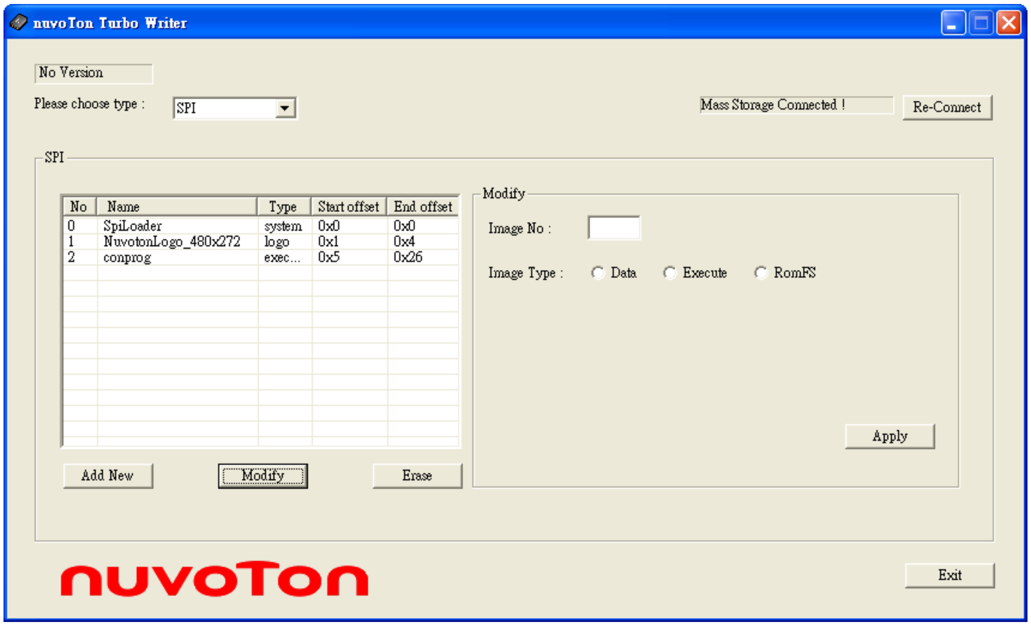
● Erase all Flash

SPI Flash Size: 16384 KB

Figure 23 Erase

- ➢ Modify button –

User clicks down the button of Modify, UI will show two options including Image No, and Image Type. User could set Image No., modify its Image Type, and click down the button of Apply to take effect.



No Version

Please choose type : SPI

Mass Storage Connected !

No	Name	Type	Start offset	End offset
0	SpiLoader	system	0x0	0x0
1	NuvotonLogo_480x272	logo	0x1	0x4
2	conprog	exec...	0x5	0x26

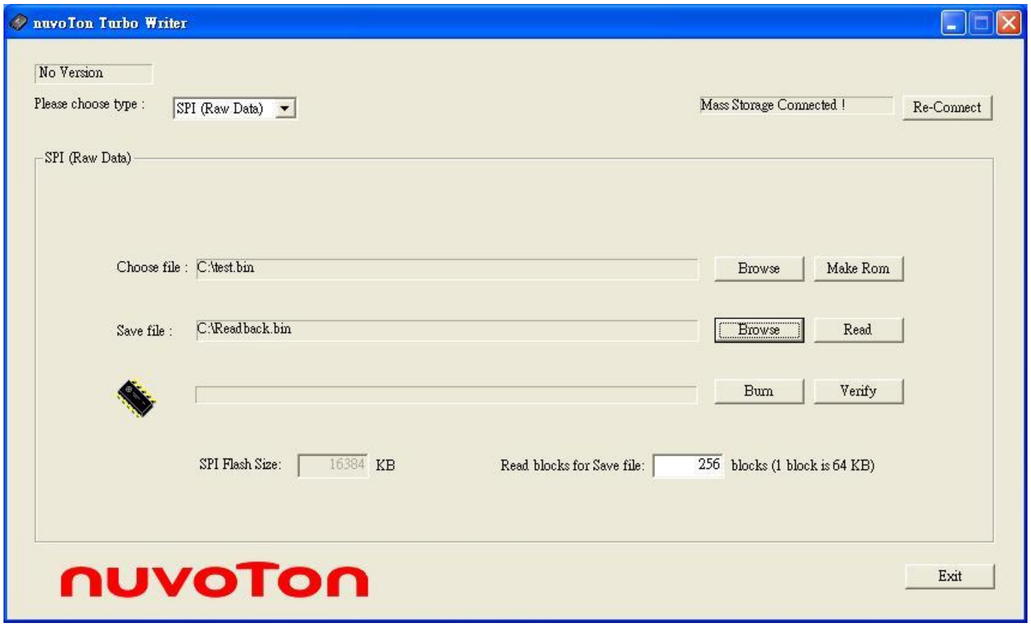
Image No :

Image Type : ○ Data ○ Execute ○ RomFS

Figure 24 Modify image type

1.8. SPI Flash – Raw Data

SPI (Raw Data) displays the SPI flash and supports Image burn, data read back from SPI flash, Make Rom function. The SPI (Raw Data) interface is as follows.



No Version

Please choose type : SPI (Raw Data)

Mass Storage Connected !

SPI (Raw Data)

Choose file : C:\test.bin

Save file : C:\Readback.bin

SPI Flash Size: 16384 KB

Read blocks for Save file: 256 blocks (1 block is 64 KB)

Figure 25 SPI(Raw) Mode

- Burn button –
  - ✧ User can use the binary file made by “Make Rom” or any other images
    - ✓ Turbowriter will burn the specified file. Using the button “Make Rom”, it will add N3290X/N3291X/N9H20 Boot code header automatically, and export the specified file.

- Verify button –
  - ✧ User can verify the binary file just burn into SPI flash (Read back and compare)

- Read button –
  - ✧ Read Back size
    - ✓ Minimum Read back unit: 64KB
    - ✓ Maximum read back block number will be the read back default value.

Turbo Writer supports SPI MKROM utility for user to build a packed image. This image includes SpiLoader_ GWTFM9563B.bin, NuvotonLogo_480x272.bin and Linux kernel – ConProg.bin.

SpiLoader.bin –

- **Set Image type “System Image”**
- **Browse the file “SpiLoader_GWTFM9563B.bin”**

NuvotonLogo_480x272.bin –

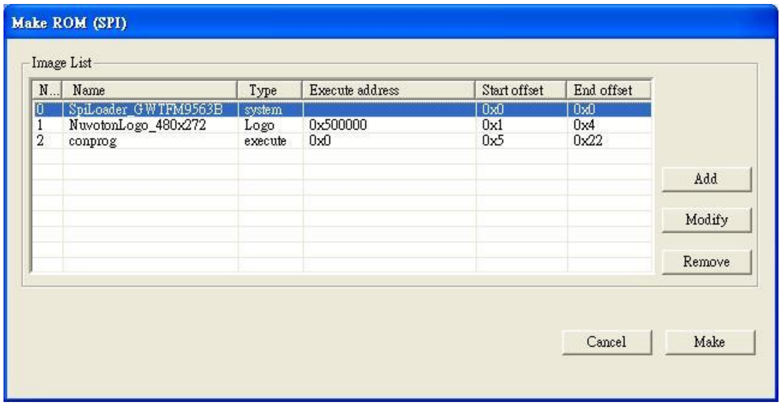
- **Set Image type “Logo”**
- **Image number “1”**
- **Browse the file “NuvotonLogo_480x272.bin”**

- **Set the executed address: 0x500000**
- **Set the start block number: 0x1**

ConProg.bin –

- **Image number "2"**
- **Set Image type "Execute"**
- **Browse the file "ConProg.bin"**
- **Set the executed address: 0x0**
- **Set the start block number: 0x4**

- Make Rom –
  - User can add / Modify / Remove image to / from Image list
  - User press "Make" to create binary file **with N3290X/N3291X/N9H20 Boot code header**.
    - ✓ When user press "Make", it will show a window to set the path and file name for the binary file.



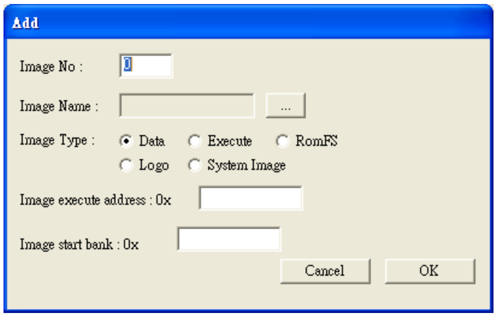
Make ROM (SPI)

Image List

N...	Name	Type	Execute address	Start offset	End offset
0	SpiLoader_GWTFM9563B	system		0x0	0x0
1	NuvotonLogo_480x272	Logo	0x500000	0x1	0x4
2	conprog	execute	0x0	0x5	0x22

Figure 26 MKROM utility map

- User can set Image No, Image Name, Image Type, Image execute address, and Image start block



Add

Image No : 0

Image Name :

Image Type : ● Data ○ Execute ○ RomFS ○ Logo ○ System Image

Image execute address : 0x

Image start bank : 0x

Figure 27 Add image in MKROM utility

2. Revision History

Version	Date	Description
V2.01.008	Aug. 9, 2018	● Add the chip N9H2X series including N9H20K1/N9H20K3/N9H20K5 and N9H26K5 ● [USER_DEFINE] is obsolete. ● Rename FA93 into N3290X, FA95 into N3291X, FA92 into N3292X. ● Delete the statements of FA91.
V2.01.007	Mar. 26, 2013	● Add description for FA92 ● Add FA93 Firmware number description about DRAM size (N32901U1DN / N32903U1DN / N32905U1DN)
V2.01.006	May. 29, 2012	● Add description for SPI (Raw Data) ■ Make ROM ■ Read back Data from SPI flash
V2.01.005	Feb. 23, 2012	● Add description for FA95 ● Modify description for new version UI ● Add description for new function ■ SD format ■ SD Port ■ SPI Flash Size
V2.01.004	Nov. 4, 2010	● Change the file name of firmware for FA93. Its name is FA93_musb.bin
V2.01.003	Oct. 25, 2010	● 16 bytes file name for FA91, and 32 bytes for FA93.
V2.01.002	Oct. 19, 2010	● Reduce the checking time for the file TurboWriter.ini,
V2.01.001	Sep. 30, 2010	● Support 32 bytes file name for FA93 later
V2.00.001	Sep. 20, 2010	● Modify for W55FA series, ● Support header of boot loader image.
V1.2	May, 2010	● Add NVT Loader for NAND
V1.1	May, 2009	● Add SPI and SPI (raw data) mode
V1.0	Apr, 2009	● Created

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