SpiWriter User Guide

V1.00.001

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1. Introduction

1.1. SpiWriter Introduction

W55FA series have two boot flows – one is Normal mode; the other is Recovery mode.
For FA93, the boot flows are as below:
Normal mode boot flow is SD card 0 boot -> NAND boot -> SPI boot -> SD card 1 boot -> USB boot
Recovery mode boot flow is USB boot

SpiWriter utilizes the character of Normal mode to load code of **SpiWriter.bin** from SD card 0. When SpiWriter.bin program executes, it will read the SpiWriter.ini file from SD card 0 then program spi flash according the INI file setting. This document will guide you how to prepare the SD card 0 and modify INI file.

2. Operation

2.1. SD Card 0

The SD card 0 must reserve some space to store the SDLoader and SpiWriter before usage. The procedure is as below step (N32903 for example):

1. Launch TurboWriter in recovery mode and set the system Reserved Area Size if this SD card does not do it before
2. Burn the SDLoader binary file – N32903_SDLoader_192MHz_0418.bin as system image
3. Burn the SpiWriter binary file – N32903_SpiWriter_QVGA.bin as execute image with "Image execute address" 0

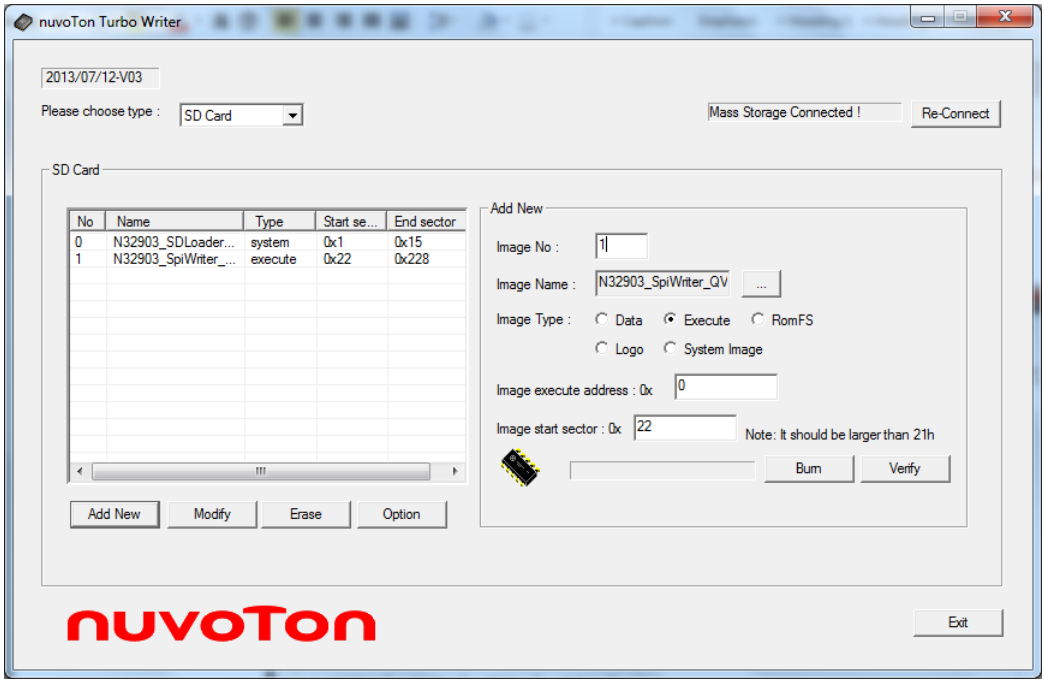


Figure 1 Burn SpiWriter

4. Reserve System area 4MB and Enable SD format.

These two files are burned in System reserved area and unable to read from card reader.

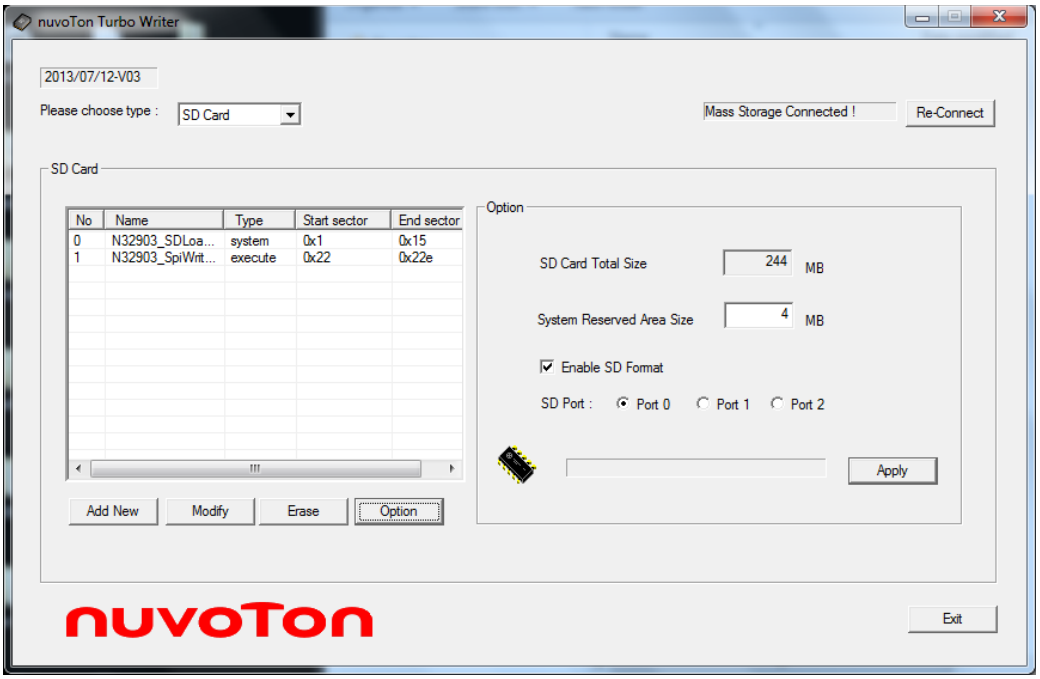


Figure 2 Set System Reserved Area Size and Format SD Card

Put this SD card to another card reader and copy SpiWriter.ini and related files that want to burn to Spi flash to this SD card.

This SD card content structure is as below figure. The root directory contains the SpiWriter.ini (must), SpiLoader binary file/Raw data Image file (must), Logo binary file (option), execute binary file (option). It also provides some option in SpiWriter.ini for user. Please check the INI File section.

SD Root

Spi Writer.ini	(Must)
SpiLoader / Raw Data Image	(Must)
Logo	(Option)
Execute	(Option)
PCM Data for Start	(Option)
PCM Data for Pass	(Option)
PCM Data for Fail	(Option)
User Image 0	(Option)
User Image 1	(Option)
User Image 17	(Option)

2.2. INI File

The INI file means **SpiWriter.ini** file that provides the user a flexible way to do a restricted modification without modifying the source code of SpiWriter.bin.

The SpiWriter.ini file provides some sections as below (spi flash is for N32905):

```
[Raw Data Mode File Name]
//Format:File name
//If SpiWriter gets the file name, it ignores other files and only write the file.
//RawDataImage.bin

 [SpiLoader File Name]
//Format:File name, execute address
N32905_SpiLoader_GPM1006_QVGA_240MHz.bin, 0x900000

[Logo File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
Logo.dat, 0x0, 0x500000

[Execute File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
conprog.bin, 0x9, 0x0000000

[Chip Erase]
// 1 to erase whole spi flash, 0 to erase the sector which will be used.
0
 [Data Verify]
// 1 to verify data, 0 to not to verify.
1


[Sound Play]
// 1 to enable sound play, 0 to disable sound play.
0

[Sound Play Volume]
// Maximum is 63
32

[Flow Status Sound File Name - Start]
//StartBurn.pcm

[Flow Status Sound File Name - Pass]
//BurnComplete.pcm

[Flow Status Sound File Name - Fail]
//BurnFail.pcm

// Format:GPIO Pin, Active Level, Example:GPA6, 1
[GPIO Flow Status - Start]


[GPIO Flow Status - Pass]


[GPIO Flow Status - Fail]
```

```
// Format for User Image:File name, Start Block (0 is decided by writer)
// Ex.Image0.bin, 0x46 (Start block is 70)
// Maximum User Image Files is 18.
[User Image File name]
Image0.bin, 0x46

[User Image File name]
Image1.bin, 0x4B

[User Image File name]
Image2.bin, 0x4D

[User Image File name]
Image3.bin, 0x52
```

Due to its limited parsing ability of SpiWriter.bin, there are some constraints in SpiWriter.ini as below:

- No space is allowed to precede the option for each line.
- Only "//" comment is allowed at the beginning of each line
- String in "[ ]" is not allowed to changed.
- Only "[SpiLoader File Name]" is necessary. The other sections are optional.

If the logo file is not necessary for the SpiWriter, below two methods are all to skip burning Logo.dat into the target SD card.

```
[Logo File Name]

//Logo.dat, 0x0, 0x500000
```

or

```
[Logo File Name]
```

It also allows changing the file name for burning. Below sample changes the file name from N32905_SpiLoader_GPM1006_QVGA_240MHz.bin to Nuvoton.bin for "[SpiLoader File Name]" section.

```
[SpiLoader File Name]

Nuvoton.bin, 0x900000
```

Raw Data Mode File Name

The format for this setting is:

[SpiLoader File Name]
File name

User can modify the file name by this setting.

Ex:

```
 [Raw Data Mode File Name]
//Format:File name
//If SpiWriter gets the file name, it ignores other files and only write the file.
//RawDataImage.bin
```

If SpiWriter gets the file name, it will only write this file into Spi flash from block 0.

SpiLoader File Name

The format for this setting is:

[SpiLoader File Name]
File name, execute address

User can modify loader file name and execute address by this setting.

Ex: For N32903, loader execute address is 0x700000

```
[SpiLoader File Name]
//Format:File name, execute address
N32903_SpiLoader_192MHz_GPM1006_QVGA_0531.bin, 0x700000
```

Logo File Name

The format for this setting is:

[Logo File Name]
File name, start block, execute address

User can modify logo file name, spi flash start block, and execute address by this setting. If user want to burn logo binary file right after the previous image, user needs to set the start block to 0.

Ex: For N32903, loader execute address is 0x400000

```
[Logo File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
Logo.dat, 0x0, 0x400000
```

Ex: For N32903, loader execute address is 0x400000 (start block is 2)

```
[Logo File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
Logo.dat, 0x2, 0x400000
```

Execute File Name

The format for this setting is:

[Execute File Name]
File name, start block, execute address

User can modify logo file name, spi flash start block, and execute address by this setting. If user want to burn logo binary file right after the previous image, user needs to set the start block to 0.

Ex: Burn execute image – demo.bin right after the previous image and execute address is 0x100000

```
[Execute File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
demo.bin, 0x0, 0x1000000
```

Ex: Burn execute image – conprog.bin from block 9 and execute image is 0x00000000

```
[Execute File Name]
// Format:File name, Start Block (0 is decided by writer), execute address
conprog.bin, 0x9, 0x0000000
```

Data Verify

The format for this setting is:

[Data Verify]
0/1

User can enable or disable Data verify operation by setting. Disable Data verify operation can speed up the spi writing operation. (If SpiWriter can't find this setting, the default setting is disabled)

Ex: Disable Data verify operation.

```
[Data Verify]
// 1 to verify data, 0 to not to verify.
0
```

Chip Erase

The format for this setting is:

[Chip Erase]
0/1

User can enable or disable Chip Erase operation by setting. If Chip Erase Operation is disabled, SpiWriter will do sector erase to erase the spi sectors that will be wrote. (If SpiWriter can't find this setting, the default setting is disabled)

Ex: Disable Data verify operation.

```
[Chip Erase]
// 1 to erase whole spi flash, 0 to erase the sector which will be used.
0
```

Sound Play

The format for this setting is:

[Sound Play]
0/1

SpiWriter can play PCM data when Burn Start/Burn Pass/Bun Fail and it has three built-in PCM data. User can enable or disable Sound Play operation by setting. (If SpiWriter can't find this setting, the default setting is disabled)

Ex: Enable Sound Play operation.

```
 [Sound Play]
// 1 to enable sound play, 0 to disable sound play.
1
```

Sound Play Volume

The format for this setting is:

[Sound Play Volume]
0/1

SpiWriter can control Sound Play operation Volume by setting. The minimum value is 0 and maximum is 63. (If SpiWriter can't find this setting, the default setting is 31)

Ex: Set Sound Play operation Volume to maximum Volume

```
[Sound Play Volume]
// Maximum is 63
63
```

Flow Status Sound File Name

The format for this setting is:

[Flow Status Sound File Name - Start]
File name

[Flow Status Sound File Name - Pass]
File name

[Flow Status Sound File Name - Fail]
File name

SpiWriter allows user to use their own PCM data when Burn Start/Burn Pass/Bun Fail. User set the PCM fiel name for Burn Start/Burn Pass/Bun Fail stage by setting. (If SpiWriter can't find this setting, it will play default PCM data when Sound Play is enabled)

Ex: Enable Sound Play operation.

```
 [Flow Status Sound File Name - Start]
StartBurn.pcm

[Flow Status Sound File Name - Pass]
BurnComplete.pcm

[Flow Status Sound File Name - Fail]
```

```
BurnFail.pcm
```

GPIO Flow Status

The format for this setting is:

[GPIO Flow Status - Start]
GPIO pin, Active Level

[GPIO Flow Status - Pass]
GPIO pin, Active Level

[GPIO Flow Status - Fail]
GPIO pin, Active Level

SpiWriter allow user to control GPIO pin for status check when Burn Start/Burn Pass/Bun Fail. SpiWriter will set the pin function setting for the setting and set the GPIO output level to inactive level after getting the setting. User can select GPIO pin and active level by this setting. (If SpiWriter can't find this setting, the default setting is disabled)

Ex: Set GPB11/GPA6/GPA7 for Status Check

```
// Format:GPIO Pin, Active Level, Example:GPA6, 1
[GPIO Flow Status - Start]
GPB11, 0

[GPIO Flow Status - Pass]
GPA6, 1

[GPIO Flow Status - Fail]
GPA7, 1
```

User Image File name

The format for this setting is:

[User Image File name]
File name, start block

User can set User image file name and spi flash start block by this setting. SpiLoader allow user to set 18 User image files. If user want to burn binary file right after the previous image, user needs to set the start block to 0.

Ex: Burn 4 User Image files, and set the start block to 70, 75, 77, and 82 for them.

```
// Format for User Image:File name, Start Block (0 is decided by writer)
// Ex.Image0.bin, 0x46 (Start block is 70)
// Maximum User Image Files is 18.
[User Image File name]
Image0.bin, 0x46

[User Image File name]
Image1.bin, 0x4B

[User Image File name]
Image2.bin, 0x4D
```

```
[User Image File name]
Image3.bin, 0x52
```

2.3. TurboWriter.ini

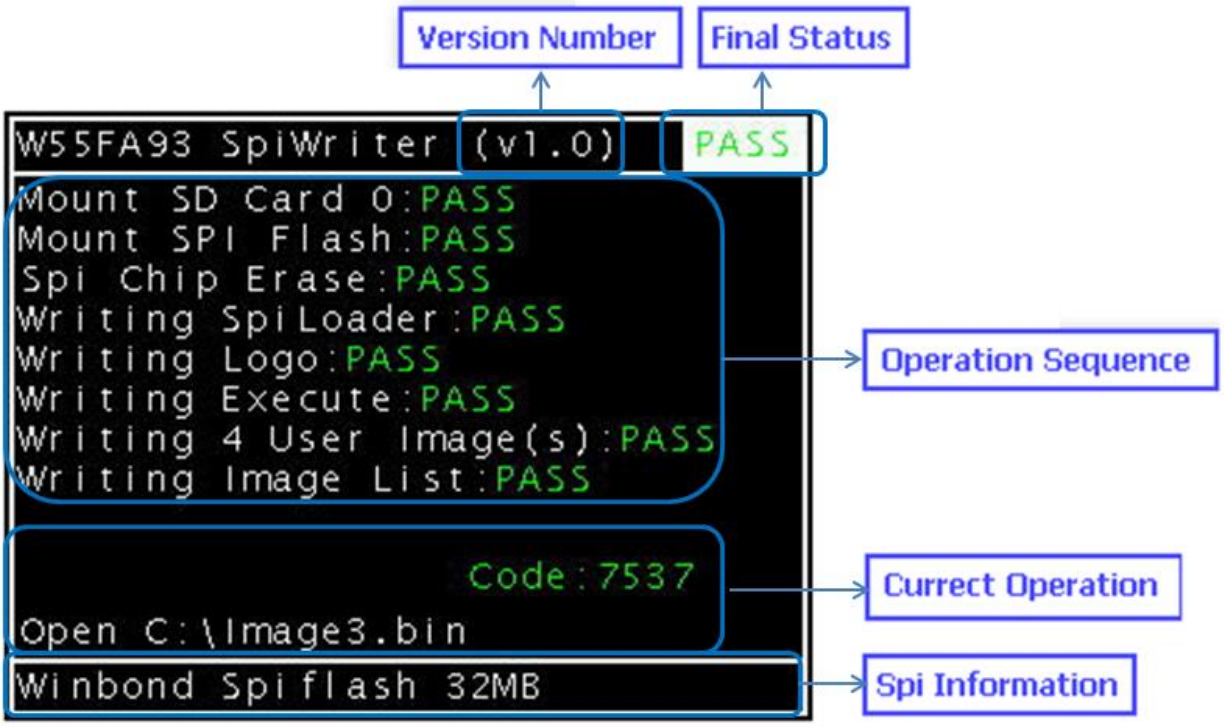
SpiWriter supports the same function as Turbowriter to provide writing some user configuration setting in the boot code header to adjust the setting of N329. Please use the same **TurboWriter.ini** file that used by Turbowriter for SpiWriter.

The TurboWriter.ini file provides some sections as below:

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

[N3290 USER_DEFINE]

[N3291 USER_DEFINE]
…

[N3292 USER_DEFINE]
  b0000204 = FFFFFFFF
  b0000208 = FFFFFFFF
  b0003008 = 0000805A
…
  b0000204 = 00E5011F
```

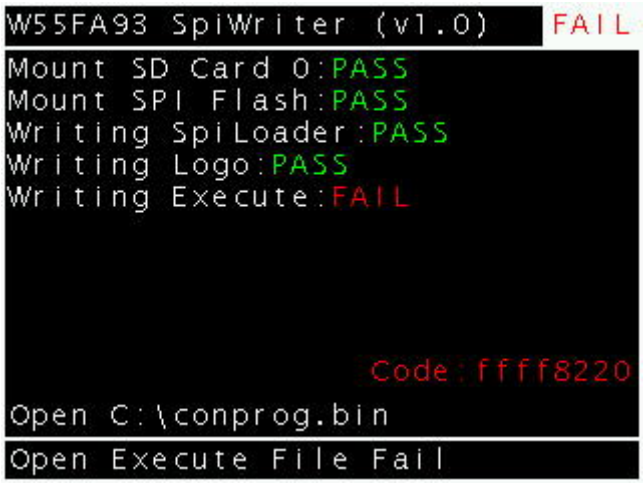
2.4. Operation

When the SD card 0 is prepared successfully and booting from Normal mode, it will show the target SD card burning status on the panel as below:



It can divide into several parts:

- Version Number: show this version number.
- Final Status: show the final operation status. If there is any fail items in the operation sequence, the final Status will be “FAIL”.
- Operation Sequence: show the current operation progress.
- Current Operation: show more detail information for current operation. For example, it fails for some function, the code will show the return code for this.
- The Spi flash and Fail operation Information: shows spi flash size and Fail operation status.

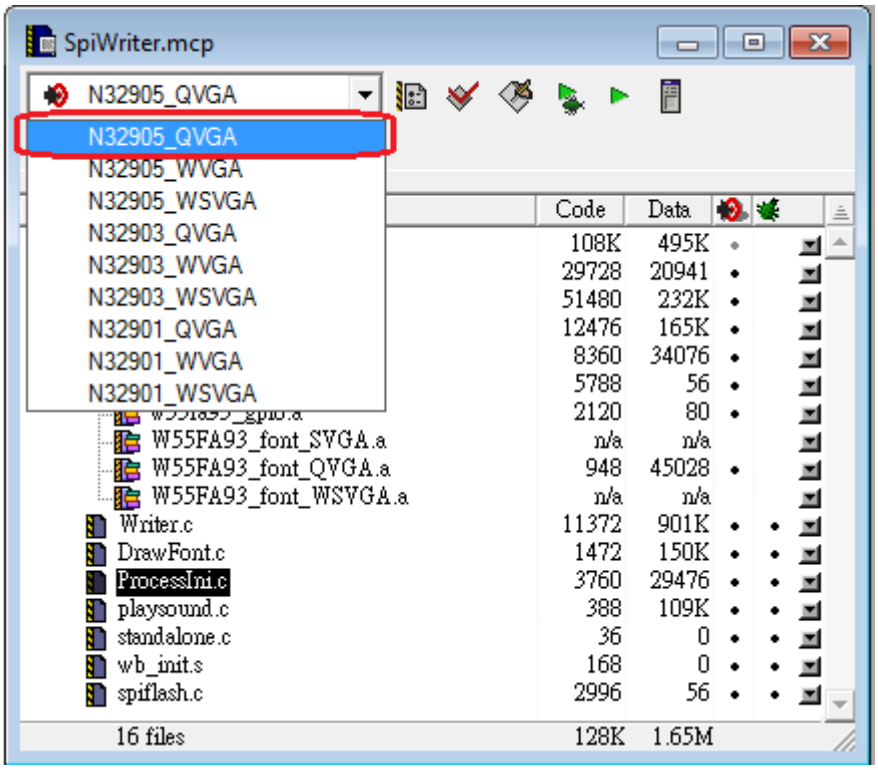


2.5. Modification

If the modification of SpiWriter.ini cannot meet customer's request, it will need to open SpiWriter project to modify the source code. This project file bases on ARM Developer Suite V1.2. If user does not have such environment, it will need user to do necessary modification for the new environment.

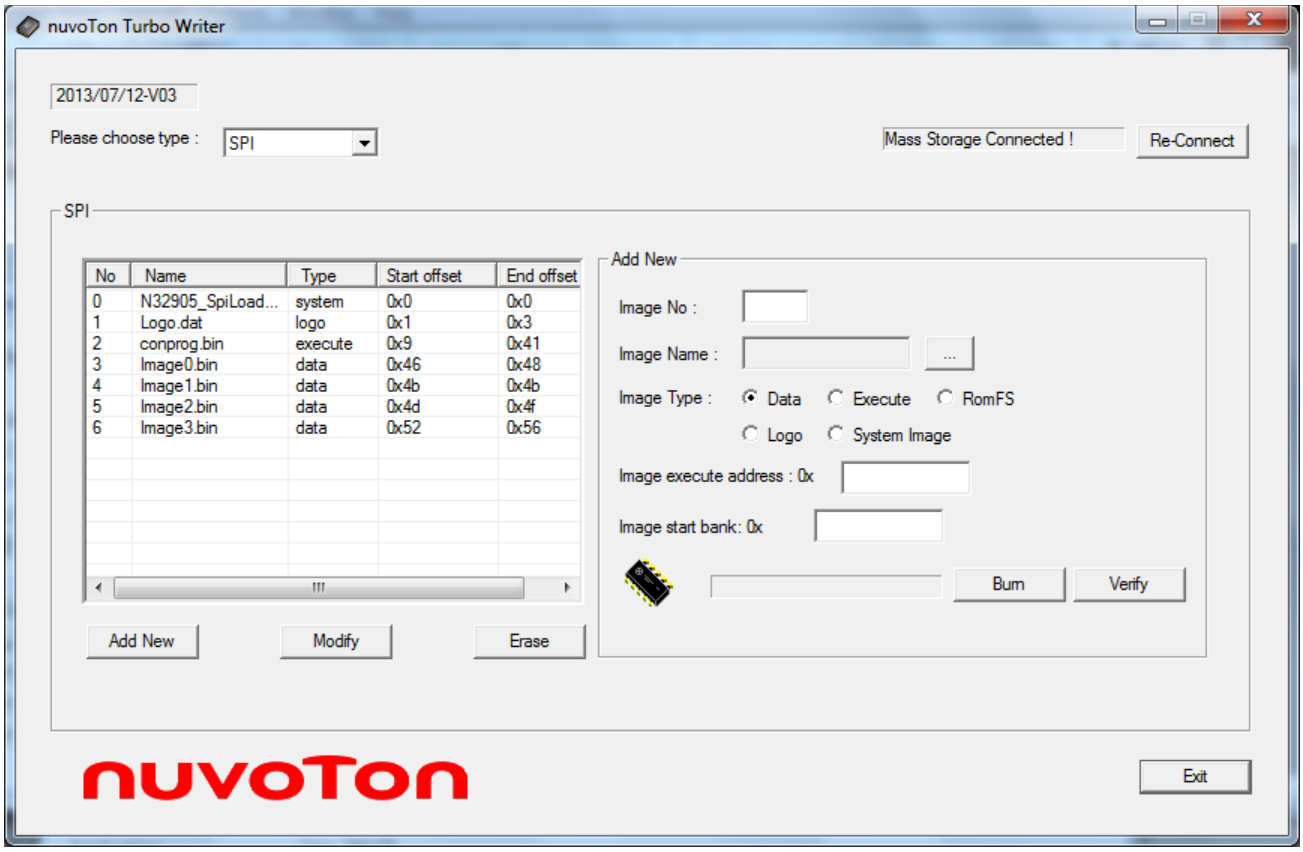
Besides the environment issue, modification is necessary for below condition:

- Panel: If the panel is changed, linked VPOST library need to change.
- Resolution: If the resolution is changed, Select related target for it as below picture.



2.6. Sample

Here is the result for section 2.2.


nuvoTon Turbo Writer
2013/07/12-V03
Please choose type :
SPI
Mass Storage Connected !
Re-Connect
SPI
No
Name
Type
Start offset
End offset
0 N32905_SpiLoad... system 0x0 0x0
1 Logo.dat logo 0x1 0x3
2 conprog.bin execute 0x9 0x41
3 Image0.bin data 0x46 0x48
4 Image1.bin data 0x4b 0x4b
5 Image2.bin data 0x4d 0x4f
6 Image3.bin data 0x52 0x56
Add New
Modify
Erase
Add New
Image No :
Image Name :
...
Image Type :
Data
Execute
RomFS
Logo
System Image
Image execute address : 0x
Image start bank: 0x
Burn
Verify
nuvoTon
Exit

3. Revision History

Version	Date	Description
V1.00.001	Apr, 2016	● Add description for Turbowriter.ini
V1.00.000	Aug, 2013	● Created

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