



# ***Blues (S5L8700A02) Nand Boot User's Guide***

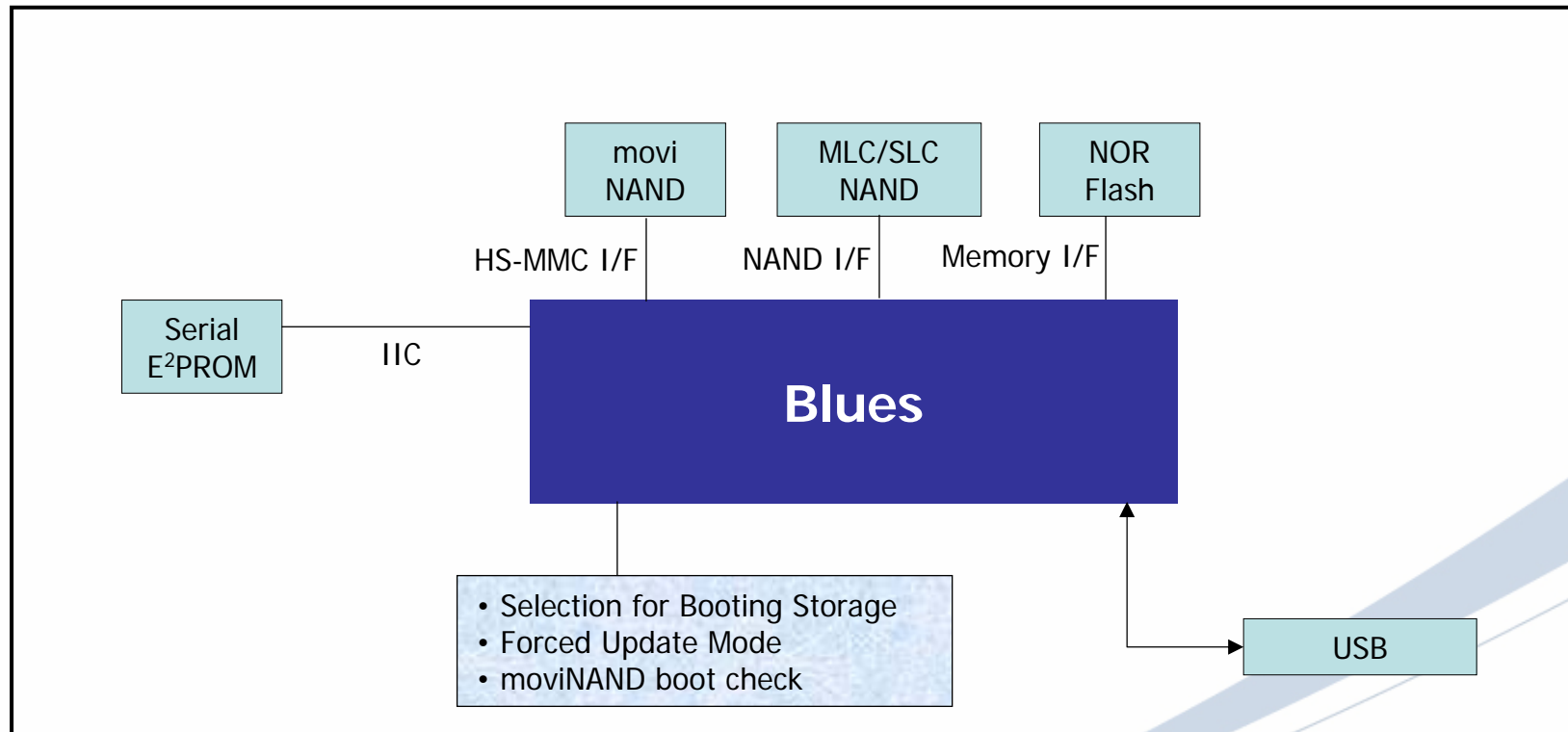


**Sep. 07. 2007**  
**System LSI Division**  
**Samsung Electronics Co., LTD.**

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- ◆ Booting Options
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- ◆ Booting Sequence
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# Booting Option - Storage



\* Booting Storage Selection Table

Check Priority	Storage
1 (00)	NOR Flash
2 (11)	Serial EEPROM
3 (10)	MoviNAND
4 (11)	SLC/MLC NAND

-> moviNAND boot condition : P5.6=HIGH (boot), LOW=SKIP

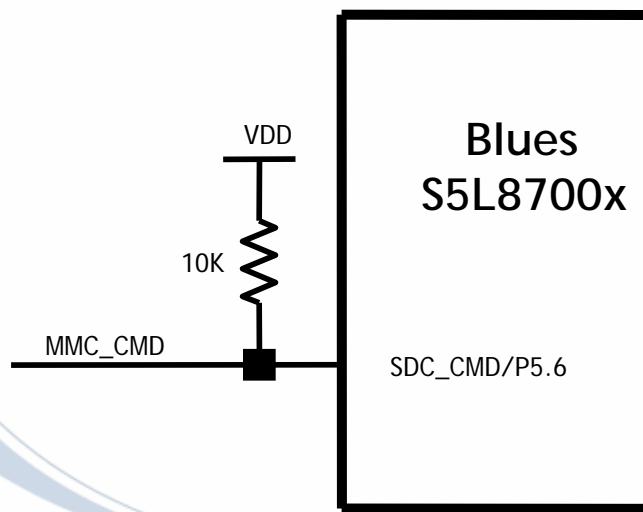
# Option Pin Summary

## ◆ Pin Option for H/W Design

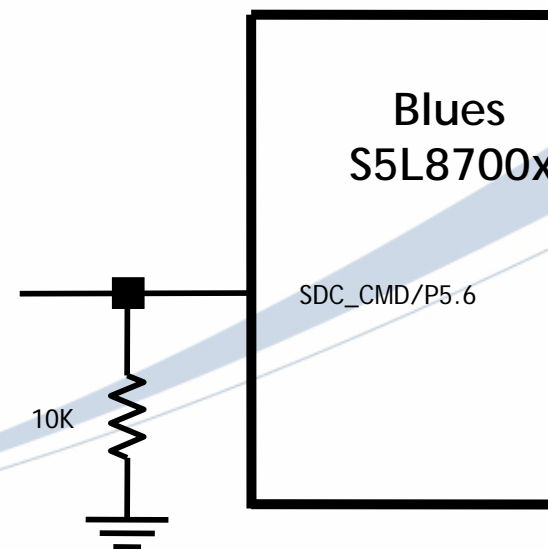
Function \ Item	Port or Pin	Status	Description
DFU Mode	P0.5	High	DFU Mode
		Low	Normal Booting
moviNand Check	P5.6 (SDC_CMD)	High	Check moviNAND Boot
		Low	Skip moviNAND Boot
ROM/NOR Boot	BOOT_MODE	High	External NOR Boot
		Low	Internal Mask ROM Boot

# moviNAND Boot Check Pin

- ◆ For moviNAND Boot
  - P5.6 (SDC\_CMD) must be connected to **Pull-up** resistor.
- ◆ To skip moviNAND boot (no use moviNAND)
  - P5.6 (SDC\_CMD) must be connected to **Pull-down** resistor or GND.
  - **Do not leave NC (No Connect) pin**



For moviNAND Boot



Skip moviNAND Boot

# DFU Mode Selection

- ◆ Forced F/W Update Mode (DFU Mode)
  - P0.5 must be connected to **VDD level** (Figure. A)
- ◆ Normal Boot Mode
  - P0.5 must be connected to **VSS level** (Figure. B)

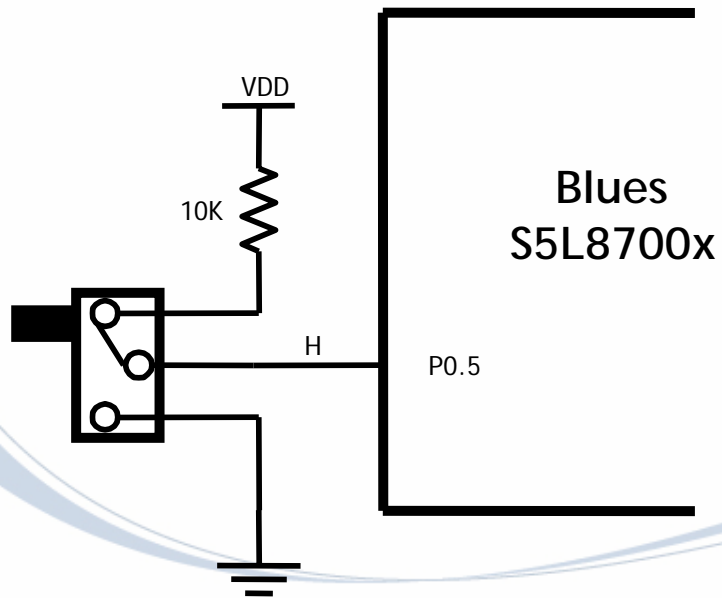


Figure. A

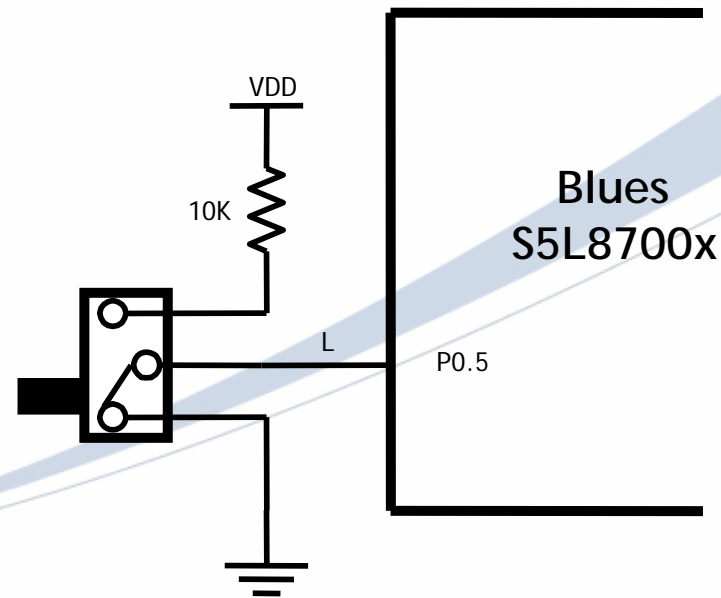
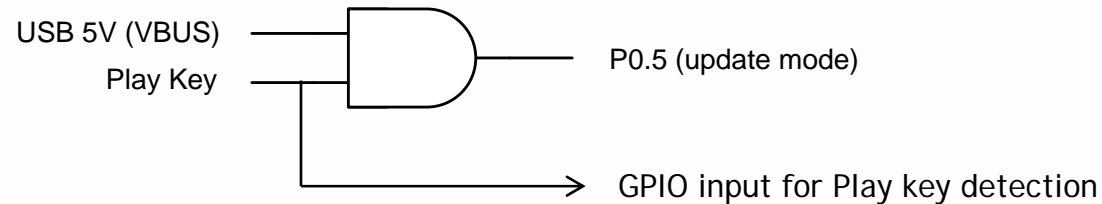


Figure. B

# Booting Scenario & Booting Condition



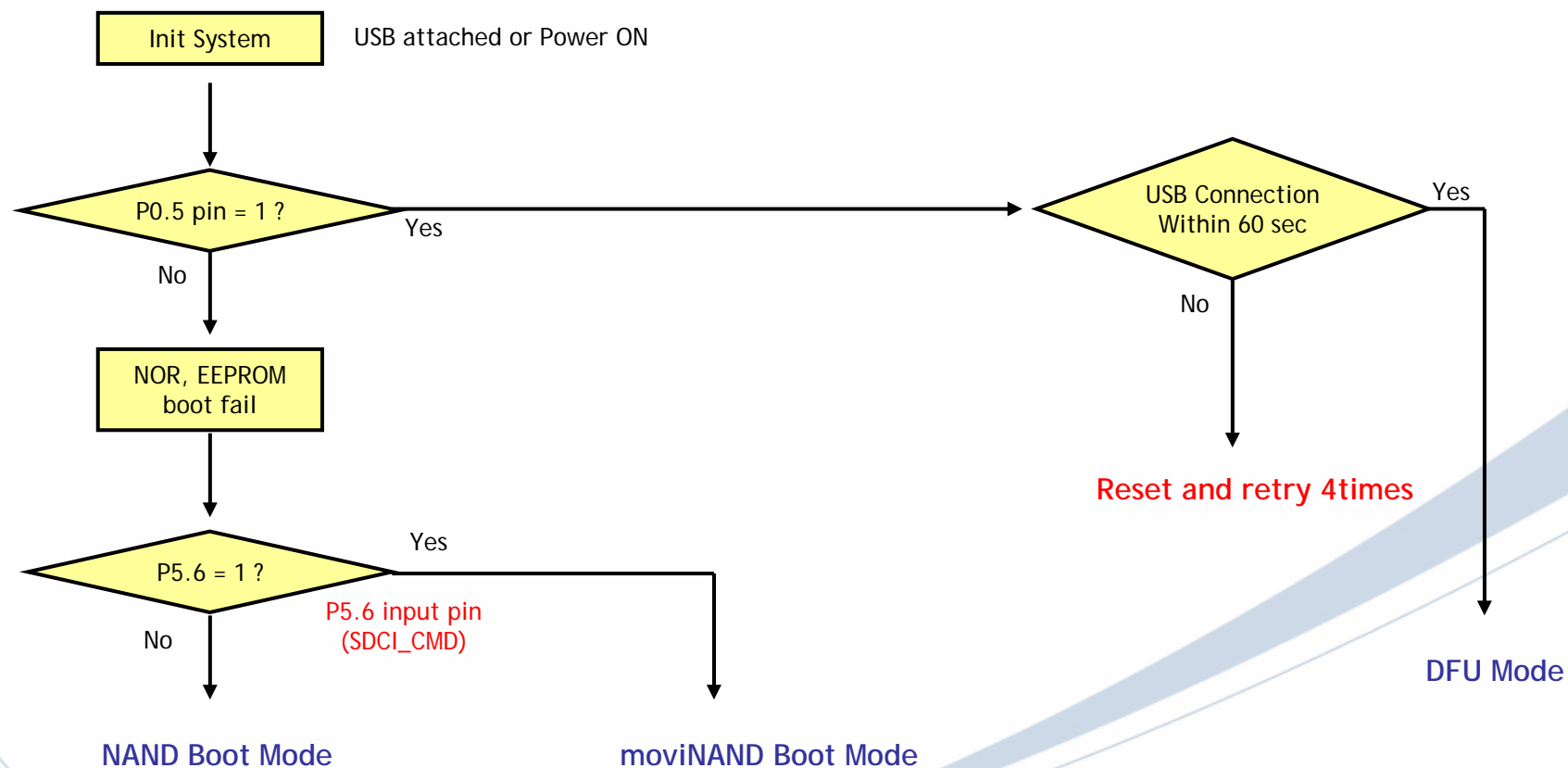
Action	USB 5V	Play Key	P0.5	Comment
USB is not connected and Play key is not pressed	LOW	LOW	LOW	No action
Play Key is Pressed	LOW	HIGH	LOW	Power up and Normal boot
USB is connected	HIGH	LOW	LOW	Normal USB connect
Play key pressed and USB connected	HIGH	HIGH	HIGH	Update mode

Ex) way to go to update mode

0. board power up (optional)
1. Press Play key
2. Connect USB cable
3. RESET or Power OFF/ON (optional)

-> USB connected and DFU application's button is activated

# Booting Flowchart – DFU mode check

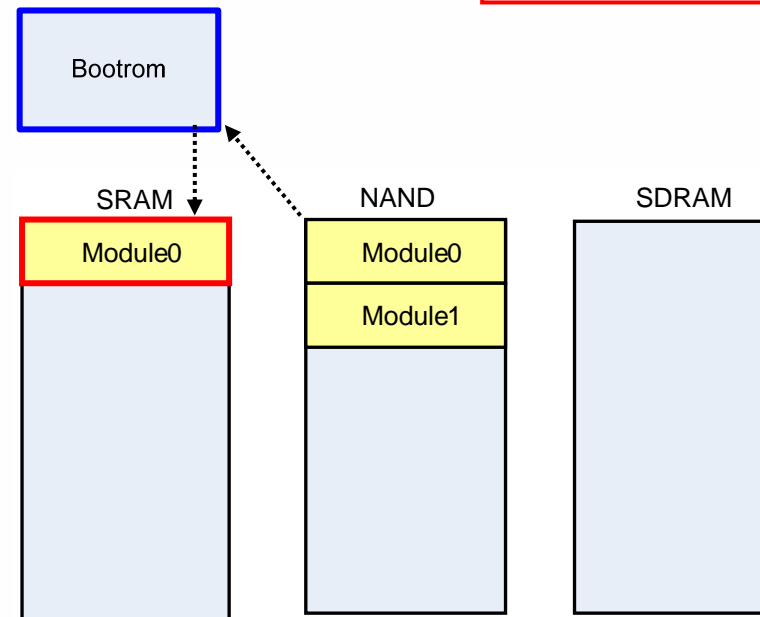
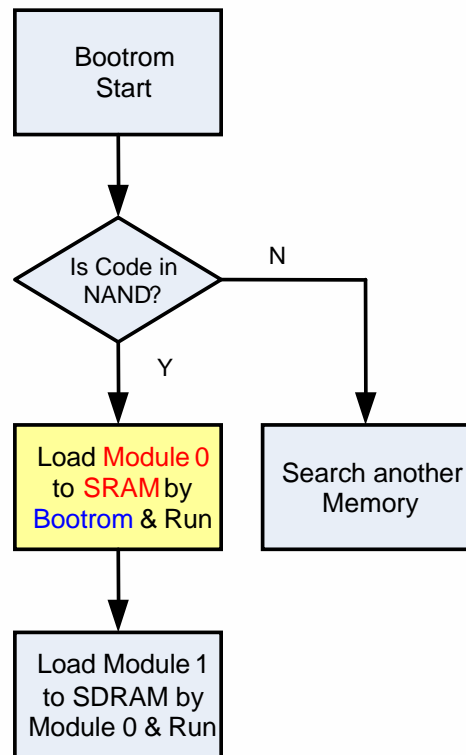


## \* P5.6 definition

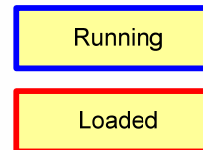
- Use moviNAND : must be connected **pull-up resistor** at SDC CMD pin (Level High)
- No use moviNAND : must be connected pull-down resistor or **GND** (Level Low). Do not leave **No Connect!**



# Booting Sequence (1)

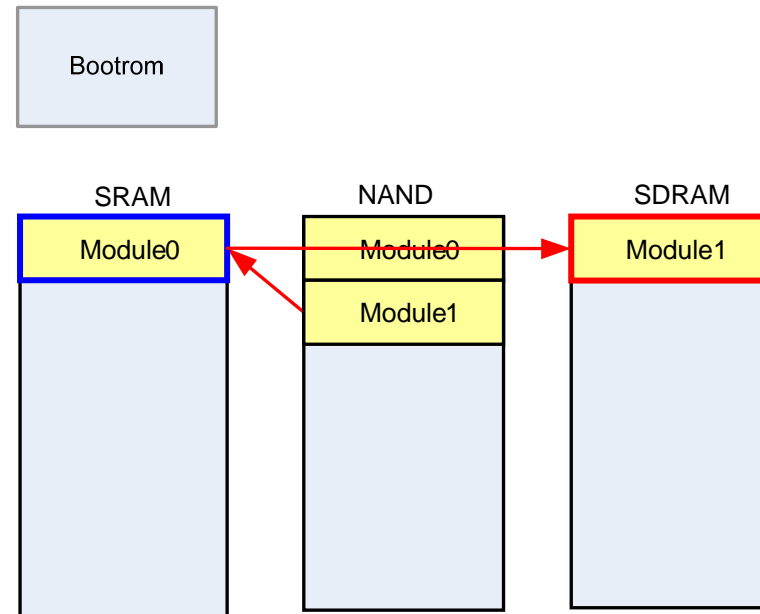
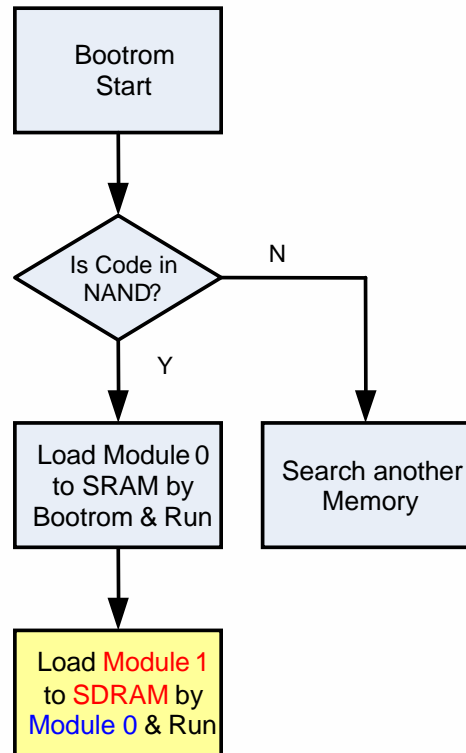


- Module0 : Loader
- Module1 : F/W Image



# Booting Sequence (2)

- Module0 : Loader
- Module1 : F/W Image



Running

Loaded

# Media Compatibility

## NAND FLASH

Item	Condition
Address Cycle	5,6 (only Block 0) Cycle
Page per Block	32,64,128 page
Page Size	2KB, 4KB, 8KB
Command	Read ID(90h), Read(00h,30h), Read Status(70h)
NAND Flash	SLC, MLC
NAND Flash Block	Large Block ( Small Block - not support )

## MoviNAND

Item	Condition
Communication	High Speed MMC
Version	MMC 4.0~MMC4.2

## Serial EEPROM

Item	Condition
Communication	IIC
Address Space	16bit

# Booting Time

Item	Accumulated Time	Condition
Update Mode Check	1.55ms	Check P0.5 is "low" or "high"
NOR Flash	25.71ms / 1.63ms	Image Exist / No Image
Serial EEPROM	1.50sec / 19.0ms	48KB Code Image/No Image, IIC CLK : Around 370Khz
MovNAND	49.7ms(V4.0), 44.3ms(V4.2) / 553ms	43KB Code, P5.6 is "high"/No Image, P5.6 is "high"
NAND Flash	36.8ms / 1.63sec	28KB Code, P5.6 is "low"/No Image, P5.6 is "low"

\* The time value is accumulated from system initialization up to each item.

# NAND Test Result

Part Name	Mem. Size	Device ID	Test Result	Comment
K9HBG08U1M	16Gb x 2nCS	ECD5 5525(M)	NAND Module loading OK, FS not support	Need upgrade FS
K9HAG08U1M	8Gb x 2nCS	ECD3 5525(M)	NAND Module loading OK, FS OK	
K9L8G08U0M	8Gb x 1nCS	ECD3 5525(M)	NAND Module loading OK, FS OK	
K9WAG08U1M	8Gb x 2nCS	ECD3 5195(S)	NAND Module loading OK, FS OK	
HY27UV08AG5M	8Gb x 1nCS	ADD3 8525(M)	NAND Module loading OK, FS not support	Need upgrade FS
HY27UT084G2M	4Gb x 1nCS	ADDC 8425(M)	NAND Module loading OK, FS not support	Need upgrade FS
HY27UG088G5M	4Gb x 2nCS	ADDC 8095(S)	NAND Module loading OK, FS not support	Need upgrade FS
TC58NVG2D4BT G00			NAND Module loading OK, FS not support	
TH58NVG3D4BT G00			NAND Module loading OK, FS not support	



# DFU Tool



# Overview

## ◆ DFU Manager

- **DFU Manager can download an image to 4 MP3 sets at the same time using USB HUB.**

- ✓ **DFU Loader**

To update firmware in DFU mode, BootROM must download DFU Loader ( updateNAND.DFU ) first from DFU server.

- ✓ **Firmware Image**

DFU Loader executed by BootRom can download firmware image (ModulesImage.BIN ) from DFU server to flash memory.

- ✓ **Utility Loader**

Utility Loader ( BluesutilNAND.DFU ) can upload data from NAND disk to NAND Utility to save as a binary file.

# Overview (Continued)

## ◆ NAND Utility

- **NAND Utility can upload data in the NAND flash by page or block unit.**
  - ✓ **NAND data**  
Utility Loader ( BluesutilNAND.DFU ) downloaded from DFU server will be executed by Boot Rom. And then, Utility Loader can upload data from NAND disk to NAND Utility to save as a binary file.

## ◆ Module Merge Utility

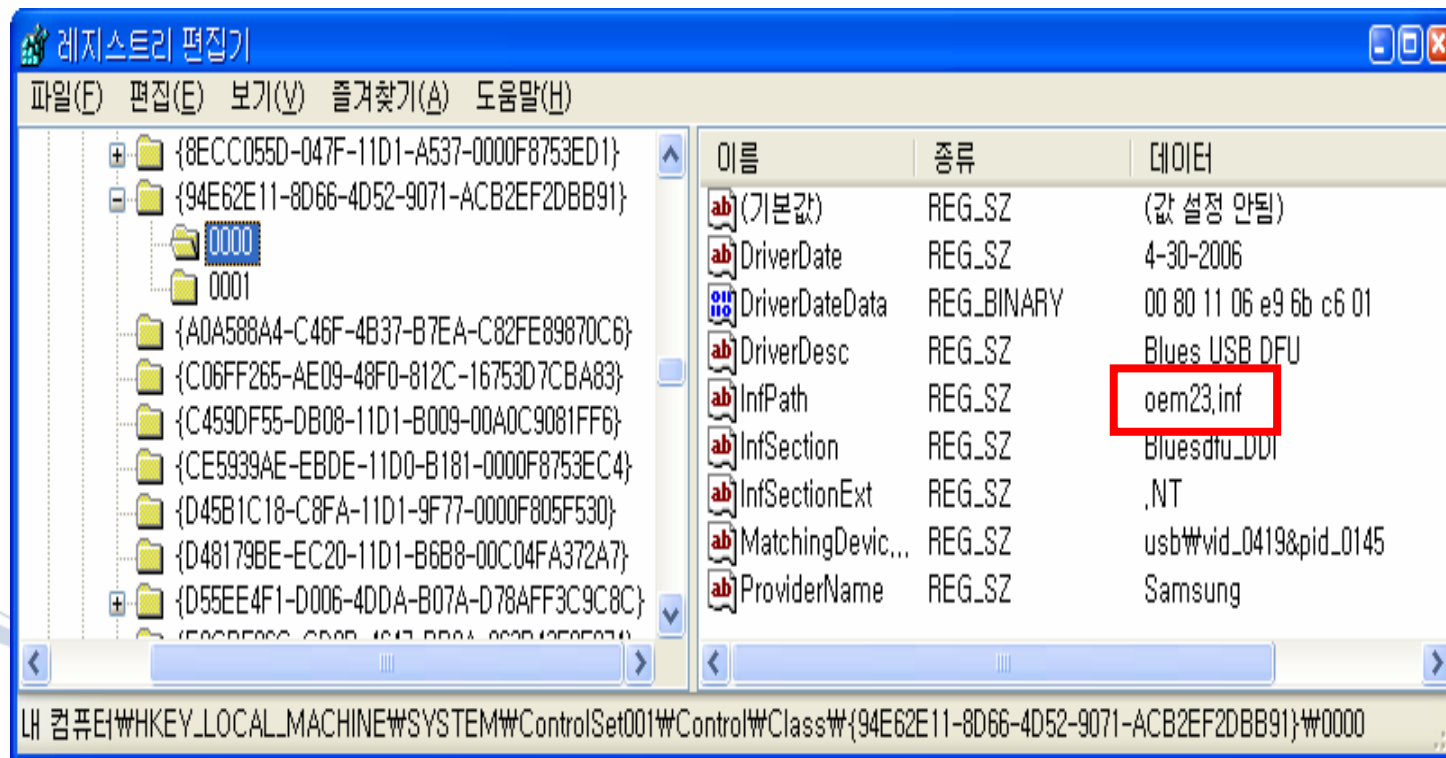
- **Module Merge Utility can merge to module images**



# Delete previous setup files (1)

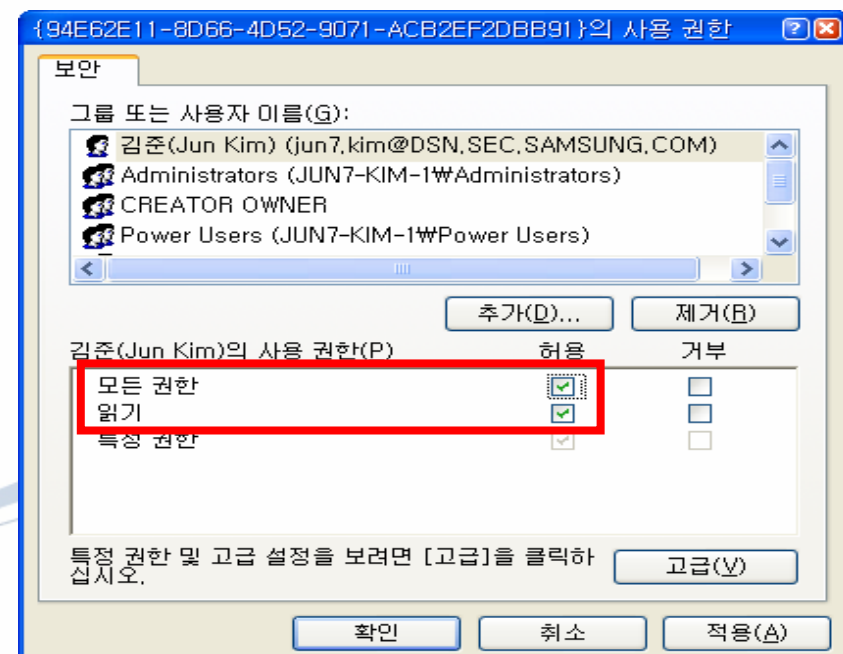
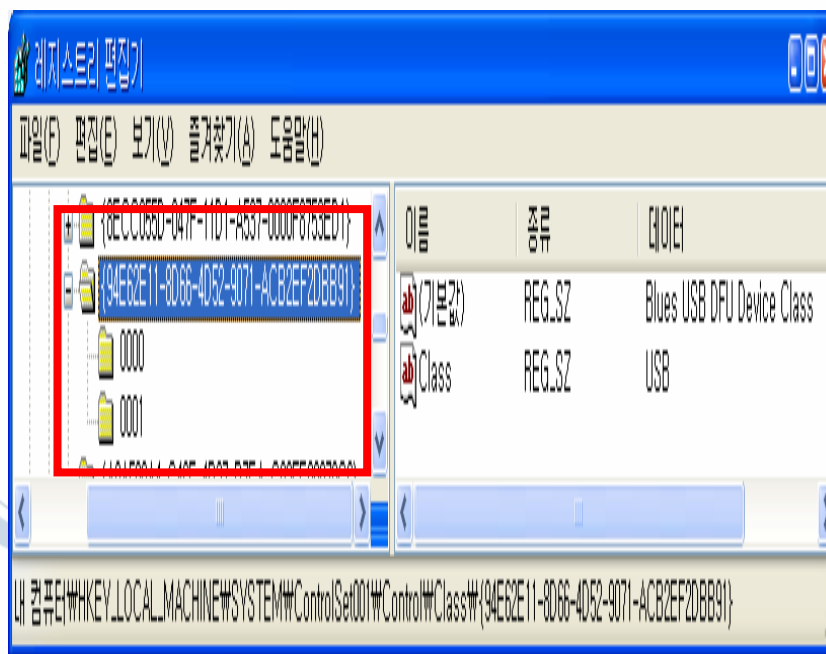
- ◆ At first, it must delete the setup files of the previous DFU tool on your PC.
- ◆ Identify **oem???.inf** (??=number) in the HKEY\_LOCAL\_MACHINE directory of the regedit.

(In this case, we delete oem23.inf and oem23.pnf in page 19)



## Delete previous setup files (2)

- ◆ Delete all {Bluesdfu} and {94E62E11-8D66-4d52-9071-ACB2EF2DBB91} in the HKEY\_LOCAL\_MACHINE directory of the regedit.
  - \* If you can not delete them, you check all permission first. And then you can delete them.



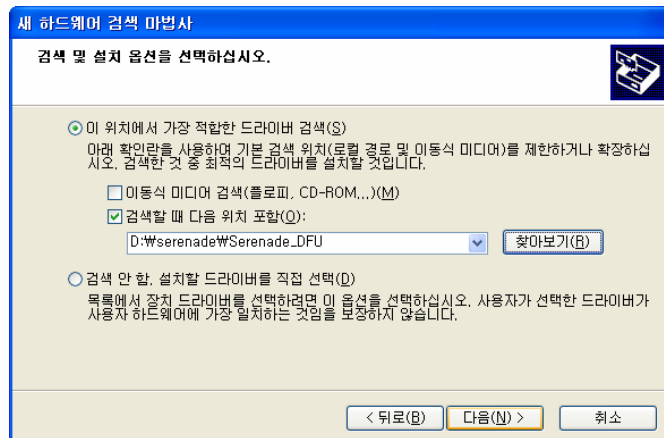
## Delete previous setup files (3)

- ◆ Delete oem??.inf and oem??.pnf in the “C:\Windows\inf”.  
\* The ?? is same as the number in page 17.
- ◆ Delete Bluesdfu.sys in the;  
“C:\WINDOWS\LastGood” and  
“C:\WINDOWS\system32\drivers” and  
“C:\WINDOWS\LastGood.Tmp\system32\drivers” directory.
- ◆ Reboot PC and install DFU tool

# Set-up - DFU Manager (1)

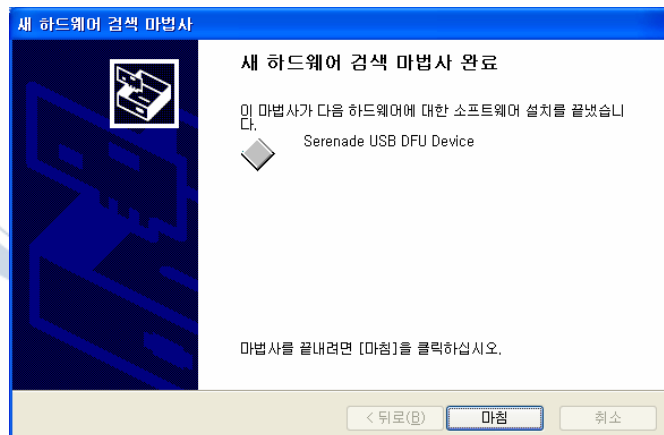
(070423)

## ➤ Device Driver Installation



1. Connect the device as DFU MODE

2. Select "BootLoader\Driver" folder for searching device driver file.

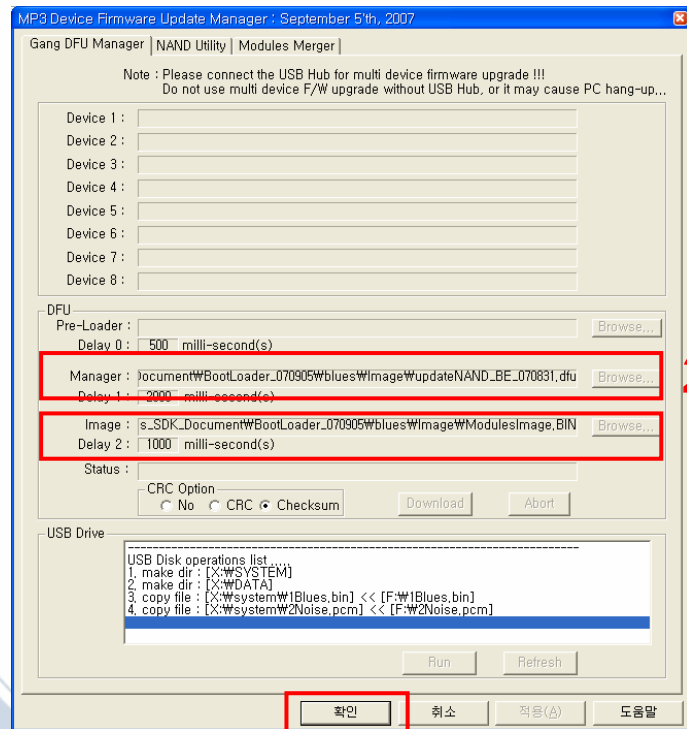


3. Click Next and then Windows will install the new hardware as "Blues USB DFU Device"

# Set-up - DFU Manager (2)

(070423)

## ➤ Download DFU Loader & update firmware



1. Connect the device as DFU mode.

2. Select DFU loader  
( updataNAND.DFU)

3. Select firmware image  
( ModulesImage.BIN )

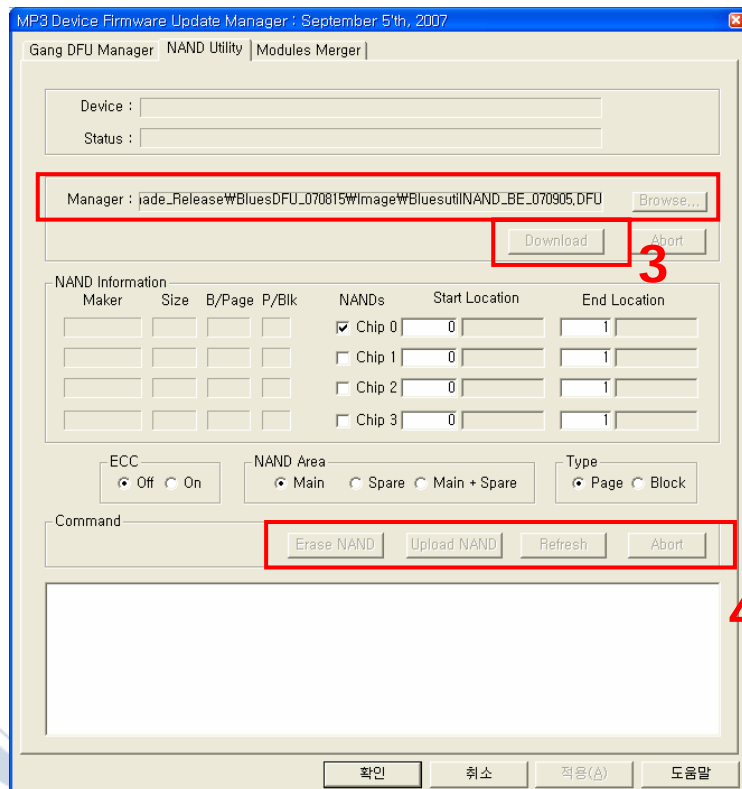
4. Click download, Boot Rom will  
download DFU Loader first.

5. DFU Loader executed by Boot Rom  
will download firmware image to  
flash memory and make  
Information Block.

# Set-up - NAND Utility (1)

(070423)

## ➤ Device Driver Installation



1. Connect the device as DFU MODE

2. Select Utility Loader  
( BluesutilNAND.DFU )

3. Click Download and then Boot  
Rom will download Utility Loader.

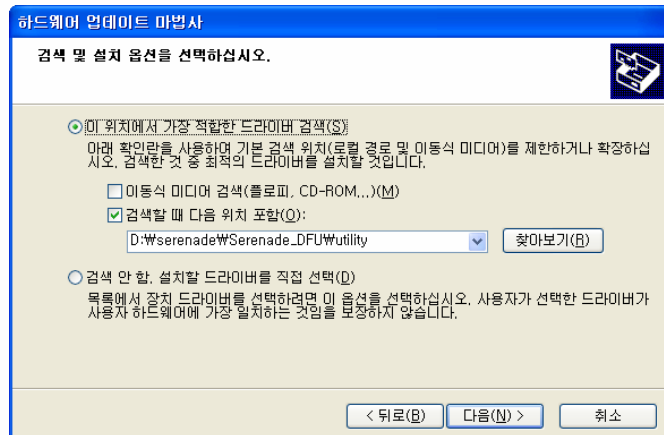
4. Utility Loader executed by Boot  
Rom will make the device as a  
new hardware.



# Set-up - NAND Utility (2)

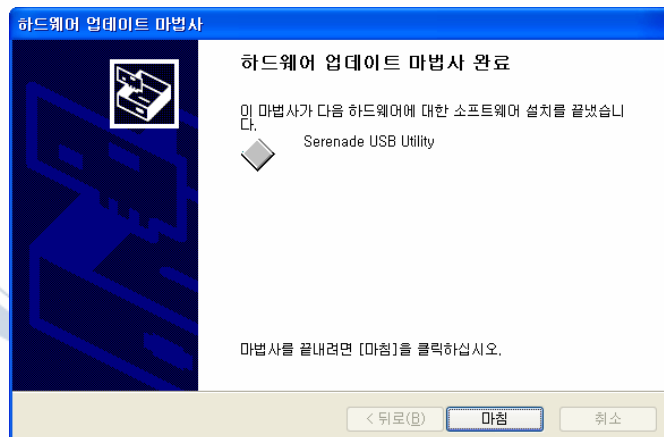
## ➤ Device Driver Installation (Continued)

(070423)



6. Select "BootLoader\Driver" folder for searching device driver file.

7. Click Next and then Windows will install the new hardware as "Blues USB Utility"



# Ini Files

## ◆ For Module Merge Utility (**BluesModuleMerge.ini**)

- Module\_total : Module total number
- Module\_align : Module alignment (4K or 2K page Nand)
- [MODULE]
  - File="D:\W...W**ModulesImage.BIN**" // Output Image
  - M000="D:\W...W**M0\_NandLoader.BIN**" // M0 Image
  - M001="D:\W...W**M1\_Blues\_SDK\_070830.bin**" // M1 Image

## ◆ For DFU Manager (**BluesGangdfu.ini**)

- [DFU2] : Update Manager
  - File="D:\W...W**updateNAND.dfu**"
- [DFU3] : Target Image(M0+M1)
  - File="D:\W...W**ModulesImage.BIN**"

## ◆ For Nand Utility (**BluesNandUtil.ini**)

- [DFU1] : Blues utility image
  - File="D:\W...W**BluesutilNAND.DFU**"





# Compile Option



## Blues SDK Compile Option

- ◆ File System should not touch BootLoader area.
- ◆ This compile option allocates NAND physical block to BootLoader area. ( $N * \text{Nand block size}$ )

`#define BOOTLOADER_USE_BLOCK_NUMBER` **N**

- ◆ Block size is different according to NAND type
  - SLC : 128 KB
  - MLC : 256 KB
- ◆ Support updating in MSC and MTP without DFU tool
  - Download "BLImage.bin" in root directory
  - "BLImage.bin" is made by Merge tool(M0+M1 image)
  - After USB disconnection, system update Bootloader Image automatically



***Thank You***