

**Nuvoton M051 BN/DN/DE Series
Programming Internal Flash Memory
Instructions Manual**

DTS INSIGHT CORPORATION

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2nd Edition	March 30, 2016	• “9 Outline of Flash Memory Definition File(*.frd)” is added.
3rd Edition	October 31,2016	• Fixed a clerical error of “2 Supported Models and Versions”



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1 Introduction

This manual describes notes and points especially for programming to Internal flash memory. For details of ICE operating instructions, see the microVIEW-PLUS User's Manual (Common Edition) and microVIEW-PLUS User's Manual (MPU-Specific Edition).

2 Supported Models and Versions

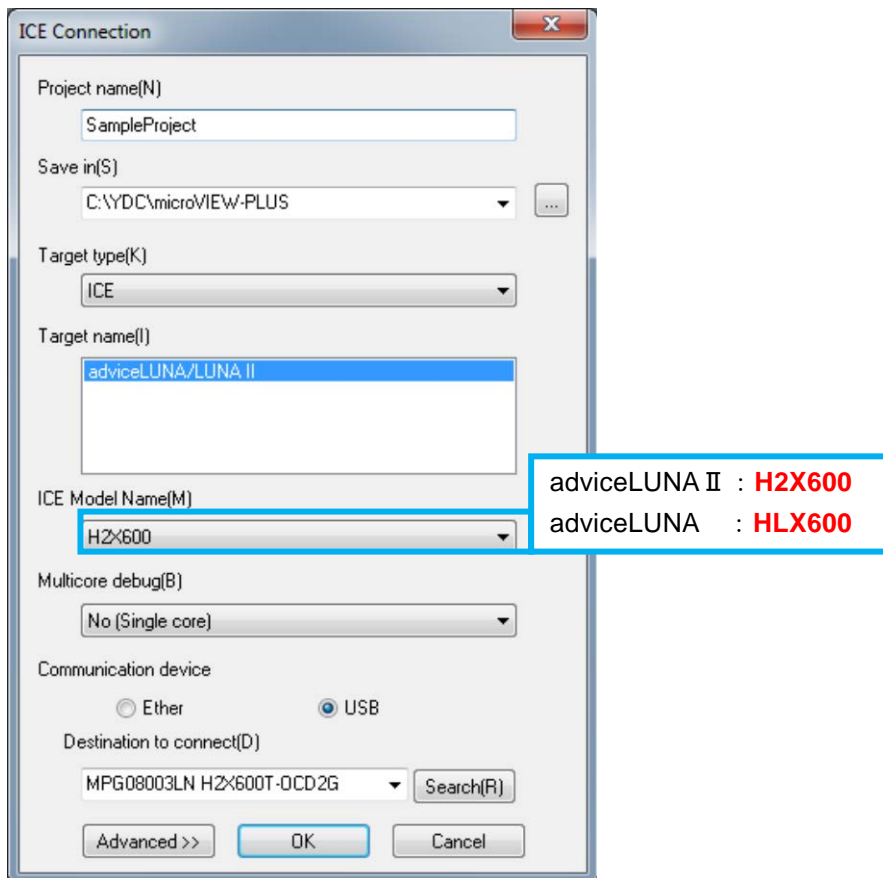
Device Name	Supported Models and Versions	
	 H2X600	 SLX600
M05xxBN	1.25 or later	3.13 or later
M05xxDN	1.25 or later	3.13 or later
M05xxDE	1.25 or later	3.13 or later

3 Preparation

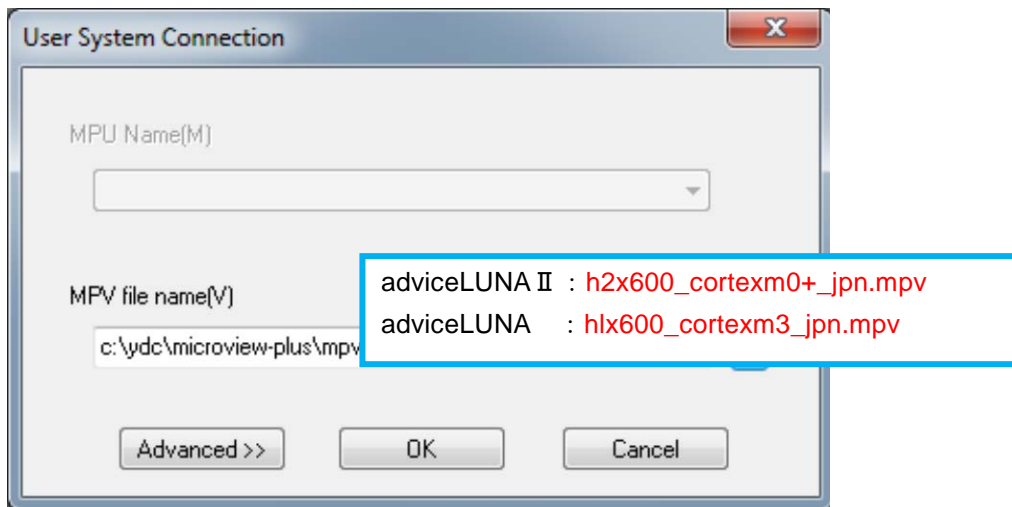
3.1 Creating a New project

Select [File] → [Connect ICE] from Start menu of microVIEW-PLUS.
ICE Connection dialog box is shown.

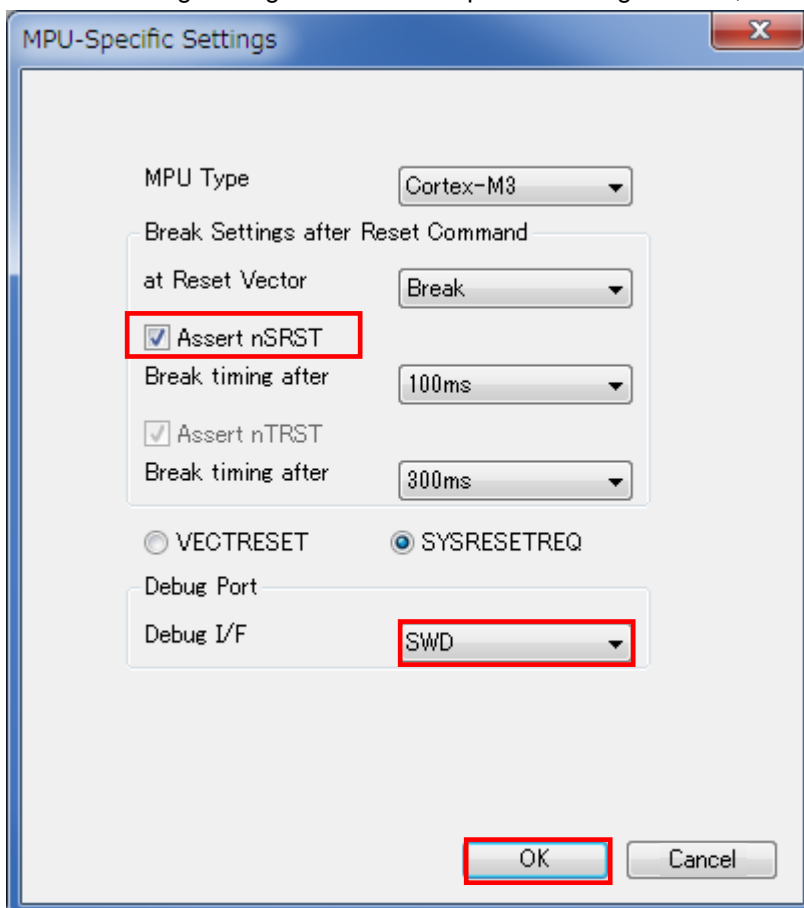
Set as follows:



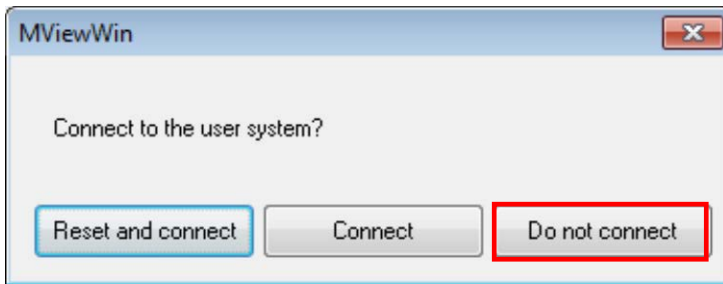
Set up MPU-specific information corresponding to a user system MPU.



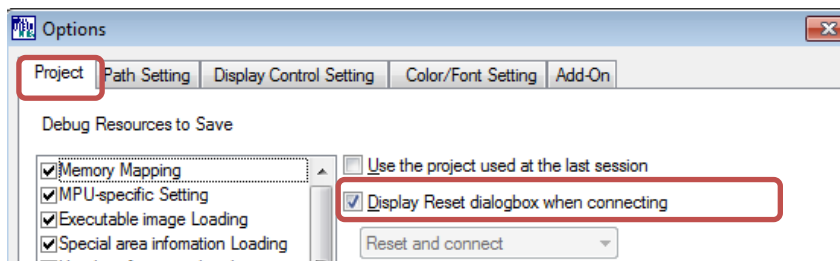
Set the following settings on the MPU-specific settings screen, and then click the [OK] button.



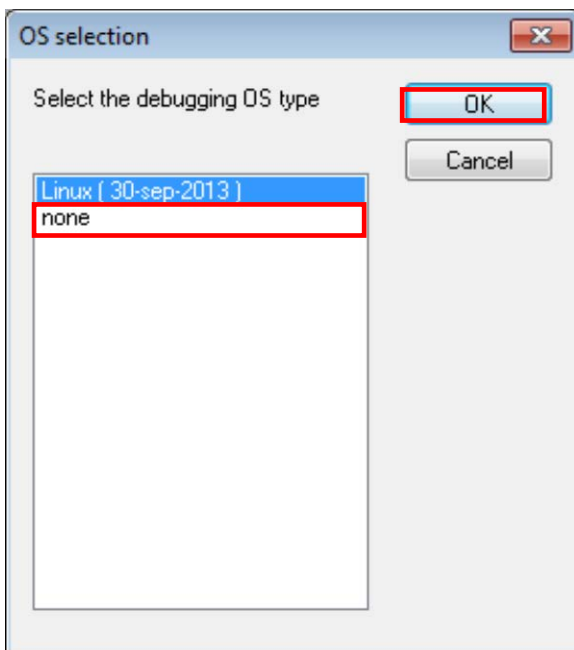
Please select the Do not connect



This dialog box is shown if you select Display Reset dialog box when connecting on the project tab of the option window, which is shown by selecting Tool – Option from the menu bar.

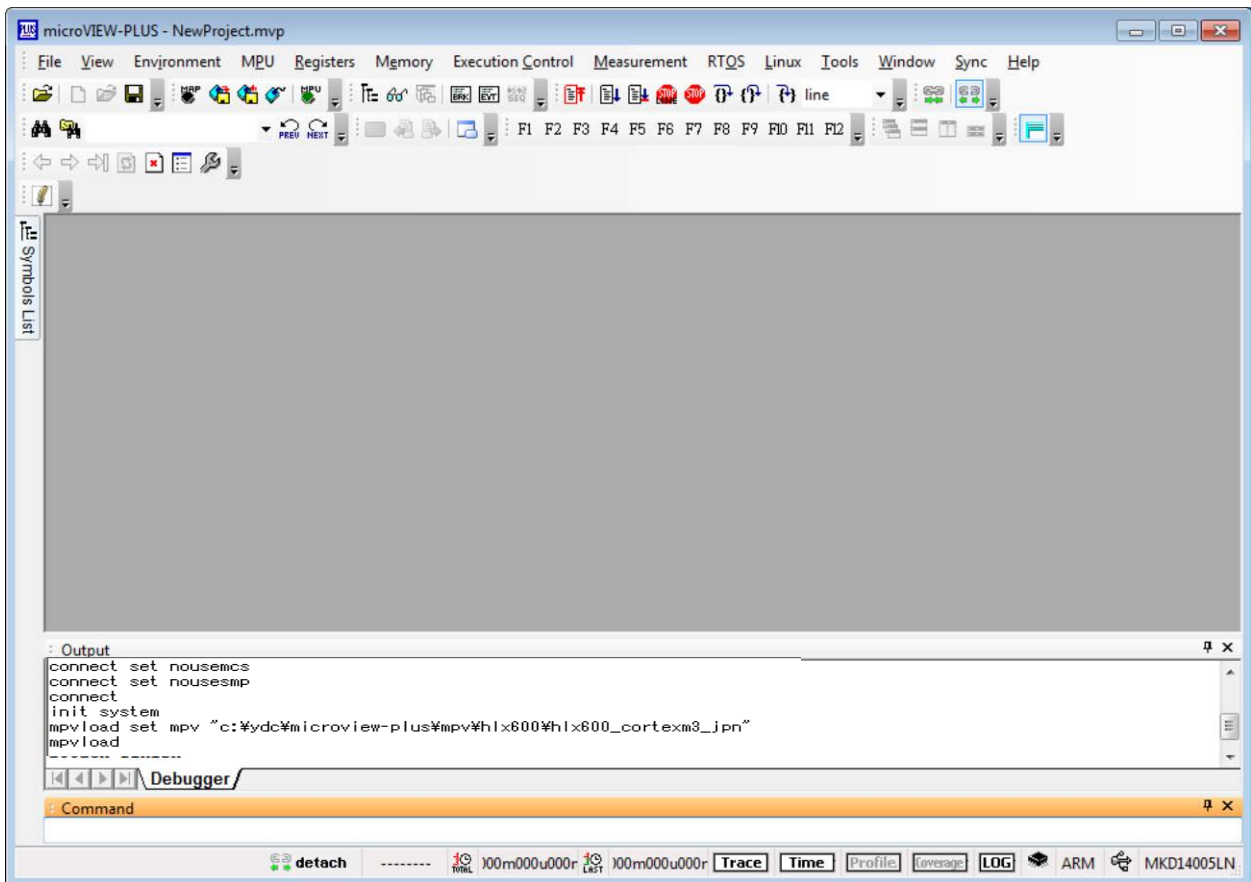


OS selection dialog, select the "none".



Notes and Points for Nuvoton M051 BN/DN/DE Series Internal Flash Memory

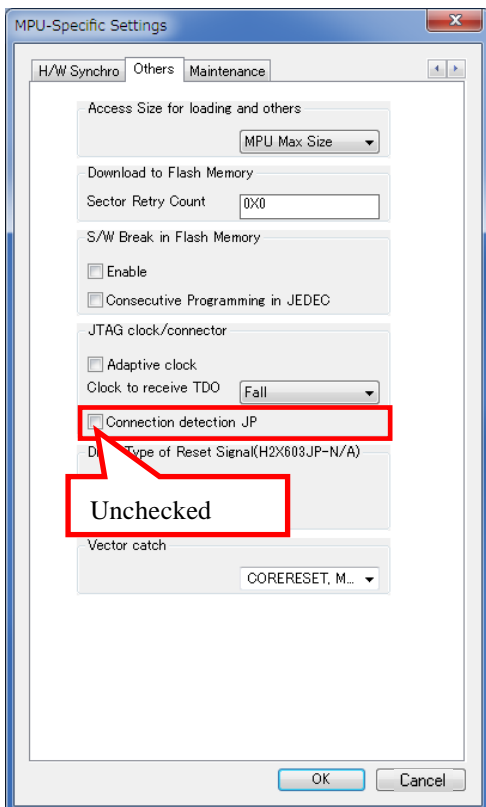
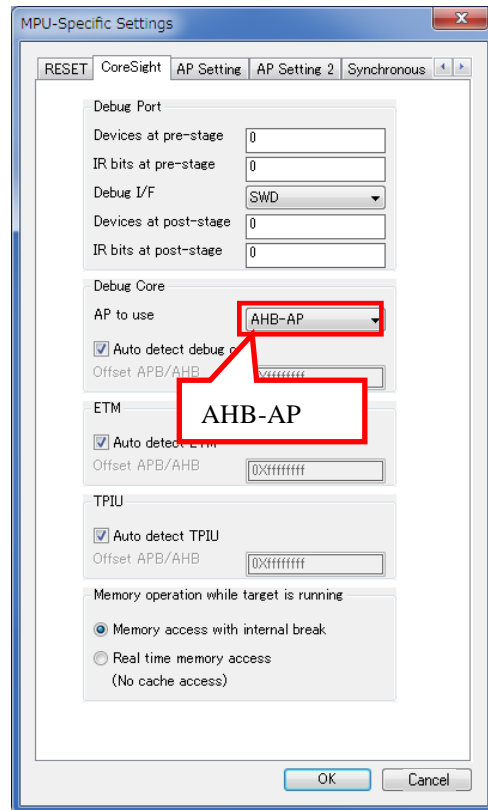
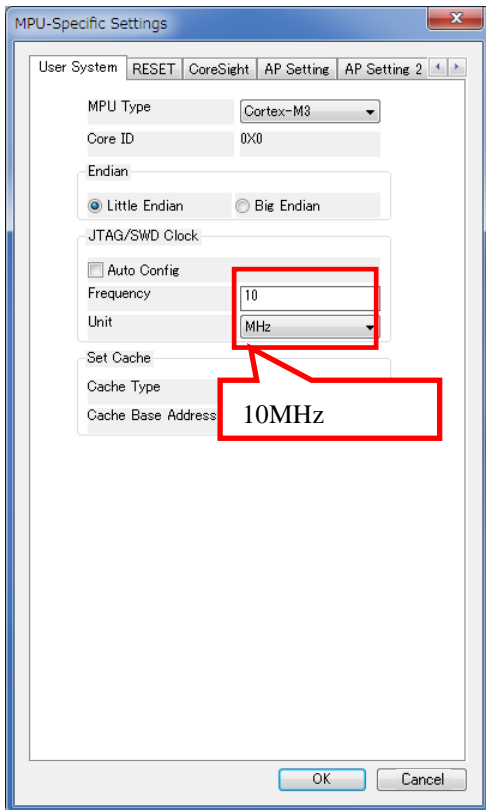
Debugging project is opened.



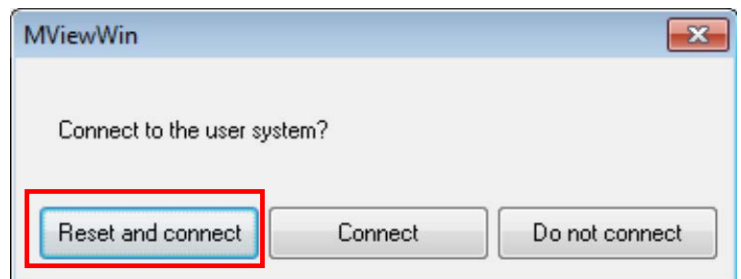
Click the [MPU]- [MPU-specific settings]

Notes and Points for Nuvoton M051 BN/DN/DE Series Internal Flash Memory

Please change the following MPU-specific settings.



When you press OK, the following dialog box is displayed. Please select the Reset and connect

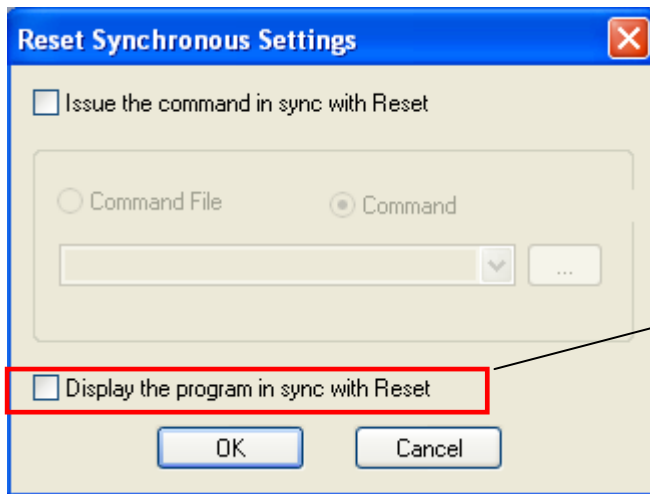


3.2 When Internal Flash memory is blank .

microVIEW-PLUS dumps a reset vector area and display a program (disassemble display) after connecting by reset commands. In case you are using Cortex-M series cores and internal flash memory is blank (erased all, i.e a vector table is 0xFFFFFFFF), area of 0xFFFFFFFFE will be dumped and “ICE Error No.f58: Sticky error” may occur.

[Workaround]

Right-click the Reset button on the toolbar, and then shown the Reset Synchronous Setting dialog box.



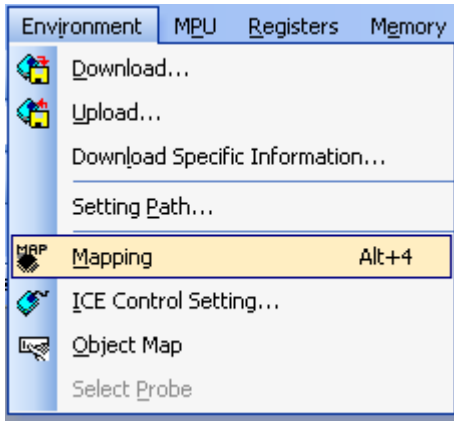
Clear the “Display the program in sync with Reset” checkbox.
(= does not dump by the reset command)

After downloading the program to the internal flash memory (correct vector table values are written), select this checkbox again.

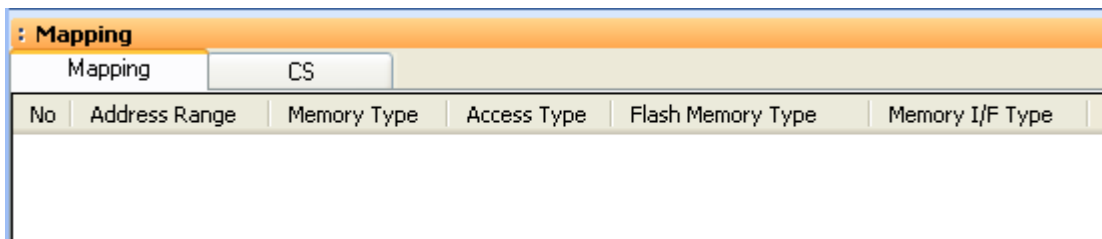
4 Setting the Memory Mapping

4.1 Setting up Flash Memory Mapping

Open the memory mapping window by clicking **Environments – Mapping**.

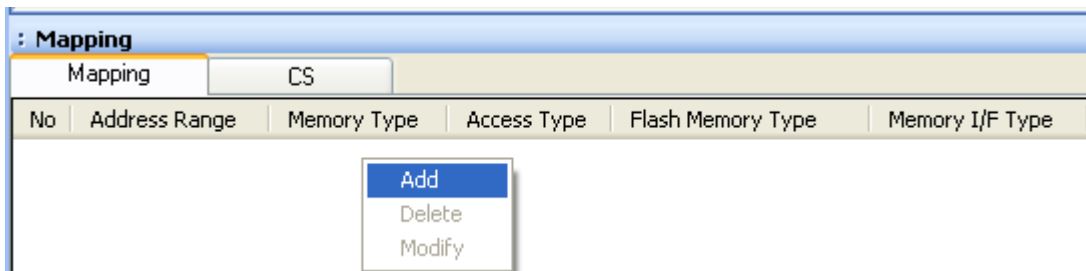


Memory map window as below is opened.

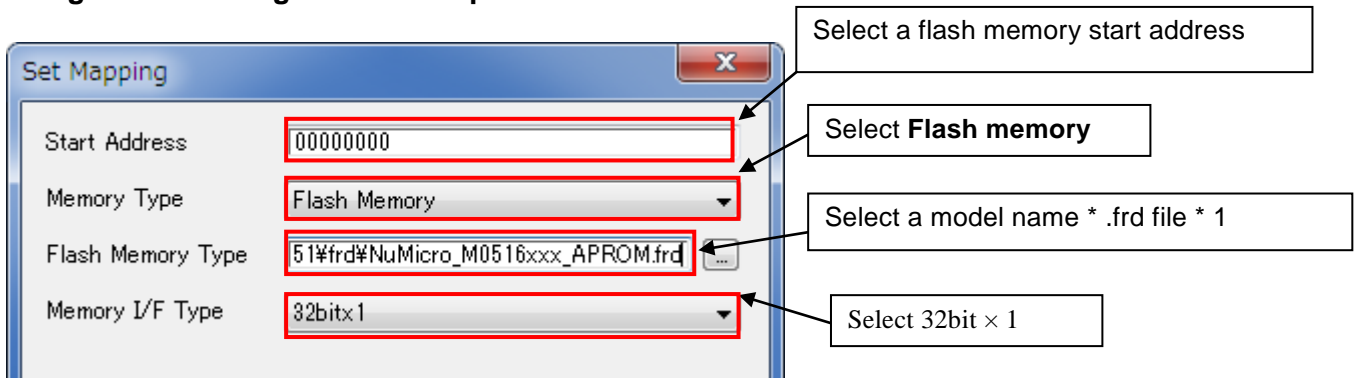


Set the mapping.

Right-click on the memory mapping window, and then select **Add**.



Configure the setting as the example below.



*1 Set as follows:

Block Name	Start Address	Size	Frd file	-
AP-ROM	0x00000000	8 Kbyte	Nuvoton_M052xxx_APROM.frd	
		16 Kbyte	Nuvoton_M054xxx_APROM.frd	
		32 Kbyte	Nuvoton_M058xxx_APROM.frd	
		64 Kbyte	Nuvoton_M0516xxx_APROM.frd	
Data Flash	0x0001F000	4 Kbyte	Nuvoton_M05xxxx_DataFlash.frd	
LD-ROM	0x00100000	4 Kbyte	Nuvoton_M05xxxx_LDROM.frd	

Setting Example

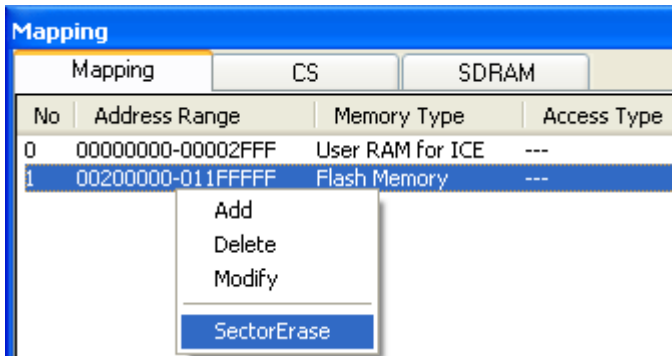
: Mapping					
Mapping		CS			
No	Address Range	Memory Type	Access Type	Flash Memory Type	Memory I/F Type
0	00000000-0000FFFF	Flash Memory	---	Nuvoton NuMicro M051 Series M0516xxx(APROM)	32bitx1
1	0001F000-0001FFFF	Flash Memory	---	Nuvoton NuMicro M051 Series M05xxxx(Data Flash)	32bitx1
2	00100000-00100FFF	Flash Memory	---	Nuvoton NuMicro M051 Series M05xxxx(LD-ROM)	32bitx1

4.2 Setting up User RAM for ICE

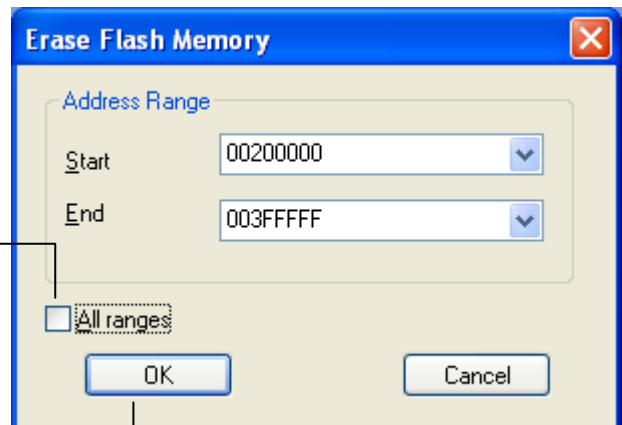
No need to setting up.

5 Erasing to Flash Memory

1. Open the Mapping window.
2. Select memory mapping settings containing an area you want to erase and right-click to choose **Sector Erase**.



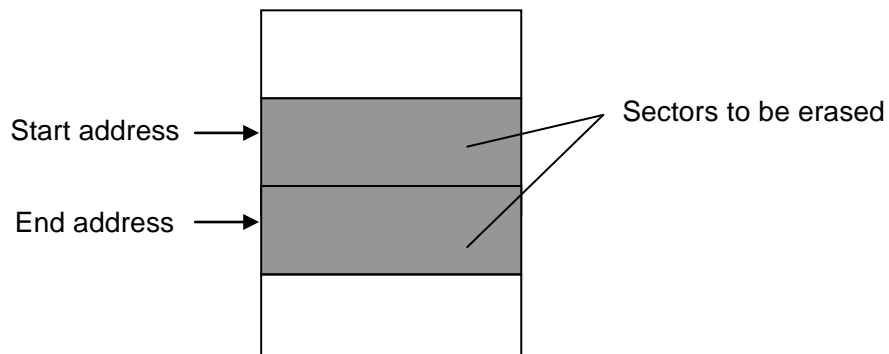
3. Specify an address range you want to erase with the Erase Flash Memory dialog box.



4. When you want to erase all devices, select this **All ranges** check box.

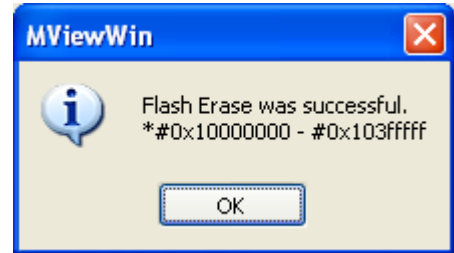
5. Click **OK**.

Note: The contents of flash memory are erased in a unit of a sector. If you specify an address range to erase, sectors contained in this range are all erased even if they are partially contained.

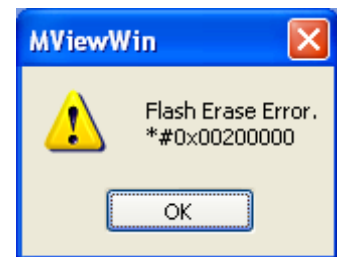


6. When the contents of the address range you have specified are erased completely, the message will appear.

- (a) When the contents of the specified address range are erased successfully, the address range where the data has been erased is displayed.



- (b) When the erase error occurred, an address where the erase error occurred is displayed and the subsequent process will be aborted.



6 Download to Flash Memory

After the setting up Flash Mapping is completed, You can download your program to Internal Flash memory.

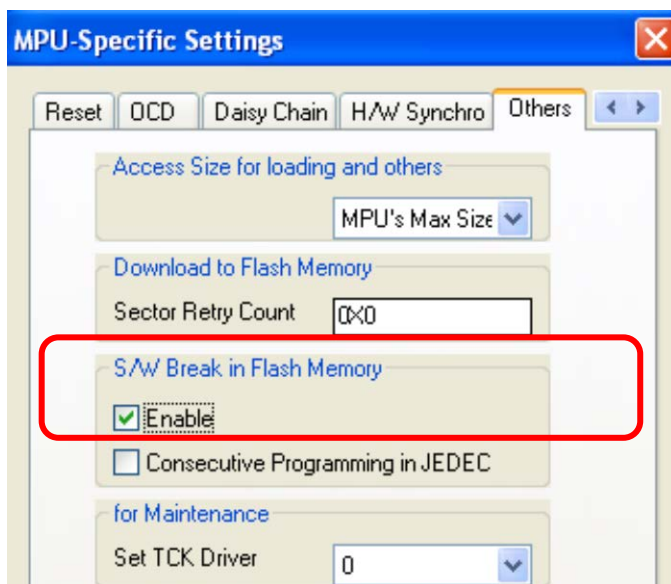
For details about download function of microVIEW-PLUS, see “chapter 6 DOWNLOADING AND UPLOADING A USERPROGRAM —LOADING” of the “microVIEW-PLUS Debugger User’s Manual Common Edition (mvwPLUSe.pdf)”,

7 Software Break in Flash Memory

You are not allowed to set up software break for flash memory in the initial state of the microVIEW-PLUS. In case you try to set up software break for flash memory cause an error("ICE Error No. 8c4: Set Software Break Verify Error") .

To enable software break setting for flash memory, change MPU-Specific Settings as shown blow.

select [MPU] → [MPU-Specific Settings] → [Others]



8 Editing of User Configuration (CONFIG0 register)

Please run the "nuvoton_M051_GONFIG0_Update.mvw" If you want to edit the CONFIG0 register.

- **Editing <nuvoton_M051_GONFIG0_Update.mvw>**

By running after edit this script file, you can change the CONFIG0 register.

Open the "nuvoton_M051_GONFIG0_Update.mvw" in any editor, please correct the reference below.

\$r => You want to edit in the set value.

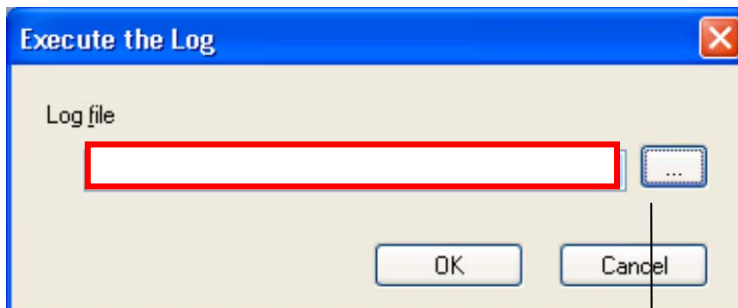
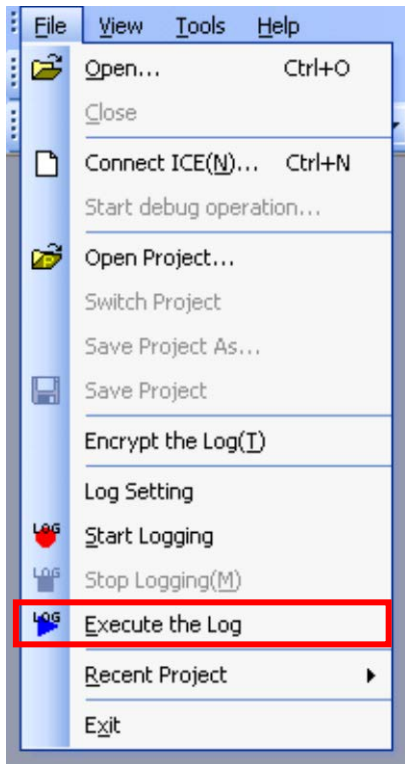
```

1 #####
2 # Nuvoton NuMicro Family M051 BN/DN/DE Series
3 # User Configuration setting script
4 #####
5 # User configuration is internal programmable configuration area for boot options.
6 # The user configuration is located at 0x300000 of Flash Memory Organization and
7 # it is 32 bits word.
8 # Any change on user configuration will take effect after system reboot.
9 #
10 # | BIT      | Description |
11 # |-----|-----|
12 # | [31]    | CWDTEN     | Watchdog Enable Control (M05xxDN/DE Only) |
13 # | [30]    | CWDTPDEN  | Watchdog Clock Power-Down Enable Control (M05xxDN/DE Only) |
14 # | [31:27] | Reserved  | Reserved. |
15 # | [26:24] | CFOSC     | CPU Clock Source Selection After Reset |
16 # | [23]    | CBODEN    | Brown-out Detector Enable Control |
17 # | [22:21] | CBOV      | Brown-out Voltage Selection |
18 # | [20]    | CBORST    | Brown-out Reset Enable Control |
19 # | [19:11] | Reserved  | Reserved. |
20 # | [10]    | CI0INI    | I/O Initial State Selection (M05xxDN/DE Only) |
21 # | [9:8]   | Reserved  | Reserved. |
22 # | [7:6]   | CBS       | Chip Boot Selection |
23 # | [5:2]   | Reserved  | Reserved. |
24 # | [1]     | LOCK      | Security Lock Control |
25 # | [0]     | Reserved  | Reserved. |
26 # |-----|-----|
27 # *Note: The reserved bits of user configuration should be kept as '1'
28 #Data      Version  Discription
29 #-----+-----+-----
30 #2016/01/15  1.00    New
31 #####
32
33 # -----
34 # Edit the value of the following variable "$r".
35 eval $r = 0xFFFFFFFF

```

- **Execution of <nuvoton_M051_GONFIG0_Update.mvw>**

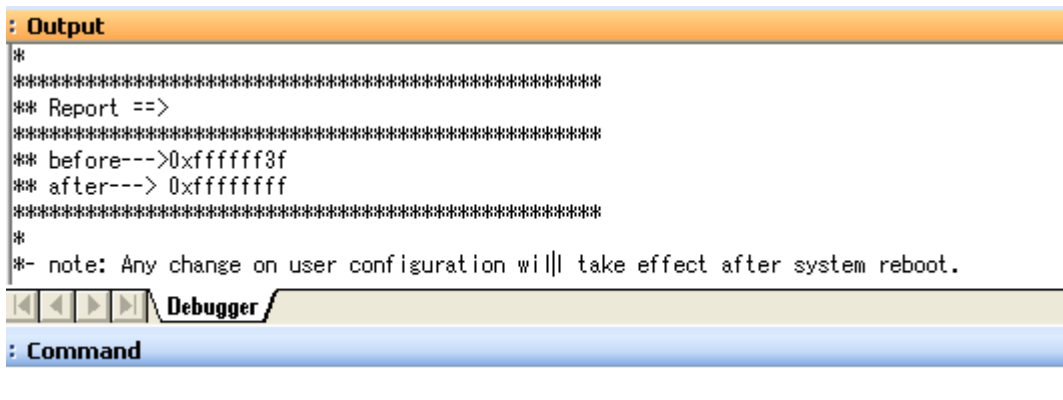
Open the Execute the Log window by clicking file – Execute the Log.



Select the nuvoton_M051_GONFIG0_Update.mvw, please click on the [OK] button.

- **<Nuvoton_M051_GONFIG0_Update.mvw> result confirmation**

*result example of if you change the CONFIG0 from 0xFFFFF3F to 0xFFFFFFFF



9 Outline of Flash Memory Definition File(*.frd)

For flash memory definition file(*.frd), the following information is defined in units of sections.

- Flash memory information
- Extended parameter information
- Sector configuration

Example> Nuvoton_M05xxxx_DataFlash.frd

[Config]	Flash memory information section	
VERSION=2.00	This is the file version. Please specify the "2.00".	
FLASH_NAME=Nuvoton NuMicro M051 Series M05xxxx(Data Flash)	Debugger display information. *1	
FLASH_TYPE=JEDEC BUS_WIDTH=16 NRM_FGM_FILE=nuvoton_M051	Do not edit.	
[ExpParam]		Extended parameter section
Exp_Param1=0x5000C000		FLASH_BA(FCM) Base address
Exp_Param2=0x00300000		User Configuration(CONFIG0) Base address
Exp_Param3=0x50000000	System Global Control Register(GCR_BA) Base address	
Exp_Param4=0x00000001	Flash Type	
	<ul style="list-style-type: none"> ● 0x00000000 : AP-ROM ● 0x00000001 : Data Flash ● 0x00000002 : LD-ROM 	
[Status] POLLING=0x80 TOGGLE=0x40 TIMING_LIMIT=0x00 [Reset] [SectorErase] [Program]	Do not edit.	
[Sector]		Sector configuration section
512 X 8		
	The number of sectors	
	Sector size	



*1: Configuration information of FLASH_NAME will be reflected in the debugger display.

Examples> FLASH_NAME = Nuvoton NuMicro M051 Series case M05xxxx of (Data Flash)

: Mapping					
Mapping	CS				
No	Address Range	Memory Type	Access Type	Flash Memory Type	Memory
0	00000000-0000FFFF	Flash Memory	---	Nuvoton NuMicro M051 Series M0516xxx(APROM)	32bitx1
1	0001F000-0001FFFF	Flash Memory	---	Nuvoton NuMicro M051 Series M05xxxx(Data Flash)	32bitx1

10 Notes & Points

10.1 Software Break in Remapped area

Remapped area (0x0000_0000 – 0x0000_0200) by Vector Remap, You could not use Software break.

10.2 "Flash memory device protect error" has occurred

When flash data is locked by CONFIG0-LOCK bit [bit 1], download to flash memory may cause an error.

*ICE Error No.1e41:Flash memory device protect error.

[Workaround]

You need to chip erase in order to unlock.

The script file "nuvoton_M051_FMC_ChipErase.mvw" is able to erase all internal flash memory and User Configuration (CONFIG0).