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

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

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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

	Supported Models and Versions			
Device Name	advice LUNA I	advice LUNA		
	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] \rightarrow [Connect ICE] from Start menu of microVIEW-PLUS. ICE Connection dialog box is shown.

Set as follows:

ICE Connection	x	
Project name(N)		
SampleProject		
Save in (S)		
C:\YDC\microVIEW-PLUS		
Target type(K)		
ICE 🔹		
Target name(I)		
adviceLUNA/LUNA II		
ICE Model Name(M)	advid	ceLUNA II:H2X600
H2×600 👻	advid	ceLUNA : HLX600
Multicore debug(B)		
No (Single core)		
Communication device		
🔘 Ether 💿 USB		
Destination to connect(D)		
MPG08003LN H2×600T-0CD2G		
Advanced >> OK Cancel		

User System Connection	
MPU Name(M)	
MPV file name(V)	adviceLUNA II : h2x600_cortexm0+_jpn.mpv adviceLUNA : hlx600_cortexm3_jpn.mpv
Advanced >>	OK Cancel

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.

MPU-Specific Settings	— X —
MPU Type	Cortex-M3 🗸
Break Settings after	Reset Command
at Reset Vector	Break 👻
📝 Assert nSRST	
Break timing after	100ms 👻
🗸 Assert nTRST	
Break timing after	300ms 🔹
C VECTRESET	SYSRESETREQ
Debug Port	
Debug I/F	SWD
	OK Cancel
	OK Cancel

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

Please select the Do not connect



 \checkmark

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.

🙀 Options				— X—
Project Path Setting Display Cont Debug Resources to Save	trol Setting	Color/Font Setting	Add-On	
Memory Mapping MPU-specific Setting Executable image Loading Special area infomation Loading	Re	e the project used at the project used at the splay Reset dialogbox was and connect	when connecting	

OS selection dialog, select the "none".

OS selection	×
Select the debugging OS type	ОК
Linux (30-sep-2013) none	Cancel

Notes and Points for Nuvoton M051 BN/DN/DE Series Internal Flash Memory Debugging project is opened.

The micro//TEW/DUIC NewProject must	
Ella View Environment MDII Penister Memory Everytion Control Measurement PTOS Linux Tesls Wordsw Sure Hale	
: 🗚 🙀 🗸 👘 🖓 👘 😴 : 🔜 48 🐟 🗔 🛫 : F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 🖕 : 🚔 🚍 🔟 🔤 👳 : 🦰 👳	
· (수 수 다) 회 🗈 🔚 🖉 🖕	
TE	
Sym	
List	
Output	₽×
connect set nousemp	~
connect init system	
mpyload set mpy "c:¥ydc¥microview-plus¥mpy¥hlx600¥hlx600_cortexm3_jpn" mpyload	
	*
Compand	4 x
Communu	
응글 detach	MKD14005LN
tour the second se	

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.

MPU-Sp	ecific Settings	— X
User	System RESET CoreS	ight AP Setting AP Setting 2 া 🕨
	MPU Type	Cortex-M2 -
	Core ID	
	Endian	
	I ittle Endian	🔿 Big Endian
	JTAG/SWD Clock	
	Auto Config	
	Frequency	10
	Unit	MHz 🗸
	Set Cache	
	Cache Type	
	Cache Base Address	10MHz
		OK Lancel
MPU-Sp	ecific Settings	X
MPU-Sp	ecific Settings	
MPU-Sp	ecific Settings Synchro Others Mainte	enance
MPU-Sp	Synchro Others Mainte Access Size for loadin	enance () g and others
MPU-Sp	ecific Settings Synchro Others Maint Access Size for loadin	enance • • • ¢ and others • • •
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me	enance
MPU-Sp	ecific Settings Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count	enance e and others e and others mory 0X0
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M	enance e and others mory 0x0 emory
MPU-Sp	ecific Settings Synchro Others Mainte Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable	enance s and others MPU Max Size mory OX0 emory
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Program	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector	enance g and others MPU Max Size mory 0x0 emory mming in JEDEC
H/W	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO	enance enance e
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progre JTAG clock/connector Adaptive clock Clock to receive TDO Connection detection	enance e and others e and others mory 0x0 emory Eall Fall
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectin D	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detection D Type of Reset S	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detection D Type of Reset S Unchecked	enance g and others g and others mory 0x0 emory Fall JP ignal(H2X603JP-N/A)
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectik D Type of Reset S Unchecked Vector catch	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectiv D Type of Reset S Unchecked Vector catch	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectiv D Type of Reset S Unchecked Vector catch	enance
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progre JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectiv D Type of Reset S Unchecked Vector catch	enance
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectin D Type of Reset S Unchecked Vector catch	enance
MPU-Sp	Synchro Others Maint Access Size for Ioadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectie D Type of Reset S Unchecked	enance
MPU-Sp	Synchro Others Maint Access Size for loadin Download to Flash Me Sector Retry Count S/W Break in Flash M Enable Consecutive Progra JTAG clock/connector Adaptive clock Clock to receive TDO Connection detectik D Type of Reset S Unchecked Vector catch	enance

MPU-Specific Settings	x
RESET CoreSight AP Setting AP Setting 2 Synchronous	
Debug Port Devices at pre-stage IR bits at pre-stage Debug I/F SW/D	
Devices at post-stage 0 IR bits at post-stage 0	
Debug Core AP to use AHB-AP	
Offset APB/AHB	
Offset APB/AHB	
Auto detect TPIU Offset APB/AHB DXfffffff Memory operation while target is running	
 Memory access with internal break Real time memory access (No cache access) 	
OK Cancel	
	-

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

MViewWin		×
Connect to the user syst	em?	
Reset and connect	Connect	Do not 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 0xFFFFFFF), area of 0xFFFFFFE 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.

leset Synchronous Settings	
Issue the command in sync with Reset	
Command File Command	Clear the "Display the program sync with Reset" checkbox. (= does not dump by the reset
Display the program in sync with Reset	command)
OK Cancel	

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.

: Mapping				
Mapping	CS			
No Address Rar	nge 🕴 Memory Ty	pe 🕴 Access Type	Flash Memory Type	Memory I/F Type

Set the mapping.

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

·			
: Mapping			
Mapping	CS		
No Address Rar	nge Memory Type	Access Type Flash Memory Type	Memory I/F Type
	Add Delete Modif	e Y	

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

: M	apping					д
	Mapping	CS				
No	Address Ra	ange	Memory Type	Access Type	Flash Memory Type	Memory I/F Type
0	0000000-0	000FFFF	Flash Memory		Nuvoton NuMicro M051 Series M0516xxx(APROM)	32bitx1
1	0001F000-0	001FFFF	Flash Memory		Nuvoton NuMicro M051 Series M05xxxx(Data Flash)	32bitx1
2	0010000-0	0100FFF	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**.

Mapping			
Mapping	CS	SDF	RAM
No 🕴 Address Rar	nge Mer	nory Type	Access Type
0 00000000-000	02FFF User I	RAM for ICE	
1 00200000-011	LFFFFF Flash	Memory	
	Add		
	Delete		
	Modify		
	SectorErase		

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

	Erase Flash Memory
 When you want to erase all devices, select this All ranges check box. 	Address Range Start O0200000 Ind Ind O03FFFFF Ind O03FFFFF Cancel
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] \rightarrow [MPU-Specific Settings] \rightarrow [Others]

MPU-Spe	cific Settings	2	×
Reset	OCD Daisy Chain	H/W Synchro Others	
-+	Access Size for loading	and others	
		MPU's Max Size 💌	
-[Download to Flash Mer	mory	
9	Sector Retry Count	0×0	
-9	67W Break in Flash Me	emory	
	Enable		
]	Consecutive Progra	mming in JEDEC	
f	or Maintenance		
9	Set TCK Driver	0 🖌	

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 config	guration is	internal programmable configuration area for boot options.		
6	# The user co	onfiguratio	n is located at 0x300000 of Flash Memory Organization and		
7	# it is 32 b	its word.			
8	# Any change	on user co	nfiguration will take effect after system reboot.		
9	#	1			
10	# BIT	Descripti	on I		
11	#	+	· · · · · · · · · · · · · · · · · · ·		
12	# [31]	CWDTEN	Watchdog Enable Control (M05xxDN/DE Only)		
13	# [30]	CWDTPDEN	Watchdog Clock Power-Down Enable Control (MO5xxDN/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]	CIOINI	I/O Initial State Selection (MO5xxDN/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	#	<u> </u>	LJ		
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.

	File	<u>V</u> iew <u>T</u> ools <u>H</u> elp
	6	Open Ctrl+O
		⊆lose
	D	Connect ICE(N) Ctrl+N
I		Start debug operation
I	6	Open Project
I		Switch Project
I		Save Project As
	B	Save Project
		Encrypt the Log(\underline{T})
I		Log Setting
I	Les	Start Logging
	Los	Stop Logging(<u>M</u>)
	19 9	Execute the Log
		Recent Project
		Exit

Execute the Log		
Log <u>f</u> ile		
	ОК	Cancel

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 0xFFFFFFF

	; Output
1	*

	** Report ==>

	** before>0xffffff3f
	** after> 0xffffffff

	*
	*- note: Any change on user configuration will take effect after system reboot.
	Lebugger
	; Command

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	Do not edit.		
NRM_FGM_FILE=nuvoton_M051			
[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		
	• 0x00000000 : AP-ROM		
	• 0x00000001 : Data Flash		
	• 0x00000002 : LD-ROM		
[Status]			
POLLING=0x80	Do not edit.		
TOGGLE=0x40			
TIMING_LIMIT=0x00			
[Reset]			
[SectorErase]			
[Program]			
[Sector]	Sector configuration section		
<u>512</u> X <u>8</u>			
	The number of sectors		
▶ ►	Sector size		

 \checkmark

*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	o Address Range		Mer	mory Type	Access Type	Flash Memory Type		Memory
0	0000000-0	000FFFF	Flash	n Memory		Nuvoton NuMicro M051 Se	es M0516xxx(APROM)	32bitx1
1	0001F000-0	001FFFF	Flash	n Memory		Nuvoton NuMicro M051 Ser	ries 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).