

SH7269 CPU Board

R0K572690C000BR

Installation Manual

Renesas 32-Bit RISC Microcomputer
SuperH™ RISC engine Family/SH7260 Series

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IMPORTANT	Indicates other important information to be observed when using the product.

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The  sign indicates a warning or caution. Example:  Be Careful About Electric Shock
The  sign indicates a prohibition. Example:  Do Not Disassemble
The  sign indicates a compulsory or directive instruction. Example:  Unplug from Socket

Important

Before using this product, be sure to read this manual (installation manual) carefully. Keep this manual, and refer to this when you have questions about this product.

About this product:

The term "this product" referred to here mean the product manufactured by Renesas Electronics Corporation.

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Purpose of use of this product:

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For those who use this product:

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When using this product:

(1) This product is a development supporting unit for use in your program development and evaluation stages.

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Usage restrictions:

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- (1) Transportation and vehicular
- (2) Medical (equipment where human life is concerned)
- (3) Aerospace
- (4) Nuclear power control
- (5) Undersea repeater

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As part of our commitment to environmental responsibility Renesas also offers to take back the equipment and has implemented a Tools Product Recycling Program for customers in Europe.

This allows you to return equipment to Renesas for disposal through our approved Producer Compliance Scheme.

To register for the program, click here "<http://www.renesas>.

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1. Introduction

1.1 Overview

This product consists of the SH7269 CPU Board (board part number: R0K572690C000BR) and the sample software.

This installation manual describes mainly how to set up the SH7269 CPU Board hardware and software. Refer to manuals in CD-ROM attached with this product for the User's manual, SH7269 hardware and programming manuals.

If any of above items is missing or damaged, please contact Renesas Electronics Corporation, Renesas Solutions Corp. or Renesas Electronics Sales Co., Ltd. or its distributor.

To Ensure Safe and Correct Use

Safety precaution:



- This manual uses various pictorial indications to ensure the correct use of the product and thereby prevent inflicting an injury on users or other people or causing damage to property.
- These pictorial indications are explained in Section 1.2, "Usage Precautions." Be sure to understand the contents written in that section before you use the product.

1.2 Usage Precautions

The precautions described here must be observed in order to prevent inflicting an injury on users or other people or causing damage to property, and to ensure that this product is used safely.

To ensure the correct use, be sure to read these precautions and understand the written contents before you use the product. Not all precautions described in this manual relate to the Renesas product alone, some of them apply to an entire personal computer system incorporating the Renesas product also.

The following explains the warnings and cautions indicated for the handling of this product.

➤ Warning Indication

WARNING

Regarding the handling of this product:



- Do not use this product outdoors. It can only be used indoors.
- Do not let foreign matters such as water, pieces of metal or inflammable material get into the board or connectors.

Regarding installation:



- Do not install the product in humid or wet places. Should water get into the internal circuit of the product, an unrecoverable fault may result.

Regarding the working environment:



- The upper-limit ambient temperature at which this product can be used (i.e., rated maximum temperature) is 50°C. Make sure this rated maximum temperature is not exceeded.

➤ Caution Indication


CAUTION

Regarding the reconstruction of this product:



- Do not reconstruct this product. If the product has got out of order for reasons of disassembly or reconstruction, requests for repair may not be accepted.

Regarding the handling of this product:



- Handle this product with caution, not to let it drop or fall down or apply strong mechanical shock.
- Do not touch the communication interface connector pins or other connector pins directly with your hand. The internal circuit may be broken by static electricity.
- When moving this product to another place of installation, be careful not to apply strong vibration or mechanical shock to it.
- After connecting each piece of equipment with cable, check the cables again to see that they are connected correctly. For details on how to connect, refer to Chapter 2, " Setting Up the Hardware".
- Before turning on the power for each connected piece of equipment, make sure you've finished connecting all cables. Do not connect or disconnect any cable when the power is turned ON.

Regarding the operating procedure for this product:

Note

- Exceptional conditions or precautions are noted in an operation procedure or explanatory description when it is necessary to call the user's attention.

1.2.1 Symbols Used

Table 1.2.1 lists the symbols used in this manual.

Table 1.2.1 Symbols

Symbol	Description
[Menu -> Menu Option]	The arrow "->" indicates menu options. Example: [File] -> [Save As...]
"File name"	" ... " is used to indicate file names, directory, or button of dialog box.
"Directory"	Example : "C:\Workspace\Sample_software\sh7269_sample"
"Button"	"OK" button "resetprg.c"

1.3 Installation Procedure

In this manual, follow the procedure indicated in Figure 1.3.1 to install the SH7269 CPU Board.

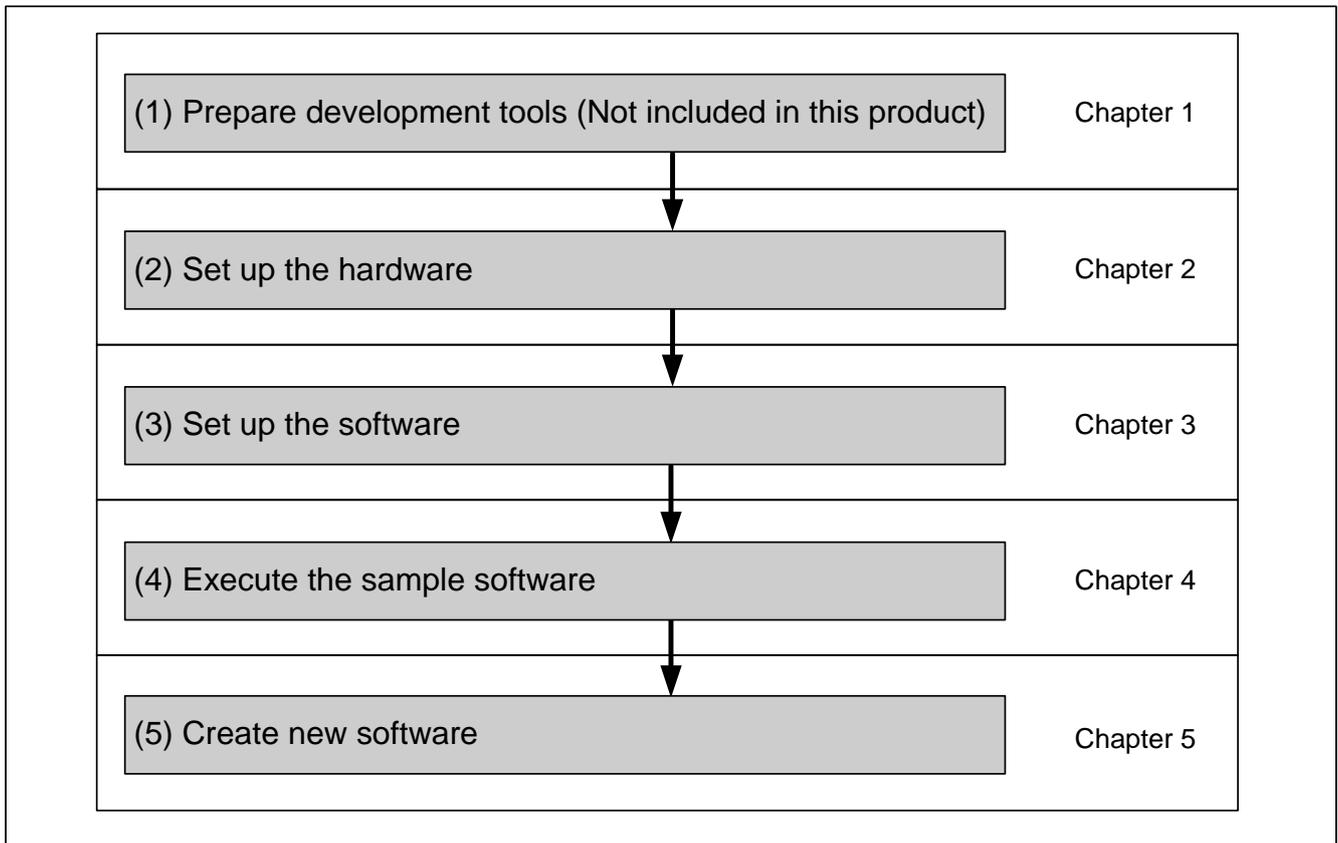


Figure 1.3.1 SH7269 CPU Board Installation Procedure

1.4 Product Behavior

This product (hardware and software) was developed for only providing users with experience on the specifications and development environment of the SH7269 MCU, and does not guarantee the results arising from the use of this product.

To use this product, the type of the host computer is specified for its operating environment (IBM PC/AT and its compatible). However, it only indicates the operating environment assumed by Renesas, and does not guarantee that the SH7269 CPU Board operates normally in all relevant types of machines or in all relevant environments (e.g., device driver and peripheral devices).

1.5 What You Need to Get Started (Not included in this product)

Following items are not included in this product and should be prepared by user.

➤For the SH7269 CPU Board

Prepare following power supply to supply power to the SH7269 CPU Board.

Table 1.5.1 Power Supply (For the SH7269 CPU Board)

No.	Item	Remarks
1	5 V DC output regulated power supply	1.5 A min.

➤For the Development Environment

This manual describes how to install this product using the Renesas development tools.

To install this product as described in this manual, prepare following Renesas development tools.

Table 1.5.2 Renesas Development Tools

No.	Item	Part number	Applicable Version
2	E10A-USB Emulator for the SuperH RISC engine Family	HS0005KCU02H or HS0005KCU01H	Supports the SH-2A device group
3	SuperH RISC engine C/C++ Compiler Package	R0C40700XSW09R	Ver.9.03 release02 or later
4	Integrated development environment tool High-performance Embedded Workshop	-	Ver.4.07.00 or later

Notes:

- (1) If you already have the E10A-USB emulator and are using any MCUs other than the SH-2A group, purchase a license tool for device group additions to use additional MCUs (not included in this product).
- (2) For details on how to set up a new device group in the E10A-USB emulator, refer to 3.2.2, "Set Up the E10A-USB Emulator" in this manual.

1.5.1 Recommended Host Computer Environment

Followings are the recommended operation environment to use the above Renesas development tools.

Table 1.5.3 Operating Environment for the Renesas Development Tools

Host Computer Specifications	IBM PC/AT Series and Compatibles
CPU	IBM PC or its compatible machine with Pentium III or later (600 MHz or higher recommended) and USB 1.1/2.0 port (full-speed)
Memory	128 MB or bigger (at least twice the load module size recommended)
Hard disk	100 MB of available hard-disk space (To reserve the swap area in the hard disk, at least twice of the memory size must be available. Four times or bigger recommended.)
OS	Windows 2000, Windows XP, Windows Vista (32-bit edition) Windows 7 (32-bit edition, 64-bit edition)

2. Setting Up the Hardware

2.1 SH7269 CPU Board and the E10A-USB Emulator Configuration

Figure 2.1.1 shows the configuration of the SH7269 CPU Board and the E10A-USB emulator.

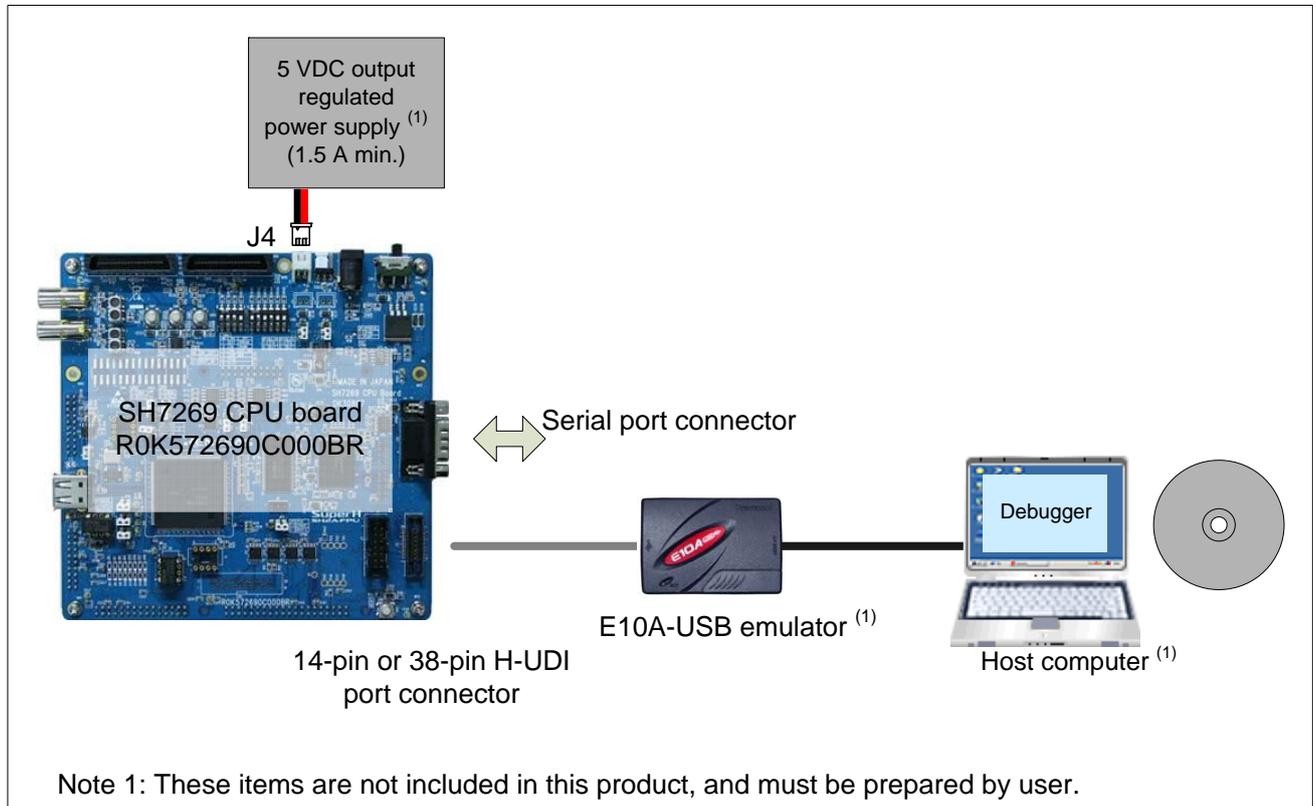


Figure 2.1.1 SH7269 CPU Board and the E10A-USB Emulator Configuration

2.2 Switch Setting

Following describes the SH7269 CPU Board switch setting.


CAUTION



- Do not change DIP switches and jumper setting while the SH7269 CPU Board is operating. Always be sure to turn OFF the power before changing DIP switches or jumper setting. This is necessary to prevent unrecoverable damage to the SH7269 CPU Board that may otherwise occur.

2.2.1 SH7269 CPU Board DIP Switches Setting

To use the SH7269 CPU Board as described in this manual, be sure to set the DIP switches (SW5 and SW6) to its default setting as shown in Figure 2.2.1, and listed in Table 2.2.1 and Table 2.2.2.



Figure 2.2.1 DIP Switches Setting

Table 2.2.1 System Setting DIP Switches Setting (SW5)

Number	Function	Default	Description
SW5-1	Clock operation mode	ON	Clock operation mode 0
SW5-2	Boot mode(MD_BOOT0)	ON	Boots from the memory (with 16 bits bus width) which is connected to the CS0 space(boot mode 0)
SW5-3	Boot mode(MD_BOOT1)	ON	
SW5-4	Boot mode(MD_BOOT2)	OFF	

Table 2.2.2 User DIP Switches Setting (SW6)

No.	Function	Default	Description
SW6-1	Connection(EXT#/SDRAM)	OFF	Connected to the SDRAM
SW6-2	Connection(SD#/NAND)	ON	Connected to the SD/MMC card slot
SW6-3	Connect the option board(VIN#/EXT_SD)	OFF	Connected to the SD card slot
SW6-4	Connect the option board(SSIF#/IEB)	ON	D/A converter
SW6-5	User DIP switch	OFF	–
SW6-6	Input port	OFF	–

2.2.2 SH7269 CPU Board Jumper Switch Setting

To use the SH7269 CPU Board as described in this manual, be sure to set the jumpers to their default setting as shown in Figure 2.2.2 and Table 2.2.3.

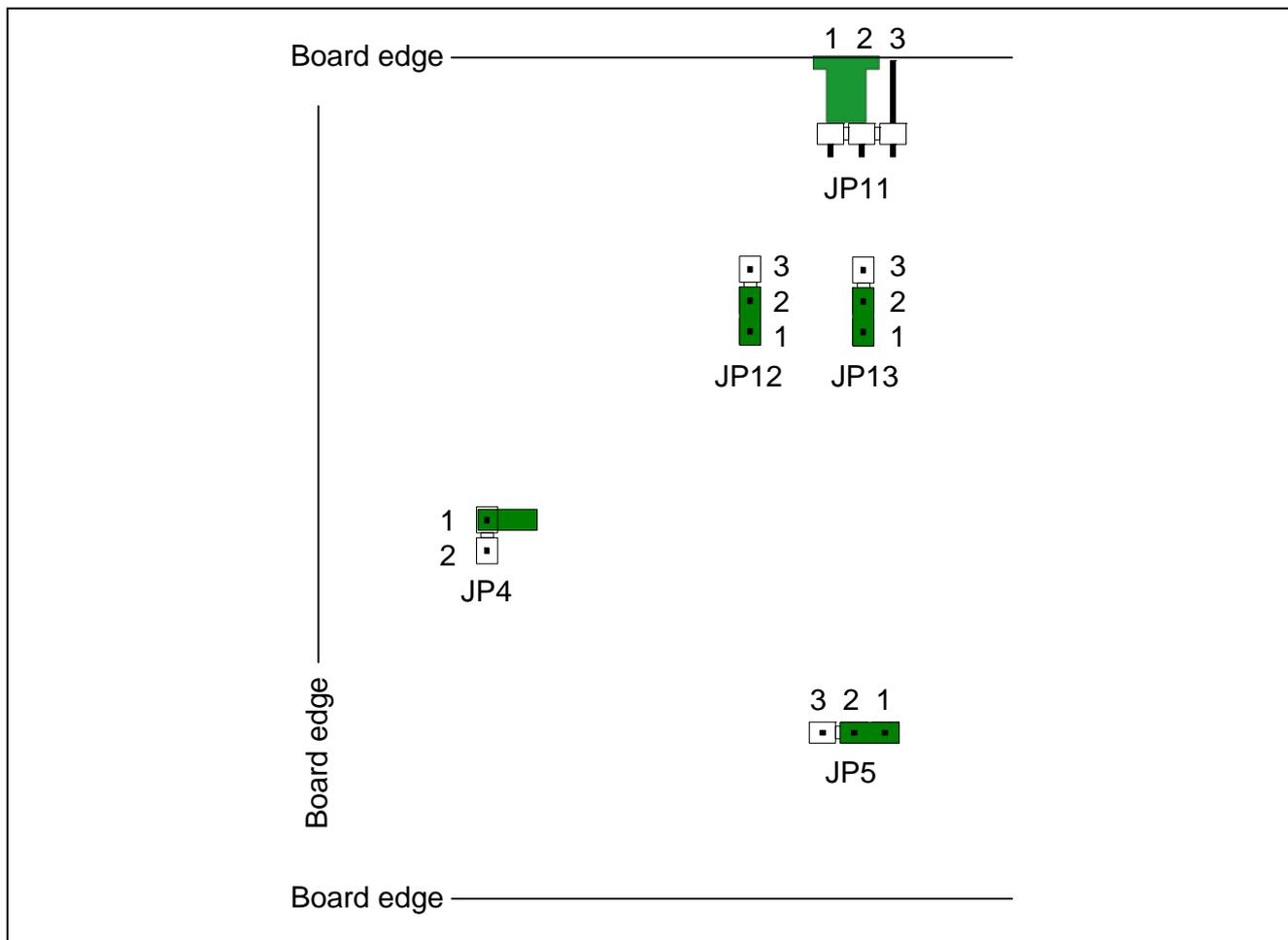


Figure 2.2.2 Jumper Setting

Table 2.2.3 SH7269 Group Power Supply Switch Jumper Setting (JP4,JP5,JP11 to JP13)

No.	Default	Description
JP4	Open	Connects PB18 as the A18 (NOR Flash)
JP5	1-2	Connects the PC0/CS0# (NOR Flash)
JP11	1-2	Supplies the power from J4
JP12	1-2	3.3V fixed power supply voltage (supplied from U18)
JP13	1-2	1.25 V fixed power supply voltage (supplied from U16)

2.3 System Connections and Power-On

Be sure to turn OFF the host computer, and not to connect the E10A-USB emulator and the host computer by a USB cable. Then, follow the procedure below.

2.3.1 Connecting the SH7269 CPU Board only

1. Connect the attached power cable (black: GND, red: +5 V) with the 5 V DV output regulated power supply.
2. Be sure that the SH7269 CPU Board is turned OFF, and connect the other side of the attached power cable (black: GND, red: +5 V) with the power supply connector (J4).
3. Attach the user interface cable to the connector on the target side of the E10A-USB emulator.
4. Attach a USB cable to the connector on the host side of the E10A-USB emulator.
5. Turn ON the host computer (Start the operating system).
6. Turn ON the SH7269 CPU Board (Turn the power ON).



2.3.2 Connecting the SH7269 CPU Board and the SH7269 optional board (M3A-HS64G01 or M3A-HS64G02)

1. Plug the attached AC adapter into the electrical outlet.
2. Be sure that the SH7269 optional board is turned OFF, and connect the attached AC adapter with the AC adapter jack (M3A-HS64G01: J19, M3A-HS64G02: J18).
3. Connect the user interface cable to the connector on the target side of the E10A-USB emulator cable.
4. Connect a USB cable to the connector on the host side of the E10A-USB emulator.
5. Turn ON the host computer (Start the operating system).
6. Turn ON the SH7269 optional board (Turn the power ON).



2.4 Disconnect the System Power Supply

Follow the procedure below to disconnect the system power supply.

1. Disconnect E10A-USB emulator from the High-performance Embedded Workshop.
2. Turn OFF the SH7269 CPU Board.
3. Exit the High-performance Embedded Workshop, and turn OFF the host computer.



CAUTION



- Unless the above power-on sequence is followed, unrecoverable damage may occur to the SH7269 CPU Board or the E10A-USB emulator or both.

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3. Setting Up the Software

3.1 About the High-performance Embedded Workshop

The High-performance Embedded Workshop is an integrated development environment with a graphical user interface to simplify the development and debug of applications written in C/C++ and assembly languages for use in Renesas MCUs. Software development on the SH7269 CPU Board is carried out by the High-performance Embedded Workshop.

For more information about the High-performance Embedded Workshop, refer to the High-performance Embedded Workshop 4 User's Manual. Following section describes how to install the High-performance Embedded Workshop.

3.1.1 High-performance Embedded Workshop Installation

- (1) Execute "HewInstMan.exe" stored in the cross tool CD-ROM (SuperH RISC engine C/C++ Compiler Package). The Install Manager will start up automatically. Click "Installation".

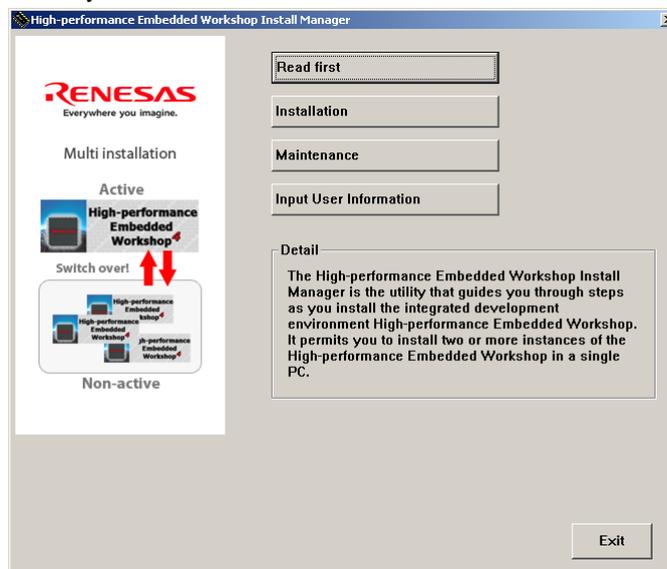


Figure 3.1.1 Installation Procedure (1/4)

(2) Following dialog box will appear as Figure 3.1.2. Click "Next".

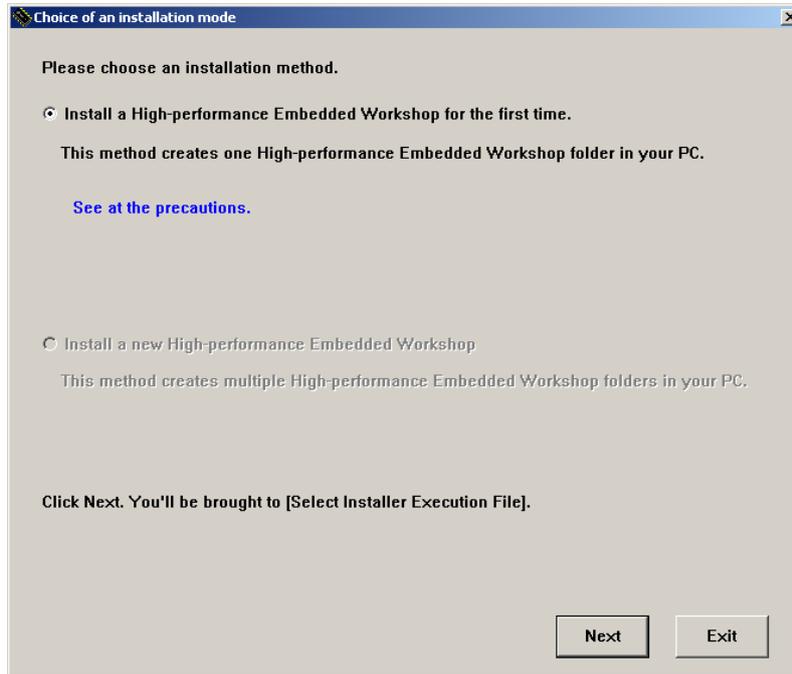


Figure 3.1.2 Installation Procedure (2/4)

Note: If the High-performance Embedded Workshop is already installed, select the "**Install a new High-performance Embedded Workshop**" radio button to install it in another directory.

(3) Follow the on-screen instructions to continue.

(4) Install the AutoUpdate Utility. Click "Next".

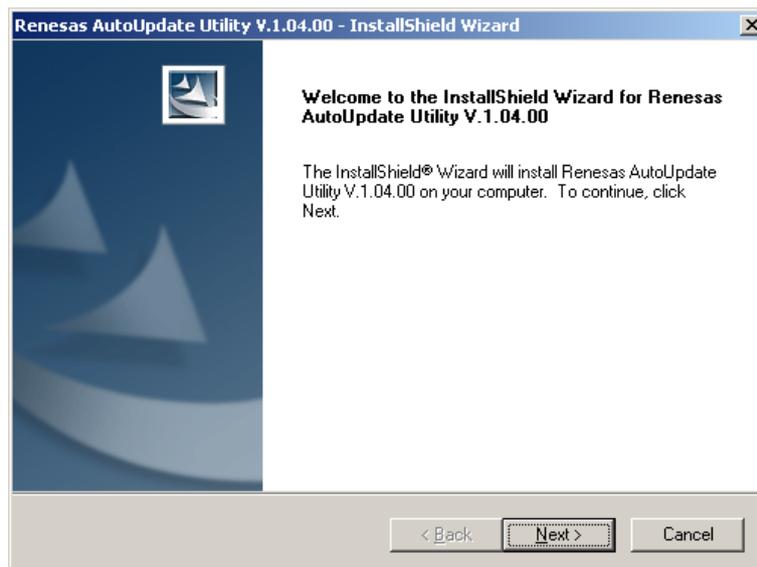


Figure 3.1.3 Installation Procedure (3/4)

Note: If the "AutoUpdate Utility" checkbox is not ticked, above window as Figure 3.1.3 will not appear.

(5) Follow the on-screen instructions to continue installation. When all installation is completed, the following window will appear as Figure 3.1.4. Click "Exit".

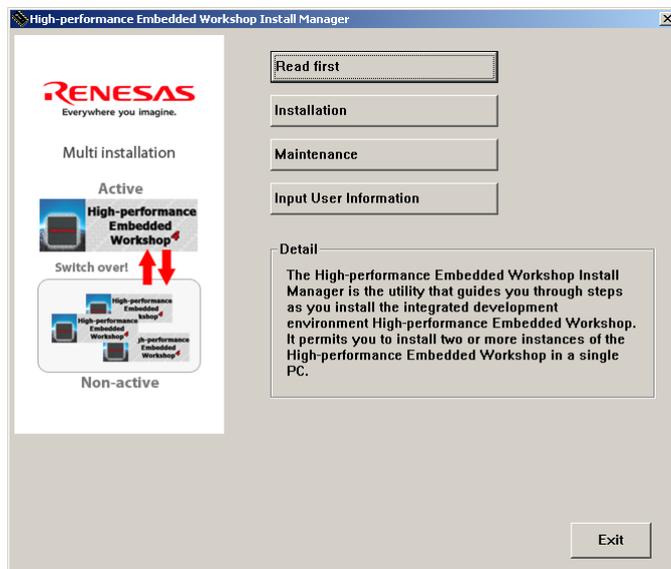


Figure 3.1.4 Installation Procedure (4/4)

3.2 Set Up the E10A-USB Emulator Software

This section explains how to set up the E10A-USB emulator software.

3.2.1 E10A-USB Software Installation Procedure

- (1) Execute "HewInstMan.exe" stored in the E10A-USB emulator software CD-ROM. The Install Manager will start up automatically. Click "Standard Install (Recommended)".

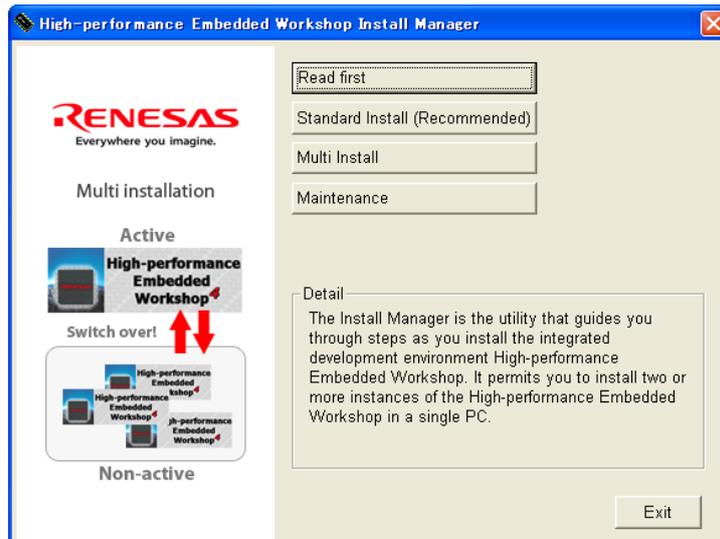


Figure 3.2.1 E10A-USB Software Installation Procedure (1/7)

Note: If the High-performance Embedded Workshop is already installed, select the **"Multi Install"** to install it in another directory.

(2) Following dialog box will appear as Figure 3.2.2. Tick the checkbox of the software to install and click "Install".

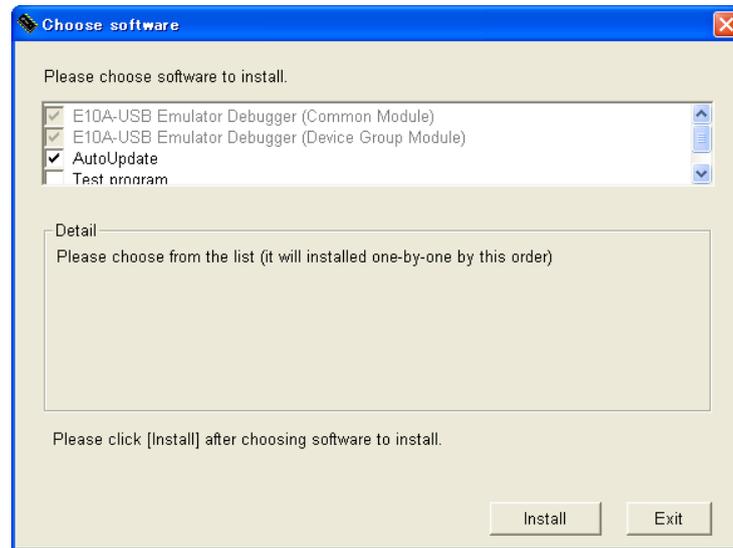


Figure 3.2.2 E10A-USB Software Installation Procedure (2/7)

(3) Following dialog box will appear as Figure 3.2.3. Select "SuperH RISC engine Family SH-2A Device Group", a desired device (e.g. SH72691) and click "Next".

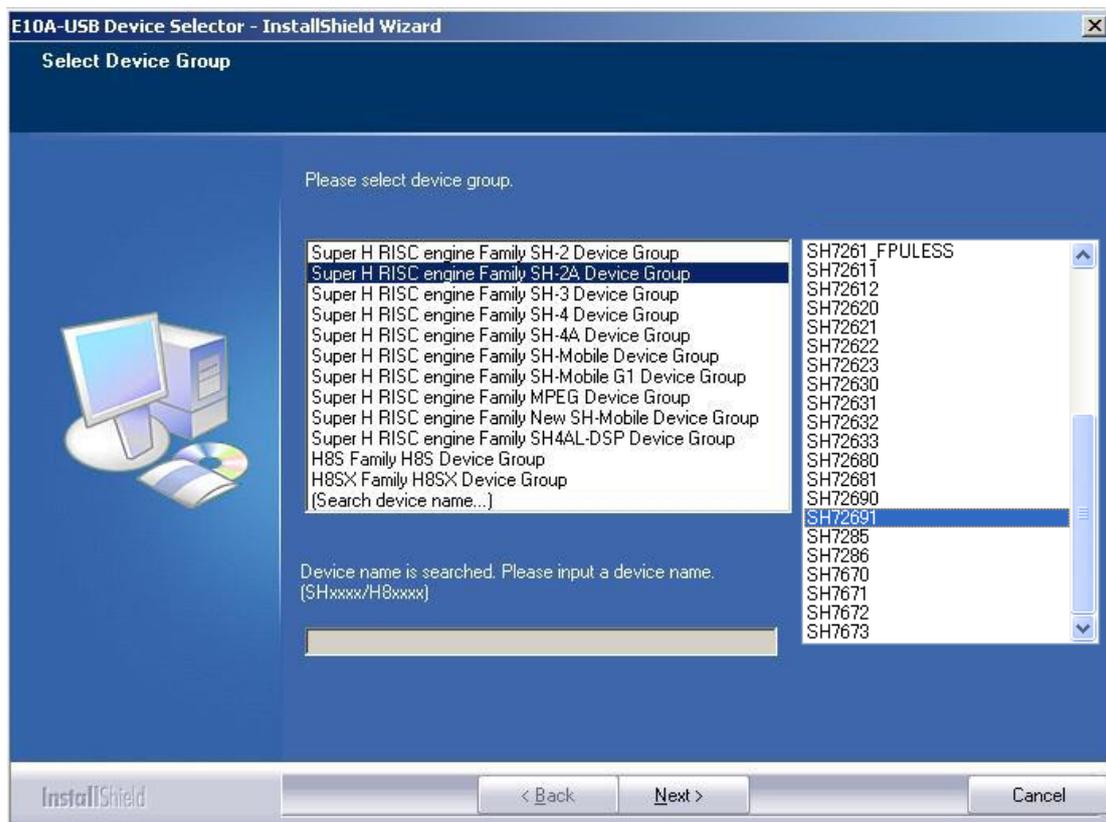


Figure 3.2.3 E10A-USB Software Installation Procedure (3/7)

(4) Installation will start. Click "Next". Follow the on-screen instructions to continue installation.



Figure 3.2.4 E10A-USB Software Installation Procedure (4/7)

(5) Click "Next" to install the AutoUpdate Utility.

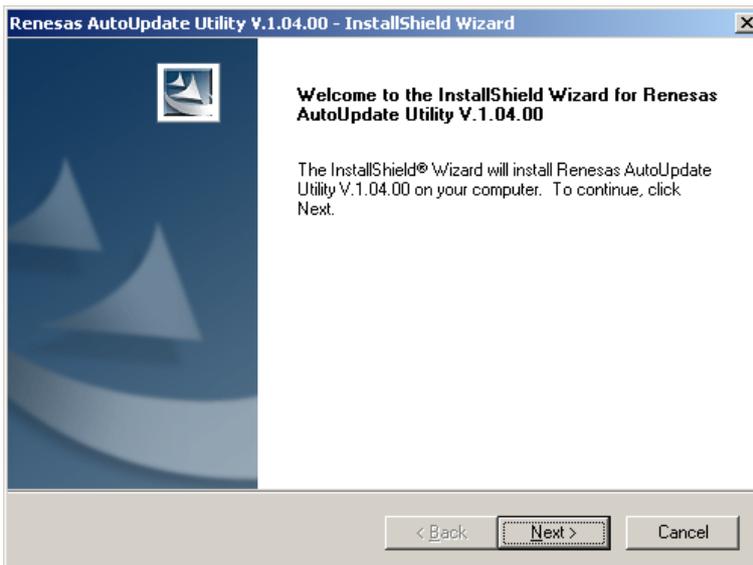


Figure 3.2.5 E10A-USB Software Installation Procedure (5/7)

Note: If the "AutoUpdate Utility" checkbox is not ticked, above dialog box will not appear.

(6) Following window as Figure 3.2.6 will appear after the installation is completed. Click "Finish".

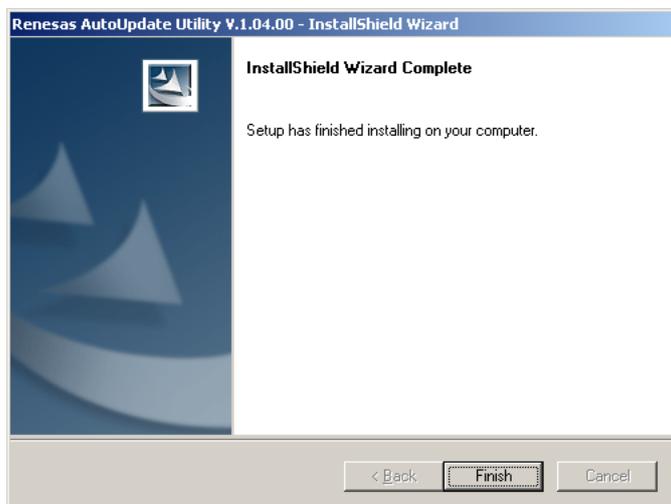


Figure 3.2.6 E10A-USB Software Installation Procedure (6/7)

(7) Following window will appear when all installation is completed. Click "Exit".

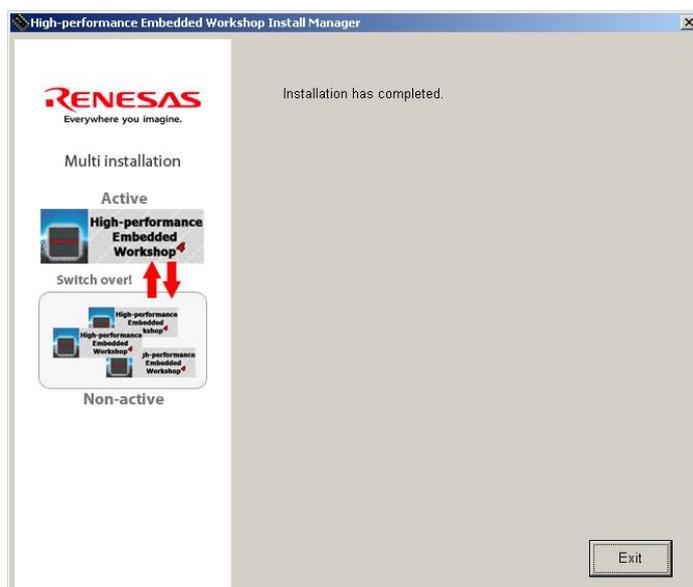


Figure 3.2.7 E10A-USB Software Installation Procedure (7/7)

3.2.2 Set Up the E10A-USB Emulator

(i) Set Up New Firmware

This section explains how to set up the E10A-USB emulator for the first time.

When the installed E10A-USB emulator firmware supports the SH-2A device group, skip this step and go to paragraph (ii) “Setup the E10A-USB Emulator Driver”.

To setup the firmware, follow the on-screen instructions to change the DIP switches on the E10A-USB emulator. Figure 3.2.8 shows the DIP switches on the E10A-USB emulator.

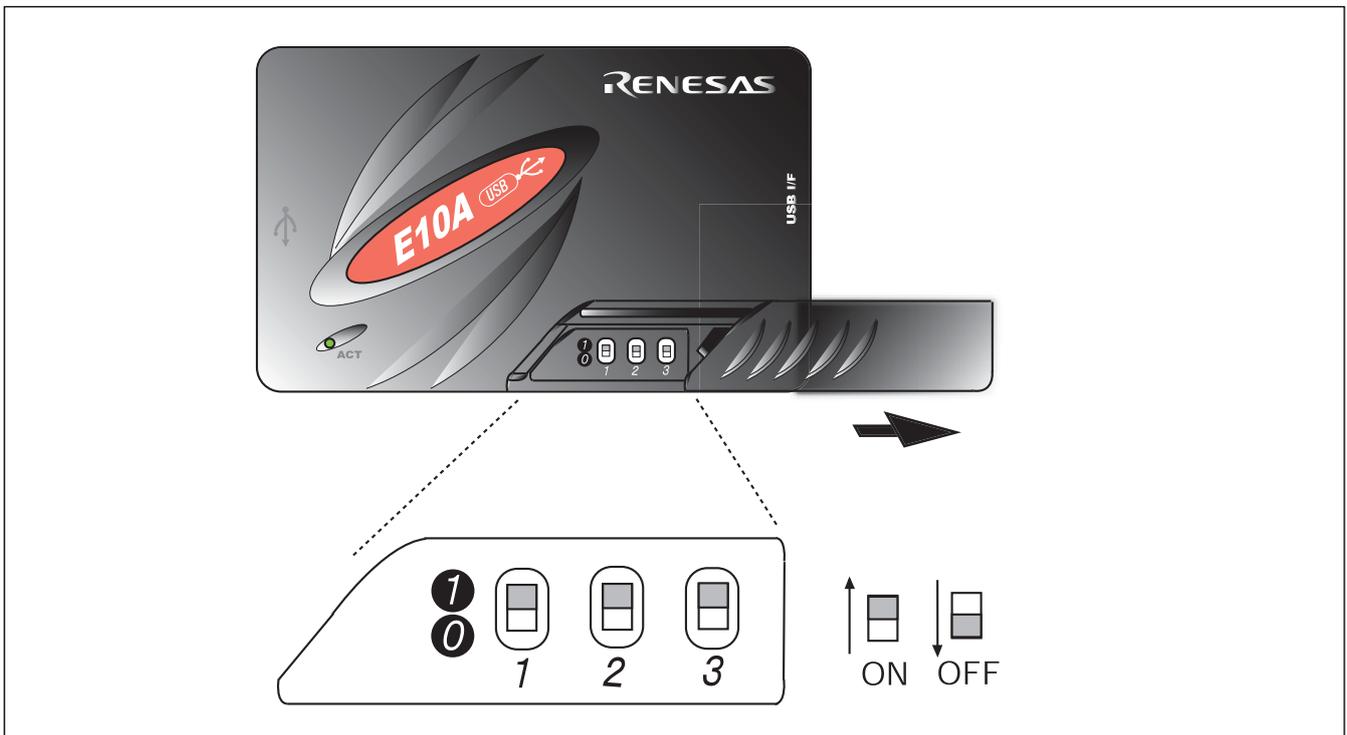


Figure 3.2.8 DIP Switches

- (1) Open the sliding switch cover of the E10A-USB emulator and check that the switch (SW1) for setting the emulator is turned to 1.
- (2) Select [All Programs] -> [Start] -> [Renesas High-performance Embedded Workshop] -> [Tools] -> [Setup Tool for E10A-USB Emulator] -> [SH-2A Device Group]. A setup tool for the E10A-USB emulator will start up.



Figure 3.2.9 E10A-USB Emulator Setup Tool

- (a) Device group of the emulator firmware: Shows the name of the device group currently set
- (b) Version number of the emulator firmware: Shows the version number of the software for controlling the SH-2A device group in the E10A-USB emulator
- (c) Version number of the setup program: Shows the version number of the setup program

Note: The version numbers shown in the dialog box depend on the version that the E10A-USB emulator supports.

Notes:

- (1) If the version numbers shown in (b) and (c) are the same, the emulator setup is not required. Set up the emulator only when "-.-.-.-" is shown in (b) or the version number shown in (b) is older than that of (c).
- (2) If the connected emulator does not support the SH7269 MCU, following error message will appear to terminate the setup tool. Purchase a license tool for device group additions for the SH7269 MCU to set up the firmware.



Figure 3.2.10 Error Message

- If the following error message appears, the host computer is not connected to the E10A-USB emulator or the setup switch (SW1) is turned to 0. If the setup switch (SW1) is 0, set it to 1 and connect the USB cable again. If the [Add New Hardware Wizard] appears, refer to (ii) "Set up the E10A-USB emulator driver".

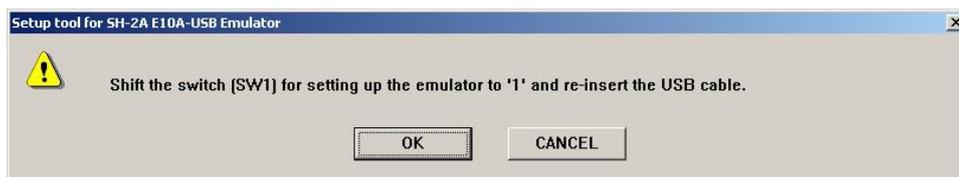


Figure 3.2.11 Error Message

(3) Clicking the "Setup" button (Figure 3.2.9) shows the following dialog box.

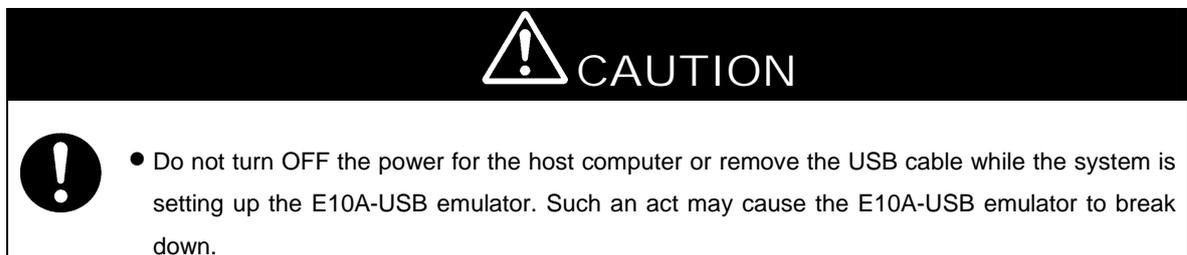


Figure 3.2.12 [Setup Tool for SHxxxx E10A-USB Emulator] Dialog Box

(4) Turn the setup switch (SW1) to 0, connect the USB cable again, and click "OK". The system will start setting up the E10A-USB emulator firmware.



Figure 3.2.13 Firmware Set Up Started



(5) When the following dialog box appears, the E10A-USB emulator setup is completed.



Figure 3.2.14 Setup Completed

- (6) When the E10A-USB emulator setup has been completed, the following message will appear.
Turn the setup switch (SW1) to 1, connect the USB cable again, and click "OK".

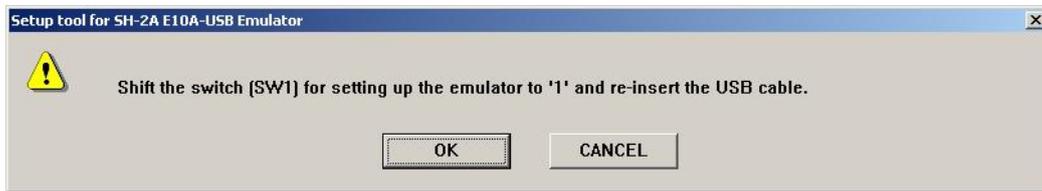


Figure 3.2.15 [Setup Tool for SH-2A E10A-USB Emulator] Dialog Box

Note: Be sure to turn the SW1 to 1 except when using the setup tool.

- (7) The following dialog box will appear again. Check if it is the latest version of the firmware, and click "Exit". The new firmware setup is now completed.



Figure 3.2.16 E10A-USB Emulator Setup Tool (Completed)

Note: The version numbers shown in the dialog box depend on the version that the E10A-USB emulator supports.

(ii) Set Up the E10A-USB Emulator Driver

Following describes how to set up the E10A-USB emulator driver.

The setup procedure described below is for the Windows XP.

Note: Following dialog boxes appear when the E10A-USB emulator driver is set up for the first time or when the emulator is connected for the first time after the USB port on the host computer is changed. It may take some time to appear the dialog box.

(1) [Welcome to the Found New Hardware Wizard] is activated.

Select the "Install from the list or specific location [Advanced]" radio button, and then click "Next".



Figure 3.2.17 Found New Hardware Wizard (1/4)

(2) Select the "Search for the best driver in these locations" radio button and tick the "Search removable media (floppy, CD-ROM...)" checkbox. Then click "Next".



Figure 3.2.18 Found New Hardware Wizard (2/4)

- (3) Search for the driver in the CD-ROM, select "<drive>:\drivers\usb\%xp%\usb_cdr.inf", and then click "Next". The underlined 'xp' indicates the version of the operating system (This example is for Windows XP).

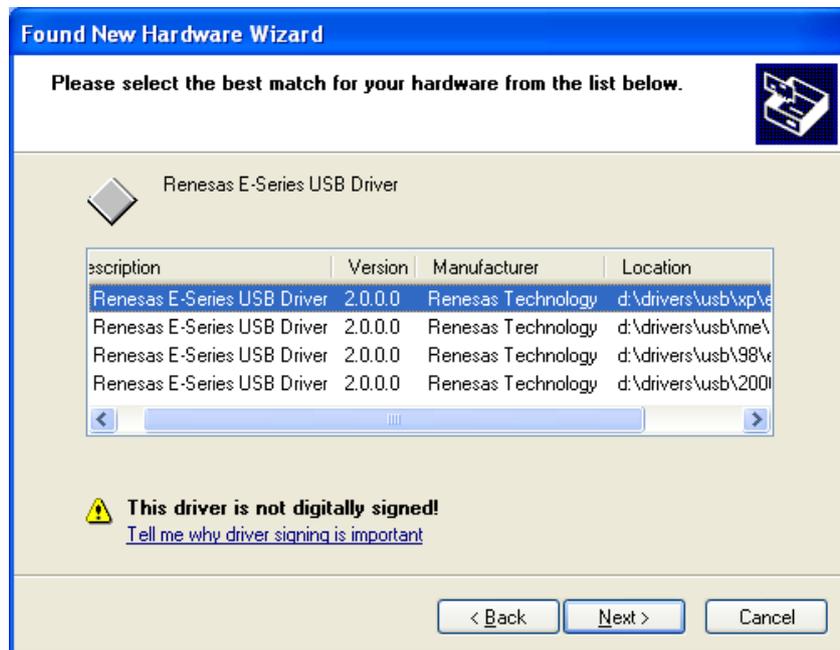


Figure 3.2.19 Found New Hardware Wizard (3/4)

Note: When an error message saying the software you are installing has not passed Windows Logo testing.. appears, just click "Continue Anyway". The version numbers shown in the dialog box depend on the version that the E10A-USB emulator supports.

- (4) [Completing the Found New Hardware Wizard] dialog box will appear. Click "Finish". The E10A-USB emulator driver setup is now completed.



Figure 3.2.20 Found New Hardware Wizard (4/4)

(5) Activate the Device Manager to confirm whether the USB controller driver has been installed.

➤ Activating Device Manager

[Start] -> [Control Panel] and double-click [System] icon. In [Properties] dialog box, click the [Hardware] tab, and then click [Device Manager].

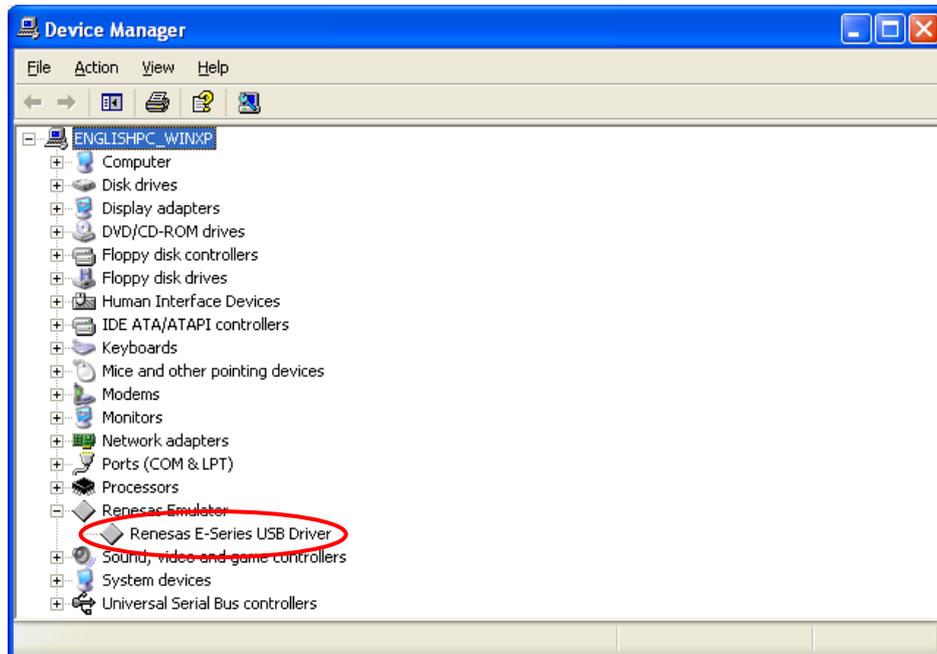


Figure 3.2.21 Confirming the USB Controller Driver is Installed (Device Manager)

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4. Executing the Software

4.1 Execute the Sample Software

This product comes with the sample software for checking the hardware operation and referring for the software development. Following describes how to download the load module of the sample software.

Note: Set DIP switches (SW5, and SW6) on the SH7269 CPU Board as the default setting to execute the sample software.

4.1.1 Prepare to Download the Sample Software

Copy "Sample_software" directory stored in the CD-ROM into the working directory of the host computer. When the "Sample_software" directory is created with a read-only attribute, cancel the read-only attribute. Do not use double-byte characters in the directory path. Presence of such characters may cause the wrong operation of the cross tools.

The explanation below assumes that this directory has been copied to the "C:\¥Workspace directory".

Notes:

- (1) The High-performance Embedded Workshop and the E10A-USB emulator software must be installed to download the load module of the sample software. (Refer to Chapter 0)
- (2) The SuperH RISC engine C/C++ Compiler Package must be installed to modify the sample software. Refer to 1.5 What You Need to Get Started (Not included in this product).

4.1.2 SH7269 CPU Board and E10A-USB Startup (High-performance Embedded Workshop Startup)

- (1) Connect the host computer and the E10A-USB emulator.
- (2) Connect the SH7269 CPU Board and the E10A-USB emulator. (Do not turn ON the power for the CPU board yet.)
- (3) Select [Start] menu -> [All Programs] -> [Renesas] -> [High-performance Embedded Workshop] (folder) -> [High-performance Embedded Workshop].
- (4) The [Welcome!] dialog box will appear.

Select the "**Browse to another project workspace**" radio button and click "OK".

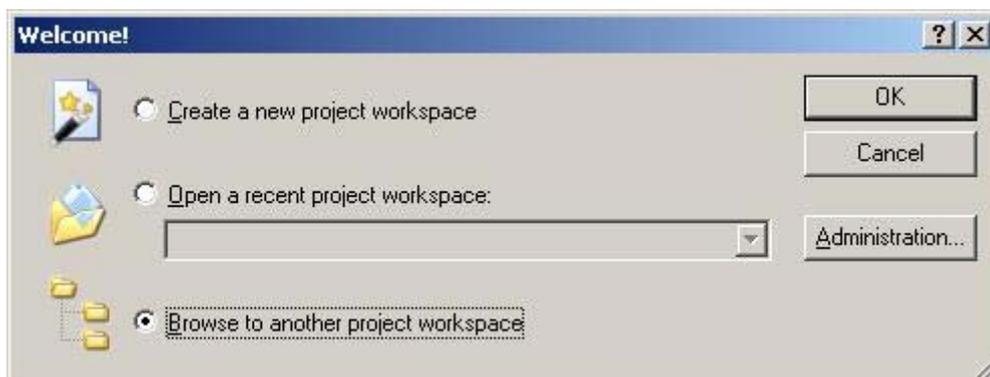


Figure 4.1.1 [Welcome!] Dialog Box

Note: A project workspace is a work area for user to store projects and their configurations. A project consists of a configuration necessary to create programs or final binary files and a set of files. For more information about the project workspace, refer to the SuperH RISC engine High-performance Embedded Workshop 4 User's Manual.

(5) The [Open Workspace] dialog box will appear, specify the following directory.

Directory to store the sample software:

"C:\¥Workspace¥Sample_software¥sh7269_sample"

(6) After specifying the directory, select the following file and click "Select" to open.

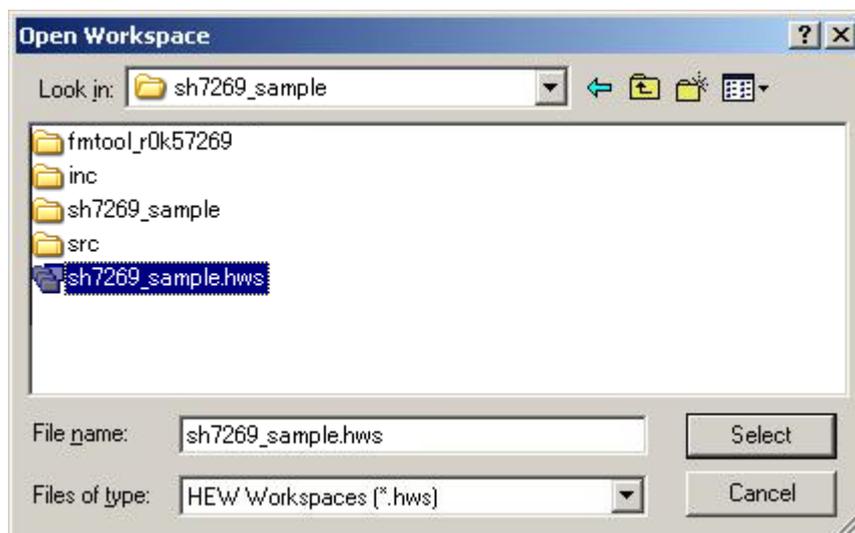


Figure 4.1.2 [Open Workspace] Dialog Box

Note: The dialog box that indicates the directory in the workspace has been moved may appear at the first time. Click "Yes" to continue.

(7) The [Select Emulator mode] dialog box will appear.

Select "SH72691" as the device, and "E10A-USB Emulator" as the emulator mode. Then, click "OK".

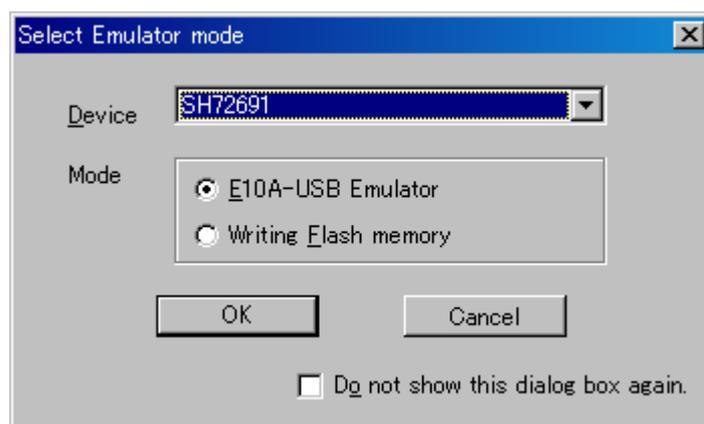


Figure 4.1.3 [Select Emulator mode] Dialog Box

Note: A message "Please choose driver" will appear at the first time. Click "OK" to show the following window to select the driver. Select "Renesas E-Series USB Driver".

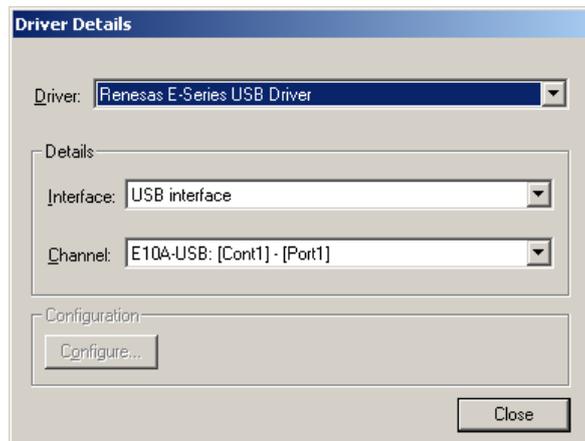


Figure 4.1.4 [Driver Details] Dialog Box

(8) Following dialog box will appear and start to connect the emulator.



Figure 4.1.5 [Connecting] Dialog Box

(9) The following dialog box will appear.



Figure 4.1.6 Dialog Box to request the Reset signal input

- (10) Turn ON the power for the SH7269 CPU Board.
- (11) Press the reset button (SW2) on the SH7269 CPU Board and click "OK" on the dialog box.
- (12) If the reset signal cannot be detected, the following dialog box will appear. Click "Ignore" to issue an internal reset to the CPU and to start up the system.



Figure 4.1.7 [Cannot find /RESET Signal] Dialog Box

- (13) When the message "Connected" appears in [Output] window of the High-performance Embedded Workshop, the E10A-USB emulator startup is now completed.

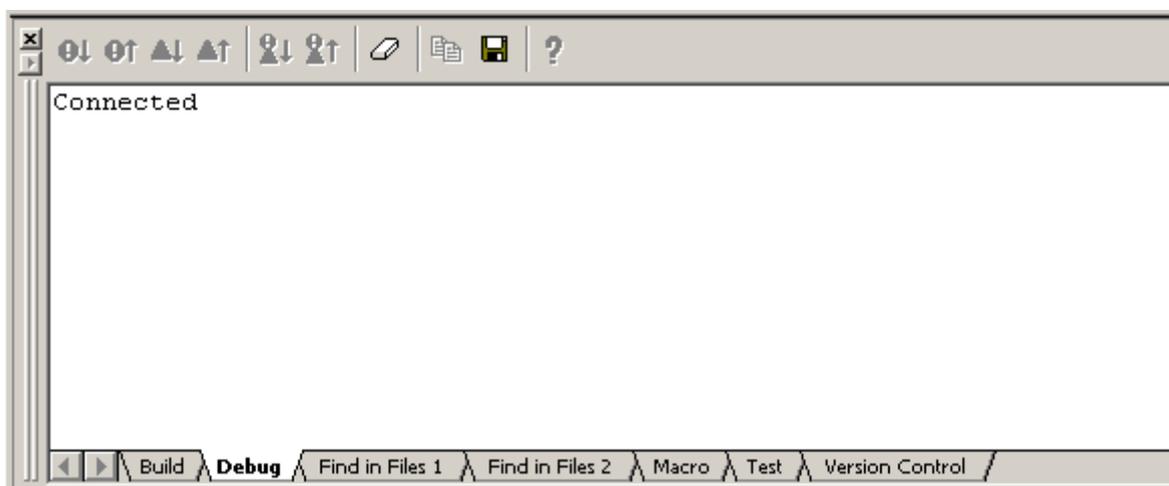


Figure 4.1.8 [Output] Window

4.1.3 E10A-USB Emulator Connection Error Dialog

When the E10A-USB emulator does not start up, the following dialog box will appear.

- (a) When the following dialog box appears and the emulator cannot be activated as (11) on the top of page 4-5, the SH7269 CPU Board system power may not be supplied. Check the power supply of the SH7269 CPU Board.



Figure 4.1.9 [Can not find /RESET signal] Dialog Box

- (b) When the following dialog box appears, the H-UDI pins and the H-UDI port connector may not be connected correctly. Check the connection between the H-UDI pins and the H-UDI port connector.

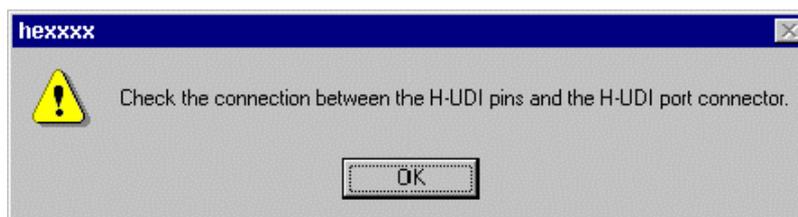


Figure 4.1.10 [Check the Connection] Dialog Box

- (c) When the following dialog box appears, the E10A-USB emulator firmware may not be set up correctly. Use the setup tool or the license tool for device group addition to set up the firmware for the device group to use.



Figure 4.1.11 [The Product Currently Connected] Dialog Box

- (d) When the following dialog box appears, the version of the firmware set up in the E10A-USB emulator may be old. Use the setup tool to set up the appropriate version of the firmware.



Figure 4.1.12 [The Version of the Emulator Firmware is incorrect] Dialog Box

(e) If the driver has not been set up correctly, the following dialog box will appear.

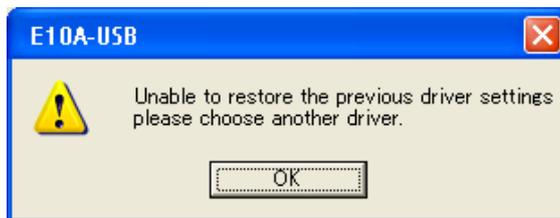


Figure 4.1.13 [Unable to restore the previous driver setting] Dialog Box

(f) When a wrong device is selected, the following dialog box will appear.

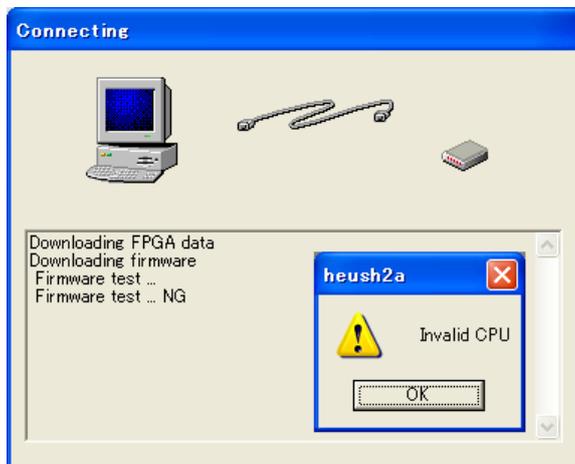


Figure 4.1.14 [Invalid CPU] Dialog Box

4.1.4 How to Download the Sample Software

This section describes how to download the load module of the sample software.

Download the load module in the SH7269 CPU Board external flash memory.

For details about flash memory download setting, refer to the SuperH Family E10A-USB Emulator User's Manual.

(1) Set up the flash memory download function

From [Setup] menu -> [Emulator] -> [System...], open [Configuration] dialog box and then [Loading flash memory] tab.

For "File Name", specify the flash memory download program "fntool_r0k57269.mot". The sample workspace shall have the flash memory download program in the following directory.

"C:\WorkSpace\Sample_software\sh7269_sample\fntool_r0k57269"

As shown in Figure 4.1.15, select "Enable" for Loading Flash Memory. Check "File name", "Bus width of flash memory" and "Entry point" are set as shown below, and click "OK".

Notes:

- (1) Check the configuration on the "Loading flash memory" tab every time the E10A-USB emulator is attached.
- (2) The writing module erases the sector in the flash memory in the "fntool_r0k57269.mot". Select "**Disable**" radio button for "Erasing flash memory".

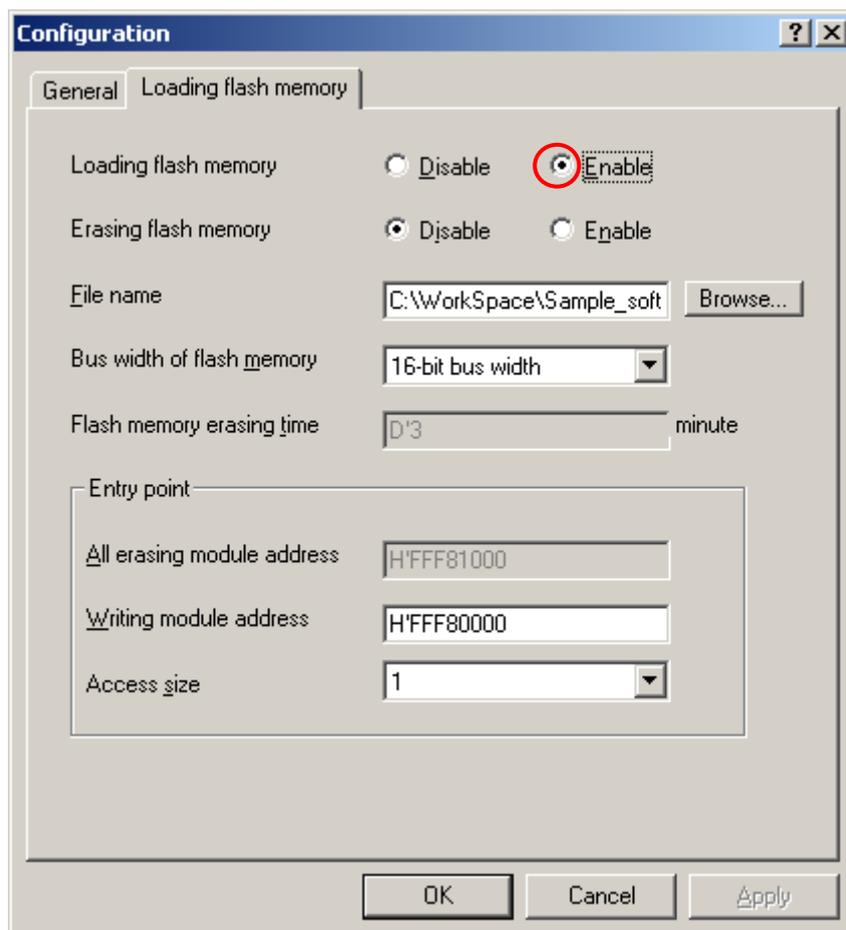


Figure 4.1.15 [Configuration] Dialog Box

(2) Specify the command batch file before downloading

Execute the script file "fmtreeool_r0k57269.hdc", consisting of the access timing and the bus control signal setting for the SH7269 CPU Board flash memory before downloading the sample software.

The following script file is assumed to be stored in the sample workspace.

```
"C:\WorkSpace\Sample_software\sh7269_sample\fmtreeool_r0k57269"
```

Open [Debug] menu -> [Debug Settings], and select [Options] tab. Check that the items on this tab are set as shown below.

Command batch file load timing (B): Before download of modules

Command line batch processing (L): "\${WORKSPDIR}\fmtreeool_r0k57269\fmtreeool_r0k57269.hdc"

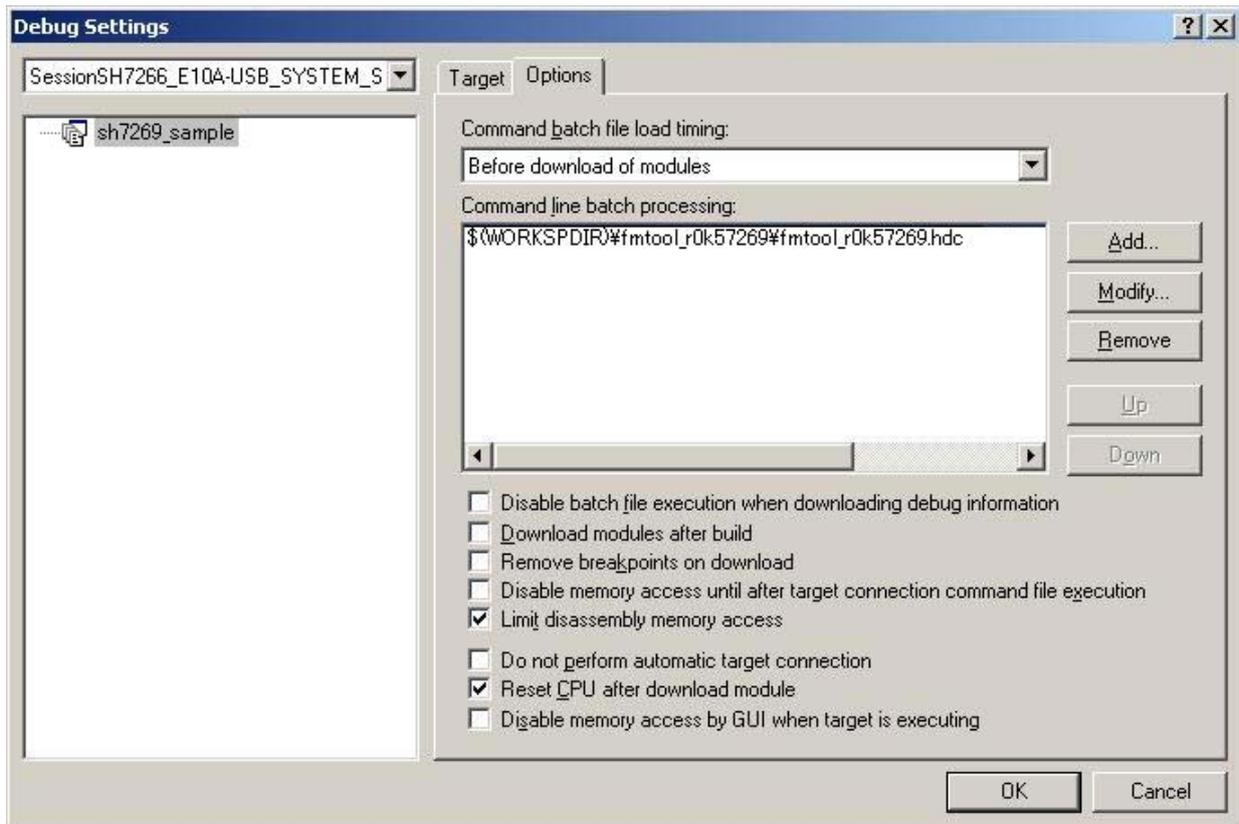


Figure 4.1.16 [Debug Settings] Dialog Box

(3) Activate the command line window

When downloading the load module of the sample software, activate the [Command Line] window to check whether the script file is running.

Select [View] menu -> [Command Line] to check whether [Command Line] window is opened.

Note: If the script file is not executed, downloading the load module into the flash memory cannot be completed.

(4) Download the sample load module

Select [Debug] menu -> [Download modules] to select the sample load module. Figure 4.1.17 shows the download operation window.

Immediately after the sample load module is selected, the script file is automatically executed. Then, the system starts downloading the sample load module.

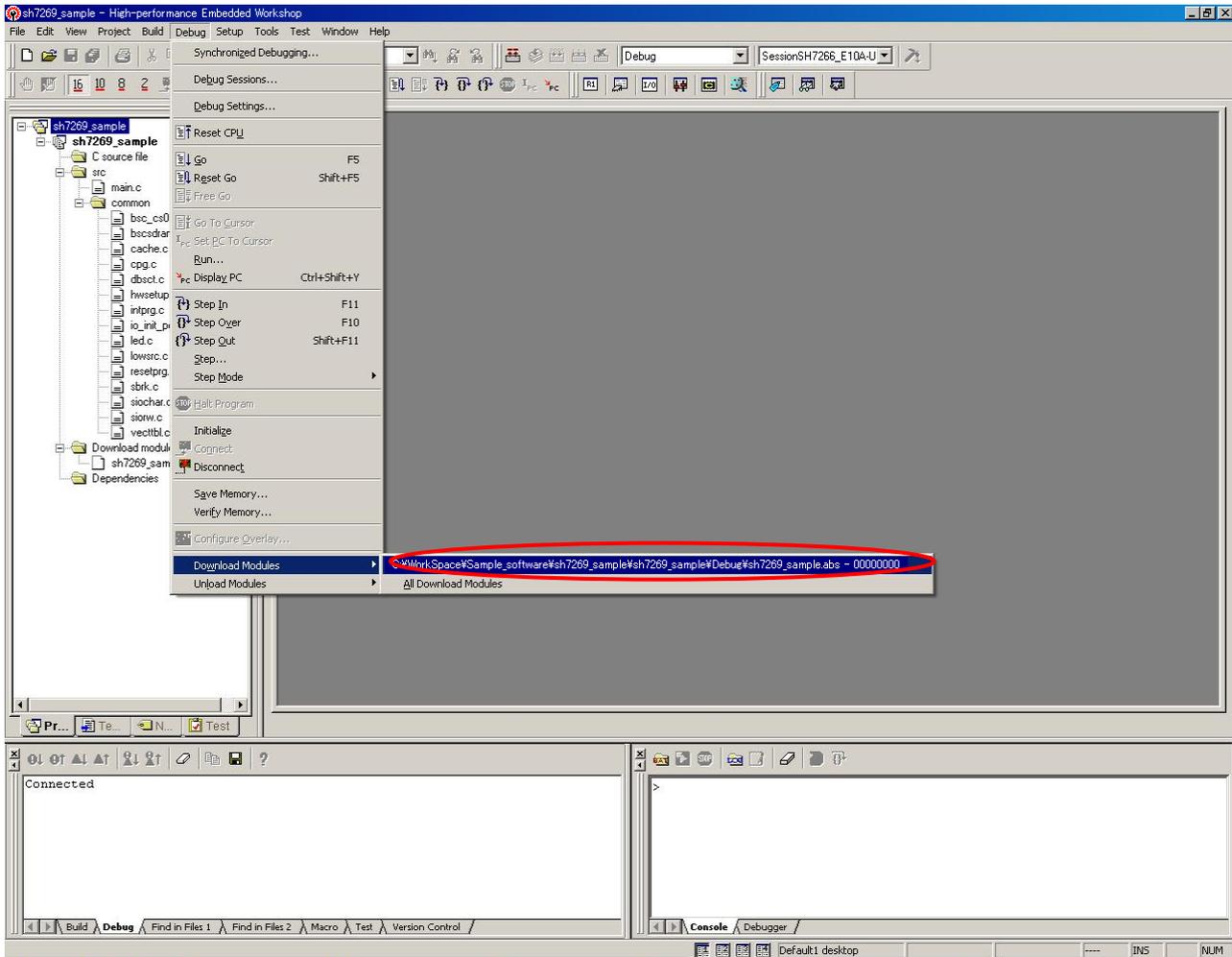


Figure 4.1.17 [Download Operation] Window

(5) Download completed

When the downloading of the sample load module is completed, the program counter will appear in "resetprg.c".

(See Figure 4.1.18)

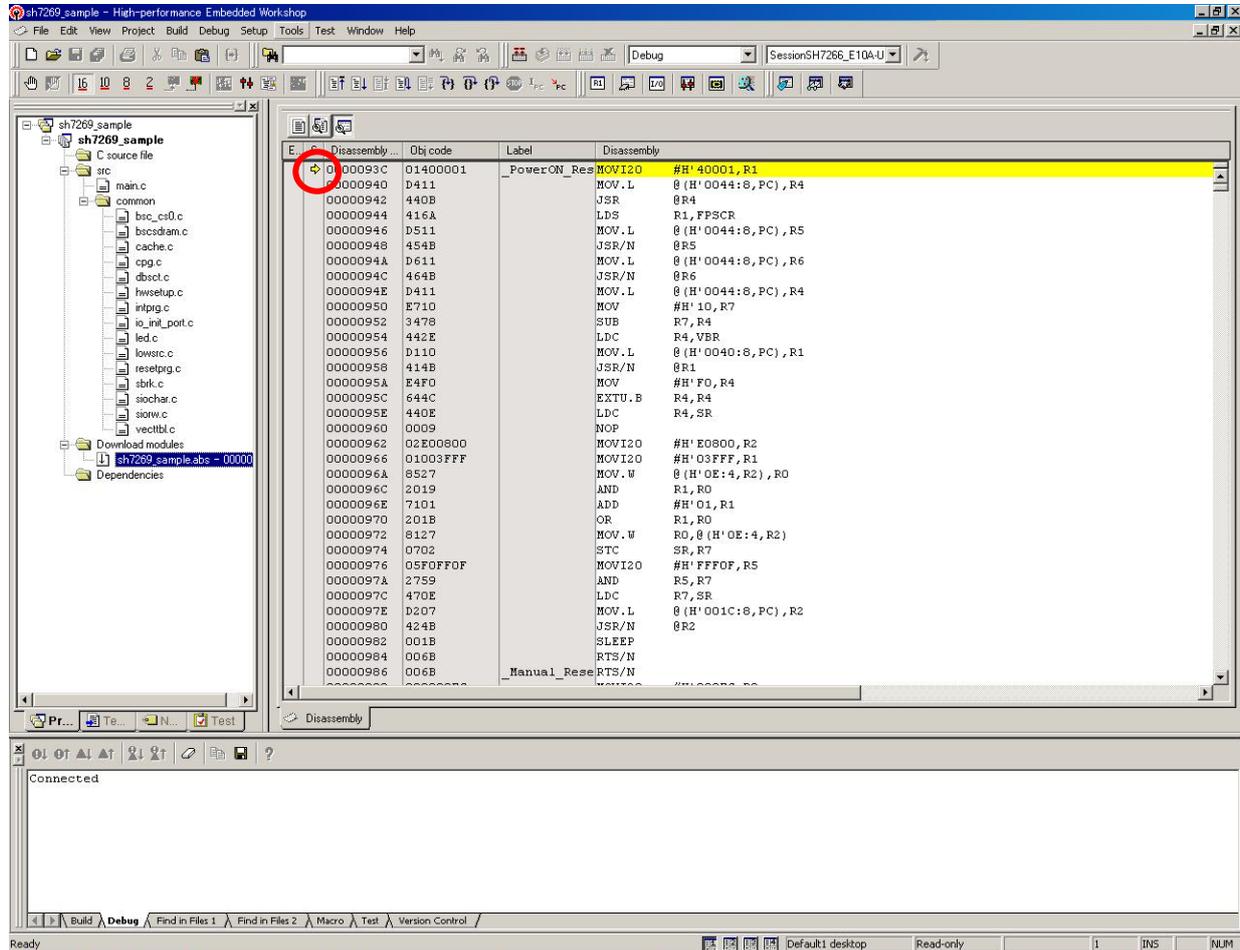


Figure 4.1.18 Download Completed

(6) Execute the program

Select "Go" from the [Debug] menu to execute the software (See Figure 4.1.19).

If the sample software is downloaded correctly, LED2 on the SH7269 CPU Board is on or off in half-second intervals.

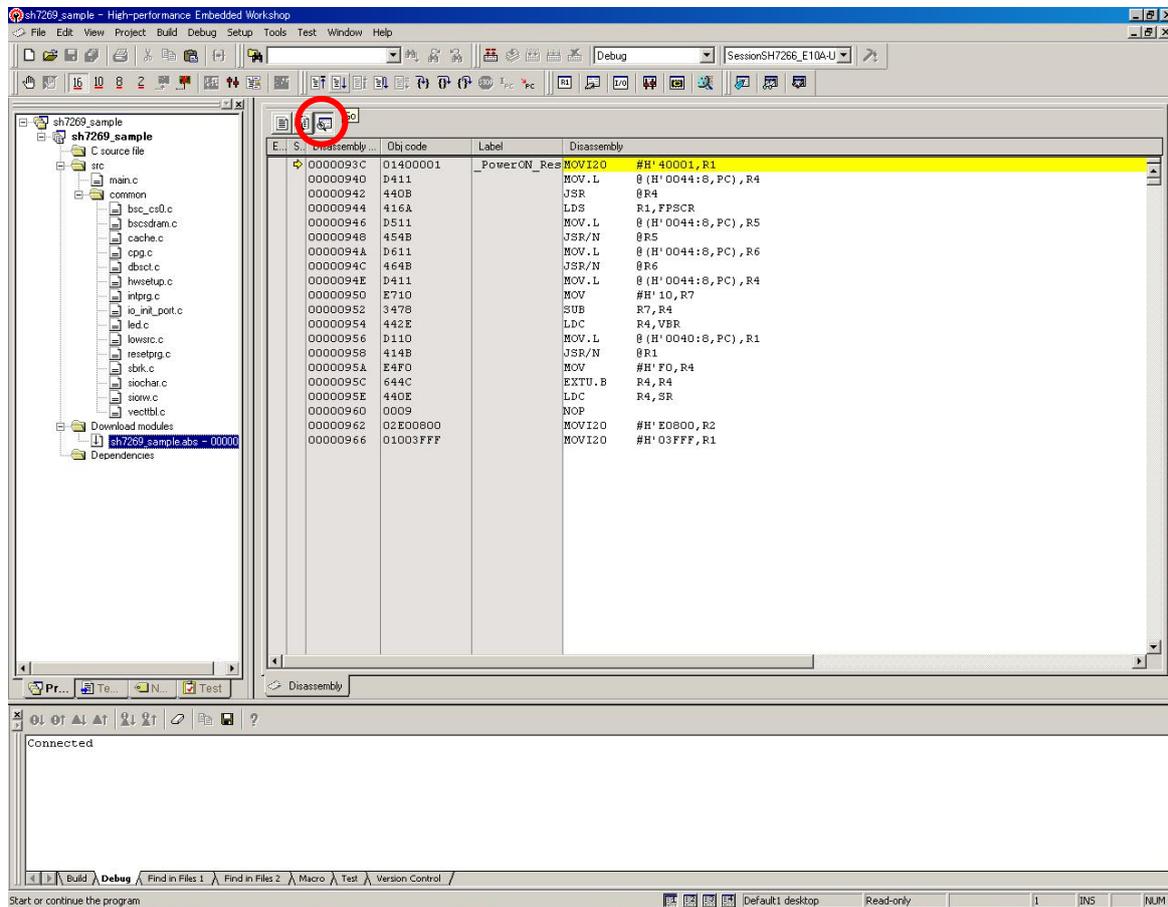


Figure 4.1.19 Executing the Program

Note: The contents of "resetprg.c" may depend on the version of the sample software. If an error occurs or the sample software does not operate correctly, the hardware or the software may not have been setup correctly. Check the setup procedures in Chapter 2 and Chapter 0.

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5. Creating and Running a New Project Workspace

5.1 Create a New Project Workspace

This section explains how to create a new project workspace in the SH7269 CPU Board.

Following are steps to create a load module from a new project workspace, to download the load module into the SH7269 CPU Board external flash memory, and to execute the module.

5.1.1 Prepare to Create a New Project Workspace

Copy "Sample_software" directory stored in the CD-ROM to the working directory of the host computer. If the "Sample_software" directory is created with a read-only attribute, cancel the read-only attribute. Do not use double-byte characters in the directory path. Presence of such characters may cause the wrong operation of the cross tools.

The explanation below assumes that this directory has been copied to the "C:\¥WorkSpace¥sample_software"

Note: To create a new project workspace, the High-performance Embedded Workshop, E10A-USB emulator software, and the SuperH RISC engine C/C++ Compiler Package must be installed in the host computer.

5.1.2 How to Create a New Project Workspace

- (1) Connect the host computer and the E10A-USB emulator.
- (2) Connect the SH7269 CPU Board and the E10A-USB emulator. (Do not turn ON the power for the CPU board yet.)
- (3) Select [Start] menu -> [All Programs] -> [Renesas] -> [High-performance Embedded Workshop] (folder) -> [High-performance Embedded Workshop].
- (4) The [Welcome!] dialog box will appear.
- (5) In this dialog box, select the "Create a new project workspace" radio button and click "OK".

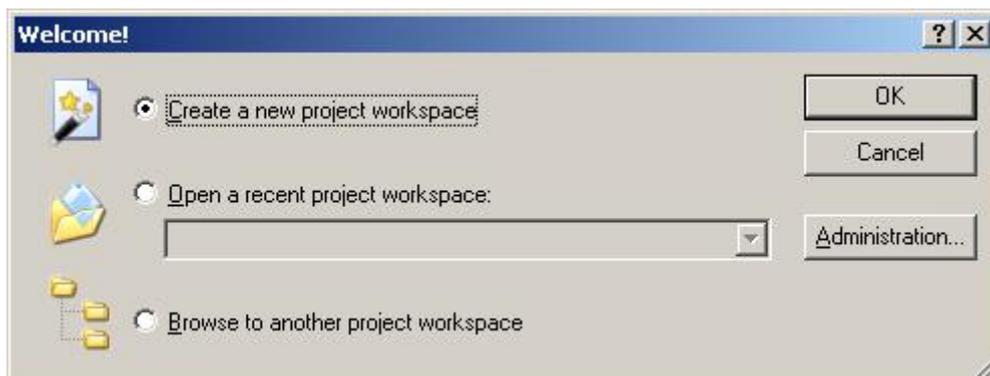


Figure 5.1.1 [Welcome!] Dialog Box

(6) Project Generator will start.

This manual uses "test" for the workspace name. Check that the Directory, CPU family and Tool chain are set as follows, then click "OK".

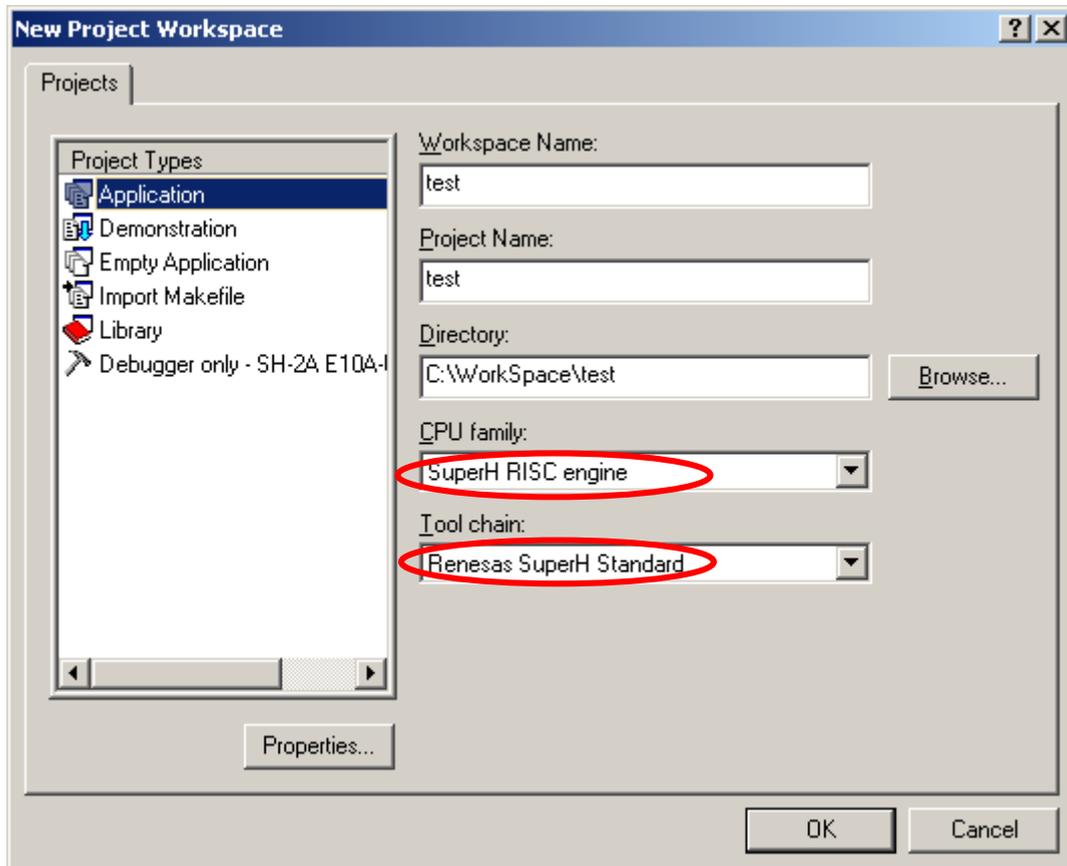


Figure 5.1.2 [New Project Workspace] Dialog Box

(7) In the [New Project-1/9-Select Target CPU] dialog box, select "SH-2A FPU" for the CPU Series, and "Other" for the CPU Type from the drop-down list.

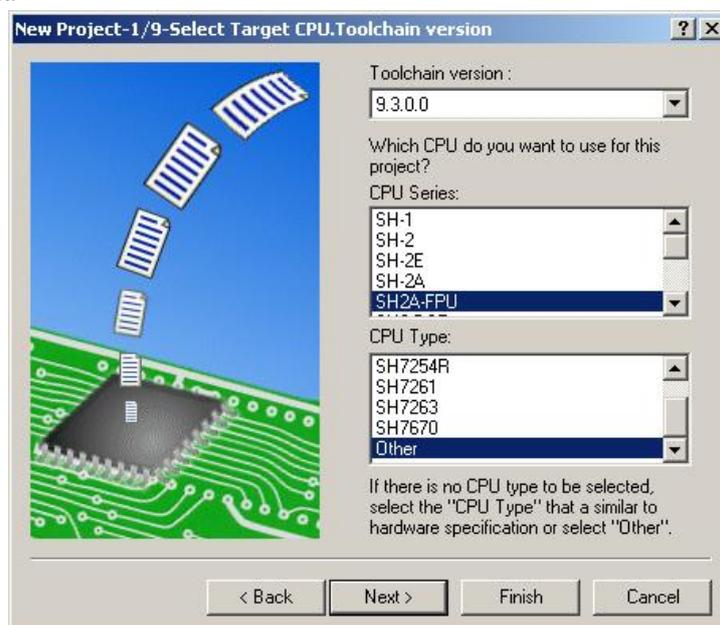


Figure 5.1.3 [New Project-1/9] Dialog Box

(8) Specify the global options from [New Project-2/9] dialog box.

FPU: Single

Round to: Zero

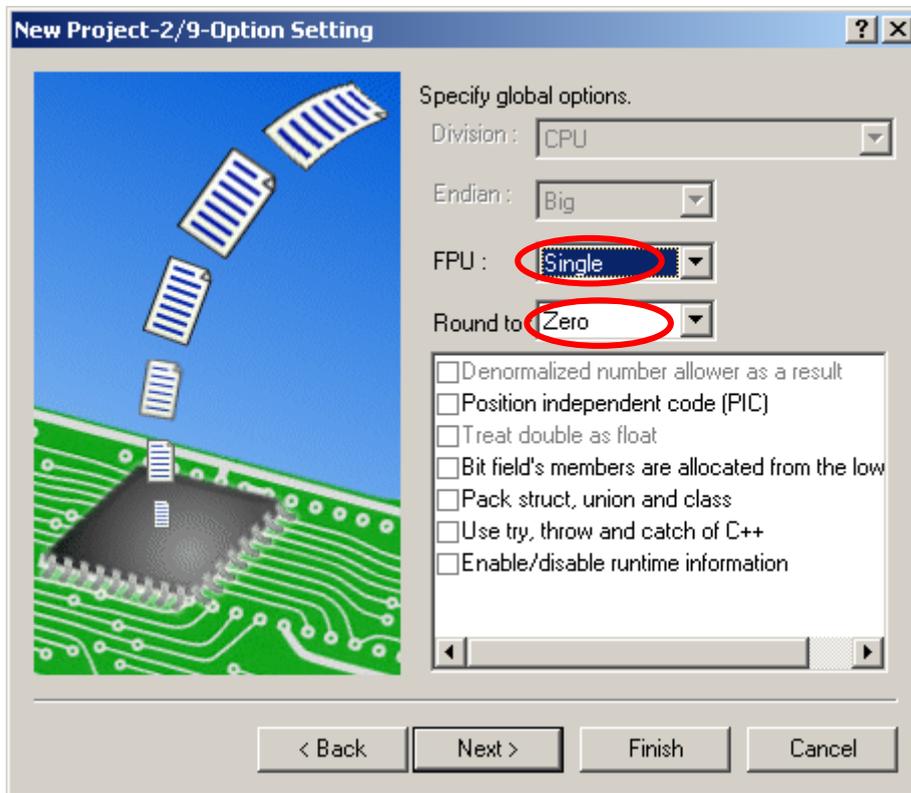


Figure 5.1.4 [New Project-2/9] Dialog Box

(9) Follow the on-screen instructions of the [New Project-3/9] and [New Project-4/9] dialog boxes. Leave the default setting in this installation step (Select the checkbox as appropriate). Click "Next".

(10) In the [New Project-5/9] dialog box, set up the stacks as follows and click "Next". Change the stack size as appropriate.

Stack Pointer Address: H'FFF90000

Stack Size: H'400

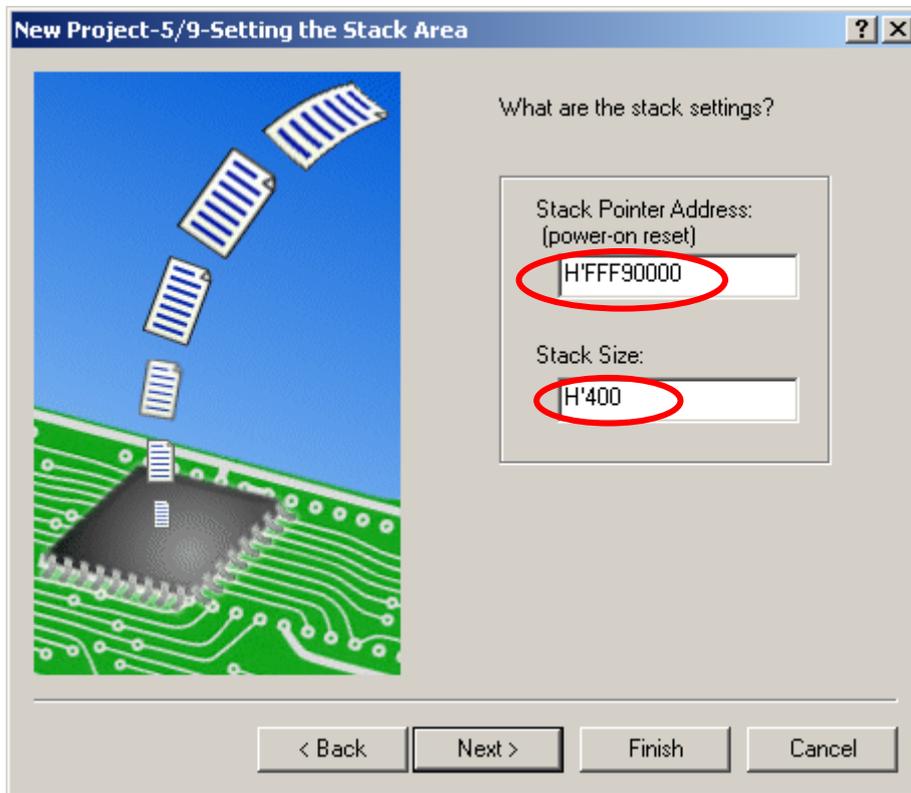


Figure 5.1.5 [New Project-5/9] Dialog Box

(11) In the [New Project-6/9] dialog box, set up a vector.

Leave default setting (the "Vector Definition Files" checkbox is selected) and click "Next".

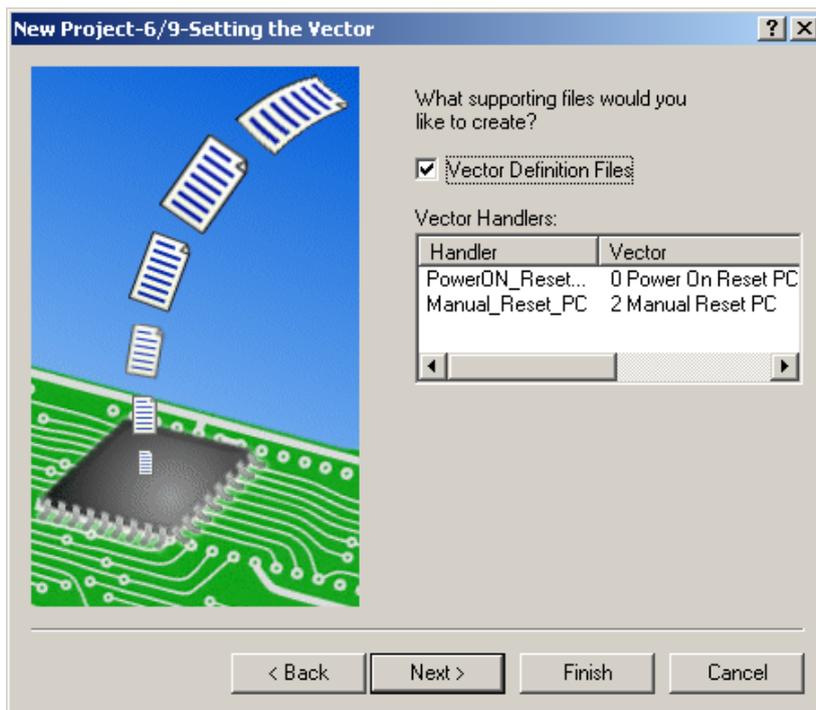


Figure 5.1.6 [New Project-6/9] Dialog Box

(12) In the [New Project-7/9] dialog box, set up the Target as below. Select the "Target type" and then select "Targets".

Target type: SH2A-FPU

Targets: SH7266 E10A-USB SYSTEM (SH2A-FPU)

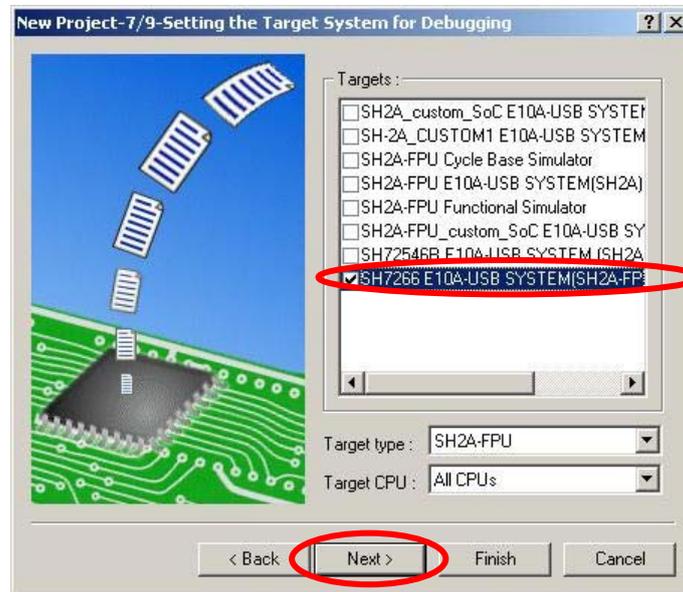


Figure 5.1.7 [New Project-7/9] Dialog Box

(13) Confirm setting in [New Project-8/9] and [New Project-9/9] dialog boxes and click "Finish".

Follow the on-screen instructions to finish the Project Generator.

The High-performance Embedded Workshop is activated and automatically generates the standard source files for the SH-2A device group.

(14) After the High-performance Embedded Workshop is activated, connect the E10A-USB emulator.

The E10A-USB emulator can be connected by switching session for the E10A-USB emulator as shown in Figure 5.1.8

Note: A dialog box to notify that the default session has been modified will appear. Click "Yes".

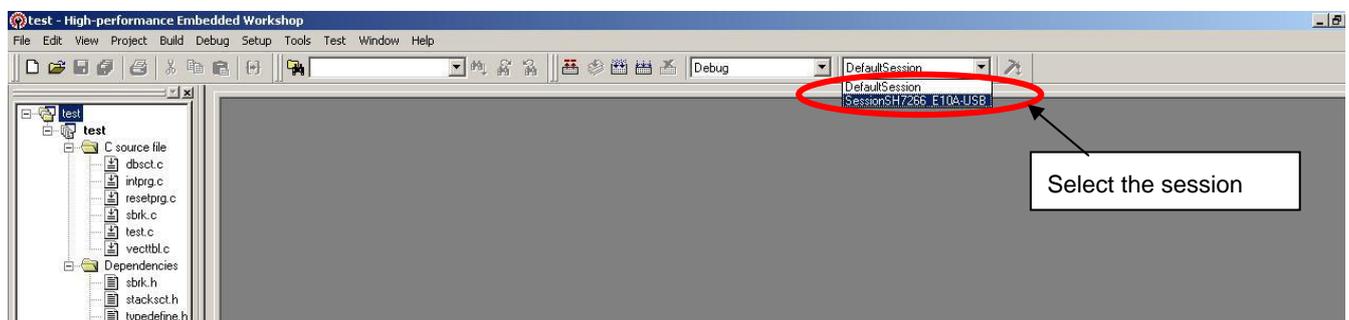


Figure 5.1.8 [E10A-USB Emulator Connection Setup] Window

(15) [Select Emulator mode] dialog box will appear.

For details to connect the E10A-USB emulator, refer to 4.1.2 SH7269 CPU Board and E10A-USB Startup (High-performance Embedded Workshop Startup) step 7 and later.

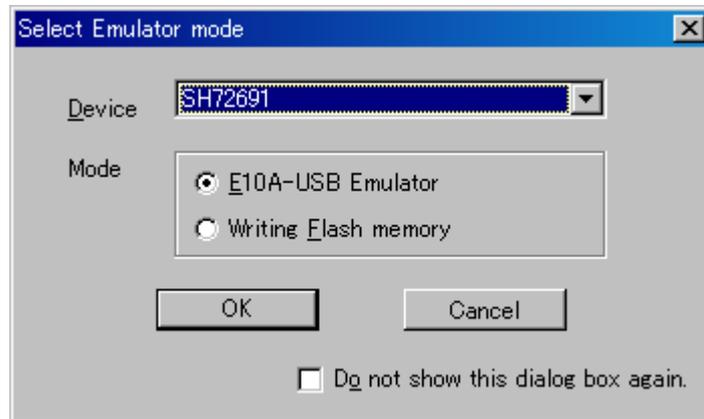


Figure 5.1.9 [Select Emulator mode] Dialog Box

(16) Execute build processing.

Select [Build] menu -> [Build] to execute the build processing.

After the E10A-USB emulator has been connected, execute build processing once without modifying the standard source file.

If a build error occurs here, the SuperH RISC engine C/C++ Compiler Package may not have been installed correctly.

5.2 How To Set Up the Flash Memory Download

This section describes how to set up the SH7269 CPU Board external flash memory download program.

The flash memory download program stored in the "C:\¥Workspace¥Sample_software¥sh7269_sample¥fmtreeool_r0k57269" directory is used in this manual.

For details about flash memory download setting, refer to the SuperH Family E10A-USB Emulator User's Manual.

5.2.1 Set Up the Flash Memory Download

- Set up the flash memory download function

From [Setup] menu -> [Emulator] -> [System...], select [Configuration] dialog box, and open [Loading flash memory] tab.

For "File Name", specify the flash memory download program "fmtreeool_r0k57269". The sample workspace shall have the flash memory download program in the following directory.

"C:\¥Workspace¥Sample_software¥sh7269_sample¥fmtreeool_r0k57269¥fmtreeool_r0k57269"

Set up "Loading flash memory", "File name", "Bus width of flash memory" and "Entry point" as shown in Figure 5.2.1 and Table 5.2.1. Then click "OK".

Note: Check the setting of the Loading flash memory every time the E10A-USB emulator is attached.

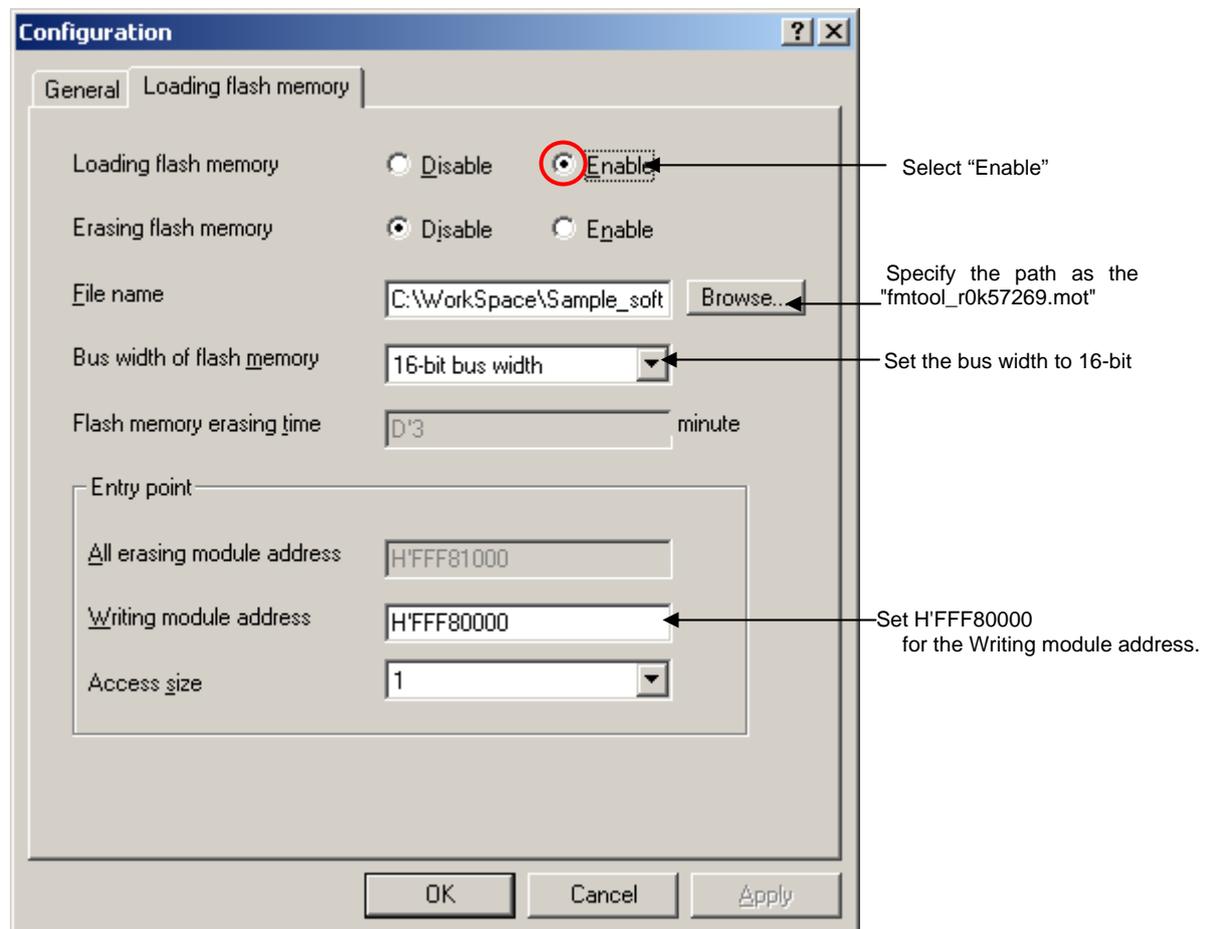


Figure 5.2.1 [Configuration] Dialog Box

Table 5.2.1 Flash Memory Setting

Loading flash memory	Enable
Erasing flash memory	Disable
File name	C:\WorkSpace\Sample_software\sh7269_sample\fmtool_r0k57269\fmtool_r0k57269.mot
Bus width of flash memory	16-bit
Flash memory erasing time	-
All erasing module address	-
Writing module address	H'FFF80000
Access size	1

5.2.2 Specify the Command Batch File Before Downloading

Execute the script file "fmtool_r0k57269.hdc", consisting of the access timing and bus control signal setting for the SH7269 CPU Board flash memory before downloading the flash memory download program.

Open [Debug] menu -> [Debug Settings] dialog box, and select [Options] tab.

Set up the items on this tab as shown below.

- Command batch file load timing (B): Before download of modules
- Command line batch processing (L):
"C:¥WorkSpace¥Sample_software¥sh7269_sample¥fmtool_r0k57269¥fmtool_r0k57269.hdc"

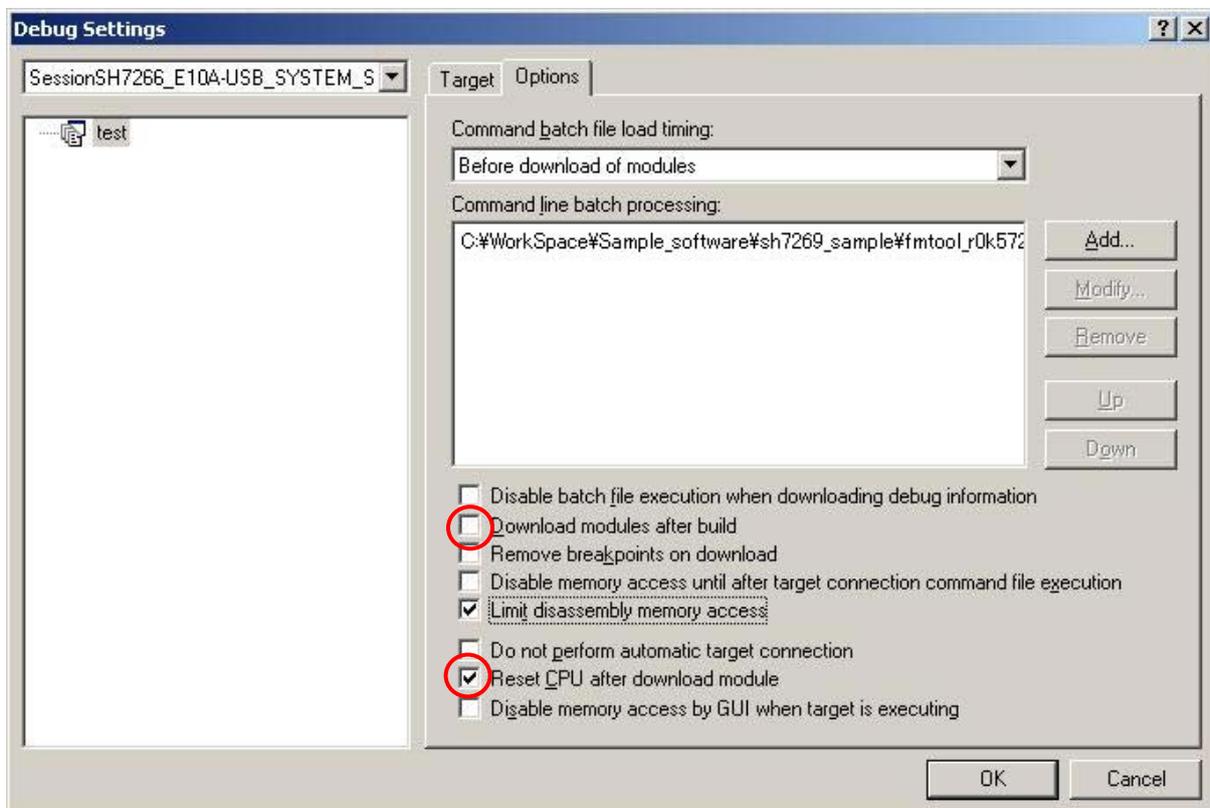


Figure 5.2.2 [Debug Settings] Dialog Box

Note: The "Download modules after build" checkbox is selected as default. However, clear this checkbox, and select "Reset CPU after download module", as shown above.

5.2.3 Activate the Command Line Window

Select [View] menu -> [Command Line] to open the [Command Line] window.

When downloading the load modules, activate the [Command Line] window to check whether the script file is executed.

Note: If the script file is not executed, downloading the load modules into the flash memory cannot be completed.

5.3 Add/Modify Hardware Setup Files

To operate the software on the SH7269 CPU Board, the hardware-dependent part of the SH7269 CPU Board must be set up.

Add or modify the SH7269 CPU Board hardware setting of the standard source files, which are automatically generated when you created a new project. How to add or modify the hardware setup files is described below.

The hardware-dependent setting means the access timing to the external memory (flash memory, and SDRAM), the operating clock setting, and the cache memory setting.

5.3.1 Copy Hardware Setup Files

Copy the "HardwareSetup" directory stored in the CD-ROM into the new project workspace directory "C:\¥WorkSpace¥test", created in 0.

The explanation given below assumes that the hardware setup files are stored in "C:\¥WorkSpace¥test¥HardwareSetup" directory.

5.3.2 Remove the Standard Source Files

(1) Select [Project] -> [Remove Files...].

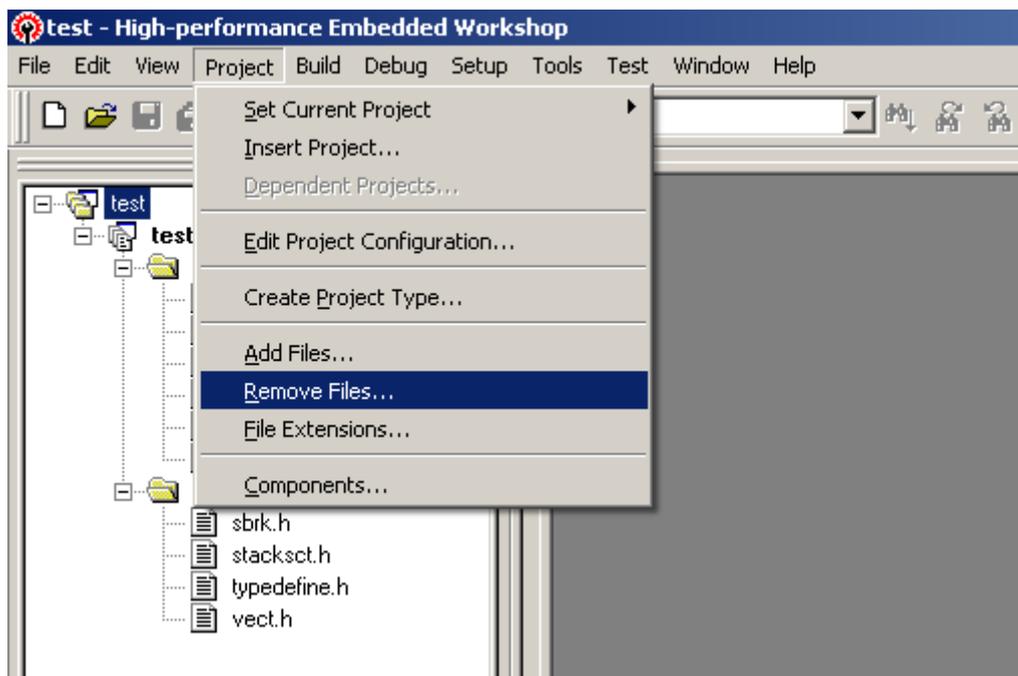


Figure 5.3.1 Remove Files (1/2)

- (2) Select the files "dbstc.c", "intrpg.c", "resetprg.c", "sbrk.c", and "vecttbl.c" from the [Remove Project Files] dialog box, and click "Remove".

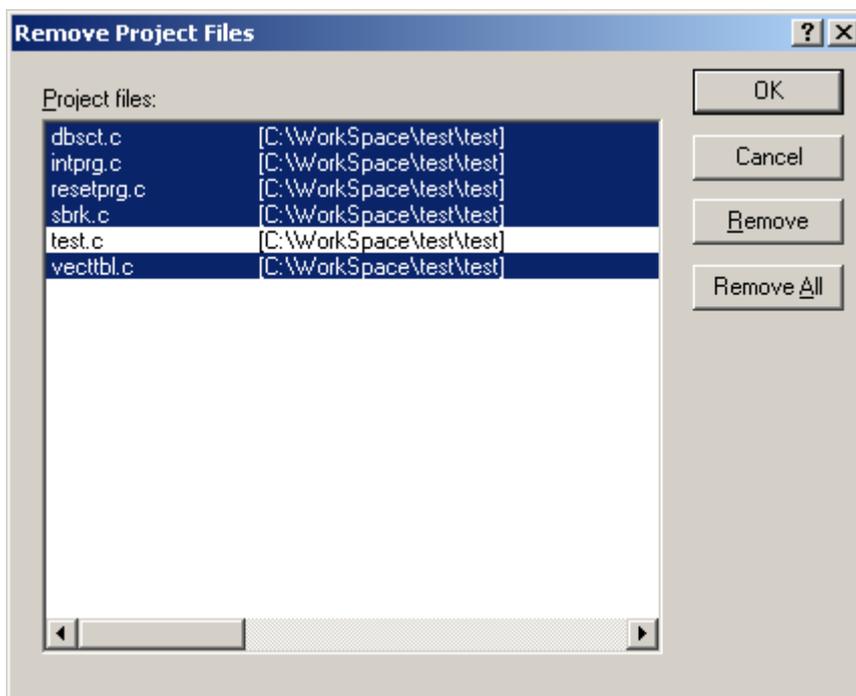


Figure 5.3.2 Remove Files (2/2)

5.3.3 Add Hardware Setup Files

- (1) Select [Project] -> [Add Files...].

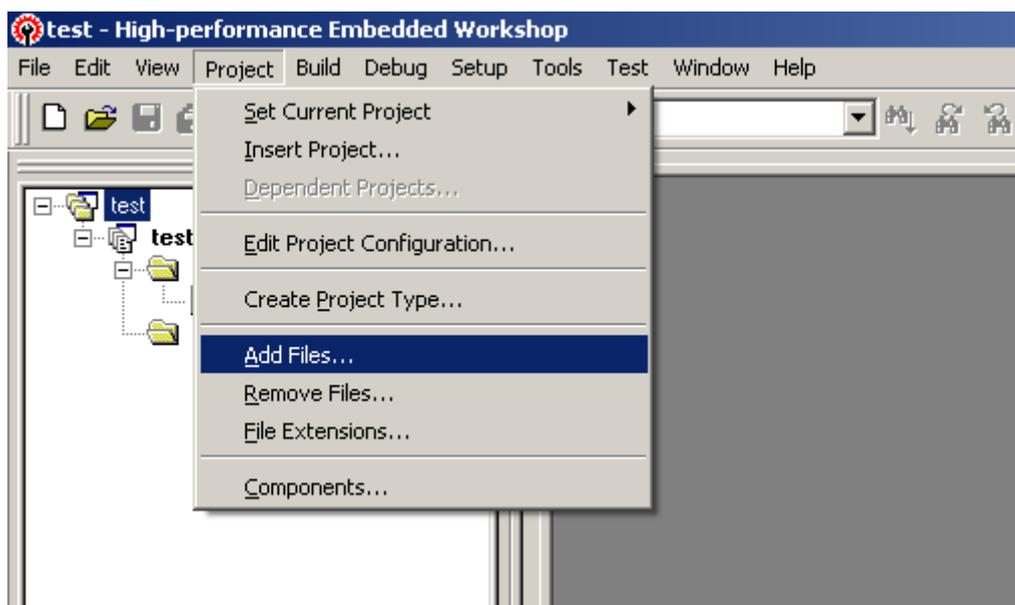
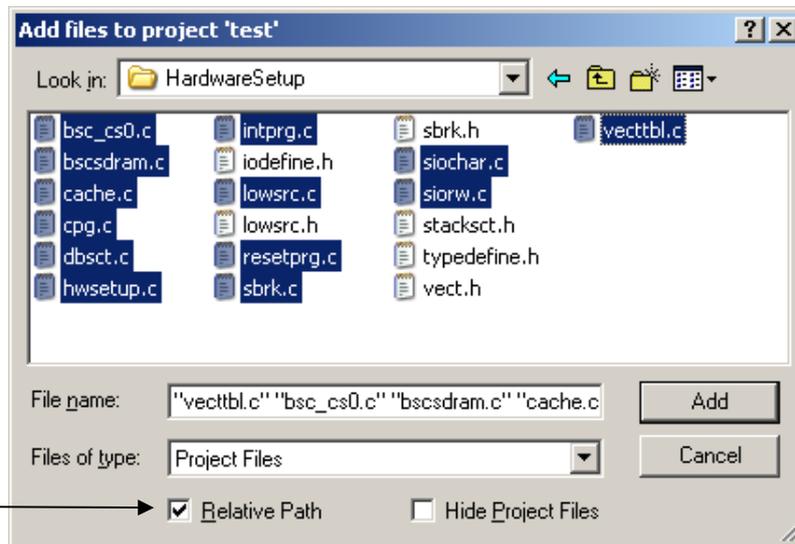


Figure 5.3.3 Add Files (1/3)

(2) From the copied hardware setup files "C:\WorkSpace\test\HardwareSetup" directory, add the files listed below.

"bsc_cs0.c", "bscsdram.c", "cache.c", "cpg.c", "dbstc.c", "hwsetup.c", "intprg.c", "lowsrc.c",
"resetprg.c", "sbrk.c", "siochar.c", "siorw.c", "vecttbl.c"

(Select the "Relative Path" checkbox)



Select the "Relative Path" checkbox

Figure 5.3.4 Add Files (2/3)

(3) Confirm that the files have been added as shown below.

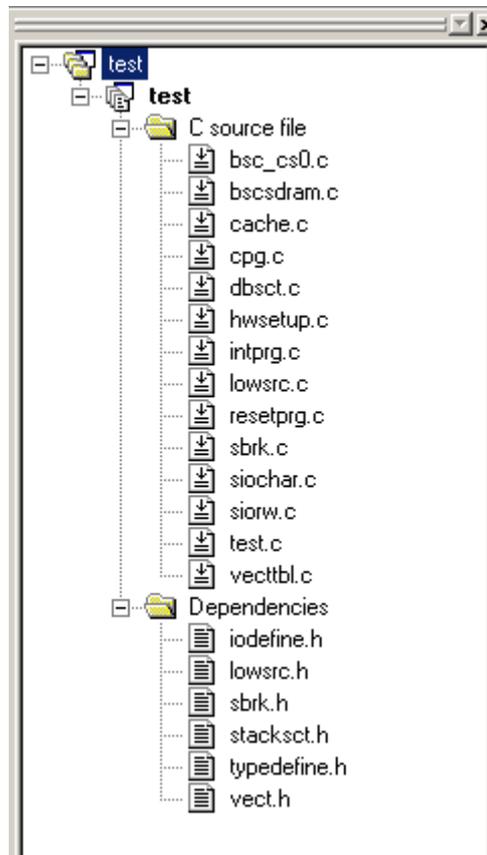


Figure 5.3.5 Add Files (3/3)

5.3.4 Set Compiler Options

Select [Build] menu, open [SuperH RISC engine Standard Toolchain] dialog box -> [C/C++] tab. Set "Category", "Show entries for" and "Options C/C++" as appropriate.

For details on how to set "Options C/C++", refer to the SuperH RISC engine C/C++ Compiler, Assembler and Optimizing Linkage Editor User's Manual.

The installation in this manual assumes that the SH7269 CPU Board hardware-dependent include file is stored in another directory (default: project directory), the relative path to the include file directory must be added.

- Project directory (default): "C:\¥Workspace¥test¥test"
- Directory that stores the include files: "C:\¥Workspace¥test¥HardwareSetup"

Steps to set a relative path to the include file directory are shown as follows.

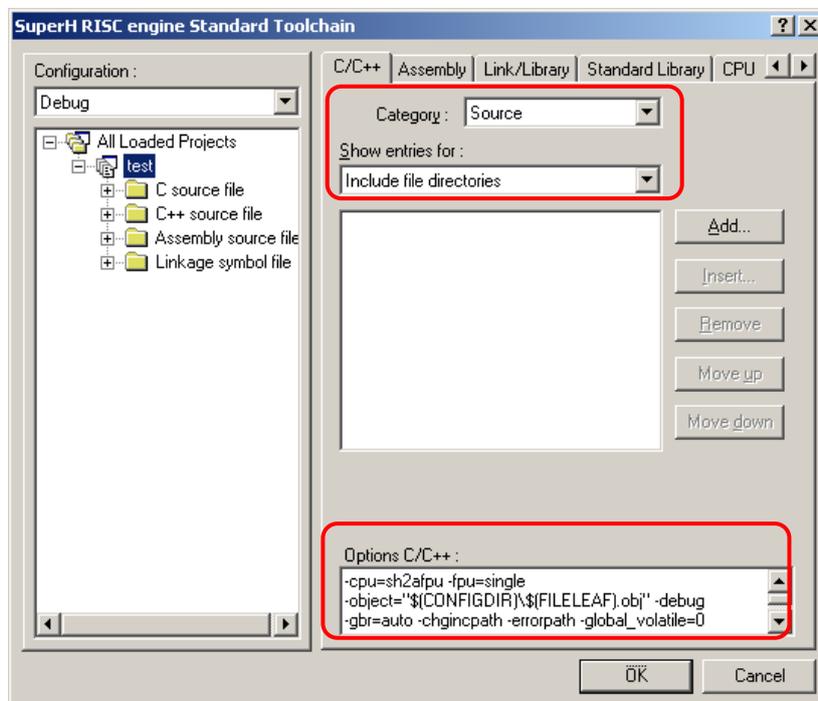


Figure 5.3.6 [Compiler Option Setup] Window

(1) Open [SuperH RISC engine Standard Toolchain] dialog box -> [C/C++] tab, set up as following, then click "Add...".

- Category: Source
- Show entries for: Include file directories

(2) Open [Add include file directory] dialog box, set up as shown below, and click "OK".

- Relative to: Select "Workspace directory" from the drop-down list.
- Sub-directory: Enter "HardwareSetup" in the text box.



Figure 5.3.7 [Add include file directory] Dialog Box

5.3.5 Set Link/Library

Select [Build] menu, open the [SuperH RISC engine Standard Toolchain] dialog box, and select [Link/Library] tab. Set "Category", "Show entries for", and "Option Link/Library" as appropriate.

For details on how to set optimization linker options, refer to the SuperH RISC engine C/C++ Compiler, Assembler and Optimizing Linkage Editor User's Manual.

This section describes how to change section setting.

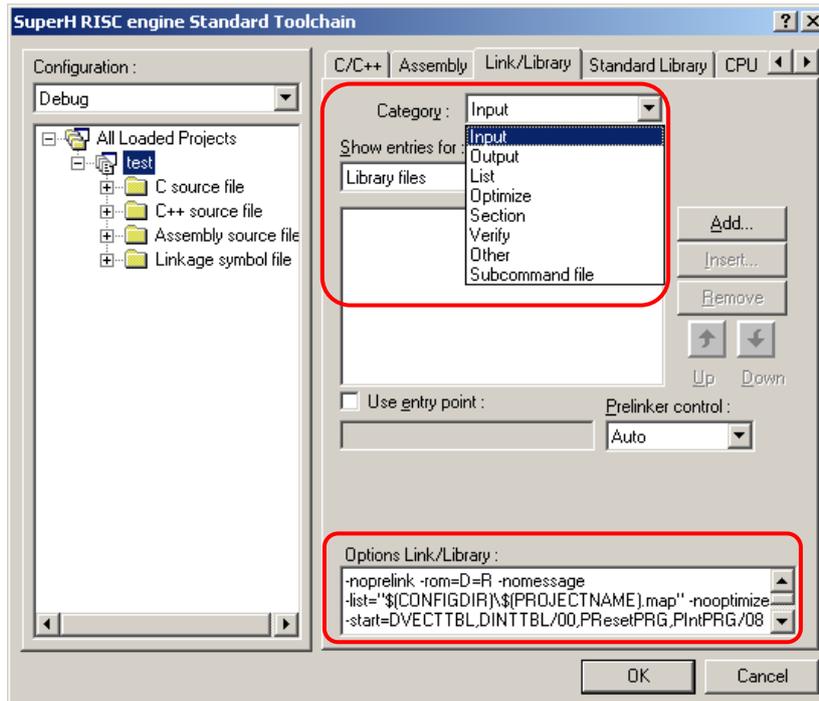


Figure 5.3.8 [Link/Library Setup] Window

(a) Set Section to use the SH7269 CPU board

(1) To use the SH7269 CPU board, the section must be allocated as follows.

Select [Build] menu -> open the [SuperH RISC engine Standard Toolchain] dialog box, and select [Link/Library] tab. Set following items as below, and click "Modify".

- Category: Section
- Show entries for: Section

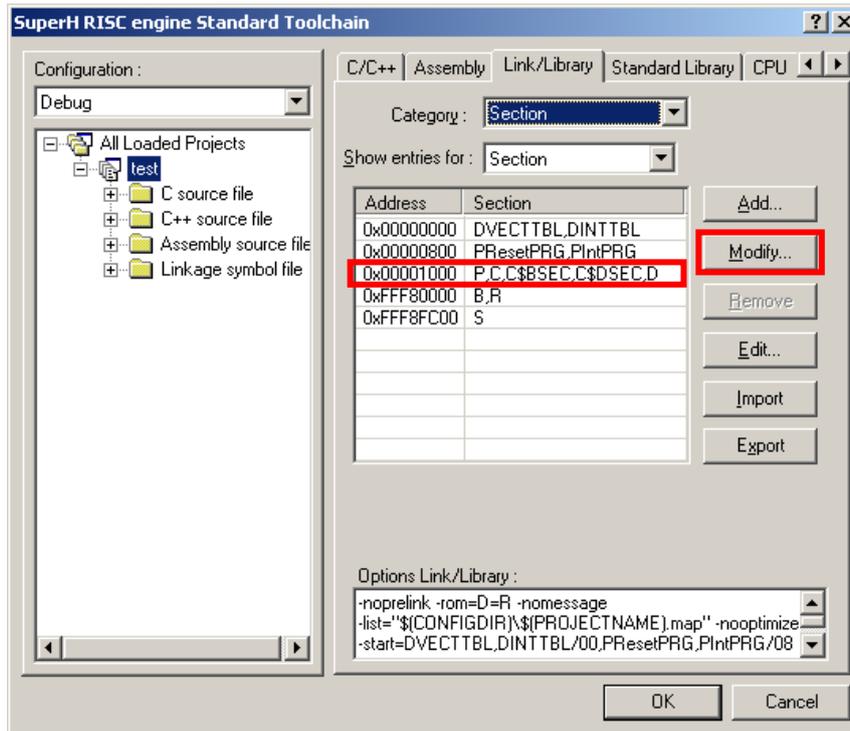


Figure 5.3.9 Section Setting (1/2)

(2) Enter "0x00001100" in the [Address] as shown in Figure 5.3.10, and click "OK".

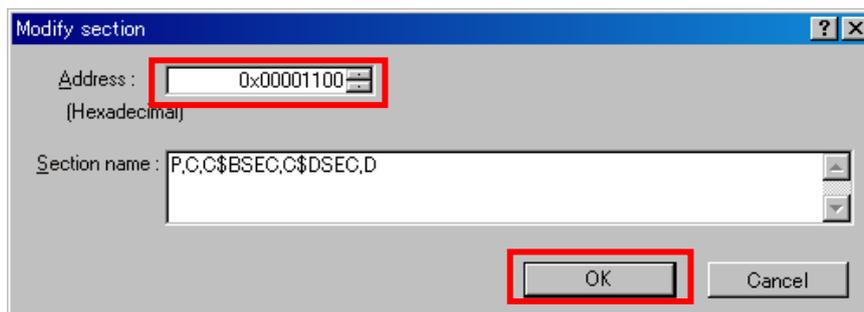


Figure 5.3.10 Section Setting (2/2)

(b) Section modification example (using the cache memory setting function)

To use "io_init_cache function (cache memory setting)", the section must be allocated to the CS0 cache-disabled space. The following describes steps to allocate the section to the CS0 cache-disabled space.

For the details on the cache memory, refer to Chapter 8 Cache and Chapter 9 BSC in the SH7268 Group, SH7269 Group Hardware Manual.

(1) Select [Build] menu -> open the [SuperH RISC engine Standard Toolchain] dialog box, and select [Link/Library] tab. Set following items as below, and click "Edit".

- Category: Section
- Show entries for: Section

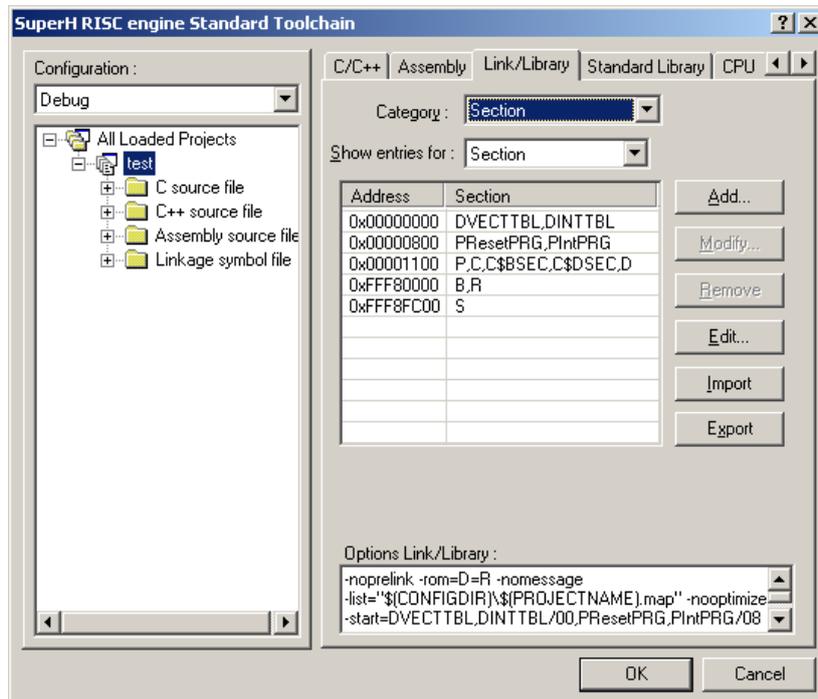


Figure 5.3.11 Section Setting (1/6)

(2) The [Section] dialog box will appear. Click "Add...".

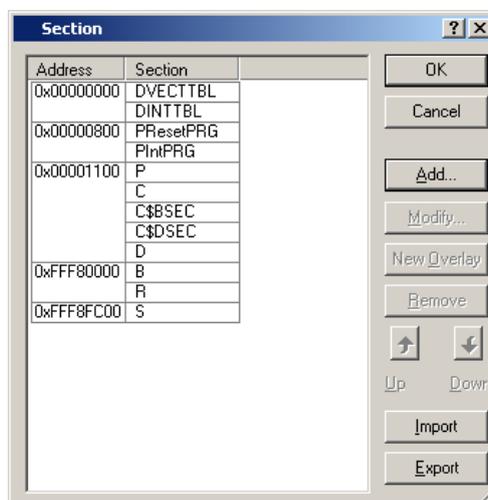


Figure 5.3.12 Section Setting (2/6)

(3) The [Section address] dialog box will open. Enter "0x203FF000" in the [Address] as shown in Figure 5.3.13, and click "OK".

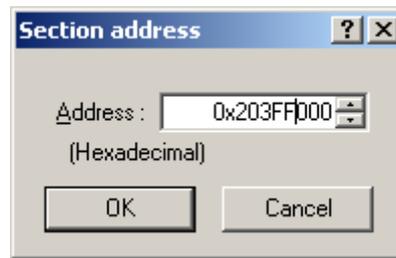


Figure 5.3.13 Section Setting (3/6)

(4) The Section address is added and the display returns to [Section] dialog box. Select the blank space of Section as shown in Figure 5.3.14, and click "Add...".

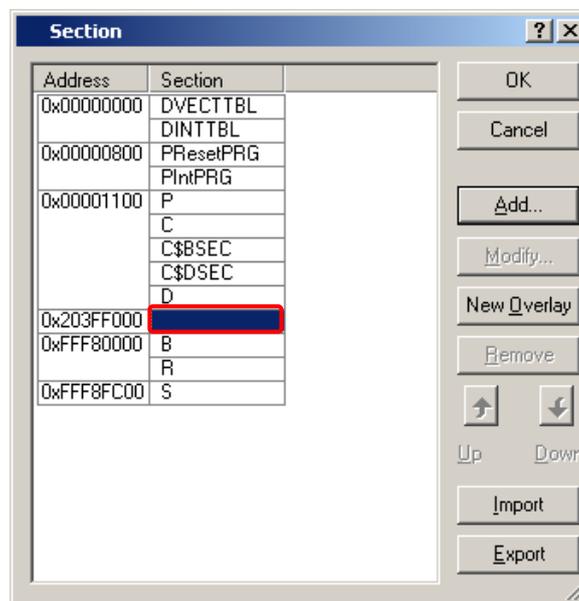


Figure 5.3.14 Section Setting (4/6)

- (5) The [Add section] dialog box will open. Enter "PCACHE" in the [Section name] as shown in Figure 5.3.15, and click "OK".
The [CACHE] section is defined in the "cache.c" source file. The first character "P" stands for section P.



Figure 5.3.15 Section Setting (5/6)

- (6) The section name is added, and the display returns to the [Section] dialog box. Confirm if the section has been set as shown in Figure 5.3.16, and click "OK".

The display returns to the [SuperH RISC engine Standard Toolchain] dialog box, and click "OK" to complete the setting.

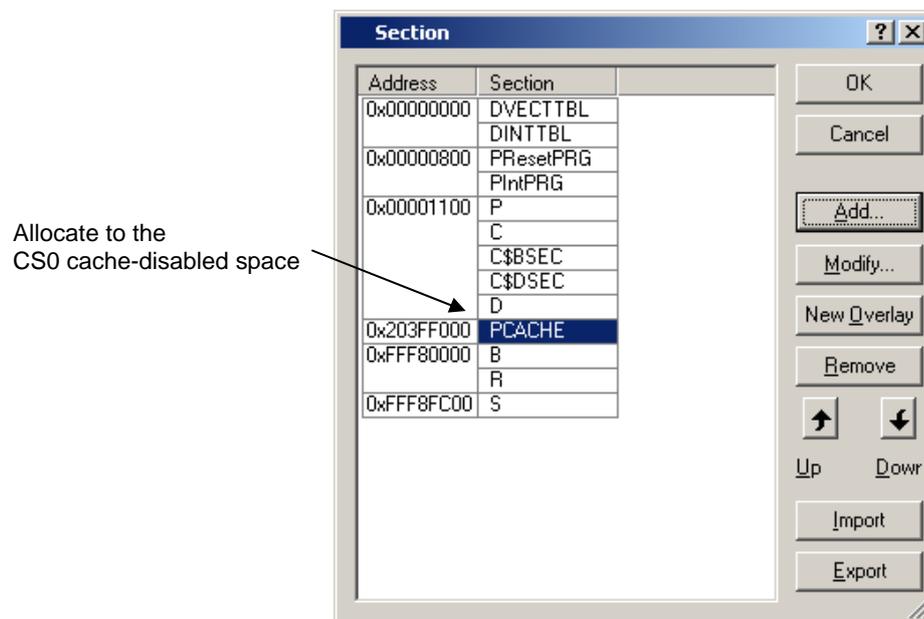


Figure 5.3.16 Section Setting (6/6)

(c) Section modification example (Change Section B to the SDRAM area)

The following shows an example for reallocating section B to the SDRAM area.

For details on the section setting, refer to paragraph (a) above.

(1) In [Section] dialog box, select section B, and click "Remove".

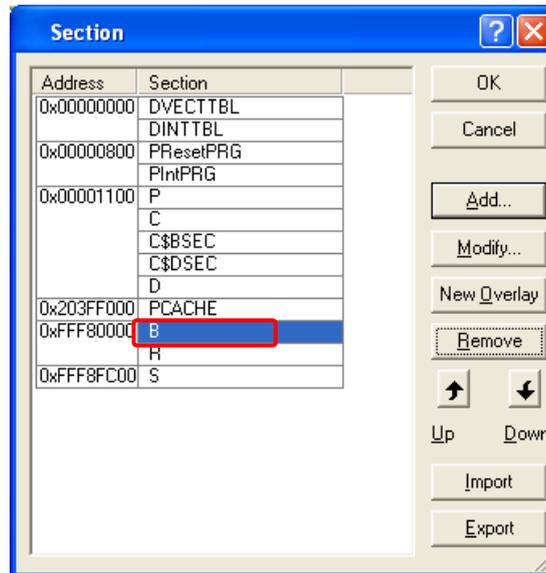


Figure 5.3.17 Change Section (1/2)

(2) In [Section] dialog box, add section B to the SDRAM area as shown in Figure 5.3.18.

Example: Adds a section to the SDRAM

- Address: 0x0C000000
- Section: B

Note: For details on the SDRAM area on the SH7269 CPU Board, refer to "1.17 Memory Maps" in the SH7269 CPU Board User's Manual.

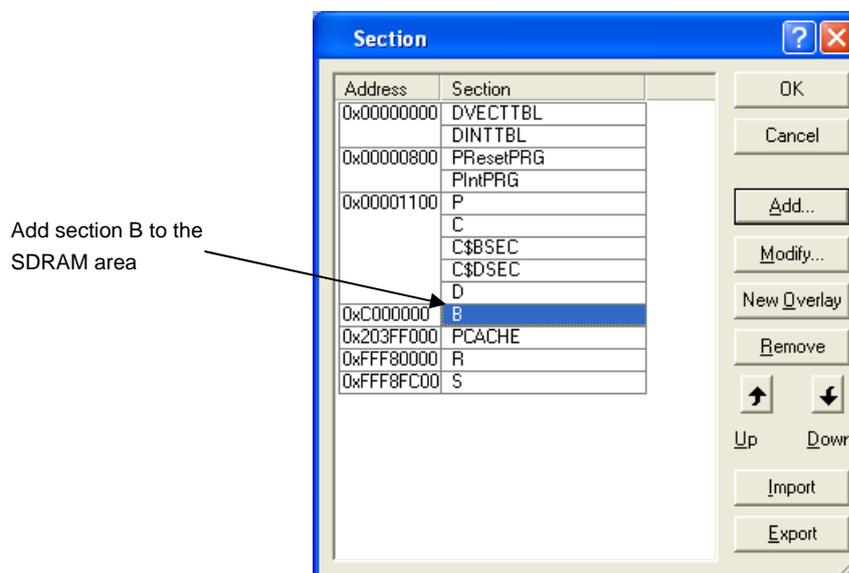


Figure 5.3.18 Change Section (2/2)

(c) Setting example (Transfers the vector table section DINTTBL to the internal RAM)

Transfer the vector table to the internal RAM and use the register bank to accelerate the interrupt response.

To transfer the vector table, set the Section of the vector table on the ROM as "DINTTBL", the Section on the transfer destination RAM as "RINTTBL" in the file "dbsct.c" added in section 5.3.3 in this manual.

Section definition for vector table:

- Section name for the vector table (ROM section): DINTTBL
- Transfer destination section name (RAM section): RINTTBL

Following are steps to move the DINTTBL section from ROM to the internal RAM in the sample program.

(1) Set the RINTTBL section to the internal RAM area in [Section] dialog box as shown in Figure 5.3.19.

➤ Example for adding section to internal RAM area

- Address: 0xFFF80000
- Section: RINTTBL

Note: When setting the address as above, set the CPU vector base register. This sample software sets the vector base register in the reset exception handling in the "resetprg.c" file.

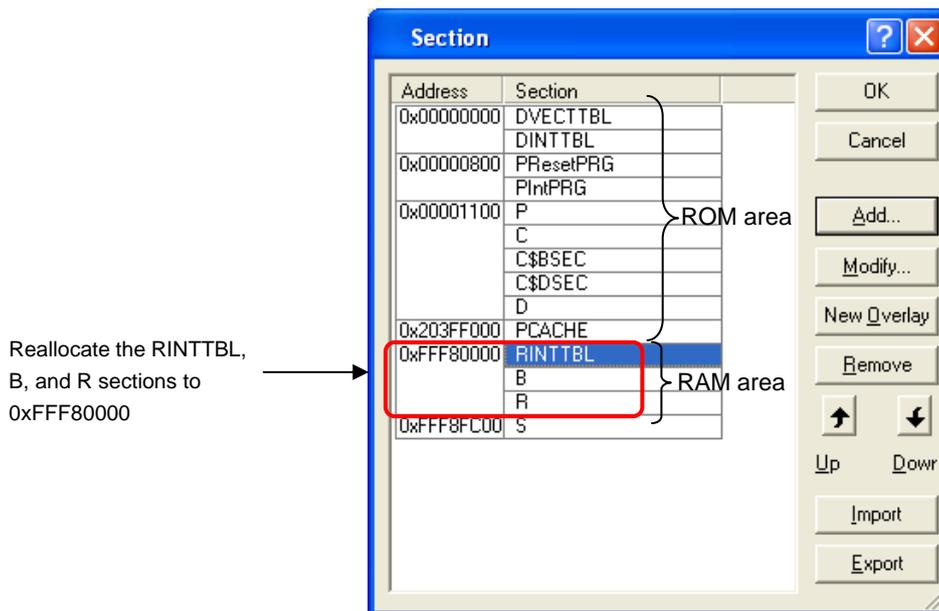


Figure 5.3.19 Change Section (1/3)

(2) Open [Link/Library] tab and set the items below, and click "Add...".

- Category: Output
- Show entries for: ROM to RAM mapped sections

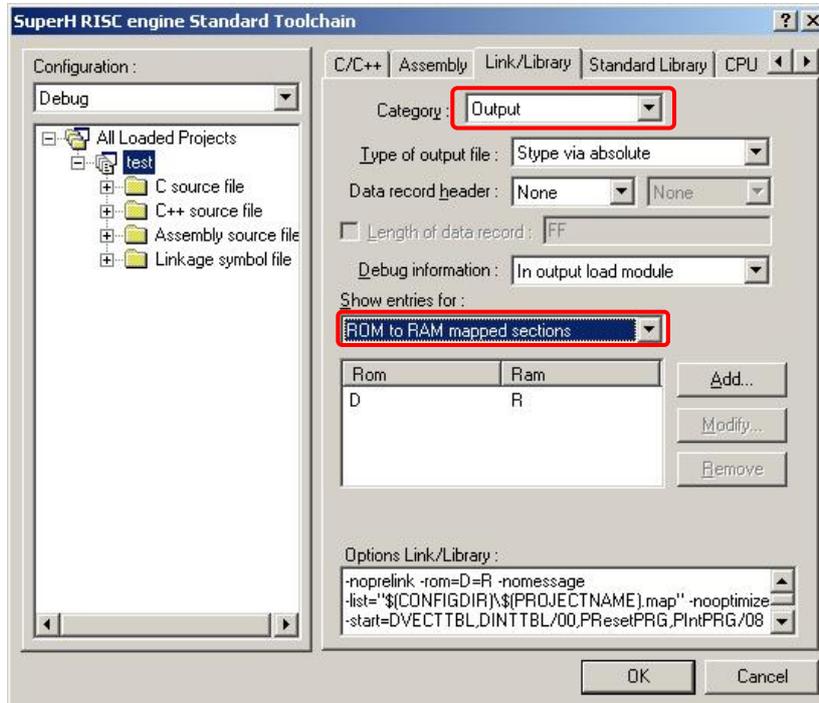


Figure 5.3.20 Change Section (2/3)

Note: This sample software sets the section initialization table in "dbsct.c" file.

(3) Set the items as below in the [Add Rom to Ram] dialog box, and click "OK".

Return to [SuperH RISC engine Standard Toolchain] dialog box, and click "OK" to complete the setting.

- ROM section: DINTTBL
- RAM section: RINTTBL



Figure 5.3.21 Change Section (3/3)

5.3.6 Describe the Main Function (For Operation Check)

In the main function (test.c source file), describe the program to turn ON the LED (LED2 on the SH7269 CPU Board is illuminated).

- Open the source file "C:\WorkSpace\test\test\test.c" with an editor, etc.
- Describe the following program to turn ON the LED.

```

Omitted
11:  #include "iodefine.h"
12:
13:  void main(void)
14:  {
15:      /* ==== Pin function setting ==== */
16:      PORT.PJCR4.BIT.PJ18MD = 0u; /* PJ18 */
17:
18:      /* ==== Port output value setting ==== */
19:      PORT.PJDR1.BIT.PJ18DR = 0u; /* PJ18 Low */
20:
21:      /* ==== Port I/O direction setting ==== */
22:      PORT.PJIOR1.BIT.PJ18IOR = 1u; /* PJ18 output (LED2 is lit)*/
23:  }
24:

```

Note: This example sets values in the port J control register 4 (PJCR4), port J data register 1 (PJDR1) and the port J I/O register 1 (PJIOR1) by the bit manipulation instruction, which performs the read-modify-write operation. Therefore, the port input level read from the unspecified bit is written in the port data registers. This may cause unintentional changes of values in other ports.

(1) Create a new load module

Select [Build] menu -> [Build] to execute the build process.

(2) Create a new load module (test.abs)

If a new load module "test.abs" has been created, the hardware setup file addition or modification is now completed.

(3) Execute the program

Download the load module to execute the program. LED2 on the SH7269 CPU Board is now illuminated.

SH7269 CPU Board R0K572690C000BR Installation Manual

Publication Date Dec. 08, 2011 Rev.1.00

Published by Renesas Electronics Corporation

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SH7269 CPU Board
R0K572690C000BR
Installation Manual

