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Renesas Electronics Corporation

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M16C/62P Group (M16C/62P, M16C/62PT)

Application Notes

Renesas Single-Chip Microcomputer
H8 Family / H8/Tiny Series

Renesas E8 Emulator

Introductory Guide for H8/300H Tiny

Introduction

Notes

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Website: <http://www.renesas.com/e8> (Global site)

<http://japan.renesas.com/e8> (Japan site)

Glossary

| | | | |
|-----|------------------------------------|-----|--------------------------------|
| CPU | Central Processing Unit | RSK | Renesas Starter Kit |
| HEW | High-performance Embedded Workshop | RTE | Renesas Technology Europe Ltd. |
| LED | Light Emitting Diode | RSO | Renesas Solutions Corporation |
| PC | Program Counter | MCU | Micro-Controller Unit |

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1. Overview

This introductory guide (application note) is intended for first-time users of the E8 emulator. It provides simple descriptions regarding the E8 emulator to help the user easily follow a straight path from unpacking of the emulator to running and stopping of a program without getting lost on the way.

The operating procedures are described in sections 4 through 6. Take the following steps to try using the emulator, starting from installation of the program and proceeding to the simple execution examples.

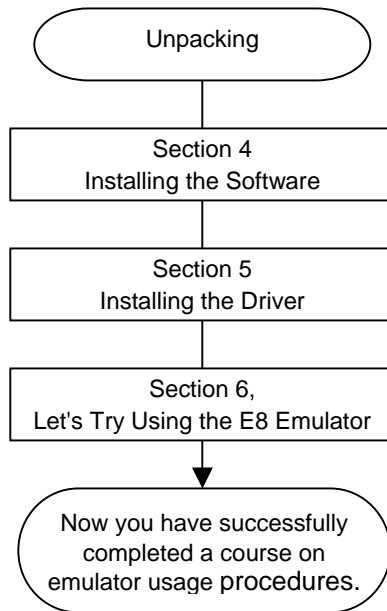


Figure 1.1 Flowchart of Procedure Descriptions

This guide assumes the use of the following machines and tools.

- (1) Host computer
- (2) E8 emulator
- (3) CPU board (H8/3664 StarterKit Plus: SKPH8Tiny manufactured by Renesas)

2. Components and Environment

This section shows the components of the E8 emulator and the devices and environment needed to use the E8 emulator. Unpack the E8 emulator package and check the components against the component list.

2.1 Components

Table 2.1 is a list of the E8 emulator components.

Table 2.1 Components of the E8 emulator

| Product Name | Quantity |
|------------------------------|----------|
| ROE000080KCE00 (E8 emulator) | 1 |
| USB cable | 1 |
| User system interface cable | 1 |
| CD-ROM | 1 |



Figure 2.1 E8 Emulator Product Package

Note: The above picture shows the product taken out of the electrically conductive bag.

2.2 Operating Environment

The software products provided together with the E8 emulator operate on the host computer and OS version shown in table 2.2.

Table 2.3 Operating Environment

| | |
|---------------|---|
| Host computer | IBM PC/AT with the USB1.1 or USB2.0 (Full-Speed) interface |
| OS | Microsoft Windows® 2000 or XP |
| CPU | Pentium® III or higher-performance CPU (600 MHz or higher performance recommended) |
| Memory | 128 Mbytes or more (512 Mbytes or more recommended) |
| HDD | Installation disk capacity: 100 Mbytes or more. Prepare an area at least double the memory capacity (four-times or more recommended) as the swap area. |
| CD-ROM drive | Required to install the software |
| Display | Monitor resolution: 1024 x 768 or higher |

2.3 CPU Board (H8Tiny-StarterKit: SKPH8TINY manufactured by Renesas Technology)

The CPU board (H8Tiny-StarterKit) has the Renesas Technology 16-bit single-chip microcomputer H8/3664 with flash memory (product code: HD64F3664FP).

This CPU board is included together with the E8 emulator in the H8Tiny-StarterKit package. The H8Tiny-StarterKit is available from Digi-Key Corporation (URL: <http://digikey.com/>).

2.4 CD-ROM

The CD-ROM provided together with the E10A-USB emulator includes the software products necessary for program development and the online manual. The following shows the files and programs stored in each folder.

```

CD-ROM
+- E8 Emulator Debugger
  | E8 Emulator Software V.2.08 Release 00
  | - High-performance Embedded Workshop V.4.00.03
  | - R8C E8 Emulator Debugger V.2.04.00
  | - M16C E8 Emulator Debugger V.2.00.00
  | - H8 E8 Emulator Debugger V.1.02.01
  | - M32C E8 Emulator Debugger V.2.00.00
  | - Free evaluation-version M3T-NC30WA V.5.40 Release 00A
  | - Free evaluation-version C/C++ compiler package
  |   for H8SX, H8S, and H8 family V.6.01 Release 01
  | - E8 Self Check Program V.1.00.00
+- Flash Development Toolkit
  | Free evaluation-version Flash Development Toolkit V.3.06 Release 00
+- AutoUpdate
  | AutoUpdate Utility V.1.01.00
  
```

Figure 2.2 Contents of E8 Emulator CD-ROM

2.5 Machines and Tools to be Prepared by the User

Please prepare the following machines and tools.

- Host computer
- Update files for the E8 emulator software (*1)
- Update files for integrated development environment High-performance Embedded Workshop (*1)

Notes: 1. Please visit the Renesas website and obtain update modules if a newer version exists.

After the software in the CD-ROM has been installed, the latest versions can be easily found through the installed AutoUpdate Utility.

3. Product Specifications

3.1 C Compiler

The free evaluation-version C/C++ compiler package for the H8SX, H8S, and H8 family is provided in the CD-ROM. This C/C++ compiler package creates a debugging information file from the C or assembly-language source programs. Note that the free evaluation version has limitations in comparison with the production-version C compiler. For the limitations, refer to section 7.1, Limitations on C Compiler.

3.2 High-performance Embedded Workshop

The High-performance Embedded Workshop integrates software development tools, such as the C compiler, assembler, emulator software, and editor, into a common graphical user interface (GUI) to make software development more efficient.

3.3 Emulator Software

The emulator software operates on the host computer and communicates with the firmware that is stored in the flash memory in the target microcomputer on the user system board to provide high-level debugging functions. This emulator software has the following features.

- 1) Source-line debugging is available in assembly language, structured assembly language, and C language.
- 2) One hardware breakpoint with the address condition is available. Software breaks can be set for up to 255 points.
- 3) The user program can be debugged in realtime by writing it to the flash memory in the target microcomputer.

4. Installing the Software

4.1 Installing the Provided Software

4.1.1 Before Starting Installation

- (1) Do not connect the E8 emulator to the host computer before the provided software is installed.
 - Installing the provided software transfers the E8 emulator driver to the host computer, and the new hardware detection processing will automatically start.

- (2) When you have both the free evaluation version and the production version of the compiler, use the production version.
 - If you have installed the production-version C/C++ compiler package for the H8SX, H8S, and H8 family, or if you purchased a production-version compiler package and E8 emulator together, you do not need to install the free-evaluation version included in the E8 emulator CD-ROM; only install the E8 emulator debugger through the [Select Features] dialog box described in section 4.1.2 (8).
 - For the limitations on the free evaluation-version C/C++ compiler package for the H8SX, H8S, and H8 family, refer to section 7.1, Limitations on C Compiler.

- (3) Dialog Boxes for Installation
 - If you have installed the High-performance Embedded Workshop in the target host computer, some dialog boxes may be skipped during the provided software installation.

4.1.2 How to Install the Software

- (1) The following shows the procedure for installing the software necessary for the E8 emulator. Insert the E8 emulator CD-ROM in the host computer and the installation program will automatically start through the automatic play function of the drive.
If the installation program does not start, execute Autorun.exe from the CD-ROM. For details on the CD-ROM, refer to section 2.4, CD-ROM.

- (2) The [Renesas Tools Installation CD] dialog box will appear. Select the software products to install and click the [Install] button. This guide shows an example of installing all software products except Flash Development Toolkit.

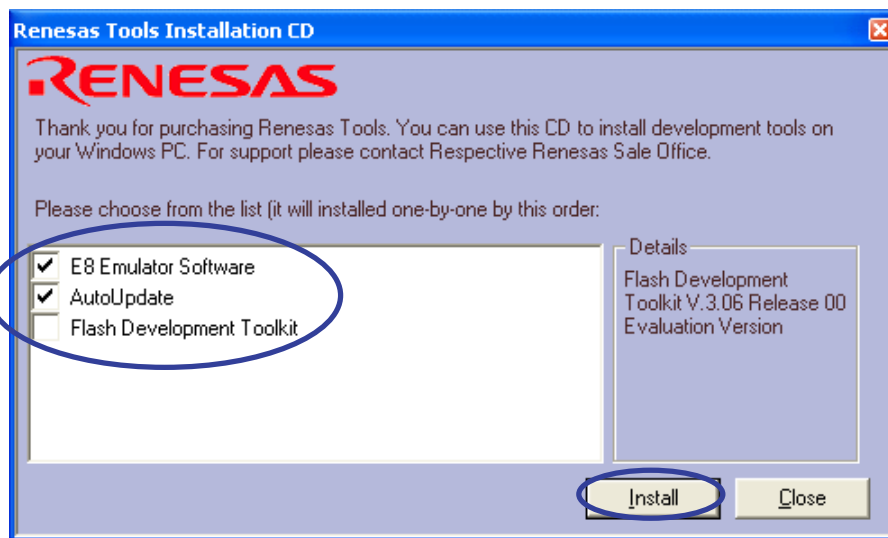


Figure 4.1 Selecting Software Products to Install from the E8 Emulator CD-ROM

(3) The [Choose Setup Language] dialog box will appear. Select [English] and click the [Next] button.

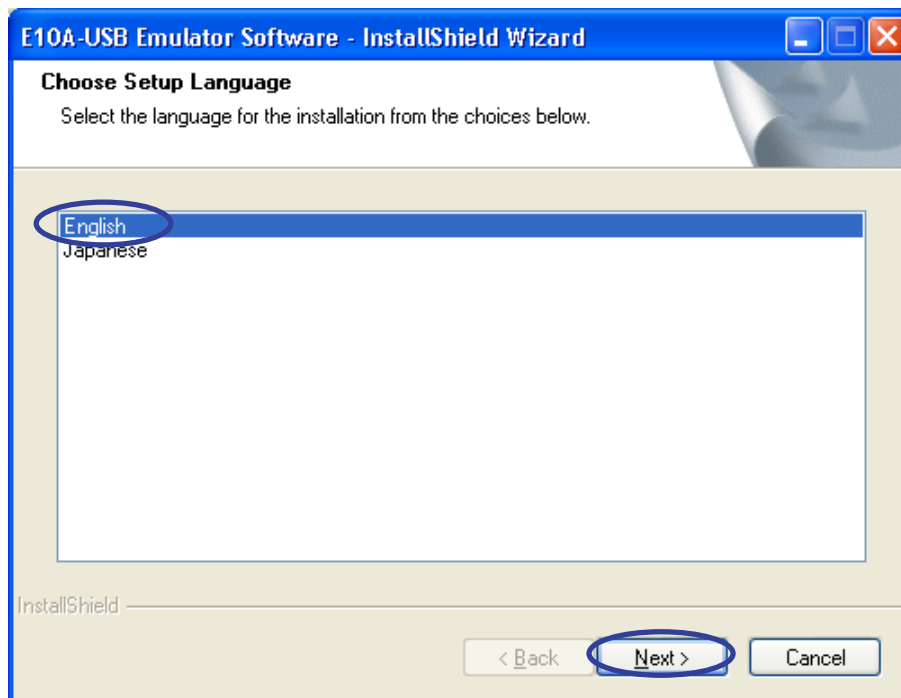


Figure 4.2 Choosing the Language for Installation

(4) The [E8 Emulator Software] installation starts as the first component in the full-screen mode.

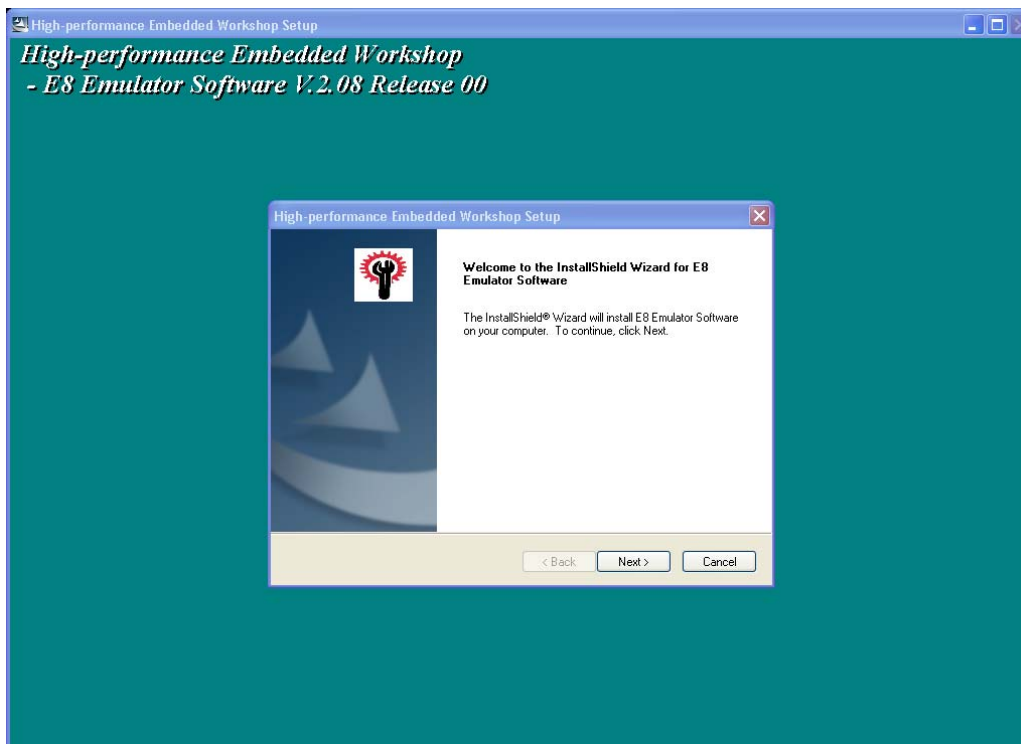


Figure 4.3 Starting the E8 Emulator Software Installation

- (5) The [Welcome to the InstallShield Wizard for E8 Emulator Software] dialog box will appear. Click the [Next] button.



Figure 4.4 Dialog Box for Starting the E8 Emulator Software Installation

- (6) The [License Agreement] dialog box will appear. Read the contents and click the [Yes] button.

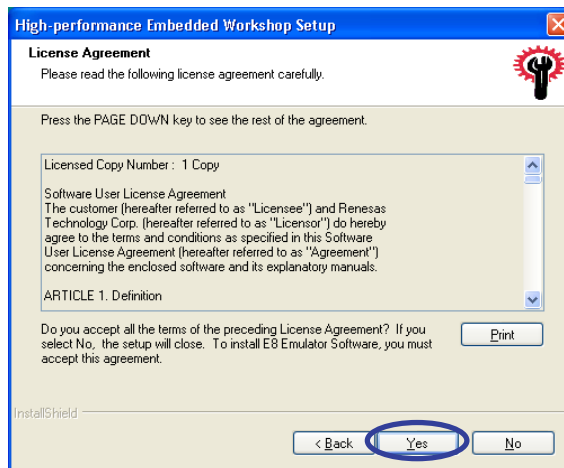


Figure 4.5 License Agreement for the E8 Emulator Software

- (7) The [Region Selection] dialog box will appear. Select the [Europe or United States of America] radio button and click the [Next] button.

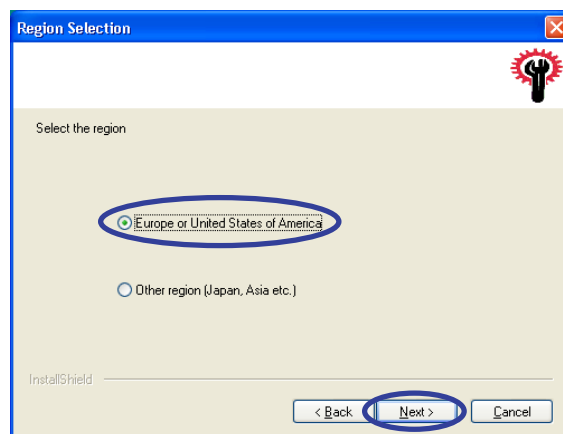


Figure 4.6 Selecting the Region

(8) The [Select Features] dialog box will appear. Deselect the functions that will not be used, and click the [Next] button. This guide shows an example of deselecting the M32C/M16C/R8C series.

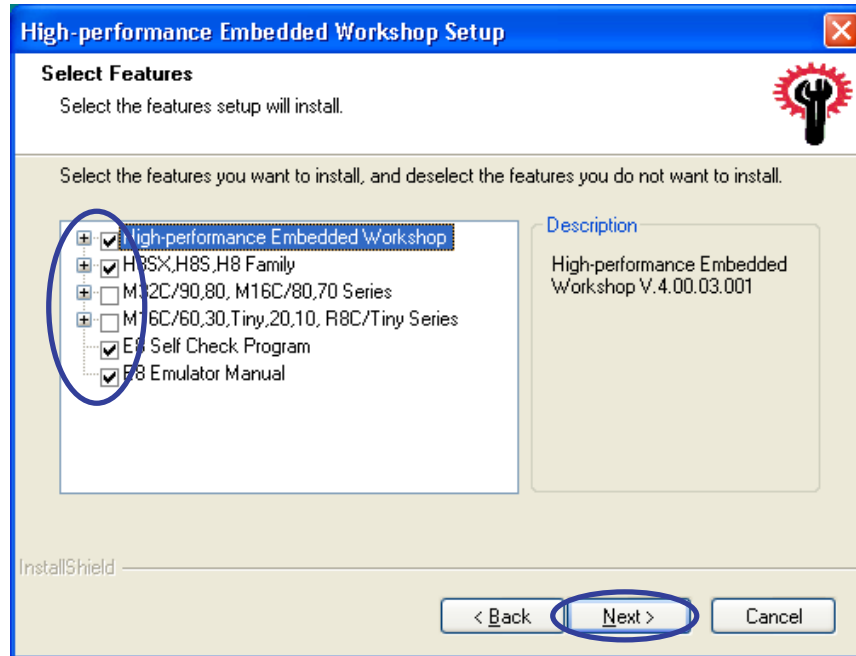


Figure 4.7 Selecting the Functions to Install

If you have installed the production-version C/C++ compiler package for the H8SX, H8S, and H8 family, or if you purchased a production-version compiler package and E8 emulator together, you do not need to install the free evaluation version included in the E8 emulator CD-ROM; only install the E8 emulator debugger by selecting it under [H8SX,H8S,H8 family] in the [Select Features] dialog box.

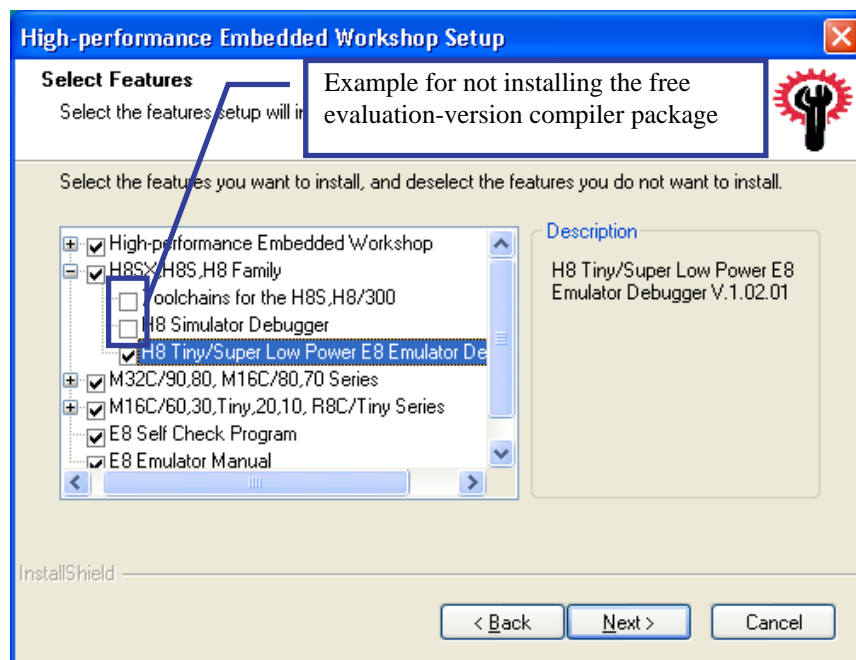


Figure 4.8 Selecting the Functions to Install - Example for Not Installing the Free Evaluation-Version Compiler Package

- (9) The [Choose Destination Location] dialog box will appear. To change [Destination folder], click the [Browse...] button and select the target folder. Check [Destination folder], and click the [Next] button. This guide shows an example of using the default installation folder.

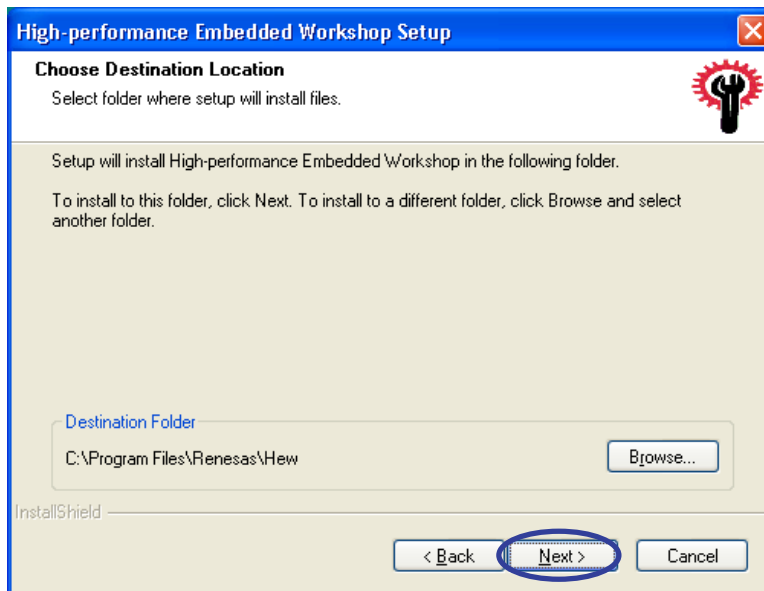


Figure 4.9 Choosing the Folder for E8 Emulator Software Installation

The installation folder may differ depending on the version of the High-performance Embedded Workshop earlier installed.

- The emulator software is installed in the same folder as the High-performance Embedded Workshop Ver.2. When the High-performance Embedded Workshop Ver.2 was installed first and then updated (Ver.2->Ver.3, Ver.2->Ver.4, or Ver.2->Ver.3->Ver.4).
- The emulator software is installed in the same folder as the High-performance Embedded Workshop Ver.3. When the High-performance Embedded Workshop Ver.3 was installed first.

- (10) The [Start Copying Files] dialog box will appear. Click the [Next] button.

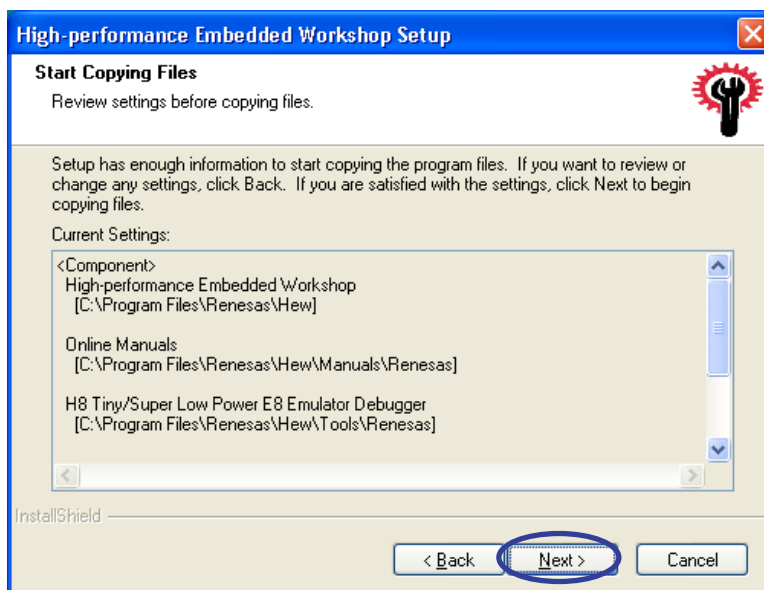


Figure 4.10 E8 Emulator Software Components to Be Installed

(11) The following progress bar will be displayed while the program files are being copied.

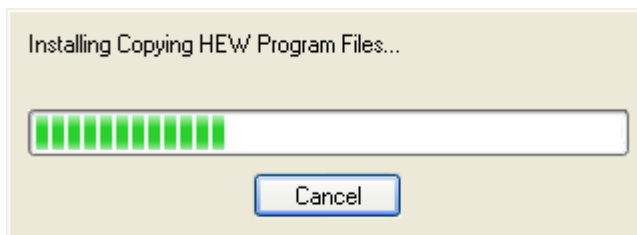


Figure 4.11 Progress Bar for E8 Emulator Software Installation

(12) The [InstallShield Wizard Complete] dialog box will appear. Click the [Finish] button.



Figure 4.12 Completing E8 Emulator Software Installation

(13) The [Supplementary and Precautions for Emulator E8] window will be displayed in html form.

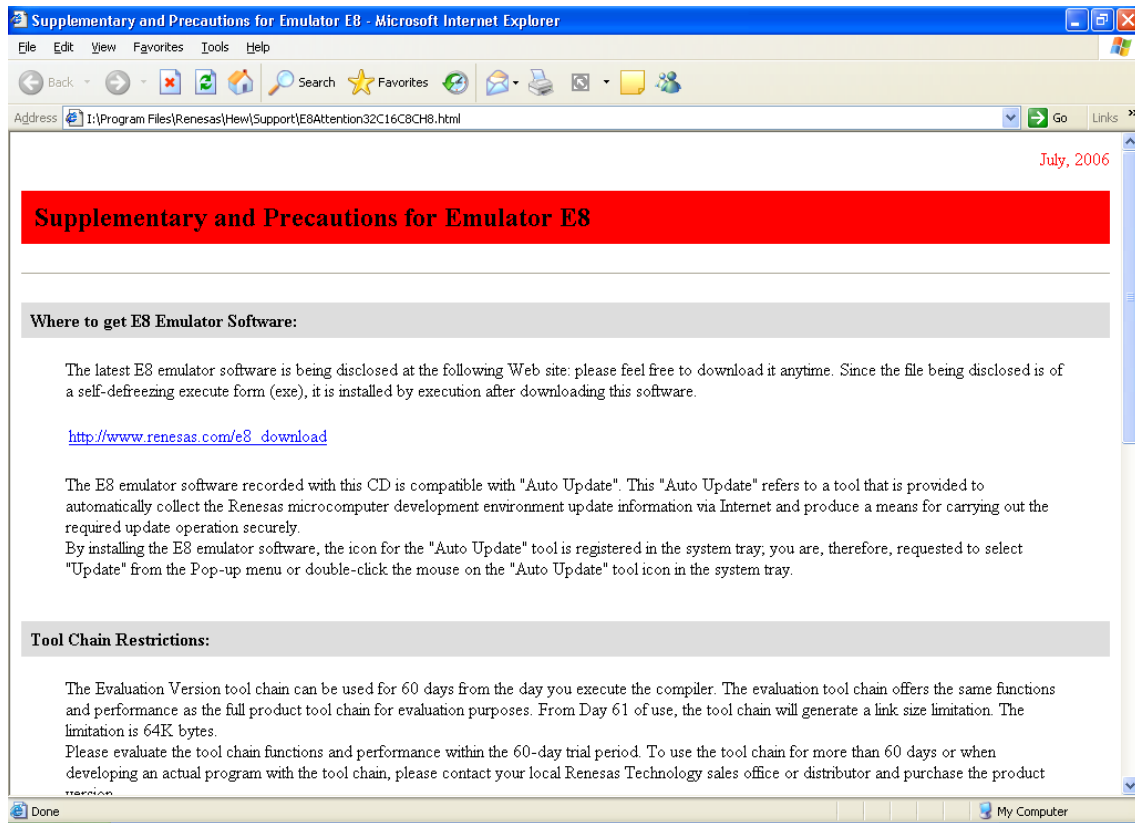


Figure 4.13 Supplementary and Precautions for Emulator E8

Be sure to read the notes and remarks on the E8 emulator. This also includes the website address where the latest-version software for the E8 emulator is available. For more information about the latest version and other supplementary information, refer to the descriptions at the website.

To close the [Supplementary and Precautions for Emulator E8] window, select [Close] from the [File] menu on the window. To read the notes and remarks on the E8 emulator later, access the following file. For the folder name, refer to the description in step (9).

"C:\Program Files\Renesas\Hew\Support\E8Attention32C16C8CH8.html"

(14) Next, installation of the [AutoUpdate Utility] component will start. The [Choose Setup Language] dialog box will appear. Select [English(United States)] and click the [OK] button.

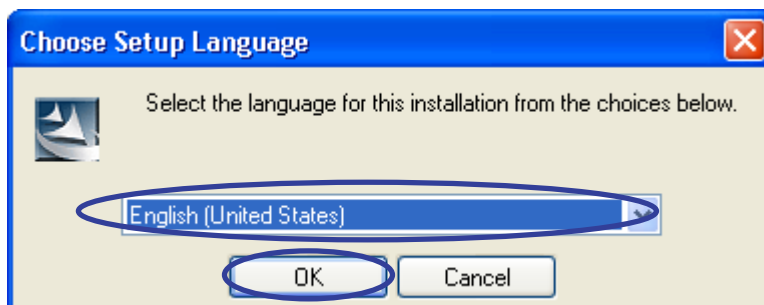


Figure 4.14 Starting AutoUpdate Utility Installation

- (15) The [Welcome to the InstallShield Wizard for Renesas AutoUpdate Utility V.*.*.*] dialog box will appear. Click the [Next] button.

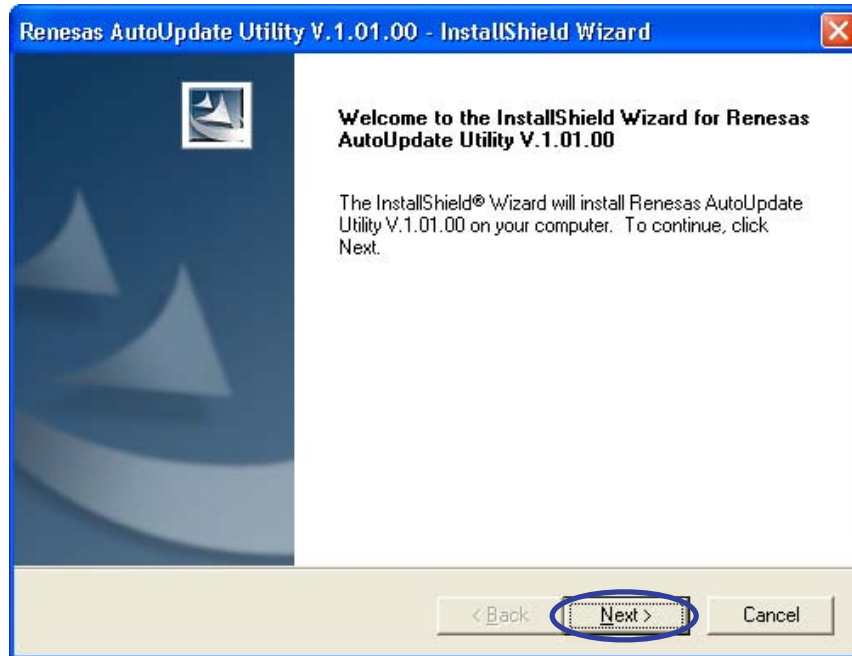


Figure 4.15 Dialog Box for Starting AutoUpdate Utility Installation

- (16) The [Choose Destination Location] dialog box will appear. To change [Destination folder], click the [Browse...] button and select the target folder. Check [Destination folder], and click the [Next] button. This guide shows an example of using the default installation folder.

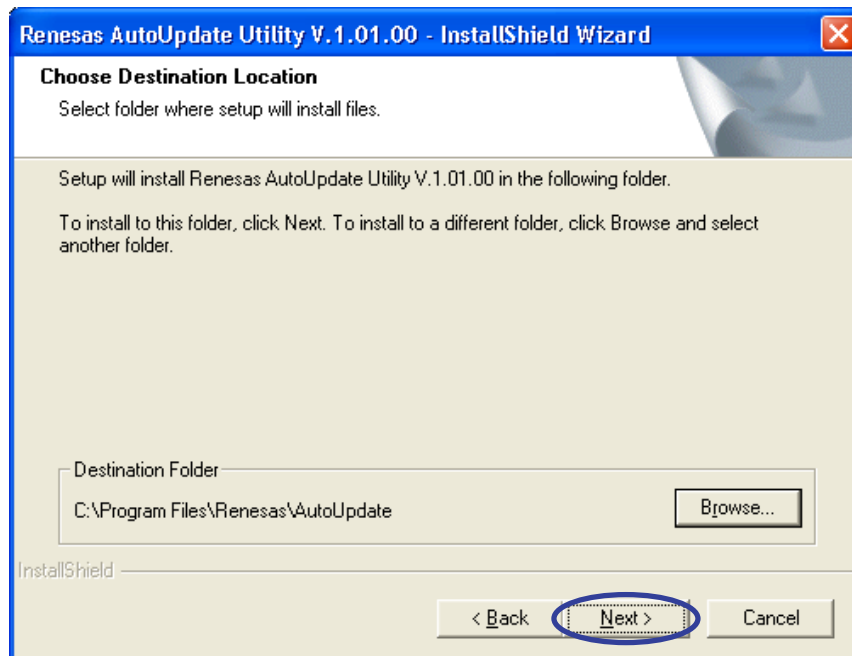


Figure 4.16 Selecting the Folder for AutoUpdate Utility Installation

- (17) The [Installation options] dialog box will appear. Selecting [I want to register the AutoUpdate utility to the startup folder] enables the product update information to be automatically monitored. Select the installation option if necessary and click the [Next] button.

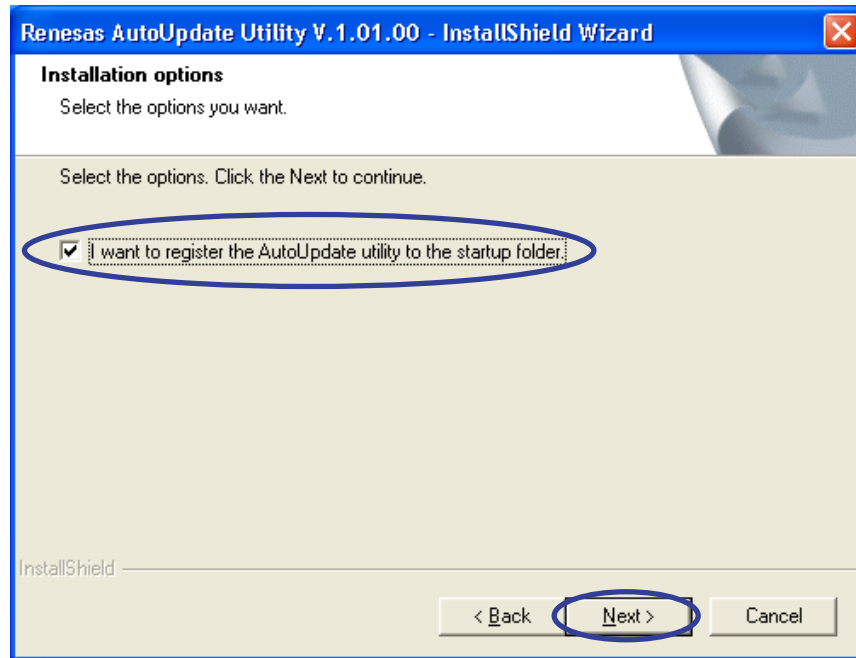


Figure 4.17 Option for AutoUpdate Utility Installation

- (18) The [Start Copying Files] dialog box will appear. Click the [Next] button.

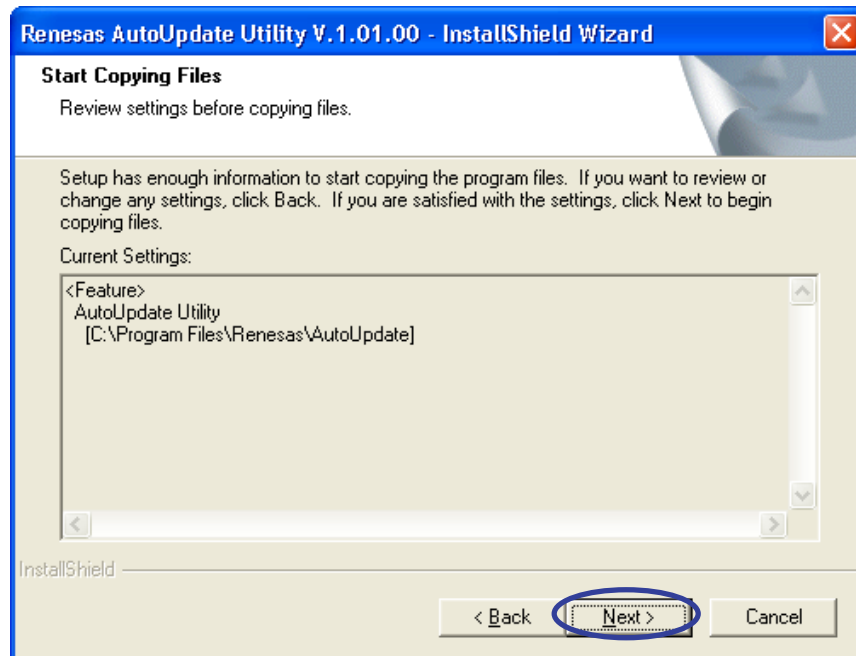


Figure 4.18 AutoUpdate Utility Component to be Installed

- (19) After file copying finishes, notes on the Renesas AutoUpdate Utility installation will be displayed in html form. Read the notes and close the window.

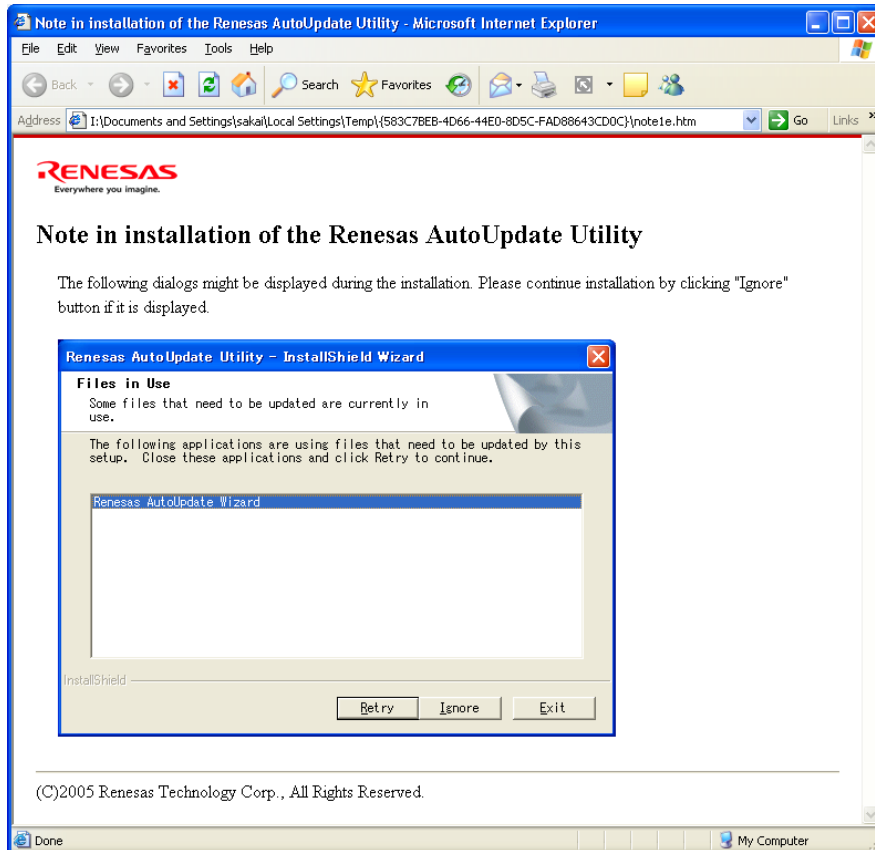


Figure 4.19 Notes on AutoUpdate Utility Installation

- (20) After the [AutoUpdate Utility] component has been installed, the [InstallShield Wizard Complete] dialog box will appear. Click the [Finish] button.

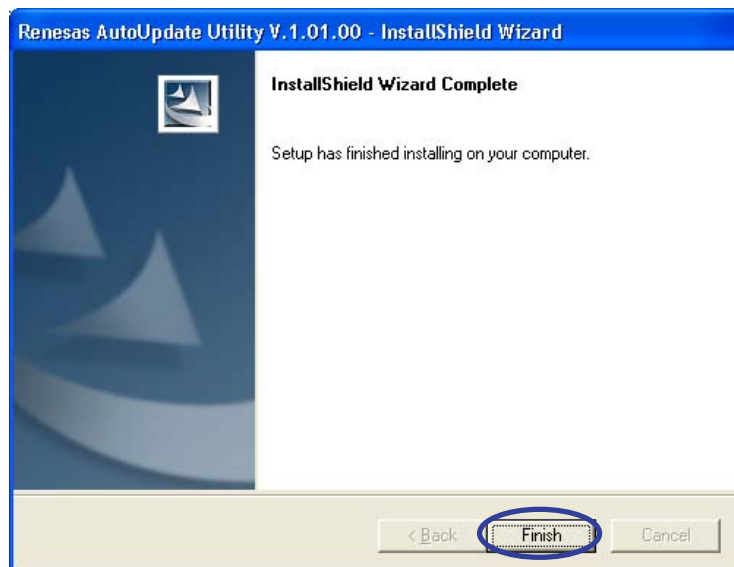


Figure 4.20 Completing AutoUpdate Utility Installation

- (21) If the [Restarting Windows] dialog box appears, select the [No, I will restart my computer later.] radio button and click the [OK] button. Restart the computer manually after completing the installation of all components.

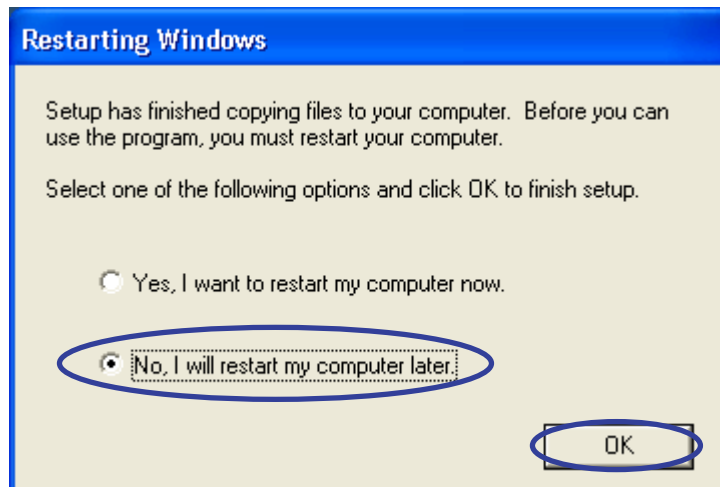


Figure 4.21 Dialog Box for Confirming Windows® Restart

- (22) The [Autorun] dialog box will appear. Click the [OK] button. This completes installation of all selected components.

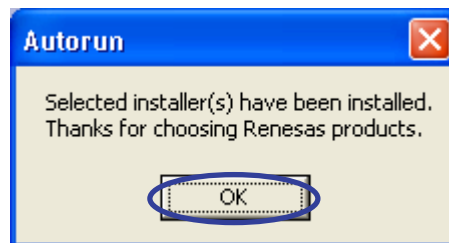


Figure 4.22 Completing Installation of Software from the E8 Emulator CD-ROM

Installation from the CD-ROM is completed through these steps.

If you were prompted to restart the computer in step (21), restart Windows® after step (22).

- (23) If you deselected installation of the free evaluation-version compiler in the [Select Features] dialog box in step (8) and want to install the production version, you can install it now. For the installation procedure, refer to the document supplied together with the production-version compiler package.
- (24) If individual update information is provided for the integrated development environment High-performance Embedded Workshop, update it now. For the update procedure, refer to the Renesas website or download page.

5. Installing the Driver

5.1 Wizard for Adding Hardware

- (1) Connect the E8 emulator body to the host computer through the USB cable.
- (2) The [Found New Hardware Wizard] dialog box will appear. Select the [No, not this time] radio button and click [Next].

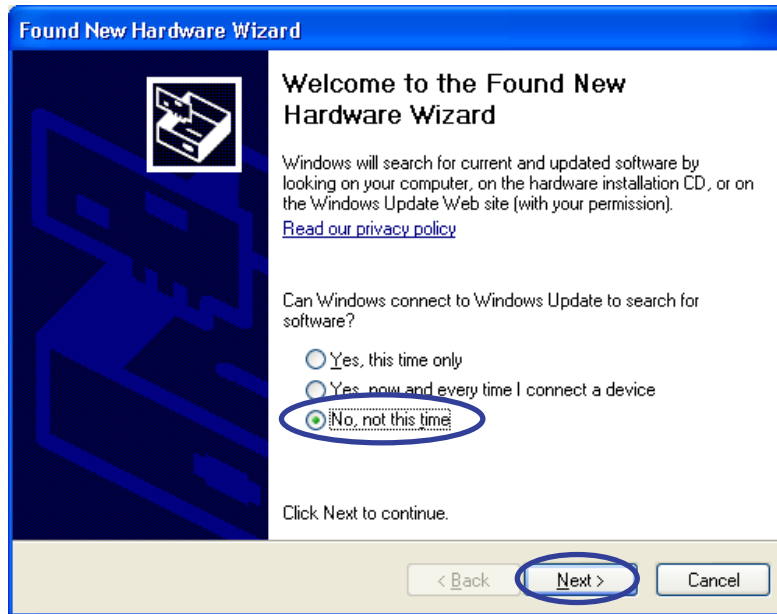


Figure 5.1 [Found New Hardware Wizard] Dialog Box

This guide shows an example of the wizard in Windows® XP Service Pack 2 (SP2).

- (3) The [Welcome to the Found New Hardware Wizard] dialog box will appear. Select the [Install the software automatically (Recommended)] radio button and click [Next].

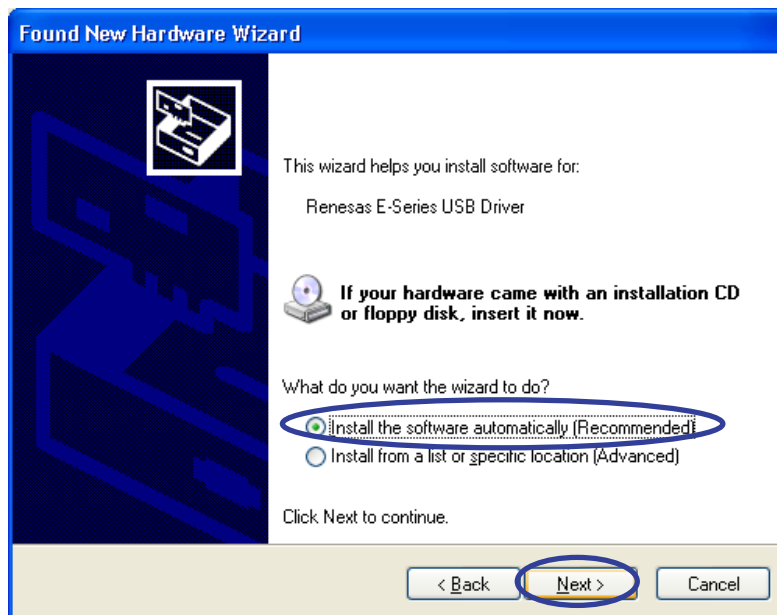


Figure 5.2 Selecting the Driver Software Installation Method

- (4) Windows® automatically detects and installs the driver. To enable automatic driver detection, the E8 emulator software should be installed in advance. For the E8 emulator software installation, refer to section 4, Installing the Software.

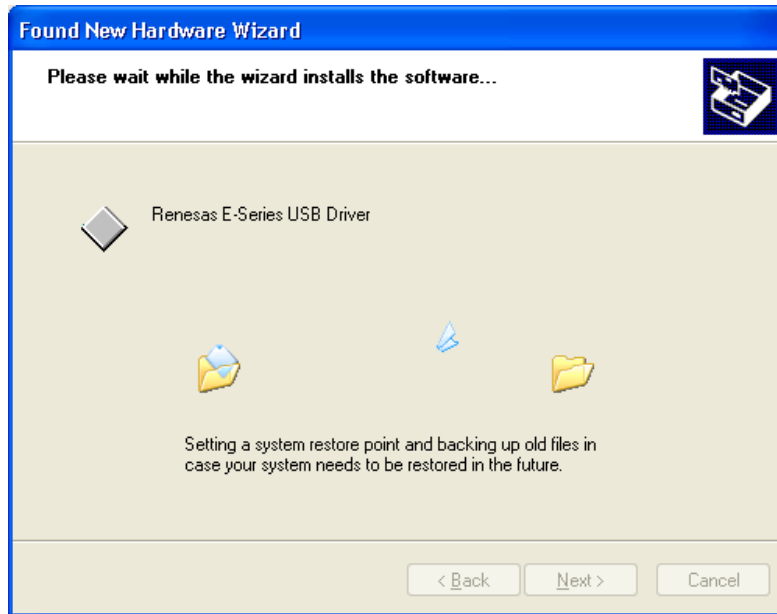


Figure 5.3 Dialog Box Shown during Driver Installation

Note: When a driver is installed in Windows® XP, a warning message from the Windows® logo test may be displayed, but this is not a problem. Select [Continue Anyway] to proceed with driver installation.

- (5) The [Completing the Found New Hardware Wizard] dialog box will appear. Click the [Finish] button.



Figure 5.4 [Completing the Found New Hardware Wizard] Dialog Box

Driver installation is completed through these steps.

6. Let's Try Using the E8 Emulator

This section describes the basic usage of the E8 emulator with regard to the sample program in the supplied CD-ROM.

6.1 Before Starting

6.1.1 Checking the Software

This example uses the C compiler, High-performance Embedded Workshop, and the E8 emulator software supplied with the emulator. Be sure to check that the software is installed in the computer before using the emulator. If any software is not installed, install it as described in section 4, Installing the Software.

6.1.2 Checking the Connections

Before using the E8 emulator, be sure to check that the host computer, USB cable, E8 emulator, user system interface cable, and CPU board (SKPH8TINY) are connected as shown in figure 6.1. If the connections are not complete, connect them as shown in the figure.

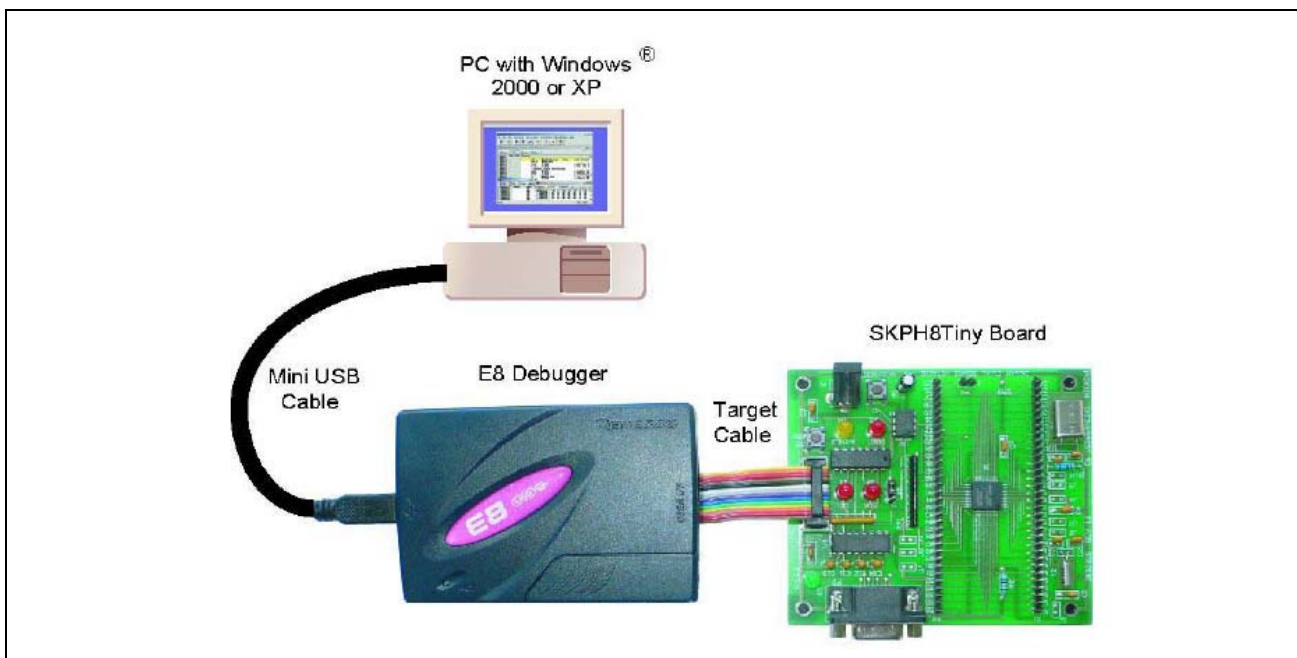


Figure 6.1 Checking the Connections

6.2 Activating the High-performance Embedded Workshop

6.2.1 Activating the High-performance Embedded Workshop

Activate the High-performance Embedded Workshop by opening the [Start] menu and selecting [All Programs], [Renesas], [High-performance Embedded Workshop], and [High-performance Embedded Workshop] in that order.



Figure 6.2 Activating the High-performance Embedded Workshop

This guide shows an example where the High-performance Embedded Workshop has been updated to V.4.01.xx through the Renesas website.

6.3 Sample Program Execution Procedures

This section guides you through the procedures for loading the sample program in memory, executing it, and checking the resultant value of a variable through the following procedures.

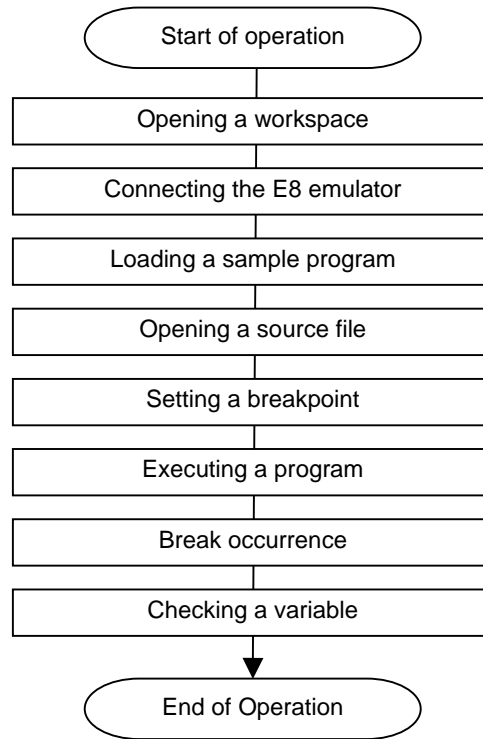


Figure 6.3 Procedures for Sample Program Execution

6.3.1 Opening a Workspace

(1) The [Welcome!] dialog box will appear on the High-performance Embedded Workshop screen.

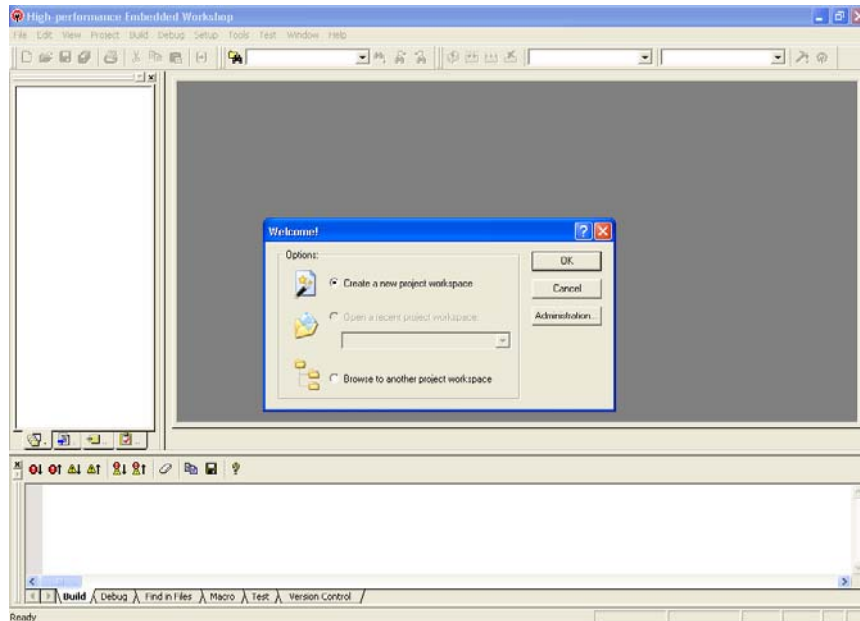


Figure 6.4 Startup Screen of the High-Performance Embedded Workshop

Select the [Browse to another project workspace] radio button in the [Welcome!] dialog box and click the [OK] button.

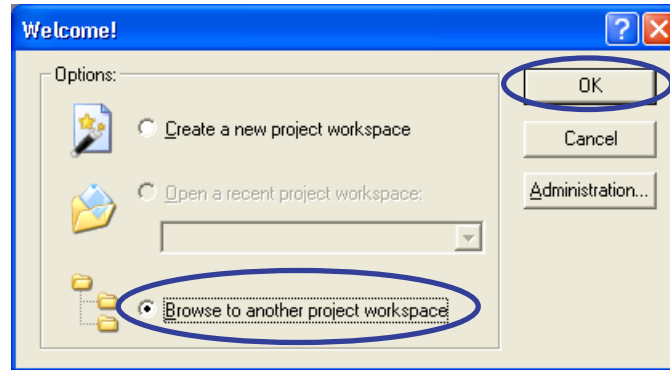


Figure 6.5 Selecting the Workspace Processing

(2)The [Open Workspace] dialog box will appear.

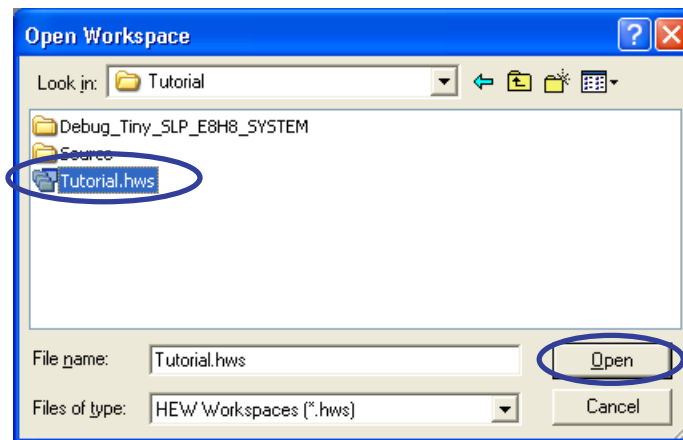


Figure 6.6 Selecting a Workspace File

When the software from the CD-ROM of this product has been installed, workspace "Tutorial.hws" is stored in the folder structure shown below (standard location). Specify the correct location by opening the folders in order. Select the workspace "Tutorial.hws" and click the [Open] button.

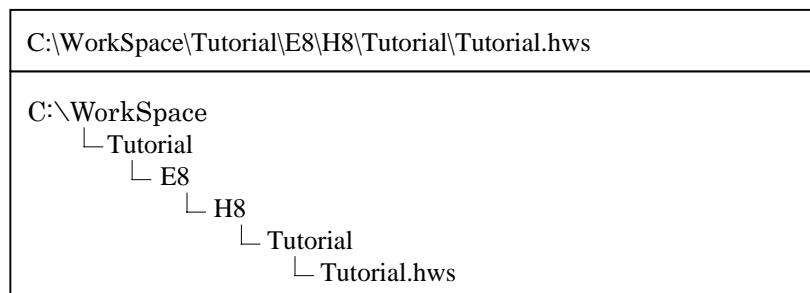


Figure 6.7 Folder Including the Workspace File

The above folder may not be specifiabile depending on the user environment. In this case, select the following folder.

C:\hew3\Tools\Renesas\DebugComp\Platform\E8\H8\Tutorial
C:\hew2\Tools\Renesas\DebugComp\Platform\E8\H8\Tutorial

Note: The drive name C: should be read as the name of the drive where the OS is installed in your computer.

- (3) If the workspace version is old, the following dialog box will appear. To update it to the new version, click the [OK] button.

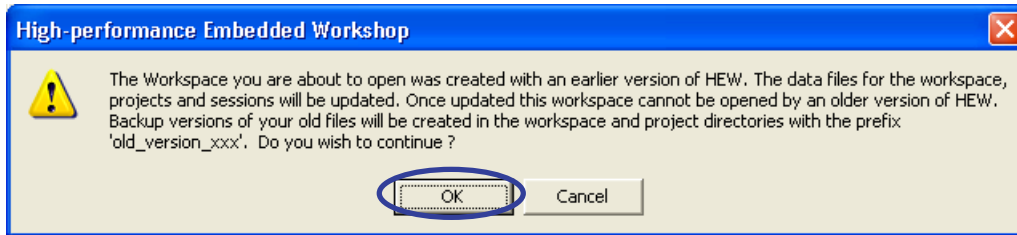


Figure 6.8 Dialog Box Shown for Old-Version Workspace

- (4) If the [Toolchain missing] dialog box appears, select the target project name and click the [OK] button.

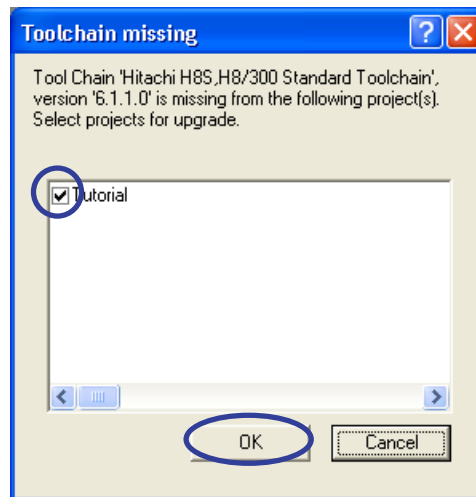


Figure 6.9 Selecting the Project to Upgrade

- (5) If the [Changing Toolchain Version] dialog box appears, select the desired toolchain version and click the [OK] button.

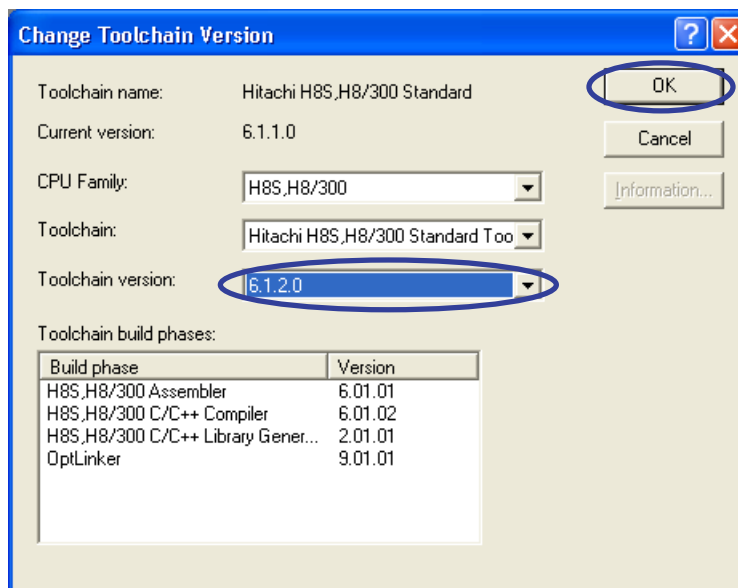


Figure 6.10 Changing the Toolchain Version

(6) If the [Change Toolchain Version Summary] dialog box appears, just click the [OK] button.

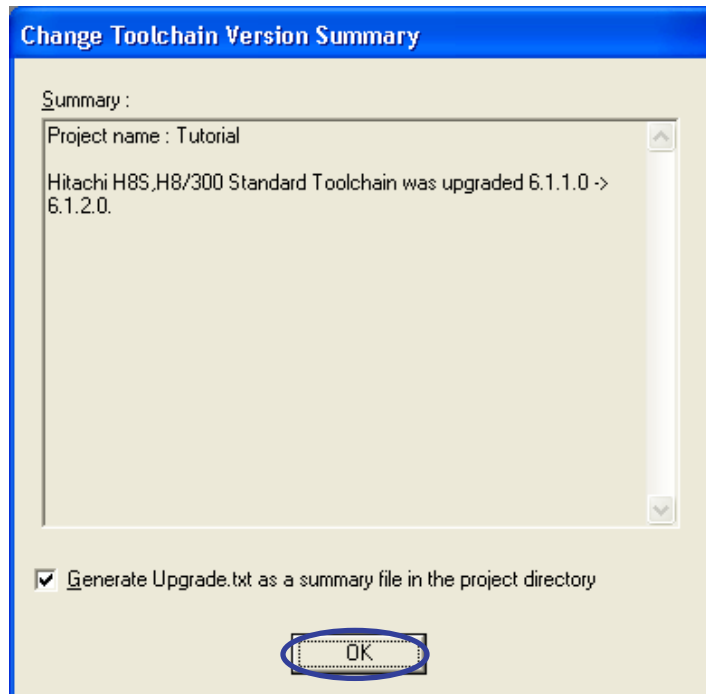


Figure 6.11 Checking the New Toolchain Version

6.3.2 Connecting the E8 Emulator

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



Figure 6.12 Target Device Name and Flash Memory Processing for Emulation

In the [Device] menu, the name of the device mounted on the user system should be specified.

Select [H8/3664F] here.

Select the [Download emulator firmware] radio button for [Mode] and click the [OK] button.

- (2) When the E8 emulator is connected for the first time, the [Please choose driver] dialog box will appear. Click the [OK] button.



Figure 6.13 Prompt to Choose the Driver for the First-Time Connection of E8 Emulator through USB

If the E8 emulator had been connected to the host computer through a USB before, the [Please choose driver] dialog box and the subsequent [Driver Details] dialog box are skipped.

- (3) When the E8 emulator is connected for the first time, the [Driver Details] dialog box will appear. Select [Renesas E-Series USB Driver], and [USB interface] and the unique channel number for the computer will be automatically displayed. Check the contents of [Details] and click the [Close] button.

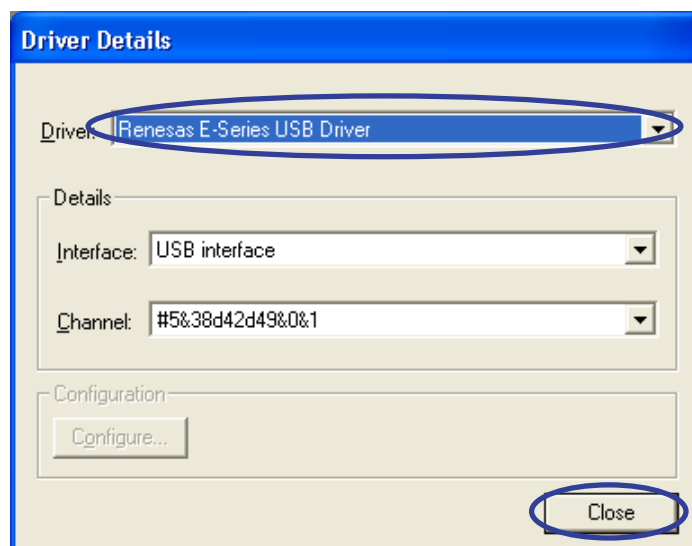


Figure 6.14 Selecting Details of the Driver

If the E10A-USB emulator had been connected to the host computer through a USB before, the [Please choose driver] dialog box and [Driver Details] dialog box are skipped.

(4) If the [e8h8] dialog box appears, just click the [OK] button.

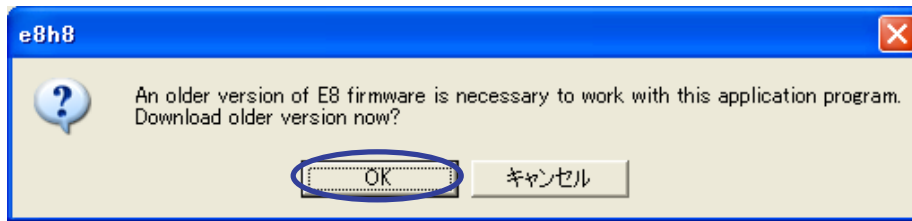


Figure 6.15 Dialog Box Requesting Older-Version E8 Firmware

(5) The [Power Supply] dialog box will appear.

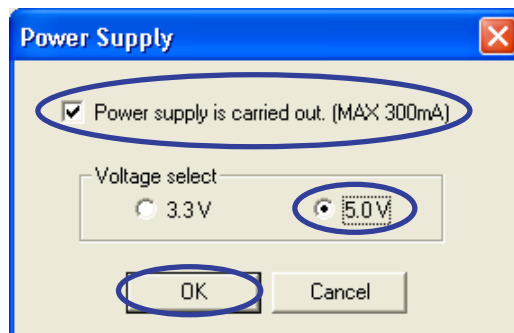


Figure 6.16 Selecting the Power Supply Method

Select [Power supply is carried out. (MAX 300mA)].

Select the [5.0 V] radio button for [Voltage select] and click the [OK] button.

(6) The [System Clock] dialog box will appear.

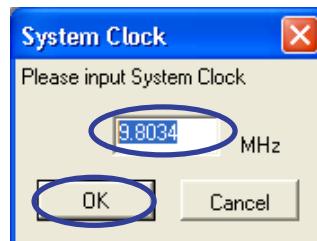


Figure 6.17 Specifying the Operating Frequency

In the [System Clock] edit box, the required operating frequency (MHz) should be specified.

Enter [9.8034] here and click the [OK] button.

(7) The [ID Code] dialog box will appear.

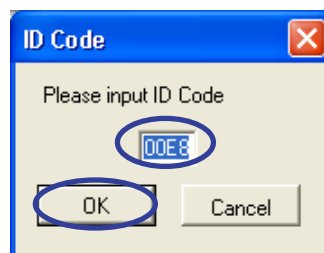


Figure 6.18 Specifying the ID Code

Enter [00E8] here and click the [OK] button.

(8) While the E8 emulator connection is in progress, the [Connecting] dialog box is shown.



Figure 6.19 Dialog Box Shown during E8 Emulator Connection

(9) After the E8 emulator has been connected, [Connected] is displayed in the [Debug] tab.

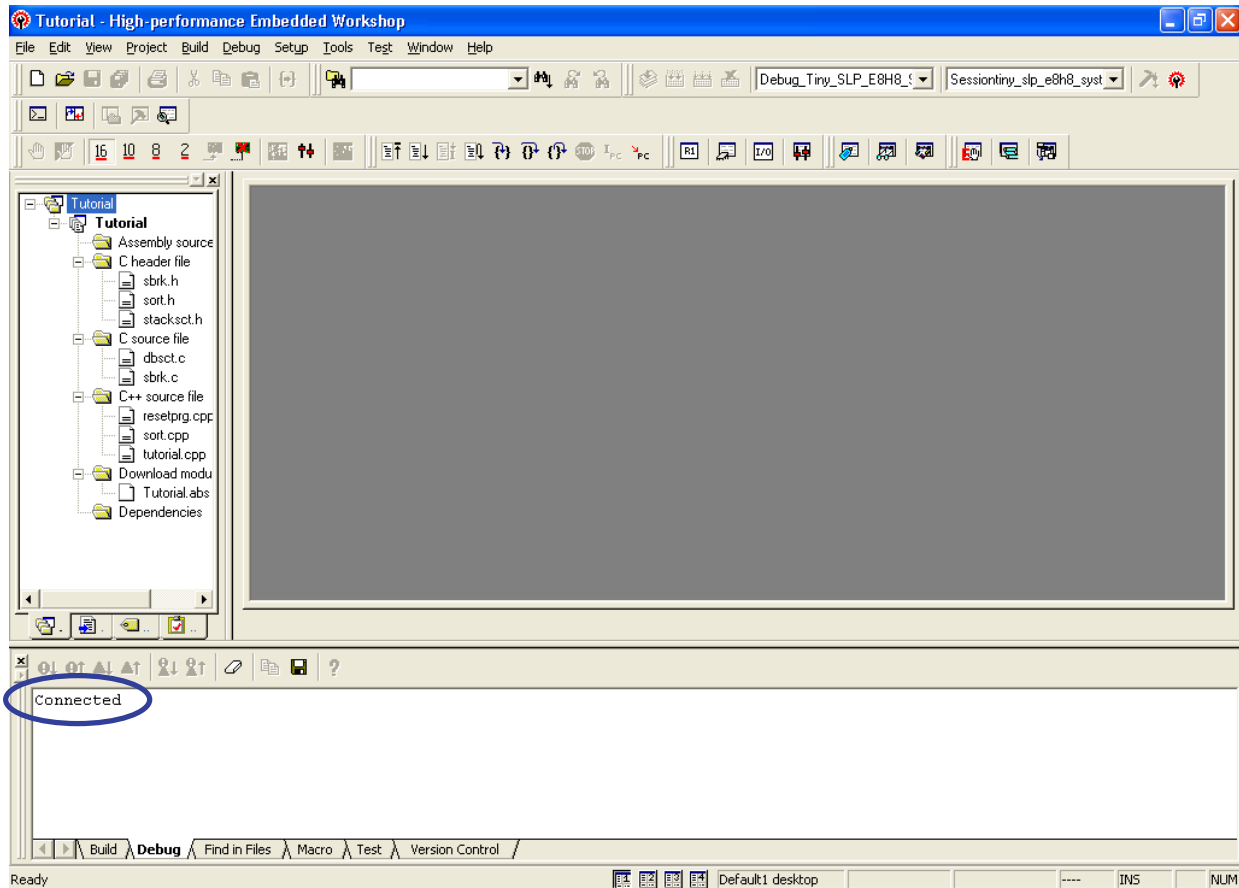


Figure 6.20 Message Shown When E8 Emulator Connection is Established

6.3.3 Loading a Sample Program

(1) Select [Download Modules] form the [Debug] menu to load the sample program.

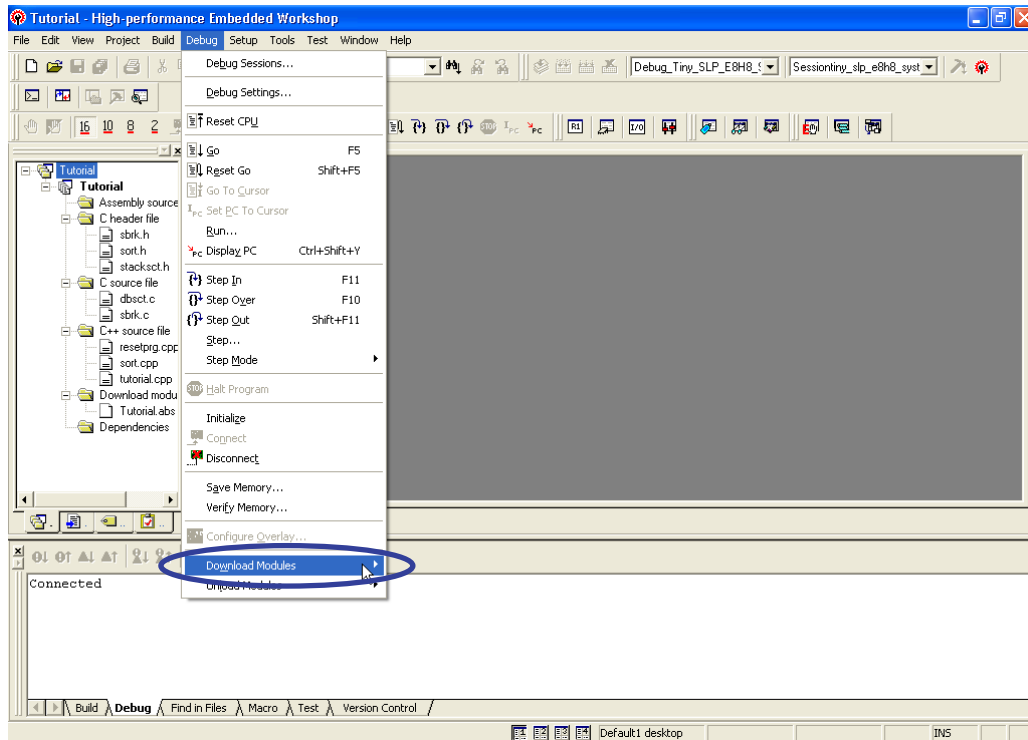


Figure 6.21 Downloading the Sample Program

(2) Select the file with extension .abs registered in the workspace.

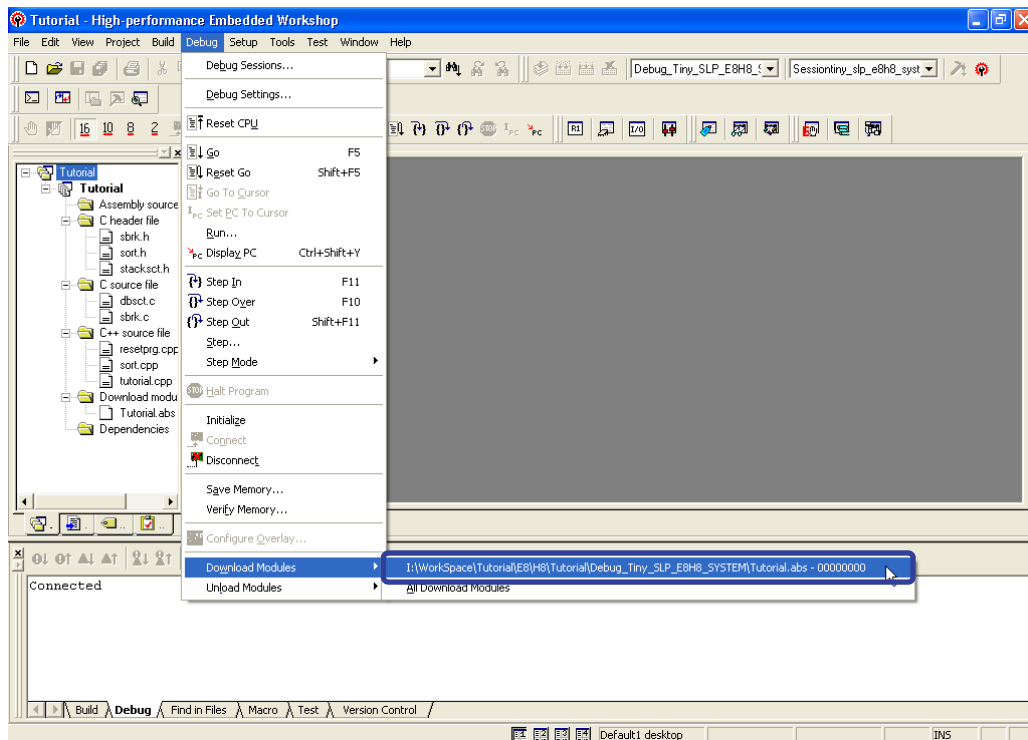


Figure 6.22 Selecting the Sample Program File

6.3.4 Opening a Source File

(1) Double-click the target source file name in the workspace to open the source code.

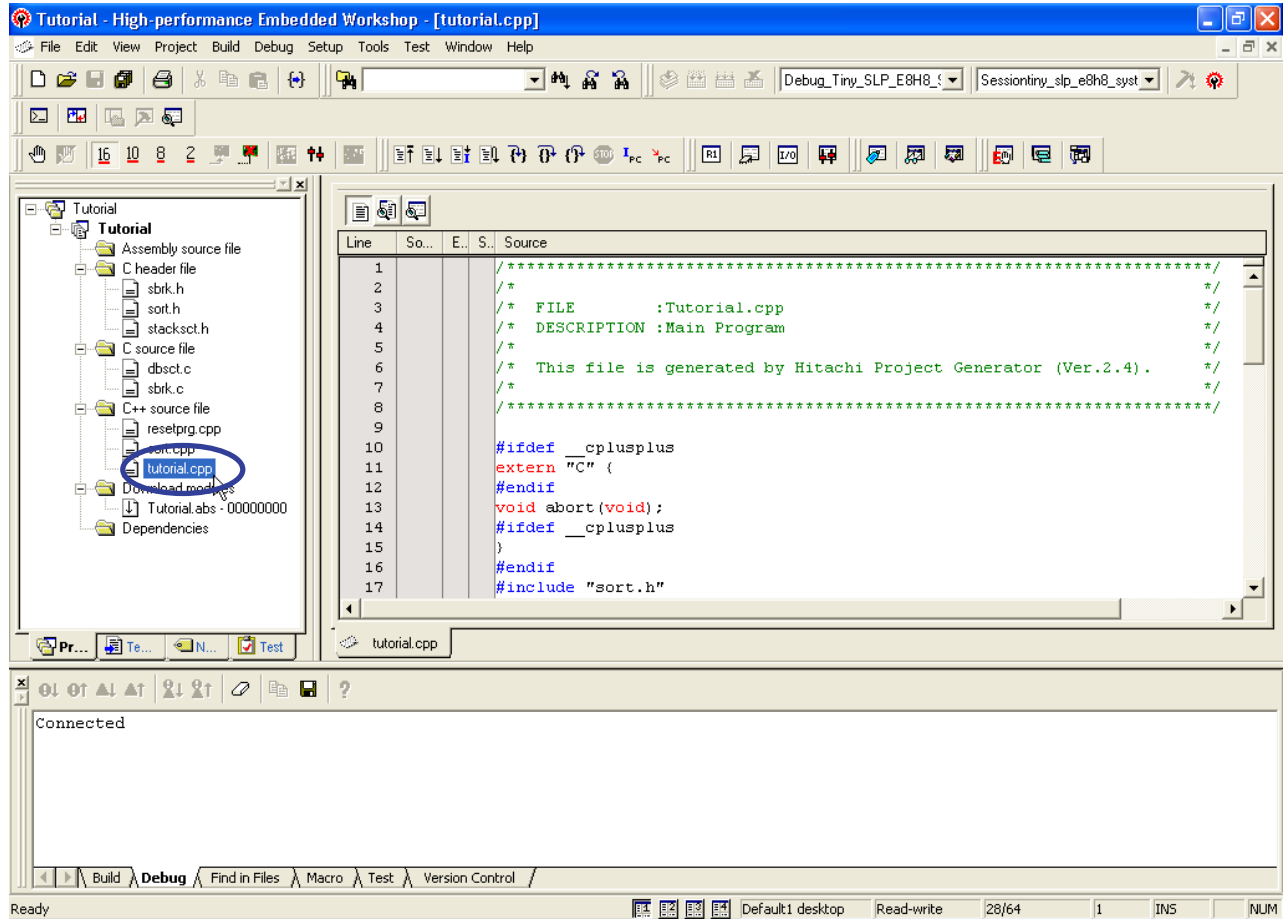


Figure 6.23 Opening a Source File

Select "tutorial.cpp" here.

6.3.5 Setting a Breakpoint

(1) Scroll the source code display to show line 47 by using the scroll bar.

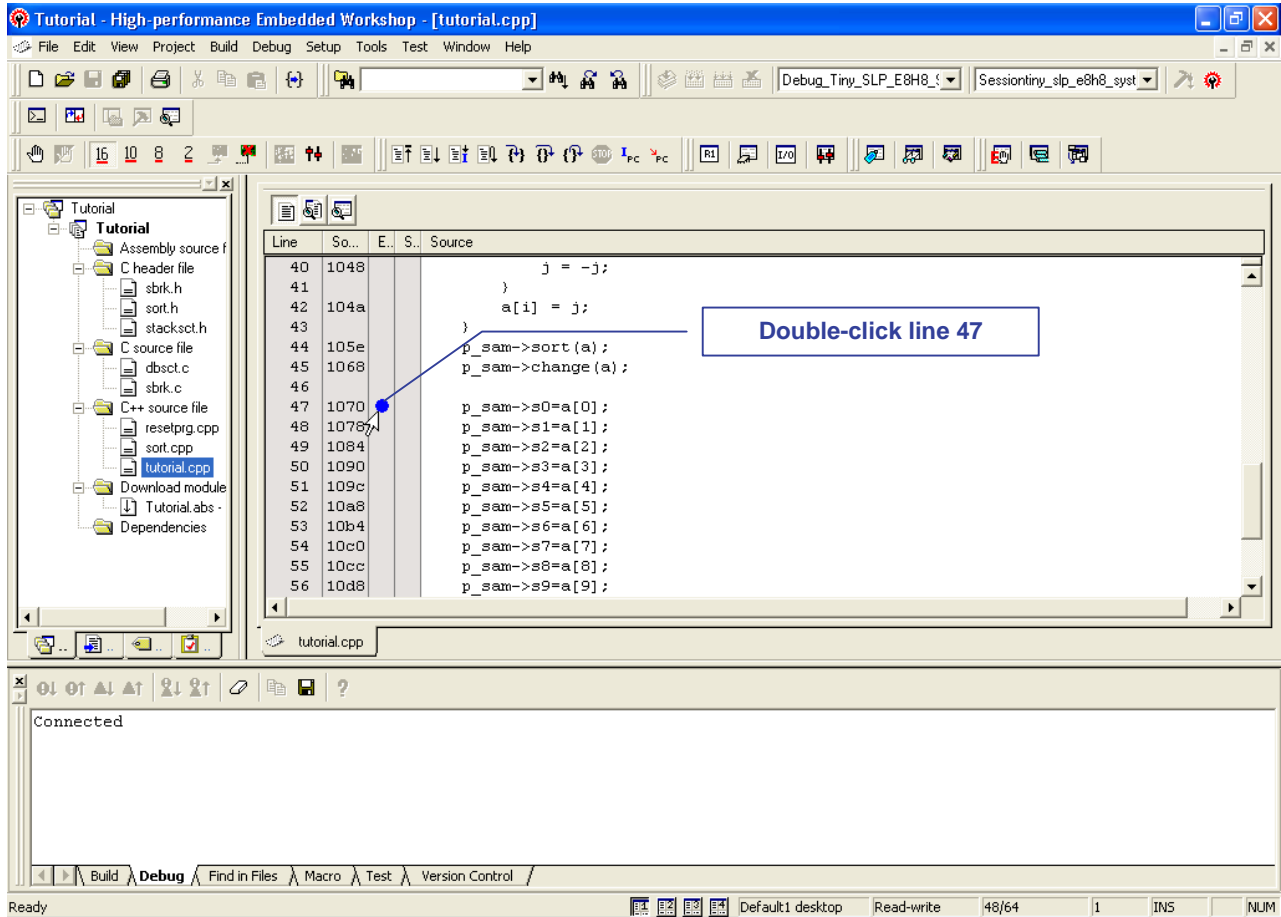


Figure 6.24 Setting a Hardware Break

Here, double-click the [Event] column on line 47 to set a break condition.

A blue dot indicates that a break condition has been set.

To clear a break condition previously set, double-click the blue dot.

During debugging of the H8/3664F program through the E8 emulator, only one breakpoint can be set as an [Event]-type break. This type of break is advantageous because it does not require write access to the on-chip flash memory of the H8/3664F to set or clear a break condition, since it is implemented by hardware (a hardware break), and thus does not degrade flash memory endurance.

In contrast, software break conditions can be set for up to 255 points, but the flash memory is written to every time a condition is set or cleared.

6.3.6 Executing a Program

(1) Select [Reset Go] from the [Debug] menu to execute a program.

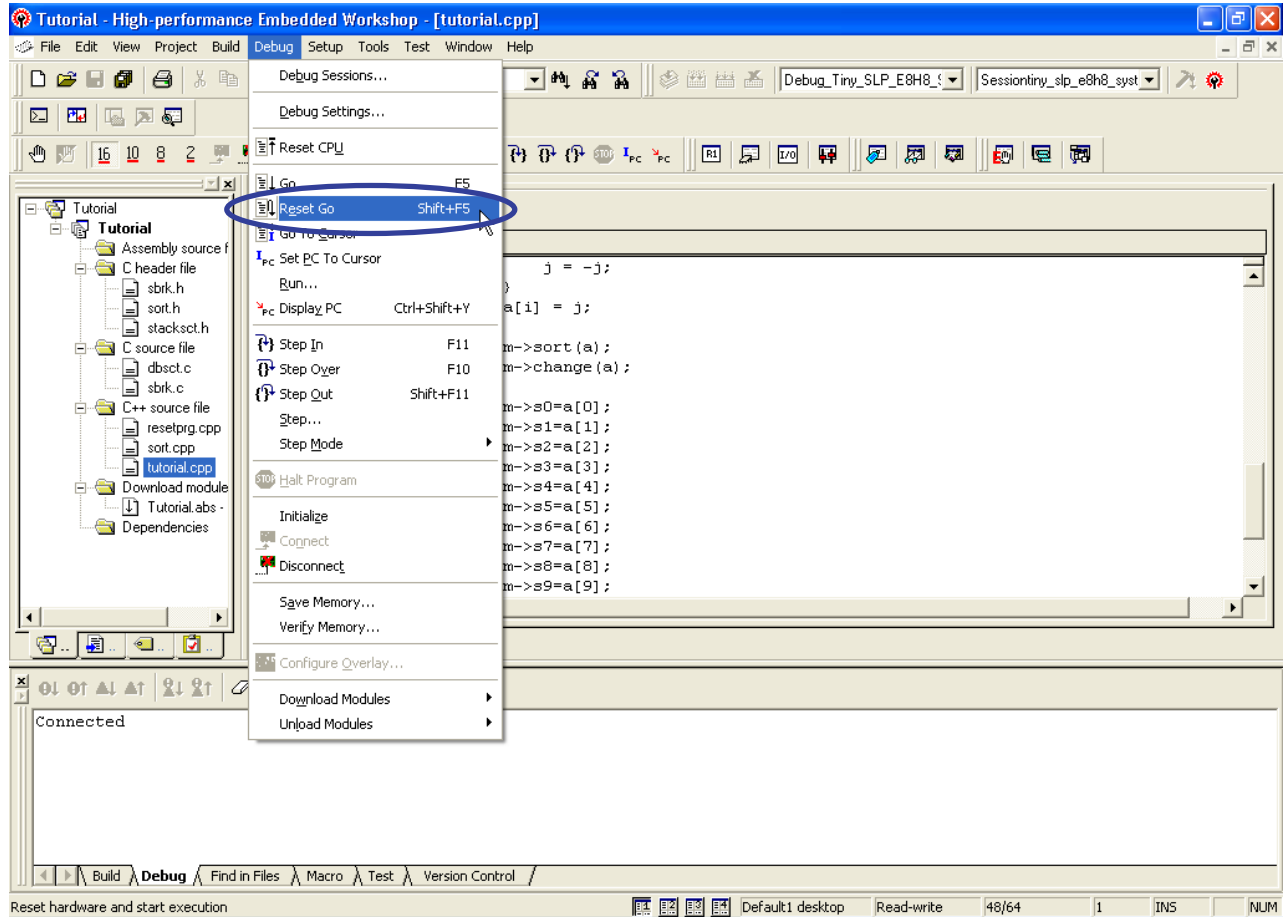


Figure 6.25 Executing a Program after a Reset

6.3.7 Break Occurrence

(1) When a break condition is satisfied, the source window shows the program stop position.

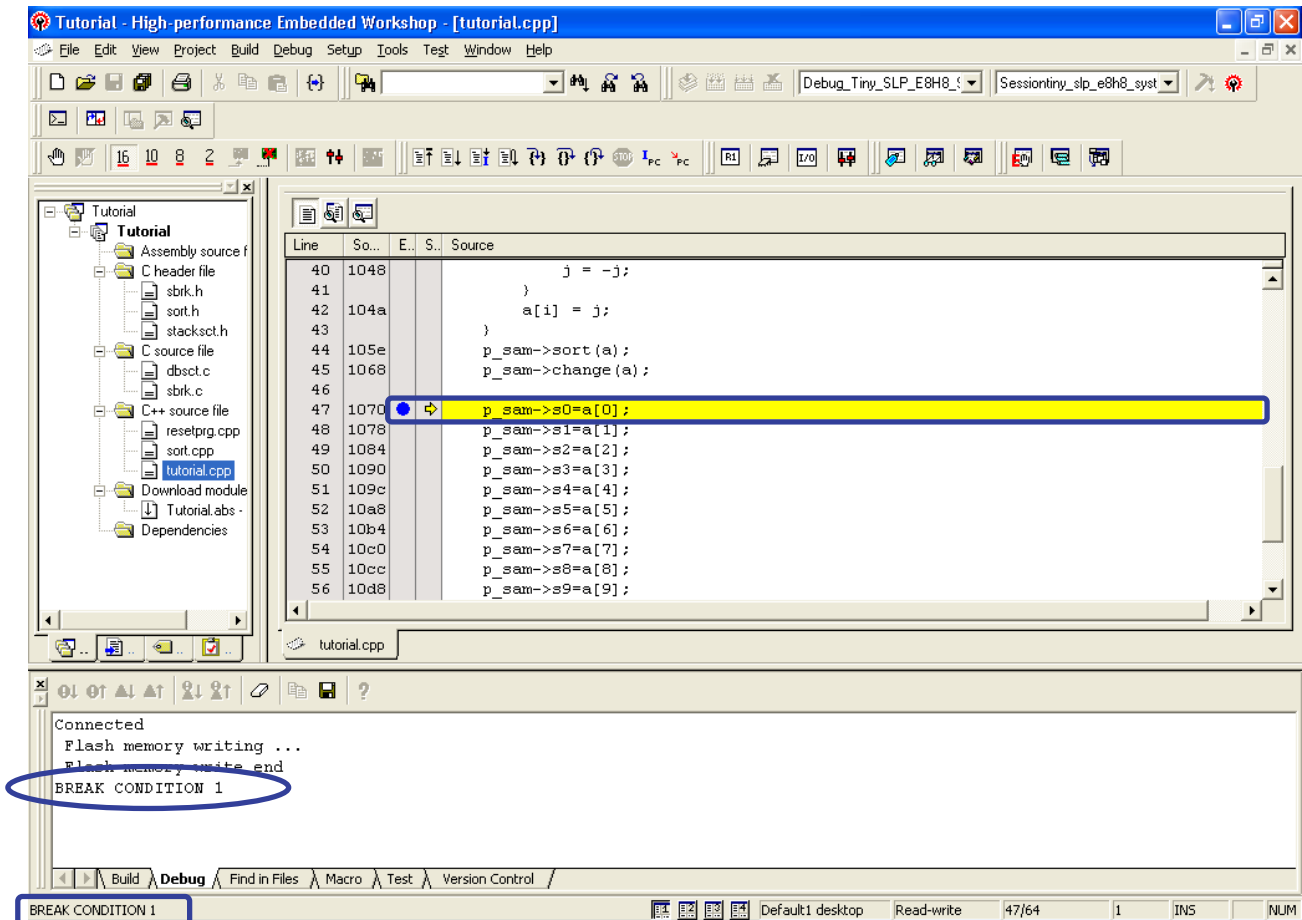


Figure 6.26 Screen Showing Break Condition Satisfaction

The yellow arrow points to the program counter location and the corresponding source line is highlighted in yellow. "BREAK CONDITION 1" is displayed as the program stop cause in the [Debug] tab and on the status bar.

6.3.8 Checking Variable Contents

(1) To show the contents of a variable, select [Symbol] from the [View] menu and select [Watch].

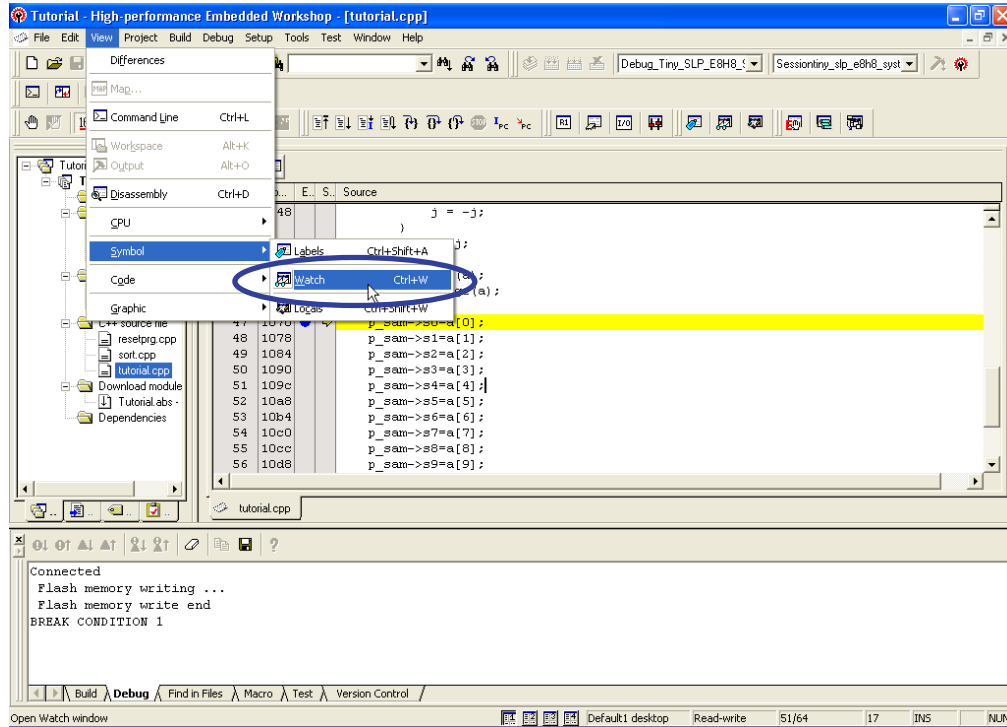


Figure 6.27 Selecting the Memory Watch Function

(2) Select [Add Watch...] from the menu opened by right-clicking on the Watch window.

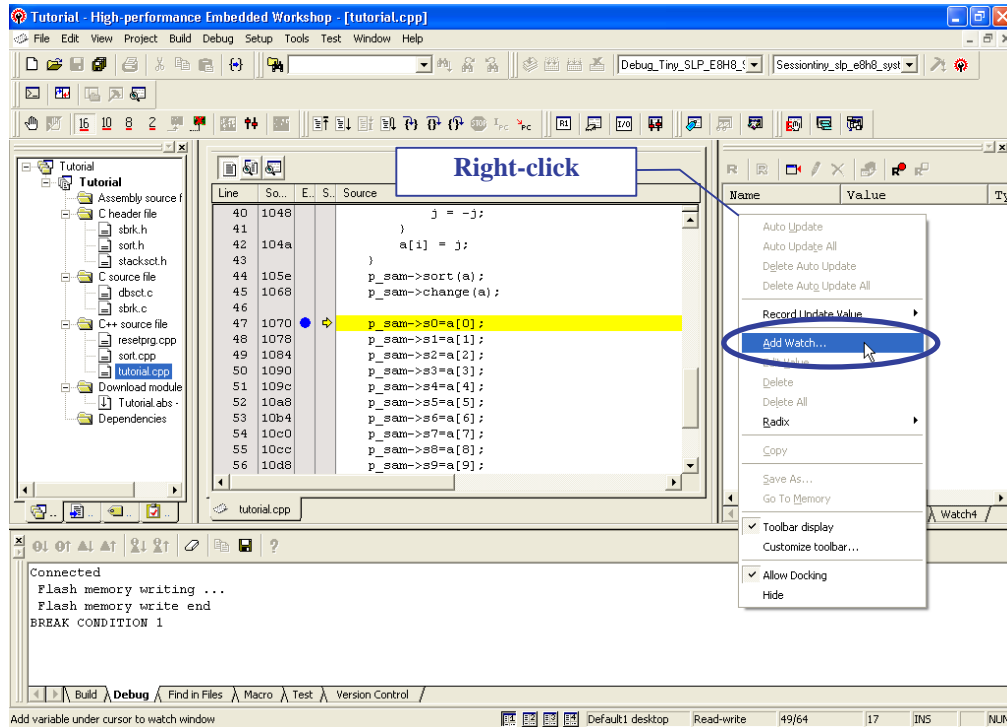


Figure 6.28 Adding a Symbol in the Watch Window

- (3) The [Add Watch] dialog box will appear.
Enter "a" (symbol name) in the [Variable or expression:] edit box and click the [OK] button.

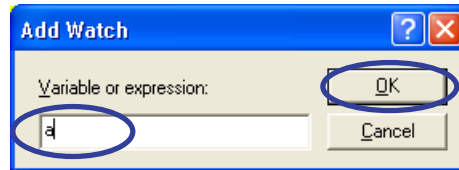


Figure 6.29 Specifying a Symbol Name

When specifying a local variable in C language as a watch symbol, note that the variable has a scope (a valid range). A local variable is only valid while the program counter (PC) points to a location in the function that declared the local variable.

The symbol "a" specified in this example is a local variable and cannot be watched when a break occurs in another function.

- (4) The Watch window shows the contents of symbol "a".

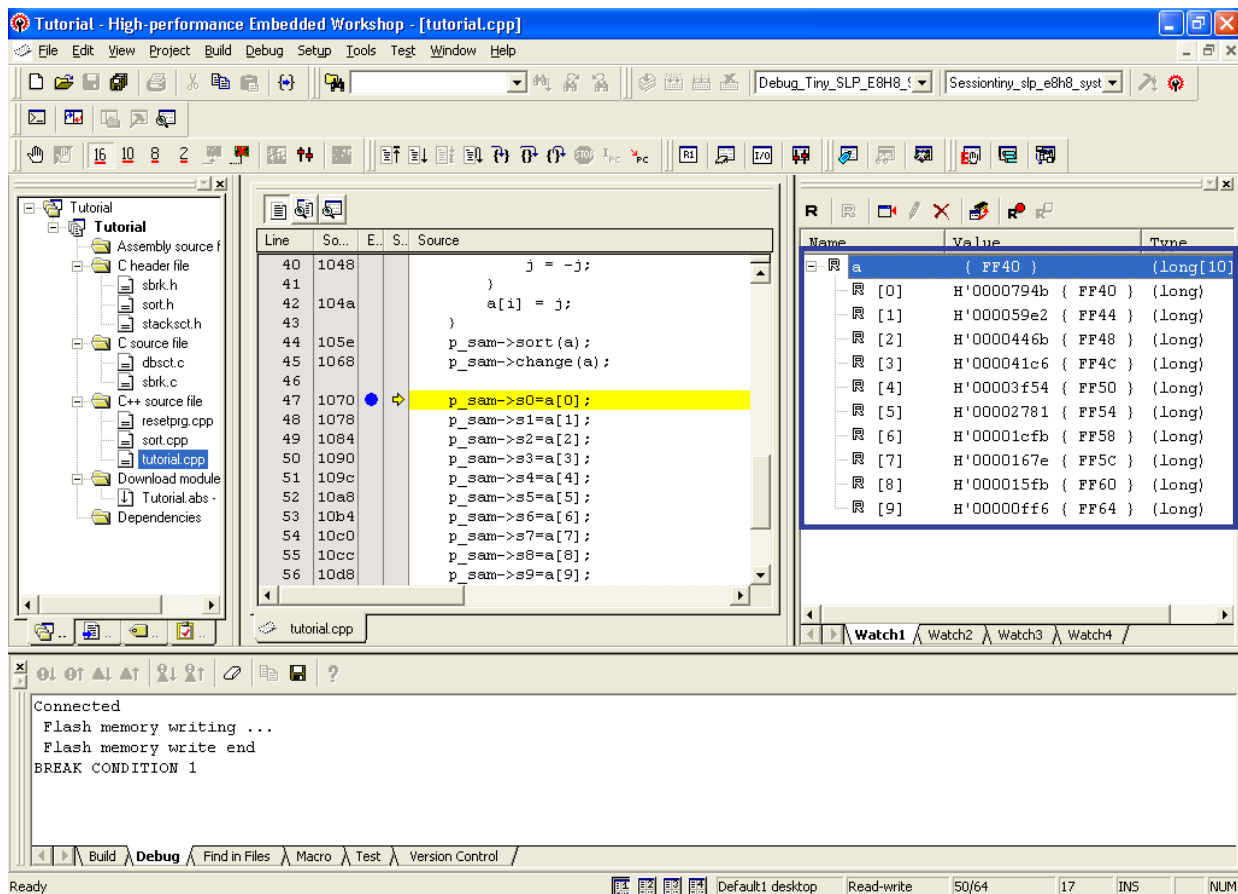


Figure 6.30 Contents of the Symbol Specified in the Watch Window

The Type column in the Watch window shows that symbol "a" is a long-type array (long[10]).

On the memory, a[0] is allocated to address H'FF40, a[1] is allocated to address H'FF44, and the last element a[9] is allocated to address H'FF64.

The [Value] column (the value of each array element) shows that the elements are arranged in descending order as a result of program execution; that is, the array elements have been created at random (line 38), sorted in ascending order (line 44), and then sorted in the opposite order (line 45).

7. Limitations

7.1 Limitations on Free Evaluation-Version C Compiler

- 1) The free evaluation-version compiler has no limitations in usage for 60 days after it is used for compilation for the first time.
- 2) From the 61st day on, the linkage size is limited to within 64 Kbytes.

7.2 Limitations on Emulator Software

There are two types of documents related to the E8 emulator: common documents and additional documents.

The common documents include the E8 Emulator User's Manual and the Precautions on Using the E8 Emulator.

An additional document is prepared for each device type. For example, for the H8/3664 used in this guide, E8 Emulator Additional Document for Users Manual - Notes on Connecting the H8/3664F, H8/3687F, H8/3694F, H8/36037F, H8/36057F, H8/36049F, H8/36064F, H8/36087F, H8/36077F, H8/36094F, and H8/36109F (REJ10B0191-0300) is available.

Please refer to them for important information required when using the E8 emulator.

7.2.1 Areas Occupied by the Emulator Program

Part of the flash memory and on-chip RAM areas are used by the E8 emulator program; do not access these areas. Table 7.1 shows the areas occupied by the E8 emulator program for each device.

If such an area is overwritten, the emulator will not work correctly. In this case, restart the computer in the download emulator firmware mode.

Table 7.1 Areas Occupied by the E8 Emulator Program

| Device Name | Occupied Area |
|----------------|---|
| H8/3664F | Flash memory H'7000 to H'7FFF |
| H8/3694 (G) F | On-chip RAM H'F780 to H'FB7F |
| H8/36064 (G) F | Vectors H'0002 to H'0007 |
| H8/36094 (G) F | H'000E to H'000F |
| | H'0018 to H'0019 |
| H8/3687 (G) F | Flash memory: H'D000 to H'DFFF |
| H8/36037 (G) F | On-chip RAM: H'F780 to H'FB7F |
| H8/36057 (G) F | Vectors: H'0002 to H'0007 |
| H8/36087 (G) F | H'000E to H'000F |
| H8/36077 (G) F | H'0018 to H'0019 |
| H8/36049 (G) F | Flash memory: H'018000 to H'018FFF (H8/36049 (G) F) |
| H8/36109 (G) F | H'01F000 to H'01FFFF (H8/36109 (G) F) |
| | On-chip RAM: H'FFF780 to H'FFFB7F |
| | Vectors: H'000004 to H'00000D |
| | H'00001C to H'00001F |
| | H'000030 to H'000033 |

7.3 Memory Map

The H8/3664 group device has a 64-Kbyte address area including both the program area and data area. Figure 7.1 shows the memory map of the flash memory-version device.

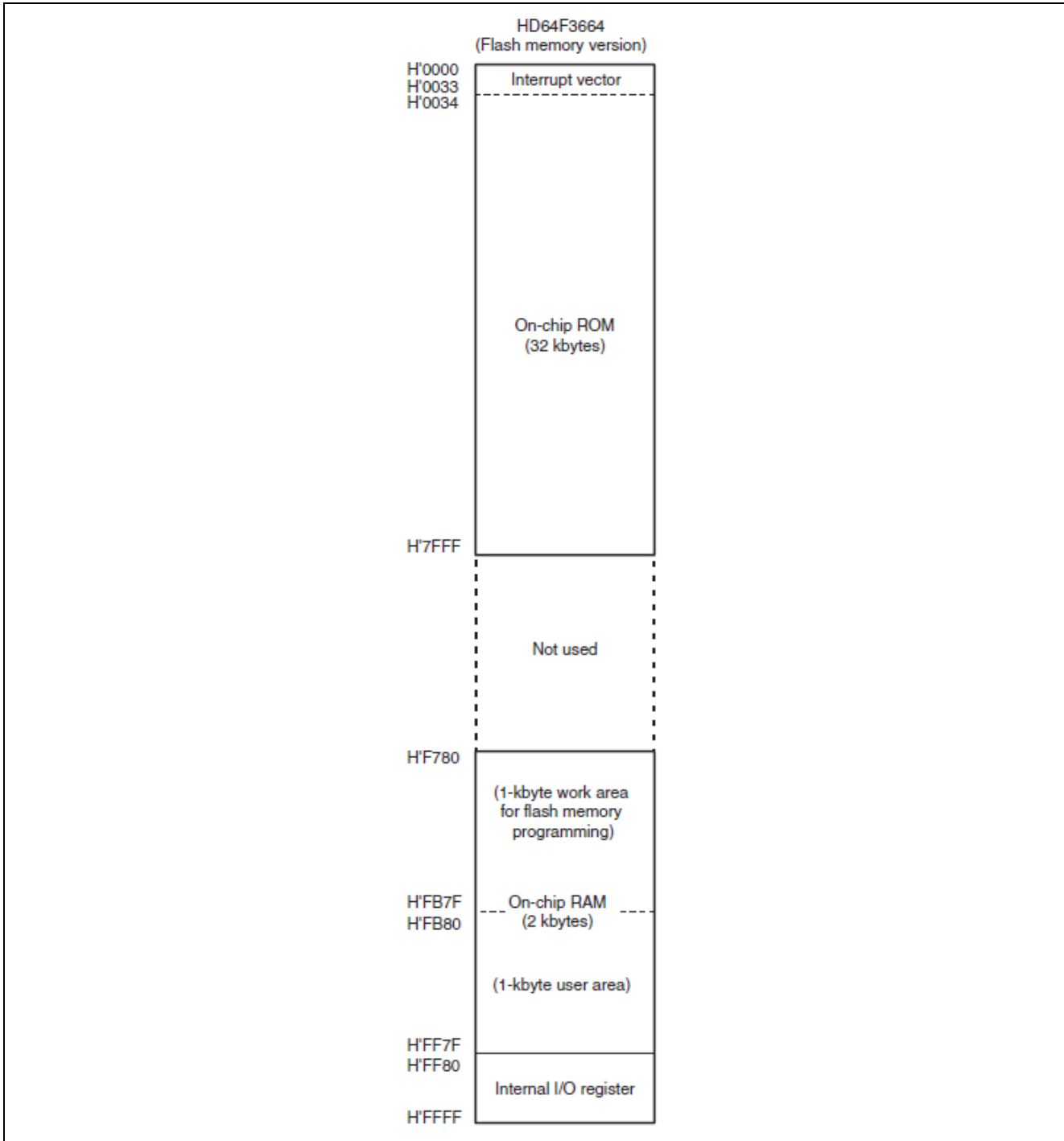


Figure 7.1 H8/3664 Memory Map

8. Frequently Asked Questions

8.1 A communication error has occurred at startup.

If a communication error has occurred at startup, confirm the following.

- 1) The USB cable and user system interface cable are correctly connected.
- 2) The power is supplied to the CPU board when an external power source is used.
(Turn on the power after the [Power Supply] dialog box appears.)
- 3) The H8/3664 is selected for the target device.

8.2 A communication error has occurred during debugging.

The firmware may have gone out of control due to user program execution (going out of control or accessing to the monitor area). Disconnect the USB cable of the E8 emulator from the host computer, connect it again, and then restart the emulator software.

8.3 Do the on-chip peripheral modules work after a break occurs?

While the program is stopped due to a break, the CPU does not accept interrupts but the peripheral modules continue operation. For example, when the user program stops due to a break after a timer has started counting, the timer continues counting but the CPU does not accept timer interrupts.

8.4 Other Frequently Asked Questions

Refer to the FAQs at the following website address for the questions and answers about the Renesas products including the E8 emulator.

<http://www.renesas.com/e8> (Global site)

Access the above address and click the FAQs at the left side of the page.

9. Related Documents

The E8 emulator and HEW provide many other useful functions not mentioned in this document. Please refer to the following related documents for important information such as detailed specifications, technical information, or restrictions.

Documents Related to the E8 Emulator:

- E8 Emulator User's Manual
- Precautions on Using the E8 Emulator
- Additional Document for User's Manual: Notes on Connecting the H8/3664F, H8/3687F, H8/3694F, H8/36037F, H8/36057F, H8/36049F, H8/36064F, H8/36087F, H8/36077F, H8/36094F, and H8/36109F

Documents Related to High-Performance Embedded Workshop:

- High-performance Embedded Workshop User's Manual
- High-performance Embedded Workshop V.4.01 Release Note

Documents Related to CPU:

- H8/3664 Group Hardware Manual
- Corrections of the H8/300H Tiny Series Hardware Manual
- H8/300H Series Software Manual

Documents Related to H8S, H8/300 Series C/C++ Compiler Package:

- Notes on Usage of the C/C++ Compiler Package for H8S, H8/300 series
- H8S, H8/300 Series C/C++ Compiler, Assembler, Optimizing Linkage Editor User's Manual

10. For More Information

Access the following addresses for information on this product.

Ask technical questions about the E10A-USB emulator through the following e-mail addresses.

USA: techsupport.rta@renesas.com

Europe: tools.support.eu@renesas.com

Japan: csc@renesas.com

Information on the E8 emulator is available at the following Renesas websites:

<http://www.renesas.com/e8> (Global site)

<http://japan.renesas.com/e8> (Japan site)

Information on the Renesas microcontrollers is available at the following Renesas websites:

<http://www.renesas.com/> (Global site)

<http://japan.renesas.com/> (Japan site)

Revision Record

| Rev. | Date | Description | |
|------|-----------|-------------|----------------------|
| | | Page | Summary |
| 1.00 | Mar.13.07 | — | First edition issued |

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Introductory Guide for H8/300H Tiny

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