

To our customers,

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# H8SX Family Emulator E6000H

## Usage of Realtime RAM Monitoring

### Overview

This document describes how to use the RAM monitoring function which displays the memory contents during realtime execution of the user program in the full-specification emulator E6000H for the H8SX/1651.

The functions described in this document can be performed through the H8SX E6000H emulator in a stand-alone form. These functions are also available through all E6000H emulators for the H8SX family.

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## 1. Specifications

The E6000H emulator provides the RAM monitoring function to display the memory contents during realtime execution of the user program. In this monitoring function, the realtime operation is retained since the bus monitoring circuit of the emulator sets the read/write signal of the MCU as a trigger and holds the address bus and data bus values to update the displayed contents of memory.

Up to eight points or 256 bytes in total can be set by using the eight monitoring channels on the bus monitoring circuit. It is possible that a part or all of monitoring ranges is overlapped.

Notes:

1. Monitoring is impossible for an area, such as an on-chip timer counter, where no internal write signal is generated to update a value.
2. The procedure to display or modify the contents of memory differs depending on the product. If the display of memory contents is updated during execution of the user program, realtime emulation may not be available. For details, refer to section 5.4, Displaying and Modifying the Contents of Memory, in the H8SX E6000H Emulator User's Manual.

## 2. Functional Descriptions

This document describes how to use the RAM monitoring function in the H8SX/1651 E6000H emulator.

It guides you through examples of the setting of the realtime RAM monitoring function in the sample program provided in the CD-ROM of the H8SX E6000H emulator. Check that the memory contents have been changed on the [Monitor] window during program execution.

## 3. Software Preparation

### 3.1 Introduction

Install the software provided in the CD-ROM of the H8SX E6000H emulator to expand the sample program (tutorial workspace) to be used in this document on your personal computer.

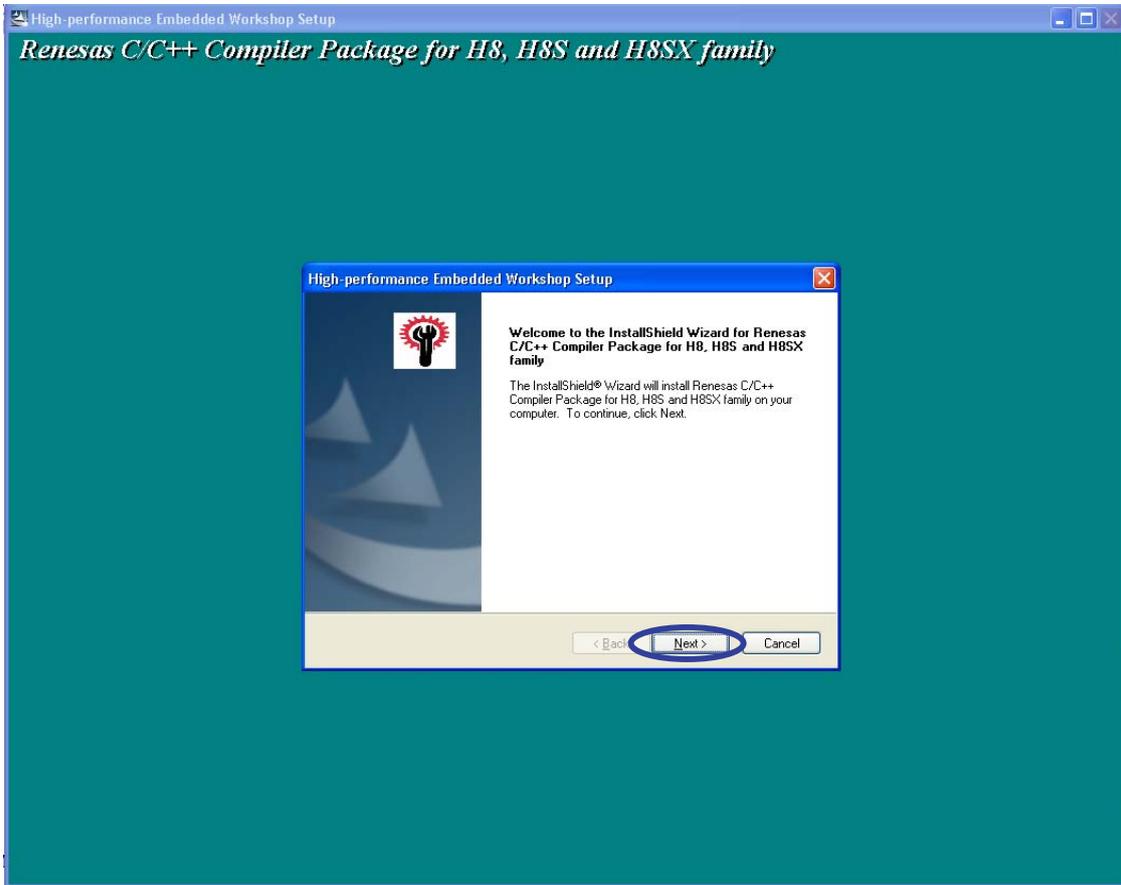
The software in the CD-ROM of the H8SX E6000H emulator can also be installed in a personal computer in which the High-performance Embedded Workshop has already been installed. In this case, some dialog boxes may be skipped in the installation process.

If the software has already been installed, go to section 4.

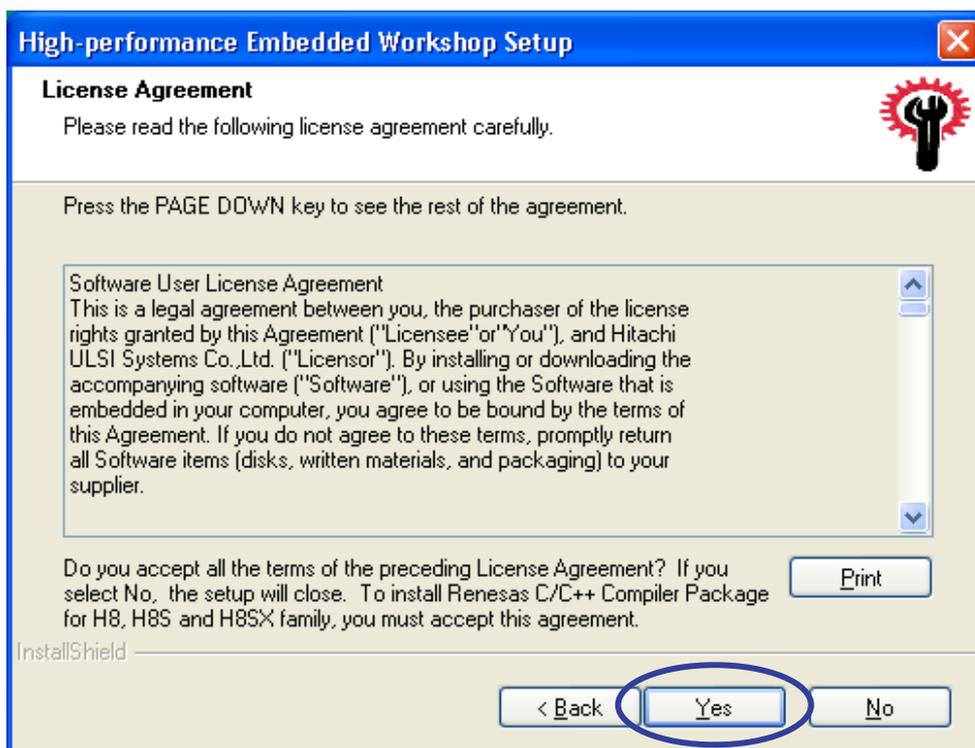
### 3.2 Installing the H8SX E6000H Emulator Software

- (1) Execute setup.exe from the CD-ROM of the H8SX E6000H emulator.

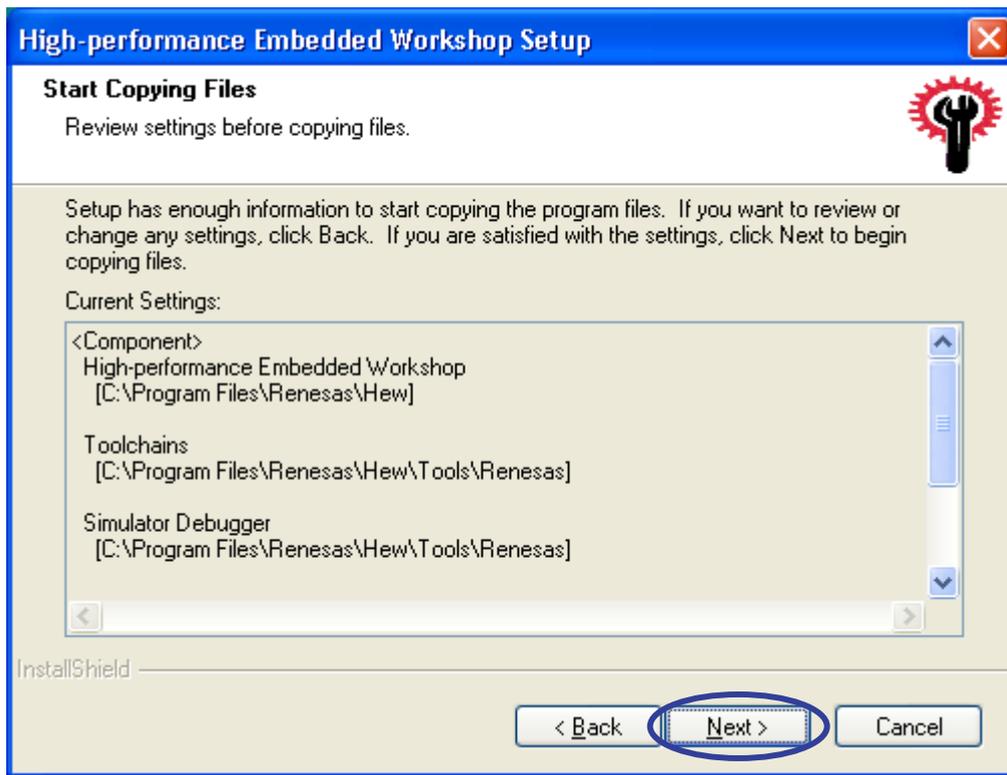
The whole screen is displayed and installation of [H8SX E6000H Emulator] is started. Click the [Next] button.



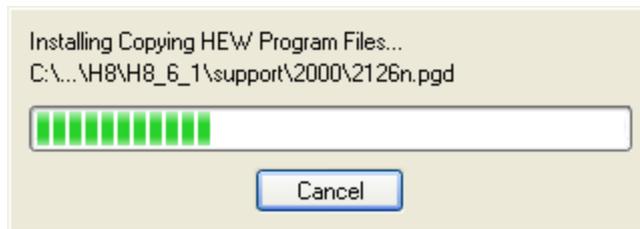
- (2) The [License Agreement] dialog box will appear. Read the contents and click the [Yes] button.



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



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



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



This is the end of software preparation.

### 3.3 Installing Other Necessary Software

For the host interface board, which is an optional board for the H8SX E6000H emulator, install the necessary software according to the connection type (PCI card, PC card, LAN adaptor, or USB adaptor). The installation procedure is described in the manual supplied with the optional product; it is not described in this document.

## 4. Operations

This section describes how to activate the High-performance Embedded Workshop (HEW) and how to use the realtime RAM monitoring function in the following steps.

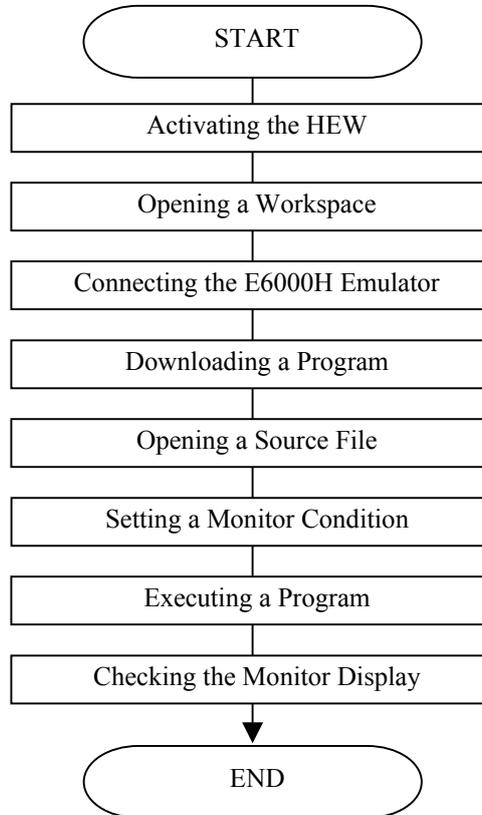
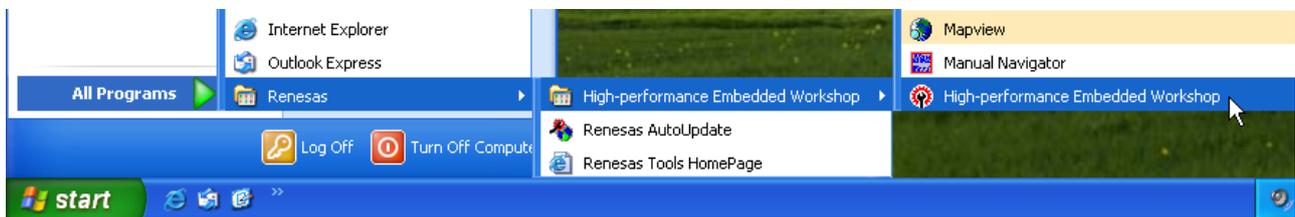


Figure 4.1 Procedures for Sample Program Execution

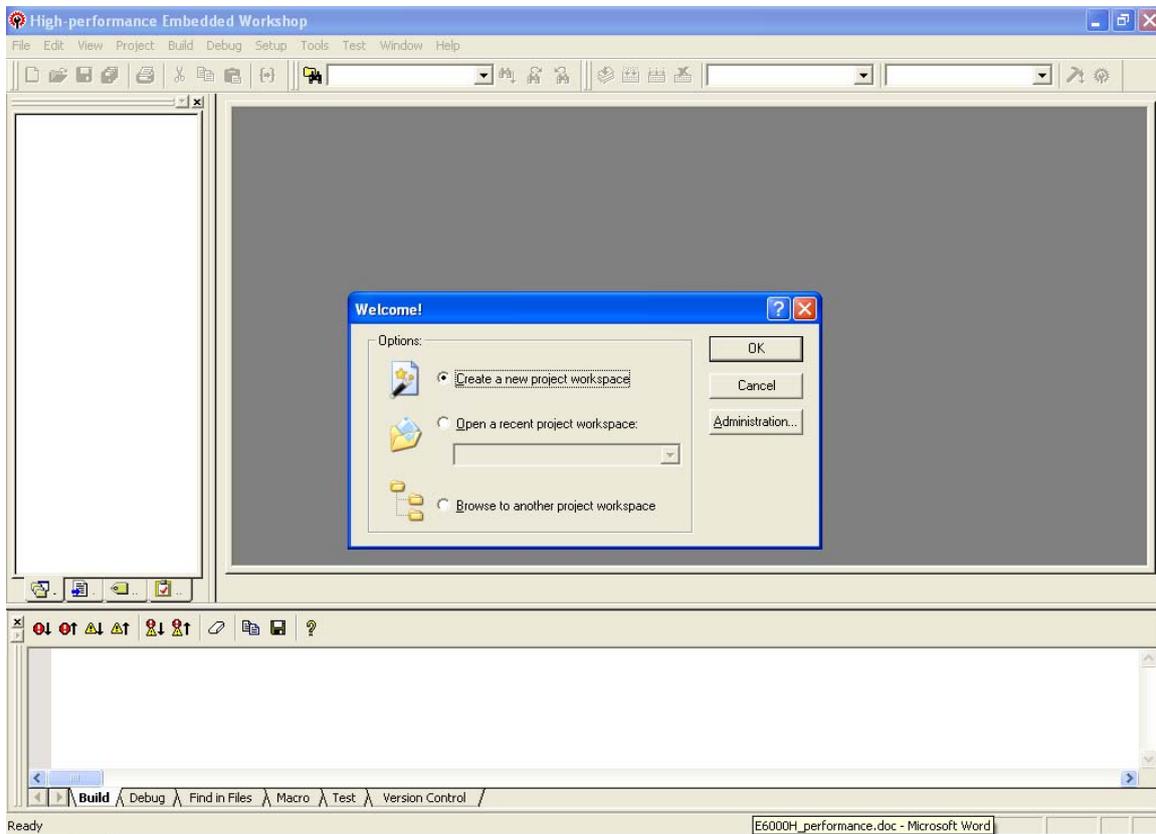
### 4.1 Activating the High-Performance Embedded Workshop

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.

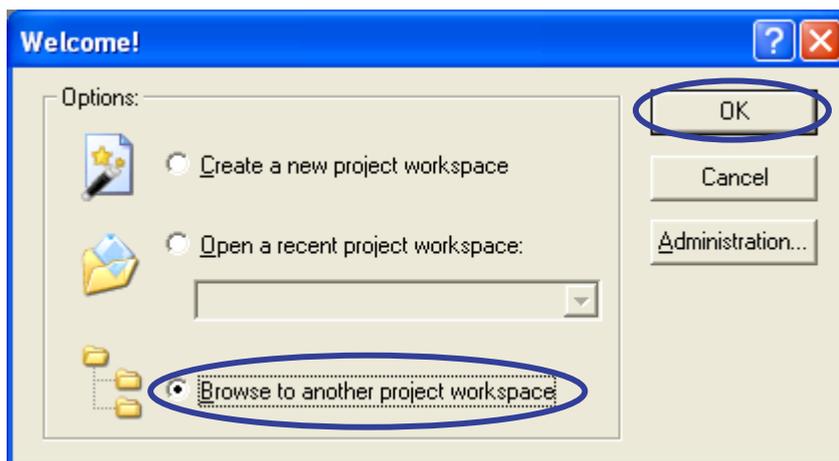


## 4.2 Opening a Workspace

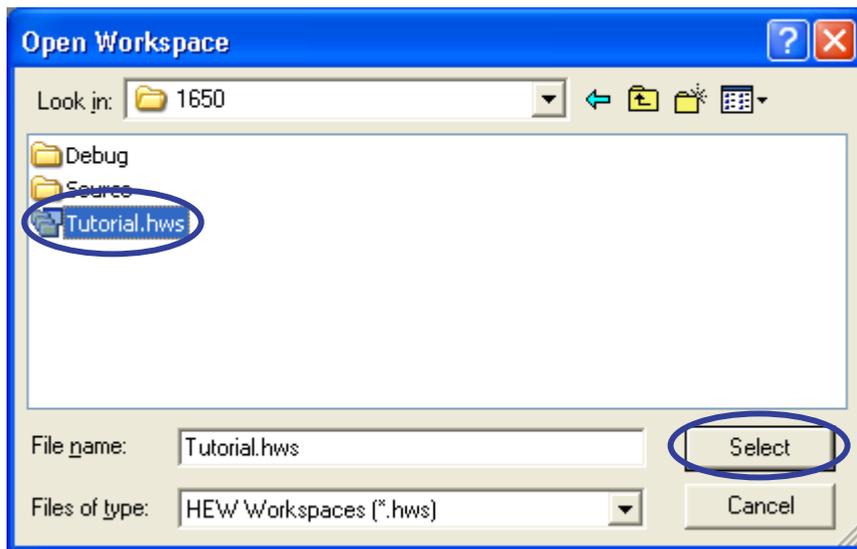
(1) The [Welcome!] dialog box will appear on the High-performance Embedded Workshop screen.



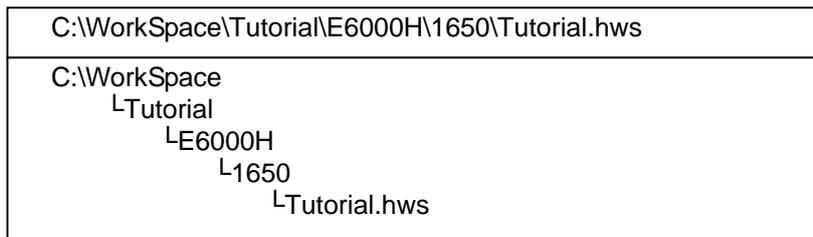
Select the [Browse to another project workspace] radio button in the [Welcome!] dialog box and click the [OK] button.



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



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.



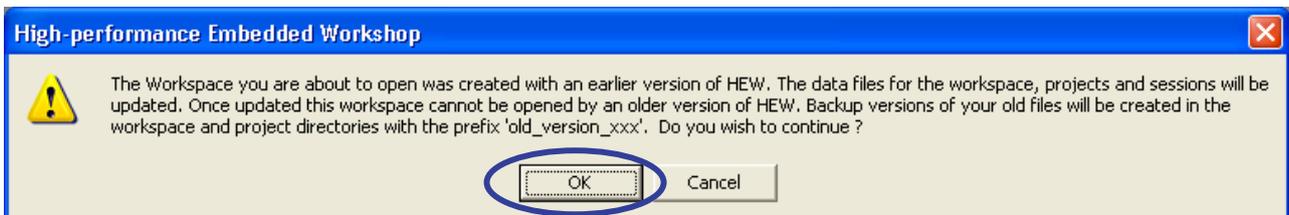
Note: The above directory may not be specifiable depending on the software version. In this case, select the following directory.

<High-performance Embedded Workshop installation directory>  
 \Tools\Renesas\DebugComp\Platform\E6000H\1650\Tutorial

Directory examples:

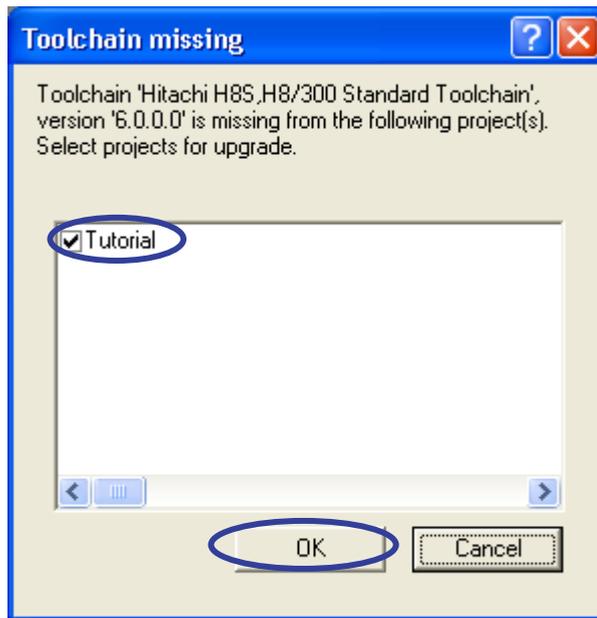
C:\hew3\Tools\Renesas\DebugComp\Platform\E6000H\1650\Tutorial  
 C:\hew2\Tools\Renesas\DebugComp\Platform\E6000H\1650\Tutorial

(3) If the workspace version is old, the following dialog box will appear.

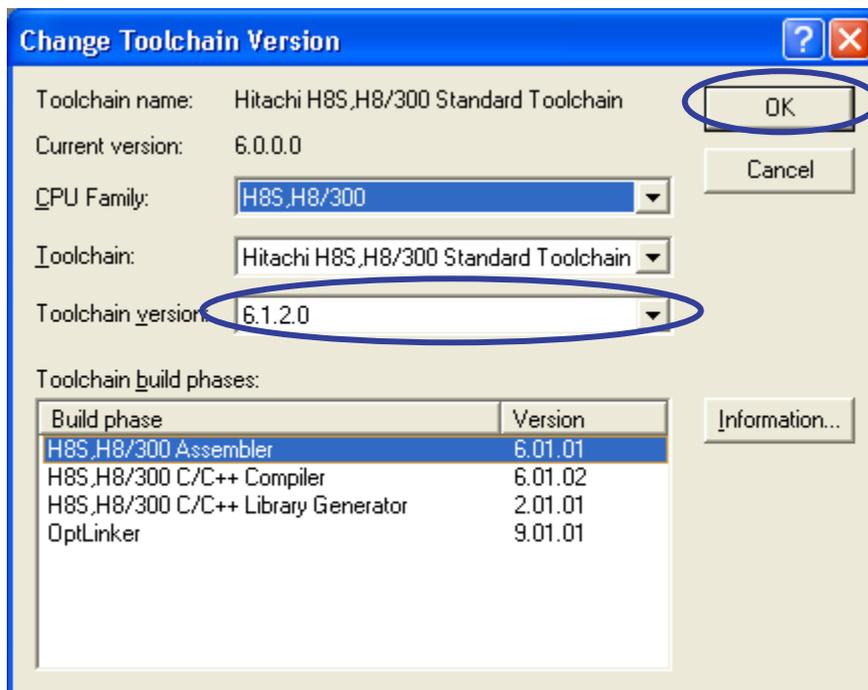


To update it to the new version, click the [OK] button.

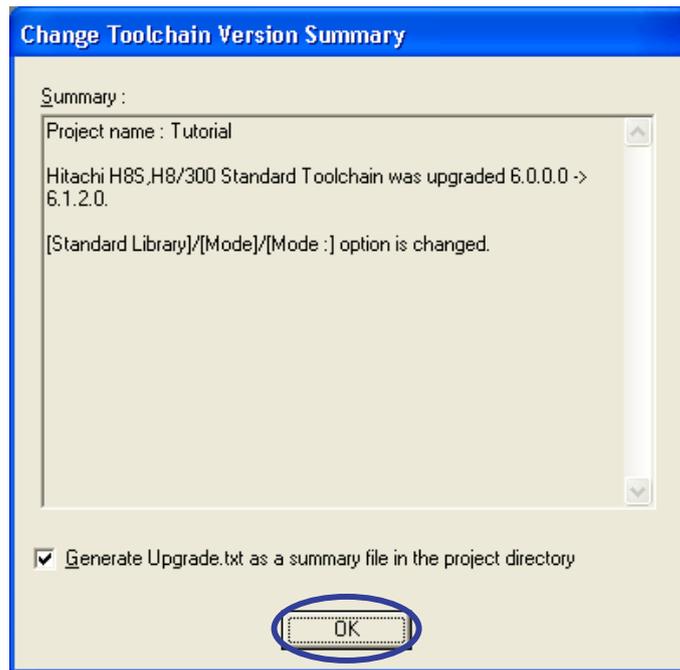
(4) If the [Toolchain missing] dialog box appears, select the target project name and click the [OK] button.



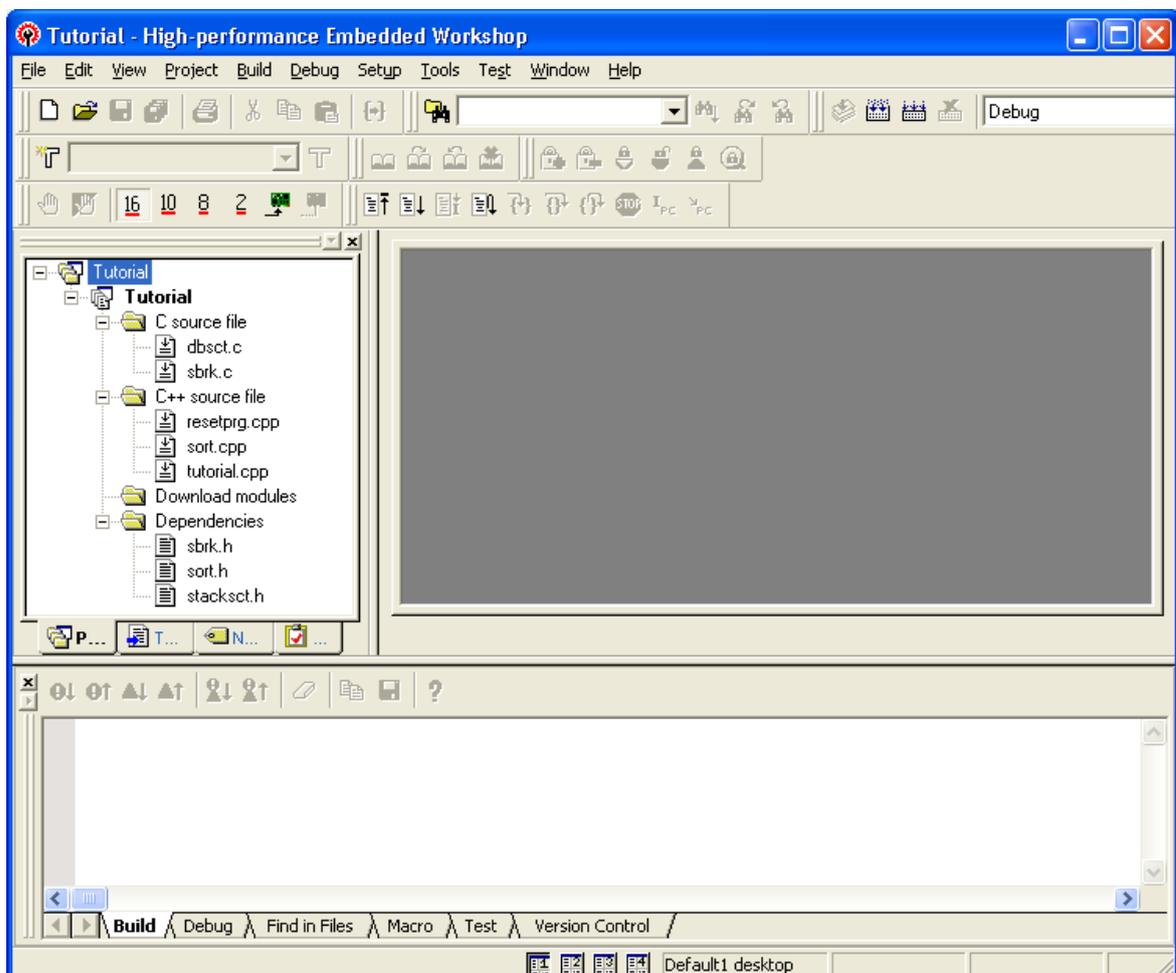
(5) If the [Changing Toolchain Version] dialog box appears, select the desired toolchain version and click the [OK] button.



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

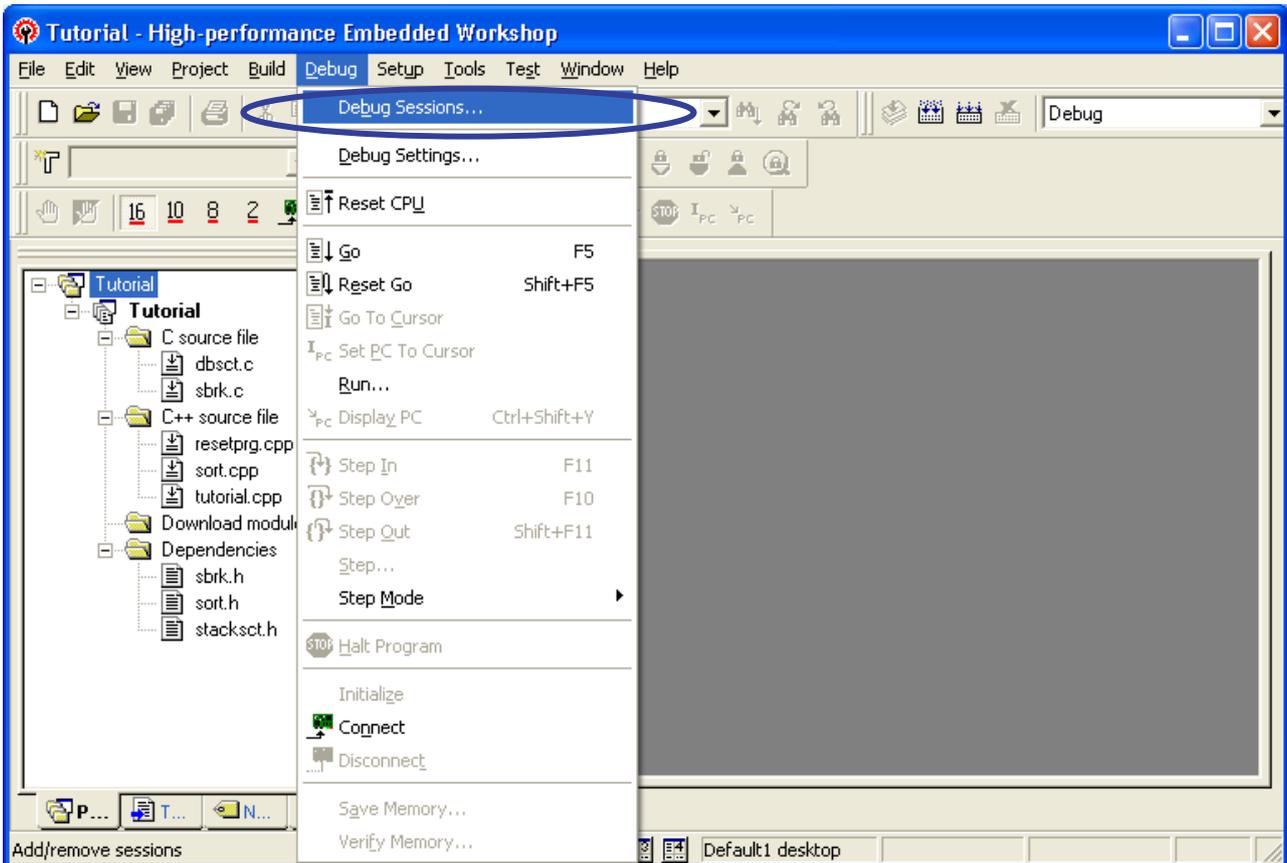


(7) After the workspace has been read, operation on the High-performance Embedded Workshop screen becomes available.

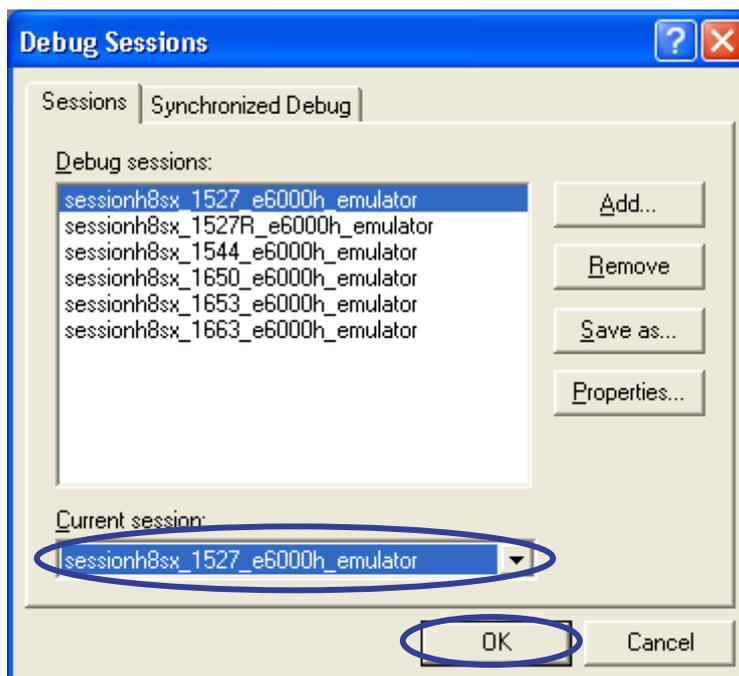


### 4.3 Connecting the E6000H Emulator

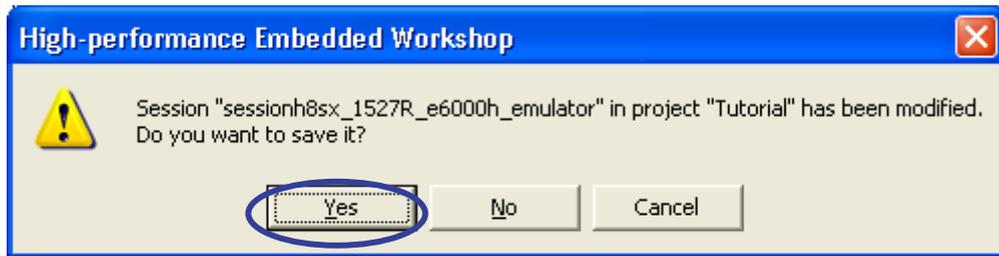
(1) Open [Debug Session] from the [Debug] menu.



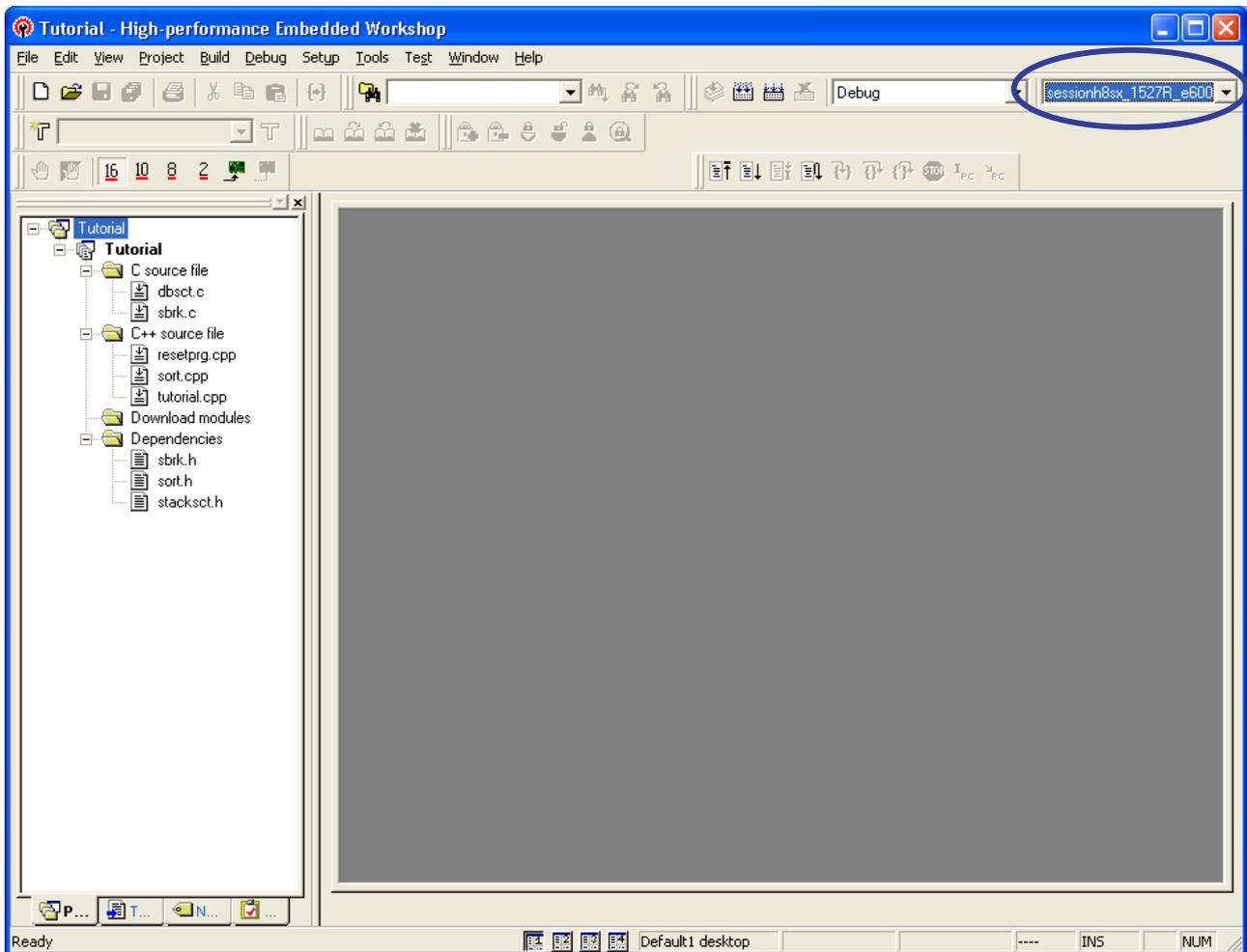
(2) The [Debug Session] dialog box will appear. Select [sessionh8sx\_1650\_e6000h\_emulator] for [Current Session] and click the [OK] button.



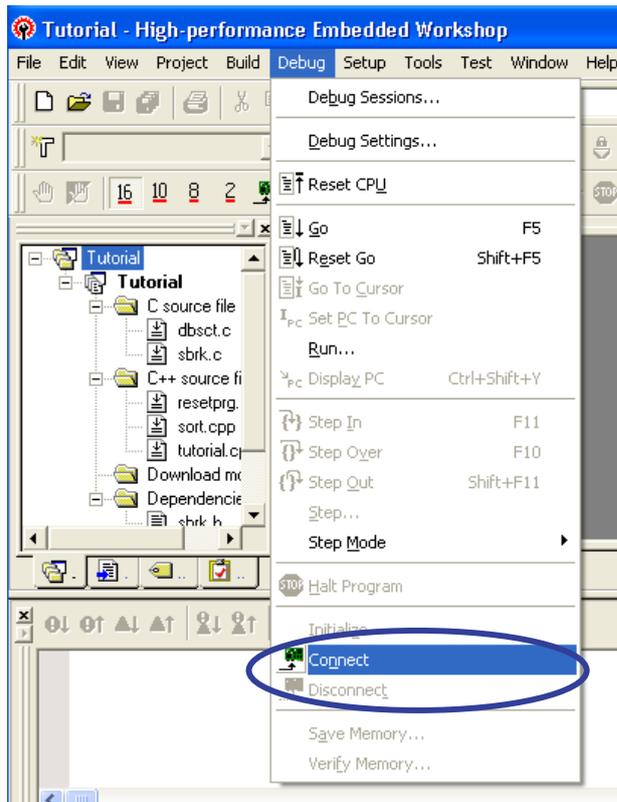
(3) The [Change Session] dialog box will appear. Click the [Yes] button.



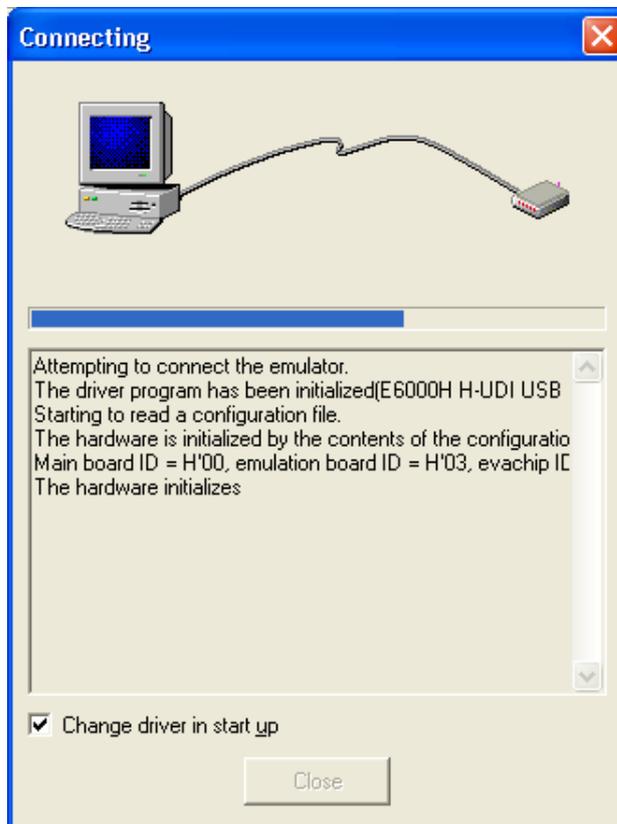
(4) The display of the session on the toolbar is changed as [sessionh8sx\_1527R\_e6000h\_emulator].



(5) Turn on the E6000H emulator and click [Connect] from the [Debug] menu.

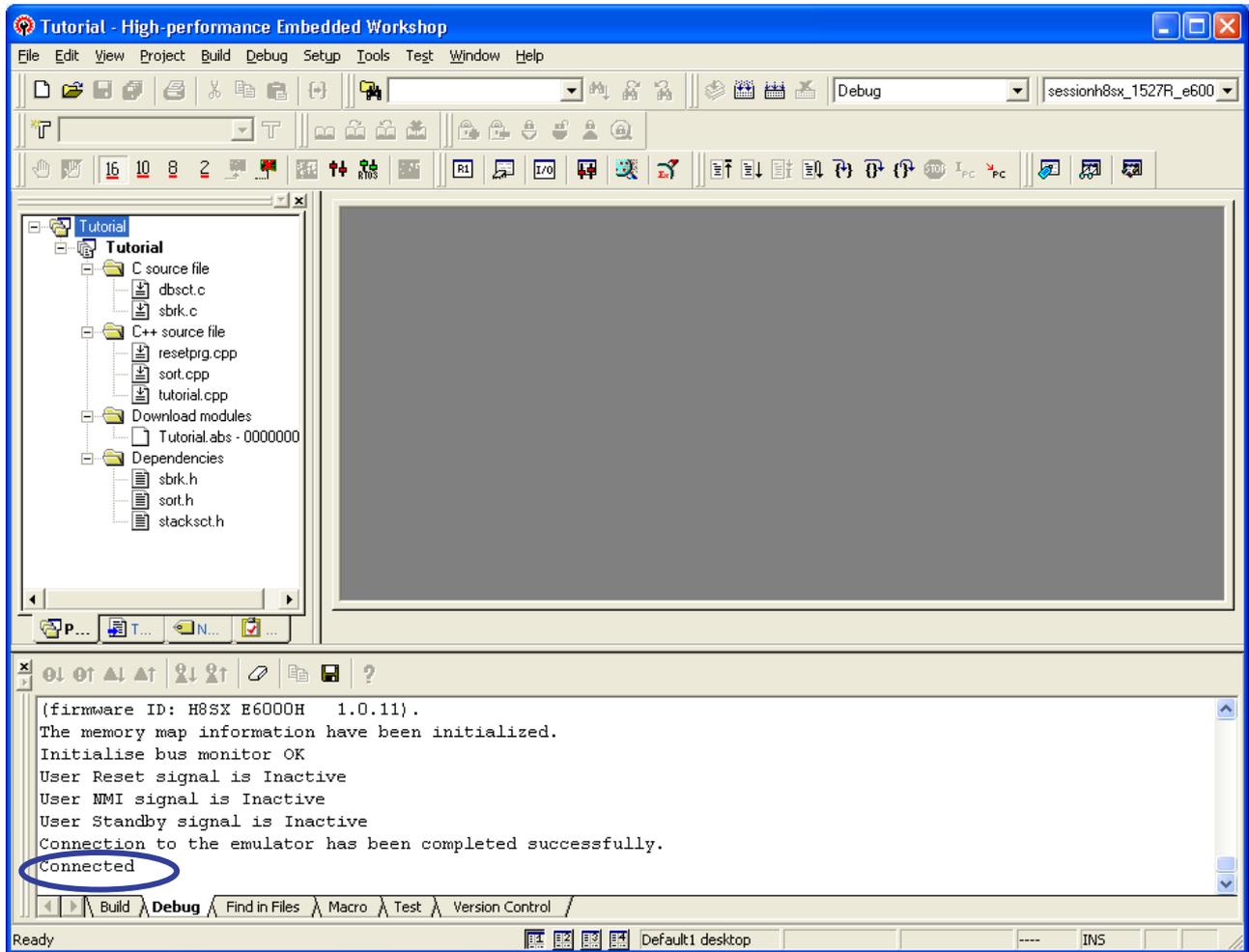


(6) The [Connecting] dialog box is displayed while the E6000H emulator is connected.



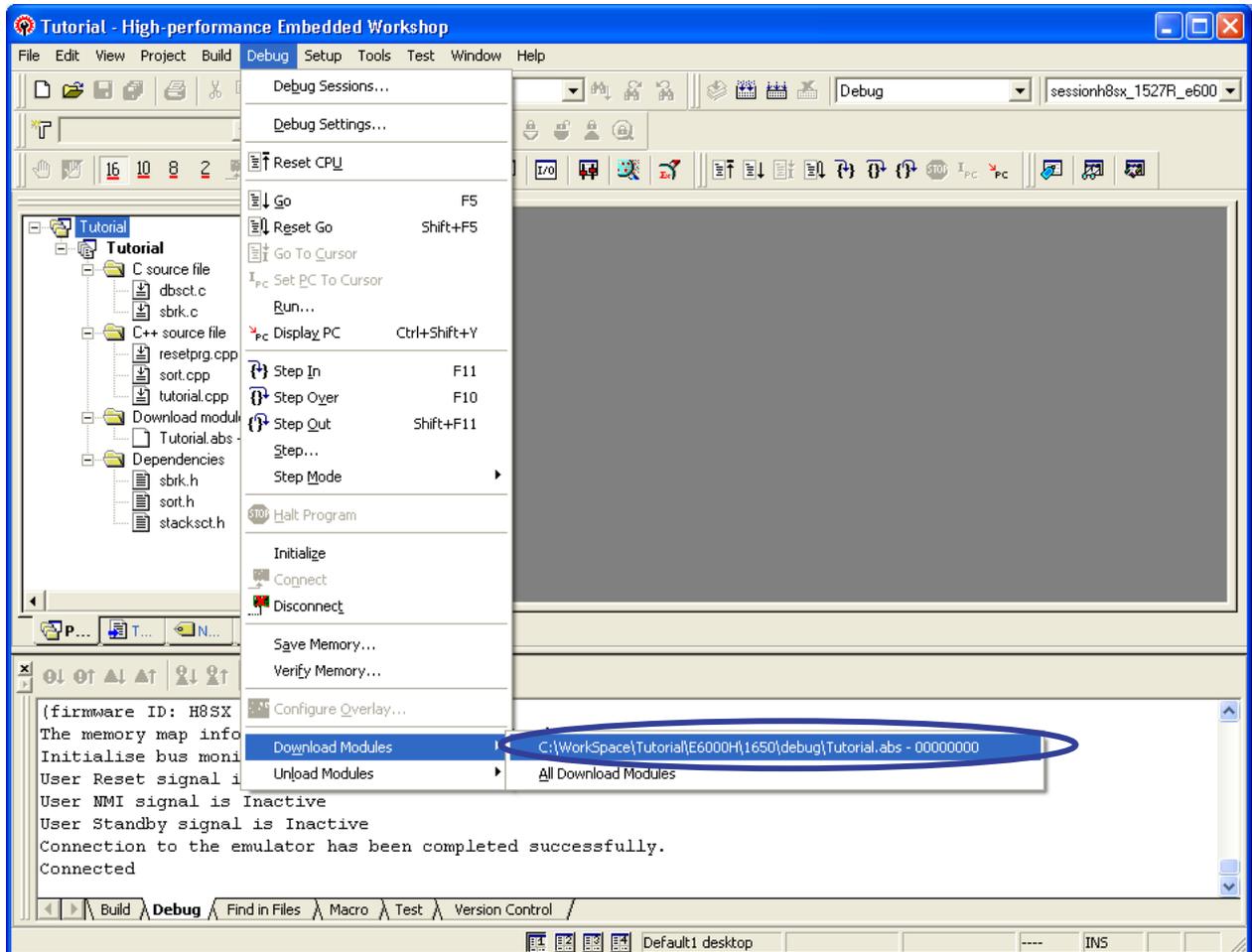
The [E6000H Driver Details] dialog box may be shown when connecting the E6000H emulator. In this case, select the driver in use and click the [Close] button.

(7) When the E6000H emulator is connected, [Connected] is displayed on the [Debug] tab.

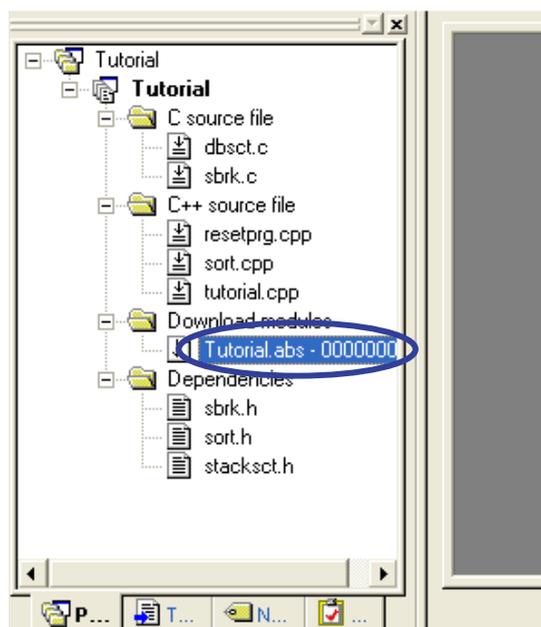


### 4.4 Downloading a Program

- (1) Select [Download Modules] form the [Debug] menu to load the sample program. Select the file "Tutorial.abs" registered in the workspace.

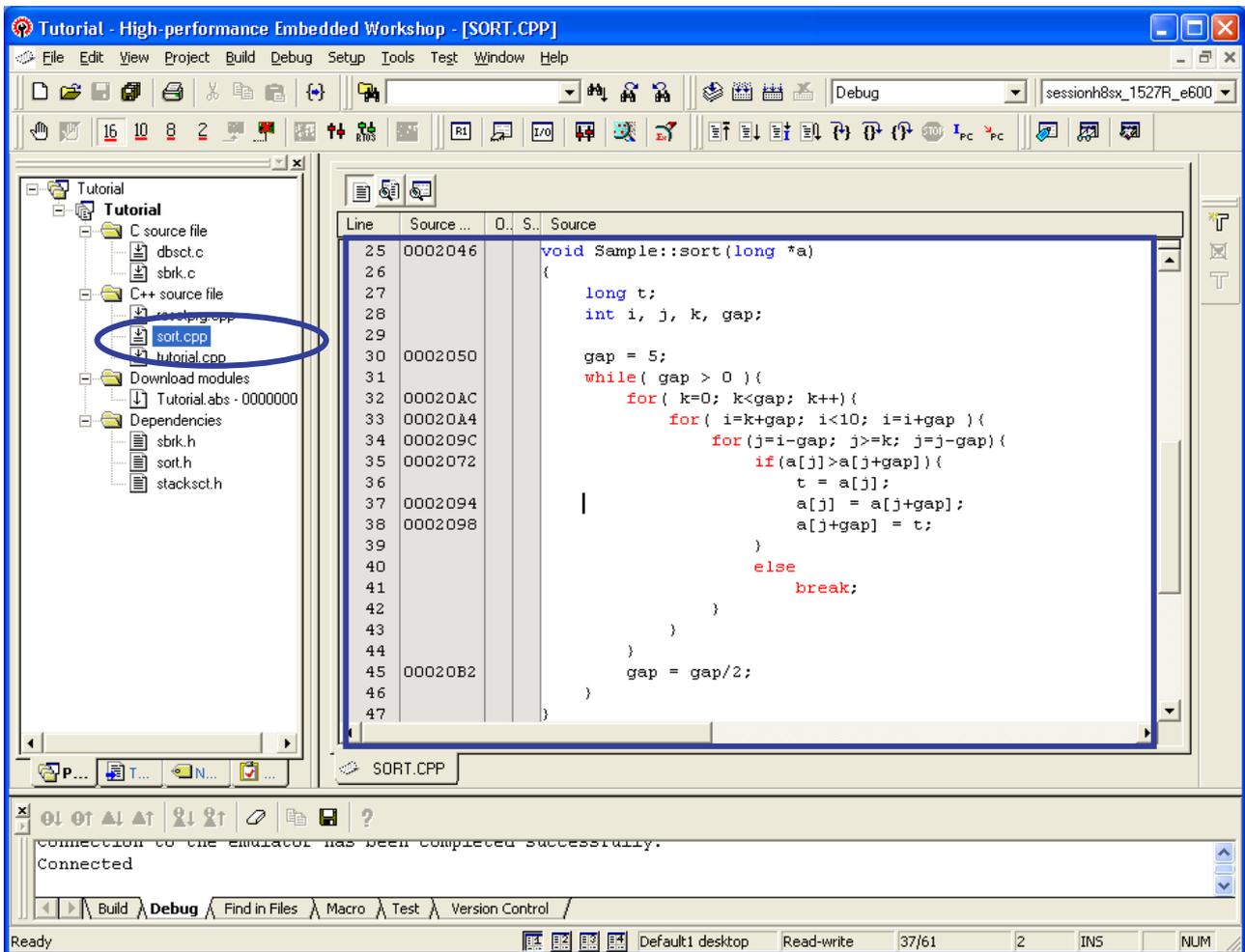


- (2) After downloading a program completes, a downward arrow is added to the icon left to the file name.

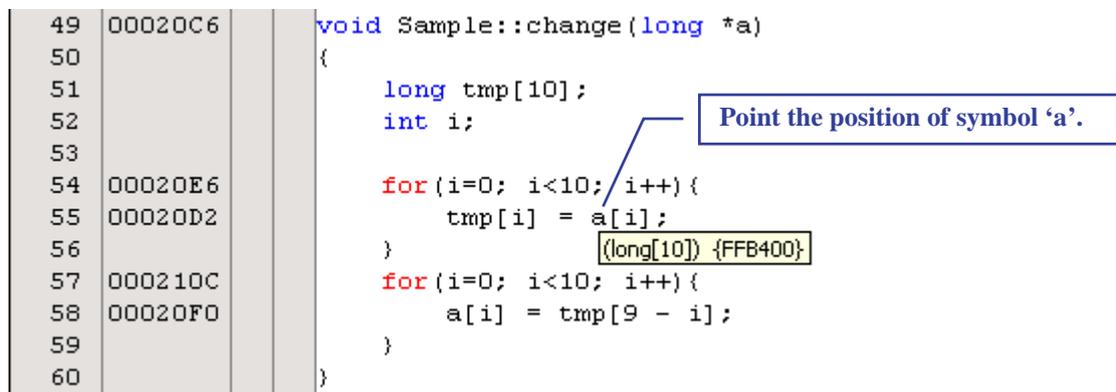


## 4.5 Opening a Source File

(1) Double-click the source file name on the workspace to open the source code. Here, select the file "sort.cpp".



(2) Move the mouse pointer on the [Source] window and point to the position of symbol 'a' on line 55 in the source file "SORT.CPP".

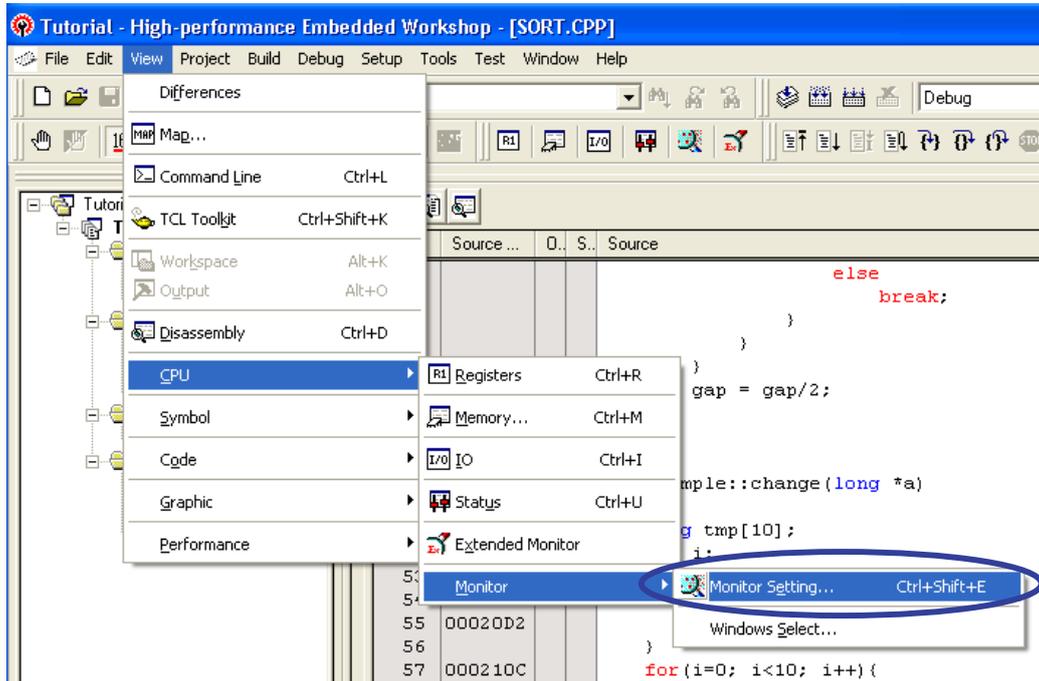


While pointing to the same position, the [Source] window shows the variable-type information and allocated addresses of symbol 'a' near the mouse.

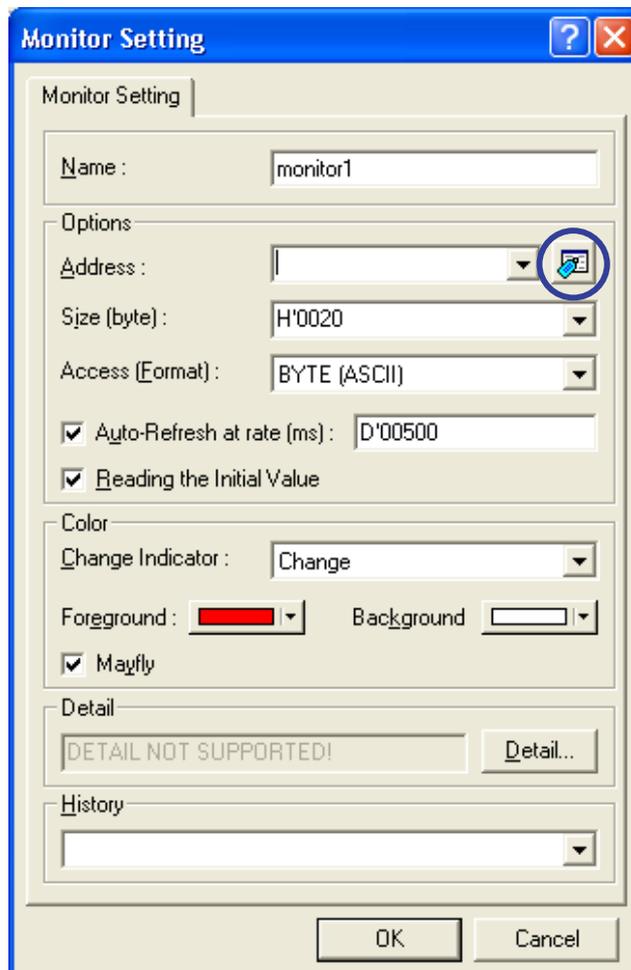
Thus the address of the symbol can be checked on the source file.

### 4.6 Setting a Monitor Condition

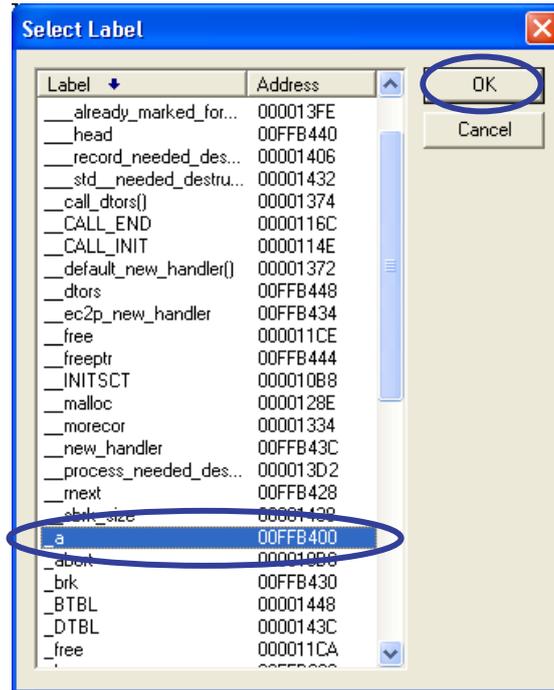
(1) Select [CPU] from the [View] menu and then [Monitor Setting...] from [Monitor].



(2) The [Monitor Setting] dialog box will appear. Click the [Label Select] button right to the [Address] combo box.



(3) The [Label Select] dialog box will appear. Here, find and select label "\_a" and click the [OK] button.

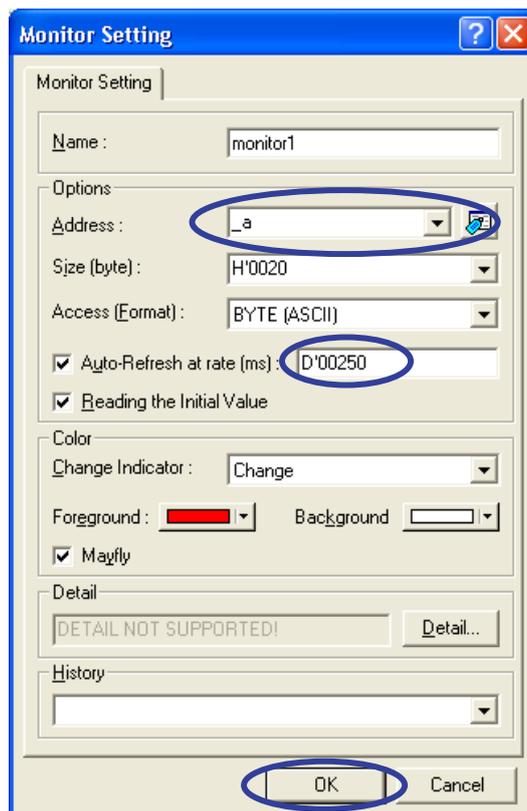


For the [Label] column in the [Label Select] dialog box, an underline '\_' (ASCII code: h'5F) is added to the beginning of symbol names on the source line. The physical addresses of labels are registered in the [Address] column.

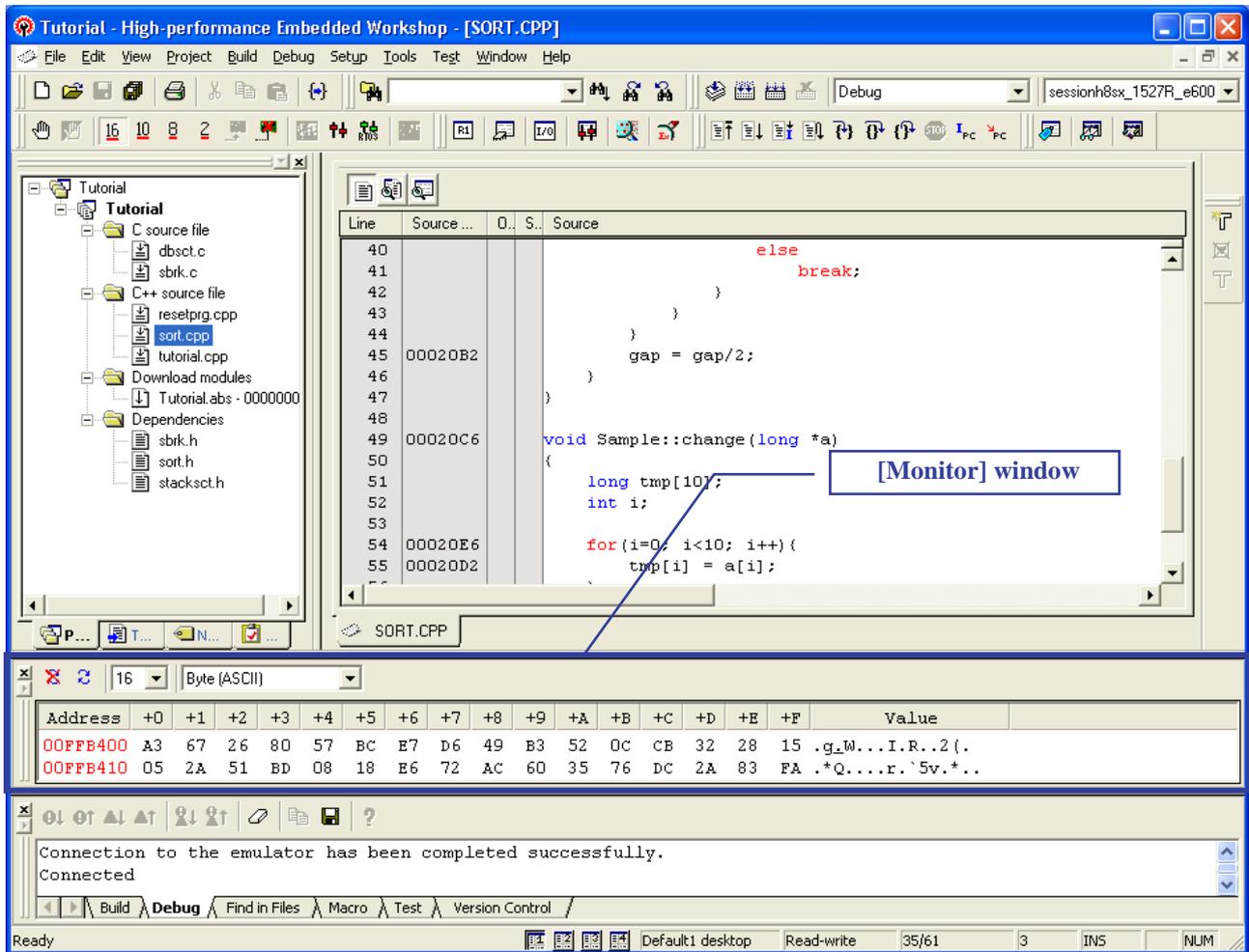
Only labels which have static addresses are registered in the [Label Select] dialog box.

It is not possible to refer to local variables of the C language because they are dynamic variables which are not registered in this dialog box.

(4) Check that the label name selected in (3) above has been entered in [Address] of the [Monitor Setting] dialog box. The [Auto-Refresh at rate] is set as 250 ms. Click the [OK] button.



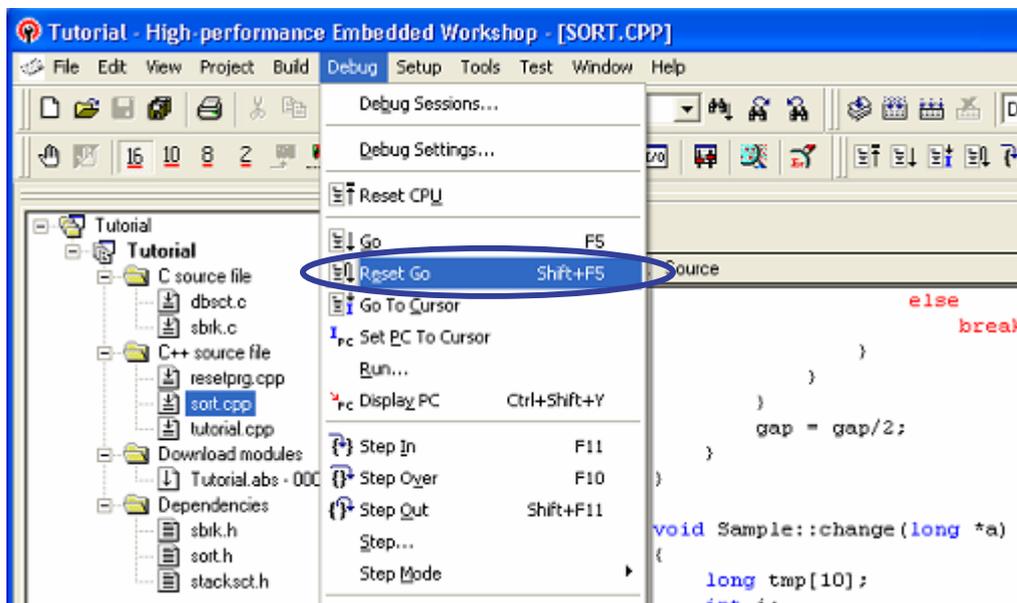
- (5) The [Monitor] window is added to the High-performance Embedded Workshop. The label addresses selected in (3) above have been registered in [Address].



This is the end of setting of the realtime RAM monitoring function.

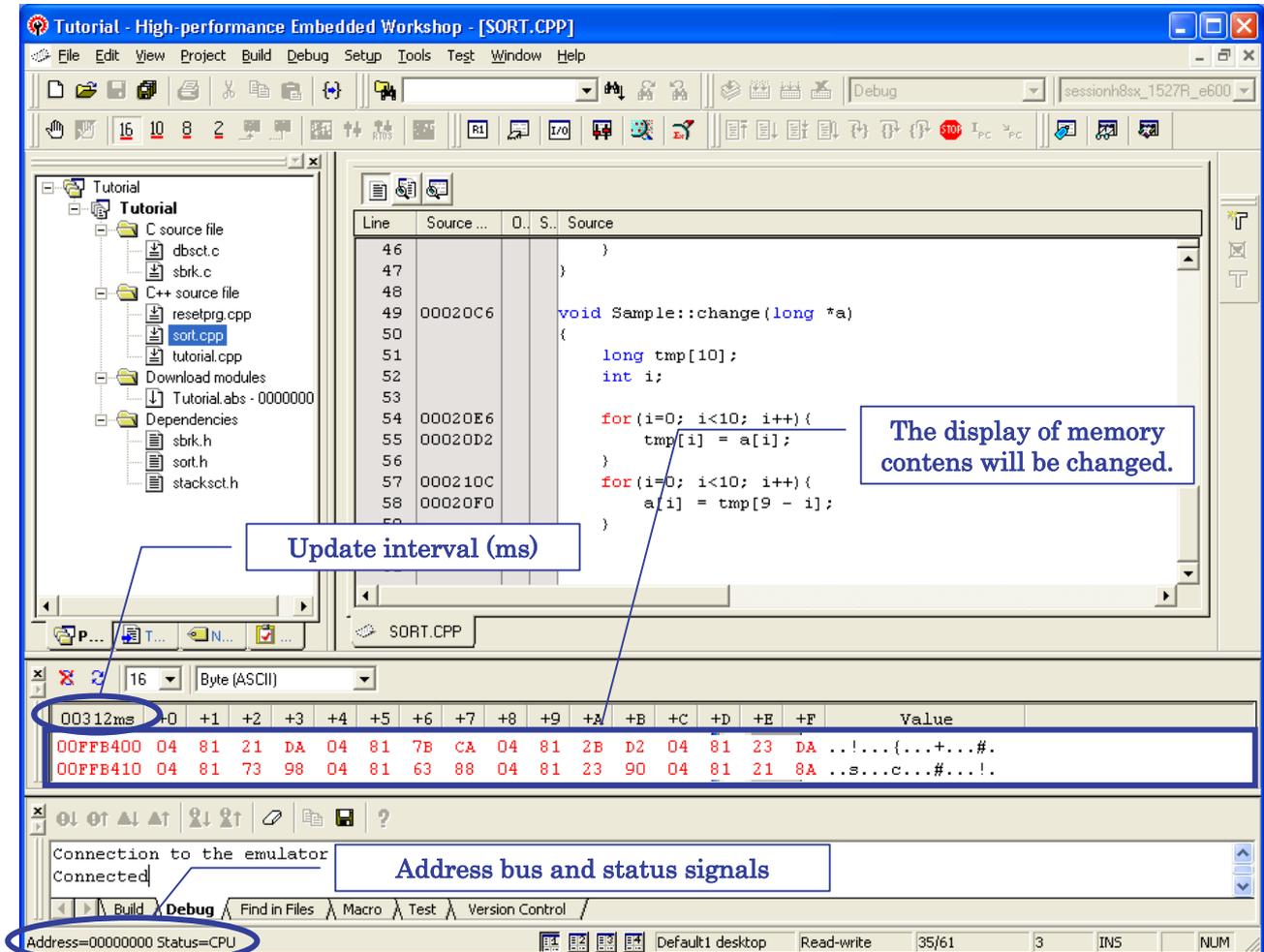
## 4.7 Executing a Program

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



### 4.8 Checking the Monitor Display

- (1) During user program execution, depending on the program, when the display of the [Monitor] window is updated after data has been written within the target address range, the display of memory contents will be changed.



The update interval is displayed in the ms unit on the title position of the [Address] column in the [Monitor] window. The value of the update interval is based on the interval value specified for the auto-update interval (refer to the description on the [Monitor Setting] dialog box in section 4.6, Setting a Monitor Condition). Actually, the update timing will be late because of an overhead of the processing.

The execution states of address bus and status signals are displayed in realtime at the lower left of the status bar.

In addition, it is possible to customize the [Color] group box or [Access] combo box.

For details on the displayed contents and the operation of the [Monitor] window, refer to the H8SX E6000H Emulator User's Manual that is listed in section 5, Related Documents.

To halt the user program, press the [Esc] key.

## 5. Related Documents

The H8SX E6000H emulator and High-performance Embedded Workshop 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 H8SX/1651 E6000H Emulator:

- H8SX E6000H Emulator User's Manual
  - Debugger Part:
    - Section 3.7, Using the Event Points
  - Tutorial:
    - Section 4.17, Trace Functions
- Precautions on Using the H8SX E6000H Emulator
- PC Card Interface for E6000, E6000H and E8000 Emulators HS6000EIP02H User's Manual
- Emulator Options 1 (PC I/F-part) documents

Document Related to High-Performance Embedded Workshop:

- High-performance Embedded Workshop User's Manual

Documents Related to CPU:

- H8SX/1651 Group Hardware Manual
- H8SX Family Software Manual

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

- Notes on Usage of the C/C++ Compiler Package for H8SX, H8S, H8 Family V.6.01 Release 02 and Corrections in the User's Manual
- H8S, H8/300 Series C/C++ Compiler, Assembler, Optimizing Linkage Editor User's Manual

Visit the following Renesas websites for information on this product:

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## Revision History

Rev.	Publication date	Revisions	
		Page	Description
1.00	Jul 09, 2007	—	First edition

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