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April 1st, 2010
Renesas Electronics Corporation

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H8SX Family Emulator E6000H

Performance Measurement

Overview

This document describes how to measure the performance function 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.

Contents

1. Specifications

The E6000H emulator provides the performance measurement function to measure the rate of execution time.

The performance measurement function does not affect the realtime operation because it measures the rate of execution time in the specified range by using the circuit for measurement of hardware performance included in the emulator.

Select one of the following five modes according to the purpose of measurement.

Table 1.1 Available Measurement Modes

Mode	Description	Purpose
a) Time Of Specified Range Measurement	Measures the execution time and execution count in the specified range.	Measurement of time taken for processing of functions except for that required for child functions called from the functions.
b) Start Point To End Point Measurement	Measures the execution time and execution count between the specified addresses.	Measurement of time taken for processing of functions.
c) Start Range To End Range Measurement	Measures the execution time from a specified range to another specified range.	Measurement of execution time spent from calling of any of sequential subroutines to calling of any of other sequential subroutines in a program that includes subroutines in sequence, such as an assembly program.
d) Access Count Of Specified Range Measurement	Measures the number of times a specified range is accessed from another specified range.	Measurement of the number of times a global variable is accessed from a specific function.
e) Called Count Of Specified Range Measurement	Measures the number of times a specified range has called another specified range.	Measurement of the number of times a function is called from a specific function.

Use eight performance channels installed on the circuit for measurement of hardware performance in the emulator for setting of conditions for measurement. Up to eight points can be set.

2. Functional Descriptions

This document describes how to measure the performance function in the H8SX/1651 E6000H emulator.

It guides you through examples of the procedures for analyzing performance in the sample program provided in the CD-ROM of the H8SX E6000H emulator. Check the measurement result on the [Performance Analysis] window after program execution. For the performance measurement mode, the 'Time Of Specified Range Measurement' (see table 1.1) is specified here.

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.

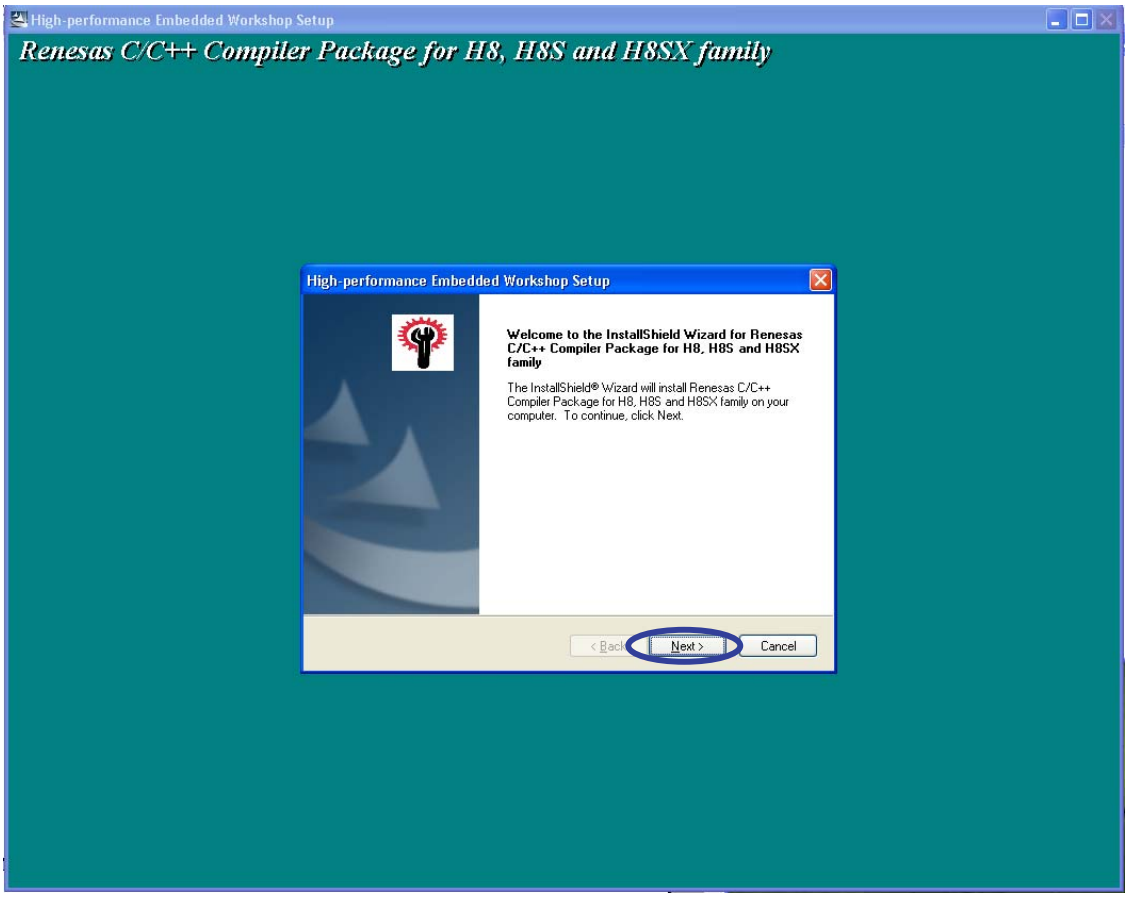
The software in the CD-ROM of the H8SX E6000H emulator can also be installed in a personal computer in which the High-performance Embedded Workshop has already been installed. In this case, some dialog boxes may be skipped in the installation process.

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

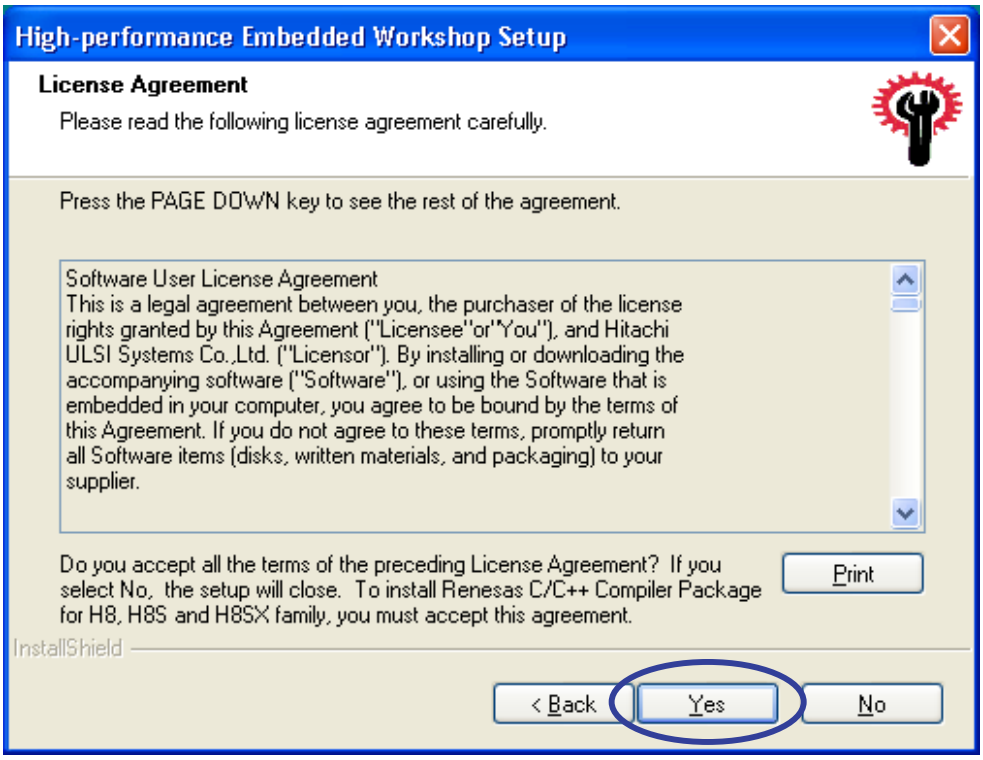
3.2 Installing the H8SX E6000H Emulator Software

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

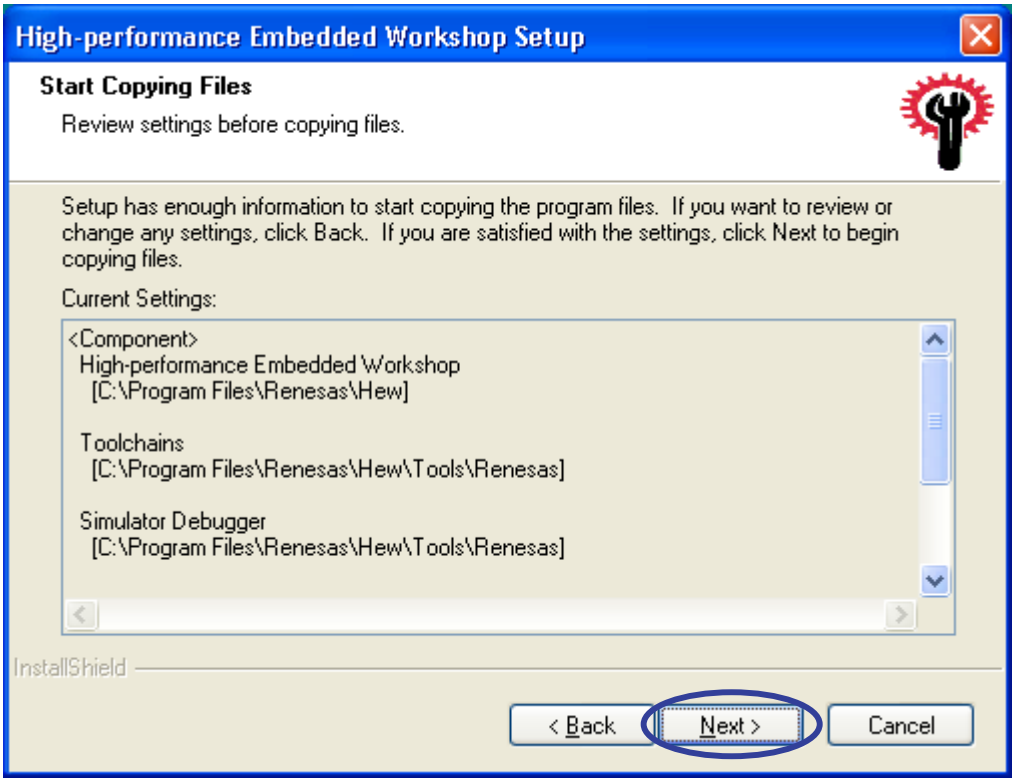
The whole screen is displayed and installation of [H8SX E6000H Emulator] is started. Click the [Next] button.



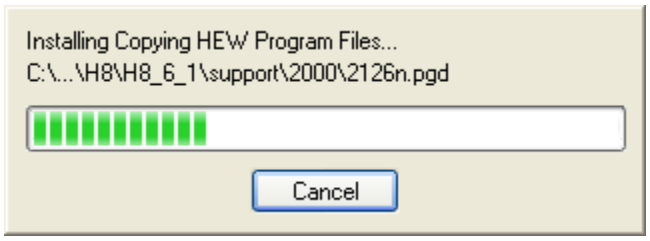
(2) The [License Agreement] dialog box will appear. Read the contents and click the [Yes] button.



(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 performance measurement function in the following steps.

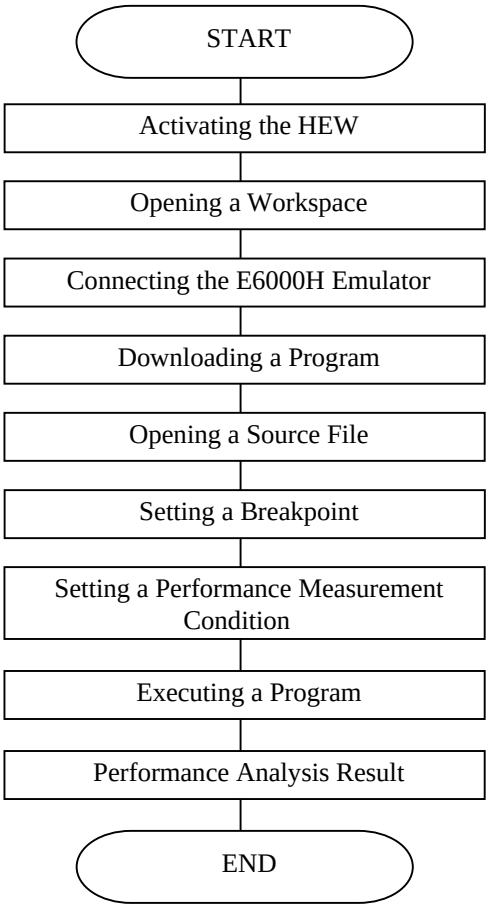
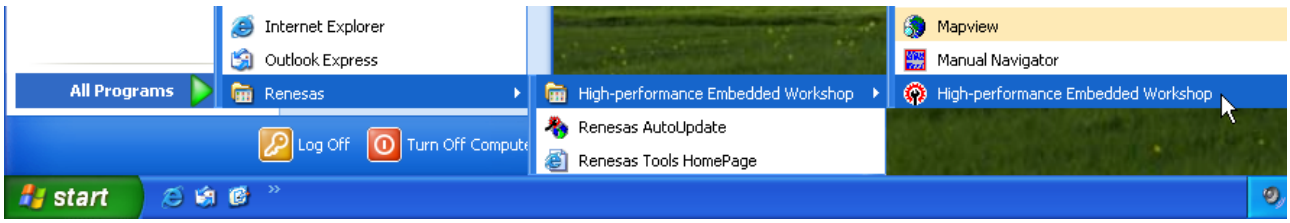


Figure 4.1 Procedures for Sample Program Execution

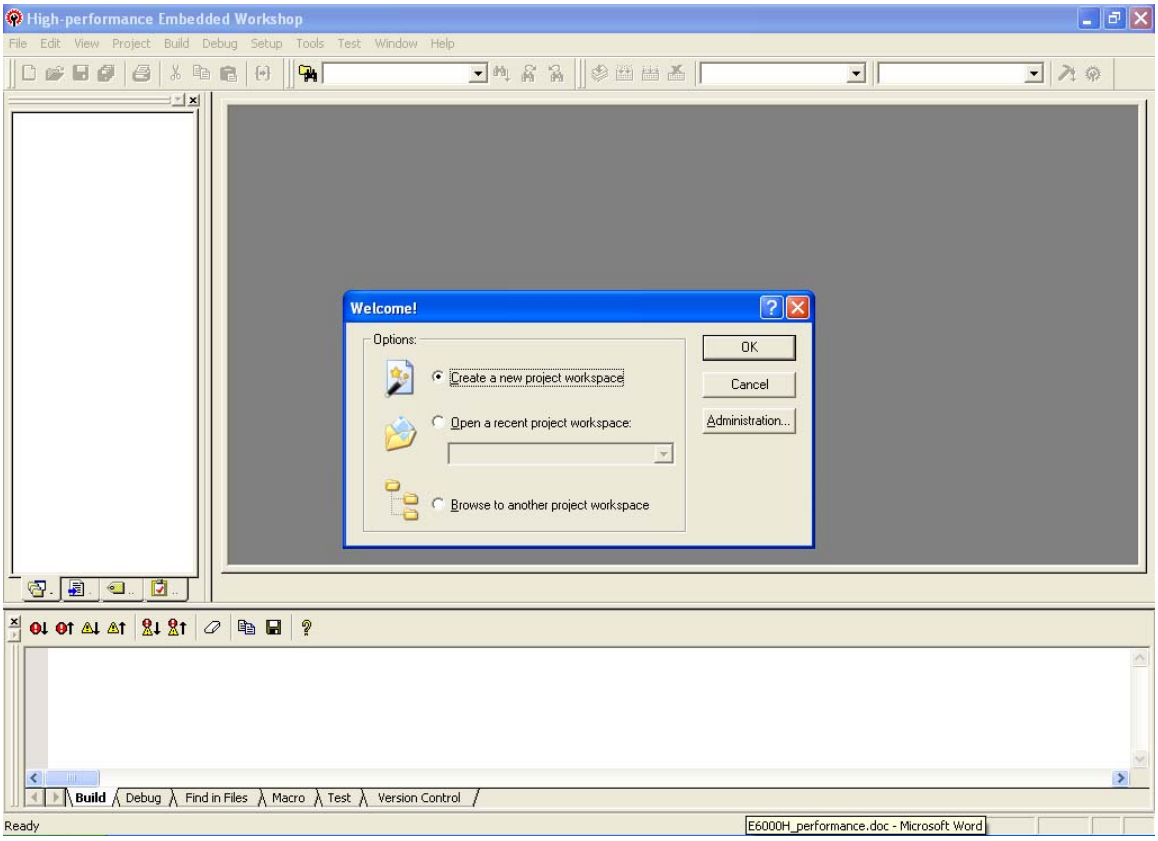
4.1 Opening a Workspace

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.

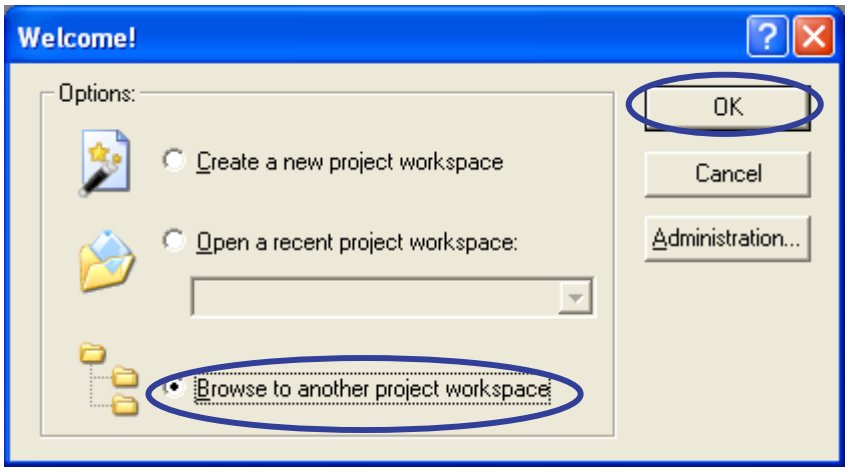


4.2 Opening a Workspace

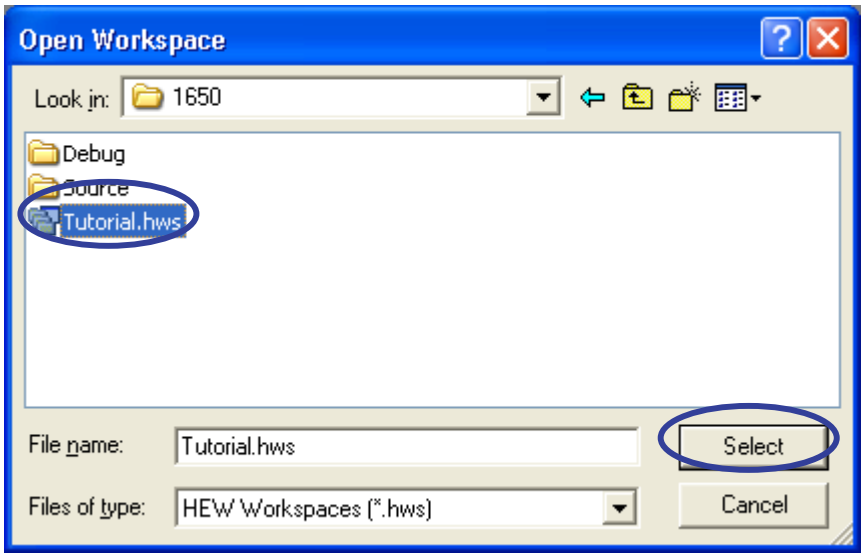
(1) The [Welcome!] dialog box will appear on the High-performance Embedded Workshop screen.



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.

C:\WorkSpace\Tutorial\E6000H\1650\Tutorial.hws
C:\WorkSpace └Tutorial └E6000H └1650 └Tutorial.hws

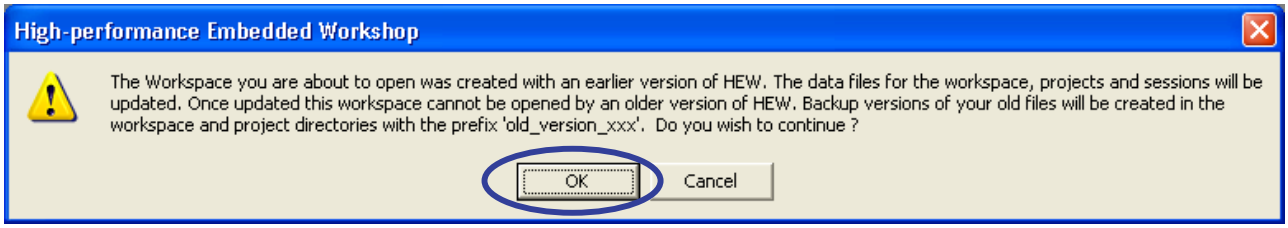
Note: The above directory may not be specifiable depending on the software version. In this case, select the following directory.

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

Directory examples:

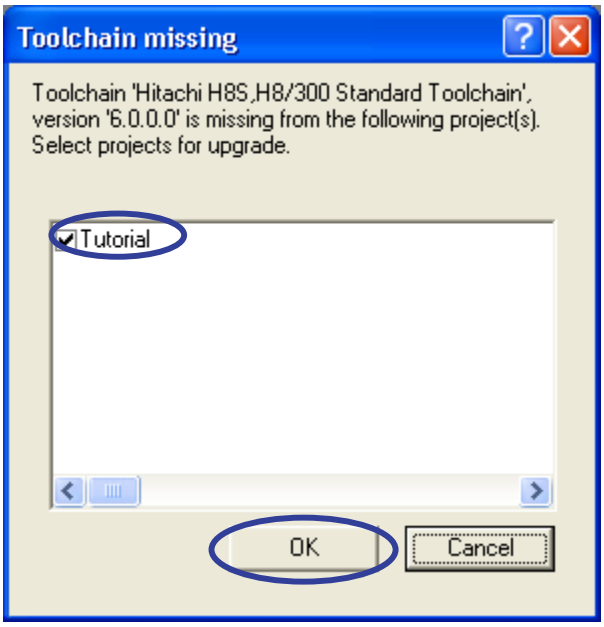
C:\hew3\Tools\Renesas\DebugComp\Platform\E6000H\1650\Tutorial
C:\hew2\Tools\Renesas\DebugComp\Platform\E6000H\1650\Tutorial

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

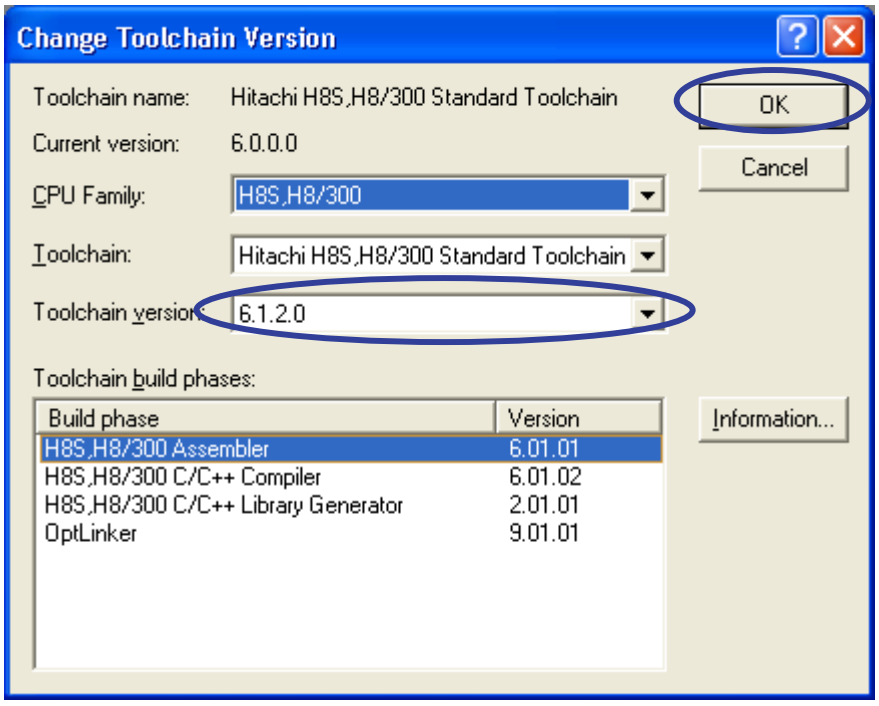


To update it to the new version, click the [OK] button.

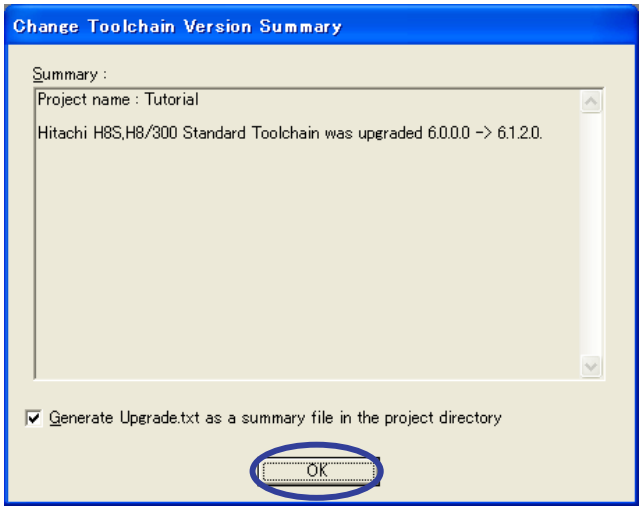
(4) If the [Toolchain missing] dialog box appears, select the target project name and click the [OK] button.



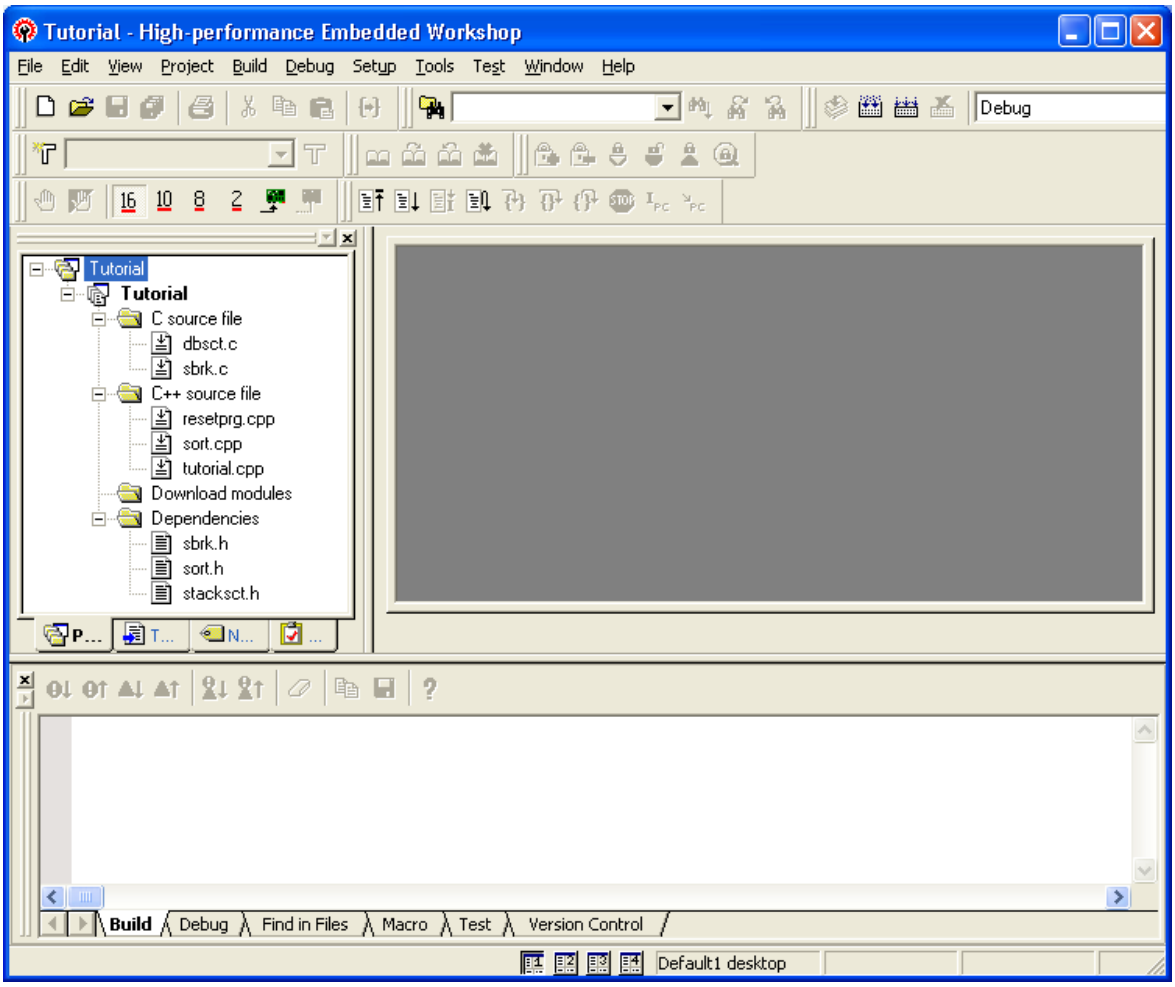
(5) If the [Changing Toolchain Version] dialog box appears, select the desired toolchain version and click the [OK] button.



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

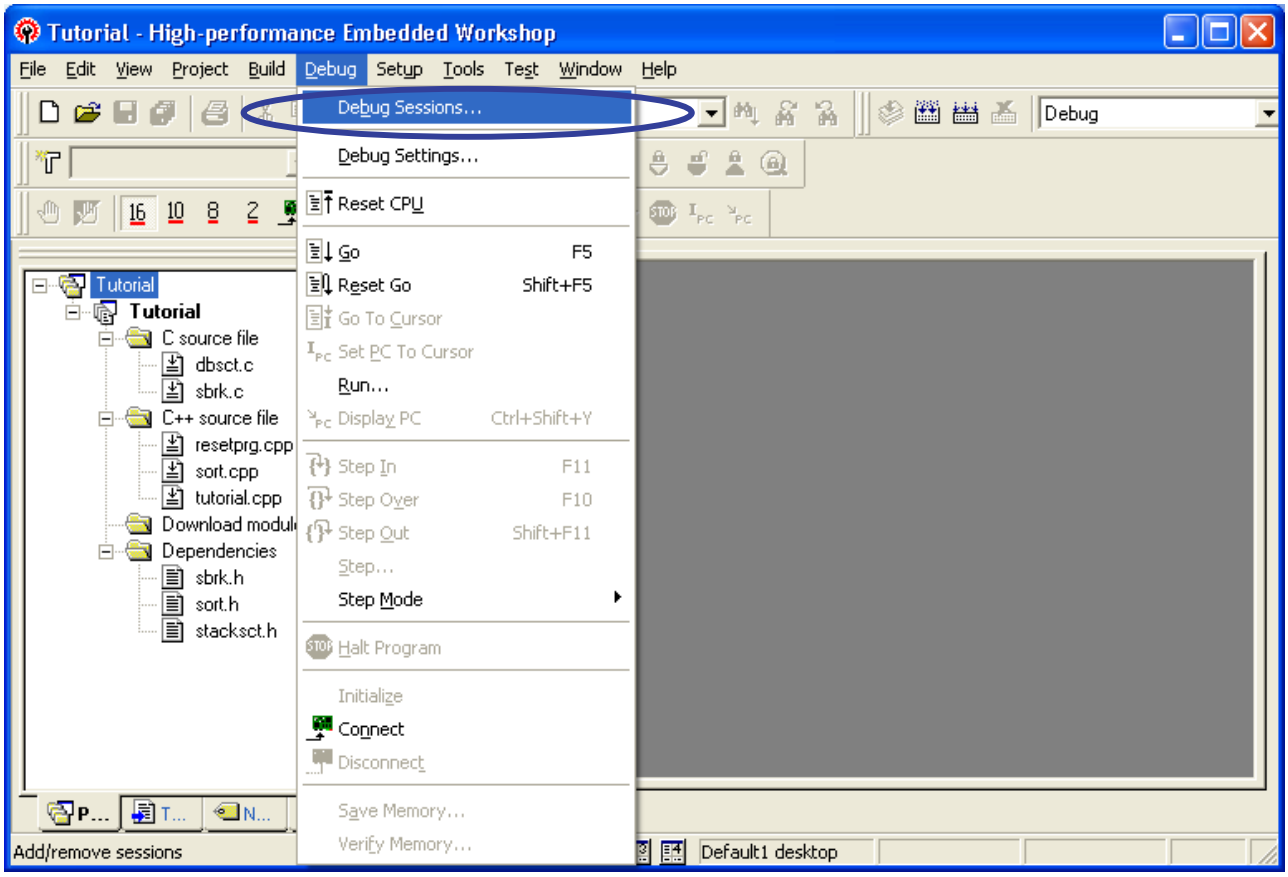


(7) After the workspace has been read, operation on the High-performance Embedded Workshop screen becomes available.

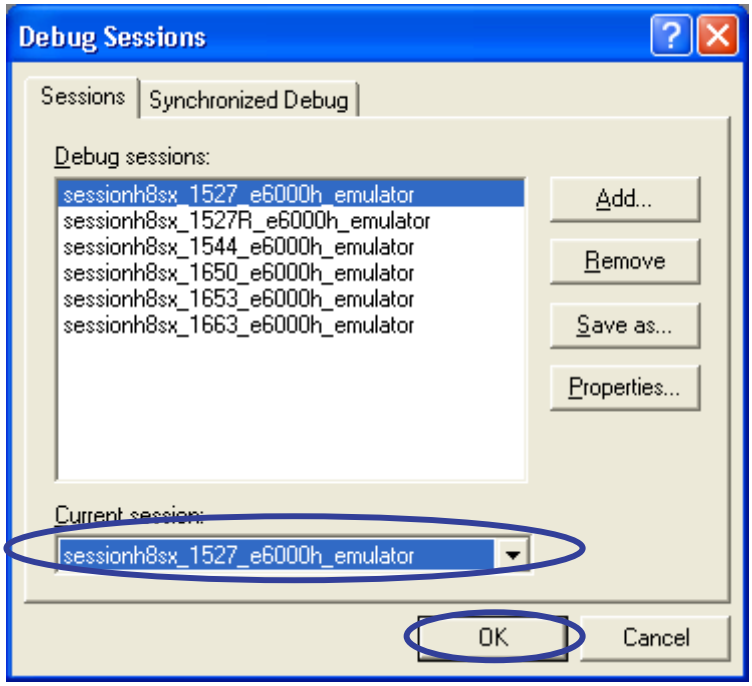


4.3 Connecting the E6000H Emulator

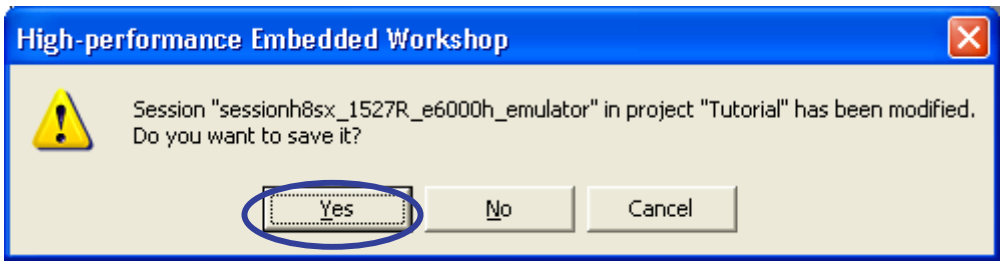
(1) Open [Debug Session] from the [Debug] menu.



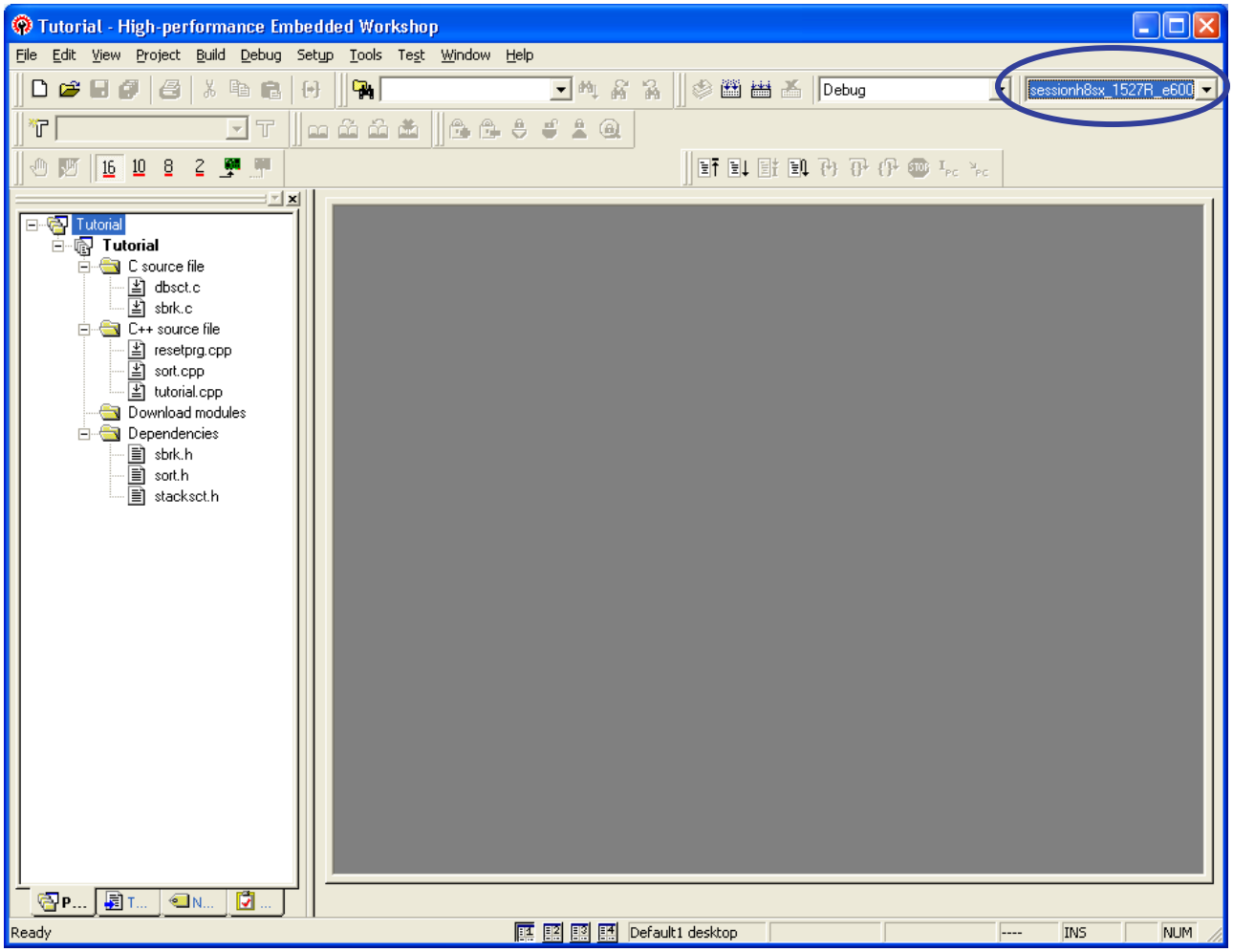
(2) The [Debug Session] dialog box will appear. Select [sessionh8sx_1650_e6000h_emulator] for [Current Session] and click the [OK] button.



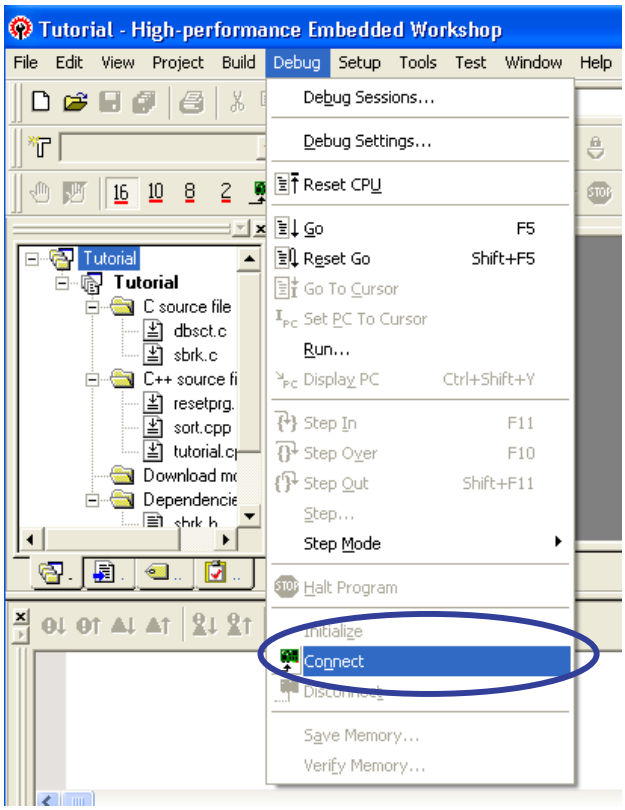
(3) The [Change Session] dialog box will appear. Click the [Yes] button.



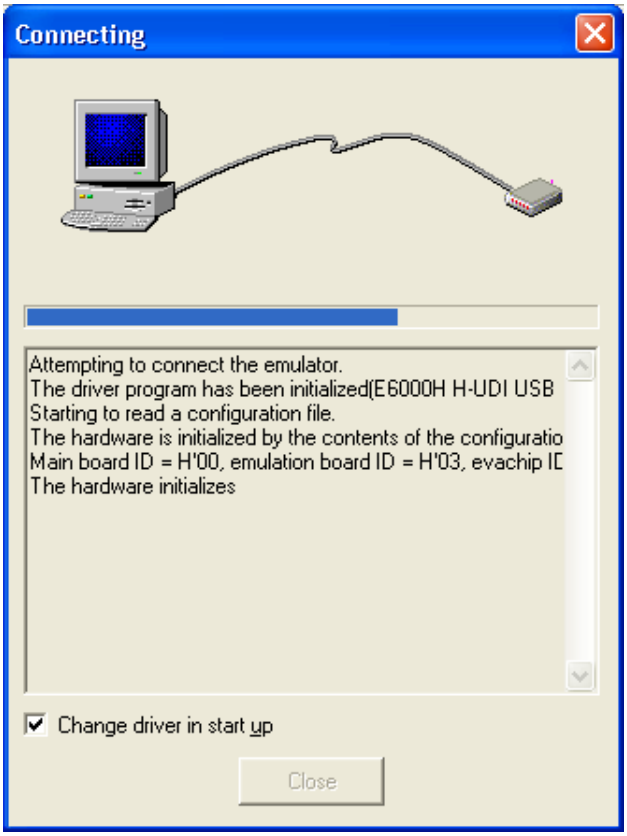
(4) The display of the session on the toolbar is changed as [sessionh8sx_1650_e6000h_emulator].



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

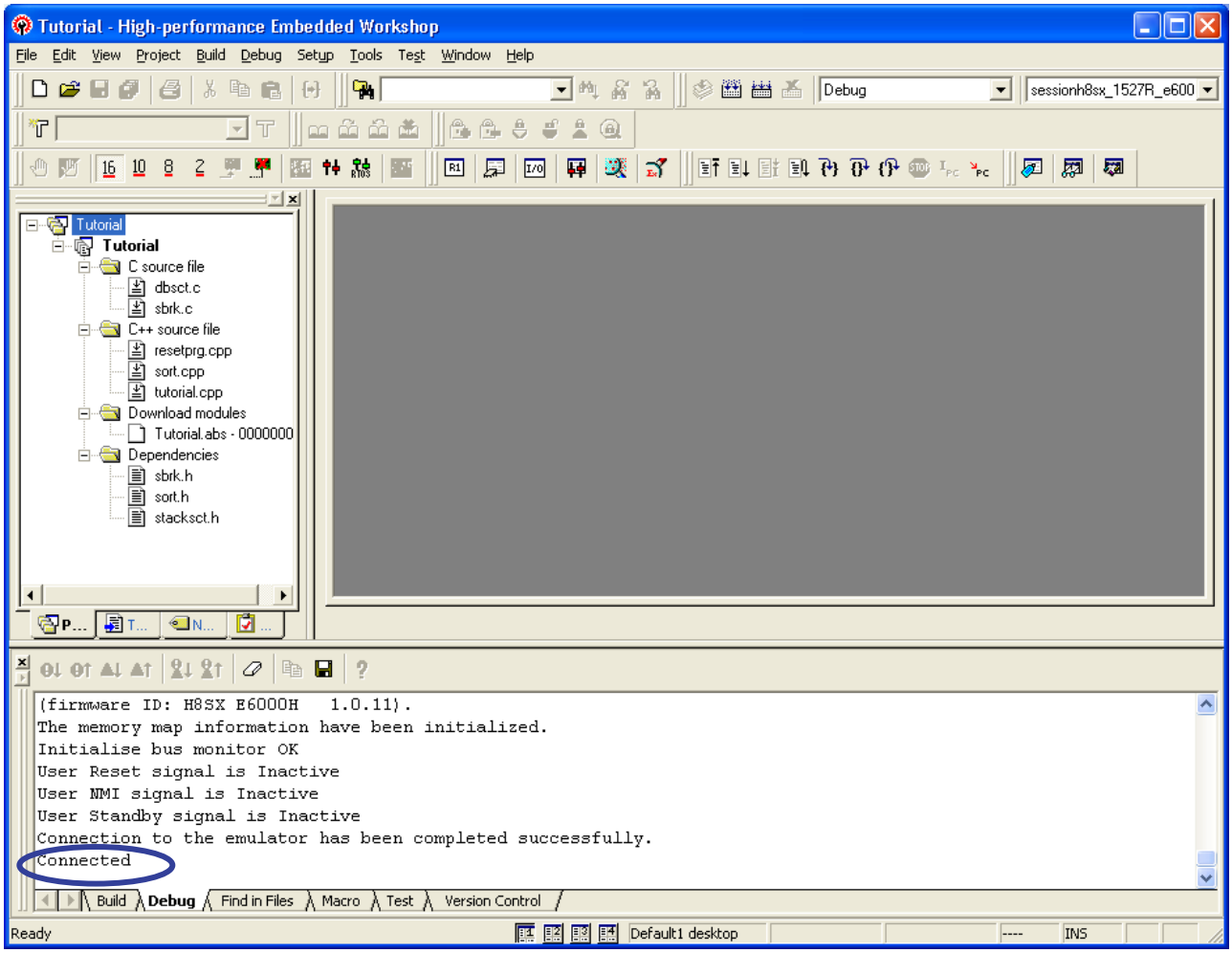


(6) The [Connecting] dialog box is displayed while the E6000H emulator is connected.



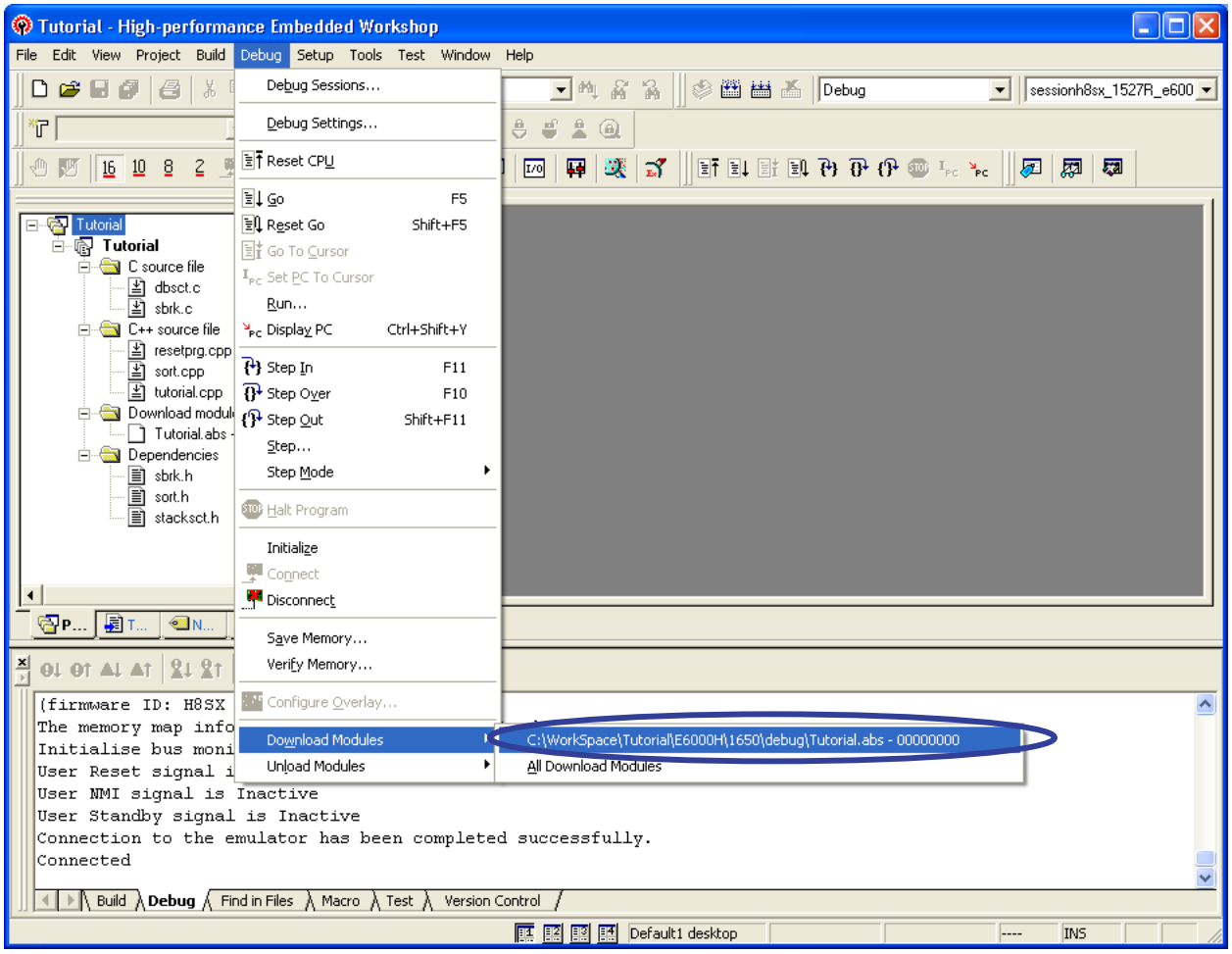
The [E6000H Driver Details] dialog box may be shown when connecting the E6000H emulator. In this case, select the driver in use and click the [Close] button.

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

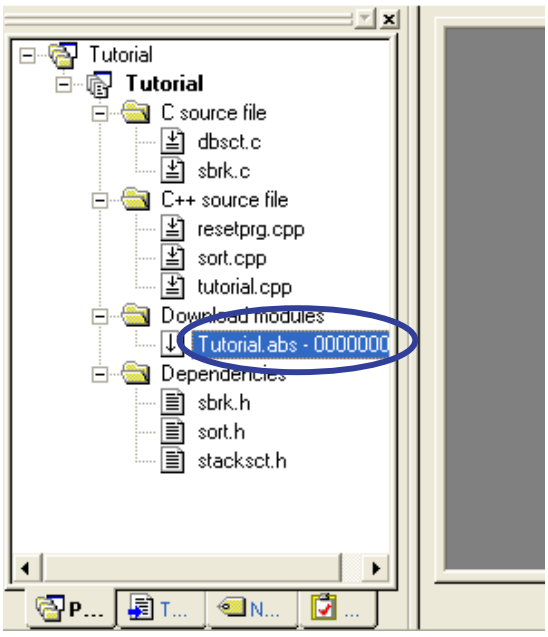


4.4 Downloading a Program

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

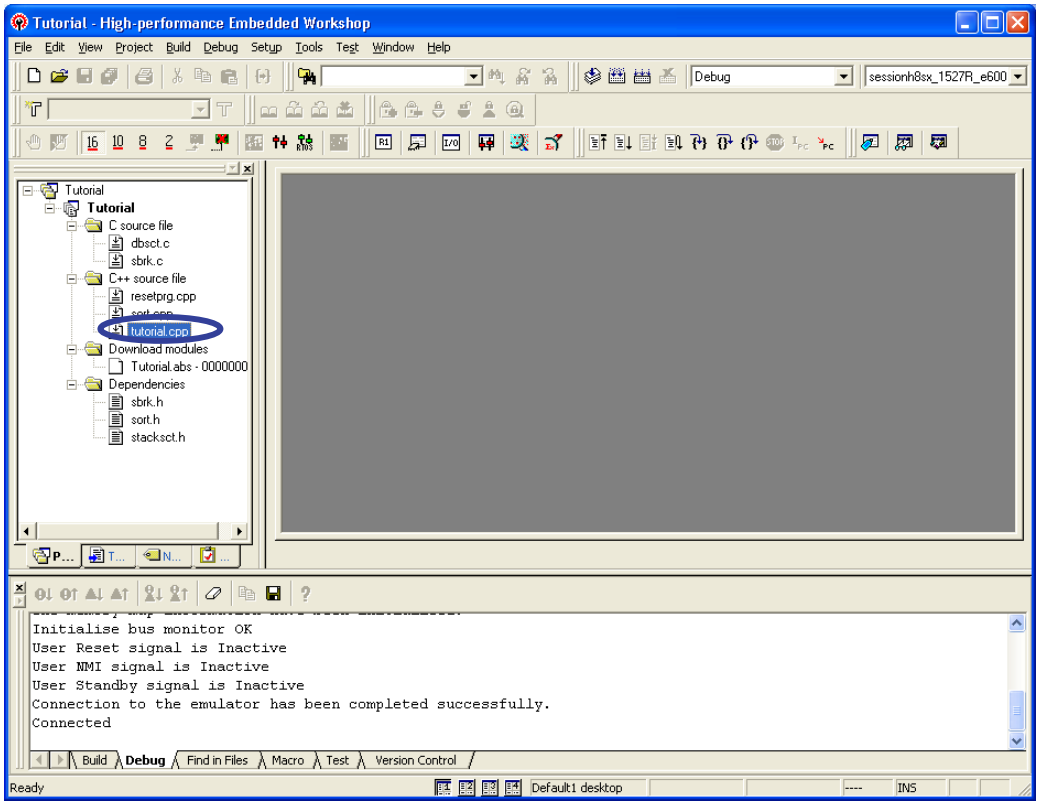


(2) After downloading a program completes, a downward arrow is added to the icon left to the file name.

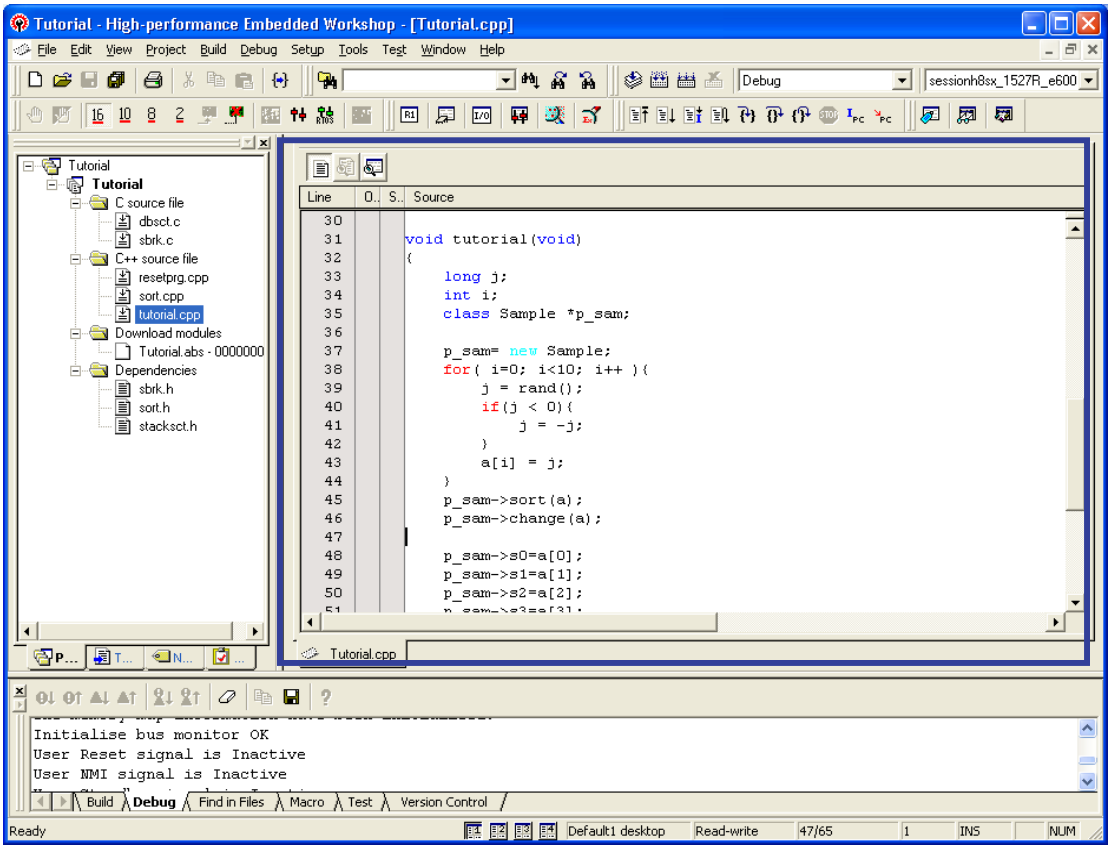


4.5 Opening a Source File

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

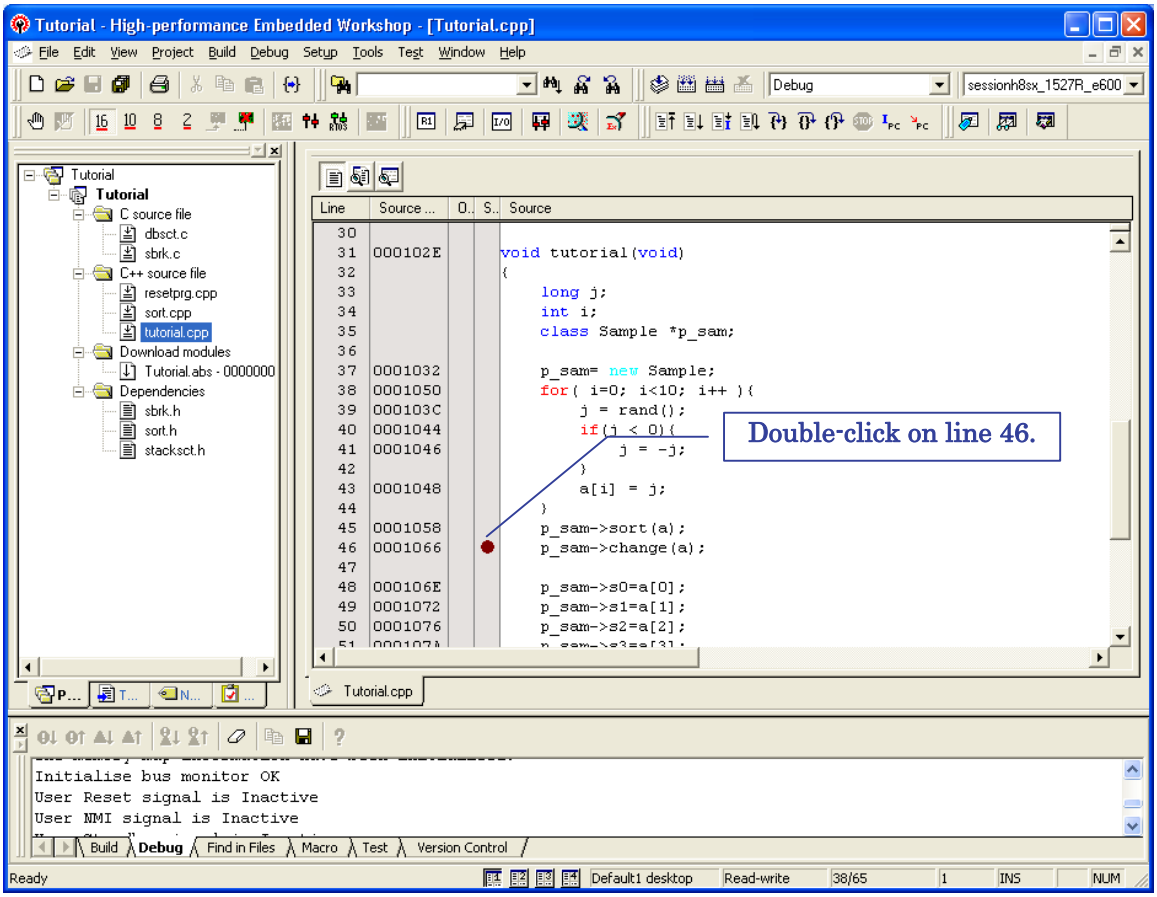


(2) The contents of the file "Tutorial.cpp" are displayed in the [Source] window.



4.6 Setting a Breakpoint

(1) Scroll the source code display to show line 46 by using the scroll bar.



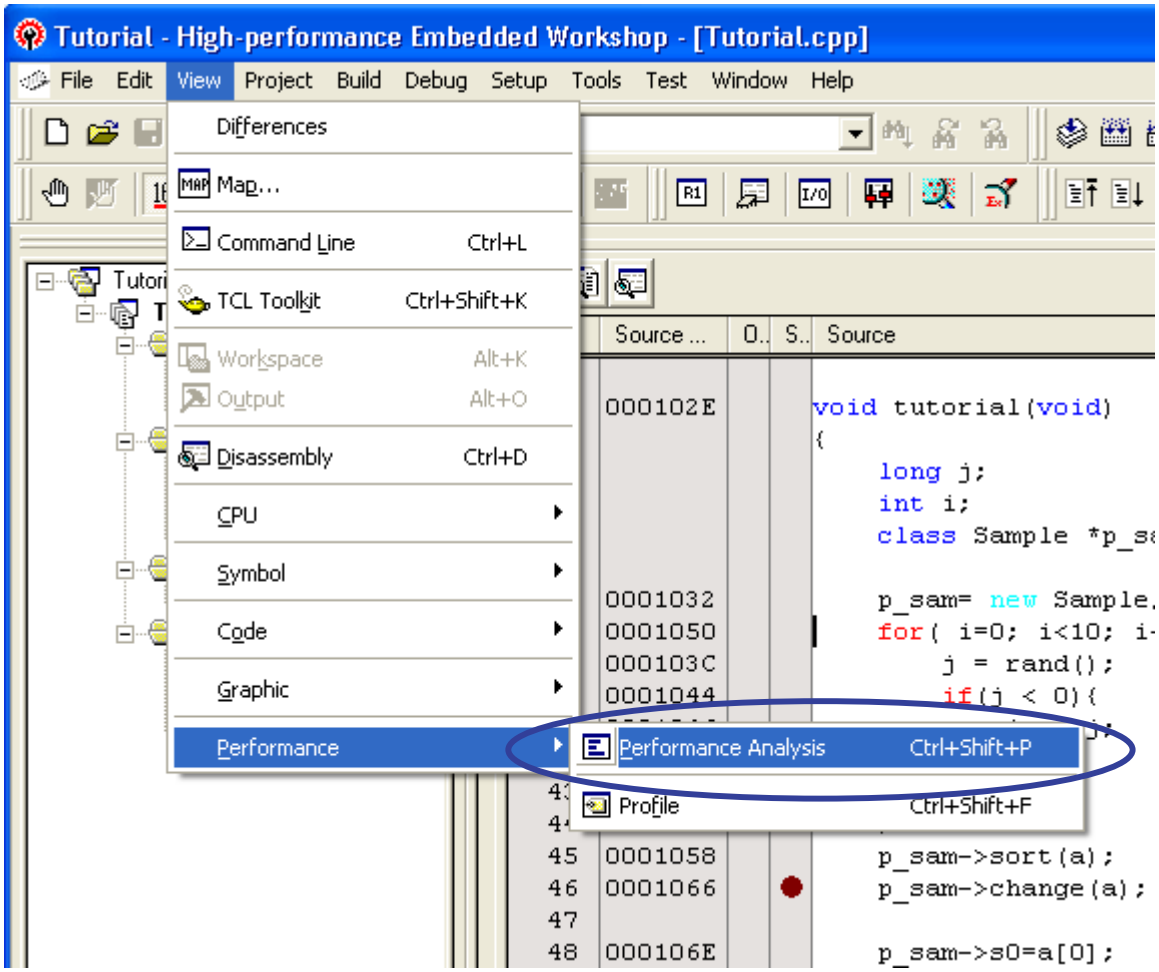
Here, double-click the [S/W Breakpoint] column on line 46 to set a breakpoint.

A red dot indicates that a software breakpoint has been set.

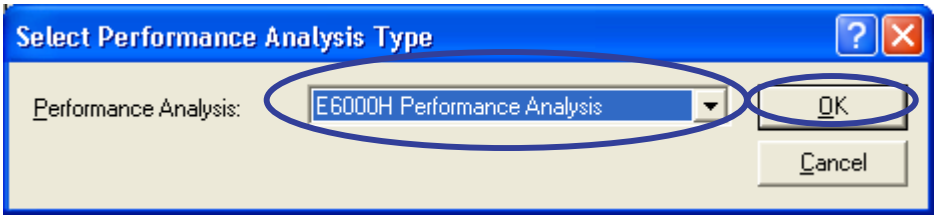
To clear a breakpoint previously set, double-click the red dot.

4.7 Setting a Performance Measurement Condition

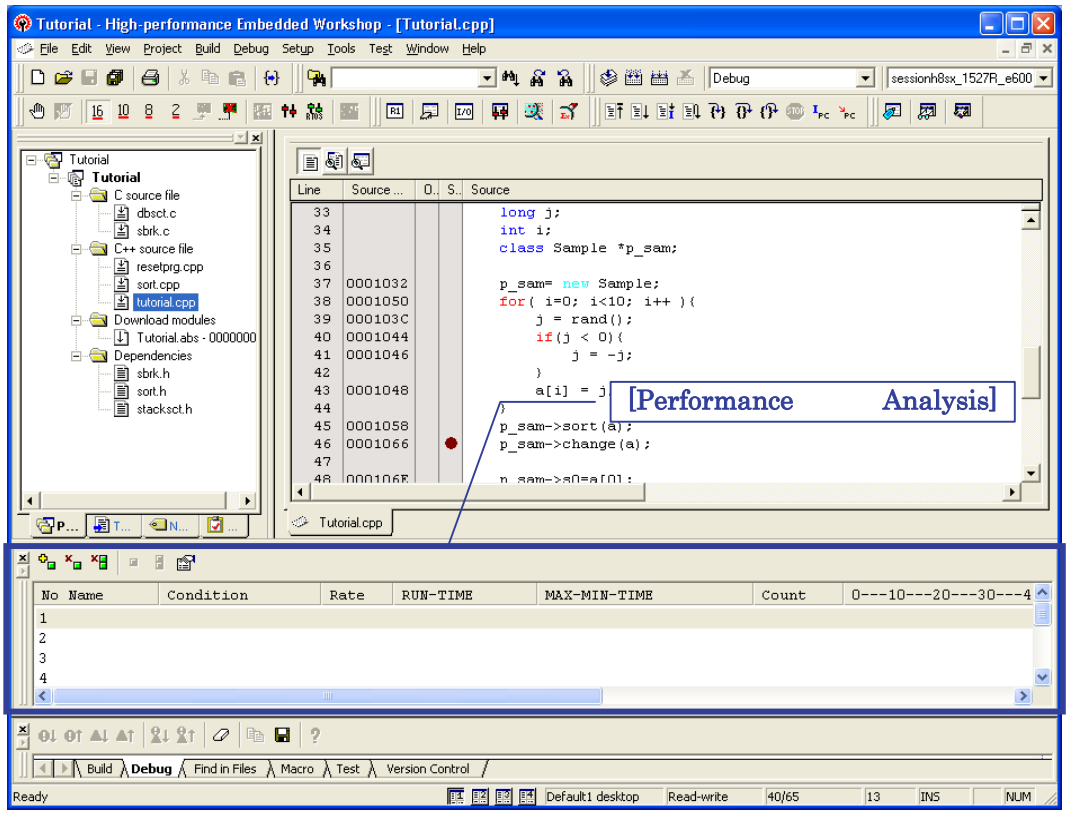
(1) Select [Performance Analysis] from [Performance] of the [View] menu.



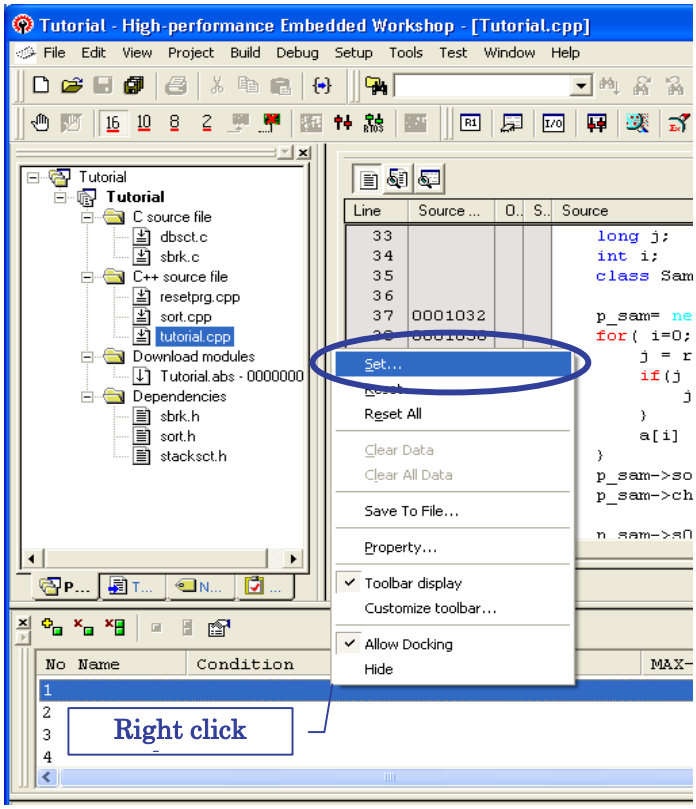
(2) The [Select Performance Analysis Type] dialog box will appear. Select [E6000H Performance Analysis] and click the [OK] button.



(3) The [Performance Analysis] window will be added.

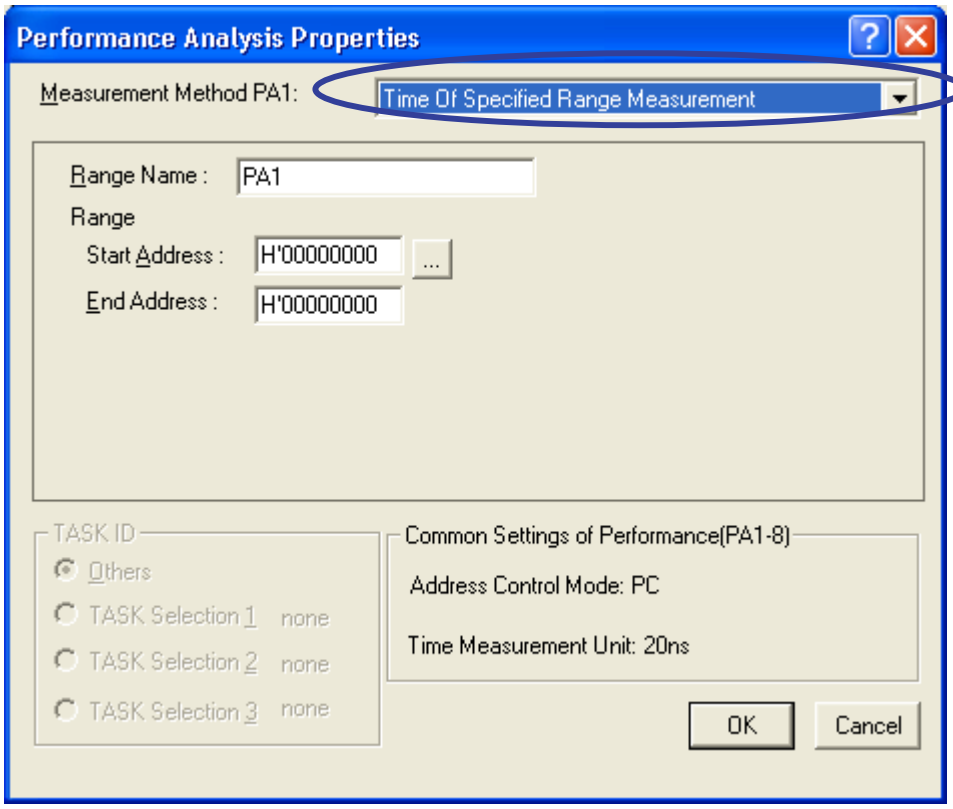


(4) Select the line in the [Performance Analysis] window that has 1 in its [No.] column and click the right-hand mouse button to display a popup menu.



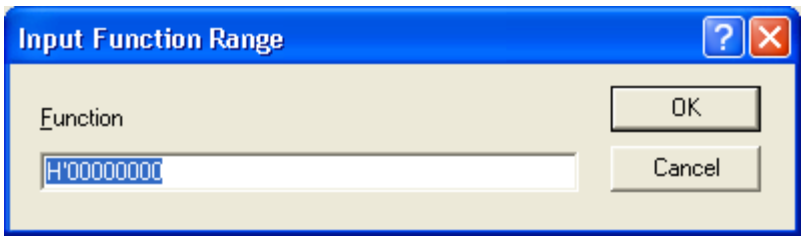
Select [Set...] from this popup menu.

(5) The [Performance Analysis Properties] dialog box will appear. Select [Time Of Specified Range Measurement] from the [Measurement Method PA1] combo box.



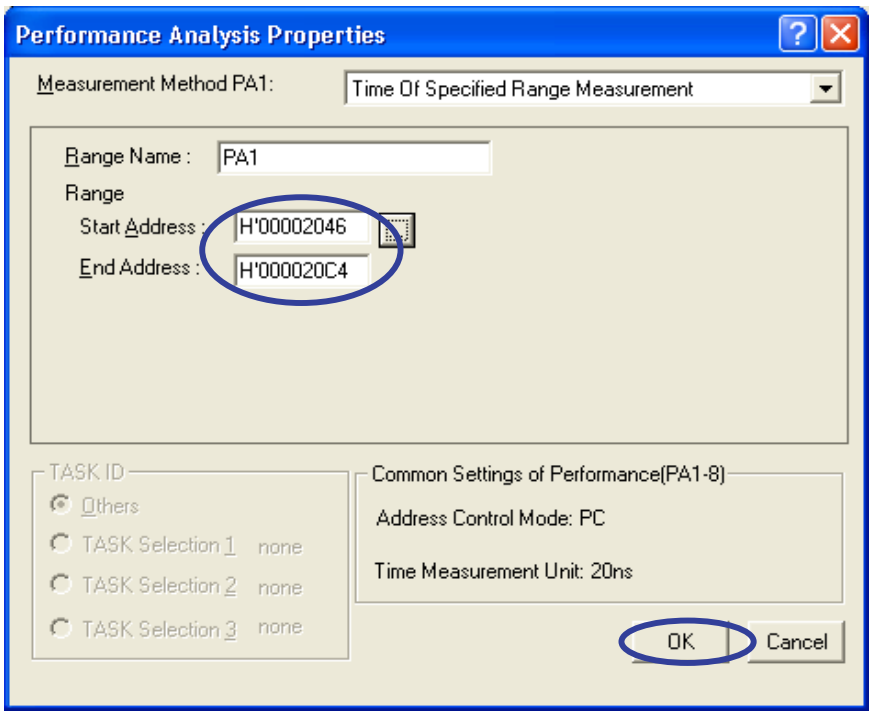
Click the [...] button on the right of the [Start Address] edit box.

(6) The [Input Function Range] dialog box will appear.

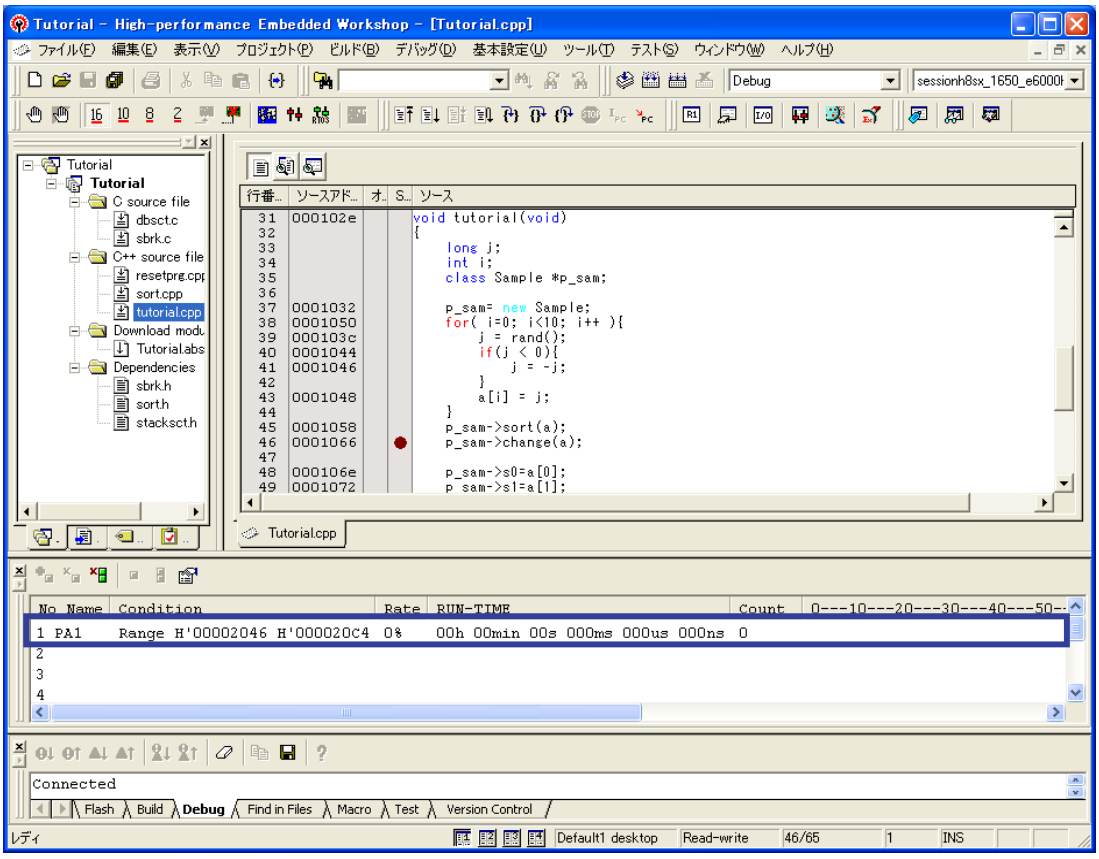


Enter 'Sample::sort(long*)' in the [Function] edit box and then click the [OK] button.

(7) The addresses for the function entered in (6) above is automatically set in the [Start Address] and [End Address] edit boxes. Check addresses for [Range] and click the [OK] button.



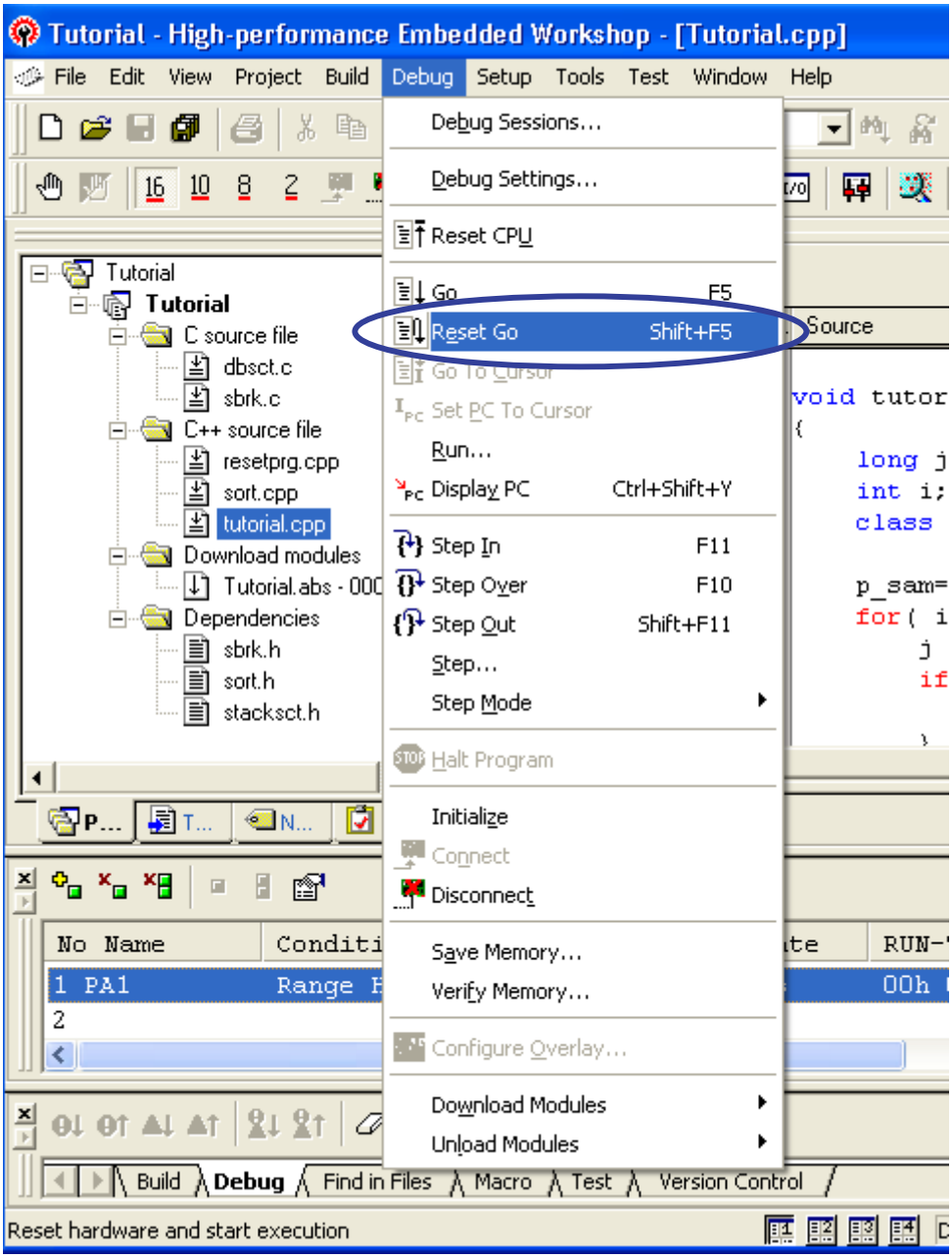
(8) The performance analysis condition is displayed on the [Performance Analysis] window.



The measured value of data will become the initial value immediately after the performance analysis condition has been set.

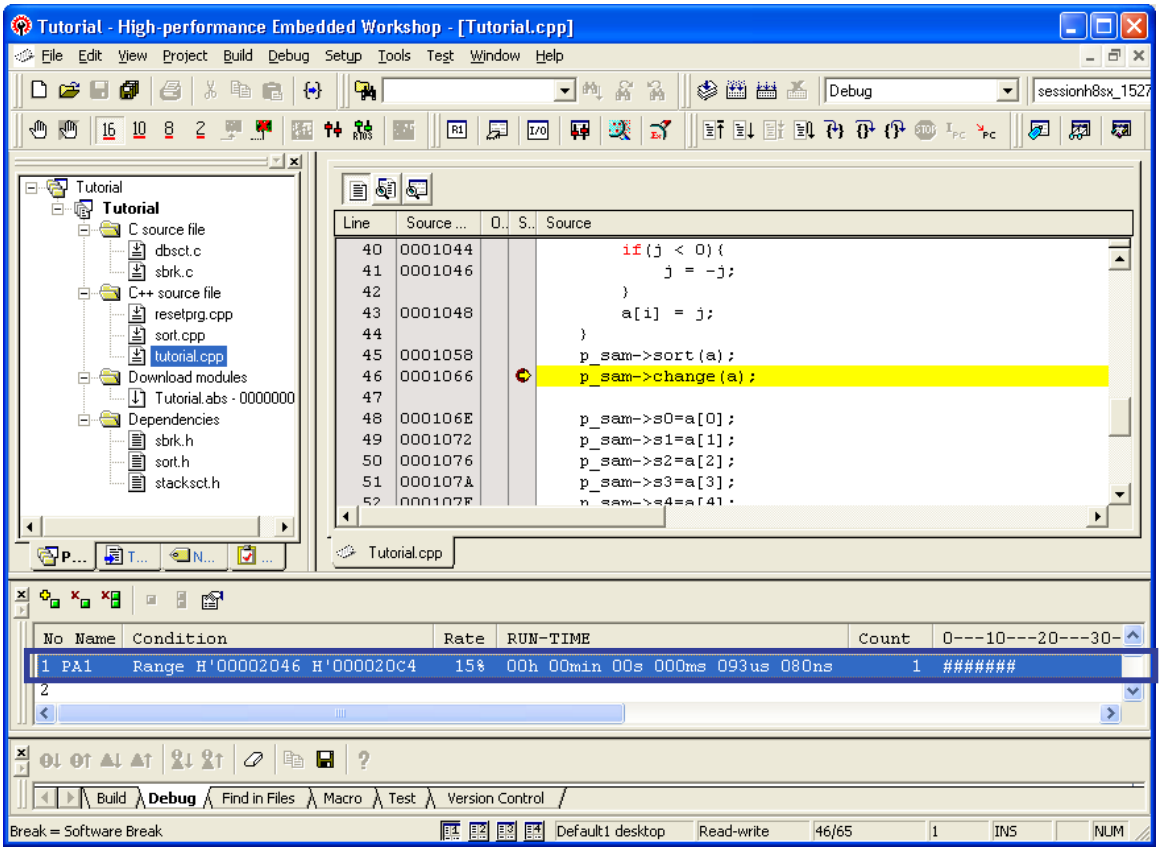
4.8 Executing a Program

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



4.9 Performance Analysis Result

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



The yellow arrow points to the program counter location and the corresponding source line is highlighted in yellow.

"Software Break" is displayed as the program stop cause in the [Debug] tab and on the status bar.

When the program execution is halted, the results of measurement are displayed in the [Performance Analysis] window.

For details on the displayed contents and the customizing methods, refer to the H8SX E6000H Emulator User's Manual that is listed in section 5, Related Documents.

In addition, the performance measurement function of the H8SX E6000H emulator has other functions than 'Time Of Specified Range Measurement' used in this document. For details on these functions, the H8SX E6000H Emulator User's Manual is also available.

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:

Japanese site: http://japan.renesas.com/e6000h

Global site: http://www.renesas.com/e6000h

Renesas Website and Customer Support

Renesas Technology Website:
http://www.renesas.com/

Customer Support:
http://www.renesas.com/inquiry
csc@renesas.com

Revision History

Rev.	Publication date	Revisions	
		Page	Description
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