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April 1st, 2010
Renesas Electronics Corporation

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H8S Family Emulator E6000

How to Use the Sequential Break Function

Overview

This document describes how to use the sequential break function in the full-specification emulator E6000 for the H8S/2215.

The functions described in this document can be performed through the H8S/2214 E6000 emulator in a stand-alone form.

These functions are also available through all E6000 emulators for the H8S family.

Contents

1. Specifications

The E6000 emulator provides a function for specifying a sequential break condition to stop program execution, which is a combination of multiple event points to be detected in sequence.

For an event point, higher-level conditions can be specified, such as a data condition, in addition to a single address condition.

By combining event points in sequence, program or hardware errors that occur under limited conditions can be efficiently debugged.

Note: The data acquisition, condition check, and action (such as stopping the user program) specified for the event point are processed by the E6000 hardware, and thus the action is delayed several cycles after the condition is satisfied.

2. Functional Descriptions

This document describes how to specify the sequential break function in the H8S/2214 E6000 emulator.

It guides you through the procedures for setting event points in the sample program provided in the CD-ROM of the H8S/2214 E6000 emulator and making sequential settings for the event points, and shows how the program execution generates a break when a specified condition is satisfied.

3. Software Preparation

3.1 Introduction

Install the software provided in the CD-ROM of the H8S/2214 E6000 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 H8S/2214 E6000 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.

3.2 Installing the H8S/2214 E6000 Emulator Software

Execute setup.exe from the CD-ROM of the H8S/2214 E6000 emulator.

For details of the installation, refer to the Setup Guide for the E6000 Emulator and follow the instructions displayed on the screen. The installation procedure is not described in this document.

3.3 Installing Other Necessary Software

1) For the host interface board, which is an optional board for the H8S/2214 E6000 emulator, install the necessary software according to the connection type (PCI card, PC card, LAN, or USB adaptor). The installation procedure is described in the manual supplied with the optional product; it is not described in this document.
2) In the description in this document, part of the sample program is modified before the program operation is checked. For this purpose, the H8S, H8/300 series C/C++ compiler package is necessary. Install a production-version compiler package if you have one.
3) If you do not have a production-version compiler package, an evaluation-version compiler package is available free of charge from the Renesas website. From the top page of the Renesas site, go to [SUPPORT] -> [Software Download for Tools], select [Evaluation Software] from [Download Search], and search for the evaluation-version H8S, H8/300 series C/C++ compiler package. For the address of the Renesas website, refer to section 5, Related

Documents. For usage restrictions and installation procedure of the evaluation-version compiler package, refer to the download page.

4. Operations

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

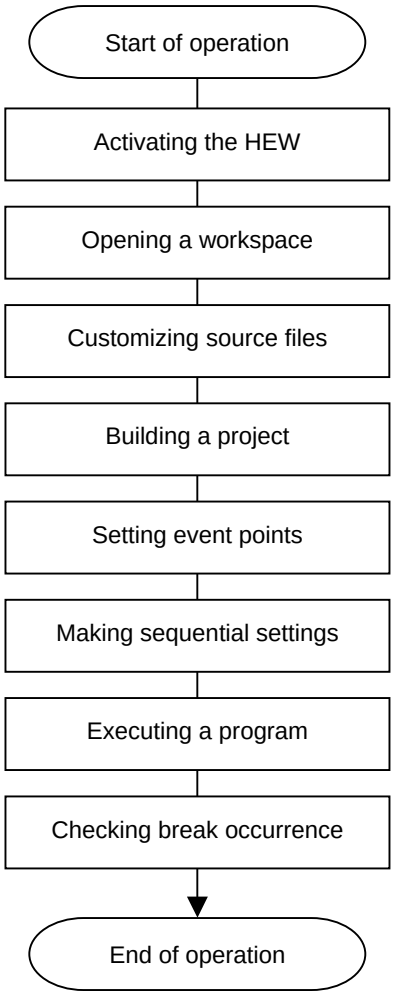
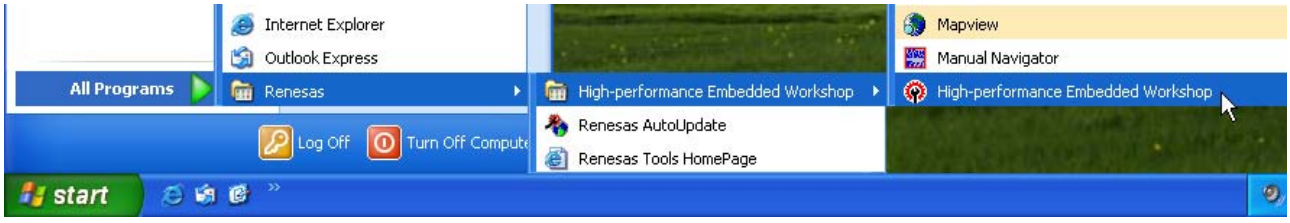


Figure 4.1 Procedures for Sample Program Execution

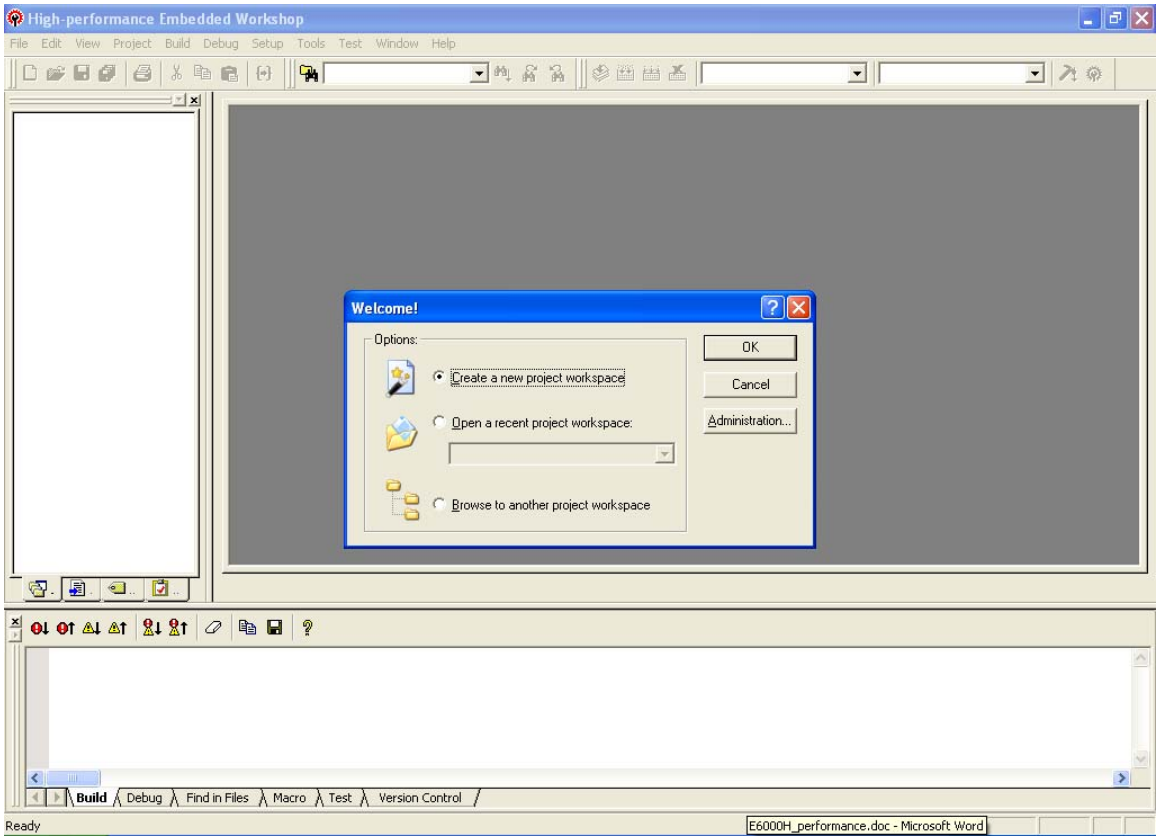
4.1 Activating the High-Performance Embedded Workshop

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.



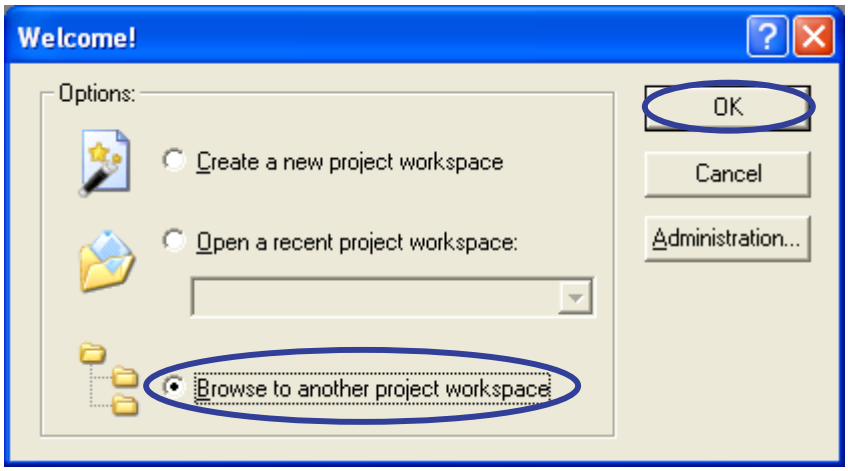
4.2 Opening a Workspace

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

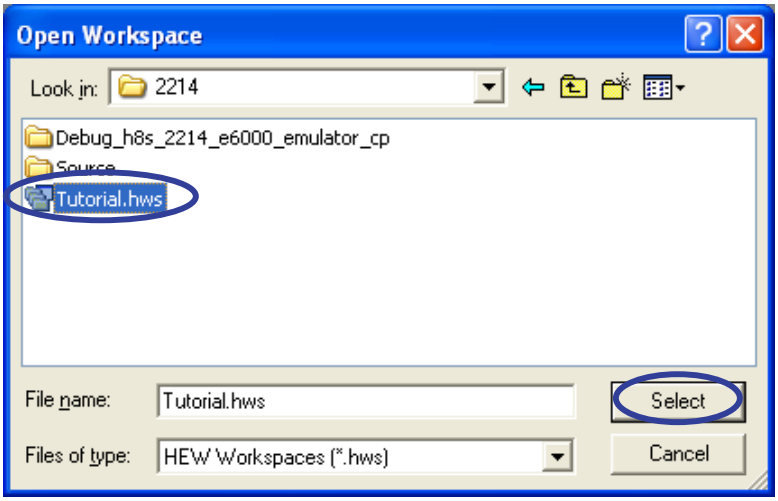


Check that the power to the H8S/2214 E6000 emulator is turned on.

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 [Select] button.

C:\WorkSpace\Tutorial\E6000\2214\Tutorial.hws
C:\WorkSpace └ Tutorial └ E6000 └ 2214 └ Tutorial.hws

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

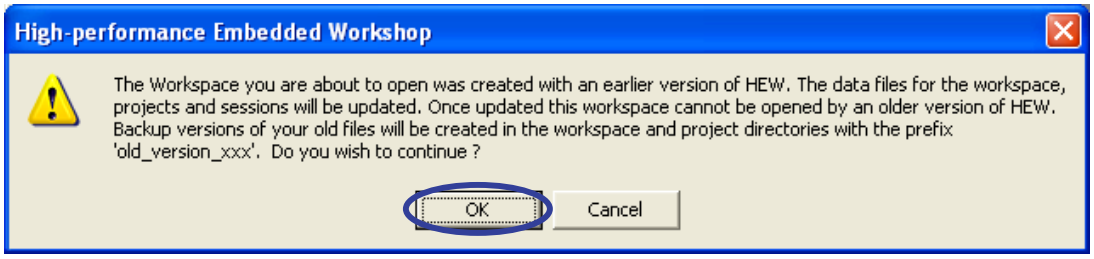
<High-performance Embedded Workshop installation directory>
\Tools\Renesas\DebugComp\Platform\E6000\2214\Tutorial

Directory examples:

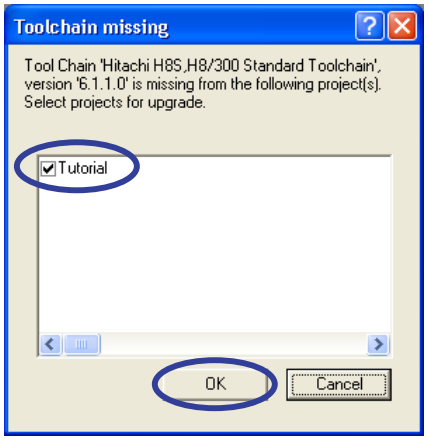
C:\hew3\Tools\Renesas\DebugComp\Platform\E6000\2214\Tutorial

C:\hew2\Tools\Renesas\DebugComp\Platform\E6000\2214\Tutorial

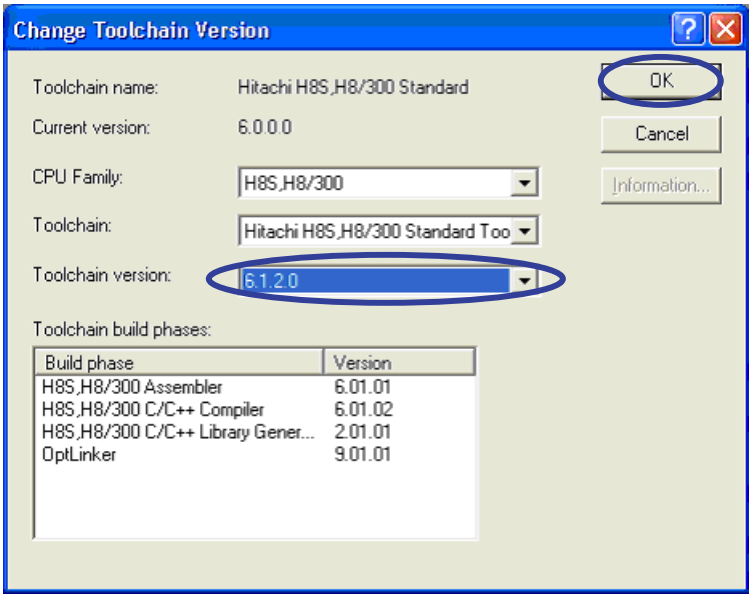
(3) If the workspace version is old, the following dialog box will appear. To update it to the new version, click the [OK] button.



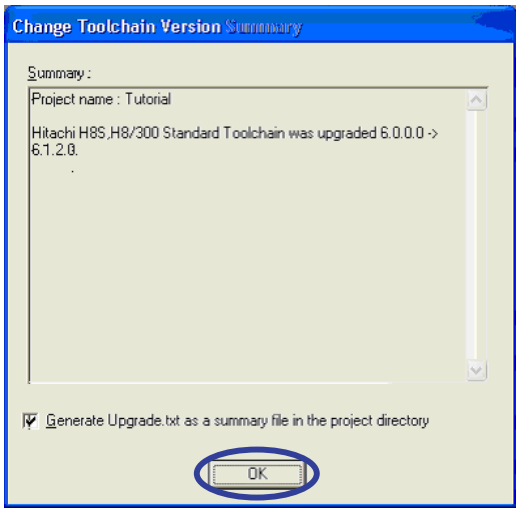
(4) If the [Toolchain missing] dialog box appears, select the target project name and click the [OK] button.



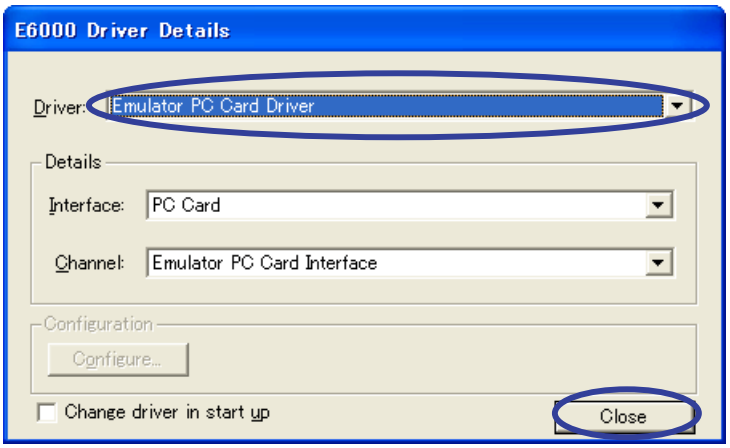
(5) If the [Change Toolchain Version] dialog box appears, select the desired toolchain version and click the [OK] button.



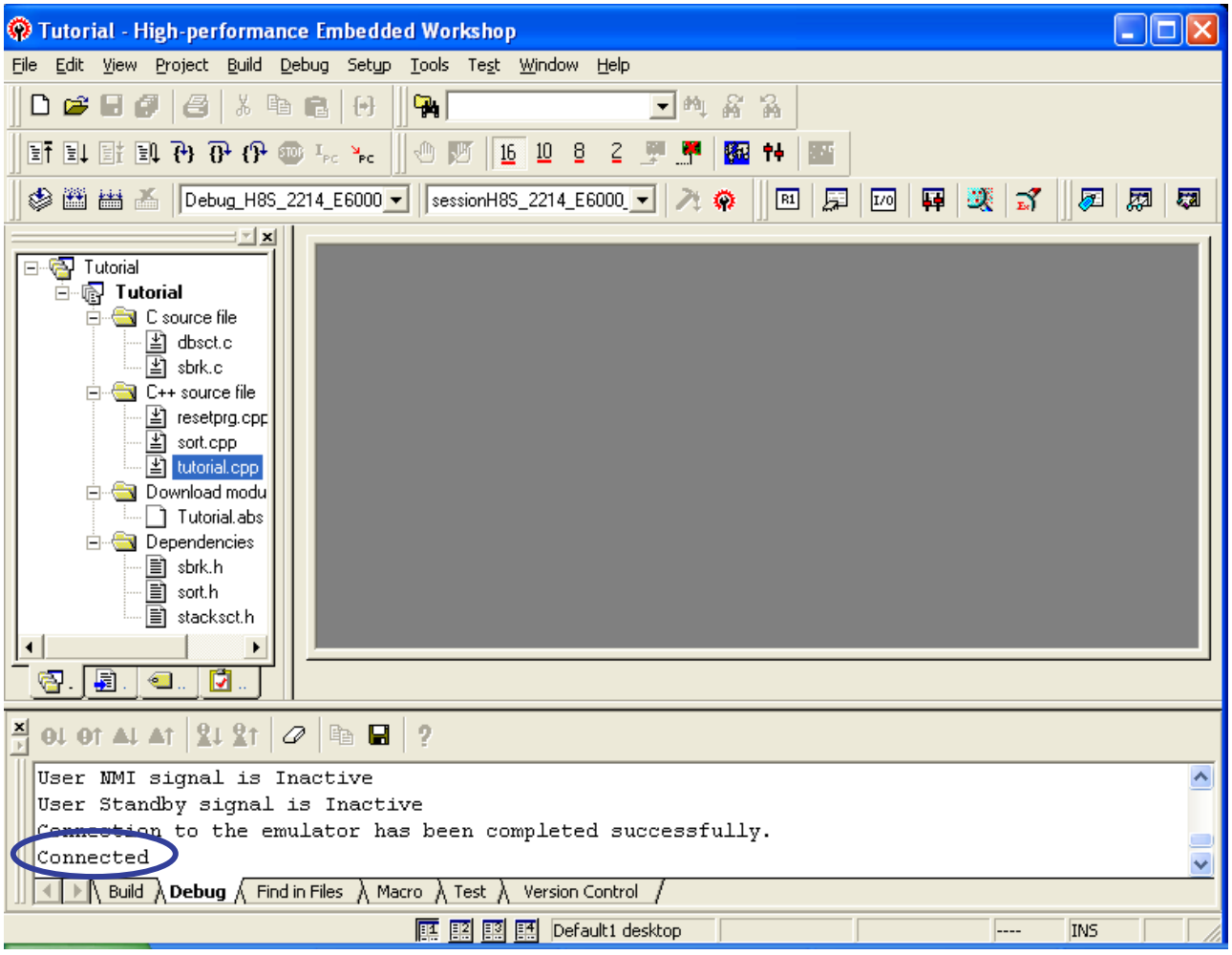
(6) If the [Change Toolchain Version Summary] dialog box appears, just click the [OK] button.



(7) The workspace will open and the HEW will be automatically connected to the emulator. The [E6000 Driver Details] dialog box may open when the emulator is connected. In this case, select the driver in use and select the [Close] button.



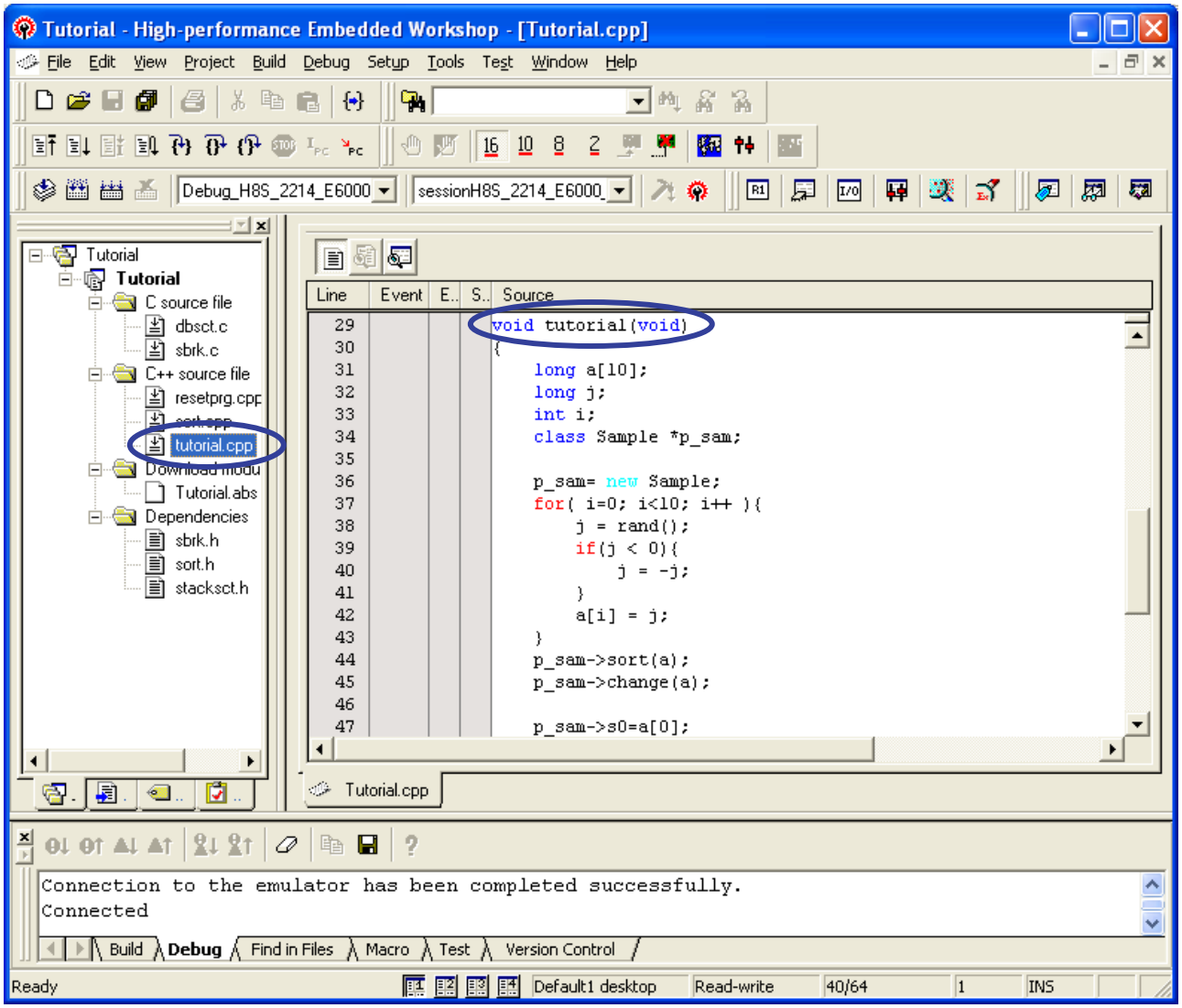
(8) After the workspace has been read, operation on the High-performance Embedded Workshop screen becomes available.



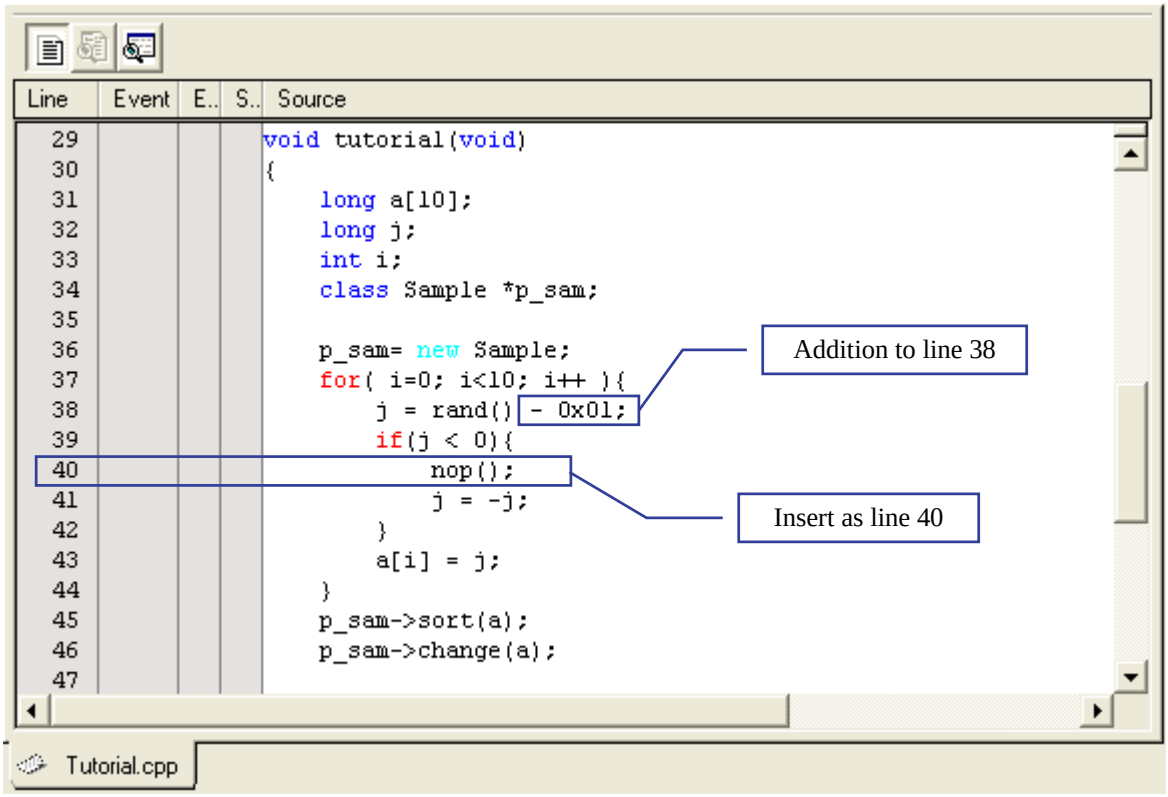
When the E6000 emulator has been successfully connected, "Connected" is displayed in the [Debug] tab of the Output window.

4.3 Customizing a Source File

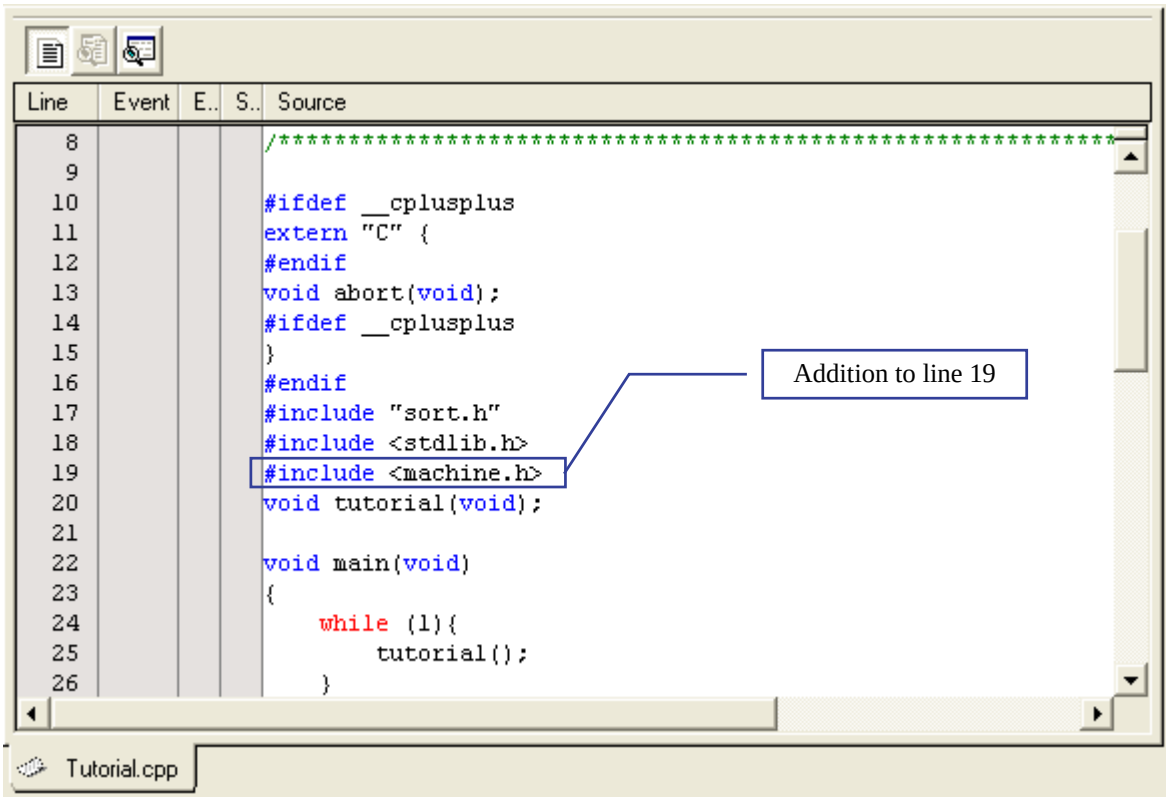
(1) Double-click the source file name "tutorial.cpp" on the workspace to open the source and find the function "tutorial" on line 29.



(2) In the Source window, add minus 0x01 on line 38, and insert "nop();" as line 40.

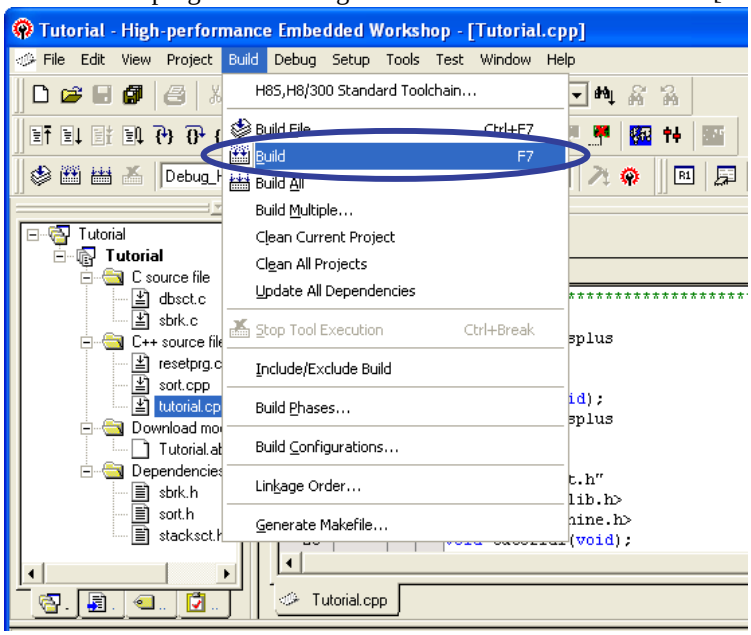


(3) Scroll the Source window up to line 19 (empty line) and add a statement to include <machine.h>.



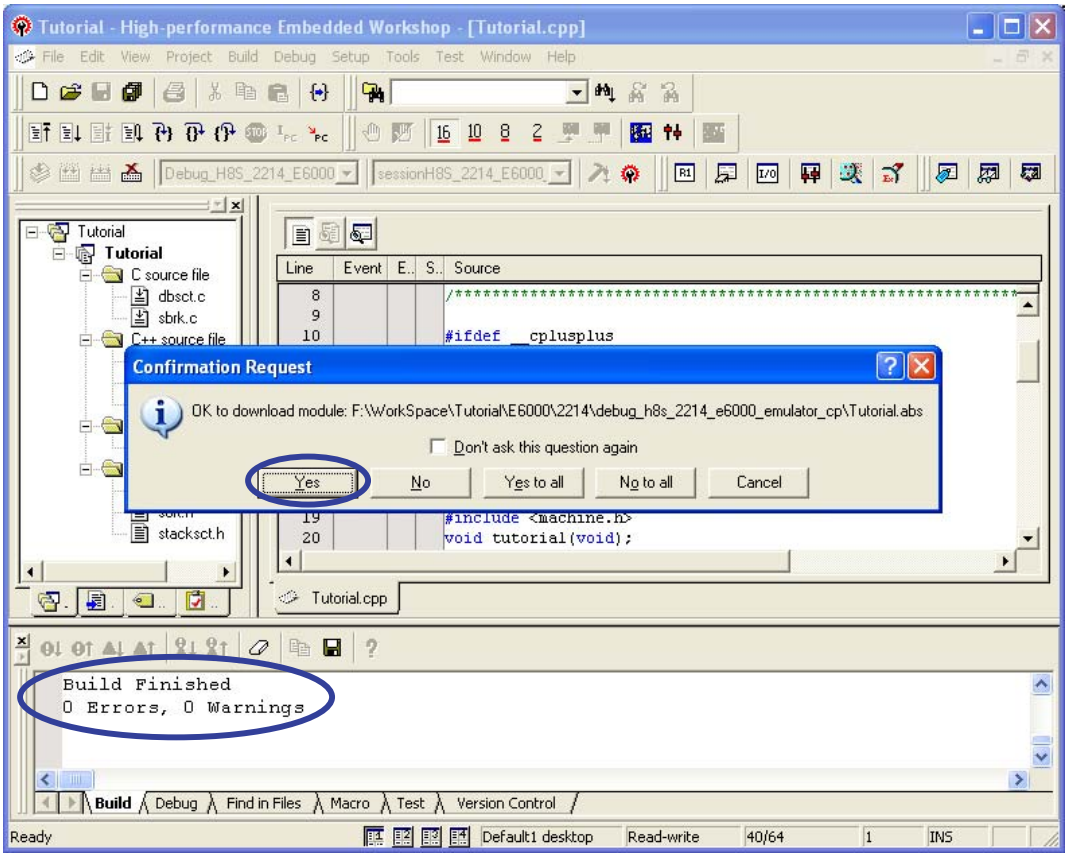
4.4 Building a Project

(1) Build a project to create a loadable program including the customized source file. Click [Build] in the [Build] menu.



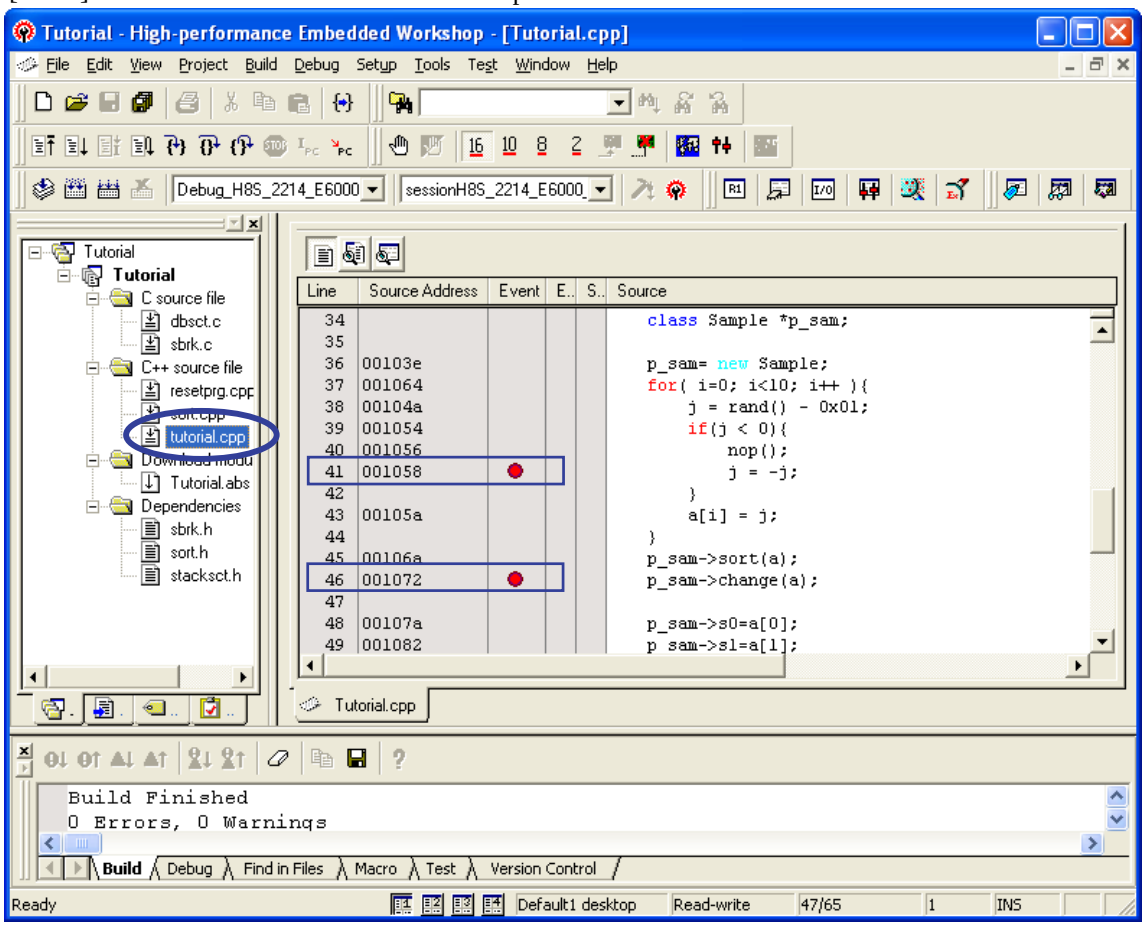
The progress of the building process can be monitored in the [Build] tab of the Output window.

(2) After the build is completed, the numbers of errors and warnings are displayed in the [Build] tab of the Output window, and if the program can be downloaded, the [Confirmation Request] dialog box automatically appears asking whether to download the built program file. Click the [Yes] button.

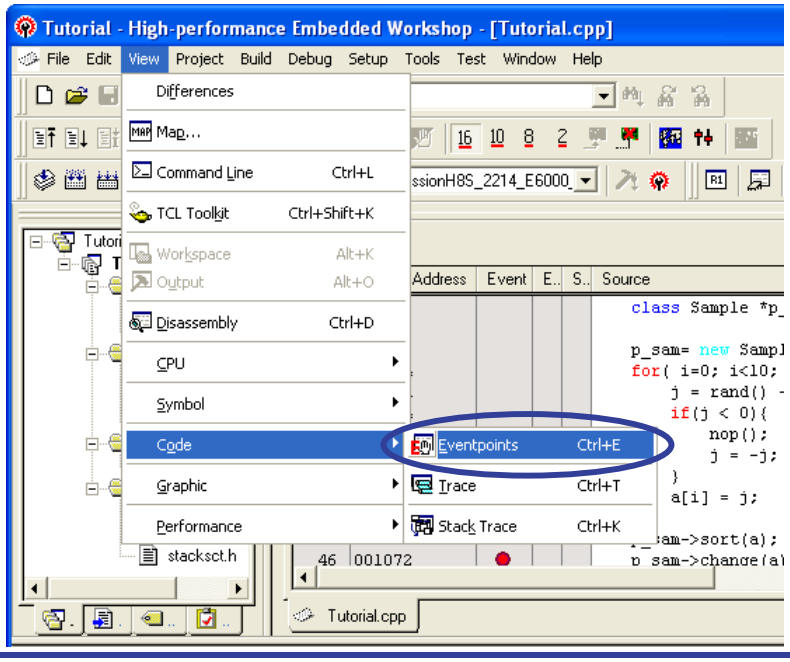


4.5 Setting Event Points

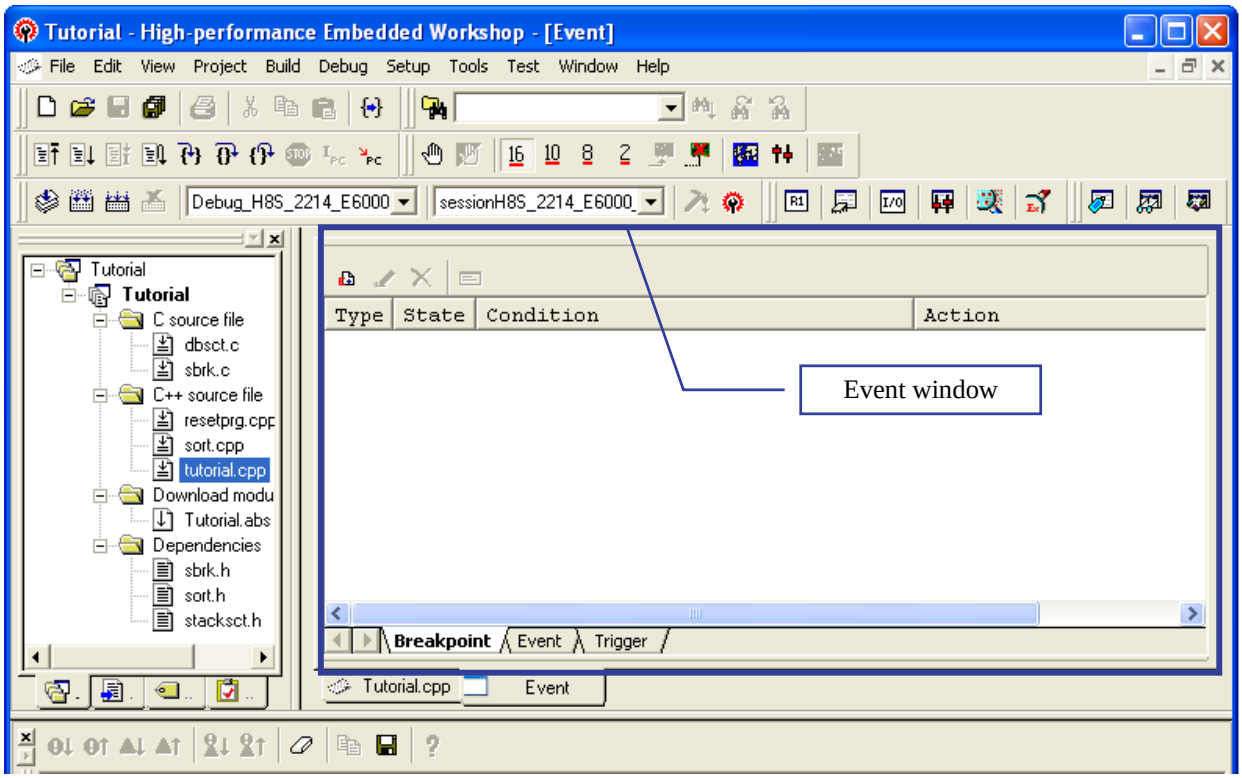
(1) Double-click the source file name "tutorial.cpp" on the workspace to open the source code, and then double-click the [Event] column on lines 42 and 46 to set event points.



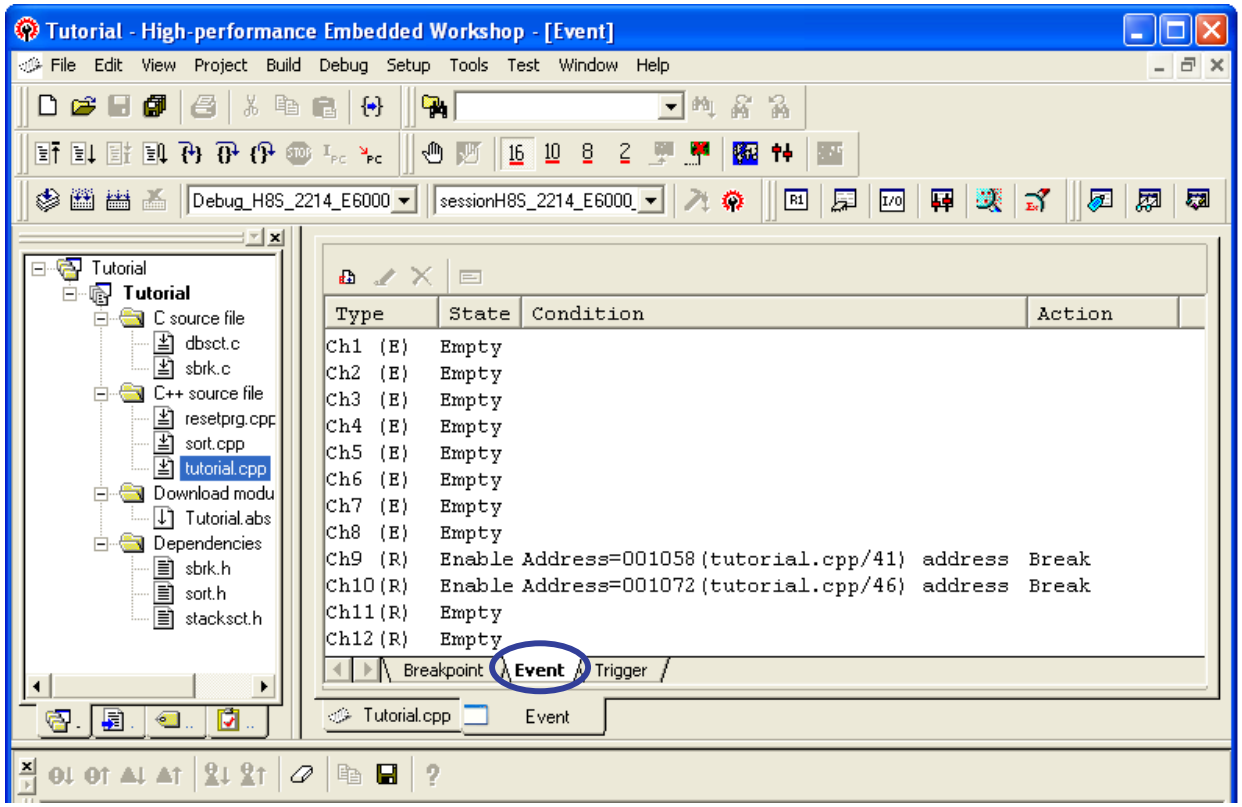
(2) Select [Code]->[Eventpoints] from the [View] menu.



(3) The Event window will appear. The following shows the display when the docking view mode has been canceled by right-clicking on the window.

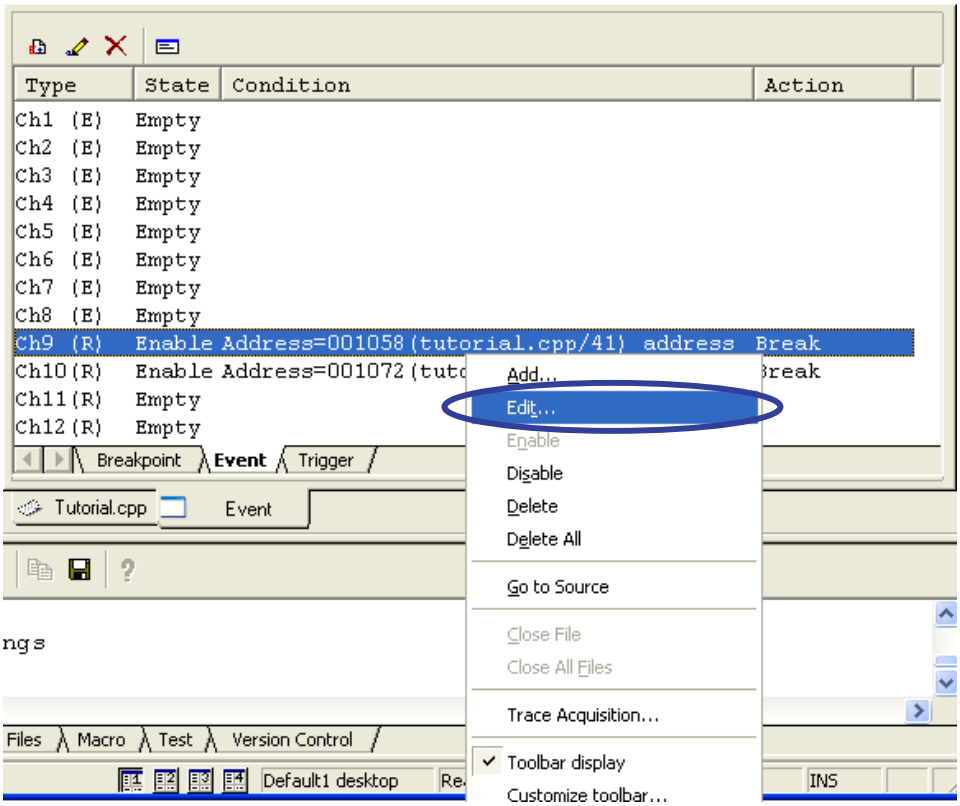


(4) Select the [Event] tab of the Event window to show the event conditions.

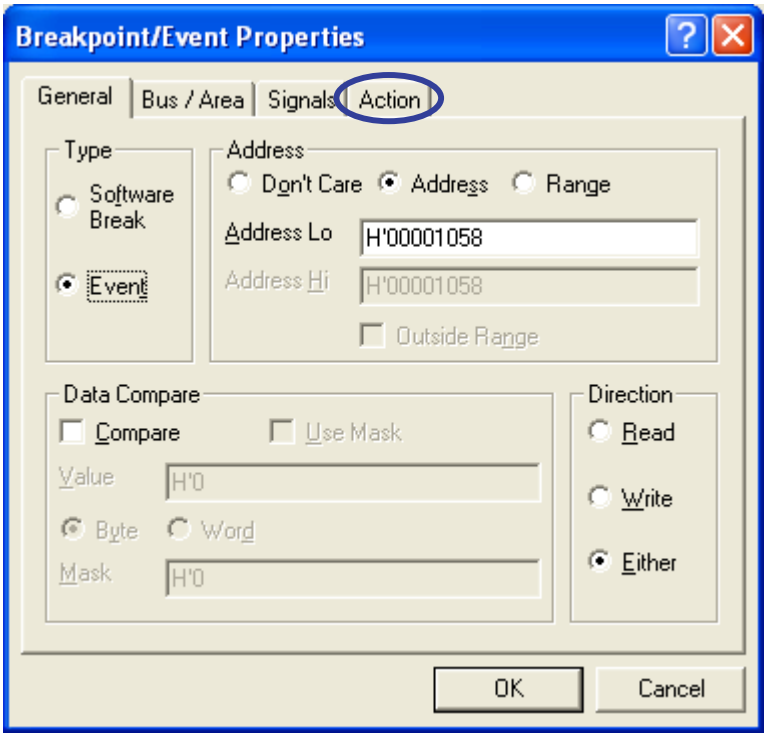


4.6 Making Sequential Settings

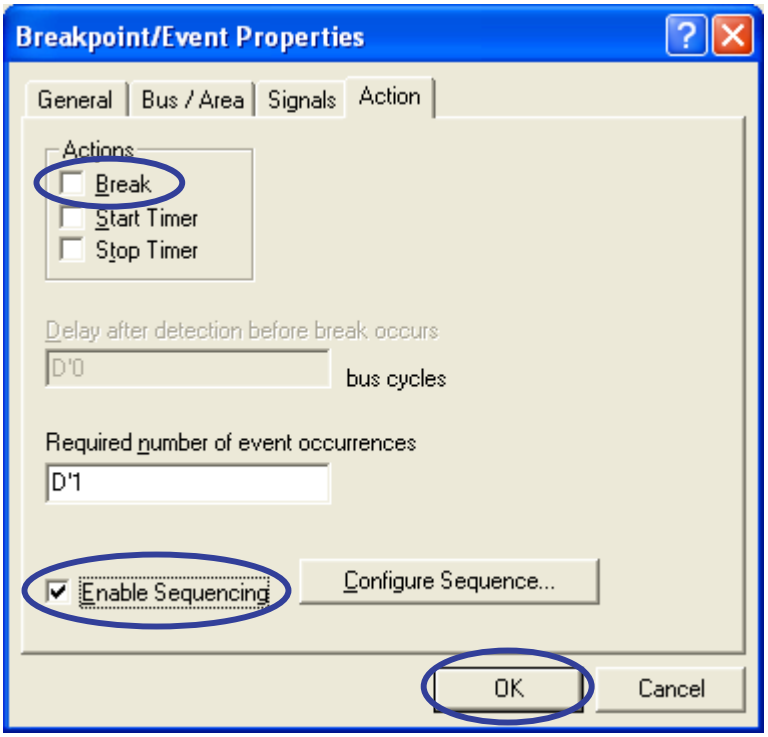
(1) Select the [Event] tab of the Event window, select the condition of Ch9, and select [Edit...] from the menu opened by right-clicking on the window.



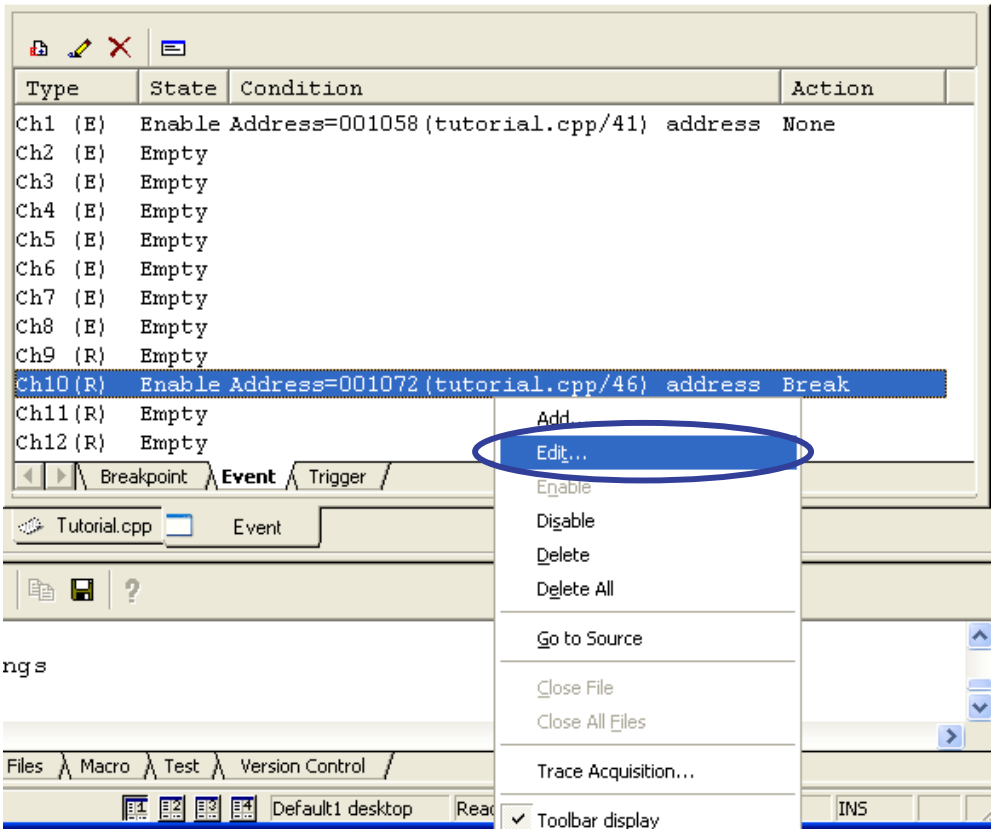
(2) The [Breakpoint/Event Properties] dialog box will appear. Select the [Action] tab.



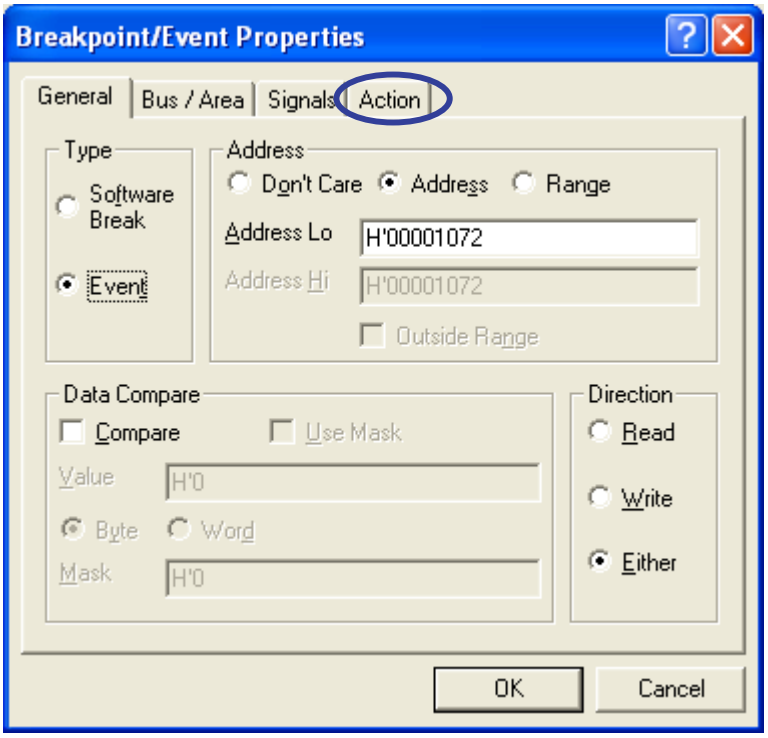
(3) Cancel the [Break] setting in [Actions] and select [Enable Sequencing]. Click the [OK] button.



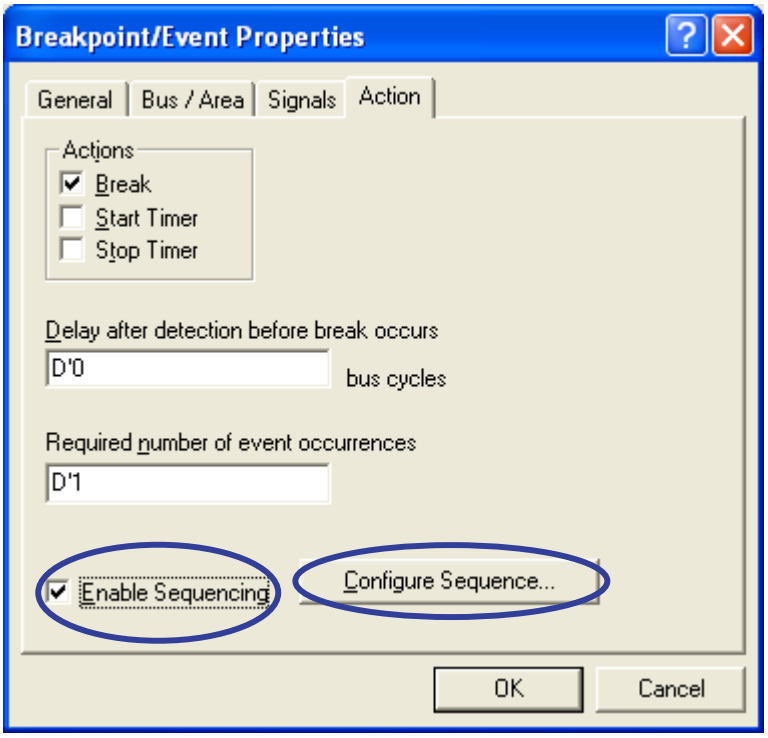
(4) In the same way, select the condition of Ch10 and select [Edit...] from the menu opened by right-clicking on the window.



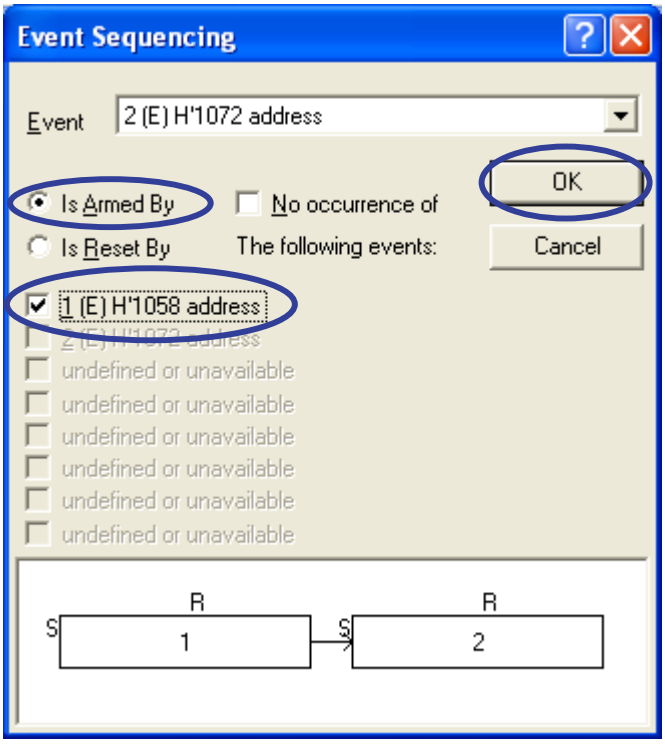
(5) The [Breakpoint/Event Properties] dialog box will appear. Select the [Action] tab.



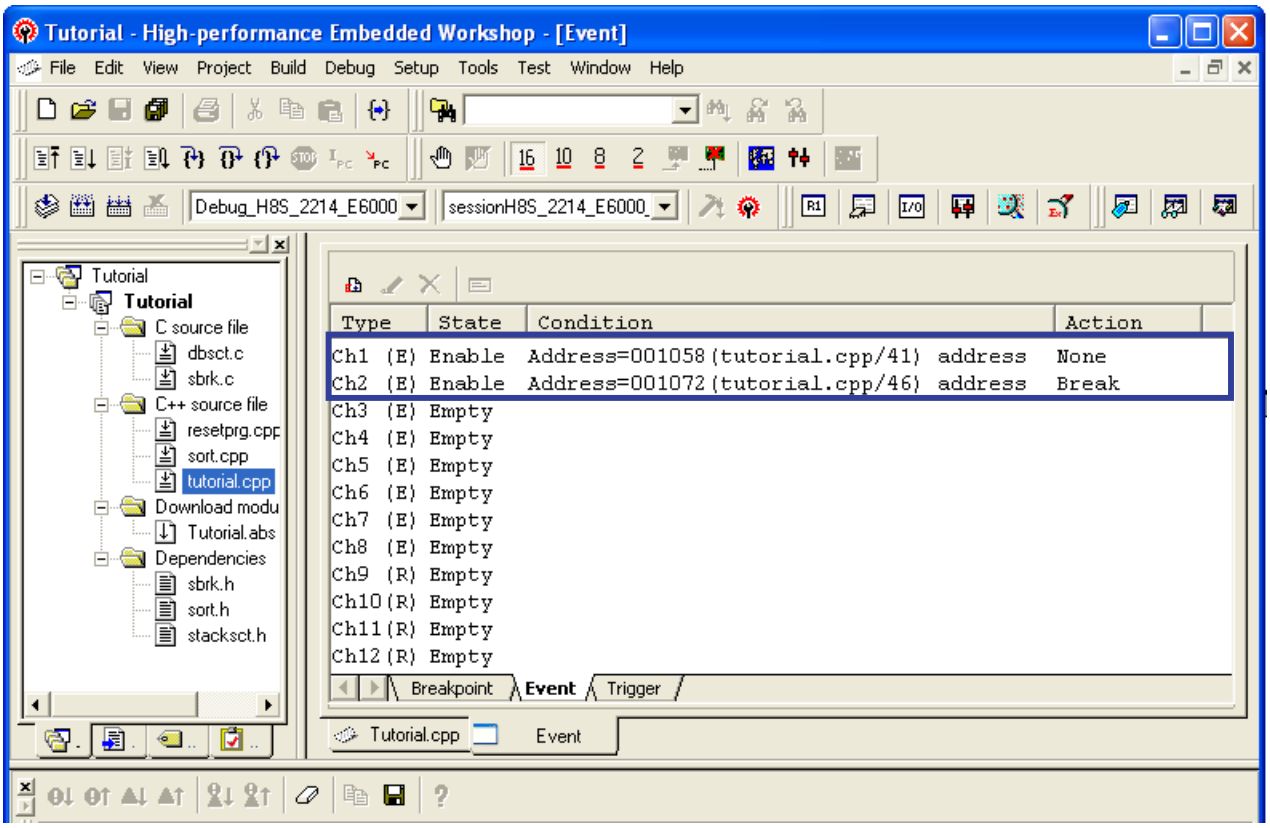
(6) Select [Enable Sequencing] and click the [Configure Sequence...] button.



(7) The [Event Sequencing] dialog box will appear. Check that the [Is Armed By] radio button is selected, and select condition 1 under it. Click the [OK] button.

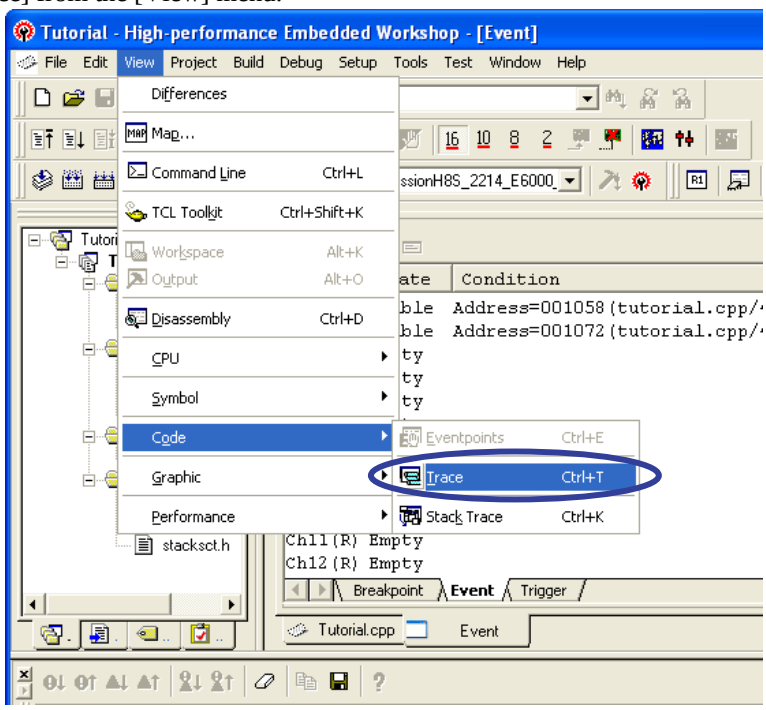


(8) The [Event] tab in the Event window shows a list of events as follows.

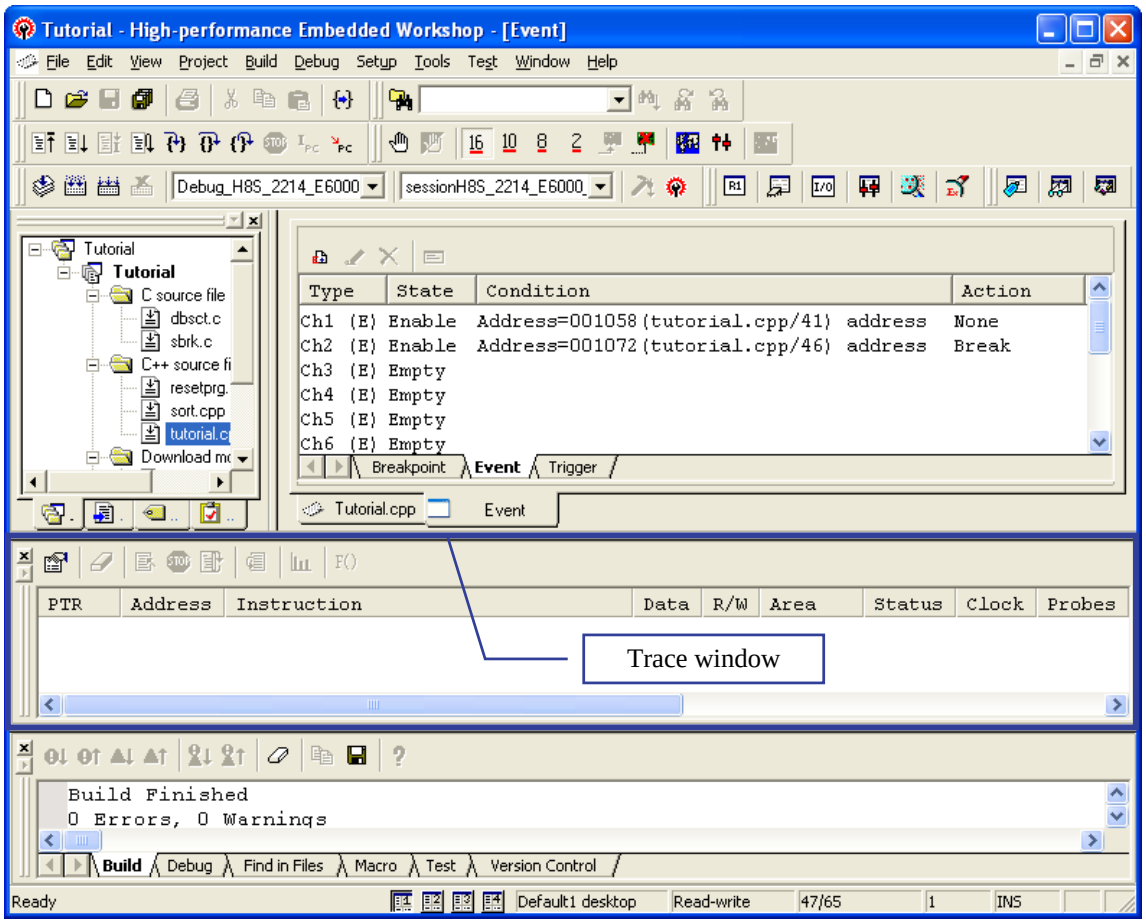


4.7 Executing a Program

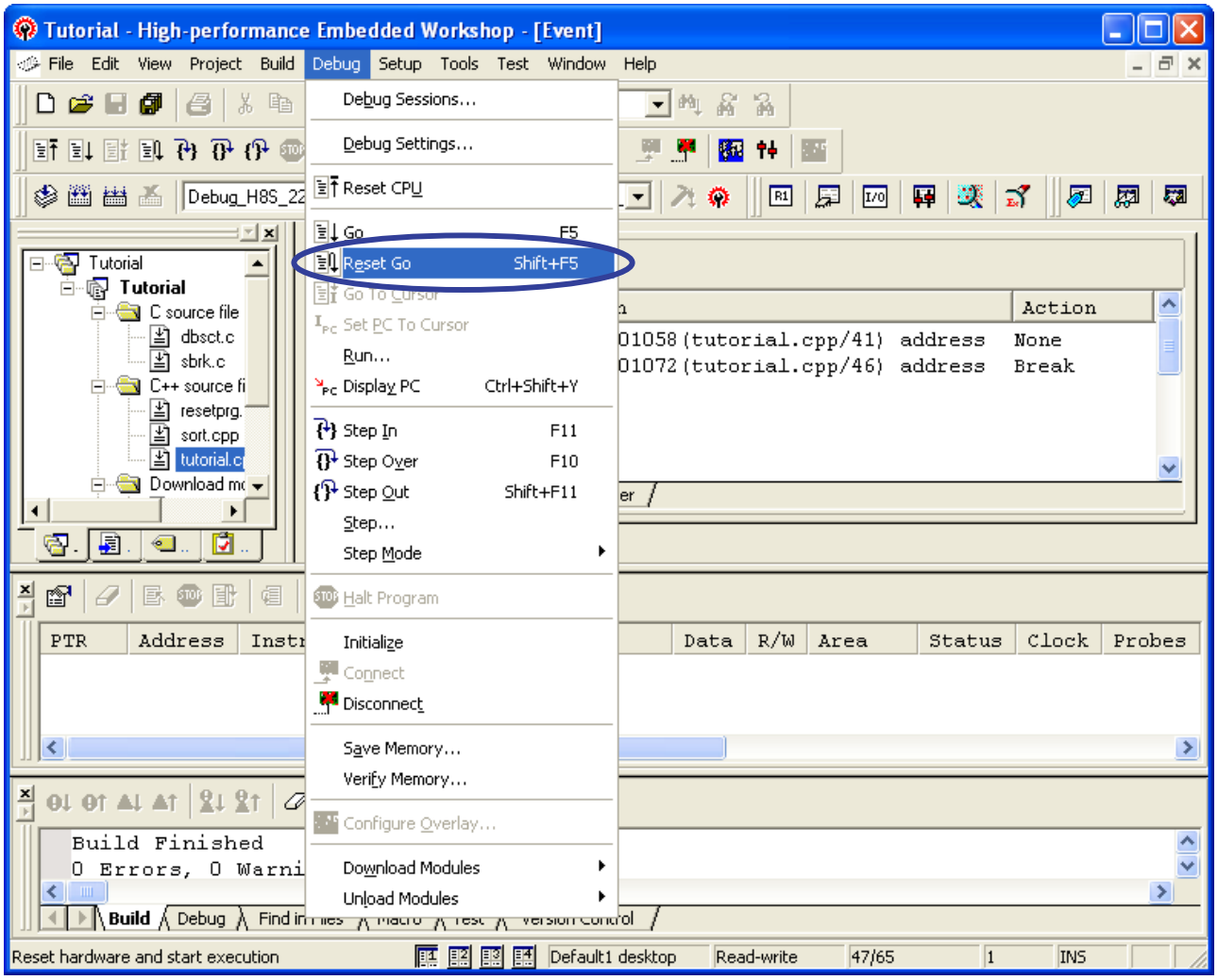
(1) Select [Code]->[Trace] from the [View] menu.



(2) The Trace window will appear.

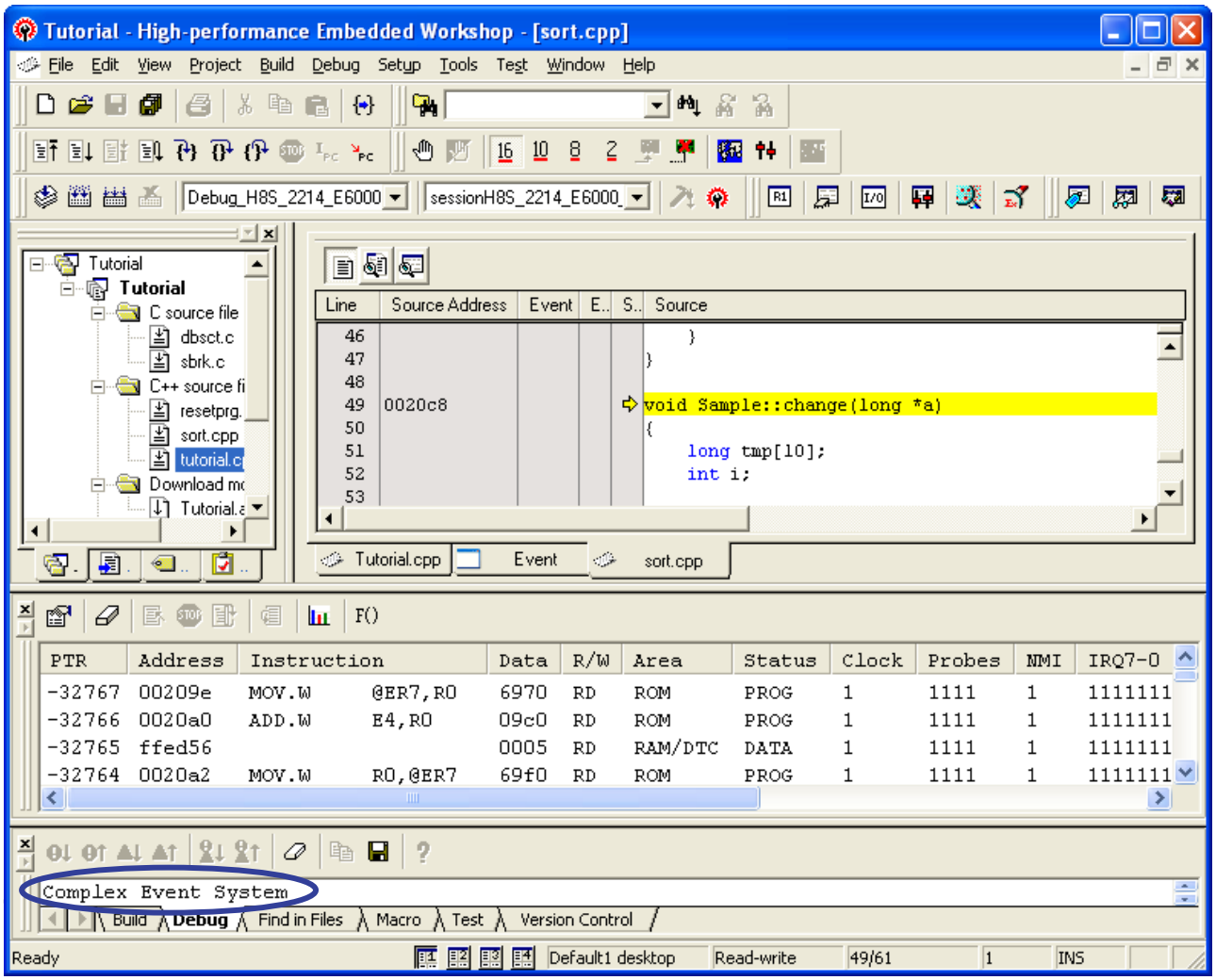


(3) Select [Reset Go] from the [Debug] menu.



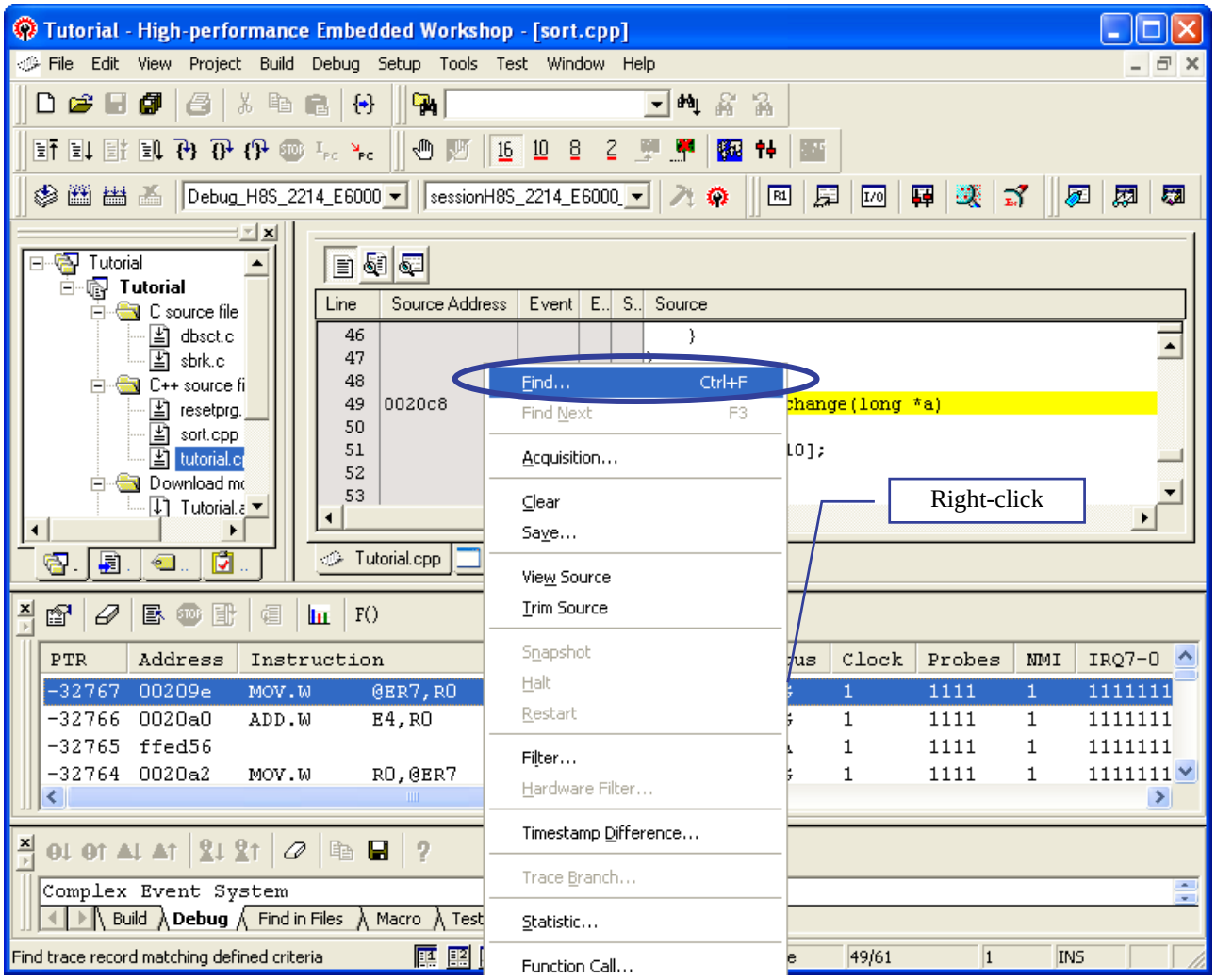
4.8 Checking Break Occurrence

(1) The [Debug] tab of the Output window displays "Complex Event System" and program execution stops.

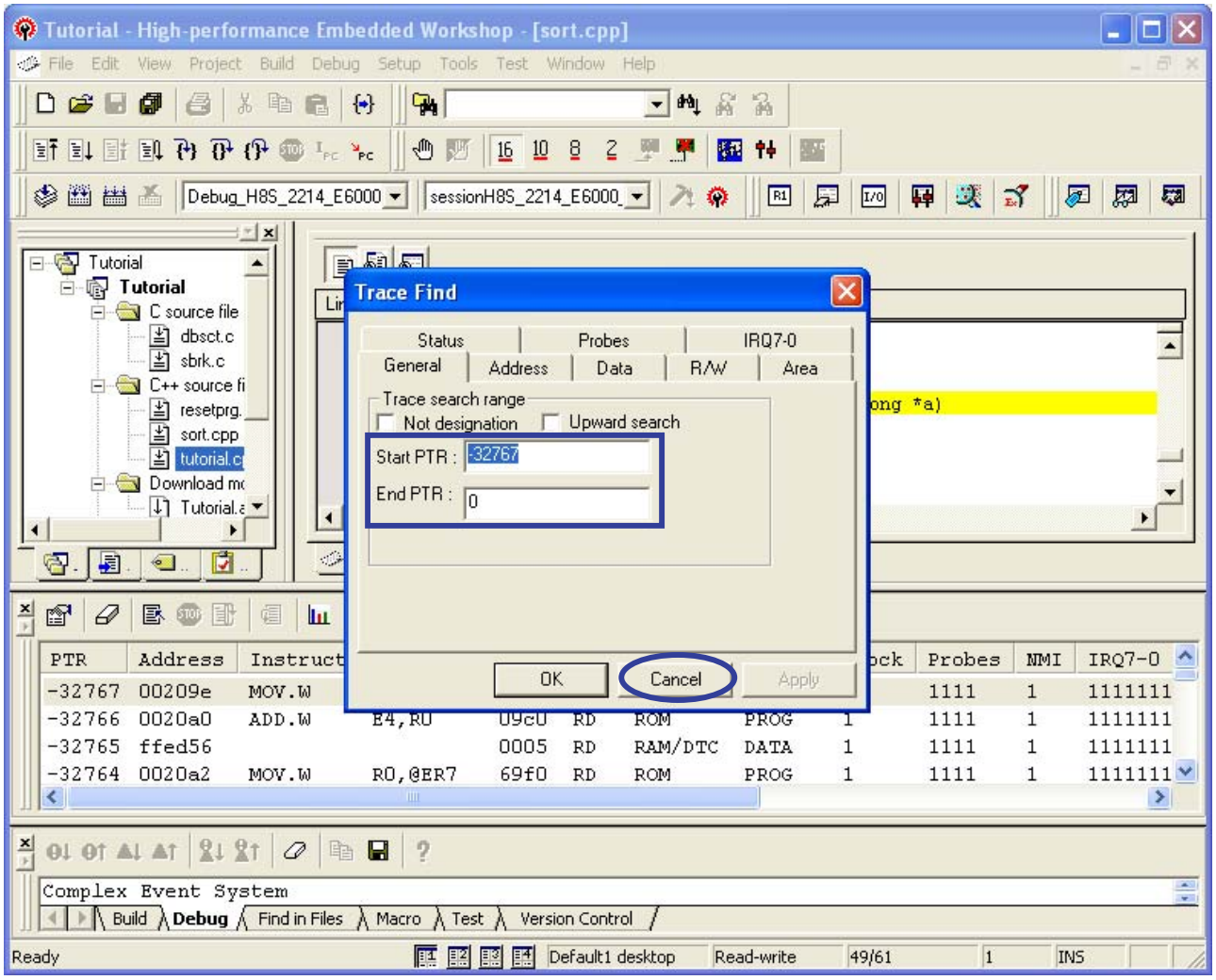


The source window shows the program stop position. The yellow arrow points to the program counter location and the corresponding source line is highlighted in yellow. The Trace window shows the program execution log.

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



(3) The [Trace Find] dialog box will appear.

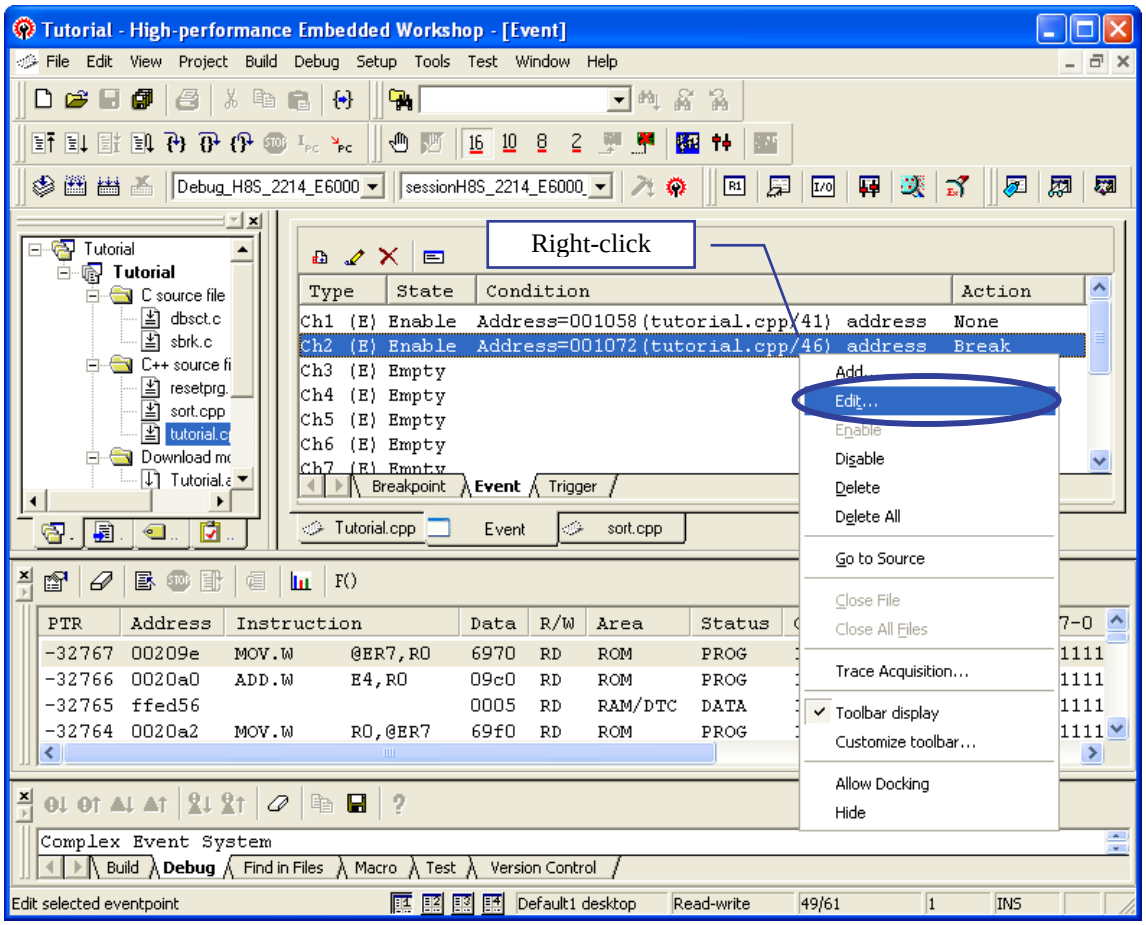


The start pointer is at the -32767th cycle and the end pointer is at the 0th cycle; 32768 cycles of trace information can be viewed in total.

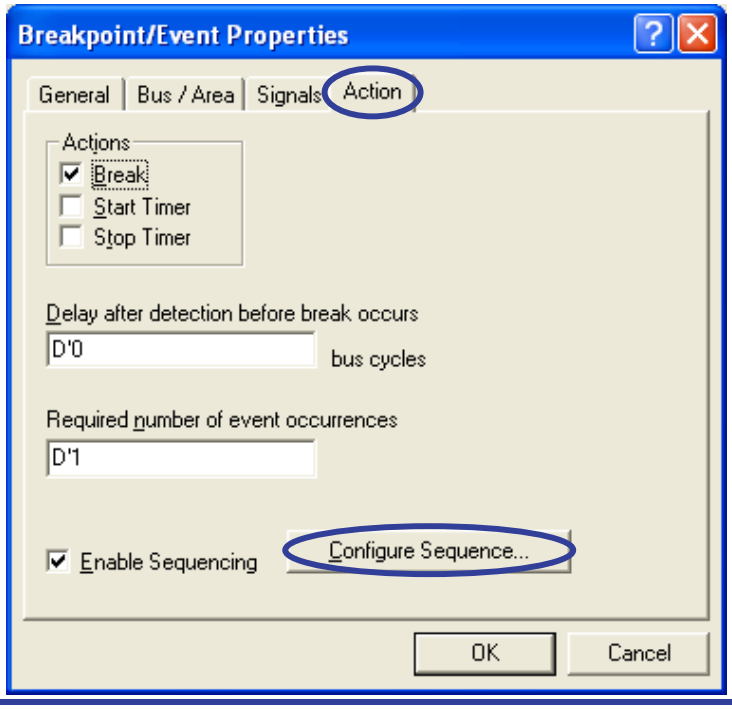
This size of information has been acquired when a break occurred at execution of line 46 after the condition that variable "j" becomes a negative value on line 39 in source file "Tutorial.cpp" was satisfied. In this case, the number of the executed cycles is larger than or equals to the maximum size (32768 cycles) that can be stored in the trace buffer.

Check the number of traced cycles and click the [Cancel] button.

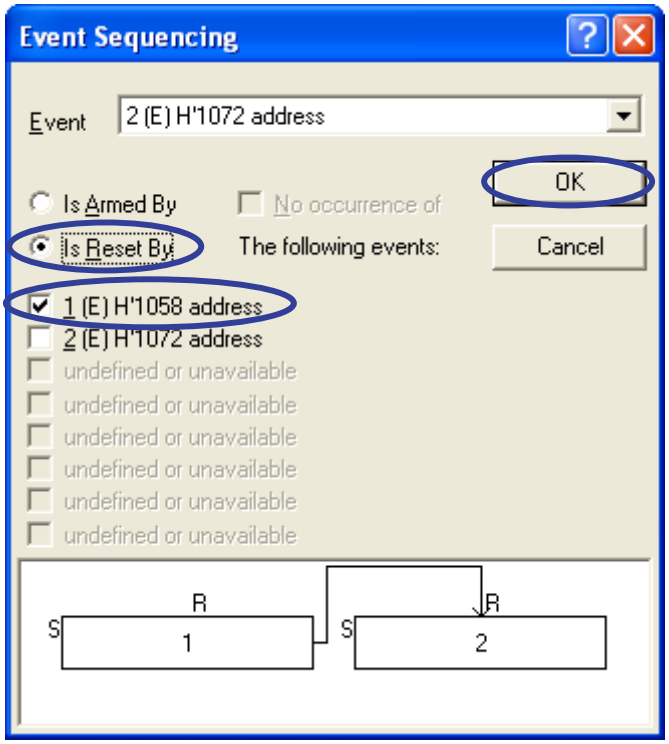
(4) Select the [Event] tab of the Event window, select the condition of Ch2, and select [Edit...] from the menu opened by right-clicking on the window.



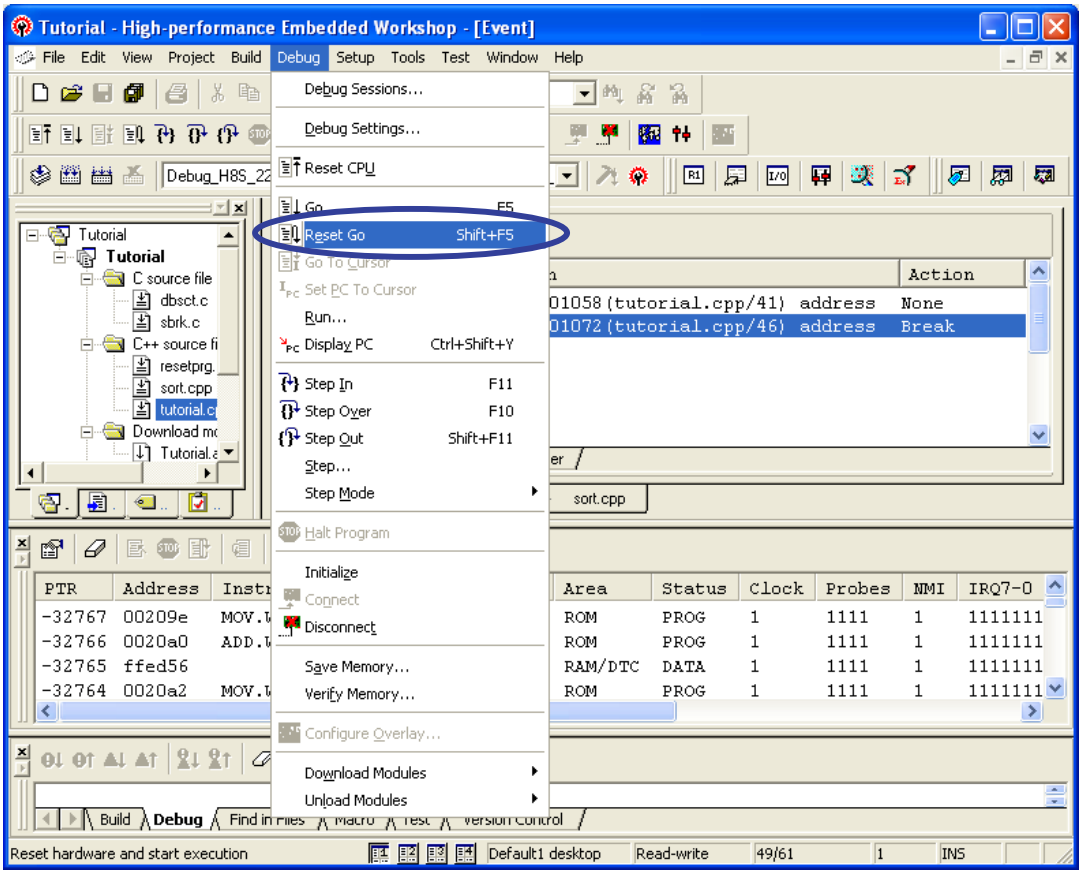
(5) Select the [Action] tab in the [Breakpoint/Event Properties] dialog box and click the [Configure Sequence...] button.



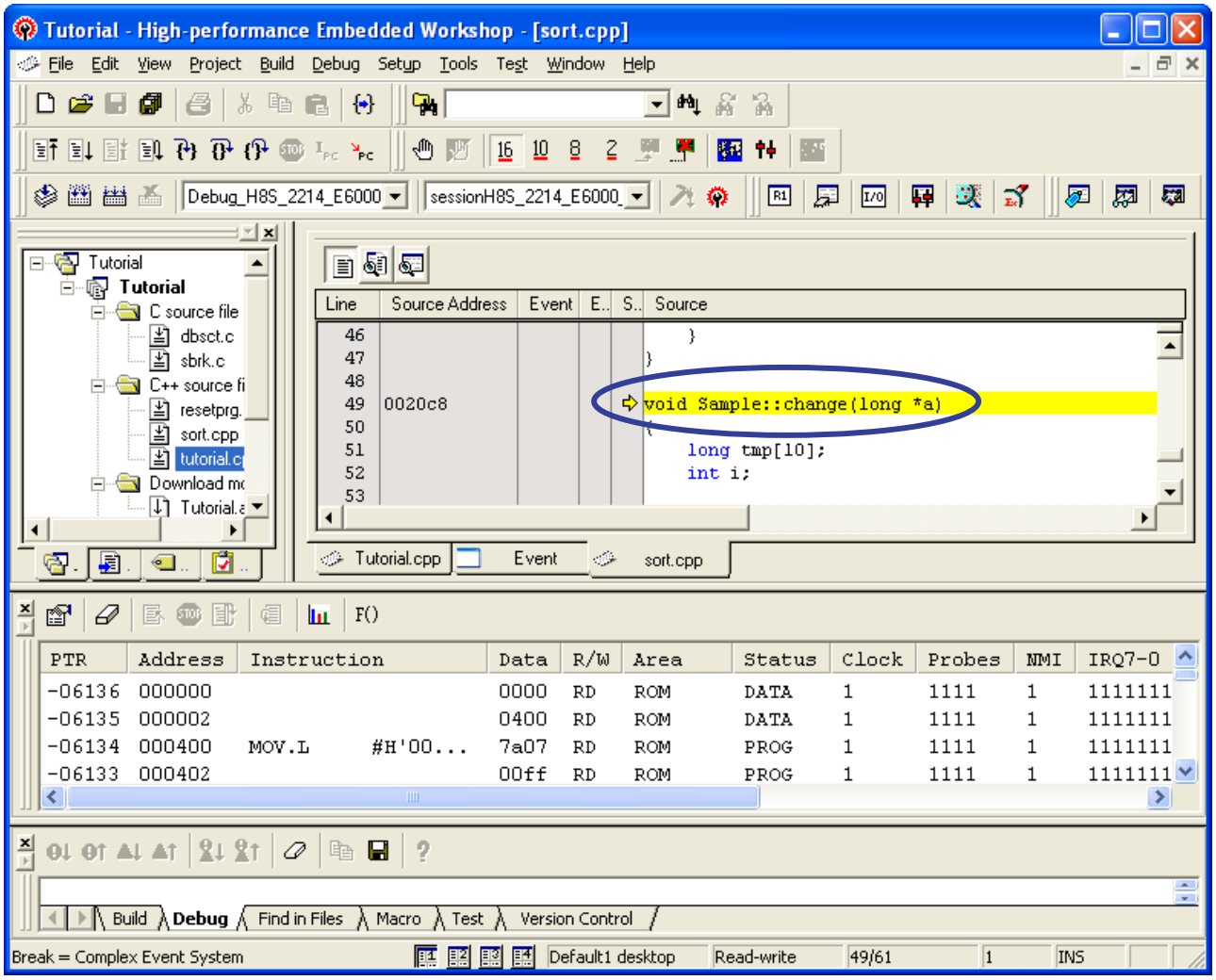
(6) The [Event Sequencing] dialog box will appear. Select the [Is Reset By] radio button and then select condition 1 under it. Click the [OK] button.



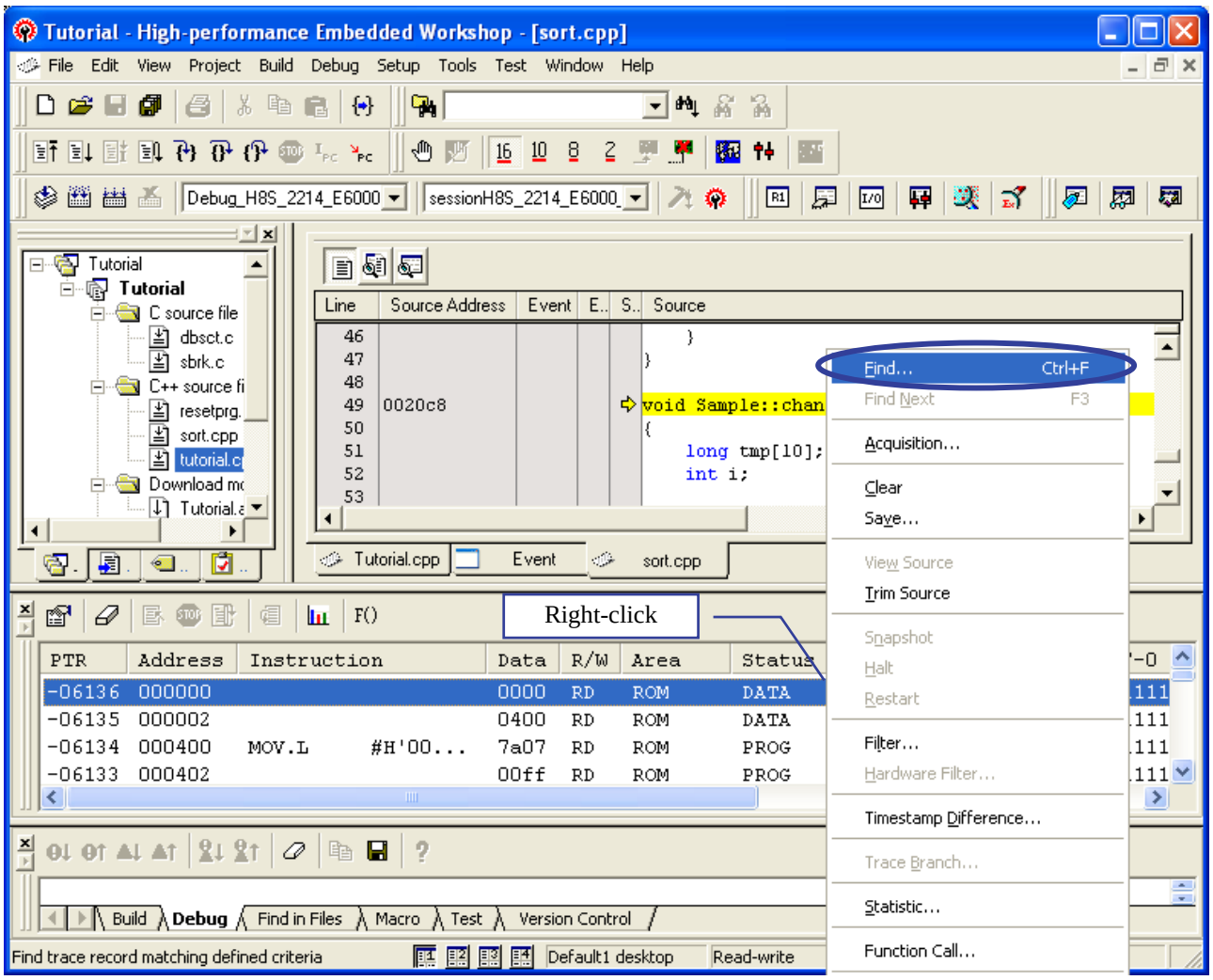
(7) Select [Reset Go] from the [Debug] menu to again execute the program.



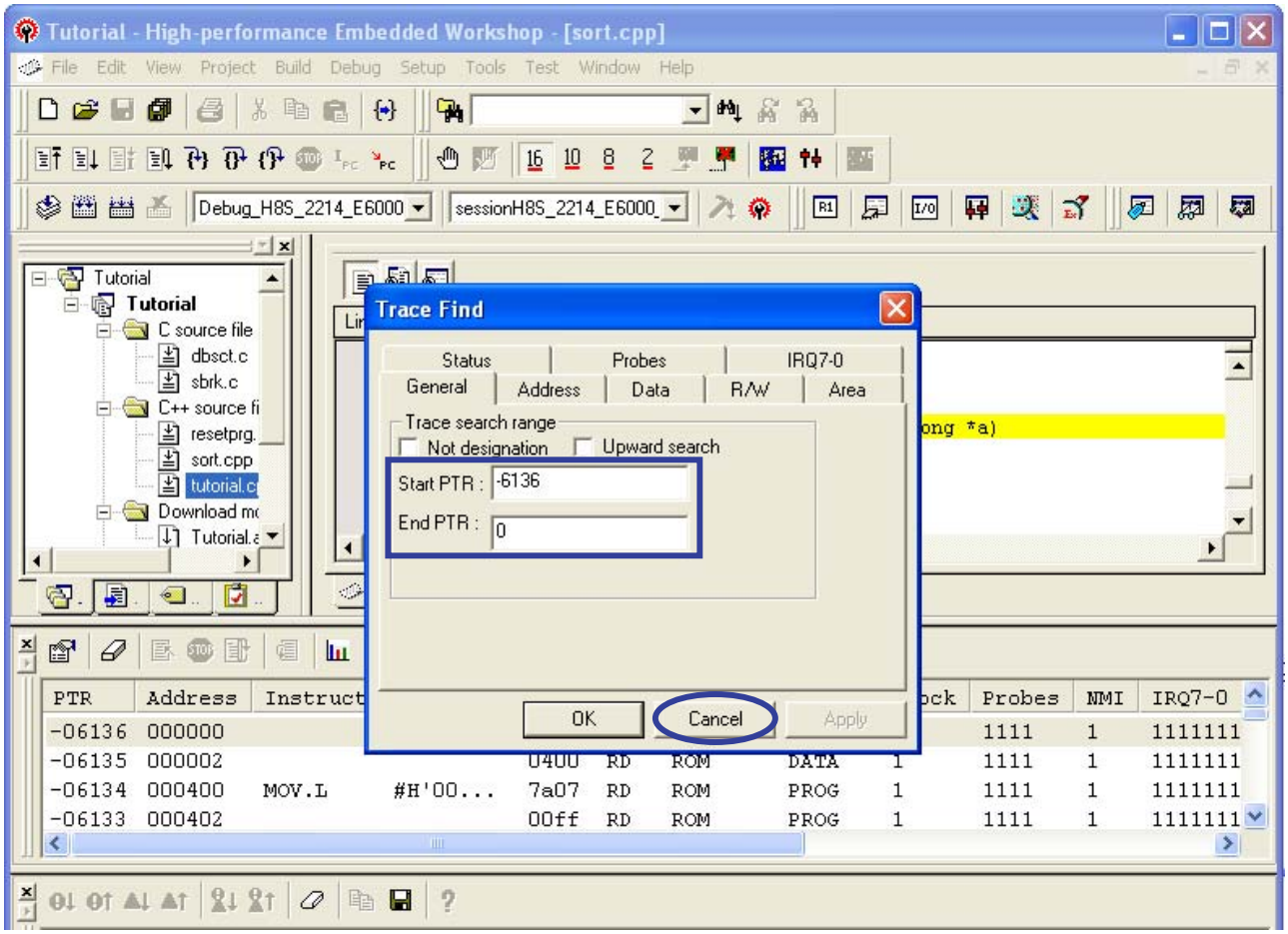
(8) Execution breaks at the same position as described in (1) in section 4.8.



(9) Select [Find...] from the menu opened by right-clicking on the Trace window.



(10) The [Trace Find] dialog box will appear.



The start pointer is at the -6136th cycle and the end pointer is at the 0th cycle; 6137 cycles of trace information can be viewed in total.

In this case, the condition that variable "j" becomes a negative value on line 39 in the source file "Tutorial.cpp" has not affected the sequential break operation and a break has occurred with the condition used when line 46 was executed for the first time. All trace information after the [Reset Go] execution until a break occurs is stored.

Check the number of traced cycles and click the [Cancel] button.

5. Related Documents

The H8S/2214 E6000 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 H8S/2214 E6000 Emulator:

- H8S/2214 E6000 Emulator User's Manual
  - Emulator Debugger Part:
    - Section 3.2, Complex Event System (CES)
    - Section 5.7, Using the Event Points
  - Tutorial:
    - Section 6.15.2, Breaking Execution at Event Points
- Precautions on Using the H8S/2214 E6000 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:

- H8S/2214 Group Hardware Manual
- H8S/2600 Series, H8S/2000 Series 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:

Global site: http://www.renesas.com/e6000

Japanese site: http://japan.renesas.com/e6000

Renesas Website and Customer Support

Renesas Technology Website:

http://www.renesas.com/

Customer Support:

http://www.renesas.com/inquiry

Revision History

		Description	
Rev.	Date	Page	Summary
1.00	Feb.05.07	—	First edition issued

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