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April 1st, 2010
Renesas Electronics Corporation

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H8/300H Tiny Series Compact Emulator

Using the GUI I/O Functions

Overview

This document describes how to use the GUI I/O functions, with the R0E436640CPE00 compact full-specification emulator for the H8/300H Tiny series as an example.

Operation as described in this document can be confirmed on the H8/300H Tiny series compact emulator as a stand-alone unit. The same functions are usable with all compact emulators for the H8/300H Tiny series.

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1. Specifications

The GUI I/O function is used to simulate key-input panels (button) and output panels of the target systems of users in the HEW window. Input panels are made up of buttons and output panels are made up of labels (character strings) and LEDs.

2. Functional Description

This document describes how to use the stack tracing function of H8/300H Tiny series compact emulators.

It guides you through a sample program provided on the CD-ROM for the H8/300H Tiny series compact emulator.

Versions of the individual tools are as follows.

Integrated Development Environment

High-performance Embedded Workshop Version 4.02.00

Compiler Package

H8SX, H8S, H8 compiler package Version 6.01, Release 02

Emulator Software

H8/300H Tiny compact emulator debugger Version 1.01, Release 00

3. Preparing the Software

3.1 Introduction

On your personal computer, install the software provided on the CD-ROM for the H8/300H Tiny series compact emulator. This will also deploy the sample program (tutorial workspace) to be used in this document.

The software on the CD-ROM can also be installed on 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 H8/300H Tiny Series Compact Emulator Software

Execute setup.exe from the CD-ROM for the H8/300H Tiny series compact emulator.

For details on installation, refer to the setup guide for the H8/300H Tiny series compact emulator and follow the instructions on the screen during installation. The installation procedure is omitted here.

3.3 Installing Other Necessary Software

- (1) The installation procedure is described in the manual supplied with the optional product; it is not described in this document.
- (2) This document describes the checking of operations when a part of the sample program is changed. The H8S, H8/300 series C/C++ compiler package is used for this purpose. Install the product version of the compiler package if you have already purchased it.
- (3) If you have not purchased the product version of the compiler package, download the evaluation version from the Renesas website. The evaluation version of the H8S, H8/300 series C/C++ compiler package can be found from the top page by selecting [Support], [Download], [Download Search], and [Select Category], in that order, then selecting [Evaluation Version]. Links to the Renesas website are given in the last section of this document. Notes on restrictions and instructions for installing the evaluation version are available on 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.

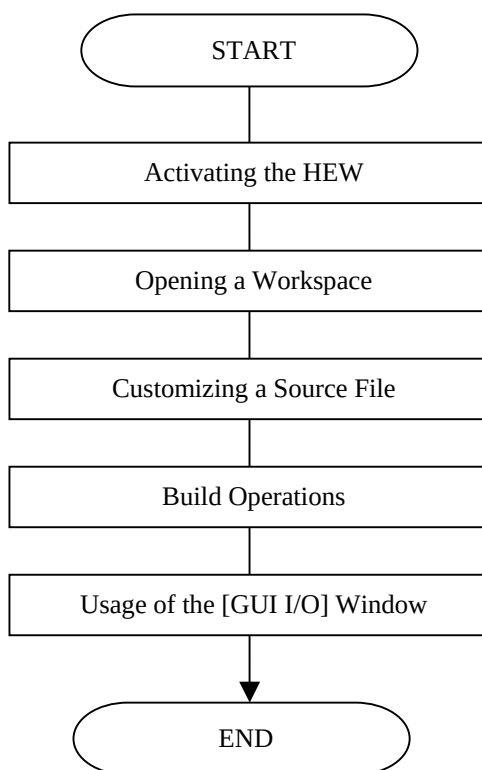
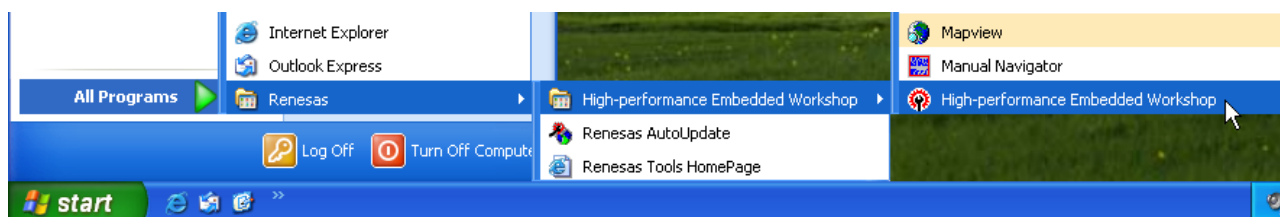


Figure 4.1 Procedures for Sample Program Execution

4.1 Activating the High-Performance Embedded Workshop

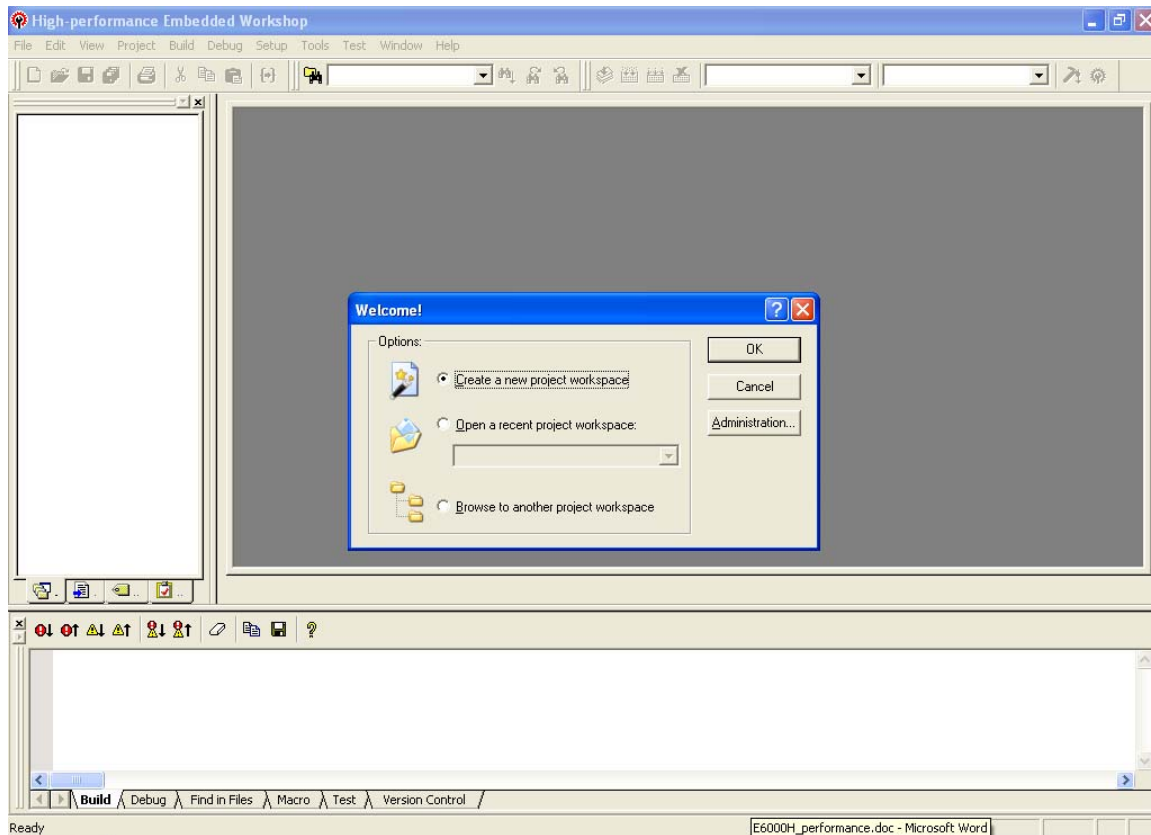
First, connect the H8/300H Tiny series compact emulator to the host computer via the USB cable to check that debugging is available.



Then, 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.

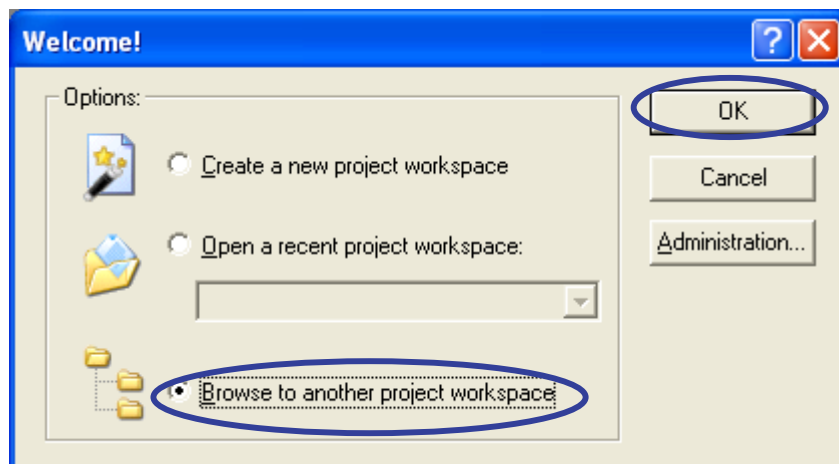
4.2 Opening a Workspace

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

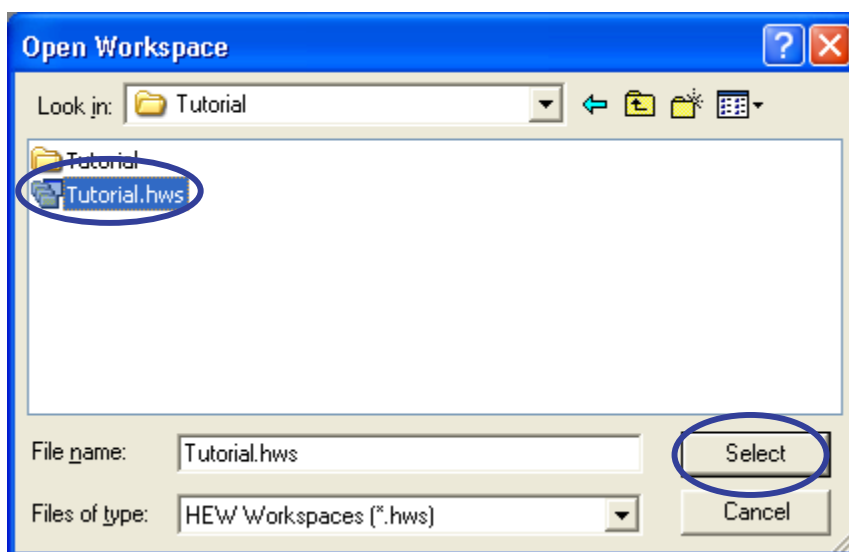


Check that the H8/300H Tiny series compact emulator is turned on.

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



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



If the software from the CD-ROM for this product has been installed, workspace "Tutorial.hws" will be within the directory structure as shown below (standard location). Specify the correct location by opening the folders in order. Select the workspace "Tutorial.hws" and click on the [Open] button.

C:\¥WorkSpace¥Tutorial¥CPE¥H8Tiny¥Tutorial¥Tutorial.hws
C:\¥WorkSpace
¥Tutorial
¥CPE
¥H8Tiny
¥Tutorial
¥Tutorial.hws

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

<High-performance Embedded Workshop installation directory>

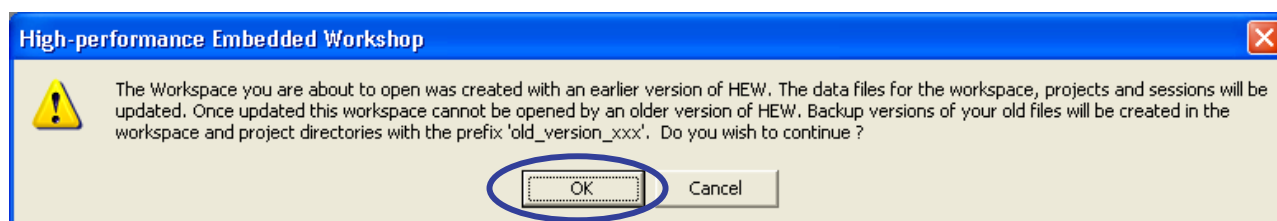
¥Tools¥Renesas¥DebugComp¥Platform¥CPE¥H8Tiny¥Tutorial

Examples of directory names:

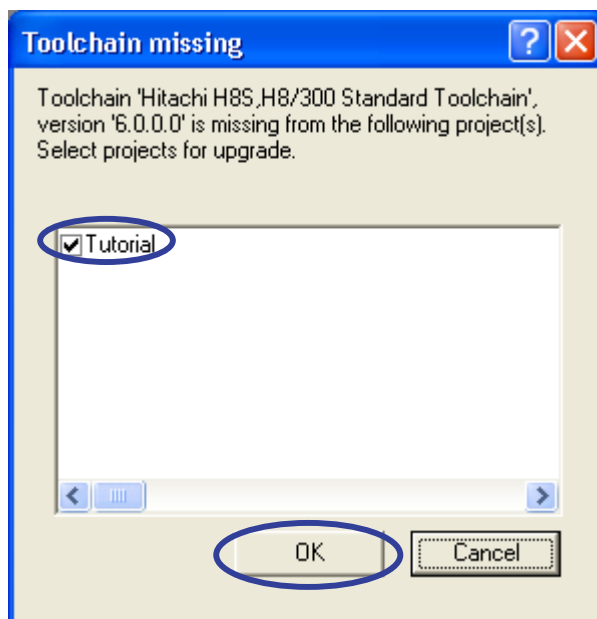
C:\¥hew3¥Tools¥Renesas¥DebugComp¥Platform¥CPE¥H8Tiny¥Tutorial

C:\¥hew2¥Tools¥Renesas¥DebugComp¥Platform¥CPE¥H8Tiny¥Tutorial

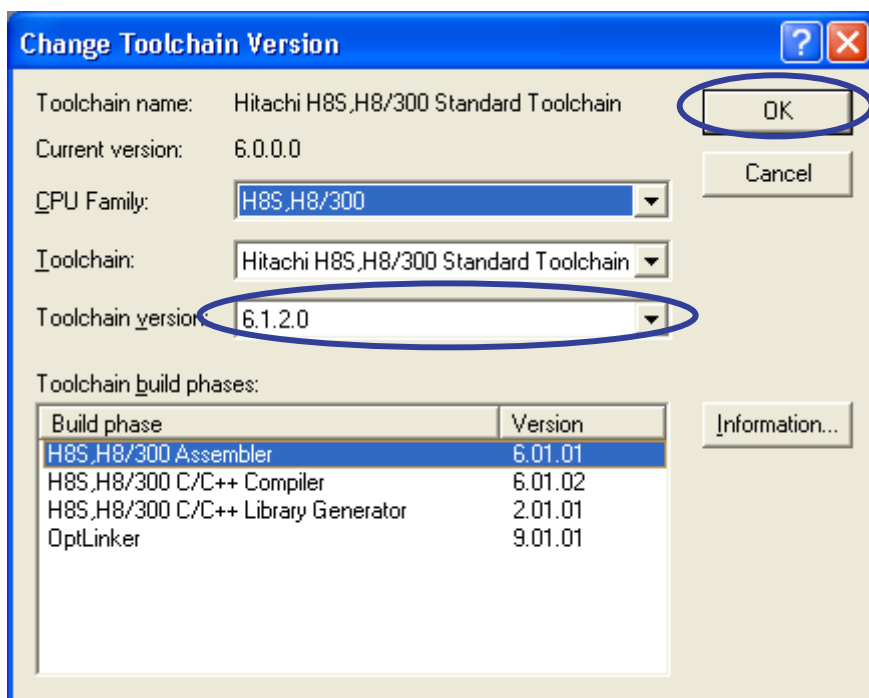
(3) If the workspace is an old version, the following dialog box will appear. To update it to the new version, click on the [OK] button.



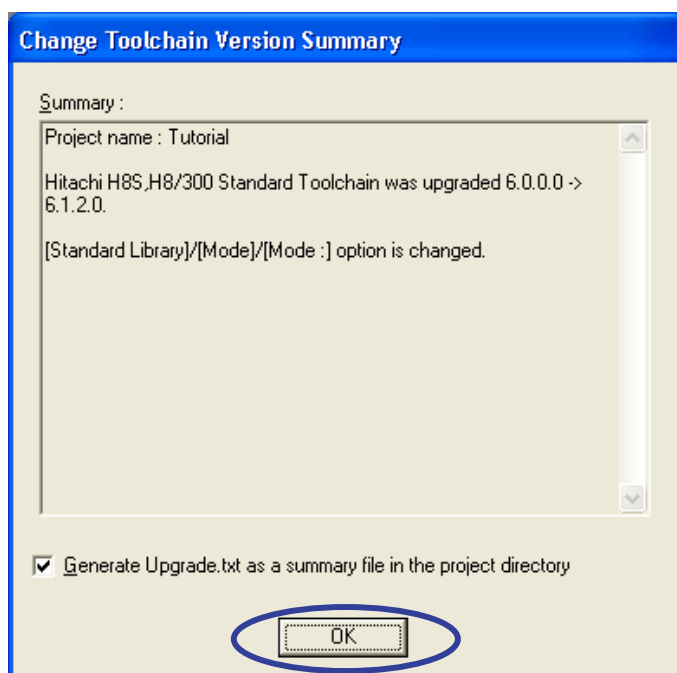
- (4) If the [Toolchain missing] dialog box appears, select the name of the target project and click on the [OK] button.



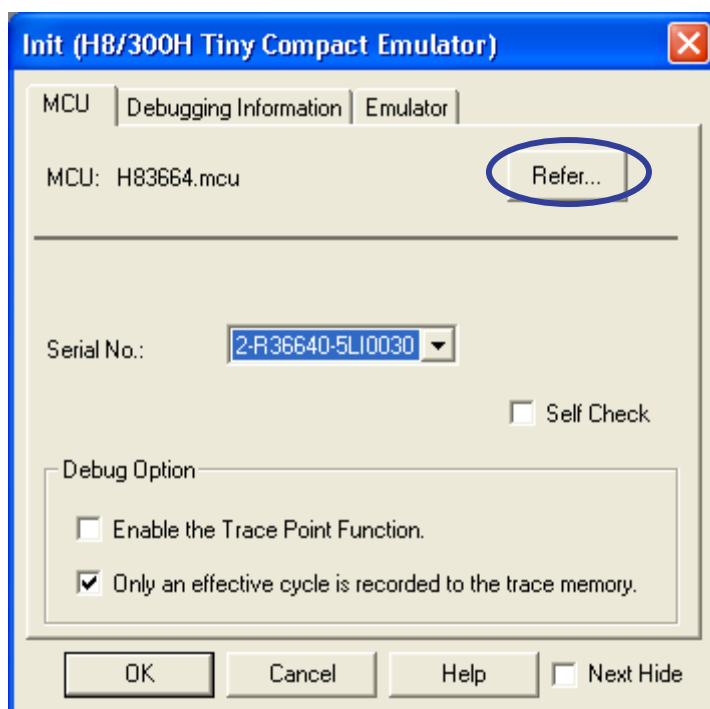
- (5) If the [Changing Toolchain Version] dialog box appears, select the desired toolchain version and click on the [OK] button.



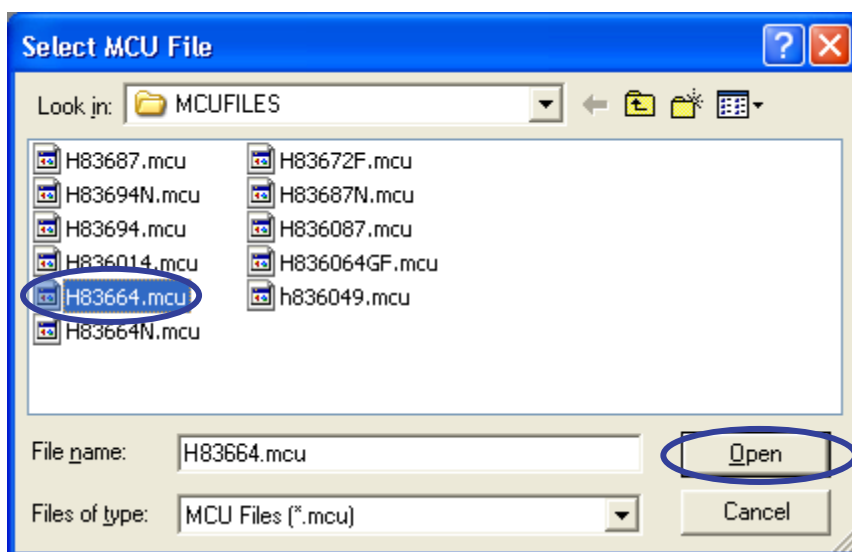
(6) If the [Change Toolchain Version Summary] dialog box appears, just click on the [OK] button.



(7) After the workspace has been opened, the [Init (H8/300H Tiny Compact Emulator)] dialog box will appear. Click on [Browse...].

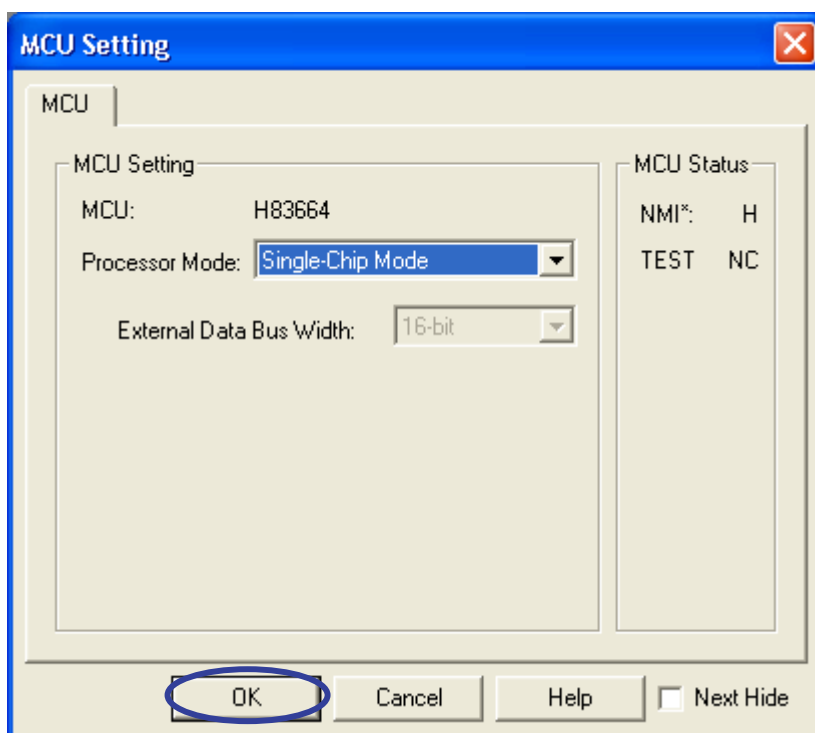


(8) The [Select MCU File] dialog box will appear. Here, select [H83664.mcu] and click on the [Open] button.

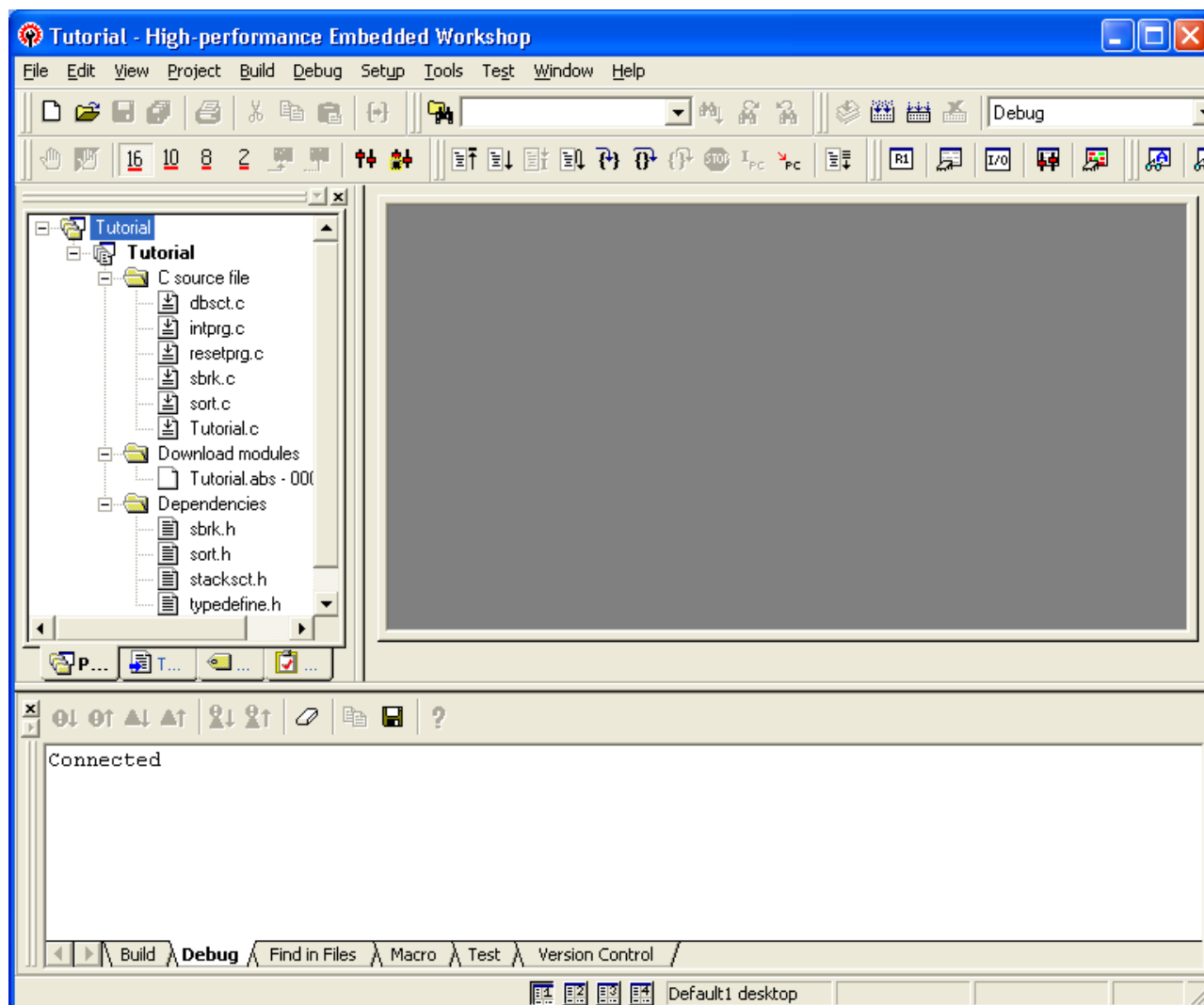


Return to the [Init (H8/300H Tiny Compact Emulator)] dialog box and click on the [OK] button.

(9) The [MCU Setting] dialog box will appear. Check that the processor mode is [Single-Chip Mode] and click on the [OK] button.



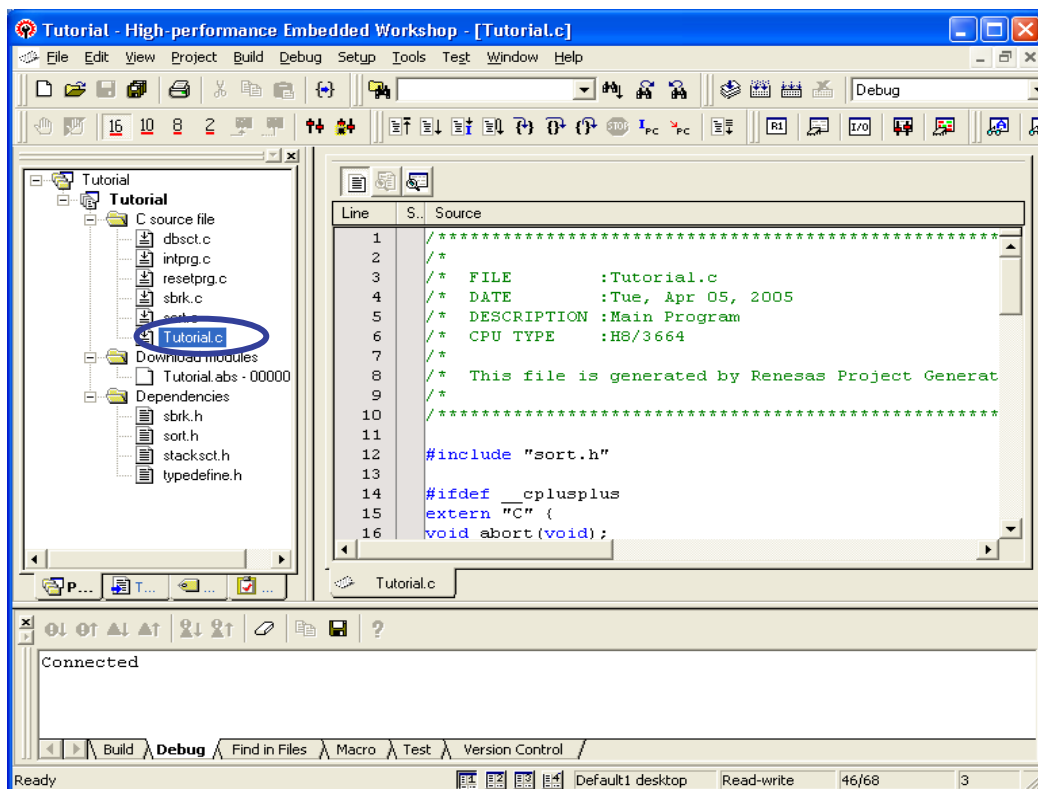
- (10) Once the workspace has been read, operations in the High-performance Embedded Workshop screen become possible.



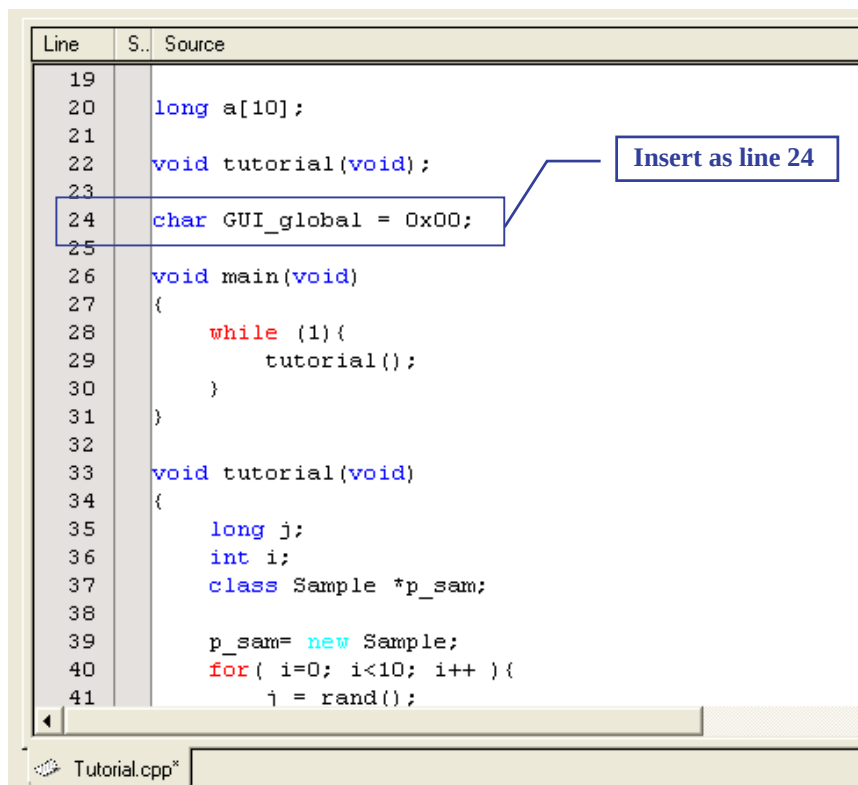
When the H8/300H Tiny series compact emulator is successfully connected, [Connected] is displayed in the [Debug] tab in the [Output] window.

4.3 Customizing a Source File

- (1) Open the source file by double-clicking on its name ("Tutorial.c") in the workspace pane.

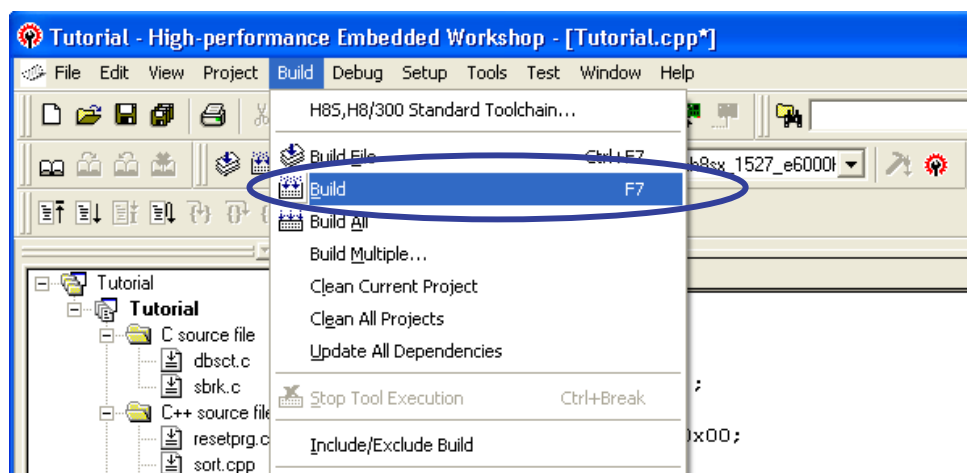


- (2) Add global variable GUI_global to line 24 in the [Source] window, as shown below.



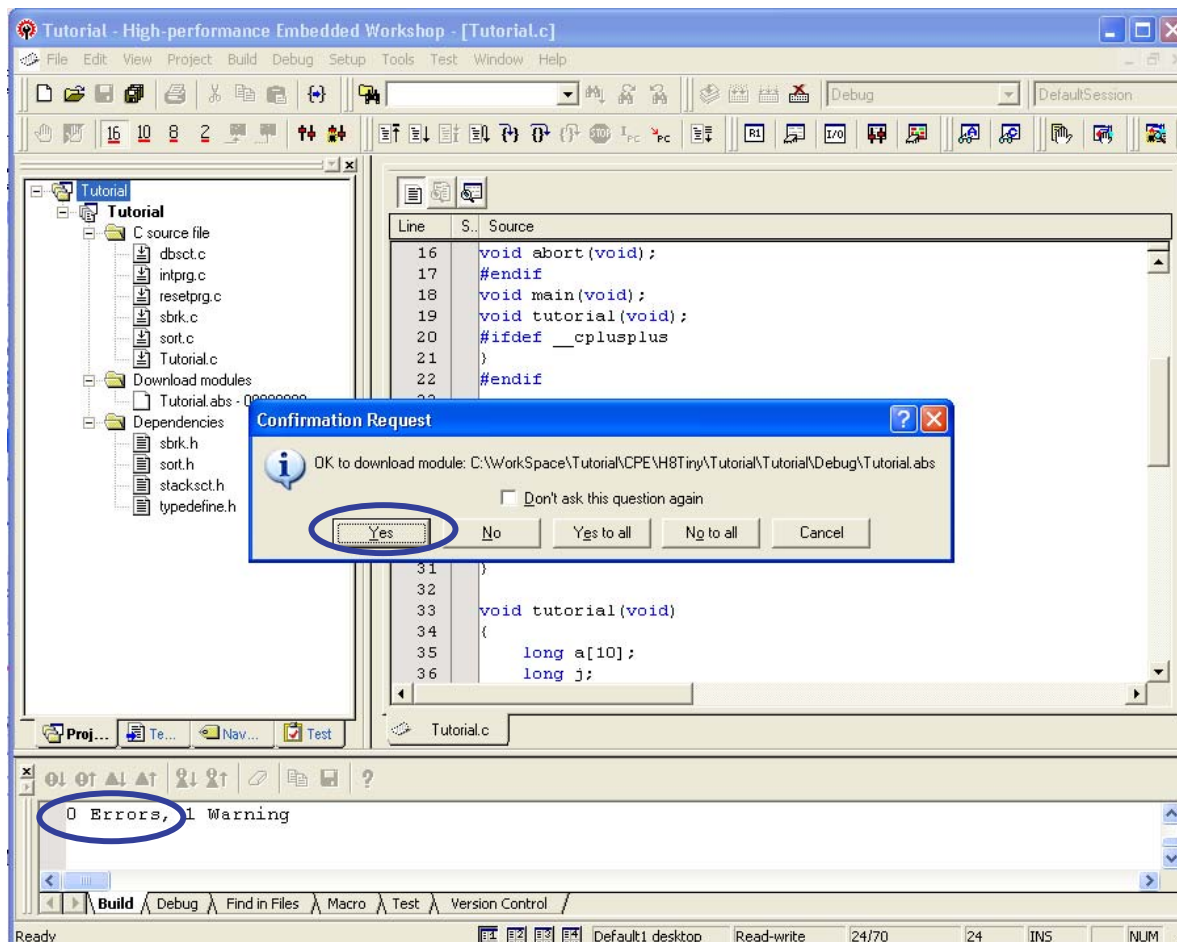
4.4 Build Operations

- (1) Before loading of the program for the customized source file, a build operation must be performed. Click on the [Build] item of the [Build] menu.



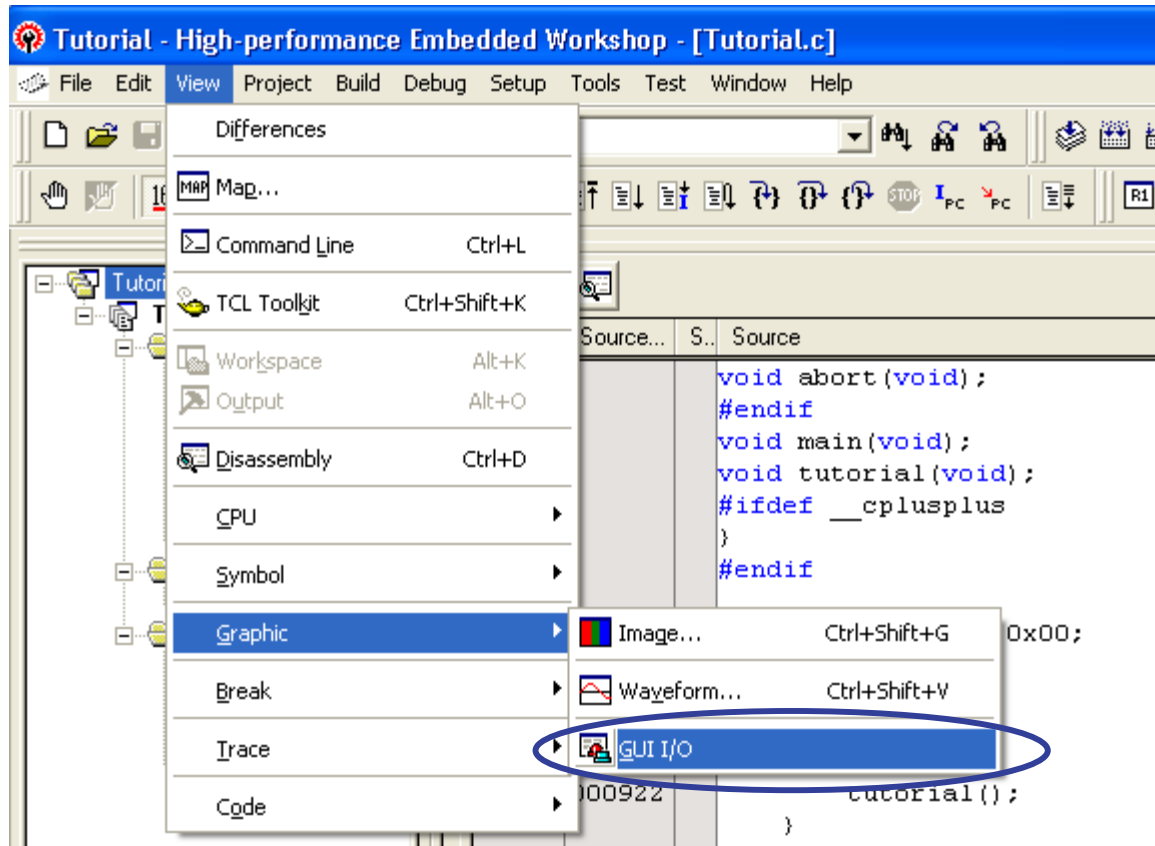
Select the [Build] tab in the [Output] window to check how far building has progressed.

- (2) On completion of building, the numbers of errors and warnings that have been generated are displayed in the [Build] tab in the [Output] window. Once downloading is possible, the [Check Request] dialog box for downloading of the program automatically appears. Here, click on the [Yes] button.

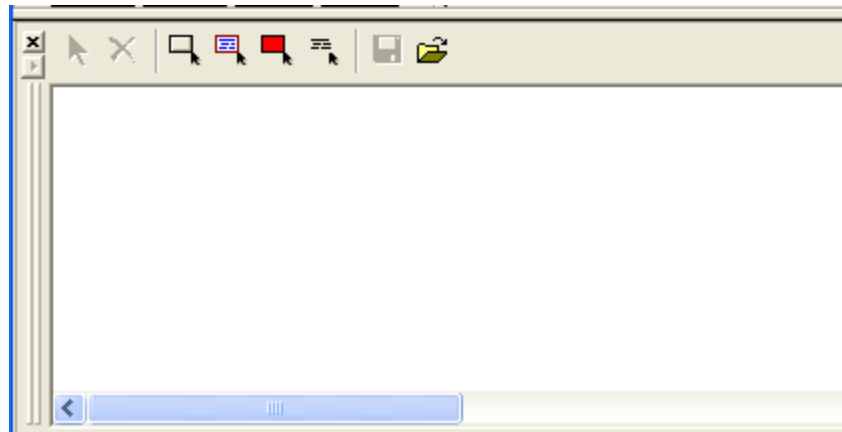


4.5 Usage of the [GUI I/O] Window

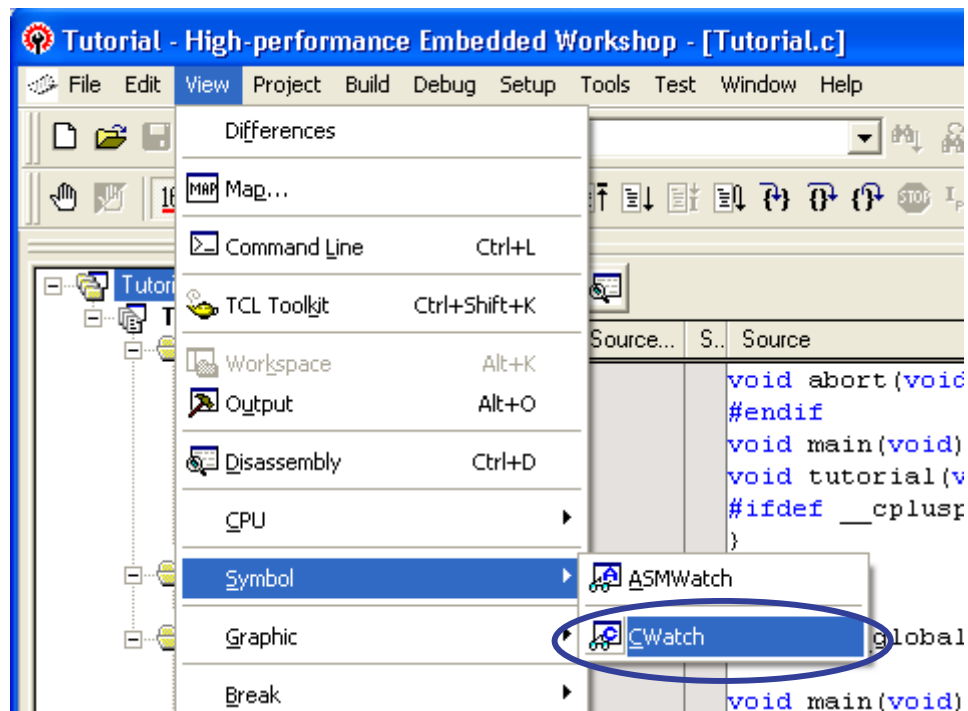
- (1) Select [Graphics] from the [View] menu and click on [GUI I/O].



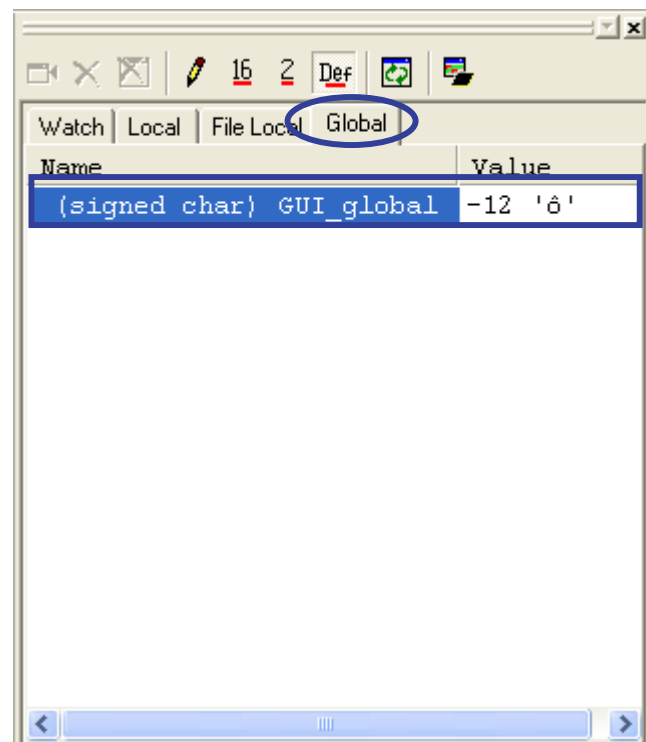
- (2) The [GUI I/O] window will be added to the HEW window.



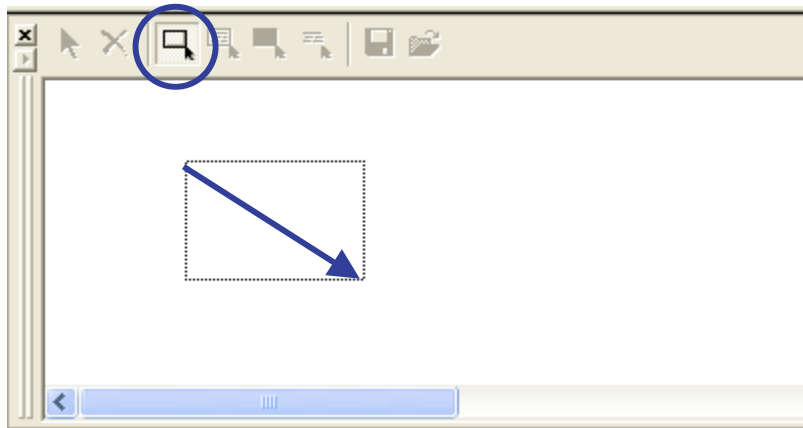
- (3) Select [Symbol] from the [View] menu and click on [C Watch].



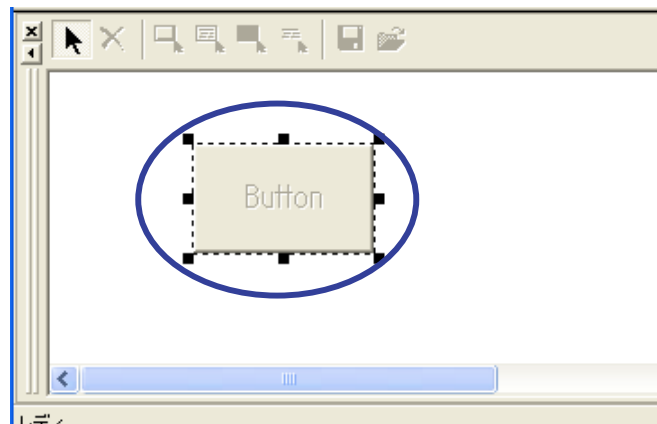
- (4) The [C Watch] window will appear. Select the [Global] tab to refer to global variable GUI_global, which was added in step (2) of section 4.3.



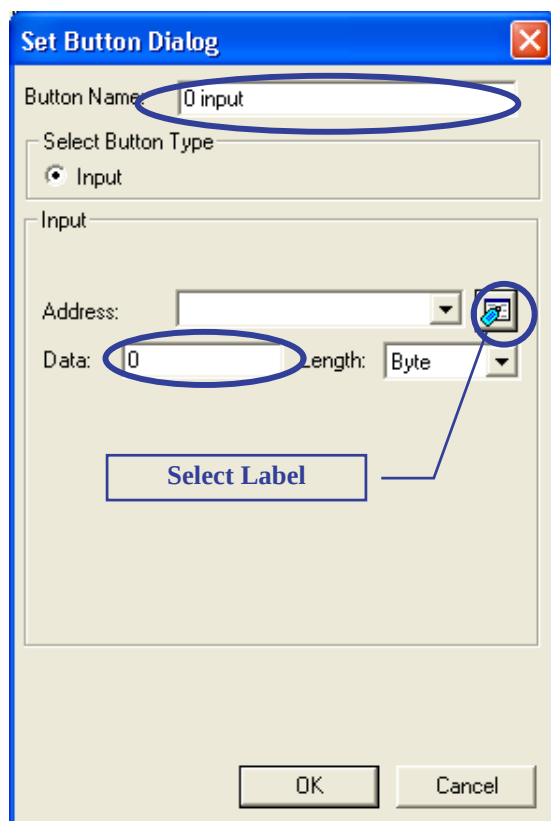
- (5) Select [Create Button] from the toolbar of the [GUI I/O] window. Then, click the left-hand mouse button and drag the mouse cursor from a higher-left to a lower-right position.



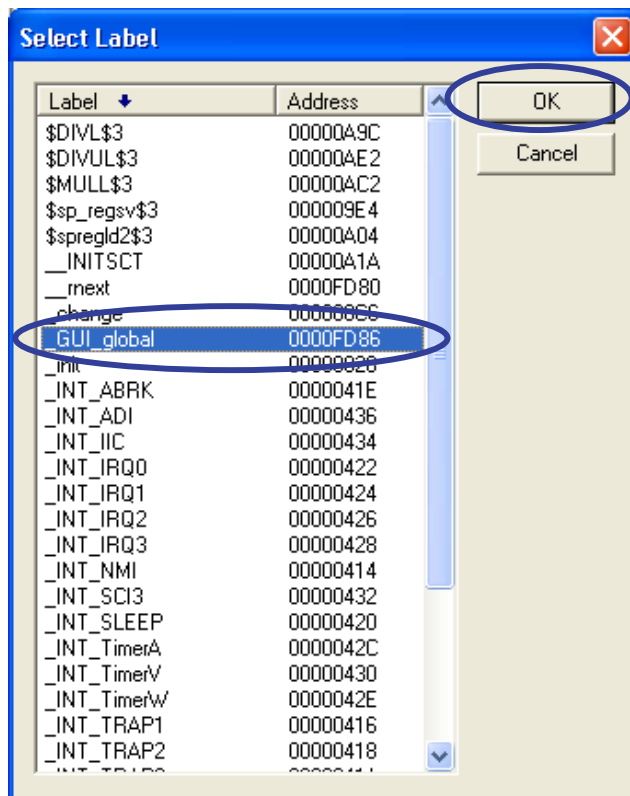
- (6) This creates a button, which is selected as shown in the figure below. Point and double-click on [Button] with the mouse.



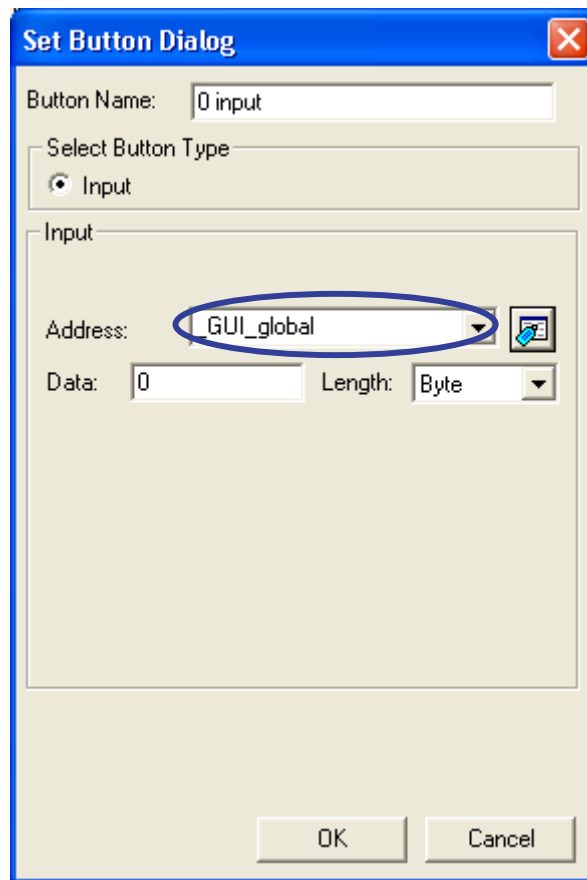
- (7) The [Set Button Dialog] dialog box will appear. Enter "0 input" in [Button Name]. Then, set 0 for [Data] and click on the [Select Label] button.



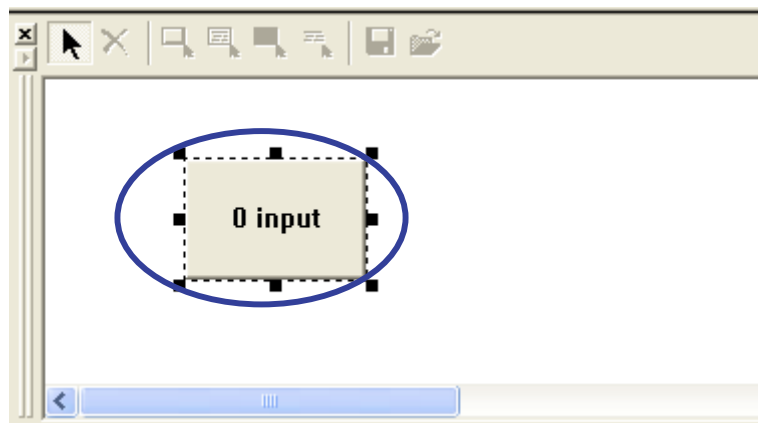
- (8) The [Select Label] dialog box will appear. Select "_GUI_global" and click on the [OK] button.



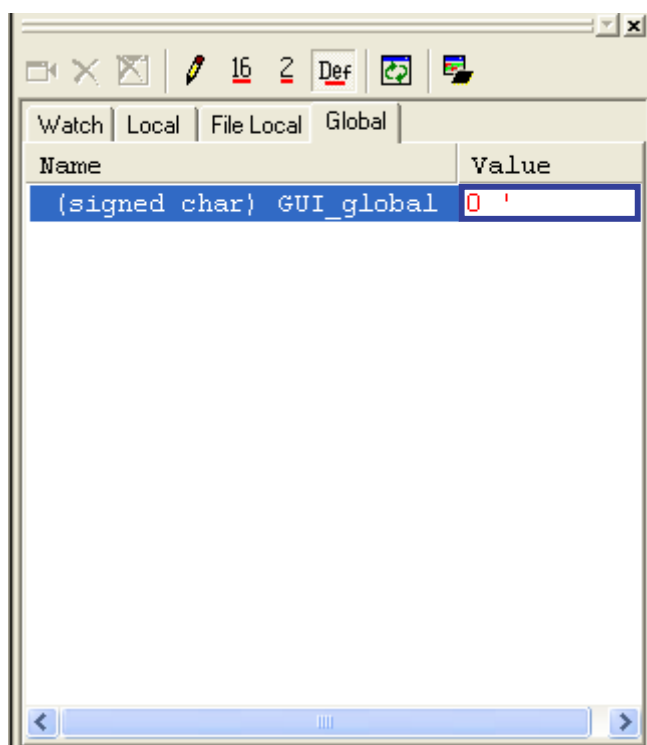
- (9) Click on the [OK] button after confirming that the [Set Button] dialog box has been set as shown below.



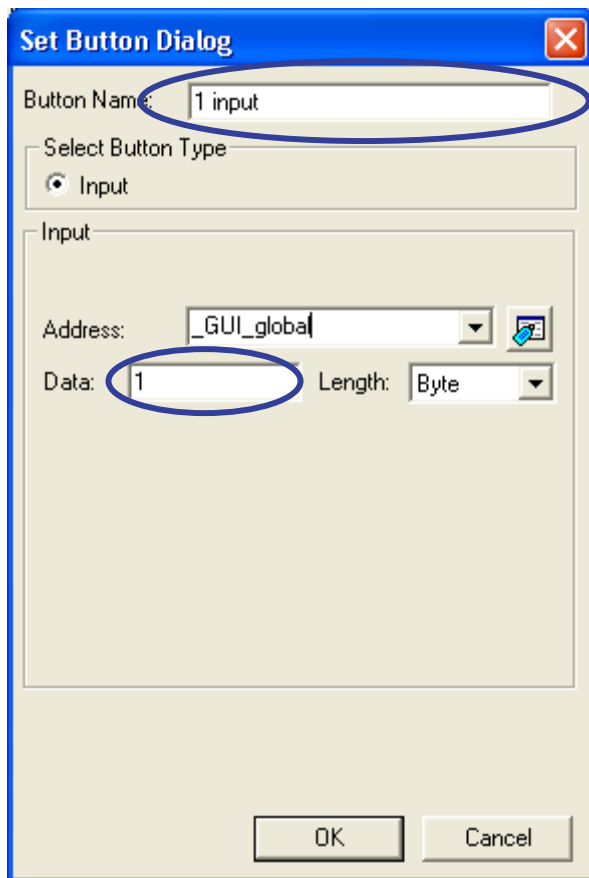
- (10) Operations with the GUI I/O function so far have created a key-input panel (button). To confirm its operation, click on the [0 input] button.



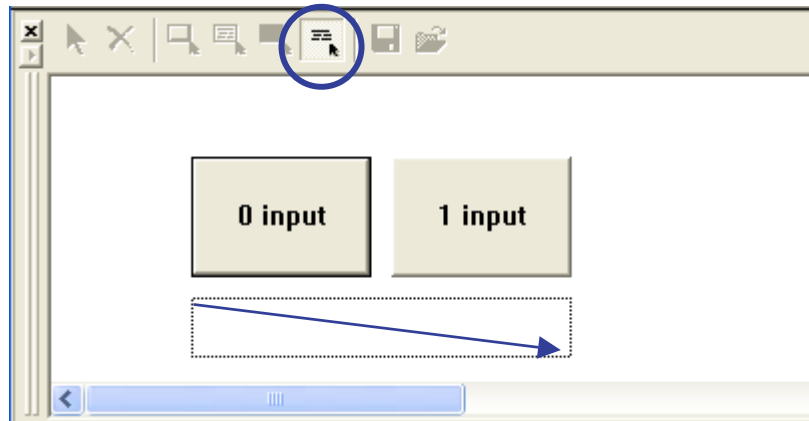
- (11) Check that the GUI_global variable in the [C Watch] window becomes 0 when the button is pressed.



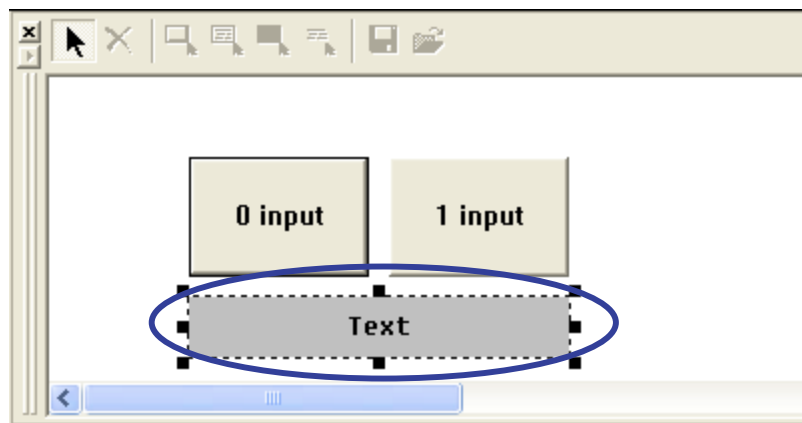
- (12) In the same way as steps (5) to (9) in this section, create a button to set variable "GUI_global" to "1". In this case, set "1 input" as the string for [Button Name] and "1" for [Data].



- (13) Create a text box under the two key-input panels ([0 input] and [1 input] buttons). Click on [Create Text] in the toolbar and, in the same way as was used to create the buttons, click the left-hand mouse button, drag the mouse cursor, then release the mouse button.



- (14) [Text] is selected as shown below. Double-click on this selected object.



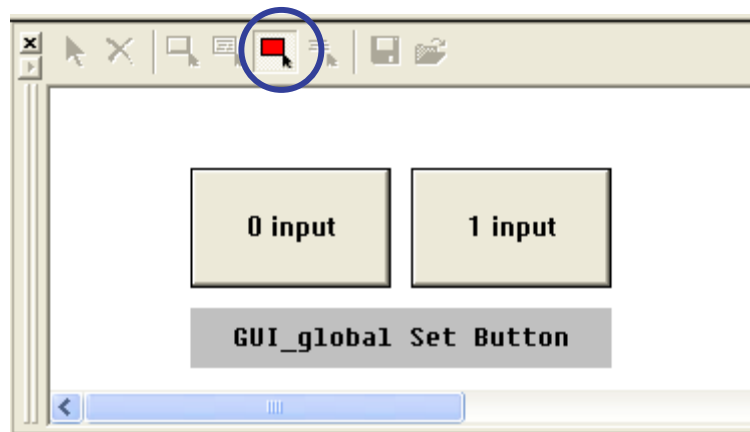
- (15) The [Set Text] dialog box will appear. Enter "GUI_global Setting Button" in [Text] and click the [OK] button. In the figure below, the font type, text color, and background color are the defaults.



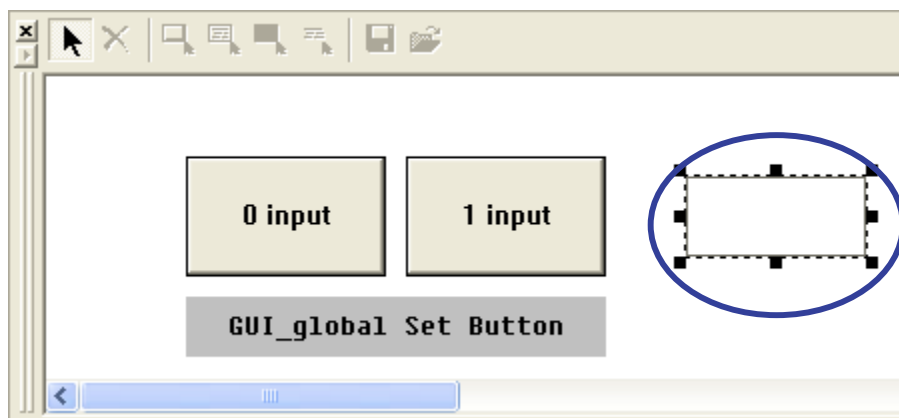
(16) A text item with the label [GUI_global Set Button] has been created.



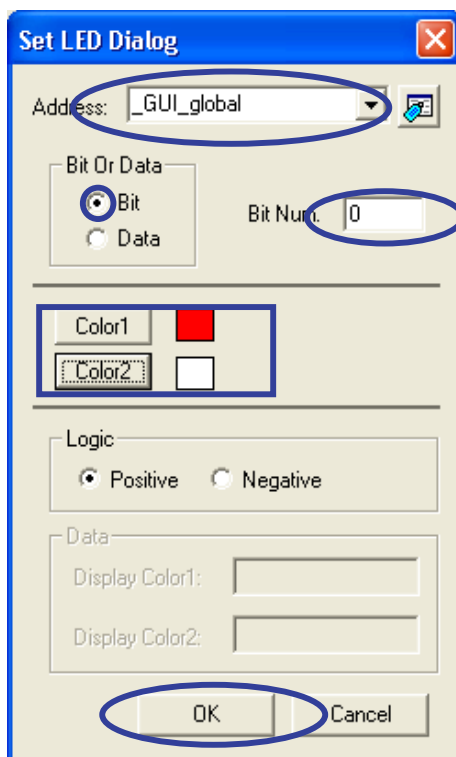
(17) Next, create an LED. Click on [Create LED] in the toolbar.



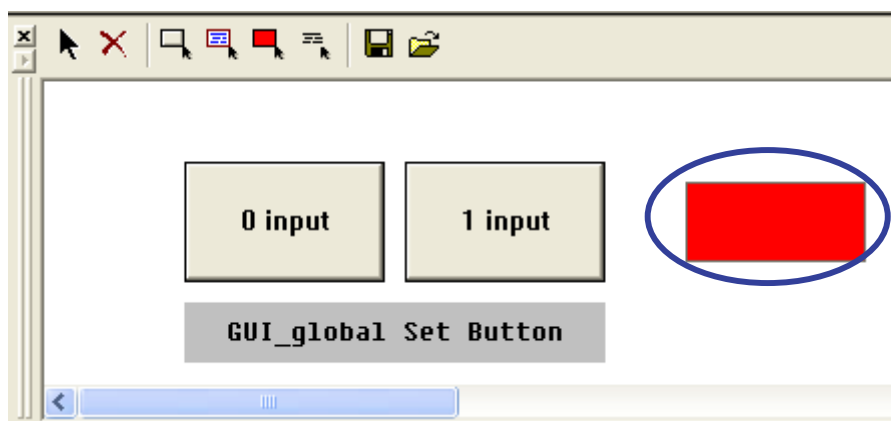
(18) In the same way as was used to create the buttons, click the left-hand mouse button, drag the mouse cursor, then release the mouse button. Since the item is selected, double-click on it.



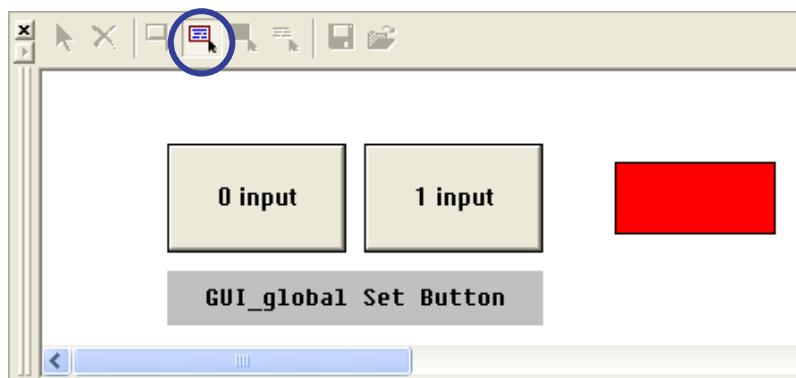
- (19) The [Set LED] dialog box will appear. Use the label-selection button to set variable "_GUI_global" for [Address]. Select [Bit] for the [Bit Or Data] radio buttons and set [Bit Num.] to 0. Select red and white as the colors for [Name1] and [Name2], respectively, and click on the [OK] button. In this example, the type of operation for the logic can be [Positive] (the default).



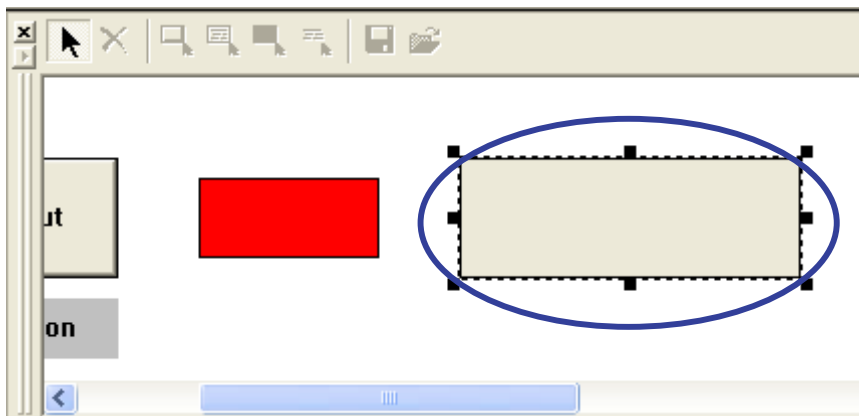
- (20) A virtual LED has been generated as shown below.



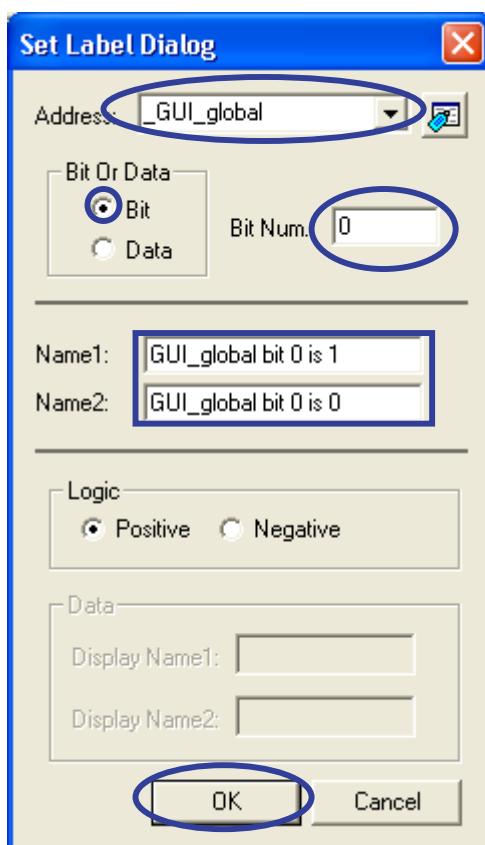
- (21) Finally, create a label. Click on the [Create Label] button of the toolbar.



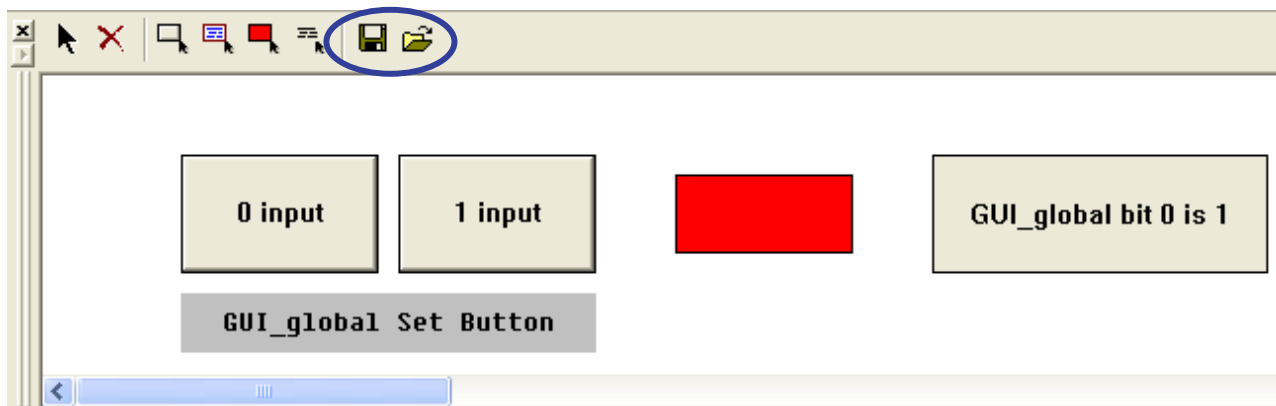
- (22) Click the left-hand mouse button and drag the mouse cursor from the higher-left to the lower-right positions that define where the label is to be created. The item is selected, so double-click on this selected object.



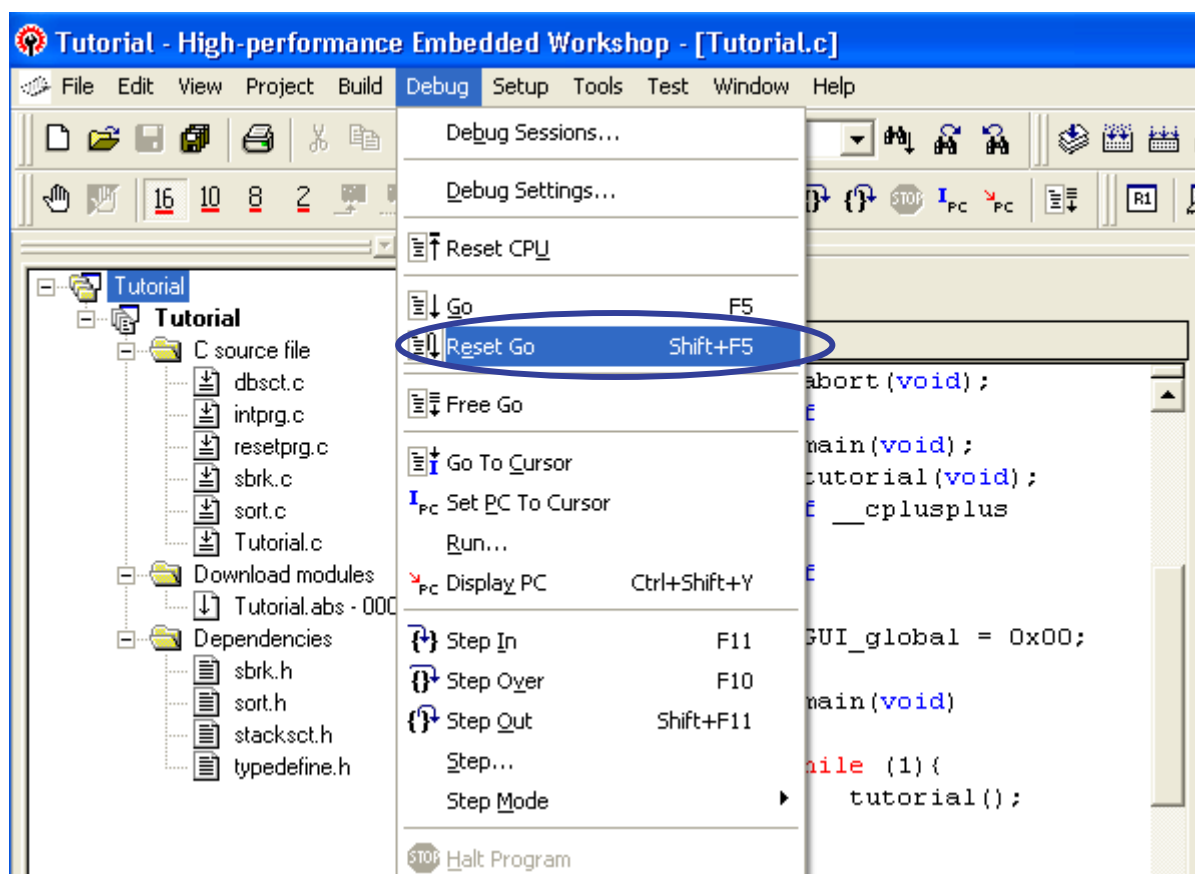
- (23) The [Set Label] dialog box will appear. Use the label-selection button to set variable "_GUI_global" for [Address]. Select [Bit] for the [Bit Or Data] radio buttons and set [Bit Num.] to 0. Enter "GUI_global bit 0 is 1" and "GUI_global bit 0 is 0" for [Name1] and [Name2], respectively, and click on the [OK] button. In this example, the type of operation for the logic can be [Positive] (the default).



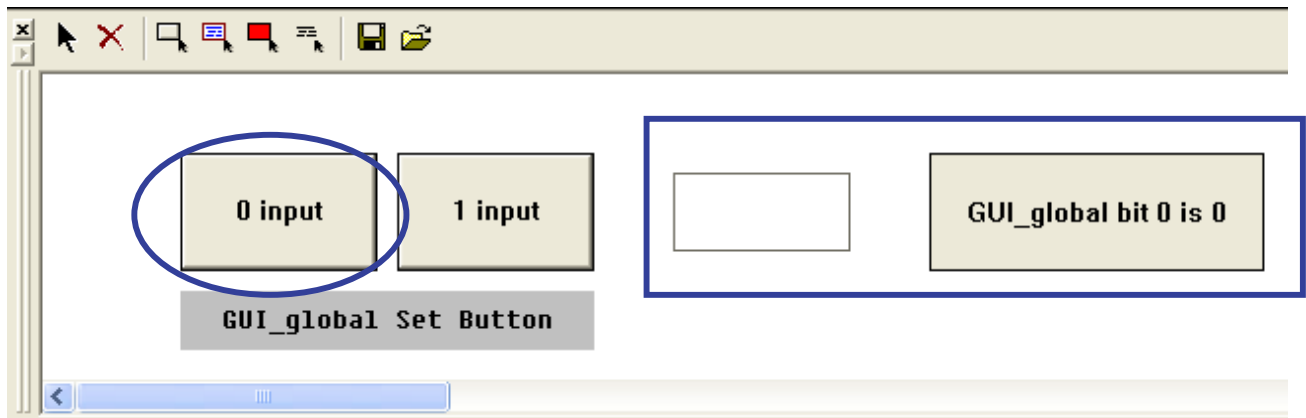
- (24) The creation of items is now complete and the [GUI I/O] window shown below has been created. Clicking on [Save] in the toolbar enables saving of the created items in a file. The saved file can be read by clicking on [Read] in the toolbar.



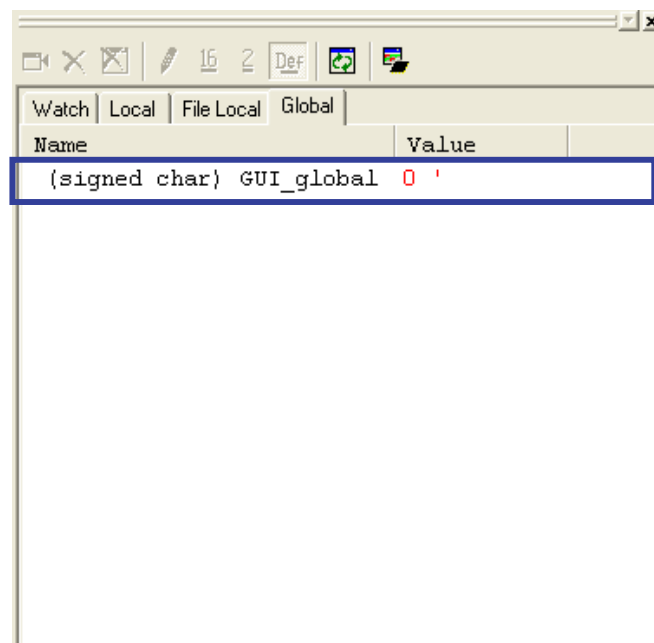
- (25) Operate the [GUI I/O] window while executing the program. Select [Reset Go] from the [Debug] menu.



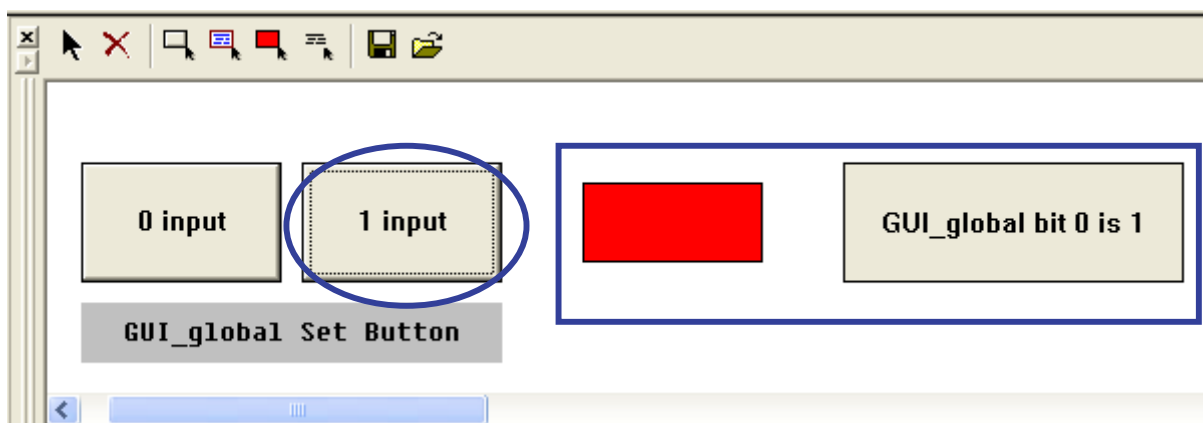
- (26) Click on the [0 input] button in the [GUI I/O] window during program execution. The virtual LED becomes white, and the value of the bit is confirmed by display of [GUI_global bit 0 is 0] as the label item.



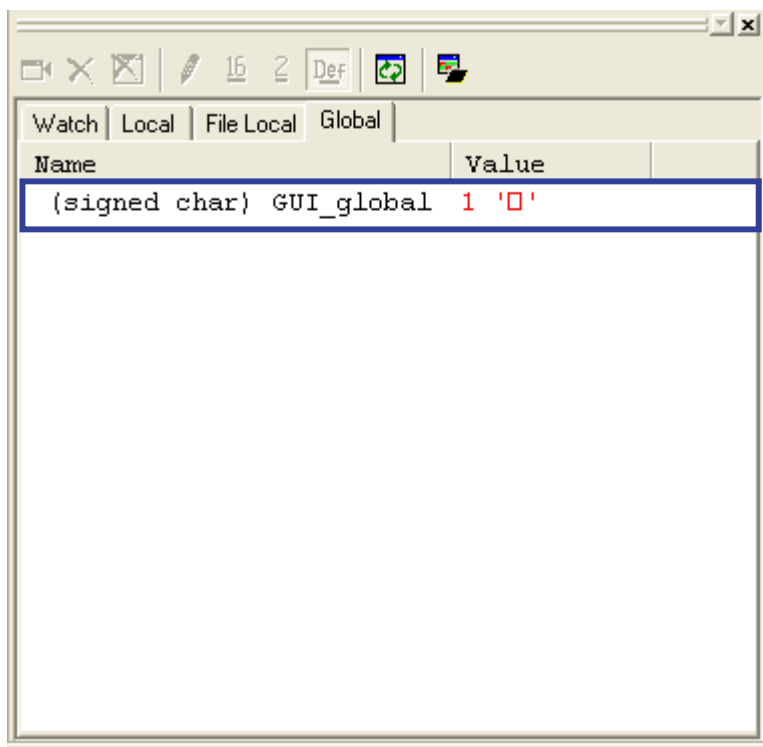
In the [C Watch] window, the variable GUI_global is 0.



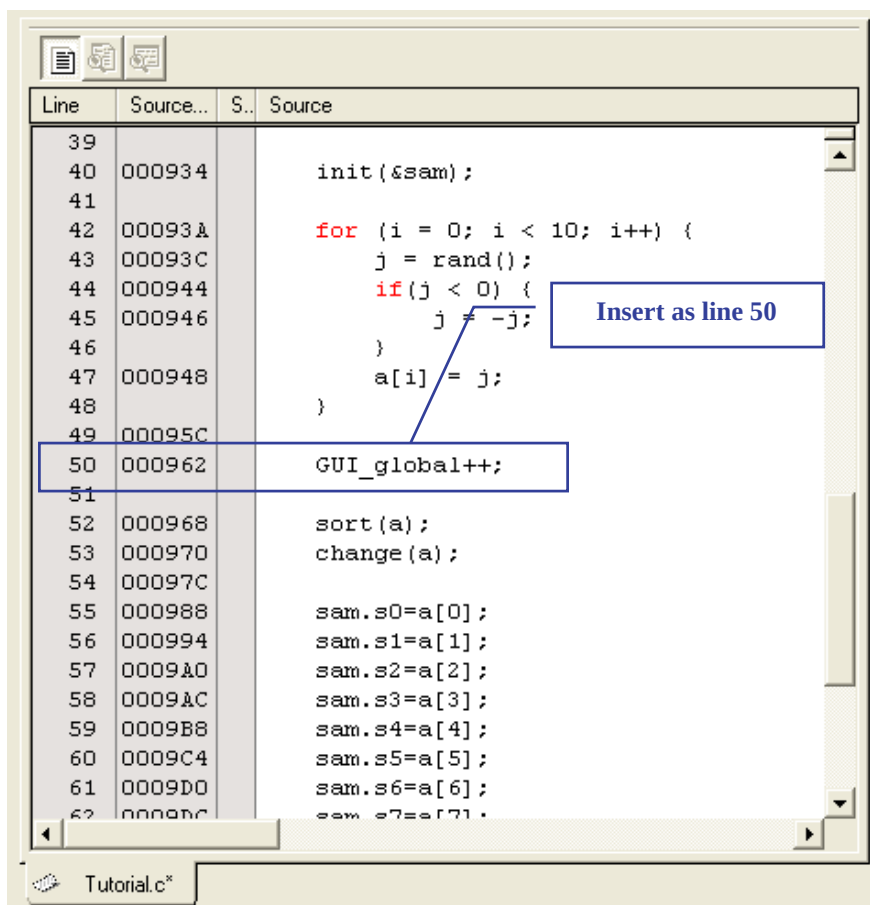
- (27) Click on the [1 input] button in the [GUI I/O] window during program execution. The virtual LED becomes red, and the value of the bit is confirmed by the display of [GUI_global bit 0 is 1] as the label item.



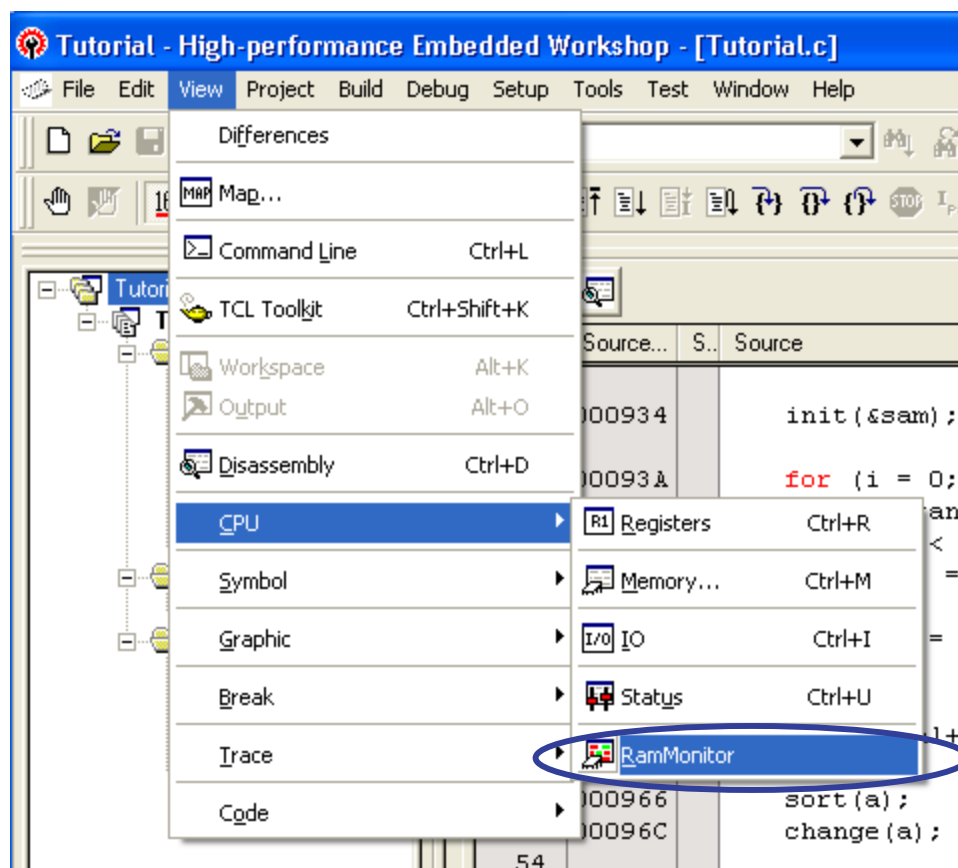
In the [C Watch] window, the variable GUI_global is 1.



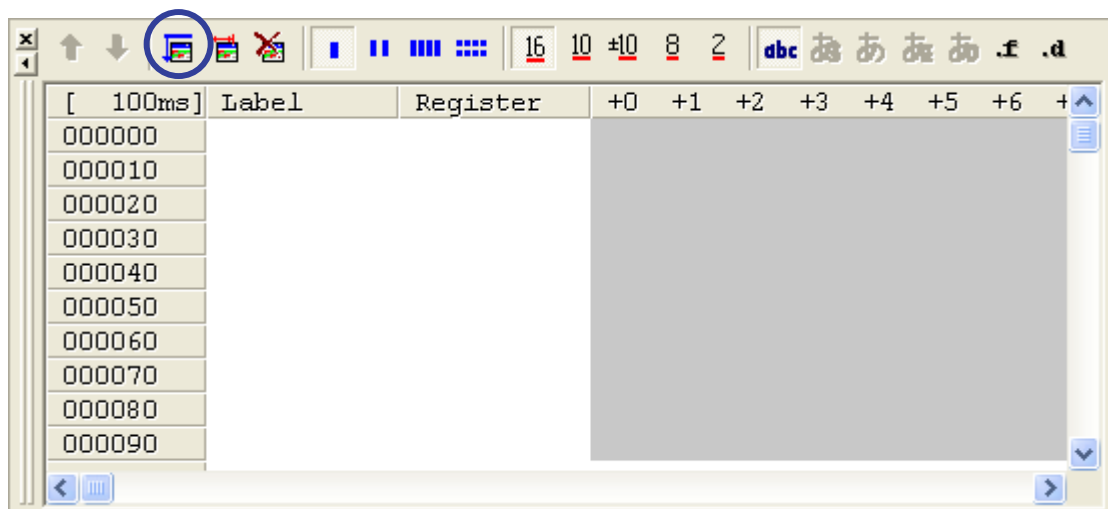
- (28) Customize the source file again. Click on the [STOP] button in the toolbar to halt program execution. Then, add an instruction to increment global variable GUI_global, as shown below, to line 50 of the source file "Tutorial.c". After that, build and download the program by referring to items (1) and (2) in section 4.4.



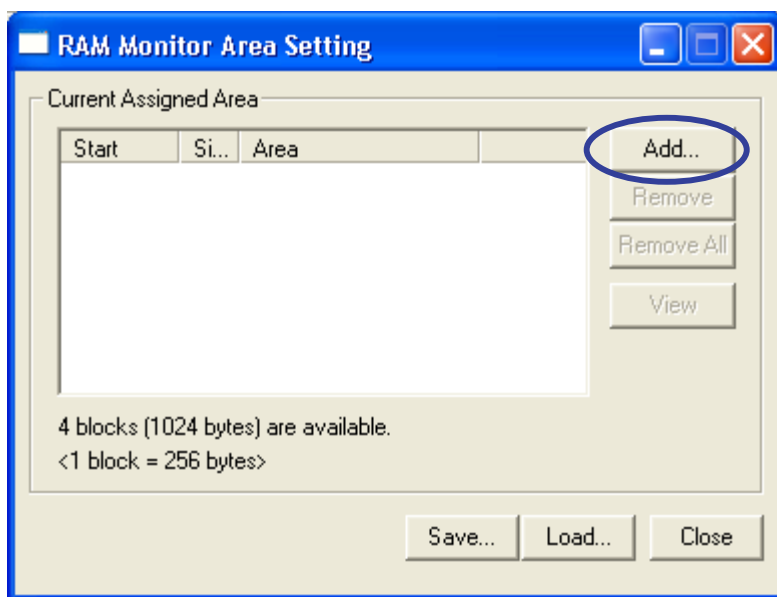
(29) Select [CPU] from the [View] menu and click on [RAM Monitor].



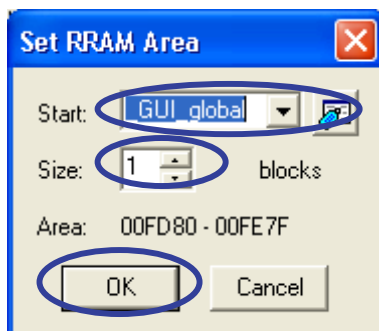
(30) The [RAM Monitor] window will appear. Click on the [Base] button in the toolbar.



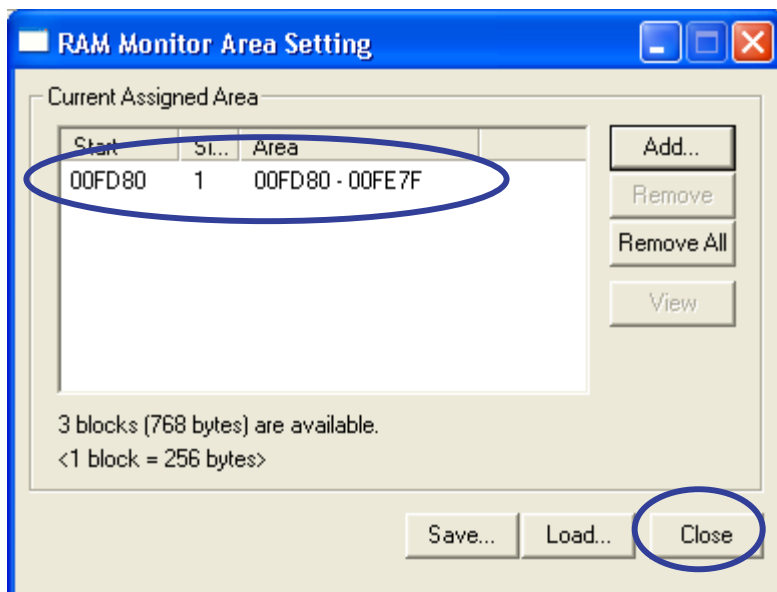
(31) The [RAM Monitor Area Setting] dialog box will appear. Click on the [Add] button.



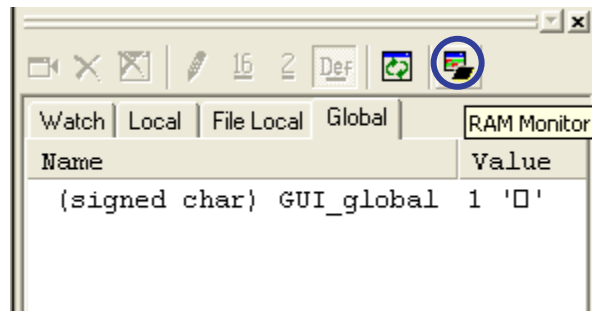
(32) The [Set RRAM Area] dialog box will appear. Specify variable "_GUI_global" for [Start] and 1 block for [Size], and click on the [OK] button.



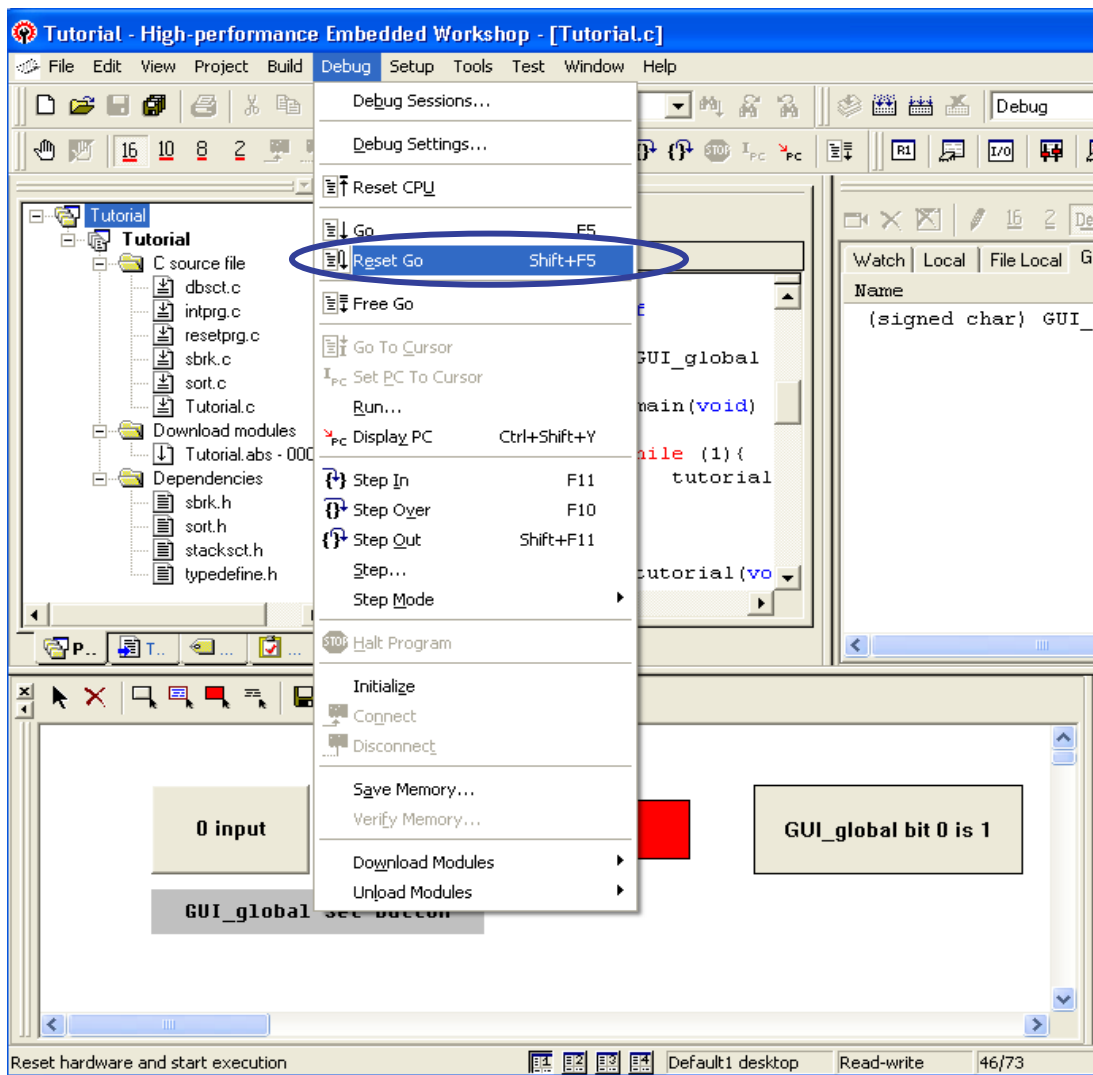
(33) Confirm that the [RAM Monitor Area Setting] dialog box has been set as shown below and click on the [Close] button.



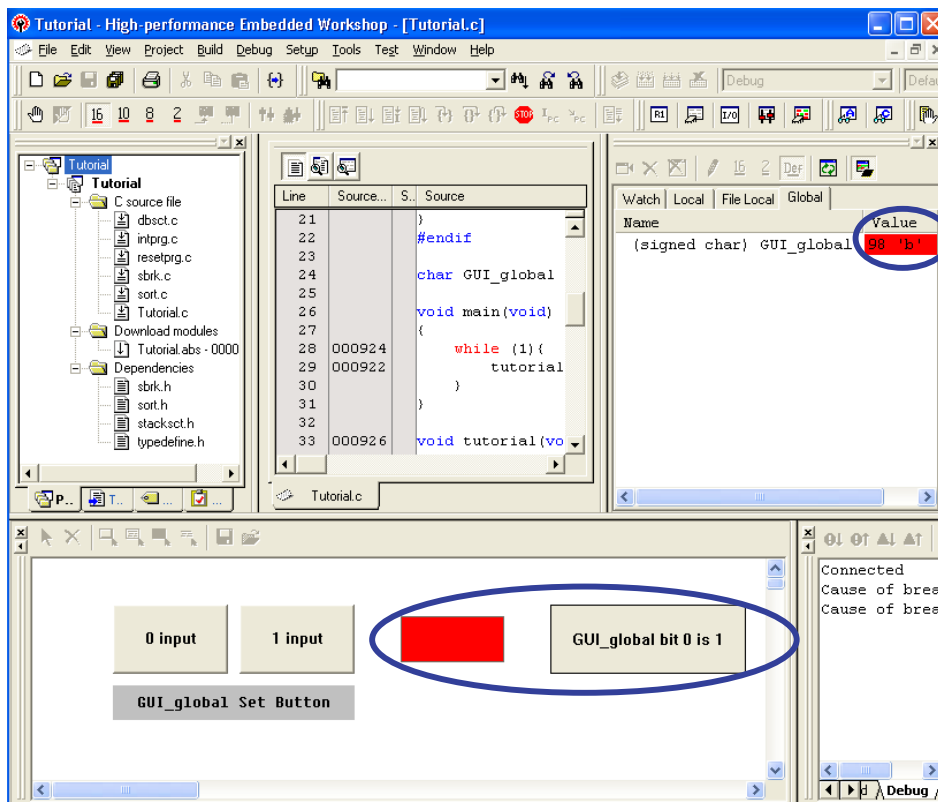
- (34) Click on the [RAM Monitor] button in the toolbar of the [C Watch] window to enable the RAM monitoring function.



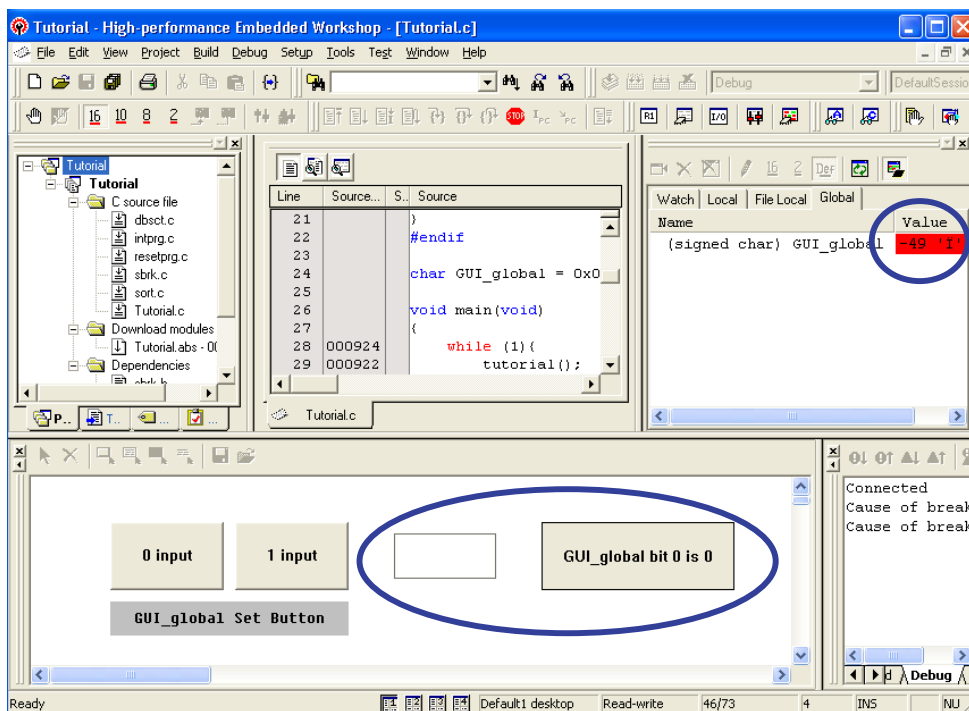
- (35) Click on [Reset Go] from the [Debug] menu to execute the program.



- (36) During program execution, the variable "GUI_global" in the [C Watch] window, the virtual LED of the [GUI I/O] window, and the label item will change.

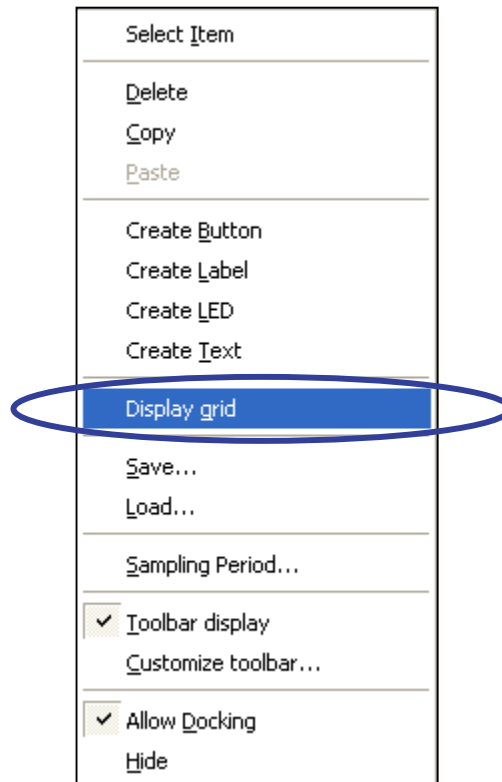


While variable "GUI_global" is odd (bit 0 is 1), the virtual LED will be red and [GUI_global bit 0 is 1] will be displayed as the text item. This depends on the timing with which the display is updated.

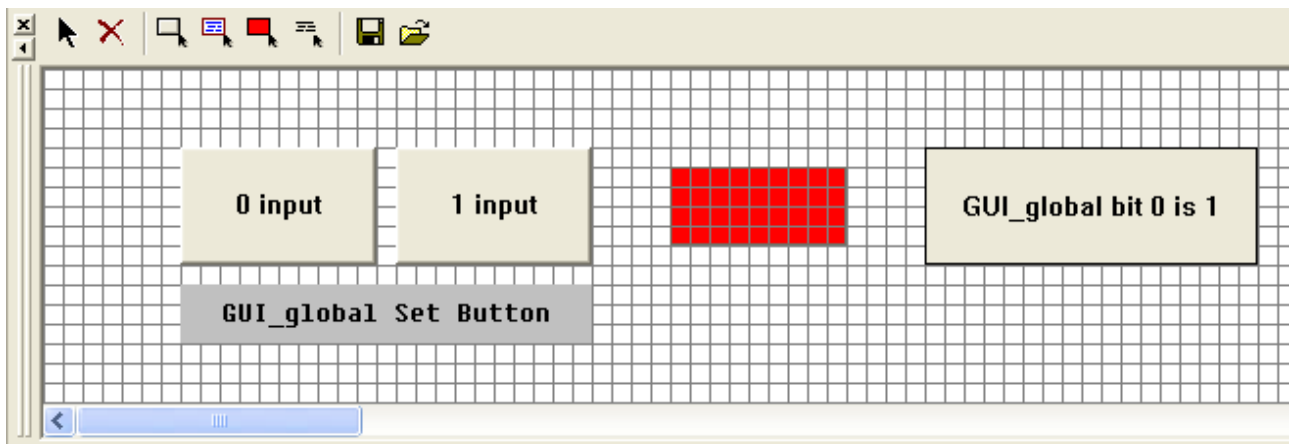


Similarly, while variable "GUI_global" is even (bit 0 is 0), the virtual LED will be white and [GUI_global bit 0 is 0] will be displayed as the text item. This also depends on the timing with which the display is updated.

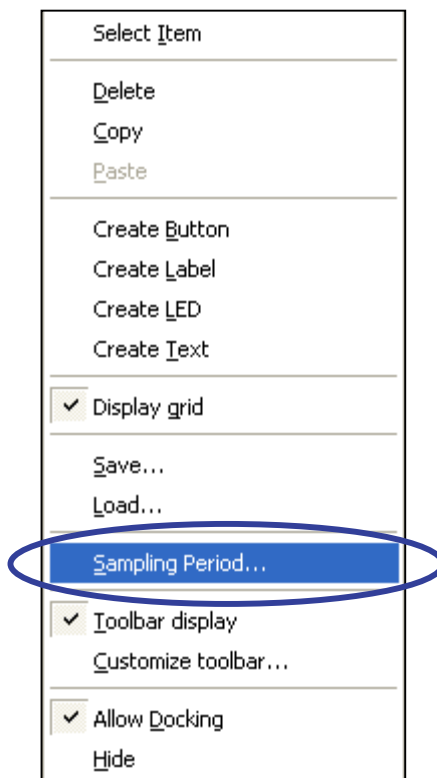
(37) Clicking on the [GUI I/O] window with the right-hand mouse button displays the popup menu below.



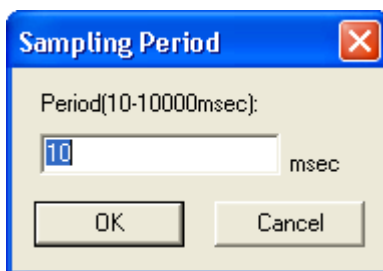
Select [Display grid] to make grid lines appear as shown below. These are effective for determining the size and placement of each item.



- (38) Select [Sampling Period...] from the popup menu for the [GUI I/O] window to adjust the interval for updating of the display in the [GUI I/O] window.



Clicking on the [Sampling Period...] item brings up the [Update View] dialog box. The interval value is specifiable to adjust the interval for updating of the [GUI I/O] window within the range from 10 ms to 10 s.



When an address value that has been specified for an item of the GUI I/O function is updated by the user program, the state of the item will be reflected in the [GUI I/O] pane each time the interval for updating of the display specified here elapses.

5. Related Documents

The H8/300H Tiny compact emulator and High-performance Embedded Workshop provide many other useful functions that have not been mentioned in this document. Please refer to the following related documents for important information such as detailed specifications, technical information, and restrictions.

Documents Related to the H8/300H Tiny Compact Emulator:

- H8/300H Tiny Compact Emulator Debugger User's Manual
- H8/300H Tiny Compact Emulator Debugger Release Notes

Document Related to High-Performance Embedded Workshop

- High-performance Embedded Workshop User's Manual

Documents Related to CPU

- H8/3664 Group Hardware Manual
- H8/300H Series Programming 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/cpe>
Japanese site: <http://japan.renesas.com/cpe>

Renesas Website and Customer Support

Renesas Technology Website:

<http://www.renesas.com/>

Customer Support:

<http://www.renesas.com/inquiry>

Revision History

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

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