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April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

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SuperH™ RISC engine Simulator/Debugger V.9.07.01

Supplementary Information for User's Manual

Introduction

This document describes how V.9.07.01 of the SuperH™ RISC engine Simulator/Debugger differs from V.9.07.00. Before using the simulator/debugger, carefully read this document, the SuperH™ RISC engine Simulator/Debugger User's Manual, and the online help for the SuperH™ RISC engine Simulator/Debugger.

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1. Memory Mapping

In V.9.07.01, the specification of memory mapping for the SH-2A has been changed. This section describes the new specification of memory mapping.

1.1 Modifying the Memory Map and Memory Resource Settings

The [Memory] tabbed page in the [Simulator System] dialog box is used to set and modify the memory map and memory resource settings.

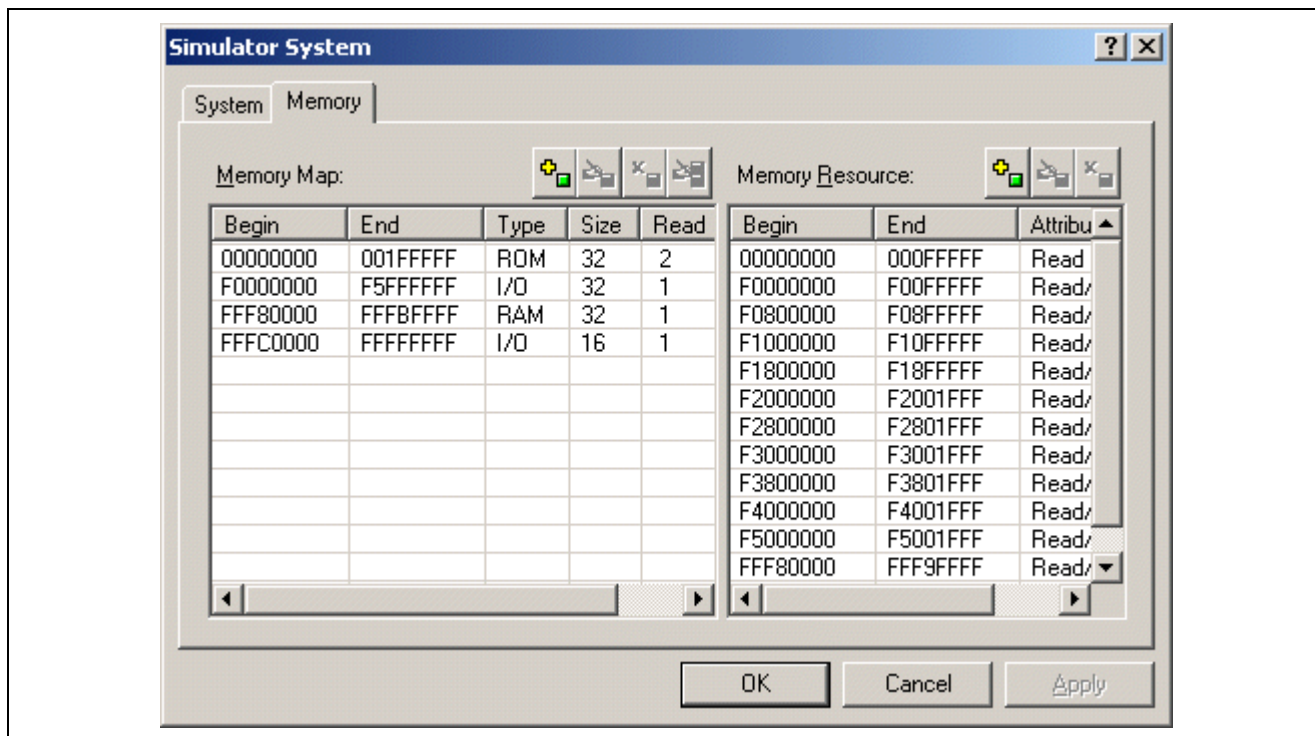


Figure 1.1 Simulator System Dialog Box (Memory Tab)

The following items can be specified in this dialog box.

- [Memory Map] Displays the types of memory, addresses where each starts and ends, data bus width, and number of access cycles.
- [Memory Resource] Displays the access type and start and end addresses of the current memory resource.

The following buttons are used to alter [Memory Map] (add, modify, or delete entries).

- Add items to [Memory Map]. Clicking on this button opens the [Set Memory Map] dialog box (figure 1.2), in which an item can be added to the map.
- Modify an item in [Memory Map]. Select the item to be modified in the list box and click on this button. This opens the [Set Memory Map] dialog box (figure 1.2), in which the selected memory map item can be modified.
- Delete an item from [Memory Map]. Select the item to be deleted in the list box and click on this button.

In [Memory Map], the start address, end address, memory type, data bus width, number of cycles for reading, and number of cycles for writing are displayed, in that order. The memory types are as follows:

- SH2A-FPU

ROM (internal ROM), RAM (internal RAM), EXT (external memory), I/O (internal I/O), EEPROM

Click on the [OK] or [Apply] button to store the modified settings. Click on the [Cancel] button to close this dialog box without modifying the settings.

1.2 Set Memory Map Dialog Box

The [Set Memory Map] dialog box specifies the memory map of the target CPU. The contents of this dialog box depend on the target CPU. The simulator/debugger uses the data specified in this box to calculate numbers of cycles for memory access.

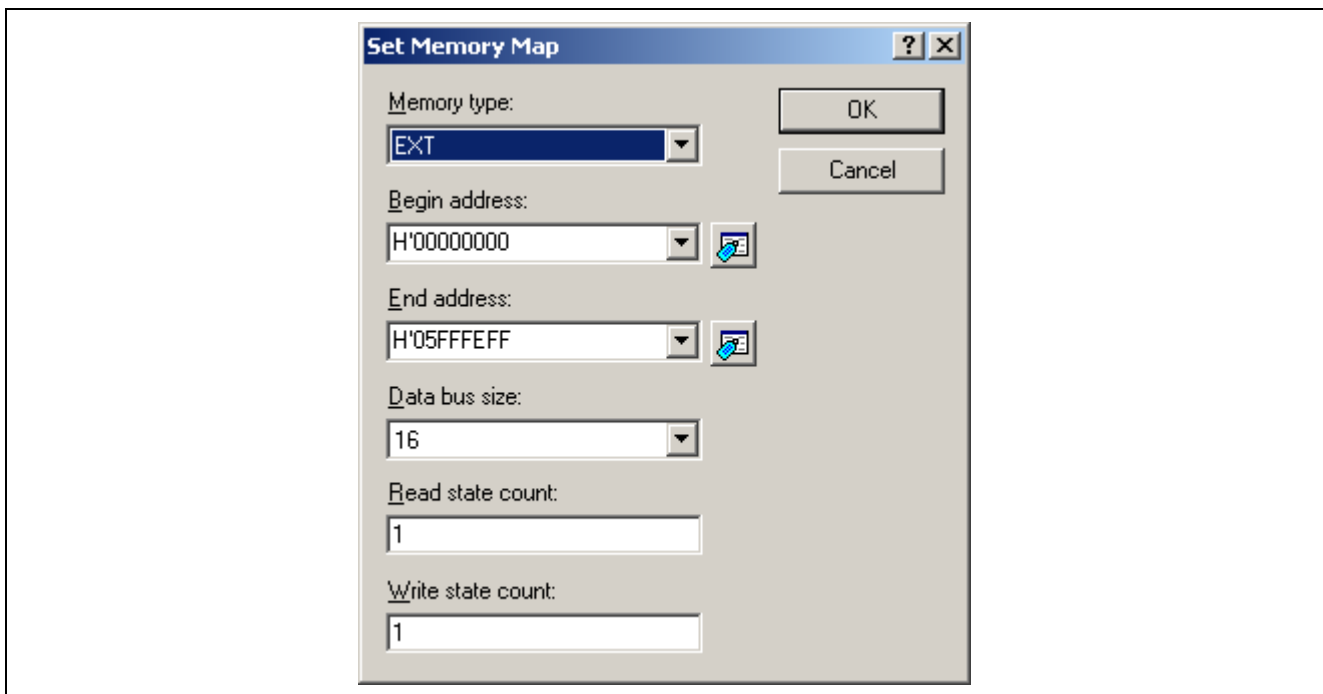


Figure 1.2 Set Memory Map Dialog Box

The following items are specified:

[Memory type]	Memory type
[Begin address]	Address where the area of the given type starts.
[End address]	Address where the area of the given type ends.
[Data bus size]	Memory data bus width
[Read state count]	When the memory type is ROM: Latency When the memory type is not ROM: Number of cycles (“states”) for read access to the specified type of memory
[Write state count]	When the memory type is ROM: Throughput When the memory type is not ROM: Number of cycles (“states”) for write access to the specified type of memory

Notes: 1. In terms of the memory resources of the SH2A-FPU, note the following.

- In the memory areas that are fixed as ROM or RAM, selection of another memory type or allocation in two or more ranges is not possible. The memory areas that are fixed as ROM and RAM are given below.

Area	Address Range	Remark
ROM	0x00000000 - 0x01FFFFFF	When the internal ROM has been enabled
RAM	0xFFFF80000 - 0xFFFFBFFFF	

- No addresses in reserved areas can be specified. The reserved areas are given below.

Area	Address Range	Remark
Reserved	0x20000000 - 0x21FFFFFF	When the internal ROM has been enabled
	0x84000000 - 0xE7FFFFFF	

- Memory can only be allocated on 8-kbyte boundaries. If memory is allocated to an address range that does not have 8-kbyte boundaries, the boundaries will be adjusted to 8-kbyte boundaries that encompass the specified range.
- Numbers of cycles for access to the areas fixed as ROM and RAM are as follows.

Area	Number of Cycles for Reading (Latency)	Number of Cycles for Writing (Throughput)
ROM	1 to 4	
RAM	1 or 2	1 to 4

2. The memory map setting for area that is allocated to a system memory resource cannot be deleted or modified. Start by deleting the system memory-resource allocation on the [Memory] tab of the [Simulator System] dialog box, then delete or modify the memory map setting.

Clicking on the [OK] button stores the modified settings. Clicking on the [Cancel] button closes the dialog box without modifying the settings.

1.3 Set Memory Resource Dialog Box

The [Set Memory Resource] dialog box is used to set and modify memory resources.

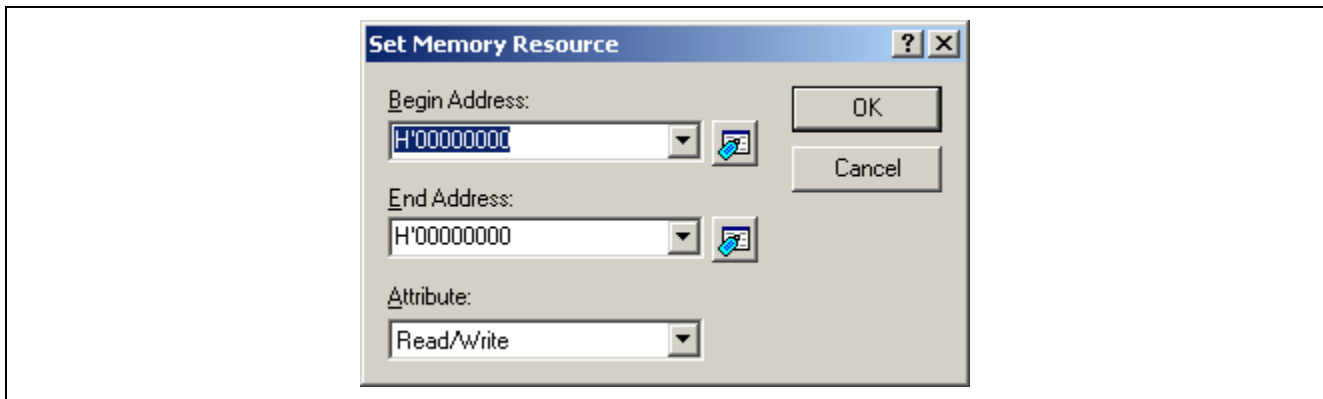


Figure 1.3 Set Memory Resource Dialog Box

The following items are specified:

[Begin Address] Address where the memory area to be allocated starts

[End Address] Address where the memory area to be allocated ends

[Attribute] Access type

[Read] Read only

[Write] Write only

[Read/Write] Readable/writable

Click on the [OK] button after specifying [Begin Address], [End Address], and [Attribute]. Click on the [Cancel] button to close the dialog box without modifying the settings.

- Notes:
1. When a memory resource is set, memory in the host computer will be used. If the user allocates excessive memory resources, operation of the host computer will be extremely slow.
 2. The following notes apply to memory resources for the SH2A-FPU series.
 - Memory resources can only be allocated on 8-kbyte boundaries. If a memory resource is allocated to an address range that does not have 8-kbyte boundaries, the boundaries will be adjusted to 8-kbyte boundaries that encompass the specified range. Accordingly, address ranges of attributes are allocated on 8-kbyte boundaries. When a memory resource does not take up a full 8-kbyte range, the memory that is actually used must be within the range defined in the hardware manual.
 - Do not clear the default allocation of a memory resource as I/O area. If such an allocation is cleared, operation of the cache memory will be incorrect.

2. Profile

In V.9.07.01, the specification of the profiler function for the SH-2A has been changed. This section describes the new specification of the profiler function.

2.1 Types and Purposes of the Profile Data Displayed by the Profiler Function

The profile data to be displayed depends on the CPU. In the case of the SH2A-FPU, the profile data consists of the items listed below.

- (a) When the internal ROM has been disabled:
 - [Cycle] (the number of cycles for execution),
 - [ICache miss] (the number of instruction cache misses),
 - [OCache miss] (the number of operand cache misses),
 - [Ext_mem] (the number of times external memory was accessed),
 - [I/O_area] (the number of times internal I/O area was accessed),
 - [Int_mem] (the number of times internal memory was accessed)
- (b) When the internal ROM has been enabled:
 - [Cycle] (the number of cycles for execution),
 - [ROM ICache miss] (the number of instruction ROM cache misses),
 - [ROM OCache miss] (the number of operand ROM cache misses),
 - [Ext_mem] (the number of times external memory was accessed),
 - [I/O_area] (the number of times internal I/O area was accessed),
 - [Int_mem] (the number of times internal memory was accessed)

3. Messages

3.1 Error Messages

Table 3.1 lists the error messages that have been added or modified in V.9.07.01.

Table 3.1 New or Modified Error Messages

Message	Description
Incorrect memory type. The specified address range includes an area fixed as rr. (Area fixed as rr: 0xmmmmmmmm - 0xnwnnnnnn)	An attempt was made to assign another memory type to an area fixed as ROM or RAM. rr: ROM or RAM 0xmmmmmmmm: Address where the fixed area starts 0xnwnnnnnn: Address where the fixed area ends
Allocating two or more ranges in an area fixed as rr is not possible. (Area fixed as rr: 0xmmmmmmmm - 0xnwnnnnnn)	An attempt was made to allocate two or more ranges in an area fixed as ROM or RAM. rr: ROM or RAM 0xmmmmmmmm: Address where the fixed area starts 0xnwnnnnnn: Address where the fixed area ends
Incorrect address. The specified address range includes a reserved area. (Reserved area: 0xmmmmmmmm - 0xnwnnnnnn)	An attempt was made to map memory to a reserved area. 0xmmmmmmmm: Address where the reserved area starts 0xnwnnnnnn: Address where the reserved area ends
I/O area does not exist. (I/O area: 0xF0000000 - 0xF5FFFFFF)	No memory has been mapped as the I/O area.
Incorrect address. The specified address range is outside an area fixed as rr. (Area fixed as rr: 0xmmmmmmmm - 0xnwnnnnnn)	An attempt was made to map memory beyond the boundaries of an area fixed as ROM or RAM. rr: ROM or RAM 0xmmmmmmmm: Address where the fixed area starts 0xnwnnnnnn: Address where the fixed area ends

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