Precautions on Using the SH-2A, SH-2 E200F Emulator

Thank you for using our product. There are the following notes on use of the SH-2A, SH-2 E200F emulator.

1   Precautions on Using the Emulator

1.1   Supported MPUs

Device Group	Debugging Platform	Supported MPUs
SH-2A	SH-2A E200F SYSTEM	SH7206
	SH-2A FLASH E200F SYSTEM	SH7211, SH7286, SH7285, and SH7243
	SH2A-FPU E200F SYSTEM (SH2A)	SH72630, SH72632, SH72631, SH72633, and SH7203
	SH72546R E200F SYSTEM (SH2A-FPU)	SH72546RFCC, SH72543R, SH72544R, SH72531, and SH72531FCC
	SH2A_custom_SoC E200F SYSTEM (SH-2A: SH2A-FPU)	SH2A_custom_SoC_1 and SH2A_custom_SoC_2
	SH7214 E200F SYSTEM (SH2A)	R5F72145BDFA, R5F72146BDFA, R5F72147BDFA, R5F72145BDFP, R5F72146BDFP, R5F72147BDFP, R5F72145BDBR, R5F72146BDBR, R5F72147BDBR, R5F72145ADFA, R5F72146ADFA, R5F72147ADFA, R5F72145ADFP, R5F72146ADFP, R5F72147ADFP, R5F72145ADBR, R5F72146ADBR, R5F72147ADBR
	SH7216 E200F SYSTEM (SH2A-FPU)	R5F72165BDFA, R5F72166BDFA, R5F72167BDFA, R5F72165BDFP, R5F72166BDFP, R5F72167BDFP, R5F72165BDBR, R5F72166BDBR, R5F72167BDBR, R5F72165ADFA, R5F72166ADFA, R5F72167ADFA, R5F72165ADFP, R5F72166ADFP, R5F72167ADFP, R5F72165ADBR, R5F72166ADBR, R5F72167ADBR
SH-2	SH7080 Series E200F SYSTEM (CPU SH-2)	R5E70835R, R5E70845R, R5E70855R, R5E70865R, R5F70834A, R5F70835A, R5F70844A, R5F70845A, R5F70854A, R5F70855A and R5F70865A
	SH7125 Series E200F SYSTEM (CPU SH-2)	SH71240, SH71241, SH71242, SH71243, SH71250, SH71251, SH71252, and SH71253
	SH7146 Series E200F SYSTEM (CPU SH-2)	R5E71464R, R5E71494R (R5E71491R), R5F71464R and R5F71494R (R5F71491R)
	SH7147 Series E200F SYSTEM (CPU SH-2)	R5F71474, R5F71475, R5F71476, R5F71424, and R5F71426
	SH7137 Series E200F SYSTEM (CPU SH-2)	SH7136 and SH7137

1.2 Setup

(1) Insert the attached CD-R (setup disk) to the CD-ROM drive and click [Run…] on the Windows® start menu.

(2) In the [Run] dialog box, select HewInstMan.exe stored in the root directory of the CD-ROM (e.g. D:\HewInstMan.exe) and click [OK].

(3) Follow the instructions by the install wizard.

1.3 Documents Provided with the Emulator

The documents provided with this emulator are stored in the following locations of the attached CD-ROM:

User's Manual		Location
SH-2A, SH-2 E200F Emulator User's Manual		\Manuals\English\eSH-2AE200Fuh.pdf
SuperH™ Family SH-2A, SH-2 E200F Emulator Additional Document for User's Manual	Supplementary Information on Using the SH7206	\Manuals\English\SH-2A\ eSH-2AE200F7206ph.pdf
	Supplementary Information on Using the SH7203 and SH7263	\Manuals\English\SH-2A\ eSH-2AE200F7263pa.pdf
	Supplementary Information on Using the SH7211	\Manuals\English\SH-2A\ eSH-2AE200F7211pd.pdf
	Supplementary Information on Using the SH72546RFCC, SH72543R, SH72544R, SH72531, and SH72531FCC	\Manuals\English\SH-2A\ eSH-2AE200F7254pa.pdf
	Supplementary Information on Using the SH7286, SH7285, and SH7243	\Manuals\English\SH-2A\ eSH-2AE200F7285pc.pdf
	Supplementary Information on Using the SH7214 and SH7216	\Manuals\English\SH-2A\ eSH-2AE200F7216pa.pdf
	Supplementary Information on Using the SH2A_custom_SoC	\Manuals\English\SH-2A\ eSH-2AE200FCUSTOMSOCpb.pdf
	Supplementary Information on Using the SH7083, SH7084, SH7085, SH7086, SH7146, SH7149, SH7124, and SH7125	\Manuals\English\SH7080\ eSH7080E200F7080ph.pdf
	Supplementary Information on Using the SH7136, SH7137, SH7142, and SH7147	\Manuals\English\SH-2A\ eSH7080E200F7147pe.pdf

1.4 Restrictions on Use of the Device

Restrictions on use of the device will also be applied to this emulator.

1.5 Event Function

1.5.1 Setting On-Chip Event Conditions

(1) A BREAKPOINT (S/W break) and a condition that causes a break at the address where an instruction was executed must not be set at the same address.

(2) If a condition to cause a break at the address of a prefetch and a condition to cause a break at the address where an instruction was executed are set at the same address, an incorrect break cause may be displayed. Even if the program execution has stopped due to the condition to cause a break at the address of a prefetch, the condition to cause a break at the address where an instruction was executed is also displayed as the break cause.

1.5.2 BreakConditionSet Command

The BreakConditionSet command cannot be used to specify multiple bus-master types. This setting must be made on the [Onchip Event] sheet of the [Event] window instead.

1.5.3 Setting Event Conditions during Execution of the User Program

During execution of the user program, AUD event, external probe event, execution time event, or BUS event conditions can be set. However, this setting will be reflected after breaking the user program. On-chip event condition setting will be reflected immediately.

1.5.4 [View Source] on the [AUD Event] and [BUS Event] Sheets

No source program is displayed even if [View Source] is selected on the [AUD Event] or [BUS Event] sheet.

1.5.5 Setting a Sequential Condition for an On-Chip Event

- The channel on which a sequential condition of an on-chip event is disabled. After setting the sequential condition, enable this channel.
- During execution of the user program, do not change the setting of the performance analysis function that uses channels 1 and 2 for an on-chip event ([Ch 2 to Ch 1 PA] or [Ch 1 to Ch 2 PA] of [Ch1,2,3] in the [Combination action(Sequential or PtoP)] dialog box). Otherwise, the performance analysis will not be done correctly.
- Do not save a session when a sequential condition is set. Otherwise, the sequential condition will not be correctly recovered when loading the session. If you encountered this problem, disable the channels on which the sequential condition has been set and then enable them again so that the sequential condition will work normally.

1.5.6 BUS Event Function

After the BUS event condition is satisfied and the external bus is accessed five to ten times, the E200F emulator detects satisfaction of the condition. If the number of accesses to the external bus is less than five, the BUS event will not occur. In other words, the event will not occur when the emulator enters the sleep, software standby, or reset state. To use the sequential BUS event function, five to ten accesses to the external bus are necessary every time the sequential condition on each channel is satisfied.

1.5.7 Sequential BUS Event Function

To use the sequential BUS event function, set a condition only on the channels specified for the sequential BUS event. No BUS event set on other channels will occur. If any sequential BUS event is set on other channels, an incorrect cause for the event will be displayed.

1.5.8 Displaying the Cause of the Event

- When a forced break caused a break, only occurrence of the forced break is displayed. Even if any other event has occurred, its cause is not displayed.
- When a S/W break caused a break, only occurrence of the S/W break is displayed. Even if any other event has occurred, its cause is not displayed.

1.6 Tracing

1.6.1 [Timestamp Difference] Column in the [Trace] Window

The values shown on the [Timestamp Difference] column are incorrect. When loading a session, the [Timestamp Difference] column may not be displayed.

1.6.2 Displaying Executed Instructions in the [Internal/AUD trace] Window

- The internal trace displays executed instructions on the lines that show [BRANCH] on the [Type] column when an odd address is the branch destination.
- The AUD trace displays executed instructions on the lines that show [BRANCH] or [DESTINATION] on the [Type] column when an odd address is the branch destination. However, the executed instructions displayed on the lines of [DESTINATION] are incorrect.
- When a software breakpoint is set on the branch destination address, the executed instructions displayed on the lines of [DESTINATION] are incorrect.

1.6.3 [Find] and [Filter] in the [Internal/AUD trace] Window

Do not select [FETCH] as the [Type] condition of [Find] and [Filter] of the [Internal/AUD trace] window.

1.6.4 Action When the Internal Trace Buffer Becomes Full

When [Break] is selected as the action to take when the internal trace buffer becomes full, a break occurs even if the user selects [No break] in the [Emulation mode] list box (on the [General] page of the [Configuration] dialog box).

1.7 Recovery of Software Breakpoints by the Session File

Information on software breakpoints that was saved in the session file is not available until a load module is loaded. If necessary, load a load module or set new software breakpoints.

1.8 Display of the Memory Content and Operation of Memory

1.8.1 Programming the Internal Flash Memory

The E200F can program the flash memory in the target MPU when the user writes data via the [Memory] window or downloads a program to the flash memory. However, there are notes and restrictions on programming of the flash memory depending on the MPU you use. For details, refer to the documents of notes on usage or limitations packaged with the microcomputer. Special care must be taken when the documents contain a restriction regarding the operating frequency (i.e., the flash memory cannot be programmed when the MPU's operating frequency is not a supported value).

An attempt to change the memory contents or to download a program to the flash memory by using the E200F causes programming of the internal flash memory. Note, however, that the flash memory is not actually programmed immediately after the said operation. When the program execution is resumed (by Go or Step), the flash memory is programmed.

If a restriction regarding the MPU's operating frequency applies, the operating frequency must be set to a specific value before execution of the program. Take the following procedure to program the internal flash memory:

1. Change the memory contents or download a program
2. Change the operating frequency
3. Execute one dummy step (this causes programming of the flash memory)

Do not execute command CPU_Reset or Reset_Go before programming the internal flash memory. Otherwise, the frequency control register will be reset.

If there is a restriction on programming of the internal flash memory, do not set a software break in the internal flash memory area.

A software break is accomplished by replacing the instruction at the specified address. Every time a software break is set or deleted in the internal flash memory area, the internal flash memory will be programmed. If you are using an MPU (WS sample) that can program the internal flash memory only for a limited number of times, the use of software breaks should be as less frequent as possible.

1.8.2   Operating Memory
Do not attempt to view the memory contents or handle memory in reserved areas.

1.8.3   Operating Memory during Execution of the User Program
The memory find, memory copy, memory compare, and memory fill functions are not available during execution of the user program. These command lines are not available either.

1.8.4   Updating the Memory Content during Execution of the User Program
If display of the [Memory] window is updated during user program execution when stepping (step-in, step-over, or step-out) is being performed, incorrect values will be displayed. In such cases, the content will be correctly displayed when the window is updated after stopping the program. This note also applies to updating of the windows [Disassembly], [Image], [IO], [Watch], [Waveform], and [Monitor], and reading of values with the monitoring function of the [Watch] window.

1.8.5   Handling Windows during Execution of the User Program
If [Real time] is selected from [Auto Refresh] in the [Image] or [Waveform] window during execution of the user program, the response by the emulator will be slower.

1.8.6   Verification on Download of Load Modules
The function of [Perform memory verify during download] in the [Download Modules] dialog box opened via [Debug Settings…] of the [Options] menu is invalid. Verification cannot be enabled even if the [Perform memory verify during download] checkbox is selected. To perform verification on a load module, prepare a binary, IntelHex, or S-Record file that has the same contents as the module, load the module, and then apply the memory verify function to perform verification.

1.8.7   FILE_LOAD Command
- Do not specify V for the FILE_LOAD command. Use the FILE_VERIFY command to verify memory.
- To use the FILE_LOAD command, attach the options to replace or add symbols after the name of the file being loaded. The following table lists these options and their descriptions.

Options	Replace or append new symbol.
none (Default)	Load symbol with no debug information.
R	Replace all existing symbols with the new symbol
A	Append new symbol to symbol bank

1.8.8   MEMORY_EDIT Command
Even if characters are enclosed with quotation marks ('), the ASCII character strings cannot be input as data. When the character strings are input as data, enter the corresponding numerical values.

1.8.9   FILE_SAVE Command
The content of memory cannot be saved in the Elf/Dwarf2 format.

1.8.10　In-Place Edit Function

When the [Memory] window is displayed in the UNICODE format, the in-place edit function may not work normally.

1.8.11　Scrolling

Scrolling the window may make the display incorrect when it is in word units. In such cases, refresh the window.

1.8.12　Difference in Size of Internal ROM and RAM

Depending on the target MPU in use, the size of internal ROM and RAM will be different while debugging with a connection to the EV-chip unit and the actual MPU.

Table　　Difference in Size of Internal ROM and RAM

Target MPU		ROM in the Actual MPU	RAM in the Actual MPU	ROM in the Emulator	RAM in the Emulator
SH7083	Flash memory: 256 Kbytes	256 Kbytes	16 Kbytes	512 Kbytes	32 Kbytes
	Flash memory: 512 Kbytes	512 Kbytes	32 Kbytes	512 Kbytes	32 Kbytes
SH7084	Flash memory: 256 Kbytes	256 Kbytes	16 Kbytes	512 Kbytes	32 Kbytes
	Flash memory: 512 Kbytes	512 Kbytes	32 Kbytes	512 Kbytes	32 Kbytes
SH7085	Flash memory: 256 Kbytes	256 Kbytes	16 Kbytes	512 Kbytes	32 Kbytes
	Flash memory: 512 Kbytes	512 Kbytes	32 Kbytes	512 Kbytes	32 Kbytes
SH7147	R5F71474BJ80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71474BD80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71474AK64FPV	256 Kbytes	12 Kbytes	256 Kbytes	16 Kbytes
	R5F71474BJ80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71475BJ80FPV	384 Kbytes	16 Kbytes	384 Kbytes	16 Kbytes
	R5F71475AK64FPV	384 Kbytes	16 Kbytes	384 Kbytes	16 Kbytes
	R5F71476BJ80FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
	R5F71476BD80FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
	R5F71476AK64FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
SH7142	R5F71424BJ80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71424AK64FPV	256 Kbytes	12 Kbytes	256 Kbytes	16 Kbytes
	R5F71426BJ80FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
	R5F71426BD80FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
	R5F71426AK64FPV	512 Kbytes	16 Kbytes	512 Kbytes	16 Kbytes
SH7136	R5F71364AN80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71364AD80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
SH7137	R5F71374AN80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
	R5F71374AD80FPV	256 Kbytes	16 Kbytes	256 Kbytes	16 Kbytes
SH72543R	R5F72543RKBGV	2.0 Mbytes	128 Kbytes	3.75 Mbytes	256 Kbytes
SH72544R	R5F72544RKBGV	2.5 Mbytes	128 Kbytes	3.75 Mbytes	256 Kbytes
SH72531	R5F72531KFPV	1.25 Mbytes	64 Kbytes	1.25 Mbytes	64 Kbytes
SH72531FCC	R5E72531KFPV	1.25 Mbytes	64 Kbytes	1.25 Mbytes	64 Kbytes
SH72546RFCC	R5E72546RBGV	3.75 Mbytes	256 Kbytes	3.75 Mbytes	256 Kbytes

1.9   Emulation

1.9.1   Temporary Breakpoints

- Run... (Run menu)

Do not set temporary breakpoints to an area wherein a software break cannot be set.

1.9.2   Rate of Stepping

- To perform stepping continuously with the [Image View] or [Waveform] window open, do not select "0 seconds" as the delay.
- Do not perform stepping continuously if you have specified the realtime update of the [Image] or [Waveform] window.

1.9.3   Conflict between Emulator Operation and Reset Input

If there is a conflict between any of the following emulator operations and a reset input to the target MPU during execution of the user program, the emulator may not work correctly:

- Setting an event condition
- Setting the internal trace
- Viewing the internal trace information
- Reading/writing data from/to memory

Be careful not to cause such conflict.

1.9.4   Note on Occurrence of Breaks

When a break occurs during execution of the user program with a dialog box open, the High-performance Embedded Workshop may not enter the breaking state. In this case, close the dialog box and select [Halt Program] from the [Debug] menu or press the [Halt Program] button on the toolbar. You can check whether a break has occurred or not by the RUN lamp (LED) on the emulator. The RUN lamp (LED) is illuminated while the user program is running.

1.9.5   H-UDI

Do not access the H-UDI because it is used by the emulator.

1.9.6   User Break Controller (UBC)

While the emulator is connected, the user break controller (UBC) does not operate.

1.9.7   Power-Down Modes

Sleep, software standby, and module standby modes are the power-down modes. The emulator can enter the sleep and software standby modes by executing a SLEEP instruction. When the emulator is in use, the sleep mode can also be exit by the [Stop] button to cause a break. Also note the followings:

- Do not view or change the contents of memory in the software standby mode.
- Do not use the module standby function to stop the clock supply to the H-UDI.

1.9.8   Source-Level Execution

- Step

Even standard C libraries are executed. To return to a higher-level function, enter Step Out. In a for statement or a while statement, executing a single step does not move execution to the next line. To move to the next line, execute two steps.

1.9.9　　[Select Emulation] Dialog Box

- User system Mode

In cases where [User system Mode] has been selected and the levels on the operating-mode pins in the user system are incorrect or not supported by the emulator, booting-up of the emulator stops indicating the error "User System pin MDS2,0 is NG". Check the levels on the operating-mode pins in the user system.

- User system Clock Mode

In cases where [User system Clock Mode] has been selected and the levels on the clock-mode pins in the user system are incorrect or not supported by the emulator, booting-up of the emulator stops indicating the error "User System pin CLK_MD2,0 is NG". Check the levels on the clock-mode pins in the user system.

For details on setting of the operating-mode pins and clock-mode pins, see the hardware manual for the device in use.

1.10　The Load/Save of the Session File

If the target clock was chosen at the time when the session file was saved and no target clock was supplied at the time when the session file was loaded, an error occurs and the emulator clock will be selected to initiate the emulator.

1.11　Assembling and Disassembling
1.11.1　Line Assembly

- Input Radix

The default for line assembly input is decimal regardless of the Radix setting. Specify H' or 0x as the radix for a hexadecimal input.

1.12　Address Space Size

In absolute addressing mode, specify the size (:16, etc.)

1.13　Note on [Register] Window Operation during the User Program Execution

During user program execution, double-clicking the [Register] window displays a dialog box that allows a change of the register contents. However, the operation to change the register contents is invalid during the user program execution.

1.14　Source File
1.14.1　Note on the Source File Location after Creating a Load Module

When the source file is moved after the load module has been created, the [Open] dialog box, which specifies the source file, may be displayed during debugging of the created load module. Select the correct source file.

1.15　Watch
1.15.1　Local Variables at Optimization

Depending on the generated object code, local variables in a C source file compiled with the optimization option enabled will not be displayed correctly. Check the generated object code in the [Disassembly] window.

1.15.2　Variable Name Specification

When a name other than a variable name (such as a symbol name or a function name) is specified, no data is displayed.

1.15.3　Automatic Update

- Automatic Update will not be available when the specified variable is outside the scope. Do not specify Automatic Update for a static or auto variable.

- Do not specify Automatic Update for a pointer variable whose value changes with a break that occurs in user program execution.
- Symbols of arrays, structures, unions, and classes, and the contents (addresses) of pointer variables are not automatically updated.
- When the variable for which Auto Update has been specified is outside the display range in the [Watch] window, the emulator does not detect whether the variable is within the scope or not. Even if the variable is in the scope when the program stops, the variable outside the display range in the [Watch] window may not be displayed by scrolling the window after execution of the program.
- Display of the global variables allocated to registers will not be automatically updated.

1.15.4   Synchronization with the [Monitor] window

The content of the [Watch] window will be undefined if you change the monitor settings in the [Monitor] window during execution of the user program while the [Monitor] window is used to monitor the addresses of the symbols registered in the [Watch] window.

1.16   Monitoring Function
1.16.1   Changing Monitor Settings during User Program Execution

If you change the monitor settings in the [Monitor] window during execution of the user program, the initial values will be undefined.

1.17   Command Line Interface
1.17.1   Overwrite File

In Command Line Interface, a file that has the same name as the output file is overwritten without asking the user.

1.17.2   Log File

To change the target platform due to a change of the session while logging of the command line window, halt logging.

1.17.3   Command Batch File Load Timing

- Do not specify the following commands in the command file for which [At target connection] has been selected in [Command batch file load timing] on the [Options] tab:
    - (a)   [OPEN_WORKSPACE]
    - (b)   [CHANGE_PROJECT]
    - (c)   [CHANGE_CONFIGURATION]
- Do not specify the following commands in the command file for which [Before download of modules] has been selected in [Command batch file load timing] on the [Options] tab:
    - (a)   [OPEN_WORKSPACE]
    - (b)   [CHANGE_PROJECT]
    - (c)   [CHANGE_CONFIGURATION]
    - (d)   [GO]
    - (e)   [GO_RESET]
    - (f)   [GO_TILL]
    - (g)   [STEP]
    - (h)   [STEP_OUT]
    - (i)   [STEP_OVER]

1.17.4   Command Line Batch Processing

[File directory] cannot be used in the placeholder of [Command Line Batch Processing] on the [Options] tab. If a command file is specified with the relative path format, the file may not be correctly

accessed. Specify the absolute path format to the command file that cannot apply a placeholder.

1.18 Expression

1.18.1 Symbol

- A function name of the C++ program cannot be specified for the expression symbol.
- No overloaded operator can be used as a function name.
- No symbol defined in a load module with its name including a space can be specified.
- No symbol registered in the [Labels] window with its name including a character that is not alphanumeric can be specified.

1.19 Entry Point

- Setting an Entry Point

In downloading of a program, no entry point address is set to the PC even if an entry point address has been specified by the ENTRY option of the linkage editor, etc. Set the PC before executing the program.

1.20 Source Window after Modification of the Program

If you have modified the program shown in the source window and reloaded the source file and load module, close the source window and then open it again. Otherwise, the content displayed in the source window may be incorrect.

1.21 Loading a File in the SYSROF Format

No program in the SYSROF format can be loaded. Any program for debugging must be created in the Elf/Dwarf2 format.

1.22 Note on the Location of the Source File after Creating a Load Module

When the source file is moved after the load module has been created, the [Open] dialog box, which specifies the source file, may be displayed during debugging of the created load module. Select the correct source file and press the [Open] button.

1.23 Limitation on the [Stack Trace] Window

If the [Stack Trace] window is displayed during interrupt handling, the content displayed before interrupt handling will be incorrect.

1.24 Limitation on a Profile

A profile does not support the overlay function.

1.25 Limitation on a Realtime Profile

1.25.1 Using the Nest Mode

- Calling a Function within the Measurement Range from Outside of the Range

If a function outside the measurement range calls a function to be measured (caller address: N) and then the callee function returns to the caller function, correct measurement is only possible when the return address is N+4. Otherwise the functions in the measurement range cannot be correctly measured.

1.25.2 Measurement Range

The main unit has a memory (Main) of 512 kbytes × 8 blocks and the expansion profiling unit has two memories (Option_1 and Option_2) of 512 kbytes × 8 blocks for measurement. Note the followings:

- A measurement range set in "Main" appears as if it is not the measurement range when viewed from a range in "Option_1" or "Option_2".
- A measurement range set in "Option_1" appears as if it is not the measurement range when viewed from a range in "Main" or "Option_2".
- A measurement range set in "Option_2" appears as if it is not the measurement range when viewed from a range in "Main" or "Option_1".

1.26 Downloading an Absolute File (*.abs)

The function to change the access size for downloading is not supported for absolute files (*.abs). An absolute file is always downloaded in byte units, regardless of the access size selected. If you want to apply another access size to download an absolute file, create a Motorola S-record file (*.mot) by using the linker option. To perform source-level debugging, only download debugging information from the absolute file.

1.27 Command-Line Help

We have modified the descriptions of AC, BT, and I in the PERFORMANCE_SET (abbreviation: PST) page of the help information.
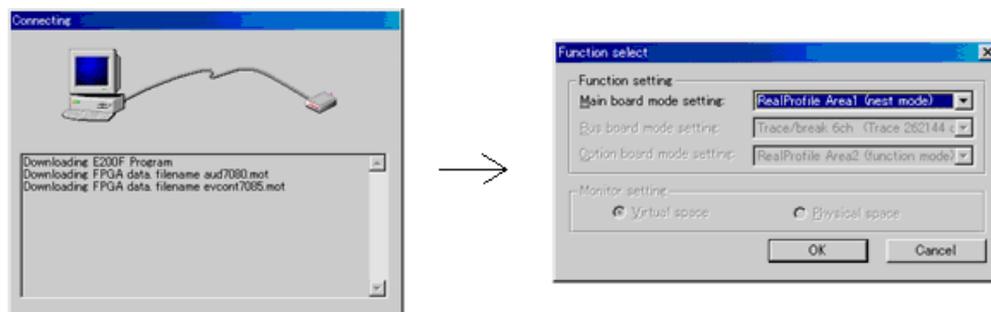
1.28 Operating Mode

While an MCU with internal flash memory is in use, operating modes that allow programming of the internal flash memory (i.e. boot mode, user boot mode, user program mode, and programmer mode) are not available. For this reason, the internal flash memory cannot be programmed while the user program is running.

1.29 Procedures to Turn the Power on

To turn on the power of the E200F and user system and start up the High-performance Embedded Workshop (HEW), follow the procedures below rather than those given in the SH-2A, SH-2 E200F Emulator User's Manual.

1.29.1 Turning the Power on

1. Turn on the power of the E200F.
2. Start up the HEW and check that loading of FPGA data is complete. When the [Function select] window appears after the [Connecting] window (see the figure below), loading of FPGA data in the EV-chip unit is complete.

3. Turn on the power of the user system.
4. Check that the E200F has been started up.

1.29.2 Turning the Power off

1. Disconnect the HEW and close it.
2. Turn off the power of the user system.
3. Turn off the power of the E200F.

Note: Do not leave either the E200F or user system with its power on. Otherwise the E200F and user system will be damaged.

1.30 Probe Functions

The E200F emulator has the following restrictions on the probe functions.

- Input probe

The input probe is not supported.

- Event-output probe

A signal is only output from the event-output probe when a specified condition is satisfied after the AUD trace function has been enabled and [Enable output trigger] has been selected on the [Action] page of the [Chx] dialog box for the on-chip event or AUD event.

- The probe functions are only usable when the EV-chip unit is connected to the emulator.

2 Notes Specific to the SH7206 E200F Emulator

2.1 Event Function
2.1.1 S/W Breakpoint

If you wish to use a S/W break (software break), specify the SH2A_SBSTK command to enable use of a user stack before setting a S/W break.

While enabled, extra four bytes of a user stack are used when a break occurs. The value of the stack pointer (R15) must be correctly set in advance because a user stack is to be used.

While disabled, the value of R0 may become incorrect when a break occurs due to a S/W break. By default, use of a user stack is disabled.

For details on the command, refer to the help file.

Example

To enable use of a user stack:
>SH2A_SBSTK enable

A hardware breakpoint can halt the program immediately before executing the instruction at the address where a breakpoint is set, in the same manner as the S/W breakpoint.

Use the "Prefetch address break before executing" condition of the On Chip Event hardware breakpoint.

2.1.2 Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while the DIVU or DIVS instruction is being executed, the condition set at the next instruction may be displayed as the break cause.

2.2 Tracing
2.2.1 Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

2.2.2   AUD Trace

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

2.3   Display of the Memory Content and Operation of Memory
2.3.1   Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00)
  — When the external-bus frequency is 56 to 66.67 MHz: 8 cycles or more
  — When the external-bus frequency is lower than 56 MHz: 6 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01)
  — When the external-bus frequency is 50 to 66.67 MHz: 3 cycles or more
  — When the external-bus frequency is lower than 50 MHz: 2 cycles or more

2.4   Performance Measurement
2.4.1   Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

3   Notes Specific to the SH72630, SH72632, SH72631, SH72633, SH7203 E200F Emulator

3.1   Event Function
3.1.1   S/W Breakpoint

If you wish to use a S/W break (software break), specify the SH2A_SBSTK command to enable use of a user stack before setting a S/W break.

While enabled, extra four bytes of a user stack are used when a break occurs. The value of the stack pointer (R15) must be correctly set in advance because a user stack is to be used.

While disabled, the value of R0 may become incorrect when a break occurs due to a S/W break. By default, use of a user stack is disabled.

For details on the command, refer to the help file.

Example
To enable use of a user stack:
>SH2A_SBSTK enable

A hardware breakpoint can halt the program immediately before executing the instruction at the address where a breakpoint is set, in the same manner as the S/W breakpoint.

Use the "Prefetch address break before executing" condition of the On Chip Event hardware breakpoint.

3.1.2   Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while the DIVU or DIVS instruction is being executed, the condition set at the next instruction may be displayed as the break cause.

3.2   Tracing

3.2.1   Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

3.2.2   AUD Trace

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Trace acquisition mode
  — When you use the DMAC in the SH7263, do not select the non-realtime trace mode as the AUD trace acquisition mode.
  — When you use 'Auto Refresh' of the SDRAM for the SH7263, do not select the non-realtime trace mode as the AUD trace acquisition mode.

3.3 Display of the Memory Content and Operation of Memory

3.3.1 Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00)
  — When the external-bus frequency is 45 to 66.67 MHz: 8 cycles or more
  — When the external-bus frequency is lower than 45 MHz: 6 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01)
  — When the external-bus frequency is 45 to 66.67 MHz: 3 cycles or more
  — When the external-bus frequency is lower than 45 MHz: 2 cycles or more

3.4 Device Selection in the Diagnostic Test Program

When you are requested to select a device series while executing the diagnostic test program, select "SH7200".

3.5 Performance Measurement

3.5.1 Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

4 Notes Specific to the SH7211 E200F Emulator

4.1 Event Function

4.1.1 S/W Breakpoint

If you wish to use a S/W break (software break), specify the SH2A_SBSTK command to enable use of a user stack before setting a S/W break.

While enabled, extra four bytes of a user stack are used when a break occurs. The value of the stack pointer (R15) must be correctly set in advance because a user stack is to be used.

While disabled, the value of R0 may become incorrect when a break occurs due to a S/W break. By default, use of a user stack is disabled.

For details on the command, refer to the help file.

Example

To enable use of a user stack:
>SH2A_SBSTK enable

A hardware breakpoint can halt the program immediately before executing the instruction at the address where a breakpoint is set, in the same manner as the S/W breakpoint.

Use the "Prefetch address break before executing" condition of the On Chip Event hardware breakpoint.

4.1.2 Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while the DIVU or DIVS instruction is being executed, the condition set at the next instruction may be displayed as the break cause.

4.2 Tracing
4.2.1 Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

4.2.2 AUD Trace

- Software trace

The software trace function is not available.

4.3 Display of the Memory Content and Operation of Memory
4.3.1 Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00): 6 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01): 3 cycles or more

4.4 Performance Measurement
4.4.1 Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

5　Notes Specific to the SH7286, SH7285, SH7243 E200F Emulator

5.1　Event Function

5.1.1　S/W Breakpoint

If you wish to use a S/W break (software break), specify the SH2A_SBSTK command to enable use of a user stack before setting a S/W break.

While enabled, extra four bytes of a user stack are used when a break occurs. The value of the stack pointer (R15) must be correctly set in advance because a user stack is to be used.

While disabled, the value of R0 may become incorrect when a break occurs due to a S/W break. By default, use of a user stack is disabled.

For details on the command, refer to the help file.

Example

To enable use of a user stack:
>SH2A_SBSTK enable

A hardware breakpoint can halt the program immediately before executing the instruction at the address where a breakpoint is set, in the same manner as the S/W breakpoint.

Use the "Prefetch address break before executing" condition of the On Chip Event hardware breakpoint.

5.1.2　Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while the DIVU or DIVS instruction is being executed, the condition set at the next instruction may be displayed as the break cause.

5.2　Tracing

5.2.1　Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

5.2.2　AUD Trace

- Software trace

The software trace function is not available.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

5.3　Display of the Memory Content and Operation of Memory
5.3.1　Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00)
    — When the external-bus frequency is 30 to 50 MHz: 8 cycles or more
    — When the external-bus frequency is lower than 30 MHz: 6 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01)
    — When the external-bus frequency is 30 to 50 MHz: 3 cycles or more
    — When the external-bus frequency is lower than 30 MHz: 2 cycles or more

5.4　Power-On Reset Emulation

Power-on reset emulation is not possible with the SH7286, SH7285, SH7243 E200F emulator.

Power-on reset emulation refers to either of the following functions:

- After power of the user system has been turned off and then turned on again, execution of the user program resumes at the reset vector (during user program execution)
- Even when power of the user system is off, programming of the internal ROM, internal RAM, or registers is possible (during a break)

5.5　Performance Measurement
5.5.1　Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

6　Notes Specific to the SH72546RFCC, SH72544R, SH72543R, SH72531, SH72531FCC E200F Emulator

6.1　Event Function

6.1.1　Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while the DIVU or DIVS instruction is being executed, the condition set at the next instruction may be displayed as the break cause.

6.2　Tracing

6.2.1　Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

6.2.2　AUD Trace

- Software trace

The software trace function is not available.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Restrictions

Do not turn off the power of the target system or reset the emulator by an input of the reset signal or making the WDT overflow. To prevent a reset input to the emulator, remove the tick from the [User Reset enable] checkbox in [User Signals] on the [Eva Board] page.

6.3 Display of the Memory Content and Operation of Memory

6.3.1 Emulation Memory

To use the emulation memory in the emulation memory unit (R0E0200F1MSR00 or R0E0200F1MSR01), specify three or more access wait-cycles to areas set as the emulation memory.

6.4 Performance Measurement

6.4.1 Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

6.5 Setting Emulation RAM

When you use emulation RAM, select [Disable] for [Flash memory synchronization] in the [Configuration] dialog box.

6.6 User Boot Mode

After the emulator has been booted up in the user boot mode, do not set software breakpoints. Use on-chip event points instead.

6.7 JTAG Clock Frequency

The frequency of the JTAG clock (TCK) for the SH72544R, SH72543R, SH72531FCC, and SH72531 must be equal to or lower than that of the peripheral module clock.

The frequency of the JTAG clock (TCK) for the SH72546RFCC must be equal to or lower than that of the clock input to the EXTAL pin.

6.8 Emulator Functions for the SH72531 and SH72531FCC

During on-chip debugging without the EV-chip unit, some of the emulator functions are not available as shown below.

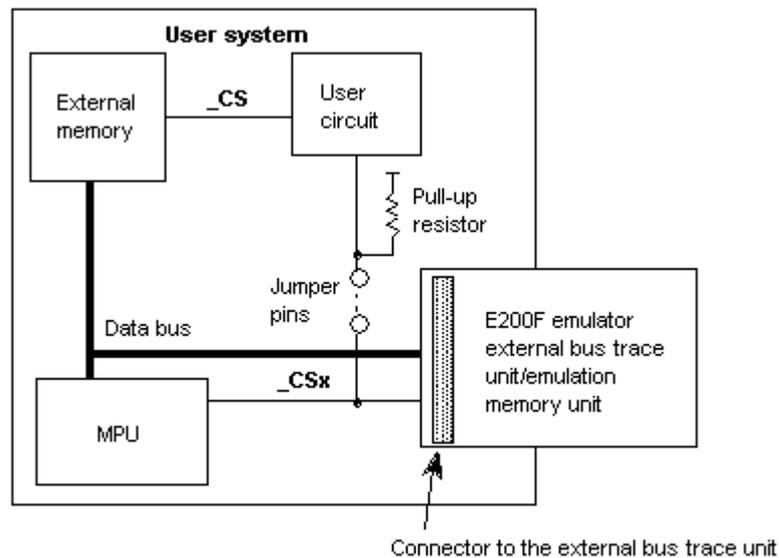Table 6.1   Emulator Functions for the SH72531 and SH72531FCC

	Internal Trace	AUD Trace	Events	Performance Measurement	ERAM
SH72531	—	—	✓	—	—
SH72531FCC	✓	—	✓	—	64 Kbytes x 8

6.9 MCU Selection for the Diagnostic Test

If you wish to use the diagnostic program, select the SH72546 as the MCU.

7   Notes on Using Emulation Memory with the SH7206, SH7211 Group

- If you connect the EV-chip unit to the emulator and assign emulation memory, the CS signals output from the emulator to the user system will be fixed high. Thus you cannot access user circuits such as external memory on the user system.
- If you wish to use emulation memory in on-chip debugging mode, circuits on the user system must be configured in a way that the external memory on the user system will not be manipulated by the CSx signals issued at accesses to emulation memory. As shown in the figure below, connect a pull-up resistor and jumper pins to the CSx signals that correspond to the areas where emulation memory is assigned. Even when you do not use the emulation memory, connection of the CS signals can be easily changed.

Note: The H-UDI connector is not shown in this figure.

Figure   CS Signals in On-Chip Debugging Mode

8 Notes Specific to the SH7083, SH7084, SH7085, SH7086, SH7146, SH7149, SH7124, SH7125 E200F Emulator

8.1 MPUs with Functional Restrictions

Under an environment that uses an MPU with functional restrictions, message "This microcomputer has functional restrictions." will be displayed on screen at initiation of the emulator. While using such MPUs, the following restrictions apply to the emulator functions.

No.	Function Name	Restriction	
1	Performance function	Not available	
2	AUD trace function	Not available	
3	Internal trace function	Not available	
4	Eventpoints	Event Condition	• Do not change the setting during user program execution. • No trace condition or performance condition can be set. • No sequential condition can be set. • Do not use a data condition on CH1/2.
5	[Configuration] dialog box	[Step option]	Do not change the setting.
		[Flash memory synchronization]	Only use [Disable].
6	Memory access	Do not change the memory contents (e.g. via the [Memory] window) during user program execution.	

8.2 Event Function

8.2.1 Setting On-Chip Event Conditions

— To use eventpoints as trace conditions, do not use a data condition on CH1/2.

— If the satisfaction is contended between the DMA or DTC transfer and conditions of Event Condition including the external bus access condition, the followings may be disabled: generation of a break after the satisfaction of conditions of Event Condition, halting and acquisition of the internal trace, and the start or end of performance measurement.

8.3 Tracing

8.3.1 Internal Trace

• SH7083, SH7084, SH7085, and SH7086
   — Incorrect data may be shown at the first line of trace information
   — The trace acquisition result of the DMA or DTC transfer may not be displayed correctly. In such a case, a master where the trace has been generated or a line for displaying the trace will be blank.

• SH7146 and SH7149
   — Incorrect data may be shown at the first line of trace information
   — The trace acquisition result of the DMA or DTC transfer may not be displayed correctly. In such a case, a master where the trace has been generated or a line for displaying the trace will be blank.

• SH7124 and SH7125 (only when debugging with a connection to the EV-chip unit)
   — Incorrect data may be shown at the first line of trace information

8.4 Display of the Memory Content and Operation of Memory

8.4.1 Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00): 8 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01): 3 cycles or more

8.5 I/O Ports

While debugging R5F70834A, R5F70835A, R5F70844A, R5F70845A, R5F70854A, R5F70855A, R5E70835R, R5E70845R, R5E70855R, SH71240, SH71241, SH71242, SH71243, SH71250, SH71251, SH71252, or SH71253 with the EV-chip unit connected to the emulator, values read from bits 8 to 15 of port F data register L (PFDRL) are undefined. In addition, while debugging R5F71464R, R5F71494R (R5F71491R), R5E71464R, or R5E71494R (R5E71491R) with the EV-chip unit connected to the emulator, values read from bits 1, 3, 5, and 7 of port F data register L (PFDRL) are undefined.

8.6 A-Mask Versions of the SH7124 and SH7125

If you wish to debug the SH71240A, SH71241A, SH71250A, or SH71251A with the EV-chip unit connected to the emulator, select the device name without "A" (e.g. select SH71240 instead of SH71240A) in the [Select Emulator mode] dialog box.

The SH71240A, SH71241A, SH71250A, and SH71251A do not have debugging functions. If you wish to debug any of these devices without the EV-chip unit connected to the emulator (i.e. on-chip connection), replace it with the corresponding device that supports debugging functions.

Table   Debugging of A-Mask Versions without the EV-Chip Unit Connected

Device in Use	Replacement (This Must Also be Selected in the [Select Emulator mode] Dialog Box)
SH71240A	SH71242 and SH71243
SH71241A	SH71242 and SH71243
SH71250A	SH71252 and SH71253
SH71251A	SH71252 and SH71253

8.7 [Writing Flash Memory] Mode

If you are using the SH71240, SH71241, SH71242, SH71243, SH71250, SH71251, SH71252, or SH71253 and write to the internal flash memory in the [Writing Flash Memory] mode, the checksum value is always handled as 128 Kbytes.

9   Notes Specific to the SH7136, SH7137, SH7142, SH7147 E200F Emulator

9.1 Connecting the E200F Emulator and the User System

The E200F emulator does not support debugging of the SH7142, SH7147 series without a connection to the EV-chip unit. Connection between the emulator and the user system is only possible via a user system interface board; in other words, connection via the H-UDI port connector is not supported. Do not apply the connection shown in section 1.5, Recommended Circuit between the H-UDI Port Connector and the MPU, in the SH-2A, SH-2 E200F Emulator Additional Document for User's Manual, Supplementary Information on Using the SH7147.

9.2 Event Function
9.2.1 Setting On-Chip Event Conditions
— To use eventpoints as trace conditions, do not use a data condition on CH1/2.

— The trace acquisition result of the DTC transfer may not be displayed correctly. In such a case, a master where the trace has been generated or a line for displaying the trace will be blank.

9.3 Tracing
9.3.1 Internal Trace
• SH7136, SH7137, SH7142, and SH7147

— Incorrect data may be shown at the first line of trace information

— The trace acquisition result of the DTC transfer may not be displayed correctly. In such a case, a master where the trace has been generated or a line for displaying the trace will be blank.

9.4 Display of the Memory Content and Operation of Memory
9.4.1 Emulation Memory
To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

• Emulation memory on the trace unit (R0E0200F1ETU00): 8 cycles or more

• Emulation memory on the emulation memory unit
(R0E0200F1MSR00 or R0E0200F1MSR01): 3 cycles or more

10 Notes on Using Emulation Memory with the SH7080, SH7146, SH7147 Group

If you wish to use emulation memory, use the mask switch on the user system interface board to mask the CSx signals that correspond to the areas where emulation memory is assigned, so that the external memory on the user system will not malfunction. For details on the mask switch, refer to section 3, User Interface Specifications, in the user's manual for respective user interface boards.

11 Notes Specific to the SH7214, SH7216 E200F Emulator

11.1 Event Function

11.1.1 Setting On-Chip Event Conditions

If a condition to cause a break at the address of a prefetch has been set at the next instruction of a DIVU or DIVS instruction and a break occurs while executing the DIVU or DIVS instruction, the condition to cause a break at the address of a prefetch set at the next instruction may be displayed as the break cause.

11.2 Tracing

11.2.1 Internal Trace

- Point-to-point trace at acquisition of I-bus trace information

To acquire I-bus trace information, do not set point-to-point trace as a sequential condition of On Chip Event.

- Point-to-point trace specification

If point-to-point trace is selected, trace acquisition starts at several instructions before the trace-start condition. Also note that the trace acquisition ends at several instructions before the trace-end condition.

- Event Condition 5 (trace-start condition) in point-to-point trace

During point-to-point trace, Event Condition 5 is satisfied even at an overrun-fetched instruction (an instruction that is not executed although it has been fetched at a branch or transition to an interrupt). Trace acquisition starts but stops when overrun-fetching is achieved (a branch is completed). The emulator may not be able to stop trace acquisition even if overrun-fetching is achieved, however, depending on the timing that the condition was satisfied. In such cases, the emulator continues trace acquisition until Event Condition 6 (trace-end condition) is satisfied.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

- Writing memory immediately before generating a break

If an instruction is executed to write memory immediately before generating a break, trace acquisition may not be performed.

11.2.2 AUD Trace

- Software trace

The software trace function is not available.

- Break after branch instructions

If a break occurs immediately after executing a non-delayed branch instruction or TRAPA instruction, or generating a branch due to an exception or interrupt, trace information of one branch immediately before the break will not be acquired.

However, this problem does not apply to software breaks and breaks by Event Condition caused at the address of a prefetch.

11.3 Display of the Memory Content and Operation of Memory

11.3.1 Emulation Memory

To use the emulation memory, specify the following number of access wait-cycles to areas set as the emulation memory:

- Emulation memory on the trace unit (R0E0200F1ETU00)
  — When the external-bus frequency is 30 to 50 MHz: 8 cycles or more
  — When the external-bus frequency is lower than 30 MHz: 6 cycles or more
- Emulation memory on the emulation memory unit
  (R0E0200F1MSR00 or R0E0200F1MSR01)
  — When the external-bus frequency is 30 to 50 MHz: 3 cycles or more
  — When the external-bus frequency is lower than 30 MHz: 2 cycles or more

11.4 Power-On Reset Emulation

Power-on reset emulation is not possible with the SH7214, SH7216 E200F emulator. Power-on reset emulation refers to either of the following functions:

- After power of the user system has been turned off and then turned on again, execution of the user program resumes at the reset vector (during user program execution)
- Even when power of the user system is off, programming of the internal ROM, internal RAM, or registers is possible (during a break)

11.5 Performance Measurement

12.5.1 Measurement of the Number of Exceptions and Interrupts

Even when [Exception/interrupt counts (EA)] is selected as the measurement item, no trap-instruction exception caused by TRAPA instructions will be counted.

11.6 MCU Operating Mode

Boot mode and user boot mode are not supported.

11.7 Device Selection for On-Chip Connection

For on-chip connection, the selection in the [Select Emulator mode] dialog box varies depending on the week code of the SH7216. If the week code of the device you are using is earlier than 0927, select either of the followings in the [Select Emulator mode] dialog box.

R5F72167ADF (with a week code earlier than 0927): R5F72167ADF_Option

R5F72167ADB (with a week code earlier than 0927): R5F72167ADB_Option

11.8 Emulation of Programming or Erasing of the Internal Flash Memory

If you wish to emulate programming or erasing of the internal flash memory in the [Writing Flash Memory] mode, select [Flash memory to PC] or [PC to flash memory, Flash memory to PC] from the [Flash memory synchronization] drop-down list box on the [General] page of the [Configuration] dialog box. That is, do not select [Disable] or [PC to flash memory]. In addition, select [Eeprom memory to PC] from the [Eeprom memory synchronization] drop-down list box. Do not select [Disable].

12 Commands Specific to High-Performance Embedded Workshop

The following commands are specific to High-Performance Embedded Workshop:

No.	Command	Function
(1)	hdi cmd	Executes an HDI command.
(2)	hdi expr	Evaluates an expression.
(3)	hdi memread	Reads data from the target system memory.
(4)	hdi memwrite	Writes a list of data items to the target system memory.
(5)	hdi progress	Sets the text and percentage shown on the progress bar.
(6)	hdi doevents	Allows background processing and other windows programs to execute while a TCL script is running.
(7)	Radix	Sets the default radix used when parsing numbers.
(8)	hdi msgbox	Displays a Windows message box.
(9)	hdi assemble	Assembles text to a list of bytes.
(10)	hdi getbrkcause	Returns a platform specific string giving the reason for the last user program break.
(11)	hdi islinkup	Returns true (non-zero) if the link to the debugging platform (emulator) is up.
(12)	hdi status	Returns a platform specific status line.

(1) hdi cmd
Execute a High-Performance Embedded Workshop command

SYNOPSIS
hdi cmd command
          command

This command allows any of the High-Performance Embedded Workshop commands to be executed from within a Tcl script. The second form is provided for convenience so that the programmer can freely mix High-Performance Embedded Workshop and Tcl commands in the script without having to know which are High-Performance Embedded Workshop commands.

Returns either an empty string if the command completed successfully, or an error message.

(2) hdi expr
Evaluate an expression

SYNOPSIS
hdi expr expression

This allows symbol names and register names to be used in the expression.

Returns the resulting integer value in hex, with a leading d'.

(3) hdi memread

Read data from the target system memory

SYNOPSIS

hdi memread space address count size

This command allows the Tcl script to read data from the target memory. The arguments are as follows:

space   Specifies which address space is to be used. This argument is only of significance for processors which support multiple address spaces. For processors which only support a single address space, this argument should be zero.

address   The address of the first data item to be read.

count   The number of data items to read.

size   The size of the data items to be read; 1 = byte, 2 = word, 4 = long word.

Returns a list containing the data items.

(4) hdi memwrite

Writes a list of data items to the target system memory.

SYNOPSIS

hdi memwrite space address size data

This command allows the Tcl script to write data to the target memory. The arguments are as follows:

space   Specifies which address space is to be used. This argument is only of significance for processors which support multiple address spaces. For processors which only support a single address space, this argument should be zero.

address   The address of the first data item to be written.

size   The size of the data items to be read; 1 = byte, 2 = word, 4 = longword.

data   A list of data items.

Returns an empty string on success, or an error string on failure.

(5) hdi progress

Set the text and percentage shown on the progress bar.

SYNOPSIS

hdi progress text percentage

Sets the status bar to show the text and percentage specified.

(6) hdi doevents

Allows background processing and other windows programs to execute while a TCL script is running. If you have a long loop it is a good idea to include this in the loop body.

SYNOPSIS

hdi doevents

(7) Radix

Sets the default radix used when parsing numbers.

SYNOPSIS

radix

radix base

If the first form is used then the current default radix is returned.

(8) hdi msgbox

Display a Windows message box..

SYNOPSIS

hdi msgbox text [options]

Displays a message box containing "text". Options is a number representing the standard windows message box options:

0x0000   Display OK button

0x0001   Display OK and Cancel buttons

0x0002   Display Abort Retry and Ignore buttons.

0x0003   Display Yes No and Cancel buttons.

0x0004   Display Yes and No buttons.

0x0005   Display Retry and cancel buttons.

0x0010   Display a Hand icon.

0x0020   Display a Question mark icon.

0x0030   Display an Exclamation mark icon.

0x0040   Display an Asterisk icon.

These values may be Ored together. The default value is 0 (OK button).

The following values are returned:

1   OK button

2   Cancel button

3   Abort button

4   Retry button

5   Ignore button

6   Yes button

7   No button

(9) hdi assemble

Assemble text to a list of bytes.

SYNOPSIS

hdi assemble address instruction

Assembles the instruction for the current CPU at the specified address and returns a list of bytes. Does not load the code into memory.

(10) hdi getbrkcause

Returns a platform specific string giving the reason for the last user program break (stop).

SYNOPSIS

hdi getbrkcause

(11) hdi islinkup

Returns true (non-zero) if the link to the debugging platform (emulator) is up.

SYNOPSIS

hdi islinkup

(12) hdi status

Returns a platform specific status line.

SYNOPSIS

hdi status linenumber

Returns one of the platform specific status lines as a string. The status lines are displayed in the status window.

13 Installation and Uninstallation

13.1 Uninstallation from [Tools Administration]

Note that a message dialog box appears for confirmation if the folder to be removed includes a file other than those installed. Even though this dialog box is displayed, press the [Ignore] button to continue uninstallation.

13.2 [Add/Remove Programs Properties] of the Control Panel

Note the followings:

- Uninstalling from [Add/Remove Programs Properties] of the control panel only removes folders and files of the product most recently installed if several products that conform to High-Performance Embedded Workshop have been installed. Use the explorer to remove the folders and files of the rest of the products.
- Once uninstallation is attempted, even the products that were not removed may not operate correctly. If you want to use these products, re-install them.

14 Usage with Other Products

To install the SuperH™ RISC engine C/C++ compiler package or H8S, H8/300 series C/C++ compiler package after installing the E200F emulator software, select [High-performance Embedded Workshop] as the component to be installed in [Select Components] during installation of the compiler package.