To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: http://www.renesas.com

April 1st, 2010
Renesas Electronics Corporation

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

Send any inquiries to http://www.renesas.com/inquiry.

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.

   "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.

   "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.

   "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

User's Manual

SuperH™ Family E10A-USB Emulator

Additional Document for User's Manual Supplementary Information on Using the SH7125 and SH7124

Renesas Microcomputer Development Environment System

SuperH™ Family / SH/Tiny Series

E10A-USB for SH7125 HS7125KCU01HE

Renesas Electronics
www.renesas.com

Rev.4.00 2010.01

Notes regarding these materials

1. This document is provided for reference purposes only so that Renesas customers may select the appropriate Renesas products for their use. Renesas neither makes warranties or representations with respect to the accuracy or completeness of the information contained in this document nor grants any license to any intellectual property rights or any other rights of Renesas or any third party with respect to the information in this document.
2. Renesas shall have no liability for damages or infringement of any intellectual property or other rights arising out of the use of any information in this document, including, but not limited to, product data, diagrams, charts, programs, algorithms, and application circuit examples.
3. You should not use the products or the technology described in this document for the purpose of military applications such as the development of weapons of mass destruction or for the purpose of any other military use. When exporting the products or technology described herein, you should follow the applicable export control laws and regulations, and procedures required by such laws and regulations.
4. All information included in this document such as product data, diagrams, charts, programs, algorithms, and application circuit examples, is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas products listed in this document, please confirm the latest product information with a Renesas sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas such as that disclosed through our website. (http://www.renesas.com)
5. Renesas has used reasonable care in compiling the information included in this document, but Renesas assumes no liability whatsoever for any damages incurred as a result of errors or omissions in the information included in this document.
6. When using or otherwise relying on the information in this document, you should evaluate the information in light of the total system before deciding about the applicability of such information to the intended application. Renesas makes no representations, warranties or guaranties regarding the suitability of its products for any particular application and specifically disclaims any liability arising out of the application and use of the information in this document or Renesas products.
7. With the exception of products specified by Renesas as suitable for automobile applications, Renesas products are not designed, manufactured or tested for applications or otherwise in systems the failure or malfunction of which may cause a direct threat to human life or create a risk of human injury or which require especially high quality and reliability such as safety systems, or equipment or systems for transportation and traffic, healthcare, combustion control, aerospace and aeronautics, nuclear power, or undersea communication transmission. If you are considering the use of our products for such purposes, please contact a Renesas sales office beforehand. Renesas shall have no liability for damages arising out of the uses set forth above.
8. Notwithstanding the preceding paragraph, you should not use Renesas products for the purposes listed below:
   (1) artificial life support devices or systems
   (2) surgical implantations
   (3) healthcare intervention (e.g., excision, administration of medication, etc.)
   (4) any other purposes that pose a direct threat to human life

   Renesas shall have no liability for damages arising out of the uses set forth in the above and purchasers who elect to use Renesas products in any of the foregoing applications shall indemnify and hold harmless Renesas Technology Corp., its affiliated companies and their officers, directors, and employees against any and all damages arising out of such applications.
9. You should use the products described herein within the range specified by Renesas, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas shall have no liability for malfunctions or damages arising out of the use of Renesas products beyond such specified ranges.
10. Although Renesas endeavors to improve the quality and reliability of its products, IC products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Please be sure to implement safety measures to guard against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other applicable measures. Among others, since the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
11. In case Renesas products listed in this document are detached from the products to which the Renesas products are attached or affixed, the risk of accident such as swallowing by infants and small children is very high. You should implement safety measures so that Renesas products may not be easily detached from your products. Renesas shall have no liability for damages arising out of such detachment.
12. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written approval from Renesas.
13. Please contact a Renesas sales office if you have any questions regarding the information contained in this document, Renesas semiconductor products, or if you have any other inquiries.

Regulatory Compliance Notices

European Union Regulatory Notices on Electromagnetic Compatibility

CE Certifications:

This product complies with the following European EMC standards.

- EMC Directive 2004/108/EC

  EN 55022 Class A

WARNING:	This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

  EN 55024

Information for Traceability:

- Authorized representative

  Name: Renesas Technology Corp.

  Address: Nippon Bldg., 2-6-2, Ote-machi, Chiyoda-ku, Tokyo 100-0004, Japan
- Manufacturer

  Name: Renesas Solutions Corp.

  Address: Nippon Bldg., 2-6-2, Ote-machi, Chiyoda-ku, Tokyo 100-0004, Japan
- Person responsible for placing on the market

  Name: Renesas Technology Europe Limited European Headquarters

  Address: Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.

United States Regulatory Notices on Electromagnetic Compatibility

FCC Certifications:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

CAUTION:	Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

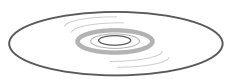
Contents

Section 1 Connecting the Emulator with the User System

1.1 Components of the Emulator

The E10A-USB emulator supports the SuperH™ family SH/Tiny series (SH7125 group or SH7124 group). Table 1.1 lists the components of the emulator.

Table 1.1 Components of the Emulator

Classi-fication	Component	Appearance	Quan-tity	Remarks
Hard-ware	Emulator box		1	HS0005KCU01H: Depth: 65.0 mm, Width: 97.0 mm, Height: 20.0 mm, Mass: 72.9 g or HS0005KCU02H: Depth: 65.0 mm, Width: 97.0 mm, Height: 20.0 mm, Mass: 73.7 g
	User system interface cable		1	14-pin type: Length: 20 cm, Mass: 33.1 g
	User system interface cable		1	36-pin type: Length: 20 cm, Mass: 49.2 g (only for HS0005KCU02H)
	USB cable		1	Length: 150 cm, Mass: 50.6 g
Soft-ware	E10A-USB emulator setup program, SuperH™ Family E10A-USB Emulator User's Manual, Supplementary Information on Using the SH7125 and SH7124*, and Test program manual for HS0005KCU01H and HS0005KCU02H		1	HS0005KCU01SR, HS0005KCU01HJ, HS0005KCU01HE, HS7125KCU01HJ, HS7125KCU01HE, HS0005TM01HJ, and HS0005TM01HE (provided on a CD-R)

Note: Additional document for the MCUs supported by the emulator is included. Check the target MCU and refer to its additional document.

1.2 Connecting the Emulator with the User System

To connect the E10A-USB emulator (hereinafter referred to as the emulator), the H-UDI port connector must be installed on the user system to connect the user system interface cable. When designing the user system, refer to the recommended circuit between the H-UDI port connector and the MCU. In addition, read the E10A-USB emulator user's manual and hardware manual for the related device.

Table 1.2 shows the type number of the emulator and the corresponding connector type.

Table 1.2 Type Number and Connector Type

Type Number	Connector
HS0005KCU01H, HS0005KCU02H	14-pin connector

1.3 Installing the H-UDI Port Connector on the User System

Table 1.3 shows the recommended H-UDI port connector for the emulator.

Table 1.3 Recommended H-UDI Port Connector

Connector	Type Number	Manufacturer	Specifications
14-pin connector	2514-6002	Minnesota Mining & Manufacturing Ltd.	14-pin straight type

Note: When designing the 14-pin connector layout on the user board, do not place any components within 3 mm of the H-UDI port connector.

1.4 Pin Assignments of the H-UDI Port Connector

Figure 1.1 shows the pin assignments of the H-UDI port connector.

Note: Note that the pin number assignments of the H-UDI port connector shown on the following page differ from those of the connector manufacturer.

Pin No.	Signal		Input/ Output*1	SH7125 Pin No.	SH7124 Pin No.	Note
1	TCK		Input	28	20	
2	_TRST	*2	Input	32	23	
3	TDO		Output	26	16	
4	_ASEBRKAK / _ASEBRK	*2	Input/ output	45	33	
5	TMS		Input	31	22	
6	TDI		Input	27	18	
7	_RES	*2	Output	39	27	User reset
8	N.C.		—			
9	(GND)	*4	—			
11	UVCC		Output			
10, 12, and 13	GND		—			
14	GND	*3	Output			

Notes: 1. Input to or output from the user system.
2. The symbol (_) means that the signal is active-low.
3. The emulator monitors the GND signal of the user system and detects whether or not the user system is connected.
4. When the user system interface cable is connected to this pin and the _ASEMD0 pin is set to 0, do not connect to GND but to the _ASEMD0 pin directly.

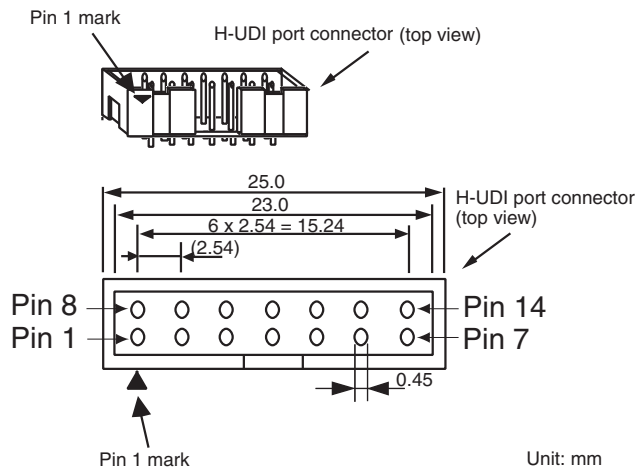


Figure 1.1 Pin Assignments of the H-UDI Port Connector

1.5 Recommended Circuit between the H-UDI Port Connector and the MCU

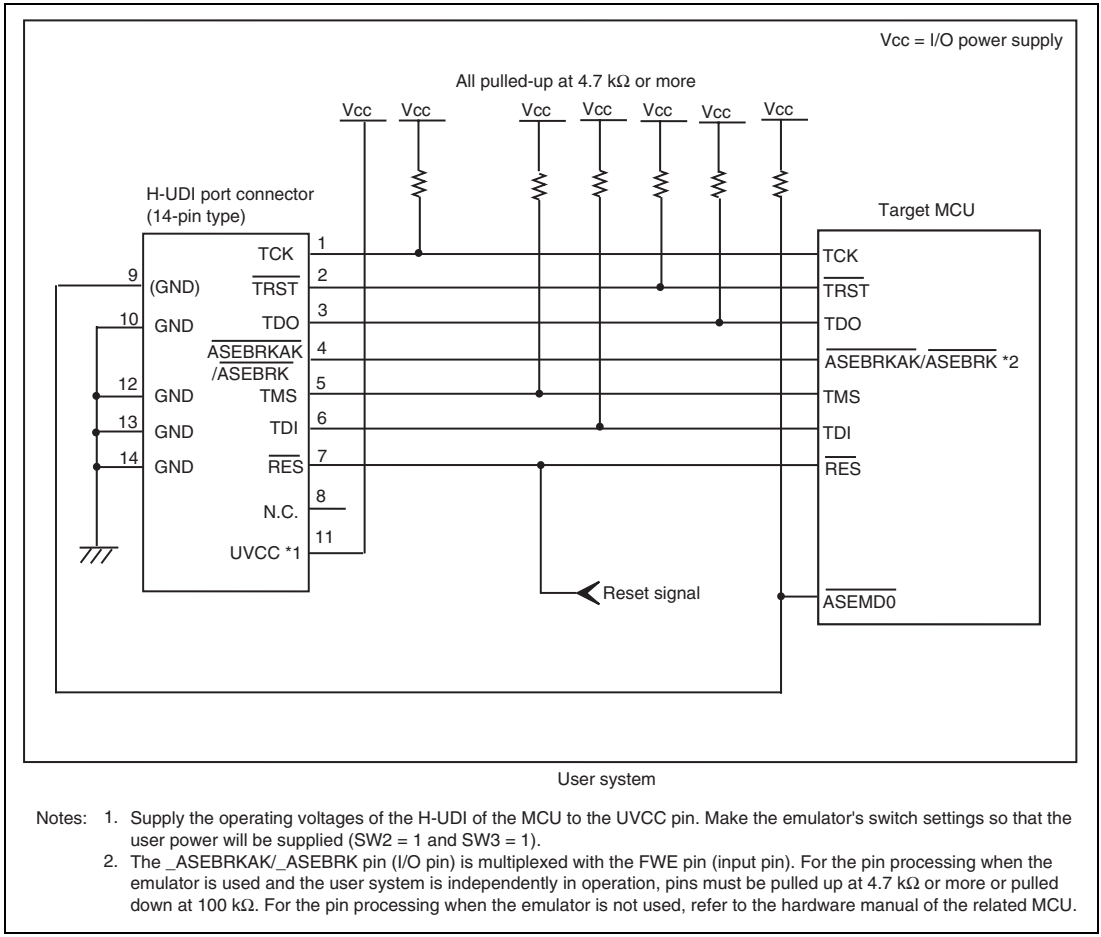
1.5.1 Recommended Circuit (14-Pin Type)

Figure 1.2 shows a recommended circuit for connection between the H-UDI port connector and the MCU when the emulator is in use.

Notes: 1. Do not connect anything to the N.C. pins of the H-UDI port connector.

2. The _ASEMD0 pin must be 0 when the emulator is connected and 1 when the emulator is not connected, respectively.
   (1) When the emulator is used: _ASEMD0 = 0
   (2) When the emulator is not used: _ASEMD0 = 1
   Figure 1.2 shows an example of circuits that allow the _ASEMD0 pin to be GND (0) whenever the emulator is connected by using the user system interface cable.
   When the _ASEMD0 pin is changed by switches, etc., ground pin 9. Do not connect this pin to the _ASEMD0 pin.
3. When a network resistance is used for pull-up, it may be affected by a noise. Separate TCK from other resistances.
4. The pattern between the H-UDI port connector and the MCU must be as short as possible. Do not connect the signal lines to other components on the board.
5. Supply the operating voltage of the H-UDI of the MCU to the UVCC pin. Make the emulator's switch settings so that the user power will be supplied (SW2 = 1 and SW3 = 1).
6. The resistance value shown in figure 1.2 is for reference.
7. For the pin processing in cases where the emulator is not used, refer to the hardware manual of the related MCU.

When the circuit is connected as shown in figure 1.2, the switches of the emulator are set as SW2 = 1 and SW3 = 1. For details, refer to section 3.8, Setting the DIP Switches, in the SuperH™ Family E10A-USB Emulator User's Manual.



Notes: 1. Supply the operating voltages of the H-UDI of the MCU to the UVCC pin. Make the emulator's switch settings so that the user power will be supplied (SW2 = 1 and SW3 = 1).
2. The _ASEBRKAK/_ASEBRK pin (I/O pin) is multiplexed with the FWE pin (input pin). For the pin processing when the emulator is used and the user system is independently in operation, pins must be pulled up at 4.7 kΩ or more or pulled down at 100 kΩ. For the pin processing when the emulator is not used, refer to the hardware manual of the related MCU.

Figure 1.2 Recommended Circuit for Connection between the H-UDI Port Connector and MCU when the Emulator is in Use

Section 2 Software Specifications when Using the SH7125 or SH7124 Group

2.1 Differences between the MCU and the Emulator

1. When the emulator system is initiated, it initializes the general registers and part of the control registers. The initial values of the MCU are undefined. When the emulator is initiated from the workspace, a value to be entered is saved in a session.

Table 2.1 Register Initial Values at Emulator Link Up

Register	Emulator at Link Up
R0 to R14	H'00000000
R15 (SP)	Value of the SP in the power-on reset vector table
PC	Value of the PC in the power-on reset vector table
SR	H'000000F0
GBR	H'00000000
VBR	H'00000000
MACH	H'00000000
MACL	H'00000000
PR	H'00000000

2. The emulator uses the H-UDI; do not access the H-UDI.
3. Low-Power States
   - When the emulator is used, the sleep state can be cleared with either the clearing function or with the [STOP] button, and a break will occur.
   - The memory must not be accessed or modified in software standby state.
   - When the emulator is used, do not use the deep software standby mode.

4. Reset Signals

   The MCU reset signals are only valid during emulation started with clicking the GO or STEP-type button. If these signals are enabled on the user system in command input wait state, they are not sent to the MCU.

Note: Do not break the user program when the /RES, /BREQ, or /WAIT signal is being low. A TIMEOUT error will occur. If the /BREQ or /WAIT signal is fixed to low during break, a TIMEOUT error will occur at memory access. (Some MCUs will incorporate no /BREQ or /WAIT signal.)

5. Memory Access during User Program Execution

   During execution of the user program, memory is accessed by the following two methods, as shown in table 2.2.

Table 2.2 Memory Access during User Program Execution

Method	Description
H-UDI read/write	The stopping time of the user program is short because memory is accessed by the dedicated bus master.
Short break	This method is not used in this product. (Do not set short break.)

   The method for accessing memory during execution of the user program is specified by using the [Configuration] dialog box.

Table 2.3 Stopping Time by Memory Access (Reference)

Method	Condition	Stopping Time
H-UDI read/write	Reading of one longword for the internal RAM	Reading: Maximum 2 bus clocks (Bϕ)
	Writing of one longword for the internal RAM	Writing: Maximum 2 bus clocks (Bϕ)

6. Using WDT

   The WDT does not operate during break.

7. Loading Sessions

   Information in [JTAG clock] of the [Configuration] dialog box cannot be recovered by loading sessions. Thus the TCK value will be as follows:

   — When HS0005KCU01H or HS0005KCU02H is used: TCK = 2.5 MHz

8. [IO] Window

   — Display and modification

   For each watchdog timer register, there are two registers to be separately used for write and read operations.

Table 2.4 Watchdog Timer Register

Register Name	Usage	Register
WTCSR (W)	Write	Watchdog timer control/status register
WTCNT (W)	Write	Watchdog timer counter
WTCSR(R)	Read	Watchdog timer control/status register
WTCNT(R)	Read	Watchdog timer counter

— Customization of the I/O-register definition file

After the I/O-register definition file is created, the MCU's specifications may be changed. If each I/O register in the I/O-register definition file differs from addresses described in the hardware manual, change the I/O-register definition file according to the description in the hardware manual. The I/O-register definition file can be customized depending on its format. Note that, however, the emulator does not support the bit-field function.

— Verify

In the [IO] window, the verify function of the input value is disabled.

9. Illegal Instructions

Do not execute illegal instructions with STEP-type commands.

10. MCU Operating Mode

Note that the emulator does not support the boot mode.

11. Multiplexing the Emulator Pins

The emulator pin is assigned as shown in table 2.5.

Table 2.5 Multiplexed Functions

MCU	Function 1	Function 2
SH7125 group	FWE	_ASEBRKAK/_ASEBRK
	PA3/_IRQ1/RXD1	_TRST
	PA4/_IRQ2/TXD1	TMS
	PA7/TCLKB/SCK2	TCK
	PA8/TCLKC/RXD2	TDI
	PA9/TCLKD/TXD2/POE8	TDO
SH7124 group	FWE	_ASEBRKAK/_ASEBRK
	PA3/_IRQ1/RXD1	_TRST
	PA4/_IRQ2/TXD1	TMS
	PA7/TCLKB/SCK2	TCK
	PA8/TCLKC/RXD2	TDI
	PA9/TCLKD/TXD2/POE8	TDO

The emulator pins are multiplexed with other pins. When the emulator is connected, function 1 cannot be used.

12. A-Mask Versions of Products in the SH7124 and SH7125 Groups

The SH71250A, SH71251A, SH71240A, and SH71241A do not have user debug interfaces (H-UDI), so are not connectable to the emulator. If the emulator is to be used, use the SH71252 (R5F71252) or SH71253 (R5F71253) instead of the SH71250A or SH71251A, and use the SH71242 (R5F71242) or SH71243 (R5F71243) instead of the SH71240A or SH71241A. Select the device you are using from the items in the [Select Emulator mode] dialog box. The values of check sums in [Writing Flash Memory] mode will be calculated according to the capacity of the internal flash memory of the device in use.

2.2 Specific Functions for the Emulator when Using the SH7125 or SH7124 Group

2.2.1 Event Condition Functions

The emulator is used to set event conditions for the following function:

- Break of the user program

Table 2.6 lists the types of Event Condition.

Table 2.6 Types of Event Condition

Event Condition Type	Description
Address bus condition (Address)	Sets a condition when the address bus (data access) value or the program counter value (before or after execution of instructions) is matched.
Data bus condition (Data)	Sets a condition when the data bus value is matched. Byte, word, or longword can be specified as the access data size.
Bus state condition (Bus State)	There are two bus state condition settings: Bus state condition: Sets a condition when the data bus value is matched. Read/Write condition: Sets a condition when the read/write condition is matched.
Count	Sets a condition when the specified other conditions are satisfied for the specified counts.
Action	Selects the operation when a condition is matched. Only a break can be set in this MCU.

Using the [Combination action (Sequential or PtoP)] dialog box, which is opened by selecting [Combination action (Sequential or PtoP)] from the pop-up menu on the [Event Condition] sheet, specifies the sequential condition and the start or end of performance measurement.

Table 2.7 lists the combinations of conditions that can be set under Ch1 to Ch10.

Table 2.7 Dialog Boxes for Setting Event Conditions

		Function				
Dialog Box		**Address Bus Condition (Address)**	**Data Bus Condition (Data)**	**Bus State Condition (Bus State)**	**Count Condition (Count)**	**Action**
[Event Condition 1]	Ch1	O	O	O	O	Only a break can be set.
[Event Condition 2]	Ch2	O	O	O	X	
[Event Condition 3]	Ch3	O	X	X	X	
[Event Condition 4]	Ch4	O	X	X	X	
[Event Condition 5]	Ch5	O	X	X	X	
[Event Condition 6]	Ch6	O	X	X	X	
[Event Condition 7]	Ch7	O	X	X	X	
[Event Condition 8]	Ch8	O	X	X	X	
[Event Condition 9]	Ch9	O	X	X	X	
[Event Condition 10]	Ch10	O	X	X	X	

Note: O: Can be set in the dialog box.
X: Cannot be set in the dialog box.

Sequential Setting: Using the [Combination action (Sequential PtoP)] dialog box specifies the sequential condition.

Table 2.8 Conditions to Be Set

Classification	Item	Description
[Ch1, 2, 3] list box	Sets the sequential condition and the start or end of performance measurement using Event Conditions 1 to 3.	
	Don't care	Sets no sequential condition or the start or end of performance measurement.
	Break: Ch3-2-1	Breaks when a condition is satisfied in the order of Event Condition 3, 2, 1.
	Break: Ch2-1	Breaks when a condition is satisfied in the order of Event Condition 2, 1.
[Ch4, 5] list box	This list box is not available for this MCU.	

Usage Example of Sequential Break Extension Setting: A tutorial program provided for the product is used as an example. For the tutorial program, refer to section 6, Tutorial, in the SuperH™ Family E10A-USB Emulator User's Manual.

The conditions of Event Condition are set as follows:

1. Ch3

   Breaks address H'00001068 when the condition [Only program fetched address after] is satisfied.
2. Ch2

   Breaks address H'0000107a when the condition [Only program fetched address after] is satisfied.
3. Ch1

   Breaks address H'00001086 when the condition [Only program fetched address after] is satisfied.

   Note: Do not set other channels.
4. Sets the content of the [Ch1,2,3] list box to [Break: Ch 3-2-1] in the [Combination action (Sequential or PtoP)] dialog box.
5. Enables the condition of Event Condition 1 from the popup menu by clicking the right mouse button on the [Event Condition] sheet.

Then, set the program counter and stack pointer (PC = H'00000800, R15 = H'00010000) in the [Registers] window and click the [Go] button. If this does not execute normally, issue a reset and execute the above procedures.

The program is executed up to the condition of Ch1 and halted. Here, the condition is satisfied in the order of Ch3 -> 2 -> 1.

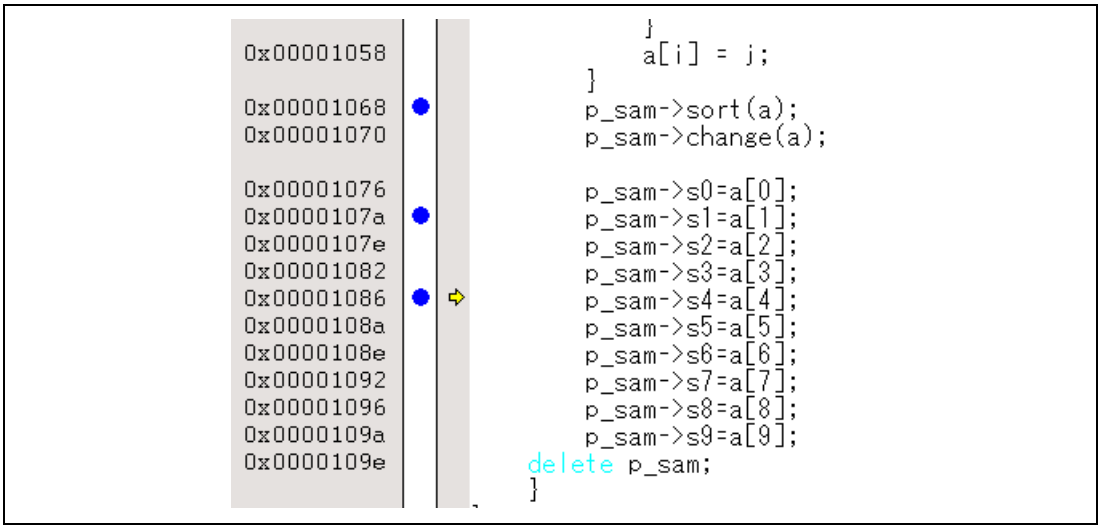


Figure 2.1 [Source] Window at Execution Halted (Sequential Break)

If the sequential condition, performance measurement start/end, or point-to-point for the internal trace is set, conditions of Event Condition to be used will be disabled. Such conditions must be enabled from the popup menu by clicking the right mouse button on the [Event Condition] sheet.

Notes: 1. If the Event condition is set for the slot in the delayed branch instruction by the program counter (after execution of the instruction), the condition is satisfied before executing the instruction in the branch destination (when a break has been set, it occurs before executing the instruction in the branch destination).

2. Do not set the Event condition for the SLEEP instruction by the program counter (after execution of the instruction).
   Do not set the data access condition before executing one or two instructions in the SLEEP instruction.

3. If the power-on reset and the Event condition are matched simultaneously, no condition will be satisfied.

4. If a condition of which intervals are satisfied closely is set, no sequential condition will be satisfied. Set the Event conditions sequentially, which are satisfied closely, by the program counter with intervals of two or more instructions.
   The CPU is structured as a pipeline; the order between the instruction fetch cycle and the memory cycle is determined by the pipeline. Accordingly, when the channel condition is matched in the order of bys cycle, the sequential condition is satisfied.

5. If the settings of the Event condition or the sequential conditions are changed during execution of the program, execution will be suspended. (The number of clocks to be suspended during execution of the program is a maximum of about 52 bus clocks (Bϕ). If the bus clock (Bϕ) is 10.0 MHz, the program will be suspended for 5.2 μs.)
6. If the settings of Event conditions or the sequential conditions are changed during execution of the program, the emulator temporarily disables all Event conditions to change the settings. During this period, no Event condition will be satisfied.
7. When the emulator is being connected, the user break controller (UBC) function is not available.

2.2.2 Trace Functions

The emulator supports the internal trace function with four branch sources and destinations.

The AUD trace is not available for this MCU.

2.2.3 Notes on Using the JTAG (H-UDI) Clock (TCK)

1. Set the JTAG clock (TCK) frequency to 1/4 or lower than the frequency of the peripheral clock (Pϕ) and to 2 MHz or more.
2. The initial value of the JTAG clock (TCK) is 2.5 MHz.
3. A value to be set for the JTAG clock (TCK) is initialized after executing [Reset CPU] or [Reset Go].

2.2.4 Notes on Setting the [Breakpoint] Dialog Box

1. When an odd address is set, the next lowest even address is used.
2. A BREAKPOINT is accomplished by replacing instructions of the specified address. It cannot be set to the following addresses:
   — An area other than CS, the internal RAM, and the internal flash memory
   — An instruction in which Break Condition 2 is satisfied
   — A slot instruction of a delayed branch instruction
3. During step operation, specifying BREAKPOINTs and Event Condition breaks are disabled.
4. When execution resumes from the address where a BREAKPOINT is specified and a break occurs before Event Condition execution, single-step operation is performed at the address before execution resumes. Therefore, realtime operation cannot be performed.

5. If an address of a BREAKPOINT cannot be correctly set in the ROM or external flash memory area, a mark ● will be displayed in the [BP] area of the address on the [Source] or [Disassembly] window by refreshing the [Memory] window, etc. after Go execution. However, no break will occur at this address. When the program halts with the event condition, the mark ● disappears.

2.2.5 Notes on Setting the [Event Condition] Dialog Box and the BREAKCONDITION_SET Command

1. When [Go to cursor], [Step In], [Step Over], or [Step Out] is selected, the settings of Event Condition 3 are disabled.
2. When an Event Condition is satisfied, emulation may stop after two or more instructions have been executed.

2.2.6 Performance Measurement Function

This MCU does not support the performance measurement function.

2.2.7 Profiling Measurement Function

This MCU does not support the profiling measurement function.

SuperH™ Family E10A-USB Emulator
Additional Document for User's Manual
Supplementary Information on Using the SH7125 and SH7124

Publication Date: Rev.1.00, February 28, 2006
Rev.4.00, January 13, 2010
Published by: Sales Strategic Planning Div.
Renesas Technology Corp.
Edited by: Customer Support Department
Global Strategic Communication Div.
Renesas Solutions Corp.

Renesas Technology Corp. Sales Strategic Planning Div. Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100-0004, Japan

RENESAS SALES OFFICES

http://www.renesas.com

Refer to "**http://www.renesas.com/en/network**" for the latest and detailed information.

Renesas Technology America, Inc.
450 Holger Way, San Jose, CA 95134-1368, U.S.A
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

Renesas Technology Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

Renesas Technology (Shanghai) Co., Ltd.
Unit 204, 205, AZIACenter, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

Renesas Technology Hong Kong Ltd.
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2377-3473

Renesas Technology Taiwan Co., Ltd.
10th Floor, No.99, Fushing North Road, Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

Renesas Technology Singapore Pte. Ltd.
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632
Tel: <65> 6213-0200, Fax: <65> 6278-8001

Renesas Technology Korea Co., Ltd.
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

Renesas Technology Malaysia Sdn. Bhd
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: <603> 7955-9390, Fax: <603> 7955-9510

SuperH™ Family E10A-USB Emulator
Additional Document for User's Manual Supplementary Information on Using the SH7125 and SH7124

Renesas Electronics Corporation
1753, Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8668 Japan

REJ10J1271-0400