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April 1st, 2010
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User's Manual

H8 Family E10T Emulator

Additional Document for User's Manual

H8/3048F-ONE E10T
HS3048BTCM01HE-U2
Renesas Microcomputer Development Environment System
H8 Family / H8/300H Series
Notes on Connecting the H8/3048F-ONE and H8/3029F

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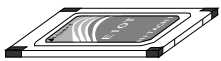
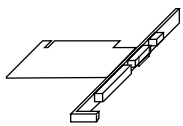
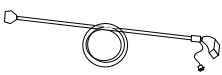
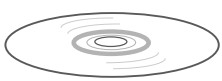
Contents

Section 1 Connecting the Emulator with the User System

1.1 Components of the Emulator

The H8/3048F-ONE E10T emulator supports the H8/3048F-ONE and H8/3029F (hereafter referred to as the MCU unless the description is specific to any of them). Table 1.1 lists the components of the emulator.

Table 1.1 Components of the Emulator (HS3048BTCM01H or HS3048BTCI01H)

Classi-fication	Component	Appearance	Quan-tity	Remarks
Hard-ware	Card emulator HS3048BTCM01H (Model: HS0005TCM02H), HS3048BTCI01H (Model: HS0005TCI02H)	 or 	1	HS3048BTCM01H (PCMCIA: 20-pin type): Depth: 85.6 mm, Width: 54.0 mm, Height: 5.0 mm, Mass: 28.0 g HS3048BTCI01H (PCI: 20-pin type): Depth: 122.0 mm, Width: 96.0 mm, Mass: 78.0 g
	User system interface cable		1	HS3048BTCM01H (PCMCIA: 20-pin type): Length: 80.0 cm, Mass: 46.0 g HS3048BTCI01H (PCI: 20-pin type): Length: 150.0 cm, Mass: 90.0 g
Soft-ware	H8/3048F-ONE E10T emulator setup program, H8 Family E10T Emulator User's Manual, and Notes on Connecting the H8/3048F-ONE and H8/3029F		1	HS3048BTCM01SR, HS0005TCM01HJ, HS0005TCM01HE, HS3048BTCM01HJ-U2, and HS3048BTCM01HE-U2 (provided on a CD-R)

1.2 Connecting the E10T Emulator with the User System

Before connecting an E10T emulator (hereafter referred to as emulator) with the user system, a connector must be installed in the user system so that an user system interface cable can be connected. When designing the user system, refer to the connector and recommended circuits shown in this manual.
Before designing the user system, be sure to read the E10T emulator user's manual and the hardware manual for related MCUs.

Table 1.2 shows the recommended connector for the emulator.

Table 1.2 Recommended Connector

Type Number	Manufacturer	Specifications
2520-6002	3M Limited	20-pin straight type

Connect pins 2, 4, 6, 8, 10, 12, 14, and 16 of the user system connector to GND firmly on the PCB. These pins are used as electrical GND and to monitor the connection of the user system connector. Note the pin assignments of the user system connector.

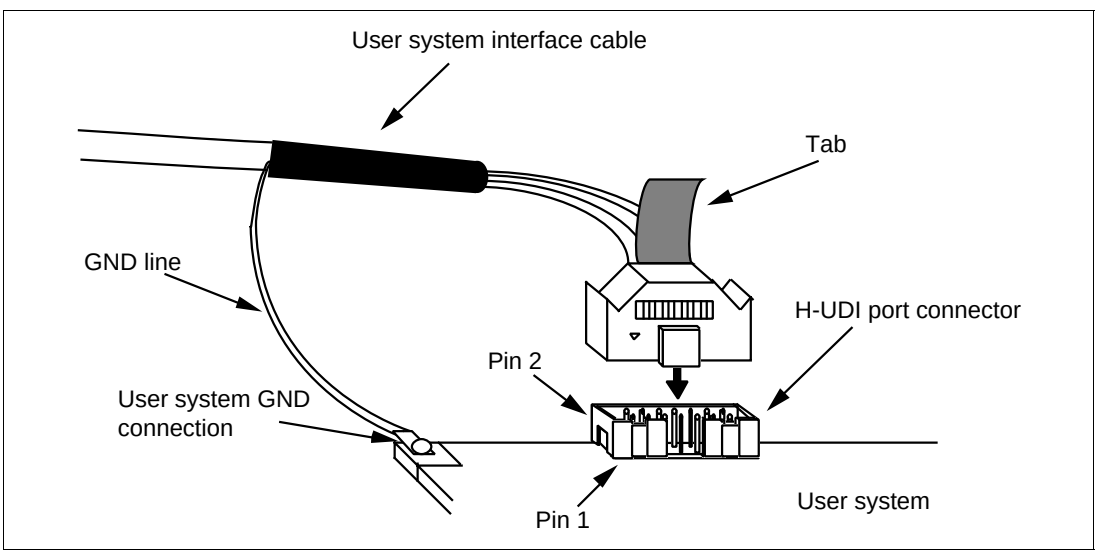
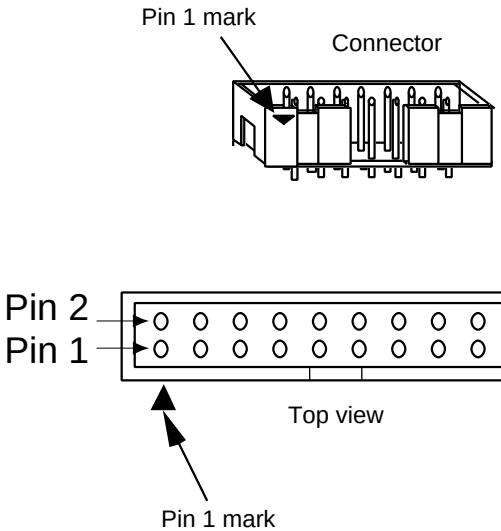


Figure 1.1 Connecting the User System Interface Cable to the User System

Notes:
1. The pin number assignments of the 20-pin connector differ from those of the E10A emulator; however, the physical location is the same.
2. When designing the connector layout on the user board, do not place any components within 3 mm of the connector.
3. When the emulator is used in the writer mode, connect the emulator similarly to the user system.

1.3 Pin Assignments of the E10T Connector

Figure 1.2 shows the pin assignments of the connector.



Pin No.	Signal
1	RES#
2	Vss
3	FWE
4	Vss
5	MD0
6	Vss
7	MD1
8	Vss
9	MD2
10	Vss
11	N.C.
12	Vss
13	N.C.
14	Vss
15	P91/TxD1
16	Vss
17	P93/RxD1
18	Vcc
19	P95/SCK1
20	Vcc

Notes: 1. The symbol (#) means that the signal is active-low.
2. Vss (pin 2) detects connection or disconnection with the E10T user system.
3. Pin 20 is Vcc; however, it can be N.C. if an on-board flash writer (including the third party's product) is not used.

Figure 1.2 Pin Assignments of the Connector

1.4 Example of Emulator Connection

Figure 1.3 shows an example of emulator connection to the MCU.

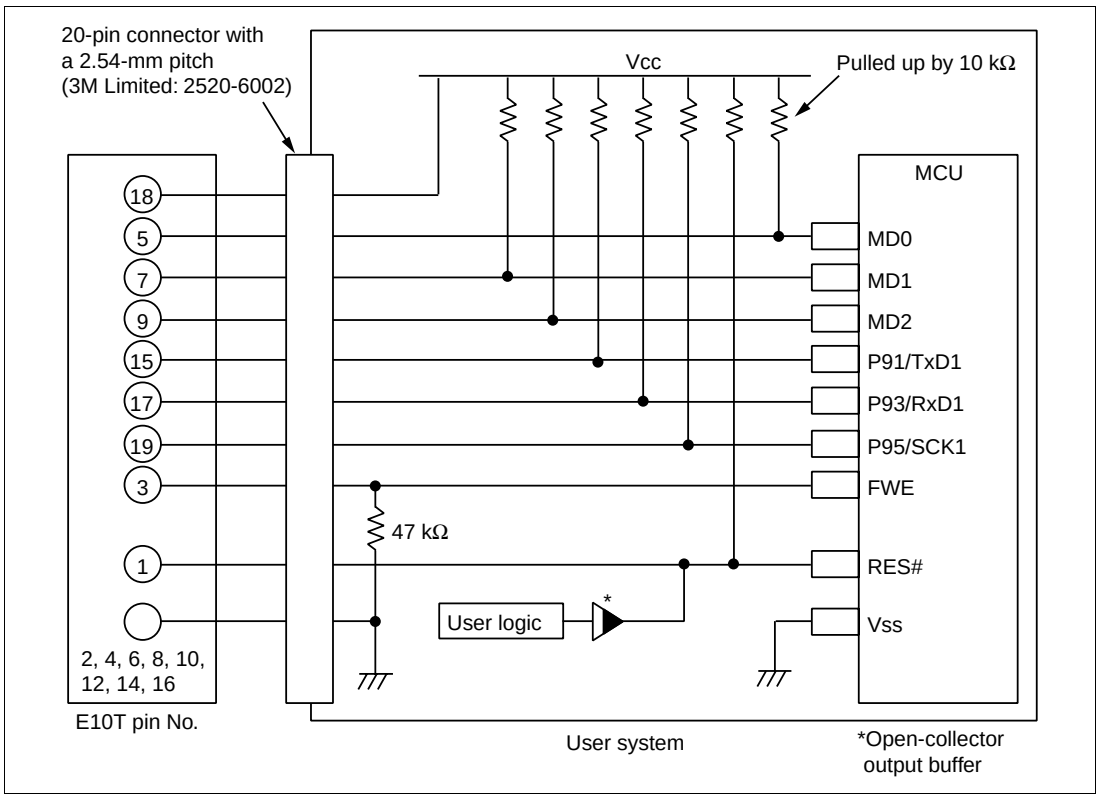


Figure 1.3 Example of Emulator Connection (Mode 7)

Notes: 1. P91, P93, and P95 are used by the emulator. Pull up and connect the emulator and MCU pins.

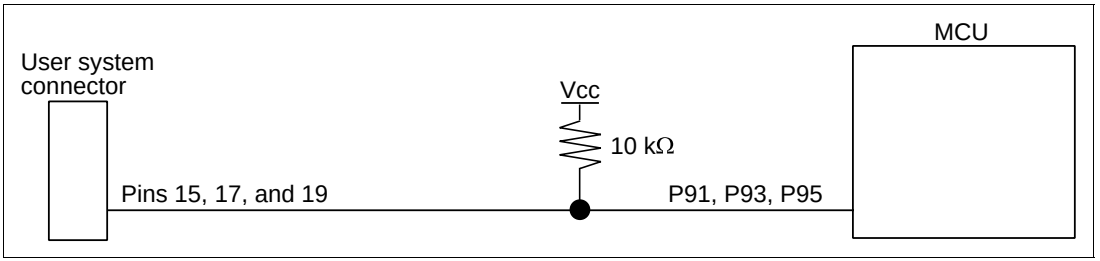


Figure 1.4 Connection of Emulator and MCU

2. The FWE signal is used for forced break control by the emulator. Connect the emulator and MCU pins directly.

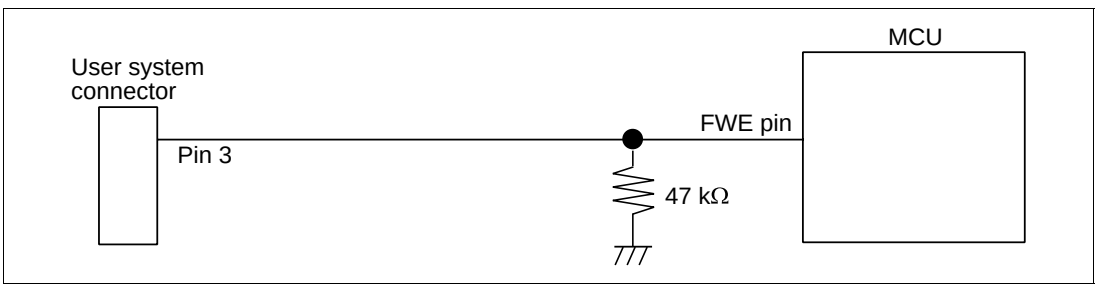


Figure 1.5 Connection of Emulator and FWE Pin

3. The RES# pin is used by the emulator. Create the following circuit so that a reset input from the emulator can be accepted:

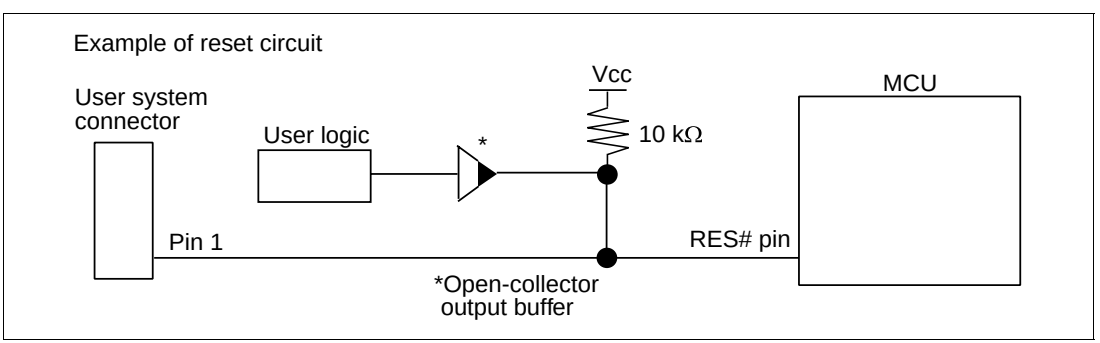


Figure 1.6 Example of Reset Circuits

4. MD0 to MD2 pins are used by the emulator at power-on reset. Connect MD0 to MD2 pins as shown in figure 1.7.

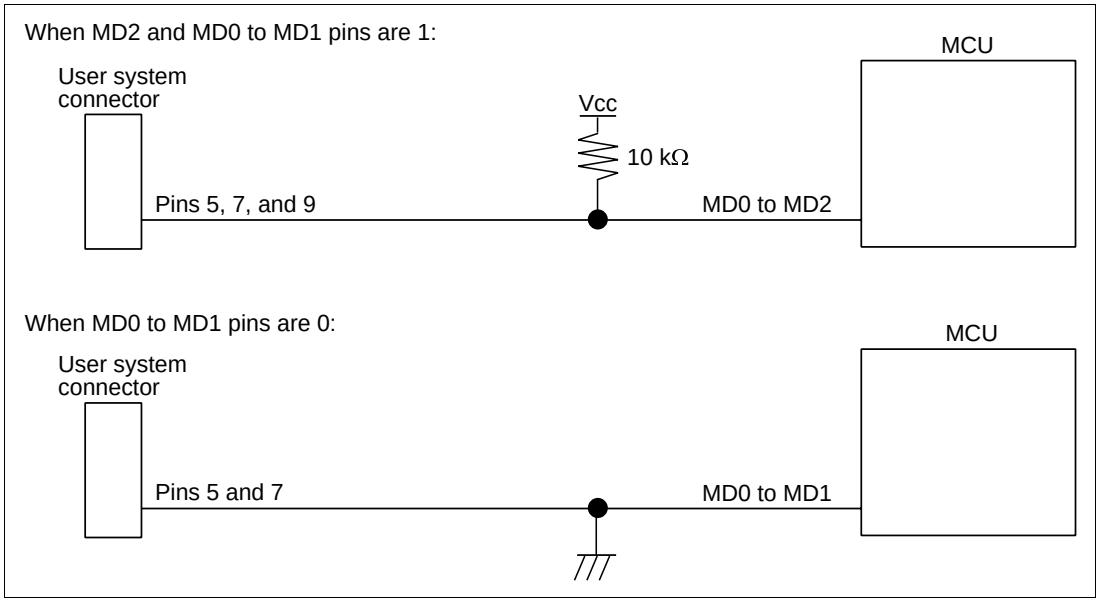


Figure 1.7 Example of Circuits for Operating Mode Setting Pins

5. Connect Vss and Vcc with the Vss and Vcc of the MCU, respectively.
6. Connect nothing with N.C.
7. The amount of voltage permitted to input to Vcc must be within the guaranteed range of the microcomputer. The H8/3048F-ONE has 4.5- to 5.5-V and 3.0- to 3.6-V input voltages. Use the correct input voltage depending on the microcomputer. The H8/3029F only has 3.0- to 3.6-V input voltage. Do not apply 4.5- to 5.5-V as the input to Vcc.

8. Figure 1.8 shows the interface circuit in the emulator. Use this figure as a reference to decide the pull-up resistance value.

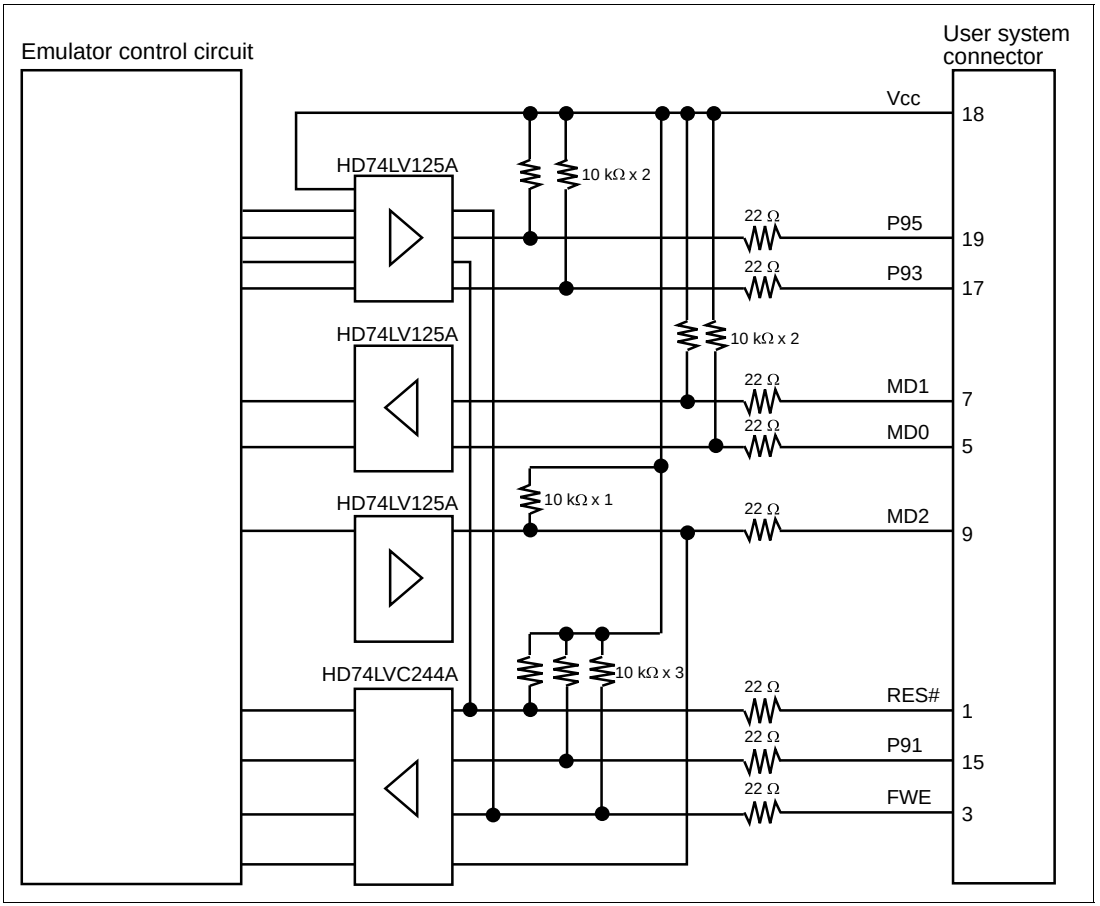


Figure 1.8 Interface Circuit in the Emulator (Reference)

9. When the MCU is connected to the emulator, the functions listed below cannot be used.

Table 1.3 Pin Functions Not Available

H8/3048F-ONE and H8/3029F
P91, P93, and P95
TxD1, RxD1, and SCK1
FWE
IRQ5#

The symbol (#) means that the signal is active-low.

Section 2 Specification of the E10T Emulator's Software

2.1 Differences between the MCUs (H8/3048F-ONE and H8/3029F) and the Emulator

1. The emulator supports the operating modes shown in table 2.1.

Table 2.1 Supported Operating Mode

MCU Name	Mode
H8/3048F-ONE	5, 6, and 7
H8/3029F	5 and 7

2. When the emulator system is initiated, it initializes the general registers and part of the control registers as shown in table 2.2.

Table 2.2 Register Initial Values at Emulator Link Up

Register	Initial Value
PC	Reset vector value in the vector address table
ER0 to ER6	Undefined
ER7 (SP)	(16-Mbyte expanded mode with on-chip ROM enabled) H8/3048F-ONE: H'FFFF10 H8/3029F: H'FFFF20 (Single-chip advanced mode) H8/3048F-ONE: H'FFF10 (1-Mbyte expanded mode with on-chip ROM enabled) H8/3048F-ONE: H'FFF10 H8/3029F: H'FFF20
CCR	1 for I mask, and others undefined

3. Low-Power Mode

   During a user program break, the CPU operating frequency is forced to ϕ for high-speed operation.

4. RES Signal

   The MCU signals are only valid during user program execution started with clicking the GO or STEP-type button. In command input wait state, the RES signal is not sent to the H8/3048F-ONE.

Note: Do not start user program execution or access the memory while control input signal (RES) is being low. A TIMEOUT error will occur. The error will also occur when (RES) is low during a break.

5. System Control Register

   In the emulator, the internal I/O registers can be accessed from the [IO] window. However, be careful when accessing the system control register. The emulator saves the register value of the system control register at a break and returns the value when the user program is executed. Since this is done during a break, do not rewrite the system control register in the [IO] window.

6. Memory Access during Emulation

   If the memory contents are referenced or modified during emulation, realtime emulation cannot be performed because the user program is temporarily halted.

7. The emulator communicates with the H8/3048F-ONE by using the P95/SCK1, P93/RxD1, P91/TxD1, RES, FWE, and MD2 to MD0 pins. These pins cannot be used, except for RES and MD2 to MD0 pins.

8. The power consumed by the MCU can reach several mA. This is because the user power supply drives one HD74LV125A to make the communication signal level match the user-system power-supply voltage. The power consumed rises little during user program execution since the emulator does not perform communication; it rises more during a break.

9. The emulator uses a two-word stack pointer for values stored on a user program break. Therefore, the stack area must accept two-word addresses.

10. Refresh Controller and DMA Controller

    The emulator cannot debug the user program that uses the refresh controller or DMA controller.

11. Reading the MDCR Register in the Reset Exception Processing

    Be sure to read MDCR in the reset exception processing of the user program.

12. Initialization of the Internal I/O Register by Reset Function

    In the [GO] - [Reset CPU], [GO] - [Reset GO] and RESET commands, the following internal I/O registers are not initialized. Be sure to initialize them by the user program.

    System control: SYSCR, MSTCR, DIVCR
    Interrupt controller: ISCR, IER, ISR, IPRA, IPRB
    Bus controller: ABWCR, ASTCR, WCR, WCER, BRCR, CSCR
    Watchdog timer: TCSR, TCNT, RSTCSR
    Serial communication interface (channel 1): SMR, BRR, SCR, TDR, SSR, RDR

Flash memory: FLMCR1, FLMCR2, EBR, RAMCR

D/A converter: DASTCR

13. Note on Using Port 9

P91, P93, and P95 of port 9 are used by the emulator. When the P9DDR register is written in the user program, set bits P91DDR, P93DDR, and P95DDR in that register as follows:

P91DDR = 1

P93DDR = 0

P95DDR = 0

2.2 The H8/3048F-ONE E10T Emulator Functions

Notes: 1. Do not use an MCU that has been used for debugging.

2. If the flash memory is rewritten many times, and the emulator is left for a few days, data may be lost due to retention problems.
3. If the flash memory is rewritten many times, the data will not be erased. If an error message is displayed, exchange the MCU for a new one.

2.2.1 Emulator Driver Selection

Table 2.3 shows drivers which can be selected in the [E10T Driver Details] dialog box.

Table 2.3 Type Name and Driver

Type Name	Driver
HS3048BTCM01H	E10T PC Card Driver 2
HS3048BTCI01H	E10T PCI Card Driver 2

2.2.2 Hardware Break Functions

Hardware Break Conditions: In the emulator, conditions of Break Condition 1,2 can be set. Table 2.4 lists the items that can be specified.

Table 2.4 Hardware Break Condition Specification Items

Items	Description
Address bus condition	Breaks when the MCU address bus value matches the specified value.
Data bus condition	Breaks when the MCU data bus value matches the specified value. Byte or word can be specified as the access data size.
Read or write condition	Breaks in the read or write cycle.

Table 2.5 lists the combinations of conditions that can be set in the [Break condition 1] and [Break condition 2] dialog boxes.

Table 2.5 Conditions Set in [Break condition 1] and [Break condition 2] Dialog Boxes

	Condition		
Dialog Box	Address Bus Condition	Data Condition	Read or Write Condition
[Break condition 1]	O	O	O
[Break condition 2]	O	X	X

Note: O: Can be set by checking the radio button in the dialog box.
X: Cannot be set in the dialog box.

Table 2.6 lists the combinations of conditions that can be set by the BREAKCONDITION_SET command.

Table 2.6 Conditions Set by BREAKCONDITION_SET Command

	Condition		
Channel	Address Bus Condition (<addropt> option)	Data Condition (<dataopt> option)	Read or Write Condition (<r/wopt> option)
Break condition 1	O	O	O
Break condition 2	O	X	X

Note: O: Can be set by the BREAKCONDITION_SET command.
X: Cannot be set by the BREAKCONDITION_SET command.

Notes on Setting the Break Condition:

1. When [Go to cursor], [Step In], [Step Over], or [Step Out] is selected, the settings of Break Condition 1 are disabled.
2. Setting of Break Condition 1 is disabled when an instruction to which a BREAKPOINT has been set is executed.
3. When step over function is used, the settings of BREAKPOINT and Break Condition 1 are disabled.
4. The address bus condition of Break Condition 2 or channel 2 of the Breakcondition_set command is satisfied only for the instruction prefetch address. The condition is not satisfied for the address bus value other than the instruction prefetch address. In this case, use Break Condition 1 or channel 1 of the Breakcondition_set command.

2.2.3 Notes on Setting the [Breakpoint] Dialog Box

1. When an odd address is set, the address is rounded down to an even address.
2. A BREAKPOINT is accomplished by replacing instructions. Accordingly, it can be set only to the flash memory or RAM area. However, a software break cannot be set to the following addresses:
   - An area other than flash memory or RAM
   - An instruction in which Break Condition 1 is satisfied
3. During step operation, a BREAKPOINT is disabled.
4. A condition set at Break Condition 1 is disabled immediately after starting execution when an instruction at a BREAKPOINT is executed. A break does not occur even if a condition of Break Condition 1 is satisfied immediately after starting the execution.
5. When execution resumes from the breakpoint address after the program execution stops at the BREAKPOINT, single-step operation is performed at the address before execution resumes. Therefore, realtime operation cannot be performed.
6. Settings of BREAKPOINT and Break Condition 1 are invalid while the STEP OVER function is being used.

2.2.4 Trace Function

The trace function in the emulator uses the branch-instruction trace function in the MCU. It displays the branch-source address or the mnemonic, and operand can be acquired in realtime.

H8 Family E10T Emulator
Additional Document for User's Manual
Notes on Connecting the H8/3048F-ONE and H8/3029F

Publication Date:	Rev.1.00, November 25, 2003
	Rev.2.00, March 1, 2004
Published by:	Sales Strategic Planning Div.
	Renesas Technology Corp.
Edited by:	Technical Documentation & Information Department
	Renesas Kodaira Semiconductor Co., Ltd.

H8 Family E10T Emulator
Additional Document for User's Manual

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REJ10B0113-0200H