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Renesas Electronics Corporation

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H8 Family E10T Emulator

Additional Document for User's Manual

H8 Family E10T HS0005TCM01HEP1
Renesas Microcomputer Development
Environment System

H8 Family / H8/300H Tiny Series
Notes on Connecting the H8/3664F,
H8/3687F, H8/3694F, H8/36037F,
H8/36057F, and H8/36049F

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Section 1 Connecting the 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 1.1 shows the recommended connector for the emulator.

Table 1.1 Recommended Connector

Type Number	Manufacturer	Specifications
2514-6002	3M Limited	14-pin straight type

Connect pins 2, 4, 6, 10, 12, and 14 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.

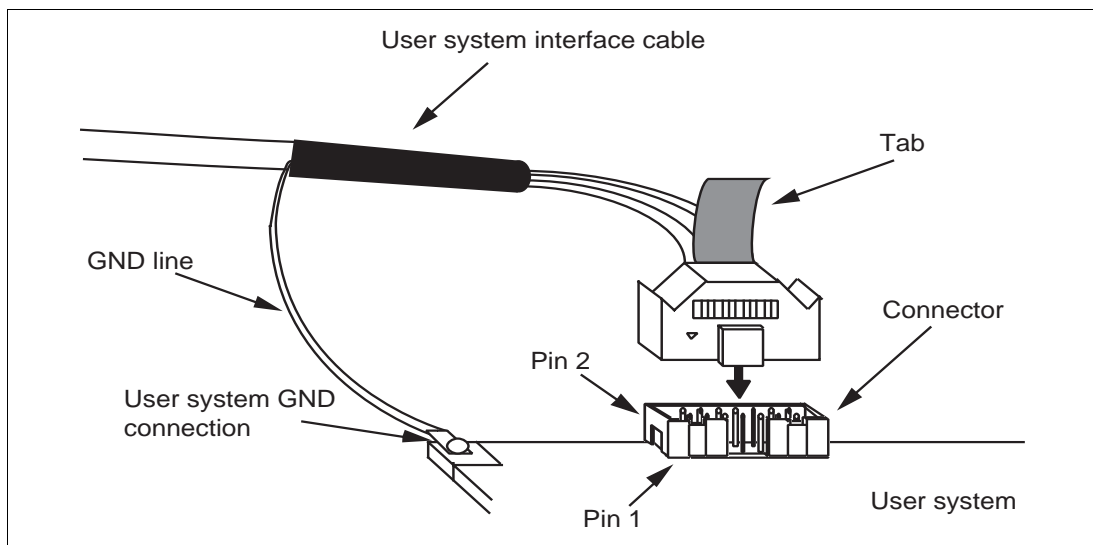


Figure 1.1 Connecting the User System Interface Cable to the User System

- Notes:
1. The pin number assignments of the 14-pin connector differ from those of the E10A emulator; however, the physical location is the same.
 2. 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.



WARNING

Be sure to place the GND line of the user system interface cable on the GND of the user system with a screw, etc. Failure to do so will result in a FIRE HAZARD due to an overcurrent and will damage the user system, the emulator product, and the host computer.

Section 2 Pin Assignments of the E10T Connector

Figure 2.1 shows the pin assignments of the connector.

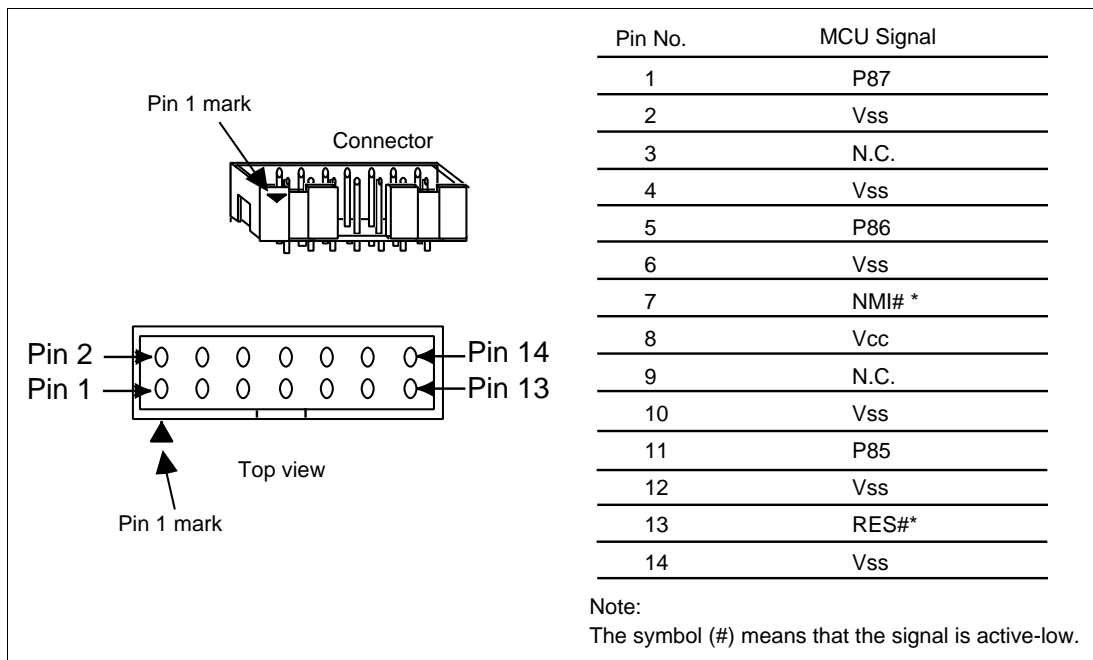


Figure 2.1 Pin Assignments of the Connector

Section 3 Example of Emulator Connection

Figures 3.1 and 3.2 show examples of emulator connection to the MCU without the POR and LVD options (H8/3664F, H8/3687F, H8/3694F, H8/36037F, H8/36057F, and H8/36049F; hereafter referred to as the MCU without the POR and LVD options) and to the MCU with the POR and LVD options installed (H8/3687(G)F, H8/3694(G)F, H8/36037(G)F, H8/36057(G)F, and H8/36049(G)F; hereafter referred to as the MCU with the POR and LVD options), respectively.

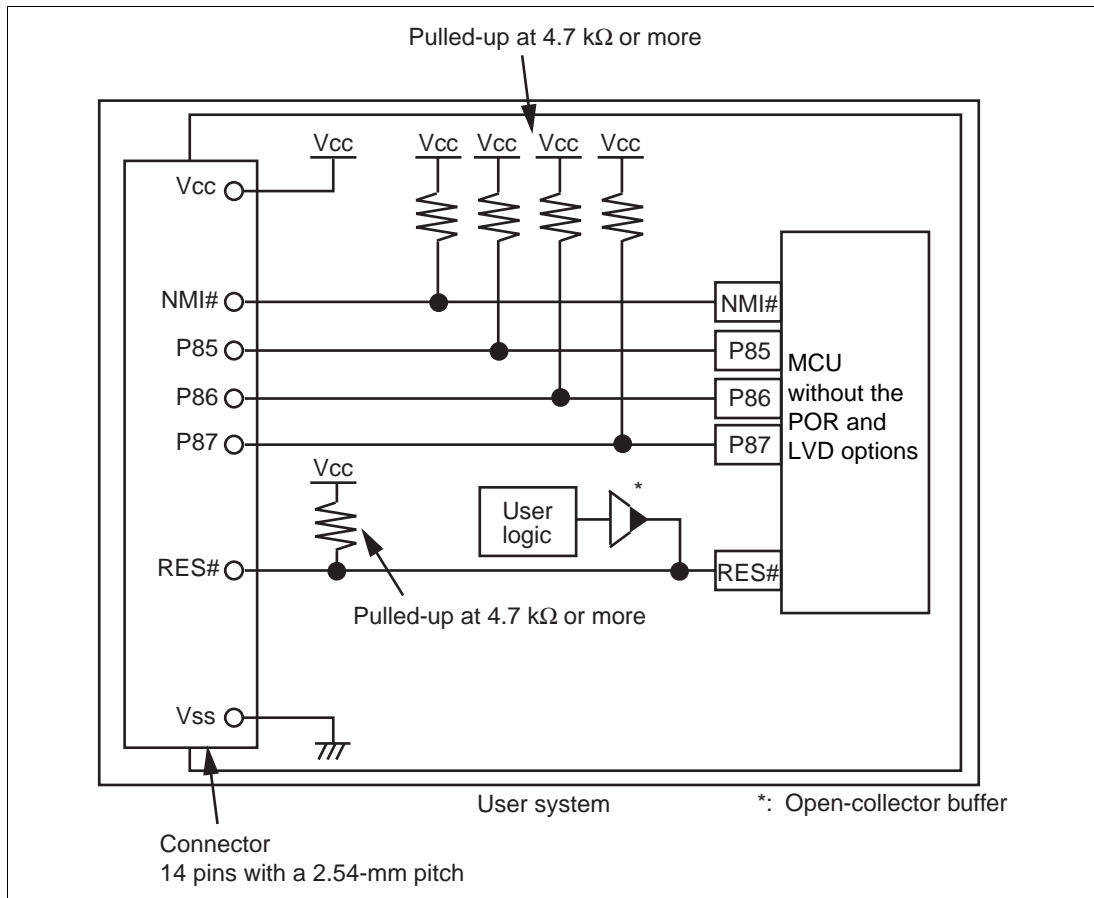


Figure 3.1 Example of Emulator Connection (MCU without POR and LVD Options)

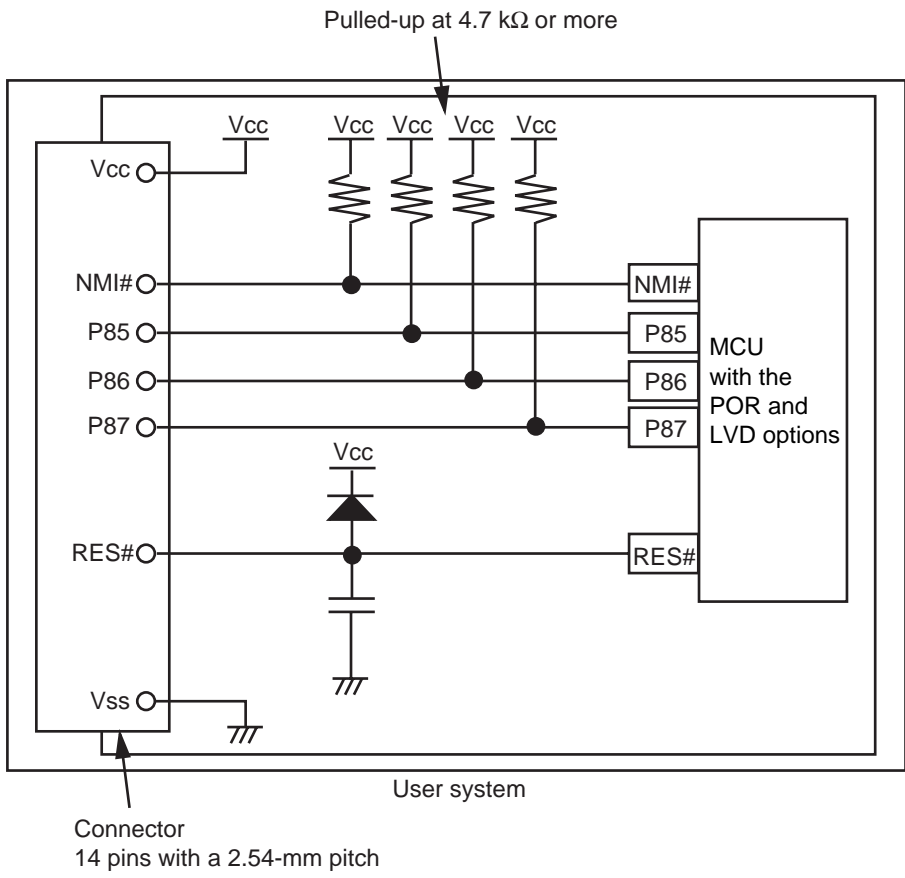


Figure 3.2 Example of Emulator Connection (MCU with POR and LVD Options)

Notes: 1. P85 to P87 pins are used by the emulator. Pull up and connect the emulator and MCU pins.

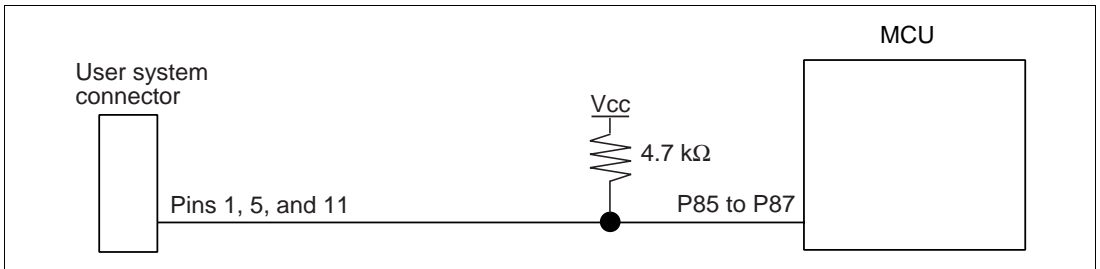


Figure 3.3 Connection of Emulator and P85 to P87 Pins

2. The NMI# signal is used for forced break control by the emulator. Connect the emulator and MCU pins directly. In debugging without forced break control, change the mode with the HEW. Then, when the user logic is connected with the open-collector output buffer, the NMI# pin can be used in the user system (however, at power-on, the NMI# pin is used by the emulator).

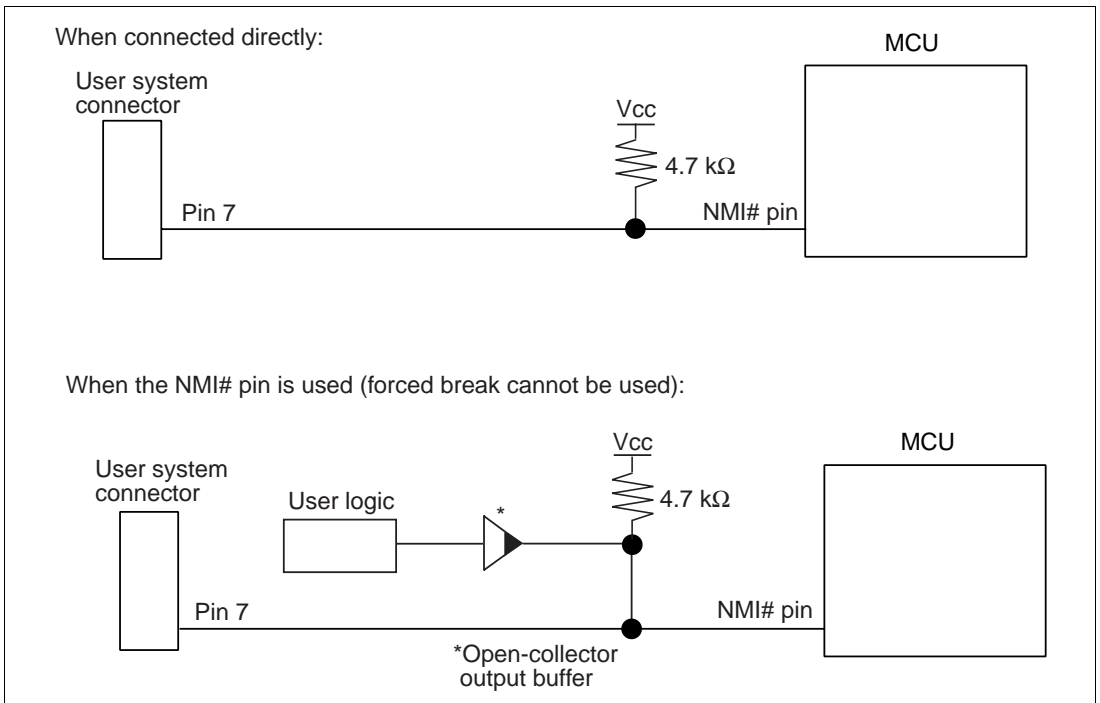


Figure 3.4 Connection of Emulator and NMI# Pin

- The RES# pin is used by the emulator. Create the following circuit by connecting the open-collector output buffer so that reset input can be accepted from the emulator.

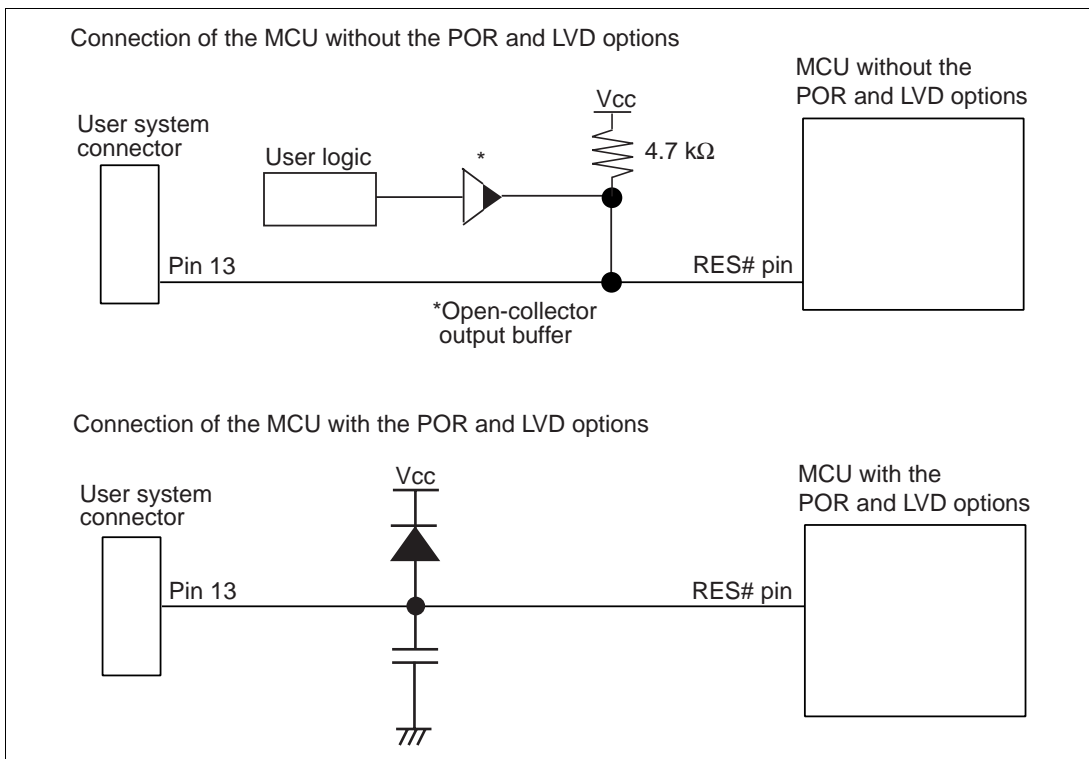


Figure 3.5 Example of a Reset Circuit

- Connect Vss and Vcc with the Vss and Vcc of the MCU, respectively.
- Connect nothing with N.C.
- The input voltage, Vcc, must be connected to the user system Vcc (power supply). The amount of voltage permitted to input to Vcc must be within the guaranteed range of the microcomputer.
- Refer to the hardware manual for the recommended capacitance of the capacitor that is connected to the RES# pin.

8. Figure 3.6 shows the interface circuit in the emulator. Use this figure as a reference when determining the pull-up resistance value.

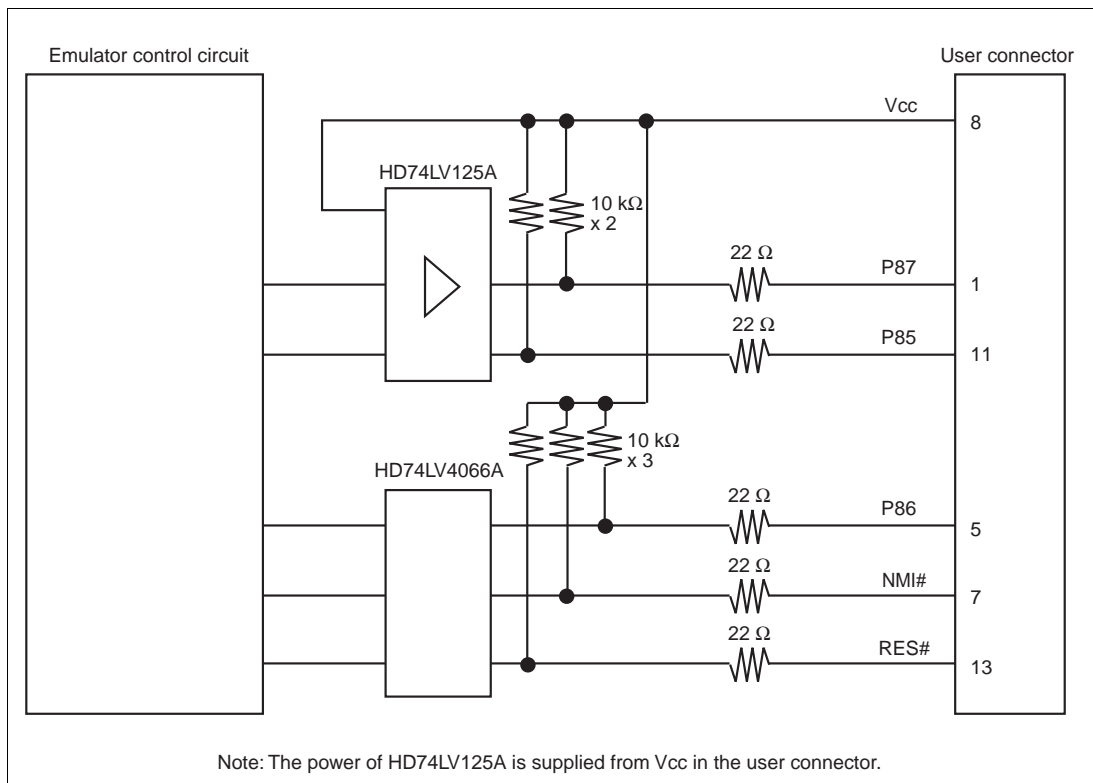


Figure 3.6 Interface Circuit in the Emulator (Reference)

Section 4 Differences between the MCUs (H8/3664F, H8/3687(G)F, H8/3694(G)F, H8/36037(G)F, H8/36057(G)F, and H8/36049(G)F) and the Emulator

1. When the emulator system is initiated, it initializes the general registers and part of the control registers as shown in table 4.1.

Table 4.1 Register Initial Values at Emulator Power-On

Register	Initial Value
PC	Reset vector value in the vector address table
ER0 to ER6	H'0000
ER7 (SP)	H'FF80 (H'FFFF80 only for H8/36049F)
CCR	H'80

2. Low-Power Mode

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

3. RES# Signal

The MCU signals are only valid during user program execution started with clicking the GO or STEP-type button. During a user program break, the RES# signal is not sent to the MCUs.

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

4. 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.

5. 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.

6. The emulator communicates with the MCUs by using the NMI, RES, and P85 to P87 pins. These pins cannot be used, however, the NMI pin can be used by changing the setting of the [NMI signal] group box in the [Configuration] dialog box.
7. Sum Data Displayed in the Writing Flash memory Mode
Sum data, which is displayed in the ‘Writing Flash memory’ mode, is a value that data in the whole ROM areas has been added by byte.
8. Note on Executing the User Program
The set value is rewritten since the emulator uses flash memory and watchdog timer registers during programming (Go, Step In, Step Out, or Step Over) of the flash memory.
9. The power consumed by the MCU can reach several milliamperes. 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.
10. Program Area for the Emulator
Do not access a part of areas in the flash memory or the internal RAM since the emulator program uses these areas. If the contents of the program area for the emulator are changed, the emulator will not operate normally. In this case, restart the emulator with the Download emulator firmware mode.

Table 4.2 Program Area for the E10T Emulator

MCU Name	Program Area
H8/3664F	Flash memory: H'7000 to H'7FFF
H8/3694(G)F	Internal RAM: H'F780 to H'FB7F Vector, etc.: H'0002 to H'0007, H'000E to H'000F, H'0018 to H'0019
H8/3687(G)F	Flash memory: H'D000 to H'DFFF
H8/36037(G)F	Internal RAM: H'F780 to H'FB7F
H8/36057(G)F	Vector, etc.: H'0002 to H'0007, H'000E to H'000F, H'0018 to H'0019
H8/36049(G)F	Flash memory: H'F18000 to H'F18FFF Internal RAM: H'FFF780 to H'FFFB7F Vector, etc.: H'000004 to H'00000D, H'00001C to H'00001F, H'000030 to H'000033

11. 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.

12. Do not use an MCU that has been used for debugging.

If the flash memory is rewritten many times, data may be lost due to retention problems after the emulator has been left for a few days and the data will be erased. If an error message is displayed, exchange the MCU for a new one.

13. Forced Break Function

When the NMI signal is used for a forced break in the emulator, the vector address of NMI is rewritten by the emulator program. An error will occur if a file in the host computer and the flash memory contents are verified. Do not use the flash memory contents as the ROM data for the mask ROM after it has been saved.

14. Setting the Usage of the NMI Signal

In the [Configuration] dialog box, when the NMI signal is changed as it is used in the user program, the vector address of NMI is not recovered. Reload the user program.

15. Address Break Release Function

When the address break function is not released for users, the vector address of address break is rewritten by the emulator program. An error will occur if a file in the host computer and the flash memory contents are verified. Do not use the flash memory contents as the ROM data for the mask ROM after it has been saved.

16. Initializing the Internal I/O Register with the Reset_CPU Function

Be sure to initialize the following internal I/O registers by the user program since they are not initialized by selecting [Debug] – [Reset CPU] or using the RESET command: SYSCR1, SYSCR2, IEGR1, IEGR2, IENR1, IRR1, IWPR, MSTCR1, and TSCR

17. Step Execution of the SLEEP Instruction

When the interrupt mask bit (I) in the condition code register (CCR) is 1, do not perform step execution of the SLEEP instruction. If the step execution is performed and not finished correctly, restart the emulator.

**H8 Family E10T Emulator
Additional Document for User's Manual
Notes on Connecting the H8/3664F, H8/3687F, H8/3694F,
H8/36037F, H8/36057F, and H8/36049F**

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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>

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, United Kingdom
Tel: <44> (1628) 585 100, Fax: <44> (1628) 585 900

Renesas Technology Europe GmbH

Dornacher Str. 3, D-85622 Feldkirchen, Germany
Tel: <49> (89) 380 70 0, Fax: <49> (89) 929 30 11

Renesas Technology Hong Kong Ltd.

7/F., North Tower, World Finance Centre, Harbour City, Canton Road, Hong Kong
Tel: <852> 2265-6688, Fax: <852> 2375-6836

Renesas Technology Taiwan Co., Ltd.

FL 10, #99, Fu-Hsing N. Rd., Taipei, Taiwan
Tel: <886> (2) 2715-2888, Fax: <886> (2) 2713-2999

Renesas Technology (Shanghai) Co., Ltd.

26/F., Ruijin Building, No.205 Maoming Road (S), Shanghai 200020, China
Tel: <86> (21) 6472-1001, Fax: <86> (21) 6415-2952

Renesas Technology Singapore Pte. Ltd.

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



H8 Family E10T Emulator Additional Document for User's Manual



Renesas Electronics Corporation

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

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