E8a Emulator

Additional Document for User’s Manual
Notes on Connecting the H8/300L Super Low Power Series
R0E00008AKCE00EP64

Supported Devices:
H8 Family / H8/300L Super Low Power Series
H8/38024F, H8/38004RF, H8/38124F,
H8/38104F, H8/38327F, and H8/38347F

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  • Manufacturer

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CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
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Note: This manual applies to the following product versions of the E8a emulator software.

<table>
<thead>
<tr>
<th>Table</th>
<th>E8a Emulator Software</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E8a Emulator V.1.00 Release 00 or later</td>
</tr>
<tr>
<td></td>
<td>(H8 Tiny/Super Low Power E8a Emulator V.1.00.00 or later)*</td>
</tr>
</tbody>
</table>

Note: This is a revision of the debugger.
Notes on Connecting the H8/38024F and H8/38004F
Section 1 Inside the E8a Emulator User’s Manual


(1) E8a Emulator User’s Manual

The E8a Emulator User’s Manual describes the hardware specifications and how to use the emulator debugger.

— E8a emulator hardware specifications
— Connecting the E8a emulator to the host computer or user system
— Operating the E8a emulator debugger
— Tutorial: From starting up the E8a emulator debugger to debugging

(2) E8a Additional Document for User’s Manual

The E8a Additional Document for User’s Manual describes content dependent on the MCUs and precautionary notes.

— Example of the E8a emulator connection or interface circuit necessary for designing the hardware
— Notes on using the E8a emulator
— Setting the E8a emulator debugger during startup
Section 2 Connecting the Emulator with the User System

Before connecting an E8a emulator (hereafter referred to as emulator) with the user system, a connector must be installed in the user system so that a 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 E8a emulator user’s manual and the hardware manual for related MCUs.

Table 2.1 shows the recommended connector for the emulator.

Table 2.1 Recommended Connector

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Manufacturer</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2514-6002</td>
<td>3M Limited</td>
<td>14-pin straight type</td>
</tr>
</tbody>
</table>

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 2.1 Connecting the User System Interface Cable to the User System](image-url)
Notes:

1. The pin number assignments of the 14-pin connector differ from those of the E10A-USB 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 [Program Flash] mode, connect the emulator similarly to the user system.
Section 3  Pin Assignments of the E8a Connector

Figure 3.1 shows the pin assignments of the connector.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>MCU Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P33</td>
</tr>
<tr>
<td>2</td>
<td>Vss</td>
</tr>
<tr>
<td>3</td>
<td>N.C. &quot;2&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Vss</td>
</tr>
<tr>
<td>5</td>
<td>P35</td>
</tr>
<tr>
<td>6</td>
<td>Vss</td>
</tr>
<tr>
<td>7</td>
<td>P95</td>
</tr>
<tr>
<td>8</td>
<td>Vcc</td>
</tr>
<tr>
<td>9</td>
<td>N.C. &quot;2&quot;</td>
</tr>
<tr>
<td>10</td>
<td>Vss</td>
</tr>
<tr>
<td>11</td>
<td>P34</td>
</tr>
<tr>
<td>12</td>
<td>Vss</td>
</tr>
<tr>
<td>13</td>
<td>RES# &quot;1&quot;</td>
</tr>
<tr>
<td>14</td>
<td>Vss</td>
</tr>
</tbody>
</table>

Notes:
1. The symbol (#) means that the signal is active-low.
2. These pins are not used in the H8/300L Super Low Power series. Do not connect anything to these pins.

Figure 3.1  Pin Assignments of the Connector
Section 4  Example of Emulator Connection

Figure 4.1 shows an example of emulator connection to the MCU.

![Diagram of Emulator Connection](image)

Figure 4.1  Example of Emulator Connection
Notes: 1. P33 to P35 pins are used by the emulator. Pull up and connect the emulator and MCU pins.

2. The P95 pin is used for forced break control by the emulator. Connect the emulator and MCU pins directly.

3. 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.
4. Connect Vss and Vcc with the Vss and Vcc of the MCU, respectively (within the guaranteed range of the microcomputer). When the power-supply mode is used, the power is supplied to the user system. Check that the power consumption or voltage of the user system is within the available range of E8a and avoid a problem such as closing of the power-supply circuit.

5. Connect nothing with N.C.

---

**WARNING**

In the power-supply mode, connect the emulator after checking that the power-supply circuit on the user system is not closed or the pin number assignments of the user system connector is correct. Failure to do so will result in a FIRE HAZARD and will damage the host computer, the emulator, and the user system.

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6. When the MCU in use is connected to the emulator, the pin functions listed below are not available.

<table>
<thead>
<tr>
<th>Table 4.1  Pin Functions Not Available</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38024F and H8/38004F</td>
</tr>
<tr>
<td>P33-P35 and P95</td>
</tr>
</tbody>
</table>
7. Figure 4.5 shows the interface circuit in the E8a emulator. Use this figure as a reference when determining the pull-up resistance value.
Section 5 Differences between the MCUs (H8/38024F and H8/38004F) and the Emulator

This section describes the differences between the emulator and MCU operations.

1. [Emulator Setting] Dialog Box

   The [Emulator Setting] dialog box is provided for setting the items that need to be set when the emulator starts up (settings are saved in the session).

![Emulator Setting Dialog Box]

   Figure 5.1 [Emulator Setting] Dialog Box
To keep the [Emulator Setting] dialog box closed next time the emulator is started, check "Do not show this dialog box again." at the bottom of the [Emulator Setting] dialog box. You can open the [Emulator Setting] dialog box using either one of the following methods:

— After the emulator gets started, select Menu - [Setup] -> [Emulator] -> [Emulator Setting...].
— Start the emulator while holding down the Ctrl key.
— After the emulator gets started and an error occurred, restart the emulator.

When you check "Do not show this dialog box again.", the emulator doesn't supply power to the user system. To use this check box, start the emulator after turning on the power.

2. Emulator Mode

The selection of the device, the specification of the mode, and the setting of the power supply are done in the [Emulator mode] page of the [Emulator Setting] dialog box.

— Device
Select the device name in use from the [Device] combo box. The following items are selected in the [Mode] group box.

— Modes
  • Erase Flash and Connect
    This mode is used when there is no emulator program in the flash memory of the target device. In this mode, data of the flash memory of the target device is erased when the emulator is activated. Select this item when the emulator is firstly activated, the version of the emulator’s software is updated, or the ID code is changed.
  
  • Keep Flash and Connect
    This mode is used when there is an emulator program in the flash memory of the target device. Enter the ID code specified above (‘Erase Flash and Connect’). If an incorrect code is entered, all the programs on the flash memory will be erased.

Note: When the emulator gets started in this mode after selecting "Do not show this dialog box again.", the initial values of the ID code is ‘0E8a’ for the E8a emulator. If you use the ID code other than the initial value, do not use "Do not show this dialog box again.".
• Program Flash
  This mode is used when the emulator is used for programming the flash memory. Debugging the program is disabled. To download the load module, register it in the workspace.

Note: In the H8/Tiny or H8/Super Low Power device, the ID code is not entered in the Program Flash mode.

— Power Supply
  When [Power Target from emulator. (MAX 300mA)] is checked, power will be supplied to the user system up to 300 mA. Then select 3.3 V or 5.0 V according to the power voltage of the user system.

3. Emulator Activation and ID Code
In the H8/Tiny- or H8/Super Low Power-series MCU, the [System Clock] and [ID Code] dialog boxes are set when the emulator is activated.

— Setting the system clock
  Enter the clock value input to the board in use. The initial value differs in each MCU.

![System Clock Dialog Box](image)

Figure 5.2 [System Clock] Dialog Box

— Setting the ID code
  When the emulator is activated in the [Erase Flash and Connect] mode, enter any hexadecimal four-digit ID code to be set (except for H'FFFF). The initial value is H'0E8A. When the emulator is activated in the [Keep Flash and Connect] mode, enter the correct ID code. If an incorrect ID code is entered, all the contents of the flash memory will be erased. In this case, restart the emulator in the [Erase Flash and Connect] mode.
4. When the emulator system is initiated, it initializes the general registers and part of the control registers as shown in table 5.1.

Table 5.1 Register Initial Values at Emulator Power-On

<table>
<thead>
<tr>
<th>Register</th>
<th>Initial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>Reset vector value in the vector address table</td>
</tr>
<tr>
<td>R0 to R6</td>
<td>H'0000</td>
</tr>
<tr>
<td>R7 (SP)</td>
<td>H'FF80</td>
</tr>
<tr>
<td>CCR</td>
<td>H'80</td>
</tr>
</tbody>
</table>

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

6. RES# Signal
   The RES# signal is 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.

7. 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.
8. 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.

9. The emulator communicates with the MCUs by using the RES#, P33 to P35, and P95 pins.
   These pins except for RES# cannot be used

10. Sum Data Displayed in the Program Flash Mode
    Sum data, which is displayed in the ‘Program Flash’ mode, is a value that data in the whole
    ROM areas has been added by byte (including data in the dedicated ROM area for the
    emulator).

11. 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.

12. The power consumed by the MCU can reach several milliamperes. This is because the user
    power supply drives ICs 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.

13. 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 Erase Flash and
    Connect mode.

Table 5.2 Program Area for the E8a Emulator

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38024F</td>
<td>Flash memory: H'7000 to H'7FFF</td>
</tr>
<tr>
<td>H8/38004F</td>
<td>Internal RAM: H'F780 to H'FB7F</td>
</tr>
<tr>
<td></td>
<td>Vector, etc.: H'0002 to H'0007, H'0014 to H'0015, H'7FF8 to H'7FF9</td>
</tr>
</tbody>
</table>

14. 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.
15. 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.

16. Items Set in the [Configuration] Dialog Box

The emulator operation conditions are set in the [Configuration] dialog box.

Figure 5.4  [Configuration] Dialog Box ([Emulator System] Page)
Items that can be displayed in this dialog box are listed below.

<table>
<thead>
<tr>
<th>[Device] combo box</th>
<th>Displays the MCU name.</th>
</tr>
</thead>
</table>
| [Emulation mode] combo box | Selects the emulation mode at user program execution.  
Select Normal to perform normal emulation.  
Select No break to disable PC breakpoint or break condition settings during emulation. |
| [Step option] combo box | Sets the step interrupt option.  
Disable interrupts during single step execution: Disables interrupts* during step execution.  
Enable interrupts during single step execution: Enables interrupts* during step execution. |
| [User interface clock] combo box | Displays the transfer clock of the user interface. |
| [Flash memory synchronization] combo box | Selects whether or not the contents of the flash memory are acquired by the emulator when the user program is stopped or the position where the PC break is set is put back as the original code.  
When the flash memory is not programmed by the user program, its contents need not be acquired by the emulator. |
If there is no problem with the state that the program in the flash memory has been replaced as the PC break code, the position where the PC break is set needs not be put back as the original code.

Disable: Read or program is not performed for the flash memory except when the emulator is activated, the flash memory area is modified, and the settings of the PC break to the flash memory area are changed.

PC to flash memory: When the user program is stopped, the specified PC break code is replaced as the original instruction. Select this option if there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

Flash memory to PC: When the user program is stopped, the contents of the flash memory are read by the emulator. Select this option if the flash memory is reprogrammed by the user program.

PC to flash memory, Flash memory to PC: When the user program is stopped, the contents of the flash memory are read by the emulator and the specified PC break code is replaced as the original instruction. Select this option if the flash memory is reprogrammed by the user program and there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

[Step Over option] combo box Enables or disables programming of the flash memory while executing step operation.

Programming of the flash memory: Uses a software break for step operation (e.g. Step Over) and enables programming of the flash memory.

No Programming of the flash memory: Uses Break Condition for step operation (e.g. Step Over) and disables programming of the flash memory. 

[Flash memory write after download] group box Enables or disables programming of the flash memory after downloading the program.

Disable: Disables programming of the flash memory after downloading the program.

Enable: Enables programming of the flash memory after downloading the program.
[Short break] group box

Enables or disables memory access during user program execution.
Enable: Enables memory access during user program execution.
Disable: Disables memory access during user program execution.

Notes:
1. Includes interrupts in a break.
2. When Step Over is performed after selecting [No Programming of the flash memory] for [Step Over option], the instruction that follows a JSR, BSR, or TRAPA instruction will also be executed. If there are consecutive JSR, BSR, or TRAPA instructions, execution proceeds until it reaches an instruction that is not JSR, BSR, or TRAPA. (When there are consecutive function calls in C language, the program steps all of these functions.)

17. Available MCU for E8a Emulator

The H8/38002F is also available for the emulator. When the emulator is activated, set the MCU to be selected as shown in table 5.3. Note that, however, an error will not be displayed even if a program which is larger than the internal ROM capacity is downloaded.

Table 5.3 List of Available MCU

<table>
<thead>
<tr>
<th>MCU to be Used</th>
<th>MCU to be Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38002F</td>
<td>H8/38004F</td>
</tr>
</tbody>
</table>

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

Be sure to initialize the internal I/O registers shown below by the user program since they are not initialized by selecting [Debug] – [Reset CPU] or using the RESET command.

Table 5.4 Registers Not Initialized

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Register Not Initialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38004F</td>
<td>SYSCR1, SYSCR2, IEGR, IENR2, IENR1, IRR1, IWPR, CKSTPR1, CKSTPR2</td>
</tr>
<tr>
<td>H8/38024F</td>
<td></td>
</tr>
</tbody>
</table>
Notes on Connecting the H8/38124F and H8/38104F
Section 1  Inside the E8a Emulator User’s Manual


(1) E8a Emulator User’s Manual

The E8a Emulator User’s Manual describes the hardware specifications and how to use the emulator debugger.
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   — Connecting the E8a emulator to the host computer or user system
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Before connecting an E8a 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 E8a emulator user’s manual and the hardware manual for related MCUs.

Table 2.1 shows the recommended connector for the emulator.

Table 2.1  Recommended Connector

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Manufacturer</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2514-6002</td>
<td>3M Limited</td>
<td>14-pin straight type</td>
</tr>
</tbody>
</table>

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 2.1  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-USB 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 [Program Flash] mode, connect the emulator similarly to the user system.
Section 3  Pin Assignments of the E8a Connector

Figure 3.1 shows the pin assignments of the connector.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>MCU Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P33</td>
</tr>
<tr>
<td>2</td>
<td>Vss</td>
</tr>
<tr>
<td>3</td>
<td>N.C. *2</td>
</tr>
<tr>
<td>4</td>
<td>Vss</td>
</tr>
<tr>
<td>5</td>
<td>P35</td>
</tr>
<tr>
<td>6</td>
<td>Vss</td>
</tr>
<tr>
<td>7</td>
<td>P95</td>
</tr>
<tr>
<td>8</td>
<td>Vcc</td>
</tr>
<tr>
<td>9</td>
<td>N.C. *2</td>
</tr>
<tr>
<td>10</td>
<td>Vss</td>
</tr>
<tr>
<td>11</td>
<td>P34</td>
</tr>
<tr>
<td>12</td>
<td>Vss</td>
</tr>
<tr>
<td>13</td>
<td>RES# *1</td>
</tr>
<tr>
<td>14</td>
<td>Vss</td>
</tr>
</tbody>
</table>

Notes:
1. The symbol # means that the signal is active-low. Use of the internal oscillator circuit is available in the H8/38124F and H8/38104F. However, an external clock input from pin OSC1 or OSC2 is necessary when the emulator is connected.
2. These pins are not used in the H8/300L Super Low Power series. Do not connect anything to these pins.
Section 4 Example of Emulator Connection

The figure shown below is an example of connecting the user system to the emulator. The H8/38124F and the H8/38104F incorporate a power-on reset circuit (hereafter referred to as POR). See figure 4.1 when you use the POR function or figure 4.2 when you do not use the POR function, respectively.

![Diagram of Emulator Connection](image)

**Figure 4.1** Example of Emulator Connection (when a POR is in Use)
Figure 4.2  Example of Emulator Connection (when a POR is not in Use)

*: Open-collector buffer

Connector
14 pins with a 2.54-mm pitch

Pulled-up at 4.7 kΩ or more

Connector
14 pin
with
a
2.54-mm pitch

User system

*: Open-collector buffer

Resonator
or
oscillator

OSCl

OSCl

OSCl

OSCl

User logic

RES#

RES#

RES#

RES#

RES#

RES#

RES#

RES#

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RES#

RES#

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RES#
Notes:

1. Pins P33 to P35 are used by the emulator. Pull up and connect the emulator and MCU pins.

2. Pin P95 is used for forced break control by the emulator. Connect the emulator and MCU pins directly.

---

**Figure 4.3** Connection of Emulator and Pins P33 to P35

**Figure 4.4** Connection of Emulator and Pin P95
3. The RES# pin is used by the emulator. Create the following circuit by connecting the open-collector output buffer so that a reset input from the emulator can be accepted:

![Circuit Diagram](image)

**Figure 4.5 Examples of Reset Circuits**

4. Connect Vss and Vcc with the Vss and Vcc of the MCU, respectively (within the guaranteed range of the microcomputer). When the power-supply mode is used, the power is supplied to the user system. Check that the power consumption or voltage of the user system is within the available range of E8a and avoid a problem such as closing of the power-supply circuit.

5. Connect nothing with N.C.

6. Refer to the hardware manual for the recommended capacitance of the capacitor that is connected to the RES# pin.

7. Use of the internal oscillator circuit is available in the H8/38124F and H8/38104F. However, an external clock input from pin OSC1 or OSC2 is necessary when the emulator is connected.
WARNING

In the power-supply mode, connect the emulator after checking that the power-supply circuit on the user system is not closed or the pin number assignments of the user system connector is correct.

Failure to do so will result in a FIRE HAZARD and will damage the host computer, the emulator, and the user system.

8. When the MCU in use is connected to the emulator, the pin functions listed below are not available.

Table 4.1 Pin Functions Not Available

<table>
<thead>
<tr>
<th>H8/38124F and H8/38104F</th>
</tr>
</thead>
<tbody>
<tr>
<td>P33-P35 and P95</td>
</tr>
</tbody>
</table>
9. Figure 4.6 shows the interface circuit in the E8a emulator. Use this figure as a reference when determining the pull-up resistance value.

---

**Figure 4.6 Interface Circuit in the E8a Emulator (Reference)**

Notes:
1. This figure omits the test circuits and pin numbers 3, 4, 9, and 14 for the user connector that are not used when H8/Tiny series is connected.
2. The power of 74LVC125B is supplied from Vcc in the user connector (or in the power-supply circuit during power-supply mode).
Section 5 Differences between the MCUs (H8/38124F and H8/38104F) and the Emulator

This section describes the differences between the emulator and MCU operations.

1. [Emulator Setting] Dialog Box
   The [Emulator Setting] dialog box is provided for setting the items that need to be set when the emulator starts up (settings are saved in the session).

![Figure 5.1 [Emulator Setting] Dialog Box](image)

Figure 5.1 [Emulator Setting] Dialog Box
To keep the [Emulator Setting] dialog box closed next time the emulator is started, check "Do not show this dialog box again." at the bottom of the [Emulator Setting] dialog box. You can open the [Emulator Setting] dialog box using either one of the following methods:

— After the emulator gets started, select Menu - [Setup] -> [Emulator] -> [Emulator Setting...].
— Start the emulator while holding down the Ctrl key.
— After the emulator gets started and an error occurred, restart the emulator.

When you check "Do not show this dialog box again.", the emulator doesn't supply power to the user system. To use this check box, start the emulator after turning on the power.

2. Emulator Mode

The selection of the device, the specification of the mode, and the setting of the power supply are done in the [Emulator mode] page of the [Emulator Setting] dialog box.

— Device
Select the device name in use from the [Device] combo box. The following items are selected in the [Mode] group box.

— Modes
  • Erase Flash and Connect
    This mode is used when there is no emulator program in the flash memory of the target device. In this mode, data of the flash memory of the target device is erased when the emulator is activated. Select this item when the emulator is firstly activated, the version of the emulator’s software is updated, or the ID code is changed.

  • Keep Flash and Connect
    This mode is used when there is an emulator program in the flash memory of the target device. Enter the ID code specified above (‘Erase Flash and Connect’). If an incorrect code is entered, all the programs on the flash memory will be erased.

Note: When the emulator gets started in this mode after selecting "Do not show this dialog box again.", the initial values of the ID code is '0E8a' for the E8a emulator. If you use the ID code other than the initial value, do not use "Do not show this dialog box again.".
- **Program Flash**
  This mode is used when the emulator is used for programming the flash memory. Debugging the program is disabled. To download the load module, register it in the workspace.

  **Note:** In the H8/Tiny or H8/Super Low Power device, the ID code is not entered in the Program Flash mode.

- **Power Supply**
  When [Power Target from emulator. (MAX 300mA)] is checked, power will be supplied to the user system up to 300 mA. Then select 3.3 V or 5.0 V according to the power voltage of the user system.

3. **Emulator Activation and ID Code**

   In the H8/Tiny- or H8/Super Low Power-series MCU, the [System Clock] and [ID Code] dialog boxes are set when the emulator is activated.

   - **Setting the system clock**
     Enter the clock value input to the board in use. The initial value differs in each MCU.

   ![Figure 5.2](image)

   **Figure 5.2  [System Clock] Dialog Box**

   - **Setting the ID code**
     When the emulator is activated in the [Erase Flash and Connect] mode, enter any hexadecimal four-digit ID code to be set (except for H'FFFF). The initial value is H'0E8A. When the emulator is activated in the [Keep Flash and Connect] mode, enter the correct ID code. If an incorrect ID code is entered, all the contents of the flash memory will be erased. In this case, restart the emulator in the [Erase Flash and Connect] mode.
4. When the emulator system is initiated, it initializes the general registers and part of the control registers as shown in table 5.1.

Table 5.1 Register Initial Values at Emulator Power-On

<table>
<thead>
<tr>
<th>Register</th>
<th>Initial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>Reset vector value in the vector address table</td>
</tr>
<tr>
<td>R0 to R6</td>
<td>H'0000</td>
</tr>
<tr>
<td>R7</td>
<td>H'FF80</td>
</tr>
<tr>
<td>CCR</td>
<td>H'80</td>
</tr>
</tbody>
</table>

5. Low-power Mode
   During a user program break, the CPU operating frequency is forced to a system clock (\(\phi\)) for high-speed operation.

6. RES# Signal
   The RES# signal is 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.

7. 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.
8. 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.

9. The emulator communicates with the MCUs by using the RES#, P33 to P35, and P95 pins. These pins except for RES# cannot be used.

10. Sum Data Displayed in the Program Flash Mode
    Sum data, which is displayed in the ‘Program Flash’ mode, is a value that data in the whole ROM areas has been added by byte (including data in the dedicated ROM area for the emulator).

11. 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.

12. The power consumed by the MCU can reach several milliamperes. This is because the user power supply drives ICs 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.

13. 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 Erase Flash and Connect mode.

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38124F</td>
<td>Flash memory: H’7000 to H’7FFF</td>
</tr>
<tr>
<td>H8/38104F</td>
<td>Internal RAM: H’F780 to H’FB7F</td>
</tr>
<tr>
<td></td>
<td>Vector, etc.: H’0002 to H’0007, H’0014 to H’0015, H’7FF8 to H’7FF9</td>
</tr>
</tbody>
</table>

14. 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.

15. 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.
16. Use of the internal oscillator circuit is available in the H8/38124F and H8/38104F. However, an external clock input from pin OSC1 or OSC2 is necessary when the emulator is connected.

17. Items Set in the [Configuration] Dialog Box

The emulator operation conditions are set in the [Configuration] dialog box.

![Configuration Dialog Box](image)

**Figure 5.4**  [Configuration] Dialog Box ([System] Page)
Items that can be displayed in this dialog box are listed below.

<table>
<thead>
<tr>
<th>[Device] combo box</th>
<th>Displays the MCU name.</th>
</tr>
</thead>
</table>
| [Emulation mode] combo box | Selects the emulation mode at user program execution.  
Select Normal to perform normal emulation.  
Select No break to disable PC breakpoint or break condition settings during emulation. |
| [Step option] combo box | Sets the step interrupt option.  
Disable interrupts during single step execution: Disables interrupts during step execution.  
Enable interrupts during single step execution: Enables interrupts during step execution. |
| [User interface clock] combo box | Displays the transfer clock of the user interface. |
| [Flash memory synchronization] combo box | Selects whether or not the contents of the flash memory are acquired by the emulator when the user program is stopped or the position where the PC break is set is put back as the original code.  
When the flash memory is not programmed by the user program, its contents need not be acquired by the emulator. |
If there is no problem with the state that the program in the flash memory has been replaced as the PC break code, the position where the PC break is set needs not be put back as the original code.

Disable: Read or program is not performed for the flash memory except when the emulator is activated, the flash memory area is modified, and the settings of the PC break to the flash memory area are changed.

PC to flash memory: When the user program is stopped, the specified PC break code is replaced as the original instruction. Select this option if there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

Flash memory to PC: When the user program is stopped, the contents of the flash memory are read by the emulator. Select this option if the flash memory is reprogrammed by the user program.

PC to flash memory, Flash memory to PC: When the user program is stopped, the contents of the flash memory are read by the emulator and the specified PC break code is replaced as the original instruction. Select this option if the flash memory is reprogrammed by the user program and there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

[Step Over option] combo box Enables or disables programming of the flash memory while executing step operation.

Programming of the flash memory: Uses a software break for step operation (e.g. Step Over) and enables programming of the flash memory.

No Programming of the flash memory: Uses Break Condition for step operation (e.g. Step Over) and disables programming of the flash memory.

[Flash memory write after download] group box Enables or disables programming of the flash memory after downloading the program.

Disable: Disables programming of the flash memory after downloading the program.

Enable: Enables programming of the flash memory after downloading the program.
Notes:  
1. Includes interrupts in a break.
2. When Step Over is performed after selecting [No Programming of the flash memory] for [Step Over option], the instruction that follows a JSR, BSR, or TRAPA instruction will also be executed. If there are consecutive JSR, BSR, or TRAPA instructions, execution proceeds until it reaches an instruction that is not JSR, BSR, or TRAPA. (When there are consecutive function calls in C language, the program steps all of these functions.)

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

Be sure to initialize the internal I/O registers shown below by the user program since they are not initialized by selecting [Debug] – [Reset CPU] or using the RESET command.

Table 5.3 Registers Not Initialized

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Register Not Initialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38104F</td>
<td>SYSCR1, SYSCR2, IEGR1, IENR2, IENR1, IRR1, IRR2, IWPR, TMW, CKSTPR1,</td>
</tr>
<tr>
<td>H8/38124F</td>
<td>CKSTPR2</td>
</tr>
</tbody>
</table>
Notes on Connecting the H8/38327F and H8/38347F
Section 1 Inside the E8a Emulator User’s Manual


(1) E8a Emulator User’s Manual
The E8a Emulator User’s Manual describes the hardware specifications and how to use the emulator debugger.
- E8a emulator hardware specifications
- Connecting the E8a emulator to the host computer or user system
- Operating the E8a emulator debugger
- Tutorial: From starting up the E8a emulator debugger to debugging

(2) E8a Additional Document for User’s Manual
The E8a Additional Document for User’s Manual describes content dependent on the MCUs and precautionary notes.
- Example of the E8a emulator connection or interface circuit necessary for designing the hardware
- Notes on using the E8a emulator
- Setting the E8a emulator debugger during startup
Section 2  Connecting the Emulator with the User System

Before connecting an E8a 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 E8a emulator user’s manual and the hardware manual for related MCUs.

Table 2.1 shows the recommended connector for the emulator.

Table 2.1  Recommended Connector

<table>
<thead>
<tr>
<th>Type Number</th>
<th>Manufacturer</th>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>2514-6002</td>
<td>3M Limited</td>
<td>14-pin straight type</td>
</tr>
</tbody>
</table>

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 2.1  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-USB 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 [Program Flash] mode, connect the emulator similarly to the user system.
Section 3  Pin Assignments of the E8a Connector

Figure 3.1 shows the pin assignments of the connector.

![Pin Assignments Diagram](image)

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal Name</th>
<th>H8/38327F</th>
<th>H8/38347F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P85</td>
<td>P25</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>N.C.‘2</td>
<td>N.C.‘2</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>P87</td>
<td>P27</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>P32</td>
<td>P24</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Vcc</td>
<td>Vcc</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>N.C.‘2</td>
<td>N.C.‘2</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>P86</td>
<td>P26</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>RES#*1</td>
<td>RES#*1</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Vss</td>
<td>Vss</td>
<td></td>
</tr>
</tbody>
</table>

Notes:
1. The symbol (#) means that the signal is active-low.
2. These pins are not used in the H8/300L Super Low Power series. Do not connect anything to these pins.
Section 4  Example of Emulator Connection

Figures 4.1 and 4.2 show examples of emulator connection to the MCU.

![Diagram of Emulator Connection](image)

Figure 4.1  Example of Emulator Connection (H8/38327F)
Figure 4.2 Example of Emulator Connection (H8/38347F)
Notes: 1. P85 to P87 pins (H8/38327F) and P25 to P27 pins (H8/38347F) are used by the emulator. Pull up and connect the emulator and MCU pins.

![Figure 4.3 Connection of Emulator and P85 to P87 Pins (H8/38327F)](image)

2. The P32 pin (H8/38327F) and P24 pin (H8/38347F) are used for forced break control by the emulator. Connect the emulator and MCU pins directly.

![Figure 4.4 Connection of Emulator and P25 to P27 Pins (H8/38347F)](image)

![Figure 4.5 Connection of Emulator and P32 Pin (H8/38327F)](image)
3. 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 4.6  Connection of Emulator and P24 Pin (H8/38347F)](image)

4. Connect Vss and Vcc with the Vss and Vcc of the MCU, respectively.
   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.

5. Connect nothing with N.C.
**WARNING**

In the power-supply mode, connect the emulator after checking that the power-supply circuit on the user system is not closed or the pin number assignments of the user system connector is correct.

Failure to do so will result in a FIRE HAZARD and will damage the host computer, the emulator, and the user system.

6. When the MCU in use is connected to the emulator, the pin functions listed below are not available.

**Table 4.1** Pin Functions Not Available in H8/38327F

<table>
<thead>
<tr>
<th>H8/38327F</th>
</tr>
</thead>
<tbody>
<tr>
<td>P85-P87 and P32</td>
</tr>
</tbody>
</table>

**Table 4.2** Pin Functions Not Available in H8/38347F

<table>
<thead>
<tr>
<th>H8/38347F</th>
</tr>
</thead>
<tbody>
<tr>
<td>P24-P27</td>
</tr>
</tbody>
</table>
7. Figure 4.8 shows the interface circuit in the E8a emulator. Use this figure as a reference when determining the pull-up resistance value.

![Interface Circuit Diagram](image)

Notes:
1. This figure omits the test circuits and pin numbers 2, 3, 4, 6, 9, 10, 12, and 14 for the user connector that are not used when H8/Tiny series is connected.
2. The power of 74LVC125B is supplied from Vcc in the user connector (or in the power-supply circuit during power-supply mode).
3. The pin numbers and corresponding MCU pin names are listed below.

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>H8/38327F</th>
<th>H8/38347F</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P85</td>
<td>P25</td>
</tr>
<tr>
<td>5</td>
<td>P67</td>
<td>P27</td>
</tr>
<tr>
<td>7</td>
<td>P32</td>
<td>P24</td>
</tr>
<tr>
<td>8</td>
<td>Vcc</td>
<td>Vcc</td>
</tr>
<tr>
<td>11</td>
<td>P66</td>
<td>P36</td>
</tr>
<tr>
<td>13</td>
<td>RES#</td>
<td>RES#</td>
</tr>
</tbody>
</table>

Figure 4.8 Interface Circuit in the E8a Emulator (Reference)
Section 5  Differences between the MCUs (H8/38327F and H8/38347F) and the Emulator

This section describes the differences between the emulator and MCU operations.

1. [Emulator Setting] Dialog Box

The [Emulator Setting] dialog box is provided for setting the items that need to be set when the emulator starts up (settings are saved in the session).

![Emulator Setting Dialog Box]

**Figure 5.1  [Emulator Setting] Dialog Box**
To keep the [Emulator Setting] dialog box closed next time the emulator is started, check "Do not show this dialog box again." at the bottom of the [Emulator Setting] dialog box. You can open the [Emulator Setting] dialog box using either one of the following methods:

— After the emulator gets started, select Menu -> [Setup] -> [Emulator] -> [Emulator Setting...].
— Start the emulator while holding down the Ctrl key.
— After the emulator gets started and an error occurred, restart the emulator.

When you check "Do not show this dialog box again.", the emulator doesn't supply power to the user system. To use this check box, start the emulator after turning on the power.

2. Emulator Mode

The selection of the device, the specification of the mode, and the setting of the power supply are done in the [Emulator mode] page of the [Emulator Setting] dialog box.

— Device

Select the device name in use from the [Device] combo box. The following items are selected in the [Mode] group box.

— Modes

- Erase Flash and Connect

  This mode is used when there is no emulator program in the flash memory of the target device. In this mode, data of the flash memory of the target device is erased when the emulator is activated. Select this item when the emulator is firstly activated, the version of the emulator’s software is updated, or the ID code is changed.

- Keep Flash and Connect

  This mode is used when there is an emulator program in the flash memory of the target device. Enter the ID code specified above ("Erase Flash and Connect"). If an incorrect code is entered, all the programs on the flash memory will be erased.

Note: When the emulator gets started in this mode after selecting "Do not show this dialog box again.", the initial values of the ID code are ‘00E8’ and ‘0E8a’, respectively, for the E8 and E8a emulators. If you use the ID code other than the initial value, do not use "Do not show this dialog box again.".
• Program Flash
  This mode is used when the emulator is used for programming the flash memory.
  Debugging the program is disabled. To download the load module, register it in the
  workspace.

Note: In the H8/Tiny or H8/Super Low Power device, the ID code is not entered in the Program
Flash mode.

— Power Supply
  When [Power Target from emulator. (MAX 300mA)] is checked, power will be supplied to
  the user system up to 300 mA. Then select 3.3 V or 5.0 V according to the power voltage
  of the user system.

3. Emulator Activation and ID Code
   In the H8/Tiny- or H8/Super Low Power-series MCU, the [System Clock] and [ID Code]
   dialog boxes are set when the emulator is activated.
   — Setting the system clock
     Enter the clock value input to the board in use. The initial value differs in each MCU.

   — Setting the ID code
     When the emulator is activated in the [Erase Flash and Connect] mode, enter any
     hexadecimal four-digit ID code to be set (except for H’FFFF). The initial value is H’0E8A.
     When the emulator is activated in the [Keep Flash and Connect] mode, enter the correct ID
     code. If an incorrect ID code is entered, all the contents of the flash memory will be erased.
     In this case, restart the emulator in the [Erase Flash and Connect] mode.
When the emulator system is initiated, it initializes the general registers and part of the control registers as shown in Table 5.1.

Table 5.1  Register Initial Values at Emulator Power-On

<table>
<thead>
<tr>
<th>Register</th>
<th>Initial Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>Reset vector value in the vector address table</td>
</tr>
<tr>
<td>R0 to R6</td>
<td>H'0000</td>
</tr>
<tr>
<td>R7</td>
<td>H'FF80</td>
</tr>
<tr>
<td>CCR</td>
<td>H'80</td>
</tr>
</tbody>
</table>

5. Low-power Mode
   During a user program break, the CPU operating frequency is forced to a system clock (\( \phi \)) for high-speed operation.

6. RES# Signal
   The RES# signal is 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.

7. 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.
8. 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.

9. The emulator communicates with the MCUs by using the P85 to P87 and P32 (H8/38327F),
P24 to P27 (H8/38347F), and RES# pins. These pins except for RES# cannot be used.

10. Sum Data Displayed in the Program Flash Mode
    Sum data, which is displayed in the ‘Program Flash’ mode, is a value that data in the whole
    ROM areas has been added by byte (including data in the dedicated ROM area for the
    emulator).

11. 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.

12. The power consumed by the MCU can reach several milliamperes. This is because the user
    power supply drives ICs 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.

13. 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 Erase Flash and
    Connect mode.

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Program Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38327F</td>
<td>Flash memory: H'E000 to H'EFFF</td>
</tr>
<tr>
<td>H8/38347F</td>
<td>Internal RAM: H'F300 to H'F6FF</td>
</tr>
<tr>
<td></td>
<td>Vector, etc.: H'0002 to H'0007, H'EFF8 to H'EFF9</td>
</tr>
</tbody>
</table>

14. 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.

15. 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.
16. Debugging of the emulator will not be normally performed if bit 2 of PCR3 and bit 2 of PDR3 are rewritten in the user program or the BSET.B and BCLR.B instructions are issued to other than bit 2 in each register.

17. Items Set in the [Configuration] Dialog Box

The emulator operation conditions are set in the [Configuration] dialog box.

![Configuration Dialog Box](image)

**Figure 5.4** [Configuration] Dialog Box ([System] Page)
Items that can be displayed in this dialog box are listed below.

<table>
<thead>
<tr>
<th>Combo Box</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Device] combo box</td>
<td>Displays the MCU name.</td>
</tr>
<tr>
<td>[Emulation mode] combo box</td>
<td>Selects the emulation mode at user program execution.</td>
</tr>
<tr>
<td></td>
<td>Select Normal to perform normal emulation.</td>
</tr>
<tr>
<td></td>
<td>Select No break to disable PC breakpoint or break condition settings during emulation.</td>
</tr>
<tr>
<td>[Step option] combo box</td>
<td>Sets the step interrupt option.</td>
</tr>
<tr>
<td></td>
<td>Disable interrupts during single step execution: Disables interrupts during step execution.</td>
</tr>
<tr>
<td></td>
<td>Enable interrupts during single step execution: Enables interrupts during step execution.</td>
</tr>
<tr>
<td>[User interface clock] combo box</td>
<td>Displays the transfer clock of the user interface.</td>
</tr>
<tr>
<td>[Flash memory synchronization] combo box</td>
<td>Selects whether or not the contents of the flash memory are acquired by the emulator when the user program is stopped or the position where the PC break is set is put back as the original code.</td>
</tr>
<tr>
<td></td>
<td>When the flash memory is not programmed by the user program, its contents need not be acquired by the emulator.</td>
</tr>
</tbody>
</table>
If there is no problem with the state that the program in the flash memory has been replaced as the PC break code, the position where the PC break is set needs not be put back as the original code.

**Disable:** Read or program is not performed for the flash memory except when the emulator is activated, the flash memory area is modified, and the settings of the PC break to the flash memory area are changed.

**PC to flash memory:** When the user program is stopped, the specified PC break code is replaced as the original instruction. Select this option if there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

**Flash memory to PC:** When the user program is stopped, the contents of the flash memory are read by the emulator. Select this option if the flash memory is reprogrammed by the user program.

**PC to flash memory, Flash memory to PC:** When the user program is stopped, the contents of the flash memory are read by the emulator and the specified PC break code is replaced as the original instruction. Select this option if the flash memory is reprogrammed by the user program and there is a problem with the state that the program in the flash memory has been replaced as the PC break code.

**[Step Over option] combo box**
Enables or disables programming of the flash memory while executing step operation.

- Programming of the flash memory: Uses a software break for step operation (e.g. Step Over) and enables programming of the flash memory.
- No Programming of the flash memory: Uses Break Condition for step operation (e.g. Step Over) and disables programming of the flash memory.

**[Flash memory write after download] group box**
Enables or disables programming of the flash memory after downloading the program.

- Disable: Disables programming of the flash memory after downloading the program.
- Enable: Enables programming of the flash memory after downloading the program.
Notes: 1. Includes interrupts in a break.
   2. When Step Over is performed after selecting [No Programming of the flash memory] for [Step Over option], the instruction that follows a JSR, BSR, or TRAPA instruction will also be executed. If there are consecutive JSR, BSR, or TRAPA instructions, execution proceeds until it reaches an instruction that is not JSR, BSR, or TRAPA. (When there are consecutive function calls in C language, the program steps all of these functions.)

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

   Be sure to initialize the internal I/O registers shown below by the user program since they are not initialized by selecting [Debug] – [Reset CPU] or using the RESET command.

Table 5.3 Registers Not Initialized

<table>
<thead>
<tr>
<th>MCU Name</th>
<th>Register Not Initialized</th>
</tr>
</thead>
<tbody>
<tr>
<td>H8/38347F</td>
<td>SYSCR1, SYSCR2, IEGR1, IENR2, IENR1, IRR1, IRR2, IWPR, CKSTPR1,</td>
</tr>
<tr>
<td>H8/38327F</td>
<td>CKSTPR2</td>
</tr>
</tbody>
</table>
E8a Emulator
Additional Document for User’s Manual
Notes on Connecting the H8/300L Super Low Power Series