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Renesas Electronics Corporation

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H8/36109 Group Expansion I/O Board

HS36109EIO61H User's Manual

Renesas Microcomputer
Development Environment
System

H8 Family / H8/300H Tiny Series

HS36109EIO61HE

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READ FIRST

- **READ** this user's manual before using this emulator product.
- **KEEP the user's manual handy for future reference.**

Do not attempt to use the emulator product until you fully understand its mechanism.

Emulator Product:

Throughout this document, the term "emulator product" shall be defined as the following products produced only by Renesas Technology Corp. excluding all subsidiary products.

- E6000 emulator station
- Expansion I/O board
- User system interface cables
- PC interface board

The user system or a host computer is not included in this definition.

Purpose of the Expansion I/O Board:

This expansion I/O board is installed in the E6000 emulator, and enables the emulator station to be connected to the user system interface cable. This expansion I/O board must only be used for the above purpose.

Improvement Policy:

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Target User of the Emulator Product:

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It is highly recommended that first-time users be instructed by users that are well versed in the operation of the emulator product.

LIMITED WARRANTY

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Figures:

Some figures in this user's manual may show items different from your actual system.

Limited Anticipation of Danger:

Renesas cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this user's manual and on the emulator product are therefore not all inclusive. Therefore, you must use the emulator product safely at your own risk.

SAFETY PAGE

READ FIRST

- **READ** this user's manual before using this emulator product.
- **KEEP** the user's manual handy for future reference.

Do not attempt to use the emulator product until you fully understand its mechanism.

DEFINITION OF SIGNAL WORDS



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE emphasizes essential information.

WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

- 1. Do not repair or remodel the emulator product by yourself for electric shock prevention and quality assurance.**
- 2. Always switch OFF the E6000 emulator and user system before connecting or disconnecting any CABLES or PARTS.**
- 3. Always before connecting any CABLES, make sure that pin 1 on both sides are correctly aligned.**
- 4. Supply power according to the power specifications and do not apply an incorrect power voltage. Use only the provided power cable.**

Preface

Thank you for purchasing this H8/36109 group expansion I/O board (HS36109EIO61H; hereinafter referred to as the expansion I/O board) for the E6000 emulator.

The expansion I/O board enables user systems for Renesas' original microcomputer H8/36109 group to be developed using an H8/36109 group E6000 emulator (HS3664EPI61H or HS3664EPI62H; hereinafter referred to as the emulator).

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Section 1 Overview

The H8/36109 group E6000 expansion I/O board (hereinafter referred to as the expansion I/O board) is an efficient software and hardware development support tool for application systems using timer RC, timer RD, SCI3, and AD converter (ports D to H are shared), which are dedicated additional functions of the Renesas' original microcomputer H8/36109 group.

The expansion I/O board should be used with H8/3664 series E6000 emulator station (HS3664EPI61H or HS3664EPI62H; hereinafter referred to as the emulator).

1.1 Environment Conditions

Table 1 Environment Conditions

Item	Specification
Temperature	Operating: +10 to +35°C
	Storage: -10 to +50°C
Humidity	Operating: 35 to 80% RH; no condensation
	Storage: 35 to 80% RH; no condensation
Ambient gases	No corrosive gases
Power supply	Power supply from E6000 emulator station
User system voltage (UVcc)	Depends on the MCU within the range 3.0 V to 5.5 V

1.2 Supported MCUs and User System Interface Cable

Table 2 shows the correspondence between the MCUs and the user system interface cable supported by the emulator.

Table 2 H8/36109 Group MCUs and User System Interface Cable

MCU Type Number	Package	E6000 User System Interface Cable
HD64F36109	100-pin QFP (FP-100A)	HS36109ECF61H
HD64336109		
HD64336108	100-pin QFP (FP-100U)	HS36109ECH61H
HD64336107		

1.3 Operating Voltage and Frequency Specifications

Table 3 shows the MCU operating voltage and frequency specifications supported by the emulator. If the emulator is used in an environment that exceeds the operating voltage range and operating frequency range guaranteed for the MCU operation, normal emulator operation is not guaranteed.

Table 3 Operating Voltage and Frequency Specifications

MCU Type	Operating Voltage (V)	Operating Frequency Range (ϕ) (MHz)
H8/36109 group	3.0 to 5.5	4 to 10
	4.0 to 5.5	4 to 20

NOTE

For details on the operating voltage and frequency specifications, refer to the MCU hardware manual.

1.4 Components

Figure 1.1 shows the HS36109EIO61H expansion I/O board appearance, and table 4 lists the components of the expansion I/O board. Please make sure you have all of these components when unpacking.

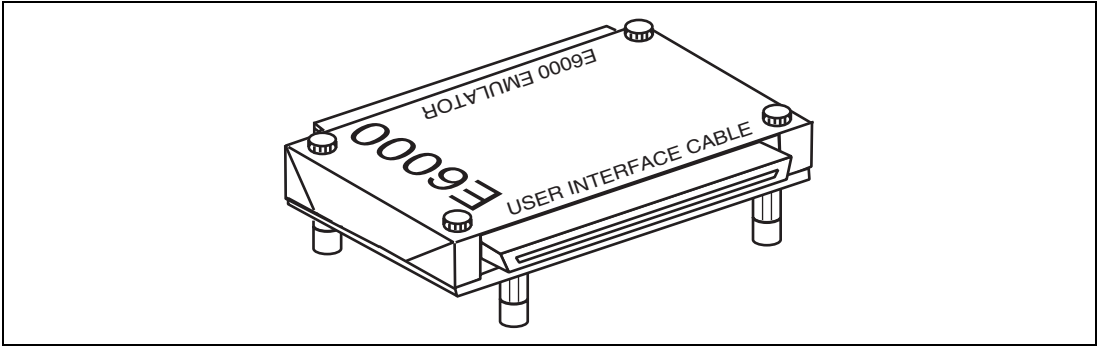


Figure 1.1 HS36109EIO61H Expansion I/O Board

Table 4 HS36109EIO61H Components

No.	Component	Quantity	Remarks
1	HS36109EIO61H	1	Expansion I/O board
2	Documentation	1	User's manual for HS36109EIO61H (this manual)

Section 2 Connection Procedures

WARNING

Always switch OFF the user system and the emulator product before the EXPANSION I/O BOARD or USER SYSTEM INTERFACE CABLE is connected to or removed from any part.

Before connecting, make sure that pin 1 on each side is correctly aligned. Failure to do so will result in a FIRE HAZARD and will damage the user system, the emulator product, the user system interface cable, and the expansion I/O board, or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

2.1 Using Emulator without Connecting User System

1. Make sure the emulator is turned off.
2. After making sure the direction of the expansion I/O board connector (labeled E6000 EMULATOR) is correct, firmly insert the expansion I/O board connector into the emulator station connector (labeled USER INTERFACE). It is possible to use the expansion I/O board connecting only to the emulator.

2.2 Using Emulator with Connecting User System through User System Interface Cable

CAUTION

When connecting or removing the user system interface cable, apply force only in the direction suitable for connection or removal, while making sure not to bend or twist the cable or connectors. Otherwise, the cables or connectors will be damaged.

1. Make sure that the emulator and the user system are turned off.
2. [1] After making sure the direction of the expansion I/O board connector (labeled E6000 EMULATOR) is correct, firmly insert the expansion I/O board connector into the emulator station connector (labeled USER INTERFACE; [1] in figure 2.1).
[2] Connect the expansion I/O board (labeled USER INTERFACE CABLE) and the user system interface cable body.

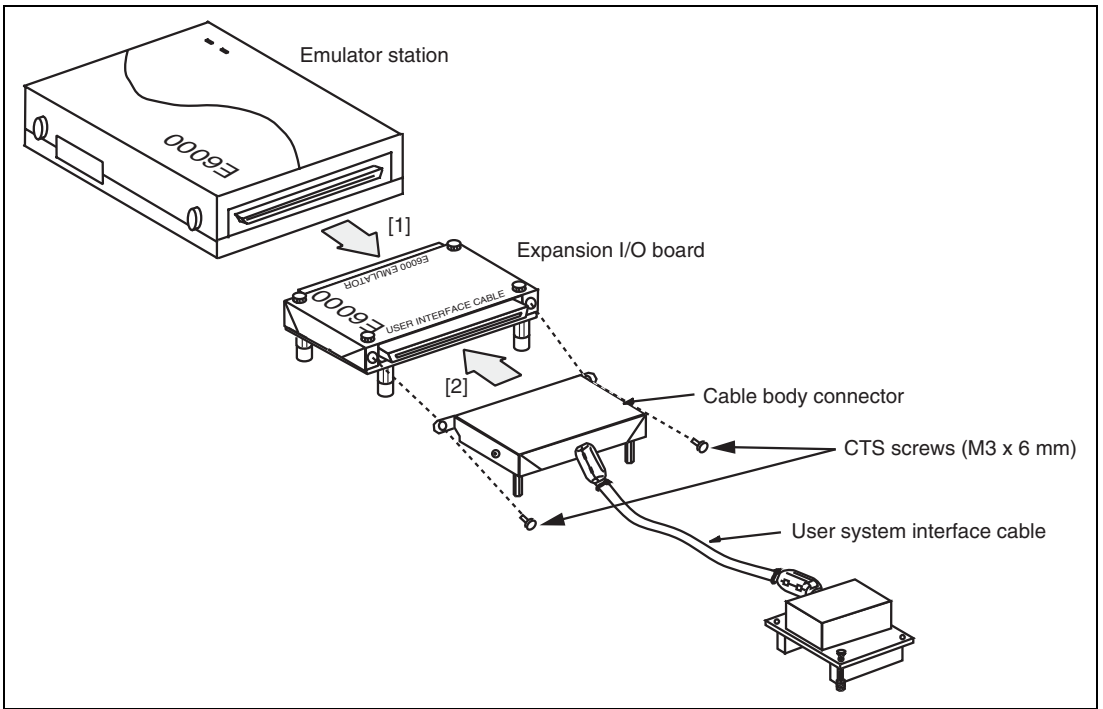


Figure 2.1 Connecting Expansion I/O Board to Emulator Station and User System Interface Cable

Section 3 User System Interface Circuit

Switches, protection circuits, and termination circuits are provided for this expansion I/O board and used to connect signals to the user system interface cable. Figure 3.1 shows the user system interface signal circuit.

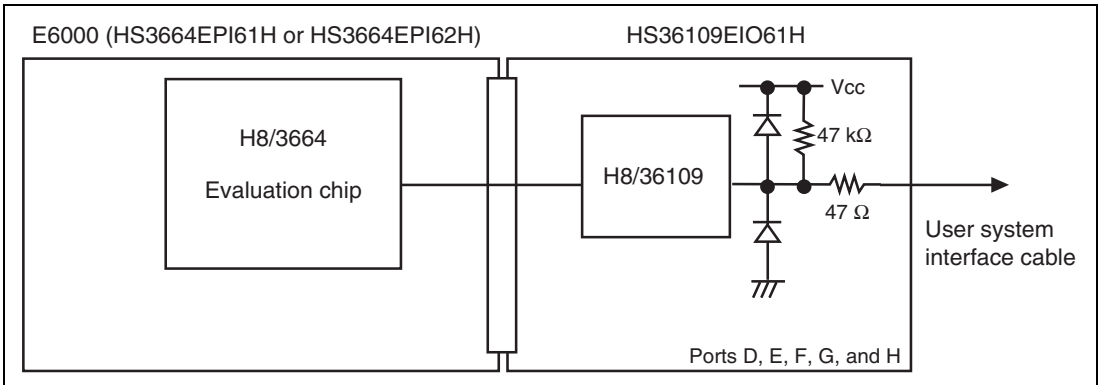


Figure 3.1 User System Interface Signal Circuit (Ports D, E, F, G, and H)

WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

- 1. This expansion I/O board is specifically designed for the H8/36109 group using the H8/3664 series E6000 emulator (HS3664EPI61H or HS3664EPI62H). Do not use this expansion I/O board with any other emulator station.**
- 2. Use the H8/36109 group user system interface cable (HS36109ECF61H for FP-100A or HS3109ECH61H for FP-100U). Do not use any other series of user system interface cable.**

1. Do not place heavy objects on the expansion I/O board.
2. Power is supplied from the emulator station to the expansion I/O board.

4.1 Notes on Accessing Registers

There are the following notes on accessing registers due to the differences between the product chip and the evaluation chip.

1. For bits 7 and 6 of H'FFF5 (interrupt enable register 2), bits 7, 4, and 2 of H'FFF9 (module standby control register 1), and bits 6, 5, 3, and 1 of H'FFFA (module standby control register 2), the hardware manual describes that 'The initial value is 0. Reserved. This bit is always read as 0.' In the emulator, replace the description as 'Set the bit to 0. This bit is read as the set value.'
2. For bit 0 of H'FFFB, the hardware manual describes that 'Reserved.' In the emulator, replace the description as 'Set the bit to 0. This bit is read as the set value.'
3. In the hardware manual, there are registers in addresses H'F730 to H'F731, H'F734, H'F738 to H'F73A, H'F73C to H'F73F, H'FF90 to H'FF93, H'FF9B, and H'FFEF. In the emulator, since there are no registers in those addresses, the description will be 'This bit cannot be modified and the read value is undefined.'

Table 5 Differences between the Evaluation Chip and Product Chip Registers

	Address Register	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
	H'F730	-	-	-	-	-	-	-	-
	H'F731	-	-	-	-	-	-	-	-
	H'F734	-	-	-	-	-	-	-	-
	H'F738	-	-	-	-	-	-	-	-
	H'F739	-	-	-	-	-	-	-	-
	H'F73A	-	-	-	-	-	-	-	-
	H'F73C	-	-	-	-	-	-	-	-
H8/3660	H'F73D	-	-	-	-	-	-	-	-
(Evaluation chip)	H'F73E	-	-	-	-	-	-	-	-
	H'F73F	-	-	-	-	-	-	-	-
	H'FFEE PCRC	-	-	-	-	-	-	-	-
	H'FFEF	-	-	-	-	-	-	-	-
	H'FFF5 IENR2	IENRB3	IENRB2	IENRB1	-	-	-	-	-
	H'FFF7 IRR2	IRRTB3	IENRB2	IENRB1	-	-	-	-	-
	H'FFF9 MSTCR1	MSTS4	MSTIIC	MSTS3	MSTAD	MSTWD	MSTTW	MSTTV	MSTTA
	H'FFFA MSTCR2	MSTS3_2	MSTTB3	MSTTB2	MSTTB1	MSTTX	-	MSTTZ0	MSTPWM
	H'FFFB MSTCR3	-	-	-	-	-	-	-	-
	H'FFFC TSCR	-	-	-	-	-	-	-	-

Table 5 Differences between the Evaluation Chip and Product Chip Registers (cont)

	Address Register	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
	H'F730	LVDCR	LVDE	BGRE	-	-	LVDSSEL	LVDRE	LVDDE	LVDUE
	H'F731	LVDSR	-	-	-	-	-	LVDDF	LVDUF	
	H'F734	CKCSR	PMRJ1	PMRJ0	-	OSCSSEL	CKSWIE	CKSWIF	-	CKCSTA
	H'F738	RCCR	RCSTP	FSEL	VCLSEL	-	-	-	RCPSC1	RCPSC0
	H'F739	RCTRMDPR	WRI	PRWE	LOCKDW	TRMDRWE	-	-	-	-
	H'F73A	RCTRMDR	TRMD7	TRMD6	TRMD5	TRMD4	TRMD3	TRMD2	TRMD1	TRMD0
	H'F73C	ICRA	ICRA7	ICRA6	ICRA5	ICRA4	ICRA3	ICRA2	ICRA1	ICRA0
H8/36109	H'F73D	ICRB	-	ICRB6	ICRB5	ICRB4	-	-	-	-
	H'F73E	ICRC	ICRC7	-	-	ICRC4	-	ICRC2	ICRC1	ICRC0
	H'F73F	ICRD	ICRD7	ICRD6	ICRD5	ICRD4	ICRD3	-	-	-
	H'FFEE	PCRC	-	-	-	-	PCRC3	PCRC2	PCRC1	PCRC0
	H'FFEF	SYSCR3	STS3	-	-	-	-	-	-	-
	H'FFF5	IENR2	-	-	IENRB1	-	-	-	-	-
	H'FFF7	IRR2	-	-	IRRTB1	-	-	-	-	-
	H'FFF9	MSTCR1	-	MSTIIC	MSTS3	-	MSTWD	-	MSTTV	MSTTA
	H'FFFA	MSTCR2	MSTS3_2	-	-	MSTTB1	-	-	-	MSTPWM
	H'FFFB	-	-	-	-	-	-	-	-	-
	H'FFFC	-	-	-	-	-	-	-	-	-

4.2 Power-on Reset and Low-voltage Detection Circuits

For the product chip, power-on reset and low-voltage detection circuits can be selected as the optional functions. However, since the evaluation chip does not incorporate these functions, software debugging cannot be performed in the emulator.

4.3 On-chip Oscillator

The product chip incorporates an on-chip oscillator. However, since the evaluation chip does not incorporate this function, software debugging on the on-chip oscillator and the general input/output function of port J cannot be performed in the emulator.

H8/36109 Group Expansion I/O Board HS36109EIO61H User's Manual

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