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April 1st, 2010
Renesas Electronics Corporation

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

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**H8/3644 Series SDIP-64
User System Interface Cable (HS3644ECS61H)
for E6000 Emulator
User's Manual**

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Preface

Thank you for purchasing this user system interface cable (HS3644ECS61H) for the Renesas's original microcomputer H8/3644 series.

The HS3644ECS61H is a user system interface cable that connects an H8/3644, 3657 series E6000 emulator (HS3644EPI60H; hereinafter referred to as the emulator) to the IC socket for an SDIP-64 package (package code: DP-64S) for the H8/3644 series MCU on the user system.

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Section 1 Configuration

CAUTION

Use an IC83-64075-GS4 socket (manufactured by YAMAICHI ELECTRONICS Co., Ltd.) for the DP-64S package IC socket on the user system.

Figure 1 shows the configuration of the HS3644ECS61H user system interface cable for the DP-64S package.

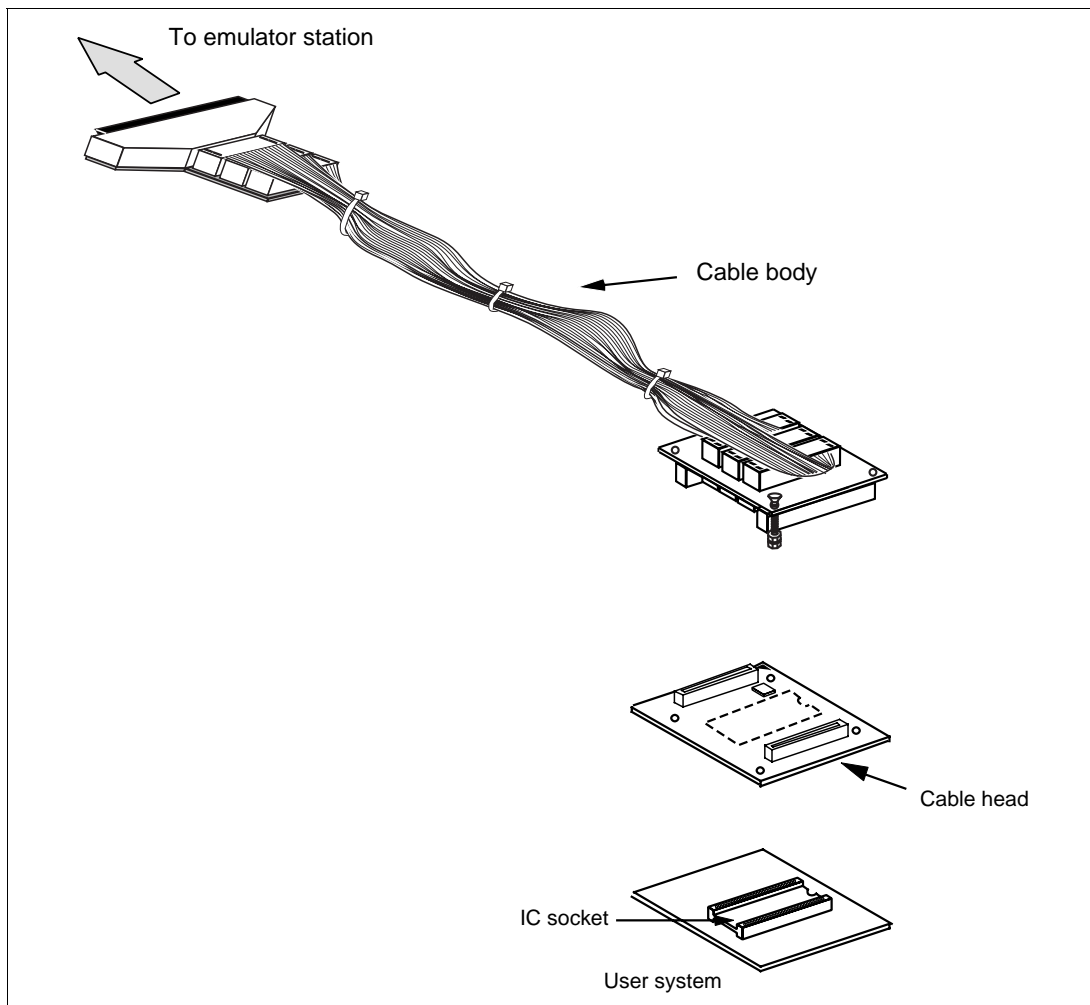


Figure 1 HS3644ECS61H User System Interface Cable

Table 1 lists the HS3644ECS61H components. Please make sure you have all of these components when unpacking.

Table 1 HS3644ECS61H Components

No.	Component	Quantity	Remarks
1	Cable body	1	Includes flat cable
2	Cable head	1	
3	IC socket	2	For the DP-64S package (for protection)
4	Documentation	1	User's manual for HS3644ECS61H (this manual)

Section 2 Connection Procedures

2.1 Connecting User System Interface Cable to Emulator Station

⚠ WARNING

Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE CABLE is connected to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned. Failure to do so will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

To connect the cable body to the emulator station, follow the instructions below.

1. Make sure the user system and emulator station are turned off.
2. After making sure the direction of the cable body connector is correct, firmly insert the cable body connector into the emulator station socket (figure 2).

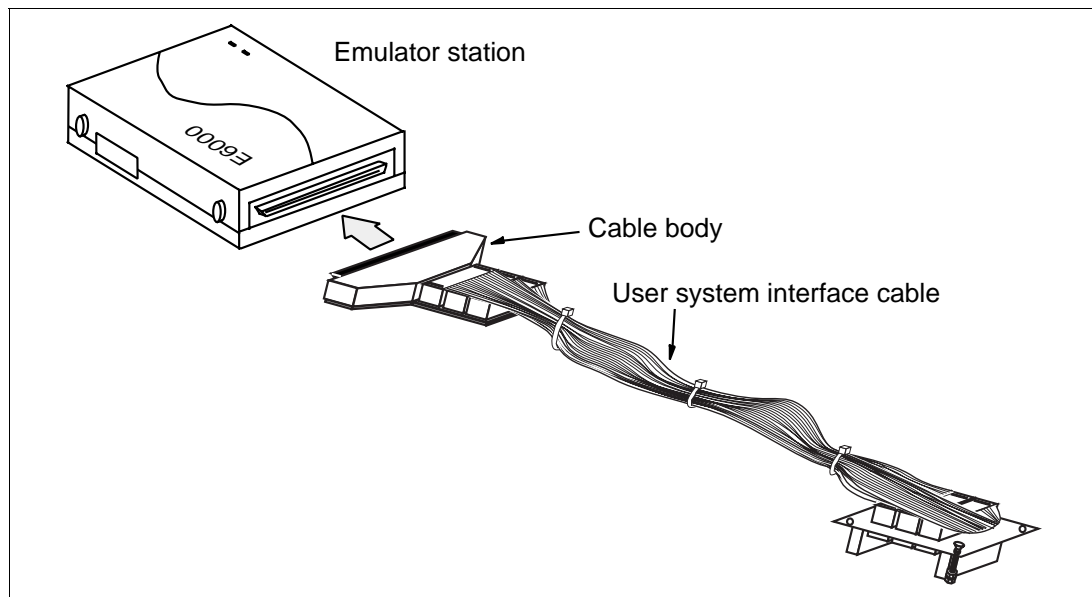


Figure 2 Connecting User System Interface Cable to Emulator Station

2.2 Connecting User System Interface Cable to User System

WARNING

Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE CABLE is connected to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned. Failure to do so will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

To connect the cable head to the user system, follow the instructions below.

2.2.1 Installing IC Socket

Prepare an IC socket (commercially available) for the DP-64S package and mount it on the user system.

Recommended IC socket: IC83-64075-GS4 (manufactured by YAMAICHI ELECTRONICS Co., Ltd.)

2.2.2 Inserting Cable Head

CAUTION

Check the location of pin 1 before inserting.

Align pin 1 on the IC socket for a DP-64S package on the user system with pin 1 on the user system interface cable head, and insert the user system interface cable head into the IC socket on the user system, as shown in figure 3.

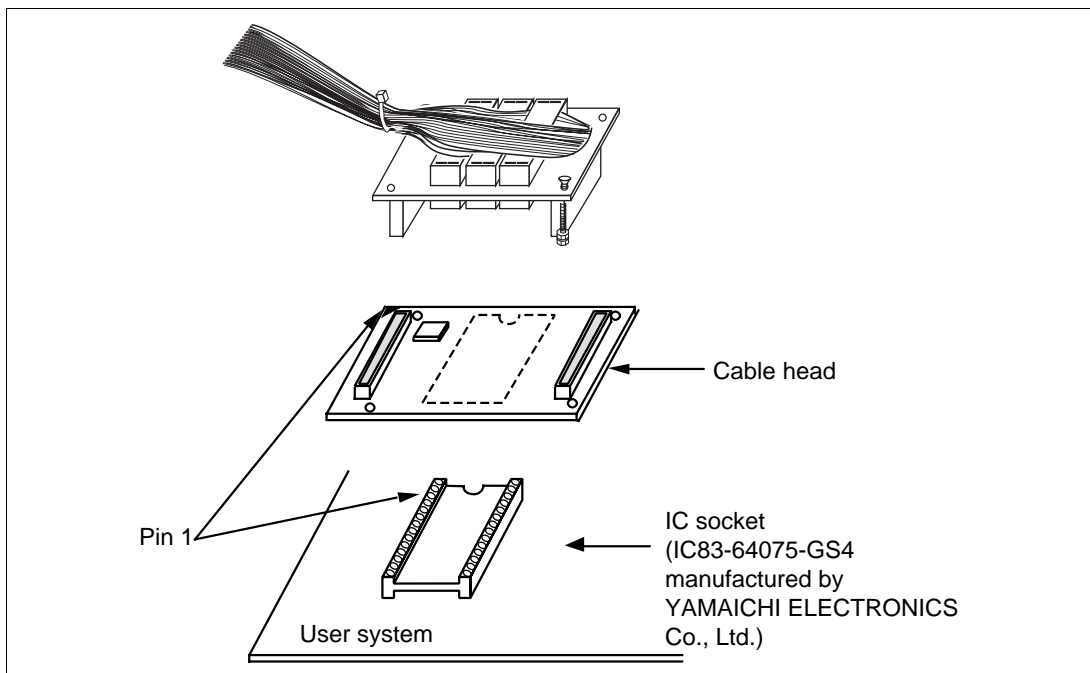


Figure 3 Connecting User System Interface Cable to User System

2.2.3 Connecting Cable Body to Cable Head

Connect the cable body to the cable head.

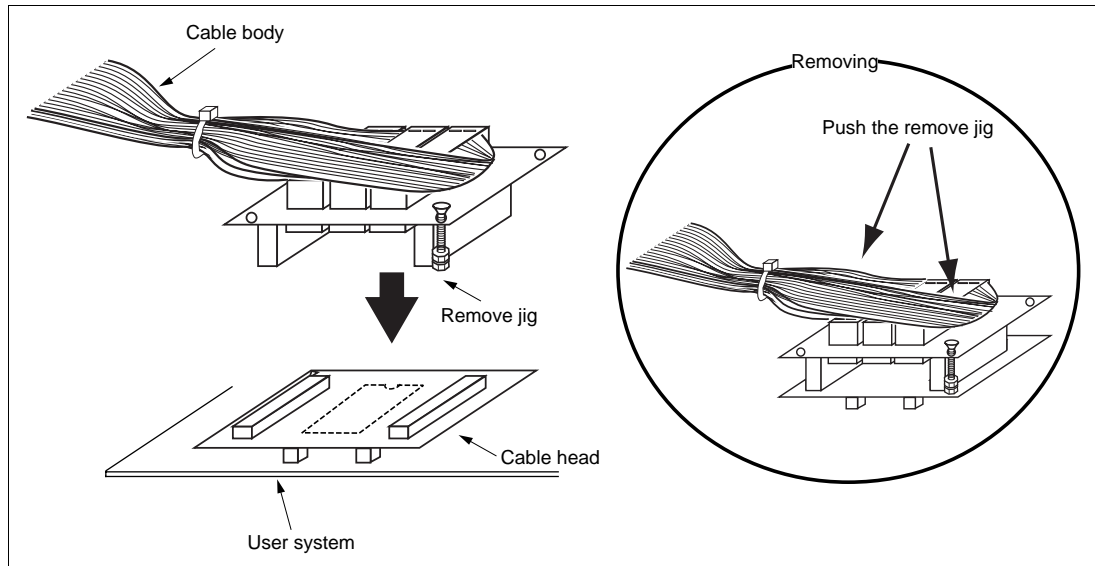


Figure 4 Fastening Cable Body

2.3 Dimensions for User System Interface Cable Head

The dimensions for the user system interface cable head are shown in figure 5.

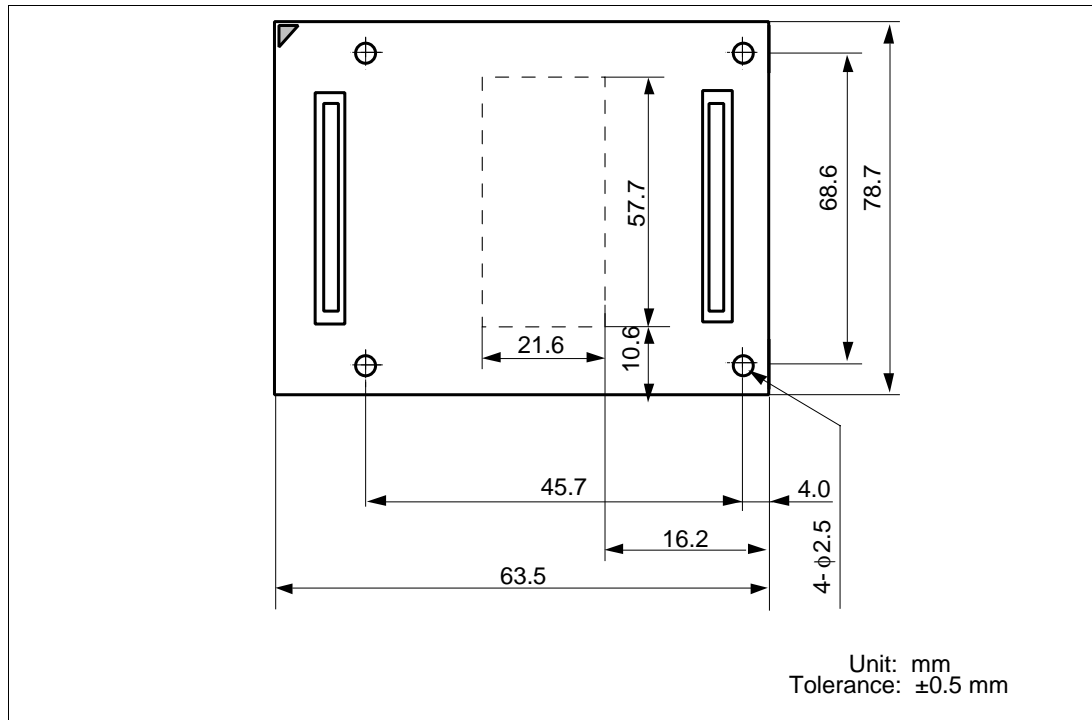


Figure 5 Dimensions for User System Interface Cable Head

2.4 Resulting Dimensions after Connecting User System Interface Cable

The resulting dimensions, after connecting the user system interface cable head to the user system, are shown in figure 6.

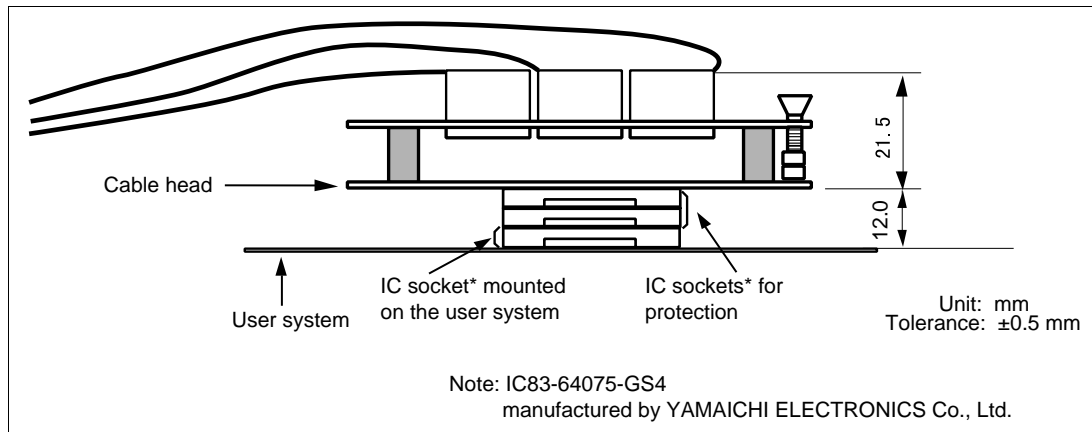


Figure 6 Resulting Dimensions after Connecting User System Interface Cable

Section 3 Verifying Operation

1. When using the H8/3644, 3657 series E6000 emulator (HS3644EPI60H), turn on the emulator according to the procedures described in the H8/3644, 3657 Series E6000 Emulator User's Manual (HS3008EPI60HE).
2. Verify the user system interface cable connections by accessing ports and checking the bus states of the pins. If an error is detected, recheck the soldered IC socket and the location of pin 1.
3. The emulator connected to this user system interface cable supports two kinds of clock sources as the MCU clock: an emulator internal clock and an external clock on the user system. For details, refer to the H8/3644, 3657 series E6000 Emulator User's Manual (HS3008EPI60HE).
 - To use the emulator internal clock
Select the clock in the emulator station as the system clock (ϕ) and the subclock (ϕ_w), by using the CLOCK command (emulator command).
 - To use the external clock on the user system as the system clock
Select target clock t2 with the CLOCK command (emulator command). Supply the external clock from the user system to the emulator. When a crystal oscillator is inserted into the OSC1 and OSC2 terminals for the system clock, the clock is generated by the oscillator circuits shown in figure 7. To input an external clock from the user system, input clock pulses satisfying the specifications described in the MCU hardware manual into the OSC1 terminal. The system clock (ϕ) frequency is half of the external clock frequency.
 - To use the external clock on the user system as the subclock
Select target clock sub t with the CLOCK command (emulator command). Supply the external clock from the user system to the emulator. To input an external subclock from the user system, input clock pulses satisfying the specifications shown in figure 7 into the X1 terminal. The oscillator circuits on the user system interface cable cannot generate external subclock pulses by using the crystal oscillator connected to the user system.

Figure 7 shows the system clock oscillator on the user system interface cable and the subclock input specifications.

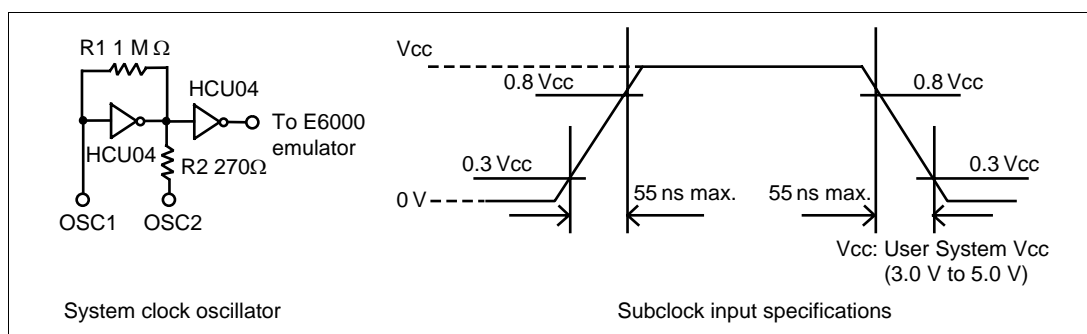


Figure 7 System Clock Oscillator and Subclock Input Specifications

4. The P60 to P67 pins are CMOS large-current ports in the MCU, but in the emulator, they are normal ports. However, when this user system interface cable is used, a large current of $I_{OL} = 10.0 \text{ mA}$ (max.) can be output from the ports by setting the jumpers shown in figure 8. Note that when the jumpers are set to the large-current mode, the P60 to P67 pins become output ports. Be sure to close only one of the jumpers; do not close both jumpers. Do not insert these two jumpers at the same time.
- Terminals TM1 and TM2 are closed: Large-current output ports
 - Terminals 2 and 3 of jumper P5 are closed: Normal input/output ports (setting at shipment)
- The pins are set to be normal output ports at shipment.

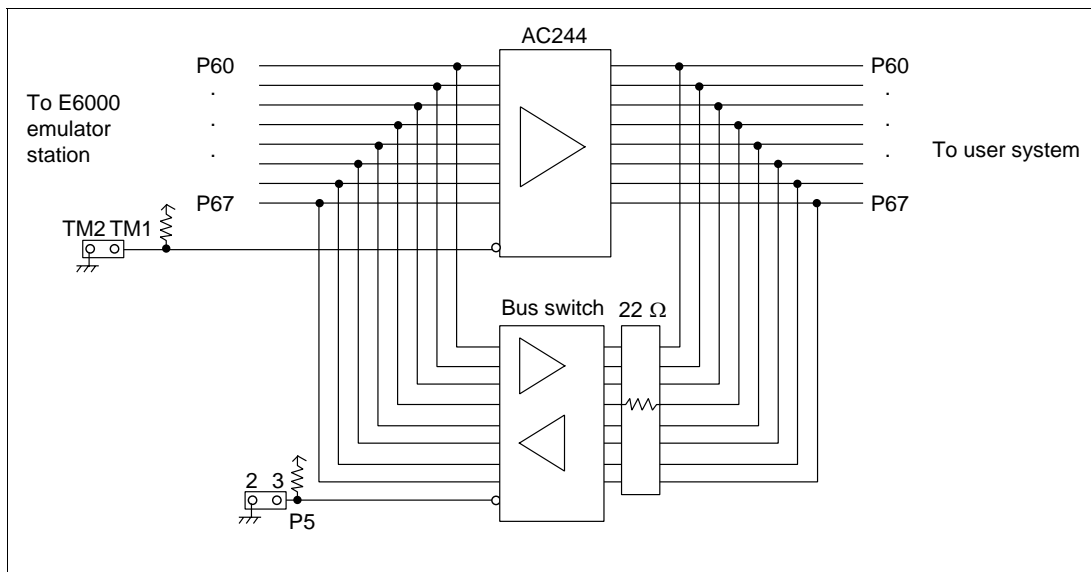


Figure 8 P60 to P67 Interface Circuit

Section 4 Notice

1. Make sure that pin 1 on the user system IC socket is correctly aligned with pin 1 on the cable head before inserting the cable head into the user system IC socket.
2. This user system interface cable is specifically designed for the HS3644EPI60H emulator. Do not use this cable with any other emulator station.
3. To prevent breaking of wires in the cable body, do not place heavy or sharp metal objects on the user system interface cable.
4. While the emulator station is connected to the user system with the user system interface cable, force must not be applied to the cable head. Place the emulator station, user system interface cable, and user system as shown in the example in figure 9.

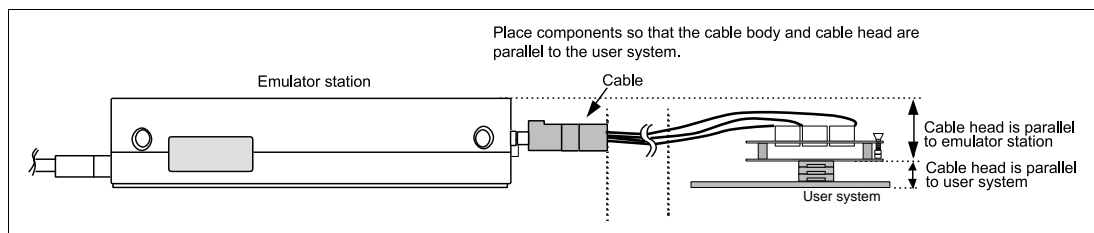


Figure 9 User System Interface Cable Location Example

- The flash memory functions of the H8/3644 series are not supported by the emulator. Therefore, do not apply 12 V to Vpp/P90 and TEST pins. If 12 V is applied, the emulator will detect it as the test mode. The Vpp/P90 and TEST pins have circuits for protection against 12-v application, as shown in figure 10.

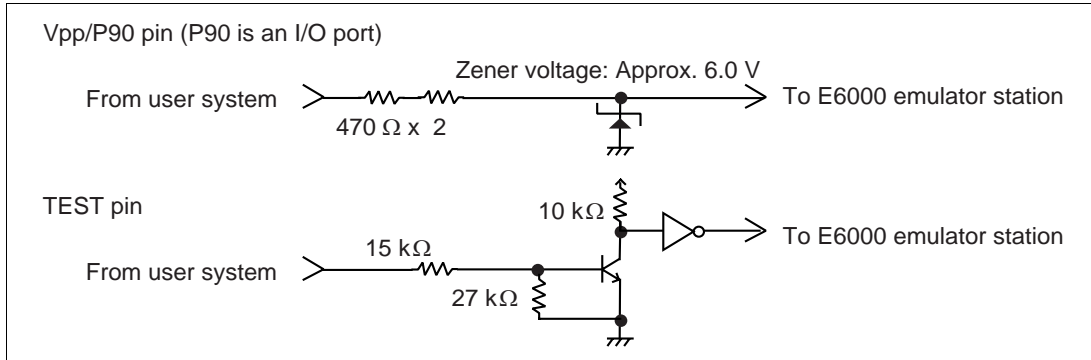


Figure 10 Vpp/P90 and TEST Pin Protection Circuits

- The P1 short connector is used for testing. Do not remove the short pins that are inserted in the sides of pin 1 and pin 2.

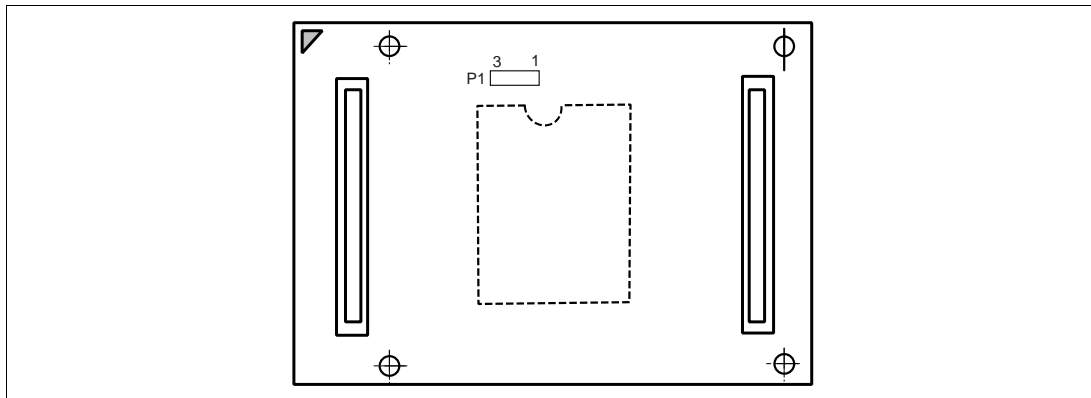


Figure 11 P1 Short Connector