H8S/2338 Series
QFP-144
User System Interface Cable
(HS2338ECH61H)
for E6000 Emulator

User's Manual

RENESAS

HS2338ECH61HE(D)

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Preface

Thank you for purchasing this user system interface cable (HS2338ECH61H) for the Renesas's original microcomputer H8S/2338 series.

The HS2338ECH61H is a user system interface cable that connects an H8S/2338 series E6000 emulator (HS2338EPI61H; hereinafter referred to as the emulator) to the IC socket for a QFP-144 package (package code: FP-144) for the H8S/2338 series MCU on the user system.

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Section 1 Configuration

CAUTION

Use an NQPACK144SD socket (manufactured by Tokyo Eletech Coporation) for the FP-144 package IC socket on the user system.

Figure 1 shows the configuration of the HS2338ECH61H user system interface cable for the FP-144 package.

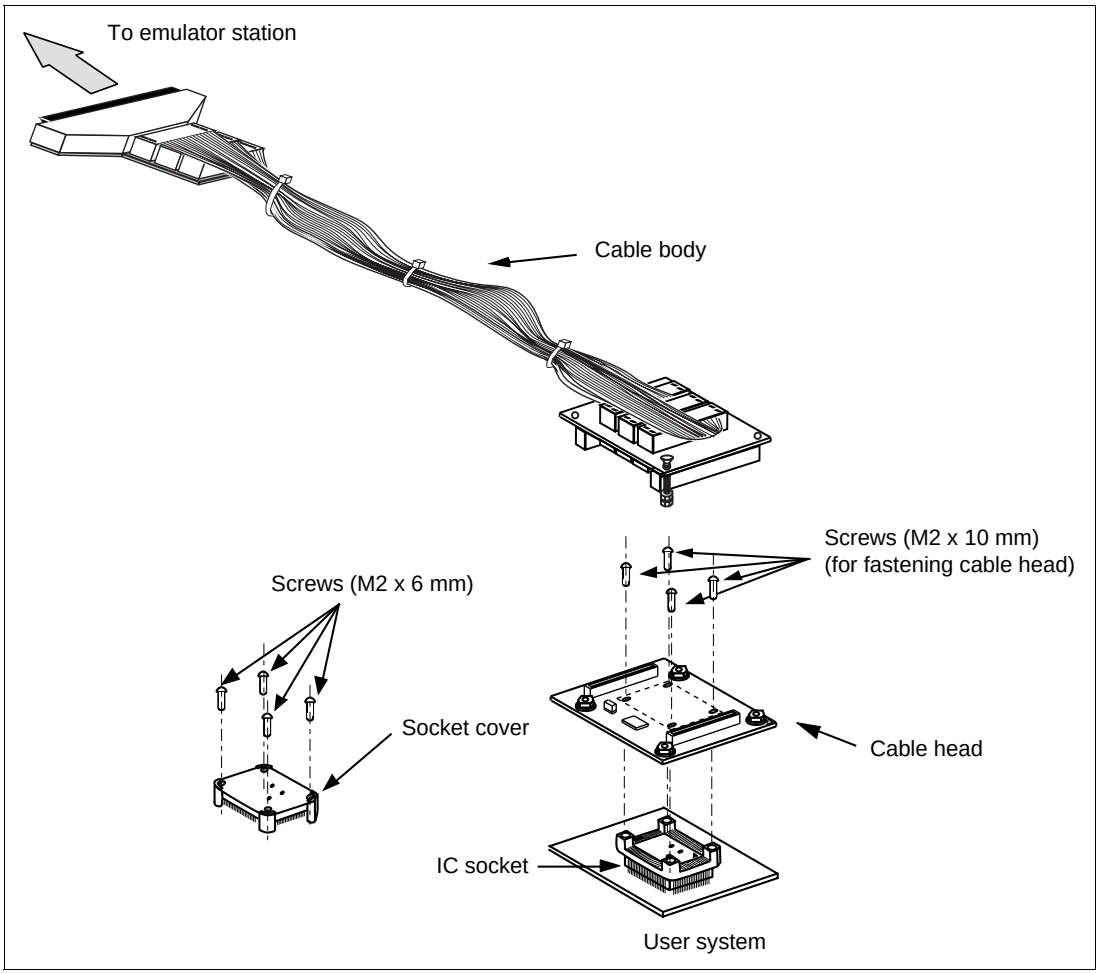

Figure 1 HS2338ECH61H User System Interface Cable

Table 1 lists the HS2338ECH61H components. Please make sure you have all of these components when unpacking.

Table 1 HS2338ECH61H Components

No.	Component	Quantity	Remarks
1	Cable body	1	Includes flat cable
2	Cable head	1	
3	IC socket	1	For the FP-144 package
4	Socket cover	1	For installing an FP-144 packaged MCU
5	Screws (M2 x 10 mm)	4	For fastening cable head
6	Screws (M2 x 6 mm)	4	For installing an FP-144 packaged MCU
7	Guide pins (ϕ 1 mm)	3	For determining the IC socket location
8	Screwdriver	1	For tightening screws
9	Documentation	1	User's manual for HS2338ECH61H (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.

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 connectors will be damaged.

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).

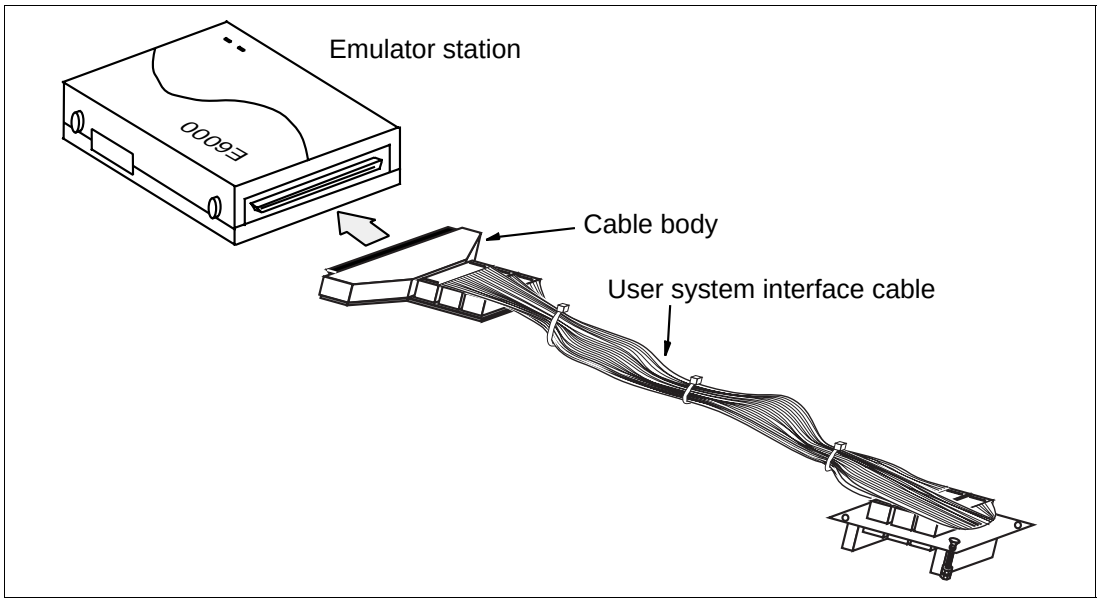

Figure 2 Connecting User System Interface Cable to Emulator Station

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

1. Confirming the location of IC socket

CAUTION

After confirming the location of pin 1 on the IC socket, apply epoxy resin adhesive to the end of the four projections at the bottom of the IC socket, and fasten it to the user system.

Use the guide pins provided to determine where to install the IC socket, as shown in figure 3.

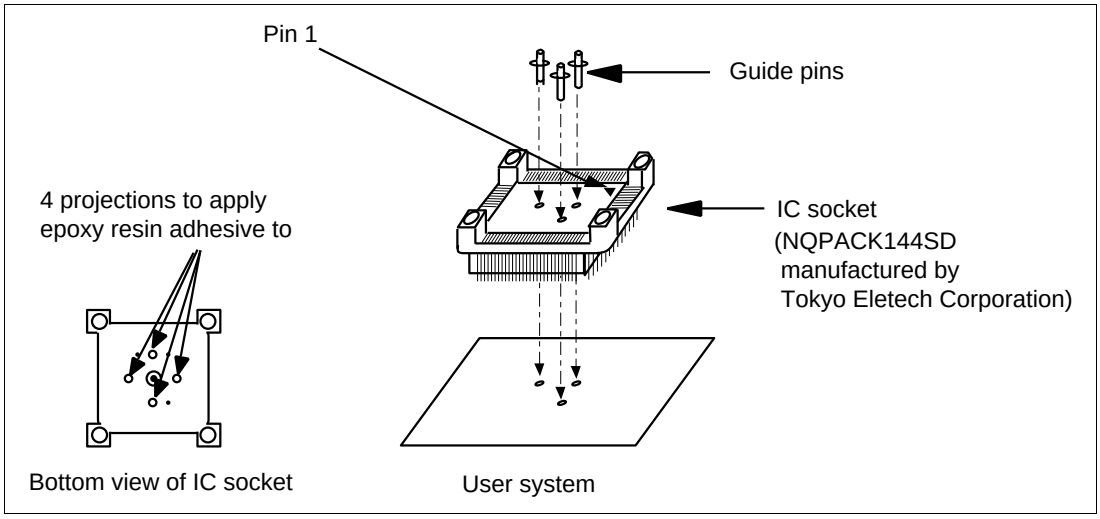

Figure 3 Location Setting of IC Socket

2. Solder the IC socket for a FP-144 package to the user system.

CAUTION

Be sure to completely solder the leads so that the solder slops gently over the leads and forms solder fillets. (Use slightly more solder than the MCU.)

2.2.2 Inserting Cable Head

CAUTION

Check the location of pin 1 before inserting.

Align pin 1 on the IC socket for a FP-144 system interface cable head into the IC socket on the user system, as shown in figure 4.

2.2.3 Fastening Cable Head

CAUTION

1. **Use the screwdriver provided for tightening screws.**
2. **The tightening torque must be 0.054 N•m or less. If the applied torque cannot be accurately measured, stop tightening when the force required to turn the screw becomes significantly greater than that needed when first tightening. If a screw is tightened too much, the screw head may break or an IC socket contact error may be caused by a crack in the IC socket solder.**
3. **If the emulator does not operate correctly, cracks might have occurred in the solder. Check conduction with a tester and re-solder the IC socket if necessary.**

Fasten the user system interface cable head to the IC socket for an FP-144 package on the user system with the four screws (M2 x 10 mm) provided. Each screw should be tightened a little at a time, alternating between screws on opposing corners. Take special care, such as manually securing the IC socket soldered area, to prevent the soldered IC socket from being damaged by overtightening the screws or twisting the components.

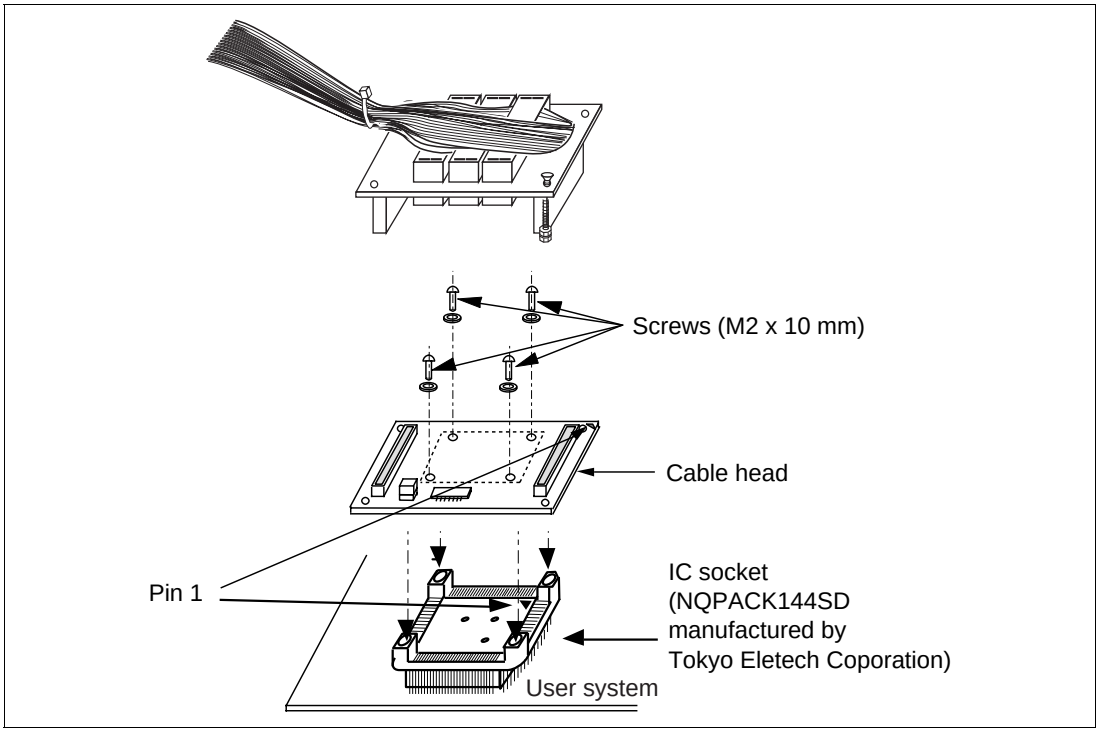

Figure 4 Connecting User System Interface Cable to User System

2.2.4 Connecting Cable Body to Cable Head

Connect the cable body to the cable head.

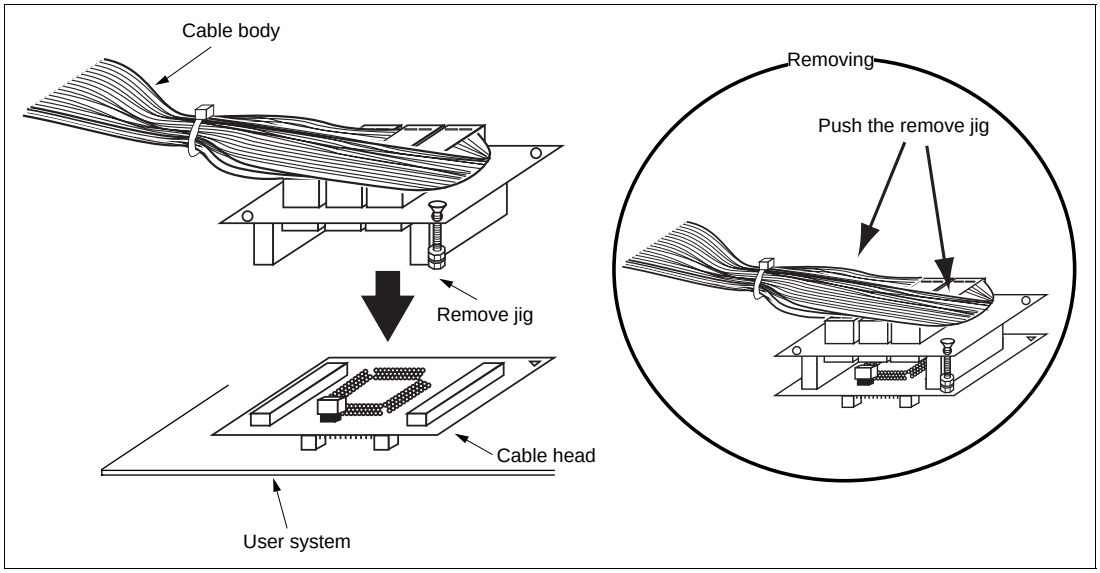

Figure 5 Fastening Cable Body

2.3 Recommended Dimensions for User System Mount Pad

Figure 6 shows the recommended dimensions for the mount pad (footprint) for the user system with an IC socket for an FP-144 package (NQPACK144SD: manufactured by Tokyo Eletech Corporation). Note that the dimensions in figure 6 are somewhat different from those of the actual chip's mount pad.

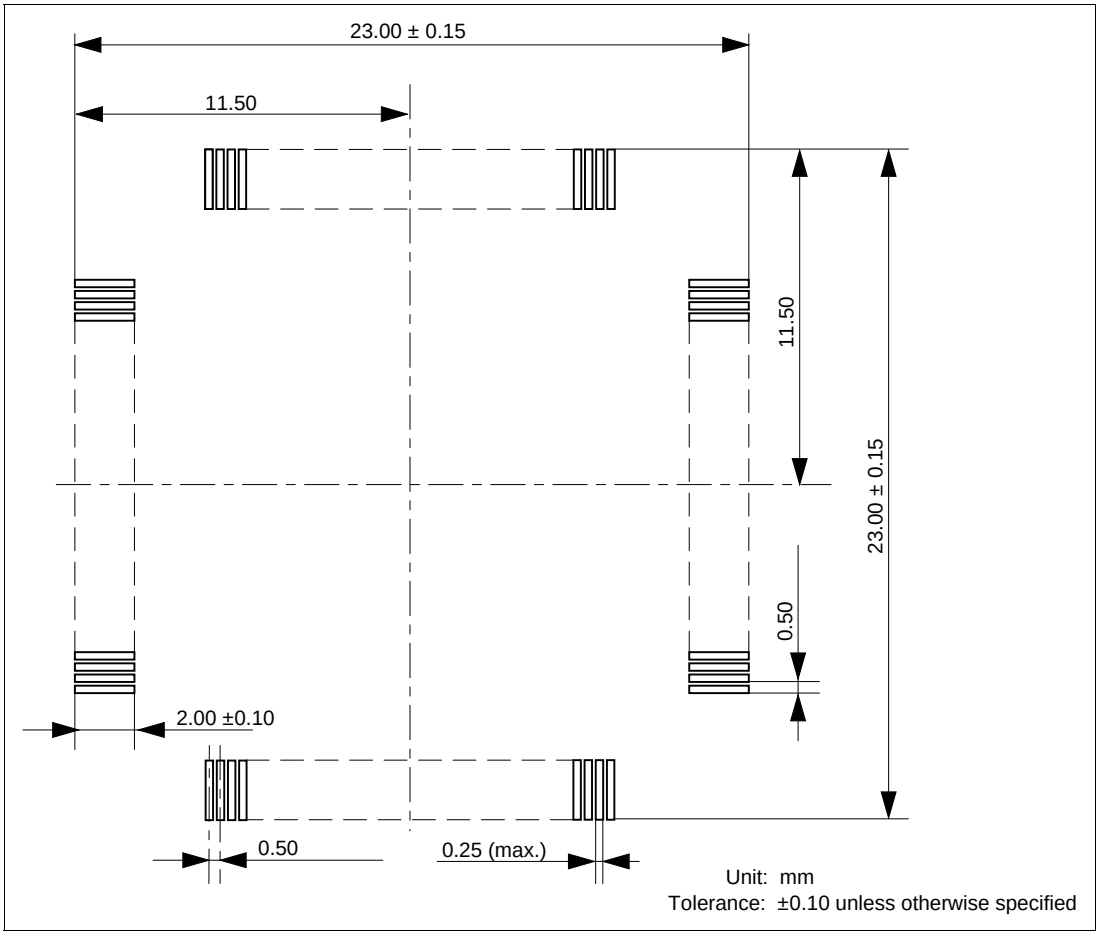

Figure 6 Recommended Dimensions for Mount Pad

2.4 Dimensions for User System Interface Cable Head

The dimensions for the user system interface cable head are shown in figure 7.

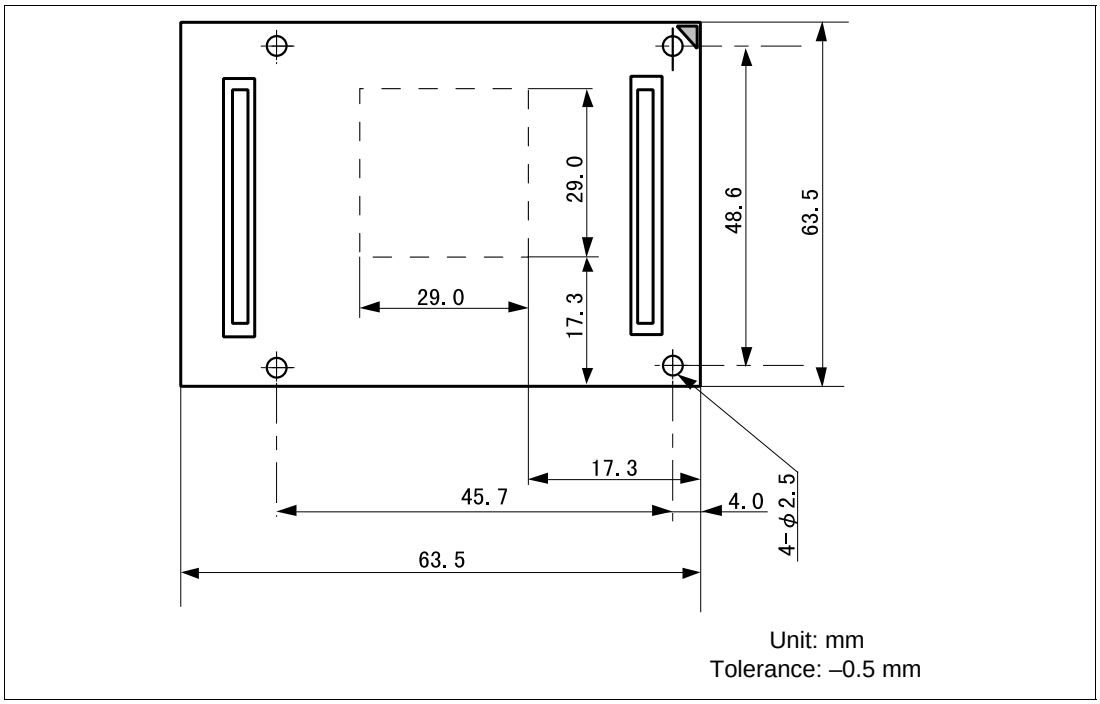

Figure 7 Dimensions for User System Interface Cable Head

2.5 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 8.

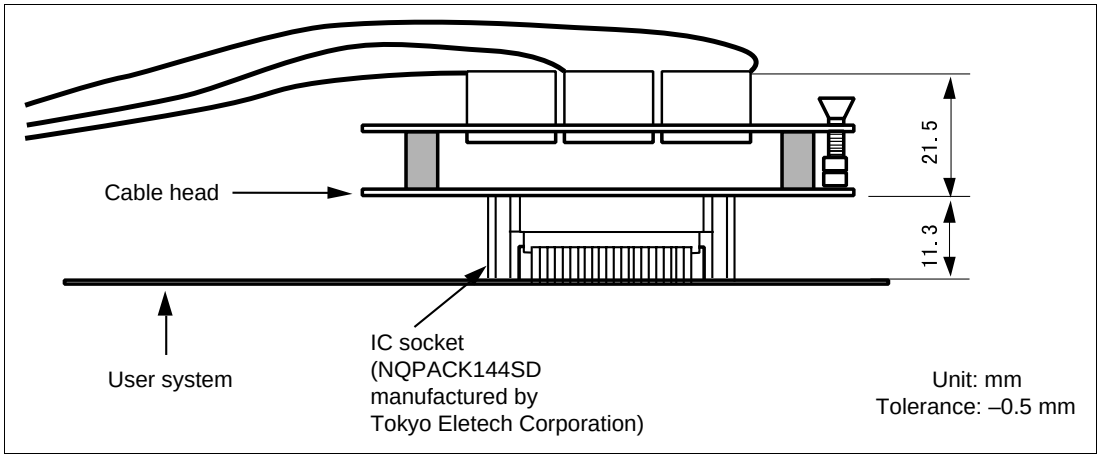

Figure 8 Resulting Dimensions after Connecting User System Interface Cable

Section 3 Installing the MCU to the User System

CAUTION

1. **Check the location of pin 1 before inserting.**
2. **Use the screwdriver provided for tightening screws.**
3. **The tightening torque must be 0.054 N•m or less. If the applied torque cannot be accurately measured, stop tightening when the force required to turn the screw becomes significantly greater than that needed when first tightening. If a screw is tightened too much, the screw head may break or an IC socket contact error may be caused by a crack in the IC socket solder.**
4. **If the MCU does not operate correctly, cracks might have occurred in the solder. Check conduction with a tester and re-solder the IC socket if necessary.**

Check the location of pin 1 before inserting the MCU into the IC socket on the user system, as shown in figure 9. After inserting the MCU, fasten the socket cover with the provided four screws (M2 x 6 mm). Take special care, such as manually securing the IC socket soldered area, to prevent the IC socket from being damaged by overtightening the screws or twisting the components.

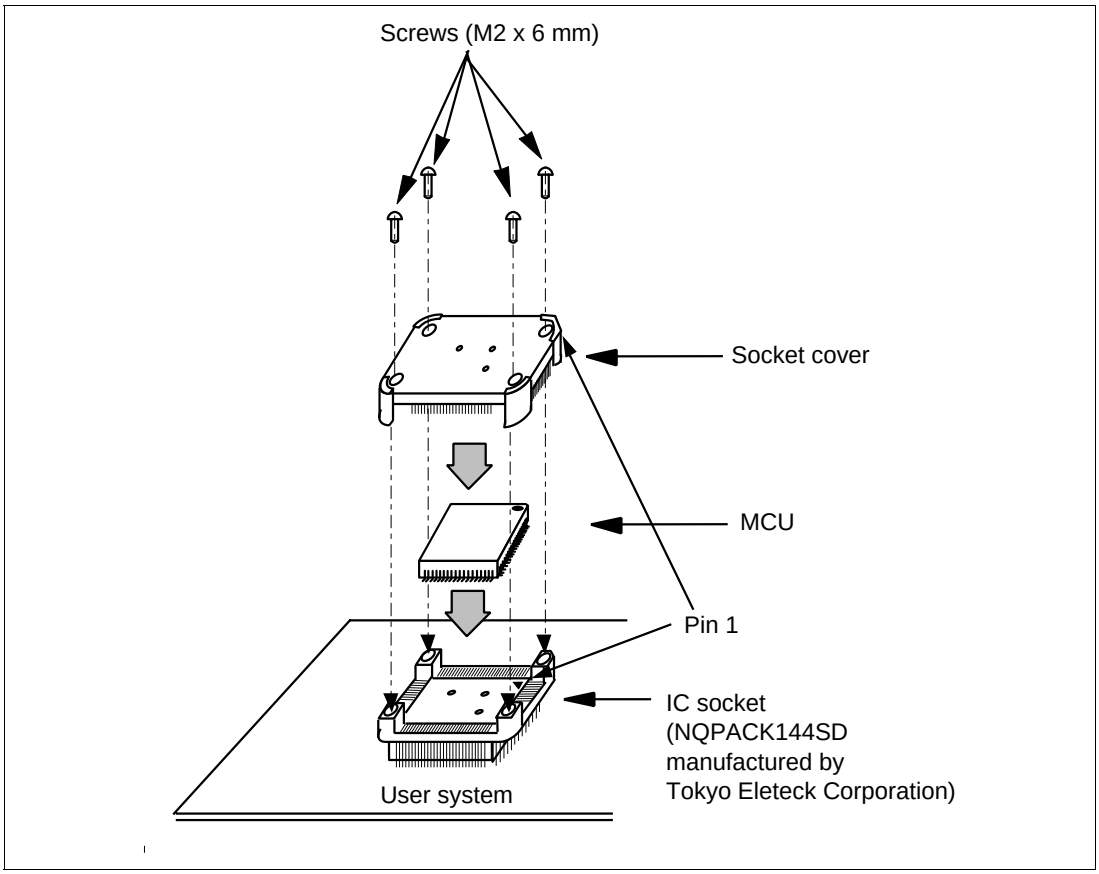

Figure 9 Installing MCU to User System

Section 4 Verifying Operation

1. When using the E6000 emulator for the H8S/2338 series, turn on the emulator according to the procedures described in the E6000 Series Emulator User's Manual (HS2000EPI61HE).
2. Verify the user system interface cable connections by accessing the external memory and ports to check the bus states of the pins with the MEMORY_FILL command (emulator command). 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 Emulator Supplementary Information (HS2338EPI61HE).
   - To use the emulator internal clock
     Select the clock in the emulator station as the system clock (ϕ), by using the CLOCK command (emulator command).
   - To use the external clock on the user system
     Supply the external clock from the user system to the emulator. Connect a crystal oscillator to the EXTAL and XTAL terminals for the system clock (ϕ). Select the external clock as the system clock (ϕ), by using the CLOCK command (emulator command). For details, refer to section 18, Clock Pulse Generator, in the H8S/2338 Series, H8S/2328 series Hardware Manual.

   Figure 10 shows the oscillator circuit on the user system interface cable.

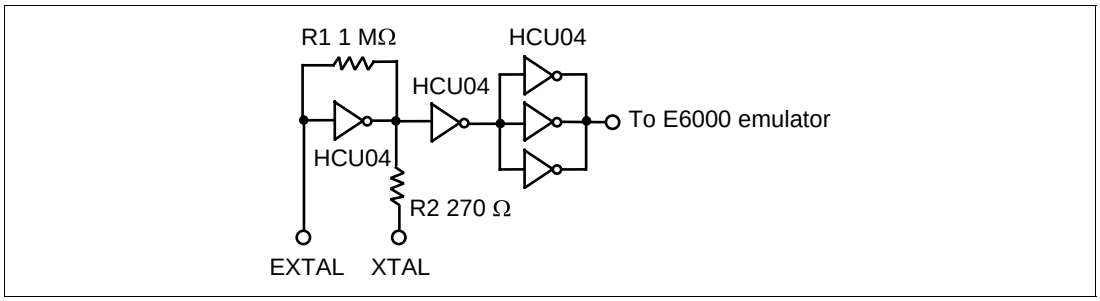

Figure 10 Oscillator Circuit

4. In the H8S/2338 series MCU, the interrupt signal pins can be selected by the register setting. To trace the interrupt signals in the E6000 emulator, select the interrupt signal pins by setting switch P5 on the user system interface cable as shown in table 2.

Table 2 Switch P5 Setting

IRPAS Bit Value	Interrupt Signal Pin	Pin No.	P5 Setting
0 (Initial value)	IRQ4	40	Close between 2 and 3 (setting at shipment)
	IRQ5	34	
	IRQ6	33	
	IRQ7	32	
1	IRQ4	105	Close between 1 and 2
	IRQ5	106	
	IRQ6	107	
	IRQ7	108	

5. In the H8S/2338 series MCU, the WAIT signal pins can be selected by the register setting. To trace the WAIT signals in the E6000 emulator, select the WAIT signal pins by setting switch P4 on the user system interface cable as shown in table 3.

Table 3 Switch P4 Setting

WAITPS Bit Value	Pin No.	P4 Setting
0 (Initial value)	4	Close between 3 and 4 (setting at shipment)
1	108	Close between 1 and 2

Section 5 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. The dimensions of the recommended mount pad for the user system IC socket are different from those of the MCU.
3. This user system interface cable is specifically designed for the HS2338EPI61H emulator. Do not use this cable with any other emulator station.
4. To prevent breaking of wires in the cable body, do not place heavy or sharp metal objects on the user system interface cable.
5. 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 11.

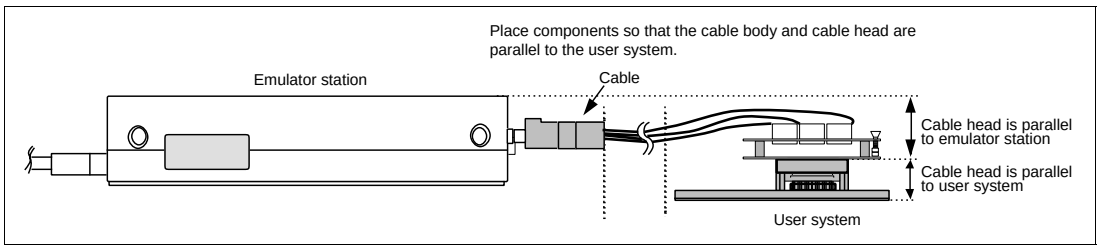

Figure 11 User System Interface Cable Location Example

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

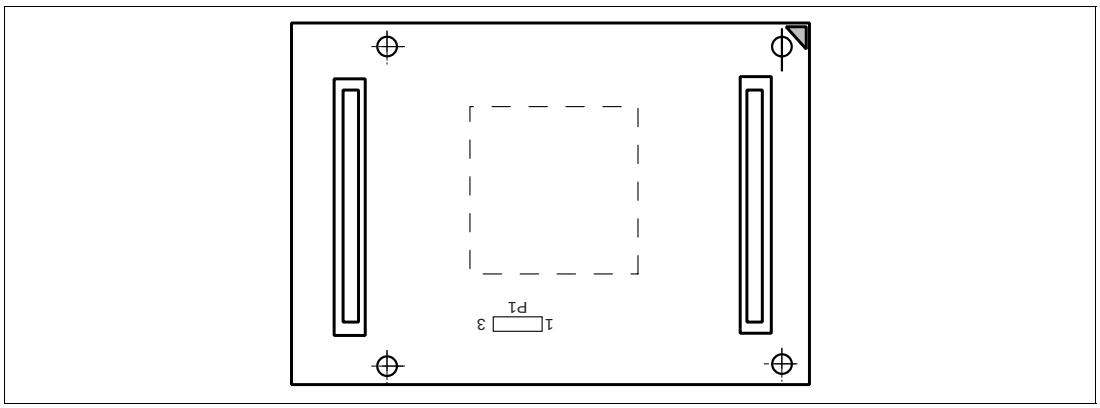

Figure 12 P1 Short Connector