

To our customers,

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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H8SX/1651 Group PLQP0120LA-A  
User System Interface Board for  
E6000H Emulator

HS1651ECN61H User's Manual

Renesas Microcomputer  
Development Environment  
System

H8SX Family / H8SX/1600 Series

HS1651ECN61HE



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# IMPORTANT INFORMATION

## READ FIRST

- **READ** this user's manual before using this user system interface board.

- **KEEP** the user's manual handy for future reference.

**Do not attempt to use the user system interface board until you fully understand its mechanism.**

### **User System Interface Board:**

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

- User system interface board (HS1651ECN61H)

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

### **Purpose of the User System Interface Board:**

This user system interface board is for connecting the evaluation chip board and user system. This user system interface board must only be used for the above purpose.

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### **Target User of the User System Interface Board:**

This user system interface board should only be used by those who have carefully read and thoroughly understood the information and restrictions contained in the user's manual. Do not attempt to use the user system interface board until you fully understand its mechanism.

It is highly recommended that first-time users be instructed by users that are well versed in the operation of the user system interface board.

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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 user system interface board are therefore not all inclusive. Therefore, you must use the user system interface board safely at your own risk.

# SAFETY PAGE

## READ FIRST

- **READ** this user's manual before using this user system interface board.
- **KEEP** the user's manual handy for future reference.

Do not attempt to use the user system interface board 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 E6000H emulator and user system before connecting or disconnecting any CABLES or PARTS.**
- 3. Always before connecting any BOARDS, make sure that pin 1 on both sides are correctly aligned.**



# Preface

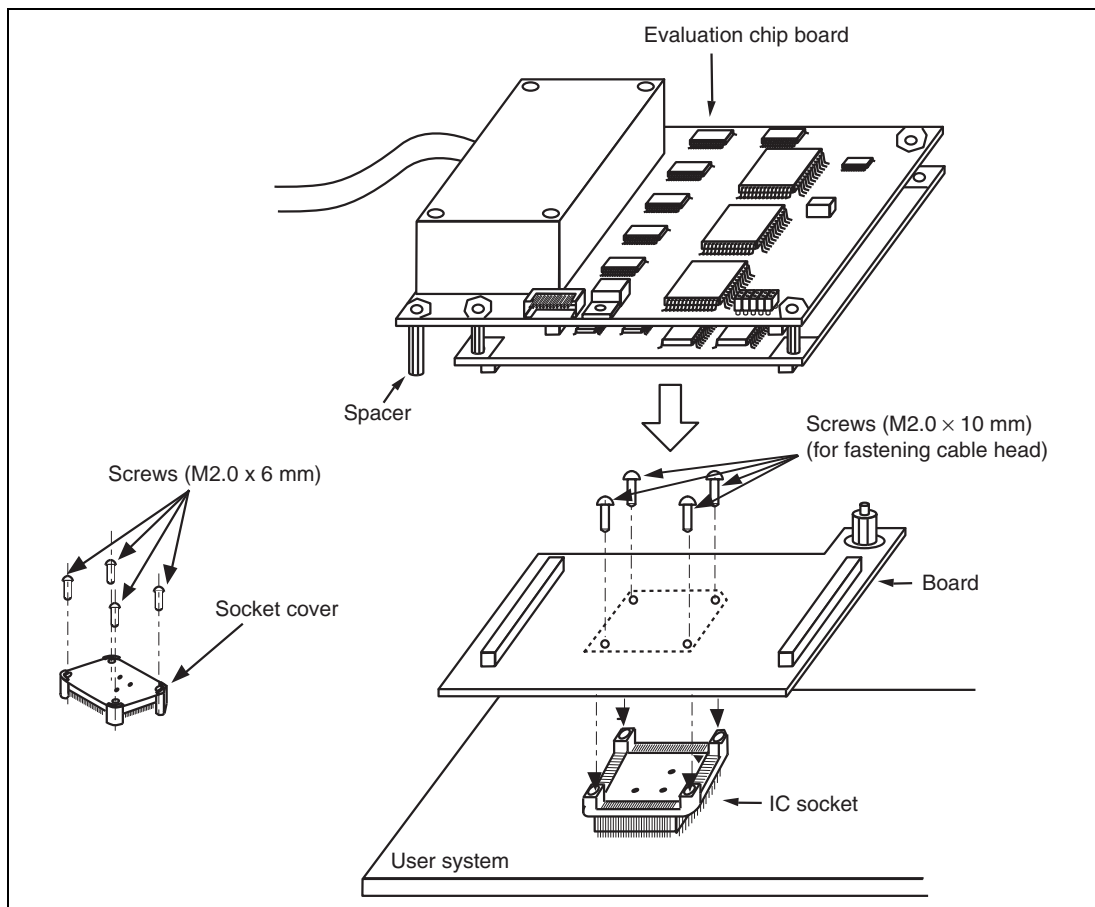
The HS1651ECN61H is a user system interface board that connects a user system for the H8SX/1651 PQLP0120LA-A (former package: FP-120B) to the H8SX/1650 E6000H emulator (HS1650EPH60H).

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# Section 1 Configuration

Figure 1 and table 1 show the external appearance and components, respectively, of the user system interface board for the PLQP0120LA-A package. Please make sure you have all of these components after you have unpacked the box.



**Figure 1 User System Interface Board for the H8SX/1651 Group PLQP0120LA-A Package**

# CAUTION

**Use an NQPACK120SE-ND socket and an HQPACK120SE cover (manufactured by Tokyo Eletech Corporation) for the PLQP0120LA-A-packaged IC socket on the user system.**

**Table 1 HS1651ECN61H Components**

No.	Component	Quantity	Remarks
1	Board	1	
2	IC socket	1	For the PLQP0120LA-A package
3	Socket cover	1	For installing an PLQP0120LA-A packaged MCU
4	Screw (M2.0 x 10 mm)	4	For fastening cable head
5	Screw (M2.0 x 6 mm)	4	For installing an PLQP0120LA-A packaged MCU
6	Guide pins ( $\phi$ 1 mm)	3	For determining the IC socket location
7	Spacers (2.6 MP x 25 mm)	2	
8	Screwdriver	1	For tightening screws
9	User's manual	1	User's manual for HS1651ECN61H (this manual)



## Section 2 Connection Procedures

### 2.1 Connecting the User System Interface Board to the User System

#### **WARNING**

**Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE BOARD is connected or removed. Before connecting the two, make sure that pin 1 on both sides are correctly aligned. 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.**

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

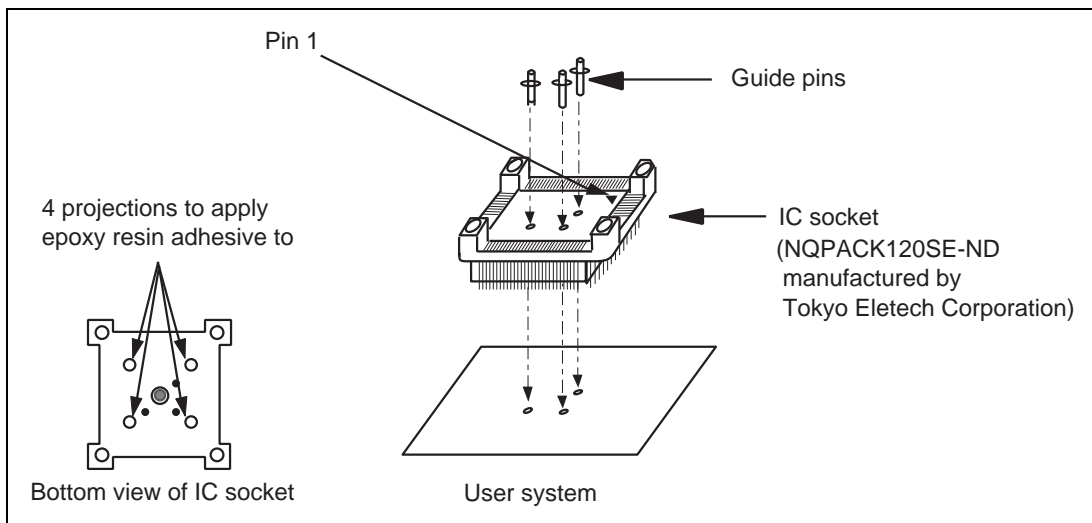
#### 2.1.1 Installing the IC Socket

After checking the location of pin 1 on the IC socket fasten it to the user system before soldering.

#### **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 with the product to determine where to install the IC socket, as shown in figure 2.



**Figure 2 Correctly Placing the IC Socket**

### 2.1.2 Soldering the IC Socket

After fastening, solder the IC socket for an PLQP0120LA-A package to the user system.

## CAUTION

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

### 2.1.3 Installing the IC Socket

## CAUTION

**Check the location of pin 1 before inserting.**

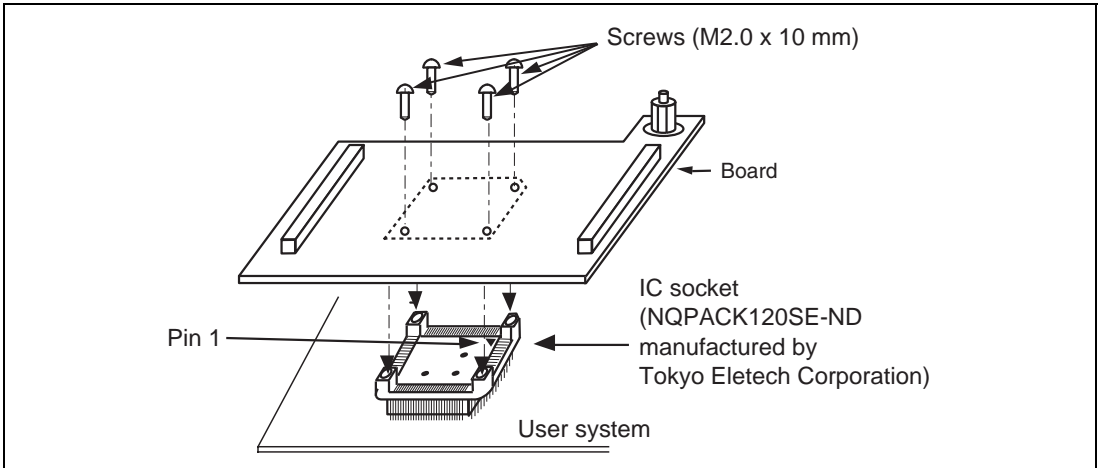
After checking the location of pin 1 on the user system interface board and pin 1 on the IC socket connector, align the guide pins on the IC socket connector with the guide holes on the user system interface board, and insert the IC socket connector into the IC socket (figure 3).

### 2.1.4 Fastening the Cable Head

## CAUTION

- 1. Use a screwdriver whose head matches the screw head.**
- 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 PLQP0120LA-A package on the user system with the four screws (M2.0 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 by manually securing the IC socket soldered area, to prevent the soldered IC socket from being damaged by overtightening the screws or twisting the components.

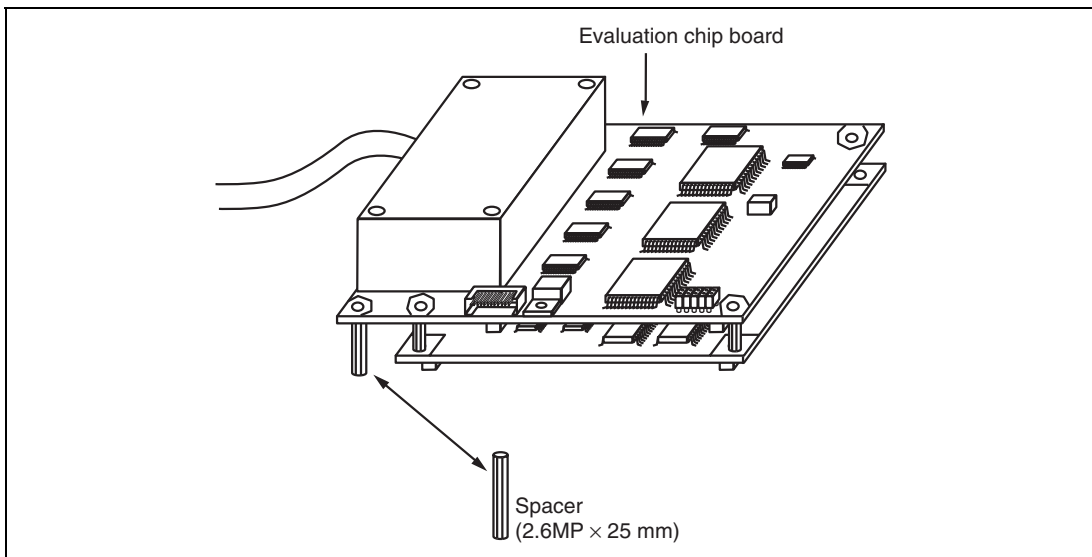


**Figure 3 Connecting the User System Interface Board to the User System**

## 2.2 Exchanging the Spacers of the Evaluation Chip Board

After connecting the user system interface board to the user system, be careful not to apply load to the user system.

Exchange the spacers (2.6MP × 10 mm) for the evaluation chip board with the spacers (2.6MP × 25 mm) provided with the user system interface board.



**Figure 4 Exchanging the Spacers**

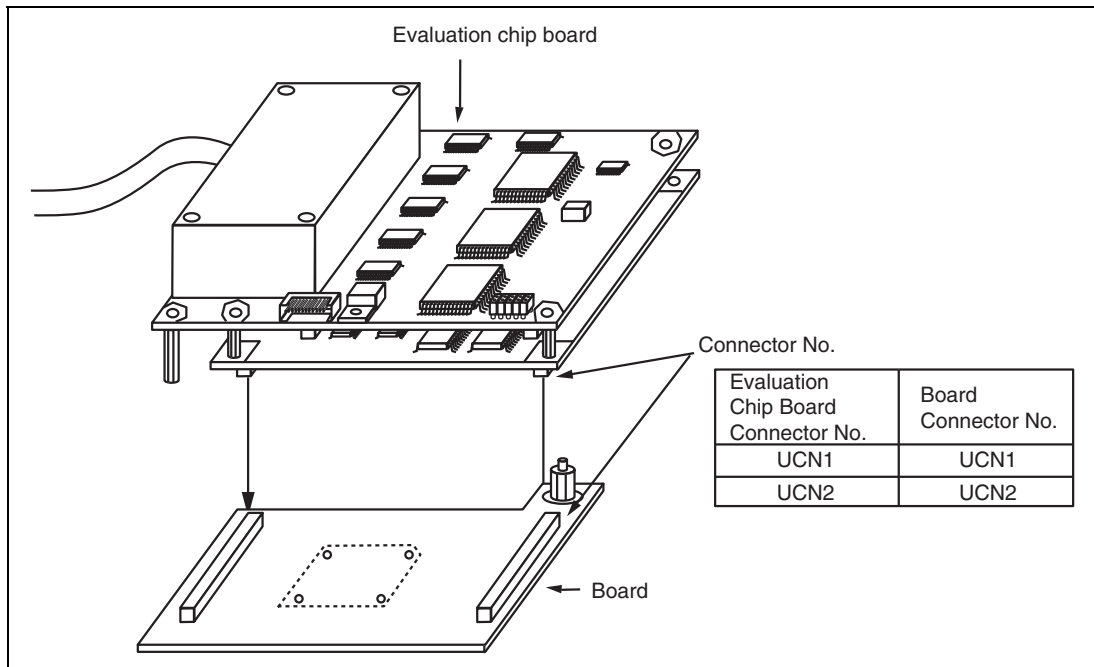
## 2.3 Connecting the User System Interface Board to the Evaluation Chip Board

### **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. Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE BOARD is connected or removed. Before connecting the two, make sure that the pin 1 positions on both sides are correctly aligned.**
- 2. The user system interface board must be used with the emulator for which it was designed.**

1. Make sure the user system and emulator are turned off.
2. Align the connectors on the user system interface board with those on the evaluation chip board by matching the numbers on the connectors (figure 5).
3. Adjust the height of the spacers of the evaluation chip board to accommodate the user system.



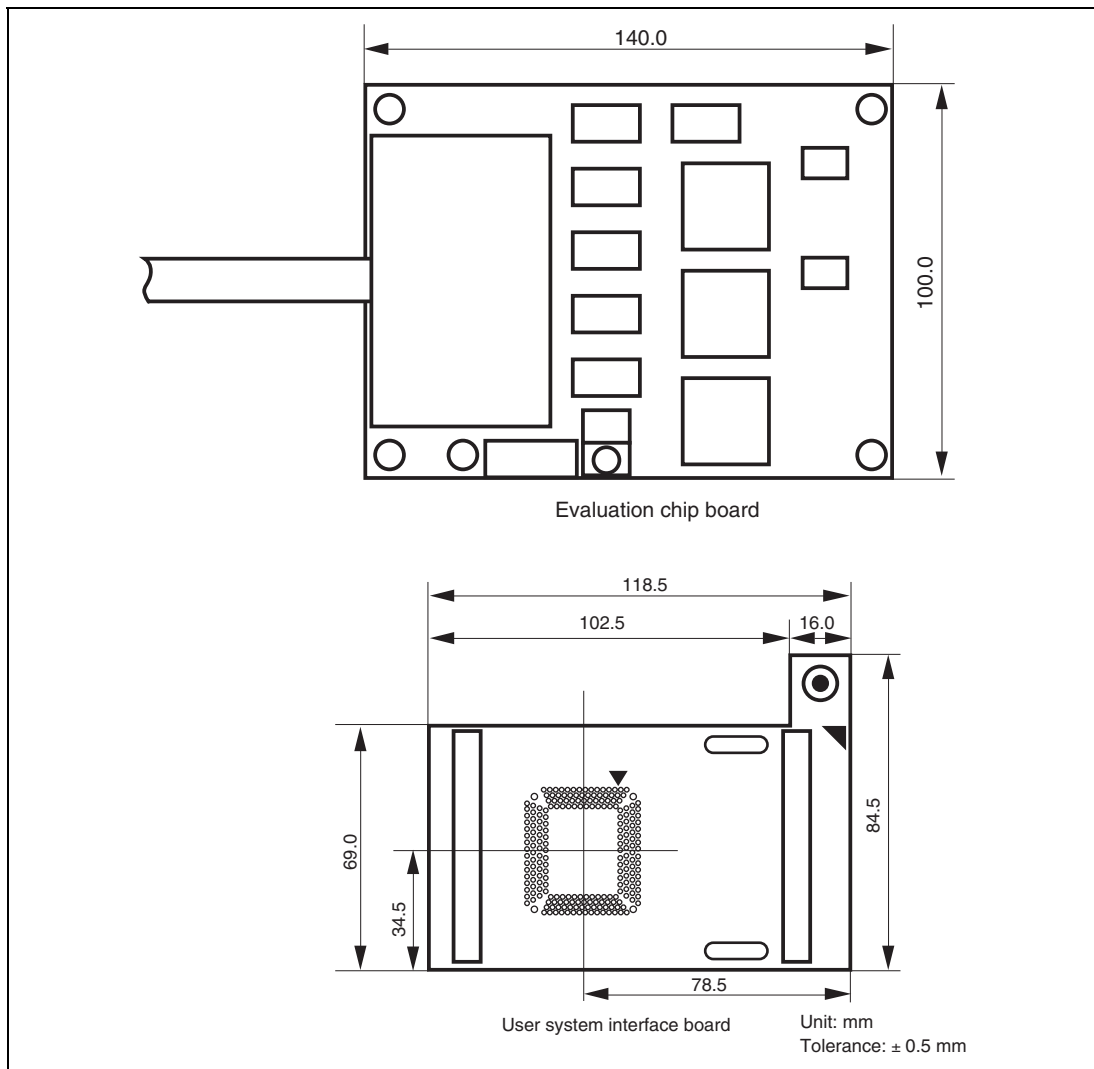
**Figure 5 Connecting the User System Interface Board to the Evaluation Chip Board**





## 2.5 Dimensions of the Evaluation Chip Board and the User System Interface Board

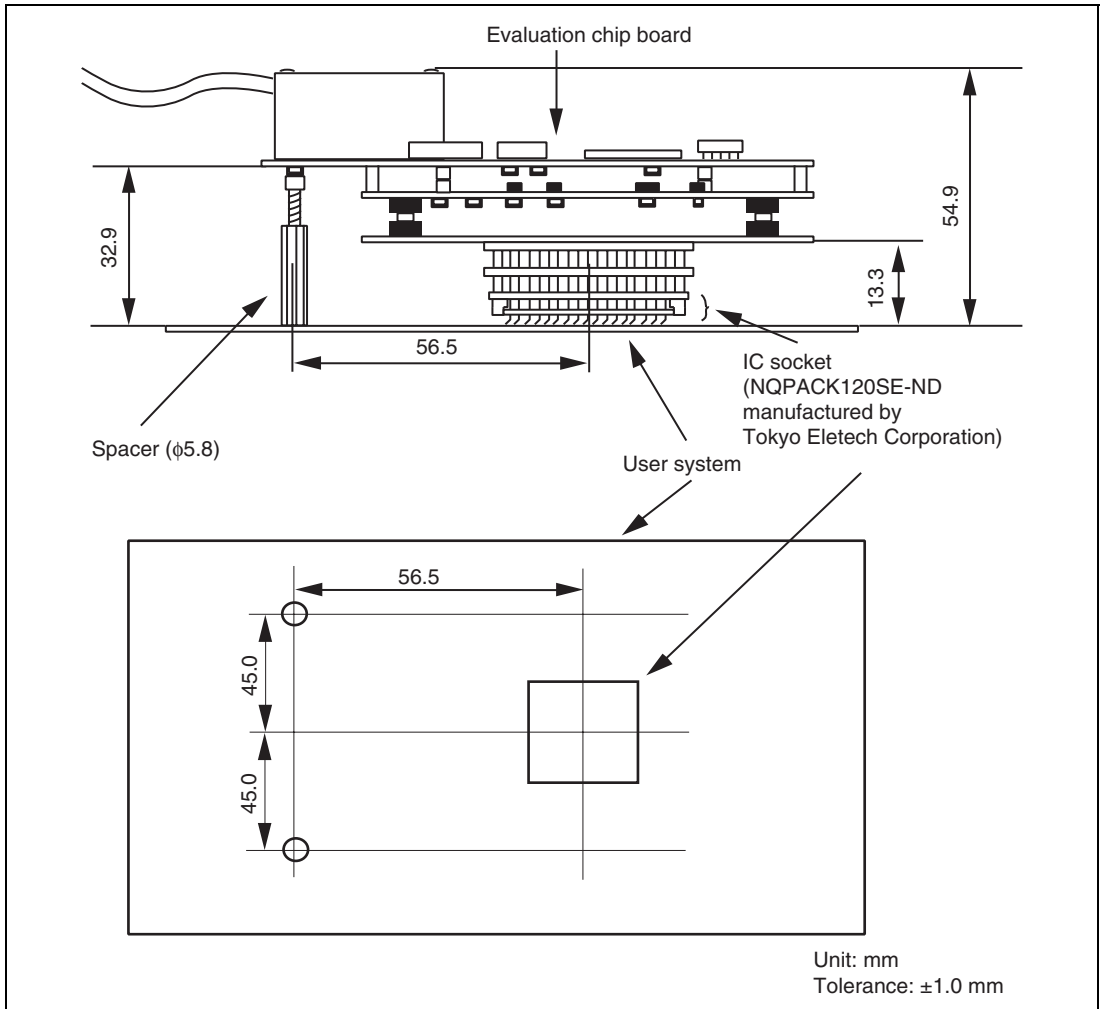
The dimensions of the evaluation chip board and the user system interface board are shown in figure 7.



**Figure 7 Dimensions of the Evaluation Chip Board and the User System Interface Board**

## 2.6 Resulting Dimensions after Connecting the User System Interface Board

The dimensions of the assembly after the user system interface board has been connected to the user system, are shown in figure 8.



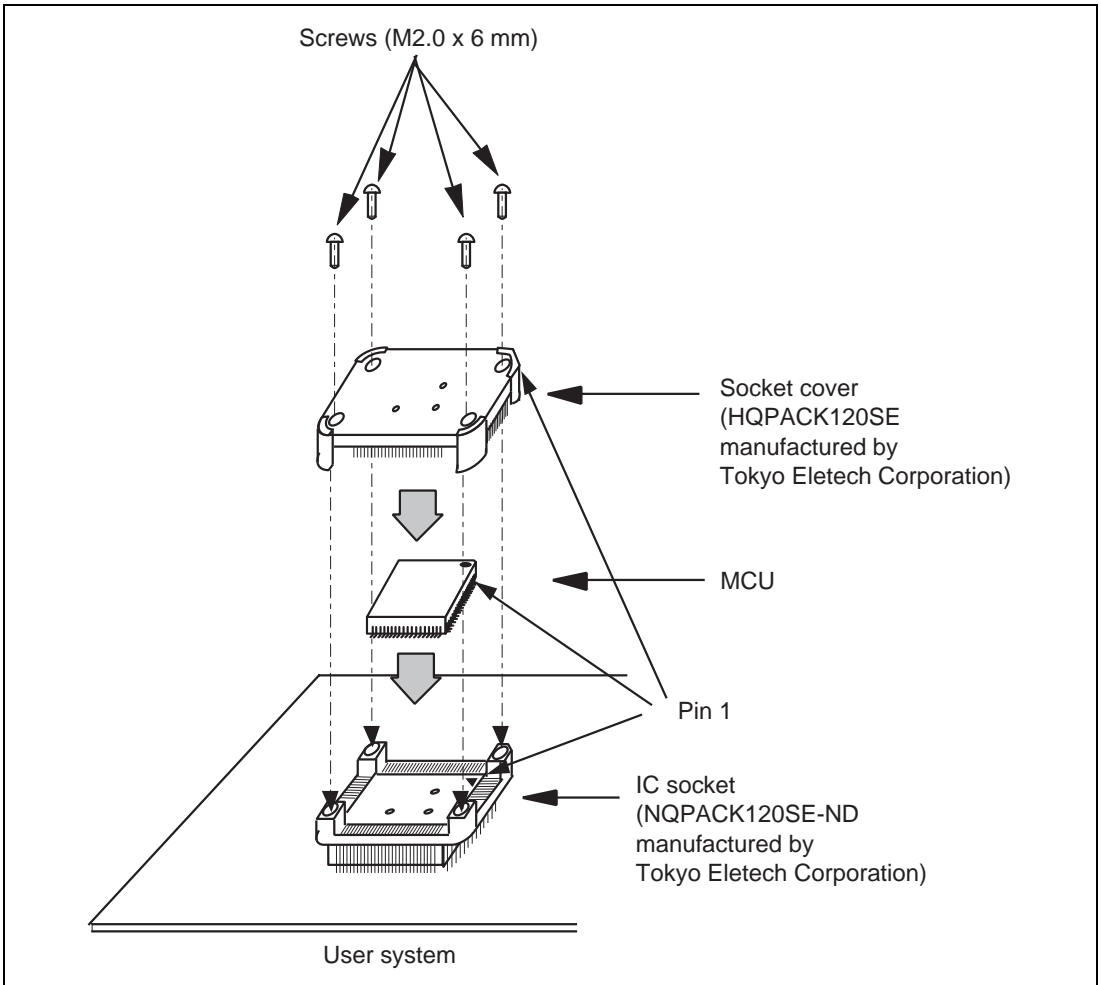
**Figure 8 Dimensions of the Assembly after Connection of the User System Interface Board**

## Section 3 Installing the MCU on the User System

### CAUTION

1. Check the location of pin 1 before inserting the MCU.
2. Use a screwdriver whose head matches the screw head.
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 four screws (M2.0 x 6 mm) provided for this. Take special care, such as by manually securing the IC socket soldered area, to prevent the IC socket from being damaged by overtightening the screws or twisting the components.

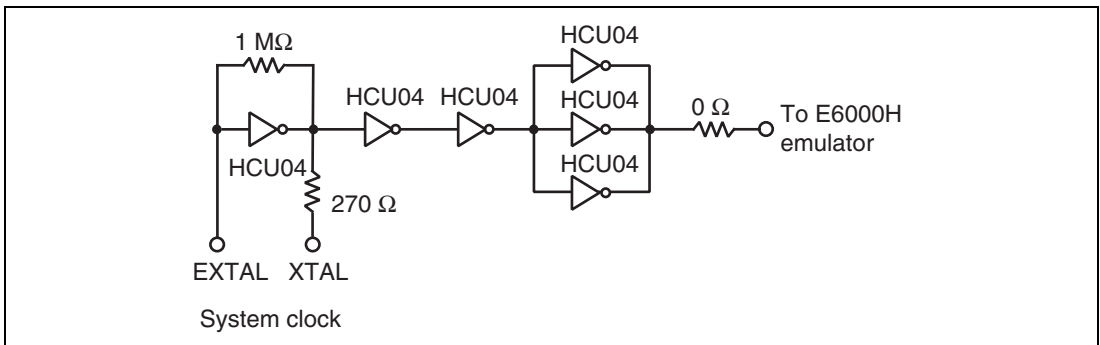


**Figure 9** Installing the MCU on the User System

## Section 4 Verifying Operation

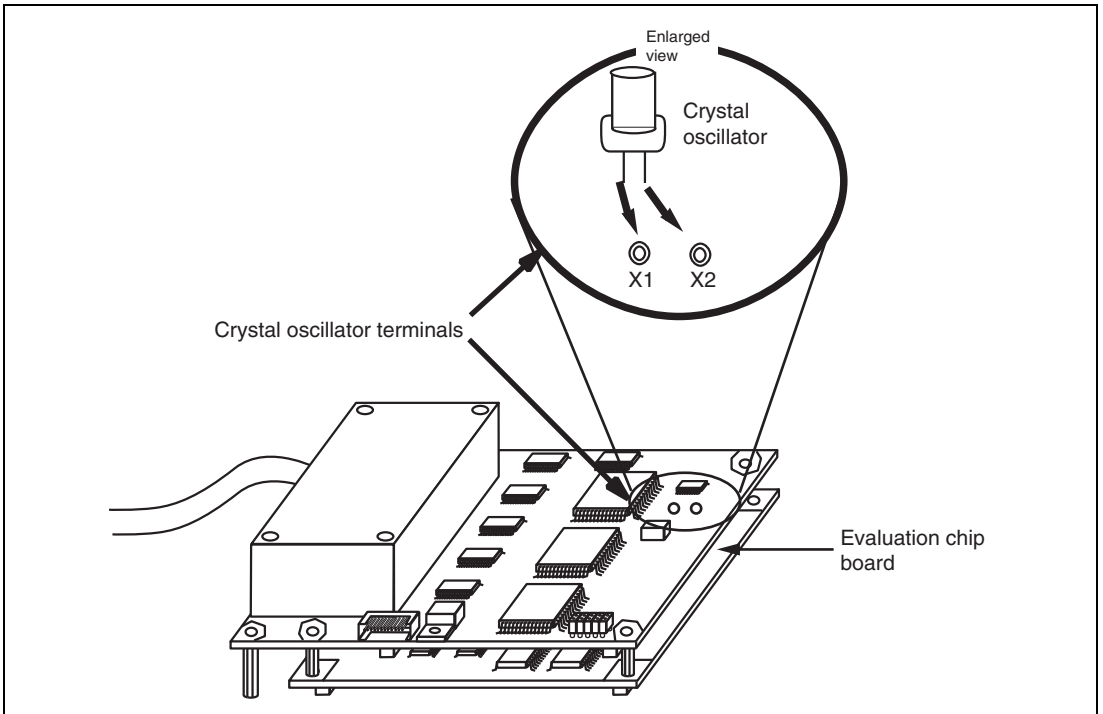
1. Turn on the emulator according to the procedures described in the H8SX/1650 E6000H Emulator User's Manual (HS1650EPH60HE).
2. Verify the user system interface cable connections by checking the pin states with the CHECK command (emulator command) and checking the bus states with the FILL command (emulator 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 board supports three kinds of clock sources as the MCU clock. For details, refer to the H8SX/1650 E6000H Emulator User's Manual (HS1650EPH60HE).
  - To use the emulator internal clock  
Select the clock in the emulator by 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 by inputting the signal to the EXTAL pin (pin 84) on the user system interface board or connecting a crystal oscillator to the XTAL (pin 83) and EXTAL pins. For details, refer to the H8SX/1651 Hardware Manual.

Figure 10 shows the clock oscillator on the user system interface board.



**Figure 10 Clock Oscillator**

- To use the crystal oscillator mounted on the evaluation chip board  
Install the crystal oscillator into the crystal oscillator terminals on the evaluation chip board.

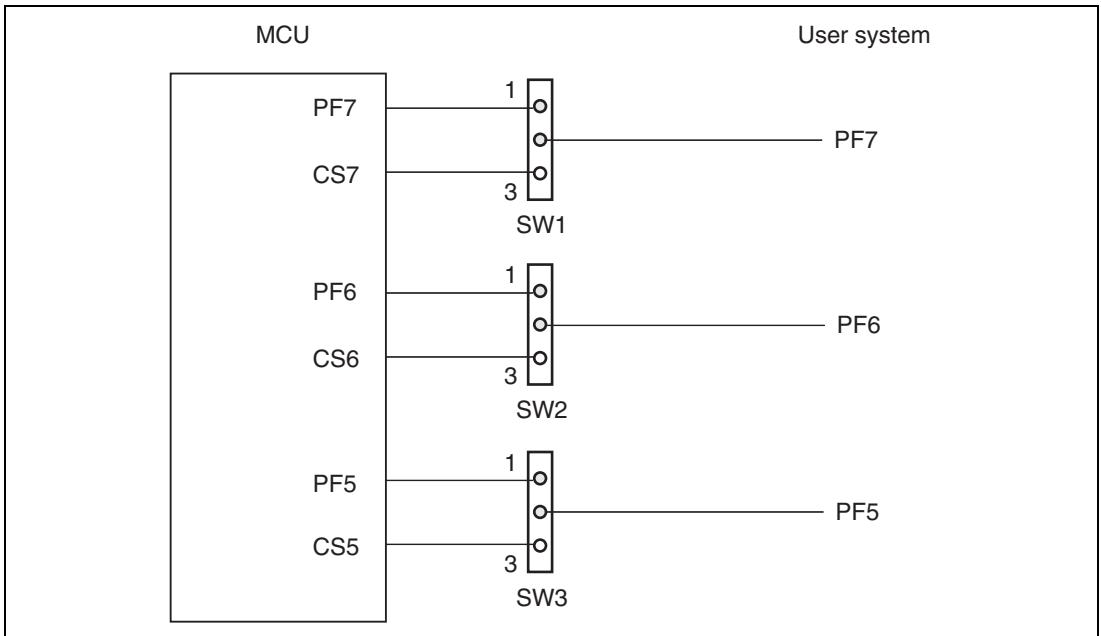


**Figure 11 Installing the Clock Oscillator**

## Section 5 Restriction on the Interface

The following restriction applies to the interface when pins PF7, PF6, and PF5 of the MCU are selected as CS-output pins by the emulator, to which the user system interface board is connected.

Jumper pins (SW1 to SW3) are used to switch the functions of pins PF7, PF6, and PF5 between port and CS-output functions. While these pins are in use as CS-output pins, the functions of PF7, PF6, and PF5 are disabled.



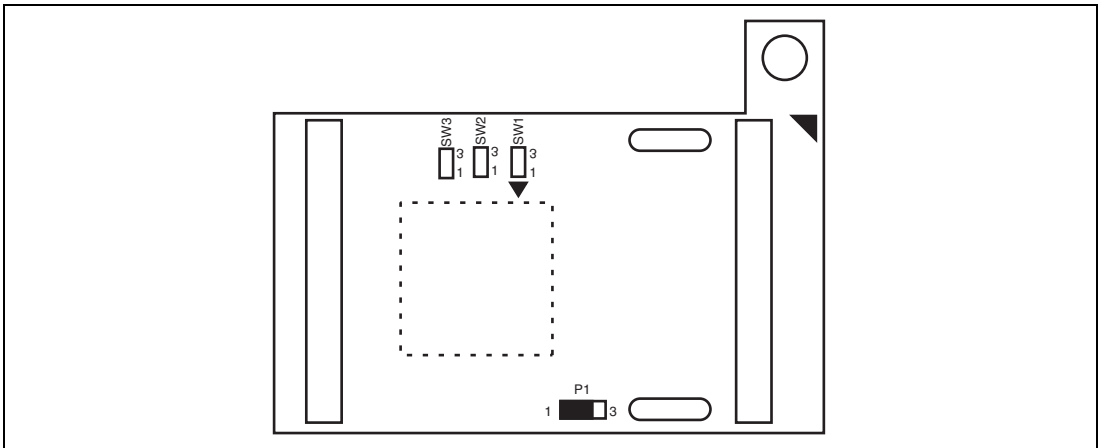
**Figure 12 Interface Circuit**





## Section 6 Points for Caution

1. Before connecting any parts or cables, make sure that the pins at the pin 1 position on both sides are correctly aligned.
2. Do not apply excessive force to the user system interface board while it is connected to the user system.
3. The dimensions of the recommended mounting pad for the IC socket for this user system interface board are different from those of the pad for the MCU.
4. This user system interface board is specifically designed for the HS1650EPH60H emulator. Do not use this board with any other emulator.
5. When power is not being supplied to the Vcc pin on the user system interface board, the emulator displays \*\* VCC DOWN. In this situation, the emulator will not operate correctly.
6. The P1 short connector is used for testing. Do not remove the inserted jumper pin.



**Figure 13 P1 Jumper Socket**

7. The terminals of SW1 to SW3 are used to switch pins between port and CS-output functions. Insert the jumper pins to select the desired function. When the pins are used for CS output, the port functions are disabled. When the port functions of the pins are in use, the CS output functions are disabled. At shipment, the port functions are enabled (i.e., the jumper pins are inserted in “1”).



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**H8SX/1651 Group PLQP0120LA\_A  
User System Interface Board  
for E6000H Emulator User's Manual**

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