

# SH7286 Group PLQP0176KB-A User System Interface Board

R0E572860CFK00

User's Manual

Renesas Microcomputer Development Environment System  
SuperH™ Family / SH7280 Series

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Renesas Technology  
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User's Manual



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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. and Renesas Solutions Corp. excluding all subsidiary products.

- E200F main unit
- External bus trace unit
- Evaluation-chip unit
- Expansion profiling unit
- Emulation memory unit
- User system interface board
- Trace cable

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 used to connect the evaluation-chip unit to the user system. This user system interface board must only be used for the above purpose.

### **Limited Applications:**

This emulator product is not authorized for use in transportation, vehicular, medical (where human life is potentially at stake), aerospace, nuclear, or undersea repeater applications. Buyers of this emulator product must notify Renesas Technology Corporation, Renesas Solutions Corporation or an authorized Renesas Technology product distributor before planning to use the product in such applications.

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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.

Users are required to be familiar with the basic knowledge for the electric circuits, logic circuits, and microcomputers.

## **Precautions to be Taken when Using This Product:**

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**Figures:**

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



# 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

Either in the user's manual or on the product, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties. Their graphic images and meanings are given in this safety page. Be sure to read this chapter before using the product.



**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.

In addition to the four above, the following are also used as appropriate.

 means WARNING or CAUTION.

Example:  CAUTION AGAINST AN ELECTRIC SHOCK

 means PROHIBITION.

Example:  DISASSEMBLY PROHIBITED

 means A FORCIBLE ACTION.

Example:  UNPLUG THE POWER CABLE FROM THE RECEPTACLE.

# **WARNING**

## **Warnings for AC Power Supply:**



• If the attached AC power cable does not fit the receptacle, do not alter the AC power cable and do not plug it forcibly. Failure to comply may cause electric shock and/or fire.

• Use an AC power cable which complies with the safety standard of the country.

• Do not touch the plug of the AC power cable when your hands are wet. This may cause electric shock.

• This product is connected signal ground with frame ground. If your developing product is transformless (not having isolation transformer of AC power), this may cause electric shock. Also, this may give an unreparable damage to this product and your developing one.


While developing, connect AC power of the product to commercial power through isolation transformer in order to avoid these dangers.

• If other equipment is connected to the same branch circuit care should be taken not to overload the circuit. Refer to nameplate for electrical ratings.



• When installing this equipment, insure that a reliable ground connection is maintained.


# **WARNING**

-  • If you smell a strange odor, hear an unusual sound, or see smoke coming from this product, then disconnect power immediately by unplugging the AC power cable from the outlet.


Do not use this as it is because of the danger of electric shock and/or fire. In this case, contact your local distributor.

- When installing or connecting this product with other equipment, shut down AC power or disconnect the AC power cord from the equipment to prevent personal injury or damage to the equipment.

## **Warnings to Be Taken for This Product:**

-  • Do not disassemble or modify this product. Personal injury due to electric shock may occur if this product is disassembled and modified.
- Make sure nothing falls into the cooling fan on the top panel, especially liquids, metal objects, or anything combustible.

## **Warning for Installation:**

-  • Do not set this product in water or areas of high humidity. Make sure that the product does not get wet. Spilling water or some other liquid into the product may cause unreparable damage.

## **Warning for Use Environment:**

- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

## CAUTION

### Cautions for AC Adapter:

- ❗ • Use only the AC adapter included in this product package.
  - The included AC adapter is for this emulator. Do not use it for other product.
  - The DC plug on the included AC adapter has the below polarity.



- The included AC adapter has no power supply switch. The AC adapter is always active while connecting the AC power cable.

### Cautions to Be Taken for This Product:

- ❗ • Use caution when handling this product. Be careful not to apply a mechanical shock.
  - Do not pull the main unit by the probe of the emulation probe or the flexible cable which are connected to this product. Excessive flexing or force of the flexible cable for connecting this product to the emulation probe may break connector.

### Caution for Installation:

- ❗ • When in use do not place the emulator on its side.

# **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 E200F 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.**

# Preface

The R0E572860CFK00 is a user system interface board that connects a user system for the SH7286 PLQP0176KB-A (former package: FP-176EV) package to the SH7280 E200F emulator (R0E0200F1EMU00 or R0E572800VKK00).

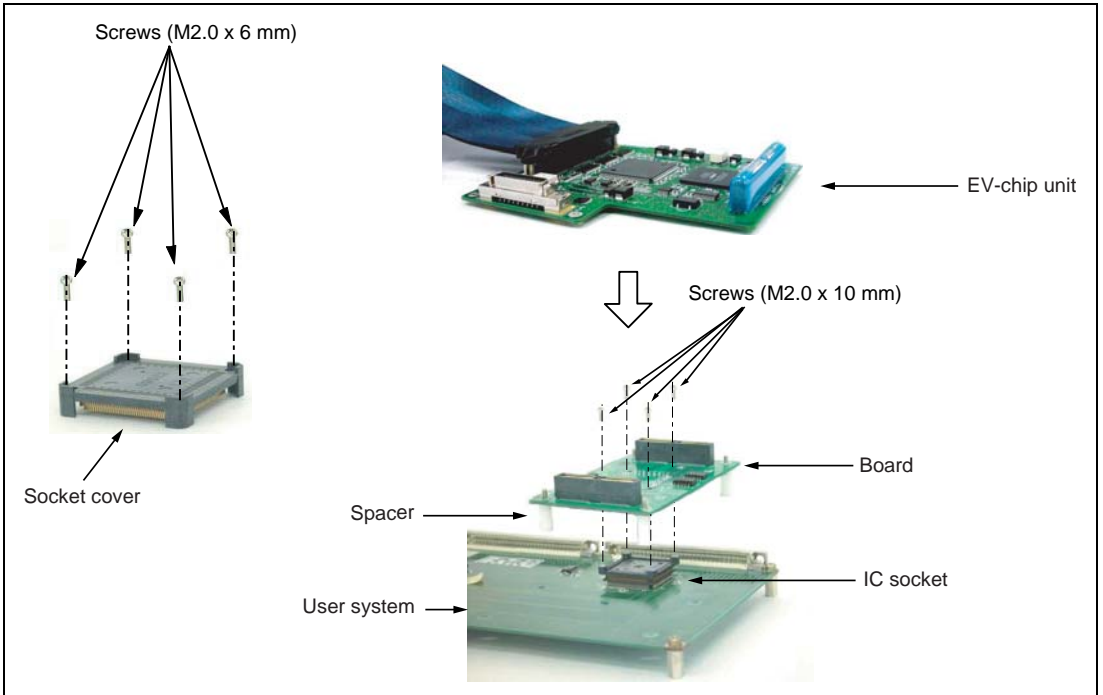
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# Section 1 Configuration

Figure 1 and table 1 show the external appearance and components, respectively, of the user system interface board for the PLQP0176KB-A. Please make sure you have all of these components when unpacking.



**Figure 1 User System Interface Board for the SH7286 PLQP0176KB-A Package**

# CAUTION

**Use a NQPACK176SD socket (manufactured by Tokyo Eletech Corporation) and a HQPACK176SD (manufactured by Tokyo Eletech Corporation) for the PLQP0176KB-A package IC socket and socket cover, respectively, on the user system.**

**Table 1 R0E572860CFK00 Components**

<b>No.</b>	<b>Component</b>	<b>Quantity</b>	<b>Remarks</b>
1	Board	1	With four spacers (2.6MP x 11 mm)
2	IC socket	1	For the PLQP0176KB-A package (to be mounted on the user system)
3	Socket cover	1	For the PLQP0176KB-A package (for installing MCU)
4	Screws (M2.0 x 10 mm)	4	For fastening board
5	Screws (M2.0 x 6 mm)	4	For installing a PLQP0176KB-A-packaged MCU
6	Guide pins	3	
7	Screwdriver	1	
8	User's manual	1	User's manual for R0E572860CFK00 (this manual)

## Section 2 Environmental Conditions

Maintain the conditions in table 2 when using the emulator.

**Table 2 Environmental Conditions**

<b>Item</b>	<b>Specifications</b>
Temperature	Operating: +10 to +35°C Storage: -10 to +35°C
Humidity	Operating: 35 to 80% RH, no condensation Storage: 35 to 80% RH, no condensation
Vibration	Operating: 2.45 m/s <sup>2</sup> max. Storage: 4.9 m/s <sup>2</sup> max. Transportation: 14.7 m/s <sup>2</sup> max.
Ambient gases	There must be no corrosive gases present.

## Section 3 Connection Procedures

### 3.1 Connecting User System Interface Board to User System

#### **WARNING**

**Always switch OFF the user system and the emulator product before the USER SYSTEM INTERFACE BOARD 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 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.

#### 3.1.1 Installing IC Socket

Solder the IC socket for a PLQP0176KB-A 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.)**

### 3.1.2 Installing Cable Head

## CAUTION

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

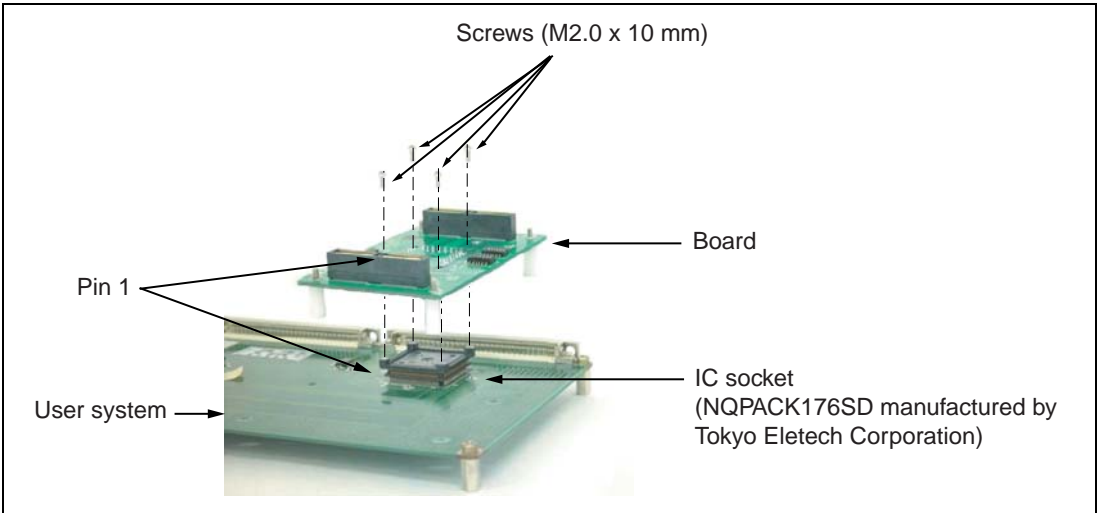
Align pin 1 on the IC socket for a PLQP0176KB-A package on the user system with pin 1 on the user system interface board, and insert the user system interface board into the IC socket on the user system, as shown in figure 2.

### 3.1.3 Fastening Cable Head

## CAUTION

- 1. Use a Phillip-type 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 board to the IC socket for a PLQP0176KB-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 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 2 Connecting User System Interface Board to User System**

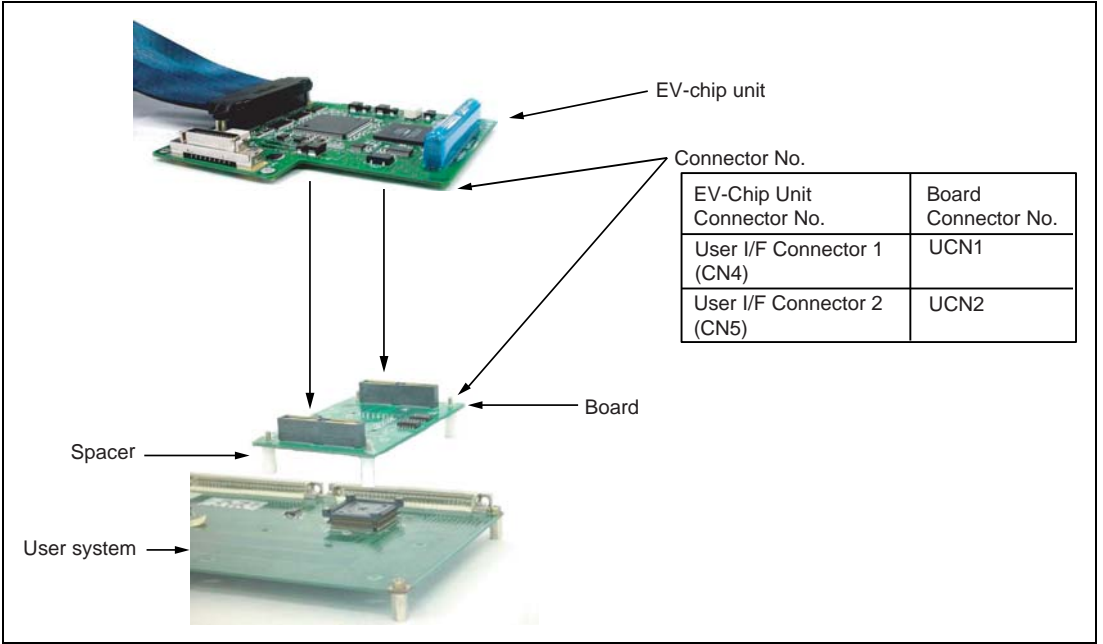
## 3.2 Connecting User System Interface Board to EV-Chip Board

### **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 to or removed from any part. Before connecting, make sure that pin 1 on both sides are correctly aligned.**
- 2. The user system interface board dedicated to the emulator must be used.**

1. Make sure the user system and emulator are turned off.
2. Align the connectors on the board with those on the EV-chip board according to their numbers (figure 3).
3. Adjust the height of the spacer attached to the board with the user system.



**Figure 3 Connecting User System Interface Board to EV-Chip Board**



### 3.3 Recommended Dimensions for User System Mount Pad (Footprint)

Figure 4 shows the recommended dimensions for the mount pad (footprint) for the user system with an IC socket for a PLQP0176KB-A package (NQPACK176SD: manufactured by Tokyo Eletech Corporation). Note that the dimensions in figure 4 are somewhat different from those of the actual chip's mount pad.

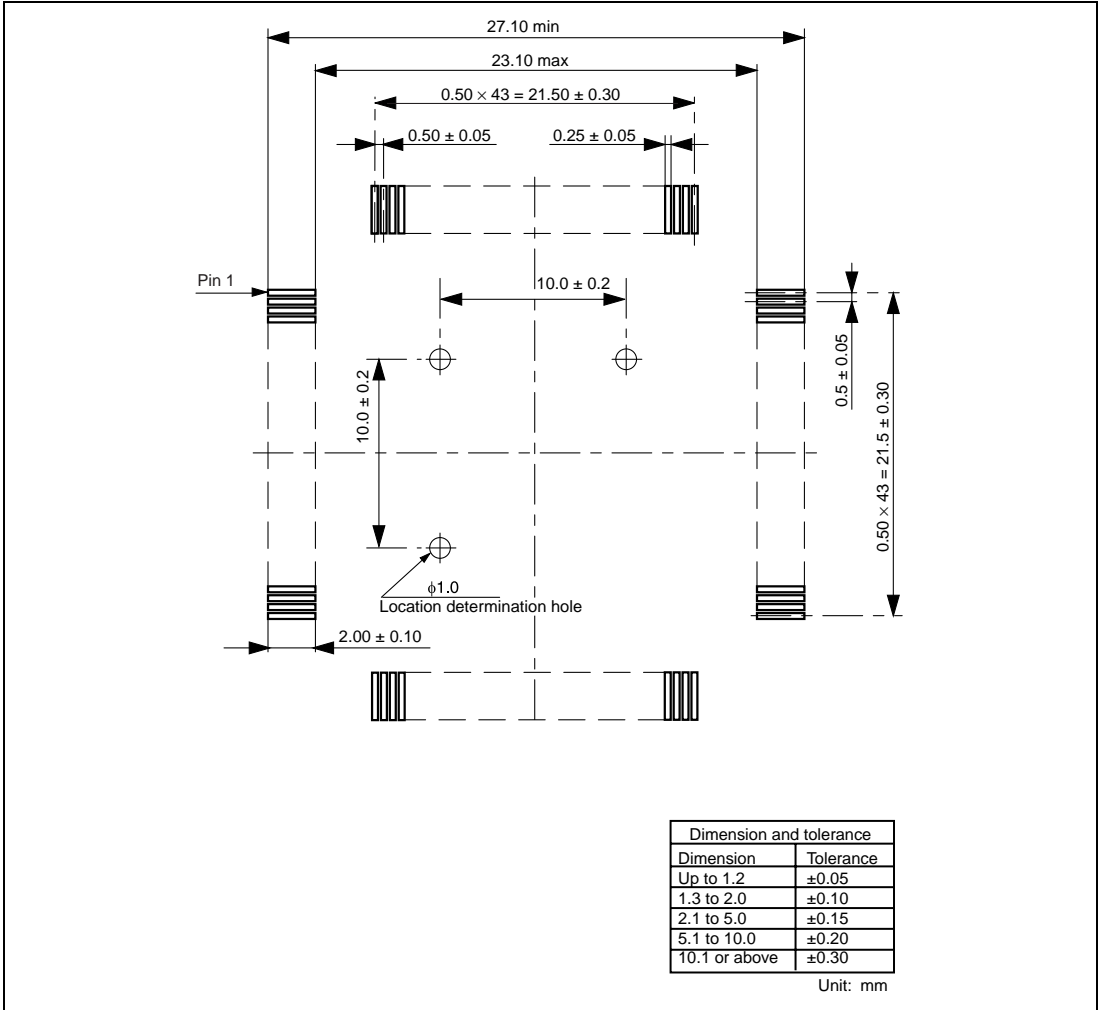
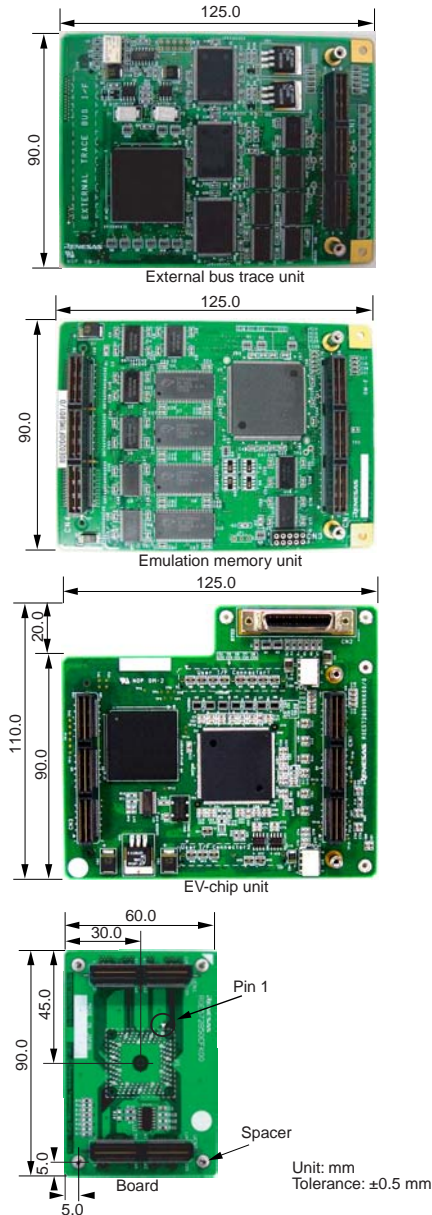


Figure 4 Recommended Dimensions for Mount Pad

### **3.4 Dimensions for External Bus Trace Unit, Emulation Memory Unit, EV-Chip Unit, and User System Interface Board**

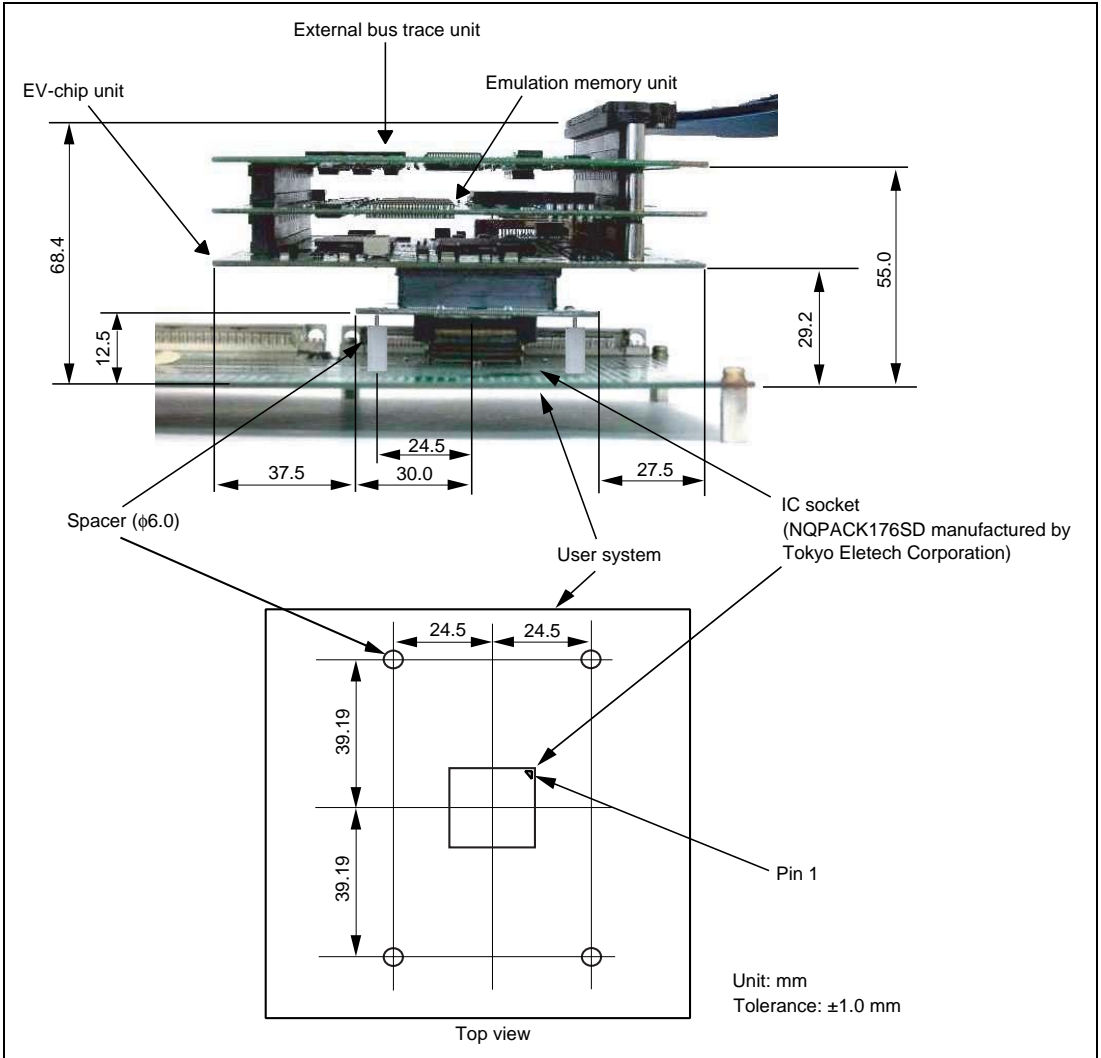
The dimensions for the external bus trace unit, emulation memory unit, EV-chip unit, and the user system interface board are shown in figure 5.



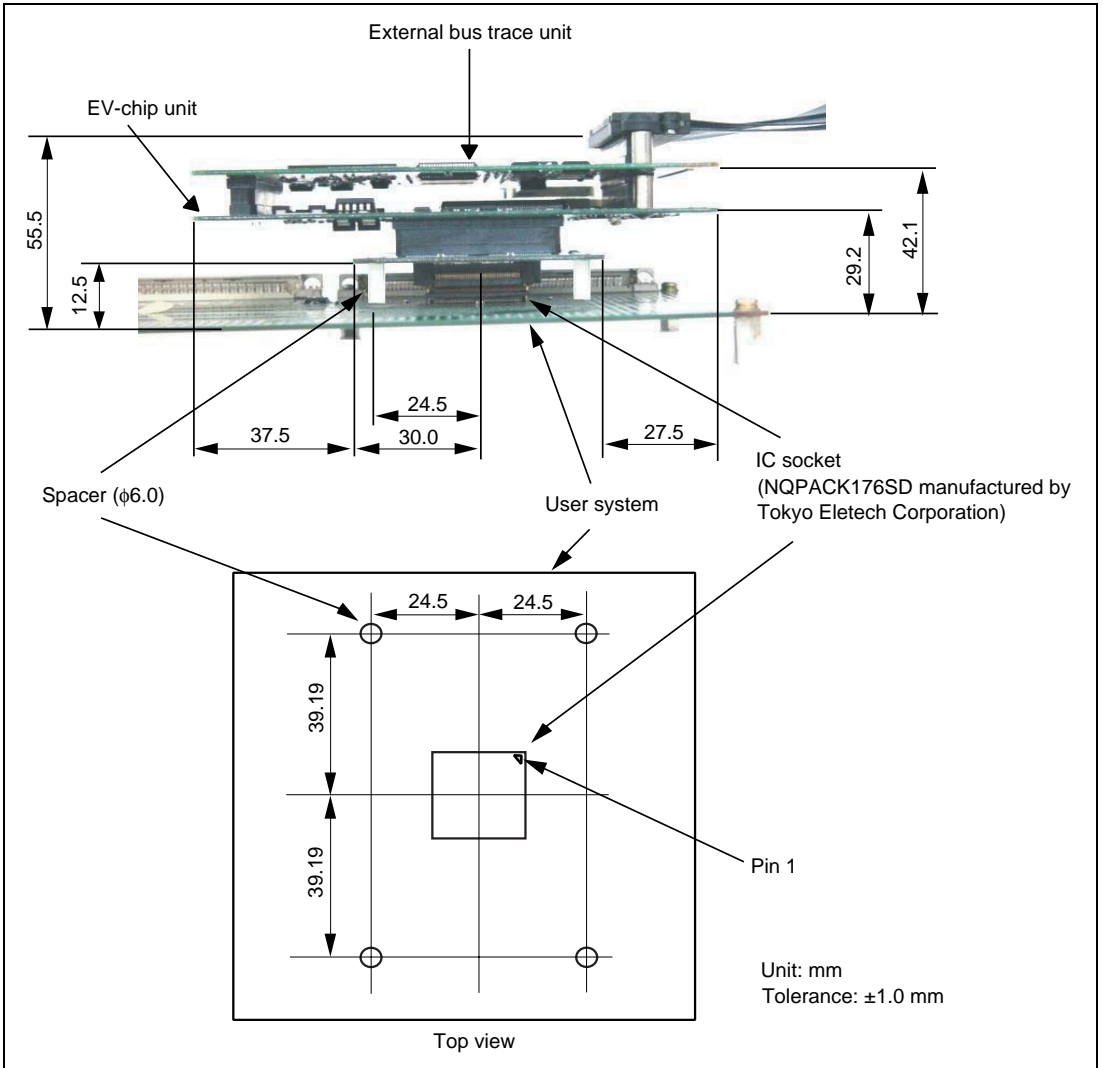
**Figure 5 Dimensions for External Bus Trace Unit, Emulation Memory Unit, EV-Chip Unit, and User System Interface Board**

### 3.5 Resulting Dimensions after Connecting User System Interface Board

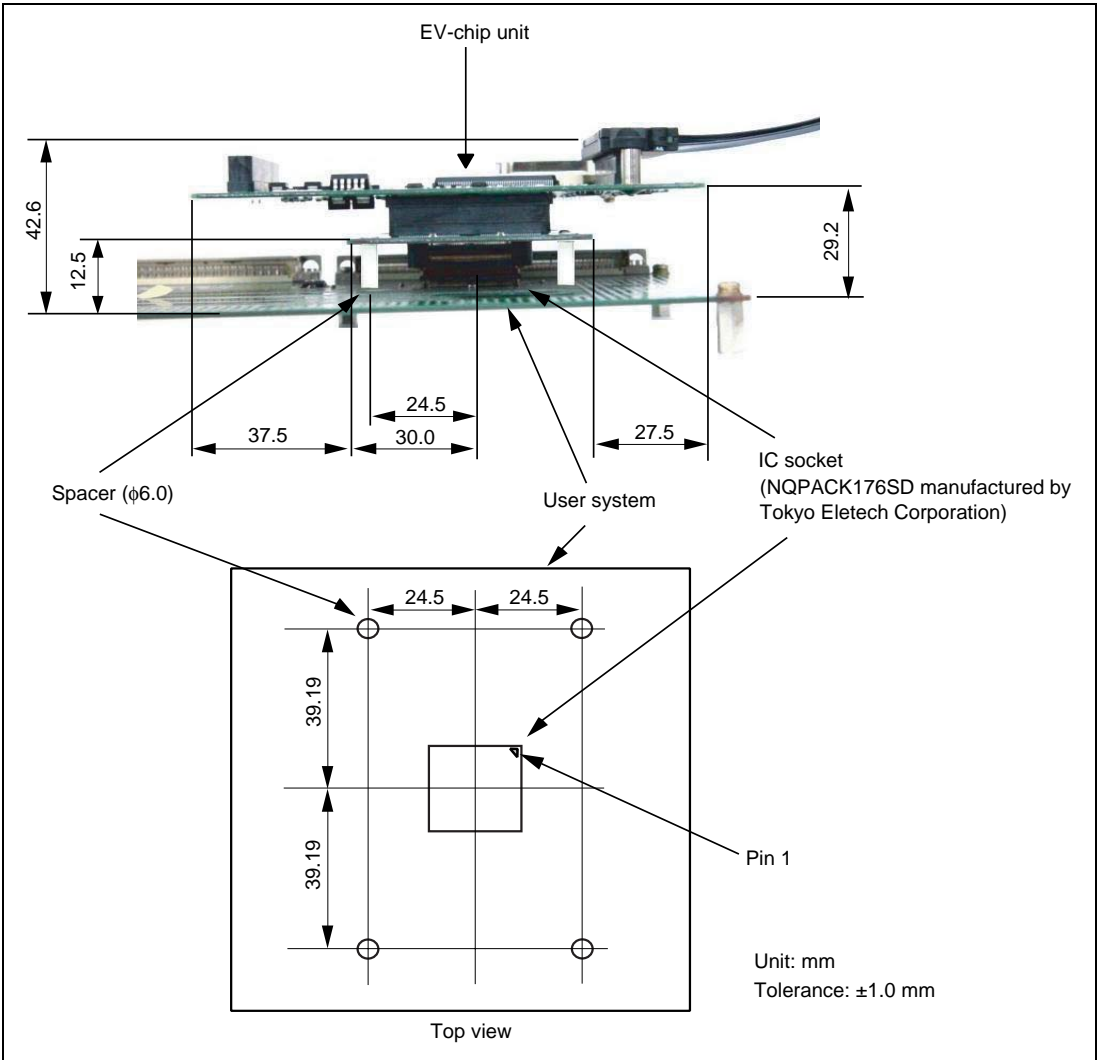
The resulting dimensions, after connecting the user system interface board to the user system, are shown in figures 6, 7, and 8.



**Figure 6 Resulting Dimensions after Connecting User System Interface Board (when Connecting External Bus Trace Unit, Emulation Memory Unit, and EV-Chip Unit)**



**Figure 7 Resulting Dimensions after Connecting User System Interface Board (when Connecting External Bus Trace Unit and EV-Chip Unit)**



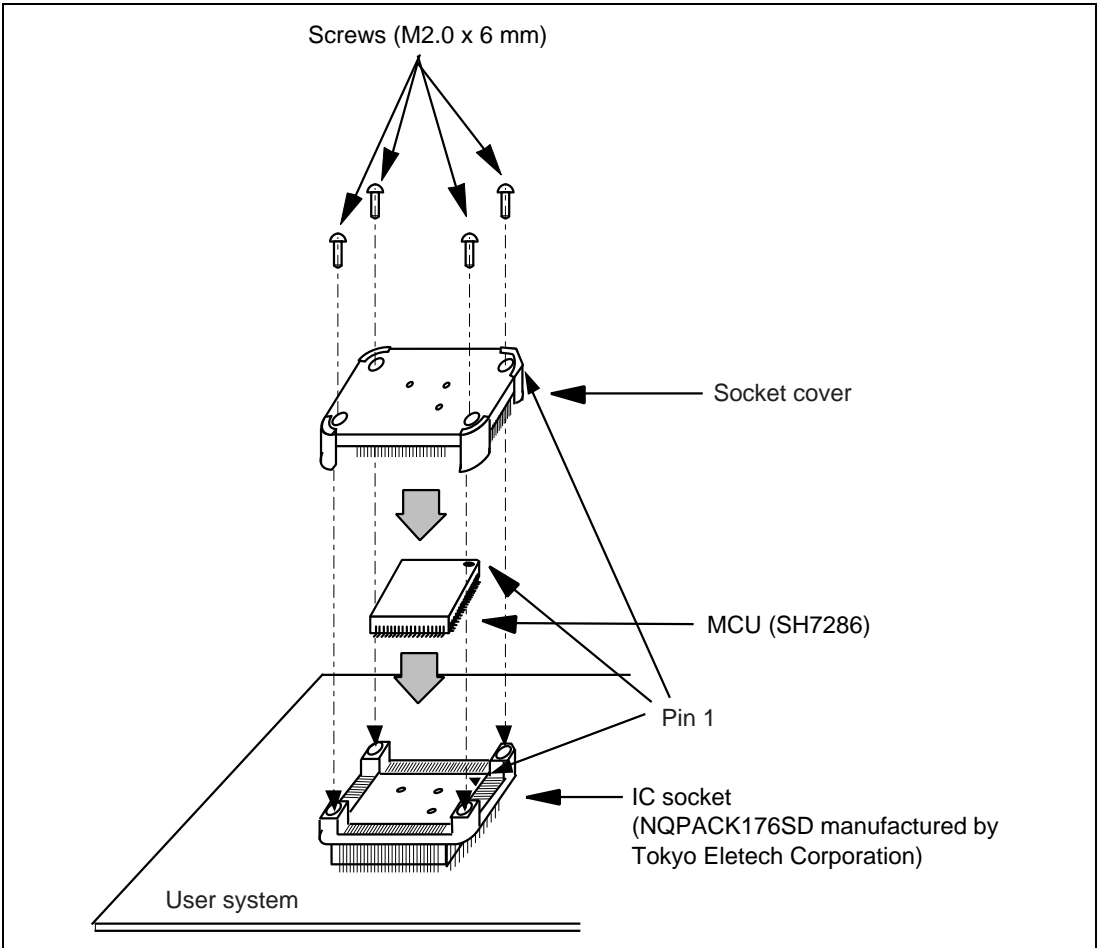
**Figure 8 Resulting Dimensions after Connecting User System Interface Board (when Connecting EV-Chip Unit)**

## Section 4 Installing the MCU to the User System

### CAUTION

- 1. Check the location of pin 1 before inserting.**
- 2. Use a Philips-type 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 provided four screws (M2.0 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 5 Verifying Operation

1. Turn on the emulator according to the procedures described in the SH-2A, SH-2 E200F Emulator User's Manual (R0E0200F1EMU00E or R0E572800EMU00E).
2. The emulator connected to this user system interface board supports three kinds of clock sources as the MCU clock. For details, refer to the SH7080 E200F Emulator User's Manual (R0E0200F1EMU00E).

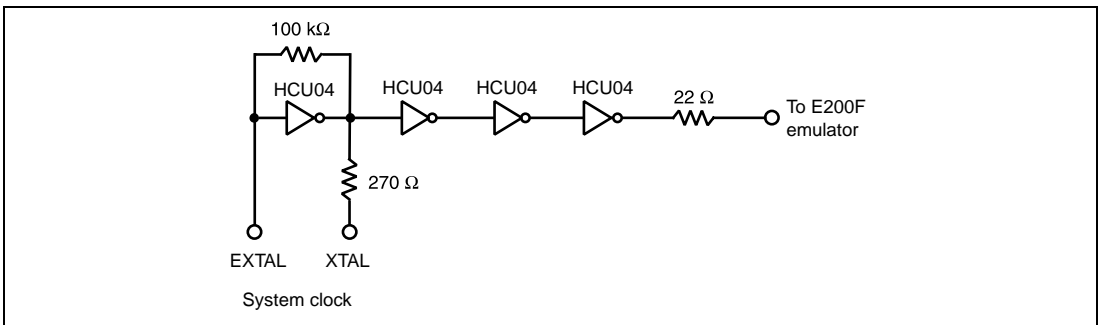
— To use the emulator internal clock

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 EXTAL pin (pin 115) on the user system interface board or connecting the crystal oscillator to the XTAL (pin 113) and EXTAL pins. For details, refer to section 4, Clock Pulse Generator, in the SH7280 Group Hardware Manual.

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



**Figure 10 Clock Oscillator**

## Section 6 Notice

1. Before connecting any parts or cables, make sure that pin 1 on the 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 mount pad for the IC socket for this user system interface board are different from those of the MCU.
4. This user system interface board is specifically designed for the SH7280 E200F EV-chip unit (R0E572800VKK00). Do not use this board with any other emulator.
5. When power is not supplied to the Vcc pin on the user system interface board, the emulator displays \*\* VCC DOWN. The emulator will not operate correctly.

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**SH7286 Group PLQP0176KB-A**  
**User System Interface Board**  
**User's Manual**

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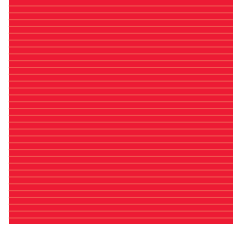
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SH7286 Group PLQP0176KB-A  
User System Interface Board  
User's Manual



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