

To our customers,

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## Old Company Name in Catalogs and Other Documents

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

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# SH72546RFCC SH72544R SH72543R User-System Interface Converter Board

R0E572546CBF10 Converter Board User's Manual

Renesas Microcomputer Development  
Environment System  
SuperH™ Family / SH72546RFCC,  
SH72544R, and SH72543R



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# IMPORTANT INFORMATION

## 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
- Expansion AUD trace unit
- Evaluation-chip unit
- Emulation memory unit
- User-system interface converter board
- Trace cable

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

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

The user-system interface converter board is used to connect the evaluation chip unit to the user system. This user-system interface converter 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:**

This emulator product 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 emulator product 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 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:**

1. This emulator is a development supporting unit for use in your program development and evaluation stages. In mass-producing your program you have finished developing, be sure to make a judgment on your own risk that it can be put to practical use by performing integration test, evaluation, or some experiment else.
2. In no event shall Renesas Solutions Corporation be liable for any consequence arising from the use of this emulator.
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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 unrepairable 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 unrepairable damage.

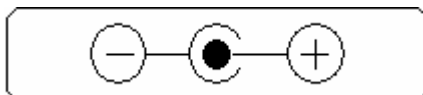
### Warning for Use Environment:

- 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. Check if the power is supplied by the LED of AC adapter.

### 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

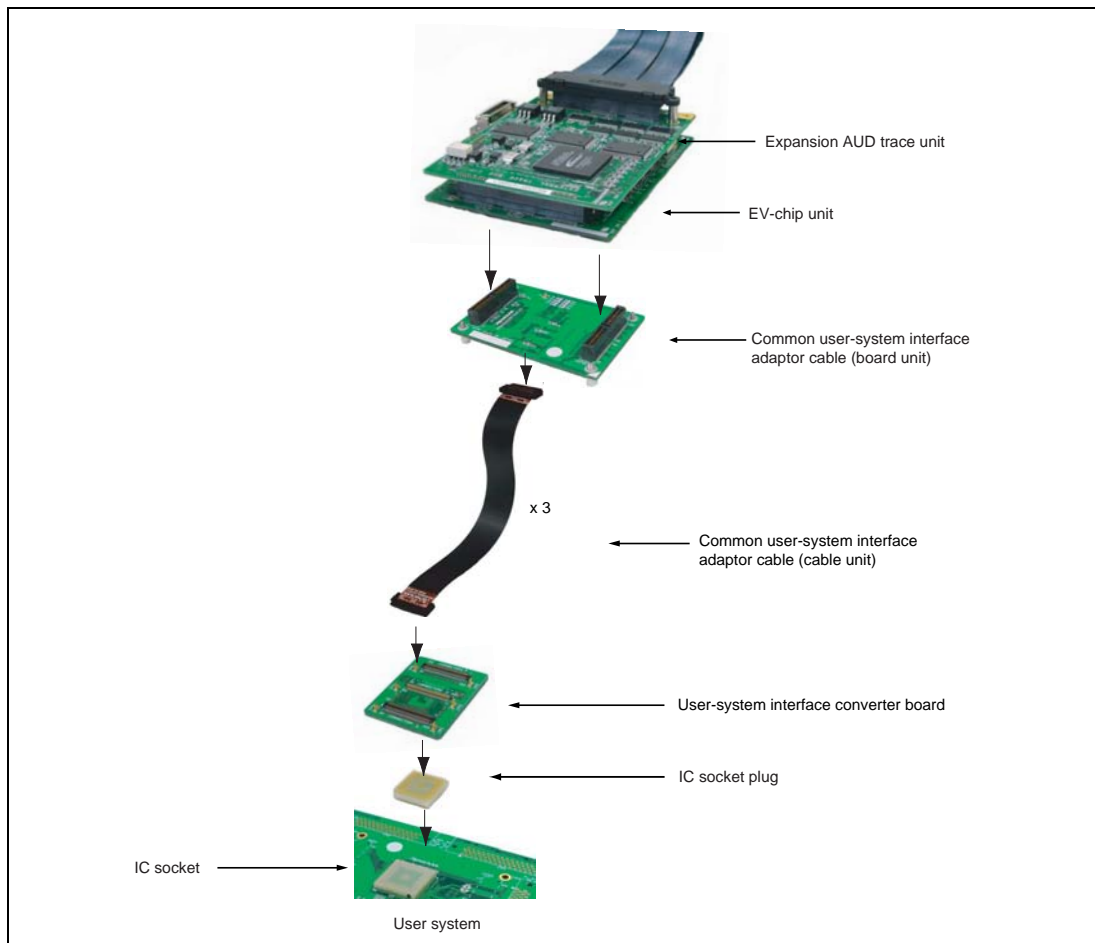
The R0E572546CBF10 is a user-system interface converter board that connects a user system for the SH72546RFCC, SH72544R, and SH72543R PRBG0272FA-A package (former package: BP-272) to the SH72546RFCC, SH72544R, SH72543R, SH72531, and SH72531FCC E200F emulator (R0E0200F1EMU00 or R0E572546VKK00).

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## Section 1 Configuration

Figure 1 and table 1 show the external appearance and components, respectively, of the user-system interface converter board. Please make sure you have all of these components when you unpack the product.



**Figure 1 External Appearance of the User-System Interface Converter Board**

## CAUTION

1. Use a BSSOCKET272Z2021RE21N socket (manufactured by Tokyo Eletech Corporation), and a CSPLUG/W272Z2021RE01 (manufactured by Tokyo Eletech Corporation) for the PRBG0272FA-A package IC socket, and IC socket plug, respectively, on the user system.
2. To connect the emulator with user-system interface converter board, the common user-system interface adaptor cable (R0E200F1CKL00) must be obtained separately.
3. To mount the MCU directly on the user system, use a LSPACK272Z2021RE02 top cover (manufactured by Tokyo Eletech Corporation) for the IC socket.

**Table 1 R0E572546CBF10 Components**

No.	Component	Quantity	Remarks
1	User-system interface converter board	1	R0E572546CBF10
2	IC socket	1	BSSOCKET272Z2021RE21N PRBG0272FA-A package (mounted on the user system)
3	IC socket plug	1	CSPLUG/W272Z2021RE01 For the PRBG0272FA-A package (for the connection with the user system)
4	User's manual	1	User's manual for R0E572546CBF10 (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 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 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.**

### 3.1.1 Installing the IC Socket

Solder the IC socket (BSSOCKET272Z2021RE21N) to the user system.

## CAUTION

1. Gently apply solder paste to the BGA pads of the user system. Be careful to keep the thickness of the solder within 100 to 150  $\mu\text{m}$ . Too much solder will cause short-circuiting of the pins.
2. A strip of protective (polyimide) tape is stuck to the surface of the IC socket which is to be connected to the IC socket plug. This prevents the adhesion of scattered (dispersed) flux in reflow for the IC socket. Leave this protective tape in place until solder reflow has been completed.
3. Since components that occupy large volumes close to the area for mounting of the IC socket will prevent the convective flow of heat during reflow, ensure that such components are not present when the socket is mounted.
4. Do not dip the IC socket in flux or otherwise wash it.

### 3.1.2 Assembling the User System Interface Cable

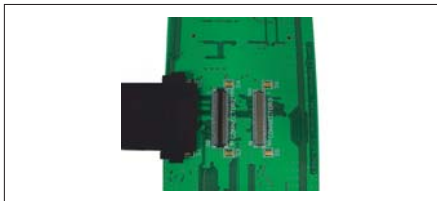
## CAUTION

**Check the location of pin 1 and the connector number before insertion.**

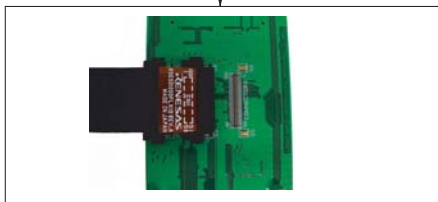
Connecting the user system interface cable

Connect the common user-system interface adaptor cable (board unit) for the user-system interface converter board via the common user-system interface cable (cable unit).

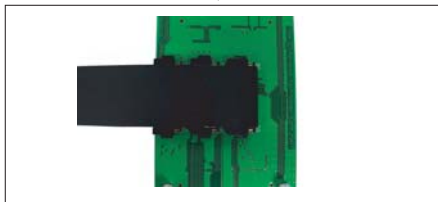




Connect the common user-system interface cable (cable unit) to CONNECTOR1 of the common user-system interface adaptor cable (board unit) as shown below.



Then connect the common user system interface adaptor cable (cable unit) to CONNECTOR2.



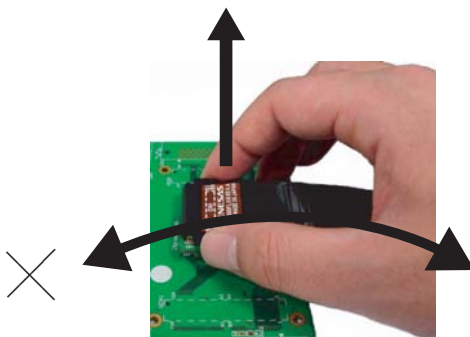
Connect the common user-system interface adaptor cable (cable unit) to CONNECTOR3.



Connect the common user-system interface adaptor cable (board unit) with the user-system interface converter board via the common user-system interface cable (cable unit) by aligning the connector numbers on those boards.

**Figure 2 Assembling the User System Interface Cable**

Removing the common user-system interface adaptor cable (cable unit).



When removing the common-user system interface adaptor cable (cable unit) from a converter board or a adaptor board, keep the board in place, hold both sides of the connector at the head of the cable, and apply vertical force to pull the cable away. If the join is stiff so that the cable is difficult to remove, pull the cable head up from the right or left side. Do not apply pressure in the direction marked "X", since this will damage the connector.

**Figure 3 Removing the Common User-System Interface Adaptor Cable (Cable Unit)**

### 3.1.3 Connecting Common User-System Interface Adaptor Cable (Board Unit) to EV-Chip Unit

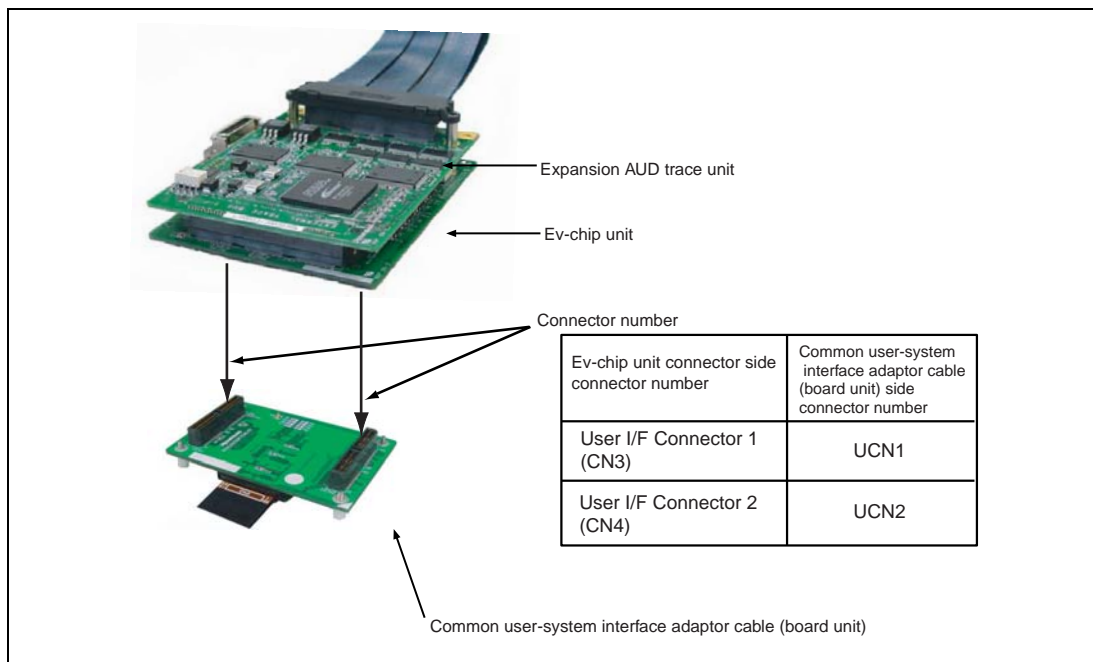


## WARNING

**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 CABLE 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 cable dedicated to the emulator must be used.**

1. Make sure the user system and emulator are turned off.
2. Align the connectors on the common user-system interface adaptor cable (board unit) with those on the EV-chip unit according to their numbers (figure 4).
3. Adjust the height of the spacer attached to the common user-system interface adaptor cable (board unit) with the user system.



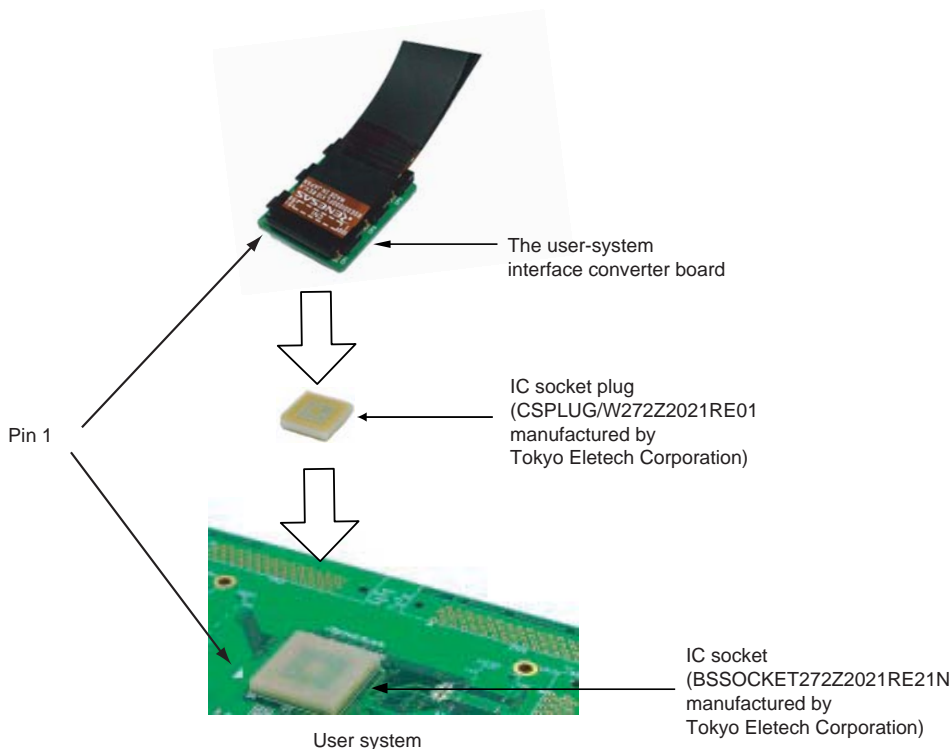
**Figure 4 Connecting Common User-System Interface Adaptor Cable (Board Unit) to EV-Chip Unit**

### 3.1.4 Installing to the IC Socket

## CAUTION

1. Check the location of pin 1 before insertion.
2. Do not fail to insert the guide pin of the IC socket plug in the user system side.

Use the provided IC socket plug to fasten the user-system interface converter board to the IC socket for a PRBG0272FA-A package on the user system. Apply vertical force to fasten the parts together. Take particular care to align the positions of pin 1 and the guide pin and to avoid the application of twisting force that might damage the soldered IC socket.

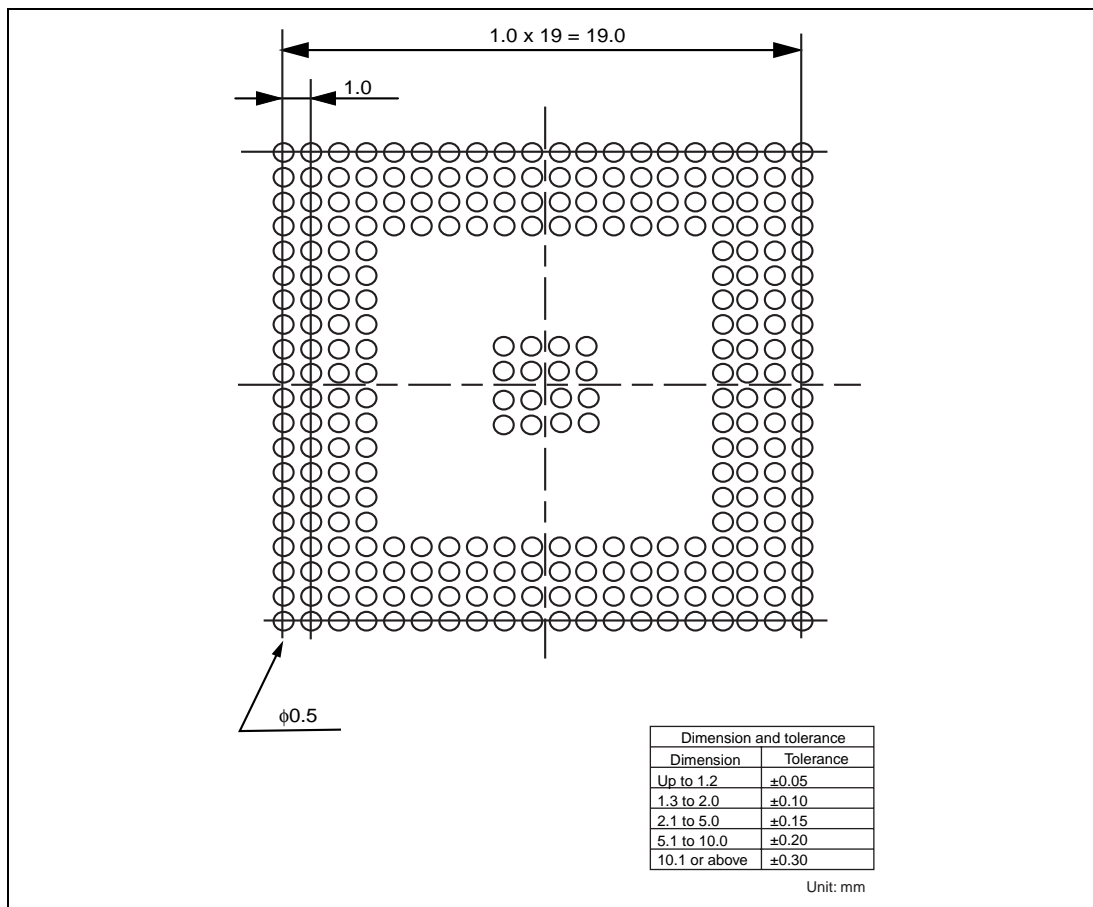


**Figure 5 Connecting the User System and User-System Interface Converter Board**

## 3.2 Dimensions

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

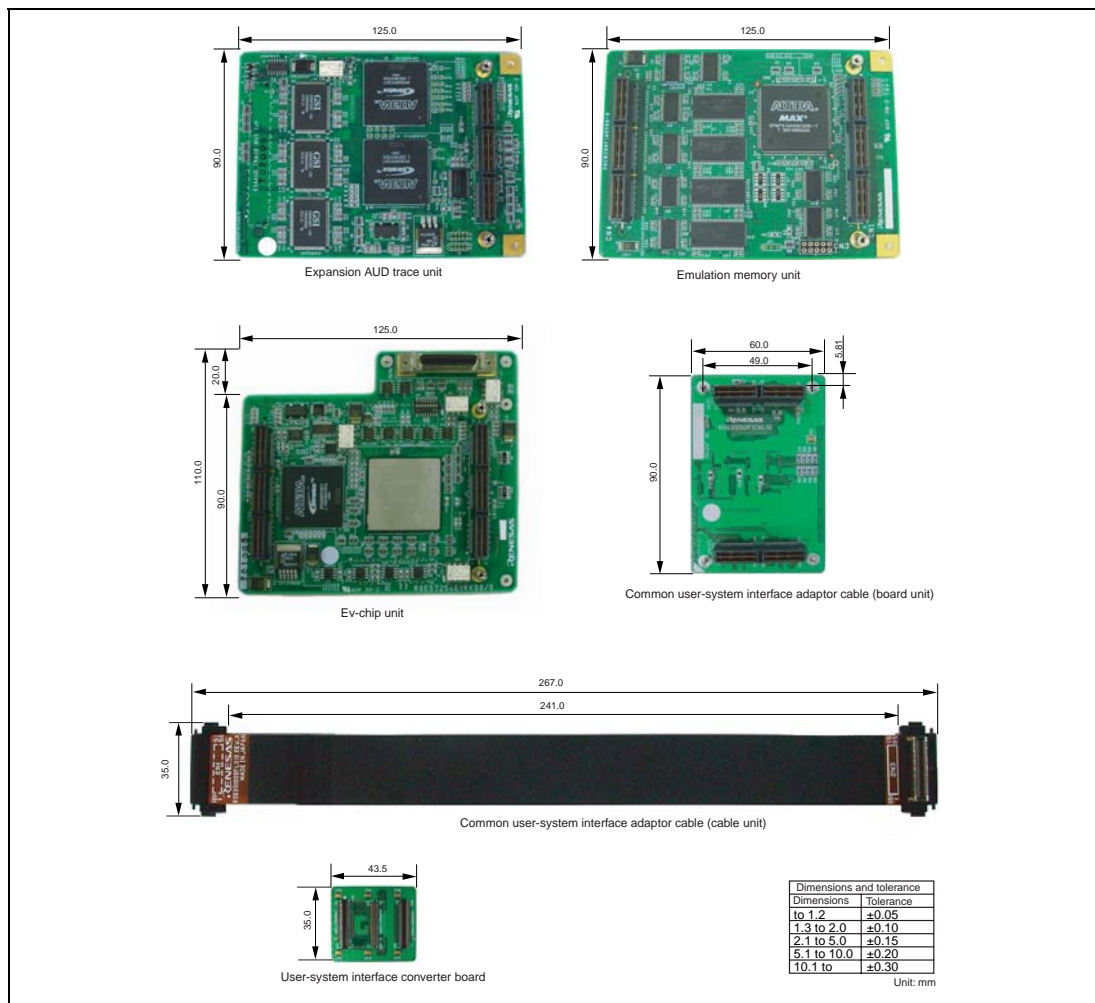
Figure 6 shows the recommended dimensions for the mount pad (footprint) for the user system with an IC socket for a PRBG0272FA-A package (BSSOCKET272Z2021RE21N: manufactured by Tokyo Eletech Corporation).



**Figure 6 Recommended Dimensions for Mount Pad**

### 3.2.2 External Dimensions

The external dimensions of the expansion AUD trace unit, emulation memory unit, EV-chip unit, common user-system interface adaptor cable (board unit), common user-system interface adaptor cable (cable unit), and user-system interface converter board are shown in figure 7.



**Figure 7 External Dimensions of the Expansion AUD Trace Unit, Emulation Memory Unit, EV-Chip Unit, Common User-System Interface Adaptor Cable (Board Unit), Common User-System Interface Adaptor Cable (Cable Unit), and User-System Interface Converter Board**

3.2.3 Dimensions of User-System Interface Converter Board when Connected

Dimensions of the user-system interface converter board when it is connected to the user system are shown in figure 8.

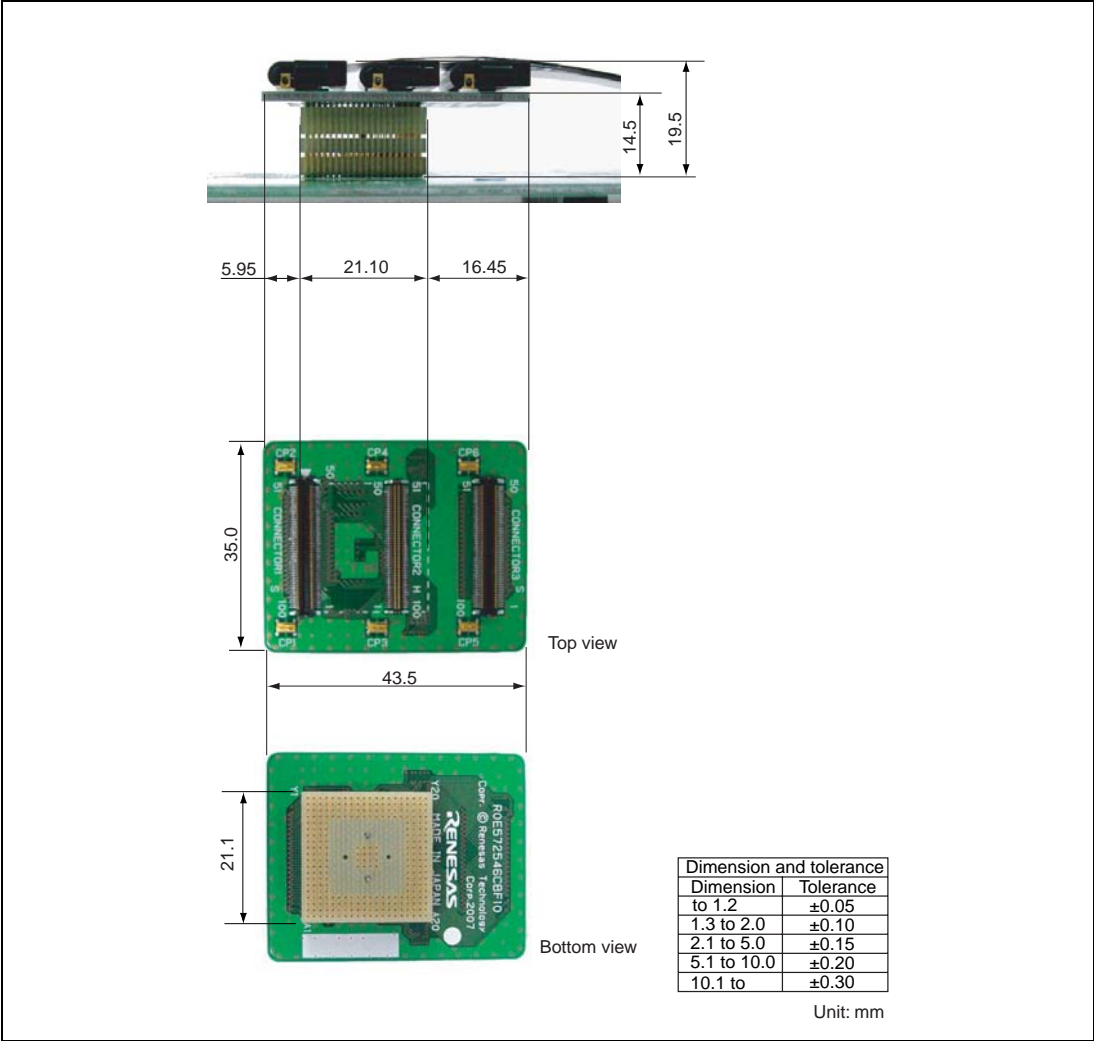


Figure 8 Dimensions of the User-System Interface Converter Board When Connected to the User System



### 3.3 Verifying Operation

1. Turn on the emulator according to the procedures described in the SH-2A, SH-2 E200F Emulator User's Manual, Supplementary information on Using the SH72546RFCC, SH72544R, SH72543R, SH72531, and SH72531FCC (R0E0200F1EMU00E or R0E572546EMU00E).
2. The emulator connected to this user-system interface converter board supports two kinds of clock sources as the MPU clock. For details, refer to the SH-2A, SH-2 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 A14) on the user-system interface converter board. For details, refer to section 3, Clock Pulse Generator, in the SH72546R Group Hardware Manual.



## Section 4 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 converter 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 converter board are different from those of the MPU.
4. This user-system interface converter board is specifically designed for the SH72546RFCC, SH72544R, SH72543R, SH72531, and SH72531FCC E200F EV-chip unit (R0E572546VKK00). Do not use this board with any other emulator.
5. When power is not supplied to the Vcc pin on the user-system interface converter board, the emulator displays \*\* VCC DOWN. The emulator will not operate correctly.



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**SH72546RFCC SH72544R SH72543R**  
**User-System Interface Converter Board**  
**User's Manual**

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**Renesas Technology America, Inc.**  
450 Holger Way, San Jose, CA 95134-1368, U.S.A  
Tel: <1> (408) 382-7500, Fax: <1> (408) 382-7501

**Renesas Technology Europe Limited**  
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.  
Tel: <44> (1628) 585-100, Fax: <44> (1628) 585-900

**Renesas Technology (Shanghai) Co., Ltd.**  
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd, Pudong District, Shanghai, China 200120  
Tel: <86> (21) 5877-1818, Fax: <86> (21) 6887-7858/7898

**Renesas Technology Hong Kong Ltd.**  
7th Floor, North Tower, World Finance Centre, Harbour City, Canton Road, Tsimshatsui, Kowloon, Hong Kong  
Tel: <852> 2265-6688, Fax: <852> 2377-3473

**Renesas Technology Taiwan Co., Ltd.**  
10th Floor, No.99, Fushing North Road, Taipei, Taiwan  
Tel: <886> (2) 2715-2888, Fax: <886> (2) 3518-3399

**Renesas Technology Singapore Pte. Ltd.**  
1 Harbour Front Avenue, #06-10, Keppel Bay Tower, Singapore 098632  
Tel: <65> 6213-0200, Fax: <65> 6278-8001

**Renesas Technology Korea Co., Ltd.**  
Kukje Center Bldg. 18th Fl., 191, 2-ka, Hangang-ro, Yongsan-ku, Seoul 140-702, Korea  
Tel: <82> (2) 796-3115, Fax: <82> (2) 796-2145

**Renesas Technology Malaysia Sdn. Bhd**  
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No.18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia  
Tel: <603> 7955-9390, Fax: <603> 7955-9510



**SH72546RFCC SH72544R SH72543R  
User-System Interface Converter Board  
R0E572546CBF10 Converter Board User's  
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**Renesas Electronics Corporation**

1753, Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8668 Japan

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