

A horizontal bar with a red square on the left and a grey textured area on the right. The title text is centered in the grey area.

SH7047 Group FP-100M User System Interface Board

HS7047ECH61H User's Manual

Renesas Microcomputer Development Environment System

SuperH™ Family/SH7047 Series

User's Manual

Cautions

Keep safety first in your circuit designs!

1. Renesas Technology Corp. puts the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

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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 (HS7047ECH61H)

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.

Improvement Policy:

Renesas Technology Corp. (including its subsidiaries, hereafter collectively referred to as Renesas) pursues a policy of continuing improvement in design, performance, functions, and safety of the user system interface board. Renesas reserves the right to change, wholly or partially, the specifications, design, user's manual, and other documentation at any time without notice.

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.

LIMITED WARRANTY

Renesas warrants its user system interface boards to be manufactured in accordance with published specifications and free from defects in material and/or workmanship. Renesas will repair or replace any user system interface boards determined to be defective in material and/or workmanship. User system interface boards are wearing parts which Renesas will not repair or replace if damaged and/or worn through use. The foregoing shall constitute the sole remedy for any breach of Renesas' warranty. This warranty extends only to you, the original Purchaser. It is not transferable to anyone who subsequently purchases the user system interface board from you. Renesas is not liable for any claim made by a third party or made by you for a third party.

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Renesas shall have no liability or legal responsibility for any problems caused by misuse, abuse, misapplication, neglect, improper handling, installation, repair or modifications of the user system interface board without Renesas' prior written consent or any problems caused by the user system.

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Figures:

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

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- **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 HS7047ECH61H is a user system interface board that connects a user system for the SH7047 FP-100M package to the SH7046 E6000H emulator (HS7046EPH60H).

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Section 1 Configuration

Figure 1 and table 1 show the configuration and components of the user system interface board for the FP-100M package. Please make sure you have all of these components when unpacking.

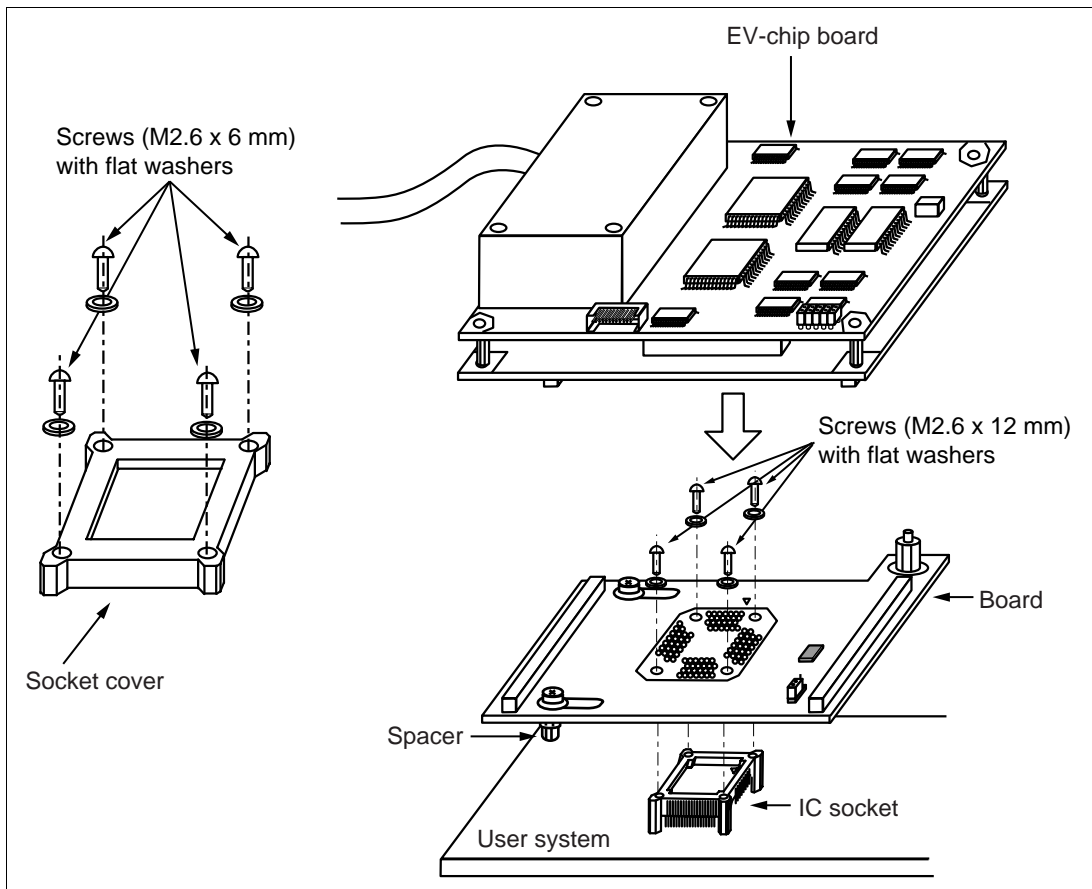


Figure 1 User System Interface Board for the SH7047 FP-100M Package

CAUTION

Use an IC149-100-054-B51 socket (manufactured by YAMAICHI ELECTRONICS Co., Ltd.) for the FP-100M package IC socket on the user system.

Table 1 HS7047ECH61H Components

No.	Component	Quantity	Remarks
1	Board	1	With two spacers (2.6MP x 6 mm)
2	IC socket	1	For the FP-100M package (to be mounted on the user system)
3	Socket cover	1	For the FP-100M package (for installing MCU)
4	Screws (M2.6 x 12 mm)	4	For fastening board (with four flat washers)
5	Screws (M2.6 x 6 mm)	4	For installing an FP-100M-packaged MCU (with four flat washers)
6	User's manual	1	User's manual for HS7047ECH61H (this manual)

Section 2 Connection Procedures

2.1 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.

2.1.1 Installing IC Socket

Solder the IC socket for an FP-100M 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.)

2.1.2 Installing Cable Head

CAUTION

Check the location of pin 1 before inserting.

Align pin 1 on the IC socket for an FP-100M 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.

2.1.3 Fastening Cable Head

CAUTION

- 1. Use a Phillip-type screwdriver whose head matches the screw head.**
- 2. The tightening torque must be 0.294 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 an FP-100M package on the user system with the four screws (M2.6 x 12 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.

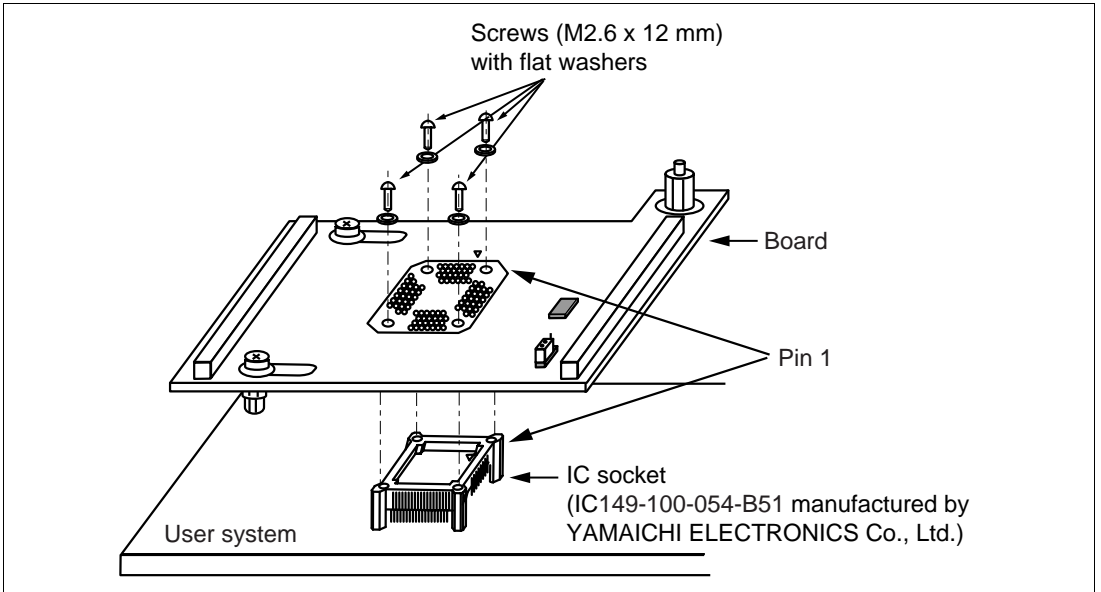


Figure 2 Connecting User System Interface Board to User System

2.2 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.

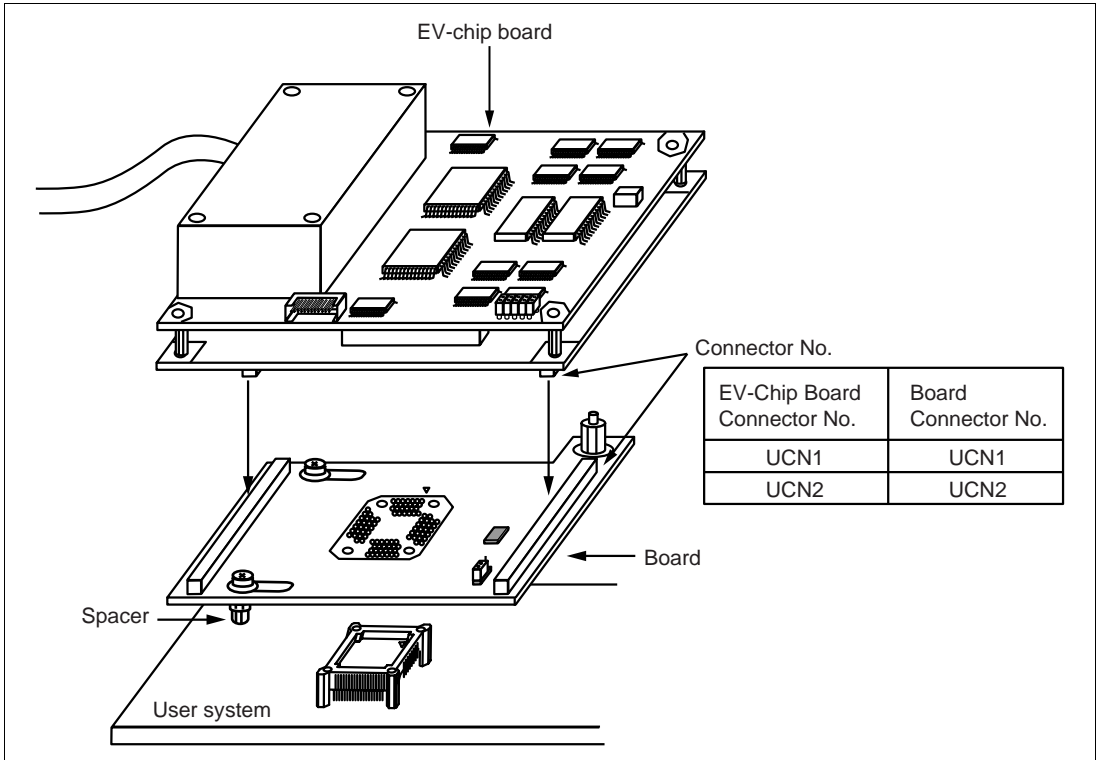


Figure 3 Connecting User System Interface Board to EV-Chip Board

2.3 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 an FP-100M package (IC149-100-054-B51: manufactured by YAMAICHI ELECTRONICS Co., Ltd.). Note that the dimensions in figure 4 are somewhat different from those of the actual chip's mount pad.

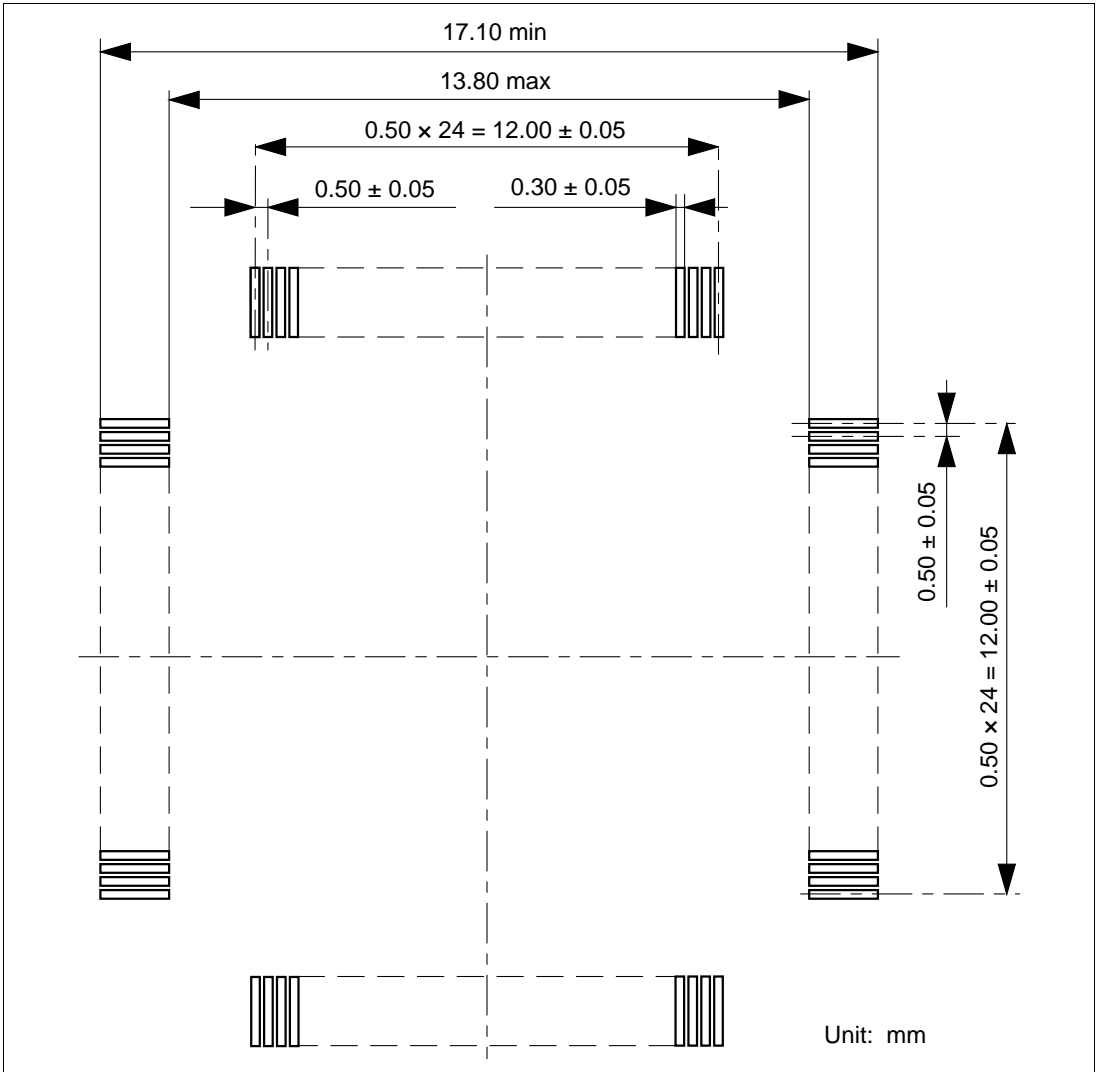


Figure 4 Recommended Dimensions for Mount Pad

2.4 Dimensions for EV-Chip Board and User System Interface Board

The dimensions for the EV-chip board and the user system interface board are shown in figure 5.

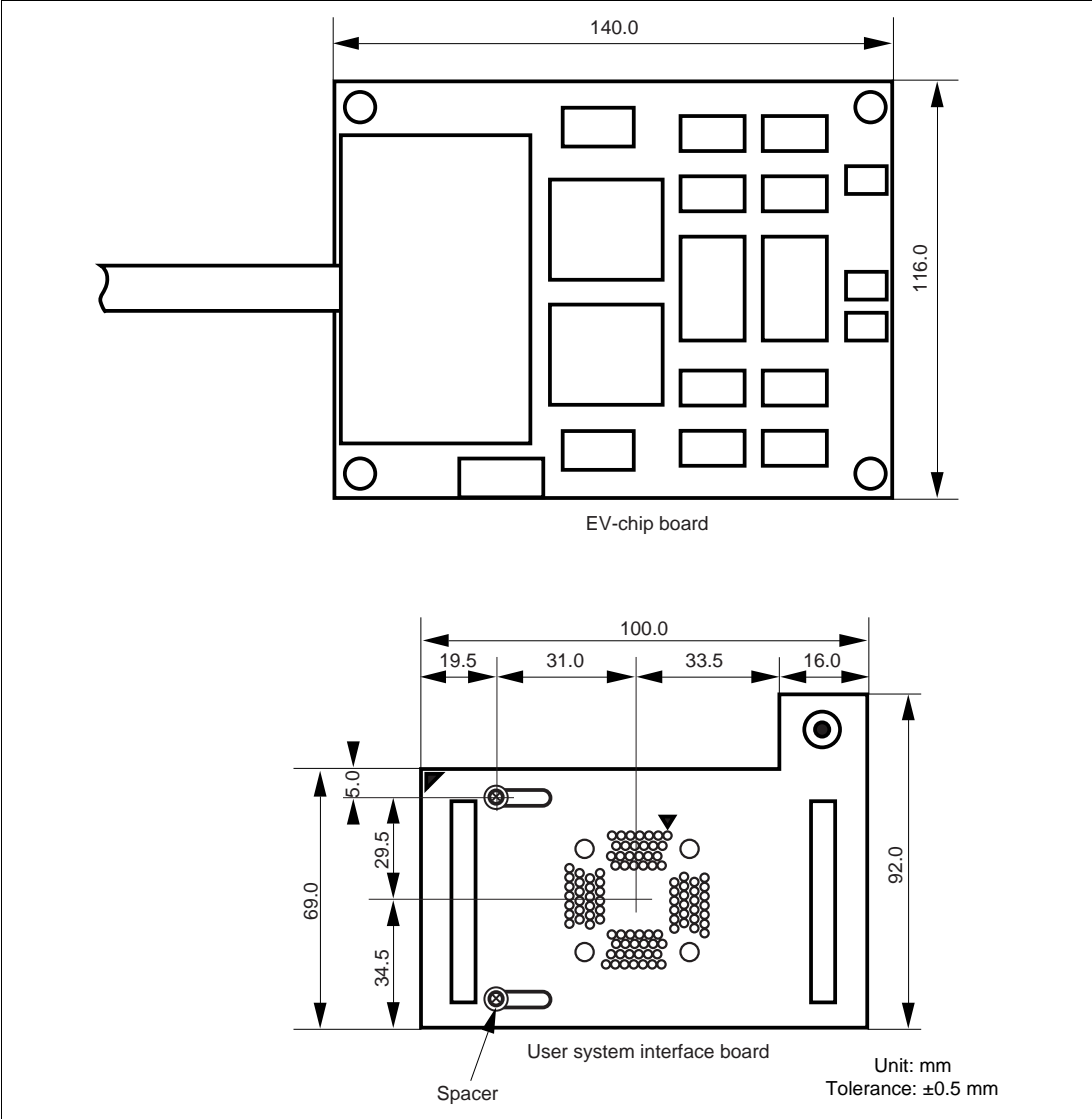


Figure 5 Dimensions for EV-Chip Board and User System Interface Board

2.5 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 figure 6.

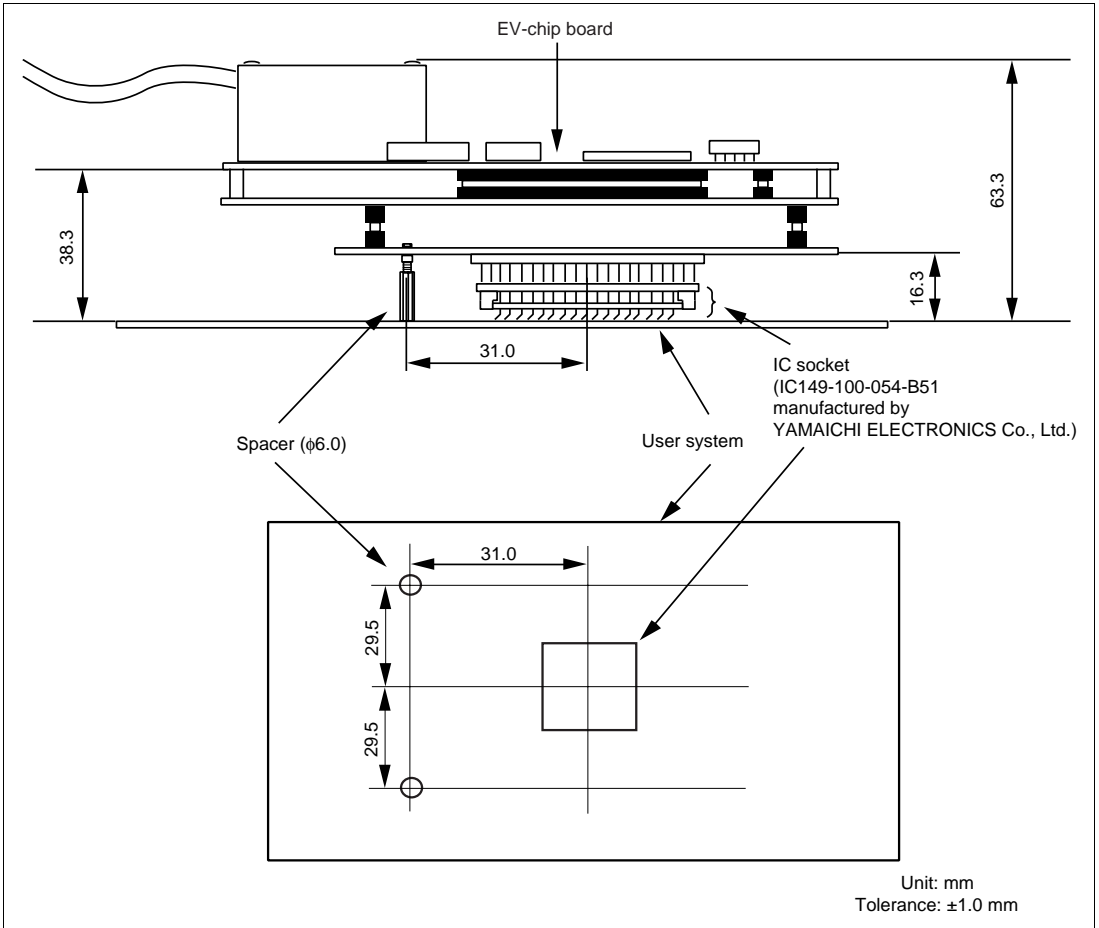


Figure 6 Resulting Dimensions after Connecting User System Interface Board

Section 3 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 0.294 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 7. After inserting the MCU, fasten the socket cover with the provided four screws (M2.6 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.

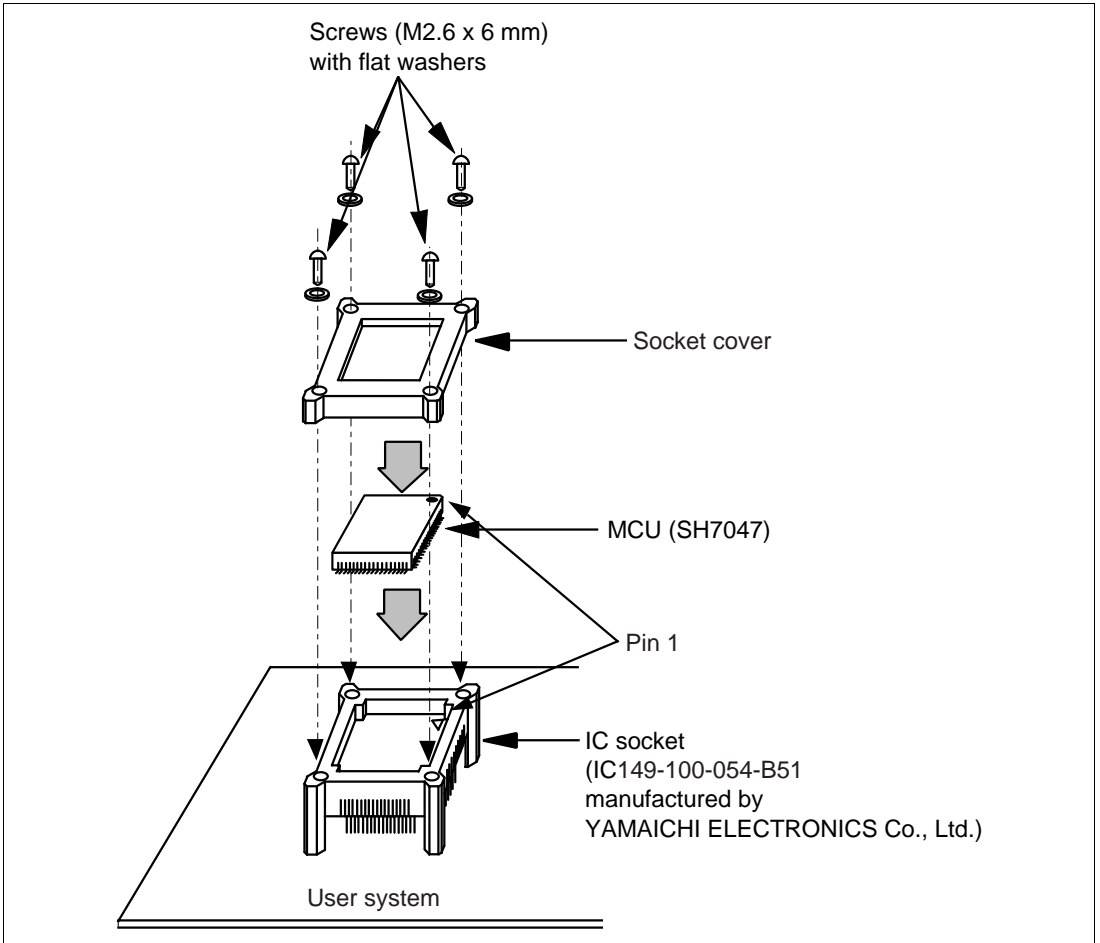


Figure 7 Installing MCU to User System

Section 4 Verifying Operation

1. Turn on the emulator according to the procedures described in the SH7046 E6000H Emulator User's Manual (HS7046EPH60HE).
2. Verify the user system interface cable connections by checking the pin states with the extended monitor 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 SH7046 E6000H Emulator User's Manual (HS7046EPH60HE).

— 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 96) on the user system interface board or connecting the crystal oscillator to the XTAL (pin 97) and EXTAL pins. For details, refer to section 4, Clock Pulse Generator, in the SH7047 Series Hardware Manual.

Figure 8 shows the clock oscillator on the user system interface board.

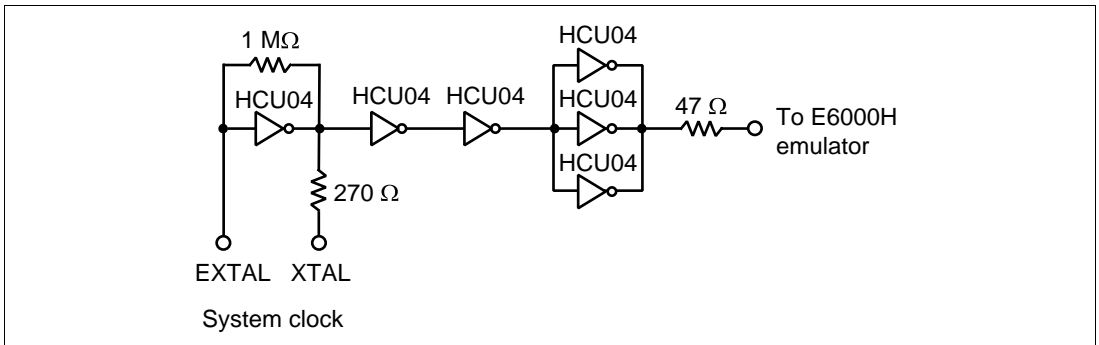


Figure 8 Clock Oscillator

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

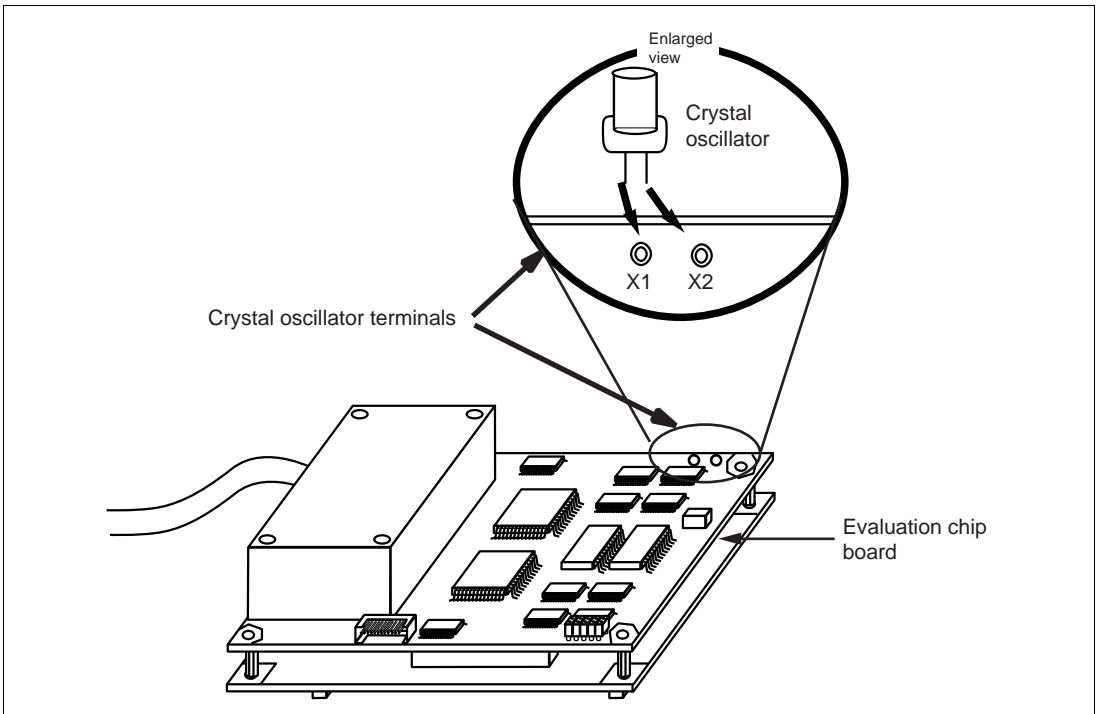


Figure 9 Installing the Clock Oscillator

Section 5 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 HS7046EPH60H emulator. 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.
6. The P1 short connector is used for testing. Do not remove the inserted jumper pin.

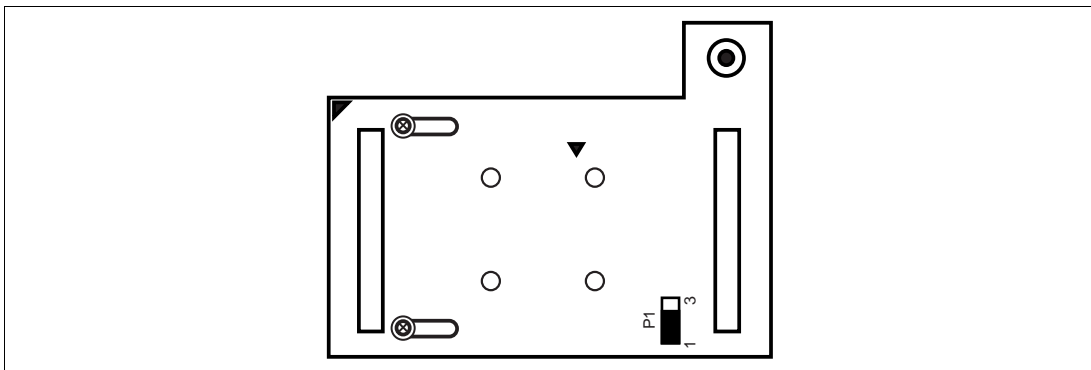


Figure 10 P1 Jumper Socket

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