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Renesas Electronics Corporation

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April 1, 2003

User's Manual

SH7060 FP-176 User System Interface Cable (HS7065ECH81H) for E8000 Emulator

User's Manual

Renesas Electronics
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• READ this user's manual before using this user system interface cable.

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

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Throughout this document, the term "user system interface cable" shall be defined as the following product produced only by Hitachi, Ltd. excluding all subsidiary products.

- User system interface cable (HS7065ECH81H)

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

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

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SAFETY PAGE

READ FIRST

• READ this user's manual before using this user system interface cable.

• KEEP the user's manual handy for future reference.

Do not attempt to use the user system interface cable 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 E8000 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

Thank you for purchasing this user system interface cable (HS7065ECH81H) for the Hitachi's original microcomputer SH7065.

The HS7065ECH81H is a user system interface cable that connects an SH7060 E8000 evaluation chip board (HS7060EBK81H; hereinafter referred to as the EV-chip board) to the IC socket for a FP-176 package for the SH7065 MCU on the user system.

Contents

Section 1 Configuration

CAUTION

Use a NQPACK176SD socket (manufactured by Tokyo Eletech Corporation) for the FP-176 package IC socket on the user system.

Figure 1 shows the configuration of the HS7065ECH81H user system interface cable for the FP-176 package.

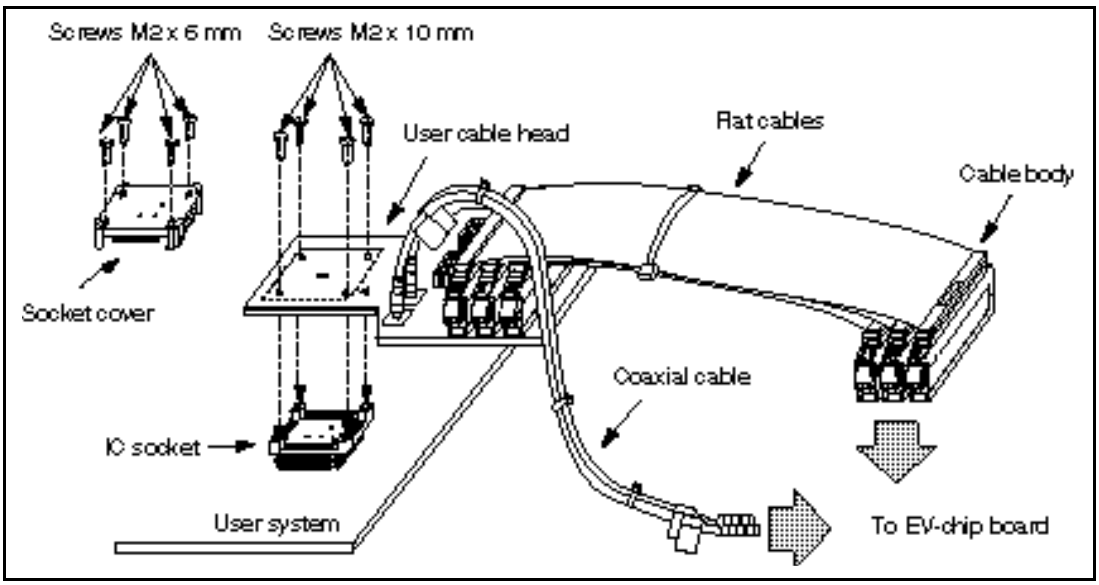


Figure 1 HS 7065ECH8 1H User System Interface Cable

Table 1 lists the HS7065ECH81H components. Please make sure you have all of these components when unpacking.

Table 1 HS7065ECH81H Components

No.	Component	Quantity	Remarks
1	Cable body	1	Includes three cables
2	User cable head	1	
3	IC socket	1	For the FP-176 package (to be mounted on the user system)
4	Socket cover	1	For the FP-176 package (For installing MCU)
5	Screws (M2 × 10 mm)	4	For fastening cable head
6	Screws (M2 × 6 mm)	4	For installing MCU
7	Coaxial cable	2	For CK, CKIO
8	Driver	1	For fastening IC socket, socket cover
9	Documentation	1	User's manual for HS7065ECH81H (this manual)

Section 2 Connection Procedures

2.1 Connecting User System Interface Cable 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 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.**

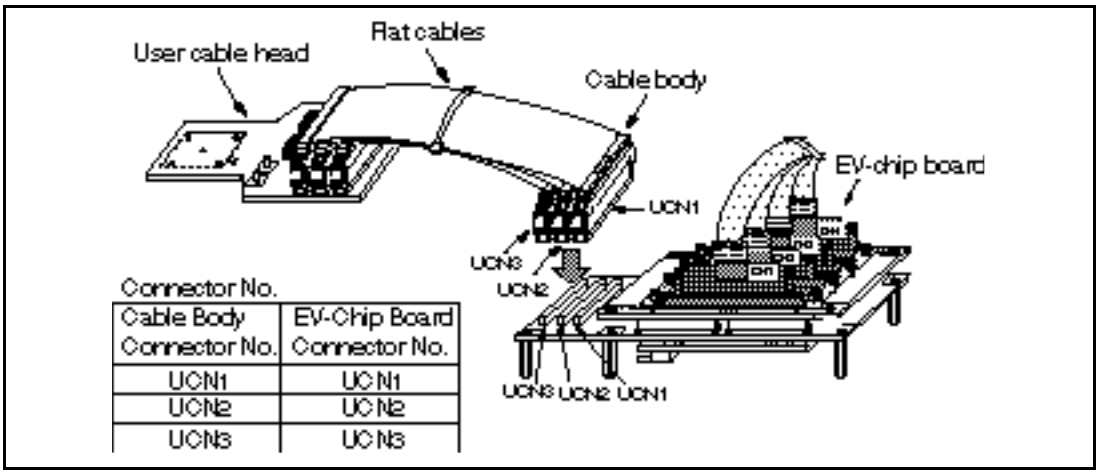
To connect the cable body to the EV-chip board, follow the instructions below.

1. Make sure the user system and emulator 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. Align the connectors on the cable body with those on the EV-chip board according to their numbers (figure 2), insert the cable body connectors to those on the EV-chip board until they are locked.

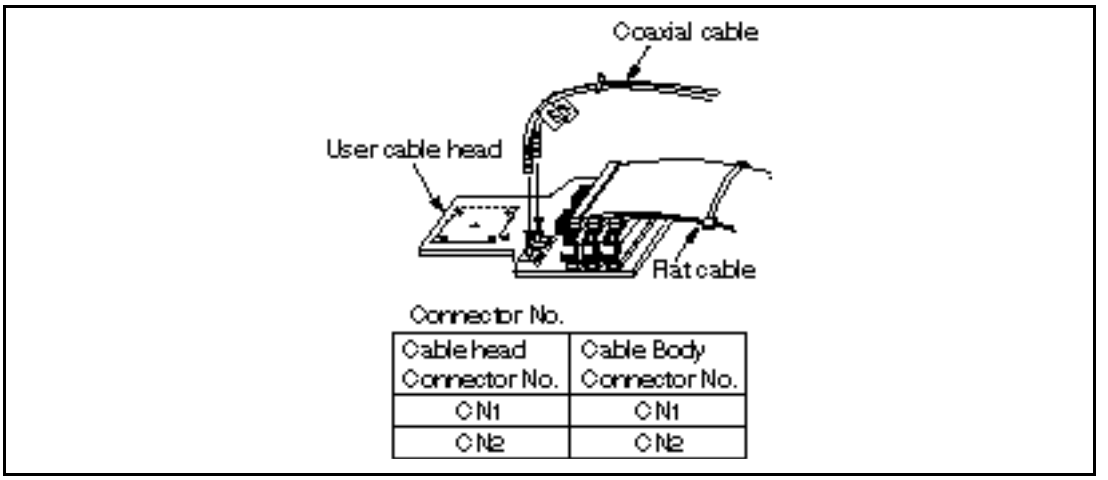


Connector No.

Cable Body Connector No.	EV-Chip Board Connector No.
UCN1	UCN1
UCN2	UCN2
UCN3	UCN3

Figure 2 Connecting User System Interface Cable to EV-Chip Board

3. Align the CN1 and CN2 connectors of the coaxial cable with those on the cable head according to their numbers (figure 3).



Connector No.

Cable head Connector No.	Cable Body Connector No.
CN1	CN1
CN2	CN2

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

4. Align the CN1 and CN2 connectors of the coaxial cable with those at the bottom of the EV-chip board according to their numbers (figure 4).

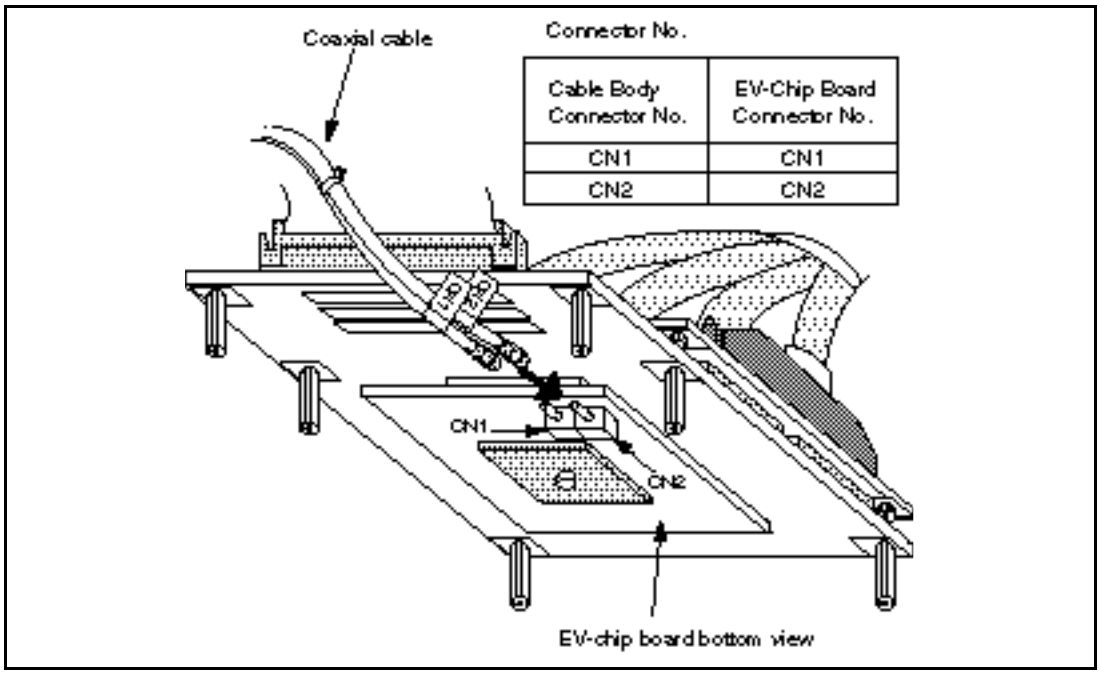


Figure 4 Connecting User System Interface Cable to EV-Chip Board

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

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 to determine where to install the IC socket, as shown in figure 5.

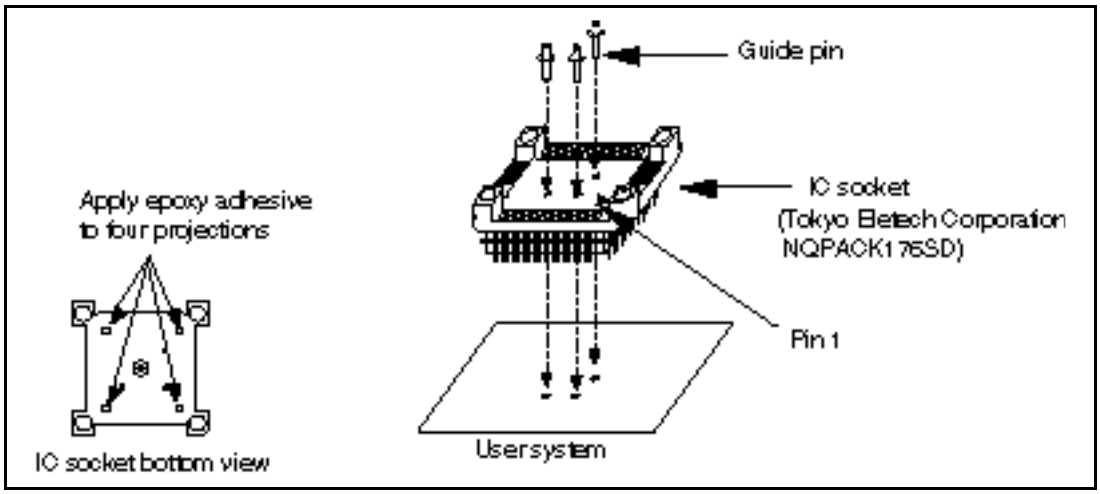


Figure 5 Installing IC Socket to User System

After fastening, solder the IC socket for a FP-176 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 Installing IC Socket Connector

CAUTION

Check the location of pin 1 before inserting.

Align pin 1 on the IC socket for a FP-176 package on the user system with pin 1 on the user system interface cable head, and insert the user system interface cable head into the IC socket on the user system, as shown in figure 6.

2.2.3 Fastening IC Socket Connector

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 a FP-176 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.

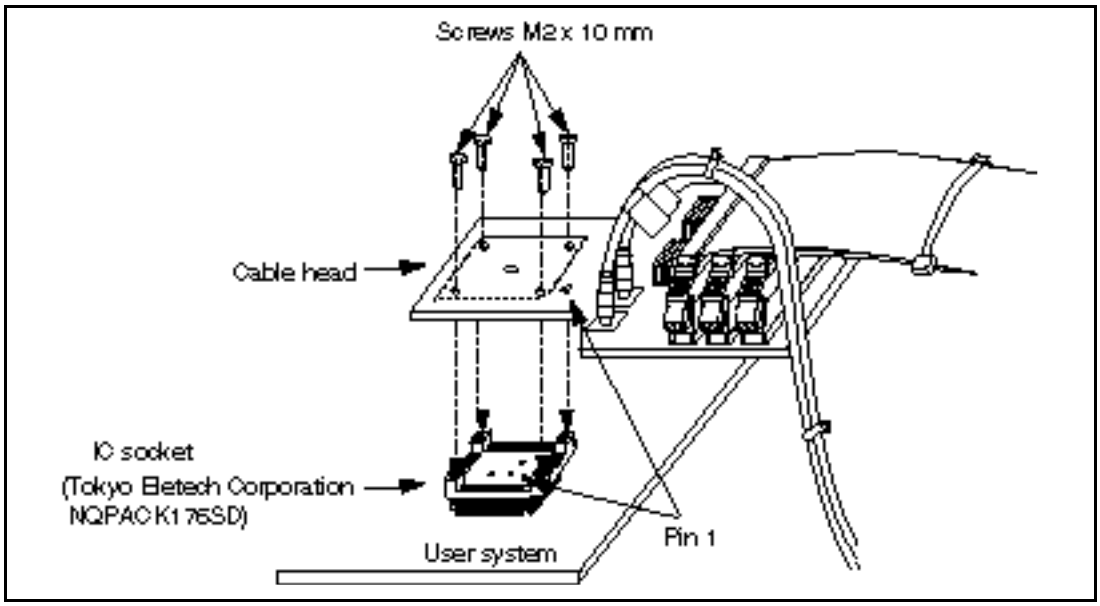


Figure 6 Connecting User System Interface Cable to User System

2.3 Recommended Dimensions for User System Mount Pad

Figure 7 shows the recommended dimensions for the mount pad (footprint) for the user system with an IC socket for an FP-176 package (NQPACK176SD: manufactured by Tokyo Eletech Corporation). Note that the dimensions in figure 7 are somewhat different from those of the actual chip's mount pad.

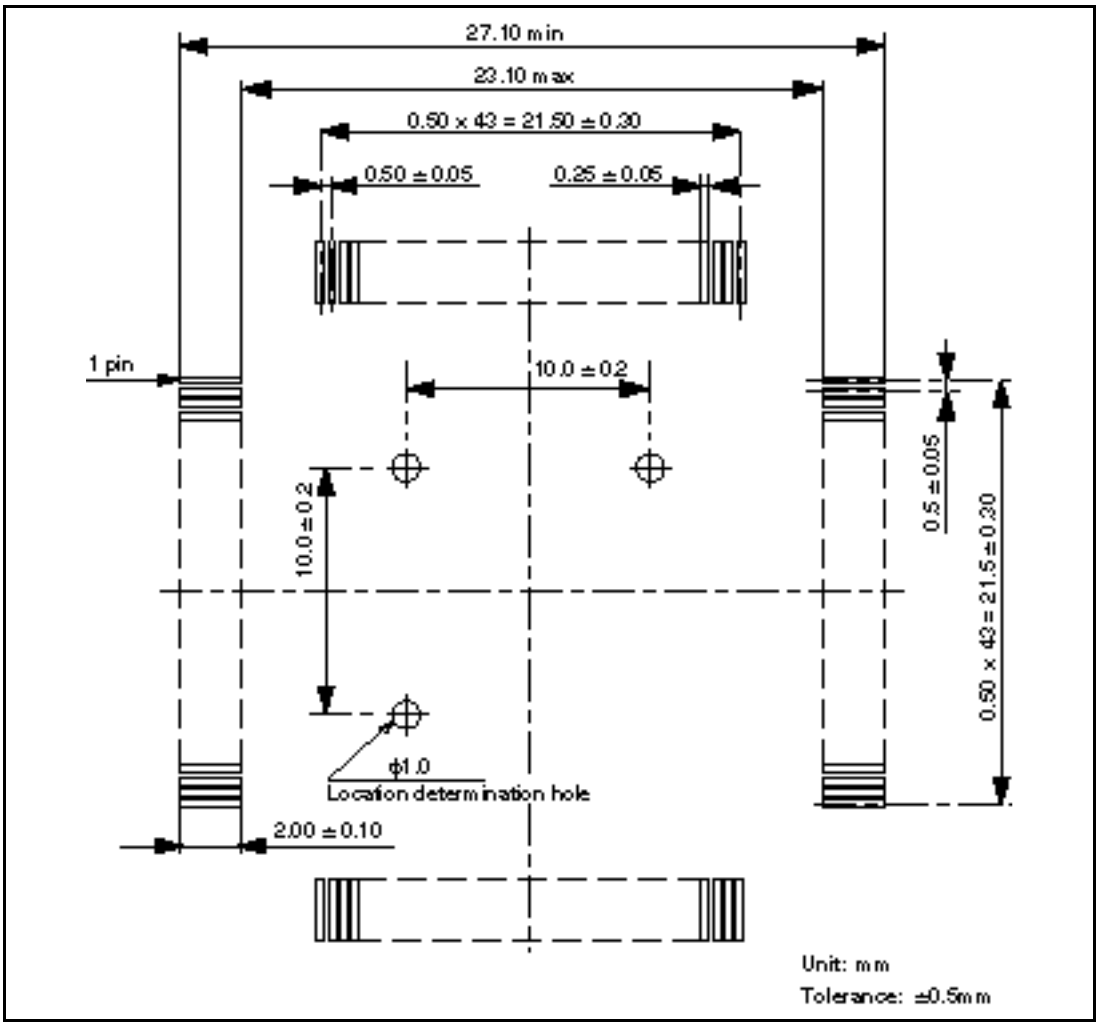


Figure 7 Recommended Dimensions for Mount Pad

2.4 Dimensions for User System Interface Cable Head

The dimensions for the user system interface cable head are shown in figure 8.

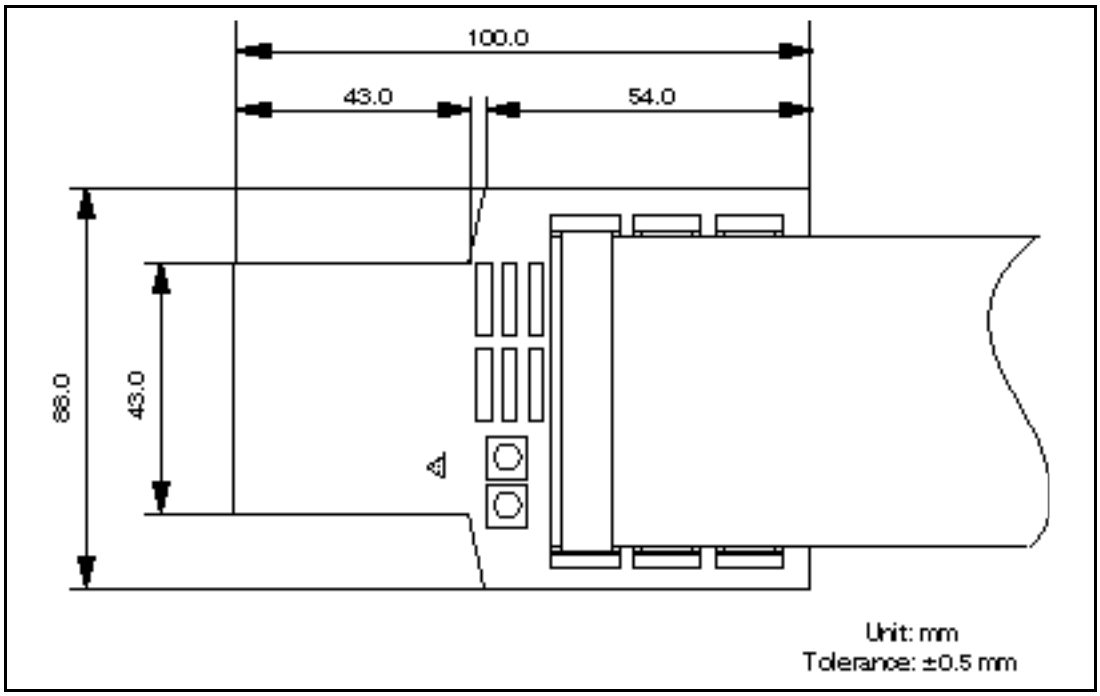


Figure 8 Dimensions for User System Interface Cable Head

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 9.

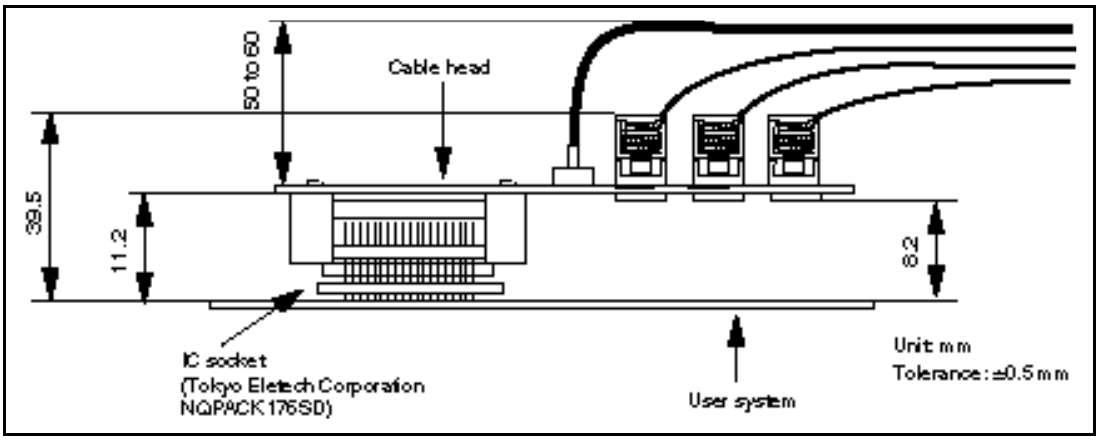


Figure 9 Resulting Dimensions after Connecting User System Interface Cable

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 10. 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.

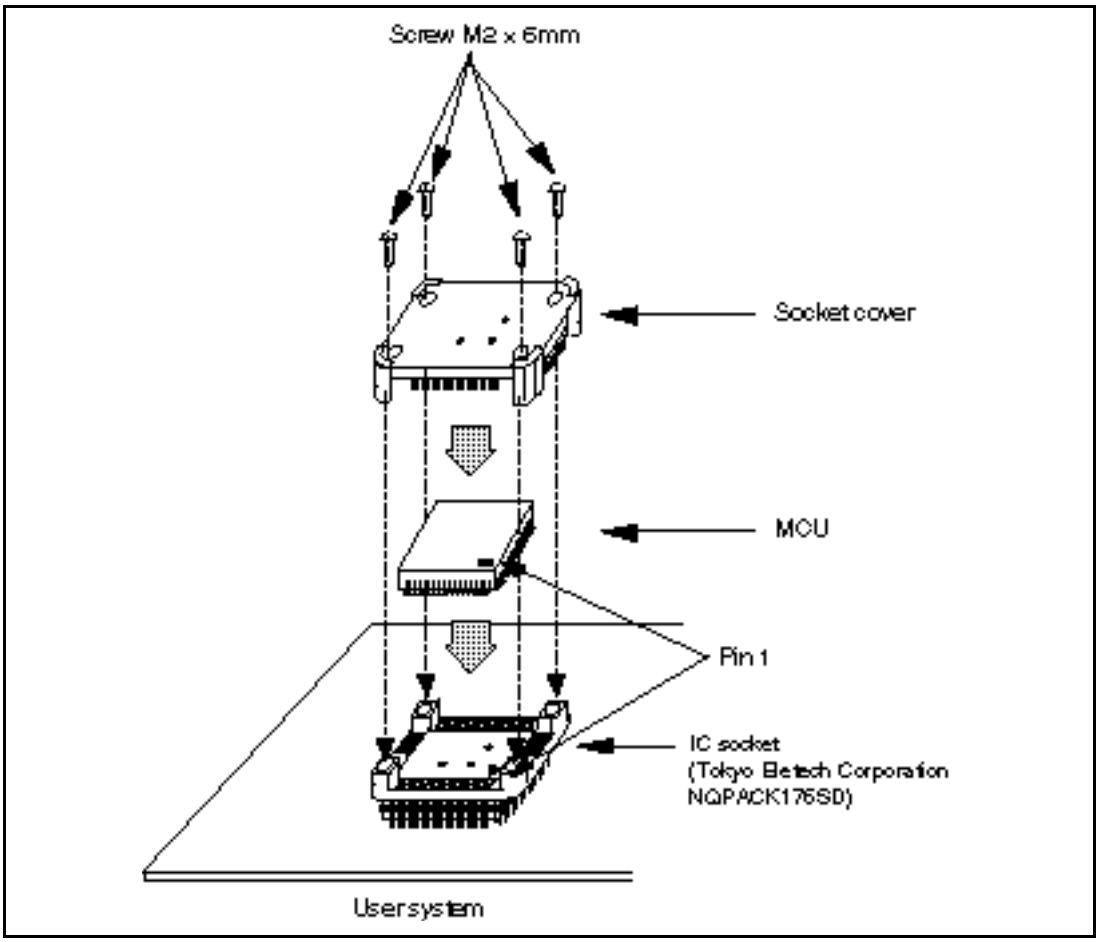


Figure 10 Installing MCU to User System

Section 4 Verifying Operation

1. When using the E8000 emulator for the SH7060, turn on the emulator according to the procedures described in the SH7060 E8000 Emulator User's Manual (HS7060EDD81HE).
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 cable supports three kinds of clock sources as the MCU clock. For details, refer to the SH7060 E8000 Emulator User's Manual (HS7060EDD81HE).
   - 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 through the EXTAL pin (pin 114) on the cable head.
   - 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.

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. Do not apply excessive force to the user system interface cable while it is connected to the user system.
3. The dimensions of the recommended mount pad for the user system IC socket are different from those of the MCU.
4. This user system interface cable is specifically designed for the HS7060EBK81H EV-chip. Do not use this cable with any other EV-chip.
5. This user system interface cable cannot be operated with a crystal oscillator mounted on the user system. To use a crystal oscillator, mount it on the crystal oscillator terminals on a side of the EV-chip.
6. When power is not supplied to the Vcc pin at the user system interface cable head, the emulator displays ** VCC DOWN. The emulator will not operate correctly.
7. While the EV-chip is connected to the user system interface cable, force must not applied to the cable head. Place the EV-chip, user system interface cable, and user system as shown in figure 11.

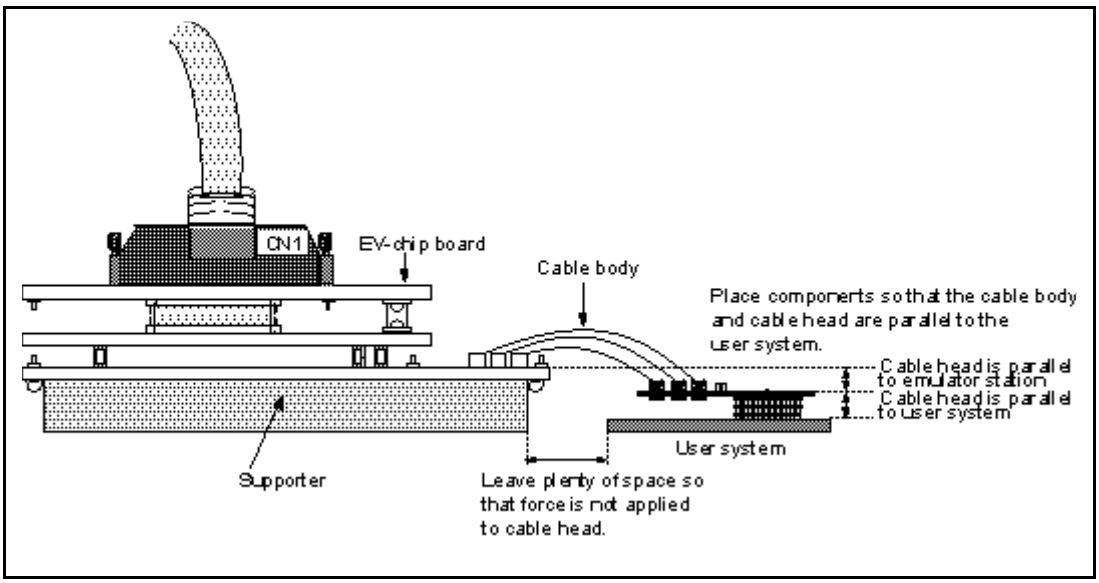


Figure 11 User System Interface Cable Location Example