CUSTOMER NOTIFICATION

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CP(K), O

QB-V850EIA4

(IECUBE for V850ES/IK1, V850E/IA3, V850E/IA4)

Preliminary User's Manual

Target Device:

V850ES/IK1

V850E/IA3

V850E/IA4

V850 Series, V850ES/IK1, V850E/IA3, V850E/IA4, and IECUBE are trademarks of NEC Electronics Corporation.

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PC/AT is a trademark of International Business Machines Corporation.

INTRODUCTION

Target Readers This manual is intended for users who design and develop application systems using the V850ES/IK1, V850E/IA3, or V850E/IA4.

Purpose The purpose of this manual is to describe the proper operation of the QB-V850EIA4, and its basic specifications.

Organization This manual is broadly divided into the following parts.

- Overview
- Setup procedure
- Cautions

How to Read This Manual

It is assumed that the reader of this manual has general knowledge in the fields of electrical engineering, logic circuits, and microcontrollers. This manual explains the basic setup procedure, so read this document before using the QB-V850EIA4.

To learn about the basic specifications and operation methods.

→ Read this manual in the order of the **CONTENTS**.

To learn about software settings such as operation methods and command functions.

→ Read the user's manual of the debugger that is used.

Conventions

Note:	Footnote for item marked with **Note** in the text.	
Caution:	Information requiring particular attention.	
Remark:	Supplementary information.	
Numeral representation:	Binary	… xxxx or xxxxB
	Decimal	… xxxx
	Hexadecimal	… xxxxH

Units for representing powers of 2 (address space or memory space):

K (kilo): 2^{10} = 1,024

M (mega): 2^{20} = $1,024^2$

Terminology The meanings of terms used in this manual are listed below.

Term	Meaning
Target device	Refers to the device targeted for emulation.
Target system	Refers to the system targeted for debugging. This includes the target program and the hardware created by the user. In the narrow sense, it means hardware only.

Related Document When using this manual, refer to the following manuals.

The related documents indicated in this publication may include preliminary versions.

However, preliminary versions are not marked as such.

- Documents related to development tools (user's manuals)

Document Name		Document Number
QB-V850EIA4		This manual
CA850 (Ver.2.50 or later) [C Compiler package]	Operation	U16053E
	C Language	U16054E
	PM plus	U16055E
	Assembly Language	U16042E
ID850QB (Ver.2.80) [Integrated debugger]	Operation Windows-Based	U16973E
SM plus (Ver.1.00) [System simulator]	Operation Windows-Based	U16906E
RX850 [Real-time OS]	Basics	U13430E
	Installation	U13410E
RX850 Pro [Real-time OS]	Fundamental	U13773E
	Installation	U13774E
RD850 [Task debugger]	Windows-Based	U13737E
RD850 Pro [Task debugger]	Windows-Based	U13916E
AZ850 [System performance analyzer]		U14410E

General cautions on handling this product

1. NEC Electronics' warranty does not cover the following cases:

- When the QB-V850EIA4 is disassembled, reconstructed, or modified by the user
- When the QB-V850EIA4 receives a heavy shock such as being dropped or falling down
- When the QB-V850EIA4 is used with excessive voltage or is stored outside the guaranteed temperature range or guaranteed humidity range
- When power is applied while the AC adapter, USB interface cable, or target system is not connected securely
- When the AC adapter cable, USB interface cable, or extension probe is excessively twisted or stretched
- When an AC adapter other than the one supplied with the QB-V850EIA4 is used
- When water is spilled on the QB-V850EIA4

2. Cautions on safe use

- The QB-V850EIA4 heats up (to approx. 50 to 60°C) when it operates for a long time. Take care not to receive injuries such as burns from a rise in the temperature.
- Be very careful to avoid electric shocks. There is risk of electric shock if the product is used as described in item 1 above.

CONTENTS

CHAPTER 1 OVERVIEW

The QB-V850EIA4 (IECUBE) is an in-circuit emulator used to emulate the V850ES/IK1, V850E/IA3, and V850E/IA4. By using IECUBE, hardware and software can be debugged efficiently in system development using the V850ES/IK1, V850E/IA3, or V850E/IA4.

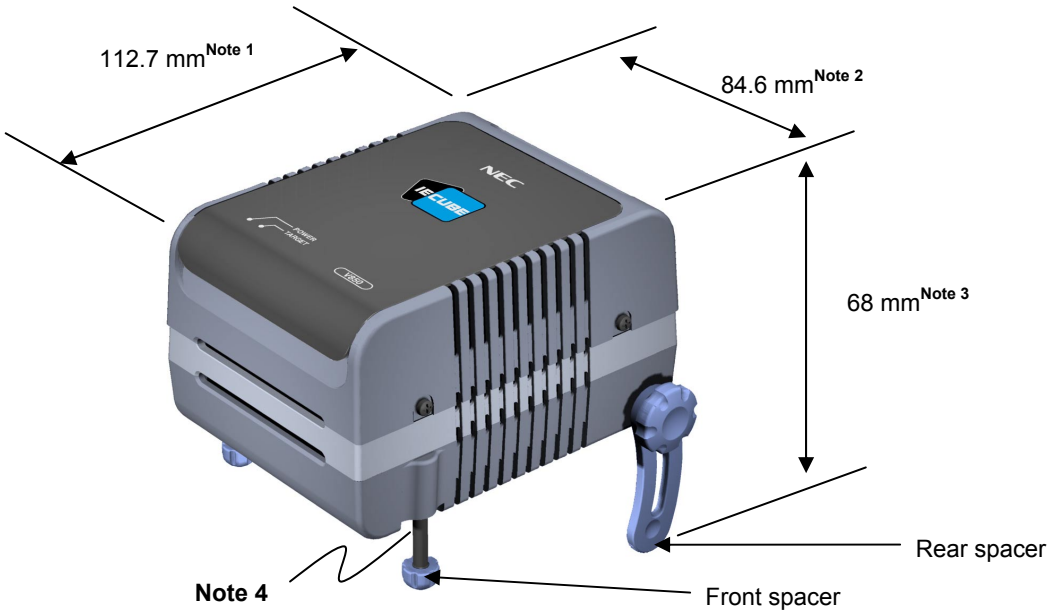
In this manual, the basic setup procedure, hardware specifications, system specifications, and switch settings are described.

This document describes the QB-V850EIA4 as IECUBE.

1.1 Hardware Specifications

Table 1-1-1. QB-V850EIA4 Hardware Specifications

Item		Specifications	
Target device		V850ES/IK1, V850E/IA3, V850E/IA4	
Target system interface voltage (unit: V)		V850ES/IK1	V_{DD} = EV_{DD} = 4.5 to 5.5 V AV_{DD} = 4.5 to 5.5 V V_{SS} = EV_{SS} = AV_{SS} = 0 V
		V850E/IA3 V850E/IA4	V_{DD} = CV_{DD} = 2.3 to 2.7 V EV_{DD} = AV_{DD} = 4.5 to 5.5 V V_{SS} = EV_{SS} = CV_{SS} = AV_{SS} = 0 V
Maximum operating frequency		When emulating V850E/IA3 or V850E/IA4: 64 MHz When emulating V850ES/IK1: 32 MHz	
Operating temperature range		0 to 40°C (without condensation)	
Storage temperature range		−15 to 60°C (without condensation)	
Package dimensions		See below.	
Power consumption	AC adapter for IECUBE	15 V, 1 A	
	Target system power supply	Lower than that of target device	
Weight		412 g	
Host interface		USB interface (1.1 and 2.0)	



Notes 1. Not including projection of power supply switch.

2. Including projection of screw for fixing rear spacer

3. Shortest dimension for the rear spacer (98 mm max.)

4. The front spacer dimension is variable between 20 mm (max.) and 5 mm (min.)

1.2 System Specifications

The system specifications of the QB-V850EIA4 are shown below.

Table 1-2-1. QB-V850EIA4 System Specifications

Item		Specifications
Emulation memory capacity	Internal ROM	1 MB max.
	Internal RAM	60 KB max.
	External memory	Optional (under development)
Program execution function	Real-time execution function	Go, Start From Here, Go & Go, Come Here, Restart, Return Out
	Non-real-time execution function	Step In, Next Over, Slow Motion
Break function	Hardware break	Execution: 10 points Access: 6 points
	Software break	2000 points
	Fail-safe break	Non-map, I/O illegal, write protect
	Other	Trace full break, Manual Break, Timer Over Flow Break
Trace function	Trace data type	Branch source PC, branch destination PC, all PCs, all execution data, access data, access address, R/W status, time stamp, DMA point (start/end)
	Trace mode	Speed Priority, Trace Priority
	Trace event	Delay trigger, section, qualify
	Memory capacity	256 frames
Real-time RAM monitor function		256 bytes × 8 points
Time measurement function	Measurement clock	Measurement-dedicated clock or CPU clock
	Measurement target	Program execution start to end Start event to end event
	Maximum measurement time	About 195 hours (when measurement-dedicated clock is used)
	Minimum resolution	20 ns
	Number of timers used for measurement	8
	Measurement result	Execution time (execution start to end) Max., min., Average, pass count (between events)
	Other	Timer overflow break function (1 point)
Coverage function		Optional (under development)
Other functions		Mapping function, event function, register manipulation function, memory manipulation function

Caution Some of the functions may not be supported, depending on the debugger used.

1.3 System Configuration

The system configuration when connecting the QB-V850ESSX to a PC (PC-9800 series or PC/AT compatible) is shown below. Connection is possible without optional products.

Connectors <6> to <11> vary depending on the target device to be emulated.

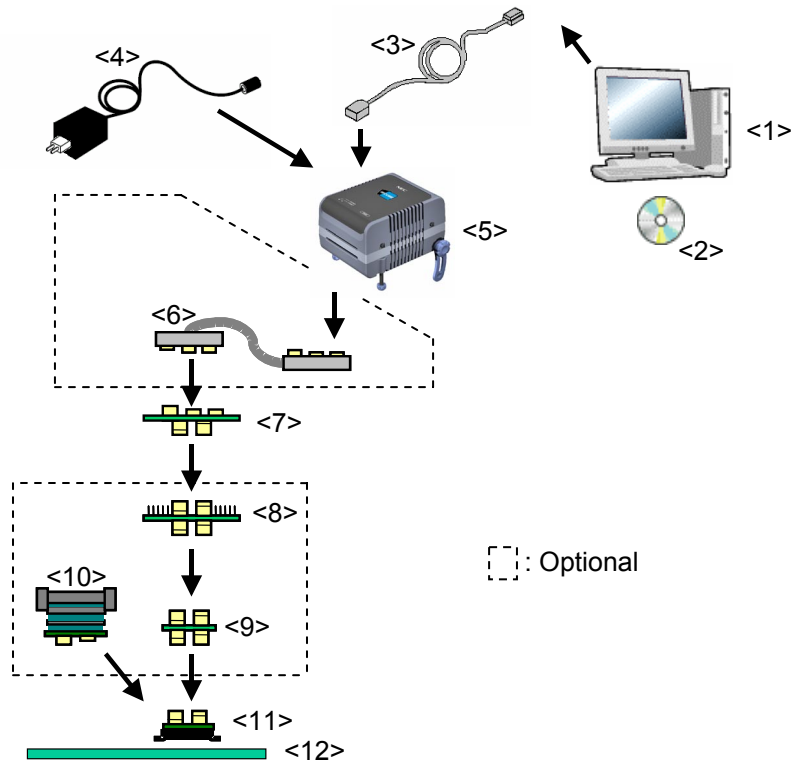


Figure 1-3-1. System Configuration

<1> Host machine: PC-9821 series or IBM PC/AT compatible machine can be used

<2> ID850QB Disk, Accessory Disk[Note 1]: Includes debugger, USB driver, manual, etc.

<3> USB interface cable: Cable used to connect the host machine and the QB-V850EIA4

<4> AC adapter: Voltages from 100 to 240 V can be used by exchanging the AC plug

<5> QB-V850EIA4: This product

<6> Extension probe (coaxial type) (optional)

<7> Exchange adapter: Adapter used to convert pins

<8> Check pin adapter (optional): Adapter used for monitoring waveforms using an oscilloscope[Note 2]

<9> Spacer adapter (optional): Adapter used to adjust the height[Note 2]

<10> Mounting adapter (optional): Adapter used to mount the target device in the socket

<11> Target connector: Connector used to solder the emulator on the target system

<12> Target system

Notes 1. Download the device from the NEC Electronics web site.

URL: http://www.necel.com/micro/ods/jpn/index.html

2. <8> and <9> can also be used in the reverse position.

Table 1-3-1. List of Probes and Connectors for Each Target Device

No.	Name	Target Device to Be Emulated			
		V850ES/IK1 (64-Pin GC)	V850E/IA3 (80-Pin GC)	V850E/IA4 (100-Pin GC)	V850E/IA4 (100-Pin GF)
<6>	Extension probe (coaxial type)	QB-144-EP-01S (sold separately)			
<7>	Exchange adapter	QB-64GC-EA-01S (sold separately)Note	QB-80GC-EA-01S (sold separately)Note	QB-100GC-EA-02S (sold separately)Note	QB-100GF-EA-02S (sold separately)Note
<8>	Check pin adapter	QB-64-CA-01S (sold separately)	QB-80-CA-01S (sold separately)	QB-100-CA-01S (sold separately)	
<9>	Spacer adapter	QB-64-SA-01S (sold separately)	QB-80-SA-01S (sold separately)	QB-100-SA-01S (sold separately)	
<10>	Mounting adapter	QB-64GC-MA-01S (sold separately)	QB-08GC-MA-01S (sold separately)	QB-100GC-MA-01S (sold separately)	QB-100GF-MA-01S (sold separately)
<11>	Target connector	QB-64GC-TC-01S (sold separately)Note	QB-08GC-TC-01S (sold separately)Note	QB-100GC-TC-01S (sold separately)Note	QB-100GF-TC-01S (sold separately)Note

Note The accessories included with this product are as shown below.

- When QB-V850EIA4-ZZZ is ordered:

  The exchange adapter and target connector are not included.

- When QB-V850EIA4-S100GC is ordered:

  The QB-100GC-EA-02S and QB-100GC-TC-01S are included.

- When QB-V850EIA4-S100GF is ordered:

  The QB-100GF-EA-02S and QB-100GF-TC-01S are included.

- When QB-V850EIA4-S80GC is ordered:

  The QB-80GC-EA-01S and QB-80GC-TC-01S are included.

- When QB-V850EIA4-S64GC is ordered:

  The QB-64GC-EA-01S and QB-64GC-TC-01S are included.

1.4 Packing Contents

The packing box of the QB-V850EIA4 contains the following. Make sure that these items are included.

♦ Items included with QB-V850EIA4-ZZZ

(1) QB-V850EIA4

(2) AC adapter

(3) USB interface cable

(4) ID850QB Disk (CD-ROM)

(5) Accessory Disk (CD-ROM)

(6) IECUBE setup manual (Japanese/English)

(7) User registration card/software agreement

(8) PG-FPL (Flashpro Lite)

(9) Probe holder

(10) Parts board (for clock)

♦ Items included with QB-V850EIA4-S100GC

(1) to (10)

(11) Exchange adapter QB-100GC-EA-02S

(12) Target connector QB-100GC-TC-01S

♦ Items included with QB-V850EIA4-S100GF

(1) to (10)

(11) Exchange adapter QB-100GF-EA-02S

(12) Target connector QB-100GF-TC-01S

♦ Items included with QB-V850EIA4-S80GC

(1) to (10)

(11) Exchange adapter QB-80GC-EA-01S

(12) Target connector QB-80GC-TC-01S

♦ Items included with QB-V850EIA4-S64GC

(1) to (10)

(11) Exchange adapter QB-64GC-EA-01S

(12) Target connector QB-64GC-TC-01S

CHAPTER 2 SETUP PROCEDURE

This chapter describes the procedure for setting up the QB-V850EIA4.

Perform setup using the following procedure.

See **2.1 Names and Functions of Hardware** for the positions of jumpers and clocks.

Clock settings

An 8 MHz resonator is mounted at shipment.

There is no need to change the setting when an 8 MHz resonator can be used without problem.

See **2.2 Removing Acrylic Board** and **2.3 Clock Settings** when changing the resonator.

↓

Target device setting

It is assumed that the IECUBE target device is the V850E/IA3 or V850E/IA4 at shipment.

There is no need to change the setting when emulating the V850E/IA3 or V850E/IA4.

See **2.2 Removing Acrylic Board** and **2.4 Target Device Settings** when using as the V850ES/IK1.

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Software setup

See **2.5 Software Setup**.

↓

Mounting and connecting connectors

See **2.6 Mounting and Connecting Connectors**.

↓

Connecting IECUBE to target system

See **2.7 Connecting IECUBE to target system**.

- When extension probe (QB-144-EP-01S) is used: See **2.7.1**.
- When extension probe (QB-144-EP-01S) is not used: See **2.7.2**.

↓

Connecting USB interface cable and AC adapter

See **2.8 Connecting USB Interface Cable and AC Adapter**.

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Power application/shutdown

See **2.9 Power application/shutdown**.

2.1 Names and Functions of Hardware

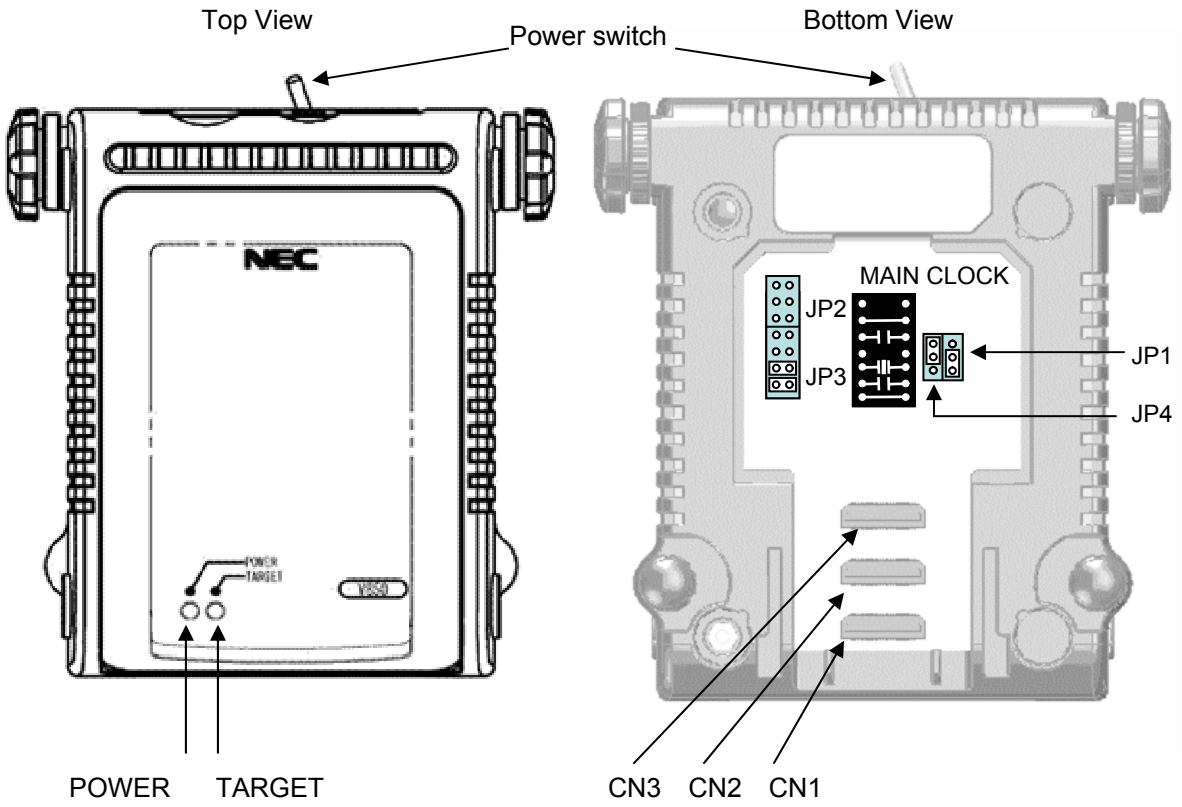


Figure 2-1-1. Names and Functions in QB-V850EIA4

(1) CN1, CN2, CN3

These are connectors used to connect the exchange adapter or extension probe.

(2) MAIN CLOCK (for clock)

This is a socket used for mounting the main clock.

An 8 MHz resonator and capacitors, etc., that configure an oscillator circuit are mounted at shipment.

(See **2.3 Clock Settings** for details.)

(3) JP1

This is a jumper whose setting should be changed in accordance with operating frequency used.

It is 1-2 shorted at shipment.

(See **2.3 Clock Settings** for details.)

(4) JP2

This is a jumper used for shipment inspection. Use the default setting (all switches are left open).

(5) JP3

This is a jumper whose setting should be changed in accordance with the clock mounted in the MAIN CLOCK block. It is 1-2 shorted, 3-4 shorted, 5-6 open, and 7-8 open at shipment.

(See **2.3 Clock Settings** for details.)

(6) JP4

This is a jumper whose setting should be changed in accordance with the target device used.

It is 2-3 shorted at shipment.

(See **2.4 Target Device Settings** for details.)

(7) POWER (red LED)

This is an LED that indicates whether or not the power to IECUBE is on.

LED Status	IECUBE Status
Lit	The power supply is on.
Extinguished	The power supply is off, or the AC adapter is not connected to IECUBE.
Blinking	An error has occurred internally. (Contact an NEC Electronics sales representative or distributor.)

(8) TARGET (green LED)

This is an LED that indicates whether or not the power to the target system is on.

LED Status	Target System Status
Lit	The power supply to the target system is on.
Extinguished	The power supply to the target system is off, or the target system is not connected.

(9) Power supply switch

This is a power switch for IECUBE. This switch is turned off at shipment.

2.2 Removing Acrylic Board

Remove the acrylic board on the bottom surface of IECUBE before changing the settings of jumpers or clocks.

The acrylic board can be removed by pulling it up.

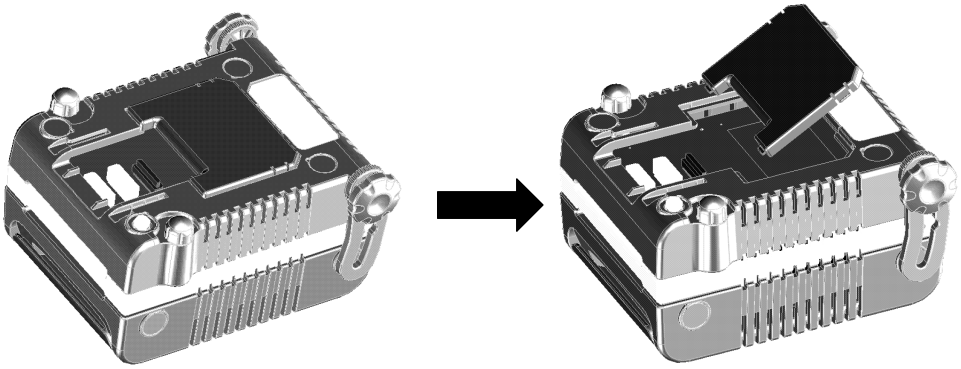


Figure 2-2-1. Removing Acrylic Board

2.3 Clock Settings

2.3.1 Overview of clock settings

Five methods are available for setting the clock.

See **2.3.2 How to set clock** for details.

(1) Use the 8 MHz resonator mounted on IECUBE (factory setting).

(2) Mount and use a resonator with a frequency of more than 6.875 MHz but not exceeding 8 MHz on IECUBE.

(3) Mount and use a resonator with a frequency of more than 4 MHz but not exceeding 6.875 MHz on IECUBE.

(4) Mount and use an oscillator with a frequency of more than 6.875 MHz but not exceeding 8 MHz on IECUBE.

(5) Mount and use an oscillator with a frequency of more than 4 MHz but not exceeding 6.875 MHz on IECUBE.

- **IECUBE does not support clock input from the target system.**

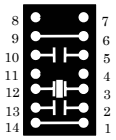
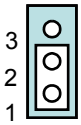
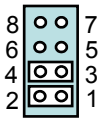
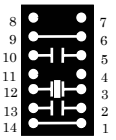
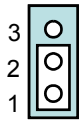
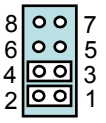
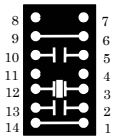
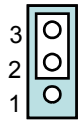
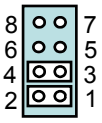
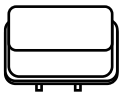
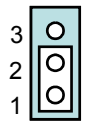
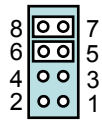
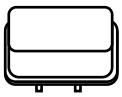
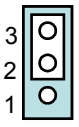
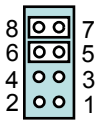
- **Clock when emulating V850ES/IK1**

  Mount a clock with a frequency twice that actually used in the MAIN CLOCK block of IECUBE. When operating at 32 MHz, for example, mount an 8 MHz clock in the MAIN CLOCK block.

2.3.2 How to set clock

A list of hardware settings for when the clock is set is shown in Table 2-3-1.

Table 2-3-1. List of Hardware Settings When Clock Is Set

Clock to Be Used	MAIN CLOCK	JP1 Setting	State of PLLSIN Pin in V850E/IA3, V850E/IA4	JP3 Setting
Use the 8 MHz resonator mounted on IECUBE (factory setting).	 (Factory setting)	 1-2: Shorted (Factory setting)	High	 7-8: Leave open 5-6: Leave open 3-4: Shorted 1-2: Shorted (Factory setting)
Mount a resonator with a frequency of more than 6.875 MHz but not exceeding 8 MHz on IECUBE and use it.	 Use the supplied parts board.	 1-2: Shorted (Factory setting)	High	 7-8: Leave open 5-6: Leave open 3-4: Shorted 1-2: Shorted (Factory setting)
Mount a resonator with a frequency of more than 4 MHz but not exceeding 6.875 MHz on IECUBE and use it.	 Use the supplied parts board.	 2-3: Shorted	Low	 7-8: Leave open 5-6: Leave open 3-4: Shorted 1-2: Shorted (Factory setting)
Mount an oscillator with a frequency of more than 6.875 MHz but not exceeding 8 MHz on IECUBE and use it.	 Use the 8-pin or 14-pin oscillator for 5 V specification.	 1-2: Shorted (Factory setting)	High	 7-8: Shorted 5-6: Shorted 3-4: Leave open 1-2: Leave open
Mount an oscillator with a frequency of more than 4 MHz but not exceeding 6.875 MHz on IECUBE and use it.	 Use the 8-pin or 14-pin oscillator for 5 V specification.	 2-3: Shorted	Low	 7-8: Shorted 5-6: Shorted 3-4: Leave open 1-2: Leave open

* Settings other than above are prohibited.

2.3.3 How to change resonator

(1) Remove the parts board mounted on the MAIN CLOCK block before changing the resonator.

(2) Solder-mount the resonator and capacitor on the parts board supplied with IECUBE as follows.

Pin 1-14: Must be shorted.
Pin 2-13: Mount the capacitor.
Pin 3-12: Mount the resonator.
Pin 4-11: Leave open.
Pin 5-10: Mount the capacitor.
Pin 6-9: Must be shorted.
Pin 7-8: Leave open.

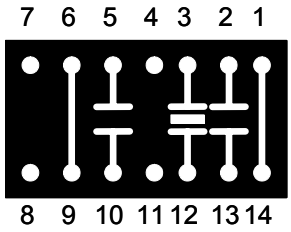


Figure 2-3-1. Parts Board Setting

(3) Insert parts board in the IECUBE.

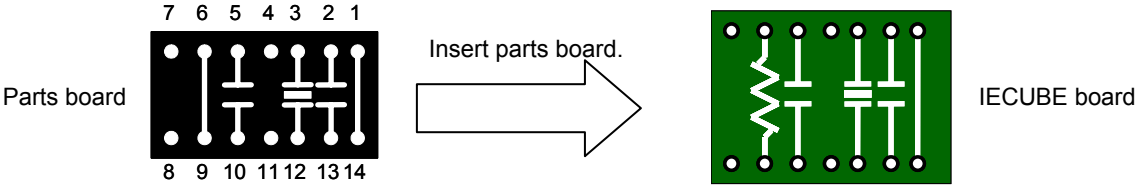


Figure 2-3-2. Inserting Parts Board in IECUBE

2.3.4 How to mount oscillator

(1) Remove the parts board mounted in the MAIN CLOCK block before replacing the clock with the oscillator.

(2) Mount the oscillator in the socket on the MAIN CLOCK block as shown below.

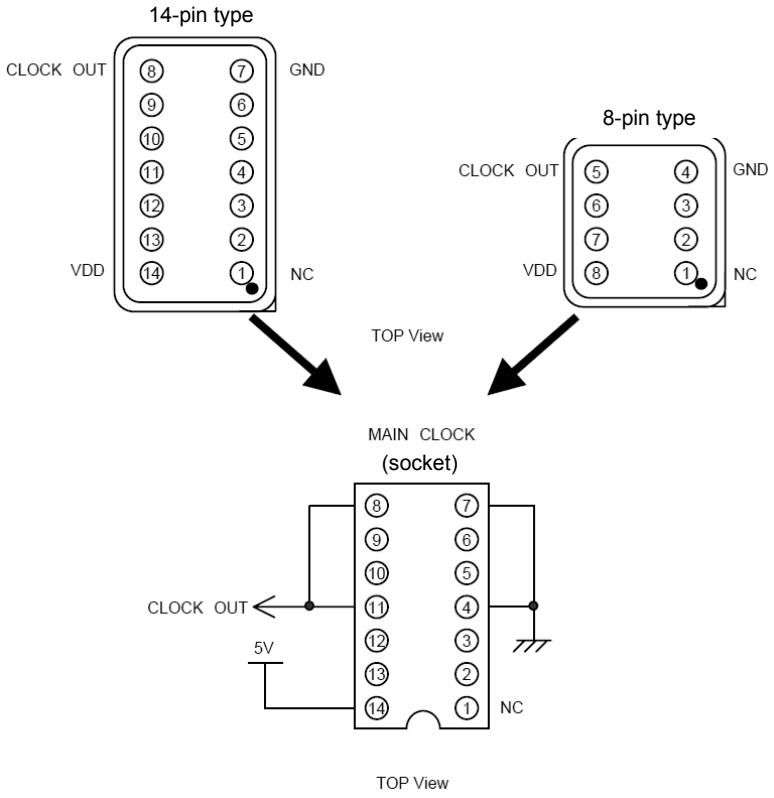


Figure 2-3-3. Mounting MAIN CLOCK

When mounting an 8-pin type crystal oscillator, align the position of pin 1 of the oscillator to that of the MAIN CLOCK socket, and the position of pin 8 of the oscillator to the position of pin 14 of the MAIN CLOCK socket.

2.4 Target Device Settings

The JP4 setting varies depending on the target device.

When emulating V850ES/IK1: 1-2 shorted

When emulating V850E/IA3, V850E/IA4: 2-3 shorted (factory setting)

Settings other than above are prohibited.

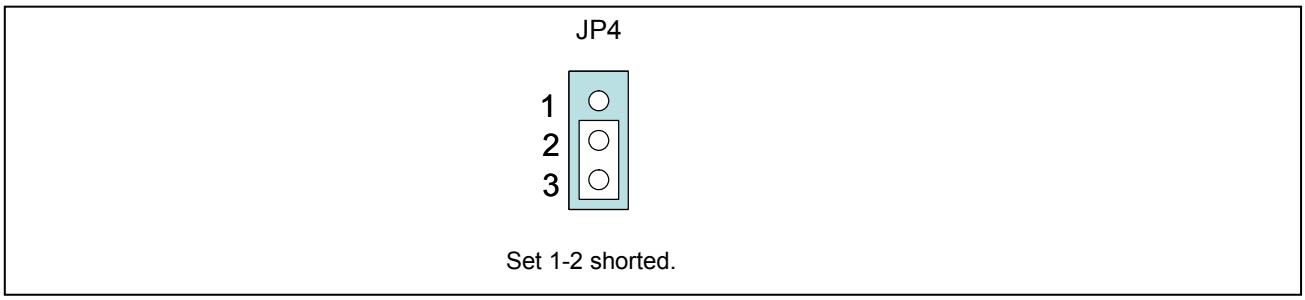


Figure 2-4-1. JP4 Setting When Using V850ES/IK1

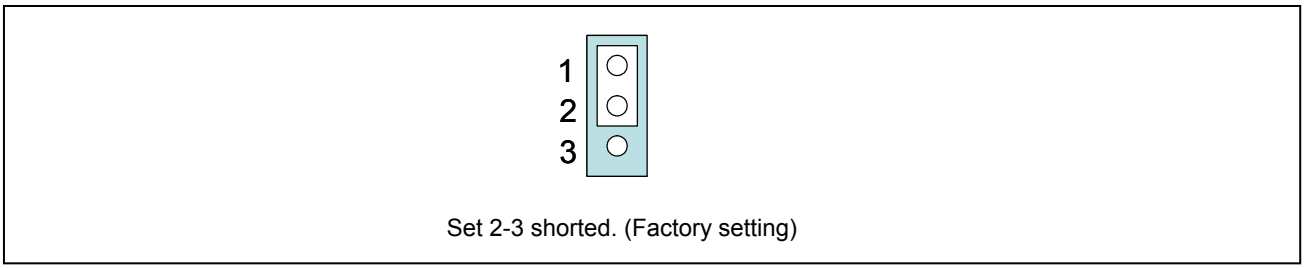


Figure 2-4-2. JP4 Setting When Using V850E/IA3 or V850E/IA4

2.5 Software Setup

2.5.1 When ID850QB debugger is used

See the document “ID850QB Operating Precautions” attached to the ID850QB debugger for details.

2.5.2 When a debugger other than ID850QB (such as Multi) is used

See the user’s manual of the debugger to be used and the IECUBE Setup Manual.

2.6 Mounting and Connecting Connectors

This section explains how to connect IECUBE and the target system.

Be sure to turn off the power supply to IECUBE and the target system before connection.

The following symbols are used in this section.

TC: Target connector

EA: Exchange adapter

MA: Mounting adapter

CA: Check pin adapter

SA: Spacer adapter

2.6.1 Mounting target connector (TC) on target system

(1) Apply cream solder to the foot pattern for mounting the IC on the target system.

(2) TC has a cylindrical projection in the center of the underside (Figure 2-6-1). Apply a two-component hardening type epoxy adhesive agent (a type that hardens in 15 to 30 minutes) sparingly to the underside of the projection to temporarily secure the connector at the specified location on the target system. Make sure that the position of pin 1 of the connector (where the corner is cut) matches the position of pin 1 on the target board.

(3) TC mounting conditions

(a) To mount TC by reflow: 245°C × 20 seconds max. (heating)

(b) To mount TC by manual soldering: 320°C × 5 seconds max. (per pin)

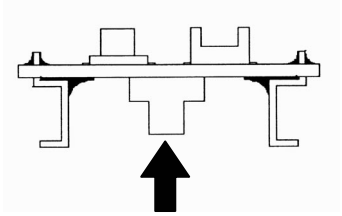


Figure 2-6-1. TC Projection Diagram

(4) Note on flux splashing

The flux splashing that takes place while the connector is being mounted often results in defective conduction. Be sure to cover the upper part of the connector with aluminum foil. **Do not clean the flux because the structure of the connector easily allows cleaner to enter.**

2.6.2 Inserting exchange adapter (EA) in TC

(1) Insert EA, MA, CA, or SA in target connector (TC) so that the position of pin 1 (where the corner is cut) on each board matches.

(a) When TC is inserted or removed, hold TC with your fingers so that no excessive force is applied to the connector.

(b) Remove or insert the adapter in the correct direction. (Figure 2-6-2)

Use a bamboo spit or similar object as a tool to remove the connector. Insert the tool between TC and EA and remove TC in the correction direction as shown in Figure 2-6-2. If force is applied to the connector in the wrong direction, the connector will be damaged.

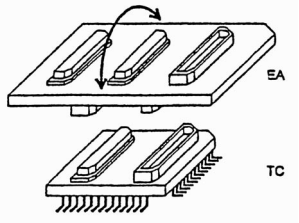


Figure 2-6-2. How to Insert/Remove EA and TC

2.6.3 General cautions on using TC, EA, MA, CA, and SA

(1) Causes of faulty contact of connector

(a) If flux gets inside TC when it is mounted

Thoroughly clean the flux with a solvent such as alcohol. Cleaning must be performed at least 5 to 6 times. If conduction is still not stable, repeat cleaning.

(b) If waste gets inside the connector

If waste, such as threads, gets inside the connector, defective conduction occurs. Remove any waste with a brush.

(c) Cautions on using CA and SA

When CA and SA are inserted, a very small amount of delay and capacitance occur in the signal propagation. Thoroughly evaluate these points after CA and SA are connected to the target system.

(2) Note on inserting or removing connector

(a) Be sure to hold the lower (mating) connector or board with your fingers when inserting or removing the connector.

(b) Be sure to insert or remove the connector in the correct direction (so that the positions match).

If the connector is inserted in a position that does not match the board direction, the connector may be damaged.

(c) When disconnecting the connector, use a thin bamboo or wooded stick as a leverage to protect the socket from being damaged. Do not remove the connector all at once, but do so little by little, shifting the leverage from one place to another.

If only a metallic object such as a screwdriver is available as a leverage, wrap its tip in a soft cloth.

2.7 Connecting IECUBE to Target System

2.7.1 Connection without using extension probe (QB-144-EP-01S)

IECUBE can be connected to the target system without using the extension probe.

When connecting IECUBE and the target system, adjust the height of IECUBE using the rear spacer so that no stress is applied to the exchange adapter and target connector.

In addition, take care to maintain insulation with the target system.

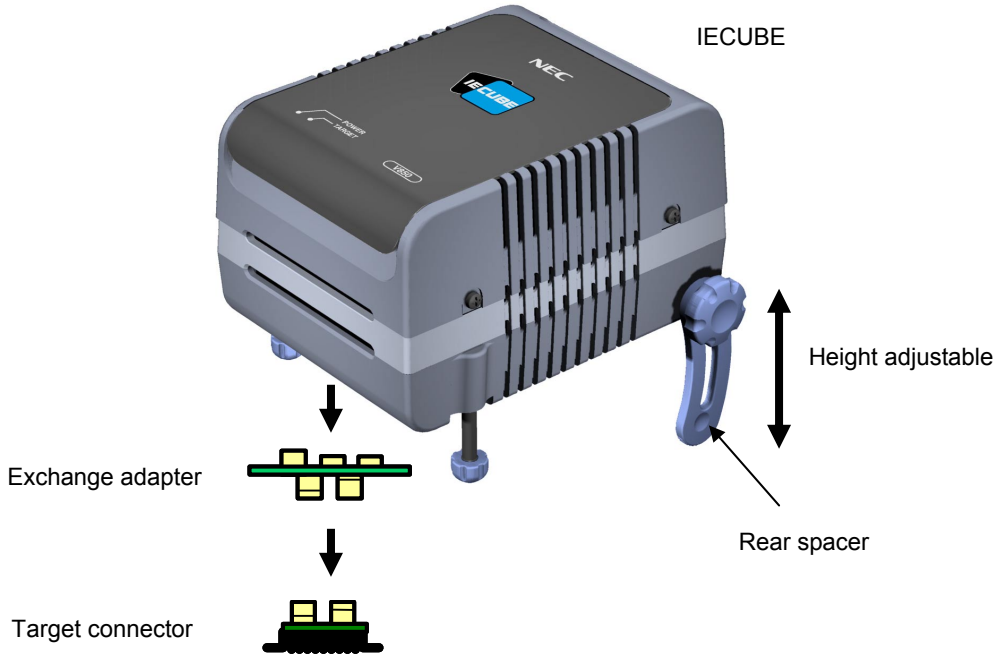


Figure 2-7-1. Connection Without Using Extension Probe

2.7.2 Connection using extension probe (QB-144-EP-01S)

When using the extension probe (QB-144-EP-01S), connect IECUBE and the target system using the following procedure.

(1) Connecting probe holder

Use the probe holder (included with IECUBE) for connecting the extension probe to IECUBE. How to connect is shown below.

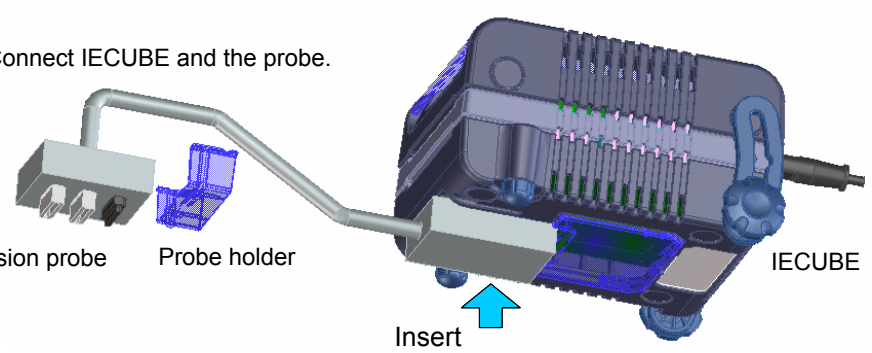


Figure 2-7-2. How to Use Probe Holder

(2) Connecting extension probe GND lines

The extension probe has three GND lines. Connect these lines to IECUBE and the target system using the following procedure.

<1> Fix a GND line of the extension probe to the nut on the bottom surface of IECUBE using a #0 or #1 precision cross-headed screwdriver. (Connection of **A** and **B** in Figure 2-7-3)

<2> Insert the connector on the top surface of the extension probe in the connector at the bottom opening of IECUBE from the lower side. Take care with the direction. (Connection of **C** and IECUBE in Figure 2-7-3)

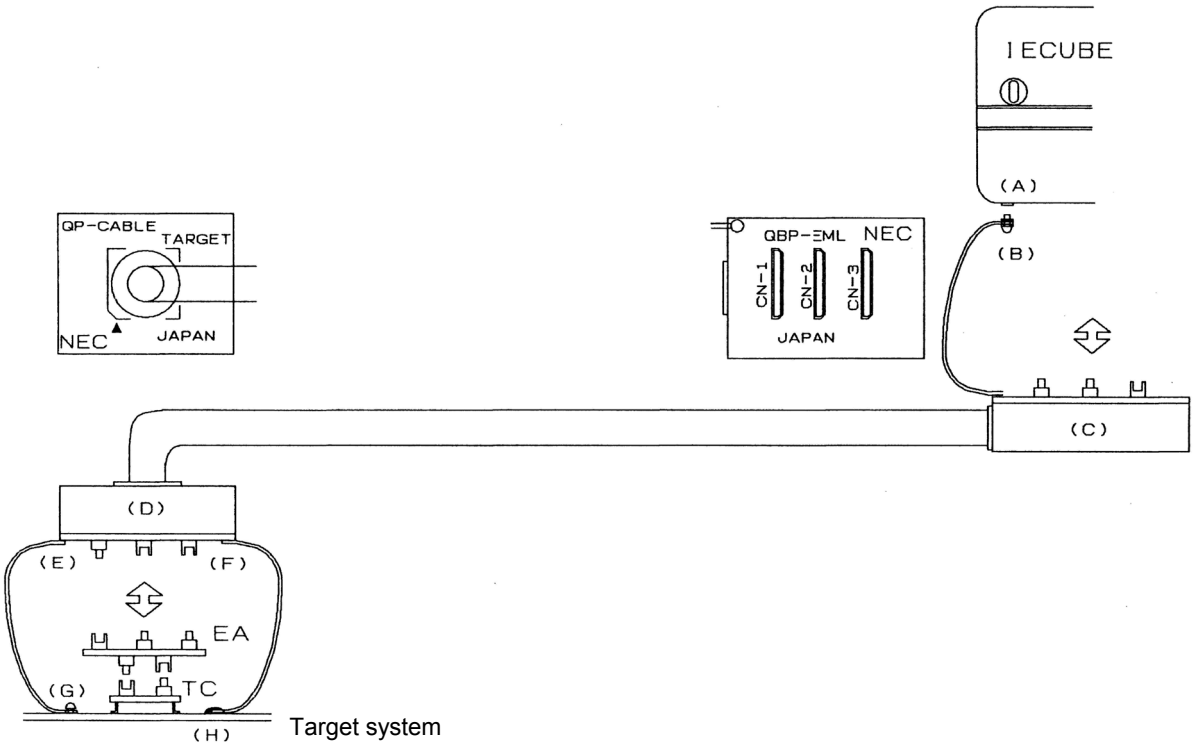


Figure 2-7-3. Connection of GND Lines

<3> Connect the exchange adapter and extension probe to the target connector.

<4> Connect two GND lines of the extension probe on the target system side to the GND block of the target system. If the pin or screw is fixed on the GND block of the target system, remove the transparent pin cover at the top of the GND line and fix the Y-branch pin of the GND line to the target system (**G** in Figure 2-7-3). In the same manner, if the GND pad on the target system is exposed, fix the Y-branch pin to the pad on the target system by soldering (**H** in Figure 2-7-3). (Recommended iron temperature: 300°C)

<5> If there is only one GND connector on the target system, connect one side and cut off the other GND lines using nippers, or leave it as is without removing the pin cover.

<6> The length of the GND line shank (insulation block) is approximately 60 mm. Therefore, as shown in Figure 2-7-4, at least one connectable GND is necessary within a radius of approximately 60 mm from the three locations on the extension probe at which the target system is connected. The GND lines on the emulation probe are soldered at the position of **J** and **K** in Figure 2-7-4. When soldering the GND line at the position of **L**, remove a GND line soldered at J or K and solder it at **L**.

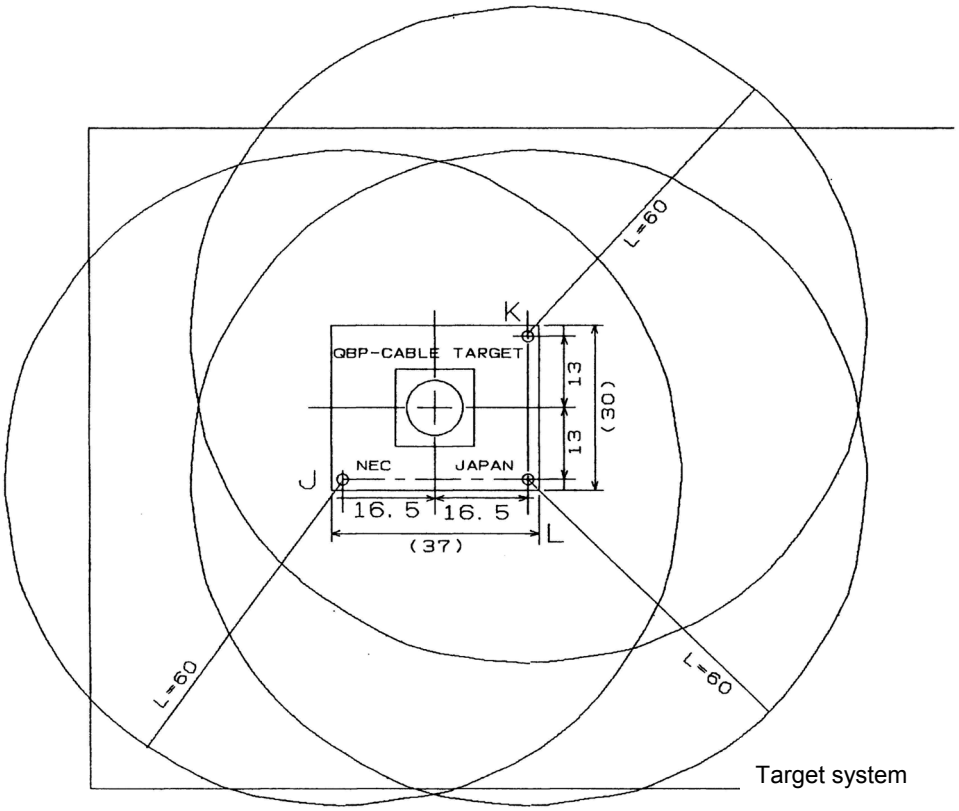


Figure 2-7-4. Location at Which GND Line Can Be Connected

(3) Maintaining insulation

When IECUBE and the target system are connected using the extension probe, adjust the height of IECUBE using the front spacer and rear spacer in order to maintain insulation with the target system.

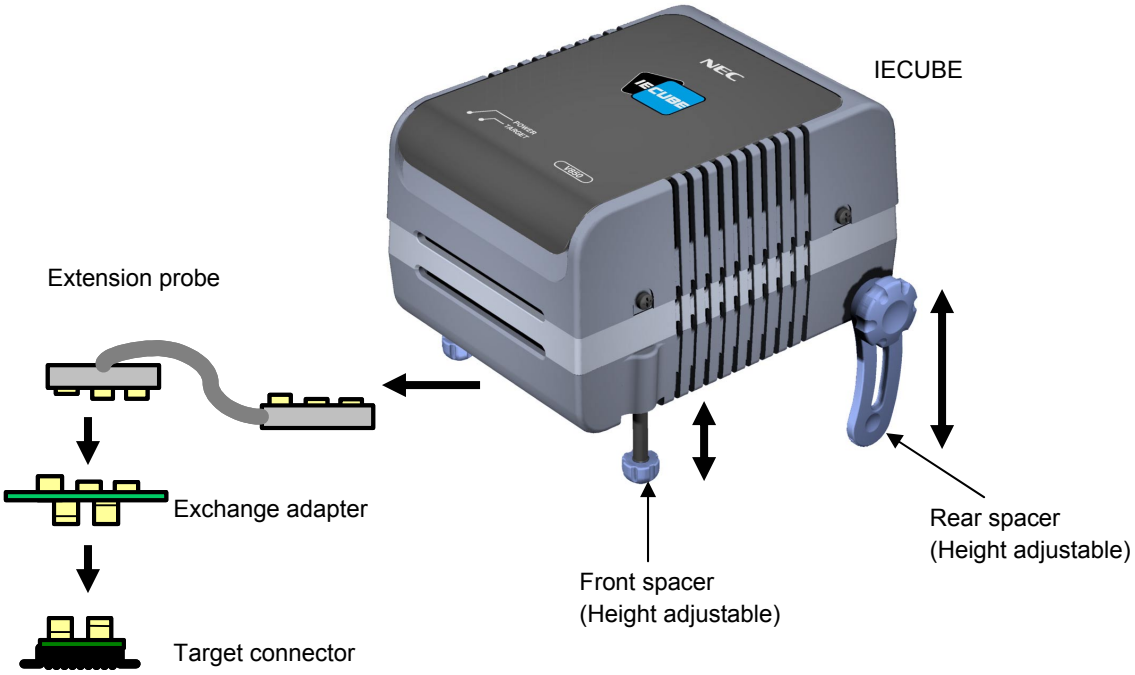


Figure 2-7-5. Connection When Using Extension Probe

(4) Cautions on using extension probe

Note the following points when using the extension probe.

- Be careful so that stress from the extension probe is not applied to the target connector. Hold the exchange adapter with your fingers when removing it so that no stress is applied to the target connector.
- Be sure to connect the GND line of the extension probe to IECUBE and the target system; otherwise the impedance of the cable becomes unstable, which may cause degradation of the signal transmission characteristics or distortion of the output waveform with respect to the input waveform.
- If the external bus interface is used when the extension probe is used, increase the data wait by one. (Increase the value set to the DWC register by one.)

2.8 Connecting USB Interface Cable and AC Adapter

Connect the computer and IECUBE using the USB interface cable supplied with IECUBE.

Insert the power supply connector on the rear side of IECUBE and insert the AC adapter plug supplied with IECUBE in the outlet. See **Figure 2-8-1** for the connector position of IECUBE.

The AC adapter can support voltages from 100 V to 240 V by exchanging the AC plug. A 100 V AC plug is mounted at shipment. To use IECUBE with 220 V or 240 V, exchange the AC plug for one that supports 220 V or 240 V (both included with IECUBE).

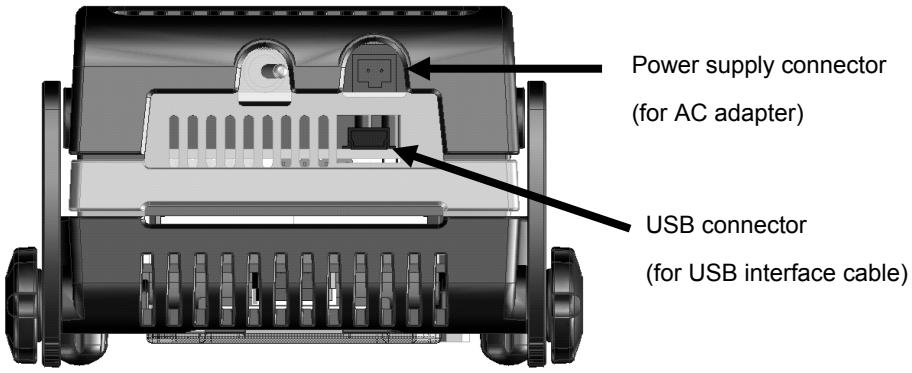


Figure 2-8-1. Connector Position

2.9 Power Application/Shutdown

Be sure follow the sequence shown below when activating or terminating the emulator; **otherwise the target system or IECUBE may be damaged**.

- When activating the emulator:

  Apply power to IECUBE → Apply power to the target system[Note] → Activates the debugger

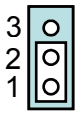
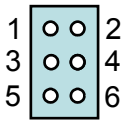
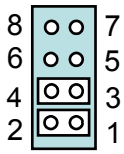
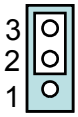
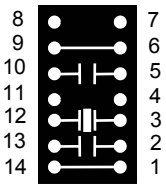
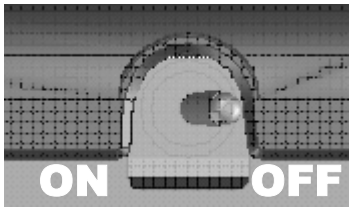
- When terminating the emulator:

  Terminate the debugger → Shut down power to the target system→ Shut down power to IECUBE

Note This step is not required when the target system is not connected.

CHAPTER 3 LIST OF FACTORY SETTINGS

Table 3-1-1. List of Factory Settings

Item	Settings	Remark
JP1		This switch is set to 1-2 shorted (when the operating frequency is higher than 6.875 MHz but not exceeding 8 MHz). When the operating frequency is higher than 4 MHz but not exceeding 6.875 MHz, change the setting to 2-3 shorted. See **2.3 Clock Settings** for details.
JP2		All pins are left open. Do not change this setting.
JP3		This switch is set to 1-2 and 3-4 shorted, 5-6 and 7-8 open at shipment. See **2.3 Clock Settings** for details.
JP4		This switch is set to 2-3 shorted (when the target device is the V850E/IA3 or V850E/IA4). When the target device is the V850ES/IK1, change the setting to 1-2 shorted. See **2.4 Target Device Settings** for details.
MAIN CLOCK		An 8 MHz resonator is mounted at the 3-12 pins. A 27 pF capacitor is mounted at the 2-13 pins and 5-10 pins. The frequency can be changed by configuring an oscillator on the parts board supplied with IECUBE. See **2.3 Clock Settings** for details.
Power supply switch		This switch is turned off at shipment.

CHAPTER 4 DIFFERENCES BETWEEN TARGET DEVICES AND TARGET INTERFACE CIRCUITS

This chapter describes the differences between the signal lines of the target device and these of the QB-V850EIA4's target interface circuit.

The target device consists of CMOS circuits, whereas the QB-V850EIA4's target interface circuit consists of emulation circuits such as the emulation CPU, TTL, and CMOS-IC.

At the time of debugging by connecting IECUBE and the target system, IECUBE performs the emulation as if the actual target device is operating on the target system, however, in reality, it is the IE system that performs the emulation, thus producing a slight differences.

The target interface of IECUBE is any of equivalent circuits A to K on the following pages.

Tables 4-1 to 4-4 show each target interface connection.

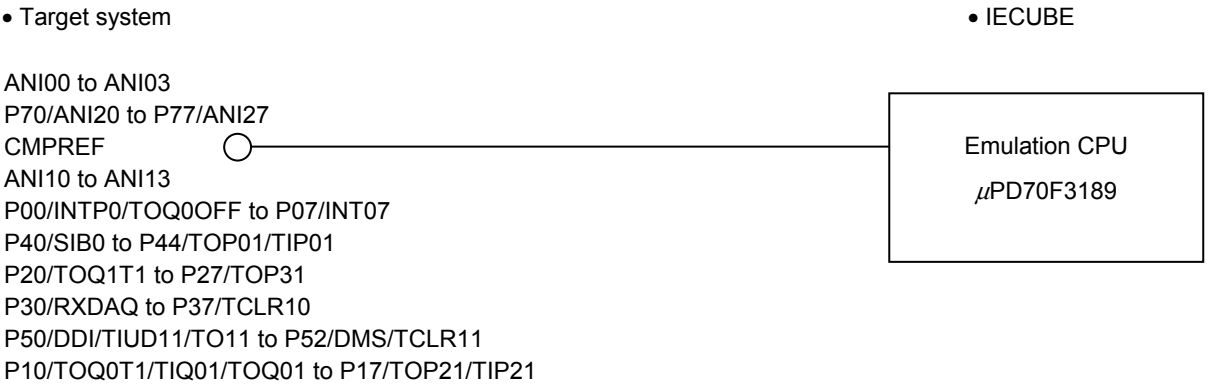


Figure 4-1. Equivalent Circuit of Emulation Circuit (A)

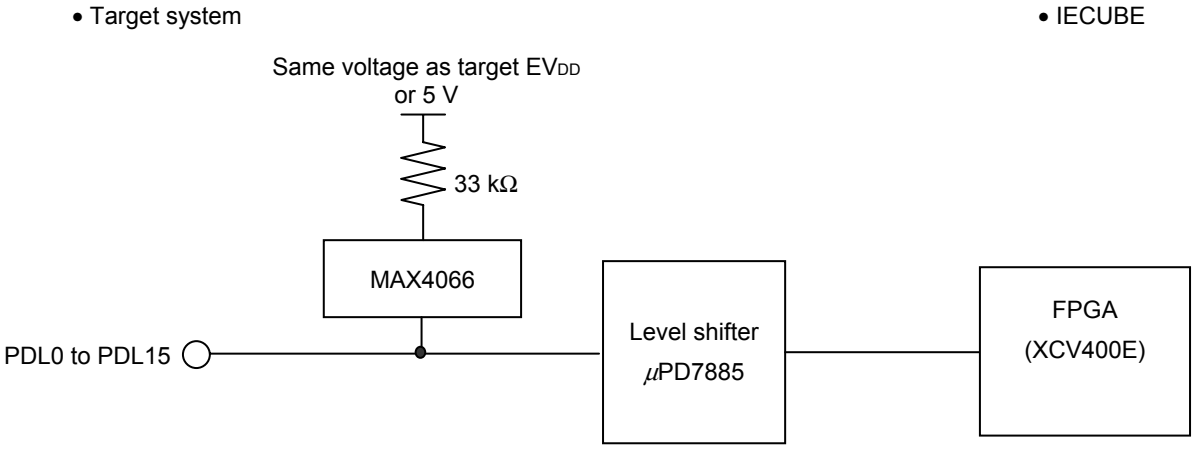


Figure 4-2. Equivalent Circuit of Emulation Circuit (B)

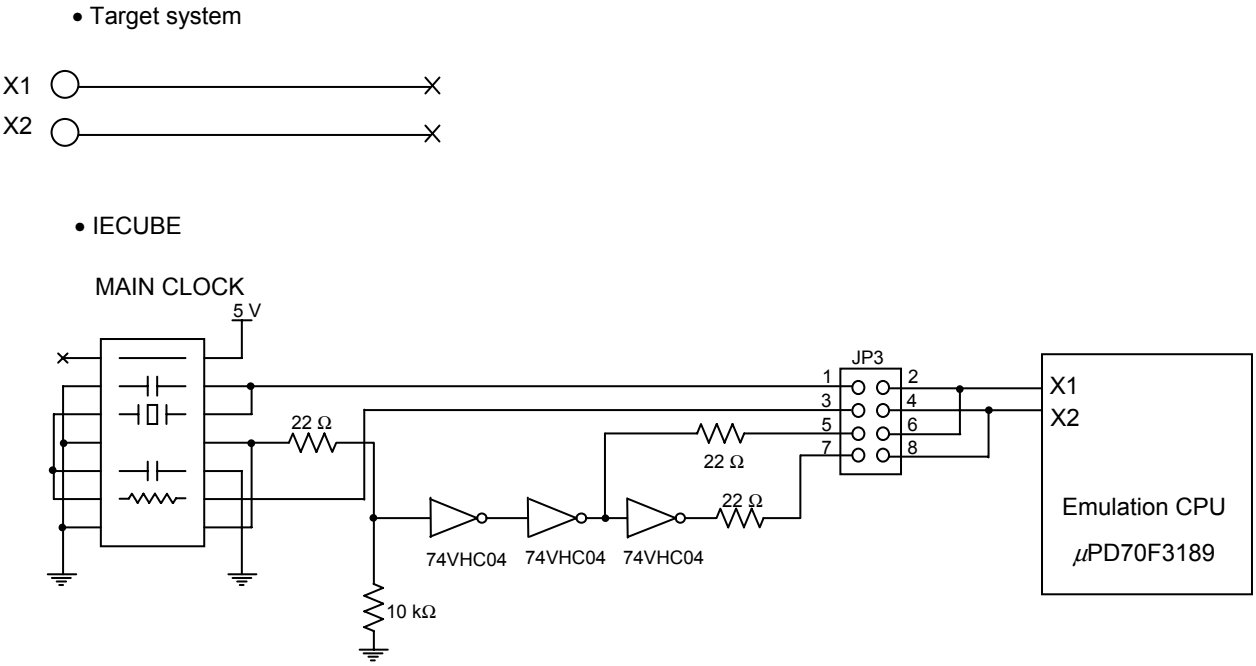


Figure 4-3. Equivalent Circuit of Emulation Circuit (C)

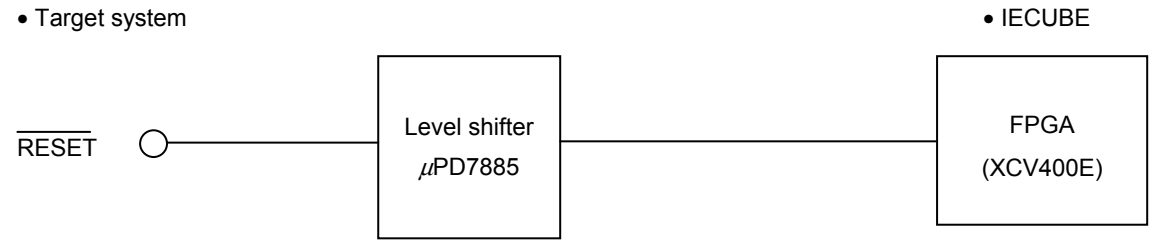


Figure 4-4. Equivalent Circuit of Emulation Circuit (D)

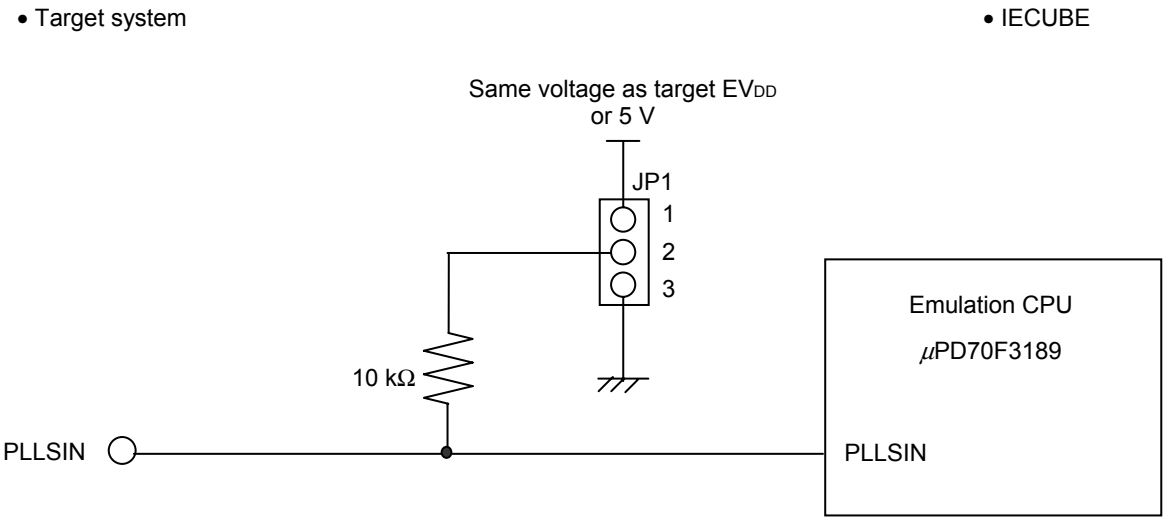


Figure 4-5. Equivalent Circuit of Emulation Circuit (E)

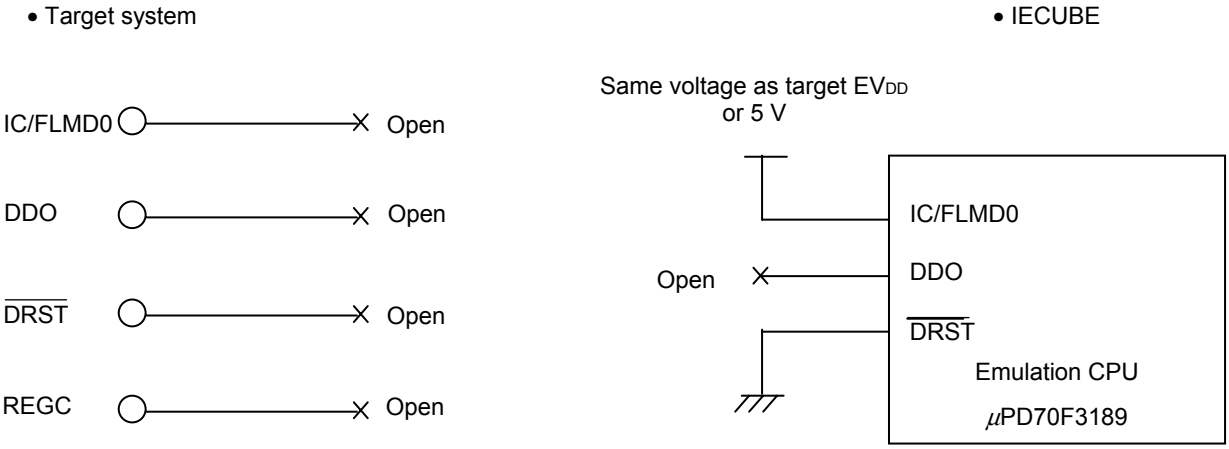


Figure 4-6. Equivalent Circuit of Emulation Circuit (F)

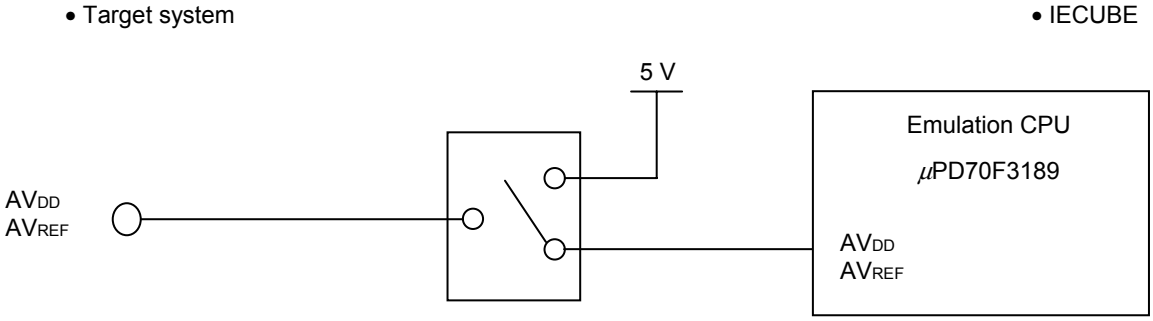


Figure 4-7. Equivalent Circuit of Emulation Circuit (G)

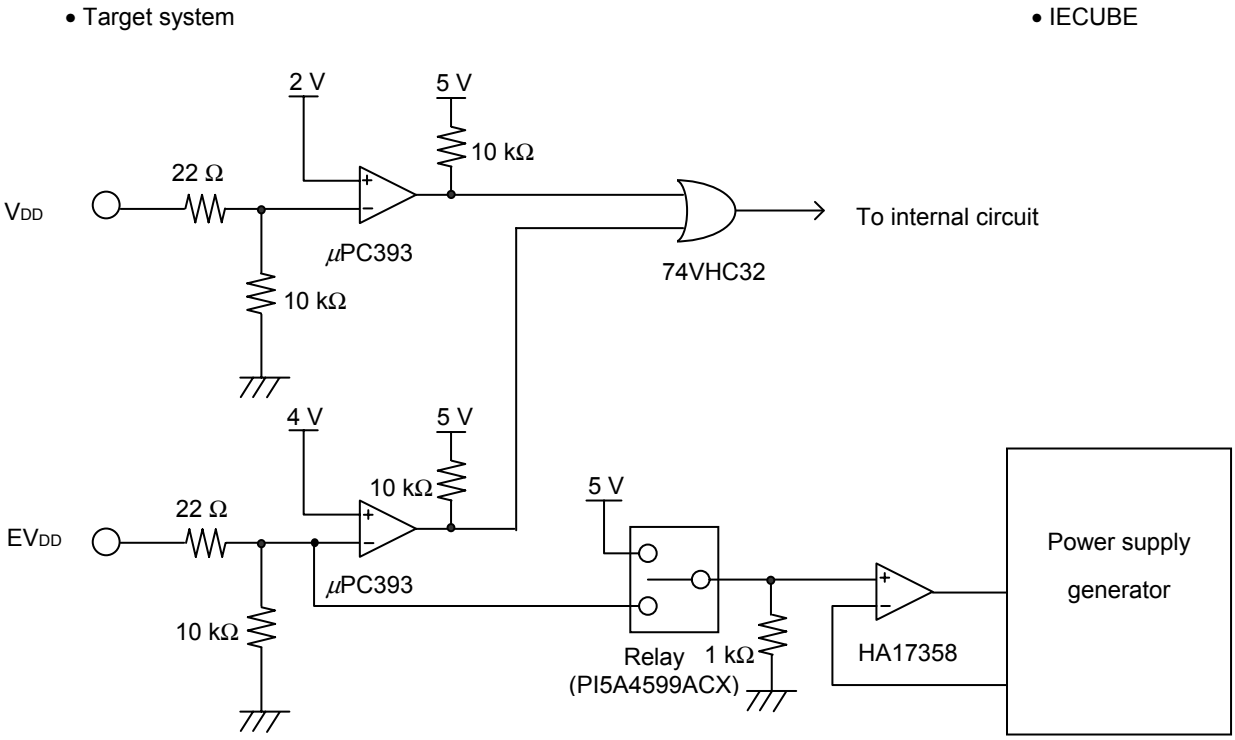


Figure 4-8. Equivalent Circuit of Emulation Circuit (H)

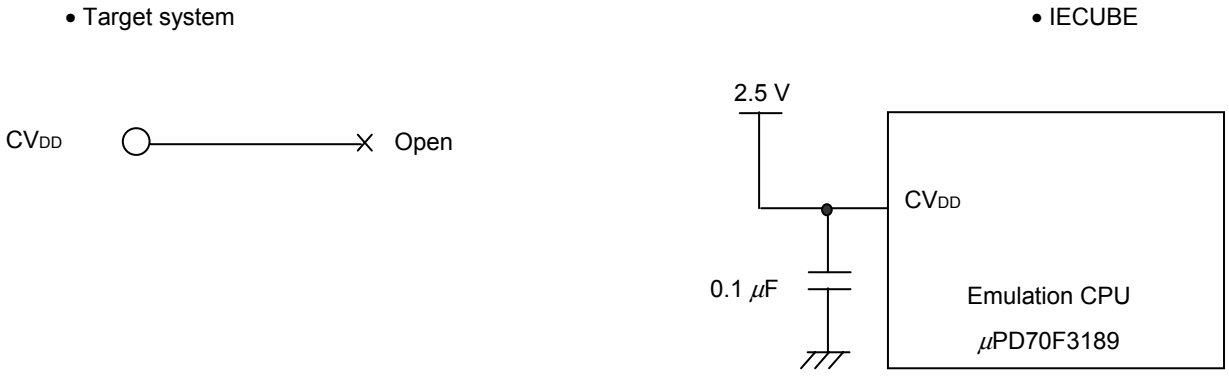


Figure 4-9. Equivalent Circuit of Emulation Circuit (I)

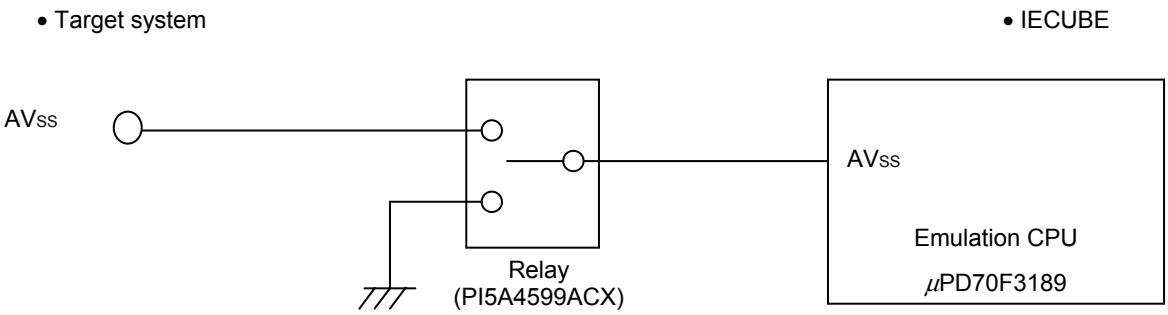


Figure 4-10. Equivalent Circuit of Emulation Circuit (J)

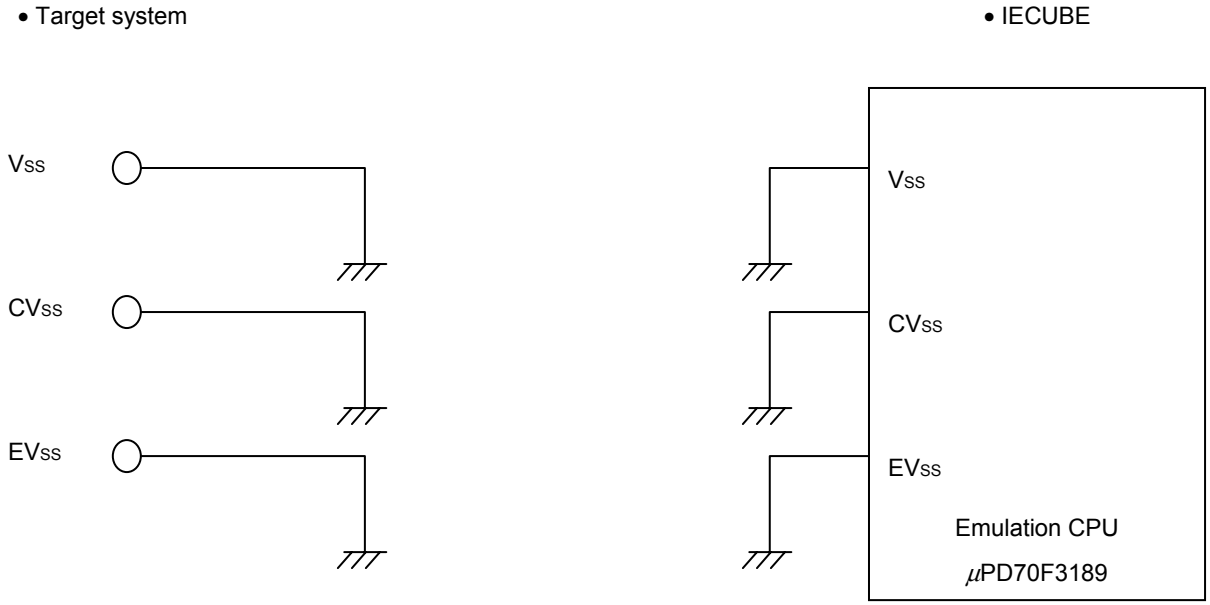


Figure 4-11. Equivalent Circuit of Emulation Circuit (K)

Table 4-1. Target Interface Connection for V850E/IA4 (100-Pin GF Package) (1/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
1	EV_{DD}	Equivalent circuit H
2	PDL8	Equivalent circuit B
3	PDL9	Equivalent circuit B
4	PDL10	Equivalent circuit B
5	PDL11	Equivalent circuit B
6	PDL12	Equivalent circuit B
7	PDL13	Equivalent circuit B
8	PDL14	Equivalent circuit B
9	PDL15	Equivalent circuit B
10	P50/DDI/TIUD11/TO11	Equivalent circuit A
11	P51/DCK/TCUD11	Equivalent circuit A
12	P52/DMS/TCLR11	Equivalent circuit A
13	V_{SS}	Equivalent circuit K
14	V_{DD}	Equivalent circuit H
15	IC1/FLMD0	Equivalent circuit F
16	P10/TOQ0T1/TIQ01/TOQ01	Equivalent circuit A
17	P11/TOQ0B1/TIQ02/TOQ02	Equivalent circuit A
18	P12/TOQ0T2/TIQ03/TOQ03	Equivalent circuit A
19	EV_{SS}	Equivalent circuit K
20	EV_{DD}	Equivalent circuit H
21	P13/TOQ0B2/TIQ00	Equivalent circuit A
22	P14/TOQ0T3/EVTQ0	Equivalent circuit A
23	P15/TOQ0B3/TRGQ0	Equivalent circuit A
24	P16/TOQ00/TIP20	Equivalent circuit A
25	P17/TOP21/TIP21	Equivalent circuit A
26	DDO	Equivalent circuit F
27	$\overline{DRST}$	Equivalent circuit F
28	PLLSIN	Equivalent circuit E
29	ANI00	Equivalent circuit A
30	ANI01	Equivalent circuit A
31	ANI02	Equivalent circuit A
32	ANI03	Equivalent circuit A
33	P70/ANI20	Equivalent circuit A

Table 4-1. Target Interface Connection for V850E/IA4 (100-Pin GF Package) (2/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
34	P71/ANI21	Equivalent circuit A
35	P72/ANI22	Equivalent circuit A
36	P73/ANI23	Equivalent circuit A
37	AV_{DD}	Equivalent circuit G
38	AV_{SS}	Equivalent circuit J
39	CMPREF	Equivalent circuit A
40	AV_{SS}	Equivalent circuit J
41	AV_{DD}	Equivalent circuit G
42	P74/ANI24	Equivalent circuit A
43	P75/ANI25	Equivalent circuit A
44	P76/ANI26	Equivalent circuit A
45	P77/ANI27	Equivalent circuit A
46	ANI10	Equivalent circuit A
47	ANI11	Equivalent circuit A
48	ANI12	Equivalent circuit A
49	ANI13	Equivalent circuit A
50	P00/INTP0/TOQ0OFF	Equivalent circuit A
51	P01/INTP1/TOQ1OFF	Equivalent circuit A
52	P02/INTP2/TOP2OFF	Equivalent circuit A
53	P03/INTP3/TOP3OFF	Equivalent circuit A
54	P04/INTP4/ADTRG0	Equivalent circuit A
55	P05/INTP5/ADTRG1	Equivalent circuit A
56	P06/INTP6	Equivalent circuit A
57	P07/INTP7	Equivalent circuit A
58	V_{DD}	Equivalent circuit H
59	V_{SS}	Equivalent circuit K
60	P40/SIB0	Equivalent circuit A
61	P41/SOB0	Equivalent circuit A
62	P42/$\overline{SCKB0}$	Equivalent circuit A
63	P20/TOQ1T1	Equivalent circuit A
64	P21/TOQ1B1	Equivalent circuit A
65	P22/TOQ1T2	Equivalent circuit A
66	EV_{DD}	Equivalent circuit H

Table 4-1. Target Interface Connection for V850E/IA4 (100-Pin GF Package) (3/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
67	EV_{SS}	Equivalent circuit K
68	P23/TOQ1B2	Equivalent circuit A
69	P24/TOQ1T3	Equivalent circuit A
70	P25/TOQ1B3	Equivalent circuit A
71	CV_{DD}	Equivalent circuit I
72	X2	Equivalent circuit C
73	X1	Equivalent circuit C
74	CVSS	Equivalent circuit K
75	$\overline{RESET}$	Equivalent circuit D
76	P43/TOP00/TIP00	Equivalent circuit A
77	P44/TOP01/TIP01	Equivalent circuit A
78	V_{DD}	Equivalent circuit H
79	V_{SS}	Equivalent circuit K
80	P30/RXDA0	Equivalent circuit A
81	P31/TXDA0	Equivalent circuit A
82	P32/SIB1/RXDA1	Equivalent circuit A
83	P33/SOB1/TXDA1	Equivalent circuit A
84	P34/$\overline{SCKB1}$	Equivalent circuit A
85	P35/TIUD10/TO10	Equivalent circuit A
86	P36/TCUD10	Equivalent circuit A
87	P37/TCLR10	Equivalent circuit A
88	P26/TOQ10	Equivalent circuit A
89	P27/TOP31	Equivalent circuit A
90	PDL0	Equivalent circuit B
91	PDL1	Equivalent circuit B
92	V_{DD}	Equivalent circuit H
93	V_{SS}	Equivalent circuit K
94	PDL2	Equivalent circuit B
95	PDL3	Equivalent circuit B
96	PDL4	Equivalent circuit B
97	PDL5/FLMD1	Equivalent circuit B
98	PDL6	Equivalent circuit B
99	PDL7	Equivalent circuit B
100	EV_{SS}	Equivalent circuit K

Table 4-2. Target Interface Connection for V850E/IA4 (100-Pin GC Package) (1/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
1	ANI00	Equivalent circuit A
2	ANI01	Equivalent circuit A
3	ANI02	Equivalent circuit A
4	ANI03	Equivalent circuit A
5	P70/ANI20	Equivalent circuit A
6	P71/ANI21	Equivalent circuit A
7	P72/ANI22	Equivalent circuit A
8	P73/ANI23	Equivalent circuit A
9	AV_{DD}	Equivalent circuit G
10	AV_{SS}	Equivalent circuit J
11	CMPREF	Equivalent circuit A
12	AV_{SS}	Equivalent circuit J
13	AV_{DD}	Equivalent circuit G
14	P74/ANI24	Equivalent circuit A
15	P75/ANI25	Equivalent circuit A
16	P76/ANI26	Equivalent circuit A
17	P77/ANI27	Equivalent circuit A
18	ANI10	Equivalent circuit A
19	ANI11	Equivalent circuit A
20	ANI12	Equivalent circuit A
21	ANI13	Equivalent circuit A
22	P00/INTP0/TOQ0OFF	Equivalent circuit A
23	P01/INTP1/TOQ1OFF	Equivalent circuit A
24	P02/INTP2/TOP2OFF	Equivalent circuit A
25	P03/INTP3/TOP3OFF	Equivalent circuit A
26	P04/INTP4/ADTRG0	Equivalent circuit A
27	P05/INTP5/ADTRG1	Equivalent circuit A
28	P06/INTP6	Equivalent circuit A
29	P07/INTP7	Equivalent circuit A
30	V_{DD}	Equivalent circuit H
31	V_{SS}	Equivalent circuit K
32	P40/SIB0	Equivalent circuit A
33	P41/SOB0	Equivalent circuit A

Table 4-2. Target Interface Connection for V850E/IA4 (100-Pin GC Package) (2/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
34	P42/$\overline{\text{SCKB0}}$	Equivalent circuit A
35	P20/TOQ1T1	Equivalent circuit A
36	P21/TOQ1B1	Equivalent circuit A
37	P22/TOQ1T2	Equivalent circuit A
38	EV_{DD}	Equivalent circuit H
39	EV_{SS}	Equivalent circuit K
40	P23/TOQ1B2	Equivalent circuit A
41	P24/TOQ1T3	Equivalent circuit A
42	P25/TOQ1B3	Equivalent circuit A
43	CV_{DD}	Equivalent circuit I
44	X2	Equivalent circuit C
45	X1	Equivalent circuit C
46	CV_{SS}	Equivalent circuit K
47	$\overline{\text{RESET}}$	Equivalent circuit D
48	P43/TOP00/TIP00	Equivalent circuit A
49	P44/TOP01/TIP01	Equivalent circuit A
50	V_{DD}	Equivalent circuit H
51	V_{SS}	Equivalent circuit K
52	P30/RXDA0	Equivalent circuit A
53	P31/TXDA0	Equivalent circuit A
54	P32/SIB1/RXDA1	Equivalent circuit A
55	P33/SOB1/TXDA1	Equivalent circuit A
56	P34/$\overline{\text{SCKB1}}$	Equivalent circuit A
57	P35/TIUD10/TO10	Equivalent circuit A
58	P36/TCUD10	Equivalent circuit A
59	P37/TCLR10	Equivalent circuit A
60	P26/TOQ10	Equivalent circuit A
61	P27/TOP31	Equivalent circuit A
62	PDL0	Equivalent circuit B
63	PDL1	Equivalent circuit B
64	V_{DD}	Equivalent circuit H
65	V_{SS}	Equivalent circuit K
66	PDL2	Equivalent circuit B
67	PDL3	Equivalent circuit B

Table 4-2. Target Interface Connection for V850E/IA4 (100-Pin GC Package) (3/3)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
68	PDL4	Equivalent circuit B
69	PDL5/FLMD1	Equivalent circuit B
70	PDL6	Equivalent circuit B
71	PDL7	Equivalent circuit B
72	EV_{SS}	Equivalent circuit K
73	EV_{DD}	Equivalent circuit H
74	PDL8	Equivalent circuit B
75	PDL9	Equivalent circuit B
76	PDL10	Equivalent circuit B
77	PDL11	Equivalent circuit B
78	PDL12	Equivalent circuit B
79	PDL13	Equivalent circuit B
80	PDL14	Equivalent circuit B
81	PDL15	Equivalent circuit B
82	P50/DDI/TIUD11/TO11	Equivalent circuit A
83	P51/DCK/TCUD11	Equivalent circuit A
84	P52/DMS/TCLR11	Equivalent circuit A
85	V_{SS}	Equivalent circuit K
86	V_{DD}	Equivalent circuit H
87	IC1/FLMD0	Equivalent circuit F
88	P10/TOQ0T1/TIQ01/TOQ01	Equivalent circuit A
89	P11/TOQ0B1/TIQ02/TOQ02	Equivalent circuit A
90	P12/TOQ0T2/TIQ03/TOQ03	Equivalent circuit A
91	EV_{SS}	Equivalent circuit K
92	EV_{DD}	Equivalent circuit H
93	P13/TOQ0B2/TIQ00	Equivalent circuit A
94	P14/TOQ0T3/EVTQ0	Equivalent circuit A
95	P15/TOQ0B3/TRGQ0	Equivalent circuit A
96	P16/TOQ00/TIP20	Equivalent circuit A
97	P17/TOP21/TIP21	Equivalent circuit A
98	DDO	Equivalent circuit F
99	$\overline{DRST}$	Equivalent circuit F
100	PLLSIN	Equivalent circuit E

Table 4-3. Target Interface Connection for V850E/IA3 (80-Pin GC Package) (1/2)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
1	ANI00	Equivalent circuit A
2	ANI01	Equivalent circuit A
3	P71/ANI21	Equivalent circuit A
4	P72/ANI22	Equivalent circuit A
5	P73/ANI23	Equivalent circuit A
6	AV_{DD}	Equivalent circuit G
7	AV_{SS}	Equivalent circuit J
8	CMPREF	Equivalent circuit A
9	AV_{SS}	Equivalent circuit J
10	AV_{DD}	Equivalent circuit G
11	P74/ANI24	Equivalent circuit A
12	P75/ANI25	Equivalent circuit A
13	ANI10	Equivalent circuit A
14	ANI11	Equivalent circuit A
15	ANI12	Equivalent circuit A
16	ANI13	Equivalent circuit A
17	P00/INTP0/TOQ0OFF	Equivalent circuit A
18	P02/INTP2/TOP2OFF	Equivalent circuit A
19	P03/INTP3/TOP3OFF	Equivalent circuit A
20	P70/ANI20	Equivalent circuit A
21	P04/INTP4/ADTRG0	Equivalent circuit A
22	P05/INTP5/ADTRG1	Equivalent circuit A
23	P06/INTP6	Equivalent circuit A
24	P07/INTP7	Equivalent circuit A
25	V_{DD}	Equivalent circuit H
26	V_{SS}	Equivalent circuit F
27	P40/SIB0	Equivalent circuit A
28	P41/SOB0	Equivalent circuit A
29	P42/$\overline{\text{SCKB0}}$	Equivalent circuit A
30	EV_{DD}	Equivalent circuit H
31	EV_{SS}	Equivalent circuit F
32	CV_{DD}	Equivalent circuit I
33	X2	Equivalent circuit C
34	X1	Equivalent circuit C
35	CV_{SS}	Equivalent circuit K
36	$\overline{\text{RESET}}$	Equivalent circuit D
37	P43/TOP00/TIP00	Equivalent circuit A
38	P44/TOP01/TIP01	Equivalent circuit A
39	V_{SS}	Equivalent circuit F
40	V_{DD}	Equivalent circuit H

Table 4-3. Target Interface Connection for V850E/IA3 (80-Pin GC Package) (2/2)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
41	PDL9	Equivalent circuit B
42	PDL8	Equivalent circuit B
43	PDL7	Equivalent circuit B
44	PDL6	Equivalent circuit B
45	PDL5/FLMD1	Equivalent circuit B
46	PDL4	Equivalent circuit B
47	PDL3	Equivalent circuit B
48	PDL2	Equivalent circuit B
49	V_{SS}	Equivalent circuit F
50	V_{DD}	Equivalent circuit H
51	PDL1	Equivalent circuit B
52	PDL0	Equivalent circuit B
53	P37/TCLR10	Equivalent circuit A
54	P36/TCUD10	Equivalent circuit A
55	P35/TIUD10/TO10	Equivalent circuit A
56	P34/$\overline{\text{SCKB1}}$	Equivalent circuit A
57	P33/SOB1/TXDA1	Equivalent circuit A
58	P32/SIB1/RXDA1	Equivalent circuit A
59	P31/TXDA0	Equivalent circuit A
60	P30/RXDA0	Equivalent circuit A
61	PDL10	Equivalent circuit B
62	PDL12	Equivalent circuit B
63	PDL12	Equivalent circuit B
64	PDL13	Equivalent circuit B
65	PDL14	Equivalent circuit B
66	PDL15	Equivalent circuit B
67	V_{SS}	Equivalent circuit F
68	V_{DD}	Equivalent circuit H
69	IC1/FLMD0	Equivalent circuit F
70	P10/TOQ0T1/TIQ01/TOQ01	Equivalent circuit A
71	P11/TOQ0B1/TIQ02/TOQ02	Equivalent circuit A
72	P12/TOQ0T2/TIQ03/TOQ03	Equivalent circuit A
73	EV_{SS}	Equivalent circuit F
74	EV_{DD}	Equivalent circuit H
75	P13/TOQ0B2/TIQ00	Equivalent circuit A
76	P14/TOQ0T3/EVTQ0	Equivalent circuit A
77	P15/TOQ0B3/TRGQ0	Equivalent circuit A
78	P16/TOQ00/TIP20	Equivalent circuit A
79	P17/TOP21/TIP21	Equivalent circuit A
80	PLLSIN	Equivalent circuit E

Table 4-4. Target Interface Connection for V850ES/IK1 (64-Pin GC Package) (1/2)

Pin No.	Target Interface Name	Connection in In-Circuit Emulator
1	ANI00	Equivalent circuit A
2	ANI01	Equivalent circuit A
3	ANI02	Equivalent circuit A
4	ANI03	Equivalent circuit A
5	$\overline{\text{RESET}}$	Equivalent circuit D
6	X1	Equivalent circuit C
7	X2	Equivalent circuit C
8	V_{SS}	Equivalent circuit K
9	V_{DD}	Equivalent circuit H
10	REGC	Equivalent circuit F
11	P06/INTP6	Equivalent circuit A
12	P05/INTP5/ADTRG1	Equivalent circuit A
13	P04/INTP4/ADTRG0	Equivalent circuit A
14	P03/INTP3/TOP3OFF	Equivalent circuit A
15	P02/INTP2/TOP2OFF	Equivalent circuit A
16	P01/INTP1/TOQ1OFF	Equivalent circuit A
17	P00/INTP0	Equivalent circuit A
18	P17/TOP21/TIP21	Equivalent circuit A
19	P16 (CLMER)/TOQ00 (CLMER)/TIP20	Equivalent circuit A
20	P14/EVTQ0	Equivalent circuit A
21	P13/TIQ00	Equivalent circuit A
22	P12/TIQ03/TOQ03	Equivalent circuit A
23	P11/TIQ02/TOQ02	Equivalent circuit A
24	P10/TIQ01/TOQ01	Equivalent circuit A
25	FLMD0/IC	Equivalent circuit F
26	EV_{DD}	Equivalent circuit H
27	EV_{SS}	Equivalent circuit K
28	PDL7	Equivalent circuit B
29	PDL6	Equivalent circuit B
30	PDL5/FLMD1	Equivalent circuit B
31	PDL4	Equivalent circuit B
32	PDL3	Equivalent circuit B

Table 4-4. Target Interface Connection for V850ES/IK1 (64-Pin GC Package) (2/2)

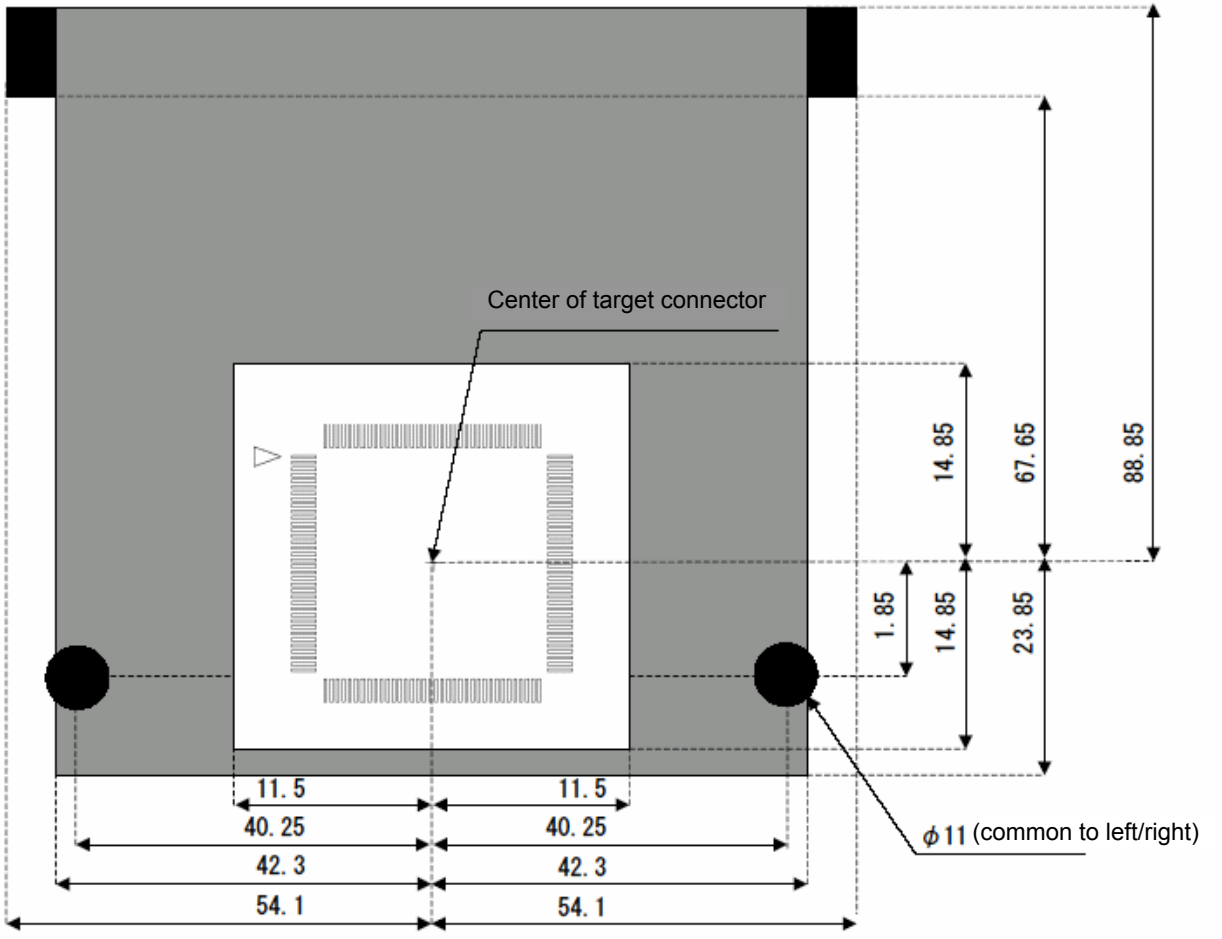
Pin No.	Target Interface Name	Connection in In-Circuit Emulator
33	PDL2	Equivalent circuit B
34	PDL1	Equivalent circuit B
35	PDL0	Equivalent circuit B
36	P44/TOP01/TIP01	Equivalent circuit A
37	P43/TOP00/TIP00	Equivalent circuit A
38	P42/$\overline{\text{SCKB0}}$	Equivalent circuit A
39	P41/SOB0	Equivalent circuit A
40	P40/SIB0	Equivalent circuit A
41	P33/TXDA1	Equivalent circuit A
42	P32/RXDA1	Equivalent circuit A
43	P31/TXDA0	Equivalent circuit A
44	P30/RXDA0	Equivalent circuit A
45	P27/TOP31	Equivalent circuit A
46	P26/TOQ10	Equivalent circuit A
47	EV_{DD}	Equivalent circuit H
48	EV_{SS}	Equivalent circuit K
49	P25/TOQ1B3	Equivalent circuit A
50	P24/TOQ1T3	Equivalent circuit A
51	P23/TOQ1B2	Equivalent circuit A
52	P22/TOQ1T2	Equivalent circuit A
53	P21/TOQ1B1	Equivalent circuit A
54	P20/TOQ1T1	Equivalent circuit A
55	ANI13	Equivalent circuit A
56	ANI12	Equivalent circuit A
57	ANI11	Equivalent circuit A
58	ANI10	Equivalent circuit A
59	AV_{REF}	Equivalent circuit G
60	AV_{DD}	Equivalent circuit G
61	AV_{SS}	Equivalent circuit J
62	AV_{SS}	Equivalent circuit J
63	AV_{DD}	Equivalent circuit G
64	AV_{REF}	Equivalent circuit G

CHAPTER 5 NOTES ON TARGET SYSTEM DESIGN

This chapter explains notes on target system design, including areas in which parts should not be mounted on the target system and the area that has a height restriction on the mounting parts.

5.1 When Extension Probe Is Not Used

5.1.1 V850E/IA4 (100-pin GF package)



: Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

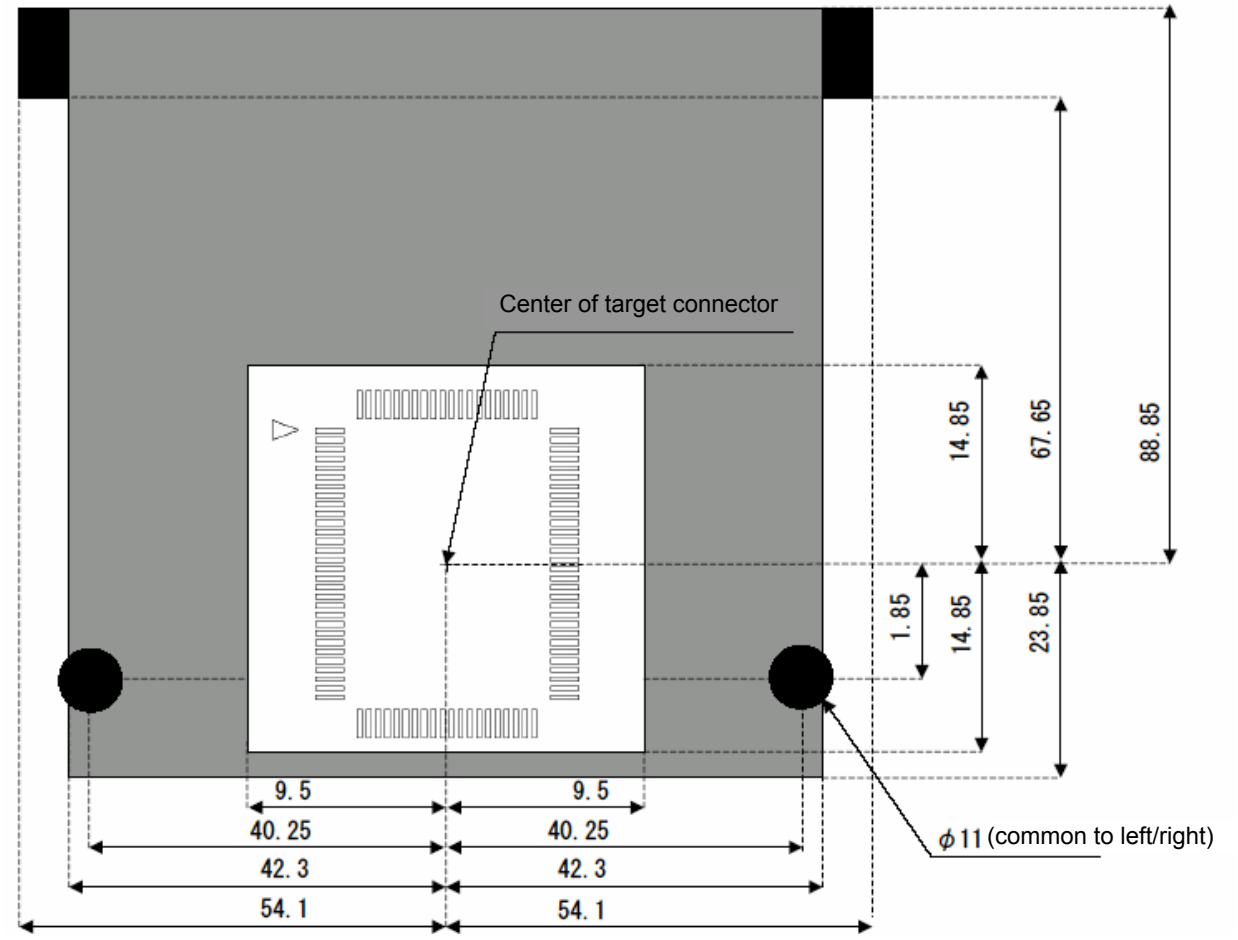
: IECUBE unit area; parts of up to 1 mm in height can be mounted[Note]

: IECUBE spacer area; mounting parts prohibited

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-1-1. V850E/IA4 (100-Pin GF Package)

5.1.2 V850E/IA4 (100-pin GC package)



: Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

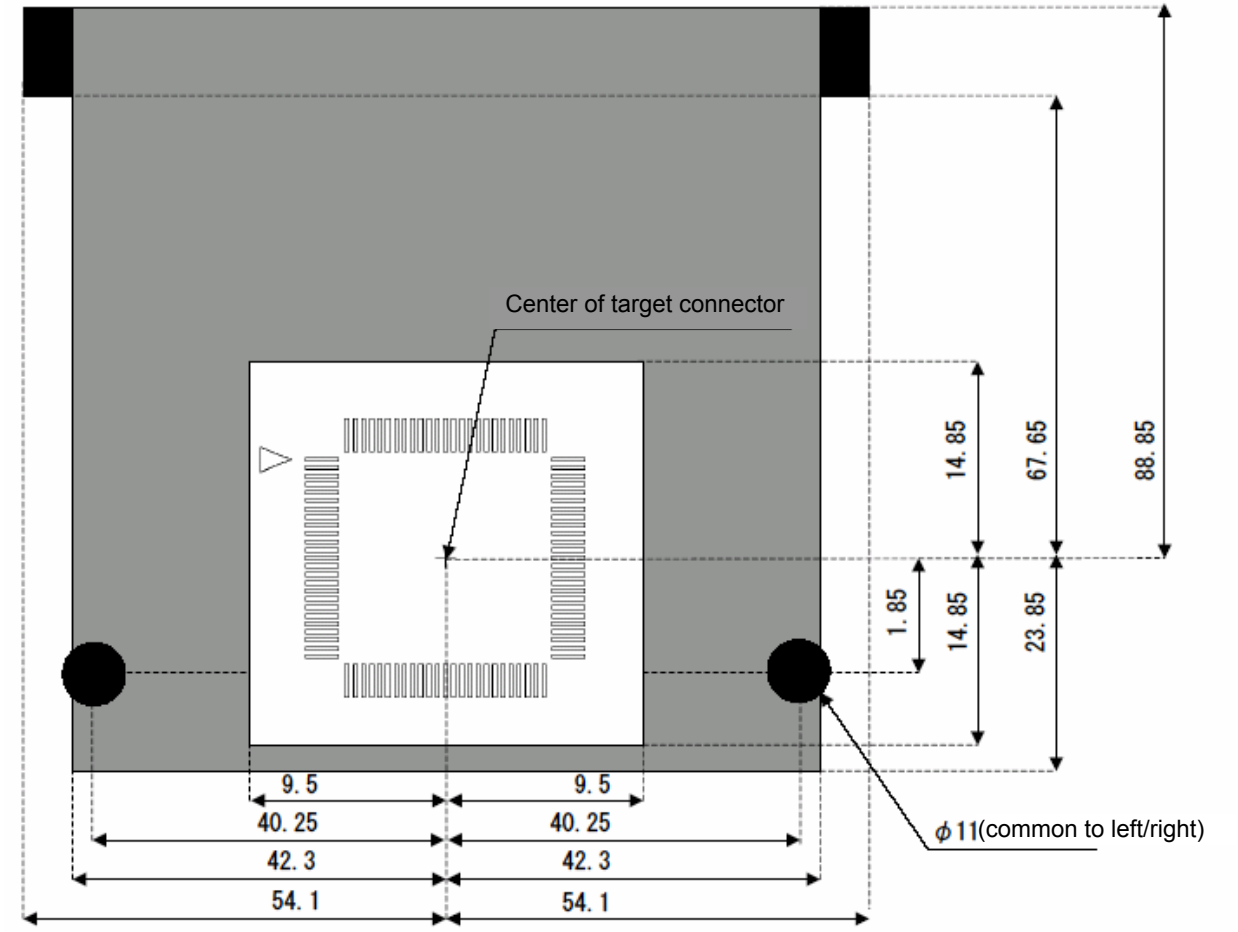
: IECUBE unit area; parts of up to 1 mm in height can be mounted[Note]

: IECUBE spacer area; mounting parts prohibited

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-1-2. V850E/IA4 (100-Pin GC Package)

5.1.3 V850E/IA3 (80-pin GC package)



: Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

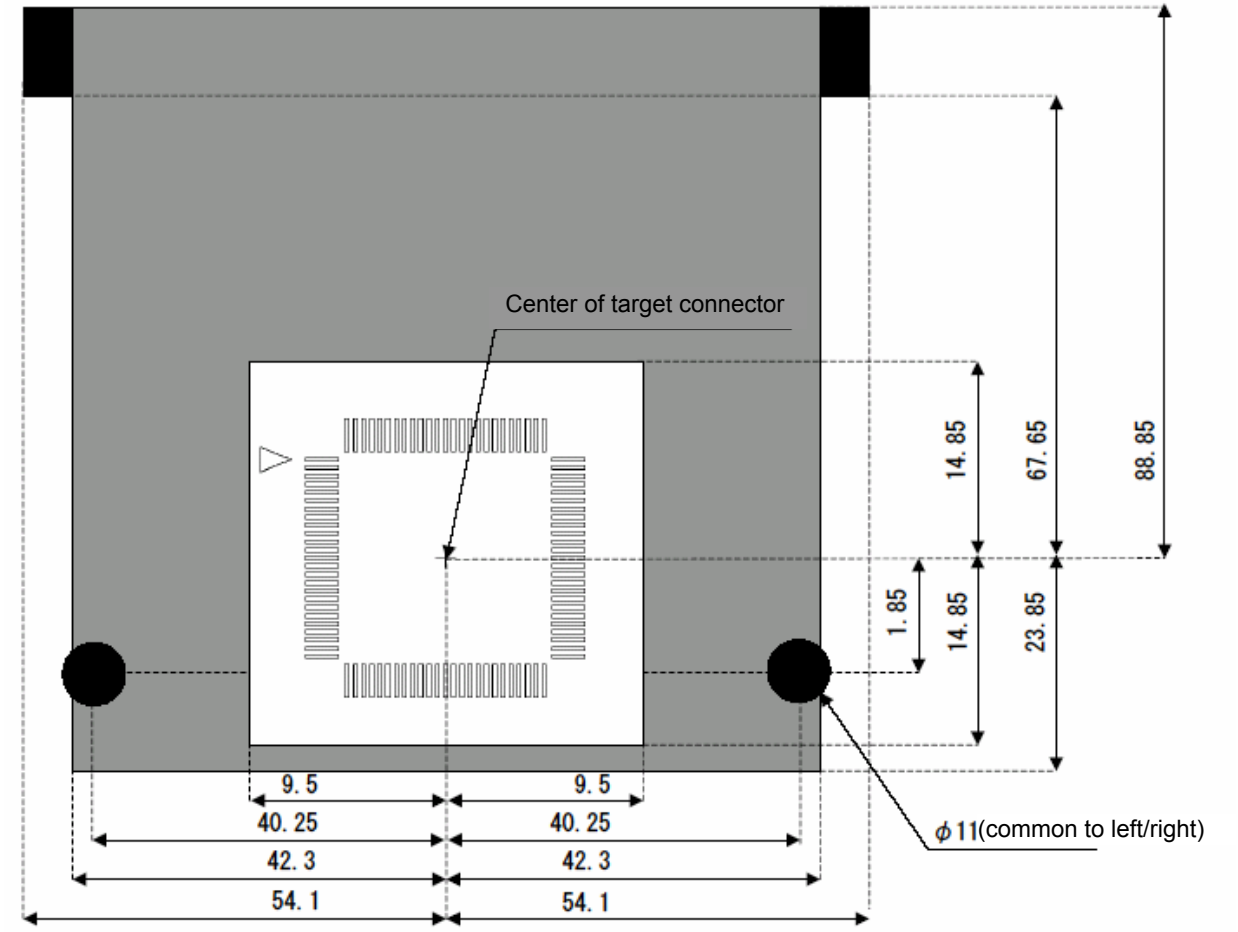
: IECUBE unit area; parts of up to 1 mm in height can be mounted[Note]

: IECUBE spacer area; mounting parts prohibited

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-1-3. V850E/IA3 (80-Pin GC Package)

5.1.4 V850ES/IK1 (64-pin GC package)



: Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

: IECUBE unit area; parts of up to 1 mm in height can be mounted[Note]

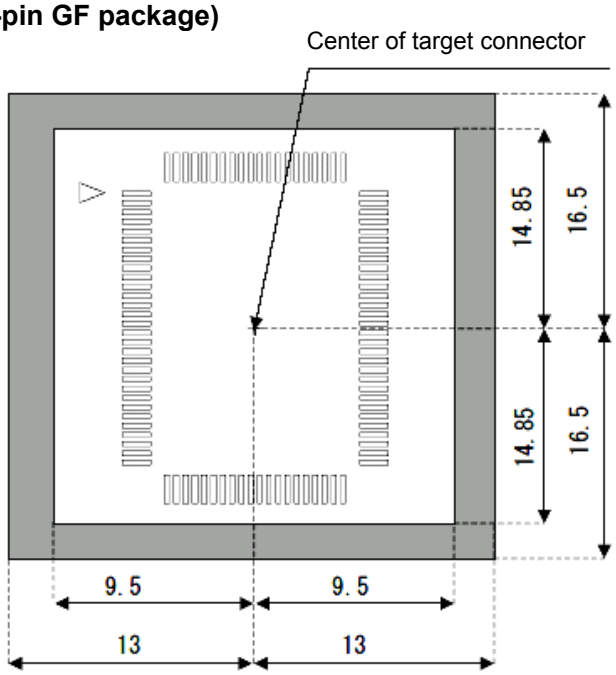
: IECUBE spacer area; mounting parts prohibited

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-1-4. V850ES/IK1 (64-Pin GC Package)

5.2 When Extension Probe Is Used

5.2.1 V850E/IA4 (100-pin GF package)



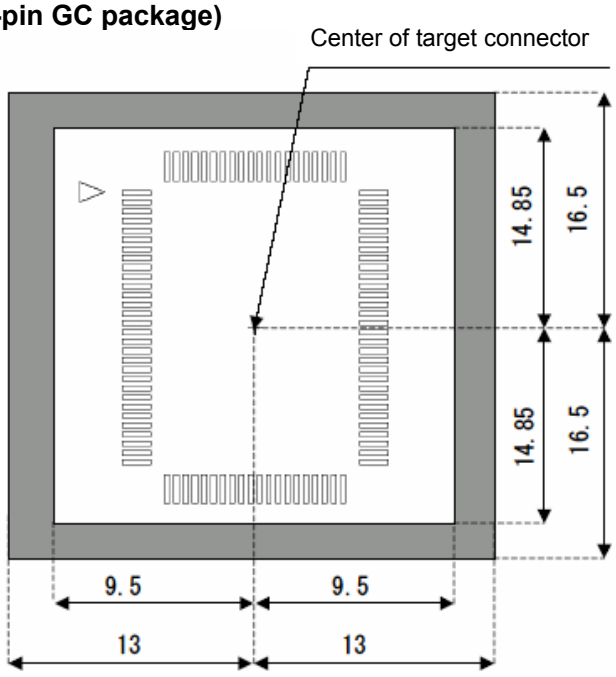
□ : Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

▒ : Extension probe top area; parts of up to 13.2 mm in height can be mounted[Note]

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-2-1. V850E/IA4 (100-Pin GF Package)

5.2.2 V850E/IA4 (100-pin GC package)



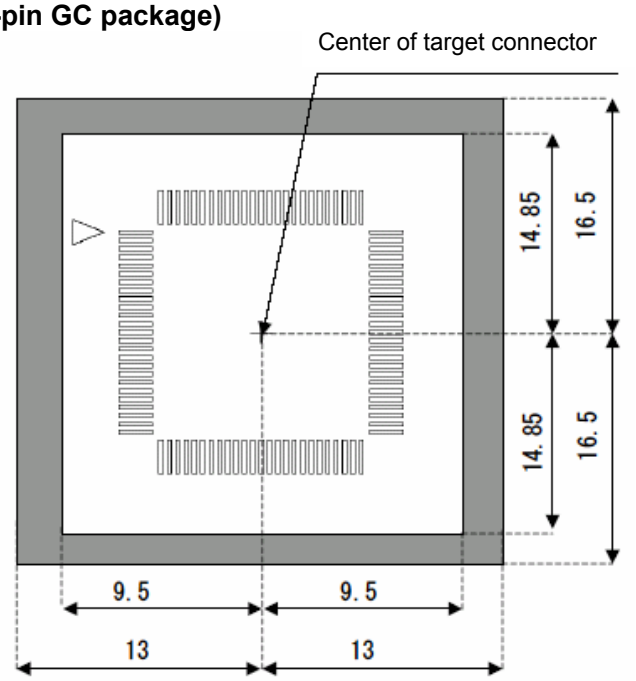
□ : Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

▒ : Extension probe connector area; parts of up to 13.2 mm in height can be mounted[Note]

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-2-2. V850E/IA (100-Pin GC Package)

5.2.3 V850E/IA3 (80-pin GC package)



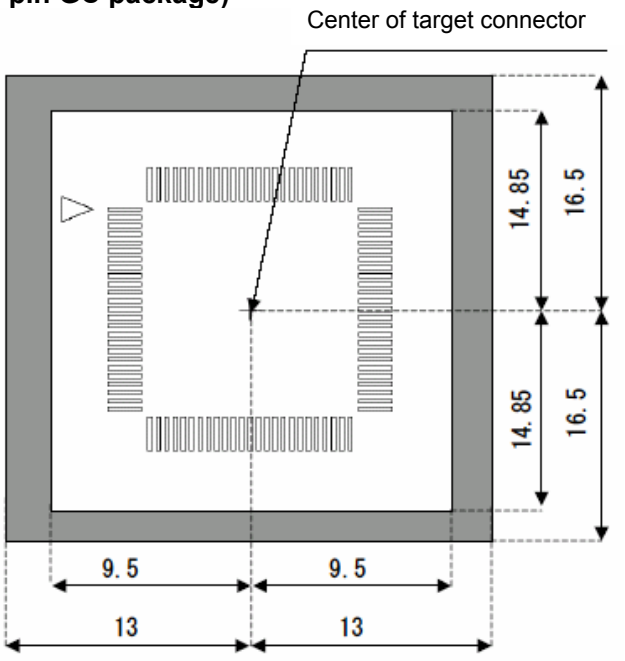
□ : Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

▒ : Extension probe connector area; parts of up to 13.2 mm in height can be mounted[Note]

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-2-3. V850E/IA3 (80-Pin GF Package)

5.2.4 V850ES/IK1 (64-pin GC package)



□ : Exchange adapter area; parts of up to 4.2 mm in height can be mounted[Note]

▒ : Extension probe connector area; parts of up to 13.2 mm in height can be mounted[Note]

Note The height can be adjusted using the spacer adapter (can increase by 5.6 mm per unit)

Figure 5-2-4. V850ES/IK1 (64-Pin GF Package)

CHAPTER 6 CONNECTOR PROBE PACKAGE DRAWINGS

6.1 Target Connector

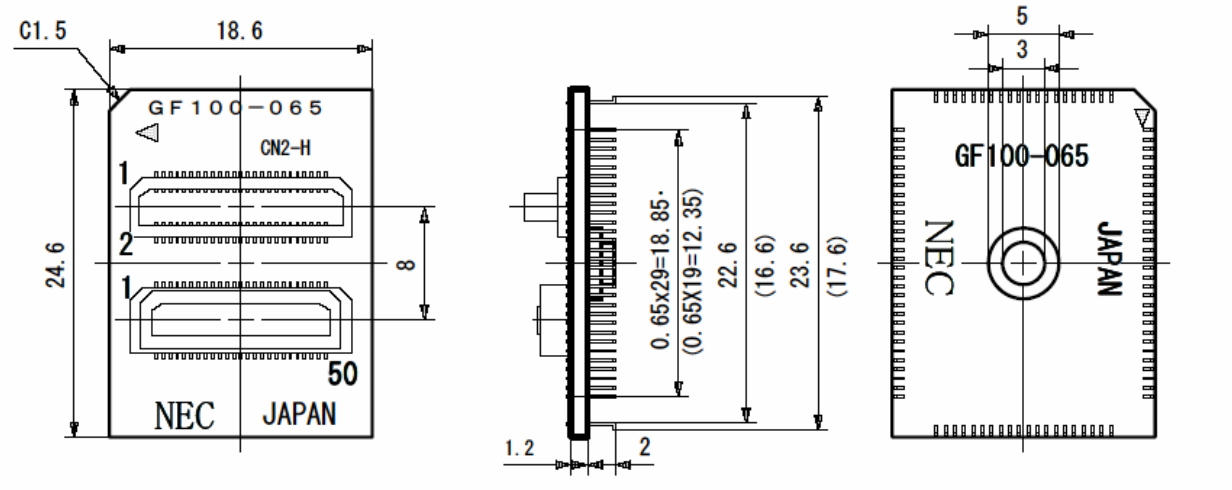


Figure 6-1-1. Target Connector for V850E/IA4 (100-Pin GF Package)

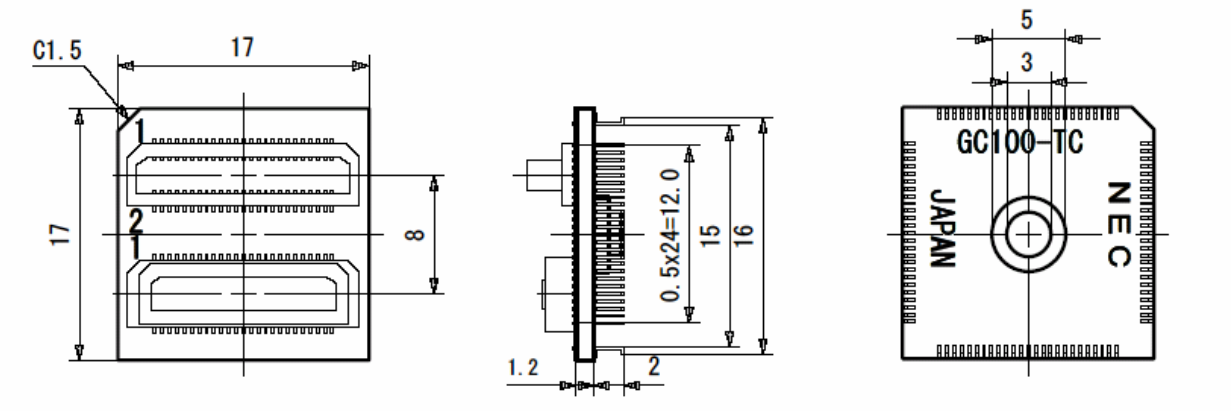


Figure 6-1-2. Target Connector for V850E/IA4 (100-Pin GC Package)

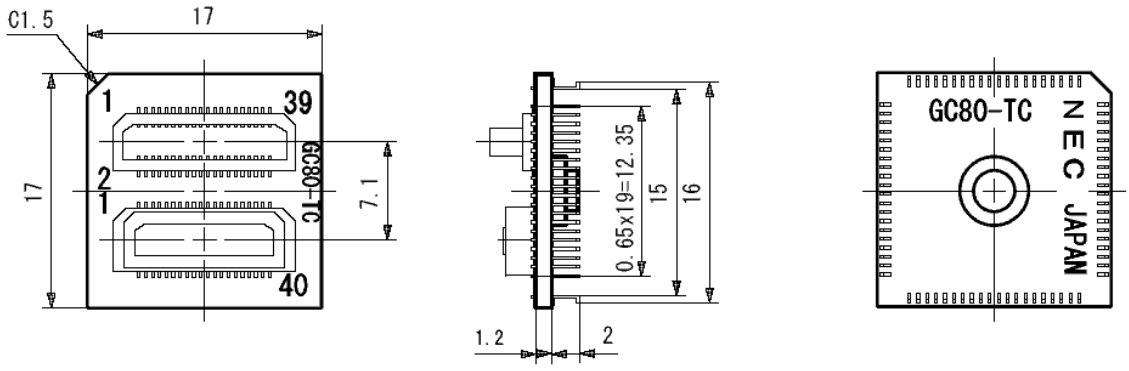


Figure 6-1-3. Target Connector for V850E/IA3 (80-Pin GC Package)

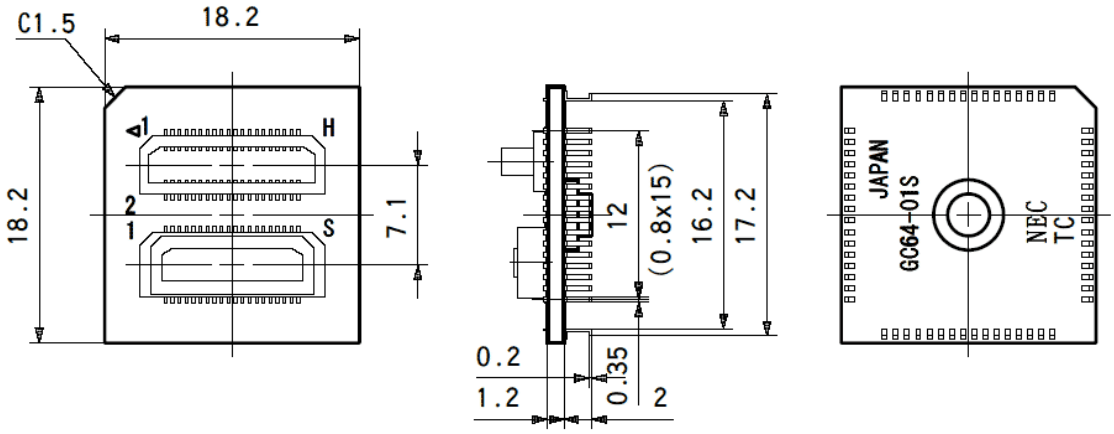


Figure 6-1-4. Target Connector for V850SE/IK1 (64-Pin GC Package)

6.2 Foot Patterns of Target Connectors

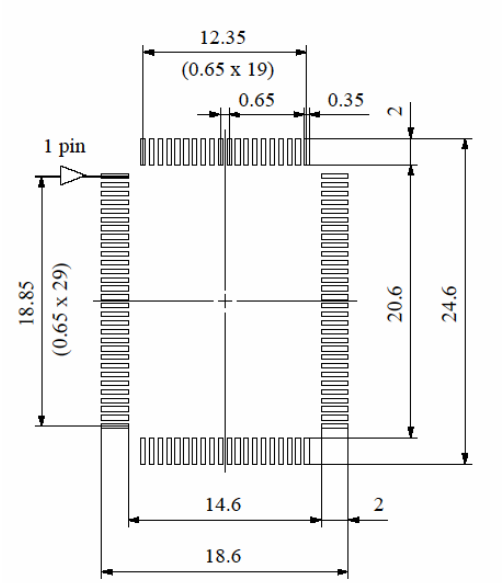


Figure 6-2-1. Foot Pattern of Target Connector for V850E/IA4 (100-Pin GF Package)

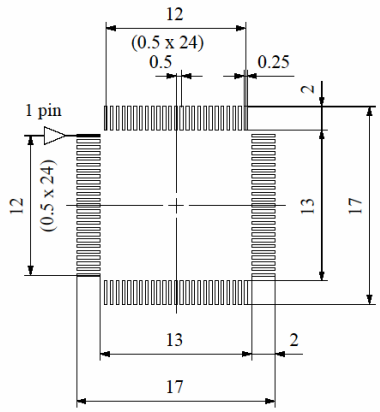


Figure 6-2-2. Foot Pattern of Target Connector for V850E/IA4 (100-Pin GC Package)

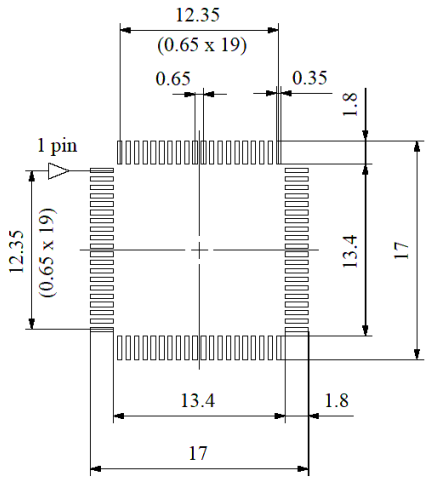


Figure 6-2-3. Foot Pattern of Target Connector for V850E/IA3 (80-Pin GC Package)

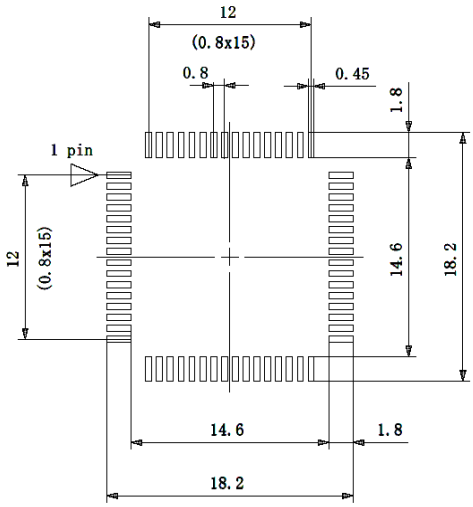


Figure 6-2-4. Foot Pattern of Target Connector for V850ES/IK1 (64-Pin GC Package)

6.3 Exchange Adapter

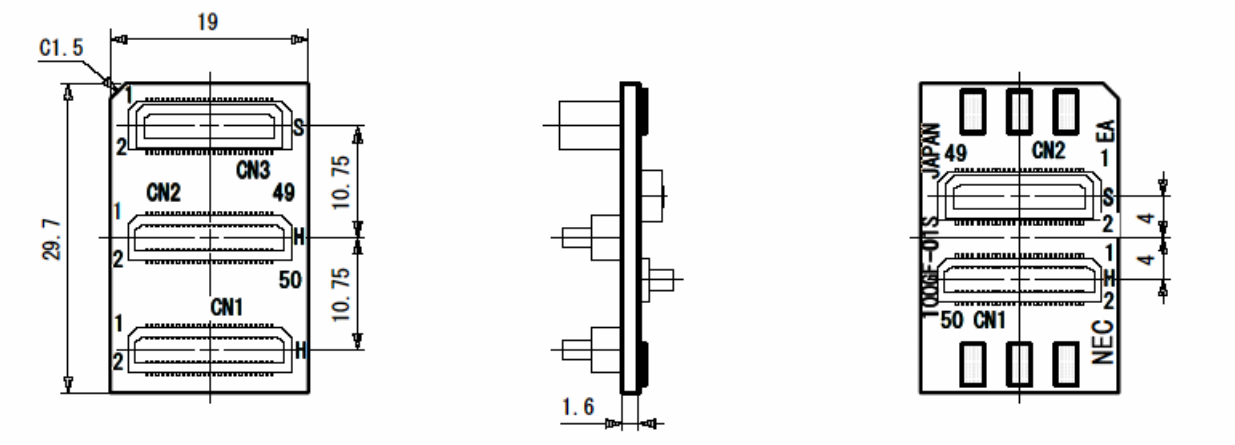


Figure 6-3-1. Exchange Adapter for V850E/IA4 (100-Pin GF Package)

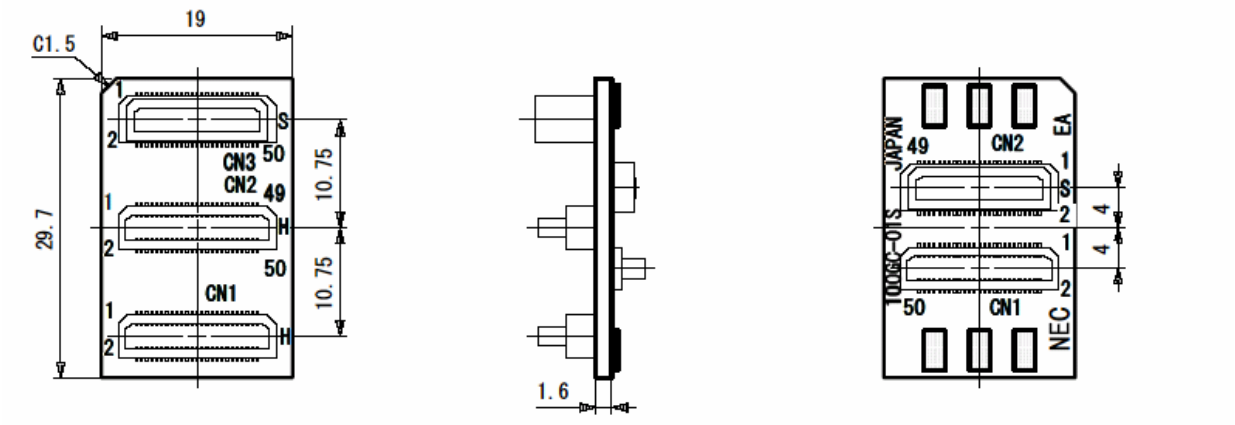


Figure 6-3-2. Exchange Adapter for V850E/IA4 (100-Pin GC Package)

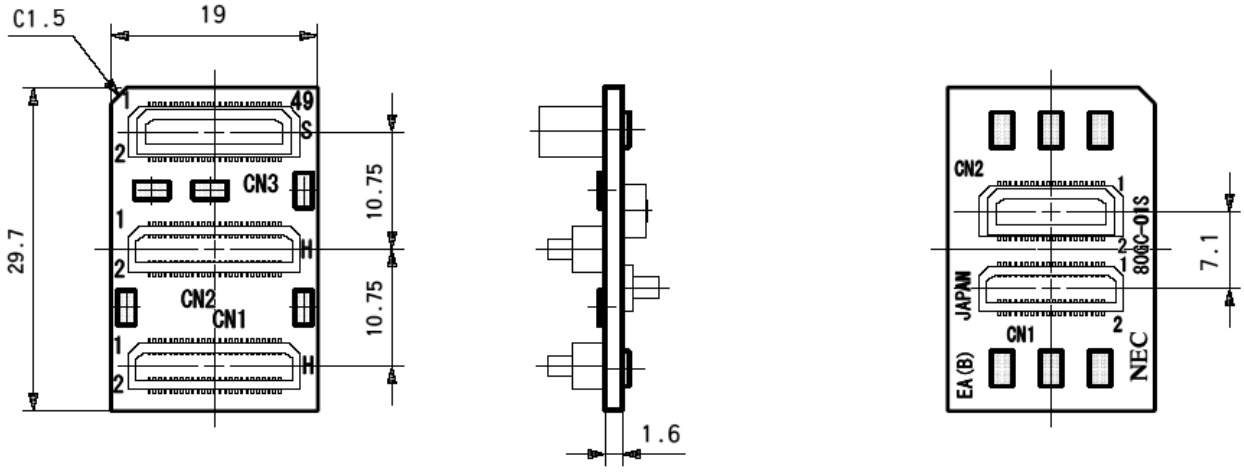


Figure 6-3-3. Exchange Adapter for V850E/IA3 (80-Pin GC Package)

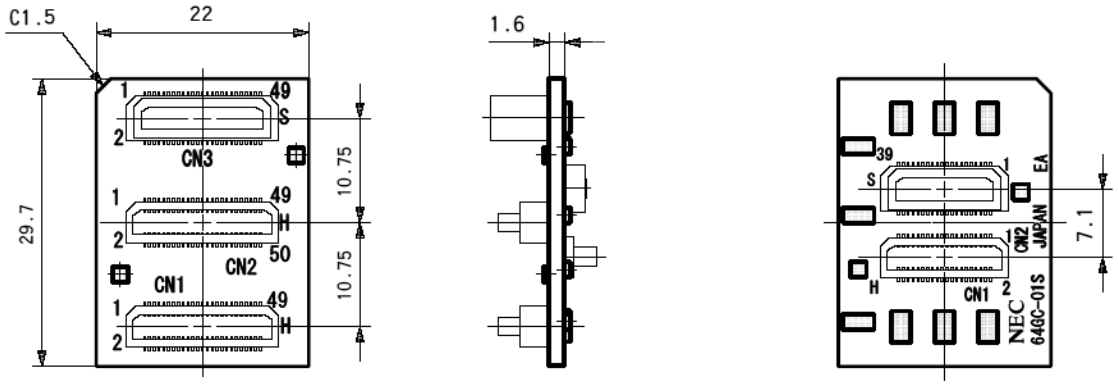


Figure 6-3-4. Exchange Adapter for V850ES/IK1 (64-Pin GC Package)

6.4 Mounting Adapter

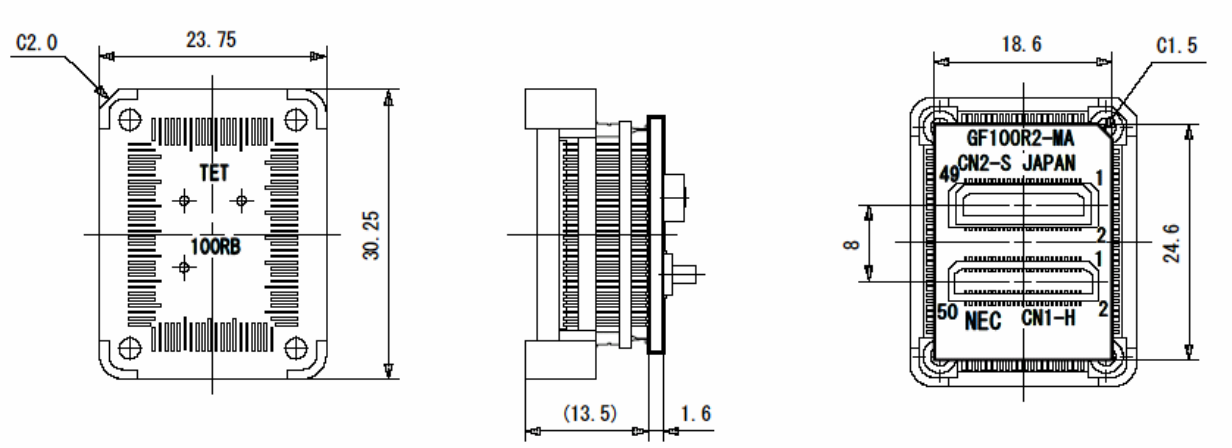


Figure 6-4-1. Mounting Adapter for V850E/IA4 (100-Pin GF Package)

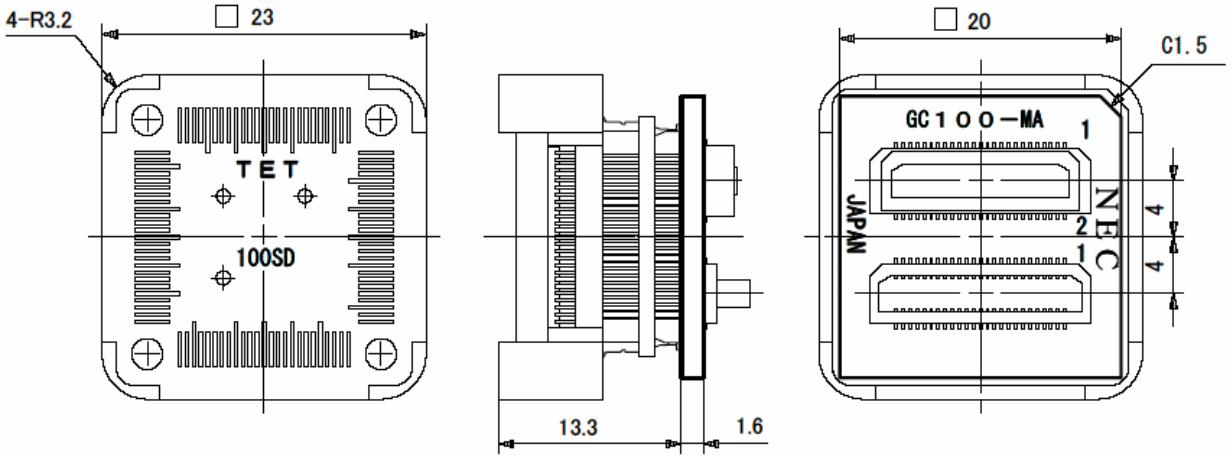


Figure 6-4-2. Mount Adapter for V850E/IA4 (100-Pin GC Package)

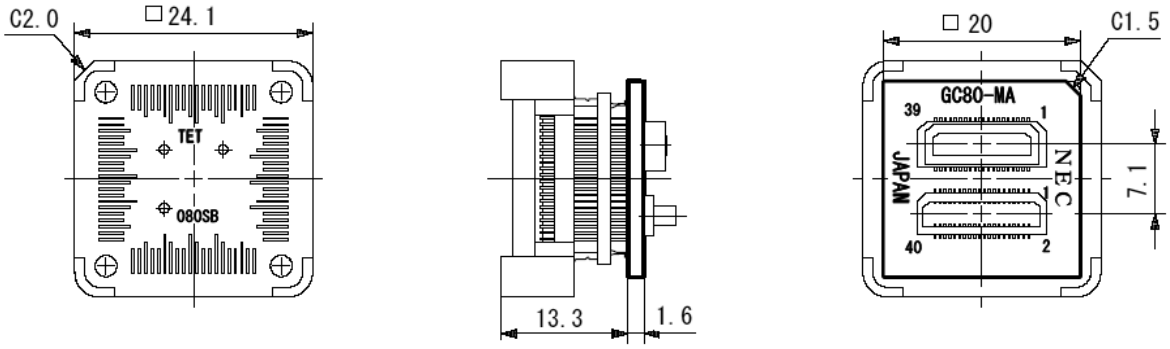


Figure 6-4-3. Mount Adapter for V850E/IA3 (80-Pin GC Package)

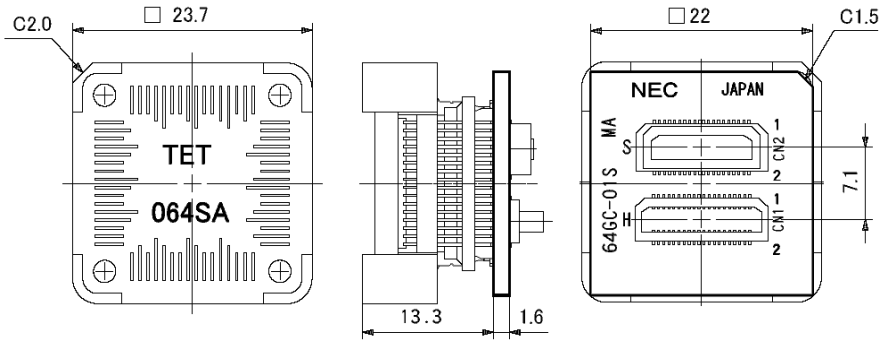


Figure 6-4-4. Mount Adapter for V850EA/IK1 (64-Pin GC Package)

6.5 Check Pin Adapter

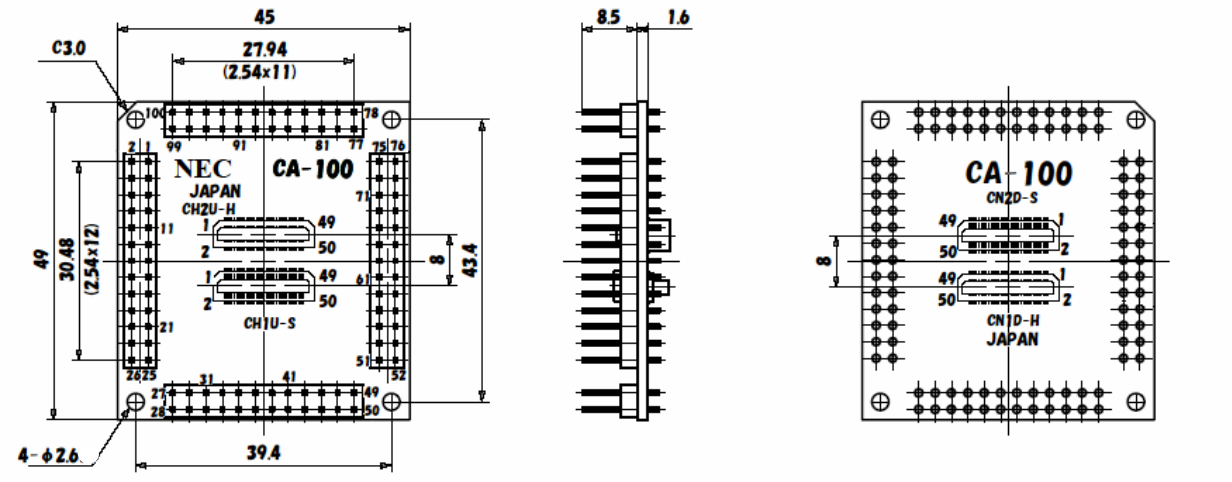


Figure 6-5-1. Check Pin Adapter for V850E/IA4

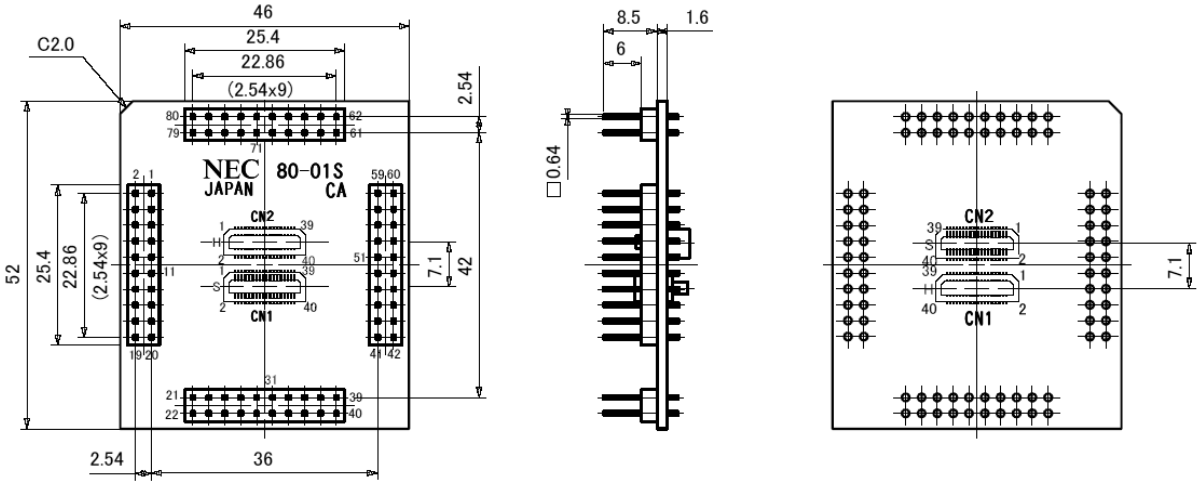


Figure 6-5-2. Check Pin Adapter for V850E/IA3

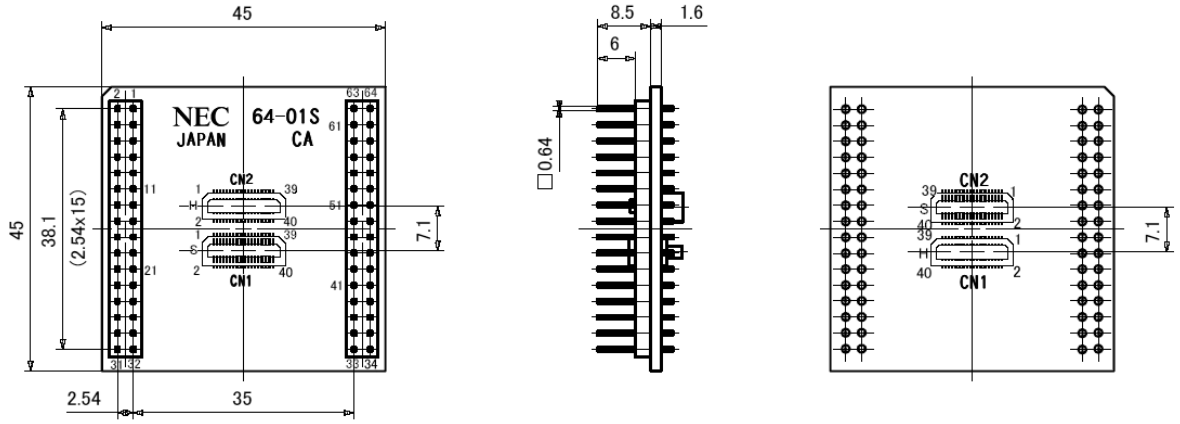


Figure 6-5-3. Check Pin Adapter for V850ES/IK1

6.6 Spacer Adapter

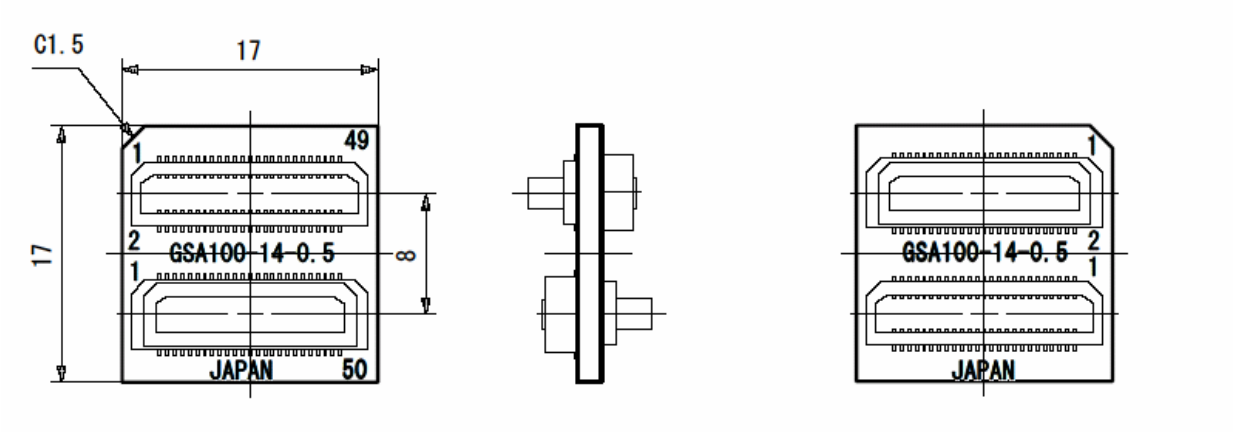


Figure 6-6-1. Spacer Adapter for V850E/IA4

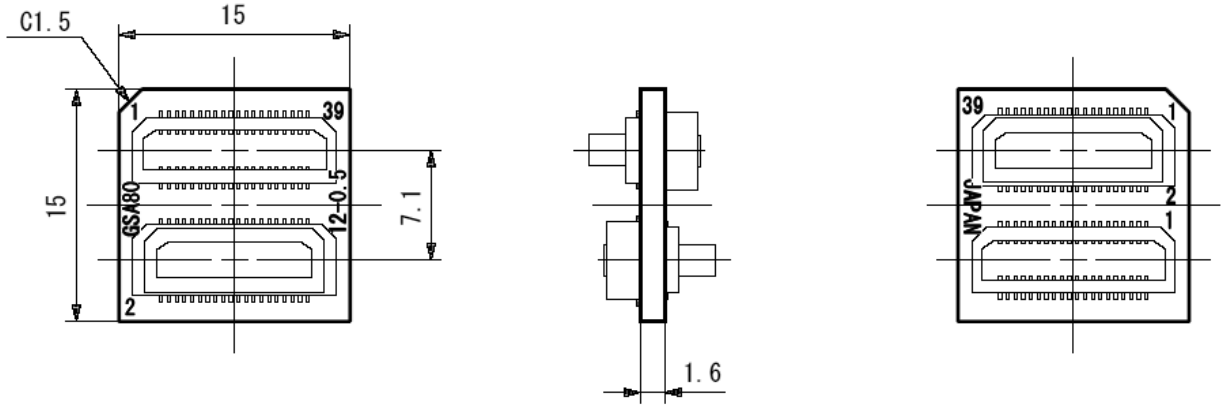


Figure 6-6-2. Spacer Adapter for V850E/IA3

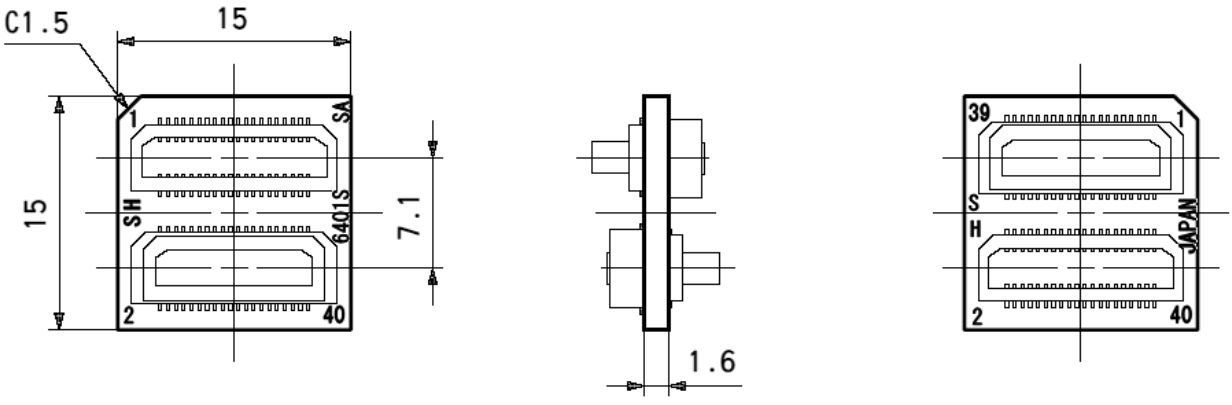


Figure 6-6-3. Spacer Adapter for V850ES/IK1

6.7 Extension Probe

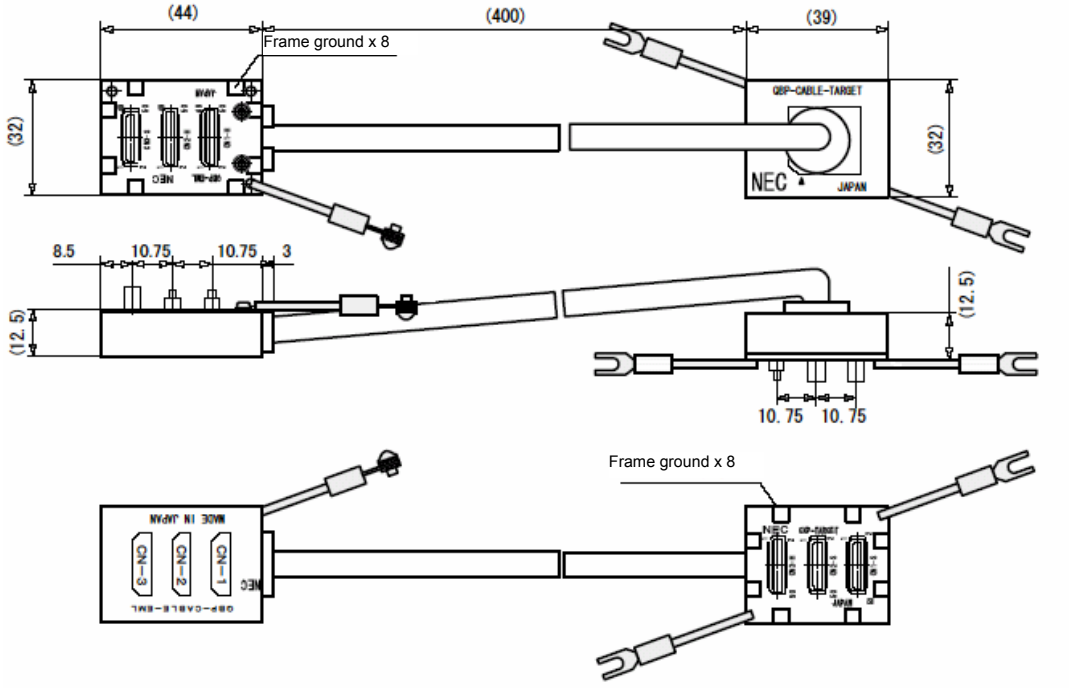


Figure 6-7-1. Extension Probe