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April 1st, 2010
Renesas Electronics Corporation

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RENESAS

User's Manual

IE-703288-G1-EM1

Emulation Board

Target Devices

V850ES/SG1
V850ES/SG2
V850ES/SJ2
V850ES/SG3
V850ES/SJ3

Document No. U16697EJ1V0UM00 (1st edition)
Date Published June 2006 NS CP(K)

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INTRODUCTION

Target Readers

This manual is intended for users who design and develop application systems using the V850ES/SG1, V850ES/SG2, V850ES/SJ2, V850ES/SG3, and V850ES/SJ3 microcontrollers.

Purpose

The purpose of this manual is to describe the basic specifications of the IE-703288-G1-EM1 and its proper operation.

Organization

This manual is broadly divided into the following parts.

- Outline
- Part names and functions
- Setup procedure
- Cautions
- Restrictions

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. Use the IE-703288-G1-EM1 connected to the in-circuit emulator (IE-V850ES-G1). This manual describes the basic setup procedures and switch settings of the IE-703288-G1-EM1 and IE-V850ES-G1. For the part names, functions, and configuration parts of the IE-V850ES-G1, refer to the **IE-V850ES-G1 User's Manual (U16313E)** provided separately.

To learn about the basic specifications and operation
→Read this manual in the order listed in **CONTENTS**.

To learn software settings such as the operation methods, command functions, etc., of the IE-V850ES-G1 or IE-703288-G1-EM1
→Read the user's manual of the debugger (sold separately) 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 ··· ×××× or ××××B
	Decimal ··· ××××
	Hexadecimal ··· ××××H

Prefix representing a power of 2 (address space, memory capacity):

K (kilo): $2^{10} = 1024$

M (mega): $2^{20} = 1024^2$

Terminology

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

Target device	This is the device to be emulated.
Target system	The system (user-built system) to be debugged. This includes the target program and hardware configured by the user.
Emulation CPU	The CPU that executes the program created by the user in the emulator.

Related Documents When using this manual, refer to the following manuals.
The related documents (user's manuals) 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
IE-V850ES-G1 (In-Circuit Emulator for V850ES)		U16313E
IE-703288-G1-EM1 (In-Circuit Emulator Emulation Board for V850ES/SG1, V850ES/SG2, V850ES/SJ2, V850ES/SG3, V850ES/SJ3)		This manual
CA850 Ver. 3.00 C Compiler Package	Operation	U17293E
	C Language	U17291E
	Assembly Language	U17292E
	Link Directives	U17294E
PM+ Ver. 6.00 Project Manager		U17178E
ID850 Ver.3.00 Integrated Debugger	Operation Windows™ based	U17358E
SM+ System Simulator	Operation	U18010E
	User Open Interface	U17663E
RX850 Ver. 3.20 Real-Time OS	Basics	U13430E
	Installation	U17419E
	Technical	U13431E
	Task Debugger	U17420E
RX850 Pro Ver. 3.20 Real-Time OS	Basics	U13773E
	Installation	U17421E
	Technical	U13772E
	Task Debugger	U17422E
AZ850 Ver. 3.30 System Performance Analyzer		U17423E
PG-FP4 Flash Memory Programmer		U15260E

Caution The related documents listed above are subject to change without notice.
Be sure to use the latest version of each document when designing.

CONTENTS

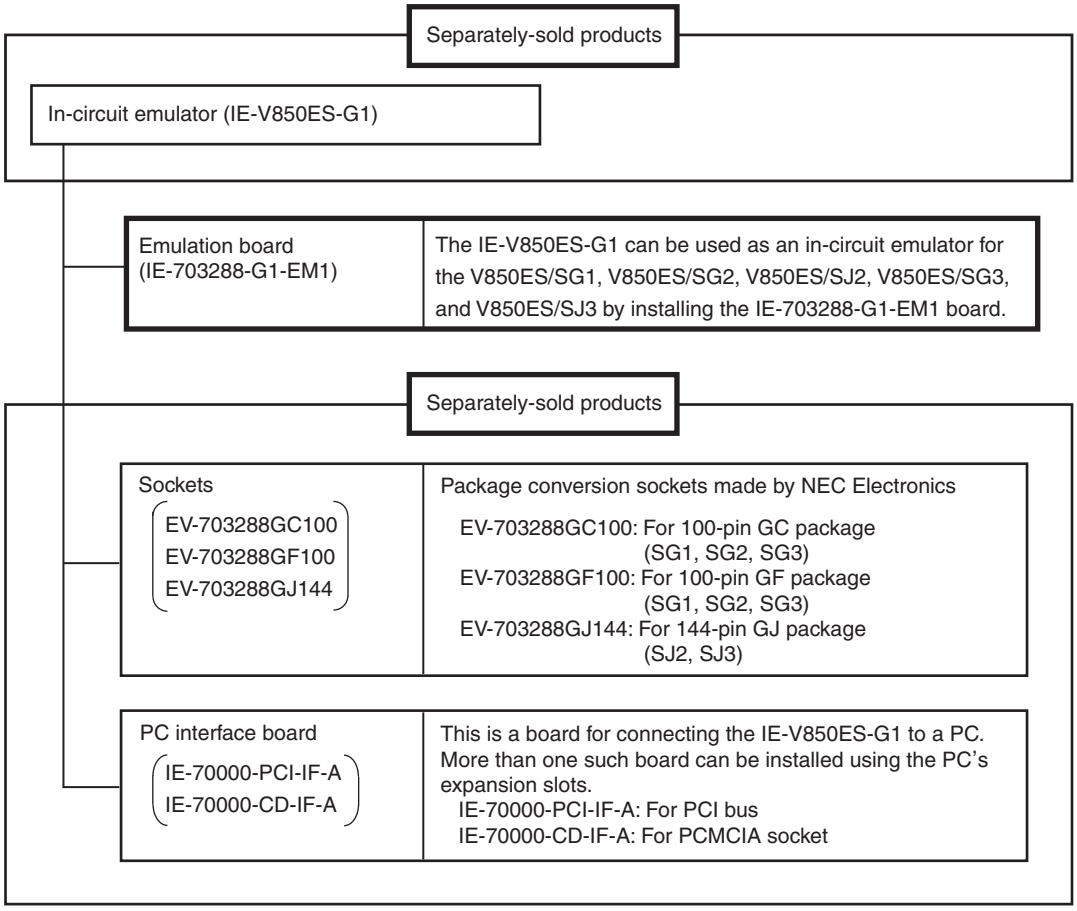
CHAPTER 1 OUTLINE

The IE-703288-G1-EM1 is an emulation board for the IE-V850ES-G1 in-circuit emulator.

Connected to the IE-V850ES-G1, the IE-703288-G1-EM1 can be used for efficient hardware and software debugging during system development using the V850ES/SG1, V850ES/SG2, V850ES/SJ2, V850ES/SG3, and V850ES/SJ3.

This manual describes the basic setup procedure and the switch settings of the IE-V850ES-G1 when connected to the IE-703288-G1-EM1. For the part names and functions of the IE-V850ES-G1, refer to the separate **IE-V850ES-G1 User's Manual (U16313E)**.

1.1 Product Configuration



1.2 Features

- Maximum operating frequency: 32 MHz
- Operating voltage range: 2.85 V to 3.6 V
- The following pins can be masked.
  NMI, $\overline{\text{WAIT}}$, $\overline{\text{RESET}}$, $\overline{\text{HLDRQ}}$
- The external dimensions of the IE-703288-G1-EM1 are listed below

Item		Value
External dimensions	Height	35 mm
	Width	205 mm
	Depth	140 mm

1.3 Function Specifications (When Connected to IE-V850ES-G1)

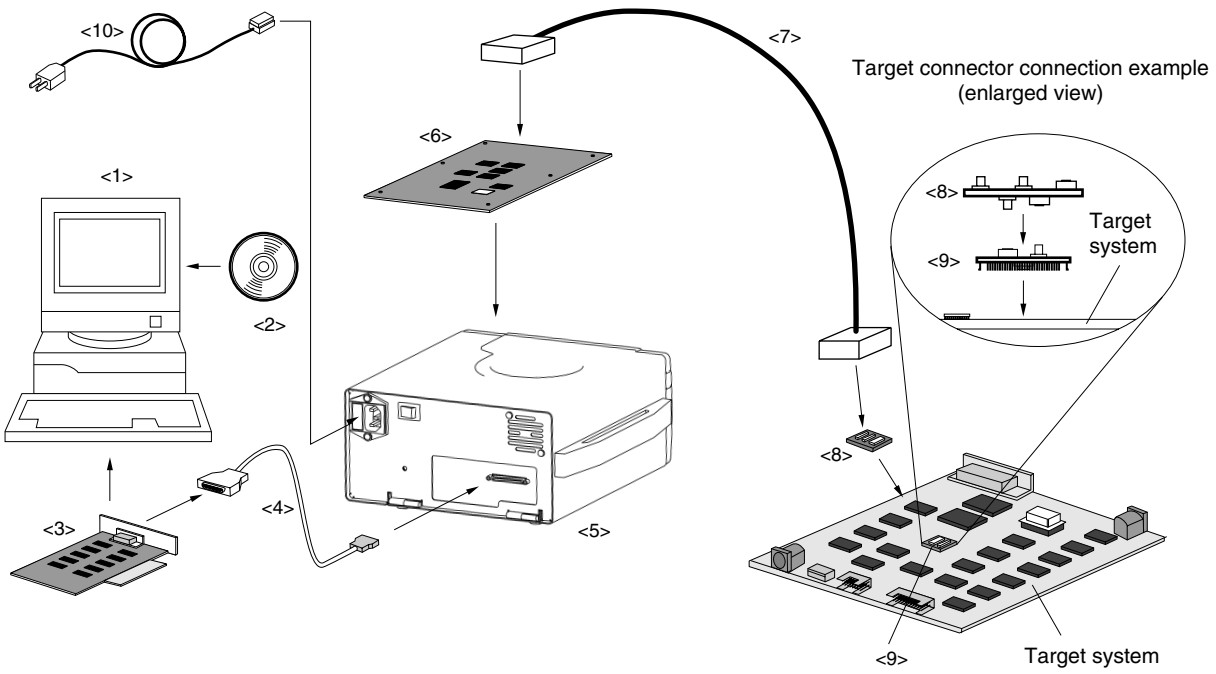
Item		Specification
Emulation memory capacity	Internal ROM	1 MB
	For user memory	4 MB
Execution/pass detection coverage memory capacity	Internal ROM	1 MB
	External memory	1 MB
Memory access detection coverage memory capacity	External memory	1 MB
Branch destination entry count calculation coverage memory capacity	Internal ROM	1 MB
	External memory	1 MB
Trace memory capacity		168 bits × 32 K frames
Time measurement function		Internal timers × 3
External logic probe		8-bit external trace possible
		Trace/break event setting possible
Break function		Event break
		Step execution break
		Forced break
		Fail-safe break • Illegal access to peripheral I/O • Access to guard area • Write to ROM area

Caution Some functions may not be supported depending on the debugger that is used.

1.4 System Configuration

The system configuration when using the IE-703288-G1-EM1 connected to the IE-V850ES-G1, which itself is connected to a PC (PC-9800 series or PC/AT™ compatible) is shown below.

Figure 1-1. System Configuration



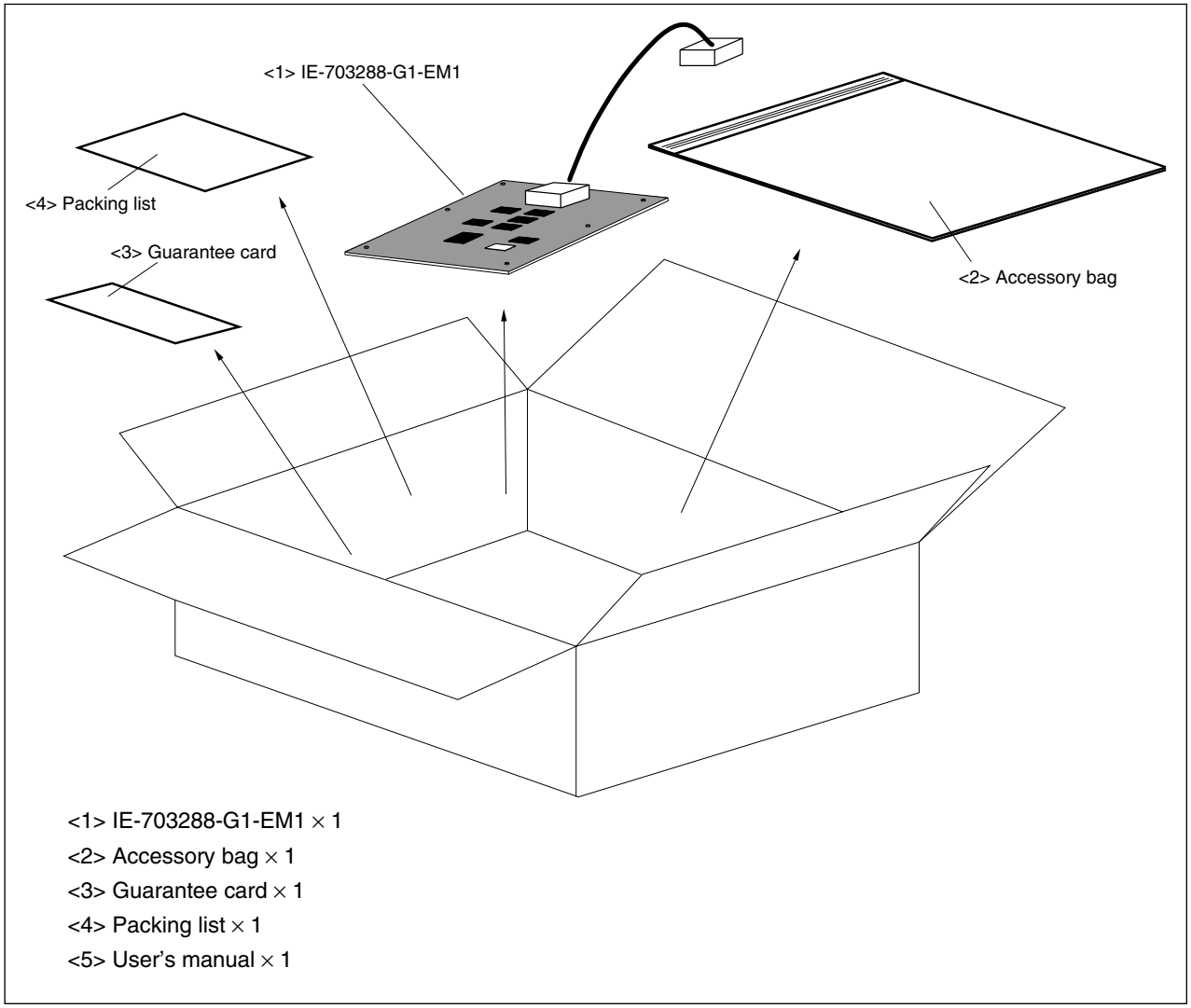
Remarks <1>: PC (PC-9800 series or PC/AT compatible)
<2>: Debugger (sold separately), device file (obtained separately)[Note]
<3>: PC interface board (IE-70000-PCI-IF-A, IE-70000-CD-IF-A: Sold separately)
<4>: PC interface cable (supplied with IE-V850ES-G1)
<5>: IE-V850ES-G1 (sold separately)
<6>: In-circuit emulator emulation board (this product)
<7>: Probe cable (supplied with this product)
<8>: Conversion adapter (EV-703288GC100 (sold separately), EV-703288GF100 (sold separately), EV-703288GJ144 (sold separately))
<9>: Target connector
<10>: Power-supply cable (3 types) (supplied with IE-V850ES-G1)

Note The device file can be downloaded from the NEC Electronics website. (URL: http://www.necel.com/micro)

1.5 Contents in Carton

The IE-703288-G1-EM1 package contains the IE-703288-G1-EM1 emulation board, a guarantee card, a packing list, this manual, and an accessory bag. Check whether the accessory bag contains the items listed below. If you find any missing or damaged items, contact an NEC Electronics sales representative or distributor.

Figure 1-2. Contents in Carton



Check whether the accessory bag contains the following items in addition to this manual and the packing list (× 1).

(a) Screws/washers:	6 sets (6 screws + 6 washers)
(b) Parts board:	× 2 (For mounting of a main system clock oscillator or subsystem clock oscillator)
(c) Oscillator (5 MHz):	× 1 (Supplied with IE-703288-G1-EM1 control code F or later)

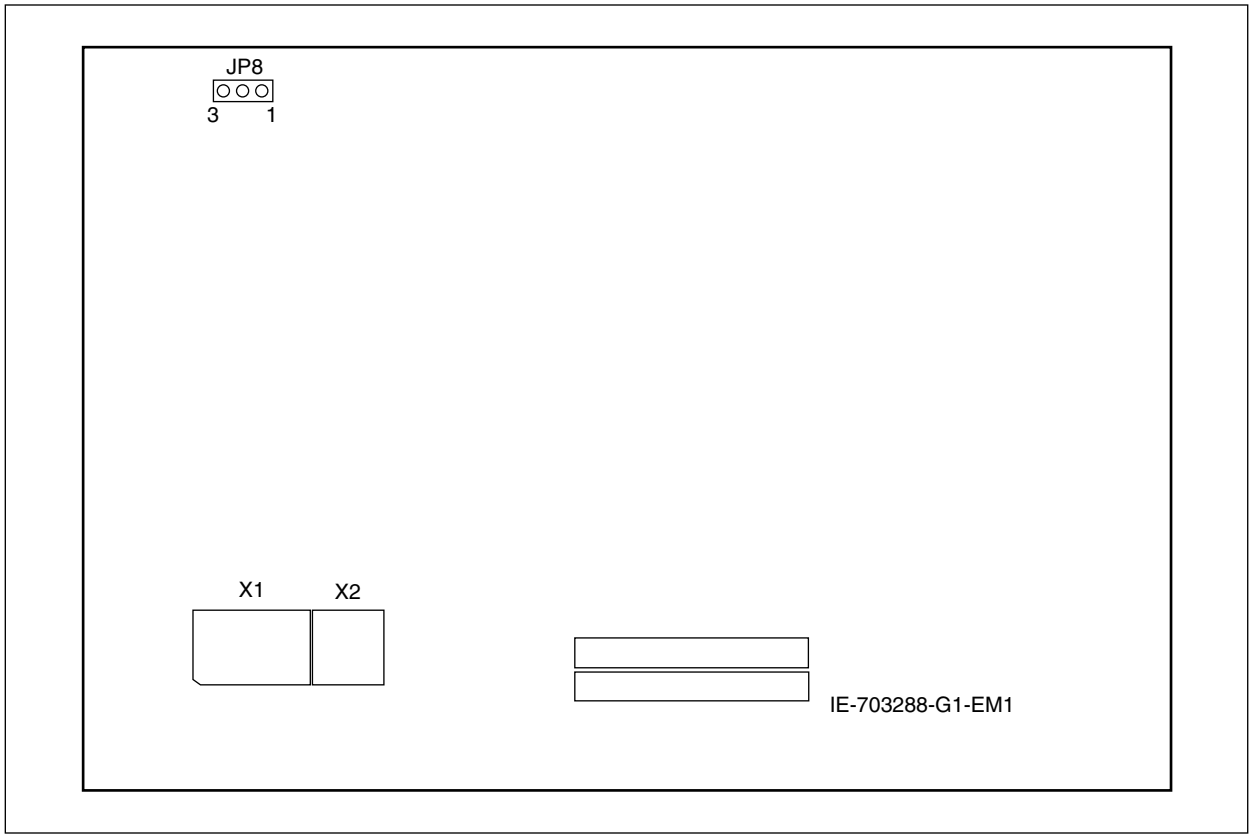
CHAPTER 2 PART NAMES AND FUNCTIONS

This chapter describes the part names and functions of the IE-703288-G1-EM1.

For the part names and functions of the IE-V850ES-G1, refer to the **IE-V850ES-G1 User's Manual (U16313E)**.

2.1 Part Names and Functions of IE-703288-G1-EM1

Figure 2-1. Part Names of IE-703288-G1-EM1



(1) Main clock oscillator socket (X1)

This socket is used to connect the main clock oscillator or the main clock resonator with the capacitor. (For details, refer to **3.2 Clock Settings**.)

(2) Subclock oscillator socket (X2)

This socket is used to connect the subclock oscillator or the subclock resonator with the capacitor. (For details, refer to **3.2 Clock Settings**.)

(3) JP8

This jumper is used to set operating voltage level of the PDH4 pin/PDH5 pin.

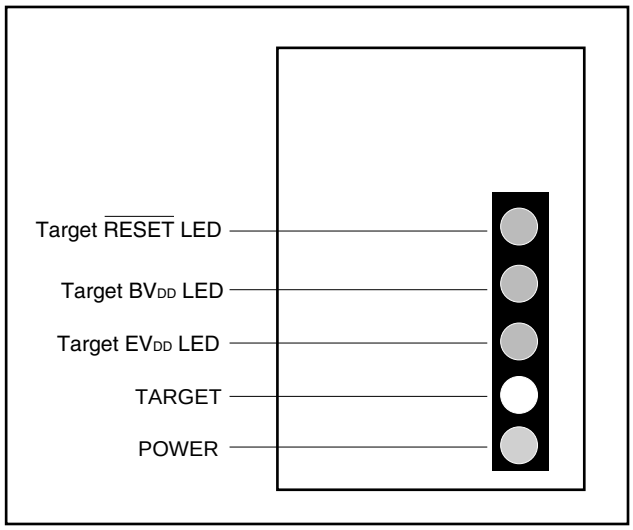
- When the target device to be Emulated is 144-pin package, use at 1-2 shorted. (Voltage level of BV_{DD} pin)
- When the target device to be Emulated is 100-pin package, use at 2-3 shorted. (Voltage level of EV_{DD} pin)

The factory-set condition of this jumper is 1-2 shorted.

2.2 LEDs Controlled by IE-703288-G1-EM1

Some of the LEDs mounted in the IE-V850ES-G1 are controlled by the IE-703288-G1-EM1.
For the LEDs that are controlled by the IE-V850ES-G1, refer to the **IE-V850ES-G1 User's Manual (U16313E)**.

Figure 2-2. LEDs Controlled by IE-703288-G1-EM1



(1) Target $\overline{\text{RESET}}$ LED

The status of the $\overline{\text{RESET}}$ signal connected to the target system is indicated as follows.

Lit (ON): The target system is connected and the $\overline{\text{RESET}}$ signal is active (GND level).

Unlit (OFF): Either the target system is not connected, or the $\overline{\text{RESET}}$ signal is inactive (V_{DD} level).

(2) Target BV_{DD} LED

The status of the BV_{DD} signal connected to the target system is indicated as follows.

Lit (ON): The target system is connected, and voltage is being applied to the BV_{DD} pin.

Unlit (OFF): Either the target system is not connected, or voltage is not being applied to the BV_{DD} pin.

(3) Target EV_{DD} LED

The status of the EV_{DD} signal connected to the target system is indicated as follows.

Lit (ON): The target system is connected and voltage is being applied to the EV_{DD} pin.

Unlit (OFF): Either the target system is not connected, or voltage is not being applied to the EV_{DD} pin.

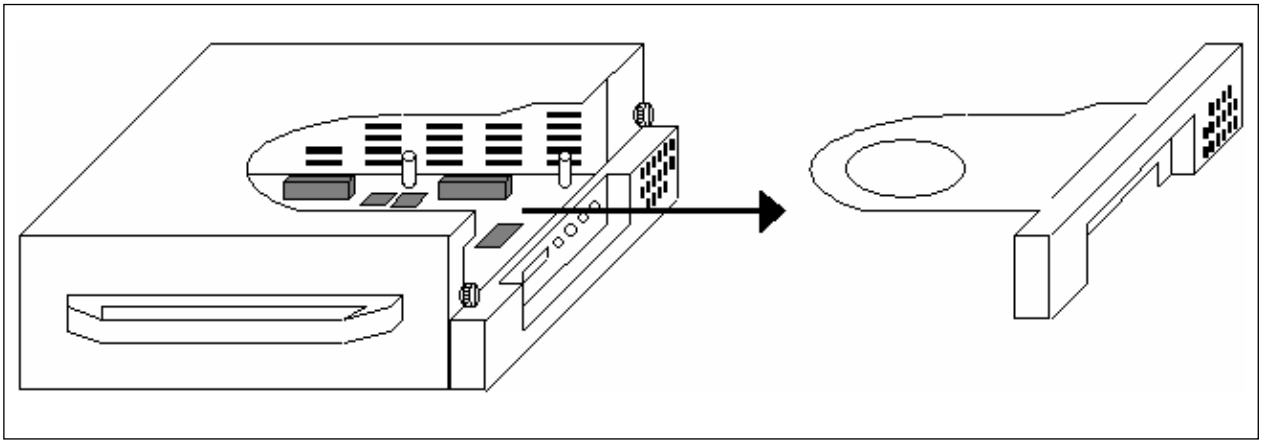
CHAPTER 3 SETUP PROCEDURE

This chapter describes how to connect the IE-703288-G1-EM1 to related products and how to replace the resonator.

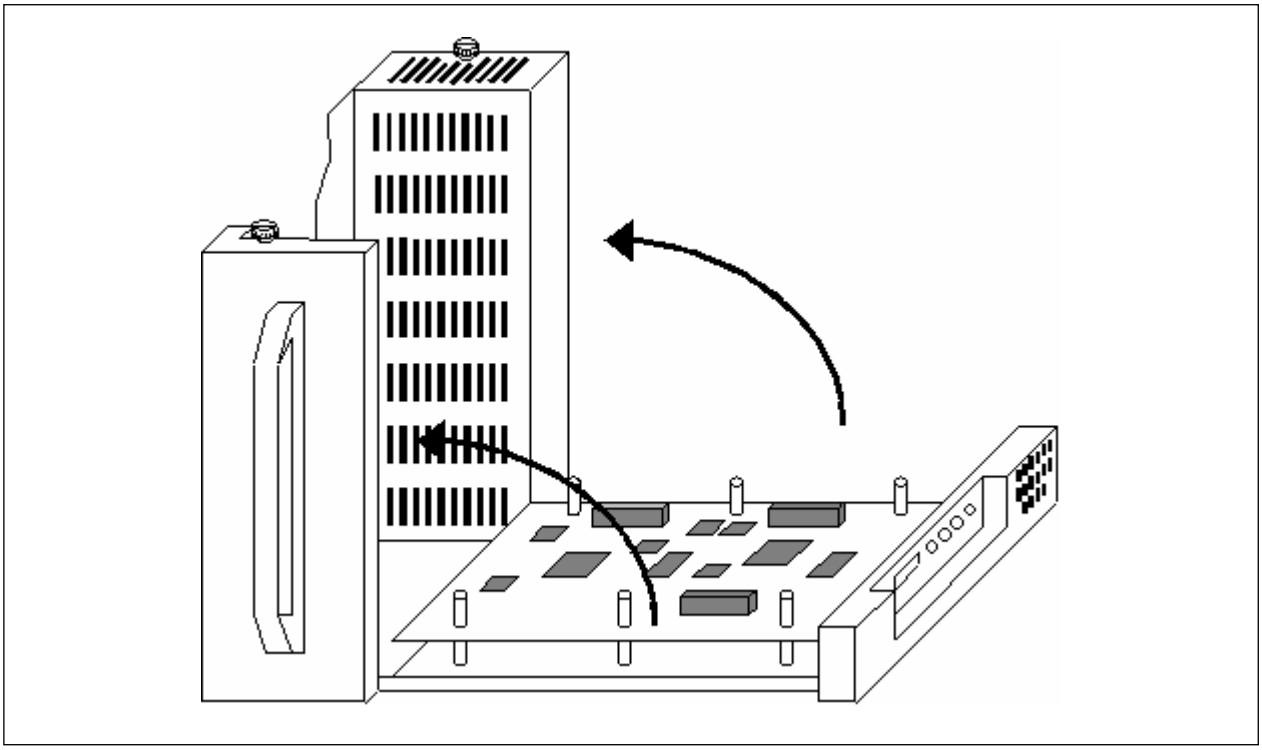
3.1 Connecting IE-V850ES-G1 and IE-703288-G1-EM1 with Probe

The following shows the procedure to connect the IE-V850ES-G1 and IE-703288-G1-EM1 with the probe.

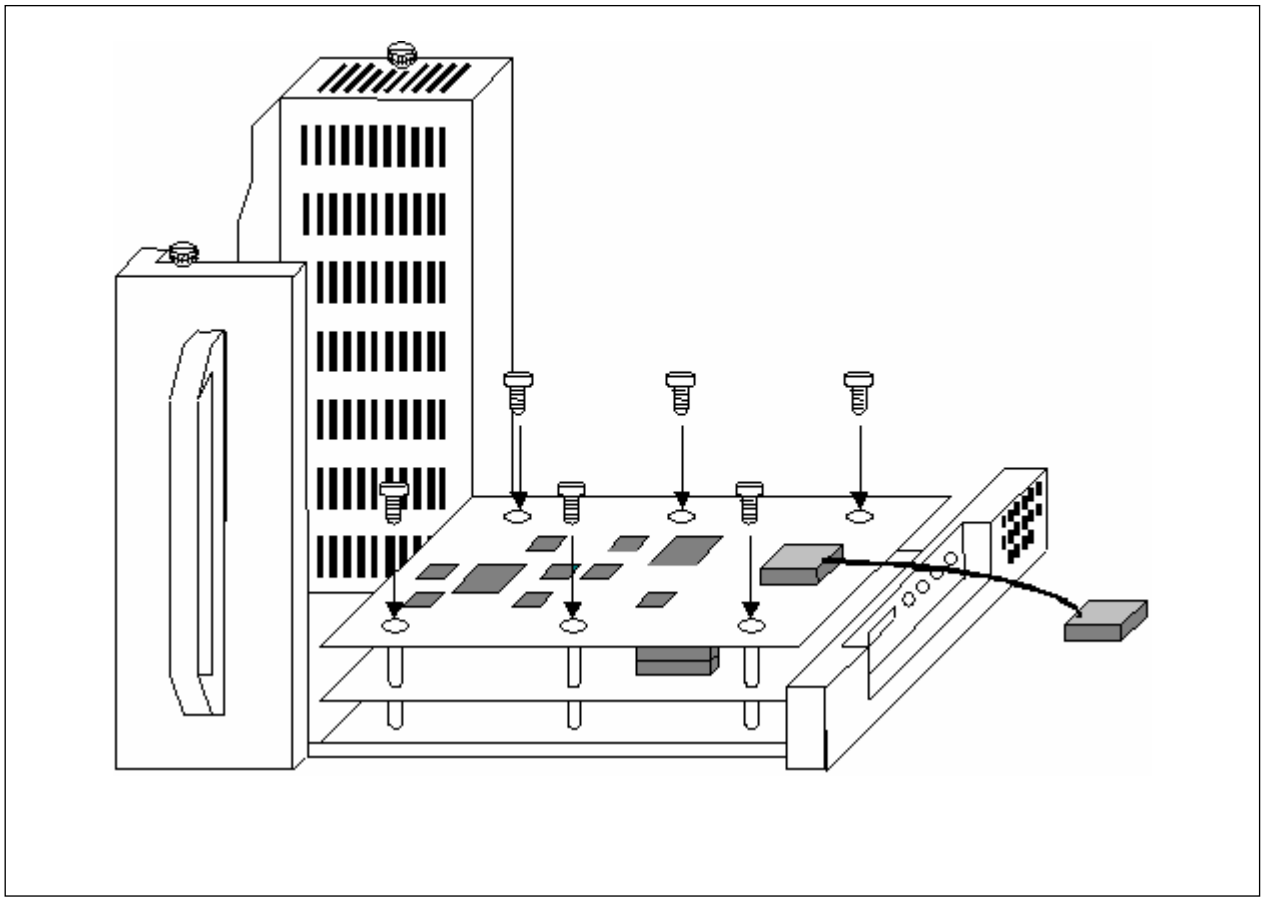
<1> Pull off the front cover of the IE-V850ES-G1.



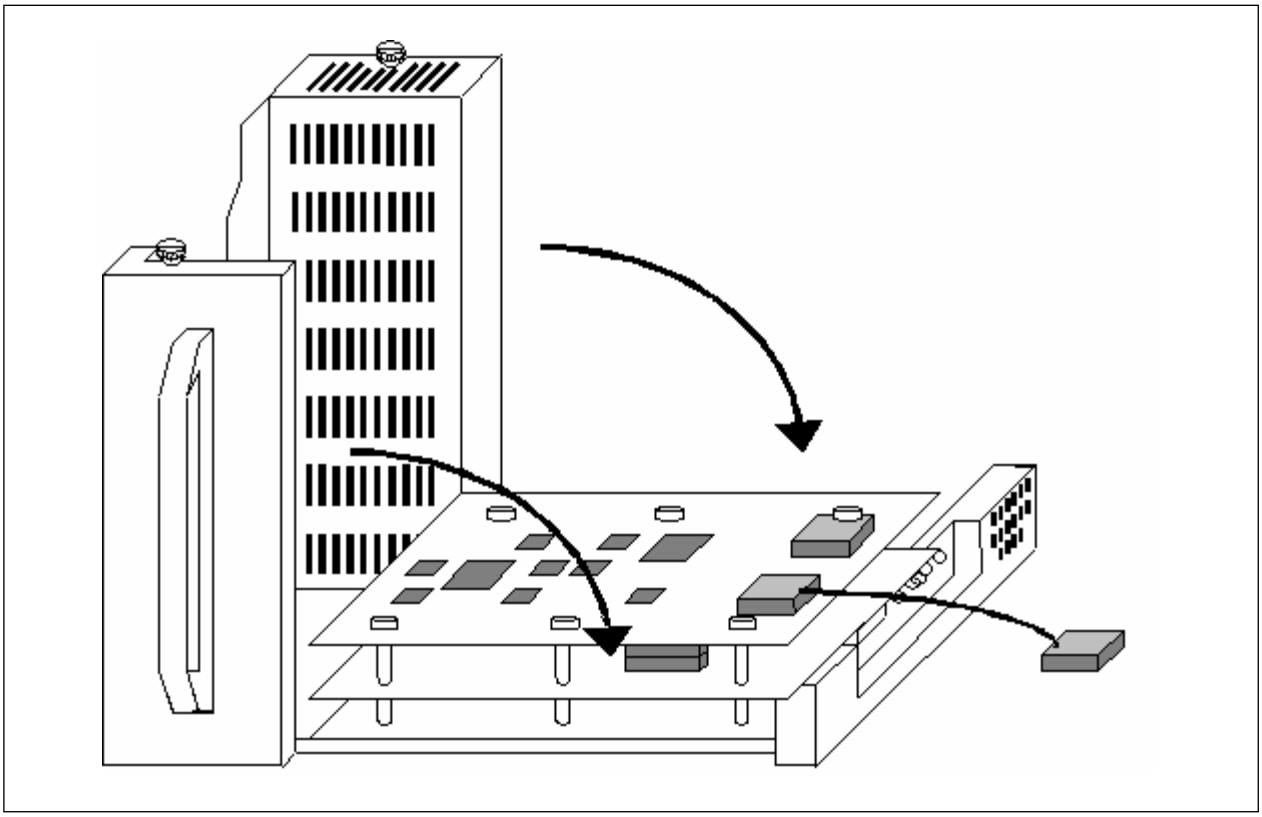
<2> Raise the frame of the IE-V850ES-G1 as shown.



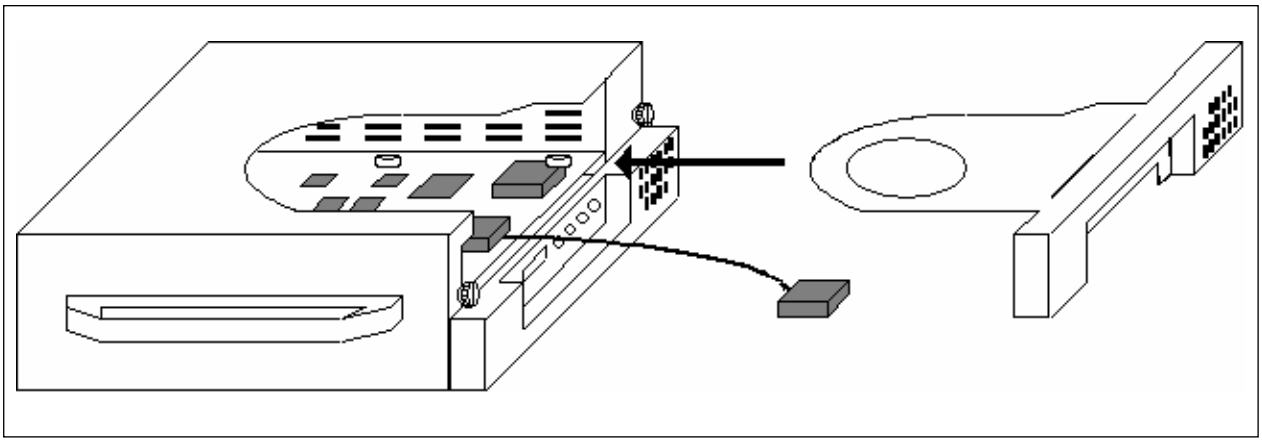
<3> With the main board and the IE-703288-G1-EM1 aligned as shown, insert three connectors on each side. Fix six cell spacers with an attached screw.



<4> Slowly lower the frame of the IE-V850ES-G1.



<5> Replace the front cover of the IE-V850ES-G1.



3.2 Clock Settings

To change the main clock frequency, replace the oscillator mounted in X1 on the IE-703288-G1-EM1 with an oscillator having the desired frequency, or mount the desired oscillator in X1.

To change the subclock frequency, replace the oscillator mounted into X2 on the IE-703288-G1-EM1 with an oscillator with the desired frequency, or mount the desired oscillator into X2.

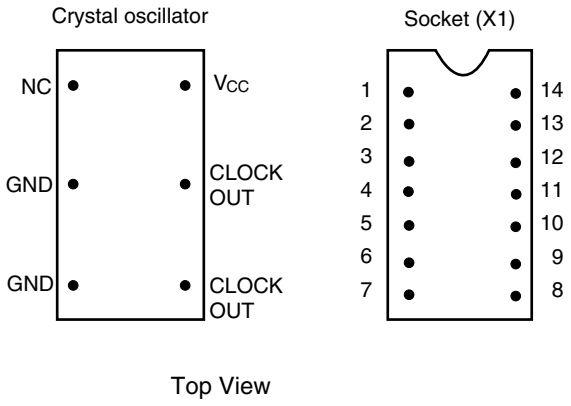
When the product is shipped, the following oscillators are mounted for generating each clock.

Item	Setting at Shipment
X1 (main clock)	A 5 MHz oscillator is mounted (for control code A to E).
	A 4 MHz oscillator is mounted (for control code F or later).
X2 (subclock)	A 32.768 kHz oscillator is mounted.

Caution X1 and X2 are the socket positions on the IE-703288-G1-EM1 but not the X1 and X2 pins in the target device.

(1) When using a crystal oscillator as the main clock

Mount the crystal oscillator into the socket, with which the pins are aligned, as shown below.



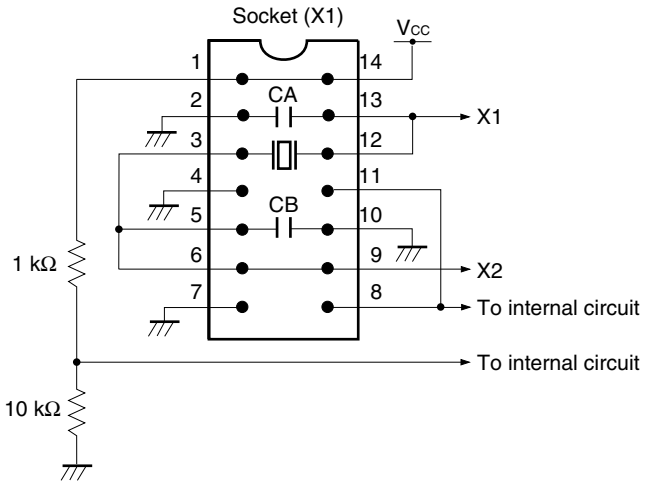
Top View

Crystal Oscillator Pin 8-Pin Type	Socket Pin No.
NC	1
GND	4
CLOCK OUT	11
V_{CC}	14

Crystal Oscillator Pin 14-Pin Type	Socket Pin No.
NC	1
GND	7
CLOCK OUT	8
V_{CC}	14

(2) When using a ceramic/crystal resonator as the main clock

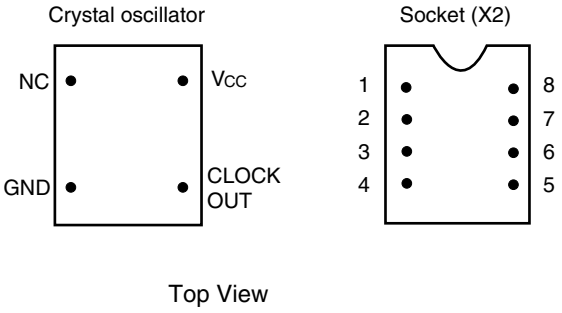
The circuit configuration of X1 (IC socket) is as follows. Mount the ceramic/crystal resonator with the required frequency, resistor, and capacitors onto the supplied parts board, and mount the board into X1 (IC socket).



Pin No.	Connection
1-14	Shorted
2-13	Capacitor CA
3-12	Ceramic/crystal resonator
5-10	Capacitor CB
6-9	Shorted

(3) When using a crystal oscillator as the subclock

Mount the crystal oscillator into the socket, with which the pins are aligned, as shown below.

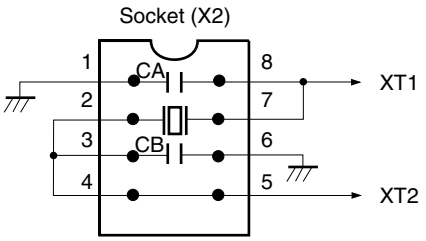


Top View

Crystal Oscillator Pin 8-Pin Type	Socket Pin No.
NC	1
GND	4
CLOCK OUT	5
VCC	8

(4) When using a ceramic/crystal resonator as the subclock

The circuit configuration of X2 (IC socket) is as follows. Mount the ceramic/crystal resonator with the required frequency, resistor, and capacitors onto the supplied parts board, and mount the board into X2 (IC socket).



Pin No.	Connection
1-8	Capacitor CA
2-7	Ceramic/crystal resonator
3-6	Capacitor CB
4-5	Shorted

Caution The IE-703288-G1-EM1 does not support clock oscillation by the resonator on the target system. Therefore, the IE-703288-G1-EM1 cannot emulate the operation between the resonator on the target system and the oscillator inside the target device.

CHAPTER 4 CAUTIONS

The following cautions apply to the IE-703288-G1-EM1.

4.1 Clock Generator

(1) Resonator to be connected

Oscillation by a resonator on the target system is not supported. Therefore, the clock oscillation operation on the target system cannot be emulated by the in-circuit emulator.

(2) Emulation of oscillation stabilization time after reset

Oscillation stabilization time is inserted after reset in the emulation target device, but it is not inserted in the in-circuit emulator.

(3) Operating clock after reset

The operating clock after reset is fxx/8 in the emulation target device, but in the in-circuit emulator, there may be a period in which the clock is not reset to fxx/8 (depending on the reset release timing).

4.2 Timing for Setting/Releasing Standby Mode

The timing for setting/releasing standby mode differs between the target device and the in-circuit emulator.
The differences are 1 clock or less for setting and 2 to 3 clocks for release.

4.3 DMA

The DCHC0 to DCHC3 registers for DMA are registers whose status is changed by reading. These registers cannot be displayed in the I/O register window of the debugger.

4.4 Operation during Break

There may be differences between the operation of the in-circuit emulator and target device because the peripheral functions of the in-circuit emulator operate during a break.
(However, the watchdog timer counter stops when the in-circuit emulator is in a break operation.)

4.5 Initial Value of Port

The initial values of each port are undefined when the IE system is activated without being connected to the target board.

4.6 Notes on Emulating the V850ES/SG3 or V850ES/SJ3

The emulation chip of IE-703288-G1-EM1 is V850ES/SJ2. Therefore, when emulating V850ES/SG3 or V850ES/SJ3, there is a difference in the specification shown below.

Difference	Emulator	V850ES/SG3, V850ES/SJ3
Rate of sampling time during conversion by A/D converter is in progress	4/26 clocks	8/26 clocks
Generation factor of low-voltage detection interrupt (INTLVI)	When the power supply voltage drops to lower than the detection voltage	When the power supply voltage drops/rises to lower/higher than the detection voltage
Output frequency of internal oscillator	200 kHz	220 kHz
Output resistance of D/A converter	3.50 kΩ	6.42 kΩ

4.7 Notes on Emulation of Self Programming Function

The IE-703288-G1-EM1 does not support emulation of the self programming function. To use this function, make an evaluation by using an on-chip debug emulator or the target device.

APPENDIX A TARGET INTERFACE CHARACTERISTICS

Take note of the following points when using the IE-703288-G1-EM1.

A.1 Connection to Target System

Be sure to turn off the power supply to the IE-V850ES-G1 before connecting it to the target system.

A.2 Target Interface Characteristics

The following shows the procedure to connect the IE-V850ES-G1 and IE-703288-G1-EM1 with the probe.

From a functional aspect, the target interface (signals that connect the in-circuit emulator and target system) appears to operate as if an actual device were connected, but there may be differences with the actual device from a performance aspect. The target interface of this product can be any one of the interfaces described in Figures A-1 to A-11. The processing of the target interface for each target device is described in Tables A-1.

Figure A-1. Equivalent Circuit A

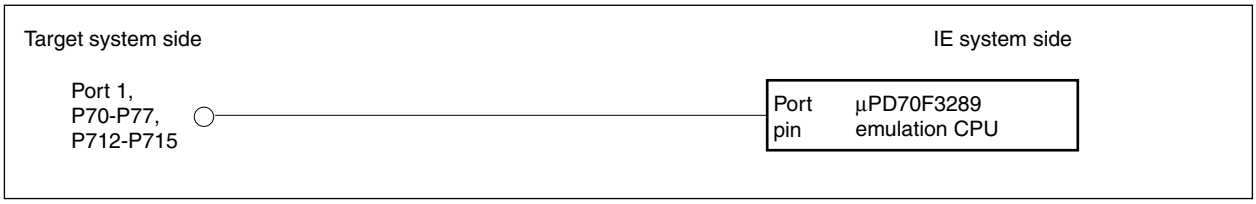


Figure A-2. Equivalent Circuit B

Figure A-3. Equivalent Circuit C

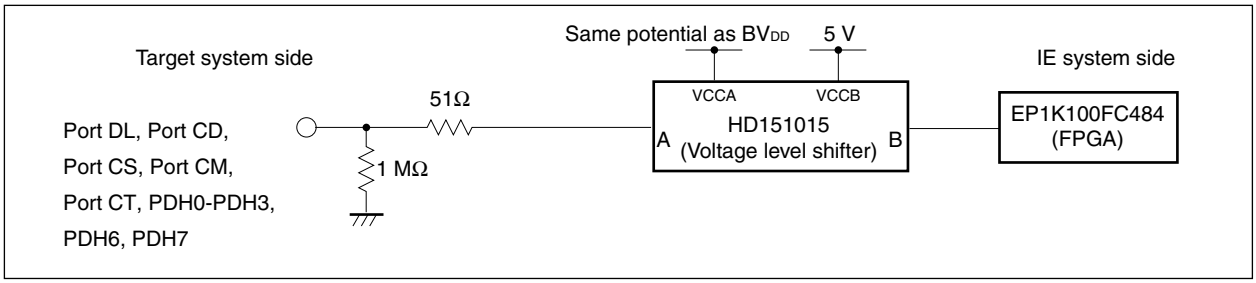


Figure A-4. Equivalent Circuit D

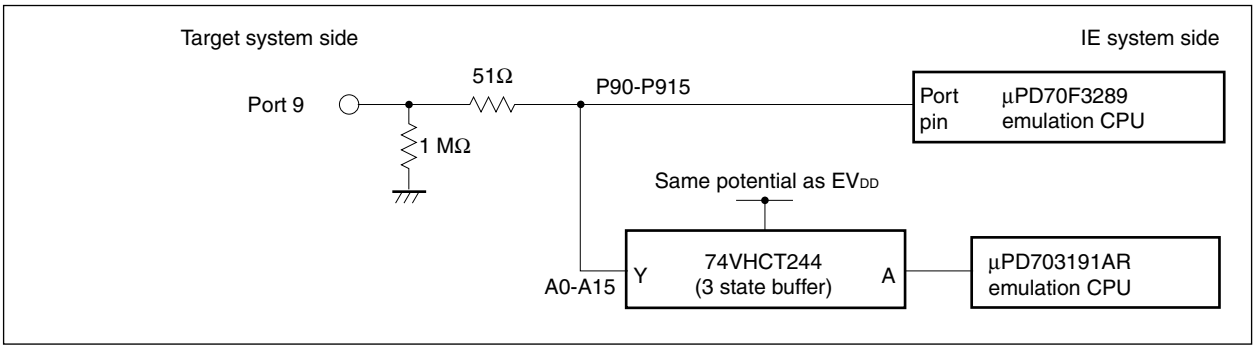


Figure A-5. Equivalent Circuit E

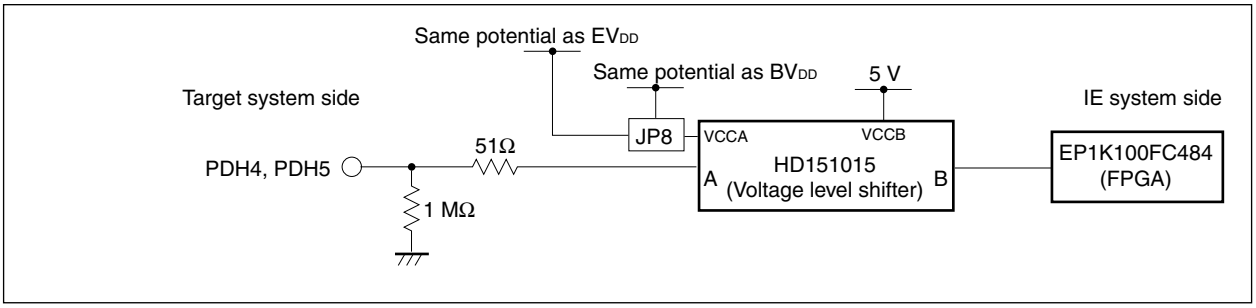


Figure A-6. Equivalent Circuit F

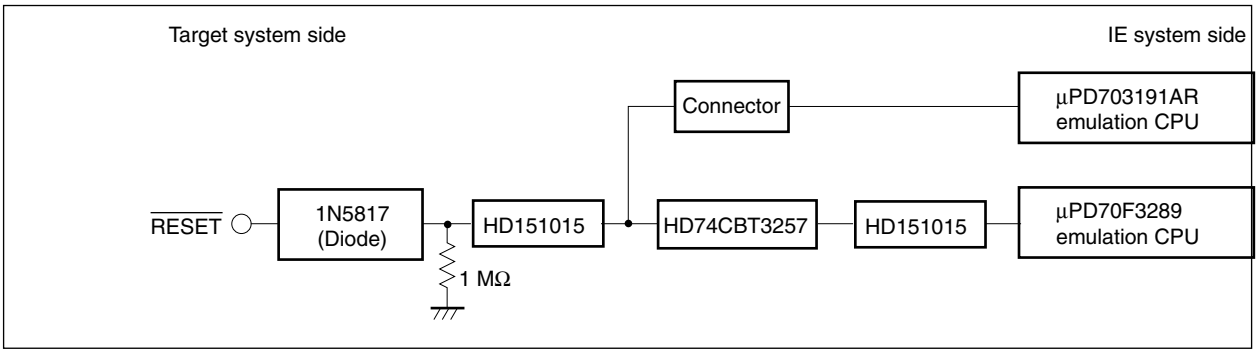
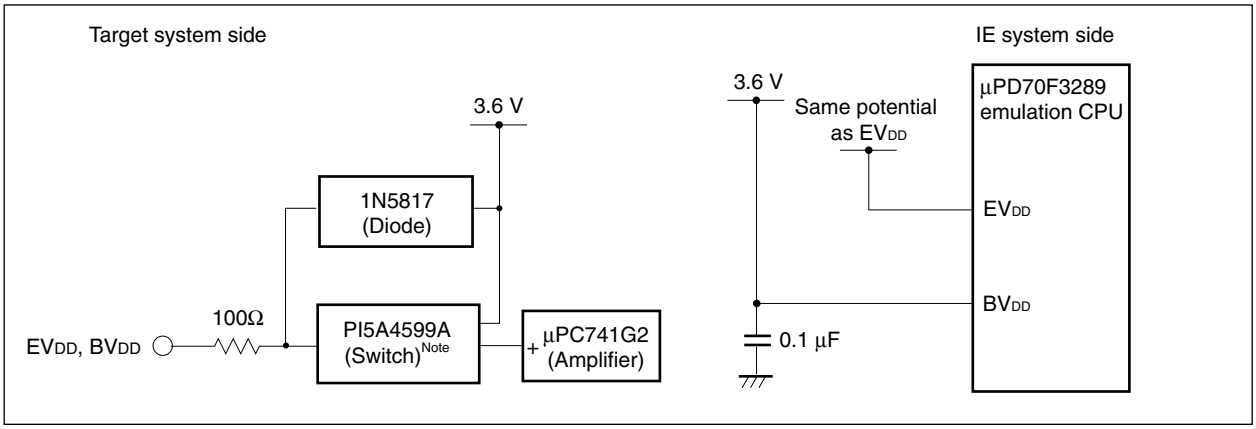


Figure A-7. Equivalent Circuit G



Note Conducts only when a target system is connected.

Figure A-8. Equivalent Circuit H

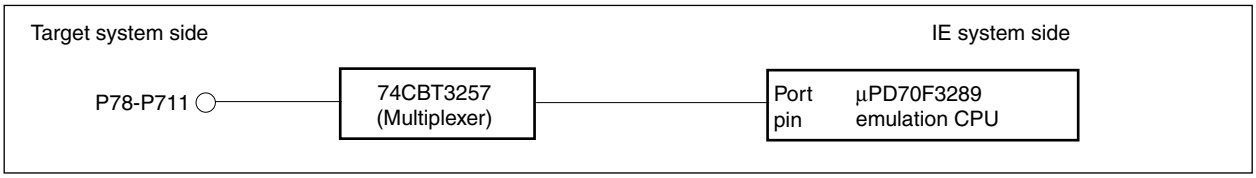


Figure A-9. Equivalent Circuit I

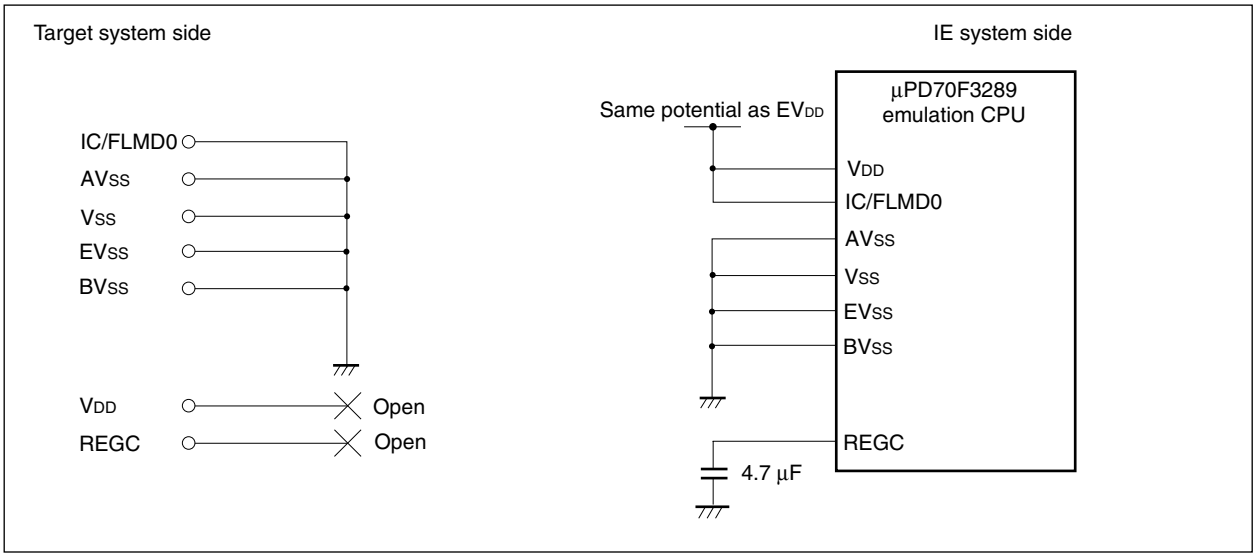


Figure A-10. Equivalent Circuit J

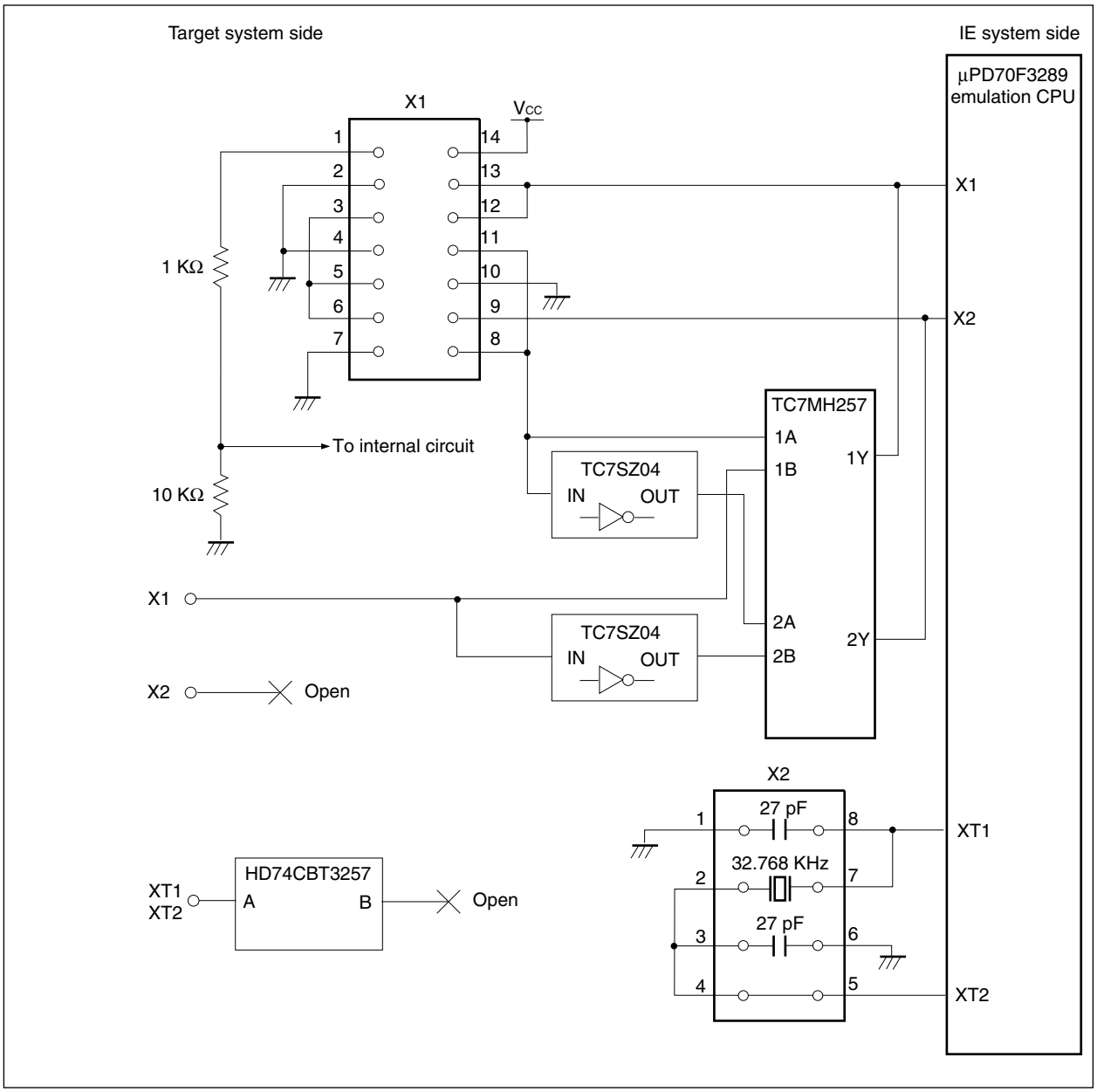


Figure A-11. Equivalent Circuit K

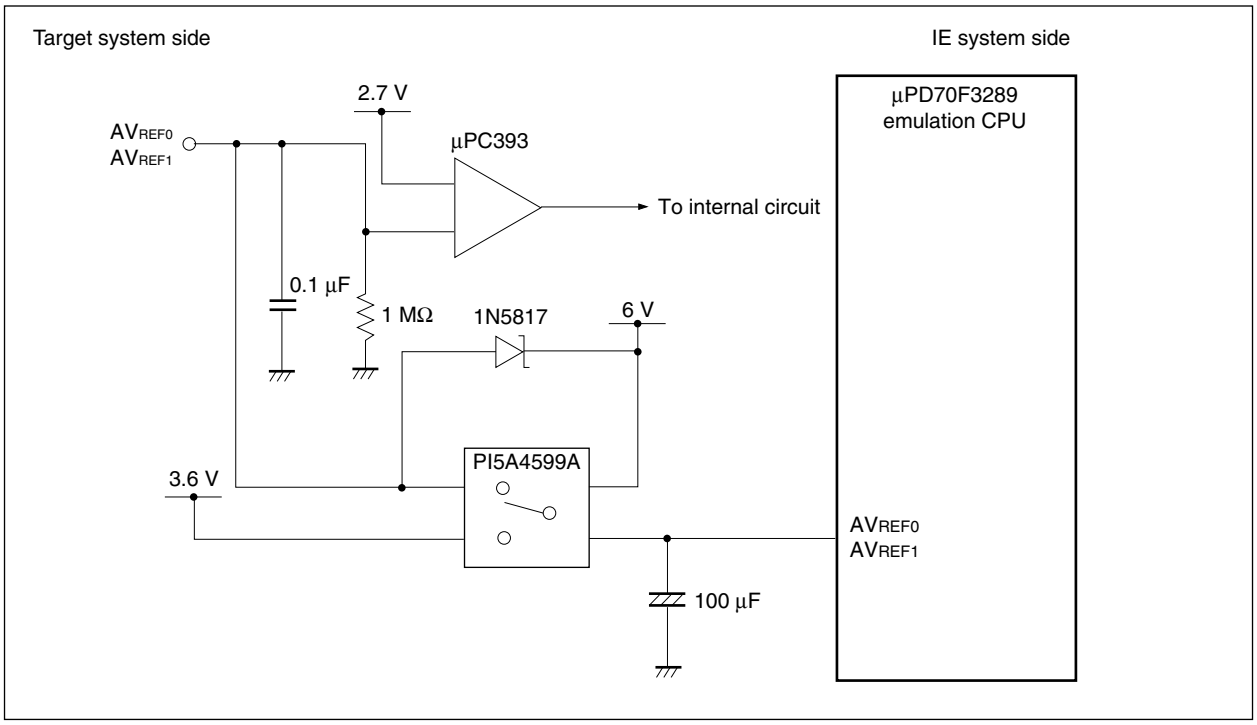


Table A-1. Pin Correspondence List (1/4)

Pin Name	V850ES/SJ2, SJ3 Pin No.	V850ES/SG1, SG2 (100GF) Pin No.	V850ES/SG1, SG2, SG3 (100GC) Pin No.	In-Circuit Emulator Processing
AV_{REF0}	1	3	1	Equivalent circuit K
AV_{SS}	2	4	2	Equivalent circuit I
P10/ANO0	3	5	3	Equivalent circuit A
P11/ANO1	4	6	4	Equivalent circuit A
AV_{REF1}	5	7	5	Equivalent circuit K
P00/TIP61/TOP61	6	□	□	Equivalent circuit B
P01/TIP60/TOP60	7	□	□	Equivalent circuit B
IC/FLMD0	8	10	8	Equivalent circuit I
V_{DD}	9	11	9	Equivalent circuit I
REGC	10	12	10	Equivalent circuit I
V_{SS}	11	13	11	Equivalent circuit I
X1	12	14	12	Equivalent circuit J
X2	13	15	13	Equivalent circuit J
$\overline{\text{RESET}}$	14	16	14	Equivalent circuit F
XT1	15	17	15	Equivalent circuit J
XT2	16	18	16	Equivalent circuit J
P02/NMI	17	19	17	Equivalent circuit B
P03/INTP0/ADTRG	18	20	18	Equivalent circuit B
P04/INTP1	19	21	19	Equivalent circuit B
P05/INTP2/$\overline{\text{DRST}}$	20	22	20	Equivalent circuit B
P06/INTP3	21	23	21	Equivalent circuit B
P40/SIB0/SDA01	22	24	22	Equivalent circuit B
P41/SOB0/SCL01	23	25	23	Equivalent circuit B
P42/$\overline{\text{SCKB0}}$	24	26	24	Equivalent circuit B
P30/TXDA0/SOB4	25	27	25	Equivalent circuit B
P31/RXDA0/INTP7/SIB4	26	28	26	Equivalent circuit B
P32/ASCKA0/$\overline{\text{SCKB4}}$/ TIP00/TOP00	27	29	27	Equivalent circuit B
P33/TIP01/TOP01/CTXD1	28	30	28	Equivalent circuit B
P34/TIP10/TOP10/CRXD1	29	31	29	Equivalent circuit B
P35/TIP11/TOP11	30	32	30	Equivalent circuit B
P36/$\overline{\text{IETX0}}$/CTXD0	31	33	31	Equivalent circuit B
P37/$\overline{\text{IERX0}}$/CRXD0	32	34	32	Equivalent circuit B
EV_{SS}	33	35	33	Equivalent circuit I
EV_{DD}	34	36	34	Equivalent circuit G
P38/TXDA2/SDA00	35	37	35	Equivalent circuit B
P39/RXDA2/SCL00	36	38	36	Equivalent circuit B
P50/TIQ01/KR0/TOQ01/ RTP00	37	39	37	Equivalent circuit B

Remark The above table lists the pin names in the V850ES/SJ2. When using the target device other than V850ES/SJ2, there are differences in the alternate-function pins. For details, see the user's manual for the device.

Table A-1. Pin Correspondence List (2/4)

Pin Name	V850ES/SJ2, SJ3 Pin No.	V850ES/SG1, SG2 (100GF) Pin No.	V850ES/SG1, SG2, SG3 (100GC) Pin No.	In-Circuit Emulator Processing
P51/TIQ02/KR1/TOQ02/ RTP01	38	40	38	Equivalent circuit B
P52/TIQ03/KR2/TOQ03/ RTP02/DDI	39	41	39	Equivalent circuit B
P53/SIB2/KR3/TIQ00/ TOQ00/RTP03/DDO	40	42	40	Equivalent circuit B
P54/SOB2/KR4/RTP04/ DCK	41	43	41	Equivalent circuit B
P55/$\overline{\text{SCKB2}}$/KR5/RTP05/ DMS	42	44	42	Equivalent circuit B
P60/RTP10	43	□	□	Equivalent circuit B
P61/RTP11	44	□	□	Equivalent circuit B
P62/RTP12	45	□	□	Equivalent circuit B
P63/RTP13	46	□	□	Equivalent circuit B
P64/RTP14	47	□	□	Equivalent circuit B
P65/RTP15	48	□	□	Equivalent circuit B
P66/SIB5	49	□	□	Equivalent circuit B
P67/SOB5	50	□	□	Equivalent circuit B
P68/$\overline{\text{SCKB5}}$	51	□	□	Equivalent circuit B
P69/TIP70/TOP70	52	□	□	Equivalent circuit B
P610/TIP71	53	□	□	Equivalent circuit B
P611/TOP71	54	□	□	Equivalent circuit B
P612/TIP80/TOP80	55	□	□	Equivalent circuit B
P613/TIP81/TOP81	56	□	□	Equivalent circuit B
P614	57	□	□	Equivalent circuit B
P615	58	□	□	Equivalent circuit B
P80/RXDA3/INTP8	59	□	□	Equivalent circuit B
P81/TXDA3	60	□	□	Equivalent circuit B
P90/A0/KR6/TXDA1/ SDA02	61	45	43	Equivalent circuit D
P91/A1/KR7/RXDA1/ SCL02	62	46	44	Equivalent circuit D
P92/A2/TIP41/TOP41	63	47	45	Equivalent circuit D
P93/A3/TIP40/TOP40	64	48	46	Equivalent circuit D
P94/A4/TIP31/TOP31	65	49	47	Equivalent circuit D
P95/A5/TIP30/TOP30	66	50	48	Equivalent circuit D
P96/A6/TIP21/TOP21	67	51	49	Equivalent circuit D
P97/A7/SIB1/TIP20/ TOP20	68	52	50	Equivalent circuit D
P98/A8/SOB1	69	53	51	Equivalent circuit D

Remark The above table lists the pin names in the V850ES/SJ2. When using the target device other than V850ES/SJ2, there are differences in the alternate-function pins. For details, see the user's manual for the device.

Table A-1. Pin Correspondence List (3/4)

Pin Name	V850ES/SJ2, SJ3 Pin No.	V850ES/SG1, SG2 (100GF) Pin No.	V850ES/SG1, SG2, SG3 (100GC) Pin No.	In-Circuit Emulator Processing
P99/A9/$\overline{\text{SCKB1}}$	70	54	52	Equivalent circuit D
P910/A10/SIB3	71	55	53	Equivalent circuit D
P911/A11/SOB3	72	56	54	Equivalent circuit D
P912/A12/$\overline{\text{SCKB3}}$	73	57	55	Equivalent circuit D
P913/A13/INTP4	74	58	56	Equivalent circuit D
P914/A14/INTP5/TIP51/ TOP51	75	59	57	Equivalent circuit D
P915/A15/INTP6/TIP50/ TOP50	76	60	58	Equivalent circuit D
PCD0	77	□	□	Equivalent circuit C
PCD1	78	□	□	Equivalent circuit C
PCD2	79	□	□	Equivalent circuit C
PCD3	80	□	□	Equivalent circuit C
PCS0/$\overline{\text{CS0}}$	81	□	□	Equivalent circuit C
PCS1/$\overline{\text{CS1}}$	82	□	□	Equivalent circuit C
PCS2/$\overline{\text{CS2}}$	83	□	□	Equivalent circuit C
PCS3/$\overline{\text{CS3}}$	84	□	□	Equivalent circuit C
PCM0/$\overline{\text{WAIT}}$	85	63	61	Equivalent circuit C
PCM1/CLKOUT	86	64	62	Equivalent circuit C
PCM2/$\overline{\text{HLDAK}}$	87	65	63	Equivalent circuit C
PCM3/$\overline{\text{HLDRQ}}$	88	66	64	Equivalent circuit C
PCM4	89	□	□	Equivalent circuit C
PCM5	90	□	□	Equivalent circuit C
PCS4	91	□	□	Equivalent circuit C
PCS5	92	□	□	Equivalent circuit C
PCS6	93	□	□	Equivalent circuit C
PCS7	94	□	□	Equivalent circuit C
PCT0/$\overline{\text{WR0}}$	95	67	65	Equivalent circuit C
PCT1/$\overline{\text{WR1}}$	96	68	66	Equivalent circuit C
PCT2	97	□	□	Equivalent circuit C
PCT3	98	□	□	Equivalent circuit C
PCT4/$\overline{\text{RD}}$	99	69	67	Equivalent circuit C
PCT5	100	□	□	Equivalent circuit C
PCT6/ASTB	101	70	68	Equivalent circuit C
PCT7	102	□	□	Equivalent circuit C
BV_{SS}	103	71	69	Equivalent circuit I
BV_{DD}	104	72	70	Equivalent circuit G
PDL0/AD0	105	73	71	Equivalent circuit C
PDL1/AD1	106	74	72	Equivalent circuit C

Remark The above table lists the pin names in the V850ES/SJ2. When using the target device other than V850ES/SJ2, there are differences in the alternate-function pins. For details, see the user's manual for the device.

Table A-1. Pin Correspondence List (4/4)

Pin Name	V850ES/SJ2, SJ3 Pin No.	V850ES/SG1, SG2 (100GF) Pin No.	V850ES/SG1, SG2, SG3 (100GC) Pin No.	In-Circuit Emulator Processing
PDL2/AD2	107	75	73	Equivalent circuit C
PDL3/AD3	108	76	74	Equivalent circuit C
PDL4/AD4	109	77	75	Equivalent circuit C
PDL5/AD5/FLMD1	110	78	76	Equivalent circuit C
PDL6/AD6	111	79	77	Equivalent circuit C
PDL7/AD7	112	80	78	Equivalent circuit C
PDL8/AD8	113	81	79	Equivalent circuit C
PDL9/AD9	114	82	80	Equivalent circuit C
PDL10/AD10	115	83	81	Equivalent circuit C
PDL11/AD11	116	84	82	Equivalent circuit C
PDL12/AD12	117	85	83	Equivalent circuit C
PDL13/AD13	118	86	84	Equivalent circuit C
PDL14/AD14	119	87	85	Equivalent circuit C
PDL15/AD15	120	88	86	Equivalent circuit C
PDH0/A16	121	89	87	Equivalent circuit C
PDH1/A17	122	90	88	Equivalent circuit C
PDH2/A18	123	61	59	Equivalent circuit C
PDH3/A19	124	62	60	Equivalent circuit C
PDH4/A20	125	8	6	Equivalent circuit E
PDH5/A21	126	9	7	Equivalent circuit E
PDH6/A22	127	□	□	Equivalent circuit C
PDH7/A23	128	□	□	Equivalent circuit C
P715/ANI15	129	□	□	Equivalent circuit A
P714/ANI14	130	□	□	Equivalent circuit A
P713/ANI13	131	□	□	Equivalent circuit A
P712/ANI12	132	□	□	Equivalent circuit A
P711/ANI11	133	91	89	Equivalent circuit H
P710/ANI10	134	92	90	Equivalent circuit H
P79/ANI9	135	93	91	Equivalent circuit H
P78/ANI8	136	94	92	Equivalent circuit H
P77/ANI7	137	95	93	Equivalent circuit A
P76/ANI6	138	96	94	Equivalent circuit A
P75/ANI5	139	97	95	Equivalent circuit A
P74/ANI4	140	98	96	Equivalent circuit A
P73/ANI3	141	99	97	Equivalent circuit A
P72/ANI2	142	100	98	Equivalent circuit A
P71/ANI1	143	1	99	Equivalent circuit A
P70/ANI0	144	2	100	Equivalent circuit A

Remark The above table lists the pin names in the V850ES/SJ2. When using the target device other than V850ES/SJ2, there are differences in the alternate-function pins. For details, see the user's manual for the device.

A.3 Power Application/Power off Procedure

(1) When activating the emulator

Follow the sequence shown below when activating the emulator.

<1> Power application to the emulator

<2> Power application to the target

<3> Debugger activation

(2) When terminating the emulator

Follow the sequence shown below when terminating the emulator.

<1> Debugger termination

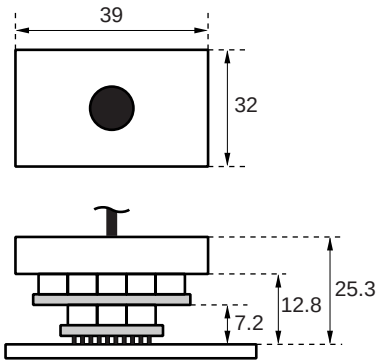
<2> Power shutdown to the target

<3> Emulator power shutdown

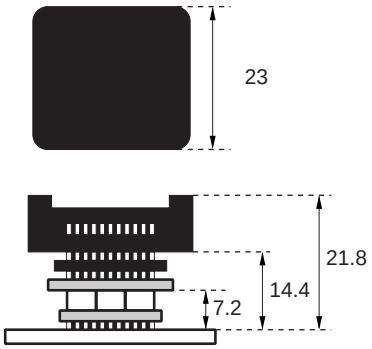
APPENDIX B EXTERNAL VIEWS

(1) EV-703288GC100 (for 100GC) Unit: mm

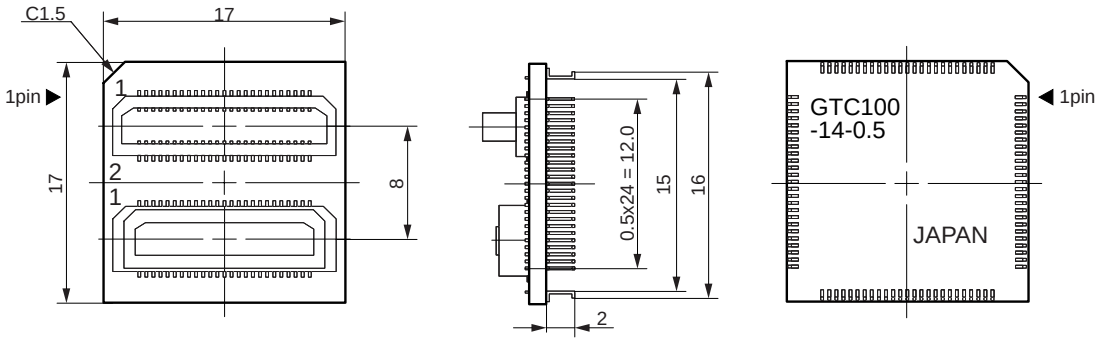
Dimensions with GX-Probe connected



Dimensions with IC mounted



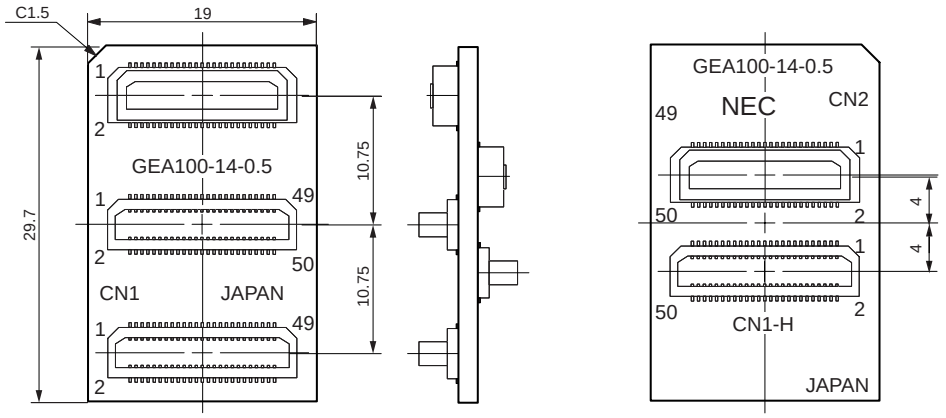
Target connector for 100GC



TOP VIEW

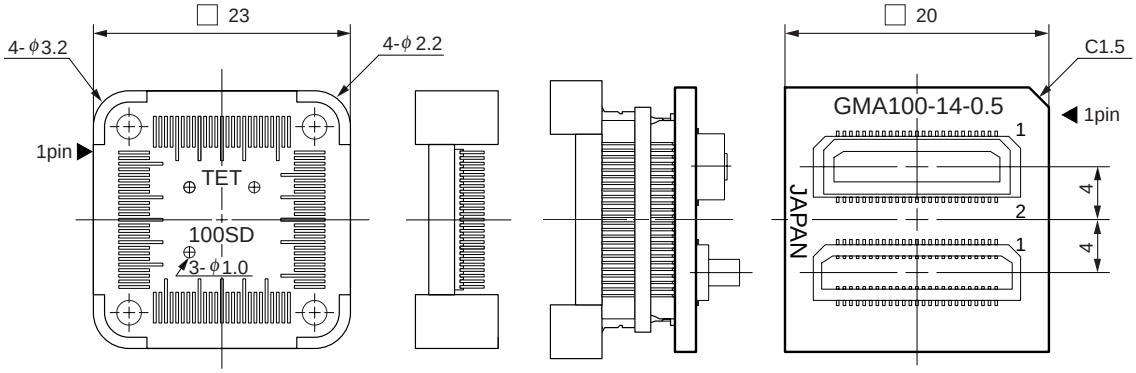
BOTTOM VIEW

Conversion adapter for 100GC



TOP VIEW BOTTOM VIEW

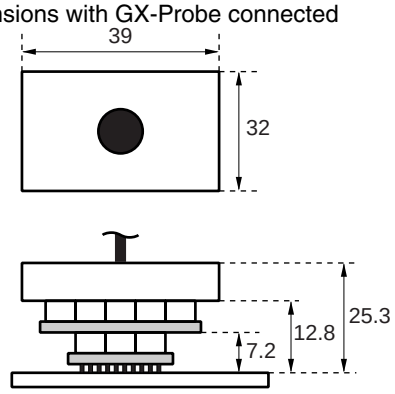
IC mounting adapter for 100GC



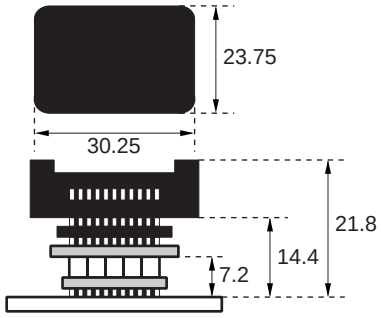
TOP VIEW BOTTOM VIEW

(2) EV-703288GF100 (for 100GF) Unit: mm

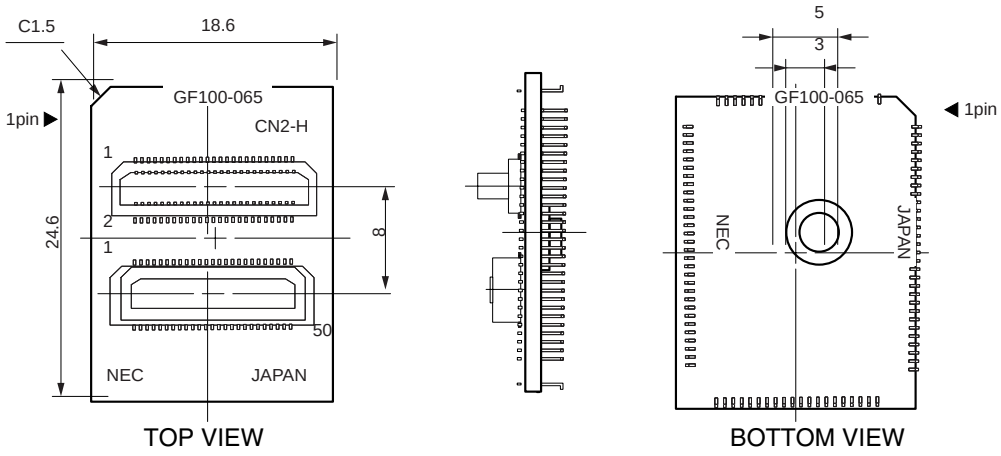
Dimensions with GX-Probe connected



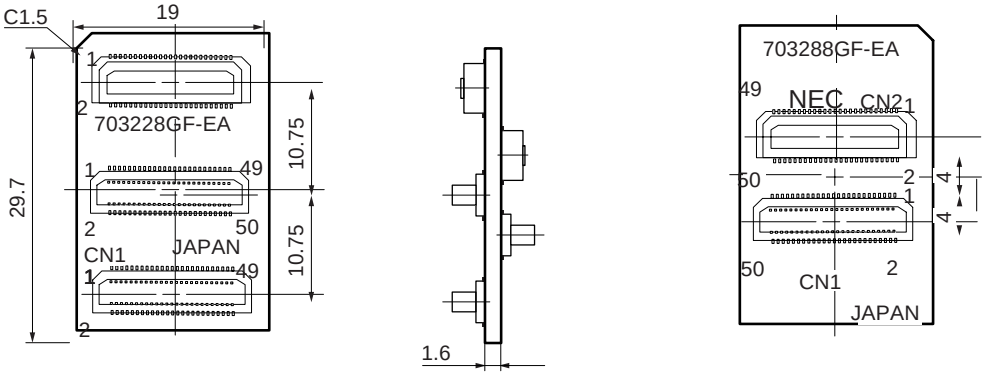
Dimensions with IC mounted



Target connector for 100GF

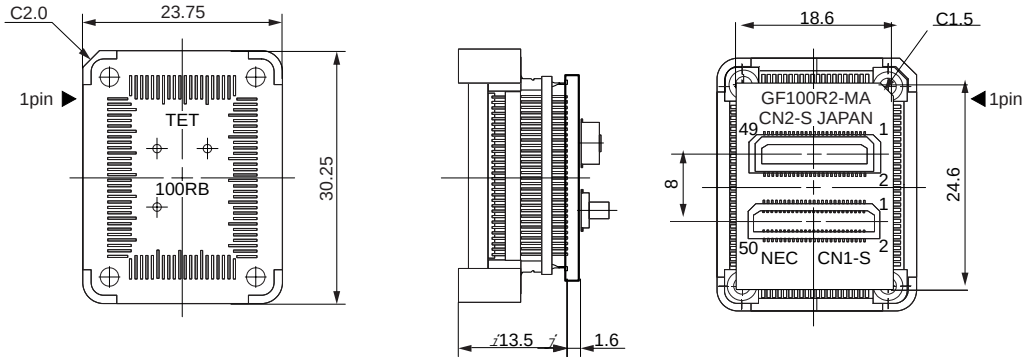


Conversion adapter for 100GF



TOP VIEW BOTTOM VIEW

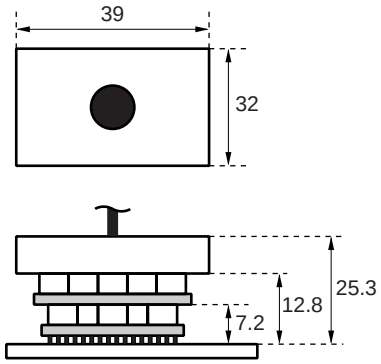
IC mounting adapter for 100GF



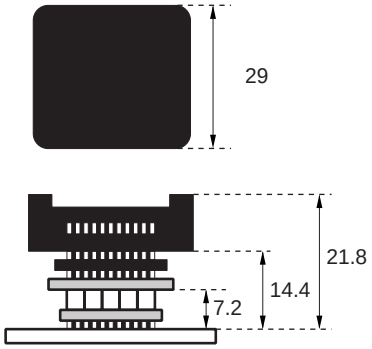
TOP VIEW BOTTOM VIEW

(3) EV-703288GJ144 (for 144GJ) Unit: mm

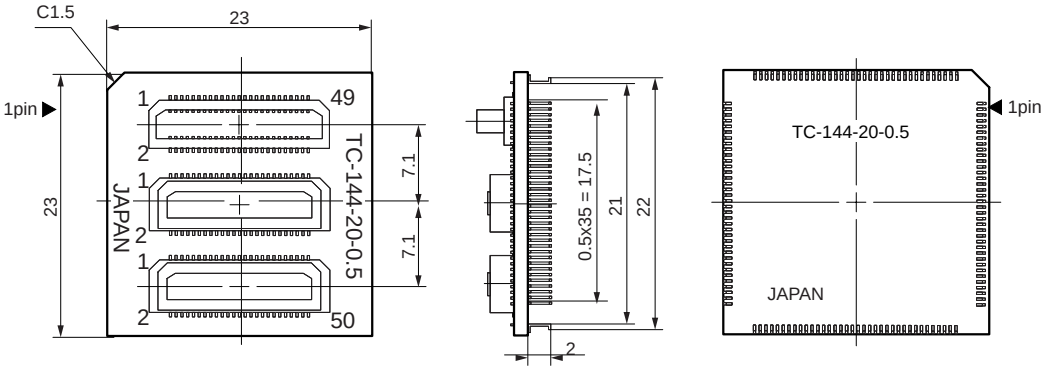
Dimensions with GX-Probe connected



Dimensions with IC mounted



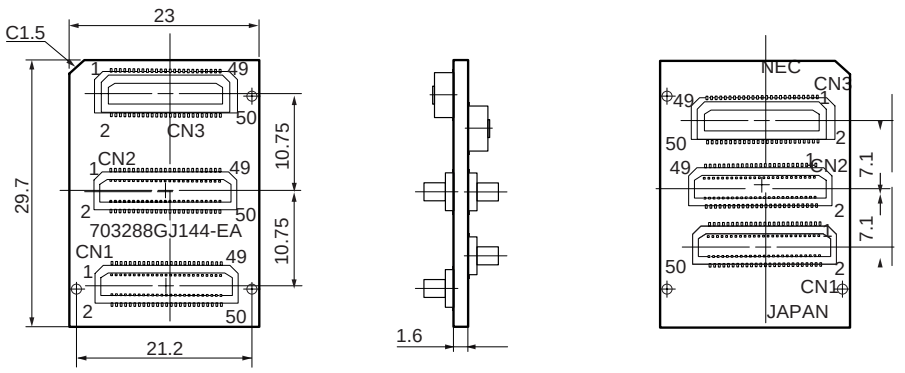
Target connector for 144GJ



TOP VIEW

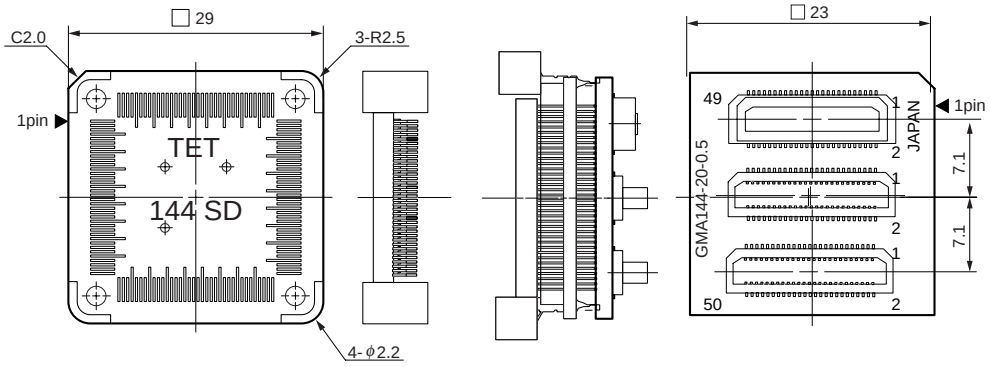
BOTTOM VIEW

Conversion adapter for 144GJ



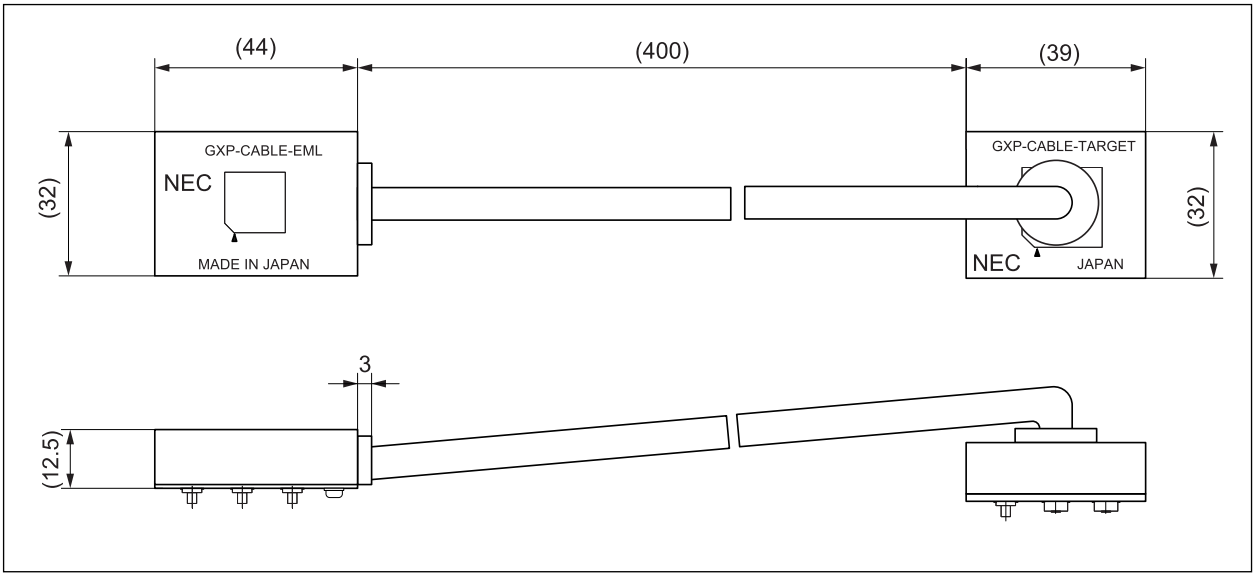
TOP VIEW BOTTOM VIEW

IC mounting adapter for 144GJ



TOP VIEW BOTTOM VIEW

(4) Emulation probe cable Unit: mm



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