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April 1st, 2010
Renesas Electronics Corporation

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RENESAS

User's Manual

IE-703220-G1-EM1

Emulation Board

Target Devices
V850ES/ST2

Document No. U17205EJ2V0UM00 (1st edition)
Date Published February 2007 NS CP(K)

[MEMO]

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GENERAL PRECAUTIONS FOR HANDLING THIS PRODUCT

1. Circumstances not covered by product guarantee

- If the product was disassembled, altered, or repaired by the customer
- If it was dropped, broken, or given another strong shock
- Use at overvoltage, use outside guaranteed temperature range, storing outside guaranteed temperature range
- If power was turned on while the power supply, PC interface cable, or target system connection was in an unsatisfactory state
- If the power supply cable, PC interface cable, emulation probe, or the like was bent or pulled excessively
- If a power supply cable other than the supplied product was used
- If the product got wet
- If the product and target system were connected while a potential difference existed between the GND of the product and the GND of the target system
- If a connector or cable was removed while the power was being supplied to the product
- If an excessive load was placed on a connector or socket

2. Safety precautions

- The power supply cable that is included with the IE-V850ES-G1 is for exclusive use with the IE-V850ES-GS1. Do not use it with other products.
- If used for a long time, the product may become hot (50°C to 60°C). Be careful of low temperature burns and other dangers due to the product becoming hot.
- Be careful of electrical shock. There is a danger of electrical shock if the product is used as described above in **1 Circumstances not covered by product guarantee**.

INTRODUCTION

Readers

This manual is intended for users who wish to understand the functions of the IE-703220-G1-EM1 to design and develop application systems using the V850ES/ST2.

Purpose

This manual is intended to give users an understanding of the basic specifications and correct usage of the IE-703220-G1-EM1.

Organization

This manual is divided into following parts.

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

How to Read This Manual

It is assumed that the readers of this manual have general knowledge in the fields of electrical engineering, logic circuits, and microcontrollers.
Use the IE-703220-G1-EM1 connected to the in-circuit emulator (IE-V850ES-G1).
This manual describes the basic setup procedures and how to set switches of the IE-703220-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 understand the overall functions and usages of the IE-703220-G1-EM1
→Read this manual according to the **CONTENTS**. The mark "<R>" shows major revised points. The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

To know the manipulations, command functions, and other software-related settings of the IE-703220-G1-EM1 and IE-V850ES-G1
→See the user's manual of the debugger (sold separately) to be used.

Conventions

Note:	Footnote for item marked with **Note** in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Binary ... xxxx or xxxxB
	Decimal ... xxxx
	Hexadecimal ... xxxxH
Prefix indicating power of 2 (address space, memory capacity):	K (kilo): 2^{10} = 1,024
	M (mega): 2^{20} = $1,024^2$

Terminology

The following terms are used in this manual.

Target device	This is the device to be emulated.
Target system	This is the system to be debugged (user-specified system). It includes the target program and the user-specified hardware.
Emulation CPU	This is the CPU that executes the user program in the emulator.

Related Documents

When using this manual, also 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 No.
IE-V850ES-G1 (In-circuit emulator for V850ES)		U16313E
IE-703220-G1-EM1 (Emulation board for V850ES/ST2)		This manual
PM plus (Ver. 6.00)		U17178E
CA850 (Ver. 3.00) (C compiler package)	Operation	U17293E
	C Language	U17291E
	Link directives	U17294E
	Assembly Language	U17292E
ID850 (Ver. 3.00) (Integrated debugger)	Operation	U17358E
SM850 (Ver. 2.50) (System simulator)	Operation	U16218E
SM850 (Ver. 2.00 or later) (System simulator)	External Part User Open Interface Specifications	U14873E
RX850 (Ver. 3.20) (Real-time OS)	Basics	U13430E
	Installation	U17419E
	Technical	U13431E
	Task Debugger	U17240E
RX850 Pro (Ver. 3.21) (Real-time OS)	Basics	U18165E
	In-Structure	U18164E
	Task Debugger	U17422E
AZ850 (Ver. 3.30) (System performance analyzer)		U17423E
TW850 Ver. 2.00 Performance Analysis Tuning Tool		U17241E
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 for designing.

CONTENTS

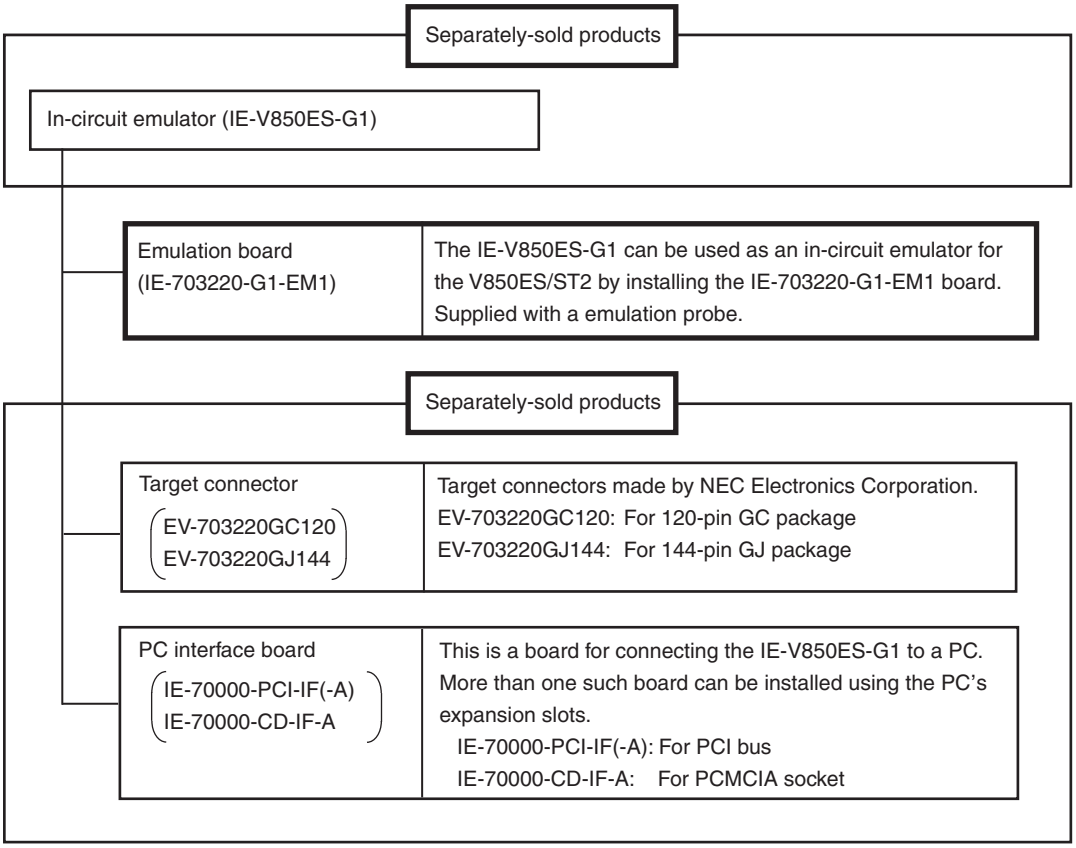
CHAPTER 1 OUTLINE

The IE-703220-G1-EM1 is an emulation board for the IE-V850ES-G1 in-circuit emulator.

Connected to the IE-V850ES-G1, the IE-703220-G1-EM1 can be used for efficient hardware and software debugging during system development using the V850ES/ST2.

This manual describes the basic setup procedure and the switch settings of the IE-V850ES-G1 when connected to the IE-703220-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 (When Connected to IE-V850ES-G1)

- Maximum operating frequency: 34 MHz (3.0 to 3.6 V)
- The following pins can be masked.
  NMI, $\overline{\text{RESET}}$
- The external dimensions of the IE-703220-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)

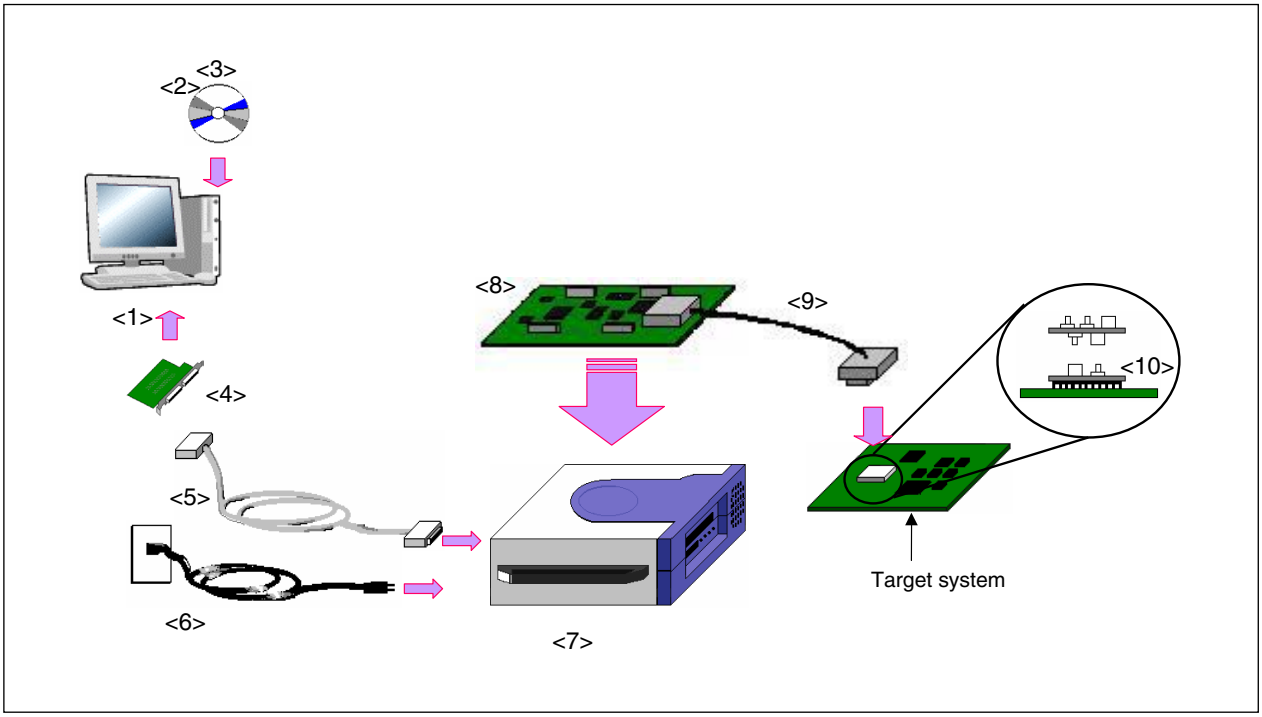
Item		Specification
Emulation memory capacity	For internal ROM	0 bytes
	For user memory	4 MB
Execution/pass detection coverage memory capacity	Internal ROM	0 bytes
	External memory	1 MB
Memory access detection coverage memory capacity	External memory	1 MB
Branch destination entry count calculation coverage memory capacity	Internal ROM	0 bytes
	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 space • Write to ROM space

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-703220-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



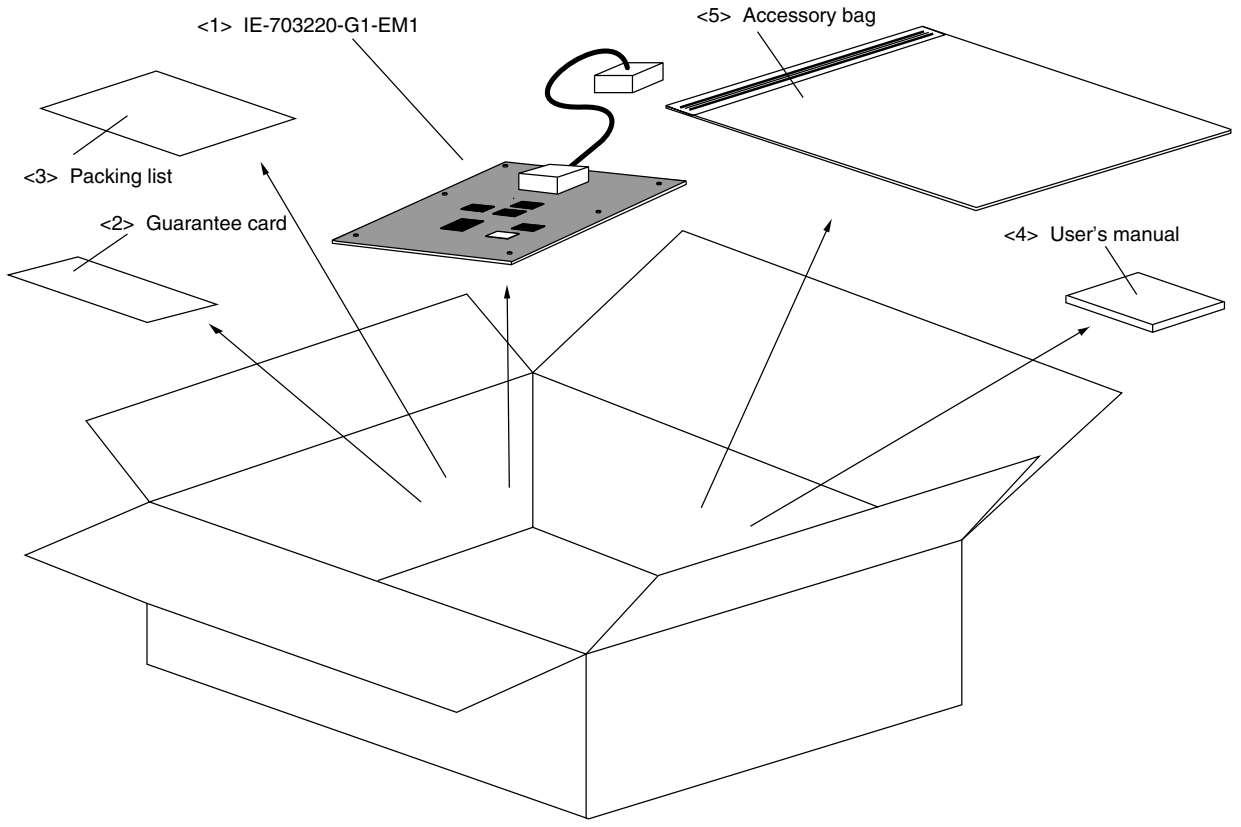
Remark <1>: PC (PC-9800 series or PC/AT compatible)
<2>: Debugger (sold separately)
<3>: Device file (obtained separately)[Note]
<4>: PC interface board (IE-70000-PCI-IF(-A), IE-70000-CD-IF-A: sold separately)
<5>: PC interface cable (supplied with IE-V850ES-G1: sold separately)
<6>: Power supply cable (supplied with IE-V850ES-G1: sold separately)
<7>: IE-V850ES-G1 (sold separately)
<8>: Emulation board (this product)
<9>: Emulation probe (supplied with this product)
<10>: EV-703220GC120 (sold separately) or EV-703220GJ144 (sold separately)

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

1.5 Contents in Carton

The IE-703220-G1-EM1 package contains the IE-703220-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



<1> IE-703220-G1-EM1 × 1
<2> Guarantee card × 1
<3> Packing list × 1
<4> User's manual × 1
<5> Accessory bag × 1

Check whether the accessory bag also contains the following, in addition to this manual and packing list (one).

(a) Screws and washers 6 sets (6 screws and 6 washers)
(b) 6-pin single-line socket 1 pc. (for connecting X1 main clock oscillator)

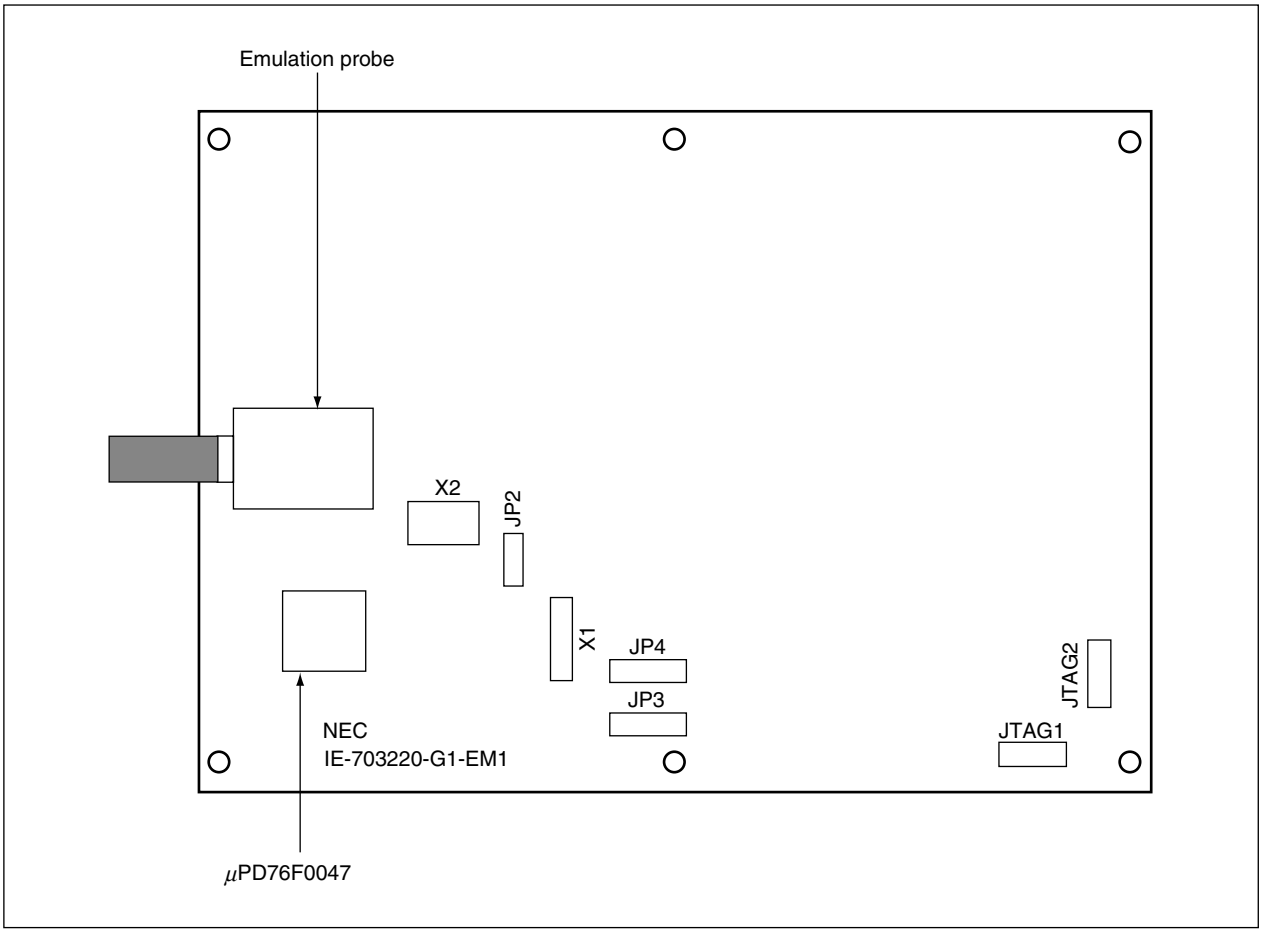
CHAPTER 2 PART NAMES AND FUNCTIONS

This chapter describes the part names and functions of the IE-703220-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-703220-G1-EM1

Figure 2-1. Part Names of IE-703220-G1-EM1



(1) X1

This is the socket for mounting the oscillation circuit for the main clock.

No clock is mounted when shipped.

For details, refer to **3.2 Clock Settings**.

(2) X2

This is the socket for mounting the oscillator for the main clock.

For details, refer to **3.2 Clock Settings**.

(3) JP2

This jumper is used to select whether X1 or X2 on the IE-703220-G1-EM1 is used as the main clock.

For details, refer to **3.2 Clock Setting**.

Pins 2 and 3 are shorted when shipped.

(4) JP3

Use it with the settings when shipped (3 and 4 shorted).

(5) JP4

Use it with the settings when shipped (3 and 4 shorted).

(6) JTAG1

These are test pins for shipment inspection. Do not change the setting.

All the pins are open when shipped.

(7) JTAG2

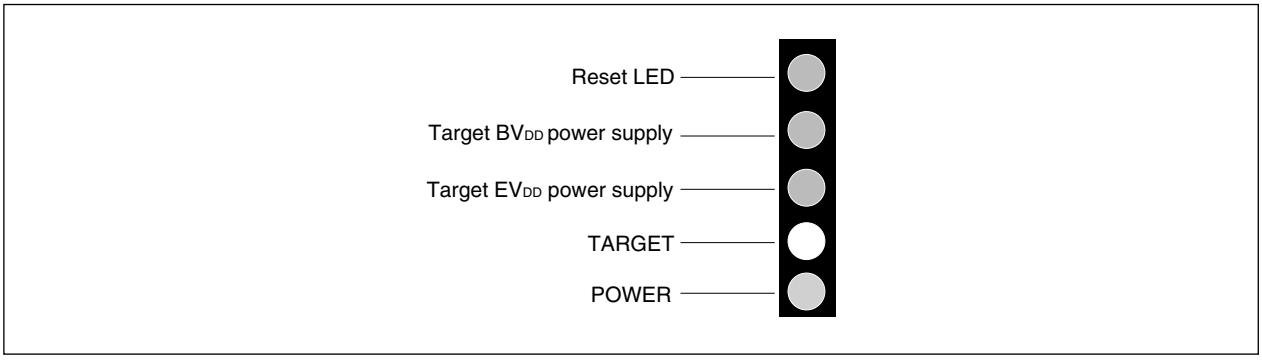
These are test pins for shipment inspection. Do not change the setting.

All the pins are open when shipped.

2.2 LEDs Controlled by IE-703220-G1-EM1

Some of the LEDs mounted in the IE-V850ES-G1 are controlled by the IE-703220-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-703220-G1-EM1



(1) Reset LED

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

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

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

(2) Target BV_{DD} power LED

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

Lit (ON): The target system is connected and a voltage is applied to BV_{DD}.

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

(3) Target EV_{DD} power LED

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

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

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

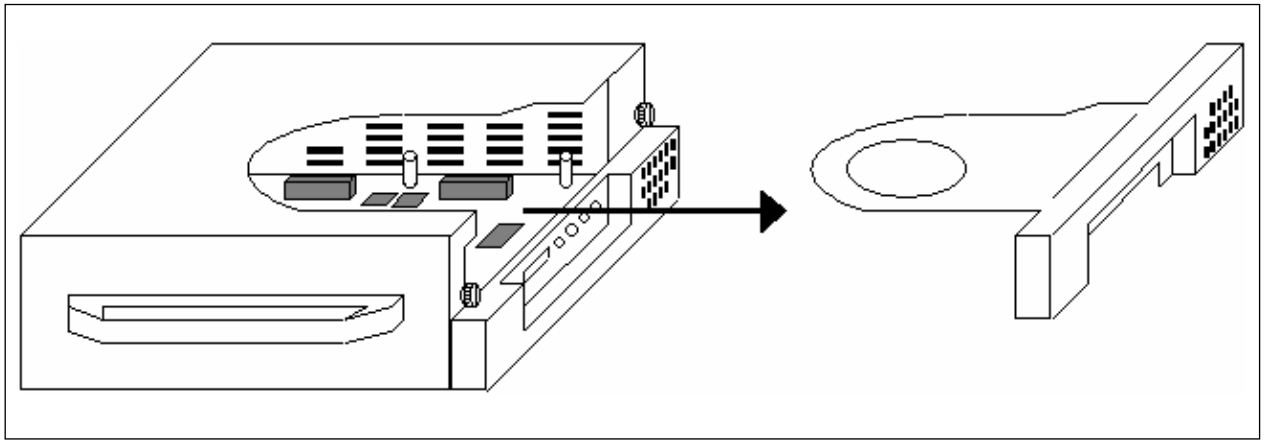
CHAPTER 3 SETUP PROCEDURE

This chapter describes how to connect the IE-703220-G1-EM1 to related products and how to replace the resonator.

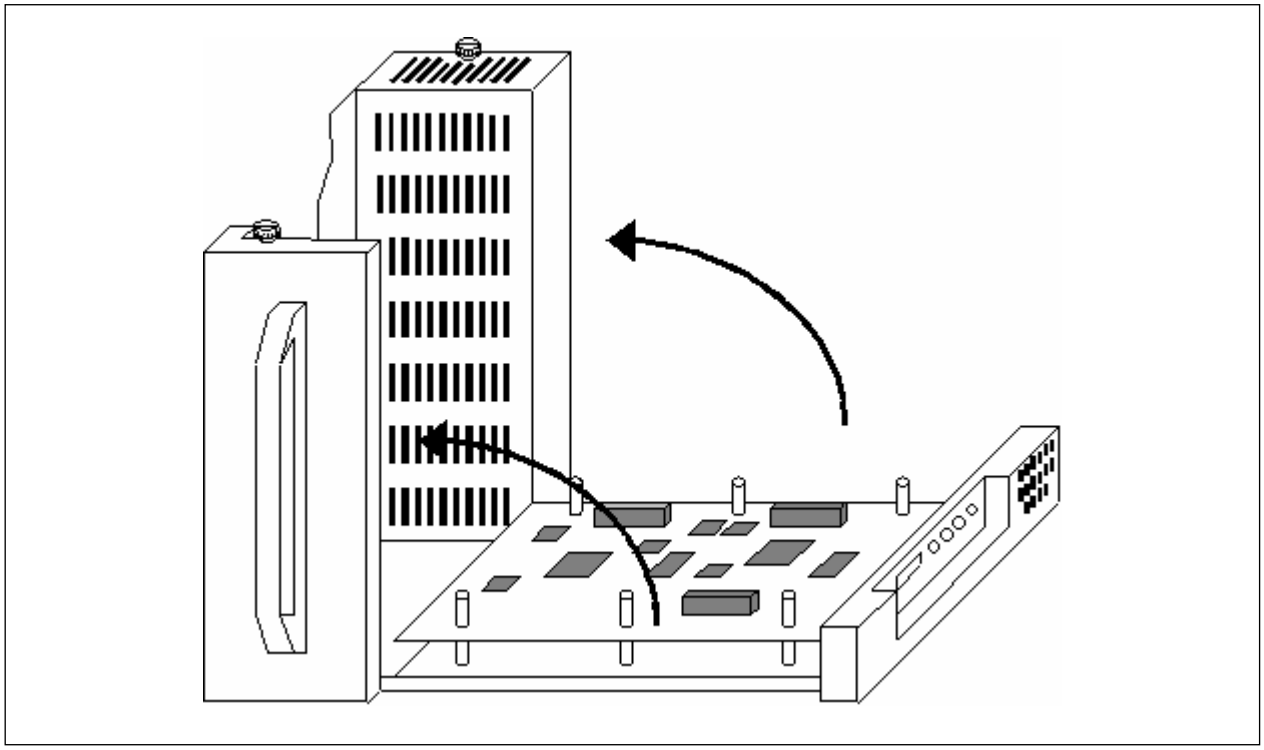
3.1 Connecting IE-V850ES-G1 and IE-703220-G1-EM1

The following shows the procedure to connect the IE-V850ES-G1 and the IE-703220-G1-EM1.

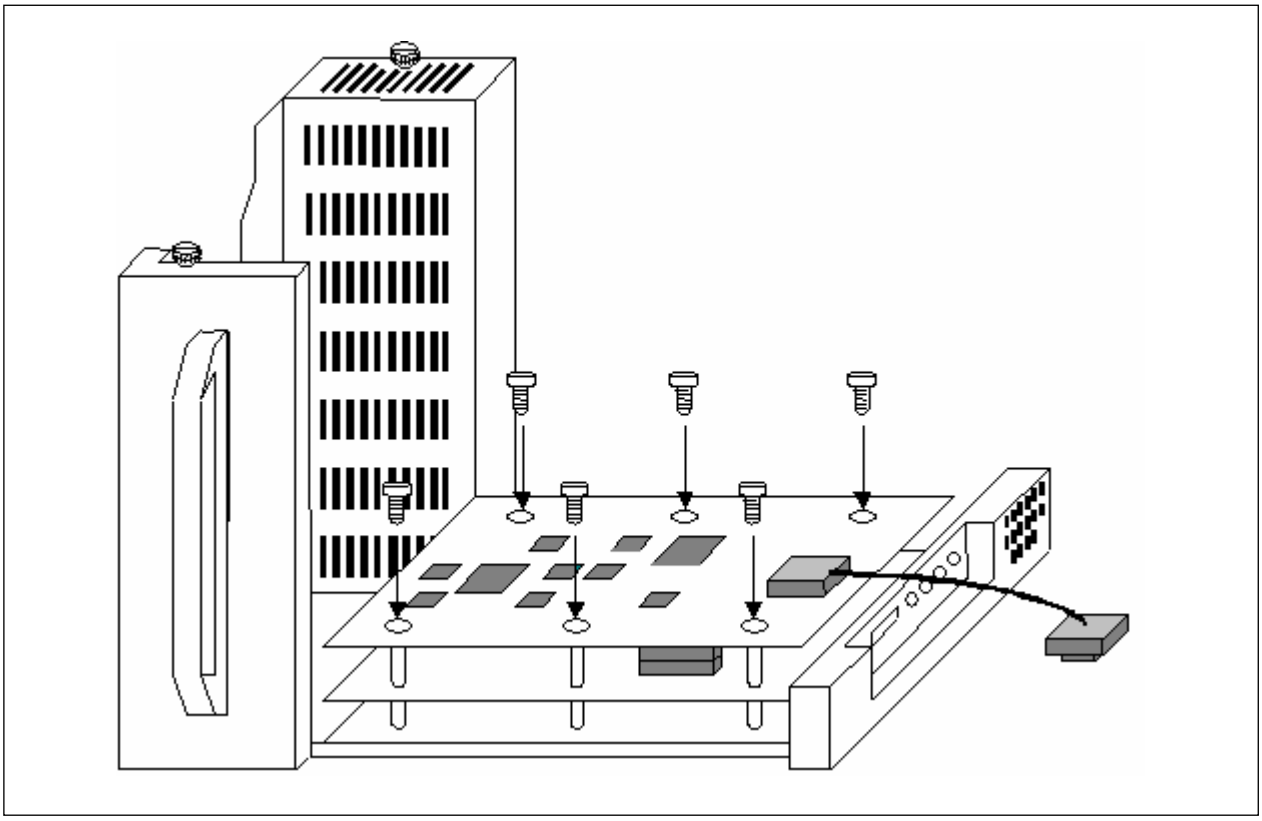
<1> Pull off the front cover of the IE-V850ES-G1.



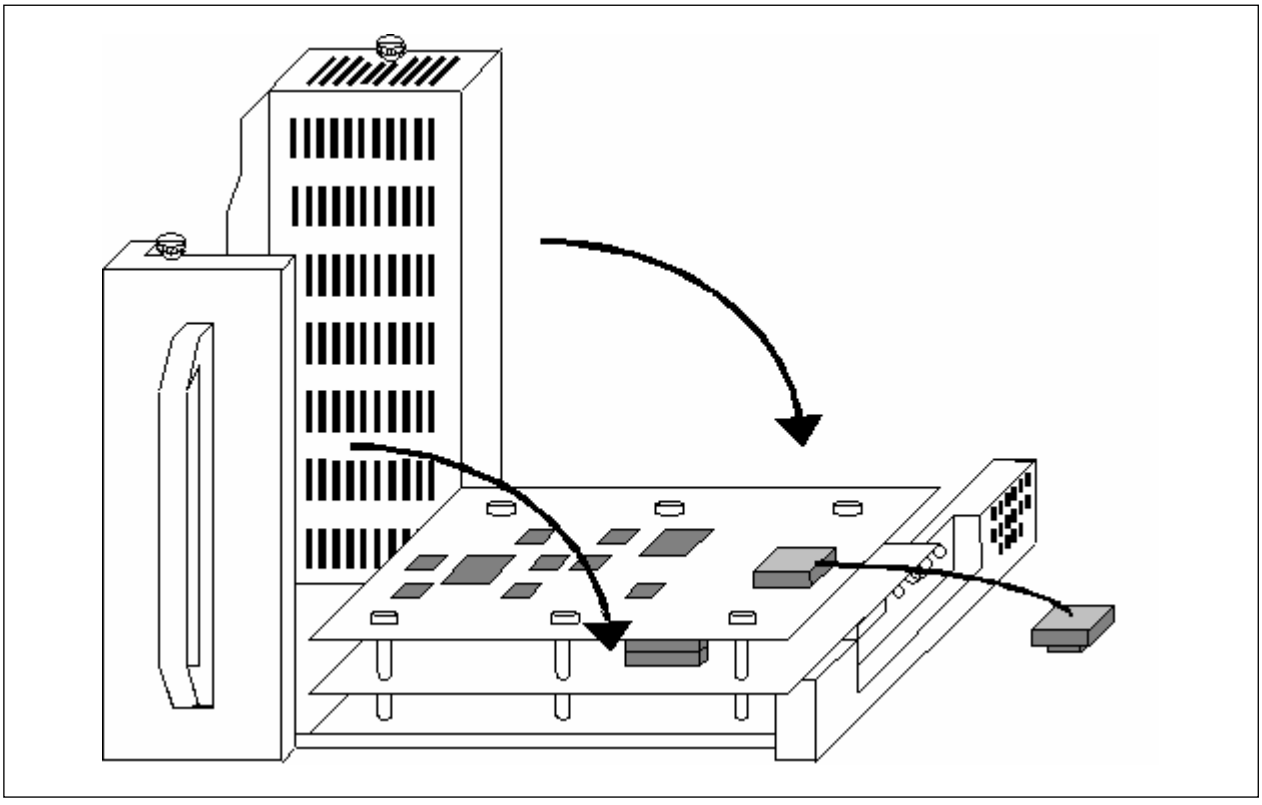
<2> Raise the frame of the IE-V850ES-G1 as shown.



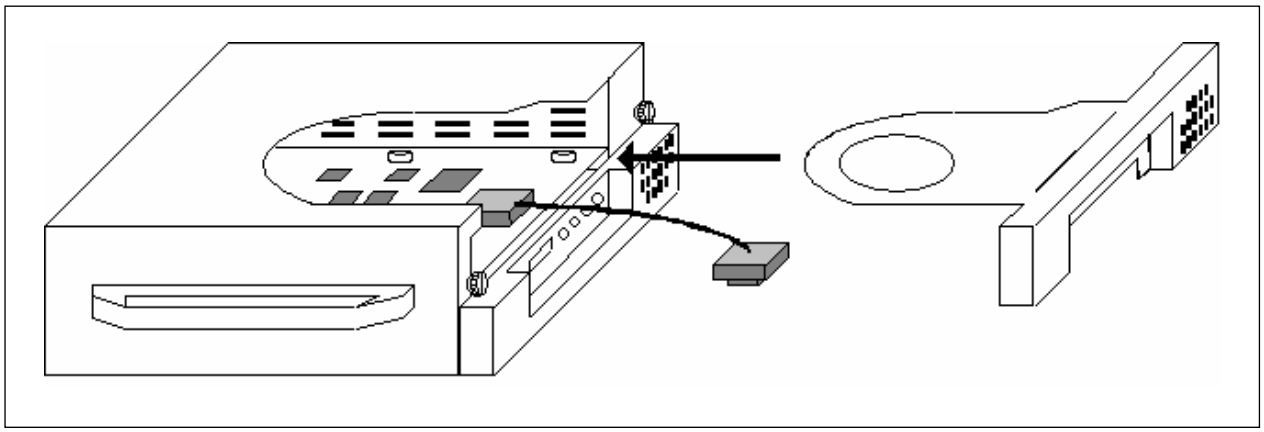
<3> Insert three connectors so that the main board and the IE-703220-G1-EM1 are overlaid horizontally. Then, fasten the six cell spacers with the supplied screws.



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



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



3.2 Clock Settings

This product does not support clock input from the target system. To change the main clock frequency, either replace the oscillator on X2 of the IE-703220-G1-EM1 with one of the desired frequencies, or connect a resonator and a capacitor to X1 to create an oscillator circuit.

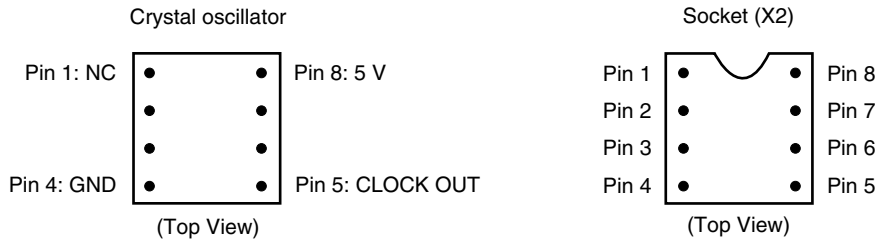
As a factory-set condition, the following oscillator is connected for the main clock.

Name on IE-703220-G1-EM1	Setting
X1	Oscillation circuit is not connected.
X2	Oscillator of 16.9344 MHz is connected.

(a) To connect the oscillator to X2 with the socket for the main clock

Mount a crystal oscillator with the following pin configuration to the socket as shown in Figure 3-1. Pins 2 and 3 of JP2 must be shorted (shipment setting).

Figure 3-1. Correspondence of Crystal Oscillator and Socket



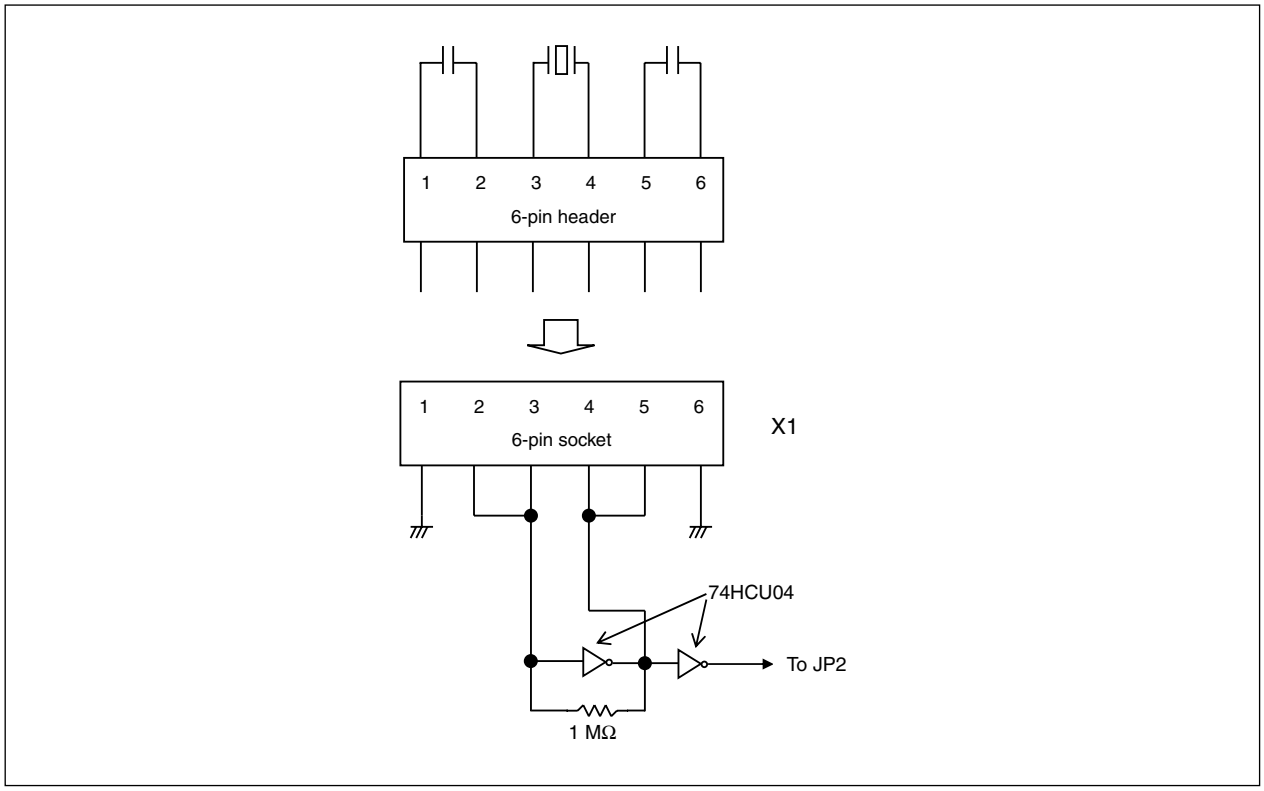
Crystal oscillator pin 8-pin type	Socket pin No.
NC	1
GND	4
CLOCK OUT	5
5 V	8

(b) To connect the resonator to X1 with the socket for the main clock

To use X1 for the main clock, connect a ceramic resonator or crystal resonator and a capacitor to the 6-pin header supplied as shown in Figure 3-2, and mount the 6-pin header to the 6-pin socket on X1.

Pins 1 and 2 of JP2 must be shorted.

Figure 3-2. Correspondence of 6-Pin Header and Socket



This product does not support clock oscillation by the resonator on the target system.

It cannot therefore emulate the operation between the resonator on the target system and the internal oscillator of the target device.

(c) Setting for JP2

JP2 is used to select whether X1 or X2 is used for the main clock.

Main Clock	Setting of JP2	Remark
X1	1-2 shorted	To use resonator
X2	2-3 shorted (shipment setting)	To use oscillator

CHAPTER 4 CAUTIONS

The following must be observed when using the IE-703220-G1-EM1.

4.1 Connection with Target System

Turn off power to the IE-V850ES-G1 before connecting the IE-703220-G1-EM1 to the target system.

<R> 4.2 144-Pin Conversion Adapter Version Upgrade

The following products have been upgraded starting with products shipped after October 2006.

- Conversion adapter included with the EV-703220GJ144 (made by NEC Electronics Corporation)
- 703220GJ144-EA (conversion adapter made by Application Corporation)

The short circuits between the power supply and ground that occurs when using the former version of the conversion adapter have been improved.

This problem applies only to 144-pin GJ package conversion adapters. (It does not apply to 120-pin GC package conversion adapters.)

Former versions of the conversion adapter will be replaced free of charge. For details, contact an NEC Electronics sales representative or a sales agent.

[Details of the upgrade]

The processing of internal pins of the IC0 to IC6 pins has been changed.

Pin Name	Pin No.	Processing of Internal Pin Before Upgrade	Processing of Internal Pin After Upgrade
IC1	6	Shorted out with EV_{SS} pin	Open
IC2	7	Shorted out with EV_{SS} pin	Open
IC3	16	Shorted out with EV_{SS} pin	Open
IC4	19	Shorted out with EV_{DD} pin	Open
IC5	28	Shorted out with V_{SS} pin	Open
IC6	32	Shorted out with V_{DD} pin	Open

[Occurring problem]

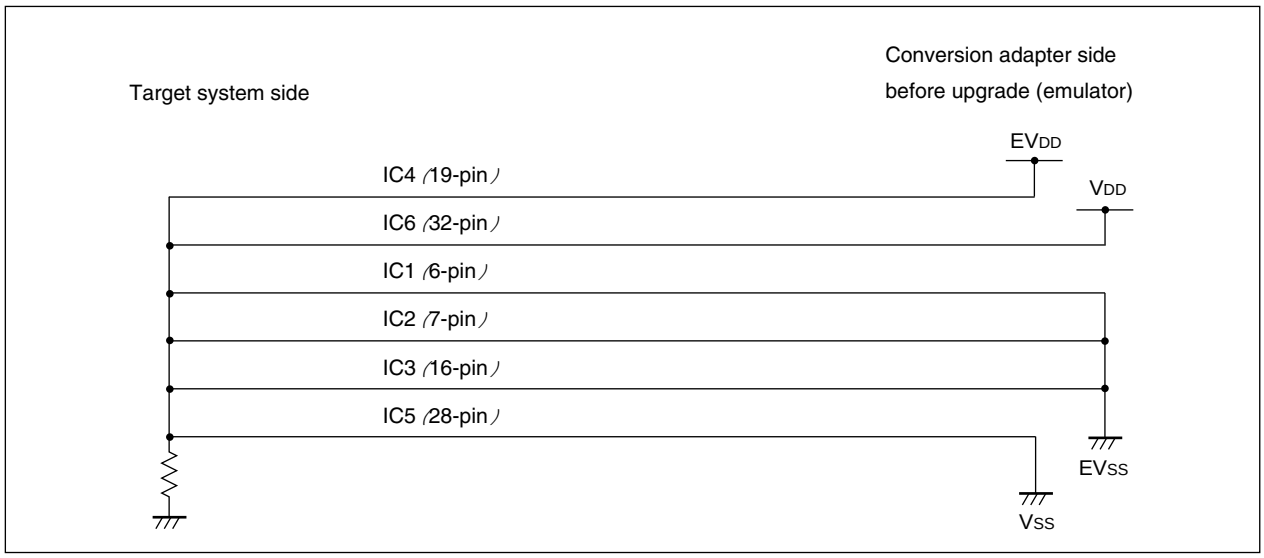
When a former version of the conversion adapter is used, a short circuit may occur between the power supply and ground, depending on the target system circuit.

This may result in failure of emulators or target systems.

(1) Example of a problematic circuit

If ICn (n = 1 to 6) pins are shorted out with the target system as shown in the figure below, the power supply and ground will be shorted out.

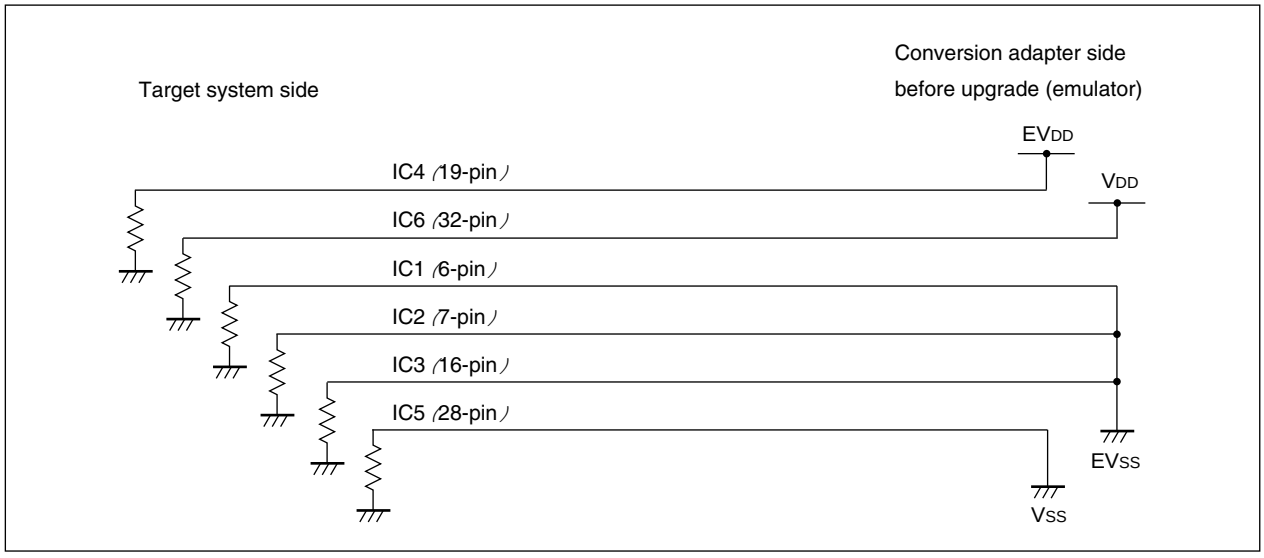
Figure 4-1. Example of a problematic circuit



(2) Example of a problem-free circuit

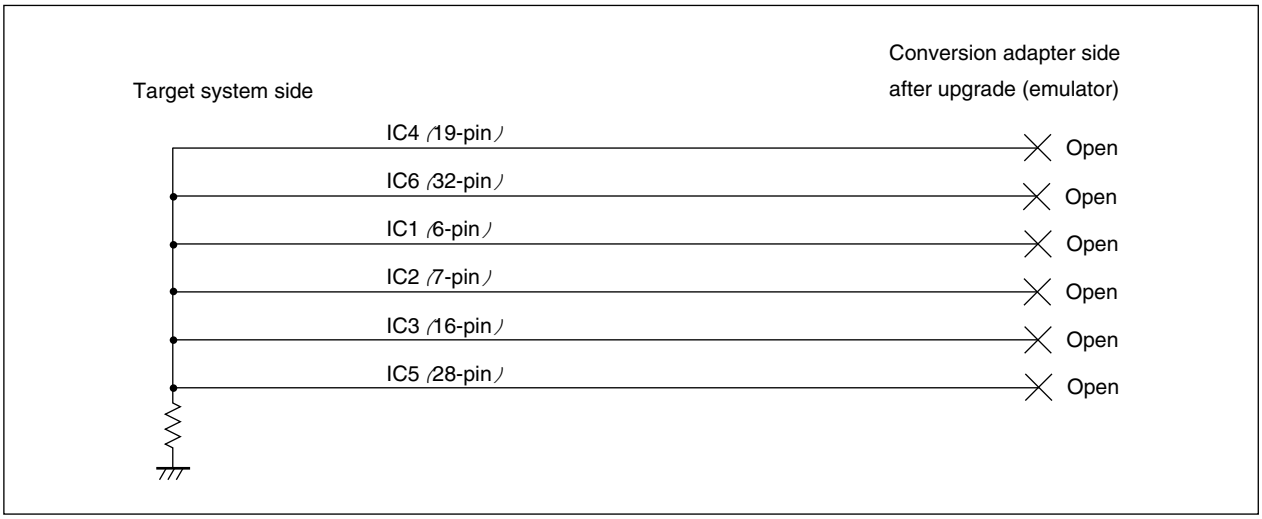
If ICn (n = 1 to 6) pins are not shorted out with the target system as shown in the figure below, no short circuit will occur between the power supply and ground.

Figure 4-2. Example of a problem-free circuit



If an upgraded conversion adapter is used, no short circuit will occur between the power supply and ground, regardless of the processing of the ICn (n = 1 to 6) pins of the target system.

Figure 4-3. Circuit after upgrade



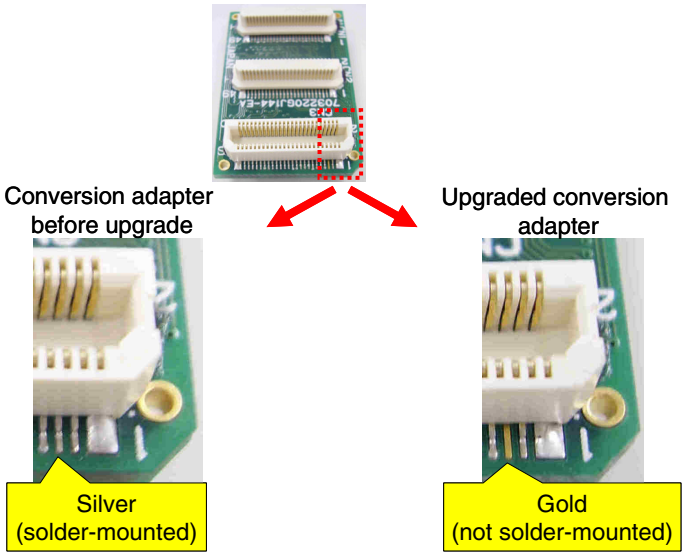
[Distinguishing conversion adapters]

Conversion adapters can be distinguished by looking at the top side (the side connected to the emulator) of the conversion adapter.

The connector can be determined based on these pictures.

If the third pin from the right is mounted, the conversion adapter has not been upgraded.

If the third pin from the right is not mounted, the conversion adapter has been upgraded.



4.3 Characteristics of Target Interface

The target interface (signals connecting the in-circuit emulator and the target system) functionally operates as if an actual device is connected, however, the characteristics may be different than those of the actual device. The target interface of the IE-703220-G1-EM1 is one of those shown in Figures 4-4 to 4-8. The target interface connection to each target device is shown in Table 4-1.

Figure 4-4. Equivalent Circuit A

Figure 4-5. Equivalent Circuit B

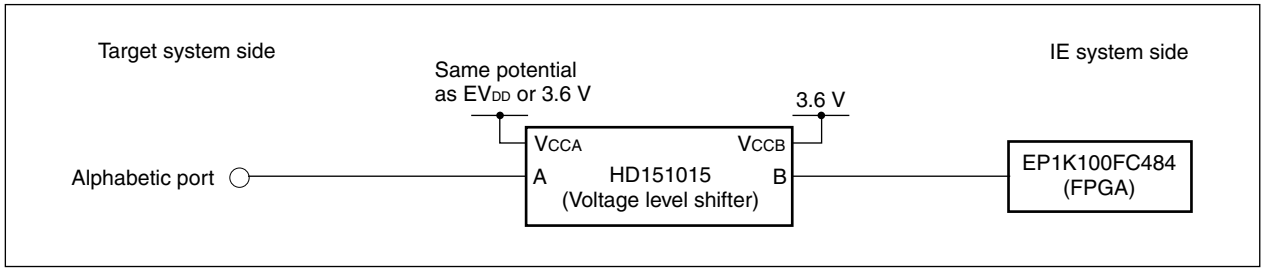


Figure 4-6. Equivalent Circuit C

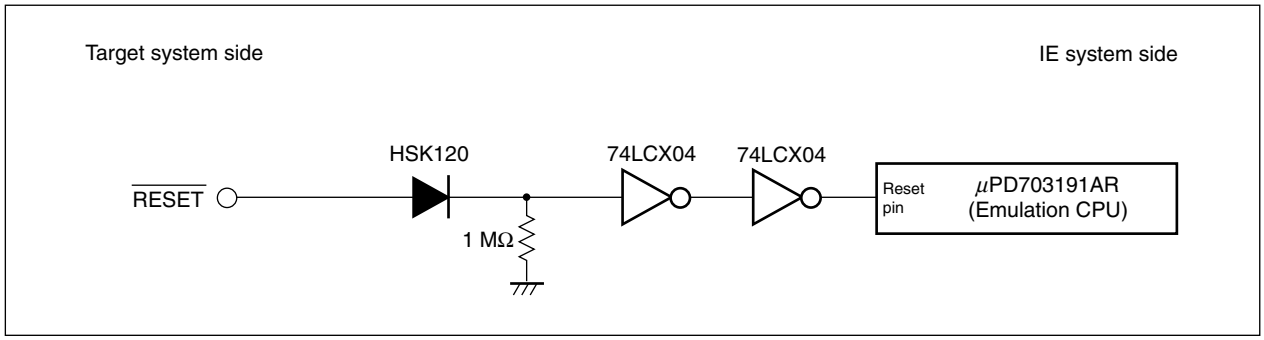
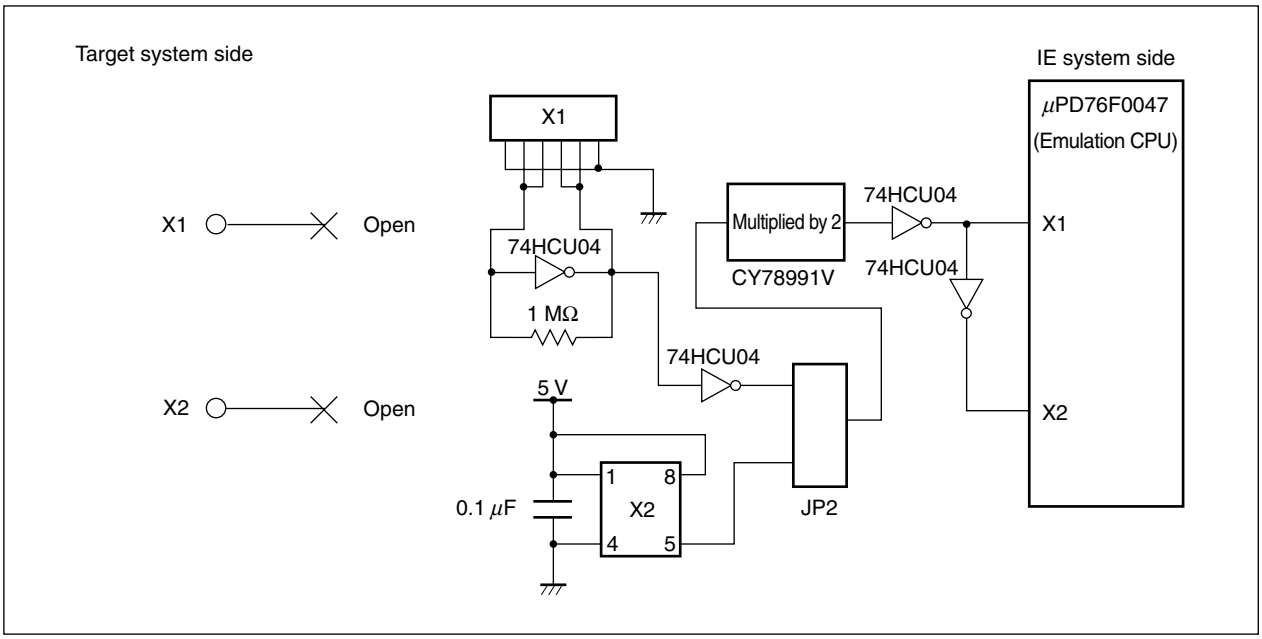


Figure 4-7. Equivalent Circuit D



<R> **Figure 4-8. Equivalent Circuit E**

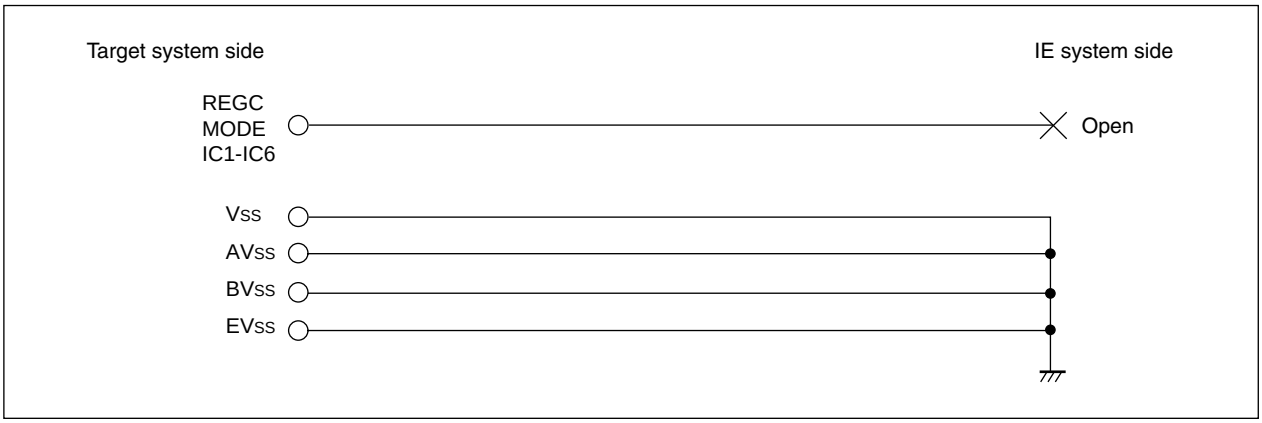


Table 4-1. Pin Correspondence List (1/4)

	Target Interface Name	Pin No. GJ Package	Pin No. GC Package	Processing in In-Circuit Emulator
	AV_{REF0}	1	1	AV_{REF0}
	AV_{SS}	2	2	Equivalent circuit E
	P10/ANO0	3	3	Equivalent circuit A
	P11/ANO1	4	4	Equivalent circuit A
	AV_{REF1}	5	5	AV_{REF1}
<R>	IC1	6	–	Equivalent circuit E
<R>	IC2	7	–	Equivalent circuit E
	P90	8	6	Equivalent circuit A
	P91	9	7	Equivalent circuit A
	P92/TIP41/TOP41	10	8	Equivalent circuit A
	P93/TOP40	11	9	Equivalent circuit A
	P94/TIP31/TOP31	12	10	Equivalent circuit A
	P95/TIP30	13	11	Equivalent circuit A
	P96/TIP21/TOP21	14	12	Equivalent circuit A
	P97/TIP20	15	13	Equivalent circuit A
<R>	IC3	16	14	Equivalent circuit E
	EV_{SS}	17	–	Equivalent circuit E
	EV_{DD}	18	15	EV_{DD}
<R>	IC4	19	–	EV_{DD}
	P98	20	16	Equivalent circuit A
	P99	21	17	Equivalent circuit A
	P910	22	18	Equivalent circuit A
	P911	23	19	Equivalent circuit A
	P912	24	20	Equivalent circuit A
	P913/INTP4	25	21	Equivalent circuit A
	P914/INTP5/TIP51/TOP51	26	22	Equivalent circuit A
	P915/INTP6/TIP50	27	23	Equivalent circuit A
<R>	IC5	28	24	Equivalent circuit E
	V_{SS}	29	–	Equivalent circuit E
	REGC	30	25	Equivalent circuit E
	V_{DD}	31	26	V_{DD}
<R>	IC6	32	–	V_{DD}
	X1	33	27	Equivalent circuit D
	X2	34	28	Equivalent circuit D
	$\overline{\text{RESET}}$	35	29	Equivalent circuit C
	MODE	36	30	Equivalent circuit E
	A21/PDH5	37	31	Equivalent circuit B
	A20/PDH4	38	32	Equivalent circuit B
	A19/PDH3	39	33	Equivalent circuit B
	A18/PDH2	40	34	Equivalent circuit B

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

Target Interface Name	Pin No. GJ Package	Pin No. GC Package	Processing in In-Circuit Emulator
A17/PDH1	41	35	Equivalent circuit B
A16/PDH0	42	36	Equivalent circuit B
EV_{SS}	43	–	Equivalent circuit E
A15	44	37	Equivalent circuit B
A14	45	38	Equivalent circuit B
A13	46	39	Equivalent circuit B
A12	47	40	Equivalent circuit B
A11	48	41	Equivalent circuit B
BV_{SS}	49	42	Equivalent circuit E
BV_{SS}	50	–	Equivalent circuit E
BV_{DD}	51	43	BV_{DD}
BV_{DD}	52	–	BV_{DD}
A10	53	44	Equivalent circuit B
A9	54	45	Equivalent circuit B
A8	55	46	Equivalent circuit B
A7	56	47	Equivalent circuit B
A6	57	48	Equivalent circuit B
A5	58	49	Equivalent circuit B
A4	59	50	Equivalent circuit B
A3	60	51	Equivalent circuit B
A2	61	52	Equivalent circuit B
A1	62	53	Equivalent circuit B
A0	63	54	Equivalent circuit B
BV_{SS}	64	55	Equivalent circuit E
BV_{SS}	65	–	Equivalent circuit E
BV_{DD}	66	56	BV_{DD}
BV_{DD}	67	–	BV_{DD}
PCT6/ASTB	68	57	Equivalent circuit B
$\overline{RD}$/PCT4	69	58	Equivalent circuit B
$\overline{WR1}$/PCT1	70	59	Equivalent circuit B
$\overline{WR0}$/PCT0	71	60	Equivalent circuit B
BV_{SS}	72	–	Equivalent circuit E
$\overline{CS0}$/PCS0	73	61	Equivalent circuit B
$\overline{CS1}$/PCS1	74	62	Equivalent circuit B
$\overline{CS2}$/PCS2	75	63	Equivalent circuit B
$\overline{CS3}$/PCS3	76	64	Equivalent circuit B
BV_{SS}	77	–	Equivalent circuit E
AD15	78	65	Equivalent circuit B
AD14	79	66	Equivalent circuit B
AD13	80	67	Equivalent circuit B

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

Target Interface Name	Pin No. GJ Package	Pin No. GC Package	Processing in In-Circuit Emulator
AD12	81	68	Equivalent circuit B
BV_{SS}	82	69	Equivalent circuit E
BV_{SS}	83	–	Equivalent circuit E
BV_{DD}	84	70	BV_{DD}
BV_{DD}	85	–	BV_{DD}
AD11	86	71	Equivalent circuit B
AD10	87	72	Equivalent circuit B
AD9	88	73	Equivalent circuit B
AD8	89	74	Equivalent circuit B
AD7	90	75	Equivalent circuit B
AD6	91	76	Equivalent circuit B
AD5	92	77	Equivalent circuit B
AD4	93	78	Equivalent circuit B
BV_{SS}	94	79	Equivalent circuit E
BV_{SS}	95	–	Equivalent circuit E
BV_{DD}	96	80	BV_{DD}
BV_{DD}	97	–	BV_{DD}
AD3	98	81	Equivalent circuit B
AD2	99	82	Equivalent circuit B
AD1	100	83	Equivalent circuit B
AD0	101	84	Equivalent circuit B
$\overline{WAIT}$/PCM0	102	85	Equivalent circuit B
CLKOUT/PCM1	103	86	Equivalent circuit B
BV_{SS}	104	–	Equivalent circuit E
$\overline{HLDAK}$/PCM2	105	87	Equivalent circuit B
$\overline{HLDRQ}$/PCM3	106	88	Equivalent circuit B
P39/RXDA2	107	89	Equivalent circuit A
P38/TXDA2	108	90	Equivalent circuit A
P35/TIP11/TOP11	109	91	Equivalent circuit A
P34/TIP10	110	92	Equivalent circuit A
P33/TIP01/TOP01	111	93	Equivalent circuit A
EV_{SS}	112	–	Equivalent circuit E
P32/ASCKA0/$\overline{SCKB4}$/TIP00	113	94	Equivalent circuit A
P31/INTP7/RXDA0/SIB4	114	95	Equivalent circuit A
P30/TXDA0/SOB4	115	96	Equivalent circuit A
P42/$\overline{SCKB0}$	116	97	Equivalent circuit A
P41/SOB0	117	98	Equivalent circuit A
P40/SIB0	118	99	Equivalent circuit A
EV_{SS}	119	100	Equivalent circuit E
EV_{SS}	120	101	Equivalent circuit E

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

Target Interface Name	Pin No. GJ Package	Pin No. GC Package	Processing in In-Circuit Emulator
EV_{DD}	121	–	EV_{DD}
EV_{DD}	122	–	EV_{DD}
P55/RTP05	123	102	Equivalent circuit A
P54/RTP04	124	103	Equivalent circuit A
P53/RTP03	125	104	Equivalent circuit A
P52/RTP02	126	105	Equivalent circuit A
P51/RTP01	127	106	Equivalent circuit A
P50/RTP00	128	107	Equivalent circuit A
EV_{SS}	129	–	Equivalent circuit E
P06/INTP3	130	108	Equivalent circuit A
P05/INTP2	131	109	Equivalent circuit A
P04/INTP1	132	110	Equivalent circuit A
P03/INTP0/ADTRG	133	111	Equivalent circuit A
P02/NMI	134	112	Equivalent circuit A
EV_{SS}	135	–	Equivalent circuit E
EV_{SS}	136	–	Equivalent circuit E
P77/ANI7	137	113	Equivalent circuit A
P76/ANI6	138	114	Equivalent circuit A
P75/ANI5	139	115	Equivalent circuit A
P74/ANI4	140	116	Equivalent circuit A
P73/ANI3	141	117	Equivalent circuit A
P72/ANI2	142	118	Equivalent circuit A
P71/ANI1	143	119	Equivalent circuit A
P70/ANI0	144	120	Equivalent circuit A

4.4 Turning ON/OFF Power

Start or terminate the emulator in the following order.

- Starting: Turn on emulator's power → Turn on target's power → Start debugger
- Terminating: Terminate debugger → Turn off target's power → Turn off emulator's power

CHAPTER 5 RESTRICTIONS

The IE-703220-G1-EM1 has the following restrictions.

5.1 Clock Generator

(1) Resonator to be connected
Oscillation by the resonator on the target system is not supported. Therefore, clock oscillation operation on the target system cannot be emulated with the in-circuit emulator.

(2) Emulation of oscillation stabilization time after reset has been released
In the target device for emulation, oscillation stabilization time is inserted after reset has been released; however, it is not inserted in the in-circuit emulator.

5.2 Timing of Setting/Releasing Standby Mode

The timing of setting/releasing the standby mode is different between the target device and the in-circuit emulator. The difference is within 1 clock when standby mode is set, and 2 or 3 clocks when it is released.

5.3 Operation During Break

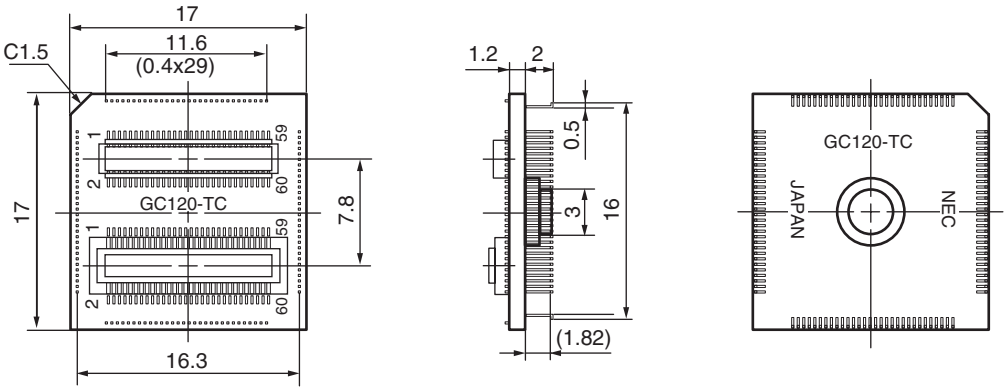
<1> In the in-circuit emulator, peripheral functions operate during a break, so there may be a difference between the operations of the in-circuit emulator and target device.
(However, while the in-circuit emulator is in the break status, the counter of the watchdog timer stops.)

<2> If the debugger is started without the target system connected, the default value of each port is undefined.

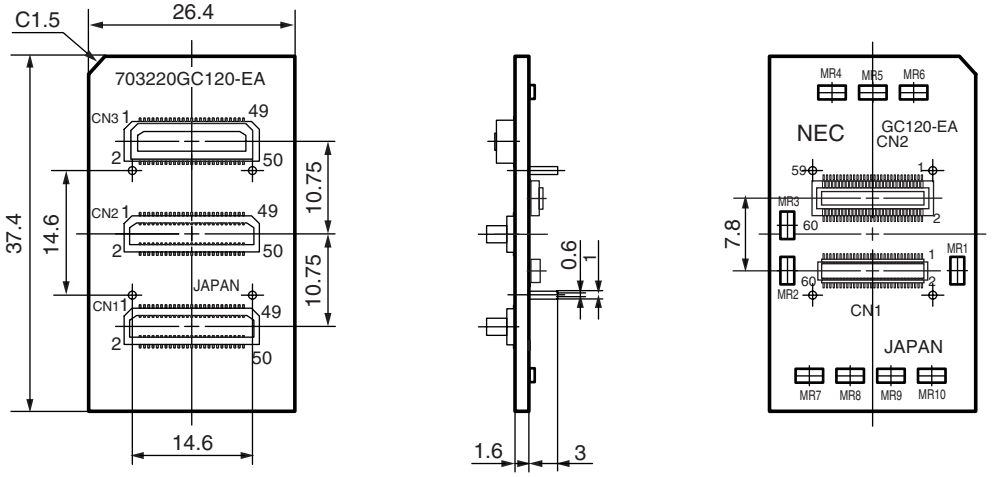
APPENDIX A PACKAGE DRAWINGS

(1) EV-703220GC120 (unit: mm)

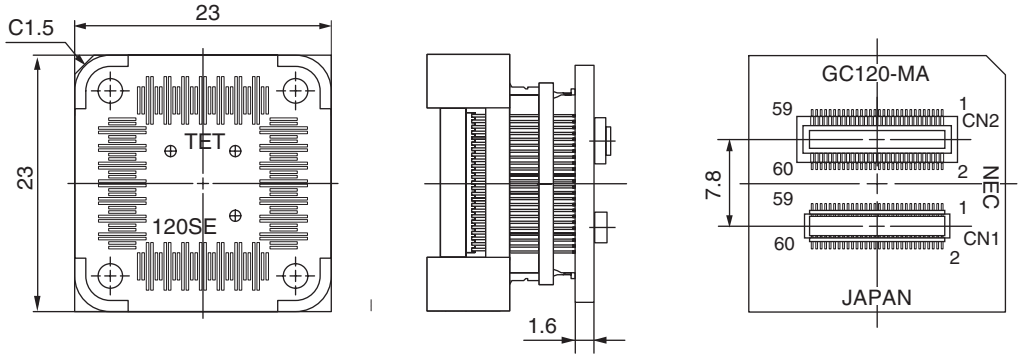
Target connector



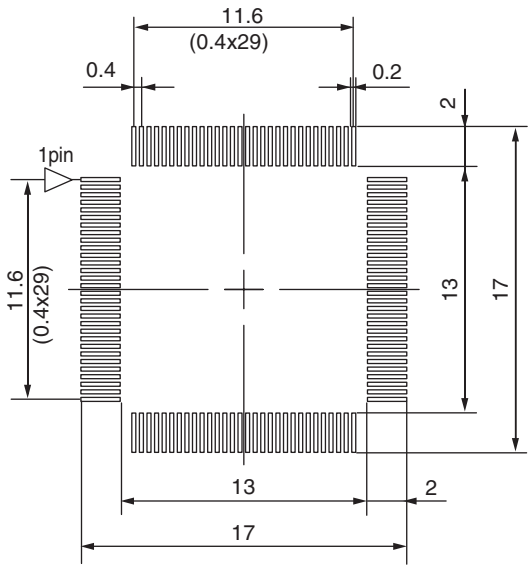
Conversion adapter



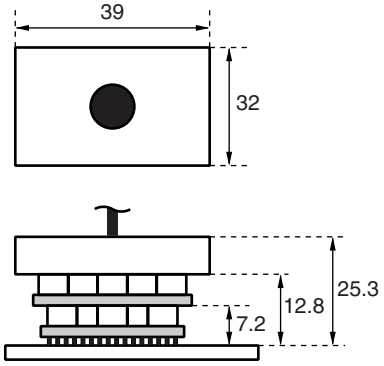
Mount adapter



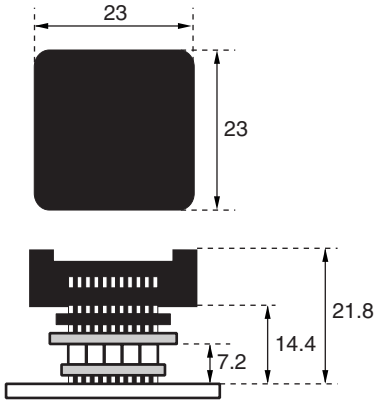
Foot pattern for target connector



Dimensions when connecting GX-Probe

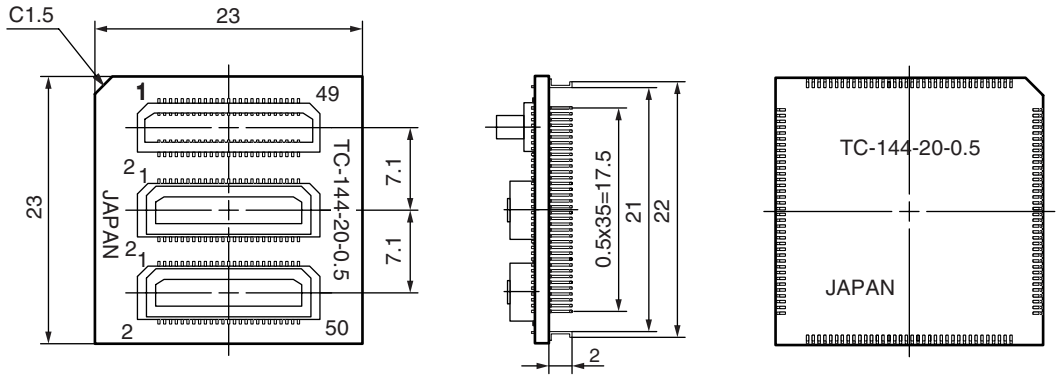


Dimensions when mounting IC

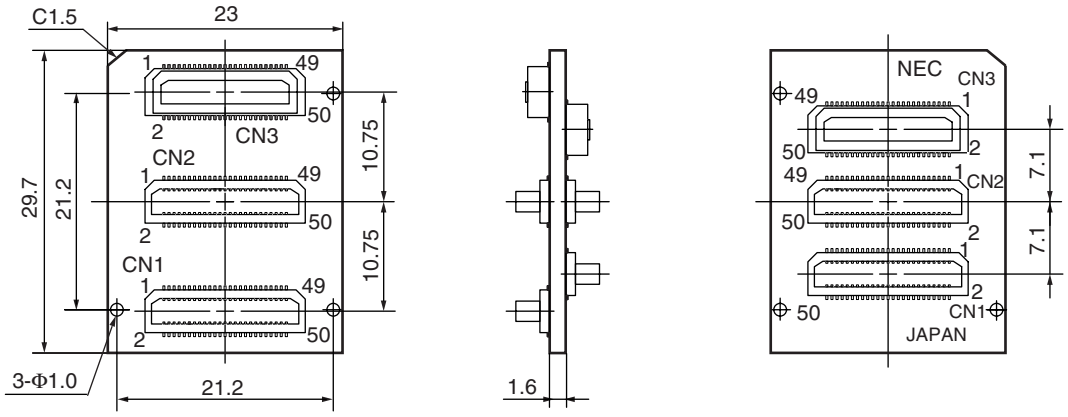


(2) EV-703220GJ144 (unit: mm)

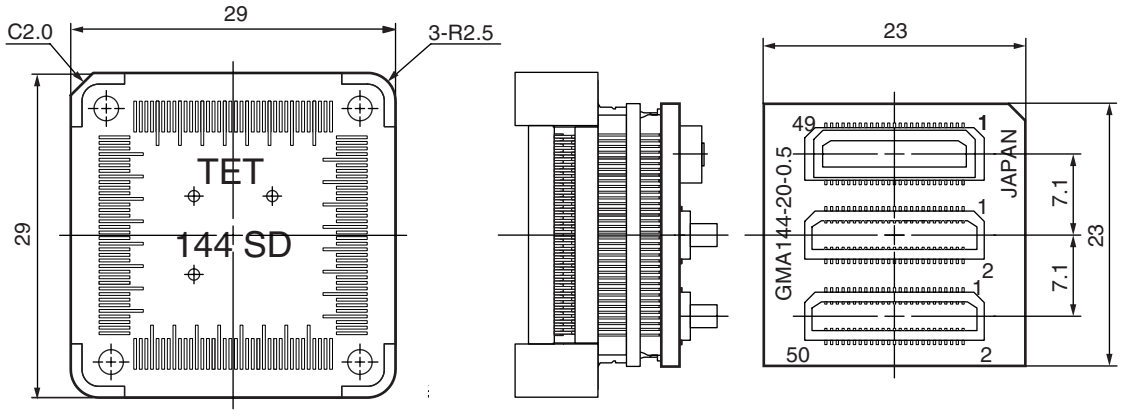
Target connector



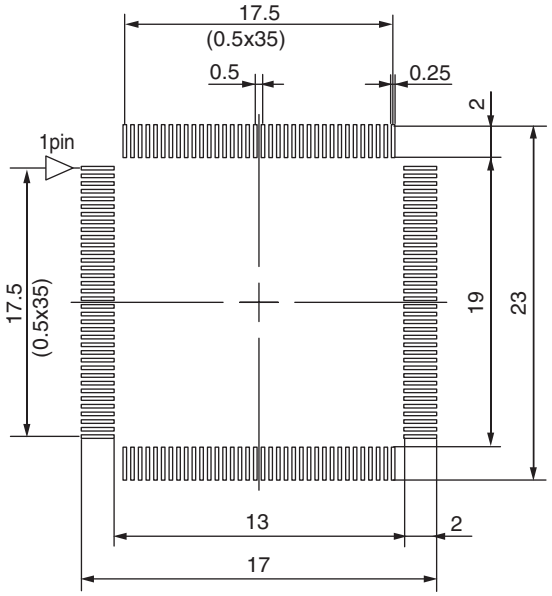
Conversion adapter



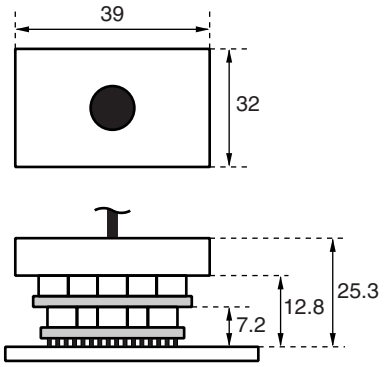
Mount adapter



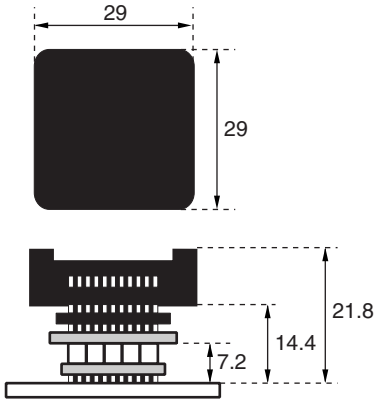
Foot pattern for target connector



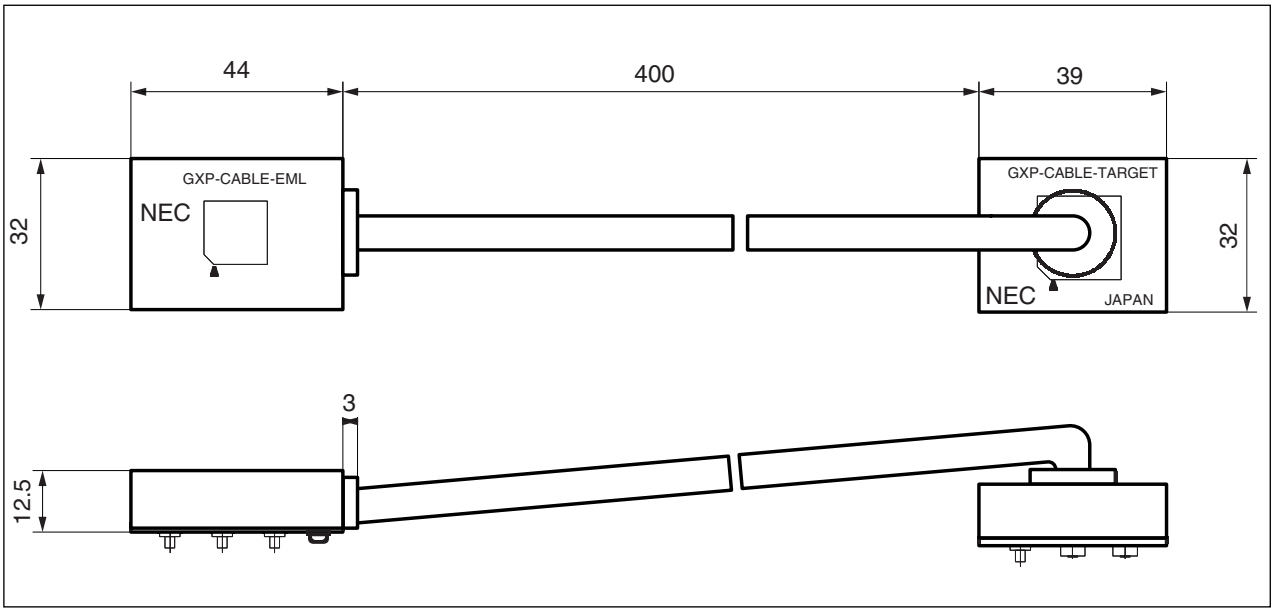
Dimensions when connecting GX-Probe



Dimensions when mounting IC



(3) Emulation probe (unit: mm)



APPENDIX B REVISION HISTORY

B.1 Major Revisions in This Edition

Page	Description
	CHAPTER 4 CAUTIONS
p.21	Addition of **4.2 144-Pin Conversion Adapter Version Upgrade**
p.25	Change of **Figure 4-8. Equivalent Circuit E**
p.26	Change of **Table 4-1. Pin Correspondence List**

For further information,
please contact:

NEC Electronics Corporation
1753, Shimonumabe, Nakahara-ku,
Kawasaki, Kanagawa 211-8668,
Japan
Tel: 044-435-5111
http://www.necel.com/

[America]

NEC Electronics America, Inc.
2880 Scott Blvd.
Santa Clara, CA 95050-2554, U.S.A.
Tel: 408-588-6000
800-366-9782
http://www.am.necel.com/

[Europe]

NEC Electronics (Europe) GmbH
Arcadiastrasse 10
40472 Düsseldorf, Germany
Tel: 0211-65030
http://www.eu.necel.com/

Hanover Office
Podbielskistrasse 166 B
30177 Hannover
Tel: 0 511 33 40 2-0

Munich Office
Werner-Eckert-Strasse 9
81829 München
Tel: 0 89 92 10 03-0

Stuttgart Office
Industriestrasse 3
70565 Stuttgart
Tel: 0 711 99 01 0-0

United Kingdom Branch
Cygnus House, Sunrise Parkway
Linford Wood, Milton Keynes
MK14 6NP, U.K.
Tel: 01908-691-133

Succursale Française
9, rue Paul Dautier, B.P. 52
78142 Velizy-Villacoublay Cédex
France
Tel: 01-3067-5800

Sucursal en España
Juan Esplandiu, 15
28007 Madrid, Spain
Tel: 091-504-2787

Tyskland Filial
Täby Centrum
Entrance S (7th floor)
18322 Täby, Sweden
Tel: 08 638 72 00

Filiale Italiana
Via Fabio Filzi, 25/A
20124 Milano, Italy
Tel: 02-667541

Branch The Netherlands
Steijgerweg 6
5616 HS Eindhoven
The Netherlands
Tel: 040 265 40 10

[Asia & Oceania]

NEC Electronics (China) Co., Ltd
7th Floor, Quantum Plaza, No. 27 ZhiChunLu Haidian
District, Beijing 100083, P.R.China
Tel: 010-8235-1155
http://www.cn.necel.com/

NEC Electronics Shanghai Ltd.
Room 2511-2512, Bank of China Tower,
200 Yincheng Road Central,
Pudong New Area, Shanghai P.R. China P.C:200120
Tel: 021-5888-5400
http://www.cn.necel.com/

NEC Electronics Hong Kong Ltd.
Unit 1601-1613, 16/F., Tower 2, Grand Century Place,
193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: 2886-9318
http://www.hk.necel.com/

NEC Electronics Taiwan Ltd.
7F, No. 363 Fu Shing North Road
Taipei, Taiwan, R. O. C.
Tel: 02-8175-9600
http://www.tw.necel.com/

NEC Electronics Singapore Pte. Ltd.
238A Thomson Road,
#12-08 Novena Square,
Singapore 307684
Tel: 6253-8311
http://www.sg.necel.com/

NEC Electronics Korea Ltd.
11F., Samik Lavied'or Bldg., 720-2,
Yeoksam-Dong, Kangnam-Ku,
Seoul, 135-080, Korea
Tel: 02-558-3737
http://www.kr.necel.com/