USER'S MANUAL

NEC

EP-75336GC-R,
EP-75336GK-R
EMULATION PROBE

INTRODUCTION

Readers   This manual is intended for the users who debug the μPD75336 subseries and μPD753036 subseries**Note** by using the IE-75001-R+IE-75000-R-EM and EP-75336GC-R or EP-75336GK-R.

      Note Under development

      Remark The IE-75001-R is based on the IE-75000-R (maintenance product) with the IR-75000-R-EM removed. The IE-75000-R can be used in the place of the IE-75001-R. In this case, replace the IE-75000-R-EM of the IE-75000-R with the IE-75300-R-EM.

Purpose   This manual explains how to connect the EP-75336GC-R or EP-75336GK-R to the IE-75001-R+IE-75000-R-EM and how to set the mask option.

Organization   This manual contains the following information:

General
Connections
Notes on use

How to Read This Manual Before reading this manual, read the manual of the IE-75001-R or IE-75000-R-EM to understand the configuration and functions of the debug system.

> Unless otherwise specified, the EP-75336GC-R is treated as the representative model in this manual. If you use the EP-75336GK-R, read EP-75336GC-R as EP-75336GK-R.
> If you use the IE-75000-R as an in-circuit emulator, read IE-75001-R as IE-75000-R.
> Again, unless otherwise specified, the IE-75001-R indicates the status of the IE-75001-R+IE-75300-R-EM.

- To understand the overall functions and connections of the EP-75336GC-R or EP-75336GK-R,
  - $\rightarrow$ Read this manual in the order of the Table of Contents.
- To understand the operating environment, configuration, and target device,
  - $\rightarrow$ Read **CHAPTER 1 GENERAL**.
- To understand connections,
  - $\rightarrow$ Read **CHAPTER 2 CONNECTIONS**.
- To understand how to set the mask option,
  - $\rightarrow$ Read **CHAPTER 3 NOTES ON USE**.

Legend   **Note**   Description of Note in the text
                               Caution Information requiring particular attention
                               Remark   Supplementary description

Related Documents   Some of the related documents are of preliminary versions but they are not so speci-
                               fied in this document.

                               • IE-75000-R/IE-75001-R User's Manual   (Document No.: EEU-1416)
                               • IE-75000-R-EM User's Manual   (Document No.: EEU-1294)
                               • IE-75300-R-EM User's Manual   (Document No.: EEU-1493)

Checking Carton Box   The carton box of the EP-75336GC-R and EP-75336GK-R contains the following.
                               Confirm that all the parts and accessories are contained on unpacking the carton box.
                               If any part or accessory is missing or damaged, contact NEC.

                                                                                                Qty
                               • Emulation probe   1
                               • Adapter board   1
                               • User's Manual (this manual)   1
                               • Spacer (with two screws)**Note 1**   1
                               • Mounting screw**Note 2**   2
                               • Conversion socket
                                 (attached to EP-75336GC-R: EV-9200GC-80)**Note 3**   1
                               • Conversion adapter
                                 (attached to EP-75336GK-R: EV-9500GK-80)**Note 3**   1

                               Notes 1. Used to connect the adapter board and IE-75000-R-EM.
                                       2. Used to connect the emulation probe and IE-75001-R.
                                       3. Used to connect the emulation probe and target system.

CONTENTS

[MEMO]

CHAPTER 1 GENERAL

This chapter describes the outline of the EP-75336GC-R.

1.1 Operating Environment

The EP-75336GC-R is a probe set that is used to connect the IE-75001-R and the target system. By using this probe set, the debugging environment for the μPD75336 subseries or μPD753036 subseries is organized, and the hardware and software of the target system can be debugged.
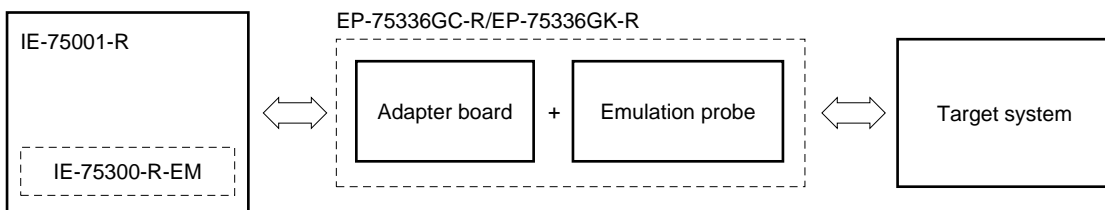
For the details of connections, refer to **CHAPTER 2 CONNECTIONS**.

Figure 1-1. Connecting IE-75001-R and Target System

(a) Connecting μPD75336 subseries
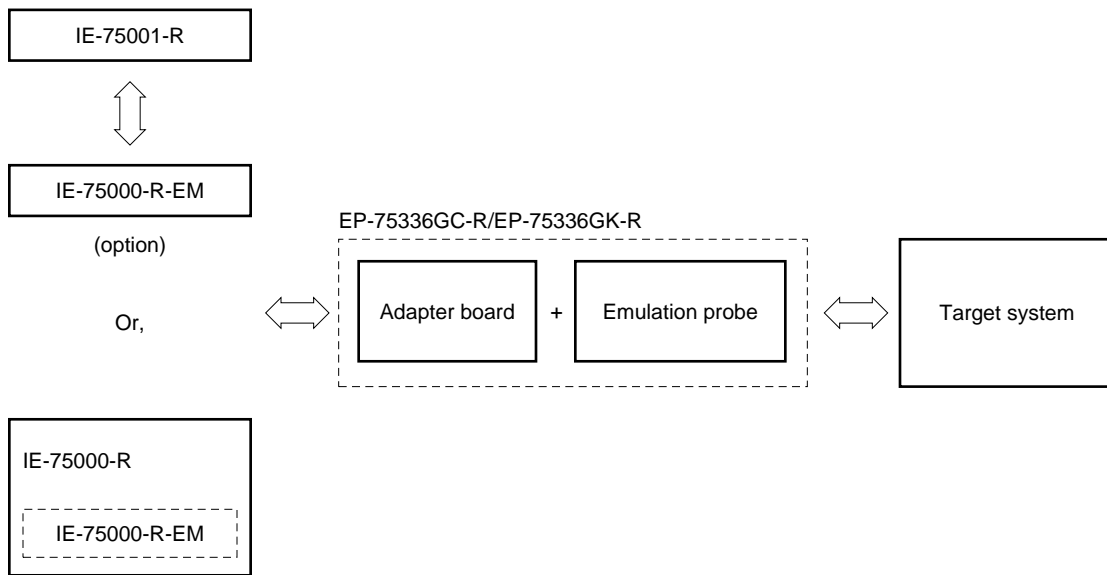
(b) Connecting μPD753036 subseries

1.2 Configuration

The EP-75336GC-R is a set consisting of an emulation probe and an adapter board.

(1) Emulation probe

The emulation probe consists of the following three parts:

☐ 80-pin GC probe or 80-pin GK probe

Connects the IE-75001-R and target system.

☐ Ground clip

Connected to GND of the target system. This makes GND potential of the IE-75001-R and target system the same, so that the IE-75001-R and target system become highly immune to static electricity and noise.

☐ External sense clips

Consist of eight sense clips that are used to check the level of the pins of the IC mounted on the target system.

(2) Adapter board

The adapter board connects the emulation board (IE-75000-R-EM) and emulation probe. This board has a function to set the mask option. For details, refer to **CHAPTER 3 NOTES ON USE**.

Figure 1-2. Emulation Probe

(a) EP-75336GC-R

External sense clips

Ground clip

80-pin GC

(b) EP-75336GK-R

External sense clips

80-pin GK

Ground clip
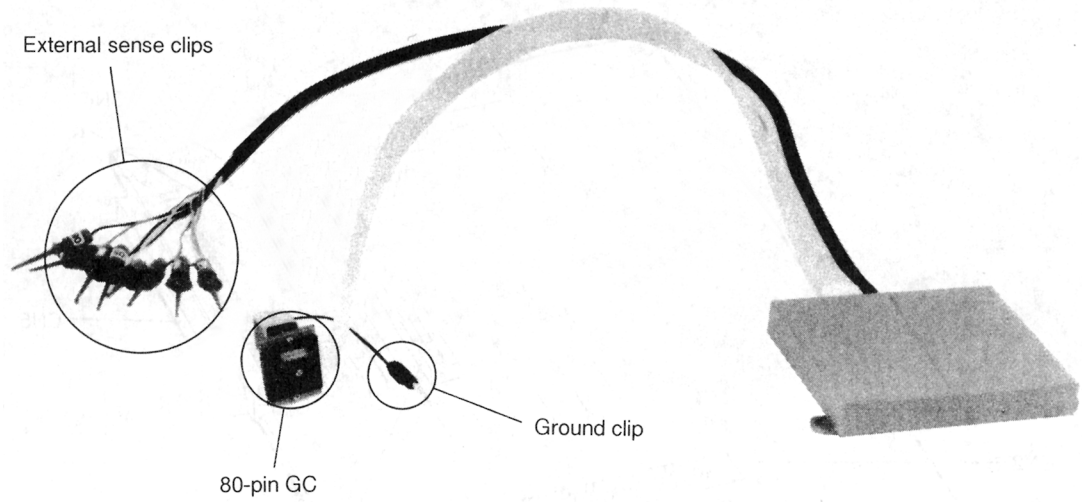
Figure 1-3. Adapter Board

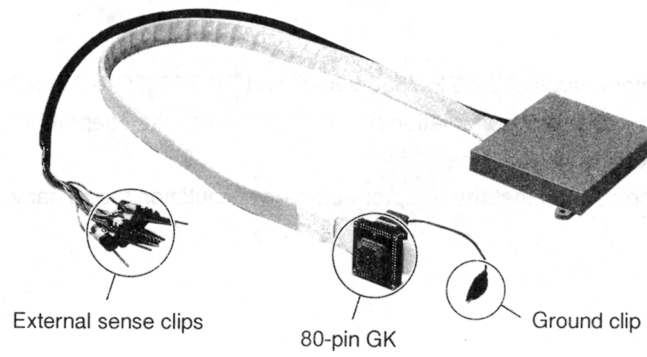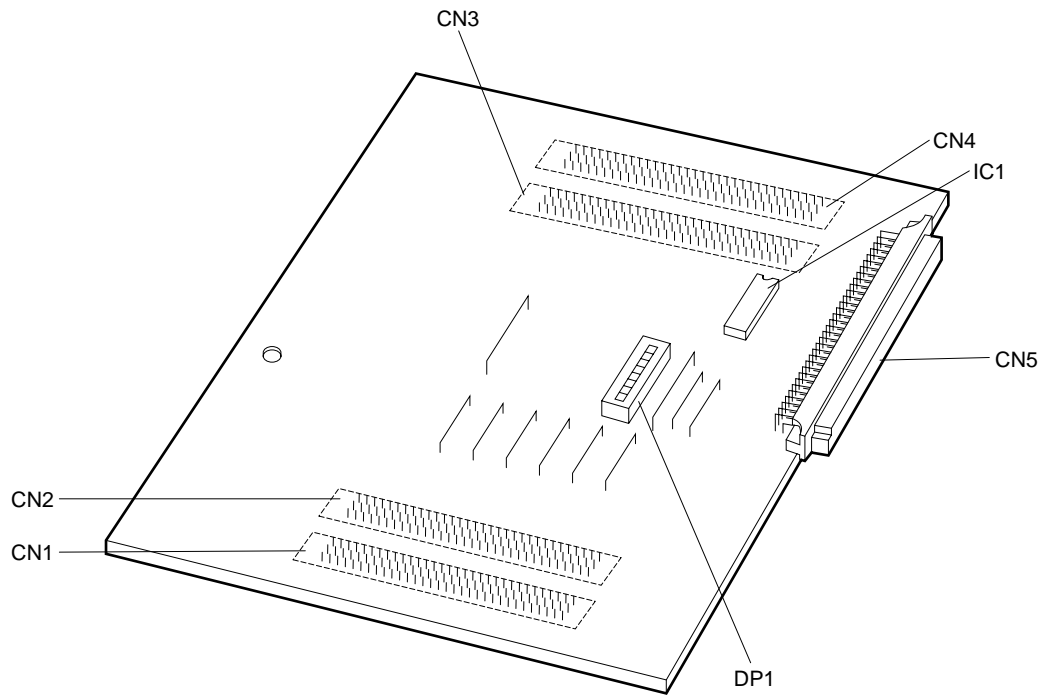**Remark**   The adapter boards of the EP-75336GC-R and EP-75336GK-R look the same. On each adapter board, the name of the emulation probe supported by the adapter board (EP-75336GC-R or EP-75336GK-R) is silk-screen-printed.
Before use confirm that the adapter board and emulation probe names are in the correct combination.

1.3 Target Devices

Each emulation probe is used to emulate the following target devices (as of July, 1995).

(1) EP-75336GC-R

- μPD75336 subseries
  - · μPD75336GC
  - · μPD75P336GC
- μPD753036 subseries
  - · μPD753036GC
  - · μPD75P3036GC

(2) EP-75336GK-R

- μPD75336 subseries
  - · μPD75336GK
  - · μPD75P336GK
- μPD753036 subseries
  - · μPD753036GK
  - · μPD75P3036GK

[MEMO]

CHAPTER 2 CONNECTIONS

This chapter explains how to connect and turn on/off power to the EP-75336GC-R, and how to disconnect the emulation probe from the target system.

2.1 Connecting IE-75001-R and Target System

Perform connections as follows:

(1) Connecting the IE-75000-R-EM and adapter board

      <1> Turn off power to the IE-75001-R.
      <2> Connect the IE-75000-R-EM and adapter board.
      <3> Install the IE-75000-R-EM (with adapter board) to the IE-75001-R.

(2) Connecting the IE-75001-R and emulation probe

(3) Connecting the emulation probe and target system

      <1> Turn off power to the target system.
      <2> Solder the conversion socket or conversion adapter to the target system.
      <3> Insert the tip of the emulation probe to the conversion socket or conversion adapter.

(4) Connecting the external sense clips (when the external sense clips are used).

(5) Turning on power

> **Caution**   **The procedure to connect the μPD753036 subseries is the same as the procedure to connect the μPD75336 subseries explained in this chapter. However, use the IE-75300-R-EM as the emulation board.**

Each connecting procedure is explained in detail next.

(1) Connecting the IE-75000-R-EM and adapter board

Connect the adapter board to the IE-75000-R-EM.

<1> Insert the spacer between the IE-75000-R-EM and adapter board, Connect CN1 through CN4 on the IE-75000-R-EM to CN1 through CN4 on the adapter board.

<2> Secure the spacer inserted between the IE-75000-R-EM and adapter board with the spacer mounting screws.

<3> Turn off power to the IE-75001-R.

<4> Remove the screws (six places) from the top of the IE-75001-R and open the top cover.

<5> Pull the card pullers at both the edges of the board toward you to pull out the IE-75000-R-BK**Note**.

<6> Secure the IE-75000-R-EM and IE-75000-R-BK with screws.

<7> Return the IE-75000-R-BK to which the IE-75000-R-EM is mounted to the original position in the IE-75001-R.

Note The IE-75000-R-EM and IE-75000-R-BK are secured with screws and installed in the IE-75000-R. Therefore, pull out the IE-75000-R-BK from the main enclosure in the sequence <3>, <4>, and <5> above, remove the screws and then the IE-75000-R-EM. Then perform steps <1>, <2>, <6>, and <7> in that order.

**Figure 2-1. Connecting IE-75000-R-EM and Adapter Board**
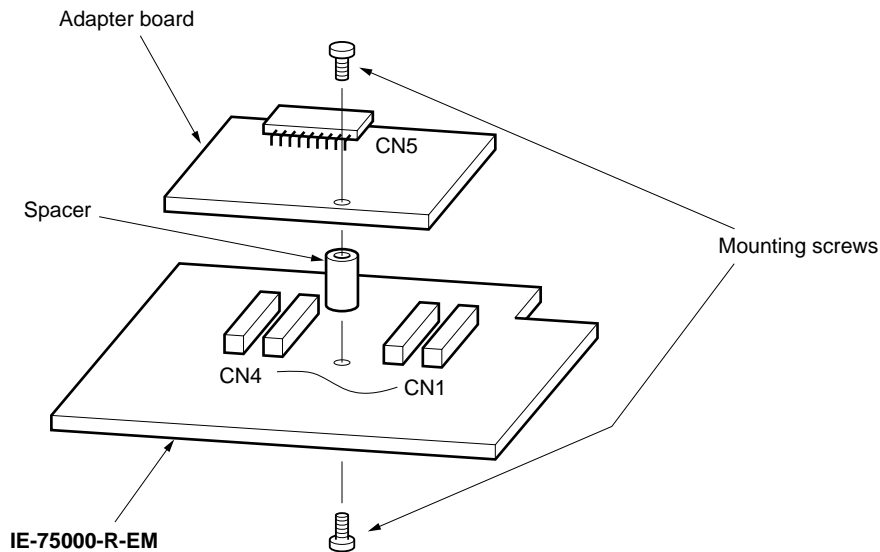
(2) Connecting the IE-75001-R and emulation probe

<1> Connect the emulation probe to the emulation probe connecting DIN connector (CN5 on the adapter board) on top of the IE-75001-R.

<2> After connecting the emulation probe, be sure to secure the emulation probe and IE-75001-R with mounting screws.

Figure 2-2. Connecting IE-75001-R and Emulation Probe
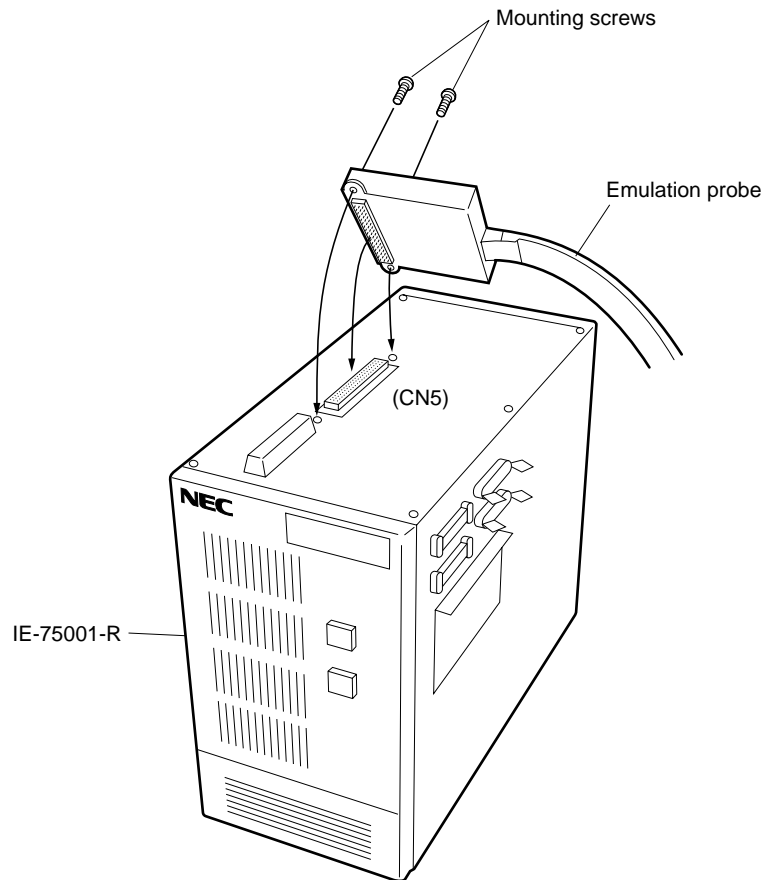
(3) Connecting the emulation probe and target system

Connect the emulation probe and target system in the following procedure:

Cautions 1.   Be sure to connect the ground clip before connecting the probe and target system. Otherwise, the IE-75001-R may be damaged by static electricity.

2.   Be sure to connect the pins in the correct direction. If the pin is connected in the wrong direction, the IE-75001-R may be damaged.

<1> Turn off power to the target system.

<2> Solder the conversion socket (EV-9200GC-80) or conversion adapter (EV-9500GK-80) to the target system.

<3> Connect the ground clip of the emulation probe to the ground (GND) of the target system.

<4> Insert the emulation probe so that 80-pin GC or 80-pin GK at the tip of the emulation probe matches the position of pin 1 of the conversion socket or conversion adapter soldered on the target system in <2>.

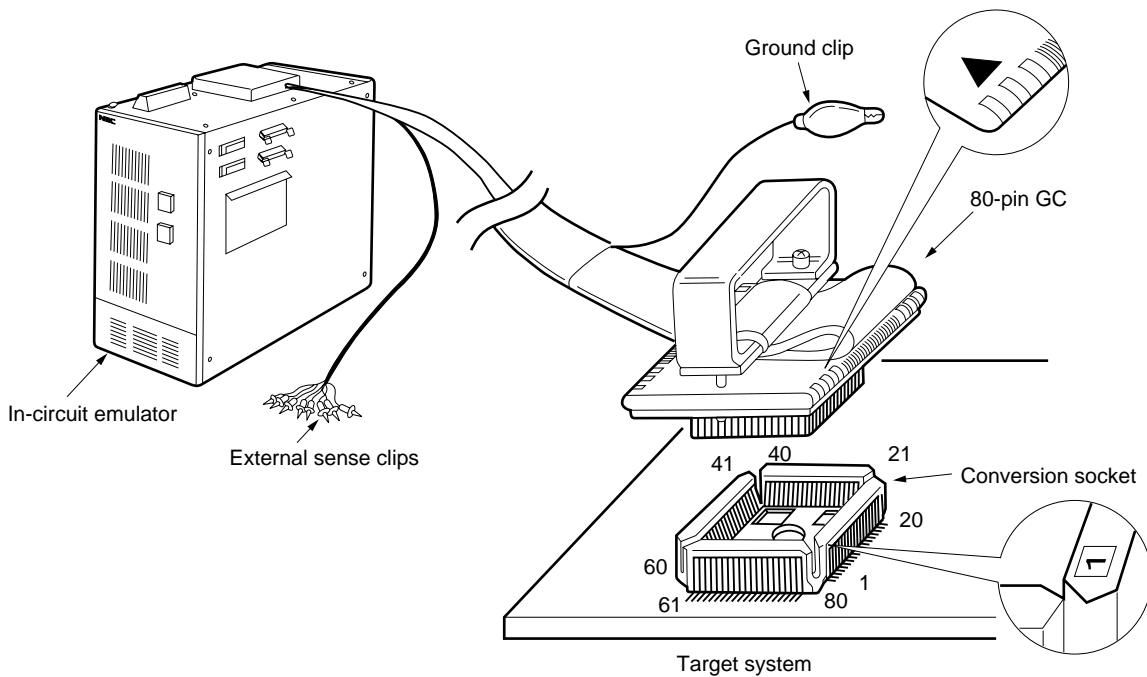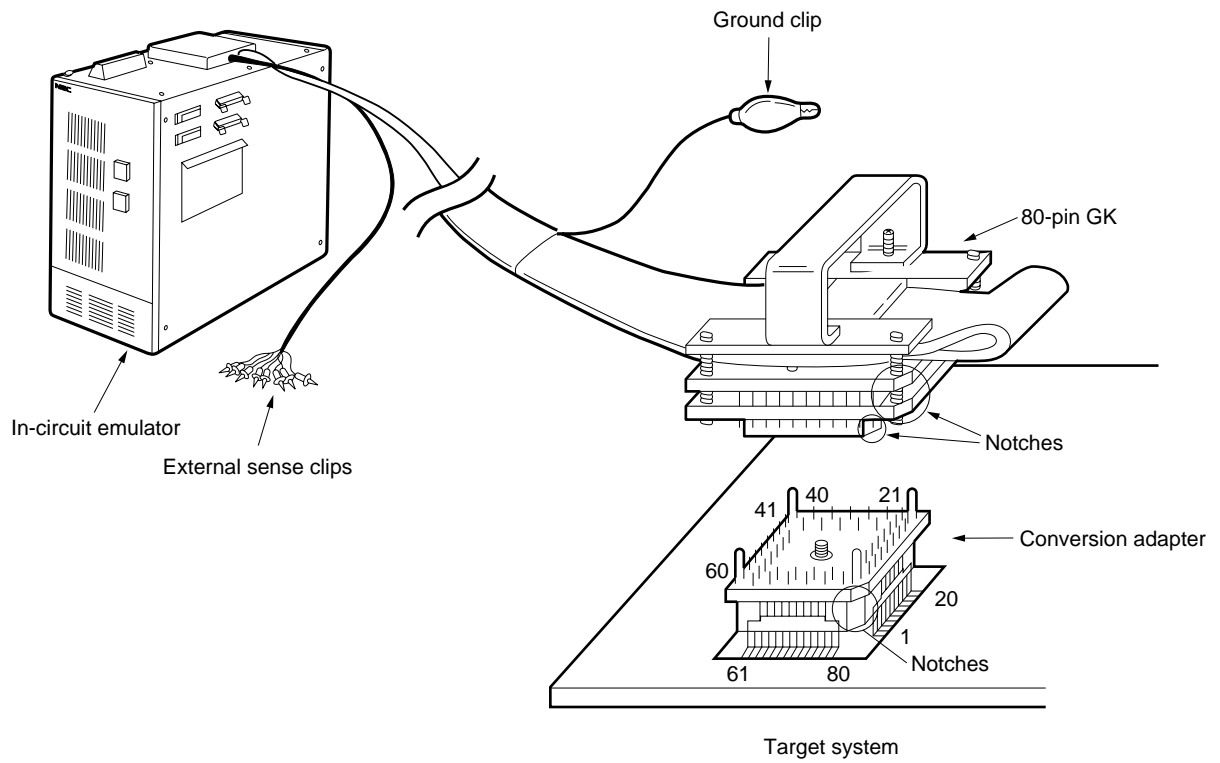**Figure 2-3. Connecting 80-Pin GC Emulation Probe**

Figure 2-4. Connecting 80-Pin GK Emulation Probe

(4) Connecting the external sense clips

The emulation probe has eight external sense clips that can trace the signals of the hardware on the target system in real-time.

Because the external sense clip is directly connected to the input buffer HCT244 in the in-circuit emulator, its input is TTL level.

Usually, the eight external sense clips are input signal lines. However, the signal line of external sense clip 1 can be used as an external trigger output signal line when an event occurs, if so specified by the OUT command of the in-circuit emulator (for details, refer to the User's Manual of the in-circuit emulator).

Cautions 1. Connect the external sense clips only to the TTL level signal lines. If they are connected to any other signal lines, accurate high and low levels cannot be detected. Moreover, the sensor of the IE-75001-R may be damaged depending on the voltage level.

2. To use external sense clip 1 for external trigger output, make sure that external sense clip 1 is not connected to a signal output line; otherwise, a malfunction may occur.

Connect the external sense clips in the following steps:

<1> Turn off power to the target system and then to the IE-75001-R.
<2> Attach an IC clip (commercially available) to any IC on the target system to be traced.
<3> Connect an external sense clip to the mounted IC clip.
<4> Turn on power to the IE-75001-R and then to the target system.

Figure 2-5. Connecting External Sense Clip

External sense clip

IC clip

IC
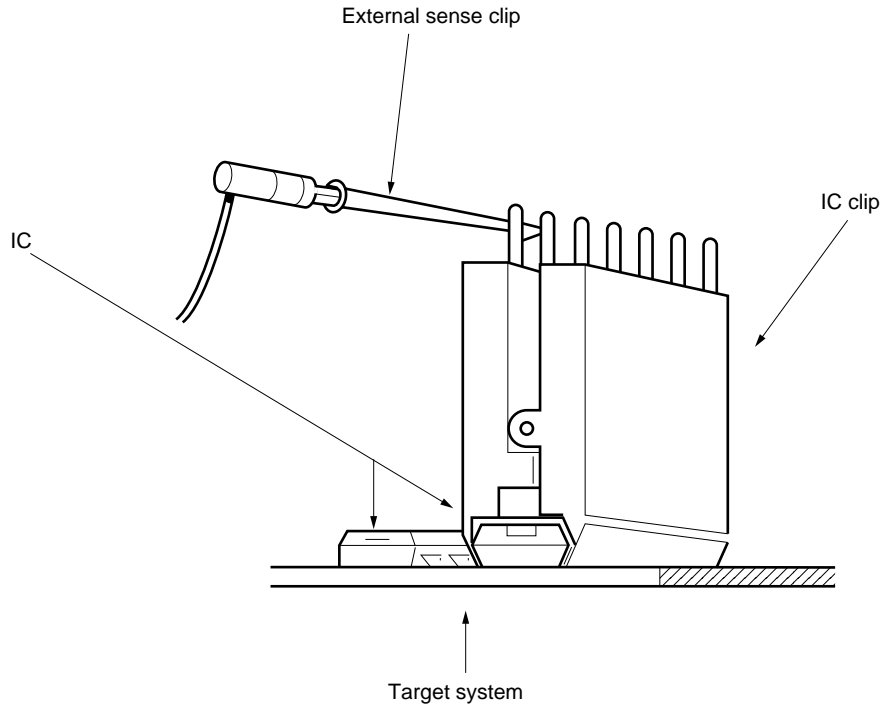
Target system

Remark   When connecting the external sense clips, use IC clips whenever possible, to prevent accidental connection and to improve operability.

2.2 Power ON/OFF Sequence

After connecting the emulation probe and target system, turn on/off power in the sequence described below.

Caution   Be sure to observe the power ON/OFF sequence described below. Otherwise, the IE-75001-R may be damaged.

(1) When IE-75001-R is connected to the target system

– Power on sequence
<1> Turn on power to the IE-75001-R.
<2> Turn on power to the target system.

– Power off sequence
<1> Turn off power to the target system.
<2> Turn off power to the IE-75001-R.

2.3 Removing Emulation Probe from Target System

Remove the emulation probe from the target system in the following procedure:

<1> Turn off power to the target system.
<2> Turn off power to the IE-75001-R.
<3> Pull up the bracket at the tip of the emulation probe at right angles to remove the emulation probe from the conversion socket or conversion adapter.

Figure 2-6. Removing Emulation Probe

(a) With EP-75336GC-R
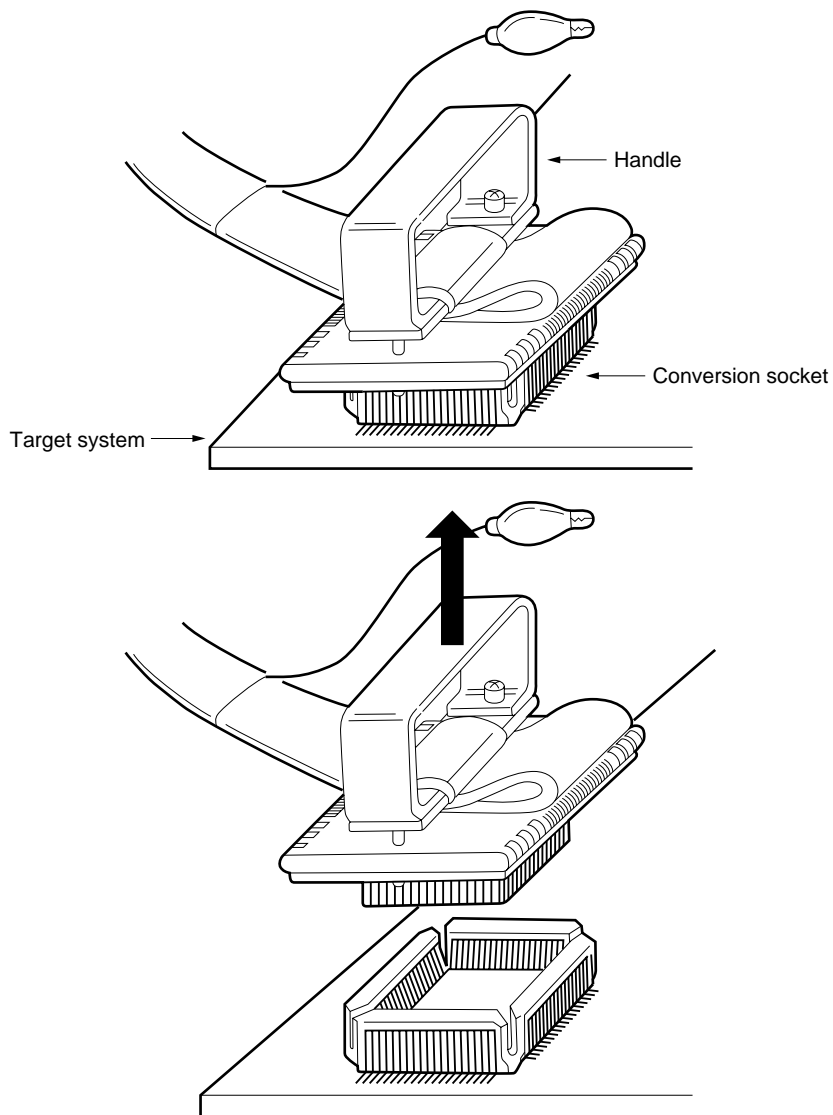
(b) With EP-753036GK-R

Handle

Conversion adapter

Target system

3.1 Setting Mask Options for Ports 4 and 5

The DP1 switch on the adapter board is used to set the mask options of ports 4 and 5. When one of these switches is set to ON, a pull-up resistor (68 kΩ) is connected.

All the switch pins of DP1 are factory-set to OFF for shipment.

Figure 3-1. Correspondence of DP1 Switch Pins

```
              P4              P5
       1   2   3   4   5   6   7   8
DP1   ┌─┐ ┌─┐ ┌─┐ ┌─┐ ┌─┐ ┌─┐ ┌─┐ ┌─┐
      │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
      │█│ │█│ │█│ │█│ │█│ │█│ │█│ │█│
      └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘ └─┘
                     OFF
       1            OFF            8
```

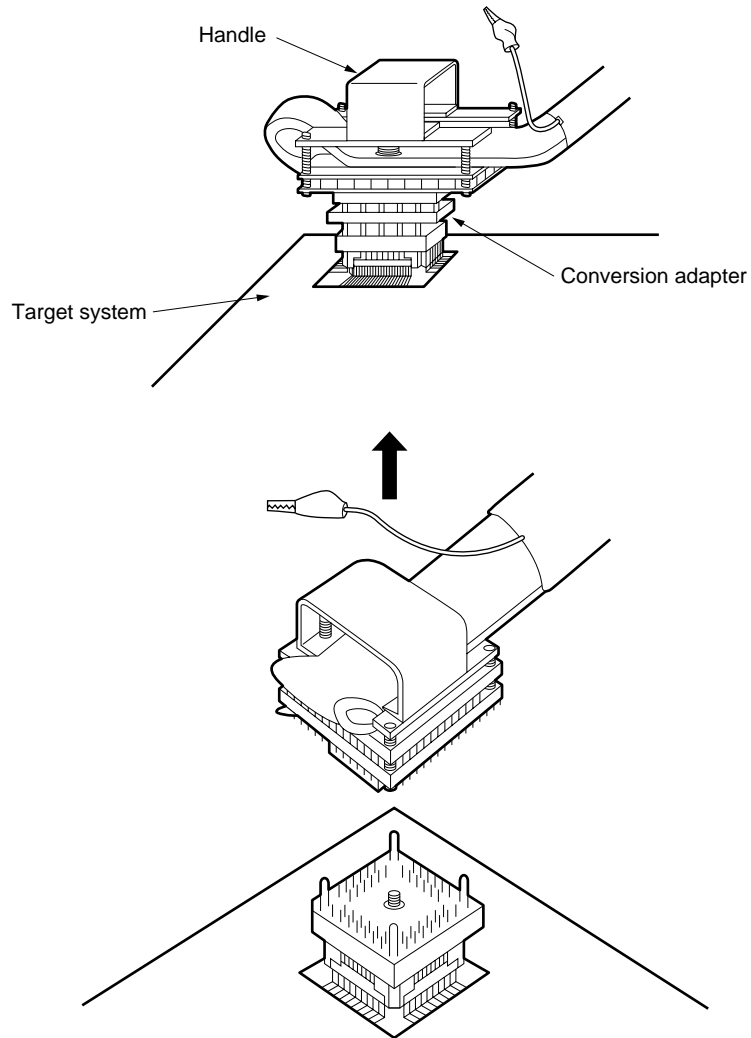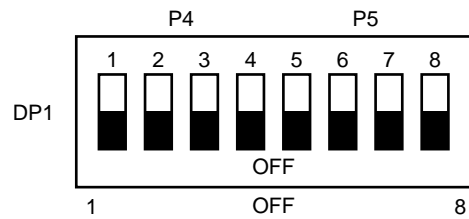SW · bit   signal name   SW · bit   signal name

DP1 − 1 → P40   DP1 − 5 → P50

   − 2 → P41   − 6 → P51

   − 3 → P42   − 7 → P52

   − 4 → P43   − 8 → P53

Pin processing

μPD75390

P40-P43
P50-P53

Pin processing
COMSPW
68 kΩ
100 Ω
Emulation probe
P40   P50
 | |
P43   P53
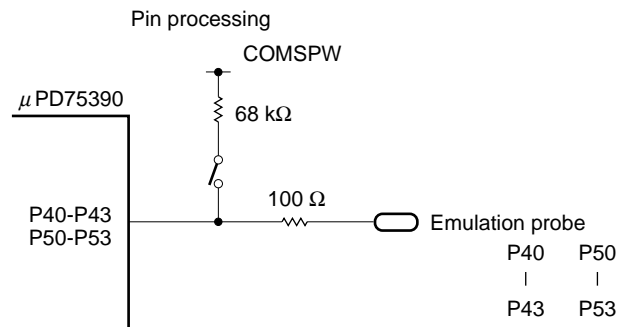
3.2 Setting LCD Driving Divider Resistor

The IC socket (IC1) on the adapter board is used to set an LCD driving divider resistor that can be set by mask option.

To set an LCD driving divider resistor, mount the resistor on a component block, and insert the component block in the IC socket (refer to **Figure 3-2**).

Figure 3-2. IC1 Pin Connection
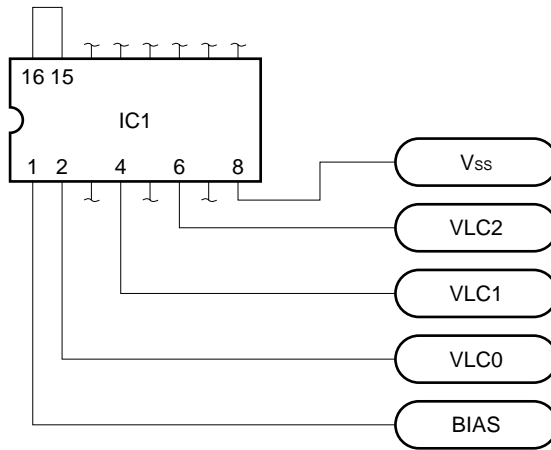
3.3 When Using Port 8 in Input Mode

When using port 8 (P80 through P83) in the input mode, high level is not output to P82 and P83, and the internal pull-up resistor connection cannot be confirmed even if connection of the internal pull-up resistor is specified by software. This is because the analog inputs (AN6 and AN7) multiplexed with P82 and P83 take precedence, and therefore, a protection buffer is connected to P82 and P83 on the emulation board.

Because the internal pull-up resistors are connected to all four pins (P80 through P83) by software at the same time, whether the internal pull-up resistors are connected can be checked by checking the levels of P80 and P81 (for details, refer to the User's Manual of the emulation board).
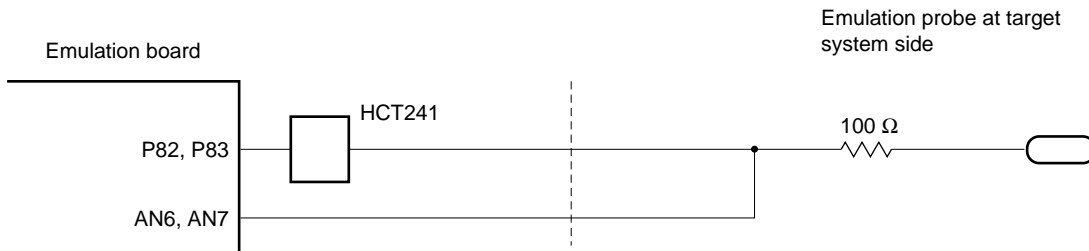
APPENDIX A PIN CORRESPONDENCE OF EACH EMULATION PROBE

A.1 80-Pin GC Emulation Probe

CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe
1	GND	25	15	49	34	73	61
2	GND	26	16	50	33	74	NC
3	EXT0	27	17	51	32	75	NC
4	EXT1	28	18	52	31	76	70
5	EXT2	29	19	53	41	77	69
6	EXT3	30	20	54	42	78	68
7	EXT4	31	21	55	43	79	67
8	EXT5	32	NC	56	44	80	66
9	EXT6	33	NC	57	45	81	65
10	EXT7	34	30	58	46	82	64
11	1	35	29	59	47	83	63
12	2	36	28	60	48	84	62
13	3	37	27	61	49	85	80
14	4	38	26	62	50	86	79
15	5	39	25	63	51	87	78
16	6	40	24	64	52	88	77
17	7	41	23	65	53	89	76
18	8	42	22	66	54	90	75
19	9	43	40	67	55	91	74
20	10	44	39	68	56	92	73
21	11	45	38	69	57	93	72
22	12	46	37	70	58	94	71
23	13	47	36	71	59	95	GND
24	14	48	35	72	60	96	GND

Remarks 1. Pin number of CN5

CN5: Connector that connects the emulation probe when the IE-75001-R is used

2. The meanings of the symbols and numbers in the Emulation Probe column of the above table are as follows:

GND   : ground clip (GND)

EXT0-EXT7 : external sense clips

1-80   : pin numbers of 80-pin GC at the tip of emulation probe

NC   : No Connection

A.2 80-Pin GK Emulation Probe

CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe	CN5 Pin No.	Emulation Probe
1	GND	25	15	49	34	73	61
2	GND	26	16	50	33	74	NC
3	EXT0	27	17	51	32	75	NC
4	EXT1	28	18	52	31	76	70
5	EXT2	29	19	53	41	77	69
6	EXT3	30	20	54	42	78	68
7	EXT4	31	21	55	43	79	67
8	EXT5	32	NC	56	44	80	66
9	EXT6	33	NC	57	45	81	65
10	EXT7	34	30	58	46	82	64
11	1	35	29	59	47	83	63
12	2	36	28	60	48	84	62
13	3	37	27	61	49	85	80
14	4	38	26	62	50	86	79
15	5	39	25	63	51	87	78
16	6	40	24	64	52	88	77
17	7	41	23	65	53	89	76
18	8	42	22	66	54	90	75
19	9	43	40	67	55	91	74
20	10	44	39	68	56	92	73
21	11	45	38	69	57	93	72
22	12	46	37	70	58	94	71
23	13	47	36	71	59	95	GND
24	14	48	35	72	60	96	GND

Remarks 1. Pin number of CN5

CN5: Connector that connects the emulation probe when the IE-75001-R is used

2. The meanings of the symbols and numbers in the Emulation Probe column of the above table are as follows:

GND   : ground clip (GND)

EXT0-EXT7 : external sense clips

1-80   : pin numbers of 80-pin GK at the tip of emulation probe
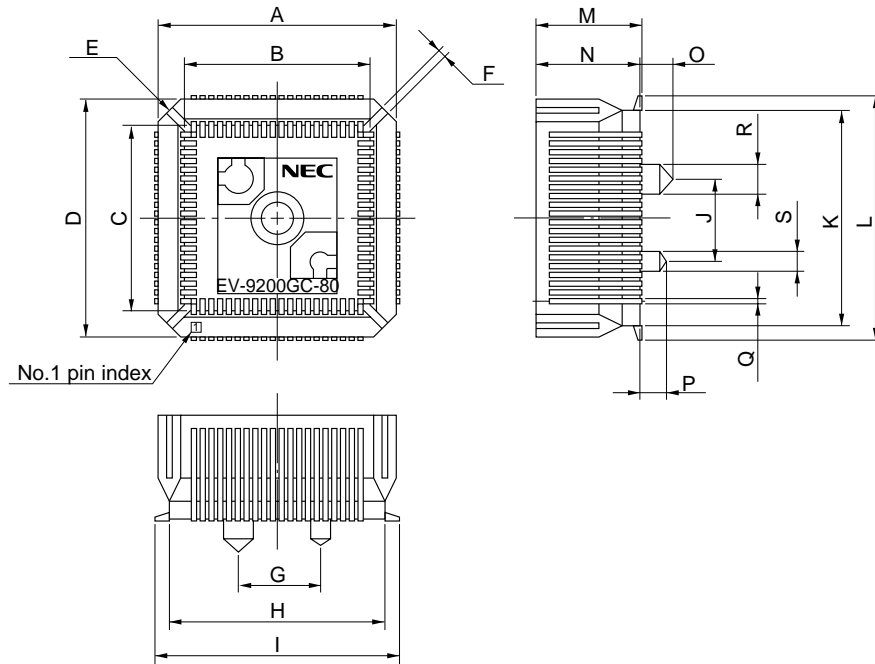
NC   : No Connection

APPENDIX B DIMENSIONS OF CONVERSION SOCKET/CONVERSION ADAPTER AND RECOMMENDED MOUNTING PATTERN ON BOARD

B.1 Conversion Socket EV-9200GC-80

EV-9200GC-80-G0

ITEM	MILLIMETERS	INCHES
A	18.0	0.709
B	14.4	0.567
C	14.4	0.567
D	18.0	0.709
E	4-C 2.0	4-C 0.079
F	0.8	0.031
G	6.0	0.236
H	16.0	0.63
I	18.7	0.736
J	6.0	0.236
K	16.0	0.63
L	18.7	0.736
M	8.2	0.323
O	8.0	0.315
N	2.5	0.098
P	2.0	0.079
Q	0.35	0.014
R	φ2.3	φ0.091
S	φ1.5	φ0.059
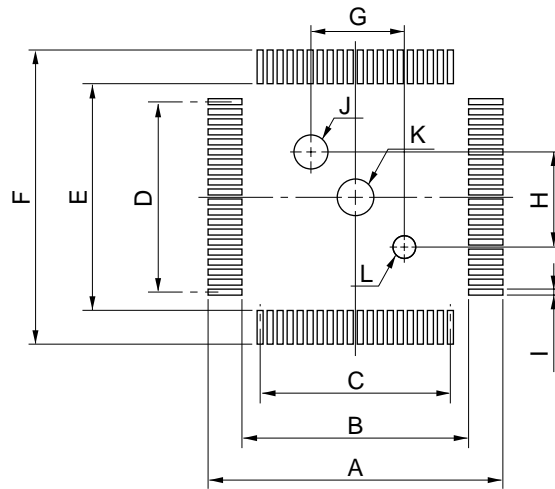
EV-9200GC-80-P0

ITEM	MILLIMETERS	INCHES
A	19.7	0.776
B	15.0	0.591
C	$0.65\pm0.02 \times 19 = 12.35\pm0.05$	$0.026^{+0.001}_{-0.002} \times 0.748 = 0.486^{+0.003}_{-0.002}$
D	$0.65\pm0.02 \times 19 = 12.35\pm0.05$	$0.026^{+0.001}_{-0.002} \times 0.748 = 0.486^{+0.003}_{-0.002}$
E	15.0	0.591
F	19.7	0.776
G	6.0 ± 0.05	$0.236^{+0.003}_{-0.002}$
H	6.0 ± 0.05	$0.236^{+0.003}_{-0.002}$
I	0.35 ± 0.02	$0.014^{+0.001}_{-0.001}$
J	$\phi 2.36\pm0.03$	$\phi 0.093^{+0.001}_{-0.002}$
K	$\phi 2.3$	$\phi 0.091$
L	$\phi 1.57\pm0.03$	$\phi 0.062^{+0.001}_{-0.002}$

Caution   Dimensions of mount pad for EV-9200 and that for target device (QFP) may be different in some parts. For the recommended mount pad dimensions for QFP, refer to "SEMICONDUCTOR DEVICE MOUNTING TECHNOLOGY MANUAL" (IEI-1207).

B.2 Conversion Adapter EV-9500GK-80

EV-9500GK-80-G0

[MEMO]

Facsimile Message

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