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Phase-out/Discontinued

**EP-753108GC-R,
EP-753108GK-R
EMULATION PROBE**

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PREFACE

Intended Readership

This manual is intended for use by users of μ PD753108 subseries debugging using the IE-75001-R +IE-75300-R-EM and EP-753108GC-R/EP-753108GK-R.

Remarks The IE-75001-R is a product equivalent to the IE-75000-R (maintenance product) with the IE-75000-R-EM removed. The IE-75000-R can be substituted for the IE-75001-R. In this case, replace the IE-75000-R-EM incorporated in the IE-75000-R with the IE-75300-R-EM.

Purpose

This manual provides an understanding of the method for connecting the EP-753108GC-R/EP-753108GK-R to the IE-75001-R+ IE-75300-R-EM and methods for setting mask options.

Organization

The contents of this manual can be roughly divided under the following general headings.

- General description
- Methods for connecting this product
- Methods for setting mask options

Using this Manual

Before reading this manual, be sure to read the manual for the IE-75001-R or IE-75300-R-EM and get a thorough understanding of the configuration and functions of the debugging system.

Unless there are any particular differences, the EP-753108GC-R is described in this manual as a representative product. When using this as the EP-753108GK-R manual, "EP-753108GC-R" should be read as "EP-753108GK-R".

When using the IE-75000-R as an in-circuit emulator, "IE-75001-R" should be read as "IE-75000-R". Unless specified otherwise, "IE-75001-R" means "IE-75001-R + IE-75300-R-EM".

- When desiring to understand general EP-753108GC-R/EP-753108GK-R functions and connection methods:
 - Read in accordance with the table of contents.
- When desiring to understand the operating environment, configuration and object devices:
 - Read **1. GENERAL DESCRIPTION.**
- When desiring to understand in detail how to understand the connection method:
 - Read **2. CONNECTIONS.**
- When desiring to understand the mask option setting method:
 - Read **3. SETTING THE MASK OPTION.**

Legend

- *** : Explains important points in the text.
- Note** : Contains important information that is of special importance.
- Remarks** : Provides a supplementary explanation for the text.

Related Documents

- IE-75000-R/IE-75001-R User's Manual (Document No.: EEU-1455)
- IE-75300-R-EM User's Manual (Document No.: EEU-1493)

Confirmation:

The following items are included in the EP-753108GC-R/EP-753108GK-R packing box. Check the items carefully. If any item is missing or damaged, be sure to contact this company's sales representative or authorized dealer.

- Emulation Probe 1
- Adaptor Board 1
- User's Manual (This Manual) 1
- Spacer (with 2 screws)*1 1
- Installation Screws*2 2
- Conversion socket*3 (provided with EP-753108GC-R: EV-9200GC-64) 1
- Conversion adapter*3 (provided with EP-753108GK-R: EV-9500GK-64) 1

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

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Phase-out/Discontinued

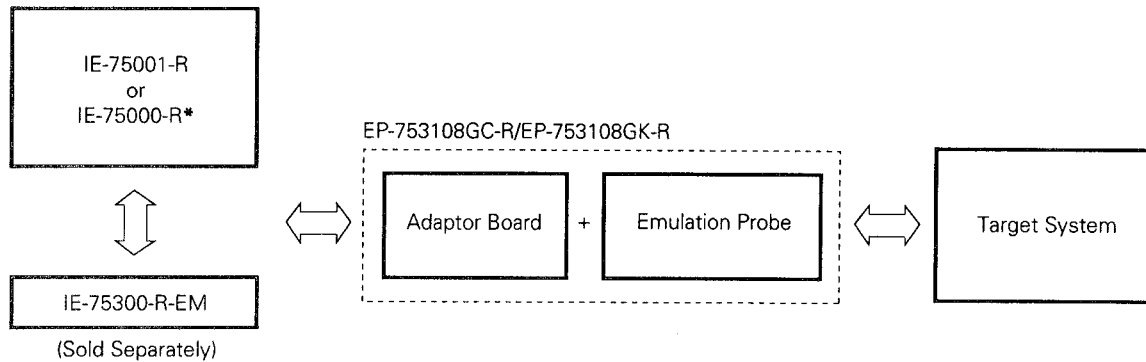
CHAPTER 1 GENERAL DESCRIPTION

This chapter gives an outline of the EP-753108GC-R.

1.1 OPERATING ENVIRONMENT

The EP-753108GC-R is a probe set designed for connection with the IE-75001-R and target system. By using the EP-753108GC-R in such connections, a debugging environment for the μ PD753108 subseries is created making comprehensive debugging of target system hardware and software possible. See 2. CONNECTIONS, concerning concrete connection methods.

Fig. 1-1 Connection to the IE-75001-R and Target System



* Replace the IE-75000-R-EM incorporated in the IE-75000-R with the IE-75300-R-EM.

1.2 CONFIGURATION

The EP-753108GC-R is a set consisting of a emulation probe and an adaptor board.

(1) Emulation Probe

The emulation probe is configured from the following 3 components.

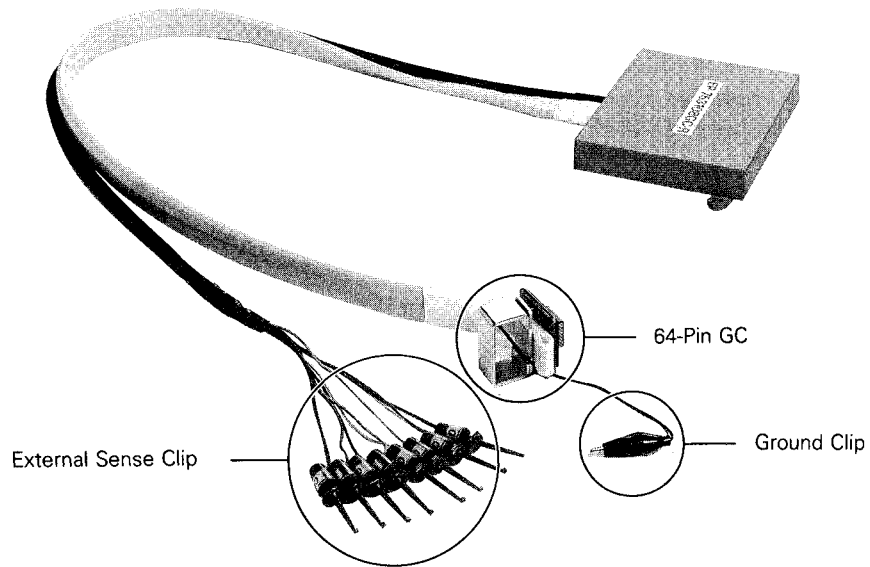
- **64-pin GC probe or 64-pin GK probe**
This connects the IE-75001-R and target system.
- **Ground clip**
This connects to the target system's GND. This makes the GND potential of the IE-75001-R and the target system the same, and protects the system against static electricity and noise.
- **External sense clips**
This consists of 8 sense clips. These clips are used to monitor the IC pin voltage level of the target system.

(2) Adaptor Board

The adaptor board is used to connect the emulation probe to the emulation board (IE-75300-R-EM). The adaptor board also includes functions to set mask options. For details, see 3. SETTING MASK OPTIONS.

Fig. 1-2 Emulation Probe

(a) EP-753108GC-R



(b) EP-753108GK-R

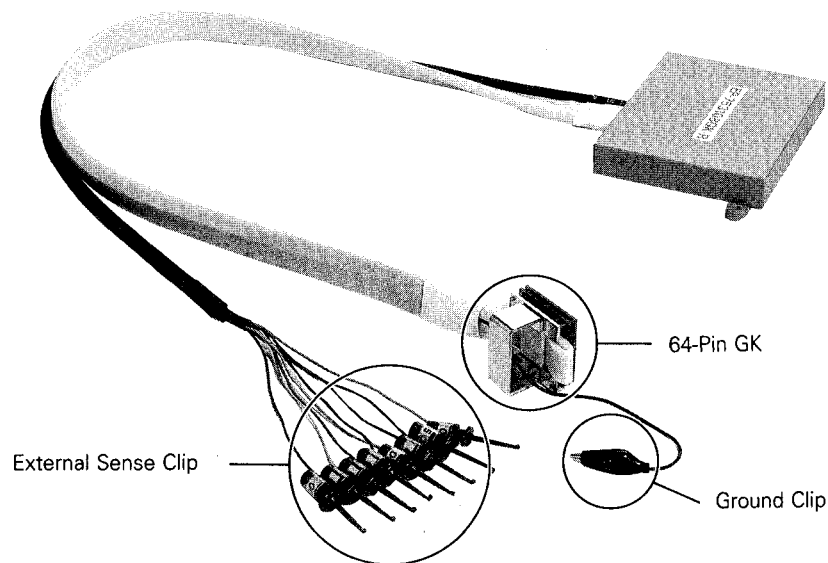
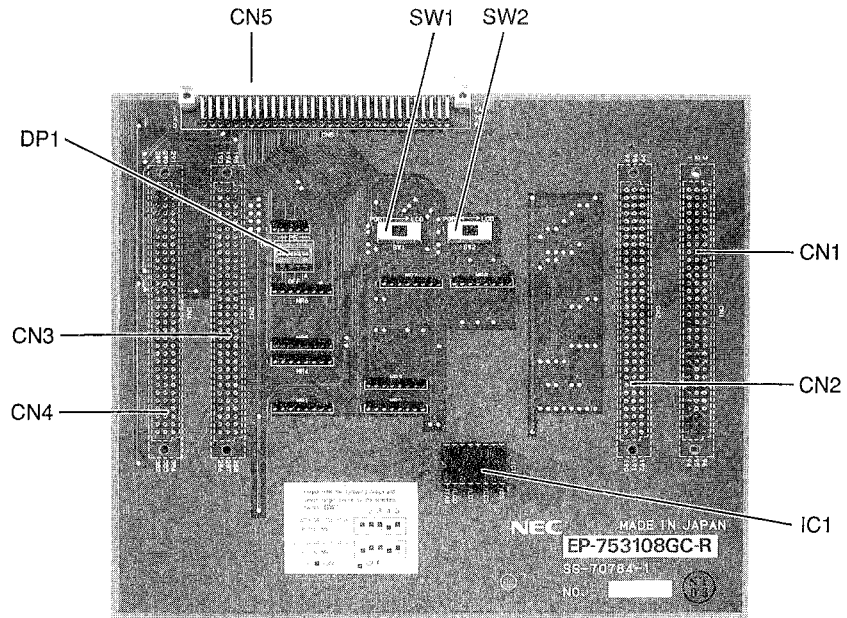
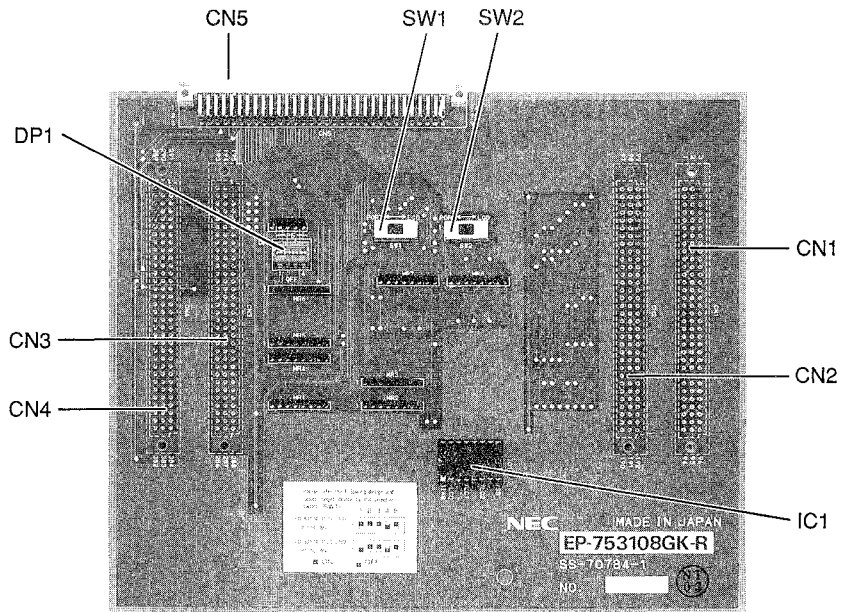


Fig. 1-3 Adaptor Board

(a) EP-753108GC-R



(b) EP-753108GK-R



1.3 TARGET DEVICES

The EP-753108GC-R is used in emulation of the following target devices (as of April 1994).

- μ PD753104GC
- μ PD753104GK
- μ PD753106GC
- μ PD753106GK
- μ PD753108GC
- μ PD753108GK
- μ PD75P3116GC
- μ PD75P3116GK

CHAPTER 2 CONNECTIONS

EP-753108GC-R, the sequence for switching on the power and switching it off and the method used to disconnect the emulation probe from the emulation system.

2.1 CONNECTION TO THE IE-75001-R AND TARGET SYSTEM

The connection procedure is outlined as follows.

- (1) Connection of the IE-75300-R-EM and adaptor board
 - ① Switching off the IE-75001-R's power
 - ② Connecting the IE-75300-R-EM and the adaptor board
 - ③ Installing the IE-75300-R-EM (with adaptor board) on the IE-75001-R
- (2) Connecting the IE-75001-R and the emulation probe
- (3) Connecting the emulation probe and target system
 - ① Switching off the target system's power
 - ② Soldering the conversion socket or conversion adaptor (supplied by the user) into the target system
 - ③ Inserting the target probe end into the conversion socket or conversion adaptor
- (4) Connecting the external sense clip (if the external sense clip is used)
- (5) Switching on the power

Next, details of each item in the connection procedure are explained.

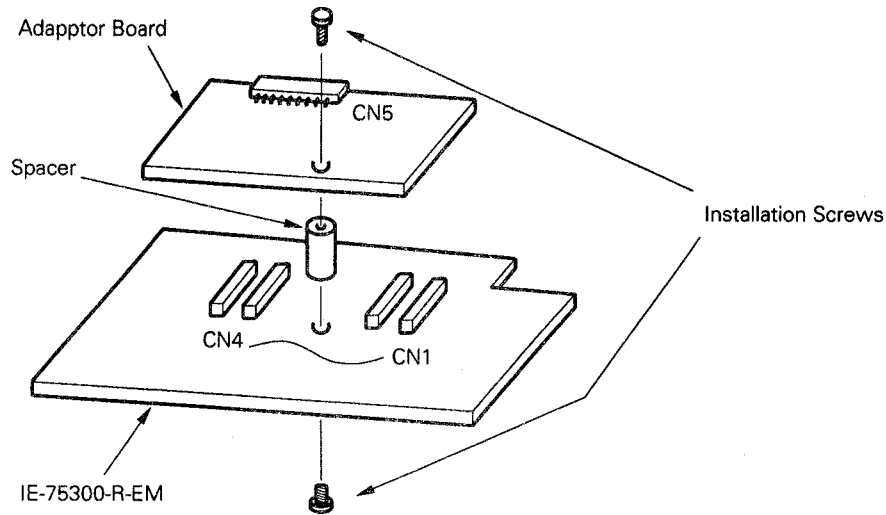
(1) Connecting the IE-75300-R-EM and Adaptor Board

Connect the adaptor board to the IE-75300-R-EM.

- ① While placing a spacer between the IE-75300-R-EM and the adaptor board, connect connectors CN1 to CN4 of the IE-75300-R-EM to connectors CN1 to CN4 of the adaptor board.
- ② Fasten the spacer between the IE-75300-R-EM and the adaptor board using the spacer installation screws.
- ③ First, switch off the IE-75001-R's power.
- ④ Take out the 6 screws in the top of the IE-75001-R unit, then open the unit's top cover.
- ⑤ Pull the card pullers on both ends of the board forward and pull out the IE-75000-R-BK*.
- ⑥ Screw the IE-75300-R-EM to the IE-75000-R-BK together.
- ⑦ Return the IE-75000-R-BK with the IE-75300-R-EM to the original position of the IE-75001-R.

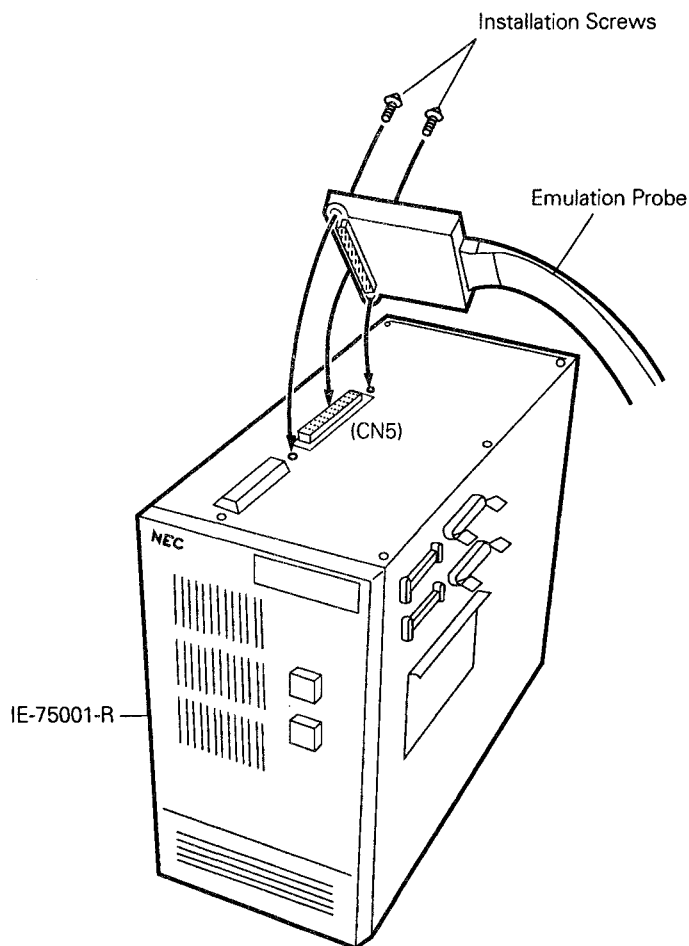
* In the case of the IE-75000-R, the IE-75000-R-EM and IE-75000-R-BK are installed screw together. Therefore, pull out the IE-75000-R-BK from the main unit in above steps ③→④→⑤, screw off and remove the IE-75000-R-EM before following steps ①→②→⑥→⑦.

Fig. 2-1 Connecting the IE-75300-R-EM and the Adaptor Board

**(2) Connecting the IE-75001-R and Emulation Probe**

- ① Connect the emulation probe to the emulation probe DIN connector (CN5 of the adaptor board) on the top of the IE-75001-R.
- ② After connection, be sure to fasten the emulation probe to the IE-75001-R with the installation screws provided.

Fig. 2-2 Connecting the IE-75001-R and Emulation Probe



(3) Connecting the Emulation Probe and Target System

Connect the emulation probe to the target system by the following procedure.

- Note**
1. Before connecting the emulation probe to the target system, be sure to connect the ground clip. If the ground clip is not connected, the IE-75001-R could be damaged by static electricity, etc.
 2. When making connections, be careful not to reverse the pins. If connections are incorrect, it could damage the IE-75001-R.
- ① Switch off the target system's power supply.
 - ② Solder the conversion socket (EV-9200GC-64) or conversion adaptor (EV-9500GK-64) to the target system.
 - ③ Connect the emulation probe's ground clip to the ground (GND) pin of the target system.
 - ④ Align the No. 1 pin of the 64-pin GC or 64-pin GK at the end of the emulation probe with the No. 1 pin of the conversion socket or conversion adaptor soldered into the target system in ②, then insert the emulation probe.

Fig. 2-3 64-Pin GC Emulation Probe Connection Diagram

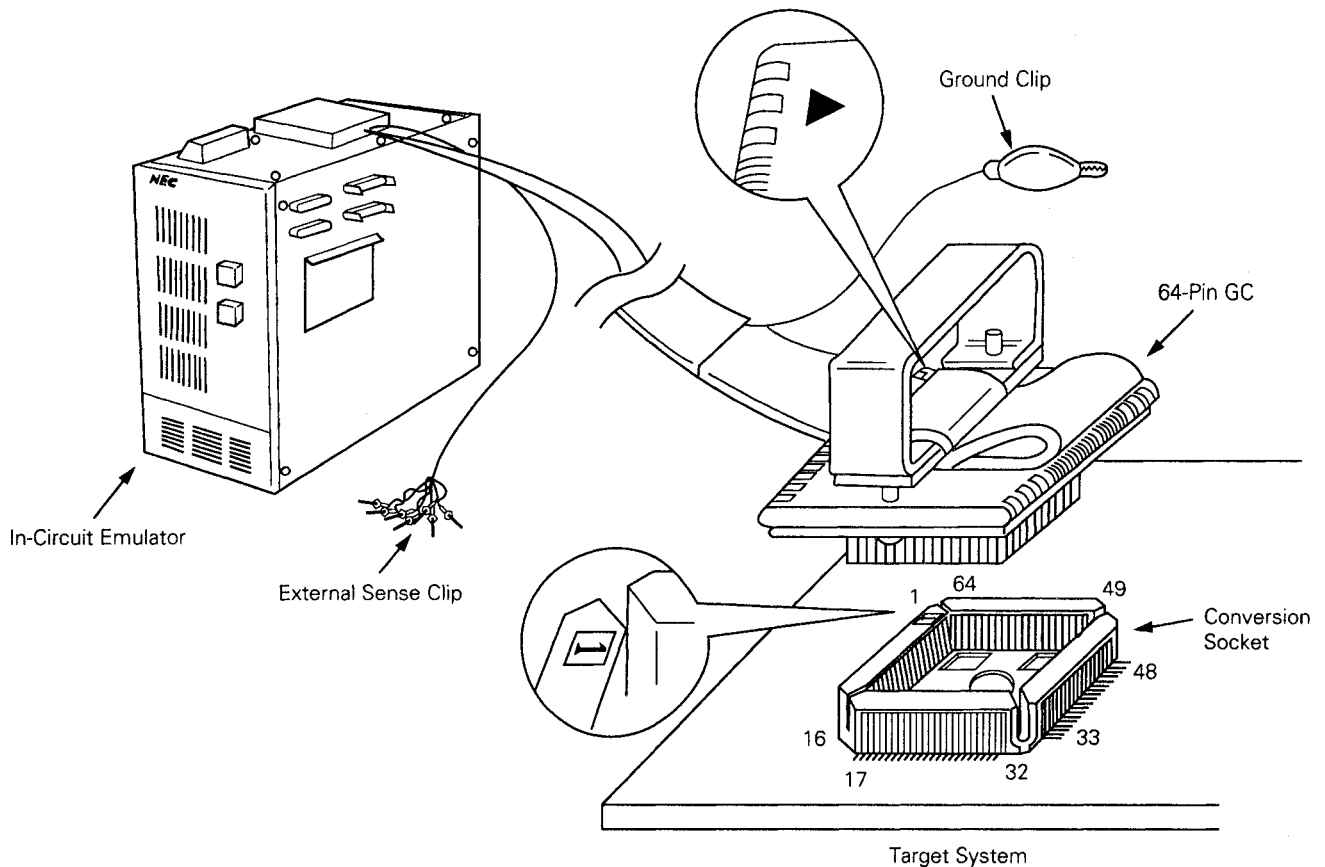
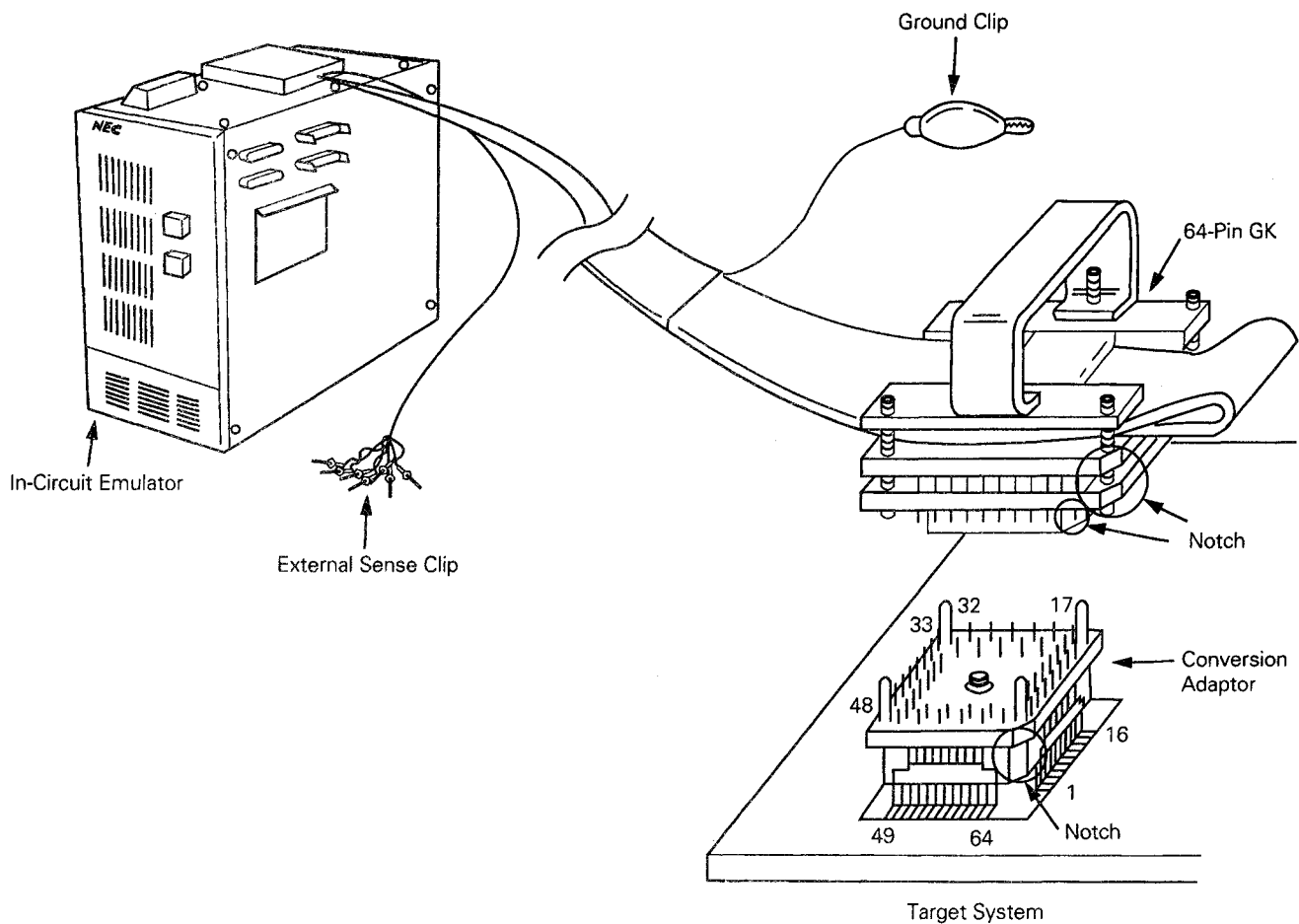


Fig. 2-4 64-Pin GK Emulation Probe Connection Diagram



(4) Connecting the External Sense Clip

The emulation probe is provided with 8 external sense clips which can trace hardware signals on the target system in real time.

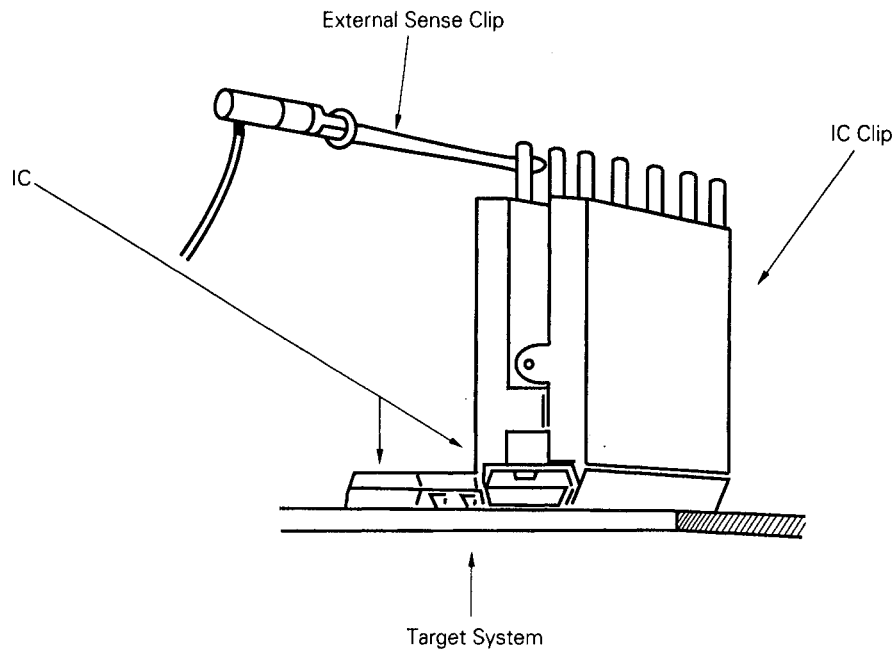
Since the external sense clips are directly connected to the input buffer HCT244 inside the in-circuit emulator unit, they are TTL level inputs.

The 8 external sense clips are normally input signal lines. However, by setting the in-circuit emulator OUT command, the signal line of external sense clip 1 can be used as an outgoing trigger output signal line in the case of an event (see the in-circuit emulator manual for details).

- Note**
1. Connect the external sense clip to a TTL level signal line only. If it is connected to a signal line other than a TTL level signal line, it will not detect the high level and low level accurately. Also, depending on the voltage level, the IE-75001-R's sensor could be damaged.
 2. Before using external sense clip 1 as an external trigger output, ensure that external sense clip 1 is not connected to the signal output line. If it is connected, a fault may result.

Connect the external sense clip by the following procedure if it is used.

- ① Switch off the power to the target system, then the IE-75001-R.
- ② Install the IC clip (commercially available) on the IC in the target system which is to be traced.
- ③ Connect the external sense clip to the IC clip.
- ④ Switch on the power to the IE-75001-R, then the target system.

Fig. 2-5 Connecting the External Sense Clip

Remarks If an external sense clip is connected, be sure to use an IC clip if at all possible. This helps prevent faulty contact and improves operability.

2.2 POWER ON AND OFF SEQUENCE

After connection of the emulation probe to the target system has been completed, switch on the power. The sequence for switching on the power and switching it off is shown below.

Note Be sure to follow the correct sequence for switching the power ON and OFF. If the sequence is mistaken, the IE-75001-R could be damaged.

(1) If the IE-75001-R is Connected to the Target System

- Power ON sequence
 - ① Switch on the power to the IE-75001-R.
 - ② Switch on the power to the target system.
- Power OFF sequence
 - ① Switch off the power to the target system.
 - ② Switch off the power to the IE-75001-R.

2.3 DISCONNECTING THE EMULATION PROBE FROM THE TARGET SYSTEM

Disconnect the emulation probe from the target system by the following procedure.

- ① Switch off the power to the target system.
- ② Switch off the power to the IE-75001-R.
- ③ Pull the extractor on the end of the emulation probe straight up to extract the emulation probe from the conversion socket.

Fig. 2-6 Disconnecting the Emulation Probe (1/2)

(a) EP-753108GC-R

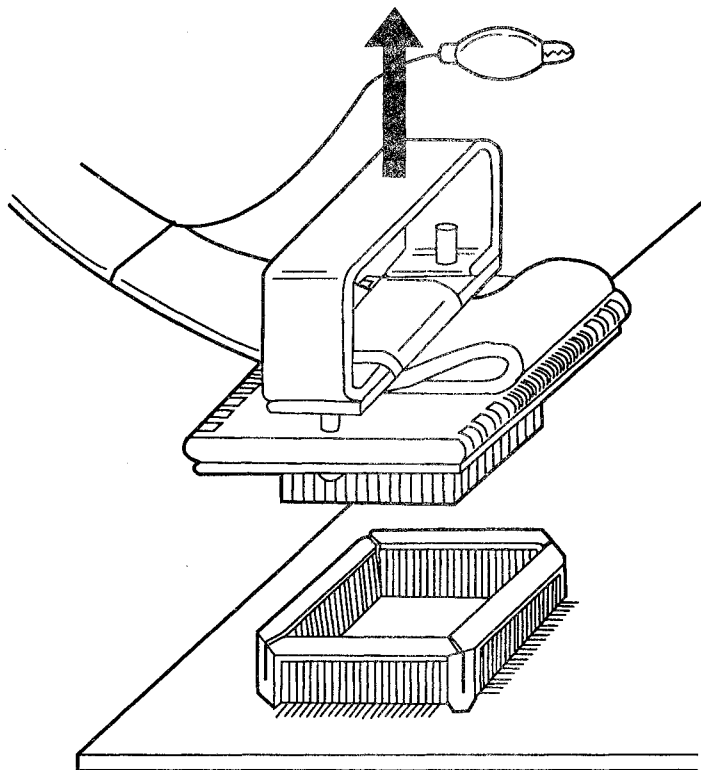
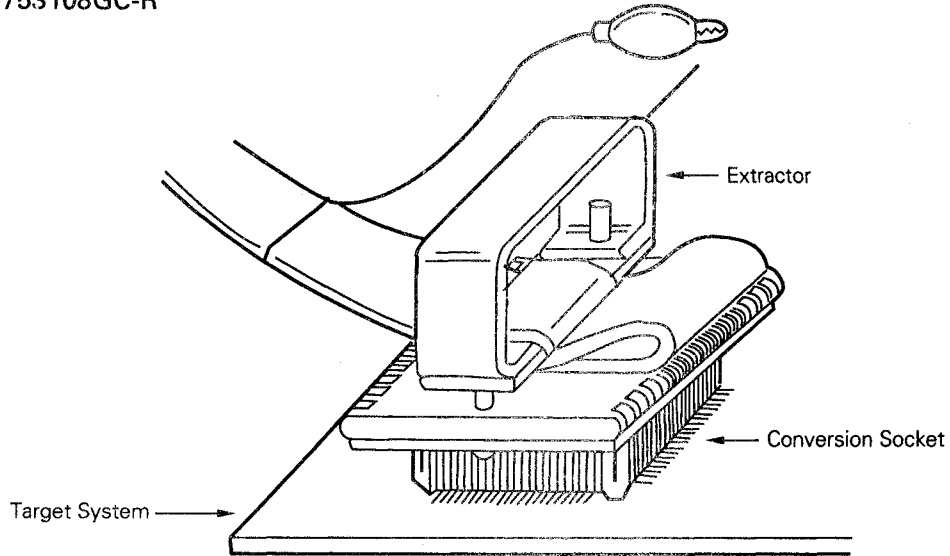
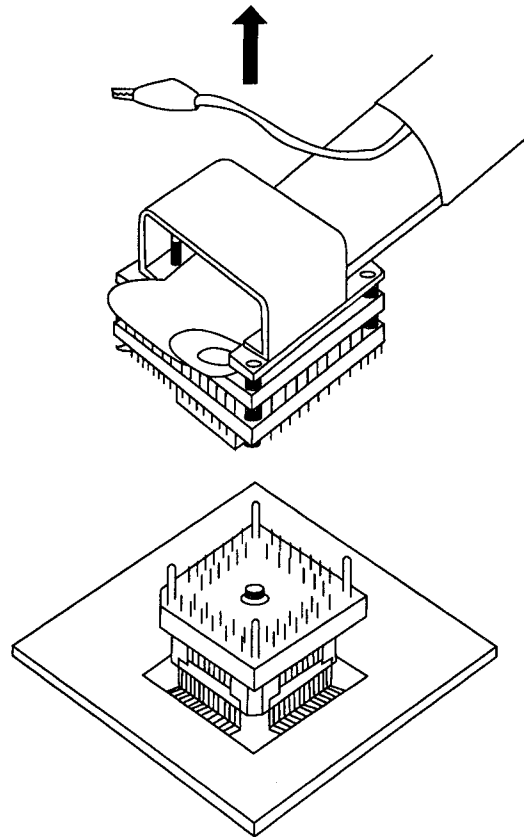
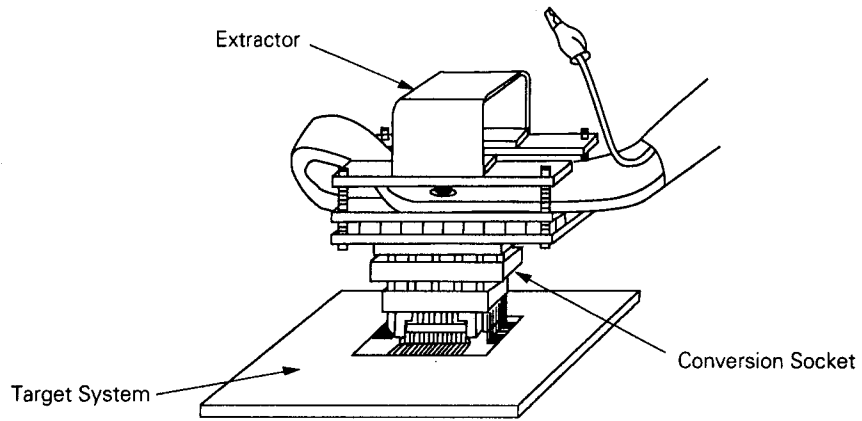


Fig. 2-6 Disconnecting the Emulation Probe (2/2)

(b) EP-753108GK-R



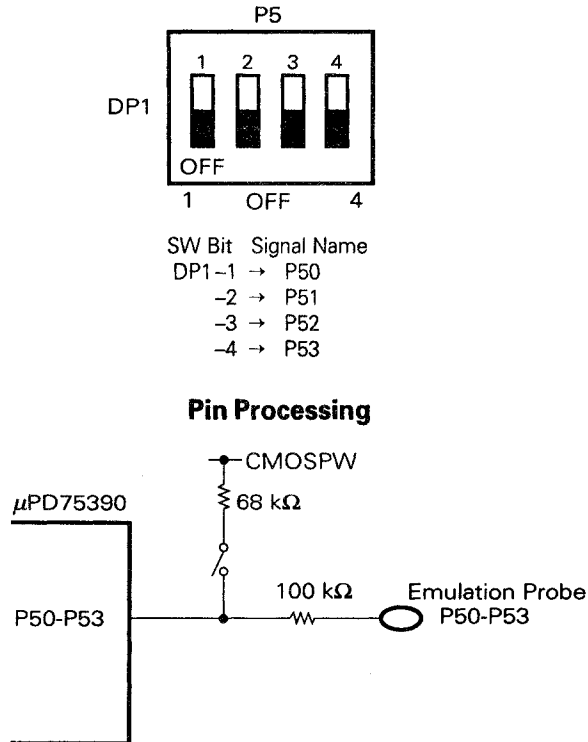
CHAPTER 3 SETTING MASK OPTIONS

3.1 SETTING THE PORT 5 MASK OPTION

The adapter board DP1 switch is the port 5 mask option setting switch. When these switches are switched ON, pull-up resistors (68 K Ω) are connected.

At shipping time, the DP1 switches are set in the OFF position.

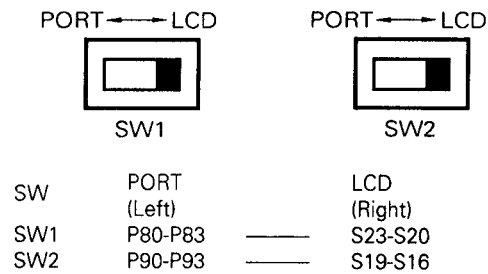
Fig. 3-1 DP1 Switch Arrangement Diagram



3.2 LCD/PORT SELECTION

SW1 and SW2 on the adapter board are used to select whether dual-function pins, S23/P80 to S20/P83 and S19/P90 to S16/P93, are used as LCD pins or ports, respectively. For LCD, set both SW1 and SW2 to the right position. For ports, set both SW1 and SW2 to the left position. Both SW1 and SW2 are set to the right position (LCD) before shipment.

Fig. 3-2 SW1 and SW2 Settings

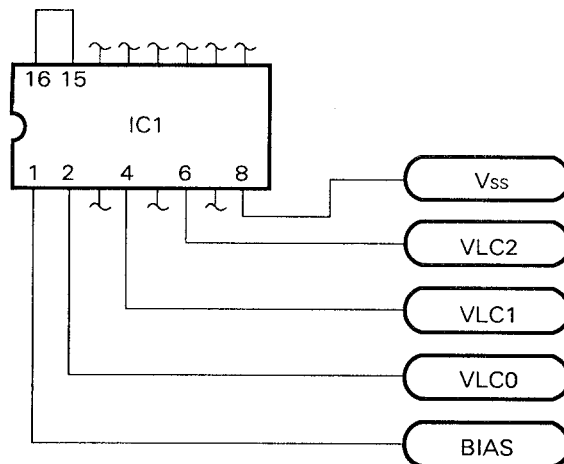


3.3 SETTING THE LCD DRIVE SPLIT RESISTOR

The adapter board IC socket (IC1) is used for setting of LCD drive split resistor which can be set by mask option.

When setting an LCD drive split resistor, the resistor is mounted on parts holder and the parts holder is inserted in the IC socket (see Fig. 3-3).

Fig. 3-3 IC1 Pin Connection



APPENDIX A EMULATION PROBE PIN ARRANGEMENT TABLE

Table A-1 Pin Correspondence of 64-Pin GC and 64-Pin GK Emulation Probe (1/2)

CN5 Pin No.	Emulation Probe	Signal Name	CN5 Pin No.	Emulation Probe	Signal Name	CN5 Pin No.	Emulation Probe	Signal Name
1	GND	GND	25	15	P61/KR1	49	39	S21/P82
2	GND	GND	26	16	P62/KR2	50	40	S20/P83
3	EXT0	EXT0	27	17	P63/KR3	51	41	S19/P90
4	EXT1	EXT1	28	18	RESET	52	42	S18/P91
5	EXT2	EXT2	29	19	XT1	53	43	S17/P92
6	EXT3	EXT3	30	20	XT2	54	44	S16/P93
7	EXT4	EXT4	31	21	IC	55	45	S15
8	EXT5	EXT5	32	22	X1	56	46	S14
9	EXT6	EXT6	33	23	X2	57	47	S13
10	EXT7	EXT7	34	24	V _{DD}	58	48	S12
11	1	BIAS	35	25	P00/INT4	59	49	S11
12	2	V _{LC0}	36	26	P01/SCK	60	50	S10
13	3	V _{LC1}	37	27	P02/SO/SB0	61	51	S9
14	4	V _{LC2}	38	28	P03/SI/SB1	62	52	S8
15	5	P30/LCDCL	39	29	P10/INT0	63	53	S7
16	6	P31/SYNC	40	30	P11/INT1	64	54	S6
17	7	P32	41	31	P12/INT2/TI1/TI2	65	55	S5
18	8	P33	42	32	P13/TI0	66	56	S4
19	9	GND	43	33	P20/PTO0	67	57	S3
20	10	P50	44	34	P21/PTO1	68	58	S2
21	11	P51	45	35	P22/PCL/PTO2/REM	69	59	S1
22	12	P52	46	36	P23/BUZ	70	60	S0
23	13	P53	47	37	S23/P80	71	61	COM0
24	14	P60/KR0	48	38	S22/P81	72	62	COM1

- Remarks**
1. If the IE-75001-R is used, the emulation probe is connected to CN5 connector.
 2. Symbols and numbers in the emulation probe column mean as follows.
 - GND : Ground clip pin No.
 - EXT0 to EXT7 : External sense clip No. 1 to No. 8
 - 1 to 64 : Pin No. of 64-pin GC or 64-pin GK on end of emulation probe
 - NC : No Connection

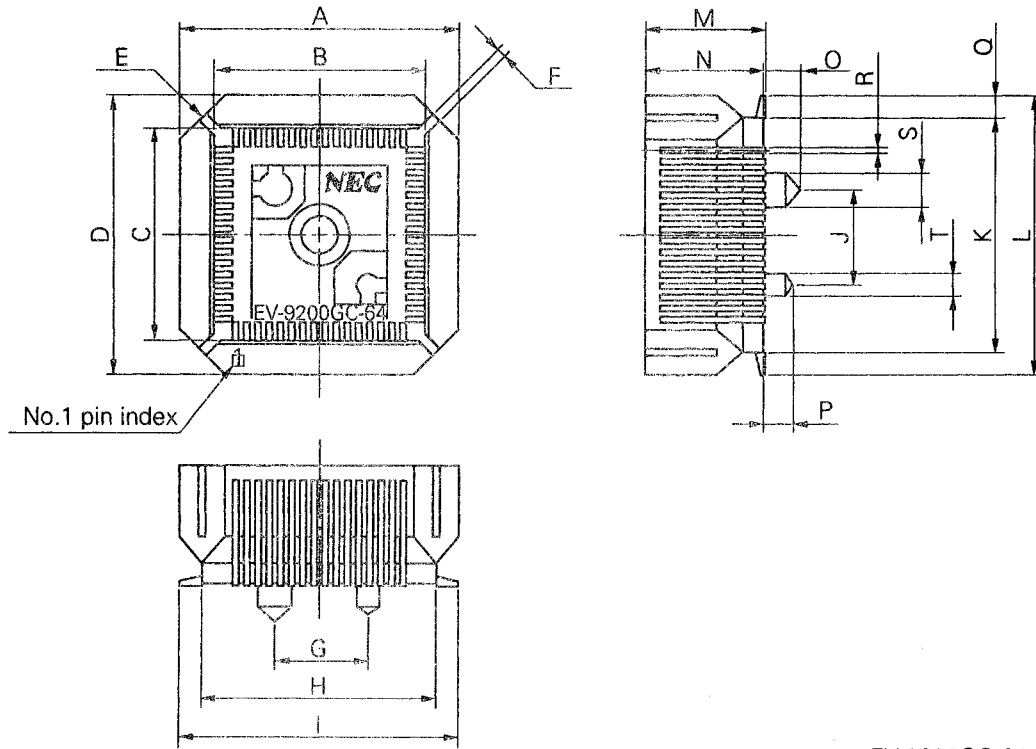
Table A-1 Pin Correspondence of 64-Pin GC and 64-Pin GK Emulation Probe (2/2)

CN5 Pin No.	Emulation Probe	Signal Name	CN5 Pin No.	Emulation Probe	Signal Name	CN5 Pin No.	Emulation Probe	Signal Name		
73	63	COM2	81	NC	NC	89	NC	NC		
74	64	COM3	82			90				
75	NC	NC	83			91				
76			84			92				
77			85			93				
78			86			94				
79			87			95			GND	GND
80			88			96			GND	GND

- Remarks**
- If the IE-75001-R is used, the emulation probe is connected to CN5 connector.
 - Symbols and numbers in the emulation probe column mean as follows.
 - GND : Ground clip pin No.
 - 1 to 64 : Pin No. of 64-pin GC or 64-pin GK on end of emulation probe
 - NC : No Connection

APPENDIX B EXTERNAL VIEW OF CONVERSION SOCKET (EV-9200GC-64) AND RECOMMENDED BOARD MOUNTING PATTERN

Fig. B-1 External View of EV-9200GC-64 (Reference)

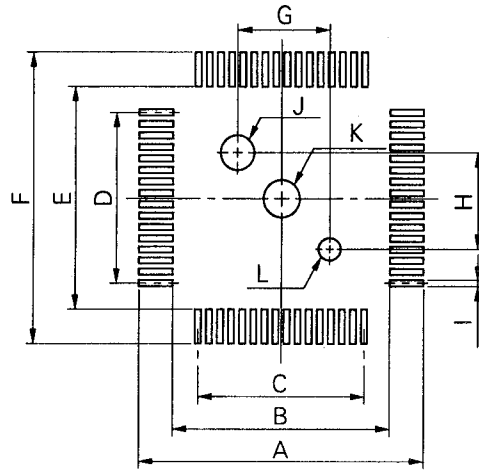


EV-9200GC-64-G0

ITEM	MILLIMETERS	INCHES
A	18.8	0.74
B	14.1	0.555
C	14.1	0.555
D	18.8	0.74
E	4-C 3.0	4-C 0.118
F	0.8	0.031
G	6.0	0.236
H	15.8	0.622
I	18.5	0.728
J	6.0	0.236
K	15.8	0.622
L	18.5	0.728
M	8.0	0.315
N	7.8	0.307
O	2.5	0.098
P	2.0	0.079
Q	1.35	0.053
R	0.35±0.1	0.014 ^{+0.004} _{-0.005}
S	φ2.3	φ0.091
T	φ1.5	φ0.059

Phase-out/Discontinued

Fig. B-2 EV-9200GC-64 Recommended Board Mounting Pattern (Reference)



EV-9200GC-64-P0

ITEM	MILLIMETERS	INCHES
A	19.5	0.768
B	14.8	0.583
C	$0.8 \pm 0.02 \times 15 = 12.0 \pm 0.05$	$0.031^{+0.002}_{-0.001} \times 0.591 = 0.472^{+0.003}_{-0.002}$
D	$0.8 \pm 0.02 \times 15 = 12.0 \pm 0.05$	$0.031^{+0.002}_{-0.001} \times 0.591 = 0.472^{+0.003}_{-0.002}$
E	14.8	0.583
F	19.5	0.768
G	6.00 ± 0.08	$0.236^{+0.004}_{-0.003}$
H	6.00 ± 0.08	$0.236^{+0.004}_{-0.003}$
I	0.5 ± 0.02	$0.197^{+0.001}_{-0.002}$
J	$\phi 2.36 \pm 0.03$	$\phi 0.093^{+0.001}_{-0.002}$
K	$\phi 2.2 \pm 0.1$	$\phi 0.087^{+0.004}_{-0.005}$
L	$\phi 1.57 \pm 0.03$	$\phi 0.062^{+0.001}_{-0.002}$

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).

Phase-out/Discontinued