

**EP-750068CU-R,  
EP-750068GT-R  
EMULATION PROBE**

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## PREFACE

### Intended Readership

This manual is intended for use by users performing debugging on the  $\mu$ PD750068 subseries using the IE-75001-R + IE-75300-R-EM and EP-750068CU-R/EP-750068GT-R.

**Remark** 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-750068CU-R/EP-750068GT-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-750068CU-R is described in this manual as a representative product. When using this as the EP-750068GT-R manual, "EP-750068CU-R" should be read as "EP-750068GT-R".

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

- When desiring to understand general **EP-750068CU-R** or **EP-750068GT-R** functions and connection methods:
  - Read this manual in the order of the table of contents.
- When desiring to understand the operating environment, configuration and object devices:
  - Read **CHAPTER 1 GENERAL DESCRIPTION**.
- When desiring to understand the connection method in detail:
  - Read **CHAPTER 2 CONNECTIONS**.
- When desiring to understand the mask option setting method:
  - Read **CHAPTER 3 SETTING MASK OPTIONS**.

## Legend

- Note : Explains important points in the text.
- Caution : Contains important information that is of special importance.
- Remark : Provides supplementary explanations.

## Related Documents

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

## Confirmation of Package Contents

The following items are included in the EP-750068CU-R/EP-750068GT-R packing box. Check the items carefully. If any item is missing or damaged, be sure to contact an NEC sales representative or an authorized dealer.

- Emulation Probe 1
- Adaptor Board 1
- User's Manual (This Manual) 1
- Spacer (with 2 screws) **Note 1** 1
- Installation Screws **Note 2** 2
- Conversion socket **Note 3** (provided with EP-750068CU-R) 1
- Flexible board **Note 3** (provided with EP-750068GT-R: EV-9500GT-42) 2

- Notes**
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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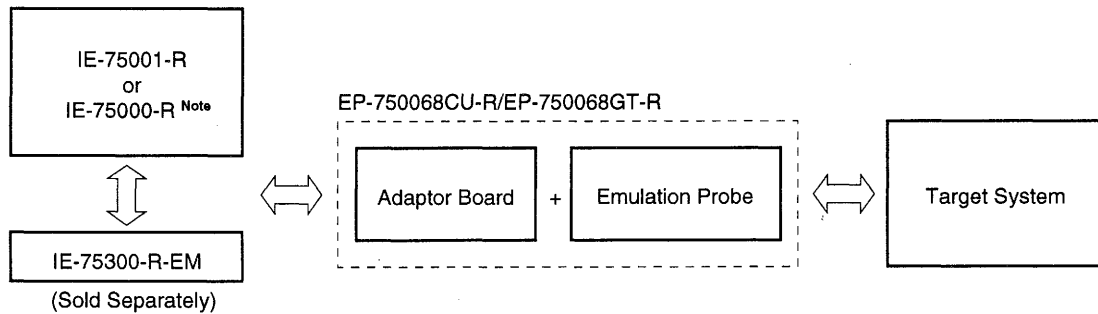
# CHAPTER 1 GENERAL DESCRIPTION

This chapter gives an outline of the EP-750068CU-R.

## 1.1 Operating Environment

The EP-750068CU-R is a probe set designed for connection with the IE-75001-R and the target system. By using the EP-750068CU-R in such connections, a debugging environment for the  $\mu$ PD750068 subseries is created, making comprehensive debugging of the target system hardware and software possible. See **CHAPTER 2 CONNECTIONS** for concerning concrete connection methods.

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



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



## 1.2 Configuration

The EP-750068CU-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.

- **42-pin CU probe or 42-pin GT probe**

This connects the IE-75001-R and the 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**

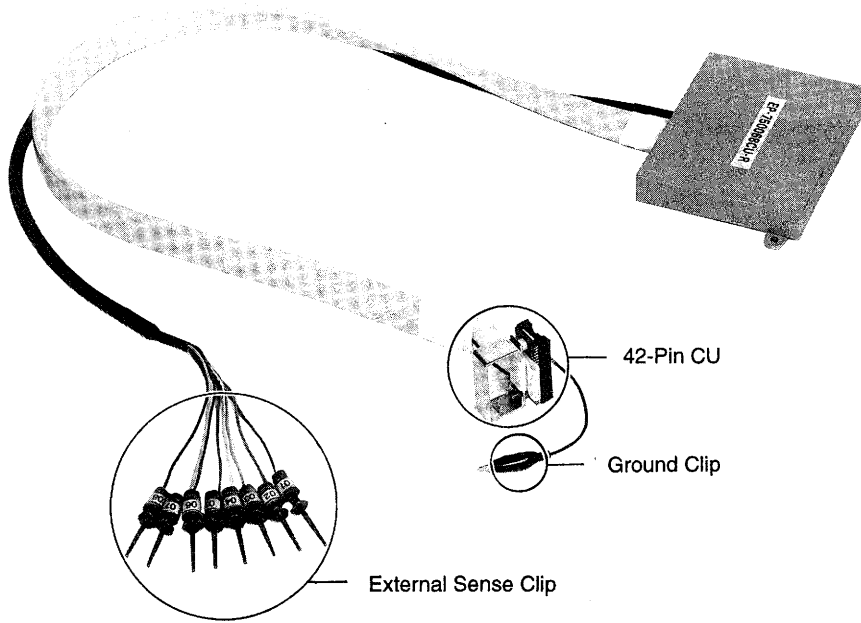
This consists of 8 sense clips. These clips are used to monitor the IC pin voltage level of the target system.

### (2) Adaptor board

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

Figure 1-2. Emulation Probe

(a) EP-750068CU-R



(b) EP-750068GT-R

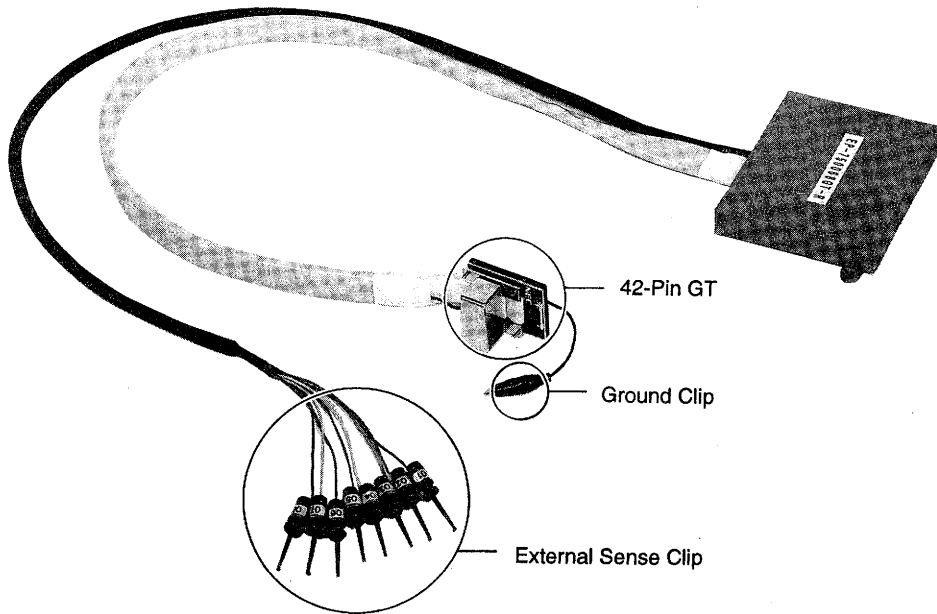
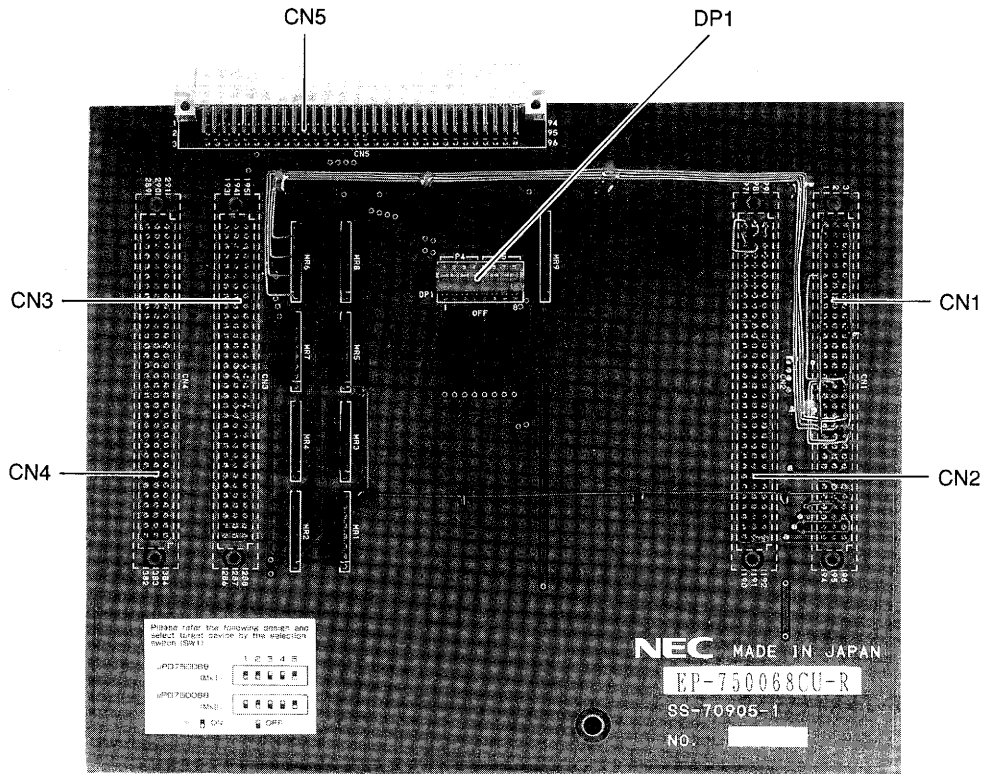
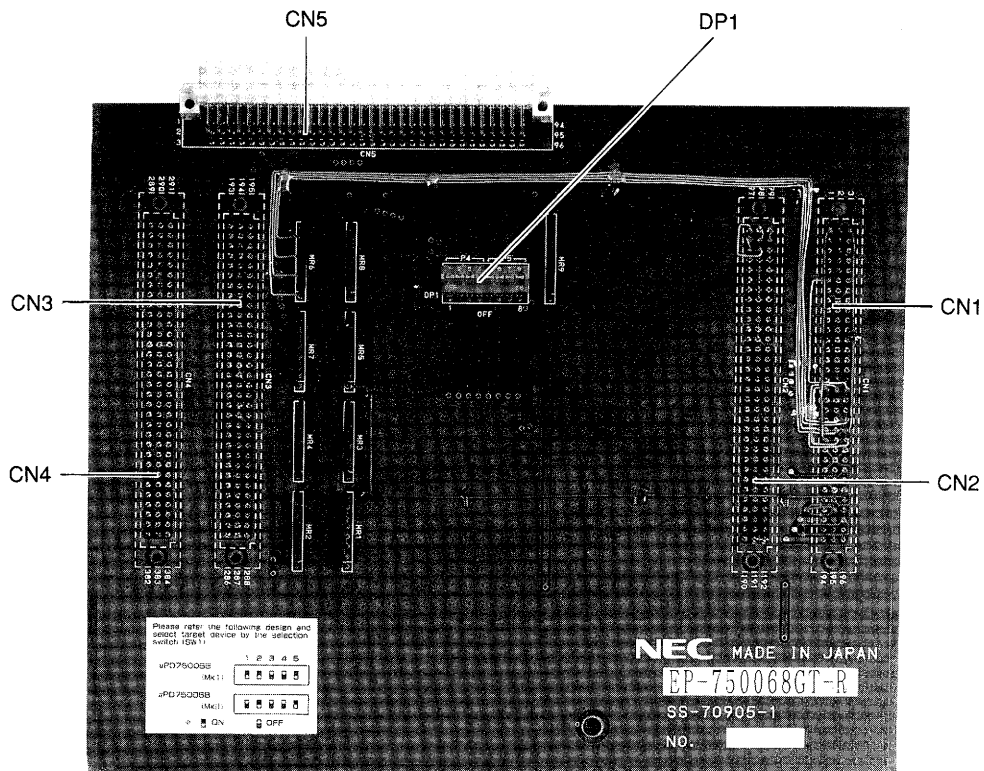


Figure 1-3. Adaptor Board

(a) EP-750068CU-R



(b) EP-750068GT-R



### 1.3 Target Devices

The EP-750068CU-R is used in emulation of the following target devices (as of October 1995).

- $\mu$ PD750064CU Note
- $\mu$ PD750064GT Note
- $\mu$ PD750066CU Note
- $\mu$ PD750066GT Note
- $\mu$ PD750068CU Note
- $\mu$ PD750068GT Note
- $\mu$ PD75P0076CU Note
- $\mu$ PD75P0076GT Note

**Note** Under development

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## CHAPTER 2 CONNECTIONS

This chapter explains about the methods for connecting the EP-750068CU-R, the sequence for switching on/off its power, and the method used to disconnect the emulation probe from the target system of the EP-750068CU-R.

### 2.1 Connection of the IE-75001-R and the Target System

The connection procedure is outlined as follows.

- (1) Connecting the IE-75300-R-EM and the adaptor board
- (2) Connecting the IE-75001-R and the emulation probe
- (3) Connecting the emulation probe and the target system
- (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.

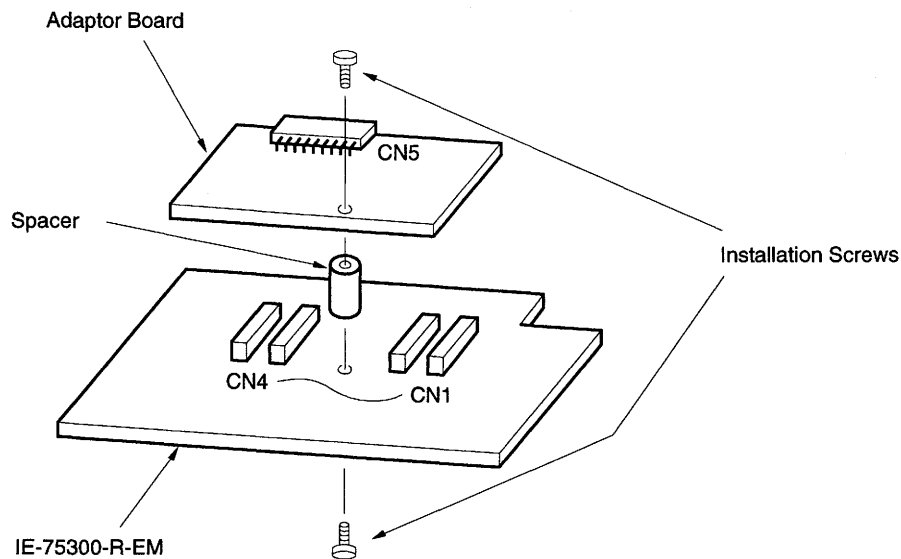
**(1) Connecting the IE-75300-R-EM and the adaptor board**

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 the connectors CN1 to CN4 of the IE-75300-R-EM and the 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> Switch off the power of the IE-75001-R.
- <4> Take off the 6 screws on 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 <sup>Note</sup>.
- <6> Screw the IE-75300-R-EM to the IE-75000-R-BK together.
- <7> Replace the IE-75000-R-BK screwed together with the IE-75300-R-EM to the original position of the IE-75001-R.

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

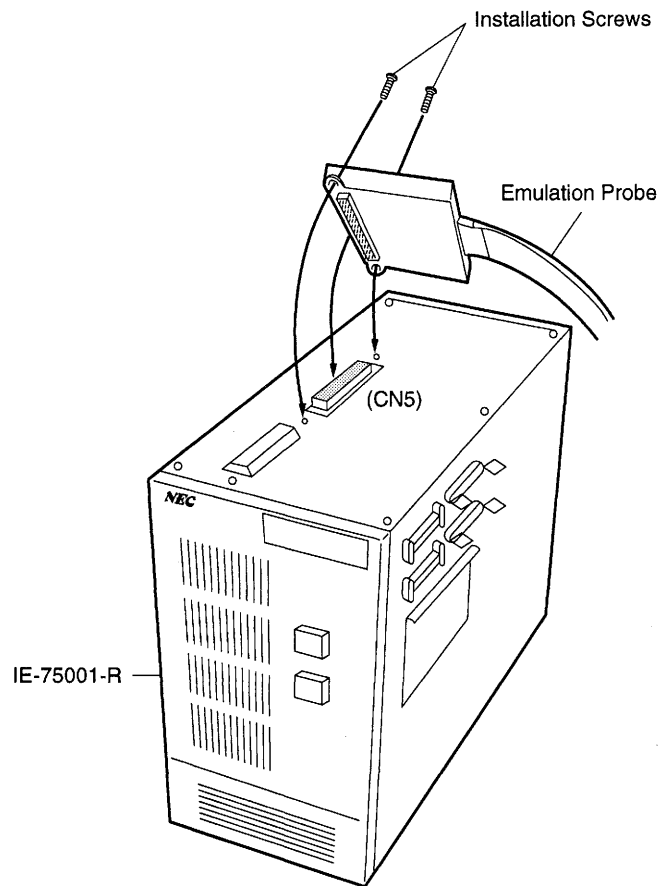
**Figure 2-1. Connecting the IE-75300-R-EM and the Adaptor Board**



**(2) Connecting the IE-75001-R and the 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.

**Figure 2-2. Connecting the IE-75001-R and the Emulation Probe**





**(3) Connecting the emulation probe and the target system**

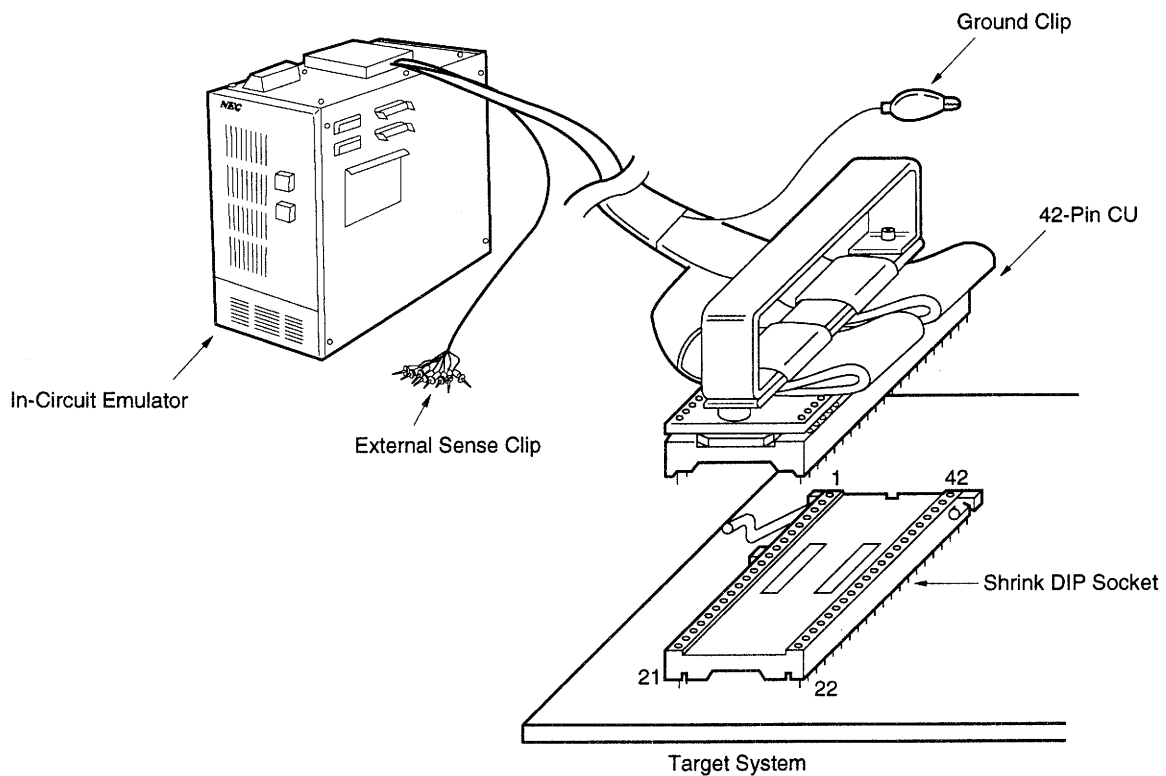
Connect the emulation probe to the target system by the following procedure.

- Cautions**
1. Before connecting the emulation probe to the target system, be sure to connect the ground clip first. Otherwise, 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.

(a) If the EP-750068CU-R is used

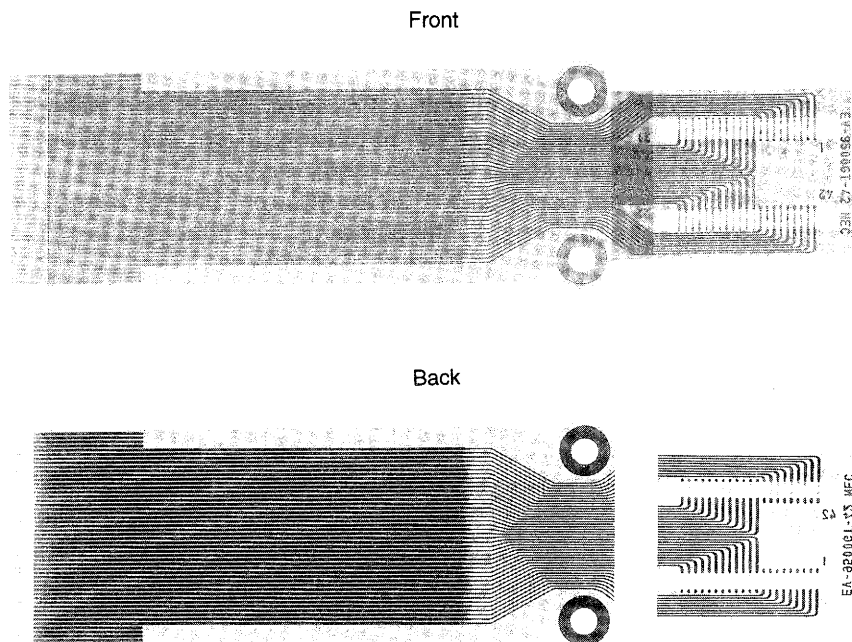
- <1> Switch off the power of the target system.
- <2> Solder the shrink DIP socket to the target system.
- <3> Connect the emulation probe's ground clip to the ground (GND) pin of the target system.
- <4> Align the No. 1 pin of the 42-pin CU at the end of the emulation probe with that of the shrink DIP socket of <2> soldered into the target system, then insert the emulation probe.

**Figure 2-3. 42-Pin CU Emulation Probe Connection**



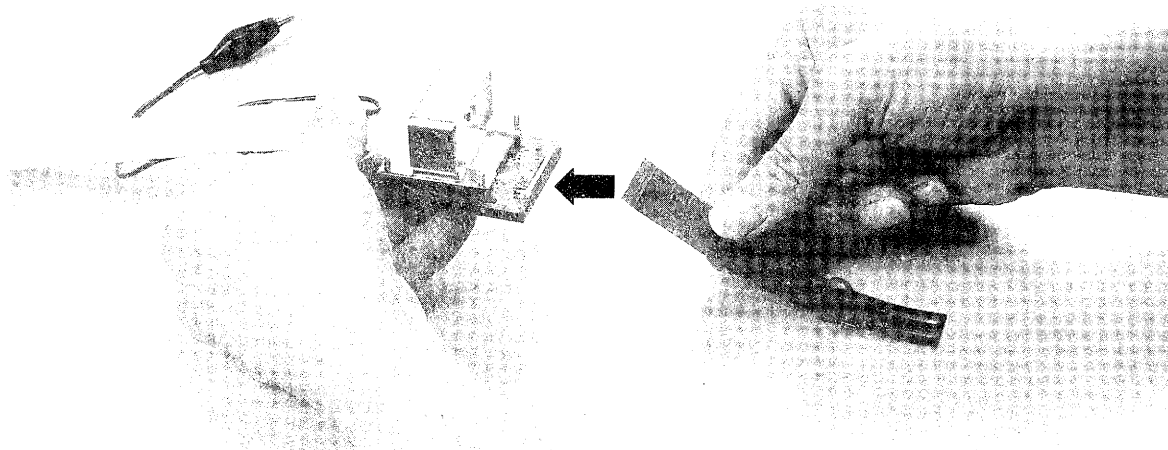
- (b) If the EP-750068GT-R is used
  - <1> Switch off the target system's power supply.
  - <2> Solder the flexible board (EV-9500GT-42) to the target system with the face upside.

**Figure 2-4. Flexible Board**



- <3> Connect the emulation probe's ground clip to the ground (GND) pin of the target system.
- <4> Connect the flexible board of <2> to the connector at the end of the emulation probe with the solder-plated face downside.

**Figure 2-5. 42-Pin GT Emulation Probe Connection**



#### (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 have TTL level inputs.

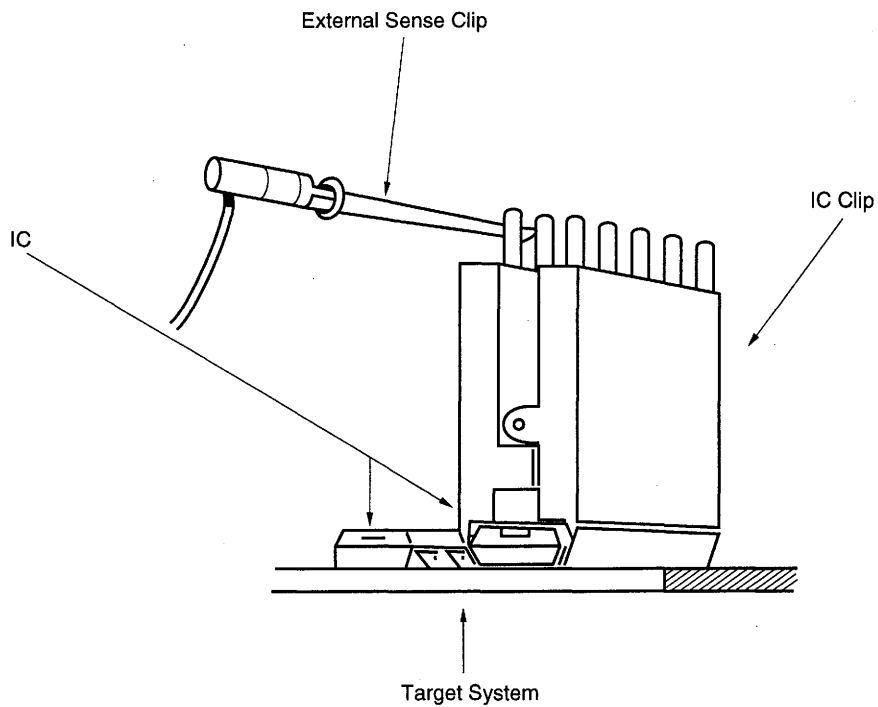
The 8 external sense clips are normally input signal lines. However, by setting the OUT command on the in-circuit emulator, the signal line of external sense clip 1 can be used as an external trigger output signal line in the case of an event (see the in-circuit emulator manual for details).

- Cautions**
- 1. Connect the external sense clip to a TTL level signal line only. Otherwise, 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. Or a fault may result.**

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

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

**Figure 2-6. Connecting the External Sense Clip**



**Remark** If an external sense clip is connected, be sure to use an IC clip as possible. This helps prevent from faulty contact and improves operability.

## 2.2 Power ON and OFF Sequence

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

**Caution** Be sure to follow the correct sequence for switching the power ON and OFF. Otherwise, the IE-75001-R could be damaged.

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

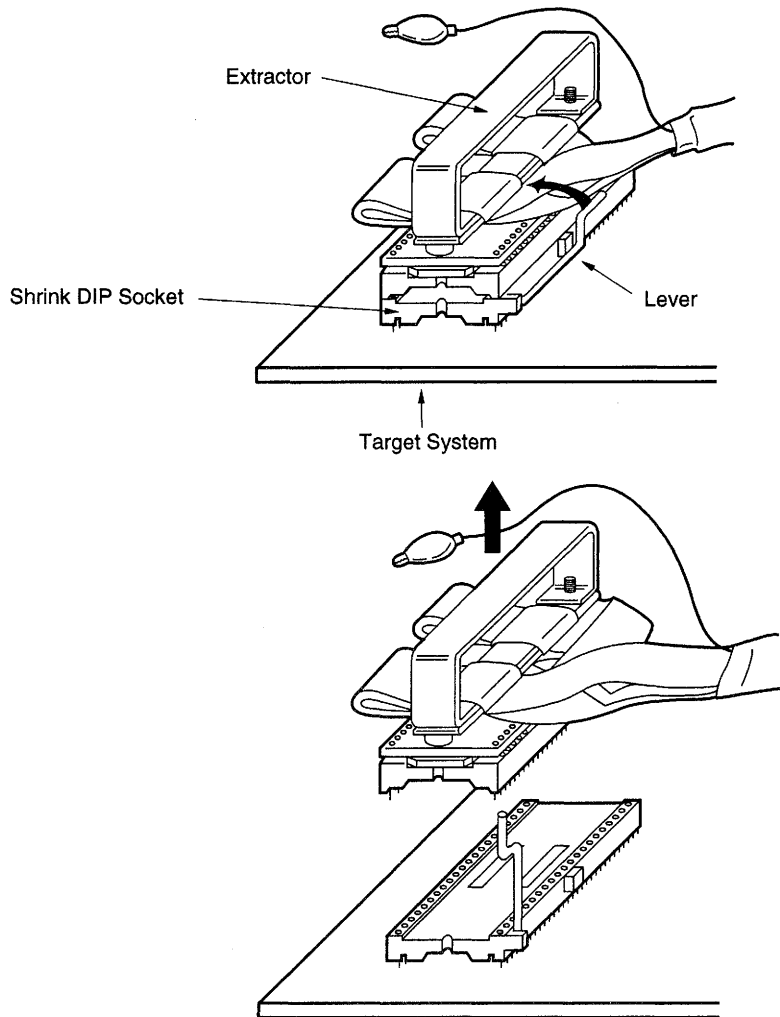
- Power ON sequence
  - <1> Switch on the power of the IE-75001-R.
  - <2> Switch on the power of the target system.
- Power OFF sequence
  - <1> Switch off the power of the target system.
  - <2> Switch off the power of the IE-75001-R.

## 2.3 Removing Emulation Probe from the Target System

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

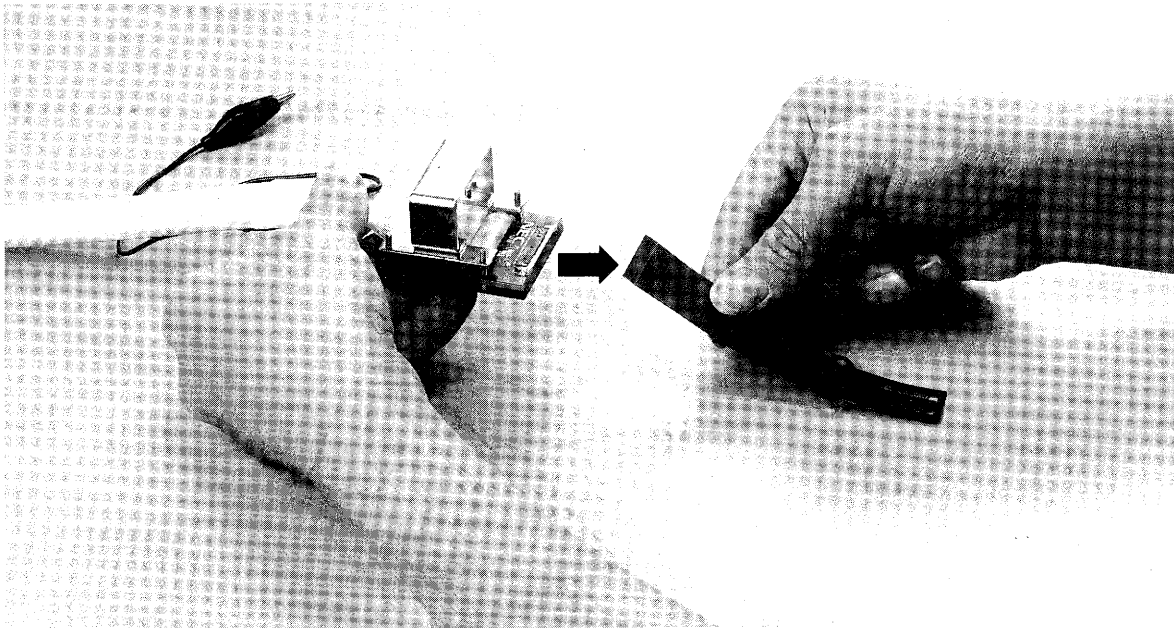
- (a) If using the EP-750068CU-R
  - <1> Switch off the power of the target system.
  - <2> Switch off the power of the IE-75001-R.
  - <3> Lift the shrink DIP socket lever.
  - <4> Pull out vertically the extractor at the end of the emulation probe, and remove the emulation probe from the shrink DIP socket.

**Figure 2-7. 42-Pin CU Emulation Probe Removal**



- (b) If using the EP-750068GT-R
- <1> Switch off the power of the target system.
  - <2> Switch off the power of the IE-75001-R.
  - <3> Remove the flexible board from the connector at the end of the emulation probe.

**Figure 2-8. 42-Pin GT Emulation Probe Removal**



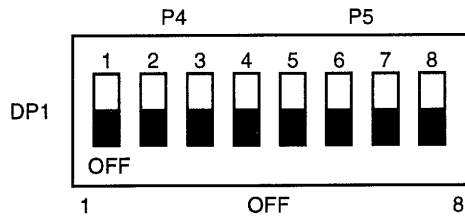
## CHAPTER 3 SETTING MASK OPTIONS

### 3.1 Setting the Ports 4 and 5 Mask Option

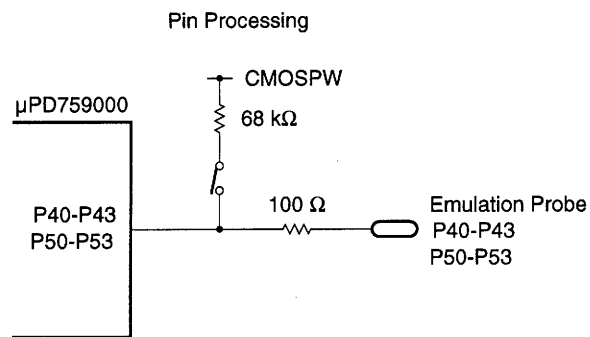
The DP1 switch on the adaptor board is for the ports 4 and 5 mask option setting. When these switches are ON, pull-up resistors (68 k $\Omega$ ) are connected.

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

Figure 3-1. DP1 Switch Arrangement Diagram



| 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       |





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## APPENDIX EMULATION PROBE PIN CORRESPONDENCE TABLE

(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          | NC              | NC                            | 49          | 7               | P32              |
| 2           | GND             | GND         | 26          |                 |                               | 50          | 8               | P31              |
| 3           | EXT0            | EXT0        | 27          |                 |                               | 51          | 9               | P30              |
| 4           | EXT1            | EXT1        | 28          |                 |                               | 52          | 10              | AV <sub>ss</sub> |
| 5           | EXT2            | EXT2        | 29          |                 |                               | 53          | NC              | NC               |
| 6           | EXT3            | EXT3        | 30          |                 |                               | 54          |                 |                  |
| 7           | EXT4            | EXT4        | 31          |                 |                               | 55          |                 |                  |
| 8           | EXT5            | EXT5        | 32          | 32              | P01/ $\overline{\text{SCK}}$  | 56          |                 |                  |
| 9           | EXT6            | EXT6        | 33          | 33              | P00/ $\overline{\text{INT4}}$ | 57          |                 |                  |
| 10          | EXT7            | EXT7        | 34          | 34              | P53                           | 58          |                 |                  |
| 11          | NC              | NC          | 35          | 35              | P52                           | 59          |                 |                  |
| 12          |                 |             | 36          | 36              | P51                           | 60          |                 |                  |
| 13          |                 |             | 37          | 37              | P50                           | 61          |                 |                  |
| 14          |                 |             | 38          | 38              | P43                           | 62          |                 |                  |
| 15          |                 |             | 39          | 39              | P42                           | 63          |                 |                  |
| 16          |                 |             | 40          | 40              | P41                           | 64          |                 |                  |
| 17          |                 |             | 41          | 41              | P40                           | 65          |                 |                  |
| 18          |                 |             | 42          | 42              | V <sub>ss</sub>               | 66          |                 |                  |
| 19          |                 |             | 43          | 1               | XT1                           | 67          |                 |                  |
| 20          |                 |             | 44          | 2               | XT2                           | 68          |                 |                  |
| 21          |                 |             | 45          | 3               | $\overline{\text{RESET}}$     | 69          |                 |                  |
| 22          |                 |             | 46          | 4               | X1                            | 70          |                 |                  |
| 23          |                 |             | 47          | 5               | X2                            | 71          |                 |                  |
| 24          | 48              | 6           | P33         | 72              |                               |             |                 |                  |

- Remarks**
- If the IE-75001-R is used, the emulation probe is connected to it using the CN5 connector.
  - Symbols and numbers in the emulation probe column mean as follows.
    - GND : Ground clip (GND)
    - EXT0 to EXT7 : External sense clip No. 1 to No. 8
    - 1 to 42 : Pin No. of 42-pin CU or 42-pin GT at the end of emulation probe
    - NC : No Connection

**APPENDIX EMULATION PROBE PIN CORRESPONDENCE TABLE**

(2/2)

| CN5 Pin No. | Emulation Probe | Signal Name | CN5 Pin No. | Emulation Probe | Signal Name | CN5 Pin No. | Emulation Probe | Signal Name  |
|-------------|-----------------|-------------|-------------|-----------------|-------------|-------------|-----------------|--------------|
| 73          | NC              | NC          | 81          | 18              | P110/AN0    | 89          | 26              | P13/TI0      |
| 74          | 11              | P63/KR3/AN7 | 82          | 19              | AVREF       | 90          | 27              | P12/INT2/TI1 |
| 75          | 12              | P62/KR2/AN6 | 83          | 20              | IC          | 91          | 28              | P11/INT1     |
| 76          | 13              | P61/KR1/AN5 | 84          | 21              | VDD         | 92          | 29              | P10/INT0     |
| 77          | 14              | P60/KR0/AN4 | 85          | 22              | P23/BUZ     | 93          | 30              | P03/SI/SB1   |
| 78          | 15              | P113/AN3    | 86          | 23              | P22/PCL     | 94          | 31              | P02/SO/SB0   |
| 79          | 16              | P112/AN2    | 87          | 24              | P21/PTO1    | 95          | GND             | GND          |
| 80          | 17              | P111/AN1    | 88          | 25              | P20/PTO0    | 96          | GND             | GND          |

- Remarks**
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