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April 1st, 2010
Renesas Electronics Corporation

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Phase-out/Discontinued

EP-753304DU-R

EMULATION PROBE

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PREFACE

Intended Readership

This manual is intended for users performing debugging on the μ PD753304 using the IE-75001-R + IE-75300-R-EM and EP-753304DU-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-75304DU-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.

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".

- To understand general **EP-753304DU-R** functions and connection methods:
 - Read this manual in the order of the table of contents.

- To understand the operating environment, configuration and object devices:
 - Read **CHAPTER 1 GENERAL DESCRIPTION**.

- To understand the connection method in detail:
 - Read **CHAPTER 2 CONNECTIONS**.

- 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.: UII354E)

Confirmation of Package Contents

The following items are included in the EP-753304DU-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

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

CONTENTS

CHAPTER 1 GENERAL DESCRIPTION	1
1.1 Operating Environment	1
1.2 Configuration	2
1.3 Target Devices	4
CHAPTER 2 CONNECTIONS	5
2.1 Connection of IE-75001-R and Target System	5
2.2 Power ON and OFF Sequence	11
2.3 Removing Emulation Probe from Target System	12
CHAPTER 3 SETTING PORT 3	13
CHAPTER 4 MASK OPTION SETTING	15
4.1 Pull-up Setting of $\overline{\text{RESET}}$ Signal	15
4.2 LCD Drive Divide Registers Setting	16
APPENDIX EMULATION PROBE PIN CORRESPONDENCE TABLE	17

[MEMO]

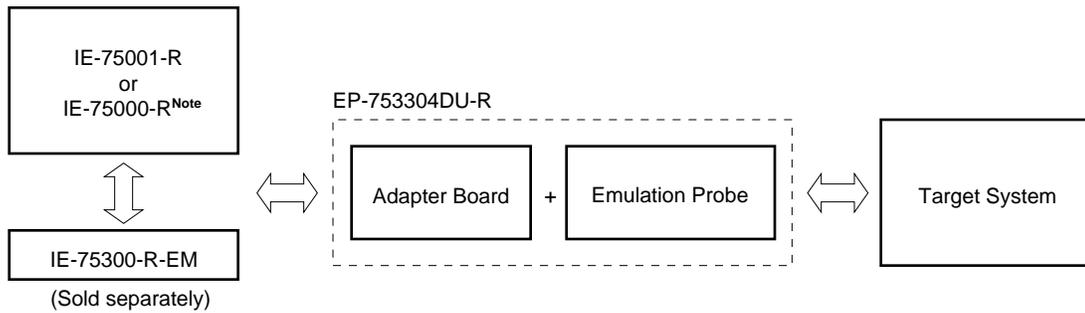
CHAPTER 1 GENERAL DESCRIPTION

This chapter gives an outline of the EP-753304DU.

1.1 Operating Environment

The EP-753304DU-R is a probe set designed for connection with the IE-75001-R and the target system. By using the EP-753304DU-R in such connections, a debugging environment for the μ PD753304 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 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-753304DU-R is a set consisting of an emulation probe and an adapter board.

(1) Emulation probe

The emulation probe is configured from the following 3 components.

- **42-pin shrink DIP probe**

Connects the IE-75001-R and the target system.

- **Ground clip**

Connects to the target system's GND. The ground clip 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**

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

(2) Adapter board

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

Figure 1-2. Emulation Probe

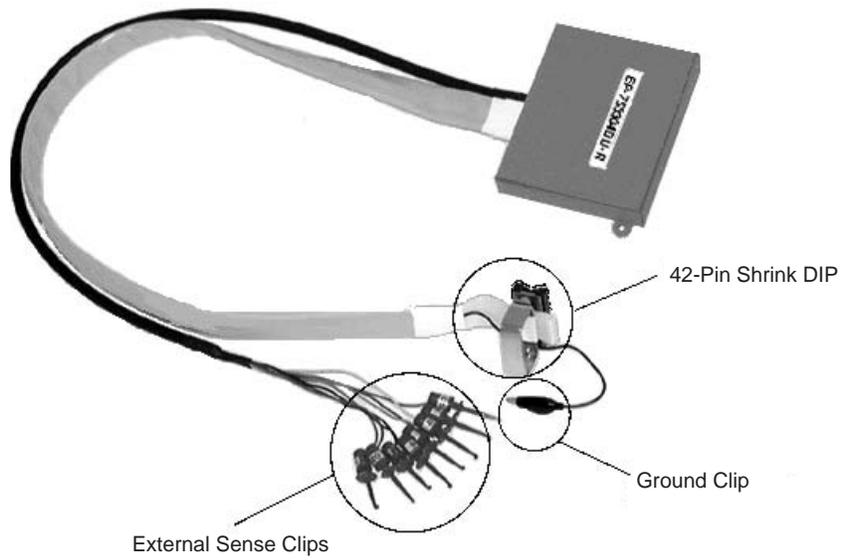
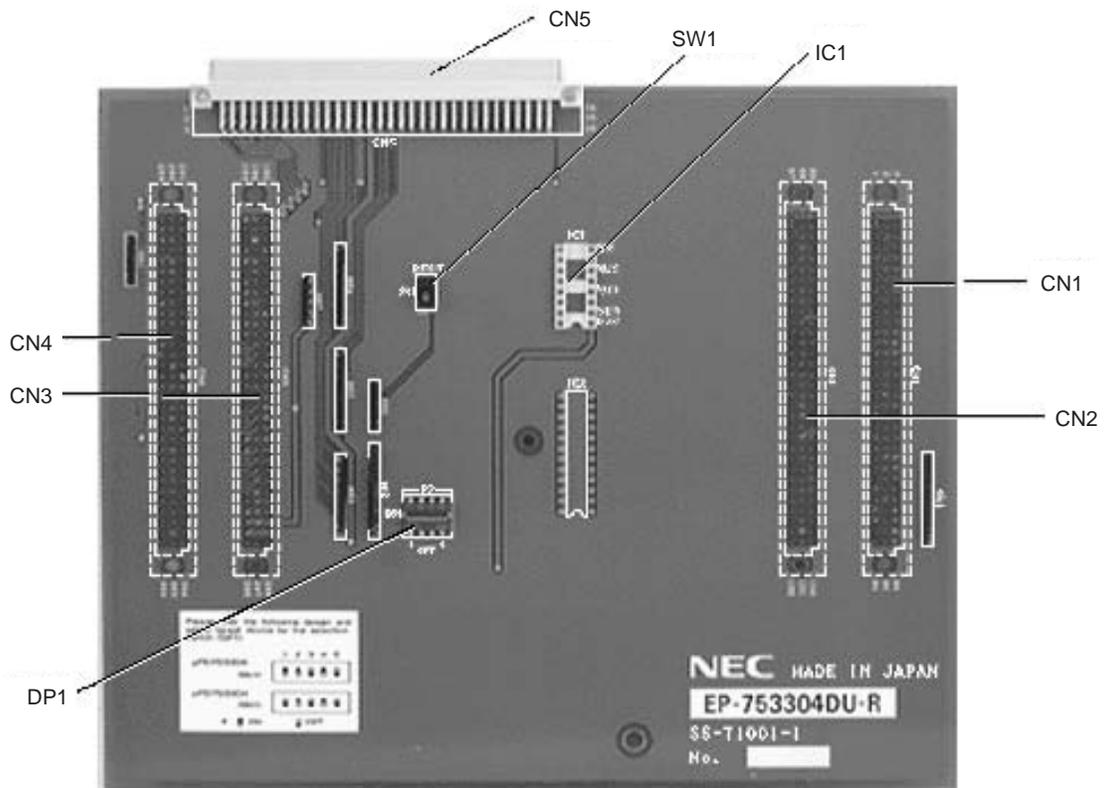


Figure 1-3. Adapter Board



1.3 Target Devices

The EP-753304DU-R is used in emulation of the following target devices (as of November 1996).

- μ PD753304DU^{Note}

Note Under development

Caution The μ PD753304DU is ES version
Bare chips are available for mass-production.

CHAPTER 2 CONNECTIONS

This chapter explains the procedures for connecting the EP-753304DU-R, switching on/off its power, and disconnecting the emulation probe from the target system of the EP-753304DU-R.

2.1 Connection of IE-75001-R and Target System

The connection procedure is outlined as follows.

- (1) Connecting the IE-75300-R-EM and the adapter 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 clips (if external sense clips are used)
- (5) Switching on the power

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

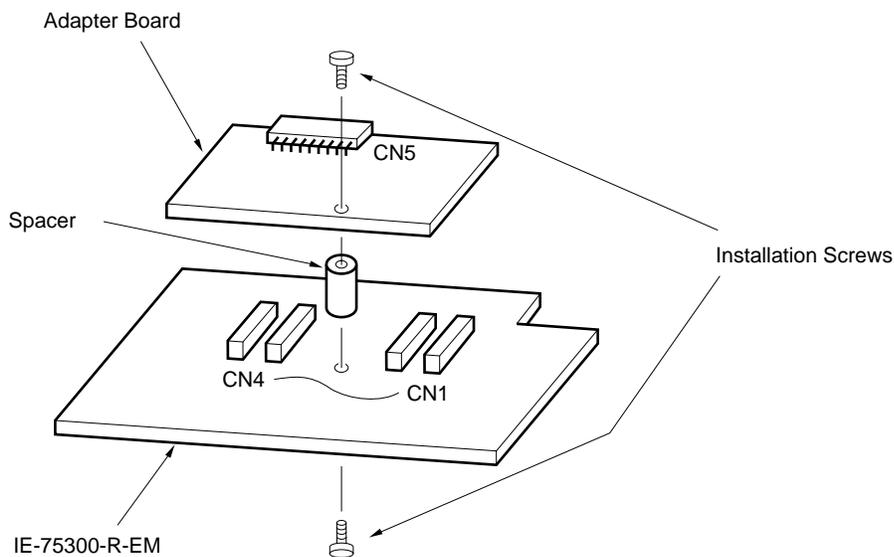
(1) Connecting IE-75300-R-EM and adapter board

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

- <1> While placing a spacer between the IE-75300-R-EM and the adapter board, connect the connectors CN1 to CN4 of the IE-75300-R-EM and the connectors CN1 to CN4 of the adapter board.
- <2> Fasten the spacer between the IE-75300-R-EM and the adapter 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^{Note}.
- <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.

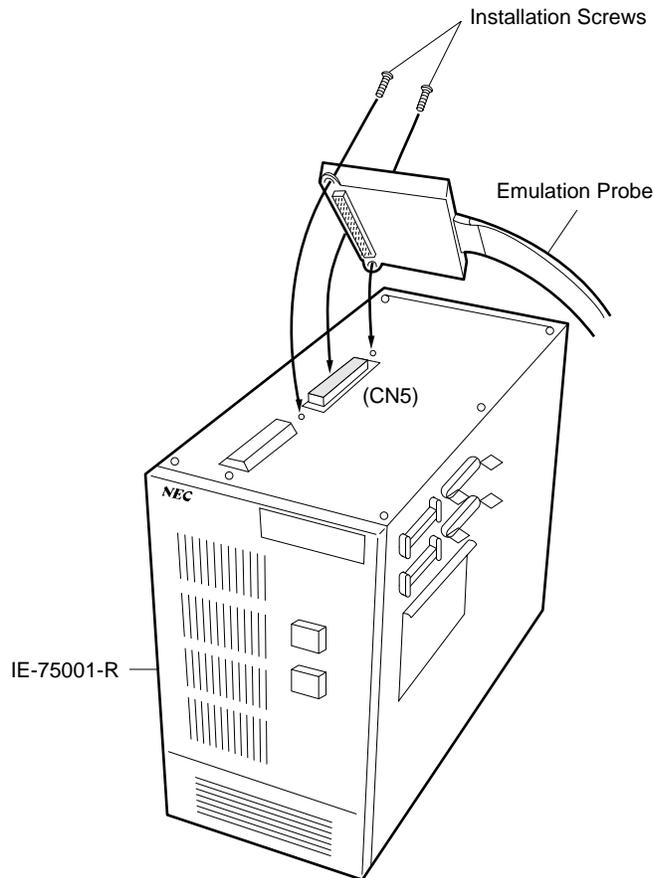
Note In the case of the IE-75000-R, the IE-75000-R-EM and the IE-75000-R-BK are installed screwed together. Therefore, pull out the IE-75000-R-BK from the main unit in the above sequence <3>→<4>→<5>, remove the screws and pull off the IE-75000-R-EM before following steps <1>→<2>→<6>→<7>.

Figure 2-1. Connecting IE-75300-R-EM and Adapter Board



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

- <1> Connect the emulation probe to the emulation probe DIN connector (CN5 of the adapter 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 IE-75001-R and Emulation Probe

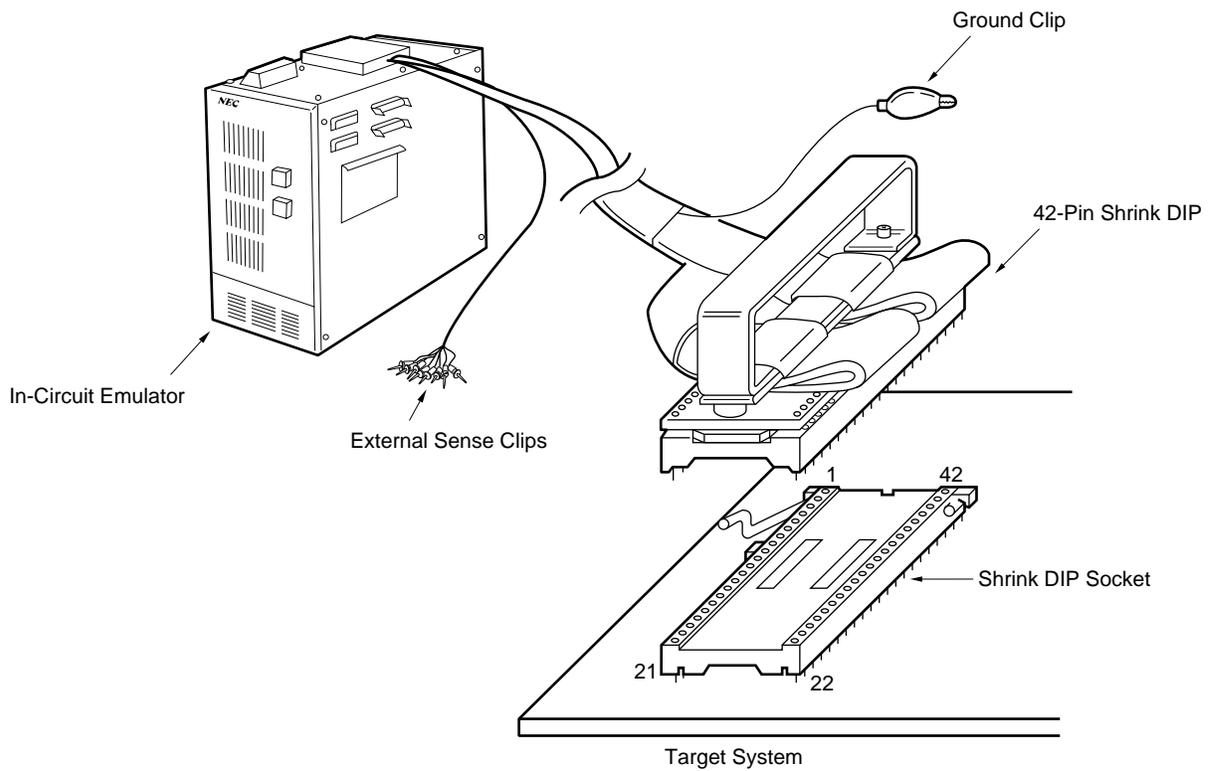
(3) Connecting emulation probe and target system

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, this could damage the IE-75001-R.

- <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 shrink DIP 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 Shrink DIP Emulation Probe Connection



(4) Connecting 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.

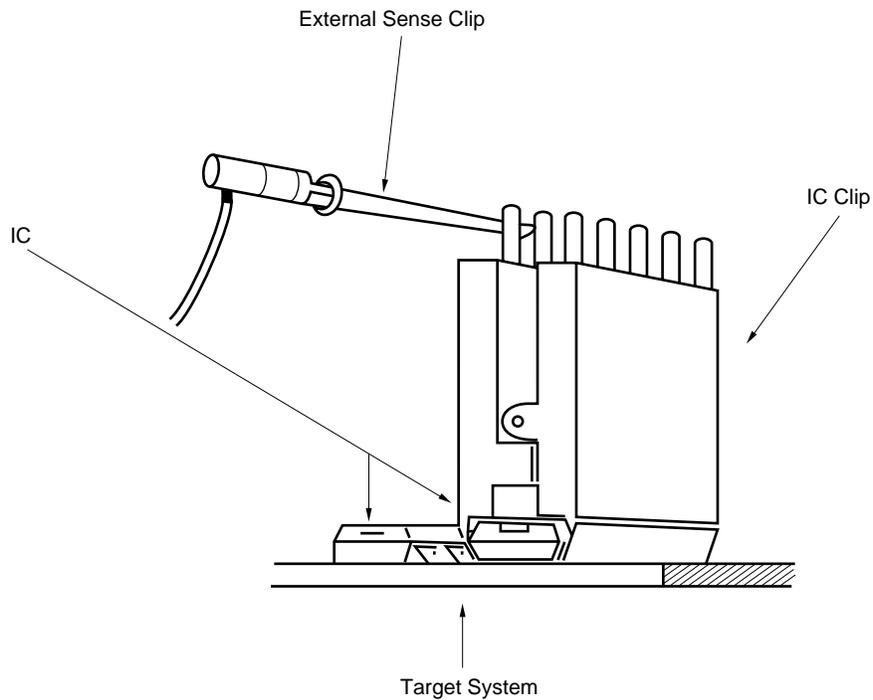
The 8 external sense clips are normally input signal lines. However, by setting the OUT command on the in-circuit emulator, the signal line of external sense clip 1 can be used as an external trigger output signal line in the case of an event (see the in-circuit emulator manual for details).

- 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, otherwise 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 External Sense Clip



Remark If an external sense clip is connected, be sure to use an IC clip insofar as possible. This helps prevent 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 the power 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

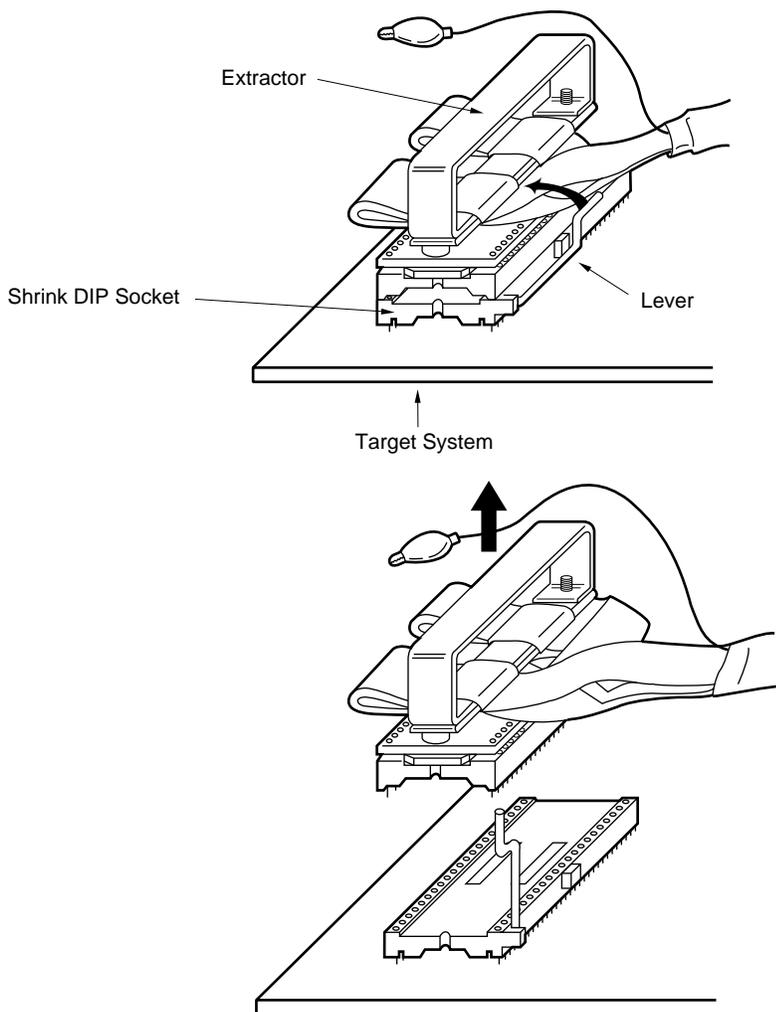
- Power ON sequence
 - <1> Switch on the power of the IE-75001-R.
 - <2> Switch on the power of the target system.
- Power OFF sequence
 - <1> Switch off the power of the target system.
 - <2> Switch off the power of the IE-75001-R.

2.3 Removing Emulation Probe from Target System

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

- <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 Shrink DIP Emulation Probe Removal



CHAPTER 3 SETTING PORT 3

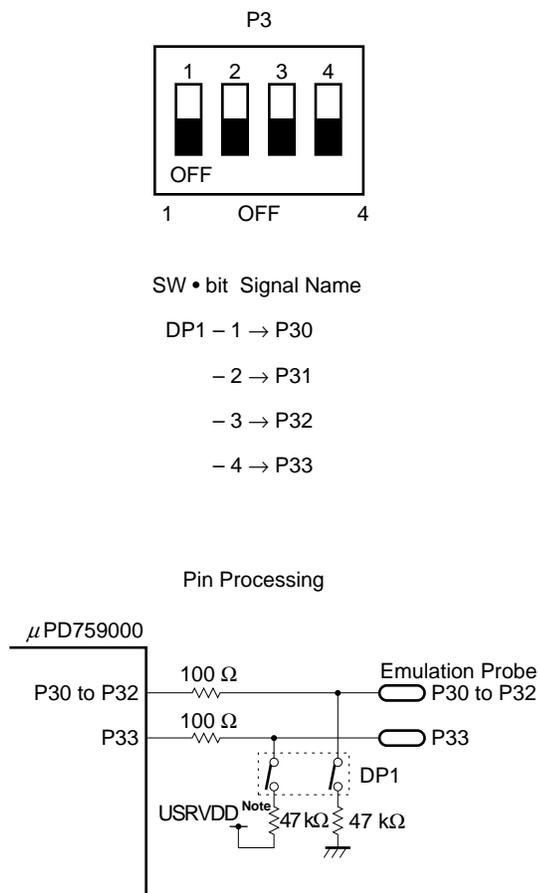
The DP1 switch on the adapter board is for the port 3 setting. When these switches are ON, pull-up resistors^{Note 1} (47 kΩ) or pull-down resistors^{Note 2} (47 kΩ) are connected.

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

- Notes**
1. P33
 2. P30 to P32

Caution Regarding port 3, the setting method for the adapter board and devices differs. The pull-up resistor and the pull-down resistor are set by the DP1 switch.

Figure 3-1. DP1 Switch Arrangement Diagram



Note The same potential voltage of user V_{DD} generated in IE.

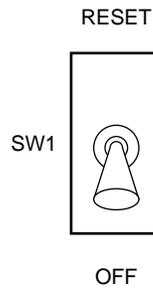
[MEMO]

CHAPTER 4 MASK OPTION SETTING

4.1 Pull-up Setting of $\overline{\text{RESET}}$ Signal

SW1 of the adapter board is a pull-up setting switch of the $\overline{\text{RESET}}$ signal. This switch is set to RESET, pull-up resistor (47 k Ω) is connected. At shipping, the switch is set to lower side (OFF).

Figure 4-1. SW1 Setting

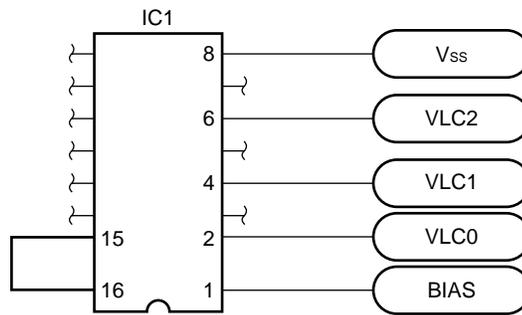


4.2 LCD Drive Divide Registers Setting

The IC socket (IC1) of the adapter board is a socket for setting the LCD drive divide resistors which can be set using the mask option.

When set the LCD drive, divide resistors mount the resistors to a part holder, and insert the part holder in the IC socket (refer to Figure 4-2).

Figure 4-2. IC1 Pin Connection



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	P82/S21
2	GND	GND	26			50	8	P83/S20
3	EXT0	EXT0	27			51	9	S19
4	EXT1	EXT1	28			52	10	S18
5	EXT2	EXT2	29			53	NC	NC
6	EXT3	EXT3	30			54		
7	EXT4	EXT4	31			55		
8	EXT5	EXT5	32	32	COM3	56		
9	EXT6	EXT6	33	33	$\overline{\text{RESET}}$	57		
10	EXT7	EXT7	34	34	P30/PCL	58		
11	NC	NC	35	35	P31/BUZ	59		
12			36	36	P32	60		
13			37	37	P33	61		
14			38	38	P100	62		
15			39	39	P101	63		
16			40	40	P102	64		
17			41	41	P103/INT1	65		
18			42	42	V _{SS}	66		
19			43	1	CL2	67		
20			44	2	CL1	68		
21			45	3	V _{DD}	69		
22			46	4	IC	70		
23			47	5	P80/S23	71		
24	48	6	P81/S22	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 the following.
 - GND : Ground clip (GND)
 - EXT0 to EXT7 : External sense clips No. 1 to No. 8
 - 1 to 42 : Pin No. of 42-pin shrink DIP at the end of emulation probe
 - NC : No Connection
 - IC : Internally Connected

(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	S10	89	26	S2
74	11	S17	82	19	S9	90	27	S1
75	12	S16	83	20	S8	91	28	S0
76	13	S15	84	21	S7	92	29	COM0
77	14	S14	85	22	S6	93	30	COM1
78	15	S13	86	23	S5	94	31	COM2
79	16	S12	87	24	S4	95	GND	GND
80	17	S11	88	25	S3	96	GND	GND

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

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