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USER'S MANUAL

Phase-out/Discontinued

EP-754144GS-R

EMULATION PROBE

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Date Published January 1996 P
Printed in Japan

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INTRODUCTION

Intended Reader

This manual is intended for use by users of μPD754144 subseries debugging using the IE-75001-R + IE-75300-R-EM and EP-754144GS-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-754144GS-R to the IE-75001-R + IE-75300-R-EM and methods for setting mask options and switch.

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
Method for setting switch

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 specified otherwise, “IE-75001-R” means “IE-75001-R + IE-75300-R-EM”.

- When desiring to understand general EP-754144GS-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 **CHAPTER 1 GENERAL DESCRIPTION**.

- When desiring to understand in detail how to understand the connection method:
  → Read **CHAPTER 2 CONNECTIONS**.

- When desiring to understand the mask option setting method:
  → Read **CHAPTER 3 SETTING THE MASK OPTIONS**.

- When desiring to understand the switch setting method:
  → Read **CHAPTER 4 SETTING THE SWITCH**.

Legend

Note : Provides additional important information.
Caution : Contains especially important information.
Remark : 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-754304GS-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) Note 1		1
• Installation screws Note 2		2
• Flexible board Note 3	(EV-9500GS-20: for shrink SOP)	2
	(EV-9501GS-20: for SOP)	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.

CONTENTS

[MEMO]

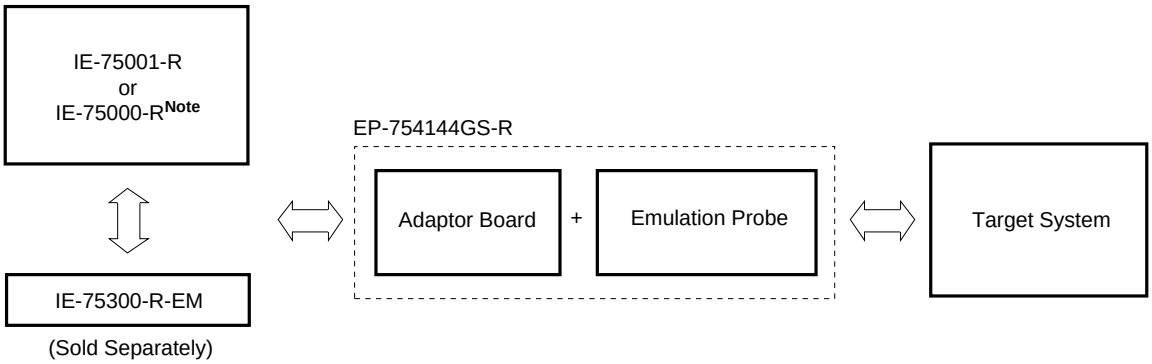
CHAPTER 1 GENERAL DESCRIPTION

This chapter gives an outline of the EP-754144GS-R.

1.1 OPERATING ENVIRONMENT

The EP-754144GS-R is a probe set designed for connection with the IE-75001-R and target system. By using the EP-754144GS-R in such connections, a debugging environment for the μPD754144 subseries is created making comprehensive debugging of target system hardware and software possible. See **CHAPTER 2 CONNECTIONS**, 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-754144GS-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.

- **20-pin GS 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 **CHAPTER 3 SETTING MASK OPTIONS**.

Figure 1-2. Emulation Probe

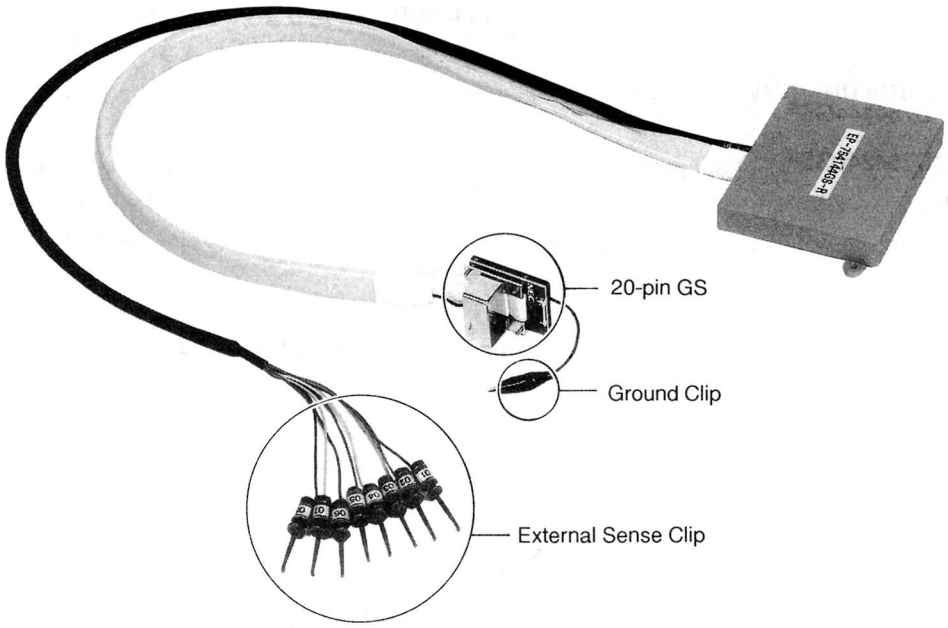
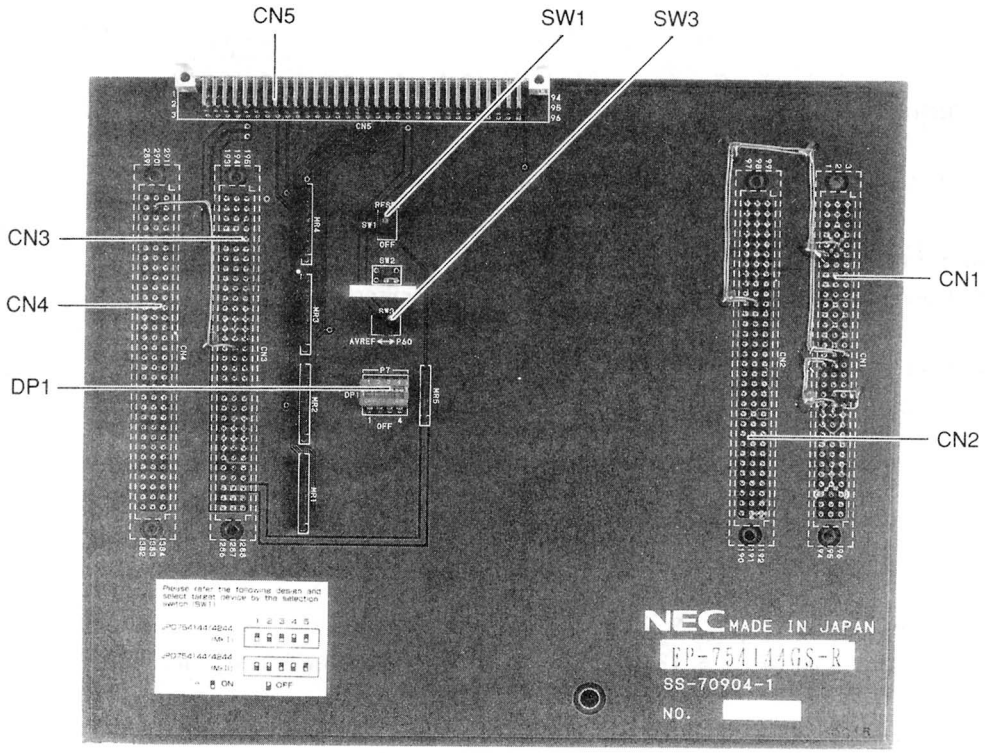


Figure 1-3. Adaptor Board



1.3 TARGET DEVICES

The EP-754144GS-R is used in emulation of the following target devices (as of October 1995).

- μPD754142GS[Note]
- μPD754244GS[Note]

Note Under development

[MEMO]

CHAPTER 2 CONNECTIONS

EP-754144GS-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

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

(3) Connecting the emulation probe and 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.

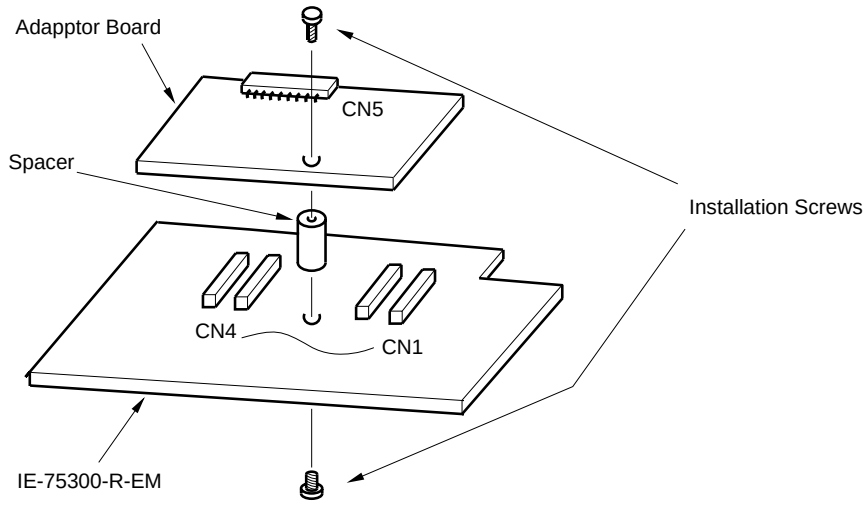
(1) Connecting the IE-75300-R-EM and Adaptor Board

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[Note].
<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.

Note 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>.

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

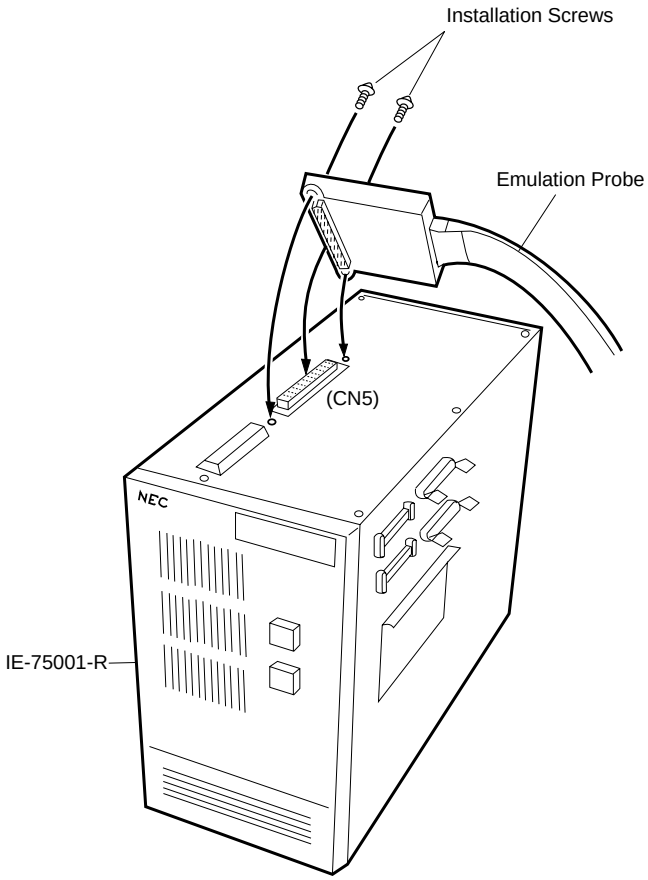


(2) Connecting the IE-75001-R and Emulation Probe

<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.

Figure 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.

Cautions1. 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.

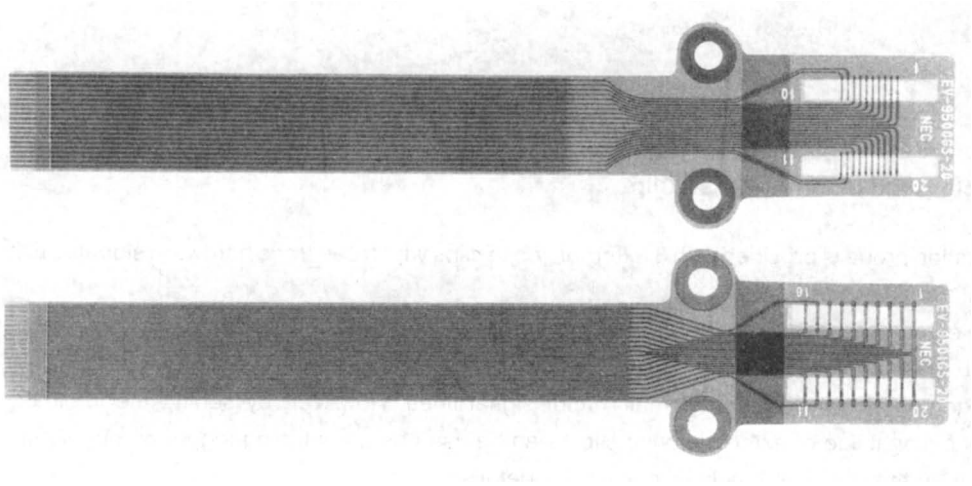
2. When making connections, be careful not to reverse the pins. If connections are incorrect, it could damage the IE-75001-R.

<1> Switch off the target system's power supply.

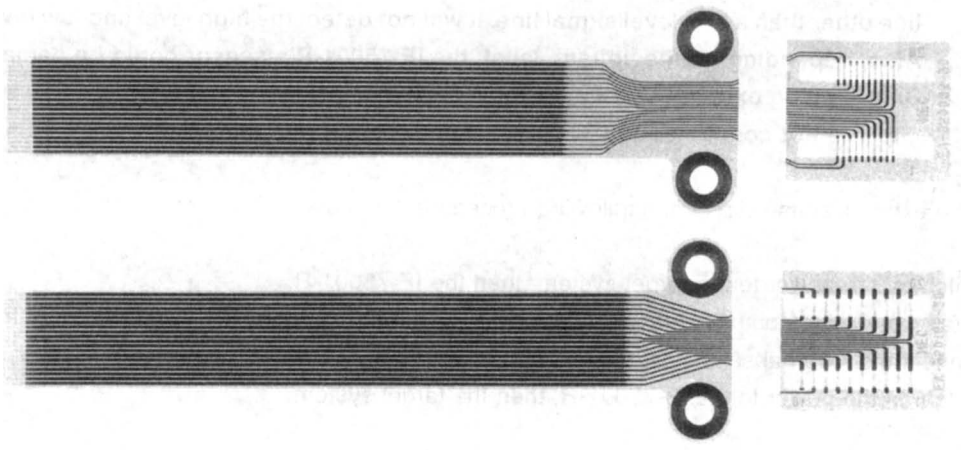
<2> Solder the flexible board (EV-9500GS-20 or EV-9501GS-20) to the target system.

Figure 2-3. Flexible Board

Front



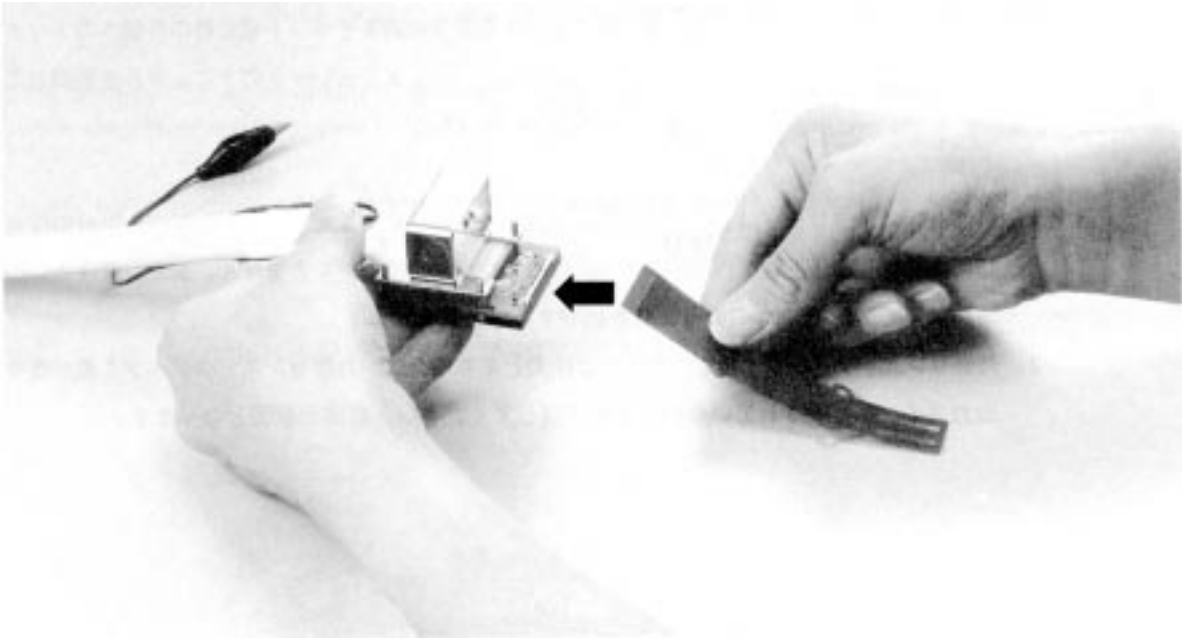
Back



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

<4> Insert into the emulation probe connector under the solder-plated surface of the flexible board soldered on the target system in step <2> in the emulation probe main unit edge connector.

Figure 2-4. 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 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).

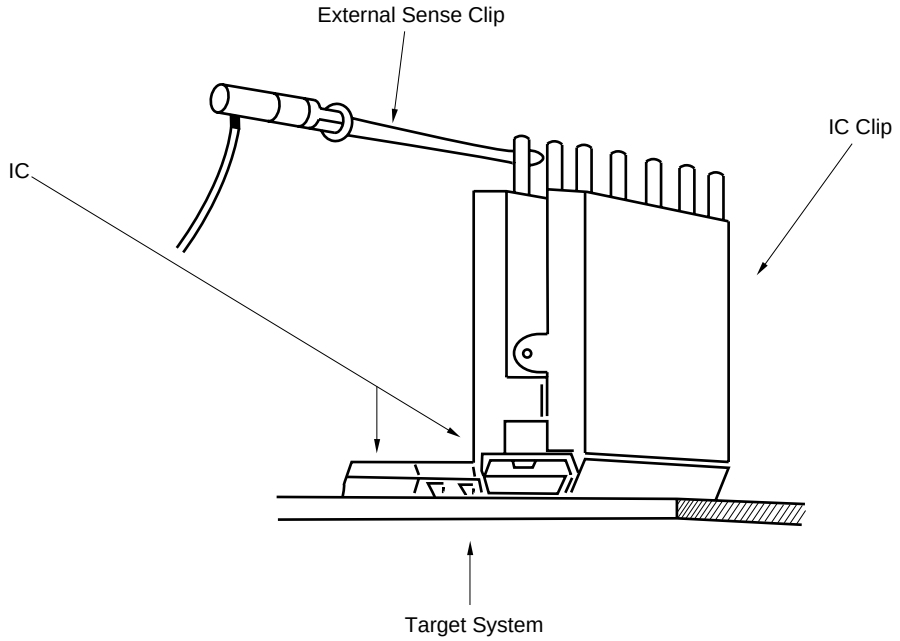
Cautions 1. Connect the external sense clip to a TTL level signal line only. If it is connected to a signal line other than a TTL level signal line, it will not detect the high level and low level accurately. Also, depending on the voltage level, the IE-75001-R's sensor could be damaged.

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.

Figure 2-5. Connecting the External Sense Clip



Remark If an external sense clip is connected, be sure to use an IC clip if at all possible. Thishelps 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.

Caution 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.

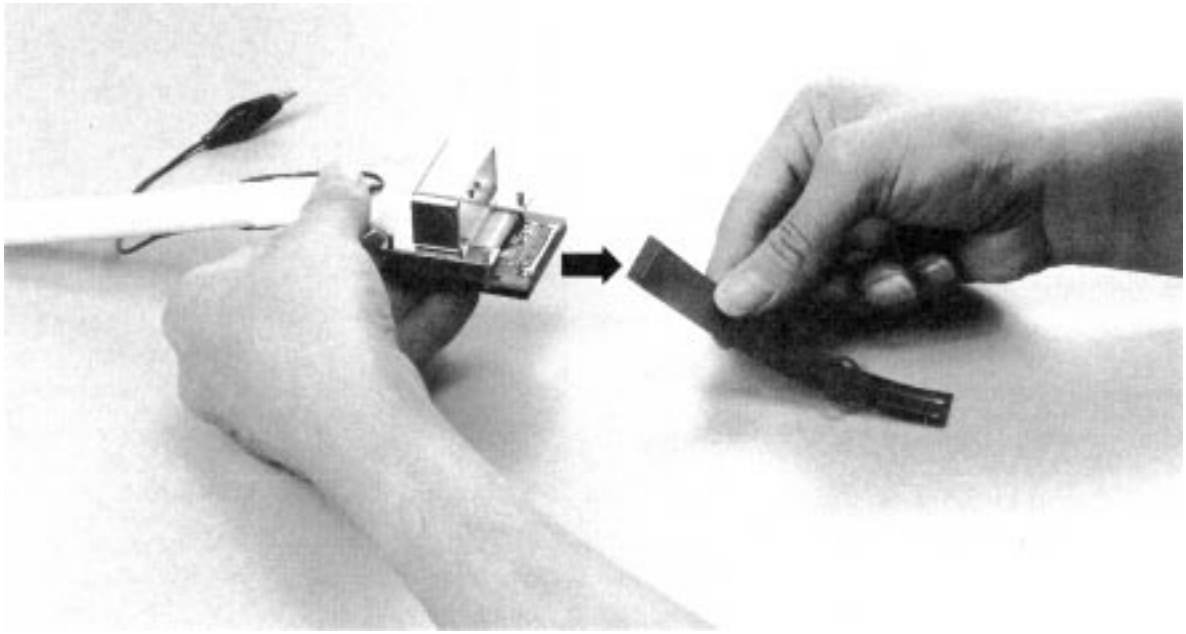
- Power OFF sequence
  <1> Switch off the power to the target system.
  <2> Switch off the power to the IE-75001-R.

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 flexible board from the connector on the end of the emulation probe.

Figure 2-6. Disconnecting the Emulation Probe



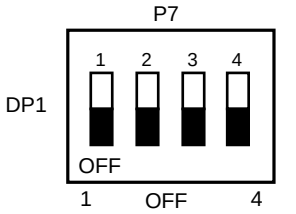
CHAPTER 3 SETTING MASK OPTIONS

3.1 SETTING THE PORT 7 MASK OPTION

The adapter board DP1 switch is the port 7 mask option setting switch. When these switches are switched ON, pull-up resistors (68 kΩ) are connected.

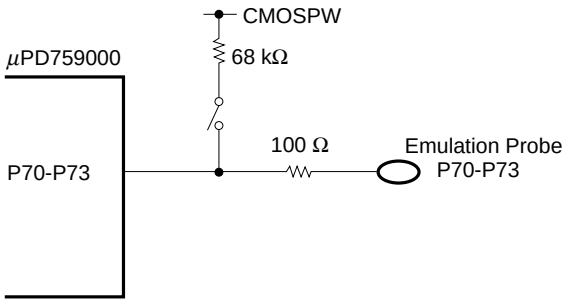
At shipping time, the DP1 switches are set in the OFF position.

Figure 3-1. DP1 Switch Arrangement Diagram



SW	Bit	Signal Name
DP1	–1	P70
	–2	P71
	–3	P72
	–4	P73

Pin Processing

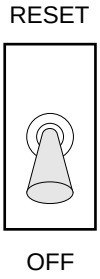


3.2 PULL-UP SETTING OF THE $\overline{\text{RESET}}$ SIGNAL

The adapter board SW1 is the pull-up setting switch of the $\overline{\text{RESET}}$ signal. When this switch is set to RESET, a pull-up resistor (68 kΩ) is connected.

At shipping time, this switch is set in the OFF position.

Figure 3-2. Setting of SW1

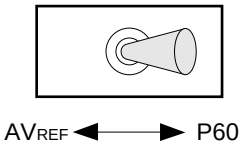


CHAPTER 4 SETTING SWITCH

4.1 SELECTION OF P60/AVREF

The adapter board SW3 is the switch to select whether the P60/AVREF dual-function pin is used as P60 or as AVREF.
When using as P60, set the switch to right.
When using as AVREF, set the switch to left.
At shipping time, this switch is set in the right (P60) position.

Figure 4-1. Setting of SW3



[MEMO]

APPENDIX EMULATION PROBE PIN ARRANGEMENT TABLE

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	7	P60/AV_{REF}	49	16	P32/PTO2
2	GND	GND	26	4	V_{SS}	50	17	P31/PTO1
3	EXT0	EXT0	27	1	$\overline{RESET}$	51	18	P30/PTO0
4	EXT1	EXT1	28	NC	NC	52	20	KRREN
5	EXT2	EXT2	29			53	19	P80
6	EXT3	EXT3	30			54	6	V_{DD}
7	EXT4	EXT4	31			55	11	P73/KR7
8	EXT5	EXT5	32			56	12	P72/KR6
9	EXT6	EXT6	33			57	13	P71/KR5
10	EXT7	EXT7	34			58	14	P70/KR4
11	NC	NC	35			59	10	P63/PTH01
12			36			60	9	P62/PTH00
13			37			61	5	IC
14			38			62	NC	NC
15			39			63		
16			40			64		
17			41			65		
18			42	GND	GND	66		
19			43	NC	NC	67		
20			44			68		
21			45			69		
22			46	2	X1	70		
23			47	3	X2	71		
24	8	P61/INT0	48	15	P33	72		

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

EXT0 to EXT7 : External sense clip No. 1 to No. 8

1 to 20 : Pin No. of 20-pin GS on end of emulation probe

NC : No Connection

(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	NC	NC	89	NC	NC
74			82			90		
75			83			91		
76			84			92		
77			85			93		
78			96			94		
79			87			95	GND	GND
80			88			96	GND	GND

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

EXT0 to EXT7 : External sense clip No. 1 to No. 8

1 to 20 : Pin No. of 20-pin GS on end of emulation probe

NC : No Connection

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