

To our customers,

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## **User's Manual**

# **IE-789234-NS-EM1**

## **Emulation Board**

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### **Target Devices**

**78K0S/KU1+**

**78K0S/KY1+**

**78K0S/KA1+**

**78K0S/KB1+**

[MEMO]

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### 1. Circumstances not covered by product guarantee

- If the product was disassembled, altered, or repaired by the customer
- If it was dropped, broken, or given another strong shock
- Use at overvoltage, use outside guaranteed temperature range, storing outside guaranteed temperature range
- If power was turned on while the power supply unit, PC interface cable, or connection to the target system was in an unsatisfactory state
- If the cable of the power supply, the PC interface cable, the emulation probe, or the like was bent or pulled excessively
- If a power supply unit other than the supplied product was used
- If the product got wet
- If this product is connected to the target system when there is a potential difference between the GND of this product and GND of the target system.
- If the connectors or cables are plugged/unplugged while this product is in the power-on state.
- If excessive load is applied to the connectors or sockets.

### 2. Safety precautions

- If used for a long time, the product may become hot (50°C to 60°C). Be careful of low temperature burns and other dangers due to the product becoming hot.
- Be careful of electrical shock. There is a danger of electrical shock if the product is used as described above in **1 Circumstances not covered by product guarantee.**

# INTRODUCTION

## Product Overview

The IE-789234-NS-EM1 is designed to be used with the IE-78K0S-NS or IE-78K0S-NS-A to debug the following target devices that belong to the 78K0S microcontrollers.

- 78K0S/KU1+:  $\mu$ PD78F9200, 78F9201, 78F9202
- 78K0S/KY1+:  $\mu$ PD78F9210, 78F9211, 78F9212, 78F9510, 78F9511, 78F9512
- 78K0S/KA1+:  $\mu$ PD78F9221, 78F9222
- 78K0S/KB1+:  $\mu$ PD78F9232, 78F9234

- Cautions 1. The IE-789234-NS-EM1 has usage restrictions. See CHAPTER 5 USAGE RESTRICTIONS for details.**
- 2. The 78K0S/KU1+ devices ( $\mu$ PD78F9500, 78F9501, and 78F9502) are not supported with the IE-789234-NS-EM1.**

## Target Readers

This manual is intended for engineers who will use the IE-789234-NS-EM1 with the IE-78K0S-NS or IE-78K0S-NS-A to perform system debugging. Engineers who use this manual are expected to be thoroughly familiar with the target device's functions and use methods and to be knowledgeable about debugging.

## Organization

When using the IE-789234-NS-EM1, refer to not only this manual (supplied with the IE-789234-NS-EM1) but also the manual that is supplied with the IE-78K0S-NS or IE-78K0S-NS-A.

IE-78K0S-NS  
User's Manual

- Basic specifications
- System configuration
- External interface functions

IE-789234-NS-EM1  
User's Manual

- General
- Part names
- Installation
- Differences between target device and target interface circuit
- Usage restrictions

IE-78K0S-NS-A  
User's Manual

- Basic specifications
- System configuration
- External interface functions

## Purpose

This manual's purpose is to explain various debugging functions that can be performed when using the IE-789234-NS-EM1.

## How to Read This Manual

It is assumed that the readers of this manual have general knowledge in the fields of electrical engineering, logic circuits, and microcontrollers.

To understand the overall functions and usages of the IE-789234-NS-EM1

→ Read this manual in the order of the **CONTENTS**. The mark “<R>” shows major revised points. The revised points can be easily searched by copying an “<R>” in the PDF file and specifying it in the “Find what:” field.

## Terminology

The meanings of certain terms used in this manual are listed below.

Term	Meaning
Emulation device	This is a general term that refers to the device in the emulator that is used to emulate the target device. It includes the emulation CPU.
Emulation CPU	This is the CPU block in the emulator that is used to execute user-generated programs.
Target device	This is the device to be emulated.
Target system	This includes the target program and the hardware provided by the user. When defined narrowly, it includes only the hardware.
IE system	This refers to the combination of the in-circuit emulator (IE-78K0S-NS or IE-78K0S-NS-A) and the emulation board (IE-789234-NS-EM1).

## Conventions

Data significance: Higher digits on the left and lower digits on the right

**Note:** Footnote for item marked with **Note** in the text

**Caution:** Information requiring particular attention

**Remark:** Supplementary information

## Related Documents

The related documents (user’s manuals) indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Document Name	Document Number
IE-78K0S-NS In-Circuit Emulator	U13549E
IE-78K0S-NS-A In-Circuit Emulator	U15207E
IE-789234-NS-EM1 Emulation Board	This manual
ID78K0S-NS Ver. 2.52 Integrated Debugger Operation	U16584E
CC78K0S Ver. 1.50 or Later Operation	U16654E
RA78K0S Ver. 1.50 or Later Operation	U17391E
PM plus Ver. 5.20	U16934E
PG-FP4 Flash Memory Programmer	U15260E
78K0S/KU1+	U18172E
78K0S/KY1+	U16994E
78K0S/KA1+	U16898E
78K0S/KB1+	U17446E

**Caution** The documents listed above are subject to change without notice. Be sure to use the latest documents when designing.



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## CHAPTER 1 GENERAL

The IE-789234-NS-EM1 is a development tool for efficient debugging of hardware or software when using one of the following target devices that belong to the 78K0S microcontrollers.

This chapter describes the IE-789234-NS-EM1's system configuration and basic specifications.

- Target devices

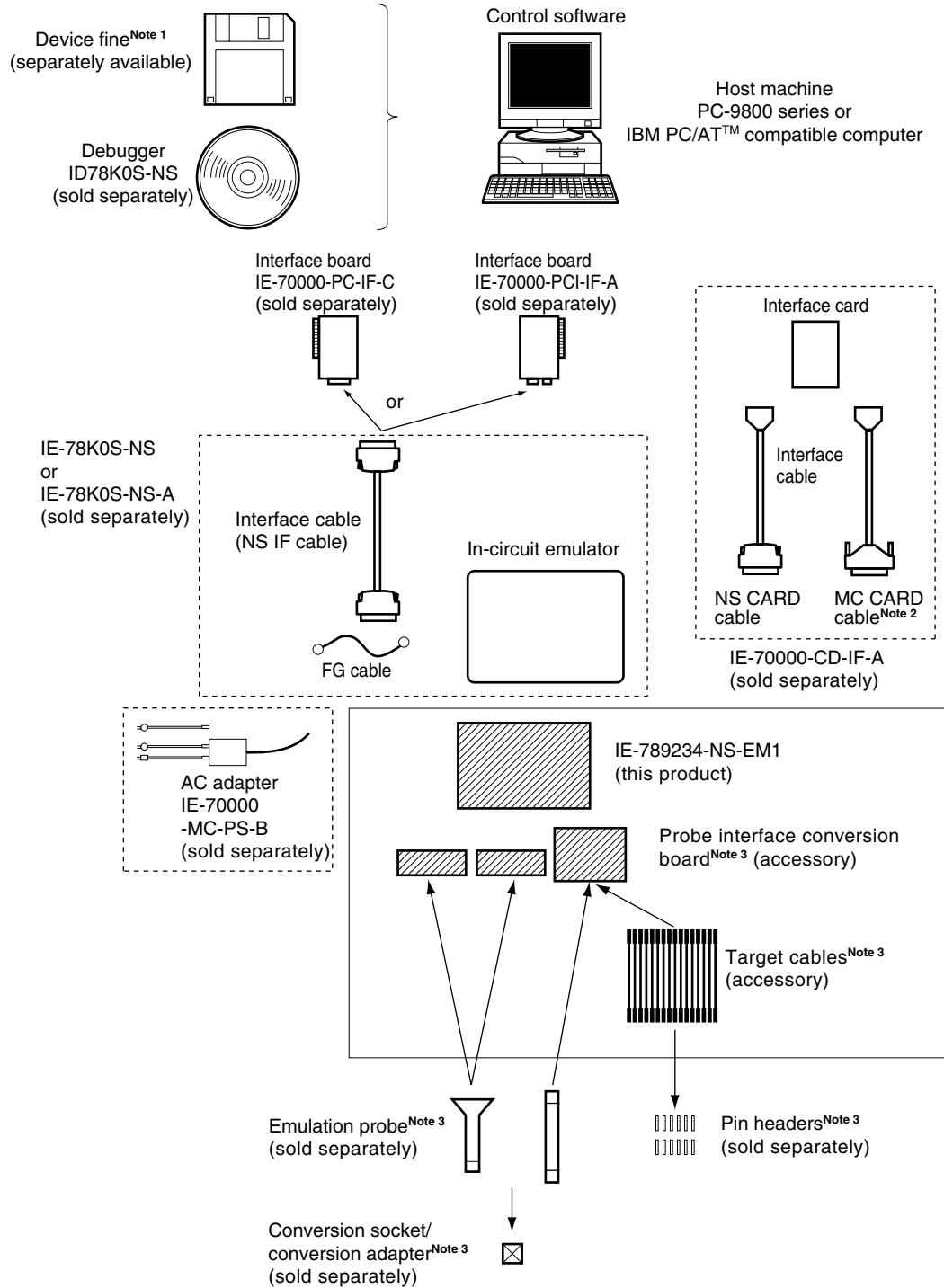
- 78K0S/KU1+:  $\mu$ PD78F9200, 78F9201, 78F9202
- 78K0S/KY1+:  $\mu$ PD78F9210, 78F9211, 78F9212, 78F9510, 78F9511, 78F9512
- 78K0S/KA1+:  $\mu$ PD78F9221, 78F9222
- 78K0S/KB1+:  $\mu$ PD78F9232, 78F9234

**Caution** The 78K0S/KU1+ devices ( $\mu$ PD78F9500, 78F9501, and 78F9502) are not supported with the IE-789234-NS-EM1.

## 1.1 System Configuration

Figure 1-1 illustrates the IE-789234-NS-EM1's system configuration.

**Figure 1-1. System Configuration**



**Notes** 1. The device file is as follows.

- DF789234 V3.10 or later 78K0S/KU1+:  $\mu$ PD78F9200, 78F9201, 78F9202  
78K0S/KY1+:  $\mu$ PD78F9210, 78F9211, 78F9212, 78F9510, 78F9511,  
78F9512  
78K0S/KA1+:  $\mu$ PD78F9221, 78F9222  
78K0S/KB1+:  $\mu$ PD78F9232, 78F9234

The 78K0S/KU1+ devices with DF789234 V3.10 or later ( $\mu$ PD78F9500, 78F9501, and 78F9502) are not supported with the IE-789234-NS-EM1.

The device file can be downloaded from the website of NEC Electronics Corporation.

(<http://www.necel.com/micro/ods/eng/index.html>)

2. The MC CARD cable is not used in the IE-789234-NS-EM1.
3. Table 1-1 shows the correspondence between the probe interface conversion board, target cable, emulation probe, conversion socket/conversion adapter, and pin header.

**Table 1-1. List of Emulation Environments**

Target Device	Package	Probe Interface Conversion Board	Target Cable/ Emulation Probe	Conversion Socket/ Conversion Adapter/Pin Header
<R> 78K0S/KU1+	10-pin SSOP	SIMPLE PROBE Board	10 target cables <sup>Note 1</sup>	10 pin headers <sup>Note 1</sup> 0.635 × 0.635 mm (height: 6 mm)
<R> 78K0S/KY1+	16-pin SSOP, WLBGA, SDIP	SIMPLE PROBE Board	16 target cables <sup>Note 1</sup>	16 pin headers <sup>Note 1</sup> 0.635 × 0.635 mm (height: 6 mm)
<R> 78K0S/KA1+	20-pin SSOP, WLBGA, SDIP	SIMPLE PROBE Board	20 target cables <sup>Note 1</sup>	20 pin headers <sup>Note 1</sup> 0.635 × 0.635 mm (height: 6 mm)
<R> 78K0S/KB1+	20-pin SSOP	789222 PROBE Board	NP-30MC <sup>Note 2</sup>	NSPACK30BK + YSPACK30BK <sup>Note 3</sup>
<R> 78K0S/KB1+	30-pin SSOP	SIMPLE PROBE Board	30 target cables <sup>Note 1</sup>	30 pin headers <sup>Note 1</sup> 0.635 × 0.635 mm (height: 6 mm)
<R> 78K0S/KB1+	30-pin SSOP	SIMPLE PROBE Board	QB-80-EP-01T	QB-30MC-EA-01T QB-30MC-YQ-01T QB-30MC-NQ-01T
<R> 78K0S/KB1+	30-pin SSOP	789234 PROBE Board	NP-30MC <sup>Note 2</sup>	NSPACK30BK + YSPACK30BK <sup>Note 3</sup>

**Notes** 1. When a 40-pin IDE connector is mounted in the target system, the 40-pin IDE cable (ATA-33 standard) can be used instead of the target cable (single wire).

2. The emulation probe NP-30MC is a product of Naito Densai Machida Mfg. Co., Ltd.  
For further information, contact Naito Densai Machida Mfg. Co., Ltd. (TEL: +81-42-750-4172)

3. The conversion adapters NSPACK30BK and YSPACK30BK are products of TOKYO ELETECH CORPORATION.

For further information, contact Daimaru Kogyo Co., Ltd.

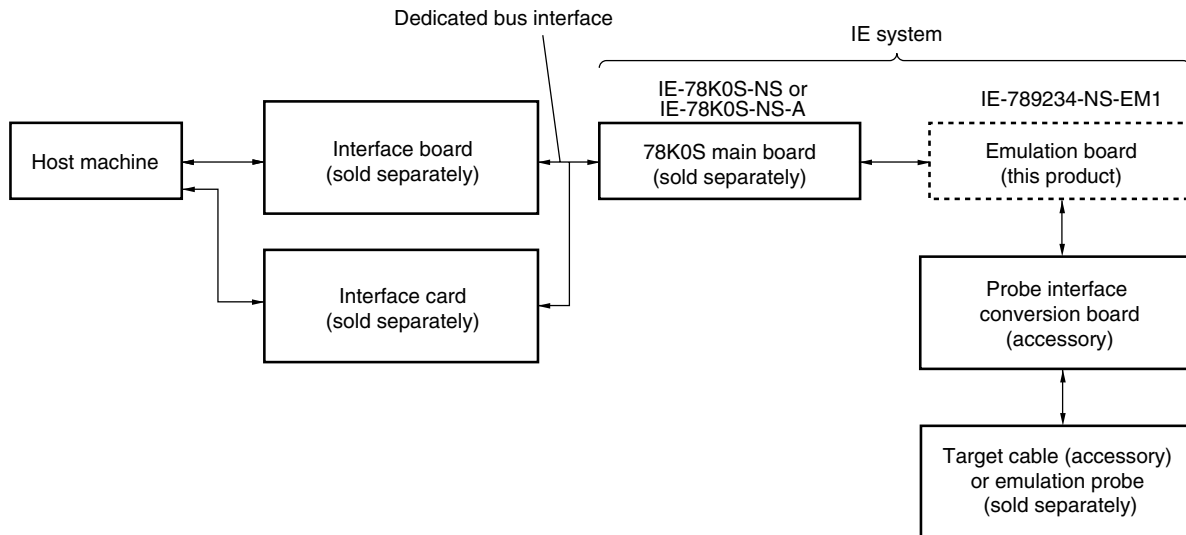
Tokyo Electronics Department (TEL: +81-3-3820-7112)

Osaka Electronics Department (TEL: +81-6-6244-6672)

## 1.2 Hardware Configuration

Figure 1-2 shows the IE-789234-NS-EM1's position in the basic hardware configuration.

**Figure 1-2. Basic Hardware Configuration**



## 1.3 Basic Specifications

The basic specifications of the IE-789234-NS-EM1 are listed in Table 1-2.

**Table 1-2. Basic Specifications**

Parameter	Description
Target device	<ul style="list-style-type: none"> <li>• 78K0S/KU1+: <math>\mu</math>PD78F9200, 78F9201, 78F9202</li> <li>• 78K0S/KY1+: <math>\mu</math>PD78F9210, 78F9211, 78F9212, 78F9510, 78F9511, 78F9512</li> <li>• 78K0S/KA1+: <math>\mu</math>PD78F9221, 78F9222</li> <li>• 78K0S/KB1+: <math>\mu</math>PD78F9232, 78F9234</li> </ul>
System clock	Low-speed internal oscillation clock: 240 kHz (fixed) High-speed internal oscillation clock: 8.0 MHz (fixed) System clock: 10.0 MHz (MAX.)
System clock supply	External: Pulse input Internal: Mounted on emulation board
Target interface power supply voltage	$V_{DD} = 2.0$ to $5.5$ V (same as that of target device)

**Caution** The 78K0S/KU1+ devices ( $\mu$ PD78F9500, 78F9501, and 78F9502) are not supported with the IE-789234-NS-EM1.

## CHAPTER 2 PART NAMES

This chapter introduces the parts of the IE-789234-NS-EM1 main unit.

The packing box contains the following.

- Emulation board (IE-789234-NS-EM1): 1
- Probe interface conversion board (SIMPLE PROBE Board): 1
- Probe interface conversion board (789222 PROBE Board): 1
- Probe interface conversion board (789234 PROBE Board): 1
- Target cables (red - 2, black - 2, yellow - 26): 1 set
- Spacers (31 mm): 2
- Spacers (7 mm): 2
- Screws (for spacer): 4
- Package details: 1
- User's manual (this document): 1
- Guarantee card: 1

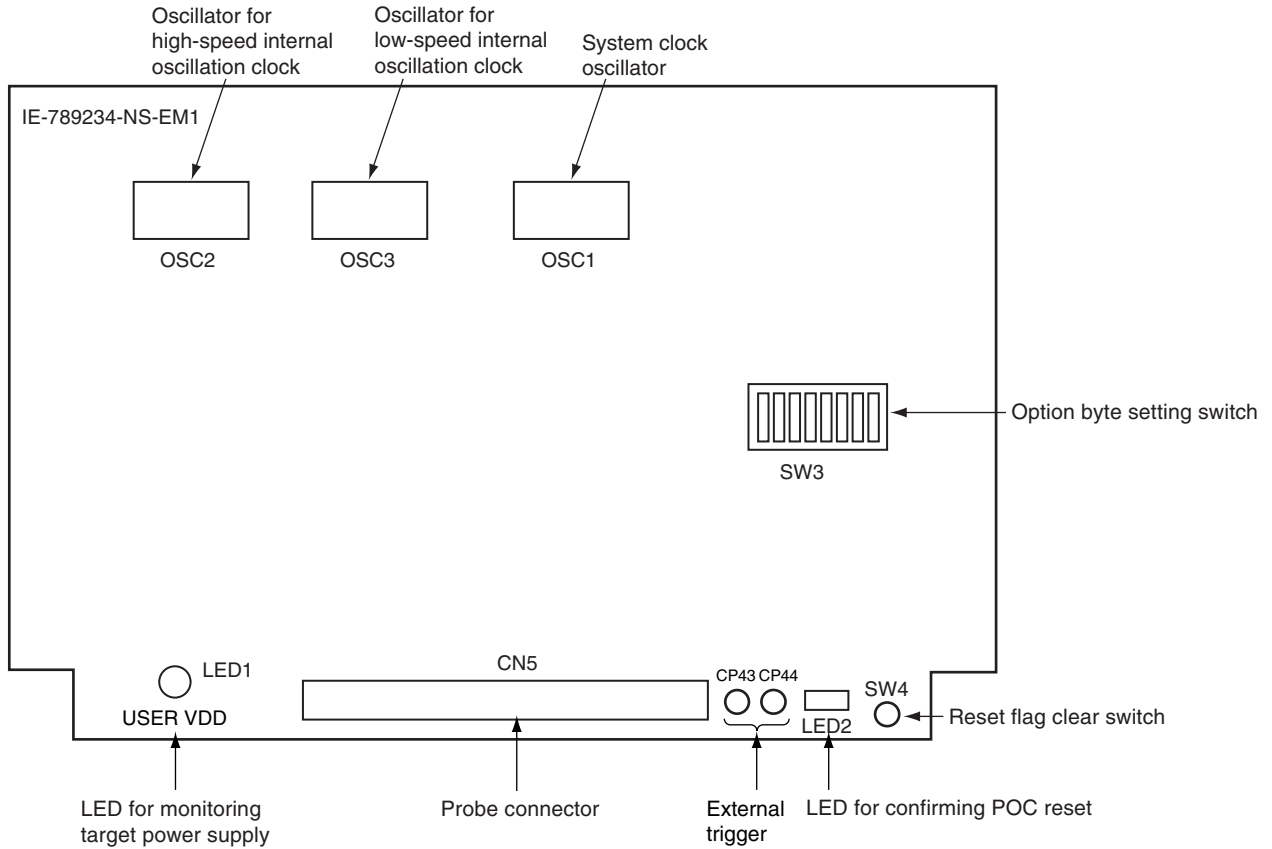
If there are any missing or damaged items, please contact an NEC Electronics sales representative.

Fill out and return the guarantee card that comes with the main unit.

2.1 Names of Parts on Board

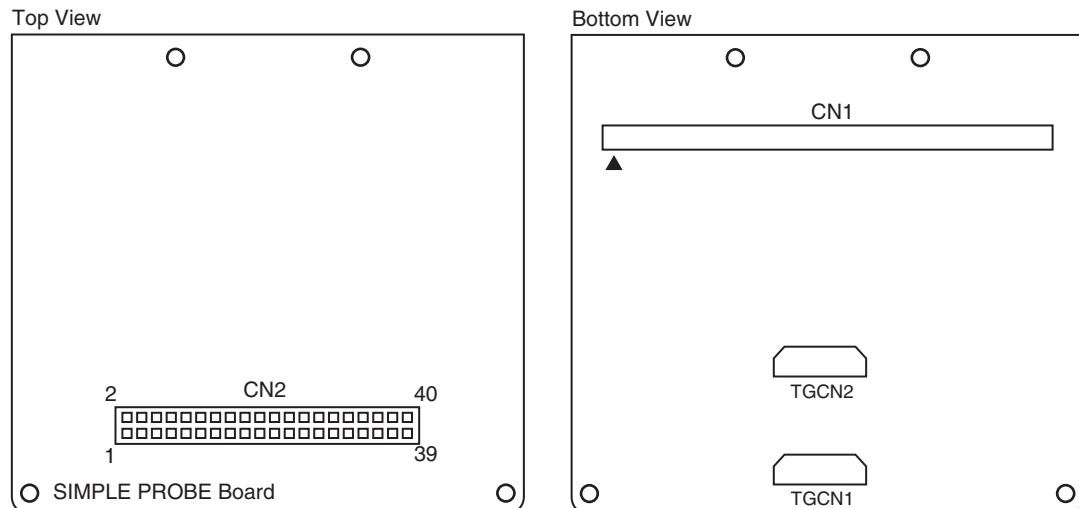
(1) Emulation board (IE-789234-NS-EM1)

Figure 2-1. Part Names of IE-789234-NS-EM1



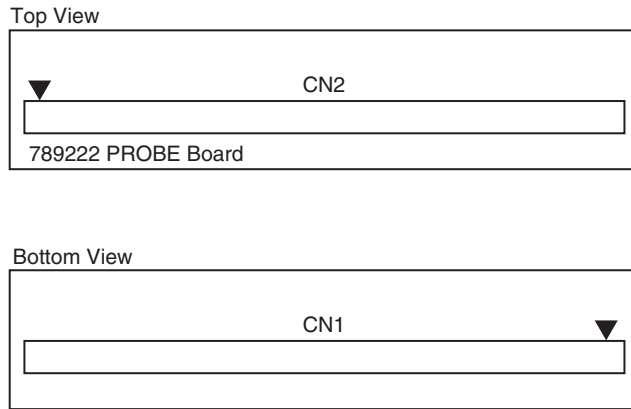
(2) Probe interface conversion board (SIMPLE PROBE Board)

Figure 2-2. Part Names of SIMPLE PROBE Board



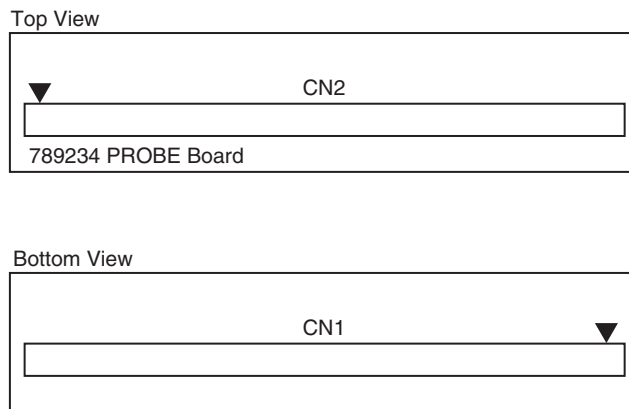
(3) Probe interface conversion board (789222 PROBE Board)

Figure 2-3. Part Names of 789222 PROBE Board



(4) Probe interface conversion board (789234 PROBE Board)

Figure 2-4. Part Names of 789234 PROBE Board





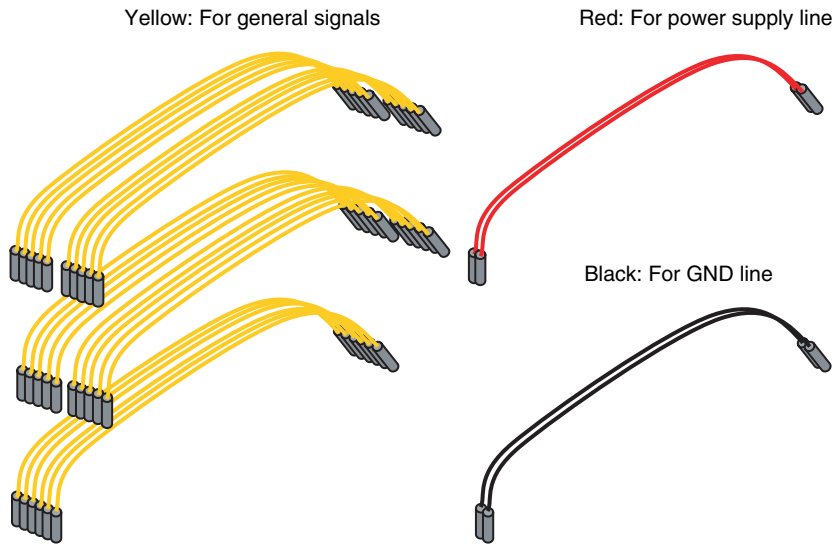
**(5) Target cables (30 single-wire cables)**

Red: 250 mm cable for power supply line (for V<sub>DD</sub>/AV<sub>REF</sub> pin connection) - 2 cables

Black: 250 mm cable for GND line (for V<sub>SS</sub>/AV<sub>SS</sub> pin connection) - 2 cables

Yellow: 250 mm cable for general signals - 26 cables

**Figure 2-5. Target Cable**



**2.2 Initial Settings of Switches and Jumper**

**Table 2-1. Initial Settings of IE-789234-NS-EM1 Switch**

Switch	SW3-8	SW3-7	SW3-6	SW3-5	SW3-4	SW3-3	SW3-2	SW3-1
Initial setting	1 side (fixed)	1 side	1 side	1 side (fixed)	1 side	1 side	1 side	1 side

**2.3 Other Initial Settings**

**Table 2-2. Clock Settings of IE-789234-NS-EM1**

Item	Setting Item	Remark
OSC1	Mounting 10 MHz oscillator in socket	A frequency of 10 MHz is supplied as the system clock; frequency selectable.
OSC2	Mounting 8 MHz oscillator	A frequency of 8 MHz is supplied as the high-speed internal oscillation clock; frequency not selectable.
OSC3	Mounting 1.92 MHz oscillator	A frequency of 240 kHz is supplied as the low-speed internal oscillation clock by dividing the default clock by 8; frequency not selectable.

## CHAPTER 3 INSTALLATION

This chapter describes methods for connecting the IE-789234-NS-EM1 to the IE-78K0S-NS or IE-78K0S-NS-A, emulation probe, etc. Mode setting methods are also described.

**Caution** Connecting or removing components to or from the target system, or making switch or other setting changes must be carried out after the power supply to both the IE system and the target system has been switched OFF.

### 3.1 Connection

#### 3.1.1 Connection with IE-78K0S-NS or IE-78K0S-NS-A main unit

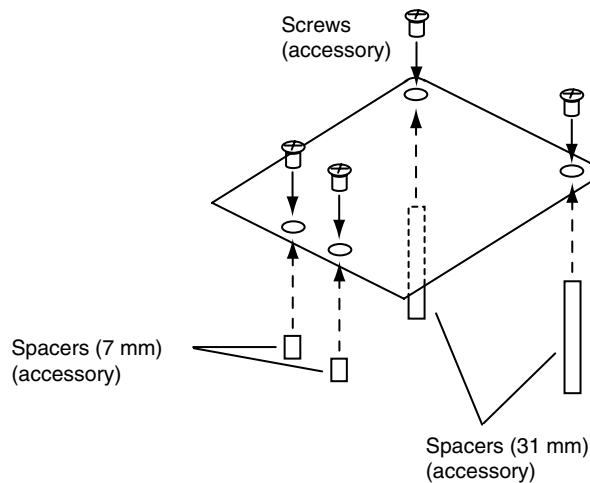
See the **IE-78K0S-NS User's Manual (U13549E)** for a description of how to connect the IE-789234-NS-EM1 to the IE-78K0S-NS.

See the **IE-78K0S-NS-A User's Manual (U15207E)** for a description of how to connect the IE-789234-NS-EM1 to the IE-78K0S-NS-A.

#### 3.1.2 Setup of probe interface conversion board

Tighten the four spacers to the SIMPLE PROBE Board using the screws included with the IE-789234-NS-EM1.

**Figure 3-1. Setup of SIMPLE PROBE Board and Spacer**



#### 3.1.3 Connection with target system

The procedures for fixing the probe interface conversion board on the IE-789234-NS-EM1 and connecting it to the target cable or emulation probe are explained below. Combinations of the probe interface conversion board, target cable, and emulation probe corresponding to the target device are shown in the table below.

<R>

**Table 3-1. Combination of Probe Interface Conversion Board, Target Cable, and Emulation Probe**

Target Device	Package	Probe Interface Conversion Board	Target Cable/Emulation Probe
78K0S/KU1+	10-pin SSOP	SIMPLE PROBE Board	10 target cables
78K0S/KY1+	16-pin SSOP, WLBGA, SDIP	SIMPLE PROBE Board	16 target cables
78K0S/KA1+	20-pin SSOP, WLBGA, SDIP	SIMPLE PROBE Board	20 target cables
	20-pin SSOP	789222 PROBE Board	NP-30MC
78K0S/KB1+	30-pin SSOP, SDIP	SIMPLE PROBE Board	30 target cables
	30-pin SSOP	SIMPLE PROBE Board	QB-80-EP-01T
	30-pin SSOP	789234 PROBE Board	NP-30MC

**(1) Connection with target cable**

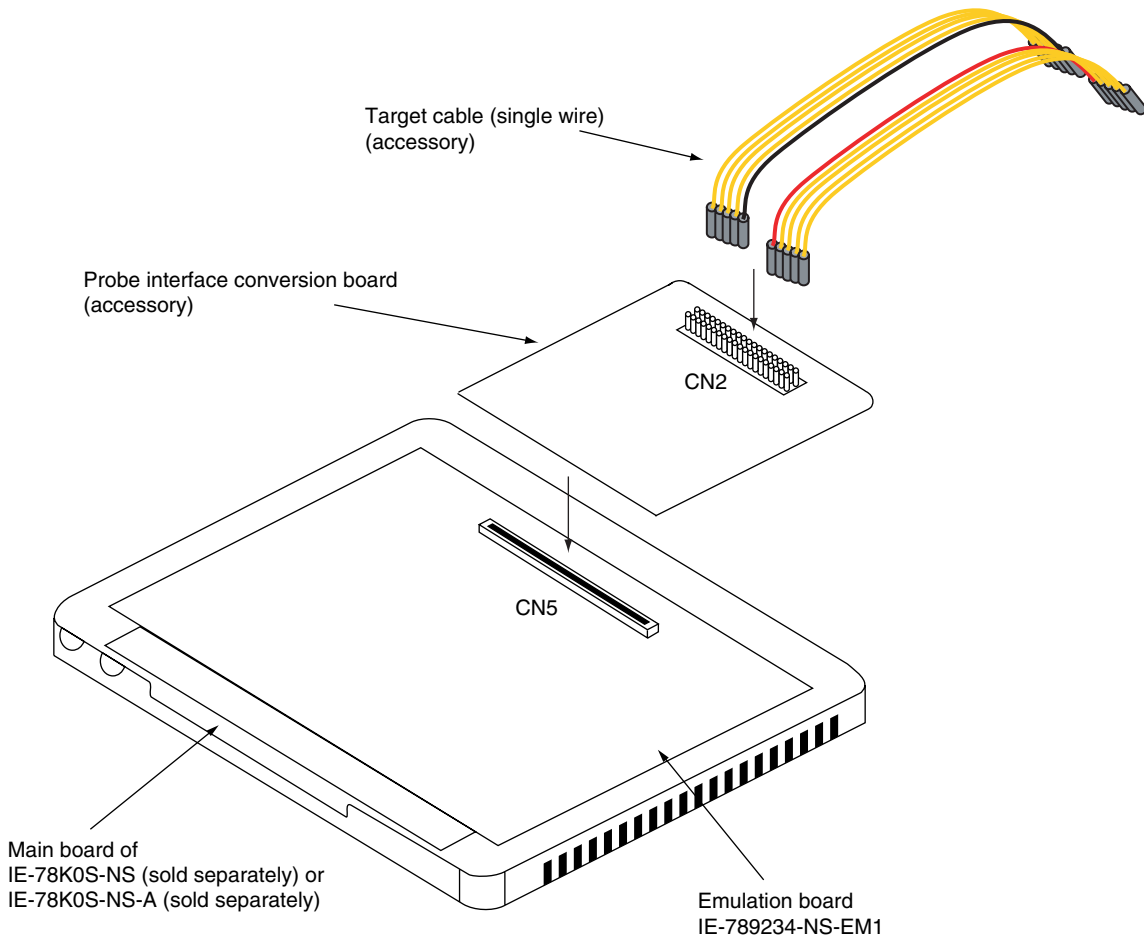
Connect a target cable whose pin count matches that of the target device to the probe interface conversion board (SIMPLE PROBE Board). Table 3-2 shows the pins that correspond to the respective target devices.

- 78K0S/KU1+: 1 V<sub>DD</sub> connection cable (red), 1 V<sub>SS</sub> connection cable (black), 8 general signal cables (yellow)
- 78K0S/KY1+: 1 V<sub>DD</sub> connection cable (red), 1 V<sub>SS</sub> connection cable (black), 14 general signal cables (yellow)
- 78K0S/KA1+: 2 V<sub>DD</sub>/AV<sub>REF</sub> connection cables (red), 1 V<sub>SS</sub> connection cable (black), 17 general signal cables (yellow)
- 78K0S/KB1+: 2 V<sub>DD</sub>/AV<sub>REF</sub> connection cables (red), black: 2 V<sub>SS</sub>/AV<sub>SS</sub> connection cables (black), 26 general signal cables (yellow).

<1> Connect CN5 of the IE-789234-NS-EM1 to CN1 of the SIMPLE PROBE Board.

<2> Connect CN2 of the SIMPLE PROBE Board to a target cable whose pin count matches that of the target device.

**Figure 3-2. Connection of SIMPLE PROBE Board and Target Cable**



**Cautions 1. Incorrect connection may damage the IE system.**

2. When emulating a device other than the 78K0S/KB1+, do not connect anything to the pins to which no functions are assigned (unused pins) in the target interface.

Table 3-2. Pin Assignment Table for SIMPLE PROBE Board and Target Device

CN2	78K0S/KU1+ (10 Pins)	78K0S/KY1+ (16 Pins)	78K0S/KA1+ (20 Pins)	78K0S/KB1+ (30 Pins)
1	–	–	AV <sub>REF</sub> (20)	AV <sub>REF</sub> (28)
2	–	–	–	AV <sub>SS</sub> (29)
3	P20/ANI0/TI000/TOH1 (1)	P20/ANI0/TI000/TOH1 (1)	P20/ANI0 (19)	P20/ANI0 (27)
4 <sup>Note 1</sup>	–	–	–	–
5	P21/ANI1/TI010/TO/INTP0 (10)	P21/ANI1/TI010/TO/INTP0 (16)	P21/ANI1 (18)	P21/ANI1 (26)
6 <sup>Note 1</sup>	–	–	–	–
7	P22/ X2/ANI2 (6)	P22/ X2/ANI2 (9)	P22/ANI2 (17)	P22/ANI2 (25)
8 <sup>Note 1</sup>	–	–	–	–
9	P23/ X1/ANI3 (5)	P23/ X1/ANI3 (8)	P23/ANI3 (16)	P23/ANI3 (24)
10 <sup>Note 1</sup>	–	–	–	–
11	V <sub>DD</sub> (4)	V <sub>DD</sub> (5)	V <sub>DD</sub> (5)	V <sub>DD</sub> (7)
12	V <sub>SS</sub> (3)	V <sub>SS</sub> (4)	V <sub>SS</sub> (1)	V <sub>SS</sub> (6)
13	–	–	–	P120 (30)
14 <sup>Note 1</sup>	–	–	–	–
15	–	–	P121/X1 (2)	P121/X1 (8)
16 <sup>Note 1</sup>	–	–	–	–
17	–	–	P122/X2 (3)	P122/X2 (9)
18 <sup>Note 1</sup>	–	–	–	–
19	–	–	P123 (4)	P123 (5)
20 <sup>Note 2</sup>	–	–	–	–
21	–	–	–	P00 (4)
22	P40 (2)	P40 (3)	P40 (9)	P40 (15)
23	–	–	–	P01 (3)
24	–	P41 (2)	P41/INTP3 (10)	P41/INTP3 (16)
25	–	–	–	P02 (2)
26	–	P42 (15)	P42/TOH1 (11)	P42/TOH1 (17)
27	–	–	–	P03 (1)
28	P43 (9)	P43 (14)	P43/TxD6/INTP1 (12)	P43/TxD6/INTP1 (18)
29	–	–	P130 (15)	P130 (23)
30	–	P44 (11)	P44/RxD6 (13)	P44/RxD6 (19)
31	–	–	P30/TI000/INTP0 (8)	P30/TI000/INTP0 (14)
32	–	P45 (10)	P45 (14)	P45 (20)
33	–	–	P31/TI010/TO00/INTP2 (7)	P31/TI010/TO00/INTP2 (13)
34	–	P46 (7)	–	P46 (21)
35	P32/INTP1 (8)	P32/INTP1 (13)	–	P32 (12)
36	–	P47 (6)	–	P47 (22)
37	–	–	–	P33 (11)
38 <sup>Note 1</sup>	–	–	–	–
39	P34/RESET (7)	P34/RESET (12)	P34/RESET (6)	P34/RESET (10)
40 <sup>Note 1</sup>	–	–	–	–

- Notes**
1. This is a GND pin. Each GND pin is connected to V<sub>SS</sub> (pin 12) on the SIMPLE PROBE Board.
  2. This pin is not connected.

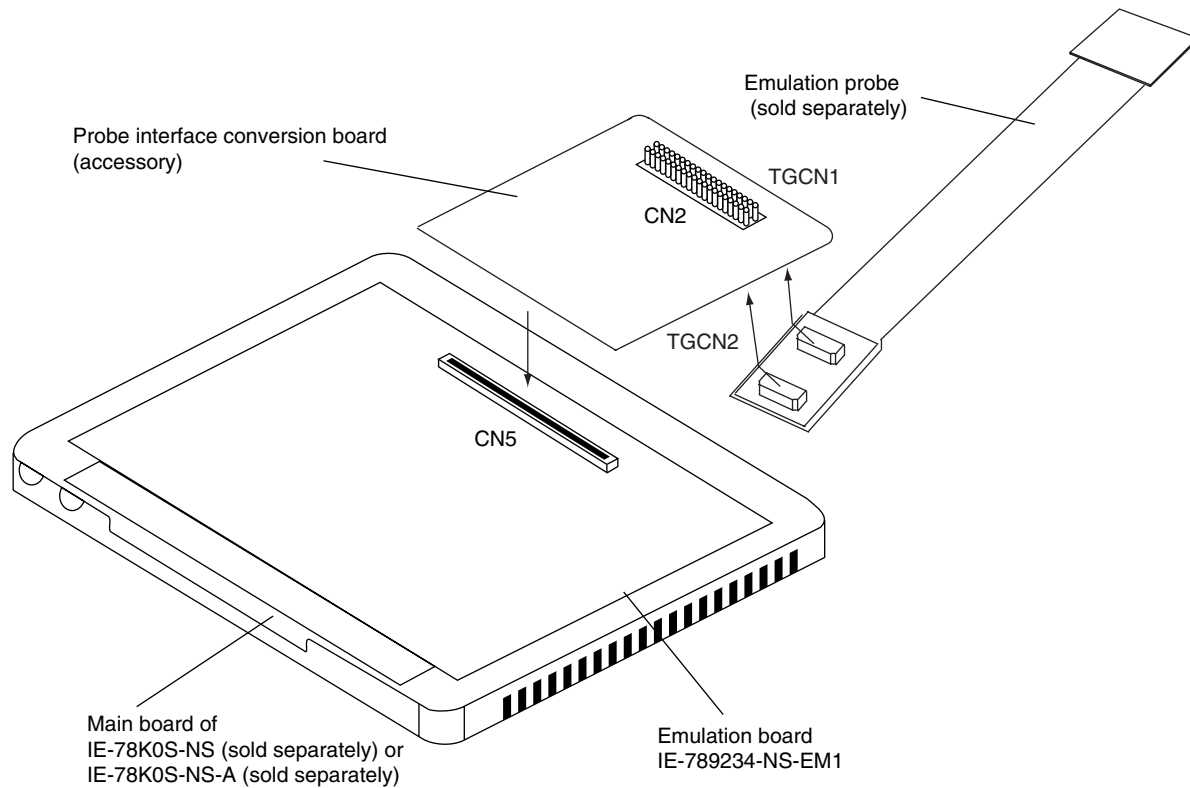
**Remark** The number in the parentheses indicates the pin number in the target device.

**(2) Connection with emulation probe (QB-80-EP-01T)**

Connect the QB-80-EP-01T to the probe connectors TGCN1 and TGCN2 of the probe interface conversion board (SIMPLE PROBE Board).

- <1> Connect CN5 of the IE-789234-NS-EM1 to CN1 of the SIMPLE PROBE Board.
- <2> Connect TGCN1 and TGCN2 of the SIMPLE PROBE Board to the emulation probe.

**Figure 3-3. Connection of QB-80-EP-01T and SIMPLE PROBE Board**



**Cautions 1. Incorrect connection may damage the IE system.**

2. Refer to **APPENDIX A EMULATION PROBE PIN ASSIGNMENT TABLE** for information on pin connections. For more details on connection, see the user's manual for each emulation probe.

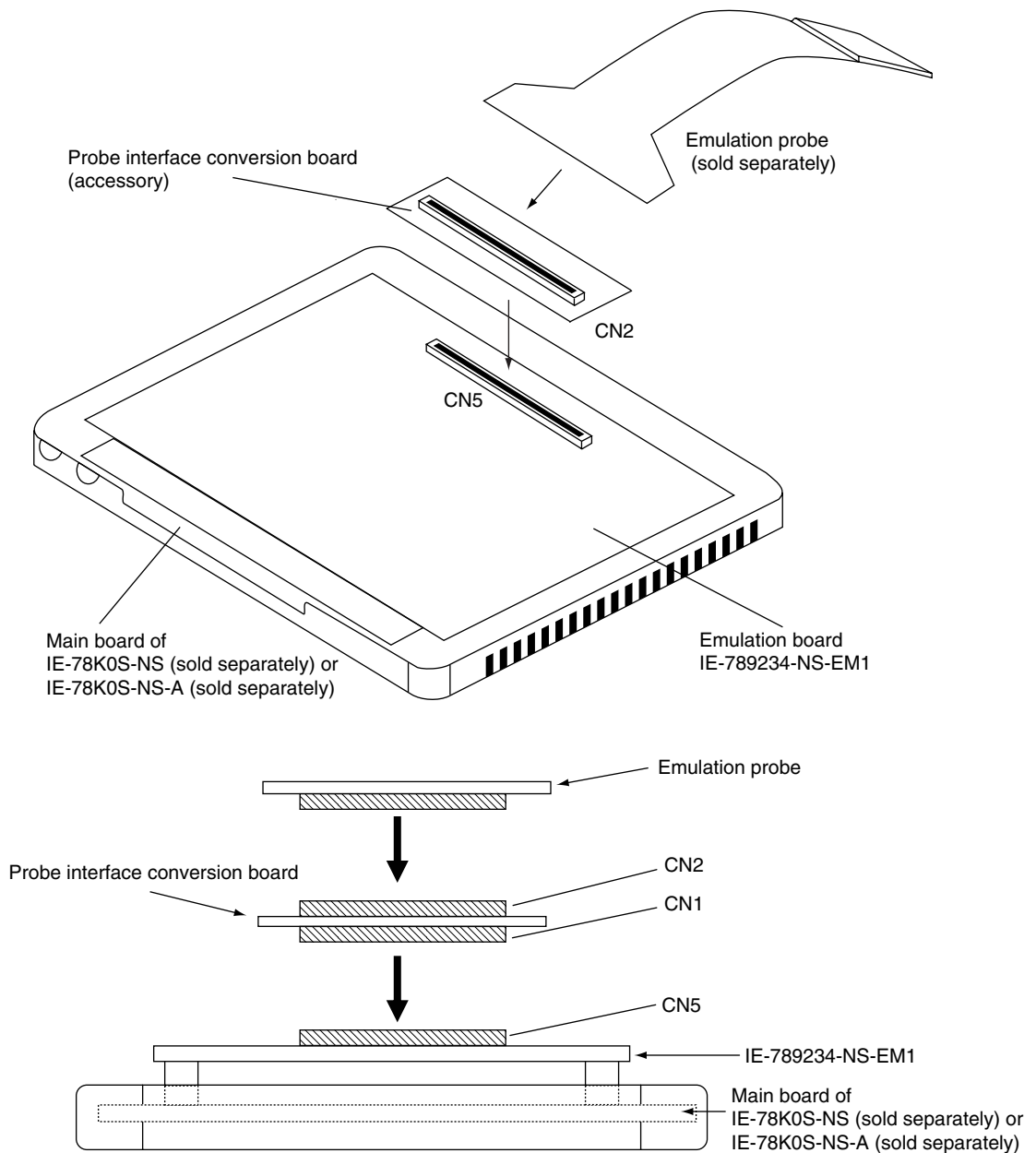
**(3) Connection with emulation probe (NP-30MC)**

Use the probe interface conversion board compatible with the target device.

- 78K0S/KA1+: 789222 PROBE Board
- 78K0S/KB1+: 789234 PROBE Board

- <1> Connect CN5 of the IE-789234-NS-EM1 to CN1 of the probe interface conversion board.
- <2> Connect CN2 of the probe interface conversion board to the emulation probe.

**Figure 3-4. Connection of NP-30MC and Probe Interface Conversion Board**



- Cautions**
1. Incorrect connection may damage the IE system.
  2. Refer to APPENDIX A EMULATION PROBE PIN ASSIGNMENT TABLE for information on pin connections. For more details on connection, see the user's manual for each emulation probe.

### 3.2 Switch and Jumper Settings on Main Unit

**(1) Settings on the IE-78K0S-NS**

When using the IE-789234-NS-EM1, set the switches and jumpers on the IE-78K0S-NS as shown in Table 3-3. For details on these switch and jumper settings, refer to the **IE-78K0S-NS User's Manual (U13549E)**.

**Caution** Incorrect jumper settings may damage the IE-789234-NS-EM1.

**Table 3-3. Switch and Jumper Settings on IE-78K0S-NS**

	SW1	SW3	SW4	JP1	JP4
Setting	OFF	All switches ON (fixed)	All switches ON (fixed)	2 and 3 shorted	1 and 2 shorted

**(2) Settings on the IE-78K0S-NS-A**

When using the IE-78K0S-NS-A, set the switches and jumpers on the IE-78K0S-NS-A as shown in Table 3-4. For details on these switch and jumper settings, refer to the **IE-78K0S-NS-A User's Manual (U15207E)**.

**Caution** Incorrect jumper settings may damage the IE-789234-NS-EM1.

**Table 3-4. Switch and Jumper Settings on IE-78K0S-NS-A**

	SW1	JP1	JP3
Setting	OFF	1 and 2 shorted	Shorted (fixed)



### 3.3 Setting Power Supply Voltage of Target Interface

In the IE system, emulation is possible with a voltage of the same level as the power supply voltage of the target system (2.0 to 5.5 V: same as the target device). When the target system is not connected ( $V_{DD}$ : 0 V), the IE system automatically operates with the emulator's internal power supply (5 V).

The  $V_{DD}$  pin of the target system is used to control LED1 (USERVDD), which monitors the connection of the target system power supply in the IE-789234-NS-EM1, and as the reference voltage for generating the target interface power supply voltage.

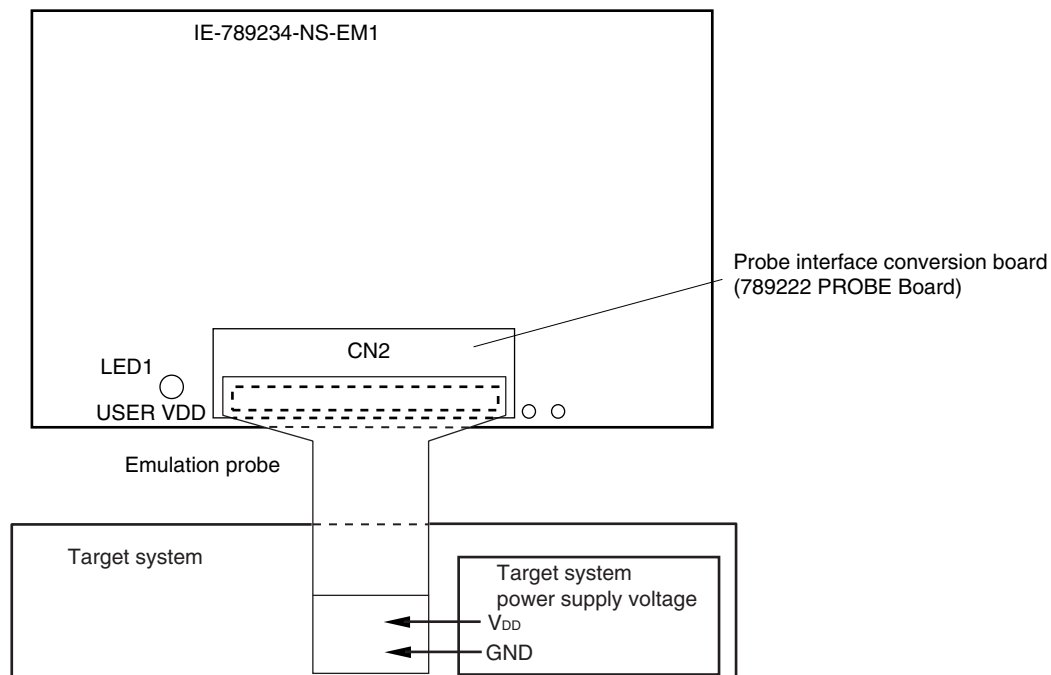
The setting of the target interface power supply voltage is shown in Table 3-5.

For how to select the operating power supply, refer to the **ID78K0S-NS Ver. 2.52 Integrated Debugger Operation User's Manual (U16584E)**.

**Table 3-5. Setting Power Supply of Target Interface**

Power Supply of Target Interface		Integrated Debugger (ID78K0S-NS)
		Operating Power Supply Selection
When the power supply of the target system is used	2.0 to 5.5 V	Target
When the power supply in the IE system is used	5 V	Internal

**Figure 3-5. Connection of Target System Power Supply Voltage**



**Caution** Before connecting or disconnecting the target system, turn off the power to the IE system and the target system.

### 3.4 Clock Settings

#### 3.4.1 Overview of clock settings

The system clock to be used during debugging can be selected from (1) to (4) below.

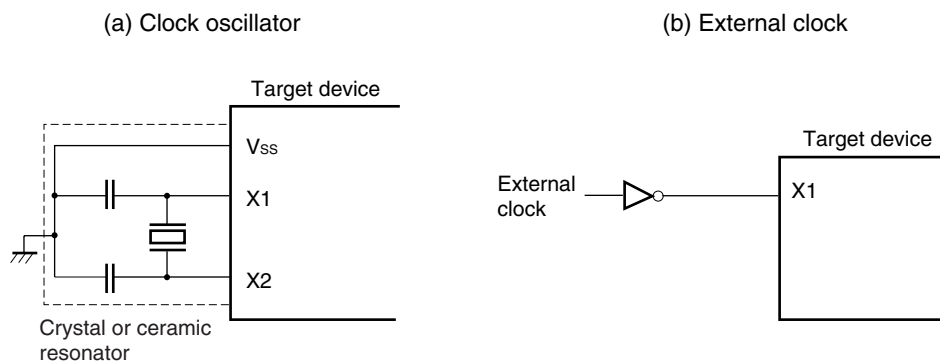
- (1) Clock that is already mounted on emulation board
- (2) Clock that is mounted by user
- (3) Clock input from target system
- (4) High-speed internal oscillation clock

If the target system includes a clock oscillator, select either **(1) Clock that is already mounted on emulation board**, **(2) Clock that is mounted by user**, or **(4) High-speed internal oscillation clock**. For the clock oscillator, a resonator is connected to the target device and the target device's internal oscillator is used. An example of the external circuit is shown in part (a) of Figure 3-6. During emulation, the oscillator that is mounted on the target system is not used. Instead, the clock that is mounted on the emulation board installed in the IE-78K0S-NS or IE-78K0S-NS-A is used.

If the target system includes an external clock, select either **(1) Clock that is already mounted on emulation board**, **(2) Clock that is mounted by user**, **(3) Clock input from target system**, or **(4) High-speed internal oscillation clock**. For the external clock, a clock signal is supplied from outside of the target device and the target device's internal oscillator is not used. An example of the external circuit is shown in part (b) of Figure 3-6.

**Caution** The IE system will hang up if the system clock is not supplied normally. Moreover, be sure to input a rectangular wave as the clock from the target system. There is no need to supply a clock to the X2 pin. Also, even if a crystal resonator is connected directly to the X1 pin, the target device will not operate.

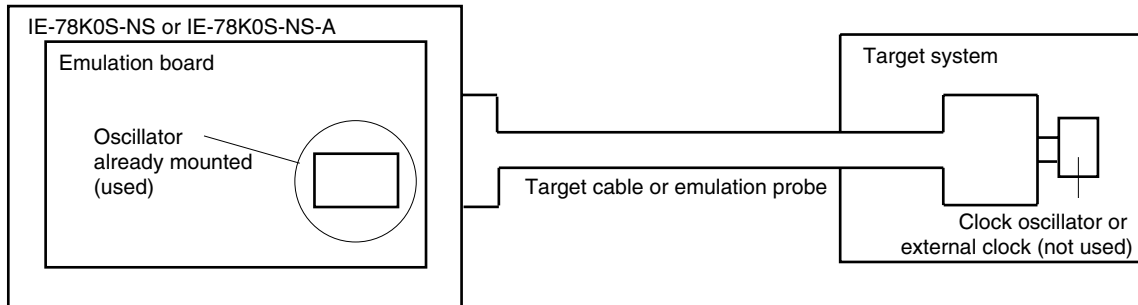
Figure 3-6. External Circuits Used as System Clock Oscillator



**(1) Clock that is already mounted on emulation board**

The crystal oscillator mounted on the IE-789234-NS-EM1 can be used.  
 A 10.0 MHz crystal oscillator (OSC1) is already mounted on the emulation board.

**Figure 3-7. When Using Clock That Is Already Mounted on Emulation Board**

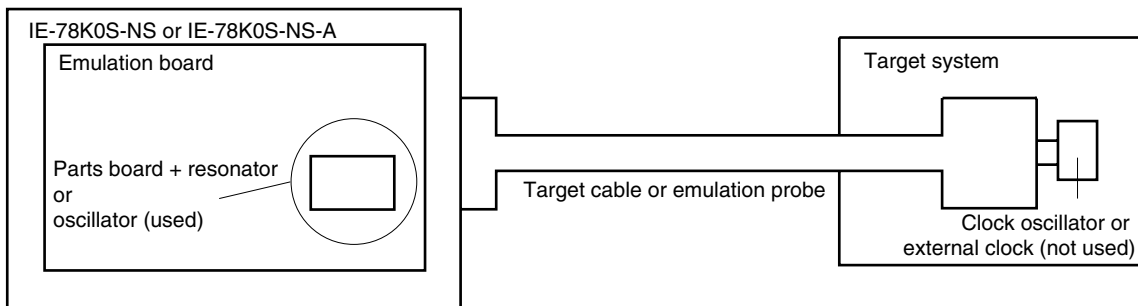


**Remark** The clock that is supplied by the oscillator of the IE-789234-NS-EM1 (encircled in the figure) is used.

**(2) Clock that is mounted by user**

The user can mount any clock supported by the set specifications on the IE-789234-NS-EM1. This feature is effective when debugging at a different frequency from that of the clock already mounted.  
 Remove the crystal oscillator (OSC1) that is already mounted on the emulation board, and mount the resonator to be used.

**Figure 3-8. When Using User-Mounted Clock**

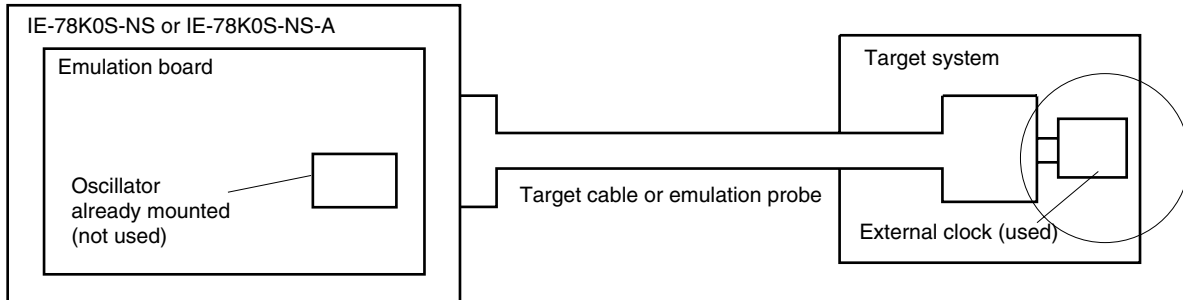


**Remark** The clock that is supplied by the resonator on the parts board or the oscillator of the IE-789234-NS-EM1 (encircled in the figure) is used.

**(3) Clock input from target system**

An external clock on the target system can be used as the system clock via the target cable or an emulation probe.

**Figure 3-9. When Supplying Clock Input from Target System**

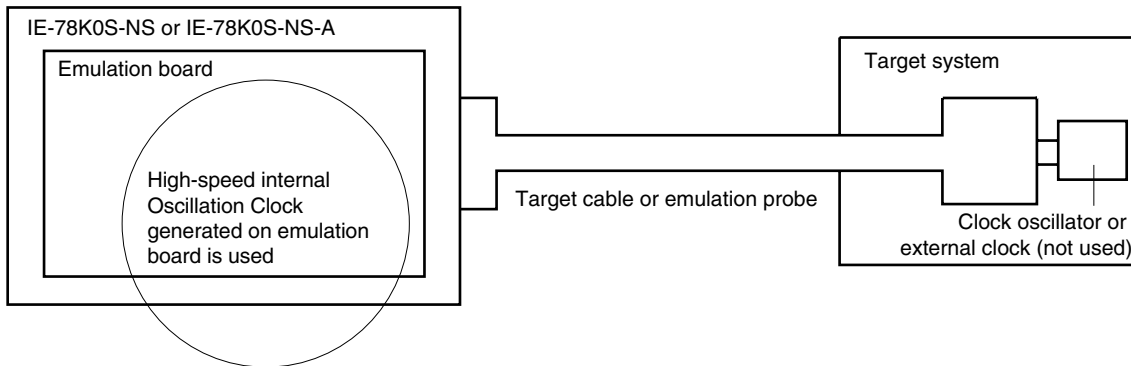


**Remark** The pulse that is supplied by the external clock on the target system (encircled in the figure) is used.

**(4) When using high-speed internal oscillation clock**

The high-speed internal oscillation clock generated on the IE-789234-NS-EM1 can be used.

**Figure 3-10. When Using High-Speed Internal Oscillation Clock**



**Remark** The clock that is supplied by the oscillator for the high-speed internal oscillation clock on the IE-789234-NS-EM1 (encircled in the figure) is used.

**3.4.2 System clock settings**

The settings of the system clock are shown in Table 3-6.

**Table 3-6. System Clock Settings**

System Clock and Frequency to Be Used		SW3 Setting (Option Byte)		CPU Clock Source Selection (ID78K0S-NS)	Alternate Function of X1 and X2
		SW3-3 (OSCSEL1)	SW3-2 (OSCSEL0)		
(1) When using clock that is already mounted on emulation board	10 MHz	0	0	Internal	X1: Used as X1 X2: Used as X2
(2) When using clock mounted by user	Other than 10 MHz			External	
(3) When inputting clock from target system					
(1) When using clock that is already mounted on emulation board	10 MHz	0	1	Internal	X1: Used as X1 X2: Can be used as port
(2) When using clock mounted by user	Other than 10 MHz			External	
(3) When inputting clock from target system					
(4) When using high-speed internal oscillation clock	8 MHz	1	x	Internal	X1: Can be used as port X2: Can be used as port

x: don't care

- Cautions**
- 1. Select the source clock for the system clock when the debugger is started. After that, do not change the setting.**
  - 2. When using the external clock, open the configuration dialog box when starting the integrated debugger (ID78K0S-NS) and select "External" in the area (Clock) for selecting the CPU clock source (this selects the user's clock).**
  - 3. Emulation by using the RC oscillator cannot be performed.**

**(1) When using clock that is already mounted on emulation board**

When the IE-789234-NS-EM1 is shipped, a 10.0 MHz crystal oscillator is already mounted in the IE-789234-NS-EM1's OSC1 socket.

Set SW3 as shown follows in accordance with the option byte setting.

SW3-2: 0, SW3-3: 0 or SW3-2: 1, SW3-0: 0

**Remark** OSCSEL0 corresponds to SW3-2, and OSCSEL1 to SW3-3.

When starting the integrated debugger (ID78K0S-NS), open the configuration dialog box and select "Internal" in the area (Clock) for selecting the CPU clock source (this selects the emulator's internal clock).

**(2) When using clock mounted by user**

Remove the crystal oscillator already mounted on the emulation board (OSC1: 10.0 MHz) and mount the parts board (oscillator) that includes the oscillator or resonator to be used.  
Set SW3 as shown follows in accordance with the option byte setting.

SW3-2: 0, SW3-3: 0 or SW3-2: 1, SW3-0: 0

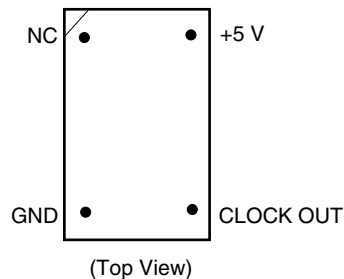
**Remark** OSCSEL0 corresponds to SW3-2, and OSCSEL1 to SW3-3.

Perform the settings described under either (a) or (b) according to the type of clock to be used.  
When starting the integrated debugger (ID78K0S-NS), open the configuration dialog box and select "Internal" in the area (Clock) for selecting the CPU clock source (this selects the emulator's internal clock).

**(a) When using a crystal oscillator**

- Items to be prepared
  - Crystal oscillator (with pinouts shown in Figure 3-11, +5 V power supply voltage, and CMOS-level output level)

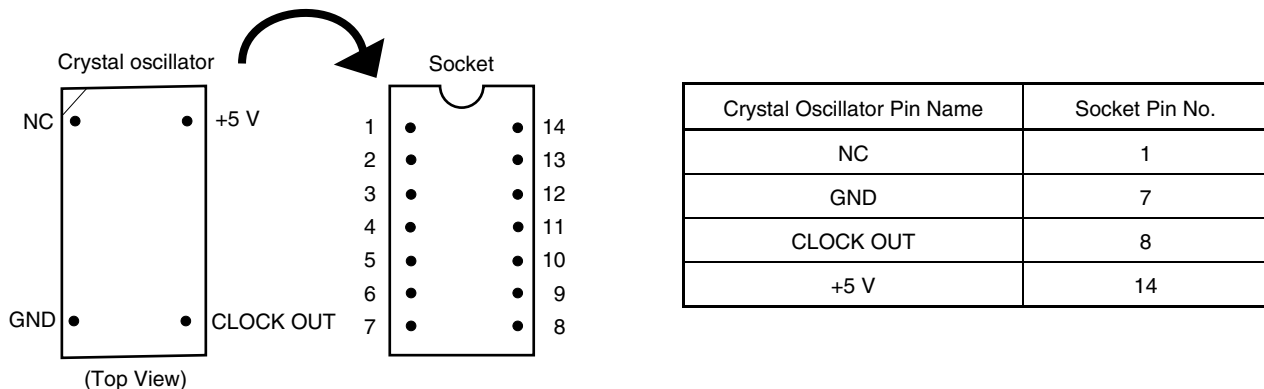
**Figure 3-11. Crystal Oscillator**



<Steps>

- <1> Prepare the IE-789234-NS-EM1.
- <2> Remove the crystal oscillator that is mounted in the IE-789234-NS-EM1's OSC1 socket.
- <3> Mount a crystal oscillator in the OSC1 socket from which the crystal oscillator was removed (in <2> above). Insert the pins of the crystal oscillator into the socket aligning the pins as shown in Figure 3-12.

**Figure 3-12. Pin Alignment of Crystal Oscillator and Socket**



- <4> Install the IE-789234-NS-EM1 in the IE-78K0S-NS or IE-78K0S-NS-A.

(b) When using a ceramic resonator or crystal resonator

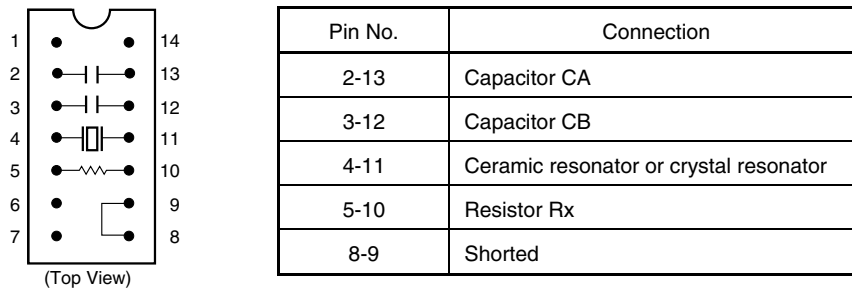
- Items to be prepared
  - Parts board
  - Ceramic resonator or crystal resonator
  - Resistor Rx
- Capacitor CA
- Capacitor CB
- Solder kit

<Steps>

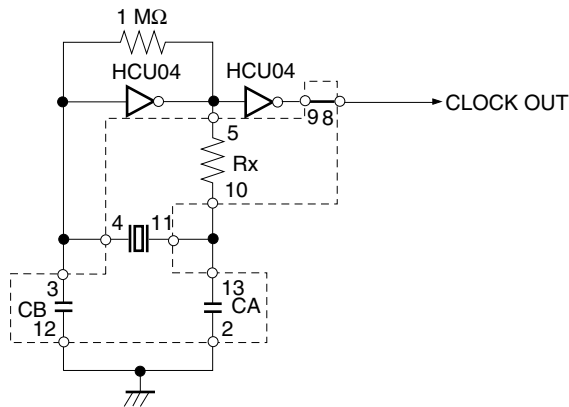
- <1> Solder the target ceramic resonator or crystal resonator, resistor Rx, capacitor CA, and capacitor CB (all with suitable oscillation frequencies) onto the parts board as shown below.

Figure 3-13. Connections on Parts Board

Parts board (OSC1)



Circuit diagram



- Remarks**
1. The sections enclosed in broken lines indicate the parts that are attached to the parts board.
  2. Refer to the data sheet of the resonator used (data sheet provided by the manufacturer) for the resistance of Rx and capacitance of CA and CB.

- <2> Prepare the IE-789234-NS-EM1.
- <3> Remove the crystal oscillator that is mounted in the IE-789234-NS-EM1's OSC1 socket.
- <4> Connect the parts board (from <1> above) to the OSC1 socket from which the crystal oscillator was removed (in <3> above). Check the pin 1 mark to make sure the parts board is mounted in the correct direction.
- <5> Make sure that the parts board is wired as shown in Figure 3-13 above.
- <6> Install the IE-789234-NS-EM1 in the IE-78K0S-NS or IE-78K0S-NS-A.

**(3) When inputting clock from target system**

Set SW3 as shown follows in accordance with the option byte setting.

SW3-2: 0, SW3-3: 0 or SW3-2: 1, SW3-3: 0

**Remark** OSCSEL0 corresponds to SW3-2, and OSCSEL1 to SW3-3.

When starting the integrated debugger (ID78K0S-NS), open the configuration dialog box and select "External" in the area (Clock) for selecting the CPU clock source (this selects the user's clock).

**(4) When using high-speed internal oscillation clock**

Set SW3 as shown follows in accordance with the option byte setting. The IE-789234-NS-EM1 uses an 8 MHz oscillator (OSC2) for generating the internal high-speed oscillation clock.

SW3-3: 1

**Remarks** 1. OSCSEL0 corresponds to SW3-2, and OSCSEL1 to SW3-3.  
2. SW3-2 can be set to 0 or 1.

When starting the integrated debugger (ID78K0S-NS), open the configuration dialog box and select "Internal" in the area (Clock) for selecting the CPU clock source.



### 3.5 External Trigger

To set an external trigger, connect to the IE-789234-NS-EM1's check pins EXTOUT and EXTIN as shown below.

Refer to the **IE-78K0S-NS User's Manual (U13549E)** or **IE-78K0S-NS-A User's Manual (U15207E)** for pin characteristics.

For the use methods, refer to the **ID78K0S-NS Ver. 2.52 Integrated Debugger Operation User's Manual (U16584E)**.

#### (1) EXTOUT

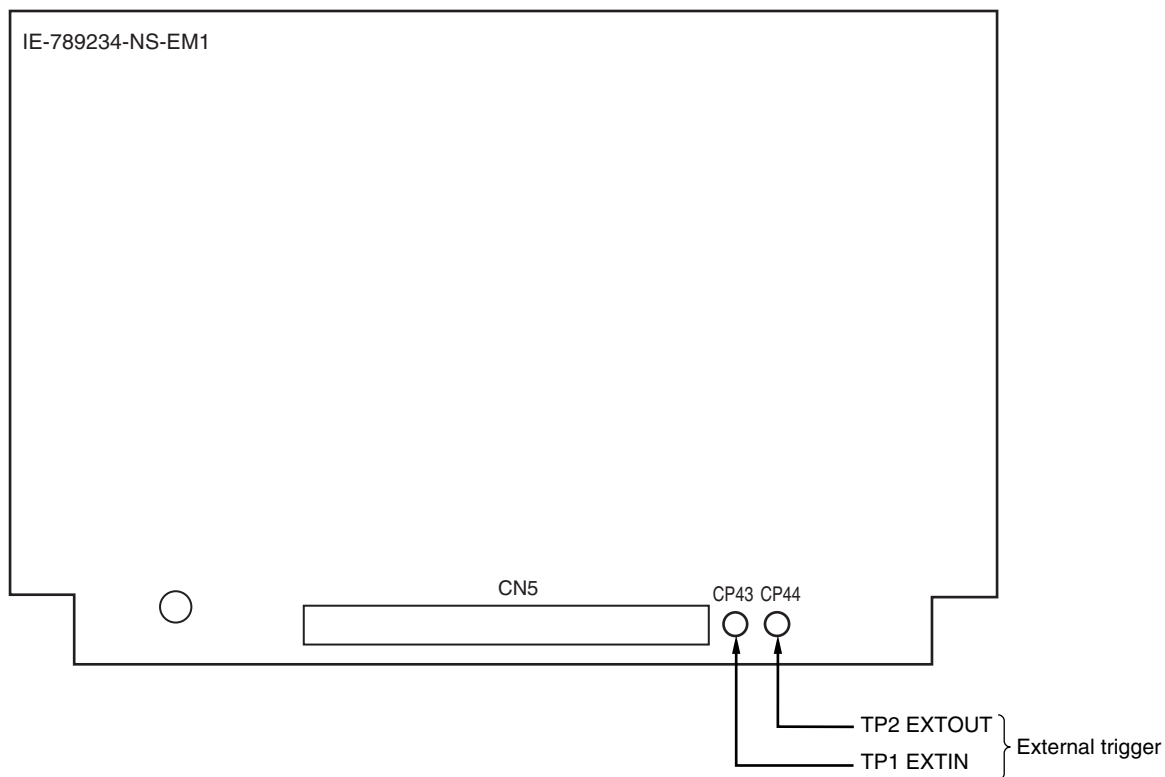
The EXTOUT pin on the IE-789234-NS-EM1 outputs a low level for 1.3  $\mu$ s when a break event occurs.

**Caution** Connect a pull-up resistor on the target system because this is an open drain output.

#### (2) EXTIN

An event signal can be input from the EXTIN pin on the IE-789234-NS-EM1. Input a high-level pulse signal for 2 CPU operation clocks or more.

**Figure 3-14. External Trigger Input Position**



### 3.6 Switch for Clearing Reset Flag

A switch SW4 to clear the reset flag is mounted on the IE-789234-NS-EM1 board.

Bit 0 (LVIRF) and bit 4 (WDTRF) of the reset control flag register can be cleared by pressing this switch.

At this time, a CPU reset may occur.

- (1) When program has been stopped  
Bit 0 (LVIRF) and bit 4 (WDTRF) are cleared.
- (2) When the reset mask is enabled in the Configuration dialog box of the debugger then the program is executed  
Bit 0 (LVIRF) and bit 4 (WDTRF) are cleared.
- (3) When the reset mask is disabled in the Configuration dialog box of the debugger then the program is executed  
Bit 0 (LVIRF) and bit 4 (WDTRF) are cleared and the CPU is reset.

LVIRF: internal reset request by the low-voltage detector (LVI)

WDTRF: internal reset request by the watchdog timer (WDT)

### 3.7 Emulation of POC and LVI Functions

LED2 is used to check the internal reset status.

LED2 blinks during the resets shown below.

- Internal reset by comparing the power supply voltage and detection voltage of the power-on-clear (POC) circuit
- Internal reset by comparing the power supply voltage and detection voltage of the low-voltage detector (LVI)

**Caution** Do not perform a break when LED2 is blinking; otherwise, the integrated debugger will hang up (applies to all breaks).

**Re-set the power supply voltage to a voltage higher than the detection voltage before performing a break.**

### 3.8 Option Byte Settings

The option byte provided in the IE-789234-NS-EM1 has the following functions.

- Setting of low-speed internal oscillator clock oscillation
- Selection of system clock source
- $\overline{\text{RESET}}$  pin control
- Setting of oscillation stabilization time for when power is applied or reset is input

The option byte can be set using SW3.

#### Format of Option Byte

Bit	7	6	5	4	3	2	1	0
Target device	1	DEFOSTS1	DEFOSTS0	1	RMCE	OSCSEL1	OSCSEL0	LIOCP
IE-789234-NS-EM1	–	SW3-7	SW3-6	–	SW3-4	SW3-3	SW3-2	SW3-1

- Setting of low-speed internal oscillator clock oscillation

**Table 3-7. Setting of Low-Speed Internal Oscillator Clock Oscillation**

SW3-1 Setting	LIOCP	Low-Speed Internal Oscillator Clock Oscillation
1 side	1	Cannot be stopped
0 side	0	Can be stopped by software

- Selection of system clock source

**Table 3-8. Selection of System Clock Source**

SW3-3 Setting	SW3-2 Setting	OSCSEL1	OSCSEL0	Selection of System Clock Source
0 side	0 side	0	0	Crystal/ceramic oscillation clock
0 side	1 side	0	1	External clock input (only X1 pin is used)
1 side	0 side	1	x	High-speed internal oscillation clock

x: don't care

- $\overline{\text{RESET}}$  pin control

**Table 3-9.  $\overline{\text{RESET}}$  Pin Control**

SW3-4 Setting	RMCE	$\overline{\text{RESET}}$ Pin Control
1 side	1	Used as $\overline{\text{RESET}}$ pin
0 side	0	Use $\overline{\text{RESET}}$ pin as dedicated input port (P34)

Operations related to reset control flag register and external reset input

- When P34/ $\overline{\text{RESET}}$  is used as P34:  
The reset control flag register can only be cleared by using SW4.
- When P34/ $\overline{\text{RESET}}$  is used as  $\overline{\text{RESET}}$  pin:
  - (1) When the reset mask is disabled in the Configuration dialog box of the debugger then the program is executed, the reset control flag register is cleared and the CPU is reset by inputting an external reset.
  - (2) When the reset mask is enabled in the Configuration dialog box of the debugger then the program is executed, the reset control flag register is cleared by inputting an external reset.
  - (3) When an external reset is input while the program has stopped, the reset control flag register is cleared.
  - (4) When masking the pins for external reset input:
    - <1> Set SW3-4 to the 0 side, i.e. to "Use  $\overline{\text{RESET}}$  pin as dedicated input port (P34)".
    - <2> Execute the program by enabling the reset mask in the Configuration dialog box of the integrated debugger.

- Setting of oscillation stabilization time for when power is applied or reset is input

**Table 3-10. Setting of Oscillation Stabilization Time**

SW3-7 Setting	SW3-6 Setting	DEFOSTS1	DEFOSTS0	Setting of Oscillation Stabilization Time for When Power Is Applied or Reset Is Input
0 side	0 side	0	0	$2^{10}/f_x$ (102.4 $\mu\text{s}$ )
0 side	1 side	0	1	$2^{12}/f_x$ (409.6 $\mu\text{s}$ )
1 side	0 side	1	0	$2^{15}/f_x$ (3.27 ms)
1 side	1 side	1	1	$2^{17}/f_x$ (13.1 ms)

**Caution** This option is valid only when a clock other than high-speed internal oscillation clock is selected as the system clock source. When a high-speed internal oscillation clock is selected, it is not necessary to insert wait time.

## CHAPTER 4 DIFFERENCES BETWEEN TARGET DEVICE AND TARGET INTERFACE CIRCUIT

This chapter describes differences between the target device's signal lines and the signal lines of the target interface circuit of the IE system.

The target device consists of CMOS circuits, whereas the IE-789234-NS-EM1's target interface circuit consists of emulation circuits such as the emulation CPU, TTL, and CMOS-IC.

At the time of debugging by connecting the IE system and the target system, the IE system performs the emulation as if the actual target device is operating on the target system, however, in reality, it is the IE system that performs the emulation, thus producing slight differences.

- (1) Signals directly input to or output from the emulation CPU
- (2) Signals input from the target system via a gate
- (3) Other signals

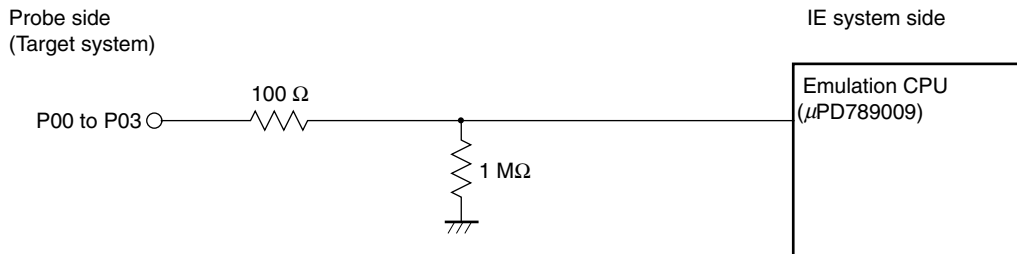
The circuits of the IE-789234-NS-EM1 are used as follows for signals listed in (1) to (3) above. The same applies to connection of alternate-function pins, for which no circuit is provided in the IE system.

(1) Signals directly input to or output from the emulation CPU

Refer to **Figure 4-1 Emulation Circuit Equivalent Circuit 1**.

- Signals related to port 0

**Figure 4-1. Emulation Circuit Equivalent Circuit 1**



(2) Signals input from the target system via a gate

Refer to **Figure 4-2 Emulation Circuit Equivalent Circuit 2** and **Figure 4-3 Emulation Circuit Equivalent Circuit 3**.

- Signals related to port 2
- Signals related to port 3
- Signals related to port 4
- Signals related to port 12
- Signals related to port 13

**Figure 4-2. Emulation Circuit Equivalent Circuit 2**

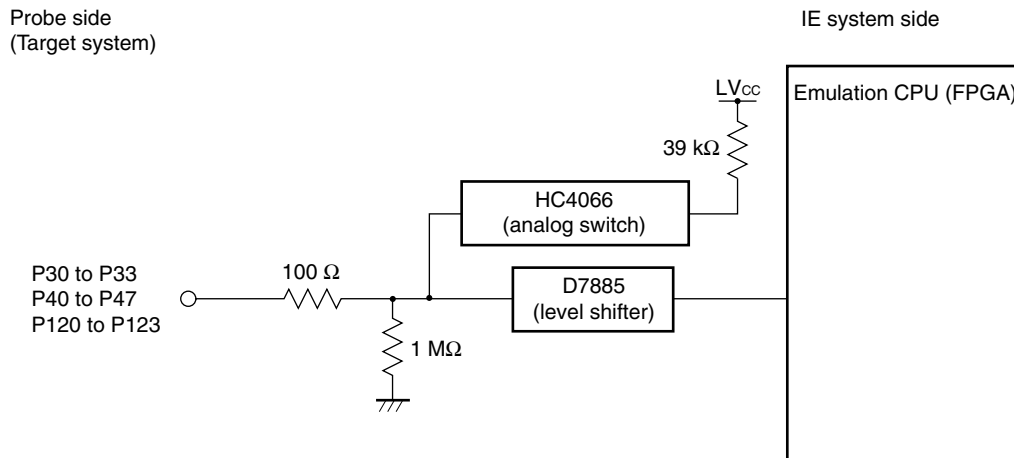
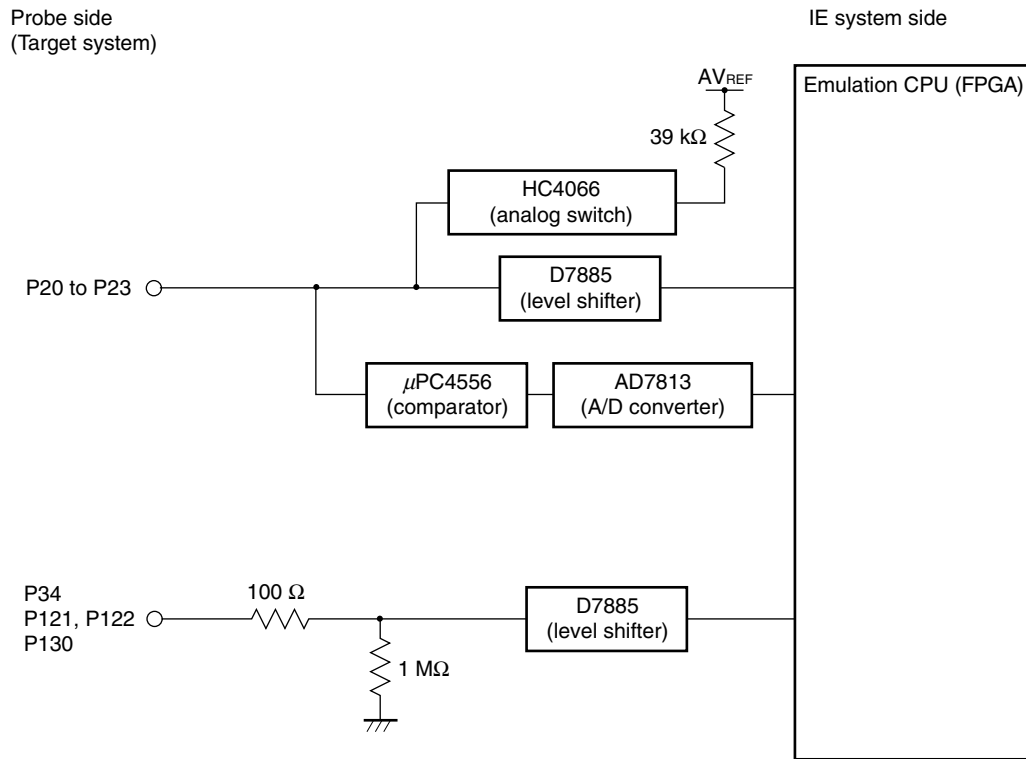


Figure 4-3. Emulation Circuit Equivalent Circuit 3

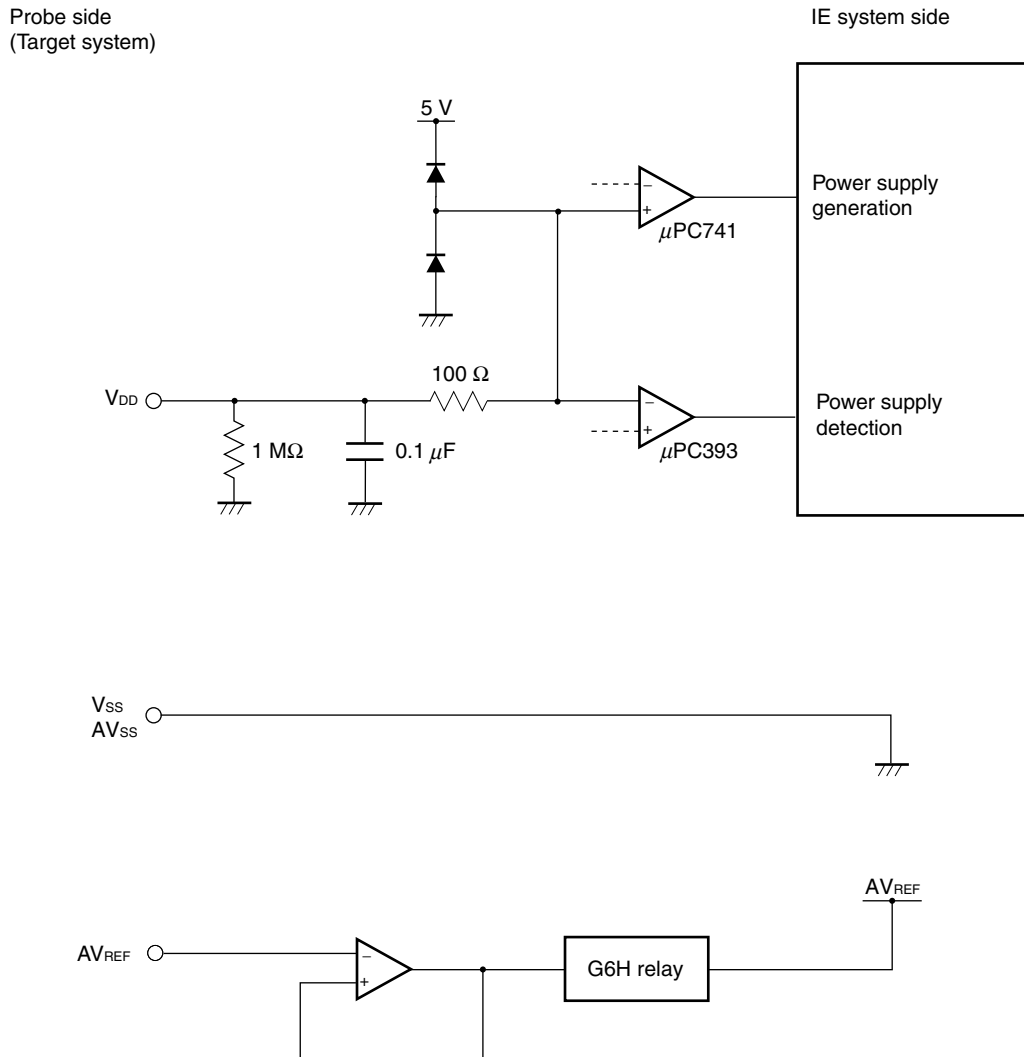


(3) Other signals

Refer to **Figure 4-4 Emulation Circuit Equivalent Circuit 4.**

- $V_{DD}$
- $V_{SS}$
- $AV_{REF}$
- $AV_{SS}$

**Figure 4-4. Emulation Circuit Equivalent Circuit 4**





## CHAPTER 5 USAGE RESTRICTIONS

This chapter describes the restrictions when using the IE-789234-NS-EM1.

- (1) Since the IE-789234-NS-EM1 sets the option byte using SW3, the value set to address 80H is not reflected.
- (2) Some bits of the port register are fixed to 0 in the target device, but some of them can be overwritten by program. However, writing is not possible on the SFR window.
- (3) A/D conversion can be started without waiting for 1  $\mu$ s or longer even if bit 0 (ADCE) of the A/D converter mode register (ADM) is set to 1.
- (4) Bit 4 (WDTRF) and bit 0 (LVIRF) of the reset control flag register (RESF) cannot be initialized by the reset button of the debugger or reset button (SW2) of the IE-78K0S-NS and IE-78K0S-NS-A. Input a reset from the target side, re-apply power to the emulator, or press SW4 on the IE-789234-NS-EM1.
- (5) The IE-789234-NS-EM1 does not support the self-programming function of the flash memory. The value set to address 81H (protect byte) is not reflected.
- (6) When HALT mode is released by an interrupt, the program is restored two or three clocks earlier than the target device.
- (7) Low-voltage detection level  
An error of several mV occurs in the IE-789234-NS-EM1 compared to the target device.
- (8) A/D converter characteristics  
The characteristics of the A/D converter of the IE-789234-NS-EM1 differ from those of the target device because a probe is connected between the IE-789234-NS-EM1 and the target system.
- (9) 8-bit timer H1  
When the low-speed internal oscillation clock is selected as the 8-bit timer count clock, the timer does not stop while the program is stopped even if "Break" is selected for "Peripheral Break" in the Configuration dialog box of the debugger.
- (10)  $\overline{\text{RESET}}$  pin  
Since the  $\overline{\text{RESET}}$  pin alternately functions as P34, it is connected to a protective resistor (pull-down resistor) inside the emulator. Consequently, the  $\overline{\text{RESET}}$  pin is always at low level.  
In initial setting of integrated debugger, a reset does not occur because "Mask: RESET" is set in the Configuration dialog box. But if the "Mask: RESET" setting is cancelled, a reset is always applied, which causes the debugger to hang up.  
When inputting an external reset from the  $\overline{\text{RESET}}$  pin, first pull the  $\overline{\text{RESET}}$  pin up and cancel the "Mask: RESET" setting in the Configuration dialog box.

(11) Caution on connecting emulation probe

When using IE-789234-NS-EM1 control code B or later, do not connect the emulation probe directly to probe connector CN5. Refer to the user's manual included with a control code B or later product or the latest user's manual for the probe interface conversion board corresponding to the target device and connect the emulation probe via this board.

Target Device	Probe Interface Conversion Board	Emulation Probe
78K0S/KA1+: $\mu$ PD78F9221, 78F9222	789222 PROBE Board	NP-30MC
78K0S/KB1+: $\mu$ PD78F9232, 78F9234	789234 PROBE Board	

(12) Caution on device file version

Use the combinations that satisfy the table below.

The device file can be downloaded from the NEC Electronics Microcontrollers and Microprocessors website. The 78K0S/KU1+ devices with DF789234 V3.10 or later ( $\mu$ PD78F9500, 78F9501, and 78F9502) are not supported with the IE-789234-NS-EM1. When a 78K0S/KU1+ device ( $\mu$ PD78F9500, 78F9501, or 78F9502) is selected as the target device, the message "A0105 Failed in reading device file (d0xxx.78k)." appears and the debugger does not start.

URL: <http://www.necel.com/micro/ods/eng/index.html> → Version-up Service

Target Device	Control Code	Device File
78K0S/KA1+: $\mu$ PD78F9221, 78F9222	A	DF789222 V1.10
	B or later	DF789222 V2.00 or DF789234 V2.00 or later
78K0S/KU1+: $\mu$ PD78F9200, 78F9201, 78F9202	B or later	DF789234 V2.11 or later
78K0S/KU1+: $\mu$ PD78F9500, 78F9501, 78F9502	Not supported	DF789234 V3.10 or later

(13) Target interface circuit specification

The target interface circuit of the IE-789234-NS-EM1 does not use Schmitt-triggered I/O with hysteresis characteristics. Note that the I/O characteristics of the IE-789234-NS-EM1 differ from those of the target device.

(14) Internal oscillator specification

The IE-789234-NS-EM1 uses an 8 MHz oscillator (OSC2) for generating the internal high-speed oscillation clock. As the internal low-speed oscillation clock, the IE-789234-NS-EM1 uses a 240 kHz clock, which is created by dividing the clock generated from a 19.2 MHz oscillator (OSC3) by eight. Note that the clock characteristics of the IE-789234-NS-EM1 differ from those of the target device.

## APPENDIX A EMULATION PROBE PIN ASSIGNMENT TABLE

**Table A-1. QB-80-EP-01T Pin Assignments**

Emulation Probe Device Side	SIMPLE PROBE Board CN2
1	27
2	25
3	23
4	21
5	19
6	12
7	11
8	15
9	17
10	39
11	37
12	35
13	33
14	31
15	22
16	24
17	26
18	28
19	30
20	32
21	34
22	36
23	29
24	9
25	7
26	5
27	3
28	1
29	2
30	13

- Remarks**
1. The numbers in the Emulation Probe Device Side column refer to the pin number of the target system.
  2. The numbers in the SIMPLE PROBE Board CN2 column refer to the probe interface conversion board (IE-789234-NS-EM1) pin.

Table A-2. NP-30MC Pin Assignments (Target Device: 78K0S/KA1+)

Emulation Probe Device Side	789222 PROBE Board CN2
1	49
2	55
3	19
4	18
5	22
6	62
7	65
8	66
9	92
10	91
11	70
12	69
13	72
14	102
15	71
16	94
17	93
18	30
19	29
20	24

- Remarks**
1. NP-30MC is a product of Naito Densai Machida Mfg. Co., Ltd.
  2. The numbers in the “Emulation Probe” column indicate the corresponding pin number on the emulation probe tip.
  3. The numbers in the 789222 PROBE Board CN2 column refer to the probe interface conversion board (IE-789234-NS-EM1) pin to be connected to the emulation probe.

Table A-3. NP-30MC Pin Assignments (Target Device: 78K0S/KB1+)

Emulation Probe Device Side	789234 PROBE Board CN2
1	58
2	56
3	49
4	55
5	19
6	18
7	22
8	62
9	65
10	66
11	92
12	91
13	98
14	97
15	21
16	99
17	63
18	64
19	70
20	69
21	72
22	102
23	71
24	94
25	93
26	30
27	29
28	24
29	23
30	20

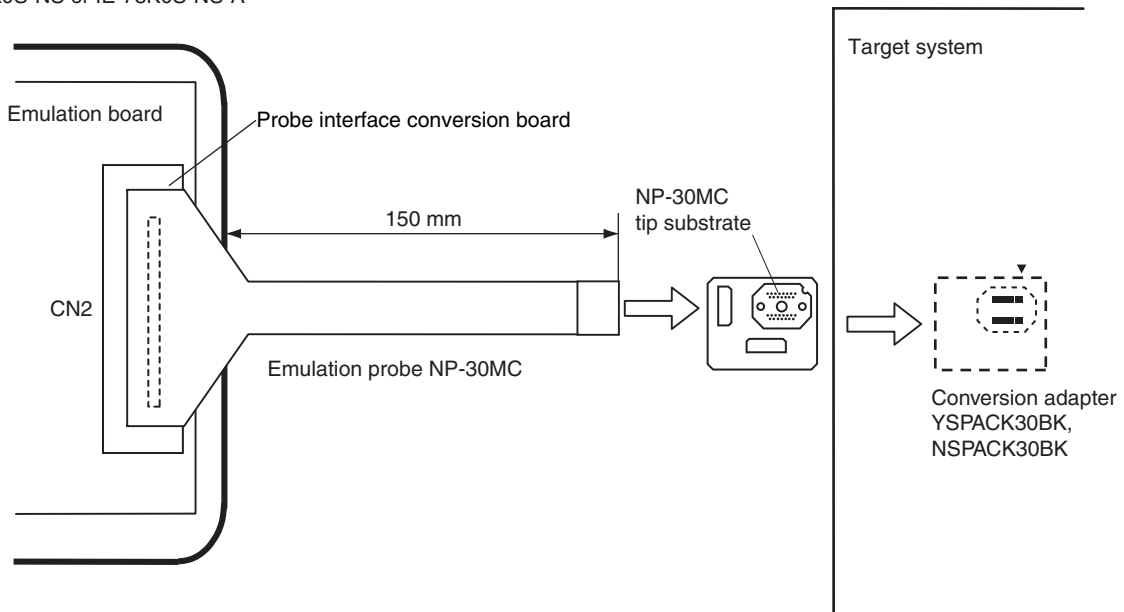
- Remarks**
1. NP-30MC is a product of Naito Densai Machida Mfg. Co., Ltd.
  2. The numbers in the "Emulation Probe" column indicate the corresponding pin number on the emulation probe tip.
  3. The numbers in the 789234 PROBE Board CN2 column refer to the probe interface conversion board (IE-789234-NS-EM1) pin to be connected to the emulation probe.

## APPENDIX B NOTES ON TARGET SYSTEM DESIGN

The following shows the conditions when connecting the emulation probe to the conversion adapter. Follow the configuration below and consider the shape of parts to be mounted on the target system when designing a system.

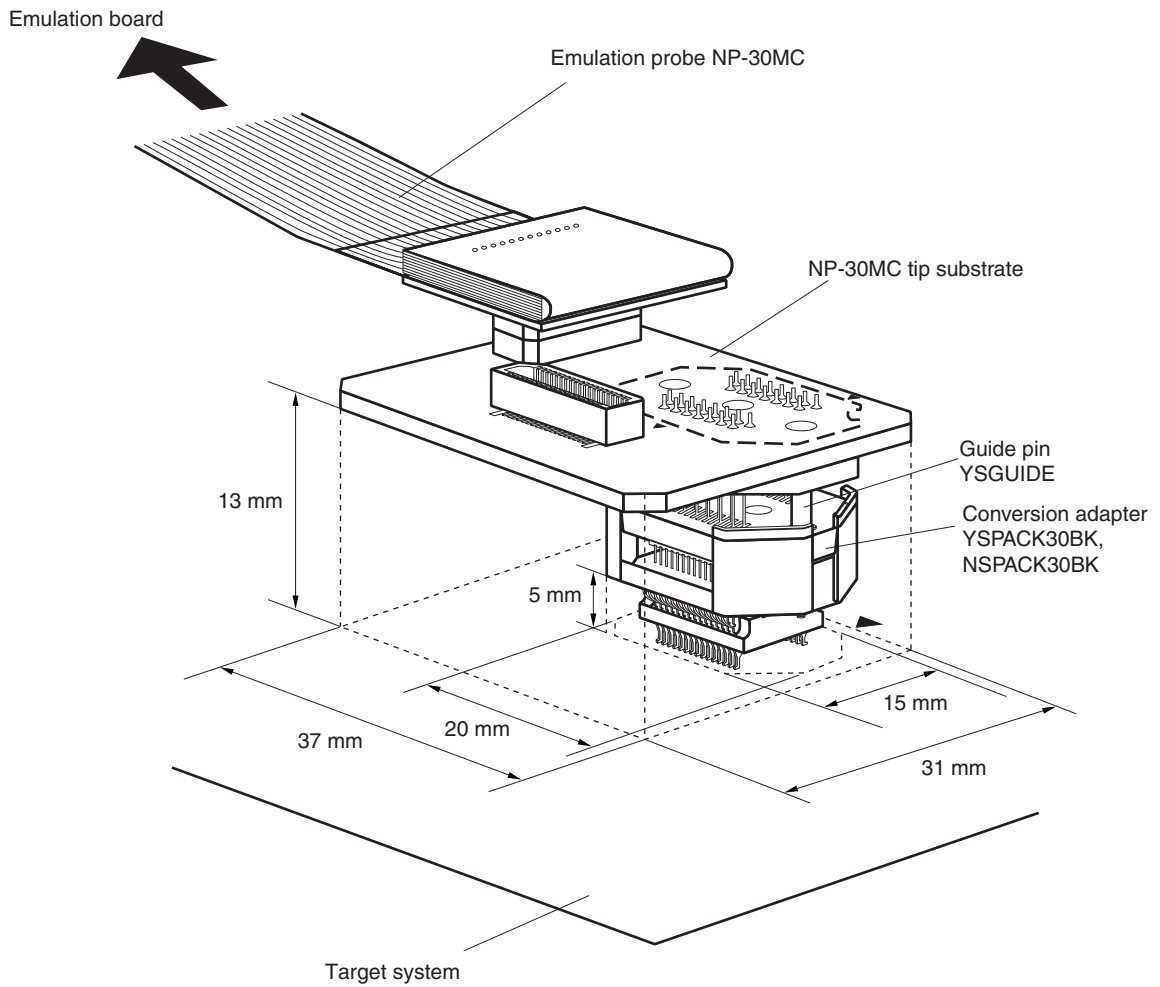
**Figure B-1. Distance Between In-Circuit Emulator and Conversion Adapter (When Using NP-30MC)**

In-circuit emulator  
IE-78K0S-NS or IE-78K0S-NS-A



**Remark** NP-30MC is a product of Naito Densai Machida Mfg. Co., Ltd.  
YSPACK30BK and NSPACK30BK are products of TOKYO ELETECH CORPORATION.

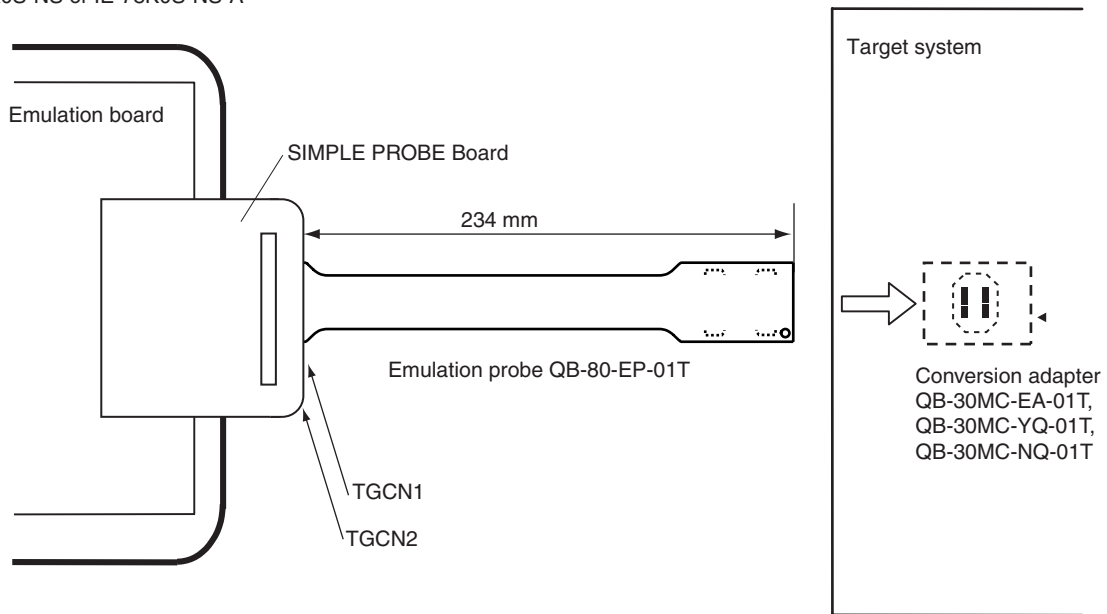
Figure B-2. Connection Conditions of Target System (When Using NP-30MC)



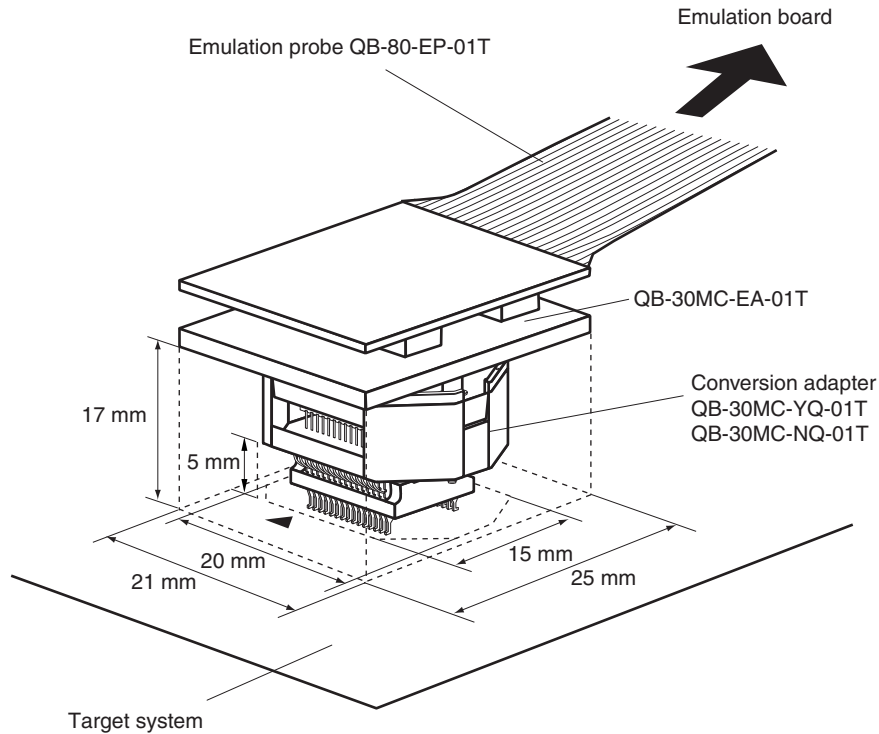
**Remark** NP-30MC is a product of Naito Densai Machida Mfg. Co., Ltd.  
 YSPACK30BK, NSPACK30BK, and YSGUIDE are products of TOKYO ELETECH CORPORATION.

**Figure B-3. Distance Between In-Circuit Emulator and Conversion Adapter (When Using QB-80-EP-01T)**

In-circuit emulator  
IE-78K0S-NS or IE-78K0S-NS-A



**Figure B-4. Connection Conditions of Target System (When Using QB-80-EP-01T)**





## APPENDIX C REVISION HISTORY

### C.1 Major Revisions in This Edition

Page	Description
<b>CHAPTER 1 GENERAL</b>	
p.10	Change of <b>Figure 1-1. System Configuration</b>
<b>CHAPTER 3 INSTALLATION</b>	
p.17	Change of <b>Table 3-1. Combination of Probe Interface Conversion Board, Target Cable, and Emulation Probe</b>

### C.2 Revision History of Preceding Editions

Edition	Description	Chapter
2nd	Deletion of description concerning 78K0S/KU1+	Throughout
3rd	Change of description concerning internal oscillator	Throughout
4th	Addition of description concerning 78K0S/KU1+	Throughout
	Change of <b>Note 1 in Figure 1-1. System Configuration</b>	<b>CHAPTER 1 GENERAL</b>
	Change of <b>Table 1-1. List of Emulation Environments</b>	
	Change of <b>Table 3-1. Combination of Probe Interface Conversion Board, Target Cable, and Emulation Probe</b>	<b>CHAPTER 3 INSTALLATION</b>
	Change of <b>Table 3-2. Pin Assignment Table for SIMPLE PROBE Board and Target Device</b>	
	Change of <b>(12) Caution on device file version</b>	<b>CHAPTER 5 RESTRICTIONS</b>
	Addition of <b>(13) Target interface circuit specification</b> and <b>(14) Internal oscillator specification</b>	
	Addition of <b>APPENDIX B REVISION HISTORY</b>	<b>APPENDIX B REVISION HISTORY</b>
5th	Addition of following target devices • 78K0S/KY1+: $\mu$ PD78F9510, 78F9511, 78F9512	Throughout
	Addition of <b>Caution</b> on the 78K0S/KU1+ devices ( $\mu$ PD78F9500, 78F9501, and 78F9502)	
	Change of <b>Note 1 in Figure 1-1. System Configuration</b>	<b>CHAPTER 1 GENERAL</b>
	Change of <b>Note 2</b> and addition of <b>Note 4</b> in <b>Table 1-1. List of Emulation Environments</b>	
	Change of <b>Table 3-1. Combination of Probe Interface Conversion Board, Target Cable, and Emulation Probe</b>	<b>CHAPTER 3 INSTALLATION</b>
	Addition of (4) to “• RESET pin control” in <b>3. 8 Option Byte Settings</b>	
	Change of <b>(10) RESET pin</b>	<b>CHAPTER 5 RESTRICTIONS</b>
	Change of <b>(12) Caution on device file version</b>	

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