

**NEC**

**User's Manual**

# **IE-78K0S-NS-A**

**In-Circuit Emulator**

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**Target Devices**  
**78K/0S Series**

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- Availability of related technical literature
- Development environment specifications (for example, specifications for third-party tools and components, host computers, power plugs, AC supply voltages, and so forth)
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# INTRODUCTION

## Product overview

The IE-78K0S-NS-A is used in combination with an emulation board (IE-789XXX-NS-EM1) to debug products of the 78K/0S Series of 8-bit single-chip microcontrollers.

## Readers

This manual is intended for engineers who perform debugging of systems, using products of the 78K/0S Series of 8-bit single-chip microcontrollers with the IE-78K0S-NS-A and an emulation board (IE-789XXX-NS-EM1).

## Purpose

This manual is intended to give users an understanding of the debugging functions that are available by using the IE-78K0S-NS-A and the emulation board (IE-789XXX-NS-EM1) together.

## Organization

When using the IE-78K0S-NS-A, please refer to the manual (this manual) that comes with the IE-78K0S-NS-A as well as the manual that comes with the emulation board (IE-789XXX-NS-EM1).

IE-78K0S-NS-A  
User's Manual  
(This manual)

- Basic specifications
- System configuration
- External interface function

IE-789XXX-NS-EM1  
User's Manual

- Function outline
- Target interface differences

## How to read this manual

To understand the overall functions of the IE-78K0S-NS-A

→ Read this manual in the order of the **CONTENTS**.

To understand the basic specifications

→ Refer to **CHAPTER 1 GENERAL** and **CHAPTER 2 PART NAMES**.

For how to connect the IE-789XXX-NS-EM1 and make settings to debug 78K/0S Series products

→ Refer to **CHAPTER 3 INSTALLATION**.

## Terminology

The meanings of the terms used in this manual are described in the table below.

Terms	Meaning
Emulation devices	Refers to the generic name for the devices in the emulator that perform emulation of the target device. This includes the emulation CPU.
Emulation CPU	Refers to the CPU that executes the user's program in the emulator.
Target device	Refers to the device to be emulated.
Target system	Refers to the system to be debugged. This includes the target program and the hardware created by the user. In the narrow sense, it means hardware only.

## 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

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## CHAPTER 1 GENERAL

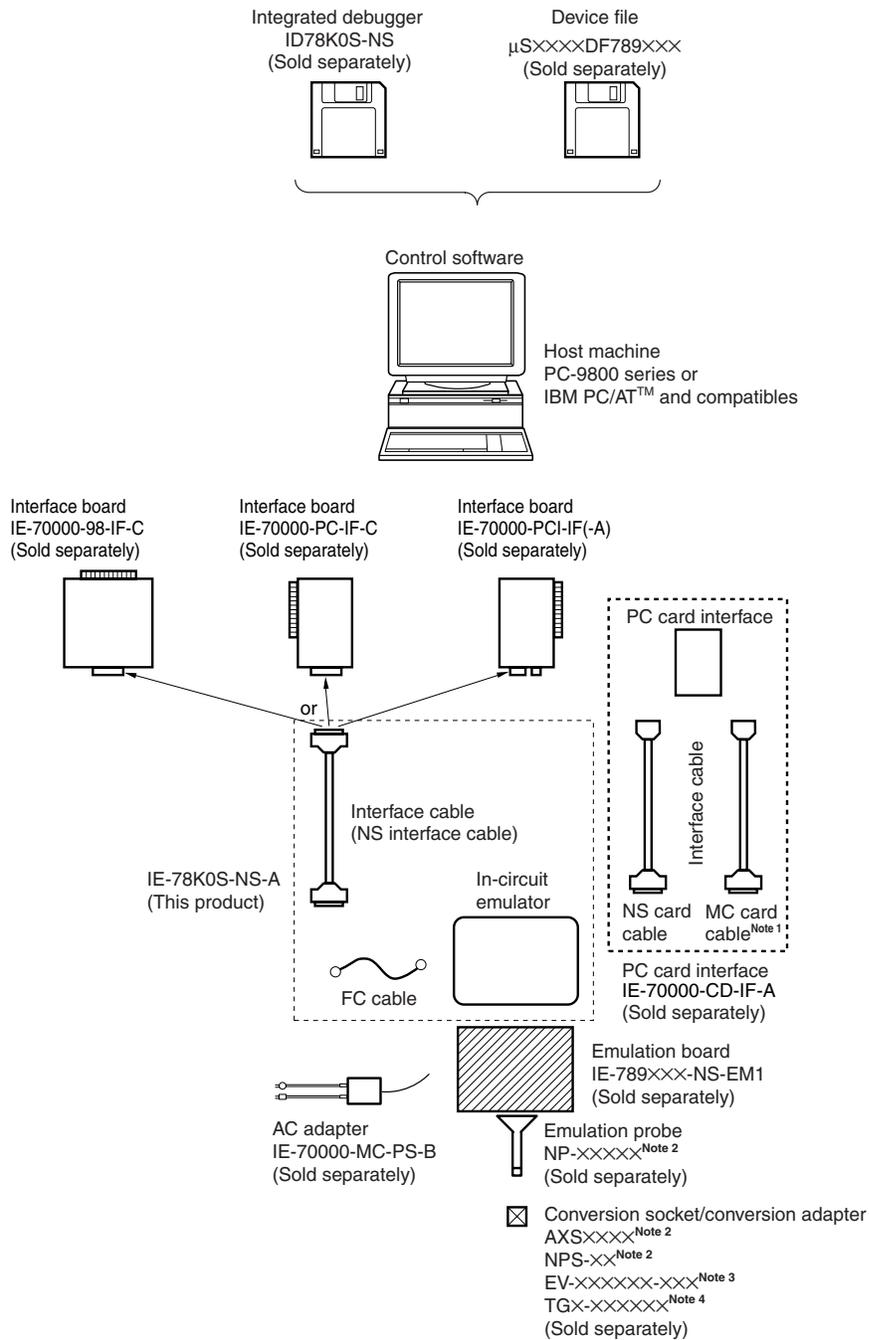
The IE-78K0S-NS-A is a development tool for effectively debugging hardware and software using a 78K/0S Series 8-bit single-chip microcontroller.

This chapter describes the system configuration and basic specifications of the IE-78K0S-NS-A.

### 1.1 System Configuration

Figure 1-1 shows the system configuration of the IE-78K0S-NS-A.

Figure 1-1. IE-78K0S-NS-A System Configuration



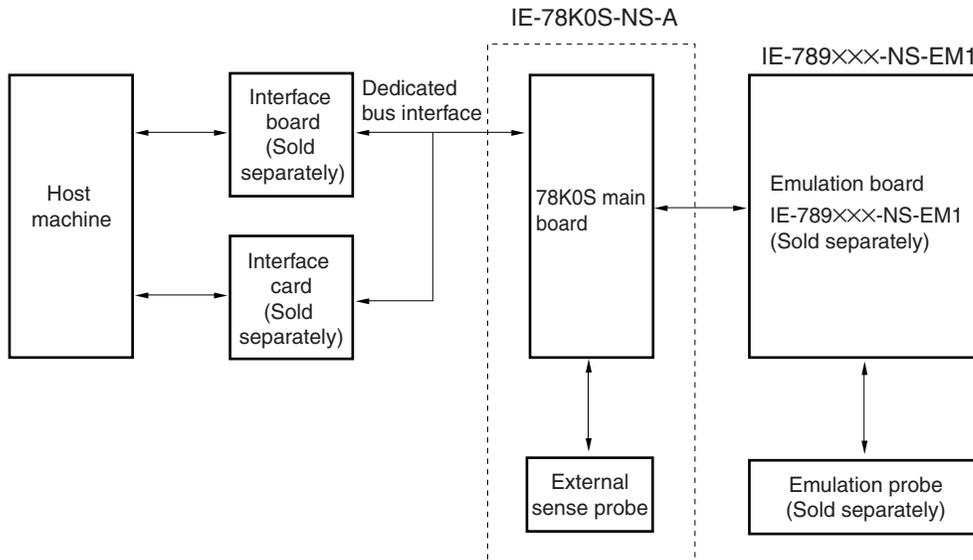
- Notes**
1. This cable is used for the V850 Family™. It cannot be used for the IE-78K0S-NS-A.
  2. The NP-×××××, AXS××××, and NPS-×× are products of Naito Densai Machida Mfg. Co., Ltd. (TEL +81-45-475-4191). Contact an NEC distributor when purchasing.
  3. The EV-×××××-××× is a product of NEC.
  4. The TG×-××××× is a product of TOKYO ELETECH Corporation.
- Inquiries: Daimaru Kougyo, Ltd.  
Tokyo Electronic Division (TEL: +81-3-3820-7112)  
Osaka Electronic Division (TEL: +81-6-6244-6672)

## 1.2 Hardware Configuration

The IE-78K0S-NS-A consists of the following hardware units (such as cabinet and boards).

- Cabinet
- 78K0S main board
- 78K0S emulation board
- NS interface cable

**Figure 1-2. Basic Hardware Configuration of IE-78K0S-NS-A**



## 1.3 Basic Specifications

Table 1-1. List of Functions (MAX. Specifications) (1/2)

Parameter		Description
Supervisor		V851™ (operating frequency: 33.0 MHz)
Target device		78K0S Series ( $\mu$ PD789XXX)
System clock		Depends on the specifications of the emulation board (sold separately) (20 MHz max.)
Clock supply	External	Pulse input
	Internal	Mounted on an emulation board (sold separately)
Emulation memory capacity		64 KB
Mapping unit	Internal ROM	256 bytes (64 KB max.)
	Internal high-speed RAM	8 bytes (1 KB max.)
	Internal low-speed RAM	64 bytes (16 KB max.)
Emulation function		<ul style="list-style-type: none"> <li>• Real-time execution</li> <li>• Break execution</li> <li>• Step execution</li> </ul>
Real-time internal RAM monitor		<ul style="list-style-type: none"> <li>• Space: All the internal RAM area</li> <li>• Timing: Data access</li> </ul>
Event detection		<ul style="list-style-type: none"> <li>• Program execution detection: 10 (BRS1 to BRS10)</li> <li>• Bus event detection: 12 (BRA1 to BRA12)</li> </ul>
Event integration		<ul style="list-style-type: none"> <li>• External trigger detection</li> <li>• External trigger output (open drain output: 1)</li> <li>• Path counter</li> <li>• Trace qualify condition</li> <li>• Delay condition</li> <li>• Trigger condition</li> </ul>
Break factor		<ul style="list-style-type: none"> <li>• Event break</li> <li>• Manual break</li> <li>• Command break</li> <li>• Fail-safe break</li> <li>• External exclusive event input (1 + 16)</li> </ul>
Real-time trace	Trace factor	<ul style="list-style-type: none"> <li>• All traces</li> <li>• Qualify trace</li> <li>• Section trace</li> </ul>
	Trace capacity	128 bits $\times$ 8 KB
	Trace content	Address, data, status, and external sense trace: 16 pins (alternately function as external exclusive event inputs)

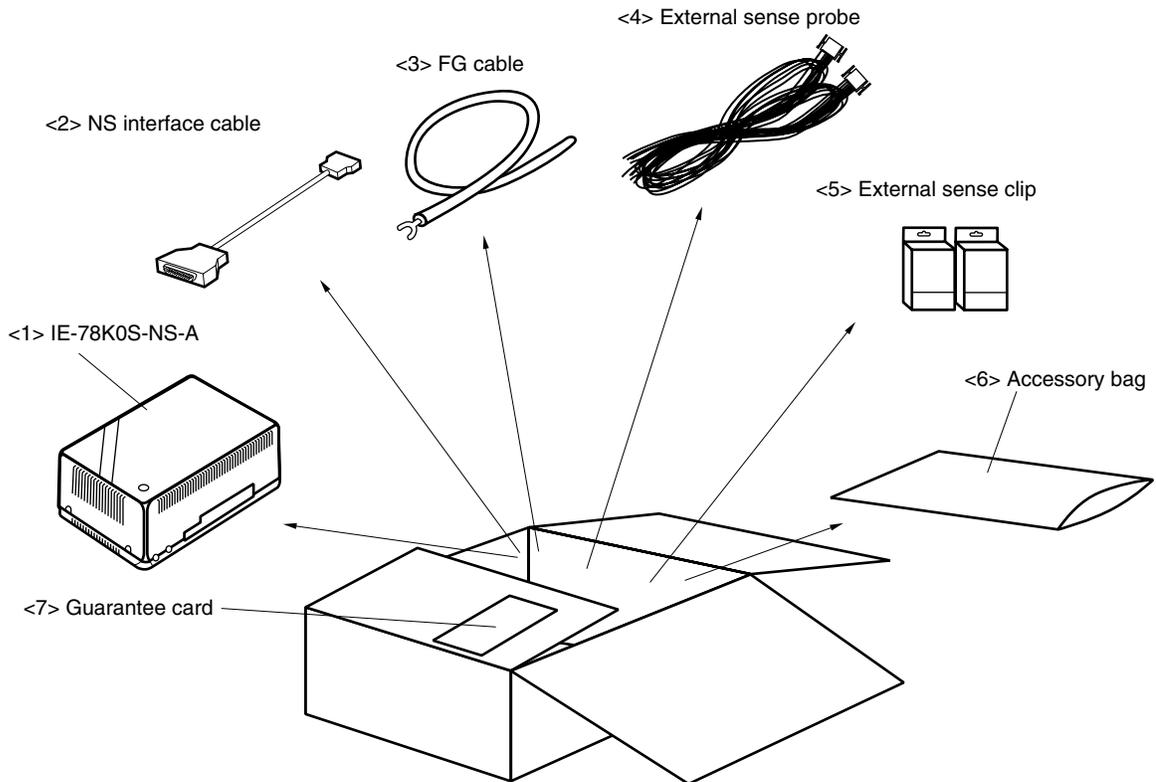
**Table 1-1. List of Functions (MAX. Specifications) (2/2)**

Parameter	Description
Execution time measurement	Up to 4 mins. 28 sec., resolution: 62.5 ns
Time measurement between events	<ul style="list-style-type: none"> <li>• Can be changed from 160 ns to 20.56 <math>\mu</math>s resolution</li> <li>• Maximum measurement time               <ul style="list-style-type: none"> <li>When 160 ns resolution is set: 11 minutes</li> <li>When 20.56 <math>\mu</math>s resolution is set: 24 hours</li> </ul> </li> </ul>
Coverage	Between 64 KB (read, write, fetch)
DMM	22 events
Target interface	Emulation probe (sold separately) provided for each target device shape
Host interface	Dedicated bus interface
Low-voltage support	Based on the guaranteed operating range of the target device
Host machine	PC-9800 series, or IBM PC/AT and compatibles
Power supply	DC 5 V
Dimensions	W235 $\times$ D195 $\times$ H39 (mm)

## 1.4 Contents in Carton

The IE-78K0S-NS-A carton contains the main unit, cables, an accessory bag, and a guarantee card. Make sure that the accessory bag contains a packing list, this user's manual, spacers, and screws. In the case of missing or damaged items, please contact an NEC sales representative or NEC distributor. Please make sure to fill out and return the guarantee card that comes with the main unit.

Figure 1-3. Contents in Carton

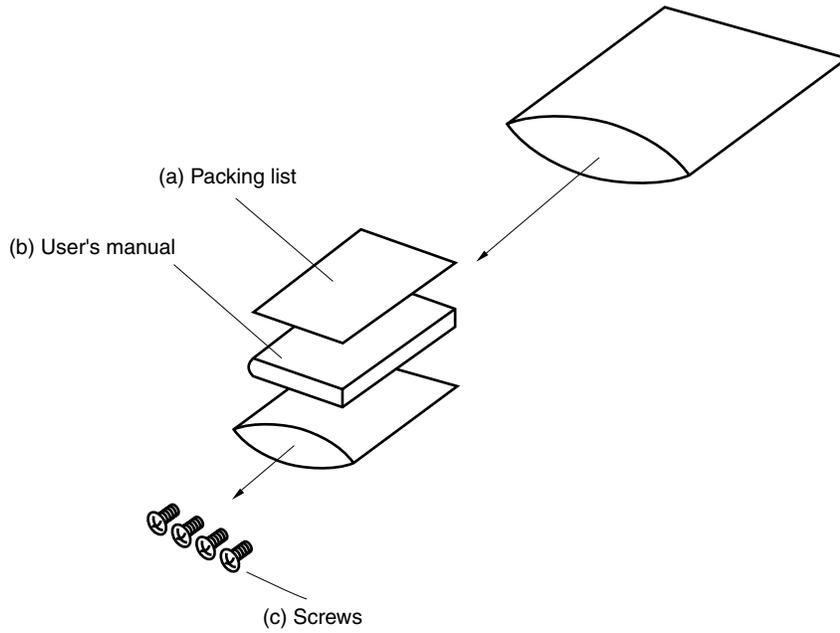


- <1> IE-78K0S-NS-A main unit × 1
- <2> NS interface cable × 1
- <3> FG cable × 1
- <4> External sense probes × 2
- <5> External sense clips × 20 (10 per case × 2)
- <6> Accessory bag × 1
- <7> Guarantee card × 1

Check that the accessory bag contains the following items (refer to **Figure 1-4 Contents in Accessory Bag**).

- <a> Packing list × 1
- <b> User's manual (this manual) × 1
- <c> Screws × 4

**Figure 1-4. Contents in Accessory Bag**



## CHAPTER 2 PART NAMES

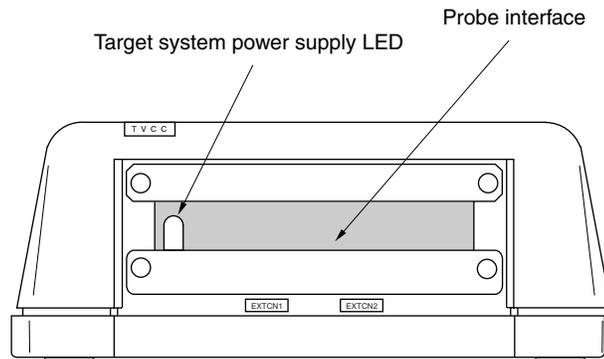
This chapter introduces the parts of the IE-78K0S-NS-A main unit.

The packing box contains the IE-78K0S-NS-A main unit. If there are any missing or damaged items, please contact an NEC sales representative.

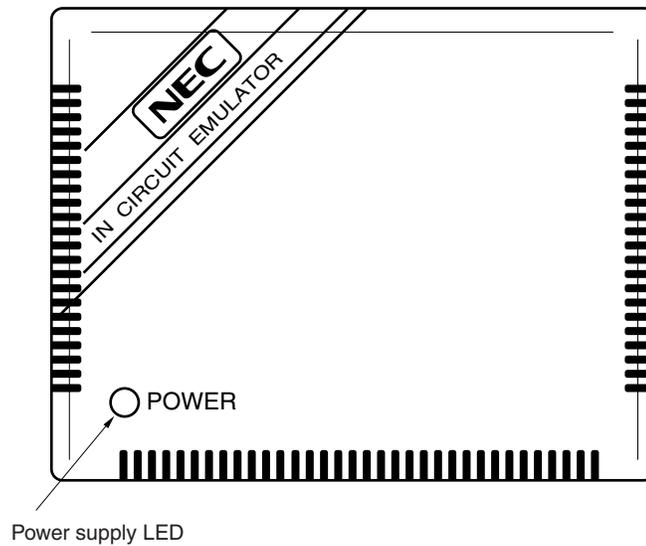
Please make sure to fill out and return the guarantee document that comes with the main unit.

### 2.1 Parts of Main Unit

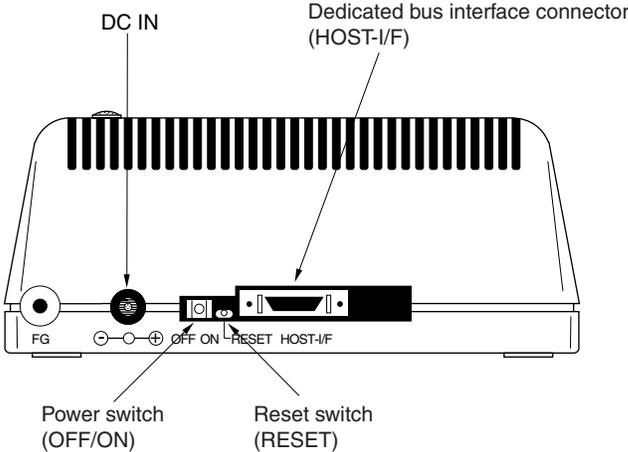
#### (1) Probe end



#### (2) Top view



(3) Interface



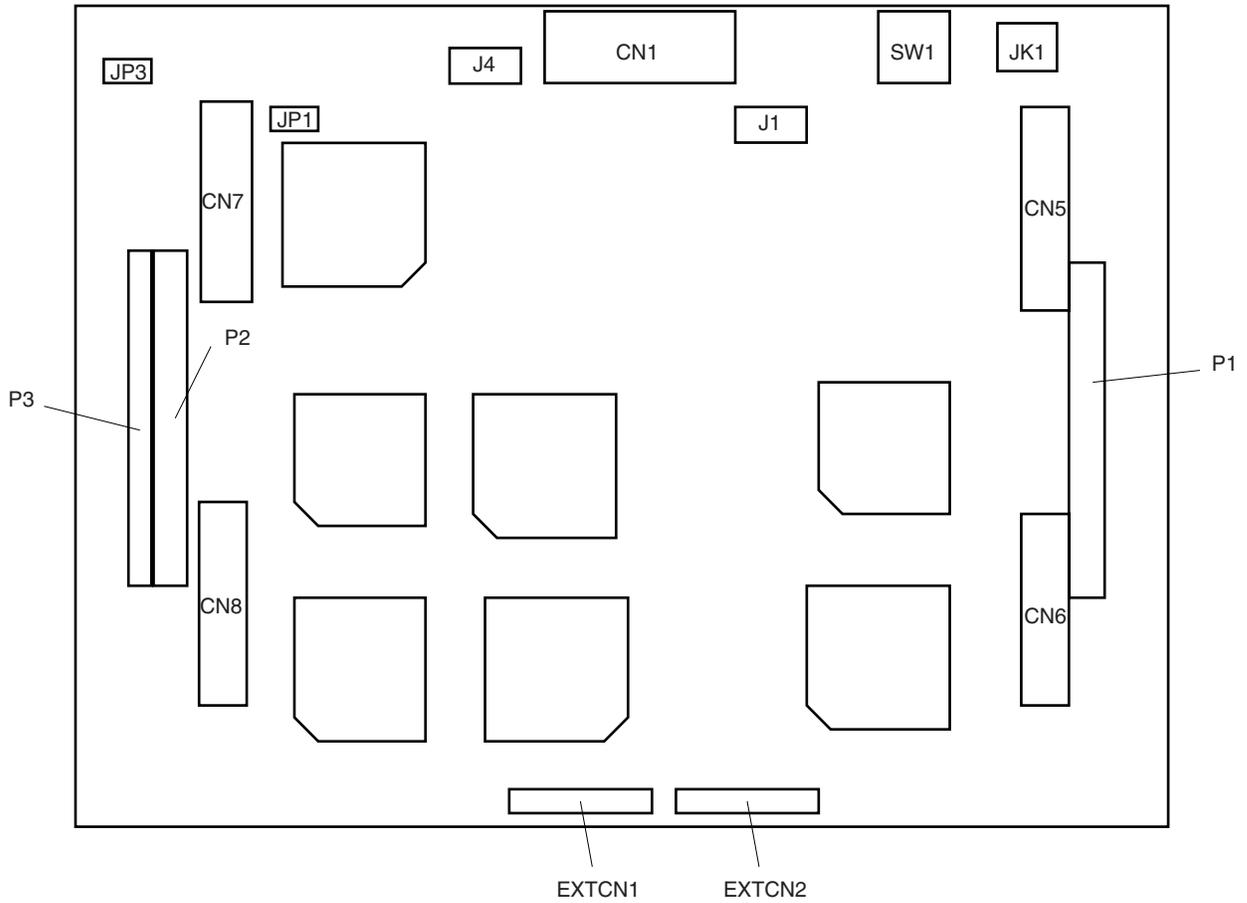
## 2.2 Board Name

The IE-78K0S-NS-A contains this board.

- Main board (IE-78K0S-NS-A): 1

Check that you have the correct board. To access the inside of the unit, remove the four screws from the sides of the main unit and open the lid.

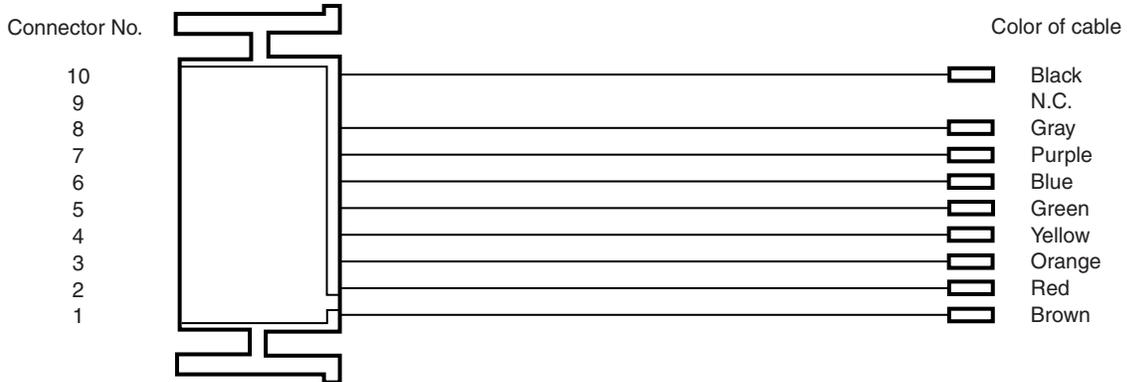
**Figure 2-1. Main Board (IE-78K0S-NS-A)**



### 2.3 External Sense Probe Names

The IE-78K0S-NS-A includes external sense probes and external sense clips.

(1) External sense probes: 2



The names of the external sense probes when they are connected to EXTCN1 and EXTCN2 are as follows.

**Table 2-1. Bit Configuration When Connecting External Sense Probe to EXTCN1**

Connector No.	1	2	3	4	5	6	7	8	9	10
External sense	EXT1	EXT2	EXT3	EXT4	EXT5	EXT6	EXT7	EXT8	N.C.	GND
Color of cable	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	N.C.	Black

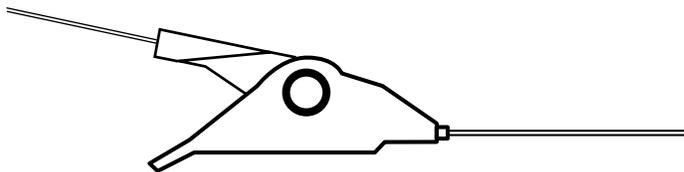
**Table 2-2. Bit Configuration When Connecting External Sense Probe to EXTCN2**

Connector No.	1	2	3	4	5	6	7	8	9	10
External sense	EXT9	EXT10	EXT11	EXT12	EXT13	EXT14	EXT15	EXT16	N.C.	GND
Color of cable	Brown	Red	Orange	Yellow	Green	Blue	Purple	Gray	N.C.	Black

**Remark** N.C.: No connection

(2) External sense clips: 20 (16 for external sense probe, 2 for GND, and 2 spares)

- Made by Sunhayato Corporation (2 sets of 10)



## CHAPTER 3 INSTALLATION

This chapter describes how to connect the cables to the IE-78K0S-NS-A and the mode settings.

### 3.1 Connection

Connect the following seven products which are sold separately.

For the interface adapter, be sure to select a product supported by the host machine.

Refer to **Figure 1-1 System Configuration of IE-78K0S-NS-A** in **CHAPTER 1 GENERAL** for the system configuration of the IE-78K0S-NS-A.

- IE-70000-98-IF-C: Interface board (use cable that comes with IE-78K0S-NS-A)
- IE-70000-PC-IF-C: Interface board (use cable that comes with IE-78K0S-NS-A)
- IE-70000-PCI-IF(-A): Interface board (use cable that comes with IE-78K0S-NS-A)
- IE-70000-CD-IF: PC card interface (NS card cable and MC card cable are included)
- IE-70000-MC-PS-B: AC adapter
- IE-789XXX-NS-EM1: Emulation board
- NP-XXXXXX: Emulation probe

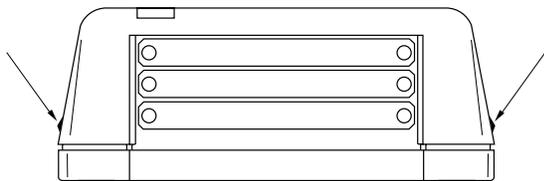
**Caution Connecting and removing cables or components from the target system and changing the settings of switches, etc. should be carried out after turning off the power of the IE-78K0S-NS-A main unit and the target system.**

**(1) Connecting emulation board (IE-789xxx-NS-EM1: for single-board configuration)**

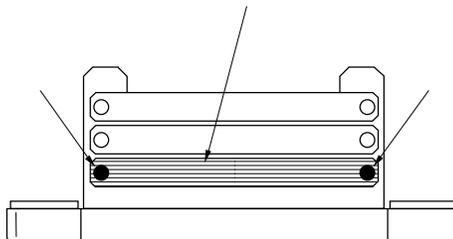
The IE-789xxx-NS-EM1 is sold separately.

**Figure 3-1. Connecting Emulation Board <1> (When IE-789xxx-NS-EM1 Uses Single-Board Configuration)**

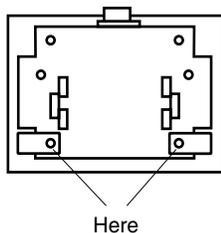
<1> Remove the screws from the sides of the main unit, and then remove the top cover.



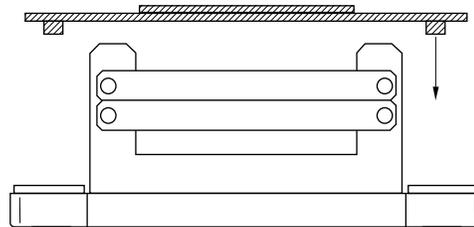
<2> Remove the first plate from the bottom by removing the screws.



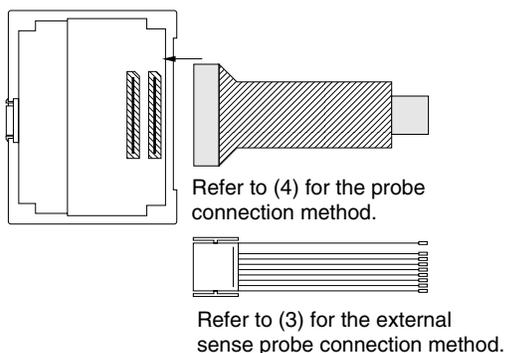
<3> Replace the spacers (metal) of the main board, as indicated in the diagram below, with the spacers (plastic) attached to the IE-78K0S-NS-A.



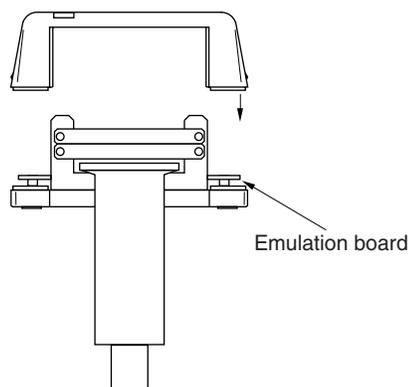
<4> Connect the IE-789xxx-EM1 and fasten the two screws to the emulation board.



<5> When using a probe, connect the probe.



<6> Replace the top cover and fasten the four screws on the sides.

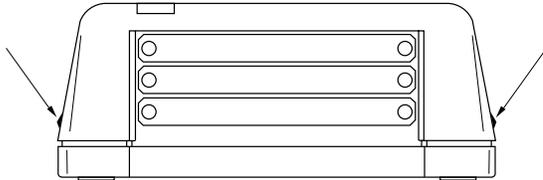


**(2) Connecting emulation board (IE-789xxx-NS-EM1: Probe board + I/O board) (2-board configuration)**

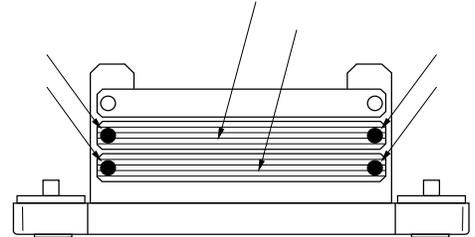
The IE-789xxx-NS-EM1 is sold separately.

**Figure 3-2. Connecting Emulation Board <2> (When IE-789xxx-NS-EM1 Uses 2-Board Configuration)**

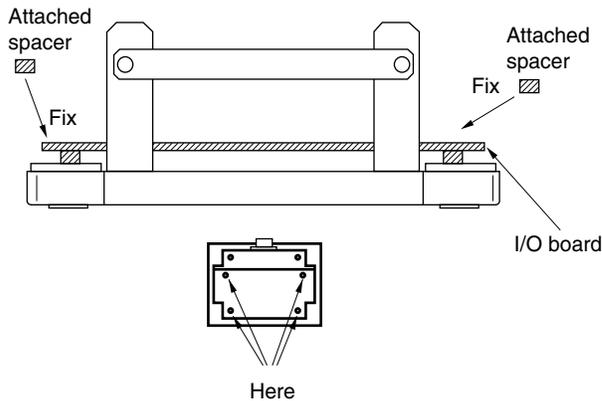
<1> Remove the screws from the sides of the main unit, and then remove the top cover.



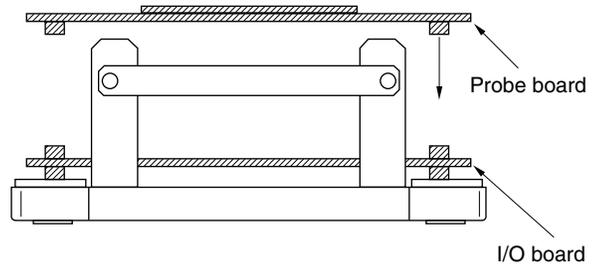
<2> Remove the first and second plates from the bottom by removing the screws.



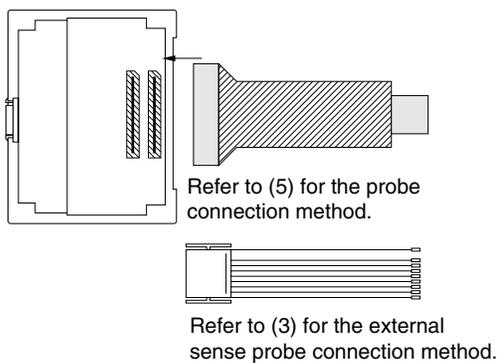
<3> Connect the I/O board and affix the attached spacers to the IE-789xxx-NS-EM1 at four points on the board.



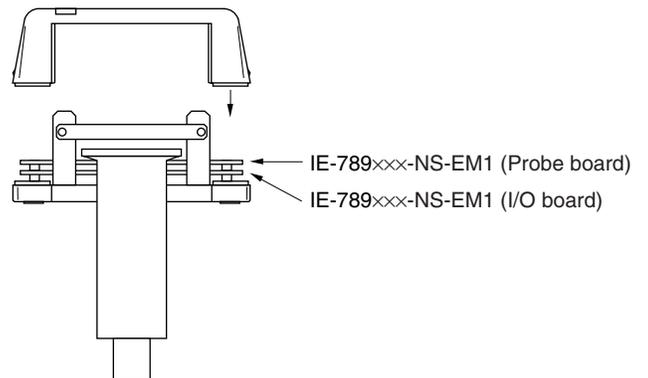
<4> Connect the probe board on the I/O board and fasten the four screws.



<5> When using a probe, connect the probe.

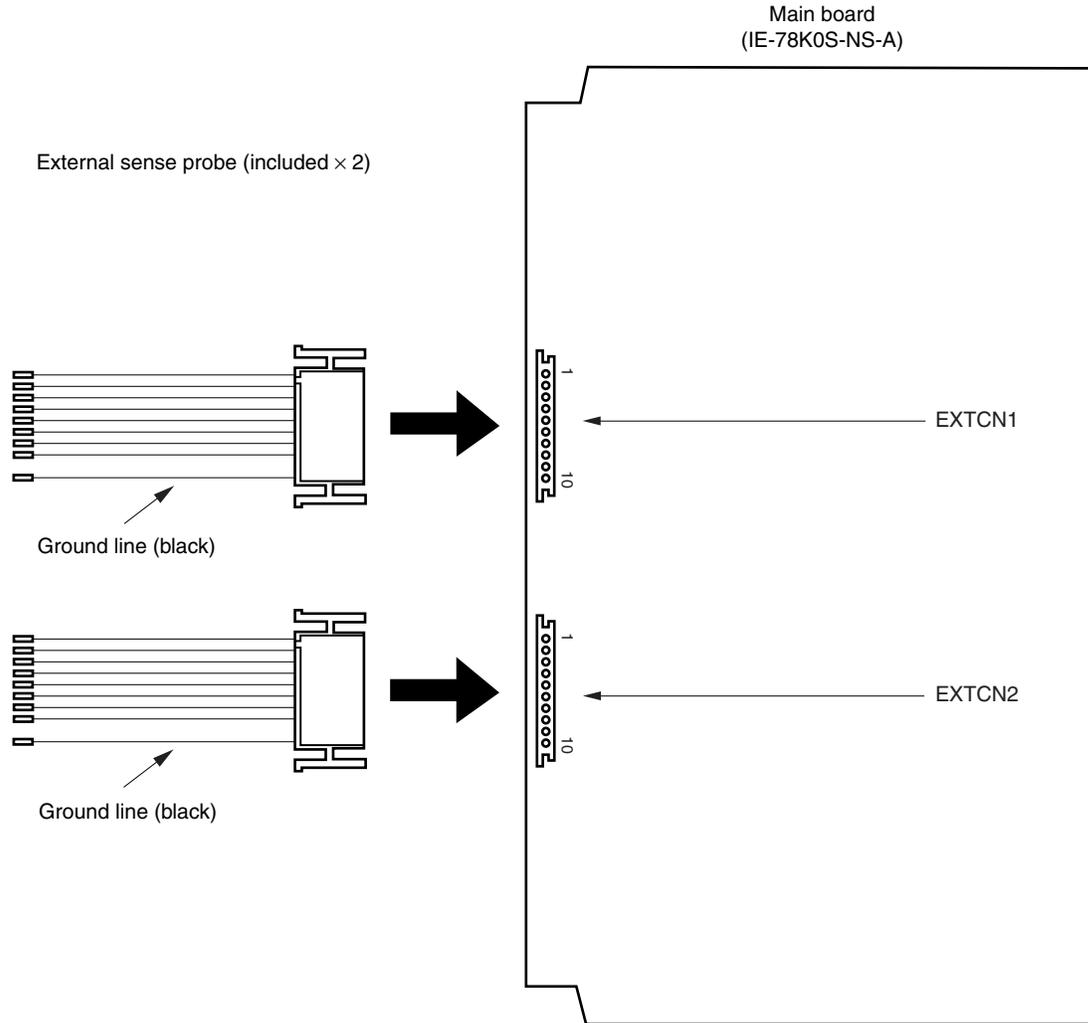


<6> Replace the top cover and fasten the four screws on the sides.



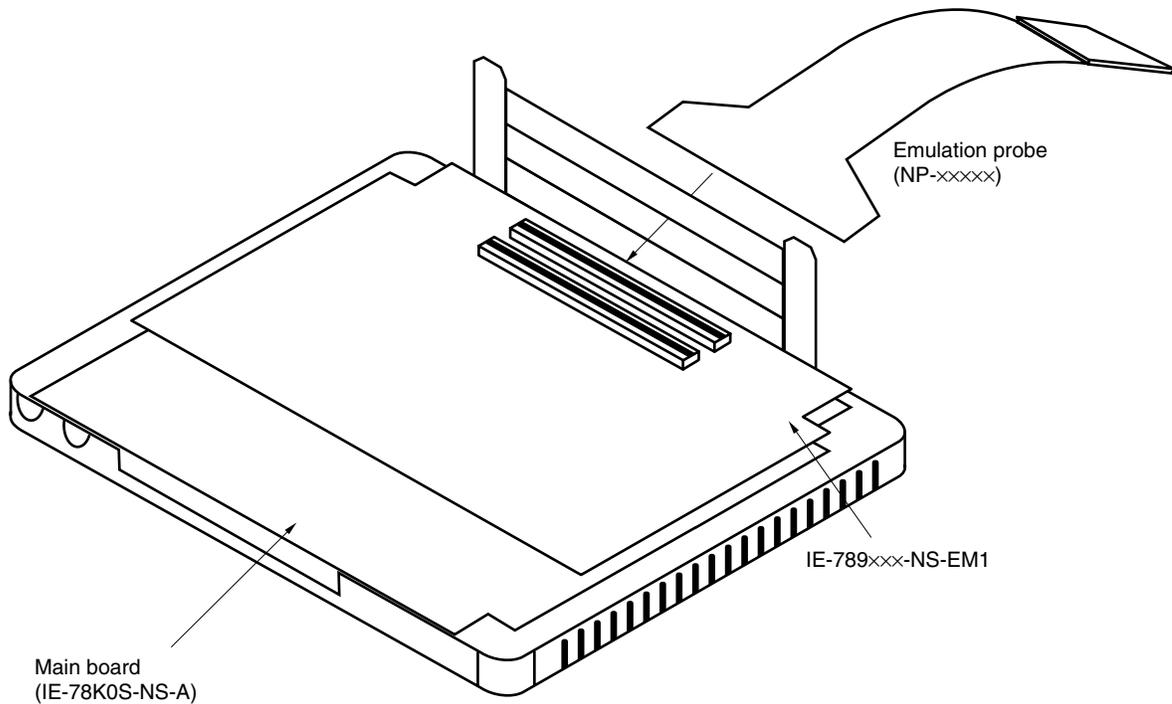
(3) Connecting external sense probe

Figure 3-3. Connecting External Sense Probe



**(4) Connecting emulation probe (NP-xxxxx) (when IE-789xxx-NS-EM1 uses single-board configuration)**

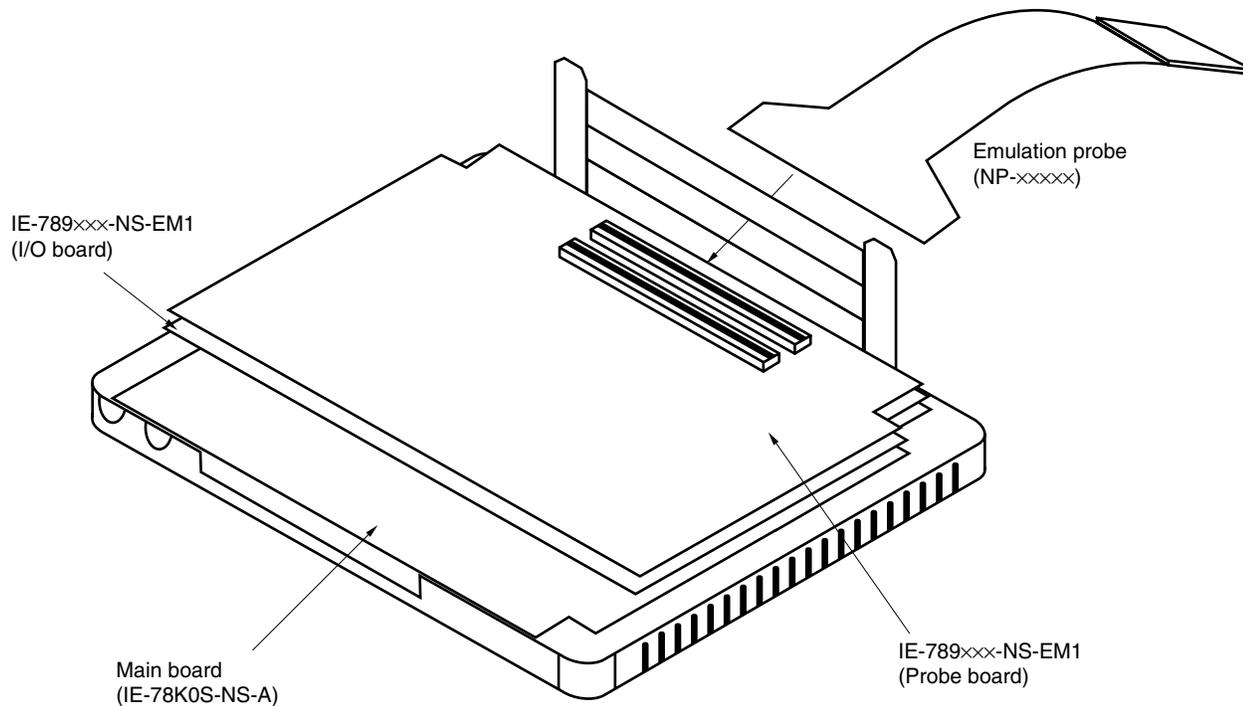
The NP-xxxxx is sold separately.

**Figure 3-4. Connecting Emulation Probe (When IE-789xxx-NS-EM1 Uses Single-Board Configuration)**

**Caution** The emulation probe (NP-xxxxx) mounting location varies depending on the model of the I/O emulation board (IE-789xxx-NS-EM1) in use. For details, refer to the IE-789xxx-NS-EM1 User's Manual.

**(5) Connecting emulation probe (NP-xxxxx) (when IE-789xxx-NS-EM1 uses 2-board configuration)**

The NP-xxxxx is sold separately.

**Figure 3-5. Connecting Emulation Probe (When IE-789xxx-NS-EM1 Uses 2-Board Configuration)**

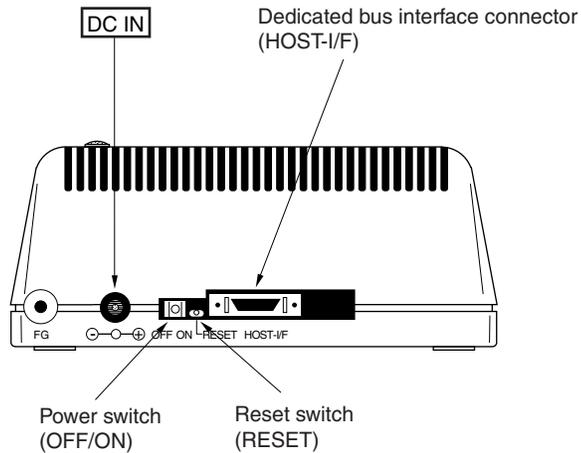
**Caution** The emulation probe (NP-xxxxx) mounting location varies depending on the model of the I/O emulation board (IE-789xxx-NS-EM1) in use. For details, refer to the IE-789xxx-NS-EM1 User's Manual.

**(6) Connecting AC adapter (IE-70000-MC-PS-B)**

The IE-70000-MC-PS-B is sold separately.

<1> Insert the AC adapter plug into the DC IN socket of the IE-78K0S-NS-A.

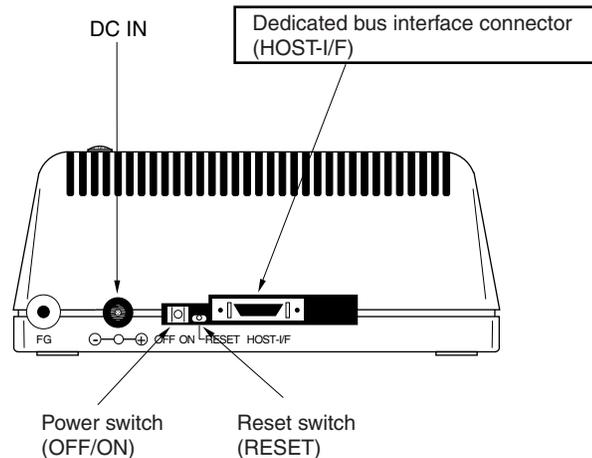
**Figure 3-6. Connecting AC Adapter**

**(7) Connecting interface cable**

The IE-70000-98-IF-C, IE-70000-PC-IF-C, IE-70000-PCI-IF(-A), and IE-70000-CD-IF-A are sold separately.

<1> Insert the interface cable into the bus interface connector on the IE-78K0S-NS-A main unit.

**Figure 3-7. Connecting Dedicated Bus Interface Cable**



**Caution** The type of interface cable varies depending on the interface board and PC card interface.

- When using an interface board (IE-70000-98-IF-C, IE-70000-PC-IF-C, or IE-70000-PCI-IF(-A))
  - Connect the NS interface cable that comes with the IE-78K0S-NS-A.
- When using a PC card interface (IE-70000-CD-IF-A)
  - Connect the NS card cable that comes with the IE-70000-CD-IF-A.

### 3.2 External Trigger Functions

#### (1) EXTOUT

At the occurrence of a break event, the EXTOUT pin on the emulation board (IE-789XXX-NS-EM1) outputs a low level for 1.3  $\mu$ s.

**Caution** Because the output is open drain, connect a pull-up resistor in the target system.

#### (2) EXTIN

The EXTIN pin on the emulation board (IE-789XXX-NS-EM1) can be used to input an event signal. Enter high-level pulse signals for two or more CPU clocks.

**Caution** For the electrical characteristics, refer to Table 3-1.

**Table 3-1. Electrical Characteristics**

Parameter	MIN. [V]	MAX. [V]
Input voltage, high	Target voltage $\times$ 0.7	Target voltage
Input voltage, low	0	Target voltage $\times$ 0.3

### 3.3 External Sense

Data of up to 16 bits can be input to the IE-78K0S-NS-A from the target system via an external sense probe. Also, when using an external sense break, input a level of at least 2 CPU clocks.

**Table 3-2. Electrical Specifications of External Sense**

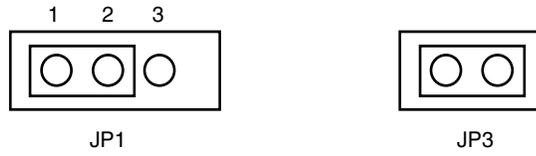
Parameter	MIN. [V]	MAX. [V]
Input voltage, high	Target voltage <sup>Note</sup> $\times$ 0.7	Target voltage <sup>Note</sup>
Input voltage, low	0	Target voltage <sup>Note</sup> $\times$ 0.3

**Note** 2.0 V when the target voltage is less than 2.0 V.

### 3.4 Jumper Settings (on Main Board)

#### (1) Default settings of Jumper

Figure 3-8. Default Settings of JP1 and JP3

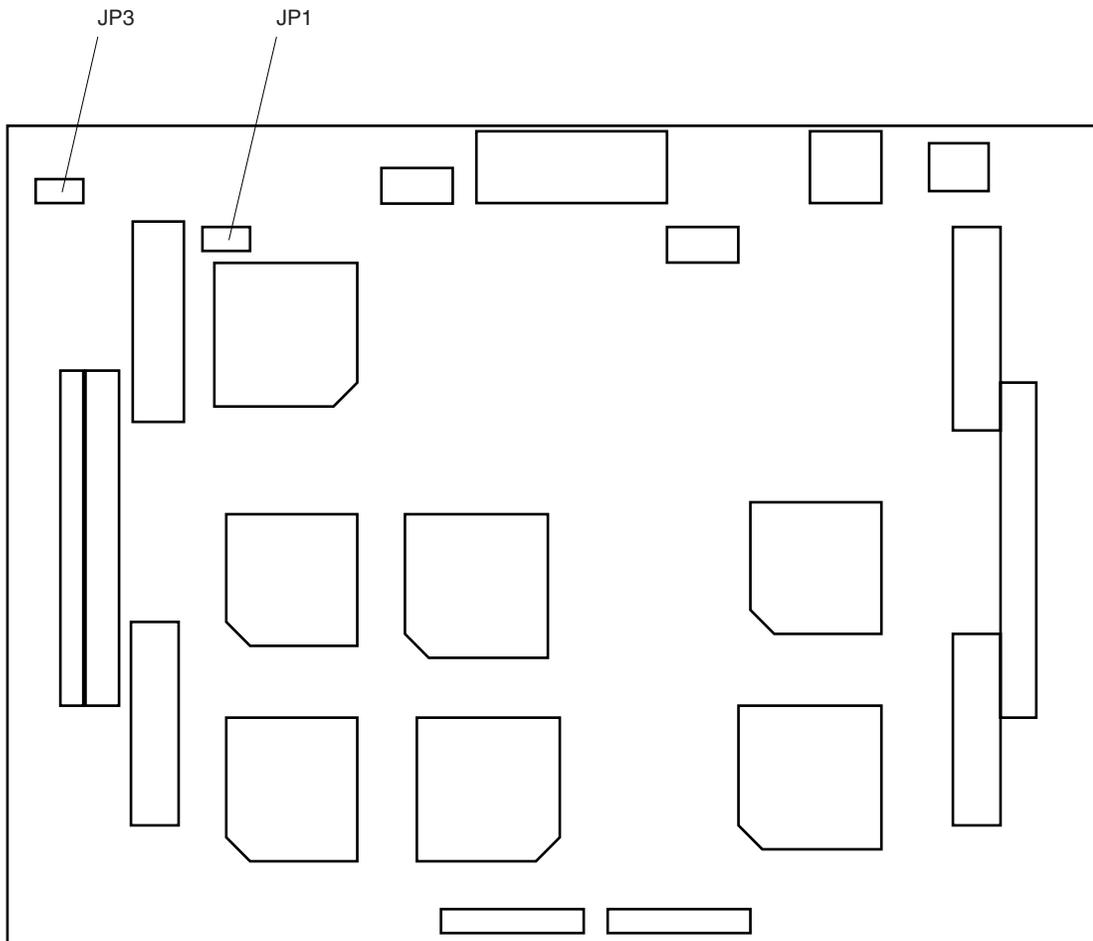


JP1: 1 and 2 are shorted (set at shipment)

JP3: Shorted (do not change)

**Caution** The make the jumper settings, follow the procedure in the user's manual of the emulation board (IE-789xxx-NS-EM1).

Figure 3-9. Jumper Position on Main Board



## APPENDIX A INTERFACE BOARD (IE-70000-PCI-IF(-A)) FOR DESKTOP PC

This chapter describes the setting method when connecting the IE-78K0S-NS-A.

For details, refer to the **IE-70000-PCI-IF(-A) User's Manual (to be prepared)**.

### A.1 Introduction

The IE-70000-PCI-IF(-A) is an interface board for an IE series product that is installed in the PCI bus slot of a PC incorporating Windows™ 95/98 or Windows NT4.0/2000.

First of all, check that you have the following items.

- Interface board (IE-70000-PCI-IF(-A)) for desktop PC × 1
- 8-bit connector board (connected to IE-70000-PCI-IF(-A)) × 1
- 32-bit connector board × 1
- User's manual × 1
- DLL-DISK × 1
- IE-PC Driver DISK × 1
- Guarantee card × 1

#### <Basic specifications>

##### Applicable models

The IE-70000-PCI-IF(-A) is designed for devices incorporating Windows 95/98 or Windows NT4.0/2000 and a premounted PCI bus slot.

##### Hardware resources used

- I/O address .....0000H to FFFFH
- Interrupts .....Unused
- Memory .....Uses 80H bytes

##### Current consumption

300 mA (MAX. when using +5 V)

- Cautions**
1. Do not place heavy objects on or apply pressure to the board.
  2. Do not drop the board or subject it to excessive vibration or shock.
  3. When removing a cable, do not pull it by the cord.
  4. Do not use or keep the board in a hot, humid or dusty environment or in a location where it is directly exposed to sunlight.
  5. Avoid subjecting the board to extreme changes in temperature or humidity.
  6. Do not spill drinks or other liquids onto the board or its accessories.
  7. Do not connect a cable for a different product to the connector.

## A.2 Installation

### (1) Board settings

There are no jumpers or DIP switches on the IE-70000-PCI-IF(-A).

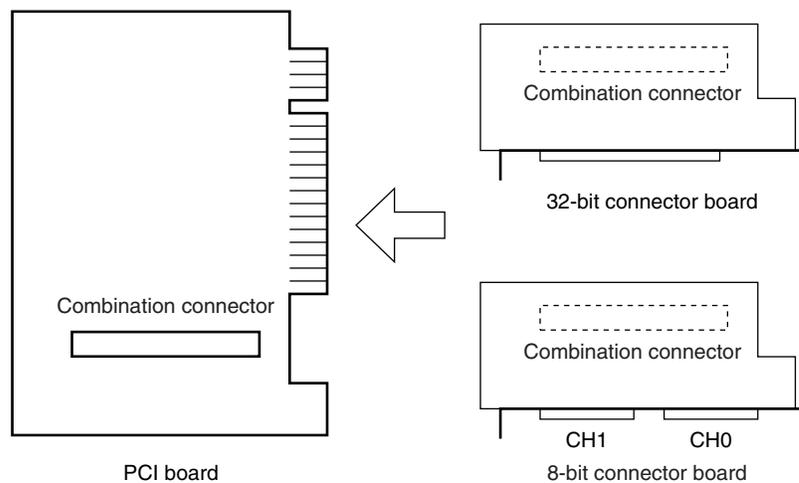
### (2) 8-bit connector board mounting

An 8-bit connector board is premounted at shipment.

**Remark** When a 32-bit board is mounted, place it on the 8-bit connector board using the combination connector (refer to **Figure A-1**) and fasten them together with screws.

**Caution** The 32-bit connector board is included for future function expansion.

**Figure A-1. Mounting of PCI Board and Connector Boards**



### (3) Installation in PC

Make sure that the PC is turned off, then install the interface board in the PCI bus slot following the instructions in the PC's manual.

At installation, fasten the PCI board to the PC with screws.

### (4) IE-PC Driver installation

Refer to the supplied IE-PC Driver DISK Readme\_e.txt for IE-PC Driver installation.

### (5) Connecting with IE-78K0S-NS-A

Using the supplied cable, connect the IE-78K0S-NS-A to the CH0 side.

**Caution** Connection with the IE-78K0S-NS-A is possible on the CH0 side only.

## APPENDIX B PC CARD INTERFACE (IE-70000-CD-IF-A)

This chapter describes the setting method when connecting the IE-78K0S-NS-A.

For details, refer to the **IE-70000-CD-IF-A User's Manual (to be prepared)**.

### B.1 Introduction

The PC card interface (IE-70000-CD-IF-A) is an interface card for an IE product that is installed in the PCMCIA2.1/JEIDA standard Ver. 4.2-compliant PC card slot of a PC incorporating Windows 95/98 or Windows NT4.0/2000.

First of all, check that you have the following items.

- PC card interface (IE-70000-CD-IF-A) × 1
- MC-A CABLE × 1
- NS-A CABLE × 1
- User's manual × 1
- DLL-DISK × 1
- IE-PC Driver DISK × 1
- Guarantee card × 1

#### <Basic specifications>

##### Applicable models

The IE-70000-CD-IF-A is designed for devices incorporating Windows 95/98 or Windows NT4.0/2000 and a premounted PC card slot compliant with PCMCIA2.1/JEIDA standard Ver.4.2.

##### Hardware resources used

- I/O address .....20H bytes starting from 220H, 260H, 2E0H, 320H, or 3E0H as a base address
- Interrupts .....Unused
- Memory .....Unused

##### Current consumption

300 mA (MAX. when using +5 V)

- Cautions**
1. Do not place heavy objects on or apply pressure to the board.
  2. Do not drop the board or subject it to excessive vibration or shock.
  3. When removing a cable, do not pull it by the cord.
  4. Do not use or keep the board in a hot, humid or dusty environment or in a location where it is directly exposed to sunlight.
  5. Avoid subjecting the board to extreme changes in temperature or humidity.
  6. Do not spill drinks or other liquids onto the board or its accessories.
  7. Do not connect a cable for a different product to the connector.

## B.2 Installation

### (1) Installation in PC

For Windows 95/98/2000, insert the PCMCIA card in the card slot when the power supply of the PC is turned on.  
For Windows NT4.0, insert the card in the slot when the power supply is turned off. Be careful to insert the card in the correct direction.

### (2) IE-PC Driver installation

Refer to the supplied IE-PC Driver DISK Readme\_e.txt for PCMCIA driver installation.

**Caution** This interface card cannot be connected to the IE-78xxxx-R. Actually, installation ends completely by selecting "IE-78xxxx-R" displayed in the IE-PC Driver DISK installation menu. In this case, however, the installation is invalid.

### (3) Connection with the IE-78K0S-NS-A

Using the NS card cable, connect the IE-70000-CD-IF-A to the IE-78K0S-NS-A.

**Caution** Be sure to use the NS card cable when connecting to the IE-78K0S-NS-A. If MC card cable is used, the IE-70000-CD-IF-A may be damaged.

## APPENDIX C INTERFACE BOARD (IE-70000-98-IF-C) FOR PC-9800 SERIES (EXCEPT FOR NX SERIES)

This chapter describes the setting method when connecting the IE-78K0S-NS-A.

For details, refer to the **IE-70000-98-IF-C User's Manual (to be prepared)**.

### C.1 Introduction

The IE-70000-98-IF-C is an interface board for the PC-9800 series (except for NX series) that is installed in the C bus slot of a PC-9800 series (except for NX series) machine.

**Caution** The PC98-NX series is treated as an IBM PC/AT compatible machine. Refer to APPENDIX A INTERFACE BOARD (IE-70000-PC-IF(-A)) FOR DESKTOP PC.

First of all, check that you have the following items.

- Interface board (IE-70000-98-IF-C) for PC-9800 series × 1
- User's manual × 1
- DLL-DISK × 1
- IE-PC Driver DISK × 1
- Guarantee card × 1

#### <Basic specifications>

##### Applicable models

This product is designed for devices incorporating Windows 95/98 or Windows NT4.0/2000 with an on-chip PC-9800 series C bus.

##### Hardware resources used

- I/O addresses ..... 16 bytes in a 256-byte boundary (00D×H, 01D×H,...FFD×H)
- Interrupts and others ...Unused

##### Current consumption

500 mA (MAX. when using +5 V)

- Cautions**
1. Do not place heavy objects on or apply pressure to the board.
  2. Do not drop the board or subject it to excessive vibration or shock.
  3. When removing a cable, do not pull it by the cord.
  4. Do not use or keep the board in a hot, humid or dusty environment or in a location where it is directly exposed to sunlight.
  5. Avoid subjecting the board to extreme changes in temperature or humidity.
  6. Do not spill drinks or other liquids onto the board or its accessories.
  7. Do not connect a cable for a different product to the connector.

## C.2 Installation

### (1) I/O address settings

SW1 and SW2 are the switches selecting the C bus I/O addresses. SW1 numbers 1 to 8 correspond to C bus addresses A4 to A11, and SW2 numbers 1 to 4 correspond to C bus addresses A12 to A15.

In the IE-78K0S-NS-A, the addresses should be set in the 16 bytes between 00DxH and FFDxH. The switch takes the value "0" when ON and "1" when OFF.

The addresses used for setup must be values that are not used in the PC system or for other boards. In addition, since these values are used during software installation, make a note of them for future reference.

Setting examples of I/O address, SW1 and SW2 are shown below.

**Table C-1. SW1 and SW2 Settings When Setting I/O Address to 01DxH**

SW1 Number	1	2	3	4	5	6	7	8
Address	A4	A5	A6	A7	A8	A9	A10	A11
ON		0				0	0	0
OFF	1		1	1	1			

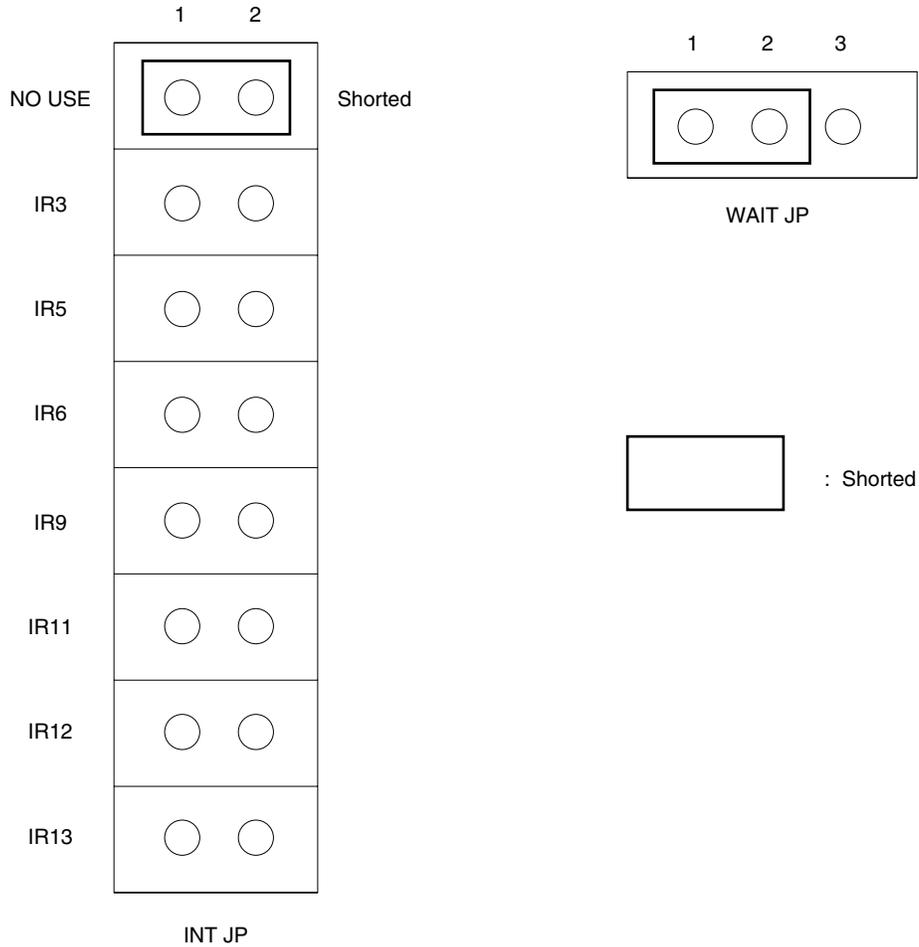
SW2 Number	1	2	3	4	5	6	7	8
Address	A12	A13	A14	A15	OFF	OFF	ON	OFF
ON	0	0	0	0			0	
OFF					1	1		1

**Caution** Set SW2 number 7 to ON and SW2 numbers 5, 6, and 8 to OFF.

**(2) Jumper settings**

The INT JP and WAIT JP are C bus interrupt and WAIT selection jumpers.  
 In the IE-78K0S-NS-A, set INT JP to NO USE, and WAIT JP to 1 and 2 shorted.

**Figure C-1. INT JP, WAIT JP Settings**



**(3) Installation in PC**

Make sure that the PC is turned off, then install the interface board in the C bus slot following the instructions in the PC's manual.

At installation, fasten the interface board to the PC with screws.

**(4) IE-PC Driver installation**

Refer to the supplied IE-PC Driver DISK Readme\_e.txt for IE-PC Driver installation.

**(5) Connecting with IE-78K0S-NS-A**

Using the supplied cable, connect the IE-78K0S-NS-A to CH0.

**Caution** Connection with the IE-78K0S-NS-A is possible to CH0 only.  
 For connection with other models, refer to their respective manuals.

## APPENDIX D INTERFACE BOARD (IE-70000-PC-IF-C) FOR IBM PC/AT AND COMPATIBLES

This chapter describes the setting method when connecting the IE-78K0S-NS-A.  
For details, refer to the **IE-70000-PC-IF-C User's Manual (to be prepared)**.

### D.1 Introduction

The IE-70000-PC-IF-C is an interface board for IBM PC/AT and compatibles and is installed in the ISA bus slot of IBM PC/AT and compatibles.

First of all, check that you have the following items.

- Interface board (IE-70000-PC-IF-C) for IBM PC/AT × 1
- User's manual × 1
- DLL-DISK × 1
- IE-PC Driver DISK × 1
- Guarantee card × 1

#### <Basic specifications>

##### Applicable models

The IE-70000-PC-IF-C is designed for IBM PC/AT and compatibles incorporating Windows 95/98 or Windows NT4.0/2000 with an on-chip ISA bus.

##### Hardware resources

- I/O address..... 16 bytes in any 16-byte boundary (020×H to 03F×H)
- Interrupts and others ... Unused

##### Current consumption

500 mA (MAX. when using +5 V)

- Cautions**
1. Do not place heavy objects on or apply pressure to the board.
  2. Do not drop the board or subject it to excessive vibration or shock.
  3. When removing a cable, do not pull it by the cord.
  4. Do not use or keep the board in a hot, humid or dusty environment or in a location where it is directly exposed to sunlight.
  5. Avoid subjecting the board to extreme changes in temperature or humidity.
  6. Do not spill drinks or other liquids onto the board or its accessories.
  7. Do not connect a cable for a different product to the connector.

## D.2 Installation

### (1) I/O address settings

SW1 and SW2 are the switches selecting the ISA bus I/O addresses. SW1 numbers 1 to 8 correspond to ISA bus addresses A4 to A11, and SW2 numbers 1 to 4 correspond to ISA bus addresses A12 to A15.

In the IE-78K0S-NS-A, the addresses should be set between 020xH and 03FxH. The switch takes the value "0" when ON and "1" when OFF.

The addresses used for setup must be values that are not used in the PC system or for other boards. In addition, since these values are used during software installation, make a note of them for future reference.

Setting examples of I/O address, SW1 and SW2 are shown below.

**Table D-1. SW1 and SW2 Settings When Setting I/O Address to 020xH**

SW1 Number	1	2	3	4	5	6	7	8
Address	A4	A5	A6	A7	A8	A9	A10	A11
ON	0	0	0	0	0		0	0
OFF						1		

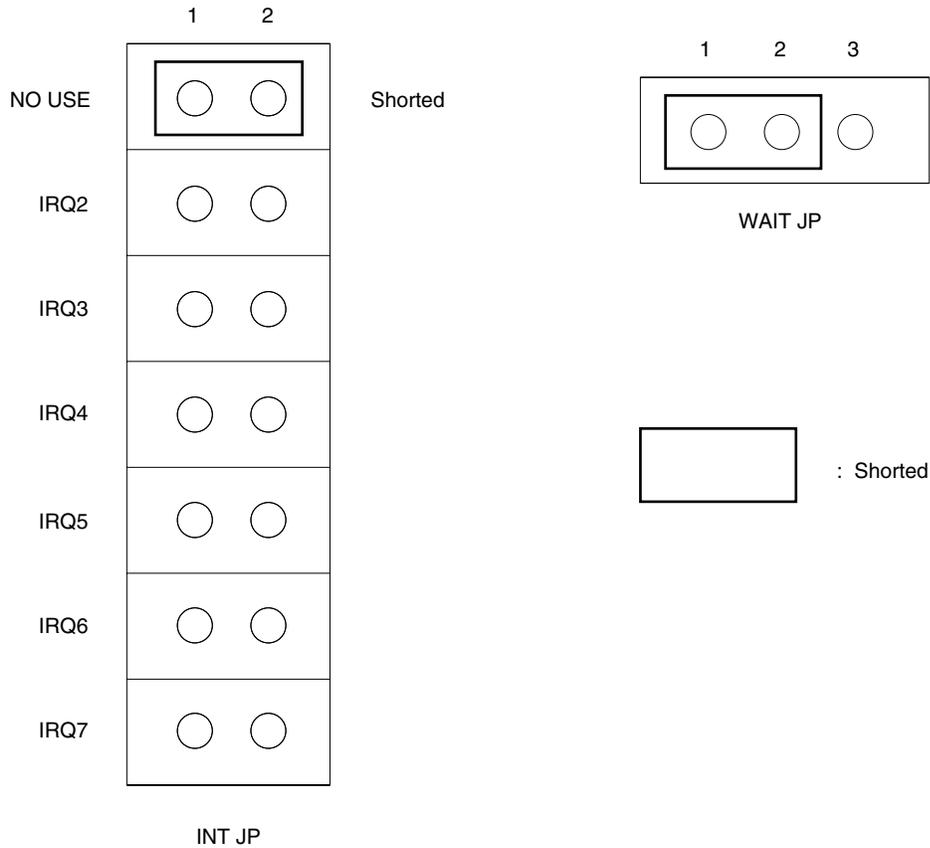
SW2 Number	1	2	3	4	5	6	7	8
Address	A12	A13	A14	A15	OFF	OFF	ON	OFF
ON	0	0	0	0			0	
OFF					1	1		1

**Caution** Set SW2 number 7 to ON and SW2 numbers 5, 6, and 8 to OFF.

**(2) Jumper settings**

The INT JP and WAIT JP are ISA bus interrupt and WAIT selection jumpers. In the IE-78K0S-NS-A, set INT JP to NO USE, and WAIT JP to 1 and 2 shorted.

**Figure D-1. INT JP, WAIT JP Settings**



**(3) Installation in PC**

Make sure that the PC is turned off, then install the interface board in the ISA bus slot following the instructions in the PC's manual.

At installation, fasten the interface board to the PC with screws.

**(4) IE-PC Driver installation**

Refer to the supplied IE-PC Driver DISK Readme\_e.txt for IE-PC Driver installation.

**(5) Connecting with IE-78K0S-NS-A**

Using the supplied cable, connect the IE-78K0S-NS-A to CH0.

**Caution** Connection with the IE-78K0S-NS-A is possible to CH0 only.  
For connection with other models, refer to their respective manuals.

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