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# User's Manual

# IE-78K0S-NS

## In-Circuit Emulator

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## Target Devices 78K/0S Series

Document No. U13549EJ2V0UM00 (2nd edition)  
Date Published September 2002 N CP(K)

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## Major Revisions in This Edition

Page	Description
Throughout	<ul style="list-style-type: none"> <li>• Addition of interface board IE-70000-PCI-IF-A</li> <li>• Deletion of interface card IE-70000-CD-IF and addition of IE-70000-CD-IF-A</li> </ul>
p.12	<p><b>Figure 1-1 IE-78K0S-NS System Configuration</b></p> <ul style="list-style-type: none"> <li>• Supply media of debugger ID78K0S-NS changed to CD-ROM</li> <li>• Addition of Web site where device file can be obtained as <b>Note 1</b></li> </ul>
pp.19 to 21, 24, and 25	<p><b>CHAPTER 3 INSTALLATION</b></p> <ul style="list-style-type: none"> <li>• Modification of <b>Figure 3-1 Connecting Emulation Board (When using an emulation board on which P1, P2, and P3 connectors are mounted)</b></li> <li>• Modification of <b>Figure 3-2 Connecting Emulation Board (When using an emulation board on which CN5, CN6, CN7, and CN8 connectors are mounted)</b></li> <li>• Modification of <b>Figure 3-3 Connecting Emulation Probe</b></li> <li>• Deletion of SW1 from previous edition and addition of SW2 in <b>Figure 3-6 Default Settings of SW2, SW3, SW4, JP1, and JP4</b></li> <li>• Addition of CN4 and SW2 in <b>Figure 3-7 Part Names of G-789000 Board</b></li> </ul>
pp.26 and 27	Addition of <b>APPENDIX A INTERFACE BOARD (IE-70000-PCI-IF-A) FOR DESKTOP PC</b>
pp.28 and 29	Deletion of previous <b>APPENDIX C PC CARD INTERFACE (IE-70000-CD-IF)</b> Addition of <b>APPENDIX B PC CARD INTERFACE (IE-70000-CD-IF-A)</b>
pp.30 to 32	Modification of <b>APPENDIX C INTERFACE BOARD (IE-70000-98-IF-C) FOR PC-9800 SERIES (EXCEPT FOR NX SERIES)</b>
pp.33 to 35	Modification of <b>APPENDIX D INTERFACE BOARD (IE-70000-PC-IF-C) FOR IBM PC/AT AND COMPATIBLES</b>

The mark ★ shows major revised points.

## INTRODUCTION

### Product overview

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

### Readers

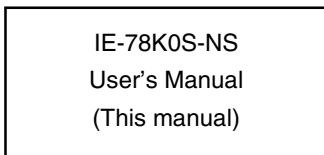
This manual is intended for engineers who perform debugging of systems that use products in the 78K/0S Series of 8-bit single-chip microcontrollers, using the IE-78K0S-NS and an emulation board (IE-789XXX-NS-EM1).

### Purpose

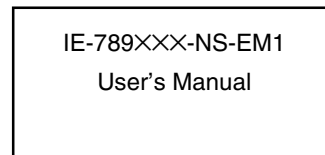
The purpose of this manual is to help the reader understand the debugging functions that are available by using the IE-78K0S-NS and an emulation board (IE-789XXX-NS-EM1) together.

### Organization

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



- Basic specifications
- System configuration
- External interface function



- Function outline
- Target interface differences

### How to read this manual

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

→ 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 device	This is a general term for 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 is the system to be debugged. It includes the target program and the hardware created by the user. When defined narrowly, it includes only the hardware.

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

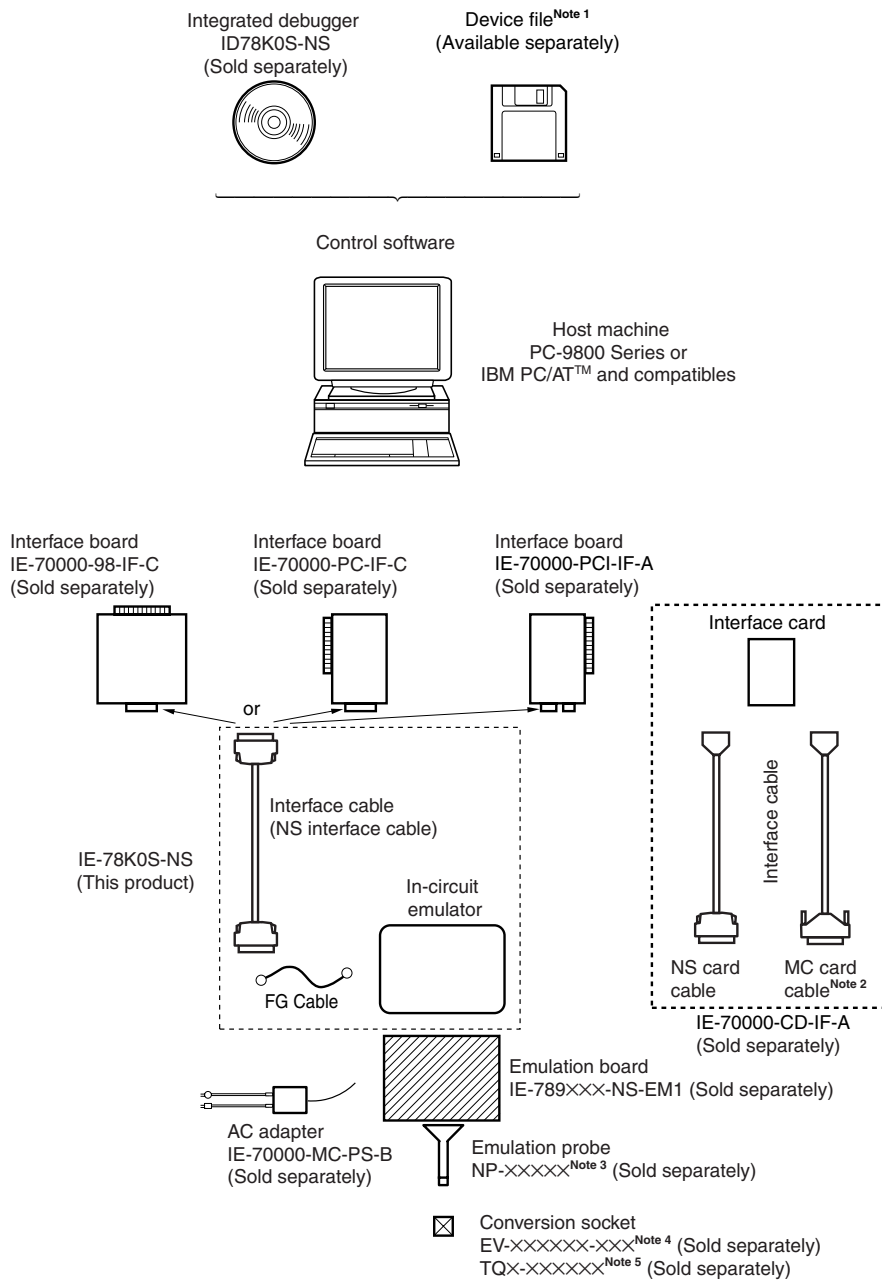
This chapter describes the system configuration and basic specifications of the IE-78K0S-NS.

### 1.1 System Configuration

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

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



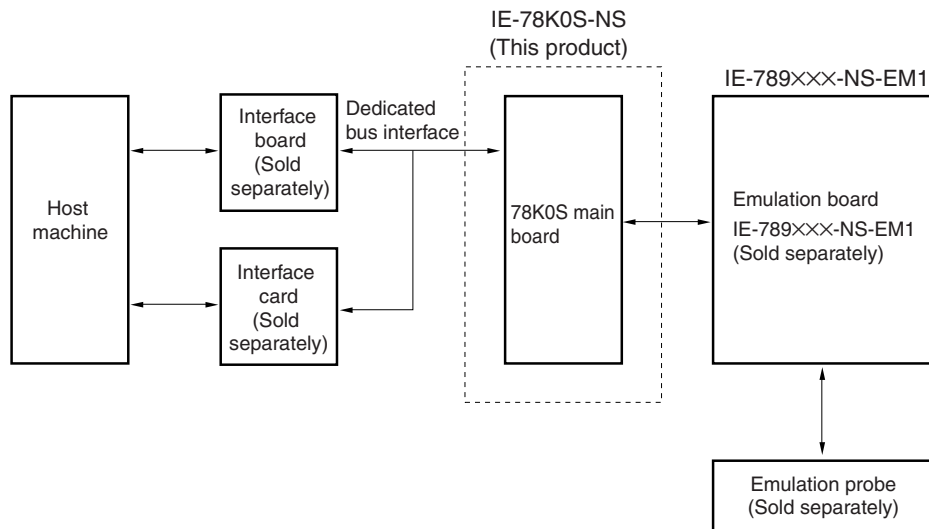
- Notes**
1. The device file can be downloaded from the Web site of NEC Electron Devices (<http://www.ic.nec.co.jp/micro/>)
  2. This cable is used for the V850 Series™. It cannot be used for the IE-78K0S-NS.
  3. The NP-xxxxx is a product of Naito Densai Machida Mfg. Co., Ltd. (TEL +81-45-475-4191). Contact an NEC distributor when purchasing.
  4. The EV-xxxxxx-xxx is a product of NEC.
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Osaka Electronics Department (TEL: +81-6-6244-6672)

## 1.2 Hardware Configuration

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

- Cabinet
- 78K0S main board
- NS interface cable

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



### 1.3 Basic Specifications

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

Parameter		Description
Supervisor		V40™ (operating frequency: 16.0 MHz)
Target device		78K0S Series ( $\mu$ PD789xxx)
System clock		Same as target device
Clock supply	External	Pulse input
	Internal	Mounted on IE-789xxx-NS-EM1
Substitute memory capacity		64 KB
Mapping unit	Internal ROM	256 bytes
	Internal high-speed RAM	8 bytes
	Internal low-speed RAM	64 bytes
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		All the internal RAM area
Event detection		<ul style="list-style-type: none"> <li>• Program execution detection</li> <li>• Bus event detection</li> <li>• External trigger detection</li> </ul> Trigger output ( $\times 1$ ) and open-drain output
Event integration		<ul style="list-style-type: none"> <li>• Path condition</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> </ul>
Real-time trace	Trace factor	<ul style="list-style-type: none"> <li>• All traces</li> <li>• Qualify trace</li> </ul>
	Trace capacity	64-bit $\times$ 8 KB
	Trace contents	Address, data, and status
Execution time measurement		Up to 4 minutes 28 seconds, resolution: 62.5 ns
Target interface		Emulation probe (sold separately) provided for each target device shape
Host interface		Dedicated bus interface
Low-voltage support		Based on the emulation board (sold separately)
Host machine		PC-9800 Series, or IBM PC/AT and compatibles
Power supply		DC 5 V
Dimensions		W235 $\times$ D195 $\times$ H39 (mm)



## CHAPTER 2 PART NAMES

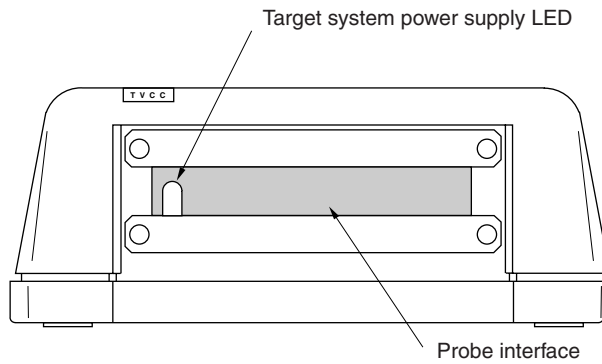
This chapter introduces the parts of the IE-78K0S-NS main unit.

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

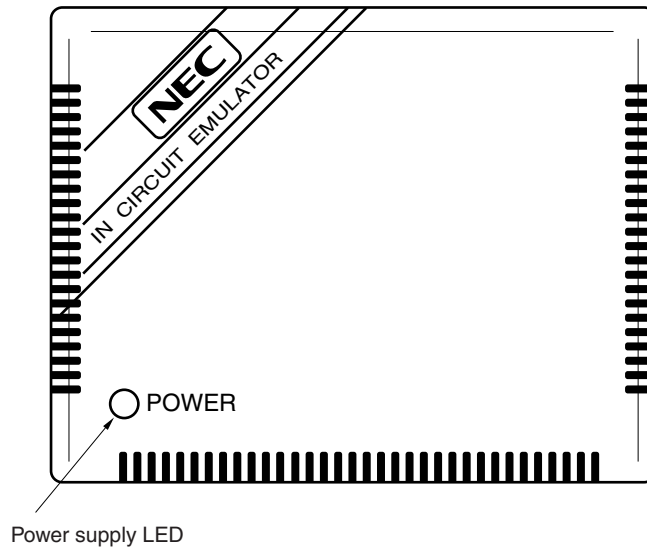
Please make sure to fill out and return the guarantee card that comes with the main unit.

### 2.1 Parts of Main Unit

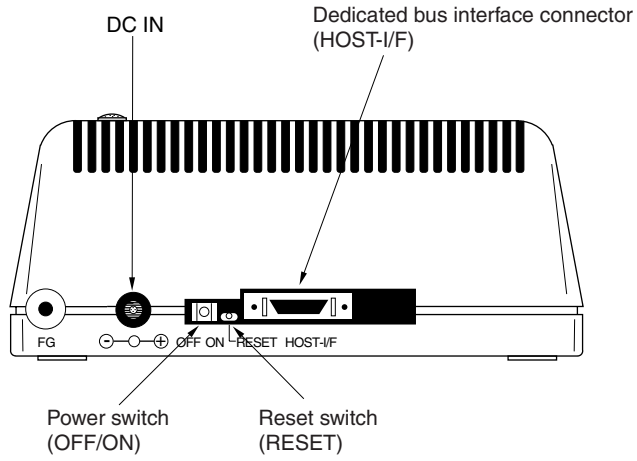
#### (1) Probe end



#### (2) Top view



(3) Interface



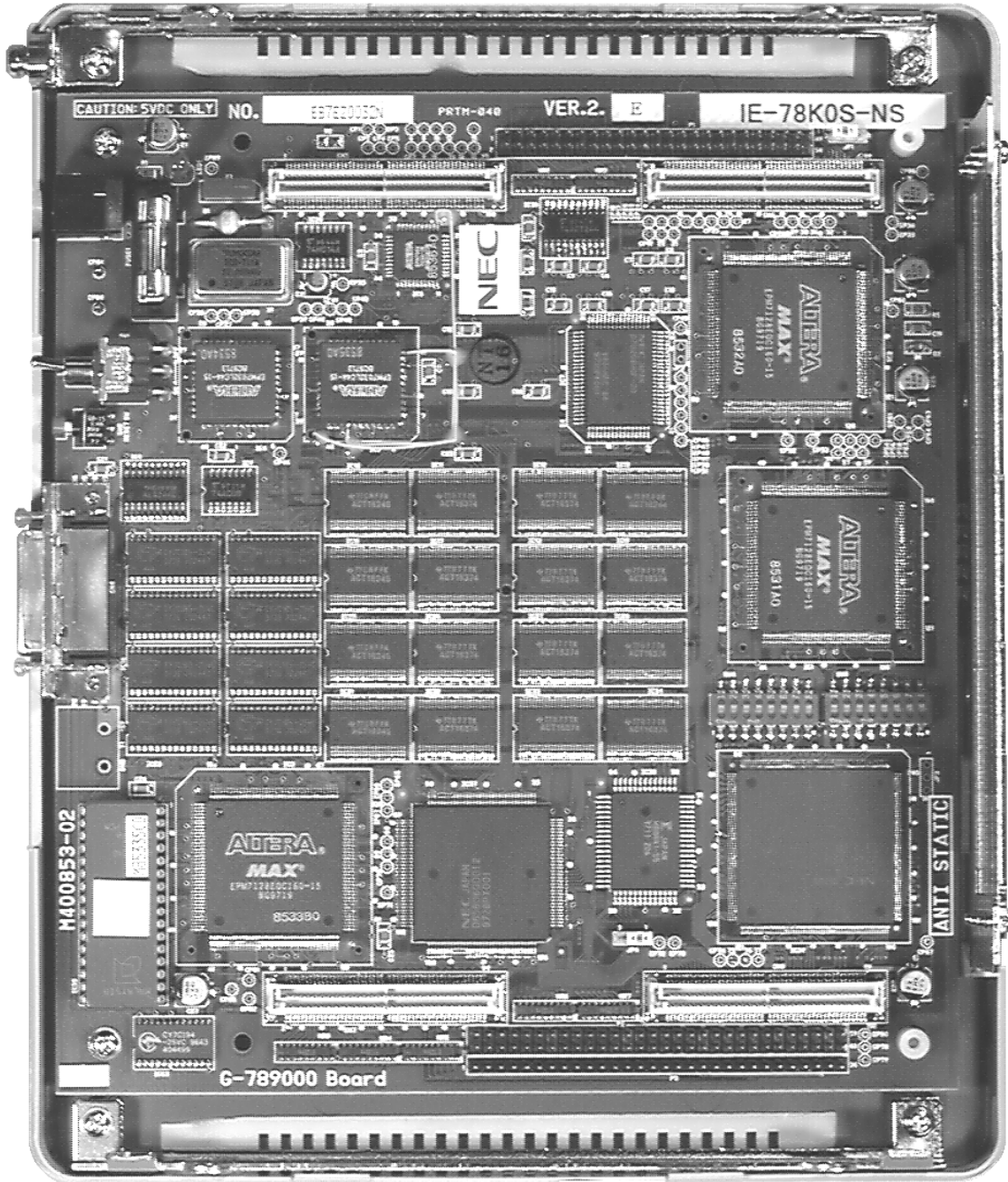
## 2.2 Board Name

IE-78K0S-NS contains this board.

- Main board (G-789000 Board): 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 (G-789000 Board)



**Remark** The above shows the main board mounted in the main unit.

## CHAPTER 3 INSTALLATION

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

### 3.1 Connection

Connect the following seven products which are sold separately.

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

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

**Note** The NP-XXXXX is a product of Naito Densai Machida Mfg. Co., Ltd. (TEL: +81-45-475-4191).

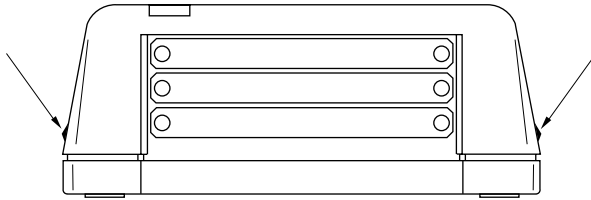
**Caution** Connecting and removing cables or components from the target system and changing the settings of switches, etc. should be carried out after turning off the power of the IE-78K0S-NS main unit and the target system.

**(1) Connecting emulation board (IE-789XXX-NS-EM1)**

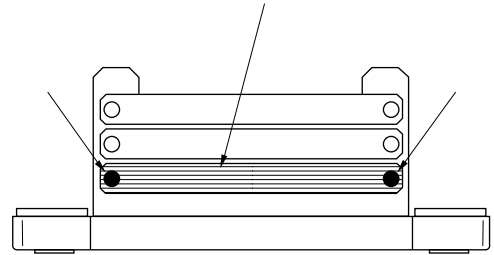
The IE-789XXX-NS-EM1 is sold separately.

★ **Figure 3-1. Connecting Emulation Board**  
**(When using an emulation board on which P1, P2, and P3 connectors are mounted)**

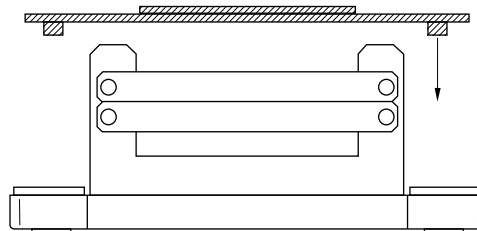
<1> Remove the screws from the sides of the main unit, and then remove the top cover.



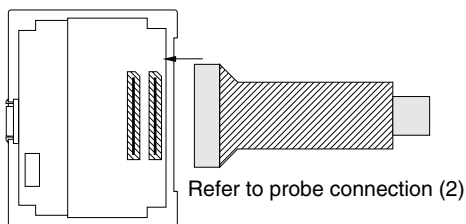
<2> Remove the first plate from the bottom by removing the screws.



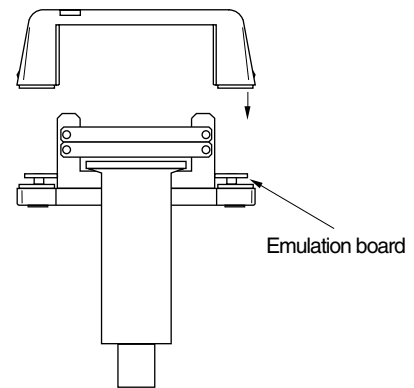
<3> Connect the IE-789xxx-EM1 and fasten the two screws to the emulation board.



<4> When using a probe, connect the probe.



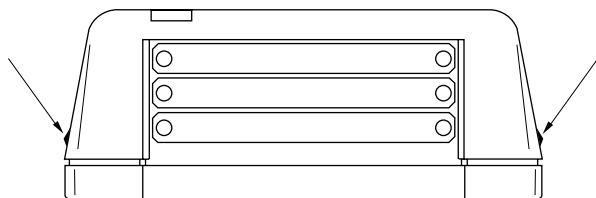
<5> Connect the top cover and fasten the four screws on the sides.



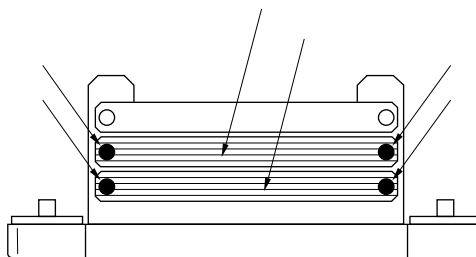
★

**Figure 3-2. Connecting Emulation Board**  
 (When using an emulation board on which CN5, CN6, CN7, and CN8 connectors are mounted)

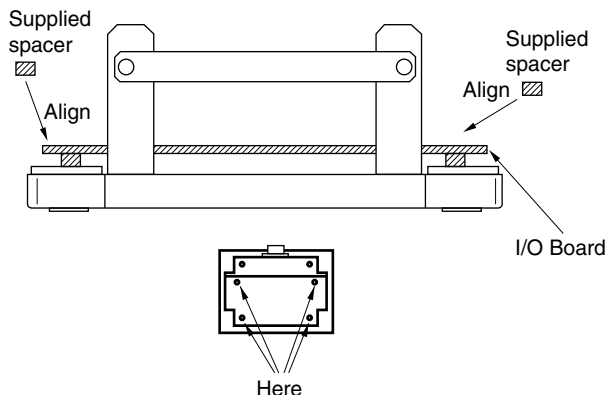
<1> Remove the screws from the sides of the main unit, and then remove the top cover.



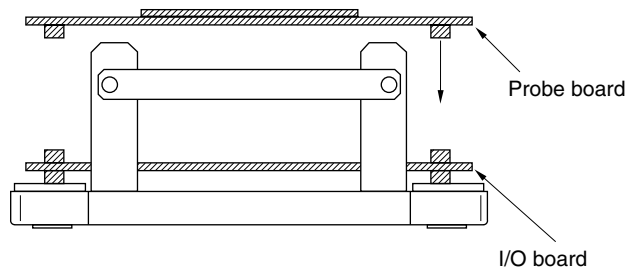
<2> Remove the first and second plates from the bottom by removing the screws.



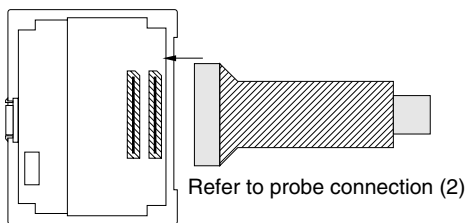
<3> Connect the I/O board and align the spacers that come with the IE-789xxx-NS-EM1 at the four positions shown below.



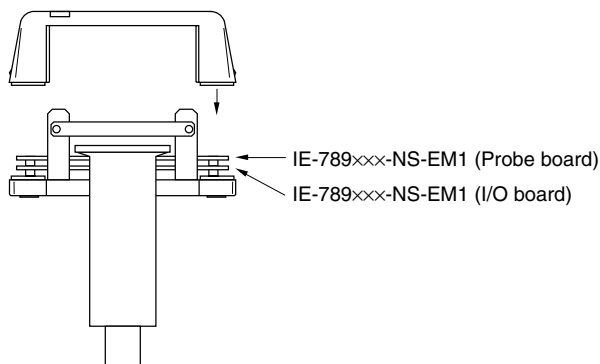
<4> Align the probe board with the I/O board and fix by tightening the four connection screws



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



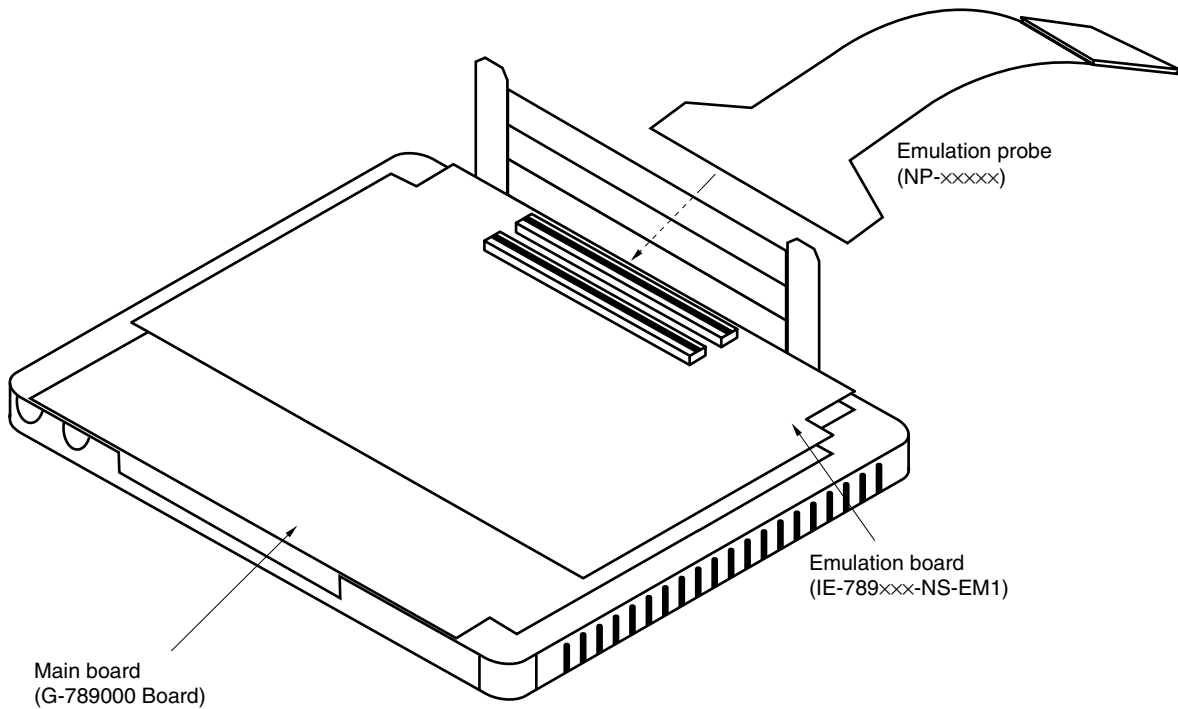
<6> Connect the top cover and fasten the four screws on the sides.



**(2) Connecting emulation probe (NP-XXXXXX)**

The NP-XXXXXX is sold separately.

★

**Figure 3-3. Connecting Emulation Probe**

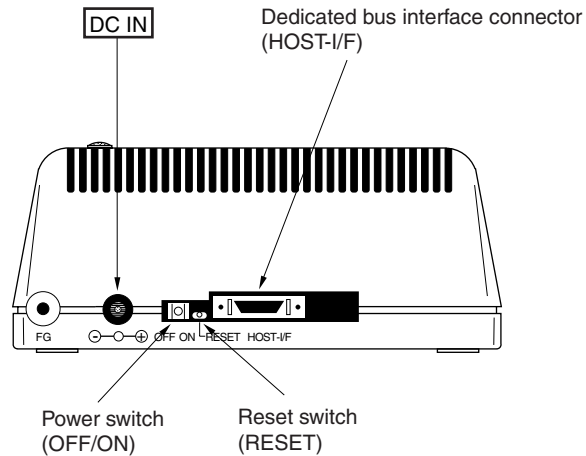
**Caution** The emulation probe (NP-XXXXXX) mounting location varies depending on the model of the IE-789XXX-NS-EM1 in use. For details, refer to the IE-789XXX-NS-EM1 User's Manual.

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

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

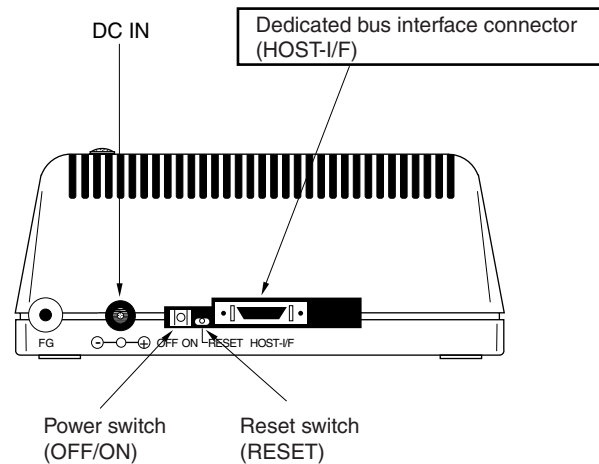
<1> Insert the AC adapter plug into the DC IN socket of the IE-78K0S-NS.

**Figure 3-4. Connecting AC Adapter**

**(4) Connecting interface cable**

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

**Figure 3-5. Connecting Dedicated Bus Interface Cable**



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

- 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.
- When using an interface card (IE-70000-CD-IF-A)  
→ Connect the NS card cable that comes with the IE-70000-CD-IF-A.

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.



## 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**

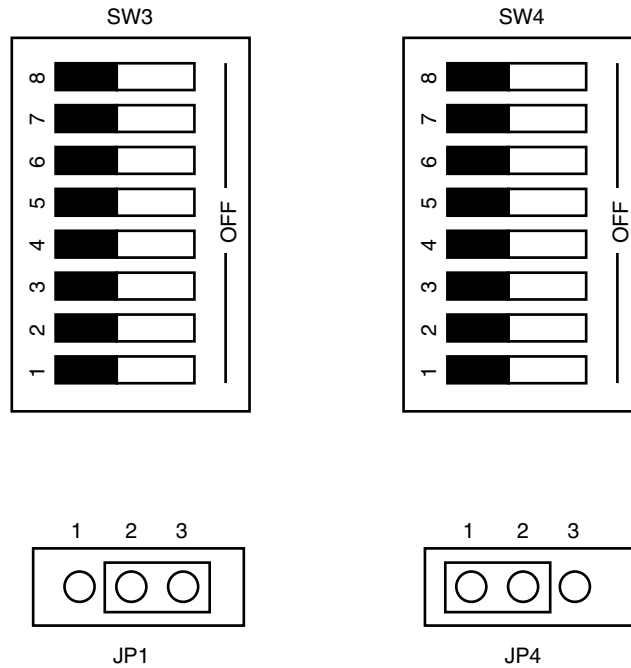
Parameter	MIN. [V]	MAX. [V]
High-level input voltage	Target voltage $\times$ 0.7	Target voltage
Low-level input voltage	0	Target voltage $\times$ 0.3

### 3.3 Jumper or Switch Settings (on Main Board (G-789000 Board))

#### (1) Default settings of Jumper or Switch

★

Figure 3-6. Default Settings of SW2, SW3, SW4, JP1, and JP4



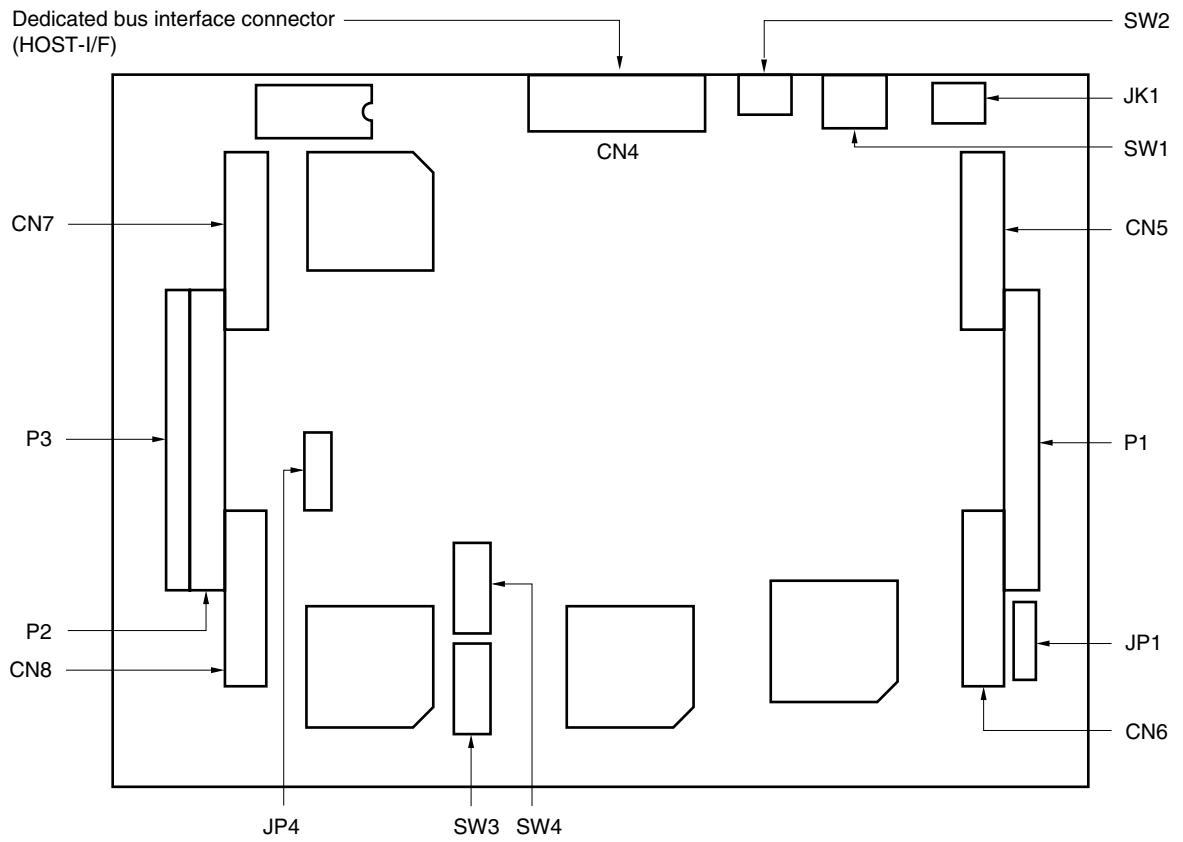
SW2 (Push button): Reset  
 SW3 (DIP switch): ON (fixed)  
 SW4 (DIP switch): ON (fixed)

JP1: 2 and 3 shorted  
 JP4: 1 and 2 shorted

JP2 and JP3 are not used.

★

Figure 3-7. Part Names of G-789000 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.  
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 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 NT 4.0/2000 and that provide a 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.

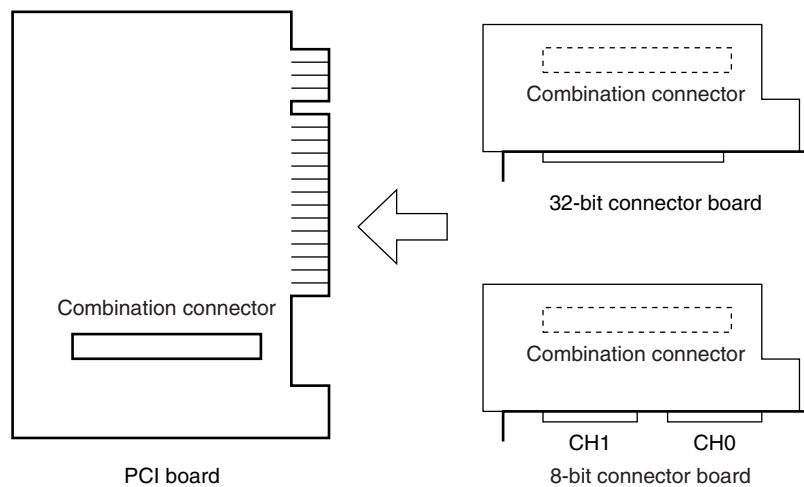
### (2) 8-bit connector board mounting

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

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

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

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

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 NT 4.0/2000.

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 that provide a 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 NT 4.0, 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-A CABLE, connect the IE-70000-CD-IF-A to the IE-78K0S-NS.

**Caution** Be sure to use the NS-A CABLE when connecting to the IE-78K0S-NS-A. If MC-A 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.  
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 NT 4.0/2000 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, the addresses should be set in the 16 bytes between 00D×H and FFD×H. 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 01D×H**

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			

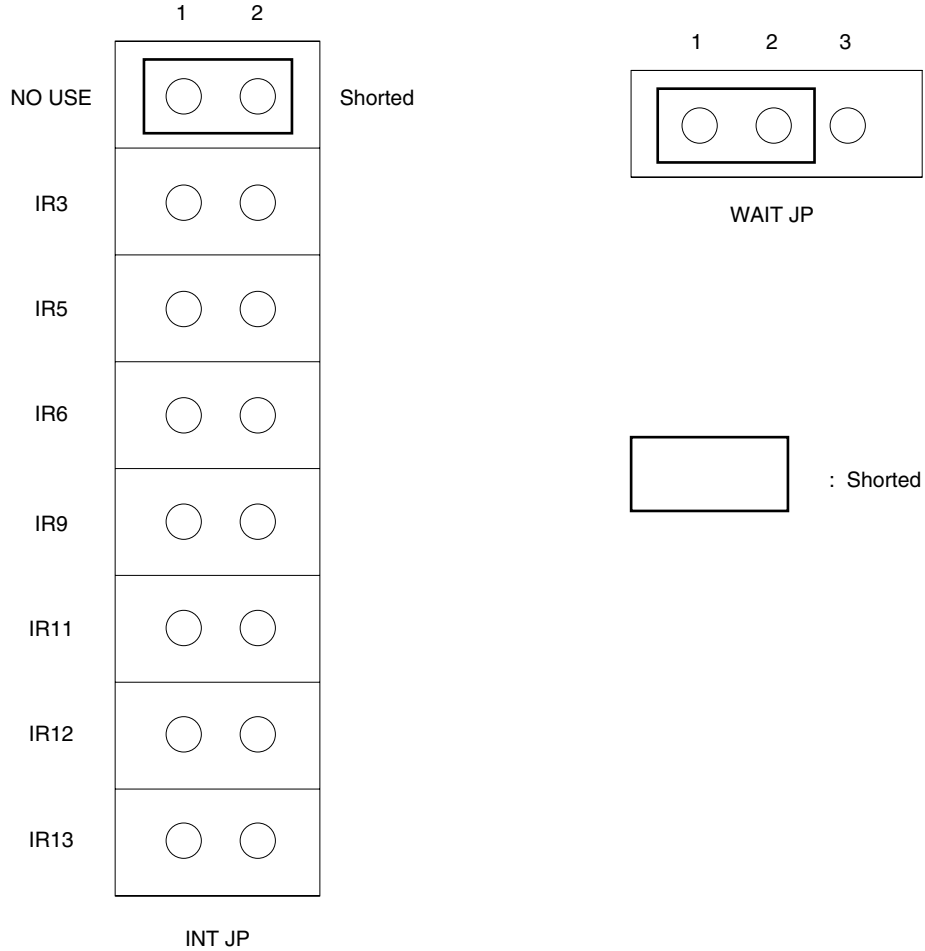
SW2 Number	1	2	3	4	5	6	7	8
Address	A12	A13	A14	A15	OFF	OFF	ON	OFF
ON	0	0	0	0			0	
OFF					1	1		1

**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, 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**

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

**Caution** Connection with the IE-78K0S-NS 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.  
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 NT 4.0/2000 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, 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		

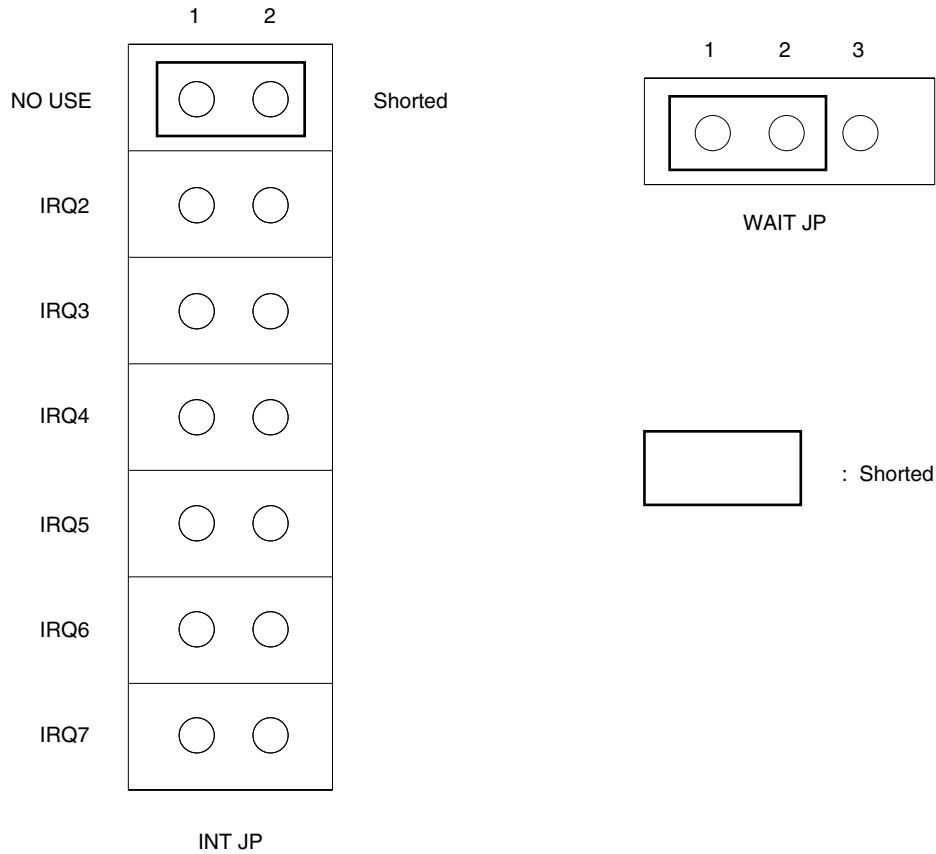
SW2 Number	1	2	3	4	5	6	7	8
Address	A12	A13	A14	A15	OFF	OFF	ON	OFF
ON	0	0	0	0			0	
OFF					1	1		1

**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, 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**

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

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

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