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RENESAS

USER'S MANUAL

IE-70732-BX-A

IN-CIRCUIT EMULATOR

TARGET DEVICES
V805™
V810™

Document No. U10667EJ1V0UM00 (1st edition)
Date Published May 1996 P
Printed in Japan

This equipment is classified as Information Equipment I (information equipment for use in commercial and industrial fields), and complies with the VCCI standard (committee on self-imposed control of electromagnetic interference from information processing equipment) created in order to reduce electromagnetic interference in commercial and industrial areas. Therefore, use of this equipment in residential or adjacent areas may cause faulty reception of radio, television, and other electromagnetic signals.
Operate this equipment according to the instructions provided in the User's Manual.

INTRODUCTION

Readers

This manual is intended for user engineers who design and develop application systems using the μPD70731 (V805).

Organization

This manual contains the following information:

General
Installation
Start-up
Notes on Designing Hardware

Purpose

This manual is designed to introduce the functions of the IE-70732-BX-A which is used to design and develop application systems using the V805, V810.

How to Read this Manual

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

To understand the basic specifications,
→ read **CHAPTER 1 GENERAL.**

To perform setting and connections,
→ read **CHAPTER 2 INSTALLATION.**

To check how to turn power on/off, attach/detach the emulation probe, and operate,
→ read **CHAPTER 3 START-UP.**

To check the points to be noted on designing the hardware,
→ read **CHAPTER 4 NOTES ON DESIGNING HARDWARE.**

To understand the overall functions of the in-circuit emulator,
→ read through the manual in the order of the Table of Contents.

Related Documents

The related documents indicated in this publication may include preliminary versions. However, preliminary versions are not marked as such.

Document related to network interface board for BX series in-circuit emulator

Product name	Document name	Document number
IE-70000-BX-SV1	User's Manual	EEU-870[Note]

Documents related to V805 and V810

Product name	Document name	Document number
V805	Data Sheet	ID-3292
V810	Data Sheet	ID-3293
V805, V810	User's Manual Hardware	U10661E
V810 Family™	User's Manual Architecture	U10082E

Documents related to development tools

Product name	Document name		Document number
C Compiler (CA732)	User's Manual	Operation, UNIX base	EEU-1484
		Operation, MS-DOS™ base PC DOS™ base	EEU-1482
		ANSI-C Language	EEU-1483
		Assembly Language	EEU-1485
Source Debugger (ID732)	User's Manual	Operation, UNIX base	EEU-5021[Note]
		Installation, UNIX base	EEU-5022[Note]
		Operation, WINDOWS	In preparation
		Installation, WINDOWS	In preparation

Note This document number is that of Japanese version.

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[MEMO]

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[MEMO]

LIST OF TABLES

[MEMO]

CHAPTER 1 GENERAL

This chapter describes the system configuration and function specifications of the IE-70732-BX-A.

1.1 Function Overview

The IE-70732-BX-A is an in-circuit emulator that efficiently debugs the hardware and software of a system using the V805, V810.

This in-circuit emulator is controlled by a host machine to which the emulator is connected.

As the host machine, a workstation (UNIX operating system) or a personal computer (in the NEC PC-9800 series or IBM PC series) can be used.

When a workstation is used as the host machine, connect the in-circuit emulator to the workstation via a network. To use a personal computer, insert a dedicated interface board into an expansion slot of the computer.

To perform actual debugging, a debugger in necessary. For details, refer to the **ID732 User's Manual.**

Remarks The in-circuit emulator is sometimes referred to as IE in this manual.

1.2 Features

- Operates with a source debugger (ID732)
- Supports target systems with power supply voltage as low as 3 V
- Real mode and logical mode operation possible
  Real mode ····· Mode in which only target system memory is accessed, without specification of emulation memory or card area
  Real-time emulation with 25-MHz no wait is possible
  Logical mode ··· Mode in which program is executed with specification of emulation memory or card area
  25-MHz operation: Emulation with 1 wait and user waits is possible
- CPU status indication by LED indicators
  RUN, NORDY, HOLD, HALT
- Event break function
  [Event condition] ····· address, memory fetch/read/write, I/O read/write
  [Number of events] ···· 16 max.
- Real-time trace at 33 MHz
- Step execution
  Up to 65,535 instructions can be executed at a time on a step-by-step basis.
- Emulation memory: 1 Mbytes (standard)
  2 Mbytes (expandible)
  During 25-MHz operation: Emulation is possible with 2 waits + user waits

Table 1-1 shows the functional specifications of the IE-70732-BX-A.

Table 1-1 Functional Specifications (1/2)

Parameter	Specifications		Remarks
Target CPU	μPD70731 (V805)		• 100-pin QFP (with socket conversion adapter)
	μPD70732 (V810)		• 176-pin PGA • 120-pin QFP (with socket conversion adapter)
Operating clock	V805	External : 64 KHz to 20 MHz Internal : 25 MHz (at 5 V) 16 MHz (at 3 V)	• Internal/external clock selectable by command • External clock using a crystal oscillator is not possible • Internal clock conversion is possible
	V810	External : 64 KHz to 20 MHz Internal : 25 MHz (at 5 V) 16 MHz (at 3 V)	
Target system power supply voltage	2.7 to 5.5 V		• Low power supply voltage supported
CPU mounting position	<1> Probe tip <2> Top of pod		• AC characteristics improved • Target system must be connected
CPU status indication	LEDs on front panel <1> RUN <2> NORDY <3> HOLD <4> HALT		<1> Lights while user program is executed (green) <2> Lights if bus cycle cannot end because $\overline{\text{READY}}$ signal is not input from target system (red) <3> Lights during bus hold status (red) <4> Lights while HALT instruction is executed (red) Above statuses <1> through <4> can also be read from host computer
Mask function	Set by following commands: <1> $\overline{\text{HLDRQ}}$ <2> $\overline{\text{RESET}}$ <3> $\overline{\text{NMI}}$ <4> $\overline{\text{SZRQ}}$ <5> SIZ16B <6> $\overline{\text{ICHEEN}}$		• Each control signal from target system can be masked
Emulation memory	960 Kbytes (standard) (can be divided into 15 blocks)		• Capacity: 960 Kbytes (64 Kbytes are used as monitor area) • 1 wait (@ 25-MHz) • Expansion emulation memory (option): Memory capacity can be expanded up to 2 Mbytes
Memory mapping function	• Emulation memory: 1 block, can be assigned in 64-Kbyte units		• Can be assigned in 64-Kbyte boundary to 4-Gbyte formal memory space • Target memory area, emulation memory area, and guard area can be mapped
I/O mapping function	Not provided (all external)		• I/O space mapping is not managed

Table 1-1 Functional Specifications (2/2)

Parameter	Specifications	Remarks
Break function[Note]	<1> Event break Up to 16 events Event condition: Combination of A1 - A31, D0 - D31, $\overline{MRQ}$, $\overline{BE0}$ - $\overline{BE3}$, ST0, ST1, R/$\overline{W}$, EXDAT0 - EXDAT7, and ADRSERR	• Event break condition is combination of address, data, and status • Address range can be specified (up to two ranges) • Data and external sense data can be selected
	<2> Number of software break points: 100 max.	• Break point can be specified by formal address
	<3> Forced break	• Forced break can be accepted even in HALT mode
	<4> Break on accessing guard area	• Break occurs when area specified as guard area is accessed, or when fetched instruction is executed
	<5> Trace full break	• Break executed when memory is full
Trace function[Note]	Width : 160 bits Depth : 16 K frames	• Real-time trace at up to 25 MHz of CPU clock • Executed instruction can be disassembled for display • Program execution time can be displayed
	Start/stop condition setting	• Up to 16 start and stop trigger conditions can be set • Trace memory full stop • Can be manually started/stopped
	Trace result display during program execution	• Trace contents can be displayed even while user program is executed
	Trace result search function	• Specified address can be searched from trace result for display
Program execution	• Execution possible from any address • Stepped execution possible	• Program execution possible from any address • Stepped execution of up to 65,535 instructions possible • Instruction execution trace and reverse assemble display
Supply voltage	AC 100 V AC 220 V	• Internal power supply (with automatic AC 100 V/220 V selection function)
Dimensions	Emulator: H327.5 × W122 × D320 (mm) Pod : H65 × W95 × D160 (mm)	• Common BX series housing is used • Power supply is incorporated • Power supplied from Emulator
Weight	Approx. 10 kg	• Handle is provided for easy transportation
Power dissipation	80 W max.	• With fan for forced air cooling
Operating temperature range	10 to 40 °C 10 to 80 % RH	• Without condensation
Storage temperature range	−15 to + 45 °C 10 to 80 % RH	• Without condensation

Note These contents are the hardware specifications of the emulator. For the contents during operation, refer to the **ID732 USER'S MANUAL**.

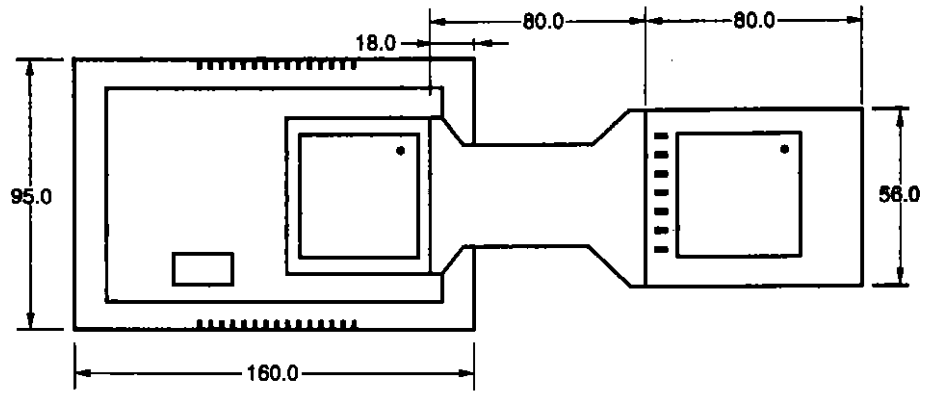
1.3 Probe Tip Dimensions

Fig. 1-1 shows a drawing of the emulation pod and emulation probe, and Fig. 1-2 shows a drawing of the emulation probe tip.

Fig. 1-1 Drawing of Emulation Pod and Emulation Probe

(Unit: mm)

Top View



Side View

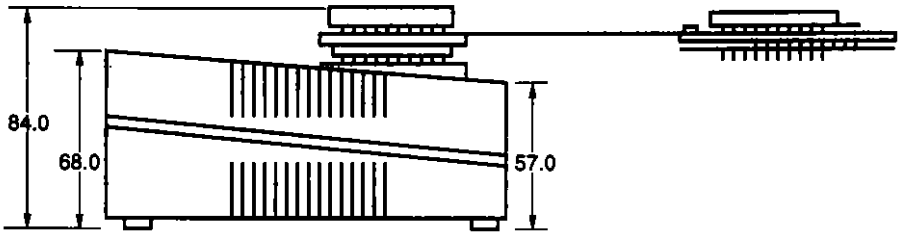
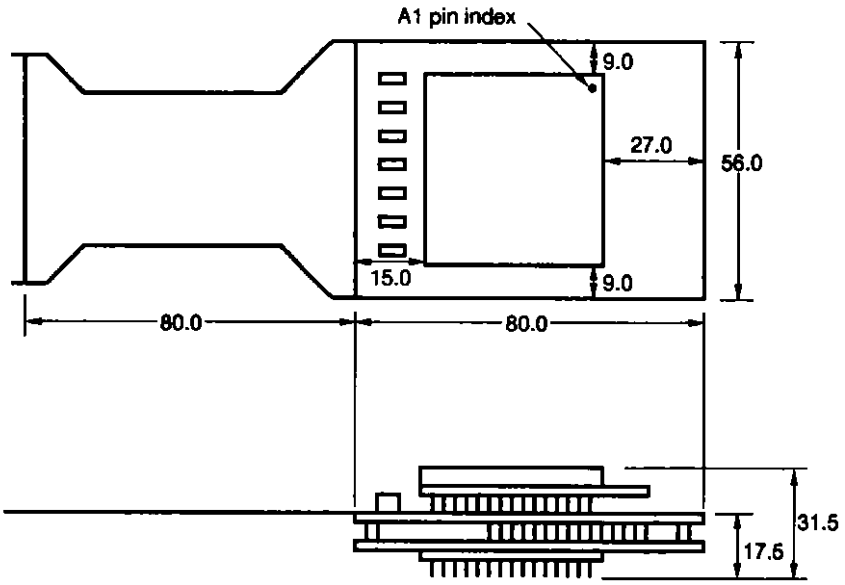


Fig. 1-2 Drawing of Emulation Probe Tip

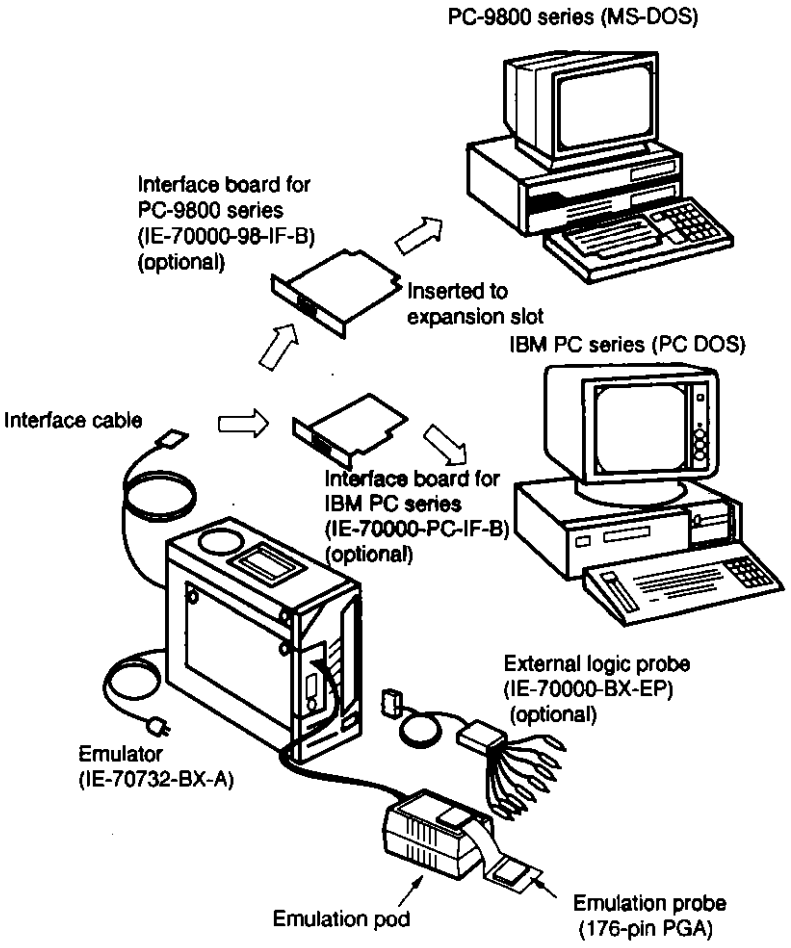
(Unit: mm)



1.4 System Configuration

Figs. 1-3 through 1-5 show the configuration of a system using the IE-70732-BX-A.

Fig. 1-3 Personal Computer-Based System



Caution Although the interface board (IE-70000-98-IF-B/IE-70000-PC-IF-B) is sold separately, it is essential for system configuration.

Fig. 1-4 Workstation-Base System (In case of Ethernet™)

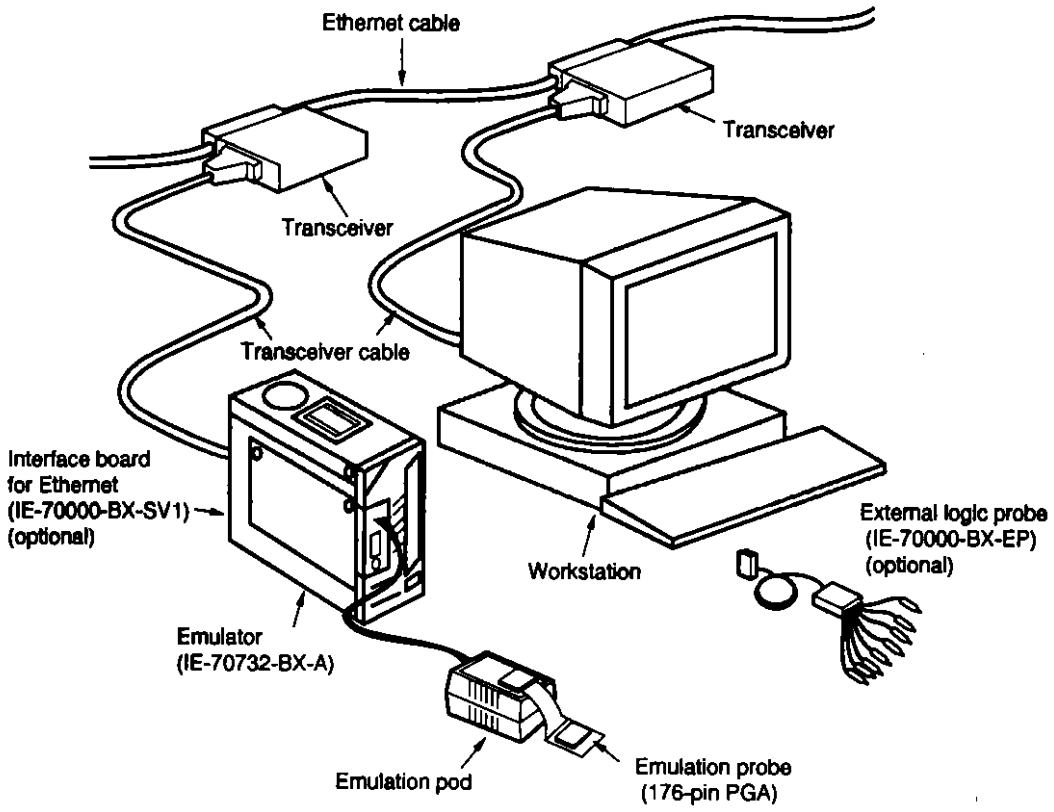
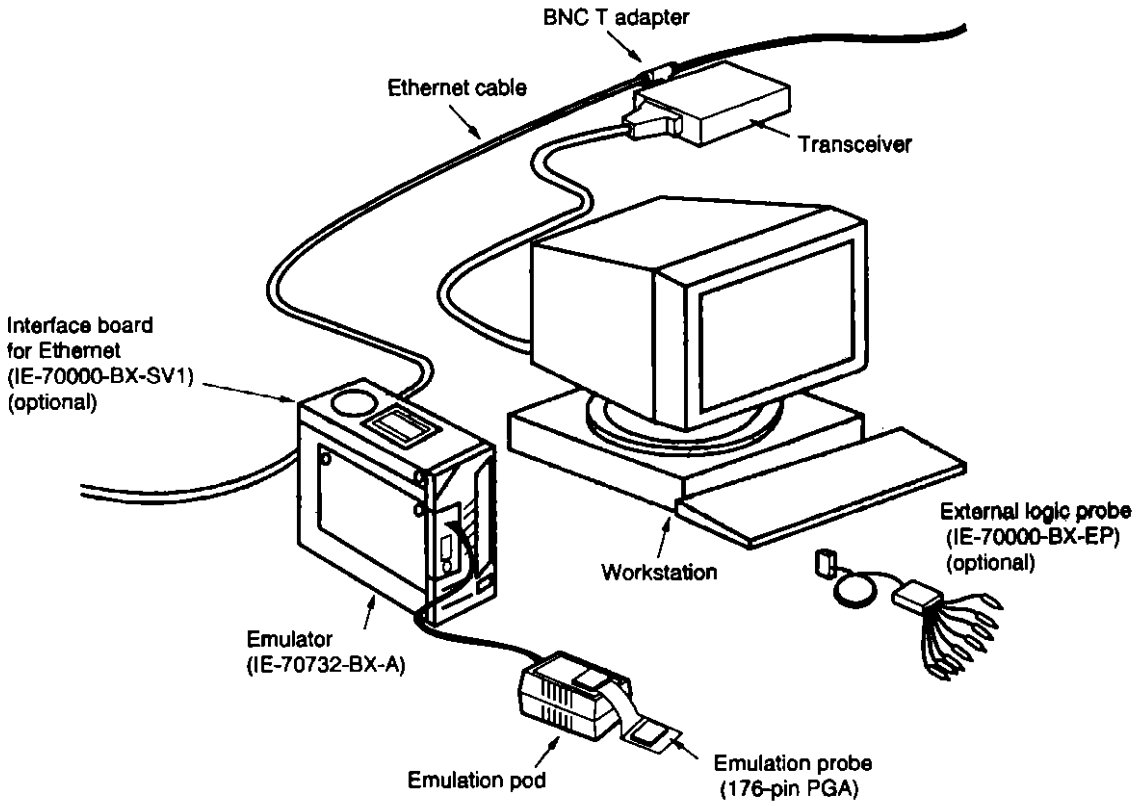


Fig. 1-5 Workstation-Based System (In case of Cheapernet)



1.5 Hardware Configuration

Table 1-2 shows the hardware configuration of the IE-70732-BX-A.
Table 1-3 shows the optional products necessary for system configuration.

Table 1-2 Hardware Configuration

No.	Name	Contents
<1>	Emulator	• V810 emulation board (EM1 board) • Real-time trace board (TR board)
<2>	Emulation pod	Mounts CPU, emulation probe, and internal clock oscillator
<3>	Interface cable	Connects interface board to emulator (length: approx. 2 m)
<4>	Emulation probe	Connects emulator to target system. • 176-pin PGA (V810) can be used. • 120-pin QFP can also be used with optional socket conversion adapter. • 100-pin QFP (V805) can also be used with optional socket conversion adapter.

Table 1-3 Necessary Optional Products

No.	Name	Contents
<1>	Personal computer interface board (IE-70000-98-IF-B: for PC-9800 series) (IE-70000-PC-IF-B: for IBM PC series)	Board connecting personal computer with IE (inserted into expansion slot of personal computer)
<2>	Network interface board (IE-70000-BX-SV1)	Board connecting Ethernet with IE (inserted into expansion slot of IE)

1.6 List of Optional and Related Products

Table 1-4 lists the optional products that can be connected to the IE-70732-BX-A.

Table 1-4 Optional Products

No.	Name	Contents
<1>	External logic probe (IE-70000-BX-EP)	Consists of GND (1) and external inputs (8) and can use external inputs as triggers or display trace result
<2>	Expansion emulation memory (IE-70000-BX-MM2)	• Inserted into dedicated slot of IE • 2-Mbyte high-speed SRAM mounted • During 25-MHz operation 2 waits + user waits
<3>	V805: Socket conversion adapter[Note 1] (LVC-PG177-TQF100-V805[Note 2] ADP-PG177-TQF100-V805[Note 2])	Conversion adapter from 176-pin PGA to 100-pin QFP Accessories: TQPACK100SD[Note 3], TQSOCKET100SDW[Note 3]
	V810: Socket conversion adapter[Note 1] (LVC-PG177-QF120-V810[Note 2] ADP-PG177-QF120-V810[Note 2])	Conversion adapter from 176-pin PGA to 120-pin QFP Accessories: TQPACK120SA[Note 3], TQSOCKET120SAW[Note 3]

Notes 1. Use either LVC or ADP. Each product is provided with one TQPACK and one TQSOCKET.
LVC: Package conversion, supports 3 V
ADP: Package conversion only

2. Please direct inquiries to: Midas Lab., Inc. Tel : 03-3357-2589
Fax: 03-3357-8029

3. Please direct inquiries to: Daimaru Kogyo Corp. Tel: 03-3820-7112, 06-244-6672

CHAPTER 2 INSTALLATION

This chapter describes how to unpack the carton box containing the IE-70732-BX-A, and connect each part of the in-circuit emulator.

2.1 Unpacking

When unpacking the carton box containing the IE-70732-BX-A, confirm that the following items are included:

	Qty.
(1) Emulator	1
(2) Accessories	
(a) User's Manual (this manual)	1
(b) Interface cable[Note]	1
(c) Fuse	1
(d) Power cable	1
(e) Accessory list	1
(f) AC power cable adapter	1
(g) Packing specifications	1

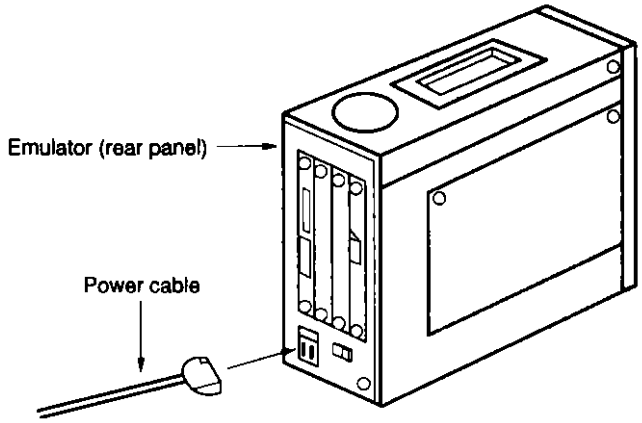
Note The interface board is optional and must be purchased separately.

2.2 Connecting IE

2.2.1 Connecting power cable

Connect the power cable to the emulator as shown in Fig. 2-1.

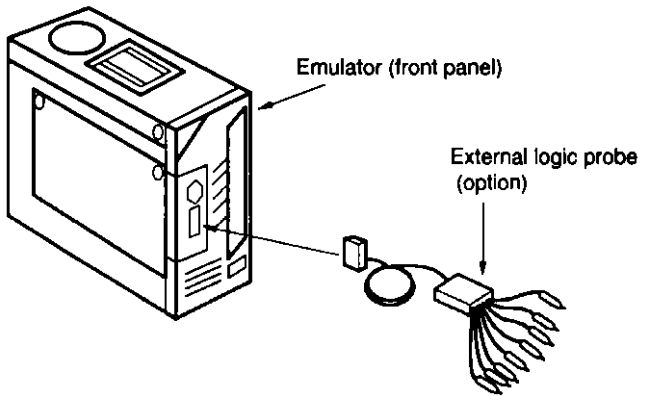
Fig. 2-1 Connecting Power Cable



2.2.2 Connecting external logic probe (option)

When using the external logic probe, connect it to the emulator as shown in Fig. 2-2. In doing so, be sure to turn off power to the emulator.

Fig. 2-2 Connecting External Logic probe



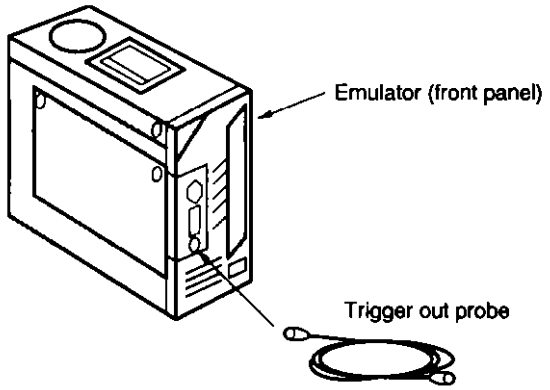
2.2.3 Connecting trigger out probe (general-purpose)

The trigger out pin is connected to an external device with a coaxial cable with BNC connectors. when using the trigger out probe, connect the probe to the emulator as shown in Fig. 2-3.

This probe is not available from NEC. Use a probe supplied with a logic analyzer, etc.

The trigger out signal is a TTL-level output signal and goes low during break, and high during user program execution.

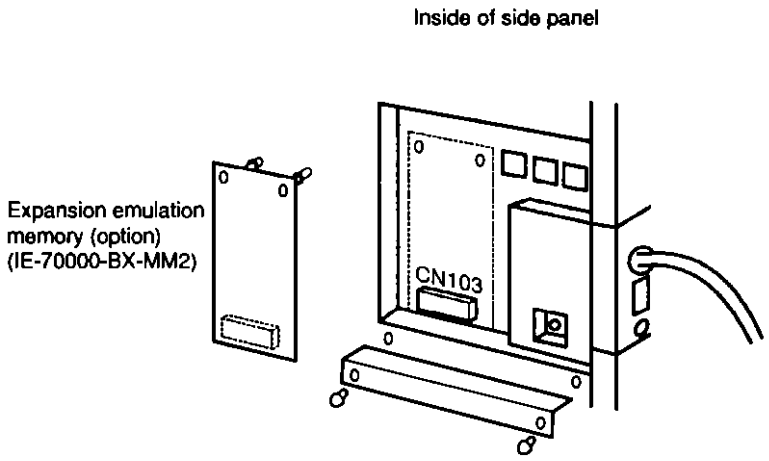
Fig. 2-3 Connecting Trigger Out Probe



2.2.4 Connecting expansion emulation memory (option)

When using the expansion emulation memory, connect the memory to the emulator as shown in Fig. 2-4.

Fig. 2-4 Connecting Expansion Emulation Memory



Remove the screws and detach the metal plate. Insert the connector of the expansion emulation memory in CN103, and put back the metal plate.

2.3 Setting Host Machine (when personal computer is used)

When using a personal computer as the host machine, an optional interface board in necessary.

No special hardware setting is necessary. However, if the I/O board that handshakes between the IE-70732-BX-A with the computer has already been used by another expansion board, either disconnect the board or change the assignment to a vacant I/O address by changing the setting of the interface board.

- **When using PC-9800 series**
  The PC-9800 series is provided with V30™ and 80286/386 modes. The in-circuit emulator operates in both modes; therefore, no setting is necessary.

- **When using IBM PC series**
  No mode has to be set with the IBM PC series, regardless of whether PC/AT™ or PC/XT™ is used.

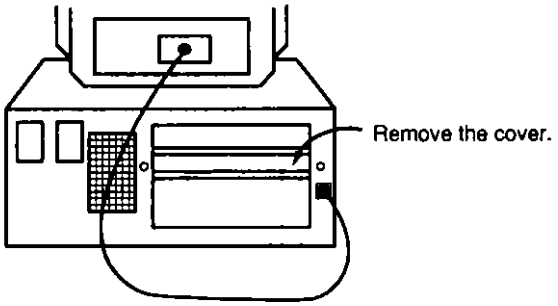
2.3.1 Connecting IE-70732-BX-A to PC-9800 series

This section describes an example of connecting the IE-70732-BX-A to a PC-9800 series personal computer. When using an IBM PC series computer, connect the in-circuit emulator in the same manner.

Connect the in-circuit emulator to the personal computer by following the steps below.

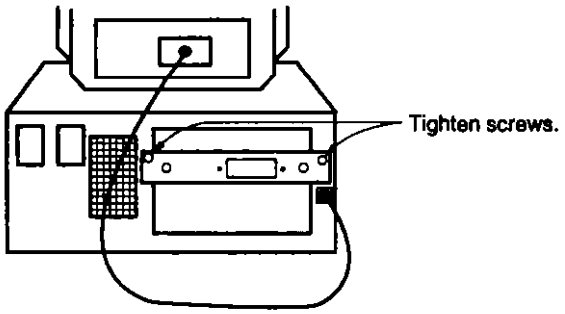
(1) Turn off power to the personal computer.
(2) Remove the cover of the slot bus as shown in Fig. 2-5.

Fig. 2-5 Rear Panel of PC-9800 Series



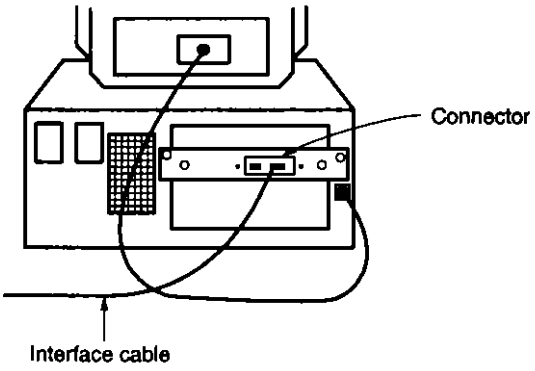
(3) Insert the interface board.
(4) Secure the interface board by tightening the screws, as shown in Fig. 2-6.

Fig. 2-6 Inserting Interface Board



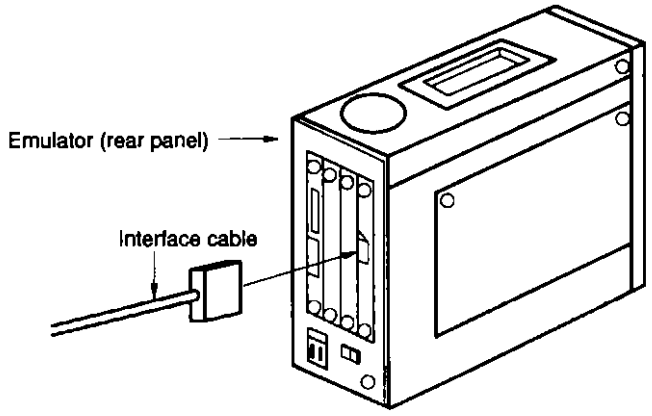
(5) Connect the interface cable as shown in Fig. 2-7.

Fig. 2-7 Connecting Interface Cable



(6) Connect the interface cable to the emulator as shown in Fig. 2-8.

Fig. 2-8 Connecting Interface Cable to Emulator



2.3.2 Setting Interface board

The I/O address of the IE-70732-BX-A must be set by using the DIP switches on the interface board to handshake the in-circuit emulator with the host machine, which is a PC-9800 series or IBM PC series personal computer.

(1) When PC-9800 series is used (setting of IE-70000-98-IF-B)

The I/O address is set by using the DIP switches 1 (SW1) and 2 (SW2) on the interface board.

SW1 and SW2 are switches that set a handshake bus address.

Set the switch pins 1 through 8 of SW1 as shown in Fig. 2-9, and set the switch pins 5 through 8 of SW2 as shown in Fig. 2-10 (addresses 00D0H through 00DBH are set).

Fig. 2-9 Setting DIP Switch 1 (PC-9800 series)

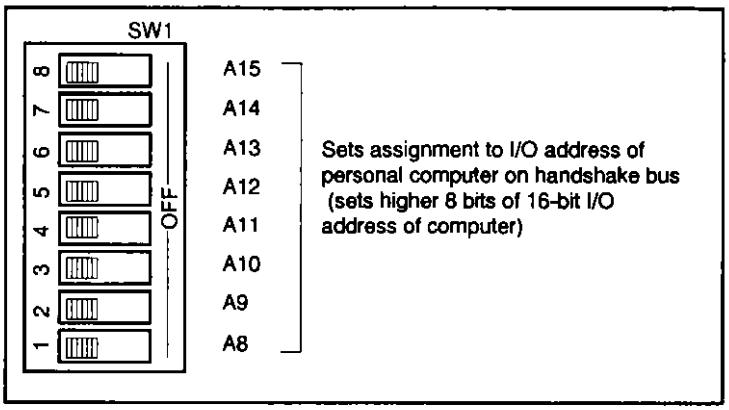


Fig. 2-10 Setting DIP Switch 2 (PC-9800 series)

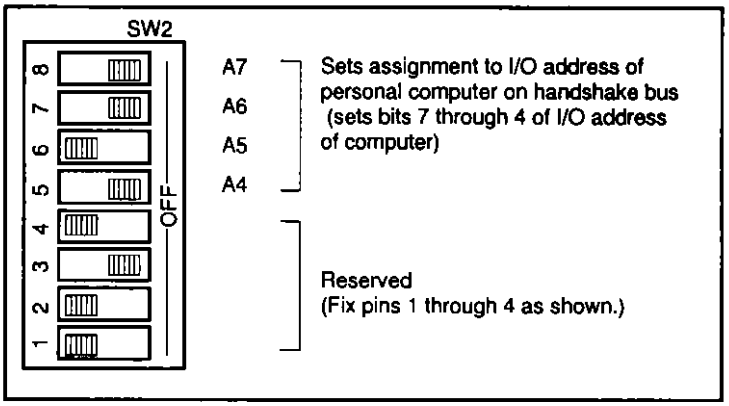
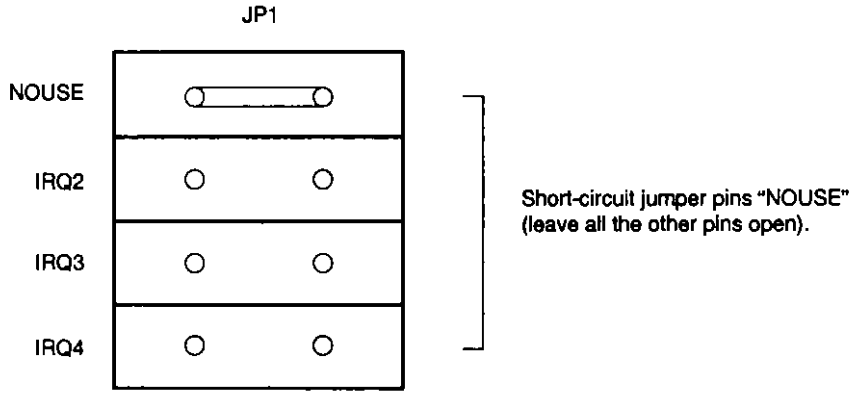


Fig. 2-11 Setting Jumper Switch (PC-9800 series)



(2) When IBM PC series is used (setting of IE-70000-PC-IF-B)

The I/O address is set by using the DIP switches 1 (SW1) and (SW2) on the interface board.

SW1 and SW2 are switches that set a handshake bus address.

Set the switch pins 1 through 8 of SW1 as shown in Fig. 2-12, and set switch pins 1 through 4 of SW2 as shown in Fig. 2-13 (addresses 0220H through 022DH are set.)

Fig. 2-12 Setting DIP Switch 1 (IBM PC series)

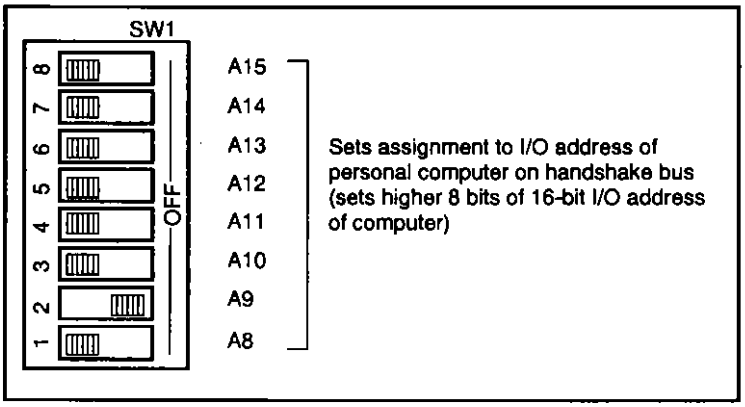


Fig. 2-13 Setting DIP Switch 2 (IBM PC series)

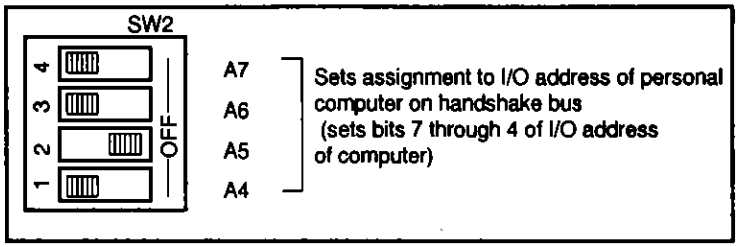
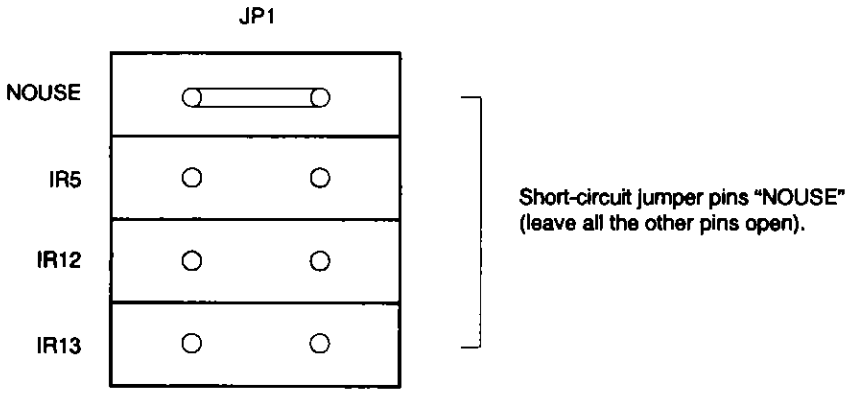


Fig. 2-14 Setting Jumper Switch (IBM PC series)



2.3.3 Setting environmental variables

- **Change handshake bus address**
  The default handshake bus address value is as follows when no environmental variable is set:

  PC-9800 series : address 00DXH
  IBM PC series : address 022XH

  If the above address cannot be used, the address can be changed to the one specified by using environmental variable "IE70732_BASE". At this time, the setting of the DIP switch must be accordingly changed (refer to **2.3.2 Setting interface board**).

  Example A>SET IE70732_BASE=01D0

  In this example, the base address is set to address 01DX.
  Although the lower 4 bits of the set value are don't care bits, they must be described.
  Input the value as a hexadecimal number. If a character other than those of hexadecimal number is used, the default value is assumed.
  For specific environment setting of the host machine, refer to the **ID732 USER'S MANUAL**.

2.4 Setting Host Machine (workstation)

2.4.1 Outline of system operation

The in-circuit emulator is provided with a ROM storing a TCP/IP program and an initialization program that routes a network.

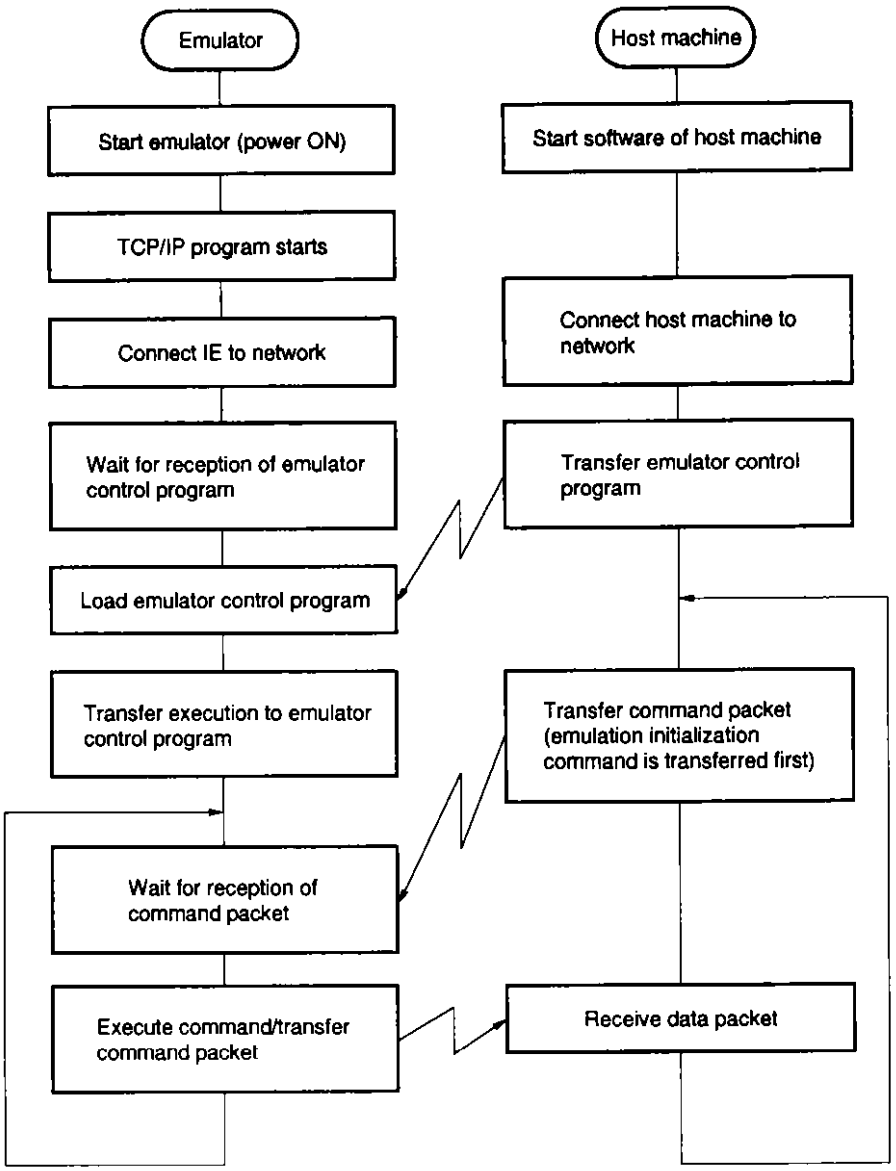
The emulator connected to a network transfers and receives debug commands and data through TCP/IP.

When starting the system or initializing the emulator, an emulator control program is downloaded from the host machine.

All the other programs controlling the emulator are downloaded from the host machine after the program that connects the emulator to the network has been started; therefore, these programs are not provided to the emulator.

The program downloaded to the emulator is erased when the power to the emulator is turned off. To turn the power back on again, restart the software of the host machine, and then load the emulator control program again. Fig. 2-15 outlines the operations, including starting the system and accepting commands.

Fig. 2-15 Outline of Operations



2.4.2 Connecting network

Connect the IE-70732-BX-A to the network by using the network interface board (IE-70000-BX-SV1)[Note].

The network interface board (hereafter referred to as SV1 board) is provided with two types of external interfaces conforming to IEEE802.3 (10BASE5 and 10BASE2), and can be connected to either Ethernet or Cheapernet. However, the two networks cannot be used at the same time.

Selection of 10BASE5 or 10BASE2 is made by setting the jumper on the SV1 board.

For specific connection of each network cable, refer to **2.4.10 Connecting network cable.**

For the details on the SV1 board, refer to **2.4.4 Setting jumper switches** and **2.4.5 Incorporating SV1 board.**

Note This board is optional. for details, refer to the **IE-70000-BX-SV1 USER'S MANUAL.**

2.4.3 Setting IE

To connect the IE-70732-BX-A to a network, initialization must be performed. The following sections describe how to perform the initialization.

Before performing the initialization, make sure that the following items are at hand:

<1> IE-70732-BX-A
<2> IE-70000-BX-SV1 (SV1 board)[Note 1]
<3> Terminal (terminal with RS-232C terminal for personal computer)[Note 2]
<4> RS-232C cable (For specifications and connections, refer to **2.4.9 Connecting RS-232C cable.**)

Notes 1. The transceiver, transceiver cable, coaxial cable , and RS-232C cable are optional. Separately order these cables according to your system.

2. The terminal and RS-232C cable are necessary for initializing the SV1 board.

2.4.4 Setting jumper switches

It is not necessary to set the jumper switches of the emulator. This section focuses on setting the jumpers on the SV1 board.

Figs. 2-16 and 2-17 show the location and factory-set conditions of the jumper switches on the SV1 board. Change the setting of these jumper switches in accordance with your system.

Table 2-1 shows the functions of the jumper switches.

Table 2-1 Functions of Jumper Switches

Jumper switch		Function	Factory-set condition
Board side	JP1	Selection of terminal power feed of SCSI (fixed to factory-set condition)	1-2
	JP2	Used to connect terminal necessary for initialization Selects baud rate of RS-232C	1-2 (9600 bps)
	JP3 - JP8	Selects network connection standard (Cheapernet/Ethernet)	1-2 (Connects Cheapernet)
	SW4	Reserved (fixed to factory-set condition)	OFF
Panel side	MASTER	Host connection select switch Selects whether host is connected to emulator via network (SV) or personal computer interface (EM)	SV (via network)
	CONF.	Initialization switch Selects whether initialization modes or TCP/IP program start mode is set on power application	1 (initialization mode)

Fig. 2-16 Factory-Set Conditions of SV1 Board (Board)

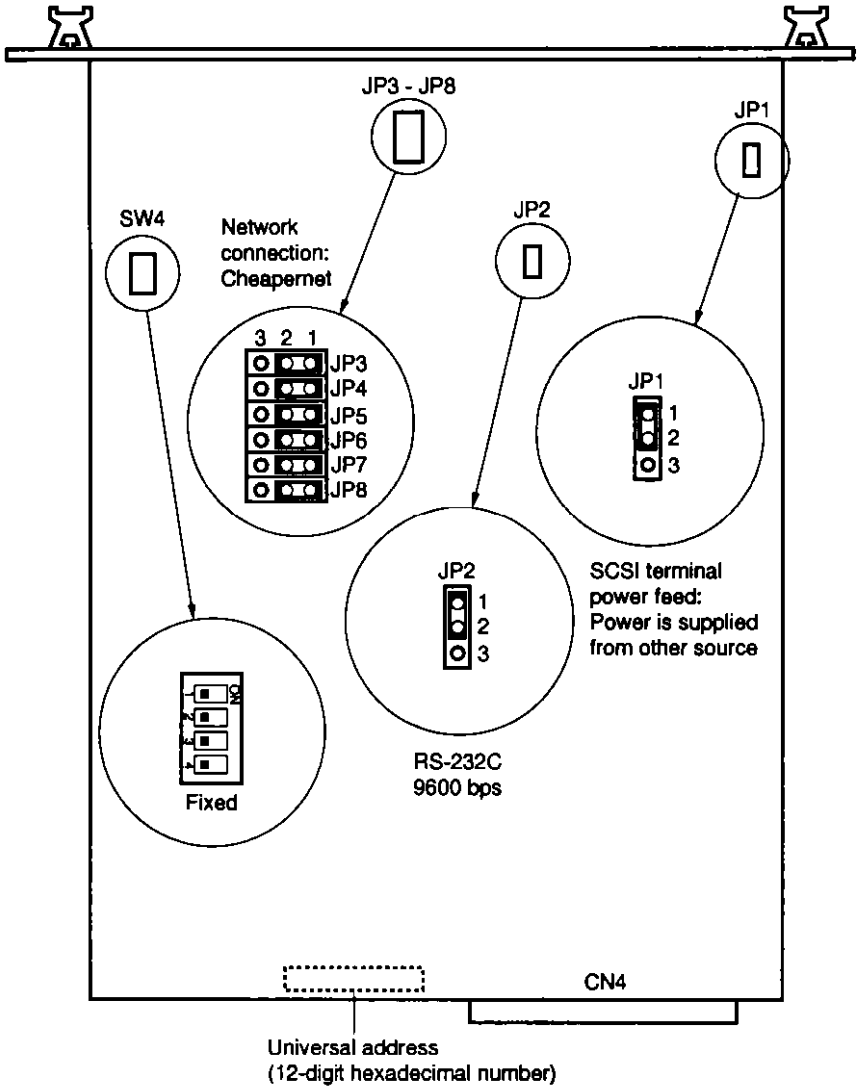
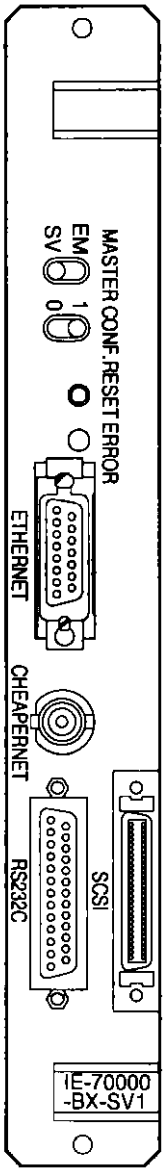


Fig. 2-17 Factory-Set Conditions of SV1 Board (Panel)



Host connection select switch

Initialization switch

Reset switch

Error indicator LED

Transceiver connector

Cheapernet connector

RS-232C connector

SCSI connector

(1) Setting of jumper switches on board

Set the jumper switches in accordance with your system.

JP1: Not used with this system. Leave this switch as factory-set.

JP2: Change setting of this switch according to the baud rate of the terminal used to set network information.

Table 2-2 Setting of JP2

Baud rate	Setting
9600 bps	1-2 shorted (factory-set condition)
4800 bps	2-3 shorted

JP3 - JP8: Change the setting of these switches according to the standards of the network cable to which the emulator is to be connected.

Table 2-3 Setting of JP3 - JP8

Network standard	Setting
Cheapernet (10BASE2)	1-2 shorted (factory-set condition)
Ethernet (10BASE5)	2-3 shorted

Caution Set all JP3 - JP8 in the same manner.
Short-circuiting 1-2 and 2-3 at the same time may cause malfunctioning of the emulator.

SW4: This switch is not used with this system. Leave this switch as factory-set.

(2) Switches on panel

Set the switches on the panel as indicated below.

Table 2-4 Setting of Switches on Panel

Switch	Setting
MASTER	Set this switch to SV position (factory-set condition)
CONF.	Set this switch to position "1" (factory-set condition) when network information is not set or when resetting is to be performed. Set the switch to position "0" if setting of network information has been done.

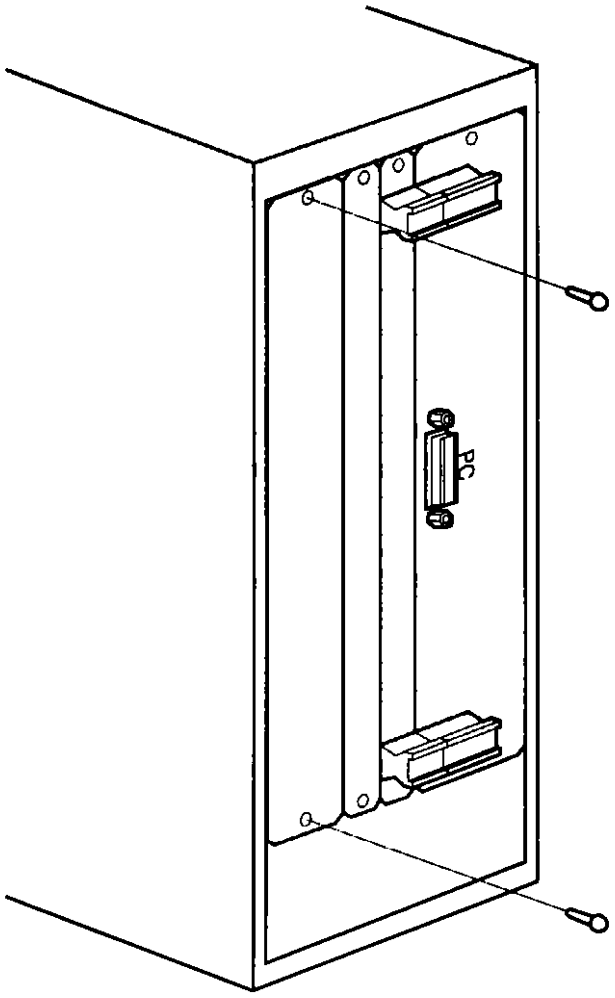
2.4.5 Incorporating SV1 board

Incorporate the SV1 board to the emulator by following steps (1) through (3) below.

(1) Remove the back panel of the emulator. In doing so, bear in mind the following points:

- Do not lose the mounting screws of the panel because they are used again.
- The emulator has four slots. The slot to which the SV1 board is to be mounted is fixed. Do not mount the board to any other slots.

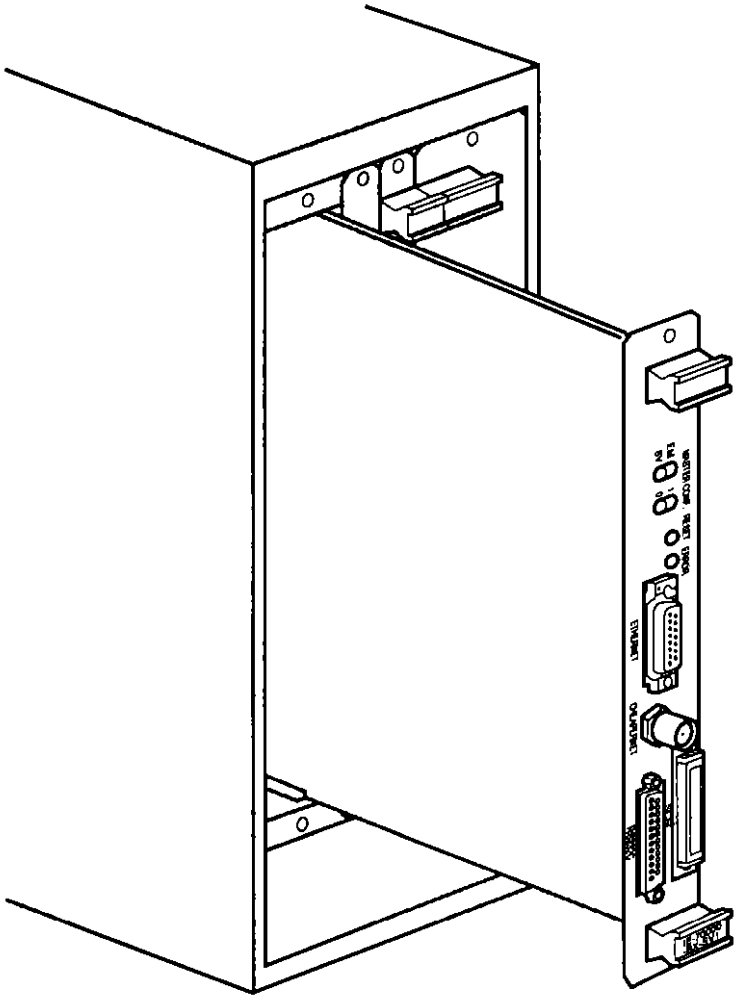
Fig. 2-18 Removing Back Panel



(2) Mount the SV1 board into the emulator. In doing so, bear in mind the following points:

- Make sure that the power to the emulator has been turned OFF.
- Confirm that the jumper switches are correctly set.
- Mount the SV1 board in the correct direction (the direction of the component side).
- Make sure that the bottom edge of the board is correctly inserted into the groove of the card rail.

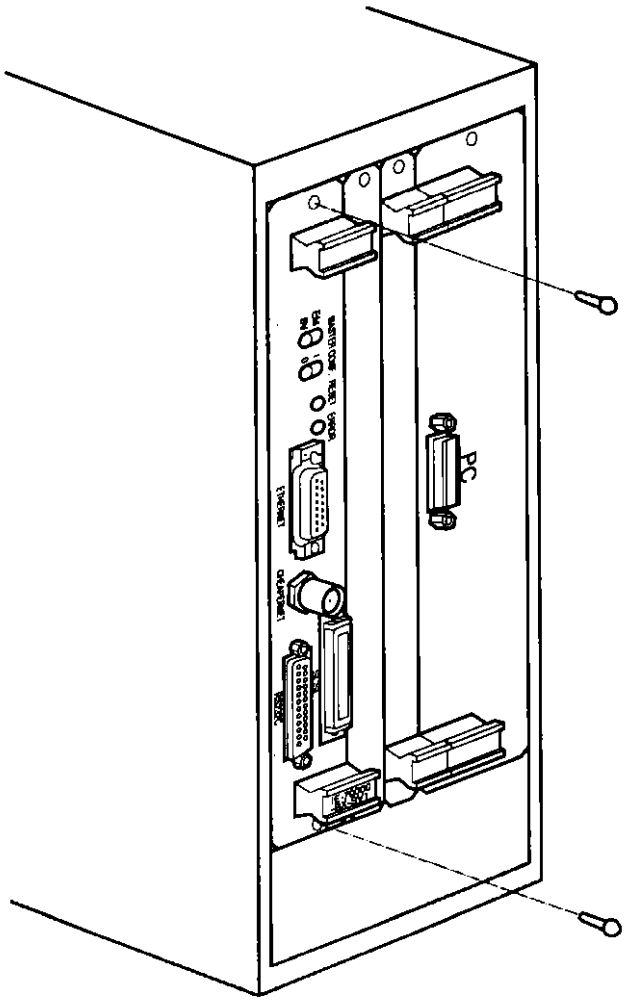
Fig. 2-19 Mounting SV1 Board



(3) Secure the panel by tightening the screws. In doing so, keep in mind the following points:

- Make sure that the connector of the board is correctly connected to the connector on the chassis.
- Secure the SV1 board to the chassis by using the mounting screws of the back panel.

Fig. 2-20 Tightening Screws of Back Panel



2.4.6 Setting network information

To connect the emulator to a network, information on the network must be set on the host machine and in the emulator.

For information on how to set the network information on the host machine, refer to the **IS732 User's Manual.**

To set the network information, information set when environments were set on the host machine is necessary. This information is provided by the manager of the UNIX operating system on the host machine or network manager.

The items of the network information necessary for setting the environments are as follows:

- **IP address (LOCAL IP ADDRESS)**
  Peculiar network address assigned to emulator
  (This address is a decimal number delimited by a period on the host machine, but is set as a continuous 8-digit hexadecimal number on the emulator.)
- **Host name (LOCAL HOST NAME)**
  Set the name same as the one set on the host machine (alphanumeric string of 16 characters or less).
- **Port number (LOCAL PORT NO.)**
  Set a 4-digit hexadecimal number other than 0 (usually, 0401 or higher).

2.4.7 Starting initialization program

Start the network information setting program on the SV1 board to set the network information.
Confirm the following points before turning on the power to the emulator:

- Whether the terminal is connected to the RS-232C port of the emulator
- Whether the "CONF." switch on the rear panel of the SV1 board is set to position "1" (If this switch is set to position "0", the network information setting program cannot be started.)

When the power to the emulator is turned on, or when the emulator is reset, the message shown in Fig. 2-21 is displayed on the screen of the terminal. Following the message, a prompt is displayed, indicating that the system is waiting for a command to be input.

Fig. 2-21 Start Message

```
8088/86 Modular BIOS Ver  x.xx  mm/dd/yy
Copyright(c)1984-89 Award Software Inc.
IBM Compatible DSIF-BIOS (c) Digital electronics Corp.
SIZING SYSTEM MEMORY.........640K FOUND

MEMORY-DISK BIOS VERSION x.xx
Copyright (C) 1990 Digital Electronics Corporation
MEMORY-DISK INSTALLED DRIVE A:

DSIF : VIDEO RESOURCES        <OPTIMIZING>
DSIF : KEYBOARD RESOURCES     <OPTIMIZING>
 entry TCP/IP System Driver.  <OPTIMIZING>
TCP/IP Driver Verx.xx

A>BREAK ON

A>CONF

A>IF ERRORLEVEL 1 GOTO END

A>
A>
```

After confirming the output of the prompt, input "ENET" to start the initialization program.

Accurately set the network information obtained in advance according to the setting menu shown in Fig. 2-22. For details on the initialization program, refer to the **IE-70000-BX-SV1 User's Manual**.

Fig. 2-22 Setting Menu

```
A>ENET

  --- SETUP NETWORK INFORMATION ----------------------
      1. LOCAL ETHERNET ADDRESS   XXXXXXXXXXXX
      2. LOCAL IP ADDRESS         XXXXXXXX
      3. LOCAL HOST NAME          XXXXXXXXXXXXXXXX
      4. LOCAL PORT NO.           XXXX
      5. REMOTE ETHERNET ADDRESS  XXXXXXXXXXXX
      6. REMOTE IP ADDRESS        XXXXXXXX
      7. REMOTE HOST NAME         XXXXXXXXXXXXXXXX
      8. REMOTE PORT NO.          XXXX
      9. ROUTER ADDRESS           XXXXXXXX
     10. SUBNET ADDRESS MASK      XXXXXXXX
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(1) Setting LOCAL ETHERNET ADDRESS

A universal address is factory-set as the local Ethernet address (1: LOCAL ETHERNET ADDRESS).

The universal address is an address peculiar to the board and cannot be changed by the user; therefore, function number 1 cannot be selected.

The value set on this menu is written to the EEPROM™; therefore, it is not lost even after the power has been turned off.

(2) Setting LOCAL IP ADDRESS

[Function]

Sets the IP address of the IE-70000-BX-SV1. One IP address is assigned to each node. Set the address provided by the network manager.

[Input format]

Input the IP address as an 8-digit hexadecimal number.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>2↵                                    Select function number 2.

  LOCAL IP ADDRESS              >XXXXXXXX              Displays current IP address.
  NEW LOCAL IP ADDRESS          >12345678↵             Input new IP address.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      2. LOCAL IP ADDRESS        12345678               Displays new IP address.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(3) Setting of LOCAL HOST NAME

[Function]

Sets the host name (node name) of the IE-70000-BX-SV1.

[Input format]

Input the host name as a alphanumeric string of 16 characters or less.
Set the host name provided by the network manager.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>3↵                                    Select function number 3.

  LOCAL HOST NAME              >XXXXXX                 Displays current host name.
  NEW LOCAL HOST NAME          >LOCALHOSTNAME↵         Input new host name.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      3. LOCAL HOST NAME         LOCALHOSTNAME         Displays new host name.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(4) Setting LOCAL PORT NO.

[Function]

Sets the port number of the IE-70000-BX-SV1.

[Input format]

Input the port number as a 4-digit hexadecimal number other than 0. Usually, set 0401 (1025 in decimal) or higher.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>4↵                                    Select function number 4.

  LOCAL PORT NO.              >XXXX                    Displays current port number.
  NEW LOCAL PORT NO.          >0401↵                   Input new port number.

--- SETUP NETWORK INFORMATION ----------------------  Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      4. LOCAL PORT NO.          0401                  Displays new port number.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(5) Setting REMOTE ETHERNET ADDRESS

[Function]

Set the Ethernet address of the host machine that operates the in-circuit emulator.

[Input format]

Input the address as a 12-digit hexadecimal number.
If the host machine is not specified, set FFFFFFFFFFFF. Usually, Input FFFFFFFFFFFF.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>5↵                                    Select function number 5.

  REMOTE ETHERNET ADDRESS      >XXXXXXXXXXXX           Displays current Ethernet address.
  NEW REMOTE ETHERNET ADDRESS >0123456789AB↵           Input new Ethernet address.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      5. REMOTE ETHERNET ADDRESS 0123456789AB          Displays new Ethernet address.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(6) Setting REMOTE IP ADDRESS

[Function]

Set the IP address of the host machine.

[Input format]

Input the IP address as an 8-digit hexadecimal number.
If the host machine is not specified, set 0. Usually, input 0.

[Input example]

```
          :
     11. EXIT
-------------------------------------------------
  FUNCTION NO. >>6↵                                  Select function number 6.

  REMOTE IP ADDRESS            >XXXXXXXX             Displays current IP address.
  NEW REMOTE IP ADDRESS        >12345678↵            Input new IP address.

--- SETUP NETWORK INFORMATION ----------------------  Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      6. REMOTE IP ADDRESS       12345678            Displays new IP address.
          :
     11. EXIT
-------------------------------------------------
  FUNCTION NO. >>■
```

(7) Setting REMOTE HOST NAME

[Function]

Sets the host name (node name) of the host machine.

[Input format]

Input the host name as an alphanumeric string of 16 characters or less.
If the host machine is not specified, input only the carriage return. Usually, input only the carriage return.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>7↵                                    Select function number 7.

  REMOTE HOST NAME             >XXXXXX                 Displays current host name.
  NEW REMOTE HOST NAME         >REMOTEHOSTNAME↵        Input new host name.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS   XXXXXXXXXXXX
          :
      7. REMOTE HOST NAME         REMOTEHOSTNAME        Displays new host name.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(8) Setting REMOTE PORT NO.

[Function]

Sets the port number of the host machine.

[Input format]

Input the port number as a 4-digit hexadecimal number.

If the host machine is not specified, input 0. Usually, input 0.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>8↵                                    Select function number 8.

  REMOTE PORT NO.              >XXXX                   Displays current port number.
  NEW REMOTE PORT NO.          >0123↵                  Input new port number.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS   XXXXXXXXXXXX
          :
      8. REMOTE PORT NO.          0123                 Displays new port number.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(9) Setting ROUTER ADDRESS

[Function]

Sets the IP address of the router. Set this address when the emulator is connected to the host machine via router.

[Input format]

Input the address as an 8-digit hexadecimal number.

Input 0 if routing is not necessary.

[Input example]

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>9↵                                    Select function number 9.

  ROUTER ADDRESS              >XXXXXXXX                Displays current router address.
  NEW ROUTER ADDRESS          >12345678↵               Input new router address.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
      9. ROUTER ADDRESS          12345678              Displays new router address.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(10) Setting SUBNET ADDRESS MASK

[Function]

Sets the address mask field of the subnet.

[Input format]

Input the address mask field as an 8-digit hexadecimal number with the bit that indicates the address position of the subnet set to 1.

Input 0 if the subnet address mask is not set.

[Input example]

The following is an example when the higher 24 bits of the IP address are used to recognize the subnet, and the lower 8 bits are used to recognized the host:

```
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>10↵                                    Select function number 10.

  SUBNET ADDRESS MASK            >XXXXXXXX              Displays current subnet address mask.
  NEW SUBNET ADDRESS MASK        >FFFFFF00↵             Input new subnet address mask.

--- SETUP NETWORK INFORMATION ------------------------ Displays menu.
      1. LOCAL ETHERNET ADDRESS   XXXXXXXXXXXX
          :
     10. SUBNET ADDRESS MASK      FFFFFF00              Displays new subnet address mask.
          :
     11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

(11) EXIT

[Function]

Terminates the network information setting menu, and updates the EEPROM contents with the set values.

[Input format]

Input S, Q, or C.

S: Writes the set network information to the EEPROM and terminates the menu.

Q: Does not write the set network information to the EEPROM and terminates the menu.

C: Continues setting the network information. Returns to the menu.

[Input example]

<1> When S is Input

```
          :
    11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>11↵                                  Select function number 11.

  Save & quit / Quit / Continue >S↵                   Writes network information to EEPROM and
                                                      terminates.
A>■
```

<2> When Q is Input

```
          :
    11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>11↵                                  Select function number 11.

  Save & quit / Quit / Continue >Q↵                   Terminates without network information
                                                      written to EEPROM.
A>■
```

<3> When C is Input

```
          :
    11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>11↵                                  Select function number 11.

    Save & quit / Quit / Continue >C↵                 Continues setting network information.

--- SETUP NETWORK INFORMATION ----------------------  Displays menu.
     1. LOCAL ETHERNET ADDRESS  XXXXXXXXXXXX
          :
    11. EXIT
-----------------------------------------------------
  FUNCTION NO. >>■
```

2.4.8 Confirming operation

After the initialization has been finished, confirm the operation.

Confirm the following points with the power to the emulator turned off:

- Whether the terminal is connected to the RS-232C port of the emulator
- Whether the "CONF." switch on the rear panel of the SV1 board is set to position "0" (If this switch is set to position 1, the TCP/IP program cannot be automatically executed.)

Turn on power to the emulator, and confirm that the message shown in Fig. 2-23 is displayed on the screen of the terminal.

Fig. 2-23 Operation Screen

```
8088/86 Modular BIOS Ver  x.xx  mm/dd/yy
Copyright(c)1984-89 Award Software Inc.
IBM Compatible DSIF-BIOS (c) Digital electronics Corp.
SIZING SYSTEM MEMORY.........640K FOUND

MEMORY-DISK BIOS VERSION x.xx
Copyright (C) 1990 Digital Electronics Corporation
MEMORY-DISK INSTALLED DRIVE A:

DSIF : VIDEO RESOURCES          <OPTIMIZING>
DSIF : KEYBOARD RESOURCES       <OPTIMIZING>
 entry TCP/IP System Driver.    <OPTIMIZING>
TCP/IP Driver Verx.xx

A>BREAK ON

A>CONF

A>IF ERRORLEVEL 1 GOTO END

A>EXELOAD -C
A>
```

This is the end of setting at the emulator side.

2.4.9 Connecting RS-232C cable

Connect the RS-232C cable to the emulator as shown in Fig. 2-24.

Table 2-5 shows the specifications of the RS-232C, and Fig. 2-25 shows the pin configuration of the cable.

Fig. 2-24 Connecting RS-232C Cable

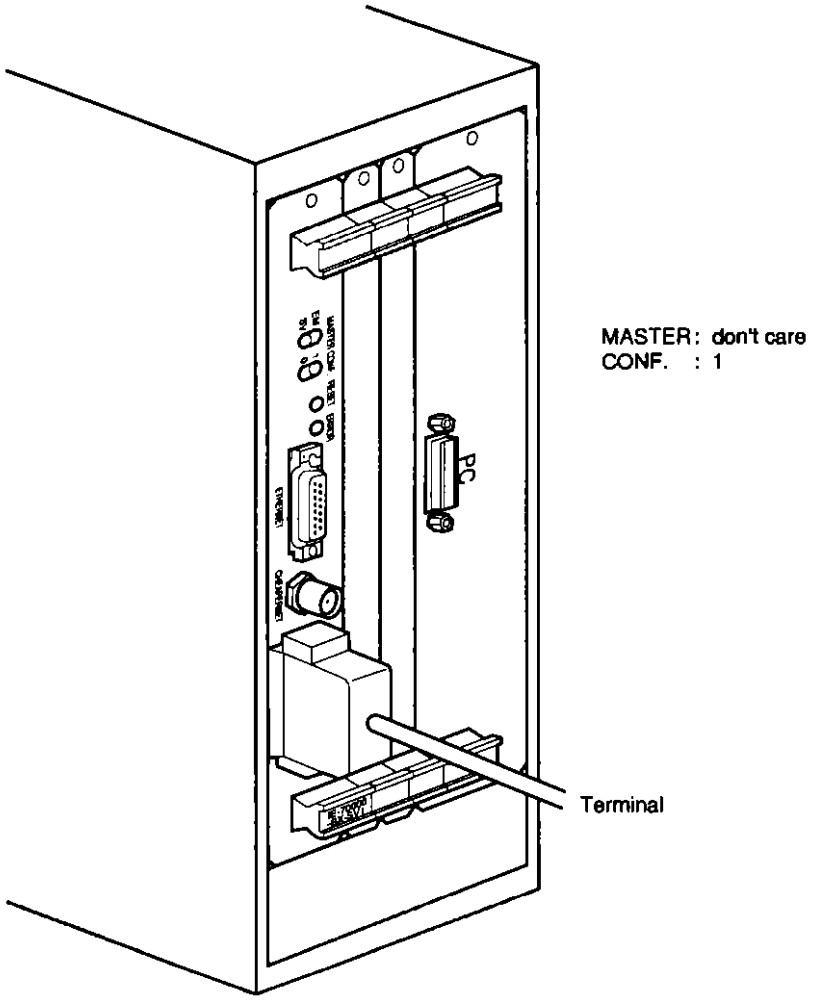
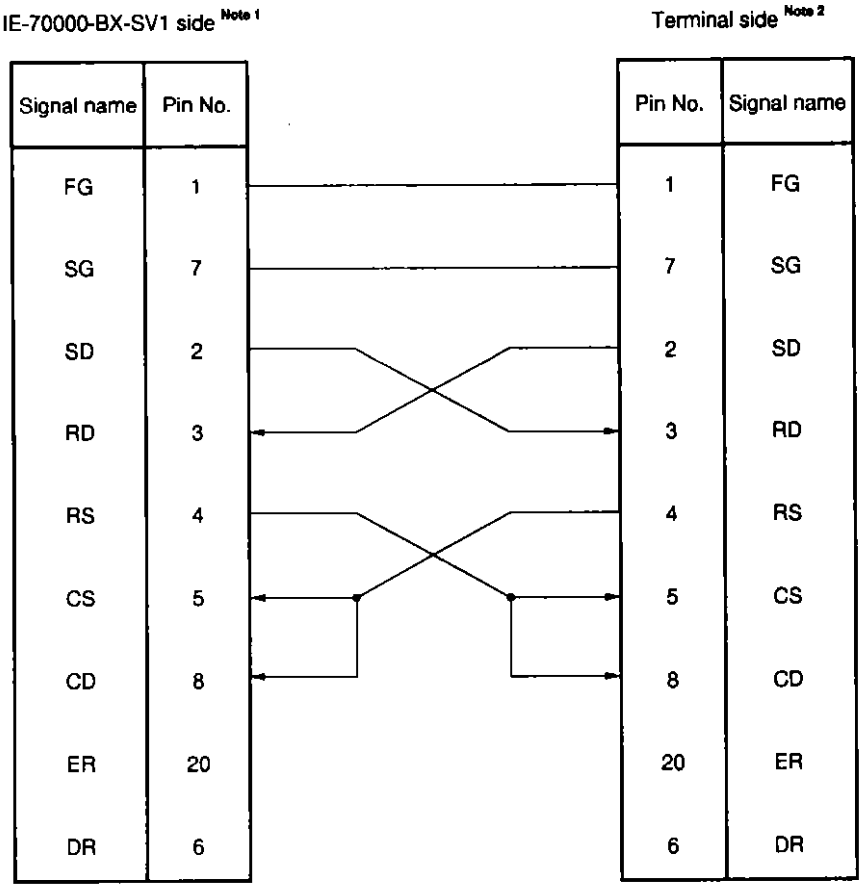


Table 2-5 Setting of RS-232C

Parameter	Contents
Character length	8 bits
Parity check	None
Stop bit	2 bits
Baud rate[Note]	4800 or 9600 bps

Note The baud rate can be selected by a jumper on the SV1 board.

Fig. 2-25 Pin Connections of RS-232C Cable



Notes 1. The connector of the RS-232C cable at the SV1 board side is male.

2. Make sure that the right connector is used for the terminal to be used.

2.4.10 Connecting network cable

Connect the network cable to the emulator as shown in Figs. 2-26 and 2-27, according to the type of the cable to be used.

Fig. 2-26 Connecting to Cheapernet (10BASE2)

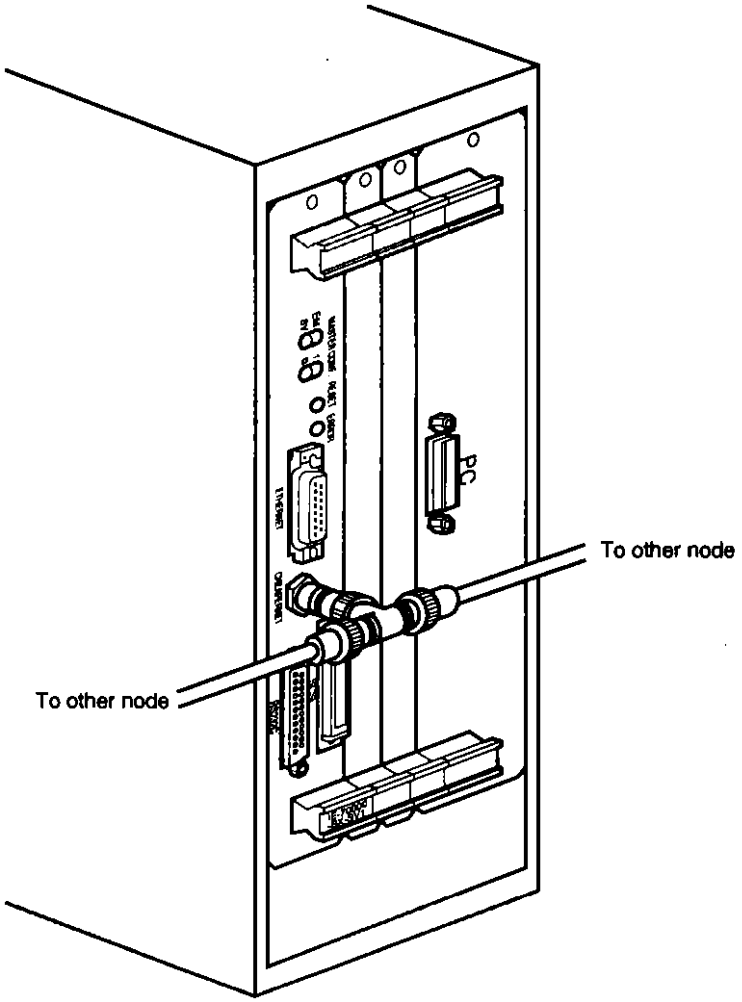
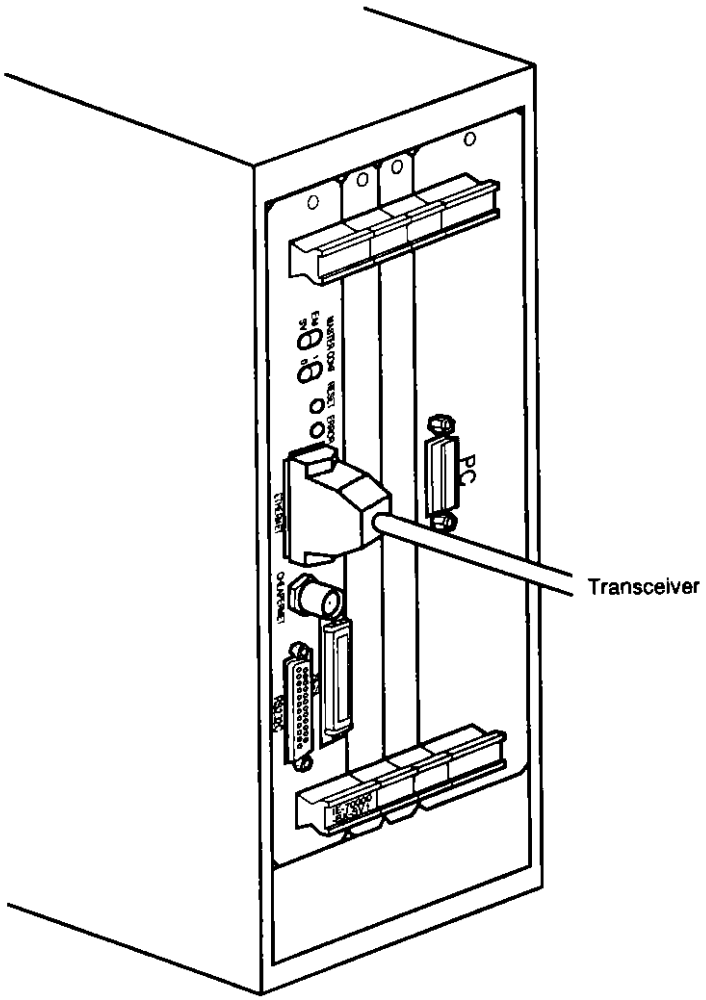


Fig. 2-27 Connecting to Ethernet (10BASE5)



2.5 Connecting Target System

The emulator and the target system are connected with the emulation probe attached to the emulation pod.

This emulation probe is designed to connect a 176-pin PGA package; therefore, an optional socket conversion adapter is necessary for connecting a target system designed to be QFP.

Fig. 2-28 shows an example of connecting a PGA package, and Fig. 2-29 shows an example of connecting a QFP.

Care must be exercised so that the emulation probe does not interfere when the emulator and the target system are connected.

Connect the emulation probe to the PGA socket in the correct direction.

Fig. 2-28 Connecting Target System (with PGA)

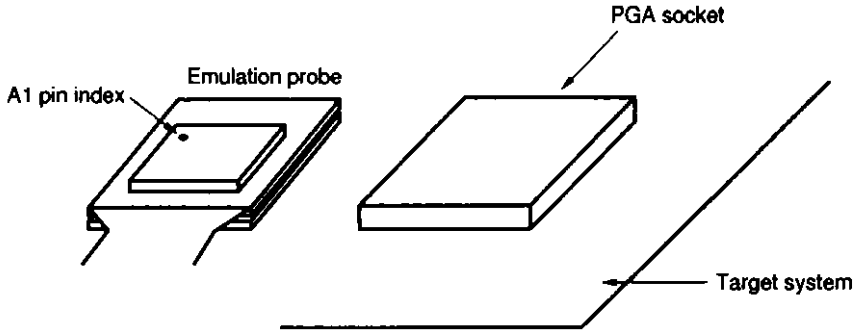
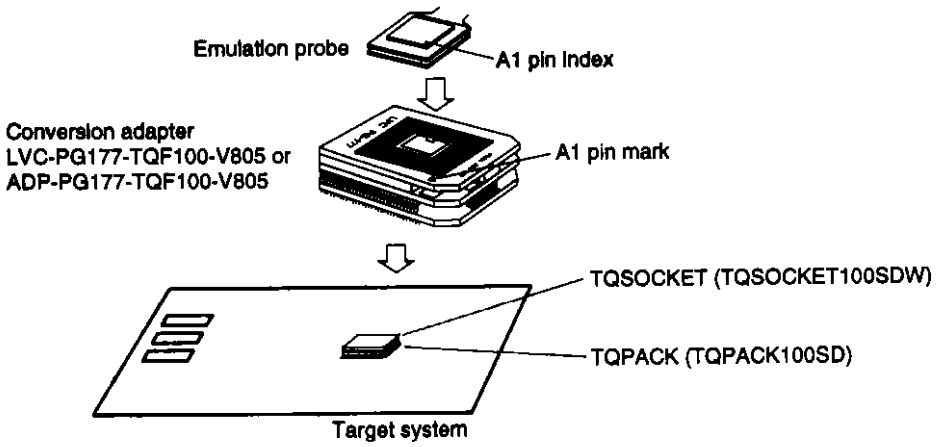


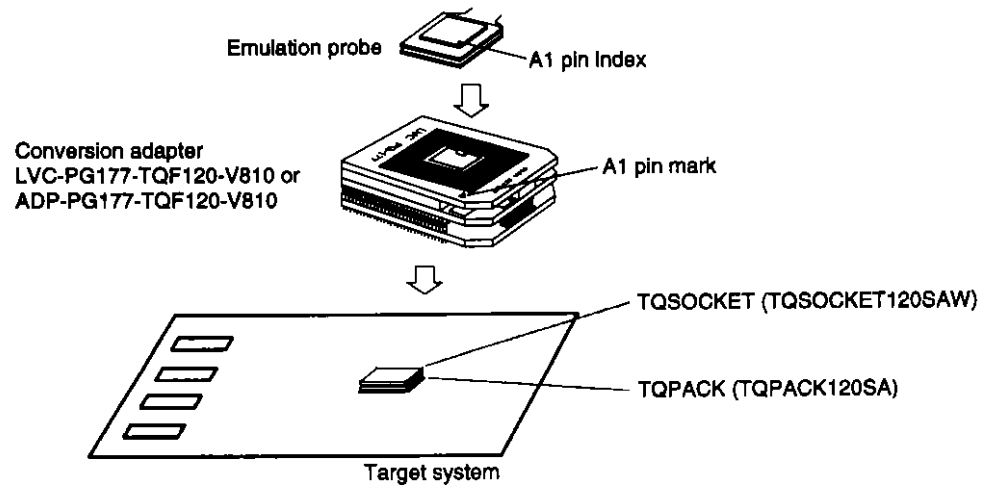
Fig. 2-29 Connecting Target System (with QFP)

(a) When target CPU is 100-pin QFP (V805)



Caution Before connecting the emulation probe, make sure that the A1 pin index is positioned over the A1 pin mark of the conversion adapter.

(b) When target CPU is 120-pin QFP (V810)

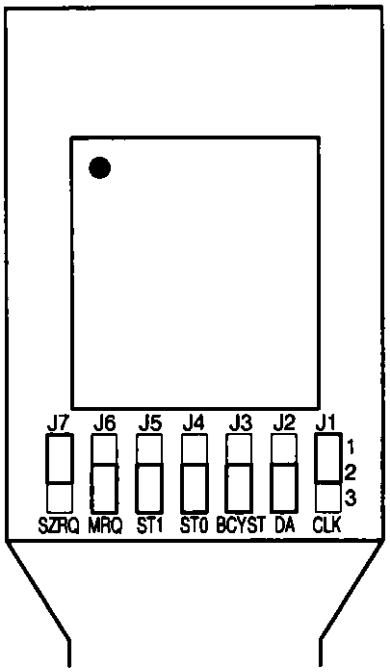


Caution Before connecting the emulation probe, make sure that the A1 pin index is positioned over the A1 pin mark of the conversion adapter.

2.6 Setting Probe Jumper Switch

The emulation probe tip contains 7 jumper switches. Use these jumper switches with their factory-set conditions.

Fig. 2-30 Probe Jumper Switch (factory-set conditions)



[MEMO]

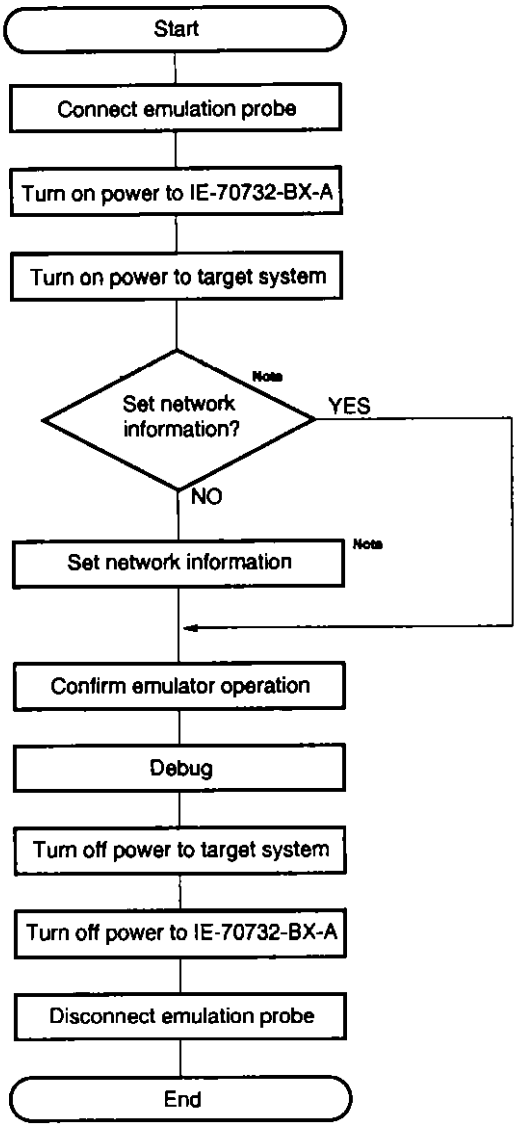
CHAPTER 3 START-UP

This chapter describes how to turn the power on or off, attach/detach the emulation probe, and confirm operations.

3.1 Start-up Procedure

Fig. 3-1 illustrates the start-up procedure.

Fig. 3-1 Start-up Procedure



Note Necessary when a network is used.

3.2 Turning Power on/off

After connecting the power cable, network cable, and target system, turn on power in the following sequence:

(1) To turn on

<1> IE-70732-BX-A

<2> Target system

(2) To turn off

<1> Target system

<2> IE-70732-BX-A

3.3 Attaching/Detaching Emulation Probe

To attach/detach the emulation probe to/from the target system, be sure to turn off the power to the target system.

Because the emulator is provided with a circuit that senses the supply voltage to the target system, the emulator makes all the output signals inactive when the power to the target system has been turned off. Therefore, it is not necessary to turn off the power to the emulator when the emulation probe is attached/detached, if the power to the target system has been turned off.

Confirm that the residual charge is completely discharged immediately after turning off the power to the target system.

When connecting/disconnecting the target system, either terminate the operation of the debugger or execute the reset or initialization command to prevent the deadlock of the emulator due to changes in the environments.

[MEMO]

CHAPTER 4 NOTES ON DESIGNING HARDWARE

This chapter describes points to be noted in designing the hardware of the V805, V810 system on the assumption that the emulator is connected.

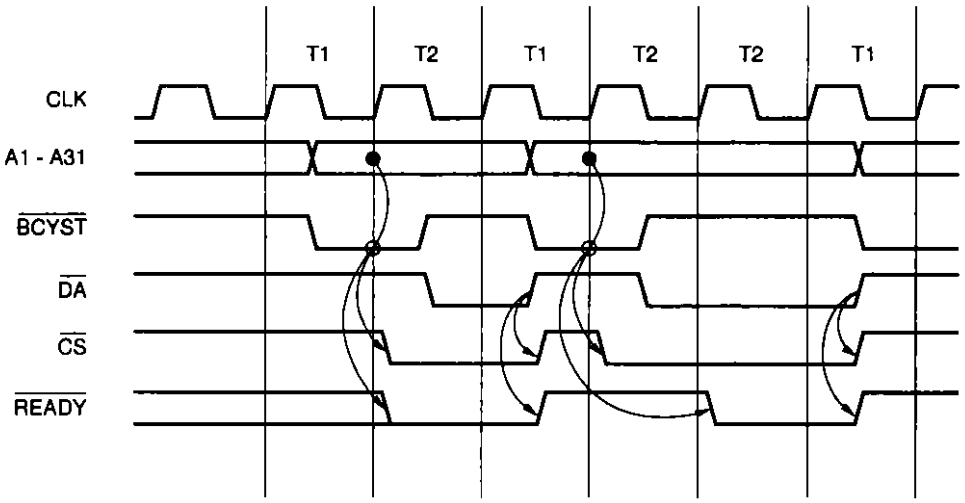
4.1 Timing Design

The AC characteristics of the emulator significantly differ from those of the actual chip.

In all, the delay time of the output signal in relation to the clock is considerably slower than that of the actual chip. Take this into consideration in controlling access to the I/O and designing a bus control circuit.

Especially, generate bus strobe signals such as the $\overline{\text{READY}}$ signal and I/O select signals in a handshaking procedure of the kind shown in Fig. 4-1.

Fig. 4-1 Generating Bus Strobe Signals



4.2 I/O Signals of Emulator

(1) Fig. 4-2 and Table 4-1 show the delay of the target system's clock behind the internal clock of the emulator.

Fig. 4-2 Clock Delay between Target System and Emulator

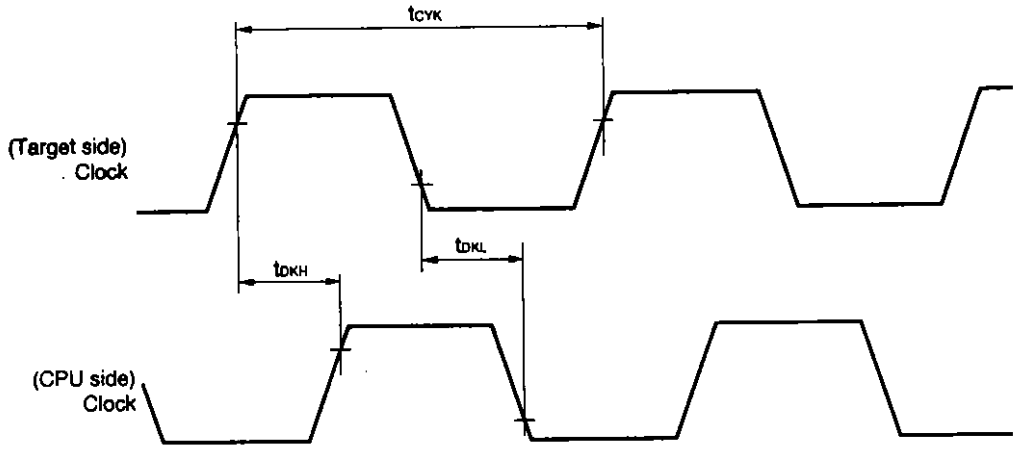


Table 4-1 Clock Delay between Target System and Emulator

(T_A = 25 °C, V_{DD} = 5 V, f = 25 MHz)

Symbol	Parameter	Installing on CPU tip	Installing on top of CPU pod
		TYP. (ns)	TYP. (ns)
t_{CYK}	Clock cycle	40	40
t_{DKH}	Clock rising delay	2	11
t_{DKL}	Clock falling delay	2	11

(2) Fig. 4-3 and Table 4-2 show the output delay (in write cycle) in relation to the target system when only the target memory is used.

Fig. 4-3 Output Delay in Relation to Target System When Only Target Memory Is Used

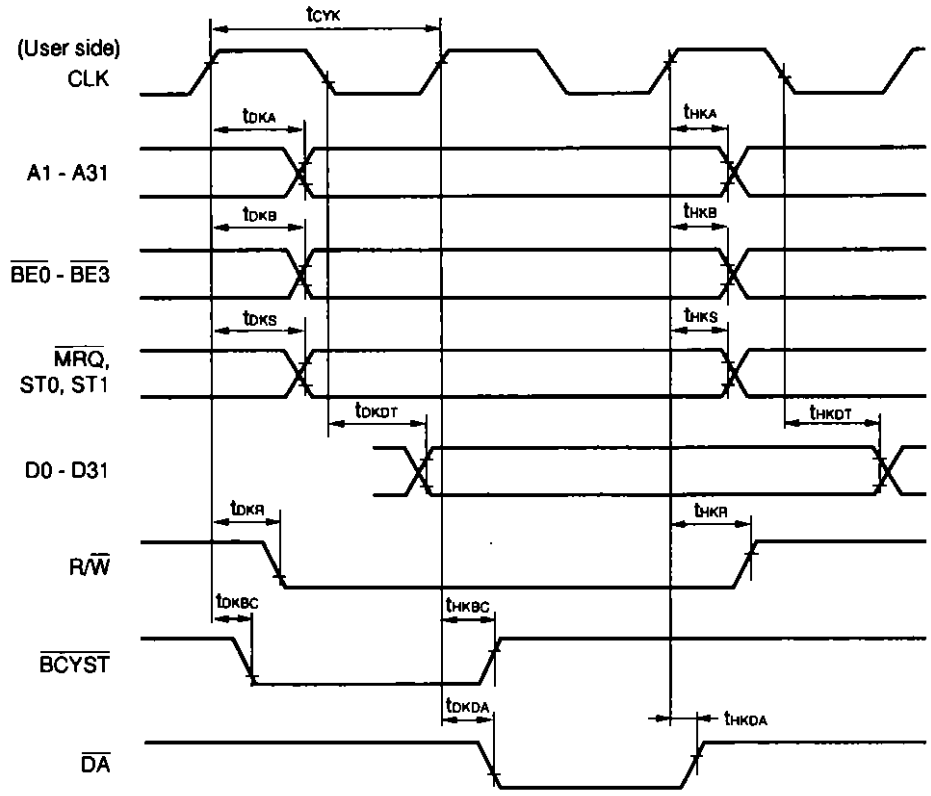


Table 4-2 Output Delay in Relation to Target System When Only Target Memory Is Used

(T_A = 25 °C, V_{DD} = 5 V, f = 25 MHz (t_{CYK} = 40 ns))

Symbol	Parameter	Installing on probe tip	Installing on top of pod
		TYP. (ns)	TYP. (ns)
t_{DKA}	Active output delay (A1 - A31)	12	21
t_{HKA}	Inactive output delay (A1 - A31)	13	21
t_{DKB}	Active output delay ($\overline{BE0}$ - $\overline{BE3}$)	12	21
t_{HKB}	Inactive output delay ($\overline{BE0}$ - $\overline{BE3}$)	12	21
t_{DKS}	Active output delay (ST0, ST1)	21	29
t_{HKS}	Inactive output delay (ST0, ST1)	21	28
t_{DKDT}	Active output delay (D0 - D31)	18	24
t_{HKDT}	Inactive output delay (D0 - D31)	17	28
t_{DKR}	Active output delay (R/$\overline{W}$)	12	21
t_{HKR}	Inactive output delay (R/$\overline{W}$)	12	21
t_{DKBC}	Active output delay ($\overline{BCYST}$)	22	29
t_{HKBC}	Inactive output delay ($\overline{BCYST}$)	21	28
t_{DKDA}	Active output delay ($\overline{DA}$)	24	30
t_{HKDA}	Inactive output delay ($\overline{DA}$)	22	28

(3) Fig. 4-4 and Table 4-3 show the output delay (in write cycle) in relation to the target system when the emulation memory or guard area is used.

Fig. 4-4 Output Delay in Relation to Target System When Emulation Memory or Guard Area Is Used (In write cycle)

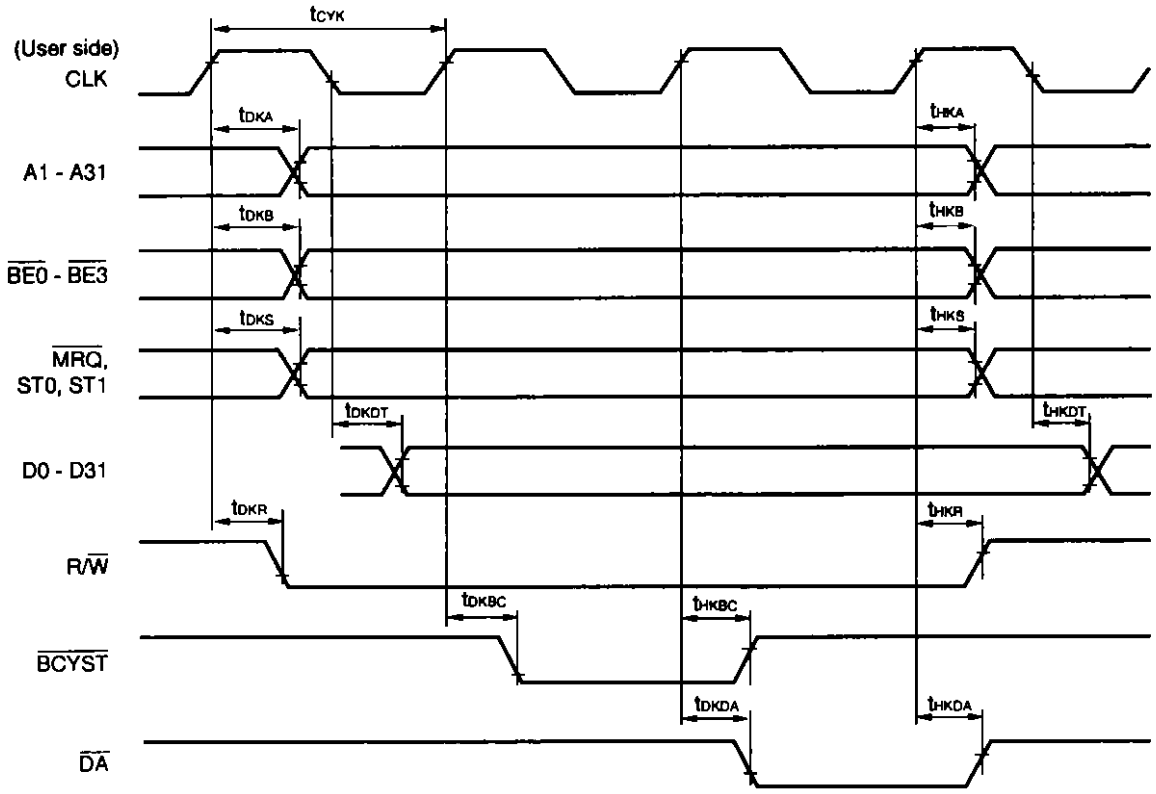


Table 4-3 Output Delay in Relation to Target System When Emulation Memory or Guard Area Is Used (in write cycle)

(T_A = 25 °C, V_{DD} = 5 V, f = 25 MHz (t_{CYK} = 40 ns))

Symbol	Parameter	Installing on probe tip	Installing on top of pod
		TYP. (ns)	TYP. (ns)
t_{DKA}	Active output delay (A1 - A31)	12	21
t_{HKA}	Inactive output delay (A1 - A31)	12	21
t_{DKB}	Active output delay ($\overline{BE0}$ - $\overline{BE3}$)	12	20
t_{HKB}	Inactive output delay ($\overline{BE0}$ - $\overline{BE3}$)	12	20
t_{DKS}	Active output delay (ST0, ST1)	26	32
t_{HKS}	Inactive output delay (ST0, ST1)	25	32
t_{DKDT}	Active output delay (D0 - D31)	18	24
t_{HKDT}	Inactive output delay (D0 - D31)	17	28
t_{DKR}	Active output delay (R/$\overline{W}$)	12	21
t_{HKR}	Inactive output delay (R/$\overline{W}$)	12	21
t_{DKBC}	Active output delay ($\overline{BCYST}$)	26	26
t_{HKBC}	Inactive output delay ($\overline{BCYST}$)	24	24
t_{DKDA}	Active output delay ($\overline{DA}$)	28	28
t_{HKDA}	Inactive output delay ($\overline{DA}$)	26	35