

Preliminary User's Manual

NEC

IE-703003-MC-EM1

IN-CIRCUIT EMULATOR OPTION BOARD

Target device
V853™

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- Product release schedule
- 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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Main Revisions in This Edition

| Pages | Description |
|-------|----------------------------------------------------------------------------------------------------------------|
| P2 | CLKOUT of maskable pin is deleted in 1.2 Features (When connected to IE-703002-MC) . |
| P2 | Emulation Memory Capacity is modified in 1.3 Function Specifications (When connected to IE-703002-MC) . |
| P3 | Target Connection Socket is modified from YQSOCKET100SDF to YQSCKETSDN in 1.4 System Configuration . |
| P7 | Insertion guides is modified to 4 in Figure 1-4. (c) Connecting part (IE-703003-MC-EM1) . |
| P12 | 3.3 NMI Signal Addition of Description |

The mark ★ shows major revised points.

[MEMO]

INTRODUCTION

READERS

This manual is intended for users who design and develop application systems using the V853.

PURPOSE

The purpose of this manual is to describe the proper operation of the IE-703003-MC-EM1 and its basic specifications.

ORGANIZATION

This manual is broadly divided into the following parts:

- Overview
- Settings of IE-703003-MC
- Cautions

HOW TO READ THIS MANUAL

This manual assumes readers who have general knowledge of electric engineering, logic circuits, and microcomputers.

The IE-703003-MC-EM1 is used connected to the in-circuit emulator IE-703002-MC for the V851™ and V852™. This manual explains the basic setup procedure and switch settings of the IE-703002-MC when it is connected to the IE-703003-MC-EM1. For the names and functions, and the connection of parts, refer to the "IE-703002-MC User's Manual Hardware".

To learn the basic specifications and operation methods broadly

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

To learn the operation methods and command functions, etc., of the IE-703002-MC and IE-703003-MC-EM1

→ Read the user's manual of the debugger (optional) that is used.

LEGEND

Note : Describe items noted in text.

Caution : Describe points that require special attention.

Remark : Provide supplementary remarks to description in text.

Numerical representations : Binary ... xxxx or xxxxB

Decimal ... xxxx

Hexadecimal ... 0xxxxx or xxxxH

Prefix representing the power of 2 (Address space, Memory capacity):

K (kilo) : $2^{10} = 1024$

M (mega) : $2^{20} = 1024^2$

TERMINOLOGY

The meaning of terms used in this manual is listed below.

| | |
|---------------|---------------------------------------------------------------------------------------------------------------|
| Target device | Device that is emulated. |
| Target system | The system (user-built system) to be debugged. This includes the target program and user-configured hardware. |

RELATED DOCUMENTS

Some of the related documents listed below may be preliminary editions, but are not noted as such.

○ Documents related V853

| Document | Document Number |
|-----------------------------------------|-----------------|
| V853 User's Manual Hardware | U10913E |
| μPD703003 Data Sheet | Planned |
| μPD70F3003 Data Sheet | Planned |
| V850 family™ User's Manual Architecture | U10243E |
| V850 family Instruction List | U10229E |

○ Documents related to development tools

| Product | | Document Number |
|-----------------------------------------------|----------------------------|-----------------|
| IE-703002-MC Hardware | | U11595E |
| IE-70000-MC-SV2 (Communication module) | | U11781E |
| IE-70000-MC-IF (Communication module adopter) | | U11601E |
| CA850 (C Compiler package) | Operation UNIX™ based | U11013E |
| | Operation Windows™ based | U11068E |
| | C language | U11010E |
| | Assembly Language | U10543E |
| RX850 (Real-time OS) | Basics | U11037E |
| | Technical | U11117E |
| | Nucleus installation | U11038E |
| | Debugger Windows-based | U11158E |
| AZ850 (System performance analyzer) Operation | | U11181E |
| ID850 (C source debugger) | Operation Windows-based | Planned |
| | Operation UNIX-based | Planned |
| | Installation Windows-based | Planned |
| | Installation UNIX-based | Planned |

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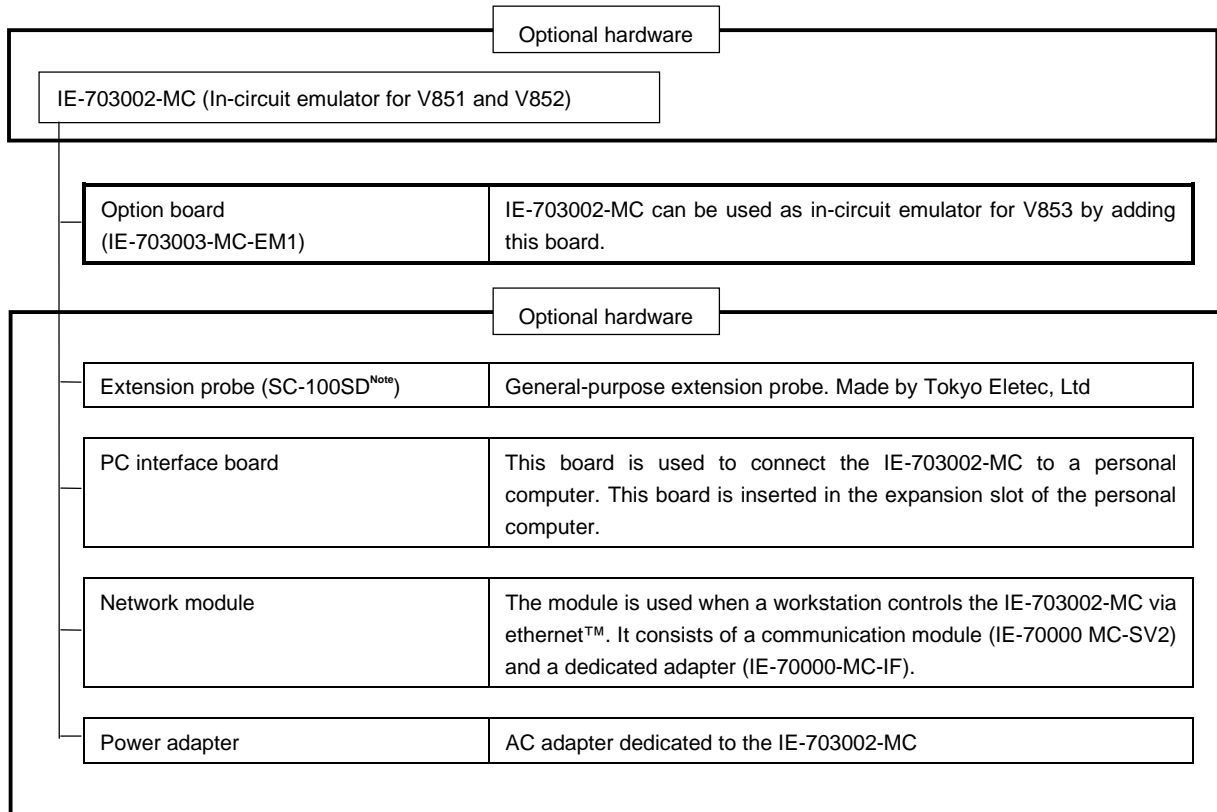
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CHAPTER 1 OVERVIEW

The IE-703003-MC-EM1 is an optional board for the in-circuit emulator IE-703002-MC for the V851 and V852. By connecting the IE-703003-MC-EM1 and IE-703002-MC, hardware and software can be debugged efficiently in system development using the V853. In this manual, the basic setup sequences and switch settings of the IE-703003-MC are described. For the names and functions of the parts of the IE-703002-MC, and for the connection of elements, refer to the "IE-703002-MC User's Manual".

1.1 Hardware Configuration



Note Contact: Daimaru Kogyo Co., Ltd. Tokyo Electronic Components Department TEL 03-3820-7112
Osaka Electronic Components Department TEL 06-244-6672

1.2 Features (When connected to IE-703002-MC)

- Maximum operation frequency: 33 MHz (at 5-V operation)
- Extremely light in weight and compact
- Higher equivalence with target device can be achieved by omitting buffer between signal cables.
- Following pins can be masked.
★ RESET, NMI, WAIT, HLDRQ
- Two methods of connection to target system:
 - Pod tip direct connection (For information on the pod, refer to the **IE-703002-MC User's Manual**)
 - Attach an extension probe (optional) to the pod tip for connection.
- Dimensions of the option board (IE-703003-MC-EM1) are as follows.

| Parameter | | Value |
|------------------------------------------------------|--------|--------------------------------------------------------|
| Power dissipation (Max. value at 5-V supply voltage) | | 0.35 W (at 33-MHz operation frequency) ^{Note} |
| | Height | 13 mm |
| | Length | 160 mm |
| | Width | 96 mm |
| Weight | | 125 g |

Note 10.35 W when IE-703002-MC with IE-703003-MC-EM1

1.3 Function Specifications (When connected to IE-703002-MC)

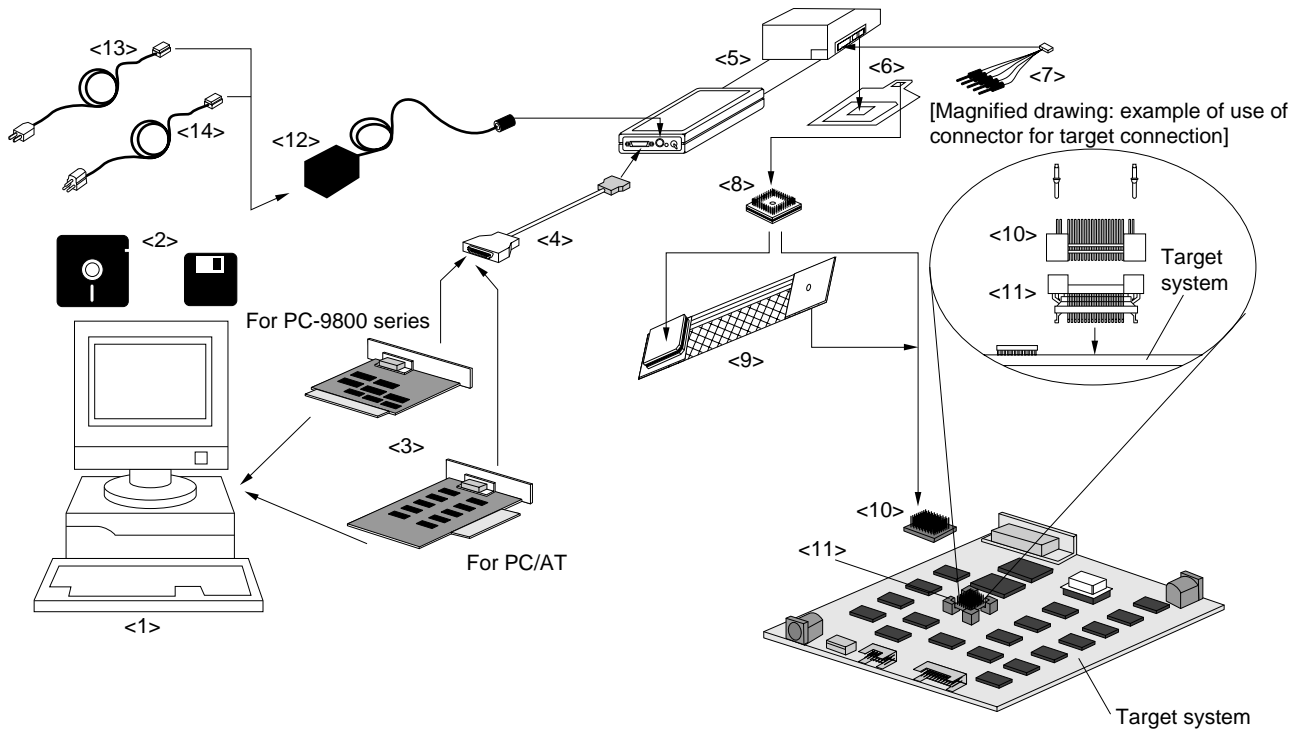
| Parameter | | | Capacity |
|--------------------------------------------------------------------|-----------------|------------------|------------|
| Emulation memory capacity | Internal ROM | | 128 Kbytes |
| | External memory | In ROM-less mode | 2 Mbytes |
| | | When using iROM | 1 Mbyte |
| Execution/pass detection | Internal ROM | | 128 Kbytes |
| | External memory | In ROM-less mode | 2 Mbytes |
| | | When using iROM | 1 Mbyte |
| Memory access detection coverage memory capacity (external memory) | | | 1 Mbyte |
| Coverage memory capacity for branching entry number counting | Internal ROM | | 128 Kbytes |
| | External memory | In ROM-less mode | 2 Mbytes |
| | | When using iROM | 1 Mbyte |

Caution Some of the functions may not be supported depending on the debugger used.

1.4 System Configuration

The system configuration when connecting the IE-703003-MC to a personal computer (PC-9800 series or PC/AT™ (or compatible machine)) is shown below.

Figure 1-1. System Configuration



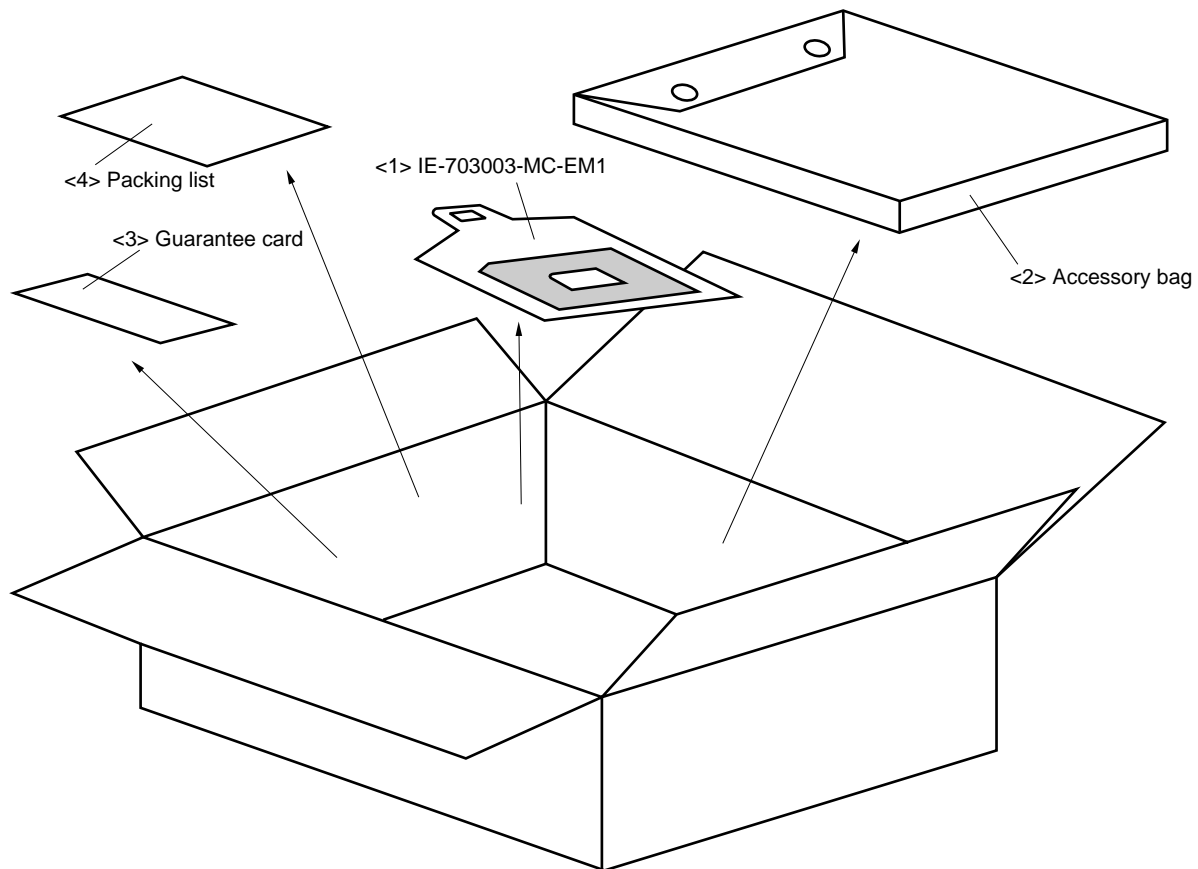
Remark

- <1> Personal computer (PC-9800 series or PC/AT)
- <2> Debugger (optional)
- <3> PC interface board (IE-70000-98-IF-B, IE-70000-PC-IF-B: optional)
- <4> PC interface cable (included with IE-703002-MC)
- <5> IE-703002-MC (In-circuit emulator)
- <6> IE-703003-MC-EM1 (Option board)
- <7> External logic probe (included with IE-703002-MC)
- ★ <8> Socket for target connection (YQSOCKET100SDF: included with IE-703002-MC)
- <9> Extension probe (SC-100SD: Optional)
- <10> Connector for emulator connection (YQPACK100SD: included in IE-703002-MC)
- <11> Connector for target connection (NQPACK100SD: included)
- <12> Power adapter (IE-70000-MC-PS-B optional)
- <13> 100-VAC power cable (attachment of optional IE-70000-MC-PS-B)
- <14> 220-VAC power cable (attachment of optional IE-70000-MC-PS-B)

1.5 Contents in Carton

The carton of the IE-703003-MC-EM1 contains a main unit, guarantee card, packing list, and accessory bag. Make sure that the accessory bag contains this manual and connector accessories. In case of missing or damaged contents, please contact an NEC sales representative or NEC dealer.

Figure 1-2. Contents in Carton

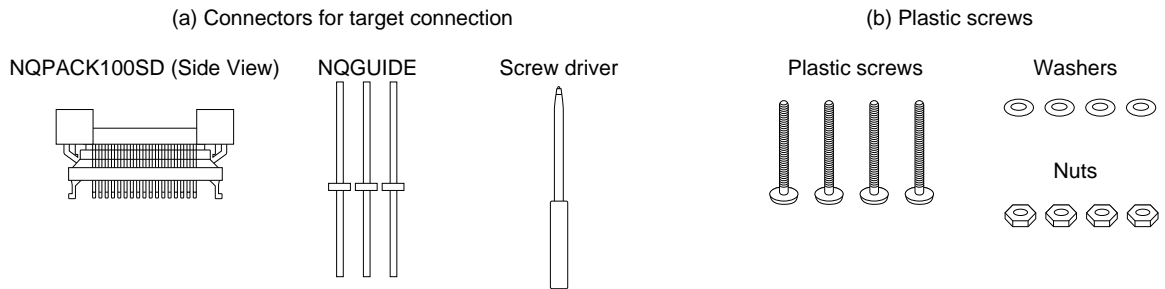


- <1> IE-703003-MC-EM1 × 1 pc.
- <2> Accessory bag × 1 pc.
- <3> Guarantee card × 1 pc.
- <4> Packing list × 1 sheet

Check that the accessory bag contains this manual, an accessory list, and the following accessories.

- (a) Connector for target connection (NQPACK100SD) × 1 set
(including NQGUIDE 3 pcs., screw driver × 1 pc.)
- (b) Plastic screws × 4 pcs.
(including nuts and washer × 4 sets)

Figure 1-3. Accessories



1.6 Connection between IE-703002-MC and IE-703003-MC-EM1

The procedure for connecting the IE-703002-MC and IE-703003-MC-EM1 is described below.

Caution Connect carefully so as not to break or bend connector pins.

- <1> Remove the pod cover of the IE-703002-MC.
- <2> Set the PGA socket lever of the IE-703003-MC-EM1 to the OPEN position as shown in Figure 1-4 (b).
- <3> Connect the IE-703003-MC-EM1 to the PGA socket at the back of the pod (refer to Figure 1-4 (c)). When connecting, position the IE-703002-MC and IE-703003-MC-EM1 so that they are horizontal.
- <4> Set the PGA socket lever of the IE-703003-MC-EM1 to the CLOSE position as shown in Figure 1-4 (b).
- <5> Set the jumpers (JP1 to JP4) and switches (SW1 and SW2). Open JP1 (Remove the jumper contact. Attach the removed jumper contact to one of the jumper pins to avoid losing them.) Set JP2 to JP4 and SW1 and SW2 depending on the use. Short the first and second pin of JP4.
- <6> Fix the IE-703003-MC-EM1 between the pod covers (upper and lower) with the plastic screws.
- <7> Secure the pod cover (upper) end with nylon rivets.

Figure 1-4. Connection between IE-703002-MC and IE-703003-MC-EM1 (1/2)

(a) Overview

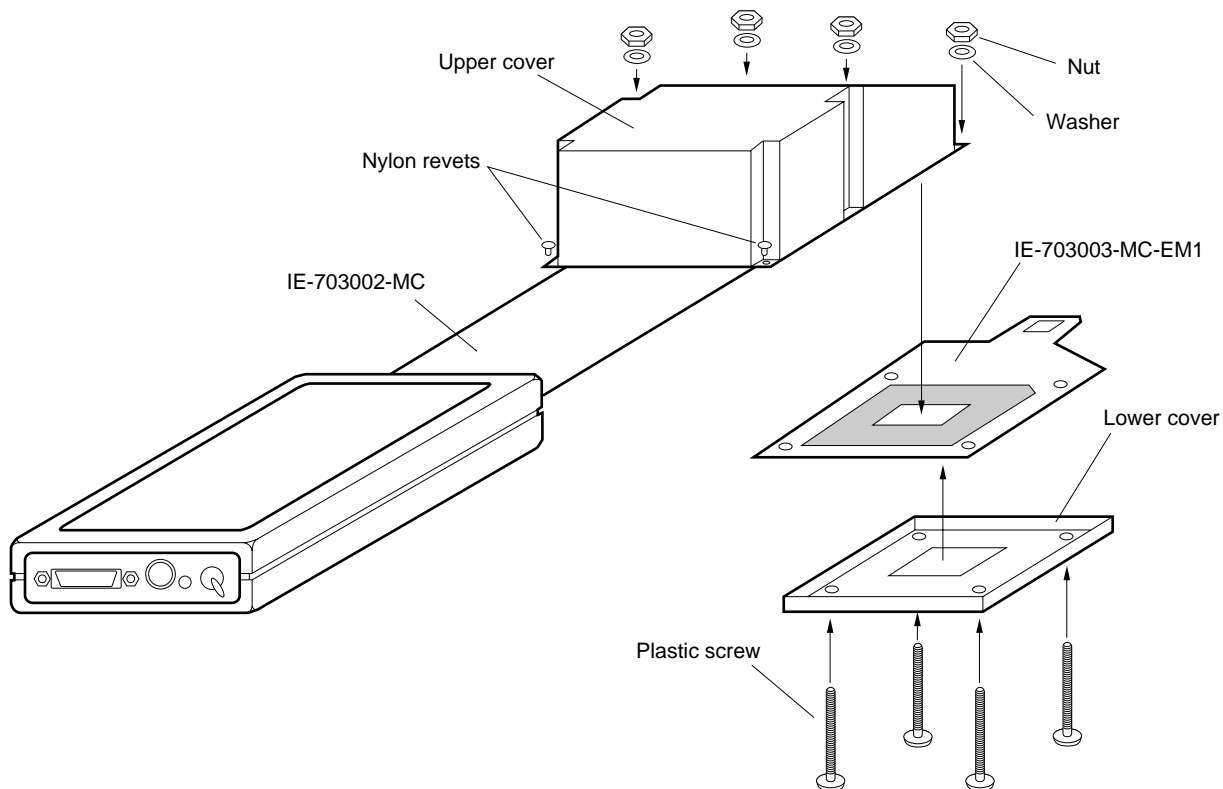
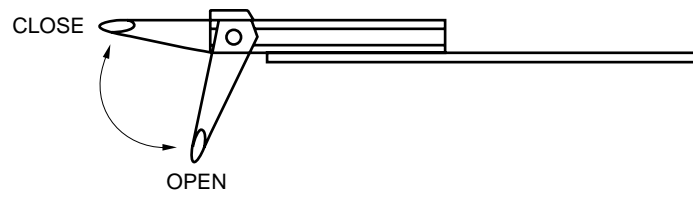
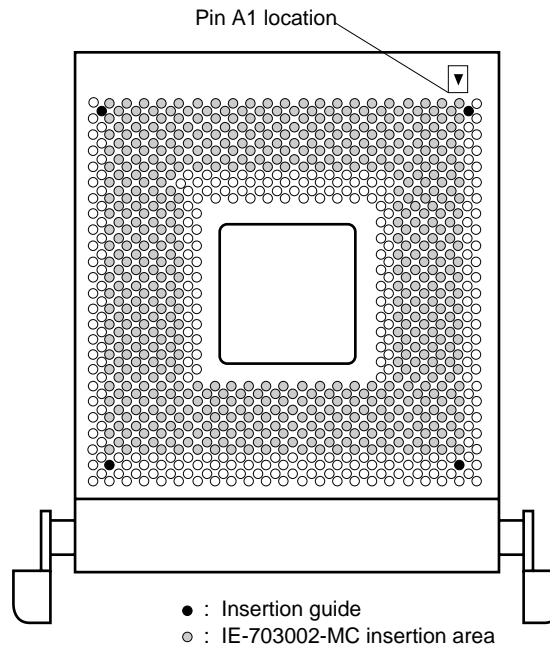


Figure 1-4. Connection between IE-703002-MC and IE-703003-MC-EM1 (2/2)

(b) PGA Socket Lever of IE-703003-MC-EM1



(c) Connecting part (IE-703003-MC-EM1)



[MEMO]

CHAPTER 2 IE-703002-MC SETTING

This chapter describes settings of the IE-703002-MC when the IE-703003-MC-EM1 is connected.

All settings are performed using the jumper and switches in the pod of the IE-703002-MC.

For the location of the pod, jumper, and switches, refer to the **IE-703003-MC User's Manual Hardware**.

2.1 Settings of JP2, SW1, and SW2

These jumper and switches set the clock. Set the jumper (JP2) and switches (SW1, SW2) depending on the use.

Remark The factory-set JP2 setting in the pod is as shown in the diagram at right. (The numbers 1, 2, 7, 8 are the jumper pin numbers printed on the board.)

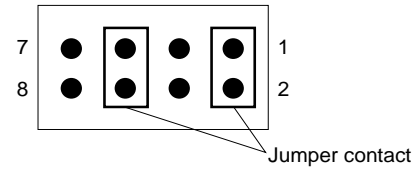
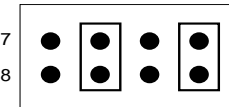
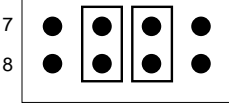


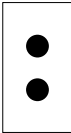
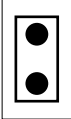
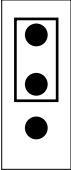
Table 2-1. Settings of JP2, SW1, and SW2

| Setting of clock supply source | | | Setting of clock mode | |
|--------------------------------|---------------------------|-----------------------------------|-------------------------------------------------------------------------------------|---------------------------------------|
| Supply method of clock | | | SW1 setting in pod (PLLSEL setting) | SW2 setting in pod (CKSEL setting) |
| Internal clock | PLL mode | 5 × multiplication (input × 5) |  | OFF |
| | | 1 × multiplication (input × 1) | | |
| | Direct mode (input × 1/2) | | Don't care | ON |
| Target clock | PLL mode | 5 × multiplication (input × 5) |  | OFF |
| | | 1 × multiplication (input × 1) | | |
| | Direct mode (input × 1/2) | | Don't care | ON |

2.2 Settings of JP1, JP3, and JP4

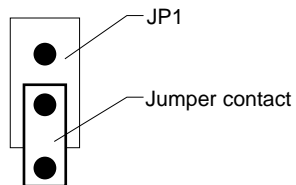
Set the JP1, JP3, and JP4 in the pod as follows.

Table 2-2. Settings of JP1, JP3, and JP4

| Jumper | Status | |
|--------------------------|-----------|------------------------------------------------------------------------------------|
| JP1 ^{Note 1, 2} | Open |  |
| JP3 | Short |  |
| JP4 ^{Note 1} | 1-2 short |  |

Notes 1. Differs from factory-set status.

2. Keep the removed connector attached to one pin as shown in the drawing below.



Remark IE-703002-MC operates under 5 V with the above described settings of JP3 and JP4, regardless of the target system voltage.

CHAPTER 3 CAUTIONS

3.1 Internal RAM and ROM

Because the internal RAM (iRAM) and internal ROM (iROM) capacity of the IE-703002-MC are set in steps, the memory capacity is different from that of the target device. If access is performed to addresses that exceed the target device capacity, the memory of the IE-703002-MC is accessed. Memory capacities are as follows.

Table 3-1. Memory Capacity Limitation List

| (a) iRAM capacity (Unit: byte) | | (b) iROM capacity (Unit: byte) | |
|--------------------------------|--------------|--------------------------------|------------------------------------|
| Target device | IE-703002-MC | Target device | IE-703002-MC (Emulation memory) |
| 1 K | 1 K | 1 K to 32 K | 32 K |
| 2 K | 2 K | 33 K to 64 K | 64 K |
| 3 K | 3 K | 65 K to 128 K (V853) | 128 K |
| 4 K (V853) | 4 K | 129 K to 256 K | 256 K |
| 5 K to 6 K | 6 K | 257 K to 512 K | 512 K |
| 7 K to 8 K | 8 K | 513 K to 1024 K | 512 K |
| 9 K to 10 K | 10 K | | |
| 11 K to 12 K | 12 K | | |
| 13 K to 16 K | 16 K | | |
| 17 K to 20 K | 20 K | | |
| 21 K to 24 K | 24 K | | |
| 25 K to 28 K | 28 K | | |

Remark The IE-703002-MC incorporates 512 Kbytes of iROM emulation memory.

3.2 Target System V_{DD}

The target system V_{DD} does not connect to the IE-703002-MC V_{DD}. The IE-703002-MC uses the V_{DD} (pin No. 13) of the system for the following purposes:

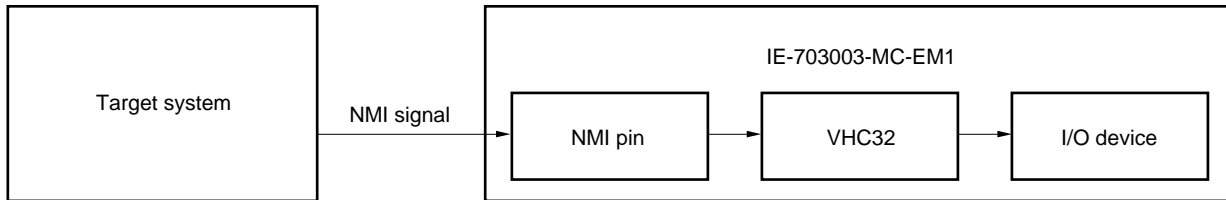
- Power ON/OFF detection of target system
- Power supply voltage emulation of target voltage

3.3 NMI Signal

The NMI signal from the target system is delayed because it passes through VHC32 before being input into the IE-703003-MC-EM1. ($t_{pLH} = t_{pHL} = 8 \text{ ns}$ (TYP.))

- ★ Moreover, DC characteristics are changed to input voltage $V_{IH} = 0.7 V_{DD}$ (MIN.), $V_{IL} = 0.3 V_{DD}$ (MAX.), input current $I_{IN} = \pm 1.0 \mu\text{A}$ (MAX.).

Figure 3-1. NMI Signal-Flow Path

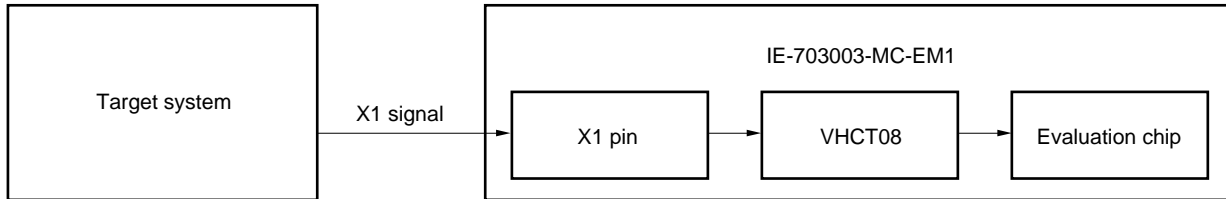


3.4 X1 Signal

The X1 signal from the target system is delayed because it passes through VHCT08 before being input into the evaluation chip of the IE-703003-MC-EM1. ($t_{pLH} = 8 \text{ ns}$ (MAX.), $t_{pHL} = 9 \text{ ns}$ (MAX.))

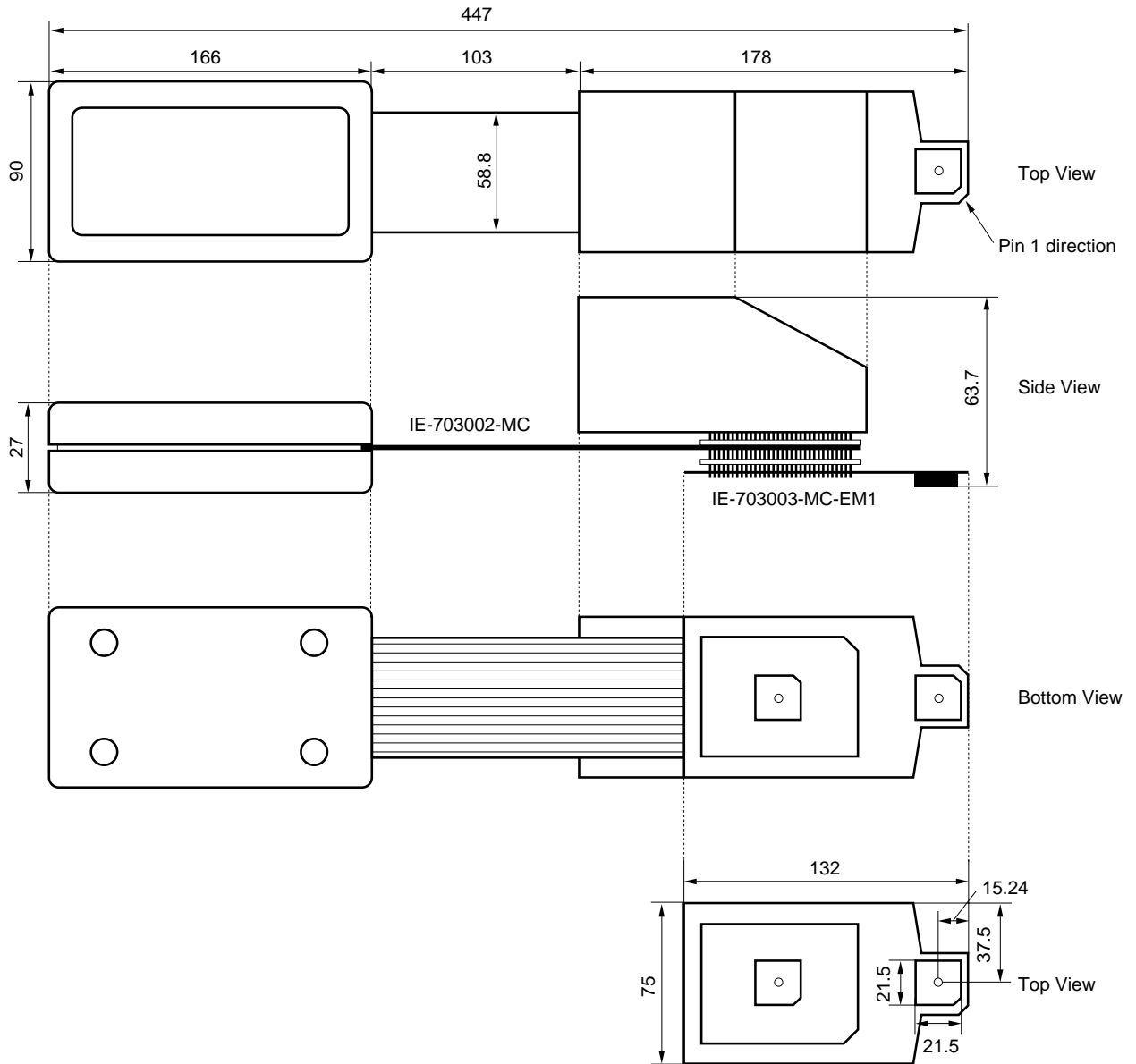
Moreover, DC characteristics are changed to input voltage $V_{IH} = 2.0 \text{ V}$ (MIN.), $V_{IL} = 0.8 \text{ V}$ (MAX.), input current $I_{IN} = \pm 1.0 \mu\text{A}$ (MAX.).

Figure 3-2. X1 Signal-Flow Path



APPENDIX DIMENSIONS

IE-703002-MC + IE-703003-MC-EM1 (Unit: mm)



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