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# PCA7447FP

User's Manual

PROM Programming Adapter for M38C89EFP

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## To use the product properly

### Precautions for Safety:





- Both in this User's Manual and on the product itself, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.
- The icons' graphic images and meanings are given in "Chapter 1. Precautions for Safety" (page 4). Be sure to read this chapter before using the product.

# Chapter 1. Precautions for Safety


In both the user's manual and on the product itself, several icons are used to insure proper handling of this product and also to prevent injuries to you or other persons, or damage to your properties.


This chapter describes the precautions which should be taken in order to use this product safely and properly. Be sure to read this chapter before using this product.


## 1.1 Safety Symbols and Meanings

|                                                                                   |                  |                                                                                                                             |
|-----------------------------------------------------------------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------|
|  | <b>WARNING</b>   | If the requirements shown in the "WARNING" sentences are ignored, the equipment may cause serious personal injury or death. |
|  | <b>CAUTION</b>   | If the requirements shown in the "CAUTION" sentences are ignored, the equipment may malfunction.                            |
|                                                                                   | <b>IMPORTANT</b> | It means important information on using this product.                                                                       |

In addition to the three above, the following are also used as appropriate.

△ means WARNING or CAUTION.  
Example:  **CAUTION AGAINST AN ELECTRIC SHOCK**

⊘ means PROHIBITION.  
Example:  **DISASSEMBLY PROHIBITED**

● means A FORCIBLE ACTION.  
Example:  **UNPLUG THE POWER CABLE FROM THE RECEPTACLE.**

The following pages describe the symbols "WARNING", "CAUTION", and "IMPORTANT".

## **WARNING**

### **Warnings for Use Environment:**



- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.
- Select the proper programming mode of the PROM programmer.

## **CAUTION**

### **Cautions to Be Taken for This Product:**



- Do not disassemble or modify this product. Disassembling or modifying this product can cause damage. Disassembling and modifying the product will void your warranty.
- Use caution when handling this product. Be careful not to apply a mechanical shock such as falling.
- Do not directly touch the connector pins of this product.
- Be careful with the static electricity when handling this product and the MCU.

### **Caution for Keeping This Product:**

- When not using this product for a long time:
  - (1) Attach the connector pins of this product to the conductive sponge.
  - (2) Put it into a conductive polyvinyl, and keep it in the package case shipped from the factory.
  - (3) Store it in the place where humidity and temperature are low and direct sunshine does not strike.

## **IMPORTANT**

### **When Using The Product:**

- Attach this product to the IC socket on the PROM programmer properly.
- Insert the MCU to the IC socket of this product properly.
- When inserting and pulling out the MCU, be sure to keep the IC socket side above and horizontal.
- Be sure to set the programming area according to your PROM programmer.
- Do not use the PROM programmer's device identification code readout function.

## Chapter 2. Introduction

The PCA7447FP is a PROM programming adapter for M38C89EFP (8-bit MCU). The PCA7447FP is used to write programs into the internal EPROM of MCU with commercially available PROM programmer.

This manual mainly explains specifications of PCA7447FP and how to operate it.

Figure 2.1 shows the external view of the product and its constituent parts.

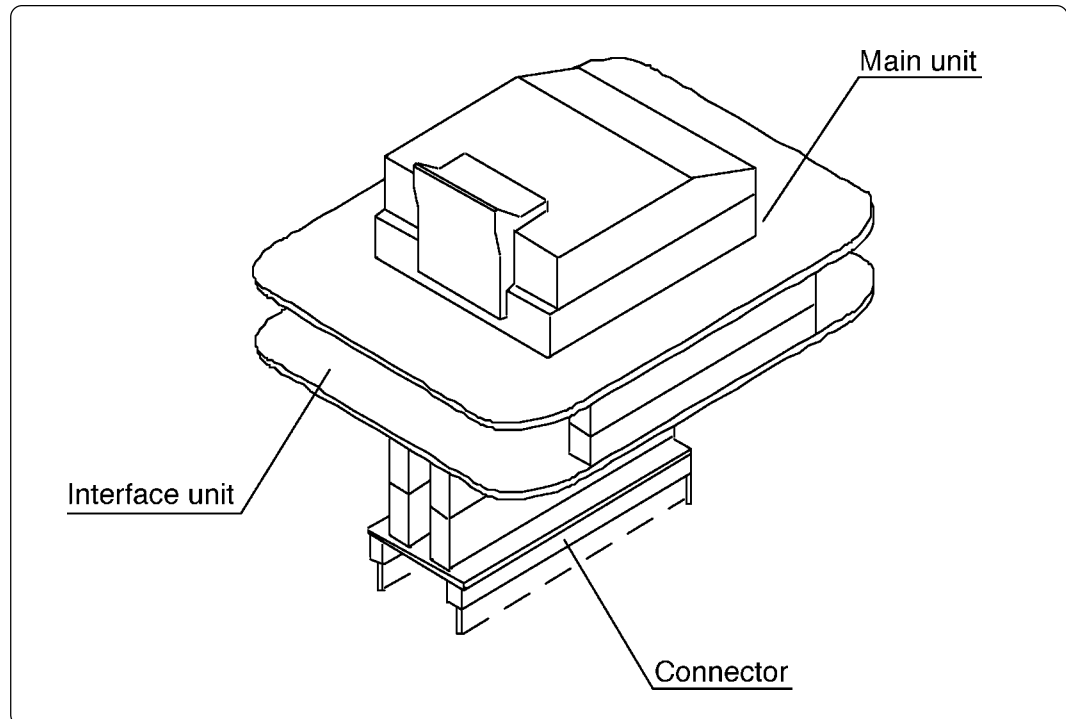


Figure 2.1 External view of adapter and constituent parts (IC socket: QFP)

### 2.1 Things to Check When Unpacking

This product consists of the parts listed in Table 2.1. When unpacking, check to see that it contains all of the components.

Table 2.1 Package components

|                |                   |
|----------------|-------------------|
| Main unit      | PCA7447FP         |
| Interface unit | PCA7402B          |
| Connector      | PCA7402E (32-pin) |
| User's manual  | This manual       |

\* If any part is missing or there is any doubt about your product package, contact your local distributor.

## Chapter 3. Specifications

Table 3.1 lists specifications of the programming adapters.

*Table 3.1 Specifications*

|                           |                              |                                                                                                                                                               |
|---------------------------|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operating clock frequency |                              | 1MHz<br>(Supplied by the ceramic oscillator mounted on the adapter)                                                                                           |
| Power supply              |                              | Supplied from Vcc of the PROM programmer                                                                                                                      |
| Board configuration       | PCA7447FP<br>(Main unit)     | Board to insert a programmable MCU<br>(IC socket mounted on it)                                                                                               |
|                           | PCA7402B<br>(Interface unit) | Interface board<br>(Connected by two rows of standard-pitch 18-pin connectors and two rows of standard-pitch 16-pin connectors to the upper and lower boards) |
|                           | PCA7402E<br>(Connector)      | Board to connect to the PROM programmer<br>(Standard-pitch 32-pin pin-header mounted)                                                                         |

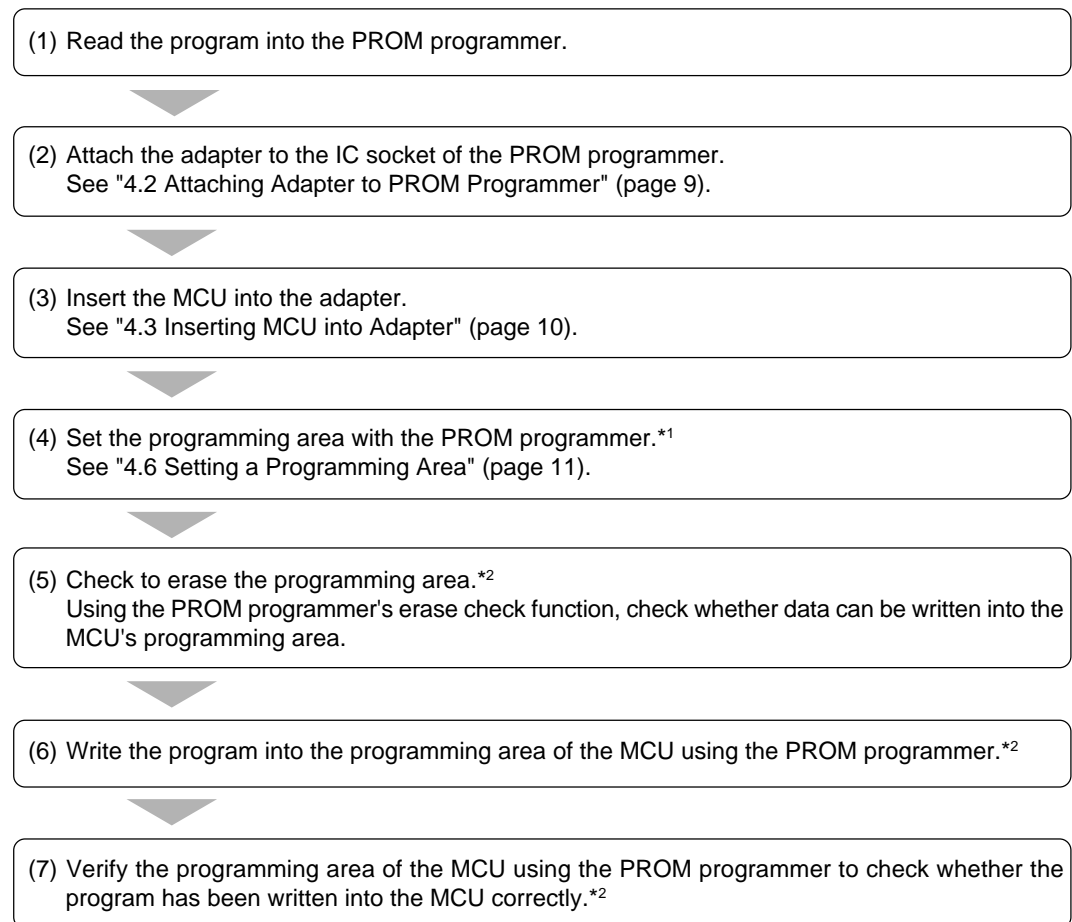
# Chapter 4. How to Write the Program

This chapter describes procedures you need to follow when writing the program.

For details on how to operate the PROM programmer, refer to the user's manual of the PROM programmer.

## 4.1 Programming Procedure

Follow steps (1) to (7) below to write the program.



\*1 Be sure to set the programming area. Otherwise the mode's shift to the programming mode may not be performed successfully. The erase check function and others may not also be performed completely.

\*2 Some PROM programmers perform the steps (5) to (7) automatically.

## 4.2 Attaching Adapter to PROM Programmer

As shown in Figure 4.1, attach the No. 1 pin of the PCA7402E connector (standard-pitch 32-pin pin-header mounted) to the No. 1 pin of the IC socket of the PROM programmer.

**Be careful when attaching to the PROM programmer because incorrect insertion can cause fatal damage to the MCU.**

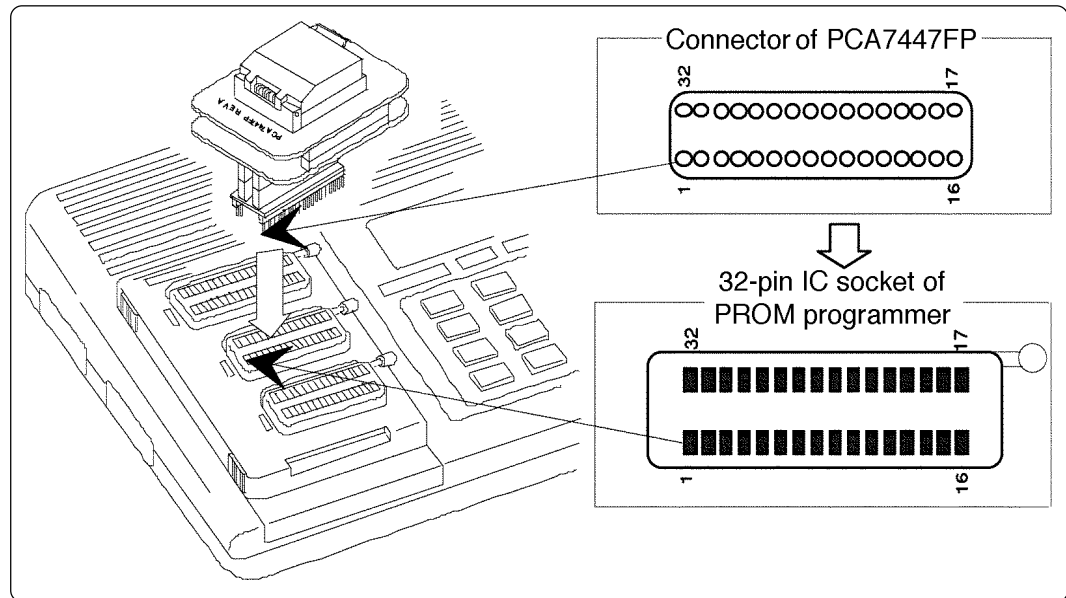


Figure 4.1 Attaching adapter to PROM programmer

### 4.3 Inserting MCU into Adapter

As shown in Figure 4.2, insert the MCU into the IC socket with the No. 1 pin of the MCU matched to the No. 1 pin of the IC socket on the PCA7447FP.

**Be careful when attaching to the PROM programmer because incorrect insertion can cause fatal damage to the MCU.**

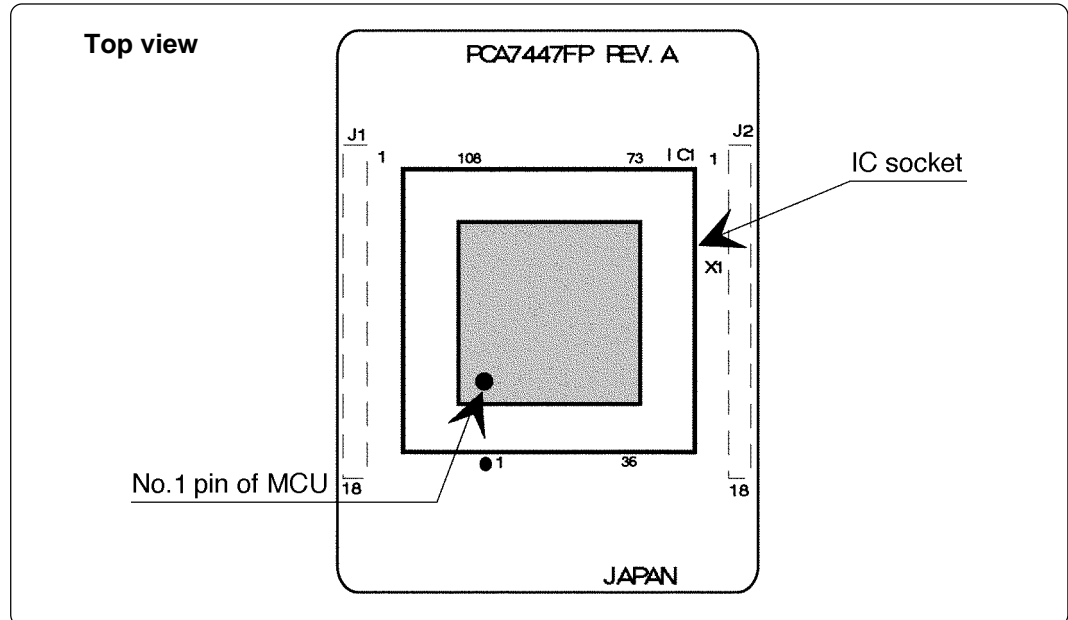


Figure 4.2 Inserting an MCU (IC socket: QFP)

#### 4.4 Precautions When Opening and Closing the IC Socket

When opening and closing the IC socket, keep the IC socket side above and horizontal. Otherwise the inside of the IC socket may become damaged and cause an electrical insulation failure. Figure 4.3 shows the state of opening and closing the IC socket to insert the MCU.

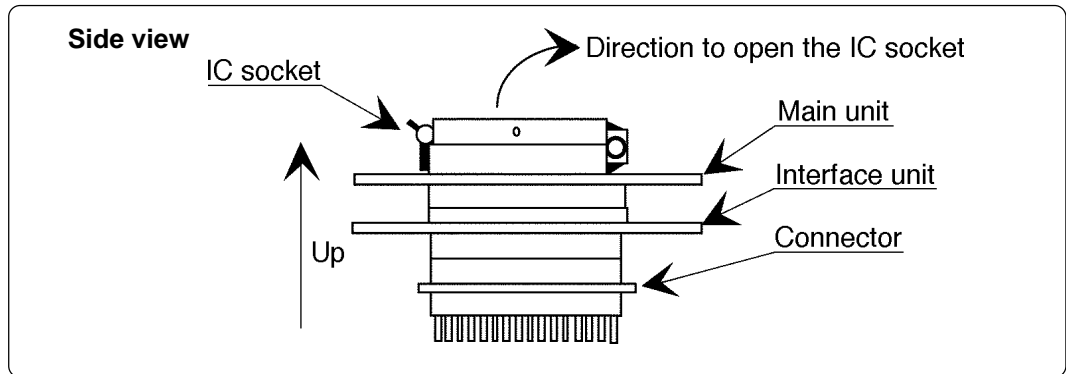


Figure 4.3 Opening and closing the IC socket and inserting MCU

#### 4.5 Caution to Be Taken for This Product

Do not touch the connector in the IC socket and the pins on the PROM programmer connector because dirt may cause an electrical insulation failure.

When not using this product, attach the connector pins of this product to the conductive sponge as it was shipped from the factory.

#### 4.6 Setting a Programming Area

When writing and erasing programs, be sure to set the programming area. And also, specify its device of the PROM programmer.

Table 4.1 Programming area

| MCU       | ROM size | PROM programmer |                                           | Internal memory area of MCU             |
|-----------|----------|-----------------|-------------------------------------------|-----------------------------------------|
|           |          | Device          | Programming area                          |                                         |
| M38C89EFP | 60KB     | M5M27C101       | 01080 <sub>16</sub> - 0FFFD <sub>16</sub> | 1080 <sub>16</sub> - FFFD <sub>16</sub> |

## Chapter 5. Recommended PROM Programmers

The PROM programmers listed in Table 5.1 are recommended for this product. Using the actual products, we have verified that these PROM programmers can be used to write programs without problem. Nonconformity occurring by using any other PROM programmers can not be supported. For the latest type of PROM programmers, contact the manufacturer to confirm whether it can be used for your product.

*Table 5.1 Recommended PROM programmers*

| Manufacturer          | Type name | Device         | Programming voltage (Vpp) |
|-----------------------|-----------|----------------|---------------------------|
| Advantest Corporation | R4945     | M5M27C101 mode | 12.5V                     |
|                       | R4945A    |                |                           |

# Chapter 6. Memory Maps

Figure 6.1 shows memory maps of the MCU and the PROM programmer.

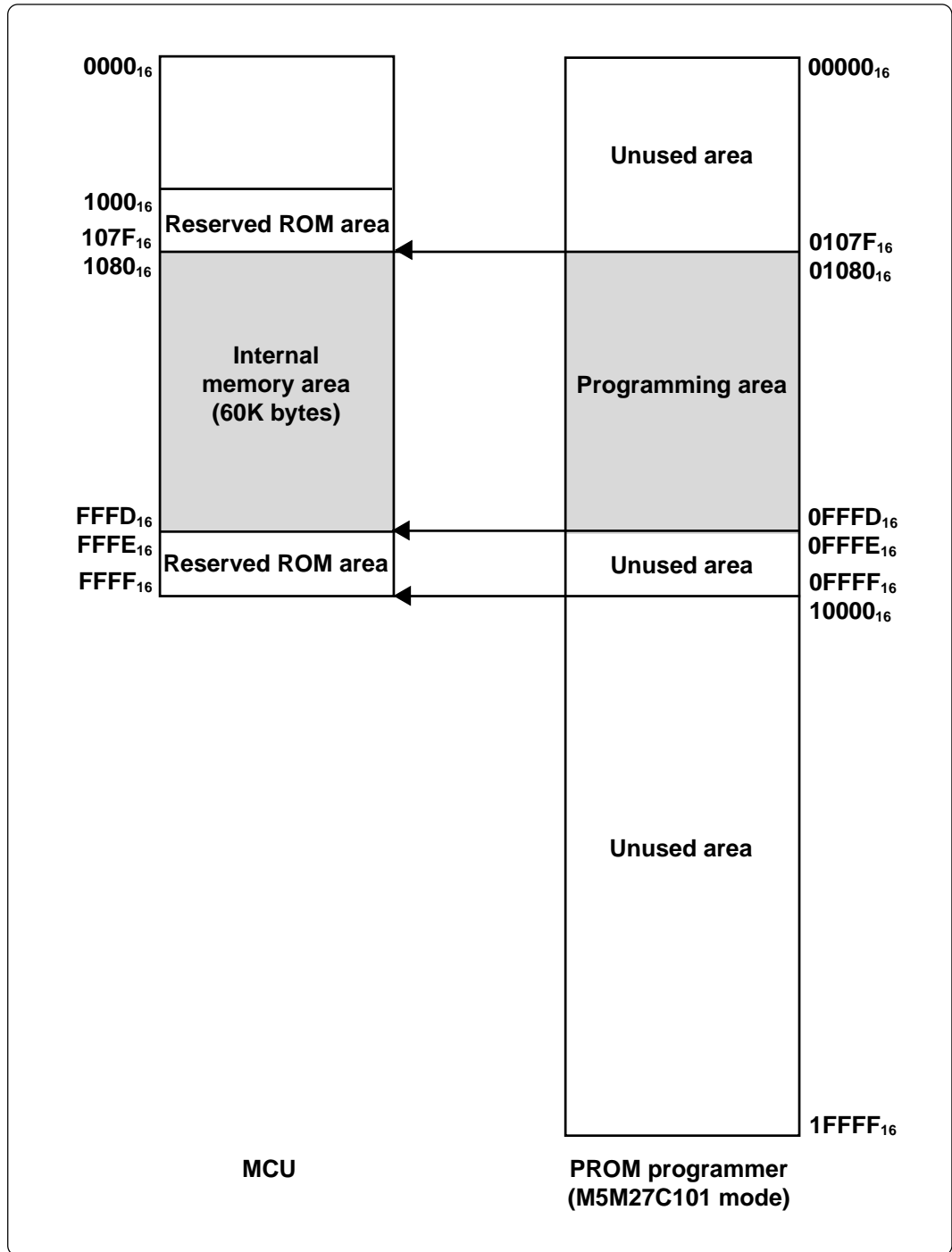


Figure 6.1 Memory maps

# Chapter 7. Troubleshooting

The table below summarizes errors to be checked carefully before you determine them to be a fault.

## 7.1 Errors That Occur When Writing to PROM

### 7.1.1 When Newly Purchased

| Cause               | Remedy                                                                           | See page |
|---------------------|----------------------------------------------------------------------------------|----------|
| Programming adapter | Is the adapter attached to the correct position of the PROM programmer?          | 9        |
|                     | Is the MCU attached to the correct position?                                     | 10       |
| PROM programmer     | Is the area specification set correctly?                                         | 11       |
|                     | Is the correct device selected?                                                  | 12       |
| Contact failure     | The IC socket of the PROM programmer may be stained. The socket needs replacing. | -        |

### 7.1.2 Previously Written Normally

| Cause               | Remedy                                                                                                              | See page |
|---------------------|---------------------------------------------------------------------------------------------------------------------|----------|
| Programming adapter | Is the adapter attached to the correct position of the PROM programmer?                                             | 9        |
|                     | Is the MCU attached to the correct position?                                                                        | 10       |
| PROM programmer     | Is the area specification set correctly?                                                                            | 11       |
|                     | Is the correct device selected?                                                                                     | 12       |
| Contact failure     | The IC socket of the PROM programmer may be stained. The socket needs replacing.                                    | -        |
|                     | The PROM programmer connector at which the PROM programmer is contacted may be stained. Clean it with alcohol, etc. | -        |

## 7.2 MCUs Do Not Function Normally

The program operates normally on the emulator, but when the MCU that has normally been written is attached the same program does not function normally.

- (1) Is the offset address specified correctly when copying data into the PROM programmer?
- (2) In the emulator, NOPs are often inserted in the area where the program has not been read, therefore the program happens to appear functioning normally even though it may have gone wild. Check your program again.
- (3) The emulator and the actual MCU may differ in characteristics. Consult the user's manual of the emulation pod to check for differences in characteristics again.

## 7.3 Other Precautions

### 7.3.1 About the Recommended PROM Programmers

Not all PROM programmers available on the market can be checked to see if they function properly. There are several PROM programmers that we have verified to function properly. These products are listed as recommended PROM programmers in this user's manual. Other PROM programmers may also be used providing that you verified them to function properly.

Note: No matter which type of PROM programmer you use, it is necessary to verify completion of programming by executing screening, etc. that are stipulated for each MCU used.

### 7.3.2 About Reading Out of Device Identification Code \*1

Please do not use the PROM programmer's device identification code readout function.

Using this function may break down the MCU. The device identification code is included in EPROM to indicate the manufacturer code and device code; it is not included in the MCU.

\*1 Depending on PROM programmer manufacturers, this may be referred to by another name (e.g. ID code).

## 7.4 How to Request for Support

After checking this manual, fill in the following information and email to your local distributor.

For prompt response, please specify the following information:

(1) Contact address

- Company name
- Department
- Responsible person
- Phone number
- Fax number
- E-mail address

(2) Product information

- Name of the programming adapter
- Serial number
- Date of purchase
- Target MCU
- Symptoms (Fails blank check/Cannot write a program/Fails verification etc.)
- Detailed symptoms
- How often does the problem occur? (2 out of 10 etc.)
- When did the problem start to occur? (Since purchase/Used to work correctly)
- Type name of the PROM programmer (Advantest R4945A etc.)
- Specified device when writing to PROM (M27C101 etc.)
- Specified programming area when writing to PROM
- Switch settings of the adapter when writing to PROM

# MEMO

# PCA7447FP User's Manual

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PCA7447FP  
User's Manual



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