

To our customers,

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April 1<sup>st</sup>, 2010  
Renesas Electronics Corporation

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Renesas Technology Corp.  
Customer Support Dept.  
April 1, 2003

# **PCA7439 Instruction Manual**

**PROM Programming Adapter  
for  
M37221EAFP**

**Second Edition: January 1, 2002**

**Mitsubishi Electric Corporation  
Mitsubishi Electric Semiconductor Application Engineering Corporation**

(1/14)

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( 2 / 14 )

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# Contents

|   |    |
|---|----|
| 1. Precautions for Safety .....                             | 4  |
| 1.1 Safety Symbols and Meanings .....                       | 4  |
| 2. Introduction .....                                       | 6  |
| 2.1 Things to Check When Unpacking .....                    | 6  |
| 3. Specifications .....                                     | 7  |
| 4. How to Write the Program .....                           | 8  |
| 4.1 Programming Procedures .....                            | 8  |
| 4.2 Attaching Adapter to PROM Programmer .....              | 9  |
| 4.3 Inserting MCU into Programming Adapter .....            | 9  |
| 4.4 Precautions When Opening and Closing IC Socket .....    | 10 |
| 4.5 Precautions When Handling Adapter .....                 | 10 |
| 4.6 Setting Programming Area .....                          | 10 |
| 5. Recommended PROM Programmer .....                        | 11 |
| 6. Memory Map .....   | 12 |
| 7. Troubleshooting .....                                    | 13 |
| 7.1 Errors That Occur When Writing to ROM .....             | 13 |
| 7.1.1 When Newly Purchased .....                            | 13 |
| 7.1.2 Previously Written Normally .....                     | 13 |
| 7.2 MCU Does Not Function Normally .....                    | 14 |
| 7.3 Other Precautions .....                                 | 14 |
| 7.3.1 About the Recommended PROM Programmers .....          | 14 |
| 7.3.2 About Reading Out of Device Identification Code ..... | 14 |

## To use the product properly

### Precautions for Safety:





- In both 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". Be sure to read this chapter before using the product.

# 1. Precautions for Safety


In this instruction manual, 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 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 page describes the symbols "WARNING", "CAUTION", and "IMPORTANT".

## **WARNING**

### **Warning for Handling This Product:**

- 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. Personal injury due to electric shock may occur if this product is disassembled or modified.
- Use caution when handling this product. Be careful not to apply a mechanical shock such as falling etc.
- Do not directly touch the connector pins of this product.
- Be careful with the static electricity when handling this product and the MCU.

### **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**

- Attach this product to the IC socket on the PROM programmer properly.
- Insert the MCU to the IC socket of this product properly.
- When opening and closing the IC socket of this product, be sure to keep it horizontal.
- Be sure to set the programming area as described in this instruction manual.
- Do not use the PROM programmer's device identification code readout function.



## 2. Introduction

PCA7439 is a programming adapter for 8-bit microcomputers of 7200 Series. The adapter is a tool that can be used to write programs into internal PROM of microcomputers using a commercially available PROM programmer.

This manual describes the specifications and the operation of PCA7439.

Figure 2.1 shows the external view of PCA7439 and its constituent parts.

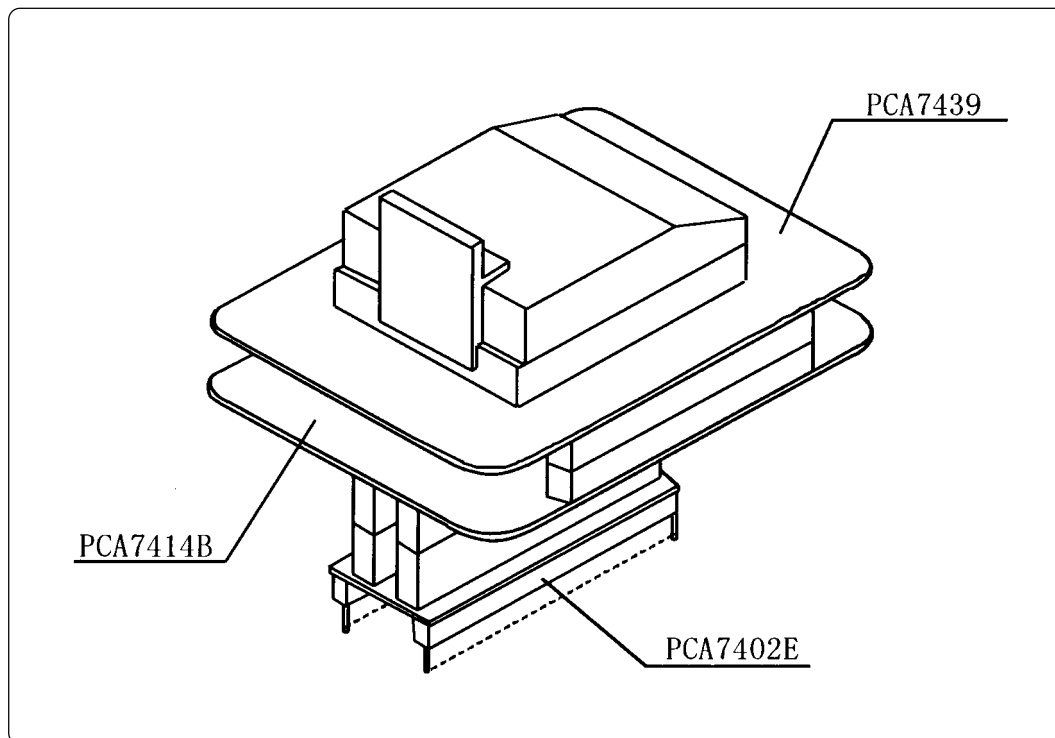


Figure 2.1 External view of PCA7439 and its constituent parts

### 2.1 Things to Check When Unpacking

Each PCA7439 Package consists of following parts. Check to see that it contains all of the parts shown below.

#### Contents

- PCA7439 (Main unit) ..... x1
- PCA7414B (Interface) ..... x1
- PCA7402E (Connector) ..... x1
- PCA7439 Instruction Manual (This manual) ..... x1

If any part is missing or there is any doubt about your product package, contact your nearest office of Mitsubishi or its distributor.

### 3. Specifications

Table 3.1 shows specifications of PCA7439.

*Table 3.1 Specifications of PCA7439*

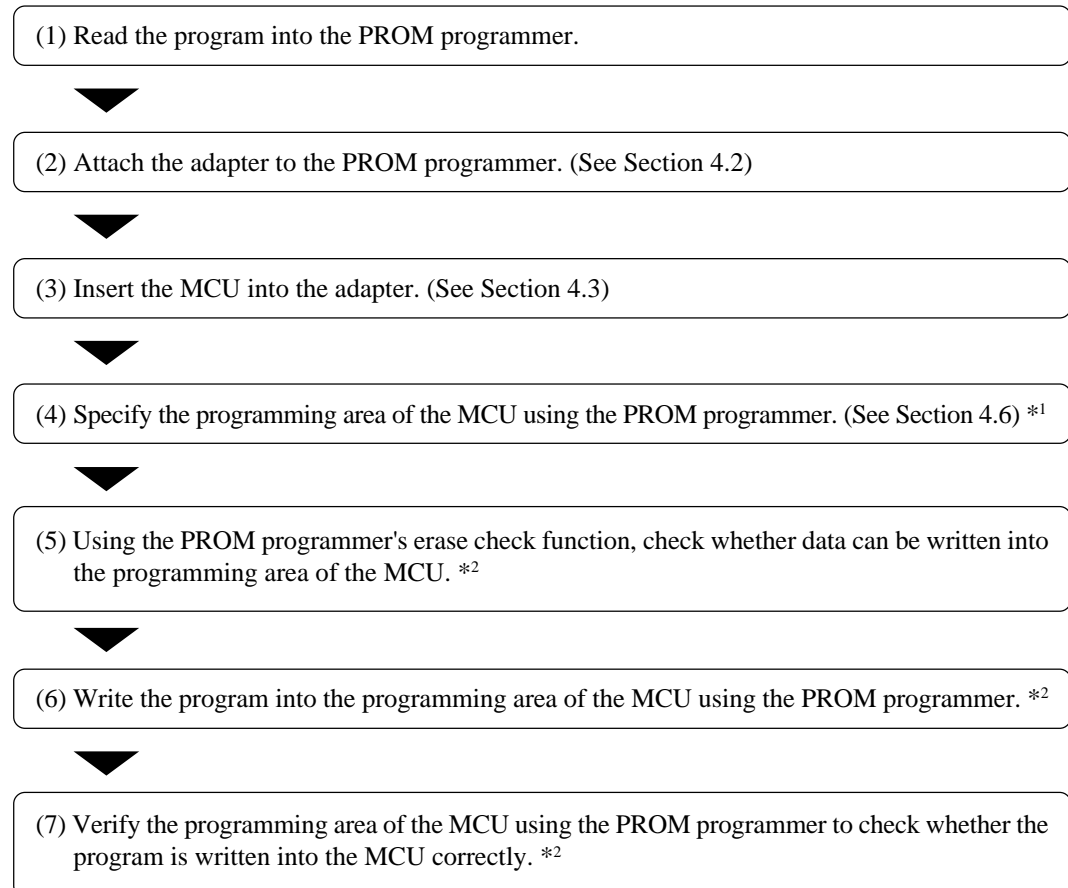
|                           |  |   |
|---------------------------|--|---|
| MCU type                  | 7200 Series OTP packages (42P2R)<br>M37221EAFP                   |   |
| Operating clock frequency | 4 MHz<br>(Supplied by the ceramic oscillator mounted on PCA7439) |   |
| Power supply              | Supplied from Vcc of the PROM programmer                         |   |
| IC socket                 | IC51-0422-393 (Made by Yamaichi Electronics Co., Ltd.)           |   |
| Board configuration       | PCA7439  | Board to insert the programmable MCU<br>(IC socket for 42-pin QFP is mounted.)  |
|                           | PCA7414B   | Interface board<br>(Connected by two standard-pitch 18-pin connectors and two standard-pitch 16-pin connectors to the upper and lower boards) |
|                           | PCA7402E   | Board to connect to the PROM Programmer<br>(Standard-pitch 32-pin pin-header is mounted.)   |

## 4. How to Write the Program

This chapter describes how to write programs using a PROM programmer. For details on how to operate the PROM programmer, refer to the user's manual of the PROM programmer.

### 4.1 Programming Procedures

Follow procedures (1) to (7) to write programs into the MCU.



\*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 etc. may not also be performed completely.**

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

## 4.2 Attaching Adapter to PROM Programmer

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

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

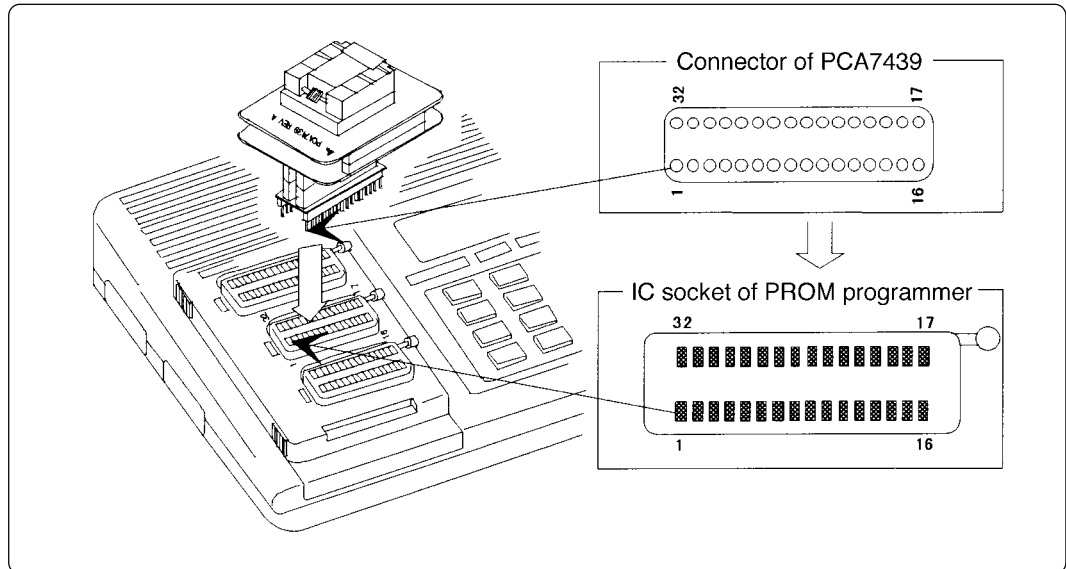


Figure 4.1 Attaching the adapter to the PROM programmer

## 4.3 Inserting MCU into Programming Adapter

- (1) As shown in Figure 4.2, set the sliding lever to the right (the diagonally shaded square is printed on the board).
- (2) As shown in Figure 4.2, insert the MCU into the IC socket, with the pin No. 1 of the MCU matched to the pin No. 1 of the IC socket on the PCA7439.

**Be careful when inserting the MCU because incorrect insertion can cause fatal damage to the MCU.**

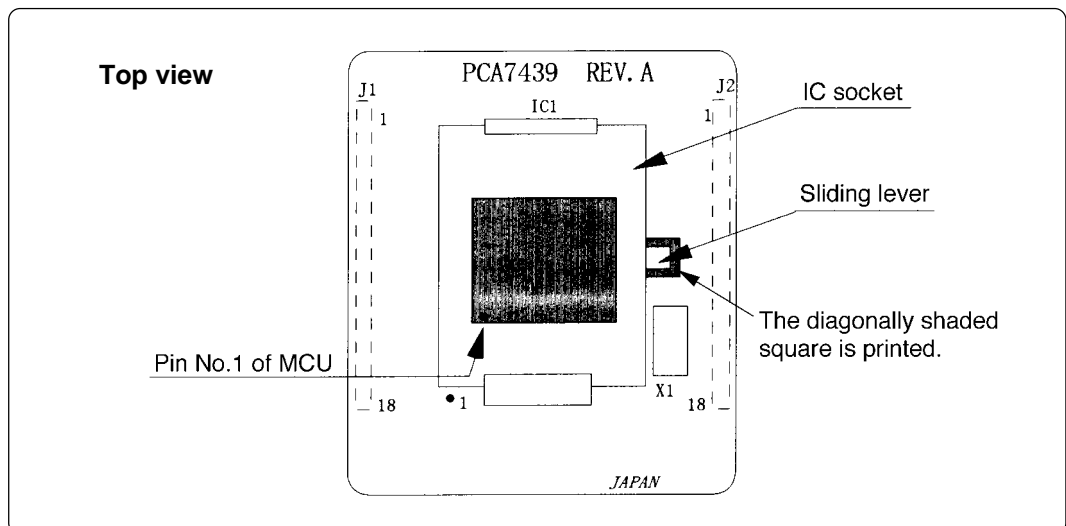


Figure 4.2 Inserting the MCU

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

When opening and closing the IC socket, hold the adapter horizontally as shown in Figure 4.3. Otherwise the inside of the IC socket may become damaged and cause an electrical insulation failure.

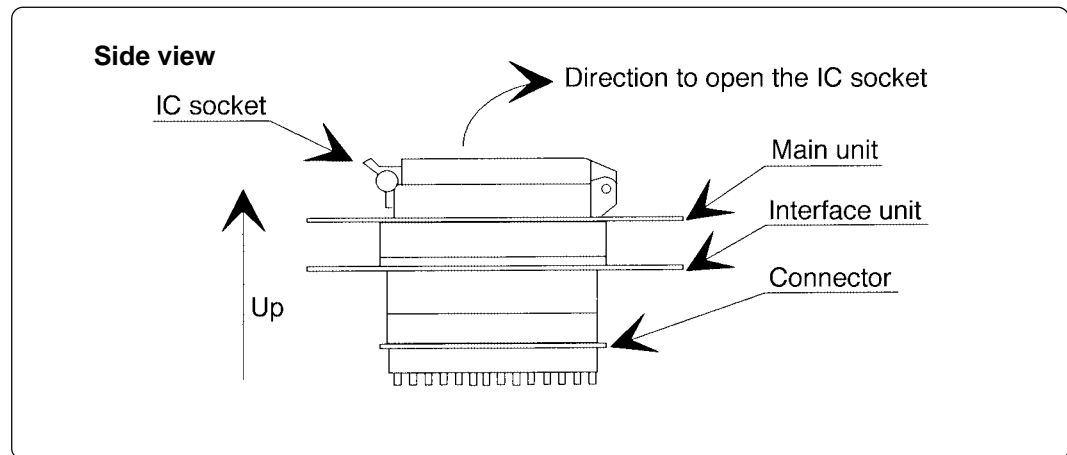


Figure 4.3 Holding the adapter in a horizontal position

#### 4.5 Precautions When Handling Adapter

Don't 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 Programming Area

When writing the program into the MCU, be sure to set the programming area. And also, specify its device of the PROM programmer.

Examples of programming area settings are shown in Table 4.1 below.

Table 4.1 Programming areas

| MCU type   | MCU area          | PROM programmer |   | Programming area of the MCU               |
|------------|-------------------|-----------------|---|---|
|            |                   | Device name     | Programming area                          |   |
| M37221EAFP | OSD ROM area      | M5M27C101       | 10000 <sub>16</sub> - 11FFF <sub>16</sub> | 10000 <sub>16</sub> - 11FFF <sub>16</sub> |
|            | Internal ROM area |                 | 06000 <sub>16</sub> - 0FFFF <sub>16</sub> | 06000 <sub>16</sub> - 0FFFF <sub>16</sub> |

## 5. Recommended PROM Programmer

The PROM programmers listed in Table 5.1 are recommended for the adapter PCA7439. 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 name    | Programming voltage (Vpp) |
|--------------|-----------|----------------|---------------------------|
| Advantest    | R4944A    | M5M27C101 mode | 12.5 V                    |
|              | R4945     |                |                           |
|              | R4945A    |                |                           |

# 6. Memory Map

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

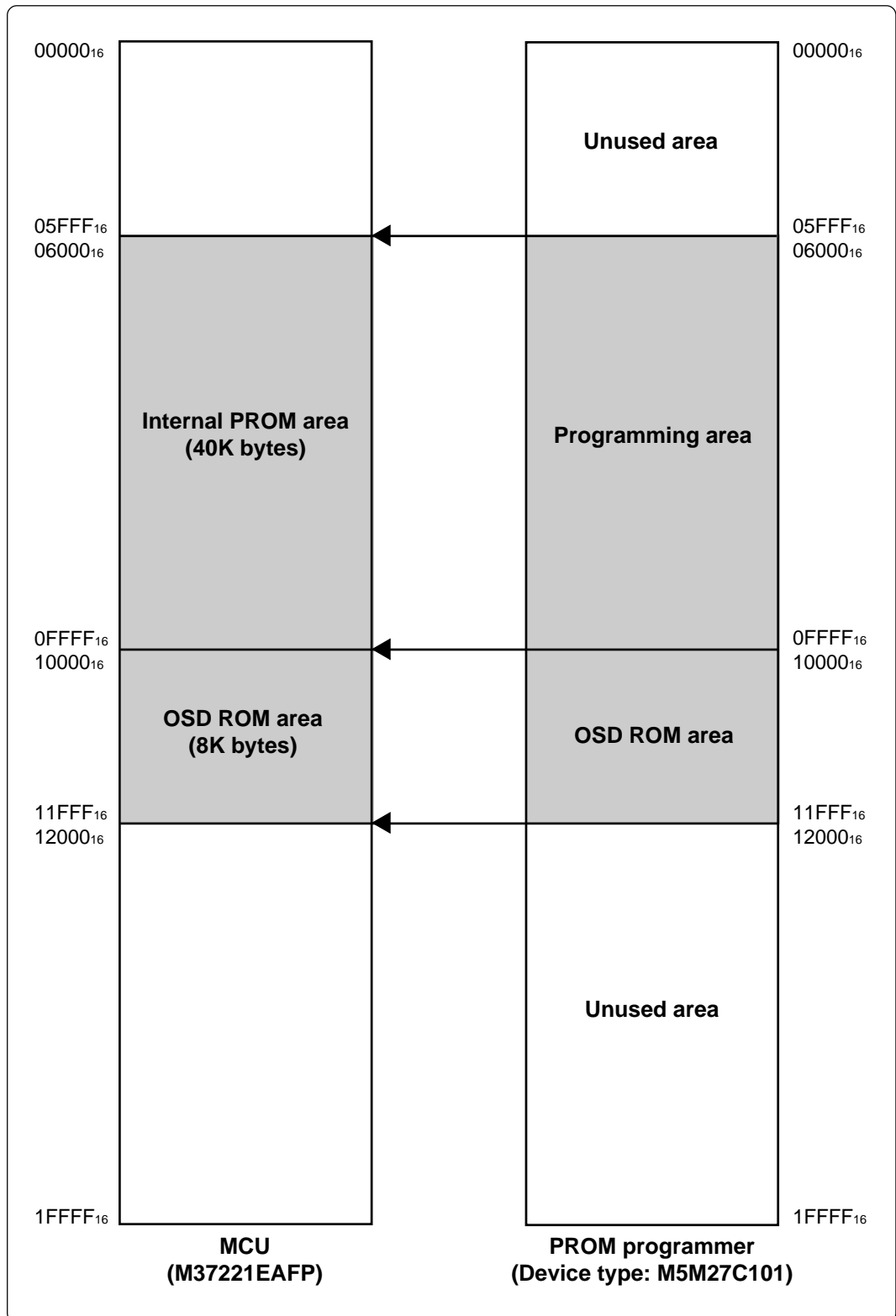


Figure 6.1 Memory maps

## 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 ROM

#### 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?                                     | 9        |
| PROM programmer     | Is the area specification set correctly?   | 10       |
|                     | Is the correct device selected?  | 10       |
| 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?  | 9        |
| PROM programmer     | Is the area specification set correctly?  | 10       |
|                     | Is the correct device selected?   | 10       |
| 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 MCU Does 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 "5. Recommended PROM Programmers". 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).

# Technical Support Communication Sheet

Date: \_\_\_/\_\_\_/\_\_\_ (Month/Day/Year)

**To Distributor:**

| Contact Address  | Product Information  |
|--|--|
| Company:   | Programming adapter:   |
| Department:  | PCA7439  |
| Name:  | Serial number:   |
| Phone:   | Date of purchase:  |
| Fax:   | Target MCU:  |
| E-mail:  |  |
| <p>1. Symptom:</p> <p><input type="checkbox"/> Fails blank check.</p> <p><input type="checkbox"/> Cannot write a program.</p> <p><input type="checkbox"/> Fails verification.</p> <p>Detail:</p>   |  |
| <p>2. How often does the problem occur?</p>  |  |
| <p>3. When did the problem start to occur?</p> <p><input type="checkbox"/> Since purchase.</p> <p><input type="checkbox"/> Used to work correctly.</p>   |  |
| Programmer   | Device   |
| <input type="checkbox"/> Advantest TR4943<br><input type="checkbox"/> Advantest R4944A<br><input type="checkbox"/> Advantest R4945<br><input type="checkbox"/> Advantest R4945A<br><input type="checkbox"/> Other<br>(Manufacturer:                    ) )<br>(Product name:                   ) ) | <input type="checkbox"/> M5L2764 or 2764<br><input type="checkbox"/> M5L27128 or 27128<br><input type="checkbox"/> M5M27C256/A or 27256<br><input type="checkbox"/> M5M27C101<br><input type="checkbox"/> M5M28F101<br><input type="checkbox"/> Other (                            ) ) |