

# PCA7450FP PCA7450SP

---

PROM Programming Adapters for M3715xEFFP/M3715xEFSS/M3715xERSS

## User's Manual

\* IC51-0422-393 and IC59-4206-G4 are products of Yamaichi Electronics Co., Ltd.

\* R4945 and R4945A are trademarks of Advantest Corporation.

#### **Keep safety first in your circuit designs!**

- Renesas Technology Corporation and Renesas Solutions Corporation put the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

#### **Notes regarding these materials**

- These materials are intended as a reference to assist our customers in the selection of the Renesas Technology product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation, Renesas Solutions Corporation or a third party.
- Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation and Renesas Solutions Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation, Renesas Solutions Corporation or an authorized Renesas Technology product distributor for the latest product information before purchasing a product listed herein. The information described here may contain technical inaccuracies or typographical errors. Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors. Please also pay attention to information published by Renesas Technology Corporation and Renesas Solutions Corporation by various means, including the Renesas home page (<http://www.renesas.com>).
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, liability or other loss resulting from the information contained herein.
- Renesas Technology semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation, Renesas Solutions Corporation or an authorized Renesas Technology product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of Renesas Technology Corporation and Renesas Solutions Corporation is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination. Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact Renesas Technology Corporation or Renesas Solutions Corporation for further details on these materials or the products contained therein.

#### **Precautions to be taken when using this product**

- This product is a development supporting unit for use in your program development and evaluation stages. In mass-producing your program you have finished developing, be sure to make a judgment on your own risk that it can be put to practical use by performing integration test, evaluation, or some experiment else.
- In no event shall Renesas Solutions Corporation be liable for any consequence arising from the use of this product.
- Renesas Solutions Corporation strives to renovate or provide a workaround for product malfunction at some charge or without charge. However, this does not necessarily mean that Renesas Solutions Corporation guarantees the renovation or the provision under any circumstances.
- This product has been developed by assuming its use for program development and evaluation in laboratories. Therefore, it does not fall under the application of Electrical Appliance and Material Safety Law and protection against electromagnetic interference when used in Japan.

Renesas Tools Homepage <http://www.renesas.com/en/tools>

# Contents

Chapter 1. Precautions for Safety .....	4
1.1 Safety Symbols and Meanings .....	4
Chapter 2. Introduction .....	6
2.1 Things to Check When Unpacking .....	7
Chapter 3. Specifications .....	8
Chapter 4. How to Write the Program .....	9
4.1 Programming Procedure .....	9
4.2 Attaching the Adapter to a PROM Programmer .....	10
4.3 Mounting an MCU into the Adapter .....	11
4.3.1 For PCA7450FP .....	11
4.3.2 For PCA7450SP .....	11
4.4 Precautions When Handling the Adapter .....	12
4.5 Setting the Programming Area .....	12
Chapter 5. Recommended PROM Programmers .....	12
Chapter 6. Memory Maps .....	13
Chapter 7. Troubleshooting .....	14
7.1 Errors That Occur When Writing to PROM .....	14
7.1.1 When Newly Purchased .....	14
7.1.2 Previously Written Normally .....	14
7.2 MCUs Do Not Function Normally .....	15
7.3 Other Precautions .....	15
7.3.1 About the Recommended PROM Programmers .....	15
7.3.2 About Reading Out of Device Identification Code .....	15
7.4 How to Request for Support .....	15

## To use the product properly

### Precautions for Safety:





- Both in this Instruction 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 Instruction 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 page describes 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.
- Mount the MCU to the IC socket of this product properly.
- 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

This product is a PROM programming adapter for Renesas 7200 Series of 8-bit MCUs. This adapter is a tool that can be used to write programs into an internal PROM of MCUs using a commercially available PROM programmer.

This manual describes the specifications and the operation of the PCA7450FP/PCA7450SP.

Figures 2.1 and 2.2 show the external views of the PCA7450FP and PCA7450SP and their constituent parts.

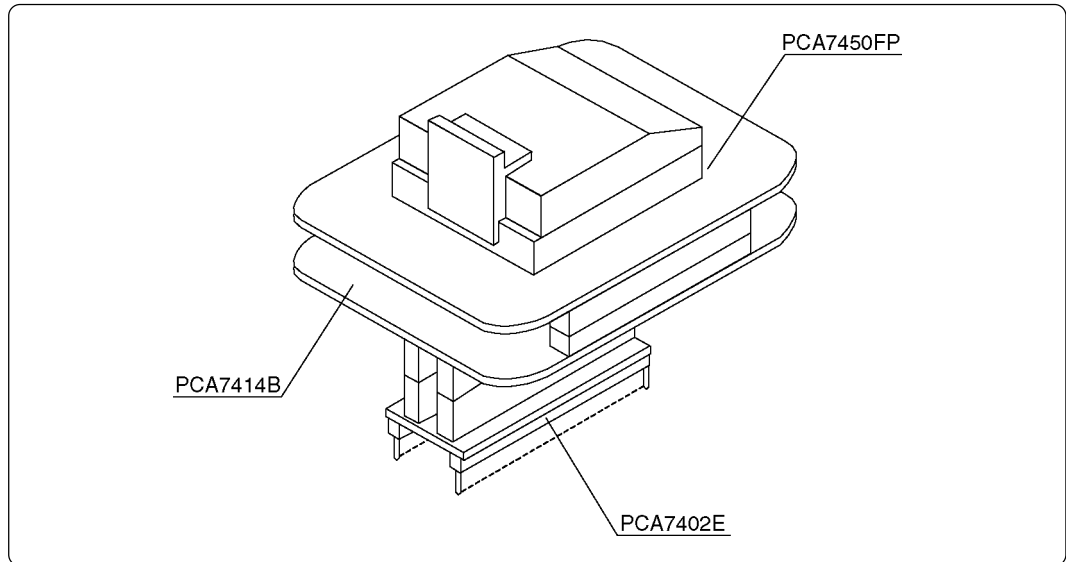


Figure 2.1 External view of the PCA7450FP and its constituent parts

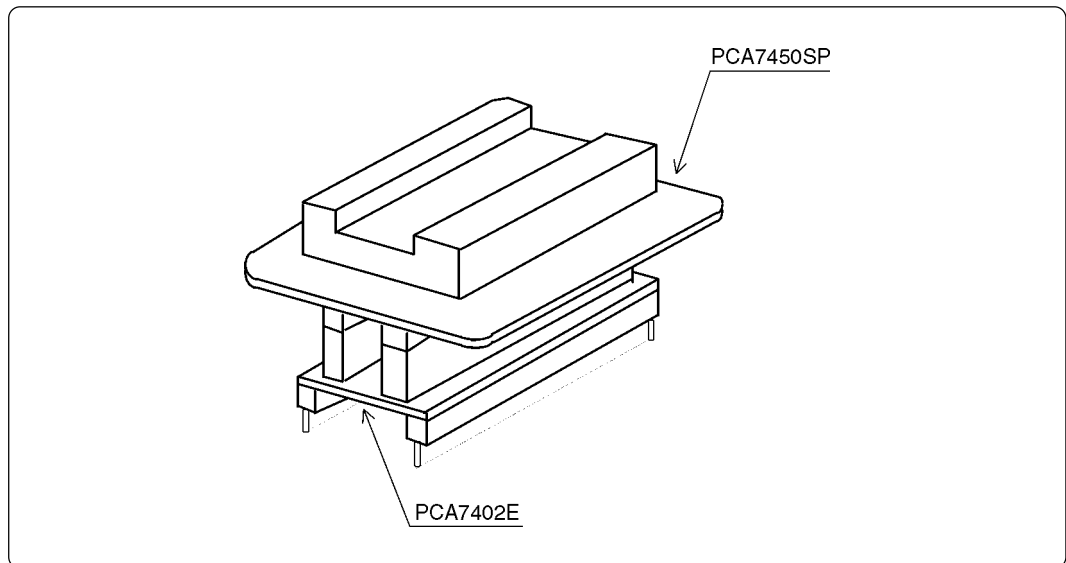


Figure 2.2 External view of the PCA7450SP and its constituent parts

## 2.1 Things to Check When Unpacking

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

*Table 2.1 Package components*

Main unit	PCA7450FP	PCA7450SP
Interface unit	PCA7414B	-
Connector	PCA7402E (32-pin)	
Instruction manual	This manual	

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

## Chapter 3. Specifications

Tables 3.1 and 3.2 list specifications of the PCA7450FP/PCA7450SP.

*Table 3.1 Common specifications of the PCA7450FP/PCA7450SP*

Operating clock frequency		1 MHz (Supplied by the ceramic oscillator mounted on the adapter)
Power supply		Supplied from Vcc of the PROM programmer
Board configuration	PCA7450FP/ PCA7450SP	Board to insert a programmable MCU (IC socket mounted on it)
	PCA7414B (only for PCA7450FP)	Interface board (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	Board to connect to the PROM programmer (Standard-pitch 32-pin pin-header mounted)

*Table 3.2 Specifications of each product*

PCA7450FP	Applicable MCU	M37150EFP, M37151EFP (42-pin 0.8-mm-pitch SSOP)
	IC socket	IC51-0422-393 (made by Yamaichi Electronics Co., Ltd.)
PCA7450SP	Applicable MCU	M37150EFSS, M37150ERSS, M37151EFSS, M37151ERSS (42-pin 1.778-mm-pitch windowed SDIP)
	IC socket	IC59-4206-G4 (made by Yamaichi Electronics Co., Ltd.)

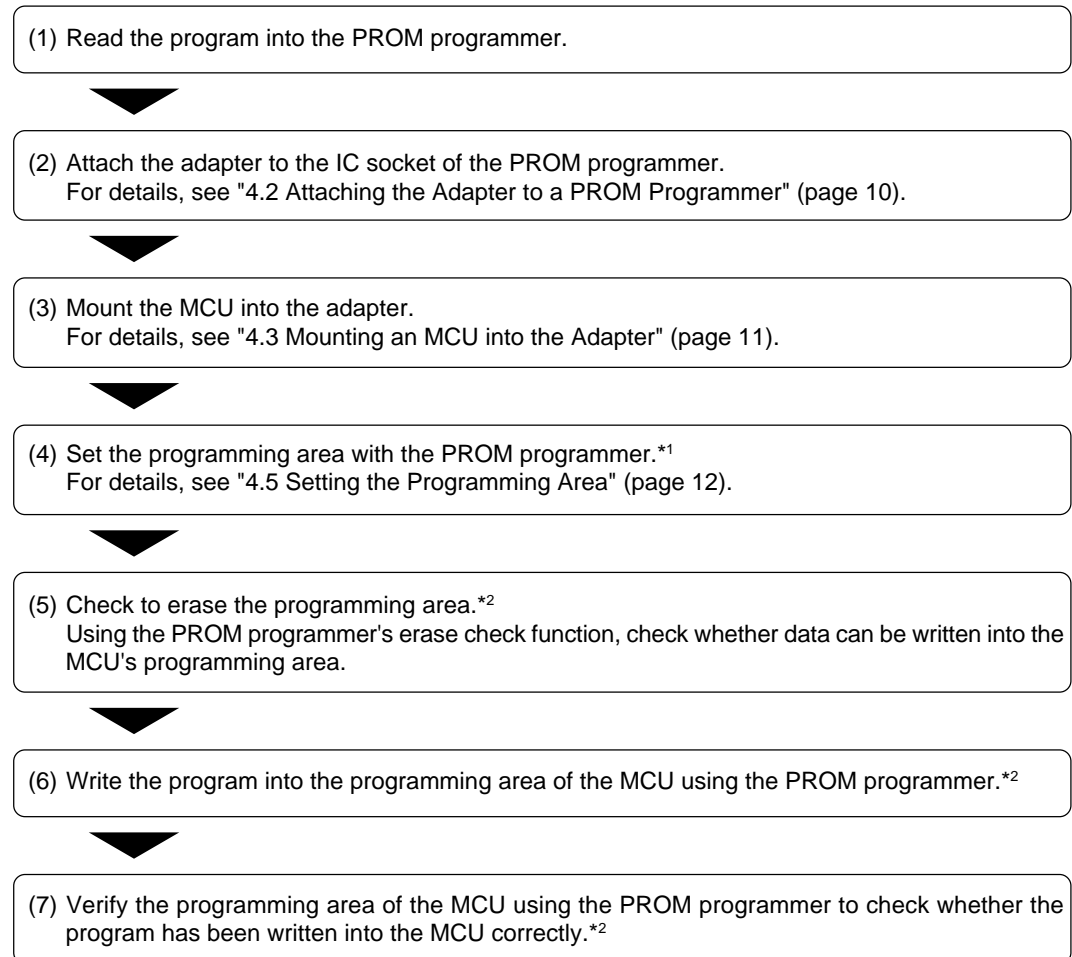


# Chapter 4. How to Write the Program

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 these procedures (1) through (7) to write the program into the MCU.



### Notes

\*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 the Adapter to a PROM Programmer

As shown in Figures 4.1 and 4.2, attach the pin No. 1 of the PCA7402E 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.**

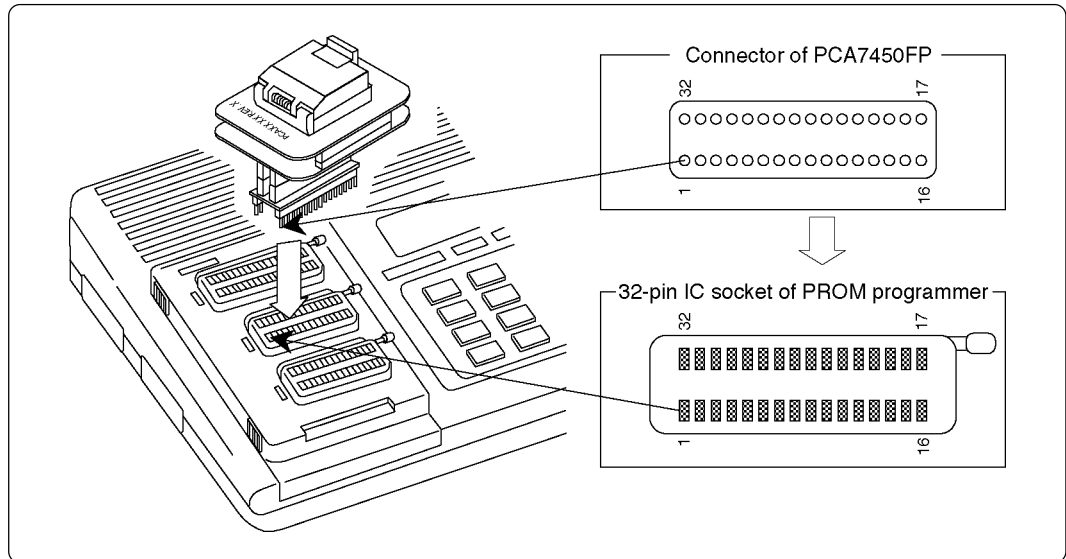


Figure 4.1 Attaching the adapter to a PROM programmer (PCA7450FP)

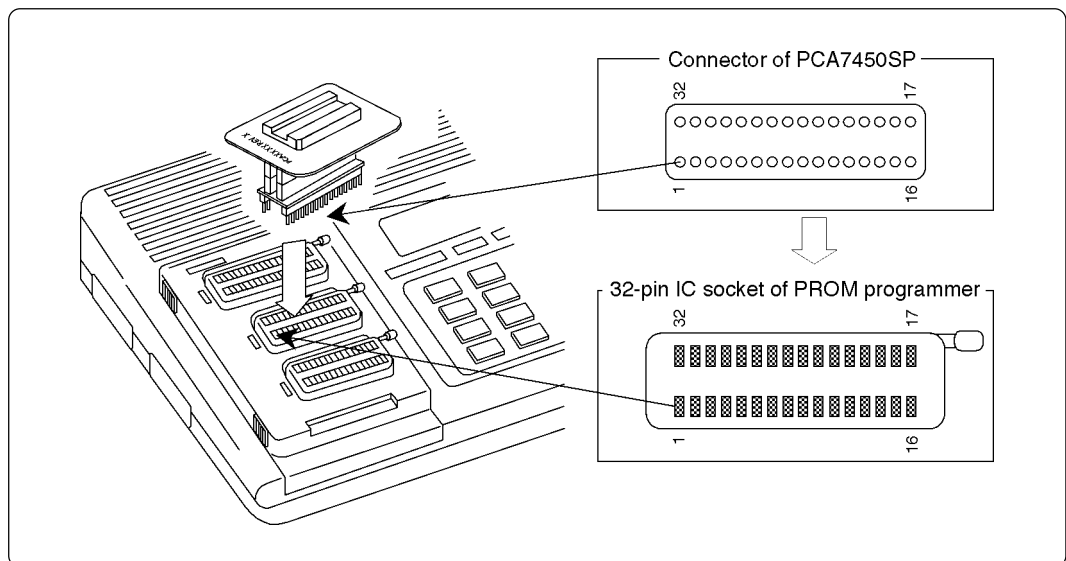


Figure 4.2 Attaching the adapter to a PROM programmer (PCA7450SP)

### 4.3 Mounting an MCU into the Adapter

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

#### 4.3.1 For PCA7450FP

- (1) As shown in Figure 4.3, set the slide bar in the center of the IC socket to the shaded area on the board.
- (2) As shown in Figure 4.3, mount 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 PCA7450FP.

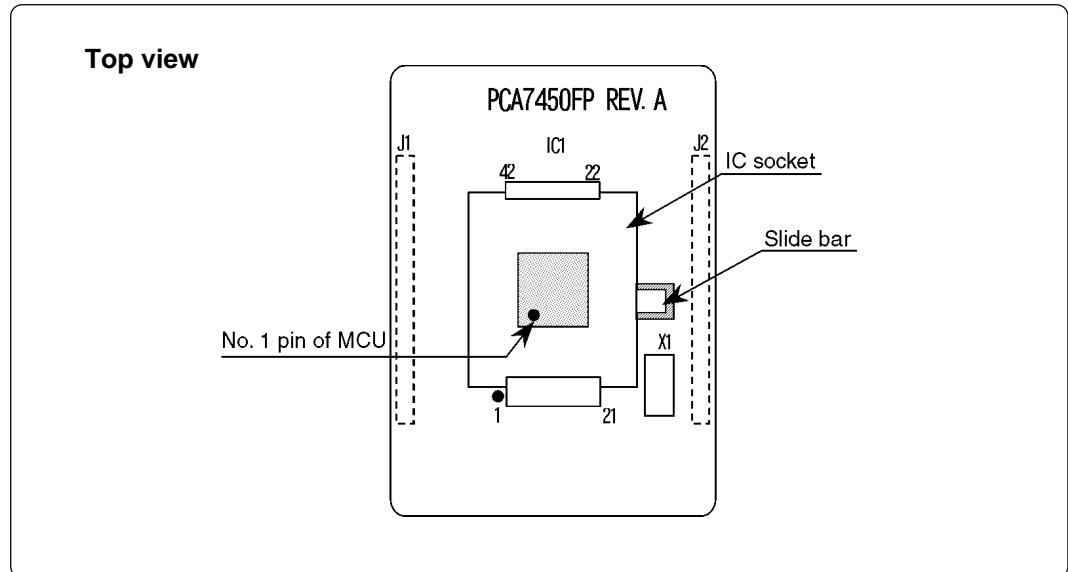


Figure 4.3 Mounting an MCU (PCA7450FP)

#### 4.3.2 For PCA7450SP

As shown in Figure 4.4, mount 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 PCA7450SP.

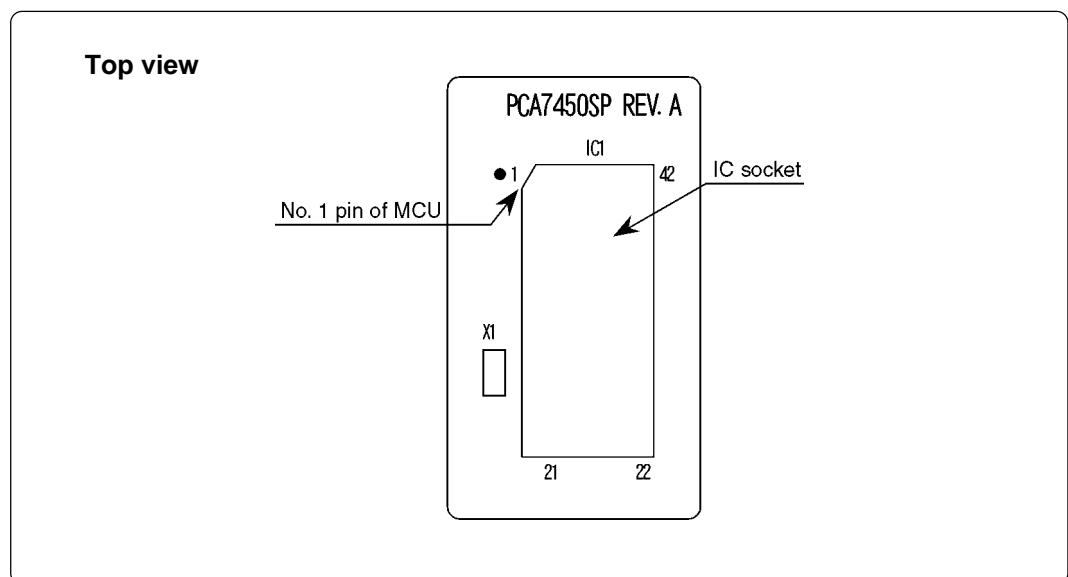


Figure 4.4 Mounting an MCU (PCA7450SP)

## 4.4 Precautions When Handling the Adapter

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.

## 4.5 Setting the 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.

*Table 4.1 Programming areas*

MCU type name	MCU area	PROM programmer		ROM area of MCU
		Device	Programming area	
M37150EFPF/ M37150EFSS	Internal ROM area	M5M27C101	1000 <sub>16</sub> --FFFF <sub>16</sub>	1000 <sub>16</sub> --FFFF <sub>16</sub>
	OSDROM area		11400 <sub>16</sub> --13BFF <sub>16</sub>	11400 <sub>16</sub> --13BFF <sub>16</sub>

# Chapter 5. Recommended PROM Programmers

The PROM programmers listed in Table 5.1 are recommended for the adapter. 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 (V <sub>PP</sub> )
Advantest Corporation	R4945	M5M27C101 mode	12.5 V
	R4945A		

# Chapter 6. Memory Maps

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

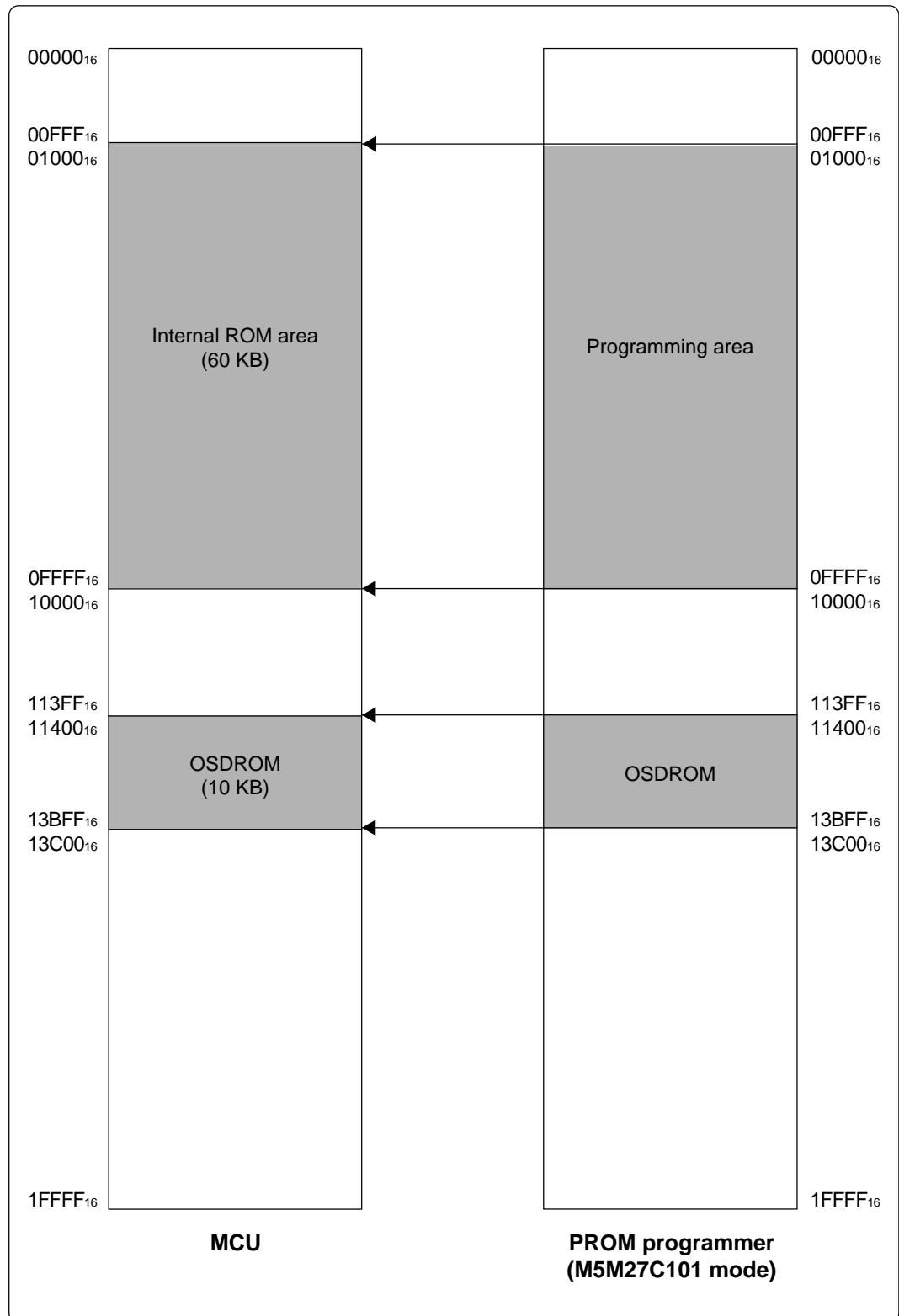


Figure 6.1 Memory maps

# Chapter 7. Troubleshooting

The tables below summarize 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?	10
	Is the MCU attached to the correct position?	11
PROM programmer	Is the area specification set correctly?	12
	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?	10
	Is the MCU attached to the correct position?	11
PROM programmer	Is the area specification set correctly?	12
	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 instruction 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



# PCA7450FP/PCA7450SP User's Manual

---

Rev. 1.00  
July 1, 2003  
REJ10J0189-0100Z

COPYRIGHT ©2003 RENESAS TECHNOLOGY CORPORATION  
AND RENESAS SOLUTIONS CORPORATION ALL RIGHTS RESERVED



**Renesas Technology Corp.**

2-6-2, Ote-machi, Chiyoda-ku, Tokyo, 100-0004, Japan