

**PCA7412F-100**  
**PCA7412L-100**  
**PCA7412G-100**  
**PCA7413F-80**

---

PROM Programming Adapters for M16C/60 Series

**User's Manual**

- 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.
- This product is not qualified under UL or other safety standards and IEC or other industry standards. This fact must be taken into account when taking this product from Japan to some other country.

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

# 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. How to Write the Program .....	7
3.1 Programming Procedures .....	7
3.2 Attaching the Adapter to a PROM Programmer .....	8
3.3 Setting the Switch .....	9
3.4 Inserting an MCU into the Adapter .....	10
3.5 Setting Programming Area .....	12
3.6 Recommended PROM Programmers .....	13
4. Specifications .....	14
4.1 Specifications .....	14
4.2 Memory Maps .....	15
5. Troubleshooting .....	17
5.1 Errors That Occur When Writing to PROM .....	17
(1) When Newly Purchased .....	17
(2) Previously Written Normally .....	17
5.2 When MCUs Do Not Function Normally .....	17
5.3 Other Precautions .....	18
(1) About the Recommended PROM Programmers .....	18
(2) About Reading Out of Device Identification Code .....	18
5.4 How to Request for Support .....	18

# 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

### Warning 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

### Caution to Be Taken for Modifying This Product:



- Do not disassemble or modify this product. Disassembling and modifying the product will void your warranty.

### Cautions to Be Taken for This Product:



- 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 MCUs.

### 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

### Note on This Product:

- We cannot accept any request for repair.

### When Using This 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 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 user's manual.
- Do not use the PROM programmer's device identification code readout function.

## 2. Introduction

This product is a PROM programming adapter for the Renesas M16C/60 Series of 16-bit MCUs. The adapter is a tool that can be used to write programs into internal PROM of an MCU using a PROM programmer commercially available. This user's manual describes specifications of the PCA7412F-100, PCA7412L-100, PCA7412G-100 and PCA7413F-80 and how to use them.

Figure 2.1 shows the external view of the PROM programming adapter and its constituent parts.

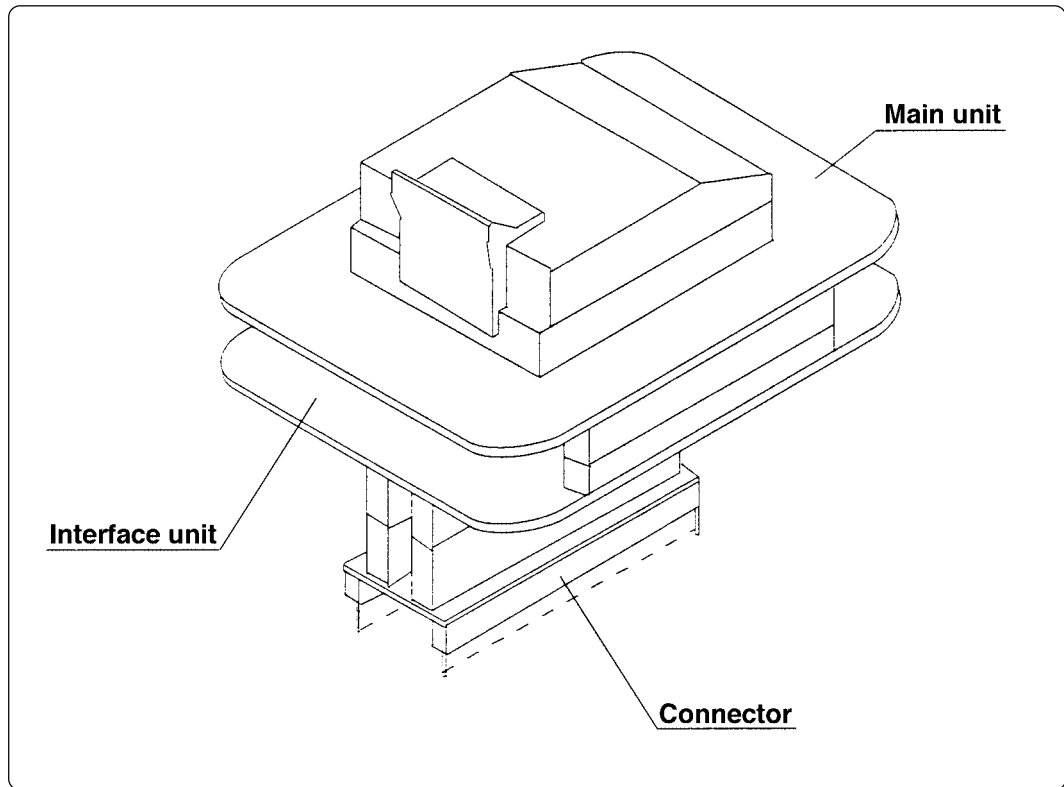


Figure 2.1 External view of the programming adapter and its constituent parts

### 2.1 Things to Check When Unpacking

This product package consists of the following parts. Check to see that it contains all the parts shown in Table 2.1 below.

Table 2.1 Contents

	PCA7412F-100 package	PCA7412L-100 package	PCA7412G-100 package	PCA7413F-80 package
Main unit	PCA7412F-100	PCA7412L-100	PCA7412G-100	PCA7413F-80
Interface unit	PCA7412B		PCA7412C	PCA7412B
Connector	PCA7476E (32-pin)		PCA7402E (32-pin)	PCA7476E (32-pin)
User's Manual	PROM Programming Adapters for M16C/60 Series User's Manual (This manual)			

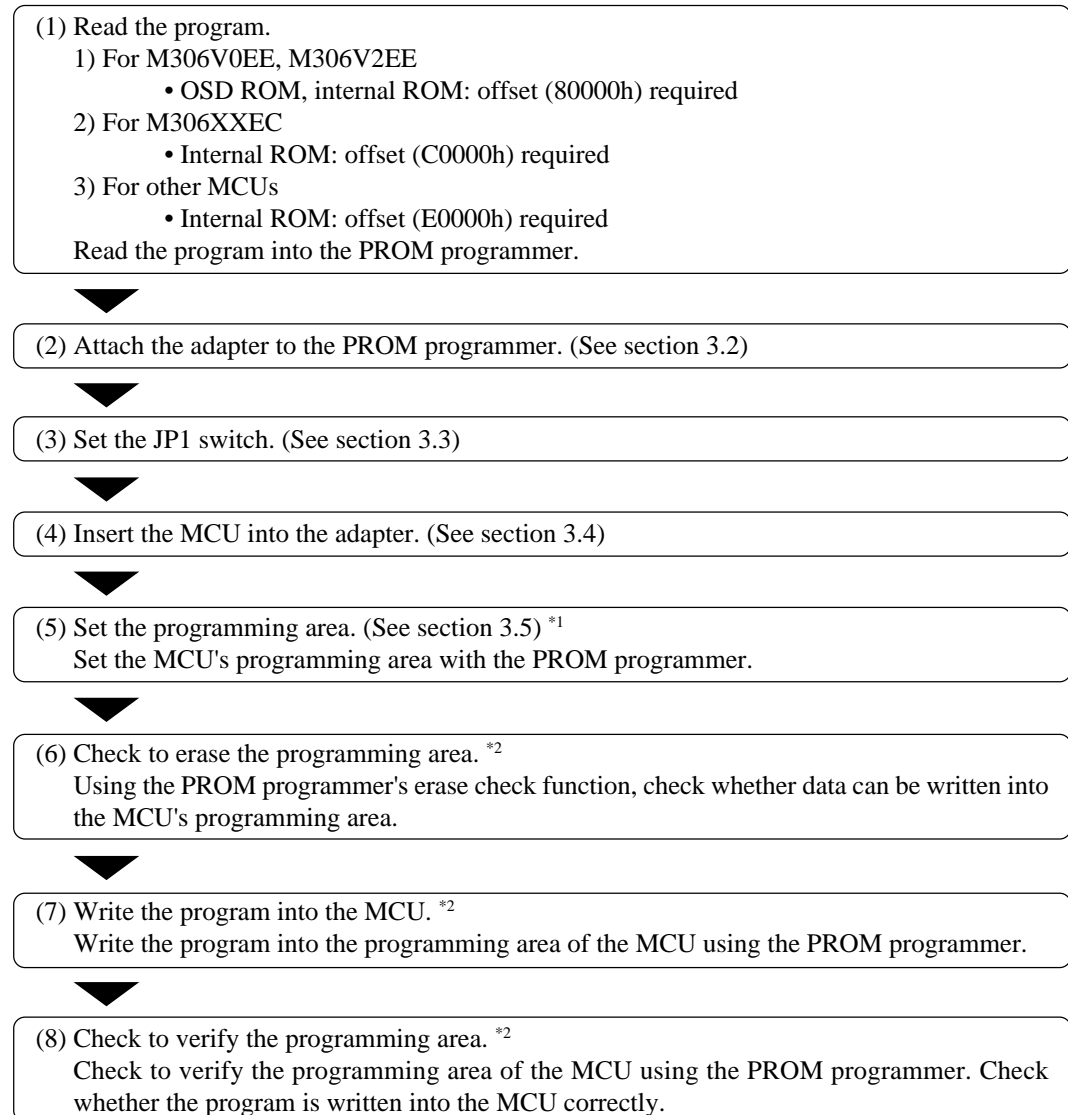
If any part is missing or there is any doubt about your product package, contact your local distributor.

## 3. How to Write the Program

This chapter describes how to write programs with a PROM programmer. For the operation of the PROM programmer, refer to the user's manual of the PROM programmer.

### 3.1 Programming Procedures

Follow these procedures (1) through (8) to write programs 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 etc. may not also be performed completely.

\*2 Some PROM programmers perform the steps (6) through (8) automatically.

### 3.2 Attaching Adapter to PROM Programmer

As shown in Figure 3.1, attach the pin No. 1 of the PROM programmer connector, PCA7402E or PCA7476E (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 an incorrect insertion can cause fatal damage to the MCU.**

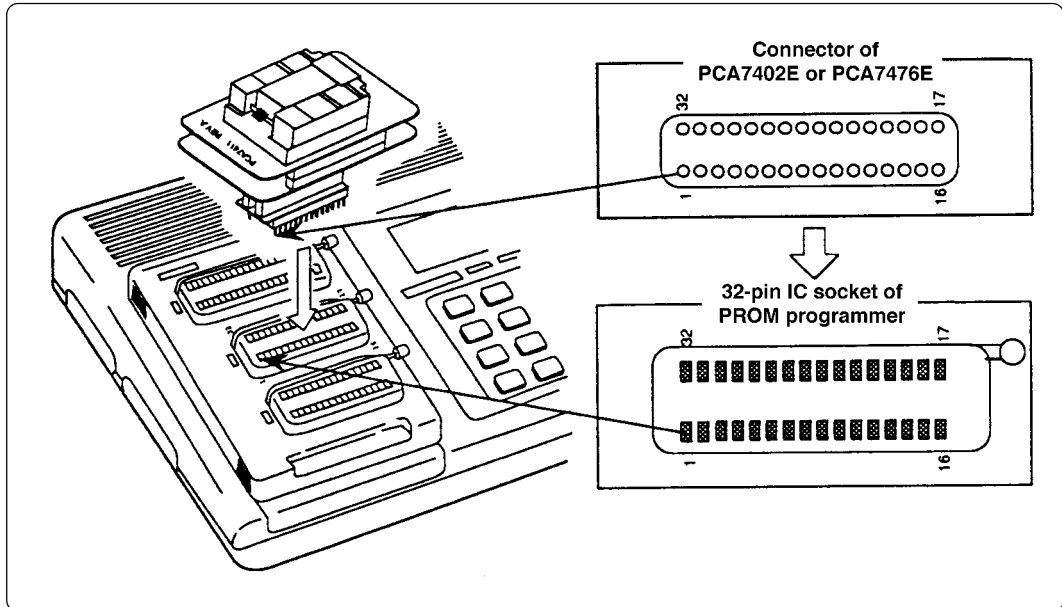


Figure 3.1 Attaching the adapter to a PROM programmer



### 3.3 Setting the Switch

The position of the JP1 and its default setting are shown in Figure 3.2. For how to set the switch, see Table 3.1.

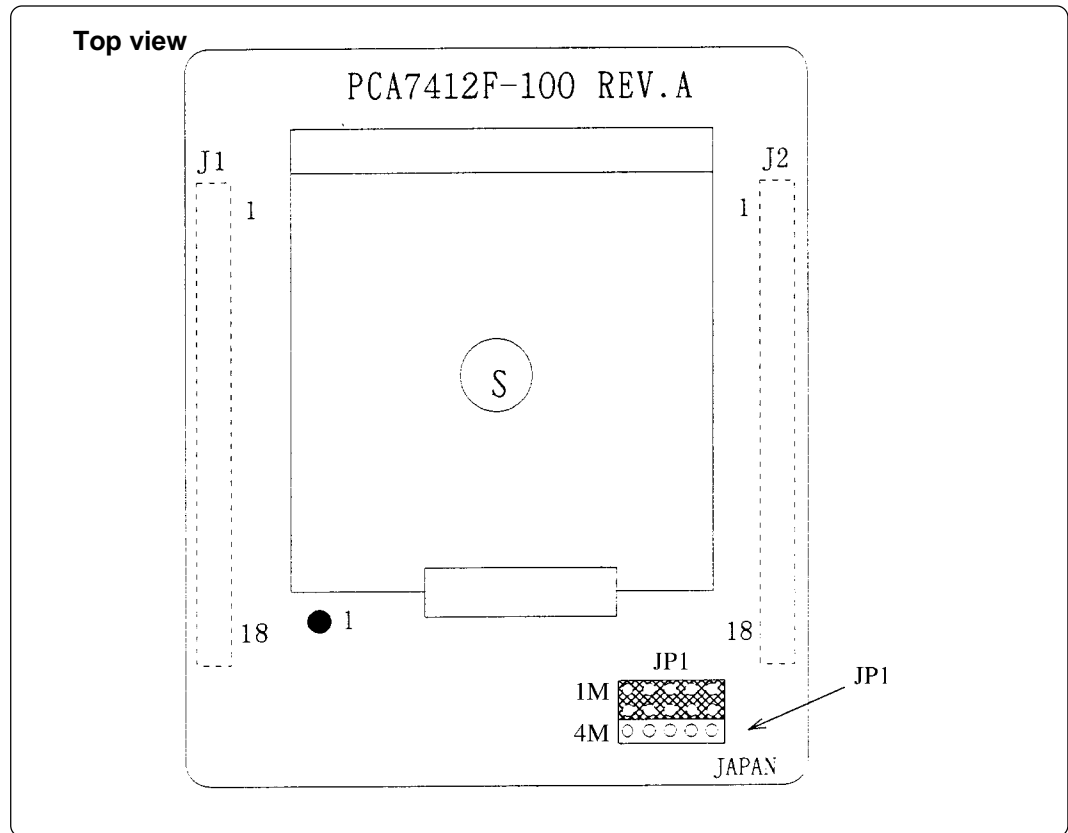


Figure 3.2 Position of the JP1 switch

Table 3.1 Setting the JP1 switch

Group	Example	JP1
Other than M16C/6V	M30612E4-XXXFP	1M
M16C/6V	M306V2EEFP	4M

## ⚠ CAUTION

### Cautions for Setting the Switch:



- Make the setting properly, because an incorrect setting can cause fatal damage to the MCU.
- Select the proper programming mode of the PROM programmer.
- An example setting shown in Figure 3.2 is also applied to the PCA7412L-100, PCA7412G-100, and PCA7413F-80.
- To use this product in M27C201 mode, set the JP1 switch to the 1M side.

### 3.4 Inserting an MCU into the Adapter

As shown in Figure 3.3, insert the MCU into the IC socket aligning the No. 1 pin. This also applies to the PCA7412L-100, PCA7412G-100, and PCA7413F-80.

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

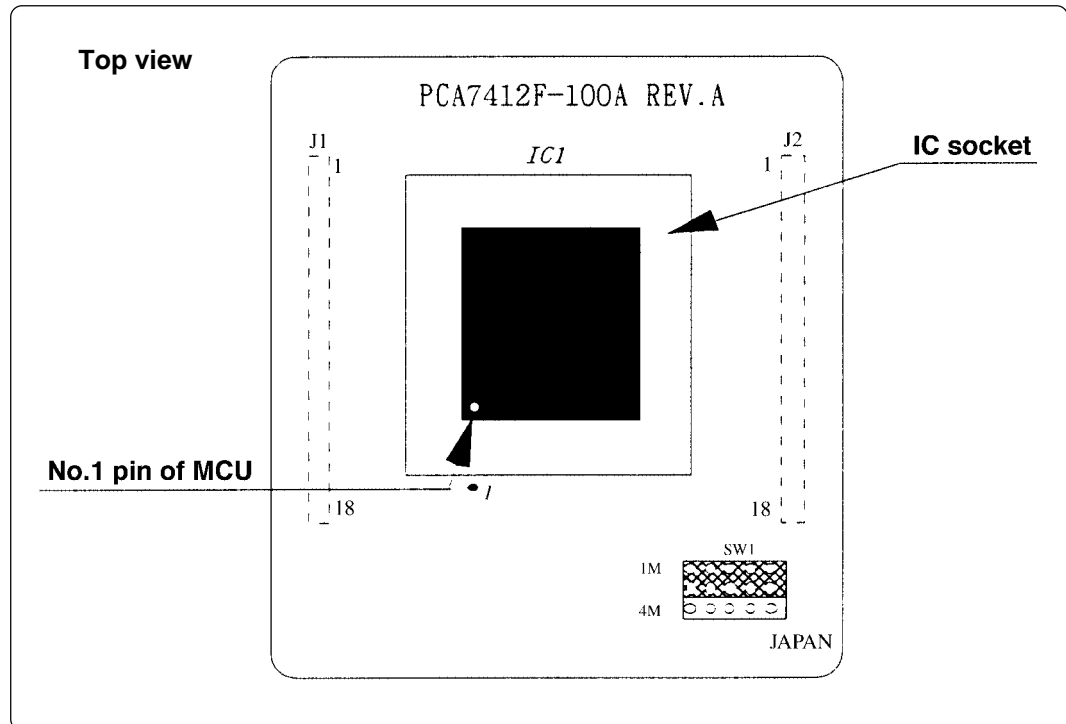


Figure 3.3 Inserting an MCU

## CAUTION

### Caution to Be Taken for Handling an MCU:

- Do not touch the connector in the IC socket and the pins on the PROM programmer connector. Otherwise it can cause an electrical insulation failure because of dirt. When not using, attach the connector pins of this product to the conductive sponge as it was shipped from the factory.

### Caution When Opening and Closing the IC Socket:

- When opening and closing the IC socket, hold the adapter horizontally as shown in Figure 3.4. Otherwise the inside of the IC socket may become damaged and cause an electrical insulation failure.

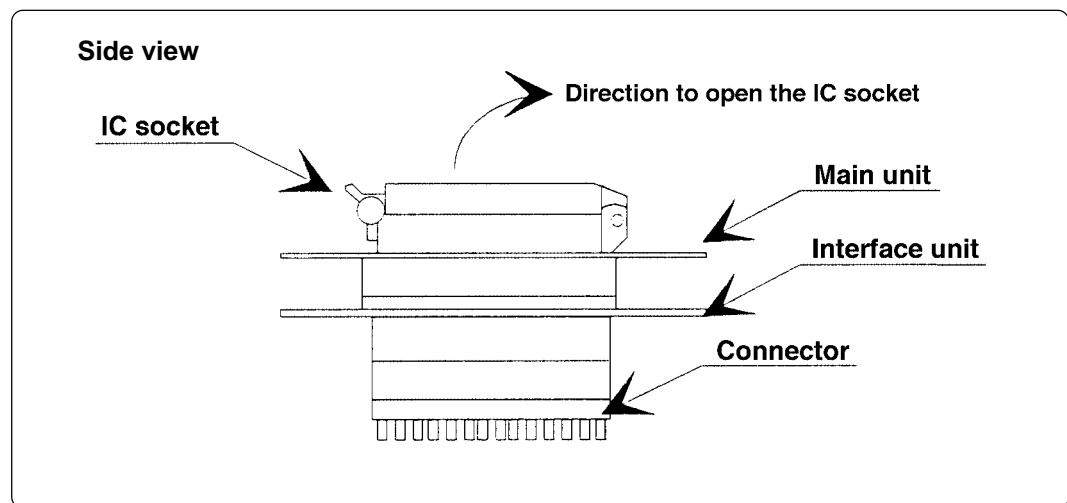


Figure 3.4 Opening the IC socket

### 3.5 Setting Programming Area

To write programs into the MCU, be sure to set the programming area. And also, specify a device by the PROM programmer. For programming areas and devices, see Tables 3.2 and 3.3.

Table 3.2 List of programming areas (other than M16C/6V)

MCU		ROM size	PROM programmer		ROM area of MCU
Type name	Example		Device	Programming area	
M306XXE4	M30612E4FP	32 KB	M5M27C101	18000h--1FFFFh	F8000h--FFFFFh
	M30613E4TGP				
M306XXE8	M30600E8FP	64 KB		10000h--1FFFFh	F0000h--FFFFFh
M306XXEA	N/A	96 KB	08000h--1FFFFh	E8000h--FFFFFh	
M306XXEC	M30610E4FP	128 KB	M5M27C201	20000h--3FFFFh	E0000h--FFFFFh

Table 3.3 List of programming areas (M16C/6V)

MCU		ROM size	PROM programmer		ROM area of MCU
Type name	Example		Device	Programming area	
M306VXEE	M306V2EEFS	OSD ROM (128 KB)	M5M27C401	10000h--2FFFFh	90000h--AFFFFh
		Internal ROM (192 KB)		50000h--7FFFFh	D0000h--FFFFFh

## CAUTION

### When Setting a Programming Area:

- Specify a proper programming mode, because an incorrect setting can cause fatal damage to the MCU.
- The programming method for M5M27C101, M5M27C201 or M5M27C401 mode is the byte-programming method.
- The MCUs listed above are shown as examples. Therefore, some MCUs may not be available in the future.

### 3.6. Recommended PROM Programmers

The PROM programmers listed in Table 3.4 are recommended for the adapters. Using the actual products, we have verified that these PROM programmers can be used to write programs without problem. For the latest types of PROM programmers from Advantest, please contact the company to confirm whether it can be used for your product.

Table 3.4 Recommended PROM programmers

Manufacturer	Type name	Device	Programming voltage (Vpp)
Advantest Corporation	R4945	M5M27C101 mode	12.5 V
		M5M27C201 mode	
		M5M27C401 mode	12.75 V
	R4945A	M5M27C101 mode	12.5 V
		M5M27C201 mode	
		M5M27C401 mode	12.75 V

## CAUTION

### Regarding Recommended PROM Programmers:

- Specify the proper programming mode, because an incorrect setting can cause fatal damage to the MCU.
- The programming method for M5M27C101, M5M27C201 or M5M27C401 mode is the byte-programming method.

# 4. Specifications

## 4.1 Specifications

Tables 4.1 lists common specifications of the programming adapters, and Table 4.2 individual specifications.

*Table 4.1 Common specifications*

Operating clock frequency		8 MHz (Supplied by the ceramic oscillator mounted on the adapter)
Power supply		Supplied from Vcc of the PROM programmer
Board configuration	Main unit	Board to insert a programmable MCU (IC socket for MCU mounted on it)
	Interface unit (PCA7412B or PCA7412C)	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)
	Connector (PCA7402E or PCA7476E)	Board to connect to the PROM programmer (Standard-pitch 32-pin pin-header mounted)

*Table 4.2 Individual specifications*

Product name	Item	Description
PCA7412F-100	MCU	M16C/60 Series 100-pin QFP (100P6S-A) e.g. M30600E8FP
	IC socket	IC51-1004-814-6 (made by Yamaichi Electronics Co. Ltd.)
	Internal ROM type	EPROM
PCA7412L-100	MCU	M16C/60 Series 100-pin LCC (100D0) e.g. M30600E8FS
	IC socket	IC51-1004-804 (made by Yamaichi Electronics Co. Ltd.)
	Internal ROM type	EPROM
PCA7412G-100	MCU	M16C/60 Series 100-pin QFP (100P6Q-A) e.g. M30600E8GP
	IC socket	IC51-1004-809 (made by Yamaichi Electronics Co. Ltd.)
	Internal ROM type	EPROM
PCA7413F-80	MCU	M16C/60 Series 80-pin QFP (80P6S-A) e.g. M30601E8GP
	IC socket	IC51-804-711 (made by Yamaichi Electronics Co. Ltd.)
	Internal ROM type	EPROM

**Note:** As this product is designed to support the same packages of the M16C/60 Series, it is ready for most of the products which will be introduced in the future.

## 4.2 Memory Maps

Figure 4.1 shows memory maps of the MCU (M306V0EE and M306V2EE) and the PROM programmer. Figure 4.2 shows memory maps of the other MCUs and the PROM programmer.

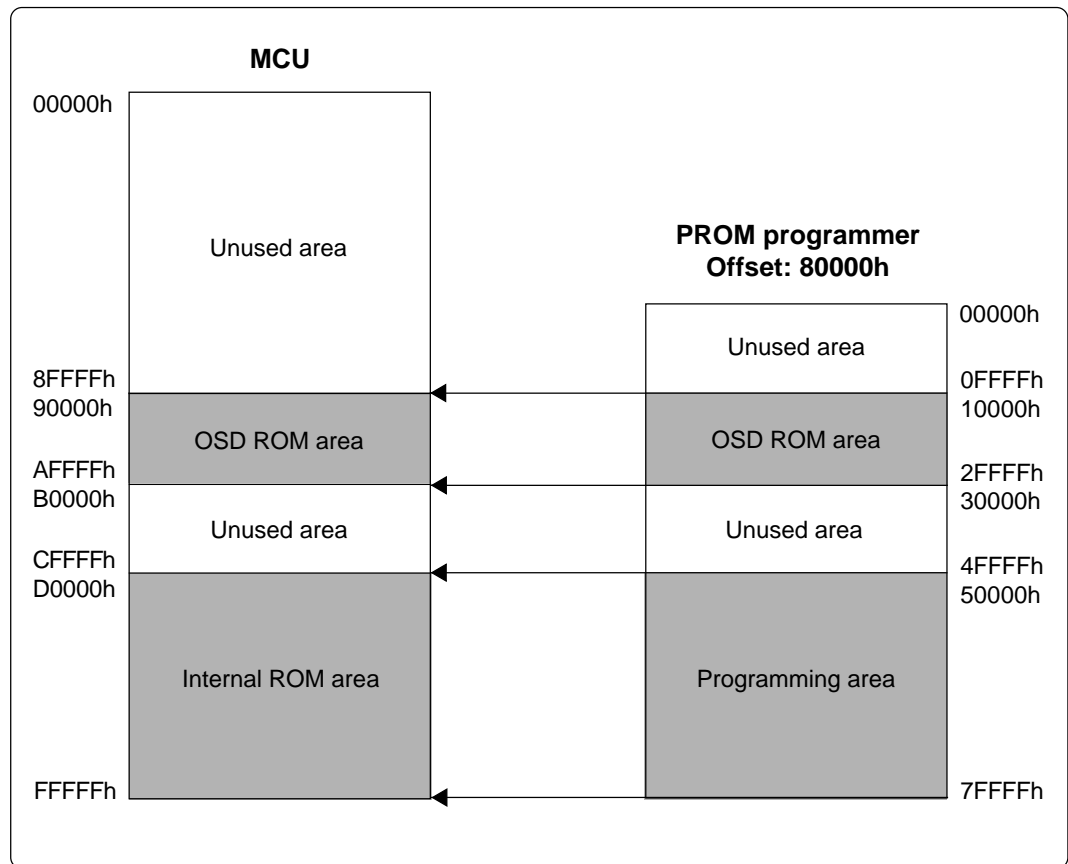


Figure 4.1 Memory maps (M306V0EE and M306V2EE)

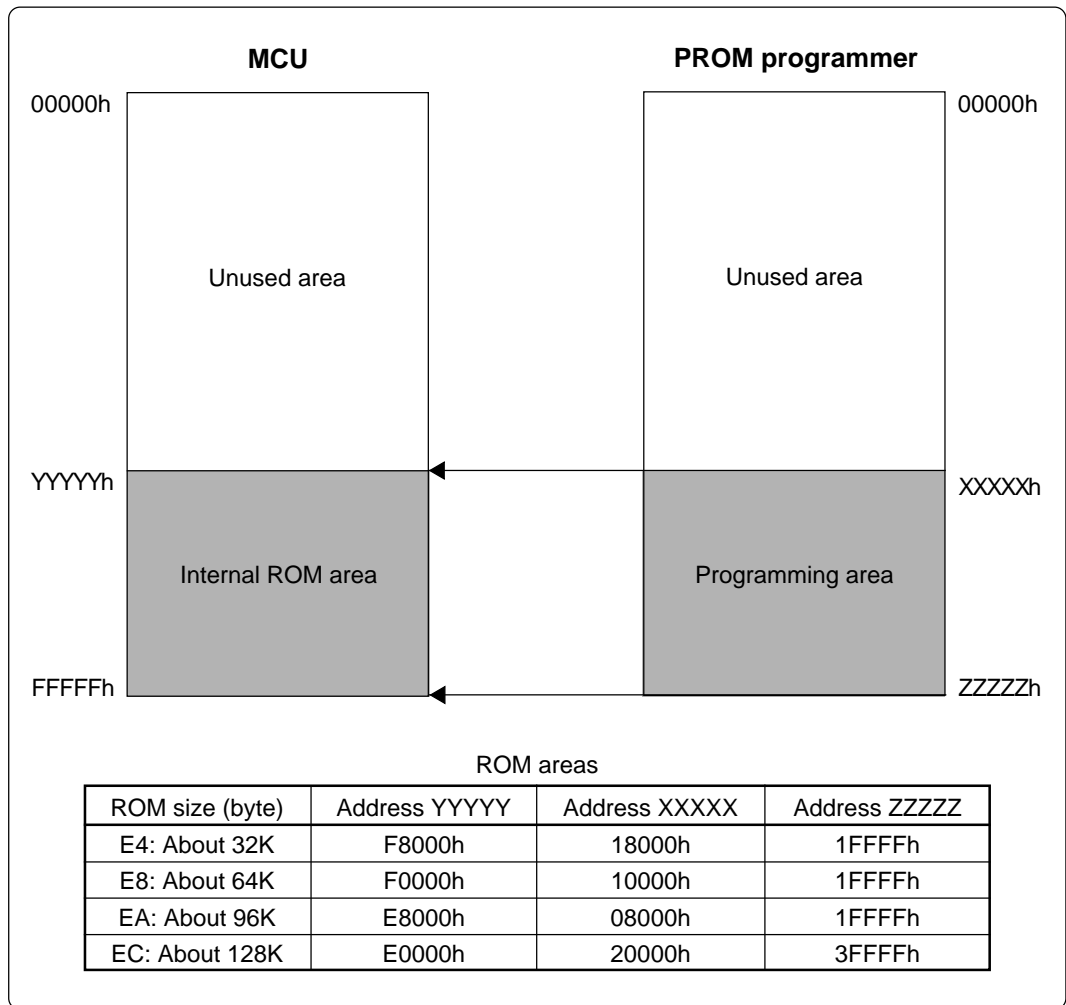


Figure 4.2 Memory map (other MCUs)



## 5. Troubleshooting

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

### 5.1 Errors That Occur When Writing to PROM

#### (1) When Newly Purchased

Cause	Remedy	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	8
	Is the switch on the PROM programmer set properly?	9
	Is the MCU attached to the correct position?	10
PROM programmer	Is the area specification set correctly?	12
	Is the correct device selected?	13
Contact failure	The IC socket of the PROM programmer may be stained. The socket needs replacing.	-

#### (2) Previously Written Normally

Cause	Remedy	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	8
	Is the switch on the PROM programmer set properly?	9
	Is the MCU attached to the correct position?	10
PROM programmer	Is the area specification set correctly?	12
	Is the correct device selected?	13
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.	-

### 5.2 When MCUs Do Not Function Normally

If 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.

## 5.3 Other Precautions

### (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 the PROM programmer you use, it is necessary to verify completion of programming by executing screening, etc. that are stipulated for each MCU used.

### (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).

## 5.4 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
- Frequency of the problem (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

# PROM Programming Adapters for M16C/60 Series User's Manual

---

Rev. 1.00  
July 1, 2003  
REJ10J0193-0100Z

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

## Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>