

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

## User's Manual

Supported Devices:  
M16C/60 Series

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## Precautions for Safety

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

Contact us if you have any questions about the precautions described here.

 **WARNING** **WARNING** indicates a potentially dangerous situation that will cause death or heavy wound unless it is avoided.

 **CAUTION** **CAUTION** indicates a potentially dangerous situation that will cause a slight injury, a medium-degree injury or a property damage unless it is avoided.

In addition to the two 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.**

**⚠ WARNING****Warnings to Be Taken for Handling:**

Do not modify this product. Personal injury due to electric shock may occur if this product is modified. Modifying the product will void your warranty.

**Warnings for Installation:**

Do not set this product in water or areas of high humidity. Make sure that the product does not get wet. Spilling water or some other liquid into the product may cause unreparable damage.

**Warnings for Storage when Not Using This Product for a Long Time:**

- (1) Attach the connector pins of this product to the conductive sponge included in the package.
- (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.

**Warnings for Ambient Temperatures:**

Do not use if the ambient temperature exceeds the rated maximum ambient temperature.  
The rated maximum ambient temperature of this product is 35°C.

**Warnings when Using the PROM Programmer:**

Select the proper programming mode of the PROM programmer.  
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.

**⚠ CAUTION****Cautions to Be Taken for Handling:**

Use caution when handling this product. Be careful not to apply a mechanical shock.

Do not directly touch the connector pins of this product. Static electricity may damage the internal circuits. Be careful with the static electricity when handling this product and the MCU.

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.

**Cautions to Be Taken for Repair**

We cannot accept any request for repair.

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## 1. Outline

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 MCUs using a PROM programmer commercially available. This chapter describes the package components, external views, system configuration and the specifications of this product.

### 1.1 Package Components

This product package consists of the following items. When unpacking it, check to see if your product contains all of these items. If there is any question or doubt about the packaged product, contact your local distributor.

Table 1.1 Contents

	Contents			
Product name	PCA7412F-100	PCA7412L-100	PCA7412G-100	PCA7413F-80
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	This manual			

### 1.2 System Configuration

Figure 1.1 shows a configuration of this product.

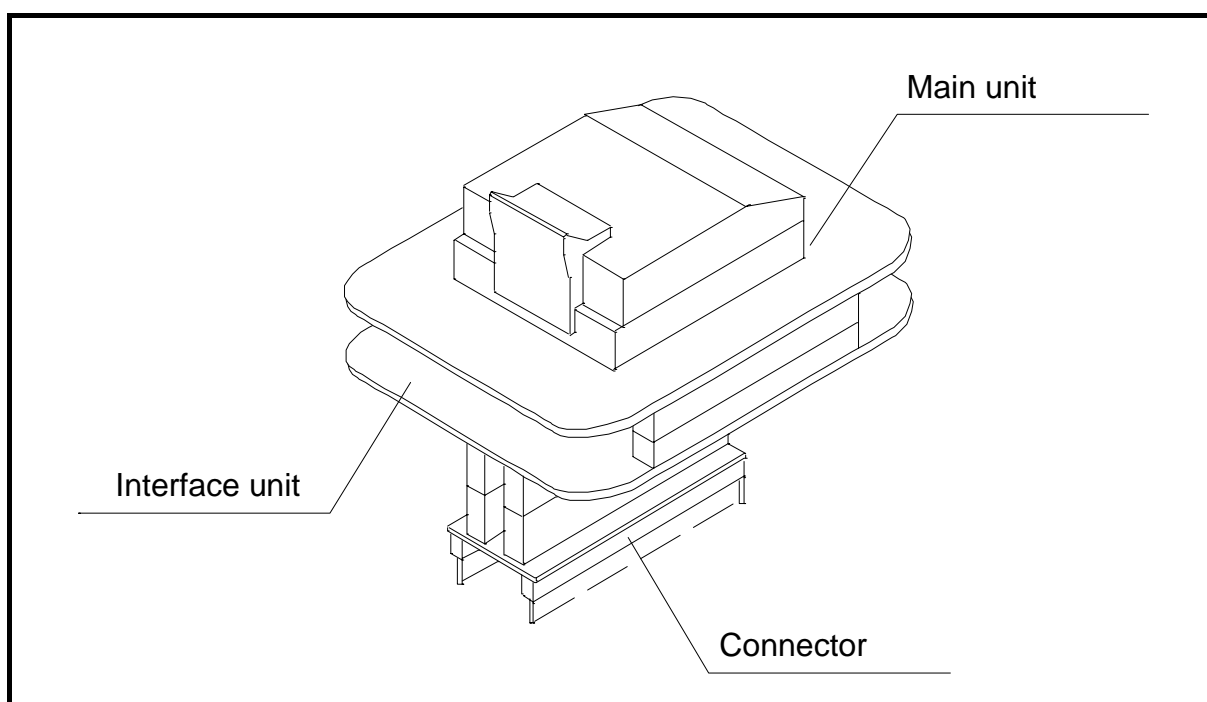


Figure 1.1 External view of the programming adapter and constituent parts



## 1.3 Specifications

### 1.3.1 Specifications

Table 1.2 lists common specifications of the programming adapters, and Table 1.3 list individual specifications of each programming adapter.

Table 1.2 Common specifications

Item		Description
Operating clock frequency		8MHz (Supplied by the ceramic oscillator mounted on the adapter)
Power supply		Supplied from Vcc of the PROM programmer
Board configuration	Main unit	Board to mount a programmable MCU (IC socket for MCU mounted on it)
	PCA7412B or PCA7412C (Interface unit)	Interface board (buffer IC mounted) (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 or PCA7476E (32-pin connector)	Board to connect to the PROM Programmer (Standard-pitch 32-pin pin-header is mounted on it.)

Table 1.3 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

### 1.4 Memory Maps

Figure 1.2 shows memory maps of the MCU (M306V0EE and M306V2EE) and the PROM programmer. Figure 1.3 shows memory maps of the other MCUs and the PROM programmer.

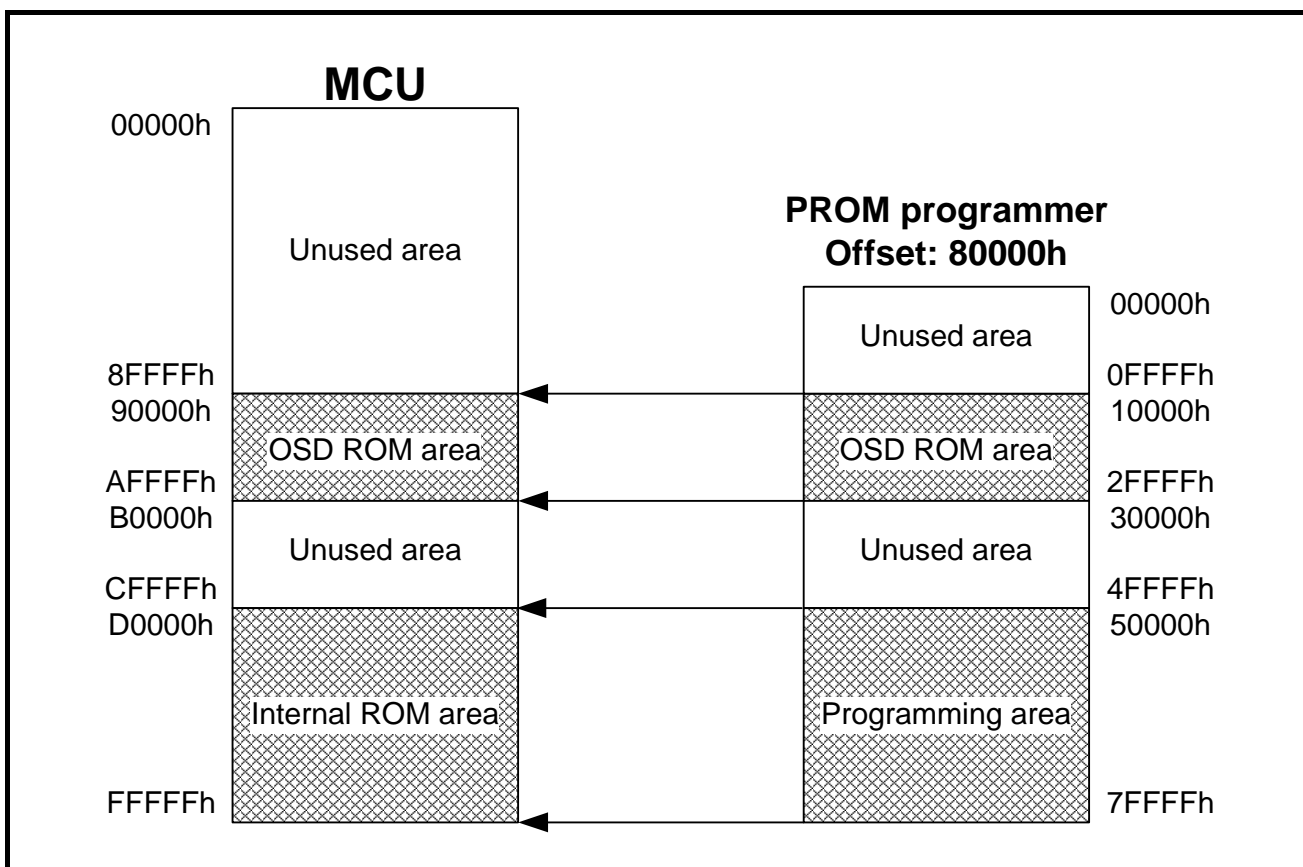


Figure 1.2 Memory maps (M306V0EE and M306V2EE)

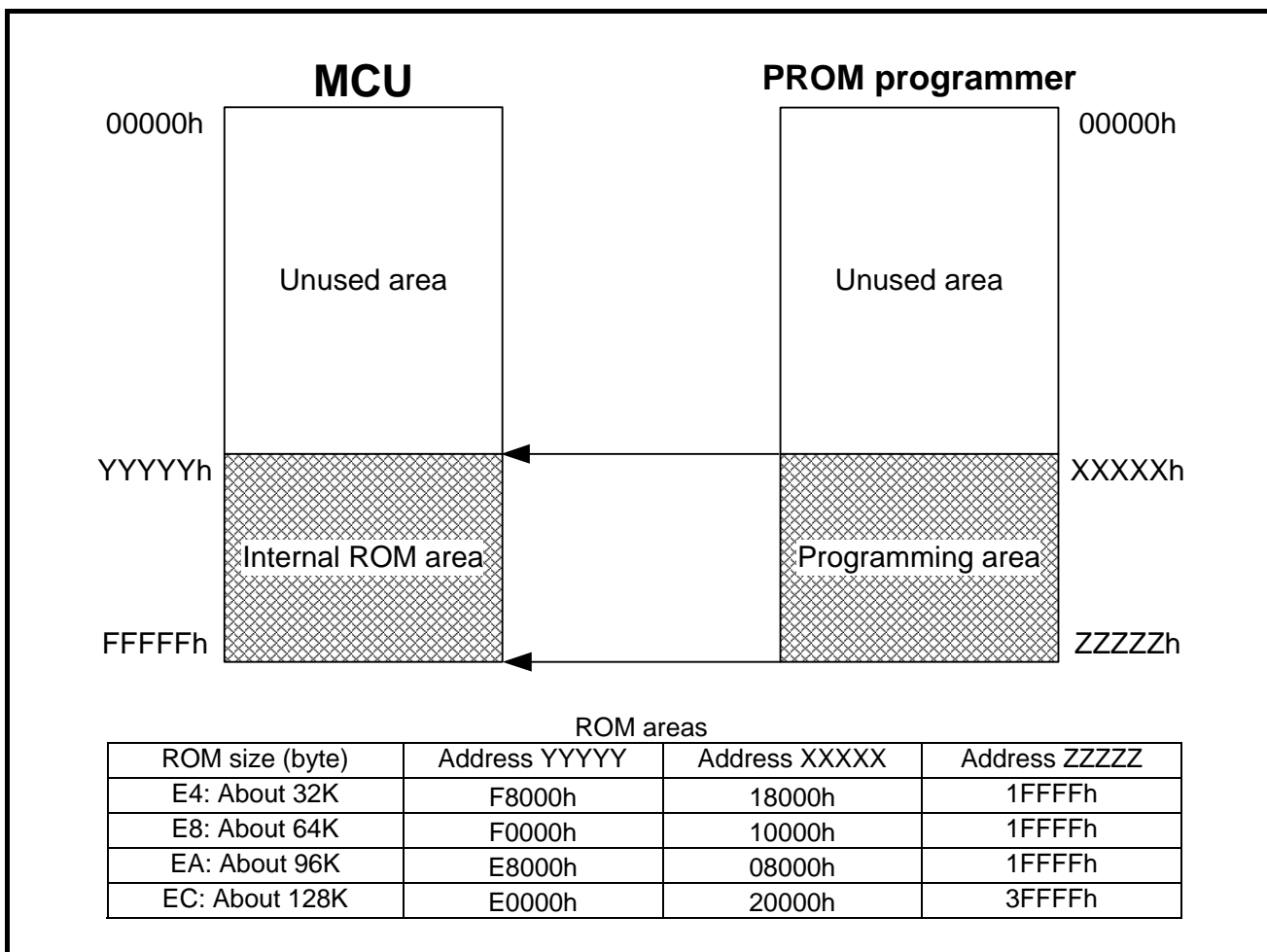


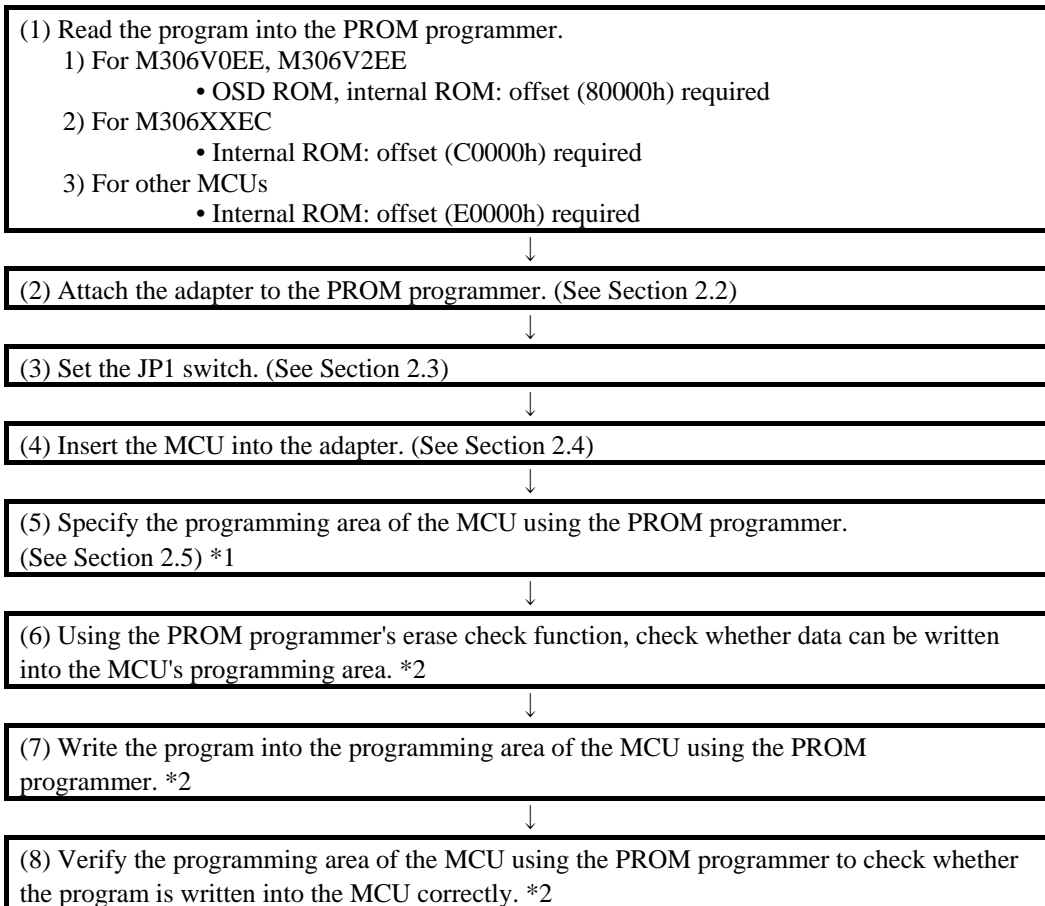
Figure 1.3 Memory map (other MCUs)

## 2. Usage (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.

### 2.1 Programming Procedures

Follow these procedures (1) through (8) to write programs into the MCU.



### CAUTION



\*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 these steps (6) through (8) automatically.

## 2.2 Attaching the Adapter to a PROM Programmer

As shown in Figure 2.1, attach the pin No. 1 of the connector PCA7402E or PCA7476E (standard-pitch 32-pin pin-header mounted) to the No. 1 pin of the IC socket of the PROM programmer.

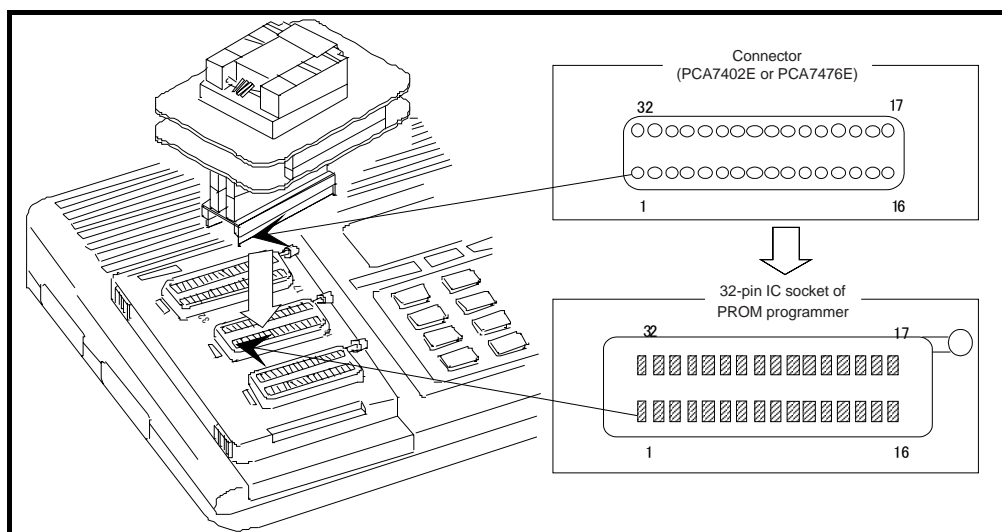


Figure 2.1 Attaching the adapter to a PROM programmer

### CAUTION



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

### 2.3 Switch Settings

The position of the JP1 and its default setting are shown in Figure 2.2. For how to set the switch, see Table 2.1.

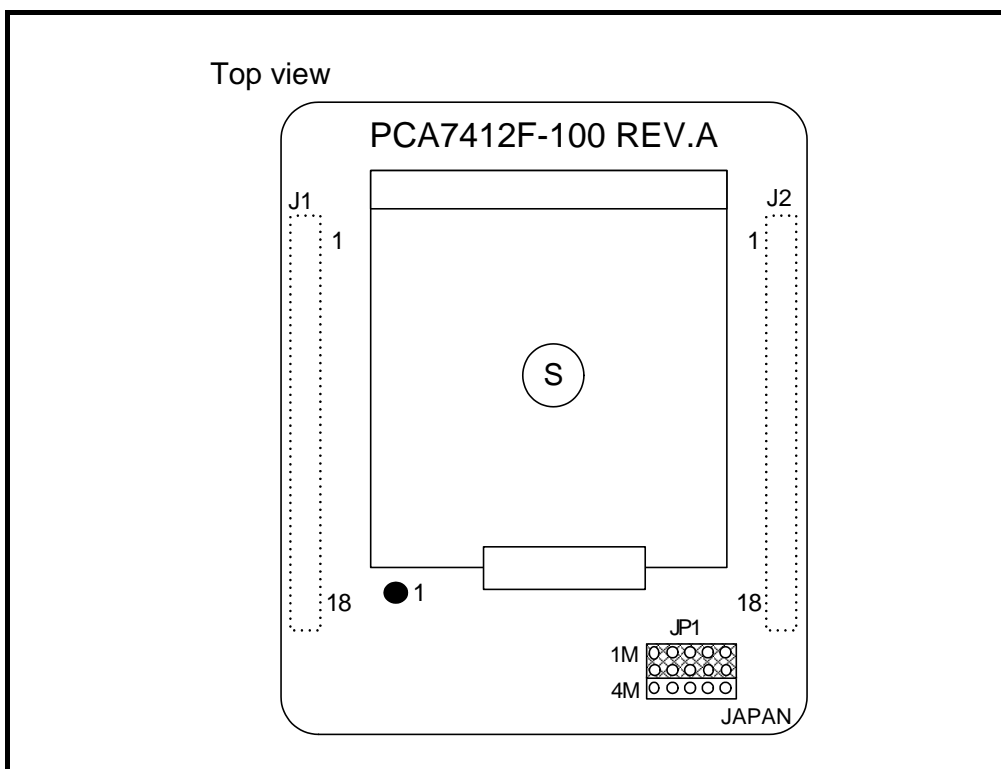


Figure 2.2 Position of the JP1 switch

Table 2.1 Setting the JP1 switch

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

## ⚠ CAUTION



- 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 2.2 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.

## 2.4 Mounting an MCU

As shown in Figure 2.3, insert the MCU into the IC socket aligning the No. 1 pin. This also applies to the PCA7412L-100, PCA7412G-100, and PCA7413F-80.

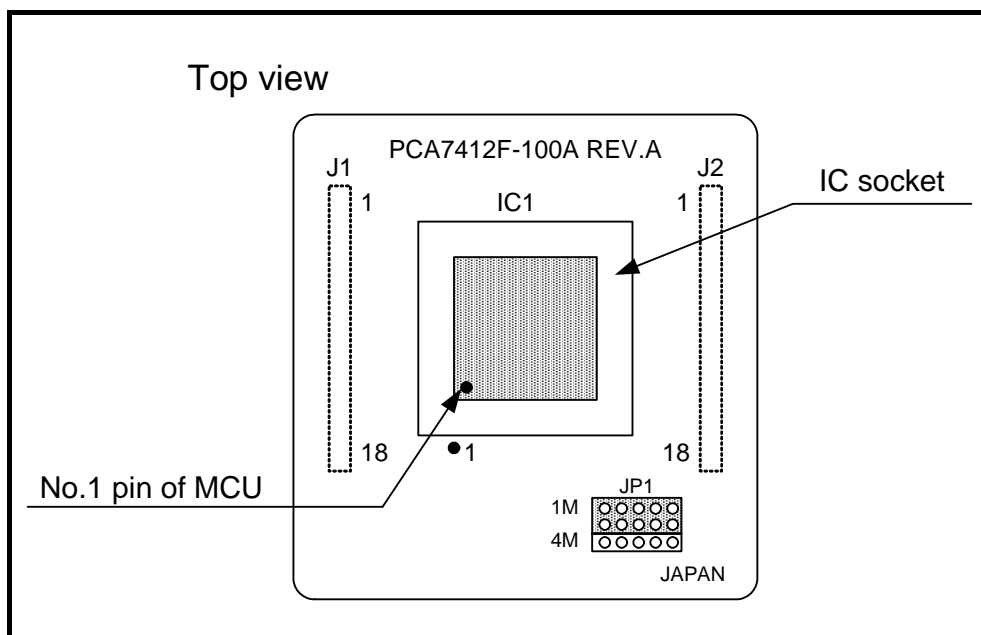


Figure 2.3 Mounting an MCU

### CAUTION



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

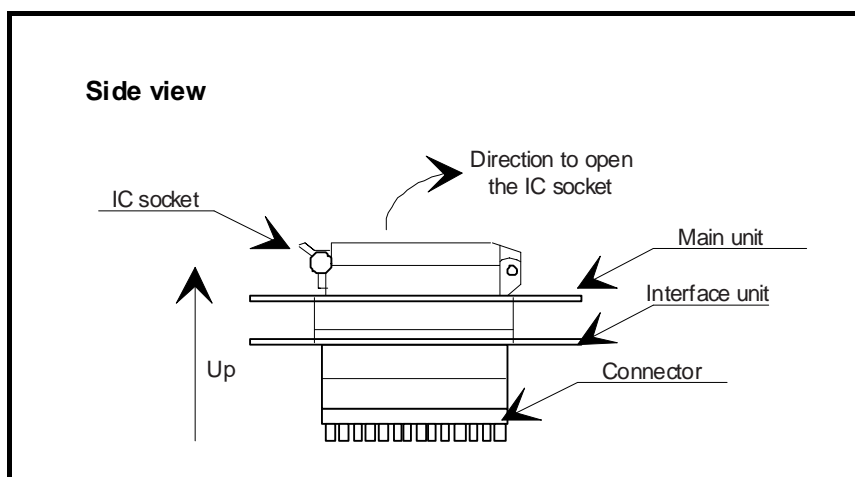


Figure 2.4 Opening and closing the IC socket

### ⚠ CAUTION

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



Do not directly touch the contact in the IC socket and the connector pins of this product because dirt may cause a faulty connection. When not using this product, attach the connector pins of this product to the conductive sponge as it was shipped from the factory.

#### Caution to Be Taken for Opening and Closing the IC Socket:



When opening and closing the IC socket, hold the adapter horizontally as shown in Figure 2.4. Otherwise the inside of the IC socket may become damaged and cause a faulty connection.



## 2.5 Setting the Programming Area

To write the program into an MCU, be sure to set the programming area. And also, specify its device of the PROM programmer. For programming areas and devices, see Table 2.2 and Table 2.3.

Table 2.2 List of programming areas (other than M16C/6V)

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

Table 2.3 List of programming areas (M16C/6V)

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

### CAUTION



- 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.

## 2.6 Recommended PROM Programmers

The PROM programmers listed in Table 2.4 are recommended for the adapters. Using the actual products, we have verified that these PROM programmers can be used to write programs without problem. Nonconformity occurring by using any other PROM programmers can not be supported.

For the latest types of PROM programmer, please contact the manufacturer to confirm whether it can be used for your product.

Table 2.4 Recommended PROM programmers

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

\* TR4943, R4945 and R4945A are products of Advantest Corporation.

### CAUTION



- 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.

### 3. Troubleshooting (Action in Case of an Error)

Be sure to check the following before seeking technical support.

#### 3.1 Errors That Occur When Writing to PROM

##### 3.1.1 When Newly Purchased

Cause	Check point	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	13
	Is the switch on the adapter set correctly?	14
	Is the MCU attached to the correct position?	15
PROM programmer	Is the area specification set correctly?	17
	Is the correct device selected?	18
Contact failure	The IC socket of the PROM programmer may be stained. The socket needs replacing.	-

##### 3.1.2 Previously Written Normally

Cause	Check point	See page
Programming adapter	Is the adapter attached to the correct position of the PROM programmer?	13
	Is the switch on the adapter set correctly?	14
	Is the MCU attached to the correct position?	15
PROM programmer	Is the area specification set correctly?	17
	Is the correct device selected?	18
Contact failure	The IC socket of the PROM programmer may be stained. The socket needs replacing.	-
	The connector with which the PROM programmer contacts may be stained. Clean it with alcohol, etc.	-

##### 3.1.3 MCU Does Not Function Normally

In the case that 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 emulator to check for differences in characteristics again.

## CAUTION

### Caution to Be Taken for Mass Programming



This product is a development supporting unit for use in your program development and evaluation stages. Therefore, it is not designed for mass-programming in mass production. Increased frequency of use causes programming failure due to the wear-out or dirt, etc. on the following parts:

- (1) Wear-out or dirt on the contact in the IC socket of this product
- (2) Wear-out or dirt on the contact of the PROM programmer's socket

Replacing the PROM programmer's socket may ease the problem.

## 3.2 Other Precautions

### 3.2.1 About 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 the 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 microcomputer used.

### 3.2.2 About Reading Out of the 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).

## 3.3 How to Request for Support

After checking the items in "3 Troubleshooting", fill in the text file which is downloaded from the following URL, then send the information to your local distributor.

<http://tool-support.renesas.com/eng/toolnews/registration/support.txt>

For prompt response, please specify the following information:

(1) Contact address

- Company name
- Department
- Responsible person
- Phone 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



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