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

PROM Programming Adapters for M16C/60 Series

User's Manual

Rev. 1.00
July 1, 2003
REJ10J0193-0100Z

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Contents

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

⚠ **WARNING**	If the requirements shown in the "WARNING" sentences are ignored, the equipment may cause serious personal injury or death.
⚠ **CAUTION**	If the requirements shown in the "CAUTION" sentences are ignored, the equipment may malfunction.
IMPORTANT	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.

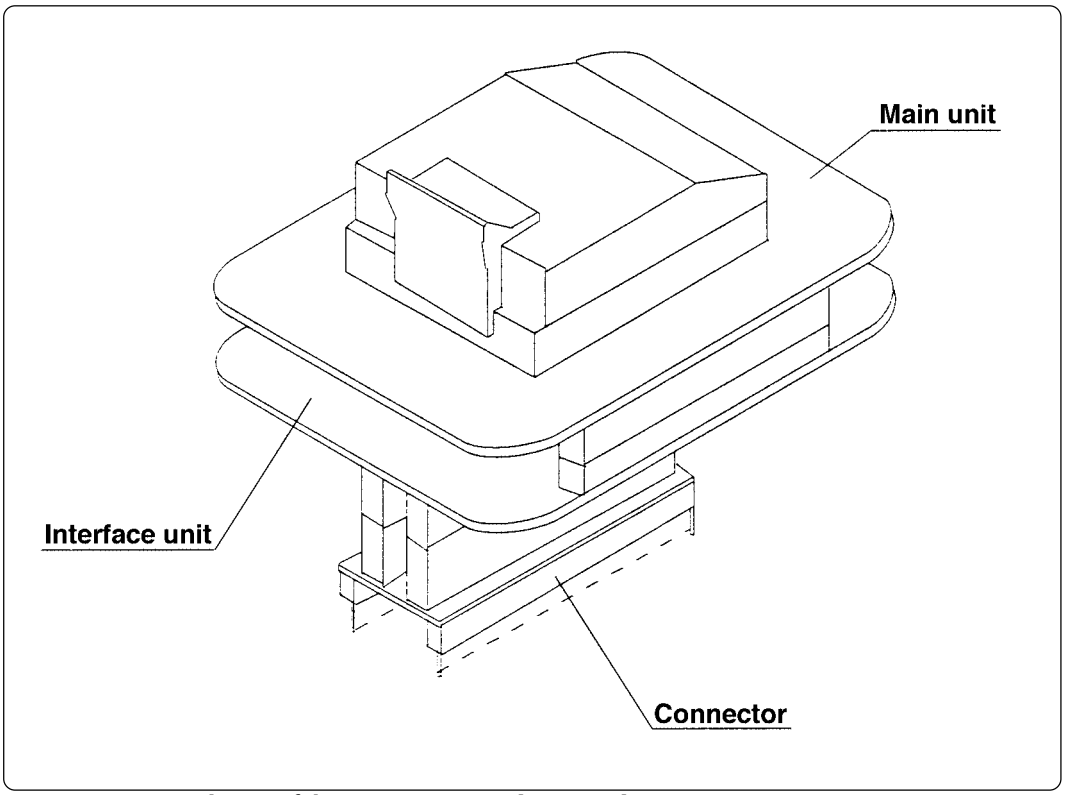


Figure 2.1 External view of the programming adapter and its constituent parts

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.

(1) Read the program.
1) For M306V0EE, M306V2EE
• OSD ROM, internal ROM: offset (80000h) required
2) For M306XXEC
• Internal ROM: offset (C0000h) required
3) For other MCUs
• Internal ROM: offset (E0000h) required
Read the program into the PROM programmer.

▼

(2) Attach the adapter to the PROM programmer. (See section 3.2)

▼

(3) Set the JP1 switch. (See section 3.3)

▼

(4) Insert the MCU into the adapter. (See section 3.4)

▼

(5) Set the programming area. (See section 3.5) *1
Set the MCU's programming area with the PROM programmer.

▼

(6) Check to erase the programming area. *2
Using the PROM programmer's erase check function, check whether data can be written into the MCU's programming area.

▼

(7) Write the program into the MCU. *2
Write the program into the programming area of the MCU using the PROM programmer.

▼

(8) Check to verify the programming area. *2
Check to verify the programming area of the MCU using the PROM programmer. Check whether the program is written into the MCU correctly.

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.

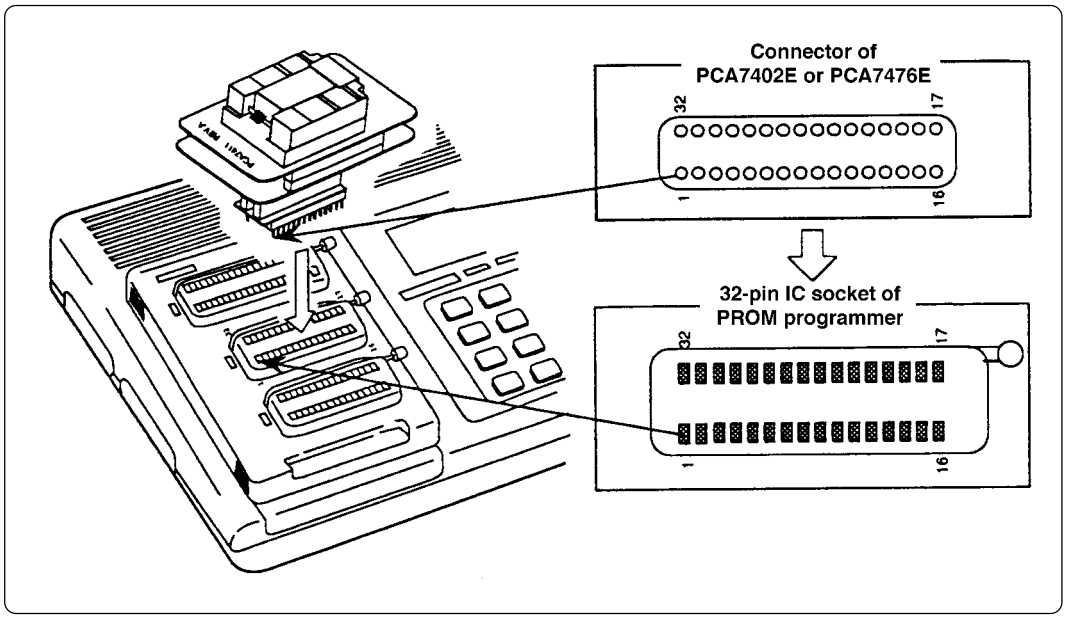


Figure 3.1 Attaching the adapter to a PROM programmer

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.

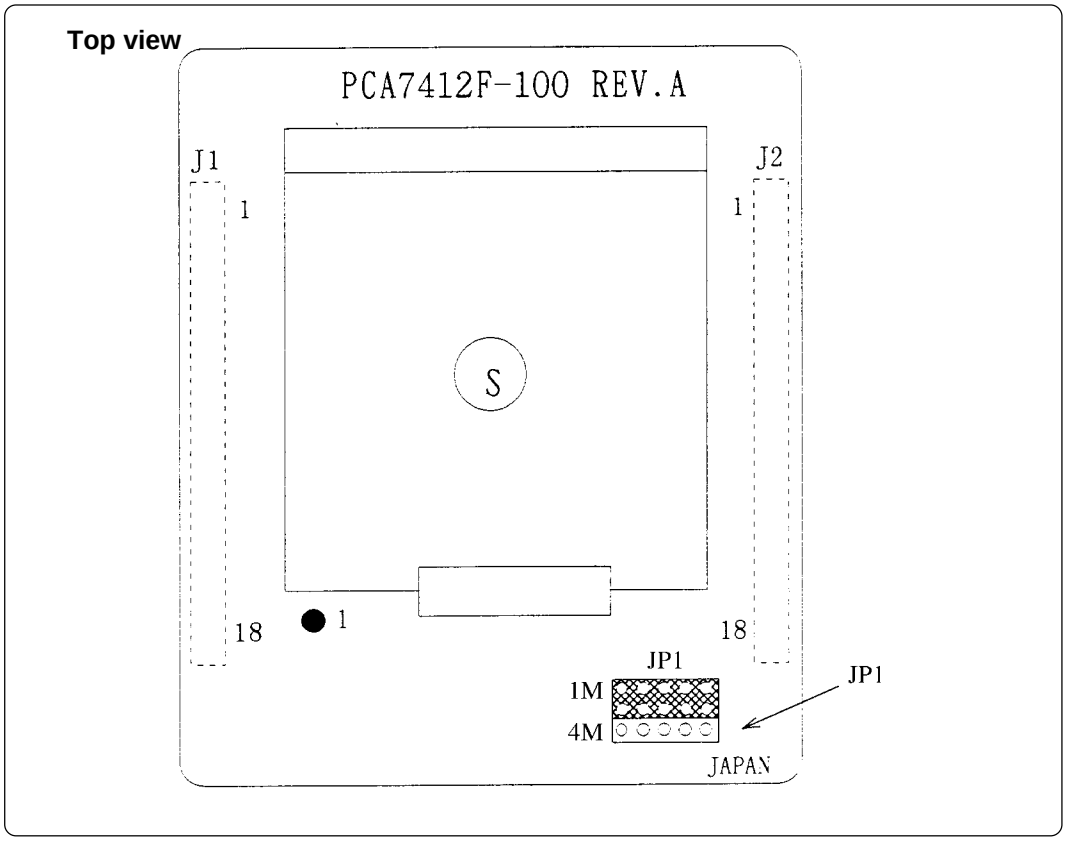


Figure 3.2 Position of the JP1 switch

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.

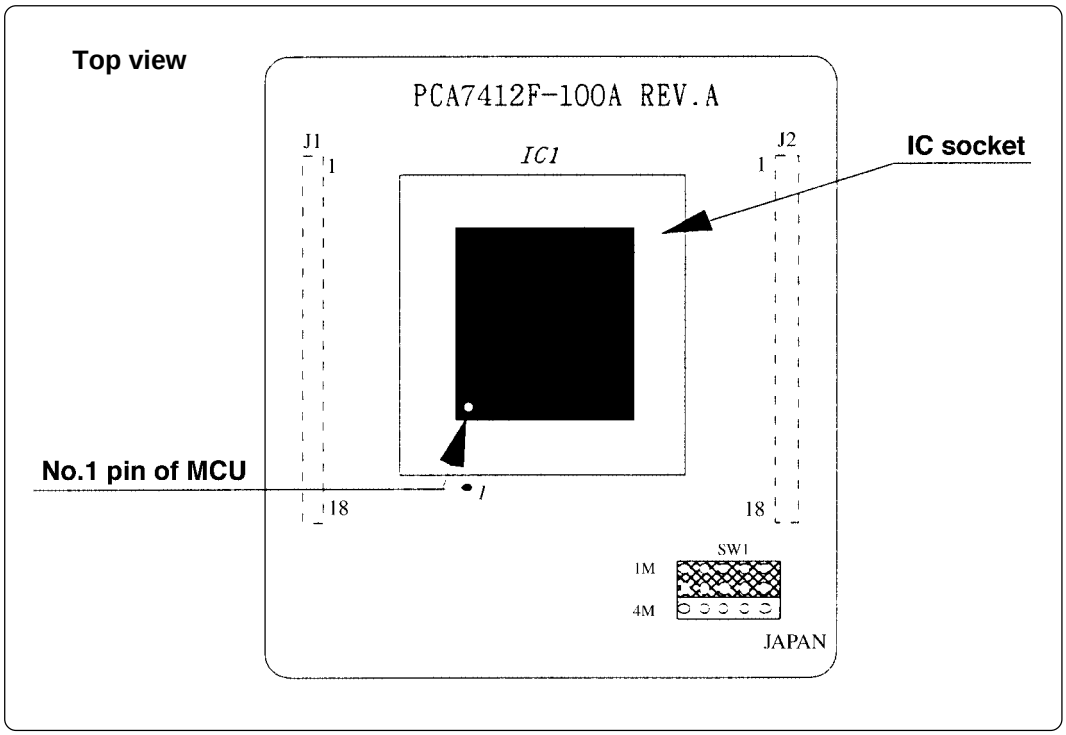


Figure 3.3 Inserting an MCU

⚠ 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.

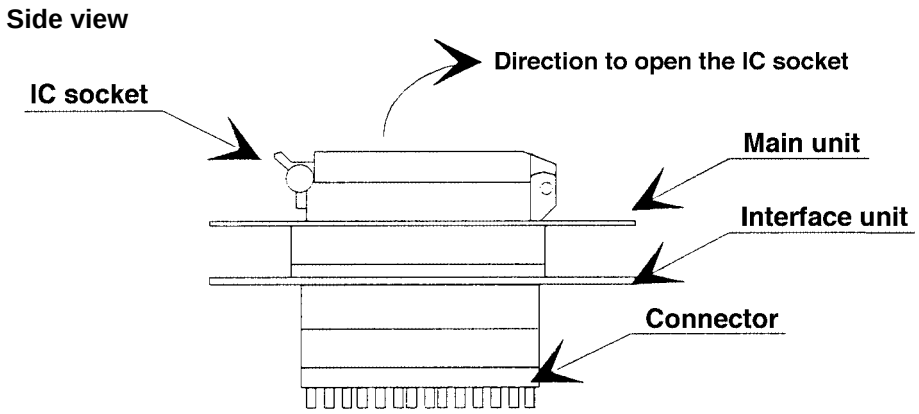


Figure 3.4 Opening the IC socket

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	M30610ECFP	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.

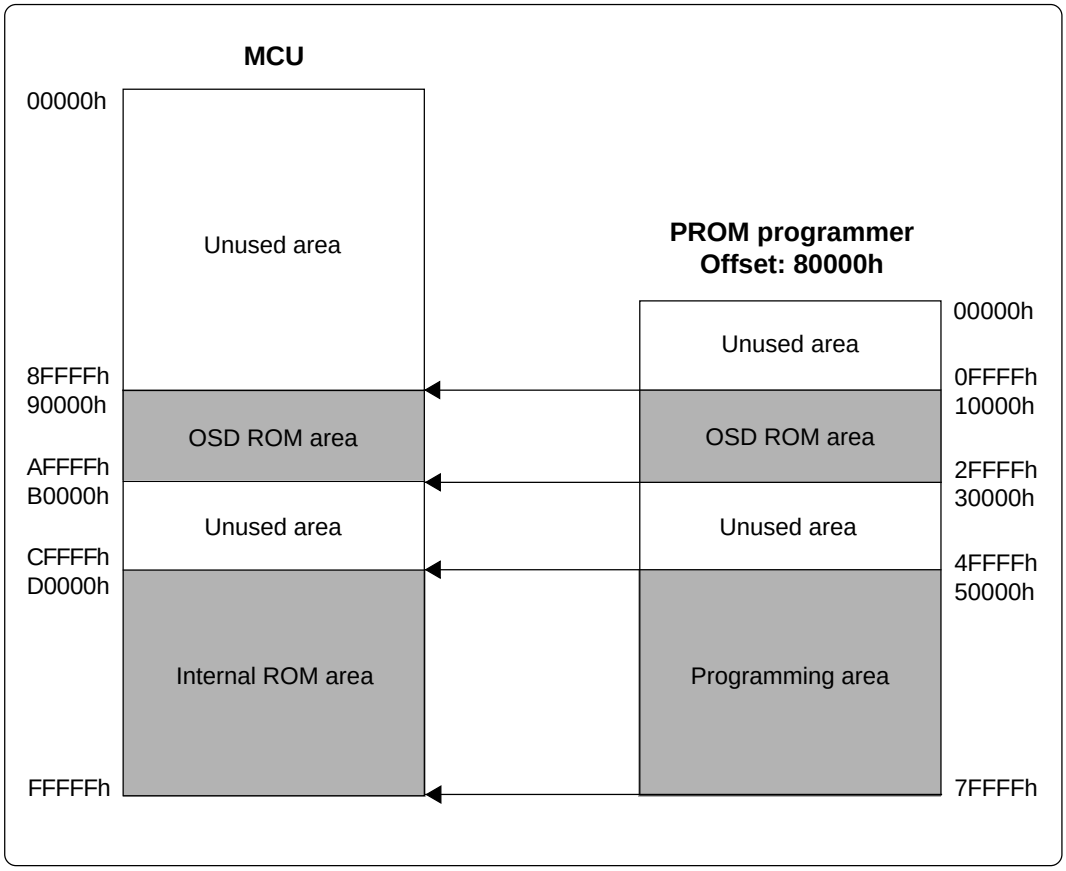
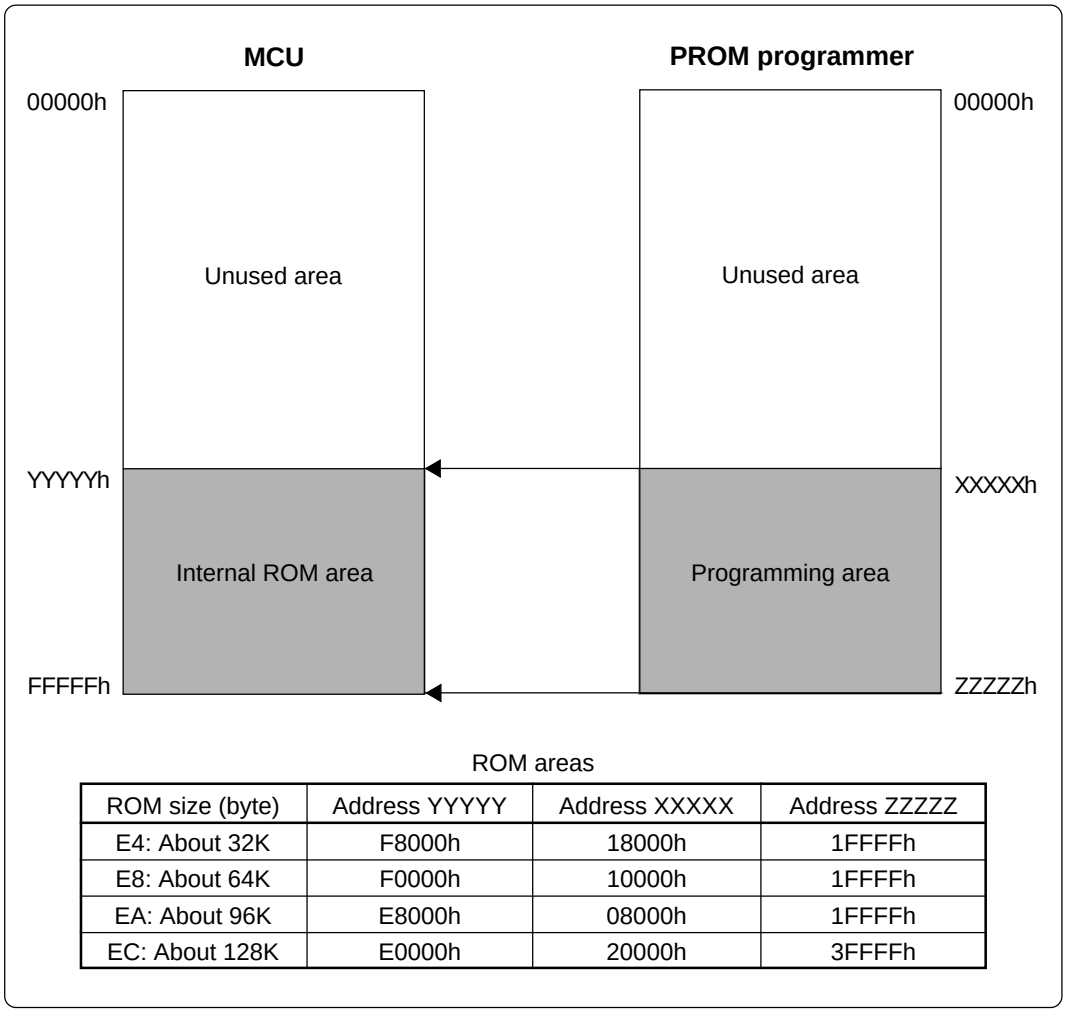


Figure 4.1 Memory maps (M306V0EE and M306V2EE)



ROM areas

ROM size (byte)	Address YYYYY	Address XXXXX	Address ZZZZZ
E4: About 32K	F8000h	18000h	1FFFFh
E8: About 64K	F0000h	10000h	1FFFFh
EA: About 96K	E8000h	08000h	1FFFFh
EC: About 128K	E0000h	20000h	3FFFFh

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

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