PCA7438F-80A
PCA7438L-80A

PROM Programming Adapter for M38B59EFFP/M38B59EFFS

User's Manual

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To Use the Product Properly

Precautions for Safety:

- Either in the User's Manual or on the product, 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.
- Their 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 user's 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

⚠ **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

Warnings for Use Environment:

- This equipment is to be used in an environment with a maximum ambient temperature of 35℃. Care should be taken that this temperature is not exceeded.
- Select the proper programming mode of the PROM programmer.

⚠ CAUTION

Cautions in Handling 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.

Caution in 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 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, hold the adapter horizontally.
- 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

The PCA7438F-80A and PCA7438L-80A are PROM programming adapters for 8-bit 38000 Series MCUs. These adapters are tools that can be used to write a program into internal PROM of MCUs using a commercially available PROM programmer.

This manual describes the specifications and the operation of the PCA7438F-80A/PCA7438L-80A.

Figure 2.1 shows the external view and the constituent parts of them.

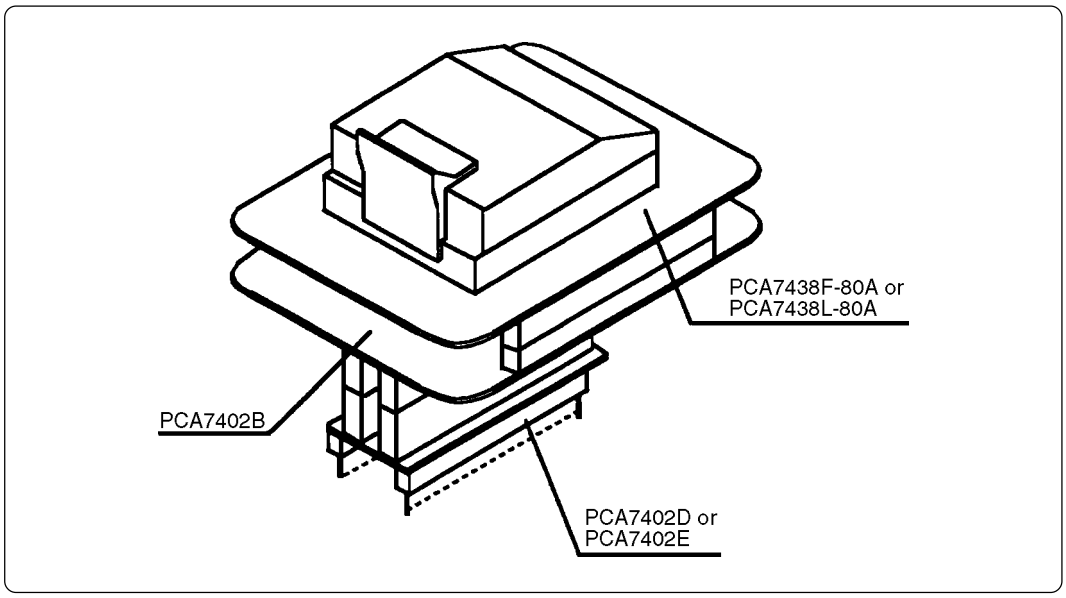

Figure 2.1 External view of the PCA7438F-80A/PCA7438L-80A and their constituent parts

2.1 Things to Check When Unpacking

The PCA7438F-80A/PCA7438L-80A consist of the following items. Check to see that it contains all of the components shown in Table 2.1.

Table 2.1 Contents of the PCA7438F-80A/PCA7438L-80A

Main unit	PCA7438F-80A/PCA7438L-80A
Interface unit	PCA7402B
PROM programer connector	PCA7402D (28-pin) PCA7402E (32-pin)
User's Manual	This user's manual

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

3. Specifications

Tables 3.1 and 3.2 list the specifications of the PCA7438F-80A and PCA7438L-80A respectively.

Table 3.1 Common specifications of the PCA7438F-80A

Applicable MCU		M38B59EFFP
Operating clock frequency		4 MHz (Supplied by the ceramic oscillator mounted on the PCA7438F-80A)
Power supply		Supplied from the Vcc of the PROM programmer
MCU socket		IC51-0804-819-6 (made by Yamaichi Electronics Co., Ltd.)
Board configuration	PCA7438F-80A	A programmable MCU mounted (IC socket for 80-pin QFP mounted)
	PCA7402B	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)
	PCA7402D	Board to be connected to the PROM programmer (for 256K bit mode) (Standard-pitch 28-pin pin-header to be connected to the PROM programmer mounted)
	PCA7402E	Board to be connected to the PROM programmer (for 1M bit mode) (Standard-pitch 32-pin pin-header to be connected to the PROM programmer mounted)

Note: The PCA7438F-80A is designed to support 38000 Series 80-pin QFP packages (80P6N-A), and it is basically compatible with the future variations of the MCU series.

Table 3.1 Common specifications of the PCA7438L-80A

Applicable MCU		M38B59EFFS
Operating clock frequency		4 MHz (Supplied by the ceramic oscillator mounted on the PCA7438L-80A)
Power supply		Supplied from the Vcc of the PROM programmer
MCU socket		IC51-0804-890 (made by Yamaichi Electronics Co., Ltd.)
Board configuration	PCA7438L-80A	A programmable MCU mounted (IC socket for 80-pin LCC mounted)
	PCA7402B	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)
	PCA7402D	Board to be connected to the PROM programmer (for 256K bit mode) (Standard-pitch 28-pin pin-header to be connected to the PROM programmer mounted)
	PCA7402E	Board to be connected to the PROM programmer (for 1M bit mode) (Standard-pitch 32-pin pin-header to be connected to the PROM programmer mounted)

Note: The PCA7438L-80A is designed to support 38000 Series 80-pin LCC packages (80D0), and it is basically compatible with the future variations of the MCU series.

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 (9) to write programs into the MCU.

(1) Read the program into the PROM programmer (8000_{16} offset required).

▼

(2) Select a PROM programmer connector (PCA7402D or PCA7402E). (See Section 4.2)

▼

(3) Attach the adapter to the PROM programmer. (See Section 4.4)

▼

(4) Set the jumper switches (SW1, SW2 and SW3). (See Section 4.3)

▼

(5) Insert the MCU into the adapter. (See Section 4.5)

▼

(6) Specify the programming area of the MCU using the PROM programmer. (See Section 4.8)

▼

(7) Using the PROM programmer's erase check function, check whether data can be written into the programming area of the MCU. *

▼

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

▼

(9) Verify the programming area of the MCU using the PROM programmer to check whether the program is written into the MCU correctly. *

Notes:

* Some PROM programmers perform the steps (7) through (9) automatically.
* **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.**

4.2 Selecting a PROM Programmer Connector

Select a PROM programmer connector (PCA7402D or PCA7402E) according to the ROM capacity of your MCU.

(1) For MCU 32KB or less: PCA7402D (for 256K bit mode)

(2) For MCU 32KB or more: PCA7402E (for 1M bit mode)

e.g.) For the M38B59EFFP and M38B59EFFS, use the PCA7402E.

Figure 4.1 shows the PROM programmer connectors.

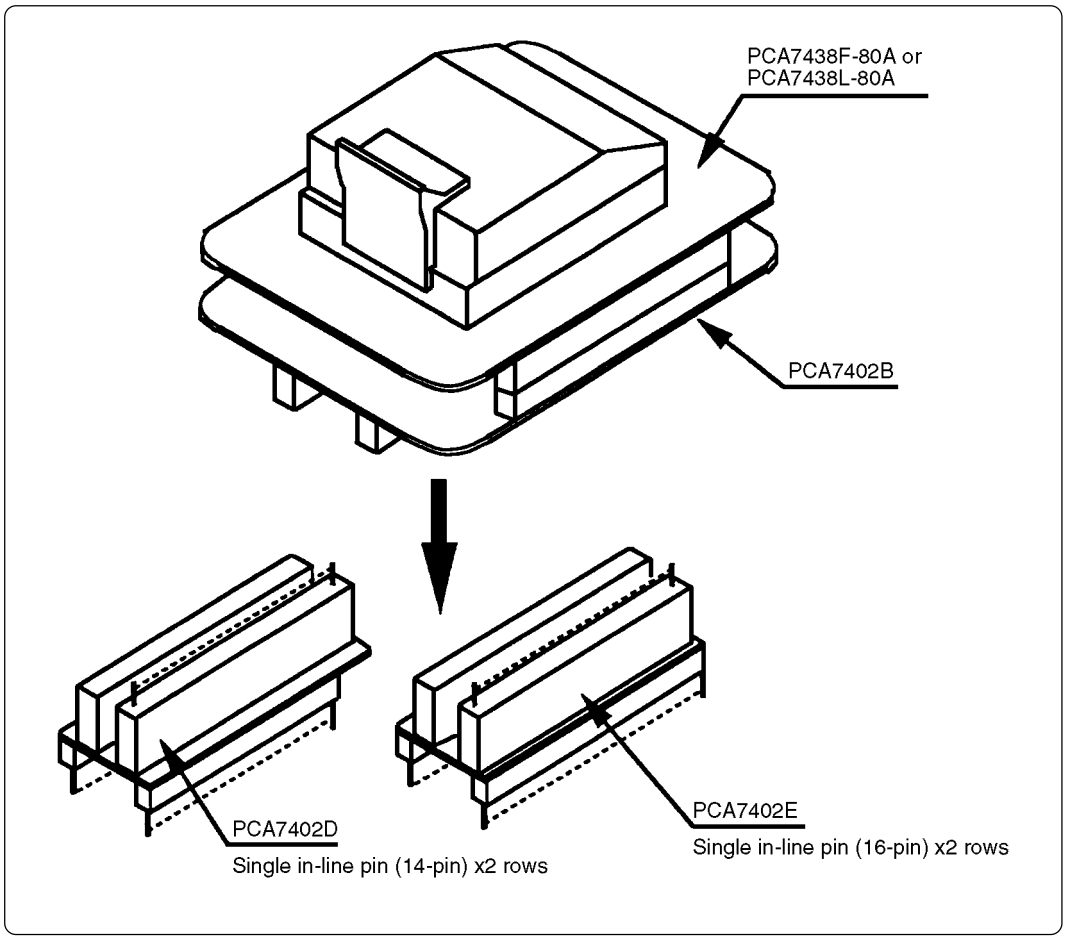

Figure 4.1 Selecting a PROM programmer connector

4.3 Setting the Jumper Switches

(1) Jumper switch SW1

Set the SW1 according to the output type of MCU's ports $P2_0$ - $P2_3$ (data buses D0-D3, No. 64-61 pins). For setting, see Table 4.1 and Figure 4.2.

- Ports $P2_0$ - $P2_3$: CMOS output ..... SW1: CMOS
- Ports $P2_0$ - $P2_3$: Pch output ..... SW1: Pch
- Ports $P2_0$ - $P2_3$: Nch output ..... SW1: Nch

(2) Jumper switch SW2

Set the SW2 according to the output type of MCU's ports $P2_4$ - $P2_7$ (data buses D4-D7, No. 60-57 pins). For setting, see Table 4.1 and Figure 4.2.

- Ports $P2_4$ - $P2_7$: CMOS output ..... SW2: CMOS
- Ports $P2_4$ - $P2_7$: Pch output ..... SW2: Pch
- Ports $P2_4$ - $P2_7$: Nch output ..... SW2: Nch

(3) Jumper switch SW3

How to set the SW3 is shown below.

- When No. 12 pin of the MCU is dedicated to pin X_{CIN} ..... SW3: ON
- When pin X_{CIN} also serves as an I/O port (e.g. $P4_1/X_{CIN}$) ..... SW3: OFF
- When there is no pin X_{CIN} ..... SW3: OFF

Table 4.1 Jumper switch settings

MCU	Example	SW1	SW2	SW3
M38B5XEXFP M38B5XEXFS	M38B59EFFP M38B59EFFS	Pch	Pch	OFF

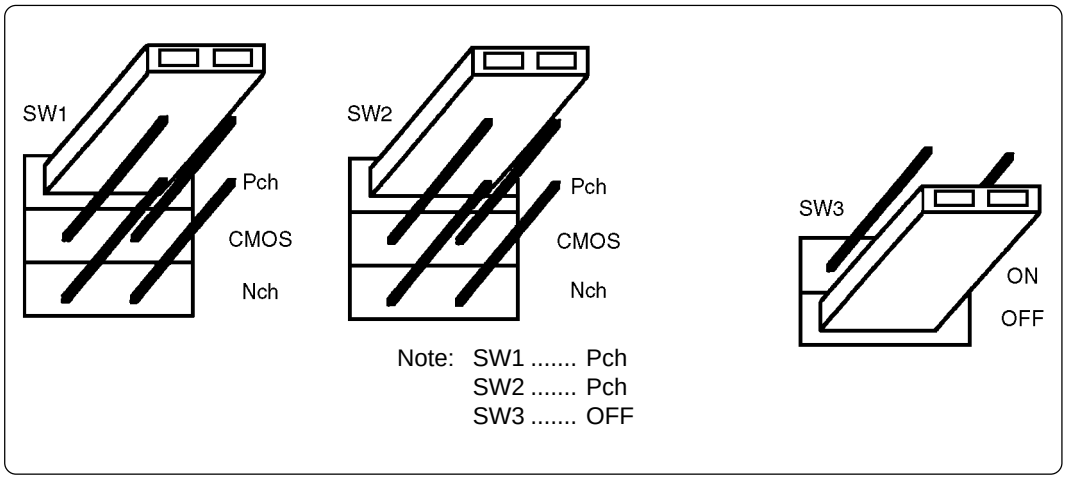

Figure 4.2 Jumper switch settings

4.4 Attaching the Adapter to a PROM Programmer

(1) For the PCA7402D

Attach the pin No. 1 of the PCA7402D PROM programmer connector (standard-pitch 28-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.

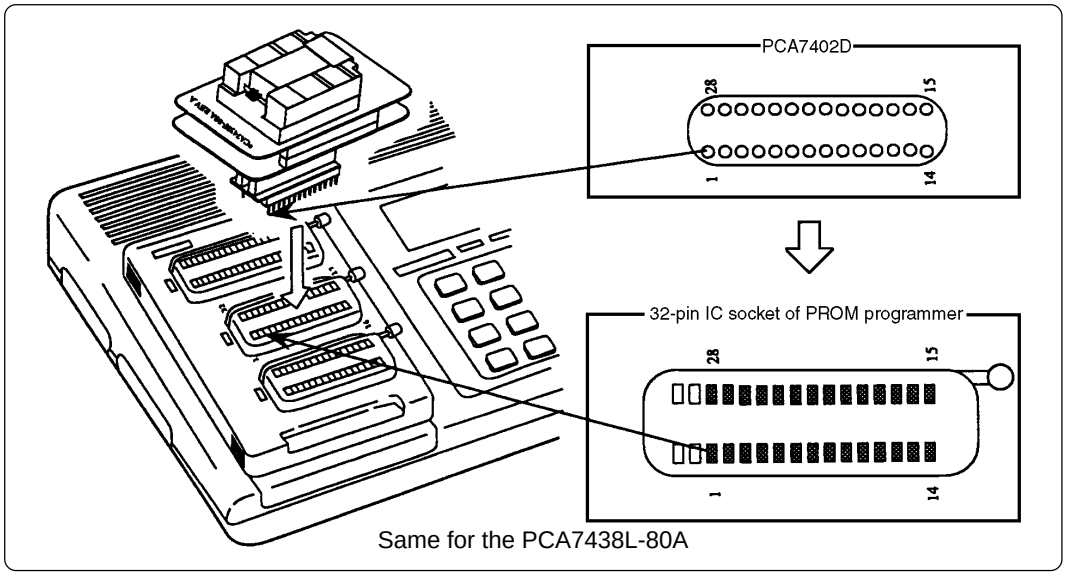

Figure 4.3 Attaching the adapter to the PROM programmer (PCA7402D)

(2) For the PCA7402E

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.

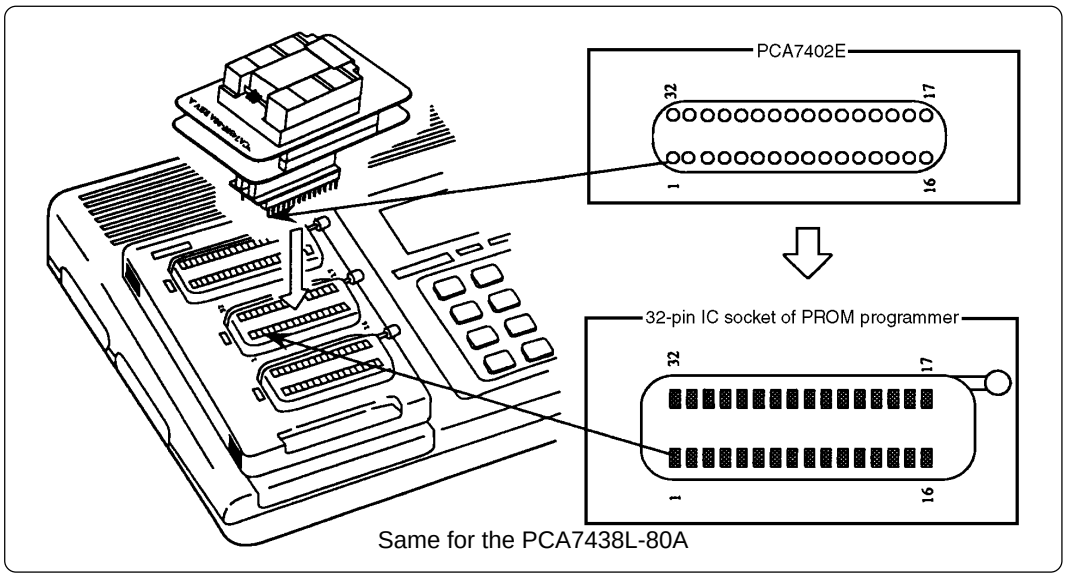

Figure 4.4 Attaching the adapter to the PROM programmer (PCA7402E)

4.5 Inserting an MCU into the Programming Adapter

As shown in Figure 4.5, 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 PCA7438F-80A/PCA7438L-80A.

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

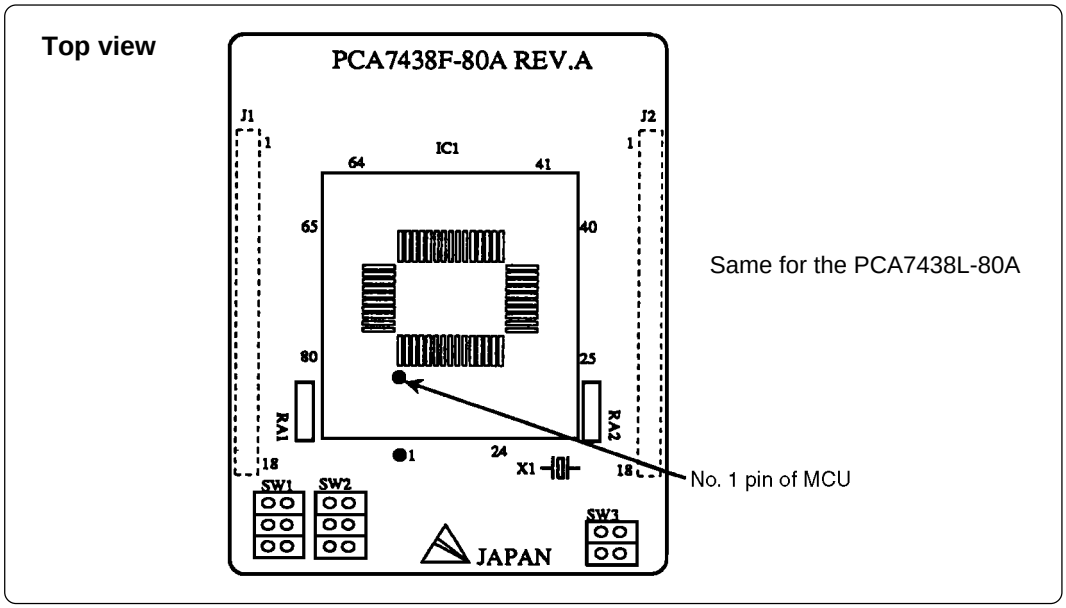

Figure 4.5 Inserting an MCU

4.6 Precautions When Opening and Closing the IC Socket

When opening and closing the IC socket, hold the adapter horizontally as shown in Figure 4.6. Otherwise the inside of the IC socket may become damaged and cause an electrical insulation failure.

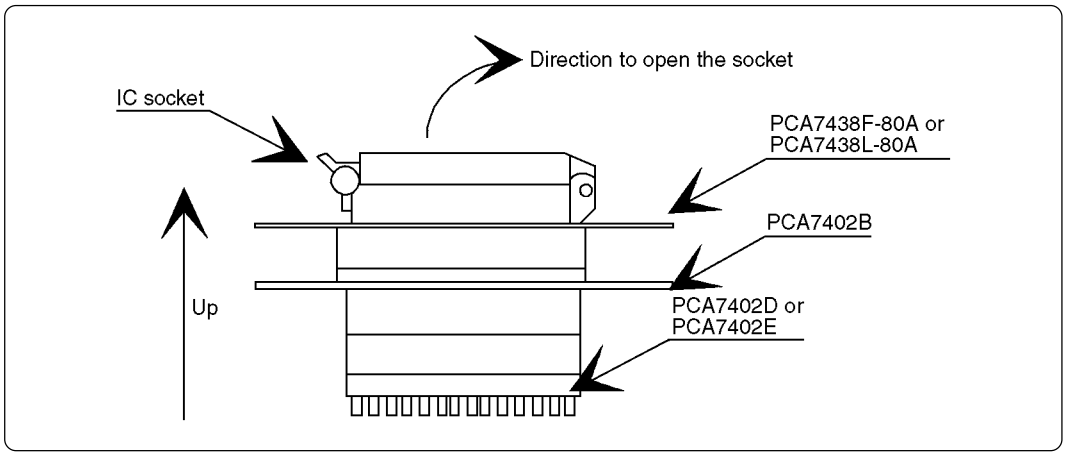

Figure 4.6 Holding the adapter in a horizontal position

4.7 Precautions When Handling the Adapter

Do not touch the connector in the IC socket and the pins on the PROM programmer connector, otherwise it 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.

4.8 Setting a 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 4.2 Programming area

MCU type	MCU area	PROM programmer		Programming area of the MCU
		Device name	Programming area	
M38B59EFFP M38B59EFFS	Internal ROM area	M5M27C101	01080_{16} - $0FFFD_{16}$	1080_{16} - $FFFD_{16}$

5. Recommended PROM Programmers

The PROM programmers listed in Table 5.1 are recommended for this product. 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		

* Be sure to select "Mitsubishi" when specifying the manufacturer for the device.

6. 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

7. Memory Maps

Figure 7.1 shows memory maps of the MCU and the PROM programmer.

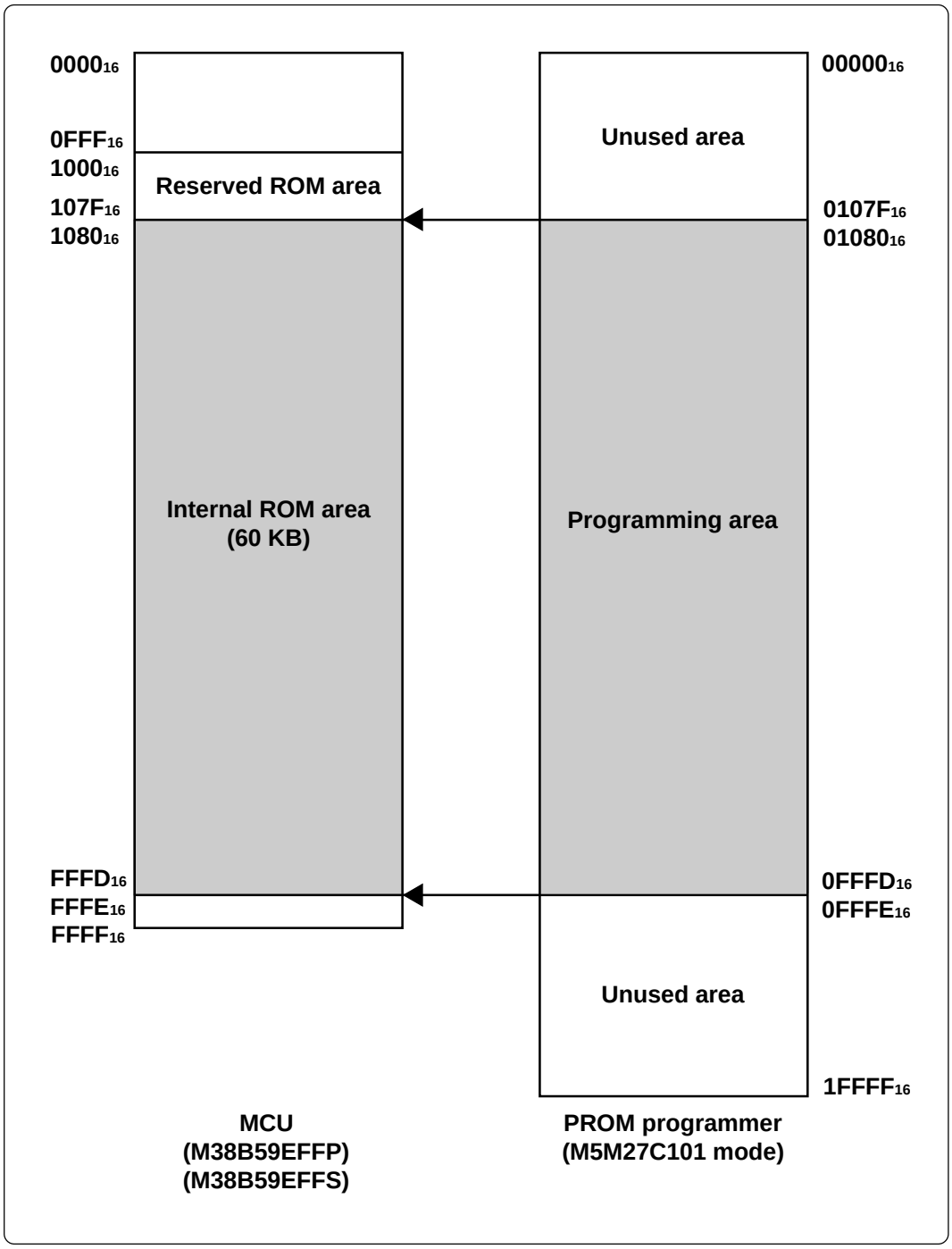

Figure 7.1 Memory maps

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