RENESAS

PCA7400

PROM Programming Adapter for M37281EKSP

User's Manual

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For inquiries about the contents of this document or product, fill in the text file the installer of the emulator debugger generates in the following directory and email to your local distributor.

\SUPPORT\Product-name\SUPPORT.TXT

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

Contents

Chapter 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.

⚠ **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˚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 or modifying this product can cause damage. Disassembling and modifying the product will void your warranty.

Cautions to Be Taken for Handling 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 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.

- When opening and closing the IC socket of this product, be sure to keep it horizontal.

- Be sure to specify the programming area of the PROM programmer properly.

- Do not use the PROM programmer's device identification code readout function.

Chapter 2. Introduction

The PCA7400 is a PROM programming adapter for the M37281EKSP (16-bit MCU). 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 PCA7400.

Figure 2.1 shows the external view of the PCA7400 and its constituent parts.

Figure 2.1 External view of the adapter 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	PCA7400
Connector	PCA4738E (32-pin)
User's manual	This manual

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

Chapter 3. Usage

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.

3.1 Programming Procedure

Follow these procedures (1) through (6) to write the program into the MCU.

(1) Mount the MCU into the adapter (see section 3.3).

(2) Attach the adapter to the IC socket of the PROM programmer (see section 3.2).

(3) Set the programming area with the PROM programmer (see section 3.4).

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

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

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

Notes

* 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.

* Some PROM programmers perform the steps (4) to (6) automatically.

3.2 Attaching the Adapter to a PROM Programmer

As shown in Figure 3.1, attach the pin No. 1 of the 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.**
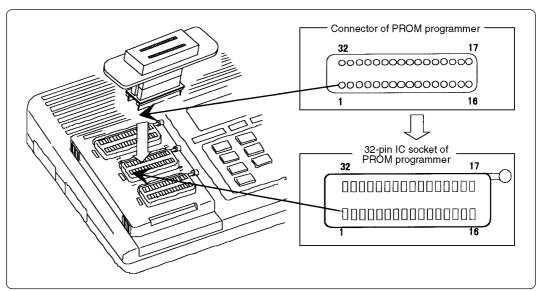

Figure 3.1 Attaching the adapter to a PROM programmer

3.3 Mounting an MCU into the Adapter

As this product uses an IC socket for 54-pin shrink DIP, mount the MCU into the IC socket with the No. 1 pin of the MCU matched to the No. 2 pin of the IC socket on the PCA7400 (SET BOTTOM).

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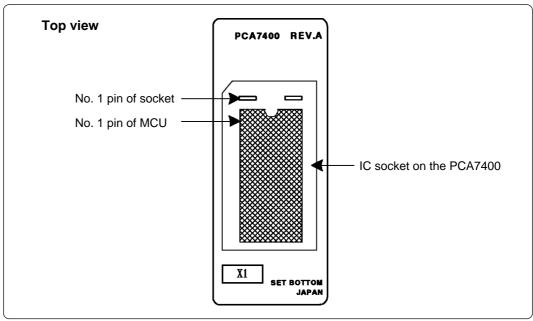

Figure 3.2 Mounting an MCU

⚠ CAUTION

Caution to Be Taken for Handling 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.

3.4 Setting the Programming Areas

When writing the program into the MCU, be sure to set the programming area. And also, specify its device of the PROM programmer.

Table 3.1 Programming areas

MCU type name	ROM capacity	PROM programmer		ROM area of MCU
		Device	Programming area	
M27281EKSP	Internal ROM (60K+20K bytes)	M5M27C101	01000_{16}--$0FFFF_{16}$ $1B000_{16}$--$1FFFF_{16}$	01000_{16}--$0FFFF_{16}$ $1B000_{16}$--$1FFFF_{16}$
	OSD display (20400+9672 bytes)		10800_{16}--$157FF_{16}$ 18000_{16}--$1ACFF_{16}$	10800_{16}--$157FF_{16}$ 18000_{16}--$1ACFF_{16}$

3.5 Recommended PROM Programmers

The PROM programmers listed in Table 3.2 are recommended for the adapter PCA7400. 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 3.2 Recommended PROM programmers

Manufacturer	Type name	Device	Programming voltage (V_{PP})
Advantest Corporation	R4945	M5M27C101 mode	12.5 V
	R4945A		

Chapter 4. Specifications

4.1 Specifications

Table 4.1 lists specifications of the PCA7400.

Table 4.1 Specifications

Applicable MCUs		M37281EKSP
IC socket		IC59-5406-G4 (made by Yamaichi Electronics Co., Ltd.) 54-pin shrink DIP socket
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	PCA7400	Board to insert a programmable MCU (IC socket for MCU mounted on it)
	PCA4738E	Board to connect to the PROM programmer (Standard-pitch 32-pin pin-header mounted)

⚠ CAUTION

MCU's Latest Information:

• For the latest information of the MCUs, visit the Renesas Tools Homepage.

http://www.renesas.com/en/tools

4.2 Memory Maps

Figure 4.1 shows memory maps of the MCU and the PROM programmer.

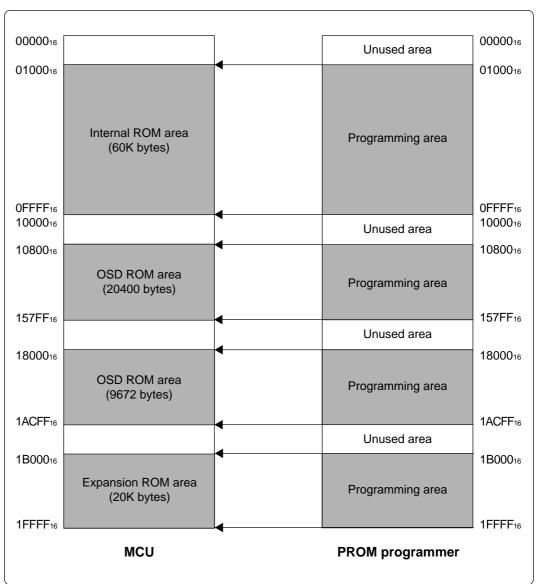| MCU		PROM programmer
00000_{16}		Unused area 00000_{16}
01000_{16} Internal ROM area (60K bytes)		Programming area 01000_{16}
$0FFFF_{16}$ 10000_{16}		$0FFFF_{16}$ Unused area 10000_{16}
10800_{16} OSD ROM area (20400 bytes)		10800_{16} Programming area
$157FF_{16}$		$157FF_{16}$ Unused area
18000_{16} OSD ROM area (9672 bytes)		18000_{16} Programming area
$1ACFF_{16}$		$1ACFF_{16}$ Unused area
$1B000_{16}$ Expansion ROM area (20K bytes)		$1B000_{16}$ Programming area
$1FFFF_{16}$		$1FFFF_{16}$

Figure 4.1 Memory map

Chapter 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 MCU attached to the correct position?	9
PROM programmer	Is the area specification set correctly?	10
	Is the correct device selected?	10
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 MCU attached to the correct position?	9
PROM programmer	Is the area specification set correctly?	10
	Is the correct device selected?	10
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 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.

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

(1) 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).

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