



# M37641T2-RPD-E

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Emulation Pod for 7641 and 7643 Group MCUs

## User's Manual

\* IC61-080-081 is a product of Yamaichi Electronics Co., Ltd.

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Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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>

# Preface

The M37641T2-RPD-E is an emulation pod for the 7641 and 7643 Groups of Renesas 16-bit microcomputers. It's used with a PC4701 emulator.

This user's manual mainly describes specifications of the M37641T2-RPD-E emulation pod and how to setup it. For details on the following products, which are used with the M37641T2-RPD-E, refer to each product's user's manual.

- Emulator: PC4701 User's Manual
- Emulator debugger: M3T-PD38 User's Manual

All the components of this product are shown in "2.2 Package Components" (page 19) of this user's manual. If there is any question or doubt about this product, contact your local distributor.

## To use the product properly

### Precautions for Safety:



- In both this 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.
- The icons' graphic images and meanings are given in "Chapter 1. Precautions for Safety". Be sure to read this chapter before using the product.

## When using outside Japan



- When using in Europe, the United States, or Canada, be sure to use both the emulator and the emulation pod which meet local standards. EMI standards are not met when the M37641T2-RPD-E is used with the PC4700H or PC4700L emulator.

# Contents

Chapter 1. Precautions for Safety .....	7
1.1 Safety Symbols and Meanings .....	8
Chapter 2. Preparation .....	17
2.1 Terminology .....	18
2.2 Package Components .....	19
2.3 Other Tool Products Required for Development .....	19
2.4 Name of Each Part .....	20
(1) System Configuration .....	20
(2) Inside of the Emulation Pod .....	21
2.5 Using the Emulator for the First Time .....	22
Chapter 3. Setting Up .....	23
3.1 Removing the Upper Cover .....	24
3.2 Replacing the Evaluation MCU .....	25
3.3 Switch Settings .....	26
3.4 Connecting USB-related Signals .....	28
(1) Pins D+ and D- .....	28
(2) Pin Ext. Cap .....	29
(3) Pins LPF, AVss and AVcc .....	30
3.5 Selecting Clock Supply .....	30
(1) Using the Oscillator Circuit on the Target System .....	31
(2) Changing the Oscillator Circuit in the Emulation Pod .....	32
(3) Replacing the Oscillator Circuit Boards .....	33
3.6 Connecting the PC4701 and Emulation Pod .....	34
(1) Connecting the Cable to the PC4701 .....	34
(2) Connecting the Cable to the Emulation Pod .....	35
3.7 Connecting the Target System .....	36
Chapter 4. Usage .....	37
4.1 Turning On the Power .....	38
(1) Checking the Connections of the Emulator System .....	38
(2) Turning On the Power .....	38
(3) LED Display When the PC4701 Starts Up Normally .....	39
4.2 Downloading Firmware .....	40
(1) When It is Necessary to Download Firmware .....	40
(2) Downloading Firmware in Maintenance Mode .....	40
4.3 Starting Up Emulator Debugger (Init Dialog Box Settings) .....	41
(1) Settings in the CLOCK Tab .....	41
(2) Settings in the MCU Tab .....	42

4.4 Self-check .....	42
(1) Self-check Procedure .....	42
(2) If an Error is Detected in the Self-check .....	42
Chapter 5. Specifications .....	45
5.1 Specifications .....	46
5.2 Connection Diagrams .....	47
5.3 Operation Timing .....	49
(1) Operation Timing When Using the Evaluation MCU (M37641M8-XXXFS) ....	49
(2) Operation Timing When Using the Evaluation MCU (M37643M8-XXXFS) ....	51
5.4 External Dimensions .....	55
(1) External Dimensions of the Emulation Pod .....	55
(2) External Dimensions of the Converter Board (M3T-FLX-80LCC) .....	56
Chapter 6. Troubleshooting .....	57
6.1 Flowchart to Remedy Troubles .....	58
(1) When the LED Display of the PC4701 is Abnormal .....	59
(2) When the Init Dialog Box is Not Displayed .....	59
(3) When the Program Window is Not Displayed (Target System Not Connected) ....	60
(4) When the Program Window is Not Displayed (Target System Connected) .....	61
6.2 When the M37641T2-RPD-E Does Not Work Properly .....	62
Chapter 7. Maintenance and Guarantee .....	63
7.1 Maintenance .....	64
7.2 Guarantee .....	64
7.3 Repair Provisions .....	64
7.4 How to Request for Repair .....	65

# MEMO

# Chapter 1. Precautions for Safety

This chapter describes precautions for using this product safely and properly. For precautions for the emulator main unit and the emulator debugger, refer to each user's manual included with your product.



1.1 Safety Symbols and Meanings .....	8
<b>WARNING</b> Warning for Installation .....	9
Warnings for Use Environment .....	9
<b>CAUTION</b> Caution to Be Taken for Modifying This Product .....	9
Cautions to Be Taken for Handling This Product .....	9
<b>IMPORTANT</b> Note on Malfunctions in the PC4701 System .....	10
Note on PC4700 Systems .....	10
Notes on Downloading Firmware .....	10
Note on Map Settings (MAP Command) .....	10
Notes on the Target System .....	11
Note on SYNCOUT Output .....	11
Note on Reset Input from the Target System .....	11
Note on RDY Input .....	11
Note on HOLD Input .....	11
Note on Differences between the Actual MCU and Emulator .....	12
Notes on the Watchdog Function .....	13
Note on DMA Transfer .....	13
Note on the Key-on Wake Up Function .....	13
Note on Reading MCU Internal Resources .....	14
Note on a Watch Point .....	14
Note on Event Breaks .....	14
Note on Software Breaks .....	14
Note on Stack Area .....	15
Note on Quitting the Emulator Debugger .....	15
Notes for Connecting the Target System .....	15

# 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.


## 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 Installation:**



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

### **Warnings for Use Environment:**



- The emulation pod is air-cooled with the ventilation slot. Therefore, do not block the ventilation slot. When heated to high temperatures, the emulation pod may not work properly.
- 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.

## **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 the main unit. Be careful not to apply a mechanical shock.
- Do not touch the connector pins of the emulator main unit and the target MCU connector pins. Static electricity may damage the internal circuits.
- Do not pull the emulation pod main unit by flexible cable FLX120-RPD for connecting to the emulator main unit or flexible cable FLX100 for connecting the target system. The cable may cause a break.
- Flexible cable FLX120-RPD for connecting to the emulator main unit and flexible cable FLX100 for connecting the target system are different from earlier models. The slits make them more flexible. However, excessive flexing or force may break conductors.
- Do not use inch-size screws for this equipment. The screws used in this equipment are all ISO (meter-size) type screws. When replacing screws, use same type screws as equipped before.

# IMPORTANT

## Note on Malfunctions in the PC4701 System:

- If the emulator malfunctions because of interference like external noise, do the following to remedy the trouble.
  - (1) Press the RESET button on the emulator front panel.
  - (2) If normal operation is not restored after step (1), shut OFF power to the emulator once and then reactivate it.

## Note for PC4700 System:

- PC4700H products whose serial number ends with a number or D, DE, G cannot be used with the M37641T2-RPD-E.  
Example: 5KE100, 5KE100D, 5KE11DE, 5KE100G  
**Do NOT use it with the M37641T2-RPD-E. The PC4700 needs upgrading.**  
Example: 5LE123B  
You can use it with the M37641T2-RPD-E.

## Notes on Downloading Firmware:

- Before using this product for the first time, it is necessary to download the dedicated firmware (control software for the emulation pod built into the PC4701). Please note that, to do this, it is necessary to start up the PC4701 in maintenance mode. For firmware download procedures, see "4.2 Downloading Firmware" (page 40). Once firmware has been downloaded, the product can be used by simply turning on the power.
- Do not shut off the power while downloading firmware. If this happens, the product will not start up properly. If power is shut off unexpectedly, redownload firmware.
- Except when a target status error occurs, if self-check is not completed successfully, there may be trouble with the product. In such case, contact your local distributor. However, perform the self-check in the below setup.
  - (1) Target system: Not connected
  - (2) Emulation pod internal switches: At their factory settings

## Note on Map Settings (MAP Command):

- Always set the SFR area and the internal RAM area to EXT.

When you debug an MCU with flash memory, however, set addresses 0470H through 0FFFH to INT. (The internal RAM size of the on-board evaluation MCU is 1 KB.) Because the internal RAM size of the evaluation MCU is smaller than the RAM size of MCUs with flash memory, allocate emulation memory.

You can set the mapping by issuing the MAP command in the script window of the emulator debugger.

Example (when using an MCU with flash memory in the memory expansion mode):

MAP	0000,046F,EXT	(SFR area and internal RAM area)
MAP	0470,0FFF,INT	(Internal RAM area extended by emulation memory)
MAP	1000,7FFF,EXT	(External area)
MAP	8000,FFFF,INT	(Internal ROM area)

# IMPORTANT

## Notes on the Target System:

- As pin Vcc of emulator is connected to the target system to observe the voltage of the target system, the target system is not powered by the emulator. Therefore design your system so that the target system is powered separately.
- The voltage of the target system should be within the range of the MCU specification and **+3.0 to +3.6 V or +4.5 to 5.25 V**.
- Do not change the voltage of the target system after turning on the power.
- Before powering on your emulator system, check that the host machine, the emulator main unit, the converter board and target system are all connected correctly. Next, turn on the power to each equipment following the procedure below.
  - (1) Turn ON/OFF the target system and the PC4701 emulator **as simultaneously as possible**.
  - (2) When the PC4701 and emulator debugger start up, check the target status LEDs on the emulator main unit's front panel to see if this product is ready to operate.

(For the target status LEDs on the front panel when starting up the PC4701, refer to "4.1 (3) LED Display When the PC4701 Starts Up Normally" on page 39)

## Note on SYNCOUT Output:

- When using the emulator, SYNCOUT signals are not output.

## Note on Reset Input from the Target System:

- If a reset is input from the target system, when a user program is being executed (when the RUN status LED on the PC4701's front panel is lit), the user program is stopped.

## Note on RDY Input:

- Be sure to input "L" to pin RDY\* of the target system during the user program execution. Inputting "L" to pin RDY\* while the user program is stopped may cause a malfunction of the emulator.

## Note on HOLD Input:

- Be sure to input "L" to pin HOLD\* of the target system during the user program execution. Inputting "L" to pin HOLD while the user program is stopped may cause a malfunction of the emulator.

# IMPORTANT

## Note on Differences between the Actual MCU and Emulator:

- Emulator operation differs from mask MCU operation as listed below.

- (1) Reset condition
- (2) Power voltage  
When using the emulator, it is not possible to use with the range of 4.15 to 4.5 V.
- (3) Initial values of internal resources data at power-on
- (3) Internal memory (ROM and RAM) capacities, etc.
- (4) Ports P0, P1, P2, P3 and P4<sub>0</sub>

Some I/O ports (P0, P1, P2, P3 and P4<sub>0</sub>) of the M37641T2-RPD-E are connected to the target system via the port emulation circuit in the M37641T2-RPD-E. Therefore, the external bus timing and the electrical characteristics are slightly different from those of the actual MCU. For the differences of the I/O timing etc. between the emulator and the actual MCU, refer to "5.2 Connection Diagrams" (page 47) and "5.3 Operation Timing" (page 49).

Table 1.1 lists the differences of the I/O level between the emulator and the MCU.

Table 1.1 Port I/O level

Port	Input level		Output level	
	Emulator	Actual MCU	Emulator	Actual MCU
P0	CMOS	CMOS	CMOS	CMOS
P1	CMOS	CMOS	CMOS	CMOS
P2 (for TTL input level*1)	CMOS	TTL	CMOS	CMOS
P2 (for CMOS input level*1)	CMOS	CMOS	CMOS	CMOS
P3	CMOS	CMOS	CMOS	CMOS
P4	CMOS	CMOS	CMOS	CMOS

\*1 Setting by the port control register (0010H) port 2 input level select bit (bit6).

- (6) Pins XIN and XOUT

Make note that in the oscillator circuit where a resonator is connected between pins XIN and XOUT, oscillation does not occur because a flexible cable, buffer IC and other devices are used between the evaluation MCU and the target system. See "Figure 3.10 Circuit in which oscillation does not occur (same for XCIN-XCOUT)" (page 31).

- (7) Pins XCIN and XCOUT

Make note that in the oscillator circuit where a resonator is connected between pins XCIN and XCOUT, oscillation does not occur because a flexible cable, buffer IC and other devices are used between the evaluation MCU and the target system. See "Figure 3.10 Circuit in which oscillation does not occur (same for XCIN-XCOUT)" (page 31).

- (8) Pin SYNCOUT

Make note that pin SYNCOUT does not output data.

- (9) Pins D+, D-, Ext. Cap, LPF, AV<sub>cc</sub> and AV<sub>ss</sub>

Refer to "3.4 Connecting USB-related Signals" (page 28).

- (10) Other pins

As a flexible cable is used between the evaluation MCU and the target system, some characteristics are slightly different from those of the actual MCU.

**Therefore, be sure to evaluate your system with an evaluation MCU. Before starting mask production, evaluate your system and make final confirmation with an ES (Engineering Sample) version MCU.**

# IMPORTANT

## Notes on the Watchdog Function:

- The MCU's watchdog timer can be used only while a program is being executed. To use it otherwise, disable the watchdog timer.
- If the reset circuit of the target system has a watchdog timer, disable it when using the emulator.

## Note on DMA Transfer:

- When using the DMA transfer function, pay attention to the following.
  - (1) Breaks are not executed during the DMA transfer. Break are executed after the DMA transfer is finished.
  - (2) The DMA transfer is not executed while a break is executed.
  - (3) The DMA transfer cannot be executed on the emulation memory. It is possible to transfer only from the area set to "EXT" to the area set to "EXT" by MAP settings.
  - (4) In the result of the real-time trace, RD and WR signals during the DMA transfer cycle displayed as fixed "H". (RD and WR signals output from the MCU change correctly.)

## Note on the Key-on Wake Up Function:

- The key-on wakeup interrupt is accepted only during STP command or WIT command execution. The interrupt is not accepted in any other situations.

# IMPORTANT

## Note on Reading MCU Internal Resources:

- When the M37641T2-RPD-E is configured with the emulator debugger, the following results occur when reading MCU internal resources (SFR and internal RAM area). In both cases, data is not displayed correctly, but internal data is not affected at all.
  - (1) Real-time tracing  
Data values in the MCU internal resource read cycle are not displayed correctly.
  - (2) Real-time RAM monitoring  
Data values in the MCU internal resource read cycle are not displayed correctly.

## Note on a Watch Point:

- When the M37641T2-RPD-E is configured with the emulator debugger, note the following if specifying a watch point for MCU internal resources (SFR and internal RAM area).

Change the address specified as a watch point so as not to overlap the area set for the real-time RAM monitor (you can check using the RRAM command of the M3T-PD38). When the address specified as a watch point overlaps the area set for the real-time RAM monitor and the MCU internal resources are read out, data will not be displayed correctly. The initial setting of the real-time RAM monitor is 0000H to 03FFH.

Example:

Watch point ..... 0000H  
Real-time RAM monitor ..... 0010H to 040FH

## Note on Event Breaks:

- With the emulator debugger you can not use data read out from the MCU internal resources (RAM and SFR area) as a condition for event breaks.

## Note on Software Breaks:

- Software breaks generate BRK interruptions by forcibly inserting a BRK instruction at "00h" instead of a instruction code. Therefore, when you reference the result of a trace in bus mode, "00h" is displayed as the instruction fetch address where a software break is set.

# IMPORTANT

## Note on Stack Area:

- With this product, a maximum 3 bytes of the user stack is consumed as work area.

## Note on Quitting the Emulator Debugger:

- To restart the emulator debugger, always shut power to the emulator module off once and then on again.

## Notes on Connecting the Target System:

- When connecting the FLX100 flexible board and the converter board, be careful not to forcibly press the connector top of the converter board. The flexible board and the converter board are guaranteed for only 20 insertion/removal iterations.
- Especially be careful not to insert the converter board in a wrong direction.

# MEMO



# Chapter 2. Preparation

This chapter describes the package components, the system configuration and the preparation for using this product for the first time.

2.1 Terminology .....	18
2.2 Package Components.....	19
2.3 Other Tool Products Required for Development.....	19
2.4 Name of Each Part .....	20
(1) System Configuration .....	20
(2) Inside of the Emulation Pod.....	21
2.5 Using the Emulator for the First Time .....	22

# Chapter 2. Preparation

## 2.1 Terminology

Some specific words used in this user's manual are defined as follows:

### **Emulator system**

This means an emulator system built around the PC4701 emulator. The PC4701 emulator system is configured with an emulator main unit, emulation pod, host machine and emulator debugger.

### **Emulator main unit (Hereafter PC4701)**

This means a generic name for emulators for 8 and 16-bit MCUs. For details on specific models of PC4701, visit the Renesas Tools Homepage at:

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

### **Emulation pod**

This means the M37641T2-RPD-E (this product). This emulation pod is for 740 Family 7600 Series 7641 and 7643 Group MCUs.

### **Host machine**

This means a personal computer used to control the emulator and emulation pod.

### **Emulator debugger**

This means a software tool M3T-PD38 to control the emulator from the host machine through an interface.

### **Firmware**

Program that analyzes contents of communication with the emulator debugger and controls the emulator hardware. This program is installed in the EEPROM. This program is downloadable from the emulator debugger to upgrade firmware or to support other MCUs.

### **Evaluation MCU**

This means the microcomputer mounted on the emulation pod which is operated in the specific mode for development tools.

### **Target MCU**

This means the microcomputer you are going to debug.

### **Target system**

This means a user's application system using the microcomputer to be debugged.

\*

In this user's manual, this symbol is used to show active LOW. (e.g. RESET\*: Reset signal)

## 2.2 Package Components

The M37641T2-RPD-E package consists of the following items. When unpacking, check to see if your M37641T2-RPD-E package contains all the items listed below.

### Package components

Item	Quantity
Emulation pod main unit M37641T2-RPD-E	1
Flexible cable FLX120-RPD for connecting PC4701	1
Converter board M3T-FLX-80LCC for 80-pin LCC package	1
IC socket IC61-080-081 (80-pin 0.8-mm-pitch) made by Yamaichi Electronics Co., Ltd.	1
Oscillator circuit board OSC-2 (bare-board)	1
Evaluation MCU M37643M8-XXXFS	1
Hardware tool user registration FAX sheet (English)	1
Hardware tool user registration FAX sheet (Japanese)	1
M37641T2-RPD-E user's manual (this manual)	1
M37641T2-RPD-E user's manual (Japanese)	1

Please keep the M37641T2-RPD-E's packing box and cushion material in your place for reuse at a later time when sending your product for repair or other purposes. Always use these packing box and cushion material when transporting the M37641T2-RPD-E.

If any of these items are missing or found faulty, please contact your local distributor. Also, if there is any question or doubt about the packaged product, contact your local distributor.

## 2.3 Other Tool Products Required for Development

To bring forward programs development on the 7641 and 7643 Group MCUs, the products listed below are necessary in addition to those contained package above. Get them separately.

### Other tool products

Emulator main unit	PC4701
Emulator debugger	M3T-PD38
Converter board (Choose according to the foot pattern of your target system. For details, see "3.7 Connecting the Target System" on page 36.)	For 80-pin 0.8-mm-pitch QFP (80P6N-A): - M3T-DUMMY80 - M3T-FLX-80NRA - M3T-FLX-80LCC (included) and IC61-080-081 (included)
	For 80-pin 0.5-mm-pitch QFP (80P6Q-A): - M3T-FLX-80NSD - M3T-FLX-80LCC (included) and M3T-80LCC-QSD

\* To purchase these products, contact your nearest distributor.

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## 2.4 Name of Each Part

### (1) System Configuration

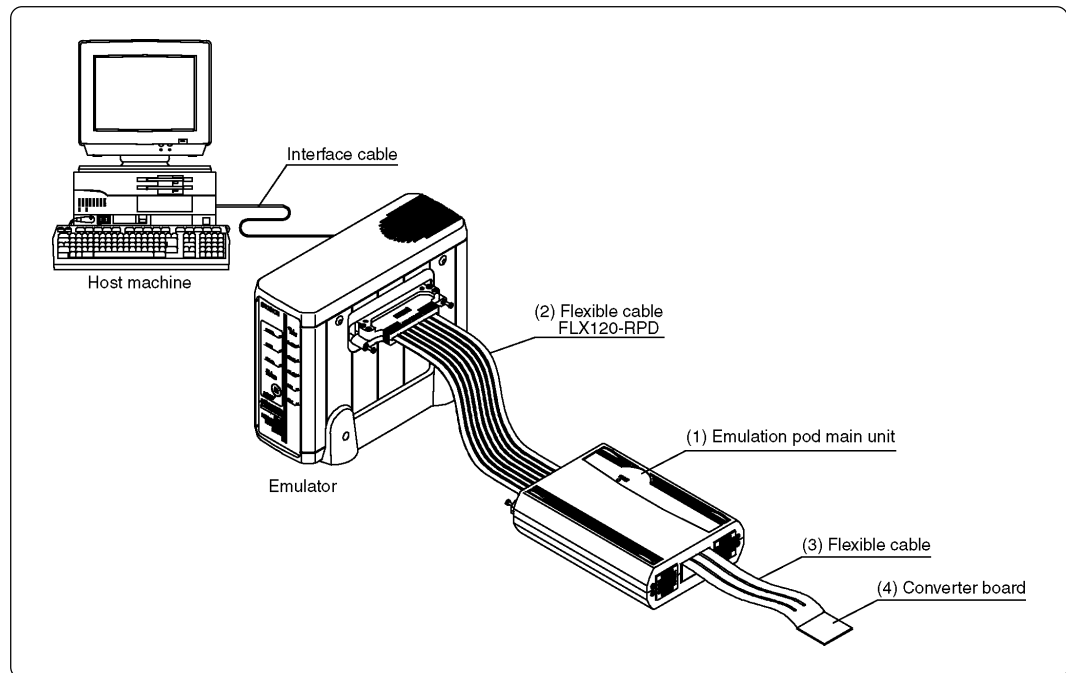


Figure 2.1 System configuration

(1) to (4) in Figure 2.1 are included with this product package.

(1) Emulation pod M37641T2-RPD-E

This emulation pod contains an evaluation MCU, emulation memory and circuit to feature the debugging functions.

(2) Flexible cable FLX120-RPD

This 120-pin flexible cable connects the PC4701 emulator and the emulation pod.

(3) Flexible cable FLX100

This 100-pin flexible cable connects the emulation pod and the target system.

(4) Converter board

This is a converter board for connecting to the target system.

For details, refer to "3.7 Connecting the Target System" (page 36).

## (2) Inside of the Emulation Pod

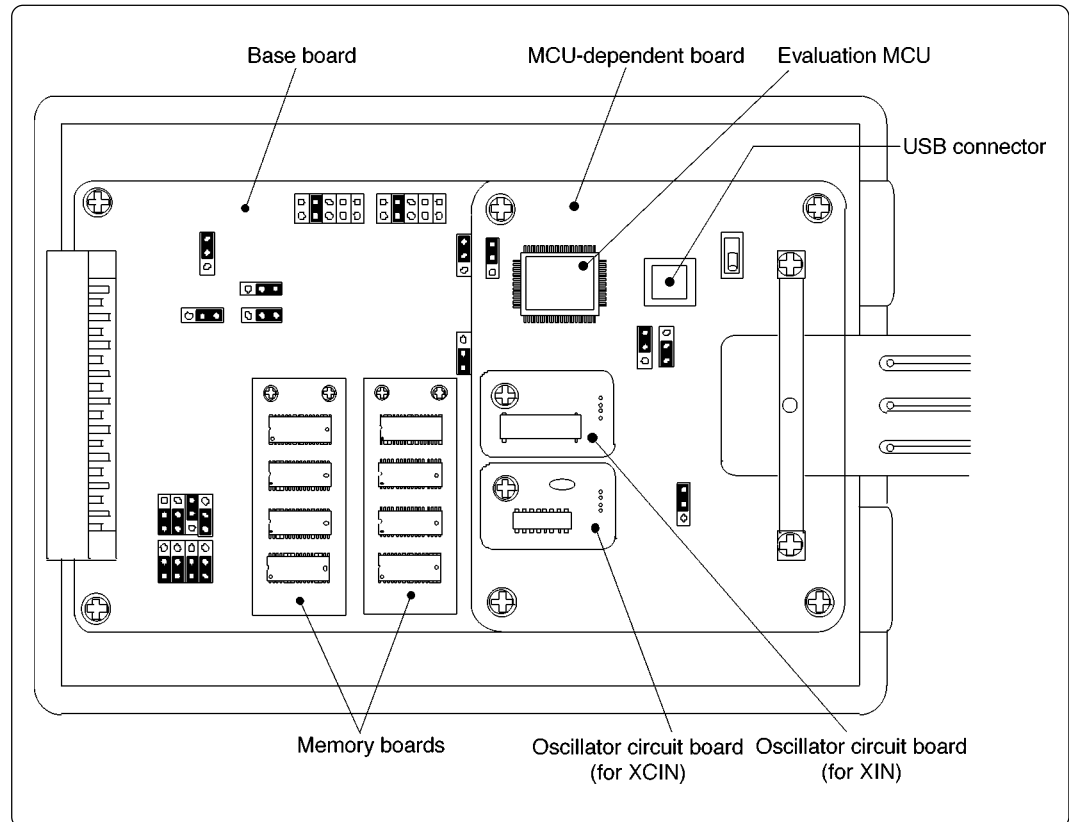


Figure 2.2 Internal view of the emulation pod

### (1) Base board

Base board for the 740 Family MCUs which controls the interface with the PC4701 and the evaluation MCU.

### (2) Memory board

Board on which the 128 KB emulation memory is mounted.

### (3) Oscillator circuit board

Board on which the oscillator circuit in the emulation pod is mounted. Its operating frequency can be changed by replacing this board with other available oscillator circuit boards.

### (4) MCU-dependent board

Board grouping parts (number of pins or added functions) which vary according to MCU model.

### (5) Evaluation MCU

Microcomputer (dedicated to the emulator) operated in the specific mode for the emulator. It is necessary to replace the evaluation MCU according to the MCU you use.

## 2.5 Using the Emulator for the First Time

If you have purchased this emulation pod newly, it is necessary to download firmware. The download procedure is given in Figure 2.3.

Before attempting to download firmware, check the emulator debugger is installed and the emulator is connected to the host machine. For more information, see each user's manual of the emulator debugger and the PC4701.

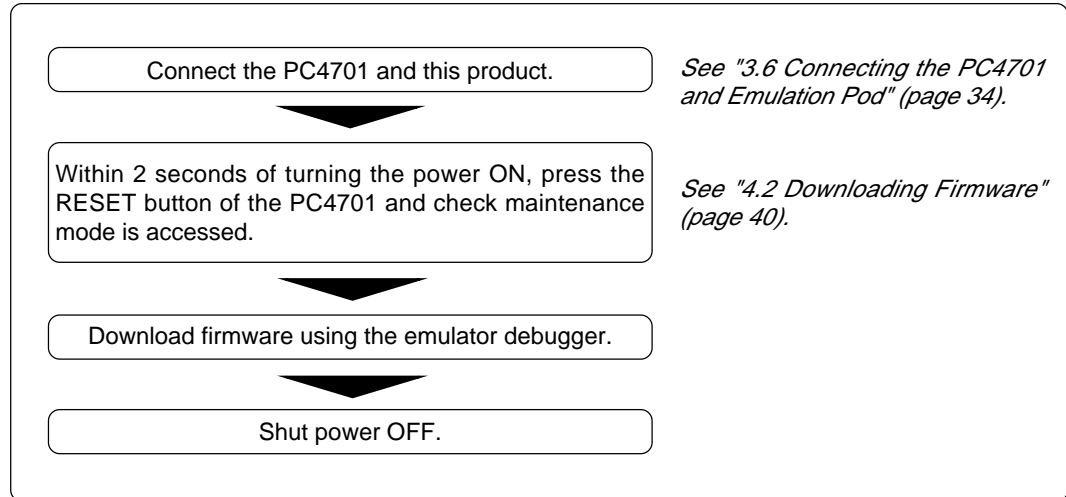


Figure 2.3 Firmware download procedure when emulator is used for the first time

To make sure the emulation pod works properly, run the self-check. For self-check procedures, see "4.4 Self-check" (page 42).

# Chapter 3. Setting Up

This chapter describes switch settings required for using this product and how to connect this product to the PC4701 and the target system.

3.1 Removing the Upper Cover .....	24
3.2 Replacing the Evaluation MCU .....	25
3.3 Switch Settings .....	26
3.4 Connecting USB-related Signals .....	28
(1) Pins D+ and D- .....	28
(2) Pin Ext. Cap .....	29
(3) Pins LPF, AVss and AVcc .....	30
3.5 Selecting Clock Supply .....	30
(1) Using the Oscillator Circuit on the Target System .....	31
(2) Changing the Oscillator Circuit in the Emulation Pod .....	32
(3) Replacing the Oscillator Circuit Boards .....	33
3.6 Connecting the PC4701 and Emulation Pod .....	34
(1) Connecting the Cable to the PC4701 .....	34
(2) Connecting the Cable to the Emulation Pod .....	35
3.7 Connecting the Target System .....	36

## Chapter 3. Setting Up

To use this emulation pod with your application system, it is necessary to set as follows. Set the following after removing the upper cover.

- Pins XIN and XOUT
- Pins XCIN and XCOU
- USB-related pins (Pins Ext. Cap, D+ and D-)
- Input frequency
- Evaluation MCU

### 3.1 Removing the Upper Cover

The procedure of removing the upper cover is shown below.

- (1) Remove the four screws of both sides of this product and lift off the upper cover (see Figure 3.1).
- (2) Set the jumper switches etc.
- (3) Replace the upper cover and secure the four screws.

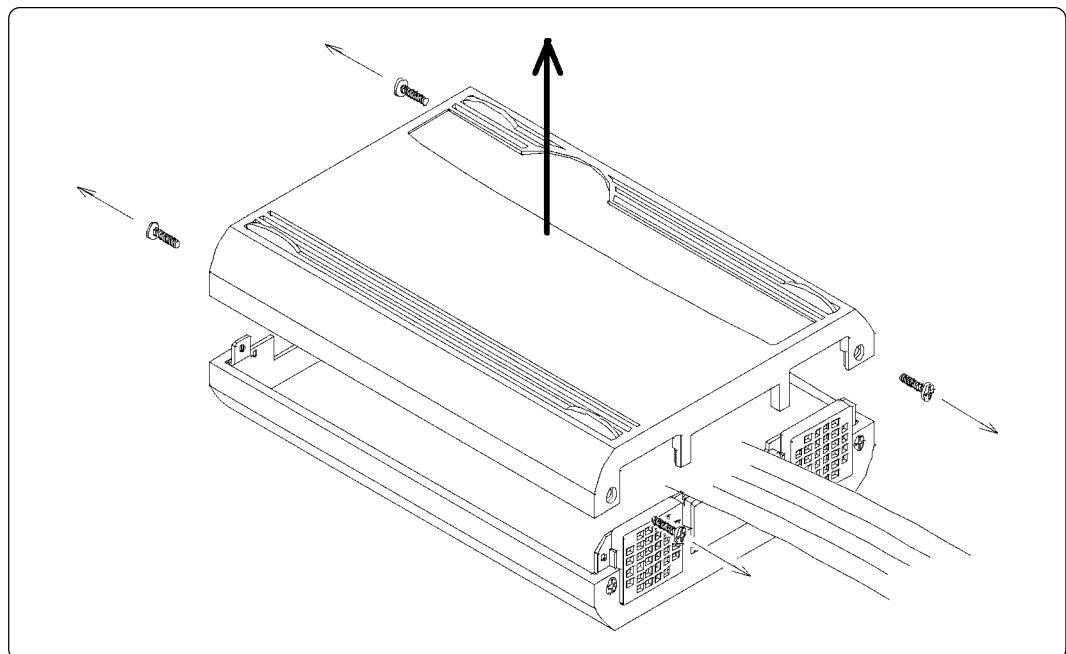


Figure 3.1 Removing the upper cover

### CAUTION

#### When Removing the Upper Cover:

- Always shut OFF power when removing the upper cover and setting the switches.



### 3.2 Replacing the Evaluation MCU

It is necessary to replace the evaluation MCU according to the MCU you use.

[MCU Group]	[Evaluation MCU]
7641 Group:	M37641M8-XXXFS
7643 Group:	M37643M8-XXXFS

To debug the 7643 Group, it is necessary to replace the evaluation MCU to the included M37643M8-XXXFS.

When replacing the evaluation MCU, align the No. 1 pin as shown in the Figure 3.2. Especially be careful not to insert the MCU in a wrong direction. Otherwise, it may cause a fatal damage to the MCU.

The M37641M8-XXXFS is mounted on this product when shipped from the factory.

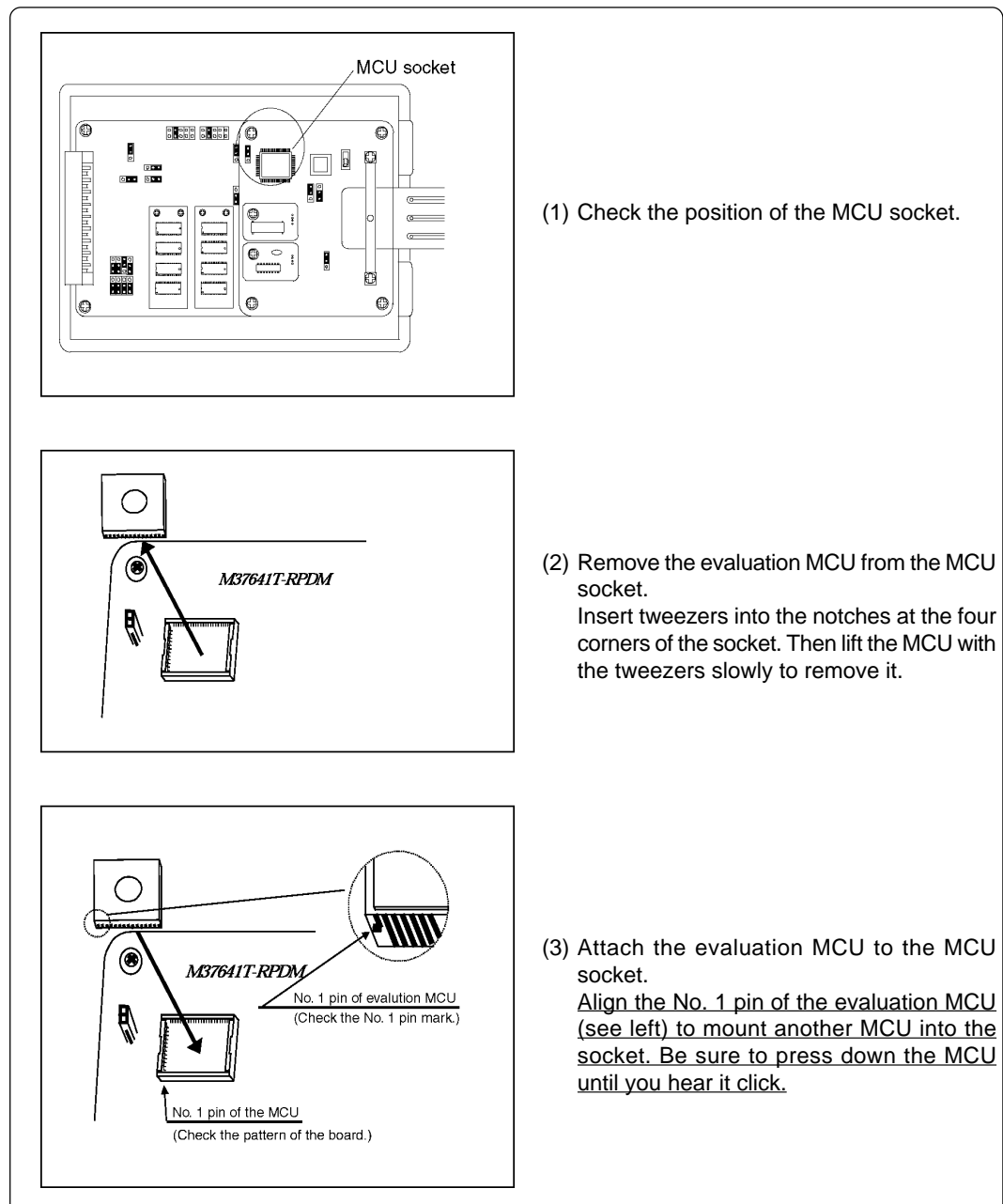


Figure 3.2 Replacing the evaluation MCU

### 3.3 Switch Settings

Figure 3.3 shows the positions of the switches and Table 3.1 shows each switch setting.

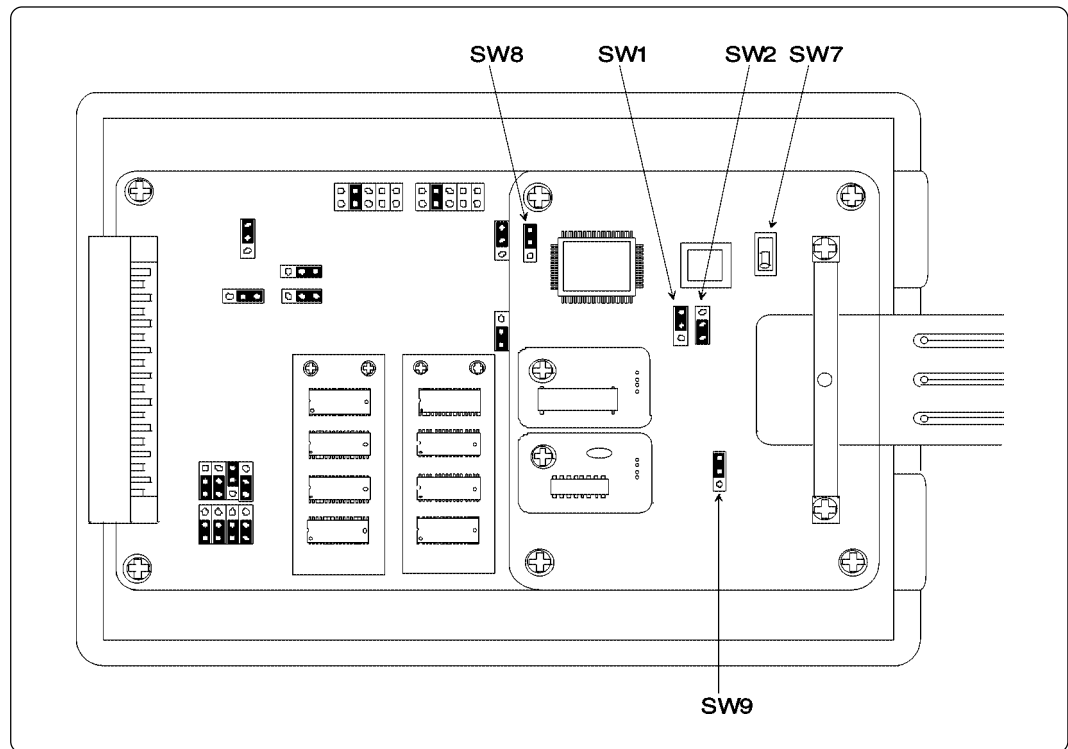
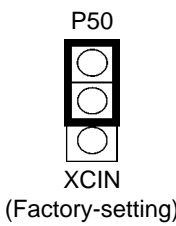
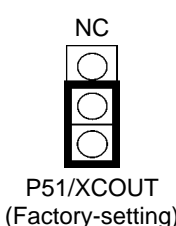
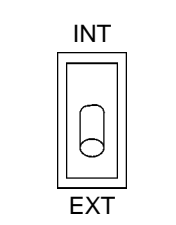
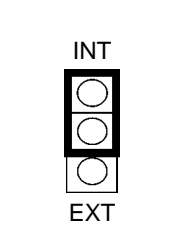
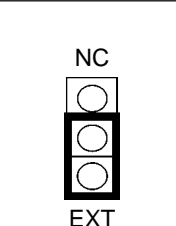


Figure 3.3 Positions of the switches and their factory-settings

- \* Switches SW3 to SW6 have not been mounted. These switches cannot be used.
- \* For the circuit configuration of the switches, refer to "5.2 Connection Diagrams" (page 47).

Table 3.1 Switch settings of the M3764IT2-RPD-E

Switch setting		Description	
SW1	 <p>P50 XCIN (Factory-setting)</p>	<p><b>P50 side</b> [Using as a port] When using pin P50/XCIN as a port, set to this side. [Using as a sub-clock] When using P50/XCIN as a sub-clock and selecting the XCIN oscillator circuit on the target board, set to this side.</p>	<p><b>XCIN side</b> [Using as a sub-clock] When using pin P50/XCIN as a sub-clock and selecting the XCIN oscillator circuit OSC-2 in the emulation pod, set to XCIN side.</p>
SW2	 <p>NC P51/XCOUT (Factory-setting)</p>	<p><b>P51/XCOUT side</b> Connects pin XCOUT/P51 to the target system.</p>	<p><b>NC side</b> Does not connects pin XCOUT/P51 to the target system. Pin XCOUT/P51 is open.</p>
SW7	 <p>INT EXT (Factory-setting)</p>	<p><b>EXT side</b> [Using the USB connector on the target board] When connecting pins USB D+ and USB D- via the flexible cable, set to this side. With this setting, pins USB D+ and USB D- are not connected to the USB connector in the emulation pod.</p>	<p><b>INT side</b> [Using the USB connector in the emulation pod] When connecting pins USB D+ and USB D- to the USB connector in the emulation pod, set to this side. With this setting, pins USB D+ and USB D- are not connected to the flexible cable.</p>
SW8	 <p>INT EXT (Factory-setting)</p>	<p><b>INT side</b> Does not output pin Ext. Cap to the target system. Pin Ext. Cap is open.</p>	<p><b>EXT side</b> To connect pin Ext. Cap to the target system, set to this side.</p>
SW9	 <p>NC EXT (Factory-setting)</p>	<p><b>NC side</b> Does not output the clock (pin XOUT) to the target system. Pin XOUT is open.</p>	<p><b>EXT side</b> Outputs the clock (pin XOUT) to the target system.</p>

### 3.4 Connecting USB-related Signals

This section explains emulation pod specifications for each USB-related pin.

#### (1) Pins D+ and D-

In the factory-setting, electrical characteristics differ from those of the actual MCU because of the flexible cable between the emulation MCU and target system. If there are problems with electrical characteristics because of the flexible cable, the USB connector on the emulation pod can be used.

- Connecting to the target system via the flexible cable (factory-setting)

Set SW7 of the emulation pod to EXT side. The connection to the target system is shown in Figure 3.4 below.

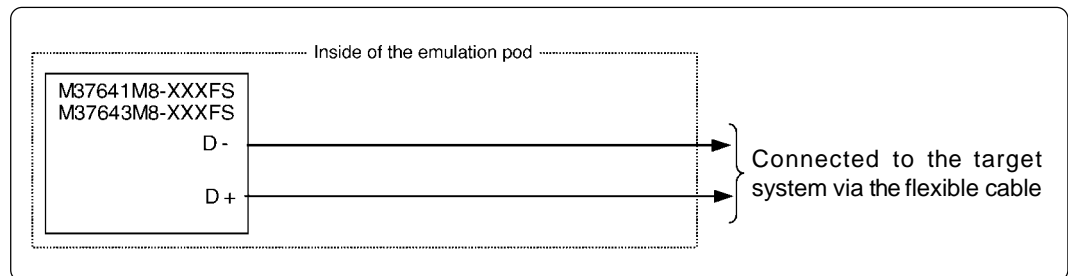


Figure 3.4 Connecting pins D+ and D- (SW7 = EXT)

- Using the USB connector

Set SW7 of the emulation pod to INT side. Then, connect the USB cable to the USB connector in the emulation pod. The connection to the target system is shown in Figure 3.5 below.

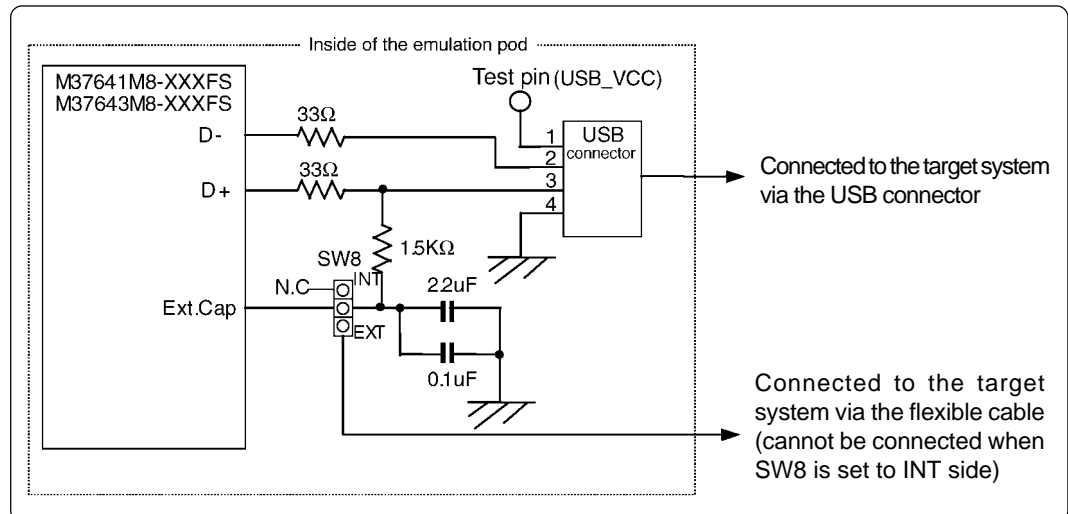


Figure 3.5 Connecting pins D+ and D- (SW7 = INT)

## IMPORTANT

### Notes on the USB Connector:

- Pin 1 of the USB connector connects only to the test pin (USB\_VCC) located near the USB connector.
- When the USB connector is used, pins D+ and Ext. Cap are connected in the emulation pod through a 1.5K resistance.

## (2) Pin Ext. Cap

In the factory-setting, the emulation pod processes the pin and does not connect it to the target system.

- When the emulation pod processes the pin (factory-setting)

Set SW8 of the emulation pod to INT side. The connection in the emulation pod is shown in Figure 3.6 below.

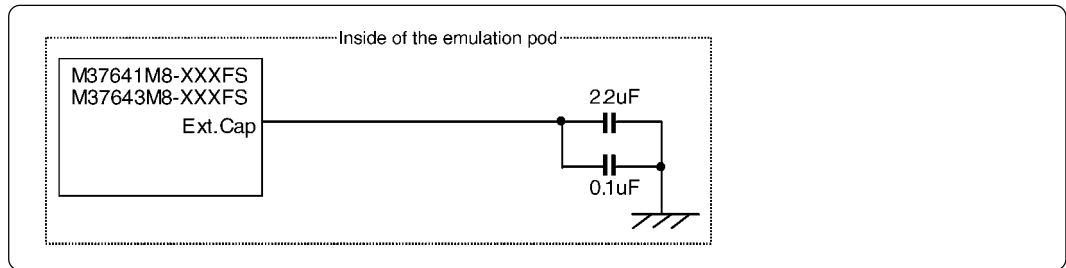


Figure 3.6 Connecting pin Ext. Cap (SW8 = INT)

- When Connecting to the target system

Set SW8 of the emulation pod to EXT side. The connection to the target system is shown in Figures 3.7 and 3.8 below.

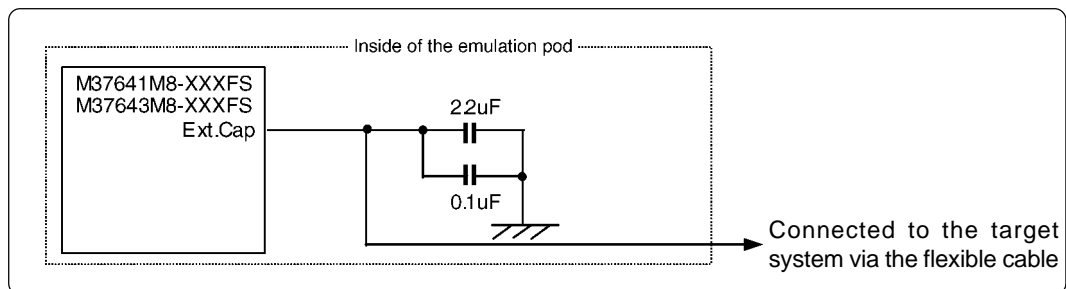


Figure 3.7 Connecting pin Ext. Cap (SW7 = EXT, SW8 = EXT)

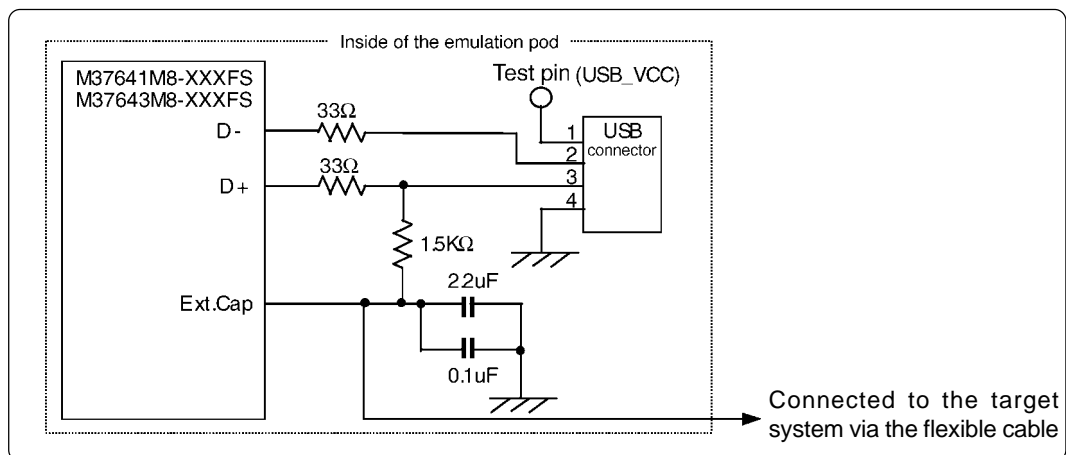


Figure 3.8 Connecting pin Ext. Cap (SW7 = INT, SW8 = EXT)

### (3) Pins LPF, AVss and AVcc

These pins are processed in the emulation pod, and not connected to the target system. The connection in the emulation pod is shown in Figure 3.9 below.

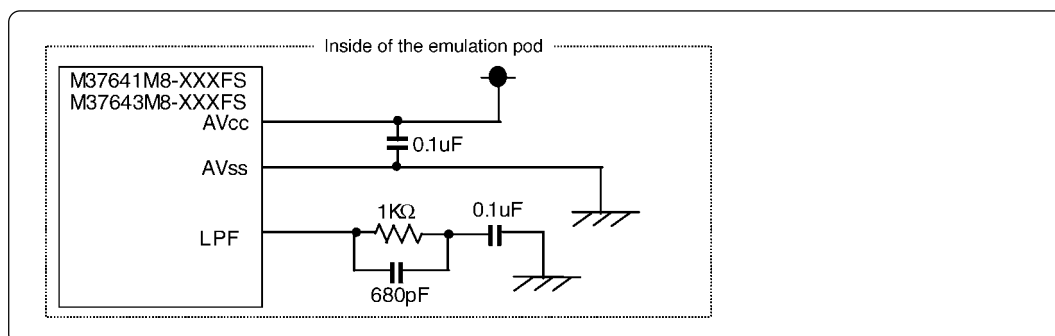


Figure 3.9 Connecting pins LPF, AVss and AVcc

## IMPORTANT

### Note on Connecting USB-related Pins:

- Pins LPF, AVss and AVcc are not connected to the target system.

## 3.5 Selecting Clock Supply

There are two ways to supply a clock to the MCU, using the oscillator circuit in the emulation pod or using the oscillator circuit on the target system. Table 3.2 shows the factory-settings of each clock supply.

Table 3.2 Clock supply to the MCU

Clock	Description	Display of emulator debugger	Factory-setting
XIN-XOUT	Oscillator circuit in the emulation pod (OSC-3: 24 MHz)	Internal	Yes
	Target system	External	-
XCIN-XCOUT	Oscillator circuit in the emulation pod (OSC-2: 32.768 kHz)	*1	-
	Target system	*1	Yes

\*1 Emulator debugger settings are inactive. The clock supply source can be selected with the emulation pod switches.

## IMPORTANT

### Note on Changing Clock Supply:

- The clock supply can be set by the Init dialog box when starting up the emulator debugger or inputting CLK command on the script window.

Example 1. When selecting the oscillator circuit in the emulation pod  
CLK INT

Example 2. When selecting the oscillator circuit on the target system  
CLK EXT

## (1) Using the Oscillator Circuit on the Target System

When you turn on the power supply, the internal clock of the emulation pod is selected to supply the clock to the MCU. To use the external clock on the target system, change the clock by the CLK command of the emulator debugger. (For details, refer to the user's manual of the emulator debugger.)

### IMPORTANT

#### Notes on the External Clock:

- Make note that in the oscillator circuit shown in Figure 3.11 where a resonator is connected between pins X<sub>IN</sub> and X<sub>OUT</sub>, oscillation does not occur because a flexible cable, buffer IC and other devices are used between the evaluation MCU and the target system.
- Make note that in the oscillator circuit shown in Figure 3.11 where a resonator is connected between pins X<sub>CIN</sub> and X<sub>COU</sub>T, oscillation does not occur because a flexible cable, buffer IC and other devices are used between the evaluation MCU and the target system.
- To operate the emulation pod with an external clock, construct the oscillator circuit as shown in Figure 3.10 in the target system and input the oscillator output at 50% duty (within the operating range of the evaluation MCU) into pins X<sub>IN</sub> and X<sub>CIN</sub>. And pins X<sub>OUT</sub> and X<sub>COU</sub>T should be open.

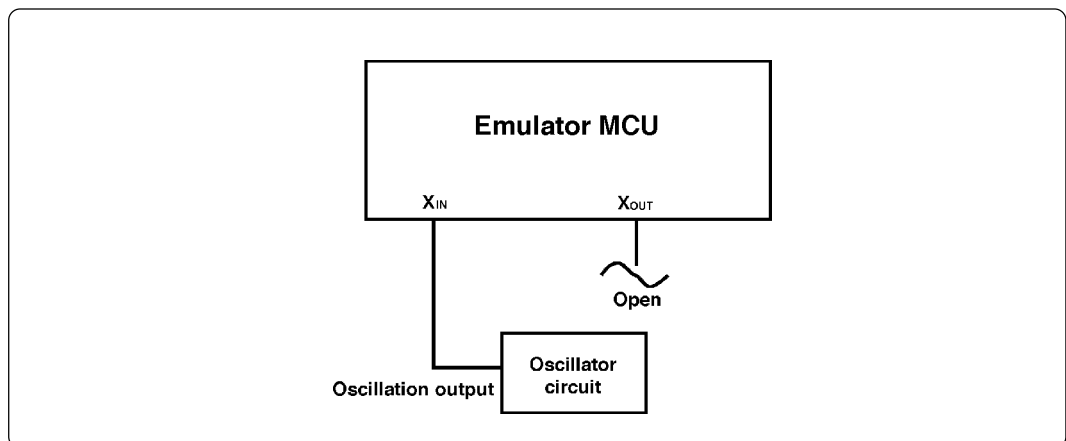


Figure 3.10 External oscillator circuit

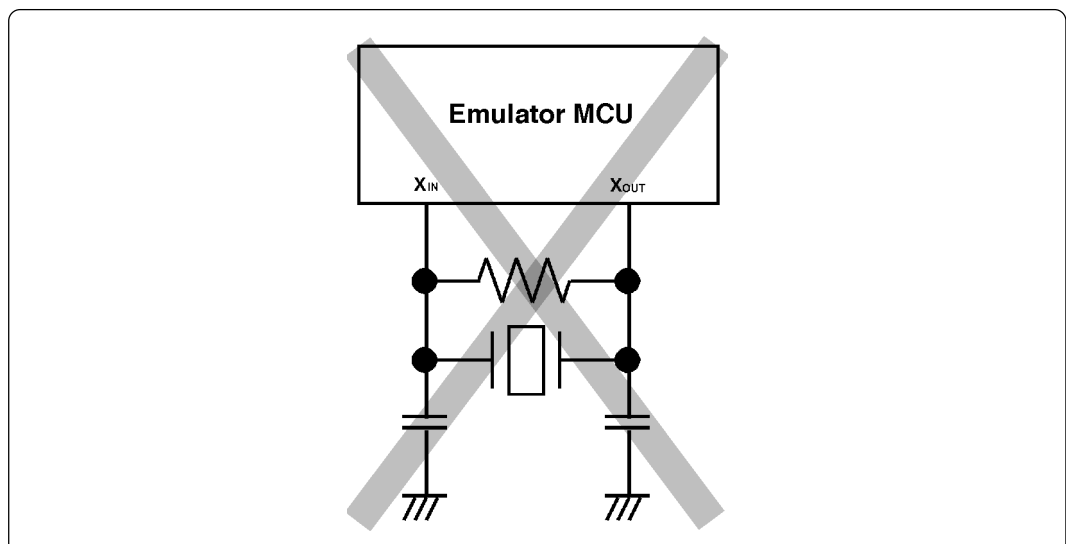


Figure 3.11 Circuit in which oscillation does not occur (same for X<sub>CIN</sub>-X<sub>COU</sub>T)

## (2) Changing the Oscillator Circuit in the Emulation Pod

Oscillator circuit boards for 24 MHz (for XIN) and 32.768 kHz (for XCIN) are mounted in this product. To use the emulation pod at a frequency other than 24 MHz or 32.768 kHz, build the desired oscillator circuit on the included oscillator circuit board OSC-2 (bare board) and replace the board installed in the emulation pod when shipped from the factory.

Figure 3.12 shows a view of oscillator circuit board OSC-2 (bare board) and where connector pins are located. Figure 3.13 shows the circuitry of oscillator circuit board OSC-2 (bare board). Use the number of oscillator circuits recommended by the oscillator manufacturer.

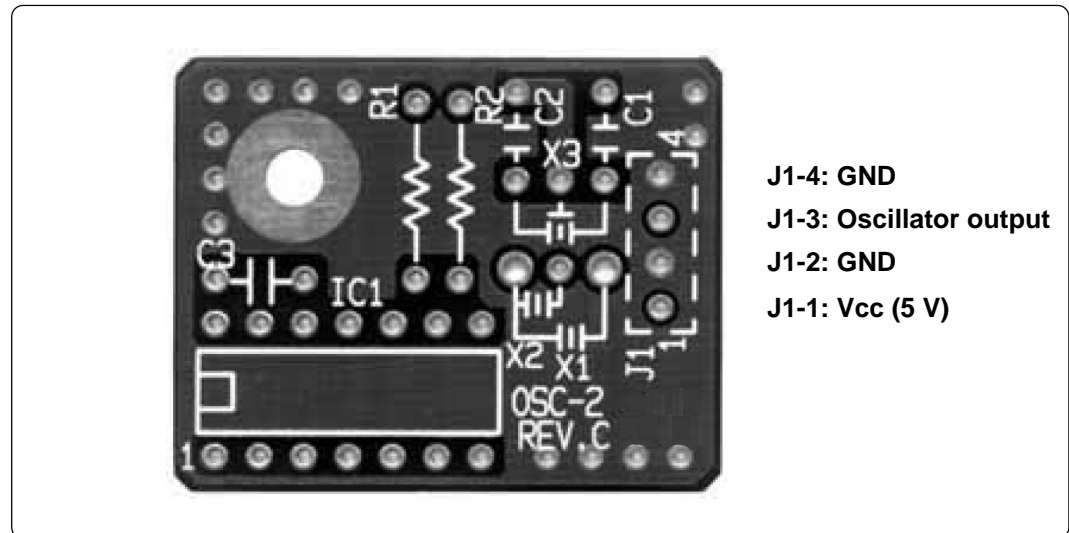


Figure 3.12 External view of oscillator board OSC-2 and connector pin assignments

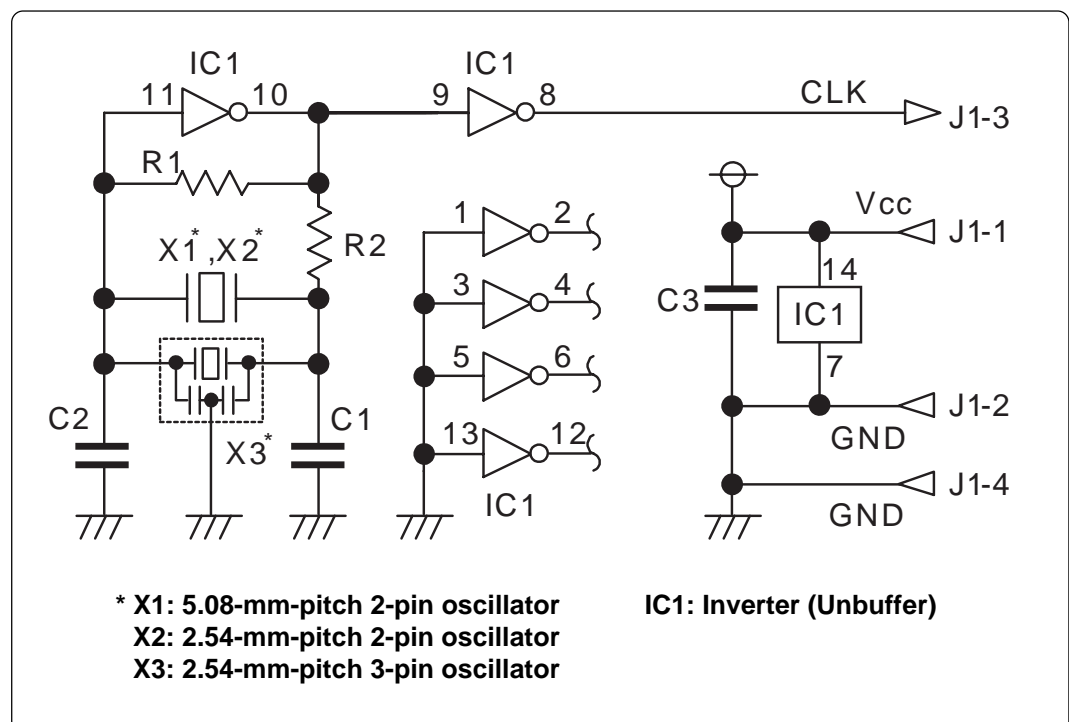


Figure 3.13 Circuit of oscillator board OSC-2



### (3) Replacing the Oscillator Circuit Boards

Figure 3.14 shows how to replace the oscillator circuit boards. For the position of the oscillator circuit board, see "Figure 2.2 Internal view of the emulation pod" (page 21).

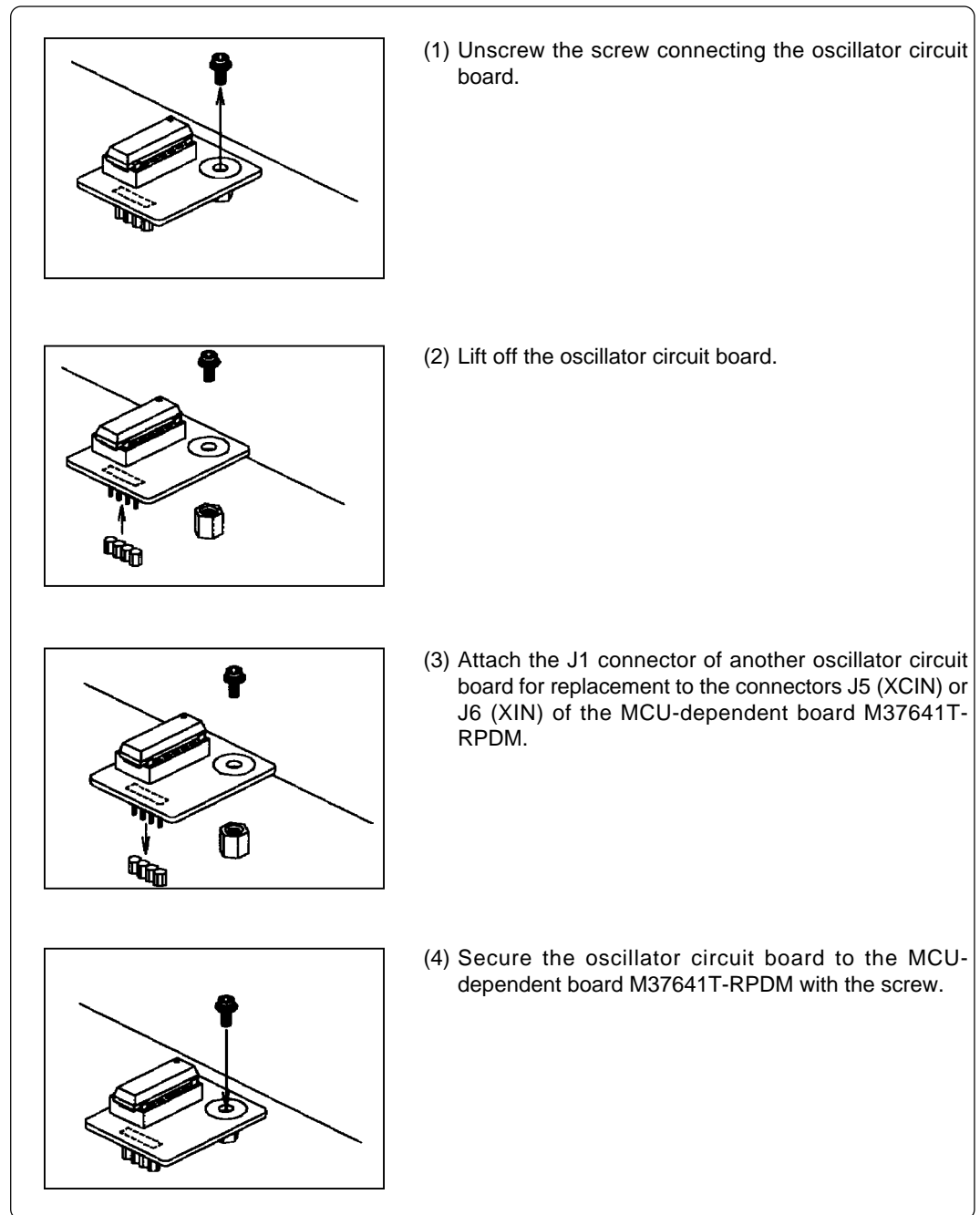


Figure 3.14 Replacing the oscillator circuit boards

### 3.6 Connecting the PC4701 and Emulation Pod

To connect the emulation pod to the PC4701, use 120-pin flexible cable FLX120-RPD included with this product package. Connect the PC4701 side connector of the FLX120-RPD to the cable connector of the PC4701, then secure with the two screws.

#### (1) Connecting the Cable to the PC4701

Figure 3.15 shows how to connect the PC4701 and FLX120-RPD.

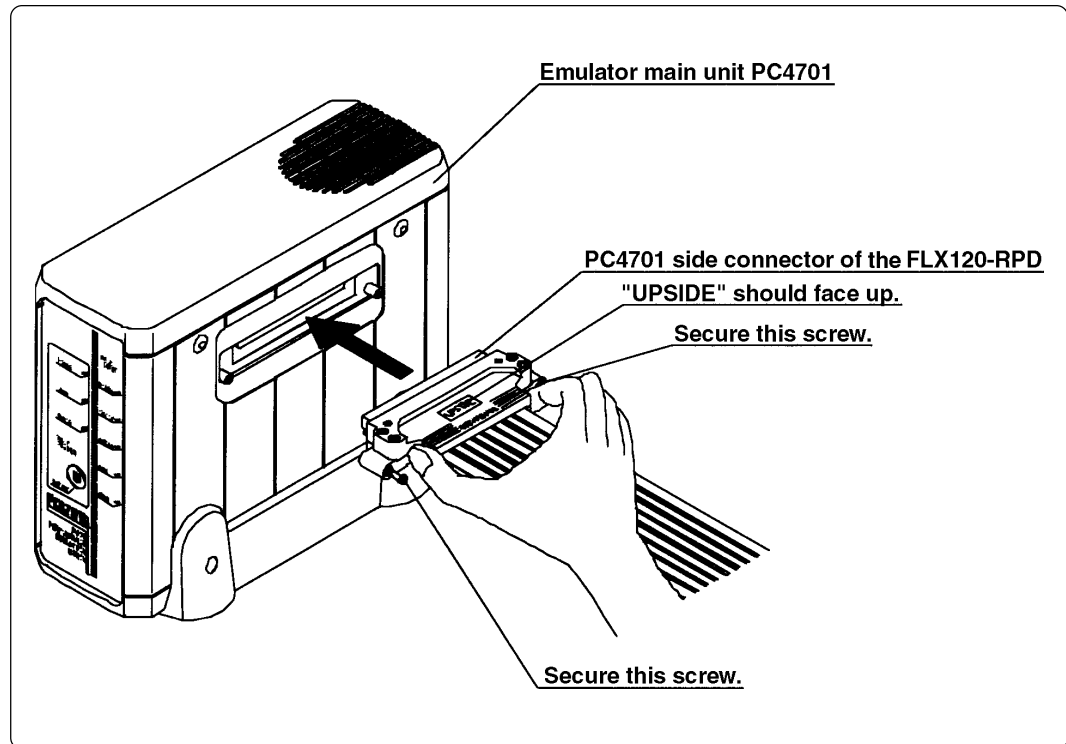


Figure 3.15 Connecting the PC4701 and FLX120-RPD

## CAUTION

### Notes on Connecting the Cable:

- To connect the FLX120-RPD, be sure to hold the both sides of the PC4701 side connector horizontally with the "UPSIDE" facing up.
- Always shut OFF power before connecting the FLX120-RPD. Otherwise internal circuits can be destroyed.

### Note on Securing the Screws:

- After connecting the FLX120-RPD to the PC4701, be sure to secure the screws mounted in both sides of the connector.

## (2) Connecting the Cable to the Emulation Pod

Figure 3.16 shows how to connect the FLX120-RPD and the emulation pod.

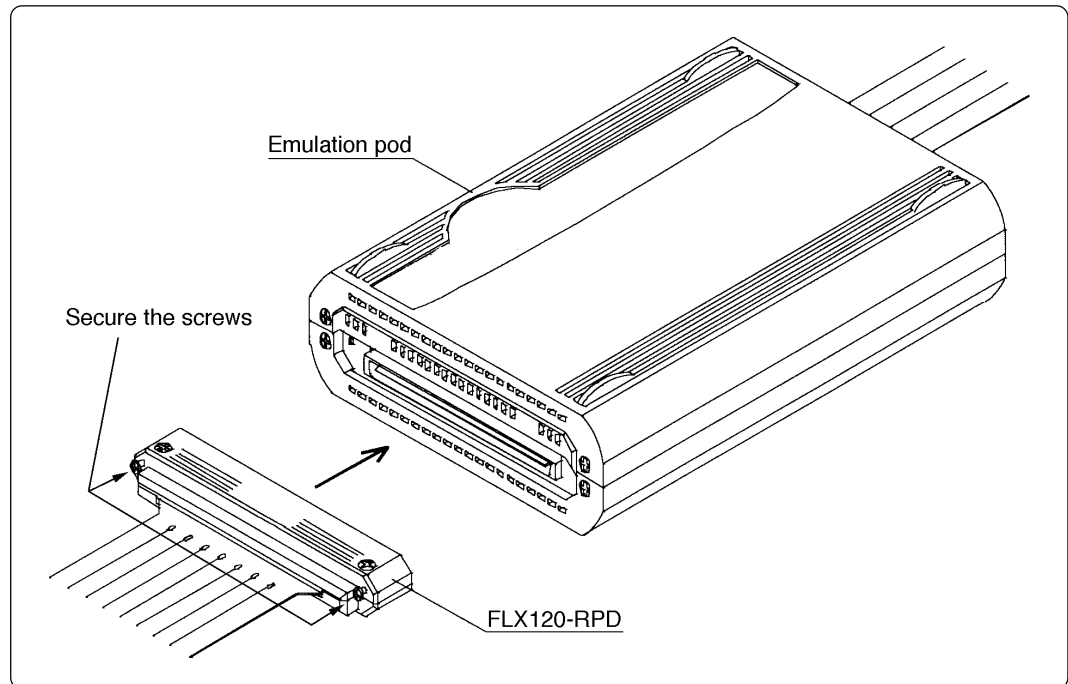


Figure 3.16 Connecting the emulation pod and FLX120-RPD

### CAUTION

#### Note on Connecting the Cable:

- Always shut OFF power before connecting the cable. Otherwise internal circuits can be destroyed.

#### Note on Securing the Screws:

- After connecting the emulation pod to the cable, be sure to secure the screws.

### 3.7 Connecting the Target System

You can connect the emulation pod to the target system as shown in Figure 3.17 below.

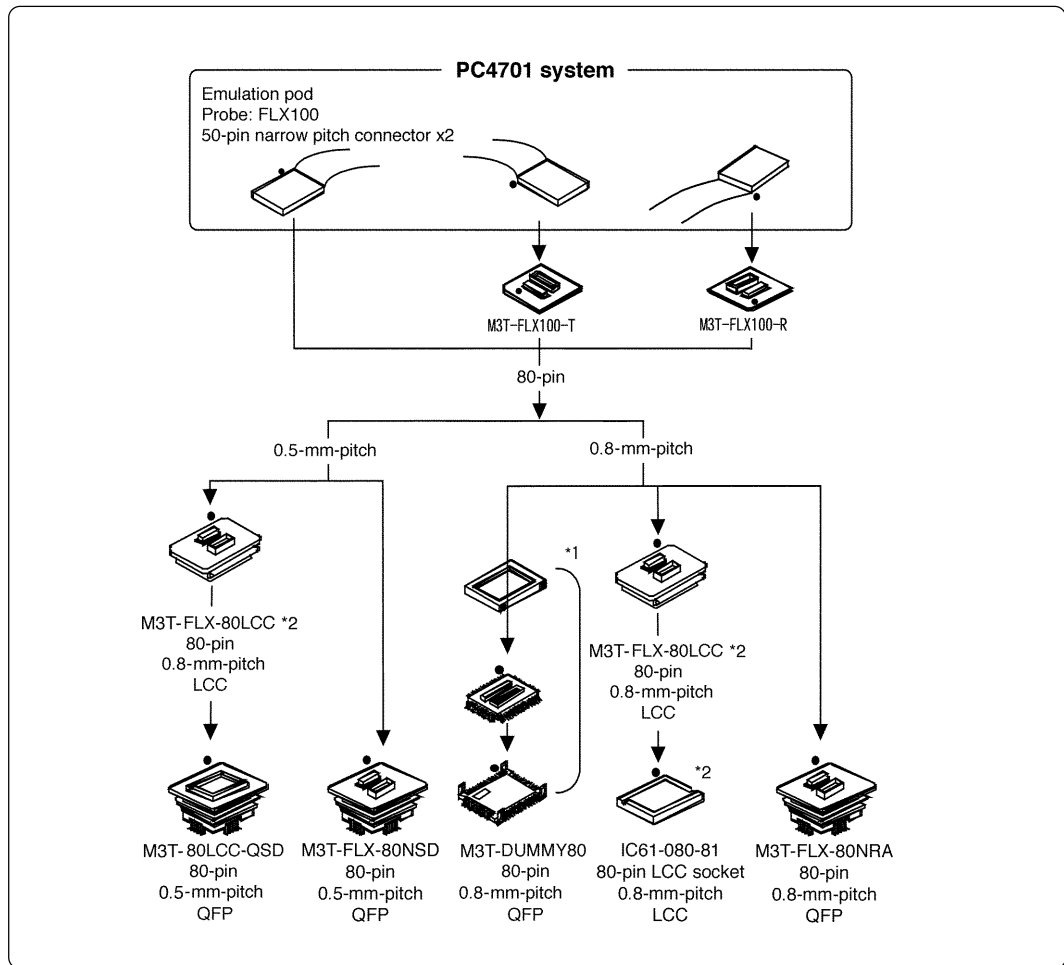


Figure 3.14 Connecting the emulation pod and target system

\*1 These three items are available in one package.

\*2 The M3T-FLX-80LCC and IC61-080-81 are included in this emulation pod package.

\* To purchase the M3T-FLX100-T, M3T-FLX100-R, M3T-80LCC-QSD, M3T-DUMMY80, M3T-FLX-80NSD, M3T-FLX-80NRA and M3T-FLX-80NSD, contact your local distributor.

\* The IC61-080-81 is a product of Yamaichi Electronics Co., Ltd. For purchasing it or for technical information, contact Yamaichi Electronics Co., Ltd. (<http://www.yamaichi.co.jp/e/index.shtml>)

## ⚠ CAUTION

### Notes on Connecting the Target System:

- Always shut OFF power before connecting the target system. Otherwise internal circuits can be destroyed.
- Take care not to attach the converter board in a wrong direction. It may cause a fatal damage to the emulation pod.

# Chapter 4. Usage

This chapter describes from turning on the power of this product to starting up the emulator debugger.

4.1	Turning On the Power .....	38
	(1) Checking the Connections of the Emulator System .....	38
	(2) Turning On the Power .....	38
	(3) LED Display When the PC4701 Starts Up Normally .....	39
4.2	Downloading Firmware .....	40
	(1) When It is Necessary to Download Firmware .....	40
	(2) Downloading Firmware in Maintenance Mode .....	40
4.3	Starting Up Emulator Debugger (Init Dialog Box Settings) .....	41
	(1) Settings in the CLOCK Tab .....	41
	(2) Settings in the MCU Tab .....	42
4.4	Self-check .....	42
	(1) Self-check Procedure .....	42
	(2) If an Error is Detected in the Self-check .....	42

# Chapter 4. Usage

## 4.1 Turning On the Power

### (1) Checking the Connections of the Emulator System

Before turning the power ON, check the connection of the PC4701, emulation pod, converter board and target system.

### (2) Turning On the Power

Power ON/OFF the target system and PC4701 as simultaneously as possible.

## CAUTION

### Notes on Power Supply:

- The emulator's pin  $V_{CC}$  is connected to the target system in order to monitor target system voltage. For this reason, **the emulator cannot supply power to the target system**. Therefore, provide the target system with a separate power supply from that of the emulator.
- Keep target system power supply voltage within the MCU's specified range and **between +3.0 and 3.6 V or between +4.5 and 5.25 V**.
- Do not change the voltage of power supply once the system is activated.

### (3) LED Display When the PC4701 Starts Up Normally

After the emulator starts up, check the status of the LEDs on the front panel to see whether emulation pod operation is enabled or not. Figure 4.1 shows the front panel LED lighting status when the emulator is turned ON.

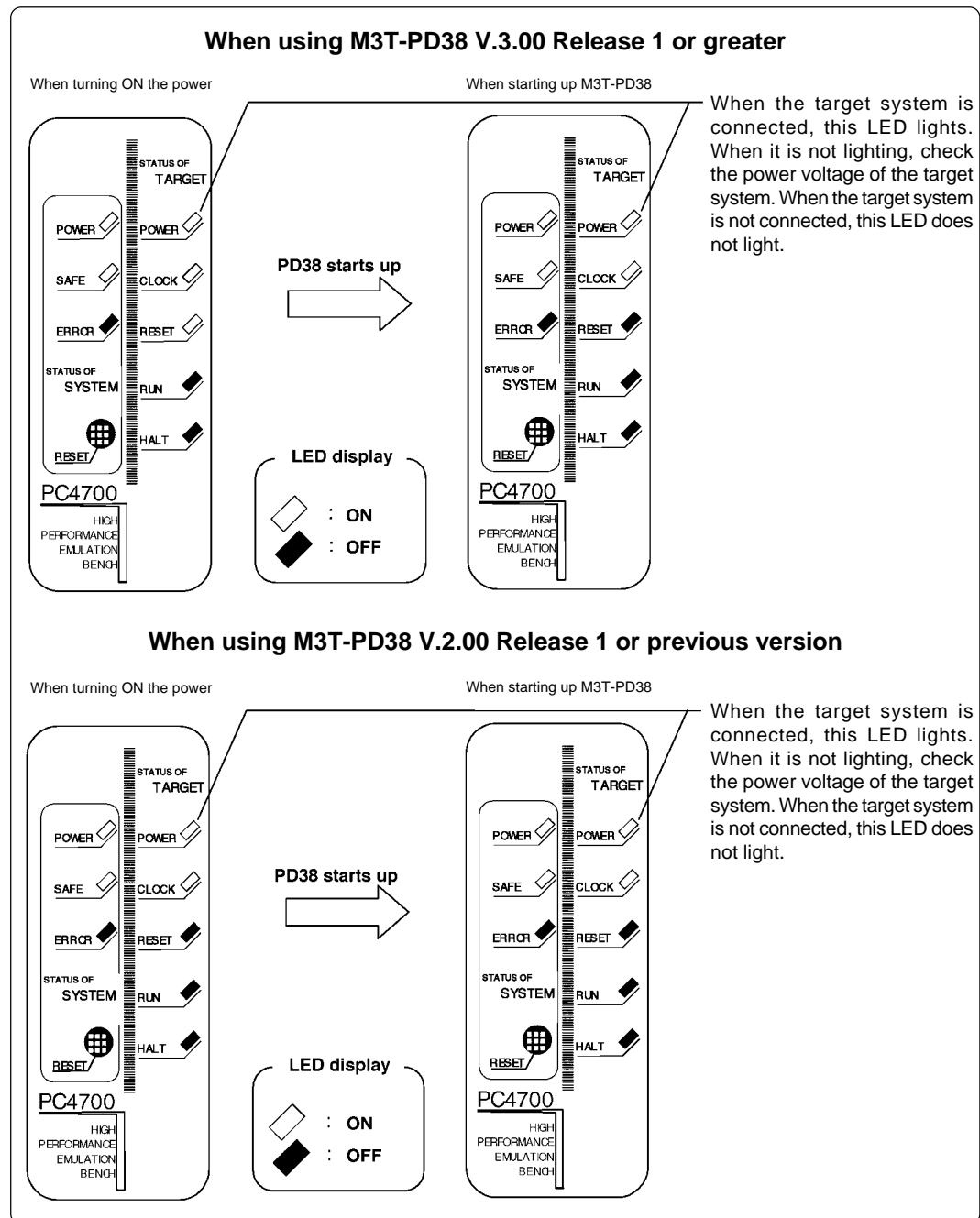


Figure 4.1 LED display when the power turned on

## 4.2 Downloading Firmware

### (1) When It is Necessary to Download Firmware

It is necessary to download firmware when:

- (1) you use this product for the first time.
- (2) firmware has been upgraded.
- (3) the emulator debugger has been upgraded.
- (4) you use this product with the PC4701 which was used with another emulation pod before.

### (2) Downloading Firmware in Maintenance Mode

Download firmware in maintenance mode as explained here following. **Do NOT connect the target system when downloading firmware.**

- (1) Within 2 seconds of activating power to the PC4701, press the RESET button on the emulator front panel. This will switch the emulator to maintenance mode.
- (2) Start the emulator debugger. When the Init dialog box setup is completed, the dialog which urges to download firmware will appear. Download firmware following the messages. Required time for downloading firmware depends on kind of interfaces.
  - Serial interface: About 7 minutes
  - Parallel interface: About 30 seconds

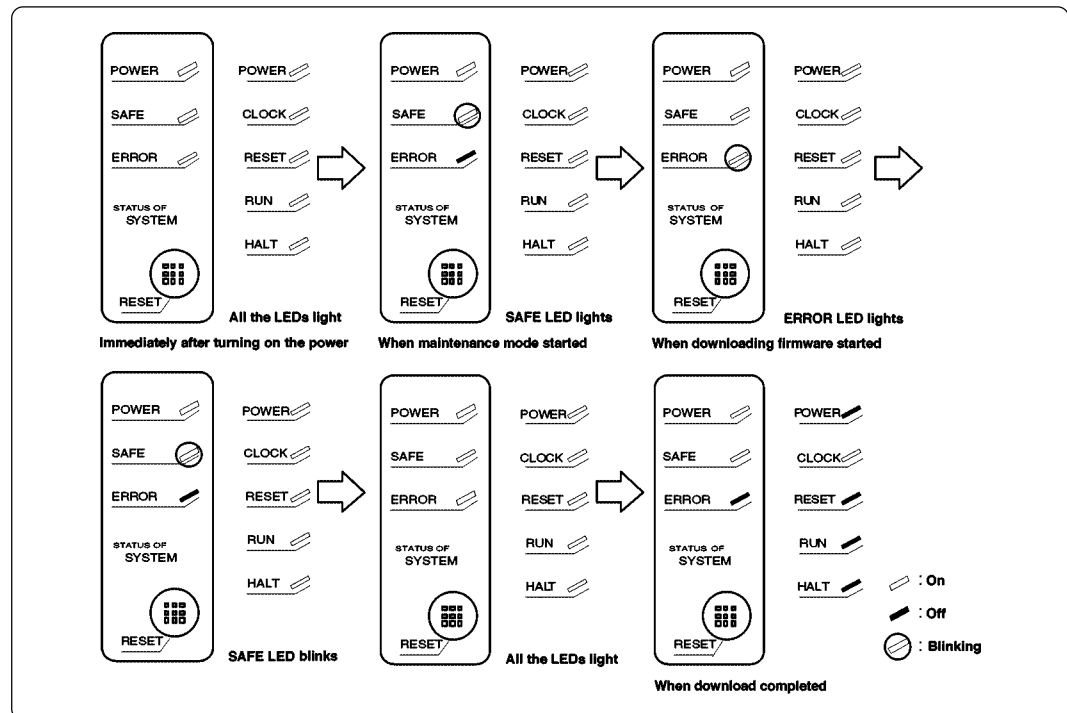


Figure 4.2 Downloading firmware in maintenance mode

## CAUTION

### Note on Downloading Firmware:

- Do not shut OFF power while firmware is being downloaded. Otherwise, the emulator will not start up properly. If power is shut OFF by mistake, redownload firmware in maintenance mode.



### 4.3 Starting Up Emulator Debugger (Init Dialog Box Settings)

The Init dialog box shown in Figure 4.3 will appear after starting up the emulator debugger. Here explains the settings in the MCU tab and Clock tab in the Init dialog box. The dialog box shown below is an example of the emulator debugger M3T-PD38 V.5.10 Release 2. For more details, refer to the M3T-PD38 User's Manual.

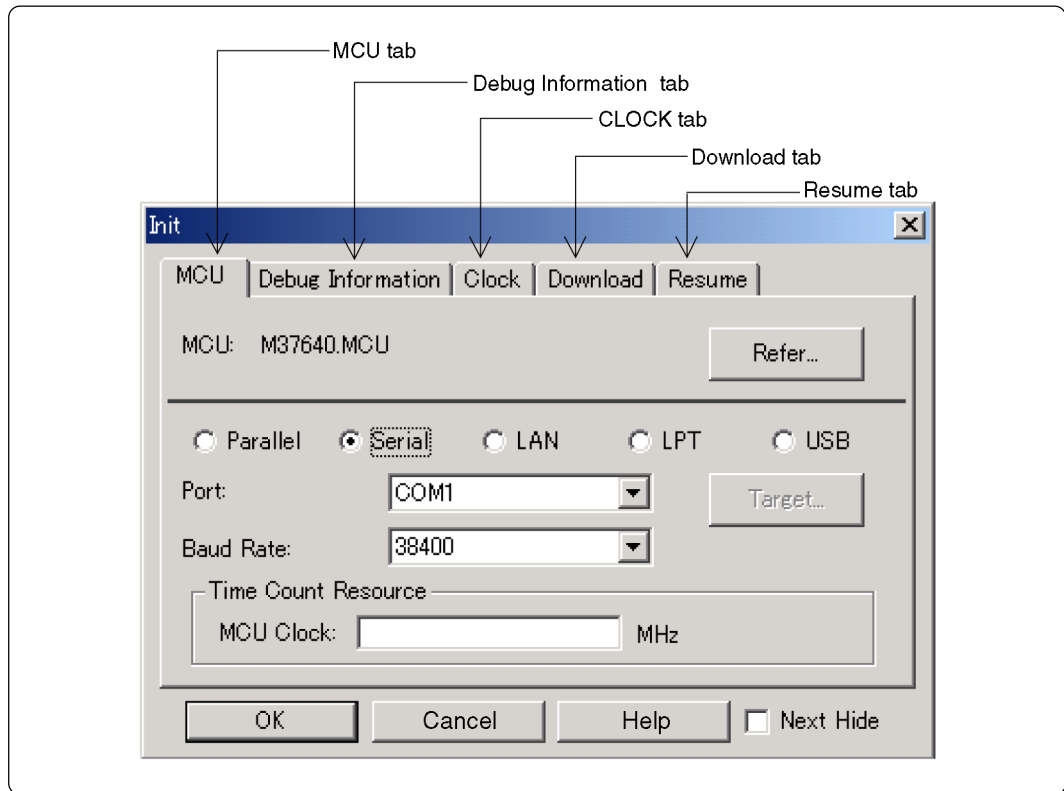
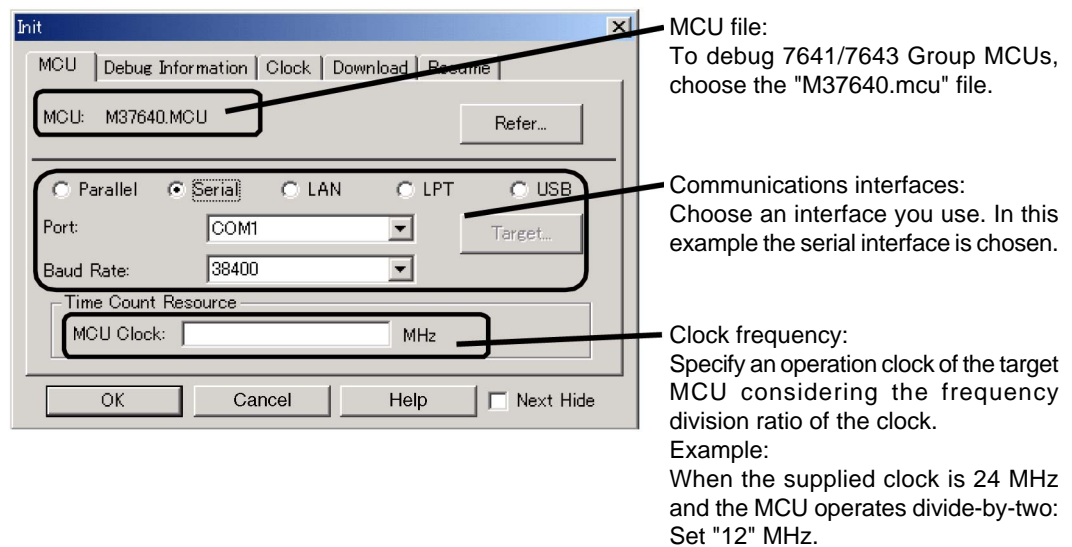
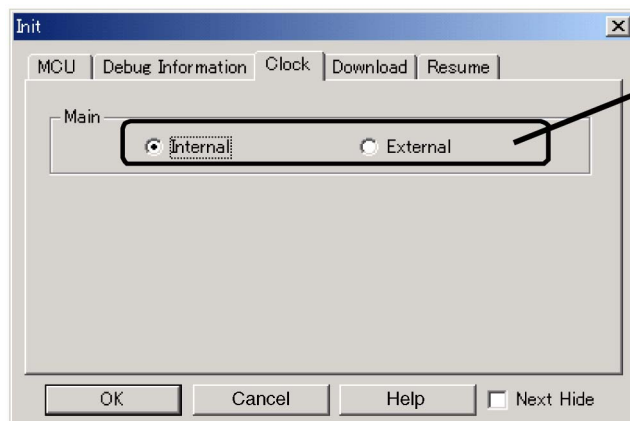


Figure 4.3 INIT dialog box

#### (1) Settings in the CLOCK Tab



## (2) Settings in the MCU Tab



Make the settings of the clock supply.  
Main  
Choose an clock supply for pin XIN.  
INTERNAL: Supplied from the oscillator circuit board of the emulation pod  
EXTERNAL: Supplied from an oscillator circuit of the target system

## 4.4 Self-check

### (1) Self-check Procedure

To use the self-check function of the PC4701, do so as explained here below. While the self-check is in progress, LEDs will change as shown in Figure 4.4.

- (1) Set the switches in the emulation pod same as the factory settings (see "Table 3.1 Switch settings of the M37641T2-RPD-E" on page 27).
- (2) When the target system is connected, disconnect it.
- (3) Within 2 seconds of activating power to the emulator, press the RESET button on the emulator front panel to switch the emulator to maintenance mode.
- (4) Check the "SAFE" LED starts flashing and then press the RESET button again.
- (5) The self-check will start. If the normal result is displayed in about 2 minutes, the self-check terminated normally.

### (2) If an Error is Detected in the Self-check

If the self-check does not result normally (ERROR 1 or ERROR 2 in Figure 4.4), do the following.

- Check the connection of the emulation pod and PC4701.
- Redownload firmware.
- Check if the switches in this product is set same as the factory-settings (see "3.3 Switch Settings" on page 26).

## CAUTION

### Note on the Self-check:

- If the self-check does not result normally (excluding errors of the target status), the emulation pod may be damaged. Contact your local distributor.

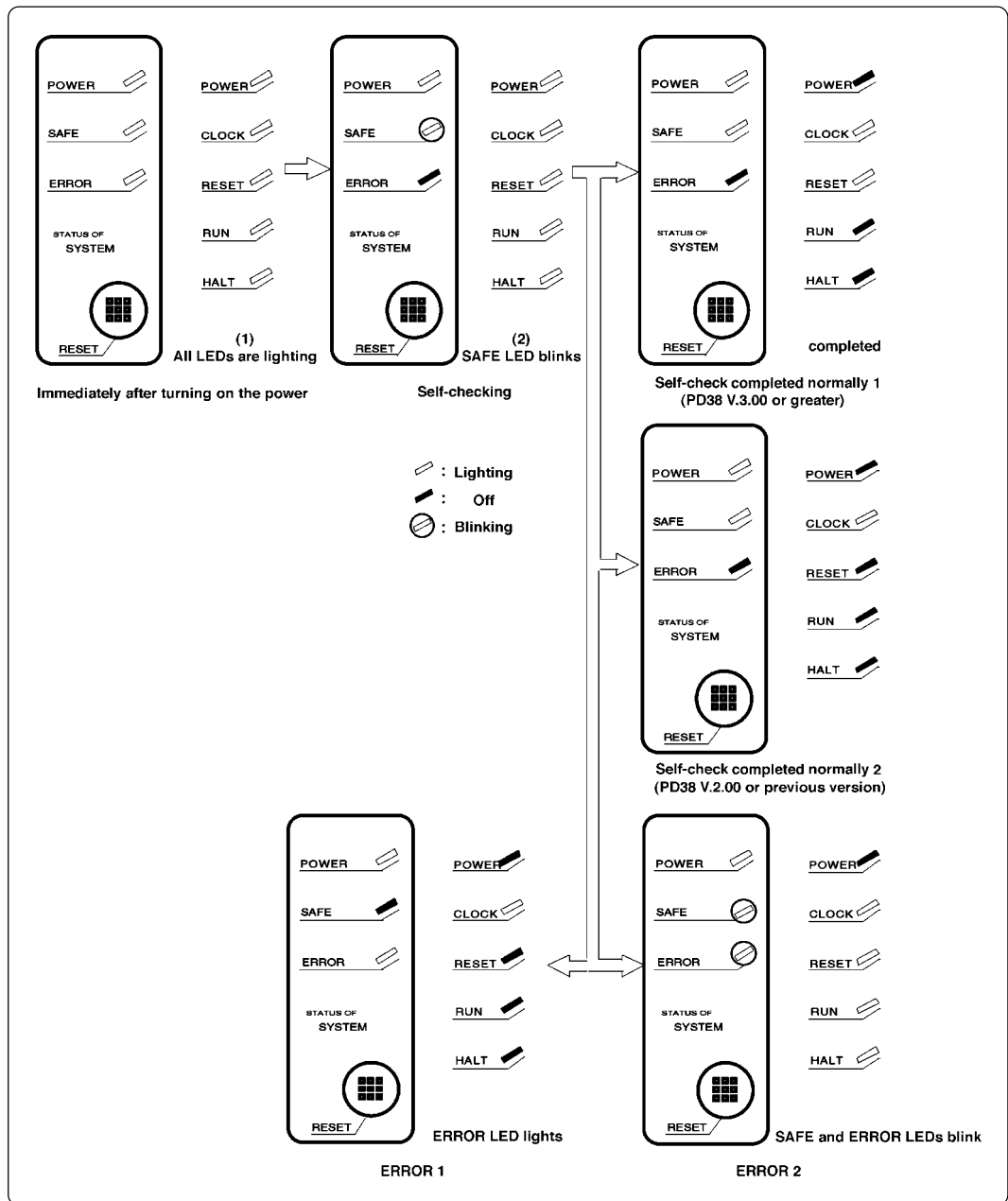


Figure 4.4 Self-check procedure

# MEMO

# Chapter 5. Specifications

This chapter describes specifications of this product.

5.1 Specifications .....	46
5.2 Connection Diagrams .....	47
5.3 Operation Timing .....	49
(1) Operation Timing When Using the Evaluation MCU (M37641M8-XXXFS) .....	49
(2) Operation Timing When Using the Evaluation MCU (M37643M8-XXXFS) .....	51
5.4 External Dimensions .....	55
(1) External Dimensions of the Emulation Pod .....	55
(2) External Dimensions of the Converter Board (M3T-FLX-80LCC) .....	56

# Chapter 5. Specifications

## 5.1 Specifications

Table 5.1 lists the specifications of the M37641T2-RPD-E.

*Table 5.1 Specifications of the M37641T2-RPD-E*

Emulator	PC4701	
Applicable MCU	7641 Group	M37641M8, M37641F8
	7643 Group	M37643M8, M37643F8
Evaluation MCU	7641 Group	M37641M8-XXXFS (premounted)
	7643 Group	M37643M8-XXXFS (included)
Usable modes	<ul style="list-style-type: none"> <li>• Single-chip mode</li> <li>• Memory expansion mode</li> <li>• Microprocessor mode</li> </ul>	
Emulation memory	Changeable 128 KB	
Maximum operating frequency	VCC = 3.0 to 3.6 V: Ø = 6 MHz (XIN = 24 MHz, divide-by-4), no-wait	
	VCC = 4.5 to 5.25 V: Ø = 12 MHz (XIN = 24 MHz, divide-by-2), no-wait	
Clock oscillator	XIN-XOUT	Internal oscillator circuit board (OSC-3: 24 MHz) Switchable to external oscillator input
	XCIN-XCOUT	Internal oscillator circuit board (OSC-2: 32.768 kHz) Switchable to external oscillator input
Operating frequency	3.0 to 3.6 V, 4.5 to 5.25 V	
Operating temperature	5 to 35°C (no dew)	
Storage temperature	-10 to 60°C (no dew)	
Power supply to emulation pod	Supplied from PC4701	
Connection to target system	(1) 80P6N-A (0.8-mm-pitch 80-pin QFP) (2) 80P6Q-A (0.5-mm-pitch 80-pin QFP) For how to connect the target system, see "3.7 Connecting the Target System" (page 36).	
Overseas standards	<ul style="list-style-type: none"> <li>• U.S. EMI standards (FCC part 15 Class A)</li> <li>• CE marking (EN55022, EN55024)</li> </ul>	



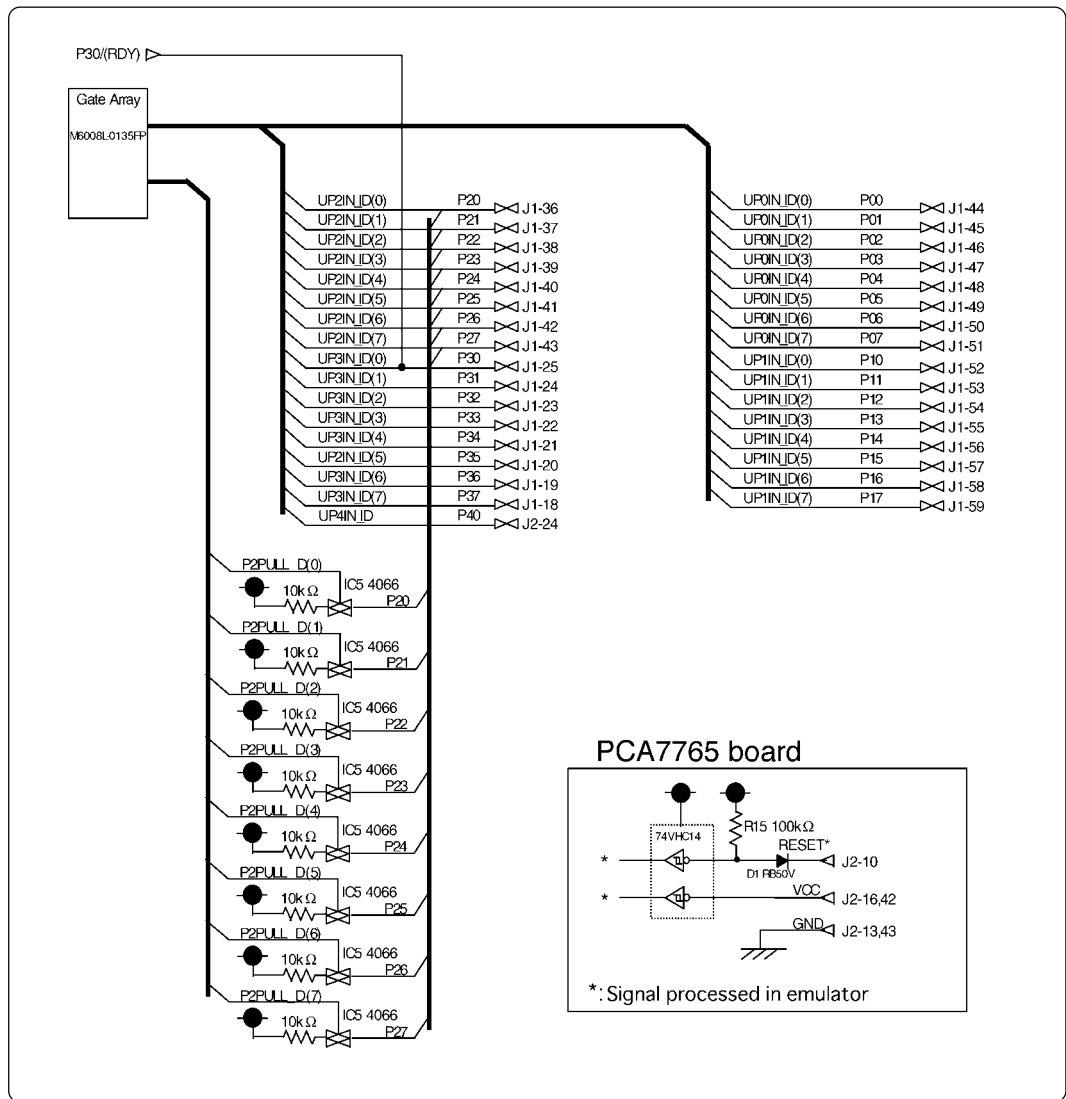


Figure 5.2 Connection diagram 2/2



### 5.3 Operation Timing

With this emulator system, ports P0 to P3 and P4<sub>0</sub> are connected via the emulation circuit. Therefore, I/O timing will differ from that of the actual MCU. Use the following as a reference when using the emulation pod.

#### (1) Operation Timing When Using the Evaluation MCU (M37641M8-XXXFS)

Table 5.2 Timing requirements and switching characteristics ( $V_{cc} = 5.0V$ ,  $\phi = 12\text{ MHz}$ )

Symbol	Item	Standard value				Unit
		Actual MCU		Emulator		
		Min.	Max.	Min.	Max.	
td ( $\phi$ -AH)	AB15 - AB8 delay time		31		32	ns
tv ( $\phi$ -AH)	AB15 - AB8 valid time	5		0		ns
td ( $\phi$ -AL)	AB7 - AB0 delay time		33		33	ns
tv ( $\phi$ -AL)	AB7 - AB0 valid time	5		0		ns
td ( $\phi$ -WR)	WR* delay time		6		15	ns
tv ( $\phi$ -WR)	WR* valid time	3		3		ns
td ( $\phi$ -RD)	RD* delay time		6		15	ns
tv ( $\phi$ -RD)	RD* valid time	3		3		ns
td ( $\phi$ -DMA)	DMAOUT delay time		25		25	ns
tv ( $\phi$ -DMA)	DMAOUT valid time	5		0		ns
tsu (RDY- $\phi$ )	RDY setup time	21		45		ns
th ( $\phi$ -RDY)	RDY hold time	0		0		ns
tsu (HOLD- $\phi$ )	HOLD* setup time	21		34		ns
th ( $\phi$ -HOLD)	HOLD* hold time	0		0		ns
td ( $\phi$ -HLDAL)	HLDA* "L" delay time		25		25	ns
td ( $\phi$ -HLDALH)	HLDA* "H" delay time		25		25	ns
tsu (DB- $\phi$ )	Data bus setup time	7		38		ns
th ( $\phi$ -DB)	Data bus hold time	0		0		ns
td ( $\phi$ -DB)	Data bus delay time		22		23	ns
tv ( $\phi$ -DB)	Data bus valid time	13		8		ns
td ( $\phi$ -EDMA)	EDMA* delay time		9		16	ns
tv ( $\phi$ -EDMA)	EDMA* valid time	4		0		ns
td (AH-WR)	Before WR* AB15 - AB8 valid time	$0.5 \cdot t_c(\phi) - 28$		$0.5 \cdot t_c(\phi) - 33$		ns
td (AL-WR)	Before WR* AB7 - AB0 valid time	$0.5 \cdot t_c(\phi) - 30$		$0.5 \cdot t_c(\phi) - 35$		ns
tv (WR-AH)	After WR* AB15 - AB8 valid time	0		-5		ns
tv (WR-AL)	After WR* AB7 - AB0 valid time	0		-5		ns
td (AH-RD)	Before RD* AB15 - AB8 valid time	$0.5 \cdot t_c(\phi) - 28$		$0.5 \cdot t_c(\phi) - 33$		ns
td (AL-RD)	Before RD* AB7 - AB0 valid time	$0.5 \cdot t_c(\phi) - 30$		$0.5 \cdot t_c(\phi) - 35$		ns
tv (RD-AH)	After RD* AB15 - AB8 valid time	0		-5		ns
tv (RD-AL)	After RD* AB7 - AB0 valid time	0		-5		ns
tsu (RDY-WR)	Before WR* RDY setup time	27		47		ns
th (WR-RDY)	After WR* RDY hold time	0		0		ns
tsu (RDY-RD)	Before RD* RDY setup time	27		47		ns
th (RD-RDY)	After RD* RDY hold time	0		0		ns
tsu (DB-RD)	Before RD* data bus setup time	13		40		ns
th (RD-DB)	After RD* data bus hold time	0		0		ns
td (WR-DB)	Before WR* data bus delay time		20		25	ns
tv (WR-DB)	After WR* data bus valid time	10		3		ns
tv (WR-EDMA)	After WR* EDMA* delay time	2		2		ns
tv (RD-EDMA)	After RD* EDMA* delay time	2		2		ns

Table 5.3 Timing requirements and switching characteristics ( $V_{cc} = 3.0\text{ V}$ ,  $\phi = 6\text{ MHz}$ )

Symbol	Item	Standard value				Unit
		Actual MCU		Emulator		
		Min.	Max.	Min.	Max.	
td ( $\phi$ -AH)	AB15 - AB8 delay time		45		51	ns
tv ( $\phi$ -AH)	AB15 - AB8 valid time	7		3		ns
td ( $\phi$ -AL)	AB7 - AB0 delay time		47		52	ns
tv ( $\phi$ -AL)	AB7 - AB0 valid time	7		3		ns
td ( $\phi$ -WR)	WR* delay time		8		15	ns
tv ( $\phi$ -WR)	WR* valid time	4		4		ns
td ( $\phi$ -RD)	RD* delay time		8		15	ns
tv ( $\phi$ -RD)	RD* valid time	3		3		ns
td ( $\phi$ -DMA)	DMAOUT delay time		26		32	ns
tv ( $\phi$ -DMA)	DMAOUT valid time	9		5		ns
tsu (RDY- $\phi$ )	RDY setup time	35		68		ns
th ( $\phi$ -RDY)	RDY hold time	0		0		ns
tsu (HOLD- $\phi$ )	HOLD* setup time	21		34		ns
th ( $\phi$ -HOLD)	HOLD* hold time	0		0		ns
td ( $\phi$ -HLDAL)	HLDA* "L" delay time		30		30	ns
td ( $\phi$ -HLDALH)	HLDA* "H" delay time		30		30	ns
tsu (DB- $\phi$ )	Data bus setup time	9		49		ns
th ( $\phi$ -DB)	Data bus hold time	0		0		ns
td ( $\phi$ -DB)	Data bus delay time		30		36	ns
tv ( $\phi$ -DB)	Data bus valid time	15		8		ns
td ( $\phi$ -EDMA)	EDMA* delay time		12		29	ns
tv ( $\phi$ -EDMA)	EDMA* valid time	8		7		ns
td (AH-WR)	Before WR* AB15 - AB8 valid time	$0.5 \cdot t_{c(\phi)} - 33$		$0.5 \cdot t_{c(\phi)} - 34$		ns
td (AL-WR)	Before WR* AB7 - AB0 valid time	$0.5 \cdot t_{c(\phi)} - 35$		$0.5 \cdot t_{c(\phi)} - 35$		ns
tv (WR-AH)	After WR* AB15 - AB8 valid time	0		-5		ns
tv (WR-AL)	After WR* AB7 - AB0 valid time	0		-5		ns
td (AH-RD)	Before RD* AB15 - AB8 valid time	$0.5 \cdot t_{c(\phi)} - 33$		$0.5 \cdot t_{c(\phi)} - 41$		ns
td (AL-RD)	Before RD* AB7 - AB0 valid time	$0.5 \cdot t_{c(\phi)} - 35$		$0.5 \cdot t_{c(\phi)} - 43$		ns
tv (RD-AH)	After RD* AB15 - AB8 valid time	0		-5		ns
tv (RD-AL)	After RD* AB7 - AB0 valid time	0		-5		ns
tsu (RDY-WR)	Before WR* RDY setup time	45		83		ns
th (WR-RDY)	After WR* RDY hold time	0		0		ns
tsu (RDY-RD)	Before RD* RDY setup time	45		76		ns
th (RD-RDY)	After RD* RDY hold time	0		0		ns
tsu (DB-RD)	Before RD* data bus setup time	18		56		ns
th (RD-DB)	After RD* data bus hold time	0		0		ns
td (WR-DB)	Before WR* data bus delay time		28		29	ns
tv (WR-DB)	After WR* data bus valid time	12		3		ns
tv (WR-EDMA)	After WR* EDMA* delay time	3		3		ns
tv (RD-EDMA)	After RD* EDMA* delay time	3		3		ns

## (2) Operation Timing When Using the Evaluation MCU (M37643M8-XXXFS)

Table 5.4 Timing requirements and switching characteristics ( $V_{cc} = 5.0V$ ,  $\phi = 12\text{ MHz}$ )

Symbol	Item	Standard value				Unit
		Actual MCU		Emulator		
		Min.	Max.	Min.	Max.	
td ( $\phi$ -AH)	AB15 - AB8 delay time		31		32	ns
tv ( $\phi$ -AH)	AB15 - AB8 valid time	0		-5		ns
td ( $\phi$ -AL)	AB7 - AB0 delay time		33		33	ns
tv ( $\phi$ -AL)	AB7 - AB0 valid time	0		-5		ns
td ( $\phi$ -WR)	WR* delay time		6		15	ns
tv ( $\phi$ -WR)	WR* valid time	0		-3		ns
td ( $\phi$ -RD)	RD* delay time		6		15	ns
tv ( $\phi$ -RD)	RD* valid time	0		-3		ns
td ( $\phi$ -DMA)	DMAOUT delay time		25		25	ns
tv ( $\phi$ -DMA)	DMAOUT valid time	0		0		ns
tsu (RDY- $\phi$ )	RDY setup time	21		45		ns
th ( $\phi$ -RDY)	RDY hold time	0		0		ns
tsu (HOLD- $\phi$ )	HOLD* setup time	21		34		ns
th ( $\phi$ -HOLD)	HOLD* hold time	0		0		ns
td ( $\phi$ -HLDAL)	HLDA* "L" delay time		25		25	ns
td ( $\phi$ -HLDALH)	HLDA* "H" delay time		25		25	ns
tsu (DB- $\phi$ )	Data bus setup time	7		38		ns
th ( $\phi$ -DB)	Data bus hold time	0		0		ns
td ( $\phi$ -DB)	Data bus delay time		22		23	ns
tv ( $\phi$ -DB)	Data bus valid time	13		8		ns
td ( $\phi$ -EDMA)	EDMA* delay time		12		19	ns
tv ( $\phi$ -EDMA)	EDMA* valid time	4		0		ns
td (AH-WR)	Before WR* AB15 - AB8 valid time	$0.5 \cdot t_{c(\phi)} - 28$		$0.5 \cdot t_{c(\phi)} - 33$		ns
td (AL-WR)	Before WR* AB7 - AB0 valid time	$0.5 \cdot t_{c(\phi)} - 30$		$0.5 \cdot t_{c(\phi)} - 35$		ns
tv (WR-AH)	After WR* AB15 - AB8 valid time	0		-5		ns
tv (WR-AL)	After WR* AB7 - AB0 valid time	0		-5		ns
td (AH-RD)	Before RD* AB15 - AB8 valid time	$0.5 \cdot t_{c(\phi)} - 28$		$0.5 \cdot t_{c(\phi)} - 33$		ns
td (AL-RD)	Before RD* AB7 - AB0 valid time	$0.5 \cdot t_{c(\phi)} - 30$		$0.5 \cdot t_{c(\phi)} - 35$		ns
tv (RD-AH)	After RD* AB15 - AB8 valid time	0		-5		ns
tv (RD-AL)	After RD* AB7 - AB0 valid time	0		-5		ns
tsu (RDY-WR)	Before WR* RDY setup time	27		47		ns
th (WR-RDY)	After WR* RDY hold time	0		0		ns
tsu (RDY-RD)	Before RD* RDY setup time	27		47		ns
th (RD-RDY)	After RD* RDY hold time	0		0		ns
tsu (DB-RD)	Before RD* data bus setup time	13		40		ns
th (RD-DB)	After RD* data bus hold time	0		0		ns
td (WR-DB)	Before WR* data bus delay time		20		25	ns
tv (WR-DB)	After WR* data bus valid time	10		3		ns
tv (WR-EDMA)	After WR* EDMA* delay time	0		0		ns
tv (RD-EDMA)	After RD* EDMA* delay time	0		0		ns

Table 5.5 Timing requirements and switching characteristics ( $V_{cc} = 3.0\text{ V}$ ,  $\emptyset = 6\text{ MHz}$ )

Symbol	Item	Standard value				Unit
		Actual MCU		Emulator		
		Min.	Max.	Min.	Max.	
td ( $\emptyset$ -AH)	AB15 - AB8 delay time		45		51	ns
tv ( $\emptyset$ -AH)	AB15 - AB8 valid time	0		-4		ns
td ( $\emptyset$ -AL)	AB7 - AB0 delay time		47		52	ns
tv ( $\emptyset$ -AL)	AB7 - AB0 valid time	0		-4		ns
td ( $\emptyset$ -WR)	WR* delay time		8		15	ns
tv ( $\emptyset$ -WR)	WR* valid time	0		0		ns
td ( $\emptyset$ -RD)	RD* delay time		8		15	ns
tv ( $\emptyset$ -RD)	RD* valid time	0		0		ns
td ( $\emptyset$ -DMA)	DMAOUT delay time		26		32	ns
tv ( $\emptyset$ -DMA)	DMAOUT valid time	0		-4		ns
tsu (RDY- $\emptyset$ )	RDY setup time	35		68		ns
th ( $\emptyset$ -RDY)	RDY hold time	0		0		ns
tsu (HOLD- $\emptyset$ )	HOLD* setup time	21		34		ns
th ( $\emptyset$ -HOLD)	HOLD* hold time	0		0		ns
td ( $\emptyset$ -HLDAL)	HLDA* "L" delay time		30		30	ns
td ( $\emptyset$ -HLDALH)	HLDA* "H" delay time		30		30	ns
tsu (DB- $\emptyset$ )	Data bus setup time	9		49		ns
th ( $\emptyset$ -DB)	Data bus hold time	0		0		ns
td ( $\emptyset$ -DB)	Data bus delay time		30		36	ns
tv ( $\emptyset$ -DB)	Data bus valid time	15		8		ns
td ( $\emptyset$ -EDMA)	EDMA* delay time		15		32	ns
tv ( $\emptyset$ -EDMA)	EDMA* valid time	0		0		ns
td (AH-WR)	Before WR* AB15 - AB8 valid time	$0.5 \cdot t_{c(\emptyset)} - 33$		$0.5 \cdot t_{c(\emptyset)} - 34$		ns
td (AL-WR)	Before WR* AB7 - AB0 valid time	$0.5 \cdot t_{c(\emptyset)} - 35$		$0.5 \cdot t_{c(\emptyset)} - 35$		ns
tv (WR-AH)	After WR* AB15 - AB8 valid time	0		-5		ns
tv (WR-AL)	After WR* AB7 - AB0 valid time	0		-5		ns
td (AH-RD)	Before RD* AB15 - AB8 valid time	$0.5 \cdot t_{c(\emptyset)} - 33$		$0.5 \cdot t_{c(\emptyset)} - 41$		ns
td (AL-RD)	Before RD* AB7 - AB0 valid time	$0.5 \cdot t_{c(\emptyset)} - 35$		$0.5 \cdot t_{c(\emptyset)} - 43$		ns
tv (RD-AH)	After RD* AB15 - AB8 valid time	0		-5		ns
tv (RD-AL)	After RD* AB7 - AB0 valid time	0		-5		ns
tsu (RDY-WR)	Before WR* RDY setup time	45		83		ns
th (WR-RDY)	After WR* RDY hold time	0		0		ns
tsu (RDY-RD)	Before RD* RDY setup time	45		76		ns
th (RD-RDY)	After RD* RDY hold time	0		0		ns
tsu (DB-RD)	Before RD* data bus setup time	18		56		ns
th (RD-DB)	After RD* data bus hold time	0		0		ns
td (WR-DB)	Before WR* data bus delay time		28		29	ns
tv (WR-DB)	After WR* data bus valid time	12		3		ns
tv (WR-EDMA)	After WR* EDMA* delay time	0		0		ns
tv (RD-EDMA)	After RD* EDMA* delay time	0		0		ns

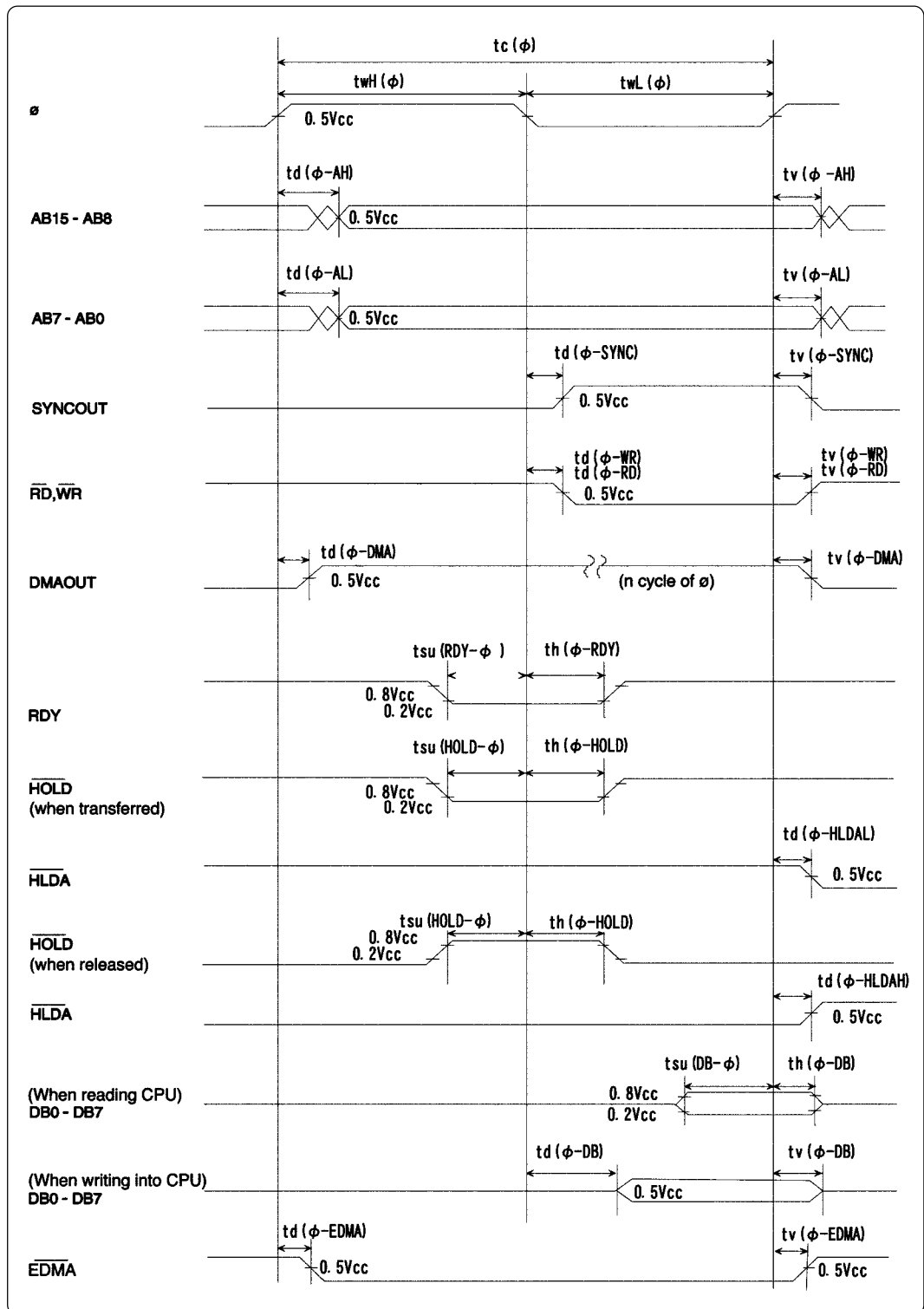


Figure 5.3 Bus timing 1/2

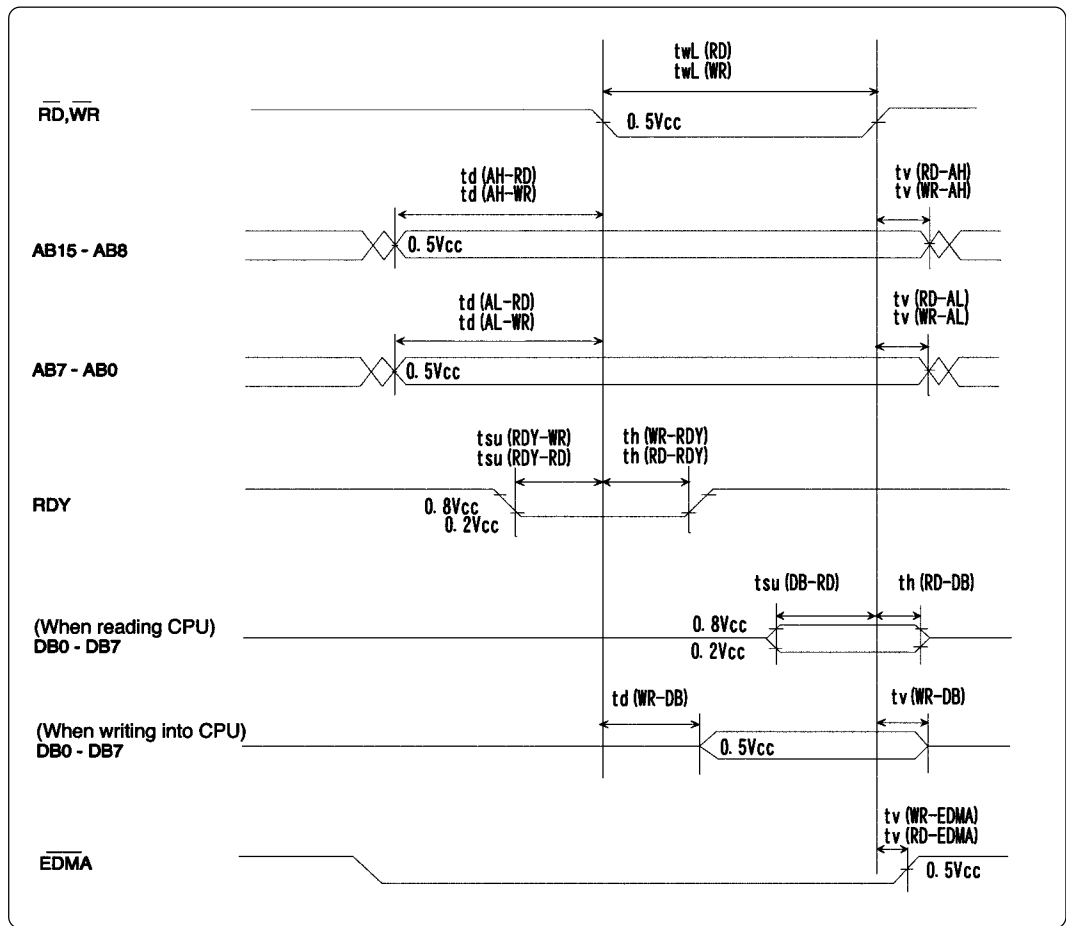


Figure 5.4 Bus timing 2/2

## 5.4 External Dimensions

### (1) External Dimensions of the Emulation Pod

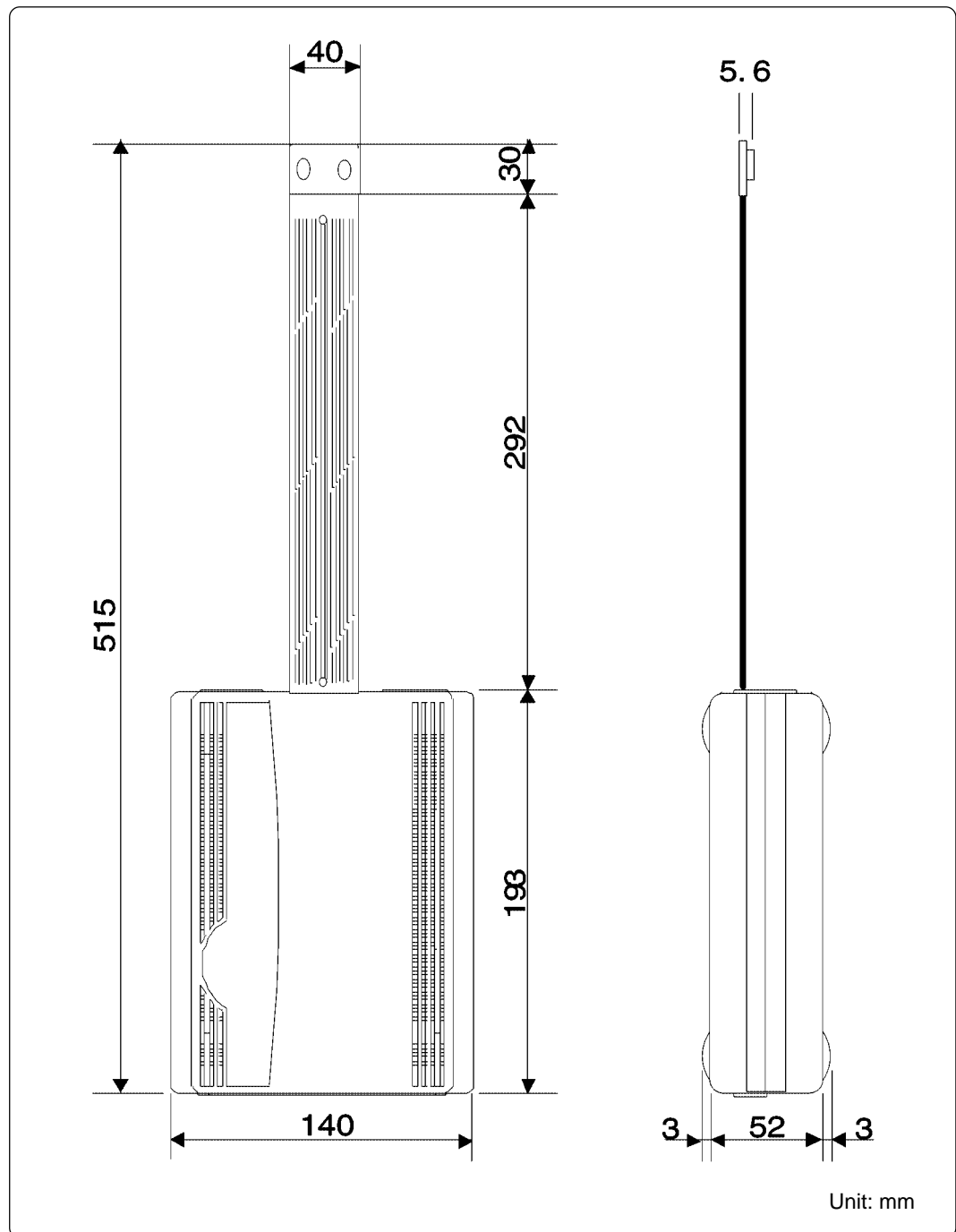


Figure 5.5 External dimensions of the emulation pod

## (2) External Dimensions of the Converter Board (M3T-FLX-80LCC)

Figure 5.6 shows the external dimensions of the converter board M3T-FLX-80LCC for 80-pin LCC (80P0).

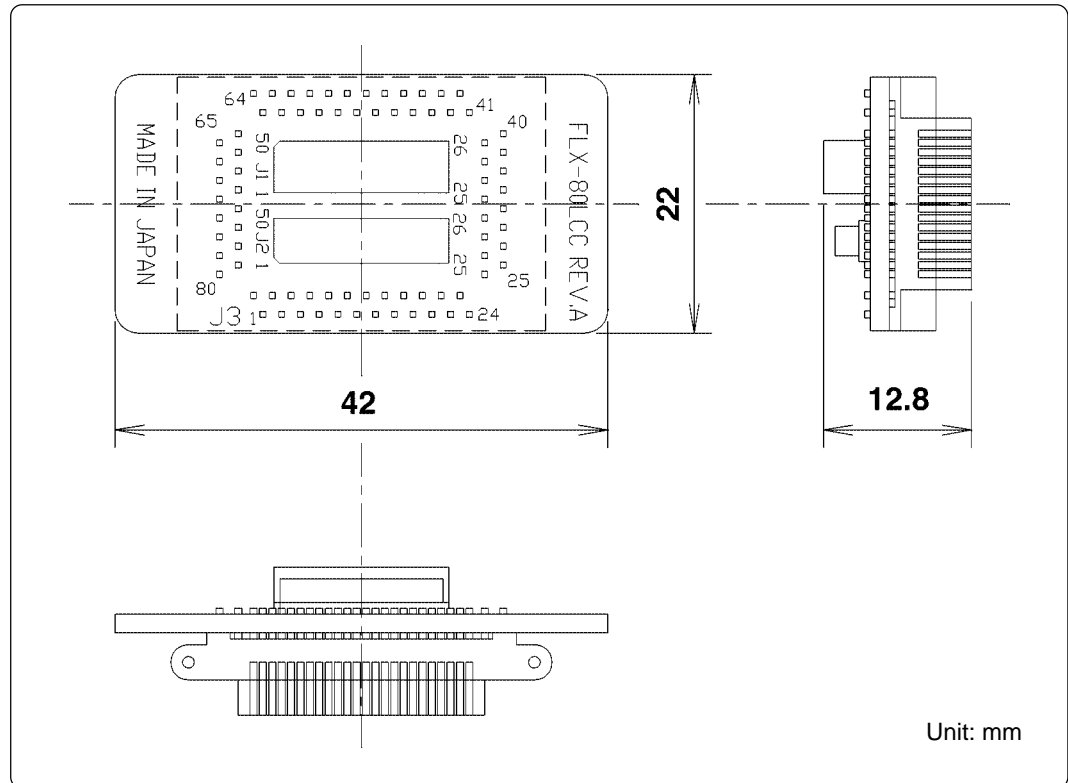


Figure 5.6 External dimensions of the converter board M3T-FLX-80LCC



# Chapter 6. Troubleshooting

This chapter describes how to troubleshoot when this product does not work properly.

6.1 Flowchart to Remedy Troubles .....	58
(1) When the LED Display of the PC4701 is Abnormal .....	59
(2) When the Init Dialog Box is Not Displayed .....	59
(3) When the Program Window is Not Displayed (Target System Not Connected).....	60
(4) When the Program Window is Not Displayed (Target System Connected).....	61
6.2 When the M37641T2-RPD-E Does Not Work Properly .....	62

# Chapter 6. Troubleshooting

## 6.1 Flowchart to Remedy Troubles

Figure 6.1 shows the Flowchart to Remedy Troubles from when power to the emulator is activated until emulator debugger M3T-PD38 starts up.

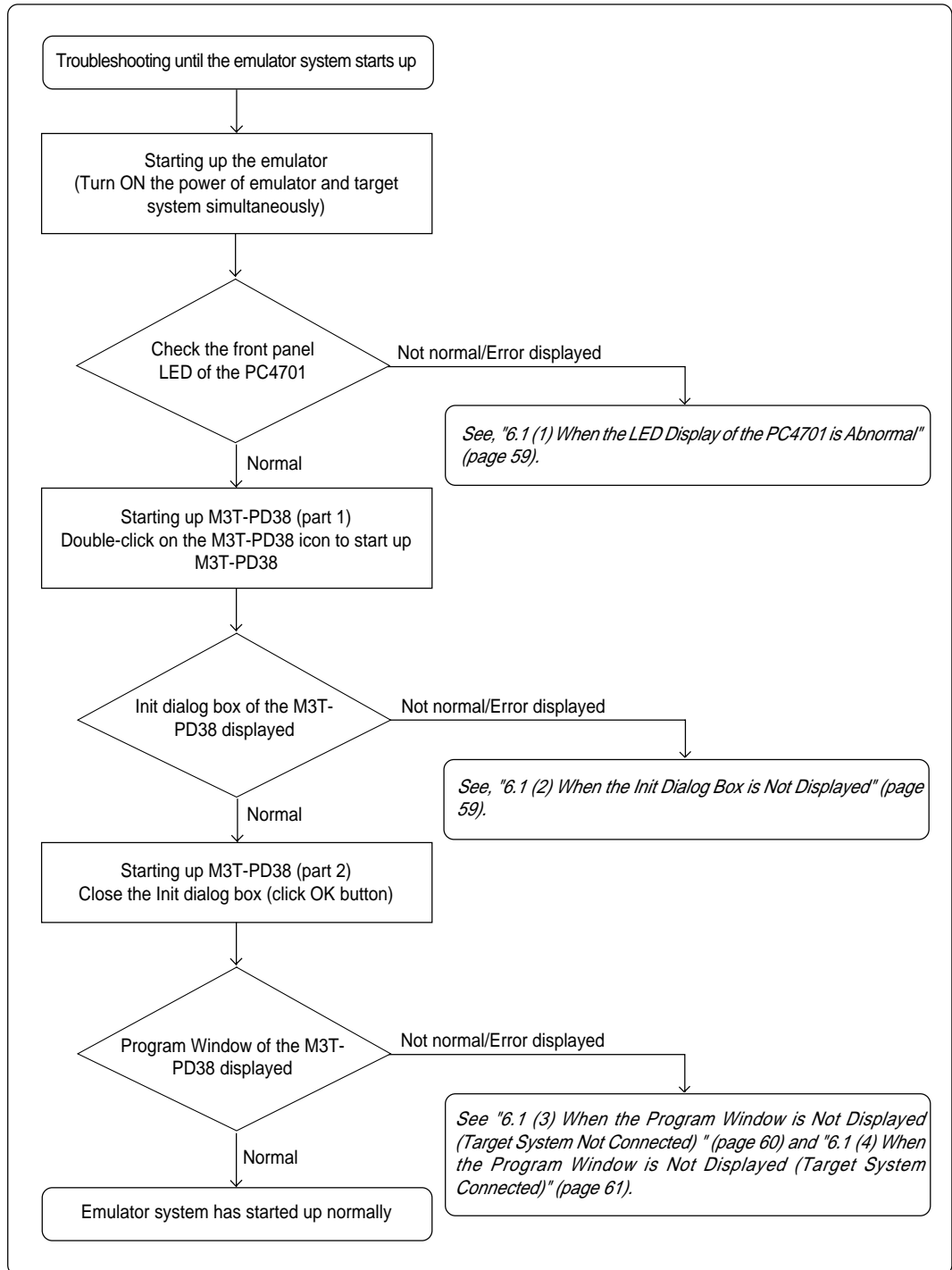


Figure 6.1 Troubleshooting when starting up the emulator system

## (1) When the LED Display of the PC4701 is Abnormal

Table 6.1 LED's abnormal display and checkpoints

Error	Connection to the target system	Checkpoint
LEDs do not light up.	-	Recheck the power cable is connected to the PC4701. <i>See the user's manual of the PC4701.</i>
All LEDs remain lit.	-	Recheck the connection between the PC4701 and this product. <i>See "3.6 Connecting the PC4701 and Emulation Pod" (page 34).</i>
The CLOCK LED of "STATUS OF TARGET" does not light up.	-	Check the oscillator circuit in the emulation pod has been installed correctly.
The POWER LED of "STATUS OF TARGET" does not light up.	Connected	Check power is properly supplied to the target system.
The RESET LED of "STATUS OF TARGET" is not normal.	Connected	Check the rest pin of the target system does not remain 'L' level. The display of the RESET LED differs depending on version of the M3T-PD38. <i>See "4.1 (3) LED Display When the PC4701 Starts Up Normally" (page 39).</i>
Others	-	The firmware version may be different. Download firmware in maintenance mode. <i>See "4.2 (2) Downloading Firmware in Maintenance Mode" (page 40).</i>

## (2) When the Init Dialog Box is Not Displayed

- Check the operation environment of the host machine where the M3T-PD38 is operating.
- The M3T-PD38 may not have been installed properly. Therefore, Reinstall it again.

### (3) When the Program Window is Not Displayed (Target System Not Connected)

Table 6.2 Checkpoints of errors when starting up the emulator debugger (target system not connected)

Error	Checkpoint
Not connected to the target system.	Communication between the emulator system and host machine is not normal. <i>Check the connection between the emulator and host machine.</i> <i>Check the interface switch on the rear of the emulation pod.</i>
Cannot be connect to target system.	
Communication error occurred. Data was not sent to the target.	
Communication error occurred. Data was not received from target.	<i>Check the interface setting of the Init dialog box.</i>
Target system is not properly built.	The emulator system is not operating properly. <i>(1) Download the proper firmware.</i> <i>See "4.2 Downloading Firmware" (page 40).</i> <i>(2) Recheck the connection between the PC4701 and this product.</i> <i>See "3.6 Connecting the PC4701 and Emulation Pod" (page 34).</i>
M3T-PD38 version is not same as firmware version in target.	Firmware is not compliant with this emulation pod. Download the proper firmware. <i>See "4.2 Downloading Firmware" (page 40).</i>
Target MCU cannot be reset. Reset target system.	MCU reset was not correctly controlled when the emulator system was started up. <i>(1) The Clock tab setting in the Init dialog box may be set to 'External'. When the target system is not connected, set it to 'Internal'.</i> <i>(2) 'M37640.MCU' may not be set in the MCU tab of the Init dialog box. Check the setting.</i>

#### (4) When the Program Window is Not Displayed (Target System Connected)

Table 6.3 Checkpoints of errors when starting up the emulator debugger (target system connected)

Error	Checkpoint
Not connected to the target system.	Communication between the emulator system and host machine is not normal. <i>Check the connection between the emulator and host machine.</i> <i>Check the interface switch on the rear of the emulation pod.</i> <i>Check the interface setting of the Init dialog box.</i>
Cannot be connect to target system.	
Communication error occurred. Data was not sent to the target.	
Communication error occurred. Data was not received from target.	
Target system is not properly built.	The emulator system is not operating properly. <i>(1) Download the proper firmware.</i> <i>See "4.2 Downloading Firmware" (page 40).</i> <i>(2) Recheck the connection between the PC4701 and this product.</i> <i>See "3.6 Connecting the PC4701 and Emulation Pod" (page 34).</i>
M3T-PD38 version is not same as firmware version in target.	Firmware is not compliant with this emulation pod. Download the proper firmware. <i>See "4.2 Downloading Firmware" (page 40).</i>
Target MCU cannot be reset. Reset target system.	MCU reset was not correctly controlled in the emulator. <i>(1) When the Clock tab setting in the Init dialog box is set to External, check the oscillator is operating properly.</i> <i>(2) 'M37640.MCU' may not be set in the MCU tab of the Init dialog box. Check the setting.</i> <i>(3) Check the reset pin of the target system is pulled up.</i> <i>See "5.2 Connection Diagrams" (page 47).</i>

## 6.2 When the M37641T2-RPD-E Does Not Work Properly

If your M37641-RPD-E does not operate normally, check the following. Go to (1) when your M37641-RPD-E is connected to the target system, and go to (2) when it is not connected.

### (1) YES, connected.

- Check whether PC4701 and M37641-RPD-E are connected properly via the 120-pin flexible cable. For more details, refer to "3.6 Connecting the PC4701 and Emulation Pod" (page 34).
- Check whether the switches of the emulation pod are properly set. For more details, refer to "3.3 Switch Settings" (page 26).
- Check whether the MCU file is properly set.
- Check whether the mapping information is properly set. The initial settings of map areas are as shown below.
  - 00000h - 03FFFh: EXT
  - 04000h - 0FFFFh: INT
  - 10000h - 1FFFFh: INT
- Check whether the proper oscillator circuit board is installed according to the current operating voltage. For more details, refer to "5.1 Specifications" (page 46).
- Check whether power (within the MCU's specified range and +3.0 to 3.6 V or +4.5 to 5.25 V) and GND are supplied to the target system.
- If an oscillator circuit on the target system is used, check whether it is oscillating properly.
- Check whether pin RESET\* is held High.
- Check whether pin HOLD\* is held High.
- Check whether pin RDY\* is held High.

### (2) NO, not connected.

- Check whether PC4701 and M37641-RPD-E are connected properly via the 120-pin flexible cable. For more details, refer to "3.6 Connecting the PC4701 and Emulation Pod" (page 34).
- Check whether the switches of the emulation pod are properly set. For more details, refer to "3.3 Switch Settings" (page 26).
- Check whether the MCU file is properly set.
- Check whether the mapping information is properly set. The initial settings of map areas are as shown below.
  - 00000h - 03FFFh: EXT
  - 04000h - 0FFFFh: INT
  - 10000h - 1FFFFh: INT
- Check whether the proper oscillator circuit board is installed according to the current operating voltage. For more details, refer to "5.1 Specifications" (page 46).

# Chapter 7. Maintenance and Guarantee

This chapter describes how to maintenance, repair provisions and how to request for repair.

7.1 Maintenance .....	64
7.2 Guarantee .....	64
7.3 Repair Provisions.....	64
7.4 How to Request for Repair .....	65

# Chapter 7. Maintenance and Guarantee

## 7.1 Maintenance

If dust or dirt collects on any equipment of your emulation system, wipe it off with a dry soft cloth. Do not use thinner or other solvents because these chemicals can cause the equipment's surface coating to separate.

## 7.2 Guarantee

If your product becomes faulty within one year after its purchase while being used under good conditions by observing "Precautions for Safety" described in Chapter 1 of this user's manual, we will repair or replace your faulty product free of charge. Note, however, that if your product's fault is raised by any one of the following causes, we will repair it or replace it with new one with extra-charge:

- Misuse, abuse, or use under extraordinary conditions
- Unauthorized repair, remodeling, maintenance, and so on
- Inadequate user's system or misuse of it
- Fires, earthquakes, and other unexpected disasters

In the above cases, contact your local distributor. If your product is being leased, consult the leasing company or the owner.

## 7.3 Repair Provisions

### (1) Repair with extra-charge

The products elapsed more than one year after purchase can be repaired with extra-charge.

### (2) Replacement with extra-charge

If your product's fault falls in any of the following categories, the fault will be corrected by replacing the entire product instead of repair, or you will be advised to purchase new one, depending on the severity of the fault.

- Faulty or broken mechanical portions
- Flaw, separation, or rust in coated or plated portions
- Flaw or cracks in plastic portions
- Faults or breakage caused by improper use or unauthorized repair or modification
- Heavily damaged electric circuits due to overvoltage, overcurrent or shorting of power supply
- Cracks in the printed circuit board or burnt-down patterns
- Wide range of faults that makes replacement less expensive than repair
- Unlocatable or unidentified faults

### (3) Expiration of the repair period

When a period of one year elapses after the model was dropped from production, repairing products of the model may become impossible.

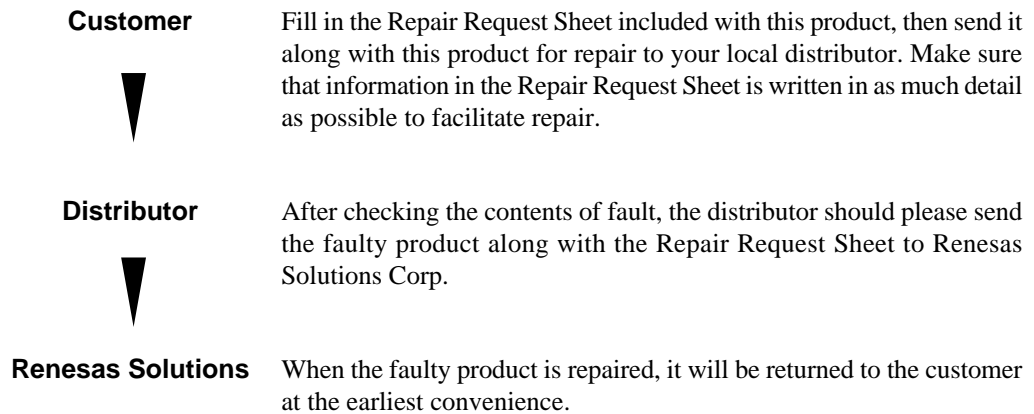
### (4) Transportation fees at sending your product for repair

Please send your product to us for repair at your expense.



## 7.4 How to Request for Repair

If your product is found faulty, follow the procedure below to send your product for repair.



### CAUTION

#### Note on Transporting the Product:



- When sending your product for repair, use the packing box and cushion material supplied with this product when delivered to you and specify handling caution for it to be handled as precision equipment. If packing of your product is not complete, it may be damaged during transportation. When you pack your product in a bag, make sure to use conductive polyvinyl supplied with this product (usually a blue bag). When you use other bags, they may cause a trouble on your product because of static electricity.

# MEMO

# M37641T2-RPD-E User's Manual

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