

To our customers,

Old Company Name in Catalogs and Other Documents

On April 1st, 2010, NEC Electronics Corporation merged with Renesas Technology Corporation, and Renesas Electronics Corporation took over all the business of both companies. Therefore, although the old company name remains in this document, it is a valid Renesas Electronics document. We appreciate your understanding.

Renesas Electronics website: <http://www.renesas.com>

April 1st, 2010
Renesas Electronics Corporation

Issued by: Renesas Electronics Corporation (<http://www.renesas.com>)

Send any inquiries to <http://www.renesas.com/inquiry>.

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: “Standard”, “High Quality”, and “Specific”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as “Specific” without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as “Specific” or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is “Standard” unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
 - “Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
 - “High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
 - “Specific”: Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

M34524T-MCU

User's Manual

MCU Board for 4524 and 4554 Group MCUs

* IBM and PC/AT are registered trademarks of International Business Machines Corporation.

* IC61-0644-053 and IC61-0644-088 are products of Yamaichi Electronics Co., Ltd.

Keep safety first in your circuit designs!

- Renesas Technology Corporation and Renesas Solutions Corporation put the maximum effort into making semiconductor products better and more reliable, but there is always the possibility that trouble may occur with them. Trouble with semiconductors may lead to personal injury, fire or property damage. Remember to give due consideration to safety when making your circuit designs, with appropriate measures such as (i) placement of substitutive, auxiliary circuits, (ii) use of nonflammable material or (iii) prevention against any malfunction or mishap.

Notes regarding these materials

- These materials are intended as a reference to assist our customers in the selection of the Renesas Technology product best suited to the customer's application; they do not convey any license under any intellectual property rights, or any other rights, belonging to Renesas Technology Corporation, Renesas Solutions Corporation or a third party.
- Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, or infringement of any third-party's rights, originating in the use of any product data, diagrams, charts, programs, algorithms, or circuit application examples contained in these materials.
- All information contained in these materials, including product data, diagrams, charts, programs and algorithms represents information on products at the time of publication of these materials, and are subject to change by Renesas Technology Corporation and Renesas Solutions Corporation without notice due to product improvements or other reasons. It is therefore recommended that customers contact Renesas Technology Corporation, Renesas Solutions Corporation or an authorized Renesas Technology product distributor for the latest product information before purchasing a product listed herein. The information described here may contain technical inaccuracies or typographical errors. Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, liability, or other loss rising from these inaccuracies or errors. Please also pay attention to information published by Renesas Technology Corporation and Renesas Solutions Corporation by various means, including the Renesas home page (<http://www.renesas.com>).
- When using any or all of the information contained in these materials, including product data, diagrams, charts, programs, and algorithms, please be sure to evaluate all information as a total system before making a final decision on the applicability of the information and products. Renesas Technology Corporation and Renesas Solutions Corporation assume no responsibility for any damage, liability or other loss resulting from the information contained herein.
- Renesas Technology semiconductors are not designed or manufactured for use in a device or system that is used under circumstances in which human life is potentially at stake. Please contact Renesas Technology Corporation, Renesas Solutions Corporation or an authorized Renesas Technology product distributor when considering the use of a product contained herein for any specific purposes, such as apparatus or systems for transportation, vehicular, medical, aerospace, nuclear, or undersea repeater use.
- The prior written approval of Renesas Technology Corporation and Renesas Solutions Corporation is necessary to reprint or reproduce in whole or in part these materials.
- If these products or technologies are subject to the Japanese export control restrictions, they must be exported under a license from the Japanese government and cannot be imported into a country other than the approved destination. Any diversion or reexport contrary to the export control laws and regulations of Japan and/or the country of destination is prohibited.
- Please contact Renesas Technology Corporation or Renesas Solutions Corporation for further details on these materials or the products contained therein.

Precautions to be taken when using this product

- This product is a development supporting unit for use in your program development and evaluation stages. In mass-producing your program you have finished developing, be sure to make a judgment on your own risk that it can be put to practical use by performing integration test, evaluation, or some experiment else.
- In no event shall Renesas Solutions Corporation be liable for any consequence arising from the use of this product.
- Renesas Solutions Corporation strives to renovate or provide a workaround for product malfunction at some charge or without charge. However, this does not necessarily mean that Renesas Solutions Corporation guarantees the renovation or the provision under any circumstances.
- This product has been developed by assuming its use for program development and evaluation in laboratories. Therefore, it does not fall under the application of Electrical Appliance and Material Safety Law and protection against electromagnetic interference when used in Japan.

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

Preface	4
1. Precautions for Safety	5
1.1 Safety Symbols and Meanings	5
2. Contents of the M34524T-MCU	9
2.1 Contents of the M34524T-MCU	9
2.2 Other Necessary Products	10
3. M34524T-MCU	11
3.1 Outline	11
3.2 Specifications	12
3.3 Switches	13
3.4 Check Pins	14
3.5 Connectors	14
3.6 Connection to the Target System	18
3.7 How to Replace the MCU	22
4. Precautions to Be Taken When Debugging a Program	23
4.1 Reset Condition	23
4.2 Watchdog Timer	23
4.3 Operation in RAM Backup Mode	24
4.4 Port I/O Timings and Characteristics	25
4.5 A-D Converter	26
4.6 System Clock	26
4.7 Real-time Capability of the Timer	27
4.8 Pullup Transistor Control	27
4.9 Program Execution (G, GB)	28
4.10 External Trigger Signal	29
4.11 Other Precautions	29
5. Connection Circuit Diagrams of the M34524T-MCU	31
6. Pitch Converter Board External Dimensions	33
6.1 PCA4917A and PCA4917B	33
6.2 PCA4918	33
7. Maintenance and Guarantee	35
7.1 Maintenance	35
7.2 Guarantee	35
7.3 Repair Provisions	35
7.4 How to Request for Repair	36

Preface

This user's manual describes the specifications of the M34524T-MCU emulator board for the Renesas 4524 and 4554 Groups of 4-bit CMOS single-chip MCUs. The M34524T-MCU is an MCU board for the PC4504 emulator. For emulator main unit PC4504 and emulator debugger M3T-PD45, refer to each user's manual (or online manual).

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.

1. Precautions for Safety


Both in the M34524T-MCU user's manual and 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.


This chapter describes precautions which should be taken in order to use the M34524T-MCU safely and properly. Be sure to read this chapter before using this product.


1.1 Safety Symbols and Meanings

	WARNING	If the requirements shown in the "WARNING" sentences are ignored, the equipment may cause serious personal injury or death.
	CAUTION	If the requirements shown in the "CAUTION" sentences are ignored, the equipment may malfunction.
	IMPORTANT	It means important information on using this product.

In addition to the three above, the following are also used as appropriate.

△ means WARNING or CAUTION.
Example:  **CAUTION AGAINST AN ELECTRIC SHOCK**

⊘ means PROHIBITION.
Example:  **DISASSEMBLY PROHIBITED**

● means A FORCIBLE ACTION.
Example:  **UNPLUG THE POWER CABLE FROM THE RECEPTACLE.**

The following pages describe the symbols "WARNING", "CAUTION", and "IMPORTANT".

WARNING

Warning for Installation:



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

Warning for Use Environment:



- This equipment is to be used in an environment with a maximum ambient temperature of 35°C. Care should be taken that this temperature is not exceeded.

CAUTION

Cautions to Be Taken for 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.
- Use caution when handling the main unit. Be careful not to apply a mechanical shock.
- Do not pull the emulator probe (64-wire half-pitch cable etc.) to disconnect from the emulator main unit.
- 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

Notes on Differences between Actual MCUs and the Emulator:

- Emulator operation differs from emulation of a mask MCU, as listed below. For details refer to "Chapter 4. Precautions to Be Taken When Debugging a Program" (page 23).
 - (1) Reset condition
 - (2) Operation of the watchdog timer function
 - (3) Operation in RAM backup mode
 - (4) Port I/O timings and characteristics
 - (5) A-D conversion function
- Therefore, always be sure to evaluate your system with an evaluation MCU (OTP version). Also, be sure to perform board-mounted evaluation with CS (Commercial Sample) version MCU to make final confirmation of device operation before starting mask production.

Note on the Target System:

- Make sure that the target's supply voltage is + 3.0 V or + 5.0 V. Therefore the target's supply voltage should be in the range of + 3.0 V \pm 10% or + 5.0 V \pm 10%.

Notes on Connecting the Target System:

- When connecting the target system, be sure to shut off the power of the emulator and the target system.
- Connect the emulator probe carefully.
- When connecting the emulator probe, use care not to twist the cable. An excessive twist may cause breaking of the wire.

IMPORTANT

Note on MCU board Installation:

- Before installing and removing the MCU board, always be sure to power off the PC4504 emulator main unit and unplug its power cord from the outlet.

Note on Registers that Can be Operated from the M3T-PD45

- The table below lists the registers that can be operated from the M3T-PD45. The "Yes" in the table means that the register can be operated; the "No" means that the register can not be operated.

Register	Reference	Modification	Remarks	Register	Reference	Modification	Remarks
PC	Yes	Yes		W5	Yes	Yes	
CY	Yes	Yes		W6	Yes	Yes	
A	Yes	Yes		J1	Yes	Yes	4524 only
B	Yes	Yes		Q1	Yes	Yes	4524 only
D	Yes	Yes		Q2	Yes	Yes	4524 only
E	Yes	Yes		Q3	Yes	Yes	4524 only
No	Yes	Yes		K0	Yes	Yes	
Y	Yes	Yes		K1	Yes	Yes	
Z	Yes	Yes		K2	Yes	Yes	
V1	Yes	Yes		PU0	Yes	Yes	
V2	Yes	Yes		PU1	Yes	Yes	
I1	Yes	Yes		FR0	No	Yes	
I2	Yes	Yes		FR1	No	Yes	
I3	Yes	Yes	4524 only	FR2	No	Yes	
MR	Yes	Yes		FR3	No	Yes	4524 only
PA	No	Yes		L1	Yes	Yes	
W1	Yes	Yes		L2	No	Yes	
W2	Yes	Yes		L3	No	Yes	4524 only
W3	Yes	Yes		SI	Yes	Yes	4524 only
W4	Yes	Yes		-	-	-	-

2. Contents of the M34524T-MCU

2.1 Contents of the M34524T-MCU

Table 2.1 shows the contents of the M34524T-MCU package. When unpacking your M34524T-MCU package, check to see that all of these components are included.

Table 2.1 Contents of the M34524T-MCU

Item	Product name	Quantity
1	M34524T-MCU	1
2	M34554EDFP (for replacement)	1
3	64-wire half-pitch cables (50 cm)	2
4	2-wire cable for external trigger signal (50 cm)	1
5	Pitch converter board PCA4917A	1
6	Pitch converter board PCA4917B	1
7	Pitch converter board PCA4918	1
8	Oscillator circuit board OSC-2 (connector J1 mounted)	1
9	M34524T-MCU User's Manual (this manual)	1
10	M34524T-MCU User's Manual (Japanese)	1

IMPORTANT

Notes on Components of this Product:

- If you find any item missing or faulty, or any suggestion, contact your local distributor.
- Keep the packaging carton and cushion material of the M34524T-MCU to transport it for repair or for other purposes in the future.
- M34524T-MCU has an oscillator circuit board OSC-2 for 6.0 MHz (main clock) and 32.768 kHz (sub clock) that is incorporated when shipped from the factory. In addition, it comes with an oscillator circuit board OSC-2, with only connector J1 mounted.

2.2 Other Necessary Products

To bring forward your program development with the 4524 and 4554 Groups of 4-bit MCUs, the products listed in Table 2.2 are necessary in addition to those contained in the package listed in Table 2.1. Get them separately when necessary.

Table 2.2 Other necessary products required for developing the 4524 and 4554 Group MCUs

Item	Product name
1	Emulator debugger M3T-PD45
2	Emulator main unit PC4504
3	IC socket IC61-0644-088*1 (required when using the PCA4918)
4	Programming adapter PCA7448

*1 For details on this product, contact:

Yamaichi Electronics Co., Ltd.

<http://www.yamaichi.co.jp/e/index.shtml>

3. M34524T-MCU

3.1 Outline

By using with the PC4504 emulator main unit, the M34524T-MCU can make up an emulator system which can be operated by a host machine. Figure 3.1 shows the emulator system configuration. For the connection to the target system, see "3.6 Connection to the Target System" (page 18).

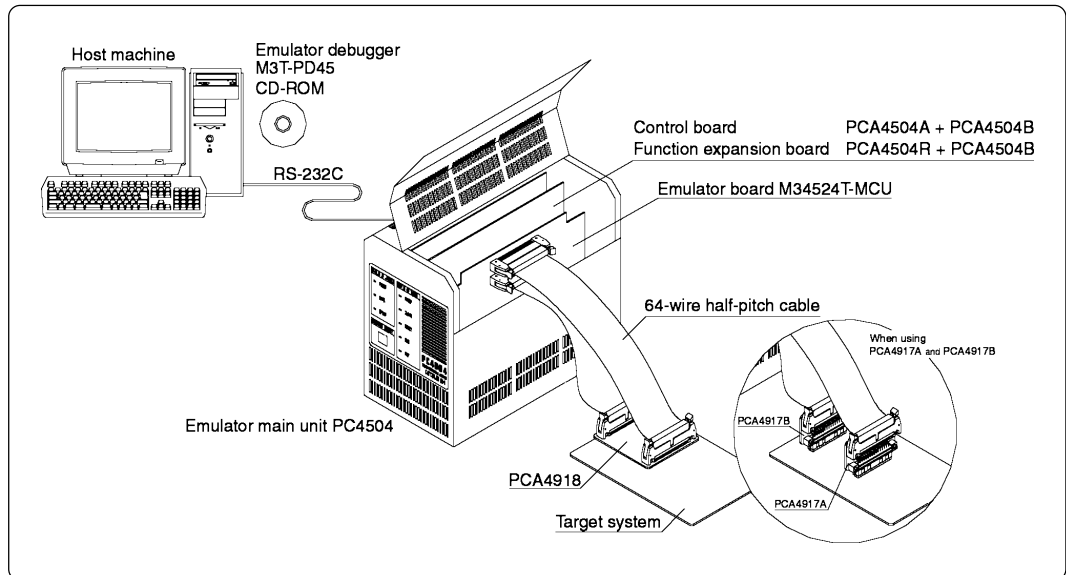


Figure 3.1 Emulator system configuration

Figure 3.2 shows the positions of the switches and connectors.

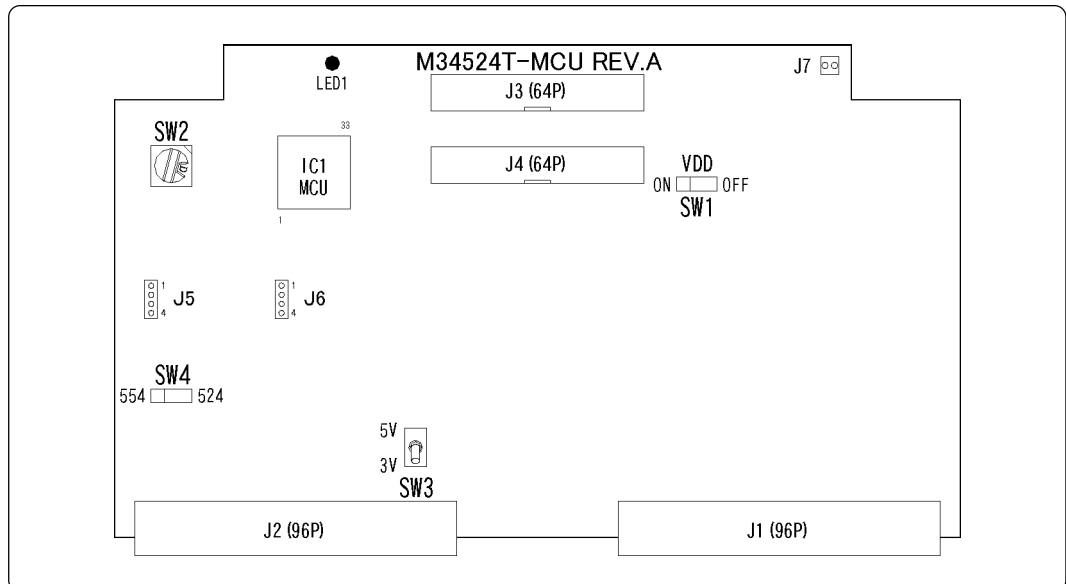


Figure 3.2 Positions of the switches and connectors

3.2 Specifications

Table 3.1 lists the specifications of the M34524T-MCU.

Table 3.1 M34524T-MCU specifications

Applicable MCUs	4524 Group				
	4554 Group* ¹				
Evaluation MCU	4524 Group	M34524EDFP (preinstalled)			
	4554 Group	M34554EDFP (included)			
Mounted clock	Main clock: 6.0 MHz (OSC-2 [6.0 MHz mounted] used) Sub clock: 32.768 kHz (OSC-2 [32.768 kHz mounted] used)				
Maximum operating clock frequency	5 V	Divide-by-8 mode (f(XIN)/8)		6.0 MHz	
		Divide-by-4 mode (f(XIN)/4)			
		Divide-by-2 mode (f(XIN)/2)			
		Through mode (f(XIN))			
	3 V	Divide-by-8 mode (f(XIN)/8)		6.0 MHz	
		Divide-by-4 mode (f(XIN)/4)			
		Divide-by-2 mode (f(XIN)/2)			
		Through mode (f(XIN))			4.4 MHz
Target system voltage	3 V \pm 10% or 5 V \pm 10%				
Power supply	Supplied by the PC4504's internal power supply (+5 V, +12 V). 3 V is generated from +12 V.				
Port emulation	Port	Output type	Direction	Device used	
	P00--P03 P10--P13 D0--D5	N-ch open drain or CMOS* ²	Input/output	Input	74HC245
				Output	74ALS641 (N-ch) 74VHC125 (CMOS)
	D7, D8, D9	N-ch open drain	Input/output	Input/Output: 74HC4066	
Emulated functions	Key-on wakeup input in RAM backup mode	Pin		Factor of return	
		P00--P03		L-level detection	
		P10--P13		L-level detection	
		INT0, INT1		Edge detection or level detection* ³	
	Pullup resistor control	Pin		Control resistor	
		P00--P03		PU0	
		P10--P13		PU1	
	Port output type control	Pin		Control resistor	
		P00--P03		FR0	
		P10--P13			
		D0--D5		FR1, FR2	
	Board dimensions	233.35 x 135.00 x 1.60 mm			
	Operating temperature	5 to 35°C (non-condensing)			
Product configuration	<ul style="list-style-type: none"> - M34524T-MCU - M34554EDFP - 64-wire half-pitch cables (2 pieces) - PCA4918 - PCA4917A - PCA4917B - 2-wire cable for external trigger signal - OSC-2 (parts not mounted) 				

*1 Available by changing MCUs



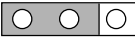






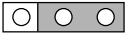
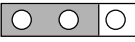
*2 N-ch open drain output and CMOS output are selectable by the control resistor.

*3 It is possible to select the leading edge, trailing edge, both edges, L-level or H-level as a factor of return by the control resistor.

3.3 Switches

Tables 3.2 lists the functions of the switches and their factory-settings.


Table 3.2 Functions of switches

Label		Switch position	Description	Factory-setting
SW1	OFF	ON  OFF	Does not output the VDD of the M34524T-MCU to the target system.	 OFF
	ON	ON  OFF	Outputs the VDD of the M34524T-MCU to the target system.	
SW2	ROMSIZE		Set the MCU's ROM size. • Set "8" (M8) • Set "C" (MC) • Set "D" (ED)	 D
SW3	5 V	5 V  3 V	Operates the evaluation MCU on the M34524T-MCU at +5 V.	 5 V
	3 V	5 V  3 V	Operates the evaluation MCU on the M34524T-MCU at +3 V.	
SW4	524	554  524	Operates for the 4524 Group.	 524
	554	554  524	Operates for the 4554 Group.	

*1 To debug the 4554 Group MCUs, it is necessary to replace the evaluation MCU to the included M34554EDFP. For how to replace the MCU, refer to "3.7 How to Replace the MCU" (page 22).

⚠ CAUTION

Caution for Setting the Switches:



- Before changing switch settings, be sure to shut off the power.

3.4 Check Pins

The M34524T-MCU has the check pins listed in Table 3.3.

Table 3.3 Check pins

Pin		Function
TP1	VDD	Outputs +3 V or +5 V (MCU voltage) according to the setting of SW3.
TP2	XIN	Outputs an instruction clock of the MCU.
TP3	GND	Ground
TP4	RUN*/STOP	Held low when executing a user program, held high when it is stopped.
TP5	WRST	Held high when executing WRST instruction, and it is possible to check the initialization cycle of a watchdog timer by observing pulse widths.

3.5 Connectors

Table 3.4 lists the functions of the connectors.

Table 3.4 Connectors

Connector	Function
J1	Connects the evaluation MCU bus.
J2	Connects the monitor CPU bus.
J3	Connects the target system. (64-pin)
J4	Connects the target system. (64-pin)
J5	Connects the oscillator circuit board OSC-2 (main clock). (4-pin)
J6	Connects the oscillator circuit board OSC-2 (sub clock). (4-pin)
J7	For an external trigger signal. (2-pin)

(1) Connectors J3 and J4

Tables 3.5 and 3.6 list the pin assignments of the 64-wire half-pitch connectors J3 and J4 for connecting the PCA4917A, PCA4917B and PCA4918. And Figure 3.3 shows the connector J3 pin layout.

Table 3.5 Pin assignments of connector J3

Line A			Line B			Line C			Line D		
Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	SEG16	O	1	SEG15	O	1	GND		1	GND	
2	SEG17	O	2	SEG14	O	2	GND		2	GND	
3	SEG18	O	3	SEG13	O	3	GND		3	GND	
4	SEG19	O	4	SEG12	O	4	GND		4	GND	
5	P43(SEG20)	I/O	5	SEG11	O	5	GND		5	GND	
6	P42(SEG21)	I/O	6	SEG10	O	6	GND		6	GND	
7	P41(SEG22)	I/O	7	SEG9	O	7	GND		7	GND	
8	P40(SEG23)	I/O	8	SEG8	O	8	GND		8	GND	
9	P33/AIN7(SEG24)	I/O	9	SEG7	O	9	GND		9	GND	
10	P32/AIN6(SEG25)	I/O	10	SEG6	O	10	GND		10	GND	
11	P31/AIN7(SEG26)	I/O	11	SEG5	O	11	GND		11	GND	
12	P30/AIN4(SEG27)	I/O	12	SEG4	O	12	GND		12	GND	
13	P23/AIN3(SEG28)	I/O	13	SEG3	O	13	GND		13	GND	
14	P22/AIN2(SEG29)	I/O	14	VLC1/SEG2	I/O	14	GND		14	GND	
15	P21/AIN1(SEG30)	I/O	15	VLC2/SEG1	I/O	15	GND		15	GND	
16	P20/AIN0(SEG31)	I/O	16	VLC3/SEG0	I/O	16	GND		16	GND	

Table 3.6 Pin assignments of connector J4

Line A			Line B			Line C			Line D		
Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O	Pin No.	Signal	I/O
1	D9/INT1	I/O	1	COM0	O	1	GND		1	GND	
2	D8/INT0	I/O	2	COM1	O	2	GND		2	GND	
3	C/CNTR1	I/O	3	COM2	O	3	GND		3	GND	
4	D7/CNTR0	I/O	4	COM3	O	4	GND		4	GND	
5	RESET	I	5	P00	I/O	5	GND		5	GND	
6	XIN	-	6	P01	I/O	6	GND		6	GND	
7	XOUT	-	7	P02	I/O	7	GND		7	GND	
8	VSS		8	P03	I/O	8	GND		8	GND	
9	VDD		9	P10	I/O	9	GND		9	GND	
10	XCOUT	-	10	P11	I/O	10	GND		10	GND	
11	XCIN	-	11	P12	I/O	11	GND		11	GND	
12	VDCE	-	12	P13	I/O	12	GND		12	GND	
13	CNVSS	-	13	D0	I/O	13	GND		13	GND	
14	D6/SCK	I/O	14	D1	I/O	14	GND		14	GND	
15	D5/SOUT	I/O	15	D2	I/O	15	GND		15	GND	
16	D4/SIN	I/O	16	D3	I/O	16	GND		16	GND	

*1 "I" in the direction column denotes "Input"; "O" denotes "Output"; "I/O" denotes "Input/output"; "-" denotes "No connection".

*2 The signals in parentheses are for the 4554 Group MCUs.

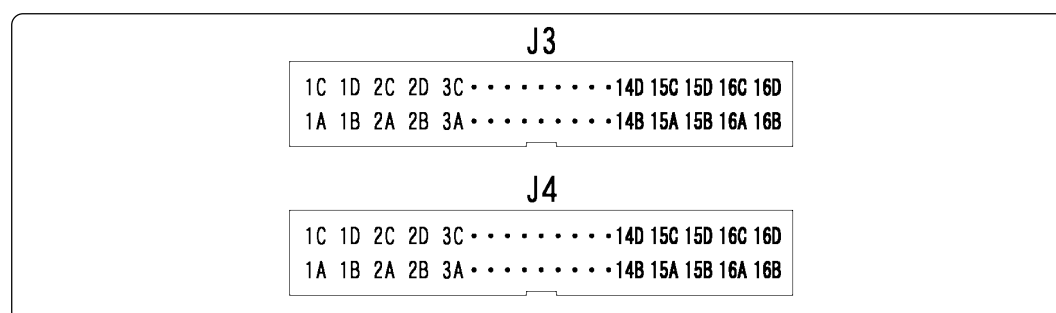


Figure 3.3 Connectors J3 and J4 pin layout

Some signals which are connected to the target system are emulated by the M34524T-MCU. Table 3.7 lists the connections of the target system and each pin.

Table 3.7 Connection of the target system and each pin

Item	Signal	
	4524 Group	4554 Group
Pins connected directly to the target system (8 types 39 pins)	<ul style="list-style-type: none"> • P20/AIN0--P23/AIN3 • P30/AIN4--P33/AIN7 • P40--P43 • D6/SCK • C/CNTR1 • SEG0--SEG19 • COM0--COM3 • VSS 	<ul style="list-style-type: none"> • P20/SEG31--P23/SEG28 • P30/SEG27--P33/SEG24 • SEG20--SEG23 • D6/SCK • C/CNTR1 • SEG0--SEG19 • COM0--COM3 • VSS
Pins connected to the target system via emulation circuit etc. (6 types 19 pins)	<ul style="list-style-type: none"> • P00--P03 • P10--P13 • D0--D5 • D7--D9 • RESET • VDD 	
Pins not connected to the target system (6 types 6 pins)	<ul style="list-style-type: none"> • XIN • XOUT • XCIN • XCOU • CNVSS • VDCE 	

CAUTION

When Connecting the Evaluation MCU and Target system:

- Pin VDD is not used for inputting power from the target system, but it is used for outputting power from the power circuit on the M34524T-MCU to the target system. Output of pin VDD (ON or OFF) is set by switch SW1, and the voltage (3 V or 5 V) is set by switch SW3.
- Pins XIN and XCIN are input from the oscillator board OSC-2 on the M34524T-MCU, and they are not input from the oscillator on the target system. To change a system clock frequency, prepare parts required for using the oscillator board OSC-2 (included).

(2) Connector J7

Connect the 2-wire external trigger signal cable included with your M34524T-MCU to connector J7. Connect the black clip of the external trigger cable to GND, and use the white clip for external trigger signal input.

The external trigger signal is used for event input of trigger breaks or trace points. Table 3.8 lists the pin assignments of connector J7.

Table 3.8 Pin assignments of connector J7

Pin No.	Signal	Function
1	TRIG	External trigger signal input
2	GND	GND

(3) Connectors J5 and J6

Connectors J5 and J6 are connectors used to connect an oscillator circuit board OSC-2. Table 3.9 lists the pin assignments of connectors J5 and J6. Figure 3.4 shows the pin layout of connectors J5 and J6.

For the 6.0MHz and 32.768kHz operation with the oscillator circuit board OSC-2, see Figure 3.5.

Table 3.9 Pin assignments of connectors J5 and J6

Pin No.	Signal	Function
1	VCC	Power supply
2	GND	GND
3	CLK	Clock input
4	GND	GND

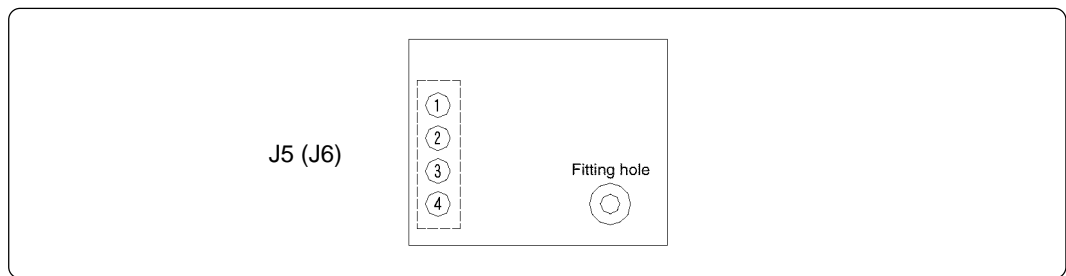


Figure 3.4 Pin layout of connectors J5 and J6

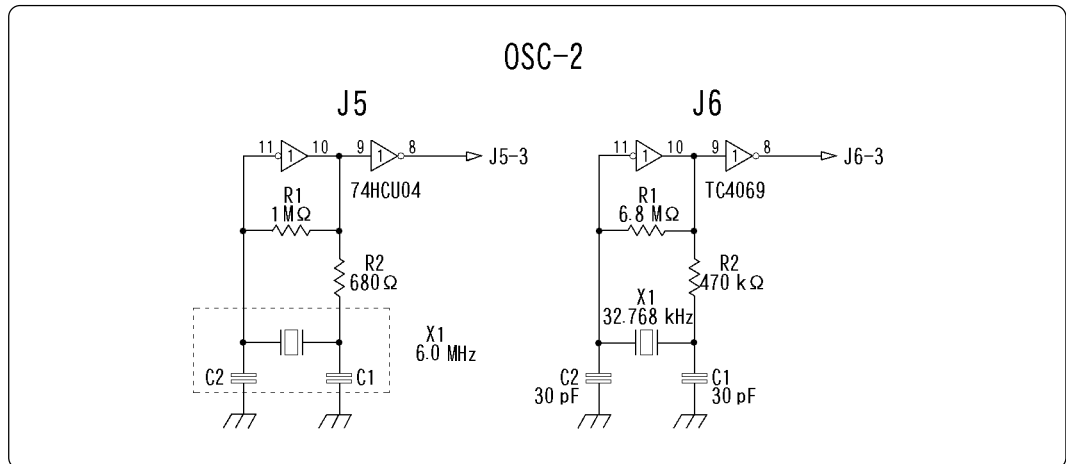


Figure 3.5 Connection diagrams of the oscillator circuits

CAUTION

When Changing a Clock Frequency:

- When changing a clock frequency, be sure to shut off the power supply to replace the oscillator circuit board (OSC-2).
- For details about the oscillation circuit constant, consult your oscillator manufacturer.

3.6 Connection to the Target System

There are two types for connecting the M34524T-MCU and the target system as shown below.

(1) When using the pitch converter boards PCA4917A and PCA4917B

Connect the PCA4917A and PCA4917B included with this product to the 2.54-mm-pitch 32-pin dual-in-line pin on the target system.

Figure 3.6 depicts the M34524T-MCU board connected to the target system using the PCA4917A and PCA4917B. Table 3.10 lists the connector signal assignments of the PCA4917A and PCA4917B. Figure 3.7 shows the pin layout of the PCA4917A and PCA4917B.

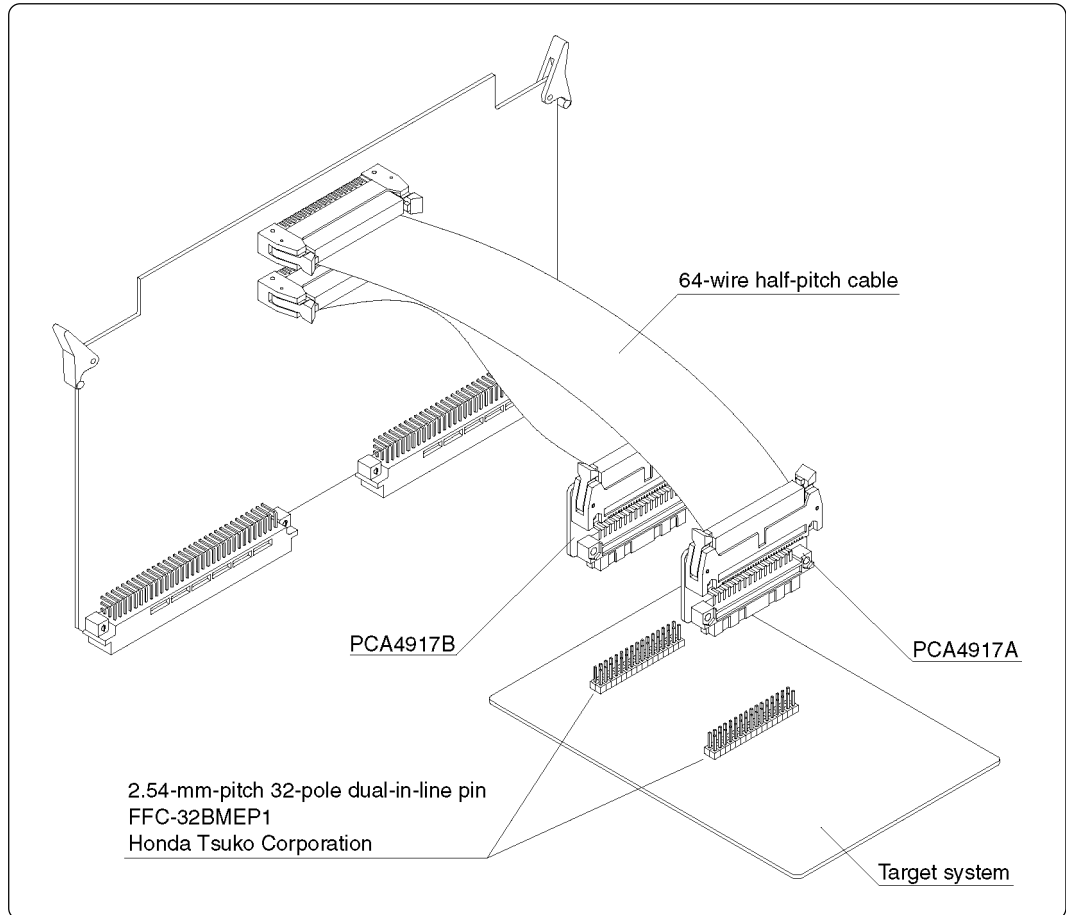


Figure 3.6 Connection to the target system using the PCA4917A and PCA4917B

CAUTION

Note on Connecting the Cable:



- Always shut OFF power before connecting the target system. Otherwise internal circuits of the target system and the emulator may be damaged.

Table 3.10 Pin assignments of the PCA4917A and PCA4917B

PCA4917A J2				PCA4917B J2			
1	SEG16	64	SEG15	17	D9/INT1	48	COM0
2	SEG17	63	SEG14	18	D8/INT0	47	COM1
3	SEG18	62	SEG13	19	C/CNTR1	46	COM2
4	SEG19	61	SEG12	20	D7/CNTR0	45	COM3
5	P43(SEG20)	60	SEG11	21	RESET	44	P00
6	P42(SEG21)	59	SEG10	22	XIN	43	P01
7	P41(SEG22)	58	SEG9	23	XOUT	42	P02
8	P40(SEG23)	57	SEG8	24	VSS	41	P03
9	P33/AIN7(SEG24)	56	SEG7	25	VDD	40	P10
10	P32/AIN6(SEG25)	55	SEG6	26	XCOUT	39	P11
11	P31/AIN5(SEG26)	54	SEG5	27	XCIN	38	P12
12	P30/AIN4(SEG27)	53	SEG4	28	VDCE	37	P13
13	P23/AIN3(SEG28)	52	SEG3	29	CNVSS	36	D0
14	P22/AIN2(SEG29)	51	VLC1/SEG2	30	D6/SCK	35	D1
15	P21/AIN1(SEG30)	50	VLC2/SEG1	31	D5/SOUT	34	D2
16	P20/AIN0(SEG31)	49	VLC3/SEG0	32	D4/SIN	33	D3

* The signals in parentheses are for the 4554 Group.

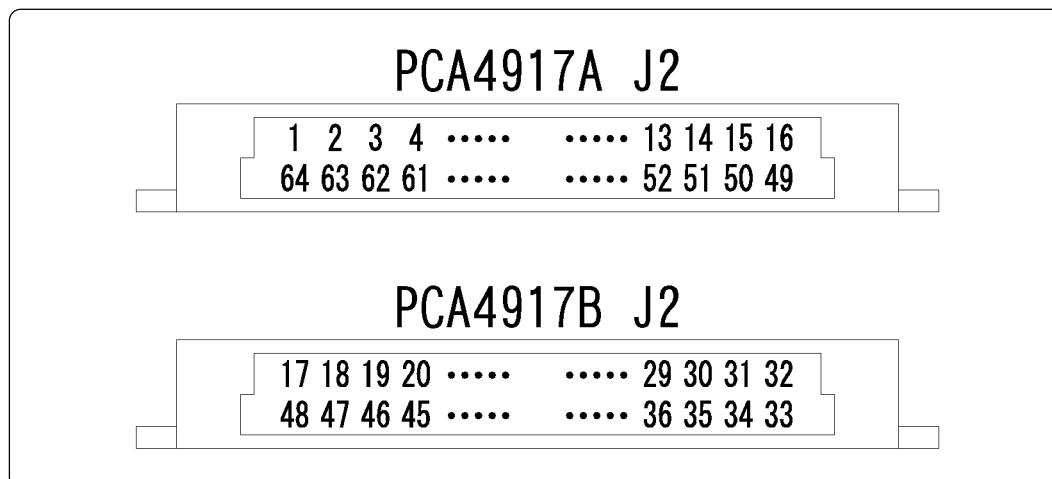


Figure 3.7 Pin layouts of the PCA4917A and PCA4917B

CAUTION

When Connecting the M34524T-MCU and Target system:

- Pin VDD is not used for inputting power from the target system, but it is used for outputting power from the power circuit on the M34524T-MCU to the target system. However, when supplying the target system with an external power, do not set switch SW1 to "ON", because the target system does not need power from the M34524T-MCU. For details on the switch settings, see "3.3 Switches" (page 13).
- Pin XIN is input from the oscillator board OSC-2 on the M34524T-MCU, and it is not input from the oscillator on the target system. To change a system clock frequency, change the frequency of the oscillator board OSC-2.

(2) When using the pitch converter board PCA4918

Connect the PCA4918 included with this product to the 64-pin LCC socket (IC61-0644-088 etc. made by Yamaichi Electronics Co., Ltd.) on the target system.

Figure 3.8 depicts the M34524T-MCU board connected to the target system using the PCA4918. Table 3.11 lists the connector signal assignments of the PCA4918. Figure 3.9 shows the pin layout of the PCA4918.

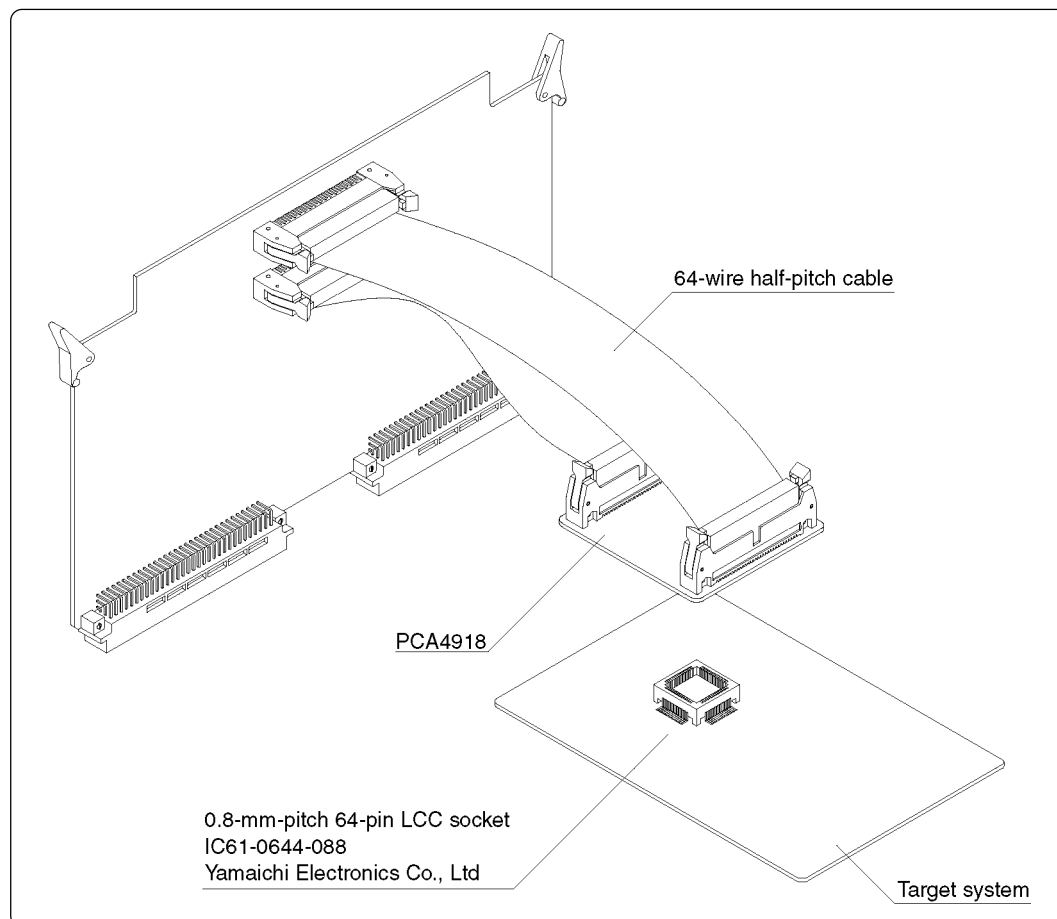


Figure 3.8 Connecting to the target system

CAUTION

Note on Connecting the Cable:



- Always shut OFF power before connecting the target system. Otherwise, internal circuits of the target system and the emulator may be damaged.
- For details on the IC61-0644-088, contact Yamaichi Electronics Co., Ltd.
<http://www.yamaichi.co.jp/e/index.shtml>

Table 3.11 Pin assignments of the PCA4918

PCA4918							
1	SEG16	17	D9/INT1	33	D3	49	VLC3/SEG0
2	SEG17	18	D8/INT0	34	D2	50	VLC2/SEG1
3	SEG18	19	C/CNTR1	35	D1	51	VLC1/SEG2
4	SEG19	20	D7/CNTR0	36	D0	52	SEG3
5	P43(SEG20)	21	RESET	37	P13	53	SEG4
6	P42(SEG21)	22	XIN	38	P12	54	SEG5
7	P41(SEG22)	23	XOUT	39	P11	55	SEG6
8	P40(SEG23)	24	VSS	40	P10	56	SEG7
9	P33/AIN7(SEG24)	25	VDD	41	P03	57	SEG8
10	P32/AIN6(SEG25)	26	XCOUT	42	P02	58	SEG9
11	P31/AIN5(SEG26)	27	XCIN	43	P01	59	SEG10
12	P30/AIN4(SEG27)	28	VDCE	44	P00	60	SEG11
13	P23/AIN3(SEG28)	29	CNVSS	45	COM3	61	SEG12
14	P22/AIN2(SEG29)	30	D6/SCK	46	COM2	62	SEG13
15	P21/AIN1(SEG30)	31	D5/SOUT	47	COM1	63	SEG14
16	P20/AIN0(SEG31)	32	D4/SIN	48	COM0	64	SEG15

* The signals in parentheses are for the 4554 Group.

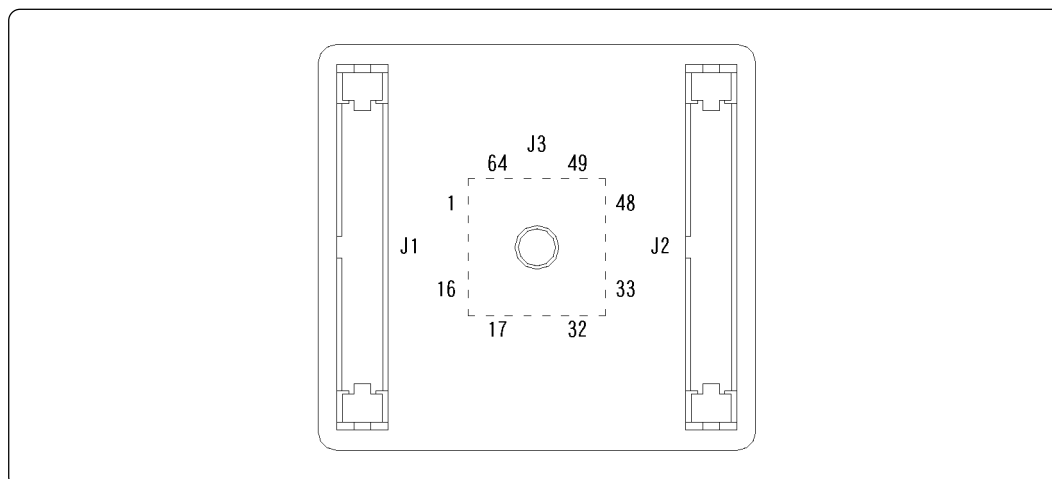


Figure 3.9 Pin layout of the PCA4918

⚠ CAUTION

When Connecting the M34524T-MCU and Target system:



- The VDD is not used for inputting power from the target system, but it is used for outputting power from the power circuit on the M34524T-MCU to the target system. However, when supplying the target system with an external power, do not set switch SW1 to "ON", because the target system does not need power from the M34524T-MCU. For details on the switch settings, see "3.3 Switches" (page 13).
- The XIN is input from the oscillator board OSC-2 on the M34524T-MCU, and it is not input from the oscillator on the target system. To change a system clock frequency, change the frequency of the oscillator board OSC-2.

3.7 How to Replace the MCU

For debugging the 4554 Group MCUs, it is necessary to replace the evaluation MCU to the included M34554EDFP. When replacing the MCU, match the No. 1 pin of the IC socket and that of the MCU. Incorrect insertion may cause a fatal damage to the MCU.

The M34524EDFP is mounted when shipped from the factory.

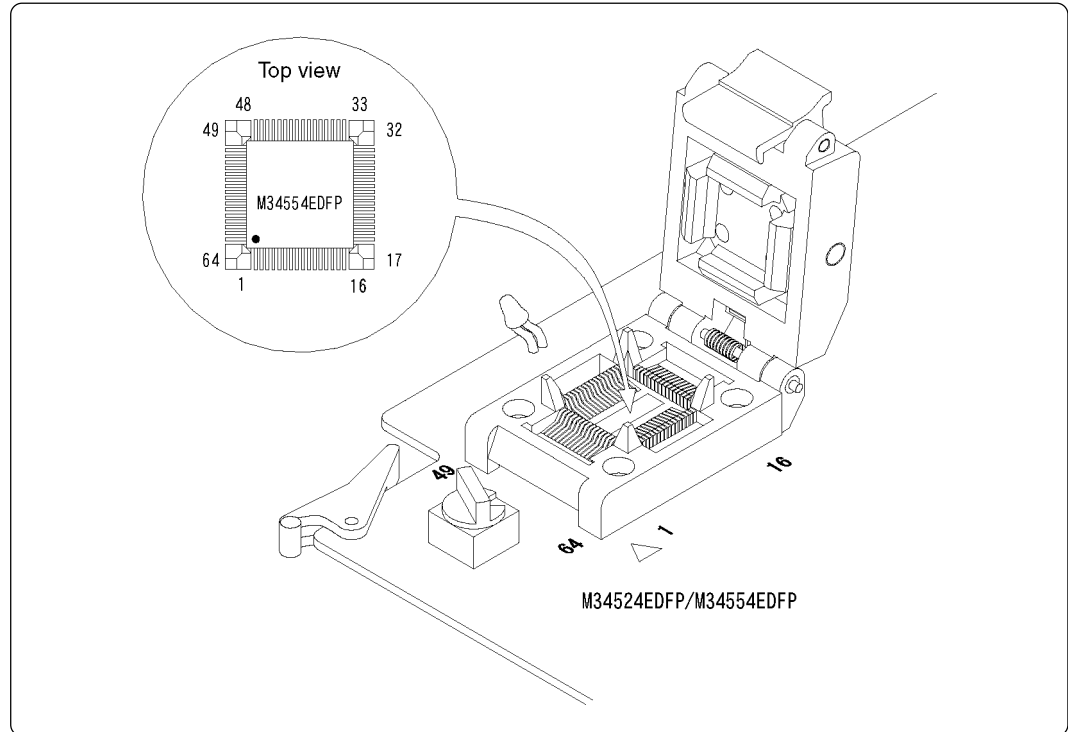


Figure 3.10 Replacing the MCU

CAUTION

Cautions for Replacing the MCU:



- Before replacing the MCU, be sure to shut off the power supply.
- When mounting the evaluation MCU, be sure to match the No. 1 pin. Incorrect insertion may cause a fatal damage to the MCU.
- When opening and closing the IC socket, hold the adapter horizontally. Otherwise the inside of the IC socket may become damaged and cause an electrical insulation failure.
- When debugging a 4554 Group MCU, it is necessary to replace the MCU to the included M34554EDFP and change the setting of switch SW4. For switch setting, see "3.3 Switches" (page 13).

4. Precautions to Be Taken When Debugging a Program

4.1 Reset Condition

The M34524T-MCU uses a 74HC14 for its RESET signal input buffer, so that its electrical characteristics differ from those of an actual MCU. Table 4.1 lists the RESET signal input characteristics of the M34524T-MCU.

Table 4.1 RESET signal input characteristics

Item	Symbol	Voltage	Min.	Max.
H-level threshold voltage	VP	VCC = 2.0 V	1.0 V	1.5 V
		VCC = 4.5 V	2.3 V	3.15 V
		VCC = 6.0 V	3.0 V	4.2 V
L-level threshold voltage	VN	VCC = 2.0 V	0.3 V	0.9 V
		VCC = 4.5 V	1.13 V	2.0 V
		VCC = 6.0 V	1.5 V	2.6 V
Hysteresis voltage	VH	VCC = 2.0 V	0.3 V	1.0 V
		VCC = 4.5 V	0.6 V	1.4 V
		VCC = 6.0 V	0.8 V	1.7 V

4.2 Watchdog Timer

The M34524T-MCU does not have an operational watchdog timer. Therefore, use an evaluation MCU (OTP version) to verify the operation associated with a watchdog timer.

The M34524T-MCU outputs a signal whose waveform is shown below from check pin TP5 during WRST instruction execution cycles. This signal allows you to check the initialization cycle of a watchdog timer.

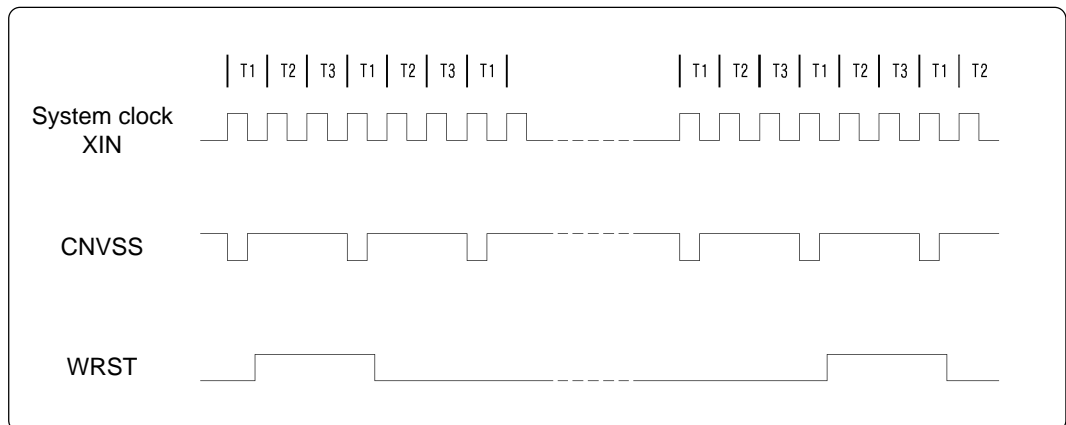


Figure 4.1 Waveform output from check pin TP5

4.3 Operation in RAM Backup Mode

In RAM backup mode, the M34524T-MCU operates differently from the actual MCUs. Although the actual MCU enters RAM backup mode depending on a combination of the EPOF and POF or POF2 instructions, the M34524T-MCU is placed in RAM backup mode by only executing the POF or POF2 instruction. The EPOF instruction has no effect on the M34524T-MCU.

<i>Program example 4.1</i>	[Actual MCU]
RC	Switched to RAM backup mode
INY	-----
EPOF	[M34524T-MCU]
POF	Switched to RAM backup mode
•	
•	
<i>Program example 4.2</i>	[Actual MCU]
RC	Not switched to RAM backup mode
INY	-----
POF	[M34524T-MCU]
•	Switched to RAM backup mode
•	

4.4 Port I/O Timings and Characteristics

(1) Port input timings

Port input timings are the same as with actual MCUs.

(2) Port output timings

When using the M34524T-MCU, output timings are different from those of the actual MCUs, because the following ports that are configured with the port emulation circuits:

- Ports D0--D5
- Ports P00--P03
- Ports P10--P13

With actual MCUs, changes occur at the beginning of the T3 state of an output instruction. With the M34524T-MCU, changes occur at the beginning of the T2 state of the next output instruction. Figure 4.2 shows the port output timings of the actual MCUs and M34524T-MCU. For the other ports, the output timings are the same as with the actual MCUs.

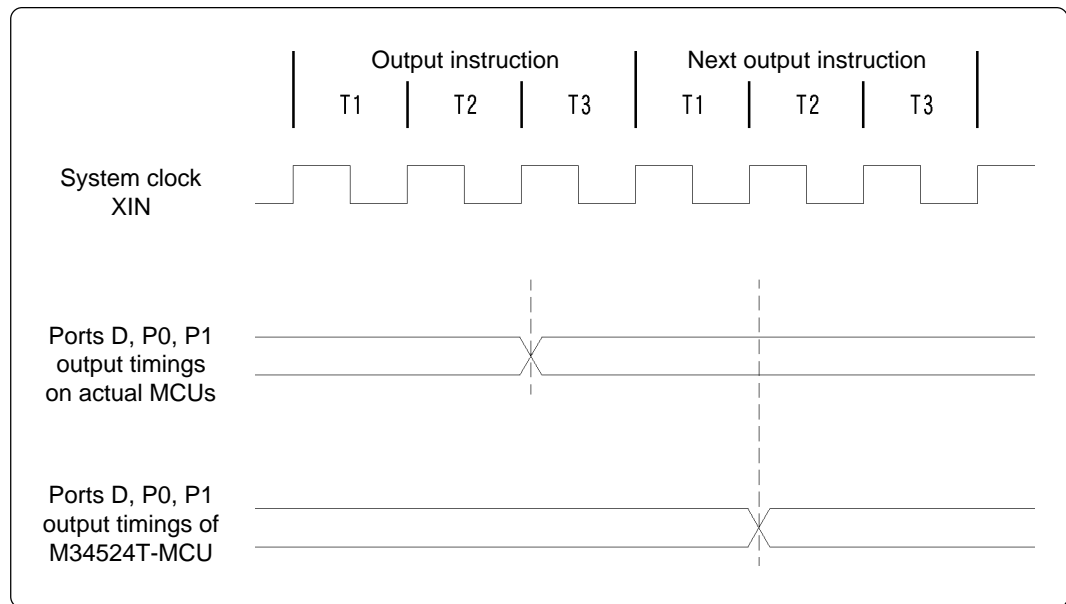


Figure 4.2 Ports D, P0 and P1 output timings

(3) Port I/O Characteristics

With the M34524T-MCU, port I/O characteristics are different from actual MCUs because there are emulation circuits in ports P00--P03, P10--P13 and D0--D5. Table 4.2 lists port I/O characteristics of the M34524T-MCU.

Table 4.2 Emulation port I/O characteristics

Port		Device	Item	Condition	Min.	Standard	Max.	Remarks
P0, P1, D0--D5	Input	74HC245	VIH	VCC = 2.0 V	1.50 V	-	-	
				VCC = 4.5 V	3.15 V	-	-	
			VIL	VCC = 2.0 V	-	-	0.50 V	
				VCC = 4.5 V	-	-	1.35 V	
	Output*1	74ALS641	IOH	VCC = 4.5 V	-	-	0.1 mA	
			VOL		-	0.35 V	0.5 V	
		74VHC125	VIH	VCC = 2.0 V	1.50 V	-	-	
				VCC = 4.5 V	3.15 V	-	-	
VIL	VCC = 2.0 V	-	-	0.50 V				
	VCC = 4.5 V	-	-	1.35 V				
D7, D8, D9	Input/ Output	74HC4066	RON	VCC = 2.0 V	-	160 Ω	-	
				VCC = 4.5 V	-	96 Ω	170 Ω	
			ΔRON	VCC = 4.5 V	-	70 Ω	100 Ω	
				VCC = 4.5 V	-	10 Ω	-	

*1 According to the setting of the output method control register FRx, change its device for output in the emulation circuit.

- When N-ch open drain output chosen: 74ALS641
- When CMOS output chosen: 74VHC125

4.5 A-D Converter

For the M34524T-MCU, its voltage is fixed at 3 V or 5 V. Therefore, because of the difference of voltage, the results of its A/D conversions are slightly different from the theoretical values. And, some characteristics are different from those of actual MCUs, because a flat cable and pitch converter board and other devices are used between the evaluation MCU and target system.

4.6 System Clock

Depending on the supply voltage and operation mode, use one of the following frequencies listed in Table 4.3 for the system clock.

Table 4.3 M34524T-MCU operating frequencies

Voltage	Mode	Frequency
5 V	Divide-by-8	6.0 MHz or less
	Divide-by-4	
	Divide-by-2	
	Through	
3 V	Divide-by-8	6.0 MHz or less
	Divide-by-4	
	Divide-by-2	
	Through	4.4 MHz or less

* To change a clock frequency, attach the necessary parts to the oscillator circuit board OSC-2 that are included with the M34524T-MCU package.

For details about the oscillation circuit constant, consult your oscillator manufacturer.

4.7 Real-time Capability of the Timer

The PC4504 and M34524T-MCU have their internal clock operating even during emulation, so that the timer values keep changing.

Examples: (1) When single-stepping the program
(2) When registers or internal RAM are referenced or modified

4.8 Pullup Transistor Control

Because the M34524T-MCU has an emulation circuit present in ports P0 and P1, it cannot use the MCU's internal pullup transistors. Therefore, the M34524T-MCU controls on/off of external pullup resistors by decoding the pullup control register transfer instructions (TPU0A and TPU1A).

The M34524T-MCU contains 150k Ω pullup resistors for use with the 4524 and 4554 Groups. If these pullup resistors need to be changed, replace the RA5 resistor array.

4.9 Program Execution (G, GB)

The PC4504 and M34524T-MCU's hardware is subject to the following restrictions with respect to the operation of the program execution commands (G and GB).

(1) Continuous description of instructions

Hardware breakpoints set in a continuous description of instructions following one after another do not cause a break to occur in the continuous description of instructions. A break occurs only after fetching the address where the continuous description of instructions is discontinued. (See Program example 4.3)

However, a break does occur even in a continuous description of instructions when an external trigger break or forced break is encountered. For execution to be resumed in this case, you need to make sure that the execution start address is next to the continuous description of instructions. (See Program example 4.4)

Program example 4.3

```
          LA    0
POINT:    LA    1    ; Continuous description of instructions
          LA    2
POINT+2:  XAM  3
```

If a break is set at POINT, execution is halted immediately before the XAM instruction at address POINT+2.

Program example 4.4

```
          LA    0
POINT:    LA    1    ; Continuous description of instructions
POINT+1:  LA    2
POINT+2:  XAM  3
```

If a forced or external trigger break is applied at POINT, execution is halted at POINT +1. When resuming program execution after the break, make sure that the start address is at POINT+2, an address immediately after the continuous description of instructions is discontinued.

(2) Skip instructions (e.g. SNZP, INY, DEY, SZB, SEAM, SZC and RTS)

In cases when a skip instruction skips the next instruction, a breakpoint set in the skipped instruction does not cause execution to halt. (See Program examples 4.5 and 4.6)

Program example 4.5

```
          LXY   0, 0
          SDZ
POINT:    B     jmp_adr    ; Skips when D(0) = 0
POINT A:  TAM   0
          .
          .
```

If a breakpoint is set at address POINT, the program stops before executing the instruction at POINT when D(0) = 0, but does not stop running when D(0) = 1 because the instruction at POINT is skipped. To stop the program immediately after executing a skip instruction, be sure to set a breakpoint at both POINT and POINT_A.

Program example 4.6

```
          RC
          INY
POINT:    TABP                ; Skips when (Y) = 0
          LA    0
          .
          .
```

If a break with pass count is set at address POINT, the count is taken and execution is halted only when the instruction at address POINT is executed.

4.10 External Trigger Signal

(1) External trigger signal input timing

The latch timing of the external trigger signal is shown in Figure 4.3.

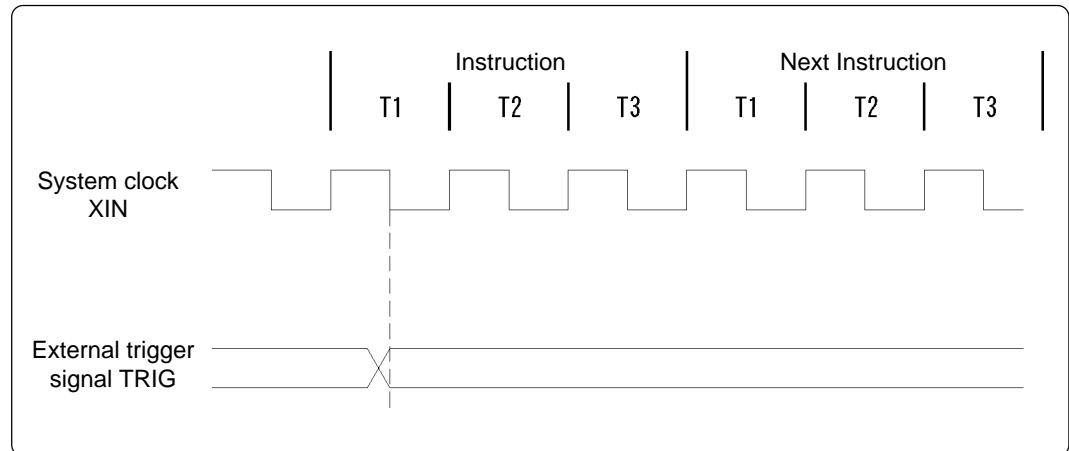


Figure 4.3 Latch timing of the external trigger signal

(2) External trigger signal input characteristics

Trigger breaks work according to the conditions (leading edge/trailing edge) of signals input from the external trigger cable. The external trigger signals of the trace points and the external trigger signals of the break points use the same signals. The input characteristics of the external trigger signals are shown in Table 4.4 below. See the table before using external trigger signals.

Table 4.4 External trigger signal input characteristics

Item	Symbol	Voltage	Min.	Max.
H-level voltage	VIH	VCC = 2.0 V	1.5 V	-
		VCC = 4.5 V	3.15 V	-
L-level voltage	VIL	VCC = 2.0 V	-	0.5 V
		VCC = 4.5 V	-	1.35 V

4.11 Other Precautions

The M34524T-MCU cannot evaluate systems that use some functions as described below. In such a case, therefore, the system needs to be evaluated using an evaluation-purpose MCU (OTP version).

- (1) Because an emulation circuit exists in the RESET pin, systems that use RESET output cannot be evaluated.
- (2) Because the M34524T-MCU has its power supply voltage fixed at 3 V or 5 V, systems that use a power-down detect function cannot be evaluated.
- (3) Power-on reset operation cannot be verified.
- (4) Because the M34524T-MCU is clocked by the system clock on the board, its clock source cannot be changed to an on-chip oscillator or CR oscillator. When using an emulator, do not use the CMCK and CRCK instructions in the program.
- (5) Because an emulation circuit exists in the D4/SIN and D5/SOUT pins, serial I/O cannot be emulated in external clock synchronized mode. Serial I/O can only be emulated in internal clock synchronized mode.
- (6) When the main clock is stopped in low-speed mode, the M34524T-MCU cannot operate normally. When using the emulator, always set bit 1 of the clock control register (main clock oscillator circuit control bit: MR1) to "0" (main clock enabled).

MEMO

5. Connection Circuit Diagrams of the M34524T-MCU

Figures 5.1 and 5.2 show the connection circuit diagrams of the M34524T-MCU. These circuit diagrams depict the M34524T-MCU connection centering on circuits connected to the target system. Emulator control blocks and other similar circuits that are not connected to the target system are omitted in this diagram.

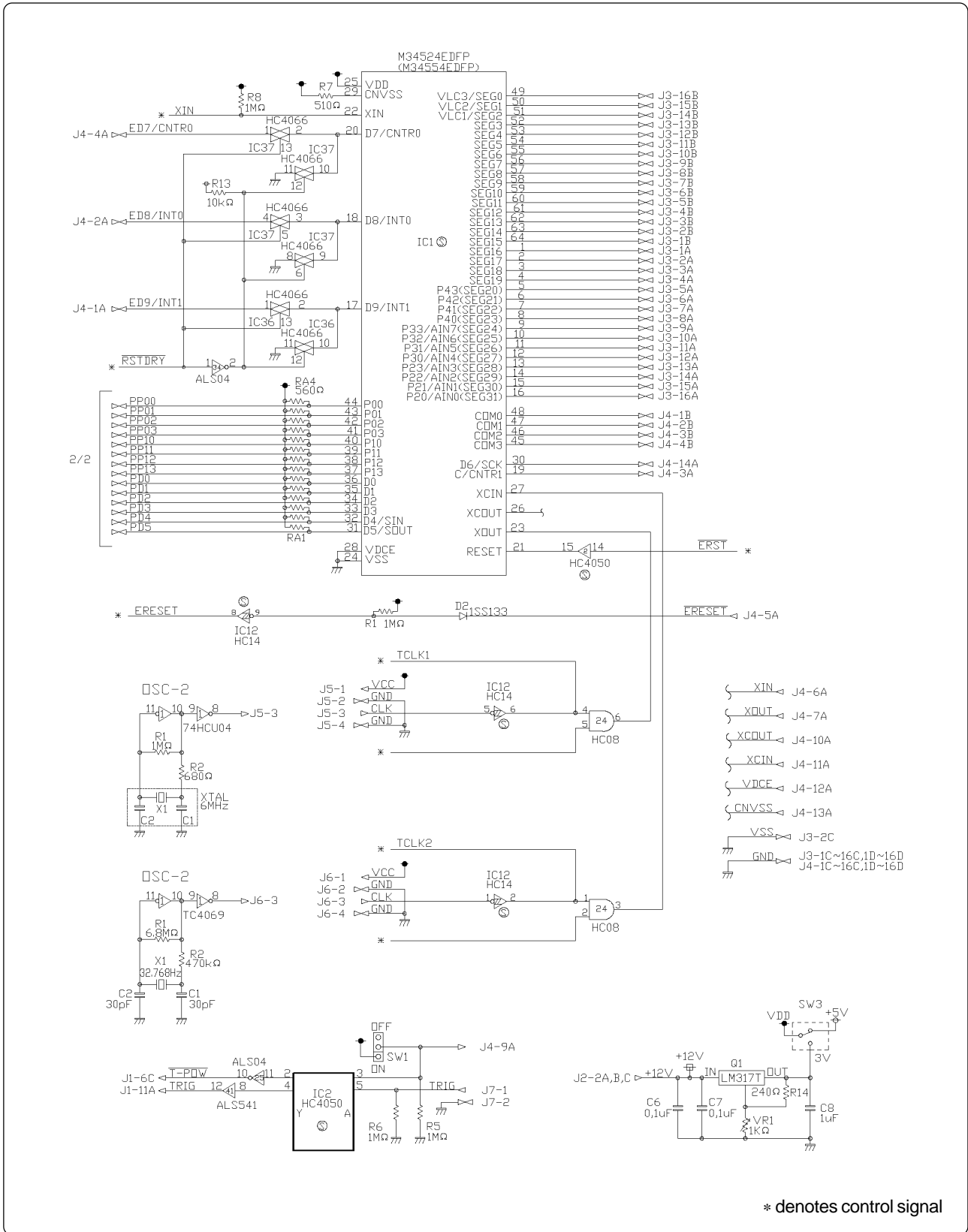
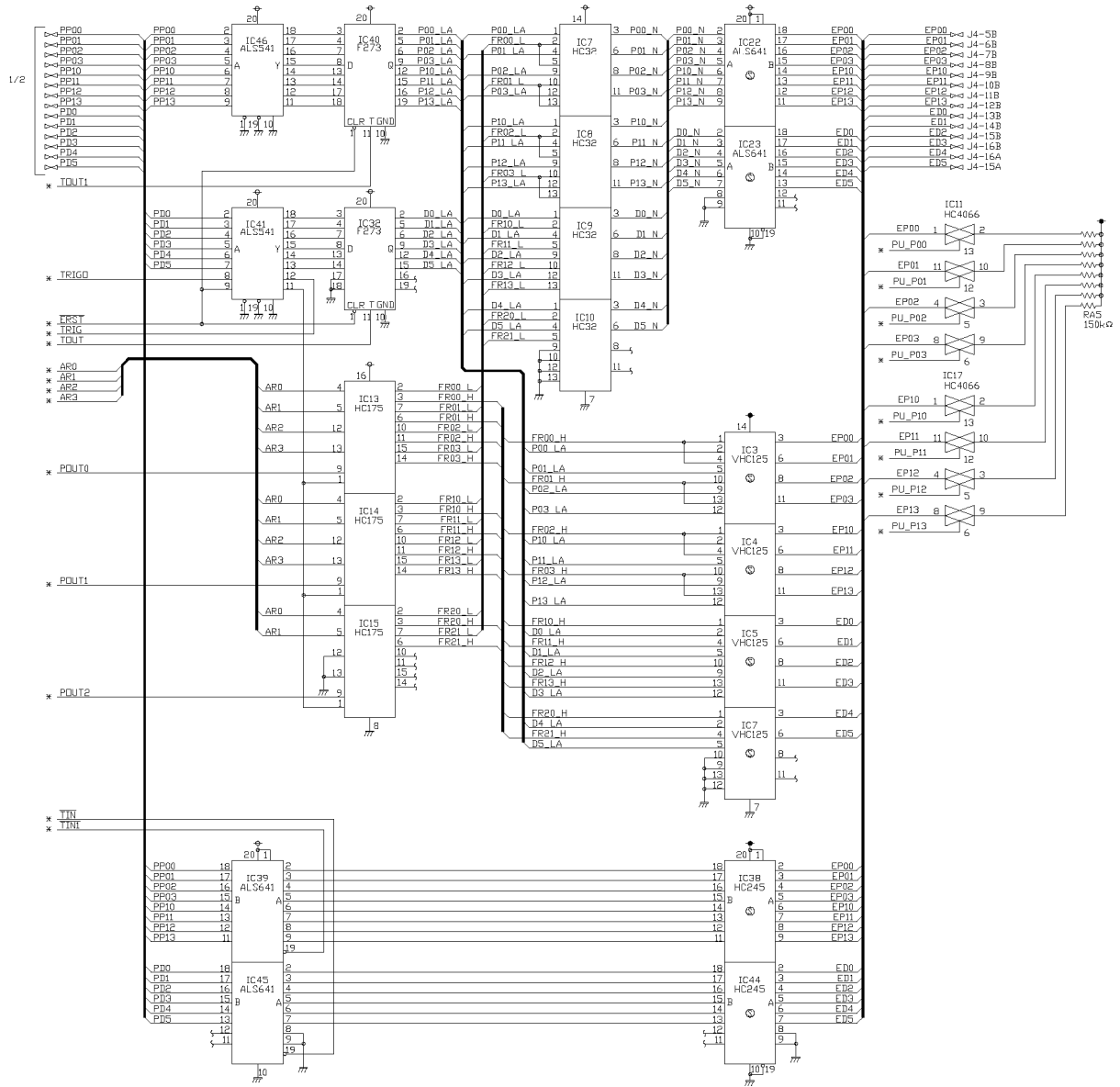


Figure 5.1 Connection circuit diagram (1/2)



* denotes control signal

Figure 5.2 Connection circuit diagram (2/2)

6. Pitch Converter Board External Dimensions

6.1 PCA4917A and PCA4917B

Figure 6.1 shows external dimensions of the PCA4917A and PCA4917B.

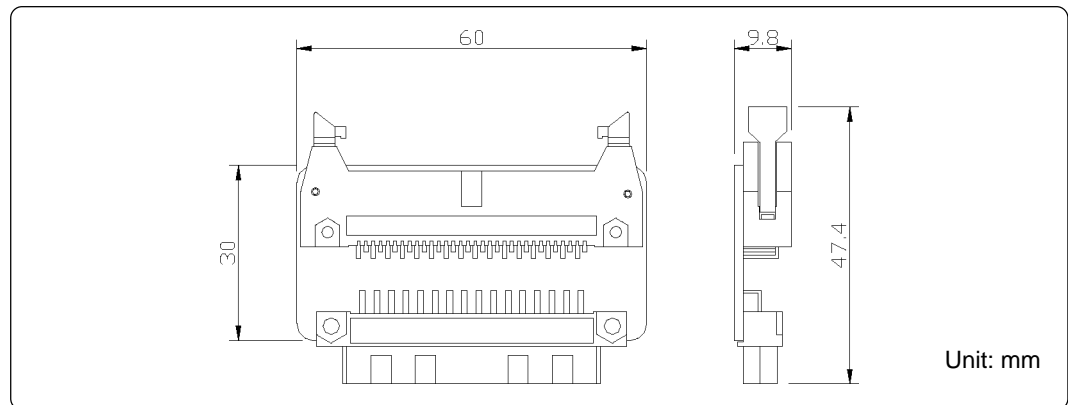


Figure 6.1 External dimensions of the PCA4917A and PCA4917B

6.2 PCA4918

Figure 6.2 shows external dimensions of the PCA4918.

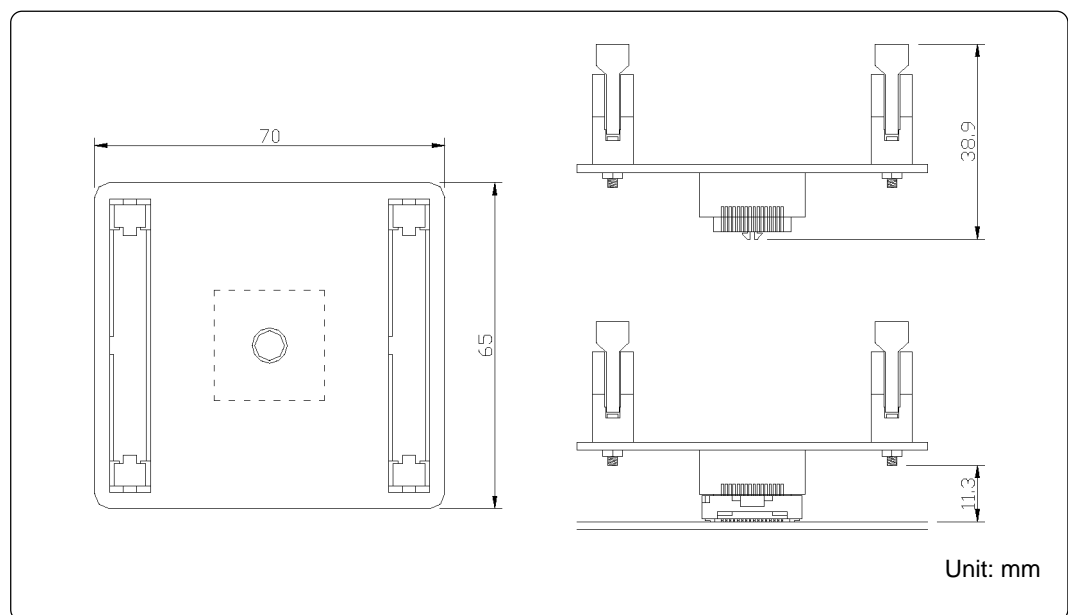


Figure 6.2 External dimensions of the PCA4918

MEMO

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

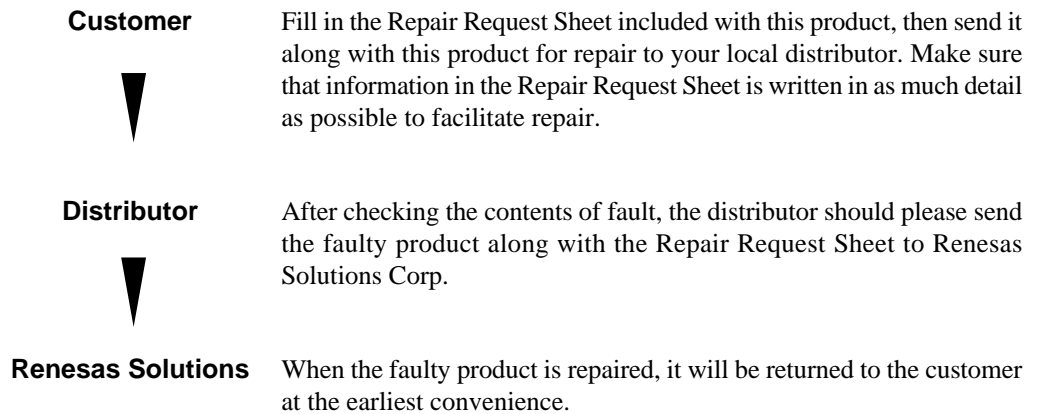
When a period of one year elapses after the model was dropped from production, repairing products of the model may become impossible.

(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.

M34524T-MCU User's Manual

Rev.2.00
July 1, 2004
REJ10J0275-0200Z

COPYRIGHT ©2003-2004 RENESAS TECHNOLOGY CORPORATION
AND RENESAS SOLUTIONS CORPORATION ALL RIGHTS RESERVED

M34524T-MCU User's Manual



Renesas Electronics Corporation

1753, Shimonumabe, Nakahara-ku, Kawasaki-shi, Kanagawa 211-8668 Japan

REJ10J0275-0200Z