

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.

M32100T-EZ-E

User's Manual

SDI Emulator System for M32R Family

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.
- Do not attempt to modify this equipment. If modified, your authority to operate this equipment might be voided by FCC.
Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.
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 M32100T-EZ-E is an emulator system using the internal debug interface SDI (Scalable Debug Interface) of the M32R Family MCUs. Using with the emulator debugger PD32RM included in this product package, it is possible to develop programs for MCUs on which the SDI is mounted.

This user's manual mainly describes specifications of the M32100T-EZ-E emulator system and how to setup it. For details on the emulator debugger, refer to PD32RM release notes and online help.

All the components of this product are shown in "2.2 Package Components" (page 15) 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.

Contents

Chapter 1. Precautions for Safety	5
1.1 Safety Symbols and Meanings	6
Chapter 2. Preparation	13
2.1 Terminology	14
2.2 Package Components	15
2.3 System Configuration of the M32100T-EZ-E	16
(1) JTAG Connection	16
2.4 Name of Each Part	17
(1) Names and Functions of Parts on the Upper Panel	17
(2) Names and Functions of Parts on the Side Panel	19
(3) Names and Functions of Parts on the Front Panel	19
(4) Names and Functions of Parts on the Rear Panel	20
Chapter 3. Setup	21
3.1 Connecting the Host Machine	22
3.3 Connecting the Target System	23
(1) Connecting the SDI Interface Connector	23
(2) SDI MCU Control Interface Connector	23
(3) Emulator Side Circuit Diagram	25
Chapter 4. Usage	27
4.1 Turning on the Power Supply	28
(1) Checking the Connections of the System	28
(2) Turning On/Off the Power Supply	28
4.2 Downloading Firmware	29
(1) When It is Necessary to Download Firmware	29
(2) Downloading Firmware in Maintenance Mode	29
Chapter 5. Specifications	31
5.1 Specifications	32
Chapter 6. Troubleshooting	33
6.1 Flowchart to Remedy Troubles	34
6.2 When the Emulator Debugger Does Not Start Up Properly	35
(1) When the LED Display of the M32100T-EZ-E is Abnormal	35
(2) Errors Occur When the Emulator Debugger Starts Up	36
Chapter 7. Maintenance and Guarantee	37
7.1 Maintenance	38
7.2 Guarantee	38
7.3 Repair Provisions	38
7.4 How to Request for Repair	39

Chapter 1. Precautions for Safety

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



1.1 Safety Symbols and Meanings	6
WARNING Warnings for AC Power Supply	7
Warnings to Be Taken for This Product	7
Warning for Installation	7
Warning for Use Environment	7
CAUTION Cautions for Power Supply	8
Cautions for Powering Up Sequence	8
Caution for Installation	8
Cautions to Be Taken for Handling This Product	8
Caution for Abnormal Operation	8
IMPORTANT Notes on Product Information	9
Notes on Downloading Firmware	9
Notes on USB Interface	9
Note on Dependencies on the MCU Model	9
Note on Stack Capacity and Stack Pointer	9
Notes on Target Program Execution in Real-time	10
Note on Specifying Breakpoints	10
Notes on Reset Control Switch	10
Note on Using Reset Mask	10
Note on LED Display	10
Note on Access Prohibited Areas	10
Notes on Target System	11

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

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

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

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

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

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

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

WARNING

Warnings for AC Power Supply:



- Power is supplied via the USB interface cable. Therefore, do not try to modify or forcibly insert it. It may cause electric shock and/or fire.
- Do not supply power from the host machine to which this product is connected to other device(s).
- If you smell a strange odor, hear an unusual sound, or see smoke coming from this product, then disconnect power immediately by unplugging the AC power cable from the outlet. Do not use this as it is because of the danger of electric shock and/or fire. Please, contact your local distributor.

Warnings to Be Taken for This Product:



- Do not disassemble or modify this product. Personal injury due to electric shock may occur if this product is disassembled or modified.
- Make sure nothing falls into the cooling fan on the top panel, especially liquids, metal objects, or anything combustible.

Warning for Installation:



- Do not set this product in water or areas of high humidity. Spilling water or some other liquid into the emulator can cause an unrepairable 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 for Power Supply:



- Power is supplied from the host machine to this product via the USB interface cable.
- Switch on and off this product by the USB interface cable.

Cautions for Powering Up Sequence:



- When turning on power, activate the emulator first and then the target system.
- When turning off power, deactivate the target system first and then the emulator.
- Always wait for about 10 seconds after turning off the power before turning it on again.

Caution for Installation:



- This product is designed to be used being laid down. Do not use this product being set up.

Cautions to Be Taken for Handling This Product:



- Use caution when handling the product. Be careful not to apply a mechanical shock.
- Do not touch the connector pins of the communications interface cable, emulator and target system. Static electricity may damage the internal circuits.
- Do not pull this product by the cable connected to the emulator. The cable may cause a break.
- 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.

Caution for Abnormal Operation:



- If the emulator malfunctions because of interference like external noise, shut down the emulator once and then reactivate it.

IMPORTANT

Notes on Product Information:

- For the information about this product, visit the Renesas Tool Homepage.
http://www.renesas.com/eng/products/mpumcu/toolhp/mcu/m32r_e.htm
- For the user registration for this product, use the registration form created when installing the emulator debugger. To registered users, the latest information about this product is delivered by e-mail.
- This product contains the CD-ROM of the emulator debugger, but it is also possible to download the latest version of the emulator debugger from the Renesas Tool Homepage.
http://www.renesas.com/eng/products/mpumcu/toolhp/mcu/m32r_e.htm

Notes on Downloading Firmware:

- When using this product for the first time or the emulator debugger has been upgraded, the emulator debugger automatically downloads the firmware (control software for the emulator built into it) to the emulator. When downloading firmware is terminated normally, the firmware will not be downloaded later.
- Do not shut down the emulator while downloading the firmware. If this happens, the product will not start up properly.
- When downloading the firmware has not completed successfully and the emulator debugger does not start up, see "4.2 Downloading Firmware" (page 29) and redownload the firmware.

Notes on USB Interface:

- USB interface can not be used with a host machine running Windows 95 or Windows NT 4.0.
- With the USB interface of the M32100T-EZ-E, not all hardware (such as host machine, USB devices, USB hub) combination will work and guaranteed.

Notes on Dependencies on the MCU Model:

- As the following items dependent on the MCU model are described in the release notes, be sure to read them.
 - (1) Differences between the emulator and actual MCU
 - (2) MCU signals connected to the SDI MCU control interface connector (Section 3.2)
 - (3) Debug specifications dependent on MCU model (Section 5.1)
 - (4) Other cautions and restrictions dependent on MCU model
- Download the latest release notes and MCU file from the Renesas Tool Homepage.
http://www.renesas.com/eng/products/mpumcu/toolhp/mcu/m32r_e.htm

Note on Stack Capacity and Stack Pointer:

- Set an address which has the device to read/write to the SPI (Stack Pointer for Interrupt) and SPU (Stack Pointer for User) during target program execution.

IMPORTANT

Note on Target Program Execution in Real-time:

- The DMA controller for the emulator incorporated in the MCU is used for the memory references/settings during target program execution. Therefore, for the memory references/settings during target program execution, the bus-cycle by the DMA controller occurs.

Note on Specifying Breakpoints:

- Due to the MCU's architecture, the following addresses cannot be set as a breakpoint.
 - (1) Addresses $(4n + 2)$ in the middle of a 1-word instruction
 - (2) Addresses $(4n + 2)$ in an instruction located in word align + 2 addresses, which are executed in parallel

Notes on Reset Control Switch:

- It is always recommended to set this switch to LOW.
- When the reset control switch on the emulator is set to Hiz START, the following operation allows you to execute the program from the reset vector during time from (2) to (3).
 - (1) Turn on the emulator.
 - (2) Turn on the target system.
 - (3) Start the emulator debugger PD32RM.

This phenomenon occurs immediately after the emulator starts up only.

Note on Using Reset Mask:

- If the reset signal from the target board is masked (disabled) using the script command (ResetMask) of the emulator debugger, the reset signal that is input to the target MCU during target program execution will be ignored and the target MCU will not be reset.

By resetting only peripheral circuits, problems will occur such as target MCU bus cycles not completing, and the target MCU may runaway.

Note on LED Display:

- Take note of the fact that the target status LEDs cannot show MCU status properly after the emulator is powered on until the emulator debugger gets started.

Note on Access Prohibited Areas:

- The emulator uses the addresses H'FFFF 8000 to H'FFFF 9FFF of the target MCU as the dedicated area for the emulator. When accessing to this area from the target program, the operation of the emulator cannot be guaranteed. Therefore, do not access to this area from the target program.

IMPORTANT

Notes on Target System:

- The power to the MCU can be turned off and back on again during target program execution. However, because the emulator makes various settings on the MCU after it is powered back on again, it takes a little longer time than when not using the emulator before the MCU can start running the program after being powered up again.
- In systems where the power is frequently turned off and back on again, the program may not operate normally.
- If the power to the MCU is turned off while the program remains idle, an error results.
- The software breaks that had been set before the power was turned off have no effect when the power is back on again, so that no software break occurs.

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	14
2.2 Package Components	15
2.3 System Configuration of the M32100T-EZ-E	16
(1) JTAG Connection	16
2.4 Name of Each Part	17
(1) Names and Functions of Parts on the Upper Panel	17
(2) Names and Functions of Parts on the Side Panel	19
(3) Names and Functions of Parts on the Front Panel	19
(4) Names and Functions of Parts on the Rear Panel	20

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 M32100T-EZ-E emulator. The M32100T-EZ-E emulator system is configured with an emulator, host machine, emulator debugger and target board.

Emulator (M32100T-EZ-E)

This means an emulator for the M32R Family MCUs on which the debug interface SDI (Scalable Debug Interface) is mounted. This emulator is connected to the target board via the SDI interface cable.

Host machine

This means a personal computer used to control the emulator.

Emulator debugger

This means the software tool PD32RM to control the emulator from the host machine through an interface. The PD32RM is included with this product.

Firmware

Program that analyzes contents of communication with the emulator debugger and controls the emulator hardware. This program is downloadable from the emulator debugger PD32RM when occasion demands.

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.

Target board

This means a board using the microcomputer to be debugged.

Target program

This means a program using the microcomputer to be debugged.

JTAG connection

A connection of the emulator via the MCU installed in the target board and the SDI interface connector. In this case, the MCU on the target board executes the target program.

2.2 Package Components

The M32100T-EZ-E package consists of the following items. When unpacking, check to see if it contains all of these items.

Item	Quantity
M32100T-EZ-E emulator	1
USB interface cable (1.8 m)	1
SDI MCU control interface cable (10-pin 1.27-mm-pitch flat cable)	1
PD32RM CD-ROM	1
M32100T-EZ-E user's manual (this manual)	1
M32100T-EZ-E user's manual (Japanese)	1
Release notes	1
Release notes (Japanese)	1
Hardware tool user registration FAX sheet	1

* The latest version of the emulator debugger PD32RM is downloadable from the Renesas Tool Homepage (http://www.renesas.com/eng/products/mpumcu/toolhp/mcu/m32r_e.htm).

* Please keep the M32100T-EZ-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 M32100T-EZ-E.

* If any of these items are missing or found faulty, please contact your local distributor.

* If there is any question or doubt about the packaged product, contact your local distributor.

2.3 System Configuration of the M32100T-EZ-E

Because the M32100T-EZ-E uses a debug interface SDI (Scale Debug Interface) built in the MCU, JTAG connection is available, which can directly control the MCU installed in the target board.

(1) JTAG Connection

The system configuration when using the M32100T-EZ-E by JTAG connection is shown below.

- (1) Host machine (Personal computer)
- (2) Emulator (M32100T-EZ-E)
- (3) Emulator debugger (PD32RM)
- (4) SDI MCU control interface cable
- (5) USB interface cable

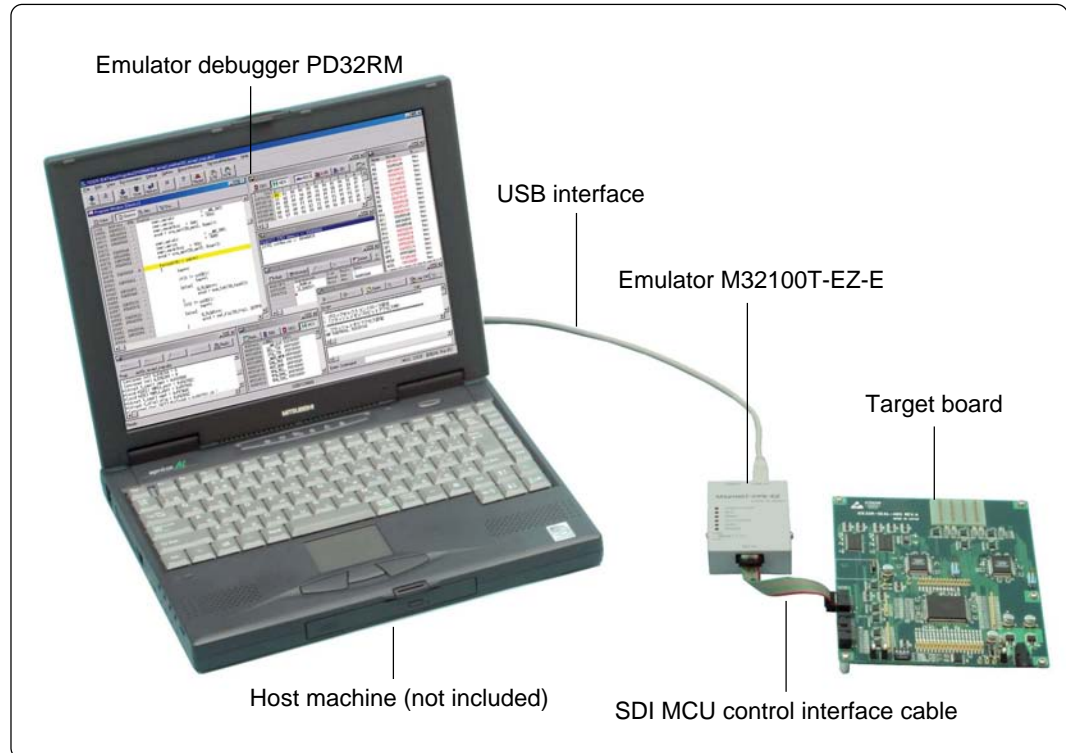


Figure 2.1 System configuration (JTAG connection)

Use the provided SDI interface cable to connect an SDI connector you prepare on the target board.

Because the emulator is connected to the target board using the SDI MCU control interface connector (10-pin), the flexibility of designing around the MCU on the target board increases. It can be used for debugging and evaluation on a test machine.

Directly installed on the target board, the target MCU will not cause problems on electrical equivalent and poor connection.

2.4 Name of Each Part

Here explains the name and function of each part.

(1) Names and Functions of Parts on the Upper Panel

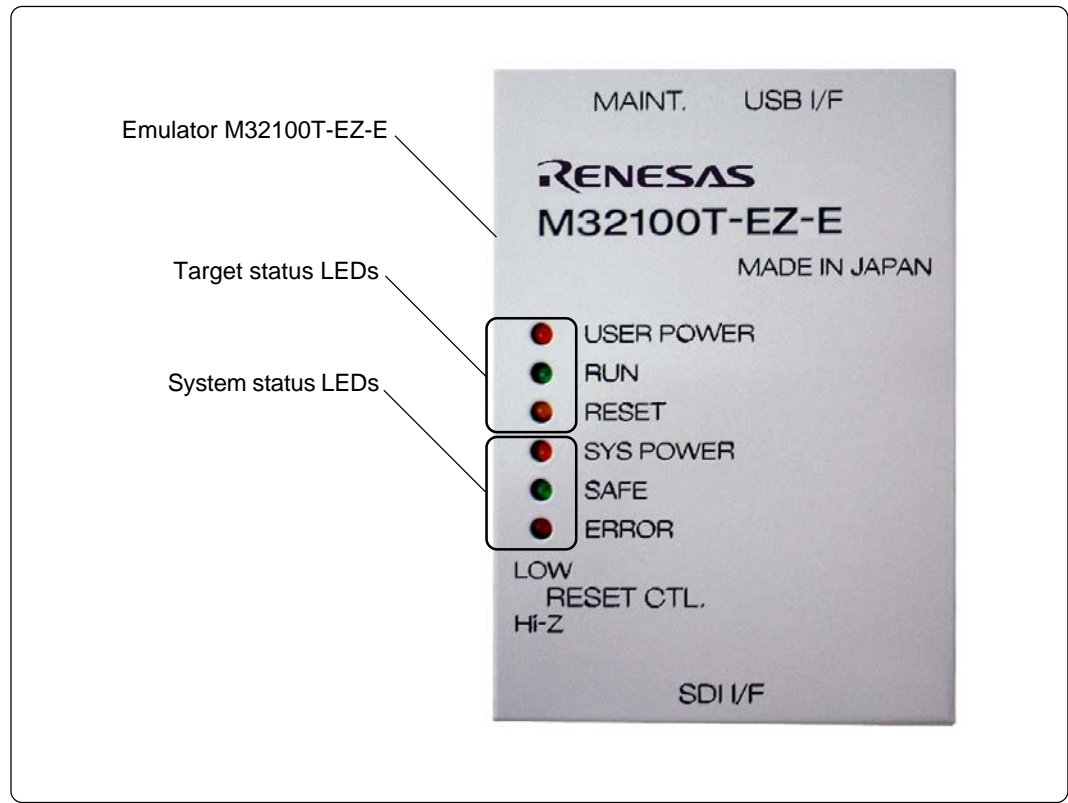


Figure 2.2 Name of each part on the upper panel

1. System status LEDs

The system status LEDs indicate the M32100T-EZ-E emulator's power supply, firmware operating status, etc. Table 2.1 lists the definitions of the system status LEDs.

Table 2.1 Definitions of the system status LEDs

Name	ON/OFF	Meaning
POWER	OFF	Emulator system is turned off.
	ON	Emulator system is turned on.
SAFE	OFF	Emulator system is not operating normally.
	Blinking	1. Emulator hardware is being configured. This occurs after the emulator is powered on until the emulator debugger gets started. 2. Emulator is in special mode (maintenance mode) for downloading firmware. Only firmware download is executed.
	ON	Emulator system is operating normally.
ERROR	OFF	Emulator is operating normally.
	Blinking	Firmware is being downloaded.
	ON	1. Emulator is not operating normally. 2. Emulator is in special mode (maintenance mode) for downloading firmware. Only firmware download is executed.

2. Target status LEDs

The target status LEDs indicate the status of the target MCU's operation and the target board's power supply, etc. Table 2.2 lists the definitions of the target status LEDs.

Take note of the fact that the target status LEDs cannot show the MCU status properly after the emulator is powered on until the emulator debugger gets started.

Table 2.2 Definitions of the target status LEDs

Name	ON/OFF	Meaning
POWER	OFF	Power is not supplied to the target board.
	ON	Power is supplied to the target board.
RUN	OFF	Target program has been halted.
	ON	Target program is being executed.
RESET	OFF	Target MCU is not being reset from an external pin.
	ON	Target MCU is being reset from an external pin. When connected by JTAG, it is not turned on by inserting a buffer into the RST signal of the SDI MCU control signal on the target board.

(2) Names and Functions of Parts on the Side Panel

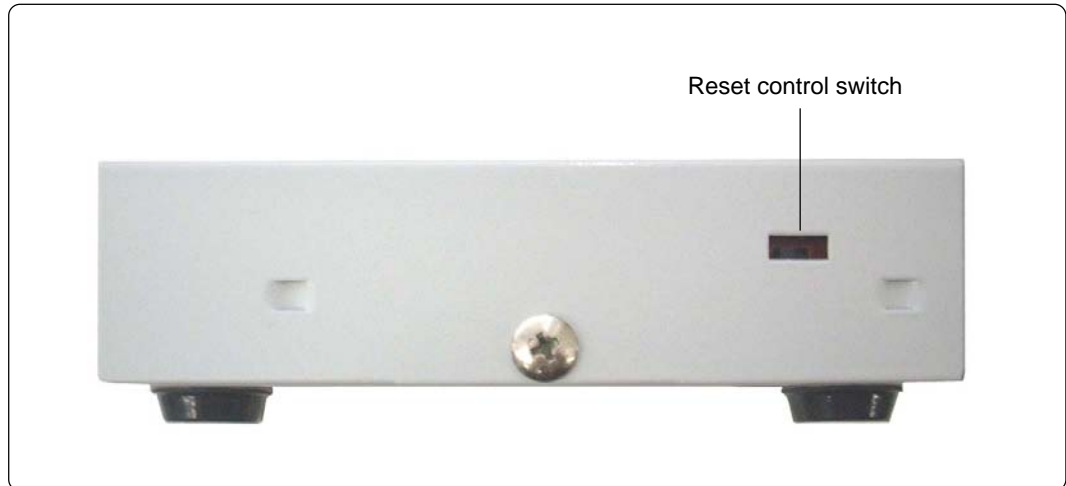


Figure 2.3 Name of each part on the side panel

1. Reset control switch

The reset control switch selects the status of the /RESET signal to the target MCU after the emulator power is turned on until the emulator debugger gets started. Table 2.3 shows the switch functions.

It is always recommended to set this switch to LOW.

Table 2.3 Functions of the reset control switch

Setting	/RESET signal to the target MCU
Hi-z	High impedance (MCU on the target board enabled.)
LOW	Fixed to low level (MCU on the target board reset.)

(3) Names and Functions of Parts on the Front Panel

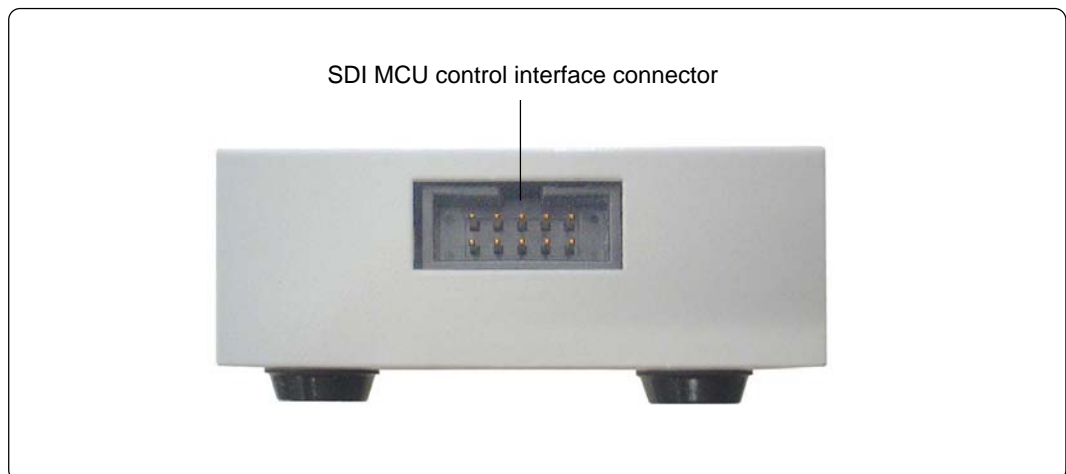


Figure 2.4 Name of each part on the front panel

1. SDI MCU control interface connector

The target MCU control signals used for the emulator with JTAG connection are assigned on the SDI MCU control interface connector. For connecting the target board, use the included SDI MCU control interface cable.

For details, refer to "3.2 Connecting the Target System" (page 23).

(4) Names and Functions of Parts on the Rear Panel

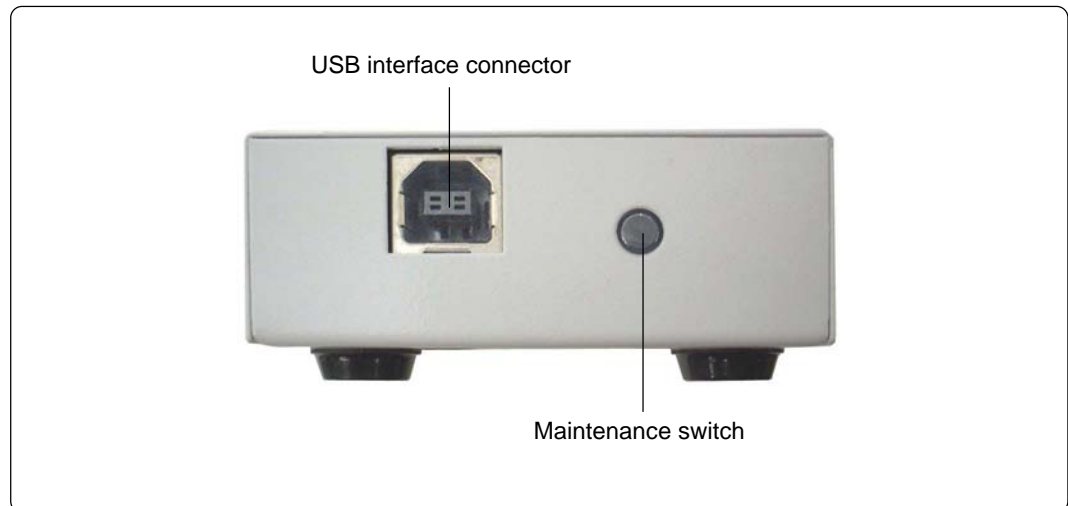


Figure 2.5 Name of each part on the rear panel

1. Maintenance switch

If this switch is pressed within 2 seconds after turning on the power, the emulator switches to maintenance mode for downloading firmware. In maintenance mode you can only download firmware. Emulator status in the mode can be checked by the system status LEDs.

Take note of the fact that the emulator has no reset switch.

2. USB interface connector

Connects the included USB interface cable.

Chapter 3. Setup

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

3.1 Connecting the Host Machine	22
3.2 Connecting the Target System	23
(1) Connecting the SDI Interface Connector	23
(2) SDI MCU Control Interface Connector	23
(3) Emulator Side Circuit Diagram	25

Chapter 3. Setup

Figure 3.1 shows how to setup the M32100T-EZ-E.

Install the emulator debugger before setting up the M32100T-EZ-E. For installing the emulator debugger, refer to the PD32RM release notes.

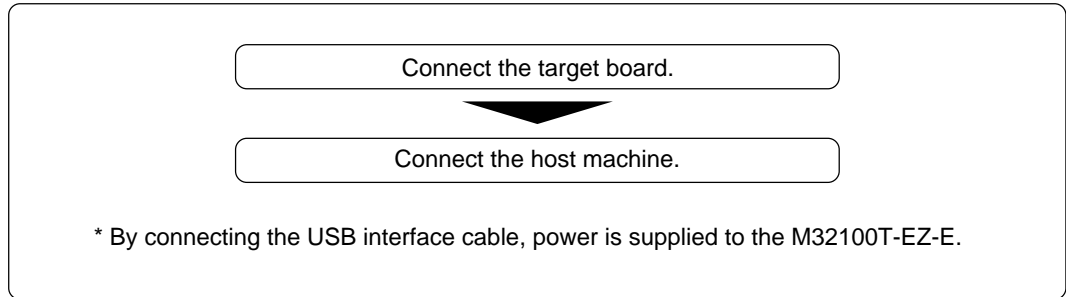


Figure 3.1 Setup procedure

3.1 Connecting the Host Machine

The emulator is connected to the host machine via the USB interface. Figure 3.2 shows how to connect the USB interface.

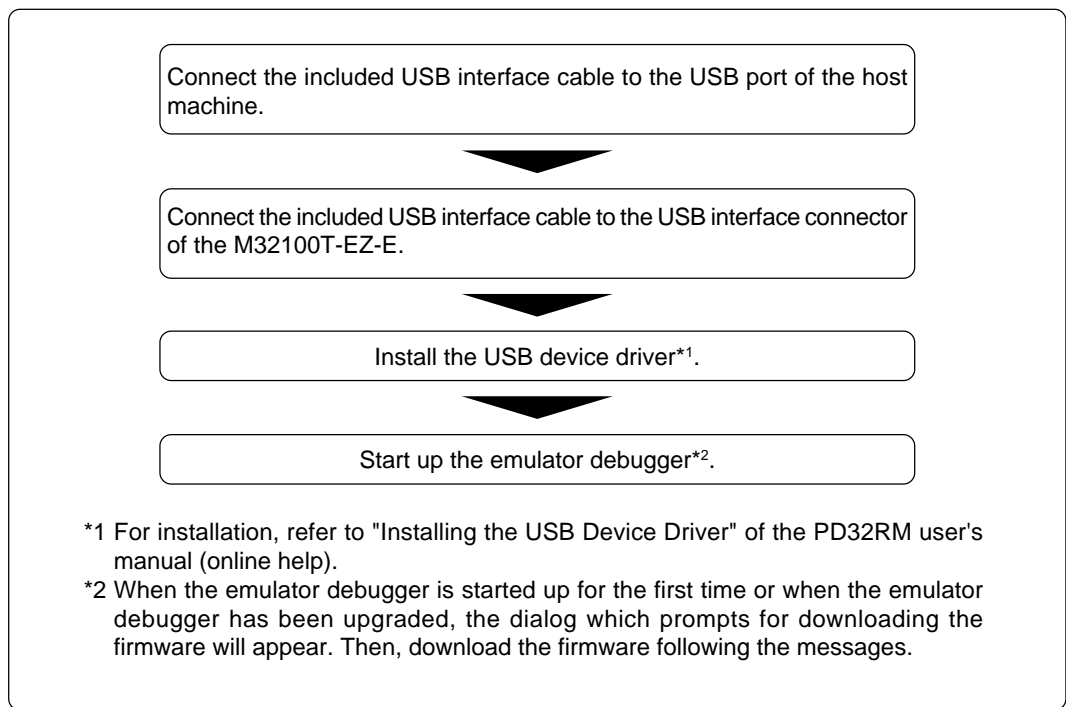


Figure 3.2 USB interface connection procedure

3.2 Connecting the Target System

The M32100T-EZ-E supports JTAG connection to connect to the target board.

To connect the emulator to the target board using the JTAG connection method, you should have the SDI MCU control interface connector on the target board. Connect the M32100T-EZ-E connector to the SDI interface connector on the target board using the provided cable.

(1) Connecting the SDI Interface Connector

Figure 3.3 shows how to connect the SDI MCU control interface connector on the target board to the emulator, and the pin numbers of the SDI MCU control interface connector.

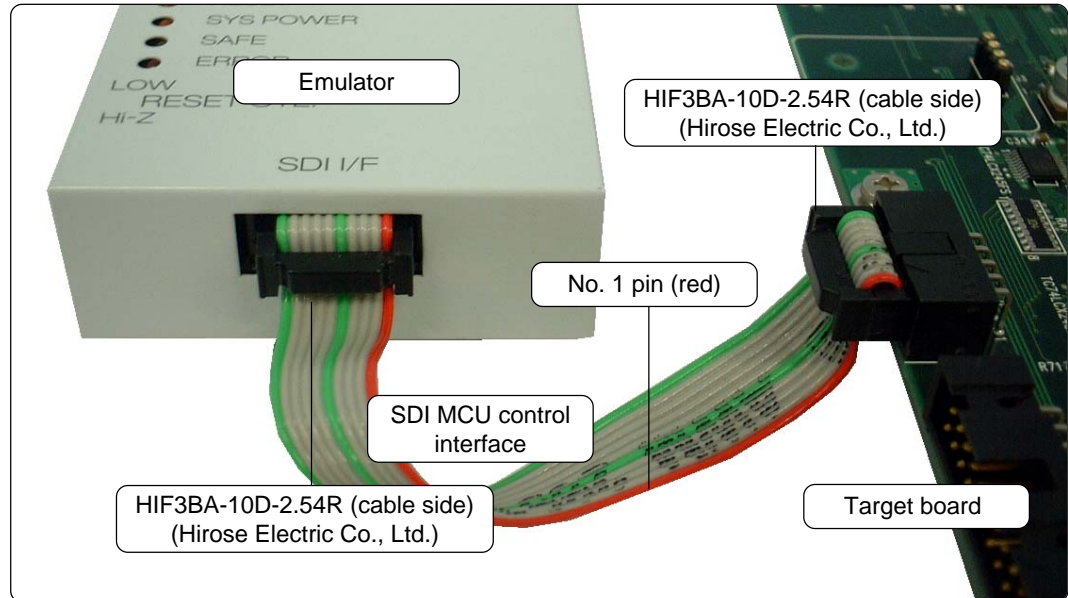


Figure 3.3 Connecting the SDI interface cable

(2) SDI MCU Control Interface Connector

Table 3.1 lists the pin assignments of the SDI MCU control interface connector. Figure 3.4 shows a sample circuit of the SDI MCU control interface. The MCU signals' names of the connection target are those of the M32170.

Table 3.1 SDI MCU control interface signal assignments

Pin No.	Pin	Direction	Connection target	Remarks
1	TCLK	Emulator to target	JTCK of MCU	Clock frequency: 10 MHz/5 MHz
2	Vss	-	GND (0 V)	
3	TDI	Emulator to target	JTDI of MCU	
4	TDO	Target to emulator	JTDO of MCU	
5	TMS	Emulator to target	JTMS of MCU	
6	TRST	Emulator to target	JTRST of MCU	Totem-pole output on emulator side
7	DBI	Emulator to target	JDBI of MCU	
8	N.C.	-	No connection	
9	Vcc	Target to emulator	VCCE of MCU	
10	RST	Emulator to target	System reset	Open collector output on emulator side

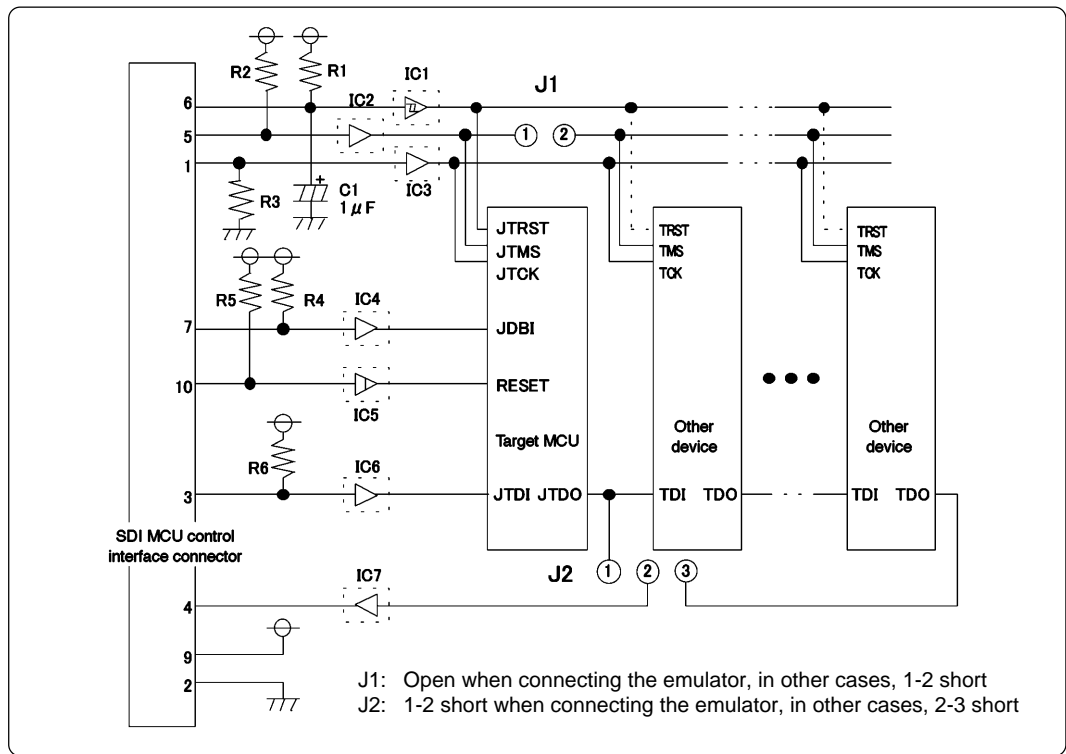


Figure 3.4 Sample circuit of the SDI MCU control interface

The following must be observed in designing a target system when you connect the SDI MCU control interface connector to the target system.

- (1) Connect the target MCU so that it is the first device seen from the SDI MCU control interface connector (JTAG connector).
- (2) Keep the TMS separate so that operation from the emulator does not adversely effect other devices.
- (3) The TDO of the M32R Family MCU should be directly connected to the TDI (pin 4) of the SDI MCU control interface connector.
- (4) Do not use TRST as RST (MCU reset request).
When using the emulator, the emulator controls TRST and RST separately. Therefore, if the two are tied together, the emulator will not function properly.
- (5) Use a CR circuit or an open collector output device to generate the TRST and RST signals on the target system without obstructing operation from the emulator. Do not connect devices with totem-pole output.

Table 3.2 Parts of the SDI MCU control interface

Part No.	Specification	Remarks
R1, R2, R6	Resistor of 10 kΩ	Pull-up with VCCE power supply. Pull-up is absolutely necessary for signal lines where a buffer IC is inserted. It is not necessary for signal lines where a buffer IC is not inserted.
R4, R5	Resistor of 10 kΩ	Pull-up with VCCE power supply. Pull-up is necessary whether a buffer IC is inserted or not.
IC1 to IC7	Buffer IC	It is logically unnecessary, but it is recommended to mount one to stabilize operation.
R3	Resistor of 10 kΩ	Pull-down at GND. Pull-down is absolutely necessary when a buffer IC (IC3) is inserted. It is not necessary when a buffer IC is not inserted.
C1	1 μF capacitor	Resets the MCU's JTAG circuit when turned on.
J1	Jumper pin	1-2 connected: except when the emulator is connected
J2	Jumper pin	1-2 connected: when the emulator is connected 2-3 connected: when the emulator is not connected

(3) Emulator Side Circuit Diagram

Figure 3.5 shows the circuit diagram in the emulator of the SDI trace interface part, and Table 3.3 lists the explanation of the circuit diagram.

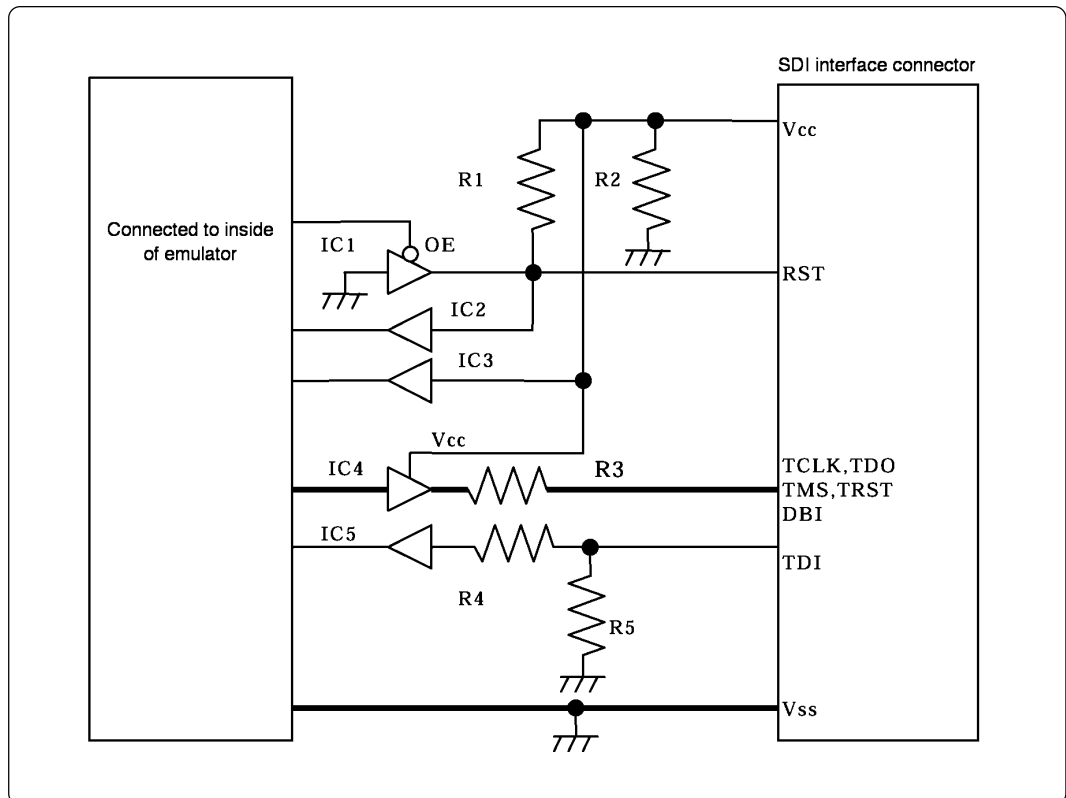


Figure 3.5 Circuit diagram of the emulator side of the SDI interface

Table 3.3 Parts in the emulator

Part No.	Specification	Remarks
IC1, IC2, IC3	Buffer IC: TC7SZ125 (made by Toshiba Corporation)	
IC4	Buffer IC: LCX245 (made by Toshiba Corporation)	Power supplied from the target board
R1, R2, R5	Resistor: 100 kΩ	
R3, R4	Resistor: 33 Ω	

MEMO

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 Supply	28
(1) Checking the Connections of the System	28
(2) Turning On/Off the Power Supply	28
4.2 Downloading Firmware	29
(1) When It is Necessary to Download Firmware	29
(2) Downloading Firmware in Maintenance Mode	29

Chapter 4. Usage

4.1 Turning on the Power Supply

(1) Checking the Connections of the System

Before turning on the power, check the connections of the host machine, communications interface cable, emulator and target system.

(2) Turning On/Off the Power Supply

- When turning on, activate the M32100T-EZ-E first and then the target system.
- When turning off, deactivate the target system first and then the M32100T-EZ-E.
- Always wait for about 10 seconds after turning off the power before turning it on again.
- Power to the emulator is supplied via the USB interface cable.

IMPORTANT

Notes on Power Supply to the Target Board:

- 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.
- Do not change the power supply voltage after the target system has been activated.

Note on Power Supply to the Emulator:

- Power is supplied from the host machine to this product via the USB interface cable. Take note of the fact that by connecting the USB interface cable, the M32100T-EZ-E is powered on.

4.2 Downloading Firmware

(1) When It is Necessary to Download Firmware

It is necessary to download the firmware in the occasions listed below. Generally, these are detected when the emulator debugger starts up, then downloading the firmware is started.

- (1) When you use this product for the first time
- (2) When the firmware has been upgraded
- (3) When the emulator debugger has been upgraded

Redownload the firmware when the power supply is shut off or when the communication interface cable is pulled out accidentally while downloading the firmware from the emulator debugger, following the procedure below.

(2) Downloading Firmware in Maintenance Mode

Download the firmware in maintenance mode as explained here following.

- (1) Within 2 seconds of activating power to the emulator, press the maintenance switch on the emulator front panel. This will switch the emulator to maintenance mode. When switching to maintenance mode, the "SAFE" system status LED blinks.
- (2) Start up the emulator debugger. When the Init dialog box setup is complete, the dialog which prompts for downloading the firmware will appear. Download the firmware following the messages. It takes about 5 seconds for downloading the firmware.

IMPORTANT

Note on Downloading Firmware:

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

MEMO

Chapter 5. Specifications

This chapter describes specifications of this product.

5.1 Specifications	32
--------------------------	----

Chapter 5. Specifications

5.1 Specifications

Table 5.1 lists specifications of the M32100T-EZ-E.

Table 5.1 Specifications of the M32100T-EZ-E

Applicable MCU		M32R MCUs integrating SDI whose operation verification has been completed by Renesas Technology *1
Emulation memory	Capacity	RAM used as emulation memory. *2
Software break		Implemented by internal resource of MCU or instruction replacement. *2
Communications interface		USB 1.1, full-speed
Connection type for target board		JTAG connection
Power supply		Supplied from the host machine
External dimensions (main body)	Width	61 mm
	Depth	86.5 mm
	Height	22 mm
Weight		130 g
Use environment	Temperature, humidity	5 to 35°C, 20 to 80%
	Dust and dirt	General office environment
Storage environment	Temperature, humidity	-10 to 60°C, 0 to 90%
	Dust and dirt	General office environment
Overseas standards		<ul style="list-style-type: none">• U.S. EMI standards (FCC part 15 Class A)• CE marking (EN55022, EN55024)

*1 The latest list of the applicable MCUs is available on the Renesas Tool Homepage.
http://www.renesas.com/eng/products/mpumcu/toolhp/mcu/m32r_e.htm

*2 Depends on the MCU specifications. For details, see the release notes.

Chapter 6. Troubleshooting

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

6.1 Flowchart to Remedy Troubles	34
6.2 When the Emulator Debugger Does Not Start up Properly	35
(1) When the LED Display of the M32100T-EZ-E is Abnormal	35
(2) Errors Occur When the Emulator Debugger Starts Up	36

Chapter 6. Troubleshooting

6.1 Flowchart to Remedy Troubles

Figure 6.1 shows the flowchart to remedy troubles from when the emulator is activated until the emulator debugger gets started. Check this while the target system is disconnected.

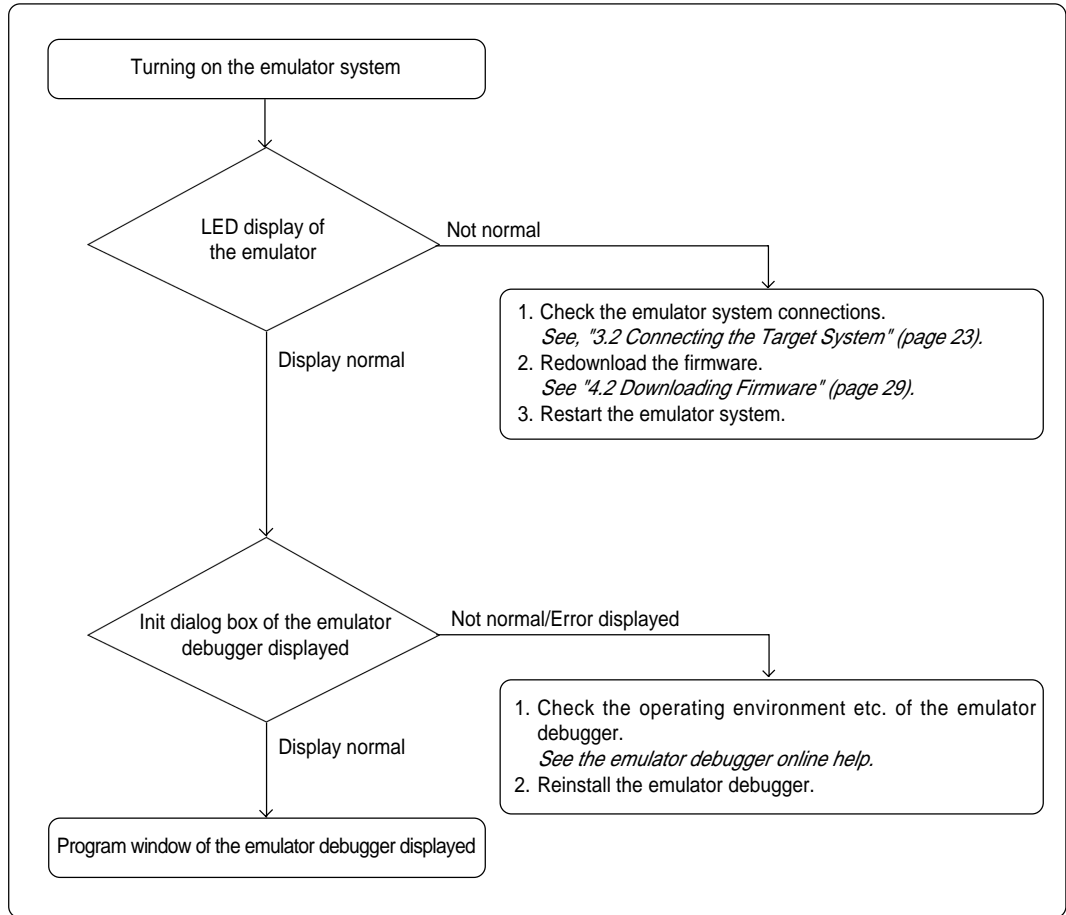


Figure 6.1 Flowchart to remedy troubles

6.2 When the Emulator Debugger Does Not Start Up Properly

(1) When the LED Display of the M32100T-EZ-E is Abnormal

Table 6.1 LED's abnormal display and its checkpoints

Error	Connection to the target system	Checkpoint
LEDs do not light up.	-	Check that the USB interface cable is properly connected. <i>See the M32100T-EZ-E User's Manual.</i>
The SAFE or ERROR LED of "STATUS OF SYSTEM" remains lit.	-	Turn on the power again. <i>See "4.1 Turning on the Power Supply" (page 28).</i>
The POWER LED of "STATUS OF USER" does not light up.	Connected	Check that power and GND are properly supplied to the target system.

(2) Errors Occur When the Emulator Debugger Starts Up

Table 6.2 Checkpoints of errors when starting up the emulator debugger

Error	Checkpoint
<ul style="list-style-type: none"> • Communication ERROR. Can't send data. 	Check that the serial number of the emulator is displayed in the MCU tab of the Init dialog box of the emulator debugger.
<ul style="list-style-type: none"> • The version of PD32RM and the firmware on the target are not same. 	Download the proper firmware. <i>See "4.2 Downloading Firmware" (page 29).</i>
<ul style="list-style-type: none"> • Target MCU is reset state. 	<ol style="list-style-type: none"> (1) Check that the reset pin of the target system is pulled up. (2) Check that the reset pin of the target system has changed from "L" to "H". (3) Check that the following pins of the MCU are properly connected. Pins: JTRST, JTCK, JTMS, JTDO, JTDI, JDBI <i>See "3.2 Connecting the Target System" (page 23).</i>
<ul style="list-style-type: none"> • Target MCU cannot be reset. 	<ol style="list-style-type: none"> (1) Check that bus hold signal is negated. (2) If the reset circuit of the target system has a watchdog timer, disable the timer. (3) Check that power and GND are properly supplied to the target system . (4) The program may be uncontrollable in an area where memory is not allocated. (5) Check that the following pins of the MCU are properly connected. Pins: JTRST, JTCK, JTMS, JTDO, JTDI, JDBI <i>See "3.2 Connecting the Target System" (page 23).</i>
<ul style="list-style-type: none"> • Target MCU is not under control. 	Check that the following pins of the MCU are properly connected. Pins: JTRST, JTCK, JTMS, JTDO, JTDI, JDBI <i>See "3.2 Connecting the Target System" (page 23).</i>
<ul style="list-style-type: none"> • Target MCU is in sleep mode. • Target MCU is in standby/stop mode. 	The MCU is either in sleep/standby/stop wait mode. Either reset the MCU or cancel the mode with an interrupt. <i>See the user's manual of the MCU.</i>
<ul style="list-style-type: none"> • Target MCU is not given power. 	Check that power and GND are properly supplied to the target system .
<ul style="list-style-type: none"> • Sent command cannot be executed in this H/W environment. 	<ol style="list-style-type: none"> (1) Check that the proper MCU file is specified. (2) Reinstall the emulator debugger.

Chapter 7. Maintenance and Guarantee

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

7.1 Maintenance	38
7.2 Guarantee	38
7.3 Repair Provisions	38
7.4 How to Request for Repair	39

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

The product presented here has passed Renesas's product inspection. If your product becomes faulty within 12 months after purchase while being used under good conditions by observing the Precautions for Safety described in "Chapter 1. Precautions for Safety", Renesas will repair the fault free-of-charge. (This provision does not apply to emulation pods leased to you.) When repair is required, contact your local distributor.

7.3 Repair Provisions

If a fault in your equipment falls under one of the following categories, the fault will be corrected by replacing the entire equipment instead of repairing, depending on the severity of fault:

- Faulty or broken mechanical section
- Flaw, separation, or rust in coated or plated section
- Flaw or crack in plastic section
- Fault or breakage caused by incorrect use or unauthorized repair or modification
- Heavily damaged electric circuits due to shorting of power supply, overvoltage, or overcurrent
- Crack in printed circuit board or burned-down patterns
- Broad range of fault making replacement less expensive than repairing
- Unlocatable or unidentifiable fault

7.4 How to Request for Repair

If your M32100T-EZ-E is found faulty, follow the procedure below to send your product for repair.

Customers



Write down the necessary information in the "M32100T-EZ-E Repair Request Sheet" attached hereto, then send it along with the M32100T-EZ-E for repair to your local distributor.

Make sure that information in the M32100T-EZ-E Repair Request Sheet is written in as much detail as possible to facilitate repair.

Distributors



After checking the contents of fault, the distributor should please send the faulty M32100T-EZ-E along with the Repair Request Sheet to Renesas Solutions.

Renesas Solutions Corp.

When the faulty M32100T-EZ-E is repaired, it will be returned to the customer at the earliest convenience.

CAUTION

Note on Transporting the Product:

- When sending your M32100T-EZ-E for repair, use the packing box and cushion material supplied with the M32100T-EZ-E 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 the M32100T-EZ-E (usually a blue bag). When you use other bags, they may cause a trouble on your product because of static electricity.

MEMO

M32100T-EZ-E User's Manual

Rev.2.00
September 1, 2003
REJ10J0002-0200Z

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

M32100T-EZ-E User's Manual



Renesas Electronics Corporation

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

REJ10J0002-0200Z