

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.

M3T-PD38 (Discontinued Product)

Emulator Debugger for 740 Family [for PC4701 Emulators]

Target Devices

- 740 Family 38000 Series (8-bit)
- 740 Family 740 Series (8-bit)
- 740 Family 7200 Series (8-bit)
- 740 Family 7600 Series (8-bit)

Overview

This product is an emulator debugger (software) included with a Renesas' full-featured emulator package. Easy-to-use GUI (Graphical User Interface) and many advanced debugging features improve the debugging efficiency of applications on your target system.

This debugger also allows you to customize with a programming tool such as Microsoft Visual C++ or Visual Basic (the PDSDK COM kit required). For example, you can create a user-defined window and interface between the debugger and other COM-compliant applications.

Applicable Emulator

- [PC4701U](#) (Emulator for M16C,7700,740 Family)
- PC4701M (Discontinued product)
- PC4701HS (Discontinued product)

Notes

*Included with an applicable emulator. Not available alone.

Features

- Easy operations with overlapping multi-windows and GUI
- Comfortable debugging environment provided by drag & drop operation
- C language and assembly language source level debugging and many other basic debug features^{*1}
- Real-time OS support^{*2}
- Real-time RAM monitoring
- Real-time tracing, C0 coverage, Time measurement and other advanced features
- Creating user-defined windows and commands
- USB, Serial, parallel and LAN interfaces support^{*3}
- On-line help in HTML

*1. C-language-source-level debugging function is provided for the IAR Systems's C compiler, ICC740 (EW740).

*2. Functions supporting real-time OS are for the Vector Informatik GmbH's real-time OS, osCAN M7600.

*3. Available host computer interfaces depend on an emulator. (See PC Interfaces)

Operating Environment

- IBM PC/AT compatibles (Windows XP, Windows Me, Windows 98, Windows 2000, Windows NT 4.0)

PC Interfaces

	PC4701U	PC4701M (Discontinued product)	PC4701HS (Discontinued product)
LAN	LAN (10Base-T)	None	LAN (10Base-T, 10Base-5)
USB/Serial	USB (*1) (USB 1.1, Full-speed)	RS-232C (max. 38,400bps)	RS-232C (max. 38,400bps)
Parallel	LPT parallel (*2)	LPT parallel (*2)	Renesas proprietary parallel (*3)

*1. A USB I/F is available on Windows XP, Windows Me, Windows 98 and Windows 2000. It is unavailable under Windows NT 4.0.

*2. It is a printer port that supports ECP, EPP, Byte/Compatibility and Nibble/Compatibility modes.

*3. PCA4202G02 parallel interface board (optional) is required. On Windows XP, the Renesas proprietary parallel interface is not supported.

Specifications

Software break	64 points
Hardware break	6 points
Real-time trace	<ul style="list-style-type: none"> • 32K cycles • 6 trace points by events • Trace write condition can be specified.
Real-time RAM monitor	1024 bytes
Time measurement	Between from RUN to STOP / Other 4 points interval
C0 coverage	Available
Exception event detection	Access protect

Basic Functions

Window	Function
PD38 Window	Controls an entire debugger. You can perform the following basic debugging commands by using the tool bar buttons: program execution/stop, step execution, execution up to cursor position, and break point setting/cancel. You can also open various other windows from this window.
Program Window	Displays the program. Source code is editable here. Matching address line is displayed in color for the program counter (PC). You can select display format from among "source", "disassemble" or "mixed". You can also set or cancel break points.
Source Window	Displays the designated place of a program. Source code is editable here. Unlike the program window, you can open more than one window. The window is displayed continuing a certain function or task, and is convenient when break points have to be set and canceled repeatedly.
Register Window	Displays/changes content of flags and registers particular to the MCU.
Memory Window	Displays memory content together with the address and label. Display format can be selected from among binary, decimal, hexadecimal, ASCII, SJIS (for Japanese) or JIS (for Japanese).
Dump Window	Displays memory content in dump format. Display format can be selected from among decimal, hexadecimal, ASCII, SJIS (for Japanese) or JIS (for Japanese).
RAM Monitor Window	Displays memory content changed during target program execution. The area read during program execution is displayed in green, and the area written is displayed in red. (You can set colors of your choice.)
ASM Watch Window	Monitors changes of memory contents and variable contents declared on assembly language level. Display format can be selected from among binary, decimal, and hexadecimal. If the specified address is within the real-time RAM area, area read is displayed in green, and the area written is displayed in red. (You can set colors of your choice.)
C Watch Window	Displays C variable contents. In addition to a window that displays variable formula of your choice, there are windows that display external variables, local variables within a file, and local variables within a function.
Script Window	The window for executing commands from the keyboard or script files. An area is provided for displaying command execution results and command history. Execution results can be output to a file.
S/W break point setting dialog	Dialog box for setting/clearing software break points. Can set 64 break points maximum (OR condition).

Screen Image : Basic Windows

The screenshot displays the PD38 development environment with several windows open. Blue arrows point from labels to the corresponding windows:

- PD38 Window:** The main application window at the top.
- Program Window:** Shows the source code for a program. The code includes:


```

      Line BRK Source
      00010 unsigned char j,k;
      00011 static nouse char data[0xFF];
      00012
      00013 while(1) {
      00014     for( i = 0 ; i <= 0xFF ; i++ ) {
      00015         j = rand();
      00016         data[i] = i;
      00017         j = rand();
      00018         k = data[i];
      00019     }
      
```
- Memory Window:** Shows memory addresses and data.

Address	LABEL	DATA
003F		00
0040		00
0041	?OP0_L00	80
0042		81
0043	?OP1_L00	FF
0044		01
0045		E9
- Register Window:** Shows the state of registers.

Name	Value	Radix
PC	81E	Hex
A	FF	Hex
X	71	Hex
Y	99	Hex
S	0AE	Hex
- RAM Monitor Window:** Shows memory addresses and data in a grid format.

Address	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E
0030	00	00	00	00	00	00	00	00	00	00	00	00	00	40	00
0040	00	FF	FF	FF	00	30	FB	8F	00	01	FF	FB	00	00	7F
0050	AD	26	FF	FF	00	30	FB	8F	00	01	FF	FB	00	00	7F
0060	40	26	FE	FF	40	26	45	8F	8F	00	00	00	00	00	FF
0070	28	28	FB	FF	00	81	FF	8F	04	00	FF	FD	08	04	EA
- C Watch Window:** Shows the state of C variables.


```

      -(unsigned char [255]) data = 0x100 (76 'L')
      (unsigned char) (data)[0] = 76 'L'
      (unsigned char) (data)[1] = 193 'f'
      (unsigned char) (data)[2] = 214 'a'
      
```
- Script Window:** Shows the execution script.


```

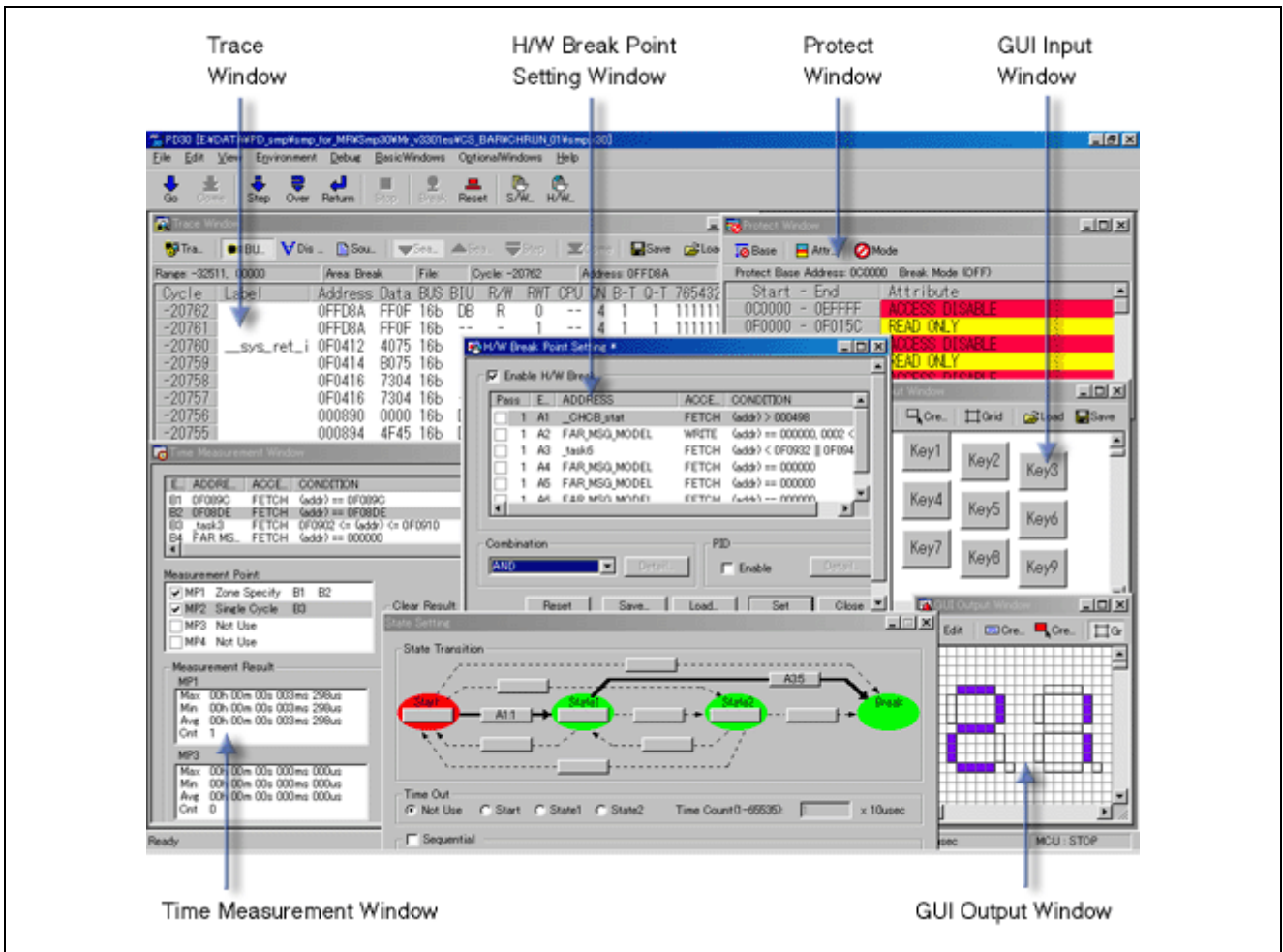
      0100: 23 BD DF 54 2E 00 5A E3 9C A8 EE 3D B9 0E DC A2 #...T...Z...
      01D0: 56 91 34 05 7B 4C 2A A7 FD 8B 85 F0 92 82 7D 0B V.4.(L*...
      01E0: 05 71 D7 29 59 D9 9E F3 68 AD 9A 2E A8 E8 31 0B .q.)Y...h...
      01F0: AE 27 A3 1C 04 84 8D C4 00 60 42 4A CE 83 68 C4 *.....B
      > r pc
      PC=80F0
      
```
- ASM Watch Window:** Shows the state of assembly instructions.

Addr:Bit	Expression	Size	Radix	Data
00:43	43	Byte	Hex	
00:45	45	Byte	Hex	
00:45:2	45	Byte	Bit	

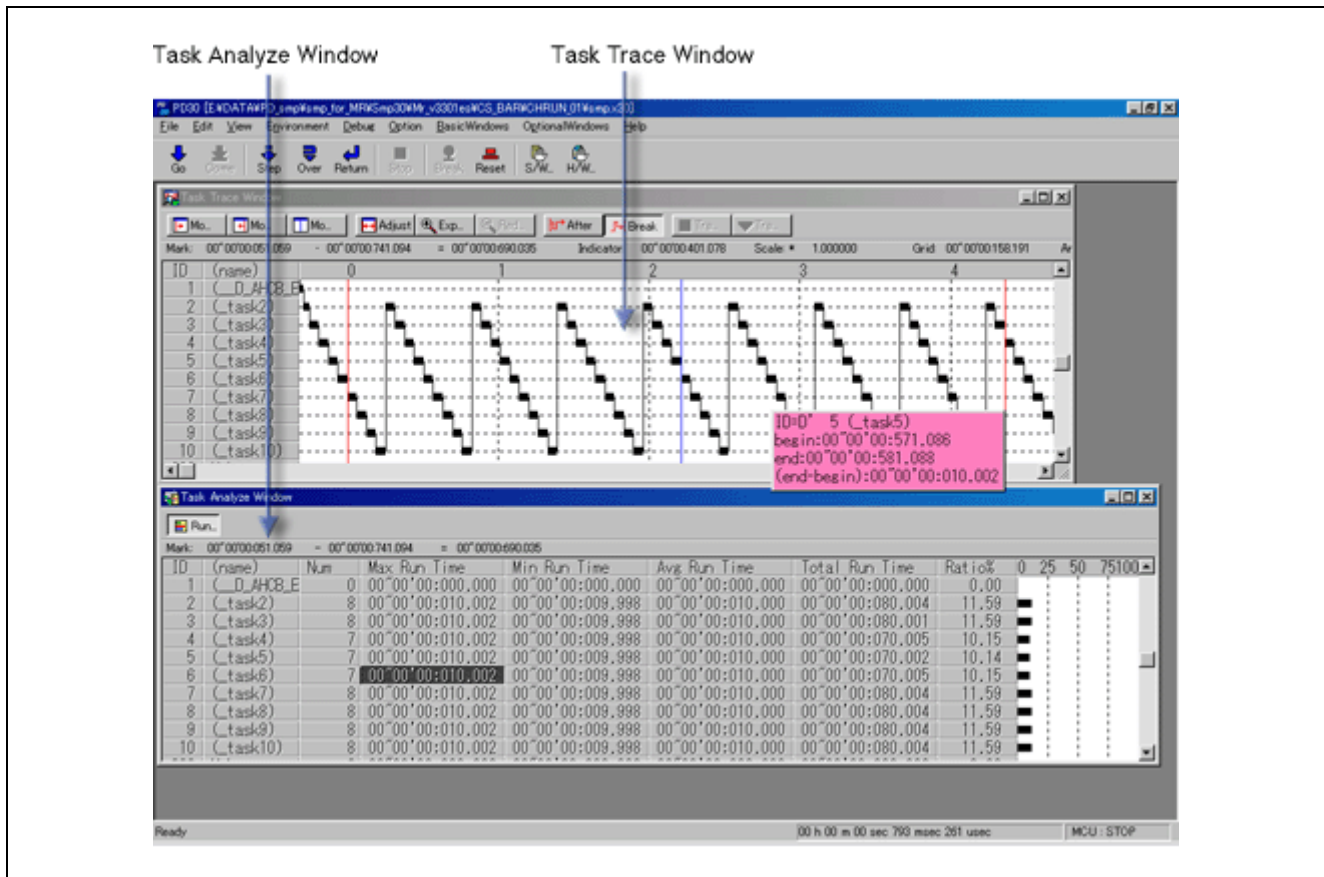
Advanced Functions

Window	Function
Protect Window	Sets the protect function that halts program execution when a reserved area is accessed. An access attribute (Access Disable, Read Only or R/W Enable) can be specified in one byte batch of memory.
H/W Break Point Setting Window	Sets/cancels hardware break points. Can set 6 break points maximum and specifies the combination condition of break events. As a combination condition, there is a choice of not only AND and OR but also state transition specification with a transition chart. Using this feature allows you to easily detect abnormalities caused by multiple interrupts and task status transition in a program with a real-time OS.
Trace Point Setting Window	Specifies conditions for trace events like the H/W Break Point Setting Window.
Trace Window	Displays the results of real-time tracing in the emulator. The following three display modes are supported: Bus mode, Disassemble mode and Source mode.
Task Trace Window	Graphically shows task execution histories of programs using real-time OS.
Task Analyze Window	Shows the results of statistical processing of measured data within the range specified with the Task Trace Window. This window shows the occupancies of tasks in a CPU.
Coverage Window	Shows coverage measurement results of C functions. Results can be checked in separate windows: "Coverage window" displaying coverage results and start and end addresses of each function, and "Coverage source window" used to see whether each source line has been executed.
Time Measurement Window	Displays the minimum/maximum/average execution time and measurement count at any measurement point. The execution time of up to 4 measurement points can be measured simultaneously.
GUI Input Window	Shows key input panels of user target system. You can make virtual key input buttons by simple mouse operation. While the program is running, pressing the button generates data input.
GUI Output Window	Shows output panels of user target system. You can make virtual output LEDs or labels by simple mouse operation.
Custom Window	User-developed new window (called "Custom window") that can be used by registering in the debugger. After registering, the "Custom window" can be opened from the menu just like other windows.

Screen Image : Advanced Windows for the Emulator (1/2)



Screen Image : Advanced Windows for the Emulator (2/2)



Upgrade Information

M3T-PD38 debugger was revised to V.5.20 Release 1 in April 1, 2004.

New feature(s):

- Distributed without charge for users of every kind of PC4701 emulator including PC4701HS. (The latest version is available by online upgrade.)
* See also the Apr. 1, 2004 issue of TOOL NEWS.

[Online-upgrading]

Users of an applicable emulator can download and use the latest version (free-of-charge). For details, see the applicable emulator's "Download" site.

Website and Contact Information

- Renesas Technology Software and Tools
<http://www.renesas.com/tools>
- Contact Information
<http://www.renesas.com/inquiry>
csc@renesas.com