

# CubeSuite+ Simulator for RX V2.01.00

## **Release Note**

R20UT2035EJ0100 Rev.1.00 April 11, 2012

### Contents

Chapter 1. Target Devices	2
Chapter 2. User's Manuals	3
Chapter 3. Range	4
Chapter 4. Simulation of Peripheral Functions	
4.1 Timer	5
4.2 Interrupt Controller	6
4.3 Memory Protection Unit	7
Chapter 5. Changes	8
5.1 Expansion of a trace memory size	8
5.2 Correspondence of a method of normal input and output same as an emulator	8
5.3 Addition of PC display during program execution	8
5.4 Improvement of a trace function	8
5.5 Removal of cautions	8
Chapter 6. Cautions	
6.1 Caution of time measurement on return out	
6.2 Caution of property panel	9



## **Chapter 1. Target Devices**

CubeSuite+ Simulator for RX600 series and RX200 series supports both simulation of RX CPU core and simulation of timer.

Below is a list of devices supported by this simulator.

Nickname	Device name
RX600	RX600 series
RX200	RX200 series



# **Chapter 2. User's Manuals**

Please read the following user's manuals together with this document.

Manual Name	Document Number
CubeSuite+ Ver.1.02.00 RX Debug	R20UT1143EJ0100
CubeSuite+ Ver.1.02.00 Message	R20UT0980EJ0100



## **Chapter 3. Range**

This section describes the functions of the RX600 series and RX200 series simulator debugger.

- (1) The simulator/debugger provides simulation functions for the RX600 series microcomputers.
- (2) The simulator/debugger supports the following RX600 series microcomputer functions:
  - All CPU instructions
  - Exception processing
  - Registers
  - All address space
  - Peripheral function (Timer, Memory Protection Unit)
- (3) The simulator/debugger does not support the following RX600 series MCU functions.

No.	Item	Remarks
1	Low power state	Simulation is stopped on the execution of a WAIT instruction.
2	Non-maskable interrupt (NMI)	
3	Reception of an interrupt during execution of any of the following instructions: (RMPA, SCMPU, SMOVF, SMOVB, SMOVU, SSTR, SUNTIL, SWHILE)	The interrupt is accepted when execution of the instruction is completed.
4	Values in memory and registers that become undefined after the execution of instructions	
5	Lower-order 16 bits of the accumulator (ACC)	A simulator debugger returns 0.



## **Chapter 4. Simulation of Peripheral Functions**

This section describes the peripheral functions of the RX600 series and RX200 series simulator debugger.

### 4.1 Timer

(1) Supported Range

The RX600 series and RX200 series simulator debugger supports a total of four compare match timer (CMT) channels, i.e. two CMT units (unit 0 and unit 1), each with two 16-bit timers.

#### (2) Control Registers

Below is a list of registers supported by this simulator.

A control register please access it at register size by all means.

Unit	Supported Control Register	Support
Unit0	CMSTR0	YES
	CMCR0、CMCR1	YES
	CMCNT0、CMCNT1	YES
	CMCOR0、CMCOR1	YES
Unit1	CMSTR1	YES
	CMCR2、CMCR3	YES
	CMCNT2、CMCNT3	YES
	CMCOR2、CMCOR3	YES

Note: YES Supported



### 4.2 Interrupt Controller

#### (1) Supported Range

The RX600 series simulator debugger supports the interrupt controller unit (ICU) that is related to the CMT and SCI. The RX200 series simulator debugger supports the ICU that is related to the CMT. The ICU can convey interrupts to the CPU but cannot activate the DTC or DMAC.

#### (2) Control Registers

Below is a list of registers supported by this simulator.

A control register please access it at register size by all means.

Supported Control Register	Support
IRn (n=028~029)	YES
IER03	NO
IPRm (m=04~07)	YES
FIR	YES

Note: YES Supported, NO Supported only CMT function



### 4.3 Memory Protection Unit

(1) Supported Range

The RX600 series simulator debugger which RX610 group removes supports the Memory Protection Unit(MPU).

(2) Control RegistersBelow is a list of registers supported by this simulator.

A control register please access it at register size by all means.

Supported Control Register	Support
RSPAGEn (n=0~7)	YES
REPAGEn (n=0~7)	YES
MPEN	YES
MPBAC	YES
MPECLR	YES
MPESTS	YES
MPDEA	YES
MPSA	YES
MPOPS	YES
MPOPI	YES
MHITI	YES
MHITD	YES

Note: YES Supported



## **Chapter 5. Changes**

This chapter describes changes from V2.00.00 to V2.01.00 of RX simulator.

### 5.1 Expansion of a trace memory size

Added 2M, 3M to size appointment of trace memory.

5.2 Correspondence of a method of normal input and output same as an emulator In normal input and output to a debugging console, it supported an input and output method same as an emulator. There is not that changes the low level interface routine that uses with an emulator by using this method, and can use it. A method and the method that supported this time are change possibility by setting of a property panel conventionally.

5.3 Addition of PC display during program execution

RX simulator supported PC display on tool bar during program execution.

About the way to use, refer to online help or User's manual.

### 5.4 Improvement of a trace function

Stop collection of trace data during program practice, and add a function to reopen. Can confirm the trace data which collected without stopping program practice because only collection of trace data stops during program practice.

### 5.5 Removal of cautions

The following problems have been fixed.

- Caution of memory writef When panel windows write memory while the program is running, unintentional instructions may be executed.
- (2) Caution of breakpoint

When data is masked with the following data comparison conditions on a breakpoint event, the data mask may not be executed.

- GT(>))
- LT (<)
- GE (>=)
- LE (<=)
- IN scope (<=Value<=)</li>
   OUT of scope ! (<=Value<=)</li>
- (3) Caution of endian

When the SCMPU, SMOVB, SMOVF, or SMOVU instruction is executed, an incorrect result of execution will be obtained if different endian systems are used in two areas, one including an operand of comparison and the other the other operand of the comparison, or one including the source of a transfer and the other its destination.



# **Chapter 6. Cautions**

This section describes cautions for using the RX600 series and RX200 series simulator debugger.

### 6.1 Caution of time measurement on return out

#### (1) Run-Break timer

When return out is measured by run break timer, only the last instruction is measured. So the total execution time, Number of execution cycle and number of execution instructions are displayed the measurement of the last instruction.

#### (2) Trace

When specifying [Yes] in [Accumulate trace time] for using trace function, last instruction in return out execution is not added.

#### 6.2 Caution of property panel

ROM Installed size to display in a tab [setting for connection] on a property panel becomes the value that added a ROM Installed domain and size displaying to in memory classification of memory mapping.

On this account display the value that was different from the ROM Installed size that chose at the time of project making.

All trademarks and registered trademarks are the property of their respective owners.



	Notice
	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
	lectronics 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
	e disclosed by Renesas Electronics such as that disclosed through our website. enesas 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
t	chnical 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
	hers. In shard an a three mailine and a share mail and an
	ou should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. escriptions 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 fo
	sculpture or circuits, solvaire and order tealed monimation in the design of your equipment. Renease Electronic or semiconductor products and apprication examples.
	se of these circuits, software, or information.
	hen 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
r	gulations. 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
t	e 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
	ohibited under any applicable domestic or foreign laws or regulations.
	enesas 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 ssumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
	ssumes no lability whatsoever for any damages included by you resulting nomenors in or omissions nom the information included neterin. enesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics produc
	pends on the product's quality grade, as indicated below. You must check the quality grade of each Renessa Electronics product before using it in a particular application. You must check the quality grade of each Renessa Electronics product before using it in a particular application.
E	ectronics 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
١	hich 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
ι	se 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.
	ne quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
	tandard*: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools;
	personal electronic equipment; and industrial robots. ligh Quality*: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically
	ign Quainty: Transportation equipment (automobiles, trains, ships, etc.); trainc control systems; anti-clisaster systems; anti-clime systems; salety equipment; and medical equipment not specifically designed for life support.
	pecific": 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.
ι. Υ	ou 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
r	nge, 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
	se of Renesas Electronics products beyond such specified ranges.
	though 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 alfunctions 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
	and control 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
	durdancy, first an injury and injury to during a durate of the testiment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software interview of the site of the testiment of the durate of the d
	ease evaluate the safety of the final products or system manufactured by you.
F 0. F F 1. T	ease evaluate the safety of the final products or system manufactured by you. ease 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 roducts 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 assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. his document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
10. F 10. F 1 11. T	ease evaluate the safety of the final products or system manufactured by you. ease 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 oducts 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 assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. Is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics. ease 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. 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
F 10. F F 11. T 12. F Note	ease evaluate the safety of the final products or system manufactured by you. ease 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 oducts 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 assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. Is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics. ease 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. 1) "Renesas Electronics as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.
[ 10. F r 11. T 112. F (Note	ease evaluate the safety of the final products or system manufactured by you. ease 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 oducts 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 assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics. ease 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. 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.
10. F F T 11. T 12. F Note Note	ease evaluate the safety of the final products or system manufactured by you. ease 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 assume to lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. ease 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. 1 "Renesas Electronics as diffice if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries. 2) "Renesas Electronics as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics Corporation. 3) "Annesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 3) "Renesas Electronics Corporation. 4) "Annesas Electronics corporation.
(0. F F r 11. 1 12. F Note Note	ease evaluate the safety of the final products or system manufactured by you. ease 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 assume the lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. ease contact a Renesas Electronics sales office if you have any form, in whole or in part, without prior written consent of Renesas Electronics. ease 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. 1) "Renesas Electronics as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. ES OFFICES Renesas Electronics Corporation and also includes its majority-owned subsidiaries. ES OFFICES DEFICES DESCRETION (Section 2)
AL see 1	ease evaluate the safety of the final products or system manufactured by you. ease 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 assume to lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assume to lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics products, or if you have any other inquiries. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics products, or if you have any other inquiries. is document may not be reproduced or duplicated or manufactured by or for Renesas Electronics. Prenesas Electronics product(s)* means any product developed or manufactured by or for Renesas Electronics. ESENTINE CONCENTION Component on the latest and detailed information. as Electronics America Inc. cott Eputyeon of the latest and detailed information. as Electronics America Inc. cott Boulevard Santa Clara. CA 95060-2554, U.S.A. -492-588-6000, Fax: +1-492-588-6130 as Electronics Canada Limited inclusion Conada Limited inclusion Conada Limited inclusion Road, Newmarket, Ontario L3Y 9C3, Canada
AL	ease evaluate the safety of the final products or system manufactured by you. ease 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 assume to lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics products, or if you have any other inquiries. 1) "Renesas Electronics asles office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics Product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics Product(s)" means any product developed or manufactured by or for Renesas Electronics. 2) "Renesas Electronics Corporation. 3) "Attributed and the set and detailed information. 3) Electronics America Inc. 4) Electronics America Inc. 4) Electronics America Inc. 4) Electronics Canada Limited 4) E
AL effer 80 \$ AL effer eness 80 \$ 11: +' eness 80 \$ 11: +'	ease evaluate the safety of the final products or system manufactured by you. ease 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 of lability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. Is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics. ease contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics around as a result of your noncompliance with applicable laws and regulations. I "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. Renesas Electronics and the detailed or manufactured by or for Renesas Electronics. ES OFFICES Professo Electronics Corporation on the result of your vertice of the result of your renesas. Beletronics America Inc. Cort Boulevard Santa Clara, CA 95050-2554, U.S.A. -408-588-6000, Fax: t-14-08-588-6130 Beletronics Canada Limited Iffolios Road, Newmarket, Ontale J.S.Y 9C3, Canada 305-389-5481-401, Fax: +1-905-589-3220 Beletronics Europe Limited Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
F F F F F F F F F F F F F F	ease evaluate the safety of the final products or system manufactured by you. ease 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 is controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior witten consent of Renesas Electronics products, or if you have any other inquiries. (1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. (2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. (2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. (3) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. (4) "Renesas Electronics Product(s)" means any product developed or manufactured by or for Renesas Electronics. (5) "Renesas Electronics Corporation and also includes its majority-owned subsidiaries. (4) "Renesas Electronics Product(s)" means any product developed or manufactured by or for Renesas Electronics. (5) "Renesas Electronics Corporation. (5) "http://www.renesas.com/" for the latest and detailed information. (6) "http://www.renesas.com/" for the latest and detailed information. (6) "Below of the product of the detailed information. (6) Electronics Canada Limitod (coll Boulevard Santa Clara, CA 90505-2554, U.S.A. (4) 90-588-6400, Fax: +14:005-588-5200 (coll Boulevard Santa Clara, CA 90505-2554, U.S.A. (5) 90-588-5400, Fax: +14:005-588-5200 (c) 120 90-588-5400, Fax: +14:005-588-5200 (c) 120 90-588-541, Fax: +1-905-588-5200
AL 0. F F 1. 1 2. F Note Note AL fer ness 1: +4 iness 1: +4	ease evaluate the safety of the final products or system manufactured by you. ease contact a Renease Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renease Electronics product. Please use Renease Electronics is doucts in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU ROHS Directive. Renease Electronics assume to liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. ease contact a Renease Electronics as used in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. ease contact a Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. ease contact is product(s)" means any product developed or manufactured by or for Renease Electronics. ease contact a Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. ease Corporation and also includes its majority-owned subsidiaries. ease contact a Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. ease Corporation and ease exception and ease exception and ease includes its majority-owned subsidiaries. ease contact a Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. exception and ease Electronics Corporation     "http://www.reneesas.com/" for the latest and detailed information. exception asses exception and ease Electronics and ease ease ease ease ease ease ease eas
AL ness 1. 1 2. F Note Note Note ness 80 3 1: + ness 80 1 1: + ness 1: + ne	ease evaluate the safety of the final products or system manufactured by you. ease 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 as its office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics as control details or durated by you noncompliance with applicable laws and regulations. is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics products, or if you have any other inquiries. 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries. 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics. ESOFFICES ENTIFIES
AL ness acadi 1. 1 2. F Note Note acadi 1: +4 acadi 1: +4 aca	ease evaluate the safety of the final products or system manufactured by you. ease contact a Renease Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renease Electronics product. Please use Renease Electronics aducts in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renease Electronics assume biadourment may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renease Electronics products, or if you have any questions regarding the information contained in this document or Renease Electronics or oducts, or if you have any other inquiries. () "Renease Electronics are used in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. () "Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. () "Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. () "Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. () "Renease Electronics product(s)" means any product developed or manufactured by or for Renease Electronics. () "Renease Electronics Corporation () "they,'//www.reneesas.com/" for the latest and detailed information. () "They,'//www.reneesas.com/" for the latest and detailed information. () "Belevice Sanda Clarg, CA 5050-2554, U.S.A. (406-588-6100, Fax, +1-408-588-6100) () "Electronics Corporation () "they,'//www.reneesas.com/" for the latest and detailed information. () "Belevice Sanda Clarg, CA 5050-2554, U.S.A. (406-588-6100, Fax, +1-408-588-7100) () "Belevice Sanda Clarg, CA 5050-2554, U.S.A. (406-588-6100, Fax, +1-408-588-7100) () "Belevice Sanda Clarg, CA 5050-2554, U.S.A. (406-588-6100, Fax, +1-408-588-7100) () "Belevice Sanda Clarg, CA 5050-2554, U.S.A. (406-588-6100, Fax, +1-40
AL for note and and and and and and and and	ease evaluate the safety of the final products or system manufactured by you. ease contact a Renease Electronics sales office for details as to environmental maters such as the environmental compatibility of each Renease Electronics product. Please use Renease Electronics assume balability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. Is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renease Electronics. Ease contact a Renease Electronics also office If you have any questions regarding the information contained in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. () "Renease Electronics" as used in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. () "Renease Electronics product(s)" means any product developed or manufactured by or for Renesase Electronics. ESE OFFICES ENERGINES ENERG
AL 11. 1 12. F 11. 1 12. F 11. 1 12. F 12. F	ease evaluate the safety of the final products or system manufactured by you. ease contact a Reneasa Electronics sales office for details as to environmental matters such as the environmental compatibility of each Reneasa Electronics product. Please use Reneasa Electronics is document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Reneasa Electronics products, or if you have any other inquiries. I) "Reneasa Electronics as ease office if you have any questions regarding the information contained in this document memans Reneasa Electronics and a Reneasa Electronics. ease contact a Reneasa Electronics such in this document memans Reneasa Electronics and a lon includes its majority-owned subsidiaries. I) "Reneasa Electronics are used in this document memans Reneasa Electronics componention and also includes its majority-owned subsidiaries. I) "Reneasa Electronics are used to evaluate the value of or Reneasa Electronics. ESENCES Reneasa Electronics are used to evalue developed or manufactured by or for Reneasa Electronics. Estimate the safety of the latest and detailed information. Esteeronics Comportation The plant of the latest and detailed information. Esteeronics Comportation The plant of the latest and detailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the latest and detailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the latest and detailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the latest and detailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the comportation of the latest and detailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the comportation of the latest and estailed information. Esteeronics Canada Limited BELECTONICS Comportation D) The plant of the comportation of the latest and estailed information. Esteeronics Conada Limited BELECTONICS Comportation D)
AL aness an Figure 2 an Figu	ease evaluate the safety of the final products or system manufactured by you. ease contact a Renease Electronics also office for details as to environmental matters such as the environmental compatibility of each Renease Electronics product. Renease Electronics also details in confinance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renease Electronics assume o liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations. In vote reproduced or duplicated, in any form, in whole or in part, without prior written content of Renease Electronics products, or if you have any other inquiries. In versase Electronics are used in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. In versase Electronics product(s)* means any product developed or manufactured by or for Renease Electronics products, or if you have any other inquiries. In versase Electronics and detailed information. Integrity of the latest and detailed information. Integrity of the latest and detailed information. Integrity of the latest and detailed information. Is Electronics Rand Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2554, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2564, U.S.A406:4389-6000, Fax: +1-408-538-6130 - Distronics Claim Claim, C. 496:060-2567, U.S.A406:4389-4000, Fax: +1-408-538-6130 - Distronics Cla
AL 11. 17 12. F Note	ease evaluate the safety of the final products or system manufactured by you. ease contral & Reneasa Electronics also direct of details as to environmental matters such as the environmental compatibility of each Reneasa Electronics meases Electronics assumed valuation for use of controlled substances, including without limitation, the EU RoHS Directive. Renease Electronics assumed valuation are used or and regulations or used or controlled substances, including without limitation, the EU RoHS Directive. Renease Electronics assumed valuations environmental many not be reproduced or duplicated, in any form, in whole or in part, without private monomental motion contained on this document or Renease Electronics assumed in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. (2) "Renease Electronics and used in this document means Renease Electronics Corporation and also includes its majority-owned subsidiaries. (2) "Renease Electronics and also fold by a have any other inquiries. (3) "Renease Electronics and also fold by a have any other inquiries. (3) "Renease Electronics and also includes its majority-owned subsidiaries. (3) "Renease Electronics and also includes its majority-owned subsidiaries. (4) "Renease Electronics and also fold by a have any other inquiries. (5) "Renease Electronics America Inc. (5) "Renease Electronics Corporation (5) "Therp://www.reneesas.com/" for the latest and detailed information. (5) Electronics Corporates (5) "Renease Electronics and (5) "Renease Electronics (5) "Renease Electronics America Inc. (5) "Renease Electronics Electronics Corporation (5) "Renease Ele
AL 11. 1 12. F (Note: AL AL AL AL AL AL AL AL AL AL	ease evaluate the safety of the final products or system manufactured by you.  ease contact a Remeasa Electronics also direct of details as to environmental instems such as the environmental compatibility of each Remeasa Electronics measured docts in compliance with all applicable was and regulations.  is dealing to dramages or losses accurring as a result of your noncompliance with applicable laws and regulations.  is dealing to dramages or losses accurring as a result of your noncompliance with applicable laws and regulations.  is dealing to dramages or losses cocurring as a result of your noncompliance with applicable laws and regulations.  is dealing to dramages or losses cocurring as a result of your noncompliance with applicable laws and regulations.  is dealing to dramages or losses cocurring as a result of your noncompliance with applicable laws and regulations.  is dealing the information contained in this document or Remeasa Electronics.  ease contact a Remeasa Electronics sales office I you have any questions regarding the information contained in this document or Remeasa Electronics.  The remeasa Electronics product(s) <sup>or</sup> means any product developed or manufactured by or for Remeasa Electronics.  The remeasa Electronics product(s) <sup>or</sup> means any product developed or manufactured by or for Remeasa Electronics.  The remeasa Electronics for the latest and detailed information.  Electronics America Inc.  The second as the laws and calabies of the document of Remeasa Electronics and allows and be allowed as a second as a second as the applicable laws and regulations.  Electronics Canada Linet  Second as the second as the document of Remeasa Electronics and allows and be allowed as a second as a sec
AL 11. 7 12. F 11. 7 12. F 12. F	ease evaluate the safety of the final products or system manufactured by you.  ease contact a Remeasa Electronics also difficient of tables as to environmental maters such as the environmental compatibility of each Remeasa Electronics product. Please use Remeasa Electronics assume viability for damages or losses cocurring as a result of your noncompliance with applicable laws and regulations. Is document may not be reproduced or duplicated, in any form, in whote or in part, whote or in vert whoto trin written consent of Remeasa Electronics assume viability for damages or losses cocurring as a result of your noncompliance with applicable laws and regulations. It is document may not be reproduced or duplicated, in any form, in whote or in part, whoto trin written consent of Remeasa Electronics as used in this document means Remeasa Electronics Corporation and also includes its majority-owned subsidiaries. It is the same Electronic as used in this document means Remeasa Electronics Corporation and also includes its majority-owned subsidiaries. It is associated as the same association of the latest and detailed information. It is associated for the latest and detailed information. It is associated for the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is associated for the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest and detailed information. It is a state of the latest an

#### © 2012 Renesas Electronics Corporation. All rights reserved. Colophon 1.1