

Contents

Chapter 1 User's Manuals	2
Chapter 2 Changes	3
2. 1. C99 standard library functions	3
2. 2. Addition of checking source code across multiple files against the MISRA-C:2012 rules [Professional edition]	3
2. 3. Extensions to the checking of source code against the MISRA-C:2012 rules [Professional edition]	4
2. 4. Addition of a feature for changing a section name when a library file is input.....	4
2. 5. Enhancement of optimization	4
2. 6. Rectified points for caution.....	6
2. 7. Other changes and improvements	6
Chapter 3 Points for Caution	7

Chapter 1 User's Manuals

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

Manual Name	Document Number
CC-RL Compiler	R20UT3123EJ0108

Chapter 2 Changes

This section describes changes to CC-RL from V1.07.00 to V1.08.00.

The features of the latter can only be used if the compiler is registered under the professional license.

They are indicated by **[Professional edition]** from here on.

2.1. C99 standard library functions

Support for standard library functions of the C99 language has newly been added and functionality for compliance with the C99 standard have been added to existing standard library functions as listed below.

fpclassify,	isfinite,	isinf,	isnan,	isnormal,	signbit,	
acosl,	asinl,	atanl,	atan2l,	cosl,	sinl,	tanl,
acosh,	acoshf,	acoshl,	asinh,	asinhf,	asinhf,	
atanh,	atanhf,	atanhl,	coshl,	sinhl,	tanhl,	
expl,	frexpl,	ldexpl,	logl,	log10l,		
log1p,	log1pf,	log1pl,	modfl,	fabsl,	powl,	sqrtl,
ceilf,	floorf,	fmodf,	scanf*1,	sscanf*1,	vscanf,	vsscanf

*1: Functionality according to the C99 standard has been added.

2.2. Addition of checking source code across multiple files against the MISRA-C:2012 rules **[Professional edition]**

The -misra_intermodule option has been added to check source code across multiple files against MISRA-C:2012 rules.

Although source code had previously only been checked within the individual files, specifying this option now enables the checking of source code across multiple files.

2.3. Extensions to the checking of source code against the MISRA-C:2012 rules [Professional edition]

The following rule numbers have been added as arguments of the -misra2012 option for checking source code against MISRA-C:2012 rules.

Required rules: [8.5](#) and [8.6](#)

The following shows the number of MISRA-C:2012 rules which can be checked by each revision.

Classification of Rules: Number of Rules	V1.07.00	V1.08.00
Mandatory rules: 16	7	7
Required rules: 108	86	88
Advisory rules: 32	26	26
Total: 156	119	121

2.4. Addition of a feature for changing a section name when a library file is input

The -lib_rename linkage option has been added. With this option, section names or symbol names in a file within a library that is input at the time of linkage can be changed and linked.

2.5. Enhancement of optimization

The performance of generated code has been improved by proceeding with optimization for reducing the type sizes of variables according to the ranges through which variables are updated within loops.

```
< Example of source code>
void func(unsigned char *A) {
    unsigned long i;
    for (i = 0; i < 1000; ++i) { /* The range of the unsigned short type */
        A[i] = 0;
    }
}
```

```
< Code generated by V1.07.00>
_func:
    .STACK _func = 4
    movw de, ax
    clrw bc
    movw hl, #0x03E8
.BB@LABEL@1_1:        ; bb
    mov [de+0x00], #0x00
    movw ax, hl
    addw ax, #0xFFFF
    movw hl, ax
    skc
.BB@LABEL@1_2:        ; bb
    decw bc
.BB@LABEL@1_3:        ; bb
    movw ax, bc
    addw ax, hl
    incw de
    bnz $.BB@LABEL@1_1
.BB@LABEL@1_4:        ; bb
    bc $.BB@LABEL@1_1
.BB@LABEL@1_5:        ; return
    ret
```

```
< Code generated by V1.08.00>
_func:
    .STACK _func = 4
    movw de, ax
    movw ax, #0x03E8
.BB@LABEL@1_1:        ; bb
    mov [de+0x00], #0x00
    addw ax, #0xFFFF
    incw de
    bnz $.BB@LABEL@1_1
.BB@LABEL@1_2:        ; return
    ret
```

Although the loop counter is declared as being of the unsigned long type, its values are only within the range covered by the unsigned short type. The performance of the generated code is improved by handling the loop counter as the unsigned short type.

2.6. Rectified points for caution

The following points for caution no longer apply. For details, refer to Tool News.

- Point for caution when a 1-bit signed bit field is written in the control expression of a switch statement (CCRL#020)
- Point for caution when a structure or union having a member that is a far pointer is packed and allocated to the far area (CCRL#021)
- Point for caution when the initial value of an integer-type member of a structure or union is an address constant (CCRL#022)
- Point for caution when the -misra2012 option is specified (CCRL#023)

2.7. Other changes and improvements

Other major changes and improvements are described below.

(a) Change to the operation in case the features of the professional edition are not available

Formerly, in the case of attempts to use the standard library for the professional edition when only a license for the standard edition had been registered, a linkage restricting error may have been generated.

This has been corrected and changed so that a message indicating the reason for the error is produced.

E0562600:Library "*library name*" requires "*edition name*"

(b) Correction of internal errors

Internal errors sometimes occurred in the build process in previous versions. These errors have been corrected.

Chapter 3 Points for Caution

Please refer to the user's manual for caution regarding V1.08.00 of the CC-RL compiler.

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

Notice

1. 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 or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving 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, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.
"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.
Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.
6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, 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 and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technologies shall 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. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
11. This document shall not be reprinted, 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.
(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.
(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)



SALES OFFICES

Renesas Electronics Corporation

<http://www.renesas.com>

Refer to "http://www.renesas.com/" for the latest and detailed information.

Renesas Electronics Corporation
TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan

Renesas Electronics America Inc.
1001 Murphy Ranch Road, Milpitas, CA 95035, U.S.A.
Tel: +1-408-432-8888, Fax: +1-408-434-5351

Renesas Electronics Canada Limited
9251 Yonge Street, Suite 8309 Richmond Hill, Ontario Canada L4C 9T3
Tel: +1-905-237-2004

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K.
Tel: +44-1628-651-700

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-6503-0, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
Room 1709 Quantum Plaza, No.27 ZhichunLu, Haidian District, Beijing, 100191 P. R. China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 301, Tower A, Central Towers, 555 Langao Road, Putuo District, Shanghai, 200333 P. R. China
Tel: +86-21-2226-0888, Fax: +86-21-2226-0999

Renesas Electronics Hong Kong Limited
Unit 1601-1611, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2265-6688, Fax: +852 2886-9022

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei 10543, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
80 Bendemeer Road, Unit #06-02 Hyflux Innovation Centre, Singapore 339949
Tel: +65-6213-0200, Fax: +65-6213-0300

Renesas Electronics Malaysia Sdn.Bhd.
Unit 1207, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics India Pvt. Ltd.
No.777C, 100 Feet Road, HAL 2nd Stage, Indiranagar, Bangalore 560 038, India
Tel: +91-80-67208700, Fax: +91-80-67208777

Renesas Electronics Korea Co., Ltd.
17F, KAMCO Yangjae Tower, 262, Gangnam-daero, Gangnam-gu, Seoul, 06265 Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5338