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This document describes the restrictions and points for caution. Read this document before using the product.

Chapter 1. User's Manuals	2
Chapter 2. Changes	3
2.1 Addition of the -stuff option	3
2.2 Addition of the -Oalign option	3
2.3 Addition of the -VERBOSE option	3
2.4 Improved precision of alias analysis	3
2.5 Rectified points for caution	6
Chapter 3. Point for Caution	7
3.1 Note on specifying path names	7

Chapter 1. User's Manuals

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

Name	Document Number
CC-RH Compiler User's Manual	R20UT3516EJ0108
CS+ Integrated Development Environment User's Manual: CC-RH Build Tool Operation	R20UT3283EJ0109

Chapter 2. Changes

This chapter describes changes to the CC-RH compiler from V2.02.00 to V2.03.00.

2.1 Addition of the -stuff option

The -stuff option has been added to allocate variables in separate sections according to their alignment values.

By specifying this option, it is possible to reduce the ROM or RAM size.

2.2 Addition of the -Oalign option

The -Oalign option has been added for optimization which changes to the alignment conditions of variables. For example, when accessing contiguous fields of a structure-type variable, the number of instructions that are generated can be reduced by changing the alignment condition of the variable and merging two or more accesses into a single access. This reduces the code size and improves the execution speed.

2.3 Addition of the -VERBOSE option

The -VERBOSE option has been added to display detailed information at link time.

By specifying crc as a parameter, the results of CRC calculations and the output position addresses are displayed.

2.4 Improved precision of alias analysis

The precision of alias analysis has been improved to make it easier to apply optimizations such as moving memory access instructions across intrinsic function calls or aggregate copies.

The following source code shows how this reduces the code size and improves the execution speed.

```
<Example of source code>
unsigned GlobalVariable;
typedef struct{
    unsigned char _array[128];
} MyStruct;
MyStruct Source;
MyStruct Destination;
void test(void){
    GlobalVariable = 0;
    Destination = Source;
    while(GlobalVariable != 0){}
}
```

< Code output by CC-RH V2.02.00 (-Osize)>

_test:

```
.stack _test = 0
movhi HIGHW1(#_GlobalVariable), r0, r2
st.w r0, LOWW(#_GlobalVariable)[r2]
movea 0x00000080, r0, r5
mov #_Source, r6
mov #_Destination, r7
add r7, r5
br9 .BB.LABEL.1_2
```

.BB.LABEL.1_1:

```
ld.b 0x00000000[r6], r8
st.b r8, 0x00000000[r7]
add 0x00000001, r6
add 0x00000001, r7
```

.BB.LABEL.1_2:

```
cmp r7, r5
bnz9 .BB.LABEL.1_1
```

.BB.LABEL.1_3:

```
ld.w LOWW(#_GlobalVariable)[r2], r2
```

.BB.LABEL.1_4:

```
cmp 0x00000000, r2
bnz9 .BB.LABEL.1_4
```

.BB.LABEL.1_5:

```
jmp [r31]
```

< Code output by CC-RH V2.03.00 (-Osize)>

_test:

```
.stack_test = 0
movhi HIGHW1(#_GlobalVariable), r0, r2
st.w r0, LOW(#_GlobalVariable) [r2]
movea 0x00000080, r0, r2
mov #_Source, r5
mov #_Destination, r6
add r6, r2
br9 .BB.LABEL.1_2
```

.BB.LABEL.1_1:

```
ld.b 0x00000000[r5], r7
st.b r7, 0x00000000[r6]
add 0x00000001, r5
add 0x00000001, r6
```

.BB.LABEL.1_2:

```
cmp r6, r2
bnz9 .BB.LABEL.1_1
```

.BB.LABEL.1_3:

```
jmp [r31]
```

2.5 Rectified points for caution

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

- Note on writing the constant value 0 to a 2-byte area (No.29)
- Performing the tail call optimization (No.30)
- Using the -Xintermodule option (No. 31)
- Using the -pic option (No.32)
- Using the switch statement (No.33)

Chapter 3. Point for Caution

This section states a point for caution regarding CC-RH.

3.1 Note on specifying path names

Absolute paths that include drive letters or relative paths can be used as the path names for specifying input/output files or folders.

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Revision History

Rev.	Date	Description	
		Page	Summary
Rev1.00	Dec 01, 2020		First Edition issued
Rev1.01	Jan 16, 2021	4,5	The error in source codes is corrected.

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