[Notes]
C Compiler Package for RL78 Family

R20TS0471EJ0100
Rev.1.00
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Outline

When using the C compiler package CC-RH for RL78 family, note the following point.

1. Mathematical library function atan (CCRL#024)

* The number after the note is the note's identification number.

1. Mathematical Library Function atan (CCRL#024)

1.1 Applicable Products

CC-RL V1.01.00 to V1.08.00

1.2 Details

If the absolute value of the argument of the math library function *atan* is larger than 3.59539e+307, the return value becomes invalid: ±1.373400766945016 is returned instead of an expected value of ±1.570796326794897.

1.3 Conditions

The return value becomes invalid when both of the following conditions (1) and (2) are met.

(1) The -dbl_size=8 option is specified.

(2) The absolute value of argument of *atan* is larger than 3.59539e+307.

1.4 Examples

Below is an example of the error. The parts corresponding to the error conditions are shown in red.

[C source] (when the -dbl_size=8 option is specified.)

```
1:  volatile double x, y;
2:  void func(void) {
3:    x = 3.59540e+307;      // Condition(2)
4:    y = atan(x);
5:  }
```

Line 3:

Condition (2) is met because a value larger than 3.59539e+307 is specified as the variable for the argument of *atan*.

Line 4:

The *atan*'s return value is 1.373400766945016, which is invalid.

1.5 Workaround

As shown in the example below, check if the argument of *atan* meets condition (2)(Note). If condition (2) is met, set ±1.570796326794897 as the return value instead of the return value of *atan*.

Note: The return value of the *atan* function that handles 8-byte floating-point type converges to ±π/2 when the absolute value of the argument exceeds approximately 10^{17}. Therefore, ±1e+307 is used as the decision value for the argument in the example below.

[C source] (when the -dbl_size=8 option is specified.)

```
1:  volatile double x, y;
2:  void func(void) {
3:    if ( x > 1e+307 )                  //  Check if x is larger than 1e+307.
4:      y = 1.570796326794897;
5:    else if ( x < -1e+307 )            //  Check if x is smaller than -1e+307.
6:      y = -1.570796326794897;
7:    else
8:      y = atan(x);
9:  }
```

1.6 Schedule for Fixing the Problem

This problem is scheduled to be fixed in CC-RL V1.09.00.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Sep.01.19	-	First edition issued

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