Note on Using C/C++ Compiler Package for RX Family (IDE: CubeSuite+), C/C++ Compiler Package for RX Family (IDE: High-performance Embedded Workshop), and C/C++ Compiler Package for RX Family (without IDE)

When using the C/C++ Compiler Package for RX Family (IDE: CubeSuite+), the C/C++ Compiler Package for RX Family (IDE: High-performance Embedded Workshop), or the C/C++ Compiler Package for RX Family (without IDE), take note of the problem regarding the following point.

- Aggregates having initial values (RXC#034)
  Note: The number at the end of the above item is from a consecutive index of problems in the compiler packages for the RX family of MCUs.

1. Product and Versions Concerned
   - C/C++ Compiler Package for RX Family (IDE: CubeSuite+) V1
     Order type name: R0C5RX00QSW01D and R0C5RX00QSW01N
     CC-RX compiler V1.02.00 through V1.02.01

   - C/C++ Compiler Package for RX Family (IDE: CubeSuite+) V2
     Order type name: RTCRX0000CL02WDR and RTCRX0000CL02WNR
     CC-RX compiler V2.00.00 through V2.02.00

   - C/C++ Compiler Package for RX Family (IDE: High-performance Embedded Workshop) V.1.00 Release 00 through V.1.02 Release 01
     Order type name: R0C5RX00XSW01R
     CC-RX compiler V1.00.00 through V1.02.01

   - C/C++ Compiler Package for RX Family (without IDE)
2. Description

When an aggregate with an initial value is defined as an automatic variable in the C99 or C++ language, in the case of ",(number of initializers) < (number of elements)," elements whose initial values have not been set will not be initialized to 0 and they will become indeterminate values.

3. Conditions

This problem arises if the following conditions are all met:

(1) Either -lang=c99 or -lang=cpp is specified as a compiler option (see Note 1).

(2) There is a definition of an aggregate (structure or array) of an automatic variable with an initial value.

(3) In the aggregate of (2), the number of initializers is smaller than the number of elements.

(4) In the aggregate of (2), there is not even one constant expression (see Note 2) as an initializer.

Note 1:

When an aggregate with an initial value is defined as an automatic variable in a language other than C99 and C++, describing an initializer that is not a constant expression breaches the language specifications. Under present circumstances, however, a compile error does not occur and the result is not guaranteed.

For languages other than C99 and C++, likewise as shown above, if the above conditions (1) to (4) are all met, the initial value will become an indeterminate value.

Note 2:

A constant expression stands for an arithmetic expression consisting of only constant values and addresses for static variables.

Example 1: Case of C99 language - sample1.c

```c
// Compile option: -cpu=rx600 -lang=c99 /* Condition (1) */
int get01a(void);
int get01b(void);
void check_ptr01(int *);
void func01(void)
{
    int array01[8] = /* Condition (2) */
    { get01a(), get01b(), }; /* Conditions (3) and (4) */
```
/* indeterminate values here. */
check_ptr01(array01);
}

-------------------------------------------------------------------------

Example 2: Case of C++ language - sample2.cpp

// Compile option: -cpu=rx600 -lang=cpp /* Condition (1) */
struct Str02
{
    short a02, b02, c02, d02;
};
short var02a;
short var02z;
void check_ptr01(int *);

void func01(void)
{
    struct Str02 st02 = /* Condition (2) */
    { var02a }; /* Conditions (3) and (4) */
    /* st02.b02, st02.c02, and st02.d02 */
    /* become indeterminate values here. */
    var02z = st02.c02;
}

-------------------------------------------------------------------------

4. Workarounds
To avoid this problem, do any of the following:
(1) Add at least one initializer of a constant expression that becomes 0.
(2) Do not set an initial value to the aggregate, but set the value at program execution.

Example of applying workaround (1) to Example 1 of above 1.3:

```c
int get01a(void);
int get01b(void);
void check_ptr01(int *);
void func01(void)
{
    int array01[8] =
    { get01a(), get01b(), 0}; /* Initializer that becomes */
    /* 0 is added. */
    /* Not only array[2] but */
```
Example of applying workaround (2) to Example 2 of above 1.3:

#include                 /* Because memset is used */
struct Str02
{
    short a02, b02, c02, d02;
};
short var02a;
short var02z;
void check_ptr01(int *);
void func01(void) {
    struct Str02 st02;        /* Initial value is not set */
        /* in the definition. */
    memset(&st02,0,sizeof(st02)); /* The entire st02 is */
        /* initialized to 0. */
    st02.a02 = var02a;        /* Initialized by assignment. */
    var02z = st02.c02;
}

5. Schedule for Fixing the Problem
- C/C++ Compiler Package for RX Family (IDE: CubeSuite+) V1 and
  C/C++ Compiler Package for RX Family (IDE: High-performance Embedded
  Workshop)

    We do not plan to make modifications. Please apply any of the above
    workarounds to avoid the problem.

- C/C++ Compiler Package for RX Family (IDE: CubeSuite+) V2 and
  C/C++ Compiler Package for RX Family (without IDE)

    This problem will be fixed in the next version.

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