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## Chapter 1. Packaged Tools

Agreement Type and Contents are different according to the product.

Product Name	Agreement Type	Contents
R0R07800TCW011	Evaluation License, Limited 1 host	A
R0R07800TCW01A	Evaluation License, Unlimited hosts	A
R0R07800TCW01K	Mass-production License, 3000 copy	A
R0R07800TCW01U	Mass-production License, Unlimited copy	A
R0R07800TCW01Z	Mass-production License, Unlimited copy, With source code	B

The following tools are provided.

Contents		Name
B	A	Realtime OS RI78V4 Kernel Object
		Realtime OS Build Tool Plug-in(Common)
		Realtime OS Build Tool Plug-in(RI78V4)
		Realtime OS Analysis Control Plug-in(Common)
		Realtime OS Analysis Control Plug-in(uITRON4)
		Realtime OS Analysis Control Plug-in(RI78V4)
		Realtime OS Resource Information Displaying Plug-in(Common)
		Realtime OS Resource Information Displaying Plug-in(uITRON4)
		System Performance Analyzer AZ78K0R
		Real-time OS RI78V4 Kernel Source Code

## Chapter 2. User's Manuals

The following user's manuals are included with this version. Please read these manuals together with this document.

Manual Name	PDF File Name
RI Series Start	r20ut0751ej0102_rist.pdf
RI78V4 Coding	r20ut0511ej0101_ri78v4cd.pdf
RI78V4 Debug	r20ut0753ej0101_ri78v4db.pdf
RI78V4 Analysis	r20ut0513ej0100_ri78v4an.pdf
RI78V4 Internal Structure	r20ut0514ej0100_ri78v4is.pdf
RI Series Message	r20ut0756ej0102_rier.pdf

These PDF files except "RI78V4 Internal Structure" are provided by this package or Renesas Electronics Home page. Please inquire of "Renesas Electronics Sales Co.,Ltd." or "Distributers", when you want to get "RI78V4 Internal Structure".

## Chapter 3. Target Devices

The following devices supported by the product.

RL78 family

78K0R family

## Chapter 4. Operating Environment

Below is described the Operating Environment for using the product.

### 4.1 Hardware environment

- Processor : At least 1 GHz (support for hyper threading/multicore CPU)
- Main memory : 2 GB or more recommended. Minimum requirement is 1 GB or more  
(64-bit Windows7 or Windows 8 requires 2 GB or more)
- Display : Resolution at least 1,204 x 768; at least 65,536 colors

### 4.2 Software environment

The following software environments are supported.

- Windows XP (32bit)
- Windows Vista (32bit, 64bit)
- Windows7 (32bit, 64bit)
- Windows8 (32bit, 64bit)
- .NET Framework 4
- Runtime library of Microsoft Visual C++ 2010 SP1
- Internet Explorer 6.0 or later

Remark For any of these, we recommend having the latest service pack installed.

### 4.3 Supported Tools

The following tools are supported.

Tool Name	Manufacturer	Version
Integrated development environment CubeSuite+	Renesas Electronics	V2.00.00 or later
C compiler CA78K0R	Renesas Electronics	V1.20 or later

## Chapter 5. Installation Cautions

This section provides cautions for installation and uninstallation.

### 5.1 Cautions for installation

#### 5.1.1 Cautions for administrator privileges

Windows administrator privileges are required to install the software.

#### 5.1.2 Cautions for execution environment

The Internet Explorer 6.0( or later ), the.NET Framework and the Visual C++ runtime libraries are required to run the installer.

#### 5.1.3 Cautions for network drives

The software cannot be installed from a network drive.

It also cannot be installed to a network drive.

#### 5.1.4 Cautions for installation folder name

The available characters for specifying the installation folder are the same as for Windows.

The 11 characters / \* : < > ? | " \ ; , cannot be used. Folder names also cannot start or end with a space.

Specify folders as absolute paths. Do not use relative paths.

Use the backspace character (\) as the path separator for the installation folder. Do not use the forward slash (/).

#### 5.1.5 Cautions for required files after installation

The following folder is created after installation. Do not delete it, because it contains files that are necessary for the tools to run.

(If Window is 32bit and the installation drive is C:)

C:\Program Files\Common Files\ Renesas Electronics CubeSuite+\

(If Window is 64bit and the installation drive is C:)

C:\Program Files\Common Files (x86)\ Renesas Electronics CubeSuite+\

#### 5.1.6 Cautions for modifying and repairing functions

To modify or repair the function of a tool that has already been installed, have the tool's installer package on hand, and run the installation program. The program maintenance program will start; select Modify or Repair.

Clicking [Modify] from the Add or Remove Programs (Windows XP), or Uninstall or change a program (Windows Vista / Windows7) dialog boxes will cause an error.

### 5.1.7 Cautions for changing the installation folder

To change the folder that tools are installed to, you must first uninstall all tools, and then perform installation again.

To uninstall all tools, start the Integrated Uninstaller, and after deleting all the tools that are displayed.

### 5.1.8 Cautions for version of installed tools

If the newer version tool is already installed, the older version tool may not be installed.

### 5.1.9 Cautions for starting installer

If the installer is started on a non-Japanese version of Windows, then if the path contains multi-byte characters it will cause an error, and the installer will not start.

### 5.1.10 Cautions for installation order

Before installing, please install CubeSuite+. Note that this package will be installed to the same folder that CubeSuite+ was installed to.

## 5.2 Cautions for uninstallation

### 5.2.1 Cautions for administrator privileges

Windows administrator privileges are required to uninstall the software.

### 5.2.2 Cautions for uninstallation folder name

Depending on the order in which tools are uninstalled, the folders may not be completely deleted. If this happens, remove any remaining folders via Explorer or the like.

### 5.2.3 Cautions for adding/repairing via other than the installer

If you added or modified files to the folders in which tools and manuals were installed using other means than the installers, they cannot be deleted during uninstallation.



## Chapter 6. Key Word for Uninstallation

There are two ways to uninstall this product.

- Use the integrated uninstaller (uninstalls CubeSuite+)
- Use separate uninstaller (uninstalls this product only)

To use the separate uninstaller, select the following from the Control Panel:

- Add/Remove Programs (Windows XP)
- Programs and Features (Windows Vista / Windows7)

After the applet appears, delete from the following.

- CubeSuite+ Realtime OS Common Plugins
- CubeSuite+ Realtime OS RI78V4 Plugins
- CubeSuite+ Realtime OS RI78V4 Object Release, or CubeSuite+ Realtime OS RI78V4 Source Release

## Chapter 7. Changes from V1.00.01 to V1.00.02

This section explains the changes from RI78V4 V1.00.01 to V1.00.02.

### 7.1 Remove restrictions applicable to V1.00.01

The following three restrictions applicable to RI78V4 V1.00.01 or earlier have been removed in V1.00.02.

#### 7.1.1 The problem that all interrupts become enable status after the `iunl_cpu` call.

Description:

When change the system status (CPU locked state, CPU unlocked state) using `iloc_cpu` and `iunl_cpu` call in interrupt handler, all interrupts become enable status after the `iunl_cpu` call. Specifically, after `iunl_cpu` call, the interrupt processing may be handled as the multiplex interrupts, when the interrupt handling of interrupt level that is lower or the same level interrupt handling occurs.

Conditions:

This problem arises if the following conditions are both satisfied:

1. The service call that `iloc_cpu` and `iunl_cpu` is called from the handler (an interrupt-, or cyclic handler).
2. The interrupt handler (including the timer handler, the cyclic handler) except interrupt handler using in clause 1 is used.

#### 7.1.2 The sample project included with the real-time OS RI78V4 have been updated.

In the sample project included with real-time OS RI78V4 V1.00.01 or earlier, you cannot use the RAM parity-error detection function of the RL78 family MCU but in the updated one, you can use it.

Related Tool News : 120701/tn6 (<http://tool-support.renesas.com/eng/toolnews/120701/tn6.htm>)

## Chapter 8. Cautions

This section describes changes by on-line update after the release of this version.

### 8.1 On-line Update on Apr 2013

#### 8.1.1 Updated Tools

The supported CubeSuite+ version is changed to V2.00.00. The Realtime OS build settings function (Build Tool Plug-in) and the resource information displaying function (Resource Information Displaying Plug-in) supported integrated development environment CubeSuite+ V2.00.00.

Name	Before	After
Realtime OS Build Tool Plug-in(Common)	V1.03.00	V2.00.00
Realtime OS Build Tool Plug-in(RI78V4)	V1.01.01	V2.00.00
Realtime OS Analysis Control Plug-in(Common)	V1.01.01	V2.00.00
Realtime OS Analysis Control Plug-in(uITRON4)	V1.01.01	V2.00.00
Realtime OS Analysis Control Plug-in(RI78V4)	V1.01.00	V2.00.00
Realtime OS Resource Information Displaying Plug-in(Common)	V1.02.00	V2.00.00
Realtime OS Resource Information Displaying Plug-in(uITRON4)	V1.02.00	V2.00.00

#### 8.1.2 Function Addition

The following function has been added.

##### 1. Resource Information Displaying Plug-in

- (1) The function of C source jumps is added by double-clicking on the information display of task, interrupt handler, cycle handler, initialization handler and idle handler.

## Chapter 9. Cautions

This section describes cautions for RI78V4 V1.00.02.

### 9.1 Cautions for Build Tool

This section describes cautions for the CubeSuite+ build tool relating to RI78V4.

#### 9.1.1 Removing configuration file deletes include path

If the output folder of the system information header file and the build tool's include path are set to the same path, then removing the system configuration file from the project will cause the build tool's include path to be deleted.

#### 9.1.2 Caution when convert a PM+ project into a CubeSuite+ project

Using the project conversion function of CubeSuite, it changes into RI78V4 project of CubeSuite from the RX78K0R project of PM. It may become an error if the changed project is built.

### 9.2 Cautions for Realtime OS Resource Information Panel

This section explains cautions on using Realtime OS Resource Information Panel.

#### 9.2.1 View after real-time OS is initialized

View the Realtime OS Resource Information Panel after the real-time OS has been initialized. Before the real-time OS has been initialized, the information in the Realtime OS Resource Information Panel is undefined.

#### 9.2.2 Use programs with debug information generated

When using the Realtime OS Resource Information Panel, download a program for which debug information has been generated. Downloading a program without debug information and viewing it in the Realtime OS Resource Information Panel will cause an error.

To generate debug information, under Build Tool, under the Link Options properties, set "Add debug information" to "Yes".

### 9.3 Cautions for System Performance Analyzer AZ78K0R

This section explains cautions on using AZ78K0R.

#### 9.3.1 Do not use qualify tracing and AZ78K0R together

Do not use qualify tracing and AZ78K0R together. If tracing is enabled in AZ78K0R while qualify tracing is being used, the qualify tracing conditions will be added to the AZ78K0R conditions. In addition, if the AZ78K0R tracing is

then disabled in this state, the qualify tracing conditions ? including conditions configured by the user ? will be deleted.

### 9.3.2 Case where elapsed time cannot be measured correctly

When executing a hardware trace using an in-circuit emulator, if the operating speed of the CPU is 33 MHz or faster, the elapsed time may not be measured between events due to problems with the resolution because the tracer timer is a 16-bit timer. In such a case, the following phenomena occur.

- It seems that time does not elapse at the entry and exit of a service call
- It seems that time does not elapse at the entry and exit of an interrupt

The AZ78K0R calculates the processing time of the specified section by adding the elapsed time between events. Therefore, if multiple events occur in the specified section, the errors described above are accumulated. Consequently, a time shorter than the actual processing time will be displayed (the number of errors is linear to the number events that occurred in the specified section).

### 9.3.3 Case where correct information is not acquired

When uploading the AZ trace data by clicking the Upload button, correct information on the RI78V4 may not be acquired if the program is stopped during RI78V4 internal processing. The following functions will be affected when the above situation occurs.

- The function that sorts tasks in the priority order in the Analyze window and Object Select dialog box.
- The function to display the task names and resource names in the Analyze window. ("Tsk [task ID] is displayed when task names cannot be acquired.)

### 9.3.4 Cautions for display

1. If the window is vertically expanded in the Object Select dialog box and then reduced, the displayed data may be disordered.
2. If a task name cannot be acquired and a system call that waits for resources is issued from an object displayed as "Tsk (???)", in the Analyze Window, a blue horizontal line indicating the resource waiting status is drawn until the end of trace even after the resource waiting status has been cleared.
3. The Analyze Window and the transition diagram of the object may not be correctly displayed while the load module subject to AZ trace has more than 1000 objects.
4. If an interrupt occurs during Idle and Idle is restored from the interrupt, the frame of IntRet is not displayed in the Trace View Window.
5. When the pull-down menu of the scale modify button is displayed in the Analyze Window (task level) in the Windows Me environment, the numbers may be dimmed. However, the operation itself can be performed normally.

### 9.3.5 About user's point trace setup and setup of point trace of AZ

Only one point trace can be registered on CubeSuite+. After the user has set up, or while the user is setting up point trace, the settings that the user has set up will be deleted.

### 9.3.6 About overflow of point trace

If AZ trace function is set to ON and then a debugging tool is terminated, the setup of point trace will remain. When AZ trace function is set to ON again, an error arises because the same point trace is set again.

Please set AZ tarce function to OFF before terminating a debugging tool.

## 9.4 Cautions for Code Generator

This section describes cautions for the CubeSuite code generator relating to RI78V4.

### 9.4.1 Procedures for performing basic operations

With RI78V4 projects, it is not possible to run a program created using only generated code as a real-time OS program. The following changes must be made in order to perform basic operations.

1. Register the RI78V4 timer handler. Set the interval of the timer used to call the timer handler on the code generation panel. Select the checkbox under Interrupt Settings.

The next section describes channel 0 of timer array unit 0 of the timer being used.

The screenshot shows the 'Channel 0' settings in the CubeSuite code generator. The 'Count clock setting' section has 'Macro clock (MCK)' selected. The 'Interval timer setting' section has 'Interval value' set to 1 ms. The 'Interrupt setting' section has the checkbox 'End of timer channel 0 count, generate an interrupt (INTTM00)' checked, and the 'Priority' is set to Low.

2. After making the settings in step 1, perform code generation, and then modify the output code.

- Task "maintask" (File name: CG\_main.c)

Add code to authorize the operation of the timer to use.

```
void maintask(VP_INT exinf)
{
  /* Start user code. Do not edit comment generated here */
  TAU0_Channel0_Start(); /* Add code */
  while (1U)
  {
    ;
  }
  /* End user code. Do not edit comment generated here */
}
```

- Timer interrupt function MD\_INTTM00 (File name: CG\_tau\_user.c)

Add code to call the timer handler.

The timer handler is part of the functionality provided by RI78V4. The user does not need to code the timer-handler processing.

```

void MD_INTTM00(void)
{
  /* Start user code. Do not edit comment generated here */
  Timer_Handler(); /* Add code */
  /* End user code. Do not edit comment generated here */
  return;
}

```

3. The code generator does not output a system configuration file (.cfg). You must prepare one yourself. The code generation outputs one task. Add the task information for this task to the system configuration file.

- Task output by code generator:

File name : CG\_main.c

Task name : maintask

- Sample task information added to system configuration file:

Set the task startup address to "maintask".

```

/*****/
/*      System Information      */
/*****/
SYS_STK( 256 );      /* System Stack Size */
MAX_PRI( 15 );      /* max priority of tasks */

/*****/
/* task */
/*****/
CRE_TSK(
  ID_TASK1,          /* task ID */
  {
    TA_HLNG | TA_ACT | TA_ENAINT, /* task attribute */
    0,                /* task extend information */
    maintask,         /* task start address */
    1,                /* task initial priority */
    256,              /* task stack size */
    NULL              /* reserved area (NULL) */
  }
);

```



## 9.5 Cautions for RX78K0R users

RI78V4 is newly version of RX78K0R. This section explains the changes from RX78K0R package V4.30 to RI78V4 .

### 9.5.1 The Changes from RX78K0R to RI78V4

- The product name changes from “RX78K0R” to “RI78V4”.
- The version number of digit changes from “3” to “5”.
- The supported uITRON version changes from “V4.03.01” to “V4.03.03”.
- The maker code for uITRON specification Changes from “0x0017(NEC Electronics)” to “0x011b (Renesas Electronics”.
- The Identification number of kernel for uITRON specification Changes from “0x1210” to “0x0006”.
- The name of kernel library changes from “librx.lib” to “libri.lib”.
- The folder structure changes. Please refer to “help” or “User’s Manual RI Series Start”.
- The conditional compile macro changes from “\_\_nec\_\_” to “\_\_rel\_\_”.
- The sections of kernel changes as follows.
  - rx78k0r → k\_system
  - rxinf → k\_info
  - sit → k\_const
  - sysarea → k\_data
  - stkarea → k\_stack
  - p0area, p1area, p2area, p3area → k\_work0, k\_work1, k\_work2, k\_work3
- Remove the following restriction.
  - AND and OR specified together as the wait conditions for the same event flag during processing of the same task.
- The configurator name changes from “CF78K0R” to “CF78V4”.
- The configurator error number of digit changes from “4” to “7”.
- Supports CubeSuite+ V1.00.00.
- Remove to support CubeSuite and PM+.
- Add function that the CubeSuite/PM+ projects convert CubeSuite+ projects.
- The function of kernel version select ion is removed.
- Supports E1/E20 emulatores.

## Chapter 10. Restrictions

There are no restrictions for this product.

## Chapter 11. Changes in User's Manual

There are no changes in User's Manual for this product.

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