CS+ for CC V3.02.00

Release Note

R20UT3517EJ0100
Rev. 1.00
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Chapter 1. Target Devices

The target devices supported by the CS+ are listed on the Website.
Please see this URL.
CS+ Product Page:

http://www.renesas.com/cs+

Chapter 2. User's Manuals

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

Manual Name	Document Number
CS+ V3.00.00 Installer	R20UT3094EJ0100
CS+ V3.02.00 Editor	R20UT3458EJ0100
CS+ V3.02.00 Python Console	R20UT3457EJ0100
CS+ V3.00.00 Updater	R20UT3098EJ0100
CS+ V3.02.00 Message	R20UT3459EJ0100
CS+ V3.02.00 Project Operation	R20UT3460EJ0100
CS+ V3.02.00 Analysis	R20UT3461EJ0100
CS+ V3.02.00 RH850 Debug Tool	R20UT3456EJ0100
CS+ V3.02.00 RX Debug Tool	R20UT3455EJ0100
CS+ V3.02.00 RL78 Debug Tool	R20UT3454EJ0100

Chapter 3. Keywords When Uninstalling the Product

There are two ways to uninstall this product.

- Use the integrated uninstaller from Renesas (uninstalls all CS+ components)
- Use the Windows uninstaller (only uninstalls this product)

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

- Programs and Features

Then select [CS+ for CC].

Chapter 4. Changes

This chapter describes changes from V3.01.00 to V3.02.00.

4.1 Additions to CS+

4.1.1 Addition of the project file monitoring facility

A new facility for monitoring project files and subproject files opened in CS+ was added. If a file was updated when this facility is enabled, a message is output and you can specify whether to reload the project files and subproject files.
This facility enables detection of a simultaneously opened project file being saved and its contents can be reflected.

4.1.2 Change to renaming of project files

The processing to change the names of project files and subproject files on the Project Tree panel was changed.
(Before change) The file is duplicated at the timing the project information is saved.
(After change) The file name is changed at the timing the user changes the name.

4.1.3 Enhanced message dialog

When the [Record Screen] button is selected in the message dialog box, a file recording the log of manipulations up to that point is newly saved.
This enables us to view the processing up to the point where the message was output, and it will reduce the time we take to solve the problem.

4.1.4 Addition of the splash window

Tips are displayed in a splash window.
This allows tips to be referenced without closing the One Point Advice dialog box every time CS+ is started, and it will reduce the time for learning how to manipulate CS+.

4.1.5 Addition of function Option dialog box (for building)

When there is a build error in a dependent project, the new facility allows building of that project to be skipped.
This reduces the time until correction of the build error starts.

4.1.6 Addition of the Full-screen display facility

A new facility for Full-screen display in CS+ was added.
This facility enables maximizes the Main window without showing its title bar.

4.1.7 Removal of the note on using the CS+

The following caution was raised.
- CS+ might be terminated forcibly when a program is downloaded to a debugging tool or when an editor panel is opened after downloading a program.
- Forced termination may occur when the source code for a project includes code that meets any of the following conditions.

(a) { } blocks nested to a depth of 128 or more within a function.
(b) 64 or more consecutive "else if" conditions are in sequence.
(c) The total of double the number of consecutive "else if" conditions and the depth of the nesting of {} blocks at some point in the sequence of consecutive "else if" conditions is 128 or more.

With conditions (b) and (c) above, the problem only arises when the C99 option is designated and the product is the RX family C/C++ compiler package (with IDE).

4.1.8 Addition on new microcontrollers

This version newly supports RH850 Family, the RH850/D1x series and RH850/P1x-C series.

4.2 Additions to the Editor panel

4.2.1 Addition of floating display for the Editor panel

A facility for making the Editor panel enter the floating state was added.
The Editor panel can be displayed outside the Main window of CS+, and the windows and panels can be located to further match your preferences.

4.2.2 Addition of the incremental search facility

The incremental search facility was added to the Editor panel.
This facilitates searching for character strings and contributes to improving the efficiency in source file editing and debugging operations.

4.2.3 Improvement of handling plug-in on the Editor panel

A change was made so that plug-in on the Editor panel is not disabled by the "/np *plug-in name*" option or "/nall" option when manipulating the command line.
This prevents plug-in on the Editor panel from being accidentally disabled.

4.3 Additions to the build tool

4.3.1 Addition of the property setting facility in build mode

A facility for reflecting all values set in the properties of the build tool in build mode was added.
This allows settings to be made for all build modes at once.

4.4 Additions to the memory map profiler

4.4.1 Addition of the facility to change the build options

When collecting the memory mapping information, the facility to change the build options to those suitable for profiling was added.

4.4.2 Addition of the facility to jump to the Editor panel

A facility to jump to the Editor panel or external editor when a detailed memory mapping area item is selected was added.
This reduces the time it takes to reference or change the source file after checking memory mapping areas.

4.4.3 Addition of the facility to change the memory mapping name

A facility to change the name of saved memory mapping areas (second or later in the display) displayed in the list of memory mapping areas was added.
This enables unique names to be used when saving multiple states. It is possible to make the kind of state saved understandable.

4.4.4 Enhanced facility for saving the file

When a detailed memory mapping area is saved in a file, the name of a label or an item selected in the memory mapping list is output on the first line.
This makes it possible to identify what information was saved when the saved file is referenced.

4.5 Additions to the analysis tool

4.5.1 Enhanced facility for enabling dynamic analysis

When using a facility that enables dynamic analysis, the standard settings necessary for dynamic analysis are set up for the debugging facilities of the emulator or simulator.
This minimizes manipulations for making settings for dynamic analysis.

4.5.2 Enhanced function attribute in the Function List panel [RL78]

The callt function in the RL78 family CC-RL compiler is now supported. When a function is defined as a callt function, callt is displayed in the attribute on the Function List panel.
Since the functions defined as callt functions are obvious, using this information with the execution count information, whether callt functions are specified efficiently can be checked and callt specification can be reviewed.

4.5.3 Addition of the time display in the Function List panel [RH850]

Using the facility to analyze time information of trace data, the execution time, execution time in percentage, and average execution time are shown on the Function List panel.
Information necessary when reviewing program tuning can be obtained by this facility.

4.5.4 Addition of the facility for display in clock-cycle units [RH850]

Using the facility to analyze time information of trace data, time can also be displayed in clock-cycle units.
This makes the time information easier to read because the display (in second units or clock-cycle units) can be switched according to your situation.

4.6 Additions to the Python console

4.6.1 Addition of Python functions

The following Python functions are added.

Function Name	Functional Overview
build.Stop	Aborts the build in progress.
debugger.DebugTool.RestoreState	Restores the debug tool state to the one saved in the file.
debugger.DebugTool.SaveState	Saves the debug tool state in a file.

4.7 Additions to the I/O Header File Generation

4.7.1 Addition of a facility to customize the I/O header file [RH850]

A facility to select modules which are output the I/O header file and to divide the I/O header file were added. By selecting only necessary module, it is possible to reduce the I/O header file size. By dividing the I/O header file, it is possible to reduce the compiling time.

4.7.2 Addition of output the I/O header file compatible with the MISRA-C:2004 rules [RH850] [RL78]

Outputs the I/O header file compatible with the following MISRA-C:2004 rules.
- Rule 6.3: typedefs that indicate size and signedness should be used in place of the basic types.
- Rule 6.4: Bit fields shall only be defined to be of type unsigned int or signed int. (int size IOR only)
- Rule 10.6: A "U" suffix shall be applied to all constants of unsigned type.
- Rule 18.4: Unions shall not be used.

When the same I/O registers allocated to the same address, output only the maximum access size IOR because no union is output using this facility.
Outputs the bit field definition in beginning of the I/O header file regardless of using the facility. This definition is checked as MISRA-C:2004 rules.

4.8 Additions to the Debug Tool

4.8.1 Addition of the saving function in watch panel [RX] [RH850] [RL78]

The function of saving after expanding the watch data was added.
By this function, when the watch expressions such as array, pointer type variables, structures / unions, register (only those with the part name) can be expanded, the watch expressions are saved in expanded form even if not expanded display.

Chapter 5. Points for Caution

This section describes points for caution regarding CS+.

5.1 Points for caution regarding CS+ (general)

5.1.1 File names

The following rules apply to folder and file names.

- Folder and file names
  Do not use folder or file names that cannot be created from Windows Explorer.
- Source file names, load module file names, and project file names
  File names consist of the characters a-z, A-Z, 0-9, the period (.), the underscore (_), plus sign (+), and minus sign (–).
  File names cannot start or end with a period (.).
  Filenames cannot start with a plus sign (+) or minus sign (–).
  CS+ is not case-sensitive to file names.
  File names may have up to 259 characters, including the path.
  Do not use source files with the same file name. Even if they are on different paths, CS+ cannot classify them.
- File names other than the above
  File names comply with Windows conventions.
  Note that the following characters cannot be used in file names.
  \ / : * ? " < > | ;
  File names cannot start or end with a period (.) or space.
  CS+ is not case-sensitive to file names.
  File names may have up to 259 characters, including the path.
- Folder names
  Folder names comply with Windows conventions.
  Note that the characters below cannot be used in file names.
  ( ) , =

5.1.2 Panel display

If your hardware environment does not meet the recommended specifications for CS+, the [Property] panel may appear small and have scrambled contents.
If this happens, move the [Property] panel outside the split panel area.
- Enable [Dockable], and make it a docking panel
- Enable [Floating], and make it a floating panel

5.1.3 User Account Control (UAC) function (Windows Vista, Windows 7)

If the UAC function is disabled on Windows Vista or Windows 7, then if a user without administrator privileges creates a project, and no Device Dependence Information is installed, installation of the Device Dependence Information will begin, but the installation will fail. If the UAC function is disabled, create projects after logging in with administrator privileges.

5.1.4 Problem with a Windows update program

Your computer may suffer a "blue screen" error if you apply the KB2393802 patch published by Microsoft Corporation. If this error occurs, please apply the patch provided by your computer's manufacturer or another source.

5.1.5 Renesas Electronics real-time OS

If you use the real-time operating system for the RX family provided by Renesas Electronics, install CS+ in a folder and path where the names contain no parentheses. If you install it under the 64-bit version of Windows, it will be installed in the "Program Files (x86)" folder by default, and since the folder path includes parentheses, this will produce an error.

5.1.6 Changing microcontrollers

Note the following points for caution when changing the microcontroller.

- The microcontroller can only be changed to another within the same family, since this will correspond to the same build tool (RH850, RX and RL78).
- When changing the microcontroller, do so while the debugger is not connected.
- Save the project before changing the microcontroller.
- Information on pin layout (design tool), code generation (design tool), and debugging (except for watch registration information) are not carried over after the microcontroller has been changed.

5.1.7 Plug-in Manager function

We recommend that the checkbox for the plug-in for the microcontroller that is the target for development is not deselected on the [Basic Function] tabbed page of the [Plug-in Manager] dialog box.

Deselect the checkboxes for the build tool and debugging tool plug-ins that are for microcontrollers that are not the target for development. For example, if only the plug-in for the build tool is deselected, the file to be downloaded by the debugging tool will not be found and an error will occur.

5.1.8 [Editor] panel

- The [Page Setup] dialog box is not available.
- Although there is a [Copy] button on the [Print Preview] toolbar, it does not work.
- When a variable or label is selected and the Jump to Function feature is used from the context menu, execution does not jump to the variable or label.
- The Jump to Function feature will not jump to a static function defined in another file.
- The following notes apply to the editor, when source files with the same name but from different folders are registered with a main project and a sub project, and load modules from both the main project and sub project are downloaded.
  - The address of the main project is displayed on the file.
  - At jumping to a source file from disassembled code, the file registered with the main project is opened.
  - If the file is opened from either project, only one file will be opened.
- The smart edit function does not work correctly for a structure that does not have a name.
- If the arguments of a function include a function call, incorrect information will be displayed in the tooltip.
- Names of member variables and functions are not correctly supplemented by the smart edit function in arrays of classes and of pointers to classes.
- Supplementation does not produce appropriate strings even if a part of a member name is entered and 'ctrl + (space)' is also entered.
- Outlining (collapse/expand) only works with files that have been registered with the project. Any files that have not been registered with the project will not be outlined in the [Editor] panel of CS+.
- On Windows 8 and Windows 8.1, the display may become unclear due to anti-aliasing.
- In mixed display mode, if a line number is specified for a jump, the disassembled code is inserted and displayed, so the specified line may not be displayed on the screen.
- If a structure is nested, the smart edit function does not work on the third and subsequent stages. In addition, information is not displayed in the tooltip.
- For the first line of code immediately after '#ifdef - #endif', the smart edit function does not show candidate members. In addition, no tooltip is displayed.
- For the first variable in '#ifdef - #endif', the smart edit function does not show candidate members for the code after '#endif'. In addition, no tooltip is displayed.
- When a file not included in a project is opened, a bookmark is set, the project is closed, the setting for the bookmark in the file is changed, the project is opened again, and the [Bookmarks] dialog box is opened, the dialog box will display the bookmark with the setting when the project was closed while the source window displays the bookmark with the new setting that was made after the project was closed. That is, different settings are displayed for the bookmark in the dialog box and source window.

  In such cases, close the file and then open it again. The display of the bookmark in the [Bookmarks] dialog box will then reflect the display in the source window.
- When the rectangular selection tool (obtained by holding the Alt key down and then using the mouse to select an area) is used and the selected area is pasted to add lines in and after the last line, the selected area is pasted from the beginning of the line after last regardless of the location specified for pasting. Insert spaces after pasting as required.
- When saving a file in the [Save As] dialog box, the extension listed at the top of the [Save as type] drop-down list is automatically added unless another extension is specified. Note however, that an extension is not added when a file name is input with an extension that is selected in the [Save as type] drop-down list or with an extension that is registered with Windows. When an automatically added extension is not as expected, modify the name of the file by using, for example, Explorer.

5.1.9 Conversion from PM+ to CS+ projects

CS+ cannot read CA850 projects made by PM+ V6.00/V6.10/V6.11 then the Build Mode has been newly added. Handling by CS+ is as follows.

1) When [Debug Build] or [Release Build] is specified, information on the added Build Mode cannot be read.
2) When the added Build Mode is specified, it leads to an error.

[Workaround]
Use V6.20 or a later version of PM+ to read the project, save it, then read the project into CS+.

5.1.10 Debugging tool settings during project appropriation

When you create a project by appropriate settings from another project, only the settings for the default debugging tool will be imported. In the RX family, however, internal processing is common to the emulator and simulator, so the settings are imported regardless of which debugging tool is selected.

5.1.11 Online help

If you close the online help while the Search tab is being displayed and you then open the online help again and display the [Contents] tab, the Coding, Build, Compiler and Build Tool Operation sections may disappear.
If this happens, close the online help while the [Contents] tab is being displayed, and then open the online help again.

5.1.12 Changing the target device during the process of converting a project

When the target device is changed in the [Project Convert Setting] dialog box while it is open for conversion of a project created by using the High-performance Embedded Workshop, PM+, or an earlier version of CubeSuite, the value chosen in [Kind of project] is returned to the default value (top type in the combo box).

For example:
The setting for [Kind of project] changes to the default type (for example, [Application]) when the device selection is changed.

5.1.13 Converting High-performance Embedded Workshop projects

Attempting to load a High-performance Embedded Workshop project into the CS+ under certain conditions may not be possible, or may lead to an error during conversion or building of the project.

(1) Converting a High-performance Embedded Workshop project to make it compatible with the CS+ fails when any of the following conditions is satisfied.

- No toolchain from Renesas Electronics Corp. is selected for the project.
- The project contains no tps file for use in setting up the High-performance Embedded Workshop environment (the tps file is automatically created when the project is opened through the High-performance Embedded Workshop). To avoid this problem, you should open the project through the High-performance Embedded Workshop once before starting conversion.
- The project contains multiple CFG files, each of which is used to set up a realtime OS from Renesas Electronics Corp.

(2) Converting a High-performance Embedded Workshop project to make it compatible with the CS+ succeeds but building of the project leads to an error when any of the following conditions is satisfied.

- Placeholder $(TCINSTALL) is used in the project.
  $(TCINSTALL) remains in the project even after conversion but the CS+ does not recognize $(TCINSTALL). Placeholder $(TCINSTALL) that has been used as a parameter for [Options] in the High-performance Embedded Workshop is simply passed to the CS+ and may cause an unintended result (e.g. an error) upon building of the project. For this reason, you should manually change $(TCINSTALL) after converting the project.

- Placeholder $(WORKSPDIR) is used in the project.
  If you select a HEW project file (with extension hwp) in the CS+, this is automatically converted to “%ProjectDir%\..” (the directory above the project directory). An error may occur during building of the project if the workspace does not exist in the directory indicated by “%ProjectDir%\..”.
  For this reason, you should manually change “%ProjectDir%\..” after converting the project.

- A custom build phase is used in the project.
  Since all custom phases are deleted upon conversion, an error may occur during building of a project that involved a file output created for a custom build phase in the High-performance Embedded Workshop.
  After converting the project, register the custom build-phase command with the CS+ as a command to be executed before or after each phase as required.

- A custom placeholder is used in the project.
  Custom placeholders are not converted because the CS+ does not recognize them. Any custom placeholder that has been used as a parameter for [Options] in the High-performance Embedded Workshop is simply passed to the CS+ and may cause an unintended result (e.g. an error) upon building of the project. For this reason, you should manually change the custom placeholders after converting the project.

(3) Other
(a) $(FILEDIR) is converted to %FileDir%.
Leaving %FileDir% as it is when the pathname is edited in the [Path Edit] dialog box will lead to the following error: The specified path contains a non-existent folder. (W0205012)
Edit the pathnames and replace %FileDir% with another placeholder or directory name.
(b) $(WINDIR) is converted to %WinDir%.
(c) The order in which folders are displayed in CS+ may differ from that in the High-performance Embedded Workshop.
(d) If a High-performance Embedded Workshop project for which downloaded files have been specified is loaded into CS+, CS+ will show these files as the second and subsequent items in the list of downloaded files for each debugging tool.
(e) The compiler option -output=src is converted to –output=obj (default).
(f) If you load a library project that has been linked to the standard library into CS+, the linkage setting will be discarded (this is indicated in the log information that is output as a result of loading the project).
(g) If [Use an existing library file] has been selected for the library generator in the High-performance Embedded Workshop, the setting is changed to [Do not add a library file] in CS+. For this reason, linking with the specified library will not proceed (this is indicated in the log information that is output as a result of loading the project).
(h) Option settings that were made on the [Toolchain Option] tabbed page of the High-performance Embedded Workshop are not converted but discarded (i.e. they are not moved across to CS+).
(i) If a sub-command file has been selected for the linkage editor in the High-performance Embedded Workshop, the [Use external subcommand file] setting is discarded when the project is loaded into CS+. The linkage editor options will have their default settings.
(j) Any files specified with the -library, -input, or -binary option will not be listed in the [Link Order] dialog box. The result is that the order of linkage for these files will not be selectable.
(k) RTOS configuration files will not be displayed under the [Configuration file] category node after the project is loaded into CS+.
(l) RTOS option settings that were made in the High-performance Embedded Workshop are discarded. RTOS options will have their default settings in CS+.
(m) The build mode for RTOS projects will be "DefaultBuild" after the project is loaded into CS+. You will need to change the build mode as required.
(n) The order of linkage of the assembly output files (ritbl.obj) for an RTOS project will differ from that in the High-performance Embedded Workshop.

5.1.14 Creating new projects

Applies to: RX

If a new project is created by selecting [Empty Application[CC-RX]] under the environment for the RX, building the project may lead to the following errors.

```
** L2132 (E) Cannot find "D" specified in option "rom"
** L2132 (E) Cannot find "D_1" specified in option "rom"
** L2132 (E) Cannot find "D_2" specified in option "rom"
```

If you encounter these errors, change the setting of [ROM to RAM mapped section] on the [Link Options] sheet in CS+.

5.1.15 Microsoft IME

If you are using Microsoft Office IME 2010, which is included in Office 2010 from Microsoft Corporation, CubeSute+ may output error E2000006.
Since Microsoft Office IME 2010 may have caused this problem, replace it with Microsoft’s standard IME or install the KB2687611 module provided by Microsoft Corporation to fix Microsoft Office IME 2010.

5.1.16 Tutorials

The Code Generator Plug-in, Pin Configurator Plug-in and Program Analyzer Plug-in are used in tutorials. Enable them through the [Plug-in Manager] dialog box.

5.1.17 Starting multiple instances of CS+

Two or more instances of CS+ can be started on the same host machine, but if you do so, take note of the points listed below.

- When two or more instances of CS+ are started, the most recent information to have been written is saved in the information file for each user's own PC.
- When two or more instances of CS+ are started, the most recent information to have been written is saved in the information file for the stack analysis tools (including CallWalker).
- When the same project file is used in two or more instances of CS+, the most recent information to have been written is saved.
- When the same project file is used in two or more instances of CS+, do not attempt building from more than one instance at the same time since the names of the output files will be identical.

5.1.18 Mentions of "R8C" in user's manuals and online help

"R8C" is mentioned in the user's manuals and online help, but CS+ does not support the R8C family.

5.2 Points for caution regarding design tools

5.2.1 Changing packages

If you change the package name in the pin layout properties, the data input in the device top view and device pin list will be cleared.

5.2.2 Saving projects

If you save a project that has sub-projects while the [Device Top View] or [Device Pin List] panel is open, then the device top view and device pin list of the last sub-project in the Project Tree will always appear.

5.3 Points for caution regarding debugging tools

The abbreviations listed below collectively denote the corresponding tools in this section.
OCD (serial): E1 Emulator (serial), E20 Emulator (serial)
OCD (JTAG): E1 Emulator (JTAG), E20 Emulator (JTAG)

5.3.1 Adding sub-projects

Applies to: All debugging tools, common to all devices

Disconnect the debugging tool before adding a sub-project that handles a different device from the main project.

5.3.2 Low-power consumption modes

Applies to: All debugging tools for RX

When a forced break occurs in a low-power consumption mode (e.g. sleep, stop, or standby) or an instruction that makes the CPU enter a low-power consumption mode is executed during stepped execution, the behavior of the simulator and the emulator will differ as follows.

- Emulator: The forced break leads to release of the CPU from the low-power consumption mode. Furthermore, the CPU will enter the low-power consumption mode during stepped execution.
- Simulator: Transitions to low-power consumption modes (e.g. by a register setting) are not supported. Executing a WAIT instruction causes a break, with the PC placed at the address of the next instruction. During stepped execution, the CPU does not enter the low-power consumption mode and the PC is placed at the address of the next instruction.

5.3.3 Traces over desired intervals

Applies to: Simulator for all devices

If you perform a trace from a trace start event until a trace end event, the simulator will not include the trace end event in the results of the trace. For this reason, if you are using a simulator, set the trace end event one line below the range for which you require display of the trace data.

5.3.4 Adding sub-projects

Applies to: Common to all debugging tools and devices

If you add a sub-project while a debugging tool is connected, downloading and so on may fail. Only add sub-projects while the debugging tool is disconnected.

5.3.5 Breakpoints and other settings becoming invalid

Applies to: Common to all debugging tools and devices

If you use leading underscores to differentiate function or variable names, the debugger may recognize them incorrectly and change the symbols or invalidate breakpoint settings.
This applies in cases such as when you have two functions, one named _reset and the other named __reset.

5.3.6 Two or more variables having the same name

Applies to: All debugging tools for RX

When two or more variables are defined with the same name in unnamed name spaces of different source files, the [Watch] panel only shows the information on the first variable to be found.

5.3.7 Member-variable pointers

Applies to: All debugging tools for RX

After the member-variable pointer "mp1" defined in the program below is registered with the [Watch] and [Local Variables] panels, the type of the pointer is indicated as "int *", not "int Foo::*".

```
class Foo {
      int   m1;
};
int Foo::*mp1 = &Foo::m1;
```

5.3.8 Assigning unions to registers

Applies to: All debugging tools for RX

When a union is assigned to a register, it is assumed that the members of the union are assigned to the lower-order bytes of the register. For this reason, the values of the members will be incorrect when displayed as big endian.

5.3.9 Functions with the same name and char-type parameters

Applies to: All debugging tools for RX

When three functions with char-type parameters are defined as shown below, the address of "Func(signed char)" will not be displayed (i.e. the address of "Func(char)" will be displayed instead).

```
void Func(char);
void Func(signed char);
void Func(unsigned char);
```

5.3.10 Char-type one-dimensional arrays

Applies to: All debugging tools for RX

When a char-type one-dimensional array is assigned to multiple locations in registers or memory as shown below, no character string will be displayed in the value column of the [Watch] or [Local Variables] panel even after the array "array" has been registered with the panel.

```
char array[5] = "ABCD";
```

5.3.11 Changing the priority section among overlaid sections

Applies to: All debugging tools for RX

Changing the priority section among overlaid sections is not immediately reflected in debugger operations. To update the display of addresses in the editor, for example, you need to close the file and open it again. To update the display of variables in the [Watch] panel, execute a single step of the program.

5.3.12 Variables assigned to registers

Applies to: All debugging tools for RX

When the selection for [Scope] in the [Local Variables] panel is not [Current], the values of variables assigned to registers are not displayed correctly. Editing these values is also not possible.

5.3.13 Locations to which variables are assigned

Applies to: All debugging tools for RX

When a defined variable satisfies both of the conditions given below, the [Watch] and [Local Variables] panels indicate the location of the entire variable rather than the location of its member variables.

Conditions:

(1) The variable is assigned to two or more addresses or registers (i.e. two or more addresses or registers are displayed in the address column).

(2) A structure-, class-, array-, or union-type member is defined in the variable.

Example:

```
struct Mem {
      long m_base;
};
struct Sample {
     long m_a;
     struct Mem m_b;    <- Condition (2)
};
```

```
main () {
    struct Sample obj;
}
```

Display in the [Watch] and [Local Variables] panels:

```
"obj"                                   -       { R1:REG, R2:REG }      (struct Sample)
    L m_a           0x00000000      { R1:REG }                  (long)
    L m_b                   -       { R1:REG, R2:REG }      (struct Base)
        L m_base    0x00000000      { R2:REG }                  (long)
```

5.3.14 Casting variables

Applies to: All debugging tools for RX

When a variable is cast to another type in the [Watch] panel, casting of the variable is C-style.
For this reason, the result of casting a class using virtual inheritance to its base class is not the same as the result of the cast within the program

```
class AAA [
      int m_aaa;
 } objA;
 class BBB : public AAA {    // BBB inherits AAA.
      int m_bbb;
 } objB;
 class CCC {    // CCC does not inherit AAA.
      int m_ccc;
 } objC

 class AAA* pa = objA;
 class BBB* pb = objB;
 class CCC* pc = objC;
```

"(AAA*)pa"	Usable
"(BBB*)pb"	Usable
"(AAA*)pb"	Usable
"(CCC*)pc"	Usable
"(AAA*)pc"	Not usable because pc is considered to point to the top address of AAA.

Image of the cast in a program: (AAA*)((void*)pc)

5.3.15 PC entering the sleep state

Applies to: OCD (JTAG) and OCD (serial) for RX

When a PC running Windows Vista or Windows 7 enters the sleep state, debugging by CS+ cannot be continued after the PC reawakes.
Please set up the PC so that it does not enter the sleep state.

5.3.16 Stopping and restarting tracing during program execution

Applies to: All debugging tools for RX

When trace start events and end events have been set, stopping and restarting tracing during program execution is not possible.

5.3.17 Timestamps of trace information

Applies to: OCD (JTAG) and OCD (serial) for RX

The timestamps of trace information will not indicate the right times if the time between frames exceeds that corresponding to the trace counter (20 bits) or when trace output is lost.

5.3.18 Linkage options of CC-RX

Applies to: All debugging tools for RX

CC-RX does not support the '-sdebug' linkage option.
Please set [Outputs debugging information] in the [output] category of the [Link Options] tabbed page to '-debug'.

5.3.19 Return-out command execution

Applies to: All debugging tools for RX

Executing a return-out command from a recursive function may lead to execution stopping at the address of the return instruction in the called function instead of the correct line in the calling function.

5.3.20 Startup program protection

Applies to: OCD (serial) for RX100

Executing a CPU reset after one of the following operations during the execution of a user program will lead to a discrepancy between the contents of ROM as displayed by the debugger and the contents of the actual ROM of the MCU.

In this case, the contents will match after re-executing then stopping the user program.

Calling the R_FCL_ChangeSwapFlag function to immediately swap boot areas

Controlling the flash initial setting register (FISR) to immediately swap boot areas

5.3.21 Coverage measurement function

Applies to: E20 emulator (JTAG) for RX64M

(1) If you connect the emulator by using hot plug-in, the coverage measurement function is not available.

If you use hot plug-in to connect the emulator, please select [No] for [Use code coverage measurement function] in the [Coverage] category of the debugging tool properties.

(2) When the error message "The system was reset." is displayed during program execution, coverage from the start of the program to the system reset will not have been measured.

5.3.22 The break point setup in for statement or inline-expanded function

Applies to: All debugging tools for RX

If the following programs are described in C sauce, the command of the source program is arranged at two or more addresses, but the editor panel shows only one address.

When the break point is set up to this line, the program stops only when the address that displayed on the editor panel is executed.

1. Inline-expanded function (*1)
2. template function
3. Head sentence of for statement or do-while statement

*1 Include the function that inline expansion was performed by optimization.

5.3.23 The setting for DMAC/DTC trace

Applies to: E20 emulator (JTSG) for RX64M

When [Bus Master of data access] in the [Trace] category on the Property panel's [Debug Tool Settings] tab is set as [DTAC/DTC], If [External trace output] in the [Trace] category is set as [Trace output], the trace function may not work correctly.

Please set as [CPU execution] or [Do not output].

5.3.24 Main clock source setting when PLL is selected as clock source

Applies to: OCD(JTAG),OCD(Serial),RX64M

Please set up the following, when PLL is selected as clock source.

Set the [Main clock source] of the [Clock] category of the [Connection settings] tab of a debug tool property as [EXTAL].

When EXTAL is selected as PLL clock source, set the frequency of EXTAL to [Main clock frequency].

When HOCO is selected as PLL clock source, set the frequency of HOCO to [Main clock frequency].

5.3.25 DMA display of trace panel

Applies to: IECUBE for RL78 and 78K0R

When there is access to SFR/ memory by DMA, character string of "DMA" is not displayed in the trace panel. ("Address" and "Data" of the access to SFR/memory by DMA are displayed correctly.)

5.3.26 Debug Tool Property panel

Applies to: All debugging tools for RH850

The [Use virtual machine and thread] from the [Connect Settings] tabbed page of the property panel, do not change it from "No.".

5.3.27 CPU reset or downloading

Applies to: All debugging tools for RL78

When using build tool option " Enhance debug information with optimization:Yes " and after a program stopped at the top of "main function" by CPU reset or downloading, Disassemble panel may be opened.

In this case, please add "__nop();" to the top of "main function".

5.4 Points for caution regarding analysis tools

5.4.1 [Analysis Chart] panel

- When the emulator does not support the time tags of the internal trace, the [Analysis Chart] panel cannot be used (E1/E20 for RX).
- When a simulator is specified as the debugging tool in a graph of transitions in values, realtime sampling of IORsis not supported.
- The results on an [Execution Time(Percentage) Chart] may not be exact. This is because the counter for time-lag measurement of the trace is small and may overflow. Please check whether it has overflowed by checking the timestamp of the [Trace] panel (E1/E20 for RX).

5.5 Points for caution regarding the Python Console

5.5.1 Japanese input

The Japanese input facility cannot be activated from the Python Console. To enter Japanese text, write it in an external editor etc., copy it, and paste it into the console.

5.5.2 Display of the prompt

The Python Console prompt “>>>” may be displayed more than once, as in “>>>>>>”, results may be displayed after the “>>>”, or the caret may appear without a preceding “>>>” prompt. Entering functions is still possible in these situations.

5.5.3 Paths to folders and files

IronPython recognizes the backslash character (\) as a control character. For example, if a folder or file name starts with a “t”, then the sequence “\t” will be recognized as a tab character. Please use r + "path_name" to avoid this.

Example: r"c:\test\test.py"

A forward slash (/) can be used instead of a backslash (\).

5.5.4 Executing scripts for projects that do not have load modules

If a script is specified in the startup options for use with a project that does not have a load module file, or if project_file.py is placed in the same folder as the project file, then although the script would have been executed automatically after normal loading of the project, it will not be executed if there is no load module file.

5.5.5 Forced termination

The following actions while a script such as an infinite loop is running may lead to the results of function execution being in error because the actions forcibly terminate the execution of functions.

1. Forcible termination by selecting “Forcibly terminate” from the context menu or pressing Ctrl+D in the Python Console
2. Changing the active project in a project with multiple projects

5.5.6 Forced stopping

Executing “Abort” from the context menu will forcibly stop an executing script or function, but hook and callback functions that had not started at the time the “Abort” was executed will still be executed in order after that.

5.5.7 Executing Python commands during building

Do not issue Python commands while building is in progress.

Chapter 6. Restrictions

This section describes restrictions on CS+.

6.1 Restrictions imposed by debugging tools

The abbreviations listed below collectively denote the corresponding tools in this section.
OCD (serial): E1 Emulator (serial), E20 Emulator (serial)
OCD (JTAG): E1 Emulator (JTAG), E20 Emulator (JTAG)

6.1.1 List of restrictions imposed by debugging tools

No.	Target tool	Target device	Description	Remarks
1	OCD (serial) OCD (JTAG)	RX64M	Restriction on ID code authentication due to an error	

6.1.2 Details of restrictions imposed by debugging tools

No.1 Condition leading to errors in ID code authentication

Applies to: OCD (serial) and OCD (JTAG) for RX64M

Description: When both of the following conditions are met, an error will occur in ID code authentication making it impossible to continue with debugging.

[Conditions]

1. A device having an ID code setting other than all FF is being debugged in user boot mode.
2. After downloading a program that includes data for the option-setting memory, the CPU is reset by a RESET command, RES# pin reset, or an internal reset.

Workaround: There is no workaround.

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