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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

<https://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+ V6.00.00 Installer	R20UT3990EJ0100
CS+ V6.00.00 Editor	R20UT3991EJ0100
CS+ V6.00.00 Python Console	R20UT3993EJ0100
CS+ V5.00.00 Updater	R20UT3942EJ0100
CS+ V6.01.00 Message	R20UT4209EJ0100
CS+ V6.01.00 Project Operation	R20UT4158EJ0100
CS+ V6.00.00 Analysis Tool	R20UT3997EJ0100
CS+ V6.01.00 RH850 Debug Tool	R20UT4161EJ0100
CS+ V6.01.00 RX Debug Tool	R20UT4160EJ0100
CS+ V6.01.00 RL78 Debug Tool	R20UT4159EJ0100
CS+ V4.01.00 GHS CCRH850 Build Tool Operation	R20UT3829EJ0100

* GHS: Green Hills Software, Inc.

Chapter 3. Uninstallation

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 V6.00.00 to V6.01.00.

4.1 Improvements of CS+

4.1.1 Support for a new emulator

CS+ now supports the following new emulator. You can now use this emulator in combination with CS+ to develop programs for the given types of target MCU.

- E2 emulator (for RX devices)

4.1.2 Providing new solutions

While retaining the basic features of the development environment, CS+ also provides useful solutions that will aid various aspects of development at a level closer to your applications. The following feature is available in V6.01.00 and is easily accessible from the [Solution List] panel.

- Measuring current consumption [RX] [E2]

In V6.01.00, this feature is now supported for the RX family as well as the RL78 family.

This facility allows you to measure current drawn by a system easily without using an ammeter. Simply specify the conditions and stop the program when excessive current is detected. You can also use measurement points, in a similar manner to the setting of breakpoints, to monitor the relationship between the behavior of the program and values for current. This will shorten times required for the current-tuning process.

4.1.3 Addition of a facility for linking to the compiler qualification service

V6.01.00 supports the output of optional information for the compiler qualification service by adding [Build tool information for Compiler Qualification service] to the items selectable for output in the [Smart Report] dialog box.

Using this facility reduces the amount of work required to integrate optional information that is provided when the compiler qualification service is used.

4.1.4 Enhanced Smart Manual features [RX and RL78]

In V6.01.00, the following two features have been added. These features allow you to view more information via the [Smart Manual] panel and also reduce the amount of work required to search for information during coding.

- Addition of a feature for showing descriptions of the API functions that are generated by the code generator

Hovering a mouse cursor over the name of an API function that was generated by the code generator in the [Editor] panel produces a description of the API function.

- Enhanced facility for the [Disassemble] panel

When the name of an SFR is displayed as an operand of an instruction in the [Disassemble] panel, hovering a mouse cursor over the name produces information on the SFR.

4.1.5 Addition of a context help facility to the Smart Browser

In V6.01.00, the [Context Help] tabbed page has been added to the [Smart Browser] panel.

When creating a main project, changing an active project, or connecting a debug tool, you can use this facility to display the latest information which is available on our Web site to assist in your current work without using a Web browser.

In addition, the Smart Browser is capable of automatically searching for FAQs related to errors that have been displayed in the error dialog box and information posted on the Renesas Rulz Web site, helping you to solve problems as they arise.

4.1.6 Addition of a menu item for starting the license manager

In V6.01.00, the [Launch License Manager] menu item has been added under [Help]. Using this facility starts the license manager from CS+.

4.2 Additions to the build tool

4.2.1 Support for new versions of compilers

Support for the following versions of compilers has been added in V6.01.00 of CS+.

- CC-RH V1.07.00
- CC-RX V2.08.00
- CC-RL V1.06.00

4.3 Improvements to the debug tool

4.3.1 Fix of the note, when the E2 emulator is used for the RL78 family [RL78] [E2]

The following caution has been fixed.

(1) When the following conditions are all met, a communication error occurs, and connection from the debugger to the E2 emulator cannot be established.

Condition 1-1: RL78/G12, RL78/G11, or RL78/G10 group is used.

Condition 1-2: The port/reset shared pin is set to be used as the port function. (The PORTSELB option byte is set to "0".)

Condition 1-3: Power is supplied from the external power supply to the user system.

(2) If (1) does not apply, connection to the E2 emulator is successfully established, and all of the following conditions are met, the programs written in the MCU operate from the reset vector for about 10 ms from the moment of connection from the emulator debugger to the E2 emulator.

Condition 2-1: The RL78 family is used.

Condition 2-2: Power is supplied from an external power supply to the user system.

4.3.2 Fix of the note, when QE for Current Consumption, a tool for current consumption measurement, is used for the RL78 family [RL78] [E2]

The following caution has been fixed.

If the current consumption of the user system is 0.5 mA or less during measurement of the current consumption, the current value of the measurement result may be inappropriately large, and the waveform of the current value may not be displayed correctly.

4.3.3 Fix of the note of editor panel and Disassemble panel during debugging [RL78] [RH850]

The following caution has been fixed.

(1) If a debug operation such as setting or canceling breakpoints is performed in the Editor panel, an error(E0200010) might occur.

(2) When the Disassemble panel is opened, an error(E0200001) might occur, or a cross mark (X) might appear as shown.

4.3.4 Fix of the note of download of the abs file [RX]

The following caution has been fixed.

(1) When the abs file is downloaded, a critical error(E0200001) occurs and the Disassemble panel displays the X mark.

(2) After the abs file is downloaded, the address column is not displayed on the Assembler Source panel and source lines cannot be debugged.

4.3.5 Fix of the note of execute programming of RH850 multi-core device [RH850] [E2]

The following caution has been fixed.

(1) "Asynchronous debugging mode" is selected by [Debug Tool Settings] tab, [Multi core] category, [Debug mode].

(2) One of CPU is executing a program already.

(3) A stopped core is set as a debugging target.

4.3.6 Fix of the note of timestamp value of the software trace which is at the time of RH850 multi-core device debugging [RH850]

The following caution has been fixed.

The timestamp value of the software trace which was acquired by the core which isn't a debugging target isn't sometimes right.

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 (.).
File names 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)

If the UAC function is disabled on Windows, 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

- 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 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.
- On Windows 8.1 and Windows 10, the display may become unclear due to anti-aliasing.
- 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.
- Printing the contents of the Editor panel is not possible in an environment with .NET Framework 4.6 installed. To do so in that case, use an editor other than that of CS+.

5.1.9 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.

5.1.10 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.

5.1.11 Converting CA78K0R or CA78K0 projects for use with CC-RL

In converting projects created by using CA78K0R or CA78K0 to projects for use with CC-RL, conversion will not proceed if the destination folder already contains files with the same names as those of the files to be output. Check that there are no such files in the destination folder before using the converter.

5.1.12 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.

5.1.13 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+.

5.1.14 Microsoft IME

If you are using Microsoft Office IME 2010, which is included in Office 2010 from Microsoft Corporation, CS+ 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.

5.1.15 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.

5.1.16 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.

5.1.17 Smart Browser

Applies to: RH850

When an RH850 project is opened, Smart Browser does not display the contents of user's manuals and sample code in some cases.

5.1.18 Loading projects by using earlier versions of CS+

If the version of CS+ being used to load a project is earlier than the CS+ version with which the project was created, some settings may be cleared since the earlier versions of CS+ do not recognize them.

5.1.19 .NET Framework from Microsoft Corporation

CS+ outputs the following message and is closed if the version of the .NET Framework you are using is earlier than 4.5.2.

```
E0200010
Failed to launch this product.
Please install the Microsoft .NET Framework 4.5.2 or later on this PC.
```

In such cases, obtain version 4.5.2 or a later version of the .NET Framework from the Web page of Microsoft Corporation and install it before starting up CS+ for CC.

Note that the update manager for CS+ for CC is not usable for updating the .NET Framework.

5.1.20 Dual-bank function of the code flash memory

Applies to: RX65N/RX651-2M Group

Products of the RX65N and RX651 groups with 2 or 1.5 MB of ROM support the dual-bank function of the code flash memory. In CS+, you can select the linear or dual mode during the process of setting up a project.

In use of dual mode, select the type name with "_DUAL".

5.1.21 Smart Manual

When the Smart Manual does not support the target MCU of an open project, the user's manuals are not displayed.

5.1.22 Smart Report

When [Build tool information for Compiler Qualification service] is output by the Smart Report facility, the following points for caution apply.

- When the [Build simultaneously] property is set to [Yes] in the [Build Method] category on the [Common Options] tabbed page of the [Property] panel of the build tool, information on the -define and -include options of the assembler is output in the [Required options] section, although it should be output in the [Other options] section. [CC-RX]
- When the [Build simultaneously] property is set to [Yes] in the [Build Method] category on the [Common Options] tabbed page of the [Property] panel of the build tool and access to external variables is to be optimized, information on the -map option of the linker is not output. [CC-RH] [CC-RX]
- When the [Output variables/functions information header file] property is set to [Yes] in the [Variable/functions information] category on the [Link Options] tabbed page of the [Property] panel of the build tool, information on the -VFINFO option of the linker is not output. [CC-RL]
- When [Use software trace (DBTAG) for exclusion control check] has been set to [Yes] in the [Output Code] category on the [Compile Options] tabbed page of the [Property] panel of the build tool, a folder that is not in [Intermediate file output folder] in the [Output File Type and Path] category on the [Common Options] tabbed page is specified and the type and path information is output, error code E0271001 will be displayed. In such cases, create a folder which is to be specified as [Intermediate file output folder] and the information will be output. [CC-RH]
- The options specified for [Other additional options] in the [Others] category of the [Property] panel of the build tool are always output under [Required options].

5.1.23 I/O Header file update

Applies to: RH850

When making it the time of a I/O header file update and the file name only of the upper/lower case difference, a file of existence isn't made as back-up file.

5.1.24 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 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 main project 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 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.

5.3.2 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.

5.3.3 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.

5.3.4 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.

5.3.5 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;
```

5.3.6 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.

5.3.7 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);
```

5.3.8 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";
```

5.3.9 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.

5.3.10 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.

5.3.11 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)
```

5.3.12 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)
```

5.3.13 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.

5.3.14 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.

5.3.15 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.

5.3.16 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'.

5.3.17 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.

5.3.18 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

5.3.19 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.

5.3.20 Breakpoints in for statements or inline-expanded functions

Applies to: All debugging tools for RX

If a line of C source code includes any of the functions or statements listed below, the instruction is placed at two or more addresses. However, the editor panel shows only one of the addresses.

In cases where a breakpoint is set on this line, the program stops only when the instruction at the address being displayed on the editor panel is executed.

1. Inline-expanded function (*)

2. Template function

3. First line of a for or do-while statement

* Includes those inline-expanded by optimization

5.3.21 Trace setting for DMAC/DTC

Applies to: E20 emulator (JTAG) for RX64M

When [DTAC/DTC] is selected for [Bus Master of data access] in the [Trace] category on the [Debug Tool Settings] tabbed page of the Property panel, select [CPU execution] or [Do not output] for [External trace output] in the [Trace] category. If you select [Trace output] for [External trace output], the trace function may not work correctly.

5.3.22 Main clock source setting when PLL is selected as the clock source

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

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

Select [EXTAL] for [Main clock source] on the [Clock] category of the [Connection settings] tabbed page of the debugging tool properties.

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

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

5.3.23 DMA display of trace panel

Applies to: IECUBE for RL78

When there is access to SFR⁴ or memory by DMA, "DMA" is not displayed in the trace panel. ("Address" and "Data" of the access to SFR/memory by DMA are displayed correctly.)

5.3.24 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."

5.3.25 Pseudo-error debugging

Applies to: All debugging tools excluding the simulator for RH850

- To cause a RH850/P1x-series and RH850/V1R-M MCU to be internally reset by a pseudo-error, set up an ECM pseudo-error trigger register from the user program. A special instruction sequence is required for writing to this register since it is protected. For details, refer to the section of write-protected registers in User's Manual: Hardware for the MCU in use.
- Do not set a breakpoint at the current PC address in pseudo-error debugging. When it is set, interrupts and internal reset will not occur.
- If you wish to set another breakpoint via a source editor or the disassemble panel at the address where a breakpoint has been set for pseudo-error debugging, designate it as a hardware breakpoint. Setting a software breakpoint in this case will lead to an error when pseudo-error debugging is started.
- The following pseudo-error debugging wasn't being supported in RH850/D1L group and RH850/D1M group.
 - * FACI Reset transfer error (FRERR)
 - * Flash sequencer error (FLERR)

5.3.26 Notice of Debugging CAN Bus Reception Procedures

Applies to: All debugging tools excluding the simulator for RH850

- The following devices weren't supporting.
 - * RH850/D1M1A:R7F701441,R7F701461

5.3.27 Notice of the project of dual mode

Applies to: All debugging tools for RX65N-2M, RX651-2M group

In case of a project of a dual mode of a device with less than 1.5 MB of ROM size, a gap exists during the address of the ROM in bank 0 and bank 1.

But data in a gap exists in the following function.

- Memory panel
- Watch panel
- Disassemble panel

[E1/E20/E2/E2Lite]

Read result is 0x00, Write is ignored.

[Simulator]

Read and Write operate correctly.

5.3.28 Notice of Watch panel

Applies to: All debugging tools for RL78, RX and RH850

In case of a variable with the size beyond 0x10000, Value, Style and Address indicate "?" in Watch panel.

5.3.29 Notice of Editor panel

Applies to: OCD (serial) for RX100

The timer function is not supported for the RX100 series, but in the right-click menu of the editor, [Timer Setting] is displayed. But It cannot be set.

5.3.30 Notice of Measuring Current Consumption

Applies to: E2 for RX100 and RX200

- Only the "USER I/F" is supported for the power supply interface.
Cannot be used with "E2 expansion I/F".
- When **monitoring** point is set, current consumption may be measured for a certain period even after user program stops.

5.4 Points for caution regarding the Python Console

5.4.1 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.

5.4.2 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.

5.4.3 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 (\).

5.4.4 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.

5.4.5 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

5.4.6 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.

5.4.7 Executing Python commands during building

Do not issue Python commands while building is in progress.

5.5 Points for caution regarding licenses

5.5.1 Updating CC-RX and CC-RH

The CC-RX V2.04.00 and later versions and CC-RH V1.03.00 and later versions compilers have the following two editions.

- standard edition
- professional edition

Start a License Manager to enable the license of "RX License Pack 2 Professional(CC-RX)" and "RH850 License Pack 1 Professional(CC-RH)" registered at present.

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.

No.2 Division of load modules

Applies to: All debugging tool for RL78, RX, RH850

Description: The restrictions below apply when the CC-RH compiler is used to generate split load modules from a program.

- a. Source-level debugging becomes impossible.
- b. The second and subsequent output files are not automatically registered with the debugging tool.

Workaround: There is no workaround.

No.3 Display of information on variables

Applies to: All debugging tool for RL78, RX, RH850

Description: If two or more variables defined in a function have the same name, the values of variables that can be viewed when the program has stopped may differ from the expected values. Whether this phenomenon arises depends on the optimization level* selected during the process of compilation.

Note: The optimization level can be set via [Build Tool] – [Common Options] – [Frequently Used Options (Link)].

[Example] In the example below, char-type variable “a” is in the innermost scope at (*1) and int-type variable “a” is in the innermost scope at (*2). Under some conditions, however, only the value of one of the variables will be visible at (*1) and (*2).

```
void main()
{
    int a = 100;
    {
        char a = 'A';
        a++; <-( *1)
    }
    a++; <-( *2)
}
```

- Display of (*1) in the [Watch] panel
“a” ‘A’ (0x41) “signed char” “0xfefb1004” // Expected value

- or "a" 100 (0x00000064) "int" "0xfeb1000"
 - Display of (*2) in the [Watch] panel
 - "a" 'B' (0x42) "signed char" "0xfeb1004"
 - or "a" 100 (0x00000064) "int" "0xfeb1000" // Expected value
- Condition: Optimization other than for debugging at the time of compilation.

Workaround: Select [Optimize for Debugging] as the optimization level before compilation.

No.4 Source files with the same name

Applies to: All debugging tool for RL78, RX, RH850

Description: When two or more files with the same name exist in a load module being debugged, line addresses are not displayed correctly in the editor. Setting of events also does not work correctly.

Example:

C:\Work\CS+\ProjA\ProjA.mtpj\Src\main.c -> A.abs

C:\Work\CS+\ProjB\ProjB.mtpj\Src\main.c -> B.abs

This is a case where the above two load modules are being debugged simultaneously.

Note: Although multiple load modules are used in the above example, this restriction is also applicable to cases where a single load module is in use.

[Conditions] The relative paths to the files from the compilation directory are the same (including the filenames).

Building by CS+

Project file directory (*.mtpj) = compilation directory

Building by using a makefile

Current directory = compilation directory

Workaround: Source files with the same name can be distinguished in either of the following ways.

- a. Change the configuration of the folders so that the relative paths to the files from the compilation directory differ.

Before: ProjA\Src\main.c

ProjB\Src\main.c

After: ProjA\SrcA\main.c

ProjB\SrcB\main.c

With this change, the relative paths will be as follows.

"SrcA\main.c"

"SrcB\main.c"

- b. Change the names of the source files so that all of the files to be debugged have unique names.

Before: ProjA\Src\main.c

ProjB\Src\main.c

After: ProjA\Src\mainA.c

ProjB\Src\mainB.c

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Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Dec. 15, 2017	-	First edition issued
1.01	Dec. 16, 2017	Overall	Modification of wrong page number in footer

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