CS+ for CC V6.00.00

Release Note

Contents

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+ V6.00.00 Message	R20UT4023EJ0100
CS+ V6.00.00 Project Operation	R20UT3992EJ0100
CS+ V6.00.00 Analysis Tool	R20UT3997EJ0100
CS+ V6.00.00 RH850 Debug Tool	R20UT3996EJ0100
CS+ V6.00.00 RX Debug Tool	R20UT3995EJ0100
CS+ V6.00.00 RL78 Debug Tool	R20UT3994EJ0100
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 V5.00.00 to V6.00.00.

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 RL78 devices)

4.1.2   Support for Windows

From V6.00.00, CS+ no longer supports Windows Vista.

4.1.3   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 features are available in V6.00.00 and are easily accessible from the [Solution List] panel.
・Measuring CAN bus reception processing times [RH850] [E2]
  Response times are important for CAN communications. This facility makes measuring response times easy. A program can also be stopped if the time is not within the allowable range. You can also check trace data and the history of CAN communications after the program has been stopped. This will help you identify problems in the early stages of development.
・Measuring current consumption [RL78] [E2]
  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.
・Smart manual [RL78] [RX]
  The Smart Manual allows you to quickly view information on any register listed in panels such as the Editor and SFR/IOR. You can read descriptions of a desired register or specific pages of the hardware manual via the [Smart Manual] panel.

4.1.4   Addition of announcements feature on Smart browser

You can use this feature to view the latest information of how to use the development tools convenient. V6.00.00 supports [Notifications] tab on Smart browser. Announcements of development tools and information from community are indicated by this tab.

4.1.5   Change of default setting for plug-in loading

The default plug-in loading operation was changed so that the plug-ins listed in the Additional Function tab on the Plug-in Manager dialog box are loaded. When CS+ is installed and started for the first time, it operates in this default state.

4.1.6   Support for use of the C source code converter in creating projects [CC-RL]

This improvement reduces the amount of work required to convert projects created by using CS+ for CA, CX with the CA78K0 compiler to projects for use with CC-RL. In creating projects, you can utilize the configuration of existing CA78K0 project files. Since this process converts the C source files to suit CC-RL, shifting from CA78K0 to CC-RL is simple.
Note, however, that assembler instructions and device-dependent statements, such as those related to the memory map and SFRs, are not converted. Alter such statements by hand to suit the target RL78 device.

4.1.7   Support for use of the C source code converter in opening PM+ projects [CC-RL]

This improvement reduces the amount of work required to convert 78K0 projects created by using PM+ to projects for use with CC-RL. Since CS+ for CC is capable of loading 78K0 projects and converting them along with the C source files to suit CC-RL, shifting from CC78K0 to CC-RL is simple.

Note, however, that assembler instructions and device-dependent statements, such as those related to the memory map and SFRs, are not converted. Alter such statements by hand to suit the target RL78 device.

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 V6.00.00 of CS+.
- ・CC-RH V1.06.00
- ・CC-RX V2.07.00
- ・CC-RL V1.05.00

4.3   Additions to the design tools

4.3.1   Addition of associated facility with Smart Configurator [RX]

Smart Configurator(SC) is a GUI-based tool that have the functionalities of the code generation and the configuration for driver and middleware,and pin configuration.

The SC generates the suitable code for each Renesas MCU family, and has the function of importing the code generated by Code Generator(CG) and the FIT modules too.

This facility requires the installations of stand-alone SC.

4.4   Improvements to the debug tool

4.4.1   Enhanced highlighting of the current PC line in the Editor panel

The highlighting function of the current PC line in the Editor panel has been enhanced in case that there are multiple source files with the same name in the load module.

But when relative path information on a load module and path information on a project tree aren't identical,there is a case that the highlighting in the PC line isn't performed.

For example, the project being debugged was created in another folder or on another computer.

In this case, select the [Do not distinguish source files with the same file name by the relative path] checkbox under the [Debug] category in the [Option] dialog box.

4.4.2   Fix of break setting to the assembler source

The following caution has been fixed.
- ・ A break can't be set as an assembler source.
- ・ Even a disassembling panel in the same area can't establish a breaking point.
- ・ When there is a homonymous label, a breaking point is sometimes set as a different file.

 Occurrence condition:
- ・ More than one load module is downloaded.
- ・ Data is defined in the head of the assembler source.
- ・ More than one text section is in the file.
- ・ The address reach of the data area is piled by more than one load module.

4.4.3   Fix of address display and break setting by the source panel

The following caution has been fixed.
- ・ The address isn't shown to a source panel.
- ・ A breaking point can't be established by a source panel.

 Occurrence condition:
- ・The object and the symbol are made the setting which isn't downloaded in a download property.

4.4.4   Addition of a facility to display graphs of values for current in simulation [RL78]

This facility allows you to view a graph showing the results of simulation of current drawn by an MCU.
The graph shows transitions of current values over time along with the following values.
・Average current
・Maximum current
・Time to cover a specified address range
・Current drawn by individual peripheral modules at a specific point

4.4.5   Addition of the simulation of current drawn by the RL78/G12 [RL78]

In addition to the simulation of peripheral modules in the RL78/G12, V6.00.00 supports the simulation of current drawn by the device even when an actual MCU (on a board) is not connected.

4.4.6   Improvement of Run-Break time [RL78] [E1, E2 Lite, E20]

The display of Run-Break time has been improved.

4.4.7   Fix of the note on using an on-chip debugging emulator while the middle-speed on-chip oscillator of RL78 Family products is being used [RL78] [E1, E2 Lite, E20]

The following caution has been fixed.
・If a program is stopped with all the following conditions satisfied while the CPU clock is operating as a
high-speed system clock, low-speed on-chip oscillator clock, or subsystem clock, a communications
error occurs between the emulator and MCU. Subsequently, the debugging tool no longer operates
correctly.
- Condition 1: The middle-speed on-chip oscillator clock is selected as the main on-chip oscillator clock.
  (Bit 0 (MCM1) in the system clock control register (CKC) of the MCU is set to 1.)
- Condition 2: The middle-speed on-chip oscillator clock is stopped.
  (Bit 1 (MIOEN) in the clock operation status control register (CSC) of the MCU is set to 0.)

4.4.8   Addition of the extended trace facility for RX65N/RX651-2M Group [RX][E20]

The data access trace function without access data is supported.

4.4.9   Removal of the note on using the CS+ Device Information for RX family [RX] [E1, E2 Lite, E20] [Simulator]

The following caution was raised.
・When the following 13 I/O registers are displayed in the IO panel and watch panel of CS+, the values
might not be displayed correctly and not be able to be written in RX113.
CTSUSSC、FSCMR、OCSR1、ICSR3、SBYCR、SCKCR3、CKOCR、INTENB0、PIPE1TRE、PIPE2TRE、
PIPE3TRE、 PIPE4TRE、 PIPE5TRE

4.4.10   Fix of debug of the load module file including the overlay section [RX]

The following caution has been fixed.
・When downloading the abs file of a program with an overlay section, CS+ sometimes terminates
forcefully.

4.4.11   Addition of the software trace (LPD) [RH850] [E2]

The software trace (LPD) function was added to the trace function of RH850 family. This function
becomes able to acquire software trace information in all devices of RH850 family.

4.4.12   Fix of Timestamp of the software trace [RH850] [E1, E2, E20, Full-spec emulator]

The following caution has been fixed.

・When a trace panel was a front and the software trace was acquired, the first timestamp weren't sometimes "0".

4.4.13 Fix of acquisition of information on symbols of static variables and static functions inside a file when using CC-RH and CC-RL [RL78] [RH850]

The following caution has been fixed.

・Acquisition of information on symbols of static variables and static functions inside a file when using CC-RH and CC-RL

4.5 Improvements to the Python console

4.5.1 Addition of Python functions

The following Python functions are added. [RH850] [E2]

Function Name	Functional Overview
debugger.SoftwareTraceLPD.Delete	Deletes software trace (LPD output) data.
debugger.SoftwareTraceLPD.Disable	Disables software tracing (LPD output).
debugger.SoftwareTraceLPD.Enable	Enables software tracing (LPD output).
debugger.SoftwareTraceLPD.Get	Acquires a specified number of frames of software trace (LPD output) data and outputs the data to a file.
debugger.SoftwareTraceLPD.Information	Displays information on software tracing (LPD output).
debugger.SoftwareTraceLPD.Set	Makes settings for software tracing (LPD output).

4.5.2 Python functions supporting a new MCU

Support for the RL78/G12 by the following Python functions has been added.

Function Name	Functional Overview
debugger.CurrentConsumption.Clear	Clears data on current drawn that have been acquired. [RL78/G10, RL78/G12, RL78/G13] [Simulator]
debugger.CurrentConsumption.Disable	Disables the acquisition of data on current drawn. [RL78/G10, RL78/G12, RL78/G13]
debugger.CurrentConsumption.Enable	Enables the acquisition of data on current drawn. [RL78/G10, RL78/G12, RL78/G13] [Simulator]
debugger.CurrentConsumption.Get	Displays the maximum and average values of data on current drawn that have been acquired. [RL78/G10, RL78/G12, RL78/G13] [Simulator]
debugger.CurrentConsumption.Information	Displays data on current drawn that have been acquired. [RL78/G10, RL78/G12, RL78/G13] [Simulator]

4.5.3 Addition of a parameter for a Python function

The following parameter for a Python function has been added. [RH850]

Function Name	Newly Added Parameter	Description
project.Create	ProjectKind.RV850	Project for RV850

4.5.4 Addition of a Python class

The following Python class has been added. [RH850] [E2]

Class Name	Class Overview
SoftwareTraceLPDEventInfo	This class holds information on software tracing (LPD output) and events.

4.5.5 Python class supporting a new MCU

Support for the RL78/G12 by the following Python class has been added.

Class Name	Class Overview
CurrentConsumptionInfo	This class holds information on current drawn. [RL78/G10, RL78/G12, RL78/G13] [Simulator]

4.5.6 Addition of Python properties for debugging tools

The following Python properties for debugging tools have been added.

Property Name	Property Overview
debugger.DebugTool.SerialNumber	This property is used to specify the serial number of the emulator or to refer to the current setting.
debugger.DebugTool.SerialNumberList	This property is used to refer to a list of the serial numbers of emulators.
debugger.Option.SupplyPower	This property is used to select whether power should be supplied from the emulator. [E1] [E2] [E2 Lite]
debugger.Option.SupplyPowerVoltage	This property is used to specify the voltage in volts to be supplied as power from the emulator. [E1] [E2]
debugger.SoftwareTraceLPD.PEList	This property is used to refer to a list of PE numbers for which software tracing (LPD output) is possible. [RH850] [E2]
debugger.SoftwareTraceLPD.Priority	This property is used to set the type of priority for the acquisition of software trace (LPD output) data or to refer to the current setting. [RH850] [E2]
debugger.SoftwareTraceLPD.RecordingMode	This property is used to specify the operation of the debugging tool when the memory for recording software trace information (LPD output) becomes full or to refer to the current setting. [RH850] [E2]

4.5.7 Enhanced facility for the output of information on current drawn in XML files

To coincide with the addition of a graphical display in the simulation of current drawn, we have added and changed the types of information to be saved in XML files by the debugger.CurrentConsumption.Get function as follows. [RL78]

・Definitions of numbers indicating peripheral modules
・The names of peripheral modules can now be output in Japanese or English.

・Information included in frames to be output at points where values for current change
・Addresses where values for current change have newly been included.
・Output time indicates the cumulative time from the beginning of measurement while it was formerly the elapsed time from the previous frame.

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)
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   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   Help

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

5.1.14   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.

5.1.15 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+.

5.1.16 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.

5.1.17 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.

5.1.18 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.

5.1.19 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.

5.1.20 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.

5.1.21 .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.

5.1.22   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".

5.1.23   Smart Manual

When an RH850 or etc. project is opened, Smart Manual does not display the contents of user's manuals in some cases.

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   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   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 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.

5.3.5 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.

5.3.6 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;
```

5.3.7 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.

5.3.8 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);
```

5.3.9 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";
```

5.3.10 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.

5.3.11 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.

5.3.12 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)
```

5.3.13   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)
```

5.3.14   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.

5.3.15   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.

5.3.16   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.

5.3.17   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'.

5.3.18   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.

5.3.19   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

5.3.20   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.

5.3.21   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

5.3.22   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.

5.3.23   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.

5.3.24   DMA display of trace panel
Applies to: IECUBE for RL78 and 78K0R
When there is access to SFR 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.)

5.3.25   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.".

5.3.26   Pseudo-error debugging
Applies to: All debugging tools excluding the simulator for RH850
・ To cause an RH850/P1x-series 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 (FRTERR)
  * Flash sequencer error (FLERR)

5.3.27   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

5.3.28   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/E2Lite]
Read result is 0x00, Write is ignored.
[Simulator]
Read and Write operate correctly.

5.3.29   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.

5.4   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 V2.04.00 and CC-RH V1.03.00

The CC-RX V2.04.00 and CC-RH V1.03.00 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.

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