User's Manual

CS+ Code Generator

Integrated Development Environment

User's Manual: Pin View

Target Device

RL78 Family

RX Family

RH850 Family

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How to Use This Manual

This manual describes the role of the CS+ integrated development environment for developing applications and systems for RX family, RL78 family, and provides an outline of its features.

CS+ is an integrated development environment (IDE) for RX family, RL78 family, integrating the necessary tools for the development phase of software (e.g. design, implementation, and debugging) into a single platform.

By providing an integrated environment, it is possible to perform all development using just this product, without the need to use many different tools separately.

Readers	This manual is intended for users who wish to understand the functions of the CS+ and design software and hardware application systems.
Purpose	This manual is intended to give users an understanding of the functions of the CS+ to use for reference in developing the hardware or software of systems using these devices.
Organization	This manual can be broadly divided into the following units. 1.GENERAL 2.FUNCTIONS A.WINDOW REFERENCE
How to Read This Manual	It is assumed that the readers of this manual have general knowledge of electricity, logic circuits, and microcontrollers.

Conventions

Data significance:	Higher digits on the left and lower digits on the right
Active low representation:	XXX (overscore over pin or signal name)
Note:	Footnote for item marked with Note in the text
Caution:	Information requiring particular attention
Remark:	Supplementary information
Numeric representation:	Decimal ... XXXX Hexadecimal ... 0xXXXX

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TABLE OF CONTENTS

1. GENERAL 5
1.1 Overview 5
1.2 Features 5
2. FUNCTIONS 6
2.1 Overview 6
2.2 Open Device List View Panel 7
2.3 Open Device Top View Panel 8
2.3.1 Select color 9
2.4 Output Report Files 10
2.4.1 Output device list view 10
2.4.2 Output device top view 11
A. WINDOW REFERENCE 12
A.1 Overview 12
Main window 13
Project Tree panel 16
Property panel 17
[Pin View Information] tab 19
[Device List View Information] tab 20
[Device Top View Settings] tab 21
Device List View panel 23
[Pin Number] tab 24
[Pin Function] tab 25
Device Top View panel 26
Output panel 28
Save As dialog box 30
Revision Record 32

1. GENERAL

CS+ is an integrated development environment used to carry out tasks such as design, coding, build and debug for developing application systems.

This chapter gives an overview of the Code Generator.

1.1 Overview

The Code Generator, which is one of the components provided by CS+, enables you to output the pin assignment of the microcontroller (device list view and device top view) by configuring various information using the GUI.

1.2 Features

The Code Generator has the following features.

(1) Reporting function
You can output configured information using the Code Generator as files in various formats for use as design documents.

2. FUNCTIONS

This chapter describes the key functions provided by the Code Generator along with operation procedures.

Remark In this chapter, an example where an RL78/G1E (ROM: 32KB) R5F10FLC(64pin) is the target device is used to explain the key functions.

2.1 Overview

The Code Generator is used to output report files such as a device list view and a device top view.
The following sections describe the operation procedures for Code Generator.

(1) Start CS+
Launch CS+ from the [Start] menu of Windows.

(2) Create/Open project
Create a new project (that defines a kind of project, microcontroller to be used, build tools to be used, etc.) or load an existing project.

(3) Open Device List View Panel
Open the Device List View panel, where you enter information on the pins of the microcontroller.

(4) Open Device Top View Panel
Open the Device Top View panel, where you can confirm the information entered for the pins.

(a) Select color
Allows you to select colors used to distinguish the type of pins whose information is displayed in the Device Top View panel.

(5) Output Report Files
Output report files (files containing configured information using Code Generator: device list view and device top view) to the specified folder.

(a) Output device list view
Output a device list view.

(b) Output device top view
Output a device top view.

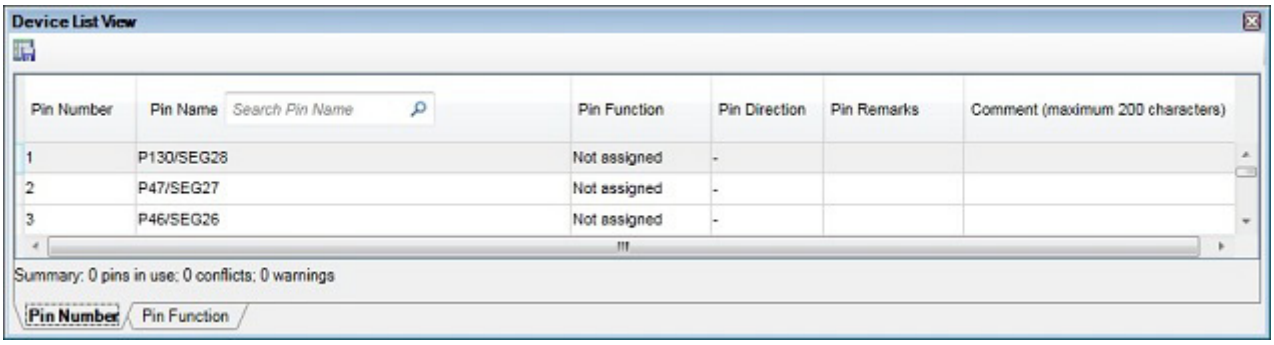
(6) Save project
Save a project.

2.2 Open Device List View Panel

Open the Device List View panel, where you enter information on the pins of the microcontroller.

To open the Device List View panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View] in the Project Tree panel.

Figure 2.1 Open Device List View Panel



Remark 1. If an unsupported microcontroller is defined in the project for Code Generator, then "[Code Generator (Design Tool)] node" will hide under [*Project name* (Project)] in the Project Tree panel.

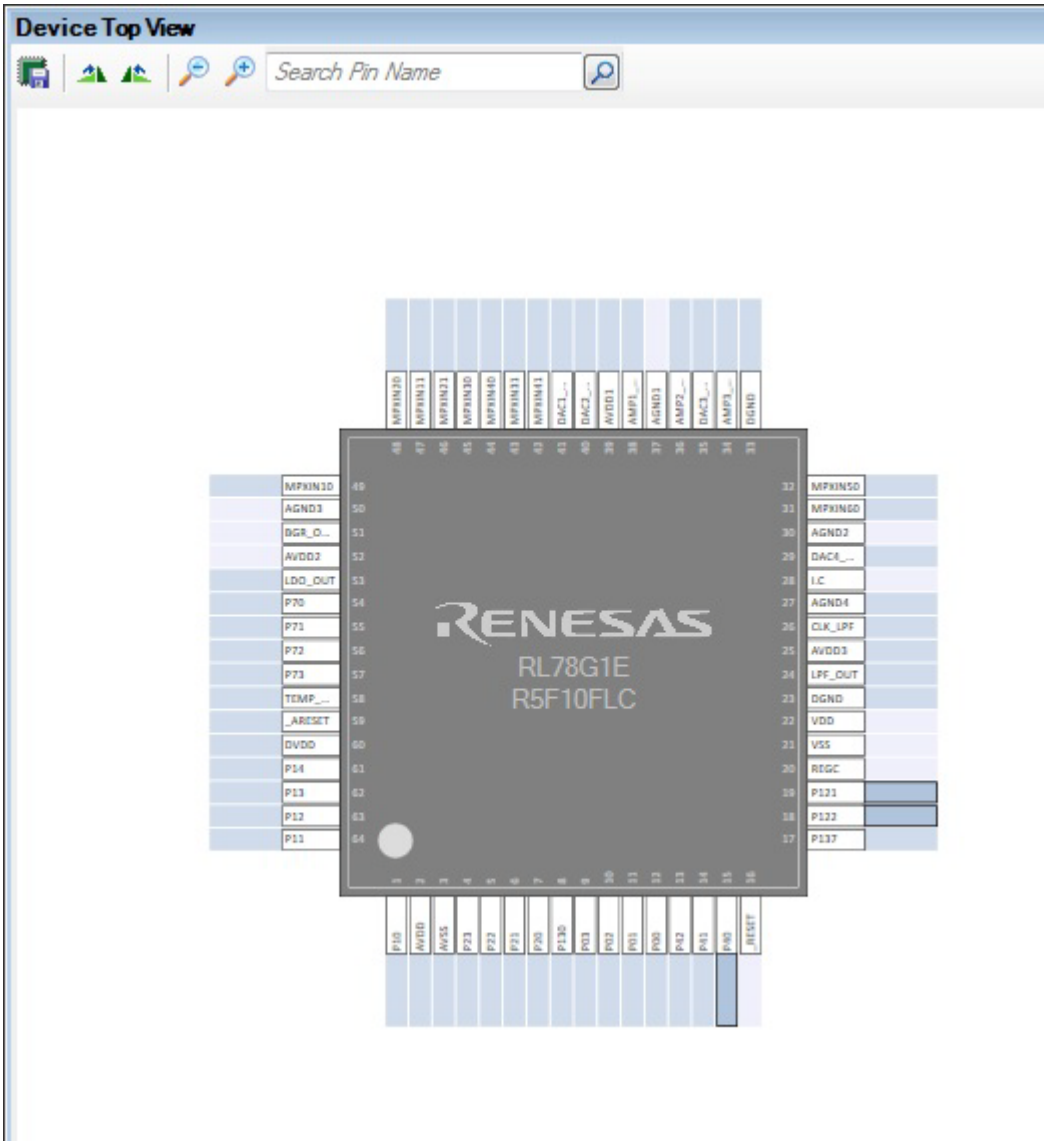
Remark 2. The Device List View panel consists of two tabs. Selecting one of the tabs changes the order in which "information on each pin of the microcontroller" is displayed.

- [Pin Number] tab
  Information on each pin of the microcontroller is displayed in the order of pin number.
- [Pin Function] tab
  Information on each pin of the microcontroller is displayed in the order it was grouped into peripheral functions.

2.3 Open Device Top View Panel

Open the Device Top View panel, where you can confirm the information entered for the pins of the microcontroller.
To open the Device Top View panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device Top View] in the Project Tree panel.

Figure 2.2 Open Device Top View Panel

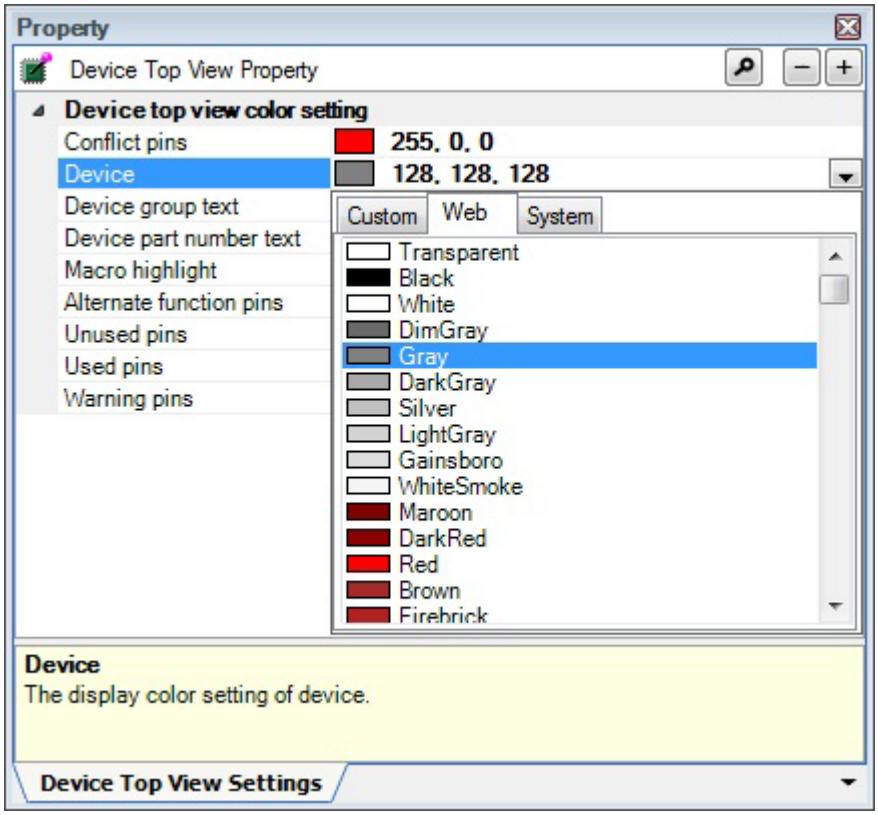


2.3.1 Select color

Select the colors used to distinguish the type of pins whose information is displayed in the Device Top View panel which is opened as described in "2.3 Open Device Top View Panel".

To select the color to be displayed, click [Device Top View Settings] tab >> [Device top view color setting] in the Property panel and select the color.

Figure 2.3 Select Color



Remark Select the colors to be displayed for the following six types of items.

Device	Selects the display color of the microcontroller.
Device group text	Selects the display color of the device group.
Device part number text	Selects the display color of the device part number.
Macro highligh	Selects the background color of pins selected in the Device List View panel, on the [Pin Function] tab.
Selected pin	Selects the background color of a pin selected in the Device List View panel, on the [Pin Number] tab.
Unused pins	Selects the display color for unused pins (dual-use pins with no use set in the Device List View panel).

2.4 Output Report Files

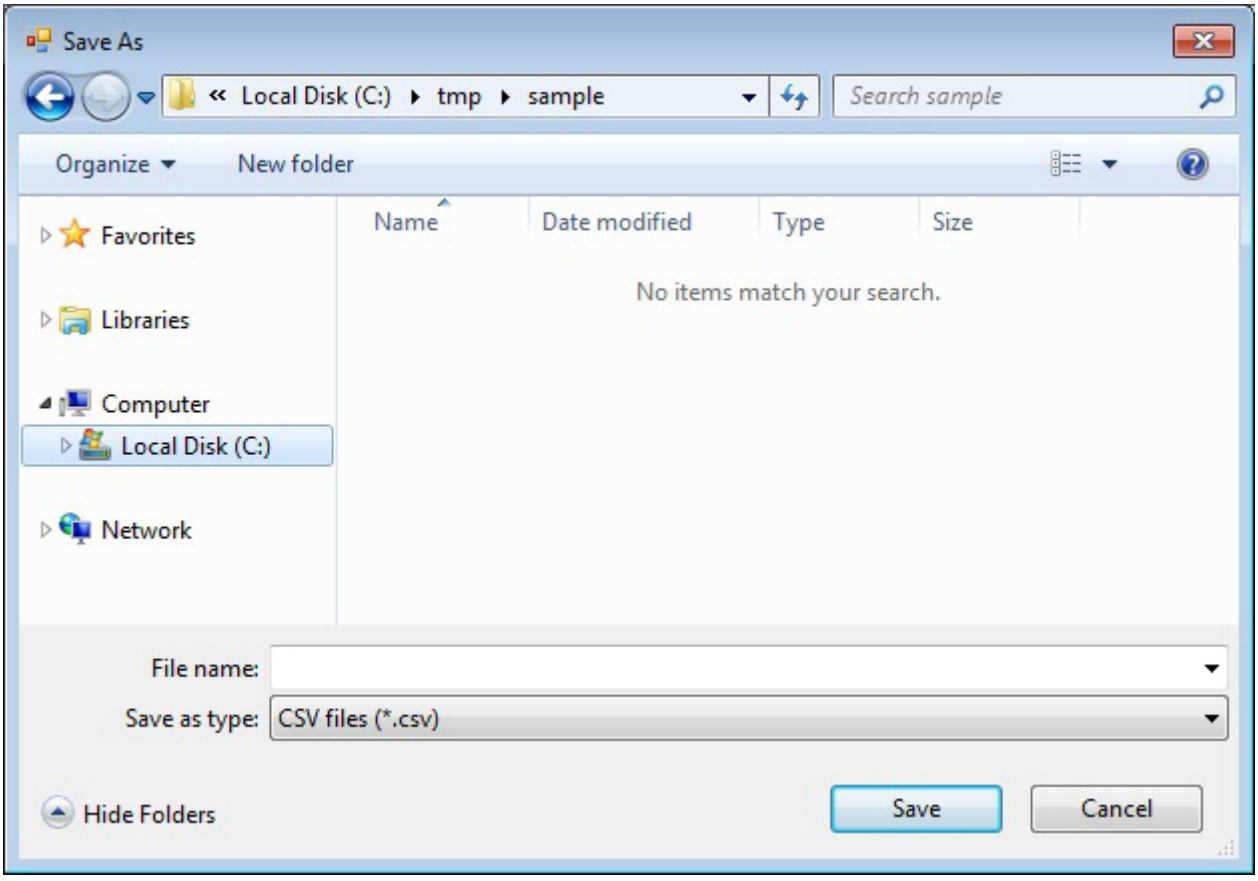
Output report files (files containing information configured using Code Generator: device list view and device top view) to the specified folder.

2.4.1 Output device list view

Select [File] menu >> [Save List View] to output a report file (a file containing information configured using Code Generator: device list view).

The destination folder for the device list view is specified in the Save As dialog box which opens by selecting [File] menu >> [Save List View].

Figure 2.4 Output Device List View



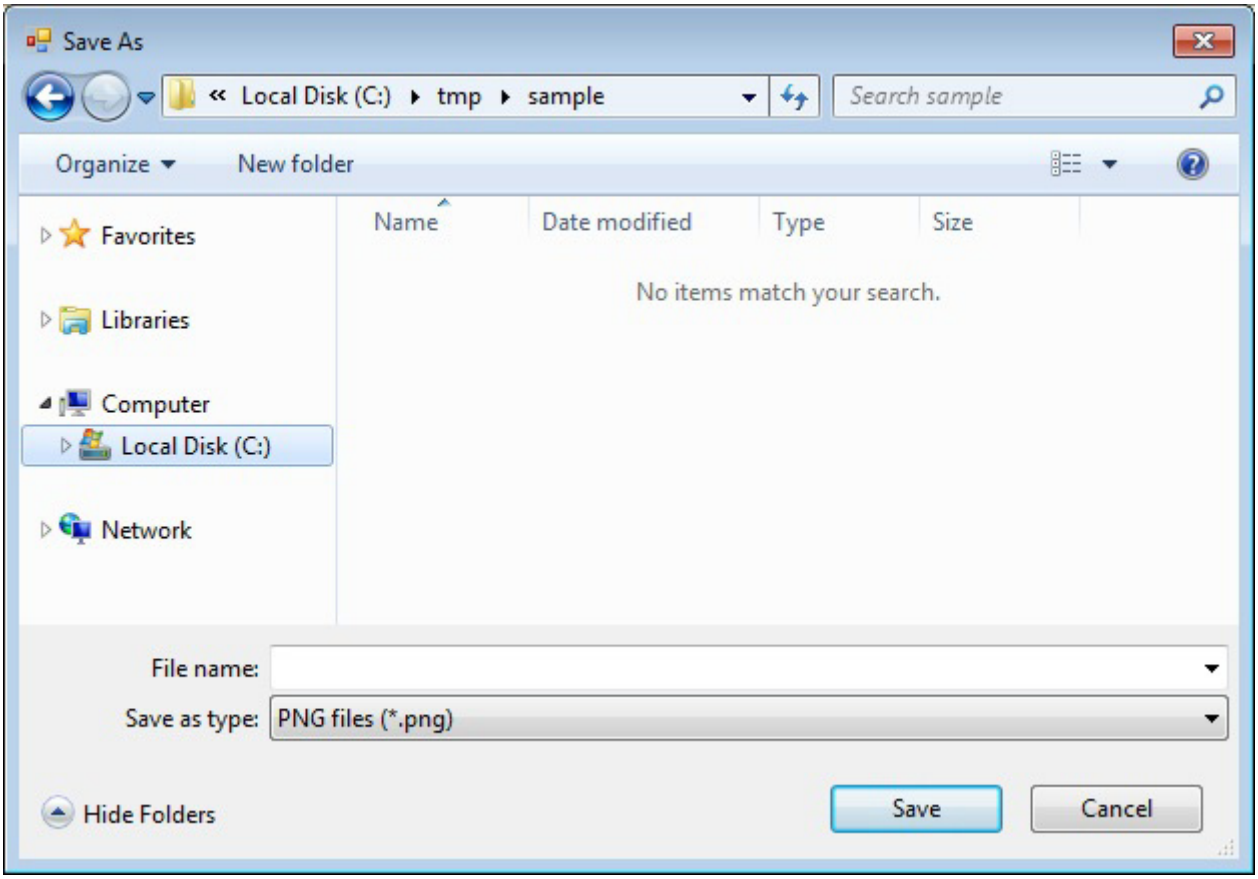
Remark The output format for the device list view is limited to CSV.

2.4.2 Output device top view

Select [File] menu >> [Save Top View] to output a report file (a file containing information configured using Code Generator: device top view).

The destination folder for the device top view is specified in the Save As dialog box which opens by selecting [File] menu >> [Save Top View].

Figure 2.5 Output Device Top View



Remark The output format for the device top view is limited to PNG.

A. WINDOW REFERENCE

This appendix explains in detail the functions of the windows, panels and dialog boxes of the Code Generator.

A.1 Overview

The Code Generator has the following windows, panels and dialog boxes.

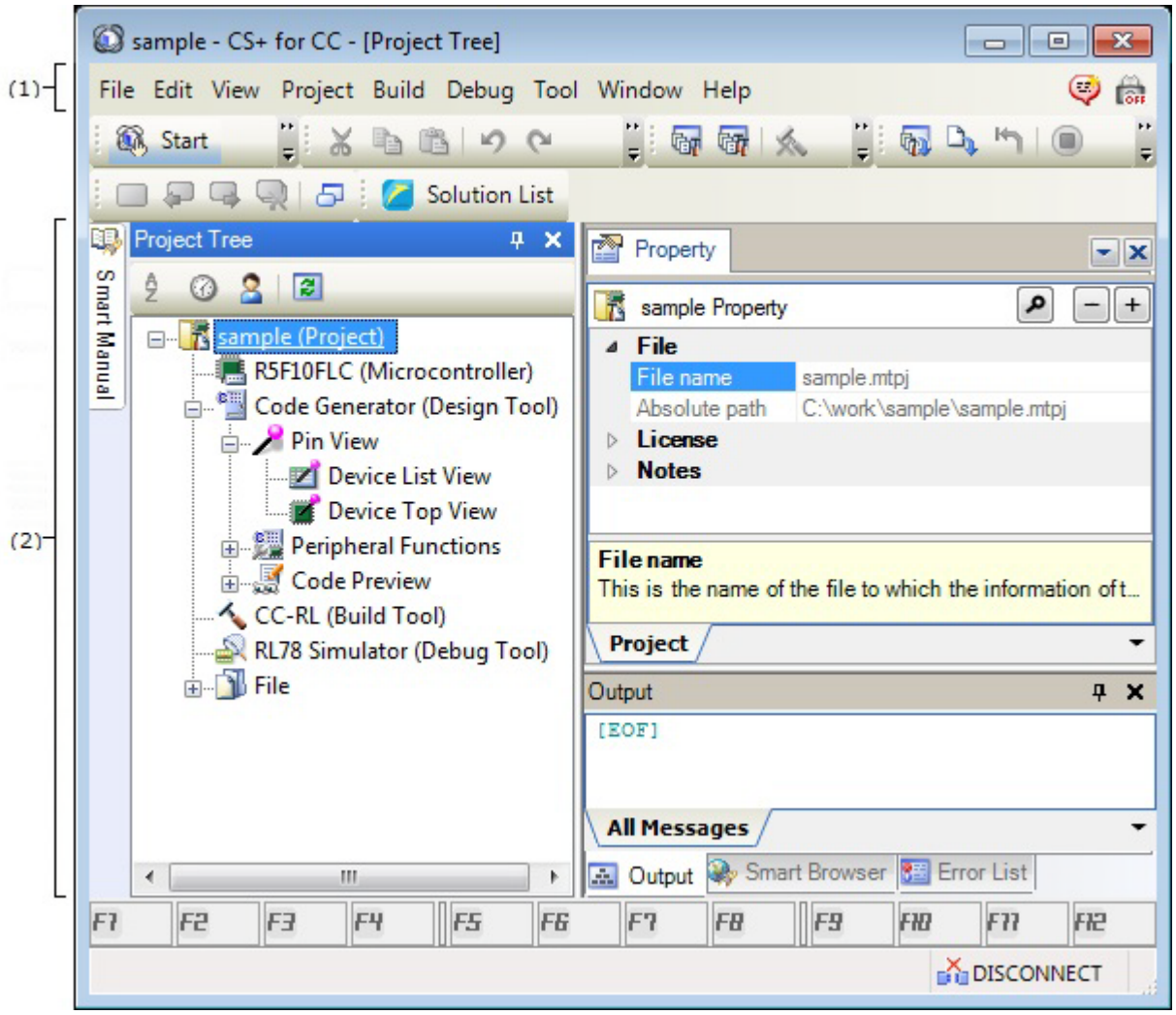
Table A.1 Window/Panel/Dialog Box List

Window/Panel/Dialog Box Name	Function
Main window	This is the first window to open when CS+ is launched. This window is used to operate various components (design tool, build tool, etc.) provided by CS+.
Project Tree panel	This panel displays the components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.
Property panel	This panel allows you to view the information on and change the setting for the node selected in the Project Tree panel.
Device List View panel	This panel allows you to enter information on each pin of the microcontroller.
Device Top View panel	This panel displays the information entered in the Device List View panel.
Output panel	This panel displays operation logs for various components (design tool, build tool, etc.) provided by CS+.
Save As dialog box	This dialog box allows you to name and save a file.

Main window

This is the first window to open when CS+ is launched. This window is used to operate various components (design tool, build tool, etc.) provided by CS+.

Figure A.1 Main Window



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- From the [start] menu, select [All Programs] >> [Renesas Electronics CS+] >>[CS+].

[Description of each area]

(1) Menu bar
This area consists of the following menu items.

(a) [FIle] menu

Save List View	Device List View panel-dedicated item Opens the Save As dialog box for naming and saving a report file (a file containing information configured using Code Generator: device list view).
Save Top View	Device Top View panel-dedicated item Opens the Save As dialog box for naming and saving a report file (a file containing information configured using Code Generator: device top view).
Save Output-*Tab Name*	Output panel-dedicated item Saves the message corresponding to the specified tab overwriting the existing file.
Save Output-*Tab Name* As...	Output panel-dedicated item Opens the Save As dialog box for naming and saving the message corresponding to the specified tab.

(b) [Edit] menu

Undo	Property panel-dedicated item Cancels the effect of an edit operation to restore the previous state.
Cut	Property panel-dedicated item Sends the character string or lines selected with range selection to the clipboard and deletes them.
Copy	Property panel/Output panel-dedicated item Sends the character string or lines selected with range selection to the clipboard.
Paste	Property panel-dedicated item Inserts the contents of the clipboard at the caret position.
Delete	Property panel-dedicated item Deletes the character string or the lines selected with the range selection.
Select All	Property panel/Output panel-dedicated item Selects all the strings displayed in the item being edited or all the strings displayed in the Message area.
Search...	Device List View panel/Output panel-dedicated item Opens the Search and Replace dialog box for searching strings with the [Quick Search] tab selected.
Replace...	Output panel-dedicated item Opens the Search and Replace dialog box for replacing strings with the [Whole Replace] tab selected.

(c) [View] menu

Project Tree	Project Tree panel-dedicated item Opens the Project Tree panel.
Property	Property panel-dedicated item Opens the Property panel.
Output	Output panel-dedicated item Opens the Output panel.

(d) [Help] menu

Open Help for Project Tree Panel	Project Tree panel-dedicated item Displays the help of Project Tree panel.
Open Help for Property Panel	Property panel-dedicated item Displays the help of Property panel.
Open Help for [Device List View] panel	Device List View panel-dedicated item Displays the help of Device List View panel.
Open Help for [Device Top View] panel	Device Top View panel-dedicated item Displays the help of Device Top View panel.
Open Help for Output Panel	Output panel-dedicated item Displays the help of Output panel.

(2) Panel display area

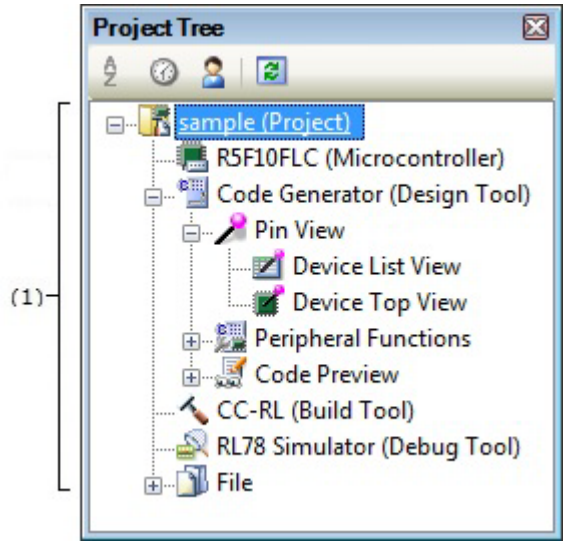
This area consists of multiple panels, each dedicated to a different purpose.
See the following sections for details on this area.

- Project Tree panel
- Property panel
- Device List View panel
- Device Top View panel
- Output panel

Project Tree panel

This panel displays components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.

Figure A.2 Project Tree Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- From the [View] menu, select [Project Tree].

[Description of each area]

(1) Project tree area
This area displays components of the project (microcontroller, design tool, build tool, etc.) in a tree structure.

(a) Code Generator (Design Tool) - Pin View
This node consists of the following pin nodes.

Device List View	Opens the Device List View panel.
Device Top View	Opens the Device Top View panel.

[Context menu]

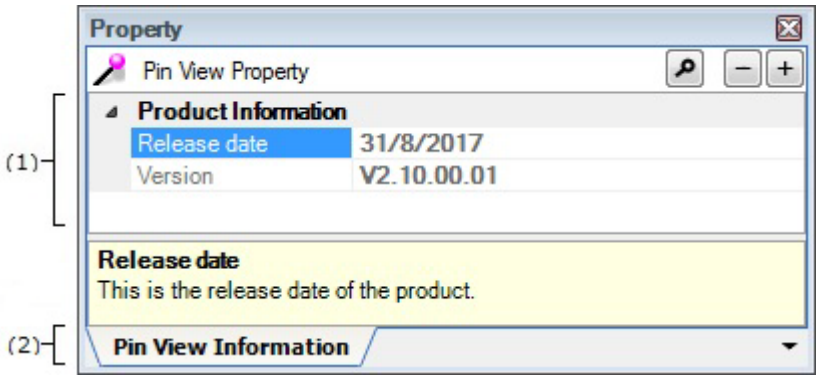
Property	Opens the Property panel corresponding to the selected node.

Property panel

This panel allows you to view the information on and change the setting for the node selected in the Project Tree panel.

Figure A.3 Property Panel

Caution 1.



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View], and then select [Property] from the context menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then select [Property] from the context menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Device Top View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Device Top View], and then select [Property] from the context menu.

Remark 1. If this panel is already open, selecting a different [Pin View] in the Project Tree panel changes the content displayed accordingly.

Remark 2. If this panel is already open, selecting a different [Device List View] in the Project Tree panel changes the content displayed accordingly.

Remark 3. If this panel is already open, selecting a different [Device Top View] in the Project Tree panel changes the content displayed accordingly.

[Description of each area]

(1) Detail information display/change area
This area allows you to view the information on and change the setting for the node selected in the Project Tree panel.
The content displayed in this area differs depending on the node selected in the Project Tree panel.

(2) Tab selection area
In this panel, following tabs are contained (see the section explaining each tab for details on the display/setting on the tab).

- [Pin View Information] tab
- [Device List View Information] tab
- [Device Top View Settings] tab

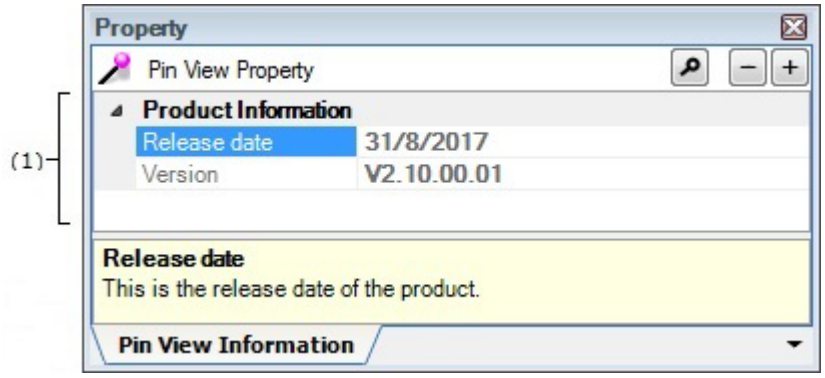
[Context menu]

Undo	Cancels the effect of an edit operation to restore the previous state.
Cut	Sends the character string or lines selected with range selection to the clipboard and deletes them.
Copy	Sends the character string or lines selected with range selection to the clipboard.
Paste	Inserts the contents of the clipboard at the caret position.
Delete	Deletes the character string or the lines selected with the range selection.
Select All	Selects all strings displayed in the item being edited.

[Pin View Information] tab

This tab displays information (Product Information) on the [Pin View)] selected in the Project Tree panel.

Figure A.4 [Pin View Information] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View], and then select [Property] from the context menu.

Remark If this panel is already open, selecting a different [Pin View] in the Project Tree panel changes the content displayed accordingly.

[Description of each area]

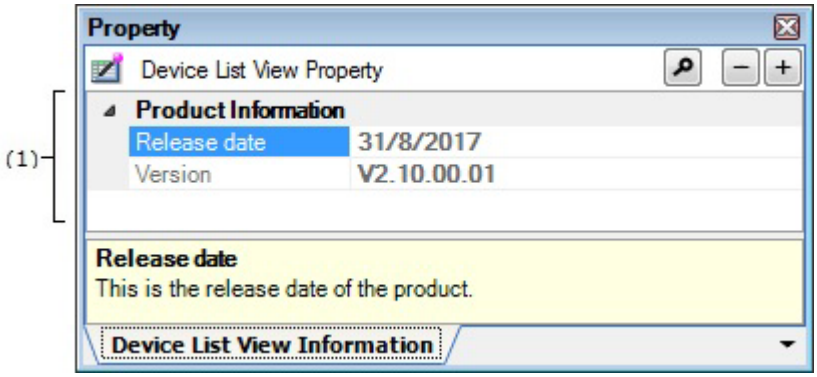
(1) [Product Information] category
This area displays product information (Version and Release date) on Code Generator.

Release date	Displays the release date of Code Generator (Code Generator 2 Plug-in).
Version	Displays the version of Code Generator (Code Generator 2 Plug-in).

[Device List View Information] tab

This tab displays information (Product Information) on the [Device List View] selected in the Project Tree panel.

Figure A.5 [Device List View Information] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then select [Property] from the context menu.

Remark If this panel is already open, selecting a different [Device List View] in the Project Tree panel changes the content displayed accordingly.

[Description of each area]

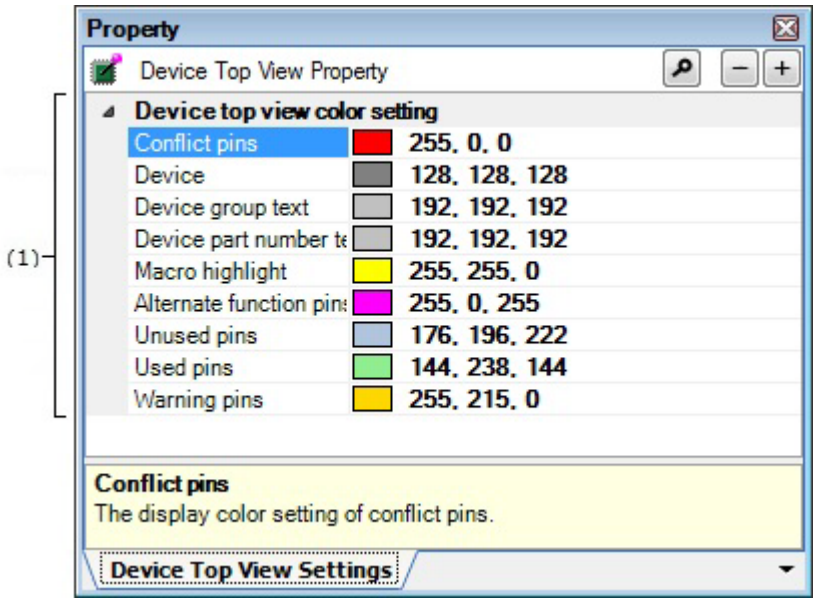
(1) [Product Information] category
This area displays product information (Release date and Version) on Code Generator.

Release date	Displays the release date of Code Generator (Code Generator 2 Plug-in).
Version	Displays the version of Code Generator (Code Generator 2 Plug-in).

[Device Top View Settings] tab

This panel allows you to view the information (Device top view color setting) on and change the setting for the node selected in the Project Tree panel.

Figure A.6 [Device Top View Settings] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device Top View], and then select [Property] from the [View] menu.
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device Top View], and then select [Property] from the context menu.

Remark If this panel is already open, selecting a different [Device Top View] in the Project Tree panel changes the content displayed accordingly.

[Description of each area]

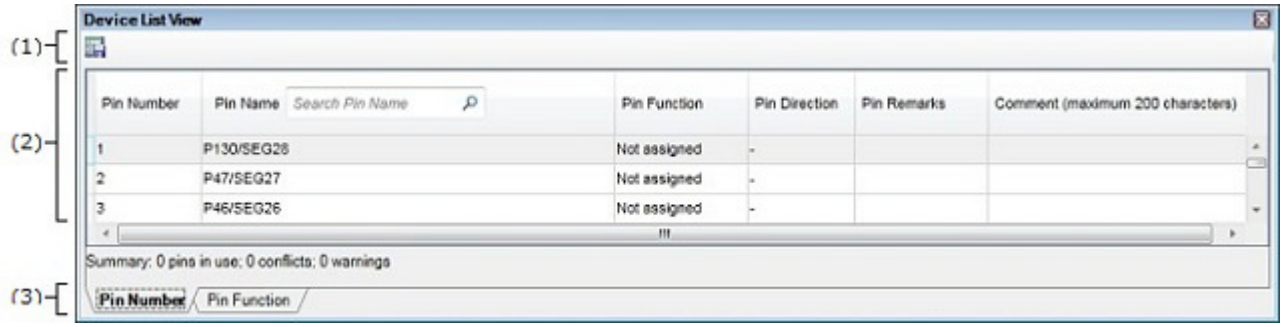
(1) [Device top view color setting] category
Select the display colors to differentiate the pin groups (Device, Device group text, etc.) in the device top view.

Conflict pins	Selects the display color of the conflict pins (same pin to which multiple functions are set).
Device	Selects the display color of the microcontroller.
Device group text	Selects the display color of the device group.
Device part number text	Selects the display color of the device part number.
Macro highligh	Selects the background color of pins selected in the Device List View panel, on the [Pin Function] tab.
Alternate function pins	Selects the background color of a pins selected in the Device List View panel, on the [Pin Number] tab.
Unused pins	Selects the display color for unused pins (dual-use pins with no use set in the Device List View panel).
Used pins	Selects the display color for used pins (dual-use pins with a use set in the Device List View panel).
Warning pins	Selects the diplay color for used pins (dual-use pins with a use and not set function parameters in the Device List View panel).

Device List View panel

This panel allows you to enter information on each pin of the microcontroller.

Figure A.7 Device List View Panel



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View].
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then press the [Enter] key.
- From the [View] menu, select [Code Generator 2] >> [Device List View].

[Description of each area]

(1) Toolbar
This area consists of the following buttons.

	Opens the Save As dialog box for naming and saving a report file (a file containing information configured using Code Generator: device list view).

(2) Device list view area
This area displays the "device list view" for entering information on the pins of the microcontroller.

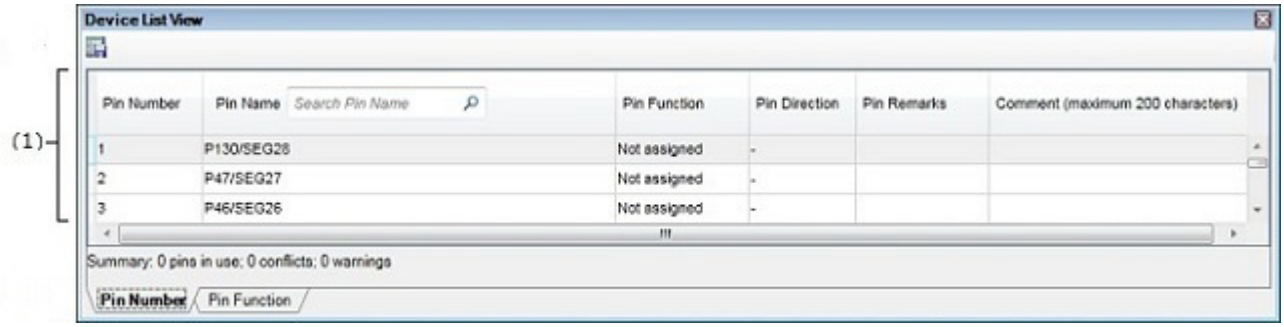
(3) Tab selection area
Selecting the tab changes the order in which "information on each pin of the microcontroller" is displayed.
This panel has the following tabs:

- [Pin Number] tab
  This tab displays information on each pin of the microcontroller in the order of pin number.
- [Pin Function] tab
  This tab displays information on each pin of the microcontroller in the order it was grouped into peripheral functions.

[Pin Number] tab

This tab displays information on each pin of the microcontroller in the order of pin number.

Figure A.8 [Pin Number] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View].
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then press the [Enter] key.
- From the [View] menu, select [Code Generator 2] >> [Device List View].

[Description of each area]

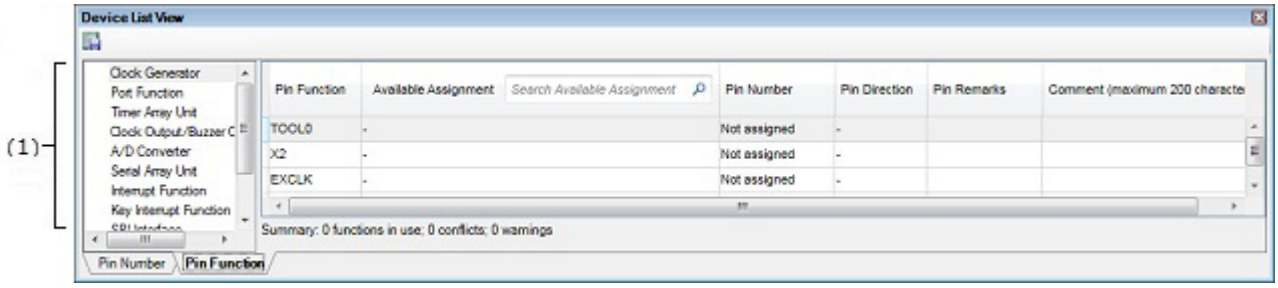
(1) Device list view area
This area displays the “device list view” for entering information on the pins of the microcontroller.
The device list view in this area is organized in the order of pin number.
The following are the columns comprising the device list view.

Pin no.	Displays the pin number of the pin.
Pin name	This area allows you to select “which function to use” when the pin has more than one functions.
Pin function	Displays the summary of function of the pin.
Pin direction	Displays the pin direction of the pin.
Pin remarks	Displays the precaution on using the pin.
Comment (maximum 200 characters)	Displays the comment of the pin Comments can be arbitrarily set up by 200 characters or less

[Pin Function] tab

This tab displays information on each pin of the microcontroller in the order it was grouped into peripheral functions.

Figure A.9 [Pin Function] Tab



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View].
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device List View], and then press the [Enter] key.
- From the [View] menu, select [Code Generator 2] >> [Device List View].

[Description of each area]

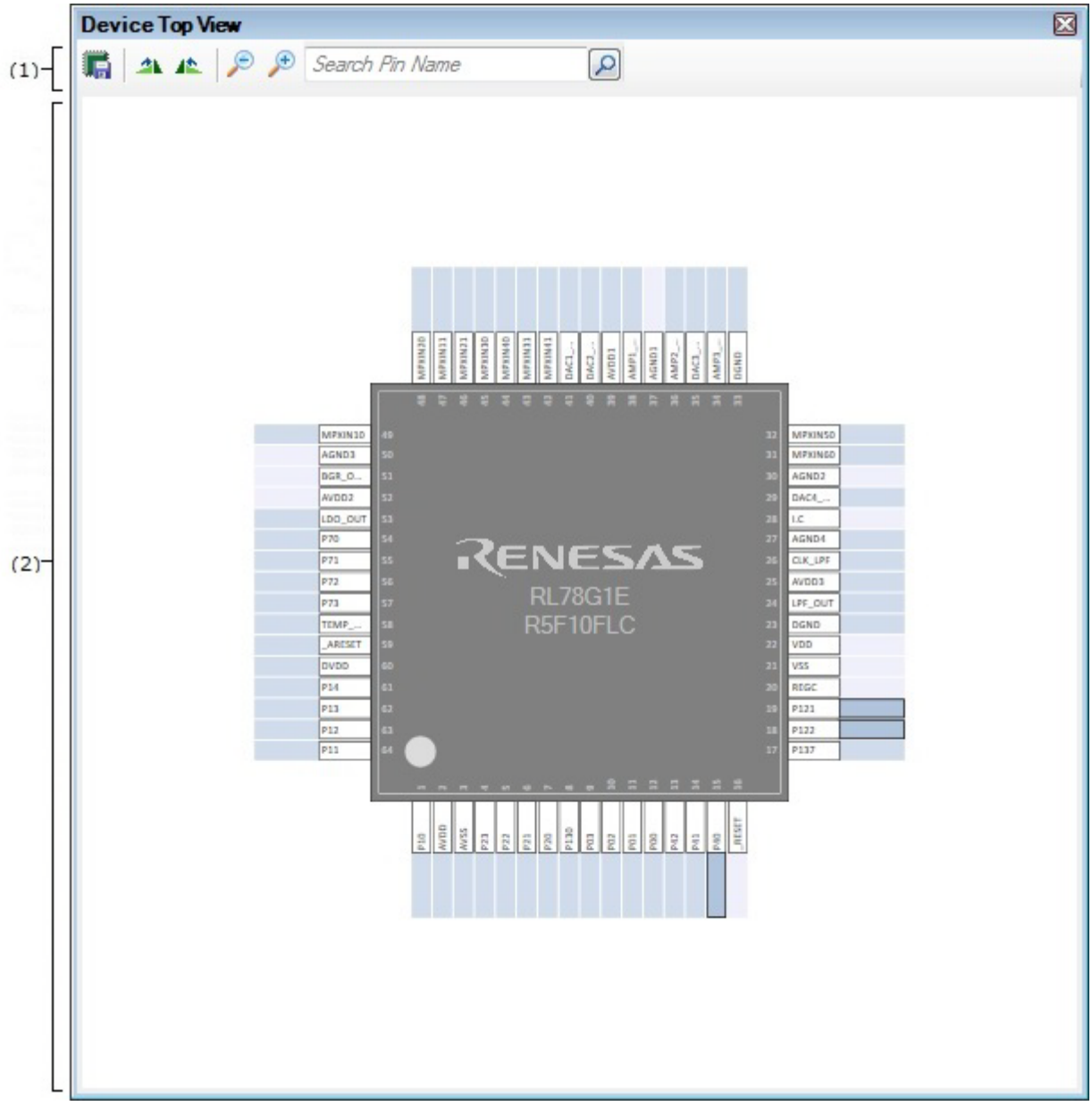
(1) Device list view area
This area displays the “device list view” for entering information on the pins of the microcontroller.
The device list view in this area is organized in the order the pins were grouped into peripheral functions.
The following are the columns comprising the device list view.

Pin name	Displays the pin name of the pin.
Available assignment	Displays the summary of function of the pin.
Pin no.	Displays the pin number of the pin.
Pin direction	Displays the pin direction of the pin.
Pin remarks	Displays the precaution on using the pin.
Comment (maximum 200 characters)	Displays the comment of the pin Comments can be arbitrarily set up by 200 characters or less

Device Top View panel

This panel displays the information entered in the Device List View panel.

Figure A.10 Device Top View Panel



The following items are explained here.

- [How to open]
- [Description of each area]

[How to open]

- On the Project Tree panel, double-click [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device Top View].
- On the Project Tree panel, select [*Project name* (Project)] >> [Code Generator (Design Tool)] >> [Pin View] >> [Device Top View], and then press the [Enter] key.
- From the [View] menu, select [Code Generator 2] >> [Device Top View].

[Description of each area]

(1) Toolbar
This area consists of the following buttons.

	Opens the Save As dialog box for naming and saving a report file (a file containing information configured using Code Generator: device top view).
	Rotates the content in the Device top view area 90 degrees clockwise.
	Rotates the content in the Device top view area 90 degrees counter-clockwise.
	Expands the content in the Device top view area.
	Reduces the content in the Device top view area.

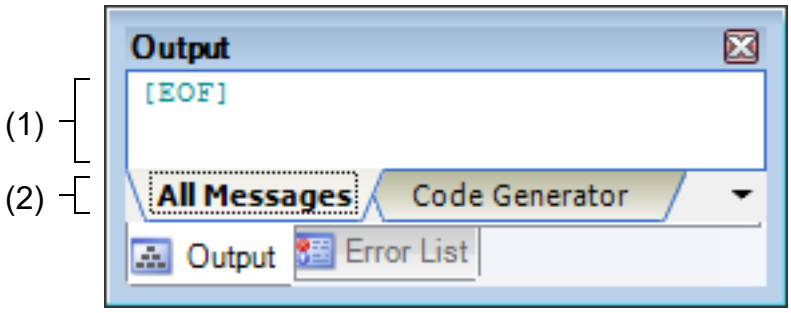
(2) Device top view area
This area displays the pin assignment of the microcontroller.
Settings of the pin assignment are displayed using the colors specified by selecting [Device Top View Settings] tab >> [Device top view color setting] in the Property panel.

Output panel

This panel displays operation logs for various components (design tool, build tool, etc.) provided by CS+.
The messages are classified by the message origination tool and displayed on the individual tabs.

Remark The Message area can be zoomed in and out by 100% in the tool bar, or by operating the mouse wheel while holding down the [Ctrl] key.

Figure A.11 Output Panel



The following items are explained here.

- [How to open]
- [Description of each area]
- [Context menu]

[How to open]

- From the [View] menu, select [Output].

[Description of each area]

(1) Message area
The output messages of each tool are displayed.
Note that the character colors/background colors of the message differ with the type of output message (and depend on the settings in the [General - Font and Color] category in the Option dialog box).

(2) Tab selection area
Select the tab that indicates the origin of message.
The following tabs are available for the Code Generator.

All Messages	Displays operation logs for all components (design tool, build tool, etc.) provided by CS+ in order of output.
Code Generator	Display only operation logs for the Code Generator out of those for various components (design tool, build tool, etc.) provided by CS+.

Caution Even if a new message is output on a deselected tab, tab selection will not automatically switch. In this case, " * " mark will be added in front of the tab name, indicating that a new message has been output.

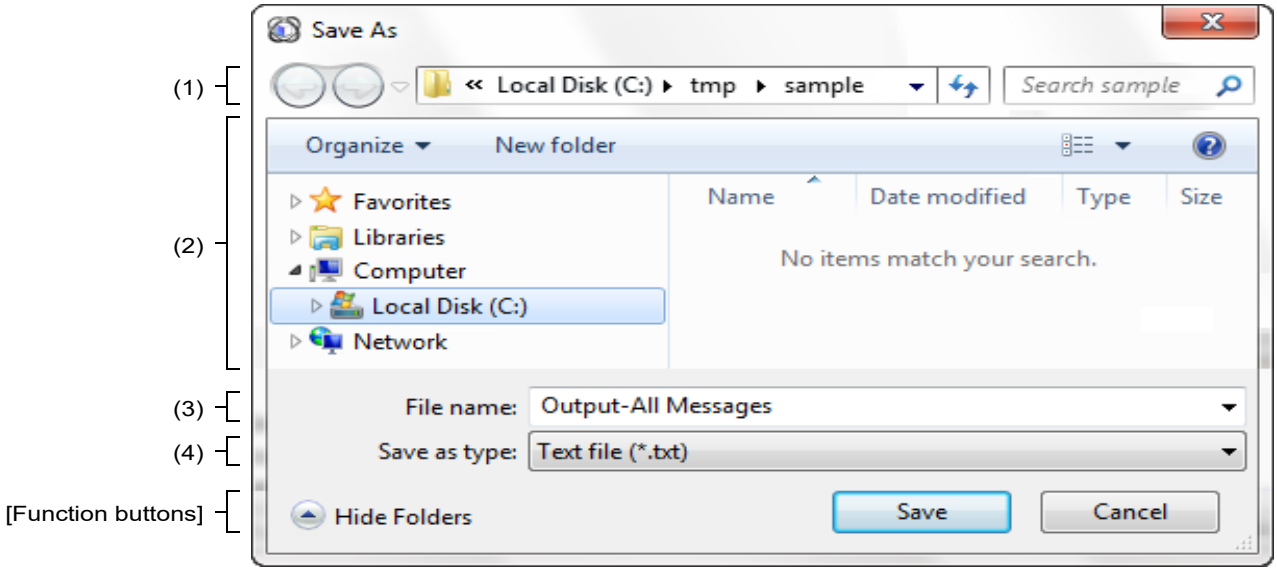
[Context menu]

Copy	Sends the character string or lines selected with range selection to the clipboard.
Select All	Selects all the messages displayed on the Message area.
Clear	Deletes all the messages displayed on the Message area.
Tag Jump	Jumps to the caret line in the editor indicated by the message (file, line, and column).
Open Help for Message	Displays help for the message on the current caret location. This only applies to warning messages and error messages.

Save As dialog box

This dialog box allows you to name and save a file.

Figure A.12 Save As Dialog Box



The following items are explained here.

- [How to open]
- [Description of each area]
- [Function buttons]

[How to open]

- From the [File] menu, select [Save List View].
- Click the button in the Device List View panel.
- From the [File] menu, select [Save Top View].
- Click the button in the Device Top View panel.
- From the [File] menu, select [Save Output-*Tab Name*].
- From the [File] menu, select [Save Output-*Tab Name* As...].

[Description of each area]

(1) Folder location
This is for selection of the output destination folder (folder name).

(2) List of files
This area displays a list of files matching the conditions selected in Folder location and [Save as type].

(3) [File name]
Specify the name of the file (file name).

(4) [Save as type]
Select the type of the file (file type).

[Function buttons]

Save	Outputs a file having the name specified in the [File name] and [Save as type] to the folder specified in the Folder location.
Cancel	Ignores the setting and closes this dialog box.

Revision Record

Rev.	Date	Description	
		Page	Summary
1.00	Aug 01, 2014	-	First Edition issued
1.10	Nov 01, 2017	14	Removed the description of Code Generator 2
		22	Added the description of Conflict pins and Warning pins
		24	Added the description of Comment (maximum 200 characters)
		25	Added the description of Comment (maximum 200 characters)

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