

SSP v2.3.0

Release Note

Renesas Synergy™ Platform
Synergy Software
Synergy Software Package

All information contained in these materials, including products and product specifications, represents information on the product at the time of publication and is subject to change by Renesas Electronics Corp. without notice. Please review the latest information published by Renesas Electronics Corp. through various means, including the Renesas Electronics Corp. website (<http://www.renesas.com>).

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall be responsible for determining what licenses are required from any third parties, and obtaining such licenses for the lawful import, export, manufacture, sales, utilization, distribution or other disposal of any products incorporating Renesas Electronics products, if required.
5. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
6. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
 - "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.
 - "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.
7. No semiconductor product is absolutely secure. Notwithstanding any security measures or features that may be implemented in Renesas Electronics hardware or software products, Renesas Electronics shall have absolutely no liability arising out of any vulnerability or security breach, including but not limited to any unauthorized access to or use of a Renesas Electronics product or a system that uses a Renesas Electronics product. RENESAS ELECTRONICS DOES NOT WARRANT OR GUARANTEE THAT RENESAS ELECTRONICS PRODUCTS, OR ANY SYSTEMS CREATED USING RENESAS ELECTRONICS PRODUCTS WILL BE INVULNERABLE OR FREE FROM CORRUPTION, ATTACK, VIRUSES, INTERFERENCE, HACKING, DATA LOSS OR THEFT, OR OTHER SECURITY INTRUSION ("Vulnerability Issues"). RENESAS ELECTRONICS DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY ARISING FROM OR RELATED TO ANY VULNERABILITY ISSUES. FURTHERMORE, TO THE EXTENT PERMITTED BY APPLICABLE LAW, RENESAS ELECTRONICS DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, WITH RESPECT TO THIS DOCUMENT AND ANY RELATED OR ACCOMPANYING SOFTWARE OR HARDWARE, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE.
8. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
12. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
13. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
14. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.

(Note1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.

(Note2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.5.0-1 October 2020)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan

www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:

www.renesas.com/contact/.

Renesas Synergy™ Platform

SSP v2.3.0 Release Note**Contents**

1. Introduction	4
2. Release Information	4
3. Synergy MCU Groups Supported.....	4
4. Software Tools and Hardware Kits Supported with this SSP Release	4
4.1 Version Information for Third-Party Modules.....	6
5. SSP Release Package and Installation Information with e ² studio.....	8
6. SSP Release Package and Installation Information with SSC	9
7. New and Updated Features in SSP v2.3.0.....	9
7.1 New Features and Improvements	9
7.1.1 File System	9
7.1.2 GUIX Integration	9
7.1.3 LevelX	9
7.1.4 NetX	9
7.1.5 sf_touch_panel_i2c.....	10
7.1.6 SSP XMLs for ISDE.....	10
7.1.7 tx	10
7.1.8 USBX	10
7.2 Issues fixed in SSP v2.3.0	10
7.2.1 BSP for Supported Platforms	10
7.2.2 Documentation.....	11
7.2.3 GUIX Integration	11
7.2.4 NetX	11
7.2.5 nxd_tls_secure.....	11
7.2.6 r_can	12
7.2.7 r_qspi	12
7.2.8 r_sci_spi.....	12
7.2.9 sf_cellular.....	12
7.2.10 sf_WiFi	13
7.2.11 SSP Bugs and Deficiencies.....	13
7.2.12 tx	13
7.2.13 USBX	13
8. Known Issues and Limitations in SSP v2.3.0	14

8.1	BSP for SSP Supported Platforms	14
8.2	Crypto/r_sce.....	14
8.3	File System	14
8.4	ISDE User Experience.....	15
8.4.1	NetX	15
8.5	NetX and NetX Duo	16
8.6	nxd_tls_secure.....	16
8.7	r_agt_input_capture.....	17
8.8	r_ctsu	17
8.9	r_rspi	18
8.10	r_sci_spi.....	18
8.11	sf_ble	18
8.12	sf_cellular.....	19
8.13	sf_el_fx.....	19
8.14	sf_el_gx.....	20
8.15	sf_el_nx.....	20
8.16	sf_el_tx.....	20
8.17	sf_el_ux.....	21
8.18	sf_touch_ctsu.....	22
8.19	sf_touch_ctsu_button.....	22
8.20	sf_Wifi	23
8.21	sf_wifi_qca4010	23
8.22	SSP Bugs and Deficiencies	24
8.23	SSP IAR Support	24
8.24	SSP XMLs for ISDEs	25
8.25	TES	25
8.26	USBX	26
9.	Synergy Development Tools	26
9.1	Fixed Issues in Synergy Development Tools	26
9.1.1	Synergy Tools.....	26
9.1.2	Pin Mapping Issues	26
9.2	Known Issues in Synergy Development Tools	26
9.2.1	Pin Mapping Issues	26
9.2.2	Synergy Tools.....	28
10.	Complete List of Modules Supported in this Release	30
10.1	BSP and Driver Modules Available in this Release.....	30
10.2	Framework Modules Supported in this Release.....	32
10.3	Third-Party Modules Supported in this Release	34
10.4	Cryptographic Functions for Each MCU Supported in this Release.....	36
10.5	Experimental Modules Supported in this Release.....	37

11. Additional Technical Notes..... 37

Revision History 39

1. Introduction

This document describes the release notes for **Synergy Software Package (SSP) version 2.3.0**.

2. Release Information

SSP Release Version	v2.3.0
Release Date	Jul 29, 2022

The intended audience for this release note is Renesas Synergy™ customers, prospective customers, partners, and support staff. This release note describes the enhancements, fixed issues and known issues in SSP v2.3.0.

3. Synergy MCU Groups Supported

MCU Groups: S7G2, S5D9, S5D5, S5D3, S3A7, S3A6, S3A3, S3A1, S128, S124, and S1JA.

4. Software Tools and Hardware Kits Supported with this SSP Release

Tool	Version	Description	Remarks
e ² studio	2022-04	Software development and debugging tool.	Link for downloading e ² studio: https://www.renesas.com/in/en/software-tool/e-studio
IAR Embedded Workbench® for Renesas Synergy™	8.23.3	Software development environment and debugging tool.	Renesas no longer distributes IAR tool chain, contact IAR: https://www.iar.com/products/architectures/renesas/iar-embedded-workbench-for-renesas-synergy/
SSC	2022-04	Synergy Standalone Configurator. Used in combination with IAR EW for Synergy.	Available here for downloading: https://www.renesas.com/in/en/software-tool/renesas-synergy-standalone-configurator-ssc
GNU Arm Compiler	GCC 10.3-2021.10	GNU compiler is an open-source compiler provided by Arm®	https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm/downloads
IAR Compiler	8.23.3	IAR Arm® compiler toolchain	
QE for Capacitive Touch	v3.1.0	Development Assistance Tool for Capacitive Touch Sensors	https://www.renesas.com/us/en/software-tool/qe-capacitive-touch-development-assistance-tool-capacitive-touch-sensors
RYZ014A EVK and pmod	v01	Evaluation kit for RYZ014A module	https://www.renesas.com/us/en/products/interface-connectivity/wireless-communications/cellular-iot-modules/ryz014a-evk-lte-cat-m1-cellular-iot-module-evaluation-kit

Tool	Version	Description	Remarks
PE-HMI1	2.0	Product Example (PE) for Human Machine Interface to evaluate Renesas Synergy™ S7G2 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/yspehmi1s20ws2j-pe-hmi1-product-example
DK-S7G2	4.1	Development Kit for Renesas Synergy™ S7G2 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ysdks7q2e40-dk-s7q2-development-kit
SK-S7G2	3.3	Starter Kit for Renesas Synergy™ S7G2 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ysks7q2e30-sk-s7q2-starter-kit
PK-S5D9	1.0	Promotion Kit for Renesas Synergy™ S5D9 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/yspks5d9e10-pk-s5d9-promotion-kit
TB-S5D5	1.1	Target Board Kit for Renesas Synergy™ S5D5 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs5d5e10-tb-s5d5-target-board-kit
TB-S5D3	1.0	Target Board Kit for Renesas Synergy™ S5D3 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs5d3e10-tb-s5d3-target-board-kit
DK-S3A7	2.0	Development Kit for Renesas Synergy™ S3A7 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ysdks3a7e20-dk-s3a7-development-kit
TB-S3A6	1.0	Target Board Kit for Renesas Synergy™ S3A6 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs3a6e10-tb-s3a6-target-board-kit

Tool	Version	Description	Remarks
TB-S3A3	1.0	Target Board Kit for Renesas Synergy™ S3A3 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs3a3e10-tb-s3a3-target-board-kit
TB-S3A1	1.0	Target Board Kit for Renesas Synergy™ S3A1 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs3a1e10-tb-s3a1-target-board-kit
DK-S128	1.1	Development Kit for Renesas Synergy™ S128 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ysdks128e10-dk-s128-development-kit
DK-S124	3.1	Development Kit for Renesas Synergy™ S124 MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ysdks124s20-dk-s124-development-kit
TB-S1JA	1.2	Target Board Kit for Renesas Synergy™ S1JA MCU Group	https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/ystbs1jae10-tb-s1ja-target-board-kit
J-Link Software	7.60e	SEGGER J-Link® debug probe is the quasi standard for Arm® Cortex®-M based MCUs	https://www.segger.com/downloads/jlink/

4.1 Version Information for Third-Party Modules

Component	Version in SSP v2.3.0	Links for Azure RTOS documents and download links for GUIX Studio and TraceX
Azure RTOS ThreadX®	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/threadx/
Azure RTOS NetX™	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/netx/
Azure RTOS NetX Duo™	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/netx-duo/
Azure RTOS NetX Application bundle	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/netx/
Azure RTOS NetX Duo Application bundle	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/netx-duo/

Component	Version in SSP v2.3.0	Links for Azure RTOS documents and download links for GUIX Studio and TraceX
Azure RTOS USBX™	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/usbx/
Azure RTOS FileX®	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/filex/
Azure RTOS GUIX™	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/guix/
Azure RTOS LevelX	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/levelx/
Azure RTOS TraceX 1	6.1.11	Downloadable from Synergy Gallery: https://www.renesas.com/in/en/software-tool/tracex-renesas-synergy Downloadable from Microsoft App Store ¹ : https://apps.microsoft.com/store/detail/azure-rtos-tracex/9NF1LFD5XXG3?hl=en-us&gl=US
Azure RTOS GUIX Studio ¹	6.1.10	https://docs.microsoft.com/en-us/azure/rtos/guix/overview-guix Downloadable from Microsoft App Store ¹ : https://www.microsoft.com/en-us/p/azure-rtos-guix-studio/9pbm1k1r7q0f?activetab=pivot:overviewtab
TES D/AVE 2D	3.40	https://www.tesdst.com/technology-products/gpus/d/ave-2d/
CMSIS component versions	CMSIS Base v5.8.0 CMSIS Core v5.5.0 CMSIS DSP v1.9.0 CMSIS NN v3.0.0	Release CMSIS 5.8.0 ARM-software/CMSIS_5 GitHub

¹ Minimum system requirement is a Windows® 10 version to build 14393. Your company's IT policy may limit the installation of software from the Microsoft App Store. In such a case, contact your company's IT department.

5. SSP Release Package and Installation Information with e² studio

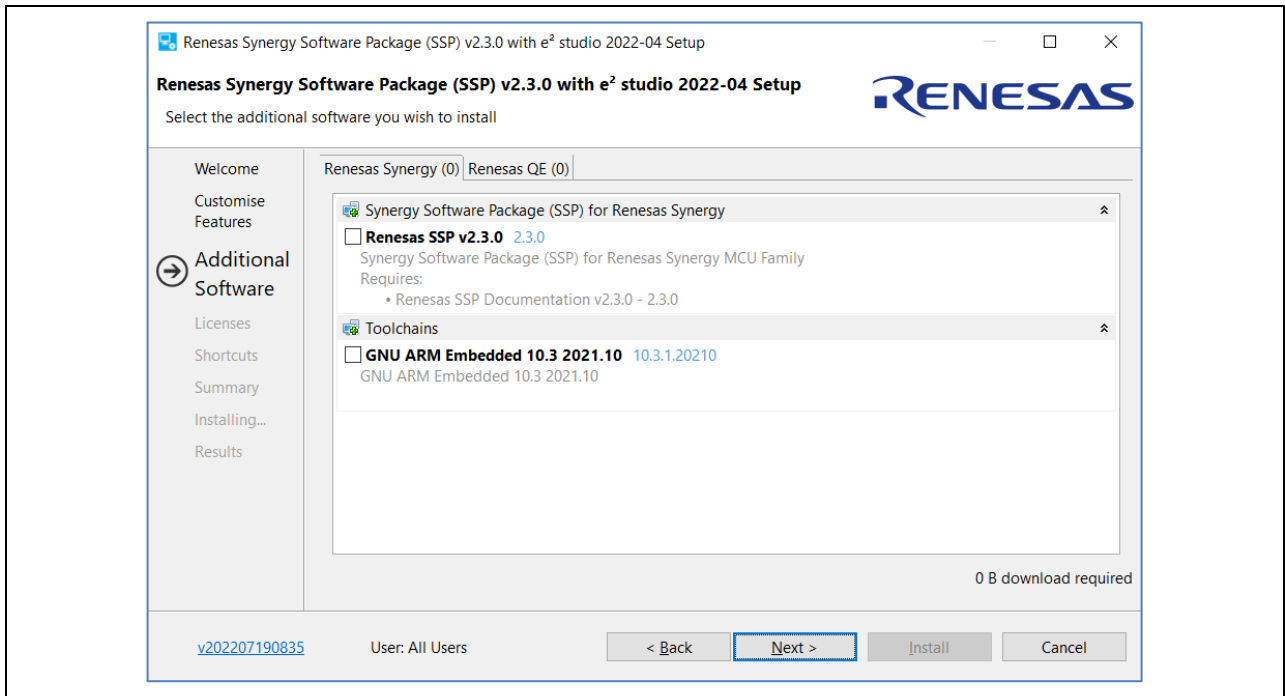
Before installing SSP standalone installer, ensure that the following items are installed on your PC:

- **Renesas e² studio ISDE v2022-04** (download and install the e² studio Installer from the Renesas website at <https://update.renesas.com/in/en/software-tool/e-studio>)
- **GNU Arm® Compiler**

There are two options to install the GNU Arm Compiler:

1. During e² studio ISDE v2022-04 installation, select the option 10.3-2021.10 in the **GCC Toolchains & Utilities** tab in the additional software screen of the installer as shown in the following image.

Note: Users are recommended to use GCC 10.3-2021.10. For previous versions of the GCC Compiler, users must use SSP v2.2.0 or earlier.



2. Install the compiler from the Arm website at <https://developer.arm.com/tools-and-software/open-source-software/developer-tools/gnu-toolchain/gnu-rm/downloads>

To install the SSP, follow these steps:

1. Download the following items for the SSP Release from [SSP Home page](#):
 - **SSP_Distribution_2.3.0.zip** (SSP Package Installer, including SSP Package)
 - **Renesas Synergy Software Package (SSP) V2.3.0 Release Note**.
2. Unzip the package and run the **SSP_Distribution_2.3.0.exe** installer.
3. Install the SSP in the root folder of e²studio 2021-10 installation.

Important Notes:

1. **The default installation folder for the SSP is C:\Renesas\Synergy.**

SSP documentation is available for download from the Renesas Synergy™ Software Package (SSP) page at <https://www.renesas.com/us/en/products/microcontrollers-microprocessors/renesas-synergy-platform-mcus/renesas-synergy-software-package>. Sign in to the MyRenesas account using your existing MyRenesas or Synergy Gallery credentials, or by creating a new MyRenesas account.

2. **All SSP v2.3.0. software source code is provided without encryption, except FMI and r_sce modules which are shared as pre-built libraries.**
3. **e² studio does not need a License key for generating SSP v2.3.0 Projects and GCC 9.3.1 is not supported currently for SSP.**

6. SSP Release Package and Installation Information with SSC

Important: Only Renesas Synergy™ users who would like to use the IAR Embedded Workbench for Renesas Synergy™ as their development environment need to download and install the SSC.

To install SSC v2022-04, download the individual SSC v2022-04 installer (.zip) from www.renesas.com/synergy/ssc. Unzip it, then double-click the installer and follow the directions on the screen.

To use the SSC and the SSP together with IAR Embedded Workbench for Synergy, follow these steps:

1. Download SSC v2022-04 from www.renesas.com/synergy/ssc, unzip it, and double-click the executable file. The default installation directory is C:\Renesas\Synergy\SSC_v2022-04_R20210916.
2. Download and install SSP from www.renesas.com/synergy/ssp. During the installation, you will be prompted to specify an installation directory for the SSP. Point the SSP installer to the directory where you just installed the SSC (for example C:\Renesas\Synergy\SSC_v2022-04_R20210916).
3. Download and install IAR Embedded Workbench for Synergy v8.23.3 from www.renesas.com/synergy/iar-embedded-workbench. Follow the *Getting Started with IAR Embedded Workbench® for Renesas Synergy™* document to create your first Synergy project.
4. Backup the existing SSP projects before migrating to SSC v2022-04.

7. New and Updated Features in SSP v2.3.0

This section includes a list of new features, improvements, and issues fixed in SSP v2.3.0.

7.1 New Features and Improvements

7.1.1 File System

Issue ID: 17088

Azure RTOS FileX v6.1.10 is integrated to SSP.

Applies to: S7, S5, and S3 MCU Series

7.1.2 GUIX Integration

Issue ID: 16808

All the graphic applications which use `sf_touch_panel_i2` have been migrated to `sf_touch_panel_v2` as `sf_touch_panel_i2` is a deprecated module.

Applies to: All MCUs

Issue ID: 17091

Azure RTOS GUIX v6.1.10 is integrated with SSP.

Applies to: S7G2, S5D9 MCU Groups

7.1.3 LevelX

Issue ID: 17093

Azure RTOS LevelX v6.1.10 is integrated with SSP.

Applies to: S7, S5, S3 MCU Series

7.1.4 NetX

Issue ID: 17092

Azure RTOS NetX v6.1.10 is integrated with SSP.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17094

Azure RTOS NetX Duo v6.1.10 is integrated with SSP.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17095

Azure RTOS NetX Secure v6.1.10 is integrated with SSP.

Applies to: S7, S5, and S3 MCU Series

7.1.5 sf_touch_panel_i2c**Issue ID:** 16985

The deprecated `sf_touch_panel_i2c` module is removed from SSP.

This module cannot be added or used from SSP v2.3.0. When importing any application that uses the above-mentioned deprecated modules with SSP v2.3.0, these modules will be unavailable in the configurator and so moving the application back to an older pack will still result in these modules being unavailable.

Applies to: All MCUs

7.1.6 SSP XMLs for ISDE**Issue ID:** 12079

Peripheral IDs and clock constraints have been added for the following modules:

- `sf_el_nx`
- `r_rspi`
- `sf_el_ux`
- `r_can`

Applies to: All MCUs

7.1.7 tx**Issue ID:** 17090

Azure RTOS ThreadX v6.1.10 is integrated to SSP.

Applies to: All MCUs

7.1.8 USBX**Issue ID:** 16960

In USBX HID Host class interrupt out endpoint is now supported.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17089

Azure RTOS USBX v6.1.10 is integrated into SSP.

Applies to: S7, S5, S3, and S1 MCU Series

7.2 Issues fixed in SSP v2.3.0**7.2.1 BSP for Supported Platforms****Issue ID:** 16770

BSP User's Manual has been updated for `R_BSP_FeatureRIICGt()` function.

Applies to: All MCUs

7.2.2 Documentation

Issue ID: 17062

An SSP Datasheet will not be provided from SSP v2.3.0. All content has been migrated to the SSP User's Manual.

Applies to: All MCUs

Note: SSC Release Note information is absorbed in to SSP Release Note (this document) from SSP v2.3.0 onwards. A separate SSC Release Note will not be available.

7.2.3 GUIX Integration

Issue ID: 16945

The text and background of the scroll wheel can be drawn with varying brush alpha value.

Applies to: S7G2, S5D9 MCU Groups

Issue ID: 17122

GUIX scroll wheel rendering issue is resolved with GUIX 6.1.10 integration. The scroll wheel works as expected with the GUIX library.

Applies to: S7G2 and S5D9 MCU Groups

7.2.4 NetX

Issue ID: 16997

NetX Duo SNMP API `nx_snmp_object_compare` was failing to find the registered entry in Azure NetX Duo 6.1.9 stack. This issue is fixed with NetX Duo 6.1.10.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17071

Both the NetX Duo mDNS server and mDNS client can be used in a single mDNS instance now.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17074

In NetX Duo mDNS module, `stack_memory` and `service_cache` memory were allocated four times more than the actual defined size. This issue is fixed now.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17077

Updated the IP address lease time calculation in NetX Duo DHCP IPv6 Client.

Applies to: S7, S5, and S3 MCU Series

7.2.5 `nx_d_tls_secure`

Issue ID: 16895

The deprecated TLS 1.0 and 1.1 are removed from SSP v2.3.0.

When importing any application that has these properties enabled, using SSP v2.3.0, these properties will not be available in the configurator.

Users are strongly recommended to migrate their projects to TLS v1.2 or TLS v1.3 in SSP immediately.

Applies to: S7 and S5 MCU Series

7.2.6 r_can

Issue ID: 17102

In `r_can`, the baud rate prescaler mask has been updated for proper baud rate calculation.

Applies to: All MCUs

7.2.7 r_qspi

Issue ID: 17078

1. Modified the BSP QSPI code of the `s7g2_dk` board with N25Q256A QSPI FLASH to `n25_device_charactersitics.memory.capacity`, which wrongly refers to MX25L12835FM QSPI FLASH's `mx_device_characteristics.memory.capacity`.
2. Memory capacity calculations have to be done in the BSP QSPI file in `bsp_qspi_config_get()` function, if there is a need for calculating actual memory capacity with respect to different vendor QSPI flash specifications. Users have to make the modifications for their custom qspi device. The same information has been updated in the User's Manual.

Applies to: S7G2 MCU Group (S7g2_dk board versions earlier than 3.95)

7.2.8 r_sci_spi

Issue ID: 10962

When the bit rate property of `r_rspi` and `r_sci_spi` modules is configured with an invalid value, the Synergy Configurator will now show a warning to prompt the user.

Applies to: All MCUs

7.2.9 sf_cellular

Issue ID: 17068

`RYZ Cellular BSD Ping API` was returning `SSP_SUCCESS` message even when ping was failing. This issue is fixed now and `RYZ Cellular BSD Ping API` returns `SF_CELLULAR_FAILED` when IP address is invalid.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17069

When `commandSend()` API is called with indefinite AT command length, the RYZ014 cellular modem is returning error response. Hence when using `commandSend()` API, always pass the actual AT command size as the buffer length.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17080

When using `recv` API in `ryz014catm1` TCP/UDP socket applications, additional bytes were required to receive actual data. This issue is fixed now.

Applies to: S7, S5, and S3 MCU Series

Issue ID: 17108

When cellular socket applications (`sf_cellular_ryz014_catm1`, `sf_cellular_qctlcatm1_socket`) are used with GCC v10.3, build error named `error: unknown type name 'fd_set'` was observed. This issue has been fixed now.

Applies to: S7, S5, and S3 MCU Series `sf_message`

Issue ID: 16823

In a multi-threaded application, the `sf_message` framework can send messages to a wrong queue (or subscriber) if the priority of the thread is not taken care of properly in the application. To overcome this issue, users have to follow one of the following:

1. Use buffer hold option in the `sf_message` framework, where the thread will not release the acquired buffer during its lifetime such that other threads cannot reuse the same buffer.
2. In a multi-threaded and repeated message transfer application, keep the message Producer thread priority higher than the subscriber thread so that the producer thread completes its operation before the subscriber thread starts releasing the received buffer.

Applies to: All MCUs

7.2.10 sf_WiFi

Issue ID: 17145

When `sf_wifi_gt202_onchip` applications are used with GCC v10.3, build error named “`error: unknown type name 'fd_set'`” was observed. This issue has been fixed now.

Applies to: S7, S5, and S3 MCU Series

7.2.11 SSP Bugs and Deficiencies

Issue ID: 17112

In an ethernet-based application, data reception would stop if packets received are larger than the size of the pockets configured in the packet pool property. This issue is resolved now.

Applies to: S7 and S5 MCU Series

7.2.12 tx

Issue ID: 17106

SSP v2.3.0 is not compatible with GCC v9.x as multiple definition linker errors may occur. When installing SSP v2.3.0, users should upgrade to GCC v10.3.

Applies to: All MCUs

7.2.13 USBX

Issue ID: 17061

Currently, DTC transfer type is not supported by the host side driver. Only DMAC is supported and documentation is updated for the same.

Applies to: All MCUs

Issue ID: 17073

When a USB port is configured in dual mode with HID as host, and CDC as device, when the HID host is initialized after a HID or CDC device un-initialization, the HID initialization used to intermittently hang, this issue is fixed now.

Applies to : All MCUs

8. Known Issues and Limitations in SSP v2.3.0

8.1 BSP for SSP Supported Platforms

Issue ID: 10664

If a user is using the trace buffer for debugging and has data stored in the RAM at addresses above 0x2000 4000, that data will be overwritten by the trace buffer when debugging.

Applies to: S128 and S1JA MCU Groups

Workaround: The S128 linker script currently allocates 1K for the trace buffer at 0x2000 0000. This allocation could be removed, freeing up the 1K mistakenly reserved for the trace buffer. Using the e² studio trace buffer function will store 1K of the trace buffer data beginning at 0x2000 4000, so that 1K of RAM must not be used by the application if the trace buffer is to be used for debugging.

8.2 Crypto/r_sce

Issue ID: 15261

At times, some noticeable delay is seen during RSA 2048-bit key generation.

Applies to: S7 and S5 MCU Series

Workaround: None

8.3 File System

Issue ID: 16181

If the block media is partially exFAT formatted (FileX configuration option “total_sectors” is less than the total sectors in block media, and the “File system on block media” id changed to “False”), the SD card media opens correctly in the board, file operation on the board also works correctly, but the media open fails in a PC Windows® environment.

Applies to: All MCUs

Workaround: The user has to exFAT format the complete block media to use it in a PC Windows® environment.

Issue ID: 17076

When files are created in a media device using FileX and if they are operated in the Windows platform, the short file name (SFN) associated with the files will get changed. If more files are created using FileX in the same media device, FileX may end up assigning SFN which collides with the SFNs of existing files.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

Issue ID: 17103

When performing format operation on a media device with FAT file system, the FileX API service, `fx_media_format()` assigns FAT entry values which are different from the FAT file system specification.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

8.4 ISDE User Experience

Issue ID: 7665

When using the Synergy Software Configurator in e² studio/SSC, if you rename a thread on the Threads tab and generate code, a new `thread_entry.c` file is created with template content, and the old `thread_entry.c` file remains in the project. If you have edited the `thread_entry.c` file, your changes are not moved to the new file. The old file remains in the project. It will not be called; it causes a build error if not removed from the project manually.

Applies to: All MCUs

Workaround: Manually move any edits (if made) from the old `thread_entry.c` file to the new `thread_entry.c` file, then manually delete the old `thread_entry.c` file from your project.

Issue ID: 12826

If Synergy Configuration window is maximized in e² studio, the property window will not be updated.

Applies to: All MCUs

Workaround: Do not maximize the Synergy Configuration window before clicking on elements when editing the properties.

Issue ID: 12908

A multiple symbol definition error may occur during linkage if an Azure RTOS library component and the corresponding source component such as `ux` and `ux_src` are included. If this occurs, remove the library such as `libux.a` from the list of libraries used by the linker.

For GCC, this in the **Cross ARM C Linker > Libraries section of the C/C++ Build > Settings** in the project **Properties**.

For IAR, this in the **IAR Linker for ARM > Library section of the C/C++ Build > Settings** in the project **Properties**.

Module Names: `ux` (USBX), `tx` (ThreadX), `nx` (NetX), `nxd` (NetX Duo), `fx` (FileX), `gx` (GUIX), `ux_host_class_XXX` (USBX Host Classes), `ux_device_class_XXX` (USBX Device Classes).

Applies to: All supported MCU Groups

Issue ID: 13854

When debugging a project with a large number of threads (for example, 150 threads) with the RTOS Resource View open, e² studio might hang and become unresponsive.

Applies to: All MCUs

Workaround: Make the RTOS Resource View small and expand it once the Debug Tree View has finished updating.

8.4.1 NetX

Issue ID: 17075

In NetX Duo mDNS applications, if the True Random Number Generator option is enabled in the application, then mDNS probing delay can be set to too large a value.

Applies to: S7, S5, and S3 MCU Series

Workaround: None.

8.5 NetX and NetX Duo

Issue ID: 7745

The NetX/NetX Duo FTP Client requires FileX in stack configuration. Due to dependencies, FileX cannot be removed from the configurator while using FTP_Client application.

Applies to: S7G2, S5D9, and S5D5 MCU Groups

Workaround: None

Issue ID: 11994

The NetX/Duo FTP server does not support passive data transfer mode. Hence only active mode FTP can be currently used.

Applies to: S7G2, S5D9, S5D5, and S5D3 MCU Groups

Workaround: None

Issue ID: 14293

Build warnings will be observed on compiling NetX Duo BSD application with GCC v7.x compiler.

Applies to: CM4 MCUs (S7, S5, and S3 MCU Series)

Workaround: None

Issue ID: 16888

New features introduced in SSP released are enabled by default. This may cause existing applications to exceed the maximum available memory space of the selected MCU causing memory overflow errors.

Applies to: All MCUs

Workaround: Use the configurator to disable any unused options and rebuild the application. For example, in SSP v2.1.0, support for ECC P-224 and P-384 ciphers is added and these are enabled by default. If an application using `r_sce` that built successfully prior to SSP v2.1.0 now fails to build with SSP v2.1.0 due to memory overflow, this may be due to the newly added ECC cipher support. This can be fixed by choosing the SCE Common driver on `r_sce` in the e² studio Threads Configuration view and disabling all cipher types and key lengths that are not used by the application.

Issue ID: 16907

The required information on using `inet_ntop()` function (that is, when it is used to convert IP address from ULONG to string) is updated in the *NetX/NetX Duo BSD Support Module APIs Overview* section of the SSP User Manual.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

8.6 nxd_tls_secure

Issue ID: 16839

With TLS 1.3, Azure RTOS NetX Duo HTTPS server cannot be connected with the client using RSA key sharing and signature algorithm.

Applies to: S7 and S5 MCU Series

Workaround: Use ECC certificates with ECDHE Key Sharing and ECDSA Signature algorithm to communicate between HTTPS server and client connection for TLS 1.3.

8.7 r_agt_input_capture

Issue ID: 15070

While capturing pulse width with AGT input capture, after a measurement completion, the counter and overflow value returned from callback are fine, but the same values read simultaneously with `lastCaptureGet` API are incorrect.

Applies to: All MCUs

Workaround: None

8.8 r_ctsu

The Capacitive Touch Framework is deprecated and will be excluded from future SSP releases. New designs should use Capacitive Touch Framework v2.

Issue ID: 6927

`R_CTSU_Update_Parameters()` returns error. Not all return codes are described in the function header.

Some return codes are as follows:

SSP_ERR_NOT_OPEN when mode is set to CTSU_MODE_UNCONFIGURED

SSP_ERR_IN_USE when Measurement Status Counter set to non-zero value or CTSU Data Transfer Status flag is set.

SSP_ERR_CTSU_RC_OVERFLOW when CTSUROVF flag is set

SSP_ERR_CTSU_SC_OVERFLOW when CTSUSOVF flag is set

SSP_ERR_CTSU_ICOMP when TSCAP Voltage Error Monitor flag is set

Applies to: All supported MCU Groups

Workaround: In cases where the returned error code is not described in the function header, refer to the description of the return code in `ssp_common_api.h`.

Issue ID: 6928

If the customer calls `R_CTSU_Read` while the driver is in an uninitialized state, then the documented return code is `SSP_SUCCESS`, but the actual return code is `SSP_ERR_NOT_OPEN`. When calling `R_CTSU_Read` while the driver is uninitialized, the application should expect a return code of `SSP_ERR_NOT_OPEN`.

The `R_CTSU_Read()` function is not sufficiently tested with the `CTSU_READ_FILTERED_REF_ICO_VALUES_SEL` and `CTSU_READ_FILTERED_REF_ICO_VALUES_ALL` options

Applies to: All supported MCU Groups

Workaround: None

Issue ID: 6929

Auto-calibration, auto-scan and auto-drift compensation features are not available in the `r_ctsu` driver.

Applies to: All MCUs

Workaround: None

Issue ID: 6931

Parameter checking for NULL parameters is not implemented. Passing in a NULL parameter to the `r_ctsu` API will result in undefined system operation.

Applies to: S7G2, S5D9, S5D5, S3A7, S128, and S124 MCU Groups

Workaround: When using this driver, make sure that the control structure passed to `r_ctsu` API is not NULL.

Issue ID: 8731

In case of a hardware issue where the channel capacitance has an invalid value (due to board layout), the CTSU data acquisition fails. The code waits in a loop for the data, and does not return.

Applies to: All MCUs

Workaround: Make sure that the TSCAP has the recommended capacitor connected.

8.9 r_rsipi

Issue ID: 16700

The RSPI SPI module uses the DTC as the low level transfer driver. If the DMAC and the DTC are contending for the DMA bus the DMAC always uses a high priority. Thus a DTC based SPI transfer from RSPI module will not get access to the DMA bus since the DMAC is already using it. This will cause the SPI to go into the IDLE mode and trigger a TEND interrupt event. Since at this point the TEND interrupt is disabled, the interrupt remains in the pending state. When the DTC transfer finishes, the CPU will receive the TX interrupt to finish the transfer and then will enable the TEND interrupt. The pending TEND interrupt causes the SPU transfer to be ended early.

Applies to: All MCUs

Workaround: This is a limitation of the RSPI module and the issue can be avoided by not using the DMAC while the DTC is being used by the RSPI module.

8.10 r_sci_spi

Issue ID: 15574

In an application, if using DTC for data transfer, SCI SPI can experience overrun error if the same application makes heavy use of DMAC and/or another DTC instance. This is because DMAC has a high priority over DTC in arbitration for the mastership of the DMA bus. Also, arbitration between different triggers/transfers in DTC is done based on interrupt/trigger priority. So, if the DMAC or DTC triggered by high priority interrupt/task is accessing the DMA bus and SCI SPI receiving the data at the same time, DTC used by SCI SPI will not be able to access the bus to transfer the received data into the memory, causing SCI SPI to return overrun error.

Applies to: All MCUs

Workaround: Overrun error can be averted with one of the following options:

1. If SCI SPI uses DTC for data transfer, avoid the use of DMAC or another DTC instance in an application.
2. If DMAC/DTC is a must for other data transfers, avoid the use of DTC with SCI SPI.
3. Use the RSPI instead of SCI SPI. The RSPI hardware can handle overrun conditions.

8.11 sf_ble

Issue ID: 9225

HID profile client mode is not supported by RL78G1D. As a result, the BLE framework implementation of the HID profile will also not support the HID profile client mode. Applications using a BLE framework for RL78G1D will not be able to use the HID profile in client mode.

Applies to: All MCUs

Workaround: None

Issue ID: 9256

The projects using RL78G1D framework will see compilation warnings. All the warnings are in the RL78G1D driver code and will not have impact on the user applications. The RL78G1D framework files do not have any warnings.

Applies to: RL78G1D on all Synergy MCUs

Workaround: None

8.12 sf_cellular

Issue ID: 14565

PAP/CHAP authentication fails on the network where authentication is enabled. PAP callback is not working when PAP authentication is enabled in the configurator.

Applies to: S7, S5, S3 MCU Series

Workaround: None

Issue ID: 14566

Automatic time zone update disable functionality does not work. Even when the user disables automatic time zone update, the current updated time is received.

Applies to: CAT3, CAT1, and Quectel BG96 modules

Workaround: None

Issue ID: 17111

The following parts or boards are obsolete and are not supported in SSP anymore:

1. NimbeLink CAT3 (NL-SW-LTE-TSVG, REVISION 17.01.571) Verizon-US
2. NimbeLink CAT3 (NL-SW-LTE-TEUG, REVISION 17.01.571) India and Europe
3. NimbeLink CAT1 (NL-SW-LTE-GELS3-B and NL-SW-LTE-GELS3-C, REVISION 4.3.3.0c) Verizon-US

Applies to: All MCUs

Workaround: None

Issue ID: 17181

SSP cellular framework using BG96 has the following limitations as per the Quectel specifications.

1. After power on/ reset, the modem should wait for "APP RDY" string before issuing any commands, but in the sf_cellular framework AT commands are being passed before "APP RDY" string is received.
2. Some of the configuration related AT commands which are supposed to be issued once in the life of the modem (for example, AT+QCFG), are being issued every time when the modem is reinitialized without any check.

Applies to: S7 and S5 MCU Series

Workaround: None

8.13 sf_el_fx

Issue ID: 17016

When creating more than 26 files using `fx_file_unicode_create()` API, the service returns `FX_ALREADY_CREATED` error code from the 27th time.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

Issue ID: 17049

When performing set, delete and set operations on the volume label of the SD card on the Windows platform and also fetching the volume label of the same SD card using `fx_media_volume_get()` after each step, the deleted volume label in the second operation is returned by `fx_media_volume_get()` after the second and third operations.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

8.14 sf_el_gx

Issue ID: 15783

Build warnings are being observed when compiling GUIX Source with GCC 7.2.1.

Applies to: S7G2 and S5D9 MCU Groups

Workaround: None

8.15 sf_el_nx

Issue ID :7513

Current sf_el_nx NetX Port driver is hard-coded to use RMMI interface which is for a Micrel Ethernet PHY chip mounted on Renesas kits but does not support the other PHY chips or MII interface. Customer need to define their own Ethernet PHY chip driver if they use a different PHY chip from the one mounted on Renesas kits, or use a PHY chip with MII interface.

Applies to: All MCUs

Workaround:

Currently there is no plan to provide support for other Ethernet PHY chip drivers in SSP, users should create their custom PHY chip driver using the reference driver provided in SSP. To do that, you can utilize sf_el_nx (NetX Port) module under `/ssp/src/framework/sf_el_nx/` as a template and modify it for your Ethernet PHY chip. Also include an interface file `sf_el_nx.h` located at `/ssp/inc/framework/instances/` in the created new PHY chip driver. Source files under sf_el_nx are plain text so you can copy the file to other directories, such as `/src/` directory and exclude original sf_el_nx module from building to avoid 'multiple definition' compile-error.

Here is the brief guideline to work around the issue:

- Copy the directory `/ssp/src/framework/sf_el_nx/` including all the files under the directory to `/src/`.
- Exclude original SF_EL_NX module in SSP from your build. Right click on the directory `/ssp/src/framework/sf_el_nx/` and select '**Exclude from build...**'. Then click '**Select All**' button.
- Modify `/src/sf_el_nx/nx_hw_init.c` `nx_synergy_ethernet_init()` needs modification below to select MII interface. Change `IOPORT_ETHERNET_MODE_RMII` to `IOPORT_ETHERNET_MODE_MII.g_ioport_on_ioport.pinEthernetModeCfg(IOPORT_ETHERNET_CHANNEL_n, IOPORT_ETHERNET_MODE_RMII);`
- Modify `/src/sf_el_nx/phy/ether_phy.c` and `ether_phy.h`. These files need modification to match to your Ethernet PHY chip.
- Make sure selecting MII pins under **Pins** tab in Synergy Configurator. Check pin configuration setting; **Peripherals > Connectivity:ETHERC**.

Notes:

- Source files under `/ssp/src/framework/sf_el_nx/` will be overwritten by tool when building a project so you should copy the files before - Source files under `/ssp/src/framework/sf_el_nx/` will be overwritten by tool when building a project so you should copy the files before your editing.
- To exclude files from building, right-click on the files and select '**Exclude from build..**' (this is the case for e² studio).

Module Name: SF_EL_NX (NetX Port)

8.16 sf_el_tx

Issue ID: 13678

SF_CONTEXT_SAVE and SF_CONTEXT_RESTORE (in `bsp_common.h`) should only be defined if TX_ENABLE_EXECUTION_CHANGE_NOTIFY or TX_ENABLE_EVENT_TRACE is defined.

Applies to: All MCUs

Workaround: None

8.17 sf_el_ux

Issue ID: 8574

The current sf_el_ux HCD driver does not enable the double buffer feature for bulk out PIPEs, which is supported by USB hardware. Because of that, USB data throughput for data write through a bulk out PIPE will be less than the value for double buffer-enabled. This issue is only for data write (bulk OUT). Double buffering is supported for data read (bulk IN).

Applies to: S7, S5, and S3 MCU Series

Workaround: None

Issue ID: 13481

The USB host sends out a PING packet after receiving NAK or NYET handshake from the device. However, it also sends out a PING packet for ACK handshake, which is not expected behavior according to the USB 2.0 specification.

Applies to: All MCUs supporting USBX Host

Workaround: None

Issue ID:15368

ux_host_class_printer_name_get function does not support all IEE 1284 Device ID strings.

Applies to: S7G2 and S5D9 MCU Group

Workaround: None

Issue ID: 16572

In sf_el_ux device class driver, there is a redundant semaphore for 'device transfer request' that needs to be removed. Common semaphore can be used for the device transfer request for both S1 MCU Series and S3, S5, S7 MCU Series instead of using two semaphores - one for S1 MCU series and another for S3, S5 and S7 MCU Series separately.

Applies to: All MCUs

Workaround: None

Issue ID: 16733

While the USB CDC device read/write transfer with timeout is in progress on a CPU transfer interface, if its corresponding host is terminated, instead of aborting the transfer after the timeout period (and returning the timeout error to the user), the CDC device gets hung up in device transfer request driver.

Applies to: All Synergy MCUs that support USBX Device.

Workaround: None

Issue ID: 16986

When the user initializes the USB HS host port for isochronous transfer, and hence an end point is created (that is, in ux_hcd_synergy_isochronous_endpoint_create()), if the device has non-zero wMaxPacketSize bits 11-12 (that is "transaction per microframe" > 1), even when the maximum pipe payload size of USB host can accommodate the wMaxPacketSize of the USB device, it returns an error.

Applies to: All MCUs

Workaround: None

Issue ID: 17121

If a user attempts to abort the current USB CDC device *read/write* transfer, after its timeout period is expired, the CDC device, instead of aborting the transfer, gets hung up in the device transfer abort driver call.

Applies to: All Synergy MCUs that support USBX Device

Workaround: None

8.18 sf_touch_ctsu

The Capacitive Touch Framework is deprecated and will be excluded from future SSP releases. New designs should use Capacitive Touch Framework v2.

Issue ID: 6858

1. When a channel is set to NULL, `SF_TOUCH_CTSU_Read()` returns `SSP_ERR_INTERNAL`.
2. Return values from ThreadX API calls are not checked in the framework. This can lead to functional issues in the framework when ThreadX APIs return error. Framework may not work as expected in such error cases since errors are not handled.
3. With valid callback and context if `callback_index` is set to `SF_TOUCH_CTSU_CFG_MAX_WIDGET_TYPES (= 3)`, `SF_TOUCH_CTSU_Open()` returns `SSP_ERR_OUT_OF_MEMORY`.

Applies to: All MCUs

Workaround: None

Issue ID: 6859

`SF_TOUCH_CTSU_Read()` returns error value `SSP_ERR_INTERNAL` if semaphore get or put are not successful.

Applies to: All MCUs

Workaround: None

8.19 sf_touch_ctsu_button

The Capacitive Touch Framework is deprecated and will be excluded from future SSP releases. New designs should use Capacitive Touch Framework v2.

Issue ID: 6882

1. Valid range for `button_count` is 0 to less than `SF_TOUCH_CTSU_BUTTON_CFG_USER_SUPPORTED_BUTTONS (= 12)`
2. For `button_count` values outside the range, `SF_TOUCH_CTSU_Button_Open()` returns error `SSP_ERR_ASSERTION`.

Applies to: All MCUs

Workaround: None

Issue ID: 6883

For `button_count` values outside the range, `SF_TOUCH_CTSU_Button_Open()` returns error `SSP_ERR_ASSERTION` and hence buttons outside the range cannot be operated.

Applies to: All MCUs

Workaround: `button_count` values must be set to value 0 to less than `SF_TOUCH_CTSU_BUTTON_CFG_USER_SUPPORTED_BUTTONS (= 12)`.

8.20 sf_Wifi

Issue ID: 8394

The projects using GT202 framework will see compilation warnings. All the warnings are in the 3rd party GT202 driver code. The GT202 framework files do not have any warnings. The warnings should not impact the user applications.

Applies to: WiFi Framework for GT202 on S7G2, S3A7, S5D9, S5D5, S3A6 (only socket), S3A3 MCU Groups

Workaround: None

Issue ID: 12742

GT202 module supported by WiFi Framework is affected by WPA2 KRACK issue.

Applies to: GT202 module supported by WiFi Framework

Workaround: None

Issue ID: 14126

WiFi WPS functionality does not work with WPA security.

Applies to: WiFi Framework using GT202

Workaround: None

Issue ID: 15793

1. In `netx_next_received_packet(0` function, else part of the condition `((length - *p_total_len) < data_len)` is not reachable.

This piece of code performs packet fragmentation and the `gt202` does not perform packet fragmentation and hence the piece of code is not executed.

2. In function `gt202_wps_start()`, else part of condition `if (SSP_SUCCESS == ssp_err)` is not reachable. That is, the table for mapping GT202 error to SSP error (`sf_wifi_gt202_ssperr_map`) always returns `SSP_SUCCESS` (as Net parameters `net_params` is initialized with 0 and holds same value throughout) irrespective of inputs, this causes unreachable branch.

The value of `net_params` may be altered by the call:

```
ioctl_struct.data = ((QOSAL_VOID *) &net_params);
ioctl_struct.length = sizeof(net_params);
retval = ath_ioctl_handler (&p_driver_handle->enet, &ioctl_struct);
```

In this case the `if(SSP_SUCCESS == ssp_err)` may not always be equal to `SSP_SUCCESS`.

Applies to: All MCUs

Workaround: None

8.21 sf_wifi_qca4010

Issue ID: 16558

SF_WIFI_QCA4010 framework does not support WPS method of provisioning.

Applies to: S3, S5, S7 MCU Series

Workaround: None

8.22 SSP Bugs and Deficiencies

Issue ID: 17218

Due to the incorrect values of `ADC_MASK_SAMPLE_HOLD_BYPASS_CHANNELS` and `ADC_MASK_SAMPLE_HOLD_BYPASS_SHIFT`, Sample and Hold Mask feature does not work as expected for the dedicated 3 channels in ADC. Either wrong channel will be selected or channel will not be enabled at all.

Applies to: S7 and S5 MCU Series

Workaround: None

8.23 SSP IAR Support

Issue ID: 13900

In some cases, the build fails with the error “Secure builder required” after migrating to a newer SSP version in EWSYN.

Applies to: All MCUs

Workaround: Select **Project > Make (F7)** after the issue occurs. The project should then build without errors.

Issue ID: 14485

Library projects which use many/long `include` paths cause the compiler command line to exceed system limit and fails to build the library.

Applies to: Projects created with IAR compiler in e² studio.

Workaround: None

Issue ID: 16723

If using the IAR compiler from IAR EWSYN product, but invoked from e² studio IDE, installing the IAR Embedded Workbench plugins into e² studio may result in the following message:

“Warning: Installing unsigned software for which the authenticity or validity cannot be established. Continue with installation?”

Applies to: All MCUs

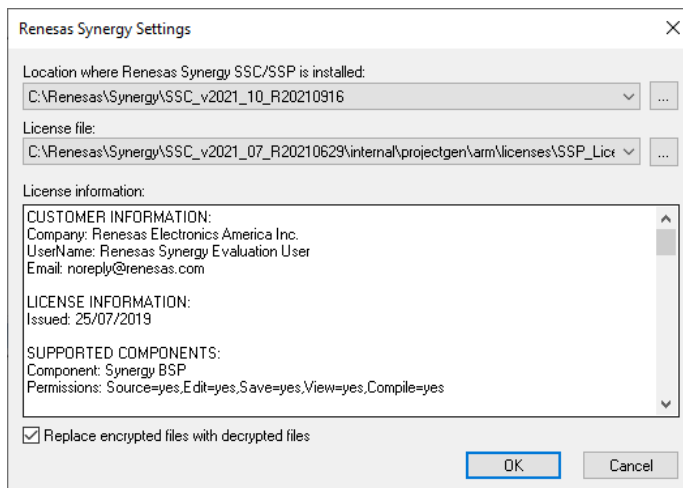
Workaround: This warning can be ignored – click on the “Install anyway” option to continue with the installation.

Issue ID: 16988

Synergy License file information is no longer required for SSP v2.x. The Renesas Synergy™ settings dialog in IAR Embedded Workbench for Synergy shows the License information section to support any imported SSP v1.x projects.

SSP Evaluation License is located in the following directory:

<SSC_base_dir>\internal\projectgen\arm\Licenses\ .



Applies to: All MCUs

Workaround: None

8.24 SSP XMLs for ISDEs

Issue ID: 10695

Configurator does not warn about the limitation on RSPI bit rate if it is less than or equal to 30 MHz.

Applies to: All MCUs

Workaround: RSPI bit rate must be a positive integer less than or equal to 30 MHz or PCLK/2, whichever is minimum.

Issue ID: 12857

Creating a project with a custom board pack might not reflect the customized values set for the properties in that custom board pack.

Applies to: All MCUs

Workaround: None

8.25 TES

Issue ID: 14095

The rendering of concave polygons is not supported when D/AVE 2D drawing engine is enabled.

Applies to: S7G2 and S5D9 MCU Groups

Workaround: Disable D/AVE 2D drawing engine to render concave polygons.

Issue ID: 15762

An application using pixelmaps to fill the shapes does not render pixelmaps properly inside the shapes if the pixelmaps width and height are not the power of 2.

Applies to: S7G2 and S5D9 MCU Groups

Workaround: The pixelmaps are properly drawn inside the shapes if pixelmap width and height are the power of 2.

8.26 USBX

Issue ID: 8647

The USB throughput for file `read/write` operation with USBX Device Class Mass Storage is not consistent and may vary for every measurement.

Applies to: All MCUs

Workaround: None

Issue ID: 17096

The `sf_el_ux_comms_v2 Write` API sends a ZLP packet after it sends the requested bytes, for all requested lengths, instead of sending ZLP only when the requested length is a Multiple of `wMaxPacketSize`. There is no functionality impact because of this, but this is an undesired behavior.

Applies to: All MCUs

Workaround: None

9. Synergy Development Tools

9.1 Fixed Issues in Synergy Development Tools

9.1.1 Synergy Tools

Issue ID: 16259

The mismatch in PFS register bits of all the MCUs in the e² studio IO register view is fixed now.

Note: In order to properly reflect the changes with the new pack, use the following steps:

Step 1: Delete the existing `<MCU>.sfrx` (for example, `R7FS3A77C.sfrx`) from `C:\<Username>\.eclipse\co.renesas.platform_XXXXX\DebugComp\Synergy\IoFiles` folder.

Step 2: Install the pack and create/ import the project. Build and run the project.

Applies to: S5, S3, and S1 MCU Series

9.1.2 Pin Mapping Issues

Issues ID: 10864

The Pin Configuration tab in the configurator cannot be used to configure the opamp or analog comparators for every use case. This issue is fixed now.

Applies to: S7G2, S5D9, S5D5, S5D3, S3A7, S3A3, S128, and S124 MCU Groups

9.2 Known Issues in Synergy Development Tools

9.2.1 Pin Mapping Issues

Issue ID: 12261

DAC8 output pin is not getting configured when it is configured through ISDE as the pin configuration does not support setting ASEL and PSEL bit fields for the same pin.

Applies to: S1JA, S128, and S3A3 MCU Groups

Workaround: Configure DAC8 output pin manually.

Update `g_ioport_on_ioport.pinCfg` setting on the pin configured for DAC by adding the following:

```
| IOPORT_CFG_PERIPHERAL_PIN | IOPORT_PERIPHERAL_CAC_AD
```

Issue ID: 14088

When setting the IRQ on the GPIO pin, there is no conflict shown if the IRQ is already assigned to another pin.

Applies to: All MCUs

Workaround: Manually check the ICU peripheral to see if the IRQ is already assigned to a pin before setting it to a GPIO pin.

Issue ID: 16560

When creating a Synergy project in EWSYN, the Synergy board selected in the project generator dialog reverts to the custom board in the configurator once the Synergy configurator is launched and the pin editor is empty.

Selecting the board again in the BSP tab shows messages about version change and conflicts. Clicking ok through the messages updates the pin editor to allow user to configure the pins, but no pin data is generated when generating project content and the file `pin_data.c` is missing.

Applies to: All MCUs

Workaround: No workaround available

Issue ID: 16561

The VREFH pin for the S1JA device cannot be configured but the VREFL pin is configurable without errors through the pin configurator. When generating the project content, `pin_data.c` file does not have the data for the pin configured. The user needs to manually add the data.

Applies to: S1JA MCU Group, and S3 MCU Series

Workaround: The user will have to manually configure the VREF pins for S1JA MCUs through the IO port API in their application, for example, `g_ioport.p_api -> pincfg(OPPORT_PORT_00_PIN_10, IOPORT_CFG_ANALOG_ENABLE);`

Issue ID: 16592

Migrating a SSP v1.x project that has the comparator functions configured, to SSP v2.x does not work properly.

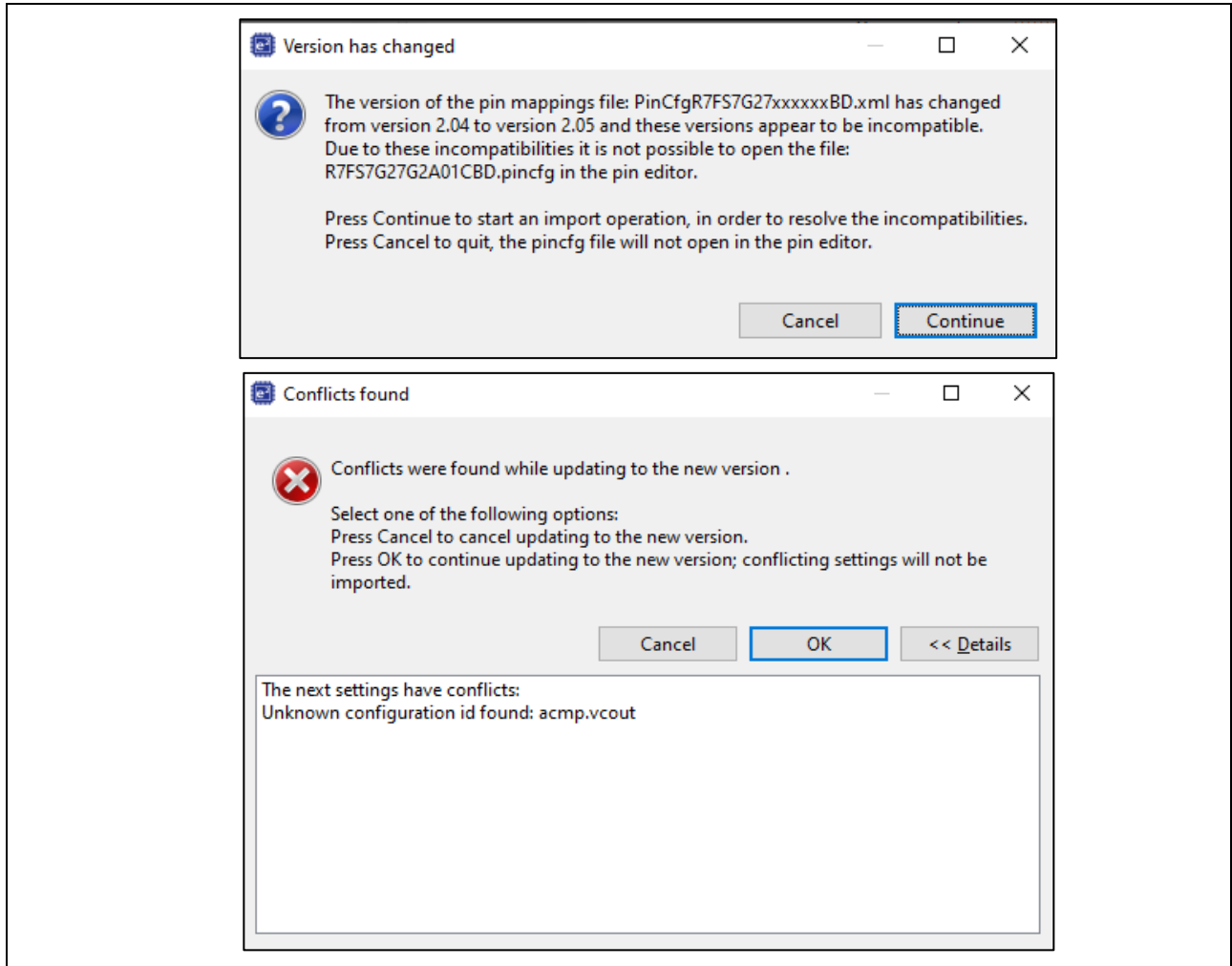
One of the following issues will be noticed:

1. Pin editor does not open and complains about the invalid `pinmapping.xml` file.
2. Shows messages about conflicts found.
3. Migrates with error in pin configuration.

Applies to: All MCUs

Workarounds (corresponding to items 1,2, and 3 in the issue description above, respectively):

1. **Option 1:** Manually recreate the configuration in SSP v2.x.
Option 2: Remove the configuration for CMP function and then migrate to SSP v2.x.
2. Click **Continue** and **OK** on the messages shown below to continue to migrate the project. The project migrates with an error. Manually fix the error in the ACMP function (for example, by selecting the pin for VCOUNT on ACMP0).
3. Manually fix the error in the ACMP function (for example, setting the operation mode).



4. Manually fix the error in the ACMP function (for example, by setting the operation mode).

9.2.2 Synergy Tools

Issue ID: 11556

Synergy builder is excluded from the tool command pattern when changing the toolchain from IAR 7.x to IAR 8.x, which leads to a build error that the secure builder is required when trying to build the project after migrating.

Applies to: All MCUs

Workaround:

The following workaround can be used to migrate projects with IAR 7.x to IAR 8.x:

1. Add environment variable `SECURE_BUILD_COMMAND: ${renesas.support.targetLoc:synergy-build} /isdebuild`
2. Update command line pattern IAR C/C++ Compiler for ARM setting if the following command is missing: `${SECURE_BUILD_COMMAND}`
3. Update command line pattern IAR C/C++ Assembler for ARM if the following command is missing: `${SECURE_BUILD_COMMAND}`

Issue ID: 12584

An error occurs when setting the watchpoint at certain addresses. Debug sessions cannot be started when these watchpoints with errors are still present.

Applies to: S5D9 MCU Group

Workaround: Remove the watchpoints from the breakpoints view and start the debug session.

Issue ID: 12925

When exporting the project, selecting the option for .tar format does not export the project in .tar format, but exports it in .zip format.

Applies to: Tools

Workaround: Edit the archive file name field by replacing the .zip with .tar, and the project will be exported in .tar format.

Issue ID: 14436

Some of the old projects with customized stacks might fail after migrating to e² studio v7.3 or later versions because the default modules get repopulated in the stack.

Applies to: All MCUs

Workaround: The user explicitly needs to delete the modules that are repopulated after migration.

Issue ID: 15339

Default property value of the IP address does not get picked up for existing projects after changes to the pack. Opening existing projects shows the previously saved value instead of the default value from the pack.

Applies to: Projects which use the packs with the change for IP address

Workaround: None

Issue ID: 17055

Developer Assistance for API reference for r_ctsuv2 module is not available.

Applies to: All MCUs

Workaround: None

Issue ID: 17237

SSC does not provide a Save button to save changes to the Synergy project configuration.

Applies to: All MCUs

Workaround: Click **Ctrl-S** to save the Synergy Configuration or close the SSC and click **Yes** in the Save Resource dialog to save your changes.

10. Complete List of Modules Supported in this Release

These modules are available on the respective MCUs based on the following criteria:

- If the core functionality of the module has been tested and works on an MCU, even if it has known issues, then the module is supported on the MCU.
- If the core functionality is broken or not tested on an MCU, then that module is not supported on the MCU.
- If a module is independent of the underlying MCU hardware or HAL drivers, and has been tested on a particular Synergy MCU, the following table indicates that this module is supported on all the Synergy MCUs that the underlying driver/framework/stack depend on have been tested.

10.1 BSP and Driver Modules Available in this Release

Module Name	SSP Feature	Supported Synergy MCU Groups
BSP	Board Support Package	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_acmphs	Analog Comparator High Speed	S1JA, S3A7, S5D9, S5D5, S5D3, S7G2
r_acmplp	Analog Comparator Low Power	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7
r_adc	A/D Converter	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_agt	Asynchronous General Purpose Timer	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_agt_input_capture	AGT Input Capture	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_analog_connect	Analog Connect	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_cac	Clock Frequency Accuracy Measurement Circuit	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_can	Controller Area Network	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_cgc	Clock Generation Circuit	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_crc	Cyclic Redundancy Check Calculator	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_ctsu (deprecated in SSP 2.0.0. use r_ctsuv2)	Capacitive Touch Sensing Unit	S124, S128, S3A7, S5D5, S5D9, S7G2
r_ctsuv2	Capacitive Touch Sensing Unit Version 2	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_dac	Digital to Analog Converter	S124, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_dac8	8-bit Digital to Analog Converter	S128, S1JA, S3A1, S3A3, S3A6
r_dmac	Direct Memory Access Controller	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_doc	Data Operation Circuit	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_dtc	Data Transfer Controller	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_elc	Event Link Controller	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_flash_hp	Flash Memory, High Performance	S5D3, S5D5, S5D9, S7G2
r_flash_lp	Flash Memory, Low Power	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7

Module Name	SSP Feature	Supported Synergy MCU Groups
r_fmi	Factory Microcontroller Information	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_glcd	Graphics LCD Controller	S5D9, S7G2
r_gpt	General Purpose Timer	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_gpt_input_capture	General Input Capture	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_icu	Interrupt Controller Unit	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_ioport	General Purpose I/O Ports	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_iwdt	Independent Watchdog Timer	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_jpeg_common	JPEG Common	S5D9, S7G2
r_jpeg_decode	JPEG Decode	S5D9, S7G2
r_jpeg_encode	JPEG Encode	S5D9, S7G2
r_kint	Keyboard Interrupt Interface	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_lpmv2_s1ja	Low Power Mode V2 for S1JA	S1JA
r_lpmv2_s124	Low Power Mode V2 for S124	S124
r_lpmv2_s128	Low Power Mode V2 for S128	S128
r_lpmv2_s3a1	Low Power Mode V2 for S3A1	S3A1
r_lpmv2_s3a3	Low Power Mode V2 for S3A3	S3A3
r_lpmv2_s3a6	Low Power Mode V2 for S3A6	S3A6
r_lpmv2_s3a7	Low Power Mode V2 for S3A7	S3A7
r_lpmv2_s5d3	Low Power Mode V2 for S5D3	S5D3
r_lpmv2_s5d5	Low Power Mode V2 for S5D5	S5D5
r_lpmv2_s5d9	Low Power Mode V2 for S5D9	S5D9
r_lpmv2_s7g2	Low Power Mode V2 for S7G2	S7G2
r_lvd	Low Voltage Detection Driver	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_opamp	Operational Amplifier	S128, S1JA, S3A1, S3A3, S3A6, S3A7
r_pdc	Parallel Data Capture Unit	S5D5, S7G2
r_ptp	Precision Time Protocol	S5D9, S7G2
r_qsapi	Quad Serial Peripheral Interface	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
r_riic	IIC	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_riic_slave	IIC Slave	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_rsapi	Serial Peripheral Interface	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_rtc	Real-time Clock	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_sci_i2c	Serial Communication Interface I2C	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_sci_spi	Serial Communication Interface SPI	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_sci_uart	Serial Communication Interface UART	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_sdadc	Sigma Delta ADC	S1JA

Module Name	SSP Feature	Supported Synergy MCU Groups
r_sdmmc	SDHI Driver for SDIO and SD/MMC Memory Devices	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
r_slcdc	Segment LCD Controller	S3A1, S3A3, S3A6, S3A7
r_ssi	(Inter-IC Sound) Interface [old: Serial Sound Interface] or r_i2s	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_wdt	Watchdog Timer	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
r_sce ¹	Cryptographic Library (HAL interfaces)	See table note on Cryptographic Functions

¹Cryptographic Functions: Section 9.4 lists cryptographic functions available for each MCU in this release; these functions are accessible as part of r_sce/cryptographic library.

10.2 Framework Modules Supported in this Release

Module Name	SSP Feature	Supported Synergy MCU Groups
sf_adc_periodic	Periodic Sampling ADC	S124, S128, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_audio_playback	Audio Playback	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_audio_playback_hw_dac	Audio Playback HW DAC	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_audio_playback_hw_i2s	Audio Playback HW I2S	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_audio_record_adc	Audio Record ADC	S124, S128, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_audio_record_i2s	Audio Record I2S	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_ble_r178g1d	BLE Framework	S124, S128, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_ble_r178g1d_onboard_profile	BLE Framework Onboard Profiles	S124, S128, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_block_media_lx_nor	Block Media Interface for LevelX NOR	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
sf_block_media_qspi	Block Media Interface for QSPI	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
sf_block_media_ram	Block Media Interface for RAM	S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_block_media_sdmmc	Block Media Interface for SD Multi Media Card	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
sf_comms_telnet	Telnet Communications	S5D3, S5D5, S5D9, S7G2
sf_console	Console	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_el_fx	Synergy FileX interface	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_el_gx	Synergy GUIX Interface	S5D9, S7G2
sf_el_lx_nor	Synergy LevelX NOR Interface	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
sf_el_nx	Synergy NetX Interface	S5D5, S5D9, S7G2
sf_el_ux	Synergy USBX Interface	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2

Module Name	SSP Feature	Supported Synergy MCU Groups
sf_el_ux_comms_v2	Synergy USBX Communication Interface V2	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_external_irq	External Interrupt	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_i2c	I2C Framework	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_jpeg_decode	JPEG Decode	S5D9, S7G2
sf_memory_qspi_nor	Memory QSPI NOR	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
sf_message	Inter-Thread Messaging	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_power_profiles_v2	Power Mode Profile V2	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_spi	SPI Framework	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_tes_2d_drw	2D Drawing Engine Framework	S5D9, S7G2
sf_thread_monitor	Thread Monitor (Watchdog)	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_touch_ctsu (deprecated)	Capacitive Touch Sensing Unit	S124, S128, S3A7, S5D9, S7G2
sf_touch_ctsu_button (deprecated)	Capacitive Touch Sensing Unit Button	S124, S128, S3A7, S5D9, S7G2
sf_touch_ctsu_slider (deprecated)	Capacitive Touch Sensing Unit Slider	S124, S128, S3A7, S5D9, S7G2
sf_touch_ctsuv2	Capacitive Touch Sensing Unit Version 2	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_touch_panel_v2	Touch Panel Version 2	S5D9, S7G2
sf_uart_comms	UART Framework	S124, S128, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_wifi_gt202	Wi-Fi Framework	S124, S128, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_wifi_gt202_onchip	Wi-Fi Framework on Chip Stack	S124, S128, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_cellular_catm1	Cellular Framework Quectel BG96 CATM1	S5D9, S7G2
sf_cellular_catm1_socket	Cellular Framework Quectel BG96 CATM1 Socket	S5D9, S7G2
sf_cellular_ryz014catm1	Cellular Framework RYZ014 CAT M1	S7G2
sf_cellular_ryz014catm1_socket	Cellular Framework RYZ014 CAT M1 Socket	S7G2
sf_crypto ^{2, 3}	Cryptographic Framework	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
sf_el_nx_crypto	Cryptographic Framework-Shim layer	S5D3, S5D5, S5D9, S7G2
sf_wifi_qca4010	Wi-Fi QCA4010 Framework	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2

² Cryptographic Functions: Section 9.4 lists cryptographic functions available for each MCU in this release; these functions are accessible as part of r_sce/cryptographic library.

³ Framework Interfaces for Cryptographic Functions (sf_crypto) available for this release include: HASH, TRNG, and Key Generation (RSA and AES).

10.3 Third-Party Modules Supported in this Release

Module Name	SSP Feature	Supported Synergy MCU Groups
fx	Azure RTOS FileX	S124, S3A3, S3A6, S3A7, S5D9, S7G2
gx	Azure RTOS GUIX	S5D9, S7G2
nx	Azure RTOS NetX	S5D9, S7G2
nx_auto_ip	Azure RTOS NetX Auto IP	S5D9 ² , S7G2
nx_bsd	Azure RTOS NetX BSD	S5D9 ² , S7G2
nx_dhcp_client	Azure RTOS NetX DHCP Client	S5D9 ² , S7G2
nx_dhcp_server	Azure RTOS NetX DHCP Server	S5D9 ²
nx_dns_client	Azure RTOS NetX DNS Client	S5D9 ² , S7G2
nx_ftp_client	Azure RTOS NetX FTP Client	S5D9 ² , S7G2
nx_ftp_server	Azure RTOS NetX FTP Server	S5D9 ² , S7G2
nx_http_client	Azure RTOS NetX HTTP Client	S5D9 ² , S7G2
nx_http_server	Azure RTOS NetX HTTP Server	S5D9 ² , S7G2
nx_pop3	Azure RTOS NetX POP3	S5D9 ² , S7G2
nx_ppp	Azure RTOS NetX PPP	S5D9 ² , S7G2 ²
nx_smtp_client	Azure RTOS NetX SMTP Client	S5D9 ² , S7G2
nx_snmp	Azure RTOS NetX SNMP	S5D3 ² , S5D5 ² , S5D9 ² , S7G2
nx_snmp_client	Azure RTOS NetX SNMP Client	S5D9 ² , S7G2
nx_telnet_client	Azure RTOS NetX Telnet Client	S5D9 ² , S7G2
nx_telnet_server	Azure RTOS NetX Telnet Server	S5D9 ² , S7G2
nx_tftp_client	Azure RTOS NetX TFTP Client	S5D9 ² , S7G2
nx_tftp_server	Azure RTOS NetX TFTP Server	S5D9 ² , S7G2
nxd	Azure RTOS NetX Duo Stack	S5D9, S7G2
nxd_auto_ip	Azure RTOS NetX Duo Auto IP	S5D9 ² , S7G2
nxd_bsd	Azure RTOS NetX Duo BSD	S5D9 ² , S7G2
nxd_dhcp	Azure RTOS NetX Duo DHCP IPv4 Client	S5D9 ² , S7G2
nxd_dhcp	Azure RTOS NetX Duo DHCP IPv6 Client	S5D9 ² , S7G2
nxd_dhcp_server	Azure RTOS NetX Duo DHCP IPv4 Server	S5D9 ² , S7G2
nxd_dhcp_server	Azure RTOS NetX Duo DHCP IPv6 Server	S5D9 ² , S7G2
nxd_dns	Azure RTOS NetX Duo DNS Client	S5D9 ² , S7G2
nxd_ftp_client	Azure RTOS NetX Duo FTP Client	S5D9 ² , S7G2
nxd_ftp_server	Azure RTOS NetX Duo FTP Server	S5D9 ² , S7G2
nxd_http_client	Azure RTOS NetX Duo HTTP Client	S5D9 ² , S7G2
nxd_http_server	Azure RTOS NetX Duo HTTP Server	S5D9 ² , S7G2

² NetX and NetX Duo Applications are MCU-independent application layer protocols dependent on the NetX and Ethernet drivers. All MCUs on which NetX has been tested and verified support these protocols.

Module Name	SSP Feature	Supported Synergy MCU Groups
nxd_mdns	Azure RTOS NetX Duo mDNS/DNS-SD	S3A7, S5D9, S7G2
nxd_nat	Azure RTOS NetX Duo NAT	S5D9 ² , S7G2
nxd_pop3	Azure RTOS NetX Duo POP3	S5D9 ² , S7G2
nxd_ppp	Azure RTOS NetX Duo PPP	S5D9 ² , S7G2 ²
nxd_smtp_client	Azure RTOS NetX Duo SMTP Client	S5D9 ² , S7G2
nxd_snmp	Azure RTOS NetX Duo SNMP	S5D3 ² , S5D5 ² , S5D9 ² , S7G2
nxd_snmp_client	Azure RTOS NetX Duo SNMP Client	S5D9 ² , S7G2
nxd_telnet_client	Azure RTOS NetX Duo Telnet Client	S5D9 ² , S7G2
nxd_telnet_server	Azure RTOS NetX Duo Telnet Server	S5D9 ² , S7G2
nxd_tftp_client	Azure RTOS NetX Duo TFTP Client	S5D9 ² , S7G2
nxd_tftp_server	Azure RTOS NetX Duo TFTP Server	S5D9 ² , S7G2
nxd_mqtt_client	Azure RTOS NetX Duo MQTT Client	S5D3, S5D5, S5D9, S7G2
nxd_tls_secure ³	Azure RTOS NetX Duo TLS Secure	S5D3, S5D5, S5D9, S7G2
nxd_web_http_client	Azure RTOS NetX Duo Web HTTP1.1 Client	S5D5 ² , S5D9, S7G2
	Azure RTOS NetX Duo Web HTTPS Client	S5D5, S5D9, S7G2
nxd_web_http_server	Azure RTOS NetX Duo Web HTTP1.1 Server	S5D9, S7G2
	Azure RTOS NetX Duo Web HTTPS Server	S5D9, S7G2
Tx	Azure RTOS ThreadX	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
Lx_nor	Azure RTOS LevelX NOR	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
ux_device_class_storage	Azure RTOS USBX Device Class Mass Storage	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
ux_device_class_hid	Azure RTOS USBX Device Class HID	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
ux_device_class_cdc_acm	Azure RTOS USBX Device Class CDC-ACM	S124, S128, S1JA, S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
ux_host_class_cdc_acm	Azure RTOS USBX Host Class CDC-ACM	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
ux_host_class_hid	Azure RTOS USBX Host Class HID	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
ux_host_class_hub	Azure RTOS USBX Host HUB	S5D3, S5D5, S5D9, S7G2
ux_host_class_printer	Azure RTOS USBX Host Class Printer	S3A3, S3A7, S5D9, S7G2

⁴ NetX and NetX Duo Applications are MCU-independent application layer protocols dependent on the NetX and Ethernet drivers. All MCUs on which NetX has been tested and verified support these protocols.

³ TLS v1.0 and v1.1 are deprecated from SSP and will be obsolete from next SSP release. Users are strongly recommended to migrate their projects to TLS v1.3 in SSP immediately.

Module Name	SSP Feature	Supported Synergy MCU Groups
ux_host_class_storage	Azure RTOS USBX Host Class Mass Storage	S3A1, S3A3, S3A7, S5D3, S5D5, S5D9, S7G2
ux_host_class_video	Azure RTOS USBX Host Video class	S5D9, S7G2

10.4 Cryptographic Functions for Each MCU Supported in this Release

Function	S5D3, S5D5, S5D9, S7G2	S3A1, S3A3, S3A6, S3A7	S124, S128, S1JA
TRNG	Generate and read random number	Generate and read random number	Generate and read random number
AES	Encryption, decryption, Key Generation - wrapped keys	Encryption, decryption, Key Generation - wrapped keys	Encryption, decryption
AES Key Size	128-bit, 192-bit, 256-bit	128-bit, 256-bit	128-bit, 256-bit
AES Key Type	Plain text / raw key, wrapped key	Plain text / raw key, wrapped key	Plain text / raw key
AES Chaining Modes	ECB, CBC, CTR, GCM, XTS ⁶	ECB, CBC, CTR, GCM, XTS	ECB, CBC, CTR
ARC4	Encryption, decryption	NA	NA
TDES	Encryption, decryption	NA	NA
TDES Key Size	192-bit	NA	NA
TDES Chaining Modes	ECB, CBC, CTR	NA	NA
RSA	Signature Generation, Signature Verification, Public-key Encryption, Private-key Decryption, Key Generation - plain text and wrapped keys	NA	NA
RSA Key Size	1024-bit, 2048-bit	NA	NA
RSA Key Type	Plain text / raw key, Wrapped key	NA	NA
Key Installation	AES, ECC, RSA keys	AES keys	NA
ECC	Key Generation – plain text and wrapped keys, Scalar Multiplication, ECDSA – Signature Generation, ECDSA – Signature Verification	NA	NA
ECC Key Size (in bits)	192-bit, 224-bit, 256-bit, and 384-bit	NA	NA
ECC Key Type	Plain text / raw keys and wrapped keys	NA	NA
DSA	Signature Generation, Signature Verification	NA	NA
DSA Key Size	(1024, 160)-bit, (2048, 224)-bit, (2048, 256)-bit	NA	NA
HASH	SHA1, SHA224, SHA256, MD5	NA	NA

⁶ XTS is supported for 128-bit and 256-bit keys only.

10.5 Experimental Modules Supported in this Release

Modules that have not been tested on the MCUs have been classified as experimental modules and are listed in the following table. These experimental modules are currently not supported by Synergy Configuration tools and use of these modules in customer projects is not supported by Renesas at this time.

Experimental Modules		
Module Name	SSP Feature	Supported Synergy MCU Groups
ux_device_class_cdc_ecm	Azure RTOS USBX Device Class CDC-ECM	S124, S3A3, S3A7, S5D9, S7G2
ux_device_class_rndis	Azure RTOS USBX Device Class RNDIS	S124, S3A3, S3A7, S5D9, S7G2
ux_host_class_gser	Azure RTOS USBX Host Class Generic Serial	S3A3, S3A7, S5D9, S7G2
ux_host_class_prolific	Azure RTOS USBX Host Class Prolific	S3A3, S3A7, S5D9, S7G2
ux_host_class_swar	Azure RTOS USBX Host Class Swar	S3A3, S3A7, S5D9, S7G2
ux_network_driver	Azure RTOS USBX Network Driver	S124, S3A3, S3A7, S5D9, S7G2
ux_device_class_pima	Azure RTOS USBX PIMA Device Class	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
ux_host_class_pima	Azure RTOS USBX PIMA Host Class	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2
ux_pictbridge	Azure RTOS Pictbridge Class	S3A1, S3A3, S3A6, S3A7, S5D3, S5D5, S5D9, S7G2

11. Additional Technical Notes

- Subscribe to the Synergy Technical Bulletin Board to receive the latest technical news and notifications about new features, known issues, workarounds, and release announcements. To subscribe, visit www.renesasrulz.com/synergy/synergy_tech_notes/f/214.aspx. Sign in to Renesas Rulz, and press **Email Subscribe to this forum**.
- Additional technical information, including informative papers and articles on SSP and Synergy can be found at Synergy Knowledge Base, www.renesas.com/synergy/knowledgebase.

Website and Support

Visit the following vanity URLs to learn about key elements of the Synergy Platform, download components and related documentation, and get support.

Synergy Platform MCUs	www.renesas.com/renesas-synergy-platform-mcus
Synergy Software Package	www.renesas.com/synergy/ssp
Software add-ons	www.renesas.com/synergy/addons
SSP Components	www.renesas.com/synergy/sspcomponents
MCU Components	www.renesas.com/synergy/components-synergy-mcus
Kits	www.renesas.com/synergy/kits
Synergy Solutions Gallery	www.renesas.com/synergy/solutionsgallery
Partner projects	www.renesas.com/synergy/partnerprojects
Application projects	www.renesas.com/synergy/applicationprojects
Self-service support resources:	
Knowledgebase	www.renesas.com/synergy/knowledgebase
Forums	www.renesas.com/synergy/forum
Training	www.renesas.com/synergy/training
Videos	www.renesas.com/synergy/videos
Chat and web ticket	www.renesas.com/synergy/resourcelibrary

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Jul.07.22	-	First release
1.01	Jul.29.22	-	Second release
1.02	Aug.01.22	-	Minor update

SSP v2.3.0 Release Note

Publication Date: Jul.29.22

Published by: Renesas Electronics Corporation

Renesas Synergy™ Platform SSP v2.3.0 Release Note