Additional Usage Notes

SSP v1.5.2

Additional Usage Note

Renesas Synergy™ Platform
Synergy Software
Synergy Software Package

Renesas Electronics
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Rev.1.00 Nov 2018

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Renesas Synergy™ Platform

SSP v1.5.2 Additional Usage Note

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1. Introduction

This document describes additional usage notes for **Synergy Software Package (SSP) version 1.5.2**.

2. Release Information

SSP Release Version	v1.5.2
Release Date	Nov 16, 2018

The intended audience for this release is Renesas Synergy™ customers, prospective customers, partners, and support staff. This document lists additional information on SSP v1.5.2 usage. See the SSP v1.5.2 Release Note for enhancements, bug fixes, and known issues that were identified since the last release for SSP v1.5.1.

3. SSP v1.5.2 Additional Usage Note

3.1 BSP for SSP Supported Platforms

Issue ID: 2625

Unaligned access across the memory map boundary 0x20000000 (between SRAMHS and SRAM0) results in a data read/write failure due to the Synergy hardware restriction. However, user applications might cause an unaligned access across the boundary, since linker script files for S7 or S5 MCU parts define the single 'RAM' section across SRAMHS and SRAM0. For details on this hardware restriction, see the *Arm® Cortex®-M4 Technical Reference Manual*, section 3.4.3
http://infocenter.arm.com/help/topic/com.arm.doc.100166_0001_00_en/arm_cortexm4_processor_trm_100166_0001_00_en.pdf.

Applies to: S7 and S5 MCU Series

Workaround: Users need to modify their linker script manually to ensure that objects do not cross the memory map boundary, 0x20000000.

Issue ID: 10664

If a user is using the trace buffer for debugging and has data stored in RAM at addresses above 0x20004000, 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 0x20000000. This allocation could be removed, freeing up the 1K mistakenly reserved for the Trace Buffer. Using e^2 studio, Trace Buffer function will store 1K of the trace buffer data beginning at 0x20004000. Therefore, 1K of RAM must not be used by the application if the Trace Buffer is to be used for debugging.

3.2 Crypto/r_sce

Issue ID: 11147

Only data input lengths that are multiples of the AES block size are supported for AES encryption/decryption APIs for XTS chaining mode.

Applies to: S7, S5, and S3 MCU Series

Workaround: None

3.3 MCU Implementation/ SW Architecture

Issue ID: 6399

If control structures are not all zeros, then, function calls to other than the open() function may incorrectly determine that the module has already been opened. If this occurs, then the module may cause undefined behavior, since it has not been properly initialized. Statically allocated control structures will be zeroed-out as part of the C runtime initialization by the BSP. An example of when a control structure should be explicitly zeroed-out is if it was allocated off the stack.

Applies to: All MCUs

Workaround:

- Follow SSP rules and ensure that the open() function is always called before the other APIs.
- Ensure that control structures are all zeros before first use.

Issue ID: 10864

The pin configuration tab in the configurator cannot be used to configure the opamp or analog comparators for every use case.

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

Workaround: Configure the pins manually in the user-defined code.

3.4 nxd_tls_secure

Issue ID: 10694

NetX Crypto Hardware Accelerator Error occurs for GCC-O3 during TLS handshake process. For GCC-O2, there is no such issue.

Applies to: S7 and S5 MCU Series

Workaround: Use GCC-O2

3.5 r_ctsu

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 the Measurement Status Counter is set to non-zero value, or the 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 MCUs

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

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 MCUs

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, S5D5, S3A7, S128, and S124 MCU Groups

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

3.6 r_flash_lp, r_flash_hp

Issue ID: 10820
The Flash API for both Flash LP and Flash HP currently disables the Flash cache for the duration that the Flash module is open. This reduces ROM performance during that period. The Flash cache only needs to be disabled during Code Flash operations, not Data Flash operations, and only for the duration of the Code Flash operation.

Applies to: S7, S5, and S3 MCU Series for both Flash LP and Flash HP.

Workaround: The cache can be manually enabled or disabled by calling the R_BSP_CacheSet() and R_BSP_CacheOff() functions respectively.

3.7 r_lpmv2

Issue ID: 9223
When entering Software Standby mode, while the PLL clock is being used as the clock source, there is a risk that some through-current flows in the PLL circuit.

Applies to: S5 MCU Series

Workaround:
This workaround is for user application.
Prior to entering Software Standby mode:

- Select a clock other than the PLL clock as clock source (MOCO is recommended. It is OK to use HOCO if you are already using it.)
- Stop the PLL clock.
- Wait at least 83 µs.
- Request that the MCU enter Software Standby mode.

After returning from Software Standby mode:

- Start the PLL clock.
- Select the PLL clock as clock source.

3.8 r_qspi

Issue ID: 9809
QSPI operations should be performed with valid address range. Invalid address operations will not result in warning or error.

Applies to: All MCUs

Workaround: Check for the valid address range before calling QSPI APIs.

3.9 r_sci_i2c

Issue ID: 9601
Applications with SCI_I2C module that have high performance requirement communication.

Applies to: All MCUs

Workaround: None

3.10 sf_audio_playback_hw_dac

Issue ID: 9308

sf_audio_playback is not tested with the DMAC module as a transfer driver.

Applies to: All boards except S1JA, S124, and S128 boards

Workaround: sf_audio_playback module can use DTC module as a transfer driver, instead of DMAC.

3.11 sf_cellular

Issue ID: 9475

Applications using the cellular framework will not be able to upgrade module firmware over the air (FOTA) since FOTA is not supported by the cellular framework.

Applies to: Cellular framework CAT3 and CAT1 implementation on all Synergy MCUs

Workaround: None

3.12 sf_el_fx

Issue ID: 12753

The warning "control reaches end of non-void function" will be seen if code is configured to reach fx_fault_tolerant_transaction_fail().

Applies to: S7, S5, and S3 MCU Series

Workaround: None

3.13 sf_el_gx

Issue ID: 12704

The GUIX Studio crashes while opening an incorrectly configured project file (.gxp). There should not be any configurations for unsupported formats in the GUIX Studio project.

Applies to: GUIX Studio project files

Workaround: None

3.14 sf_el_nx

Issue ID: 7513

The current sf_el_nx (NetX Port driver) is hard-coded to use the RMMI interface (a Micrel Ethernet PHY chip mounted on Renesas kits which does not support other PHY chips or MMI interfaces). The customer defines an Ethernet PHY chip driver when using a different PHY chip than the one mounted on Renesas kits, or when using a PHY chip with a MII interface.

Workaround: There is no plan to provide support for additional Ethernet PHY chip drivers included in SSP; users are required to create their own PHY chip driver.

To create a PHY chip driver, users can use the sf_el_nx module under **/ssp/src/framework/sf_el_nx/** as a template and modify it for the target Ethernet PHY chip. Source files under sf_el_nx are in plain text; you can copy the file to other directories, such as **/src/** directory, and exclude the original sf_el_nx module from being built to avoid 'multiple definition' compile-error.

The following steps give high-level guidance:

1. Copy the directory **/ssp/src/framework/sf_el_nx/** including all the files under the directory to **/src/**.
2. 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 the '**Select All**' button.
3. Modify **/src/sf_el_nx/nx_hw_init.c**. Modify nx_synergy_ethernet_init() as indicated below, and select the 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);
   ```
4. Modify **/src/sf_el_nx/phy/ether_phy.c** and **ether_phy.h**. Modify these files to match to your Ethernet PHY chip.
5. Be sure to select MII pins under the '**Pins**' tab in the Synergy Configurator. Check the pin configuration setting; **Peripherals** > **Connectivity:ETHERC**.

Notes:

- Source files under **/ssp/src/framework/sf_el_nx/** are overwritten by the tool when building a project. Be sure to copy the files before editing.
- To exclude files from building, right-click on the files and select '**Exclude from build**' (as is the case for e^2 studio).

3.15 sf_el_ux

Issue ID: 7687

USBX HID Host API to get mouse events, or keyboard events may not work and may return 'no data,' even though the actual HID reports were received from a HID device. The issue happens if the application does not allocate adequate memory for USBX.

Applies to: All MCUs

Workaround: Specify enough memory size for USBX. (Set the value to “USBX Pool Memory Size” in the Properties of “USBX on ux” component). The following examples show the USBX Pool Memory Size setting (minimum). The values are obtained through measurements on a Synergy target board.

HID Mouse:

- 35 KB if USBX Host Class HID Pre-built library is used.
- 28 KB if USBX Host Class HID Source module is used.

HID Keyboard:

- 43 KB if USBX Host Class HID Pre-built library is used.
- 33 KB if USBX Host Class HID Source module is used.

The following fixed configurations are used for USBX Host Class HID Pre-built library:

- UX_HOST_CLASS_HID_DECOMPRESSION_BUFFER: 4096 (in bytes, default value).
- UX_HOST_CLASS_HID_USAGE: 1024 (in WORDs, default value).

The following configurations are used for USBX Host Class HID Source module:

- UX_HOST_CLASS_HID_DECOMPRESSION_BUFFER: 128 (in bytes).
- UX_HOST_CLASS_HID_USAGE: 256 (in WORDs).

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 the USB hardware. Therefore, 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 Groups

Workaround: None

3.16 sf_touch_ctsu

Issue ID: 6858

When channel is set to NULL, the SF_TOUCH_CTSU_Read() returns SSP_ERR_INTERNAL. Return values from the ThreadX API calls are not checked in the framework, which can lead to functional issues in the framework when ThreadX APIs return errors. The framework may not work as expected in such error cases, since errors are not handled. 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 the error value SSP_ERR_INTERNAL if the semaphore **get** or **put** are not successful.

Applies to: All MCUs

Workaround: None

3.17 sf_touch_ctsu_button

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 the error SSP_ERR_ASSERTION, and buttons outside the range cannot be operated.

Applies to: All MCUs

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

Issue ID: 12742

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

Applies to: GT202 module supported by the WiFi Framework

Workaround: None

3.18 SSP XMLs for ISDE

Issue ID: 10695

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

Applies to: All MCUs

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

3.19 Synergy Software Configurator

Issue ID: 7665

When using the Synergy Software Configurator in e^2 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. It will not be called; it causes a build error if the old thread_entry.c file is 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.

3.20 Synergy Tools

Issue ID: 12863

Support for ID byte programming for S5D3 and S5D5 devices is not available in SEGGER J-Link DLL version 6.32.

Applies to: S5D5 and S5D3 MCU Groups

Workaround: None

3.21 USBX

Issue ID: 6389

Public header files for USBX Device RNDIS Class and USBX Network Driver are not stored in SSP public header file directory for X-wares **\synergy\ssp\inc\framework\el**, so the user application would not build with such USBX components.

Applies to: All MCUs

Workaround: Add **ux_device_class_rndis_src** or **ux_network_driver_src** module to your project through the Synergy Configurator **Components** tab. Use populated header files and move them to path **\synergy\ssp\inc\framework\el**, or add the file include paths to the e^2 studio project property settings (**Cross Arm C Compiler** - **Includes** - **Include path**s) to make them compile.
Note: The USBX Device RNDIS Class and USBX Network Driver are experimental modules. These modules are not yet tested and may not work.

Issue ID: 8505

Users need to set the 'requested_length' of the USBX Device CDC API ux_device_class_cdc_acm_read large enough compared to the expected reception data length. If length of the reception data from a USB Host is larger than 'requested_length', the API returns UX_SUCCESS but reception data will not be stored in a user buffer and 'actual_length' is set to '0'.

Applies to: All MCUs

Workaround: Set 'requested_length' of the USBX Device CDC API ux_device_class_cdc_acm_read large enough compared to the expected reception data length.

Issue ID: 10027

USBX Device Class HID does not support Interrupt-Out endpoint. The use of Interrupt-Out endpoint is optional in the USB HID specification. It would not often be the case in embedded applications, but Synergy customers may require the feature for their production.

Applies to: All MCUs

Workaround: Ask Synergy customer support for a custom HID class example that enables Interrupt-In and Interrupt-Out endpoints.

Issue ID: 13036

In the user guide from Express Logic, the return error code 0x91 is not defined for ux_host_class_video_transfer_buffer_add(), and the example code sequence for the UVC application is incorrect.

Applies to: None

Workaround: None

4. Additional Technical Notes

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