Linux BSP 36.0_cd Release Notes for S32G3

07-Feb-2023

Contents

1 Release Contents

This document contains important information about the package contents, supported features, and known issues/limitations.
The following sections provide information about release contents and license.

Note: Unless otherwise stated, information contained in this document refers only to the S32G3 support provided in the Linux BSP 36.0_cd release.

Contents

This release contains the source code for U-Boot bootloader, Linux kernel, ARM Trusted Firmware, Xen, OP-TEE and Yocto recipes with specific support for NXP S32 SoC on the boards specified below

Table-1. Release Content Metadata

SoC	Component and Version	Compatible Firmware Version	Boards supported & tested
S32G399A Rev 1.0	Linux v5.15.85 PFE Linux Driver 1.2.0 U-Boot v2020.04 Yocto 4.0.5 ARM Trusted Firmware v2.5 Xen v4.17 OP-TEE v3.18 PKCS#11 Base Specification v3.0	PFE Firmware 1.5.0 HSE Firmware 0.2.16.1 HSE Premium Firmware 1.2.16.1 LLCE Firmware 1.0.5 DDR Firmware generated with: *S32 Design Studio 3.5* + *RTD 4.4 Version 4.0.0*	S32G-PROCEVB-S S32G3-PROCEVB3-S S32G-VNP-RDB3

This Linux BSP has been built and tested using GCC 10.2.0 for ARM64 toolchain.

License

All source code files of the Board Support Package (BSP) are either GNU General Public License version 2.0 (GPLv2), GNU Lesser General Public License (LGPL), BSD-3-Clause, or another open source license.

2 What's New?

This section describes the changes in this release, including new features and defect fixes.

Highlights

The following features were introduced in this Linux BSP release:

- ARM Trusted Firmware
  - Enabled in-place execution for the BL2 stage when the ARM Trusted Firmware is compiled with FIP_MEMORY_OFFSET flag.
- Linux Kernel
  - Updated TMU Calibration tables as per latest Reference Manuals, in the Linux TMU driver.
- XEN
  - Upgraded Xen to version 4.17 (Dec 2022 release).
- Yocto meta-alb
  - Upgraded Xen to version 4.17 (Dec 2022 release).
  - Integrated our OpenSSL support on version 3.0.5 from Yocto version 4.0 (kirkstone).
  - Updated machines and layer config files according to syntax changes from Yocto version 4.0 (kirkstone).
  - Added support for Ubuntu 22.04 LTS (default version) and Ubuntu 20.04 LTS BSP images as part of Yocto version 4.0 (kirkstone).
  - Recipes from meta-alb Yocto layer were updated according to Yocto version 4.0 (kirkstone) support.
  - Updated primary Linux Kernel version to 5.15.85-rt and secondary Linux Kernel version to 5.10.158-rt.
  - LXC support from meta-alb Yocto layer was updated to version 4.0.12 available from Yocto version 4.0 (kirkstone).
  - Changed meta-alb layer priority to 9 and meta-alb-dev priority to 10, to enforce correct layer usage order.
  - Updated ImageBuilder to version v1.0.

Note: All features which are specified as initially supported in this release should be considered at ORTM quality level.

Defect Fixes

The following issues were corrected in this release:

ID	Summary	Component/s
ALB-9627	Correctly set the inverse code of 'VR5510_FS_I_SAFE_INPUTS' register value into 'VR5510_FS_I_NOT_SAFE_INPUTS' register in A-TF VR5510 PMIC module.	AT-F
ALB-9444	Serial flash memory address mapping was set to maximum size available (512 MB) for all operating modes (SDR and DTR-OPI).	Linux
ALB-9411	Added reserved SRAM regions for SD boot.	U-Boot
ALB-9628	Fixed ARM Generic Timer interrupts to be parsed by "interrupts-names" if available.	XEN

3 Known Issues/Limitations

Read through all hardware related reference material and ensure the necessary hardware modifications have been made before using the software. Table below lists known issues.

Feature	Category	Affected Platforms	Description	Resolution/ Workaround	Jira ID
HSE	Linux	S32CC	Kernel driver: hmac(sha384) and hmac(sha512) not supported with key lengths between 64 and 128 bytes due to the standard HSE firmware limits imposed on maximum key sizes. References: HSE_FW_S32G3_0_2_16_1_ReleaseNotes.pdf	N/A	N/A
HS400ES	Linux	S32CC	The MMC HS400 Enhanced Strobe mode is not officially supported. None of the supported platforms has an eMMC memory which supports HS400ES, and this mode has not been validated.	N/A	ALB-7208
PCIe	Linux	S32CC	Riser Card (Delock PCIe switch) not probed successfully in Linux.	Add option 'skip=1' in hwconfig for the corresponding 'pcie' block. The Riser Card (Delock PCIe switch) will not be probed in U-Boot but will be correctly probed in Linux.	ALB-7415
PCIe	Linux	S32CC	When re-plugging a NVME SSD if the same PCIe slot after removing an E1000E network card, the Linux kernel panics.	N/A	ALB-8203
GPIO	Linux	S32CC	The GPIO driver does not correctly indicate the initial direction via sysfs.	Configure the desired initial direction of the GPIO pin when requesting it via sysfs.	ALB-8656
PCIe	Linux	S32CC	Riser Card (Delock PCIe switch) not probed after soft reset.	Power cycle the board and the power supply of the riser card.	ALB-8698

GMAC	Linux	S32G3	GMAC interrupt storm causing CPU stall.	N/A	ALB-9024
GMAC	Linux	S32G3	The EST of GMAC does no function properly.	N/A	ALB-9026
eMMC	Linux	S32G-VNP-RDB3	Degradation of eMMC write performance for sizes larger than 5GB.	N/A	ALB-8856
SJA1105	Linux	S32G3	KASAN: slab-out-of-bounds in sja1105_build_vlan_table.	N/A	ALB-9286
PFE	Linux	S32G	When linux is booted pfeng_slave.ko is in the root filesystem but is not loaded as there is no pfe_slave definition in the device tree.	N/A	ALB-9239
PCIe	U-Boot	S32G-VNP-RDB3	U-Boot hwconfig has no way of selecting autonegociation for the XPCS interfaces.	N/A	ALB-9599
PFE	Linux	S32G-VNP-RDB3	SerDes Mode1(fixed 1G speed) is not working in Linux, only in U-Boot (using SJA1110 1G image).	N/A	ALB-9600
PCIe	U-Boot	S32G3	SRNS phy mode can not be enabled.	N/A	ALB-9598
GMAC	Linux	S32G3	SGMII mode of GMAC0 does not work, only RGMII.	N/A	ALB-8785
HSE	OP-TEE	S32G3	Cannot retrieve HUK using HSE FW S32G3XX_1_2_16_1	N/A	ALB-9593
PCIe	Linux	S32G3	Can't probe PCIE driver when using PCIe Delock switch under Xen.	N/A	ALB-9557
Xen	Linux	S32G3	DomU unable to reboot when NULL Scheduler enabled	N/A	ALB-9521
IPCF	Linux	S32G3	IPCF is not supported on Linux Kernel 5.15.	N/A	ALB-9578

PFE	Linux	S32G3-PROCEVB3-S	Kernel panic error when "reboot" or "poweroff"	Unload the (built-in) SJA1105 driver via: "echo spi5.0 > /sys/bus/spi/drivers/sja1105/unbind" before poweroff/reboot.	ALB-9587
HSE	Linux	S32G-VNP-RDB3	Secboot not working after reboot on Linux	VDD_EFUSE can be set to HIGH on startup; DCD can configure GPIO25 as output	ALB-9592
HSE	Linux	S32G3	Kernel boot hangs with dm-verity and HSE enabled. HSE firmware does not support the number of streaming contexts expected by dm-verity.	Build the HSE crypto driver as a module (CONFIG_CRYPTO_DEV_NXP_HSE=m) or disable message digest support (CONFIG_CRYPTO_DEV_NXP_HSE_AHASH=n).	ALB-9619

4 History of Releases

Note: The information in this section covers the support for S32G3 based machines, simulators and emulators.

Features

The following features were introduced in previous releases of the Linux BSP:

- U-Boot
  - SerDes mode5 demo (combo PCIe and SGMII 2.5G mode) was added for SerDes1 on S32G3.
  - Moved all S32 Common Chassis device trees from U-Boot into Arm Trusted Firmware repository.
  - Added support for secure boot with Arm Trusted Firmware enabled.
  - U-Boot support was refactored in order to support distinct G2/G3 SoCs with EVB2/EVB3 combinations.
  - PCIe device ID for S32G3 platforms was updated in both U-Boot and Linux based on derivatives.
  - Enabled Distro Boot for Linux distributions based on Linux Kernel 5.18.
  - Encapsulated the information found in MIDR registers from SIUL2 into a non-volatile memory driver.
  - Removed platform clk driver and rely on SCMI protocol for clocking
  - Enabled clocks over SCMI by default
  - Set PSCI enable method for cpus by default.
  - Enabled clocks over SCMI by default.
  - Changed HS400/ES to be enabled in Linux via changes in the U-Boot environment which trigger a DTB fixup.
  - Enabled DM_SERIAL.Removed non-dm version of linflex uart driver.Enabled dm version of linflex uart driver.
  - Added support for secure boot with ATF enabled
  - Moved DDR ECC exclusion mechanism in ATF
  - ATF boot flow support enabled by default - U-Boot can be used as BL33 only
  - Added SAR-ADC U-Boot driver.
  - Renamed 'cpu' command to 'mp' due to name clash with 'cpu' command under CONFIG_CMD_CPU config.
  - Enable all fuse subcommands (read, sense, override, prog).
  - Added S32GEN1_SET_NEAREST_FREQ config. It allows the the clock driver to set the nearest frequency for a clock if the requested one cannot be set.
  - Update FIRC clock frequency to 48MHz in U-Boot. This can be seen in the output of clk dump.
  - Removed support for S32-GEN1 Revision 1.
  - Initial support for S32G399.
  - Set A53 maximum frequency based on the SIUL2_MIDR2 register.
  - Add support for S32G3EVB.
  - Enable DDR Driver for S32G3XXEVB.
  - Update sec-boot to use HSE FW 1.0.0
  - Add support for SGMII AN, new XPCS commands and update to latest electrical parameters.
- Linux Kernel
  - PFE Linux driver updated to version RTM 1.2.0. See PFE_S32G_A53_LNX_1.2.0_ReleaseNotes.pdf for the PFE Linux driver release notes.
  - Removed secondary Linux kernel, version 5.4.
  - Added secondary Linux kernel, version 5.15.
  - Added secure boot and keystore format support to userspace through UIO.
  - Added support for Dynamic Frequency Scaling for A53 cores (experimental).

  - Corrected revision reporting on S32G2 2.1 from Linux using the NVMEM driver.
  - Added support for PHY AQR113, found on S32GRV-PLATEVB board rev. F.
- Yocto meta-alb
  - Linux kernel version 5.4 support has been removed.
  - Added secondary Linux kernel, version 'v5.15.73-rt52'.
  - Migrated Yocto repositories to GitHub.
- OP-TEE
  - Updated OP-TEE to version 3.18.
  - The HSE RNG Driver is signaled of RNG service completions through secure interrupts.
  - HSE Driver uses the hse_interface.h as provided in the HSE Firmware Package.
- PKCS11-HSE
  - Added support for digest operations in HSE PKCS, currently supporting SHA1.
  - Added secure boot and keystore format support to userspace through UIO.
- U-Boot
  - Updated hwconfig format to support all SerDes modes for S32G3.
- ALB demos
  - The demo showcasing the GPIO sysfs interface was removed.
- ARM Trusted Firmware
  - Updated DDR driver to RTD 4.4 Version 3.0.4 Firmware, including an ERRATUM fix regarding the DDR PHY impedance calibration sequence.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added support for integration of external DDR Firmware in ATF.
- Linux Kernel
  - PFE Linux driver updated to version RTM 1.1.0. See PFE_S32G_A53_LNX_RTM_1.1.0_ReleaseNotes.txt for the PFE Linux driver release notes.
  - Updated the key groups for the HSE driver to correspond to the new format of the HSE RAM Key Catalog.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added 'gpio-reserved-ranges' in the device tree sources for GPIOs that are not accessible.
  - Renamed the 'pins' property to 'nxp,pins' inside the 'siul2-pinctrl' node in the device tree sources.
  - Added QSPI MTD partitions support.
- Yocto meta-alb
  - Linux Kernel subminor version was updated from 'v5.10.109-rt65' to 'v5.10.120-rt70'.
  - The demo showcasing the GPIO sysfs interface was removed.
  - Added MTD QSPI partitions support for the userspace Flash script.
  - PFE driver updated to RTM 1.1.0.
  - Enabled 'SystemD' as default init manager.
- OP-TEE

  - Added dedicated key groups for the HSE driver in the HSE RAM Key Catalog.
  - Derived OP-TEE Hardware Unique Key (HUK) from an HSE Shared Secret Key.
  - Implemented HSE Random Number Generator (RNG).
  - Added cryptographic offloading for AES-CBC & AES-ECB algorithms in the HSE Driver through OP-TEE's Cipher API.
- PKCS11-HSE
  - Added support for PKCS11 spec v3.0.
  - Added support for persistence over reset for both libhse and libpkcs-hse.
  - Added support for saving hse-stored key info to file from libpkcs-hse.
  - Added support for updating SYS_IMG through libhse.
- U-Boot
  - HSE RAM Key Catalog has been divided into separate key groups for OP-TEE/Linux.
  - Enabled live device tree support for all S32CC platforms.
  - Set J102/PROC,J108/PROC, J102/PLAT, J108/PLAT, J109/PLAT, J111/PLAT, J112/PLAT Ethernet ports active on EVB board.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Fixed PCIe functionality in U-Boot on SerDes mode5 for EP devices with Gen3 speeds (e.g. SSDs) by limiting max speed to Gen2.
  - Switched to generic pinmux/pinconf interface for specifying pinctrls in device tree sources.
  - Unified SIUL2 pinctrl/gpio nodes into a single one.
  - Added MTD QSPI partition support.
  - Updated SerDes driver bindings to align with the Linux kernel format.
  - Encapsulated SerDes functionality into a PHY driver.
- ARM Trusted Firmware
  - Moved all S32 Common Chassis device trees from U-Boot into Arm Trusted Firmware repository.
- Linux Kernel
  - PFE Linux driver updated to version BETA 1.0.0. See PFE_S32G_A53_LNX_RTM_1.0.0_ReleaseNotes.txt for the PFE Linux driver release notes.
  - Upgraded the LLCE drivers to firmware S32G_LLCE_GATEWAY_1.0.4_D2204.
  - Enabled MSI-X support in S32 Common Chassis PCIe driver for use with EPF and pcitest application.
  - Linux Kernel support was refactored in order to support distinct G2/G3 SoCs with EVB2/EVB3 combinations.
  - Enabled AES-OFB block mode for HSE crypto driver.
  - PCIe device ID for S32G3 platforms was updated in both U-Boot and Linux based on derivatives.
  - PFE routing table and system buffers were moved from DDR to S32G Internal SRAM, for improved fast-path performance. The memory placement of these is configurable via PFE's 'reserved-memory' device tree nodes.
  - Entropy cache maximum size made configurable for HSE crypto driver.
  - Used generic PINCONF interface for pin configuration.
  - Unified the two SIUL2 instances into a single dts node. There gpio1 and pinctrl1 nodes are no longer valid.
  - Assigned names for GPIOs. These names are used/displayed by libgpiod and the sysfs interface.
  - Set PSCI enable method for cpus by default.
  - Enabled clocks over SCMI by default.
  - HSE: Added S32G398A support
  - PFE Linux driver updated to version BETA 0.9.7

  - Fixed Suspend to Ram Linux hang when NVME SSD is mounted in rootfs.
  - Added initial support in PCIe driver for the EPF test framework.
  - S32-GEN1 PCIe controller supports Hot-Unplug.
  - For S32-GEN1 platforms, probe PCIE controller successfully when no Endpoint is connected to the PHY.
  - Add GMAC timestamp clock to device tree. This fixes incorrect PTP reference clock used for calculation in GMAC driver.
  - Enable SWT8, SWT9, SWT10 and SWT11.
  - Enable FTM0 and FTM1.
  - Update LLCE Drivers for 1.0.3 CD firmware.
  - Removed support for S32-GEN1 Revision 1.
  - Initial support for S32G399.
  - S32-GEN1 PCIe controller supports hotplug.
  - Add support for S32G3EVB.
  - Enable STM0, STM1 modules.
- Yocto
  - Linux kernel version 5.4 support has been removed.
  - Added secondary Linux kernel, version 'v5.15.73-rt52'.
  - Migrated Yocto repositories to GitHub.
- OP-TEE
  - Updated OP-TEE to version 3.18.
  - The HSE RNG Driver is signaled of RNG service completions through secure interrupts.
  - HSE Driver uses the hse_interface.h as provided in the HSE Firmware Package.
- PKCS11-HSE
  - Added support for digest operations in HSE PKCS, currently supporting SHA1.
  - Added secure boot and keystore format support to userspace through UIO.
- U-Boot
  - Updated hwconfig format to support all SerDes modes for S32G3.
- ALB demos
  - The demo showcasing the GPIO sysfs interface was removed.
- ARM Trusted Firmware
  - Updated DDR driver to RTD 4.4 Version 3.0.4 Firmware, including an ERRATUM fix regarding the DDR PHY impedance calibration sequence.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added support for integration of external DDR Firmware in ATF.
- Linux Kernel
  - PFE Linux driver updated to version RTM 1.1.0. See PFE_S32G_A53_LNX_RTM_1.1.0_ReleaseNotes.txt for the PFE Linux driver release notes.
  - Updated the key groups for the HSE driver to correspond to the new format of the HSE RAM Key Catalog.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added 'gpio-reserved-ranges' in the device tree sources for GPIOs that are not accessible.

  - Renamed the 'pins' property to 'nxp,pins' inside the 'siul2-pinctrl' node in the device tree sources.
  - Added QSPI MTD partitions support.
- Yocto meta-alb
  - Linux Kernel subminor version was updated from 'v5.10.109-rt65' to 'v5.10.120-rt70'.
  - The demo showcasing the GPIO sysfs interface was removed.
  - Added MTD QSPI partitions support for the userspace Flash script.
  - PFE driver updated to RTM 1.1.0.
  - Enabled 'SystemD' as default init manager.
- OP-TEE
  - Added dedicated key groups for the HSE driver in the HSE RAM Key Catalog.
  - Derived OP-TEE Hardware Unique Key (HUK) from an HSE Shared Secret Key.
  - Implemented HSE Random Number Generator (RNG).
  - Added cryptographic offloading for AES-CBC & AES-ECB algorithms in the HSE Driver through OP-TEE's Cipher API.
- PKCS11-HSE
  - Added support for PKCS11 spec v3.0.
  - Added support for persistence over reset for both libhse and libpkcs-hse.
  - Added support for saving hse-stored key info to file from libpkcs-hse.
  - Added support for updating SYS_IMG through libhse.
- U-Boot
  - HSE RAM Key Catalog has been divided into separate key groups for OP-TEE/Linux.
  - Enabled live device tree support for all S32CC platforms.
  - Set J102/PROC,J108/PROC, J102/PLAT, J108/PLAT, J109/PLAT, J111/PLAT, J112/PLAT Ethernet ports active on EVB board.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Fixed PCIe functionality in U-Boot on SerDes mode5 for EP devices with Gen3 speeds (e.g. SSDs) by limiting max speed to Gen2.
  - Switched to generic pinmux/pinconf interface for specifying pinctrls in device tree sources.
  - Unified SIUL2 pinctrl/gpio nodes into a single one.
  - Added MTD QSPI partition support.
  - Updated SerDes driver bindings to align with the Linux kernel format.
  - Encapsulated SerDes functionality into a PHY driver.
- ARM Trusted Firmware
  - Moved all S32 Common Chassis device trees from U-Boot into Arm Trusted Firmware repository.
- Linux Kernel
  - PFE Linux driver updated to version BETA 1.0.0. See PFE_S32G_A53_LNX_RTM_1.0.0_ReleaseNotes.txt for the PFE Linux driver release notes.
  - Upgraded the LLCE drivers to firmware S32G_LLCE_GATEWAY_1.0.4_D2204.
  - Enabled MSI-X support in S32 Common Chassis PCIe driver for use with EPF and pcitest application.
  - Linux Kernel support was refactored in order to support distinct G2/G3 SoCs with EVB2/EVB3 combinations.
  - Enabled AES-OFB block mode for HSE crypto driver.

  - PCIe device ID for S32G3 platforms was updated in both U-Boot and Linux based on derivatives.
  - PFE routing table and system buffers were moved from DDR to S32G Internal SRAM, for improved fast-path performance. The memory placement of these is configurable via PFE's 'reserved-memory' device tree nodes.
  - Entropy cache maximum size made configurable for HSE crypto driver.
  - Used generic PINCONF interface for pin configuration.
  - Unified the two SIUL2 instances into a single dts node. There gpio1 and pinctrl1 nodes are no longer valid.
  - Assigned names for GPIOs. These names are used/displayed by libgpiod and the sysfs interface.
- Yocto
  - meta-alb was refactored in order to support distinct G2/G3 SoCs with EVB2/EVB3 combinations.
  - Linux Kernel version was updated to 'v5.10.90-rt'.
  - ATF boot flow support enabled by default.
  - PFE passthrough example was added. The example allows running of two PFE driver instances in XEN environment.
  - Updated libgpiod to version 1.6.3.
  - PFE Linux driver updated to version BETA 0.9.7
  - Added gpio_libgpiod demo application, which uses the libgpiod library for interacting with GPIOs.
  - Remove ICC from yocto and documentation. It has been obsolete since the introduction of IPCF.
  - Update LLCE Drivers for 1.0.3 CD firmware.
  - Removed support for S32-GEN1 Revision 1.
  - Enable blind support for S32G3 derivatives.
  - Add support for S32G3EVB.
  - Support for an optional boot flow with M7 as boot target enabling A53 lockstep operation.
- ARM Trusted Firmware
  - Added secure boot and keystore format support to userspace through UIO.
  - DDR: Integrated latest firmware generated with DDR Tool 1.6 Update 3.
  - Extended CLOCK_DESCRIBE_RATES SCMI command to return multiple available rates for several clocks.
  - Added support for S32G3 RDB3 revision F.
- Linux Kernel
  - PFE Linux driver updated to version RTM 1.2.0. See PFE_S32G_A53_LNX_1.2.0_ReleaseNotes.pdf for the PFE Linux driver release notes.
  - Removed secondary Linux kernel, version 5.4.
  - Added secondary Linux kernel, version 5.15.
  - Added secure boot and keystore format support to userspace through UIO.
  - Added support for Dynamic Frequency Scaling for A53 cores (experimental).
  - Corrected revision reporting on S32G2 2.1 from Linux using the NVMEM driver.
  - Added support for PHY AQR113, found on S32GRV-PLATEVB board rev. F.
- Yocto meta-alb
  - Linux kernel version 5.4 support has been removed.
  - Added secondary Linux kernel, version 'v5.15.73-rt52'.
  - Migrated Yocto repositories to GitHub.
- OP-TEE
  - Updated OP-TEE to version 3.18.
  - The HSE RNG Driver is signaled of RNG service completions through secure interrupts.

  - HSE Driver uses the hse_interface.h as provided in the HSE Firmware Package.
- PKCS11-HSE
  - Added support for digest operations in HSE PKCS, currently supporting SHA1.
  - Added secure boot and keystore format support to userspace through UIO.
- U-Boot
  - Updated hwconfig format to support all SerDes modes for S32G3.
- ALB demos
  - The demo showcasing the GPIO sysfs interface was removed.
- ARM Trusted Firmware
  - Updated DDR driver to RTD 4.4 Version 3.0.4 Firmware, including an ERRATUM fix regarding the DDR PHY impedance calibration sequence.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added support for integration of external DDR Firmware in ATF.
- Linux Kernel
  - PFE Linux driver updated to version RTM 1.1.0. See PFE_S32G_A53_LNX_RTM_1.1.0_ReleaseNotes.txt for the PFE Linux driver release notes.
  - Updated the key groups for the HSE driver to correspond to the new format of the HSE RAM Key Catalog.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Added 'gpio-reserved-ranges' in the device tree sources for GPIOs that are not accessible.
  - Renamed the 'pins' property to 'nxp,pins' inside the 'siul2-pinctrl' node in the device tree sources.
  - Added QSPI MTD partitions support.
- Yocto meta-alb
  - Linux Kernel subminor version was updated from 'v5.10.109-rt65' to 'v5.10.120-rt70'.
  - The demo showcasing the GPIO sysfs interface was removed.
  - Added MTD QSPI partitions support for the userspace Flash script.
  - PFE driver updated to RTM 1.1.0.
  - Enabled 'SystemD' as default init manager.
- OP-TEE
  - Added dedicated key groups for the HSE driver in the HSE RAM Key Catalog.
  - Derived OP-TEE Hardware Unique Key (HUK) from an HSE Shared Secret Key.
  - Implemented HSE Random Number Generator (RNG).
  - Added cryptographic offloading for AES-CBC & AES-ECB algorithms in the HSE Driver through OP-TEE's Cipher API.
- PKCS11-HSE
  - Added support for PKCS11 spec v3.0.
  - Added support for persistence over reset for both libhse and libpkcs-hse.
  - Added support for saving hse-stored key info to file from libpkcs-hse.
  - Added support for updating SYS_IMG through libhse.

- U-Boot
  - HSE RAM Key Catalog has been divided into separate key groups for OP-TEE/Linux.
  - Enabled live device tree support for all S32CC platforms.
  - Set J102/PROC,J108/PROC, J102/PLAT, J108/PLAT, J109/PLAT, J111/PLAT, J112/PLAT Ethernet ports active on EVB board.
  - Updated SMPR[DLLFSMPF] QSPI setting for DTR-OPI mode.
  - Fixed PCIe functionality in U-Boot on SerDes mode5 for EP devices with Gen3 speeds (e.g. SSDs) by limiting max speed to Gen2.
  - Switched to generic pinmux/pinconf interface for specifying pinctrls in device tree sources.
  - Unified SIUL2 pinctrl/gpio nodes into a single one.
  - Added MTD QSPI partition support.
  - Updated SerDes driver bindings to align with the Linux kernel format.
  - Encapsulated SerDes functionality into a PHY driver.

- ARM Trusted Firmware
  - Moved all S32 Common Chassis device trees from U-Boot into Arm Trusted Firmware repository.
  - Added S32_SET_NEAREST_FREQ mechanism to ATF
  - Added support for secure boot with ATF enabled
  - DDR: Fixed missing ANIB4-9 registers for IO Retention mode
  - Moved DDR ECC exclusion mechanism in ATF
  - Enabled clocks over SCMI by default
  - Changed 'PLAT' build parameter to match the board name instead of the SoC.
  - Enabled Open Page Policy, disabled Read/Write Idle Gap in DDR Controller configuration, increasing DDR memory writing speed by 30%.
  - Update to version 2.5.
  - Support for an optional boot flow with M7 as boot target enabling A53 lockstep operation.
  - Move PMIC watchdog disabling in BL2 stage.
  - Removed support for S32-GEN1 Revision 1.
  - Initial support for S32G399.
  - Corrected suspend and resume operations when booting in lockstep mode.
  - Provide build time parameters to allow TF-A to read FIP image from configurable offsets from QSPI, MMC or memory.
  - Set A53 maximum frequency based on the SIUL2_MIDR2 register.
  - Enable DDR Driver for S32G3XXEVB.

Defects

The following defects were fixed in previous releases of the Linux BSP:

ID	Summary	Component/s
ALB-9442	In the Linux QSPI driver, the AHB buffer size is now allocated with the size information parsed from the qspi node as part of the Linux Kernel DTB.	Linux
ALB-9444	Serial flash memory address mapping was set to maximum size available (512 MB) for all operating modes (SDR and DTR-OPI).	Linux
ALB-8137	GMAC fails to resume from suspend on error path on S32G.	Linux
ALB-9306	Fixed suspend and resume feature when OP_TEE is enabled.	OP-TEE
ALB-8762	Added check to change reset entry target core depending on FW platform.	PKCS#11
ALB-9211	Fixed 'Synchronous Abort' if probing only 'pcie1' by fixing PCIe uclass sequence generation and the reading of the config space during enumeration.	U-Boot
ALB-9566	MAC address specified by ethaddr is not passed to Linux Kernel if GMAC U-Boot driver is not activated.	U-Boot

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ALB-9030	Defined S32CC platforms 'cpus' as part of their associated clusters, at ATF and Linux DTS (device-tree) level.	ATF Linux
ALB-8981	Changed the clock-name from ts to ptp_ref for GMAC.	ATF
ALB-9034	Updated the clock divider values for the i2c driver according to the S32G3 Reference Manual.	Linux U-Boot
ALB-8914	Fixed setting correct Vendor and Device ID for both PCIe controllers.	Linux
ALB-8925	HSE: crypto: Fixed wrong hash result after import/export.	Linux
ALB-8925	HSE: crypto: Fixed allocation of hash state context in non-DMA-able memory.	Linux
ALB-9145	Updated the Linux dts compatible for fsl-s32-gen1.dts for gmac0 node.	Linux5.4
ALB-9091	Fixed the PFE driver load issue on Kernel 5.4 by updating the PFE device tree nodes to keep them in sync with the latest PFE Linux driver.	Linux5.4
ALB-8943	Fixed NVMe SSD not probing correctly on S32G3.	Linux

ALB-9199	Installed by default the SJA1110 fw loader driver in fsl-image-ubuntu* images.	Yocto
ALB-9232	Fixed PCIe controllers configured as RC in U-Boot when defined as EP in hwconfig.	U-Boot
ALB-7446	U-Boot ethernet fixup on RDB2 restricts PFE_EMAC_1 port speed only for SGMII mode.	U-Boot
ALB-8981	Remove initialization of unused ts clock in GMAC.	U-Boot
ALB-9006	Fixed Xen booting with Linux 5.4.	Xen
ALB-9073	Fixed services booting with SystemD.	Xen

ID	Summary	Component/s
ALB-8449	The Ethernet header was not correctly parsed by the hardware because of integration issues on our SoC. Deactivated split header expectations from software.	Linux
ALB-8894	Fixed FlexCAN bittiming const parameters with respect to 'tseg1_min' and 'tseg2_min'.	Linux
ALB-8859	DDR PMU: Added handling of CP parameter for perf events	Linux
ALB-8773	HSE: Fixed race condition on synchronous request interrupt	Linux
ALB-8939	Disabled llcecan14 and llcecan15 on S32G EVB. The transceivers are connected by default to flexcan2 and flexcan3 via J166 and J167.	Linux
ALB-8758	Fixed GPIO and pinctrl drivers to support configuring the GPIO bias at runtime.	Linux
ALB-8860	Removed from DDR PMU driver the events that do not exist in hardware.	Linux
ALB-6765	Fixed PFE Linux pinmuxing. Moved the pinctrl properties from subnodes to the root node.	Linux
ALB-8259	Enabled ethtool statistics for LLCE CAN interfaces. The statistics covers a CAN specific subset of the errors returned by the LLCE FW.	Linux
ALB-8258	Fixed the way probe deferral is handled in the PCIe driver.	Linux
ALB-8492	DDR PMU: Fixed support for handling counter overflows, enabling measurements of any duration	Linux
ALB-7437	Fixed incoming MSI delivery route.	Linux
ALB-8438	Handled underflow conditions for both descriptors of GMAC.	Linux

ALB-8638	Fixed CVE-2022-0847: A new high severity vulnerability in the Linux kernel which allows overwriting data in arbitrary read-only files.	Linux
ALB-8459	Fixed a bug related to 2's complement, which reported inaccurate temperature values for extremely cold environments.	Linux
ALB-8455	Missing PFE registers were added for correct passthrough functionality.	Linux
ALB-7726	Set clock frequency correctly based on S32 platform flavors.This issue was not reproduced on Linux environment because 40 MHz Ad_clk frequency is used.	Linux
ALB-7959	Fix panic caused by incorrect address access in LLCE driver.	Linux
ALB-7910	For S32-GEN1 platform with ATF support, 'suspend/resume' callbacks from PCIe Linux driver are now handling PCIe Endpoint scenario.	Linux
ALB-4038	HSE: Fix hwrng to handle non-blocking read.	Linux
ALB-7960	Fix message to userspace when deinitialising LLCE CAN channels.	Linux
ALB-6756	SPI IOCTL calls work as expected.	Linux
ALB-9211	Fixed 'Synchronous Abort' if probing only 'pcie1' by fixing PCIe uclass sequence generation and the reading of the config space during enumeration.	U-Boot
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ALB-8888	Fixed python3 dependencies when building U-Boot	Yocto

ALB-8753	Fixed U-Boot dependency on python3-dev	Yocto
ALB-8968	Fixed U-Boot CVE-2022-30790 and CVE-2022-30552	U-Boot
ALB-8867	Fixed NULL pointer reads during PFE probing (pfeng_probe()) while initializing the firmware.	U-Boot
ALB-8636	Fixed the clk dump command.	U-Boot
ALB-8743	Added support for SGMII connection of PFE_EMAC_1 on EVB and EVB3 boards.	U-Boot
ALB-7437	Fixed incoming MSI delivery route.	U-Boot
ALB-7415	Add a new option, skip, to hwconfig variable in U-Boot (supported values: 1 or true), so that the corresponding SerDes/PCIe controller is not configured in U-Boot, but the proper mode (RC or EP) is set for the Linux device tree so that Linux could configure it completely.	U-Boot
ALB-7973	Use the correct compatible string for S32-GEN1 platforms in QSPI driver from U-Boot.	U-Boot
ALB-7902	Fix log errors when loading files with OP-TEE enabled and drop CONFIG_PRAM.	U-Boot
ALB-9306	Fixed suspend and resume feature when OP_TEE is enabled.	OP-TEE
ALB-8762	Added check to change reset entry target core depending on FW platform.	PKCS#11
ALB-9211	Fixed 'Synchronous Abort' if probing only 'pcie1' by fixing PCIe uclass sequence generation and the reading of the config space during enumeration.	U-Boot
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ALB-8753	Fixed U-Boot dependency on python3-dev	Yocto
ALB-8233	Added rng-tools to fsl-image-base to speed-up the entropy	Yocto
ALB-7969	Fixed fsl-image-base/auto rebuilding due to an old timestamp in the root file system file name.	Yocto
ALB-8287	Fixed building fsl-image-ubuntu-ros.	Yocto
ALB-7599	Instruct 'dhcpcd' to not set any default routes on the available network interfaces.	Yocto
ALB-7752	xen: Fix manual compilation with GCC 10+	Yocto
ALB-7755	Split PFE Master/Slave recipes.	Yocto
ALB-4601	Enabled SJA1105 upstream driver for S32G274A EVB board.	Yocto
ALB-9442	In the Linux QSPI driver, the AHB buffer size is now allocated with the size information parsed from the qspi node as part of the Linux Kernel DTB.	Linux
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ALB-7892	Do not copy the entire image in SRAM, improving TF-A booting time and SRAM memory usage in BL2.	TF-A
ALB-7902	Disable relying on CONFIG_PRAM mechanism and inject reserved-memory TF-A node in Device Tree.	TF-A

5 Errata