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# **MCUXpresso SDK Release Notes Supporting evkmimxrt685**

**Change Logs**

**NXP Semiconductors**



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# 1 Driver Change Log

## CLOCK

The current CLOCK driver version is 2.7.1.

- 2.7.1
  - Improvements
    - \* Added lost comments for some enumerations.
- 2.7.0
  - Bug Fixes
    - \* Updated enum sys\_pll\_mult\_t and audio\_pll\_mult\_t to fix the supported MULT values for PLLs.
    - \* Supported more APIs for DSP core.
- 2.6.1
  - New feature
    - \* Added CLOCK\_SetClkinFreq API.
  - Other Changes
    - \* Remove main\_clk from UTICK, WWDT0/1 clock attach define.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rules.
- 2.6.0
  - API change
    - \* Added enableLowPower parameter in CLOCK\_EnableSysOscClk().
    - \* Added id parameter in CLOCK\_GetSdioClkFreq().
  - Other Changes
    - \* Fixed C++ build errors.
    - \* Added sdio1 and flexcomm6,7 clock support.
    - \* Added syspll pfd clock dividers define.
    - \* Updated register access per the B0 header file's change.
    - \* Added assert in CLOCK\_SetFRGClock(), the FRG DIV should be always set to 0xFF according to User Manual.
- 2.5.0
  - New feature
    - \* Moved SDK\_DelayAtLeastUs function from clock driver to common driver.
- 2.4.1
  - Bug Fixes
    - \* Avoided waiting REQFLAG when divider configured to HALT in CLOCK\_SetClkDiv().
- 2.4.0
  - Modify Audio PLL mult parameter range.
  - Update get mclk\_in api.
- 2.3.0
  - New feature
    - \* Adding Deinit PLL&PFD API.

- API change
    - \* Add delay\_us parameter in CLOCK\_EnableSysOscClk()
- 2.2.0
  - Update I3C and SDIO clock get API.
  - Modify wwdt clock API name.
- 2.1.1
  - Update PLL initialization function.
- 2.1.0
  - New feature
    - \* Adding new API CLOCK\_DelayAtLeastUs() implemented by DWT to allow users set delay in unit of microsecond.
- 2.0.5
  - Clean up 3 USB clock enable APIs;
- 2.0.4
  - New feature
    - \* add get mclk\_in api.
  - Bug Fixes
    - \* The SysTick clock value should not be divided except choose main clock.
- 2.0.3
  - Update according to UM 0.7.
- 2.0.2
  - some minor fixes.
- 2.0.0
  - initial version.

## POWER

The current POWER driver version is 2.3.2.

- 2.3.2
  - Bug Fixes
    - \* Fixed MISRA issue in function POWER\_GetLibVersion.
- 2.3.1
  - Bug Fixes
    - \* Fixed the return value of function countPartitionSwitches.
- 2.3.0
  - API change: POWER\_SetLdoVoltageForFreq()
    - \* Changed power\_part\_temp\_range\_t. 70C->85C.
    - \* Added parameter power\_volt\_op\_range\_t.
    - \* Changed main clock freq parameter to cpu clock freq.
    - \* Added return value to indicate success or failure.
  - Optimization
    - \* Turn on all memory partitions simultaneously on deep sleep wakeup to save time.
  - Release in source code instead of in library.

- 2.2.1
  - Exposed POWER\_DisableLVD() and POWER\_RestoreLVD() APIs in header.
  - Added PMIC\_VDDCORE\_RECOVERY\_TIME\_IGNORE macro for POWER\_UpdatePmic-RecoveryTime() API.
  - Adjusted main frequency table for SetXXXVoltageForFreq() API to match latest B0 data.
- 2.2.0
  - Added parameter to POWER\_SetLdoVoltageForFreq to specify part temperature range.
- 2.1.0
  - Updated power library implementation for B0.
  - Added POWER\_SetLvdFallingTripVoltage() API.
  - Added POWER\_GetLvdFallingTripVoltage() API.
  - Added POWER\_UpdatePmicRecoveryTime() API.
- 2.0.3
  - Updated PD\_bits per the B0 header file's change.
- 2.0.2
  - Added POWER\_SetPadVolRange() API
- 2.0.1
  - Add POWER\_UpdateOscSettlingTime() API to set on-board system osc settling time.
- 2.0.0
  - initial version.

## RESET

The current RESET driver version is 2.1.2.

- 2.1.2
  - Bug Fixes
    - \* Fixed typo in \_RSTCTL\_RSTn enumeration's comment.
- 2.1.1
  - Bug Fixes
    - \* Fixed MISRA C-2012 rule 10.6 and rule 16.4.
- 2.1.0
  - Updated register access per the B0 header file's change.
- 2.0.4
  - Add SDIO1 and Flexcomm6,7 support.
- 2.0.3
  - Rename RSTCTRL to RSTCTL.
- 2.0.2
  - Update according to UM 0.7.
- 2.0.1
  - Update component full\_name to "Reset Driver".
- 2.0.0
  - initial version.

## DSP

The current DSP driver version is 2.1.1.

- 2.1.1
  - Fixed Misra issue.
- 2.1.0
  - Allowed multiple calls to DSP\_Init.
  - Removed DSP clock gate operation.
- 2.0.1
  - Update DSP Init&Deinit function.
- 2.0.0
  - initial version.

## ACMP

The current ACMP driver version is 2.0.6.

- 2.0.6
  - Bug Fixes
    - \* Fixed the wrong comments, the DAC value should range from 0 to 255.
- 2.0.5
  - Bug Fixes
    - \* Fixed the out-of-bounds error of Coverity caused by missing an assert sentence to avoid the return value of ACMP\_GetInstance() exceeding the array bounds.
    - \* Fixed the violations of MISRA C-2012 rules:
      - Rule 10.1, 14.4, 16.4, 17.7.
- 2.0.4
  - Bug Fixes
    - \* Avoided changing wlc bit in ACMP\_SetRoundRobinPreState().
- 2.0.3
  - New Features
    - \* Added feature functions for usage of different power domains(1.8 V and 3 V). These functions are first enabled in ULP1. They are about:
      - ACMP\_EnableLinkToDAC()
      - ACMP\_SetDiscreteModeConfig()
      - ACMP\_GetDefaultDiscreteModeConfig()
- 2.0.2
  - Other Changes
    - \* Changed coding style of peripheral base address from "s\_acmpBases" to "s\_acmpBase".
- 2.0.1
  - Bug Fixes
    - \* Fixed bug regarding the function "ACMP\_SetRoundRobinConfig". It will not continue execution but returns directly after disabling round robin mode.

## CACHE

The current CACHE driver version is 2.0.4.

- 2.0.4
  - Improvement
    - \* Disable cache policy feature on SoC without CACHE64\_POLSEL IP.
  - Bug Fixes
    - \* Fixed doxygen issue.
- 2.0.3
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.3.
- 2.0.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.1, 10.3, 10.4 and 14.4.
    - \* Fixed doxygen issue.
- 2.0.1
  - Improvements
    - \* Moved CLCR register configuration out of the while loop, it's unnecessary to repeat this operation.
- 2.0.0
  - Initial version.

## COMMON

The current COMMON driver version is 2.3.1.

- 2.3.1
  - Bug Fixes
    - \* Fixed MAKE\_VERSION overflow on 16-bit platforms.
- 2.3.0
  - Improvements
    - \* Split the driver to common part and CPU architecture related part.
- 2.2.10
  - Bug Fixes
    - \* Fixed the ATOMIC macros build error in cpp files.
- 2.2.9
  - Bug Fixes
    - \* Fixed MISRA C-2012 issue, 5.6, 5.8, 8.4, 8.5, 8.6, 10.1, 10.4, 17.7, 21.3.
    - \* Fixed SDK\_Malloc issue that not allocate memory with required size.
- 2.2.8
  - Improvements
    - \* Included stddef.h header file for MDK tool chain.
  - New Features:
    - \* Added atomic modification macros.



- 2.2.7
  - Other Change
    - \* Added MECC status group definition.
- 2.2.6
  - Other Change
    - \* Added more status group definition.
  - Bug Fixes
    - \* Undef \_\_VECTOR\_TABLE to avoid duplicate definition in cmsis\_clang.h
- 2.2.5
  - Bug Fixes
    - \* Fixed MISRA C-2012 rule-15.5.
- 2.2.4
  - Bug Fixes
    - \* Fixed MISRA C-2012 rule-10.4.
- 2.2.3
  - New Features
    - \* Provided better accuracy of SDK\_DelayAtLeastUs with DWT, use macro SDK\_DELAY\_USE\_DWT to enable this feature.
    - \* Modified the Cortex-M7 delay count divisor based on latest tests on RT series boards, this setting lets result be closer to actual delay time.
- 2.2.2
  - New Features
    - \* Added include RTE\_Components.h for CMSIS pack RTE.
- 2.2.1
  - Bug Fixes
    - \* Fixed violation of MISRA C-2012 Rule 3.1, 10.1, 10.3, 10.4, 11.6, 11.9.
- 2.2.0
  - New Features
    - \* Moved SDK\_DelayAtLeastUs function from clock driver to common driver.
- 2.1.4
  - New Features
    - \* Added OTFAD into status group.
- 2.1.3
  - Bug Fixes
    - \* MISRA C-2012 issue fixed.
      - Fixed the rule: rule-10.3.
- 2.1.2
  - Improvements
    - \* Add SUPPRESS\_FALL\_THROUGH\_WARNING() macro for the usage of suppressing fallthrough warning.
- 2.1.1
  - Bug Fixes
    - \* Deleted and optimized repeated macro.
- 2.1.0
  - New Features

- \* Added IRQ operation for XCC toolchain.
- \* Added group IDs for newly supported drivers.
- 2.0.2
  - Bug Fixes
    - \* MISRA C-2012 issue fixed.
      - Fixed the rule: rule-10.4.
- 2.0.1
  - Improvements
    - \* Removed the implementation of LPC8XX Enable/DisableDeepSleepIRQ() function.
    - \* Added new feature macro switch "FSL\_FEATURE\_HAS\_NO\_NONCACHEABLE\_SECTION" for specific SoCs which have no noncacheable sections, that helps avoid an unnecessary complex in link file and the startup file.
    - \* Updated the align(x) to **attribute**(aligned(x)) to support MDK v6 armclang compiler.
- 2.0.0
  - Initial version.

## FLEXSPI

The current FLEXSPI driver version is 2.3.5.

- 2.3.5
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 14.2.
- 2.3.4
  - Bug Fixes
    - \* Updated flexspi\_config\_t structure and FlexSPI\_Init to support new feature FSL\_FEATURE\_FLEXSPI\_HAS\_NO\_MCR0\_CONBINATION.
- 2.3.3
  - Bug Fixes
    - \* Removed feature FSL\_FEATURE\_FLEXSPI\_DQS\_DELAY\_PS for DLL delay setting. Changed to use feature FSL\_FEATURE\_FLEXSPI\_DQS\_DELAY\_MIN to set slave delay target as 0 for DLL enable and clock frequency higher than 100MHz.
- 2.3.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 8.4, 8.5, 10.1, 10.3, 10.4, 11.6 and 14.4.
- 2.3.1
  - Bug Fixes
    - \* Wait for bus to be idle before using it as access to external flash with new setting in FLEXSPI\_SetFlashConfig() API.
    - \* Fixed the potential buffer overread and Tx FIFO overwrite issue in FLEXSPI\_WriteBlocking.
- 2.3.0
  - New Features
    - \* Added new API FLEXSPI\_UpdateDllValue for users to update DLL value after updating

- flexspi root clock.
- \* Corrected grammatical issues for comments.
- \* Added support for new feature FSL\_FEATURE\_FLEXSPI\_DQS\_DELAY\_PS in DLL configuration.
- 2.2.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.1, 10.3 and 10.4.
    - \* Updated \_flexspi\_command from named enumerator into anonymous enumerator.
- 2.2.1
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.1, 10.3, 10.4, 10.8, 11.9, 14.4, 15.7, 16.4, 17.7, 7.3.
    - \* Fixed IAR build warning Pe167.
    - \* Fixed the potential buffer overwrite and Rx FIFO overread issue in FLEXSPI\_Read-Blocking.
- 2.2.0
  - Bug Fixes
    - \* Fixed flag name typos: kFLEXSPI\_IpTxFifoWatermarkEmptyFlag to kFLEXSPI\_IpTxFifoWatermarkEmptyFlag; kFLEXSPI\_IpCommandExcutionDoneFlag to kFLEXSPI\_IpCommandExecutionDoneFlag.
    - \* Fixed comments typos such as sequencen->sequence, levle->level.
    - \* Fixed FLSHCR2[ARDSEQID] field clean issue.
    - \* Updated flexspi\_config\_t structure and FlexSPI\_Init to support new feature FSL\_FEATURE\_FLEXSPI\_HAS\_NO\_MCR0\_ATDFEN and FSL\_FEATURE\_FLEXSPI\_HAS\_NO\_MCR0\_ARDFEN.
    - \* Updated flexspi\_flags\_t structure to support new feature FSL\_FEATURE\_FLEXSPI\_HAS\_INTEN\_AHBBUSERROREN.
- 2.1.1
  - Improvements
    - \* Defaulted enable prefetch for AHB RX buffer configuration in FLEXSPI\_GetDefault-Config, which is align with the reset value in AHB RX BUFxCR0.
    - \* Added software workaround for ERR011377 in FLEXSPI\_SetFlashConfig; added some delay after DLL lock status set to ensure correct data read/write.
- 2.1.0
  - New Features
    - \* Added new API FLEXSPI\_UpdateRxSampleClock for users to update read sample clock source after initialization.
    - \* Added reset peripheral operation in FLEXSPI\_Init if required.
- 2.0.5
  - Bug Fixes
    - \* Fixed FLEXSPI\_UpdateLUT cannot do partial update issue.
- 2.0.4
  - Bug Fixes
    - \* Reset flash size to zero for all ports in FLEXSPI\_Init; fixed the possible out-of-range flash access with no error reported.

- 2.0.3
  - Bug Fixes
    - \* Fixed AHB receive buffer size configuration issue. The FLEXSPI\_AHBRXBUFCR0\_BUFSZ field should configure 64 bits size, and currently the AHB receive buffer size is in bytes which means 8-bit, so the correct configuration should be `config->ahbConfig->buffer[i].bufferSize / 8`.
- 2.0.2
  - New Features
    - \* Supported DQS write mask enable/disable feature during set FLEXSPI configuration.
    - \* Provided new API FLEXSPI\_TransferUpdateSizeEDMA for users to update eDMA transfer size(SSIZE/DSIZE) per DMA transfer.
  - Bug Fixes
    - \* Fixed invalid operation of FLEXSPI\_Init to enable AHB bus Read Access to IP RX FIFO.
    - \* Fixed incorrect operation of FLEXSPI\_Init to configure IP TX FIFO watermark.
- 2.0.1
  - Bug Fixes
    - \* Fixed the flag clear issue and AHB read Command index configuration issue in FLEXSPI\_SetFlashConfig.
    - \* Updated FLEXSPI\_UpdateLUT function to update LUT table from any index instead of previous command index.
    - \* Added bus idle wait in FLEXSPI\_SetFlashConfig and FLEXSPI\_UpdateLUT to ensure bus is idle before any change to FlexSPI controller.
    - \* Updated interrupt API FLEXSPI\_TransferNonBlocking and interrupt handle flow FLEXSPI\_TransferHandleIRQ.
    - \* Updated eDMA API FLEXSPI\_TransferEDMA.
- 2.0.0
  - Initial version.

## FLEXSPI DMA Driver

- 2.2.1
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.1, 10.3, 10.4, 10.8.
- 2.2.0
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 Rule 10.1, 10.3.
  - New Features
    - \* Updated name of FLEXSPI\_TransferGetTransferCountDMA API.
- 2.1.1
  - New Features
    - \* Updated driver to support feature FSL\_FEATURE\_FLEXSPI\_DMA\_MULTIPLE\_DES.
- 2.1.0
  - Bug Fixes
    - \* Updated enumeration flexspi\_dma\_transfer\_nsize\_t and remove the unsupported items.

- New Features
  - \* Updated driver for deprecating the multiple linked descriptors inside FLEXSPI\_Transfer-DMA, only up to one linked descriptor is needed according to hardware update.
- 2.0.0
  - Initial version.

## LPADC

The current LPADC driver version is 2.5.1.

- 2.5.1
  - Bug Fixes
    - \* Fixed some typos in Lpadc driver comments.
- 2.5.0
  - Improvements
    - \* Added missing items to enable trigger interrupts.
- 2.4.0
  - New features
    - \* Added APIs to get/clear trigger status flags.
- 2.3.0
  - Improvements
    - \* Removed LPADC\_MeasureTemperature() function for the LPADC supports different temperature sensor calculation equations.
- 2.2.1
  - Improvements
    - \* Optimized LPADC\_MeasureTemperature() function to support the specific series with flash solidified calibration value.
    - \* Clean doxygen warnings.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 10.3, rule 10.8 and rule 17.7.
- 2.2.0
  - New Feature
    - \* Added API LPADC\_MeasureTemperature() to get correct temperature from the internal sensor.
  - Improvements
    - \* Separated lpadc\_conversion\_resolution\_mode\_t with related feature macro.
  - Bug Fixes
    - \* Fixed the violations of MISRA C-2012 rules:
      - Rule 10.3, 10.4, 10.6, 10.7 and 17.7.
- 2.1.1
  - Improvements
    - \* Updated the gain calibration formula.
    - \* Used feature to segregate the new item kLPADC\_TriggerPriorityPreemptSubsequently.
- 2.1.0

- New Features
  - \* Added the API LPADC\_SetOffsetValue() to support configure offset trim value manually.
  - \* Added the API LPADC\_DoOffsetCalibration() to do offset calibration independently.
- Improvements
  - \* Improved the usage of macros and removed invalid macros.
- 2.0.2
  - Improvements
    - \* Added support for platforms with 2 FIFOs and different calibration measures.
- 2.0.1
  - Bug Fixes
    - \* Ensured the API LPADC\_SetConvCommandConfig configure related registers correctly.
- 2.0.0
  - Initial version.

## MU

The Current MU driver version is 2.1.0.

- 2.1.0
  - Improvements
    - \* Added new enum mu\_msg\_reg\_index\_t.
- 2.0.7
  - Bug Fixes
    - \* Fixed MU\_GetInterruptsPending bug that can not get general interrupt status.
- 2.0.6
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 17.7.
- 2.0.5
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 14.4, 15.5.
- 2.0.4
  - Improvements
    - \* Improved for the platforms which don't support reset assert interrupt and get the other core power mode.
- 2.0.3
  - Bug fixes
    - \* MISRA C-2012 issue fixed.
      - Fixed rules, containing: rule-10.3, rule-14.4, rule-15.5.
- 2.0.2
  - Improvements
    - \* Added support for MIMX8MQx.
- 2.0.1
  - Improvements
    - \* Added support for MCIMX7Ux\_M4.

- 2.0.0
  - Initial version.

## SEMA42

The current SEMA42 driver version is 2.0.2.

- 2.0.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 17.7.
- 2.0.1
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 10.3, 10.4, 14.4, 18.1.
- 2.0.0
  - Initial version.

## USDHC

The current USDHC driver version is 2.8.1.

- 2.8.01
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9.
- 2.8.0
  - Improvements
    - \* Fixed the mmc boot transfer failed issue which is caused by the Dma complete interrupt not enabled.
    - \* Marked api USDHC\_AdjustDelayForManualTuning as deprecated and added new api USDHC\_SetTuningDelay/USDHC\_GetTuningDelayStatus.
    - \* Improved the manual tuning flow according to specification.
    - \* Added memory address conversion to support buffers which could only be accessed using alias address by non-core masters.
    - \* Fixed violations of MISRA C-2012 rule 10.4.
- 2.7.0
  - Improvements
    - \* Added api USDHC\_TransferScatterGatherADMANonBlocking to support scatter gather transfer.
    - \* Added feature FSL\_FEATURE\_USDHC\_REGISTER\_HOST\_CTRL\_CAP\_HAS\_NO\_RETUNING\_TIME\_COUNTER for re-tuning time counter field in HOST\_CTRL\_CAP register.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 10.1, 10.3, 10.4, 8.4.
- 2.6.0
  - Improvements

- \* Added api USDHC\_SetStandardTuningCounter to support adjust tuning counter of Standard tuning.
- 2.5.1
  - Improvements
    - \* Used different status code for command and data interrupt callback.
    - \* Added cache line invalidate for receive buffer in driver IRQ handler to fix CM7 speculative access issue.
- 2.5.0
  - Improvements
    - \* Added new api USDHC\_SetStrobeDllOverride for HS400 strobe dll override mode delay taps configurations.
    - \* Corrected the STROBE DLL configurations sequence.
- 2.4.0
  - Improvements
    - \* Added feature macro for read/write burst length.
      - Disabled redundant interrupt per different transfer request.
      - Disabled interrupt and reset command/data pointer in handle when transfer completes.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 15.7, 4.7, 16.4, 10.1, 10.3, 10.4, 11.3, 14.4, 10.6, 17.7, 16.1, 16.3.
    - \* Fixed PA082 build warning.
    - \* Fixed logically dead code Coverity issue.
- 2.3.0
  - Improvements
    - \* Added USDHC\_SetDataConfig API to support manual tuning.
    - \* Removed the limitaion that source clock must be bigger than the target in function USDHC\_SetSdClock by using source clock frequency as target directly.
    - \* Added peripheral reset in USDHC\_Init function.
    - \* Added tuning reset support in function USDHC\_Reset function.
- 2.2.8
  - Bug Fixes
    - \* Fixed out-of bounds write in function USDHC\_ReceiveCommandResponse.
- 2.2.7
  - Improvements
    - \* Added API USDHC\_GetEnabledInterruptStatusFlags and used in USDHC\_TransferHandleIRQ.
    - \* Removed useless member interruptFlags in usdhc\_handle\_t.
- 2.2.6
  - Improvements
    - \* Added address align check for ADMA descriptor table address.
    - \* Changed USDHC\_ADMA1\_DESCRIPTOR\_MAX\_LENGTH\_PER\_ENTRY to (65536-4096) to make sure the data address is 4KB align for a transfer which need more than one ADMA1 descriptor.
- 2.2.5
  - Bug Fixes



- \* Fixed MDK 66-D warning.
- 2.2.4
  - Bug Fixes
    - \* Fixed issue that real clock frequency was mismatched with target clock frequency, which was caused by an incorrect prescaler calculation.
  - New Features
    - \* Added control macro to enable/disable the CLOCK code in current driver.
- 2.2.3
  - Bug Fixes
    - \* Fixed issue where AMDA did not disable with DMAEN clear.
  - Improvements
    - \* Improved set clock function to check the output frequency range.
    - \* Dynamic set SDCLKFS during DDR enable or disable.
- 2.2.2
  - Improvements
    - \* Improved read transfer cache maintain operation, combined clean, and invalidated them into one function.
- 2.2.1
  - Bug Fixes
    - \* Disabled the invalidate cache operation for tuning.
- 2.2.0
  - Improvements
    - \* Improved USDHC to support MMC boot feature.
- 2.1.3
  - Bug Fixes
    - \* Fixed MISRA issue.
- 2.1.2
  - Bug Fixes
    - \* Fixed Coverity issue.
    - \* Added base address and userData parameter for all callback functions.
- 2.1.1
  - Improvements
    - \* Added cache maintain operation.
    - \* Added timeout status check for the DATA transfer which ignore error.
    - \* Added feature macro for SDR50/SDR104 mode.
    - \* Removed useless IRQ handler from different platforms.
- 2.1.0
  - Improvements
    - \* Integrated tuning into transfer function.
    - \* Added strobe DLL feature.
    - \* Added enableAutoCommand23 in data structure.
    - \* Removed enable card clock function because the controller would handle the clock on/off.
- 2.0.0
  - Initial version.

## **2 Middleware Change Log**

### **DSP Audio Streamer**

The current version of DSP Audio Streamer is 2.6p2.

- 2.6p2
  - Update to version 2.6p2 (2.6 patch)
- 2.6p1
  - Update to version 2.6p1 (2.6 patch release 1)
- 2.6
  - Update to version 2.6 GA
- 2.0
  - Initial version of DSP Audio Streamer

### **NatureDSP**

The current version of NatureDSP is 4.0.0.

- 4.0.0
  - Initial version of NatureDSP from Cadence for HiFi4 DSP.

### **emWin library**

The currently supported version is 6.16c

- v6.16c
  - upgraded to v6.16c
  - updated temperature\_control demo generated by AppWizard
- v6.14d
  - upgraded to v6.14d
- v6.10f
  - upgraded to v6.10f

### **FatFs for MCUXpresso SDK**

Current version is FatFs R0.14b\_rev0.

- R0.14b\_rev0
  - Upgraded to version 0.14b
- R0.14a\_rev0
  - Upgraded to version 0.14a
  - Applied patch ff14a\_p1.diff and ff14a\_p2.diff

- R0.14\_rev0
  - Upgraded to version 0.14
  - Applied patch ff14\_p1.diff and ff14\_p2.diff
- R0.13c\_rev0
  - Upgraded to version 0.13c
  - Applied patches ff\_13c\_p1.diff, ff\_13c\_p2.diff, ff\_13c\_p3.diff and ff\_13c\_p4.diff.
- R0.13b\_rev0
  - Upgraded to version 0.13b
- R0.13a\_rev0
  - Upgraded to version 0.13a. Added patch ff\_13a\_p1.diff.
- R0.12c\_rev1
  - Add NAND disk support.
- R0.12c\_rev0
  - Upgraded to version 0.12c and applied patches ff\_12c\_p1.diff and ff\_12c\_p2.diff.
- R0.12b\_rev0
  - Upgraded to version 0.12b.
- R0.11a
  - Added glue functions for low-level drivers (SDHC, SDSPI, RAM, MMC). Modified diskio.c.
  - Added RTOS wrappers to make FatFs thread safe. Modified syscall.c.
  - Renamed ffconf.h to ffconf\_template.h. Each application should contain its own ffconf.h.
  - Included ffconf.h into diskio.c to enable the selection of physical disk from ffconf.h by macro definition.
  - Conditional compilation of physical disk interfaces in diskio.c.

## lwIP for MCUXpresso SDK

Lightweight IP (lwIP) is a small independent implementation of the TCP/IP protocol suite. Source code included in this SDK is based on development version 2.2.0.dev taken from 3rd party lwIP GIT repository. The webpage <https://git.savannah.nongnu.org/cgit/lwip.git> allows to browse the repository and also contains URLs for its cloning. The development versions (X.Y.Z.dev) do not refer to a single source code snapshots. To avoid ambiguity, change log below contains SHA-1 hashes of GIT commits used when importing the code into the SDK.

- 2.2.0\_rev5
  - New features:
    - \* Ported lwIP 2.2.0.dev (2021-05-11, branch: master, SHA-1: 7ec4e9be304e7f8953740f10b2c810a292) to MCUXpresso SDK.
    - \* LPC ENET adaptation layer allocates more buffers for frame reception now. Previously the number of receive buffers was determined by ENET\_RXBD\_NUM, which defaults to 5. It is determined by ENET\_RXBUFF\_NUM now, which is 2 \* ENET\_RXBD\_NUM by default. Increase was needed because the actual version of LPC ENET driver always hold ENET\_RXBD\_NUM number of buffers and few additional buffers are needed for passing zero-copy frame data to lwIP. If this takes too much memory in your application, you can counteract by decreasing PBUF\_POOL\_SIZE, since PBUF\_POOL is used only

for transmission when LPC ENET, Kinetis ENET or ENET QOS is used.

- 2.2.0\_rev4
  - New features:
    - \* Ported lwIP 2.2.0.dev (2021-03-05, branch: master, SHA-1: 0056522cc974d2be2005c324f37187b5b3) to KSDK 2.0.0.
    - \* LWIP\_DHCP\_DOES\_ACD\_CHECK option default changed to 0 (disabled):
      - Although the ACD check makes getting IP address from DHCP more robust, it added several seconds delay at startup of all applications which use DHCP.
      - This feature was not present in earlier versions of lwIP.
    - \* ENET QOS adaptation layer - implemented zero-copy on receive.
    - \* Kinetis ENET and ENET QOS adaptation layers allocate more buffers for frame reception now. Previously the number of receive buffers was determined by ENET\_RXBD\_NUM, which defaults to 5. It is determined by ENET\_RXBUFF\_NUM now, which is 2 \* ENET\_RXBD\_NUM by default. Increase was needed because the actual version of Kinetis ENET and ENET QOS drivers always hold ENET\_RXBD\_NUM number of buffers and few additional buffers are needed for passing zero-copy frame data to lwIP. If this takes too much memory in your application, you can counteract by decreasing PBUF\_POOL\_SIZE, since PBUF\_POOL is used only for transmission when Kinetis ENET or ENET QOS is used.
    - \* Removed ethernetif\_config\_t.non\_dma\_memory field which was required to configure memory ranges unusable by ENET DMA on LPC devices. The setting has been replaced by BOARD\_ENET\_NON\_DMA\_MEMORY\_ARRAY macro.
- 2.2.0\_rev3
  - New features:
    - \* Ported lwIP 2.2.0.dev (2020-07-07, branch: master, SHA-1: c385f31076b27efb8ee37f00cb5568783a) to KSDK 2.0.0.
- 2.2.0\_rev2
  - New features:
    - \* Kinetis ENET adaptation layer - implemented zero-copy on receive.
    - \* lwiperf - counter of transferred bytes extended from 32 to 64 bit
  - Bug fixes:
    - \* Fixed restarting Auto IP from DHCP.
- 2.2.0\_rev1
  - New features:
    - \* Ported lwIP 2.2.0.dev (2019-12-12, branch: master, SHA-1: 555812dcec38c9a2ef1ef9b31816291549) to KSDK 2.0.0.
    - \* Implemented LWIP\_ASSERT\_CORE\_LOCKED related functions in sys\_arch.c. It can be enabled in lwipopts.h:
      - `#define LWIP_ASSERT_CORE_LOCKED() sys_check_core_locking()`
      - `#define LWIP_MARK_TCPIP_THREAD() sys_mark_tcpip_thread()`  
`// if NO_SYS == 0`
      - `#define LOCK_TCPIP_CORE() sys_lock_tcpip_core() // if NO_SYS == 0 and LWIP_TCPIP_CORE_LOCKING == 1`
      - `#define UNLOCK_TCPIP_CORE() sys_unlock_tcpip_core() // if NO_SYS == 0 and LWIP_TCPIP_CORE_LOCKING == 1`

- 2.1.2\_rev5
  - New features:
    - \* Implemented TCP\_USER\_TIMEOUT socket option.
    - \* Implemented SIOCOUTQ ioctl.
- 2.1.2\_rev4
  - New features:
    - \* Ported lwIP 2.1.3.dev (2019-02-27, branch: STABLE-2\_1\_x, SHA-1: 1bb6e7f52de1cd86be0eed31e3 to KSDK 2.0.0.
    - \* Updated sys\_thread\_new implementation and comment.
    - \* Kinetis ENET adaptation layer - reading frames into a pbuf chain is conditionally compiled only when a single pbuf from pool cannot hold maximum frame size (PBUF\_POOL\_BUFSIZE >= maximum frame size). Avoiding this code also reduces stack size requirements by about 1.5 kilobytes.
  - Bug fixes:
    - \* Fixes in ethernetif\_linkoutput() in enet\_ethernetif\_lpc.c:
      - Removed access to possibly freed pbuf.
      - Call pbuf\_free() when transmit buffers not available.
      - When copying pbuf chain, updating the number of necessary transmit buffers to wait for, which can be often smaller in the copy.
    - \* When CGI script is reading POST data by chunks, the loop in httpsrv\_read() may cause blocking in receive function waiting for more data at the end of the stream
      - HTTPSrv\_cgi\_read() - added limiting of the last chunk length according to content length to avoid undesired blocking
    - \* Applied AUTOIP patch <https://savannah.nongnu.org/patch/?9847> - with modification to support multiple network interfaces.
    - \* Fixed buffer overflow in httpsrv when application provided CGI script does not handle the whole content of POST request
  - Removed LwipMibCompiler contrib application as it contained LGPL licensed files in Sharp-SnmpLib.
- 2.1.2\_rev3
  - New features:
    - \* lwiperf updated with UDP client/server support from the patch 9751 (<https://savannah.nongnu.org/patch/?9751>)
- 2.1.2\_rev2
  - Bug fixes:
    - \* Fixed lwiperf\_abort() in lwiperf.c to correctly close connections and free resources
- 2.1.2\_rev1
  - New features:
    - \* Ported lwIP 2.1.2 (2018-11-22, SHA-1: 159e31b689577dbf69cf0683bbaffbd71fa5ee10) to KSDK 2.0.0.
    - \* Ported lwIP-contrib 2.1.0 (2018-09-24, SHA-1: 35b011d4cf4c4b480f8859c456587a884ec9d287) to KSDK 2.0.0.
- 2.0.3\_rev1
  - New features:
    - \* Ported lwIP 2.0.3 (2017-09-15, SHA-1: 92f23d6ca0971a32f2085b9480e738d34174417b)

- to KSDK 2.0.0.
- 2.0.2\_rev1
  - New features:
    - \* Ported lwIP 2.0.2 (2017-03-13, SHA-1: c0862d60746e2d1ceae69af4c6f24e469570ecef) to KSDK 2.0.0.
- 2.0.0\_rev3
  - New features:
    - \* Ported lwIP 2.0.0 (2016-11-10, SHA-1: 216bf89491815029aa15463a18744afa04df58fe) to KSDK 2.0.0.
- 2.0.0\_rev2
  - New features:
    - \* Ported lwIP 2.0.0 RC2 (2016-08-08, SHA-1: b1dfd00f9233d124514a36a8c8606990016f2ad4) to KSDK 2.0.0.
- 2.0.0\_rev1
  - New features:
    - \* Ported lwIP 2.0.0 RC0 (2016-05-26) to KSDK 2.0.0.
    - \* Changed lwIP bare-metal examples to use poll-driven approach instead of interrupt-driven one.
- 1.4.1\_rev2
  - New features:
    - \* Enabled critical sections in lwIP.
  - Bug fixes:
    - \* Fixed default lwIP packet-buffer size to be able to accept a maximum size frame from the ENET driver.
    - \* Fixed possible drop of multi-frame packets during transmission.
- 1.4.1\_rev1
  - New features:
    - \* Ported lwIP 1.4.1 to KSDK 2.0.0.

## Multicore SDK

The current version of Multicore SDK is 2.11.0.

- 2.11.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.9.0
    - \* eRPC generator (erpcgen) v.1.9.0
    - \* Multicore Manager (MCMgr) v4.1.1
    - \* RPMsg-Lite v3.2.0
  - New features:
    - \* eRPC: Improving template usage, GitHub PR #153.
    - \* eRPC: run\_clang\_format.py cleanup, GitHub PR #177.
    - \* eRPC: Build TCP transport setup code into liberpc, GitHub PR #179.
    - \* eRPC: Fix multiple definitions of g\_client error, GitHub PR #180.

- \* eRPC: Fix memset past end of buffer in erpc\_setup\_mbf\_static.cpp, GitHub PR #184.
- \* eRPC: Fix deprecated error with newer pytest version, GitHub PR #203.
- \* eRPC: Allow used LIBUSB\_SIO device index being specified from the Python command line argument.
- \* eRPC, erpcgen: Static allocation support and usage of rpmsg static FreeRTOSs related API, GitHub PR #168, #169.
- \* erpcgen: Remove redundant module imports in erpcgen, GitHub PR #196.
- \* RPMsg-Lite: Improve static allocations - allow OS-specific objects being allocated statically, GitHub PR #14.
- \* RPMsg-Lite: Minor Misra and typo corrections, GitHub PR #19, #20.
- 2.10.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.8.1
    - \* eRPC generator (erpcgen) v.1.8.1
    - \* Multicore Manager (MCMgr) v4.1.1
    - \* RPMsg-Lite v3.1.2
  - New features:
    - \* eRPC: Fix misra erpc c, GitHub PR #158.
    - \* eRPC: Allow conditional compilation of message\_loggers and pre\_post\_action.
    - \* eRPC: New i2c\_slave\_transport transport introduced.
    - \* eRPC: (D)SPI slave transports updated to avoid busy loops in rtos environments.
    - \* erpcgen: Re-implement EnumMember::hasValue(), GitHub PR #159.
    - \* erpcgen: Fixing several misra issues in shim code, erpcgen and unit tests updated, GitHub PR #156.
    - \* erpcgen: Fix bison file, GitHub PR #156.
    - \* RPMsg-Lite: Fixed incorrect description of the rpmsg\_lite\_get\_endpoint\_from\_addr function.
    - \* RPMsg-Lite: Updated RL\_BUFFER\_COUNT documentation.
    - \* RPMsg-Lite: env\_print macro adjusted to address MISRA 21.6 rule in MCUXpressoSDK projects.
- 2.9.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.8.0
    - \* eRPC generator (erpcgen) v.1.8.0
    - \* Multicore Manager (MCMgr) v4.1.1
    - \* RPMsg-Lite v3.1.1
  - New features:
    - \* eRPC: Support win32 thread, GitHub PR #108.
    - \* eRPC: Add mbed support for malloc() and free(), GitHub PR #92.
    - \* eRPC: Update makefile.
    - \* eRPC: Fixed warnings and error with using MessageLoggers, GitHub PR #127.
    - \* eRPC: Extend error msg for python server service handle function, GitHub PR #132.
    - \* eRPC: Update CMSIS UART transport layer to avoid busy loops in rtos environments, introduce semaphores.
    - \* eRPC: Introduced pre and post callbacks for eRPC call, GitHub PR #131.

- \* eRPC: Introduced new USB CDC transport.
  - \* eRPC: Introduced new Linux spidev-based transport.
  - \* eRPC: SPI transport update to allow usage without handshaking GPIO.
  - \* eRPC: Native *WIN32 erpc serial transport and threading*.
  - \* *eRPC: Arbitrator deadlock fix, TCP transport updated, TCP setup functions introduced, GitHub PR #121.*
  - \* *eRPC: Update of matrix\_multiply.py example: Add -serial and -baud argument, GitHub PR #137.*
  - \* *eRPC: Added formatting extension for VSC, GitHub PR #134.*
  - \* *eRPC: Update of .clang-format, GitHub PR #140.*
  - \* *eRPC: Update of erpc\_framed\_transport.cpp: return error if received message has zero length, GitHub PR #141.*
  - \* *eRPC, erpcgen: Fixed error messages produced by -Wall -Wextra -Wshadow -pedantic-errors compiler flags, GitHub PR #136, #139.*
  - \* *eRPC, erpcgen: Core re-formatted using Clang version 10.*
  - \* *erpcgen: Enable deallocation in server shim code when callback/function pointer used as out parameter in IDL.*
  - \* *erpcgen: Removed '\$' character from generated symbol name in '\$union' suffix, GitHub PR #103.*
  - \* *erpcgen: Resolved mismatch between C++ and Python for callback index type, GitHub PR #111.*
  - \* *erpcgen: Python generator improvements, GitHub PR #100, #118.*
  - \* *erpcgen: Fixed error messages produced by -Wall -Wextra -Wshadow -pedantic-errors compiler flags, GitHub PR #136.*
  - \* *erpcgen: Introduce ustring type for unsigned char and force cast to char\*, GitHub PR #125.*
  - \* *RPMMsg-Lite: Introduced RL\_ALLOW\_CONSUMED\_BUFFERS\_NOTIFICATION config option to allow opposite side notification sending each time received buffers are consumed and put into the queue of available buffers.*
  - \* *RPMMsg-Lite: Added environment layers for Threadx.*
- 2.8.0
    - Multicore SDK component versions:
      - \* embedded Remote Procedure Call (eRPC) v1.7.4
      - \* eRPC generator (erpcgen) v.1.7.4
      - \* Multicore Manager (MCMgr) v4.1.0
      - \* RPMMsg-Lite v3.1.0
    - New features:
      - \* eRPC: Unit test code updated to handle service add and remove operations.
      - \* eRPC: Several MISRA issues in rpmmsg-based transports addressed.
      - \* eRPC: Support MU transport unit testing.
      - \* eRPC: Adding mbed os support.
      - \* eRPC: Fixed Linux/TCP acceptance tests in release target.
      - \* eRPC: Minor documentation updates, code formatting.
      - \* erpcgen: Whitespace removed from C common header template.
      - \* RPMMsg-Lite: MISRA C-2012 violations fixed (7.4).



- \* RPMsg-Lite: Fix missing lock in `rpmsg_lite_rx_callback()` for QNX env.
- \* RPMsg-Lite: Correction of `rpmsg_lite_instance` structure members description.
- \* RPMsg-Lite: Address -Waddress-of-packed-member warnings in GCC9.
- \* RPMsg-Lite: Clang update to v10.0.0, code re-formatted.
- 2.7.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.7.3
    - \* eRPC generator (erpcgen) v.1.7.3
    - \* Multicore Manager (MCMgr) v4.1.0
    - \* RPMsg-Lite v3.0.0
  - New features:
    - \* eRPC: Improved the `test_callbacks` logic to be more understandable and to allow requested callback execution on the server side.
    - \* eRPC: `TransportArbitrator::prepareClientReceive` modified to avoid incorrect return value type.
    - \* eRPC: The `ClientManager` and the `ArbitratedClientManager` updated to avoid performing client requests when the previous serialization phase fails.
    - \* erpcgen: Generate the shim code for destroy of statically allocated services.
    - \* MCMgr: Code adjustments to address MISRA C-2012 Rules
    - \* RPMsg-Lite: MISRA C-2012 violations fixed, incl. data types consolidation.
    - \* RPMsg-Lite: Code formatted
- 2.6.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.7.2
    - \* eRPC generator (erpcgen) v.1.7.2
    - \* Multicore Manager (MCMgr) v4.0.3
    - \* RPMsg-Lite v2.2.0
  - New features:
    - \* eRPC: Improved support of `const` types.
    - \* eRPC: Fixed Mac build.
    - \* eRPC: Fixed serializing python list.
    - \* eRPC: Documentation update.
    - \* eRPC: Add missing doxygen comments for transports.
    - \* RPMsg-Lite: Added configuration macro `RL_DEBUG_CHECK_BUFFERS`.
    - \* RPMsg-Lite: Several MISRA violations fixed.
    - \* RPMsg-Lite: Added environment layers for QNX and Zephyr.
    - \* RPMsg-Lite: Allow environment context required for some environments (controlled by the `RL_USE_ENVIRONMENT_CONTEXT` configuration macro).
    - \* RPMsg-Lite: Data types consolidation.
    - \* MCMgr: Documentation updated to describe handshaking in a graphic form.
    - \* MCMgr: Minor code adjustments based on static analysis tool findings
- 2.5.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.7.1
    - \* eRPC generator (erpcgen) v.1.7.1

- \* Multicore Manager (MCMgr) v4.0.2
  - \* RPMsg-Lite v2.0.2
- New features:
  - \* RPMsg-Lite, MCMgr: Align porting layers to the updated MCUXpressoSDK feature files.
  - \* eRPC: Fixed semaphore in static message buffer factory.
  - \* erpcgen: Fixed MU received error flag.
  - \* erpcgen: Fixed tcp transport.
- 2.4.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.7.0
    - \* eRPC generator (erpcgen) v.1.7.0
    - \* Multicore Manager (MCMgr) v4.0.1
    - \* RPMsg-Lite v2.0.1
  - New features:
    - \* eRPC: Improved code size of generated code.
    - \* eRPC: Generating crc value is optional.
    - \* eRPC: Fixed CMSIS Uart driver. Removed dependency on KSDK.
    - \* eRPC: List names are based on their types. Names are more deterministic.
    - \* eRPC: Service objects are as a default created as global static objects.
    - \* eRPC: Added missing doxygen comments.
    - \* eRPC: Forbid users use reserved words.
    - \* eRPC: Removed outByref for function parameters.
    - \* eRPC: Added support for 64bit numbers.
    - \* eRPC: Added support of program language specific annotations.
    - \* eRPC: Optimized code style of callback functions.
    - \* RPMsg-Lite: New API rpmsg\_queue\_get\_current\_size()
    - \* RPMsg-Lite: Fixed bug in interrupt handling for lpc5411x, lpc5410x
    - \* RPMsg-Lite: Code adjustments based on static analysis tool findings
- 2.3.1
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.6.0
    - \* eRPC generator (erpcgen) v.1.6.0
    - \* Multicore Manager (MCMgr) v4.0.0
    - \* RPMsg-Lite v1.2.0
  - New features:
    - \* eRPC: Improved code size of generated code.
    - \* eRPC: Improved eRPC nested calls.
    - \* eRPC: Improved eRPC list length variable serialization.
    - \* eRPC: Added @nullable support for scalar types.
    - \* MCMgr: Added new MCMGR\_TriggerEventForce() API.
- 2.3.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.5.0
    - \* eRPC generator (erpcgen) v.1.5.0
    - \* Multicore Manager (MCMgr) v3.0.0

- \* RPMsg-Lite v1.2.0
- New features:
  - \* eRPC: Added support for unions type non-wrapped by structure.
  - \* eRPC: Added callbacks support.
  - \* eRPC: Added support @external annotation for functions.
  - \* eRPC: Added support @name annotation.
  - \* eRPC: Added Messaging Unit transport layer.
  - \* eRPC: Added RPMMSG Lite RTOS TTY transport layer.
  - \* eRPC: Added version verification and IDL version verification between eRPC code and eRPC generated shim code.
  - \* eRPC: Added support of shared memory pointer.
  - \* eRPC: Added annotation to forbid generating const keyword for function parameters.
  - \* eRPC: Added python matrix multiply example.
  - \* eRPC: Added nested call support.
  - \* eRPC: Added struct member "byref" option support.
  - \* eRPC: Added support of forward declarations of structures
  - \* eRPC: Added Python RPMsg Multiendpoint kernel module support
  - \* eRPC: Added eRPC sniffer tool
  - \* MCMgr: Unused API removed
  - \* MCMgr: Added the ability for remote core monitoring and event handling
  - \* RPMsg-Lite: Several source files renamed to avoid conflicts with other middleware sw components
  - \* RPMsg-Lite: Added the ability to use Multicore Manager (MCMGR) as the IPC interrupts router
- 2.2.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.4.0
    - \* eRPC generator (erpcgen) v.1.4.0
    - \* Multicore Manager (MCMgr) v2.0.1
    - \* RPMsg-Lite v1.1.0
  - New features:
    - \* eRPC: win\_flex\_bison.zip for windows updated.
    - \* eRPC: Use one codec (instead of inCodec outCodec).
    - \* eRPC: New RPMsg-Lite Zero Copy (RPMsgZC) transport layer.
    - \* MCMgr: code updated to be Misra compliant.
    - \* RPMsg-Lite: Added macros for packed structures (compiler.h).
    - \* RPMsg-Lite: Improved interrupt handling in platform layer.
    - \* RPMsg-Lite: Changed RL\_BUFFER\_SIZE definition.
    - \* RPMsg-Lite: Fix of double initialization of vring shared data structure.
    - \* RPMsg-Lite: Support for the multi-instance.
- 2.1.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.3.0
    - \* eRPC generator (erpcgen) v.1.3.0
  - New features:

- \* eRPC: New annotation types introduced (@length, @max\_length, ...).
- \* eRPC: Support for running both erpc client and erpc server on one side.
- \* eRPC: New transport layers for (LP)UART, (D)SPI.
- \* eRPC: Error handling support.
- 2.0.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.2.0
    - \* eRPC generator (erpcgen) v1.2.0
    - \* Multicore Manager (MCMgr) v2.0.0
    - \* RPMsg-Lite v1.0.0
  - New features:
    - \* Multicore SDK support for lpcxpresso54114 board added.
    - \* RPMsg component of the Open-AMP framework re-implemented and the RPMsg-Lite version introduced.
    - \* eRPC source directory organization changed.
    - \* Many eRPC improvements.
- 1.1.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.1.0
    - \* Multicore Manager (MCMgr) v1.1.0
    - \* Open-AMP / RPMsg based on SHA1 ID 44b5f3c0a6458f3cf80 rev01
  - New features:
    - \* Multicore SDK 1.1.0 ported to KSDK 2.0.0.
    - \* Python support added into eRPC.
- 1.0.0
  - Multicore SDK component versions:
    - \* embedded Remote Procedure Call (eRPC) v1.0.0
    - \* Multicore Manager (MCMgr) v1.0.0
    - \* Open-AMP / RPMsg based on SHA1 ID 44b5f3c0a6458f3cf80 rev00

## Host USDHC driver for MCUXpresso SDK

The current driver version is 2.6.1.

- 2.6.1
  - Improvements
    - \* Increased the delay after enable DAT3 detect card feature to fix the misdetect issue.
- 2.6.0
  - Improvements
    - \* Removed deprecated api in SDHC host driver.
    - \* Added SDMMCHOST\_ConvertDataToLittleEndian api.
    - \* Added capability/maxBlockCount/maxBlockSize in host decriptor.
    - \* Improved the manual tuning flow according to specification.
    - \* Added mutual exclusive access for function init/deinit/reset/transfer function.

- \* Fixed violations of MISRA C-2012 rule 10.1, 10.4, 16.3, 4.7.
- 2.5.3
  - Bug Fixes
    - \* Corrected the DAT3 detect card flow by PULL down the DAT3 pin firstly and then enable the host DAT3 function.
- 2.5.2
  - Improvements
    - \* Improved DAT3 card detect mechanism to avoid card false detection.
- 2.5.1
  - Improvements
    - \* Enabled DAT3 card detect interrupt in function SDMMCHOST\_PollingCardDetectStatus to support DAT3 re-detect card.
- 2.5.0
  - Improvements
    - \* Added cache line size alignment maintain for the read transfer.
    - \* Added FSL\_FEATURE\_HAS\_L1CACHE to enable cache maintain operation for the soc has LMEM cache.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 15.7, 4.7, 16.4, 10.1, 10.3, 10.4, 11.3, 14.4, 10.6, 17.7, 16.1, 16.3.
- 2.4.0
  - Improvements
    - \* Added cache maintain functionality in the host driver.
    - \* Enabled DAT3 card detect feature.
    - \* Increase the default STD tuning counter to 60 to cover range of the tuning window.
    - \* Added host instance capability macro.
    - \* Added clear card inserted/removed event when card removed/inserted interrupt generated.
- 2.3.0
  - Improvements
    - \* Merged the host controller driver from polling/freertos/interrupt to non\_blocking/blocking.
    - \* Added SDMMC OSA layer to support muxtex access/event/delay.
- 2.2.14
  - Bug Fixes
    - \* Fixed uninitialized value Coverity issue.
- 2.0.0
  - Initial version

## MMC Card driver for MCUXpresso SDK

The current driver version is 2.5.0.

- 2.5.0
  - Improvements
    - \* Added api MMC\_SetSleepAwake to support enter/exit sleep state.

- \* Added new api MMC\_PollingCardStatusBusy for application polling card status.
- \* Removed deprecated api in mmc driver and mark MMC\_HostReset as deprecated.
- \* Improved the read/write/erase function flow.
- \* Added mutual exclusive access for init/deinit/read/write/erase function.
- \* Fixed violations of MISRA C-2012 rule 4.7, 17.7, 10.7, 10.4, 13.5, 14.4, 10.6.
- 2.4.1
  - Improvements
    - \* Improved the voltage window argument of CMD1 according to host capability instead of use card ocr directly.
    - \* Added host HS200/HS400/8bit bus width capability validation during card initialization.
    - \* Used cache line size align buffer for MMC relate api.
    - \* Increased the CMD13 timeout count to avoid polling CMD13 time out issue.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 15.7, 4.7, 16.4, 10.1, 10.3, 10.4, 11.3, 14.4, 10.6, 17.7, 16.1, 16.3.
- 2.4.0
  - Improvements
    - \* Added new apis MMC\_EnableCacheControl/MMC\_FlushCache to support cache feature.
- 2.3.1
  - Improvements
    - \* Removed the dead loop while polling DAT0 and CMD13 instead of using timeout mechanism.
    - \* Added card state check before switching to HS400 to improve the emmc initialization stability.
    - \* Removed the redundant operation of memset internal buffer in MMC\_WriteBlocks function.
  - Bug Fixes
    - \* Fixed the sandisk emmc always busy while sending CMD1 without supported voltage provide in argument.
- 2.3.0
  - Improvements
    - \* Deprecated api MMC\_PowerOnCard/MMC\_PowerOffCard by api MMC\_SetCardPower.
    - \* Added internalBuffer in mmc\_card\_t and removed rawCid/rawCsd/rawExtendedCsd.
    - \* Added retuning support during data transfer under HS200 mode.
    - \* Increased the read/write blocks failed retry times for stability.
    - \* Added delay while retry the CMD1 for stability.
    - \* Added legacy card support, the card not support CMD6, CMD8.
- 2.2.13
  - Improvements
    - \* Used the boot mode value instead of boot mode mask value as the parameter of MMC\_SetBootConfig to improve user experience.
    - \* Removed dynamic voltage switch feature for mmc, according to JEDEC standard, the voltage should be fixed after power up.
- 2.2.12
  - Improvement

- \* Increased the CMD1 retry times in the MMC card driver to improve driver compatibility.
- Bug Fixes
  - \* Fixed the build warning by changing the old style function declaration static status\_t inline to static inline status\_t(found by adding -Wold-style-declaration in armgcc build flag).
  - \* Fixed the fall through build warning by adding SUPPRESS\_FALL\_THROUGH\_WARNING() in mmc driver.
- 2.2.7
  - Bug Fixes
    - \* Fixed MDK 66-D warning.
- 2.2.6
  - Improvements
    - \* Saved MMC OCR registers while sending CMD1 with argument 0.
  - Bug Fixes
    - \* Added MMC\_PowerOn function in which there is delay function after powerup sdcard. Otherwise, the card initialization by fail.
- 2.2.5
  - Improvements
    - \* Added SDMMC\_ENABLE\_SOFTWARE\_TUNING to enable/disable software tuning and it is disabled by default.
- 2.2.4
  - Bug Fixes
    - \* Fixed DDR mode data sequence miss issue, which is caused by NIBBLE\_POS.
  - Improvements
    - \* Increased g\_sdmmc 512byte to improve the performance when application use a non-word align data buffer address.
    - \* Used OCR access mode bits to determine the mmccard high capacity flag.
- 2.2.3
  - Bug Fixes
    - \* Added response check for send operation condition command. If not checked, the card may occasionally init fail.
- 2.2.1
  - Improvements
    - \* Improved MMC Boot feature.
- 2.2.0
  - Improvements
    - \* Optimized tuning/mmc switch voltage/mmc select power class/mmc select timing function.
    - \* Added strobe dll for mmc HS400 mode.
    - \* Added write complete wait operation for MMC\_Write to fix command timeout issue.
- 2.1.2
  - Improvements
    - \* Improved SDMMC to support eMMC v5.0.
  - Bug Fixes
    - \* Fixed incorrect comparison between count and length in MMC\_ReadBlocks/MMC\_WriteBlocks.

- 2.1.1
  - Bug Fixes
    - \* Fixed the block range boundary error when transferring data to MMC card.
- 2.1.0
  - Improvements
    - \* Optimized the function of setting maximum data bus width for MMC card.
- 2.0.0
  - Initial version

## SD Card driver for MCUXpresso SDK

The current driver version is 2.4.0.

- 2.4.0
  - Improvements
    - \* Removed deprecated api in sd driver.
    - \* Added new api SD\_PollingCardStatusBusy for application polling card status.
    - \* Improved the read/write/erase function flow.
    - \* Improved the signal line voltage switch flow.
    - \* Added powerOnDelayMS/powerOffDelayMS in sd\_usr\_param\_t to allow redefine the default power on/off delay.
    - \* Added mutual exclusive access for init/deinit/read/write/erase function.
    - \* Fixed the driver strength configurations missed when timing mode switch to non SDR50/-SDR104 mode.
    - \* Fixed violations of MISRA C-2012 rule 4.7, 17.7, 10.7, 10.4, 13.5, 14.4.
- 2.3.3
  - Improvements
    - \* Added host SDR timing mode capability validation during card initialization.
    - \* Added polling card ready for data status when transfer data failed.
    - \* Used cache line size align buffer for SD initialization api.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 15.7, 4.7, 16.4, 10.1, 10.3, 10.4, 11.3, 14.4, 10.6, 17.7, 16.1, 16.3.
- 2.3.2
  - Improvements
    - \* Moved power off function after card detect in SD\_Init for DAT3 detect card feature.
- 2.3.1
  - Improvements
    - \* Removed the dead loop while polling DAT0 and CMD13 instead of using timeout mechanism.
- 2.3.0
  - Improvements
    - \* Marked api SD\_HostReset/SD\_PowerOnCard/SD\_PowerOffCard/SD\_WaitCardDetect-Status as deprecated.



- \* Added new api SD\_SetCardPower/SD\_PollingCardDetectStatus/SD\_HostDoReset.
- \* Added internalBuffer in sd\_card\_t and removed rawCid/rawCsd/rawScr.
- \* Added retuning support during data transfer under SDR50/SDR104 mode.
- \* Increased the read/write blocks failed retry times for stability.
- \* Added delay while retry the ACMD41 for stability.
- 2.2.12
  - Improvements
    - \* Increased the sd io driver strength for SD2.0 card.
  - Bug Fixes
    - \* Fixed the build warning by changing the old style function declaration static status\_t inline to static inline status\_t(found by adding -Wold-style-declaration in armgcc build flag).
- 2.2.10
  - Bug Fixes
    - \* Added event value check for all the FreeRTOS events to fix program hangs when a card event occurs before create.
- 2.2.7
  - Bug Fixes
    - \* Fixed MDK 66-D warning.
- 2.2.5
  - Improvements
    - \* Added SD\_ReadStatus api to get 512bit SD status.
    - \* Added error log support in sdcard functions.
    - \* Added SDMMC\_ENABLE\_SOFTWARE\_TUNING to enable/disable software tuning and it is disabled by default.
- 2.2.4
  - Bug Fixes
    - \* Fixed DDR mode data sequence miss issue, which is caused by NIBBLE\_POS.
  - Improvements
    - \* Increased g\_sdmmc 512byte to improve the performance when application use a non-word align data buffer address.
    - \* Enabled auto cmd12 for SD read/write.
- 2.2.3
  - Bug Fixes
    - \* Added response check for send operation condition command. If not checked, the card may occasionally init fail.
- 2.2.1
  - Improvements
    - \* Kept SD\_Init function for forward compatibility.
- 2.2.0
  - Improvements
    - \* Separated the SD/MMC/SDIO init API to xxx\_CardInit/xxx\_HostInit.
    - \* SD\_Init/SDIO\_Init will be deprecated in the next version.
- 2.1.6
  - Improvements
    - \* Enhanced SD IO default driver strength.

- 2.1.5
  - Bug Fixes
    - \* Fixed Coverity issue.
    - \* Fixed SD v1.x card write fail issue. It was caused by the block length set error.
    - \* Fixed card cannot detect dynamically.
- 2.1.3
  - Bug Fixes
    - \* Fixed Non high-speed sdcard init fail at switch to high speed.
  - Improvements
    - \* Added Delay for SDCard power up.
- 2.1.2
  - Improvements
    - \* Improved SDMMC to support SD v3.0.
- 2.1.1
  - Bug Fixes
    - \* Fixed the bit mask error in the SD card switch to high speed function.
  - Improvements
    - \* Optimized the SD card initialization function.
- 2.1.0
  - Bug Fixes
    - \* Changed the callback mechanism when sending a command.
    - \* Fixed the performance low issue when transferring data.
  - Improvements
    - \* Changed the name of some error codes returned by internal function.
    - \* Merged all host related attributes to one structure.
- 2.0.0
  - Initial version.

## SDIO Card driver for MCUXpresso SDK

The current driver version is 2.4.0.

- 2.4.0
  - Improvements
    - \* Removed deprecated api in sdio driver.
    - \* Improved the signal line voltage switch flow.
    - \* Added powerOnDelayMS/powerOffDelayMS in sdio\_usr\_param\_t to allow redefine the default power on/off delay.
    - \* Added mutual exclusive access for init/deinit/direct/extend function.
    - \* Fixed violations of MISRA C-2012 rule 4.7, 17.7, 10.1, 12.2.
- 2.3.3
  - Bug Fixes
    - \* Fixed logical dead code coverity issue.
  - Improvements

- \* Removed deprecated api in sdio driver.
- 2.3.2
  - Improvements
    - \* Added host SDR timing mode capability validation during card initialization.
    - \* Used cache line size align buffer for SDIO initialization api.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.9, 15.7, 4.7, 16.4, 10.1, 10.3, 10.4, 11.3, 14.4, 10.6, 17.7, 16.1, 16.3.
- 2.3.1
  - Improvements
    - \* Moved power off function after card detect in SD\_Init for DAT3 detect card feature.
- 2.3.0
  - Improvements
    - \* Marked api SDIO\_HostReset/SDIO\_PowerOnCard/SDIO\_PowerOffCard/SDIO\_Wait-CardDetectStatus as deprecated.
    - \* Added new api SDIO\_SetCardPower/SDIO\_PollingCardDetectStatus/SDIO\_HostDo-Reset.
    - \* Added internalBuffer in sdio\_card\_t for card register content extract and improve the data access efficiency.
    - \* Added retry function after switch to target timing failed in SDIO\_SelectBusTiming.
    - \* Changed default bus clock from 400KHZ to 25MHZ.
- 2.2.13
  - Improvements
    - \* Removed the sdio card interrupt from sdio host initialization, since the card interrupt enablement should be determined by application.
  - Bug Fixes
    - \* Fixed Out-of-bounds write Coverity issue.
- 2.2.12
  - Improvements
    - \* Added manual tuning function for looking for the tuning window automatically.
    - \* Fixed the build warning by changing the old style function declaration static status\_t inline to static inline status\_t(found by adding -Wold-style-declaration in armgcc build flag).
    - \* Fixed the fall through build warning by adding SUPPRESS\_FALL\_THROUGH\_WARNING() in sdio driver.
- 2.2.11
  - Bug Fixes
    - \* Added check card async interrupt capability in function SDIO\_GetCardCapability.
    - \* Fixed OUT OF BOUNDS access in function SDIO\_IO\_Transfer.
- 2.2.10
  - Bug Fixes
    - \* Fixed SDIO card driver get an incorrect io number when the card io number is bigger than 2.
  - Improvements
    - \* Added SDIO 3.0 support.
    - \* Added API SDIO\_IO\_RW\_Direct for direct read/write card register access.

- 2.2.9
  - Improvements
    - \* Added API SDIO\_SetIOIRQHandler/SDIO\_HandlePendingIOInterrupt to handle multi io pending IRQ.
- 2.2.8
  - Improvements
    - \* Updated sdmmc to support SDIO interrupt.
    - \* Added API SDIO\_GetPendingInterrupt to get the pending io interrupt.
- 2.2.7
  - Bug Fixes
    - \* Fixed MDK 66-D warning.
- 2.2.6
  - Improvements
    - \* Added an unify transfer interface for SDIO.
  - Bug Fixes
    - \* Fixed Wrong pointer address used by SDMMCHOST\_Init.
- 2.1.5
  - Improvements
    - \* Improved SDIO card init sequence and add retry option for SDIO\_SwitchToHighSpeed function.
- 2.1.4
  - Improvements
    - \* Added Go\_Idle function for SDIO card.
- 2.0.0
  - Initial version.

## USB stack for MCUXpresso SDK

The current version of USB stack is 2.8.1.

- 2.8.1
  - Improvement:
    - \* update USB audio demos to use audio component (components).
    - \* Add the checking of function call return value.
    - \* Add audio multiple channels demo (usb\_device\_composite\_audio\_multi\_ch\_unified) on RT600 audio board.
    - \* Fix audio noise on sync mode and improve overflow/underflow checking method.
    - \* Support UAC 3.1 and 7.1 on audio speaker demo.
    - \* Set USB device CDC demo not to depend on DTR setting from host.
    - \* Support MCUX toolchain on some RTxxxx platforms.
- 2.8.0
  - Improvement:
    - \* Fix the USB device stack vulnerability issues.
    - \* Update the audio PLL and FRO adjustment codes for audio examples in RTxxx, LP-

- C54xxx and LPC55xxx.
  - \* Improve the USB PD AMS collision avoidance.
  - \* Improve IP3511 controller driver's dedicated ram allocation.
  - \* Change the USB\_DATA\_ALIGN\_SIZE to 4 because the controller driver uses the dedicated RAM to do memcpy.
- New features:
  - \* Enable USB host audio recorder demo for mutiple boards.
- 2.7.0
  - Improvement:
    - \* Use new feedback solution and low latency playback for usb device speaker demo and unified demos. Add underflow and overflow protection.
    - \* Optimize hard code for usb audio demos.
    - \* Update Unconstrained Power field in the Sink Capabilities Message according to the external power state.
    - \* Fix CVE-2021-38258 and CVE-2021-38260
  - New features:
    - \* Enable USB host video demo for mutiple boards.
    - \* Enable USB device MTP demo for mutiple boards.
    - \* Add PPS message to usb pd stack.
- 2.6.1
  - Improvement:
    - \* rename sdcard as disk for all of sdcard demos. For ramdisk demos, they are not changed.
    - \* add wrapper for all of disk demos to support emmc.
- 2.6.0
  - Improvement:
    - \* Added more ufi event to support dynamic sdcard capacity.
    - \* Passed MISRA-2012 mandatory and required rules.
      - Except rule 17.2 in host hub and otg stack.
      - Except rule 5.1, rule 5.4, rule 21.1 and rule 21.2.
    - \* Re-implemented USB components and supported NPW.
    - \* Improved IP3511 controller driver's cancelling transfer function.
    - \* Enabled the audio2.0 defaultly for device audio demos.
    - \* Enabled the host audio2.0 function in host audio class driver and host audio speaker demo.
  - New features:
    - \* enable two USB controllers in one USB host mouse demo which named as host\_hid\_-mouse\_dual.
    - \* enable UAC 5.1 for usb device audio speaker demo.
- 2.5.0
  - Improvement:
    - \* Integrated sdk components (OSA, Timer, GPIO and serial\_manager) to USB stack and demos.
    - \* Improved the ip3511 driver throughput.
    - \* Improved audio initialization codes after SDK audio drivers update.
    - \* Improved auido to support the audio2.0 in win10.
    - \* Add one "enumeration fail" callback event to host stack.

- 2.4.2
  - Improvement:
    - \* Put the USB controller data and transfer buffer to noncache section, removed the setting that sets the whole ocram and sdram as noncached.
    - \* Separated composite audio examples' channel,sample rate,format parameters from commom macro to in dedicated macro and out dedicated macro.
    - \* replaced USB\_PrepareData with USB\_AudioRecorderGetBuffer.
- 2.4.1
  - New features:
    - \* Added enumeration fail callback to host stack when the attached device's enumeration failed.
- 2.4.0
  - Improvement:
    - \* Device Charger Detection (DCD) software architecture was refactored.
  - New features:
    - \* Enabled Device Charger Detection (DCD) on RT1060.
    - \* Enabled Device Charger Detection on RT600.
    - \* Enabled host battery charger function on RT600.
- 2.3.0
  - New features:
    - \* Added host video camera support. example: usb\_host\_video\_camera
    - \* Added a new device example. example: usb\_device\_composite\_cdc\_hid\_audio\_unified
- 2.2.0
  - New features:
    - \* Added device DFU support.
    - \* Supported OM13790DOCK on LPCXpresso54018.
    - \* Added multiple logical unit support in msc class driver, updated usb\_device\_lba\_information\_struct\_t to support this.
    - \* Supported multiple transfers for host ISO on IP3516HS.
  - Bug fixes:
    - \* Fixed device ip3511 prime data length than maxpacket size issue.
    - \* Initialized interval attribute in usb\_device\_endpoint\_struct\_t/usb\_device\_endpoint\_init\_struct\_t.
    - \* Removed unnecessary header file in device CDC class driver, removed unnecessary usb\_echo, and added DEBUG macro for necessary usb\_echo in device CDC class driver.
    - \* Fixed device IP3511HS unfinished interrupt transfer missing issue.
- 2.1.0
  - New features:
    - \* Added host RNDIS support. example: lwip\_dhcp\_usb
    - \* Enabled USB 3.0 support on device stack.
    - \* Power Delivery feature: Added OM13790HOST support; Added auto policy feature; Printed e-marked cable information;
- 2.0.1
  - Bug fixes:
    - \* Fixed some USB issues: Fixed MSC CV test failed in MSC examples.

- \* Changed audio codec interfaces.
- 2.0.0
  - New features:
    - \* PTN5110N support.
  - Bug fix:
    - \* Added some comments, fixed some minor USB issues.
- 1.9.0
  - New features:
    - \* Examples:
      - usb\_pd\_alt\_mode\_dp\_host
- 1.8.2
  - Updated license.
- 1.8.1
  - Bug fix:
    - \* Verified some hardware issues, support aruba\_flashless.
- 1.8.0
  - New features:
    - \* Examples:
      - usb\_device\_composite\_cdc\_vcom\_cdc\_vcom
      - usb\_device\_composite\_hid\_audio\_unified
      - usb\_pd\_sink\_battery
      - Changed usb\_pd\_battery to usb\_pd\_charger\_battery.
  - Bug fix:
    - \* Code clean up, removed some irrelevant code.
- 1.7.0
  - New features:
    - \* USB PD stack support.
  - Examples:
    - \* usb\_pd
    - \* usb\_pd\_battery
    - \* usb\_pd\_source\_charger
- 1.6.3
  - Bug fix: -IP3511\_HS driver control transfer sequence issue, enabled 3511 ip cv test.
- 1.6.2
  - New features:
    - \* Multi instance support.
- 1.6.1
  - New features:
    - Changed the struct variable address method for device\_video\_virtual\_camera and host\_phdc\_manager.
- 1.6.0
  - New features:
    - \* Supported Device Charger Detect feature on usb\_device\_hid\_mouse.
- 1.5.0
  - New features:

- \* Supported controllers
    - OHCI (Full Speed, Host mode)
    - IP3516 (High Speed, Host mode)
    - IP3511 (High Speed, Device mode)
  - \* Examples:
    - usb\_lpm\_device\_hid\_mouse
    - usb\_lpm\_device\_hid\_mouse\_lite
    - usb\_lpm\_host\_hid\_mouse
- 1.4.0
  - New features:
    - \* Examples:
      - usb\_device\_hid\_mouse/freertos\_static
      - usb\_suspend\_resume\_device\_hid\_mouse\_lite
- 1.3.0
  - New features:
    - \* Supported roles
      - OTG
    - \* Supported classes
      - CDC RNDIS
    - \* Examples
      - usb\_otg\_hid\_mouse
      - usb\_device\_cdc\_vnic
      - usb\_suspend\_resume\_device\_hid\_mouse
      - usb\_suspend\_resume\_host\_hid\_mouse
- 1.2.0
  - New features:
    - \* Supported controllers
      - LPC IP3511 (Full Speed, Device mode)
- 1.1.0
  - Bug fix:
    - \* Fixed some issues in USB certification.
    - \* Changed VID and Manufacturer string to NXP.
  - New features:
    - \* Supported classes
      - Pinter
    - \* Examples:
      - usb\_device\_composite\_cdc\_msc\_sdcard
      - usb\_device\_printer\_virtual\_plain\_text
      - usb\_host\_printer\_plain\_text
- 1.0.1
  - Bug fix:
    - \* Improved the efficiency of device audio speaker by changing the transfer mode from interrupt to DMA, thus providing the ability to eliminate the periodic noise.
- 1.0.0
  - New features:



- \* Supported roles
  - Device
  - Host
- \* Supported controllers:
  - KHCI (Full Speed)
  - EHCI (High Speed)
- \* Supported classes:
  - AUDIO
  - CCID
  - CDC
  - HID
  - MSC
  - PHDC
  - VIDEO
- \* Examples:
  - usb\_device\_audio\_generator
  - usb\_device\_audio\_speaker
  - usb\_device\_ccid\_smart\_card
  - usb\_device\_cdc\_vcom
  - usb\_device\_cdc\_vnic
  - usb\_device\_composite\_cdc\_msc
  - usb\_device\_composite\_hid\_audio
  - usb\_device\_composite\_hid\_mouse\_hid\_keyboard
  - usb\_device\_hid\_generic
  - usb\_device\_hid\_mouse
  - usb\_device\_msc\_ramdisk
  - usb\_device\_msc\_sdcard
  - usb\_device\_phdc\_weighscale
  - usb\_device\_video\_flexio\_ov7670
  - usb\_device\_video\_virtual\_camera
  - usb\_host\_audio\_speaker
  - usb\_host\_cdc
  - usb\_host\_hid\_generic
  - usb\_host\_hid\_mouse
  - usb\_host\_hid\_mouse\_keyboard
  - usb\_host\_msd\_command
  - usb\_host\_msd\_fatfs
  - usb\_host\_phdc\_manager
  - usb\_keyboard2mouse
  - usb\_pin\_detect\_hid\_mouse

## NXP WiFi

Version 1.3.r37.p3

- New Additions:
  - Updated RB3+ firmware version to p11.3.
  - Updated 8801 firmware version to p191.2
  - Updated RB3 firmware version to p186.2.
  - Added WPA3 R3 support for 8801.

## Bug Fixes:

- Fixed WPA3 R3 for RB3.
- Country code not being displayed in 11d is being fixed.

## Version 1.3.r37.p2

- New Additions:
  - Updated RB3+ firmware version to 21.p11.2.
  - Updated 8801 firmware version to p191.1
  - Updated CA2 firmware version to p235.2
  - Updated RB3 firmware version to p186.1.
  - Added WPA3 R3 support for RB3, RB3+ and CA2.
- Bug Fixes:
  - Fixed MISRA/Coverity issues.
  - Fixed SVD vulnerability issue on 8977, 8801 and CA2.
  - Fixed an issue where UDP traffic was not working on uAP mode.

## Version 1.3.r37.p1

- New Additions: Updated RB3+ firmware version to 21.p11.
- Bug Fixes:
  - Fixed MISRA/Coverity issue for C 2012 rule 9.1 and C 2012 rule 20.18.
  - Fixed SVD vulnerability issue on RB3+.
  - Fixed an issue where default netif was not set to STA after closing uAP.
  - Fixed wlan\_start and wlan\_stop API working.
  - Fixed an issue where wlan\_get\_dtim\_period API was not returning any value.

## Version 1.3.r35.p2

- Bug Fixes:
  - Fixed an issue for CA2 where tcp/udp Rx traffic was not seen with Linksys AP.
  - Changed WLAN\_PSK\_MAX\_LENGTH to 64 from 65.
  - Fixed an issue where mfpc was not set properly.

## Version 1.3.r34.p2

- New Additions:
  - Updated CA2(8987) SoC firmware to p235.1.
- Bug Fixes:
  - Fixed WPA3 Authentication failure for CA2.
  - Fixed SPP connection issue.

## version 1.3.r34.p1

- New Additions:

- Updated CA2(8987) SoC firmware to p235.
- Added Separation of fw download from Wi-Fi initialization.
- Added support for Multicast group creation
- Updated license content in the wlan src for Murata or Generic customer.
- Added support for new firmware version display.
- Added config Macro for disabling Rx SDIO aggregation. This is enabled by default.
- Bug Fixes:
  - Fixed CH 144 connection issue.

## version 1.3.r33.p2

- New Additions:
  - Updated RB3+(8978) SoC firmware to p214.
  - Updated CA2(8987) SoC firmware to p200.
- Bug Fixes:
  - Fixed an issue where, wifi connection was failing during BLE activity.
  - Fixed an issue where a2dp profile app could not find a2dp sink device.

## version 1.3.r32.p5

- New Additions:
  - Updated RB3+(8978) SoC firmware to p198.
  - Updated CA2(8987) SoC firmware to p199.
- Bug Fixes:
  - Fixed an issue where BT pairing auth failure was observed between two 8987 or two IW416 devices due to same DH Public Key being generated.

## version 1.3.r32.p4

- New Additions:
  - Updated RB3+(8978) SoC firmware to p197.
- Bug Fixes:
  - Fixed an issue where, in presence of WLAN, BT A2DP SNK scenario can observe continuous glitches because of BT utilizing the WLAN overlapping channels.
  - Fixed an issue where, in presence of BT A2DP SRC scenario and WLAN traffic, both will share air-time. WLAN Rx TP can drop to 15-20% of its baseline because of A2DP occupying more air-time duty cycle.

## version 1.3.r32.p3

- New Additions:
  - Updated RB3+(8978) SoC firmware to p196.
  - Updated CA2(8987) SoC firmware to p162.
  - Updated RB3(8977) SoC firmware to p186.
  - Updated Falcon(8801) SoC firmware to p191.
- Bug Fixes:
  - Fixed an issue where STAUT was not advertising extended capabilities in assoc request
  - Fixed an issue where cal data download API is not setting the cal data correctly.
  - Fixed an issue where Ping of 10000 bytes is not working for WMM case with 11n/11ac pre-cert

WFA testbed AP's.

- VU FFD(vulnerability) fixes have been made for CA2(8987)/RB3+(8978)/RB3(8977)/-Falcon(8801).

version 1.3.r31.p1

- New Additions:
  - Updated RB3+(8978) SoC firmware to p152.
  - Updated CA2(8987) SoC firmware to p152.
  - Added WMM feature for 8987 SoC -Updates
  - Enabled wifi deep sleep and IEEEPS modes as part of CLI initialisation.
  - Updated module macro for CA2 from WIFI\_BOARD\_AW\_CM358MA to WIFI\_BOARD\_AW\_CM358.
- Bug Fixes:
  - Fixed deepsleep error when called immediately after disconnection
  - Fixed an issue where uAP was not turned on when country is specified using wlan\_set\_country API.

version 1.3.r30.p2

- New Additions:
  - Updated 8978 SoC firmware to p185.
  - Updated 8987 SoC firmware to p185.
- Bug Fixes:
  - Fixed a regression issue in WiFi FW where Ex-client is not able to associate with uAP on 8978 and 8987 SoC.

version 1.3.r30.p1

- New Additions:
  - Updated RB3+(8978) SoC firmware to p145.
  - Updated CA2(8987) SoC firmware to p145.
- Bug Fixes:
  - Fixed MISRA C-2012 Rule 14.4 issues.
  - Updated TX Power configuration table for uAP.
  - Fixed an issue where in MFG mode measured TX power value for 2.4GHz is 10.97dBm and for 5GHz is 12.03dBm always irrespective of TX-power values configured in CA2.
  - Fixed an issue where in control frames measured TX power is less than configured Tx power by 3dBm for 5Ghz 40Mhz BW and ~7dBm for 5Ghz 80Mhz BW in CA2.

version 1.3.r29.p2

- New Additions:
  - Updated 8987 SoC firmware to p142.
  - Updated 8978 SoC firmware to p142.
- Bug Fixes:
  - Fixed MISRA C-2012 Directive 4.7, Directive 4.10, Rule 15.7 and Rule 14.4 issues
  - Fixed wlan\_get\_sta\_tx\_power() API implementation for retrieving station tx power level.
  - Fixed wlan-set/get-tpwrlimit CLI command for setting/getting TX power limit for 11AC

modulation groups in 8987.

- Fixed an issue where in MFG mode(rf\_test\_mode=1) after disabling wlan\_set\_rf\_cont\_mode(CMD18\_CW=1) command response timeout is seen in 8987.

version 1.3.r29.p1

- New Additions:
  - Added support for 8987 SoC with p141 firmware version.
  - Updated 8978 SoC firmware to p141.
- Bug Fixes:
  - Fixed Misra C-2012 required category issues for Rule 17.7.
  - Fixes for BCA-TDM in Co-Ex for 8978 SoC.
  - Fixed A2DP glitches in BT when WLAN connected for 8978 SoC.

version 1.3.r27.p2

- New Additions:
  - Updated FW versions to p130 for 8978.

version 1.3.r27.p1

- Bug Fixes:
  - Fixed PMF pre-cert issue where STAUT is not associating to PSK-SHA-256 enabled AP.
  - Fixed 11N pre-cert issue where 11N-5.2.47 STAUT AMPDU TX test case is failing.

version 1.3.r26.p2

- New Additions:
  - Updated FW versions to p184 for 8977 and p122 FW for 8978.
  - Added wifi\_cert application under wifi\_examples.
- Bug Fixes:
  - Fixed an issue where connection problem is seen with uAP in wifi\_webconfig after removing stored credentials.
  - Fixed RF Test Mode issue for setting data rate in uAP mode.
  - Fixed Coverity and MISRA issues in WiFi Driver.
  - Fixed WPA3 SAE pre-cert requirement where there was requirement of Auth confirm to be initiated by either STA or Ex-AP.
  - Removed following API's from WiFi driver as they were not supported:
    - \* wifi\_auto\_reconnect\_enable()
    - \* wifi\_auto\_reconnect\_disable()
    - \* wifi\_get\_auto\_reconnect\_config()
    - \* wifi\_get\_tbtt\_offset()
    - \* wifi\_set\_packet\_filters()
    - \* wifi\_set\_auto\_arp()
    - \* wifi\_tcp\_keep\_alive()
    - \* wifi\_nat\_keep\_alive()

version 1.3.r23.p2

- New Additions:
  - Minor update to wifi\_test\_mode CLIs for better usability.

- Added bug fixes in WiFi FW and updated FW versions to p155 for 8801, p182 for 8977 and p106 for 8978.
- Added new wlan\_uap\_set\_htcapinfo() API for setting HT Capability field for uAP.
- Bug Fixes:
  - Fixed RF Test Mode issues for SD8801 and SD8977 reported by QA.
  - Fixed WiFi 802.11n WPA3 SAE pre-cert test failures for SD8978.
  - Fixed stack overflow issue with WLCMGR thread during wlan-connect.
  - Fixed memory corruption issue cause by scan list overflow when using 11D.

## version 1.3.r21.p1

- New Additions:
  - Added support for SD8978.
  - Added Test Mode support for 8801, 8977 and 8978.
  - Added new FW binaries for 8801, 8977 and 8978.
  - Added OTP Force Region support in WiFi Driver.
  - Added support for DHCP Server CLI to print IP addresses of connected clients to uAP.
  - Added support to set HT Capability field for uAP.
  - Added wlan\_get\_chanlist API and CLI.
  - Added WiFi Driver task priority configurability option.
  - Reduced WiFi Driver SRAM footprint.
  - Added support in Wi-Fi driver to print debug events from WLAN FW.
  - Added support for FW Dump generation using a micro-USB mass storage device.
- Bug Fixes:
  - Fixed an issue where a redundant Link Loss disconnect timer was defined in the wifi\_iperf app.
  - Fixed an issue where sometimes the wlan\_disconnect call did not abort an ongoing re-association.
  - Fixed an issue where station connection to an Open security Ext-AP fails after connection to a WPA3-SAE Ext-AP.
  - Fixed an issue where uAP did not start with WPA3-SAE security type.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

## version 1.3.r20.p1

- New Additions:
  - Added new FW for 8801.
- Bug Fixes:
  - Fixed an issue where STAUT went to hang state when doing a disconnect in the wifi\_iperf app.
  - Fixed an issue where STAUT failed to reassociate with an Ext-AP after band switch.
  - Fixed an issue where Scan command timeout was observed after changing the ssid of Ext-AP to which STAUT is connected.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

## version 1.3.r19.p1

- New Additions:
  - Added new FW for 8801.
  - Updated WiFi API reference manual.
- Bug Fixes:
  - Fixed an issue where STAUT attempted to connect with Ext-AP continuously even when an Auth Failure occurred due to incorrect passphrase.
  - Fixed an issue where SDIO write error occurred sometimes for some packet sizes during Tx.
  - Fixed an issue where packet leakage was noticed on SD8801 when noise was applied.
  - Fixed an issue to suppress Association Failed warning generated during a connection attempt.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r18.p1

- New Additions:
  - Added new FW for 8977.
- Bug Fixes:
  - Fixed an issue where STAUT fails to scan after Channel Switch and STAUT moves to new channel after eCSA IE.
  - Fixed IAR, MDK build compilation warnings.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r17.p1

- New Additions:
  - Added new FW for 8977.
  - Added CLI command to get a list of stations connected to uAP.
- Bug Fixes:
  - Fixed an issue where Scan was temporarily aborted due to noise but correct status was not being returned to the host.
  - Fixed an issue where STAUT failed to connect with an AP with hidden SSID.
  - Fixed IAR, MDK build compilation warnings.
  - Fixed an issue where TCP bi-directional throughput stops abruptly for SD8801 and STAUT is disconnected.
  - Fixed an issue where UDP Dual Mode throughput stops abruptly and disconnection is seen.
  - Fixed an issue where Tx got stuck after removal of interference noise.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r16.p1

- New Additions:
  - Added PMF Configuration for uAP.
  - Updated WLAN Versioning.
  - Updated WLAN CLIs.
- Bug Fixes:
  - Fixed an issue where the STAUT sometimes did not send aggregated packets during Tx.

- Fixed an issue External Client could not associate with the UAP in WPA3-SAE mode.
- Fixed IAR build compilation warnings.
- Fixed an issue where the STAUT failed to associate with an AP with hidden SSID.
- Fixed an issue where active scan probe requests were sent for DFS channels.
- Fixed an issue where 2.4GHz-HT40 power values were exposed via CLI configuration.
- Fixed an issue where the STAUT will be continuously in re-association mode after link-loss.
- Known Issues
  - Wi-Fi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r15.p1

- New Additions
  - Added support for Tx Power Limit configuration.
  - Added support for Channel List configuration.
  - Added support for CW MODE.
  - Added support for sysinfo CLI to get threads information, network stats, wlan stats and heap stats.
  - Added -d and -r options to iperf CLI for dual and trade-off mode.
  - Added support for antenna configuration for 8801.
  - Added support for band configuration.
  - Added new FW for 8977
- Bug Fixes:
  - Fixed an issue where UDP Rx data rate was low in iperf dual mode operation.
  - Fixed an issue where STAUT traffic was getting halted when there is traffic in overlapping BSS on the extension channel.
  - Fixed an issue where STAUT was not able to transmit above MCS 4.
  - Fixed an issue where association with uAP failed with WPA2 security mode.
  - Fixed an issue where STAUT failed to connect to WPA3 AP due to PMF config mismatch.
  - Fixed an issue where ping loss was observed for packets of size greater than 10000 bytes.
  - Fixed an issue in CLI where CR and LF characters were not handled properly.
  - Fixed an issue where TCP-Tx traffic abruptly stops when parallel traffic is ongoing on another device using the same AP.
  - Fixed an issue where DUT goes into hang state when iperf run is aborted.
  - Fixed an issue where the STATU was not sending aggregated packets to the AP.
  - Fixed an issue where UAP did not start with WPA2 security mode when ACS is configured.
  - Fixed an issue where ED MAC was not enabled by default.
- Known Issues
  - WiFi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r14.p1

- New Additions
  - Added support for Panasonic PAN9026 module.
  - Added -t option in iperf CLI for setting traffic running time.
  - Added -B option for supporting Tx/Rx Multicast packets during iperf runs.
  - Added World Wide Safe Mode configurability to the WiFi Driver.
  - Added ED MAC support for 8977.



- Added support for PMF APIs and CLIs.
- Added new FW for 8977 and 8801.
- Bug Fixes:
  - Fixed Coverity and mandatory MISRA issues reported on v1.3.r13.p1 release.
  - Fixed an issue where DUT console was getting stuck after initiating connection with an AP which has different RSN values than expected.
  - Fixed an issue where DUT was not able to roam from SAE-PSK to PSK configured AP.
  - Fixed an issue where the app became unresponsive after Soft AP is stopped.
  - Removed unnecessary files after Blackduck scan.
- Known Issues
  - WiFi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r1r3.p1

- New Additions
  - Updated WiFi Driver to be independent of the LwIP stack. Only the WLAN Connection Manager now uses LwIP.
  - Added WiFi Roaming feature.
  - Added CLI support for iperf in wifi\_cli app.
  - Added support for CSA handling from wlan station side.
  - Added WLAN APIs for wlan-set-txratecfg, wlan-get-txratecfg, wlan-get-data-rate, wlan-set-reg and wlan-get-reg.
  - Updated External AP SSID required for wifi\_iperf app.
- Bug Fixes:
  - Fixed Coverity issues reported on v1.3.r12.p1 release.
  - Added a fix for ping loss observed during ping test.
  - Added a fix where the console became unresponsive after wlan-start-network+wlan-stop-network commands are executed in loop.
  - Added a fix for HT IE missing from beacon for both 2.4GHz and 5GHZ bands.
  - Fixed warnings reported for IAR.
  - Added a fix for increasing DHCP lease time to 24 hrs for long duration stress tests.
- Known Issues
  - WiFi sample apps do not work with Rev-C (2018) version of RT685 board

version 1.3.r12.p1

- New Additions
  - Added support for ping utility.
- Bug Fixes
  - Restart of SoftAP fails once SoftAP is stopped.
  - HT IE is missing from beacon for both 2.4GHz and 5GHZ bands.
  - Low TCP-Rx and UDP-Rx throughput observed for 5GHz-HT40 band.
  - uAP couldn't be started after STA is associated to Ex-AP.
  - Stopping SoftAP results in disconnection of In-STA from Ex-AP.
  - DHCP server is not started for BSS created using "wlan-add" command.
- Known Issues
  - N.A

## version 1.3.r11.p2

- New Additions
  - Updated SDK version for RT1060 to 2.7.1 RFP RC2.
  - Added FP91 based WiFi FW for SD8801, SD8977, SD8978, and SD8987.
  - SD8801, SD8977, SD8978 and SD8987 WiFi Fw have embedded WPA3 SAE support from version v1.3.r11.p1 onwards.
  - Added WLAN CLI support. Added new wifi\_cli for CLI demo.
- Enhancements
  - License and Copyright Updates.
  - Formated code base with clang-format 10.0.0 standards.
  - Integrated PICK utility for WiFi Driver code scrubbing.
- Bug Fixes
  - Removed unnecessary prints LwIP stats display.
  - Fixed an issue where uAP did not start on 5GHz band.
  - Fixed an issue where loww TCP/UDP-Rx throughput was observed for 5GHz-HT40Mhz.
- Known Issues
  - N.A

## version 1.3.r10.p1

- New Additions
  - Moved to using LwIP provided IPerf App.
  - Added SDIO Rx Aggregation support to improve throughput.
  - Added support for 11ac configuration API.
  - Updated License and Copyright information on all WiFi driver files and sample apps.
  - Moved MCUXpresso SDK base for RT1060 platform from 2.6.2 to 2.7.0 rc3.
- Known Issues
  - N.A

## version 1.3.r9.p1

- New Additions
  - Achieved additional TP improvements by updating LwIP parameters.
- Bug Fixes
  - Fixed the issue of low throughput for both TCP and UDP (Tx/Rx) by updating LwIP parameters.
  - TCP Throughput was observed to be lower than UDP throughput by 70%-80%. Fixed this issue by updating TCP related LwIP configurations.
- Known Issues
  - N.A

## EdgeFast Bluetooth Protocol Abstraction Layer Implementation for MCU-Xpresso SDK

The current version is 1.0.0.

- 1.1.0
  - Improvement:
    - \* Updated to Zephyr Bluetooth 2.6.0
    - \* change fixed wireless\_uart central and peripheral role number to flexiable number.
- 1.0.0
  - New features:
    - \* Enable SMP Pairing and Bonding feature for BLE
    - \* Enable AVRCP
    - \* Enable L2CAP for BR
    - \* Add examples wireless\_uart and edgefast\_bluetooth\_shell
    - \* Enable data signing, GATT caching, GATT service changed features
    - \* Enable data len update, whitelist, phy update
    - \* Enable privacy mode
    - \* Enable setting for bonding
    - \* Enable A2DP content protection/recovery/reporting/delay reporting/header compression/multiplexing services.
  - Improvement:
    - \* Enhance SPP to support multiple connection
    - \* Use LittleFS to manage the NVM.
    - \* Improve A2DP APIs and implementation.
      - Add endpoint callbacks to struct bt\_a2dp\_endpoint.
      - Add content protection/recovery/reporting/delay reporting/header compression/multiplexing related fields to struct bt\_a2dp\_endpoint and struct bt\_a2dp\_control\_cb.
      - Upgrade struct a2dp\_configure\_result to struct bt\_a2dp\_endpoint\_configure\_result.
      - Add deconfigured callback.
      - Change sink\_start\_play callback to start\_play callback.
      - Change sink\_suspend\_play callback to stop\_play callback.
      - Add bt\_a2dp\_disconnect API.
      - Remove bt\_a2dp\_register\_control\_callback API.
      - Change bt\_a2dp\_configure API's callback.
      - Add peer\_endpoint to bt\_a2dp\_configure\_endpoint API.
      - Change bt\_a2dp\_src\_start to bt\_a2dp\_start.
      - Change bt\_a2dp\_src\_suspend to bt\_a2dp\_stop.
      - Remove bt\_a2dp\_get\_configured\_peer\_endpoint.
      - Change the parameter as endpoint for the APIs: bt\_a2dp\_deconfigure, bt\_a2dp\_start, bt\_a2dp\_stop, bt\_a2dp\_reconfigure, bt\_a2dp\_src\_media\_write and bt\_a2dp\_snk\_media\_sync.
      - Add new APIs for content protection/delay reporting services: bt\_a2dp\_set\_cp\_header, bt\_a2dp\_set\_initial\_delay\_report and bt\_a2dp\_send\_delay\_report.
- 0.1.0
  - New features:
    - \* Initialization version

## EdgeFast Bluetooth PAL for MCUXpresso SDK

The current version is 1.1.0.

- 1.1.0 (Based on Zephyr V2.6, commit: 2595cce7143cd34bc9e35405de4968dc58052692)
  - New features:
    - \* Update the header files to Zephyr V2.6 base.
- 1.0.0 (Based on Zephyr V2.5, commit: dabf23758417fd041fec2a2a821d8f526afac29d)
  - New features:
    - \* Update the header files to Zephyr V2.5 base.
- 0.1.0 (Based on Zephyr V2.4, tag: v2.4.0)
  - New features:
    - \* Initialization version

### 3 Component Change Log

#### CODEC

The current codec common driver version is 2.3.0.

- 2.3.0
  - Improvements
    - \* Added enum `_codec_volume_capability` for `CODEC_SetVolume/CODEC_SetMute` to cover more volume configurations.
- 2.2.2
  - Bug Fixes
    - \* Fixed the typo in codec common driver.
- 2.2.1
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 10.3, 8.3, 10.7, 17.7.
- 2.2.0
  - Improvements
    - \* Used `HAL_CODEC_HANDLER_SIZE` which is determined by low level driver instead of use `CODEC_HANDLE_SIZE` for the codec device handle definition.
- 2.1.1
  - Improvements
    - \* Supported all of the codec in the codec adapter.
    - \* Modified the codec handle definition to improve user experience.
    - \* Modified the capability member type from entity to pointer in codec handle.
  - Bug Fixes
    - \* Fixed the Coverity issue regarding array compared against 0.
- 2.1.0
  - Deprecated APIs
    - \* `CODEC_GetMappedFormatBits`
    - \* `CODEC_I2C_WriteReg`
    - \* `CODEC_I2C_ReadReg`
    - \* `CODEC_I2C_ModifyReg`
    - \* `CODEC_SetEncoding`
  - new APIs
    - \* `CODEC_SetPower`
    - \* `CODEC_SetVolume`
    - \* `CODEC_SetMute`
    - \* `CODEC_SetPlay`
    - \* `CODEC_SetRecord`
    - \* `CODEC_SetRecordChannel`
    - \* `CODEC_ModuleControl`
  - new features
    - \* Removed duplicate members in `codec_handle_t` and `codec_config_t`.

- \* Added codec\_config\_t pointer in codec\_handle\_t.
- \* Added codec capability flag in codec\_handle\_t.
- \* Used codec adapter instead of function opinter in codec common driver.
- 2.0.1
  - Added delayMs function pointer in codec handle.
- 2.0.0
  - Initial version.

## WM8904

The current wm8904 driver version is 2.5.0.

- 2.5.0
  - Improvements
    - \* Added master clock configuration support in function WM8904\_SetAudioFormat.
    - \* Align the sysclk paramter definition for the WM8904\_SetAudioFormat/WM8904\_SetMasterClock.
    - \* Added api WM8904\_SetDACVolume to support adjust DAC volume.
    - \* Fixed the MISRA-2012 violation of 12.2, 10.3.
- 2.4.4
  - Bug Fixes
    - \* Added the 11.025kHz/22.05kHz/44.1kHz samplerate support on codec WM8904.
    - \* Fixed the MISRA-2012 violation of 4.7.
- 2.4.3
  - Bug Fixes
    - \* Fixed the MISRA-2012 violations.
      - Fixed rule 8.6, 9.3, 10.1, 10.3, 10.4, 10.7, 10.8, 11.8, 11.9, 14.4, 16.1, 16.3, 16.4, 17.7, 20.9.
- 2.4.2
  - Bug Fixes
    - \* Corrected the volume setting function behavior in wm8904 driver, support range align with its specification range.
    - \* Corrected the volume setting function behavior in wm8904 adapter, support range 0 - 100, 0 for mute, 100 for maximum volume.
- 2.4.1
  - Bug Fixes
    - \* Fixed the bit width reigster field overwritten issue.
- 2.4.0
  - New features
    - \* Added flt support in wm8904 driver.
- 2.3.0
  - Improvements
    - \* Added new API WM8904\_SetMasterClock to support BCLK/LRCLK output mode.
- 2.1.0

- new APIs
  - \* WM8904\_ReadRegister
  - \* WM8904\_WriteRegister
  - \* WM8904\_ModifyRegister
  - \* WM8904\_SetRecord
  - \* WM8904\_SetPlay
  - \* WM8904\_SetRecordChannel
  - \* WM8904\_SetModulePower
  - \* WM8904\_SetChannelVolume
  - \* WM8904\_SetChannelMute

#### New features

- Removed dependency on codec common driver.
- Added dependency on codec i2c.

#### Bug Fixes

- Fixed unchecked return value in WM8904\_Deinit.
- Fixed the alignment fault issue by adding \_\_NOP between continuous memory access.

#### 2.0.3

- Bug Fixes
  - Fixed issue that wm8904 register access function truncated return value.

#### 2.0.2

- Bug Fixes
  - Fixed using uninitialized value format.fsRatio when calling WM8904\_UpdateFormat.

#### 2.0.1

- Added WM8904\_CheckAudioFormat API.
- Changed the second parameter's name of WM8904\_SetAudioFormat to sysclk.

#### 2.0.0

- Initial version.

## CS42888

The current cs42888 driver version is 2.1.3

- 2.1.3
  - Improvements
    - \* Removed the assertion for codec reset function pointer.
- 2.1.2
  - Improvements
    - \* Corrected the volume setting function behavior in CS42888 adapter, support range 0 - 100, 0 for mute, 100 for maximum volume.
  - Bug Fixes

- \* Fixed violations of MISRA C-2012 rule 4.7, 10.3, 8.3, 10.7, 17.7.
- \* Corrected the channel index during setting AIN volume in CS42888\_Init.
- 2.1.1
  - Improvements
    - \* Used software delay with delayMs pointer not provided by application.
    - \* Fixed error status overwrite issue in CS42888\_Init function.
    - \* Removed dependency on codec common driver.
    - \* Added API CS42888\_SelectFunctionalMode/CS42888\_SetChannelMute.
    - \* Added dependency on codec i2c.
- 2.1.0
  - Improvements
    - \* Unified CS42888 codec driver interface.
  - \* Bug Fixes
    - Corrected the ADC/DAC functional mode macro definition.
    - Added TDM and OLM mode support in the function CS42888\_SetProtocol.
- 2.0.0
  - Initial version.

## SERIAL\_MANAGER

The current Serial\_Manager component version is 1.0.2.

- 1.0.2
  - Add SerialManager\_WriteTimeDelay()/SerialManager\_ReadTimeDelay() for serial manager's read/write non-blocking mode.
- 1.0.1
  - Add prefixing fsl\_component\_xxx/fsl\_adapter\_xxx.
- 1.0.0
  - Initial version



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