

---

# **MCUXpresso SDK Release Notes Supporting evkmimxrt595**

**Change Logs**

**NXP Semiconductors**



# Contents

## Driver Change Log

<b>CLOCK</b> .....	<b>1</b>
<b>POWER</b> .....	<b>2</b>
<b>RESET</b> .....	<b>3</b>
<b>DSP</b> .....	<b>3</b>
<b>MIPI DSI SOC level driver</b> .....	<b>3</b>
<b>ACMP</b> .....	<b>4</b>
<b>CACHE</b> .....	<b>4</b>
<b>COMMON</b> .....	<b>5</b>
<b>CTIMER</b> .....	<b>7</b>
<b>DMIC</b> .....	<b>7</b>
<b>FLEXCOMM</b> .....	<b>8</b>
<b>I2C</b> .....	<b>9</b>
<b>I2S</b> .....	<b>11</b>
<b>SPI</b> .....	<b>12</b>
<b>USART</b> .....	<b>13</b>
<b>USART_DMA</b> .....	<b>15</b>
<b>USART_FREERTOS</b> .....	<b>15</b>
<b>FLEXIO</b> .....	<b>15</b>
<b>FLEXIO_UART</b> .....	<b>16</b>
<b>FLEXIO_I2C</b> .....	<b>17</b>

<b>Title</b>	<b>Page No.</b>
<b>FLEXIO_SPI</b> .....	<b>19</b>
<b>FLEXIO_MCU_LCD</b> .....	<b>20</b>
<b>FLEXIO_MCU_LCD_SMARTDMA</b> .....	<b>21</b>
<b>FLEXSPI</b> .....	<b>21</b>
<b>FLEXSPI DMA Driver</b> .....	<b>24</b>
<b>FMEAS</b> .....	<b>24</b>
<b>I3C</b> .....	<b>24</b>
<b>IAP</b> .....	<b>25</b>
<b>INPUTMUX</b> .....	<b>26</b>
<b>LCDIF</b> .....	<b>26</b>
<b>LPADC</b> .....	<b>27</b>
<b>CRC</b> .....	<b>28</b>
<b>DMA</b> .....	<b>28</b>
<b>GPIO</b> .....	<b>30</b>
<b>IOPCTL</b> .....	<b>30</b>
<b>RTC</b> .....	<b>31</b>
<b>MIPI_DSI</b> .....	<b>31</b>
<b>MIPI_DSI_SMARTDMA</b> .....	<b>32</b>
<b>MRT</b> .....	<b>33</b>
<b>MU</b> .....	<b>33</b>
<b>OSTIMER</b> .....	<b>34</b>
<b>OTFAD</b> .....	<b>34</b>
<b>PINT</b> .....	<b>35</b>
<b>POWERQUAD</b> .....	<b>36</b>
<b>PUF</b> .....	<b>36</b>

<b>Title</b>	<b>Page No.</b>
<b>SCTIMER</b> .....	<b>37</b>
<b>SEMA42</b> .....	<b>39</b>
<b>SMARTDMA</b> .....	<b>39</b>
<b>USDHC</b> .....	<b>40</b>
<b>UTICK</b> .....	<b>42</b>
<b>WWDT</b> .....	<b>43</b>

### **Middleware Change Log**

<b>DSP Audio Streamer</b> .....	<b>45</b>
<b>NatureDSP</b> .....	<b>45</b>
<b>emWin library</b> .....	<b>45</b>
<b>FatFs for MCUXpresso SDK</b> .....	<b>45</b>
<b>LigJpeg for KSDK</b> .....	<b>46</b>
<b>LittlevGL for KSDK</b> .....	<b>46</b>
<b>lwIP for MCUXpresso SDK</b> .....	<b>47</b>
<b>mbedTLS for MCUXpresso SDK</b> .....	<b>50</b>
<b>Multicore SDK</b> .....	<b>54</b>
<b>nghttp2 library for MCUXpresso SDK</b> .....	<b>59</b>
<b>Host USDHC driver for MCUXpresso SDK</b> .....	<b>60</b>
<b>MMC Card driver for MCUXpresso SDK</b> .....	<b>61</b>
<b>SD Card driver for MCUXpresso SDK</b> .....	<b>63</b>
<b>SDIO Card driver for MCUXpresso SDK</b> .....	<b>65</b>
<b>USB stack for MCUXpresso SDK</b> .....	<b>67</b>
<b>VGLite GPU Driver</b> .....	<b>72</b>
<b>NXP WiFi</b> .....	<b>78</b>

---

**Title**

**Page No.**

**Component Change Log**

<b>CODEC</b> .....	<b>87</b>
<b>WM8904</b> .....	<b>88</b>
<b>CS42888</b> .....	<b>89</b>
<b>TFA9896</b> .....	<b>90</b>
<b>SERIAL_MANAGER</b> .....	<b>90</b>

# 1 Driver Change Log

## CLOCK

The current CLOCK driver version is 2.6.1.

- 2.6.1
  - Improvements
    - \* Added lost comments for some enumerations.
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 11.1.
- 2.6.0
  - API changes
    - \* Added CLOCK\_EnableFroClkRange API.
    - \* FRO clock name changed from FRO192M, FRO96M, FRO48M, FRO24M, FRO12M to FRO\_DIV1, FRO\_DIV2, FRO\_DIV4, FRO\_DIV8, FRO\_DIV16.
  - Bug Fixes
    - \* Added kAUX0\_PLL\_to\_MIPI\_DPHYESC\_CLK, kAUX1\_PLL\_to\_MIPI\_DPHYESC\_CLK for clock\_attach\_id\_t.
    - \* Fixed the error usage of macro in CLOCK\_DeinitSysPfd() function.
- 2.5.1
  - Bug Fixes
    - \* Updated enum sys\_pll\_mult\_t and audio\_pll\_mult\_t to fix the supported MULT values for PLLs.
    - \* Added kHCLK\_to\_OSTIMER\_CLK for clock\_attach\_id\_t.
    - \* Fixed the calculation of main\_pll\_clk, dsp\_pll\_clk, aux0\_pll\_clk, aux0\_pll\_clk.
    - \* Renamed "kFRO192M\_to\_CLKOUT" to "kFRO96M\_to\_CLKOUT" to align with RM.
- 2.5.0
  - API change
    - \* Added CLOCK\_SetClkinFreq API.
  - Other Changes
    - \* Macro "CLK\_CLK\_IN" changed to "CLK\_EXT\_CLKIN".
- 2.4.0
  - API change
    - \* Added enableLowPower parameter in CLOCK\_EnableSysOscClk().
  - Other Changes
    - \* Fixed C++ build errors.
    - \* Added assert in CLOCK\_SetFRGClk(), the FRG DIV should be always set to 0xFF according to Reference Manual.
- 2.3.1
  - Other Changes:
    - \* Updated register access per the header file's change.
- 2.3.0
  - New feature:

- \* Moved SDK\_DelayAtLeastUs function from clock driver to common driver.
- 2.2.2
  - Bug Fixes
    - \* Avoided waiting REQFLAG when divider configured to HALT in CLOCK\_SetClkDiv().
- 2.2.1
  - Added CLOCK\_EnableLpOscClk() and CLOCK\_EnableFroClk() API
- 2.2.0
  - New feature
    - \* Added Deinit PLL&PFD API.
  - API change
    - \* Added delay\_us parameter in CLOCK\_EnableSysOscClk()
- 2.1.0
  - New feature
    - \* Adding new API CLOCK\_DelayAtLeastUs() implemented by DWT to allow users set delay in unit of microsecond.
- 2.0.1
  - Updated clock\_attach\_id\_t elements, removing the FRG(Fractional Generator) clock source selection from CLOCK\_AttachClk.
  - Users need call CLOCK\_SetFRGClock to set FRG clock source.
- 2.0.0
  - initial version.

## POWER

The current POWER driver version is 2.3.2.

- 2.3.2
  - Bug Fixes
    - \* Added PORCORE\_LP bitfield in macro PCFG0\_DEEP\_SLEEP.
    - \* Updated pSlowSwitches calculation in function countPartitionSwitches.
    - \* Added PMC internal clock divider config in POWER\_ApplyPD to decrease the PMC register access delay, incase the divider was enabled before.
- 2.3.1
  - Updated powerFreqLevel array for B2 sample.
- 2.3.0
  - Set MEMSEQNUM to 0x3F to turn on all partitions in parallel to decrease deep sleep wakeup time.
  - Updated power\_pad\_vrange\_val\_t for supported PAD voltage range.
- 2.2.2
  - Supported dual FRO frequency in deep sleep.
- 2.2.1
  - Optimized MAINCLKSAFETY calculation.
  - Used FRO48M instead of FRO192M as main clock source in deep sleep.
- 2.2.0

- Moved power lib implementaion to fsl\_power.c
- 2.1.0
  - Added LVD APIs.
  - Added POWER\_UpdatePmicRecoveryTime() API.
- 2.0.4
  - Supported OTP switch RBB in deep sleep.
- 2.0.3
  - Improved XIP recovery in deep sleep wakeup.
- 2.0.2
  - Added POWER\_SetDeepSleepClock() API to allow main clock source selection in deep sleep.
  - Added POWER\_SetPadVolRange() API
- 2.0.1
  - Added POWER\_UpdateOscSettlingTime() API to set on-board system osc settling time.
- 2.0.0
  - initial version.

## RESET

The current RESET driver version is 2.0.1.

- 2.0.1
  - Bug Fixes
    - \* Fixed MISRA C-2012 rule 10.6 and rule 16.4.
- 2.0.0
  - initial version.

## DSP

The current DSP driver version is 2.0.1.

- 2.0.1
  - Fixed Misra issue.
- 2.0.0
  - initial version.

## MIPI DSI SOC level driver

Current MIPI DSI SOC level driver version is 2.0.0

- 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 w1c 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
  - 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 2.3.0.

- 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.

## CTIMER

The current CTimer driver version is 2.2.1.

- 2.2.1
  - Bug Fixes
    - \* Fixed use specified channel to setting the PWM period in SetupPwmPeriod() API.
    - \* Fixed Coverity Out-of-bounds issue.
- 2.2.0
  - Improvements
    - \* Updated three API Interface to support Users to flexibly configure the PWM period and PWM output.
  - Bug Fixes
    - \* MISRA C-2012 issue fixed: rule 8.4.
- 2.1.0
  - Improvements
    - \* Added the CTIMER\_GetOutputMatchStatus() API Interface.
    - \* Added feature macro for FSL\_FEATURE\_CTIMER\_HAS\_NO\_CCR\_CAP2 and FSL\_FEATURE\_CTIMER\_HAS\_NO\_IR\_CR2INT.
- 2.0.3
  - Bug Fixes
    - \* MISRA C-2012 issue fixed: rule 10.3, 10.4, 10.6, 10.7 and 11.9.
- 2.0.2
  - New Features
    - \* Added new API "CTIMER\_GetTimerCountValue" to get the current timer count value.
    - \* Added a control macro to enable/disable the RESET and CLOCK code in current driver.
    - \* Added a new feature macro to update the API of CTimer driver for lpc8n04.
- 2.0.1
  - Improvements
    - \* API Interface Change
      - Changed API interface by adding CTIMER\_SetupPwmPeriod API and CTIMER\_UpdatePwmPulsePeriod API, which both can set up the right PWM with high resolution.
- 2.0.0
  - Initial version.

## DMIC

The current DMIC driver version is 2.3.0.

- 2.3.0
  - Improvements
    - \* Added new apis DMIC\_ResetChannelDecimator/DMIC\_EnableChannelGlobalSync/DMIC\_DisableChannelGlobalSync.
- 2.2.1

- Bug Fixes
  - \* Fixed violations of the MISRA C-2012 rules 14.4, 17.7, 10.4, 10.3, 10.8, 14.3.
- 2.2.0
  - Bug Fixes
    - \* Corrected the usage of feature FSL\_FEATURE\_DMIC\_IO\_HAS\_NO\_BYPASS.
- 2.1.1
  - Improvements
    - \* Added feature FSL\_FEATURE\_DMIC\_HAS\_NO\_IOCFG for IOCFG register.
- 2.1.0
  - New Features
    - \* Added API DMIC\_EnableChannelInterrupt/DMIC\_EnableChannelDma to replace API DMIC\_SetOperationMode.
    - \* Added API DMIC\_SetIOCFG and marked DMIC\_ConfigIO as deprecated.
    - \* Added API DMIC\_EnableChannelSignExtend to support sign extend feature.
- 2.0.5
  - Improvements
    - \* Changed some parameters' value of DMIC\_FifoChannel API, such as enable, resetn, and trig\_level. This is not possible for the current code logic, so it improves the DMIC\_FifoChannel logic and fixes incorrect math logic.
- 2.0.4
  - Bug Fixes
    - \* Fixed the issue that DMIC DMA driver(ver2.0.3) did not support calling DMIC\_TransferReceiveDMA in DMA callback as it did before version 2.0.3. But calling DMIC\_TransferReceiveDMA in callback is not recommended.
- 2.0.3
  - New Features
  - Supported linked transfer in DMIC DMA driver.
  - Added new API DMIC\_EnableChannelFifo/DMIC\_DoFifoReset/DMIC\_InstallDMADescriptor.
- 2.0.2
  - New Features
    - \* Supported more channels in driver.
- 2.0.1
  - New Features
    - \* Added a control macro to enable/disable the RESET and CLOCK code in current driver.
- 2.0.0
  - Initial version.

## FLEXCOMM

The current FLEXCOMM driver version is 2.0.2.

- 2.0.2
  - Bug Fixes

- \* Fixed typos in FLEXCOMM15\_DriverIRQHandler().
- \* Fixed MISRA issues.
  - Fixed rules 10.1, 10.3, 10.4, 10.7, 10.8, 11.3, 11.6, 11.8, 11.9, 13.5.
- Improvements
  - \* Added instance calculation in FLEXCOMM16\_DriverIRQHandler() to align with Flexcomm 14 and 15.
- 2.0.1
  - Improvements
    - \* Added more IRQHandler code in drivers to adapt new devices.
- 2.0.0
  - Initial version.

## I2C

The current I2C driver version is 2.3.0.

- 2.3.0
  - Improvement
    - \* Added new return codes kStatus\_I2C\_EventTimeout and kStatus\_I2C\_SclLowTimeout, and added the check for event timeout and SCL timeout in I2C master transfer.
- 2.2.0
  - New Features
    - \* Added enumeration `_i2c_status_flags` to include all previous master and slave status flags, and added missing status flags.
    - \* Modified `I2C_GetStatusFlags` to get all I2C flags.
    - \* Added API `I2C_ClearStatusFlags` to clear all clearable flags not just master flags.
    - \* Modified master transactional APIs to enable bus event timeout interrupt during transfer, to avoid glitch on bus causing transfer hangs indefinitely.
  - Bug Fixes
    - \* Fixed bug that status flags and interrupt enable masks share the same enumerations by adding enumeration `_i2c_interrupt_enable` for all master and slave interrupt sources.
- 2.1.0
  - Bug Fixes
    - \* Fixed bug that during master transfer, when master is nacked during slave probing or sending subaddress, the return status should be `kStatus_I2C_Addr_Nak` rather than `kStatus_I2C_Nak`.
  - Bug Fixes
    - \* Fixed MISRA issues.
      - Fixed rules 10.1, 10.4, 13.5.
  - New Features
    - \* Added macro `I2C_MASTER_TRANSMIT_IGNORE_LAST_NACK`, so that user can configure whether to ignore the last byte being nacked by slave during master transfer.
- 2.0.8
  - Bug Fixes

- \* Fixed I2C\_MasterSetBaudRate issue that MSTSCLOW and MSTSCHIGH are incorrect when MSTTIME is odd.
- 2.0.7
  - Bug Fixes
    - \* Two dividers, CLKDIV and MSTTIME are used to configure baudrate. According to reference manual, in order to generate 400kHz baudrate, the clock frequency after CLKDIV must be less than 2mHz. Fixed the bug that, the clock frequency after CLKDIV may be larger than 2mHz using the previous calculation method.
    - \* Fixed MISRA 10.1 issues.
    - \* Fixed wrong baudrate calculation when feature FSL\_FEATURE\_I2C\_PREPCLKFRG\_8MHZ is enabled.
- 2.0.6
  - New Features
    - \* Added master timeout self-recovery support for feature FSL\_FEATURE\_I2C\_TIMEOUT\_RECOVERY.
  - Bug Fixes
    - \* Eliminated IAR Pa082 warning.
    - \* Fixed MISRA issues.
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 10.8, 11.3, 11.6, 11.8, 11.9, 13.5.
- 2.0.5
  - Bug Fixes
    - \* Fixed wrong assignment for datasize in I2C\_InitTransferStateMachineDMA.
    - \* Fixed wrong working flow in I2C\_RunTransferStateMachineDMA to ensure master can work in no start flag and no stop flag mode.
    - \* Fixed wrong working flow in I2C\_RunTransferStateMachine and added kReceiveData-BEGINState in \_i2c\_transfer\_states to ensure master can work in no start flag and no stop flag mode.
    - \* Fixed wrong handle state in I2C\_MasterTransferDMAHandleIRQ. After all the data has been transferred or nak is returned, handle state should be changed to idle.
  - Improvements
    - \* Rounded up the calculated divider value in I2C\_MasterSetBaudRate.
- 2.0.4
  - Improvements
    - \* Updated the I2C\_WATI\_TIMEOUT macro to unified name I2C\_RETRY\_TIMES
    - \* Updated the "I2C\_MasterSetBaudRate" API to support baudrate configuration for feature QN9090.
  - Bug Fixes
    - \* Fixed build warning caused by uninitialized variable.
    - \* Fixed COVERITY issue of unchecked return value in I2C\_RTOS\_Transfer.
- 2.0.3
  - Improvements
    - \* Unified the component full name to FLEXCOMM I2C(DMA/FREERTOS) driver.
- 2.0.2
  - Improvements
    - \* In slave IRQ:

1. Changed slave receive process to first set the I2C\_SLVCTL\_SLVCONTINUE\_MASK to acknowledge the received data, then do data receive.
  2. Improved slave transmit process to set the I2C\_SLVCTL\_SLVCONTINUE\_MASK immediately after writing the data.
- 2.0.1
    - Improvements
      - \* Added I2C\_WATI\_TIMEOUT macro to allow users to specify the timeout times for waiting flags in functional API and blocking transfer API.
  - 2.0.0
    - Initial version.

## I2S

The current I2S driver version is 2.2.2

- 2.2.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 8.4.
- 2.2.1
  - Improvements
    - \* Added feature FSL\_FEATURE\_FLEXCOMM\_INSTANCE\_I2S\_SUPPORT\_SECONDARY\_CHANNELn for the SOC has parts of instance support secondary channel.
  - Bug Fixes
    - \* Added volatile statement for the state variable of i2s\_handle and enable the mainline channel pair before enable interrupt to avoid the issue of code execution reordering which may cause the interrupt generated unexpectedly.
- 2.2.0
  - Improvements
    - \* Added 8/16/24 bits mono data format transfer support in I2S driver.
    - \* Added new apis I2S\_SetBitClockRate.
  - Bug Fixes
    - \* Fixed the PA082 build warning.
    - \* Fixed the sign-compare warning.
    - \* Fixed violations of the MISRA C-2012 rules 10.4, 10.8, 11.9, 10.1, 11.3, 13.5, 11.8, 10.3, 10.7.
    - \* Fixed the Operand don't affect result Coverity issue.
- 2.1.0
  - Improvements
    - \* Added a feature for the FLEXCOMM which supports I2S and has interconnection with DMIC.
    - \* Used a feature to control PDMDATA instead of I2S\_CFG1\_PDMDATA.
    - \* Added member bytesPerFrame in i2s\_dma\_handle\_t, used for DMA transfer width configure, instead of using sizeof(uint32\_t) hardcoded.
    - \* Used the macro provided by DMA driver to define the I2S DMA descriptor.



- Bug Fixes
  - \* Fixed the issue that I2S DMA driver always generated duplicate callback.
- 2.0.3
  - New Features
    - \* Added a feature to remove configuration for the second channel on LPC51U68.
- 2.0.2
  - New Features
    - \* Added ENABLE\_IRQ handle after register I2S interrupt handle.
- 2.0.1
  - Improvements
    - \* Unified the component full name to FLEXCOMM I2S (DMA) driver.
- 2.0.0
  - Initial version.

## SPI

The current SPI driver version is 2.2.1.

- 2.2.1
  - Bug Fixes
    - \* Fixed MISRA 2012 10.4 issue.
    - \* Added code to clear FIFOs before transfer using DMA.
- 2.2.0
  - Bug Fixes
    - \* Fixed bug that slave gets stuck during interrupt transfer.
- 2.1.1
  - Improvements
    - \* Added timeout mechanism when waiting certain states in transfer driver.
  - Bug Fixes
    - \* Fixed MISRA 10.1, 5.7 issues.
- 2.1.0
  - Bug Fixes
    - \* Fixed Coverity issue of incrementing null pointer in SPI\_TransferHandleIRQInternal.
    - \* Eliminated IAR Pa082 warnings.
    - \* Fixed MISRA issues.
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 10.8, 11.3, 11.6, 11.8, 11.9, 13.5.
  - New Features
    - \* Modified the definition of SPI\_SSELPOL\_MASK to support the socs that have only 3 SSEL pins.
- 2.0.4
  - Bug Fixes
    - \* Fixed the bug of using read only mode in DMA transfer. In DMA transfer mode, if transfer->txData is NULL, code attempts to read data from the address of 0x0 for configuring the last frame.

- \* Fixed wrong assignment of handle->state. During transfer handle->state should be kSPI\_I\_Busy rather than kStatus\_SPI\_Busy.
- Improvements
  - \* Rounded up the calculated divider value in SPI\_MasterSetBaud.
- 2.0.3
  - Improvements
    - \* Added "SPI\_FIFO\_DEPTH(base)" with more definition.
- 2.0.2
  - Improvements
    - \* Unified the component full name to FLEXCOMM SPI(DMA/FREERTOS) driver.
- 2.0.1
  - Changed the data buffer from uint32\_t to uint8\_t which matches the real applications for SPI DMA driver.
  - Added dummy data setup API to allow users to configure the dummy data to be transferred.
  - Added new APIs for half-duplex transfer function. Users can not only send and receive data by one API in polling/interrupt/DMA way, but choose either to transmit first or to receive first. Besides, the PCS pin can be configured as assert status in transmission (between transmit and receive) by setting the isPcsAssertInTransfer to true.
- 2.0.0
  - Initial version.

## USART

The current USART driver version is 2.6.0.

- 2.6.0
  - Improvements
    - \* Use separate data for TX and RX in usart\_transfer\_t.
  - Bug Fixes
    - \* Fixed bug that when ring buffer is used, if some data is received in ring buffer first before calling USART\_TransferReceiveNonBlocking, the received data count returned by USART\_TransferGetReceiveCount is wrong.
  - New Features
    - \* Added missing API USART\_TransferGetSendCountDMA get send count using DMA.
- 2.5.0
  - New Features
    - \* Added APIs USART\_GetRxFifoCount/USART\_GetTxFifoCount to get rx/tx FIFO data count.
    - \* Added APIs USART\_SetRxFifoWatermark/USART\_SetTxFifoWatermark to set rx/tx FIFO water mark.
  - Bug Fixes
    - \* Fixed DMA transfer blocking issue by enabling tx idle interrupt after DMA transmission finishes.
- 2.4.0

- New Features
  - \* Modified `usart_config_t`, `USART_Init` and `USART_GetDefaultConfig` APIs so that the hardware flow control can be enabled during module initialization.
- Bug Fixes
  - \* Fixed MISRA 10.4 violation.
- 2.3.1
  - Bug Fixes
    - \* Fixed bug that operation on `INTENSET`, `INTENCLR`, `FIFOINTENSET` and `FIFOINTE-NCLR` should use bitwise operation not 'or' operation.
    - \* Fixed bug that if rx interrupt occurs before TX interrupt is enabled and after `txDataSize` is configured, the data will be sent early by mistake, thus TX interrupt will be enabled after data is sent out.
  - Improvements
    - \* Added check for baud rate's accuracy that returns `kStatus_USART_BaudrateNotSupport` when the best achieved baud rate is not within 3% error of configured baud rate.
- 2.3.0
  - New Features
    - \* Added APIs to configure 9-bit data mode, set slave address and send address.
    - \* Modified `USART_TransferReceiveNonBlocking` and `USART_TransferHandleIRQ` to use 9-bit mode in multi-slave system.
- 2.2.0
  - New Features
    - \* Added the feature of supporting USART working at 32 kHz clocking mode.
  - Improvements
    - \* Modified `USART_TransferHandleIRQ` so that `txState` will be set to idle only when all data has been sent out to bus.
    - \* Modified `USART_TransferGetSendCount` so that this API returns the real byte count that USART has sent out rather than the software buffer status.
    - \* Added timeout mechanism when waiting for certain states in transfer driver.
  - Bug Fixes
    - \* Fixed MISRA 10.1 issues.
    - \* Fixed bug that operation on `INTENSET`, `INTENCLR`, `FIFOINTENSET` and `FIFOINTE-NCLR` should use bitwise operation not 'or' operation.
    - \* Fixed bug that if rx interrupt occurs before TX interrupt is enabled and after `txDataSize` is configured, the data will be sent early by mistake, thus TX interrupt will be enabled after data is sent out.
- 2.1.1
  - Improvements
    - \* Added check for transmitter idle in `USART_TransferHandleIRQ` and `USART_Transfer-SendDMACallback` to ensure all the data would be sent out to bus.
    - \* Modified `USART_ReadBlocking` so that if more than one receiver errors occur, all status flags will be cleared and the most severe error status will be returned.
  - Bug Fixes
    - \* Eliminated IAR Pa082 warnings.
    - \* Fixed MISRA issues.

- Fixed rules 10.1, 10.3, 10.4, 10.7, 10.8, 11.3, 11.6, 11.8, 11.9, 13.5.
- 2.1.0
  - New Features
    - \* Added features to allow users to configure the USART to synchronous transfer(master and slave) mode.
  - Bug Fixes
    - \* Modified USART\_SetBaudRate to get more accurate configuration.
- 2.0.3
  - New Features
    - \* Added new APIs to allow users to enable the CTS which determines whether CTS is used for flow control.
- 2.0.2
  - Bug Fixes
    - \* Fixed the bug where transfer abort APIs could not disable the interrupts. The FIFOINT-ENSET register should not be used to disable the interrupts, so use the FIFOINTENCLR register instead.
- 2.0.1
  - Improvements
    - \* Unified the component full name to FLEXCOMM USART (DMA/FREERTOS) driver.
- 2.0.0
  - Initial version.

## USART\_DMA

The current USART\_DMA driver version is 2.5.0.

- 2.5.0
  - Refer USART driver change log 2.0.1 to 2.5.0

## USART\_FREERTOS

The current USART\_FREERTOS driver version is 2.5.0.

- 2.5.0
  - Refer USART driver change log 2.0.1 to 2.5.0

## FLEXIO

The current FLEXIO driver version is 2.0.4.

- 2.0.4
  - Bug Fixes
    - \* Fixed MISRA 8.4 issues.
- 2.0.3

- Bug Fixes
  - \* Fixed MISRA 10.4 issues.
- 2.0.2
  - Improvements
    - \* Split FLEXIO component which combines all flexio/flexio\_uart/flexio\_i2c/flexio\_i2s drivers into several components: FlexIO component, flexio\_uart component, flexio\_i2c\_-master component, and flexio\_i2s component.
  - Bug Fixes
    - \* Fixed MISRA issues
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 11.6, 11.9, 14.4, 17.7.
- 2.0.1
  - Bug Fixes
    - \* Fixed the dozen mode configuration error in FLEXIO\_Init API. For enableInDoze = true, the configuration should be 0; for enableInDoze = false, the configuration should be 1.

## FLEXIO\_UART

The current FLEXIO\_UART driver version is 2.4.0.

- 2.4.0
  - Improvements
    - \* Use separate data for TX and RX in flexio\_uart\_transfer\_t.
  - Bug Fixes
    - \* Fixed bug that when ring buffer is used, if some data is received in ring buffer first before calling FLEXIO\_UART\_TransferReceiveNonBlocking, the received data count returned by FLEXIO\_UART\_TransferGetReceiveCount is wrong.
- 2.3.0
  - Improvements
    - \* Added check for baud rate's accuracy that returns kStatus\_FLEXIO\_UART\_Baudrate-NotSupport when the best achieved baud rate is not within 3% error of configured baud rate.
  - Bug Fixes
    - \* Added codes in FLEXIO\_UART\_TransferCreateHandle to clear pending NVIC IRQ before enabling NVIC IRQ, to fix issue of pending IRQ interfering the on-going process.
- 2.2.0
  - Improvements
    - \* Added timeout mechanism when waiting for certain states in transfer driver.
  - Bug Fixes
    - \* Fixed MISRA 10.4 issues.
- 2.1.6
  - Bug Fixes
    - \* Fixed IAR Pa082 warnings.
    - \* Fixed MISRA issues
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 11.6, 11.9, 14.4, 17.7.

- 2.1.5
  - Improvements
    - \* Triggered user callback after all the data in ringbuffer were received in FLEXIO\_UART-  
\_TransferReceiveNonBlocking.
- 2.1.4
  - Improvements
    - \* Unified component full name to FLEXIO UART(DMA/EDMA) Driver.
- 2.1.3
  - Bug Fixes
    - \* The following modifications support FLEXIO using multiple instances:
      - Removed FLEXIO\_Reset API in module Init APIs.
      - Updated module Deinit APIs to reset the shifter/timer configuration instead of disabling module and clock.
      - Updated module Enable APIs to only support enable operation.
- 2.1.2
  - Bug Fixes
    - \* Fixed the transfer count calculation issue in FLEXIO\_UART\_TransferGetReceiveCount, FLEXIO\_UART\_TransferGetSendCount, FLEXIO\_UART\_TransferGetReceiveCountDMA, FLEXIO\_UART\_TransferGetSendCountDMA, FLEXIO\_UART\_TransferGetReceiveCountEDMA and FLEXIO\_UART\_TransferGetSendCountEDMA.
    - \* Fixed the Dozen mode configuration error in FLEXIO\_UART\_Init API. For enableInDoze = true, the configuration should be 0; for enableInDoze = false, the configuration should be 1.
    - \* Added code to report errors if the user sets a too-low-baudrate which FLEXIO cannot reach.
    - \* Disabled FLEXIO\_UART receive interrupt instead of all NVICs when reading data from ring buffer. If ring buffer is used, receive nonblocking will disable all NVIC interrupts to protect the ring buffer. This had negative effects on other IPs using interrupt.
- 2.1.1
  - Bug Fixes
    - \* Changed the API name FLEXIO\_UART\_StopRingBuffer to FLEXIO\_UART\_Transfer-StopRingBuffer to align with the definition in C file.
- 2.1.0
  - New Features
    - \* Added Transfer prefix in transactional APIs.
    - \* Added txSize/rxSize in handle structure to record the transfer size.
  - Bug Fixes
    - \* Added an error handle to handle the situation that data count is zero or data buffer is NULL.

## FLEXIO\_I2C

The current FLEXIO\_I2C driver version is 2.4.0.

- 2.4.0
  - Improvements
    - \* Added delay of 1 clock cycle in FLEXIO\_I2C\_MasterTransferRunStateMachine to ensure that bus would be idle before next transfer if master is nacked.
    - \* Fixed issue that the restart setup time is less than the time in I2C spec by adding delay of 1 clock cycle before restart signal.
- 2.3.0
  - Improvements
    - \* Used 3 timers instead of 2 to support transfer which is more than 14 bytes in single transfer.
    - \* Improved FLEXIO\_I2C\_MasterTransferGetCount so that the API can check whether the transfer is still in progress.
  - Bug Fixes
    - \* Fixed MISRA 10.4 issues.
- 2.2.0
  - New Features
    - \* Added timeout mechanism when waiting certain state in transfer API.
    - \* Added an API for checking bus pin status.
  - Bug Fixes
    - \* Fixed COVERITY issue of useless call in FLEXIO\_I2C\_MasterTransferRunStateMachine.
    - \* Fixed MISRA issues
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 11.6, 11.9, 14.4, 17.7.
    - \* Added codes in FLEXIO\_I2C\_MasterTransferCreateHandle to clear pending NVIC IRQ, disable internal IRQs before enabling NVIC IRQ.
    - \* Modified code so that during master's nonblocking transfer the start and slave address are sent after interrupts being enabled, in order to avoid potential issue of sending the start and slave address twice.
- 2.1.7
  - Bug Fixes
    - \* Fixed the issue that FLEXIO\_I2C\_MasterTransferBlocking did not wait for STOP bit sent.
    - \* Fixed COVERITY issue of useless call in FLEXIO\_I2C\_MasterTransferRunStateMachine.
    - \* Fixed the issue that I2C master did not check whether bus was busy before transfer.
- 2.1.6
  - Bug Fixes
    - \* Fixed the issue that I2C Master transfer APIs(blocking/non-blocking) did not support the situation of master transfer with subaddress and transfer data size being zero, which means no data followed the subaddress.
- 2.1.5
  - Improvements
    - \* Unified component full name to FLEXIO I2C Driver.
- 2.1.4
  - Bug Fixes
    - \* The following modifications support FlexIO using multiple instances:

- Removed FLEXIO\_Reset API in module Init APIs.
  - Updated module Deinit APIs to reset the shifter/timer config instead of disabling module/clock.
  - Updated module Enable APIs to only support enable operation.
- 2.1.3
  - Improvements
    - \* Changed the prototype of FLEXIO\_I2C\_MasterInit to return kStatus\_Success if initialized successfully or to return kStatus\_InvalidArgument if "(srcClock\_Hz / master-Config->baudRate\_Bps) / 2 - 1" exceeds 0xFFU.
- 2.1.2
  - Bug Fixes
    - \* Fixed the FLEXIO I2C issue where the master could not receive data from I2C slave in high baudrate.
    - \* Fixed the FLEXIO I2C issue where the master could not receive NAK when master sent non-existent addr.
    - \* Fixed the FLEXIO I2C issue where the master could not get transfer count successfully.
    - \* Fixed the FLEXIO I2C issue where the master could not receive data successfully when sending data first.
    - \* Fixed the Dozen mode configuration error in FLEXIO\_I2C\_MasterInit API. For enable-InDoze = true, the configuration should be 0; for enableInDoze = false, the configuration should be 1.
    - \* Fixed the issue that FLEXIO\_I2C\_MasterTransferBlocking API called FLEXIO\_I2C\_MasterTransferCreateHandle, which lead to the s\_flexioHandle/s\_flexioIsr/s\_flexioType variable being written. Then, if calling FLEXIO\_I2C\_MasterTransferBlocking API multiple times, the s\_flexioHandle/s\_flexioIsr/s\_flexioType variable would not be written any more due to it being out of range. This lead to the following situation: NonBlocking transfer APIs could not work due to the fail of register IRQ.
- 2.1.1
  - Bug Fixes
    - \* Implemented the FLEXIO\_I2C\_MasterTransferBlocking API which is defined in header file but has no implementation in the C file.
- 2.1.0
  - New Features
    - \* Added Transfer prefix in transactional APIs.
    - \* Added transferSize in handle structure to record the transfer size.

## FLEXIO\_SPI

The current FLEXIO\_SPI driver version is 2.2.0.

- 2.2.0
  - Improvements
    - \* Added timeout mechanism when waiting certain states in transfer driver.
  - Bug Fixes



- \* Fixed MISRA 10.4 issues.
- \* Added codes in FLEXIO\_SPI\_MasterTransferCreateHandle and FLEXIO\_SPI\_SlaveTransferCreateHandle to clear pending NVIC IRQ before enabling NVIC IRQ, to fix issue of pending IRQ interfering the on-going process.
- 2.1.3
  - Improvements
    - \* Unified component full name to FLEXIO SPI(DMA/EDMA) Driver.
  - Bug Fixes
    - \* Fixed MISRA issues
      - Fixed rules 10.1, 10.3, 10.4, 10.7, 11.6, 11.9, 14.4, 17.7.
- 2.1.2
  - Bug Fixes
    - \* The following modification support FlexIO using multiple instances:
      - Removed FLEXIO\_Reset API in module Init APIs.
      - Updated module Deinit APIs to reset the shifter/timer config instead of disabling module/clock.
      - Updated module Enable APIs to only support enable operation.
- 2.1.1
  - Bug Fixes
    - \* Fixed bug where FLEXIO SPI transfer data is in 16 bit per frame mode with eDMA.
    - \* Fixed bug when FLEXIO SPI works in eDMA and interrupt mode with 16-bit per frame and Lsbfirst.
    - \* Fixed the Dozen mode configuration error in FLEXIO\_SPI\_MasterInit/FLEXIO\_SPI\_SlaveInit API. For enableInDoze = true, the configuration should be 0; for enableInDoze = false, the configuration should be 1.
  - Improvements
    - \* Added #ifndef/#endif to allow users to change the default TX value at compile time.
- 2.1.0
  - New Features
    - \* Added Transfer prefix in transactional APIs.
    - \* Added transferSize in handle structure to record the transfer size.
  - Bug Fixes
    - \* Fixed the error register address return for 16-bit data write in FLEXIO\_SPI\_GetTxData-RegisterAddress.
    - \* Provided independent IRQHandler/transfer APIs for Master and slave to fix the baudrate limit issue.

## FLEXIO\_MCU\_LCD

The current FLEXIO\_MCU\_LCD driver version is 2.0.6.

- 2.0.6
  - Bug Fixes
    - \* Fixed MISRA 10.4 issues when FLEXIO\_MCULCD\_DATA\_BUS\_WIDTH defined as

- signed value.
- 2.0.5
  - Improvements
    - \* Changed FLEXIO\_MCULCD\_WriteDataArrayBlocking's data parameter to const type.
- 2.0.4
  - Bug Fixes
    - \* Fixed MISRA 10.4 issues.
- 2.0.3
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 10.1, 10.3, 10.4, 10.6, 14.4, 17.7.
- 2.0.2
  - Improvements
    - \* Unified component full name to FLEXIO\_MCU\_LCD (EDMA) driver.
- 2.0.1
  - Bug Fixes
    - \* The following modification to support FlexIO using multiple instances:
      - Removed FLEXIO\_Reset API in module Init APIs.
      - Updated module Deinit APIs to reset the shifter/timer configuration instead of disabling module and clock.
      - Updated module Enable APIs to only support enable operation.
- 2.0.0
  - Initial version.

## FLEXIO\_MCU\_LCD\_SMARTDMA

The current FLEXIO\_MCU\_LCD\_SMARTDMA driver version is 2.0.2.

- 2.0.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 10.1, 10.3, 10.4, 10.6, 14.4, 17.7.
- 2.0.1
  - Other Changes
    - \* Update driver implementation due to SMARTDMA driver update.
- 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\_ReadBlocking.
- 2.2.0
  - Bug Fixes
    - \* Fixed flag name typos: kFLEXSPI\_IpTxFifoWatermarkEmpltyFlag 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\_AHBUSERROREN.
- 2.1.1
  - Improvements
    - \* Defaulted enable prefetch for AHB RX buffer configuration in FLEXSPI\_GetDefaultConfig, 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\_AHB RX BUFxCR0 - 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\_TransferDMA, only up to one linked descriptor is needed according to hardware update.
- 2.0.0
  - Initial version.

## FMEAS

The current FMEAS driver version is 2.1.1.

- 2.1.1
  - Bug Fixes
    - \* MISRA C-2012 issues fixed: rule 10.4, rule 10.8.
- 2.1.0
  - Updated "FMEAS\_GetFrequency", "FMEAS\_StartMeasure", "FMEAS\_IsMeasureComplete" API and add definition to match ASYNC\_SYSCON.
- 2.0.0
  - Initial version ported from LPCOpen.

## I3C

The current I3C driver version is 2.3.2.

- 2.3.2

- Bug Fixes
  - \* Fixed violations of the MISRA C-2012 rules 8.4, 17.7.
  - \* Fixed incorrect HotJoin event index in I3C\_GetIBIType.
- 2.3.1
  - Bug Fixes
    - \* Fixed the issue that call of I3C\_MasterTransferBlocking/I3C\_MasterTransferNon-Blocking fails for the case which receive length 1 byte of data.
    - \* Fixed the issue that STOP signal is not sent when NAK status is detected during execution of I3C\_MasterTransferBlocking function.
- 2.3.0
  - Improvements
    - \* Added I3C common driver APIs to initialize I3C with both master and slave configuration.
    - \* Updated I3C master transfer callback to function set structure to include callback invoke for IBI event and slave2master event.
    - \* Updated I3C master non-blocking transfer model and always enable the interrupts to be able to re-act to the slave start event and handle slave IBI.
- 2.2.0
  - Bug Fixes
    - \* Fixed the issue that I3C transfer size limit to 255 bytes.
- 2.1.2
  - Bug Fixes
    - \* Reset default hkeep value to kI3C\_MasterHighKeeperNone in I3C\_MasterGetDefault-Config
- 2.1.1
  - Bug Fixes
    - \* Fixed incorrect FIFO reset operation in I3C Master Transfer APIs.
    - \* Fixed i3c slave IRQ handler issue, slave transmit could be underrun because tx FIFO is not filled in time right after start flag detected.
- 2.1.0
  - Added definitions and APIs for I3C slave functionality, updated previous I3C APIs to support I3C functionality.
- 2.0.0
  - Initial version.

## IAP

The current IAP driver version is 2.1.3.

- 2.1.3
  - Bug Fixes
    - \* Fixed misra issue.
- 2.1.2
  - Bug Fixes
    - \* Fixed some macro undefined issue.

- \* Put IAP\_FlexspiNorInit API into RAM.
- 2.1.1
  - Bug Fixes
    - \* Fixed misra issue.
- 2.1.0
  - New Features
    - \* Added IAP\_RunBootLoader() API
- 2.0.2
  - Bug Fixes
    - \* Fixed doxygen issue.
- 2.0.1
  - Bug Fixes
    - \* Minor update for MISRA issue fix.
- 2.0.0
  - Initial version.

## INPUTMUX

The current INPUTMUX driver version is 2.0.4.

- 2.0.4
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rule 10.4, 12.2 in INPUTMUX\_EnableSignal() function.
- 2.0.3
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 10.4, 10.7, 12.2.
- 2.0.2
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 10.4, 12.2.
- 2.0.1
  - Support channel mux setting in INPUTMUX\_EnableSignal().
- 2.0.0
  - Initial version.

## LCDIF

The current LCDIF driver version is 2.1.1.

- 2.1.1
  - Improvements
    - \* Added memory address conversion to support buffers which could only be accessed using alias address by non-core masters.
  - Bug Fixes

- \* Fix MISRA-C 2012 issues.
- 2.1.0
  - Bug Fixes
    - \* Corrected the frame buffer pixel format name.
- 2.0.0
  - Initial version.

## LPADC

The current LPADC driver version is 2.4.0.

- 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.

## CRC

The current CRC driver version is 2.1.1.

- 2.1.1
  - Fix MISRA issue.
- 2.1.0
  - Add CRC\_WriteSeed function.
- 2.0.2
  - Fix MISRA issue.
- 2.0.1
  - Fixed KPSDK-13362. MDK compiler issue when writing to WR\_DATA with -O3 optimize for time.
- 2.0.0
  - Initial version.

## DMA

The current DMA driver version is 2.4.2.

- 2.4.2
  - Bug Fixes
    - \* Fixed violation of the MISRA C-2012 rule 8.4.
- 2.4.1
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 5.7, 8.3.
- 2.4.0
  - Improvements
    - \* Added new APIs DMA\_LoadChannelDescriptor/DMA\_ChannelIsBusy to support polling transfer case.
  - Bug Fixes
    - \* Added address alignment check for descriptor source and destination address.
    - \* Added DMA\_ALLOCATE\_DATA\_TRANSFER\_BUFFER for application buffer allocation.
    - \* Fixed the sign-compare warning.

- \* Fixed violations of the MISRA C-2012 rules 18.1, 10.4, 11.6, 10.7, 14.4, 16.3, 20.7, 10.8, 16.1, 17.7, 10.3, 3.1, 18.1.
- 2.3.0
  - Bug Fixes
    - \* Removed DMA\_HandleIRQ prototype definition from header file.
    - \* Added DMA\_IRQHandle prototype definition in header file.
- 2.2.5
  - Improvements
    - \* Added new API DMA\_SetupChannelDescriptor to support configuring wrap descriptor.
    - \* Added wrap support in function DMA\_SubmitChannelTransfer.
- 2.2.4
  - Bug Fixes
    - \* Fixed the issue that macro DMA\_CHANNEL\_CFER used wrong parameter to calculate DSTINC.
- 2.2.3
  - Bug Fixes
    - \* Improved DMA driver Deinit function for correct logic order.
  - Improvements
    - \* Added API DMA\_SubmitChannelTransferParameter to support creating head descriptor directly.
    - \* Added API DMA\_SubmitChannelDescriptor to support ping pong transfer.
    - \* Added macro DMA\_ALLOCATE\_HEAD\_DESCRIPTOR/DMA\_ALLOCATE\_LINK\_DESCRIPTOR to simplify DMA descriptor allocation.
- 2.2.2
  - Bug Fixes
    - \* Do not use software trigger when hardware trigger is enabled.
- 2.2.1
  - Bug Fixes
    - \* Fixed Coverity issue.
- 2.2.0
  - Improvements
    - \* Changed API DMA\_SetupDMADescriptor to non-static.
    - \* Marked APIs below as deprecated.
      - DMA\_PrepareTransfer.
      - DMA\_Submit transfer.
    - \* Added new APIs as below:
      - DMA\_SetChannelConfig.
      - DMA\_PrepareChannelTransfer.
      - DMA\_InstallDescriptorMemory.
      - DMA\_SubmitChannelTransfer.
      - DMA\_SetChannelConfigValid.
      - DMA\_DoChannelSoftwareTrigger.
      - DMA\_LoadChannelTransferConfig.
- 2.0.1
  - Improvements

- \* Added volatile for DMA descriptor member xfercfg to avoid optimization.
- 2.0.0
  - Initial version.

## GPIO

The current GPIO driver version is 2.1.7.

- 2.1.7
  - Improvements
    - \* Enhanced GPIO\_PinInit to enable clock internally.
- 2.1.6
  - Bug Fixes
    - \* Clear bit before set it within GPIO\_SetPinInterruptConfig() API.
- 2.1.5
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 3.1, 10.6, 10.7, 17.7.
- 2.1.4
  - Improvements
    - \* Added API GPIO\_PortGetInterruptStatus to retrieve interrupt status for whole port.
    - \* Corrected typos in header file.
- 2.1.3
  - Improvements
    - \* Updated "GPIO\_PinInit" API. If it has DIRCLR and DIRSET registers, use them at set 1 or clean 0.
- 2.1.2
  - Improvements
    - \* Removed deprecated APIs.
- 2.1.1
  - Improvements
    - \* API interface changes:
      - Refined naming of APIs while keeping all original APIs, marking them as deprecated. Original APIs will be removed in next release. The mainin change is updating APIs with prefix of \_PinXXX() and \_PorortXXX
- 2.1.0
  - New Features
    - \* Added GPIO initialize API.
- 2.0.0
  - Initial version.

## IOPCTL

The current IOPCTL driver version is 2.0.0.

- 2.0.0
  - Initial version.

## RTC

The current RTC driver version is 2.1.2.

- 2.1.2
  - Bug Fixes
    - \* MISRA C-2012 issue fixed: rule 10.1, 10.4 and 10.7.
- 2.1.1
  - Bug Fixes
    - \* MISRA C-2012 issue fixed: rule 10.3 and 11.9.
- 2.1.0
  - Bug Fixes
    - \* Created new APIs for the RTC driver.
      - RTC\_EnableTimer
      - RTC\_EnableWakeUpTimerInterruptFromDPD
      - RTC\_EnableAlarmTimerInterruptFromDPD
      - RTC\_EnableWakeupTimer
      - RTC\_GetEnabledWakeupTimer
      - RTC\_SetSecondsTimerMatch
      - RTC\_GetSecondsTimerMatch
      - RTC\_SetSecondsTimerCount
      - RTC\_GetSecondsTimerCount
    - \* deprecated legacy APIs for the RTC driver.
      - RTC\_StartTimer
      - RTC\_StopTimer
      - RTC\_EnableInterrupts
      - RTC\_DisableInterrupts
      - RTC\_GetEnabledInterrupts
- 2.0.0
  - Initial version.

## MIPI\_DSI

The current MIPI\_DSI driver version is 2.1.0.

- 2.1.0
  - Improvements
    - \* Improved for the platforms which does not support ULPS.
- 2.0.6
  - Bug Fixes
    - \* Fixed the timing issue that non-continuous HS clock mode does not work.

- 2.0.5
  - Bug Fixes
    - \* Fixed kDSI\_InterruptGroup1BtaTo and kDSI\_InterruptGroup1HtxTo definition error.
  - Improvements
    - \* Changed to override MIPI\_DriverIRQHandler instead of MIPI\_IRQHandler.
- 2.0.4
  - Bug Fixes
    - \* Fixed MISRA C-2012 issues: 10.1, 10.3, 10.4, 10.4, 10.6, 10.7, 10.8, 11.3, 11.8, 12.2, 14.4, 16.4, 17.7.
- 2.0.3
  - Improvement
    - \* Updated for combo phy header file.
- 2.0.2
  - New Features
    - \* Supported sending separate DSI command from TX data array.
  - Bug Fixes
    - \* Disabled all interrupts in DSI\_Init.
- 2.0.1
  - Improvements
    - \* Updated to support the DPHY which does not have internal DPHY PLL.
- 2.0.0
  - Initial version.

## MIPI\_DSI\_SMARTDMA

The current MIPI\_DSI driver version is 2.2.1.

- 2.2.1
  - Bug Fixes
    - \* Fixed MISRA C-2012 issues: 10.1, 10.3, 11.3, 11.8, 14.4, 17.7.
- 2.2.0
  - Improvements
    - \* Supported swap or don't swap the pixel byte before written to MIPI DSI FIFO.
- 2.1.0
  - Improvements
    - \* Supported frame buffer format XRGB8888.
    - \* Added virtual channel setting in dsi\_smartdma\_write\_mem\_transfer\_t, current driver only support channel 0, added for future enhancement.
- 2.0.1
  - Bug Fixes
    - \* Fixed the issue that driver handle not set to busy during transfer.
- 2.0.0
  - Initial version.

## MRT

The current MRT driver version is 2.0.3.

- 2.0.3
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 10.1 and 10.4.
    - \* Fixed the wrong count value assertion in MRT\_StartTimer API.
- 2.0.2
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rule 10.4.
- 2.0.1
  - Added control macro to enable/disable the RESET and CLOCK code in current driver.
- 2.0.0
  - Initial version.

## MU

The Current MU driver version is 2.0.7.

- 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.

## OSTIMER

The current OSTIMER driver version is 2.1.2.

- 2.1.2
  - Bug Fixes
    - \* Fixed MISRA-2012 rule 10.8.
- 2.1.1
  - Bug Fixes
    - \* removes the suffix 'n' for some register names and bit fields' names
  - Improvements
    - \* Added HW CODE GRAY feature supported by CODE GRAY in SYCTRL register group.
- 2.1.0
  - Bug Fixes
    - \* Added a workaround to fix the issue that no interrupt was reported when user set smaller period.
    - \* Fixed violation of MISRA C-2012 rule 10.3 and 11.9.
  - Improvements
    - \* Added return value for the two APIs to set match value.
      - OSTIMER\_SetMatchRawValue
      - OSTIMER\_SetMatchValue
- 2.0.3
  - Bug Fixes
    - \* Fixed violation of MISRA C-2012 rule 10.3, 14.4, 17.7.
- 2.0.2
  - Improvements
    - \* Added support for OSTIMER0
- 2.0.1
  - Improvements
    - \* Removed the software reset function out of the initialization API.
    - \* Enabled interrupt directly instead of enabling deep sleep interrupt. Users need to enable the deep sleep interrupt in application code if needed.
- 2.0.0
  - Initial version.

## OTFAD

The current driver version is 2.1.3.

- 2.1.3
  - Bug fixes
    - \* Fixed the error that waiting for both FLEXSPI AHB idle and SEQ idle.
- 2.1.2
  - Bug fixes

- \* Fixed MISRA 2012 issue: 10.4.
- 2.1.1
  - Improvements:
    - \* Hided some bits in CR and SR registers for selected platforms.
    - \* Fixed doxygen issues.
- 2.1.0
  - Improvements:
    - \* Used boolean type to define 1-bit field concepts.
- 2.0.0
  - Initial version.

## PINT

The current PINT driver version is 2.1.8.

- 2.1.8
  - Bug Fixes
    - \* Fixed MISRA-2012 rule 10.1 rule 10.4 rule 10.8 rule 18.1 rule 20.9.
- 2.1.7
  - Improvements
    - \* Added fully support for the SECPINT, making it can be used just like PINT.
- 2.1.6
  - Bug Fixes
    - \* Fixed the bug of not enabling common pint clock when enabling security pint clock.
- 2.1.5
  - Bug Fixes
    - \* Fixed issue for MISRA-2012 check.
      - Fixed rule 10.1 rule 10.3 rule 10.4 rule 10.8 rule 14.4.
    - \* Changed interrupt init order to make pin interrupt configuration more reasonable.
- 2.1.4
  - Improvements
    - \* Added feature to control distinguish PINT/SECPINT relevant interrupt/clock configurations for PINT\_Init and PINT\_Deinit API.
    - \* Swapped the order of clearing PIN interrupt status flag and clearing pending NVIC interrupt in PINT\_EnableCallback and PINT\_EnableCallbackByIndex function.
    - \* Bug Fixes
      - Fixed build issue caused by incorrect macro definitions.
- 2.1.3
  - Bug fix:
    - \* Updated PINT\_PinInterruptClrStatus to clear PINT interrupt status when the bit is asserted and check whether was triggered by edge-sensitive mode.
    - \* Write 1 to IST corresponding bit will clear interrupt status only in edge-sensitive mode and will switch the active level for this pin in level-sensitive mode.
    - \* Fixed MISRA c-2012 rule 10.1, rule 10.6, rule 10.7.



- \* Added `FSL_FEATURE_SECPINT_NUMBER_OF_CONNECTED_OUTPUTS` to distinguish IRQ relevant array definitions for SECPINT/PINT on lpc55s69 board.
- \* Fixed PINT driver c++ build error and remove index offset operation.
- 2.1.2
  - Improvement:
    - \* Improved way of initialization for SECPINT/PINT in `PINT_Init` API.
- 2.1.1
  - Improvement:
    - \* Enabled secure pint interrupt and add secure interrupt handle.
- 2.1.0
  - Added `PINT_EnableCallbackByIndex/PINT_DisableCallbackByIndex` APIs to enable/disable callback by index.
- 2.0.2
  - Added control macro to enable/disable the RESET and CLOCK code in current driver.
- 2.0.1
  - Bug fix:
    - \* Updated PINT driver to clear interrupt only in Edge sensitive.
- 2.0.0
  - Initial version.

## POWERQUAD

The current POWERQUAD driver version is 2.0.3.

- 2.0.3
  - Bug Fixes
    - \* Fixed violations of the MISRA C-2012 rules 8.4, 10.1, 10.3, 10.4, 10.6, and so on.
- 2.0.2
  - Bug Fixes
    - \* Fixed array size issue in `fsl_powerquad_data.h` file.
    - \* Fixed vector function pipeline issue.
- 2.0.1
  - Bug Fixes
    - \* Fixed build error in C++ mode.
- 2.0.0
  - Initial version.

## PUF

The current PUF driver version is 2.1.5.

- 2.1.5
  - Use common SDK delay in `puf_wait_usec()`.
- 2.1.4

- Replace register uint32\_t ticksCount with volatile uint32\_t ticksCount in puf\_wait\_usec() to prevent optimization out delay loop.
- 2.1.3
  - Fix MISRA C-2012 issue.
- 2.1.2
  - Update: Add automatic big to little endian swap for user (pre-shared) keys destined to secret hardware bus (PUF key index 0).
- 2.1.1
  - Fix ARMGCC build warning .
- 2.1.0
  - Align driver with PUF SRAM controller registers on LPCXpresso55s16.
  - Update initialization logic .
- 2.0.3
  - Fix MISRA C-2012 issue.
- 2.0.2
  - New feature:
    - \* Add PUF configuration structure and support for PUF SRAM controller.
  - Improvements:
    - \* Remove magic constants.
- 2.0.1
  - Bug Fixes:
    - \* Fixed puf\_wait\_usec function optimization issue.
- 2.0.0
  - Initial version.

## SCTIMER

The current SCTimer driver version is 2.4.0.

- 2.4.0
- 2.3.0
  - Bug Fixes
    - \* Fixed the potential overflow issue of pulseperiod variable in SCTIMER\_SetupPwm/SCTIMER\_UpdatePwmDutycycle API.
    - \* Fixed the issue of SCTIMER\_CreateAndScheduleEvent API does not correctly work with 32 bit unified counter.
    - \* Fixed the issue of position of clear counter operation in SCTIMER\_Init API.
  - Improvements
    - \* Update SCTIMER\_SetupPwm/SCTIMER\_UpdatePwmDutycycle to support generate 0% and 100% PWM signal.
    - \* Add SCTIMER\_SetupEventActiveDirection API to configure event activity direction.
    - \* Update SCTIMER\_StartTimer/SCTIMER\_StopTimer API to support start/stop low counter and high counter at the same time.
    - \* Add SCTIMER\_SetCounterState/SCTIMER\_GetCounterState API to write/read counter

- current state value.
  - \* Update APIs to make it meaningful.
    - SCTIMER\_SetEventInState
    - SCTIMER\_ClearEventInState
    - SCTIMER\_GetEventInState
- 2.2.0
  - Improvements
    - \* Updated for 16-bit register access.
- 2.1.3
  - Bug Fixes
    - \* Fixed the issue of uninitialized variables in SCTIMER\_SetupPwm.
    - \* Fixed the issue that the Low 16-bit and high 16-bit work independently in SCTIMER driver.
  - Improvements
    - \* Added an enumerable macro of unify counter for user.
      - kSCTIMER\_Counter\_U
    - \* Created new APIs for the RTC driver.
      - SCTIMER\_SetupStateLdMethodAction
      - SCTIMER\_SetupNextStateActionwithLdMethod
      - SCTIMER\_SetCOUNTValue
      - SCTIMER\_GetCOUNTValue
      - SCTIMER\_SetEventInState
      - SCTIMER\_ClearEventInState
      - SCTIMER\_GetEventInState
    - \* Deprecated legacy APIs for the RTC driver.
      - SCTIMER\_SetupNextStateAction
- 2.1.2
  - Bug Fixes
    - \* MISRA C-2012 issue fixed: rule 10.3, 10.4, 10.6, 10.7, 11.9, 14.2 and 15.5.
- 2.1.1
  - Improvements
    - \* Updated the register and macro names to align with the header of devices.
- 2.1.0
  - Bug Fixes
    - \* Fixed issue where SCT application level Interrupt handler function is occupied by SCT driver.
    - \* Fixed issue where wrong value for INSYNC field inside SCTIMER\_Init function.
    - \* Fixed issue to change Default value for INSYNC field inside SCTIMER\_GetDefault-Config.
- 2.0.1
  - New Features
    - \* Added control macro to enable/disable the RESET and CLOCK code in current driver.
- 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.

## SMARTDMA

The current SMARTDMA driver version is 2.6.2.

- 2.6.2
  - Bug Fixes
    - \* Fixed MISRA C-2012 issues: 8.4, 11.6, 17.7.
- 2.6.1
  - Improvements
    - \* Optimize MIPI DSI APIs performance.
- 2.6.0
  - Improvements
    - \* Optimize MIPI DSI APIs performance.
  - New Features
    - \* Add new APIs to send MIPI DSI frame with 180 degree rotation.
- 2.5.0
  - Improvements
    - \* Supported swap or don't swap the pixel byte before written to MIPI DSI FIFO.
    - \* Updated MIPI DSI firmware, make sure data has been sent out before calling callback function.
- 2.4.0
  - Improvements
    - \* Added new APIs for MIPI DSI kSMARTDMA\_MIPI\_XRGB2RGB\_DMA.
- 2.3.0
  - Improvements
    - \* Added new APIs for FlexIO one SHIFTBUF, kSMARTDMA\_FlexIO\_DMA\_ONELANE.
  - Bug Fixes
    - \* Fixed kSMARTDMA\_MIPI\_RGB565\_DMA color bias issue.
- 2.2.0
  - Improvements
    - \* Added new APIs for MIPI DSI, kSMARTDMA\_MIPI\_RGB565\_DMA and kSMARTD-

MA\_MIPI\_RGB888\_DMA.

- \* Supported install firmware and callback function dynamically.
- 2.1.0
  - Improvements
    - \* Removed test APIs, including kSMARTDMA\_LightOn, kSMARTDMA\_LightOff, kSMARTDMA\_Notify, and kSMARTDMA\_Test.
    - \* Added new APIs, including kSMARTDMA\_FlexIO\_DMA\_Reverse, kSMARTDMA\_FlexIO\_DMA\_ARGB2RGB, kSMARTDMA\_FlexIO\_DMA\_ARGB2RGB\_Endian\_Swap, and kSMARTDMA\_FlexIO\_DMA\_ARGB2RGB\_Endian\_Swap\_Reverse.
- 2.0.0
  - Initial version.

## USDHC

The current USDHC driver version is 2.8.0.

- 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 wss 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.

## UTICK

The current UTICK driver version is 2.0.4.

- 2.0.4
  - Bug Fixes

- \* Fixed compile fail issue of no-supporting PD configuration in utick driver.
- 2.0.3
  - Bug Fixes
    - \* Fixed violations of MISRA C-2012 rules: 8.4, 14.4, 17.7
- 2.0.2
  - Added new feature definition macro to enable/disable power control in drivers for some devices have no power control function.
- 2.0.1
  - Added control macro to enable/disable the CLOCK code in current driver.
- 2.0.0
  - Initial version.

## WWDT

The current WWDT driver version is 2.1.9.

- 2.1.9
  - Bug Fixes
    - \* Fixed violation of the MISRA C-2012 rule 10.4.
- 2.1.8
  - Improvements
    - \* Updated the "WWDT\_Init" API to add wait operation. Which can avoid the TV value read by CPU still be 0xFF (reset value) after WWDT\_Init function returns.
- 2.1.7
  - Bug Fixes
    - \* Fixed the issue that the watchdog reset event affected the system from PMC.
    - \* Fixed the issue of setting watchdog WDPROTECT field without considering the backwards compatibility.
    - \* Fixed the issue of clearing bit fields by mistake in the function of WWDT\_ClearStatus-Flags.
- 2.1.5
  - Bug Fixes
    - \* deprecated a unusable API in WWWDT driver.
      - WWDT\_Disable
- 2.1.4
  - Bug Fixes
    - \* Fixed violation of the MISRA C-2012 rules Rule 10.1, 10.3, 10.4 and 11.9.
    - \* Fixed the issue of the inseparable process interrupted by other interrupt source.
      - WWDT\_Init
- 2.1.3
  - Bug Fixes
    - \* Fixed legacy issue when initializing the MOD register.
- 2.1.2
  - Improvements



- \* Updated the "WWDT\_ClearStatusFlags" API and "WWDT\_GetStatusFlags" API to match QN9090. WDTOF is not set in case of WD reset. Get info from PMC instead.
- 2.1.1
  - New Features
    - \* Added new feature definition macro for devices which have no LCOK control bit in MOD register.
    - \* Implemented delay/retry in WWDT driver.
- 2.1.0
  - Improvements
    - \* Added new parameter in configuration when initializing WWDT module. This parameter, which must be set, allows the user to deliver the WWDT clock frequency.
- 2.0.0
  - Initial version.

## 2 Middleware Change Log

### DSP Audio Streamer

The current version of DSP Audio Streamer is 2.6p1.

- 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 1.0.1.

- 1.0.1
  - Initial version of NatureDSP from Cadence for FusionF1 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 R0.14a\_rev0.

- 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.

## LigJpeg for KSDK

Current version is LigJpeg 9b.

- 9b\_rev1
  - New Feature:
    - \* The configuration file libjpeg/inc/jmorecfg.h could include user defined header file to override pixel format configuration.
- 9b\_rev0
  - Initial version. Changes when integrate with SDK:
    - \* In libjpeg/inc/jinclude.h line 88-96, map JFREAD and JFWRITE to FATFS f\_read and f\_write
    - \* In libjpeg/inc/jmorecfg.h line 397-406, change RGB color offset.
    - \* In libjpeg/src/jerror.c line 79-81, don't call function exit.

## LittlevGL for KSDK

- 7.10.1\_rev1
  - Integrate LittlevGL 7.10.1 to SDK.
  - Added PXP, VGLite hardware acceleration.
- 7.4.0\_rev1
  - Integrate LittlevGL 7.4.0 to SDK.
- 7.0.0\_rev1

- Integrate LittlevGL 7.0.0 to SDK.
- Added PXP hardware acceleration initial version.
- 6.1.1\_rev1
  - Integrate LittlevGL 6.1.1 to SDK.
- 5.3\_rev1
  - Integrate LittlevGL 5.3 to SDK.

## 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\_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.

## mbedTLS for MCUXpresso SDK

The current version of mbedTLS is based on mbedTLS 2.26.0 released 2021-03-08

- 2.26.0
  - New features:
    - \* Ported mbedTLS 2.26.0 to SDK.
- 2.16.6\_rev5
  - New features:
    - \* Changed return type of CRYPTO\_InitHardware() from void to status\_t. Added check of this return value in selftest.c and benchmark.c files.
- 2.16.6\_rev4
  - New features:
    - \* Added mutex for HW modules HASHCRYPT and CASPER. Enabled by MBEDTLS\_T-HREADING\_C
- 2.16.6\_rev3
  - New features:
    - \* Added support for KW45 device with latest Sentinel200. Port of SSS API mbedtls implementation to KW45.
- 2.16.6\_rev2
  - New features:
    - \* Added support for SW computing AES-192/256 while using DCP driver.
- 2.16.6\_rev1
  - New features:
    - \* Added support for NIST P-521 elliptic curve with CASPER driver.
    - \* Added support for using multiple elliptic curves at once with CASPER driver.
- 2.16.6
  - New features:
    - \* Ported mbedTLS 2.16.6 to SDK.
- 2.16.2\_rev2
  - Bug fixes:
    - \* Add support for HASHCRYPT context switch check, Hashcrypt without context switch is not able to calculate SHA in parallel with AES. HW acceleration of SHA is disabled by default in MbedTLS integration, enabled on chip with context switch.
- 2.16.2\_rev1
  - Bug fixes:
    - \* Add support for CTR\_DRBG using AES-128 for crypto engines without AES-256 capability.
- 2.16.2
  - New features:
    - \* Ported mbedTLS 2.16.2 to SDK.
- 2.13.1\_rev5
  - Bug fixes:
    - \* ecp\_alt\_ksdk.c fix CASPER port for ECJPAKE shortcut when points equal 1. This case is point addition and this shortcut follows original mbedtls\_ecp\_muladd() implementation which is required for ecjpake\_ecp\_add3().

- 2.13.1\_rev4
  - New features:
    - \* Added support for NIST P-384 elliptic curve with CASPER driver.
- 2.13.1\_rev3
  - Bug fixes:
    - \* Force align AES\_CCM and AES\_GCM self-test keys to fix unaligned key issue when using HW acceleration.
- 2.13.1\_rev2
  - Bug fixes:
    - \* Disable default HW acceleration of SHA in parallel with AES.
- 2.13.1\_rev1
  - Bug fixes:
    - \* Fixed incorrect macro check when skipping AES-192 or AES-256
- 2.13.1
  - New features:
    - \* Ported mbedTLS 2.13.1 to KSDK.
- 2.12.0\_rev1
  - New features:
    - \* Added support for NIST P-256 elliptic curve with CASPER driver.
- 2.12.0
  - New features:
    - \* Ported mbedTLS 2.12.0 to KSDK.
- 2.9.0\_rev2
  - New features:
    - \* Added support for Hashcrypt driver.
- 2.9.0\_rev1
  - New features:
    - \* Added support for CASPER driver.
- 2.9.0
  - New features:
    - \* Ported mbedTLS 2.9.0 to KSDK.
- 2.6.0\_rev2
  - Bug fixes:
    - \* ssl\_cookie.c now uses SHA256 for COOKIE\_MD (instead of original SHA224). Some hw crypto acceleration (such as CAU3) don't support SHA224 but all support SHA256.
- 2.6.0\_rev1
  - Bug fixes:
    - \* ksdk\_mbedtls.c bignum functions now read sign of input mbedtls\_mpi at beginning of functions to properly support in place computations (when output bignum is the same as one of input bignums). Affected functions: mbedtls\_mpi\_mul\_mpi(), mbedtls\_mpi\_mod\_mpi(), ecp\_mul\_comb().
- 2.6.0
  - New features:
    - \* Ported mbedTLS 2.6.0 to KSDK.
    - \* Added MBEDTLS\_FREESCALE\_FREERTOS\_CALLOC\_ALT to allow alternate



implementation of `pvPortCalloc()` when using `/middleware/mbedtls/port/ksdk/ksdk_mbedtls.c`.

- 2.5.1\_rev1
  - New features:
    - \* Added support for DCP driver.
- 2.5.1
  - New features:
    - \* Ported mbedtls 2.5.1 to KSDK.
- 2.4.2\_rev2
  - New features:
    - \* Added Curve25519 support for CAU3.
    - \* Added `MBEDTLS_ECP_MUL_MXZ_ALT` configuration parameter enabling overloading of `ecp_mul_mxz()`.
- 2.4.2\_rev1
  - New features:
    - \* Added support for CAU3 driver.
    - \* Added new files:
      - \* `/middleware/mbedtls/port/ksdk/des_alt.c` - contains regular software implementation of DES algorithm with added `MBEDTLS_DES3_SETKEY_DEC_ALT` and `MBEDTLS_DES3_SETKEY_ENC_ALT` config parameters.
      - \* `/middleware/mbedtls/port/ksdk/des_alt.h` - contains modified `mbedtls_des_context` and `mbedtls_des3_context` structures.
      - \* Added `MBEDTLS_DES3_SETKEY_DEC_ALT` configuration parameter enabling reloading of `mbedtls_des3_set2key_dec()` and `mbedtls_des3_set3key_dec()`.
      - \* Added `MBEDTLS_DES3_SETKEY_ENC_ALT` configuration parameter enabling reloading of `mbedtls_des3_set2key_enc()` and `mbedtls_des3_set3key_enc()`.
- 2.4.2
  - New features:
    - \* Ported mbedtls 2.4.2 to KSDK 2.0.0.
    - \* Added `CRYPTO_InitHardware()` function.
    - \* Added new file:
      - `/middleware/mbedtls/port/ksdk/ksdk_mbedtls.h` - contains declaration of `CRYPTO_InitHardware()` function and should be included in applications.
- 2.3.0\_rev1
  - New features:
    - \* Added support for CAAM driver.
    - \* In LTC-specific wrapper, allocate temporary integers from heap in one large block.
- 2.3.0
  - New features:
    - \* Ported mbedtls 2.3.0 to KSDK 2.0.0.
- 2.2.1
  - New features:
    - \* Ported mbedtls 2.2.1 to KSDK 2.0.0.
    - \* Added support of MMCAU cryptographic acceleration module. Accelerated MD5, SHA, AES, and DES.

- \* Added support of LTC cryptographic acceleration module. Accelerated AES, DES, and PKHA.
- \* Added new files:
  - \* /middleware/mbedtls/port/ksdk/ksdk\_mbedtls.c - alternative implementation of cryptographic algorithm functions using LTC and MMCAU module drivers.
  - \* /middleware/mbedtls/port/ksdk/ksdk\_mbedtls\_config.h - configuration settings used by mbedtls KSDK bare metal examples.
- \* Added mbedtls KSDK bare-metal examples:
  - /boards/<board name>/demo\_apps/mbedtls/mbedtls\_benchmark - KSDK mbedtls benchmark application.
  - /boards/<board name>/demo\_apps/mbedtls/mbedtls\_selftest - KSDK mbedtls self-test application.
- \* Added MBEDTLS\_GCM\_CRYPT\_ALT configuration parameter enabling reloading of mbedtls\_gcm\_crypt\_and\_tag().
- \* Added MBEDTLS\_ECP\_MUL\_COMB\_ALT to enable alternate implementation of ecp\_mul\_comb().
- \* Added MBEDTLS\_ECP\_ADD\_ALT configuration parameter enabling reloading of ecp\_add().
- \* Added MBEDTLS\_DES\_SETKEY\_DEC\_ALT configuration parameter enabling reloading of mbedtls\_des\_setkey\_dec(), mbedtls\_des3\_set2key\_dec() and mbedtls\_des3\_set3key\_dec().
- \* Added MBEDTLS\_DES\_SETKEY\_ENC\_ALT configuration parameter enabling reloading of mbedtls\_des\_setkey\_enc(), mbedtls\_des3\_set2key\_enc() and mbedtls\_des3\_set3key\_enc().
- \* Added MBEDTLS\_DES\_CRYPT\_CBC\_ALT configuration parameter enabling reloading of mbedtls\_des\_crypt\_cbc().
- \* Added MBEDTLS\_DES3\_CRYPT\_CBC\_ALT configuration parameter enabling reloading of mbedtls\_des3\_crypt\_cbc().
- \* Added MBEDTLS\_AES\_CRYPT\_CBC\_ALT configuration parameter enabling reloading of mbedtls\_aes\_crypt\_cbc().
- \* Added MBEDTLS\_AES\_CRYPT\_CTR\_ALT configuration parameter enabling reloading of mbedtls\_aes\_crypt\_ctr().
- \* Added MBEDTLS\_CCM\_CRYPT\_ALT configuration parameter enabling reloading of mbedtls\_ccm\_encrypt\_and\_tag() and mbedtls\_ccm\_auth\_decrypt().
- \* Added MBEDTLS\_MPI\_ADD\_ABS\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_add\_abs().
- \* Added MBEDTLS\_MPI\_SUB\_ABS\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_sub\_abs().
- \* Added MBEDTLS\_MPI\_EXP\_MOD\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_exp\_mod().
- \* Added MBEDTLS\_MPI\_MUL\_MPI\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_mul\_mpi().
- \* Added MBEDTLS\_MPI\_MOD\_MPI\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_mod\_mpi().
- \* Added MBEDTLS\_MPI\_GCD\_ALT configuration parameter enabling reloading of

- mbedtls\_mpi\_gcd().
- \* Added MBEDTLS\_MPI\_INV\_MOD\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_inv\_mod().
- \* Added MBEDTLS\_MPI\_IS\_PRIME\_ALT configuration parameter enabling reloading of mbedtls\_mpi\_is\_prime().
- \* Added encrypt/decrypt mode to mbedtls\_des\_context and mbedtls\_des3\_context structure.
- \* Added carriage return '\r' for mbedtls\_printf() in self test functions.

## Multicore SDK

The current version of Multicore SDK is 2.10.0.

- 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.
  - \* RPMsg-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.
  - \* RPMsg-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
      - \* RPMsg-Lite v3.1.0
    - New features:
      - \* eRPC: Unit test code updated to handle service add and remove operations.
      - \* eRPC: Several MISRA issues in rpmsg-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.
  - \* RPMsg-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
    - \* RMPmsg-Lite v2.0.2
  - New features:
    - \* RMPmsg-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
    - \* RMPmsg-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.
    - \* RMPmsg-Lite: New API rmpmsg\_queue\_get\_current\_size()
    - \* RMPmsg-Lite: Fixed bug in interrupt handling for lpc5411x, lpc5410x
    - \* RMPmsg-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
    - \* RMPmsg-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) v.1.2.0
    - \* 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

## nghttp2 library for MCUXpresso SDK

Original package is available at <https://github.com/nghttp2/nghttp2>. The current version of nghttp2 library is 1.32.90.

- 1.32.90
  - Initial version of library for MCUXpresso SDK



## Host USDHC driver for MCUXpresso SDK

The current driver version is 2.6.0.

- 2.6.0
  - Improvements
    - \* Removed deprecated api in SDHC host driver.
    - \* Added SDMMCHOST\_ConvertDataToLittleEndian api.
    - \* Added capability/maxBlockCount/maxBlockSize in host decription.
    - \* 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 sdcad. 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.
  - Improvements
    - \* Added host SDR timing mode capability validation during card initialization.
    - \* Added plling 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 2.8.0.

- 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 memcopy.
  - New features:
    - \* Enable USB host audio recorder demo for mutilple 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.
  - New features:
    - \* Enable USB host video demo for mutilple boards.
    - \* Enable USB device MTP demo for mutilple 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

## VGLite GPU Driver

The current version of the VGLite GPU Driver is 3.0.11\_rev3.

- version 3.0.11\_rev3
  - Fixed:
    - \* Fix async event reset after being initialized
    - \* (IMX-2604) Fix polygon's rendering regression in multitasking scenarios
    - \* Avoid "vg\_lite\_blit" modifying user's transformation matrix
- version 3.0.11\_rev2
  - Fixed:
    - \* (MGG-685) Added workaround to improve "blit" output quality for RT500
    - \* (MCUX-43004) Fixed clipping window regression issue introduced by VGLite 3.0.11.1
    - \* (MGG-764) Fixed VGLite heap useless splitting of memory nodes
    - \* (MGG-765) Fixed regression issue introduced by VGLite 3.0.11.1 when loading graphic resources using Elementary library
    - \* (IMX-2506) Fixed "vg\_lite\_update\_rad\_grad" not checking the result of memory allocation
    - \* (MCUX-42992) Fixed IAR toolchain not recognizing optimization directive
    - \* (MGG-763) Remove risk of out-of-bounds read in "vg\_lite\_update\_rad\_grad" function
  - Changed:
    - \* (IMX-2527) Improved memory footprint by using a common tessellation buffer for all drawing tasks
    - \* (MGG-712) Restructured OS abstraction layer to allow easier integration with popular OSes
- version 3.0.11\_rev1
  - Fixed:
    - \* (IMX-2502) Fixed GPU command buffer overflow when copying context data
    - \* (IMX-2503) Fixed additional colour ring incorrectly appearing at the edge of radial gradients
    - \* (IMX-2487) Fixed risk of memory leak in "vg\_lite\_upload\_path"
    - \* (IMX-2429) Fixed incorrect blending of A4 and A8 images (regression since VGLite 3.-0.4.x)
    - \* (MGG-687) Fixed build warning when VG\_RENDER\_TEXT feature is disabled
  - Changed:
    - \* (IMX-2354) Added support for dynamic command buffer size management
  - Added:
    - \* (IMX-2435) Added new API function - vg\_lite\_get\_transform\_matrix - to calculate parameters for 2D perspective transformations
    - \* (IMX-2411) Added support for radial gradients in Elementary library
    - \* (IMX-2026) Added support for images embedded in EVO data in Elementary library
    - \* (IMX-2026) Added support for patterns embedded in EVO data in Elementary library
- version 3.0.9\_rev2
  - Fixed:
    - \* (MCUX-40557) Fixed build warnings
- version 3.0.9\_rev1
  - Fixed:
    - \* (MGG-648) Fixed rendered text overlapping issue
    - \* (MGG-650) Fixed memory leak caused by failure to unload RLE font data

- \* (IMX-2395) Fixed incorrect reporting of indexed images as "supported" for GC355 GPU (RT1170)
- Changed:
  - \* (IMX-2370) Refactored GPU driver HAL and OS layers
  - \* (MGG-646) Configured a vector font as default font
- version 3.0.9
  - Fixed:
    - \* (IMX-2361) Fixed tessellation bounds computation error
  - Changed:
    - \* (IMX-2367) Enabled alpha channel premultiplication by default for GC355 GPU (RT1170)
    - \* (IMX-2261) Added Elementary library input data address alignment verification
  - Added:
    - \* (IMX-2323) Added support for radial colour gradients for GC355 GPU (RT1170)
    - \* (IMX-2317) Upgraded the Elementary library to be thread safe
- version 3.0.6\_rev4
  - Fixed:
    - \* (IMX-2357) Fixed rendering performance degradation since the implementation of the multithread/multicontext support
    - \* (MGG-576) Elementary: Fixed hard fault when resetting translation of EVO object
    - \* (MCUX-38672) Fixed font and text support build warnings
    - \* (MGG-596) Fixed memory leak in raster font loading
    - \* (MGG-596) Font and text support: Fixed out of range memory access in Elementary library
  - Changed:
    - \* (MGG-596) "VG\_RENDER\_TEXT=1" build symbol now required to enable font and text support
    - \* (MGG-594) Updated font and text support to allow easy decoupling from GPU driver and Elementary when not needed
    - \* (MGG-533) Removed "is\_tspan" attribute from "vg\_lite\_font\_attributes\_t"
    - \* (MGG-533) Added new attribute "tspan\_has\_dx\_dy" to "vg\_lite\_font\_attributes\_t"
    - \* (MGG-533) Added new argument "matrix" to "vg\_lite\_draw\_text" API function
    - \* (MGG-592) Renamed "eFontTypes\_t" enum to "eFontType\_t"
    - \* (MGG-592) Renamed "eFontVectorType" identifier to "eFontTypeVector"
    - \* (MGG-592) Renamed "eFontRasterType" identifier to "eFontTypeRaster"
    - \* (MGG-596) Changed "vg\_lite\_draw\_text" function return value from "int" to "vg\_lite\_error\_t"
  - Added:
    - \* (MGG-596) Added "vg\_lite\_find\_font" API function
    - \* (MGG-596) Added 2 new error codes for "vg\_lite\_error\_t": VG\_LITE\_ALREADY\_EXISTS and VG\_LITE\_NOT\_ALIGNED
    - \* (IMX-2357) Allow users to override command queue task priority at build time using QUEUE\_TASK\_PRIO build symbol
    - \* (MGG-551) Added text wrapping support for vector fonts
    - \* (MGG-533) Added support for text right alignment

- version 3.0.6\_rev3
  - Added:
    - \* (MGG-551) Added support for font and text rendering
- version 3.0.6\_rev2
  - Fixed:
    - \* (IMX-2292) Fixed command buffer flushing after draw
    - \* (IMX-2293) Fixed copy of register status when command buffer was not full
    - \* (IMX-2305) Fixed scissor window taking no effect
    - \* (IMX-2324) Fixed GPU feature table reset when calling "vg\_lite\_close"
    - \* (IMX-2358) Fixed misuse of address operator in checking colour channel premultiplication flag
    - \* (MGG-542) Cleaned up useless "memset" in "vg\_lite\_init"
- version 3.0.6\_rev1
  - Fixed:
    - \* (IMX-2295) Initialize task context to zero in vg\_lite\_init()
- version 3.0.6
  - Fixed:
    - \* (MGG-525) Fixed "vg\_lite\_init\_path" not properly initializing the "path" data structure
  - Changed:
    - \* (IMX-2255) Updated "vg\_lite\_set\_scissor" arguments to (x, y, width, height) instead of (x0, y0, x1, y1)
  - Added:
    - \* (IMX-2104) Added API to enable/disable colour channel pre-multiplication at runtime on RT1170
- version 3.0.5
  - Fixed:
    - \* (IMX-2252) Reset global mutex when it is destroyed
    - \* (IMX-2252) Fixed reset of task local context in vg\_lite\_close()
  - Changed:
    - \* (MGG-333) Enabled scissoring for GC255 GPU (i.MXRT500)
  - Added:
    - \* (IMX-1729) Added support for drawing from multiple threads
- version 3.0.4\_rev5
  - Changed:
    - \* (IMX-2104) Disabled by default colour channel pre-multiplication on RT1170 platform
    - \* (MGG-517) Updated "vg\_lite\_draw\_pattern" function to return VG\_LITE\_NOT\_SUPPORTED for A4/A8 patterns
  - Fixed:
    - \* (IMX-2155) Fixed hard coded image mode in "vg\_lite\_draw\_pattern"
    - \* (IMX-2153) Updated "vg\_lite\_draw\_pattern" to take into account pattern transparency
    - \* (KPSDK-37093) Elementary library - Fixed bad free in "load\_evo"
    - \* (KPSDK-37093) Elementary library - Avoid resource leak in "ElmCreateBuffer"
- version 3.0.4\_rev4
  - Fixed:
    - \* Fixed empty function argument lists definition for scissoring related API functions



- \* (IMX-1995) Extended RT500 image rotation fix to `vg_lite_blit_rect`, `vg_lite_draw_pattern`
- \* (IMX-1995) Isolated RT500 image rotation fix effects to RT500 platform only
- version 3.0.4\_rev3
  - Fixed:
    - \* (IMX-1995) Compensated for RT500 image shift effect when rotation is approaching multiples of 90 dgs
- version 3.0.4\_rev2
  - Fixed:
    - \* Fixed integration issue of "`vg_lite_mem_avail`" API
- version 3.0.4\_rev1
  - Changed:
    - \* (IMX-1768) Enabled users to query, at runtime, the support for `VG_LITE_UPPER` draw quality
  - Fixed:
    - \* (IMX-2074) Fixed GPU exception handling issue
  - Added:
    - \* (IMX-2045) Added API to provide available heap memory
- version 3.0.4
  - Changed:
    - \* (IMX-1957) Enabled users to query, at runtime, the support for `BORDER_CULLING` and `SCISSOR` features
    - \* Enable users to query, at runtime, the support for RGBA 2 bits-per-channel image formats
  - Fixed:
    - \* (IMX-1934) Fixed image stride alignment verification for `TILED` images
    - \* Fix GC355 GPU (i.MXRT1170) draw error when tessellation window width is not aligned to 128
  - Added:
    - \* (MGG-333) Added support for GC355 GPU (i.MXRT1170) scissoring
- version 3.0.1\_rev1
  - Fixed:
    - \* (MGG-250) Fixed GPU hang after a random time (mostly reproduced on RT1170 platforms)
    - \* (KPSDK-33132) Fixed Elementary library memory leaks in case of failed EBO loading
    - \* (MGG-336) Allow use of blend modes not affected by the border culling limitation
    - \* (MGG-18) Fixed Elementary library memory leaks when loading EVO/EBO/EGO objects
    - \* (MGG-353) Fixed linear colour gradient rendering error when loading EVOs using the Elementary library
- version 3.0.1
  - Changed:
    - \* Removed "`vg_lite_blit2`" API function due to lack of hardware support
    - \* Removed "`vg_lite_scanline`" API function due to lack of hardware support
    - \* Aggregated "`vg_lite_error.h`" API header file content into "`vg_lite.h`"
    - \* Aggregated "`vg_lite_features.h`" API header file content into "`vg_lite.h`"
    - \* Aggregated "`vg_lite_matrix.h`" API header file content into "`vg_lite.h`"

- \* Aggregated "vg\_lite\_path.h" API header file content into "vg\_lite.h"
- \* Aggregated "vg\_lite\_util.h" API header file content into "vg\_lite.h"
- \* (IMX-1861) Added return code to the "vg\_lite\_flush" API function
- \* Changed VGLite GPU driver license from proprietary to MIT
- Fixed:
  - \* Fixed definition of "elm\_alloc" function in Elementary toolkit
  - \* (IMX-1869) Fixed initialization of aligned bytes in the command buffer
  - \* (IMX-1821) Fixed inverted background colours when using "vg\_lite\_draw\_pattern"
  - \* Fixed hang when calling "vg\_lite\_flush" repeatedly
  - \* (IMX-1861) Fix propagation of return codes from "stall", "submit", "vg\_lite\_flush" function calls
- version 2.0.14\_rev1
  - Changed:
    - \* (IMX-1809) Fixed misspelling of "vg\_lite\_buffer\_transparency\_mode"
    - \* (IMX-1778) Added verification of colour gradients parameters
    - \* (IMX-1813) Added return code to the "vg\_lite\_hal\_allocate\_contiguous" function
    - \* (MGG-204) Added return code to "vg\_lite\_finish"
  - Fixed:
    - \* (IMX-1808) Fixed "vg\_lite\_blit" failure on dynamically allocated buffers
    - \* (IMX-1773) Fixed failure to create 16 colours gradients
    - \* (IMX-1790) Fixed driver incorrectly reporting available heap space
    - \* (IMX-1810) Fixed verification of raster image stride alignment
    - \* (IMX-1810) Fixed verification of raster image colour depth
    - \* (IMX-1816) Fixed "vg\_lite\_close" not releasing memory allocated from OS heap
    - \* (MGG-201) Fixed hard fault caused by command buffer management
    - \* (MGG-202) Fixed "vg\_lite\_hal\_wait\_interrupt" function ignoring the timeout
    - \* (MGG-203) Fixed "vg\_lite\_draw" function always returning success
- version 2.0.13\_rev2
  - Fixed:
    - \* (MGG-102) Fixed incorrect colour gradient clipping issue when using "vg\_lite\_draw\_gradient" API
    - \* (MGG-140) Fixed "vg\_lite\_draw\_gradient" error when gradient is not covering the entire shape
- version 2.0.13\_rev1
  - Added:
    - \* (MGG-88) Support for operating with BGRA2222, ABGR2222, ARGB2222 type images
    - \* (MGG-88) Support for operating with ABGR4444, ARGB4444 type images
    - \* (MGG-88) Support for operating with ABGR8888, ARGB8888 type images
    - \* (MGG-88) Support for operating with XBGR8888, XRGB8888 type images
    - \* (MGG-52) Improved GPU bus error reporting by using weak functions
  - Changed:
    - \* (MGG-66) Restructured GPU driver by exposing the HAL source code for easier integration with operating systems
  - Fixed:
    - \* (MGG-72) Fixed rough edges of vector artefacts when using the "vg\_lite\_draw\_pattern"

## API

- \* (MGG-58) Fixed "vg\_lite\_blit\_rect" API not supporting a zero Y coordinate
- version 2.0.13\_rev0

**NXP WiFi**

## 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 IEEE802.11b/e 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-txpwrlimit 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\_tbt\_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 leave 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

## 3 Component Change Log

### CODEC

The current codec common driver version is 2.2.2.

- 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 pointer 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.
- 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 2.1.2

- 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 defnitaion.
      - Added TDM and OLM mode support in the function CS42888\_SetProtocol.
- 2.0.0
  - Initial version.

## TFA9896

The current TFA9896 driver version is 6.0.1.

- 6.0.1
  - Bug Fixes
    - \* Fixed the coverity issue of error code overwritten.
- 6.0.0
  - 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

**How to Reach Us:**

**Home Page:**

[nxp.com](http://nxp.com)

**Web Support:**

[nxp.com/support](http://nxp.com/support)

Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including "typicals," must be validated for each customer application by customer's technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: [nxp.com/SalesTermsandConditions](http://nxp.com/SalesTermsandConditions).

While NXP has implemented advanced security features, all products may be subject to unidentified vulnerabilities. Customers are responsible for the design and operation of their applications and products to reduce the effect of these vulnerabilities on customer's applications and products, and NXP accepts no liability for any vulnerability that is discovered. Customers should implement appropriate design and operating safeguards to minimize the risks associated with their applications and products.

NXP, the NXP logo, NXP SECURE CONNECTIONS FOR A SMARTER WORLD, Freescale, the Freescale logo, Kinetis, Processor Expert, and Tower are trademarks of NXP B.V. All other product or service names are the property of their respective owners. Arm, Cortex, Keil, Mbed, Mbed Enabled, and Vision are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. Oracle and Java are registered trademarks of Oracle and/or its affiliates. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org.

© 2021 NXP B.V.

