

Kinetis SDK v.2.0.0 Release Notes

Supporting TWR-K80F150M, TWR-K81F150M, and FRDM-K82F

1 Overview

The Kinetis Software Development Kit (KSDK) 2.0.0 is a collection of software enablement for Kinetis Microcontrollers that includes peripheral drivers, high-level stacks including USB and LWIP, integration with WolfSSL and mbed TLS cryptography libraries, other middleware packages, such as multicore support and FatFs, and integrated RTOS support for FreeRTOS OS and μ C/OS. In addition to the base enablement, the KSDK is augmented with demo applications and driver example projects, and API documentation to help the customers quickly leverage the support of the Kinetis SDK.

For the latest version of this and other Kinetis SDK documents, see the Kinetis SDK homepage [KINETIS-SDK: Software Development Kit for Kinetis MCUs](#).

2 KSDK 2.0.0

KSDK 2.0.0 is the evolution of KSDK 1.x into a more optimized software solution. KSDK 2.0.0 eliminates the need for a separate HAL and Peripheral Driver, replacing these two layers with a single driver for each peripheral. The single driver provides both the low-level functionality of the HAL and the non-blocking interrupt-based functionality of the Peripheral Driver, enabling customers to select the right level of abstraction for their solution. Peripheral drivers in KSDK

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Development Tools

2.0.0 also eliminate external software dependencies. The Operating System Abstraction, Power Manager, and Clock Manager are no longer required by the KSDK 2.0.0 drivers.

At the middleware level, RTCS and MFS have been removed, and the USB stack has been replaced with a BSD licensed solution. KSDK 2.0.0 has also aligned with ARM® architecture through the integration of mbed TLS with our accelerated cryptography drivers. This integration ensures the highest level of performance from our on-chip security peripherals.

The existing MQX™ RTOS support has been deprecated to focus on support of FreeRTOS OS, µC/OS-II, and µC/OS-III.

The Real Time Control Embedded Software Library (RTCESL) and motor control examples for PMSM and BLDC are added to the middleware layer.

3 Development Tools

The Kinetis SDK 2.0.0 was compiled and tested with these development tools:

- Kinetis Design Studio IDE v3.2
- IAR Embedded Workbench for ARM version 7.70
- MDK-ARM Microcontroller Development Kit (Keil)® 5.20
- Makefiles support with GCC revision v4.9-2015-q3 from ARM Embedded
- Atollic® TrueSTUDIO® 5.5.2

4 Supported Development Systems

This release supports boards and devices listed in this table. Boards and devices in boldface were tested in this release:

Table 1. Supported MCU devices and development boards

Development boards	Kinetis MCU devices
TWR-K80F150M, TWR-K81F150M, FRDM-K82F	MK81FN256CAx15, MK81FN256VDC15, MK81FN256VLL15, MK81FN256VLQ15, MK80FN256CAx15, MK80FN256VDC15, MK80FN256VLL15, MK80FN256VLQ15, MK82FN256CAx15, MK82FN256VDC15, MK82FN256VLL15 , MK82FN256VLQ15

5 Release Contents

This table provides an overview of the KSDK release package contents and locations.

Table 2. Release contents

Deliverable	Location
Boards	<install_dir>/boards
Demo applications	<install_dir>/boards/<board_name>/demo_apps
USB demo applications	<install_dir>/boards/<board_name>/usb_examples
Driver examples	<install_dir>/boards/<board_name>/driver_examples

Table continues on the next page...

Table 2. Release contents (continued)

RTOS examples	<install_dir>/boards/<board_name>/rtos_examples
Multicore examples	<install_dir>/boards/<board_name>/multicore_examples
Documentation	<install_dir>/docs
USB Documentation	<install_dir>/docs/usb
lwIP Documentation	<install_dir>/docs/lwip
Middleware	<install_dir>/middleware
lwIP stack	<install_dir>/middleware/lwip_<version>
DMA manager	<install_dir>/middleware/dma_manager_<version>
EMV stack	<install_dir>/middleware/emv_<version>
FatFS stack	<install_dir>/middleware/fatfs_<version>
mmCAU	<install_dir>/middleware/mmcau_<version>
Multicore stack	<install_dir>/middleware/multicore_<version>
SDMMC card driver	<install_dir>/middleware/sdmmc_<version>
USB stack	<install_dir>/middleware/usb_<version>
WolfSSL stack	<install_dir>/middleware/wolfssl_<version>
Driver, SoC header files, extension header files and feature header files, utilities	<install_dir>/devices/<device_name>
Cortex Microcontroller Software Interface Standard (CMSIS) ARM Cortex®-M header files, DSP library source	<install_dir>/CMSIS
Peripheral Drivers	<install_dir>/devices/<device_name>/drivers
Utilities such as debug console	<install_dir>/devices/<device_name>/utilities
RTOS Kernel Code	<install_dir>/rtos
Tools	<install_dir>/tools

6 Kinetis SDK Release Package

The KSDK 2.0.0 release package contents are aligned with the silicon subfamily it supports. This includes the boards, CMSIS, devices, documentation, middleware, and RTOS support.

6.1 Kinetis device support

The device folder contains all available software enablement for the specific SoC subfamily. This folder includes clock-specific implementation, device register header file, device register feature header file, CMSIS derived device SVD, and the system configuration source files. Included with the standard SoC support are folders containing peripheral drivers, toolchain support, and a simple debug console.

The device-specific header files provide a direct access to the Kinetis MCU peripheral registers. The device header file provides an overall System-on-Chip (SoC) memory mapped register definition. In addition to the overall device memory mapped header file, the Kinetis SDK also includes the feature header file for each peripheral instantiated on the SoC.

The toolchain folder contains the startup code and linker files for each supported toolchain. The startup code is a CMSIS-compliant startup that efficiently transfers the code execution to the main() function.

6.1.1 Kinetis board support

The boards folder provides the board-specific demo applications, driver examples, RTOS, and middleware examples.

6.1.2 Demo applications and other examples

The demo applications demonstrate the usage of the peripheral drivers to achieve a system level solution. Each demo application contains a readme file that describes the operation of the demo and required setup steps.

The driver examples demonstrate the capabilities of the peripheral drivers. Each example implements a common use case to help demonstrate the driver functionality.

The RTOS and middleware folders each contain examples demonstrating the use of the included source.

6.2 Middleware

6.2.1 USB stack

See the *USB Stack User's Guide* (document KSDKUSBSUG) for more information.

6.2.1.1 Peripheral devices tested with the USB Host stack

This table provides a list of USB devices tested with the USB Host stack.

Table 3. Peripheral devices

Device type	Device
USB HUB	BELKIN F5U233
	BELKIN F5U304
	BELKIN F5U307
	BELKIN F4U040
	UNITEK Y-2151
	Z-TEK ZK032A
	HYUNDAI HY-HB608
USB flash drive	ADATA C008 32 GB
	ADATA S102 8 G
	ADATA S102 16 G
	Verbatim STORE N GO USB Device 8 G
	Kingston DataTraveler DT101 G2
	SanDisk Cruzer Blade 8 GB

Table continues on the next page...

Table 3. Peripheral devices (continued)

	Unisplendour 1 G Imation 2 GB V-mux 2 GB Sanmina-SCI 128 M Corporate Express 1 G TOSHIBA THUHYBS-008G 8 G Transcend JF700 8 G Netac U903 16 G SSK SFD205 8 GB Rex 4 GB SAMSUNG USB3.0 16GB
USB card reader/adapter	SSK TF adapter Kawau Multi Card Reader Kawau TF adapter Kawau SDHC card
USB Mouse	DELL MS111-P DELL M066U0A DELL MUAVDEL8 TARGUS AMU76AP DELL MD56U0 DELL MS111-T RAPOO M110
USB Keyboard	DELL SK8135 DELL SK8115

6.2.2 TCP/IP stack

The lwIP TCP/IP stack is pre-integrated with Kinetis SDK and runs on top of the Kinetis SDK Ethernet driver with Ethernet-capable devices/boards. For details, see the *lwIP TCPIP Stack and Kinetis SDK Integration User's Guide* (document KSDKLWIPUG).

6.2.3 File System

The FatFs file system is integrated with Kinetis SDK and can be used to access either the SD card or the USB memory stick when the SD card driver or the USB Mass Storage Device class implementation is used.

For details, see the FatFs documentation installed at <install_dir>/middleware/fatfs_<version>/doc.

6.2.4 RTOS

The Kinetis SDK is preintegrated with FreeRTOS OS, μ C/OS-II OS, and μ C/OS-III OS.

6.2.5 CMSIS

The Kinetis SDK is shipped with the standard CMSIS development pack, including the prebuilt libraries.

7 MISRA Compliance

All KSDK drivers and USB stack comply to MISRA 2004 rules with the following exceptions.

Exception Rules	Description
1.1	All code shall conform to ISO 9899:1990 Programming languages - C, amended and corrected by ISO/IEC 9899/COR1:1995, ISO/IEC 9899/AMD1:1995, and ISO/IEC
2.4	Sections of code should not be commented out.
5.1	Identifiers (internal and external) shall not rely on the significance of more than 31 characters.
6.3	typedefs that indicate size and signedness should be used in place of the basic types.
6.4	Bitfields shall only be defined to be of type unsigned int or signed int.
8.1	Functions shall have prototype declarations and the prototype shall be visible at both the function definition and call.
8.5	There shall be no definitions of objects or functions in a header file.
8.1	All declarations and definitions of objects or functions at file scope shall have internal linkage unless external linkage is required.
8.12	When an array is declared with external linkage, its size shall be stated explicitly or defined implicitly by initialization.
10.1	The value of an expression of integer type shall not be implicitly converted to a different underlying type if: <ul style="list-style-type: none"> a. it is not a conversion to a wider integer type of the same signedness, or b. the expression is complex, or c. the expression is not constant and is a function argument, or d. the expression is not constant and is a return expression.
10.3	The value of a complex expression of integer type shall only be cast to a type that is not wider and of the same signedness as the underlying type of the expression.
11.3	A cast should not be performed between a pointer type and an integral type.
11.4	A cast should not be performed between a pointer to object type and a different pointer to object type.
11.5	A cast shall not be performed that removes any const or volatile qualification from the type addressed by a pointer.
12.2	The value of an expression shall be the same under any order of evaluation that the standard permits.
12.4	The right-hand operand of a logical && or operator shall not contain side effects.
12.6	The operands of logical operators (&&, , and !) should be effectively boolean. Expressions that are effectively boolean should not be used as operands to operators other than (&&, , !, =, ==, !=, and ?).
12.13	The increment (++) and decrement (--) operators should not be mixed with other operators in an expression.
14.3	Before preprocessing, a null statement shall only occur on a line by itself; it may be followed by a comment, provided that the first character following the null statement is a whitespace character.
14.5	The continue statement shall not be used.
14.7	A function shall have a single point of exit at the end of the function.
16.1	Functions shall not be defined with a variable number of arguments.
17.4	Array indexing shall be the only allowed form of pointer arithmetic.
18.4	Unions shall not be used.
19.1	#include statements in a file should only be preceded by other preprocessor directives or comments.
19.1	In the definition of a function-like macro, each instance of a parameter shall be enclosed in parentheses unless it is used as the operand of # or ##.
20.4	Dynamic heap memory allocation shall not be used.
20.9	The input/output library <stdio.h> shall not be used in production code.

Figure 1. MISRA exceptions

8 Known Issues

8.1 Maximum file path length in Windows® 7 Operating System

Windows 7 operating system imposes a 260 character maximum length for file paths. When installing the Kinetis SDK, place it in a directory close to the root to prevent file paths from exceeding the maximum character length specified by the Windows operating system. The recommended location is the C:\nxp folder.

8.2 USBFS controller issue

Because of the USBFS controller design issues, the USB host suspend/resume demos (usb_suspend_resume_host_hid_mouse) of the full speed controller do not support the low speed device directly.

8.3 USB PID issue

Because the PID of all USB device examples is updated, uninstall the device drivers and then reinstall when the device (with new PID) is plugged in the first time.

8.4 Mutex support issue

There is only one mutex instance supported when configSUPPORT_STATIC_ALLOCATION is enabled. If more than one mutex is needed, two lines of code need to be changed in <SDK_DIR>\middleware\usb\osa\usb_osa_freertos.c.

1. In the function USB_OsaMutexCreate, change "usb_osa_sem_struct_t *mutex;" to "usb_osa_sem_struct_t *mutex = NULL;" at line 497.
2. Change "#define USB_OSA_FREERTOS_MUTEX_COUNT (1U)" to "#define USB_OSA_FREERTOS_MUTEX_COUNT (xU)" at line 47 while the 'x' is the count of the mutex instance. For example, if using CDC device class driver which would work with at least 3 mutex instances, at least change "#define USB_OSA_FREERTOS_MUTEX_COUNT (1U)" to "#define USB_OSA_FREERTOS_MUTEX_COUNT (3U)".

9 Change Log - Peripheral drivers

ADC16

The current ADC16 driver version is 2.0.0

- 2.0.0
 - Initial version

CMP

The current CMP driver version is 2.0.0

- 2.0.0
 - Initial version

CMT

The current CMT driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - Changes
 - Added static to global CMT variables.

DAC

Change Log - Peripheral drivers

The current DAC driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Moved the default DAC_Enable(..., true) from the DAC_Init() to the application code to enable the DAC output

DMAMUX

The current DMAMUX driver version is 2.0.2

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Fixed build warning while setting the DMA request source in the DMAMUX_SetSourceChange issue by changing the type of the parameter source from uint8_t to uint32_t
- 2.0.2
 - New feature:
 - Added the *always on enable* feature of a DMA channel for the ULP1 DMAMUX support

DSPI

The current DSPI driver version is 2.1.3

- 2.1.0
 - New features:
 - Added transfer prefix to transactional APIs
- 2.1.1
 - Bug fix:
 - Set the EOQ (End Of Queue) bit to TRUE for the last transfer in transactional APIs
- 2.1.2
 - Bug fix:
 - The DSPI_MasterTransferBlocking function hangs in corner cases, for example, when bitsPerFrame is 4 and 6 and in the kDSPI_MasterPcsContinuous transfer mode
- 2.1.3
 - Bug Fix:
 - DSPI eDMA driver doesn't support the odd transfer data size and the bitsPerFrame greater than 8.
 - Optimization:
 - Added the #ifndef/#endif to allow users to change the default tx value at compile time.

eDMA

The current eDMA driver version is 2.1.1

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Fixed the issue where an eDMA callback does not check a valid status in the EDMA_HandleIRQ API
- 2.0.2
 - Bug fix:
 - Fixed the incorrect minorLoopBytes type definition in the _edma_transfer_config structure. Defined the minorLoopBytes as uint32_t instead of uint16_t
- 2.0.3
 - Bug fix:

- Fixed the incorrect pubweak IRQHandler name issue, which causes re-definition build errors when a client sets his/her own IRQHandler, by changing the 32-channel IRQHandler name to DriverIRQHandler
- 2.0.4
 - Improvement:
 - Added support for SoCs with multiple eDMA instances.
 - Added the pubweak DriverIRQHandler for the KL28T DMA1 and MCIMX7U5_M4.
- 2.0.5
 - Improvement:
 - Added the pubweak DriverIRQHandler for the K32H844P (16 channels shared).
- 2.1.0
 - Improvement:
 - Changed the EDMA_GetRemainingBytes API to EDMA_GetRemainingMajorLoopCount because of the eDMA IP limitation (see API comments/note for details).
- 2.1.1
 - Improvement:
 - Added documentation of the eDMA data flow when scatter/gather is implemented for the EDMA_HandleIRQ API.
 - Updated and corrected comments in the EDMA_HandleIRQ API and edma_handle_t struct.

Flash

The current Flash driver version is 2.2.0

- 2.0.0
 - Initial version
- 2.1.0
 - New features:
 - Support for the FTL device in FLASH_Swap API
 - Support for various pflash start addresses
 - Added support for KV58 in the cache clear function
 - Bug fix
 - Compiled execute-in-RAM functions as a PIC binary code for driver use
 - Added missed FlexRAM properties
 - Fixed an unaligned variable issue for the execute-in-RAM function code array
- 2.2.0
 - New Features:
 - Added support for devices with the secondary flash (KW40)
 - Added support for devices with the LP flash (K3S/G)
 - Added flash pre-fetch speculation APIs

FlexIO UART

The current FlexIO UART driver version is 2.1.4

- 2.1.0
 - New features:
 - Added a transfer prefix to the transactional APIs
 - Added the txSize/rxSize parameters to the handle structure to record the transfer size
 - Bug fix
 - Added an error handle to handle the data count zero or data buffer NULL situation
- 2.1.1
 - Bug fix
 - Renamed FLEXIO_UART_StopRingBuffer to FLEXIO_UART_TransferStopRingBuffer to align with the definition in the C file
- 2.1.2
 - Fixed the baud rate bug to ensure that the computed baud rate is accurate.
- 2.1.3

Change Log - Peripheral drivers

- Added the Rx framing error and parity error status check when using an interrupt transfer.
- 2.1.4
 - Changed the parameter type in UART_RTOS_Init() struct rtos_uart_config -> uart_rtos_config_t.

FlexIO I2C

The current FlexIO I2C driver version is 2.1.1

- 2.1.0
 - New features:
 - Added a transfer prefix to the transactional APIs
 - Added the txSize/rxSize parameters to the handle structure to record the transfer size
 - Bug fix
 - Added an error handle to handle the data count zero or data buffer NULL situation
- 2.1.1
 - Bug fix
 - Implemented the FLEXIO_I2C_MasterTransferBlocking API which is defined in the header file but has no implementation in the C file

FlexIO SPI

The current FlexIO SPI driver version is 2.1.0

- 2.1.0
 - New features:
 - Added a transfer prefix to the transactional APIs
 - Added the txSize/rxSize parameters to the handle structure to record the transfer size
 - Bug fix
 - Fixed the error register address return for 16-bit data write in the FLEXIO_SPI_GetTxDataRegisterAddress

FlexIO I2S

The current FlexIO I2S driver version is 2.1.1

- 2.1.0
 - New features:
 - Added a transfer prefix to the transactional APIs
 - Added the txSize/rxSize parameters to the handle structure to record the transfer size
- 2.1.1
 - Bug fix
 - Fixed the FlexIO I2S RX data read error and eDMA address error
 - Fixed the FlexIO I2S slave timer comparison setting error

FTM

The current FTM driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Updated the FTM driver to fix write to ELSA and ELSB bits
 - Set the COMBINE bit before writing to the CnV register

GPIO

The current GPIO driver version is 2.1.1

- 2.1.0
 - API Interface Change:

- Added "pins" or "pin" to some API names
- Renamed the "GPIO_PinConfigure" to "GPIO_PinInit"
- 2.1.1
 - API Interface Change
 - Added API for the check attribute bytes

I2C

The current I2C driver version is 2.0.2

- 2.0.1
 - New features
 - Added a double buffer enable configuration for SoCs which have the DFEN bit in S2 register
 - Added the flexible transmit/receive buffer size support in I2C_SlaveHandleIRQ
 - Added the start flag clear address match and release bus operation in I2C_SlaveWrite/ReadBlocking API
 - Bug fix:
 - Updated the kI2C_SlaveRepeatedStartEvent to kI2C_SlaveStartEvent
- 2.0.2
 - Bug Fix:
 - Fixed the issue that occurs in master receive and slave transmit mode with no stop flag and master can't start a next transfer because it can't send out restart signal
 - Fixed a data transfer out of order issue which occurs because of a memory barrier
 - New Features:
 - Added an address nak event for the master.
 - Added a general call event for the slave.

LLWU

The current LLWU driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - Changes:
 - Updated for KL8x

LMEM

The current LMEM driver version is 2.1.0

- 2.0.0
 - Initial version
- 2.1.0
 - Removed the write buffer enable from the cache enable API.
 - Added the enable write buffer APIs.

LPTMR

The current LPTMR driver version is 2.0.0

- 2.0.0
 - Initial version

LPUART

The current LPUART driver version is 2.2.3

- 2.1.0
 - Updated transactional APIs
- 2.1.1

Change Log - Peripheral drivers

- Removed the needless check of event flags and assert in LPUART_RTOS_Receive
- Wait always for RX event flag in LPUART_RTOS_Receive
- 2.2.0
 - Added seven data bits and MSB support
- 2.2.1
 - Added a separate RX and TX IRQ number support
- 2.2.2
 - Added software reset feature support.
 - Added software reset API to LPUART_Init().
- 2.2.3
 - Changed the parameter type in the LPUART_RTOS_Init() struct rtos_lpuart_config --> lpuart_rtos_config_t.

MPU

The current MPU driver version is 2.1.0

- 2.0.0
 - Initial version
- 2.1.0
 - API updates:
 - Updated the mpu_region_num_t and mpu_master_t to uint32_t
 - Updated the mpu_low_masters_access_rights_t and mpu_high_masters_access_rights_t to mpu_rwxrights_master_access_control_t and mpu_rwrights_master_access_control_t
 - Updated the MPU_SetRegionLowMasterAccessRights() and MPU_SetRegionHighMasterAccessRights() to MPU_SetRegionRwxMasterAccessRights() and MPU_SetRegionRwMasterAccessRights()
- 2.1.1
 - Add the feature file macro definition limitation for the MPU_SetRegionRwMasterAccessRights()

PDB

The current PDB driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - Changed the PDB register base array to a constant

PIT

The current PIT driver version is 2.0.0

- 2.0.0
 - Initial version

PMC

The current PMC driver version is 2.0.0

- 2.0.0
 - Initial version

PORT

The current PORT driver version is 2.0.2

- 2.0.1
 - Changes:
 - Added "const" in function parameters
 - Updated enumeration variable names
- 2.0.2
 - Changes:

- Added feature guard macros in the driver

QSPI

The current QSPI driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - New API:
 - QSPI_SetReadArea to set the read area.
 - Bug fix:
 - Fixed the QSPI_UpdateLUT function by updating the first LUT issue.
 - Fixed an issue caused by some functions that have the QSPI0 hardcoded as the base.

RCM

The current RCM driver version is 2.0.1

- 2.0.0
 - Initial version
- 2.0.1
 - [KPSDK-10249] Fixed the kRCM_SourceSw bit shift issue.

RTC

The current RTC driver version is 2.0.0

- 2.0.0
 - Initial version

SAI

The current SAI driver version is 2.1.1

- 2.0.0
 - Initial version
- 2.1.0
 - API name change:
 - SAI_GetSendRemainingBytes -> SAI_GetSentCount
 - SAI_GetReceiveRemainingBytes -> SAI_GetReceivedCount
 - Added "Transfer" prefix to all transactional API names
 - All transactional APIs use a base and a handle as input parameters
 - Unify the parameter names.
 - Bug fix:
 - Fixed the W1C bug while reading TCSR/RCSR registers.
 - Fixed the MOE enable flow issue by moving the MOE enable after MICS settings in SAI_TxInit/SAI_RxInit.
- 2.1.1
 - Optimization:
 - Reduced code size while not using transactional APIs.

SDHC

The current SDHC driver version is 2.0.0

- 2.1.0
 - New Features:
 - Added a host descriptor to contain the SDHC-related attributes.
 - Bug Fix:

Change Log - Peripheral drivers

- Removed the clock auto-gated function because it causes a hardware issue.
- Changes:
 - Added more SDIO card-related command types.
 - Changed the callback mechanism in the non-blocking transactional APIs.
 - Merged the two ADMA configuration functions into one.
 - Changed the transactional API names.
- 2.1.1
 - Bug Fix:
 - Fixed the compile error when the ADMA1 is enabled.

SDRAMC

The current SDRAMC driver version is 2.1.0

- 2.0.0
 - Initial version
- 2.0.1
 - Changes:
 - Added static to the global SDRAMC variables.
- 2.1.0
 - API change:
 - Changed the status_t SDRAMC_SendCommand() function to void the SDRAMC_SendCommand();

SIM

The current SIM driver version is 2.0.0

- 2.0.0
 - Initial version

Smart Card

The current Smart Card driver version is 2.1.1

- 2.1.0
 - Initial version
- 2.1.1
 - New features:
 - Added a default PHY interface selection to Smart Card RTOS drivers (KPSDK-9063)
 - Replaced the smartcard_phy_ncn8025 driver with the smartcard_phy_tda8035
 - Bug fix
 - Fixed the protocol timers activation sequences in the smartcard_emvsim and smartcard_phy_tda8035 drivers during the EMVL1 pre-certification tests (KPSDK-9170, KPSDK-9556)

SMC

The current SMC driver version is 2.0.2

- 2.0.0
 - Initial version
- 2.0.1
 - Changes:
 - Updated for KL8x
- 2.0.2
 - Bug fix:
 - Added DSB before WFI and ISB after WFI
 - Changes:
 - Updated the SMC_SetPowerModeVlpw implementation

TPM

The current TPM driver version is 2.0.2

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Fixed the TPM_UpdateChnEdgeLevelSelect ACK wait issue.
 - Fixed the TPM_SetupdualEdgeCapture failure to set the FILTER register.
 - Fixed the TPM_UpdateChnEdgeLevelSelect ACK wait issue.
- 2.0.2
 - Bug fix:
 - Fixed issues in TPM_SetupPwm/TPM_UpdateChnEdgeLevelSelect /TPM_SetupInputCapture/TPM_SetupOutputCompare/TPM_SetupDualEdgeCapture functions wait acknowledgement when the channel is disabled.

VREF

The current VREF driver version is 2.1.0

- 2.1.0
 - Added new functions:
 - Added VREF_SetTrim2V1Val() and VREF_GetTrim2V1Val() functions to supply 2V1 output mode.

WDOG

The current WDOG driver version is 2.0.0

- 2.0.0
 - Initial version

CLOCK

The current CLOCK driver version is 2.2.0

- 2.0.0
 - Initial version
- 2.1.0
 - Changes:
 - Merged the fsl_mcg and fsl_osc into fsl_clock
- 2.2.0
 - New features:
 - [KPSDK-9157] Updated the CLOCK_SetFeiMode/CLOCK_SetFbiMode/CLOCK_BootToFeiMode() to support set MCG_C4[DMX32]=1 in FEI/FBI modes
 - Bug fix:
 - Updated the IP_CLOCKS array, removed unused gates, and added missing gates

10 Change Log - Middleware

DMA Manager for KSDK

The current DMA Manager driver version is 2.0.0

- 2.0.0
 - Initial version

EMVL1 for KSDK

The current EMVL1 driver version is 2.0.2

Change Log - Middleware

- 2.0.0
 - Initial version
- 2.0.1
 - Bug fix:
 - Fixed low level driver protocol timer failures during EMVL1 pre-certification tests (KPSDK-9556)
 - Fixed incorrect T0 command response that causes long command responses (KPSDK-8707). Command case2, case3, and case4 are affected
- 2.0.2
 - Re-implemented a function for sending commands in T=0
 - Bug Fix:
 - Fixed the incorrect size of response in T=0 (KPSDK-11248)
 - Fixed a problem with command cases 3 in T=1; expected incorrect length of response (KPSDK-11335)
 - Fixed an incorrect length of response in T=1 (KPSDK-11868)
 - Fixed the usage application buffer for the data payload and overhead associated with T=1 protocol (KPSDK-11336)

FatFs for KSDK

The current FatFs driver version is R0.11a

- Added glue functions for low level drivers (SDHC, SDSPI, RAM, and MMC) and modified the diskio.c file
- Added RTOS wrappers to make FatFs thread-safe. Modified the syscall.c file
- Renamed ffconf.h file to ffconf_template.h file. Each application should contain its own ffconf.h file
- Included ffconf.h into diskio.c files to enable selection of a physical disk from the ffconf.h by macro definition
- Conditional compilation of physical disk interfaces in diskio.c

mbedTLS for KSDK

The current mbedTLS driver version is based on the mbedTLS 2.2.1 released on 2016-01-05

- 2.2.1
 - New features:
 - Ported mbedTLS 2.2.1 to KSDK 2.0.0
 - Added support for the mmCAU cryptographic acceleration module. Accelerated MD5, SHA, AES, and DES
 - Added support for the LTC cryptographic acceleration module. Accelerated AES, DES, and PKHA
 - Added new files:
 - .c - alternative implementation of cryptographic algorithm functions using LTC and mmCAU module drivers
 - .h - configuration settings used by mbedTLS KSDK bare metal examples
 - Added mbedTLS KSDK bare metal examples:
 - <board name> - KSDK mbedTLS benchmark application
 - <board name> - KSDK mbedTLS self-test application
 - Added the MBEDTLS_GCM_CRYPT_ALT configuration parameter to enable reloading the mbedtls_gcm_crypt_and_tag() function
 - Added the MBEDTLS_ECP_MUL_COMB_ALT to enable an alternate implementation of the ecp_mul_comb() function
 - Added the MBEDTLS_ECP_ADD_ALT configuration parameter to enable reloading the ecp_add() function
 - Added the MBEDTLS_DES_SETKEY_DEC_ALT configuration parameter to enable reloading mbedtls_des_setkey_dec(), mbedtls_des3_set2key_dec(), and mbedtls_des3_set3key_dec() functions
 - Added the MBEDTLS_DES_SETKEY_ENC_ALT configuration parameter to enable reloading mbedtls_des_setkey_enc(), mbedtls_des3_set2key_enc(), and mbedtls_des3_set3key_enc() functions
 - Added the MBEDTLS_DES_CRYPT_CBC_ALT configuration parameter to enable reloading the mbedtls_des_crypt_cbc() function
 - Added the MBEDTLS_DES3_CRYPT_CBC_ALT configuration parameter to enable reloading the mbedtls_des3_crypt_cbc() function

- Added the MBEDTLS_AES_CRYPT_CBC_ALT configuration parameter to enable reloading the mbedtls_aes_crypt_cbc() function
- Added the MBEDTLS_AES_CRYPT_CTR_ALT configuration parameter to enable reloading the mbedtls_aes_crypt_ctr() function
- Added the MBEDTLS_CCM_CRYPT_ALT configuration parameter to enable reloading mbedtls_ccm_encrypt_and_tag() and mbedtls_ccm_auth_decrypt() functions
- Added the MBEDTLS_MPI_ADD_ABS_ALT configuration parameter to enable reloading the mbedtls_mpi_add_abs() function
- Added the MBEDTLS_MPI_SUB_ABS_ALT configuration parameter to enable reloading the mbedtls_mpi_sub_abs() function
- Added the MBEDTLS_MPI_EXP_MOD_ALT configuration parameter to enable reloading the mbedtls_mpi_exp_mod() function
- Added the MBEDTLS_MPI_MUL_MPI_ALT configuration parameter to enable reloading the mbedtls_mpi_mul_mpi() function
- Added the MBEDTLS_MPI_MOD_MPI_ALT configuration parameter to enable reloading the mbedtls_mpi_mod_mpi() function
- Added the MBEDTLS_MPI_GCD_ALT configuration parameter to enable reloading the mbedtls_mpi_gcd() function
- Added the MBEDTLS_MPI_INV_MOD_ALT configuration parameter to enable reloading the mbedtls_mpi_inv_mod() function
- Added the MBEDTLS_MPI_IS_PRIME_ALT configuration parameter to enable reloading the mbedtls_mpi_is_prime() function
- Added encrypt/decrypt modes to the mbedtls_des_context and the mbedtls_des3_context structure
- Added a carriage return to the mbedtls_printf() in self test functions

mmCAU library for KSDK

The current mmCAU driver version is 2.0.0

- 2.0.0
 - New features:
 - Q4/2013 release of the CAU library
 - Added the fsl_mmcau.h/fsl_mmcau.c optional layer between the application and the legacy CAU library (cau_api.h). This API has no alignment requirements

SDMMC for KSDK

The current SDMMC driver version is 2.1.1

- 2.1.0
 - Bug fix:
 - Changed the callback mechanism when sending a command
 - Fixed the performance low issue when transferring data
 - Changes:
 - Changed the name of error codes returned by an internal function
 - Merged all host-related attributes into one structure
 - Optimized the function to set a maximum data bus width for the MMC card
- 2.1.1
 - Bug fix:
 - Fixed the block range boundary error when transferring data to the MMC card
 - Fixed the bit mask error in the SD card when switching to a high-speed function
 - Changes:
 - Added an error code to indicate that SDHC ADMA1 transfer type is not supported
 - Optimized the SD card initialization function

USB stack for KSDK

The current USB stack version is 1.4.0

Change Log - Middleware

- 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
 - vusb_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
 - 1.0.1
 - Bug fix
 - Improved the device audio speaker efficiency by changing the transfer mode from interrupt to DMA to eliminate the periodic noise
 - 1.1.0
 - Bug fix:
 - Fixed issues in the USB certification
 - Updated the VID and Manufacturer string to NXP Semiconductors
 - New features:
 - Supported classes
 - Printer
 - Examples
 - usb_device_composite_cdc_msc_sdcard

- usb_device_printer_virtual_plain_text
 - usb_host_printer_plain_text
- Changes:
 - Renamed example usb_device_composite_cdc_msc to usb_device_composite_cdc_msc_ramdisk
- 1.2.0
 - New features:
 - Supported controllers
 - LPC IP3511 (Full speed, device mode)
- 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
- 1.4.0
 - New features:
 - Examples
 - usb_device_hid_mouse/freertos_static
 - usb_suspend_resume_device_hid_mouse_lite

wolfSSL for KSDK

The current wolfSSL is based on the release 3.9.0 of wolfSSL

- 3.8.0
 - New features:
 - Added support for the Kinetis LTC hardware acceleration module, which accelerates AES, 3DES, TFM module (modular integer arithmetic), and ECC wolfSSL modules
 - Added support for the Kinetis random number generator modules TRNG and RNGA.
 - Miscellaneous changes:
 - The Kinetis mmCAU acceleration now uses the "fsl_mmcau.h" file instead of the "cau_api.h" file
 - In DSA, wc_dsaSign() function is updated to repeat the wc_RNG_GenerateBlock() until k is less than q
 - wolfssl/wolfcrypt/settings.h file is changed to remove the unused macros and add support for the KSDK 2.0.0
 - In the wolfcrypt/src/asn.c file, the ksdk_time(time_t) is changed to external, to be defined by an application
- 3.9.0
 - New Features:
 - Added more LTC public key acceleration (curve25519, ed25519, and RSA4096)
 - FREESCALE_LTC_TFM_RSA_4096_ENABLE macro added to enable RSA4096 on K8x/KL8x LTC
 - LTC_MAX_ECC_BITS increased to 384 to enable ECC-384 curve acceleration on LTC
 - FREESCALE_LTC_SHA added for KL8x SHA-1 and SHA-256 hardware acceleration
 - Other changes:
 - wolfssl/wolfcrypt/settings.h is changed to remove unused macros and add support for KSDK 2.0.0
 - LTC public key acceleration is implemented in a separate source file ksdk_port.h and ksdk_port.c

11 Change Log - RTOS

FreeRTOS OS for KSDK

Revision History

The current version is FreeRTOS OS 8.2.3. The original package is available at freertos.org.

- 8.2.3
 - New features:
 - Added tickless idle mode support
 - Added a template application for Kinetis Expert (KEx) tool (template_application)
 - Changes:
 - Reduced the folder structure to keep only Kinetis-related information

μC/OS-II OS for KSDK

The current version is μC/OS-II OS V2.92.11

- 2.92.11
 - New features:
 - Added a template application for the Kinetis Expert (KEx) tool (template_application)
 - Changes:
 - Reduced the folder structure to keep only Kinetis-related information
 - Added wrappers to adaptat PendSV_Handler and SysTick_Handler. Related files are located in rtos\ucosii_<version>\uCOS-II\Ports\ARM-Cortex-Mx\Generic\<compiler>\fsl_isr_wrapper.S

μC/OS-III OS for KSDK

The current version is μC/OS-III OS V3.05.01

- V3.05.01
 - New features:
 - Added a template application for the Kinetis Expert (KEx) tool (template_application)
 - Bug fix:
 - [KPSDK-7247] Downgraded port files from V3.05.01 to V3.05.00 because of the context switch issue
 - Changes:
 - Reduced the folder structure to keep only Kinetis-related information

12 Revision History

This table summarizes revisions to this document.

Table 4. Revision history

Revision number	Date	Substantive changes
0	09/2016	Initial release

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