StarterWare 01.04.00.10

Release Notes

Applies to Product Release: 01.04.00.10

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1. Overview

This document is the **Release notes** of the ADAS StarterWare package. StarterWare release provides no-OS platform support for TI's series of ADAS specific SoCs TDA1Mxx, TDA2xx, TDA2Ex and TDA3xx. The StarterWare package contains Device Abstraction Layer libraries and peripheral/board level sample/demo examples that demonstrate the capabilities of the peripherals on TDA1Mxx, TDA2xx, TDA2Ex and TDA3xx SoCs.

TDA1Mxx device family is a derivative of TMS320DM8148 that supports Advanced Driver Assistance Systems (ADAS) applications. For more information about the TDA1Mxx device family, please contact your local TI sales representative. For more information about TMD320DM814x, please visit http://www.ti.com/product/tms320dm8148.

TDA2xx and TDA2Ex are high-performance, automotive vision application devices based on enhanced OMAP™ architecture integrated on a 28-nm technology. The architecture is designed for Advanced Driver Assistance applications, including Vision Analytics for Single/Dual Front Camera, LVDS/Ethernet Surround View, Night Vision, Blind Spot Detection, Sensor Fusion and LIDAR, among others, and best-in-class CPU performance, video, image, and graphics processing sufficient to support:

- Streaming video up to full high definition (Full-HD) (1920×1080p, 60 fps)
- 2-dimensional (2D) and 3-dimensional (3D) graphics.

TDA3x is an ADAS application device based on enhanced OMAP™ architecture integrated on a 28-nm technology. TDA3x complements the TDA2x ADAS device family by using a common architecture, enabling scalability from entry to high performance for a broad range of applications. The device family is targeted at ADAS applications including Front Camera, Intelligent Rear Camera, Radar and Mirror Replacement.

2. Documentation

List of documents provided in the package

- StarterWare_Userguide.pdf
- StarterWare_DataSheet.pdf
- StarterWare_API_Reference.chm
- SBL_Userguide.pdf

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- **Installation**

To install ADAS StarterWare (supports TDA1Mxx, TDA2xx, TDA2Ex and TDA3xx) on your PC, run the StarterWare installer (starterware_setupwin32_01_04_00_10.exe). The installer allows you to choose the installation directory. The ADAS StarterWare includes several sub-components and all the components will be installed in the same location (e.g., "C:/ti/ starterware_01_04_00_10").

New In this Release

- Added HAL and example usage for Extended Memory Controller (XMC) and Memory Protection Unit (MPU) modules within the C66x subsystem.
- Added EMIF ECC HAL support for TDA3xx, TDA2Ex and TDA2xx platform.
- Added IPU ECC HAL support for Tda3xx platform.
- Added support to service user defined ISR for Abort Interrupts in A15 interrupt controller.
- Added support for enabling ECC in OCMC HAL for TDA2xx and TDA2Ex platform.
- Updated fatlib from version 0.4 to version 0.11. Added new library fat_lib_edma which contains APIs for data transfer from SD card. Applications like VSDK can implement their own EDMA layer for integrating FAT lib.
- Made the starterware package MISRA C compliant.
- PM:
  - Added support for decoupling the I2C driver from the PMIC programming. The application must now register the I2C driver with the PMHALPmicComm module to program the PMIC.
  - Added PMLIBVideoPll wrapper functions to support programming the DSS VENC source clocks.
  - Updated the PMLIBSysconfig function to assert CPU resets when the CPU subsystems are enabled. The API on exit ensures the CPUs are held in reset and the subsystem is out of reset to allow application software to program subsystem level resources.
  - Added support for multi-opp voltage programming in TDA3xx.

- TDA3xx SBL
  - Removed dependency of SBL library on peripheral libraries.
  - Added a new utility library sbl_utils which is used by SBL application for communicating with boot peripherals.
  - Added support for computing CRC on app image in TDA3xx SBL.
    - Added support in multicore image generation tool for generating updated headers.
    - Added new tool for generating CRC on multicore image.
  - Added support for enabling ECC on EMIF in TDA3xx SBL.
  - Added multi OPP support in TDA3xx SBL.

- Bug fixes
  1. OMAPS00327332 [Uart] Open MISRA C issue in uart.h from TI starterware_01_01_03_20 package
  2. OMAPS00314660 [DSS]- Frame height should be used for Interlaced display
  3. OMAPS00316393 Need to implement Manual Mode and Virtual Mode delay sequence while doing pin mux for QSPI Boot
  4. OMAPS00322185 Errata: i870 - PCIe unaligned read access issue
  5. OMAPS00322186 Errata: i848 McASP PAD loopback is not allowed
  6. OMAPS00322201 TDA3x Errata: i873 - DSS: First Two Columns Of Active Video Are Always Black At The Output Of Video Encoder
  7. OMAPS00323625 PMHAL PMIC APIs Too tightly coupled with STW I2C Drivers
  8. OMAPS00324287 [STW - Mcasp] Mcasp transmit and Mcasp BurstTransmit apps are not reporting correct frequencies
  9. OMAPS00324429 Remove dependency of SBL lib on other starterware libararies e.g. UartConsole, Boards, etc.
  10. OMAPS00324984 [SBL] - UART Test
  11. OMAPS00325342 [Board] Probing of HDMI EDID fails after IO Expander Intialization
  12. OMAPS00325396 Remove --dynamic from M4 build options
  13. OMAPS00325441 IPU_WUGEN_Interrupt_Lookup function not setting the MEVT correctly
  14. OMAPS00325525 LDC Outputs extra block at the end of the frame
  15. OMAPS00325526 LDC does not support smaller frame output for YUV420
  16. OMAPS00325606 Fatlib BSD License should be included in manifest
  17. OMAPS00326047 [DCAN] "DCAN Module hit the sw wakeup issue /could get stuck during RamInit" Errata workaround needs to be implemented
  18. OMAPS00326312 PM Video PLL Hard codes the sys clock frequency.
  19. OMAPS00326396 PMLIB DSP CPU Idle does not map the Cpu Idle sub functions correctly.
  20. OMAPS00326410 QSPI flash writer prints dummy error messages
  21. OMAPS00326565 Align tool chain paths between Starterware and Vision SDK
  22. OMAPS00326861 [DSS] LCD2 to DPI1 output doesnot work in tda2xx
  23. OMAPS00327293 PMHAL Database TDA2ex CAL base address is incorrect
  24. OMAPS00307880 [DSS] "1.10 LCDENABLE Not Functional" Errata workaround needs to be implemented - Rejected

25. OMAPS00312717 Random display controller failure observed on some TDA2x EVMS - Rejected
26. OMAPS00314648 Sometimes AppImage isn't booting with SBL on tda3xx - Rejected
27. OMAPS00322062 Errata: i641 - Overlay Optimization Limitations – Rejected
28. OMAPS00298489 [STW] Enable Semi-hosting in Cortex-A15 build system – Rejected

Upgrade and Compatibility Information

Below are the interface changes in starterware:

- Modified multicore image generation scripts and tools in order to support CRC:
  - Added new fields *metaHeaderCrcH* (High) and *metaHeaderCrcL* (Low) in Meta Header Start.
  - Added new fields *isRprcImageValid*, *rprcImageCrcH (High)*, *rprcImageCrcL (Low)* and *rprcImageSize* to Meta Header Core.
  - Moved APIs for peripheral communication (used by SBL application) from SBL Lib Private Layer to SBL Utils library and made corresponding change in API names.
  - **It should be noted that TDA3xx SBL and TDA3xx application images created using tools from previous releases will not work with this release.**
- Modified the below build flags:
  - Removed --dynamic flag from TMS470 linker options (for A8, M4 and M3) and C6000 linker options (for C66x and C674x). This results in use of rom_model for auto initialization of data section.
  - Made --zero_init=on for auto-initializing BSS section to zero.
- Modified QSPI Flash Writer to verify the flashed data. Due to this there is a change in the loadRaw command load address. User should make sure the correct load command is used while flashing.
- FATLIB: Moved the fatlib specific files from folder <rootdir>/fatlib to <rootdir>/fatlib/fatfs. Now application should also link with fat_lib_edma library which contains APIs for data transfer from SD card

- EMIF ECC has been moved from platform folder (stw_platformEccTda3xx.c & stw_platformEccTda3xx.h) to EMIF ECC HAL. Hence API, macros, enum, etc. have been renamed as per the coding guidelines.
- Modified A15 Cache APIs. Now cacheType parameter is passed as uint32_t variable instead of passing as enum type. This is done to make it compatible with OSAL layer.
- Moved contents of L3FW lib to safety lib and renamed APIs, macros, etc. accordingly.

Supported/ Validated Examples

StarterWare examples are supported for multiples cores and multiple platforms. In case of A8 core on TI814x multiple tool chains are supported. The following legend is applicable to a particular core on a particular platform and for a particular tool chain (Only in case of A8 and TI814x):

- Yes – Example is supported and tested successfully for this release
- NA – Example is not supported on the core for the particular platform
- NT – Example is supported but not tested for this release
- No – Example is supported but fails for this release

Example	Folder	TI814X			
		A8 CGT	A8 GCC	M3	C674x
ddr_test_app	examples\ddr_stress_test	NT	Yes	NA	NA
edma_test_app	examples\edma_test	Yes	Yes	Yes	Yes
i2c_driver_led_blink_app	examples\i2c\i2c_driver_led	Yes	Yes	Yes	NA
i2c_eeprom_app	examples\i2c\i2c_eeprom_app	Yes	Yes	NA	NA
mailbox_app	examples\mailbox	NT	NT	NT	NA
mcaspTransmit_app	examples\mcasp\mcasp_transmit	NT	NT	NT	NA
mcspi_app	examples\mcspi	NT	NT	NT	NA
mmu_tlb_twl_app	examples\mmu\tlb_twl	NA	NA	NA	Yes
nor_edma_read	examples\nor\nor_edma_read	Yes	Yes	NA	NA
sensor_config_app	examples\ov10630_sensor	NT	NT	NT	NA
timer_app	examples\timer	Yes	Yes	Yes	Yes
uart1_test	examples\uart\uart1	Yes	Yes	NA	NA
vipCapt	examples\vipCapt	NA	NA	NT	NA
wdtimer_app	examples\wdtimer	Yes	Yes	NA	NA

Example	Folder	TDA2XX		
		A15	M4	C66x
DssApp	examples\DssApp	NA	Yes	NA
boot_app	examples\boot	Yes	NA	NA
dcan_app_evm_loopback	examples\dcan\dcanEvmLoopback	Yes	Yes	NA
dcan_app_loopback	examples\dcan\dcanLoopback	Yes	Yes	NA
ddr_test_app	examples\ddr_stress_test	Yes	NA	NA
ecc_app	examples\ecc_app	Yes	Yes	Yes
edid_programmer	examples\i2c_diag_test\edid_programmer	Yes	NA	NA
edma_test_app	examples\edma_test	Yes	Yes	Yes
eeprom_app	examples\i2c_diag_test\eeprom_i2c	Yes	NA	NA
gpio_exp_app	examples\i2c_diag_test\i2c_gpio_expander	Yes	NA	NA
gpio_input_interrupt_app	examples\gpio\gpio_input_interrupt	Yes	NA	NA
gpio_output_app	examples\gpio\gpio_output	Yes	NA	NA
i2c_driver_led_blink_app	examples\i2c\i2c_driver_led	Yes	NA	NA
i2c_eeprom_app	examples\i2c\i2c_eeprom_app	Yes	NA	NA
i2c_test_app	examples\i2c_diag_test\i2c_all	NT	NA	NA
l3fw_app	examples\l3fw	Yes	NA	NA
mailbox_app	examples\mailbox	Yes	Yes	Yes
mcaspBurstTransmit_app	examples\mcasp\mcasp_bursttransmit	NT	NT	NA
mcaspTransmit_app	examples\mcasp\mcasp_transmit	Yes	Yes	NA
mcasp_sinetone_app	examples\mcasp\mcasp_sinetone	Yes	NA	Yes
mcspiMasterSlave_app	examples\mcspiMasterSlave\masterslave	Yes	Yes	NA
mmc_raw_access	examples\mmc_raw_access	Yes	NA	NA
mmcsd_fileIO_app	examples\sd_fileIO	Yes	NA	NA
mmu_a15_data_validation_app	examples\mmu\a15	Yes	NA	NA
mmu_tlb_twl_app	examples\mmu\tlb_twl	NA	NA	Yes
mmu_translation_fault_handle_app	examples\mmu\translation_fault_handle	Yes	NA	Yes
nor_edma_read	examples\nor\nor_edma_read	NA	Yes	NA
nor_read_write	examples\nor\nor_read_write	Yes	NA	NA
ocmc_app	examples\ocmc\ocmc_basic	Yes	Yes	NA
pcie_app_ep_write_loopback	examples\pcie\write_loopback\ep	Yes	NA	NA
pcie_app_rc_write_loopback	examples\pcie\write_loopback\rc	Yes	NA	NA
pm_clkrate_test_app	examples\pm\clkrate_manager	Yes	Yes	NA
pm_cpuidle_test_app	examples\pm\cpuidle	Yes	Yes	Yes
pm_junctiontemp_test_app	examples\pm\junction_temp_sensor	Yes	NA	NA
pm_systemconfig_test_app	examples\pm\systemconfig	Yes	Yes	NA
pmic_app	examples\i2c_diag_test\pmic_i2c	Yes	NA	NA
qspi_test_app	examples\qspi_test	Yes	Yes	NA
sensor_config_app	examples\ov10630_sensor	Yes	NA	NA
spinlock_test	examples\spinlock_test	Yes	Yes	Yes
temp_sensor_app	examples\i2c_diag_test\i2c_temp_sensor	Yes	NA	NA
timer_app	examples\timer	Yes	Yes	Yes
uart1_test_app	examples\uart\uart1	Yes	NA	NA

uart3_test_app	examples\uart\uart3	Yes	NA	NA
uart_edma_test	examples\uart\uart_edma	Yes	Yes	NA
uart_intr_test	examples\uart\uart_intr	NA	Yes	NA
uart_test	examples\uart\uart_test	Yes	NA	NA
videoLoopback	examples\videoLoopback	NA	Yes	NA
vipCapt	examples\vipCapt	NA	Yes	NA
wdtimer_app	examples\wdtimer	Yes	NA	NA

Example	Folder	TDA2EX		
		A15	M4	C66x
Boot_app	examples\ boot	Yes	NA	NA
dcan_app_evm_loopback	examples\dcan\dcanEvmLoopback	NT	NT	NA
dcan_app_loopback	examples\dcan\dcanLoopback	Yes	NT	NA
DssApp	examples\DssApp	NA	Yes	NA
ddr_test_app	examples\ddr_stress_test	Yes	NA	NA
ecc_app	examples\ecc_app	Yes	Yes	Yes
edid_programmer	examples\i2c_diag_test\edid_programmer	Yes	NA	NA
edma_test_app	examples\edma_test	Yes	Yes	Yes
eeprom_app	examples\i2c_diag_test\eeprom_i2c	Yes	NA	NA
gpio_exp_app	examples\i2c_diag_test\i2c_gpio_expander	Yes	NA	NA
gpio_input_interrupt_app	examples\gpio\gpio_input_interrupt	Yes	NA	NA
gpio_output_app	examples\gpio\gpio_output	Yes	NA	NA
i2c_driver_led_blink_app	examples\i2c\i2c_driver_led	Yes	NA	NA
i2c_eeprom_app	examples\i2c\i2c_eeprom_app	NT	NA	NA
i2c_test_app	examples\i2c_diag_test\i2c_all	NT	NA	NA
l3fw_app	examples\l3fw	NT	NA	NA
mailbox_app	examples\mailbox	Yes	Yes	Yes
mcaspBurstTransmit_app	examples\mcasp\mcasp_bursttransmit	NT	NT	NA
mcaspTransmit_app	examples\mcasp\mcasp_transmit	Yes	Yes	NA
mcasp_sinetone_app	examples\mcasp\mcasp_sinetone	Yes	NA	Yes
mcspiMasterSlave_app	examples\mcspiMasterSlave\masterslave	Yes	Yes	NA
mmc_raw_access	examples\mmc_raw_access	Yes	NA	NA
mmcsd_fileIO_app	examples\sd_fileIO	Yes	NA	NA
mmu_tlb_twl_app	examples\mmu\tlb_twl	NA	NA	Yes
mmu_translation_fault_handle_app	examples\mmu\translation_fault_handle	Yes	NA	Yes
nor_edma_read	examples\nor\nor_edma_read	NA	Yes	NA
nor_read_write	examples\nor\nor_read_write	NT	NA	NA
ocmc_app	examples\ocmc\ocmc_basic	Yes	Yes	NA
pcie_app_ep_write_loopback	examples\pcie\write_loopback\ep	Yes	NA	NA
pcie_app_rc_write_loopback	examples\pcie\write_loopback\rc	Yes	NA	NA
pm_clkrate_test_app	examples\pm\clkrate_manager	Yes	Yes	NA
pm_cpuidle_test_app	examples\pm\cpuidle	Yes	Yes	Yes
pm_junctiontemp_test_app	examples\pm\junction_temp_sensor	Yes	NA	NA
pm_systemconfig_test_app	examples\pm\systemconfig	Yes	Yes	NA

pmic_app	examples\i2c_diag_test\pmic_i2c	Yes	NA	NA
qspi_test_app	examples\qspi_test	Yes	Yes	NA
sensor_config_app	examples\ov10630_sensor	Yes	NA	NA
spinlock_test	examples\spinlock_test	Yes	Yes	Yes
temp_sensor_app	examples\i2c_diag_test\i2c_temp_sensor	Yes	NA	NA
timer_app	examples\timer	Yes	Yes	Yes
uart1_test_app	examples\uart\uart1	Yes	NA	NA
uart_edma_test	examples\uart\uart_edma	Yes	Yes	NA
uart_intr_test	examples\uart\uart_intr	NA	Yes	NA
uart_test	examples\uart\uart_test	Yes	NA	NA
videoLoopback	examples\videoLoopback	NA	Yes	NA
vipCapt	examples\vipCapt	NA	Yes	NA
wdtimer_app	examples\wdtimer	Yes	NA	NA

Example	Folder	TDA3XX	
		M4	C66x
DssApp	examples\DssApp	Yes	NA
adc_app	examples\adc_app	Yes	NA
boot_app	examples\boot	Yes	NA
crc_app	examples\crc	Yes	Yes
dcan_app_evm_loopback	examples\ dcan\dcanEvmLoopback	Yes	NA
dcan_app_loopback	examples\dcan\dcanLoopback	Yes	NA
dcc_app	examples\dcc_app	Yes	NA
ddr_test_app	examples\ddr_stress_test	Yes	NA
ecc_app	examples\ecc_app	Yes	Yes
edid_programmer	examples\i2c_diag_test\edid_programmer	Yes	NA
edma_test_app	examples\edma_test	Yes	Yes
eeprom_app	examples\i2c_diag_test\eeprom_i2c	Yes	NA
esm_app	examples\esm_app	Yes	NA
gpio_input_interrupt_app	examples\gpio\gpio_input_interrupt	Yes	NA
gpio_output_app	examples\gpio\gpio_output	Yes	NA
i2c_eeprom_app	examples\i2c\i2c_eeprom_app	Yes	NA
i2c_driver_led_blink_app	examples\i2c\i2c_driver_led	Yes	NA
l3fw_app	examples\l3fw	Yes	NA
mailbox_app	examples\mailbox	Yes	Yes
mcaspTransmit_app	examples\mcasp\mcasp_transmit	Yes	NA
mcspiMasterSlave_app	examples\mcspiMasterSlave\masterslave	Yes	NA
mmcsd_fileIO_app	examples\sd_fileIO	Yes	NA
mmu_tlb_twl_app	examples\mmu\tlb_twl	NA	Yes
mmu_translation_fault_handle_app	examples\mmu\translation_fault_handle	Yes	Yes
nor_edma_read	examples\nor\nor_edma_read	Yes	NA
nor_read_write	examples\nor\nor_read_write	Yes	NA
ocmc_app	examples\ocmc\ocmc_basic	Yes	Yes
pm_clkrate_test_app	examples\pm\clkrate_manager	Yes	NA

pm_cpuidle_test_app	examples\pm\cpuidle	Yes	Yes
pm_junctiontemp_test_app	examples\pm\junction_temp_sensor	Yes	NA
pm_systemconfig_test_app	examples\pm\systemconfig	Yes	NA
pmic_app	examples\i2c_diag_test\pmic_i2c	Yes	NA
qspi_test_app	examples\qspi_test	Yes	NA
rti_app	examples\rti	Yes	NA
sensor_config_app	examples\ov10630_sensor	Yes	NA
spinlock_test	examples\spinlock_test	Yes	Yes
temp_sensor_app	examples\i2c_diag_test\i2c_temp_sensor	Yes	NA
timer_app	examples\timer	Yes	Yes
uart1_test_app	examples\uart\uart1	Yes	NA
uart2_test_app	examples\uart\uart2	Yes	NA
uart3_test_app	examples\uart\uart3	Yes	NA
uart_edma_test	examples\uart\uart_edma	Yes	NA
uart_intr_test	examples\uart\uart_intr	Yes	NA
uart_test	examples\uart\uart_test	Yes	NA
videoLoopback	examples\videoLoopback	Yes	NA
vipCapt	examples\vipCapt	Yes	NA
xmc_mpu_app	examples\xmc_mpu_app	NA	Yes

- **Release Content**

Category	Peripherals
HAL	UART, I2C, GPIO, Mailbox, Spinlock, EDMA, GPMC, McASP, McSPI, OCMC, QSPI, MMU, Timer, MMCSD, PCIe, DCAN, RTI, CRC, ESM, ADC, DCC, L3FW, UNICACHE, AMMU, CACHE_A15, MMU_A15, WDTimer, IPU ECC, C66x XMU and C66x MPU
Libs	I2C, QSPI, FAT, FAT EDMA, NOR, VIP, DSS, VPE, ISS, Safety and PM
Utils	Uart console
Examples	Examples for the supported hal peripheral drivers.
Bootloader	SBL bootloader for TDA2xx, TDA2Ex and TDA3xx platform.

- **Known Issues**

CQ Id	Headline	Release Version
OMAPS00321233	[DCAN] - RX interrupt is not working when we enable INT0/1 interrupt	StarterWare_01_02_05_08
OMAPS00325850	Blank output for AR0140 sensor in ISS Loopback application	StarterWare_01_03_00_09
OMAPS00326119	Need to implement Manual Mode and Virtual Mode delay sequence while doing pin mux for NOR Boot	StarterWare_01_03_00_09

OMAPS00326936	[IPU ECC] ERR_DATA_LOC bit is not getting set when a SEC Error is occurred for L2RAM and L1Data	StarterWare_01_04_00_10
OMAPS00326937	[ECC] On A15, Subquanta writes on EMIF is not resulting in aborts when ECC is enabled on Tda2xx ES1.0 & 1.1	StarterWare_01_04_00_10
OMAPS00327416	[IPU ECC] Not able to test ECC code error feature for IPU L2RAM / L1Data	StarterWare_01_04_00_10
OMAPS00327418	[IPU ECC] Not able to test IPU L1 Tag ECC feature	StarterWare_01_04_00_10
OMAPS00327578	Using ROM Model increases time to come to main of TDA3xx SBL	StarterWare_01_04_00_10

Known Limitations

1. Junk characters are observed in the UART terminal whenever we do reset on the board because of EVM issue. This is observed on TDA3xx-EVM and TDA2Ex-EVM.
2. DCAN RAM Init doesn't work for Tda2xx ES 1.0 silicon. For more details, please refer the Errata 1.21- DCAN Ram Initialization issue

Build Dependencies

Tool chain	Version	Description
TMS470 CG	5.2.5	Compiler for Cortex A8
TMS470 CG	5.2.5	Compiler for Cortex M3 and Cortex M4
C6000 CG Tool	7.4.2	Compiler for C674x and C66x
CCS	5.5.0.00077	Code composer studio to load and run the application. Build system on windows uses tools from Cygwin like gmake, rm, mkdir etc.
Linaro bare-metal GCC	Linaro GCC 4.7.2013q3	Compiler for Cortex A8 GCC
Linaro bare-metal GCC	Linaro GCC 4.7.2013q3	Compiler for Cortex A15