Processor SDK - Radar

Version 03.00.00

Release Notes
July 2017

Contents

Build ID: 03.00.00.00

IMPORTANT NOTE: Processor SDK Radar by default supports the TDA3xx and TDA2xx super set device configuration. Please refer to the Device Data Manual to know the details of the CPUs supported in that part. Processor SDK Radar supports selecting only the CPUs available for the specific part.

Major Features in the Release

Processor SDK Radar is consists of 2 parts,

- **Core SDK:** Includes all links and FW under \vision_sdk\links_fw

- **Examples:** This is sample use cases to validate core SDK, under \vision_sdk\apps

Processor SDK Radar is based on the Vision SDK 03.00.00.00 release.
This is targeted for AR12XX + TDA3xx Radar Data Processing and TDA2xx Radar Data Processing.

The following features are tested and supported.
New features in the release vs previous Processor SDK Radar release are highlighted in **blue**.

SDK Features (BIOS ONLY)

- o **SDK restructuring.**

    - o **PDK Integration with Vision SDK.**

    - o **SDK Framework and application separation**.

- Support the following SoC/Platforms

    - o TDA3x SoC + AR12 (ES1.0 & **ES2.0**) ALPS Board.

- o **TDA3x SoC + AR12 D3 RVP Board.**
- o **TDA3x SoC + FPDLink AR12 D3 RVP Board.**
- o TDA3x SoC ES1.0/ES1.0A (15x15) EVM + AR12 (ES1.0 & **ES2.0**) Booster Pack.
- o TDA2x SoC ES1.1/ES2.0 (23x23) EVM

- Support for CPU's in the TDA3xx Device (IPU1-0, IPU1-1, DSP1, EVE)
  - o Support for AR12xx Radar Sensor Data Capture
  - o Support for Radar Processing Algorithm Plugin with sample Frame Copy Algorithm Function.
  - o Support for Radar Processing Algorithm Plugin with FFT Algorithm Function and FFT Heat Map Draw Algorithm Functions.
  - o Support for low latency inter-processor communication mechanism based on Work Queues (WorkQ).
    - ▪ EVE FFT algorithm integrated using WorkQ.
  - o SD card based pre-recorded Radar Sensor ADC data read. (This feature is not supported on TDA3x modified EVM for AR12 sensor integration with DIB and VAB)
  - o SD card write of Algorithm processed output. (This feature is not supported on TDA3x modified EVM for AR12 sensor integration with DIB and VAB)
  - o Support for AR12 Firmware Flash (on ALPS board)
  - o Support for TI Fast Data Transfer Protocol (TFDTP) networking protocol.
  - o Network (TCP/IP, TFDTP) based pre-recorded Radar Sensor ADC data read.
  - o Network (TCP/IP, TFDTP) based write of Algorithm processed output.
  - o **Support for the TDA3xx RVP platform for direct connection of AR12 with TDA3x CSI and single channel FPDLink based connection of AR12 to TDA3xx.**
  - o **Support for AR12 advanced frame configuration, Dynamic Configuration of parameters to change the radar waveform properties.**
    - ▪ **Support for interpreting chirp profile data along with ADC data.**
  - o **Support to read back programmed profile, chirp and frame configuration parameters.**

- Support for CPU's in the TDA2xx Device (IPU1-0, IPU1-1, DSP1, EVE)
  - o Support for Radar Processing Algorithm Plugin with FFT Algorithm Function and FFT Heat Map Draw Algorithm Functions.
  - o Support for low latency inter-processor communication mechanism based on Work Queues (WorkQ).
    - ▪ EVE FFT algorithm integrated using WorkQ.
  - o SD card based pre-recorded Radar Sensor ADC data read.
  - o SD card write of Algorithm processed output.
  - o Support for TI Fast Data Transfer Protocol (TFDTP) networking protocol.
  - o Network (TCP/IP, TFDTP) based pre-recorded Radar Sensor ADC data read.

TEXAS INSTRUMENTS

- o Network (TCP/IP, TFDTP) based write of Algorithm processed output.
- Support for Links Such as Dup, Merge, Select, Sync, NullSrc, Null and IPC (In/Out).
- Algorithm link with algorithm plug-in's support on all CPU's.
  - o Radar Process Algorithm Plugin which allows plugging in Algorithm Functions
  - o Sample Algorithm Function of Radar Frame Copy which copies the input frame data to output frame data.
  - o Radar FFT Algorithm Function which performs Range and Doppler FFT with work thread on EVE.
  - o Radar FFT Heat Map Draw, to display the FFT output data.
- **Migrated to MMWAVEDFP 00.07.04.00**

Installation and Usage (BIOS ONLY)

- Kindly refer the user guide vision_sdk/docs/ProcessorSDKRadar_UserGuide.pdf

Example use-cases (BIOS ONLY)

- Processor SDK Radar demonstrates use-cases as examples. Below table lists these use cases and also indicate the SOC/Platform it is validated on.

No.	Use cases	TDA2xx EVM	TDA3xx EVM	TDA3xx + AR12 BOOSTER	TDA3xx ALPS	TDA3xx – RVP (Direct Connection)	TDA3xx – RVP (FPDLink)
Radar Use cases							
1.	AR12 Firmware Flash	NO	NO	NO	**YES**	NO	NO
2.	Radar (Single AR1243) Capture + Null	NO	NO	**YES**	**YES**	NO	NO
3.	Radar (Single AR1243) Capture + Radar FFT (EVE1) + Null	NO	NO	**YES**	**YES**	NO	NO
4.	Radar (Single AR1243) Capture + Radar Frame Copy (DSP1) + Null	NO	NO	**YES**	**YES**	NO	NO
5.	Radar (Single AR1243) Capture + Radar FFT (EVE1) + Display	NO	NO	**YES**	NO	**YES**	NO
6.	Null Source (SD/Network) Input + Radar FFT (EVE1) + Null (SD/Network)	**YES**	**YES**	NO	NO	NO	NO
7.	Satellite Radar (Single AR1243) FPDLink Capture + Radar FFT (EVE1) + Display	NO	NO	NO	NO	NO	**YES**

Component Versions

The versions of the different components included in the Processor SDK Radar Package can be referred to at vision_sdk\docs\Radar\Processor_SDK_Radar_03_00_00_00_manifest.html

Validation Hardware

This software package is tested with the below hardware

- **TDA3xx EVM and TDA2xx EVM**
  - Radar SD Card/Network Read and Write Usecase (Null Source Input + Radar FFT (EVE1) + Null output)

- **TDA3xx + AR1243 ALPS Board:**
  - AR12 Firmware Flash (ALPS board Only)
  - Radar (Single AR1243) Capture + Null (TDA3xx Only)
  - Radar (Single AR1243) Capture + Radar FFT (EVE1) + Null (TDA3xx Only)
  - Radar (Single AR1243) Capture + Radar Frame Copy (DSP1) + Null (TDA3xx Only)
- **TDA3xx EVM + AR1243 Booster + AR1xxx Debug Dev Pack**
  - Radar (Single AR1243) Capture + Null (TDA3xx Only)
  - Radar (Single AR1243) Capture + Radar FFT (EVE1) + Display (TDA3xx Only)
  - Radar (Single AR1243) Capture + Radar FFT (EVE1) + Null (TDA3xx Only)
  - Radar (Single AR1243) Capture + Radar Frame Copy (DSP1) + Null (TDA3xx Only)
- **TDA3xx RVP + AR1243 (Direct Connection & FPDLink)**
  - Radar (Single AR1243) Capture + Radar FFT (EVE1) + Display (TDA3xx Only)
  - Satellite Radar (Single AR1243) FPDLink Capture + Radar FFT (EVE1) + Display
- **Boot mode Supported**
  - TDA2x EVM: QSPI boot, SD boot, NOR boot, CCS boot
  - TDA3x EVM: QSPI boot, QSPI+SD boot (SBL in QSPI, AppImage in SD card), CCS boot
  - TDA3x RVP: QSPI boot, QSPI+SD boot (SBL in QSPI, AppImage in SD card), CCS boot
  - TDA3x EVM + AR1243 Booster: QSPI boot, CCS boot
  - TDA3x + AR1243 ALPS: QSPI boot, CCS boot

Refer user guide for exact board number and revision that this release is validated with.

SW Quality – Status

Software Component	System Testing	MISRA - C *	Static analysis	Quality / Safety
SBL	Yes	Yes	Yes	QM
CSL/FL / StarterWare	Yes	Yes	Yes	QM
BSP / Drivers	Yes	Yes	Yes	QM
EVE SW	Yes	Yes	Yes	QM
VXLib (C66x)	Yes	Yes	Yes	QM
NDK / NSP / AVB	Yes	Yes	Yes	QM
IVAHD codecs	Yes	No	Yes	QM

EDMA LLD	Yes	Yes	Yes	QM
Framework Components	Yes	Yes	Yes	QM
BIOS	Yes	Yes	Yes	QM
BIOS-IPC	Yes	Yes	Yes	QM
IPCLib	Yes	Yes	Yes	QM
Links Framework[‡]	Yes	Yes	Yes	QM
AutoSAR MCAL	Yes	Yes	Yes	ASIL – B

[‡] Vision Software Development Kit (Vision SDK) is broadly divided into

- o **Core SDK Framework (links_fw)**
    - o Core SDK – Contains Links and Chain Framework for both Bios and HLOS
    - o SW quality processes like MISRA-C/KW static checker etc. are done only for links framework
- o **Demo Application (apps)**
    - o Demo applications to validate VSDK FW
    - o SW quality processes like MISRA-C/KW static checker etc. are NOT done for apps and sample_app

Compilers	Production ready	Compiler Qualification Kit
EVE TI compiler	Yes	Available from TI
ARM M4 compiler	Yes	Available from TI
C66x TI compiler	Yes	Available from TI
ARM A15 compiler	Yes	3P

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Bugs Fixed In This Release

Defect ID	Defect Description
ADASVISION-1253	Satellite Radar use case FFTHeatmap configuration doesn't match firmware
ADASVISION-1229	[Radar] File Read and Write Usecase : Buffers not being processed by EVE
ADASVISION-1225	[TFDTP][RADAR] Network Rx with TFDTP hangs sometimes
ADASVISION-1224	[RADAR] Dynamic configuration with Advanced frame causes wrong heat map axis
ADASVISION-1207	[RADAR] Dynamic Configuration of parameters fails without delay

Known Issues / Limitations

Module	Description	Workaround	Frequency of Occurrence	CQ ID
Processor SDK Radar	Windows Command Prompt Build missing characters of file name	Refer User Guide for WA	Random	ADASVISION-1043

Refer also to BSP / Starterware Release Notes for additional known issues

Compatibility Info

This section contains information about compatibility of APIs between this release and 02.12.00.00.

Kindly note there has been a change in the folder structure in 03.00.00.00 versus 02.12.00.00.

NOTE: It is recommended to recompile the user created use-cases, alg plugins, links against the new release interface files even if no code level change is required in the user application.

Link API

Module	Interface file	Change in user application required	Change details
Alg Link	algorithmLink.h	No	Addition of Surround view SFM, driver monitoring, stitching, adaptive bowl, TIDL and OpenVX. Change not influencing Processor SDK Radar
Alg Link	algorithmLink_rvcDiagnostics.h	No	[Moved to apps/include/alglink_api] Change not influencing Processor SDK Radar.
Alg Link	algorithmLink_swCrc.h	No	[Moved to apps/include/alglink_api] Change not influencing Processor SDK Radar.
AVB Rx Link	avbRxLink.h	No	Misra C Fixes
AVB Tx Link	avbTxLink.h	No	[New File] AVB Tx Link acts as IEEE 1722 listener and sends MJPEG/H264 video frames or metadata frames in AVB IEEE 1722 compliant format. In a typical.
Graphics Link	grpxSrcLink.h	No	Addition of stero calibration display and rear view panaroma parameters. Change not influencing Processor SDK Radar.
ISS ISP Configuration Link	issIspConfiguration.h	No	Adapting to PDK include paths.
ISS Simcop Configuration Link	issM2mSimcopLink.h	No	Adapting to PDK include paths.
Network Control Link	networkCtrl_if.h	Yes	Update to network port numbers.
Null Source Link	nullSrcLink.h	No	Support for restart file read parameters, EOF callback and pause read options.
OpenCL Link	openclLink.h	No	[New File] OpenCL link is used to connect to the OpenCL monitor is the DSP.
SGX SFM Link	sgx3DsfmLink.h	No	[New File] Sgx3Dsfm Link is used to display maps/objects using SGX. The rendered output will be pushed to display via DRM. Change not influencing Processor SDK Radar.
SGX SRV Link	sgx3DsrvLink.h	No	[New File] Sgx3Dsrv Link is used to feed video frames to SGX for creating the surround view (360 degree view) of the Car. The rendered output will be pushed to display via DRM. Change not influencing Processor SDK Radar.
SGX FRMCOPY Link	sgxFrmcpyLink.h	No	[New File] SgxFrmcpy Link is used to feed video frames to SGX for rendering. Change not influencing Processor SDK Radar.
System Link	system.h	No	Adapting include paths to modified SDK structure.
System Common	system_common.h	No	Added common main support and system API initialization and de-initialization links.

System Constant	system_const.h	No	Buffer alignment of RTOS applications made to 32.
System Link IDs	system_linkId.h	No	Support for multiple Null, Select, ISS M2M Simcop links. Support for AVB_Tx, Lidar, dump, IMU links.
System Trace	system_trace.h	No	Adapting include paths to modified SDK structure.
System vring config	system_vring_config.h	No	Unified the IPC Vring buffers. Change not influencing Processor SDK Radar.
System Link Common	systemLink_common.h	No	Support Global time structure and commands to read the global time using the system commands. Change not influencing Processor SDK Radar.
Ultrasonic Capture Link	ultrasonicCaptureLink.h	No	[New File] Capture data from ultrasonic sensors connected via UART. Sends measurement info to next link.

Utils API – This API is used by users when writing an algorithm plugin or use-case or link

Module	Interface file	Change in user application required	Change details
UTILS	network_api.h	No	Adapting include paths to modified SDK structure.
UTILS	network_tfdtp_api.h	No	Adapting include paths to modified SDK structure.
UTILS	utils.h	No	Adapting include paths to modified SDK structure. Support to read the global timer counters.
UTILS	utils_buf.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_buf_ext.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_cbuf_ocmc.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_dma.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_eveloader.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_idle.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_ipc_que.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_iss.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_l3_emif_bw.h	No	Adapting include paths to modified SDK structure. Added API to set the Bandwidth regulators.
UTILS	utils_link_stats_if.h	No	Adapting include paths to modified SDK structure. Increased the link statistics instances to 145.
UTILS	utils_mbx.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_mem.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_mem_cfg.h	Yes	Removed hardcoding of heap and buffer sizes.
UTILS	utils_mem_debug.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_pm.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_prcm.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_prcm_stats.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_prf.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_que.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_stat_collector.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_temperature.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_timer_reconfig.h	No	Adapting include paths to modified SDK structure.

Module	Interface file	Change in user application required	Change details
UTILS	utils_tsk.h	No	Adapting include paths to modified SDK structure.
UTILS	utils_vip_interrupt.h	No	Adapting include paths to modified SDK structure.

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