Introduction to
Processor SDK Radar – Part 1

30 - October - 2018

Agenda

- What is Processor SDK Radar?
  - Radar SDK Software Stack
- Processor SDK Radar Processing Chain
  - Algorithm Blocks (FFT, Peak Detection, Beam Forming)
  - Cascade Radar Data Processing Chain
- Getting Started with Processor SDK Radar

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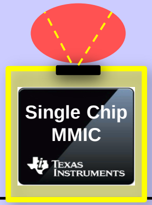
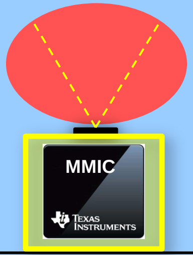
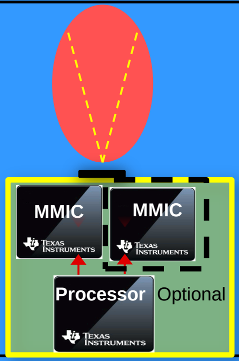
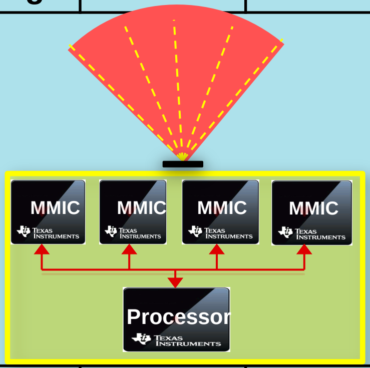
Radar Configurations

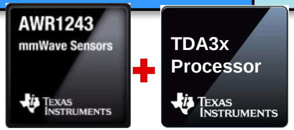
Processor Entitlement using Processor SDK Radar

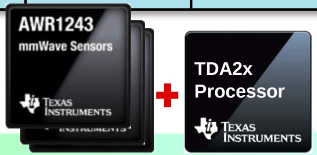
End Equipment	Proximity Sensor	Short Range Radar	Medium /Long Range Radar	Cascade/Satellite		
				Long	Medium	Short
Typical Configuration						
Typical Radar Cube Memory	128 KiB	512 KiB	4 MiB	8 MiB	16 MiB	24 MiB
Approx. Mega Operations per second*	500	2200	5362	12720	25294	37868

Single Chip MMIC
Texas Instruments
MMIC
Texas Instruments
MMIC
MMIC
Processor
Optional
Texas Instruments
MMIC
MMIC
MMIC
MMIC
Processor
Texas Instruments

AWR1443
mmWave Sensors
Texas Instruments

AWR1642
mmWave Sensors
Texas Instruments


AWR1243
mmWave Sensors
Texas Instruments
+
TDA3x
Processor
Texas Instruments


AWR1243
mmWave Sensors
Texas Instruments
+
TDA2x
Processor
Texas Instruments

R4F @ 200 MHz
FFT Acc. @ 200 MHz
Radar Data Mem
= 384 KiB

R4F @ 200 MHz
C67x @ 600 MHz
Radar Data Mem
= 768 KiB

2x DSP @ 750 MHz
1x EVE @ 650 MHz
DDR Memory =
64/128 MiB

2x DSP @ 750 MHz
4x EVE @ 650 MHz
DDR Memory = 512 / 1024 MiB

mmWave SDK

Processor SDK Radar

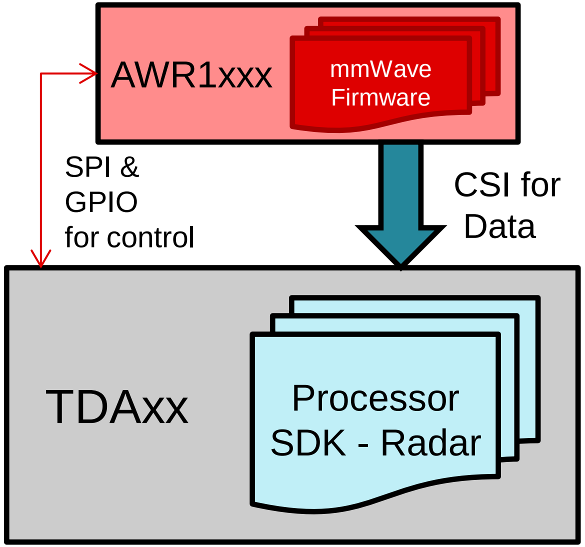
What is Processor SDK Radar?

- Processor SDK Radar (a.k.a. Radar SDK) is a multi-processor software development package for TI's family of ADAS SoCs.

- The software framework allows users to create different Radar application data flows involving integration of FMCW transceiver, radar signal processing, and visualization on a display device.

- The framework has sample Radar processing data flows which exercises different CPUs and HW accelerators in the ADAS SoC and demonstrates how to effectively use different sub-systems within the SoC.

- The frame work is generic enough to plug in application specific algorithms in the system.


AWR1xxx
mmWave Firmware
SPI & GPIO for control
CSI for Data
TDAxx
Processor SDK - Radar

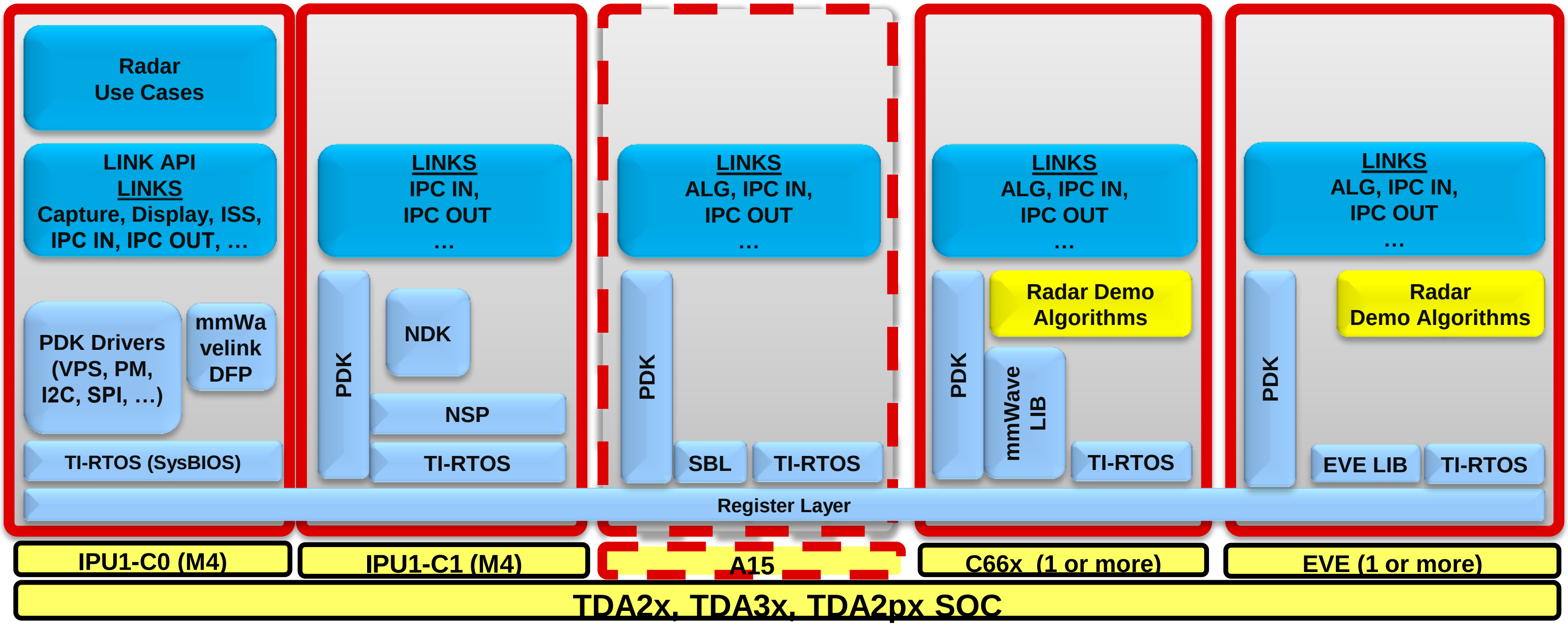
Processor SDK Radar Delivers:

- Demo use-cases on TDA3x, TDA2x and TDA2px:
  - Single and Multi chip AWR1243 configuration.
  - FFT, Peak Detection (CFAR - CA) and Angle of Arrival Estimation (Beam forming) on EVE.
  - FFT, Peak Detection (CFAR – CA) and Angle of Arrival Estimation (FFT) on C66x DSP.
  - Radar Raw Data capture via 1Gb Ethernet interface.
  - Cascade (TDA2x) and Satellite Radar (TDA3x) Demo.
  - Cascade Raw Radar Data capture via PCIe on TDA2x. (Q4 2018)
- Production ready imager drivers, peripheral drivers, and framework.

Processor SDK Radar – TI-RTOS SW Stack

- 🟨 Demo Algorithms
- 🟦 Links Framework
- 🟦 Low level Components
- ⬜ Open Compute Components

⬚ Only on TDA2x, TDA2Ex, TDA2px



Radar Use Cases
LINK API
LINKS
Capture, Display, ISS, IPC IN, IPC OUT, …
PDK Drivers (VPS, PM, I2C, SPI, …)
mmWavelink DFP
TI-RTOS (SysBIOS)
IPU1-C0 (M4)

LINKS
IPC IN, IPC OUT …
PDK
NDK
NSP
TI-RTOS
IPU1-C1 (M4)

LINKS
ALG, IPC IN, IPC OUT …
PDK
SBL
TI-RTOS
A15

LINKS
ALG, IPC IN, IPC OUT …
PDK
Radar Demo Algorithms
mmWave LIB
TI-RTOS
C66x (1 or more)

LINKS
ALG, IPC IN, IPC OUT …
PDK
Radar Demo Algorithms
EVE LIB
TI-RTOS
EVE (1 or more)

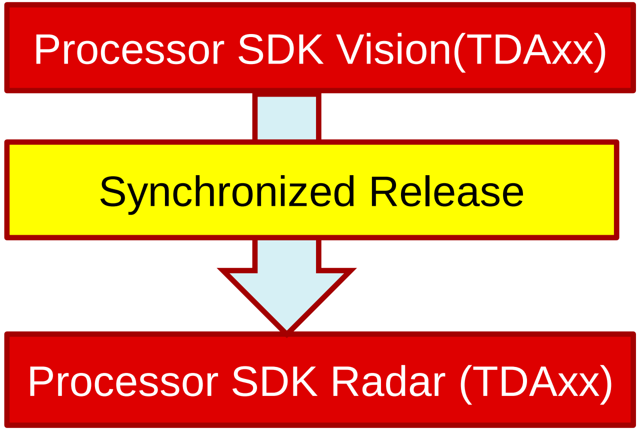
Register Layer

TDA2x, TDA3x, TDA2px SOC

Processor SDK Radar and Processor SDK Vision

- Cut-down of Vision SDK, focused on Radar
- Optimized functions for Radar processing (FFT kernels, …) on DSP and EVE libraries
- Out-of-box integration with AWR12xx
- Sample Radar data flow using TDA3x/2x + AWR12xx and EVE/DSP processing libraries
- Same low level drivers, OS and tools as Vision SDK
- Same data/control flow framework as Vision SDK

- Video, vision, radar framework, algorithms, demos
- Common SW across TDA2x, TDA3x, TDA2Ex, TDA2px SoC/EVMs



Processor SDK Vision(TDAxx)

Synchronized Release

Processor SDK Radar (TDAxx)

- Excludes packages, algorithms, demos for video, vision
- Compact package with focus on Radar ONLY

More about Processor SDK Vision

- Introduction to Processor SDK Vision
  - https://training.ti.com/introduction-processor-sdk-vision (13m 33s)
- Getting Started with Processor SDK Vision
  - https://training.ti.com/getting-started-processor-sdk-vision (14m 49s)
- Start Development with Processor SDK Vision
  - https://training.ti.com/start-development-processor-sdk-vision (22m 52s)
- Getting Started with ADAS Platform Development Kit (PDK)
  - https://training.ti.com/getting-started-adas-platform-development-kit-pdk (21m 46s)
- Download Link: http://www.ti.com/tool/processor-sdk-tdax

Looking for Support?

- Use TI E2E forum to get additional support
- Kindly post queries/feedback on below forum
  - https://e2e.ti.com/support/arm/automotive_processors

Thank you

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