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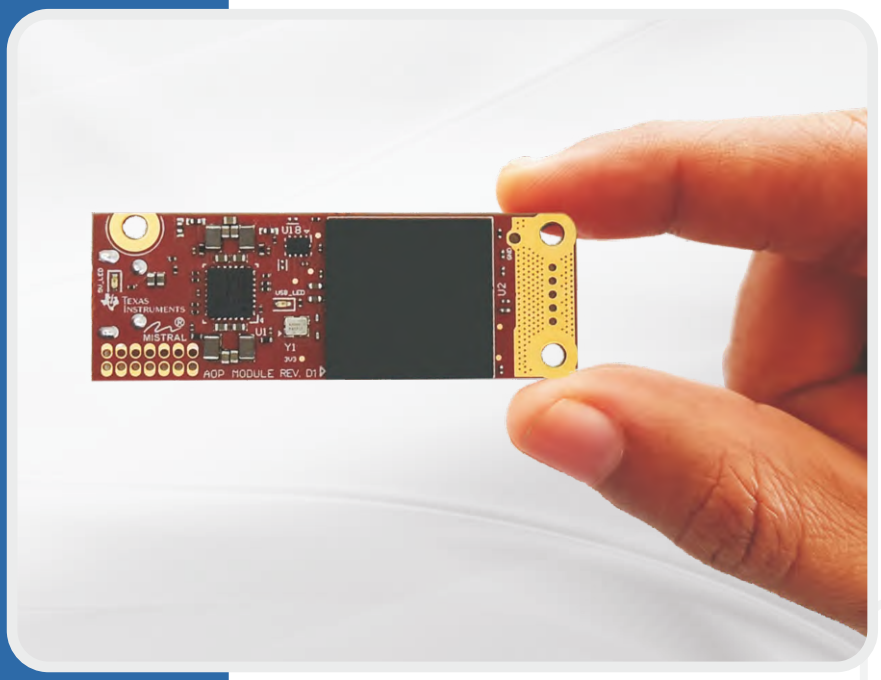
DATA SHEET

60GHz Industrial AoP Radar



Texas Instruments Design Network Platinum Partner

60GHz Industrial AoP Radar

OVERVIEW

The 60GHz Industrial AoP RADAR with Antenna on Package (AoP) SoC from Mistral is a low cost, ultra-compact, light-weight and easy to use RADAR module catering to wide range of industrial applications. Based on Texas Instruments IWR6843AoP ES2.0, an ultra-high-resolution single chip FMCW RADAR sensor, the 60GHz AoP RADAR is ideal for low power, self-monitored, ultra-accurate RADAR systems in industrial environment. The highlight of the module is the IWR6843AoP ES2.0 Chipset, which comes with an Integrated Antenna on Package, minimizing the RF PCB design challenges, product cost and footprint drastically.

The AoP RADAR module operates at frequency bands of 60-64GHz. Currently, the module is one of the most powerful and highly integrated in Industrial RADAR market. The RADAR comes with advanced features such as FMCW Transceiver, DSP for Advanced Signal Processing, Hardware Accelerator (for FFT, Filtering, and CFAR Processing), ARM R4F Micro-controller, Built-in Calibration and Self-test in a compact form factor (46.25 X 15.76 mm).

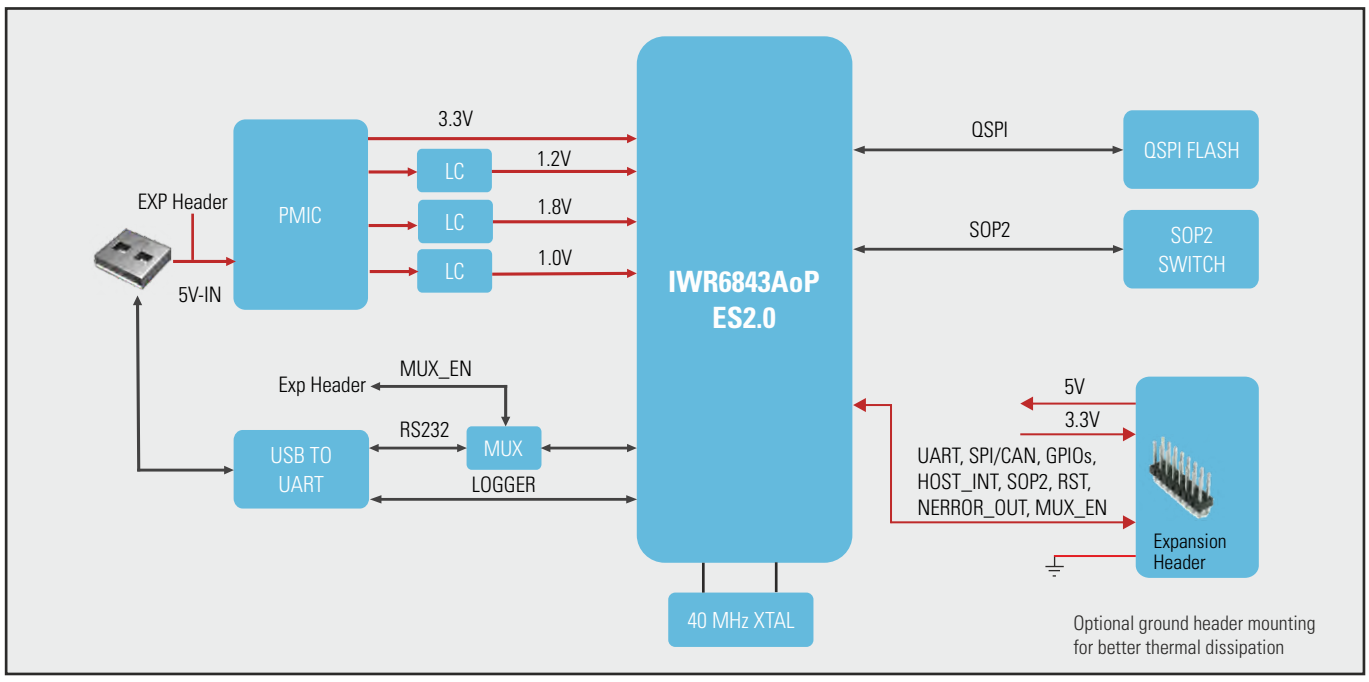
FEATURES

- Ultra-compact Module
- Integrated Antenna on Package (AoP)
- USB powered
- Flexible Connectivity: UART, SPI/ CAN, GPIOs
- Standalone boot up and programming support
- On-board QSPI flash
- UART communication over USB for Configuration and RADAR Data
- Built-in Calibration and Self-test
- Thermal Plate with easy mounting

The module is powered via USB / Expansion header in standalone mode and delivers processed point cloud RADAR data (Target's ID, Range, Angle and Velocity). The AoP RADAR supports interfaces like USB, SPI / CAN, UART and GPIOs. The module comes with SDK 3.5 along with object detection sample application.

Mistral also offers AoP RADAR module with a mechanical mount that acts as a thermal plate.

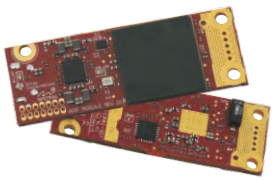
BLOCK DIAGRAM - 60GHz Industrial AoP RADAR



The 60GHz Industrial AoP RADAR is built around IWR6843AoP ES2.0 from Texas Instruments, assuring long lifecycle and support. Mistral adds value by supplying pre-certified AoP RADAR module which helps customer to accelerate time to market, reduce certification risks and ensure seamless product integration.

SPECIFICATIONS

- Integrated Antenna on Package (AoP)
  - FMCW Transceiver with Integrated PLL, Transmitter, Receiver, Baseband and ADC
  - 60 - 64GHz Coverage with 4GHz Continuous Bandwidth
  - Built-in Calibration and Self-test
  - ARM Cortex R4F-Based Radio Control System for Object Detection and Interface Control
  - C674x DSP for Advanced Signal Processing
- Three Transmit Channels and Four Receive Channels
- Max sampling rate: 25MSPS
- Hardware Accelerator for FFT, Filtering and CFAR Processing
- Host Connectivity:
  - 2 x UART / UART over USB
- Peripherals Support: SPI / CAN, GPIOs, Reset, SOP2 interface support
- USB Powered, 5V, 500mA - 1A
- Dimensions (L x W x H): 46.25 x 15.76 x 5mm
- Operating Temperature: -40^{0}C to 85^{0}C



PERFORMANCE PARAMETERS

Antenna Type		1E ODS	
Range Max	Adult	9m	BRR Config
Range Min	Hand	8cm	
Azimuth FOV Max	at 2m	150^0	
	at 8m	120^0	-
	at 9m	60^0	-
Elevation FOV Max	at 2m	140^0	-
	at 8m	110^0	BRR Config
	at 9m	40^0	
Resolution at bore sight	Range	4.6cm	BRR Config
	Azimuth Angle	29^0	-
	Elevation Angle	29^0	

MISTRAL SOFTWARE IPs

Mistral offers software IPs that can support and accelerate product development lifecycle. These IPs are not a part of standard deliverables, customer can optionally order based on development needs.

Host Parser Application

Helps product developers to parse the point cloud data received from the RADAR and makes it available as an API.

- Runs on: Linux Ubuntu machines, Windows 10 (WIP)
- Python 3 implementation
- Consists of:
  - Base library and Parser with documented API
    - Does Real-time capture of Point cloud data and range profile TLVs
    - Supports 5 to 20 frames per second
  - Sample application (using the above library)
    - Connects and sends configuration file to the RADAR on start up
    - Saves the Point cloud data in CSV or text file
- Supports TI mmWave SDK 3.5.0.4 and out of box demo
- Works with xWR1843, xWR6843 and xWR6843AoP RADAR sensors
- Deliverables: Python scripts, API document and User guide

Remote Firmware Upgrade

Enables upgrade of the RADAR firmware remotely over UART interface for commercially deployed products.

- Runs on Linux Host machines
- Python 2 / 3 implementation
- Based on modified TI mmWave SDK 3.5.04
- Default factory copy and working copy of firmware for Failure Protection
- Working copy is upgradable
- CRC based firmware health check
- Works with xWR1843, xWR6843 and xWR6843AoP RADAR sensors
- Deliverables: Python scripts, Secondary bootloader binary, firmware binaries, TI mmWave SDK patches, build guide and user guide.

Note: Requires few HW changes for older modules. Documented

Multi Configuration Management

Helps load and store up to five RADAR configurations and manage them remotely during both development and after deployment. One of the configurations can be set to Autoload on Power-on enabling instant streaming of point cloud data.

- Runs on Linux Host machines
- Python2/3 implementation
- Based on modified TI mmWave SDK 3.5.04

- Remotely managed over UART interface
- Capability to save up to 5 configuration parameter set files and to define any one of them as Default
- Auto load of default configuration parameters during RADAR module boot
  - Does not required loading of configuration parameters from the host
- Works with xWR1843, xWR6843 and xWR6843AoP RADAR sensors
- Deliverables: Python scripts, firmware binaries, TI mmWave SDK patches, build guide and user guide.

APPLICATIONS

- Building/Factory Automation
- Robotics
- People Counting
- Traffic Monitoring
- Motion/Occupancy Detection
- Industrial Fluid Level Sensing
- Displacement Sensing
- Proximity/Position Sensing
- Gesture Recognition

CUSTOMIZATION

Mistral offers customization support for industrial customers on enclosure design, connectivity, data processing and applications development. We develop products & System on Modules customized to customer specific requirements. With our expertise in industrial automation, industrial RADAR and related imaging sensors & video analytics, we can help developers reduced time to market for their products while ensuring high reliability and low cost of development.

Mistral is a TI Design Network Platinum Partner and has worked with Texas Instruments on the EVM [Evaluation Module] and reference design of IWR6843AoP ES2.0 Chipset.

DELIVERABLES

- 60GHz Industrial AoP RADAR
- Quick Start Guide (Online)
- Software Package and Documentation (Online)

ORDERING

For ordering information please email us at sales@mistralsolutions.com

ABOUT MISTRAL

Mistral is a technology design and systems engineering company providing end-to-end solutions for product design and application deployment. Mistral focuses in three business domains: Product Engineering Services, Aerospace & Defense and Homeland Security.

Mistral provides total solutions for a given requirement, which may include hardware board design, embedded software development, FPGA design, systems integration and customized turnkey solutions.

Mistral's strategic partnerships with leading technology companies help provide customers with a comprehensive package of end-to-end solutions.

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