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Qualcomm® IQ9 Series Platform

The Qualcomm IQ9 Series delivers unmatched on-device AI performance for the most demanding industrial applications, as well as available built-in safety features and design flexibility for high-compute, power-efficient performance capable of handling heavy workloads in extreme environments.

Qualcomm IQ9 Series delivers industrial-grade AI performance of up to 100 TOPS for the most demanding industrial and robotics uses. By adding power efficiency and integrated safety features such as error correction code (ECC) memory and a dedicated safety island or real-time subsystem to its edge AI capabilities, the Qualcomm IQ9 Series is ideally suited for the most extreme and demanding industrial environments ranging from -40°C to +115°C. It delivers powerful computing capabilities through a Qualcomm® Kryo™ Gen 6 CPU with eight high-performance cores and a flexible, heterogeneous design that supports a powerful Qualcomm® Adreno™ 663 GPU, dual Qualcomm® Hexagon™ Tensor Processors, up to 16 concurrent cameras, 4K video encoding/decoding at up to 4K170/4K275 respectively, multiple 4K displays, and more.

Industrial-grade performance and available built-in safety features for IoT are a first of its kind for Qualcomm Technologies' IoT lineup.

The Qualcomm IQ9 Series also delivers up to 100 TOPS of AI performance, supporting Llama2 7-billion-parameter models, and generating 22 tokens per second.

Built-in ECC memory adds reliability alongside an MCU-like subsystem dedicated for added safety, while a rich set of wired peripherals and an enterprise-grade Wi-Fi 6E attach round out a flexible design.

Highlights

On-Device AI

Qualcomm IQ9 Series delivers unmatched AI performance of up to 100 dense TOPS, running Llama2 13-billion-parameter models, and generating 12 tokens per second, powering many AI and generative AI industrial uses at the edge.

Safety and Reliability

The Qualcomm IQ9 Series offers available industrial-grade safety features as well as error correction code (ECC) memory that add reliability to devices operating in harsh industrial environments ranging from -40°C to +115°C.

A high-performance MCU-like subsystem, which contains a physically and electrically separated subsystem with a dedicated 4x high-performance, real-time core CPU, standard and high-speed IOs like Ethernet, and CAN-FD, helps address safety and real-time use cases with the ability to offload to an external MCU.
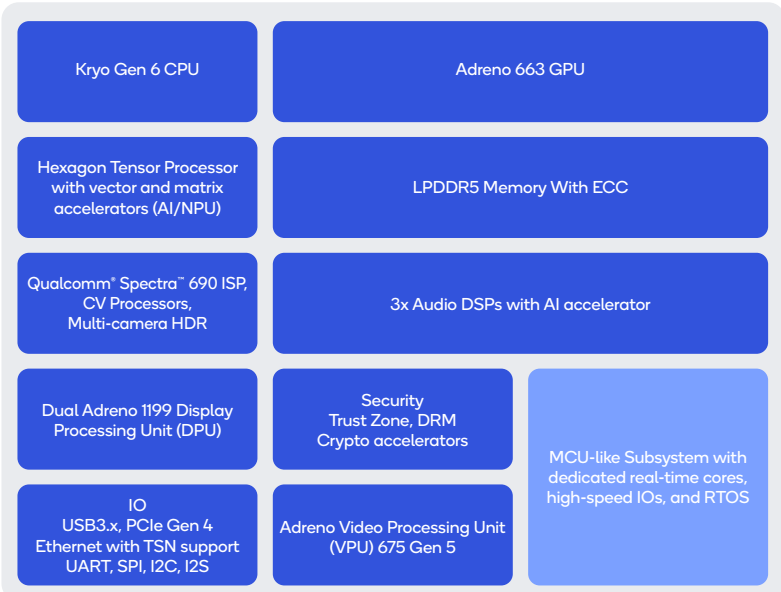
Developer-Friendly Design

The Qualcomm IQ9 Series is designed to be developer-friendly, with multi-OS support for Qualcomm® Linux® software stack and Ubuntu. Combined with product longevity support for 10+ years, developers can easily build, test, and deploy solutions based on this platform with confidence that their designs will be supported for years to come.

Block Diagram

Kryo Gen 6 CPU	Adreno 663 GPU	
Hexagon Tensor Processor with vector and matrix accelerators (AI/NPU)	LPDDR5 Memory With ECC	
Qualcomm® Spectra™ 690 ISP, CV Processors, Multi-camera HDR	3x Audio DSPs with AI accelerator	
Dual Adreno 1199 Display Processing Unit (DPU)	Security Trust Zone, DRM Crypto accelerators	MCU-like Subsystem with dedicated real-time cores, high-speed IOs, and RTOS
IO USB3.x, PCIe Gen 4 Ethernet with TSN support UART, SPI, I2C, I2S	Adreno Video Processing Unit (VPU) 675 Gen 5	

Target Applications

- Factory Automation
- Industrial Robots
- Industrial Personal Computers
- Drones
- Edge AI Boxes
- Machine Vision
- Autonomous Mobile Robots (AMRs)
- Industrial Gateways

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Features

- Two Hexagon Tensor Processors integrated with a Hexagon DSP, quad Hexagon Vector eXtensions (HVX) processor, and dual Hexagon Matrix eXtensions (HMX) coprocessors to deliver up to 100 INT8 TOPS to power high-performance, AI-centric, and edge AI industrial use cases

- Available built-in safety features and a high ball pitch design combine to support uptime, reliability, and design for industrial operations across demanding environments where devices are prone to extreme temperatures, shocks, and vibrations

- Built-in MCU-like subsystem dedicated for safety with four real-time cores for high levels of monitoring, error detection, self tests, and more

- Qualcomm® Kryo® Gen 6 CPU with eight high-performance cores, and a flexible, extensible design enable customers to create a variety of applications

- Octa-core processor that includes eight high-performance CPU cores, a GPU, and two Hexagon Tensor Processors with vector and matrix extensions for managing various concurrent compute and AI workloads simultaneously

- Developer-friendly design with support for multiple operating systems, including Qualcomm® Linux® software stack and Ubuntu

- Features to help meet safety goals with support for ECC memory

- Designed for use in extreme temperatures (-40°C to 115°C)

- Rich in peripherals, including integrated Ethernet with TSN, USB, Wi-Fi, PCIe, and Bluetooth

Ordering Information

Product	Part Number
IQ-9075	QCS9075-0-AA
IQ-9100	QCS9100-0-AA

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Specifications

Chipsets	IQ-9075s	IQ-9100s
CPU	Octa-Core Kyro Gen 6	
	Scales 1.632–2.55 GHz	8x Kryo Gold Prime @ 2.36 GHz
GPU	Adreno 663 GPU	
Memory	6x16 LPDDR5 @ 3200 MHz	
Addressable Memory	Up to 36 GB with inline ECC	
Audio DSP (LPASS)	1980 MPPS, 7x TDM/I2S	
	3x High-Speed I2S for Radio FE	
AI Performance	Scales 50 – 100 INT8 TOPS (Dense)	100 INT8 TOPS (Dense)
Display Support	Up to 12 Typical 48 MP – 5x 4K	
Display Interfaces	2x DSI 2x DP MST2 2x DP MST4	
Video Decode/ Encode	4K @ 275 Decode / 4K @ 170 Encode	
Camera	24b HDR safe ISP Max 12 MP sensor resolution Up to 16 cameras over 4x 4-lane CSI2 2.4 GPix/s throughput	
Peripherals	2x PCIe Ports – 1x 2-lane + 1x 4-lane (Gen4) 2x 2.5 GbE w/ TSN (SGMII) 1x QSPI	
USB Support	2x USB 3.1 1x USB 2.0	
Storage	2x UFS 3.1 G4 2-lanes, 1x 8-bit SDCC5, NVMe over PCIe	
MCU-Like Subsystem	4x real-time cores @ 1.85 GHz w/ 8x CAN FD + 1x 1 GbE (1x RGMII)	Up to SIL3-compliant, dedicated safety island with 4x real-time cores @ 1.85 GHz w/ 8x CAN FD + 1x 1 GbE (1x RGMII)
Operating System	Linux Yocto, Ubuntu	Linux
Temperature Range	-40°C to 115°C (Tj)	
Build Design	FCBGA1723+HS, 25.0 mm x 25.0 mm, 0.6 mm ball pitch	

The Qualcomm IQ9 Series is a part of the Product Longevity Program for Qualcomm IoT Portfolio. These products are developed and engineered with product longevity and durability in mind, helping to bring stability to our customer product designs. Product longevity dates are subject to change without notice.

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