

Qualcomm Dragonwing™ IQ9 Series Platform



The Dragonwing 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.

Dragonwing IQ9 Series delivers industrial-grade AI performance of up to 100 dense 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 Dragonwing 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 Dragonwing IQ9 Series also delivers up to 100 dense TOPS of AI performance, supporting Llama 2 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

Dragonwing IQ9 Series delivers unmatched AI performance of up to 100 dense TOPS, running Llama 2 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 Dragonwing 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.



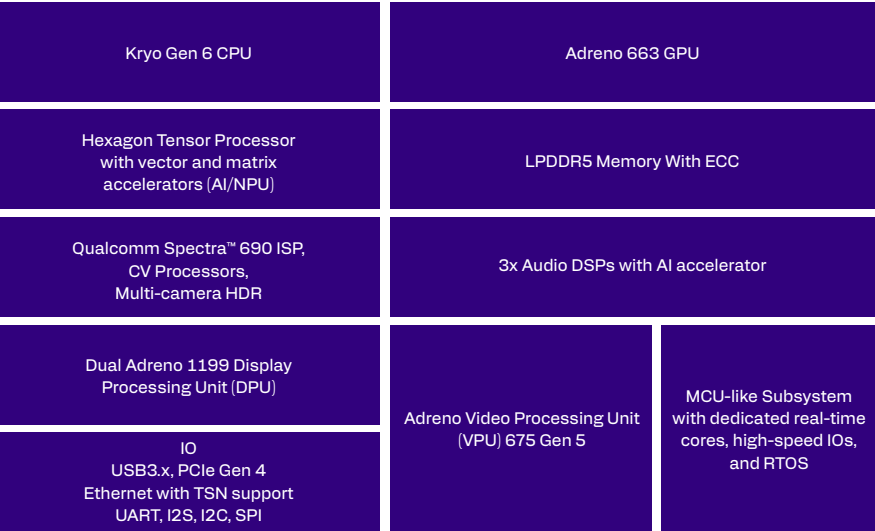
A high-performance MCU-like subsystem, which contains a physically and electrically separated subsystem with a dedicated 4x high-performance, real-time core CPU, standard and high-speed IOs like Ethernet, and CAN-FD, helps address safety and real-time use cases with the ability to offload to an external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

DEVELOPER-FRIENDLY DESIGN

The Dragonwing 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





Features

- 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
- NPU with 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 dense 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
- Kryo Gen 6 CPU with eight high-performance cores, and a flexible, extensible design enable customers to create a variety of applications
- 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-AC
IQ-9075	QCS9075-0-AA
IQ-9100	QCS9100-0-AA

Target Applications

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

Specifications

Chipsets	IQ-9075	IQ-9075	IQ-9100
SKU	QCS9075-AC	QCS9075-AA	QCS9100-AA
CPU	Octa-Core Kryo Gen 6		
	2.1 GHz	2.36 GHz	
AI Performance	Hexagon		
	Llama 2 7 Bn, 22 tokens/sec		
	50 dense TOPS	100 dense TOPS	
GPU	Adreno 663 GPU		
	530 MHz	800 MHz	
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		
Display Support	Max 48 Mpix and 12 displays with no superframe 5x 4K60, 3x 4K60 + 8x 1080p60, 2x DSI + 2x DP/eDP MST2 + 2x DP/eDP MST4		
Video Decode	1x 8K60, 2x 8K30, 4x 4K60, 8x 4K30, 16x 1080p60, 32x 1080p30 Formats: AV1, H.264, H.265, VP9, MPEG2		
Video Encode	2x 4K60, 4x 4K30, 8x 1080p60, 16x 1080p30 Formats: H.264, H.265, HEIF/ HEIC		
Camera	Up to 16 cameras, max 12 MP sensor resolution, 4x 4-lane CSI2		
PCIe	2x PCIe Gen 4: 1x 2-lane + 1x 4-lane (Root Complex & Endpoint)		
USB	2x USB 3.1 Gen 2, 1x USB 2.0		
Networking	2x 2.5 GbE w/ TSN (SGMII)		
Other I/O	21x QUP_SEs (supports UART/I2C/SPI), 149x GPIOs		
Storage	2x UFS 3.1 Gen 4 2-lane, 1x 8-bit SDCC5, NVMe over PCIe		
Wi-Fi/Bluetooth/WAN	Support through companion chips: QCA6698AQ , SDX35 , SDX72		
MCU-Like Subsystem	4x real-time cores @ 1.85 GHz 1x RGMII w/TSN, 8x CAN-FD, 5x QUP_SEs ¹ (supports UART/I2C/SPI)		Planned support for safety certification up to SIL3-capable with dedicated safety island. 1x RGMII w/TSN, 8x CAN-FD, 5x QUP_SEs ¹ (supports UART/I2C/SPI)
Power (SoC only)	3.8W–20W		
Operating System	Linux Yocto, Linux Ubuntu		
Package	25.0 mm x 25.0 mm / 0.6 mm ball pitch		
Temperature Range	-40°C to 115°C (Tj)		
Longevity	2038 ² (subject to change without notice)		

¹ Qualcomm Universal Peripheral Serial Engines

² Refer to the [Product Longevity Program](#) page for the latest information

To learn more visit: [qualcomm.com](https://www.qualcomm.com)



The Dragonwing 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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