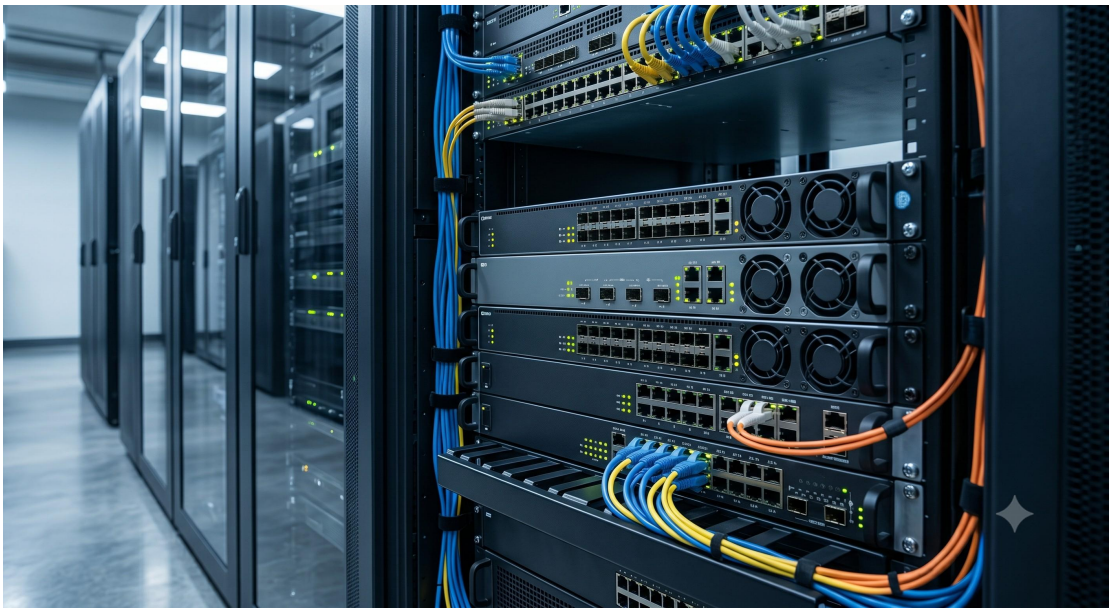
Ultra-Low Latency Packet Buffering Engine Factsheet: QCT-9000 Series

ULTRA-LOW LATENCY PACKET BUFFERING ENGINE FACT SHEET: QCT-9000 SERIES

PRODUCT IDENTIFICATION

The QCT-9000 Series represents a paradigm shift in data center interconnect and high-frequency trading infrastructure, engineered as a purpose-built, ultra-low latency packet buffering and forwarding engine. This platform is meticulously designed to address the stringent requirements of next-generation data centers, where microseconds of latency translate directly to competitive advantage and operational efficiency. As the cornerstone of modern, high-performance network fabrics, the QCT-9000 Series delivers deterministic, sub-microsecond switching performance without compromising on advanced telemetry, security, or programmability. This document serves as the definitive technical reference for network architects, infrastructure engineers, and procurement specialists evaluating the platform for deployment in mission-critical, latency-sensitive environments.



SYSTEM OVERVIEW & STRATEGIC POSITIONING

The QCT-9000 Series is a 1RU, fixed-form-factor switching platform that redefines the benchmark for low-latency networking. It is architected around a next-generation, purpose-built ASIC that integrates a highly intelligent packet buffering engine with a non-blocking, cut-through switching architecture. This design philosophy enables wire-rate forwarding on all ports with deterministic latency, making it the ideal solution for financial services, artificial intelligence (AI) training clusters, high-performance computing (HPC), and advanced content delivery networks (CDNs). The platform is available in 32x400G QSFP-DD and 64x200G QSFP56 port configurations, offering unparalleled flexibility and density for leaf-spine and spine-super-spine topologies. Strategic positioning focuses on reducing application completion times and maximizing the ROI of compute resources by eliminating network-induced bottlenecks.

HARDWARE ARCHITECTURE & SILICON INNOVATION

The core of the QCT-9000 is the proprietary "Helios" forwarding engine, a 12.8 Tbps co-packaged optics-ready ASIC fabricated on a 5nm process. This innovative silicon features a fully shared packet buffer architecture with a capacity of 64 MB, dynamically allocated to prevent head-of-line blocking while ensuring near-zero jitter. The packet buffer is complemented by a sophisticated on-chip memory controller that enables nanosecond-scale access times. The hardware pipeline is designed for cut-through switching, making forwarding decisions based on the packet header before the entire frame is received. Advanced features like in-band network telemetry (INT) and postcard-based telemetry are offloaded to dedicated hardware engines, ensuring that performance monitoring does not tax the main forwarding plane. The system is powered by a dual, hot-swappable, redundant power supply and a fan-tray module with variable-speed fans for optimal energy efficiency and acoustic performance.

KEY FEATURES & ROUTING LOGIC

- Ultra-Low Latency: Offers a deterministic, port-to-port latency of less than 500 nanoseconds under all traffic conditions, including full line-rate 64-byte packet forwarding.

- Flexible Forwarding: Supports a comprehensive suite of L2/L3 protocols, including advanced features like VXLAN, NVGRE, and MPLS segment routing, enabling seamless integration into overlay and underlay networks.
- Intelligent Buffer Management: The dynamic buffer allocation algorithm intelligently manages the 64 MB shared buffer, preventing packet drops during microbursts and ensuring fairness across all traffic flows.
- Programmable Pipelines: Integrated P4-programmable pipeline allows for rapid service deployment and customization, enabling network operators to implement proprietary packet-processing logic without hardware upgrades.
- Enhanced Telemetry: Native support for streaming telemetry, sFlow, and the industry-standard OpenConfig data models provides granular, real-time visibility into network performance and buffer utilization.
- Comprehensive Security: Hardware-based MACsec (IEEE 802.1AE) encryption on all ports secures data in transit with line-rate performance, ensuring data integrity and confidentiality.

COMPLIANCE & STANDARDS

The QCT-9000 Series is designed and certified to meet a comprehensive array of industry standards and regulatory requirements, ensuring interoperability and compliance in diverse global deployments. The platform adheres to IEEE 802.3bs, 802.3cd, and 802.3ck for Ethernet and optical interfaces. It is fully

compliant with the RoHS and WEEE directives, ensuring environmental responsibility. For network management, it supports standard MIBs and RESTCONF/gRPC interfaces. The hardware is safety-certified per UL 62368-1, CAN/CSA C22.2 No. 62368-1, and EN 62368-1. EMC compliance includes FCC Part 15 (Class A), EN 55032 (Class A), EN 55035, and EN 61000-3-2. The system is also tested to meet the rigorous NEBS Level 3 standards for use in telecommunications environments.

TECHNICAL SPECIFICATIONS

Parameter	**Specification**
Form Factor	1RU Fixed Chassis
Switching Capacity	12.8 Tbps (Full-Duplex)
Power Supply	Dual 1600W Hot-Swappable Redundant AC/DC, 80+ Platinum
Port Density	32x400G QSFP-DD or 64x200G QSFP56
Latency	< 500 ns (64-byte frames)
Packet Buffer	64 MB Shared, Dynamically Allocated
Forwarding Rate	Up to 8.4 Billion pps
Management Ports	1x 10/100/1000BASE-T out-of-band, 1x RJ45 Console, 1x USB

TECHNICAL SPECIFICATIONS

- Port Configuration: 32 x 400G QSFP-DD (breakout capable to 4x100G) / 64 x 200G QSFP56
- Switching Capacity: 12.8 Tbps full-duplex
- Forwarding Rate: Up to 8.4 Bpps (billion packets per second)
- CPU: Dual-core x86 SoC (for management and control plane)
- Memory: 16 GB DDR4 RAM, 64 GB eMMC storage
- Latency: < 500 ns (64-byte frames)
- Packet Buffer: 64 MB dynamically shared
- MAC Address Table: 256,000 entries
- Routing Table: 256,000 IPv4 / 128,000 IPv6 routes
- Power Supply: Dual 1600W AC/DC Hot-swappable, 80+ Platinum certified
- Cooling: Front-to-back airflow, 6 x hot-swappable fan trays
- Dimensions: 1RU, 17.2 x 1.75 x 22 inches (W x H x D)
- Weight: 20 lbs (fully loaded)
- Operating Temperature: 0°C to 45°C



ORDERING SKU INFORMATION

- QCT-9016-32D: QCT-9000 Series Main System, 32x400G QSFP-DD, Dual PSU, 6 Fan Trays

- QCT-9024-64Q: QCT-9000 Series Main System, 64x200G QSFP56, Dual PSU, 6 Fan Trays

- QCT-PSU-1600-AC: 1600W AC Power Supply Module

- QCT-PSU-1600-DC: 1600W DC Power Supply Module

- QCT-FAN-6: 6-unit Fan Tray Assembly (Front-to-Back)

- QCT-LIC-ADV: Advanced Feature License (P4 programmability, VXLAN routing)

- QCT-LIC-TELE: Telemetry and Monitoring License (INT, Streaming telemetry)

- QCT-ACC-RMK: 19-inch Rack Mount Kit for all QCT-9000 Series models

LIFECYCLE ASSURANCE (MTBF)

The QCT-9000 Series is engineered for maximum reliability and uptime. The Mean Time Between Failures (MTBF) is calculated to be in excess of 350,000 hours at 40 °C, based on Telcordia SR-332 methodology. This exceptional reliability is achieved through rigorous component selection, a robust thermal management system, and a fully redundant architecture for power and cooling. The platform is supported by a comprehensive 5-year advance-replacement hardware warranty, with optional 24/7/4-hour on-site support service level agreements available for mission-critical deployments.

TARGET BACKBONE TOPOLOGIES

The QCT-9000 Series is ideally suited for a variety of high-performance data center topologies. In a leaf-spine architecture, it provides massive bandwidth for server racks and storage arrays, ensuring low-latency communication. In a spine-super-spine topology, it can act as a high-density spine switch, interconnecting multiple leaf switches to create a scalable and resilient fabric. Its advanced capabilities also make it an excellent candidate for network boundary deployments, such as data center interconnect (DCI) and edge peering points, where high throughput and low latency are paramount.