datasheet



NVIDIA Quantum-2 QM9700 Series

Scaling Out Data Centers with 400G InfiniBand Smart Switches

Accelerate Research, Innovation, and Product Development with Greater Data Capacity and In-Network Computing

As high-performance computing (HPC) and artificial intelligence (AI) applications become more complex, the demand for the most advanced high-speed networking is critical for extreme-scale systems. NVIDIA Quantum-2 is the industry-leading switch platform in power and density, with NDR 400 gigabit per second (Gb/s) InfiniBand throughput that provides AI developers and scientific researchers with the highest networking performance available to take on the world's most challenging problems.

Advanced Computing Needs Advanced Networking

The NVIDIA Quantum-2-based QM9700 and QM9790 switch systems deliver an unprecedented 64 ports of 400Gb/s InfiniBand per port in a 1U standard chassis design. A single switch carries an aggregated bidirectional throughput of 51.2 terabits per second (Tb/s), with a landmark of more than 66.5 billion packets per second (BPPS) capacity. Supporting the latest NVIDIA high-speed interconnect 400Gb/s technology, NVIDIA Quantum-2 brings a high-speed, extremely low-latency and scalable solution that incorporates state-of-the-art technologies such as Remote Direct Memory Access (RDMA), adaptive routing, and NVIDIA Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)™.

Unlike any other networking solution, NVIDIA InfiniBand provides self-healing network capabilities, as well as quality of service (QoS), enhanced virtual lane (VL) mapping, and congestion control to provide the highest overall application throughput. As an ideal rack-mounted InfiniBand solution, the QM9700 and QM9790 400Gb/s InfiniBand fixed-configuration switches allow maximum flexibility, as they enable a variety of topologies, including Fat Tree, SlimFly, DragonFly+, multi-dimensional Torus, and more. They're also backwards compatible to previous generations and include expansive software ecosystem support.

The Era of Data-Driven Computing

Today's complex research demands ultra-fast processing of high-resolution simulations, extreme-size datasets, and complex, highly parallelized algorithms that need to exchange information in real time. The QM9700 400Gb/s InfiniBand switches extend NVIDIA In-Network Computing technologies and introduce the third generation of NVIDIA SHARP technology, SHARPv3. Creating virtually unlimited scalability for small and large data aggregation through the network, SHARPv3 allows 32X higher AI acceleration power compared to the previous generation. SHARPv3 dramatically boosts application performance of complex

System Specifications

Performance	**400Gb/s per port**
Switch radix	**64 400Gb/s non-blocking ports with aggregate data throughput up to 51.2Tb/s**
Connectors and cabling	**32 octal small form-factor pluggable (OSFP) connectors; passive or active copper or active fiber cable; optical module**
Power supply	**1+1 redundant and hot-swappable power** **Input range: 200-240Vac; US min: 2 phases of 100-110v—in total, at least 208v** **80 Gold+ and ENERGY STAR certified**
Cooling	**Front-to-rear or rear-to-front** **Cooling option: 6+1 hot-swappable fan unit**
Management ports	**1x USB 3.0 x1** **1x USB for I2C channel** **1x RJ45** **1x RJ45 (UART)**
CPU	**x86 Coffee Lake i3**
System memory	**Single 8GB, 2,666 mega transfers per second (MT/s), DDR4 SO-DIMM**
Storage	**M.2 SSD SATA 16GB 2242 FF**
Software	**MLNX-OS**
System weight	**14.5kg**
System dimensions	**Height: 1.7 in (43.6 mm)** **Width: 17.0 in (438 mm)** **Depth: 26.0 in (660.4 mm)**
Rack mount	**1U rack mount**

computations while data moves through the data center network, participating in the application's runtime and reducing the amount of data needed to traverse the network.

Streamlining Network Design and Topologies

By implementing NVIDIA port-split technology, the QM9700 and QM9790 switches provide a double-density radix for 200Gb/s data speeds, reducing the cost of network design and network topologies. Supporting up to 128 ports of 200Gb/s, NVIDIA delivers the densest top-of-rack (TOR) switch available on the market. The QM9700 family of switches enables small to medium-sized deployments to scale with a two-level Fat Tree topology while reducing power, latency, and space requirements.

Integrated Router Capabilities

NVIDIA® Quantum-2 InfiniBand switches with optional router capabilities support the scale-out of InfiniBand clusters to a very large scale of nodes. This scale-out extends far beyond the previous generation's limit, to sustain the peak performance and reliability demands of research, simulations, AI, and cloud applications data processing.

Enhanced Management

The internally managed QM9700 switch features an on-board subnet manager that enables simple, out-of-the-box bringup for up to 2,000 nodes. Running the NVIDIA MLNX-OS® software package, the subnet manager delivers full chassis management through command-line interface (CLI), web-based user (WebUI), Simple Network Management Protocol (SNMP), or JavaScript Object Notation (JSON) interfaces.

The externally managed QM9790 switch can utilize the advanced NVIDIA Unified Fabric Manager (UFM®) feature sets to empower data center operators to efficiently provision, monitor, manage, preventatively troubleshoot, and maintain the modern data center fabric, to realize higher utilization and reduce overall opex.

Ordering Information

Orderable Part Number (OPN)	Description
MQM9700-NS2F	64-ports 400Gb/s, 32 OSFP ports, managed, power-to-connector (P2C) airflow (forward)
MQM9700-NS2R	64-ports 400Gb/s, 32 OSFP ports, managed, connector-to-power (C2P) airflow (reverse)
MQM9790-NS2F	64-ports 400Gb/s, 32 OSFP ports, unmanaged, P2C airflow (forward)
MQM9790-NS2R	64-ports 400Gb/s, 32 OSFP ports, unmanaged, C2P airflow (reverse)

System Specifications

Environmental conditions	**Temperature:** > Operational: Forward air flow: 0° to 35°C Reverse air flow: 0° to 40°C > Non-Operational: -40° to 70°C **Humidity:** > operating 10% to 85% non-condensing > non-operating 10% to 90% non-condensing **Altitude:** Up to 3050m
EMC (emissions)	**CE, FCC, VCCI, ICES, and RCM**
Product safety compliant/ certified	**RoHS, CB, cTUVus, CE, and CU**
Warranty	**1 year**

Learn more

Learn more about **NVIDIA InfiniBand switches**
Learn more about **NVIDIA UFM software**

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