NVIDIA QUANTUM QM8700 SERIES

Accelerating Data Centers with HDR 200G
InfiniBand Smart Switches

Scaling Out High-Performance Computing (HPC), AI, Cloud Applications, and Storage Infrastructures with HDR 200G InfiniBand

Faster servers combined with high-performance storage and applications that use increasingly complex computations are causing data bandwidth requirements to spiral upward. As servers are deployed with next-generation processors, HPC, AI, and hyperscale cloud environments will need every last bit of network bandwidth. NVIDIA Quantum QM8700 and QM8790 HDR 200 gigabits per second (Gb/s) InfiniBand fixed-configuration switches provide up to forty 200Gb/s ports with 16 terabits per second (Tb/s) of non-blocking bandwidth or eighty 100Gb/s ports with full bidirectional bandwidth per port with extremely low latency—an ideal choice for building flexible and scalable data centers at any size.

Collective Communication Acceleration

The QM8700 and QM8790 fixed-configuration switches are designed to enable NVIDIA In-Network Computing offload engines through NVIDIA Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)™ technology. Using in-switch silicon-embedded hardware, the switch architecture enables the usage of all active data center devices to accelerate the communications frameworks, resulting in order-of-magnitude performance improvements.

NVIDIA Quantum switches improve the performance of select collective operations commonly used in HPC and deep learning communication frameworks, such as Message Passing Interface (MPI), Shared Memory (SHMEM), and NVIDIA Collective Communication Library (NCCL). By processing data as it traverses the network, Quantum switches eliminate the need to send data multiple times between server endpoints. They also support the aggregation of large data vectors at wire speed, which are crucial for machine learning applications.

Streamlining Network Design and Topologies

QM8700, together with the NVIDIA® ConnectX®-6 adapter card, also supports HDR100. This unique technology supports up to 80 ports of 100Gb/s, providing double-density radix for 100Gb/s data speeds and thus reducing the cost of network design and topologies. The HDR QM8700 InfiniBand fixed-configuration switch enables four-lane 200Gb/s ports to be split into two distinct two-lane 100Gb/s ports. As the switch creates a highly dense top-of-rack (ToR) switch, it's the perfect solution for double-dense racks. In addition, NVIDIA Quantum-based HDR switches provide maximum flexibility, supporting a variety of network topologies, including Fat Tree, DragonFly+, multi-dimensional Torus, and more. NVIDIA HDR switches are backwards compatible to previous generations and include extensive software ecosystem support.

Enhanced Management

The internally managed QM8700 switch features an on-board subnet manager that enables simple, out-of-the-box bring-up for up to 2,000 nodes. NVIDIA MLNX-OS® 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 QM8790 switch can utilize the advanced NVIDIA Unified Fabric Manager (UFM®) platform to empower data center operators to efficiently provision, monitor, manage, preventatively troubleshoot, and maintain the modern data center network to realize higher utilization and reduce overall opex.

Building Efficient Clusters

NVIDIA Quantum-based QM8700 and QM8790 switches are used as cost-effective building blocks for deploying high-performance and computing-efficient data centers. With features such as static routing, adaptive routing, congestion control, and quality of service that enable modern topologies, the switches ensure maximum effective fabric bandwidth by eliminating congestion hot spots. Featuring best-in-class design to support low power consumption, power is further reduced upon partial port utilization. Whether looking at price to performance or energy to performance, the QM8700 series offers superior performance, low power, and scalability, reducing capital and operating expenses and providing the best return on investment.

Ordering Information

ORDERABLE PART NUMBER (OPN)	DESCRIPTION
MQM8700-HS2F	NVIDIA Quantum HDR InfiniBand switch, 40 QSFP56 ports, two power supplies (AC), x86 dual core, standard depth, P2C airflow, rail kit
MQM8700-HS2R	NVIDIA Quantum HDR InfiniBand switch, 40 QSFP56 ports, two power supplies (AC), x86 dual core, standard depth, C2P airflow, rail kit
MQM8790-HS2F	NVIDIA Quantum HDR InfiniBand switch, 40 QSFP56 ports, two power supplies (AC), unmanaged, x86 dual core, standard depth, P2C airflow, rail kit
MQM8790-HS2R	NVIDIA Quantum HDR InfiniBand switch, 40 QSFP56 ports, two power supplies (AC), unmanaged, x86 dual core, standard depth, C2P airflow, rail kit
MTEF-PSF-AC-C	200G 1U systems 1,100W AC power supply with P2C air flow
MTEF-PSR-AC-C	200G 1U systems 1,100W AC power supply with C2P air flow
MTEF-FANF-C	200G 1U systems fan module with P2C air flow
MTEF-FANR-C	200G 1U systems fan module with C2P air flow

SYSTEM SPECIFICATIONS

Performance	**200Gb/s per port**
Switch radix	**40 HDR non-blocking ports with aggregate data throughput up to 16Tb/s**
Connectors and cabling	**Quad small form-factor pluggable (QSFP56) connectors; passive or active copper or active fiber cable; optical module**
System power usage	**Average power with passive cables (ATIS): 253W**
Power supply	**1+1 redundant and hot-swappable power** **Input range: 100-127VAC, 200-240VAC** **80 Gold+ and ENERGY STAR certified power supplies**
Management ports	**1x RJ45** **1x console port: RS232** **1x micro USB**
CPU	**Broadwell ComEx D-1508 2.2GHZ**
System memory	**Single 8GB**
Software	**MLNX-OS**
System weight	**1 PSU: 11.4kg** **2 PSUs: 12.48kg**
System dimensions	**Height: 1in (43.6mm)** **Width: 17in (433.2mm)** **Depth: 23.2in (590.6mm)**
Mount rack	**1U rack mount**
Operating Conditions	**Temperature:** > Operating: 0ºC-40ºC > Non-operating: -40ºC-70ºC **Humidity:** > Operating: 10%-85% non-condensing > Non-operating: 10%-90% non-condensing **Altitude: up to 3,200m**
EMC (Emissions)	**CE, FCC, VCCI, ICES, and RCM**
Safety	**RoHS Compliant**
Warranty	**1 year**

Learn more about **NVIDIA InfiniBand switches**.

Learn more about **NVIDIA UFM software**.