



NVIDIA QUANTUM CS8500 MODULAR SWITCH SERIES

Increase Data Center Availability with
HDR 200G InfiniBand Smart Switches



Delivering modular, high-availability design and performance
for HPC, AI, cloud, and hyperscale data centers

Today's rapid data growth, real-time data processing, and mission-critical application environments fuel demand for faster, more efficient interconnect solutions. The high-density NVIDIA Quantum™ CS8500 switch provides up to 800 ports of HDR 200 gigabits per second (Gb/s) InfiniBand connectivity, enabling high throughput, availability, and scalability.

The Era of Data-Driven Computing

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 CS8500 has the highest-performing fabric solution in a 29U form factor, delivering 320 terabits per second (Tb/s) of full bi-directional bandwidth with ultra-low port latency. CS8500 switches create the highest scalability for large data aggregation, with the highest application performance of complex computations while data moves through the data center network.

The NVIDIA® Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)™ technology takes advantage of all active data center devices to accelerate the communications frameworks, resulting in an order-of-magnitude improvement in application performance. Enabling efficient computing, the CS8500 leverages such features as adaptive routing, congestion control, and quality of service, which ensure maximum effective network bandwidth by eliminating a variety of congestion hot spots.

World-Class Design

The modular CS8500 chassis switch is designed for performance, serviceability, energy efficiency, and high availability. Providing an excellent price-performance ratio for medium- to extremely large-size clusters, the CS8500 features the reliability and manageability expected from a modular-class switch. The leaf blades, spine blades, management modules, power supplies, and fan units are all hot-swappable to help eliminate downtime.

As an eco-friendly solution, the CS8500 is cooled solely by a liquid closed loop to enable a low noise level and reduce infrastructure opex. It arrives with a liquid coolant distribution unit (CDU) or air heat exchanger (AHX) data units to best fit all data centers. NVIDIA HDR switches are backwards compatible to previous generations and include extensive software ecosystem support.

Streamlining Network Design and Topologies

By implementing NVIDIA port-split technology, the CS8500 switch provides a double-density radix for 100Gb/s (HDR 100) data speeds, reducing the cost of network design and network topologies. Supporting up to 1,600 ports of 100Gb/s, CS8500 is an ultra-dense chassis switch perfect for medium-to-large deployments that require lower power, latency, and space.

Collective Communication Acceleration

The NVIDIA Quantum switch improves the performance of selected collective operations by processing data as it traverses the network, eliminating the need to send data multiple times between endpoints. It also supports the aggregation of large data vectors at wire speed to enable Message Passing Interface (MPI) large vector reduction operations, which are crucial for machine learning applications.

Enhanced Management

The CS8500 switch comes with NVIDIA MLNX-OS chassis management software. It delivers a complete and familiar chassis management experience, including configuration and monitoring of power supplies, fans, and ports. It also ensures interoperability with the previous generation of NVIDIA InfiniBand switch systems. MLNX-OS supports full chassis management through command-line interface (CLI), web-based user (WebUI), Simple Network Management Protocol (SNMP), or JavaScript Object Notation (JSON) interfaces.

For best-in-class data center networking management, including for the CS8500, the advanced NVIDIA Unified Fabric Manager (UFM®) platform combines enhanced, real-time network telemetry with AI-powered cyber intelligence and analytics.

Ordering Information

ORDERABLE PART NUMBER (OPN)	DESCRIPTION
900-00796	MCS85xx director systems liquid-to-liquid CDU
AHX-22KW-350MM	MCS85xx director systems liquid-to-air heat exchanger
MCS8500	320Tb/s, 800-port HDR InfiniBand chassis, includes nine power supply units (N+1) with support for up to 16 power supply units (N+N)
MMB8500	x86 dual-core chassis management module
MQM8510-H	40 ports HDR, QSFP56, leaf blade
MQM8520-H	40 ports HDR, spine blade
MTDF-BLK-E	MCS85xx management module (blank)
MTDF-BLK-F	MCS85xx leaf (blank)
MTDF-BLK-G	MCS85xx power supply (blank)
MTDF-CH-D	MCS85xx 800p cable holder
MTDF-CP-B	MCS85xx director system cable supported
MTDF-KIT-C	MCS85xx systems rail kit
MTDF-LCD-A	MCS85xx director systems 7" LCD screen tablet
MTDF-LIQ-A	MCS85xx director chassis water cooling set; includes 8x hoses, 4x air bleeders, and 4x stainless steel manifolds (each with 21 dripless quick release connectors)
MTDF-LIQ-B	MCS85xx director chassis 19 liters CoolIT PG25 Coolant
MTDF-MTN-A	MCS85xx director systems maintenance equipment kit
MTDF-PS-B	MCS85xx 3KW AC power supply with P2C airflow

Learn more about **NVIDIA InfiniBand switches**.

Learn more about **NVIDIA UFM software**.

SYSTEM SPECIFICATIONS

Performance	800 HDR 200Gb/s ports 1,600 HDR100 100Gb/s ports
Switch radix	320Tb/s aggregate switch throughput
Connectors and cabling	QSFP56 connectors, passive copper or active fiber cables; optical modules
System power usage	Average power with passive cables (ATIS): CDU based configuration: 12,300W AUX based configuration: 13300W
Power supply	N+1 or N+N redundant and hot-swappable power supplies Input range: 200-240Vac 80+ Platinum and Energy Star certified power supplies
Cooling	Liquid-cooled > Liquid-to-air AHX > Liquid-to-liquid CDU
Management modules	Two available (one is required for operation) SSH, Telnet, Web, SNMP, and XML
Fabric management	On-board subnet manager supports fabrics with 2,000 nodes UFM agent
CPU	x86 ComEx Broadwell CPU
Software	MLNX-OS
System weight	Weight: > 747kg for full CDU-based configuration > 910kg for full AHX-based configuration
System dimensions (H x D x W)	1,289mm x 770mm x 483mm
EMC (emissions)	CE, FCC, VCCI, ICES, RCM
Operating Conditions	Temperature: > Operating: 0°–40°C > Non-operating: -40°–70°C Humidity: > Operating: 10%–85% non-condensing Altitude: Up to 3,050m
Product safety compliant/certified	RoHS compliant, CB, cTUVus, CE, CU
Warranty	One-year hardware warranty and five-year service fee (mandatory)