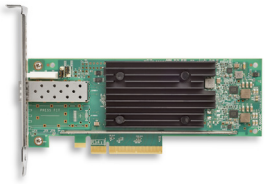
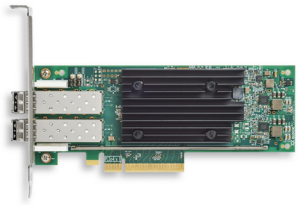
HPE® SN1700Q 64Gb Fibre Channel Host Bus Adapters

64GFC HBAs from Marvell® QLogic®



Single Port SN1700Q



Dual Port SN1700Q

- Secure firmware update backed by hardware Root of Trust
- Improve scale out NVMe efficiencies by delivering concurrent support for FCP-SCSI and FC-NVMe
- Industry leading performance of up to 2 million IOPS and 25,600MBps of aggregate throughput
- Universal SAN Congestion Mitigation (USCM) helps pinpoint and prevent SAN Congestion utilizing Fabric Performance Indication Notification (FPIN) technology
- Port isolation design delivers deterministic and scalable performance on each port along with enhanced reliability

The HPE® SN1700Q Host Bus Adapters (HBAs), based on Marvell QLogic technology, are 64-Gigabit Fibre Channel (GFC) HBAs that secure mission critical data and protect against firmware corruption through hardware-based Root of Trust (RoT). In addition, support for FC-nonvolatile memory express (NVMe®) provides improved performance on flash-based systems.

Leveraging over 20 years of market leadership, the HPE SN1700Q 64Gb FC HBAs are designed from the ground up for customers looking to accelerate databases, host more virtual machines (VMs), and reduce total cost of ownership (TCO), all while leveraging their investment in NVMe-based all flash arrays. HPE SN1700Q 64Gb FC HBAs provide full backward compatibility with 32GFC and 16GFC SANs.

NVMe Over Fibre Channel (FC-NVMe)

Workloads that demand higher throughput, IOPS, and lower latency are moving to flash. The NVMe protocol has been designed from the ground up for flash and features deep parallelism, random access, and flash access over PCI Express® (PCIe®) to maximize bandwidth.

NVMe works best when coupled with a network that can provide lossless, low-latency, and high-performing transport. FC-NVMe extends these benefits over a Fibre Channel fabric.

The HPE SN1700Q 64Gb FC HBAs support low-latency access to scale out NVMe with full support for the FC-NVMe protocol. These adapters can simultaneously support FC-NVMe and FCP-SCSI storage traffic on the same physical port, enabling customers to migrate to NVMe at their own pace.

The SN1700Q 64Gb FC HBAs bring the best of both worlds by offering up to 2 million IOPS and line rate 64GFC performance, while delivering low-latency access to NVMe and SCSI storage over a Fibre Channel network.

Firmware Integrity Protection With Hardware Root of Trust

Security threats continue to evolve and increase, driving Chief Information Officers towards securing the server all the way down to the firmware at the lowest layers of the server platform, where attacks are the most difficult to detect. To address this issue, the HPE SN1700Q 64Gb FC HBAs incorporate a hardware RoT that keeps malicious firmware from hijacking the adapter. The SN1700Q's RoT enables both integrity and authenticity during adapter firmware updates by both validating firmware embedded signatures with hardware embedded keys to ensure that only bona fide firmware executes, and protecting firmware updates that are applied over public networks.

- Marvell StorFusion™ technology accelerates deployment, simplifies diagnostics, enhances reliability, and optimizes performance
- Improve database transactional performance, enable faster business decisions with up to 2x faster data mining, and host more VMs
- Supports PCIe 4.0 systems

Fully Featured FC Technology

Marvell provides HPE with a full-featured 64GFC adapter product line, designed to meet and exceed the requirements of modern SANs. Marvell's FC solution offers high per-port performance (1 million IOPS); and its power-efficient, port-isolated design enables data centers to reduce their carbon footprint.

HPE SN1700Q 64Gb FC HBAs resolve data center complexities by enabling a storage network infrastructure that supports powerful virtualization features like N_Port ID virtualization (NPIV), Virtual Machine ID (VM-ID), application-aware services with standards based quality of service (QoS), and simplified management.

Marvell StorFusion technology delivers streamlined provisioning and improved resiliency with built-in forward error correction (FEC). These features address the needs of agile IT organizations that run hybrid cloud infrastructures and require mission-critical reliability, guaranteed network performance, and the ability to scale their SANs to business needs.

Innovations That Improve Business Productivity And Integrity

These HPE adapters from Marvell QLogic, powered by StorFusion technology, include advanced capabilities when deployed with supported Brocade® and Cisco® switches. By implementing these industry-leading solutions together, SAN administrators can take advantage of enhanced features that improve availability, accelerate deployment, and increase network performance.

Improved Total Cost of Ownership and Reliability

StorFusion technology delivers advanced link diagnostics, which improve availability and support for high-performance fabrics. Using the Diagnostics Port feature with a Brocade or Cisco switch that supports Fibre Channel diagnostics, administrators can quickly run a battery of automated diagnostic tests to assess the health of links and fabric components.

The HPE SN1700Q 64Gb FC HBAs support link cable beacon (LCB) technology, which enables administrators to visually identify both ends of a physical link to troubleshoot connectivity issues.

Read diagnostic parameters (RDP) provide optics and media diagnostics while the link is in service, enabling identification of link-related errors and degrading conditions on the HBA-to-FC switch link.

Automatic buffer-to-buffer credit recovery (BB-CR) helps overcome performance degradation, congestion, and link resets caused by buffer credit loss, especially on longer distance and high-loss fiber connections.

Marvell Universal SAN Congestion Mitigation Technology (USCM)

Modern SANs are observing unprecedented data growth in several different vectors. 32GFC and 64GFC upgrades are added to original 8GFC and 16GFC investments to form diverse heterogeneous SANs. Mission critical applications that rely on SANs are expected to run at full capacity and capability 24x7, 365 days a year, while increasingly

being accelerated by flash storage technology. Meanwhile, modern and legacy applications are consolidated to increase utilization while new workloads and VMs are added to improve CapEx and OpEx. These conditions have the potential to create congestion in the SAN, which can significantly impact application performance. SAN congestion typically occurs and quickly spreads when older, slower FC endpoints cannot accept frames at the rate generated by the source, referred to as over-subscription, over-utilization, or slow-drain. It is critical that SAN congestion is quickly detected, other components are made aware, and decisive action is taken to isolate the problem.

Implementing industry standard Fabric Performance Impact Notifications (FPINs), HPE SN1700Q 64Gb FC HBAs' USCM Technology works both independently and in coordination with Brocade and Cisco FC fabrics to avoid SAN congestion by enabling congestion detection, notification, and mitigation. HPE SN1700Q 64Gb FC HBAs can poll the status of buffer credits at various configurable intervals to detect credit starvation, notify and get notified by upstream and downstream switches of congestion points, and facilitate decisive actions such as transmit throttling, multi-path failover, load balancing, or flow quarantining. As a fallback mechanism, the SN1700Q HBAs are also capable of receiving FC primitive signaling in cases when the FPIN notifications cannot be delivered due to heavy congestion.

Single-Pane-of-Glass Management for Simplified Management

The Marvell unified management application, QConvergeConsole® (QCC), provides single-pane-of-glass management across generations of Marvell QLogic FC adapters. In addition, Marvell supports all major APIs for deployment flexibility and integration with third-party management tools, including the VMware vCenter™.

Unparalleled Insight and QoS for Virtualized Deployments

The HPE SN1700Q 64Gb FC HBAs support several standards-based virtualization features that optimize virtual server deployment, troubleshooting, and application performance.

Marvell QLogic virtual machine ID (VM-ID) technology seamlessly integrates with Brocade's VM Insight to allow customers to effectively monitor and manage their Fibre Channel storage networks; for example, load balancing VM clusters with storage to ensure efficient use of the storage resources. Supported for VMware ESXi 6.*x* and later, I/O requests and responses can be tagged with the VM-ID of the appropriate virtual machine, providing end-to-end visibility at the VM level.

Additionally, support for NPIV enables a single FC adapter port to provide multiple virtual ports for increased network scalability. Standard class-specific control (CS_CTL)-based QoS technology per NPIV port allows multi-level bandwidth controls and guarantees per VM. As a result, mission-critical workloads can be assigned a higher priority than less time-sensitive storage traffic for optimized performance.

High Availability and Reliability

HPE SN1700Q 64Gb FC HBAs provide complete port-level isolation across the FC controller architecture. This unique architecture provides an independent protocol handing function, transmit/receive buffers, an on-chip CPU, DMA channels, and a firmware image for each port. Complete port-level isolation prevents errors and firmware crashes from propagating across all ports and provides predictable and scalable performance across all ports. See Figure 1.

The HPE SN1700Q 64Gb FC HBAs also provide end-to-end data integrity with support for T10 Protection Information (T10 PI), which prevents the risk of silent data corruption in environments running Oracle® Linux® with the Unbreakable Enterprise Kernel.

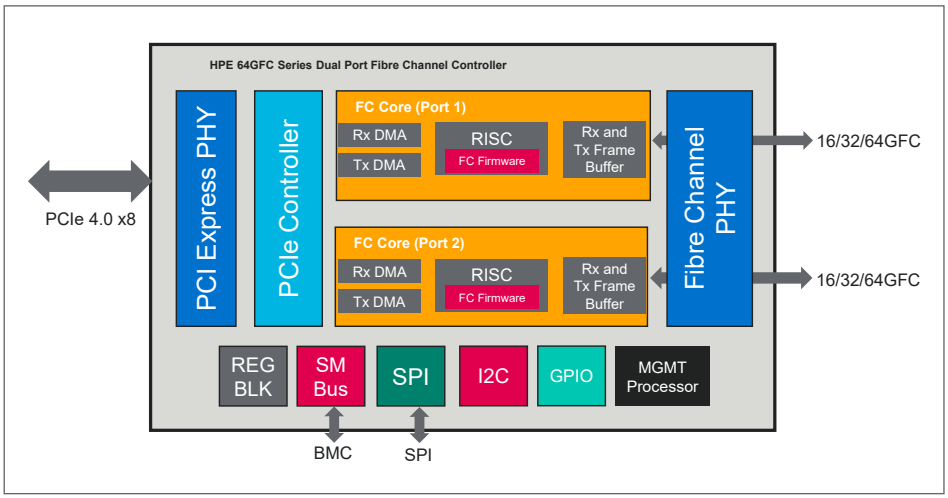


Figure 1. HPE SN1700Q 64Gb FC HBAs Block Diagram

Leadership, Confidence, and Trust

The HPE SN1700Q 64Gb FC HBAs are compatible with the same FC software driver stack that has been tested and validated across all major hardware platforms, all major hypervisors, and operating systems. Operating at 64GFC, these adapters are backward compatible with existing 16GFC and 32GFC infrastructure, leveraging existing SAN investments.

Marvell QLogic is the undisputed leader in FC adapters, with over 20 years in business and over 20 million ports shipped, with multiple generations of FC products that have been qualified by all major server OEMs. Marvell owns the most established, proven FC stack in the industry with more FC ports shipped than any other vendor.

Host Bus Interface Specifications

Bus Interface

- SN1700Q: PCIe 4.0 ×8 (single- and dual-port)

Host Interrupts

- INTx and MSI-X

Compliance

- *PCIe Base Specification*, rev. 4.0
- *PCIe Card Electromechanical Specification*, rev. 3.0
- *PCIe Card Electromechanical Specification*, rev. 4.0 draft 0.9
- *PCI Bus Power Management Interface Specification*, rev. 1.2
- *PCI Hot Plug Specification*, rev. 1.1

Fibre Channel Specifications

Throughput

- 12,800MBps full duplex line rate per port

Logins

- Support for 2,048 concurrent logins and 2,048 active exchanges per port

Port Virtualization

- NPIV

Compliance

- *SCSI Fibre Channel Protocol 4 (FCP-4)*
- *Fibre Channel Tape (FC-TAPE) Profile*
- *Fibre Channel Generation Services 8 (FC-GS-8)*
- *Fibre Channel-Physical Interface-5 (FC-PI-5)*
- *Fibre Channel-Physical Interface-6 (FC-PI-6)*
- *Fibre Channel-Physical Interface-7 (FC-PI-7)*
- *Fibre Channel Link Services 4 (FC-LS-)*
- *Fibre Channel Framing and Signaling 5 (FC-FS-5)*
- *Fibre Channel - Non-volatile Memory Express - 2 (FC-NVMe-2)*

Tools and Utilities

Management Tools and Device Utilities

- QConvergeConsole CLI: a unified management tool that supports multiple generations of Marvell FC adapters
- MCTP/PLDM
- ESXCLI Plug-in for vSphere
- MRVLFC PowerKit (cmdlets for Windows PowerShell)
- QCC Plug-ins for vSphere
- Marvell QLogic FC QCC Extension for Windows Admin Center

Tools and Utilities (continued)

Boot Support

- BIOS
- Unified Extensible Firmware Interface (UEFI)
- Forth code (FCode)

APIs

- SNIA HBA API V2
- SMI-S

Operating Systems

- For the latest applicable operating system information, see https://www.hpe.com/Storage/Spock/

End-to-End Provisioning and Management Features

The following features require a supported Brocade or Cisco switch.

Performance

- QoS CS_CTL
- FEC for 64GFC/32GFC/16GFC
- BB-CR: automatic buffer credit loss detection and recovery
- FPIN and hardware signaling for Universal SAN Congestion Mitigation

Diagnostics

- Diagnostics Port
- LCB
- RDP

Deployment and Management

- VM-ID
- Fabric device management interface (FDMI) enhancements

Physical Specifications

Ports

- SN1700Q: 64GFC, single-port FC HBA
- SN1700Q: 64GFC, dual-port FC HBA

Form Factor

- Single port: low profile PCIe card (6.6 inches × 2.731 inches)
- Dual port: low profile PCIe card (6.6 inches × 2.731 inches)

Environment and Equipment Specifications

Temperature

- Operating: 0°C to 55°C (32°F to 131°F)
- Storage: –20°C to 70°C (–4°F to 158°F)

Environment and Equipment Specifications (continued)

Humidity

- Relative (noncondensing): 10% to 90%
- Storage: 5% to 95%

Cable Distances

- Multimode optic:

Rate	Cable and Distance (m)		
	OM2	OM3	OM4/ OM5
16GFC	35	100	125
32GFC	20	70	100
64GFC	N/A	70	100

Agency Approvals—Safety

US and Canada

- UL 60950-1
- CSA C22.2

Europe

- TUV EN60950-1
- TUV IEC 60950-1
- CB Certified
- EN/IEC 62368 2nd, 3rd Edition

Agency Approvals—EMI and EMC (Class A)

US and Canada

- FCC Rules, CFR Title 47, Part 15, Subpart Class A
- Industry Canada, ICES-003: Class A

Europe

- EN55032
- EN55024
- EN61000-3-2
- EN61000-3-3
- CISPR 32 Class A

Japan

- VCCI: Class A

New Zealand and Australia

- AS/NZS: Class A

Korea

- KC-RRA Class A

Agency Approvals—EMI and EMC (Class A) (continued)

Taiwan

- BSMI CNS 13438

UK

- UKCA
- BS DoC

Ordering Information

SN1700Q (Single Port)
Part number R7N86A

- Ships in an bulk packed box with standard-height bracket installed
- Ships with 64GFC SR optical transceiver installed

SN1700Q (Dual Port)
Part number R7N87A

- Ships in an bulk packed box with standard-height bracket installed
- Ships with 64GFC SR optical transceivers installed

To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies over 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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