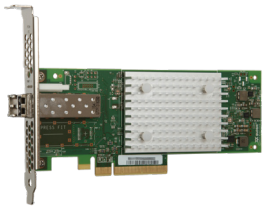
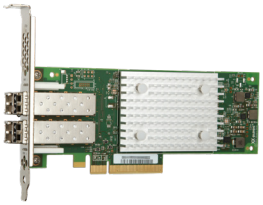
Marvell® QLogic® 2740/2760 Series

32GFC, PCIe® 3.0 Fibre Channel Adapters





- Industry's first 32GFC HBA available in single, dual, and quad-port versions
- Up to four ports of 32GFC deliver 25,600MBps aggregate throughput
- Up to 2.6 million IOPS fuel high performance in AFA and high-density virtualized environments
- FC-NVMe capability allows simultaneous access to NVMe and FCP Storage on the same port
- StorFusion technology, powered by Marvell QLogic, enhances reliability, diagnostics, and accelerates deployment
- Port isolation design offers deterministic and scalable performance on each port

The Marvell QLogic 2740/2760 Series Adapters are the industry's first 32GFC Host Bus Adapters (HBAs) available in single, dual, and quad ports. Designed with full hardware offloads, the 2740/2760 Series Adapters boast industry-leading native FC performance with extremely low CPU usage.

32GFC Technology

Marvell QLogic FC technology provides the industry's first 32GFC adapter. This solution offers higher per-port performance (up to 650K IOPS) with lower power consumption. In addition, Marvell StorFusion™ technology delivers streamlined provisioning, guaranteed QoS, and improved resiliency with in-built forward error correction (FEC). These features address the needs of IT organizations that require reliability, integrated management, and guaranteed network performance.

Marvell QLogic FC technology resolves data center complexities by enabling a storage network infrastructure that supports powerful virtualization features, application-aware services, and simplified management. The 2740/2760 Series Adapters provide advanced storage networking features capable of supporting the most demanding virtualized and private cloud environments. These features fully leverage the capabilities of high-performance 32GFC, all-flash arrays (AFAs), and demanding enterprise applications. Powerful management tools automate and simplify Storage Area Network (SAN) provisioning to help reduce cost and complexity, while the 32GFC line rate performance eliminates potential I/O bottlenecks in today's powerful multiprocessor, multicore servers.

Accelerate Mission-Critical Applications

The 2740/2760 Series Adapters provide industry-leading application performance by delivering up to 2.6 million IOPS for physical, virtual, and private cloud environments. Marvell adapters deliver application performance in virtualized and non-virtualized environments with up to 25,600MBps of aggregate throughput.

NVMe® Over Fibre Channel (FC-NVME)

The 2740/2760 Series Adapters support the FC-NVMe-2 (NVMe over Fibre Channel) protocol. The 2740/2760 Series Adapters can simultaneously support FC-NVMe and FCP-SCSI storage traffic. NVMe storage offers exceptionally high performance at very low latencies. NVMe works best when coupled with a network that can provide lossless, low-latency, and high-performing transport. The 2740/2760 Series 32GFC Adapters

bring the best of both worlds by offering the highest performance and lowest latency access to NVMe and SCSI storage over a Fibre Channel network.

Virtualization Optimized

The Marvell QLogic 2740/2760 Series Adapters support standards-based virtualization features. Under VMware® ESXi (versions 6.5 and later), I/O requests and responses can be tagged with the virtual machine-ID (VM-ID) of the appropriate virtual machine, providing end-to-end visibility at the VM level. Support for N_Port ID virtualization (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 bandwidth controls and guarantees per virtual machine (VM). In addition, the 32GFC line rate per physical port delivers unmatched storage performance to maximize the number of VMs per physical server.

High Resiliency While Improving IT Staff Productivity

Marvell QLogic FC Adapters 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 link diagnostics, administrators can quickly run a battery of automated diagnostic tests to assess the health of links and fabric components.

The Marvell QLogic 2740/2760 Series Adapters support link cable beacon (LCB) technology, which enables administrators to visually identify both ends of a physical link. In a large data center, with hundreds of ports and cables to manage, a simple command turns on port LED beacons on both ends of a link cable connection. Administrators can use LCB to quickly identify connection peer ports without tracing the cable.

Marvell technology includes the read diagnostic parameters (RDP) feature, which provides optics and media diagnostics while the link is in service. From any point in the fabric, an administrator can use RDP to easily access diagnostic information, thereby enabling identification of link-related errors and degrading conditions on any N_Port-to-F_Port link.

Diagnostics Port, LCB, and RDP reduce fabric deployment time and eliminate tedious, manual troubleshooting methods, thus saving thousands of man-hours in enterprise environments.

Rapid Server Deployment and Orchestration

StorFusion technology includes fabric pre-provisioning services that enable servers to be quickly deployed, replaced, and moved across the SAN. By leveraging fabric-assigned

port world wide name (FA-WWN) and fabric-based boot LUN discovery (F-BLD) capabilities, the creation of zones, LUNs, SAN-based boot images, and other services can be completed before the servers arrive on site—eliminating time-consuming, manual tasks that typically delay server deployment.

Performance SLA Enforcement with VM-level Quality of Service

Network performance can be dramatically improved by implementing the industry standard CS_CTL-based frame prioritization QoS, which helps to alleviate network congestion. Marvell QLogic adapters with StorFusion technology, when connected to supported SAN fabrics, enable the classification of traffic as it arrives at the switch. The classified traffic is then processed on the basis of configured priorities. Traffic can be prioritized for delivery or subjected to limited delivery options. As a result, mission-critical workloads can be assigned a higher priority than less time-sensitive network traffic for optimized performance.

Higher Resiliency and Performance with Automatic Error Recovery

FEC is automatically used at 32GFC as required by the *Fibre Channel Specification* to improve performance and link integrity. FEC automatically detects and automatically recovers from bit errors, which results in higher availability and performance.

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.

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 VMware vCenter™.

High Availability and Reliability

Marvell QLogic 32GFC Adapters continue the tradition of providing complete port-level isolation across the FC ASIC controller architecture. This architecture, unlike other vendor solutions, provides independent function, transmit/receive buffers, an on-chip CPU, DMA channels, and a firmware image for each port. These features enable complete port-level isolation, prevent errors and firmware crashes from propagating across all ports, and provide predictable and scalable performance across all ports. The Marvell architecture delivers ultimate reliability to meet the needs of mission-critical enterprise applications, with lower power and fewer CPU cycles, while maintaining peak performance. See Figure 1.

In addition, overlapping protection domains (OPDs) ensure the highest level of reliability as data moves to and from the PCI bus and FC network.

The 2740/2760 Series Adapters 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.

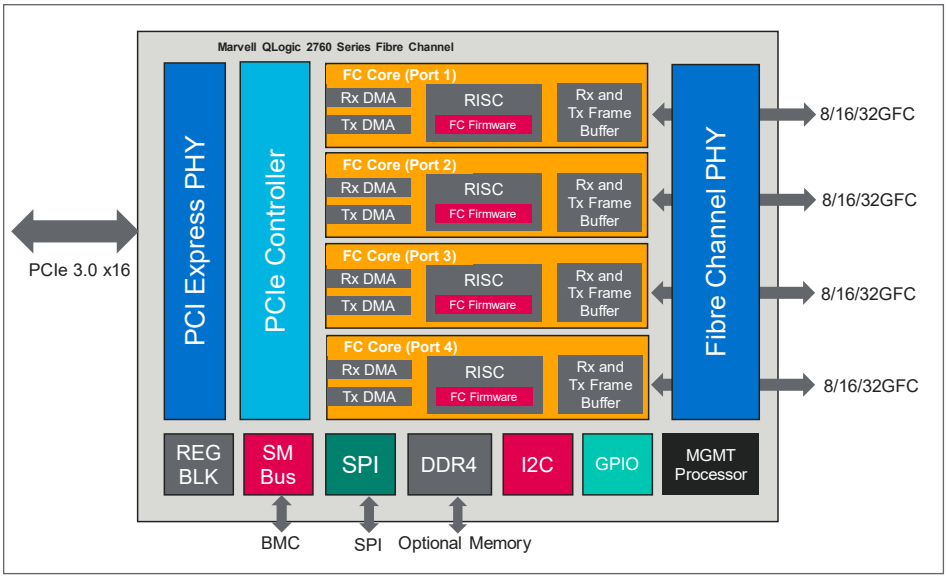


Figure 1. 2760 Series Adapter Block Diagram

Leadership, Confidence, and Trust

The Marvell QLogic 2740/2760 Series Adapters 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 32GFC, these adapters are backward compatible with existing 16GFC and 8GFC infrastructure, leveraging existing SAN investments.

Marvell is the undisputed leader in FC adapters, with over 20 years of experience, 20+ million ports shipped, and 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

- QLE2740: PCI Express® (PCIe) 3.1 × 8 (single-port)
- QLE2742: PCIe 3.1 × 8 (dual-port)
- QLE2764: PCIe 3.1 × 16 (quad-port)

Host Interrupts

- INTx and MSI-X

Compliance

- *PCIe Base Specification*, rev. 3.1
- *PCIe Card Electromechanical Specification*, rev. 3.0
- *PCI Bus Power Management Interface Specification*, rev. 1.2
- *PCI Hot Plug Specification*, rev. 1.1

Fibre Channel Specifications

Throughput

- 6,400MBps full duplex line rate per port

Logins

- Support for 2,048 concurrent logins and 2,048 active exchanges per port
- Expandable to 32K concurrent logins and 32K active exchanges (QLE2764)

Port Virtualization

- NPIV

Compliance

- *SCSI Fibre Channel Protocol 4 (FCP-4)*
- *Fibre Channel Tape (FC-TAPE) Profile*
- *Fibre Channel Generic Services 8 (FC-GS-8)*
- *Fibre Channel-Physical Interface-5 (FC-PI-5)*
- *Fibre Channel-Physical Interface-6 (FC-PI-6)*
- *Fibre Channel Link Services 4 (FC-LS-5)*
- *Fibre Channel Framing and Signaling 5 (FC-FS-5)*
- *Fibre Channel NVMe-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

Operating Systems

- For the latest applicable operating system information, see www.marvell.com

End-to-End Provisioning and Management Features

The following features require a supported Brocade or Cisco switch.

Performance

- QoS CS_CTL
- FEC for 16GFC
- BB-CR: automatic buffer credit loss detection and recovery

Diagnostics

- Diagnostics Port
- LCB
- RDP

Deployment and Management

- FA-WWN
- F-BLD
- FC ping
- FC traceroute
- VM-ID
- Fabric device management interface (FDMI) enhancements

Physical Specifications

Ports

- QLE2740: single-port 32GFC
- QLE2742: dual-port 32GFC
- QLE2764: quad-port 32GFC

Form Factor

- QLE2740: low profile PCIe card (6.6 inches × 2.731 inches)
- QLE2742: low profile PCIe card (6.6 inches × 2.731 inches)
- QLE2764: standard height PCIe card (6.6 inches × 4.38 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)

Humidity

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

Cable Distances

- Multimode optic:

Rate	Cable and Distance (m)		
	OM2	OM3	OM4/OM5
8GFC	50	150	190
16GFC	35	100	125
32GFC	20	70	100

Agency Approvals—Safety

US and Canada

- UL 60950-1
- CSA C22.2

Europe

- TUV EN60950-1
- TUV IEC 60950-1
- CB Certified

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

- EN55022
- EN55024
- EN61000-3-2
- EN61000-3-3

Japan

- VCCI: Class A

New Zealand and Australia

- AS/NZS: Class A

Korea

- KC-RRA Class A

Taiwan

- BSMI CNS 13438

Ordering Information

QLE2740-SR-CK (Single Port)

- Ships in an individually packed box with a standard-height bracket installed
- Ships with SR optical transceiver installed

QLE2742-SR-CK (Dual Port)

- Ships in an individually packed box with a standard-height bracket installed
- Ships with SR optical transceivers installed

QLE2764-SR-CK (Quad Port)

- Ships in an individually packed box with a standard-height bracket installed
- Ships with SR optical transceivers installed

MARVELL

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 for 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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