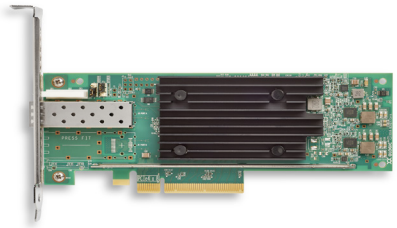
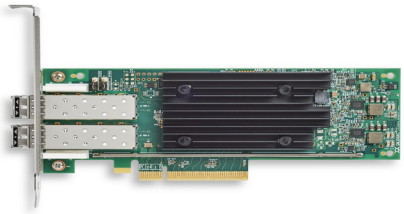
Marvell® QLogic® 2870 Series

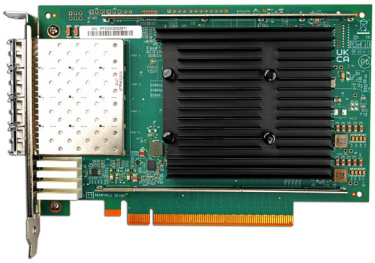
High Performance, Secure, 64GFC PCIe 4.0 to Fibre Channel Adapters



Single Port: QLE2870



Dual Port: QLE2872



Quad Port: QLE2874

- Up to 50% higher IOPS and twice the throughput of total full duplex over previous generations
- Improve database transactional performance, enable faster business decisions with up to 2x faster data mining, and host more VMs
- Advanced security features for Zero Trust Architecture, including CNSA secure boot and signed drivers
- Silicon Root of Trust ensures SAN Integrity with Cryptographically Secured Firmware

The Marvell QLogic 2870 Series Adapters are high performance and low latency PCIe 4.0, 64-Gigabit Fibre Channel (GFC) Host Bus Adapters (HBAs) that secure mission critical data with silicon Root of Trust (RoT). The adapters are available in single, dual, and quad ports across PCIe standard form factors with industry leading performance, high bandwidth, and low latency.

Leveraging over 20 years of Fibre Channel (FC) expertise, the Marvell QLogic 2870 Series 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), while leveraging their investment in nonvolatile memory express (NVMe™)-based all flash arrays. Marvell QLogic 2870 Series FC (64GFC) HBAs provide full backward compatibility with previous generations of 32GFC and 16GFC SANs.

64Gb Fibre Channel Technology

Standardized by the INCITS T11, 64GFC creates the fastest single-lane Fibre Channel networking speed, delivering real world storage performance of up to 12,800MBps full duplex over a single lane serial SFP+ cable interface. Marvell QLogic's 2870 Series of 64GFC HBAs deliver standards compliant line rate performance for connecting NVMe, flash, and legacy disk storage to business critical applications running in the private cloud, telco, and mega data center.

Firmware Integrity With PQC Silicon Root of Trust

Marvell, the pioneers in security and data encryption was the first to address the silicon RoT issue with the Marvell QLogic 2870 Series Adapters which prevent malicious firmware from hijacking the FC HBA.

Securing data center infrastructure from application software all the way down to firmware and hardware components of server platforms - where malicious attacks are most difficult to detect, Marvell QLogic 2870 Series adapters offer advanced security features including post quantum cryptography (PQC) incorporated into silicon RoT, secure boot, and digitally signed drivers. This provides integrity and authenticity checks during adapter firmware updates by validating firmware embedded signatures with hardware embedded keys to ensure that only trusted firmware executes, and protecting firmware updates that are applied over public networks.

- Improve scale out NVMe efficiencies by delivering concurrent support for FCP and FC-NVMe
- Automated SAN Congestion Mitigation (USCM) helps pinpoint and prevent SAN Congestion utilizing Fabric Performance Indication Notification (FPIN) technology
- Supports PCIe 4.0 systems
- Marvell StorFusion™ technology accelerates deployment, simplifies diagnostics, enhances reliability, and optimizes performance
- Port isolation design delivers deterministic and scalable performance on each port while improving reliability

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 2870 Series Adapters support low-latency access to scale out NVMe with full support for the FC-NVMe protocol. The 2870 Series 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 2870 Series FC Adapters bring the best of both worlds by offering up to 4 million IOPS and line rate 64GFC performance, while delivering low-latency access to NVMe and SCSI storage over a Fibre Channel network.

Fully Featured FC Technology

Marvell QLogic FC technology provides a featured 64GFC adapter product line, designed to meet and exceed the requirements of modern SANs. Marvell's FC solution offers industry leading performance, while its power-efficient, port-isolated design enables data centers to reduce their carbon footprint.

Marvell QLogic 2870 Series FC HBAs resolve data center complexities by enabling a storage network infrastructure that supports powerful virtualization features like N_Port ID virtualization (NPIV), application-aware services with standards based quality of service (QoS), on-the-fly firmware updates (no reboot), and simplified management.

Marvell StorFusion technology delivers streamlined provisioning, 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

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

The Marvell QLogic 2870 Series Adapters 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.

High Performance With Universal SAN Congestion Mitigation (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.

Marvell automates the industry standard Fabric Performance Impact Notifications (FPINs), as Marvell's QLogic 2870 Series Adapters' USCM Technology works both independently and in coordination with Brocade and Cisco MDS FC fabrics to avoid SAN congestion by enabling congestion detection, notification, and mitigation. Marvell QLogic 2870 Series 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 2870 Series HBAs are also capable of receiving FC primitive signaling in cases when the FPIN notifications cannot be delivered due to heavy congestion.

Ease of Mangement with QConvergeConsole (QCC)

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 efficiency flexibility and integration with third-party management tools, including the VMware vCenter™.

Unparalleled Insight and QoS for Virtualized Deployments

The Marvell 2870 Series Adapters support several standards-based virtualization features that optimize virtual server efficiency, troubleshooting, and application performance.

Marvell QLogic virtual machine ID (VM-ID) technology seamlessly integrates with Brocade and Cisco switches to allow customers to effectively monitor and manage QoS in 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 7.x or 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

Marvell FC Adapters 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.

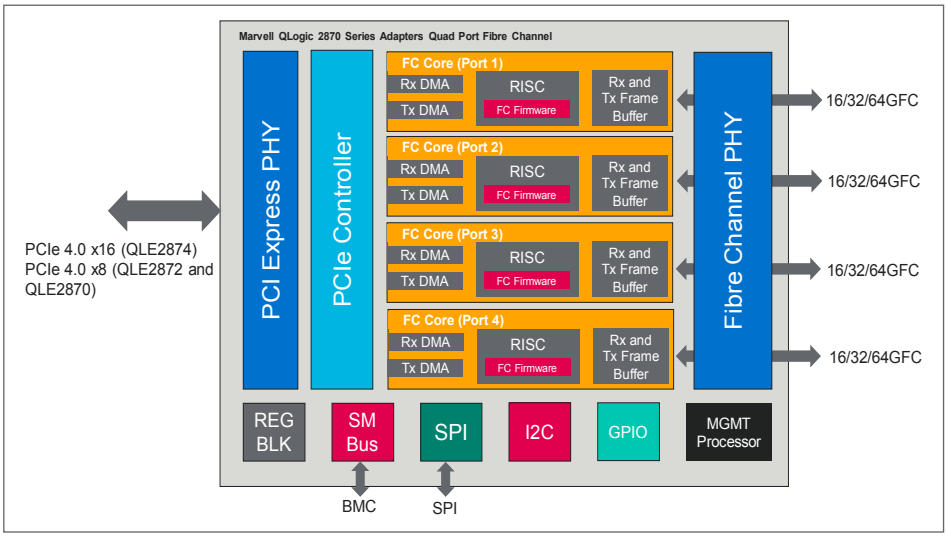


Figure 1. Marvell QLogic 2870 Series Adapters Block Diagram

The 2870 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.

Pioneers and Leaders in Fibre Channel Security, Data Encryption, and FC-NVMe

The Marvell 2870 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 64GFC, these adapters are backward compatible with existing 32/16GFC infrastructure, leveraging existing SAN investments.

Marvell QLogic is the undisputed leader in FC adapters, with over 20 years of market history and more than 22 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

- QLE2870: PCIe 4.0 ×8 (single-port)
- QLE2872: PCIe 4.0 ×8 (dual-port)
- QLE2874: PCIe 4.0 ×16 (quad-port)

Host Interrupts

- INTx and MSI-X

Compliance

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

Fibre Channel Specifications

Negotiation

- 64/32/16GFC auto-negotiation

Throughput

- 12,800MBps full duplex line rate per port(maximum)

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-PI5)*
- *Fibre Channel-Physical Interface-6 (FC-PI6)*
- *Fibre Channel Link Services 4 (FC-LS-4)*
- *Fibre Channel Framing and Signalling-4 (FC-FS-4)*
- *Fibre Channel-NVMe-2 (FC-NVMe-2)*

Zero Trust Architecture Security Features

- Post-Quantum Silicon Root of Trust (ECDSA-384P)
- Secure boot and signed drivers
- CNSA (Commercial National Security Algorithm Suite) Compliant

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

Boot Support

- Unified Extensible Firmware Interface (UEFI)
- Supports secure boot

APIs

- SNIA HBA API V2
- SMI-S

Operating Systems

- For the latest applicable operating system information, see 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
- FPIN and hardware signaling for Congestion Management

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

- QLE2870: single-port FC
- QLE2872: dual-port FC
- QLE2874: quad-port FC

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)
- Quad port: 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
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

Japan

- VCCI: Class A

New Zealand and Australia

- AS/NZS: Class A

Korea

- KC-RRA Class A

Taiwan

- BSMI CNS 13438

UK

- UKCA

Ordering Information

QLE2870-SR-SP (Single Port)
QLE2870-SR-BK (Single Port)

- Ships with a standard-height bracket installed
- Ships with 64GFC SR optical transceiver installed

QLE2872-SR-SP (Dual Port)
QLE2872-SR-BK (Dual Port)

- Ships with a standard-height bracket installed
- Ships with 64GFC SR optical transceivers installed

QLE2874-SR-SP (Quad Port)
QLE2874-SR-BK (Quad Port)

- Ships with a standard-height bracket installed
- Ships with 64GFC 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 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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