

Marvell® QLogic® EP2814/2812 Controllers

64GFC Fibre Channel Controllers



- Performance of up to 4 million IOPS and 51,200MBps of bidirectional throughput for four ports to fuel high performance in flash arrays and virtualized environments
- Hardware Root of Trust ensures SAN Integrity with Cryptographically Secured Firmware
- Improve scale out NVMe efficiencies by delivering concurrent support for FCP and FC-NVMe
- Port isolation design delivers deterministic and scalable performance on each port
- Improve database transactional performance, enable faster business decisions with up to 2x faster data mining, and host more VMs

The Marvell QLogic EP2814/2812 are 64-Gigabit Fibre Channel (GFC) Controllers that secure mission critical data and hardware based Root of Trust (RoT). The controllers are available in dual and quad port models.

Leveraging over 20 years of experience, the EP2814/2812 Fibre Channel (FC) Controllers are designed from the ground up for customers looking to accelerate databases, implement 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 EP2814/2812 Controllers provide full backward compatibility to 32GFC and 16GFC SANs.

Firmware Integrity Protection With Hardware Root of Trust

Security threats continue to evolve and increase, driving Chief Information Officers towards securing the system all the way down to the firmware at the lowest layers of the system platform, where attacks are the most difficult to detect. To address this issue, the Marvell QLogic EP2814/2812 Controllers incorporate a hardware RoT that prevents malicious firmware from hijacking the FC controller. The EP2814/2812 Controllers RoT enables both integrity and authenticity during firmware updates by both validating firmware embedded signatures with hardware embedded keys to ensure that only bonafide firmware executes, and protecting firmware updates that are applied over public networks.

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 EP2814/2812 Controllers support low-latency access to scale out NVMe All Flash Arrays (AFAs) with full support for the FC-NVMe-2 protocol. The EP2814/2812 Controllers 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 EP2814/2812 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.

- StorFusion™ technology simplifies deployment and troubleshooting
- Supports PCIe Gen 4
- Available in dual and quad-port versions

Fully Featured FC Technology

Marvell QLogic 64GFC technology provides the industry's most fully featured 64GFC controller, designed to meet and exceed the requirements of modern SANs. Marvell's FC solution offers 50-percent higher per-port performance (1 million IOPS/port) than previous generations; and its power-efficient, port-isolated design enables data centers to reduce their carbon footprint.

Marvell QLogic EP2814/2812 FC Controllers 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), 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

Powered by StorFusion technology, Marvell QLogic FC Controllers are capable of supporting advanced features 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.

Marvell Universal SAN Congestion Mitigation Technology (USCM)

SAN congestion, although rare, has the potential to quickly spread and significantly disrupt application performance, leading to lost business. Modern SANs, specifically those with flash storage and mix of Fibre Channel endpoint speeds, can be prone to congestion. SAN congestion typically occurs when slower FC endpoints cannot accept responses generated by flash/NVMe storage, a condition referred to as oversubscription/over-utilization. Rarely, a misbehaving FC device can also lead to SAN congestion when it is unable to replenish credits that are key to reliable Fibre Channel transmissions, a condition referred to as slow-drain. SAN congestion, when timely detected, can be isolated and decisive actions applied. A Fibre Channel standard, Fabric Performance Impact Notifications (FPINs), brings congestion awareness to FC endpoints.

Utilizing FPINs, Marvell's QLogic EP2814/2812 Controllers implement Universal SAN Congestion Mitigation Technology (USCM). USCM uniquely works both Brocade and Cisco SAN fabrics to keep applications running at peak performance by providing an in-band and zero touch SAN congestion detection, notification, and avoidance system. QLogic EP2814/2812 Controllers interact with Cisco and Brocade SANs using both the more reliable FC primitive signaling as well as protocol events to bring awareness of the presence of congestion, peer congestion, link integrity, lost frames, etc.

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 Marvell QLogic EP2814/2812 Controllers support link cable beacon (LCB) technology, which enables administrators to visually identify both ends of a physical link.

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 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.

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 worldwide 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.

Unparalleled Insight and QoS for Virtualized Deployments

The Marvell QLogic EP2814/2812 Controllers are capable of supporting 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 and Cisco switches to enable implementations that support monitoring and managing Fibre Channel storage networks, as well as load balancing VM clusters with storage to ensure efficient use of the storage resources. Supported for VMware ESXi 6.0 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 controller 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 Controllers provide complete port-level isolation across the FC controller architecture. This unique architecture provides an independent protocol handling

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.

The EP2814/2812 Controllers 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.

Leadership, Confidence, and Trust

The Marvell QLogic EP2814/2812 Controllers are supplied with an FC software driver stack that has been tested and validated across all major hardware platforms. Operating at 64GFC, these controllers are backward compatible to existing 32/16GFC infrastructure, leveraging existing SAN investments.

Marvell is the undisputed leader in FC controllers, with over 20 years of market share leadership and 20 million ports shipped, and multiple generations of FC products that have been qualified by all major server and storage 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

- EP2814: Up to PCI Express Gen 4 ×16
- EP2812: Up to PCI Express Gen 4 ×8

Host Interrupts

- INTx and MSI-X

Compliance

- *PCIe Base Specification*, rev. 4.0
- *PCIe Card Electromechanical Specification*, rev. 4.0
- *PCI Hot Plug Specification*, rev. 1.1

Fibre Channel Specifications

Negotiation

- EP2814: Quad-port 64/32/16GFC autonegotiation
- EP2812: Dual-port 64/32/16GFC autonegotiation

Throughput

- 12,800MBps 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 with external DDR4 (EP2814)

Port Virtualization

- N_Port ID virtualization

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-4)*
- *Fibre Channel Framing and Signaling-5 (FC-FS-5)*
- *Fibre Channel Non-Volatile Memory Express-2 (FC-NVMe-2)*

Controller Specifications

Port Configurations

- EP2814: Four 64GFC ports
- EP2812: Two 64GFC ports

Controller Specifications (continued)

Memory

- Integrated SRAM for FC applications
- 8/16-bit, ECC-protected, single or double DDR4 interface to external SDRAM (optional) EP2814

Temperature

- Operating: 105°C maximum junction temperature
- Storage: -45°C to 125°C

Airflow

- System-design dependent

RoHS Compliance

- Green (RoHS 6 compliant and halogen free)

Packaging

- EP2814
 - 29mm × 29mm, 1152 ball (lidless flip chip ball grid array)
 - 0.8mm ball pitch
- EP2812
 - 21mm × 21mm, 621 ball (lidless flip chip ball grid array)
 - 0.8mm ball pitch

End-to-End Provisioning and Management Features

The following features require a supported Brocade or Cisco switch.

Performance

- QoS CS_CTL
- FEC for 16GFC and 32GFC
- Fabric Performance Impact Notification (FPIN)
- 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

Ordering Information

EP2814

- Quad-port, 64GFC embedded controller for storage target applications
- Ships with a minimum order of 128 devices (32 devices per tray × 4 trays)

EP2812

- Dual-port, 64GFC embedded controller for storage target applications
- Ships with a minimum order of 240 devices (60 devices per tray × 4 trays)



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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