The QLogic FastLinQ® QL41164HxRJ Converged Network Adapter (CNA) with Universal Remote Direct Memory Access (RDMA) leverages QLogic’s eighth-generation technology to deliver 10Gbps Ethernet performance. Integrated, advanced networking eliminates I/O bottlenecks and conserves CPU cycles. Optimized for use across enterprises, managed service providers (MSPs), and large public and scalable public cloud deployments, the QL41164HxRJ enables organizations to achieve new levels of performance in physical, virtual, and cloud environments.

The 10Gb Ethernet (10GbE) specification enables network bandwidth to be cost-effectively scaled in support of next-generation server and storage solutions residing in cloud and Web-scale data center environments.

The FastLinQ QL41164HxRJ 10GbE Adapter delivers advanced Ethernet solutions that are designed to meet requirements from leading enterprise and cloud providers. QLogic features that collectively deliver the most advanced 10GbE adapter include:

- Cutting-edge server virtualization technologies—single-root I/O virtualization (SR-IoV) and switch independent NIC partitioning (NPAR)
- Network virtualization—offloads for Virtual Extensible LAN (VXLAN), Generic Network Virtualization Encapsulation (GENEVE), and Network Virtualization using Generic Routing Encapsulation (NVGRE)
- Universal RDMA technologies—RDMA over converged Ethernet (RoCE), RoCEv2, iSCSI extensions for RDMA (iSER), and Internet wide area RDMA protocol (iWARP)

The QLogic FastLinQ QL41164HxRJ 4-port 10GBASE-T Converged Network Adapter with iSCSI, FCoE, and Universal RDMA with Universal RDMA—Delivers choice and flexibility with concurrent support for RoCE, RoCEv2 and iWARP technologies
- Secure firmware update process with private/public key encryption technology prevents hackers from altering adapter
- Increase VM density and accelerate multitenant networks with full offload for tunneling protocols
- Accelerate the most demanding telco NFV workloads with QLogic® DPDK high-speed packet processing engine
- Orchestrate and manage hyperscale OpenStack deployments with QLogic cloud-enabled management framework
- Supports NVMe-oF, iSCSI, and FCoE offloaded storage operation

REDUCE CAPITAL EXPENDITURE AND OPERATING EXPENSE

FastLinQ QL41164HxRJ 10GbE technology delivers excellent price-per-gigabit value. This technology enables cloud providers and large-scale data center operators to reduce operating expense while continuing to scale their network of server and storage nodes to meet increasing demands of the future.

ACCELERATE ANY NETWORK WITH UNIVERSAL RDMA OFFLOAD

The FastLinQ QL41164HxRJ 10GbE Adapter supports RoCE and iWARP acceleration to deliver low latency, low CPU usage, and high performance on Windows Server® Message Block (SMB) Direct 3.0 and 3.02, Windows Server Storage Spaces Direct (S2D), and iSER. The QL41164HxRJ 10GbE Adapter has the unique ability to deliver Universal RDMA that enables RoCE, RoCEv2, and iWARP. QLogic Universal RDMA and emerging low latency I/O bus mechanisms, such as network file system over RDMA (NFSoRDMA), and NVMe Express® (NVMe™) over fabric (NVMe-oF) allow customers to accelerate access to data. QLogic’s cutting-edge offloading technology increases cluster efficiency and scalability to many thousands of nodes.
HIGH DENSITY SERVER VIRTUALIZATION
The latest hypervisors and multicore systems use several technologies to increase the scale of virtualization. The QLogic FastLinQ QL41164HxRJ 10GbE Adapter supports:

- VMware® NetQueue
- Windows® Hyper-V® Virtual Machine Queue (VMQ)
- Linux® Multiqueue
- Windows, Linux, and VMware switch-independent NPAR
- Windows Hyper-V, Linux Kernel-based Virtual Machine (KVM), and VMware ESXi SR-IOV

These features provide ultimate flexibility, quality of service (QoS), and optimized host and virtual machine (VM) performance while providing full 10Gbps bandwidth per port. Public and private cloud virtualized server farms can now achieve VM density for the best price and VM ratio.

WIRE-SPEED NETWORK VIRTUALIZATION
Enterprise-class data centers can be scaled using overlay networks to carry VM traffic over a logical tunnel using NVGRE, VXLAN, and GENEVE. Although overlay networks can resolve virtual local area network (VLAN) limitations, native stateless offloading engines are bypassed, which places a greater load on the system’s CPU. The FastLinQ QL41164HxRJ 10GbE Adapter efficiently handles this load with advanced NVGRE, VXLAN, and GENEVE stateless offload engines that access the overlay protocol headers. This access enables traditional stateless offloads of encapsulated traffic with native-level performance in the network. Additionally, the FastLinQ QL41164HxRJ Adapter supports VMware NSX® and Open vSwitch (OVS).

HYPER-SCALE ORCHESTRATION WITH OPENSTACK
The FastLinQ QL41164HxRJ 10GbE Adapter supports the OpenStack open source infrastructure for constructing and supervising public, private, and hybrid cloud computing platforms. The OpenStack infrastructure provides for both networking and storage services (block, file, and object) for iSER. These platforms allow providers to rapidly and horizontally scale VMs over their entire, diverse, and widely spread network architecture to meet the real-time needs of their customers. QLogic’s integrated, multiprotocol management utility, QConvergeConsole® (QCC), provides breakthrough features that allow customers to visualize the OpenStack-orchestrated data center using autodiscovery technology.

ACCELERATE TELCO NETWORK FUNCTION VIRTUALIZATION (NFV) WORKLOADS
In addition to OpenStack, the FastLinQ QL41164HxRJ 10GbE Adapter supports NFV, which enables the decoupling of network functions and services from dedicated hardware (such as routers, firewalls, and load balancers) into hosted VMs. NFV enables network administrators to flexibly create network functions and services as they need them, reducing capital expenditure and operating expenses, and enhancing business and network services agility.

TRUSTED, SECURE, RELIABLE, AND INTEROPERABLE
The FastLinQ QL41164HxRJ 10GbE Adapter adheres to standards that ensure interoperability with a wide range of network solutions. QLogic adapters are secure by design. Through public and private key encryption technology, the adapter enforces a process for secure firmware updates that prevent hackers from altering the code running on the adapter.

Note: All advertised features are enabled in the hardware. Actual feature availability is dependent on software driver releases. See the release notes.
QLic FastLinQ QL41164HxRJ

Host Bus Interface Specifications

Bus Interface
- PCI Express (PCIe) Gen3 x8, Gen2 x8 (electrical)

Host Interrupts
- MSI-X

I/O Virtualization
- SR-IOV (up to 192 virtual functions)
- NPAR (up to 16 physical functions)

Compliance
- PCI Express Base Specification, rev. 3.1
- PCI Express Card Electromechanical Specification, rev. 3.0
- PCI Bus Power Management Interface specification, rev. 1.2

Ethernet Specifications

Throughput
- 10Gbps line rate per-port in 10GbE mode

Ethernet Frame
- Standard MTU sizes and jumbo frames up to 9,600 bytes

Stateless Offload
- IP, TCP, and user datagram protocol (UDP) checksum offloads
- TCP segmentation offload (TSO)
- Large send offload (LSO)
- Giant send offload (GSO)
- Large receive offload (LRO)
- Receive segment coalescing (RSC) (Windows)
- Receive side scaling (RSS)
- Transmit side scaling (TSS)
- Interrupt coalescing
- VMware NetQueue, Microsoft Hyper-V VMQ, and Linux Multiqueue
- Universal RDMA

Tunneling Offloads
- Virtual Extensible LAN (VXLAN)
- Network Virtualization using Generic Routing Encapsulation (NVGRE)
- Generic Network Virtualization Encapsulation (GENEVE)

Compliance
- IEEE Specifications:
  - 802.3-2015 (10Gb) Ethernet Flow Control
  - 802.3-2015 Clause 55 (10GBASE-T)
  - 802.1q (VLAN)
  - IPv4 (RFC 791)
  - IPv6 (RFC 2460)
  - 1588-2002 PTPv1 (Precision Time Protocol)
  - 802.1AS/1588-2008 PTPv2

Board Firmware Features
- Secure Firmware Update process

RDMA Specifications

Universal RDMA
- RoCE
- RoCEv2
- iWARP
- Storage over RDMA: iSER, SMB Direct, S2D, and NVMe over Fabrics
- NISoRDMA

FCoE Specifications

N_Port ID Virtualization (NPIV) on Linux, Windows, VMware
- Technical Committee T11 in the Fibre Channel - Link Services (FC-LS) specification

Performance
- Up to 3.6 million FCoE IOPS

iSCSI Specifications

Performance
- Up to 2.9 million iSCSI IOPS

Tools and Utilities

Management Tools and Device Utilities
- QLogic Control Suite integrated network adapter management utility (CLI) for Linux and Windows
- QConvergeConsole (QCC) integrated network management utility (GUI) for Linux and Windows
- QCC Plug-ins for vSphere (GUI) and ESXCLI plug-in for VMware
- QCC PowerKit (Windows PowerShell®) cmdlets for Linux and Windows
- Pre-boot unified extendible firmware interface (UEFI) Device Configuration pages in system BIOS
- Native OS management tools for networking

Boot Support
- UEFI
- Pre-execution environment (PXE) 2.0
- iPXE
- iSCSI remote boot
- FCoE remote boot

APIs
- SNIA HBA API v2, and SMI-S

Operating Systems
- For the latest applicable operating system information, see http://www.dell.com/support/home/us/en/4

Ports
- Quad 10Gbps Ethernet: RJ-45

Form Factor
- Low-profile PCIe card (6.60in. × 2.71in.)

Environment and Equipment Specifications

Temperature
- Operating: 0°C to 55°C (32°F to 131°F)
- Storage: –40°C to 65°C (–40°F to 149°F)

Airflow
- 250LFM at 55°C

Humidity
- Operating: 10% to 80%
- Storage: 5% to 90%

Connectivity
- RJ-45, 100m twisted pair

Agency Approvals—Safety

US/Canada
- UL 60950-1
- CSA C22.2

Europe
- TUV EN60950-1
- TUV IEC 60950-1
- CB Certified
QLLogic FastLinQ QL41164HxRJ

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

US/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/Australia
- AS/NZS: Class A

Korea
- KC-RFA Class A

Taiwan
- BSMI CNS 13438

Compliance
- RoHS compliant

Ordering Information

QL41164HxRJ-DE-BK
- 33M0K full-height bracket installed
- RJ45 connectors for unshielded twisted pair cable

QL41164HxRJ-DE-BK
- JKT42 low-profile bracket installed
- RJ45 connectors for unshielded twisted pair cable

1 Agency approvals have not been authorized at the time of publication; this list is preliminary.