QLogic FastLinQ QL41164HMRJ-DE

Four-port 10Gbps Ethernet Converged Network Adapter with Universal RDMA

OVERVIEW

The QLogic® FastLinQ® QL41164HMRJ-DE four-port Converged Network Adapter (CNA) with Universal remote direct memory access (RDMA) leverages QLogic’s technology to deliver true 10G bits (10GbE) bits per second 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 QL41164HMRJ-DE enables organizations to achieve new levels of performance in physical, virtual, and cloud environments.

The 10Gbps 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. QLogic is a leading innovator driving 10GbE and higher speed Ethernet technologies across enterprise and cloud market segments.

The QL41164HMRJ-DE 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 NIC
• Network virtualization—offloads for Virtual Extensible LAN (VXLAN), Generic Network Virtualization Encapsulation (GENEVE), and Network Virtualization using Generic Routing Encapsulation (iWGRE)
• Universal RDMA technologies—RDMA over Converged Ethernet (RoCE), RoCEv2, iSCSI Extensions for RDMA (iSER), and Internet wide area RDMA protocol (iWARP)
• Supports FCoE and iSCSI stateless offload operation
• Provides extremely low host CPU usage by enabling full hardware offloads
• Industry’s most powerful four-port 10GbE rack-mount server network daughter card (rNDC) adapter
• Universal RDMA—Delivers choice and flexibility with concurrent support for RoCE, RoCEv2 and iWARP technologies
• Supports FCoE and iSCSI stateless offload operation
• Fully offloaded virtualization tunneling protocols for increased VM density and accelerated multitenant networks
• Secure firmware update with private/public key encryption to prevent rogue firmware installations and enhance security

See note on page 3.
**REDUCE CAPITAL EXPENDITURE AND OPERATING EXPENSE**
FastLinQ QL41164HMRJ-DE 10GbE technology delivers true 10 gigabits per second. 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. QLogic 10GbE technology is cost-efficient and power-efficient. All four ports support the Energy Efficient Ethernet™ (EEE) reduced idle power consumption protocol.

**ACCELERATE ANY NETWORK WITH UNIVERSAL RDMA OFFLOAD**
The FastLinQ QL41164HMRJ-DE 10GbE adapter supports RoCE and iWARP acceleration to deliver low latency, low CPU utilization, and high performance. These features are supported on Windows Server Message Block (SMB) Direct 3.0 and 3.02, Windows Server Storage Spaces Direct (S2D), Windows Server Live Migration, VMware paravirtualized RDMA (pvRDMA), and Linux/VMware iSER. QL41164HMRJ-DE 10GbE adapters have the unique capability 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 Non-Volatile Memory Express (NVMe™) 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 QL41164HMRJ-DE adapter supports:

- VMware® NetQueue
- Windows® Hyper-V Virtual Machine Queue (VMQ)
- Linux® Multiqueue
- Windows, Linux, and VMware switch-independent NIC partitioning (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 10GbE bandwidth per port.

**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 LAN (vLAN) limitations, native stateless offloading engines are bypassed, which places a higher load on the system’s CPU. The QL41164HMRJ-DE 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 QL41164HMRJ-DE 10GbE adapter supports VMware NSX and Open vSwitch (OVS).

**HYPER-SCALE ORCHESTRATION WITH OPENSTACK**
The FastLinQ QL41164HMRJ-DE 10GbE adapter supports the OpenStack® open source infrastructure for constructing and supervising public, private, and hybrid cloud computing platforms. It 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 auto-discovery technology.

**ACCELERATE TELCO NETWORK FUNCTION VIRTUALIZATION (NFV) WORKLOADS**
In addition to OpenStack, the FastLinQ QL41164HMRJ-DE adapter supports NFV that allows 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. QLogic 10GbE technology is integrated into the Data Plane Development Kit (DPDK) and can deliver up to 9 million packets per second per port on 10GbE interfaces and a maximum line rate of approximately 1.5 million packets per second on 1GbE interfaces to host the most demanding NFV workloads.

**TRUSTED, SECURE, RELIABLE, AND INTEROPERABLE**
The FastLinQ QL41164HMRJ-DE 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.
Host Bus Interface Specifications

Bus Interface
- PCI Express (PCIe) Gen 3 x8, Gen 2 x8 (electrical)

Host Interrupts
- MSI-X

I/O Virtualization
- SR-IOV (up to 192 virtual functions)
- NPAR (up to 16 physical functions, 4 per port)

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 (generic) send (segmentation) offload (GSO)
- Large receive offload (LRO): receive segment coalescing (RSC) for Windows
- Generic receive offload (GRO) for Linux
- Receive side scaling (RSS)
- Transmit side scaling (TSS)
- Interrupt coalescing
- VMware® NetQueue, Microsoft® Hyper-V® VMQ (up to 208 dynamic queues), and Linux Multiqueue
- Universal RDMA

RDMA Specifications

Universal RDMA
- RoCE
- RoCEv2
- iWARP
- Storage over RDMA: ISER, SMB Direct S2D, and NVMe over Fabrics (NVMe-oF)
- NFSvRDMA

FCoE Specifications

Performance
- 2.4 million FCoE IOPS (one port)
- 3.6 million FCoE IOPS (two or more ports)

iSCSI Specifications

Performance
- 2.4 million iSCSI IOPS (one port)
- 2.9 million iSCSI IOPS (two or more ports)

Tools and Utilities

Management Tools and Device Utilities
- QLogic Control Suite™ integrated network adapter management utility (CLI) for Linux and Windows
- QConvergeConsole integrated network management utility (GUI) for Linux and Windows
- QConvergeConsole Plug-ins for vSphere (GUI) and ESXCLI plug-in for VMware
- QConvergeConsole PowerKit (Windows PowerShell®) cmdlets for Linux and Windows
- Native OS management tools for networking
- Support for Linux/Windows/VMware in OS NIC Teaming/Bonding driver utilities
- SNMP support for the Integrated Dell Remote Access Controller (iDRAC) and other application tools

Boot Support
- Unified extensible firmware interface (UEFI)
- Pre-execution environment (PXE) 2.0
- FCoE Boot from SAN
- iSCSI remote boot

APIs
- SNIA HBA API v2
- SMI-S

Operating Systems
- For the latest applicable operating system information, see support.dell.com

Physical Specifications

Ports
- Four ports 10Gbps Ethernet; RJ45 connectors

Form Factor
- Rack NDC

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)

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

Connectivity
- CAT6a/7 up to 100 meters

Note:
All advertised features are enabled in the hardware. Actual feature availability is dependent on software driver releases. See the release notes. Picture may not be representative of the final shipping product.
### Agency Approvals—Safety

**US and Canada**
- UL 60950-1
- CSA C22.2

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

### Agency Approvals¹—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

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

### Compliance

- RoHS compliant

### Ordering Information

- **QL41164HMRJ-DE-BK**
  - Four ports RJ45 twisted-pair copper
  - Bulk Kit (BK)