QLogic FastLinQ QL41164HMCU-DE

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

OVERVIEW

The QLogic® FastLinQ QL41164HMCU-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 QL41164HMCU-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 QL41164HMCU-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:

- 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
- FastLinQ® SmartAN™ for simplified connectivity with switches without user intervention
- Secure firmware update with private/public key encryption to prevent rogue firmware installations and enhance security

The QLogic FastLinQ QL41164HMCU-DE is a four-port 10Gbps Ethernet Converged Network Adapter with Universal RDMA.
**REDUCE CAPITAL EXPENDITURE AND OPERATING EXPENSE**
FastLinQ QL41164HMCU-DE 10GbE technology delivers true 10 gigabits per second Ethernet. 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.

**ACCELERATE ANY NETWORK WITH UNIVERSAL RDMA OFFLOAD**
The FastLinQ QL41164HMCU-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. QL41164HMCU-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 QL41164HMCU-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-10V

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 QL41164HMCU-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 QL41164HMCU-DE 10GbE adapter supports VMware NSX and Open vSwitch (OVS).

**HYPER-SCALE ORCHESTRATION WITH OPENSTACK**
The FastLinQ QL41164HMCU-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 QL41164HMCU-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 to host the most demanding NFV workloads.

**TRUSTED, SECURE, RELIABLE, AND INTEROPERABLE**
The FastLinQ QL41164HMCU-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 (electrical portion of the specification)
- 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) for Windows receive segment coalescing (RSC)
- 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

Tunneling Offloads
- VXLAN
- NVGRE
- GENEVE

Compliance
- IEEE Specifications:
  - 802.1AS/1588-2008 PTPv2
  - 802.1AX (Link Aggregation)
  - 802.1q (VLAN)
  - 802.1Qaz (DCBX and ETS)
  - 802.1Qbb (Priority-based Flow Control)
  - 802.3-2015 (10Gb Ethernet flow control)
  - 802.3-2015 Clause 52 (10Gb Ethernet optical)
  - 802.3ae (10Gb Ethernet)
  - 1588-2002 PTPv1 (Precision Time Protocol)
  - SFF8431 Annex E (10Gb Direct Attach Copper)
- RFQs:
  - IPv4 (RFQ 791)
  - IPv6 (RFC 2460)

Board Firmware Features
- Secure Firmware Update process
- Smart Auto Negotiation (FastLinQ SmartAN)

RDMA Specifications

**Universal RDMA**
- RoCE
- RoCEv2
- iWARP
- Storage over RDMA: iSER, SMB Direct S2D, and NVMe over Fabrics (NVMe-oF)
- NFSoRDMA

**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 ESXiCL1 plug-in for VMware
- QConvergeConsole PowerKit (Windows PowerShell®) cmdlets for Linux and Windows
- Pre-boot unified extensible firmware interface (UEFI) Device Configuration pages in system BIOS
- 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 (DRAC) and other application tools

Boot Support
- 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: SFP+ cages

**Form Factor**
- Rack NDC

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.
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

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<tr>
<th>Rate</th>
<th>Cable and Maximum Distance (m)</th>
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<tbody>
<tr>
<td></td>
<td>DAC</td>
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<td>10GbE</td>
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DAC = Direct attach cable
SR FOC = SR fiber optic cable
AOC = Active optic cable

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
- EN55032
- EN55024
- EN61000-3-2
- EN61000-3-3

Agency Approvals—Safety

New Zealand and Australia
- AS/NZS: Class A

Korea
- KC-RRA Class A

Taiwan
- BSMI CNS 13438

Compliance
- RoHS compliant

Ordering Information

QL41164HMCU-DE-BK
- Four ports SFP28 direct-attach copper
- Bulk Kit (BK)

Follow us:

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