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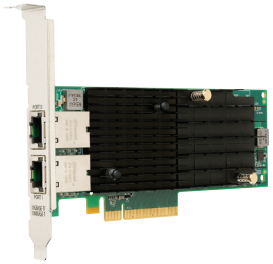
CONNECT - DATA SHEET

OCe14000 10GBASE-T Converged Network Adapter

High Performance Networking for Enterprise Virtualization and the Cloud Using Cost-Effective Twisted Pair (CAT) Cabling



OneConnect OCe14102-UT dual-port 10GBASE-T Converged Network Adapter

Overview

An adapter within the fourth generation of the Emulex OneConnect® product line, the OCe14102-UT dual-port 10GBASE-T Converged Network Adapter (CNA) provides high performance 10Gb Ethernet (10GbE) connectivity delivering multiple benefits for the enterprise cloud, including:

- Support for lowest cost 10GbE infrastructure using CAT 6/6A/7/7A twisted pair cabling
- 10GbE cabling support up to 100m for data center deployments using structured cabling
- Increasing data center IT agility and scalability through deployment of a secure multi-tenant cloud
- Driving scalability and flexibility in converged infrastructures
- Optimizing server hardware utilization by scaling high density virtualization

The OCe14102-UT CNA is designed for the high bandwidth and scalability demands of tier 1 enterprise applications with storage protocol (Fibre Channel over Ethernet (FCoE) and iSCSI) offloads, more scalable virtualization with support for RDMA over Converged Ethernet (RoCE), enhanced Single-Root I/O Virtualization (SR-IOV) and Network Interface Card (NIC) port partitioning, and cloud optimization using overlay network technology.

Emulex Virtual Network Exceleration™ (VNeX) overlay network offloads for multi-tenant cloud networking

Scaling existing technologies for private or public multi-tenant infrastructures requires networking solutions that can enable VM-to-VM communication and virtual workload migration across Layer 2 and Layer 3 boundaries without impacting connectivity or performance.

At the same time, these solutions need to ensure isolation and security for thousands or millions of tenant networks. However, with existing technology, the available 4094 virtual Local Area Network (VLAN) IDs are insufficient to isolate/secure each tenant in a data center (private cloud) or hybrid cloud environment.

Virtual Extensible Local Area Network (VXLAN) (supported by VMware and Linux) and Network Virtualization using Generic Routing Encapsulation (NVGRE) (supported by Microsoft) are next-generation overlay networking solutions that address these requirements. These solutions are a frame-in-frame data packet encapsulation scheme enabling the creation of virtualized Layer 2 subnets that can span physical L3 IP networks. Traffic from each VM is tunneled to a specific virtual network; the packets are then routed transparently over the existing physical infrastructure.

Key benefits

- Infrastructure compatibility with widely deployed 1000BASE-T (1GbE) networks
- Flexibility to support top-of-rack, middle-of-row, end-of-row or zone distribution data center architectures
- Maximizes total cost of ownership (server hardware ROI)with high virtual machine density
- Simplifies deployment of secure, scalable multi-tenant cloud infrastructures
- Minimizes total cost of ownership (TCO) through deployment of heterogeneous workloads on Converged Infrastructure
- Accelerates applications and storage performance
- Provides the bandwidth needed for slot constrained server platforms
- Reduces complexity through the deployment of a common network platform
- Reduces management, infrastructure and energy costs

Key features

- Superior network convergence—storage and network traffic over a common 10GbE infrastructure
- SR-IOV
- Data acceleration with RoCE support
- Powerful hardware offloads for:
  - Overlay networks (NVGRE and VXLAN)
  - Storage protocols: iSCSI and FCoE
  - Stateless TCP
- Greater bandwidth with PCIe 3.0
- VMware vSphere NetQueue with RSS support
- Microsoft Windows Server VMQ, Dynamic VMQ, RSS and vRSS support

OCe14000 10GBASE-T Converged Network Adapter

Emulex VNeX offload technology, powered by a multi-core adapter ASIC engine, accelerates the performance of network virtualization by preserving legacy stateless TCP offloads and scaling methods on encapsulated packets which provides full native network performance in a virtual network environment.

Remote Direct Memory Access (RDMA) support

The OCe14102-UT CNA leverages RoCE, enabling server to server data movement directly between application memory without any CPU involvement. This provides high throughput and data acceleration on a standard Ethernet fabric without the need for any specialized infrastructure or management.

Flexible workload storage connectivity with FCoE and iSCSI offloads

The OCe14102-UT CNA supports FCoE hardware-based offload using the same enterprise-class Emulex drivers that work with Emulex LightPulse® Fibre Channel (FC) Host Bus Adapters (HBAs). The OCe14102-UT CNA also supports iSCSI hardware-based offload, providing performance that is superior to iSCSI solutions based on software initiators and standard NICs. Finally, the OCe14102-UT CNA also has the ability to support iSCSI and FCoE offloads on the same port (i.e. concurrent storage).

Optimized host virtualization density with SR-IOV support

SR-IOV optimizes I/O for VMs, enabling higher host server virtualization ratios in order to deliver maximum server return on investment (ROI). SR-IOV provides a more cost-effective solution than multiple, physical adapter ports.

SR-IOV enables multiple VMs to directly access the OCe14102-UT's I/O resources, thus allowing VM networking I/O to bypass the host and take a path directly between the VM and the adapter. This eliminates redundant I/O processing in the hypervisor, which in turn, allows higher I/O performance, lower CPU utilization and significantly reduced latency as compared to the alternative of software-emulated NIC devices that are implemented in the hypervisor.

Optimized bandwidth allocation with Universal Multi-Channel port partitioning (also known as network partitioning, NPAR)

Emulex Universal Multi-Channel™ (UMC) is ideal for virtualized server environments because bandwidth allocation can be optimized to support VM migration, management and I/O intensive applications. UMC allows multiple Peripheral Component Interconnect (PCI) physical functions (PFs) to be created on each adapter port. Each port on the dual-port OCe14102-UT can be configured with up to eight functions.

Each port can support: eight NIC functions; seven NIC functions and a storage function (iSCSI or FCoE); or six NIC functions, an iSCSI function, and a FCoE function (concurrent mode).

The key benefits of deploying Emulex UMC technology include:

Lower TCO

- Consolidates multiple 1GbE adapters, associated cables and switch ports
- Higher VM workload bandwidth allocation to drive higher VM density on host servers
- Lower per Gb bandwidth cost compared to deploying multiple 1GbE adapters

Optimized I/O utilization

- Granular bandwidth provisioning minimizes wasted idle bandwidth and the waste of dedicated 1GbE adapters
- Enables Service Level Agreement (SLA) based provisioning and deployment

Simplified deployment

- UMC is not dependent on specialized operating system support
- Works with any 10GbE switch with RJ45 ports

UMC is ideal for virtualized server environments because bandwidth allocation can be optimized to support I/O intensive applications, VM migration, and management functions.

Simplified management OneCommand Manager application

The OneCommand® Manager application provides centralized management of Emulex OneConnect CNAs and LightPulse® FC HBAs throughout the data center from a single management console. The OneCommand Manager application provides a graphical user interface (GUI) and a scriptable command line user interface (CLI). OneCommand Manager for VMware is fully integrated with VMware vCenter to simplify management for virtual server deployments.

Fourth generation platform delivers enterprise-class reliability and performance

Leveraging generations of advanced, field-proven controller and adapter technology,the OCe14102-UT CNA meets the robust interoperability and reliability requirements of enterprise and scale-out data centers.

OneConnect™ OneCommand™

OCe14000 10GBASE-T Converged Network Adapter

Controller

- Emulex Engine™ (XE)100 series (Skyhawk™) of Ethernet Controllers

Ethernet Standards

- IEEE 802.3an 10GBASE-T
- IEEE 802-3ab 1000BASE-T
- IEEE 802.1Q virtual LANs (VLAN)
- IEEE 802.3-2012 Flow control with Pause frames
- IEEE 802.1Qbg Edge Virtual Bridging
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS); Data Center Bridging Capability Exchange (DCBX)
- IEEE 802.1Qbb Priority Flow Control (PFC)
- IEEE 802-1AX Link Aggregation/LACP
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1Qau Congestion Notification

Ethernet Network Interface (Layer 2 NIC) and TCP/IP

- NDIS 6.0, 6.2, 6.3-compliant Ethernet functionality
- IPv4/IPv6 TCP, UDP checksum offload
- IPv4/IPv6 Receive Side Scaling (RSS)
- IPv4/IPv6 Large Receive Offload (LRO)
- IPv4/IPv6 Large Send Offload (LSO)
- Dynamic VMQ (Windows Server 2012 Hyper-V) and NetQueue (VMware vSphere)
- Programmable MAC and VLAN addresses
- 128 MAC/VLAN addresses per port
- Support for hash-based Multicast MAC address filters
- Support for hash-based Broadcast frame filters per port
- VLAN offloads (insertion and extraction)
- Jumbo frame support up to 9000 Bytes

I/O Virtualization

- Stateless L2, L3, and L4 offloads for frame-in-frame encapsulation (VXLAN, NVGRE)
- PCI-SIG Address Translation Service (ATS) v1.0
- Support for up to 512 hardware queues
- Virtual Switch Port Mirroring for diagnostic purposes
- Virtual Ethernet Bridging (VEB)
- Virtual Ethernet Port Aggregator (VEPA)
- Emulex Universal Multi-Channel (UMC), support for up to 16 PCIe per adapter, which can be used as partitions as follows:
  - OCe14102-UT CNA adapter, each port can support: eight NIC functions; seven NIC functions and a storage function; (iSCSI or FCoE); or six NIC functions, an iSCSI function, and a FCoE function (concurrent mode)
  - Note: the system hardware must support and enable ARI and the host operating system must support ARI for maximum number of functions to be enabled; see Emulex UMC manual for more details
- NIC SR-IOV
  - up to 63 virtual functions (VFs) per port
- Quality of Service (QoS) for controlling and monitoring bandwidth assigned to and used by virtual entities
- Configurable control of network bandwidth by physical port, queue, or protocol
- Traffic shaping and QoS across each VF and PF

Fibre Channel over Ethernet (FCoE) Offload

- Hardware offload for FCoE protocol
- ANSI T11 FC-BB-5 Compliant
- Programmable World Wide Name (WWN)
- Support for FIP and FCoE Ether Types
- Concurrent Logins (RPI): up to 8K per adapter (FCoE adapter-only mode)
- Open Exchanges (XRI): up to 4K per adapter (FCoE adapter-only mode)
- Supports up to 255 N_Port ID Virtualization (NPIV) interfaces per port
- Concurrent FCoE and iSCSI support on each port

Internet Small Computer System Interface (iSCSI) Offload

- Hardware offload for iSCSI protocol
- Header and data digest support
- Up to 4K outstanding commands (iSCSI adapter-only mode)
- Up to 512 offloaded iSCSI connections (iSCSI adapter-only mode)
- Support for multipath I/O
- Operating system-agnostic INT13-based iSCSI boot and iSCSI crash dump support
- RFC 4171 Internet Storage Name Service (iSNS)
- Support for both IPv4 and IPv6 connections
- MTU packet size support up to 8342 bytes
- Concurrent iSCSI and FCoE support on each port

Converged Enhanced Ethernet (CEE) and Data Center Bridging (DCB)

- IEEE 802.1Qbb PFC
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1Qaz Data Center Bridging Exchange (DCBX)
- IEEE 802.1Qau Congestion Notification (QCN)
- Absolute per-priority rate control option/ configuration

RDMA

- Direct data placement in application buffers without CPU intervention
- Supports IBTA RoCE specifications
- Linux Open Fabrics Enterprise Distribution (OFED) support
- Support for Linux Network File System over RoCE, iSCSI Extensions for RDMA (iSER)
- Low latency queues for small packet sends and receives
- Windows Server SMB Direct (SMB over RDMA)

PCIe Interface

- PCIe 3.0 x8 (8, 5.0, and 2.5 GTp/s per lane) compliant interface:
  - Up to 64Gbp/s full duplex bandwidth
  - Configurable width and speed to optimize power versus bandwidth
- Support for up to 16 PCIe PFs
- Support for x1, x2, x4, and x8 links widths
- NIC SR-IOV
  - up to 63 VFs per port
- Message Signal Interrupts Extended (MSI-X)
- Advanced Error Reporting (AER)
- Completion Timeout (CTO)
- Function Level Reset (FLR)
- Alternative Routing ID Interpretation (ARI)

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Comprehensive OS Support

- Windows
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- Oracle Linux
- VMware vSphere
- CentOS
- Debian (NIC mode only, storage not supported)
- Ubuntu (NIC mode only, storage not supported)
- FreeBSD (NIC mode only, storage not supported)

Management, Boot Support

- vCenter management plug-in support
- Role-based management, integrated with Active Directory and LDAP
- Flexible personality definition for networking and storage protocols
- Multi-channel configuration and bandwidth control
- UEFI and x86 remote boot support including PXE v2.1, UEFI 2.3.1, iSCSI and FCoE
- MAC statistics gathering (SNMP, Ethernet MIB, MIB2, RMON, RMON2)
- Offline and online firmware updates
- Integrated thermal sensor works with management utilities

Hardware Environments

- x86, x64 servers

Please refer to the product page on www.emulex.com for further details.

Interconnect

- Cabling distances
  - Up to 100m on CAT 6A, CAT 7 in 10G mode
  - Up to 55m on CAT 6 in 10G mode
  - Up to 100m on CAT 5E (or higher category cable) in 1000BASE-T (1G) mode

Physical Dimensions

- Short, low profile MD2 form factor card
- 167.64mm x 68.91mm (6.60" x 2.71")
- Standard, full height bracket installed (low-profile bracket ships in box)

Environmental Requirements

- Operating temperature: 0° to 55°C (32° to 131°F)
- Storage temperature: -40° to 70°C (-40° to 158°F)
- Relative humidity: 5% to 95% non-condensing

Agency and Product Safety Approvals

North America
- FCC/Industry Canada Class A
- UL/CSA Recognized

Europe
- CE Mark
- EU RoHS compliant
- TUV Bauart Certified

Australia
- C-Tick or RCM Mark

Japan
- VCCI Class A

Taiwan
- BSMI Class A

Korea
- MSIP (formally KCC/MIC) Class A

China
- China RoHS Compliant

Ordering Information

Adapters

OCe14102-UT
- Dual-port, 10GBASE-T twisted pair RJ45, Converged Network Adapter

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