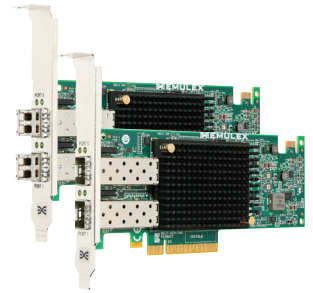




CONNECT

# EMC OCe14000-E 10GbE Converged Network Adapters

High Performance Virtualization Networking and Enterprise Hardened Storage Interoperability



OneConnect OCe14000-E Family

### Overview

As the fourth generation of the EMC Qualified Emulex OneConnect® product line, the OCe14000-E family of Converged Network Adapters (CNAs) provides high performance 10Gb Ethernet (10GbE) connectivity delivering a wide array of EMC solutions for networking, storage, big data, hybrid cloud and data backup and recovery.

- Increasing data center IT agility and scalability through deployment of a secure scale-out cloud
- Driving scalability and flexibility in converged infrastructures
- Optimizing server hardware utilization by scaling high density virtualization

The OCe14000-E family of 10GbE CNAs is designed for the high bandwidth and scalability demands of tier 1 enterprise applications with storage protocol (FCoE and iSCSI) offloads, more scalable virtualization with support for enhanced Single-Root I/O Virtualization (SR-IOV) and NIC port partitioning, and cloud optimization using overlay networking technology.

### Perfect Partnership

Emulex is the leading supplier of adapters for EMC customers. This adapter has been tested, qualified and approved for sales and support with leading EMC solutions such as the EMC® VNX™ family and VMAX storage arrays. This EMC Qualified adapter ensures interoperability with applications such as VMware, EMC Control Center and EMC PowerPath. This adapter is listed on EMC Support Matrix (ESM) and is part of the EMC Technology Connect - Select portfolio of complementary third-party products. The Emulex partnership enables EMC to provide customers with complete, end-to-end storage solutions.

### Emulex Virtual Network Excleration™ (VNeX) Overlay Network Offloads for Virtualized Scale-Out Cloud

Scaling existing technologies for private or public cloud 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 VLAN IDs are insufficient to isolate/secure each tenant in a data center (private cloud) or public/hybrid cloud environment.

### Key Benefits

- Maximizes server hardware ROI with high virtual machine density
- Simplifies deployment of secure, scalable multi-tenant cloud infrastructures
- Accelerates applications and storage performance
- Reduces adapter and cable costs— one adapter for simultaneous storage and data traffic on a common 10GbE fabric
- Eliminates wasted idle bandwidth by optimizing bandwidth allocation for applications, management and virtualization services with Universal Multi Channel (UMC) port partitioning
- Reduces management and infrastructure costs

### Key Features

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

# EMC OCe14000-E 10GbE Converged Network Adapters

Virtual Extensible Local Area Network (VXLAN) used by VMware, and Network Virtualization using Generic Routing Encapsulation (NVGRE) used by Microsoft, are next generation overlay networking solutions that address these requirements.

Emulex VNeX offload technology powered by a multi-core adapter ASIC engine accelerates the performance of network virtualization by offloading the header encapsulation process, while simultaneously preserving legacy stateless TCP offloads, providing full native network performance in a virtual network environment.

## Flexible Workload Storage Connectivity with FCoE and iSCSI Offloads

The OCe14000-E adapters support FCoE offload using the same enterprise-class Emulex drivers that work with Emulex LightPulse® Fibre Channel Host Bus Adapters (HBAs). The OCe14000-E adapters also support iSCSI offload, providing performance that is superior to iSCSI solutions based on software initiators and standard NICs. Finally the OCe14000-E adapters also have the ability to support NIC and iSCSI or FCoE offloads on the same port.

## Optimized Host Virtualization Density with SR-IOV Support

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

SR-IOV enables multiple VMs to directly access the OCe14000-E'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, eliminating redundant I/O processing in the hypervisor. This, in turn, allows higher I/O performance and lower CPU utilization 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

Emulex Universal Multi-Channel (UMC) allows multiple PCI functions to be created on each adapter port. As a CNA, each port can be configured with up to three NIC functions and one storage function for a total of two storage and six NIC functions on a two-port adapter.

The key benefits of deploying Emulex UMC technology include:

### Lower Total Cost of Ownership (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 waste of dedicated 1GbE adapters
- Enables Service Level Agreement (SLA) based provisioning and deployment

### Simplified Deployment

- UMC is not dependent on specialized OS support
- Works with any 10GbE switch

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

### Simplified Management OneCommand® Manager Application

The OneCommand Manager application provides centralized management of Emulex OneConnect CNAs and LightPulse® 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, OCe14000-E CNAs meet the robust interoperability and reliability requirements of enterprise and scale-out data centers.

# EMC OCe14000-E 10GbE Converged Network Adapters

## Controller

- Emulex Engine, XE100 series controllers

## Ethernet Standards

- Single or Dual IEEE 802.3-2008 10GBASE Ethernet ports (10GBASE-SR/10GBASE-CR)
- Single or Dual 1GBaseX/SGMII auto negotiation
- IEEE 802.1Q virtual LANs (VLAN)
- IEEE 802.3x 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 802.3ad Link Aggregation/LACP
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

## 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 9200 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)
- OneConnect Universal Multi-Channel™ (UMC), support for 4 NIC partitions or functions per physical port
  - For CNAs 1 function can be a storage function (iSCSI or FCoE)
- NIC SR-IOV:
  - For 2x10G: up to 31 VFs per port
- 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 NPIV interfaces per 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

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

- IEEE 802.1Qbb Priority Flow Control (PFC)
- IEEE 802.1Qaz Enhanced Transmission Selection (ETS)
- IEEE 802.1Qaz Data Center Bridging Exchange (DCBX)
- Absolute per-priority rate control option/configuration

## PCI Express (PCIe) Interface

- PCIe 3.0 x8 (8, 5.0, and 2.5 GT/s per lane) compliant interface:
  - Up to 64 Gb/s full duplex bandwidth
  - Configurable width and speed to optimize power versus bandwidth
- Support for up to 8 PCIe physical functions (PFs)
- Support for x1, x2, x4, and x8 links widths
- Single Root I/O Virtualization (SR-IOV)
  - For 2x10G: up to 31 VFs per port
- Message Signal Interrupts (MSI-X)
- Advanced Error Reporting (AER)
- Completion Timeout (CTO)
- Function Level Reset (FLR)

## Comprehensive OS Support

- Windows Server
- Red Hat Enterprise Linux
- SUSE® Linux Enterprise Server
- Oracle Linux
- VMware vSphere
- CentOS

## Management, Boot Support

- vCenter management plugin 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](http://www.emulex.com) for further details.

# EMC OCe14000-E 10GbE Converged Network Adapters

## Interconnect

- Copper
  - SFP+ Direct Attached Twin-Ax Copper interface
  - Standards compliant passive copper cables up to 5m and active copper cables up to 10m
- Optical\*
  - Optic 10GBASE-SR short wave lasers with LC type connector supported up to 300m on laser-optimized OM3 multimode fiber (MMF) cables

## Physical Dimensions

### Short, low profile MD2 form factor card

- 167.64mm x 68.91mm (6.60" x 2.71")
- Standard bracket installed (low-profile bracket available)

## Agency and Product Safety Approvals

The following approvals will be obtained prior to production shipment:

### North America

- FCC/Industry Canada Class A
- UL/CSA Recognized
- Class 1 Laser Product per DHHS 21CFR (J)

### Europe

- CE Mark
- EU RoHS compliant
- TUV Bauart Certified
- Class 1 Laser Product per EN60825-1

### Australia

- C-Tick Mark

### Japan

- VCCI Class A

### Taiwan

- BSMI Class A

### Korea

- MSIP (formally KCC/MIC) Class A

### China

- China RoHS Compliant

## Ordering Information

### Adapters

#### OCe14102-UX-E

- Dual-channel, 10GBASE-CR (direct attach copper) SFP+, CNA Adapter

#### OCe14102-UM-E

- Dual-channel, 10GBASE-SR (short reach optical) SFP+, CNA Adapter, Optics included

### Optional Accessories\*

#### OC10-SR-OPT-1

- 10GBASE-SR (short reach optical) SFP+ Optical Kit, 1 pc

#### OC10-SR-OPT-2

- 10GBASE-SR (short reach optical) SFP+ Optical Kit, 2 pcs

\* Only Emulex Accessories are warranted and fully supported by Technical Support

For more information on Emulex and EMC solutions, please visit [www.emulex.com/emc](http://www.emulex.com/emc).



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