



## ADAPTER CARDS

# ConnectX® EN

## 10 Gigabit Ethernet Adapters with PCI Express 2.0

ConnectX EN Ethernet Network Interface Cards (NIC) deliver high-bandwidth and industry-leading 10GigE connectivity with stateless offloads for converged fabrics in High-Performance Computing, Enterprise Data Centers, and Embedded environments. Clustered databases, web infrastructure, and IP video servers are just a few example applications that will achieve significant throughput and latency improvements resulting in faster access, real time response and increased number of users per server. ConnectX EN improves network performance by increasing available bandwidth to the CPU and providing enhanced performance, especially in virtualized server environments.

New enhancements such as Data Center Ethernet (DCE) are being added to Ethernet for better I/O consolidations. ConnectX EN enables servers and storage systems to utilize Low Latency Ethernet (LLE) which provides efficient RDMA transport over Layer 2 Ethernet with IEEE 802.1q VLAN tagging and Ethernet Priority-based Flow Control (PFC). The LLE software stack maintains existing and future application compatibility for bandwidth and latency sensitive clustering applications. With link-level interoperability in existing Ethernet infrastructure, Network Administrators can leverage existing data center fabric management solutions.

ConnectX EN protects investments by providing in hardware today support for DCE and Fibre Channel over Ethernet (FCoE) as well as technologies such as SR-IOV that provide enhanced virtual machine performance for virtualized servers.

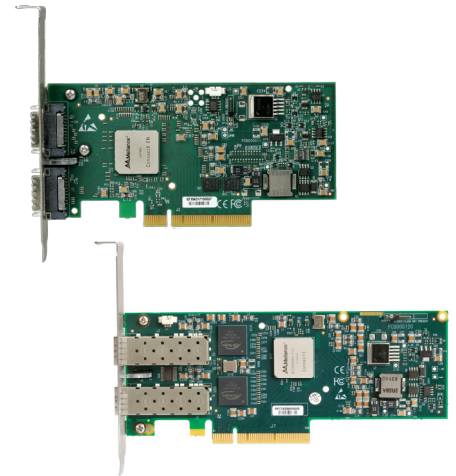
### Optimal Price/Performance

ConnectX EN removes I/O bottlenecks in mainstream servers that are limiting application performance. Servers supporting PCI Express 2.0 with 5GT/s will be able to fully utilize both 10Gb/s ports, balancing the I/O requirement of these high-end servers. Hardware-based stateless offload engines handle the TCP/UDP/IP segmentation, reassembly, and checksum calculations that would otherwise burden the host process. These offload technologies are fully compatible with Microsoft RSS and NetDMA. Total cost of ownership is optimized by maintaining an end-to-end Ethernet network on existing operating systems and applications.

Mellanox provides 10GigE adapters suitable for all network environments. The dual port SFP+ adapter supports 10GBASE-SR, -LR, and direct attached copper cable providing the flexibility to connect over short, medium, and long distances. Single and dual port 10GBASE-T adapters provide easy connections up to 100m over familiar UTP wiring. The dual port 10GBASE-CX4 adapter with its powered connectors can utilize active copper and fiber cables as well as passive copper.

### I/O Virtualization

ConnectX support for hardware-based I/O virtualization provides dedicated adapter resources and guaranteed isolation and protection for virtual machines (VM) within the server. I/O virtualization with ConnectX gives data center managers better server utilization and LAN and SAN unification while reducing cost, power, and cable complexity.



## BENEFITS

- 10Gb/s full duplex bandwidth for servers and storage
- Industry-leading throughput and latency performance
- I/O consolidation
- Virtualization acceleration
- High-performance networking and storage access
- Software compatible with standard TCP/UDP/IP and iSCSI stacks

## KEY FEATURES

- Dual 10 Gigabit Ethernet ports
- Copper and fiber connection options
  - SFP+ for -SR, -LR, direct attached copper
  - 10GBASE-T
  - 10GBASE-CX4
- PCI Express (up to 5GT/s)
- Traffic steering across multiple cores
- TCP/UDP/IP stateless offload in hardware
- Intelligent interrupt coalescence
- Hardware-based I/O virtualization
- Fibre Channel over Ethernet
- Data Center Ethernet
- Advanced Quality of Service
- Full support for Intel I/OAT

## Quality of Service

Resource allocation per application or per VM is provided by the advanced QoS supported by ConnectX EN. Service levels for multiple traffic types can be based on IETF DiffServ or IEEE 802.1p/Q allowing system administrators to prioritize traffic by application, virtual machine, or protocol. This powerful combination of QoS and prioritization provides the ultimate fine-grain control of traffic – ensuring that applications run smoothly in today's complex environment.

## Software Support

ConnectX EN is supported by a full suite of software drivers for Microsoft Windows, Linux distributions, VMware and Citrix XENServer. ConnectX EN supports stateless offload and is fully interoperable with standard TCP/UDP/IP stacks. Stateless offload connections are also easy to scale using multiple adapters to reach the desired level of performance and fault tolerance. ConnectX EN supports various management interfaces and has a rich set of configuring and management tools across operating systems.

## FEATURE SUMMARY

### ETHERNET

- IEEE Std 802.3ae 10 Gigabit Ethernet
- IEEE Std 802.3ak 10GBASE-CX4
- IEEE Std 802.3an 10GBASE-T
- IEEE Std 802.3aq 10GBASE-LRM
- IEEE Std 802.3ad Link Aggregation and Failover
- IEEE Std 802.3x Pause
- IEEE Std 802.1Q VLAN tags
- IEEE Std 802.1p Priorities
- Multicast
- Jumbo frame support (10KB)
- 128 MAC/VLAN addresses per port

### TCP/UDP/IP STATELESS OFFLOAD

- TCP/UDP/IP checksum offload
- TCP Large Send (< 64KB) or Giant Send (64KB-16MB) Offload for segmentation
- Receive Side Scaling (RSS) up to 32 queues
- Line rate packet filtering

### ADDITIONAL CPU OFFLOADS

- Traffic steering across multiple cores
- Intelligent interrupt coalescence
- Full support for Intel I/OAT
- Compliant to Microsoft RSS and NetDMA

### HARDWARE-BASED I/O VIRTUALIZATION

- Single Root IOV
- Address translation and protection
- Multiple queues per virtual machine
- VMware NetQueue support
- PCISIG IOV compliant

## COMPATIBILITY

### CPU

- AMD X86, X86\_64
- Intel X86, EM64T, IA-32, IA-64
- SPARC
- PowerPC, MIPS, and Cell

### PCI EXPRESS INTERFACE

- PCIe Base 2.0 compliant, 1.1 compatible
- 2.5GT/s or 5.0GT/s link rate x8 (20+20Gb/s or 40+40Gb/s bidirectional bandwidth)
- Fits x8 or x16 slots
- Support for MSI/MSI-X mechanisms

### CONNECTIVITY

- Interoperable with 10GigE switches and routers
- 20m+ of copper CX4 cable, with powered connectors supporting active copper or fiber cables (MNEH28/9)
- 100m of Cat6a and Cat7 UTP, 50m of Cat5e and Cat6 (MNTH18/28/29)
- 100m (OM-2) or 300m (OM-3) of multimode fiber cable, duplex LC connector from SFP+ optics module (MNPH28B/29B)
- 10m direct attached copper cable through SFP+ connector (MNPH28B/29B)
- Consult the factory for 10GBASE-LR availability

### OPERATING SYSTEMS/DISTRIBUTIONS

- Novell SuSE Linux Enterprise Server (SLES), Red Hat Enterprise Linux (RHEL), and other Linux distributions
- Microsoft Windows Server 2003/2008, Windows Compute Cluster Server 2003
- VMware ESX 3.5
- Citrix XENServer 4.1

### MANAGEMENT

- MIB, MIB-II, MIB-II Extensions, RMON, RMON 2
- Configuration and diagnostic tools

## Adapter Cards

Ordering Part Number	Ethernet Port	Host Bus	Power Typ	Dimensions w/o Brackets
MNEH28-XTC	Dual CX4 with powered connector	PCIe 2.0 2.5GT/s	9.3W	13.6cm x 6.4cm
MNEH29-XTC	Dual CX4 with powered connector	PCIe 2.0 5.0GT/s	11.3W	13.6cm x 6.4cm
MNPH28B-XTC	Dual SR (300m MMF)	PCIe 2.0 2.5GT/s	12.9W	16.8cm x 6.4cm
MNPH29B-XTC	Dual SR (300m MMF)	PCIe 2.0 5.0GT/s	14.9W	16.8cm x 6.4cm
MFM1T02A-SR	SR Module	n/a	consult factory	n/a
MNTH18-XTC	Single RJ-45	PCIe 2.0 2.5GT/s	16.2W	16.8cm x 6.4cm
MNTH28B-XTC	Dual RJ-45	PCIe 2.0 2.5GT/s	consult factory	16.8cm x 6.4cm
MNTH29B-XTC	Dual RJ-45	PCIe 2.0 5.0GT/s	consult factory	16.8cm x 6.4cm



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