Mellanox TECHNOLOGIES

ConnectX™

Mellanox ConnectX™ EN

Dual-Port 10 Gigabit Ethernet Controller with PCI Express 2.0

BENEFITS

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

KEY FEATURES

- Single chip architecture
  - Integrated CX4, XFI and backplane PHY interfaces
  - No local memory needed
- Dual 10 Gigabit Ethernet ports
- PCI Express 2.0 (up to 5GT/s)
- Traffic steering across multiple cores
- TCP/UDP/IP stateless offload in hardware
- Intelligent interrupt coalescence
- Hardware-based I/O virtualization
- Advanced Quality of Service
- Full support for Intel I/OAT

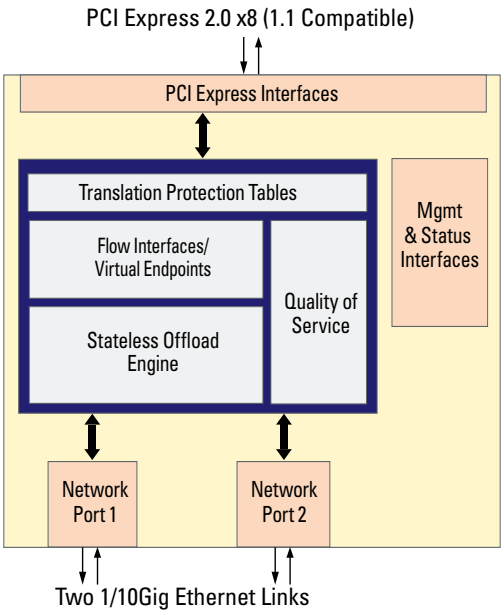
SPECIFICATIONS

- Dual Ethernet ports: 10Gb/s (XAUI, CX4, KX4, XFI or KR) or 1Gb/s (SGMII or KX)
- PCI Express 2.0 x8 (1.1 compatible)
- Management interfaces (DMTF compatible, Fast Management Link)
- 4 x 16MB serial Flash interface
- Dual I²C interfaces
- IEEE 1149.1 boundary-scan JTAG
- Link status LED indicators
- General purpose I/O
- 21 x 21mm HFCBGA
- RoHS-5 compliant
- Requires 3.3V, 2.5V, 1.8V, 1.2V supplies

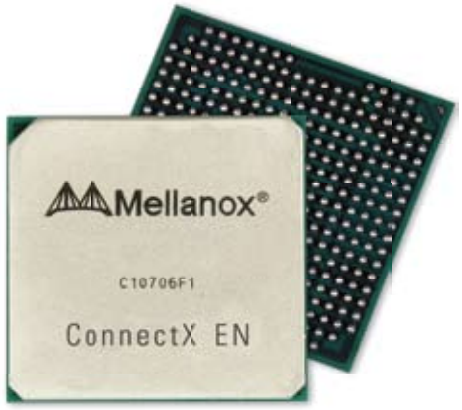
Mellanox ConnectX EN 10Gig Ethernet Media Access Controller (MAC) delivers high-bandwidth and industry leading 10GigE connectivity with stateless offloads for performance-driven server and storage applications in High-Performance Computing, Enterprise Data Centers, and Embedded environments. Clustered 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 while decreasing the associated transport load on the CPU and providing enhanced performance, especially in virtualized server environments. The device is well suited for Blade Server and LAN on the Motherboard (LOM) designs due to its small overall footprint requirement.

Optimal Price/Performance

ConnectX EN 10Gig Ethernet removes I/O bottlenecks in mainstream servers that are limiting application performance. Servers supporting PCI



ConnectX EN Block Diagram



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 processes. These offload technologies are fully compatible with Intel I/OAT QuickData technology. Total cost of ownership is optimized by maintaining an end-to-end Ethernet network on existing operating systems and applications.

Integrated CX4, KX4, XFI and KR PHYs reduce the number of components required. This in turn reduces the power, board space, and complexity of the system compared to other solutions. Each port is independently configured, increasing the options available to OEMs.

I/O Virtualization

ConnectX EN support for hardware-based I/O virtualization is complementary to Intel and AMD virtualization technologies. Virtual machines (VM) within the server are provisioned with dedicated I/O adapter resources and guaranteed isolation and protection. Hypervisor offload features remove software-based virtualization overheads and free up CPU cycles enabling native OS performance for VMs and higher server utilization by supporting more VMs per physical server.

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Quality of Service

Resource allocation per application or per VM is provided and protected 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

The ConnectX EN 10GigE MAC is supported by a full suite of Microsoft Windows and Linux drivers and is fully interoperable with standard TCP/UDP/IP stacks. Unlike complex TCP Offload Engine implementations, stateless offloads are compatible with host-resident TCP stacks, eliminating the need to change operating systems, drivers, or applications, and thereby easing the transition to 10Gb/s. With host-resident TCP under Linux, the entire open source community stands behind the TCP implementation, and code can be quickly updated in the event that any security holes are discovered. Stateless offload connections are also easy to scale using multiple adapters to reach the desired level of performance and fault tolerance.

FEATURE SUMMARY

ETHERNET

- IEEE Std 802.3ae 10 Gigabit Ethernet
- IEEE Std 802.3ak 10GBASE-CX4
- IEEE Std 802.3ap Backplanes
- 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

- Address translation and protection
- Multiple queues per virtual machine
- Native OS performance
- Complimentary to Intel and AMD I/OMMU

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)
- Auto-negotiates to x8, x4, x2, or x1
- Support for MSI/MSI-X mechanisms

CONNECTIVITY

- Interoperable with 10GigE switches and routers
- Drives copper cables, fiber optic modules, or backplanes

OPERATING SYSTEMS/DISTRIBUTIONS

- Novell SuSE Linux Enterprise Server (SLES), Red Hat Enterprise Linux (RHEL), and other Linux distributions
- Microsoft Windows Server 2003, Windows Compute Cluster Server 2003, Windows server code named "Longhorn"

MANAGEMENT

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

ADAPTER SILICON

Ordering Part Number	Ethernet Ports	Host Bus	Power (Typical)
MT25408A0-FCC-SE	Dual 1/10GigE	PCIe 2.0 2.5GT/s	9.6W
MT25408A0-FCC-TE	Dual 1/10GigE	PCIe 2.0 5.0GT/s	10.2W

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