Mellanox ConnectX-2 Dual Port 10 GbE Adapter for IBM System x

IBM System x at-a-glance guide

The Mellanox ConnectX-2 Dual Port 10 GbE Adapter for IBM System x delivers high-bandwidth and industry leading low latency 10 GbE connectivity. With industry-leading performance, power-efficiency, integration and feature set, ConnectX-2 EN with RDMAoE (RDMA over Ethernet) adapters provide an optimized, low-latency solution for high-transaction databases, financial services, cloud computing, and virtualized server and storage data center environments. The ConnectX-2 Dual-Port 10 GbE Adapter improves network performance by increasing available bandwidth to the CPU and providing enhanced performance especially in virtualized server environments.

The adapter is shown in Figure 1.

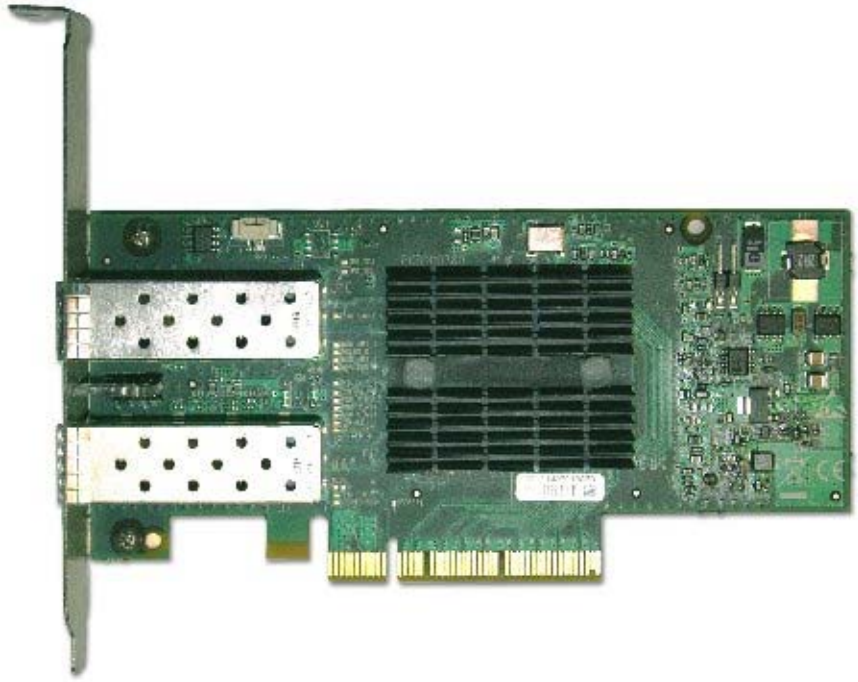

Figure 1. Mellanox ConnectX-2 Dual Port 10 GbE Adapter for IBM System x

Did you know?

The Mellanox ConnectX-2 Dual Port 10GbE Adapter for IBM System x is a a high-performance, dual-port network adapter for 10Gb/s Ethernet (10GbE) networks with performance requirements for low latency. It provides an ideal solution for all servers needing high- performance, low-latency data transfer in LAN connectivity for mission-critical applications. This network adapter provides support for 10GbE networking with optical or copper connectivity.

Part number information

The part number to order this card is shown in Table 1.

Table 1. Ordering part number and feature code

Description	Part number	Feature code
Mellanox ConnectX-2 Dual Port 10 GbE Adapter for IBM System x	81Y9990	A1M4

The adapter has two empty SFP+ cages that support either SFP+ SR transceivers or twin-ax direct-attached copper (DAC) cables as listed in Table 2.

Table 2. Supported transceivers and direct-attach copper (DAC) cables

Description	Part number	Feature code
IBM 10Gb SFP+ SR Optical Transceiver (BN-CKM-SP-SR)	44W4408	4942
IBM/BNT 10Gb SFP+ SR Optical Transceiver	46C3447	Not available
IBM/Brocade 10Gb SFP+ SR Optical Transceiver (IB-000180)	45W2411	2117
IBM/Brocade 10Gb SFP+ SR Optical Transceiver	49Y4216	0069
IBM/QLogic 10Gb SFP+ SR Optical Transceiver (SFP10-SR50-IBMX-BK)	49Y4218	0064
IBM Twinax Direct Attach Cable (DAC) - 1m	45W2398	2711
IBM Twinax Direct Attach Cable (DAC) - 3m	45W2408	2731
IBM Twinax Direct Attach Cable (DAC) - 5m	45W3039	2751

Features and benefits

The Mellanox ConnectX-2 Dual Port 10 GbE Adapter for IBM System x has the following features:

Performance:

Based on ConnectX-2 EN technology, the PCI Express 2.0 x8 adapter provides a high level of throughput performance for all network environments by removing I/O bottlenecks in mainstream servers that are limiting application performance. Servers supporting PCI Express 2.0 with 5 GTps can fully utilize both 10 Gbps ports and achieve up to 40 Gbps duplex bandwidth. Hardware-based stateless offload engines handle the TCP/UDP/IP segmentation, reassembly, and checksum calculations that would otherwise burden the host processor. These offload technologies are fully compatible with Microsoft RSS and NetDMA.

RDMA over Ethernet (RDMAoE) further accelerates application run time. The RDMAoE specification provides efficient data transfer with very low latencies on lossless Ethernet networks. RDMAoE enables lowest latency memory transaction, with less than 2µs at full bandwidth with small message size. This allows very high volume, transaction intensive applications typical of financial market firms and other industries where speed of data delivery is paramount to take advantage. With Mellanox ConnectX-2 Dual Port 10 Gbe Adapter, high frequency transaction applications are able to access trading information with shorter times, making sure the trading servers are able to respond first to any new market data and market inefficiencies, while the higher throughput enables higher volume trading, maximizing liquidity and profitability.

In data mining or web crawl applications, RDMAoE provides the needed boost in performance to search faster by solving the network latency bottleneck associated with I/O cards and the corresponding transport technology in the cloud. Various other applications that benefit from RDMAoE with ConnectX-2 EN include Web 2.0 (Content Delivery Network), Business intelligence, data base transactions and various Cloud computing applications.

Mellanox ConnectX-2 EN low power consumption, less than 3.5W per port, provides customers high bandwidth and low latency at the lowest cost of ownership.

I/O virtualization

ConnectX-2 EN with Virtual Intelligent Queuing (Virtual-IQ) technology provides dedicated adapter resources and guaranteed isolation and protection for virtual machines within the server. The adapter gives data center managers better server utilization and LAN and SAN unification while reducing cost, power, and cable complexity.

Quality of Service

Resource allocation per application or per virtual machine is provided by the advanced QoS supported by ConnectX-2 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.

Specifications

The adapter has the following specifications:

- Low-profile adapter form factor
- Ports: Two 10 Gigabit Ethernet ports with SFP+ connectors
- ASIC: Mellanox ConnectX-2 EN
- Cabling types: Direct Attached Copper, SR and LR Fiber Optic
- Host interface: PCI Express 2.0 x8 (5.0 GT/s)
- Features: Stateless Offload, Priority Flow Control, FCoE Ready
- Power consumption: 6.4 W (typical)

Ethernet support and standards:

- IEEE Std 802.3ae 10 Gigabit Ethernet
- IEEE Std 802.3ad Link Aggregation and Failover
- IEEE Std 802.3x Pause
- IEEE 802.1Q, .1p VLAN tags and priority
- IEEE P802.1au D2.0 Congestion Notification
- IEEE P802.1az D0.2 Enhanced Transmission Selection
- IEEE P802.1bb D1.0 Priority-based Flow Control
- Multicast
- Jumbo frame support (10KB)
- 128 MAC/VLAN addresses per port

TCP/UDP/IP stateless offload:

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

Additional CPU offloads:

- RDMA over Ethernet support
- Traffic steering across multiple cores
- Intelligent interrupt coalescence
- Compliant to Microsoft RSS and NetDMA

Hardware-based I/O virtualization:

- Address translation and protection
- Dedicated adapter resources and guaranteed isolation
- Multiple queues per virtual machine
- Hardware switching between guest OSs
- Enhanced QoS for vNICs
- VMware NetQueue support

Physical specifications

The adapter has the following physical specifications (without the bracket):

- Length: 142 mm
- Height: 69 mm
- Depth: 18 mm
- Maximum weight: 0.25 kg (0.5 lb)

Operating environment

The adapter is supported in the following environment:

- Operating temperature: 0 to 55° C
- Air flow: 200 LFM at 55° C

Warranty

One year limited warranty. When installed in a System x server, these cards assume your system's base warranty and any IBM ServicePac® upgrade.

Supported servers

The adapter is supported in the IBM System x servers listed in Table 3.

Table 3. Supported System x servers (Part 1)

Adapter	x3100 M3	x3200 M2	x3200 M3	x3250 M2	x3250 M3	x3350	x3400	x3400 M2	x3400 M3	x3455	x3500	x3500 M2	x3500 M3	x3550	x3550 M2
Mellanox ConnectX-2 Dual Port 10 GbE Adapter	N	N	N	N	N	N	N	N	Y	N	N	N	Y	N	N

Table 3. Supported System x servers (Part 2)

Adapter	x3550 M3	x3620 M3	x3630 M3	x3650	x3650 T	x3650 M2	x3650 M3	x3655	x3690 X5	x3755	x3755 M3	x3850 M2	x3950 M2	x3850 X5	dx360 M3
Mellanox ConnectX-2 Dual Port 10 GbE Adapter	Y	Y	Y	N	N	N	Y	N	Y	N	Y	N	N	Y	Y

Supported operating systems

The adapter as part of the System x portfolio supports the following operating systems:

- SUSE LINUX Enterprise Server 10 for x86
- SUSE LINUX Enterprise Server 10 for AMD64/EM64T
- SUSE LINUX Enterprise Server 11 for x86
- SUSE LINUX Enterprise Server 11 for AMD64/EM64T
- Red Hat Enterprise Linux 5 Server Edition
- Red Hat Enterprise Linux 5 Server x64 Edition
- Red Hat Enterprise Linux 6 Server Edition
- Red Hat Enterprise Linux 6 Server x64 Edition

See IBM ServerProven for the latest information about the specific versions and service packs supported: http://ibm.com/servers/eserver/serverproven/compat/us/. Click System x servers, and then click LAN to see the support matrix. Click the check mark that is associated with the System x server in question to see the details of operating system support.

Related publications

For more information refer to these documents:

- *Mellanox ConnectX-2 Dual Port 10 GbE Adapter Installation and User's Guide*
  http://ibm.com/support
- Linux device drivers (select the **Download** tab, then choose the link for the supported operating system):
  http://www.mellanox.com/content/pages.php?pg=products_dyn&product_family=26
- Publications for the IBM Intelligent Cluster portfolio:
  http://www.ibm.com/support/docview.wss?uid=psg1MIGR-5080504
- Mellanox ConnectX-2 EN Dual-port SFP+ 10GbE PCI-E 2.0 Adapter product page:
  http://mellanox.com/content/pages.php?pg=ethernet_cards_overview
- IBM System x Configuration and Options Guide
  http://www.ibm.com/support/docview.wss?uid=psg1SCOD-3ZVQ5W

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