Product Brief

Intel® 10 Gigabit CX4 Dual Port Server Adapter

Network Connectivity

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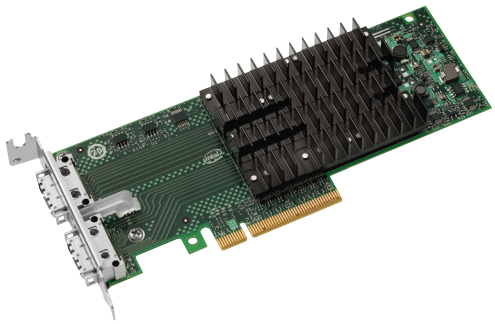
10 Gigabit Performance at the Lowest Cost Per Port

Adding to a robust family of 10 Gigabit Ethernet adapters, Intel is now offering the Intel® 10 Gigabit CX4 Dual Port Server Adapter. Following the 802.ak specification, the Intel 10 Gigabit CX4 Dual Port Server Adapter offers the lowest cost per port of all the current 10GbE interconnects. The low-profile PCI Express* form factor combined with two CX4 ports and a low-power envelope for energy efficiency, makes the board ideal for slot-constrained environments. 10GBASE-CX4 adapters are well-suited for customers with shorter distance and low latency requirements.

Next-Generation 10 Gigabit Performance

10 Gigabit Ethernet has moved past the early adoption stage and is rapidly becoming mainstay for backbones within enterprise and service provider networks. The escalating deployments of servers with multi-core processors and demanding applications such as High Performance Computing (HPC), database clusters, and video on demand are driving the need for 10 Gigabit connections.

Designed to meet the need of high-speed, low-latency interconnects of HPC clusters, the Intel® 10 Gigabit CX4 Dual Port Server Adapter provides bandwidth-intensive applications with highly affordable 10GbE network performance for distances up to 15 meters with standard twinaxial or up to 100 meters with Intel® Connects cable. Based on the Intel® 82598EB 10 Gigabit Ethernet controller, Intel's next-generation 10 Gigabit CX4 Dual Port Server Adapter is designed to meet the throughput requirements of bandwidth-hungry applications. Intel's new 10GBASE-CX4 adapter can also be used in wiring closets and server racks, as well as data centers to aggregate servers.



Performance-Enhancing Features Designed for Multi-Core Environments

When implemented within multi-core processor environments, the Intel 10 Gigabit CX4 Dual Port Server Adapter offers advanced networking features for efficient distribution of Ethernet workloads across CPU cores. Load balancing of interrupts using MSI-X enables more efficient response times and improved application performance. CPU utilization can be lowered further through stateless offloads such as TCP segmentation offload, header replications/splitting, and Direct Cache Access (DCA).

Multiple Queues Optimized for Virtual Environments

The Intel 10 Gigabit CX4 Dual Port Server Adapter is optimized for virtualized environments, supporting multiple queues, alleviating I/O bottlenecks between virtual machines. Virtual Machine Device queue[1] (VMDq) technology offloads data sorting and data copying from the virtual machine monitor (VMM) software layer to the hardware, improving overall throughput and CPU utilization on virtualized servers. Additionally, the Intel 10 Gigabit CX4 Dual Port Server Adapter enables Intel® I/O Acceleration Technology[2] (Intel® I/OAT) with support for Intel® QuickData for faster I/O processing on the new Quad-Core and Dual-Core Intel® Xeon® processor-based servers.

Conserve valuable PCI Express (PCIe*) server slots while adding 10 Gigabit Ethernet capability with the Intel 10 Gigabit CX4 Dual Port Server Adapter. The dedicated input/output (I/O) bandwidth of PCIe ensures priority performance on each port — without bus sharing — for 10 Gigabit Ethernet connectivity, as well as a low-profile design, which improves server throughput and rack density at the same time. In addition, eight-lane PCIe enables maximum bandwidth for fast and efficient data transfer.

Advances for Unified Storage

The fast growth in storage capacity coupled with server virtualization has brought the need for Storage Area Network (SAN) to the forefront. To satisfy this growing demand, Intel's 10 Gigabit CX4 Dual Port Server adapters support iSCSI acceleration through

Intel I/OAT and provide advanced features for unified storage connectivity. Fast and reliable networked storage can be achieved via native iSCSI support with Microsoft, Linux*, and VMware operating systems as well as support for iSCSI remote boot.

Features	Benefits
Intel® 82598EB 10 Gigabit Ethernet Controller	• Industry-leading, energy-efficient design for next-generation 10 Gigabit performance and multi-core processors
Low profile	• Enables higher bandwidth and throughput from standard and low-profile PCIe slots and servers
Load balancing on multiple CPUs	• Increases performance on multi-processor systems by efficiently balancing network loads across CPU cores when used with Receive-Side Scaling from Microsoft or Scalable I/O on Linux*
Intel® I/OAT[2]	• Accelerates I/O with higher throughput and lower CPU utilization by offloading processing overhead
iSCSI remote boot support	• Provides centralized storage area network (SAN) management at a lower cost than competing iSCSI solutions
MSI-X support	• Minimizes the overhead of interrupts • Allows load balancing of interrupt handling between multiple cores/CPUs
Virtual Machine Device queues (VMDq)	• Allows the efficient routing of packets to the correct target machine in a virtualized environment using multiple hardware queues • Ensures transmit fairness and prevents head-of-line blocking
Low latency	• Ability to toggle between the interrupt aggregation and non-aggregation mode based on the type of data being transferred
Optimized queues: 32 Transmit (Tx) and 64 Receive (Rx) per port	• Network packet handling without waiting or buffer overflow • Efficient packet prioritization
Compatible with x8, and x16 standard and low-profile PCI Express* slots	• Allows each PCI Express* slot port to operate without interfering with the other
Support for most Network Operating Systems (NOS)	• Enables widespread deployment • Supports up to 100m with Intel® Connects Cable
CX4 connections over 8 pair, 100 Ohm, Twinaxial cabling	• Ensures compatibility with cable lengths up to 15m • Supports up to 100m with Intel® Connects Cable
RoHS-compliant[3]	• Compliant with the European Union directive 2002/95/EC to reduce the use of hazardous materials
Intel® PROSet Utility for Microsoft Windows* Device Manager	• Provides point-and-click power over individual adapters, advanced adapter features, connection teaming, and virtual local area network (VLAN) configuration
Intel backing	• Backed by an Intel® limited lifetime warranty, 90-day money-back guarantee (U.S. and Canada), and worldwide support

Specifications

General

Product code	EXPX9502CX4
Connectors	CX4
Cabling	8 pair, 100 Ohm, twinaxial cable

Adapter Product Features

Intel® PROSet Utility for easy configuration and management	▪
Plug and play specification support	Standard
Intel® I/OAT[2] including QuickData	▪
Ships with full-height bracket installed, low-profile bracket added in package	▪
Cable Distance	
8 pair, 100 Ohm, twinaxial cable	15m
Intel® Connects Cable	100m
Receive-side scaling	▪
VMDq[1]	In a virtualized environment, packets dedicated to different virtual machines can be routed to different queues, thus easing the routing of these packets to the target machine
Advanced packet filtering (per port)	▪ 16 exact-matched packets (unicast or multicast) ▪ 4096-bit hash filter for multicast frames ▪ Promiscuous (unicast and multicast) transfer mode support ▪ Optional filtering of invalid frames
Direct Cache Access (DCA)	The I/O device activates a pre-fetch engine in the CPU that loads the data into the CPU cache ahead of time, before use, eliminating cache misses and reducing CPU load

Network Management

DMI 2.0 support, Windows Management Instrumentation (WMI) and SNMP	▪
Remote Installation Services (RIS)	▪
PXE 2.0 enabled through boot Read-Only Memory (ROM)	▪

Network Operating Systems (NOS) Software Support

Windows Vista SP1*	IA32, X64
Windows Server* 2003 SP2	IA32, X64, IPF
Windows Unified Storage Solution* 2003	IA32, X64, IPF
Windows Server* 2008	IA32, X64, IPF
Linux* Stable Kernel version 2.6	IA32, X64, IPF
Linux* RHEL 4 and RHEL 5	IA32, X64, IPF
Linux* SLES 9 and SLES 10	IA32, X64, IPF
FreeBSD* 7.0	IA32, X64, IPF
EFI* 1.1	IA32, X64, IPF

Intel Backing

Limited lifetime warranty	▪
90-day, money-back guarantee (U.S. and Canada)	▪

Advanced Software Features

Adapter Fault Tolerance (AFT)	▪
Switch Fault Tolerance (SFT)	▪
Adaptive Load Balancing (ALB)	▪
Teaming support	▪
IEEE 802.3ad[4] (link aggregation control protocol)	▪
Test switch configuration	Tested with major switch original equipment manufacturers (OEMs)
PCIe Hot Plug*/Active Peripheral Component Interconnect (PCI)	▪
IEEE 802.1Q* VLANs	▪
IEEE 802.3 2005* flow control support	▪
Tx/Rx IP, TCP, & UDP checksum offloading (IPv4, IPv6) capabilities (Transmission control protocol (TCP), User Datagram Protocol (UDP), Internet Protocol (IP)	▪
IEEE 802.1p*	▪
TCP segmentation/large send offload	▪
MSI-X supports Multiple Independent Queues	▪
Interrupt moderation	▪
IPv6 offloading	Checksum and segmentation capability extended to new standard packet type

Technical Features

Data rate supported per port	10 Gigabit
Bus type	PCI Express 2.0 (2.5 GT/s)
Bus width	x8 lane PCI Express, operable in x8 and x16 slots
Bus speed (x8, encoded rate)	20 Gbps uni-directional; 40 Gbps bi-directional
Interrupt levels	INTA, MSI, MSI-X
Hardware certifications	FCC B, UL, CE, VCCI, BSMI, CTICK, MIC
Controller-processor	Intel® 82598EB
Typical power consumption	4.5 W (passive cables), 6.9 W (active cables)
Operating temperature	0° C to 55° C (32° F to 131° F)
Storage temperature	-40° C to 70° C (-40° F to 158° F)
Storage humidity	90% non-condensing relative humidity at 35° C
LED Indicators	LINK (solid) and ACTIVITY (blinking)

Physical Dimensions

Length	16.74 cm (6.59 in)
Width	6.89 cm (2.71 in)
Height of end bracket	PCI Express standard, 12 cm (4.725 in); PCI Express low-profile, 7.92 cm (3.12 in)