Product Brief

Intel® 10 Gigabit AF DA Dual Port Server Adapter

Network Connectivity

Intel® 10 Gigabit AF DA Dual Port Server Adapter

10 Gigabit Performance for Top-of-Rack Connections

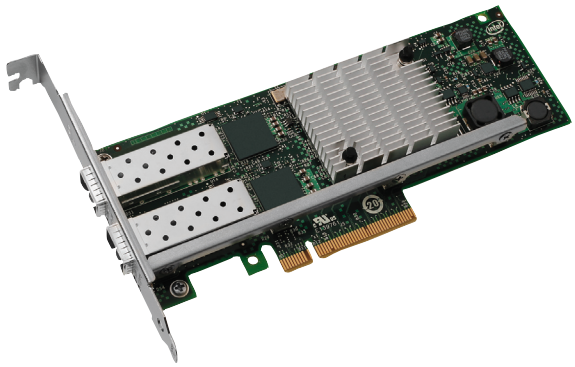
The Intel® 10 Gigabit AF DA Dual Port Server Adapter is the newest member of Intel's robust family of 10 Gigabit products. Designed as a low-cost, low-power adapter, the Intel 10 Gigabit AF DA Dual Port Server Adapter provides direct attach copper twinaxial cable connections between servers and a top-of-rack switch. Two ports, coupled with a low-profile PCI Express* form factor, make this adapter ideal for slot-constrained environments. Using direct attach copper cables compliant with the SFP + MSA SFF-8431 specification, the Intel 10 Gigabit AD DA Dual Port Server Adapter is well-suited for customers who require low-cost "in-the-rack" connections of less than 10 meters between server and top-of-rack switch.

Energy-Efficient, Next-Generation 10 Gigabit Performance

10 Gigabit Ethernet is rapidly becoming the mainstay for backbones within enterprise and service provider networks. Intel's 10GBASE Direct Attach adapter extends the 10 Gigabit adoption to the server rack. The escalating deployments of servers with multi-core processors and demanding applications such as high-performance computing (HPC), database clusters, virtualized servers and video on demand are driving the need for 10 Gigabit connections in the server rack. Based on the 82598EB 10 Gigabit Ethernet controller, Intel's 10 Gigabit AF DA Server Adapter is designed to meet the throughput and latency requirements of bandwidth-hungry applications, while offering a very low-power envelope for energy efficiency.

Performance-Enhancing Features for Multi-Core Environments

As a member of the 10 Gigabit family of products, the 10GbE Direct Attach adapter supports all of the features and functionality in Intel's other 82598EB-based adapters. When implemented within multi-core processor environments, the Intel 10 Gigabit AF DA 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 application performance. CPU utilization can be lowered further through stateless offloads such as TCP segmentation offload, header replications/splitting, and Direct Cache Access (DCA).

Intel 10 Gigabit AF DA Server Adapters are 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, Intel 10 Gigabit AF DA Server Adapters enable 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 Intel 10 Gigabit AF DA Server Adapters. 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. The low-power, efficient design allows for two 10 Gigabit Ethernet ports in a single low-profile PCIe adapter.

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 AF DA Server adapter supports iSCSI acceleration and provides 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. Advanced QoS features such as priority groups and per priority pause are also implemented in the adapters.

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[1] (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 x4,[5] x8, and x16 standard and low-profile PCI Express* slots	• Allows dual-port operation in almost any PCI Express server slot, except x1 slots, and allows each PCI Express slot port to operate without interfering with the other
Support for most Network Operating Systems (NOS)	• Enables widespread deployment
Remote management support	• Reduces support costs with remote management based on industry-wide standards
SFP+ Direct Attached Cable (Twinaxial)	• Ensures compatibility with direct attached cable lengths up to 10 meters
RoHS compliant[3], lead-free[4] technology	• Compliant with the European Union directive (effective as of July 2006) 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	E10G42AFDA
Connectors	SFP+ connectors
Cabling	▪ SFP+ direct attached cable (twinaxial) only ▪ Other SFP+ optics are not allowed and cannot be used with this adapter

Adapter Product Features

Intel® PROSet Utility	▪ For easy configuration and management
Intel® lead-free[4] technology	▪
Plug and play specification support	Standard
Intel® I/OAT[2] including QuickData	▪
Ships with full-height bracket installed, low-profile bracket added in package	▪
RoHs[3]	▪
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

Microsoft Windows* 2003 Server	IA32, X64
Microsoft Vista*	IA32, X64, IPF
Windows Virtual Server* 2005	IA32, X64, IPF
Red Hat Linux* 2.6x or later	IA32, X64, IPF
SUSE SLES 10* or later, Professional 9.2 or later	IA32, X64, IPF
FreeBSD* 5.x or later	IA32, X64, IPF
ESX 3.x* support (for VMware)	IA32, X64, IPF
Fedora*	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 802.3ae*[5]	▪
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 0 offloading (IPv4, IPv6) capabilities 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 x4,[5] x8 and x16 slots
Bus speed (x8, encoded rate)	20 Gbps uni-directional; 40 Gbps bi-directional
Interrupt levels	INTA, INTB, INTC, INTD
Hardware certifications	FCC B, UL, CE, VCCI, BSMI, CTICK, MIC
Controller-processor	Intel® 82598EB
Typical power consumption	▪ 12.2 W maximum power, 10.1 W typical power ▪ PCI Express +3.3 V power supply – consumes 2.3 A max, 1.7 A typical ▪ PCI Express +12 V power supply – consumes 0.4 A max, 0.4 A typical
Airflow	150 LFM (Linear Feet per Minute)
Operating temperature	0° C to 55° C (32° F to 131° F) with 100 LFM forced airflow (linear feet per minute)
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)

Order Codes

E10G42AFDA

Companion Products

Consider these Intel products in your server and network planning:

- Intel® 10 Gigabit Server Adapters
  - Copper or fiber-optic network connectivity, up to two ports per card
- Intel® PRO/1000 Server Adapters
  - Copper or fiber-optic network connectivity, up to four ports per card
  - Solutions for PCI Express, PCI-X,* and PCI interfaces
- Intel® PRO/1000 Desktop Adapters for PCI Express and PCI interfaces
- Other Intel® PRO Desktop and Server Adapters
- Intel® Xeon® processors
- Intel® Server Boards

Network-Ready Servers

Top PC and server manufacturers offer Intel adapters in their new products. Specify or ask for Intel Network Connections with your next PC, server, or mobile PC purchase. For a list of preferred suppliers, visit us at http://www.intel.com/buy/networking/adapters.htm.

Customer Support

Intel® Customer Support Services offers a broad selection of programs including phone support and warranty service. For more information, contact us at support.intel.com/support/go/network/adapter/home.htm. Service and availability may vary by country.

For Product Information

To speak to a customer service representative regarding Intel products, please call 1-800-538-3373 (U.S. and Canada) or visit support.intel.com/support/go/network/contact.htm for the telephone number in your area. For additional product information on Intel Networking Connectivity products, visit www.intel.com/network/connectivity.

To see the full line of Intel Network Adapters for PCI Express, visit www.intel.com/network/connectivity

[1] Intel® VMDq requires an operating system that supports VMDq.

[2] Intel® I/O Acceleration Technology (Intel® I/OAT) requires an operating system that supports Intel I/OAT.

[3] Lead and other materials banned in RoHS Directive are either (1) below all applicable substance thresholds the EU or (2) an approved exemption applies.

[4] Lead has not been intentionally added, but lead may still exist as an impurity below 1000 ppm, or an approved RoHS exemption applies.

[5] Available only when used with a capable switch.

[6] Only x4 connections implemented with an x8 connector are supported.

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