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 82599EB-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 (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® (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.

<table>
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<tr>
<th>Features</th>
<th>Benefits</th>
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<tr>
<td>Intel® 82598EB 10 Gigabit Ethernet Controller</td>
<td>• Industry-leading, energy-efficient design for next-generation 10 Gigabit performance and multi-core processors</td>
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<tr>
<td>Low profile</td>
<td>• Enables higher bandwidth and throughput from standard and low-profile PCIe slots and servers</td>
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<td>Load balancing on multiple CPUs</td>
<td>• 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*</td>
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<td>Intel® I/OAT 2</td>
<td>• Accelerates I/O with higher throughput and lower CPU utilization by offloading processing overhead</td>
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<td>iSCSI remote boot support</td>
<td>• Provides centralized storage area network (SAN) management at a lower cost than competing iSCSI solutions</td>
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<tr>
<td>MSI-X support</td>
<td>• Minimizes the overhead of interrupts • Allows load balancing of interrupt handling between multiple cores/CPUs</td>
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<td>Virtual Machine Device queues* (VMDq)</td>
<td>• 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</td>
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<td>Low latency</td>
<td>• Ability to toggle between the interrupt aggregation and non-aggregation mode based on the type of data being transferred</td>
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<td>Optimized queues: 32 Transmit (Tx) and 64 Receive (Rx) per port</td>
<td>• Network packet handling without waiting or buffer overflow • Efficient packet prioritization</td>
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<td>Compatible with x4, x8, and x16 standard and low-profile PCI Express* slots</td>
<td>• 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</td>
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<td>Support for most Network Operating Systems (NOS)</td>
<td>• Enables widespread deployment</td>
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<td>Remote management support</td>
<td>• Reduces support costs with remote management based on industry-wide standards</td>
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<tr>
<td>SFP+ Direct Attached Cable (Twinaxial)</td>
<td>• Ensures compatibility with direct attached cable lengths up to 10 meters</td>
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<td>RoHS compliant*, lead-free* technology</td>
<td>• Compliant with the European Union directive (effective as of July 2006) to reduce the use of hazardous materials</td>
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<td>Intel® PROSet Utility for Microsoft Windows* Device Manager</td>
<td>• Provides point-and-click power over individual adapters, advanced adapter features, connection teaming, and virtual local area network (VLAN) configuration</td>
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<tr>
<td>Intel backing</td>
<td>• Backed by an Intel® limited lifetime warranty, 90-day money-back guarantee (U.S. and Canada), and worldwide support</td>
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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 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: •
Receive-side scaling: •
VMDq: 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, XP
Windows Virtual Server* 2005 IA32, X64, XP
Red Hat Linux® 2.6.x or later IA32, X64, XP
SUSE SLES 10* or later, Professional 9.2 or later IA32, X64, XP
FreeBSD* 5.x or later IA32, X64, IFP
ESX 3.x support (for VMware) IA32, X64, IFP
Fedora*: IA32, X64, IFP
EFI 11*: IA32, X64, IFP

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* 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: 100 LFM (Linear Feet per Minute)
Operating temperature: 0°C to 55°C (32°F to 131°F) with 100 LFM forced air flow (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)
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Companion Products
Consider these Intel products in your server and network planning:

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  - 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

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