Product Brief

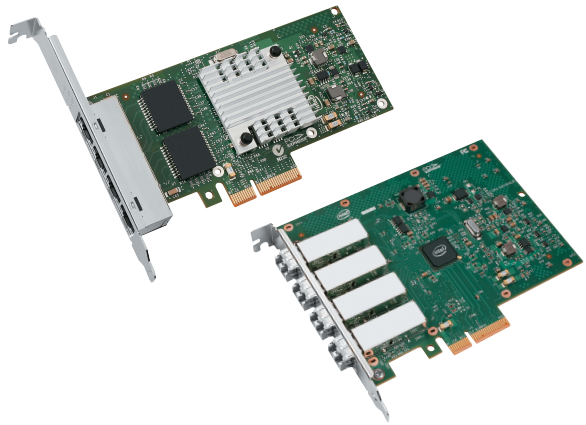
Intel® Ethernet I340 Server Adapter

Network Connectivity

Intel® Ethernet I340 Server Adapter

Quad-port Gigabit Ethernet server adapter designed for multi-core processors and optimized for Virtualization & Unified Networking Environments

- Four high-performing 10/100/1000 BASE-T Ethernet connections (Copper)
- Four high-performing 10/100/1000 BASE-SX Ethernet connections (Fiber)
- Low power high performing bridgeless design supporting PCI Express* Gen 2.0 5 GT/s
- Environmentally-friendly halogen-free[1] (Copper) and lead-free adapter
- Hardware acceleration for TCP-IP and iSCSI
- Hardware optimizations for virtualized servers
- Reliable and proven Gigabit Ethernet technology from Intel Corp.



Based on the new Intel® 82580 Gigabit Ethernet Controller, the Intel® Ethernet I340 Server Adapter is Intel's fourth generation of PCIe GbE adapter. This adapter showcases the industry's first fully integrated quad-port PCIe Gen2 GbE controller, providing a smaller footprint and lower power dissipation. In addition, the Intel® Ethernet I340 Server Adapter offers advanced features, including support for multi-core processors and server virtualization, as well as a scalable PCI Express Gen 2.0 interface. Intel's first eco-friendly halogen-free board combines low-power and cost for the best price/performance ratio in a quad-port solution available today.

Halogen-Free[1]

Working to create a more environmentally sustainable future, Intel is pleased to introduce its first halogen-free Ethernet Server Adapter. The transition to halogen-free products is not government mandated, but driven by Intel's goal to eliminate the use of environmentally sensitive materials. The move to halogen-free products marks another step in our continual march toward minimizing the environmental footprint of Intel's products, processes, and technologies.

Designed for Multi-Core Processors

This quad-port adapter provides high-performing, multi-port Gigabit connectivity in a multi-core platform as well as in a virtualized environment. In a multi-core platform, the adapter supports technologies such as MSI-X, and Low Latency Interrupts that help accelerate data across the platform, improving application response times.

The I/O technologies on a multi-core platform make use of the multiple queues and multiple interrupt vectors available on the network controller. These queues and interrupt vectors help in load balancing the data and interrupts amongst themselves in order to lower the load on the processors and improve overall system performance. For example, depending upon the latency sensitivity of the data, the low latency interrupts feature can bypass the time interval for specific TCP ports or for flagged packets to give certain types of data streams the least amount of latency to the application.

Intel I/O Acceleration Technology (Intel I/OAT) is a suite of features that improves data acceleration across the platform, from networking devices to the chipset and processors, which helps to improve system performance and application response times. The different features include MSI-X, Low-Latency Interrupts, Receive Side Scaling (RSS), and others. MSI-X helps in load-balancing I/O interrupts across multiple processor cores, and Low Latency Interrupts can provide certain data streams a non-modulated path directly to the application. RSS directs the interrupts to a specific processor core based on the application's address.

1 Low Halogen applies only to halogenated flame retardants and PVC in components. Halogens are below 1,000ppm bromine and 1,000ppm chlorine..

Support for iSCSI

Intel® Ethernet server adapters with native iSCSI initiators built into Microsoft® Windows®, Linux®, and VMware® ESX platforms provide a simple, dependable, cost-effective way to connect to LANs and iSCSI SANs. These native initiators are broadly tested using multiple generations of operating systems, storage systems, and OS tools to help ensure reliability and ease of use. Standardizing on Intel Ethernet server adapters for iSCSI allows administrators to use a single initiator, TCP/IP stack, and set of management tools and IT policies. In addition, the I340 server adapter includes a number of hardware features designed to accelerate iSCSI traffic and enhance data processing. For example, TCP segmentation offload, Receive side coalescing (RSC), and checksum offload capabilities help reduce processor utilization, increase throughput, and deliver exceptional iSCSI performance. The adapters are designed to flexibly scale workloads across multi-core processor–based systems. Finally, using native OS initiators, an Intel® Ethernet I340 Server Adapter enables support for the CRC-32 digest instruction set included in the Intel® Xeon® processor 5500 series, which improves transmission reliablity and thus delivers an enterprise class iSCSI solution for the IT customer.

Optimized for Virtualization

The Intel® Ethernet I340 Server Adapter showcases a suite of hardware assists that improves overall system performance by lowering the I/O overhead in a virtualized environment. This optimizes CPU usage, reduces system latency, and improves I/O throughput. These features include:

- Virtual Machine Device Queues (VMDq)
- Intel® I/O Acceleration Technology (Intel® I/OAT)

Use of multi-port adapters in a virtualized environment is very important because of the need to provide redundancy and data connectivity for the applications/workloads in the virtual machines. Due to the need for redundancy and data connectivity, it is recommended that a virtualized physical server needs at least six GbE ports to satisfy the I/O requirement demands..

Virtual Machine Device queues (VMDq)

VMDq reduces I/O overhead on the hypervisor in a virtualized server by performing data sorting and coalescing in the network silicon. VMDq technology makes use of multiple queues in the network controller. As data packets enter the network adapter, they are sorted, and packets traveling to the same destination (or virtual machine) get grouped together in a single queue. The packets are then sent to the hypervisor, which directs them to their respective virtual machines. Relieving the hypervisor of packet filtering and sorting improves overall CPU usage and throughput levels.

Reliable Performance

The server adapter includes a number of advanced features that enable it to provide industry-leading quad-port 1GbE performance and reliability. With over 25 years of experience shipping Ethernet adapters, Intel offers unmatched quality and design.

PCIe* v2.0 (5 GT/s)

PCIe v2.0 (5 GT/s) support enables customers to take full advantage of the 1 GbE by providing a maximum of 2.0 Gbps bi-directional throughput per port on a single quad-port card.

For today's demanding virtualized data center environments, the new Intel® Ethernet I340 Server Adapter delivers ultimate flexibility and scalability.

Features	Benefits
General	
Intel® 82580 Gigabit Ethernet Controller with PCI Express* V2.0 (5 GT/s) Support	• Industry-leading smallest non-bridged PCIe Gen2 quad-port 1GbE controller • Enables customers to take full advantage of 1GbE by providing maximum bi-directional throughput per port on a single quad-port adapter
Halogen Free (Copper) (Low Halogen applies only to halogenated flame retardants and PVC in components. Halogens are below 1,000ppm bromine and 1,000ppm chlorine.)	• Leadership in an environmentally friendly ecosystem
Low-Profile (Copper only), Standard height (Copper and Fiber)	• Enables higher bandwidth and throughput from standard and low-profile PCIe slots and servers
iSCSI remote boot support	• Provides centralized storage area network (SAN) management at a lower cost than competing iSCSI solutions
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*
Compatible with x4, x8, and x16 standard and low-profile PCI Express* slots	• Enables quad-port operation in almost any PCI Express server slot, except x1 slots
Multi-port design	• Allows each port to operate without interfering with the others
Support for most network operating systems (NOS)	• Enables widespread deployment
RoHS-compliant	• Compliant with the European Union directive 2002/95/EC to reduce the use of hazardous materials
Intel® PROSet Utility for Windows* Device Manager	• Provides point-and-click management of individual adapters, advanced adapter features, connection teaming, and virtual local area network (VLAN) configuration

Features	Benefits
I/O Features for Multi-core Processor Servers	
MSI-X support	• Minimizes the overhead of interrupts • Allows load-balancing of interrupt handling between multiple cores/CPUs
Low Latency Interrupts	• Based on the sensitivity of the incoming data, the adapter can bypass the automatic moderation of time intervals between the interrupts
Header Splits and Replication in Receive	• Helps the driver focus on the relevant part of the packet without the need to parse it
Multiple Queues: 8 queues per port	• Network packet handling without waiting or buffer overflow providing efficient packet prioritization
Tx/Rx IP, SCTP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities	• Lower processor usage • Checksum and segmentation capability extended to new standard packet type
Tx TCP segmentation offload (IPv4, IPv6)	• Increased throughput and lower processor usage • Compatible with large-send offload feature (in Microsoft Windows* Server operating systems)
Receive and Transmit Side Scaling for Windows environment and Scalable I/O for Linux* environments (IPv4, IPv6, TCP/UDP)	• This technology enables the direction of the interrupts to the processor cores in order to improve the CPU usage rate
Virtualization Features	
VMDq	• Offloads the data-sorting functionality from the Hypervisor to the network silicon, improving data throughput and the CPU usage • Sorting based on MAC addresses and VLAN tags
Advanced Packet Filtering	• 24 exact-matched packets (unicast or multicast) • 4096-bit hash filter for unicast and multicast frames • Lower processor usage • Promiscuous (unicast and multicast) transfer mode support • Optional filtering of invalid frames
VLAN support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags	• Ability to create multiple VLAN segments
Manageability Features	
Advanced filtering capabilities	• Supports extended L2, L3, and L4 filtering for traffic routing to BMC • Supports MAC address, VLAN, ARP, IPv4, IPv6, RMCP UDP ports, and UDP/TCP ports filtering • Supports flexible header filtering • Enables the BMC to share the MAC address with the host OS
Preboot eXecution Environment (PXE) Support	• Enables system boot up via the LAN (32-bit and 64-bit)) • Flash interface for PXE image
Simple Network Management Protocol (SNMP) and Remote Network Monitoring (RMON) Statistic Counters	• Easy system monitoring with industry-standard consoles
Wake-on-LAN support	• Packet recognition and wake-up for LAN on motherboard applications without software configuration
iSCSI Boot	• Enables system boot up via iSCSI • Provides additional network management capability
Watchdog Timer	• Gives an indication to the manageability firmware or external devices that the chip or the driver is not functioning
IEEE 1588 precision time control protocol	• Time synch capability—synchronizes internal clocks according to a network master clock • HW timestamping of IEEE 1588 precision time protocol packets for increased accuracy
Intel Backing	
Backed by an Intel® limited lifetime warranty, 90-day money-back guarantee (U.S. and Canada), and worldwide support	

Customer Support

Intel® Customer Support Services offers a broad selection of programs including phone support and warranty service. For more information, contact us at www.intel.com/support. 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 www.intel.com/support/feedback.htm for the telephone number in your area. For additional product information on Intel Networking Connectivity products, visit www.intel.com/go/ethernet.

Specifications

General

Product codes	E1G44HT: Intel® Ethernet Server Adapter I340-T4 E1G44HTBLK: Bulk Pack – Order 5, Get 5 - RJ45 IEEE E1G44HF: Intel® Ethernet Server Adapter I340-F4 E1G44HFBLK: Bulk Pack; Order 5, Get 5; LC Fiber Optic IEEE
Connectors	Rj45 (Copper) / LC Fiber Optic (Fiber)
IEEE standards/network topology	IEEE 802.3 10BASE-T, 100BASE-TX, 1000BASE-T:
Cabling	Copper: Category-3 or higher for 10BASE-T operation Category-5 or higher for 100BASE-TX operation Category-5e or higher for 1000BASE-T operation Fiber: MMF 62.5/50um

Adapter Product Features

Intel® PROSet Utility	For easy configuration and management
Plug and play specification support	Standard
Intel® I/OAT	Extreme system throughput
Ships with full-height bracket installed; low-profile bracket included in package (Copper)	Streamlines installation
Cable distance	Copper: up to 100 m Fiber: up to 300 m
Receive Side Scaling	Multiple Rx queues enable the efficient distribution of network receive processing across multiple CPUs in multiprocessor systems
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

Advanced Software Features

Adapter fault tolerance (AFT)	
Switch fault tolerance (SFT)	
Adaptive load balancing (ALB)	
Teaming support	
IEEE 802.3ad (link aggregation control protocol)	
Test switch configuration	
PCIe Hot Plug*/Active peripheral component interconnect (PCI)	
IEEE 802.1Q* VLANs	
IEEE 1588 Precision Time Control Protocol	Time synch capability – synchronizes internal clocks according to a network master clock
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:	10/100/1000 Mbps
Bus type	PCI Express* 2.0 (5 GT/s)
Bus width	4-lane PCI Express; operable in x4, x8 and x16 slots
Interrupt levels	INTA, INTB, INTC, INTD, MSI, MSI-X
Hardware certifications	FCC B, UL, CE, VCCI, BSMI, CTICK, KCC
Controller-processor	Intel® 82580 Gigabit Ethernet Controler
Power consumption (typical)	Copper: 4.3 W Fiber: 4.5 W
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
Connect Speed LED Indicators	not illuminated=10 Mb/s; green=100 Mb/s; amber=1 Gb/s

Physical Dimensions

Copper	
Length	13.54 cm (5.33 in.)
Width	6.89 cm (2.71 in.)
Full-height end bracket	12.0 cm (4.725 in.)
Low-profile end bracket	7.92 cm (3.117 in.)

Fiber	
Length	13.54 cm (5.33 in.)
Width	11.12 cm (4.376 in)
Full-height end bracket	12.0 cm (4.725 in.)
Low-profile end bracket	N/A

Network Operating Systems (NOS) Software Support

Operating System	IA32	X64	IPF
Windows* Vista* SP2	▪	▪	N/A
Windows Server* 2003 SP2	▪	▪	▪
Windows* Unified Storage Solution 2003	▪	▪	▪
Windows Server 2008 SP2	▪	▪	▪
Windows Server 2008 R2	▪	▪	▪
Windows 7	▪	▪	N/A
Linux* Stable Kernel version 2.6	▪	▪	▪
Linux RHEL 4.8.	▪	▪	N/A
Linux RHEL 5.4	▪	▪	▪
Linux SLES 10 SP3	▪	▪	N/A
Linux SLES 11	▪	▪	N/A
FreeBSD* 8.0	▪	▪	N/A
FreeBSD*7.2	▪	▪	N/A
UEFI* 2.1	N/A	▪	▪
VMware ESX* 4.x	N/A	▪	N/A

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

[1]VMDq requires a virtualization operating system that supports VMDq.

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

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