

## PCI Express x4 Dual Port SFP Gigabit Server Adapter (Intel I350 Based)

Dual-port Gigabit Ethernet server adapters designed with performance enhancing features and new power management technologies

### Key Features

- Halogen-free dual-port Gigabit Ethernet adapters with fiber interface options
- Innovative power management features including Energy Efficient Ethernet (EEE) and DMA Coalescing for increased efficiency and reduced power consumption
- Flexible I/O virtualization for port partitioning and quality of service (QoS) of up to 32 virtual ports
- Scalable iSCSI performance delivering cost-effective SAN connectivity
- High-performing bridgeless design supporting PCI Express\* Gen 2.1 5GT/s
- Reliable and proven Gigabit Ethernet technology from Intel Corporation

### Overview

The new P0-2SFP builds on Intel's history of excellence in Ethernet products. Intel continues its market leadership with this new generation of PCIe\* GbE network adapters. Built with the bridgeless Intel® Ethernet Controller I350, these adapters represent the next step in the Gigabit Ethernet (GbE) networking evolution for the enterprise and data center by introducing new levels of performance through industry-leading enhancements for both virtualized and iSCSI Unified Networking environments. This new family of adapters also includes new power management technologies such as Energy Efficient Ethernet (EEE) and DMA Coalescing (DMAC).

### Flexible I/O Virtualization

The P0-2SFP includes Intel® Virtualization Technology for connectivity (Intel® VT-c) to deliver I/O virtualization and Quality of Service (QoS) features designed directly into the controller on the adapter. I/O virtualization advances network connectivity models used in today's servers to more efficient models by providing Flexible Port Partitioning (FPP), multiple Rx/Tx queues, and on-controller QoS functionality that can



be used in both virtual and non-virtual server deployments.

By taking advantage of the PCI-SIG SR-IOV specification, Intel® Ethernet products enable Flexible Port Partitioning (FPP). With FPP, virtual controllers can be used by the Linux\* host directly and/or assigned to virtual machines. With this port partitioning, administrators can create up to eight dedicated connections on a single Ethernet port for use in bare-metal and virtualized server deployments.

In a bare-metal Linux server, host processes can be assigned to dedicated network resources to provide traffic isolation and balanced bandwidth allocation.

In a virtualized environment, a VM can be assigned to a virtual controller to reduce the CPU overhead seen when using a software-based network bridge by offloading network traffic management to the controller.

### Scalable iSCSI Performance

An P0-2SFP with native iSCSI initiators built into Microsoft\* Windows\*, Linux\*, and VMware\* ESX platforms provides a simple, dependable, cost-effective way to connect to 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 Adapters for iSCSI enables administrators to use a single initiator, TCP/IP stack, and a common set of management tools and IT

policies. In addition, Intel® Ethernet Server Adapters include a number of hardware features designed to accelerate iSCSI traffic and enhance data processing.

For example, TCP segmentation offload and checksum offload capabilities help reduce processor usage, increase throughput, and deliver exceptional iSCSI performance. Finally, using native OS initiators, an iSCSI-2SFP supports the CRC-32 digest instruction set included with Intel® Xeon® processor products, which improves transmission reliability and delivers an enterprise-class iSCSI solution.

## Power Management Technologies

Today, companies everywhere are looking for ways to decrease energy consumption across the enterprise to reduce costs and environmental impact, while at the same time solving increasingly important power density challenges. That's why Intel has introduced new, advanced Power Management Technologies (PMTs) with the iSCSI-2SFP that enable enterprises to configure power options on the adapter and more effectively manage their power consumption.

## Energy Efficient Ethernet (EEE)

The iSCSI-2SFP supports the IEEE802.3az Energy Efficient Ethernet (EEE) standard so that, during periods of low network activity, EEE reduces the power consumption of an Ethernet connection by negotiating with a compliant EEE switch port to transition to a low power idle (LPI) state. This reduces the controller power to approximately 50% of its normal operating power, saving power on the network port and the switch port. As soon as increased network traffic is detected, the controller and the switch quickly come back to full power to handle the increased network traffic. EEE is supported for both 1000BASE-T and 100BASE-TX.

## DMA Coalescing

Another power management technology that can reduce power on the server platform is DMA Coalescing (DMAC). Typically, when a packet arrives at a server, DMA calls are made to transfer the packet within the server. These calls wake up the processor, memory and other system components from a lower power state in order to perform the tasks required to handle the incoming packet.

Based on the configurable DMAC settings, incoming packets are buffered momentarily before any DMA calls are made. This enables the controller to intelligently identify opportunities to batch multiple packets together so that when components are wakened from lower power states they can efficiently handle the batched packets at the same time. This enables platform components to remain in lower power states longer, which can

dramatically reduce platform energy consumption. DMAC synchronizes DMA calls across all controller ports to ensure maximum power savings.

## Software Tools and Management

Intel® Advanced Network Services (Intel® ANS) include new teaming technologies and techniques such as Virtual Machine Load-Balancing (VMLB) for Hyper-V environments. Today, Intel ANS includes a variety of teaming configurations for up to eight adapters, support for mixed vendors server adapters teaming and includes support for 802.1q VLANs, making Intel ANS one of the most capable and comprehensive tools for supporting server adapter teaming.

Additionally, Intel® PROSet for Windows\* Device Manager and PROSet CL extends driver functionality to provide additional reliability and Quality of Service features and configuration.

## General Features

Intel® Ethernet Controller I350  
With PCI Express\* V2.1 (5 GT/s) Support  
Low-Profile and Standard height full

## Ethernet Features

IEEE\* 802.3 auto-negotiation  
1Gb/s Ethernet IEEE 802.3, 802.3u, 802.3ab PHY specifications Compliant  
Integrated PHY for 10/100/1000 Mb/s for multispeed, full, and half-duplex  
IEEE 802.3x and 802.3z compliant flow control support with software-controllable Rx thresholds and Tx pause frames  
Automatic cross-over detection function (MDI/MDI-X)  
IEEE 1588 protocol and 802.1AS implementation

## Power Management and Efficiency

<1W S0-Max (state) 1000BASE-T Active 90oC (mode)  
<400mW S0-Typ (state) 100BASE-T Active (mode)  
IEEE802.3az - Energy Efficient Ethernet (EEE) DMA Coalescing  
Smart Power Down (SPD) at S0 no link / Sx no link  
Active State Power Management (ASPM) Support  
LAN disable function  
Full wake up support  
Advanced Power Management (APM) Support (formerly Wake on LAN)  
Advanced Configuration and Power Interface (ACPI) specification v2.0c  
Magic Packet\* wake-up enable with unique MAC address  
ACPI register set and power down functionality supporting D0 and D3 states  
MAC Power Management controls  
Low Power Link Up - Link Speed Control  
Power Management Protocol Offload (Proxying)  
Latency Tolerance Reporting (LTR)



## I/O Virtualization Features

Eight transmit (Tx) and receive (Rx) queue pairs per port  
Flexible Port Partitioning:  
32 Virtual Functions on Quad-port or 16 Virtual Functions on Dual-port  
Support for PCI-SIG SR-IOV specification  
Rx/Tx Round-Robin Scheduling  
Traffic Isolation  
Traffic Steering  
VM to VM Packet forwarding (Packet Loopback)  
MAC and VLAN anti-spoofing  
Malicious driver detection  
Storm control  
Per-pool statistics, offloads, and jumbo frames support  
Independent Function Level Reset (FLR) for Physical and Virtual Functions  
IEEE 802.1q Virtual Local Area Network (VLAN) support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags  
IEEE 802.1q advanced packet filtering  
Mirroring rules  
Support for Simple VEPA  
VF Promiscuous modes

## Stateless Offloads/Performance Features

TCP/UDP, IPv4 checksum offloads (Rx/ Tx/Large-send); Extended Tx descriptors for more offload capabilities  
IPv6 support for IP/TCP and IP/UDP receive checksum offload  
Tx TCP segmentation offload (IPv4, Ipv6)  
Transmit Segmentation Offloading (TSO)  
Interrupt throttling control  
Legacy and Message Signal Interrupt (MSI) Modes  
Message Signal Interrupt Extension (MSI-X)  
Intelligent interrupt generation  
Receive Side Scaling (RSS) for Windows environment  
Scalable I/O for Linux environments (IPv4, IPv6, TCP/UDP)  
Support for packets up to 9.5K Bytes (Jumbo Frames)  
Low Latency Interrupts  
Header/packet data split in receive  
PCIe v2.1 TLP Processing Hint Requester  
Descriptor ring management hardware for Transmit and Receive

## Remote Boot Options

Preboot eXecution Environment (PXE) flash interface support  
Intel® Ethernet iSCSI Remote Boot for Windows, Linux, and VMware  
Intel Boot Agent software:

Linux boot via PXE or BOOTP, Windows\* Deployment Services, or UEFI

## Manageability Features

Management Component Transport Protocol (MCTP)  
Firmware Based Thermal Management  
IEEE 802.3 MII Management Interface  
MAC/PHY Control and Status  
Watchdog timer  
Extended error reporting  
Controller Memory Protection  
Vital Product Data (VPD) Support

## Adapter Product Features

Plug and play specification support  
Intel® I/O Acceleration Technology (Intel® I/OAT)  
Ships with full-height bracket installed; low-profile bracket included in package

## Technical Features

Data rate supported per port: 1000 Mbps  
Bus type: PCI Express\* 2.1 (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  
Controller-processor: Intel Ethernet Controller I350  
Power consumption (typical): 6.0 W  
Storage temperature: -40 °C to 70 °C (-40 °F to 158 °F)  
Operating temperature: 0 °C to 55 °C (32 °F to 131 °F)  
Storage humidity: 90% non-condensing relative humidity at 35 °C

## Network Operating Systems (NOS) Software Support

DOS, Novell ODI  
Windows XP 32-bit(64-bit)  
Windows Server 2003 32-bit(64-bit)  
Windows Vista 32-bit(64-bit)  
Windows 7 32-bit(64-bit)  
Windows 8 32-bit(64-bit)  
Windows 8.1 32-bit(64-bit)  
Windows Server 2008 32-bit(64-bit)  
Windows Server 2008 R2 32-bit(64-bit)  
Windows Server 2012  
Windows Server 2012 R2  
Linux 2.4 series kernel, 2.6.x, 3.x  
FreeBSD 7.x or most of FreeBSD  
UnixWare / Open Unix 8  
Sun Solaris x86  
Vmware  
Xen4



**Order Information:**

M/N	Description	Noted
P0-2SFP	PCI Express x4 Dual Port SFP Gigabit Server Adapter (Intel I350 Based)	Not including module

PS: The above details are only for reference, if there is any change, no inform will have