(intel)

Intel® Ethernet Converged Network Adapters XL710 10/40 GbE

Extending Intel® Virtualization Technology beyond Server Virtualization to the Network with Hardware Optimizations and Offloads for the Rapid Provisioning of Networks in an Agile Data Center

Key Features

- Single- and dual-port 40 GbE adapters

- PCI Express* (PCIe) 3.0, x8

- Exceptional Low Power Adapters

- Network Virtualization offloads including VXLAN, NVGRE, Geneve, Network Service Headers (NSH)[3]

- Intel® Ethernet Flow Director for hardware-based application traffic steering

- Intel® Data Plane Developer Kit (DPDK) optimized for efficient packet processing

- Excellent small packet performance for network appliances and Network Function Virtualization (NFV)

- Intelligent offloads to enable high performance with Intel® Xeon® processor-based servers

- I/O virtualization innovations for maximum performance in a virtualized server

- Unified networking providing a single wire support for LAN and storage: NAS (SMB, NFS) and SAN (iSCSI[1])

Product Overview

Intel continues its legacy of Ethernet leadership by introducing a 10/40 gigabit family of adapters powered by, the Intel® Ethernet XL710 Controller, codenamed Fortville.

The XL710 adapter family addresses the demanding needs of the next-generation agile data center by providing unmatched features for both server and network virtualization, flexibility for LAN and SAN networks, and proven, reliable performance.

Leading 10/40 GbE Performance

Optimized performance vectors (and key uses) include:

- **Small Packet Performance:** Maintains wire-rate throughput on smaller payload sizes (>128 Bytes for 40 GbE and >64 Bytes for 10 GbE

- **Bulk Transfer Performance:** Delivers line-rate performance with low CPU usage for large application buffers

- **Virtualized Performance:** Alleviates hypervisor I/O bottlenecks by providing flow separation for Virtual Machines (VMs)

- **Network Virtualization:** Network virtualization overlay offloads including VXLAN, NVGRE, Geneve, Network Service Headers (NSH)[3]

- **Storage Performance:** Enables competitive performance with native OS drivers and intelligent offload for NAS (NFS, SMB), and SAN (iSCSI)

A Complete, Unified Networking Solution

Converging data and storage onto one fabric eliminates the need for multiple adapters, cables, and switches. Furthermore both 10 and 40 gigabit Ethernet provides the bandwidth to converge these multiple fabrics onto a single wire. A key capability that makes all this possible is traffic class separation provided by Data Center Bridging (DCB)[1]—providing a one-wire solution with virtual pipes for the different classes of traffic:

- **Data:** Best effort delivery of standard LAN traffic

- **Storage:** Lossless network for iSCSI

- **Management:** Guaranteed connectivity of data center IP management

One Adapter, One Price

With the Intel adapters, iSCSI support is included in the price of an adapter. There is no need to purchase multiple adapters or additional licensing for an XL710 adapter. It's simple and easy. Everything you need to unify your networking is included in a single SKU. One adapter, one price.

Power Savings

Power efficiency is critical to IT specialists as energy consumption is a real OpEx concern.

- **Lowest Power Consumption:** The new generation of XL710 adapters are power misers. They deliver double the throughput with only half the power of the previous X520 generation.

- **Energy Efficient Ethernet (EEE):** Reduces power consumption during periods of low data activity. Energy is used to maintain the physical layer transmitters in a "ready state" to transmit data on the wire. During periods of low data traffic, EEE sends a low-power-idle signal to put the transmitters into a "low power state" saving power and cost. When data needs to be sent, EEE sends a normal idle signal to wake up the transmit system before data is due to be sent so there is no degradation of performance.

Server Virtualization

With Intel® Virtualization Technology (Intel® VT), the XL710 family of adapters deliver outstanding I/O performance in virtualized server environments. They reduce I/O bottlenecks by providing intelligent offloads for networking traffic per virtual machine (VM), enabling near-native performance and VM scalability. The host-based virtualization technologies supported by Intel VT include:

- **VMDq for Emulated Path:** Adapter-based VM Queue sorting enabling efficient hypervisor-based switching

- **SR-IOV for Direct Assignment:** Adapter-based isolation and switching for various virtual station instances enabling optimal CPU usage in virtualized environments

  Additionally, XL710 adapters provide Virtual Bridging[1] support that delivers both host-side and switch-side control and management of virtualized I/O as well as the following modes of virtualized operation:

- **VEPA[1]:** IEEE 802.1Qbg support for Virtual Ethernet Port Aggregator[1]

- **VEB:** Virtual Ethernet Bridge support via Intel VT

Network Virtualization

Network virtualization is the next big trend in creating an agile data center. The family of XL710 adapters are ready to help you take that next step.

- **VXLAN, NVGRE, Geneve, NSH Offloads[3]:** These stateless offloads preserve application performance for overlay networks. With these offloads it is possible to distribute network traffic across CPU cores.

  At the same time XL710 offloads LSO, GSO, and checksum from the host software reducing CPU overhead.

Intel® Ethernet Flow Director

Flow Director is an advanced traffic steering capability built into the XL710 controller. It consists of a large number of flow affinity filters that direct received packets by their flows to queues for classification, load balancing, and matching between flows and CPU cores. It eliminates context switching required within the CPU. As a result, Flow Director significantly increases the number of transactions per second and reduces latency for cloud applications like Memcached.

Intelligent Offloads

The Intel® Xeon® processor family has demonstrated increased computing performance and increased integration of key server subsystems generation after generation. To offload is to leverage the ever-escalating computing power of the Intel Xeon processor where appropriate and implement complementary accelerations in the network controller—this is what Intel refers to as "intelligent offloads." By employing a balanced hybrid of compute and offload, intelligent offloads are able to achieve the optimized point of performance and efficiency. This is most notably observed in the following usage models:

- **TCP Stateless Offloads:** Demonstrates leading performance vs. TOE solutions without restricting feature usage (TOE usage usually requires that key features be disabled). Supported stateless offloads include Checksum, TSO, VMDq, and RSS.

- **Host iSCSI Initiator:** Provides exceptional performance without the need for full-offload HBA methods.
- **Flow Classification:** Trafficking data flows across multiple consumers and connections.

Manageability

The XL710 family of adapters also incorporate the manageability required by IT personnel for remote control and alerting. Communication to the Board Management Controller (BMC) is available either through an on-board SMBus port or the DMTF-defined NC-SI, providing a variety of management protocols, including IPMI, BMC Pass-thru, OS2BMC, and MCTP/SMBus and MCTP/PCIe.

World-Class Intel Support

Intel Customer Support Services offers a broad selection of technical and customer support programs. For more information, contact your local Intel representative. Service and availability may vary by country.

GENERAL	
FEATURES	**BENEFITS**
Intel® XL710 10/40 Gigabit Ethernet Controller	• Industry-leading, energy-efficient design for next-generation 10/40 Gigabit performance and multi-core processors
QSFP+ Connectivity	• XL710 adapters with QSFP+ connections support 40GBASE-SR4, 40GBASE-LR4[1] and QSFP+ CR4 Copper Direct Attach physical media.
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 (RSS) from Microsoft or Scalable I/O on Linux*
iSCSI remote boot support	• Provides centralized storage area network (SAN) management at a lower cost than other iSCSI solutions • No additional cost for iSCSI support, included in standard adapter
Support for most network operating systems	• Enables widespread deployment
RoHS-compliant	• Complies with the European Union directive 2011/65/EU 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
Time Sync (IEEE 1588*, 802.1as)	• Enables networked Ethernet equipment to synchronize internal clocks according to a network master clock; endpoint can then acquire an accurate estimate of the master time by compensating for link latency

I/O FEATURES FOR MULTI-CORE PROCESSOR SERVERS

FEATURES	BENEFITS
Intel® Flow Director	• An advanced traffic steering capability increases the number of transactions per second and reduces latency for cloud applications like Memcached
MSI-X support	• Minimizes the overhead of interrupts • Load-balancing of interrupt handling between multiple cores/CPUs
Multiple Queues: 1,536 Tx and Rx queues per port	• Network packet handling without waiting for buffer overflow providing efficient packet prioritization • Actual number of queues will vary depending upon software implementation
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

VIRTUALIZATION FEATURES

FEATURES	BENEFITS
Next-Generation VMDq	• Up to 256 maximum VMDq VMs supported • Enhanced QoS feature by providing weighted round-robin servicing for the Tx data • Offloads the data-sorting functionality from the Hypervisor to the network silicon, improving data throughput and CPU usage • Provides QoS feature on the Tx data by providing round-robin servicing and preventing head-of-line blocking • Sorting based on MAC addresses and VLAN tags • Provides loopback functionality, where data transfer between the virtual machines within the same physical server need not go out to the wire and come back in, improving throughput and CPU usage
PC-SIG SR-IOV Implementation (128 per device)	• Provides an implementation of the PCI-SIG standard for I/O Virtualization. The physical configuration of each port is divided into multiple virtual ports. Each virtual port is assigned to an individual virtual machine directly by bypassing the virtual switch in the Hypervisor, resulting in near-native performance. • Integrated with Intel® VTI for Directed I/O (VT-d) to provide data protection between virtual machines by assigning separate physical addresses in the memory to each virtual machine • 64/port for dual port • 32/port for quad port
Virtual Machine Load Balancing (VLMB)	• Virtual Machines Load Balancing (VMLB) provides traffic load balancing (Tx and Rx) across Virtual Machines bound to the team interface, as well as fault tolerance in the event of switch, port, cable, or adapter failure
Advanced Packet Filtering	• 1536 exact matched packets (unicast or multicast) • 512 hash entries each for unicast and multicast • 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
VXLAN and NVGRE Support	• Preserves application performance in network virtualized environments

MANAGEABILITY FEATURES

FEATURES	BENEFITS
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
iSCSI Boot[1]	• 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

SPECIFICATIONS

GENERAL

Connections	Single or Dual QSFP+ cages for: • QSFP+ SR4 fiber-optic transceivers • QSFP+ LR4 fiber-optic transceivers • QSFP+ CR4 Direct Attach Cables Intel® Ethernet QSFP+ Optics required for a fiber configuration
Network Standards Physical Layer Interface	IEEE 802.3: • 40GBASE-SR4 • 40GBASE-LR4 SFF-8431: • 40GSFP+ CR4 (Direct Attach Copper) • 40GSFP+ CR4 to 4x SFP+ (Breakout Cable)

ADVANCED SOFTWARE FEATURES – ALL ADAPTERS

Adapter fault tolerance (AFT)

Switch fault tolerance (SFT)

Adaptive load balancing (ALB)

Teaming Support

IEEE 802.3ad (link aggregation control protocol)

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

Operating temperature	0 °C to 55 °C (32 °F to 131 °F)
Air Flow	Minimum of 150 LFM required
Storage temperature	-40 °C to 70 °C (-40 °F to 158 °F)
Storage humidity	Maximum: 90% non-condensing relative humidity at 35 °C
LED Indicators	LINK (solid) and ACTIVITY (blinking) LINK SPEED (green=10 Gbps; yellow=1 Gbps)

Physical Dimensions

XL710 DA2 Low-profile PCIe*	2.703 in. x 6.578 in.
Data rate supported per port	• Optical: 10 GbE/40 GbE • Direct Attach: 40 GbE
Bus type	PCI Express 3.0 (8 GT/s)
Bus width	4-lane PCI Express* and 8-lane PCI Express
Interrupt levels	INTA, MSI, MSI-X
Hardware certifications	FCC B, UL, CE, VCCI, BSMI, CTICK, KCC

Controller-processor	Intel® Ethernet Controller XL710-AM2

Power Consumption

SKU	TYPICAL POWER	MAX POWER
Single-port 40GBASE-SR4	4.2W	4.6W
Single-port 40GBASE-CR4	3.4W	3.8W
Dual-port 40GBASE-SR4	4.9 W	5.6W
Dual-port 40GBASE-CR4	3.6 W	4.0W

NETWORK OPERATION SYSTEM (NOS) SUPPORT – ALL ADAPTERS

OPERATING SYSTEM	IA-32	X86-64	IA-64
Windows Server 2012 R2*	N/A	X	N/A
Windows Server 2012 R2 Core	N/A	X	N/A
Windows Server 2012	N/A	X	N/A
Windows Server 2012 Core	N/A	X	N/A
Windows Server 2008 R2*	N/A	X	N
Windows Server 2008 R2 Core	N/A	X	N
Linux* Stable Kernel version 2.6.32/3x	X	X	X
Linux RHEL 6.5 and RHEL 7.0	X	X	X
Linux SLES 11 SP3 and SLES 12	X	X	X
FreeBSD* 9 and FreeBSD* 10	X	X	X
UEFI* 2.1	N/A	X	X
UEFI* 2.3	N/A	X	X
VMware ESXi 5.1[1] (Limited Functionality)	N/A	X	N/A
VMware ESXi 5.5[1]	N/A	X	N/A

INTEL® BACKING INFORMATION

Backed by an Intel limited lifetime warranty, 90-day money-back guarantee (U.S. and Canada), and worldwide support.

INTEL® ETHERNET CONVERGED NETWORK ADAPTER XL710 PRODUCT CODES

CONFIGURATION	PRODUCT CODE	ADAPTER HEIGHT	BULK SKU
XL710-QDA1	XL710QDA1	Low Profile	XL710QDA1BLK
XL710-QDA2	XL710QDA2[2]	Low Profile	XL710QDA2BLK

INTEL® ETHERNET QSFP+ TWINAXIAL CABLES

CABLE LENGTH (M)	PRODUCT CODE
1	XLDACBL1
3	XLDACBL3
5	XLDACBL5

INTEL® ETHERNET QSFP+ BREAKOUT CABLES[1]

CABLE LENGTH (M)	PRODUCT CODE
1	X4DACBL1
3	X4DACBL3
5	X4DACBL5

INTEL® ETHERNET QSFP+ OPTIC PRODUCT CODES

OPTIC	PRODUCT CODE
SR4 Optic	E40GQSFPSR
LR4 Optic[1]	E40GQSFPLR[1]

For Product Information

To speak to a customer service representative, 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/ethernet

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.)

[1] Feature to be enabled in Post-Launch Release.
[2] XL710-DA2 will only support ONE QSFP+ breakout cable.
[3] Network Virtualization Offload availability may vary please check both Intel® Ethernet XL710 10 GbE/40 GbE Controller Feature Software Support Matrix **https://www-ssl.intel.com/content/dam/www/public/us/en/documents/release-notes/xl710-ethernet-controller-feature-matrix.pdf** and Operating System Vendor enablement schedules.

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  [XL710QDA2](#) [XL710QDA1](#)

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- Поставка оригинальных импортных электронных компонентов напрямую с производств Америки, Европы и Азии, а так же с крупнейших складов мира;
- Широкая линейка поставок активных и пассивных импортных электронных компонентов (более 30 млн. наименований);
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Помощь Конструкторского Отдела и консультации квалифицированных инженеров;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Поставка электронных компонентов под контролем ВП;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком);
- Поставка специализированных компонентов военного и аэрокосмического уровня качества (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Actel, Aeroflex, Peregrine, VPT, Syfer, Eurofarad, Texas Instruments, MS Kennedy, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

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«JONHON» (основан в 1970 г.)

Разъемы специального, военного и аэрокосмического назначения:

(Применяются в военной, авиационной, аэрокосмической, морской, железнодорожной, горно- и нефтедобывающей отраслях промышленности)

«FORSTAR» (основан в 1998 г.)

ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

(Применяются в телекоммуникациях гражданского и специального назначения, в средствах связи, РЛС, а так же военной, авиационной и аэрокосмической отраслях промышленности).

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