



Intel® Ethernet Server Adapter XL710 for OCP



Industry-leading, energy-efficient design for 10/40GbE performance and multi-core processors.

Key Features

- OCP Spec. v2.0, Type 1
- Supports 4x10GbE, 1x40GbE or 2x40GbE configurations
- PCI Express* (PCIe) v3.0, x8
- Exceptional low power adapters
- Network Virtualization offloads including VXLAN, GENEVE, NVGRE, MPLS, and VXLAN-GPE with Network Service Headers (NSH)
- Intel® Ethernet Flow Director for hardware based application traffic steering
- Data Plane Development Kit (DPDK) optimized for efficient packet processing
- Excellent small packet performance for network appliances and Network Functions Virtualization (NFV)
- Intelligent offloads to enable high performance on servers with Intel® Xeon® Processors
- I/O virtualization innovations for maximum performance in a virtualized server
- Unified networking providing a single wire support for LAN and storageL NAS (SMB, NFS) and SAN (iSCSI)

Overview

As a founding member of OCP, Intel strives to increase the number of open solutions based on OCP specifications. The Intel® Ethernet Network Adapter XL710 for OCP is part of the Intel® Ethernet 700 Series, and offers 10/40GbE port speeds.

Intel® Ethernet 700 Series Network Adapters are the foundation for server connectivity, providing broad interoperability, critical performance optimizations, and increased agility for Telecommunications, Cloud, and Enterprise IT network solutions.

- **Interoperability** - Multiple speeds and media types for broad compatibility backed by extensive testing and validation.
- **Optimization** - Intelligent offloads and accelerators to unlock network performance in servers with Intel® Xeon® processors.
- **Agility** - Both Kernel and Data Plane Development Kit (DPDK) drivers for scalable packet processing.

Built on more than 35 years of continuous Ethernet innovations, the Intel® Ethernet 700 Series delivers networking performance across a wide range of network port speeds through intelligent offloads, sophisticated packet processing, and quality open source drivers.

All Intel® Ethernet 700 Series Network Adapters include these feature-rich technologies:

Flexible and Scalable I/O for Virtualized Infrastructures

Intel® Virtualization Technology (Intel® VT), delivers outstanding I/O performance in virtualized server environments.

I/O bottlenecks are reduced through intelligent offloads such as Virtual Machine Device Queues (VMDq) and Flexible Port Partitioning, using SR-IOV with a common Virtual Function driver for networking traffic per Virtual Machine (VM), enabling near-native performance and VM scalability. Host-based features supported include:

VMDq for Emulated Path: VMDq, enables a hypervisor to represent a single network port as multiple network ports that can be assigned to the individual VMs. Traffic handling is offloaded to the network controller, delivering the benefits of port partitioning with little to no administrative overhead by the IT staff.

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

- Up to 128 VFs, each VF can support a unique and separate data path for I/O related functions within the PCI Express* hierarchy.
- Use of SR-IOV with a networking device, for example, allows the bandwidth of a single port (function) to be partitioned into smaller slices that can be allocated to specific VMs or guests, via a standard interface.

Intel® Ethernet Adaptive Virtual Function (Intel® Ethernet AVF): A virtual function driver that eases SR-IOV hardware upgrades or changes, and preserves base mode functionality in hardware and software. Customers deploying mass-scale VMs or containers for their network infrastructure now have a common Virtual Function (VF) driver. This driver supports a Base Mode and advanced set of features on the Intel® Ethernet 700 Series.

Enhanced Network Virtualization Overlays (NVO)

Network virtualization has changed the way networking is done in the data center, delivering accelerations across a wide range of tunneling methods.

VXLAN, GENEVE, NVGRE, MPLS, and VXLAN-GPE with NSH Offloads: These stateless offloads preserve application performance for overlay networks, and the network traffic can be distributed across CPU cores, increasing network throughput.

Flexible Port Partitioning (FPP)

FPP leverages the PCI-SIG SR-IOV specification. Virtual controllers can be used by the Linux* host directly and/or assigned to virtual machines.

- Assign up to 63 Linux host processes or virtual machines per port to virtual functions.
- Control the partitioning of per port bandwidth across multiple dedicated network resources, ensuring balanced QoS by giving each assigned virtual controller equal access to the ports bandwidth.

Network administrators can also rate limit each of these services to control how much of the pipe is available to each process.

Greater Intelligence and Performance for NFV

Dynamic Device Personalization (DDP) customizable packet filtering, along with enhanced Data Plane Development Kit (DPDK), support advanced packet forwarding and high efficient packet processing for both Cloud and Network Functions Virtualization (NFV) workloads.

- DDP enables a method to change the packet processing pipeline by applying a profile package to the Intel® Ethernet 700 Series Network Adapter at runtime—resulting in improvements in throughput, latency and reduced CPU loads.
- DPDK provides a programming framework for Intel® processors and enables faster development of high-speed data packet networking applications.

Advanced Traffic Steering

Intel® Ethernet Flow Director (Intel® Ethernet FD) is an advanced traffic steering capability built into the adapter. It consists of a large number of flow affinity filters that direct receive packets by their flows to queues for classification, load balancing, and matching between flows and CPU cores.

Steering traffic into specific queues can eliminate context switching required within the CPU. As a result, Intel® Ethernet FD significantly increases the number of transactions per second and reduces latency for cloud applications like memcached.

FEATURES	DESCRIPTION
GENERAL	
QSFP+ Connectivity	<ul style="list-style-type: none"> Supports QSFP+ Direct Attach Copper (DAC) Twinaxial cable, and QSFP+ breakout cable.
Load balancing on multiple CPUs	<ul style="list-style-type: none"> Increases performance on multi-processor systems by efficiently balancing network loads across CPU core when used with Receive-Side Scaling (RSS) from Microsoft* or scalable I/O on Linux*.
Support for most network operating systems	<ul style="list-style-type: none"> Enables broad deployment for different applications.
RoHS-compliant	<ul style="list-style-type: none"> Complies with the European Union directive 2011/65/EU to reduce the use of hazardous materials.
Time Sync (IEEE 1588*, 802.1as)	<ul style="list-style-type: none"> 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

Intel® Ethernet Flow Director (Intel® Ethernet FD)	<ul style="list-style-type: none"> An advanced traffic steering capability increases the number of transactions per second and reduces latency for cloud applications like Memcached.
MSI-X support	<ul style="list-style-type: none"> Minimizes the overhead of interrupts. Load-balancing of interrupt handling between multiple cores/CPUs.
Multiple Queues: 1,536 Tx and Rx queues per device	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Lower processor usage. Checksum and segmentation capability extended to new standard packet type.

VIRTUALIZATION FEATURES

Next-Generation VMDq	<ul style="list-style-type: none"> Up to 256 maximum VMDq VMs supported. Offloads the data-sorting based on MAC addresses and VLAN tags, functionality from the Hypervisor to the network silicon, improving data throughput and CPU usage.
PCI-SIG SR-IOV Implementation (128 per device)	<ul style="list-style-type: none"> 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 VM directly by bypassing the virtual switch in the Hypervisor, resulting in near-native performance. Integrated with Intel® VT for Directed I/O (Intel® VT-d) to provide data protection between VMs by assigning separate physical addresses in the memory to each VM. 64/port for dual port.
Virtual Machine Load Balancing (VLMB)	<ul style="list-style-type: none"> VMLB provides traffic load balancing (Tx and Rx) across VMs bound to the team interface, as well as fault tolerance in the event of switch, port, cable, or adapter failure.
Advanced Packet Filtering	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Ability to create multiple VLAN segments.
VXLAN, NVGRE, GENEVE, VXLAN-GPE+NSH, MPLS	<ul style="list-style-type: none"> Preserves application performance in network virtualized environments.

MANAGEABILITY FEATURES

Preboot eXecution Environment (PXE) Support	<ul style="list-style-type: none"> Enables system boot up via the LAN (32-bit and 64-bit). Flash interface for PXE image.
Unified Extensible Firmware Interface (UEFI)	<ul style="list-style-type: none"> Enables new technologies during the pre-OS boot process and addresses legacy BIOS limitations on hardware.
Simple Network Management Protocol (SNMP) and Remote Network Monitoring (RMON) Statistic Counters	<ul style="list-style-type: none"> Easy system monitoring with industry-standard consoles.
iSCSI Boot	<ul style="list-style-type: none"> Enables system boot up via iSCSI. Provides additional network management capability.
Watchdog Timer	<ul style="list-style-type: none"> Gives an indication to the manageability firmware or external devices that the controller or the software device driver is not functioning.

SPECIFICATIONS

GENERAL

Connections	Single or dual QSFP+ cages compliant with SFF-8436, optical transceivers, direct attach copper, and QSFP+ to 4x SFP+(breakout cable)
Network Standard Physical Layer Interfaces	IEEE802.3: 40GBASE-SR4 (optical transceiver) and -CR4 (direct attach copper) SFF-8431: SFI linear (10GbE with breakout cable)

TECHNICAL FEATURES

Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
Air Flow	Minimum of 170 LFM required for CR4. Additionally, for SR4, the following is required: <ul style="list-style-type: none">• 45 °C @ 400 LFM• 40 °C @ 300 LFM• 35 °C @ 170 LFM SR4 high temp optics: <ul style="list-style-type: none">• 55 °C @ 300 LFM• 50 °C @ 250 LFM• 45 °C @ 150 LFM
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 = 40Gbps; yellow = 10Gbps)

ADAPTER FEATURES

Data Rate Supported Per Port	<ul style="list-style-type: none">• Optical: 1/10GbE• Direct Attach: 10GbE
Bus Type	PCI Express v3.0 (8 GT/s)
Bus Width	PCI Express x8
Interrupt Levels	INTA, MSI, MSI-X
Hardware Certifications	FCC A, UL, CE, VCCI, BSMI, CTICK, KCC
Controller	Intel® Ethernet Controller XL710-BM2

POWER CONSUMPTION

SKU	Typical Power	Maximum Power
Single-port 40GBASE-CR4	3.2 W	3.4 W
Single-port 40GBASE-SR4	4.1 W	4.5 W
Dual-port 40GBASE-CR4	3.9 W	4.6 W
Dual-port 40GBASE-SR4	4.8 W	5.6 W

PHYSICAL DIMENSIONS

Standard OCP v2.0 form factor, Type 1

PRODUCT ORDER CODE

Configuration	Product Code
Single Port	X710QDA1OCP
Dual port	X710QDA2OCP

SUPPORTED OPERATING SYSTEMS

For a complete list of supported network operating systems for Intel® Ethernet 700 Series Adapters visit:
[intel.com/content/www/us/en/support/contact-support.html](https://www.intel.com/content/www/us/en/support/contact-support.html)

INTEL® ETHERNET ACCESSORIES

Intel® Ethernet Optics and Cables are proven, reliable solutions for high-density Ethernet connections. Combine these accessories with Intel® Ethernet 700 Series and 500 Series Network Adapters for dependable interoperability and consistent performance across the network. Learn more at [intel.com/ethernet](https://www.intel.com/ethernet)

Warranty

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

Customer Support

For customer support options in North America visit:
[intel.com/content/www/us/en/support/contact-support.html](https://www.intel.com/content/www/us/en/support/contact-support.html)

Product Information

For information about Intel® Ethernet Products, visit:
[intel.com/ethernet](https://www.intel.com/ethernet)

No license (express or implied, by estoppel or otherwise) to any intellectual property rights is granted by this document. Intel disclaims all express and implied warranties, including without limitation, the implied warranties of merchantability, fitness for a particular purpose, and non-infringement, as well as any warranty arising from course of performance, course of dealing, or usage in trade.

This document contains information on products, services and/or processes in development. All information provided here is subject to change without notice. Contact your Intel representative to obtain the latest forecast, schedule, specifications and roadmaps.

The products and services described may contain defects or errors which may cause deviations from published specifications.

Intel, the Intel logo are trademarks of Intel Corporation or its subsidiaries in the U.S. and/or other countries.

*Other names and brands maybe claimed as the property of others.

© Intel Corporation. All Rights Reserved.

