Key Features

- Supports 4x10GbE and 2x40GbE configurations¹
- PCI Express (PCIe) v3.0, x8
- Exceptional low power adapter
- 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
- Dynamic Device Personalization (DDP) enables increased packet processing efficiency for NFV and Cloud deployments
- 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

Overview

The Intel® Ethernet Network Adapter XL710 offers dual port 40GbE, and is backwards compatible to 10GbE.

The XL710 is part of the Intel® Ethernet 700 Series Network Adapters. These adapters are the foundation for server connectivity, providing broad interoperability, critical performance optimizations, and increased agility for Communications, 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.

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, enabling near-native performance and VM scalability. These offloads include 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).

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 virtual functions (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):** Customers deploying mass-scale VMs or containers for their network infrastructure now have a common VF driver. This driver eases SR-IOV hardware upgrades or changes, preserves base-mode functionality in hardware and software, and supports an advanced set of features in 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 port’s 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 and Cloud deployments**

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

- **DDP enables workload-specific optimizations, using the programmable packet-processing pipeline.** Additional protocols can be added to the default set to improve packet processing efficiency that results in higher throughput and reduced latency. New protocols can be added or modified on-demand and applied at runtime using Software Defined Firmware or APIs, eliminating the need to reset or reboot the server. This not only keeps the server and VMs up, running, and computing, it also increases performance for Virtual Network Functions (VNFs) that process network traffic that is not included in the default firmware. [Download DDP Profiles](#)

- **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. Large numbers of flow affinity filters 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

<table>
<thead>
<tr>
<th>General</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>QSFP+ Connectivity</td>
<td>Supports QSFP connections for 40GBASE-SR4, 40GBASE-LR4 and QSFP+ CR4 Direct Attach Copper physical media</td>
</tr>
<tr>
<td>Load balancing on multiple CPUs</td>
<td>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.</td>
</tr>
<tr>
<td>Protect, Detect and Recover</td>
<td>The Intel Ethernet 700 Series implements a design philosophy of platform resiliency with 3 attributes supporting the NIST Cybersecurity Framework: Protect, Detect and Recover. These attributes verify the firmware and critical device settings with built-in corruption detection and automated device recovery to return the device to its originally programmed state.</td>
</tr>
<tr>
<td>Support for most network operating systems</td>
<td>Enables broad deployment for different applications.</td>
</tr>
<tr>
<td>RoHS-compliant</td>
<td>Complies with the European Union directive 2011/65/EU to reduce the use of hazardous materials.</td>
</tr>
<tr>
<td>Time Sync (IEEE 1588, 802.1as)</td>
<td>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.</td>
</tr>
</tbody>
</table>

## I/O Features for Multi-Core Processor Servers

| Intel® Ethernet Flow Director (Intel® Ethernet FD) | 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. |
| TX/RX IP, SCTP, TCP, and UDP checksum offloading (IPv4, IPv6) capabilities | Lower processor usage. |

## Virtualization Features

| Next-Generation VMDq | Up to 256 maximum VMDq VMs supported. |
| PCI-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 VM directly by bypassing the virtual switch in the Hypervisor, resulting in near-native performance. |
| Virtual Machine Load Balancing (VLMB) | 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. |

## Manageability Features

| Advanced Packet Filtering | 1536 exact matched packets (unicast or multicast). |
| VLAN support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags | Ability to create multiple VLAN segments. |

## Specifications

<table>
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<tr>
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<tbody>
<tr>
<td>Connections</td>
<td>Dual QSFP+ cages supporting Direct Attach Copper (DAC) Twinaxial cable and optical transceivers</td>
</tr>
<tr>
<td>Network Standard Physical Layer Interfaces</td>
<td>IEEE802.3: 40GBASE-SR4 and -LR4 SFF-8431: 40GSFP+ CR4 (DAC), 40GSFP+ CR4 to 4x SFP+ (Breakout Cable)</td>
</tr>
</tbody>
</table>
## Technical Features

**Operating Temperature**  
0 °C to 55 °C (32 °F to 131 °F)

**Air Flow**  
150 LFM minimum required  
For LR4 the following is required:  
- 55 °C @ 400 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  
  - DAC: 40GbE  
  - 4x SFP+ Breakout Cable: 10GbE

**Bus Type**  
PCI Express 3.0 (8 GT/s)

**Bus Width**  
PCI Express x8

**Interrupt Levels**  
INT A, MSI, MSI-X

**Hardware Certifications**  
FCC A, UL, CE, VCCI, BSMI, CTICK, KCC

**Controller**  
Intel® Ethernet Controller XL710-BM2

## Power Consumption

<table>
<thead>
<tr>
<th>SKU</th>
<th>Typical Power</th>
<th>Maximum Power</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dual-port 40GBASE-CR4</td>
<td>3.6 W</td>
<td>4.0 W</td>
</tr>
<tr>
<td>Dual-port 40GBASE-SR4</td>
<td>4.9 W</td>
<td>5.6 W</td>
</tr>
<tr>
<td>Dual-port 40GBASE-LR4</td>
<td>8.5 W</td>
<td>9.5 W</td>
</tr>
</tbody>
</table>

## Physical Dimensions

**Dimension**  
167mm x 69mm

## Supported Operating Systems

For a complete list of supported network operating systems for Intel® Ethernet 700 Series Adapters visit:  
intel.com/support/EthernetOS

## Product Order Codes

**Dual Port**  
Cisco Product ID

**Server Installed**  
UCSC-PCIE-ID40GF

**Spare adapter**  
UCSC-PCIE-ID40GF=

Cisco servers supported*: C240 M6, C245 M6, C220 M5, C240 M5, C480 M5, S3260 M5, C220 M4, C240 M4, C460 M4

*Server compatibility indicated as of the date of this publication.  
For up-to-date server compatibility, please check:  
https://ucshcitoool.cloudapps.cisco.com/public/

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1. See Ethernet Port Configuration Tool (EPCT) for more information about supported configurations.  
   Download EPCT.

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