

# Intel® Ethernet Network Adapter E810-XXVDA4

Increase port density and optimize workload performance

## Key Features

- Quad Port SFP28
- PCI Express (PCIe) 4.0 x16
- Application Device Queues (ADQ)
- Dynamic Device Personalization (DDP)
- Supports both RDMA iWARP and RoCEv2
- IEEE 1588 Precision Time Protocol (PTP)

Intel® Ethernet 800 Series network adapters improve application efficiency and network performance with innovative and versatile capabilities. With its high 10/25GbE port density, the E810-XXVDA4 adapter is designed to optimize high-performance system workloads for Cloud and Communications.

## Performance optimizations and port density for Cloud and Storage deployments

- Four 25GbE SFP28 ports deliver multiple high-speed connections
- Application Device Queues (ADQ) provides dedicated traffic queues to reduce latency and increase application throughput
- Dynamic Device Personalization enables protocol-specific traffic acceleration<sup>1</sup> to improve packet processing efficiency and reduce CPU overhead
- iWARP and RoCEv2 support provides high-speed, low-latency, high-throughput connectivity for Cloud storage targets

## Accelerated packet processing and PCIe slot savings for Communications workloads

- Four 25GbE SFP28 ports deliver greater bandwidth in slot-constrained RAN systems
- Enhanced Data Plane Development Kit (DPDK) support increases packet processing speeds
- Dynamic Device Personalization enables protocol-specific traffic acceleration and reduces CPU overhead for emerging high-bandwidth workloads
- IEEE 1588 PTP v2 Precision Time Protocol support enables precise clock synchronization across 5G

## Flexible Configurations

Intel® Ethernet Optics, and specification-compliant Active Optical Cables and Direct Attach Cables, can support multiple configurations.



E810-XXVDA4



Intel® Ethernet SFP28 Optics  
(SR, and SR and LR extended temp)

# All 800 Series products include these technologies

## Greater Predictability at Scale

As modern data centers scale, a key challenge is to provide scalable, predictable application-level performance. Application Device Queues (ADQ) technology improves performance scalability and predictability by dedicating queues to key workloads, delivering predictable high performance through dramatically reduced jitter.

Increasing the predictability of application response times by lowering jitter enables more compute servers to be assigned to a task and can allow more users to access the system, providing a better end-user experience. Even applications that are not large scale can benefit from higher consistency, enabling them to meet service-level agreements (SLAs) more easily.

ADQ enables application-specific data steering, signaling, and rate limiting using an optimized application thread to device data path. This ability to dedicate queues and shape network traffic not only increases performance, it reduces latency and improves throughput.

## Increase Throughput and Lower Latency

Remote Direct Memory Access (RDMA) provides high throughput and low-latency performance for modern high-speed Ethernet by eliminating three major sources of networking overhead: TCP/IP stack process, memory copies, and application context switches. Intel Ethernet 800 Series Network Adapters support all Ethernet-based storage transport, including iWARP, RoCEv2, and NVMe over Fabric.

**RoCE (RDMA over Converged Ethernet):** RoCEv2 substitutes the InfiniBand physical layer and data link layer with Ethernet, operates on top of UDP/IP, and is routable over IP networks.

**iWARP, IETF standard protocols based:** Delivers RDMA on top of the pervasive TCP/IP protocol. iWARP RDMA runs over standard network and transport layers and works with all Ethernet network infrastructure. TCP provides flow control and congestion management and does not require a lossless Ethernet network. iWARP is a highly routable and scalable RDMA implementation.

## Improve Packet Processing Efficiency

Dynamic Device Personalization (DDP) customizable packet filtering, along with enhanced DPDK, supports advanced packet forwarding and highly-efficient packet processing for both Cloud and NFV workloads.

The 800 Series firmware loads an enhanced DDP profile with many workload-specific protocols at driver initialization for greater flexibility. When multiple 800 Series adapters are present in a system, the pipeline on each adapter can be programmed independently with a different DDP profile.

## Increase Timing Accuracy

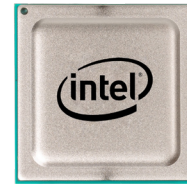
Intel Ethernet 800 Series supports both IEEE 1588 PTP v1 and v2 with two-step option. The products provide increased accuracy at single-digit nanosecond level, and can report the reception time for every packet. This level of timing accuracy can help ensure tight synchronization across network deployments ranging from 5G RAN to financial services, industrial automation, and energy monitoring.

## Protect, Detect, and Recover

Zero Trust is a security design strategy centered on the belief that organizations, by default, should not automatically trust any request for system access. This includes requests coming from outside, as well as inside its perimeters. Zero Trust demands that every access request be verified before granting access.

The 800 Series implements a design philosophy of platform resiliency with 3 attributes compliant with the NIST Cybersecurity Framework, including NIST 800-193 Platform Firmware Resiliency Guidelines: Protect, Detect and Recover. By design, the Hardware Root of Trust in the 800 Series protects the firmware and critical device settings with authentication for every access. Signed firmware updates and the Hardware Root of Trust protects and verifies critical device settings with built-in corruption detection and automated device recovery. Together these features ensure the device safely returns to its originally programmed state.

# Intel® Ethernet 800 Series Network Adapters are designed with Intel® Ethernet Controller E810 and include these features<sup>2</sup>.



## Host Interface

- Compliance with PCIe 4.0
- Concurrency for 256 non-posted requests

## Software Interface

- Base mode VF compatibility with [Intel® Adaptive Virtual Functions Specification](#)
- Tx/Rx Queues
  - 2048 Tx queues and 2048 Rx queues
  - Dynamic allocation of queues to functions and VSIs
- Interrupts
  - 2048 interrupts vectors, allocated in a flexible manner to queues and other causes
  - Multiple interrupt moderation schemes
  - 20M interrupts/sec
- Control Queues (a.k.a. Admin Queues)
  - Mailbox Queues for PF-VF and driver-driver
  - Admin Queues for Software-Firmware control flows
  - Sideband Queues for Software to access IPs inside the E810
- 256 Tx Doorbell (DB) Queues
- 512 Tx Completion Queues
- Quanta Descriptor (QD) Queue per Tx queue. Quanta information is also embedded in the Tx doorbell
- Programmable Rx descriptor fields

## Packet Processing

- Enhanced Data Plane Development Kit (DPDK)
- General
  - Stages of parsing, switching, ACLs, classification, packet modification
  - Programmable packet processing pipeline
  - Profile based
  - Programmable actions
  - Propagation of priorities between stages
- Parser
  - Parses up to 504B from packet header
  - Parse Graph based
  - Session-based parsing
  - Programmable parse engine
- Binary Classifier (VEB Switch)
  - 768 switch ports (VSIs)
  - Programmable forwarding rules
  - Storm Control

- ACLs
  - 8K programmable TCAM entries
  - Tiling capability to n\*40b width
- Classification Filters
  - Hash-based statistical distribution
  - Intel® Ethernet Flow Director (Intel® Ethernet FD) flow-based classification
  - Flow-based identification of iWARP and RoCE flows
  - Programmable rules
- Modifier
  - Insert (Tx), remove (Rx), and modify of packet VLANs
  - L3 and L4 checksums and CRC

## Virtualization

- Host virtualization via VMDQ and SR-IOV
- Up to 256 SR-IOV Virtual Functions
- Stateless offloads for tunneled packets (network virtualization support)
- Malicious VF protection
- Virtual machine load balancing (VMLB)
- Advanced packet filtering
- VLAN support with VLAN tag insertion, stripping and packet filtering for up to 4096 VLAN tags
- VxLAN, GENEVE, NVGRE, MPLS, VxLAN-GPE with Network Service Headers (NSH)
- Intel® Ethernet Adaptive Virtual Function drivers

## RDMA

- iWARP and RoCEv2
- 256K Queue Pairs (QPs)
- Send Queue Push Mode

*Note:* RDMA is not supported when the E810 is configured for >4-port operation.

## QoS

- WFQ Transmit scheduler with nine programmable layers
- Pipeline sharing and starvation avoidance
- QoS via 802.1p PCP or Differentiated Services Code Point (DSCP) value
- Packet shaping

## Manageability

- SMBus operating at up to 1Mb/s
- DMTF-compliant NC-SI 1.1 Interface at 100Mb/s
- MCTP over PCIe and SMBus
- Enterprise-level management schemes via local BMC
- SNMP and RMON statistic counters
- Watchdog timer
- PLDM over MCTP; PLDM Monitoring; PLDM firmware update; PLDM for RDE
- Firmware Management Protocol support

## Power Management

- Supports PCI power management states D3hot and D3cold

## Time Synchronization

- Time stamp with each Rx packet
- Selective time stamps for Tx packets
- IEEE 1588 PTP v1 and v2 support
- Time synchronization signaling with other local platform ingredients

## Pre-Boot

- Signed UEFI option ROM compatible with HTTPS boot

## Security

- Hardware-based Root of Trust
- Authentication on NVM Read and Power On
- Built-in detection of firmware/critical setting corruption with automated device recovery

## Adapter Features

Data Rate Supported	25/10GbE per port
Bus Type/Bus Width	PCIe 4.0 x16
Performance	Full line rate with either PCIe 4.0 x16 or 3.0 x16 active lanes, or PCIe 4.0 x8 active lanes
Hardware Certifications	FCC B, UL, CE, VCCI, BSMI, CTICK, KCC
RoHS-compliant	Product is compliant with EU RoHS Directive 2011/65/EU (Directive 2011/65/EU) and its amendments (e.g. 2015/863/EU)
Controller	Intel® Ethernet Controller E810-CAM1
Bracket	Full height (Lowest port number is at top of bracket)
Dimension	6.58 in x 4.37 in (167 mm x 111 mm)

## Power Consumption

DACs	Typical Power	Max Power
25GbE Max	14.2 W	16.7 W
Idle (no traffic)	12.9 W	15 W
<b>Optics</b>		
25GbE Max	18 W	22.9 W
Idle (no traffic)	16.5 W	21.4 W
SFP28 Max Power Per Port*		1.5 W

\*The max power per port is not an additional power requirement, it is included in the optics maximum power figures listed in the Power Consumption table.

## Technical Specifications

Airflow*	<b>Extended Temp 1.5W Optics</b> 150 LFM at 45 °C Ambient 300 LFM at 55 °C Ambient 500 LFM at 60 °C Ambient	<b>Commercial Temp DAC:</b> 100 LFM at 45 °C Ambient 150 LFM at 55 °C Ambient 175 LFM at 60 °C Ambient	<b>Commercial Temp 1.5W Optics</b> 450 LFM at 45 °C Ambient
Storage Humidity	Maximum: 90% non-condensing relative humidity at 35 °C		
Storage Temperature	-40 °C to 70 °C (-40 °F to 158 °F)		
Operating Temperature	0 °C to 60 °C (32 °F to 140 °F)		
LED Indicators	ACTIVITY (blinking) NO ACTIVITY (off) LINK SPEED (green = 25GbE; amber = less than 25GbE; off = no link)		

\*Testing performed in a closed-loop wind tunnel at the temperatures listed in table. Max operating ambient temperature 60 °C. Non-operating ambient temperature range: -40 °C to +70 °C

## Supported Physical Layer Interfaces

	25Gbps	10Gbps
DACs	25GBASE-CR (802.3by 25Gb Twinax)	SFP+ Twinax
Optics and AOCs	25GBASE-SR 25GBASE-LR	10GBASE-SR 10GBASE-LR

## Supported Cisco Optics and Cables

These optics and cables have been tested for compatibility and are approved for use with Intel® Ethernet Network Adapter E810-XXVDA4 (as of the time of this publication). For the latest update, check the UCS Technical Specs, and consult Cisco Compatibility Matrix: <https://tmgmatrix.cisco.com>

Cisco Product ID	Description
QSFP-4SFP25G-CU1M	Cisco 100GBASE QSFP to 4xSFP25G Passive Copper Splitter Cable, 1-meter
QSFP-4SFP25G-CU2M*	Cisco 100GBASE QSFP to 4xSFP25G Passive Copper Splitter Cable, 2-meter
QSFP-4SFP25G-CU3M*	Cisco 100GBASE QSFP to 4xSFP25G Passive Copper Splitter Cable, 3-meter
SFP-25G-AOC10M	Cisco 25GBASE-AOC SFP28 Active Optical Cable, 10-meter
SFP-H25G-CU1M	Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 1-meter
SFP-H25G-CU2M*	Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 2-meter
SFP-H25G-CU3M*	Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 3-meter
SFP-H25G-CU5M*	Cisco 25GBASE-CR1 SFP28 Passive Copper Cable, 5-meter
SFP-10/25G-CSR-S	Cisco 10/25GBASE-CSR SFP28 Module for MMF
SFP-25G-SR-S	Cisco 25GBASE-SR SFP28 Module for MMF, S-Class
SFP-10/25G-LR-S	Cisco 10/25GBASE-CSR SFP28 Module for MMF, S-Class
SFP-H10GB-CU1M	Cisco 10GBASE-CU SFP+ Cable 1 Meter, passive
SFP-H10GB-CU3M	Cisco 10GBASE-CU SFP+ Cable 3 Meter, passive
SFP-H10GB-CU5M	Cisco 10GBASE-CU SFP+ Cable 5 Meter, passive
SFP-10G-AOC7M	Cisco 10GBASE SFP+ Active Optical Cable, 7-meter
SFP-10G-SR-S	Cisco 10GBASE-SR SFP+ Module for MMF
SFP-10G-LR	Cisco 10GBASE-LR SFP+ Module for SMF
SFP-10G-SR	Cisco 10GBASE-SR SFP+ Module for MMF

\*RS-FEC enablement is required for 2M, 3M, and 5M DACs.

## Intel® Ethernet Optics

Intel® Ethernet Optics are proven, reliable solutions for high-density Ethernet connections. Combine these accessories with Intel® Ethernet 800 Series Network Adapters for dependable interoperability and consistent performance across the network.

Learn more at [intel.com/ethernetproducts](https://intel.com/ethernetproducts)

## Supported Operating Systems

For a complete list of supported network operating systems for Intel® Ethernet 800 Series Network Adapters visit:

[intel.com/support/EthernetOS](https://intel.com/support/EthernetOS)

## Product Order Codes

Dual Port	Cisco Product ID
Server Installed	UCSC-P-18Q25GF
Spare adapter	UCSC-P-18Q25GF=

Cisco servers supported\*: C220 M6, C240 M6, C225 M6, C245 M6, C220 M7, C240 M7

\*Server compatibility indicated as of the date of this publication.

For up-to-date server compatibility, please check:

<https://ucsheltool.cloudapps.cisco.com/public/>

1. Dynamic Device Personalization (DDP) enables protocol-specific traffic acceleration, to deliver throughput improvement and latency reduction for some cloud workloads
2. See the [Intel® Ethernet Controller E810 Datasheet](#) for the full list of product features.

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 Corporation. Intel, the Intel logo, and other Intel marks are trademarks of Intel Corporation or its subsidiaries.

Other names and brands may be claimed as the property of others.