

# Intel® Ethernet Network Adapter E810-XXVDA4 for OCP 3.0

Increase port density and optimize workload performance

## Key Features

- Quad Port SFP28
- OCP NIC 3.0 Small Form Factor
- PCI Express (PCIe) 4.0 x16
- Application Device Queues (ADQ)
- Dynamic Device Personalization (DDP)
- Supports both RDMA iWARP and RoCEv2

Intel® Ethernet 800 Series Network Adapters improve application efficiency and network performance with innovative and versatile capabilities. With four 25GbE SFP28 ports and key performance optimizations, the E810-XXVDA4 for OCP 3.0 supports solutions across Cloud, Enterprise, and Communications.

The OCP NIC 3.0 specification defines a standardized design for a new generation of network adapters. Simple and straightforward form factors, clear manageability requirements, and improved serviceability help simplify deployment for current and emerging capabilities.

## 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 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 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 support enables precise clock synchronization across 5G

## Flexible Configurations

Intel Ethernet Optics, and commonly available Active Optical Cables and Direct Attach Cables, can support multiple configurations.



E810-XXVDA4 for OCP 3.0



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

## Intel® Ethernet 800 Series Network Adapters include these technologies:

### Application Device Queues (ADQ) for Predictability at Scale

As modern data centers scale, a key challenge is to provide scalable, predictable application-level performance. 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.

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

### Improve Packet Processing Efficiency with Dynamic Device Personalization (DDP)

DDP customizable packet filtering, along with enhanced DPDK, support 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.

### IEEE 1588 Precision Time Protocol (PTP)

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.

### Increase Throughput and Lower Latency with Remote Direct Memory Access (RDMA)

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.

### 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                                                                                                        |
| Hardware Certifications       | FCC A, 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                                                                                |
| Dimension                     | 116.6 mm x 76 mm                                                                                                    |
| Form Factor                   | OCN NIC 3.0 Small Form Factor                                                                                       |
| Manageability for OCP NIC 3.0 | RBT, and RBT + MCTP                                                                                                 |

## Supported Physical Layer Interfaces

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

## Technical Specifications

|                                            |                                                                                                          |                                |                                       |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------|
| Airflow                                    |                                                                                                          | Direct Attach Cable 70 °C case | Optical Transceiver (1.5W) 85 °C Case |
| Hot aisle - heat sink to port (5 - 65 °C)  |                                                                                                          | Tier 3                         | Tier 7                                |
| Cold aisle - port to heat sink (5 - 45 °C) |                                                                                                          | Tier 2                         | Tier 2                                |
| 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 65 °C (32 °F to 149 °F)                                                                          |                                |                                       |
| LED Indicators                             | ACTIVITY (blinking) NO ACTIVITY (off) LINK SPEED (green = 25GbE; amber = less than 25GbE; off = no link) |                                |                                       |

## 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)

## Intel® Ethernet Accessories

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)

## Warranty

Intel limited lifetime hardware warranty, 90-day money-back guarantee (US 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://intel.com/content/www/us/en/support/contact-support.html)

## Product Information

For information about Intel® Ethernet products and technologies visit: [intel.com/ethernet](https://intel.com/ethernet)

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.

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