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Intel® Ethernet Network Adapter E810-XXVDA2 for OCP 3.0

10/25GbE network adapter optimized to meet the performance needs for dynamic workloads

Key Features

- OCP NIC 3.0 Small Form Factor
- PCI Express (PCIe) 4.0 x8
- 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 two 25GbE SFP28 ports and key performance optimizations, the E810-XXVDA2 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 for Cloud, Enterprise, and Storage deployments

- 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 storage targets and initiators

### Accelerated packet processing for Communications workloads

- 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 RAN deployments

Flexible Configurations

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

E810-XXVDA2 for OCP 3.0
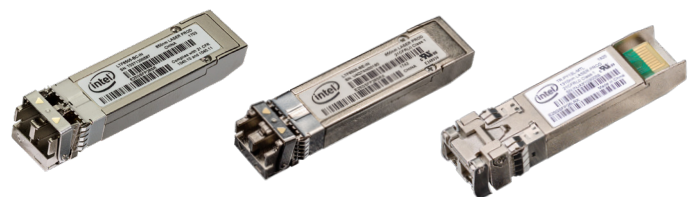
Intel® Ethernet SFP28 Optics
(SR, and SR and LR extended temp)

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.

For more information about Intel® Ethernet Technologies, including videos and resource libraries, visit intel.com/ethernet

Intel® Ethernet 800 Series Network Adapters designed with Intel® Ethernet Controller E810-XXVAM2 include these features[1].

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
  - Standard: 100KHz (100Kb/s)
  - Full speed: 400KHz (400Kb/s)
  - Fast Mode 1MHz (1Mb/s)
- DMTF-compliant NC-SI 1.1 Interface at 100Mb/s
- MCTP over PCIe and SMBus
- 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 WoL in MAIN Mode and AUX Mode

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 x8
Hardware Certifications	BSMI, CE, CMIM, FCC, ICES, KCC, RCM, UKCA, cURus, and VCCI
BMSI RoHS and RoHS-compliant	Product is compliant with Taiwan Bureau of Standards, Metrology and Inspection (BMSI), and EU RoHS Directive 2 2011/65/EU (Directive 2011/65/EU) and its amendments (e.g. 2015/863/EU)
Controller	Intel® Ethernet Controller E810-XXVAM2
Dimensions	115 mm x 76 mm (OCP NIC 3.0 Small Form Factor)
Form Factor	OCP 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 25GBASE-LR	10GBASE-SR 10GBASE-LR

Product Order Code

Configuration	Product Code
Dual Port	E810XXVDA2OCPV3

Power Consumption

DACs	Typical Power	Max Power
25GbE Max	8.9 W	10.1 W
Idle (no traffic)	7.9 W	8.9 W
Optics		
25GbE Max	12.5 W	14.3 W
Idle (no traffic)	11.6 W	13.1 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.

Note: Power consumption of transceivers varies. Optical Transceivers are included in the Active Cables device category in the OCP NIC 3.0 specification.

Technical Specifications

Airflow	Direct Attach Cable 70 ºC case	Optical Transceiver (1.5W) 70 ºC Case	Optical Transceiver (1.5W) 85 ºC Case
Hot aisle - heatsink to port (5 - 65 ºC)	Tier 3	Tier 7 at 45 ºC	Tier 4
Cold aisle - port to heatsink (5 - 45 ºC)	Tier 2	Tier 2	Tier 2
Storage Humidity	Maximum: 90% non-condensing relative humidity at 35 ºC		
Storage Temperature	-40 ºC to 70 ºC (-40 ºF to 158 ºF)		
Operating Temperature	0 ºC to 65 ºC (32 ºF to 149 ºF)		
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

Intel® Ethernet Optics

Combine high-density Ethernet connections with Intel® Ethernet 800 Series Network Adapters for dependable interoperability and consistent performance across the network. Intel Ethernet Optics have been extensively tested for compatibility with Intel Ethernet Network Adapters. Learn more at 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

Product Information

For information about Intel® Ethernet products and technologies visit: intel.com/ethernet

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