Product Brief

intel. + **DELL** Technologies

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 1588v2 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 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 1588v2 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.

Software Tools and Management

Intel® Ethernet Network Adapters support Dell's Lifecycle Controller. The Lifecycle Controller is coupled with the Dell Remote Access Card (DRAC) service processor to provide embedded system management. The Lifecycle Controller enables both local and remote access to manage initial setup and configuration of the BIOS settings on the platform, setup, and configuration of Intel Ethernet adapters, update of all the platform firmware, and the deployment of the operating systems.

Intel® Advanced Network Services (Intel® ANS) include new teaming technologies and techniques such as Virtual Machine Load-Balancing (VMLB) for Hyper-V environments. Intel ANS also provides a variety of teaming configurations for up to eight ports, and support for teaming mixed vendors' server adapters. Intel ANS includes support for 802.1Q VLANs, making Intel ANS one of the most capable and comprehensive tools for supporting server adapter teaming.

PowerEdge and Config PowerEdge (two different groups at Dell) are offering same product.

Intel® Ethernet 800 Series Network Adapters are designed with Intel® Ethernet Controller E810 and include these features².

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 D0, D3hot, 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	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-CAM1
Bracket	Full height
Dimension	6.58 in x 4.37 in (167mm x 111mm)

Power Consumption

DACs	Typical Power	Max Power
25GbE Max	14.2 W	16.7 W
Idle (no traffic)	12.9 W	15 W
Optics		
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*	Dell iDRAC closed loop thermals
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	-5 ºC to 55 ºC (23 ºF to 131 ºF)
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 ºC. Non-operating ambient temperature range: -40 ºC to +70 ºC

Product Order Codes for PowerEdge

Description	SKU	DPN	Intel MM#
E810-XXVDA4-FH	Factory installed: 540-BDDR Customer kit: 540-BDDQ	VK88G	99A3KW

Intel® Ethernet Optics

Intel® Ethernet SFP28 Optics provide unmatched flexibility for LAN and SAN networking. Intel Ethernet Optics undergo extensive compatibility testing for trouble-free interoperability, and deliver proven, reliable performance.

Intel® Ethernet SFP28 Optics	Data Protocol	Dell Tech SKU	Intel MM#
SFP28 SR Optic, Customer Kit	SR 1x25GbE	407-BCBF	958203
SFP28 Extended Temp Optic, Customer Kit	SR 1x25GbE	407-BCBK	960605

Supported Physical Layer Interfaces

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

Dell Tech Backing Information

Standard one-year warranty.

To see the full line of Intel Ethernet Network Adapters visit www.dell.com or contact your Dell Technologies sales representative.

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.