

Product Brief

Intel® Ethernet Network Adapter E810-2CQDA2

Up to 200Gbps for bandwidth-intensive workloads

Key Features

- Dual-Port QSFP28
- PCI Express (PCIe) 4.0 x16
- Ethernet Port Configuration Tool (EPCT)
- Application Device Queues (ADQ)
- Dynamic Device Personalization (DDP)
- Supports both RDMA iWARP and RoCEv2

Meet the demanding bandwidth needs of advanced Communications, Cloud, and Storage deployments and improve application efficiency and network performance with innovative and versatile capabilities that optimize high-performance server workloads.

The Intel® Ethernet Network Adapter E810-2CQDA2 delivers up to 200Gbps of total bandwidth in systems¹ that are PCIe 4.0 compliant. Each QSFP28 port supports up to 100Gbps, providing the functionality and throughput of two 100Gbps adapters in a single bifurcated PCIe 4.0 x16 slot.

Performance for Cloud Applications

Delivers the bandwidth and increased application throughput required for demanding cloud workloads including edge services, web servers, database applications, caching servers, and storage targets.

- Application Device Queues (ADQ) improves application response time predictability using advanced traffic-steering technology
- Dynamic Device Personalization (DDP) enhances packet classification capabilities, to deliver up to 3x throughput improvement² for some cloud workloads
- Supports both RDMA iWARP and RoCEv2 for high-speed, low-latency connectivity to storage targets, hybrid cloud, and HPC

Optimizations for Communications Workloads

Optimizations for Communications Workloads Provides packet classification and sorting optimizations for high-bandwidth network and communications workloads, including mobile core, 5G RAN, and network appliances.

- Dynamic Device Personalization (DDP) supports existing and new communications-specific protocols improving packet-processing efficiency up to 3x for some Network Functions Virtualization (NFV) workloads
- IEEE 1588 Precision Time Protocol (PTP) v2 enables precise clock synchronization across the 5G RAN deployments
- Enhanced Data Plane Development Kit (DPDK) support increases packet-processing speeds

Connect to a wide range of switch speeds and media types



E810-2CQDA2

Versatile Port Configurations with EPCT

Using EPCT, each port supports up to 100Gbps and can be programmed to act as different physical adapters.

The E810-2CQDA2 supports these configurations:

- 2x100Gb
- 4x50Gb
- 8x25Gb

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 Network Adapter E810-2CQDA2 is designed with two Intel® Ethernet 800 Series Controllers and includes these features³.



E810-CAM1



E810-CAM1

Host Interface

- Compliance with PCIe 4.0
- Concurrency for 512 non-posted requests*

Software Interface

- Base mode VF compatibility with [Intel® Adaptive Virtual Functions Specification](#)
- Tx/Rx Queues
 - 4,096 Tx queues and 4,096 Rx queues*
 - Dynamic allocation of queues to functions and VSIs
- Interrupts
 - 4,096 interrupts vectors*, allocated in a flexible manner to queues and other causes
 - Multiple interrupt moderation schemes
 - 40M 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
- 512 Tx Doorbell (DB) Queues*
- 1,024 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)
 - 1,536 switch ports (VSIs*)
 - Programmable forwarding rules
 - Storm Control

- ACLs
 - 16K 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 512 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 8,192 VLAN tags*
- VxLAN, GENEVE, NVGRE, MPLS, VxLAN-GPE with Network Service Headers (NSH)
- Intel® Ethernet Adaptive Virtual Function drivers

RDMA

- iWARP and RoCEv2
- 512K 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

Ethernet Port Configuration Tool (EPCT)

- Available for all 100Gb Intel® Ethernet 800 Series Network Adapters
- Offers system configuration options for high-density, port-constrained network environments Up to six configurations to choose from
- Validate once, reconfigure as often as needed
- [Watch the video](#), or [see the infographic](#)

*Assumes system with bifurcation, with both LAN controllers registered on their respective buses.

**E810-2CQDA2 supports 512 total VFs (256 VFs per controller) however, there may be operating system restrictions. Please check with your OS vendor.

Adapter Features

| | |
|------------------------------|--|
| Data Rate Supported | 100/50/25/10GbE per port |
| Bus Type/Bus Width | PCIe 4.0 x16 Note: full 200Gbps performance requires PCIe slot bifurcation enabled in the system BIOS |
| 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 (two controllers per adapter) |
| Bracket | Full height |
| Dimension | 167 mm x 111 mm |
| Port Bifurcation | The platform can affect the port numbering of the card and how PCIe bifurcation is implemented. If the platform requires PCIe lane reversal to the slot, the physical network port order (as marked on the adapter faceplate) may be reversed unless the BIOS maintains the PCIe bus enumeration, thereby configuring the lowest ordered physical PCIe lanes to the lowest PCIe bus number assigned to the slot. |

Power Consumption

| DACs | Typical Power | Max Power |
|----------------------------|---------------|-----------|
| 100GbE Max | 21.8 W | 29.6 W |
| Idle (no traffic) | 19.2 W | N/A |
| Optics | | |
| 100GbE Max | 25.3 W | 33.5 W |
| Idle (no traffic) | 22.8 W | N/A |
| QSFP28 Max Power Per Port* | | 7 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.

Product Order Codes for PowerEdge

| Description | SKU | Dell Tech | Intel MM# |
|-------------|---|-----------|-----------|
| E810-2CQDA2 | Factory installed: TBD Customer kit: TBD | Y64J4 | 99CGHM |

Supported Physical Layer Interfaces

| | 100Gbps | 50Gbps | 25Gbps | 10Gbps |
|-----------------|-----------------------------------|---|-------------------------------|----------------|
| DACs | IEEE 100GBASE-CR2 100GBASE-CR4 | IEEE 50GBASE-CR 25G/50G Consortium 50GBASE-CR2 | 25GBASE-CR (CA-N, CA-S, CA-L) | SFP+ 10GbE DAC |
| Optics and AOCs | CAUI-4 100GAUI-2 100GAUI-4 | IEEE 50GAUI-1 IEEE 50GAUI-2 IEEE LAUI-2 | 25GBASE-SR/LR | 10GBASE-SR/LR |

Technical Specifications

| | | | |
|-----------------------|--|---|---|
| Airflow* | Commercial Temp DAC Dual Port 250 LFM @ 55 °C ambient Dual Port 150 LFM @ 45 °C ambient | Commercial Temp Optics (2 W) Dual Port 600 LFM @ 55 °C ambient Dual Port 300 LFM @ 45 °C ambient | Extended Temp* Optics (2 W) Dual Port 250 LFM @ 55 °C ambient Dual Port 200 LFM @ 45 °C ambient *85 °C max case |
| 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 = 100GbE; amber = less than 100GbE; off = no link) | | |

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. Requires x16 slot bifurcation.
2. Dynamic Device Personalization (DDP) enables protocol-specific traffic acceleration, to deliver throughput improvement and latency reduction for some cloud workloads
3. See the [Intel® Ethernet Controller E810 Datasheet](#) for the full list of product features.

The information contained in this document, including all instructions, cautions, and regulatory approvals and certifications, is provided by Intel and has not been independently verified or tested by Dell. Dell cannot be responsible for damage caused as a result of either following or failing to follow these instructions. All statements or claims regarding the properties, capabilities, speeds or qualifications of the part referenced in this document are made by Intel and not by Dell. Dell specifically disclaims knowledge of the accuracy, completeness or substantiation for any such statements. All questions or comments relating to such statements or claims should be directed to Intel. Visit www.dell.com for more information.

INFORMATION IN THIS DOCUMENT IS PROVIDED IN CONNECTION WITH INTEL® PRODUCTS. NO LICENSE, EXPRESS OR IMPLIED, BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT. EXCEPT AS PROVIDED IN INTEL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, INTEL ASSUMES NO LIABILITY WHATSOEVER, AND INTEL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY, RELATING TO SALE AND/OR USE OF INTEL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT. UNLESS OTHERWISE AGREED IN WRITING BY INTEL, THE INTEL PRODUCTS ARE NOT DESIGNED NOR INTENDED FOR ANY APPLICATION IN WHICH THE FAILURE OF THE INTEL PRODUCT COULD CREATE A SITUATION WHERE PERSONAL INJURY OR DEATH MAY OCCUR.

Intel may make changes to specifications and product descriptions at any time, without notice. Designers must not rely on the absence or characteristics of any features or instructions marked "reserved" or "undefined." Intel reserves these for future definition and shall have no responsibility whatsoever for conflicts or incompatibilities arising from future changes to them. The information here is subject to change without notice. Do not finalize a design with this information. The products described in this document may contain design defects or errors known as errata which may cause the product to deviate from published specifications. Current characterized errata are available on request. Contact your local Intel sales office or your distributor to obtain the latest specifications and before placing your product order. Copies of documents which have an order number and are referenced in this document, or other Intel literature, may be obtained by calling 1-800-548-4725, or by visiting Intel's Web Site at <http://www.intel.com>.

© 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.