

ThinkSystem Intel E610 10GBASE-T Ethernet Adapters

Product Guide

Simplify network management and enhance control with the ThinkSystem Intel E610 10GBASE-T Ethernet Adapters. These adapters offer industry-leading power efficiency, comprehensive manageability (including Secure SPDM, PLDM, BMC pass-through, SMBus, RMII, and NC-SI), and enhanced security with modern, standards-based cryptographic features and a hardware Root of Trust. The Intel E610 adapters provides versatile and optimized connectivity for applications from cloud to edge.

The ThinkSystem Intel E610 10GBASE-T Ethernet Adapters have two or four 10GBASE-T ports with 10GbE connectivity, and improve application efficiency and network performance with innovative and versatile capabilities. The adapters are available in PCIe low profile and OCP 3.0 form factors.

The following figure shows the ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter.



Figure 1. ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter

Did you know?

The Intel E610 adapters offer excellent small packet performance, and offer virtualization features with support for GENEVE, VXLAN, NVGRE offloads. The adapters also have planned support for Energy Efficient Ethernet (EEE) / IEEE 802.3az.

Part number information

The following table provides the ordering part numbers and feature codes for the Intel E610 adapters.

Table 1. Ordering information

Part number	Feature code	Description
4XC7A96733	C4HT	ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter(Generic FW)
4XC7A96732	C4HS	ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter(Generic FW)

The option part numbers includes the following items:

- One Intel Ethernet adapter
- PCIe adapters: Low profile (2U) bracket attached with full-height (3U) bracket included in the box
- Documentation flyer

E610-T4 4-port adapter: When installing the E610-T4 4-port adapter as a field upgrade, you will need to turn on slot bifurcation in UEFI system settings for the slot the adapter is installed in (**System Settings > Devices and I/O Ports > Override Slot Bifurcation > x4x4x4x4**). For details see the flyer that ships with the adapter.

The following figure shows the ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter.

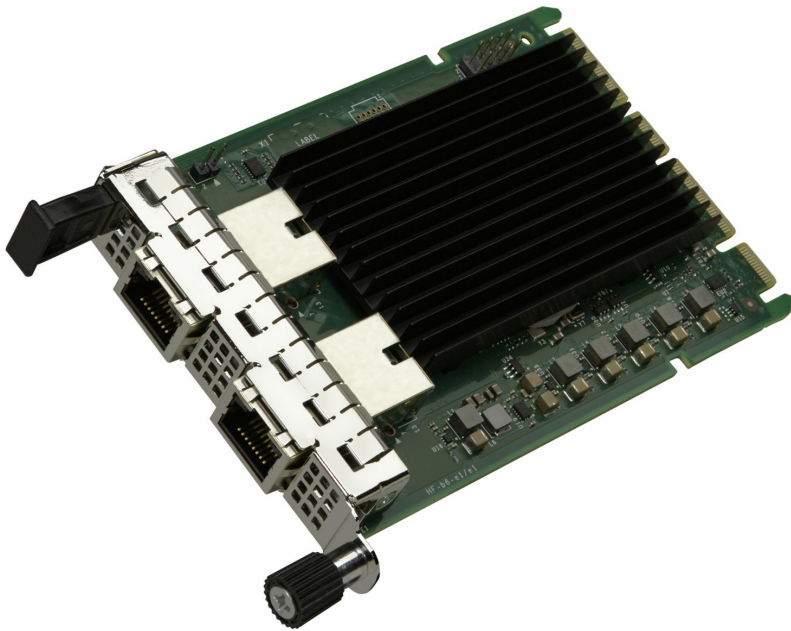


Figure 2. ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter

Network cabling requirements

The network cables that can be used with the adapters are as follows:

- 10GBASE-T maximum lengths:
 - CAT6: 55 m
 - CAT6a: 100 m
- 5GBASE-T, 2.5GBASE-T, 1000BASE-T, 100BASE-TX maximum lengths:
 - CAT5e: 100 m
 - CAT6: 100 m
 - CAT6a: 100 m

The following table lists the supported Category 6 (CAT 6) cables supported by adapters with RJ45 ports.

Table 2. CAT6 cables

Part number	Feature code	Description
CAT6 Green cables		
00WE123	AVFW	0.75m Green Cat6 Cable
00WE127	AVFX	1.0m Green Cat6 Cable
00WE131	AVFY	1.25m Green Cat6 Cable
00WE135	AVFZ	1.5m Green Cat6 Cable
00WE139	AVG0	3m Green Cat6 Cable
90Y3718	A1MT	10m Green Cat6 Cable
90Y3727	A1MW	25m Green Cat6 Cable
CAT6 Blue cables		
90Y3721	A1MU	10m Blue Cat6 Cable
90Y3730	A1MX	25m Blue Cat6 Cable
CAT6 Yellow cables		
90Y3715	A1MS	10m Yellow Cat6 Cable
90Y3724	A1MV	25m Yellow Cat6 Cable
CAT6 White cables without jackets		
4X97A83980	BRW9	Lenovo 750mm Cat6 RJ45 White Cable without Jacket
4X97A83981	BRWA	Lenovo 1000mm Cat6 RJ45 White Cable without Jacket
4X97A83982	BRWB	Lenovo 1250mm Cat6 RJ45 White Cable without Jacket
4X97A83983	BRWC	Lenovo 1500mm Cat6 RJ45 White Cable without Jacket
4X97A83984	BRWD	Lenovo 3000mm Cat6 RJ45 White Cable without Jacket

The following table lists the supported Category 5e (CAT 5e) cables supported by adapters with RJ45 ports.

Table 3. CAT5e Cables

Part number	Feature code	Description
CAT5e Blue Cables		
40K5679	3801	e1350 .6 Meter Blue Ethernet Cable
00WE111	AVFT	0.75m Blue Cat5e Cable
00WE115	AVFU	1.0m Blue Cat5e Cable
00WE119	AVFV	1.25m Blue Cat5e Cable
40K8785	3802	1.5 Meter Blue Ethernet Cable
40K5581	3803	3m Blue Cat5e Cable
40K8927	3804	e1350 10 Meter Blue Ethernet Cable
40K8930	3805	25m Blue Cat5e Cable
CAT5e Green Cables		
40K5563	BQ6P	Ethe .6m Green
00WE099	AVFQ	0.75m Green Cat5e Cable
00WE103	AVFR	1.0m Green Cat5e Cable
00WE107	AVFS	1.25m Green Cat5e Cable
40K5643	3797	e1350 1.5 Meter Green Ethernet Cable
40K5793	3798	e1350 3 Meter Green Ethernet Cable
40K5794	3799	10m Green Cat5e Cable
40K8869	3800	25m Green Cat5e Cable
CAT5e Yellow Cables		
40K8933	3791	e1350 .6 Meter Yellow Ethernet Cable
40K8951	3792	1.5m Yellow Cat5e Cable
40K8957	BQ6Q	Ethe 3m Yellow
40K8801	3794	10m Yellow Cat5e Cable
40K8807	3795	25m Yellow Cat5e Cable

Features

Simplify technology transitions with the ThinkSystem Intel E610 10GBASE-T Ethernet Adapters. These adapters support auto-negotiation between multiple port speeds to provide maximum flexibility for dual and quad-port configurations. The adapters' efficient design also delivers a significant generation-over-generation reduction in power consumption to enable diverse use cases across servers and network appliances.

The Intel E610 adapters are part of the Intel Ethernet 600 Series, delivering the latest advances in 10GBASE-T and 2.5GBASE-T performance and connectivity, including advanced security features. The 600 Series offers modern standards-based cryptographic security anchored by hardware Root of Trust (RoT) and secure communications with management controllers to enhance Ethernet security.

Low power consumption

With an absolute max power consumption of 5.2 W, the dual port E610-XT2 represents a 45 percent reduction in power compared to the Intel X710-T2L, and a 60 percent reduction in power compared to the Intel X550-T2.

Flexible and scalable I/O for virtualized Infrastructures

Intel Virtualization Technology (Intel VT) delivers outstanding I/O performance in virtualized server environments.

I/O bottlenecks are reduced through intelligent offloads, enabling near-native performance and VM scalability. These offloads include Virtual Machine Device Queues (VMDq) and Flexible Port Partitioning using SR-IOV with a common Virtual Function (VF) driver for networking traffic per Virtual Machine (VM). Host-based features supported include:

- VMDq for Emulated Path. VMDQ enables a hypervisor to represent a single network port as multiple network ports that can be assigned to individual VMs. Traffic handling is offloaded to the network controller, delivering the benefits of port partitioning with little or no administrative overhead.
- SR-IOV for Direct Assignment. Adapter-based isolation and switching enables optimal CPU usage in virtualized environments.
 - Up to 64 VFs per port; each VF can support a unique and separate data path for I/O-related functions within the PCI Express hierarchy.
 - SR-IOV, used with a networking device, allows the bandwidth of a single port (function) to be partitioned into smaller slices that can be allocated to specific VMs or guests via a standard interface.

Advanced traffic steering

Intel Ethernet Flow Director (Intel Ethernet FD) is an advanced traffic steering capability. Large numbers of flow affinity filters direct receive packets by their flows to queues for classification, load balancing, and matching between flows and CPU cores.

Steering traffic into specific queues can eliminate context switching required within the CPU. As a result, Intel Ethernet FD significantly increases the number of transactions per second and reduces latency for cloud applications like memcached.

Enhanced Network Virtualization Overlays (NVO)

Network virtualization has changed the way networking is done in the data center, delivering accelerations across a wide range of tunneling methods: VxLAN, GENEVE, NVGRE, MPLS, and VxLAN-GPE with NSH Offloads.

These stateless offloads preserve application performance for overlay networks, enabling network traffic to be distributed across CPU cores – increasing network throughput.

Manageability

Broad system manageability capabilities using the latest DTMF (Distributed Management Task Force) protocols.

- NC-SI 1.2 protocol compliance. Transport options include NC-SI over RBT and NC-SI over MCTP.
- Secured messages using SPDM over MCTP.
- PLDM over RBT with an extended list of message types, including T4, T5, and T6 over RBT, and MCTP transport.

Modern standards-based security

Intel offers modern standards-based cryptographic security anchored by a hardware Root of Trust (RoT).

- Device attestation in compliance with SPDM 1.1.2 Security Protocol and Data Model.
- Compliant with NIST SP 800-193 platform firmware resiliency guidelines.
- Meets FIPS 140-3 level 1 requirements.
- Secure boot isolates sensitive parameters and keys used for boot and operation.
- Secure firmware update verifies digital signatures of new firmware binaries.
- Recovery mode/failsafe mode is activated upon detection of abnormal device operation.

Specifications

The Intel E610 adapters have the following technical specifications:

- Two or four port 10 Gbps Ethernet controller with RJ45 connectors
- Support for these connections:
 - 10GBASE-T
 - 5GBASE-T
 - 2500BASE-T
 - 1000BASE-T
 - 100BASE-TX
- Based on the Intel E610-XT2 (2-port) and E610-XT4 (4-port)
- Host interface:
 - 2-port adapters: PCIe 4.0 x4
 - 4-port adapters: PCIe 4.0 x8
- Network Features
 - Compliant with the 10 GbE and 1 GbE Ethernet/ 802.3 Clause 70, 71 (KX only) Specification
 - Compliant with the 10 GbE 802.3 Clause 72 (KR) Specification
 - Compliant with SFI Interface
 - SerDes Interface for External PHY Connection or System Interconnect
 - SGMII Interface
 - Full-Duplex Operation at all Supported Speeds
 - 10 GbE/1 GbE/100 Mb/s Copper PHYs Integrated On-Chip (MCP only)
 - 802.3az Energy Efficient Ethernet (EEE) Support
 - Support Jumbo Frames of up to 9.5 KB
 - MDIO Interface Clause 45
 - Flow Control Support: Send/Receive Pause Frames and Receive FIFO Thresholds
 - Statistics for Management and RMON
 - 802.1q VLAN Support
 - Double VLAN
- Host interface features
 - PCIe 4.0
 - 64-bit Address Support for Systems Using More Than 4 GB of Physical Memory
 - Outstanding Requests for Tx Data Buffers: 16
 - Outstanding Requests for Tx Descriptors: 8
 - Outstanding Requests for Rx Descriptors: 8
- Miscellaneous Features
 - Serial Flash Interface
 - 4-wire SPI EEPROM Interface
 - Configurable LED Operation for Software or OEM Customization of LED Displays
 - Protected NVM Space for Private Configuration
 - Device Disable Capability
 - Watchdog Timer
 - Time Sync (IEEE 1588)
 - NVM authentication on update
 - NVM authentication on read
 - Firmware authentication RSA3K-PKCSv1.5
 - Key validation: SHA384
 - SPDM
 - Secure MCTP
 - Fused based SVN (Security Version Number)
 - Key revocation
- LAN Functions Features
 - Programmable Host Memory Receive Buffers
 - Descriptor Ring Management Hardware for Transmit and Receive
 - ACPI Register Set and Power Down Functionality Supporting D0 and D3 States

- Software-Controlled Global Reset Bit (Resets Everything Except the Configuration Registers)
- Software-Definable Pins (SDP): 4 per port
- SDP Pins Can Be Configured as General Purpose Interrupts
- Wake on LAN (WoL)
- IPv6 Wake-up Filters
- Configurable (through NVM) Wake-up Flexible Filters
- Default Configuration by NVM for all LEDs for Pre- Driver Functionality
- LAN Function Disable Capability
- Programmable Memory Transmit Buffers: 160 KB per port
- Programmable Memory Receive Buffers: 384 KB per port
- LAN Performance Features
 - TCP/UDP Segmentation Offload
 - TSO Interleaving for Reduced Latency
 - Data Center Bridging (DCB), IEEE Compliance to Enhanced Transmission Selection (ETS) - 802.1Qaz
 - Priority-based Flow Control (PFC) - 802.1Qbb
 - Rate Limit VM Tx Traffic per TC (i.e. per TxQ)
 - IPv6 Support for IP/TCP and IP/UDP Receive Checksum Off load
 - Fragmented UDP Checksum Off load for Packet Reassembly
 - Message Signaled Interrupts (MSI)
 - Message Signaled Interrupts (MSI-X)
 - Interrupt Throttling Control to Limit Maximum Interrupt Rate and Improve CPU Use
 - Rx Packet Split Header
 - Multiple Rx Queues (RSS)
 - Flow Director Filters: up to 32 KB Flows by Hash Filters or up to 8 KB Perfect Match Filters
 - Number of Rx Queues: 128 per port
 - Number of Tx Queues 128 per port
 - TCP Timer Interrupts
 - Relax Ordering
- Virtualization Features
 - Support for Virtual Machine Device Queues (VMDq1 and Next Generation VMDq): 64 queues
 - L2 Ethernet MAC Address Filters (Unicast and Multicast): 128
 - L2 VLAN Filters: 64
 - PCI-SIG SR IOV
 - Multicast and Broadcast Packet Replication
 - Packet Mirroring
 - Packet Loopback
 - RSS Replication
 - Traffic Shaping
 - Anti Spoof: MAC, VLAN, Ethertype
 - Malicious Driver Protection
 - Forwarding Modes: MAC, VLAN, E-tag
 - VEB Support
 - VEPA Support
 - E-tag filtering support
 - Tunneling protocols NVGRE, VXLAN
 - Tunneling protocol GENEVE
- Manageability Features
 - Advanced Pass Through-compatible Management Packet Transmit/Receive Support
 - SMBus Interface to an External MC
 - NC-SI Interface to an External MC
 - L2 Address Filters: 4
 - VLAN L2 Filters: 8
 - Flex L3 Port Filters: 16
 - Flexible TCO Filters: 1
 - L3 Address Filters (IPv4): 4

- L3 Address Filters (IPv6): 4
- Host-Based Application-to-BMC Network Communication Patch (OS2BMC)
- Flexible MAC Address
- MC Inventory of LOM Device Information
- iSCSI Boot Configuration Parameters via MC
- MC Monitoring
- NC-SI to MC
- NC-SI Arbitration
- MCTP over SMBus (pass through and control)
- MCTP over PCIe (pass through and control)
- NC-SI Package ID Via SDP Pins
- NC-SI Flow Control
- PDLM Monitoring and Control
- PLDM Firmware Update
- PLDM RDE support
- SPDM support

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 4. Server support (Part 1 of 4)

Part Number	Description	AMD V3				2S Intel V3/V4				4S 8S Intel V3			Multi Node V3/V4		1S V3						
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR630 V4 (7DG8 / 7DG9)	SR650 V4 (7DGC / 7DGD)	SR650a V4 (7DGC / 7DGD)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
4XC7A96732	ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N
4XC7A96733	ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N

Table 5. Server support (Part 2 of 4)

Part Number	Description	GPU Rich				Edge				Super Computing						1S Intel V2					
		SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	SC750 V4 (7DDJ)	SC777 V4 (7DKA)	SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	SD650-N V3 (7D7N)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)
4XC7A96732	ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XC7A96733	ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 6. Server support (Part 3 of 4)

Part Number	Description	2S Intel V2			AMD V1				Dense V2				4S V2	8S	4S V1				
		ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)
4XC7A96732	ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XC7A96733	ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 7. Server support (Part 4 of 4)

Part Number	Description	1S Intel V1				2S Intel V1								Dense V1				
		ST150 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)	ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)	
4XC7A96732	ThinkSystem Intel E610-T2 10GBase-T 2-Port OCP Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XC7A96733	ThinkSystem Intel E610-T4 10GBase-T 4-Port PCIe Ethernet Adapter(Generic FW)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Support of adapters with generic firmware

One or more of the adapters described in this product guide uses standard vendor firmware (look for "Generic FW" or "Generic" in the adapter names). These adapters are supported in Lenovo servers however there are currently limitations on the use of Lenovo management tools.

Support in Lenovo XClarity management tools for adapters with generic firmware is per the following table.

Tip: Always use firmware that is obtained from Lenovo sources to ensure the firmware is fully tested by Lenovo and is supported. You should not use firmware that is obtained from the vendor web site, unless directed to do so by Lenovo support.

Table 8. Lenovo XClarity management tools support

Function	Lenovo XClarity Provisioning Manager	Lenovo XClarity OneCLI (out-of-band)	Lenovo XClarity OneCLI (in-band)	Lenovo XClarity Administrator
Adapter configuration	Supported (in-band via UEFI)	Planned for support 3Q/2025	Planned for support 3Q/2025	Planned for support 3Q/2025

Physical specifications

The PCIe adapters have a Low Profile form factor with the following dimensions:

- Length: 168 mm (6.6 in.)
- Height: 69 mm (2.7 in.)

The OCP adapter has the following dimensions:

- Width: 76 mm (3 in.)
- Depth: 115 mm (4.5 in.)

Operating environment

The Intel E610 adapters are supported in the following environment:

- Operating temperature: 0 to 55 °C (32 to 131 °F)
- Storage temperature: -40 °C to 70 °C (-40 °F to 158 °F)
- Relative humidity (non-operating): 10% to 90%

Warranty

One-year limited warranty. When installed in a supported server, these adapters assume the server's base warranty and any warranty upgrade.

Agency approvals

The adapter conforms to the following standards:

- FCC Class A
- UL 62368-1 and CAN/CSA C22.2 No. 62368-1-14
- cULus
- CE
- VCCI
- BSMI
- RCM
- KCC
- EEE

Related publications

For more information, see the following resources:

- ThinkSystem Ethernet and InfiniBand Adapter Reference
<https://lenovopress.lenovo.com/lp1594-thinksystem-ethernet-infiniband-adapter-reference>
- Intel Ethernet Products web page
<https://www.intel.com/content/www/us/en/architecture-and-technology/ethernet.html>
- Lenovo ServerProven compatibility information
<http://serverproven.lenovo.com>

Related product families

Product families related to this document are the following:

- [10 Gb Ethernet Connectivity](#)
- [Ethernet Adapters](#)

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