ThinkSystem NVIDIA ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter
Product Guide

NVIDIA ConnectX-7 with four 25Gb Ethernet ports is a remote direct-memory access (RDMA) over converged Ethernet (RoCE) network adapter that supports Ethernet protocol at 25 Gb/s. It enables a wide range of advanced, scalable, and secure networking solutions for enterprise needs, from traditional workloads to the world's most-demanding AI, scientific computing, and hyperscale cloud data center workloads.

The following figure shows the ThinkSystem NVIDIA ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter.
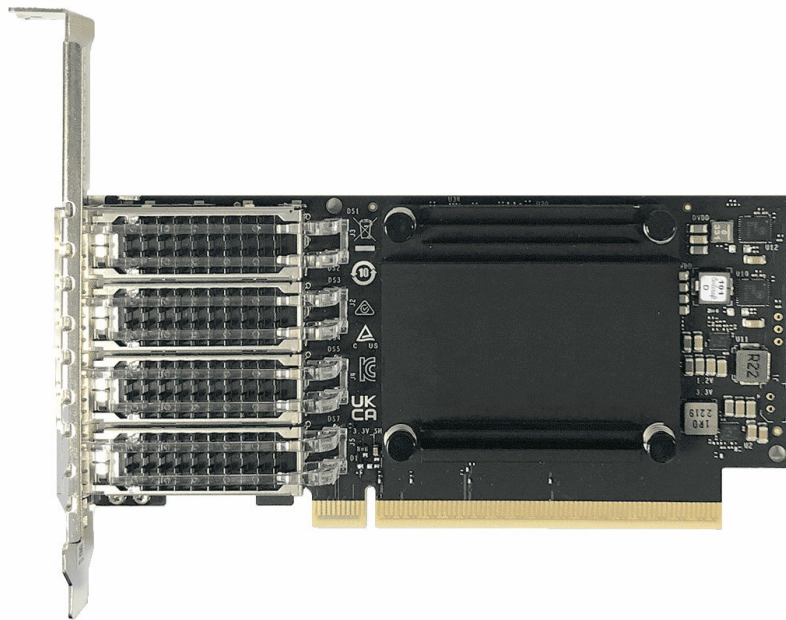

Figure 1. ThinkSystem NVIDIA ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter

Did you know?

The ConnectX-7 adapters are optimized to deliver accelerated networking for modern cloud, artificial intelligence, and traditional enterprise workloads. ConnectX-7 provides a broad set of software-defined, hardware-accelerated networking, storage, and security capabilities which enable organizations to modernize and secure their IT infrastructures.

Part number information

The following table provides the ordering part numbers and feature codes for the ConnectX-7 10/25GbE adapter.

Table 1. Ordering information

Part number	Feature code	Description	NVIDIA equivalent
4XC7A99191	C62J	ThinkSystem Nvidia ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter(Generic)	MCX713104AS-ADAT

The option part number include the following items:

- One Ethernet adapter
- Full-height (3U) bracket attached with Low profile (2U) bracket included in the box
- Documentation flyer

Note: The adapters ship without any transceivers or direct attach cables. These items must be ordered separately as listed in the following section.

Supported transceivers and cables

The ConnectX-7 10/25GbE adapter has empty SFP28 cages for connectivity. The adapter either supports connections to a 10 Gb or 25 Gb switch or can share a connection to a 100 Gb switch using a 4:1 breakout cable.

The following table lists the supported transceivers.

Table 2. Transceivers

Part number	Feature code	Description
1Gb Transceivers		
00FE333	A5DL	SFP 1000Base-T (RJ-45) Transceiver
10Gb Transceivers		
00FE331	B0RJ	10GBASE-LR SFP+ Transceiver
46C3447	5053	SFP+ SR Transceiver
4TC7A78615	BNDR	ThinkSystem Accelink 10G SR SFP+ Ethernet transceiver
25Gb Transceivers		
4M27A67041	BFH2	Lenovo 25Gb SR SFP28 Ethernet Transceiver
4TC7A88638	BYBJ	ThinkSystem Finisar Dual Rate 10G/25G SR SFP28 Transceiver

25Gb transceivers: When installed in this 25Gb Ethernet adapter, 25Gb transceivers are designed to operate at either 25 Gb/s or 10 Gb/s speeds as listed in the description of the transceiver, however the speed also depends on the negotiation with the connected switch. In most configurations, this negotiation is automatic, however in some configurations you may have to manually set the link speed or FEC mode.

The following table lists the supported optical cables.

Table 3. Optical cables

Part number	Feature code	Description
LC-LC OM3 Fiber Optic Cables		
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable
MTP-4xLC OM3 MMF Breakout Cables (these cables require a transceiver)		
00FM412	A5UA	Lenovo 1m MPO-4xLC OM3 MMF Breakout Cable
00FM413	A5UB	Lenovo 3m MPO-4xLC OM3 MMF Breakout Cable
00FM414	A5UC	Lenovo 5m MPO-4xLC OM3 MMF Breakout Cable
SFP+ 10Gb Active Optical Cables		
00YL634	ATYX	Lenovo 1M SFP+ to SFP+ Active Optical Cable
00YL637	ATYY	Lenovo 3M SFP+ to SFP+ Active Optical Cable
00YL640	ATYZ	Lenovo 5M SFP+ to SFP+ Active Optical Cable
00YL643	ATZ0	Lenovo 7m SFP+ to SFP+ Active Optical Cable
00YL646	ATZ1	Lenovo 15M SFP+ to SFP+ Active Optical Cable
00YL649	ATZ2	Lenovo 20M SFP+ to SFP+ Active Optical Cable
SFP28 25Gb Active Optical Cables		
4X97A94008	AV1F	Lenovo 3m 25G SFP28 Active Optical Cable
4X97A94011	AV1G	Lenovo 5m 25G SFP28 Active Optical Cable
4X97A94012	AV1H	Lenovo 10m 25G SFP28 Active Optical Cable
4X97A94013	AV1J	Lenovo 15m 25G SFP28 Active Optical Cable
4X97A94702	AV1K	Lenovo 20m 25G SFP28 Active Optical Cable
OM4 LC to LC Cables		
4Z57A10845	B2P9	Lenovo 0.5m LC-LC OM4 MMF Cable
4Z57A10846	B2PA	Lenovo 1m LC-LC OM4 MMF Cable
4Z57A10847	B2PB	Lenovo 3m LC-LC OM4 MMF Cable
4Z57A10848	B2PC	Lenovo 5m LC-LC OM4 MMF Cable
4Z57A10849	B2PD	Lenovo 10m LC-LC OM4 MMF Cable
4Z57A10850	B2PE	Lenovo 15m LC-LC OM4 MMF Cable
4Z57A10851	B2PF	Lenovo 25m LC-LC OM4 MMF Cable
4Z57A10852	B2PG	Lenovo 30m LC-LC OM4 MMF Cable

The following table lists the supported direct-attach copper (DAC) cables.

Table 4. Copper cables

Part number	Feature code	Description
SFP+ 10Gb Passive DAC Cables		
00D6288	A3RG	0.5m Passive DAC SFP+ Cable
90Y9427	A1PH	1m Passive DAC SFP+ Cable
00AY764	A51N	1.5m Passive DAC SFP+ Cable
00AY765	A51P	2m Passive DAC SFP+ Cable
90Y9430	A1PJ	3m Passive DAC SFP+ Cable
90Y9433	A1PK	5m Passive DAC SFP+ Cable
00D6151	A3RH	7m Passive DAC SFP+ Cable
SFP28 25Gb Passive DAC Cables		
7Z57A03557	AV1W	Lenovo 1m Passive 25G SFP28 DAC Cable
7Z57A03558	AV1X	Lenovo 3m Passive 25G SFP28 DAC Cable
7Z57A03559	AV1Y	Lenovo 5m Passive 25G SFP28 DAC Cable
QSFP28 100G-to-4x25G Ethernet Breakout Cables		
7Z57A03564	AV22	Lenovo 1m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable
4Z57A85043	BS32	Lenovo 1.5m 100G to 4x25G Breakout SFP28 Breakout DAC Cable
4Z57A85044	BS33	Lenovo 2m 100G to 4x25G Breakout SFP28 Breakout DAC Cable
7Z57A03565	AV23	Lenovo 3m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable
7Z57A03566	AV24	Lenovo 5m 100G QSFP28 to 4x25G SFP28 Breakout DAC Cable

Features

The ConnectX-7 10/25GbE adapter has the following features:

- **Accelerated Networking and Security**

  ConnectX-7 provides a broad set of software-defined, hardware-accelerated networking, storage, and security capabilities which enable organizations to modernize and secure their IT infrastructures. Moreover, ConnectX-7 empowers agile and high-performance solutions from edge to core data centers to clouds, all while enhancing network security and reducing the total cost of ownership.

- **Accelerate Data-Driven Scientific Computing**

  ConnectX-7 provides ultra-low latency, extreme throughput, and innovative NVIDIA In-Network Computing engines to deliver the acceleration, scalability, and feature- rich technology needed for today's modern scientific computing workloads.

- **Accelerate Software- Defined Networking**

  NVIDIA ASAP^2 technology accelerates software-defined networking, delivering line-rate performance with no CPU penalty.

- **Enhance Storage Performance**

  ConnectX-7 enables high-performance and efficient data storage by leveraging RDMA/RoCE, GPUDirect Storage, and hardware-based NVMe-oF offload engines.

Specifications

The ConnectX-7 10/25GbE adapter has the following technical specifications:

- Host interface
  - PCIe Gen 4.0 x16 host interface
  - Support for PCIe bifurcation
  - Support for MSI/MSI-X mechanisms

- Ethernet Interface
  - Four network ports supporting NRZ
  - Auto-detection of 10G/25G link
  - RDMA over converged Ethernet (RoCE)

- Enhanced Ethernet Networking
  - Zero-touch RoCE
  - NVIDIA Accelerated Switch and Packet Processing (ASAP2) for software-defined networking (SDN) and virtual network functions (VNF)
  - OVS acceleration
  - Overlay network acceleration: VXLAN, GENEVE, NVGRE
  - Connection tracking (L4 firewall)
  - Flow mirroring, header rewrite, hierarchical QoS
  - SR-IOV Stateless TCP offloads

- Management and Control
  - NC-SI, MCTP over SMBus, and MCTP over PCIe
  - Platform-Level Data Model (PLDM) for Monitor and Control DSP0248
  - PLDM for Firmware Update DSP0267
  - PLDM for Redfish Device Enablement DSP0218
  - PLDM for Field-Replaceable Unit (FRU) DSP0257
  - Security Protocols and Data Models (SPDM) DSP0274
  - Serial Peripheral Interface (SPI) to flash
  - JTAG IEEE 1149.1 and IEEE 1149.6

- Remote Boot
  - Remote boot over iSCSI
  - UEFI
  - PXe

- Platform security:
  - Secure boot with hardware root of trust (RoT)
  - Secure firmware update
  - Flash encryption
  - Device attestation

Note: This adapter does not support crypto features

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 5. 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)
4XC7A99191	ThinkSystem Nvidia ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter(Generic)	N	N	N	N	N	N	N	Y	Y	Y	N	N	N	N	N	N	N	N	N	N

Table 6. 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)
4XC7A99191	ThinkSystem Nvidia ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter(Generic)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 7. Server support (Part 3 of 4)

		2S Intel V2			AMD V1					Dense V2				4S V2		8S	4S V1		
Part Number	Description	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)
4XC7A99191	ThinkSystem Nvidia ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter(Generic)	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 8. Server support (Part 4 of 4)

		1S Intel V1				2S Intel V1								Dense V1			
Part Number	Description	ST50 (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)
4XC7A99191	ThinkSystem Nvidia ConnectX-7 10/25GbE SFP28 4-Port PCIe Ethernet Adapter(Generic)	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 9. Lenovo XClarity management tools support for adapters with generic firmware

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: 144 mm (5.6 in.)
- Height: 69 mm (2.7 in.)

Operating environment

The adapters have the following operating characteristics:

- Typical power consumption (passive cables): 15.1W

- Temperature
  - Operational: 0°C to 55°C
  - Non-operational: -40°C to 70°C

- Humidity: 90% relative humidity

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 has the following regulatory approvals:

- Safety: CB / cTUVus / CE

- EMC: CE / FCC / VCCI / ICES / RCM / KC

- RoHS: RoHS Compliant

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

- NVIDIA ConnectX-7 User Manual:
  https://docs.nvidia.com/networking/display/connectx7vpi

- Lenovo ServerProven compatibility information
  http://serverproven.lenovo.com

Related product families

Product families related to this document are the following:

- 25 Gb Ethernet Connectivity
- Ethernet Adapters

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