

ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 Ethernet Adapter

Product Guide

The ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter is a high-performance 25 GbE adapter that is designed for high-performance electronic trading environments and cloud and enterprise data centers. It is suitable for applications such as artificial intelligence, big data, analytics, machine learning, storage, and telco applications.

The following figure shows the ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter.

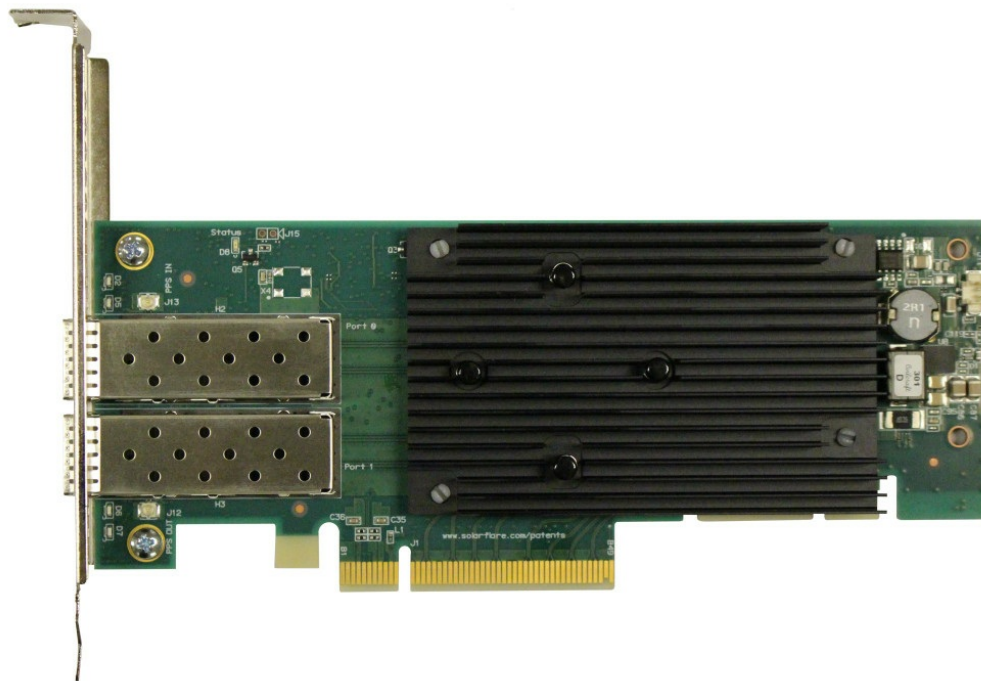


Figure 1. ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter

Did you know?

Extremely low latency and high throughput enables the Solarflare X2522-Plus adapter to provide real-time packet and flow information to thousands of virtual NICs. This combination of ultra-high bandwidth, ultra-low latency, ultra-scale connectivity, and packet telemetry allows the adapter to scale with each server or virtual machine.

Part number information

The following table provides the ordering part numbers and feature codes for the Solarflare X2522 adapter.

Table 1. Ordering information

Part number	Feature code	Description
4XC7A62581	BHE2	ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter

The option part numbers includes the following items:

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

Note: The adapter ships without any SFP28 transceivers or direct attach cables. These items must be ordered separately as listed in the following section.

Supported transceivers and cables

The Solarflare X2522 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
10Gb Transceivers		
7G17A03130	AVV1	Lenovo 10GBaseT SFP+ Transceiver
46C3447	5053	SFP+ SR Transceiver
4TC7A78615	BNDR	ThinkSystem Accelink 10G SR SFP+ Ethernet transceiver
25Gb Transceivers		
7G17A03537	AV1B	Lenovo Dual Rate 10G/25G SR SFP28 Transceiver
4TC7A88638	BYBJ	ThinkSystem Finisar Dual Rate 10G/25G SR SFP28 Transceiver

25Gb transceivers: When installed in the Solarflare X2522 Ethernet adapter, the supported 25Gb transceiver will currently only operate at 25Gb/s speeds.

The following table lists the supported fiber optic cables and Active Optical Cables.

Table 3. Optical cables

Part number	Feature code	Description
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
QSFP28 100Gb Ethernet Breakout Active Optical Cables		
7Z57A03554	AV1U	Lenovo 15m 100G to 4x25G Breakout Active Optical 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

Features

Key features and benefits:

- Sub-microsecond latency
- Near-zero jitter
- Highly scalable
- Predictable, deterministic system performance
- High message rates
- Precision Time Stamping for accurate synchronization
- NVMe/TCP storage ready
- SolarCapture Pro network performance monitoring

The Solarflare X2522 adapter supports the Onload kernel bypass application acceleration and DPDK services which deliver superior small packet performance with sub-microsecond hardware latency, essential for electronic trading environments.

Onload dramatically accelerates and scales network-intensive workloads such as in-memory databases, software load balancers, and web servers. With Onload, data centers can support 4X or more users on their cloud network while delivering improved reliability, enhanced quality of service (QoS), and a higher return on investment, without modification to existing applications.

In addition, the X2522 adapter supports the precision time protocol (PTP) fabric service for apps that require synchronized time stamping of packets down to single-digit nanosecond resolution.

SolarCapture Pro packet capture software enables the X2522 adapter to capture and time stamp packets in hardware, persist packet to disk, and replay packets streams. This feature provides the essential ingredient for corporate data centers to run applications such as high-precision network performance monitoring, analysis, and regulatory compliance.

The X2522 adapter is ideal for scale-out cloud, web, and CDN application environments. Use cases include software-defined networking (SDN), network functions virtualization (NFV), web content optimization, DNS acceleration, web firewalls, load balancing, NoSQL databases, caching tiers (Memcached), web proxies, video streaming, and storage networks.

X2522 adapters speed up TCP, unicast, multicast and UDP traffic for a wide variety of trading applications. The X2522 is ideal for electronic trading environments, from mission-critical exchange gateways and matching engines on the financial exchange side, to feed handlers, order routing, algorithmic trading engines, messaging applications, order execution, data distribution and client communications on the trading side.

Specifications

The Solarflare X2522-Plus adapter has the following specifications:

- Adapter hardware
 - PCIe Gen 3.1 x8 host interface
 - Two SFP28 cages
- NIC capabilities
 - MSI-X support
 - Interrupt coalescing
 - 2x10/25G 64-byte line rate

- Virtualization
 - Linux Multi-queue
 - VMware NetQueue
 - SR-IOV (Linux/VMware): hardware capability - 240 functions
 - 2,048 guest OS protected vNICs
 - Full hardware switch fabric in silicon capable of steering any flow based on Layer 2 to Layer 4 protocols, between physical and virtual interfaces
 - VXLAN, NVGRE, and GENEVE tunneling offloads; adaptable to custom overlays
 - VLAN and VLAN Q-in-Q insertion/stripping
- Manageability and Remote Boot
 - PXE and UEFI
 - MCTP PCIe VDM
- Management and Utilities
 - Ethtool support
 - vCenter plug-in
 - Solarflare boot manager
- Stateless Offloads
 - TCP/UDP Checksum Offload (CSO)
 - TCP Segmentation Offload (TSO)
 - Generic Segmentation Offload (GSO)
 - Large Send Offload (LSO)
 - Large Receive Offload (LRO)
 - Receive Side Scaling (RSS)
- Network Acceleration
 - Data Plane Development Kit (DPDK) Poll Mode Driver – Packet
 - Onload - TCP/UDP
 - TCPDirect - TCP/UDP
- Time Synchronization and Hardware Timestamping
 - On-board Stratum 3 compliant oscillator
 - Solarflare software PTP Daemon delivers enhanced stability and clock synchronization accuracy and can be used to synchronize the adapter clock to external time source
- Traffic Engineering
 - XtremePacket Engine for dedicated parsing, filtering, and flow steering
 - TCP/UDP/IP, MAC, VLAN, RSS filtering
 - Accelerated Receive Flow Steering (ARFS)
 - Transmit Packet Steering
- Ethernet Standards
 - IEEE 802.3-2012 Ethernet base standard, including 802.3bx
 - IEEE 802.3-2015 Ethernet flow control
 - IEEE 802.3ad, 802.1AX link aggregation
 - IEEE 802.1Q, 802.1P VLAN tags and priority
 - IEEE 1588-2008 PTPv2
 - Jumbo frame support (9000 bytes)

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 5. Server support (Part 1 of 4)

[illegible]

Table 6. Server support (Part 2 of 4)

[illegible]

Table 7. Server support (Part 3 of 4)

Part Number	Description	AMD V1					Dense V2				4S V2	8S	4S V1	1S Intel V1						
		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)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)
4XC7A62581	ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	N	N	N	Y	Y	N	N	N	N	N	N	Y	N	N	N	N	N	N	N

Table 8. Server support (Part 4 of 4)

Part Number	Description	2S Intel V1								Dense V1			
		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)
4XC7A62581	ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	N	N	N	N	N	Y	Y	N	N	N	N	N

Operating system support

The following table lists the supported operating systems for the adapter.

Tip: This table is automatically generated based on data from [Lenovo ServerProven](#).

Table 9. Operating system support for ThinkSystem Solarflare X2522-Plus 10/25GbE SFP28 2-Port PCIe Ethernet Adapter, 4XC7A62581

Operating systems	SR630 V3 (4th Gen Xeon)	SR630 V3 (5th Gen Xeon)	SR645 V3	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR665 V3	SR630 V2	SR650 V2	SR645	SR665	SR630 (Xeon Gen 2)	SR650 (Xeon Gen 2)	SR950 (Xeon Gen 2)	SR630 (Xeon Gen 1)	SR650 (Xeon Gen 1)	SR950 (Xeon Gen 1)
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	N	N	N	N	N	N	Y	Y	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	N	N	N	N	N	N	Y	Y	Y ¹	Y ¹	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	N	N	N	N	N	N	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	N	Y	Y	N	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	N	Y	Y	N	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	N	Y	Y	N	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y
Ubuntu 20.04 LTS	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	N	Y	Y	N	Y	Y	Y	Y ²	Y ²	Y	Y	Y	Y	Y	Y

¹ The OS is not supported with EPYC 7003 processors. HW is not supported with EPYC 7003 processors.

² HW is not supported with EPYC 7003 processors.

Physical specifications

The adapter has a Low Profile form factor with the following dimensions:

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

Operating environment

The Solarflare X2522 adapter is supported in the following environment:

- Temperature
 - Operating: 0°C to 55 °C (32 °F to 131 °F)
 - Storage: -40 °C to 65 °C (-40 °F to 149 °F)
- Humidity
 - Operating: 10% to 80%
 - Storage: 5% 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, UL, CE
- RoHS - complies with EU directive 2011/65/EU

Related publications

For more information, see the following resources:

- Networking Options for ThinkSystem Servers
<https://lenovopress.com/lp0765-networking-options-for-thinksystem-servers>
- Xilinx XtremeScale product page for the Solarflare X2522 adapter
<https://www.xilinx.com/products/boards-and-kits/x2-series.html>
- Lenovo ServerProven compatibility information
<http://www.lenovo.com/us/en/serverproven>

Related product families

Product families related to this document are the following:

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

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

© Copyright Lenovo 2024. All rights reserved.

This document, LP1432, was created or updated on October 31, 2023.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<https://lenovopress.lenovo.com/LP1432>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <https://lenovopress.lenovo.com/LP1432>.

Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®

ServerProven®

ThinkSystem®

The following terms are trademarks of other companies:

AMD and Xilinx are trademarks of Advanced Micro Devices, Inc.

Intel® and Xeon® are trademarks of Intel Corporation or its subsidiaries.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

Other company, product, or service names may be trademarks or service marks of others.