ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter

Product Guide

The ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter is a high-performance 25 Gb Ethernet adapter in the Open Compute Project (OCP) 3.0 SFF form factor. It offers TruFlow™ intelligent flow processing and supports advanced networking technologies including RoCE v1/2, SDN, NFV and virtualization.

The following figure shows the 4-port OCP adapter.

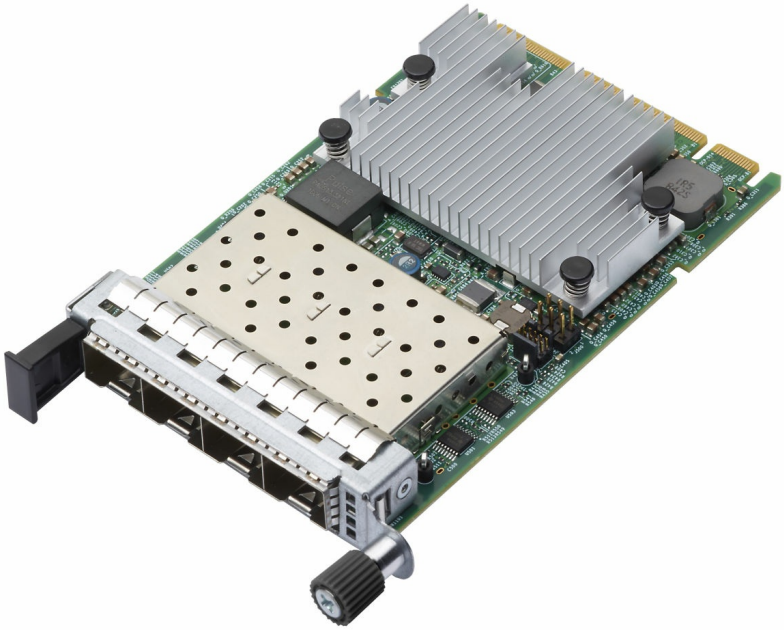

Figure 1. ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter

Did you know?

This adapter supports 10 Gb or 25 Gb Ethernet switches, including the ThinkSystem NE2572 RackSwitch 25 Gb Ethernet switch. Alternatively, with suitable breakout cables, you can connect four 25 Gb adapters or ports to a single 100 GbE switch port such as the ThinkSystem NE10032 RackSwitch to maximize the investment of your 100Gb switch.

Part number information

The ordering information is listed in the following table.

Table 1. Ordering information

Part number	Feature code	Description
OCP adapters		
4XC7A08242	B5SV	ThinkSystem Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter

The adapter, when shipped as a stand-alone option part number, includes the following items:

- One Broadcom adapter
- Documentation flyer

Supported transceivers and cables

The adapters have empty SFP28 cages for connectivity. The adapters either support a connection 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		
46C3447	5053	SFP+ SR Transceiver
49Y4218	0064	QLogic 10Gb SFP+ SR Optical Transceiver
49Y4216	0069	Brocade 10Gb SFP+ SR Optical Transceiver
90Y9412	A1PM	SFP+ LR Transceiver
00FE331	B0RJ	10GBASE-LR SFP+Transceiver
25Gb transceivers		
7G17A03537	AV1B	Lenovo 25GBase-SR SFP28 Transceiver

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

Table 3. Optical cables

Part number	Feature code	Description
LC-LC 0M3 Fiber Optic Cables (these cables require a transceiver)		
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

Part number	Feature code	Description
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		
7Z57A03541	AV1F	Lenovo 3m 25G SFP28 Active Optical Cable
7Z57A03542	AV1G	Lenovo 5m 25G SFP28 Active Optical Cable
7Z57A03543	AV1H	Lenovo 10m 25G SFP28 Active Optical Cable
7Z57A03544	AV1J	Lenovo 15m 25G SFP28 Active Optical Cable
7Z57A03545	AV1K	Lenovo 20m 25G SFP28 Active Optical Cable
100G Breakout OM4 MPO Cables (these cables require a transceiver)		
7Z57A03573	AV2B	Lenovo 1m MPO to 4x LC Breakout OM4 MMF Cable
7Z57A03574	AV2C	Lenovo 3m MPO to 4x LC Breakout OM4 MMF Cable
7Z57A03575	AV2D	Lenovo 5m MPO to 4x LC Breakout OM4 MMF Cable
QSFP28 100Gb Breakout Active Optical Cables		
7Z57A03551	AV1R	Lenovo 3m 100G to 4x25G Breakout Active Optical Cable
7Z57A03552	AV1S	Lenovo 5m 100G to 4x25G Breakout Active Optical Cable
7Z57A03553	AV1T	Lenovo 10m 100G to 4x25G Breakout Active Optical Cable
7Z57A03554	AV1U	Lenovo 15m 100G to 4x25G Breakout Active Optical Cable
7Z57A03555	AV1V	Lenovo 20m 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
SFP+ 10Gb Active DAC Cables		
00VX111	AT2R	Lenovo 1m Active DAC SFP+ Cables
00VX114	AT2S	Lenovo 3m Active DAC SFP+ Cables
00VX117	AT2T	Lenovo 5m Active DAC SFP+ Cables
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 Breakout Cables		
7Z57A03564	AV22	Lenovo 1m 100G QSFP28 to 4x25G 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 adapter has the following features:

- Broadcom TruFlow technology integrates flow processing to provide hardware assisted processing of traffic flows with data path Acceleration. TruFlow enables efficient network flow processing and increases Virtual Machine density by offloading the server CPU to improve application performance.
- Broadcom adapters are the industry's most secure Ethernet solution, leveraging Broadcom's BroadSAFE® technology to provide unparalleled platform security via Silicon Root of Trust. Broadcom is the first Ethernet Adapter vendor to store authentication key and code in silicon to protect clients from maliciously modified firmware.
- The adapter supports both RoCEv1 and RoCEv2 simultaneously. RoCE (RDMA over Converged Ethernet) allows Remote Direct Memory Access (RDMA) traffic to be communicated over Converged Ethernet using Data Center Bridging (DCB). Broadcom's Smart Congestion Control provides consistent and predictive performance for real world workloads plus scaling for heavily loaded network traffic making it ideal for clients looking for deterministic low latency.
- Support for Data Center Bridging (DCB), including IEEE 802.1Qbb Priority based Flow Control (PFC), 802.1Qaz Enhanced Transmission Selection (ETS), and 802.1Qau Quantized Congestion Notification (QCN) capabilities. DCB technology allows the device to provide lossless data delivery, prioritize low latency traffic, and share bandwidth among data center physical links.
- Support for SR-IOV to allow I/O transactions to bypasses hypervisors, which reduces latency by removing data copies and context switches between VM address space and hypervisor address space, when transmitting or receiving data over the network. The implementation supports 802.1Qbg Edge Virtual Bridging (EVB)

Specifications

The adapter has the following technical specifications:

- Based on the Broadcom BCM57454 (4-port) controller
- PCIe 3.0 x16 host interface
- Designed to the Open Compute Project (OCP) NIC 3.0 (version 0.85) with the primary connector (4C+ OCP)
- Supports Message Signal Interrupt (MSI-X)
- Fully compliant with the SFF-8402 standard
- Up to four SFP28 external connectors supporting a transceiver, direct-attach copper (DAC) cable or active optical cable (AOC).
- Support for PXE boot, UEFI, iSCSI boot and Wake-on-LAN (WOL)
- Function-Level Reset (FLR) support
- Network Controller Sideband Interface (NC-SI)
- PCIe-based UART and KCS
- SMBus 2.0
- Networking Features
    - Jumbo frames (up to 9600-Byte)
    - 3x flow control
    - Link Aggregation (802.3ad)
    - Virtual LANs-802.1q VLAN tagging
    - Configurable Flow Acceleration
    - Advanced Congestion Avoidance
    - IEEE 1588 and Time Sync
    - Forward Error Correction Clause 74, Clause 91 support over 25 Gbps
- Performance Features
    - 30M Packet Per Second
    - Low latency
    - Bidirectional wire speed throughput
- Stateless Offload Features
    - IPv4 and IPv6 offloads
    - TCP, UDP, IPv4, IPv6 checksum offload
    - Large Send Offload (LSO)
    - Receive Segment Coalescing
    - TCP Segmentation offload (TSO)
    - Large Receive Offload (LRO)
    - Generic Receive Offload
    - Receive Side Scaling (RSS)
    - Transmit Side Scaling (TSS)
    - Header-Payload Split
    - Accelerated Received Flow Steering (RFS)
- Virtualization
    - vSwitch Acceleration
    - NetQueue, VMQueue, and Multiqueue
    - SR-IOV with up to 1K virtual functions (VFs).
    - VXLAN-aware stateless offloads
    - NVGRE-aware stateless offloads
    - Geneve-aware stateless offloads
    - IP-in-IP-aware stateless offloads
    - GRE-aware (encap/decap) stateless offloads

    - Stateless Transport Tunneling
    - Edge Virtual Bridging (EVB)
    - Per Virtual Function (VF) statistics
    - VF Receive-Side Scaling (RSS)/Transmit-Side Scaling (TSS)
- RDMA over Converged Ethernet (RoCE)
    - RoCEv1 and RoCEv2
    - Data Center Bridging with RoCE
    - Reliable Connection Queue Pair
    - Unreliable Datagram Queue Pair
    - Raw Ethertype Queue Pair
    - Up to 1 million Queue Pairs
    - Up to 64K Shared Receive Queues
    - Up to 1 million Completion Queues
    - Up to 1 million Memory Regions and Memory Windows
    - Up to 1 million Protection Domains
    - Up to 250 outstanding RDMA Reads or Atomics per Queue Pair
    - Congestion Avoidance (hardware-based flows tracking and rate adjustment)
    - Fast Memory Register
    - Linux OFED 3.5 and later
    - MS-Windows Network Direct Kernel Provider Interface and SMBDirect
    - MS-Windows Network Direct Service Provider Interface
- Integrated Flow Processing
    - 1 million+ Exact Match Flows
    - Exact Match Flow Lookup
    - Wildcard Match Flow Lookup
    - VLAN insertion/deletion
    - NAT/NAPT
    - Tunnel Encapsulation/De-capsulation
    - Flow tracking and aging
    - Mirroring
    - Metering
    - Flow counters/statistics
    - Custom tunnel header support
- Data Center Bridging
    - Priority-based flow control (PFC; IEEE 802.1Qbb)
    - Enhanced transmission selection (ETS; IEEE 802.1Qaz)
    - Quantized Congestion Notification (QCN; IEEE 802.1Qau)
    - Data Center Bridging Capability eXchange (DCBX; IEEE 802.1Qaz)
    - Up to 8 traffic classes per port; fully DCB compliant per 802.1Qbb
- Manageability
    - TruManage Technology based on Distributed Management Task Force (DMTF) standards and protocols, support for SMASH2.0, WS-Man, and IPMI2.0/DCMI1.5
    - Management Component Transport Protocol (MCTP) - MCTP over SMBus and MCTP over PCIe VDM
- Power Saving
    - ACPI compliant power management
    - PCI Express Active State Power Management (ASPM)
    - PCI Express eCLKREQ support
    - PCI Express unused lane powered down
    - Ultra low-power mode
    - Energy Efficient Ethernet (IEEE Std 802.3az-2010)
    - Power Management (PM) Offload

Server support

The following table lists the ThinkSystem servers that are compatible.

Table 5. ThinkSystem server support

	E	1S Intel				2S Intel								AMD		4S Intel				Dense/ Blade			
Description and part number	**SE350 (7Z46/7D1X)**	**ST50 (7Y48/7Y50)**	**ST250 (7Y45/7Y46)**	**SR150 (7Y54)**	**SR250 (7Y51/7Y52)**	**ST550 (7X09/7X10)**	**SR530 (7X07/7X08)**	**SR550 (7X03/7X04)**	**SR570 (7Y02/7Y03)**	**SR590 (7X98/7X99)**	**SR630 (7X01/7X02)**	**SR650 (7X05/7X06)**	**SR670 (7Y36/7Y37/7Y38)**	**SR635 (7Y98/7Y99)**	**SR655 (7Y00/7Z01)**	**SR850 (7X18/7X19)**	**SR850P (7D2F/2D2G)**	**SR860 (7X69/7X70)**	**SR950 (7X11/12/13)**	**SD530 (7X21)**	**SD650 (7X58)**	**SN550 (7X16)**	**SN850 (7X15)**
Broadcom 57454 10/25GbE SFP28 4-port OCP Ethernet Adapter, 4XC7A08242	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N

Physical specifications

The OCP adapter has the following dimensions:

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

Operating environment

The adapters are supported in the following environment:

- Temperature (operating): 0 to 55 °C (32 to 131 °F)
- Temperature (storage): -40 to 65 °C (-40 to 149 °F)
- Humidity: 5 to 95% non-condensing

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 adapters conform to the following standards:

- EN 55022:2010 + AC:2011 Class B (CE EU)
- EN 55024 Class B (EU)
- CFR47, Part 15 Class B (USA FCC)
- ICES-003 Class B (Canada)
- CNS13438 Class B (BSMI Taiwan)
- RRL KN22 Class B (S. Korea)
- KN24 (ESD) (S. Korea)
- V-3 / 2014 / 04 (VCCI Japan)
- EN 60950-1
- UL 60950-1
- CTUVus UL
- CSA 22.2 No. 950
- CNS14336 Class B
- ICES 003
- UL 1977 (connector safety)
- UL 796 (PCB wiring safety)
- UL 94 (flammability of parts)

Top-of-rack Ethernet switches

The following table lists the Ethernet LAN switches that are offered by Lenovo.

Table 6. Ethernet LAN switches

Part number	Description
1 Gb Ethernet Rack switches	
7Y810011WW	Lenovo ThinkSystem NE0152T RackSwitch (Rear to Front)
7Z320O11WW	Lenovo ThinkSystem NE0152TO RackSwitch (Rear to Front, ONIE)
7159BAX	Lenovo RackSwitch G7028 (Rear to Front)
7159CAX	Lenovo RackSwitch G7052 (Rear to Front)
7159G52	Lenovo RackSwitch G8052 (Rear to Front)
7165H1X	Juniper EX2300-C PoE Switch
7165H2X	Juniper EX2300-24p PoE Switch
1 Gb Ethernet Campus switches	
7Z340011WW	Lenovo CE0128TB Switch (3-Year Warranty)
7Z360011WW	Lenovo CE0128TB Switch (Limited Lifetime Warranty)
7Z340012WW	Lenovo CE0128PB Switch (3-Year Warranty)
7Z360012WW	Lenovo CE0128PB Switch (Limited Lifetime Warranty)
7Z350021WW	Lenovo CE0152TB Switch (3-Year Warranty)
7Z370021WW	Lenovo CE0152TB Switch (Limited Lifetime Warranty)
7Z350022WW	Lenovo CE0152PB Switch (3-Year Warranty)
7Z370022WW	Lenovo CE0152PB Switch (Limited Lifetime Warranty)
10 Gb Ethernet switches	
7159A1X	Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)
7159B1X	Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)
7159C1X	Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)
7159CRW	Lenovo RackSwitch G8272 (Rear to Front)
7159GR6	Lenovo RackSwitch G8296 (Rear to Front)
25 Gb Ethernet switches	
7159E1X	Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)
7Z210O21WW	Lenovo ThinkSystem NE2572O RackSwitch (Rear to Front, ONIE)
100 Gb Ethernet switches	
7159D1X	Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)
7Z210O11WW	Lenovo ThinkSystem NE10032O RackSwitch (Rear to Front, ONIE)

For more information, see the list of Product Guides in the following switch categories:

- 1 Gb Ethernet switches: http://lenovopress.com/networking/tor/1gb?rt=product-guide
- 10 Gb Ethernet switches: http://lenovopress.com/networking/tor/10gb?rt=product-guide
- 25 Gb Ethernet switches: http://lenovopress.com/networking/tor/25gb?rt=product-guide
- 40 Gb Ethernet switches: http://lenovopress.com/networking/tor/40gb?rt=product-guide
- 100 Gb Ethernet switches: https://lenovopress.com/networking/tor/100Gb?rt=product-guide

Related publications

For more information, see the following resources:

- Networking Options for ThinkSystem Servers
  https://lenovopress.com/lp0765-networking-options-for-thinksystem-servers
- 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

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