

ThinkSystem Broadcom 57454 10GBASE-T Ethernet Adapters

Product Guide

The ThinkSystem Broadcom 57454 10GBASE-T Ethernet Adapters are high-performance 10 Gb Ethernet adapters in either standard PCIe form factor or the Open Compute Project (OCP) 3.0 SFF form factor. They offer TruFlow™ intelligent flow processing and support 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 10GBASE-T 4-port OCP Ethernet Adapter

Did you know?

10GBASE-T is a low-cost way to enter the 10 Gb Ethernet space. By using standard UTP twisted pair cabling, you eliminate the need for transceivers or fiber optic cabling.

The OCP 3.0 adapters support the Network Controller Sideband Interface (NC-SI) for communication with the server's onboard service processor. This support enables sharing the network interface with the service processor and the operating system, thereby eliminating the need for a separate management network.

Part number information

The ordering information is listed in the following table.

Table 1. Ordering information

Part number	Feature code	Description
PCIe adapters		
4XC7A08245	B5SU / BFY6*	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter
OCP adapters		
4XC7A08240	B5T4	ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter

* Feature code BFY6 is for the SR860 V2 and SR850 V2; B5SU is for all other supported servers

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

- One Broadcom adapter
- PCIe adapters: Full-height (3U) bracket attached with low-profile (2U) bracket included in the box
- Documentation flyer

The following figure shows the ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter.

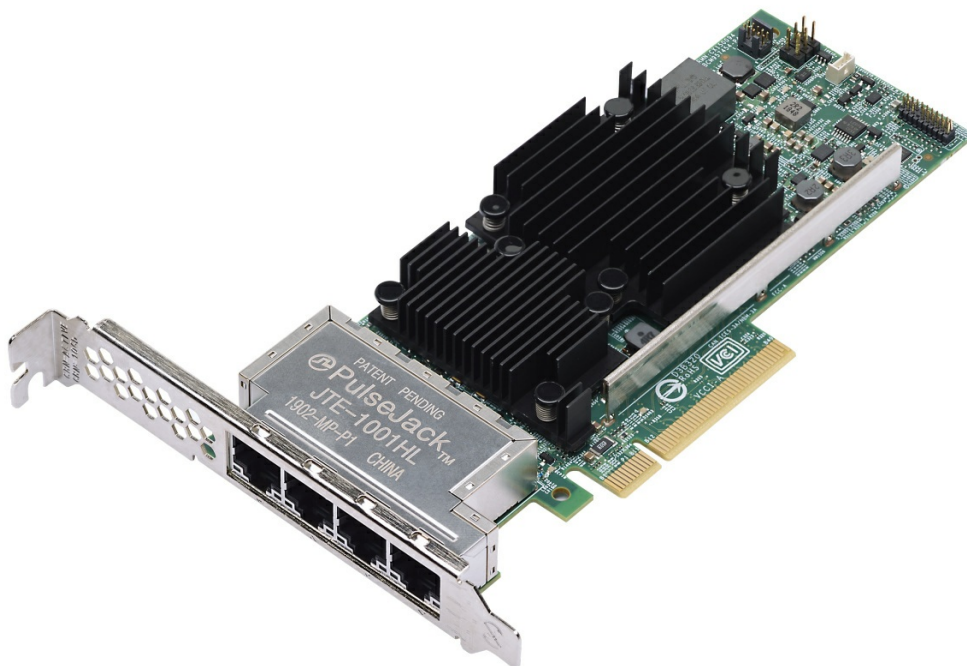


Figure 2. ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter

Network cabling requirements

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

- 10GBASE-T
 - UTP Category 7 (100 m maximum)
 - UTP Category 6a (100 m maximum)
 - UTP Category 6 (55 m maximum)

The following table lists the supported Category 6 (CAT 6) cables.

Table 2. CAT6 cables

Part number	Feature code	Description
CAT6 Green Cables		
00WE123	AVFW	0.75m CAT6 Green Cable
00WE127	AVFX	1.0m CAT6 Green Cable
00WE131	AVFY	1.25m CAT6 Green Cable
00WE135	AVFZ	1.5m CAT6 Green Cable
00WE139	AVG0	3m CAT6 Green Cable
90Y3718	A1MT	10m CAT6 Green Cable
90Y3727	A1MW	25m CAT6 Green Cable
CAT6 Blue Cables		
90Y3721	A1MU	10m CAT6 Blue Cable
90Y3730	A1MX	25m CAT6 Blue Cable
CAT6 Yellow Cables		
90Y3724	A1MV	25m CAT6 Yellow Cable

Features

The adapters have 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 adapters support 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 predictable 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 adapters have the following technical specifications:

- Four port 10 Gbps Ethernet controller with RJ45 connectors
 - 10GBASE-T IEEE 802.3an support
 - 1000BASE-T IEEE 802.3ab support
- Based on the Broadcom BCM57454 (4-port) controller
- Host interface:
 - Low profile adapter: PCIe 3.0 x8 host interface
 - OCP 3.0 adapter: PCIe 3.0 x16 host interface
- OCP adapters are 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)
- Support for PXE boot, UEFI, iSCSI boot and Wake-on-LAN (WOL, OCP adapter only)
- Function-Level Reset (FLR) support
- Network Controller Sideband Interface (NC-SI) (OCP adapter)
- 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
 - Power Management (PM) Offload

Server support

The following tables list the ThinkSystem servers that are compatible.

SR860 V2 and SR850 V2 : For the SR860 V2 and SR850 V2, use feature BFY6 to order the PCIe adapter in the server using configure-to-order. For field upgrades, use part number 4XC7A08245 but ensure the adapter has the latest firmware.

Table 3. Server support (Part 1 of 2)

Part Number	Description	Edge		1S Intel V2		2S Intel V2				AMD				Dense V2				4S V2	8S		
		SE350 (7Z46 / 7D1X)	SE450 (7D8T)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR670 V2 (7Z22 / 7Z23)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	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)
4XC7A08245	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	N	Y	N	N	N	Y	Y	Y	N	Y	Y	Y	Y	N	N	N	N	Y	Y	N
BFY6	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	Y	Y	N
4XC7A08240	ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter	N	N	N	N	N	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N	Y	Y	N

Table 4. Server support (Part 2 of 2)

Part Number	Description	1S Intel V1				2S Intel V1						Dense V1				4S V1				
		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)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)
4XC7A08245	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
BFY6	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4XC7A08240	ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Operating system support

The following tables list the supported operating systems:

- [ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter, 4XC7A08245](#)
- [ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter, 4XC7A08240](#)

Tip: These tables are automatically generated based on data from [Lenovo ServerProven](#).

Table 5. Operating system support for ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter, 4XC7A08245

Operating systems	SE450	SR630 V2	SR650 V2	SR850 V2	SR860 V2	ST650 V2	SR635	SR645	SR655	SR665
Microsoft Windows Server 2016	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.6	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	N	N	N	Y	N	Y	N
Red Hat Enterprise Linux 8.1	N	N	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	N	N	Y	N	Y	N
SUSE Linux Enterprise Server 12 SP5	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	N	N	N	N	N	N	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	Y	Y	N	N	Y	N	N	N	N
Ubuntu 20.04 LTS	N	Y	Y	N	N	N	N	N	N	N
Ubuntu 22.04 LTS	N	Y	Y	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	Y	Y	N	N	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	Y	Y	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Table 6. Operating system support for ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter, 4XC7A08240

Operating systems	SR630 V2	SR650 V2	SR850 V2	SR860 V2	SR635	SR645	SR655	SR665
Microsoft Windows Server 2016	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.6	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 7.9	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	N	Y	N	Y	N
Red Hat Enterprise Linux 8.1	N	N	N	N	Y	Y	Y	Y
Red Hat Enterprise Linux 8.2	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.3	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP4	N	N	N	N	Y	N	Y	N
SUSE Linux Enterprise Server 12 SP5	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 12 SP5 with Xen	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	Y	N	Y	Y
SUSE Linux Enterprise Server 15 SP1 with Xen	N	N	N	N	Y	N	Y	Y
SUSE Linux Enterprise Server 15 SP2	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP2 with Xen	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3 with Xen	Y	Y	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	Y	Y	N	N	N	N	N	N
Ubuntu 20.04 LTS	Y ¹	Y ¹	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	N	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y

¹ Limitation notice: Broadcom 57454 OCP adapter bandwidth shows incorrectly under Ubuntu OS with SR650 V2/SR630 V2 servers, which is planned to be fixed by 1Q'22

Physical specifications

The PCIe adapter has the following dimensions:

- Length: 167 mm (6.6 in.)
- Height: 63 mm (2.5 in)

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)

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:

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

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This document, LP1310, was created or updated on July 7, 2021.

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