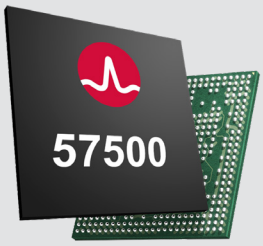
BROADCOM®

Product Brief

BCM57500

200 Gb/s Ethernet Controller with PCIe 4.0, 50G PAM-4, and 1/2/4-Port



Highlights

- Single, dual, or quad-port with 200 Gb/s aggregate throughput
- 200GbE/100GbE/50GbE/40GbE/25GbE/10GbE
- 8x SerDes, 50G PAM-4 or 25G NRZ
- PCIe 4 x16, multihost up to 4
- End-to-end In-band Telemetry
- TruTrust™: Silicon Root-of-Trust and Secure Boot Loader
- TruFlow™: Flow Processing offload
- TruManage™: Advanced Manageability
- RoCEv1/v2, Smart Congestion Control
- NCCL 2.0 and GPUDirect support
- Comprehensive Stateless offloads
- Overlay network: Tunnel-aware state-less offloads and VTEP offloads

Applications

- Cloud/enterprise data center servers
- Machine Learning (ML) clusters
- NVMe Storage Disaggregation
- Hadoop clusters and database services
- Network Function Virtualization
- Mobile Edge Computing
- High Performance Computing (HPC)

Description

Building upon the success of the widely deployed Broadcom® NetXtreme®-E architecture, the BCM57500 series Ethernet Controllers set the bar higher by supporting single, dual, and quad-port configurations with 200 Gb/s aggregate throughput. The BCM57500 supports network interfaces of 200GbE, 100GbE, 50GbE, 40GbE, 25GbE, and 10GbE.

Incorporating industry-leading PHY technology, the BCM57500 provides highly efficient network connectivity using eight lanes of built-in SerDes, each supporting 50G PAM-4 and 25G NRZ. When paired with Broadcom's market-leading Ethernet switches StrataXGS® or StrataDNS™, the BCM57500 assures the highest level of performance, interoperability, and features.

The BCM57500 supports RDMA over Converged Ethernet (RoCE) with hardware-based congestion control. Broadcom's RoCE congestion control not only delivers the lowest latency in real-life scenarios but dramatically reduces the complexity of RoCE deployment at scale.

The BCM57500 TruFlow™ technology integrates hardware acceleration with enhanced programmable parser/lookup/match/action engine. TruFlow increases virtual machine density and improves application performance.

The BCM57500 TruTrust™ technology enables the Industry's most secure server platform with Broadcom's Silicon Root of Trust and Secure Boot Loader. TruTrust provides absolute protection by locking down the lowest level resources against attacks.

The BCM57500 is PCIe 4.0 compliant and backwards compatible with 3.0, 2.0, and 1.1.

Benefits

- Lowers data center TCO with 200G and 50G PAM-4
- Unleashes the networking performance of PCIe 4-capable servers
- Improves network reliability and real-time control with In-band Telemetry
- Enables unparalleled platform security with TruTrust
- Maximizes service density and application performance with TruFlow
- Minimizes management cost and complexity with TruManage
- Enables large-scale RoCE deployment with Smart RoCE Congestion Control
- Boosts efficiency of GPGPU-based Machine Learning cluster with NCCL 2.0 and GPUDirect
- Accelerates applications with Kernel-bypass: RDMA, DPDK, and SR-IOV
- Reduces CPU cycles for I/O with comprehensive stateless offloads

Key Features

Network:

- High Availability (HA) support
- BASE-R FEC (CL74) and RS-FEC (CL91, CL108)
- Auto-negotiation
- IEEE-1588v2 and Time Sync

Host Interface:

- 16 lanes of PCI Express 4.0
- Link rates: 16, 8, 5, 2.5 GT/s
- Lane configuration: x16, x8, x4, x2, and x1
- PCIe bifurcation, up to four hosts

Platform Security:

- Silicon Root of Trust (RoT)
- Secure Firmware update
- Secure Firmware loading
- Secure erasure
- Audit logging

Network Boot

- PXE, UEFI
- iSCSI boot

Stateless Offloads:

- IP/TCP/UDP checksum offload
- TCP Segmentation Offload
- Large Send Offload v1 and v2
- Large Receive Offload
- Generic Receive Offload
- Header-Data Split
- Transmit Side Scaling
- Receive Side Scaling
- Accelerated RFS
- Interrupt Coalescing

Flow Processing:

- Flexible matching key
- NAT and NAPT
- Tunnel encap/decap
- Custom tunnel processing
- Connection tracking
- Flow aging
- Sampling and mirroring
- Rate-limiting and metering
- Flow-based statistics

Virtualization:

- Multi-Queue, NetQueue, and VMQ
- Single Root I/O Virtualization
- Up to 1K Virtual Functions
- VF isolation and protection
- VXLAN, GRE, NVGRE, Geneve, and IP-in-IP
- Tunnel-aware stateless of-floads
- Edge Virtual Bridging (EVB)

Manageability

- Network Controller Sideband Interface (NC-SI)
- Management Component Transport Protocol (MCTP)
- MCTP over SMBus
- MCTP over PCIe VDM
- NC-SI over MCTP
- Platform Level Data Model
- PLDM over MCTP

Standards

- PCI-SIG PCIe 4.0 Specification
- IEEE 802.3bs 200GbE
- IEEE 802.3bj 100GbE
- IEEE 802.3bm 40GbE/100GbE
- IEEE 802.3by 25GbE
- IEEE 802.3ba 40GbE
- IEEE 802.3ae 10GbE
- IEEE 802.3ap Backplane Ethernet
- IEEE 802.3ad Link Aggrega-tion
- IEEE 802.3x Flow Control
- IEEE 802.1Qbb PFC
- IEEE 802.1Qaz Enhanced Transmission Selection and DCBX Protocol
- IEEE 802.1Qbg EVB
- IEEE 802.1Q VLAN
- IEEE 802.1P Priority Control
- IEEE 802.1AS Timing and Synchronization
- IEEE 1588 PTP
- 25G/50G Ethernet Consortium

Ordering Information

Part Number	Throughput	Host Interface	Network Interface	Package
BCM57508A0KFSBG	200 Gb/s	×16 PCIe 4.0	1× 200GbE, 2× 100GbE, or 4× 50GbE	21 mm x 21 mm FCBGA
BCM57504A0KFSBG	100 Gb/s	×16 PCIe 4.0	1× 100GbE, 2× 50/40GbE, or 4× 25GbE	
BCM57502A0KFSBG	50 Gb/s	×8 PCIe 4.0	1× 50/40GbE, 2× 25GbE, or 4× 10GbE	

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57500-PB101 05.10.18