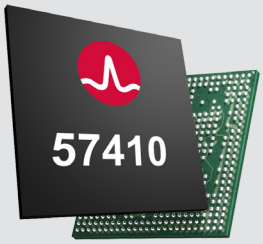
BROADCOM®

Product Brief

BCM57410

High-Performance 10GbE/25GbE/ 40GbE/50GbE Solutions



Key Features

- Dual-port and single-port high-performance Ethernet controllers
- Standards-compliant 10GbE/25GbE/40GbE/50GbE
- Eight lanes of PCI Express (PCIe) Gen3 interface
- SR-IOV with up to 128 VFs
- Function Level Reset (FLR) support
- TruFlow flow processing engine
- RoCE v1 and v2
- TruFlow Technology for integrated flow processing and flexible network management
- SR-IOV support (up to 128 VFs)
- Tunnel-aware stateless offloads
- Tunnel End Point processing offload for VXLAN, NVGRE and Geneve
- RoCE v1/v2
- Windows SMB Direct storage protocol
- GPUDirect
- DCB support: PFC, ETS, QCN, DCBx
- TruManage integrated management processors
- Network Controller Sideband Interface (NCSI)
- SMBus 2.0
- MCTP over SMBus and PCIe VDM

Description

Virtualization technologies continue to expand server CPU demand, with network performance requirements scaling accordingly. This growth demands a new breed of Ethernet connectivity solutions. Designed and optimized for public and private cloud, the Broadcom BCM57410 family of Ethernet Controllers provides high-performance, low-latency, and value-added features for end-to-end solutions.

Paired with industry leading Broadcom data center Ethernet switches and PCIe switches, the BCM57410 provides highly optimized 25G/50G connectivity over Ethernet fabric and PCIe Gen3 connectivity over PCIe fabric. The BCM57410 supports RDMA over Converged Ethernet over Layer 2 (RoCE v1) and Layer 3 (RoCE v2) networks. RoCE enables efficient communications between host CPUs as well as computing coprocessors such as GPGPUs.

The BCM57416 and BCM57417 support dual media providing 10GbE/25GbE and 10GBASE-T/1000BASE-T with copper PHYs integrated on-chip.

All devices in the family feature RoCE v1/v2, Data Center Bridging (DCB), RDMA Congestion Control, Stateless Offloads, TruFlow™, Single Root I/O Virtualization (SR-IOV), and TruManage™.

Highlights

- The world's smallest, lowest power 50G Ethernet controller
- TruFlow: On-chip flow processing engine boosts application performance by up to 50%
- Virtual Switch Acceleration: Integrated virtual Top of Rack (vTOR) switch processes known flows while preserving network policy management domains
- Virtual Tunnel End Points (vTEPs) processing: Full network virtualization encap and decap support including VXLAN, NVGRE, Geneve, and other network overlay protocols
- Flexible SDN Provisioning: Standards-based in-band and out-of-band SDN support
- TruManage: Sideband management over MCTP, PLDM/MCTP, embedded agent, and network control services
- Optimized end-to-end solution with market leading Broadcom data center Ethernet switches (StrataXGS®): Delivers high performance 25G and 50G server connectivity
- RDMA over Converged Ethernet (RoCE): Supports RoCE v1 and v2 significantly reducing CPU cycles and application latency

Key Features (con't)

- PCIe-based UART and KCS
- LLDP, DCBX, CDCP, PFC, and ETS
- Secure firmware loading and update
- Jumbo frames up to 9 KB
- Advanced RDMA Congestion Control
- Multiqueue, NetQueue, and VMQ
- IPv4 and IPv6 offloads
- Checksum Offload (CSO)
- Large Send Offload (LSO)
- Large Receive Offload (LRO)
- Generic Receive Offload (GRO)
- TCP Segmentation Offload (TSO)
- Receive-Side Coalescing (RSC)
- Receive-Side Scaling (RSS)
- Accelerated Receive Flow Steering (aRFS)
- Transmit-side Scaling (TSS)
- VMWare NetQueue, Microsoft Virtual Machine Queue (VMQ) for Windows
- VLAN insertion/removal
- Network boot—PXE, UEFI
- iSCSI boot
- Wake-on-LAN (WOL)
- MSI and MSI-X
- DPDK support for packet processing acceleration and use in NFV deployments

Highlights (con't)

- RDMA Congestion Control (CC): Advanced CC mechanism ensures low End-to-End latency and high fabric bandwidth utilization in a large scale RDMA networks
- Highly efficient heterogeneous computing clusters: Communication via RDMA between computing coprocessors (GPGPUs) optimizes data transfer (GPUDirect) and enables large clusters for scale-out applications such as Deep Learning
- Seamless connectivity with market leading Broadcom data center PCIe switches (PEX9700)

Benefits

- End-to-End 25G and 50G connectivity: Paired with industry-leading StrataXGS and StrataDNX™ switches
- High performance:
  - Line rate throughput up to 50 Gb/s
  - Small packet rate up to 30 Mp/s
  - End-to-End latency as low as 1.5 µs
- Next-Generation Virtualization support:
  - TruFlow on-chip flow processing engine frees the host CPU from expensive network operations, providing up to 50% application performance boost
  - TruFlow extends vSwitch policy domain over SR-IOV
- RoCE
  - Low application latency
  - Low CPU cycles for networking or storage access
- NFV and SDN optimized
  - TruFlow boosts the performance of NFV applications
  - Flexible, standards-based SDN interface enables easy configuration and management
- Integrated management
  - TruManage on-chip management processor provides standards-based server management for ease-of-use
  - TruManage enables sideband management for rapid deployment

Standards

- PCI Express Base 3.0 Specification
- 25G/50G Ethernet Consortium
- IEEE 802.3by—25GbE
- IEEE 802.3ba—40GbE
- IEEE 802.3ae—10GbE
- IEEE 802.3az—EEE compliant
- IEEE 802.3ap—Backplane Ethernet
- IEEE 802.3ad—Link aggregation
- IEEE 802.3x—Flow Control

Standards (con't)

- IEEE 802.1Qbb—Priority Flow Control
- IEEE 802.1Qaz—Enhanced Transmission Selection and DCB eXchange protocol
- IEEE 802.1Qau—QCN
- IEEE 802.1Qbg—Edge Virtual Bridging
- IEEE 802.1Q—VLAN
- IEEE 802.1P—Priority control
- IEEE 802.1AS—Timing and Synchronization
- IEEE 1588—Precision Time Protocol

Ordering Information

Part Number	Host Interface	Network Interface	Package
BCM57412	PCIe Gen3 ×8	Single 25GbE or Dual 10GbE	14 mm × 14 mm FCBGA
BCM57414	PCIe Gen3 ×8	Single 50GbE/40GbE or Dual 25GbE/10GbE	14 mm × 14 mm FCBGA
BCM57416	PCIe Gen3 ×8	Dual 10GbE or Dual 10GBASE-T/1GBASE-T	23 mm × 23 mm FCBGA
BCM57417	PCIe Gen3 ×8	Dual 25GbE or Dual 10GBASE-T/1GBASE-T	23 mm × 23 mm FCBGA

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