



BCM57712 PRODUCT Brief



10 Gbps Dual-Port TOE, iSCSI, FCoE, and RDMA PCI-SIG SR-IOV x8 PCI Express® Gen-2 Controller

FEATURES

- **Media Interfaces**
 - Integrated dual 10 Gbps MAC and dual XAUI™/10GBASE-CX4/10GBASE-KX4
 - Integrated quad 1000BASE-X/SGMII operation in 4x1G mode
 - Single 25.00 MHz clock crystal for dual-port 10 Gbps operation
- **Host Interfaces**
 - PCI Express® x8 2.0, 5 GT/s compliant
 - PCI Express x8 1.1, 2.5 GT/s compliant
 - PCI Express Lanes x1, x2, x4, x8
 - No external memory required; flow-through architecture
 - PCI Express CLKREQ support
 - Single Root IO Virtualization (SR-IOV)
 - Message Signal Interrupt (MSI/MSI-X) support
- **Network Interfaces**
 - Dual-port 1000BASE-KX/10GBASE-KX4/XAUI/10GBASE-CX4 interfaces for 1 Gbps/2.5 Gbps/10 Gbps operation
 - IEEE 802.3ap Clause 73 compliant backplane operation
 - IEEE 802.3xx Clause 37 compliant auto-negotiation for 1 Gbps
- **TCP/IP Offload Engine (TOE)**
 - Microsoft® TCP chimney compliant
 - Full FASTPATH® TCP offload for IPv4 and IPv6
- **Internet Small Computer Systems Interface (iSCSI) Controller**
 - Offloaded full HBA functionality iSCSI initiator
 - iSCSI boot and iSCSI crash dump support
- **Fibre Channel over Ethernet (FCoE)**
 - Receiver and transmitter CRC offload
 - Offloaded full HBA functionality FCoE initiator
- **RDMA Controller (R-NIC)**
 - Hardware-based data placement in application buffers without CPU intervention (for user and Kernel modes)
 - Very low latencies
- **Robust Manageability**
 - Network Controller Sideband Interface (NC-SI)
 - PXE v2.1 remote boot
 - Wake-on-LAN (WOL)
 - Statistics gathering (SNMP MIB II, Ethernet MIB) (IEEE 802.2x, Clause 30)
 - Comprehensive diagnostic and configuration software suite
 - Energy Efficient Ethernet™ compliant with IEEE Draft P802.3az/D1.21
- **Data Center Bridging (DCB)**
 - Enhanced Transmission Selection (ETS) (IEEE 802.1Qaz)
 - Quantized Congestion Notification (QCN) (IEEE 802.1Qau)
 - Priority-based Flow Control (PFC) (IEEE 802.1Qbb)
 - Data Center Bridging Capability eXchange (DCBX) protocol
- **Advanced Network Features**
 - Virtual LANs—IEEE 802.1q VLAN tagging
 - IEEE 802.3x flow control
 - Congestion management support
 - Broadcom's RemotePHY™ auto-negotiation

SUMMARY OF BENEFITS

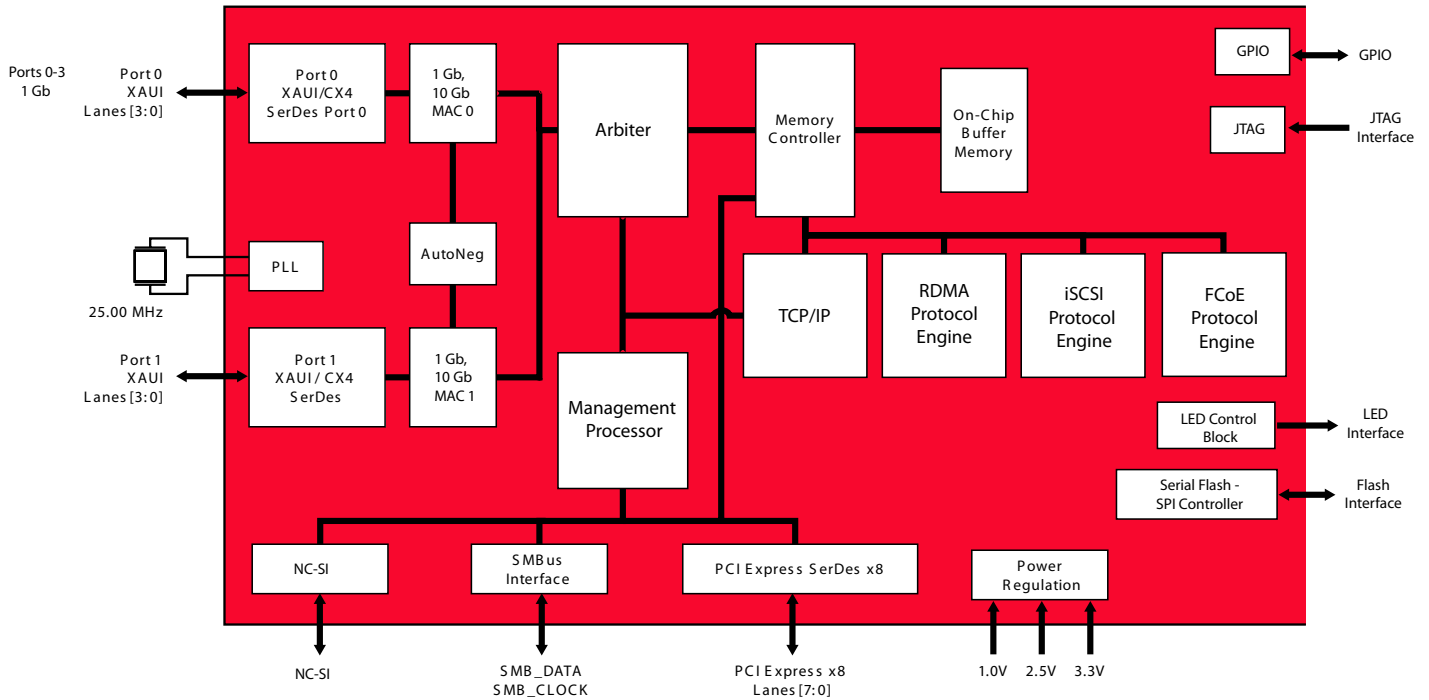
- **SR-IOV 1000 Mbit/10 Gbps SerDes-based TCP/IP solution—Power and space optimized for server blade, rack tower, and C-NIC applications**
 - Four-lane XAUI for 10 Gbps operation on server blade backplane or rack/tower using optical or CX-4 cables
 - Up to four ports of 1 Gbps operation over copper or optical fiber for rack and tower servers
- **Extremely low CPU utilization for TCP/IP applications**
 - Host CPU is free to run application code
 - Minimal load on memory subsystem with zero copy
- **Accelerated IP-based file and block storage**
 - Lower CPU utilization for file-level storage protocols such as CIFS/SMB and NFS
 - Offloaded and accelerated iSCSI block storage with high I/O per second and low CPU utilization
- **Accelerated FCoE**
 - Offloaded and accelerated FCoE for Fibre Channel block storage with high I/O per second and low CPU utilization
- **Performance-focused—Optimized for high throughput lowest latency and CPU utilization**
 - Adaptive interrupt coalescing
 - RSS reduces CPU utilization on multi-CPU systems
 - MSI/MSI-X allows interrupt distribution in a multi-CPU system
- **Robust and highly manageable**
 - NC-SI enables high bandwidth out-of-band system management functionality over shared infrastructure
 - Guaranteed delivery of management traffic
 - PXE v2.1, ACPI v2.0b, WOL
- **Server class reliability, availability, and performance features**
 - Link aggregation and load balancing
 - Switch-dependent
 - IEEE 802.3ad (LACP), generic trunking (GEC/FEC)
 - Switch- and NIC-independent

APPLICATIONS

- 10G-KR backplane solution with Broadcom external KR PHY device (e.g., BCM8073)
- 10G multiport SFP+ optical Network Interface Card (NIC) with Broadcom external 10G optical PHY device (e.g., BCM8727)
- iSCSI v1.0 Host Bus Adapter (HBA)
- FCoE HBA applications
- Applications where Energy Efficient Ethernet is a requirement for data center power savings
- Virtualization environments
- 10GBASE-CX4, 10GBASE-KX4, 10GBASE-KR Mezzanine card for server blades (via companion device)
- 10GBASE-T copper NIC with Broadcom external 10G copper PHY (e.g., BCM8481)
- Quad-port 1 Gbps SFP or 10 Mbps/100 Mbps/1000 Mbps applications with the BCM54640 external PHY



OVERVIEW



BCM57712 Block Diagram

The BCM57712 is a fifth-generation Convergence Network Interface Card (C-NIC) that enables PCI SIG Single Root IO Virtualization (SR-IOV), FCoE, DCB, along with iSCSI, on-chip TOE, and RDMA.

In addition to the dual-channel XAU10 Gb interfaces offered, the BCM57712 provides an operating mode where four 1.25 Gbaud SerDes lanes are supported for 1000BASE-X or SGMII operation. The BCM57712 integrates four IEEE 802.3™-compliant Media Access Controllers (MAC) and supports the NC-SI. Host-BMC communication is also supported on top of NC-SI to permit high-speed communication between the local host and the Baseboard Management Controller (BMC or MC).

The C-NIC products enable convergence of all the possible network communications in a server, such as data network (LAN), FCoE storage

network (block, for example, iSCSI, or file, for example, CIFS/NFS), clustering (e.g., High-Performance Computing [HPC]), or Inter Process Communications (IPC) by support of RDMA over TCP. The BCM57712 is a C-NIC and allows one network connection to provide access to all traffic types. The C-NIC class of products also supports convergence on the host side by providing services to multiple stacks at the same time: networking, storage, and Kernel bypass (for RDMA operation).

The BCM57712 is compatible with both PCI Express (PCIe™) Base Specification Revisions 2.0 and 1.1. The BCM57712 has a native x8 PCI Express interface that can operate in Gen-1 or Gen-2 modes. The PCI Express supports MSI and MSI-X capabilities. The host supports a separate function for each LAN interface on the BCM57712.

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BROADCOM CORPORATION

5300 California Avenue
Irvine, California 92617

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Phone: 949-926-5000
Fax: 949-926-5203
E-mail: info@broadcom.com
Web: www.broadcom.com