BCM5708S
PRODUCT Brief

SINGLE-PORT 1000/2500BASE-X ETHERNET CONTROLLER WITH INTEGRATED TCP PROCESSING ENGINE, RDMA, iSCSI WITH PCI EXPRESS®

FEATURES

- **Single-chip solution for LAN-on Motherboard (LOM) and Network Interface Card (NIC) applications**
  - Integrated 1000/2500BASE-X SerDes
    - Auto-negotiation between 1G and 2.5G modes
    - SGMII support
  - Host interfaces
    - PCI Express® x4 Host interface
- **TCP processing engine**
  - Full fast-path TCP processing
- **iSCSI controller**
  - iSCSI initiator
- **RDMA controller (RNIC)**
  - RDMA over TCP (iWARP)—RDMAC 1.0 compliant
  - Hardware-based data placement in application buffers without CPU intervention (for User and Kernel modes)
- **Other performance features**
  - Receive Side Scaling (RSS)
  - TCP, IP checksum
  - TCP segmentation
  - Adaptive interrupts
  - Message Signal Interrupt (MSI) support
- **Robust manageability**
  - Universal Management Port (UMP)
  - PXE 2.0 remote boot
  - Wake-On LAN
  - IPMI pass-through feature
  - Statistics gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))
  - Comprehensive diagnostic and configuration software suite
  - ACPI 1.1a compliant power management
- **Advanced network features**
  - Virtual LANs—802.1q VLAN tagging
  - Jumbo frames (9 KB)
  - 802.3x flow control
- **Low-power CMOS design**
- **On-chip power circuit controller**
- **400-ball 21 mm x 21 mm FBGA package**
- **3.3V I/Os**
- **JTAG**

SUMMARY OF BENEFITS

- **Industry's first 1000/2500 SerDes-based TOE solution—power and space optimized for server blade and low-profile NIC applications**
- **Extremely low CPU utilization for TCP/IP applications**
  - Host CPU is free to run application code.
- **Accelerated IP-based storage**
  - Lower CPU utilization for file-level storage protocols such as CIFS and NFS
  - iSCSI functionality with low CPU utilization
- **RDMA support for data placement in application buffers reduces CPU utilization and lowers data transit latencies.**
- **Future-proof**
  - Flexible implementation for TCP, iWARP, and iSCSI can accommodate specification changes and interoperability issues.
- **Performance-focused – optimized for throughput and CPU utilization**
  - Adaptive interrupts
  - 2.5 Gigabit Ethernet
  - RSS reduces CPU utilization on multi-CPU systems.
  - MSI allows interrupt distribution in a multi-CPU host system.
  - PCI Express host interface allows a low-latency access to CPU and memory resources.
- **Robust and highly manageable**
  - UMP enables high bandwidth out-of-band system management functionality over shared infrastructure.
  - PXE 2.0, ACPI 1.1, Wake-On LAN
  - IPMI pass-through capability allows on-board management controllers access to the network in OS-present and OS-absent states.
- **Server class reliability, availability, and performance features**
  - Link aggregation and load balancing
    - Switch-dependent
  - 802.3ad (LACP), generic trunking (GEC/FEC)
    - Switch and NIC independent
- **Low power for zero airflow implementations**
  - Advanced power management
- **Minimal real estate—ideal for LOM**
  - On-chip power circuit controller
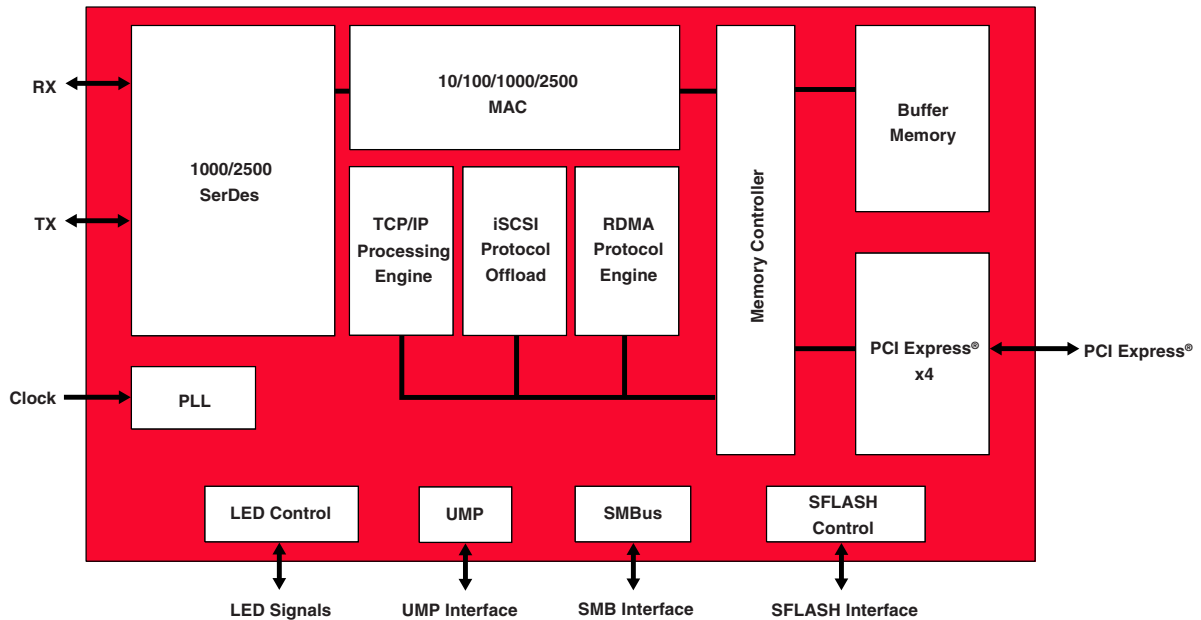
The BCM5708S provides a fully integrated Layer 4 and Layer 5 solution – TCP/IP, RDMA, and iSCSI along with a complete 1000/2500BASE-X Gigabit Ethernet, IEEE 802.3™ compliant Media Access Control (MAC), and Physical Layer Transceiver solution for high performance network applications. By itself, the BCM5708S provides a complete single-chip Gigabit Ethernet NIC with a TCP/IP Processing Engine, RDMA NIC (RNIC), iSCSI HBA, or LOM solution.

The BCM5708S is different from other network controllers because it can process the TCP/IP and relevant L5 protocols on data directly from the application buffers on the host, thereby relieving the host CPU from these time-consuming operations. On the receive path, the BCM5708S processes the frame up to the highest layer supported present in it, for example, the BCM5708S processes the frame for RDMA when the frame is an RDMA frame.

With the appropriate configuration, the BCM5708S can simultaneously support the following three functions:

- RDMA network interface controller (RNIC)
- iSCSI host bus adapter
- TOE chimney-enabled network accelerator

Target Applications of the BCM5708S

- Gigabit Ethernet NICs and LAN-on Motherboard (LOM)
- 2.5 Gigabit Ethernet Server Blade Applications
- ISCSI Host Bus Adapters (HBA)
- RDMA network interface card (RNIC)

Network Interface Cards (NIC) designs		LAN on Motherboard (LOM) designs	
1000 BASE-SX/LX	PCI Express x4 NIC	1000/2500 BASE-X	PCI Express x4, x2, or x1 LOM

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