

# **BCM5706**





# 10/100/1000BASE-T TCP OFFLOAD ENGINE, RDMA, ISCSI/ISER AND ETHERNET CONTROLLER

# FEATURES

### Single-chip solution for LAN on Motherboard (LOM) and Network Interface Card (NIC) applications

- Integrated 10BASE-T/100BASE-TX/1000BASE-T transceivers
- Integrated SerDes (BCM5706S)
- Host interfaces
  - PCI v2.3—32/64 bits, 33/66 MHz
  - PCI-X v1.0—64 bits, 66/100/133 MHz

## TCP offload engine

- Full "fast Path" TCP offload
- Designed for Microsoft's TOE Chimney Architecture

#### iSCSI controller

- iSCSI initiator
- iSER (iSCSI over RDMA)

# • 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

- TCP, IP checksum
- TCP segmentation
- Adaptive interrupts
- Message Signal Interrupt (MSI) support

## Robust manageability

- PXE 2.0 remote boot
- Alert Standard Format (ASF v1.0) support
- Wake-On LAN
- IPMI 'pass-through' mode
- Statistic 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 21x21 mm FBGA package
- 3.3V I/Os
- JTAG

# SUMMARY OF BENEFITS

- Industry's smallest 10/100/1000 TOE solution—power and space optimized for LOM and low-profile NIC applications.
- Extremely low CPU utilization for TCP/IP applications
  - Host CPU is free to run application code
  - Easy integration with Microsoft's TOE Chimney Architecture

#### • 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. The result is improved application performance and faster user response time.

## • Interoperable with:

- Broadcom's Gigabit controller family BCM570x
- Existing Ethernet 10/100/1000 network infrastructure

#### • 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
  - MSI allows interrupt distribution in a multi-CPU host system
  - Support for PCI-X—allows sufficient bandwidth for wire speed operation

# Robust and highly manageable

- PXE 2.0, ACPI 1.1, Wake-On LAN, ASF 1.0
- Integrated cable testing—link quality, length, pair skew, pair polarity, pair swap
- 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

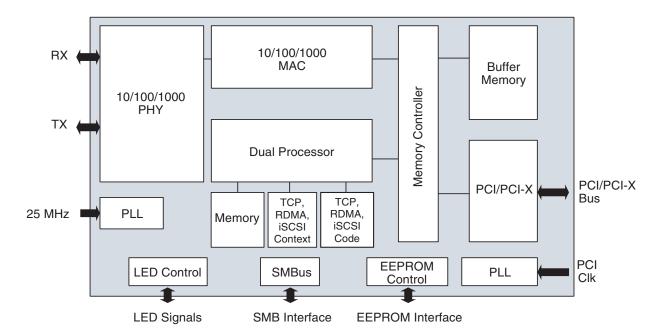
- Link aggregation and load balancing
  - Switch-dependent
- 802.3ad (LACP), generic trunking (GEC/FEC)
  - Switch and NIC independent
- PCI hot plug

## Low power for zero airflow implementations

- Advanced power management
- Minimal real estate—ideal for LOM
  - On-chip power circuit controller



# OVERVIEW



The **BCM5706** provides a fully integrated Layer 4 and Layer 5 solution - TCP/IP, RDMA and iSCSI 1.0/iSER along with a complete 10/100/1000BASE-T Gigabit Ethernet, IEEE 802.3 compliant Media Access Control (MAC) and Physical Layer Transceiver solution for high performance network applications. By itself the **BCM5706** provides a complete single-chip Gigabit Ethernet NIC with a TCP/IP Offload Engine, RDMA NIC (RNIC), iSCSI 1.0/iSER HBA or LOM solution.

The BCM5706 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, therefore relieving the host CPU from these time-consuming operations. On the receive path, the BCM5706 processes the frame up to the highest layer supported present in it, e.g., the BCM5706 processes the frame for RDMA when the frame is an RDMA frame.

With the appropriate configuration, the **BCM5706** can simultaneously support any two of the following three functions:

- RDMA Network Interface Controller (RNIC)
- iSCSI or iSER Host Bus Adapter
- · TOE Chimney enabled network accelerator

## **Target Applications of the BCM5706**

- Gigabit Ethernet NICs and LAN-on Motherboard (LOM)
- ISCSI 1.0 / iSER Host Bus Adapters (HBA)
- RDMA Network Interface Card (RNIC)

Network Interface Cards (NIC) designs		LAN on Motherboard (LOM) designs	
10/100/1000	PCI 2.3 Adapters	10/100/1000	PCI 2.3 LOM
BASE-T	PCI-X v1.0 Adapters	BASE-T	PCI-X v1.0 LOM
1000	PCI 2.3 Adapters	1000	PCI 2.3 LOM
BASE-SX	PCI-X v1.0 Adapters	BASE-SX	PCI-X v1.0 LOM
1000	PCI 2.3 Adapters	1000	PCI 2.3 LOMPCI
BASE-LX	PCI-X v1.0 Adapters	BASE-LX	PCI-X v1.0 LOM

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