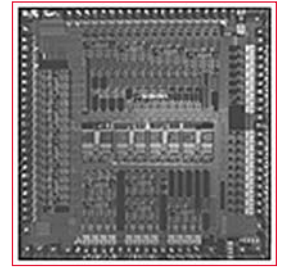




# BCM5701 PRODUCT Brief



## 10/100/1000BASE-T CONTROLLER WITH INTEGRATED TRANSCEIVER

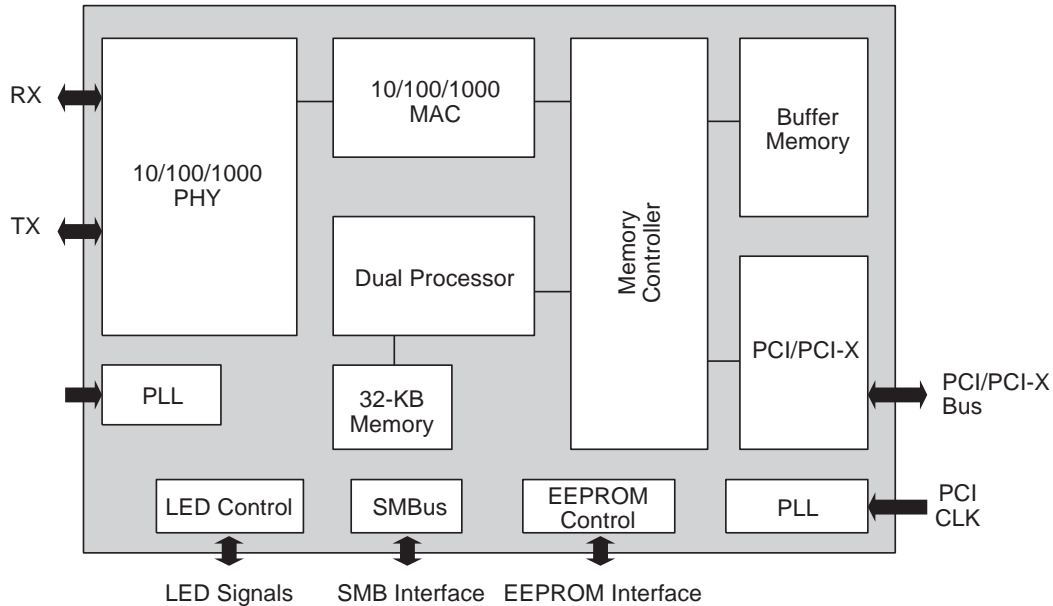
### BCM5701 FEATURES

- **Single-chip solution for LAN on Motherboard (LOM) and network interface card (NIC) applications**
  - Integrated 10BASE-T/100BASE-TX/1000BASE-T transceivers
  - 10/100/1000 tri-speed MAC
  - Host interfaces
    - PCI v2.2, 32/64-bit, 33/66-MHz
    - PCI-X v1.0, 64-bit, 133-MHz
  - MIU/GMIU/TBI interfaces for external transceivers
  - Ultra-deep, 96-KB on-chip packet buffer
  - Dual high-speed RISC cores with 16-KB caches
    - Programmable, in-line packet classification
  - SMBus controller
  - On-chip power circuit controller and Wake on LAN power switching circuit
- **Performance features**
  - TCP, IP, UDP checksum
  - TCP segmentation
  - CPU task offload
  - Adaptive interrupts
  - Ultra-deep, 96-KB packet buffer
- **Robust manageability**
  - PXE 2.0 remote boot
  - Alert specification forum (ASF 1.0 support)
  - Wake-on LAN
  - Statistics gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))
  - Comprehensive diagnostic and configuration software suite
  - ACPI 1.1a compliant (multiple power modes)
  - Wake on LAN
- **Advanced network features**
  - Priority queuing (802.1p Layer 2 priority encoding; support for four priority queues)
  - Virtual LANs (802.1q VLAN tagging; support for up to 64 VLANs)
  - Jumbo frames (9 KB)
  - 802.3x flow control
- **Advanced server features**
  - Link aggregation (802.3ad, GEC/FEC, Smart Load Balancing™ (supports heterogeneous teams))
  - Heterogeneous, mixed-speed failover
  - Hot-Plug PCI support
- **Low-power, 0.18 μm CMOS design**
- **300-pin HBGA package**
- **3.3V I/Os (5V tolerant)**
- **JTAG**

### SUMMARY OF BENEFITS

- **Industry's first 10/100/1000 MAC/PHY solution (power and space optimized for LOM and low profile NIC applications)**
- **Completely backward compatible:**
  - To existing 10/100 network infrastructure
  - To existing PCI-based desktop and server platforms
- **Futureproof**
  - PCI-X interface, on-chip programmable CPUs, ASF support
- **Performance focused (optimized for throughput and CPU utilization)**
  - Adaptive interrupts
  - PCI-X eliminates PCI bottlenecks
  - Ultra-deep, 96-KB packet buffer lowers CPU utilization and averts PCI congestion
  - CPU task offloads
- **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)
- **Advanced features**
  - VLAN, priority queuing, jumbo frames
  - RISC processors for advanced packet classification
- **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
      - Smart Load Balancing™ (unique technology that supports heterogeneous teams, and can operate with any switch)
  - Failover
    - Smart Load Balancing™ allows heterogeneous failover
  - Hot Plug PCI support
- **Low power for zero airflow implementations**
  - 0.18 μm CMOS design
  - Advanced Power Management
- **Space savings for LOM**
  - 300-pin HBGA package
  - No external memory
  - Integrated power circuitry

# BCM5701 OVERVIEW



The **BCM5701** is a fully-integrated 10/100/1000BASE-T Gigabit Ethernet Media Access Control and physical layer transceiver solution for high-performance network applications. The **BCM5701** is a highly integrated solution combining triple-speed, IEEE 802.3 compliant media access controller (MAC), PCI and PCI-X bus interfaces, on-chip buffer memory, and integrated physical layer transceiver in a single device. The **BCM5701** is fabricated in a low-voltage, 0.18  $\mu\text{m}$  CMOS process, providing a low-power system solution. By itself the **BCM5701** provides a complete, single-chip Gigabit Ethernet NIC or LOM solution.

The **BCM5701** includes a 10/100/1000-Mbps Ethernet MAC with full/half-duplex capability at all speeds, and a 10/100/1000 copper PHY. Support for the following 802.3 functions is featured in the MAC: VLAN tagging, layer 2 priority encoding, link aggregation, and full-duplex flow control.

The device provides both PCI v2.2 and PCI-X v1.0 bus interfaces. The **BCM5701** provides a large on-chip buffer memory for stand-alone operation. Dual on-chip, high-performance processors enable custom frame processing features, including TCP segmentation.

The transceiver is fully compatible with the IEEE 802.3 standard for auto-negotiation of speed. Additionally, several Plug and Play enhancements have been added to make the device even more user friendly. A link quality indicator LED gives installers an

instant visual indication if there are any issues with the wiring plant supporting operation at the desired speed. This includes physical wiring defects or channel conditions, such as excessive cable length, return loss, crosstalk, echo, and noise. Broadcom's remote cable management and diagnostics software can be used with the device to provide remote management of the cable and a first level of diagnostics and fault isolation. The **BCM5701** continually monitors various channel conditions. The optional wire speed capability allows the **BCM5701** to force auto-negotiation to be automatically limited by the speed that the channel can reliably support, rather than the performance of the end equipment.

## Target Applications of the BCM5701

Network Interface Card (NIC) designs		LAN on Motherboard (LOM) designs	
Single Port		Single Port	
10/100/1000 BASE_T	PCI 2.2 Adapters PCI-X v1.0 Adapters	10/100/1000 BASE_T	PCI 2.2 LOM PCI-X v1.0 LOM
Dual Port		Dual Port	
1000 BASE_SX	PCI 2.2 Adapters PCI-X v1.0 Adapters	10/100/1000 BASE_T	PCI 2.2 LOM PCI-X v1.0 LOM
1000 BASE_LX	PCI 2.2 Adapters PCI-X v1.0 Adapters		
Dual Port			
10/100/1000 BASE_T	PCI 2.2 Adapters PCI-X v1.0 Adapters		

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