



# BCM5704C PRODUCT Brief



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

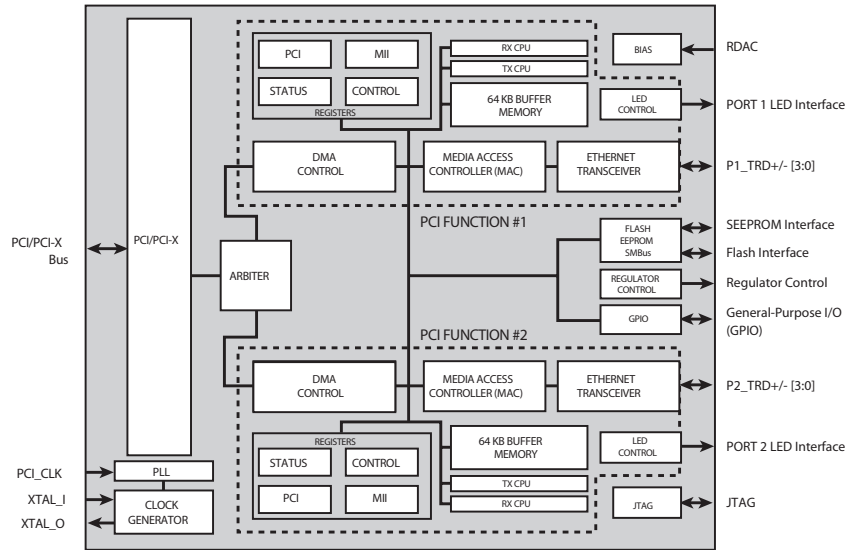
### FEATURES

- **Single-chip, dual-port solution for dual LAN on Motherboard (LOM) and network interface card (NIC) applications**
  - Two integrated 10BASE-T/100BASE-TX/1000BASE-T transceivers
  - Two 10/100/1000 triple-speed MACs
  - Single host interface
    - PCI v2.2 32/64-bit, 33/66 MHz
    - PCI-X v1.0 64-bit, 66/100/133 MHz
  - Dual ultradeep 64 KB on-chip packet buffer
  - Dual high-speed RISC cores with 16 KB caches
    - Programmable, in-line packet classification
  - SMBus 2.0 controller
  - On-chip power circuit controller and Wake-on-LAN (WOL) power switching circuit
- **Performance features**
  - TCP, IP, UDP checksum
  - TCP segmentation
  - CPU task offload
  - Adaptive interrupts
  - Ultradeep 64 KB packet buffer
- **Robust manageability**
  - PXE 2.0 remote boot
  - Alert Standard Format: ASF 1.0 support
  - WOL
  - Out-of-box WOL
  - Intelligent Platform Management Interface (IPMI), ver. 1.5
  - Statistic gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB)
  - Comprehensive diagnostic and configuration software suite
  - ACPI 1.1a-compliant (multiple power modes)
- **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)
  - IEEE 802.3x flow control
- **Advanced server features**
  - Link aggregation: IEEE 802.3ad, GEC/FEC, Smart Load Balancing (supports heterogeneous teams)
  - Heterogeneous, mixed speed failover
  - Hot-Plug PCI support
- **Low-power, 0.13 µm CMOS design**
- **300-pin HBGA package**
- **3.3V I/Os (5V tolerant)**
- **JTAG**

### SUMMARY OF BENEFITS

- **Industry's smallest dual 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
- **Future-proof**
  - PCI-X interface, on-chip programmable CPUs, ASF support
- **Performance focused: optimized for throughput and CPU utilization**
  - Adaptive interrupts
  - PCI-X eliminates PCI bottlenecks.
  - Ultradeep 64 KB packet buffer lowers CPU utilization, avoids PCI congestion.
  - Networking task offloads reduces utilization level of CPU.
- **Robust and highly manageable**
  - PXE 2.0, ACPI 1.1, WOL, ASF 1.0, IPMI
  - 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
- **Low power for zero airflow implementations**
  - 0.13 µm CMOS design
  - Advanced power management
- **Space savings for LOM**
  - 300-pin HBGA package
  - No external memory
  - Integrated power circuitry

# OVERVIEW



## Block Diagram

The BCM5704C is a fully integrated dual-port, 10/100/1000BASE-T Gigabit Ethernet (GbE) MAC and physical layer transceiver solution for high-performance network applications. The BCM5704C is a highly integrated solution combining two triple-speed, IEEE 802.3-compliant MACs, PCI, and PCI-X bus interfaces, an on-chip buffer memory, and an integrated physical layer transceiver in a single device. The BCM5704C is fabricated in a low-voltage, 0.13  $\mu\text{m}$  CMOS process providing a low-power system solution. By itself, the BCM5704C provides a complete single-chip dual-port GbE NIC or LOM solution.

The BCM5704C includes two 10/100/1000-Mbps Ethernet MACs with full-/half-duplex capability at all speeds and two 10/100/1000 copper PHYs. Support for the following IEEE 802.3™ functions is featured in the MAC: VLAN tagging, Layer 2 priority encoding, link aggregation, and full-duplex flow control.

Although the device provides a single PCI v2.2/PCI-X v1.0 bus interface, the device functions as if there are two logical software interfaces. Interrupts are handled via two interrupt pins (INTA and INTB) on the PCI connector. Individual MAC on-chip memory provides packet buffering for higher performance and load balancing. Each MAC function contains dual (TX and RX) on-chip processors enabling 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 BCM5704C continually monitors various channel conditions. The optional wirespeed capability allows the BCM5704C 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 BCM5704C:

Network Interface Card (NIC) Designs		LAN on Motherboard (LOM) Designs	
Dual Port		Dual Port	
10/100/1000BASE-T	PCI v2.2 Adapters PCI-X v1.0 Adapters	10/100/1000BASE-T	PCI 2.2 LOM PCI v1.0 LOM

Gigabit Ethernet (GbE) network interface cards (NICs) and LAN on motherboard (LOM) applications for servers and workstations

BCM5704C software support:

- Microsoft® Windows® 98, NT4.0, 2000, XP, NT64
- Linux® 2.2, 2.4
- Linux64®
- NetWare® 4.x, 5.x, 6.x
- PXE 2.0
- Solaris™ x86

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