BROADCOM®

C o n n e c t i n g
e v e r y t h i n g ®

BCM5400
PRODUCT Brief

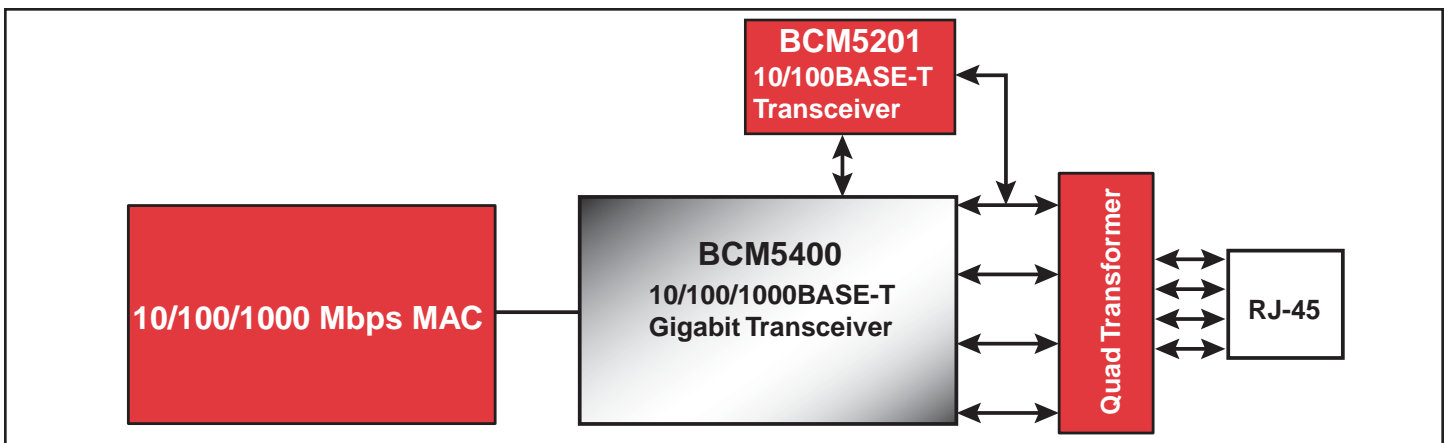# BCM5400 100/1000BASE-T GIGABIT ETHERNET TRANSCEIVER

BCM5400 FEATURES

- The Broadcom® BCM5400 is a fully integrated 100BASE-TX/1000BASE-T Gigabit Ethernet transceiver
  - IEEE 802.3u and 802.3ab compliant
- Glueless interface to an external 10BASE-T transceiver for 10/100/1000BASE-T applications
- Digital Signal Processor (DSP) based system, including digital adaptive equalizers, echo and crosstalk cancellers, encoders and decoders
- Link quality monitor
- Advanced power management
- Automatic detection and correction of pair swaps, pair skew, and pair polarity
- Automatic MDI crossover
- Auto-negotiation with next page support
- On-chip transmit wave shaping eliminates external filters
- Internal 1000BASE-T hybrids simplifies external magnetics
- GMII and 10-bit interface (TBI) interfaces to the media access controller
  - Works with any existing GB Fiber ASICs
- 125 MHz low jitter clock generator
- Support for jumbo packets up to 9 KB
- JTAG test interface
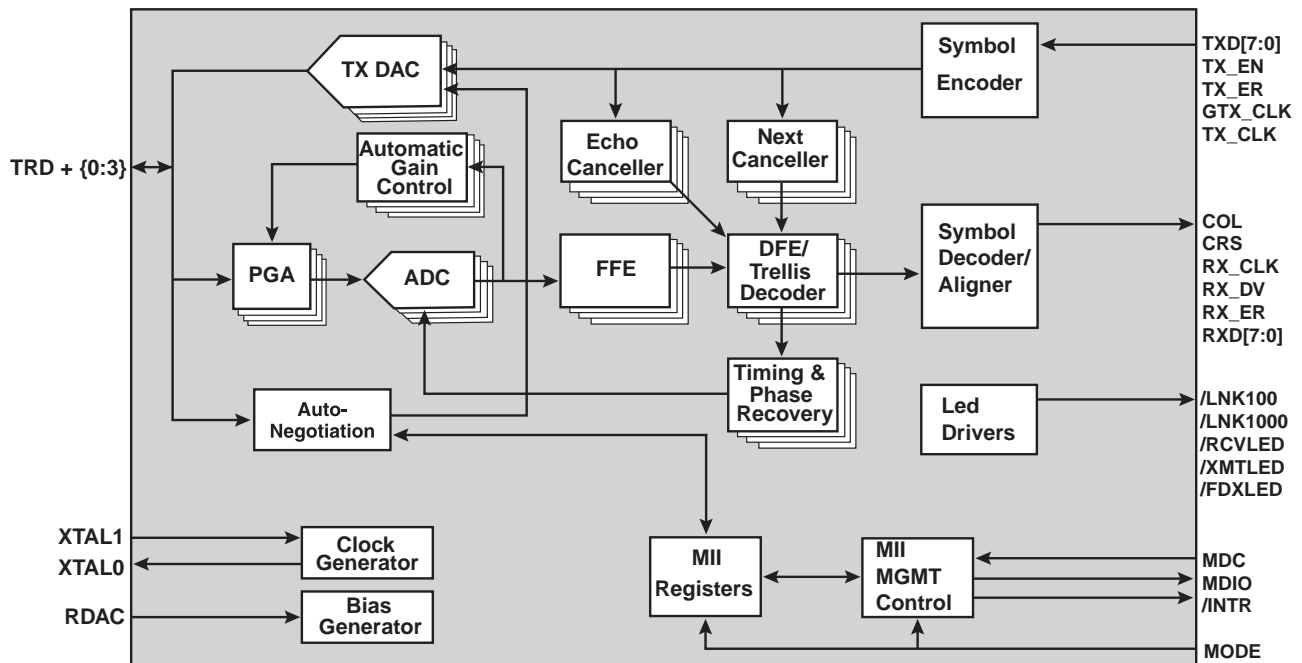- 3.3V/2.5V CMOS with 5V tolerant I/Os
- 256-pin TBGA

SUMMARY OF BENEFITS

- Highly robust 100/1000BASE-T transceiver designed to operate on existing CAT 5 cable plants.
- Supports 10/100/1000BASE-T applications via external 10BASE-T transceiver.
- Ability to dynamically sense and adapt to changes in channel conditions of the cable plant.
- Allows early identification of network problems through continual monitoring of link quality.
- Reduced power through intelligent power management techniques.
- Automatically corrects common installation and configuration mistakes with twisted-pair wiring.
- Works with any existing ASICs and MACs that support either an industry standard 10-bit interface, or IEEE 802.3z standard GMII interface.
- Maximizes network thoughput with support for oversized (jumbo) packets.
- Internal 125 MHz clock generator eliminates external clock circuit for MAC/ASIC.
- Works with low-cost transformers available from multiple suppliers.
- Flexible and programmable LED support.

Complete 10/100/1000BASE-T Solution Diagram

The Broadcom® **BCM5400** is a complete 10/100/1000BASE-T solution operating on standard grade CAT 5 unshielded twisted pair (UTP) cable. The device integrates all of the circuitry required for 100/1000BASE-T Ethernet on-chip, and provides a glueless interface to an external 10BASE-T transceiver for 10/100/1000BASE-T support. The chip is based on a highly advanced DSP architecture combining digital adaptive equalizers, encoders, decoders, echo cancellers, crosstalk cancellers, ADCs, phase lock loop, line drivers, and all required support circuitry. The **BCM5400** easily interfaces to Ethernet MACs and repeater controllers that are compliant with the IEEE 802.3 GMII (Gigabit Media Independent Interface), or TBI (10-bit interface for SERDES). A 125-MHz clock with low jitter is generated internally to eliminate external clocking circuitry for the GMII or TBI interfaces.

The **BCM5400** makes Gigabit Ethernet network equipment easier to install by automatically detecting and correcting the most common wiring problems. These include the ability to automatically configure MDI crossover, correct pair swaps, pair skew, and pair polarity problems. Plug and Play operation is achieved through support of IEEE auto-negotiation for 10/100/1000 Mbps in full- and half-duplex modes.

In 1000BASE-T mode, the **BCM5400** transmits and receives data on CAT 5 UTP using a five-level pulse amplitude modulated (PAM5) data stream. The chip transmits and receives data simultaneously on all four pairs of the UTP cable. In 100BASE-TX mode, the **BCM5400** transmits and receives data on separate pairs using a three-level MLT3 encoded serial data stream in accordance with the IEEE 802.3u standard. The **BCM5400** integrates a complete transceiver from GMII, or TBI, to magnetics.

Connecting
everything®

BROADCOM