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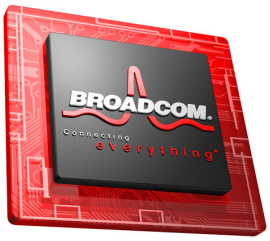
BCM54980 PRODUCT Brief



OCTAL-PORT 10/100/1000BASE-T GIGABIT ETHERNET TRANSCEIVER

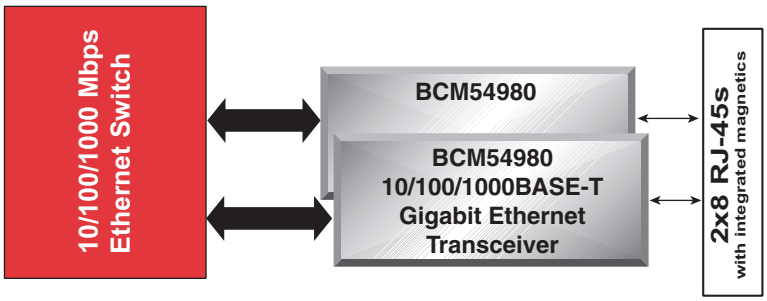
FEATURES

- Eight 10BASE-T/100BASE-TX/1000BASE-T Gigabit Ethernet (GbE) transceivers in a single fully integrated 90-nm CMOS chip
- Reverse MDI capability
- Low power: 500 mW per port
- SGMII and SerDes MAC interface options
- Internal 100Ω twisted-pair termination resistors
- Supports 10/100/1000BASE-T and 100BASE-FX on copper interface
- Enhanced LED driver modes
- Fully compliant with IEEE 802.3, IEEE 802.3u, and IEEE 802.3ab standards
- Line-side loopback
- Low EMI emissions
- Hardware-accelerated CableChecker™ diagnostics
- Robust cable-sourced electrostatic discharge (CESD) tolerance
- Support for jumbo packets
- IEEE 1149.1 (JTAG) and 1149.6 (AC-JTAG) boundary scan
- Ethernet@Wirespeed™ and Super-Isolate mode support

SUMMARY OF BENEFITS

- Energy efficient, low-cost, and low-power octal-port integration enables single-row, high-port density switches
- Ability to reverse MDI, easing board design and simplifying layout in high port density switch designs
- Low-cost solution for unmanaged switch applications
- Lowers system BOM cost and simplifies system design
- Internal 100Ω twisted-pair termination resistors eliminate need for external resistors, saving eight resistors per port
- Provides compatibility with IEEE standard devices operating at 10 Mbps, 100 Mbps, and 1000 Mbps at half-duplex and full-duplex
- Eases system-level debug
- Enables use of low-cost magnetics, even in high-density (48+) designs
- CableChecker characterizes cable plant condition and immediately indicates cabling issues
  - CableChecker detection of cable plant impairments
  - Prevents erroneous equipment return due to bad cable plants
  - Prevents manufacturing fallout due to bad cable plants
- Operates with larger packets for wider range of packet-protocol support and improved efficiency
- Ease of manufacturing with JTAG support, simplified power supply, and multiple MAC interfaces

BCM54980 System Diagram



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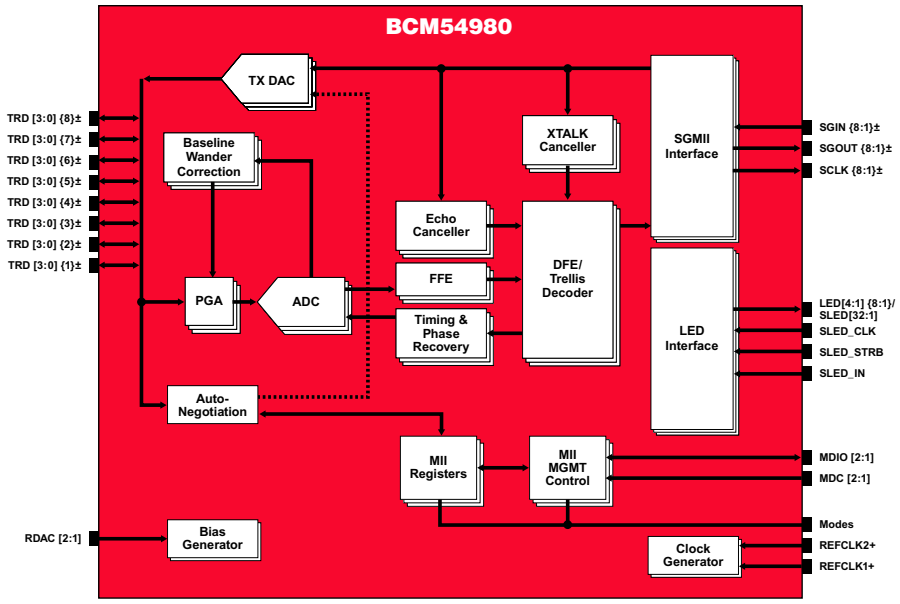
OVERVIEW



BCM54980 Reference Design

The BCM54980 comprises eight complete 10/100/1000BASE-T GbE transceivers integrated on a single monolithic CMOS chip. The BCM54980 is optimized for low power and small footprint size to enable high port density applications. By lowering system cost and reducing power dissipation by nearly 15 percent compared to previous generation PHY products, the BCM54980 enables a new class of cost-effective GbE equipment, driving the delivery of GbE bandwidth to the desktop.

The BCM54980 DSP-based architecture and advanced power management techniques combine with enhanced analog front-end design to achieve robust and low-power operation over existing Category 5 twisted-pair wiring. The BCM54980 architecture not only meets the requirements of IEEE 802.3, IEEE 802.3u, and IEEE 802.3ab but also maintains the industry's highest level of margin over IEEE requirements for echo, near-end crosstalk (NEXT), and far-end crosstalk (FEXT). Low power is the key to implementing high-density GbE switches, and the BCM54980 has the smallest footprint and lowest power in the industry at less than 500 mW per port. In addition, the BCM54980 has extremely low EMI emissions, which reduces the design constraints required to meet EMI radiation specifications. The BCM54980 provides the highest level of external component integration in the smallest possible package, resulting in a PBC space savings of 40% for high-density switch applications.

The BCM54980 supports the SGMII and SerDes MAC interfaces. The SGMII and serial SerDes interfaces are reduced pin-count (6 and 4, respectively, versus 25) versions of the GMII. These reduced pin-count interfaces simplify design and lower system cost by reducing the number of layers required to route high-density solutions. In addition, these interfaces allow fewer pins at the MAC/switch, which reduces the MAC/switch cost by enabling smaller die sizes than would be possible with full GMII.

This new device is the first member of Broadcom's 90-nm GbE copper PHY family, joining more than a dozen previous-generation quad and single products. The 90-nm process is the optimal process that offers the best performance, lowest cost, and lowest power for highly-integrated GbE copper solutions. Devices based on the 90-nm process offer an excellent long-term cost curve, enabling better cost reduction over time (compared to older technologies) without needing to redesign or requalify a new part.

Each BCM54980 port is fully independent and has individual interface, control, and status registers, and incorporates a number of advanced features. A link-quality indicator LED gives installers an instant visual indication if there is a problem with the wiring plant supporting operation at the preferred speed, including physical wiring defects that the BCM54980 cannot automatically correct as well as channel conditions such as excessive cable length and return loss, crosstalk, echo, and noise. Broadcom's CableChecker software can be used with this device to provide remote management of the cable and a first level of diagnostics and fault isolation.

The BCM54980 has the industry's highest tolerance to electrostatic discharge (ESD). This prevents ESD damage not only during manufacturing but also during CESD events in the field. CESD is an ESD event that occurs when an electrically charged network cable is plugged into a network port. This is an issue that has become more prevalent with contemporary cable installations, and the BCM54980 leads the industry in tolerance level.

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