



## OCTAL 10/100/1000BASE-T GIGABIT ETHERNET BROADR-REACH™ TRANSCEIVER

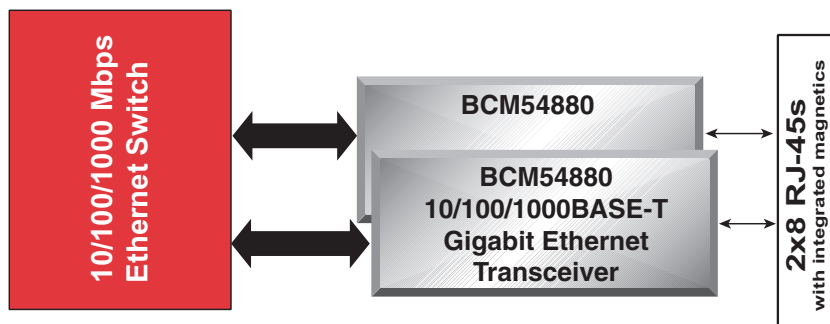
### FEATURES

- Eight 10BASE-T/100BASE-TX/1000BASE-T Gigabit Ethernet (GbE) and BroadR-Reach transceivers in a single fully integrated 65-nm CMOS chip
- Full duplex operation at the rate of 10 Mbps over one single 500-meter telephone-grade twisted-pair cable or 100 Mbps over four-pair CAT5 twisted-pair wiring
- 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

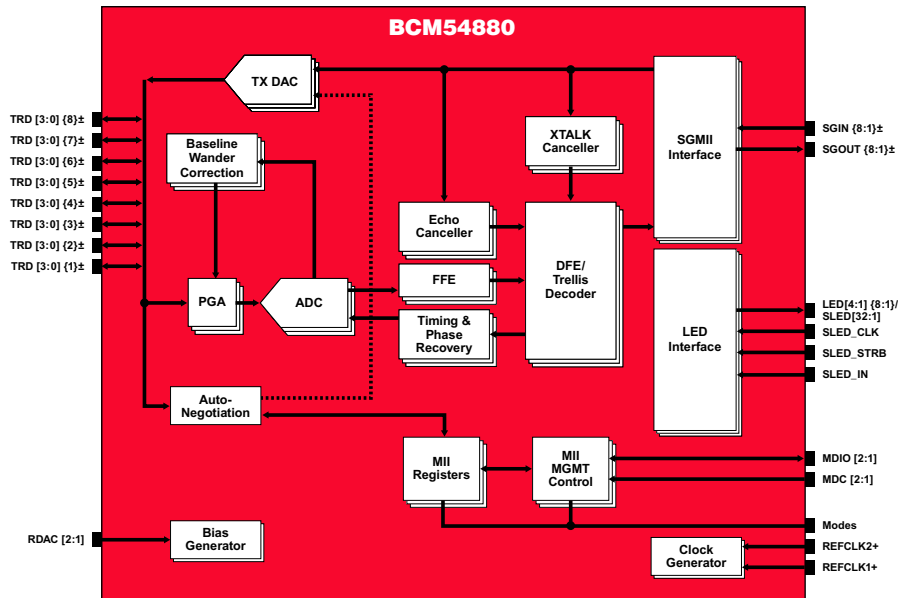
### SUMMARY OF BENEFITS

- Energy efficient, low-cost, and low-power 8-port integration enables single-row, high-port density switches
- Enables new IP services that require extended over one-, two-, or four-pair of either CAT5 or telephony grade cables
- Each port individually configurable as BroadR-Reach 10/100 or standard Ethernet 10/100/1000
- Low-cost solution for service providers access switches and enterprise/SMB managed and 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 802.3 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
- Operates with larger packets for wider range of packet-protocol support and improved efficiency

**BCM54880 System Diagram**



# OVERVIEW



**Block Diagram**

The BCM54880 is the first member of Broadcom's GbE BroadR-Reach family of copper PHY products; It includes eight complete 10/100/1000 BASE-T and BroadR-Reach transceivers integrated on a single 65-nm CMOS chip. The BCM54880 includes eight SGMII serial media access controller interfaces and eight copper ports, whereby each copper port supports one, two or four twisted pair line connections.

BroadR-Reach technology supports both 100-meter traditional Ethernet services and other applications that require longer than 100 meter reach or operation over a single twisted wire pair (such as hotels, colleges/universities, convention centers, airports, train stations, to name a few). The extended reach will also broaden the range of cable installations and can be used for new IP services and applications such as broadband access, voice over IP, wireless access points, and surveillance cameras. In contrast to previous technologies that extended the range of Ethernet over twisted pair, Broadcom's new approach enables every BroadR-Reach port to also support IEEE 802.3-compliant technologies such as 10BASE-T, 100BASE-TX and 1000BASE-T. As a result, BroadR-Reach guarantees interoperability and connectivity to standard 10/100/1000BASE-T devices, over distances up to 100 meters while extending 10/100 operations to 500 meters. Additionally, BroadR-Reach technology works in Power over Ethernet-enabled platforms providing a new generation of IP services and applications such as security camera surveillance.

BroadR-Reach technology addresses key issues that affect deployment of IP services in today's enterprise. For example, since many traditional digital PBX phone systems use twisted pair cables that will not support standard IEEE 802.3 Ethernet PHY technology, BroadR-Reach would

be a good solution for migrating to IP-based telephony systems by leveraging the current infrastructure. Also, in new installations, some devices such as wireless access points (WAPs) and surveillance cameras may not be conveniently located within the standard 100-meter range of horizontal wiring in structured cabling systems. For these applications, BroadR-Reach provides IT managers with additional flexibility in connecting devices over distances that would otherwise require fiber optic cabling and expensive optical transceivers.

When in BroadR-Reach mode of operation, the BCM54880 can operate full duplex at the rate of 10 Mbps over one single 500-meter telephone-grade twisted-pair cable or the rate of 100 Mbps over four-pair CAT5 twisted-pair wiring.

The BCM54880 also features advanced hardware-accelerated cable-checker diagnostic software that detects cable length or cable plant impairments. The information obtained from the diagnostic software can be used in conjunction by the OEM software and has the intelligence to automatically put the BCM54880 in either BroadR-Reach mode or normal Ethernet mode of operation.

The BCM54880 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).

Since BroadR-Reach ports also support standard 10/100/1000BASE-T configurations, system vendors can easily offer upgraded products with no compromise to the features, performance, and interoperability of their existing switch technology.

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**BROADCOM CORPORATION**

5300 California Avenue  
Irvine, California 92617

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54880-PB00-R 05/18/07

Phone: 949-926-5000  
Fax: 949-926-5203  
E-mail: info@broadcom.com  
Web: www.broadcom.com