

## OCTAL 10/100BASE-TX ETHERNET BroadR-Reach™ TRANSCEIVER

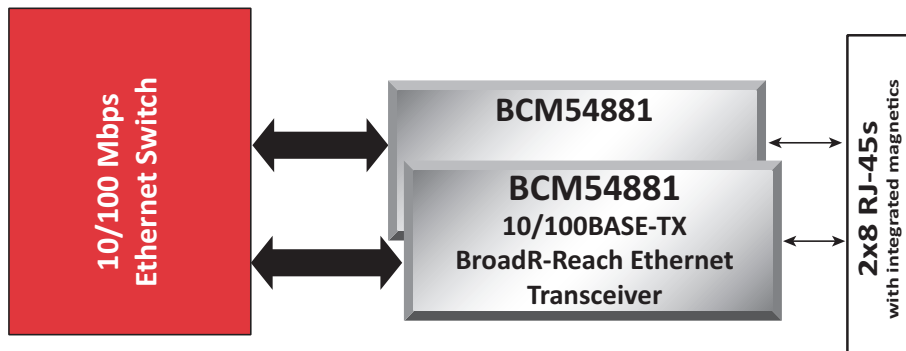
### FEATURES

- Eight 10BASE-T/100BASE-TX and BroadR-Reach™ transceivers in a single fully integrated 65 nm CMOS chip
- Full duplex operation at the rate of 10 Mbps and 100 Mbps over one, two, and four pair of unshielded twisted pair cable up to 1000m, depending on cable quality.
- Full duplex 100 Mbps and 10 Mbps operation over point-to-point coax cable
- S3MII interface
- Internal 100Ω twisted pair termination resistors
- Supports 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

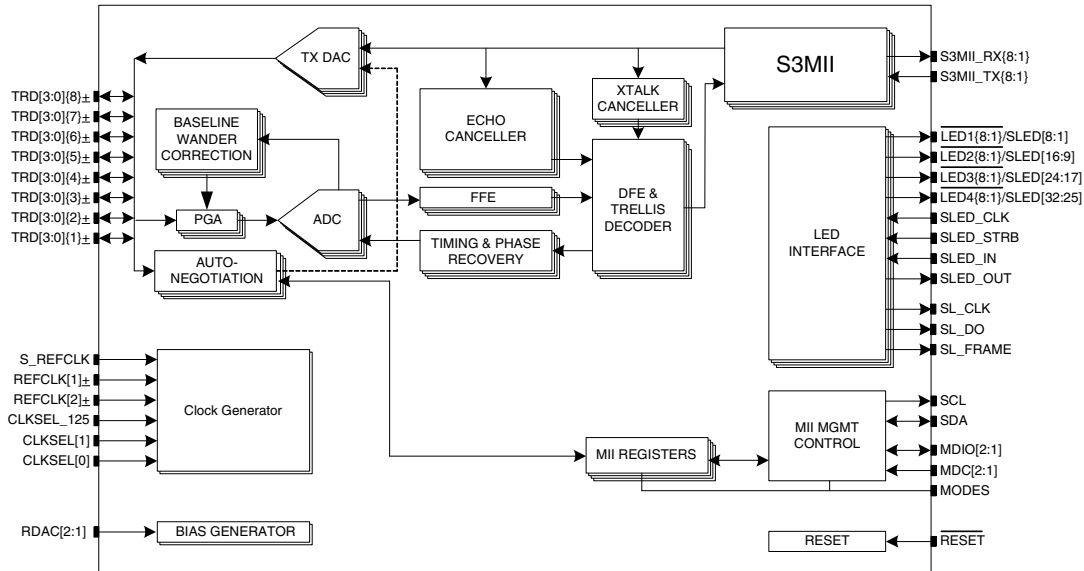
### SUMMARY OF BENEFITS

- Low-cost, and low-power 8-port integration enables single-row, high-port density switches.
- Enables new IP services that require extended reach over one, two, and four pairs of either CAT5 or telephony grade cables
- Each port individually configurable as BroadR-Reach 10/100 or standard Ethernet 10/100
- Low-cost solution for service provider 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 and 100 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

**BCM54881 System Diagram**



# OVERVIEW



**Block Diagram**

The BCM54881 is a member of Broadcom's BroadR-Reach family of copper PHY products. It includes eight complete 10/100BASE-TX and BroadR-Reach transceivers integrated on a single 65 nm CMOS chip. The BCM54881 includes eight S3MII serial media access controller (MAC) 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 FTTC/FFTB in MTU/MDU and hotels). 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 and 100BASE-TX. As a result, BroadR-Reach guarantees interoperability and connectivity to standard 10/100BASE-TX devices, over distances up to 100 meters, while extending 10/100 operations over one, two, or four pairs of UTP cable up to 1000m, depending on the quality of the cable and number of pairs used.

Additionally, BroadR-Reach technology works in Power over Ethernet (PoE)-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

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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 the BroadR-Reach mode of operation, the BCM54881 can operate full duplex at the rate of 10 Mbps or 100 Mbps.

The BCM54881 also features advanced hardware-accelerated CableChecker diagnostic software that detects cable length or cable plant impairments. The information obtained from the diagnostic software can be used in conjunction with the OEM software and has the intelligence to automatically put the BCM54881 in either BroadR-Reach mode or normal Ethernet mode of operation.

The BCM54881 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 10/100BASE-TX configurations, system vendors can easily offer upgraded products with no compromise to the features, performance, or interoperability of their existing switch technology.



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