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BCM8481 PRODUCT Brief

10GBASE-T TRANSCEIVER

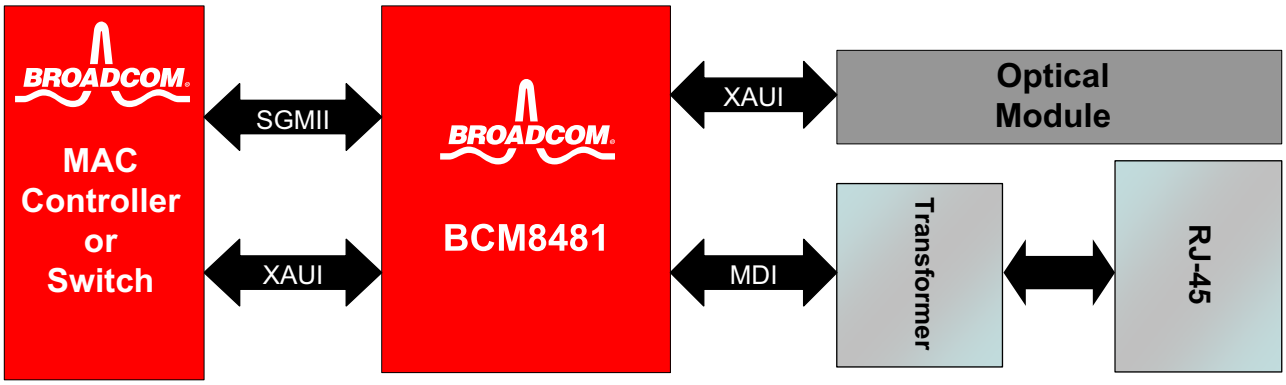
FEATURES

- **Fully integrated 10GBASE-T Ethernet Transceiver**
- **Supports lower speeds: 10BASE-T, 100BASE-TX, 1000BASE-T**
- **XAUI™ and SGMII MAC interface options**
- **XAUI to XAUI pass-through option for dual medium applications**
- **Compliant with IEEE 802.3™, 802.3an, 802.3ab, and 802.3u standards**
- **Support for 100m operation with a 30m low-power mode**
- **On-chip low-voltage regulators**
- **Line-side loopback mode**
- **Low electromagnetic interference (EMI) emissions**
- **Cable plant diagnostics**
- **Detection and correction of pair-swaps (MDI crossover), pair skew, and pair polarity**
- **Support for Jumbo Packets up to 18 KB**
- **IEEE 1149.1 (JTAG) boundary scan**
- **480-pin FBGA 23 mm x 23 mm package**

SUMMARY OF BENEFITS

- **Simplifies system and board design**
  - Lowers system bill of materials (BOM)
- **Provides interoperability with IEEE standard devices operating at 10 Mbps, 100 Mbps, 1000 Mbps, and 10 Gbps**
- **Compatibility with industry standard Ethernet MACs**
- **Flexibility for copper or fiber applications**
- **Low-power mode enables XENPAK and X2 module applications**
- **Reduces system design constraints to meet EMI emissions standards**
- **Cable diagnostic function characterizes cable plant condition and immediately indicates cabling issues**
- **Operates with larger packets for wider range of packet protocol support and improved efficiency**
- **Ease of manufacturing with JTAG support and simplified power supply**

General 10 Gigabit Ethernet Connectivity



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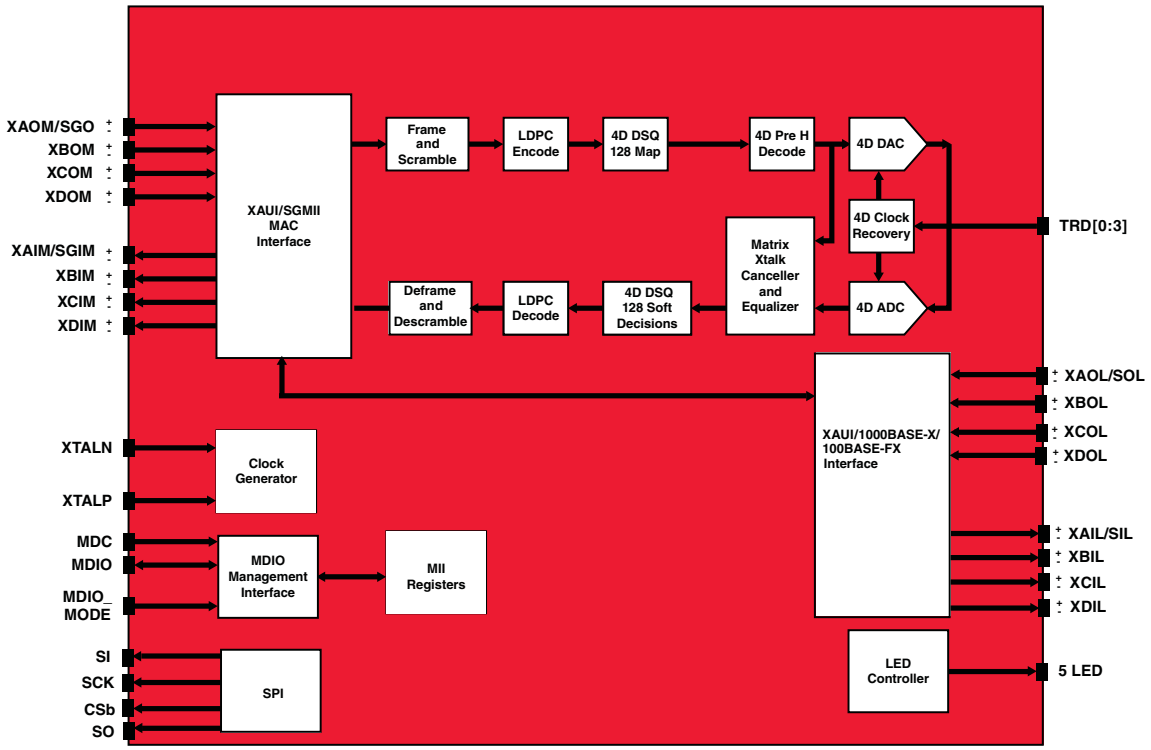
OVERVIEW



BCM8481 Single Chip Block Diagram

The BCM8481 is a complete 10/100/1000/10GBASE-T solution operating at 100m over CAT6a or CAT7 unshielded twisted pair (UTP) cable. It is based on highly advanced digital signal processor-based architecture to allow robust operation over UTP wiring. It is a highly integrated solution combining an enhanced analog front-end with digital adaptive equalizers, ADCs, phase-locked loops, line drivers, LDPC encoders and decoders, echo cancellers, crosstalk cancellers, and all required support circuitry.

The BCM8481 is optimized to enable switch, controller, and other general 10 Gigabit Ethernet connectivity applications. It supports the 4-lane 3.125 Gbps XAUI interface to allow connectivity to 10 Gigabit Ethernet MACs. One lane of the 4-lane XAUI interface is reserved to support the SGMII interface to support lower speed 10/100/1000BASE-T operation.

The product also includes a pass-through XAUI interface mode to allow optional connectivity to a fiber-optic module. Again, one lane of the pass-through XAUI interface is reserved to support lower speed 100BASE-FX and 1000BASE-X fiber applications using the SerDes interface. Switching between copper and fiber media can be accomplished either automatically or through software control. The BCM8481 monitors copper link and fiber detect status and, based on priorities set at initialization, automatically swaps either copper traffic or fiber traffic to the MAC interface.

This device is another member of Broadcom's 65-nm copper PHY family, joining the BCM54880 and BCM54684. The 65-nm process offers the best performance, lowest cost, and lowest power for 10 Gigabit copper solutions. Furthermore, devices based on the 65-nm process offer an excellent long-term cost curve, enabling better cost reduction over time compared to older technologies, without having to redesign or requalify a new part.

The BCM8481 incorporates a number of advanced features. A link quality indicator LED provides instant notification of any problems with the wiring plant operating at the desired speed. This includes physical wiring defects that the BCM8481 cannot automatically correct and channel conditions such as excessive cable length and return loss, crosstalk, echo, and noise. Broadcom's cable analyzer software can be used with the device to provide remote management of the cable and a first level of diagnostics and fault isolation.

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