



## XAUI-TO-10GBASE-CX4 RETIMER

### FEATURES

- **High-speed retiming for transmission-over-copper interconnects** such as InfiniBand® cables or backplanes
- **Multiconfigurable to support various operating modes**
  - Four independent 1.0-Gbps to 3.2-Gbps retimers (single clocking domain)
  - IEEE 802.3™ae compliant XAUI-to-XAUI retimer
  - XAUI-to-CX4 retimer
- **Low power dissipation**
  - Less than 400 mW per retiming channel including I/O
- **SONET/SDH-quality jitter performance**
  - Less than 3 picoseconds rms jitter generation
  - Exceeds SONET jitter tolerance mask
- **High-performance programmable receive equalization and transmit pre-emphasis**
  - **Transmit** pre-emphasis for interoperability with CML SerDes
  - **Receive** equalization for copper interconnects
- **Enhanced test capability**
  - Full loopback and on-chip PRBS generator/checker
- **Compact 17-mm × 17-mm BGA package**
  - No requirement for heat sink or airflow

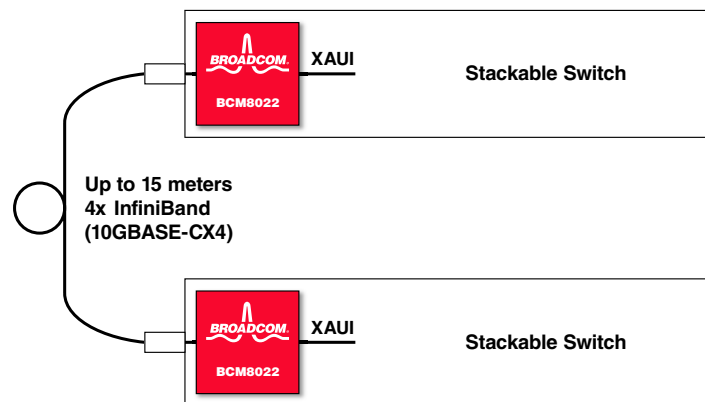
### SUMMARY OF BENEFITS

- Enables low-cost applications transmitting 10 GbE over various copper media: 15 meters InfiniBand cable (10GBASE-CX4), FR-4 backplanes
- Flexible mixed-signal architecture to support various modes of operation and applications with a single device footprint
- Advanced 0.13μ CMOS process technology provides unparalleled performance while achieving the lowest possible power consumption
- Superior jitter characteristics enable data signals transmitted through front panel or backplane networking equipment over low-cost copper media
- Drive PMD devices or backplane directly with no external clean-up circuit required
- Simplifies manufacturability with integrated built-in self-test (BIST), high-speed loopbacks, and programmable PRBS generator/checker
- Decreases complexity and reduces board space on multichannel line-card designs

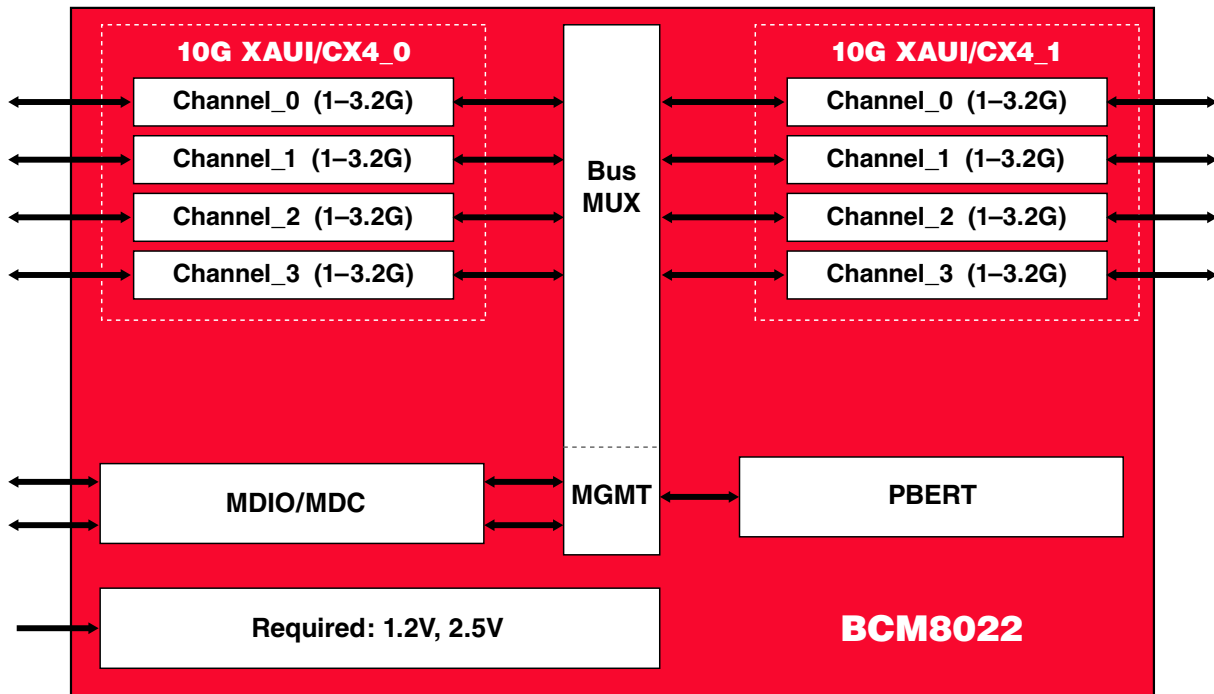
### APPLICATIONS

- 10-GbE LAN, MAN, WAN stackable switches and routers
- 1x, 2x, or 10-Gbps Fibre Channel or SONET network cards
- Advanced test equipment (ATE)

### BCM8022 Application Diagram



## OVERVIEW



**BCM8022 Block Diagram**

The BCM8022 device integrates four retimer channels, leveraging Broadcom's high-performance mixed signal design experience along with advanced 0.13 $\mu$  CMOS process technology. This, combined with a robust architecture offering the highest degree of flexibility, results in a highly programmable, lowest power retimer solution for network line-card and backplane applications.

The BCM8022 was designed to support the new IEEE802.3ak (draft) standard developed for transmitting high-speed 10-GbE data over relatively short distances of low-cost copper media, up to 15 meters of 4X InfiniBand cable. The BCM8022 can be leveraged inside copper-based modules designed with easy plug ability similar to XENPAK or XPAK/X2 type modules or within discrete solutions directly on the line card.

The high-speed serial I/O of the BCM8022 supports transmission rates ranging from 1 Gbps to 3.2 Gbps. An on-chip phase lock loop (PLL) synthesizes the supplied reference clock to support the desired transmit

rate, while clock and data recovery (CDR) units recover the receive rate clock for timing. The interface can support single-channel (single clock domain) or quad (XAUI/CX4) differential CML I/O.

For high-speed serial copper connections, the BCM8022 incorporates both transmit pre-emphasis on the transmit channels and receive equalization on the receive channels. Transmit pre-emphasis is programmable to improve the overall cable reach and compensate for electrical imperfections associated with traces and connectors. Receive equalization provides optimal performance over a variety of receive interfaces.

Highly programmable test capabilities exist within the BCM8022 to support high-speed loopbacks using generators/checkers that support PRBS 27 to 231 patterns along with IEEE802.3ae-defined test patterns.

A complete evaluation kit, including an evaluation board, related software, and documentation is available upon request.

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8022-PB02-R 04/14/06

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