



## QUAD XAUI™/CX4/LX4 1.0–3.2-GBPS RETIMER/SWITCH

### FEATURES

- Eight independent retimer channels supporting multiple data rates from 1.0 to 3.2 Gbps, including 1.06 Gbps, 1.25 Gbps, 2.12 Gbps, 2.488 Gbps, 2.5 Gbps, 2.667 Gbps, 3.125 Gbps, and 3.1875 Gbps
- Multiconfigururable to support various operating modes
  - Eight independent 1.0- to 3.2-Gbps retiming channels (single clock domain)
  - Dual XAUI™/CX4/LX4 to XAUI/CX4/LX4 retiming channels with redundancy compatible to IEEE802.3™ae
  - Dual XAUI/CX4/LX4 to XAUI/CX4/LX4 retiming switch
- Low power dissipation
  - Less than 400 mW per retiming/switch channel including I/O
- 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, BIST, 10G BERT, and random Ethernet packet generation
- Compact 23-mm × 23-mm package with no external components required
  - No requirement for heat sink or airflow

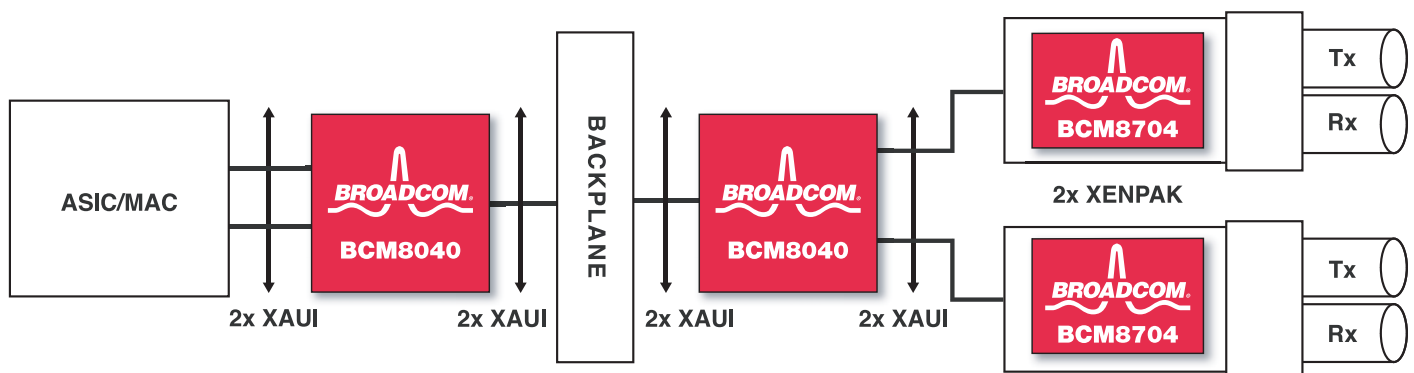
### SUMMARY OF BENEFITS

- One device supports a variety of applications including Gigabit Ethernet, 1× and 2× Fibre Channel, OC-48 SONET (with/without FEC), InfiniBand®, 10-GbE, 10-Gigabit Fibre Channel, or others.
- Flexible architecture supports programmable configurations enabling an aggregate usable data rate of over 40 Mbps. Built-in redundancy mode provides high availability to support critical line side or backplane applications. The high-speed to high-speed retimer mode extends the use of longer traces on line-card designs.
- Advanced 0.13µ CMOS process technology provides unparalleled performance while achieving the lowest possible power consumption.
- Eases linecard designs to allow for multiple connectors or low-cost PCB materials such as FR4.
- Drive PMD devices or backplane directly with no external cleanup circuit required.
- Simplifies manufacturability with integrated built-in self-test (BIST), full loopbacks, and programmable PRBS generator/checker.
- Decreases complexity and reduces board space on multichannel linecard designs.

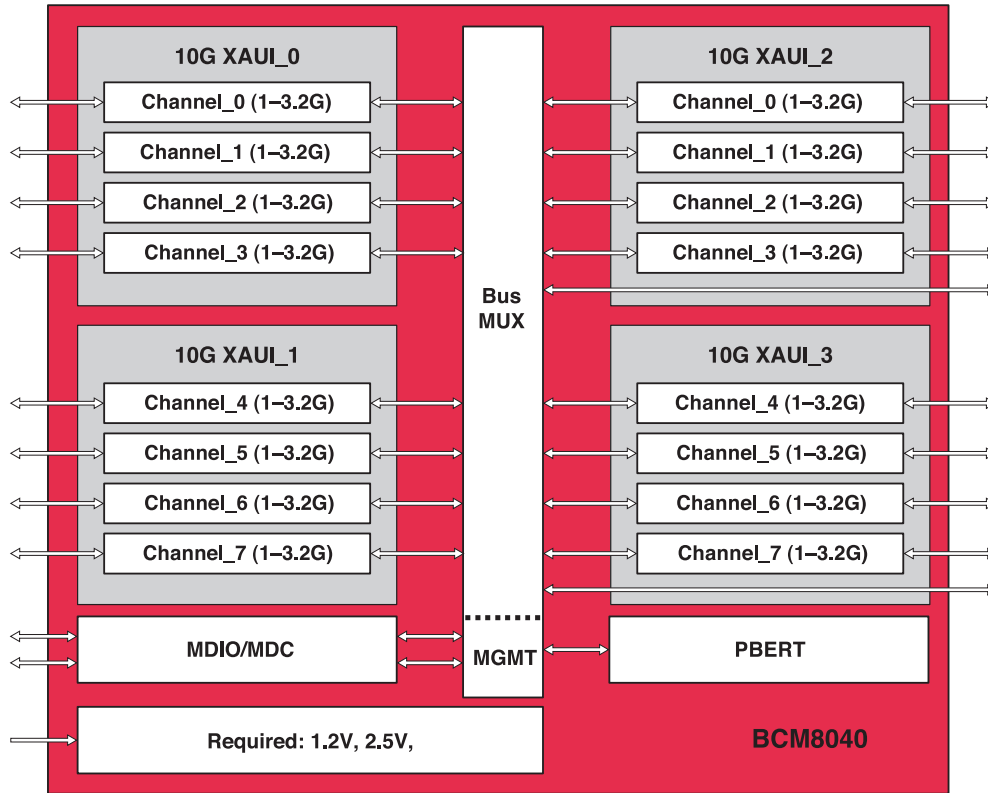
### APPLICATIONS

- 1-GbE and 10-GbE LAN, MAN, WAN switches and routers
- 1×, 2×, or 10-Gigabit Fibre Channel, InfiniBand, SONET network cards
- 40-Gbps backplanes and backplane extenders
- Advanced test equipment (ATE)

**Dual Independent XAUI Cross-Link Application Diagram**



## OVERVIEW



**BCM8040 Block Diagram**

The BCM8040 device integrates four independent XGXS (XGMII eXtender sublayer) cores 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.

An internal MUX connects each serial channel to enable fully redundant operation. The MUX enables an active serial link to be switched to the primary channel, while a protection serial link can be continuously monitored to insure its condition. If the active link fails, the protection link can be switched over through external control to ensure continued system operation.

Each transmitter and receiver interface supports serial 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 (octal) or dual-channel quad (XAUI) differential CML I/O.

For high-speed serial copper connections, the device 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 within the device support loopbacks using generators/checkers that provide 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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