



# BCM8228 PRODUCT Brief



## VARIRATE™ MULTI-RATE TRANSCEIVER WITH SONET RATE ADAPTATION AND PM

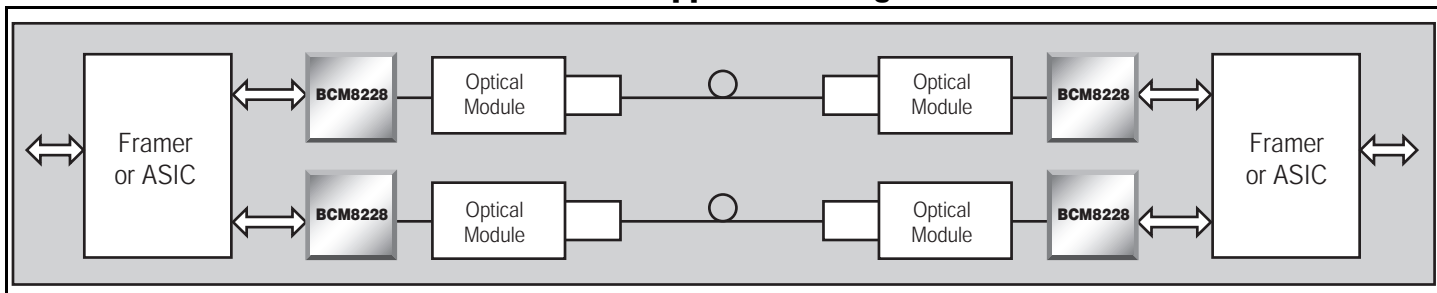
### FEATURES

- Highly integrated rate adaptation device that maps a single STS-3/STM-1 or a single STS-12/STM-4 stream into STS-48/STM-16 frames
- Channel Add/Channel Extract functionality for mapping and extracting lower SONET rates
- Fully integrated serial clock and data recovery (CDR) 155-Mbps/622-Mbps/2.488-Gbps SONET/SDH transceiver
- Retiming functionality for GbE(SGMII)/FC(CML)/2xFC(CML)/ESCON(CML)/FICON(CML) rates
- Retiming functionality for STS-3/STM-1, STS-12/STM-4 and STS-48/STM-16 rates (CML)
- MUX/DEMUX functionality for STS-3/STM-1, STS-12/STM-4, and STS-48/STM-16 rates (4-bit LVDS)
- MUX/DEMUX functionality for GbE (TBI)/ESCON (10-bit)/FICON (10-bit)
- Pass-through functionality for other rates (DVB, HDTV etc.)
- Performance Monitoring (PM) for SONET with optional Section overhead insertion
- Redundant receive inputs and transmit outputs to facilitate protection switching designs
- 2-wire/4-wire serial interface for register access and PM count retrieval
- Powers down unused blocks via register access
- PRBS generators and detectors for inbound/outbound SONET and inbound/outbound GbE
- Polarity reversal for differential signals (low and high speed)
- Bit order swapping for parallel bus (4-bit and 10-bit)
- Exceeds SONET requirements for jitter generation, jitter transfer, and jitter tolerance
- Core supply: 1.8V
- I/O power supplies: CML at 1.8V, CMOS at 1.8V or 3.3V
- Low power consumption ~1.1W
- Standard CMOS process in 196-pin BGA package

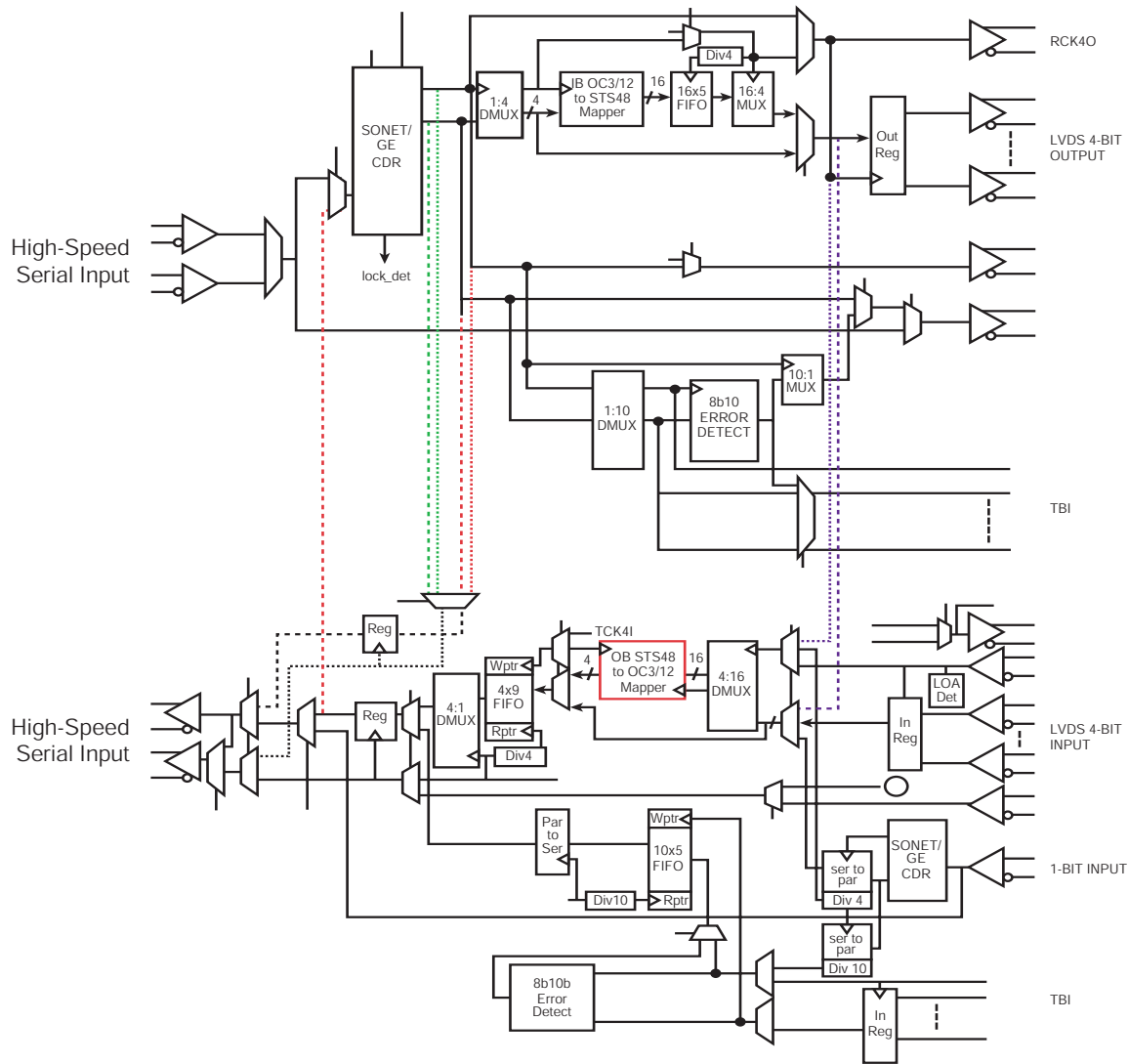
### SUMMARY OF BENEFITS

- Compliant with Optical Internetworking Forum (OIF), Telcordia, ITU-T, and IEEE 802.3 standards
- Reduces design cycle and time to market
- Enables new multirate and multiservice features while retaining existing architectures
- Integrated performance monitoring ensures higher reliability without sacrificing cost or real estate
- High level of integration allows for higher port density solutions
- Bit order swap allows for ease of PCB design
- Uses the most effective silicon economy of scale for CMOS-based devices
- Low power consumption eliminates the need for external cooling sources
- Target Applications
  - Multiservice platforms
  - Multiple rate SONET/SDH transmission equipment
  - SONET/SDH/GbE/FC Multiservice boxes
  - ADD/DROP Multiplexers
  - Optical and Digital cross-connects
  - SONET test equipment
  - Terabit routers
  - Edge routers
  - Repeaters

### BCM8228 Application Diagram



# OVERVIEW



The **BCM8228** VariRate™ device is a highly integrated variable-rate transceiver/mapper operating at STS-48/12/3, GbE, FC/2xFC (Fibre Channel), ESCON, and FICON data rates. The device has an integrated serial clock and data recovery (CDR) circuit, loss-of-signal (LOS) detection circuitry as well as an advanced feature set including performance monitoring and a serial interface (2-wire or 4-wire) for register access. The **BCM8228** provides high-jitter tolerance and low-jitter generation to comply with Optical Internetworking Forum (OIF), IEEE 802.3, Telcordia, ANSI, and ITU-T standards.

The **BCM8228** reference clock input frequency is user-selectable to the line rate divided by either 16 or 10. It can be powered with a single 1.8V supply or dual 1.8/3.3V supply without any special power supply sequencing requirements. Power consumption of the device is typically 1.1W. The power-down control register turns off any unused blocks.

The **BCM8228** is packaged in a 15 x 15 mm, 196-pin BGA.

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