10 Gbit/s Ethernet XENPAK Transceiver
10GBASE-LR (λ=1310 nm)

PRODUCT BRIEF

DESCRIPTION

The TOP 3010-SC 10 Gbit/s Ethernet Fiber Optic Transceiver module in XENPAK format is a highly integrated Ethernet PHY. It provides high-speed serial link signaling at an optical data rate of 10.3 Gbit/s with λ=1310nm wavelength. TOP 3010-SC is compliant to IEEE 802.3ae Draft 5.0 and to XENPAK 2.1.

XENPAK hot swappable transceivers offer flexible system design and field configuration for varying and changing demands on capacity and transmission distances. The 2x4 lane electrical XAUI interface to the Ethernet MAC provides an area efficient transport on standard board materials for the 10 Gbit/s data streams.

TOP 3010-SC has extensive management and test features for design integration and field maintenance. It is Class 1 laser safe and designed according to Telcordia GR-468-CORE for reliability.

APPLICATIONS

- Ethernet metro/aggregation switches.
- Edge/core routers.
- Communication test equipment.

KEY FEATURES

- Complete integrated Ethernet PHY.
- True system "Hot-Swappable".
- Configurable through the MDIO.
- Extensive Built In Self-Test.
- Small footprint.
- Low power dissipation 4.5 W (typical).
- Only two supply voltages. 3.3 V, and 5V.
- Allows extended traces on PCB.
- Built in XAUI back plane transceivers.
- No fiber pigtails, SC receptacles.
- Low pin count for electrical I/O.

BENEFITS FOR EQUIPMENT MANUFACTURERS

- Pluggable concept for flexible design and manufacturing.
- System XAUI bus for shelf distributed 10Gbit/s optical port designs.
- Miniaturized, low power module.
- XENPAK multi-sourced form factor.

BENEFITS FOR CARRIERS/SERVICE PROVIDERS

- Ethernet transmission up to 10 km over single mode fiber.
- Improved service availability.
- Supports pay-as-you-grow business models.
- Changing traffic pattern flexibility.
- XENPAK form factor for all 10 Gbit/s Ethernet link types.

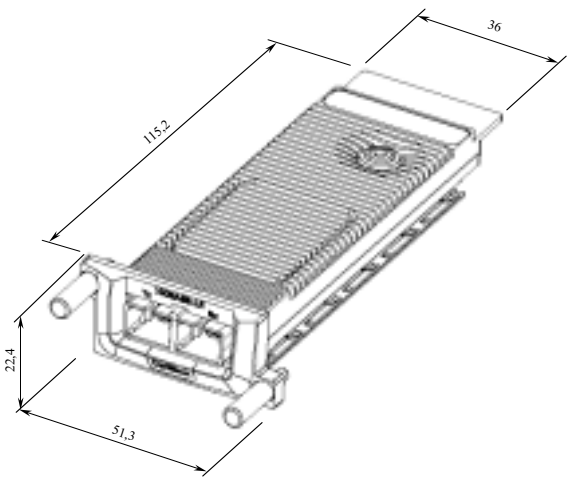

Figure 1 –Mechanical outline for TOP-3010-SC 1310 nm single mode fiber optic transceiver.

All dimensions in mm.

FUNCTIONAL DESCRIPTION

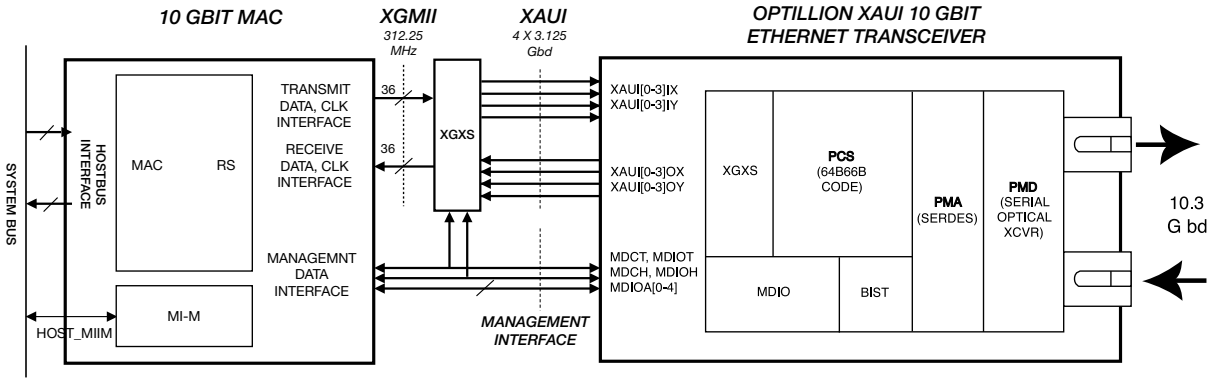

Figure 2 – System connection environment for TOP 3010-SC.

TRANSMIT PATH

The 10 Gbit/s Ethernet compliant 4 bit wide XAUI data is received into a serial to parallel converter (XGXS). The clock is recovered at a data rate of 3.125 Gbit/s per channel. 8B/10B decoding is done and the data is passed on an internal interface to the TX part of the PCS. The PCS does error detection on the data and 64B/66B encoding and scrambling. The data is converted further from wide internal parallel to high-speed serial stream in the PMA serializer and pass data to the laser-driver, which drives the PMD laser. The laser and laser-driver is kept at correct drive levels by a feedback loop with a monitor.

RECEIVE PATH

The detector diode is detecting the incoming light. The output from the diode is amplified in the PMD. The clock is recovered and the PMA deserialize the incoming data and forward data to the RX part of the PCS. After frame synchronization (frame lock acquired) and descrambling, decoding of the 64B/66B encoded data is done to an internal parallel interface after clock rate adaptation.

The data is passed to XGXS. The encoder does an 8B/10B encoding, and data is sent out on the XAUI output.

ADDITIONAL FUNCTIONALITY

An MDIO interface is available for communication of transceiver status to for example a device processor. The MDIO implements the relevant addresses, status and preference registers (XGXS, 64B/66B PCS and PMA). Optionally tailored functionality may include:
Built-In Self-Test, with or without external fiber loop back, with or without external XAUI loop back, BER measurements on specific bit patterns, limited programmable bit patterns for measurements at PMD level. Loop backs in many different configurations (RX-fiber to TX-fiber, TX XAUI to RX-XAUI, loop back at XGXS to PCS interface and vice-versa), programmable LED control output from status registers including AND/OR of masked status registers and direct LED control via MDIO.

Note: Latest information about the XENPAK MSA and detailed specifications: www.xenpak.org

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