CENTILLIUM COMMUNICATIONS

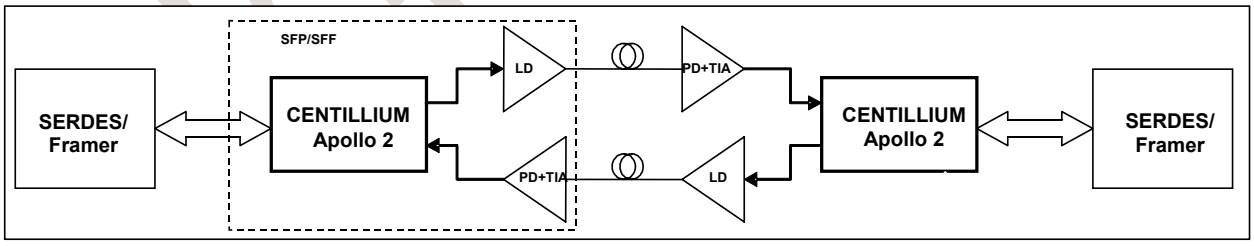
Apollo 2

CT-TCPMM248
Continuous Mode Optical Transceiver Chips

System Features

- Fully integrated LDD and LIA
- 155 Mbps to 2.5 Gbps data rates, NRZ, PRBS2^{23}-1 (PRBS2^{7}-1 for GbE)
- All laser power is saved during disable with response time <5 ns
- Low power consumption
- Bias current range: 1 mA to 75 mA
- Modulation current range: 1 mA to 70 mA
- SFF and SFP compatible
- 6 mm x 6 mm, 40-pin QFN package
- Integrated EEPROM
- Single ended DC-coupling or differential AC coupling to the laser diode
- Laser eye PWA (pulse width adjustment) of +/- 30-ps digitally controlled
- Limiting amplifier sensitivity of 5 mVppd at 2.5 Gbps (BER <1E-10)
- Low laser driver output voltage compliance 0.9V when the modulation current is equal to 70 mA
- Laser output power and extinction ratio closed-loop control
- Laser driver safety shut-off feature
- User-programmable bias and modulation current through two-wire interface (APC disabled)
- Built-in PIN-PD bias circuit for PIN-TIA (PD current monitor included)
- Laser output disable (pin and register controlled)
- Transmit fault indication (pin and register monitored)
- Loss of receive signal detect (pin and register monitored)
- On-chip transceiver digital diagnostics monitoring (internal and external calibration supported)
  - Laser bias and modulation current measurement according to SFF-8472
  - Receive and transmit power measurement according to SFF-8472
  - On-chip voltage and temperature measurement according to SFF-8472
  - Internal temperature sensor
- Single power supply 3.3V operation
- Operating ambient temperature (–40°C to 85°C)
- Two-wire serial interface with programmable chip addresses (in the EEPROM)
- Programmable threshold and reaction time for the LOS (loss of signal) detect
- Protected manufacturer access to EEPROM
- Complies with Telcordia specifications
- Exceeds SONET/SDH jitter requirements

Application Block Diagram



Overview

The Apollo 2 family of OC-3/OC-12/GbE/OC-48 transceiver chips are mixed-signal devices fabricated using 0.18 micron CMOS process. The chips are a fully integrated LDD (laser diode driver), LIA (limiting amplifier), and DDM (digital diagnostic monitor). In addition, the chips perform all necessary transmitter and receiver functions in conformance with SFP and SFF-8472 standards.

The transmit section consists of the continuous mode laser driver with the digital closed-loop average laser power and extinction ratio control. It operates with the data rates of 155 Mbps to 2.5 Gbps. All signal paths are differential for improved immunity to supply noise.

The receive section is a limiting amplifier with loss of signal-detect circuitry. The limiting amplifier boosts the strength of the received signal from the external trans-impedance amplifier and implements the offset correction of the received signal. It can operate at data rates of 155 Mbps to 2.5 Gbps.

The Apollo 2 transceiver supports digital diagnostic monitoring interface for optical transceivers in accordance to the SFF-8472 standard. The internal EEPROM registers are accessible through two-wire serial interface. There is user and manufacturer (protected) access to the EEPROM.

It is a fully integrated, low power OC-3/OC-12/GbE/OC-48 transceiver chip compliant with SFF-8472 Digital Diagnostic Monitoring Interface for Optical Transceivers specification.

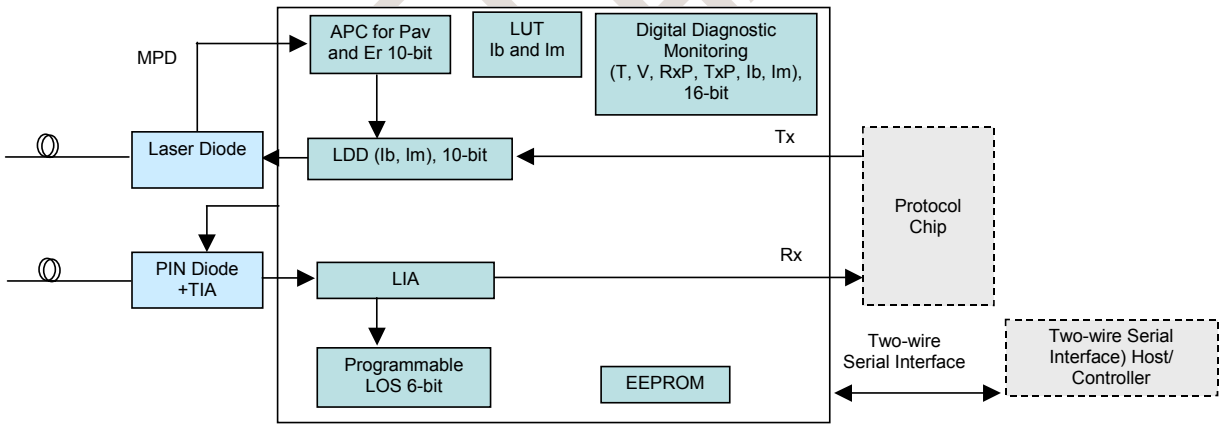
The average laser power and extinction ratio are automatically controlled with the APC advanced LUT (look-up table) circuitry over the operating range of the device.

Applications

The Apollo 2 chip family is suited for optical transceivers for the following networks:

- SONET OC-3/OC-12/OC-48 Transceivers (SFP, SFF and etc.)
- STM -1/4/16 SDH transceivers
- Gigabit ethernet and fiber channel transceivers
- Point-to-point optical transceivers
- DWDM, and test equipment
- ADD/DROP multiplexers
- Digital/optical cross-connects and section repeaters
- Optical line cards and transponders

System Block Diagram



Document Number: 5052