Product Brief

TN8000 10GBase-T TeraPHY® Family

Introduction

The TN8000 10GBase-T TeraPHY® family includes low-power, high-performance 10 Gigabit Ethernet PHY devices that are optimized for next generation networking equipment that seeks to service the increasing demand of higher network bandwidth fueled by the rapid adoption of cloud networking and rich multimedia streaming applications.

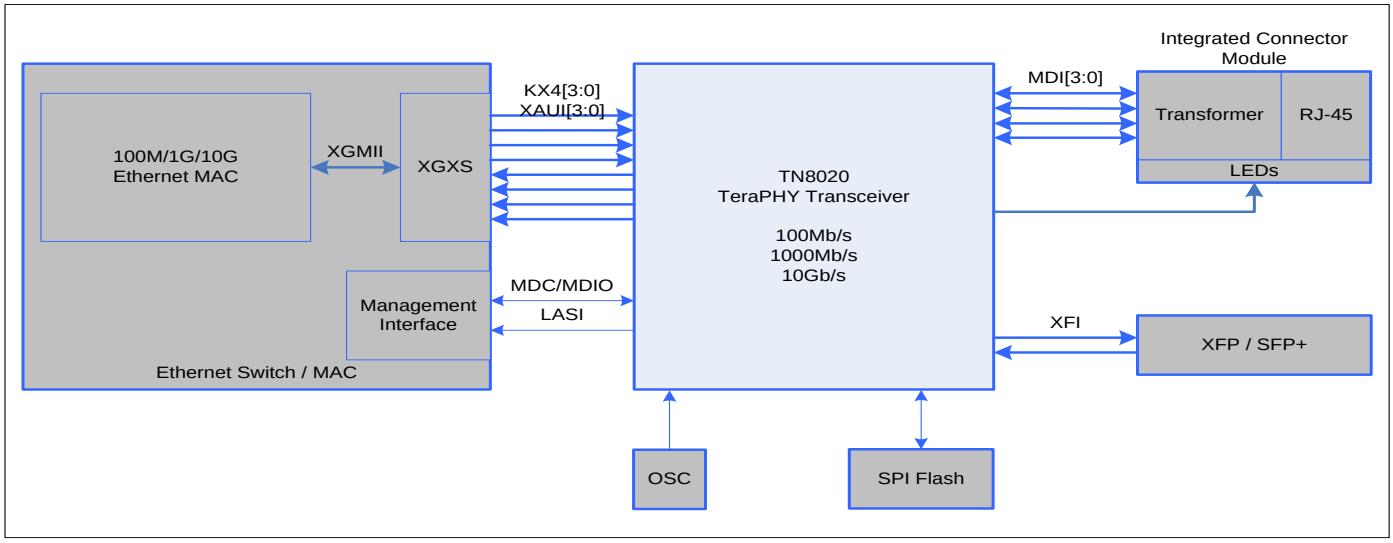
The TN8000 PHYs, designed on 40nm process node, have multiple medium dependent interfaces that allow flexibility for system designers to choose the configuration that fits the system requirement.

Available in single- (TN8020), dual- (TN8022), and quad- (TN8044 & TN8045) port packaging, the TN8000 PHY devices are ideal for a wide range of applications such as Top-of-Rack (ToR) switches, multiport Network Adaptors for Servers, multi-port switch uplinks, and media converters.

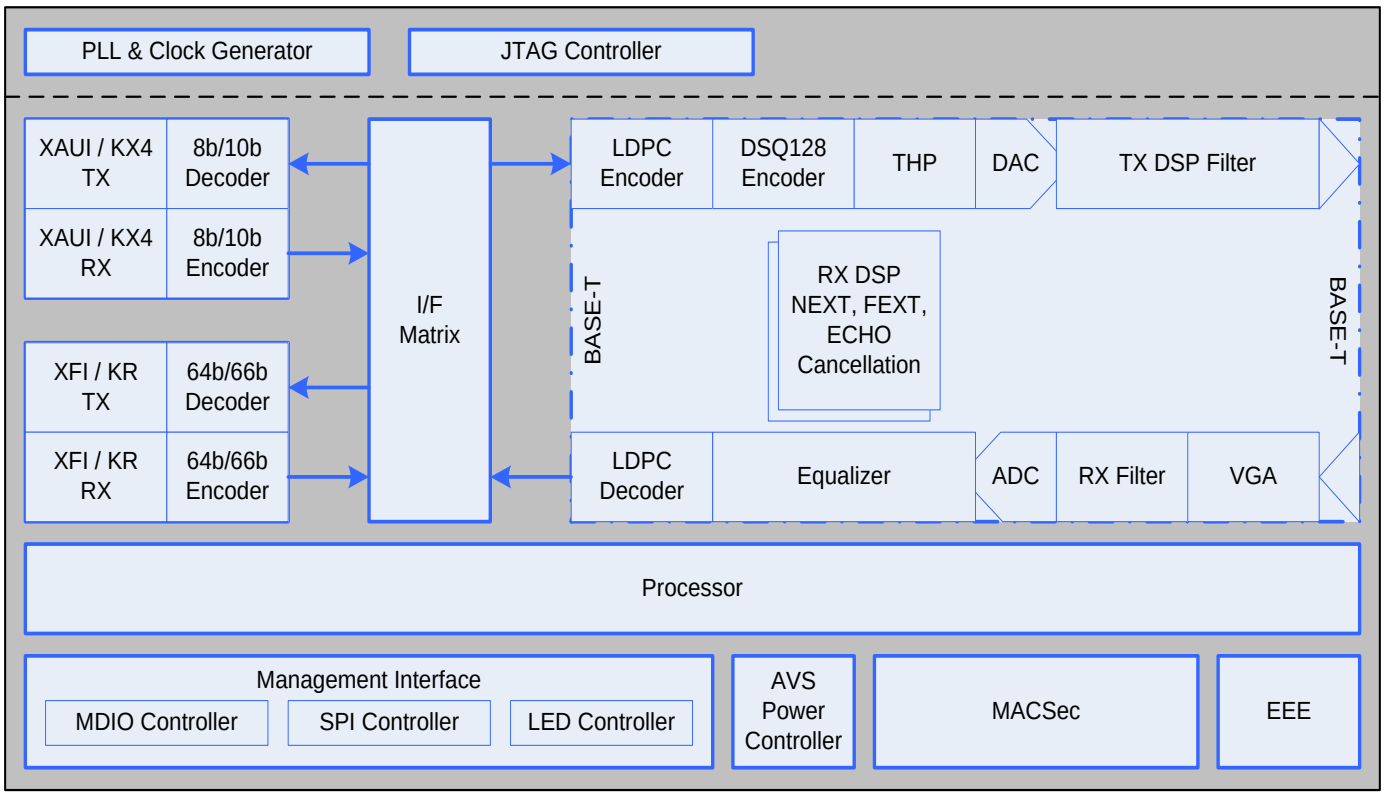
The TN8045 is the smaller package quad-port alternative to the TN8044 (27x27mm^2 BGA package) and it's 25x25mm^2 BGA package is space optimized to allow for all twelve TN8045 devices to fit side-by-side in a standard 48-port switch.

Feature Highlights and Benefits

- **Full IEEE Std 802.3an Compliance**
- **Low Power**: 3.5W/port @ 100m; 2.5W/port @30m
- **Low Latency**: < 2.0 µs
- **Compact packaging** with embedded passives offers efficient board space utilization and lowers system cost
- **Auto-negotiation** capability with legacy 100MB/s and 1GB/s interfaces enables compatibility with existing install base
- **Any-to-Any Interface configuration**:
  - 10GBase-T / 1000Base-T / 100Base-TX
  - 10GBase-KR / XFI
  - 10GBase-KX4 / XAUI
- **Shared power regulators and reference clock** simplify system design and increase reliability
- Comprehensive **built-in manufacturing tests** improves yield, increases reliability, and lowers overall cost
- **Advanced cable diagnostics** for more effective on-the-field cable and network connection debug
- **Energy Efficient Ethernet (EEE)** for fast zero-packet-loss transitions (within micro-seconds) in and out of Low Power Idle mode for lower energy consumption when there is no traffic even when used with MAC that does not support EEE
- Closed-loop **Adaptive Voltage Scaling** (AVS™) further reduces overall power consumption by 10% in typical cases
- On-die **temperature sensor** with warning & auto-shutdown option for optimizing system management & thermal design
- **MACsec Core** provides 802.1AE compliant link level security to meet IPv6 security requirements



System Block Diagram for Typical 10G Connectivity with TN8000 PHY



TN8000 Simplified Block Diagram

TN8000 10GBase-T TeraPHY Family

	TN8020	TN8022	TN8044	TN8045
# of Ports	1	2	4	4
Package Size	25x25mm^2	25x25mm^2	27x27mm^2	25x25mm^2
Line-rates	10G/1G/100M			
Interfaces	Base-T, KR, KX4, XAUI, XFI			Base-T, KR, KX4, XFI
Power per Port	3.5W at 100m, 2.5W at 30m, and < 2.0W at 10m			
Shared Reference Clock	Yes	Yes	Yes	Yes
Shared Power Regulators	Yes	Yes	Yes	Yes
EEE with Legacy MAC	Yes	Yes	Yes	Yes
MACSec	Yes	Yes	Yes	Yes
AVS Technology	Yes	Yes	Yes	Yes
External SPI Flash	Optional	Optional	Optional	Optional
Ordering Part Number:	TN8020-B0-FCLB	TN8022-B0-FCLB	TN8044-B0-FCLB	TN8045-B0-FCLB