Intel® IXF18101

10Gbps Physical Layer Device for STS-192c/STM 64c POS/GFP and 10 Gigabit Ethernet LAN or WAN PHY

Product Overview

The Intel® IXF18101 device is a highly integrated solution for STS-192c/STM 64c and 10 Gigabit Ethernet LAN/WAN port applications, as specified in IEEE 802.3ae. The IXF18101 supports various modes of operation for transport of 10 Gigabit Ethernet, High Level Data Link Control (HDLC) frames, Packet over SONET (POS), or Generic Framing Procedure (GFP) packet formatting.

Internal mapping engines provide the required formatting and maintenance of packet data into the STS-192c/STM 64c SONET/SDH frame payload. A data-over-fiber packet mapping mode is supported for test equipment and test functionality verification within a system.

The 10 Gigabit MAC handles frame encapsulation, verification, 10GbE flow control, and Remote Monitoring/Simple Network Management Protocol (RMON/SNMP) statistics management, per IEEE 802.3ae standards.

The IXF18101 also handles the 802.3ae Physical Coding Sub-layer (PCS) and WAN Interface Sub-layer (WIS) functions of the 10 Gigabit Ethernet standard. The PCS hardware handles the 64B/66B encoding/decoding to provide the transition density and balance the 10.3125Gbps stream. The WAN interface sub-layer provides the rate matching mechanism for 9.953Gbps rate transport, as well as the STS-192c/STM 64c framing structure used in WAN PHY applications. The GFP mapping engine can be connected directly to Forward Error Correction (FEC) or Optical Transport Networks (OTN) digital wrapper devices for GFP client mapping directly per G.709.

The system interface supports the industry-standard System Parallel Interface-level 4 (SPI-4) Phase 2. This interface is 16 bits wide with 622Mbps-800Mbps double data rate clocking. The SPI-4 Phase 2 interface is Low Voltage Differential Signaling (LVDS), which provides the customer with less connection concerns than previous 64-bit High-Speed Transport Layer (HSTL) interfaces.

On the line side, the IXF18101 supports both the OIF SFI-4 and IEEE 802.3ae XSBI interfaces. These interfaces can operate at the SONET/SDH 622Mbps rate or the 10 Gigabit Ethernet 622Mbps and 644Mbps rates. An integrated Pseudo Random Bit Sequence (PRBS) packet generator/analyzer for the PCS and WIS blocks (per IEEE 802.3ae clause 49 and 50) is also supported.

Loopbacks like line remote, line local, system remote, and system local are supported. The device also supports Synchronous Payload Envelope (SPE) payload test loop back for general development functionality test and debug.

Intel® IXF18101 Block Diagram
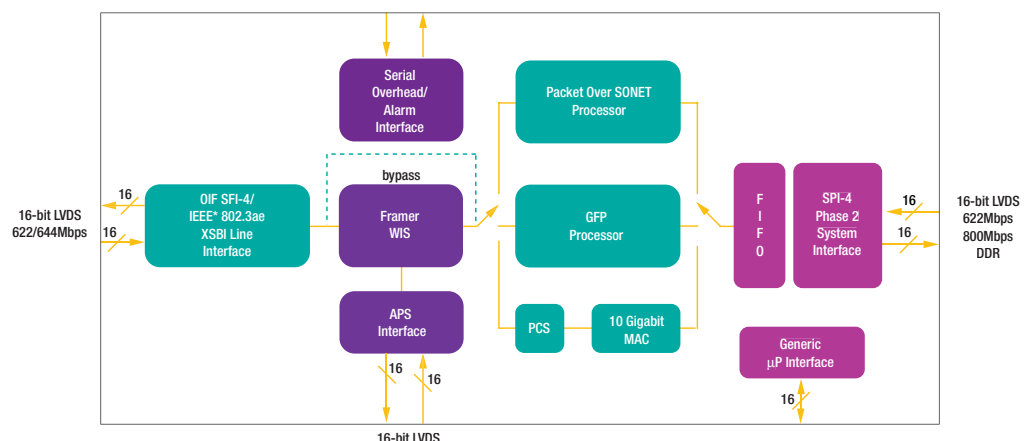
IXF1810x Family of 10Gbps Physical Layer Devices for—High Level Overview

Intel's family of 10 Gigabit framer devices provide the broadest support for 10Gbps solutions. The protocols supported are STS-192c POS, 10 Gigabit Ethernet WAN, 10 Gigabit Ethernet LAN, and GFP framing. The table below summarizes the high level feature set:

Part Number	Feature Set	
IXF18101	■ STS-192c/STM 64c POS ■ GFP ■ 10 GbE LAN and WAN with MAC, PCS, and WIS	■ SFI-4/XSBI line side interface ■ SPI-4 Phase 2 system-side interface
IXF18102	■ STS-192c/STM 64c POS ■ GFP	■ SFI-4 line side interface ■ SPI-4 Phase 2 system-side interface
IXF18103	■ 10 Gigabit Ethernet LAN and WAN PHY with MAC, PCS, and WIS	■ XSBI line side interface ■ SPI-4 Phase 2 system-side Interface
IXF18104	■ 10 Gigabit Ethernet LAN PHY with MAC, and PCS	■ XSBI line side interface ■ SPI-4 Phase 2 system-side Interface

All these devices are pin-, footprint-, and register set-compatible. This allows customers to design one line card for multiple applications, providing cost savings over a single line card with other unsupported features.

The IXF18101 is designed to provide a single chip solution for all 10 Gigabit physical layer requirements for metro and the core networks, and it offers the following features and benefits:

Features	Benefits
■ Four modes of operation: STS-192c/STM 64c POS 10 Gigabit LAN PHY 10 Gigabit WAN PHY GFP	■ Single line cards that can support multiple applications, such as port types and protocols ■ Helps reduce inventory and investment protection for carriers ■ Easy re-configuration with Software switch
■ SFI-4/XSBI	■ SFI-4 is widely deployed as the interface for OC-192c optics modules ■ XSBI is comprised of 16-bit LVDS I/O runs at 622Mbps for 10GbE WAN and at 644Mbps for 10GbE LAN ■ This accommodates both WAN and LAN rates in a single module
■ SPI-4 Phase 2	■ Helps minimize pin count and allows interface architecture to be scaled beyond 10Gbps ■ LVDS I/O, which improves signal integrity versus HSTL implementations ■ It is independent of the type of data protocol being transferred
■ Integrated 10 Gigabit Ethernet MAC, PCS, WIS	■ Highly integrated 10 Gigabit Ethernet solution ■ Enables configuration either as 10GbE LAN PHY or a 10GbE WAN PHY
■ Automatic protection switching	■ Provides facilities protection and redundancy using working and protection IXF18101 devices

- Terabit Switch/Router Platforms
- Edge and Core Router Platforms
- SONET/SDH Add/Drop Multiplexers
- Multi-Service Provisioning Platforms
- 10GbE PMON in Long-Haul Transport
- Metro POP Ethernet Switches
- Storage Area Networks
- Network Attached Storage
- Emerging Resilient Packet Ring (RPR)
- Dynamic Packet Transport applications

Intel® IXF18101 Advantage

- Supports advanced SPI-4 Phase 2 interface
- Supports GFP, which allows the transport of data center protocols such as FICON, ESCON, and Fiber Channel-Over-Transport networks
- Supports 10GbE LAN and WAN line card applications
- Footprint-compatible with the Intel® IXF1810x device family, to provide cost reduction for customers who may only need a subset of the IXF18101 functionality
- Optimized for OC-192c/SDH 64c line card applications

STS-192c, 10 Gigabit Ethernet LAN or WAN, POS/GFP over OTN Router
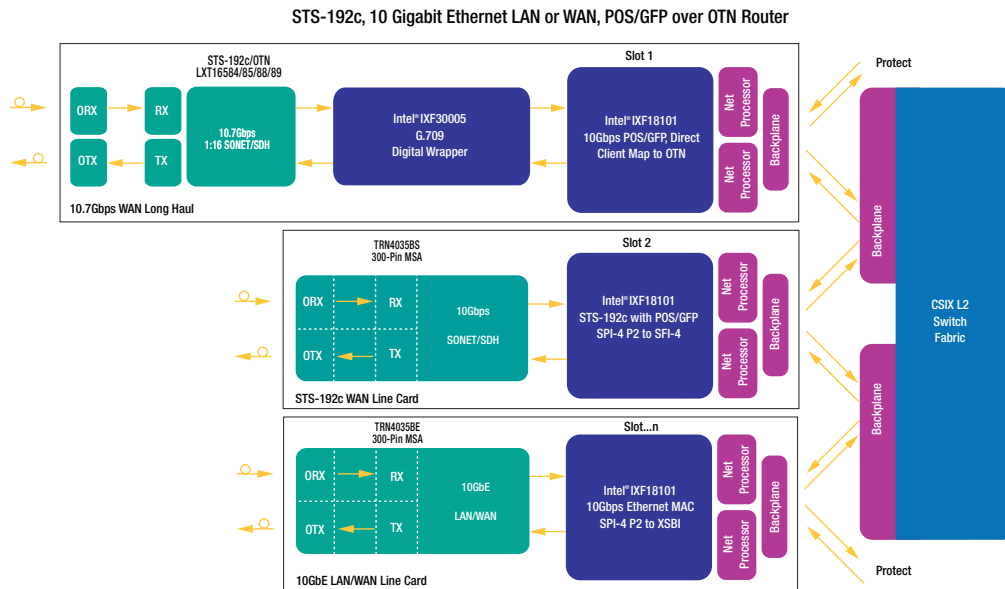
Support Collateral/Tools

Item	Description	Order Number
■ IXF18101	10Gbps Physical Layer Device for STS-192c/STM 64c POS/GFP and 10 Gigabit Ethernet LAN or WAN PHY Technical Product Brief	249944
■ IXF18101	10Gbps Physical Layer Device for STS-192c/STM 64c POS/GFP and 10 Gigabit Ethernet LAN or WAN PHY Short Form Specifications Preview	273604

The following document is available only subject to NDA

■ IXF18101	10Gbps Physical Layer Device for STS-192c/STM 64c POS/GFP and 10 Gigabit Ethernet LAN or WAN PHY Data Sheet	273608

Intel Advantage

Intel is a leading supplier of communications building blocks, adding value at many levels of integration. Through continuous innovations and advancements in Ethernet connectivity and processing in the network, Intel is delivering, along with its customers and developer community, a wide choice of solutions that enable faster time-to-market, longer time-in-market and increased revenue opportunity.

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