

OTN Family | ODU4 Multiplexer for P-OTS | TPO415

Altera's OTN SoftSilicon® Family provides a complete family of optical network processors for metro/core OTN and packet networks covering applications from network interfaces over transponders and muxponders to large OTN cross connect or Packet-Optical Transport Systems (P-OTS).

The Altera SoftSilicon® solution provides maximum performance while optimizing customers' time-to-market, flexibility, risk profile, and cost-over-lifetime.

Family Key Features

- All OTN networking applications covered
- Latest OTN/packet standards supported
- Maximum flexibility provided
- Low risk for system vendors and end users
- Low development cost and total cost of ownership
- 2.5 Gbps – 100 Gbps bandwidth
- G.709 OTN mapping, multiplexing, cross-connection, framing and FEC
- Client ports configurable to any rate and any protocol
- Support of ODU0 and ODUflex
- Built-in ODU cross connect for efficient sub-wavelength networking
- Stand-alone and switch-fabric applications
- Maximum flexibility and low risk for system vendors and end users
- Advanced and easy-to-use software API

All Applications

Altera provides standard solutions for all applications in the packet optical space, ranging from simple, but efficient, framer/mapper interface components over stand-alone transponder and muxponder systems to 100G capacity, high density line cards on ODU cross connect and P-OTS.

Fastest time-to-market

The Altera SoftSilicon® model with standard devices with a well-defined set of features, pin-out and software API validated on reference hardware guarantees shortest time to market.

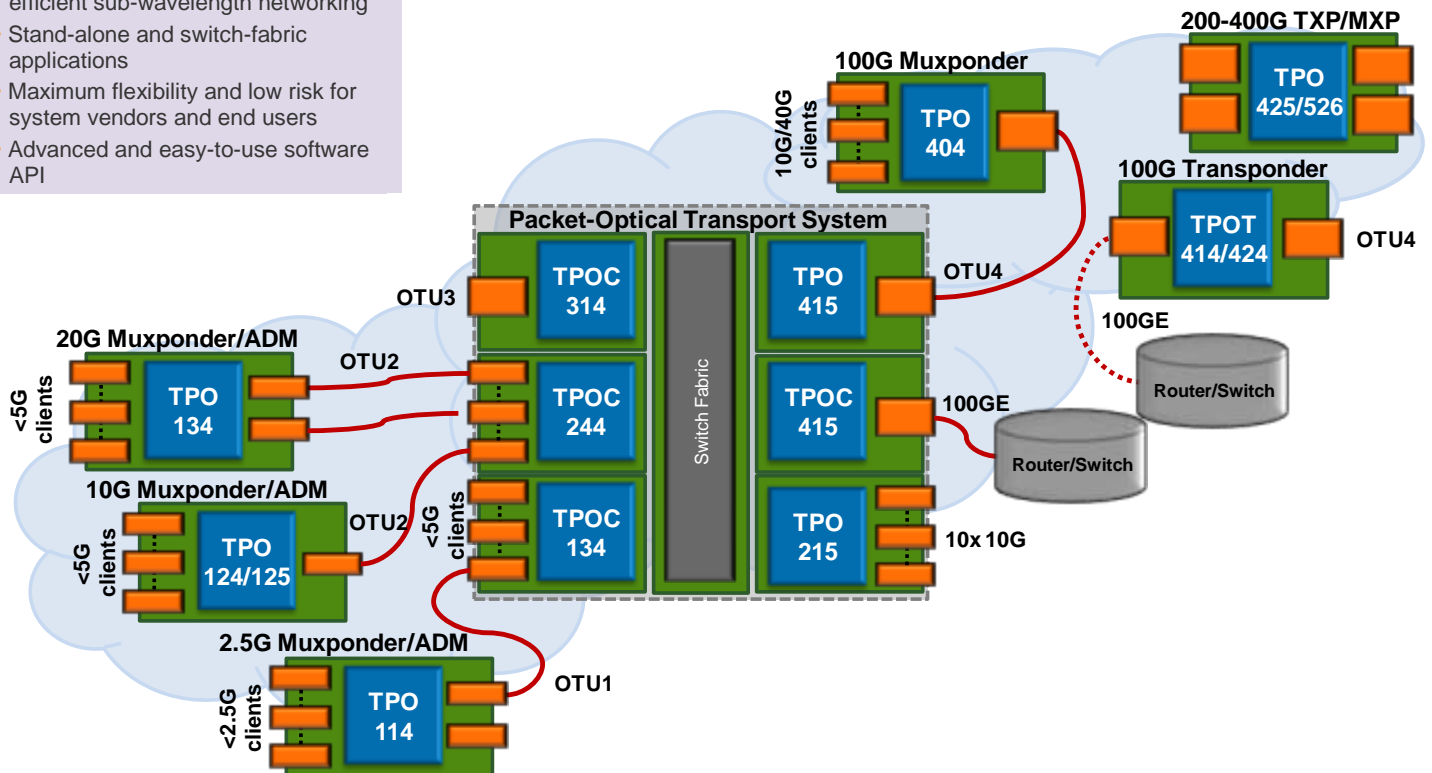
Lowest Risk

Because SoftSilicon® devices have been built and validated on reference platforms that closely resemble the target application they minimize the

development risk for system providers. The FPGA platform mitigates the risk from new or changing requirements from end-customers or standardization bodies.

Low Development and Maintenance Cost

Altera provides an easy-to-use unified software API for the various solutions even when chip sets are used. This makes it efficient for software teams to integrate their solutions into the system software and makes software maintenance much easier, particularly if hardware solutions are migrated to more integrated implementations and new process nodes over time.



TPO415 | ODU4 Multiplexer

Specifications

Interfaces

- OTL4.10 OTU4 interface
- 12x 11.4 Gbps Mate interface for ODUk/flex interconnect with other devices

Multiplexing

- GMP mapping/multiplexing of ODUk/flex to ODU4, any k, any flex
- Support for transport of higher order ODU4

OTN Overhead

- Full OTN overhead processing at TCM (1 - 6) and PM levels for ODUk/flex
- Full OTN overhead add/drop

Driver Software

- Driver API software provided for easy integration with application layer software

TPO415 Applications

The figure below shows different applications for the TPO415 processor.

To the right is shown how the TPO415 processor may be implemented on OTU4 line cards in ODUk cross-connect systems or in hybrid ODUk cross-connect and packet switching systems based on packet based switch fabrics.

TPO415 will terminate the OTU4 signal and demultiplex it into ODUk/flex channels. For ODU cross-connect systems with interfaces other than Interlaken the mate interface of TPO415 may be used as an interworking interface to the system side.

For packet based switch fabrics w. Interlaken interface TPO415 will work in conjunction with TPOC415 to implement an OTU4 line card with ODUk/flex to ODU4 multiplexing, segmentation-and-reassembly (SAR) function for cross-connection of the ODUk/flex channels by means of the switch fabric and a packet mapper function for mapping of ETH/MPLS packets from the switch fabric.

As shown to the left the TPO415 may also be used in an OTU4 muxponder system in combination with

a TPO215 client device. Such a muxponder can demultiplex all client signals down to their intrinsic ODU0/ODU1/ODUflex levels.

before multiplexing into the ODU4 signal. That way the ODU4 signal becomes a one-staged multiplexed and can interwork efficiently with other single-stage ODU4 multiplexers.

TPO415 Functions

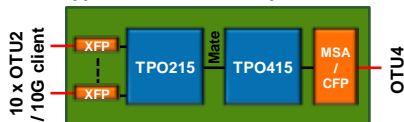
Looking at the block diagram at the bottom of the page and coming from the right hand side TPO415 can terminate an OTU4 signal and demultiplex the ODU4 to up to 80 ODUk/flex containers in any mix and sizes. In doing so there is full support of OTN overhead handling. The higher order ODU4 may also be transferred directly w/o demultiplexing.

Coming from the switch fabric ODUk/flex signals are GMP-mapped and multiplexed into ODU4.

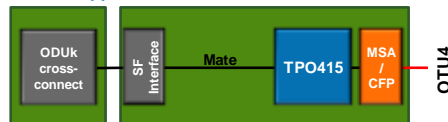
Justification is performed to conform with the timing of the outgoing ODU4. Digital low-pass filters perform jitter attenuation. When the ODU4 signal is passed directly through the ODU cross-connect (without demux-mux) TPO415 will derive the original ingress clock and control the transmit oscillator accordingly.

TPO415 Applications

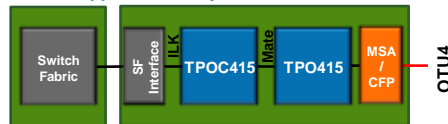
TPO415 application in OTU4 muxponder



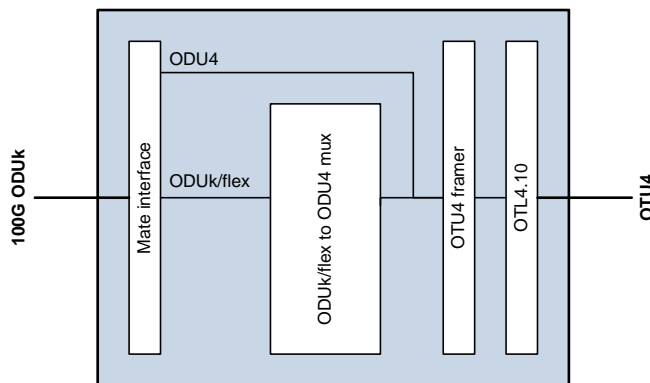
TPO415 application in OTN cross-connect



TPO415 application in hybrid P-OTS



TPO415 Block Diagram



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