

OTN Family | 100G ODU2 Mapper and Multiplexer | TPO215

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.

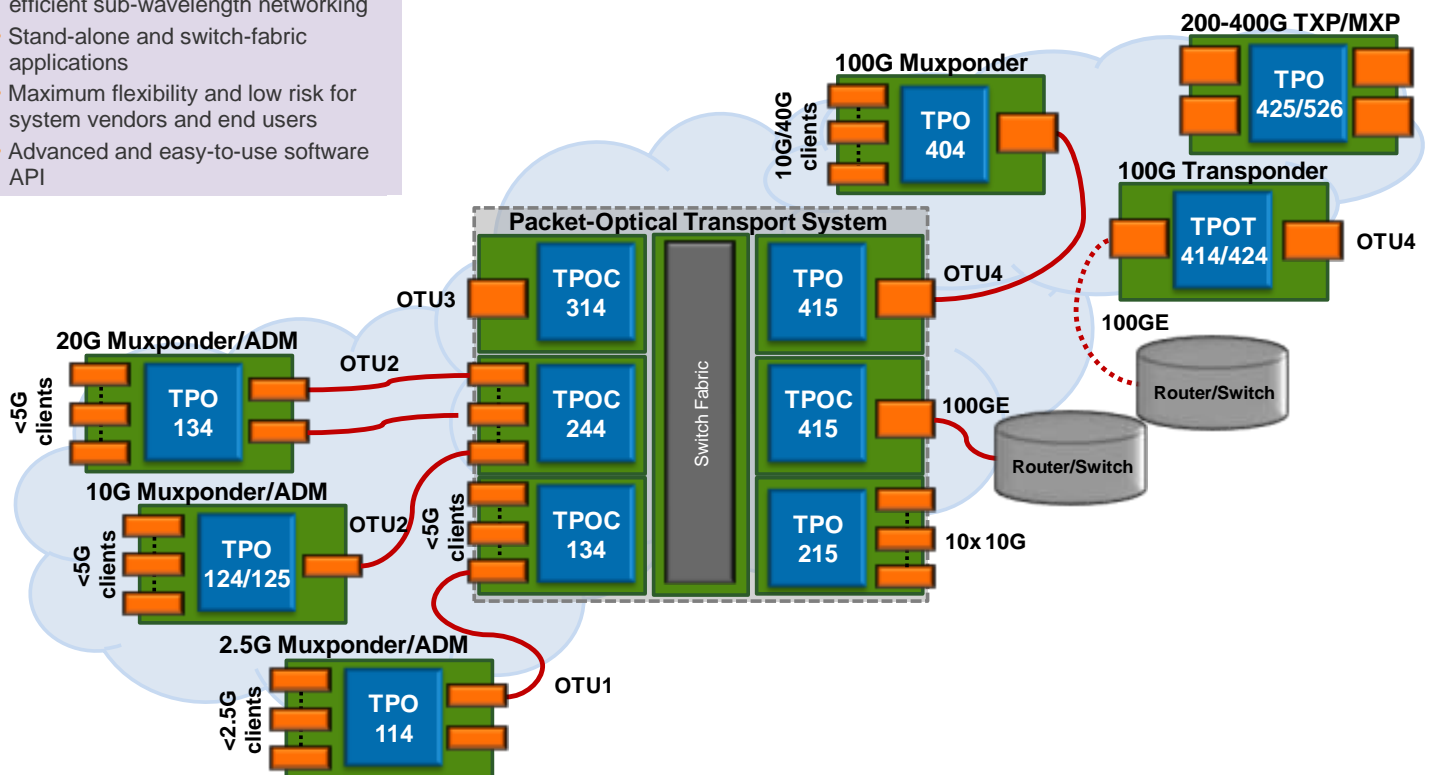
Lowest Risk

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.



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Specifications

Interfaces

- 10 interfaces of any OTU2, 10GE, OC192/STM-64, 8/10GFC, IB QDR
- 100G capacity ODUk mate interface

OTN Multiplexing

- Two stage (de) multiplexing of ODU2 to ODU0/ODU1/ODUflex
- Support for transport of higher order ODU2/ODU2e

ODUk Mapping

- CBR10G (STM-64/OC-192, 10GE WAN) mapping into OPU2
- CBR10G3 (10GE LAN and transcoded 10GFC) mapping into OPU2e/1e
- 10GFC mapping into OPU1f/2f
- 8GFC, IB QDR, CPRI option 7 mapping into OPUflex
- GFP-T mapping of 8GFC into OPU2
- GFP-F map of 10GE LAN to OPU2

OTN Cross-Connection

- Full 100G ODUk connectivity including multicasting for protection
- Full 200G ODUk connectivity with dual TPO215

OTN Overhead

- Integrated OTN OH processing at TCM (1-6), PM levels for all ODUk
- Full OTN overhead add/drop

Encryption Function

- ODU2/OPU2 AES-256 encryption
- Low latency counter mode operation

Driver Software

- High level API for easy integration with application layer software

TPO215 Applications

The figure below shows different applications for the TPO215 processor.

To the right is shown how the TPO215 processor may be implemented on high density 10G line cards for ODU cross-connect systems. The TPO215 device can terminate and demultiplex 10 OTU2 signals and send the demultiplexed ODU0/ODU1/ODUflex components to a switch fabric for cross connection and vice versa. It can also map 10G client signals to ODU2/ODUflex. The system interface is a 100 Gbps ODUk interface that is also offered for integration in system vendors' switch-fabric interface components.

In a similar manner the TPO215 device can work together with the TPOC415 SAR and packet mapper to implement high density 10G cards with ODUk multiplexing to ODU2, with mapping 10G clients to OTN or with pure Ethernet switching interfaces in any mix.

A stand-alone TPO215 processor can also work as a 100 Gbps ODUk cross connect system with 10 10G interfaces. If two TPO215 devices are interconnected they can serve as a 200 Gbps ODUk cross connect as shown bottom left.

A third application shown is an OTU4 muxponder system in combination with a TPO415 multiplexer.

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.

TPO215 Functions

A TPO215 block diagram is shown at the bottom.

10 x 10 Gbps signals can be independently configured for different functions. All signals can run completely asynchronously.

The TPO215 processor contains a 100 Gbps ODUk cross connect function that provides full ODU0/1/2/flex connectivity between all clients and system ports.

In the middle of the client block it is shown how an OTU2 signal can be demultiplexed in (up to) two stages to ODU0/1/flex.

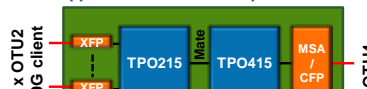
At the top is shown how the TPO215 processor can interface to all the client signals in the 8-10 Gbps range and supports all standardized mapping methods (AMP/BMP/GMP/GFP).

At the bottom is shown how the TPO215 processor can transport complete ODU2 containers whether they are OTU2, -2e, -1e, -2f, -1f or OTUflex signals.

The TPO215 processor supports new ODU/OPU encryption technology. The TPO215 processor performs encryption at the ODU2 level and thereby provides secure transport of any service over an OTN network.

TPO215 Applications

TPO215 application in OTU4 muxponder



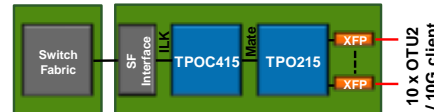
TPO215 application in OTN cross-connect



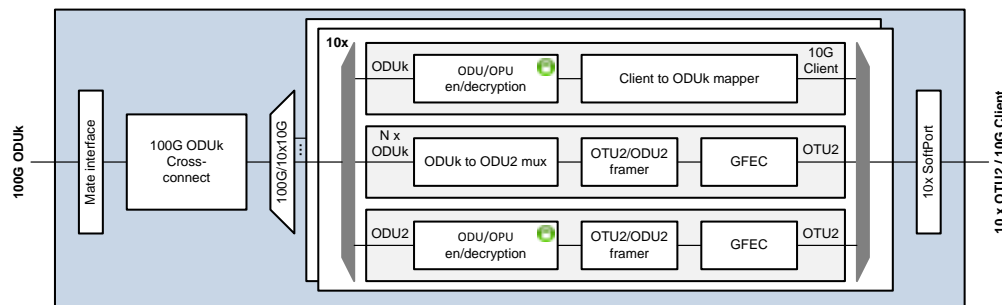
TPO215 application in 200G OTN Cross-Connect



TPO215 application in hybrid P-OTS



TPO215 Block Diagram



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