

## OTN Family | 20G Muxponder | TPO134

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.

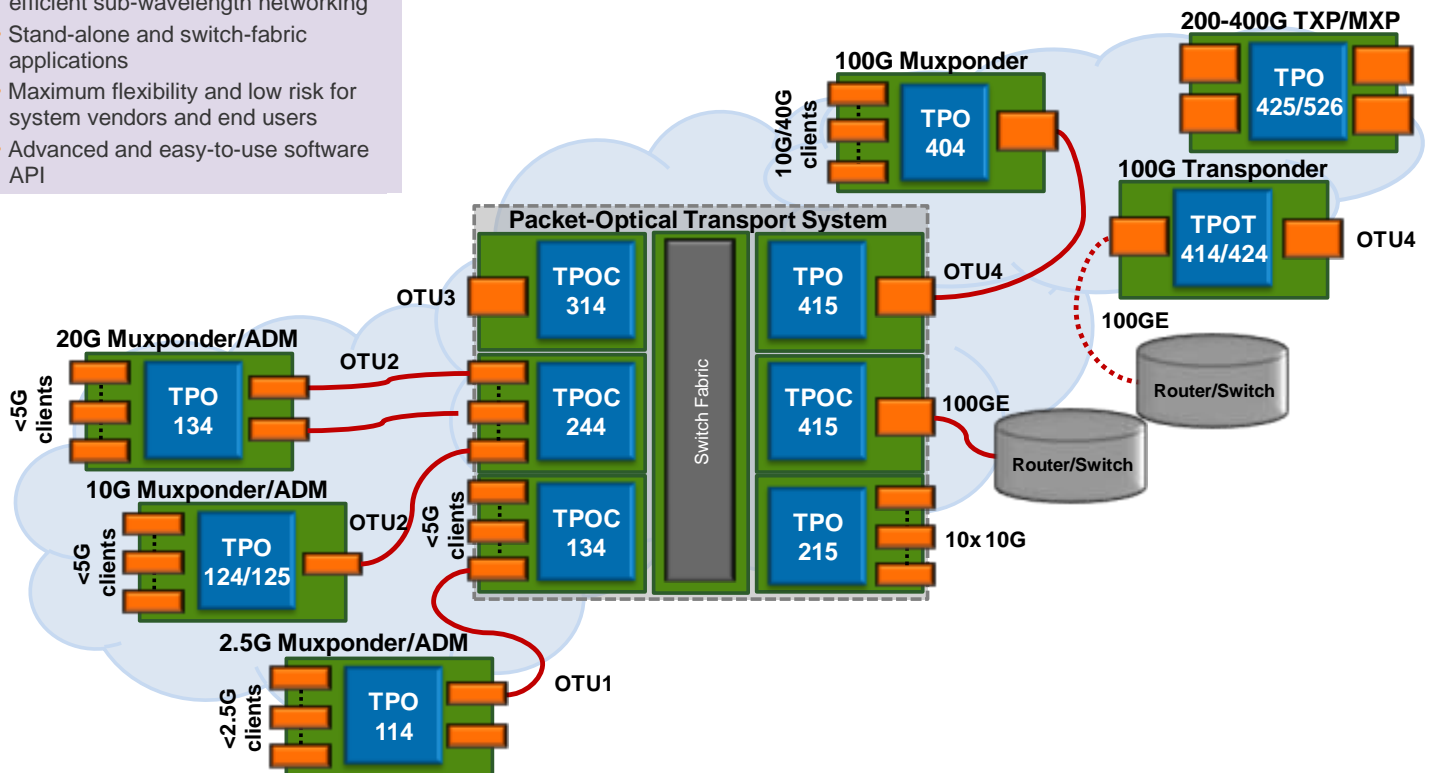
### Lowest Risk

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.



# TPO134 | 20G OTN Muxponder

## Specifications

### Client Interfaces

- 16 x client SoftPorts with configurable support for:
  - STM-1/OC-3, STM-4/OC-12 and STM-16/OC-48
  - Gigabit Ethernet (GE) and Fast Ethernet (FE)
  - 1GFC / 2GFC / 4GFC
  - Video Clients
  - Generic 8B/10B clients
  - Any rate / protocol clients

### OTN Interfaces

- 2 x OTU2 interface
- 8 x OTU1 interface

### Mappings as per G.709

- Any client <1.25Gbps into ODU0 (e.g. GE)
- Any client <2.5Gbps into ODU1 (e.g. OC-48)
- Any client >2.5Gbps into ODUflex (e.g. 4GFC)

### OTN Overhead

- OTN overhead processing at SM level for OTU1/OTU2
- OTN overhead processing at TCM (1 - 6) and PM levels for ODU0/1/2/flex

### Connectivity

- Full 80G LO ODU cross-connect
- Add-Drop MUX function providing Client Add-Drop, OTN ring closure

### Driver Software

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

## TPO134 Functions

Looking at the left hand side of the block diagram below, the TPO134 can flexibly map signals from 16 clients into ODU0, ODU1 or ODUflex OTN containers. In the egress direction, TPO134 will derive the original timing of the client signals before transmission out. The client ports are so-called SoftPorts that can carry any rate between 125 Mbit/s and 4.25 Gbit/s and any client protocol. As an example a SoftPort can be a GE interface or an OC-48 / STM-16 TDM interface. Also, up to eight of the SoftPorts can be configured to support OTU1.

On the right hand side of the block diagram, TPO134 can terminate two OTU2 signals and (de)multiplex to/from ODU0/1/flex containers.

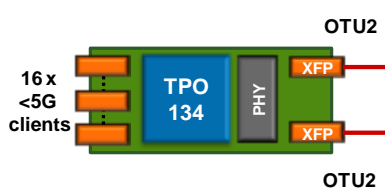
In the middle is an ODU cross-connect that provides full connectivity between all ports.

The mate interface at the bottom of the block diagram allows two TPO134 device to be connected together still with full connectivity between all ports. This may be used to implement an 80G OTN cross connect system.

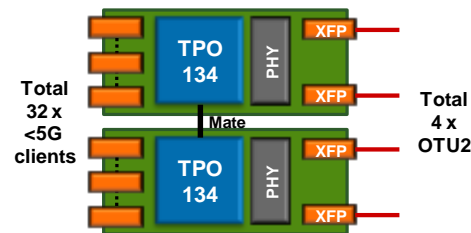
## Driver Software

An advanced API software is provided for easy integration with and maintenance of application layer software. The API does also cover the application where two TPO134s are used as an add/drop multiplexer. The API software can be compiled to any OS.

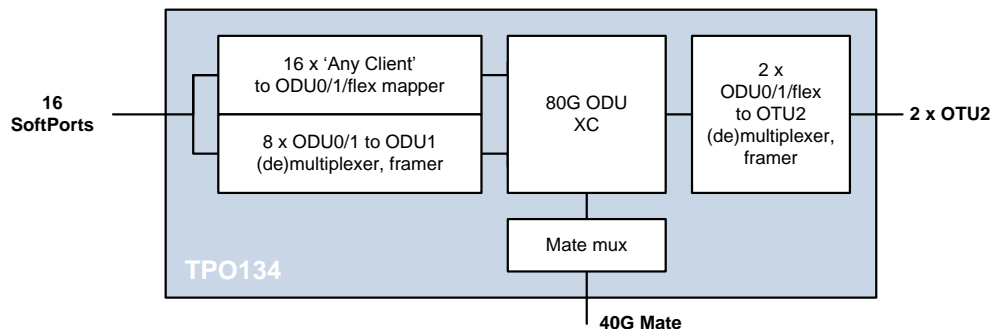
### Add/Drop Multiplexer Application:



### Cross-connect Application:



### Block Diagram



**Altera Corporation**  
101 Innovation Drive  
San Jose, CA 95134  
USA  
[www.altera.com](http://www.altera.com)

**Altera European Headquarters**  
Holmers Farm Way  
High Wycombe  
Buckinghamshire  
HP12 4XF  
United Kingdom  
Telephone: (44) 1494 602000

**Altera Japan Ltd.**  
Shinjuku i-Land Tower 32F  
6-5-1, Nishi-Shinjuku  
Shinjuku-ku, Tokyo 163-1332  
Japan  
Telephone: (81) 3 3340 9480  
[www.altera.co.jp](http://www.altera.co.jp)

**Altera International Ltd.**  
Unit 11-18, 9/F  
Millennium City 1, Tower 1  
388 Kwun Tong Road  
Kwun Tong  
Kowloon  
Hong Kong  
Telephone: (852) 2945 7000  
[www.altera.com.cn](http://www.altera.com.cn)

