

# TJ1600-6

## Compact OTN/DWDM/MPLS-TP Platform



### DATA SHEET



### Product Highlights

**Compact OTN/DWDM/MPLS-TP platform**

**Integrated OTN Fabric Switch**

**L2 packet blade with MPLS-TP support**

**High Capacity: 10G-600G Per lambda**

**Smaller footprint and power efficient**

**Supports SONET/ SDH /GE /OTN /FC client types**

## Key Features and benefits

**Network Evolution:** Networks designers are constantly looking to drive the lowest cost per bit for transport while providing high reliability. Leveraging the advantages of statistical multiplexing while minimizing the number of protocol layers used at each node helps to minimize costs. The TJ1600-6 allows network designers to use the most cost effective transport technologies for each service type.

**One device for OTN and DWDM:** The TJ1600-6 compact OTN and DWDM platform balances OTN and DWDM transport in way unique to the industry. TJ1600-6 with its integrated fabric switch has an unique architecture that plays a significant role to achieve compact, power efficient, smaller footprint system which is capable of delivering OTN services or all DWDM Photonic Transport using the same hardware and software. This flexibility creates a unique opportunity for network designs by allowing every service to be optimized based upon the service requirements. In addition, TJ1600-6 reduces operations costs by having a single platform for all services requirements preventing the need for multiple devices at any site.

**MPLS-TP:** MPLS label based Connection Oriented Ethernet allows packet traffic to be easily and precisely routed through the network. The TJ1600-6 provides MPLS-TP based pseudowires for traffic engineered flows on trunks, which optimizes the network by providing the right amount of control. The cost benefits of stat-muxing are combined with traffic engineering and capacity planning to lower CAPEX by right sizing the network. OPEX reductions come through faster provisioning, robust protection and quicker root cause analysis during failures. With mesh protection capabilities, latency and protection switch times are minimized.

**Advanced Ethernet Features:** The TJ1600 provides best in class packet switching to create networks with the highest performance. Ingress rate limiting prevents any one service/application from congesting/choking the network. Each packet is classified so that the appropriate network policies (like prioritization and scheduling) can be applied. Eight CoS queues and scheduling algorithms ensure that there are sufficient options available to manage the data traffic efficiently. The TJ1600 provides sub 50ms protected packet rings for greater resiliency. Multiple ringlets and multiple ring topologies are supported.

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**Ethernet OAM:** This allows real-time monitoring of end-to-end circuits, connections or trunks enabling quick detection and isolation of faults to a particular subnet, trunk, link or node. The TJ1600 supports BFD based Fault OAM and ping/traceroute at tunnel/pseudowire level. It also supports MPLS-TP based performance OAM for MPLS-TP based PW services. For .1q.1ad based MEF services, Y.1731/802.1ag based CFM OAM (Port level down MEP) and Y.1731 PM counters are supported.

**Optimizing Services:** With the TJ1600-6, services can be matched to the best transport technology whether it is maximizing efficiency with Stat-muxing, reducing costs by using OTN switching to by-pass routers, maximizing fiber utilization with DWDM or minimizing latency with optical / OTN switching.

**Optimizing Packet to DWDM interworking:** To provide the lowest cost Packet to DWDM interworking the TJ1600-6 uses a unique blend of technologies including 10GE interfaces. With OTN wrappers and direct interconnection between Packet and TDM switches to simplify router by-pass in regional / long haul networks.

**Lower Packet transport costs:** The TJ1600-6 OTN and DWDM platform optimizes 1G and 10G transport by using OTN switching to efficiently pack and route traffic through the network. The use of OTN switching also reduces the complexity of the Packet network by offloading high bandwidth services directly onto the OTN/DWDM optical layer.

**DWDM reach greater than 2500kms :** With DWDM available for all high speed interfaces, the TJ1600-6 can optimize fiber utilization using the latest technology for reliable transport in metro, regional and long haul networks.

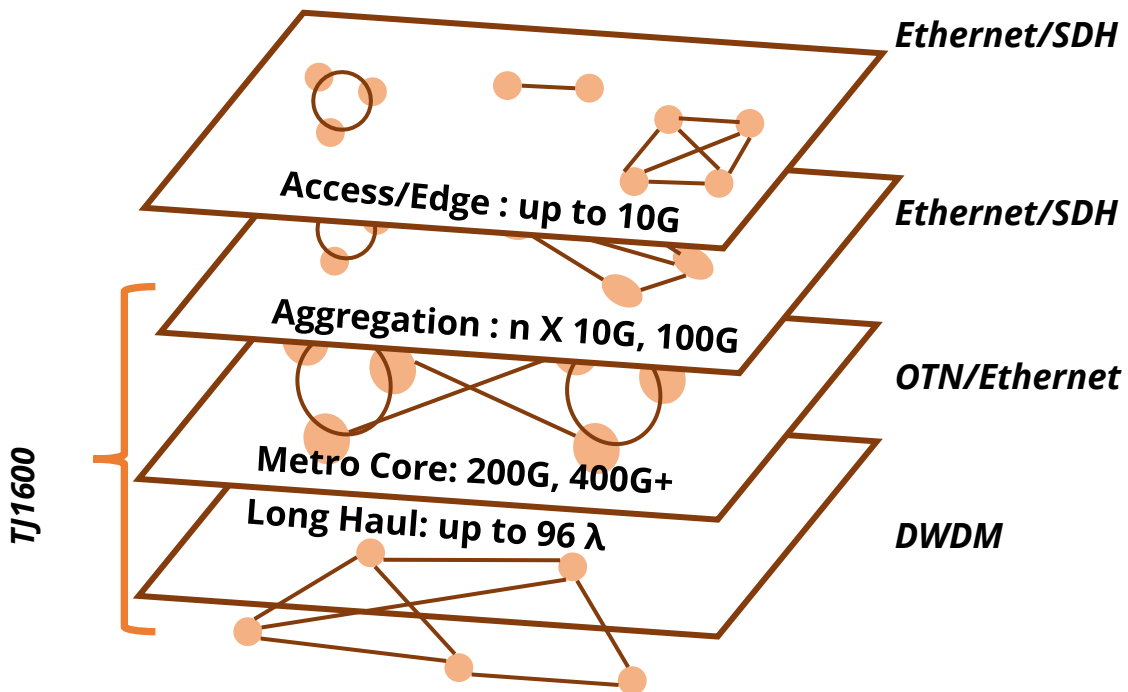
**Network Management:** With Tejas Networks' suite of management tools network evolution is much easier to manage. Point and Click technologies for Packet, SONET/SDH, OTN and DWDM traffic allow for more accurate service designs, more efficient routing and better fault correlation. Accurate alarming and "fault to affected service mapping" enables fault resolution prioritization. Enhanced network element backups and simple remote software upgrades reduce operational costs while enhancing reliability. NMS server redundancy and geographical diversity ensure faster disaster recovery.

**ASON and WSON GMPLS control plane:** With Tejas Networks' ITU-T G.8080 based GMPLS control plane software, highly resilient networks with multiple levels of protection can be created with ease. The TJ1600-6 supports 1+Reroute and 1+1+ Reroute options by implementing standard protocols. Tejas GMPLS control plane enables this capability for OTN (L1) as well as DWDM (L0) enabling most flexible and resilient optical network deployments.

**Flexible Network Architectures:** The TJ1600-6 has a flexible architecture that allows it to build the network best suited for all services linearly for rapid deployment such as hub and spoke for cost effective build outs at the edge of the network, ring and ringlet for high utilization and resiliency, meshed for low latency and flexible protection. This is achieved with a unique combination of functionality including the ability for traffic to be switched at Packet, TDM or the optical layer depending on service requirements.

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***High Density Switching and Optical Transport***

## Technical Specifications

### MPLS-TP

- MPLS-TP Connection Oriented Ethernet
- VPWS, VPLS, H-VPLS
- ELAN, EVLAN, EVPL, EPL, E-TREE\*

### Ethernet/MPLS-TP OAM

- MPLS-TP OAM RFC5860
- BFD based Fault OAM
- LSP Ping and Traceroute
- PW Ping
- MPLS-TP
- Y.1731 based delay measurements

### Ethernet Switch Capacity-single shelf

- 80G standalone
- 240 Gbps in mesh-matrix

### Ethernet Switching

- VLAN, QinQ based services
- Ingress Rate Limiting at 64kbps granularity
- Programmable Committed / Peak Rates
- Programmable Committed/Peak Burst sizes
- Egress rate shaping on all ports
- Every Ethernet port UNI/NNI

### Platform Capacity

- DWDM Mode: upto 4.8 Tbps
- OTN Mode : upto 400 Gbps

### OTN Switch Capabilities

- ODU0, ODU1, ODU2/2e, ODU4\*, ODUFlex
- Integrated Fabric switch
- Ethernet GFP-mapped ( 2 port/card)

### Technical Specifications

#### Network Protection

- Unprotected, 1+1 MSP unidirectional on CNI
- ODUK/ ODUj SNCP
- OLP
- 1+1 network port protection
- Revertive and non-revertive switching
- L1-GMPLS/ASON
- L0-GMPLS/WSN

#### Client Interfaces (max per system)

- 400GE\* – up to 6 QSFP-DD ports
- 100GE/ OTU4 – up to 24 QSFP28 ports
- 40GE – up to 8 QSFP+ ports
- FC32G – up to 8 SFP28 ports
- FC16G – up to 16 SFP28 ports
- 10GE/STM-64/OTU2/OTU2e/FC12G/FC8G – up to 80 SFP+ ports
- FC4G/FC2G/FC1G – up to 24 SFP+ ports
- STM-16 – up to 32 SFP ports
- STM-1/STM-4/1GE – up to 64 SFP ports

#### Photonic Layer Capabilities

- eFEC/gFEC for 10G ports
- HD-FEC/ SD-FEC for Coherent Line ports
- Up to 96 Channels/Lambda per fiber
- Amplified reach of 2500+ km
- L0 GMPLS
- Degradation based Switching on OLPs
- Grey/ Coherent/ DWDM optics supported
- Flex-grid Support
- Optical Supervisory Channel

#### Environmental

- ETSI EN 300 019-1-1, Class 1.2 Storage
- ETSI EN 300 019-1-2, Class 2.3 Transportation
- ETSI EN 300 019-1-3, Class 3.2 Operating stationary use
- ETSI EN 300 019-1-3 V2.1.2 and ETSI EN 300 019-2-3 V2.1.2 for Environmental Class 3.1
- QM333 – Functional for Environmental testing of Electronic equipments for Transmission and switching use.

#### Network Management

- Web-based Craft UI
- Network Management System
- SNMP

#### DWDM Cards and Components

- **Amplifier Types:** Low Gain, Fixed Gain, High Gain, Variable Gain, Mid-stage Variable Gain, Raman, Booster amplifiers
- **Amplifier usage types:** Pre-, Post-, inline
- **ROADM** - CDCG: 9 degree\*, 8 degree, 4 degree and 2 degree
- **Optical Mux/ DeMux:** 1 Ch, 4 Ch, 8 Ch, 16 Ch, 40Ch/80 Ch, 64 Ch, 96 Ch
- **Dispersion Modules:** Fiber and Bragg-Grating Based
- **Optical Channel Monitors** – OSNR, Power
- **OTDR** – traces, fiber attenuation, fiber cut info

#### Client Interface protocols supported

- Ethernet : 400GE\*, 200GE\*, 100GE, 50GE\*, 40GE, 25GE\*, 10GE, 1GE
- SDH: STM-64/STM-16/STM-4/STM-1
- SONET: OC-192/OC-48/OC-12/OC-3
- OTN: OTU4/OTU2/OTU2e
- Fiber Channel: FC32G/FC16G/FC12G/FC8G/FC4G/FC2G/FC1G

#### Transponders and Muxponders

- 12 x 100G / 8 x 100G + 40 x 10G -> 2 x 600G Muxponder
- 8 x 100G / 5 x 100G + 30 x 10G -> 2 x 400G Muxponder\*
- 1 x 400G Transponder\*
- 2 x 100G / 1 x 100G + 10 x 10G -> 1 x 200G Muxponder
- 20 x 10G -> 1 x 200G Muxponder
- 2 x 100G Transponder
- 10 x 10G / 2 x 40G + 2 x 10G -> 100G Muxponder
- 10 x 10G -> 1 x 100G Muxponder
- 10 x 10G Transponder
- 10G Muxponder

#### Power Supply (optional redundancy)

- -40V to -57V DC
- 1000/1250\* Watt variants available

#### Dimensions

- 178mm x 445mm x 258mm (HxWxD)
- 19", 21" and 23" rack mount options
- All Front Access

*\*upcoming release specifications subject to change without notice*



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