FSP 3000

## Open, secure and efficient terascale networking

Benefits

- **Scalability**
  Up to 9.6THz bandwith capacity per fiber (C+L band); Coherent pluggable optics up to 800Gbit/s

- **Flexibility**
  From complete turnkey systems, including all equipment necessary for end-to-end transport applications, to disaggregated solutions

- **Pay-as-you-grow design**
  Modular and scalable architecture, with hot-swappable modules and pluggable optics that ensures both low initial cost and flexibility into the future

- **Fully open and programmable**
  Open line system (OLS) architecture and YANG-based APIs (OpenConfig) for network disaggregation and easy integration into SDN-based environments

- **Dynamic and scalable optical layer**
  Fixed- (FOADM), broadcast- (BOADM), and flexgrid reconfigurable optical add/drop multiplexer nodes (ROADM) with multiple add/drop options

- **Quantum-safe encryption technology**
  Certified Layer 1 encryption with ultra-low latency and 100% throughput. PQC cryptography with hybrid key exchange system

Overview

The FSP 3000 is an open and scalable optical transport solution that enables high-capacity, secure and cost-efficient networking solutions from the edge to the network's core. Today's optical transport demands are constantly changing. High-bandwidth services and cloud-based applications are booming and software-defined networking (SDN) is evolving to the domain of transport networks. These services and applications are essential for our daily lives and economies. Network operators and enterprises need a secure, flexible and future-proof optical transport solution that increases agility and automation, while keeping cost and footprint at a minimum.

Our FSP 3000 has been designed to efficiently deal with this new environment, lowering its complexity and minimizing cost-per-bit and operational efforts. With an open and modular design, our FSP 3000 supports a wide range of services and applications, from data center interconnect (DCI) to carrier-optimized infrastructure solutions. Incorporating the latest innovation in photonic networking and innovative ConnectGuard™ low-latency encryption technology, our FSP 3000 enables secure optical network solutions that can scale and accommodate tomorrow's needs. As the first commercial post-quantum cryptography (PQC) optical transport solution, our FSP 3000 also protects data against cyberattacks from quantum computers. Moreover, with a high-density and energy-efficient design for minimal footprint and power consumption, our FSP 3000 meets the most stringent sustainability requirements.
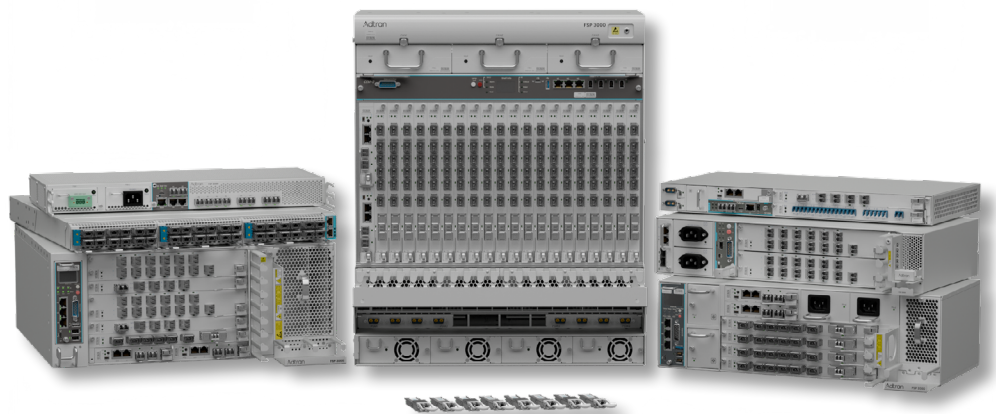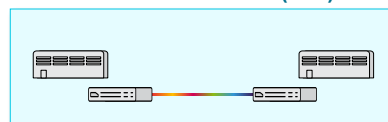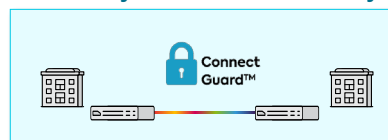
FSP 3000

Applications in your network

Open optical transport network infrastructure from the edge to the core

OLT

CCAP

Router

DU

Nx 10/100G DWDM aggregation

Nx 400/800G DWDM transport

Connect Guard™
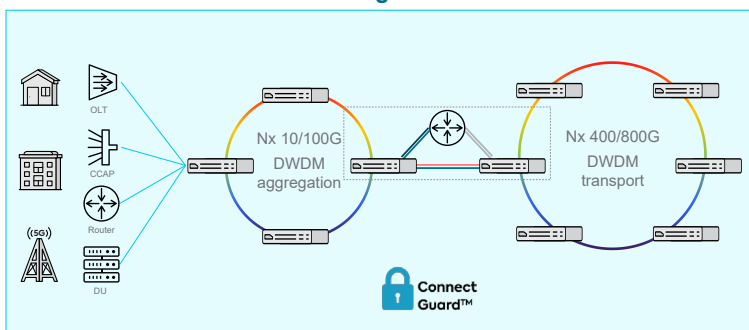
Small and hyperscale data center interconnect (DCI)

Enterprise DCI for business continuity and disaster recovery

Connect Guard™

End-to-end network infrastructure

- Open optical networking solutions for turnkey as well as disaggregated, multi-vendor use cases
- Tailor-made solutions for edge, metro and core optical network infrastructure

DCI for cloud and business continuity applications

- Purpose-built innovation for SAN DCI and terascale 400ZR-based DCI
- Open hardware architecture and YANG-based software (OpenConfig) modelling for easy integration into SDN-based environments

Product specifications

Wavelength technologies

- DWDM:
  - Filter-based multiplexing with 50, 75, 100, 150, 200 and 400GHz spacing options
  - Flexgrid with down to 6.25 GHz channel width granularity
- CWDM:
  - Up to 16 wavelengths/20 nm according to ITU-T G.694.2

Topologies

- Point-to-point
- Point-to-multipoint
- Linear add/drop
- Multiplexed add/drop (drop and continue)
- Ring (+ feeder + dual homing)
- Hubbed-ring
- Meshed

Services

- From 100Mbit/s to 850Gbit/s
- Ethernet: FE, GbE, 10GbE (LAN and WAN), 25GbE, 40GbE, 100GbE and 800GbE, 10G and 25G RoCE, CE LR
- Fibre Channel/FICON up to 64Gbit/s
- InfiniBand 5G and 10G
- STM-1, -4, -16, -64 / OC-3, -12, -48, -192
- OTU-1, -2, -3 and -4, OTUCn
- CPRI up to 25Gbit/s speeds (eCPRI)

Service protection and restoration

- Options based on
  - ROADM-based optical layer restoration
  - Optical switches
  - Redundant cards
  - OTN path protection

Optical terminals

- Suite of
  - Coherent pluggable optics
  - Multi-rate, multi protocol trans-/muxponders
  - Multi-rate, multi protocol trans-/muxponders with integrated low-speed OTN switching
- Coherent optics based solutions
- Line speeds up to 800Gbit/s
- Variants with built-in ConnectGuard™ layer 1 encryption technology
- 10Gbit/s QSFP-based service multiplexer

ConnectGuard™ encryption

- Layer 1 AES-256 encryption with ultra-low latency and 100% throughput
- Dynamic key exchange <=4096 bit keys every minute
- FIPS 140-2 and CC EAL-2 certified
- Germany's Federal Office for Information Security (BSI) approval for transport of classified data up to German "VS-V" or "NATO confidential"
- Quantum-safe encryption via post-quantum cryptography (PQC) or third-party quantum key distribution attach (QKD)

Optical layer

- 9.6THz spectrum bandwidth (C+L bands)
- Filter-based multiplexing with 50, 75, 100, 150, 200 and 400GHz spacing options
- Reconfigurable optical add/drop modules (ROADM) from 1 to 32 degrees with multiple fixed, colorless, directionless and contentionless add/drop structures
- Broadcast optical add/drop modules (BOADM) optimized for next-gen optical edge networks
- Optical amplification options using Erbium fiber (EDFA) and integrated EDFA+Raman amplifiers
- Automated optical layer with channel equalization and span loss equalization
- Optical supervisory functions like optical channel monitoring with full support of third-party wavelengths
- Tailored solutions for access, metro and regional/long-haul infrastructure, and for 400ZR-based DCI
- Optical timing channel (OTC)
- Fiber monitoring (OTDR)

Common equipment

- Variety of active chassis from 1RU to 12RU; 300mm and 600mm depth variants
- 19in/ETSI/NEBS rack mounting
- Hardened ETSI-compliant 1RU shelf suitable for outdoor deployments, such as street cabinets
- Fully redundant power supply modules; AC, DC, and mixed AC/DC options
- Hot-swappable (non traffic affecting) controller modules

FSP 3000

Equipment and network management

- Embedded CRAFT/CLI
- Embedded web-based graphical user interface with "point and click" provisioning via HTTPS
- Full support of SNMP, TL1, REST, NETCONF (OpenConfig)
- Streaming telemetry (gRPC)
- Full support of FTP, SFTP, SCP, SSH, TELNET
- Remote authentication via RADIUS or TACACS+
- Equipment management using DCN or in-band management tunnels
- Enhanced user management with multiple security options
- Zero-touch provisioning methods using automated set-up, scripting environment like Ansible and network-wide profile management
- Guided installation and fault identification
- Ensemble Controller network management system and domain control with T-API

Laser safety

- Class 1M laser product with hazard Level 1M

Environmental

- Standard temperature (operating): +5ºC to +40ºC
- Extended temperature active (operating): -40ºC to +65ºC
- Extended temperature passive: -40ºC to 85ºC
- Relative humidity (non-condensing): 5% to 85% (operating) / 5% to 90% (short-term)
- Outdoor enclosures for passive components

Regulatory compliance

- ETSI EN 300 019-1-1 V2.2.1 Storage class 1.2
- ETSI EN 300 019-1-2 V2.2.1 Transportation class 2.2
- ETSI EN 300 019-1-3 V2.4.1 Stationary use at weather protected locations class 3.1
- ETSI EN 300 019-2-3 V2.4.1 Non- temperature controlled, weather protected locations Class 3.3E (-40ºC to max +65C) for extended temperature shelf configurations
- NEBS level 3
- Laser safety: IEC 60825-1, IEC 60825-2, ITU-T G.664-2012
- EMC: CISPR 22, CISPR 24 / CISPR 32, CISPR 35
- Product safety: IEC 60950-1, IEC 62368-1:2014
- Directive 2011/65/EU (RoHS II) and 2015/863/EU (RoHS III)
- WEEE: directive 2012 / 19 / EU, EN 50419:2006
- IP20. Use in a pollution degree 2 environment and indoor controlled office environments only
- CE declaration of conformity
- FCC supplier's declaration of conformity
- WCAG 2.0 certification for embedded web GUI

TL9000
TL19.1270

ADTRAN
Certified
Supplier

ISO 9001
ISO 14001
TL 9000