FSP 3000 CloudConnect™

Open terascale transport for cloud applications

Data traffic demand is booming, putting enormous pressure on your data center interconnect (DCI) network. You need a scalable solution that can rapidly address this problem while optimizing space and power consumption.

Times have changed. Your main priority is no longer longevity of equipment, with a focus on how many decades it can be milked for revenue. With ever-decreasing life cycles, today's biggest challenges are technology obsolescence and how to accommodate new technology quickly and efficiently. Sustainability is key. The emphasis is now on minimizing power consumption, footprint and environmental impact; finding the best balance between compactness, integration and modularity to achieve the maximum energy efficiency and minimum material intake. Our FSP 3000 CloudConnect™ is an all-new solution that has been built directly with the industry to address your changing requirements with best-in-class sustainability performance.

Your benefits

- **Best-in-class metrics**
  Unprecedented scalability up to 25.6Tbit/s duplex capacity at ultra-high density, lowest energy demand and maximum security
- **Simplified operations**
  Complete system in a box including channel multiplexers, optical amplifiers and all equipment necessary for end-to-end transport applications
- **Open design for network disaggregation**
  Open Line System (OLS) concept meets evolving needs
- **For current and future demand**
  MicroMux™ module expands client port flexibility without compromise
- **Coherent and direct detect solutions**
  Single platform supporting both optical layers; innovative SmartAmp™ for direct detection modulation format, such as PAM4
- **Fully open and programmable**
  Open direct network element and network level APIs for simple integration into SDN-based environments

High-level specifications

Chassis configurations

- 1 RU / 540mm depth – 2 channel cards
- 4 RU / 540mm depth – 7 channel cards
- 12 RU / 280mm depth – 20 channel cards

Channel modules and pluggables

- Software-defined 400G transponder
- 400G flexible service switching module
- 10G / 40G QSFP service multiplexer

Service and network interfaces

- 10GbE / 25GbE / 40GbE / 100GbE
- OTN, SONET / SDH and Fibre Channel (up to 32G FC)
- Open Line System
- Coherent and direct detection (PAM4) based modulations

Best in-class eco design

- Highest energy efficiency, TEER-proven
- Optimized transport and logistics (CO2 reduction)
- Options for recycling and take-back models

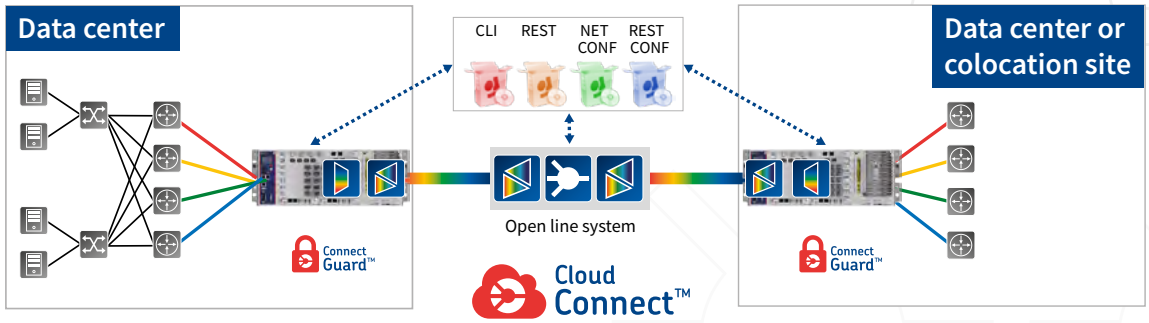
Photonic layer architectures

- Direct Detect: 40 channels at 100GHz for 4.0Tbit/s capacity
- Coherent: 48/96/128 channels for 9.6/19.2/25.6 Tbit/s capacity

Management interfaces

- Easy to use JUNOS-like CLI
- Support for SNMP, REST, RESTCONF & NETCONF (API details available)
- YANG-model based (with model details available)

Applications in your network



Up to 25.6Tbit/s duplex capacity in a single rack with less than 0.2W per Gbit/s power consumption

Data center and network operator benefits

- Enables growing enterprises, web-scale operators and data center operators to rapidly connect dispersed sites at highest speeds
- Designed to seamlessly scale with business needs for public, private and hybrid cloud applications
- Simplified multi-layer provisioning by intelligent software control and software-defined networking (SDN), built with a data center operations model
- Reduces total cost of ownership via industry-leading low power consumption, highest density, coherent and direct detection modulation based optical layers and client interface flexibility

For more information please visit us at www.advaoptical.com

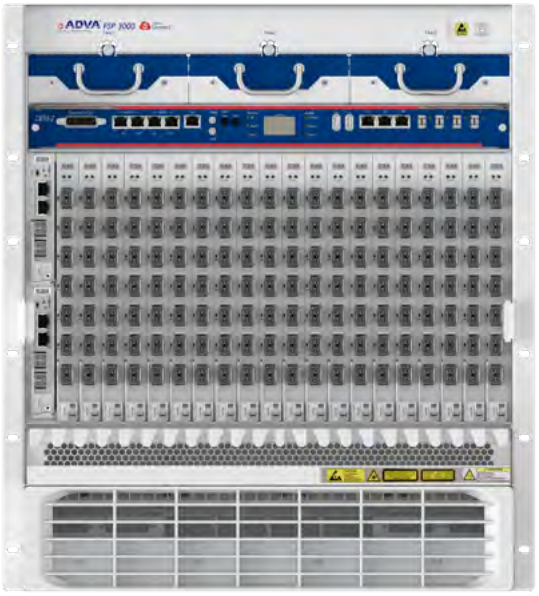
Product specifications are subject to change without notice or obligation.

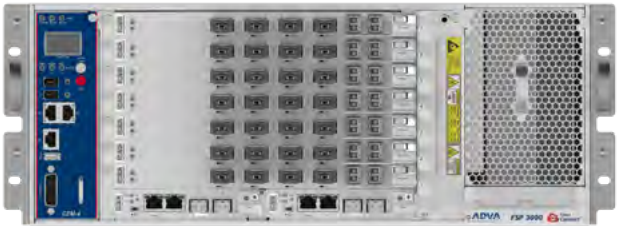
ADVA™ Optical Networking

Shelf options

SH12 shelf

- 8Tbit/s system in just one 12RU shelf
- Dimensions (W x D x H): 430mm x 280mm * x 12RU / 17.4" x 11" x 12RU
- 20 slots for traffic and two slots for management modules
- Front traffic and management access
- Power:
  - AC / DC redundant power supply units
  - Typical / maximum power at 48V: 2900W / 4000W
- Cooling:
  - Front to rear airflow
  - Redundant plug-in fan units
- Mounting brackets for 19", 23" and 600mm ETSI





SH4R shelf

- 2.8Tbit/s system in just one 4RU shelf
- Dimensions (W x D x H): 430mm x 540mm * x 4RU / 16.9" x 21.3" x 4RU
- Seven slots for traffic and two slots for management modules
- Front traffic and management access
- Power:
  - AC / DC redundant power supply units
  - Typical / maximum power at 100 to 240V: 1035W / 1500W
- Cooling:
  - Front to rear airflow
  - Redundant plug-in fan units
- Mounting brackets for 19", 23" and 600mm ETSI

SH1R shelf

- 800Gbit/s system in just one 1RU shelf
- Dimensions (W x D x H): 430mm x 540mm * x 1RU / 16.9" x 17.7" x 1RU
- Two slots for traffic and two slots for management modules
- Front traffic access and management access
- Power:
  - AC / DC redundant power supply units
  - Typical / maximum power: 380W / 460W
- Cooling:
  - Front to rear airflow
  - Redundant plug-in fan units

** With front cover*

Channel modules and pluggable units

Software-defined 400G transponder

- Single-slot module
- Modes of operation:
  - Transponder
  - Dual transponder
  - Multiplexing transponder
  - Dual multiplexing transponder
- Client interfaces: four 100GbE / OTU4 (QSFP28)
- Network interfaces: two 100G / 150G / 200G DWDM tunable
- 8QAM, 16QAM and QPSK coherent transmission at 100G / 150G and 200G

400G flexible service switching module

- Single-slot module
- Multi-functional card
  - Service aggregation
  - Grooming and switching
  - SAN transport
  - AES-256 encryption
- Multi-service capabilities: Ethernet, OTN, SONET / SDH, Fibre Channel
- Client interfaces:
  - Two flexible QSFP+ / QSFP28 and three QSFP+ (PSM4,LR4, SR4)
  - QSFP+ support 40GbE / OTU3 and four 10GbE / OTU2 fan-out
- Network interfaces:
  - Two QSFP28 via two OTU4 with GFEC
- Open design (third party transport support)

MicroMux™ QSFP service multiplexer

- Active QSFP28 adapter converting 100GbE client interfaces into either 10x 10GbE or 2x 40GbE interfaces
- Physical dimension: QSF28 MSA INF-8438i
- Client interface format:
  - 10GBase-SR, 40G Base SR4 (SR version)
  - 10Gbase-LR, 40G Base IR4 (MR version)
- Network interface:
  - 1x MPO24MM (SR version)
  - 1x MPO24SM (MR versión)
- SM / MM breakout cables
- Management interface: SFF-8636

DWDM filter modules and amplifiers

48-channel DWDM c-band filter

- Single-slot card
- Fixed 100GHz channel grid (#19600GHz – #19130GHz)
- Two bi-directional monitor points for input and output
- Transport protocol independent

96-channel DWDM c-band filter

- 4HU high shelf
- Rack mountable (19”, 23” and 300mm ETSI)
- Fixed 50GHz channel grid (#19600GHz – #19125GHz)
- Transport protocol independent

128-channel DWDM c-band filter

- 4HU high shelf, rack mountable (19”, 23” and 300mm ETSI)
- Fixed 37.5GHz channel grid (#19600GHz – #19130GHz)
- Designed for flexgrid traffic modules with coherent detection
- Two uni-directional monitor points for input and output
- Transport protocol independent

Pre-amplifier / in-line amplifier

- Single-slot card
- Integrated optical supervisory channel (OSC)
- Maximum output power: 20dBm
- Typical / maximum power consumption: 40W / 55W
- Monitor points for input and output power
- Performance monitoring: OPT, OPR, OPT TCA H / L, OPR TCA / HL
- Fault management: LOS

SmartAmp™ for direct detect transmission

- Optical layer specifically designed for PAM4 direct detection based modulation solutions
- Consists of two modules in a SH4R shelf:
  - Smart Filter Module: integrating a 40-channel mux/demux filter, a preamplifier and chromatic dispersion measurement
  - Smart Amplifier Module: integrating a post amplifier, a tunable chromatic dispersion compensator and the OSC

Security

- TACACS+ for authentication, authorization and accounting
- Access control lists (ACL), specified at the system level and applying to all management interfaces
- Encryption for network controller – element controller communications
- Optional encryption of database storage
- Management interfaces can be disabled when not used
- Serial port auto-logoff upon local disconnect
- Optical line interface encryption
  - Advanced encryption standard AES 256
  - Diffie-Hellmann key exchange protocol
  - Authentication

System capacity per fiber pair

- Direct Detect:
  - 40 channels at 100GHz for 4.0Tbit/s capacity
- Coherent:
  - 48/96/128 channels for 9.6/19.2/25.6 Tbit/s capacity

Link reach

- DP-QPSK – 100Gbit/s over up to 3,500km
- DP-8QAM – 150Gbit/s over up to 1,500km
- DP-16QAM – 200Gbit/s over up to 800km
- PAM4: 100Gbit/s over up to 100Km

Protection

- Fully redundant common equipment for highest equipment protection
- Service protection options including client channel and path protection

Services

- 10GbE / 25GbE / 40GbE / 100GbE
- OTN, SONET / SDH and Fibre Channel

Management

- Local management via
  - Ethernet port (RJ-45) for web-based GUI, CLI via Telnet, SSH or SNMP
  - Serial port (RJ-45) for text based CLI
- Remote management via IP in-band management tunnels
- Management protocols:
  - CLI
  - HTTP/HTTPS/REST
  - SNMP
  - NETCONF
  - RESTCONF
- High-availability management configuration
- Redundant and hot-swappable management modules
- Redundant management and DCN connectivity

Laser safety

- Class1M laser product with hazard Level 1M

Environmental conditions

- Temperature range
  - 5°C to 40°C (41°F to 104°F) long term
  - -5°C to 50°C (23°F to 122°F) short term, testing to 55°C (131°F)
- Humidity:
  - 85% at 40°C (104°F) long term

Agency approvals and regulatory compliance

- Transport and storage: ETS 300-019-1-2 class 1.2 and 2.3
- Operation: ETS 300-019-1-3 class 3.1
- Laser safety: IEC 60825-1, IEC 60825-2, ITU-T G.664-2012
- EMC: CISPR 22, CISPR 24
- Product safety: IEC 60950-1
- RoHS: directive 2011 / 65 / EU, EN 50581-2012,
- WEEE: directive 2012 / 19 / EU, EN 50419:2006

Before you install, operate and service the FSP 3000 CloudConnect™ (FSP 3000 C) system, review and read the FSP 3000 C Documentation Suite. The FSP 3000 C Hardware Guide contains important safety and permissible configuration information, as well as installation and maintenance procedures. Other manuals in the FSP 3000 C Documentation Suite contain operating procedures. To avoid personal injury and equipment damage due to incorrect usage, you need to be familiar with the documentation contents.