



Dynamic Optical Transport
WDM Transport & OTN Switching Solutions for Optical
Networking Applications from Network Edge to Carrier Core

EKINOPS360 OPTICAL TRANSPORT PORTFOLIO PRODUCT BROCHURE 02 | 2024

EKINOPS360

Dynamic Optical Transport

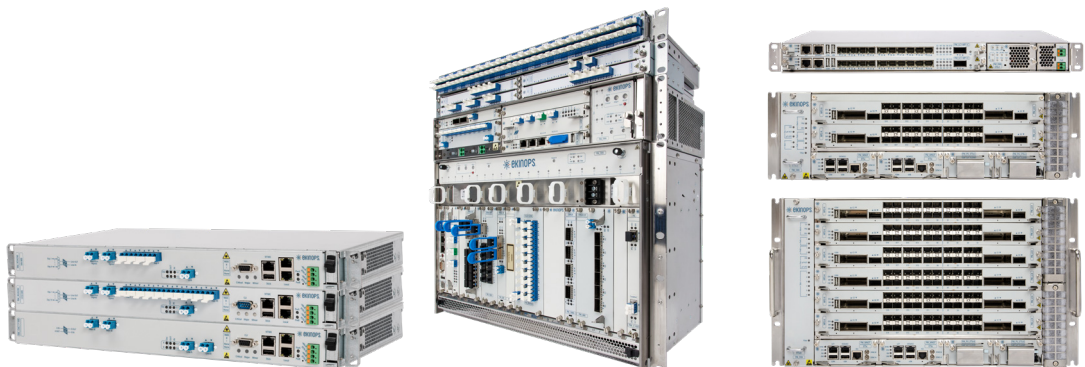


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EKINOPS OTN PRODUCTS

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DESCRIPTION OF EKinOPS GROUP

Ekinops is a leading provider of open and fully interoperable Layer 1, 2 and 3 solutions to service providers around the world. Our programmable and highly scalable solutions enable the fast, flexible and cost-effective deployment of new services for both high-speed, high-capacity optical transport as well as virtualization-enabled managed enterprise services.

Our product portfolio consists of three highly complementary product and service sets: Ekinops360, OneAccess and Compose.

EKinOPS360
Dynamic Optical Transport

- One, marketed under the Ekinops360 brand name, provides a single, fully integrated platform for metro, regional, long-haul and OTN switching applications.

ONEACCESS

- OneAccess offers a wide choice of physical and virtualized deployment options for Layer 2 and Layer 3 access network functions. For full product information, refer to the OneAccess portfolio brochure or website at www.ekinops.com.

 **COMPOSE**

- Compose supports service providers in making their networks software-defined with a variety of software management tools and services, including the scalable SD-WAN Xpress.

As service providers embrace SDN and NFV deployment models, Ekinops enables future-proofed deployment today, enabling operators to seamlessly migrate to an open, virtualized delivery model at a time of their choosing.

A global organization, with operations in 4 continents; Ekinops (EKI) - a public company traded on the Euronext Paris exchange - is headquartered in Lannion, France, and Ekinops Corp., a wholly-owned subsidiary, is incorporated in the USA.

Ekinops360

Ekinops360 consists of two distinct but interoperable product lines, one for high-capacity WDM transport and the other for efficient, flexible OTN switching, both managed through a unified interface. The combination of these two systems provides a highly powerful platform enabling Layer 1 connectivity for any type of optical networking application.

The WDM product line delivers active and passive DWDM and CWDM solutions for all transport applications from short reach enterprise, access and data center interconnection (DCI) to metro, regional long haul, ultra-long haul and even submarine distances with line rates from 1G to 800G and beyond. It can also be used for mobile backhaul and fronthaul applications in 3G, 4G and 5G radio access networks.

Developed by a team of senior telecom engineers with extensive experience in designing optical systems and sub-systems for long haul and submarine applications, it has proven to be the most adaptable Layer 1 optical transport system in the industry.

EKINOPS360 Dynamic Optical Transport

- Line rates from 1G to 800G
- Advanced optics including white box-based open ROADMs up to 20 degrees and low noise amplifiers with both EDFA and Raman technology
- Multi-protocol service aggregation to a single optical carrier with multi-tier aggregation for sub-10G service transport on high speed coherent channels

FLEXRATE™ EKINOPS

- Alien wavelength capabilities allowing customers to add capacity over existing infrastructure without disruption of existing traffic
- System automation capabilities reduce reliance on manual tasks to commission and operate networks while increasing network uptime by minimizing human error

TRANSPORT ON-A-CHIP TECHNOLOGY T-CHIP® EKINOPS

- Flexgrid and ITU-standard 50GHz/75GHz/100GHz channel plans
- Bi-directional transmission capability up to 600G over single fiber
- Extended Temperature Range (ETR) operation from -40 °C to +65 °C for deployment in outdoor cabinets and other unconditioned spaces
- Advanced Forward Error Correction for 10G/40G and coherent solutions
- Programmable T-Chip® (Transport-on-a-Chip) technology that enables a small footprint, low power consumption, short manufacturing times, and quick introduction of new features via software rather than hardware
- Operationally efficient requiring minimum space & power consumption

White Box Family

IMROADM-H4-WB



4D ROADM + Amplifier + OSC + OCM

IMROADM-H10-WB



10D ROADM + Amplifier + OSC + OCM

IMOAC17-WB



InLine Amplifier + OSC

Disaggregated Applications

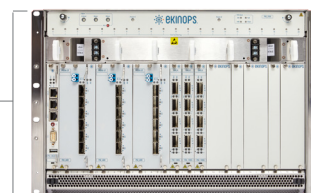
EKINOPS C200HC



Client: 40x10G/8x40G/12x100G/2x400G
Line: 1G-800G

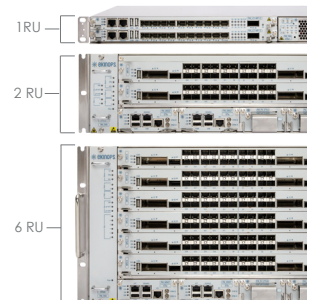
Mid-Size Applications

EKINOPS C600HC



Client: 120x10G/24x40G/20x100G/6x400G
Line: 1G-800G

Large Applications



OTN Switching Applications



The Ekinops360 OTN product line is the ETSc compact transport switch. It is a G.709 standards-based OTN switch that integrates Layer 1 and Layer 2 networking capability to provide a highly functional, service-oriented solution for the efficient delivery of any client service. The ETSc is designed for all applications from the edge to the core and is available in multiple form factors. The ETSc de-couples client and line side interfaces, eliminating the service scalability limitations inherent in pure WDM transport solutions, and virtualizing valuable optical resources to make them more efficient and profitable.

The ETSc platform is designed with a pay-as-you-grow architecture that allows for cost-effective solutions for installations of all sizes. Its agnostic cell-based switching fabric delivers the functionality and efficiency service providers need to support any service type. Centralized switch fabrics operate either in an N+1 or 1+1 configuration while the control and timing functions provide 1+1 redundancy for high availability and carrier-grade reliability. Blade-based switching for the edge uses the same switch fabric technology allowing for hardwired connectivity across the backplane and eliminating the need for—as well as the cost of—a central fabric at sites with low capacity. The ETSc platform provides ODUk level granularity from ODU0 to ODU4—including ODUFlex with hitless adjustment (HAO)—so it can switch any service regardless of size including using ODUFlex to switch Layer 2 VLANs.

The ETSc platform uses a distributed ASON-based software control plane that enables service configuration and performance monitoring. It also provides link verification, network discovery and multilayer resource availability functions providing all nodes full knowledge of the network state in real time. The software abstracts and simplifies the underlying switch complexity using an interface adaptation layer that allows the operator to configure the OTN switch using simple commands from the management system. The control plane supports multiple line protection schemes including 1+0, 1+1 and 1+R to maximize the availability of high priority traffic.

Part of Ekinops' Compose software suite, Celestis NMS is the gateway for managing the Ekinops360 platform delivering service-based management tools for both the Ekinops360 OTN and WDM product lines. An easy to use graphical user interface (GUI) provides an at-a-glance status of all network elements, services and alarms with the ability to drill down to the port level on line card in any device. Point-and-click service provisioning allows a NOC operator to establish trails and services along any optical path. With both wavelength and ODUk-level performance monitoring and service management, Celestis NMS allows traffic to be protected and restored on a per-service basis prioritized based on its SLA.



- Integrated element management, network management and service management functions in a single system
- Fully distributed architecture in order to guarantee high performance and high scalability
- Support for thousands of managed devices and up to 150 simultaneous user sessions
- High availability architecture (cluster and load balance)
- Integrated design tool for offline modeling and network optimization with direct import/export of files
- Layered software architecture (J2EE + Web Services)
- State of the art web presentations tools
- Intuitive graphical user interface (GUI)

Celestis NMS has a distributed architecture in order to ensure flexibility for managing a variety of network technologies, high availability, high performance and scalability. The management system application can be installed in a single standalone server for managing small networks or in multi-server clusters to ensure high availability and scalability when managing large networks.

SDN-capable, Celestis NMS connects to the network elements via SNMP or NETCONF while the Northbound interface (NBI) is based on REST/JSON and SNMP for easy integration into higher layer network controllers, orchestrators and OSS/BSS.

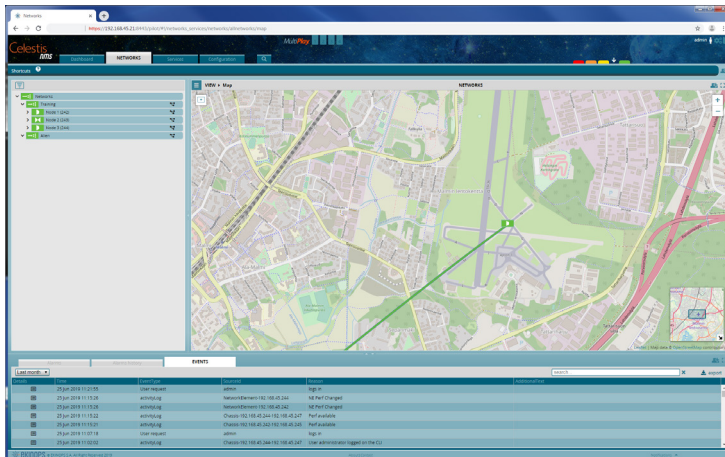


Figure : Ekinops Celestis NMS street-level view

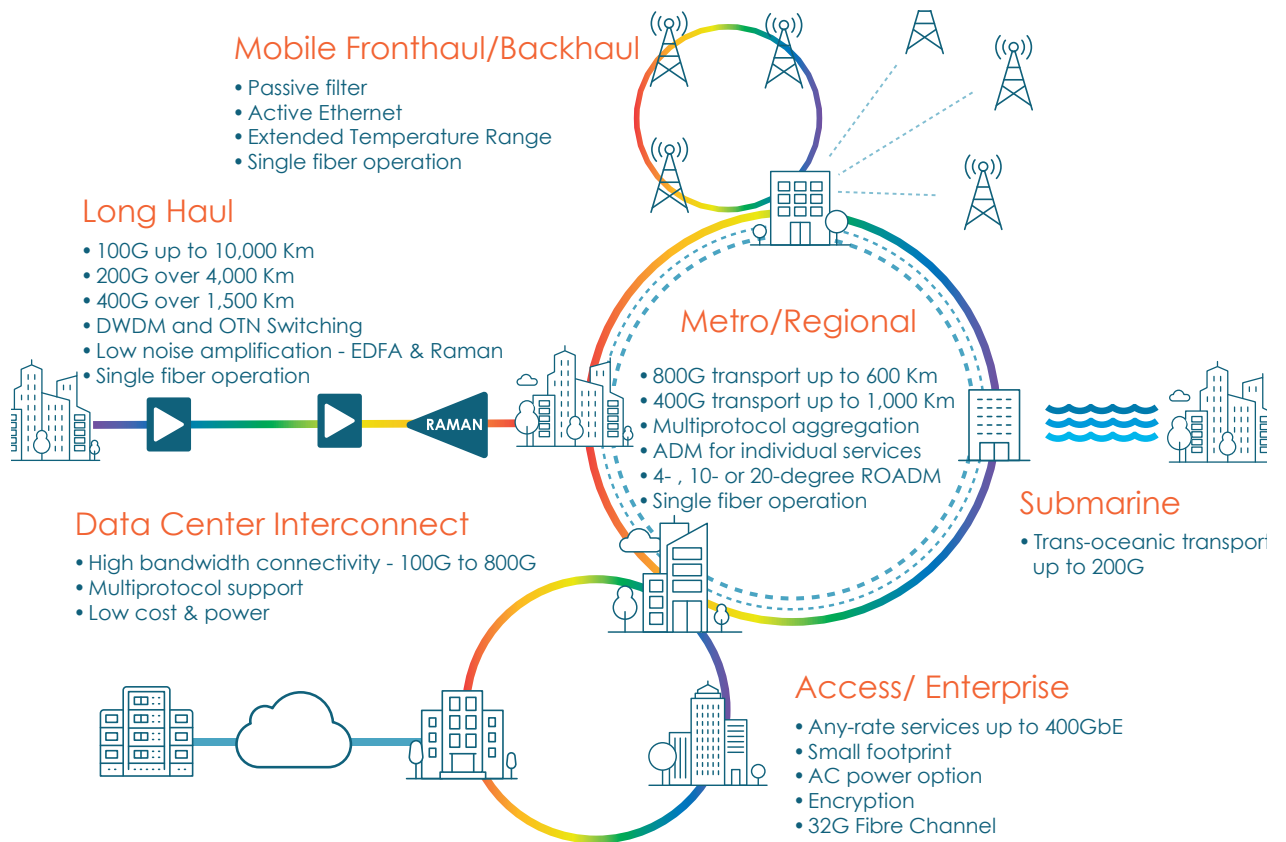


OpenStreetMap® is built by a community of mappers and allows comprehensive net-work views, zooming in easily from a very high-level, entire-network view to a detailed view. Ekinops Celestis® NMS supports maps up to level 14 equivalent to a 1:35000 scale in offline mode. Higher scales such as 1:2000 are supported in online mode, depending on available storage server capacity.

Most Ekinops360 modules include an embedded Data Communications Channel (DCC) or Generalized Communications Channel (GCC) for remote monitoring and management. Management information is embedded and transported in the same wavelength but outside of the client traffic, eliminating the need for allocating a special wavelength.

Optical Supervisory Channel (OSC) capability is available for both dual-fiber and single-fiber networks using 1510nm and/or 1590nm channels to maintain management connectivity outside the data plane.

ONE PLATFORM - MULTIPLE SOLUTIONS



APPLICATIONS

Alien Wavelengths

- Easiest, most cost-efficient way to add capacity
- Replace n x 10G with coherent channel up to 800G
- Proven operation over any 3rd party line system

Anyhaul Transport

- FlexRate™ technology with tunable performance
- Span any distance from 10m to 10,000 Km on a single line card
- Multi-protocol, multi-rate client service support
- No license fees to upgrade line speed & no keyed optics

OTN Switching

- Highly scalable from 100G to 2 Tbps switch capacity
- Multiple form factors to address any application
- Increased service protection and network reliability

Data Center Interconnection

- Small 2RU form factor with up to 1.6Tbps capacity
- FlexRate™ programmable line interface—selectable from 100G to 800G
- Compatible with existing filters, no line system replacement needed
- Eliminates rip-and-replace with 'evergreen' design that allows technology migration within existing units by simply replacing modules

Encryption

- Bulk Layer 1 encryption of Layer 2/3 services—lower latency and more secure
- Industry standard AES-GCM 256 encryption engine
- FIPS 140-2 compliant solution

Extended Temperature Range

- Operates in any temperature from -40 °C to +65 °C with no impact on system performance
- Ideal for unconditioned spaces and outdoor cabinets
- Active and passive solutions

Fiber Deep

- Efficient aggregation of 10G services at every fiber node
- Programmable capacity up to 800G to meet backhaul requirements
- Enhanced metro core transport

Single Fiber Operation

- Bi-directional transport of up to 32 channels per direction (64 channels on a single fiber)
- Supported for all line rates from 10G to 600G
- Complete line of single fiber capable transponders, muxponders, amplifiers, filters and ROADMs

Submarine Transport

- High speed, low cost capacity upgrade for both repeatered and un-repeatered applications

System Automation

- Automatic topology discovery with hands-free commissioning
- Point-and-click service provisioning remotely from the NOC
- Automatic power balancing for optimal performance

Transport-as-a-Service

- Leverage transport infrastructure to accelerate service deployment
- Dedicated, secure bandwidth for all services on a shared wavelength
- Guaranteed performance with customized SLA

SPECIFICATIONS

WDM Systems

PHYSICAL SPECIFICATIONS

CHASSIS	CAPACITY	HEIGHT	WIDTH*	DEPTH	AC POWER	DC POWER
C200HC	6 modules	2 RU	442 mm 17.4"	269 mm 10.7" (DC version) 442 mm 17.7" (AC version)	Internal Option — AC/DC versions available —	Standard
C200HC ETR	6 modules	2 RU	442 mm 17.4"	269 mm 10.7"	N/A	Standard
C600HC	20 modules	7 RU	442 mm 17.4"	269 mm 10.7"	External Option	Standard

*Note: standard 19" ETSI - ETSI 21" and 23" mounting options also available.

OPERATING TEMPERATURE

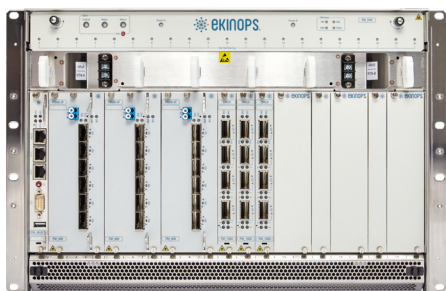
0°C to +50°C | +32°F to +122°F
 -40°C to +65°C | -40°F to +149°F (C200HC-ETR)

STORAGE TEMPERATURE

-20°C to +85°C | -4°F to +185°F
 -40°C to +85°C | -40°F to +185°F (C200HC-ETR)

POWER CONSUMPTION

C200HC Maximum fully loaded 500W
 C200HC-ETR Maximum fully loaded 150W
 C600HC Maximum fully loaded 1000W



C600HC



C200HC

OTN Systems

PHYSICAL SPECIFICATIONS

CHASSIS	CAPACITY	HEIGHT	WIDTH*	DEPTH	POWER
ETSc6	6 modules	6 RU	475 mm 19"	240 mm 9.6"	40.8 to -57.6 VDC
ETSc2	2 modules	3 RU	475 mm 19"	240 mm 9.6"	40.8 to -57.6 VDC
ETSc1	2 half-modules	1 RU	475 mm 19"	240 mm 9.6"	40.8 to -57.6 VDC

*Note: standard 19" ETSI - ETSI 21" and 23" mounting options also available.

OPERATING TEMPERATURE 0°C to +50°C | +32°F to +122°F

STORAGE TEMPERATURE -20°C to +85°C | -4°F to +185°F

POWER CONSUMPTION

ETSc6 Maximum fully loaded 2500W
 ETSc2 Maximum fully loaded 1000W
 ETSc1 Maximum fully loaded 440W

10 |



ETSc6



ETSc2



ETSc1

OPTICAL LINE INTERFACES

EKINOPS uses a variety of both pluggable and integrated optics on its equipment. Pluggable options include SFP, SFP+, SFP28, XFP, QSFP+, QSFP28, CFP and CFP2 and will vary depending on the individual line card. Ekinops proprietary integrated OTX optics are used on our coherent line cards. The OTX is a special optical module designed by Ekinops to achieve exceptional span distances without in-line amplification.

EKINOPS 360

Dynamic Optical Transport

WDM PRODUCTS

Pluggable Modules (PM)

Rack Mount (RM)

Cassette Module (CM)

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High Bitrate Modules: 800 | 600G | 400G | 200G | 100G
→ FlexRate™ Transponders/Muxponders

PM_800FR04

2 slots Pluggable 800G FlexRate™ Transponder/Muxponder



Pluggable 800G MR/400G LH muxponder with two QSFP28 and two QSFP-DD multiprotocol client ports. Single integrated tunable 400G/800G coherent FlexRate line port with FEC. Used for transmission up to 1,500Km. Supports 100GbE, 200GbE, 400GbE and OTU4 clients.

PM_600FRS06-SF

3 slots Pluggable 600G FlexRate™ Transponder/Muxponder



Pluggable 100G to 600G multi-reach muxponder with six multiprotocol QSFP28 client ports. Single integrated tunable 100G/200G/300G/400G/500G/600G coherent FlexRate line port with FEC. Used for transmission from 10Km to 10,000Km. Compatible with 400GbE client interface. Compatible with single fiber bi-directional operation.

PM_400FRS04-SF

3 slots Pluggable 400G FlexRate™ Transponder/Muxponder



Pluggable 100G to 400G multi-reach muxponder with four multiprotocol QSFP28 client ports. Single integrated tunable 100G/200G/300G/400G coherent FlexRate line port with FEC. Used for transmission from 10Km to 10,000Km. Compatible with single fiber bi-directional operation.

PM_400FR05-C2B

2 slots Pluggable 400G FlexRate™ Transponder/Muxponder



Pluggable 100G to 400G multi-reach muxponder with four multiprotocol QSFP28 client ports and one QSFP56-DD for 400GbE. Pluggable, tunable 100G/200G/300G/400G coherent OpenROADM-compliant FlexRate™ line port with proprietary enhanced mode for higher performance.

PM_200FRS02 (-SF)

1 slot Pluggable 200G FlexRate™ Transponder/Muxponder



Pluggable 100G/200G multi-reach transponder/muxponder with two multiprotocol QSFP28 client ports. Single integrated coherent FlexRate 100G/200G line port with FEC. Used for transmission from 10Km to 10,000Km. -SF version compatible with single fiber bi-directional operation.

PM_100G-AGG

2 slots **100G Aggregation Module**



Pluggable 100G muxponder with 10 multiprotocol SFP+ client ports. Single pluggable QSFP28 G.709 OTU4 line side port. Used for efficient aggregation of 10 x 10G services or 2 x 40GbE + 2 x 10GbE onto high speed coherent line or to interface with any OTN network.

PM_100G-EMUX

1 slot **100 Gigabit Ethernet Aggregation Module**



10GbE/40GbE to 100G aggregator module. Multiple configuration options (10 x 10G; 1 x 40GbE + 4 x 10GbE; 2 x 40GbE). 3 client ports, 1 line port, QSFP+ clients and QSFP28 line interface.

PM_100G-EMUX-SFP

2 slots **10x10 Gigabit Ethernet Aggregation Module**



10GbE to 100G aggregator module, 10 clients ports, 1 line port, SFP+ clients and QSFP28 line interface.

PM_100G-XPONDER

2 slots **10x10G Add/Drop Crossponder**



Pluggable 100G crossponder provides efficient aggregation of up to ten 10GbE services into a single 100G OTN uplink with the ability to add or drop any individual 10GbE service or combination of services up to five at any node on the network. 10 multiprotocol SFP+ client ports and two pluggable QSFP28 G.709 OTU4 line side ports.

PM_CRYPTO

2 slots **Hardware based Data Security Engine**



Pluggable 100G muxponder with 10 multiprotocol SFP+ client ports and 1 QSFP28 client port. Multiple configuration options (10 x 10G; 2 x 40GbE + 2 x 10GbE; 1 x 100GbE). Single pluggable QSFP28 G.709 OTU4 encrypted line side port. AES-GCM 256 encryption module used for bulk Layer 1 in-flight data protection.

PM_100G-FMUX-D

2 slots **Dual 32G Fibre Channel Muxponder**



Pluggable, high density 32 Fibre Channel aggregation module. Dual independent muxponders on a single blade, each aggregate 3 x 32G FC to 100G OTU4 line format for interconnection to any OTN switched network. Pluggable optics for both client and line sides.

8Gbps | 10Gbps | 16Gbps Modules

→ 8Gbps, 10Gbps and 16 Gbps Transponder Modules

PM_O5005MP

2 slots **10G Multi-protocol OTN Transponder**



Pluggable 5x10G OTN-based multiprotocol transponder with five SFP+ client ports. Five pluggable SFP+ OTU2/OTU2e line side ports with G.709 FEC. Used for efficient transport of 10G services over standard OTN network.

PM_1001RR

1 slot **10G Metro, Regional and Long Haul Transponder & Regenerator**



Pluggable 10G 3R regenerator with dual XFP line ports. Used for mid-span regeneration.

PM_C1001HC

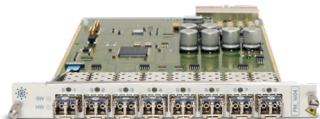
1 slot **10G Metro, Regional and Long Haul Transponder & Regenerator**



Pluggable 10G transponder with a single multiprotocol SFP+ client port. Single pluggable XFP line side port with DynaFEC. Used for long haul transport of 10G services.

PM_1604

1 slot **Quad 8G/10G/16G Fibre Channel & 10GbE Transponder**



Pluggable quad 16G multiprotocol transponder with four SFP+ client ports. Four pluggable SFP+ line side ports with 3R Regen. Used for efficient transport of 8G/10G/16G Fibre Channel and 10GbE services.

8Gbps | 10Gbps | 16Gbps Modules

→ 10Gbps Aggregation Modules

PM_C1008MPLH

2 slots Multi-Protocol, Multi-Rate, 10G Multiplexer/ADM with FEC

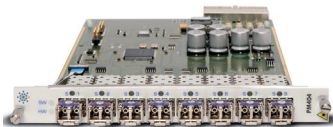


Pluggable 10G muxponder with eight multiprotocol SFP client ports. Dual pluggable line side ports with FEC. Used for timeslot-based service aggregation with add/drop capability.

Low Speed Aggregation and Media Converter Modules

PM_404

1 slot Multiport Transponder



Pluggable quad multi-rate transponder with a four SFP client ports. Four pluggable SFP line side ports with 3R regen. Used for efficient transport of any service from 100Mbps to 4Gbps.

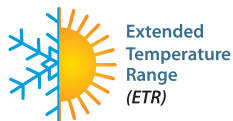
Extended Temperature Range Products

C200HC-ETR

2 RU Ekinops360 Dynamic, Multi-Reach Transport Platform



Extended Temperature Range version of 2RU modular shelf with temperature-hardened fans and management card. Operating temperature range from -40 °C to +65 °C.

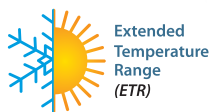


PM_OAC20-ETR

2 slots Pluggable C-band Amplifier with Extended Temperature Range Operation



Pluggable high capacity booster/pre-amplifier module. +20 dBm output power. Variable gain range from +15 dB to +25dB. Integrated OSC channel for remote management. Operating temperature range from -40 °C to +65 °C.

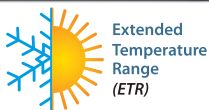


CM_OM8-ETR

1 slot DWDM Optical Multiplexer

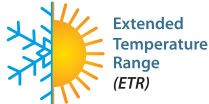


Case mounted 8-channel passive optical multiplexer units with Extended Temperature Range capability. For DWDM applications. BR/RB versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65.



CM_OM-ETR-CWDM

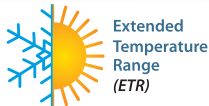
1 slot **CWDM Optical Multiplexer Family**



Case mounted 8- and 10-channel passive optical multiplexer units with Extended Temperature Range capability. For CWDM applications. CSF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

CM_OADM-ETR-DWDM

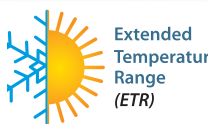
1 slot **DWDM Optical Add & Drop Multiplexer Family**



Case mounted 1-, 2- and 4-channel passive optical multiplexer units with Extended Temperature Range capability. For DWDM applications. SF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

CM_OADM-ETR-CWDM

1 slot **CWDM Optical Add & Drop Multiplexer Family**



Case mounted 1-, 2- and 4-channel passive optical multiplexer units with Extended Temperature Range capability. For CWDM applications. CSF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

RM_OADM4R-ETR

1 RU **Optical Add-Drop Multiplexer, 4 Wavelengths (Bi-directional)**



Rackable 1RU 4-channel, dual sided bi-directional optical add/drop multiplexer shelf with mid-access point and Extended Temperature Range capability from -40 °C to +65 °C.

Infrastructure Elements
→ **Optical Amplifier Modules**

PM_OABP-HCS2 (-BR/-RB)

2 slots **High Capacity Next Generation Booster/Pre-Amplifier**



Pluggable high capacity booster/pre-amplifier module. +17 dBm or +20 dBm output power. Variable gain range from +10 dB to +18dB (booster) or +18 dB to +32 dB (pre-amp). Integrated OSC channel for remote management. BR/RB version compatible with single fiber bi-directional operation.

PM_OAIL-HCS2 (-SF)

2 slots **High Capacity Next Generation Inline Amplifier**



Pluggable high capacity in-line amplifier module. +17 dBm or +20 dBm output power. Variable gain range from +18 dB to +32 dB. Integrated OSC channel for remote management. SF version compatible with single fiber bi-directional operation.

PM_OAC20

2 slots **Pluggable C-band Erbium Doped Fiber Amplifier**



Pluggable high capacity booster/pre-amplifier module. +20 dBm output power. Variable gain range from +15 dB to +25dB. Integrated OSC channel for remote management.

RM_OAC17-WB

1 RU **Open White Box Optical Line Amplifier for C-band**



1RU Variable Gain Optical Line Amplifier, 15dB to 25db gain, +17dBm output power, for WDM application over the C band. Includes 1510 nm Optical Supervisory Channel.

Infrastructure Elements
→ **Passive Shelves**

RM_OPR

1 RU **Optical Passive Rack**



Passive shelf for all cassette mounted (CM) OM and OADM units. Accommodates up to four units in any combination.

RM_TR1

1 RU **Fiber Tray**



Rack mount fiber tray.

Infrastructure Elements

→ Optical Add & Drop Modules

RM_ROADM-H4-WB

1 RU **Four-Degree Open Architecture ROADM Shelf**



Rackable 4 degree reconfigurable optical add/drop multiplexer White Box. Includes ROADM, optical amplifier with 1510 nm optical supervisory channel (OSC) and optical channel monitoring (OCM). Scalable from two to four degrees using one RM ROADM White Box per ROADM degree. Supports more than 96 channels.

RM_ROADM-H10-WB

1 RU **Ten-Degree Open Architecture ROADM Shelf**



Rackable 10 degree reconfigurable optical add/drop multiplexer White Box. Includes ROADM, optical amplifier with 1510 nm optical supervisory channel (OSC) and optical channel monitoring (OCM). Scalable from two to ten degrees using one RM ROADM White Box per ROADM degree. Supports more than 96 channels.

PM_ROADM-FLEX-H4M

1 slot **Flexgrid Four-Degree Pluggable ROADM**



Pluggable single-slot 4-degree reconfigurable optical add/drop multiplexer with optical channel monitoring (OCM). Scalable from two to four degrees using one module per degree. Supports more than 96 channels.

PM_ROADM-FLEX-H10M

2 slots **Flexgrid Ten-Degree Pluggable ROADM**



Pluggable dual-slot 10-degree reconfigurable optical add/drop multiplexer with optical channel monitoring (OCM). Scalable from two to ten degrees using one module per degree. Supports more than 96 channels.

PM_ROADM-FLEX-H20M

3 slots **Flexgrid Twenty-Degree Pluggable ROADM**



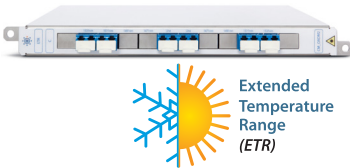
Pluggable three-slot 20-degree reconfigurable optical add/drop multiplexer with optical channel monitoring (OCM). Scalable from two to twenty degrees using one module per degree. Designed for directionless configurations. Supports more than 96 channels.

Infrastructure Elements

→ Optical Add & Drop Multiplexer Modules

CM_OADM-ETR-DWDM

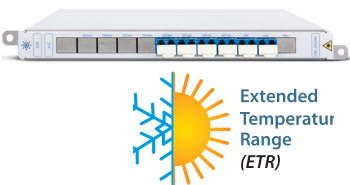
1 slot DWDM Optical Add & Drop Multiplexer Family



Case mounted 1-, 2- and 4-channel passive optical multiplexer units with Extended Temperature Range capability. For DWDM applications. SF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

CM_OADM-ETR-CWDM

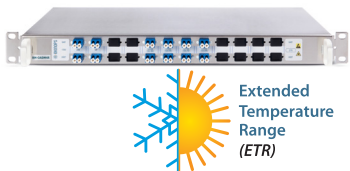
1 slot CWDM Optical Add & Drop Multiplexer Family



Case mounted 1-, 2- and 4-channel passive optical multiplexer units with Extended Temperature Range capability. For CWDM applications. CSF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

RM_OADM4R-ETR

1 RU Optical Add-Drop Multiplexer, 4 Wavelengths (Bi-directional)



Rackable 1RU 4-channel, dual sided bi-directional optical add/drop multiplexer shelf with mid-access point and Extended Temperature Range capability from -40 °C to +65 °C.

CM_OADM Family

1 slot Large Band Optical Add/Drop Multiplexer



Case mounted 2- or 4-channel passive optical optical add/drop multiplexer units with Large-band filtering capability providing wider bandwidth than standard filters. Accommodates high-speed coherent channels up to 400G. 2-channel unit is dual sided and 4-channel unit is single sided. For DWDM applications.

Infrastructure Elements

→ Optical Multiplexer Modules

RM_OM64-FTC

1 RU **WDM Coherent Multiplexer / Demultiplexer**



Rackable 64-channel 1RU passive optical flat top multiplexer with 75GHz spacing. Uses wideband AWG filter design for high baud rate coherent channels up to 600G.

RM_OM40FT

1 RU **WDM Multiplexer / Demultiplexer**



Rackable 40-channel 1RU passive optical flat top multiplexer with 100GHz spacing. RM OM40 can be upgraded to 80 DWDM channels with 50GHz spacing.

RM_OM16FT-BR/RB

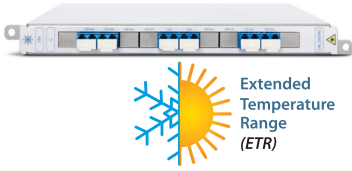
1 RU **16-channel WDM Multiplexer / Demultiplexer**



Rackable 16-channel 1RU passive optical flat top multiplexer with 100GHz spacing used for single-fiber applications. BR variant muxes Blue band and demuxes Red band. RB variant muxes Red band and demuxes Blue band. Includes upgrade port for expanding to 32-channels.

CM_OM8-ETR

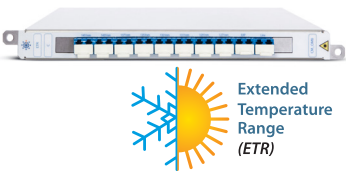
1 slot **DWDM Optical Multiplexer**



Case mounted 8-channel passive optical multiplexer units with Extended Temperature Range capability. For DWDM applications. BR/RB versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65.

CM_OM-ETR-CWDM

1 slot **CWDM Optical Multiplexer Family**



Case mounted 8- and 10-channel passive optical multiplexer units with Extended Temperature Range capability. For CWDM applications. CSF versions compatible with single fiber bi-directional operation. Operating temperature range from -40 °C to +65 °C.

CM_OM8-B1-LB

1 slot **CWDM Optical Multiplexer Family**



Case mounted 8-channel passive optical multiplexer units with Large-band filtering capability providing wider bandwidth than standard filters. Accommodates high-speed coherent channels up to 400G. For DWDM applications

Infrastructure Elements
 → **Optical Protection Modules**

PM_OPS2

1 slot **Optical Protection Switch**



Pluggable dual window, single channel optical protection switch module. Supports both 1310nm and 1550nm optical windows.

PM_OPS2D

1 slot **Dual Optical Protection Switch**



Pluggable dual window, dual channel optical protection switch module. Supports both 1310nm and 1550nm optical windows on both channels.

Infrastructure Elements
 → **System Automation Modules**

PM_OPM8

1 slot **Optical Power Measurement Module**



Pluggable remote optical performance monitoring module. Used for automated power balancing in locations where feature is not available.

PM_OTDR

1 slot **Optical Time Domain Reflectometer**



Pluggable optical time domain reflectometer module. Supports one or two fibers independently. Used to detect fiber failures up to 80 Km from the node. Operates at 1610nm.

PM_VOA

1 slot **8-port Pluggable Variable Optical Attenuator**



Pluggable variable optical attenuator module. Up to eight pluggable SFP VOAs per module. Used for cost efficient power management.

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EKINOPS 360

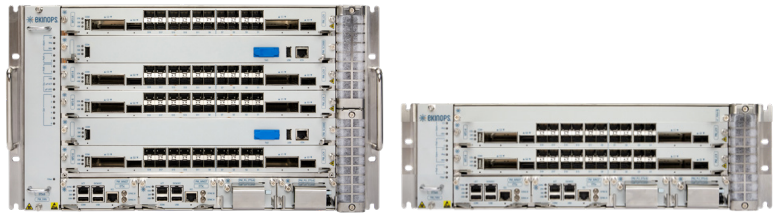
Dynamic Optical Transport

OTN PRODUCTS

Pluggable Modules (PM)

pages 26-27 [↗](#)

ETSc6 /ETSc2 Modules



PM_LC4-MP2-A

1 slot **400G Multirate Multiprotocol Aggregation Module**



Pluggable 400G multi-rate, multi-protocol service aggregation module with SFP+/SFP28, QSFP28 and CFP2 pluggable interfaces. 2x200G/4x100G + 20x10G/25G in a single slot with B&W or tunable WDM optics. Integrated management & timing features.

PM_LC5-MP4-D

1 slot **500G Multirate Multiprotocol Aggregation Module**



Pluggable 500G multi-rate, multi-protocol service aggregation module with SFP+/SFP28, QSFP28, QSFP28-DD and CFP2 pluggable interfaces. 1x400G + 2x200G + 4x100G + 4x8G/10G/25G in a single slot with B&W or tunable WDM optics. Integrated management & timing features.

PM_SC2000

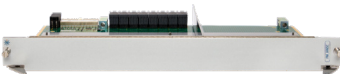
1 slot **OTN Switching Fabric Card**



Provides up to 2.0 Tbps switching capacity in the ETSc6. Two SC2000 fabric cards can be used in the same chassis for 1+1 switching matrix redundancy. (Maximum switching capacity can be limited depending on line cards used in the chassis).

PM_HWSC

1 slot **OTN Hardwired Switching Card**



Provides line card (LC) interconnectivity with bandwidth between slots depending on the LCs used. Cross connection point, non-redundant.

ETSc1 Module



PM_LC1-MP1-C

1 slot **100G Aggregation Module**



Pluggable 100G Ethernet aggregation module with blade-based ODUk switching capability for network edge applications. Efficiently maps up to eight Gigabit Ethernet interfaces into ODU0 payloads or ten 10GbE interfaces into ODU2e for further aggregation to an OTU4 uplink. B&W or tunable DWDM optics.

Dynamic Optical Transport

WDM Transport & OTN Switching Solutions for Optical Networking Applications from Network Edge to Carrier Core



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