

EKINOPS PM 100G-FMUX-D/-DE

Dual 32G Fibre Channel Muxponder

DATA SHEET 11 | 2020

KEY FEATURES & BENEFITS

- Provides high density 32G Fibre Channel aggregation
- Supports dual independent muxponders on a single module
- Provides OTU4 line format for interconnection to any OTN switched network
- Uses FlexMode™ adaptable hardware technology
- 25GbE-capable (future)
- Integrated hardware-based AES-GCM 256 encryption for highest level of data security (PM FMUX-DE only)

APPLICATIONS

- Business Continuance & Disaster Recovery (BC/DR)
- Virtual machine (VM) migration
- Data/disk mirroring
- Cloud services
- Managed connectivity services

OVERVIEW

EKINOPS PM 100G-FMUX-D and PM 100G-FMUX-DE represent the first release of its FlexMode™ “virtual hardware” module that uses a single hardware design to deliver different service profiles and transport functionalities including aggregation, individual service add/drop and even switching. Having a single pluggable module that can assume different personalities just by changing the resident firmware and software allows Ekinops to bring new features to market quickly while keeps development costs low resulting in a highly functional and cost-efficient transport solution that is unique in the market.

In this first release of the FlexMode module, the EKINOPS PM 100G-FMUX-D and PM 100G-FMUXDE, they each provide dual muxponders for the efficient aggregation of multiple 32G Fibre Channel services into a single 100G uplink. The growing use of ‘big data’ applications for business analytics is creating ever larger data sets that need to be both securely stored and readily accessible. Large and frequent block-data transfers require Storage Area Networks (SANs) with high speed connectivity to deliver the bandwidth and performance they require. As a result, there is now a mass migration to 32G Fibre Channel that is driving the SAN connectivity market at the increasing expense of lower bit rate 4G, 8G and even 16G Fibre Channel solutions. With this level of aggregation, the PM 100G-FMUX-D and PM 100G-FMUX-DE greatly improve bandwidth utilization.

They also increase the flexibility, manageability and reliability of SANs by providing a standardsbased OTU4 line interface that can interconnect with any OTN switch such as the EKINOPS TRANSPORT SWITCH (ETS) platform, also part of the Ekinops360 product line.

The PM 100G-FMUX-D and PM 100G-FMUX-DE consist of six SFP28 clients, three dedicated to each of the dual muxponders residing on the module that aggregate up to three 32G Fibre Channel clients onto a single 100G OTU4 QSFP28 line interface. That output can then be handed off for further aggregation to a higher speed coherent optical channel using EKINOPS FlexRate™ modules operating at line rates from 100G to 600G, or to any other third-party OTN capable device.

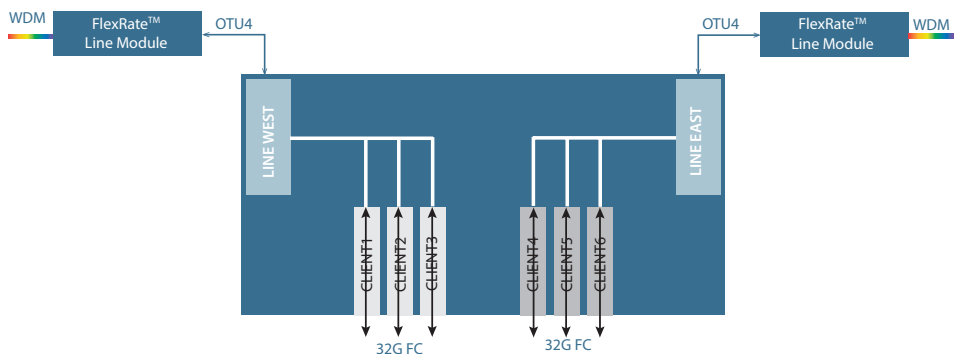
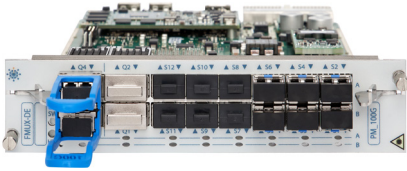


Figure 1: PM 100G-FMUX-D functionality



EKINOPS PM 100G-FMUX-D/-DE

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In addition, EKinops PM 100G-FMUX-DE uses the strongest, industry proven AES-GCM 256 based encryption to provide the highest level of security from end-to-end. By having each OTU4 line port encrypted independently, PM 100G-FMUX-DE provides a further layer of security for data in-flight across high speed optical networks. It uses a hardware based algorithm that operates at wire speed to fully encrypt the payload and guarantee the security of even the most critical data and applications. Because it is hardware-based, the Diffie-Hellman key exchange rotates the keys multiple times per minute to prevent in-flight interception while sub-microsecond latency provides hitless performance for all service types—capabilities not possible with software-based solutions.

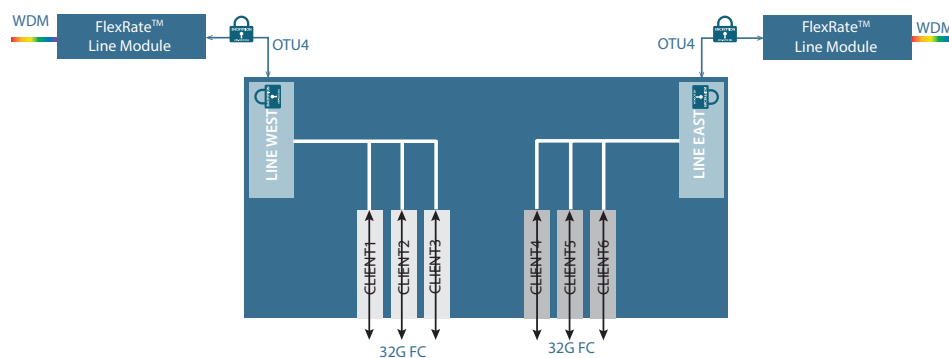
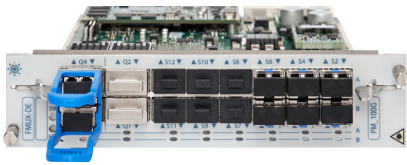


Figure 2: PM 100G-FMUX-DE functionality

MANAGEMENT

The PM 100G-FMUX-D/-DE modules can be managed through SNMP or via the Ekinops standard element level management interfaces, which includes a CLI (*Command Line Interface*) and an Ekinops GUI (*Graphical User Interface*). The CLI is accessible via SSH and Telnet remotely or via a local serial port locally on the Management board. Complete performance monitoring and management is provided, including laser shut off and local and remote loopback which is useful for maintenance and fault isolation. Digital Diagnostics Management (*DDM*) is supported for both QSFP28 and SFP28 interfaces. This includes link status, transmit (*TX*) and receive (*RX*) signal power monitoring, and operational temperature, as well as manufacturer and transceiver model.

The EKINOPS PM 100G-FMUX-D/DE modules are also supported by **Celestis NMS**, the Ekinops advanced Network Management System. the Ekinops advanced Network Management System (PM_FMUX-DE requires the use of **Celestis NMS** for specific end-to-end encrypted service setup and management).



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SPECIFICATIONS

CLIENT INTERFACE

Protocols	32G Fibre Channel
Optical interface	SFP28; QSFP28/QSFP+
Number of ports	6; (6xSFP28 and 2xQSFP28/QSFP+ unused)

LINE INTERFACES

Protocol	OTU4
Optical interfaces	QSFP28
Number of ports	2

MANAGEMENT

MIB	SNMP V2c Private MIB
Remote management	10 Mb GCC per line
Encryption management	Celestis NMS (PM_FMUX-DE only)

PHYSICAL SPECIFICATIONS

Module size	2 slots
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	QSFP28 dependent

INDICATORS

Status	HW ready, SW ready
Alarm	Port down (clients and lines)

ENCRYPTION (PM_FMUX-DE only)

Data Encryption	AES-GCM 256
Key Exchange Encryption	Elliptic Curve Diffie-Hellman

REFERENCE STANDARD

FC-FS-5 (Fibre Channel – Framing and Signaling); FC-PI-6 (Fibre Channel – Physical Interface, 32GFC definition)

ORDERING INFORMATION

PLUGGABLE MODULE (PM)

PRODUCT CODE	DESCRIPTION
PM_100G-FMUX-D	Dual 3x32GFC to OTU4 aggregation module, 2x3 client ports, 2x line ports, SFP28 clients and QSFP28 OTU4 line interface (SFP28 and QSFP28 not included). Compatible with C600HC and C200HC chassis.
PM_100G-FMUX-DE	Dual 3x32GFC to encrypted OTU4 aggregation module, 2x3 client ports, 2x line ports, SFP28 clients and QSFP28 OTU4 line interface (SFP28 and QSFP28 not included). Compatible with C600HC and C200HC chassis.
C600HC	High capacity modular chassis 7RU
C200HC	High capacity modular chassis 2RU
PM_MNGT4	Management card
400EEM	Ekinops Craft interface software

EKINOPS CHASSIS

CONTACT



www.ekinops.com

Ekinops EMEA
sales.eu@ekinops.com

Ekinops APAC
sales.asia@ekinops.com

Ekinops Americas
sales.us@ekinops.com