EKINOPS PM 400FR05-C2

FlexRate™ Muxponder

KEY FEATURES & BENEFITS

- Selectable FlexRate line from 100Gbps to 400Gbps
- CFP2-based pluggable line side optics
- Compliant with OpenROADM standards
- High performance enhanced mode at 400G
- Integrated tunable optical filter and amplifier
- Easy capacity addition using pluggable client optics
- Mix and match Ethernet and OTN clients on the same line
- In-band digital communications channel (DCC) for remote management connectivity

APPLICATIONS

- OpenROADM-compliant networks
- Colorless, directionless and gridless ROADM networks
- Alien wavelengths
- Router by-pass
- Multi-protocol client transport
- Service provider demarcation for IP services

OVERVIEW

Ekinops PM 400FR05-C2 addresses the need for cost-effective transport in all networks up to regional distances. Using OpenROADM compliant pluggable coherent CFP2 DCO line side optics, it delivers all the performance typically found in integrated solutions. The PM 400FR05-C2 provides selectable line rates from 100G to 400G allowing capacity to be tuned and upgraded to meet traffic requirements. It includes an integrated tunable optical filter *(TOF)* and EDFA-based amplifier giving it a high launch power with low noise so it is deployable over existing ROADM networks including colorless (including coupler-based), directionless and gridless ROADM networks. It supports five client interfaces— one QSFP-DD client for native 400GbE services and up to four QSFP28 clients for any mix of 100GbE and OTU4 services. While 400GbE clients map directly to a 400G coherent WDM wavelength, 100GbE and OTU4 clients can be aggregated incrementally as they are added and the FlexRate line adjusted to match client capacity. The PM 400FR05-C2 is supported in both Ekinops C200HC and C600HC chassis.
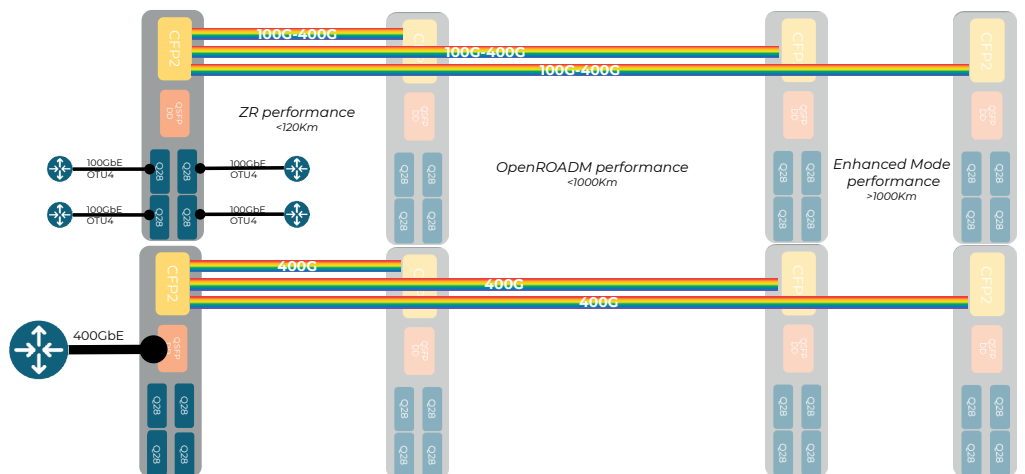

Figure 1: PM 400FR05-C2 in point-to-point networks

APPLICATIONS

PM 400FR05-C2 fits any application requiring performance over access, metro and even regional distances. Its design makes it deployable in pure point-to-point, linear chain and even colorless, directionless and gridless ROADM networks. High launch power gives it extended reach to bypass routers for express traffic while the integrated TOF eliminates noise allowing it to be deployed over both fixed filter and ROADM-based networks. Unlike pure pluggable solutions, the PM 400FR05-C2 is an independent muxponder functionally separate from the IP-routed network making it useable as a strict service demarcation point between the customer and the service provider network.

EKINOPS PM 400FR05-C2

FlexRate™ Muxponder

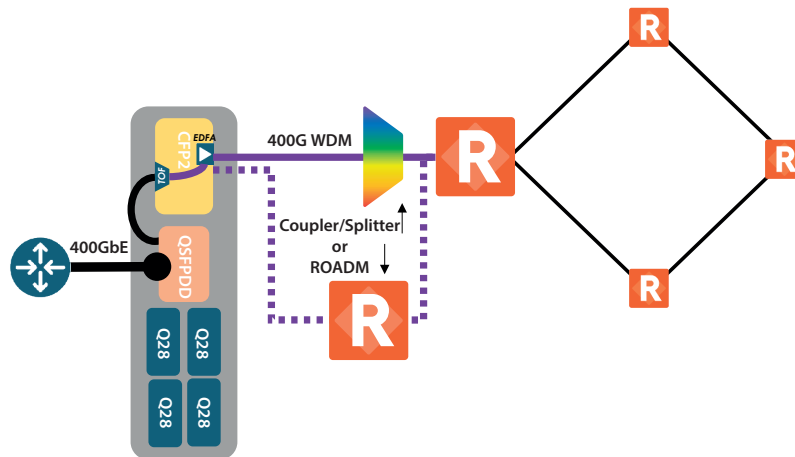Figure 2: PM 400FR05-C2 in a colorless ROADM network

MANAGEMENT

The EKINOPS PM 400FR05-C2 module can be managed through SNMP or via the Ekinops standard element level management interfaces, which include a Command Line Interface *(CLI)* and an Ekinops Graphical User Interface *(GUI)*. The CLI is accessible via Secure Socket Shell *(SSH)* and Telnet remotely or via a local serial port on the management board.

Complete performance monitoring and management are provided, including laser shutoff and local and remote loopback, useful for maintenance and fault isolation. Digital Diagnostics Management *(DDM)* is supported for QSFP28 and QSFP-DD interfaces. This includes link status, transmit *(TX)* and receive *(RX)* signal power monitoring, and operational temperature, as well as manufacturer and transceiver model information essential for inventory management. A 10 Mbps in-band Data Communications Channel *(DCC)* is embedded in the CFP2 for remote management. The EKINOPS PM 400FR05-C2 module is also supported by Celestis **NMS**, the Ekinops advanced Network Management System.

SPECIFICATIONS

• CLIENT INTERFACES

Protocols	100GbE/OTU4; 400GbE
Optical interface	4 x QSFP28; 1 x QSFP-DD

• LINE INTERFACES

Optical interface	1 x CFP2

	100G	200G			300G	400G	
Modulation	DP-QPSK	DP-QPSK	8QAM	16QAM	8QAM	16QAM	16QAM-PS
Baud Rate (GBaud)	31.6	63.1	42.1	31.6	63.1	63.1	65.7
OSNR (dB)	12	16	19.5	20.5	21	24	23

• MANAGEMENT

MIB	SNMP V2c Private MIB
Remote Management	10 Mb DCC

• 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 (typ.)	70W
Power (max.)	91W

EKINOPS PM 400FR05-C2

FlexRate™ Muxponder

- **INDICATORS**

Status	HW ready, SW ready
Alarm	Port down *(Clients and Lines)*

- **REFERENCE STANDARDS**

ITU-T G707 12/2003 edition; ITU-T G709; IEEE 802.3-2002; IEEE 803.3ae-2002; IEEE 802.3ba; ISO/IEC 18033-3, OpenROADM

ORDERING INFORMATION

PLUGGABLE MODULE (PM)

PRODUCT CODE	DESCRIPTION
PM_400FR05-C2B	100G ULH to 400GMR FlexRate muxponder; 5 client ports *(4 QSFP28 clients for 100GbE or OTU4 and 1 QSFP56-DD for 400GbE)*, 1x 100G to 400G FlexRate CFP2 pluggable tunable line port with DCC *(QSFP28, QSFP-DD not included; line side CFP2 included)*

EKINOPS CHASSIS

C600HC	High capacity modular chassis 7RU
C200HC	High capactity modular chassis 2RU
PM_MNGT4-2	Management card
400EEM	Ekinops Craft Interface Software

CONTACT