COMMUNICATION NETWORKS

FOX615 CESM1/CESM2 Core Units
Designed for packet-switched transport in mission-critical networks

CESM1 and CESM2 are MPLS-TP capable core units for the FOX615/612 Multiservice Platform optimized for mission-critical networks.

MPLS-TP readiness
CESM1 and CESM2 core units perform all node management functions of the FOX615/612 platform and data transport for the packet traffic. Designed to meet the most stringent environmental requirements, available are versions for fan-less operation, respective CESM1-F and CESM2-F.

CESM1 and CESM2 support MPLS-TP functionality, providing the application of MPLS protocol to the construction of packet-switched transport networks for mission-critical applications.

MPLS-TP allows provisioning of explicit co-routed bidirectional connection-oriented paths, static routing, protection (1:1), fast restoration mechanisms (below 50ms) and a comprehensive set of functions for operation and maintenance of a network without a dynamic control plane and IP forwarding.

CESM1 and CESM2 fully support the hybrid approach of FOX615/612 Platform thus enabling parallel operation of SDH and MPLS-TP networks and a smooth migration from SDH to MPLS-TP networks.

Key features
• MPLS-TP capable for packet-switched transport networks
• Support of Optical and Electrical Ethernet interfaces
• ERPS for Protection Switching in Ethernet rings
• Core Unit Hardware Redundancy
• SyncE and IEEE 1588v2 on all Ethernet front ports
• OSPF Routing for Management traffic

1:1 equipment protection
CESM1 and CESM2 can be installed redundantly in the FOX615/612 chassis. The redundant core unit works in a standby mode and takes over operation in case a failure occurs in the active unit. This mechanism ensures highest availability of the system, including the packet data layer, timing and synchronization as well as network element management.

ERPS for protection switching
CESM1 and CESM2 support Ethernet Ring Protection Switching (ERPS) for rapid restoration within Ethernet networks in ring topologies. ERPS compliance with ITU-T G.8032v2 allows ring interconnections supporting major/sub-ring configurations and multiple ERP instances (or multiple logical rings).
Technical data

Timing and synchronization
The timing and synchronization functionalities include a 2048 kHz reference clock input. The front ports support Synchronous Ethernet (SyncE) and IEEE 1588v2 (PTP). These options allow for synchronous timing and a very high timing precision of sub-microseconds that are required for various applications.

Management
All FOX615 functions are managed centrally via the management system FOXMAN-UN or via a local craft terminal (FOXCST).

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<tr>
<th>Interfaces</th>
<th>CESM1</th>
<th>CESM2</th>
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<tr>
<td>Optical (SFP)</td>
<td>2 x 10 GbE</td>
<td>2 x 10 GbE 2 x 1 GbE</td>
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<tr>
<td>Electrical (RJ45)</td>
<td>3 x 10/100/1000BASE-T/TX with auto-negotiation (half/full duplex modes)</td>
<td>1 x 10/100/1000BASE-T/TX with auto-negotiation (half/full duplex modes)</td>
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<tr>
<td>SFP Modules</td>
<td>SFP+ modules (10GBASE-LR) / SFP modules (1000BASE-SX/-LX/-EX/-ZX)</td>
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Synchronization
- Synchronous Ethernet According to ITU-T G.8262 to transfer clock signals over Ethernet physical layer
- Synchronous Ethernet ESMC According to ITU-T G.8264 for indication of clock quality level.
- Precision Time Protocol According to IEEE 1588-2008v2 for the synchronization of network clock and time of day (ToD)

Ethernet Functions
- VLAN services Customer bridging acc. to IEEE 802.1Q-2011, 4096 VLANs supported
  Port-based customer VLAN tunneling (Q-in-Q)
  Port-/PCP-/DSCP-based classification (CoS) of ingress traffic with eight priority queues per port
  Maximum frame length of up to 9 216 bytes (Jumbo frames)
- Port Mirroring Up to 32 source ports (RX/TX traffic) to a single mirror port
- Port Security Ingress Storm Control (flood control, flood rate limiting)
- Spanning tree protocols RSTP (Rapid Spanning Tree Protocol), acc. to IEEE 802.1D-2004
  MSTP (Multiple Spanning Tree Protocol), acc. IEEE 802.1Q-2011
- Ethernet Ring Protection Switching (ERPS) According to ITU-T G.8032v2, supporting up to 12 ERP instances
- MPLS-TP MPLS-TP function acc. to IETF RFC5921
  Deterministic (static) LSP/PW configuration without the use of control plane protocols
  Co-routed bidirectional LSP supporting 1:1 linear protection
  environmental specification
  MPLS-TP L2 VPN support for VPWS
- Reverse Layer 2 Gateway Protocol (R-L2GP) According to IEEE 802.1ah on MPLS-TP ports

Management
- Functions Management and control of FOX615/612 and all plug-in units
  Database with management information, Embedded software download
  Alarm collection and notification, External alarm interfacing via backplane and management OSPF routing for management traffic, Management via PDH ECC
- FOXCST Local management system
- FOXMAN-UN Central management system

Power Supply
- Input voltage nominal (min/max) ~48/~60 V DC (~40.5 V DC ... ~72 V DC)
- Power consumption 30W

Operation Environment
- Temperature range and humidity As per FOX615 Platform
- Reliability 23-year MTTF at 35°C (MIL-HDBK-217F) fan-less operation
  46-year MTTF at 35°C (MIL-HDBK-217F) fan-based operation