

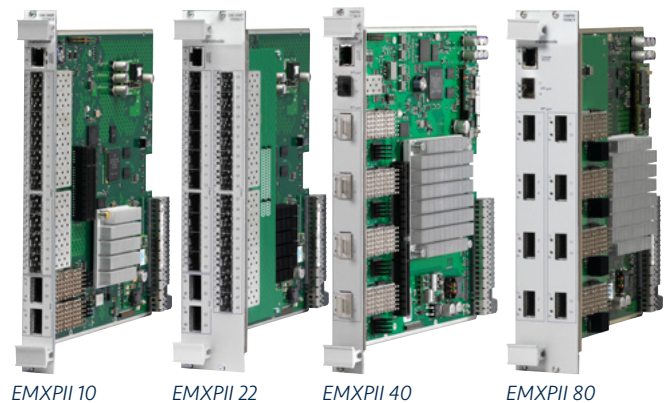
# Ethernet Muxponder II

## Delivering Ethernet services in transport networks

### Key benefits:

- Compact and cost efficient demarcation and aggregation of FE/ CbE and 10GbE LAN services
- Provides E-LINE, E-LAN or E-TREE services
- Ultra low latency and zero jitter
- Source Specific Multicast allowing efficient video distribution
- Flexible network resilience options through ring protection and point-to-point protection
- Efficient tools for implementation of flexible and robust services
- Synchronous Ethernet for efficient network synchronization
- Tunable optics on line side for maximum flexibility
- Provides seamless Layer 1 and Layer 2 integration with Ethernet services into flexible CWDM and DWDM networks
- Low Power Design ensures low total cost of ownership

The Ethernet Muxponder II (EMXP II) family is a powerful part of Transmode’s TM-Series platform. Its seamless integration of Layer 1 transport and Layer 2 Metro Ethernet functionality enables cost efficient transport of Ethernet services over flexible CWDM and DWDM networks. The units included in the EMXP II family are the EMXP II 10, the EMXP II 22, the EMXP II 40 and the EMXP II 80.



### Ethernet Transport

The EMXP II units are especially designed to deliver an optimized Ethernet transport solution. They create a Layer 2 optimized transport architecture using selective integration of Layer 2 functions. Expensive switching and routing network components can therefore be used more efficiently, providing a lower total cost of ownership for the complete network.

The following example shows how the EMXP II units can be deployed to provide transport of Ethernet traffic in a Mobile Backhaul network.

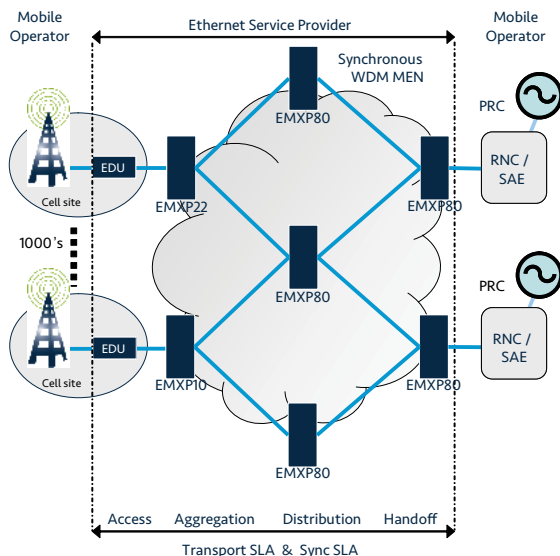


Fig. 1 EMXP units in an Ethernet Mobile Backhaul Network

### Ethernet Access

The EMXP II units provide powerful UNI and E-NNI interfaces enabling port based or fully service multiplexed E-LINE, E-LAN or E-TREE services, certified by the Metro Ethernet Forum. The EMXP offers a strong classification and policy engine to better define extended and flexible Ethernet Services and QoS classifications. The Ethernet services could be setup as fully transparent services.

There are bandwidth profiles allowing service providers to offer services using less than full port speed. Furthermore, there are point-to-point or ring protection schemes to provide carrier-class sub 50ms protection in service provider topologies.

### Service OAM

The Ethernet services provided by the EMXP II units are constantly monitored for interruption and performance. There are in-service surveillance for connectivity and measurement that are standards based and fully interoperable.

### In-band management

The EMXP II units offer standard methods for in-band management. Transmode’s Intelligent WDM (iWDM™) technology combined with the standard in-band access methods can be used for easy and flexible in-band management across the entire network.

### Quality of Service

The EMXP II units provide a flexible toolkit of traffic management features. The toolkit includes features such as strict and weighted scheduling, bandwidth profiles and shaping of min and max bandwidth. Traffic can be classified either per port (for EPL, EP-LAN and EP-Tree services) or it can be classified per VLAN for service multiplexed services (EVPL and EVP-LAN).

## Resiliency

The EMXP11 units offer various methods to provide resiliency. The simplest method is to utilize IEEE 802.3ad Link aggregation, where the dual GbE line ports are configured as protected aggregated links, providing protection switching if a fault occurs while utilizing the resources in an optimum way in normal operation. If any of the units in the EMXP 11 family are deployed in a ring topology, then ITU-T G.8032 Ethernet Ring Protection Switching also becomes an option. Protection switching is performed with carrier class sub 50 ms protection using either of these 2 protection schemes.

## Source Specific Multicast for video distribution

The EMXP11 units offer IGMPv3 and Source Specific Multicast (SSM), features that are unique in transport networks. These features allow the distribution of video traffic to be highly optimized and efficient as a destination only receives the traffic intended for it.

## Technical specifications (Valid for EMXP11 10, EMXP11 22, EMXP11 40 and EMXP11 80):

<b>Interfaces</b> EMXP11 10: 10 x GbE + 2 x 10G EMXP11 22: 22 x GbE + 2 x 10G EMXP11 40: 4 x 10G + 1GbE EMXP11 80: 8 x 10G + 1GbE	10G interfaces (XFP): <ul style="list-style-type: none"> <li>• Uncolored Multimode and Singlemode</li> <li>• CWDM up to 8 channels, DWDM up to 40 channels or Tunable XFP up to 80 channels</li> </ul> GE/FE interfaces (SFP): <ul style="list-style-type: none"> <li>• Uncolored Multimode and Singlemode</li> <li>• CWDM up to 16 channels or DWDM up to 40 channels</li> <li>• Single-strand fiber solution</li> <li>• Electrical 10/100/1000BASE-T</li> </ul>
<b>Resilience</b>	ITU-T G.8032 Ethernet Ring Protection IEEE 802.3ad Link Aggregation
<b>Ethernet Services</b>	E-LINE (EPL and EVPL) E-LAN (EP-LAN and EVP-LAN) E-TREE (EP-Tree) MEF 9+14 Certification
<b>Quality of Service</b>	Policing using bandwidth profiles Flexible Traffic Classification, e.g. based on DSCP, CoS, port and inner/outer VLAN 8 Strict priority queues / WRR queues Min and Max Shaping. WRED
<b>Latency</b>	1.9 $\mu$ s delay for all packet sizes using RFC1242 store and forward metric Frame Delay variation below 0.05 $\mu$ s
<b>Performance Monitoring &amp; OAM</b>	IEEE 802.1ag Continuity Check and Loopback Port Mirroring Management VLAN for in-band management Port isolation using Private VLAN technique
<b>Synchronous Ethernet</b>	ITU-T G.8262 Synchronous Ethernet Equipment Clocks (EEC) ITU-T G.8264 Ethernet Synchronization Messaging Channel (ESMC) ITU-T G.781 Synchronization Status Messages (SSM)
<b>Source Specific Multicast</b>	RFC4607 Source-Specific Multicast for IP RFC4541 IGMP Snooping RFC2236 IGMPv2 RFC3376 IGMPv3
<b>Switching</b>	Selectable learning enabled per VLAN 32K MAC-addresses 4,094 VLAN IDs Storm Control IEEE 802.1ad Q-in-Q SVLAN Flexible tag handling: push, pop, swap, pop-swap Super Jumbo Frames upto 10248 Bytes
<b>Power consumption (including optics)</b>	Max 30W for EMXP11 10, max 45W for EMXP11 22 , max 50W for EMXP11 40, max 65W for EMXP11 80



The specifications and information within this document are subject to change without further notice.

All statements, information and recommendations are believed to be accurate but are presented without warranty of any kind. Contact Transmode for more details.