

# XMP1-LCC

Compact network element for PDH/SDH multiplexing and Layer2 switching with high cross-connect capacity



- PDH/SDH multiplexer in a 3HU subrack
- Cross-connect capacity of up to 8064 x 8064 x 64 kbps
- Uplink with up to STM-16
- Grooming on up to STM-4 level
- Up to 252 x E1 interfaces
- Up to 36 Ethernet interfaces (Ethernet-over-PDH)
- Designed for highest availability
- Fully integrated in the SOX network management

XMP1-LCC (Large Cross-Connect) extends the XMP1 product family. The compact SDH/PDH cross-connect multiplexer unites high cross-connect capacity and a high number of interfaces in a compact 3 HU subrack. XMP1-LCC offers up to 4 x STM-1/4/16, 8 x STM-1/-4, 3 x 12 Ethernet, 252 x E1, depending on the installed cards.

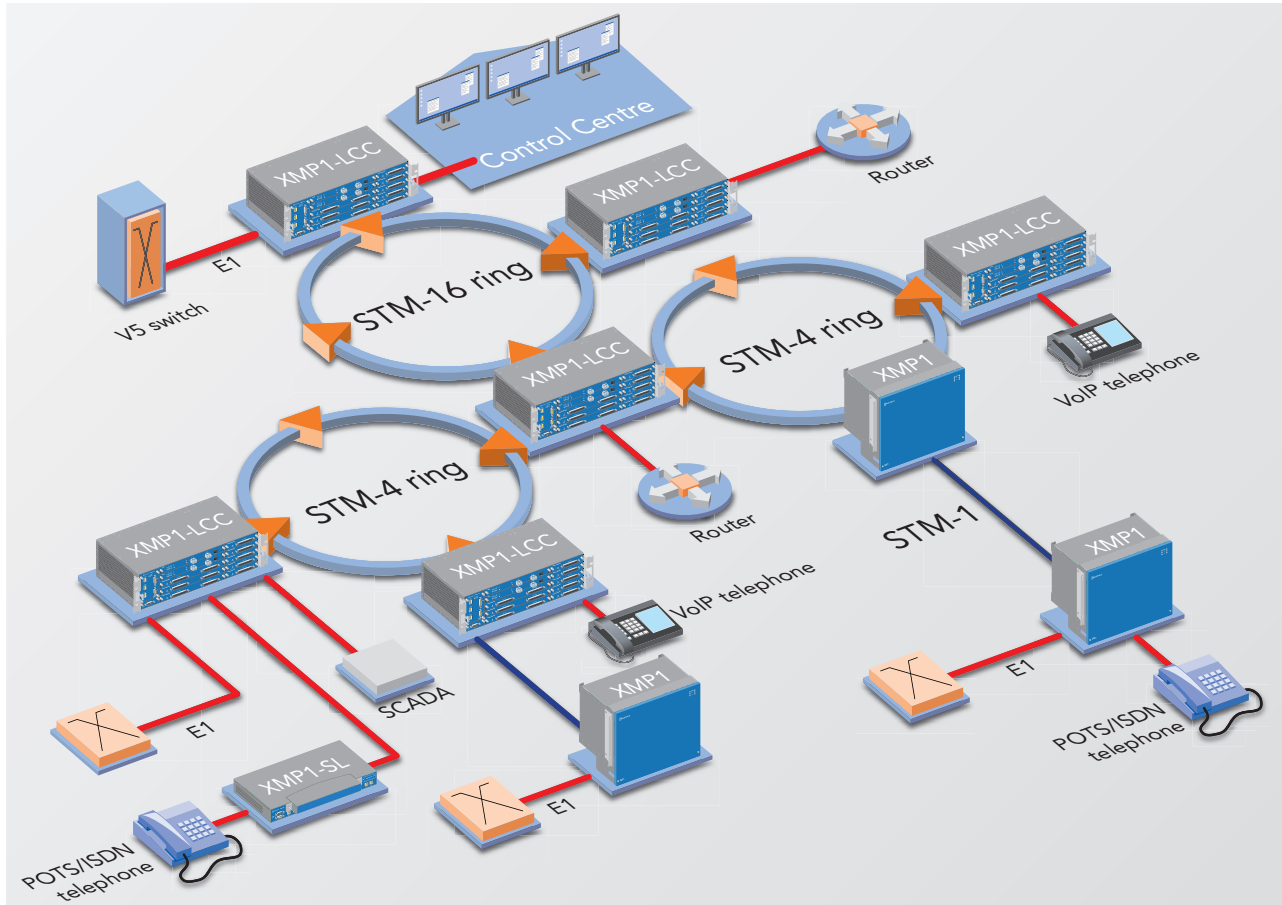
## ■ Cross-connect properties

The integrated TDM cross-connect switches the traffic on SDH level (183 x VC-4, 3024 x VC-12, 144 x VC-3) and E1 level respectively 64 kbps level (8064 x 64 kbps [252 x E1]). When switching on 64 kbps level it can be selected whether CAS signalling is to be forwarded in parallel to the payload in timeslot 16.

## ■ Application areas

The supported features, its compact design and the variety of units make XMP1-LCC suitable for a wide range of scenarios. The cross-connect capacity makes it the ideal solution for large network nodes in dedicated networks.

It is first choice also for locations where large numbers of incoming 64kbps connections have to be multiplexed or where different technologies (SDH, PDH, Ethernet, 64kbps) have to be transmitted. Ethernet interfaces can be smoothly integrated into legacy



#### Applications with XMP1-LCC

networks with its Ethernet-over-PDH functionality.

In the access area of mobile networks it is designed for grooming and consolidating of traffic via 2 Mbps connections.

#### ■ Application examples

XMP1-LCC suits best telecommunications networks operated by:

- Public transport companies (railways, waterways, motorways)

- Utilities (gas, water, electricity)

- Pipeline operators

Another speciality are:

- Transmission networks of public network operators
- Grooming and consolidation in mobile networks
- Applications in security and defence segment (e.g. air traffic control) public services (police, fire brigade, emergency services)

#### ■ Expendability

Starting with low initial investment XMP1-LCC can be adapted step by step up to its maximum capacity following increasing demand.

#### ■ Transmission reliability

The optional redundant cross-connect and control unit, decentralised power supply and redundant power feeding lead to a high reliability of 99.999%.

Similar to the other XMP1 systems, the network's availability can be increased with a variety of protection mechanisms. These are MSP, SNCP (Subnetwork Connection Protection), redundant 2 Mbps lines and 64 kbps channels. These features make XMP1-LCC ideal for the transport of mission-critical data.

#### ■ System design

The XMP1-LCC basic system consists of a compact 3 HU subrack, power feeding and an integrated connector panel. The connector panel contains the Ethernet interface for the local configuration (F interface), the Ethernet interface for connecting the network management system (Q interface), an interface for Ethernet over PDH transmission (ULAN), the T3/T4 clock interfaces as well as the alarm interface and input and output contacts (EDI interface)

#### ■ Equipment

The XMP1-LCC provides 10 slots. Two slots are reserved for the central units and 8 for interface units.

The central unit consists of a non-blocking 64 kbps cross-connect (CUL) or two STM-1/4/16 interfaces, a non-blocking VC-4/3/12 and 64 kbps cross-connect (CUS) and the control unit. To increase reliability it is possible to equip the central unit redundantly. Manual switch-over between active and passive central unit for maintenance purpose happens without bit errors. Automatic switch-over time in case of fault <50 ms.

The 8 slots for interface units can be equipped as followed

- Three 64 port 2 Mbps modules Port 2M (64)
- Three 12 port Ethernet modules Port L2P (12)
- Two 4 port STM-1/4 modules Port STM (4)
- Five 32 port 2 Mbps module Port 2M (32)

#### ■ Ethernet module

The XMP1-LCC can be equipped with up to three Port L2P (12) Ethernet modules. The module provides 12 10/100Base-T interfaces. It comes with an integrated Layer2 switch. Each Ethernet ports can be transmitted over the backbone with 31 x 64 kbps time slots (Ethernet-over-PDH) via E1 or SDH interfaces. The switch can be disabled to operate the module in point-to-point operation. The bandwidth can be configured independent for every port.

#### ■ Management

The ServiceOn XMP1 (SOX) network management system fully supports installation, configuration and monitoring of an XMP1 network and the XMP1-LCC. Integrating the XMP1-LCC into the SOX network management facilitates the setup and monitoring of end-to-end connections. SOX-LCT allows necessary local configuration. Just like XMP1, XMP1-LCC supports the connection to the network management system using the system channel in time slot 0. It is established automatically as soon as the network nodes are connected via 2 Mbps connections

## Technical Data

<b>General</b>	
Number of Slots	10
Slots for central unit with redundancy	max. 2
Slots for interface units (full width)	3
Slots for interface units (half width)	5
<b>Standards and Recommendations</b>	
Supports ITU-T recommendations	G.703, G.704, G.706, G.732, G.796, G.797, G.810, G.811, G.812, G.821, G.823, G.826
<b>System Properties</b>	
Cross-connect capacity	Up to 8064 x 8064 64 kbps time-slots (non-blocking) Capacity can be increased step by step (by software key)
SDH cross-connect capacity	183 x VC-4, 3024 x VC-12, 144 x VC-3
Redundancy/protection mechanism	Redundancy of central unit with cross-connect Redundancy for 64 kbps channel and 2 Mbps line
Clock	Clock Signal Sources: T3 input (9-pin Sub-D connector) and arbitrary E1 signal, clock priorities, configurable network wide
<b>SDH STM-1/STM-4/STM-16 – Aggregate</b>	
Bit rates	155 Mbps, 622 Mbps and 2488 Mbps
Number of ports (per unit)	2 x STM-4/STM-16 (optical) or STM-1 (optical/electrical)
Types of ports	SFP based
<b>SDH STM-1/STM-4 – Tributary</b>	
Bit rates	155 Mbps and 622 Mbps
Number of ports (per unit)	4 x STM-4 (optical) or STM-1 (optical/electrical)
Types of ports	SFP based
<b>EOW Interfaces</b>	
Engineering Order Wire	RJ11 socket
<b>E1 Application Interfaces</b>	
Number of ports (per unit)	64 or 32
E1 interfaces	E1 interfaces according to ITU-T G.703, G.704 120 Ohms symmetrical or 75 Ohms asymmetrical, max. 6 dB attenuation, CRC-4 synchronization, 160 pin Molex LFH connector
<b>Ethernet Application Interfaces (Ethernet over PDH)</b>	
Number of ports (per unit)	12 x 10/100BaseT (RJ45 connectors)
WAN transmission	Via HDLC encapsulation,
Bandwidth	n x 64 kbps, n = 1 ... 31
Frame size	Max. 1532 Bytes
Layer 2 switch	24 port VLAN switch Double tagging supported Point-to-point operation
<b>Dimensions (W x D x H) and Weight</b>	
XMP1-LCC	132 mm x 440 mm x 240 mm, 7.5 kg
<b>Power supply</b>	
Input voltage nominal (min/max)	-48/-60 V DC (-36 VDC ... -75 VDC)
Plug	3 pin Sub-D connector or 2 x 2 pin Plug connector
<b>Management</b>	
SOX (ServiceOn XMP1)	For local and central management
Management channel	64 kbps in-band management channel DCN connection in time slot 0 (XMP1 system channel)
<b>Operation environment</b>	
Operating temperature	-5 °C ... +55 °C
Humidity	According class 3.2, up to 95 %, no condensation



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