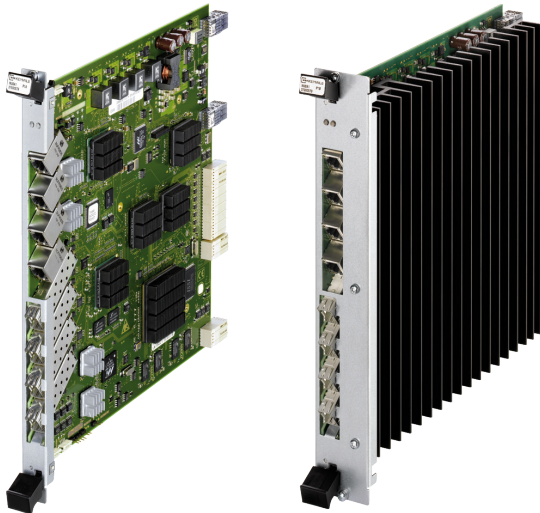


XMC20 NUSA1

Mission-critical-grade TDM and Ethernet/IP services over SDH networks



The XMC20 SDH STM-16 unit NUSA1 offers the ability to transport TDM and Ethernet services via SDH STM-16, STM-4, or STM-1 from the XMC20 platform. NUSA1 enables the smooth migration from SDH networks to pure Ethernet networks in one subrack. NUSA1 also allows the coexistence of both types of transport technologies simultaneously.

01 NUSA1 and NUSA1-F (right) for fanless operation

- Interfaces
 - 2 x SDH STM-16/STM-4
 - 2 x SDH STM-4/STM-1
 - 4 x 10/100/1000BaseT
- PDH/SDH mapping/ demapping for
 - 2 Mbps unframed
 - 2 Mbps framed
 - n x 64 kbps
- Ethernet-over-SDH (EoS)
- Layer 2 switching
- ERPS for protection switching in Ethernet/SDH-rings (Supported only in System Release R4)
- SDH/PDH protection (MSP, SNCP)
- 1+1 equipment protection
- Fanless operation possible

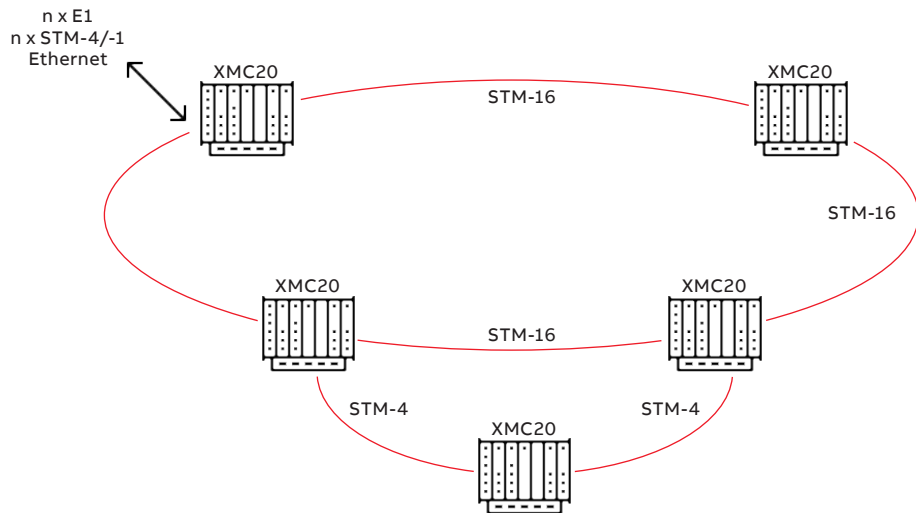
Overview

NUSA1 can be fitted in the subracks XMC25, XMC23 and XMC22. NUSA1 provides SDH and Ethernet interfaces on the front of the unit. It has access to the traffic of the TDM bus as well as to the GbE/10 GbE star of the backplane. NUSA1's access to the

TDM backplane allows the transport of TDM traffic from any TDM interface installed in the XMC20 subrack. This includes SHDSL TDM lines, E1 and V/X interfaces as well as legacy voice services. NUSA1 is available in a 1-slot wide fan-based and a 2-slot wide fan-less variant.

Ethernet-over-SDH (EoS)

NUSA1 can transport Ethernet traffic via an SDH network with its Ethernet-over-SDH functionality. The Ethernet data can be supplied via the front ports of the unit or the backplane. Hence, data from installed Ethernet cards can be processed as well as data from the core unit COGE5. Beside the Layer 2 switching operational mode, the front ports can be configured for a direct point-to-point connection mode, to ensure the availability of the required bandwidth.



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01 Application with NUSA1

Supported topologies

The unit allows the realization of various SDH transport topologies:

- Ring networks, including multiple ring connections on one XMC20
- Linear networks
- Star networks
- Meshed networks

Protection functions

The NUSA1 provides a set of functions which guarantees the highest equipment service availability through the support of traffic and equipment protection mechanisms:

- Multiplex Section Protection (MSP)
- Subnetwork Connection Protection (SNCP)
- 1+1 equipment protection
- Synchronous Equipment Timing Source (SETS) protection
- Ethernet-over-SDH providing Link Capacity Adjustment Scheme (LCAS)

Chassis switch architecture

NUSA1 is part of XMC20's chassis switching architecture. This means that XMC20 is one switch

with one IP address and an expandable number of ports. Every installed Ethernet card will expand the switch. With it the access node can be adapted to the local demands.

ERPS for protection switching

NUSA1 supports Ethernet Ring Protection Switching (ERPS) for rapid restoration within Ethernet/SDH networks in ring topologies.

ERPS compliance with ITU-T G.8032v2 allows ring interconnections supporting major/subring configurations and multiple ERP instances (or multiple logical rings).

Safety concept

XMC20 offers highest reliability and quality. For this purpose all modules come with an on-board power supply and high MTBF values.

Management

All services are managed centrally via the management system UNEM or via the local craft terminal ECST.

Technical Data

General	
VC cross connects	High order: 123x123 VC-4 Low order: 48 x 48 VC-3, 1261x1261 VC-12
Multiplex Section Protection (MSP)	1+1 unidirectional and bidirectional
Traffic protection	Subnetwork Connection Protection (SNCP)
Equipment protection	1+1 EQP, with 2 units via the backplane
Performance monitoring	According to G.826
Synchronisation	SETS according ITU-T G.813
Access to TDM bus	64 terminated/transparent 2 Mbps channels, n x 64 kbps with grooming
Ethernet switching	Onboard 10 Gbps VLAN-aware Layer2 switch
VLAN services	Customer bridging acc. to IEEE 802.1Q-2011, 4096 VLANs supported Port-based customer VLAN tunnelling (Q-in-Q) Port-/PCP-/DSCP-based classification (CoS) of ingress traffic with eight priority queues Maximum frame length of up to 9'216 bytes (Jumbo frames)
Port Security	Ingress storm control (flood control, flood rate limiting) RSTP (Rapid Spanning Tree Protocol), acc. to IEEE 802.1D-2004 MSTP (Multiple Spanning Tree Protocol), acc. IEEE 802.1Q-2011-(Supported only in System Release R4)
Spanning Tree Protocols	
ERPS	Ethernet Ring Protection Switching (ERPS), acc. to ITU-T G.8032v2, supporting up to 12 ERP instances
Remote management	Via DCC-channel (MSOH and/or RSOH), OSPF routing on COGE5
SDH Network Interfaces	
Bit rate	2.5 Gbps (STM-16), 622 Mbps (STM-4), or 155 Mbps (STM-1)
Number of ports (single unit)	2 x STM-16/STM-4 and 2 x STM-4/STM-1
Number of ports (EQP-pair, two units)	4 x STM-16/STM-4 and 4 x STM-4/STM-1
Port types (optical and electrical)	SFP-based
Ethernet-over-SDH (EoS)	
Framing procedure	GFP according to ITU-T G.7041
Virtual concatenation (VCAT)	According to ITU-T G.707
Link Capacity Adjustment (LCAS)	According to ITU-T G.7042
Number of EoS channels	Up to 32
Total bitrate (all EoS channels)	Up to 2 Gbps
Ethernet Interfaces	
Interfaces (connectors)	4 x 10/100/1000BaseT (RJ45)
Mode of operation	EoS and GbE point-to-point and switched operation
Management	
ECST	For local management and offline configuration
UNEM	For central management
Power Supply	
Input voltage nominal (min/max)	-48/-60 V DC (-39.5 V DC ... -72 V DC)
Operation Environment	
Temperature range and humidity	According to XMC20 environmental specifications