

## FOX615 SAMO2

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



Mission critical networks are often still based on SDH technology. FOX615 with the SDH SAMO2 interface card allows building up of entire SDH networks. SAMO2 offers the ability to transport TDM and Ethernet services via SDH STM-16, STM-4, or STM-1 offering communication channel performance required by the most critical applications.

01 SAMO2

The hybrid design of FOX615, where SAMO2 provides the SDH uplink ports, enables the smooth migration from SDH networks to pure packet switched without exchange of hardware by allowing the coexistence of both types of transport technologies simultaneously.

### Main characteristics

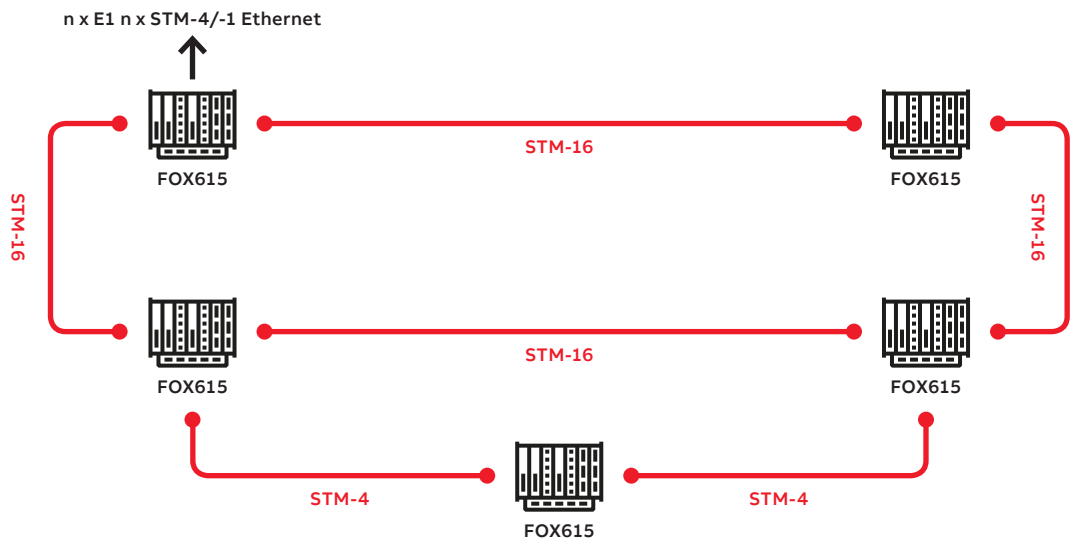
- Interfaces:
  - 2 x SDH STM-16/STM-4
  - 2 x SDH STM-4/STM-1
  - 4 x 10/100/1000BaseT
- PDH/SDH mapping/ demapping for:
  - 2 Mbps unframed
  - 2 Mbps framed
  - n x 64 kbps
- Ethernet-over-SDH (EoS)
- Layer 2 switching
- ERPS for protection switching in Ethernet/SDH-rings (Supported only in System Release R1)
- SDH/PDH protection (MSP, SNCP)
- 1+1 equipment protection
- Fanless operation possible
- Interoperability with FOX515 SYN4E as well as NEBRO for EoS

### Overview

SAMO2 can be fitted in the subracks FOX615 and FOX612. SAMO2 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. SAMO2's access to the TDM backplane allows the transport of TDM traffic from any TDM interface installed in the FOX615 subrack. This includes SHDSL TDM lines, E1 as well as legacy voice services. SAMO2 is available in a 1-slot wide fan-based and a 2-slot wide fan-less variant.

### Ethernet-over-SDH (EoS)

SAMO2 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 CESMx. 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.



### Supported topologies

The unit allows the realization of various SDH transport topologies:

- Ring networks, including multiple ring connections on one FOX615
- Linear networks
- Star networks
- Meshed networks

### Protection functions

The SAMO2 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

SAMO2 is part of FOX615's chassis switching architecture. This means that FOX615 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

SAMO2 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

FOX615 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 FOXMAN-UN or via the local craft terminal FOXCST.

## Technical Data

<b>General</b>	
VC cross connects	High order: 125x125 VC-4 Low order: 48 x 48 VC-3, 1309x1309 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)
Spanning Tree Protocols	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 R1)
ERPS	Ethernet Ring Protection Switching (ERPS), acc. to ITU-T G.8032v2, supporting up to 12 ERP instances (Supported only in System Release R1)
Remote management	Via DCC-channel (MSOH and/or RSOH), OSPF routing on COGE5
<b>SDH Network Interfaces</b>	
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
<b>Ethernet-over-SDH (EoS)</b>	
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
<b>Ethernet Interfaces</b>	
Interfaces (connectors)	4 x 10/100/1000BaseT (RJ45)
Mode of operation	EoS and GbE point-to-point and switched operation
<b>Management</b>	
FOXCST	For local management and offline configuration
FOXMAN-UN	For central management
<b>Power Supply</b>	
Input voltage nominal (min/max)	-48/-60 V DC (-39.5 V DC ... -72 V DC)
<b>Operation Environment</b>	
Temperature range and humidity	According to FOX615 environmental specifications