FOX515H complements ABBs FOX-portfolio as a high-end Next Generation Utility Multiplexer. It covers the full TDM-connectivity range from E1 up to multiple STM-64 interfaces. In addition, FOX515H provides strong Ethernet over SDH features.

FOX515H can be configured for full hardware redundancy and the network element supports various SDH-traffic protection schemes including 2/4-fibre MS-SPRing. EoS features are implemented based on GFP including LCAS and VCAT.

All optical ports are XFP / SFP based and most of them support multirate configuration. Fully integrated and managed boosters and preamplifiers allow implementing highly flexible and reliable long haul connections without additional external devices.

Like all other FOX family members, FOX515H is fully type-tested for Utility applications and integrates seamlessly into ABB’s Network management solutions.
FOX515H is a member of ABB’s comprehensive FOX-family of utility proven communication solutions. FOX515H is positioned as high-end Next Generation backbone multiplexer complementing the portfolio of FOX access multiplexers like:

- FOX515: Powerful Utility Access-MUX with trunk-capacity up to STM-4 providing a wide range of user interfaces for legacy, data and voice. Integrated teleprotection and C37.94 functionalities are just a few of its utility specific features.
- FOX505: Smart and space-efficient Utility Access-MUX with trunk-capacity up to STM-1 and the full range of user interfaces required for typical utility applications. FOX505 provides along with traditional services a rich set of LAN-features including TDM-circuit emulation over LAN.

FOX515H is a highly scalable device, which allows growing backbone capacities from STM-1 up to STM-64 for the transport of TDM- as well as of Ethernet-traffic. This very compact FOX-device (9U high only) provides extensive protection mechanisms such as HW-protection for MPU and tributaries (two groups 1:N, N=1-5) and the full set of traffic protection methods like MSP, SNCP and/or 2 / 4-fiber MS-SPring for SDH-connections.

The robust mechanical and EMC-design including the distributed power supply concept of FOX515H are optimized to cope with harsh environments typical for utility applications. The mechanical, electrical and EMC / safety performance of FOX515H is fully type-tested by an independent, certified Swiss Test-lab.

Most interfaces are provided with multirate SFP/XFP cages enabling each individual port to have a different configuration with a wide variety of optical wave-lengths for WDM, connectors and available ranges. The integrated space-optimized optical boosters and amplifiers meet the frequent utility requirement for long, repeater less spans.

FOX515H offers various types of Main Processing Units (MPUs), comprising the system-controller, the clock & synchronization functionality and a non-blocking cross-connect (DXC). For efficient network design and traffic grooming, the DXC even allows to cross-connect at DS0 (64kbps) level. If equipped redundantly, the hot swappable MPU’s work in main/ standby protection mode.

Flexible Network Management
As provider of turn-key communication solutions for utility networks, ABB knows about the importance of flexible Network Management System (NMS) solutions. Lean on-site management as well as integration of a variety of different communication devices of a utility network into an overall solution is key. With its NMS-suite (FOXMAN / FOXView) and WEB-based management approaches, all NMS requirements can be covered in a modular, customer-friendly way. Management not only addresses fibre optic equipment but also ABB’s comprehensive range of PLC, Radio and Data-Switch solutions.

Element specific management tasks can be performed either with functionality embedded in the overall NMS or by using the integrated secure WEB-server of FOX515H and a standard WEB-browser. Both methods provide full management capabilities.

In the shelf-view, individual objects (ports, status indicators etc) can be clicked to retrieve additional information or to configure features of the concerned item.

NMS example of Network comprising FOX515, FOX515H and ETL600 PLC-equipment

NMS Shelf-view example of FOX515H
Technical data

FOX515H MPU types

DXC8G*-2 is DXC with HO/ LO cross connect capacity equivalent to 8G/8G (48xVC-4/ 144xVC-3/ 3024xVC-12), embedded DS0 (64 Kbit/s) cross connect matrix with 384xE1 equivalent capacity, two SFP based STM-1/4 configurable ports.

DXC40G* is DXC with HO/ LO cross connect capacity equivalent to 40G/ 40G (256xVC-4/ 768xVC-3/ 16128xVC-12), embedded DS0 (64 Kbit/s) cross connect matrix with 1008xE1 equivalent capacity.

DXC80G* is DXC with HO/ LO cross connect capacity equivalent to 80G/ 10G (512xVC-4/ 192xVC-3/ 4032xVC-12)

*All MPU cards support hot standby

FOX515H Interface Cards

TM-STM64 is STM-64 XFP interface card with one port (S-64.1, L-64.2, X-64.2)

TM-STM64 OP is STM-64 XFP interface card with one port and one integrated optical booster

TM-2STM16 is STM-16 SFP interface card with two ports (S-16.1, L-16.1, L-16.2)

TM-2STM16 OP is STM-16 SFP interface card with two ports and one integrated optical booster

TM-2STM16 2OP is STM-16 SFP interface card with two ports and two integrated optical boosters

TM-4STM4 is STM-4 SFP interface card with four ports (S-4.1, L-4.1, L-4.2, X-4.2)

TM-8STM1 is STM-1 SFP interface card with eight ports (S-1.1, L-1.1, L-1.2, X-1.2)

TM-3E3T3 is interface card with three E3/T3 (34/45 Mbit/s) coaxial ports with BNC connector

TM-32E1 is interface card with 32x E1 (2.048 Mbit/s) 120 Ohms) ports with EPS support

TM-63E1 is interface card with 63x E1 (2.048 Mbit/s 120 Ohms) ports with EPS support

TM-GBE155 is interface card with one GBE combo port 10Base-T/ 100Base-Tx/ 1000Base-X, SX, LX and eight electrical FE 10Base-T/ 100Base-Tx ports. GFP/ VCAT/ LCAS, QinQ, DSCP, Flow Control, etc.

TM-2GBE is interface card with two GBE SFP ports (1000Base-X/ SX/ LX), two electrical GBE and six electrical FE ports (10Base-T/ 100Base-Tx), GFP/ VCAT/ LCAS, L1 Transparent Bridge/ L2 Switch, VLAN, QinQ, STP/ RSTP, EAPS, Link Aggregation, IP Precedence, Policing, Traffic sharding, Jumbo Frames, etc.

TM-8GBE is interface card with eight GBE SFP ports (100Base-T/ 100Base-Tx/ 1000Base-X/ SX/ LX), GFP/ VCAT/ LCAS, L1 Transparent Bridge/ L2 Switch, VLAN, QinQ, STP/ RSTP/ MSTP, EAPS, Link Aggregation, IP Precedence, Policing, Traffic sharding, Jumbo Frames, etc.

FOX515H Special Cards

OP-Boost is optical booster sub-module with max. output power +15 dBm (fits into OP-Frame)

OP-Preamp is optical preamplifier sub-module with min. receiver sensitivity -32 dBm (fits into OP-Frame)

OP-Comp is passive Dispersion compensation sub-module (fits into OP-Frame)

OP-Frame is framework occupying one equipment slot. Can be equipped with up to two OP-Boost/ OP-Preamp/ OP-Comp sub-modules

MM-HK is miscellaneous interface card with Alarms 8xIn/ 4xOut, V.11 & RS232 service interfaces, EOW interface with selective calls and DTMF signaling

Chassis

9U high with 16+ slots
400x480x272 mm (H x W x D)
Distributed, redundant -48/ 60 VDC power concept

Synchronization
Input STM-n, E1 (2,048 Mbit/s), 2 MHz
Output 2 MHz

Mechanical tests
IEC60721-3-2
IEC60721-3-3

Emission tests
EN61000-6-4
EN55022

Immunity tests
EN61000-6-2 and utility specific tests

Safety tests
EN60950-1 and EN60255-5

Climatic tests
IEC60721-3-3

Operation:
ETSI EN 300019-1-3 class 3.2 E
Temperature -5° to 45°C / 55°C
Humidity 95% r. h. (non condensation)

Transport:
ETSI EN 300019-1-1 class 2.2
Temperature -25° to +70°C

Storage:
ETSI EN 300019-1-1 class 2.2
Temperature -25° to +70°C
Abbreviations

E1 2Mbit/s signal according to ITU-T G.703 / G.704
EMC Electromagnetic Compatibility
EoS Ethernet over SDH
EPS Equipment Protection Switching
Gb Gigabit (Gbit/s)
GFP Generic Framing Procedure ITU-T G.7041
TCP/IP Transmission Control Protocol / Internet Protocol
LAN Local Area Network; Today mostly based on Ethernet
LCAS Link Capacity Adjustment Scheme according to ITU-T G.7042
MPU Main Processing Unit
NMS Network Management System
OSPF Open Shortest Path First: Dynamic Routing Protocol
PDH Plesiochronous Digital Hierarchy: multiplexing hierarchy based on 64kbit/s
PLC Power Line Carrier
SDH Synchronous Digital Hierarchy: Multiplexing hierarchy based on 155Mbit/s
SFP/XFP Small-factor pluggable unit: Pluggable unit containing complete electrical/optical signal interfaces
STM-n Synchronous Transport Module, level n: STM-1, STM-4, STM-16, STM-64
TDM Time Division Multiplexing (e.g. PDH or SDH technology)
VCAT Virtual Concatenation (of SDH transport containers)
WDM Wavelength Division Multiplexing

Communication solutions for utilities

The FOX-Family of equipment forms an important part of ABB's comprehensive range of solutions for Utility Communications. As a turnkey provider, ABB has answers to all kind of communication requirements. The following list summarizes the portfolio, which complements the FOX-family in a perfect way.

Optical communication for long distances

As spans in utility networks tend to be much longer than in public telecom networks, ABB provides specific solutions for long haul solutions to extend FOX-links repeaterless to more than 300 km.

Power Line Carrier

ABB's combined analogue / digital Power Line Carrier solutions are based on the ETL500 / 600 product family. ETL600 reaches so far unseen transmission rates and self-adapting speed- & multiplexing features to obtain optimized transmission capacities.

Teleprotection systems

ABB's NSD-family has a long tradition of stand-alone teleprotection devices. The latest generation of NSD570 provides highly reliable protection signaling over a wide choice of media (dedicated fiber, analogue / digital interfaces).

Voice systems solutions

To cover the requirements for traditional analogue or up-coming IP-based telephony-services, ABB works closely with selected partners and adds utility specific voice-communication features to the overall solution.

Wireless solutions

Where no fibers can be installed due to missing rights of way or topographic reasons, ABB can provide microwave, VHF/UHF radio, cellular and satellite solutions, tailored to the local situation and available frequencies.

In-Plant communications

In-Plant communications refer to the applications and technologies used internally in a substation or a power plant. It includes video, public addressing systems, local radio, access control, intruders detection and similar services. The FOX platform enables not only the integration between them but also the connection to the out-plant systems and allows the remote access, a key functionality in the modern utility.