Utility Communications
ETER1 for FOX515/512
L2/L3 Ethernet aggregation unit

Driven by the IEC 60870-5-104 SCADA protocol and other Ethernet based communication such as energy metering, enhanced Ethernet / IP functionality on the FOX515 utility communication equipment is required. To cover such needs, the FOX515 platform has been extended by the module ETER1. It allows to transmit operational data, such as SCADA data via Ethernet networks and provides at the same time the possibility to separate the SCADA data from non operational data on the SDH wide area network.

ETER1 enables the FOX515 platform to aggregate Ethernet traffic, using the implemented Layer 2 and Layer 3 functionality. ETER1 includes enhanced features for utility environment to grant highest availability figures for operational Ethernet networks. With ETER1, the FOX515 platform improves already supported Ethernet aggregation Layer 2 and Layer 3 functionality significantly. The module enables larger bandwidth for Ethernet services, as well as enhanced performance and traffic separation.

ETER1 at a glance
- 4 x electrical 10/100 BaseT ports
- VLAN aware Layer 2 switching including RSTP
- Layer 3 routing including OSPF, RIPv2 and static routing
- Hardware redundancy using VRRP
- Multiple bridge instances
- 8 x E1 (16 x E1) trunk capacity
- Bundling of several 2 Mbps channels to a single logical channel using Multi-Link Point-to-Point Protocol (MLPPP)

TDM protection mechanisms like 1+1 path protection and Sub-Network Connection Protection (SNCP) are supported in the unit in order to make it compatible with protection mechanisms in existing networks.

PPP and HDLC termination
The ETER1 unit terminates PPP encapsulated traffic from the units DATAx, LAWA4 and LEMU6; as well as HDLC encapsulated traffic from DTM-M. The traffic terminated from these units can then be switched or routed using ETER1.

Switching functionality
ETER1 provides switching functionality towards the backplane for Ethernet traffic services from other FOX515 units or from any of its front ports.

ETER1 allows the creation of various independent bridge instances with VLAN support, therefore allowing the creation of completely separated L2 networks using only one module in the FOX515. The multiple bridge instances allow full separation of traffic into different TDM channels. Rapid Spanning Tree Protocol (RSTP) is supported on each of the bridge instances.

Routing functionality
Besides the above mentioned L2 functionality ETER1 provides also layer 3 routing functionality with support of OSPF and RIPv2 routing protocols. This allows to build routed IP networks with the FOX515 platform as well as interconnection to external routed networks using the OSPF protocol.

Virtual Router Redundancy Protocol (VRRP) is implemented to provide hardware redundancy of the L3 routing functionality. This is especially required to provide highest availability figures for the default gateway servicing hosts on the same subnet. Some of the main applications with ETER1 are:
- Aggregation of local Ethernet traffic from other FOX515 units: DATAx, LAWA4
- Aggregation of remote Ethernet service provided over xDSL: STICx - DTM-M, and LEMU6 - MUSIC100.
- Transport of n x 2 Mbps Ethernet services over PDH or SDH channels using MLPPP
- Creation of Ethernet L2 and L3 networks transported over PDH or SDH.

Management System
The FOX515 management and the variety of services are administered centrally by UCST/FOXMAN management system. Operators save cost and accelerate the provisioning process with only one element manager for all service types.
Technical data

General
Number of ports | 4 x 10/100 BaseT
Backplane | 64 x TDM backplane access with a total capacity of 8 x P12 (16 x P12)
UCST version | R8C SP03 or higher

Supported Standards
Protection | 1+1 path protection, SNCP

Layer 2 Features
PPP | RFC 3518
MLPPP | RFC 1990
HDLC | DTM-M compatible
VLAN support | VLAN tagging (IEEE 802.1 Q), port based VLAN
Spanning tree | RSTP (IEEE 802.1 w)
QoS | Packet classification and marking, fixed priority based

Layer 3 Features
Routing (available on ETER1 Release 2) | OSPF v2 (RFC 2328), Static routing
Redundancy | VRRP (RFC 2338)

Management
UCST | For local management
FOXMAN management system | For central management

Power Supply
Input voltage nominal (min/max) | -48/-60 VDC (-40.5 VDC ... -72 VDC)

Operation Environment
Temperature range and humidity | According to FOX515 environmental specifications

Separated bridging instance and channel for each service

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List of abbreviations
IP | Internet Protocol
OSPF | Open Shortest Path First
PDH | Plesiochronous Digital Hierarchy
PPP | Point to Point Protocol
RIPv2 | Routing Information Protocol
SDH | Synchronous Digital Hierarchy
TDM | Time Division Multiplexing
VLAN | Virtual LAN
VRRP | Virtual Router Redundancy Protocol