

UMUX SDH Family of Plug-in Units

One solution for cost-effective delivery of reliable, flexible, secure, and managed SDH services



- Field proven protection and resilience
- Narrowband to broadband access and SDH transport
- Smooth and incremental upgrade path
- Wide range of optical interfaces
- Ethernet over SDH support
- Comprehensive management

UMUX in SDH networks

The UMUX SDH family of plug-in units offers scaleable and cost-effective delivery of reliable, flexible, secure, and managed services. Together with the UMUX platform's multi-service capability and extensive interworking functionality the SDH family enables operators to offer high revenue generating services, such as, voice and private circuits plus multimedia broadband and Ethernet whilst conserving capital and operational expenses.

■ All in one offering

All UMUX subracks are 'SDH ready' through a 'broadband bus' on the backplane. This enables the deployment of optical and electrical aggregate interfaces up to SDH-STM-4, as well as a wide variety of tributary interfaces from 2 Mbps to SDH STM-1 optical plus EoS (Ethernet over SDH) functionality all within the same UMUX subrack.

■ Carrier grade solution

The UMUX is hardened for outdoor applications and features redundant power supply and control cards to ensure a carrier grade product. The SDH family further enforces this aspect and guarantees the highest equipment service availability through the support of recognised traffic and equipment protection standards:

- Multiplex Section Protection (MSP)
- Sub-Network Connection Protection (SNCP)

- ❑ Linear Trail Protection (LTP)
- ❑ 1+1 Equipment Protection (EQP)
- ❑ Synchronous Equipment Timing
- ❑ Source (SETS) Protection
- ❑ EoS providing Link Capacity
- ❑ Adjustment Scheme (LCAS)

■ Seamless migration

Each UMUX network element is upgradeable to SDH operation. Moreover, the same platform provides smooth migration to Next Generation Networks with IP centric technology such as Voice over IP (VoIP).

■ One management system

The management of the SDH STM-1/4 family and other functions is an integral part of the UCST/UNEM management system.

This enables operators to operate in a familiar environment and accelerates the provisioning process. The optional UNEM Networking Packaging provides further support through automatic trail management.

■ Standard compliant

By means of fully standard interfaces and functions, the UMUX assures compatibility with other elements of the operator's network. KEYMILE also offers higher order SDH STM products and support for coloured laser support for Coarse Wavelength Division Multiplexing (CWDM) networks.

■ Product overview

The SDH functionalities available on the UMUX are:

- ❑ Optical STM-4 and STM-1 interface module with EoS functionality – SYN4E
- ❑ Optical or electrical STM-1 interface module – SYNUF
- ❑ Optical STM-1 tributary interface module – SYNOT
- ❑ EoS interface modules – NEBRO/NEBRA
- ❑ 2 Mbps interface units (VC-12) – SYNAM/SYNAD
- ❑ 34/45 Mbps interface module (VC-3) – SYTEL
- ❑ 2 Mbps to VC-12 mapping unit – SYNAC
- ❑ TU-12 mapping unit – SYNVA

Furthermore, UMUX 1500 features two distinct SDH buses from which it is possible to deploy separate and independent SDH functionalities from within the same subrack.

SYN4E: Provides 2 optical STM-4 and 2 optical or electrical STM-1 transmission interfaces (aggregates) plus 4 x Ethernet ports supporting EoS incorporating GFP, VCAT on VC-12 and VC-3 level, and LCAS. It is used for the implementation of terminal or add/drop multiplexer functionality. Multiplex Section Protection (MSP) and 1+1 Equipment Protection are supported. SFP modules allow a wide range of optical and electrical interfaces. The SYN4E can also be used in conjunction with higher order SDH equipment (STM-16 to STM-64).

Additionally, SYN4E provides termination of four VC-12 signals and mapping of 2 Mbps into VC-12 between the system buses of UMUX.

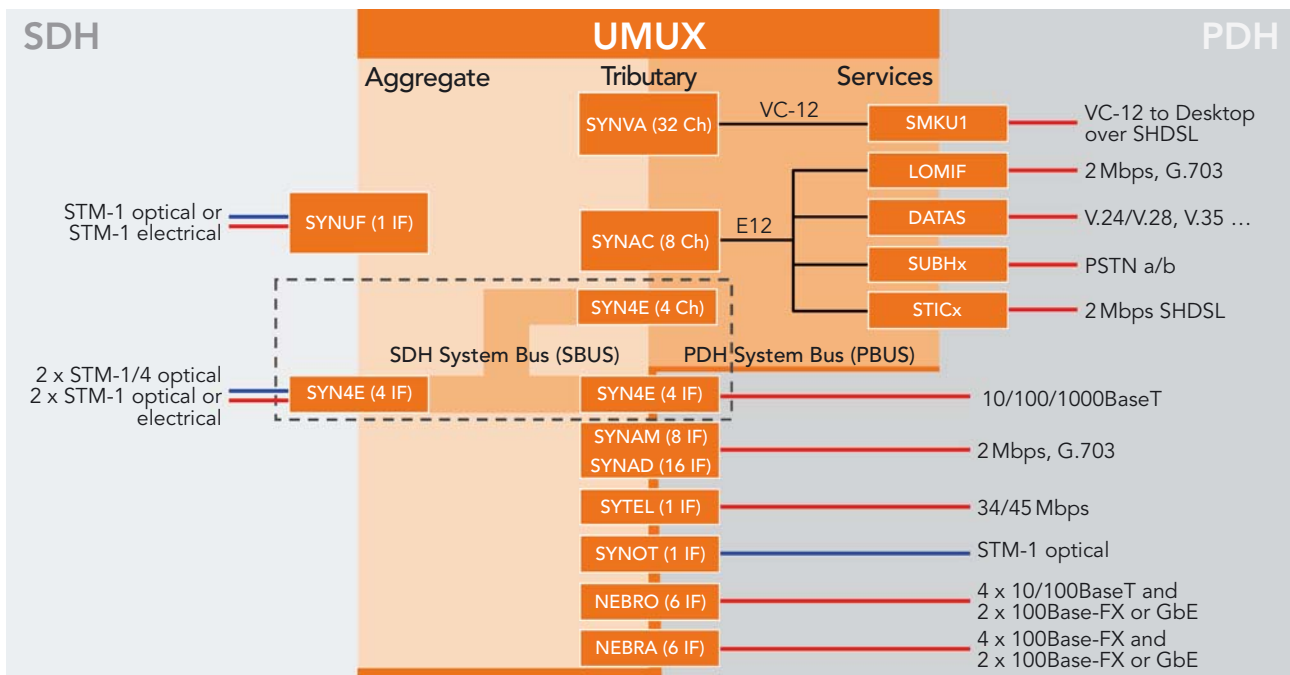
SYNUF: Provides one optical or one electrical STM-1 transmission interface (aggregate). It is used for the implementation of terminal or add/drop multiplexer functionality. Multiplex Section Protection (MSP) and 1+1 Equipment Protection are supported. SFP modules allow a wide range of optical and electrical interfaces plus support for CWDM coloured laser. The SYNUF can also be used in conjunction with higher order SDH equipment (STM-4 to STM-64).

SYNOT: The tributary interface module provides one optical STM-1 transmission interface. It terminates the VC-4 signal and connects the related VC-12 and VC-3 signals on to the SDH system bus. SYNOT is typically used in fibre to the business network scenarios or in STM-1 peripheral collector ring head-end stations for the interfacing with higher order SDH equipment.

NEBRO/NEBRA: The modules provide the transport of Ethernet signals (e.g. private line and LAN) over SDH networks based on the EoS standard suite incorporating GFP, VCAT on VC-12 and VC-3 level and LCAS. In addition to the standard SDH protection mechanisms, LCAS resiliency feature and Rapid Spanning Tree Protocol can be used.

Furthermore, NEBRO offers on-board Ethernet switching, full VLAN 802.1Q support, VLAN tag stacking and Class of Service (CoS) based on 802.1p. The modules provide six Ethernet interfaces (electrical/optical SFP based).

SYNAM/SYNAD: The tributary interface modules provide eight/sixteen 2 Mbps electrical interfaces which are mapped to VC-12. The unit provides path protection at the VC-12 level. It is



UMUX SDH architecture

mainly used to cross connect 2 Mbps signals in leased line applications.

SYTEL: The tributary interface module provides one 34 Mbps or one 45 Mbps electrical interface. The unit features path protection at the VC-3 level and is mainly used for the backhauling of traffic from peripheral units e.g. an ATM switch.

SYNAC: The tributary unit provides termination of eight VC-12 signals and mapping of 2 Mbps into VC-12 between the system buses of UMUX. As such, it does not feature external interfaces. The unit provides path protection at the VC-12 level.

SYNVA: The tributary mapping unit provides termination of 32 TU-12 signals and connections of the related VC-12 into the PDH system bus for further cross connection. It does not feature external interfaces. SYNVA is mainly used as a "VC-12 relay" for "VC-12 to the desktop".

Network applications

The primary applications of UMUX in SDH networks are where service providers need maximum flexibility and manageability to achieve cost containment, reliability and bandwidth management for a wide variety of different services.

A huge variety of different circuit and packet applications can be supported from the UMUX. These include private lines, POTS, primary rate ISDN, LAN-LAN, WAN, VPN, mobile base station links etc. To meet these demands a variety of private and public networking applications and architectures are supported. Two are described below.

Terminal Multiplexer/Add-Drop Multiplexer: The UMUX can be configured as a head-end Terminal Multiplexer (TM) in either a point-to-point or SDH STM-1/4 ring application. Connections can be duplicated and protected with EQP and 1+1 MSP thus offering a highly reliable equipment. Through the selection of a

CWDM colour, compatible SFP transceiver the TM can access CWDM networks. SYNAC unit(s) would provide access to the various voice and data interfaces. Configuring two optical aggregate units as east and westbound interfaces, the UMUX can be used as a SDH Add-Drop Multiplexer (ADM).

Ethernet-over-SDH: Through the use of the Ethernet ports in SYN4E and NEBRO/NEBRA unit, the UMUX provides the reliable base for the economical rollout of Ethernet services. Thus, existing SDH networks can be leveraged for new services.

These applications are fully managed by our easy-to-use NMS, called UNEM, which provides comprehensive element, network and service management across entire networks that could consist of hundreds of UMUX network elements.

To find out more about this product, please contact KEYMILE.

Technical Data

All modules	
Performance monitoring	According to G.826
Module width (4 TE = 20.32 mm)	1
SYN4E	
SDH STM-4 (opt.) and SDH STM-1 (opt./elec.) interface unit + 4 x Ethernet	
Bit rate	622 Mbps or 155.52 Mbps \pm 4.6 ppm
Number of ports	2 x STM-4, 2 x STM-1 and 4 x Ethernet
Port types	SFP-based STM-4/1 transceiver supporting S-4/1.1, L-4/1.1, L-4/1.2, X-4/1.2
Multiplex Section Protection (MSP)	1+1 unidirectional and bi-directional
Equipment Protection	1+1 EQP, by using SNCP
Front connector type	4 x RJ-45, 4 x SFP cage (2 x STM-4/1 and 2 x STM-1)
SYNUF	
SDH STM-1 optical or electrical interface unit	
ITU-T recommendations	G.702, G.703, G.707, G.783, G.803, G.805 (optical only), G.813 (electrical only), G.841, G.957, G.958
Bit rate (Number of Ports)	155.52 Mbps \pm 4.6 ppm (1)
Electrical impedance	75 ohms asymmetrical
Port types	SFP-based STM-1 transceiver supporting S-1.1, L-1.1, L-1.2, X-1.2 and "coloured" CWDM compatibility (optical only) plus SDH electrical interface
VC services	VC-3 and VC-12
Multiplex Section Protection (MSP)	1+1 unidirectional and bi-directional, through two SYNUF units
Equipment Protection	1+1 EQP, through two SYNUF units
Front connector type	LC duplex (optical) or 1.0/2.3 ms (electrical) via SFP transceiver
SYNOT	
Tributary SDH STM-1 optical interface unit	
ITU-T recommendations	G.703, G.707, G.783, G.803, G.805, G.841, G.957, G.958
Bit rate (Number of Ports)	155.52 Mbps \pm 4.6 ppm (1)
Optical port types	S-1.1, L-1.1, L-1.2
VC services	VC-3 and VC-12
Front connector type	E-2000 (optical)
SYNAC	
2 Mbps (PDH system bus) SDH STM-1 access interface unit	
ITU-T recommendations	G.702, G.704, G.707, G.775, G.783, G.803, G.805, G.823, G.825, G.841
PDH system bus/SDH system bus capacity	8 x 2 Mbps (VC-12 termination)
Traffic protection	1+1 Linear Trail Protection (LTP) on VC-12
SYNAM/SYNAD	
2 Mbps (E12) SDH STM-1 access interface units	
ITU-T recommendations	G.702, G.703, G.707, G.775, G.783, G.803, G.805, G.823, G.825, G.841
Bit rate (Number of Ports)	2048 kbps \pm 50 ppm (SYNAM: 8, SYNAD: 1)
Line impedance	75 ohms asymmetrical or 120 ohms symmetrical
Traffic protection	1+1 Linear Trail Protection (LTP) on VC-12
Front connector type	DIN 41612
SYTEL	
34/45 Mbps (E3/T3) STM-1 access interface unit	
ITU-T recommendations	G.702, G.703, G.707, G.751, G.753, G.775, G.783, G.803, G.805, G.823, G.824, G.841
Bit rate (Number of Ports)	34,368/44,736 kbps \pm 20 ppm (1)
Line impedance	75 ohms asymmetrical
Traffic protection	1+1 Linear Trail Protection (LTP) on VC-3
Front connector type	1.6/5.6 ms (75 ohms, electrical)
SYNVA	
2.3 Mbps (PDH system bus) TU-12 SDH STM-1 access interface unit	
ITU-T recommendations	G.702, G.704, G.707, G.775, G.783, G.803, G.805, G.823, G.825, G.841
PDH system bus/SDH system bus capacity	32 x 2.3 Mbps (TU-12 termination)
Traffic protection	Sub-Network Connection Protection (SNCP) – N/I
NEBRO/NEBRA	
Ethernet over SDH transport unit	
ITU-T recommendations	G.707, G.783, G.803, G.805, G.841, G.7041, G.7042
Bit rate	10Mbps, 100Mbps, 1Gbps (NEBRO); 100Mbps, 1Gbps (NEBRA)
Interfaces	4 x 10/100BaseT, 2 x SFP slots (100Base-FX, GbE) (NEBRO) 2 x SFP slots 100Base-FX, 2 x SFP slots (100Base-FX, GbE) (NEBRA)
Traffic protection	Sub-Network Connection Protection (SNCP) – N/I
Front connector type	4 x RJ-45, 2 x SFP cage (NEBRO); 6 x SFP cage (NEBRA)



Looking for more information?
Find your local contact on www.keymile.com
or contact us: info@keymile.com ...