Network Termination Unit BSTU4 for EFM Applications

for ULAF+ access platform

Product Overview

The BSTU4 is an Ethernet Network Termination Unit of the ULAF+ SHDSL product family designed to transmit broadband traffic over multiple copper wire-pairs.

The BSTU4 is the leading choice for delivering business class service levels over Ethernet Networks with its high reliability. The built in Layer 2 switch with comprehensive VLAN support and flexible QoS prioritisation allows for carrier class multiservice applications.

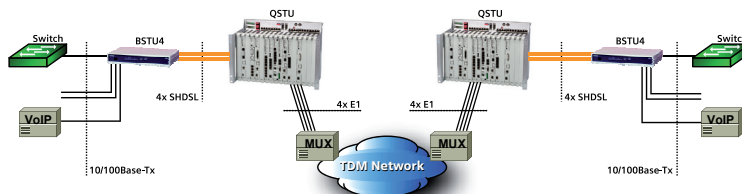In Metro and Campus applications the BSTU4 transmits Ethernet services up to 22,8 Mbit/s.

The BSTU4 helps network operators bridging the existing bandwith gap between E1 and E3/STM-1 services by bundling up to 4 E1 channels, over legacy SDH/TDM networks.

22,8 Mbit/s Connections via Metro Ethernet Network
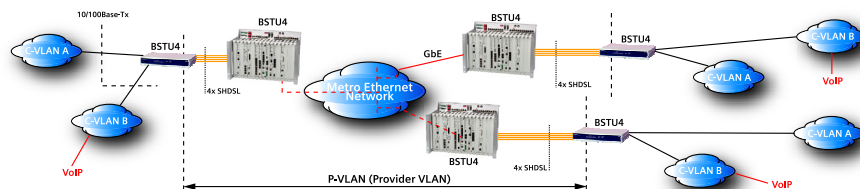
8 Mbit/s Ethernet Leased Lines over SDH/TDM Networks

22,8 Mbit/s Ethernet Access/Campus Networks

ULAF+: Future-proof with Ethernet & TDM

As bandwidth demands of telecom operators for data transmission services continually rise, the BSTU4 extends the existing ULAF+ product portfolio with a broadband Ethernet transmission solution. The UL AF+ family now features both legacy TDM as well as promising Ethernet solutions in a single system environment.

Since the BSTU4 is fully integrated into ULAF+, it is configured and managed just like any other ULAF+ product: either with the LCT (Local Craft Terminal) software or ULAF+'s network management software.

More Bandwidth - more efficiency

With its patent-pending technology the BSTU4 bundles up to four SHDSL links in order to transmit Ethernet traffic from its 10Base-T/ 100BaseTX ports. Together with ULAF+'s QSTU the BSTU4 provides 2, 4, 6 or 8Mbit/s Ethernet services across legacy SDH/TDM networks. In back-to-back operation the BSTU4 provides up to 22,8 Mbit/s over four wire-pairs.

The SHDSL Payload Bitrate can be configured for each SHDSL line individually.

Its channel bundling algorithm combines bandwidth efficiency and link resiliency: the BSTU4 dynamically adjusts the bundling algorithm in case of one or more failures of E1 or SHDSL links. Even with three links down, the BSTU4 link doesn't fail.

Compared to other bundling algorithms, the BSTU4's bandwidth efficiency is unmatched: while IMA (Inverse Multiplexing over ATM) reaches an approx. 79% of payload efficieny, BSTU4 boasts an average of 96%.

Fast Ethernet Managed Switch

The BSTU4 incorporates a 4-port, self-learning Layer-2 switch with Customer VLAN and Provider VLAN support (including Q-in-Q: IEEE 802.1ad) and Quality of Service (QoS: 4 priority queues). Weighted Fair Queueing (WFQ) and Strict Priority Queueing (PQ) are supported:

- **WFQ (Weighted Fair Queueing)**: The queues of the individual ports are processed in a defined order in the ratio 8:4:2:1
- **PQ (Strict)**: The queues are serviced in strict order of queue priority, so the high queue always is served first, then the next lower priority and so on.

Technical data

Power Supply

Input Voltage	
Plug-in version	40 VDC to 72 VDC
Desktop version	40 VDC to 72 VDC
	95 VAC to 260 VAC
Remote Power Supply	
Voltage	120 VDC
Current	50 /60 mA
Power Consumption	< 13 W
providing remote power 4x 120 V / 50 mA	< 37 W
providing remote power 4x 120 V / 60 mA	< 46 W

Interfaces

Connector	4x RJ45
10Base-T/100Base-Tx ports	IEEE 802.3
	Full / Half Duplex, Flow Control, Auto neg., Auto MDI-X
Switch	self learning (1024 MAC adresses)
	frame size up to 2048 bytes
	VLAN support (IEEE 802.1Q)
	Provider VLAN support (Q-in-Q: IEEE 802.1ad)
	4 priority queues
	Priority schemas (PQ or WFQ)
	Traffic classification: 802.1p, DSCP, Port based, VLAN based
Local Craft Terminal (LCT)	
Serial V.24 interface	1x RJ45 (ISO 8877)
Transmission	
SHDSL over 1...4 copper wire pairs	1x RJ45 (ISO 8877)
Line code	TC-PAM 16/32
Technology	ETSI TS 101 524, ITU-T G.991.2
Payload Bitrates	192 kbit/s to 5696 kbit/s per wire-pair
	1 to 4 wire-pairs (up to 22,8 Mbit/s with 4 wire pairs)
Repeater	1 to 4 wire-pairs with BSRU support (4 stages)

Physical and environment

Plug-in version	Double Eurocard size
Desktop version (W x H x D)	272 x 47,5 x 175 mm
	(wall-mounting possible)
Temperature (in operation)	-5° – +55°
	at 5 – 95 % rel. humidity

Q-in-Q VLAN Tagging

Q-in-Q adds an additional VLAN tag to each Ethernet frame. The technology is used in Metro Ethernet applications since it provides a very cost effective and secure solution to transport multiple customer VLANs totally isolated from each other.

Carrier Ethernet Certification

The BSTU4 meets the Metro Ethernet Forum (MEF) standards MEF9 and MEF14 for EPL (Ethernet Private Line), EVPL (Ethernet Virtual Private Line) and E-LAN (Ethernet LAN) services.