

SHDSL LT / NT Device QuFast SHDSL 650

The QuFast SHDSL 650 is a high-capacity, cost-effective point-to-point equipment that can deliver up to 100 Mbps of high quality, symmetrical Ethernet services combined with up to 4 E1/T1 TDM interfaces.



Highlights

- ◆ *E1/T1 Replacement with High Precision Synchronization*
- ◆ *MEF 8 CESoETH, MEF 9, 14 & 18 Certified*
- ◆ *Low CESoETH Delay*
- ◆ *Standards-based IEEE 802.3ah EFM) 2Base-TL transport*
- ◆ *Rapid Service Deployment*
- ◆ *Superior Rate, Reach & Reliability*
- ◆ *Worldwide Spectral Compliance*
- ◆ *OSMINE, NEBS III, FCC, UL, CE*

Applications

- ◆ *Leased Lines Replacement*
- ◆ *Seamless Migration from all TDM to all Ethernet / Packet*
- ◆ *DSLAM, MSAP, BLC backhaul*
- ◆ *4G LTE backhaul*
- ◆ *WiMAX backhaul*
- ◆ *WiFi backhaul*
- ◆ *PBX backhaul*

The QuFast SHDSL 650 Ethernet Access Devices (EADs) enable simultaneous delivery of E1/T1s (MEF 8 CESoETH) and high-speed carrier Ethernet services. With up to 4 E1/T1s and 100 Mbps of fiber-quality symmetrical Ethernet traffic over existing copper pairs, the QuFast SHDSL 650 EADs provide a cost-effective solution for mobile or PBX backhauling applications. Available in 8 copper pairs and fiber configurations, the EADs can be deployed in a Point-to-Point configuration or as the CPE in an Ethernet Point-to-Multipoint configuration with the QuFast SHDSL EFM aggregation platforms. With its superior performance and extensive functionality, the EADs offer rapid service delivery over a converged Ethernet facility, allowing for complete future-proof utilization of the existing network infrastructure.

The QuFast SHDSL 650 introduces a novel resilient clocking solution with timing accuracy better than that provided by traditional E1/T1 circuits. This solution complies with wander and jitter requirements of ITU-T G.823/G.824 for synchronization interfaces.

The EAD is the first copper-based solution that can truly support a comprehensive and seamless migration strategy for wireless backhaul. With its definitive solution to the clock synchronization problem, the QuFast SHDSL 650 is finally enabling wireless backhaul providers to fully utilize the copper networks using Ethernet and pseudo wire technology to complement and/or replace traditional E1/T1 backhaul circuits. All EAD models provide 802.1q VLAN-aware wirespeed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, L2 (Ethernet priority) and L3 (ToS/Diff-Serv) classification with 8 traffic classes, RSTP/STP, bandwidth monitoring, Multicast/Broadcast limiting, 2Base-TL rate limiting, and Link Aggregation (LAG) on all Ethernet ports. The QuFast SHDSL 650 lets

service providers create an intelligent Ethernet access edge with advanced bandwidth control and traffic management features that are fully compliant with MEF 9, 14 and 18 specifications. The QuFast SHDSL 650 enables flexible service provisioning using Ethernet Virtual Connections (EVCs) and Quality of Service (QoS) capabilities that maximize the efficiency of access bandwidth and strictly enforce Service Level Agreements for each subscriber and class of service, allowing service providers to safely aggregate multiple services or multiple subscribers on the same access port.

Implementing the IEEE 802.3ah-2004 (EFM) long-reach, Ethernet over copper specification, the EAD bonds up to 8 copper pairs together to create a 2Base-TL aggregated link. The systems support current and evolving Ethernet QoS requirements and have the highest available packet throughput efficiency. Powered by Actelis Networks' award-winning EFMplus™ technology, the rate, reach and reliability are increased significantly using advanced Dynamic Spectrum Management (DSM), Dynamic Spectral Shaping (DSS), and Cross Talk Cancellation (CTC)* techniques. These technologies provide the best rate/reach performance and most resilient fiber quality transmission, ensuring carrier-class service availability.

The QuFast SHDSL 650 can be used with the XR239 EFM Repeaters to increase the loop length using remote powering units, PFU-8. The QuFast SHDSL 650 EAD platforms can be managed In- and Out-of-Band by the MetaASSIST™ View graphical craft application and via the multiplatform Element Management System, MetaASSIST EMS. The management protocols include standard TL1 command line interface and SNMP using standard MIBs for seamless integration with third-party Network Management Systems (NMS).

Specifications

Interfaces

TDM

• T1/E1	4 ports
Connector:	RJ45/RJ48c
Standards Compliance	ITU-T G.703 + G.704 Short & Long, ITU-T G.703, G.704, GR-499, ANSI-T1.403, ANSI-T1.102
Line Codes:	Unframed / Framed / Fractional Facility and Equipment
Framing:	
Service Loopback:	

TDM Synchronization

• Clock Source	T1/E1, BITS-2MHz external clock (ML650S), Synchronous Ethernet over copper or fiber (ML650S), IEEE1588v2*
• Clock	Accuracy ±50ppb
• Clock Holdover	Stratum 3, GR-1244 Type II and G.813
• Clock Jitter	ITU-T G.823/G.824 SSU
• Clock APS	Automatic Protection Switch from Primary to Secondary as specified in GR-1244-CORE

TDM Protocols

- ITU-T G.703, G.704, GR-499-CORE, GR-253-CORE

CES Protocols

• CESoETH	According to MEF 8
• CESoPSN*	According to IETF RFC 5086
• SAToP*	According to IETF RFC4553
• CES Delay	< 5 ms

Ethernet (Network/User)

• 10/100Base-T	4 ports
Connector:	RJ45, Auto-MDIX
• 100Base-FX/1000Base-FX	2 ports (ML650S) 1 port (ML650)
Connector:	SFP based, MSA compliant

High Speed Link (Bonded Copper Pairs)

• Protocol	IEEE 802.3ah 2Base-TL
• Line code	ITU-T G.991.2 rev. 2
• Bandwidth	Up to 100 Mbps (symmetrical)
• Number of Copper Pairs	4 or 8 pairs
Connector:	RJ45 (per modem/pair)
• End-to-end Delay	2-4 ms (typical)
• Spectral Compliance	ITU-T .991.2 (Annex A,B,F), ETSI TS 101 524 (Annex E) ANSI T1.417, T1.426 Per country regulatory compliant spectral modes
• Sealing Current	48VDC/4mA nominal

Management (Out-of-Band)

• 10/100Base-T	
Connector:	RJ45, Auto-MDIX
• Craft	EIA RS-232 (DCE)
Connector:	DB9

LAN Protocols

• Dynamic Bridging	IEEE 802.1, 8K MAC addresses
• Discovery Mechanisms	LLDP
• VLAN Tagging	IEEE 802.1Q
• Double Tagging	Q-in-Q
• RSTP, STP	IEEE 802.1d
• Link Aggregation	IEEE 802.3ad
• Provider Bridges	IEEE 802.1ad

Management Protocols

• ITU-T G.826	Performance Monitoring for Line and Path
• ITU-T G.704/G.707	Synchronization Status Message
• SNMP	SNMP v1 and v2c
• Command Line Interface	TL1
• Remote Access	Telnet
• Secure Access (option)	SSH v2
• Time Synchronization	SNTP v3
• File transfer	FTP, TFTP

• User Authentication	RADIUS and/or local passwords
• EFM & OAM	IEEE 802.3ah clause EFM OAM
• CFM	IEEE 802.1ag

Metro Ethernet Forum – Advanced Service Provisioning and Traffic Management

• EVCs	8
• Mapping Rules	32 ingress rules (Port/VLAN/ L2/L3/L4 Flexible)
• BW profiling	CIR, CBS, EIR, EBS per EVC
• Frame Marking	2 rate, 3 color traffic management (green, yellow, red) ingress policing Per EVC L2/L3 marking
• CoS Marking	

Quality of Service

• Classes of Service	8
• Scheduler	SP, WFQ, Hybrid
• Classification	L2 802.1p/Q priorities, L3 ToS/Diff Serv

Applications

• EMS	MetaASSIST EMS
• Craft GUI	MetaASSIST View

Front Panel Indicators (LEDs)

• Power	
• Status	
• Alarm	
• Synch	
• MLP per modem/pair	
• ACT (Activity) per Ethernet/HSL port	
• LNK (Link) per Ethernet/HSL/T1/E1 port	
• ERR (Error) Alarm per T1/E1/External Clock port	

Alarm Contacts

• Terminal Block	2 Input, 1 Output
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Physical

• Dimensions	Height: 1.6" / 40mm (1U) Depth: 11.0" / 280mm Width: 8.4" / 213mm
• Weight	3.75 lbs / 1.7 Kg
• Mounting	Rack: 2 units in 19", 23" or ETSI racks Desktop, Wall Mount
• Power	DC: -48/-60 VDC nominal, <22 Watt AC: 90-264 VAC, 47-63 Hz, 25-30 Watt (per model)

Environmental

• Operating Temp.	-40° to +65°C
• Storage Temp.	-40° to +70°C
• Relative humidity	Up to 95%, non-cond.

Regulatory Approval/Certifications

- Metro Ethernet Forum
- MEF 9, 14, 18 Certified



Safety

- UL 60950, CSA C22.2 60950-1
- EN 60950-1, IEC 60950-1

EMC

- FCC Part 15 Class B; ICES-003 Class B
- ETSI EN 300 386 Class B
- ETSI ETS 300 132-2
- ITU-T K20, K.21

NEBS

- Level III (GR-1089-CORE, GR-63-CORE)

CE

- EMC and Safety



Environmental

- GR-63-CORE
- ETSI ETS 300 019

* Planned for future release



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