ML650SV Ethernet Access Device

The ML650SV Ethernet Access Devices (EADs) from Actelis® enable delivery of up to four E1/T1s (MEF 8 CESoETH) and high-speed carrier Ethernet services over Fiber. The ML650SV EADs provide a cost-effective solution for Mobile, DSLAM, MSAP, BLC and PBX backhaul applications.

ML650SV EADs can be deployed in a Point-to-Point configuration. The ML650SV EADs offer rapid service delivery over a converged Ethernet facility with continuous support for existing TDM systems.

The ML650SV introduces a novel resilient clocking solution with timing accuracy better than that provided by traditional E1/T1 circuits. This solution complies with the wander and jitter requirements of ITU-T G.823/G.824 for synchronization interfaces. Actelis has developed this advanced clock transmission mechanism to eliminate all carrier concerns related to clock recovery over a pseudowire. The ML650SV supports various clock interfaces such as synchronous Ethernet (over copper or fiber), E1/T1, and 2MHz.

The Actelis ML650SV EAD offers a seamless migration strategy for applications still requiring TDM backhaul. ML650SV EAD models provide 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, L2 (Ethernet priority) and L3 (ToS/Diff-Serv) classification with 4 traffic classes, RSTP/STP, bandwidth monitoring, Multicast/Broadcast limiting, and Link Aggregation (LAG) on all Ethernet ports, as well as IGMP snooping for video distribution applications. The ML650SVS lets service providers create an intelligent Ethernet access edge with advanced bandwidth control and traffic management features that are compliant with MEF 9, 14 and 18 specifications.

The ML650VS platforms are interoperable with any standard Ethernet switch, router or hub. Compliant with Metro Ethernet Forum (MEF) specifications, ML650SV systems seamlessly integrate into carrier Ethernet Networks. Equipped with four 10/100Base-T Ethernet interfaces and two 100/1000Base-FX Small Form Factor (SFP) port as well as four T1/E1 interfaces.

The ML650SVS EADs provide proactive and dynamic tools for enhanced trouble shooting and monitoring capabilities. Advanced Carrier-class CFM (802.1ag), Y.1731 (ITU), and Ethernet Loopback with MAC swapping capabilities are supported by the product offering both physical link as well as service level end to-end advanced troubleshooting mechanisms.

The ML650SV 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).
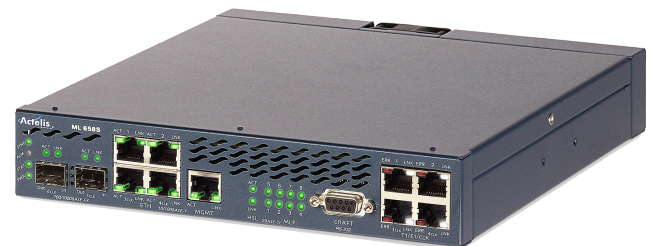
Highlights

- T1/E1 Replacement with High Precision Synchronization
- MEF 9, 14, 8, 18 certified
- Low CESoETH Delay
- Rapid Service Deployment
- Superior Reliability
- Low Delay and Jitter for Voice and Video Transmission
- Carrier Class OAM - Y.1731, CFM
- NEBS III, FCC, UL, CE
- Environmentally Hardened

Applications

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

Markets Served

- ILECs, CLECs, IOCs, PTTs, Alternative Carriers, and Mobile Operators
- Federal, State and Local Government Agencies
- Education, Health Care, Utilities, and Private Campuses

ML650SV

Specifications

Interfaces

Ethernet (Network/User)

- **10/100Base-T**: 4 ports, Connector: RJ45, Auto-MDIX
- **100Base-FX/1000Base-FX:** 2 ports, Connector: SFP based, MSA compliant

TDM

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

TDM Synchronization

- **Clock Source:** T1/E1, BITS-2MHz external clock, **Synchronous Ethernet** over copper or fiber, Adaptive Timing
- **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

Management

- 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
- IGMP snooping IGMP v1/v2
- **OAM:** IEEE 802.1ag, ITU Y.1731,Ethernet loopback with MAC swap

Management Protocols

Protocols

- ITU-T G.826 Performance Monitoring for Line and Path
- ITU-T G.704/G.707 Synchronization Status Message
- **SNMP:** SNMP V3, V2C, V1
- **IP addresses:** IPV4 and IPV6
- **Command Line Interface:** TL1, Industry Standard CLI
- **Remote Access:** Telnet
- **Secure Access (option):** SSH v2
- **Time Synchronization:** SNTP v3
- **Web Access:** HTTP
- **File transfer:** FTP, TFTP
- **IEEE 802.3ah EFM OAM:** Dying Gasp
- **User Authentication:** RADIUS and/or local passwords

Applications

- **EMS** MetaASSIST EMS
- **Craft** GUI MetaASSIST View

Advanced Service Provisioning and Traffic Management

Quality of Service

- **Classes of Service:** 4
- **Scheduler:** WFQ, SP
- **Classification:** L2 802.1p/Q priorities, L3 ToS/Diff Serv

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

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 +75°C
- **Relative humidity:** Up to 95%, non-cond.

*Tested in accordance with NEMA temperature requirements

Regulatory Approval/Certifications

Metro Ethernet Forum

- CE 1.0 - MEF 9, 14, 18

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