

ML700 Ethernet Access Device

The ML700 Ethernet Access Devices (EADs) from Actelis® are the first and only line of EADs in the market that deliver up to 500Mbps of bandwidth, with extended reach, using standard EFM bonding over 4 or 8 copper pairs by utilizing DMT (ADSL2/2+ and VDSL2) technology.

The ML700 family of EADs delivers the longest reach with the greatest reliability and the most cost-effective solution for high-bandwidth DSLAM and next-generation mobile backhaul (HSPA+ and LTE, Small Cell) applications.

In addition to best-in-class rate and reach capabilities, ML700 EADs offer the highest link resilience and best-in-class customer Quality of Experience (QoE) through its unique implementation of SRA (Seamless Rate Adaptation) and Impulse Noise Protection (INP), and complying with G.inp for unsurpassed bonded link reliability. All ML700 EADs are hardened and compact devices.

Models currently available include:

- ML740 with 4 X 10/100BaseT ports; and
- ML750*, which combines all the capabilities of the ML740 with simultaneous delivery of up to 4 TDM (E1/T1) services (MEF 8 CESoETH, CESoPSN, SAToP), and high-accuracy clock synchronization.

The ML700 provides the option of bonding up to 8 copper pairs, and can be deployed back-to-back in a Point-to-Point topology. It offers a fully standards compliant multimode DMT (ADSL2+/VDSL2) chipset and supports various profiles for VDSL2 and a variety of PSDs, ensuring country specific spectral regulations.

All ML700 EADs provide 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, L2, L3 and L4 classification with eight traffic classes, RSTP/STP, bandwidth monitoring, and Multicast/Broadcast limiting.

The ML700 line of EADs is fully compliant with the MEF 9, 14 and 18 specifications. The ML700 enables flexible service provisioning using Ethernet Virtual Connections (EVCs) with flexible mapping and Quality of Service (QoS) capabilities to maximize the efficiency of access bandwidth. The ML700 complies with IEEE Y.1731 for monitoring and enforcing Service Level Agreements (SLAs). When multiple services are offered on the same link, SLAs can be monitored and enforced for each service, in compliance with MEF 10 standard, allowing reliable aggregation of multiple services on the same Ethernet access link.

Actelis' award-winning EFMplus™ technology, combined with multi-standard auto selecting DMT scheme (ADSL2/2+/VDSL2), provide the industry's best rate, reach and reliability. Actelis' fast, resilient calibration coordinates all modems and balances SNR margins across all modems in the High Speed Link (HSL) to ensure optimal performance and highest reliability. The Actelis Broadband Accelerator (BBA) can be used to further extend the reach and rate of the ML700 link, distributing up to 100Mbps at 12Kft/4km (24 AWG, 0.5mm). Actelis' BBA is remotely powered by the ML700 CO unit and does not require any management or configuration.

The ML700 EADs provide proactive and dynamic tools for enhanced trouble shooting and monitoring capabilities. Advanced Carrier-class EFM OAM, including 802.3ah, CFM (802.1ag) and Y.1731 (ITU), are incorporated, offering both physical link as well as service level end-to-end advanced troubleshooting mechanisms. The ML700 EADs can be managed In and Out-of-Band by the Actelis' MetaASSIST™ View and via the multi-platform Element Management System, MetaASSIST EMS. The management protocols include standard command line interface and SNMP using standard MIBs for seamless integration with third-party Network Management Systems (NMS).



Highlights

- Best-in-class Rate Reach & Reliability
- Best-in-Class Link Resilience, Implementing G.inp
- CE 1.0 - MEF 9, 14
- Clock Synchronization with SyncE
- IEEE 802.3ah EFM 10PASS-TS Solution
- MEF8 CESoETH, CESoPSN, SAToP
- Advanced SLA Monitoring
- BBA for rate and reach extension - up to 100 Mbps at 12 Kft/4 km (24 AWG, 0.5 mm)
- IGMP Snooping
- Environmentally Hardened

Applications

- Mobile: WiFi, WiMax, LTE, HSPA+, 2G, 3G, and Small, Pico, Micro, and Metro Cell Backhaul
- DSLAM Backhaul
- Metro Ethernet Extension

Markets Served

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



Specifications

Interfaces

Ethernet (Network/User)

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

High Speed Link (Bonded Copper Pairs)

- **Protocol:** IEEE 802.3ah, 10PASS-TS, ITU-T G.998.2 G.bond
- **DMT Multimode:** ITU-T G.992.3 (ADSL2), G.992.5 (ADSL2+), G.993.2 (VDSL2) supporting multiple VDSL profiles with auto line code selection
- **Impulse Noise Protection:** G.INP (ITU-T G.998.4) and Interleaved modes for bonded links
- **Bandwidth:** Up to 500Mbps (aggregated upstream + downstream)
- **Number of Copper Pairs:** 4 or 8
Connector: RJ45 (per modem/pair)
- **End-to-end Delay:** 2-4 ms (typical)
- **Sealing Current:** 48VDC/1.5mA nominal

Management (Out-of-Band)

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

TDM (ML750* only)

- **T1/E1: 4 ports Connector:** RJ45, RJ48c Stand. Compliance: ITU-T G.703 + G.704 short & long, G.703, G.704, GR-499, ANSI T1.403, T1.102
Framing: Unframed / Framed / Fractional

Clock Synchronization (ML750* only)

- **Clock source:** T1, E1, 2Mhz, SyncE (over copper or fiber)
- **Clock:** Accuracy +/- 50ppb
- **Clock holdover:** Stratum 3, GR-1244 type II and G.813
- **Clock Jitter:** ITU-T G.823/G.824 SSU

PWE Protocols (ML750* only)

- **CESoETH:** According to MEF 8
- **CESoPSN:** According to IETF RFC 5086

- **SAToP:** According to IETF RFC 4

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
- **OAM:** IEEE 802.3ah clause 57 (EFM OAM) IEEE 802.1ag, ITU Y.1731

Management

Protocols

- **SNMP:** SNMP v1 and v2c
- **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**
- **User Authentication:** RADIUS and/or local passwords

Metro Ethernet Forum – Advanced Service Provisioning and Traffic Management

- **EVCs:** 8
- **Mapping Rules:** 16 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
- **CoS Marking:** Per EVC L2/L3 marking

Quality of Service

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

Management Applications

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

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, 13.5-17 Watt (per model);
AC: 90-264 VAC, 47-63 Hz, 17-21 Watt (per model);
Remotely powering the BBA for extended reach and rate over the data lines.

Environmental

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

Regulatory Compliance/Certifications

Metro Ethernet Forum

- MEF 9, 14 Compliant

Safety

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

EMC

- FCC Part 15 Class B
- ICES-003 Class B
- ETSI EN 300 386 Class B
- ETSI ETS 300 132-2

NEBS

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

CE

- EMC and Safety

Telecom

- ITU-T K20, K.21

Environmental

- GR-63-CORE, ETSI ETS 300 019



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