

ML684M Ethernet Access Device

The ML684M Ethernet Access Device (EAD) from Actelis® is a copper Add-Drop EAD that enables delivery of high-speed Carrier Ethernet services over existing copper and fiber infrastructure with speeds up to 60 Mbps of symmetrical Ethernet traffic over copper.

As a 4 copper pair model, the ML684M takes in the copper pairs and allows them to be split into two directions, thereby allowing multiple nodes to be connected to each other over copper in a linear chain or ring configuration. Each node has full switching capabilities and can drop and add Ethernet traffic at each location while transferring the rest of the traffic through. The ML684M EAD can also be deployed as a mini-CO supporting EADs. With its superior performance, extensive functionality and low cost, the ML684M EAD offers rapid service delivery and allows for complete utilization of the existing network infrastructure.

The ML684M EAD is interoperable with any standard Ethernet switch, router or hub. Compliant with Metro Ethernet Forum (MEF) specifications, ML684M EAD systems seamlessly integrate into carrier Ethernet networks. Equipped with 4 10/100Base-T Ethernet interfaces and an optional 100/1000Base-FX Small Form Factor (SFP) port, the ML684M EAD allows assignment of a service or a customer per port. The ML684M EAD model lets service providers, enterprises and municipalities create an intelligent Ethernet access edge with bandwidth limiting per ingress port and traffic shaping on the Ethernet Access uplink (HSL).

Powered by Actelis Networks' award-winning, patented EFMplus™ technology, the rate, reach and reliability are increased significantly using advanced Dynamic Spectrum Management (DSM) techniques. This technology provides the best rate/reach performance and most resilient fiber-quality transmission, ensuring carrier-class reliability.

The ML684M EAD provides 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, L2 (Ethernet priority), L3 (ToS/Diff-Serv) classification with four traffic classes, RSTP/STP, Link Aggregation, bandwidth monitoring,

Multicast/Broadcast limiting, as well as IGMP snooping for video distribution applications.

The ML684M EAD provides 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 ML684M EADs can be managed In- and Out-of-Band by the MetaASSIST™ View graphical craft application and via the multi-platform 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

- Support for 2 High Speed Copper Links
- IEEE 802.3ah Ethernet in the First Mile (EFM) 2Base-TL Solution
- CE 1.0 - MEF 9, 14
- Rapid Service Deployment
- Superior Rate, Reach & Reliability
- Low Delay and Jitter for Voice and Video Transmission
- Carrier-Class OAM
- Worldwide Spectral Compliance
- FCC, UL, CE, NEMA II
- Environmentally Hardened

Applications

- IP-based Traffic Controllers
- Dynamic Message Signs
- HD Video Cameras & Streaming
- Vehicle Detection
- Smart Parking
- Emergency Response
- Supports & Complements City Wi-Fi Access



Specifications

Interfaces

Ethernet (Network/User)

- **10/100Base-T:** 4 ports, Connector: RJ45, Auto-MDIX
- **100/1000Base-FX:** 1 port (option) 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 60 Mbps (symmetrical)
- **Number of Copper Pairs:** 4 (2 high speed links each of 2 copper pairs), **Connector:** RJ45 (per modem/pair)
- **End-to-end Delay:** 2-4 ms (typical)
- **Spectral Compliance:** ITU-T G.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/1.5mA 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
- **IGMP snooping:** IGMP V1/V2
- **OAM:** IEEE 802.3ah clause 57 (EFM OAM), IEEE 802.1ag, ITU Y.1731, Ethernet loopback with MAC swap

Management

Protocols

- **SNMP:** SNMP v1 and v2c
- **IP addresses:** IPV4 and IPV6
- **Command Line Interface:** TL1
- **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**
- **MLP per modem/pair**
- **ACT (Activity)**
- **LNK (Link) per Ethernet/HSL 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, 17 Watt
AC: 90-264 VAC, 47-63 Hz, 21 Watt

Environmental

- **Operating Temp.** -40° to +74°C
- **Storage Temp.** -40° to +74°C
- **Relative humidity:** Up to 95%, non-cond.

Regulatory Approval/Certifications

- Metro Ethernet Forum
- CE 1.0 - MEF 9, 14

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
- ITU-T K.20, K.21

NEBS

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

CE

- EMC and Safety

Environmental

- GR-63-CORE
- ETSI ETS 300 019



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