

ML540E Ethernet Access Device

The ML540E Ethernet Access Device (EAD) from Actelis® complements Actelis' industry-leading EFM over bonded copper solutions, offering advanced, intelligent CE 2.0 Ethernet service delivery over Fiber.

The ML540E EAD can be used to deliver fully managed, very high bandwidth Ethernet-based service for a variety of network applications, including business-class services, traffic and surveillance, backhaul, campus and enterprise applications.

The ML540E EAD is interoperable with any standard Ethernet switch, router or hub. Compliant with Metro Ethernet Forum (MEF) CE2.0 specifications, ML540E EADs seamlessly integrate into carrier Ethernet networks. Equipped with four 10/100/1000Base-T Ethernet interfaces and two 100/1000Base-FX Small Form Factor (SFP) ports, the ML540E EAD allows assignment of a service or a customer per port. DS3/E3 uplinks can be used to connect to legacy networks instead of the 100/1000Base-FX SFPs.

Service providers utilizing the ML540E intelligent EAD can offer CE 2.0 based services with comprehensive bandwidth control and traffic management features. The ML540E's flexible service provisioning using Ethernet Virtual Connections (EVCs), along with its advanced mapping and Hierarchical Quality of Service (H-QoS) capabilities, allows carriers to maximize the efficiency of the access bandwidth on all their ports and configurations. Service Level Agreements (SLAs) can be easily enforced per each subscriber enabling service providers to safely aggregate multiple services or multiple subscribers, on the same Ethernet access uplink.

All ML540E models provide 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, VLAN translation, L2, L3 and L4 classification with eight traffic classes, RSTP/STP, ERPS, bandwidth monitoring, Multicast/Broadcast limiting, as well as IGMP snooping for video distribution applications.

The ML540E is a hardened, RoHS 6 compliant compact unit that is ideal for deployments in outside plants, remote cabinets, basements, as well as customer locations and central offices. Flexible installation options include rack mount, desktop, wall mount, and self-contained NEMA-3 enclosures for pole/wall-mounted or strand-mount applications, and offers remote powering.

The ML540E 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), Y.1564 embedded traffic generator* and Ethernet Loopback with MAC/IP swapping* offer both physical link as well as service level end to-end advanced troubleshooting mechanisms.

The Actelis ML540 EAD ensures a high level of security, enabling safe and protected communication that supports SSH, Radius and additional advanced capabilities.

The ML540E 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 command line interface, Telnet and SNMP using standard MIBs for seamless integration with third-party Network Management Systems (NMS).



Highlights

- Standards-based IEEE 802.3ah Ethernet in the First Mile (EFM), transport over fiber.
- MEF CE 2.0 and H-QoS
- Rapid Service Deployment
- Multiple fiber connection types
- Long-haul Optics for up to 120 km
- EFM Enhanced Security capabilities
- Carrier Class OAM, including Y.1731, CFM, Y.1564*, EFM OAM
- Worldwide Spectral Compliance
- NEBS*, FCC, UL, CE
- Environmentally Hardened

Applications

- Transparent LAN Service
- Fast Internet Access
- Metro Ethernet Extension
- Private Campus Network Intra-Connection
- MDU/MTU Backhaul
- DSLAM Backhaul
- WiFi and Cellular Backhaul (Radio Access Network)
- Leased Lines Replacement

Markets Served

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

* Future release

Specifications

Interfaces

Ethernet (Network/User)

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

Management (Out-of-Band)

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

Ethernet Bridge Features

- **Bridging:** IEEE 802.1q
- **Forwarding Database size:** 16K MAC addresses
- **MTU:** Up to 9k
- **TPID:** up to 4 settable per inner/outer tag
- **Aging:** Configurable
- **MAC Limiting and Filtering**
- **Multicast/Broadcast Control**
- **Port based VLAN Stacking (Q-in-Q)**
- **Conditional VLAN Stacking**
- **VLANs:** 4K, supports VLAN translations
- **RSTP, STP:** IEEE 802.1d
- **Link Aggregation:** IEEE 802.3, L2/L3 balancing
- **Provider Bridges:** IEEE 802.1ad
- **LLDP:** IEEE 802.1ab
- **IGMP Snooping:** RFC 4541, V1/V2 RFC 1112/2236
- **ERPS:** ITU-T G.8032
- **EFM OAM:** IEEE 802.3ah clause 57 inc. Dying Gasp
- **CFM/MEF OAM:** IEEE 802.1ag, ITU Y.1731
- **ITU SAM:** Y.1564 traffic generator/analyzer *
- **Loopback:** L2/L3 - MAC/IP swap*, wire-speed CFM loopback by LBM-LBR

Quality of Service Features

- **Classes of Service** (queues per port): 8
- **Two Levels Hierarchical Scheduler (H-QOS)**, up to 64 queues per port, WFQ, SP, Hybrid
- **Bandwidth Control:** 32 profiles, 2 rate, 3 color metering (CIR, CBS, EIR, EBS)
- **EVCs:** 32 Services
- **Classification:** 128 rules (Port/VLAN/L2 L3/L4)
- **Shaping:** per queue/port
- **Color Mode Awareness** by COS or DEI
- **CoS Marking:** by COS or DEI, per Service

Management

Applications

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

Protocols

- IPv4 and IPV6
- **DHCP Client:** RFC 2132
- **ACS Client, CWMP:** TR-069
- **Command Line Interface:** TL1, CLI
- **Remote Access:** Telnet
- **SNMP:** V3, V2C, V1
- **Radius Authentication:** RFC 2865
- **Secure Access (option):** SSH v2
- **Time Synchronization:** SNTP v3
- **Web Access:** HTTP
- **File transfer:** FTP, TFTP
- **Syslog:** RFC 3164

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

Physical

- **Dimensions Height:** 1.6" / 40 mm (1U)
- **Depth:** 11.0" / 280 mm, **Width:** 8.4" / 213 mm
- **Weight:** 3.75 lbs / 1.7 Kg
- **Mounting Rack:** 2 units in 19", 23" or ETSI racks
Desktop, Wall Mount
- **Power**
DC: 24/48 Vdc nominal (20-60 Vdc range), 15-24 Watt (per model)
AC: 90-264 VAC, 47-63 Hz, up to 30 Watt

Environmental

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

Regulatory Certifications/Compliance

Metro Ethernet Forum

- CE 2.0

Safety

- UL 60950, CSA C22.2 60950
- 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 K.20, K.21

NEBS

- GR-1089-CORE, GR-63-CORE

CE

- EMC and Safety

Environmental

- GR-63-CORE
- ETSI ETS 300 019



* Future release

Corporate Headquarters
Actelis Networks, Inc.
47800 Westinghouse Drive
Fremont, CA 94539

t. +1 510-545-1045 or toll-free in U.S. 1-866-ACTELIS



denk-stein:net
MEASUREMENT TECHNOLOGY

Kaiserin-Augusta-Allee 8 ■ 10553 Berlin ■ Germany

☎ +49-(0)30-398981-0 ☎ +49-(0)30-398981-39

✉ sales@denk-stein.com 🌐 www.denk-stein.com

Vertrieb & Systemintegrator für Carrier + Corporate Networks