Actelis Networks™

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INFONETICS RESEARCH

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ML684D

All-In-One Industrial Ethernet Switch and Extender

The ML684D Industrial Ethernet Switch and Extender from Actelis® is a small form factor Add-Drop unit enabling the delivery of symmetrical high-speed Ethernet services over existing copper and fiber infrastructure. Up to 60 Mbps of symmetrical Ethernet traffic over copper and 1 Gbps over fiber.

Designed for Industrial, utility and traffic applications, The ML684D takes in two fiber ports and/or four copper pairs and allows them to be split into two directions, east and west, thereby allowing multiple nodes to be connected over copper or fiber in a linear chain, RSTP/STP mesh or ERPSv2 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 ML684D offers extremely small factor and DIN rail mounting for flexible deployment within utilities, traffic and industrial cabinets. With its superior performance, extensive functionality, high robustness and reliability, the ML684D Ethernet switch offers rapid service delivery and allows for complete utilization of the existing network infrastructure.

Interoperable with any standard Ethernet switch, router or hub ML684D devices seamlessly integrate into any Ethernet network. Equipped with six 10/100Base-T Ethernet interfaces and two 100/1000Base-FX Small Form Factor (SFP) port, the ML684D allows assignment of a service or a customer per port.

The ML684D is a hardened and robust Ethernet switch with redundant power inputs, designed for deployment in harsh environments. It complies with NEMA 4 extended temperature requirements and K.20/K.21/K.45 for extended protection against overvoltages and over-currents.

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

Actelis has comprehensive mechanisms that include high level authentication and advanced encryption capabilities. The segmented and scrambled Ethernet packets are disseminated over multiple transmission conduits and include sophisticated filtering and access control using layer 2 processes. Actelis ML684D offers an all-embracing level of security initiating from the physical layer through switching and up to the management and access layers. This gives you a significantly strong and resilient solution and enables transmissions which have the highest level of immunity with notably lower vulnerability to hacking attempts.

The ML684D 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, ERPSv2, RSTP/STP, Link Aggregation, LLCF (Link Loss Carrier Forward), bandwidth monitoring, Multicast/Broadcast limiting, as well as IGMP bandwidth snooping for video distribution applications.

The ML684D 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 MetaASSIST™ View graphical craft application and the MetaASSIST EMS multi-platform Element Management System offer in- and out-of-band management of the ML684D. 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 two High Speed Copper Links
- Small form factor, no fan, DIN railing
- Environmentally hardened
- Enhanced Security - Low vulnerability to hacking
- IEEE 802.3ah Ethernet in the First Mile (EFM) 2Base-TL Solution
- CE 1.0
- Rapid Service Deployment
- Superior Rate, Reach & Reliability
- Low Delay and Jitter for Voice and Video Transmission
- Carrier-Class OAM
- Worldwide Spectral Compliancy
- FCC, UL, CE, NEMA 4

Applications

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

ML684D

Specifications

Interfaces

Ethernet (Network/User) - 8 port switch

- **10/100Base-T:** 6 ports, Connector: RJ45, Auto-MDIX
- **100/1000Base-FX:** 2 ports **Connector:** SFP Based, MSA compliant

High Speed Link (HSL) - Bonded copper pairs

- **Protocol:** IEEE 802.3ah 2Base-TL
- **Line code:** ITU-T G.991.2 rev. 2
- **Number of copper pairs:** 4, **Connector:** RJ45 x 2
- **Number of HSLs:** 1 HSL- up to 4 pairs, 2 HSLs- east/west, 2 pair each
- **Bandwidth per HSL:** 1 HSL - up to 60 Mbps; 2 HSLs up to 30Mbps
- **End-to-end Delay:** 2-4 ms (typical)
- **Spectral Compliance:** ITU-T G.991.2 annex A, B, F, G, ETSI TS 101 524 annex E, ANSI T1.417, T1.426, Per-country regulatory compliant spectral modes
- **Sealing Current:** 48 VDC/1.5mA nominal (sink)

Management (Out-of-Band)

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

Alarm Contacts

- Terminal Block, 2 Input, 1 Output

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
- **ERPSv2:** G.8032 ERPSv2
- **Link Aggregation:** IEEE 802.3ad
- **Provider Bridge:** 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

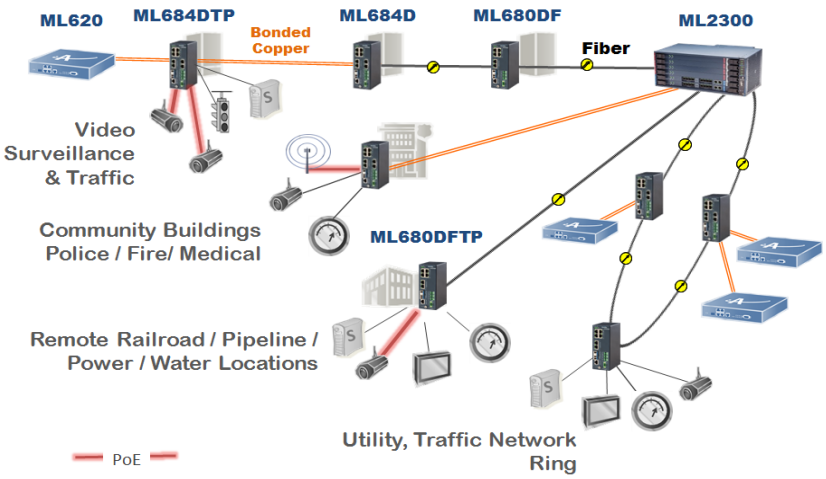
Advanced Service Provisioning and Traffic Management

Quality of Service

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

Management Applications

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



Management Protocols

- **SNMP:** SNMP V3, V2C, V1
- **IP addresses:** IPV4 and IPV6
- **Command Line Interface:** TL1, 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

Front Panel Indicators (LEDs)

- **Status**
- **Alarm**
- **MLP per modem/pair**
- **ACT (Activity) per Ethernet port**
- **LNK (Link) per Ethernet/HSL port**
- **Power A / Power B**

Physical

- **Dimensions: Height:** 5.95" / 151 mm, **Depth:** 5.1" / 130 mm, **Width:** 2.3" / 58 mm
- **Weight:** 1.76 lbs / 0.8 kg
- **Mounting**: Din Rails, Wall Mount Design for top hat rail EN 50022 – 35 × 7.5, or 35 × 15 - type O / type Omega (Ω)
- **Power**

Power

- DC (integrated): -24/-48 VDC (20 to 57V), 9 Watt
  P/N 501RG0230 - Redundant dual inputs
  P/N 501RG0220 - Single input
- AC (external): 90-264 VAC

Environmental

- **Operating Temp.** -40° to +74°C
- **Storage Temp.** -40° to +75°C
- **Relative humidity:** Up to 95%, non condensing

Regulatory Approval/Certifications

Metro Ethernet Forum

- CE 1.0 - MEF 9, 14

Safety

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

EMI(Emission):

- FCC Part 15 Class A
- ICES-003 Class A
- ETSI EN 300 386 Class A
- ETSI ETS 300 132-2
- EN 55022 Class A
- EN50155 (48 VDC), IEC60571 (48 VDC)

EMS (Immunity):

- EN 300 386 level 3 ESD,Surge, EFT level 2 or 3
- EN 61000 - Level 3: 4-2 (ESD), 4-3 (RS), 4-4 (EFT), 4-5 (Surge), 4-6 (CS)
- EN 61000-4-8
- ITU-T K.20, K.21, K.45

CE

- EMC and Safety

Environmental

- ETSI ETS 300 019
- NEMA 4 Thermal

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