

# Actelis Networks ML130



2007

FROST & SULLIVAN

Global Ethernet in the First Mile Over Copper Market Leadership Award

## Carrier Ethernet Over Copper™

The ML130 is an Ethernet in the First Mile (EFM) aggregation switch, delivering symmetrical Ethernet services to remote subscribers over multiple voice-grade copper pairs within the customer service area. The ML130 allows service providers and enterprises to use the existing copper infrastructure to deliver up to 100 Mbps of Ethernet service per customer. It achieves unprecedented rate, reach and reliability on any grade of available copper and installs within minutes, enabling immediate deployment of broadband services. The ML130 is interoperable with any standard Ethernet switch or router. Aligned with Metro Ethernet Forum (MEF) recommendations, Actelis systems seamlessly integrate into carrier Ethernet networks.

Architecturally, the ML130 platform serves as a central office aggregator in a Point-to-Multipoint topology connecting to multiple ML600 and ML50 Ethernet Access Devices (EADs). Each ML50/ML600 unit is connected to the ML130 via a High Speed Link (HSL) comprised of 1-8 bonded copper pairs. A number of ML130 shelves can be stacked in a star or ring topology, providing flexible topology layouts and higher port density per uplink. Additionally, two ML130 platforms can be connected together in a Point-to-Point topology, offering a HSL comprised of 1-32 bonded copper pairs.

The ML130 contains a single Service Dispatcher Unit (SDU) slot and a single Multiport Line Unit (MLU) slot. A variety of SDU and MLU cards exist, supporting different numbers of Ethernet and modem ports. The supported MLU-16N line unit offers 16 G.SHDSL.bis modems per card, whereas the MLU-32EF line unit offers 32 G.SHDSL.bis modems per card. An ML130, equipped with MLU-32EF cards, may also use up to 4 repeaters in a span across all pairs using XR239 EFM Repeaters to increase the span

length, and using up to four concatenated repeater remote powering units, PFU-8 or PFU-8E (Note: 4 repeaters per span requires double-sided feeding when using the PFU-8E as the remote powering unit). Small Form Factor (SFP) ports accept standard 100Base-FX, 1000Base-FX, 1000Base-T and T3/E3 modules, providing redundant uplinks to Ethernet and SONET/SDH networks.

Implementing the standard IEEE 802.3ah-2004 (EFM) long reach Ethernet-over-Copper specification, the ML130 bonds together up to 8 copper pairs in a Point-to-Multipoint topology and up to 32 copper pairs in a Point-to-Point topology to create a 2Base-TL aggregated high-speed link. Powered by Actelis Networks® award-winning EFM-plus™ technology, the rate, reach and reliability are increased significantly using advanced Dynamic Spectrum Management (DSM) and Dynamic Spectral Shaping (DSS) techniques. The ML130 supports current and evolving Ethernet Quality of Service (QoS) requirements and has the highest available packet throughput efficiency.

The ML130 provides 802.1q VLAN-aware wire-speed bridging, double tagging (VLAN stacking) for end-user VLAN transparency, L2 (Ethernet priority) and L3 (ToS/DiffServ) classification with eight hybrid scheduled traffic classes, RSTP/STP, bandwidth monitoring, HSL rate limiting, and Link Aggregation (LAG) on all Ethernet ports.

The ML130 can be managed In-Band and Out-of-Band by Actelis' 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.

## Highlights

- IEEE 802.3ah Ethernet in the First Mile (EFM) 2Base-TL Solution
- MEF Certified Ethernet Capabilities
- Rapid Service Deployment
- Superior Rate, Reach & Reliability
- Low Delay and Jitter for Voice and Video Transmission
- Worldwide Spectral Compliancy
- NEBS III, 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)

## Markets Served

- RBOCs, PTT, Independent Operators, Competitive Operators
- Federal, State and Local Government Agencies
- Education, Health Care, Utilities, Private Campuses

# ML130



## Specifications

### System

- Modem Line Cards 1
- Max. Copper Pairs 32
- End-to-end Delay 2-4 ms (typical)

### Product Interfaces

#### Ethernet (Network/User)

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

#### High Speed Link (Bonded Copper Pairs)

- Max HSLs 32 (using MLU-32 EF)
- Protocol IEEE 802.3ah 2Base-TL
- Linecode ITU-T G.991.2 rev. 2
- Bandwidth per HSL 1-45 Mbps (symmetrical) P2MP;  
1-100 Mbps (symmetrical) P2P
- Copper Pairs per HSL 1-8 P2MP; 1-32 P2P topologies  
Connector: 50-pin telco rear access for MLU 16N; 2x50-pin telco front access for MLU-32EF
- Spectral Compliancy ITU-T G.991.2 (Annex A,B,F,G)  
ETSI TS 101 524 (Annex E)  
ANSI T1.417, T1.426  
NICC ND1602 (ANFP)  
BIPT BRUO 2005
- Sealing (Wetting) Current 48V/4mA nominal (MLU-16N); 1.5mA nominal for MLU-32EF
- TDR MLU-32EF

#### Management (Out-of-Band)

- 10/100Base-T Connector: RJ45, Auto-MDIX
- Craft Connector: EIA RS-232 (DCE)  
DB9
- Dialup Modem Connector: EIA RS-232 (DTE)  
DB9
- Alarm Contacts 4 Input; 4 Output  
Connector: DB15 and Wire-wrap

### LAN Protocols

- Dynamic Bridging IEEE 802.1, 8K MAC addr.
- VLAN Tagging IEEE 802.1Q
- Double Tagging Q-in-Q, VMAN
- RSTP, STP IEEE 802.1d
- Link Aggregation IEEE 802.3ad
- Provider Bridges IEEE 802.1ad
- CFM IEEE 801.ag

### Quality of Service

- Classes of Service 8
- Scheduler WFQ, SP, or hybrid
- Queue Management Tail Drop or RED
- Classification L2 802.1p/Q priorities  
L3 ToS/DiffServ

### Front Panel Indicators and Controls

#### System

- Power
- Critical • Major • Minor • HSL/RMT Alarm
- ACO (Alarm Cut-Off) / LMT (Lamp Test) Button

### Card

- Active
- ACT (Activity)
- Status
- LNK (Link) per Ethernet port

### Management

#### Protocols

- SNMP SNMP v1 and v2c
- Command Line Interface TL1
- Remote Access Telnet
- Secure Access (option) SSH v2
- Time Synchronization NTP v3
- Web Access HTTP
- File transfer FTP, TFTP
- EFM OA&M IEEE 802.3ah
- CFM IEEE 801.ag

#### Applications

- EMS MetaASSIST EMS
- Craft GUI MetaASSIST View

### Physical

- Mounting Rack: 19", 23" or ETSI rack  
Wall mount
- Dimensions Height: 3.5" / 88mm (2U)  
Depth: 11" / 280mm (DC),  
12" / 305mm (AC)  
Width: 17.2" / 438mm
- Weight 14.8 lbs / 6.7 Kg (chassis only)
- Plug-in Cards 2 horizontal, front loading
- Power DC: -48/-60 VDC nominal, dual A+B  
90 Watt for fully loaded system  
AC: 110/240 VAC, 47-63Hz  
Up to 110 Watt for fully loaded system

### Environmental

- Operating Temp. -40° to +74°C
- Storage Temp. -40° to +70°C
- Relative humidity Up to 95%, non-cond.

### Regulatory Approval/Certifications

#### Metro Ethernet Forum

- MEF 9, 14

### Safety

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

### EMC

- FCC Part 15 Class A
- ICES-003 Class A
- ETSI EN 300 386
- ETSI ETS 300 132-2
- ITU-T K.20

### 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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