Actelis Networks
ML2300

Carrier Ethernet Over Copper™

Available with front and rear access for International and North American markets, respectively, the ML2300 is the next generation of Actelis Networks® Ethernet in the First Mile (EFM) aggregation switches, delivering symmetrical Ethernet access services to remote subscribers over multiple voice-grade copper pairs within the customer service area. Interoperable with any standard Ethernet switch or router and aligned with Metro Ethernet Forum (MEF) recommendations, the ML2300 allows service providers and enterprises to use existing copper infrastructure to deliver up to 100 Mbps Ethernet service per customer in G.SHDSL.bis technologies, and has the infrastructure ready for advanced Layer 1 and Layer 2 applications and features available in future releases. The ML2300 also achieves unprecedented rate, reach and reliability on any grade of available copper and installs within minutes, enabling immediate deployment of broadband services.

Architecturally, the ML2300 platform serves as a central office aggregator in a Point-to-Multipoint topology, connecting to multiple ML600 Ethernet Access Devices (EADs). Each ML600 EAD or ML130 can be connected to the ML2300 via a High Speed Link (HSL) comprised of 1-8, or 1-32, bonded copper pairs, respectively. A number of ML2300 shelves can be stacked in a star or ring topology, providing higher port density per uplink.

The ML2300 provides two Service Dispatcher Unit (SDU) slots and four Multiport Line Unit (MLU) slots, allowing incremental service growth, equipment redundancy and flexible modem allocation (any modem to any HSL) using pluggable cards. A variety of SDU and MLU cards exist, supporting different numbers of Ethernet and modem ports. The MLU-32EF and MLU-32ER line unit offer 32 G.SHDSL.bis modems per card, reaching up to 128 modems per shelf.

By concatenating multiple repeater remote powering units, PFU-8 or PFU-8E, an ML2300 system may use four XR239 EFM Repeaters in a span to increase the loop rate and reach of its pairs. Time-Domain Reflectometer (TDR) capability, integrated as part of the ML2300, enables an effective troubleshooting tool to locate most DSL-affecting copper problems. The information gathered includes accurate end-to-end loop length measurement, as well as identification of various fault types impacting signal continuity between loop spans. The ML2300 also provides a variety of redundant uplinks to Ethernet and SONET/SDH networks. Multiple Small Form Factor (SFF) ports accept standard 100Base-FX, 1000Base-FX, 1000Base-T and T3/E3 modules.

Implementing the standard IEEE 802.3ah-2004 (EFM) long-reach Ethernet-over-Copper specification, the ML2300 bonds up to 32 copper pairs together to create a 2Base-TL aggregated 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 ML2300 supports current and evolving Ethernet Quality of Service (QoS) and Type of Service (ToS) requirements, and has the highest available packet throughput efficiency. Additionally, the ML2300 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 8 hybrid scheduled traffic classes, RSTP/STP, bandwidth monitoring, HSL rate limiting, and Link Aggregation (LAG) on all Ethernet ports.

The ML2300 can be managed In-Band and Out-of-Band by Actelis' MetaASSIST™ View graphical craft application and via our multiplatform 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

- 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
- OSMINE, NEBS III, FCC, UL, CE
- Environmentally Hardened

Applications

- Transparent LAN Service
- Fast Internet Access
- Metro Ethernet Extension
- Private Campus Network Intra-Connection
- WiFi and Cellular Backhaul
- MDU/MTU Backhaul
- DSLAM Backhaul

Markets Served

- RBOCs, PTTs, Alternative Carriers and IOCs
- Federal, State and Municipalities
- Education, Health Care, Utilities, Private Campuses

Actelis
Networks

ML2300

Specifications

System

•	Switch Cards	SDU-300 Series
		SDU-400 Series*
•	Modem Line Cards	4, MLU32-ER (rear access) or
		4, MLU32-EF (front access)
•	Max. Copper Pairs	128
•	End-to-End Delay	2-4 ms (typical)

Product Interfaces

Ethernet (Network/User)	Using the SDU-300 Series Cards
• 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

Ethernet (Network/User)	Using the SDU-400* Series Cards
• 10/100/1000Base-T	2 ports
Connector:	RJ45, Auto-MDIX
• 100/1000Base-FX	8 ports
Connector:	SFP-based, MSA compliant

High Speed Link (Bonded Copper Pair Link)

•	Max HSLs	64
•	Protocol	IEEE 802.3ah 2Base-TL
•	Linecode	ITU-T G.991.2 rev. 2
•	Bandwidth per HSL	1-100 Mbps (symm)
•	Copper Pairs per HSL	1-8 and up to 32
	Connector:	2x50-pin telco front access for MLU-32EF;1x64-pin telco rear access for MLU-32ER
•	Spectral Compliancy	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 (Wetting) Current	48V/1.5mA nominal

TDR

•	Loop length measurement	Fault types identifications (presence & location)

Management (Out-of-Band)

•	10/100Base-T	
	Connector:	RJ45, Auto-MDIX
•	Craft	EIA RS-232 (DCE)
	Connector:	DB9
•	Dial-up Modem	EIA RS-232 (DTE)
	Connector:	DB9
•	Auxiliary port	For PFU-8 Remote Management (with SDU-400* series only)
	Connector:	RJ45T port
•	Alarm Contacts	4 Input; 4 Output
	Connector:	DB15 and Wire-wrap

External Loop Test

•	RLM-16MT	2 RJ45 connectors for external metallic loop testing (MLT) allows any copper pair to be connected to the MLT test port

Clock Synchronization

•	External Port Clocks	2 RJ45 ports to external clock sources (with SDU-400* series only)

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

Quality of Service

•	Classes of Service	8
•	Scheduler	WFQ, SP
•	Classification	L2 802.1p/Q priorities L3 ToS/DiffServ

Front Panel Indicators

System
- Power A/B
- Critical • Major • Minor • HSL/FAN Alarm
- ACO (Alarm Cut-Off) / LMT (Lamp Test) Button

Card
- Active • Status
- ACT (Activity) • 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	SNTP v3
•	Web Access	HTTP
•	File transfer	FTP, TFTP
•	EFM OA&M	IEEE 802.3ah clause 57
•	CFM	IEEE 802.3ag

Applications

•	EMS	MetaASSIST EMS
•	Craft GUI	MetaASSIST View

Physical

•	Chassis	19" and ETSI
•	Mounting	Rack: 19", or ETSI rack
•	Dimensions	Height: 7" / 178mm (4U) or 225 mm (for ETSI chassis)
		Depth: 12" / 305mm or 11"/ 280 mm (for ETSI chassis)
		Width: 17.32" / 440 mm
•	Weight	15.0 lbs/ 6.8 Kg (chassis only)
•	Plug-in Cards	6 horizontal, front loading
•	Power	DC: -48/-60 VDC nominal, dual A+B 110 Watt for minimal system 320 Watt for fully loaded system (with no SDU-400 redundancy) 410 Watt for fully loaded system (with SDU-400 redundancy)

Environmental

•	Operating Temp.	-40° to +65°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

Corporate Headquarters
6150 Stevenson Blvd. | Fremont, CA 94538, USA
Tel. 1.866.ACTELIS | Tel. 1.510.545.1045
Fax. 1.510.545.1075
email: sales@actelis.com

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Note: * = Future SDU series cards