



ML600

Ethernet Access Devices

*Carrier Ethernet
over Copper™*



High Bandwidth

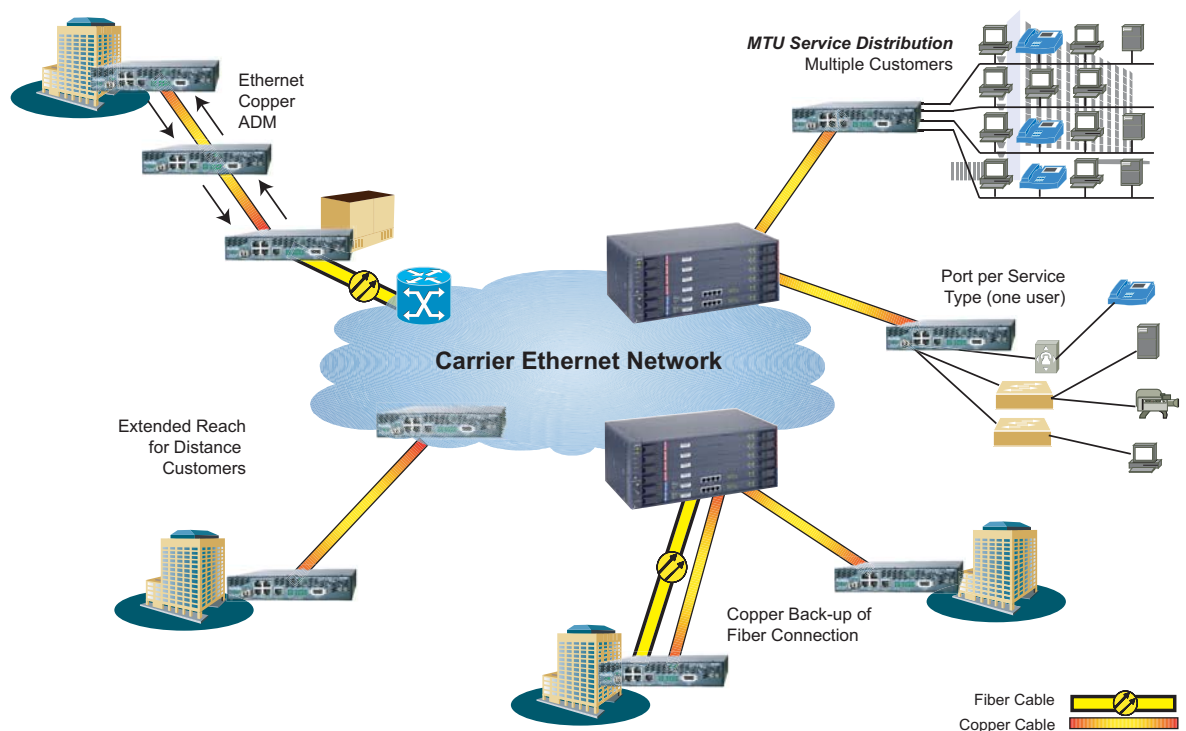
Ethernet Access Devices (EAD) from Actelis Networks enable delivery of high-speed Carrier Ethernet services over the existing copper and fiber infrastructure. The ML600s are a compact, cost-effective Ethernet in the First Mile (EFM) EADs that deliver up to 45 Mbps symmetrical Ethernet traffic at fiber quality over existing copper pairs.

Available in 1 to 8 copper pairs and fiber configurations, the ML600 EAD can be deployed in a Point-to-Point configuration, optional copper add-drop chain, or as the CPE in a Point-to-Multi-Point configuration with Actelis' EFM switches. With its superior performance, extensive functionality and low cost, the ML600 EAD platforms offer rapid service delivery and allow for complete utilization of the existing network infrastructure.

The ML600 EAD platform is interoperable with any standard Ethernet switch, router or hub. Compliant with Metro Ethernet Forum (MEF) specifications, ML600 EAD systems seamlessly integrate into Carrier Ethernet Networks. Equipped with four 10/100Base-T Ethernet interfaces and an optional 100Base-FX or 1000Base-FX Small Form Factor (SFP) port, the ML600 EAD platform allows assignment of a service or a customer per port. A DS3/E3 uplink can be used to connect to legacy networks in the 100Base-FX SFP version.

Implementing the standard IEEE 802.3ah-2004 (EFM) long reach Ethernet-over-copper specification, the ML600 EAD platform bonds up to 8 copper pairs together to create a 2Base-TL aggregated link. The systems support current and evolving Ethernet Quality of Service (QoS) requirements, and has the highest available packet throughput efficiency.

Powered by Actelis Networks' field-proven EFMplus™ technology, the rate and reach are increased significantly, using advanced Dynamic Spectrum Management (DSM) techniques. This technology ensures the best rate/reach performance and most resilient fiber-quality transmission ensuring carrier class service availability.



Extended Rate and Reach

All ML600 EAD models provide 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 four traffic classes, RSTP/STP, bandwidth monitoring and Multicast/Broadcast limiting.

The ML600 EAD platforms 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 3rd party Network Management Systems (NMS).

Optional Features

Optical Interfaces

Choice of optical interfaces accommodate short and long distances as needed with speeds of 100Mbps or 1000Mbps with connections over the existing copper and fiber infrastructure. These optical interfaces provide an evergreen investment by allowing a smooth migration to higher service speeds over fiber without changing the EADs at the customer premises.

Copper Add-Drop EADs

The Copper Add-Drop EADs allow multiple nodes to be connected to each other over copper, in a linear chain or ring configuration. Each node has the full switching capabilities of the ML600 EAD and can drop and add Ethernet traffic at each location, while transferring the rest of the traffic through. With up to 22.8Mbps aggregated traffic, the copper Add-Drop EAD is a powerful tool for distribution of Ethernet traffic across linear/ring copper networks.

Product Category	Product Group	Product Name	Number of Pairs	Description
Ethernet Access Device (EAD)	ML620	ML622	2	4x10/100M copper Ethernet ports and a 100Base-FX optical (or DS3/E3) SFP* port
		ML624	4	
		ML628	8	
	ML630	ML638	8	4x10/100M copper Ethernet ports and a 1000Base-FX optical SFP* port
Copper Add-Drop Multiplexer (CADM)	ML680	ML688	8	4x10/100M copper Ethernet ports and a 100Base-FX optical (or DS3/E3) SFP* port
				*SFP modules - optional

Highlights

- ◆ IEEE 802.3ah Ethernet in the First Mile (EFM) 2 Base-TL Solution
- ◆ Fiber Quality
- ◆ MEF compliant Carrier Ethernet Switching Features
- ◆ High Performance, Resilient Fiber-Like Experience
- ◆ Hard Quality of Service
- ◆ Rapid Service Deployment
- ◆ Superior Rate and Reach
- ◆ Low Delay and Jitter for Voice and Video Transmission
- ◆ Worldwide Spectral Compliance - NEBS III, FCC, UL, CE
- ◆ Environmentally Hardened

Applications

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

Markets Served

- ◆ RBOC's, PTT's, Independent Operators, Competitive Operators
- ◆ Federal, State and Local Government Agencies
- ◆ Education, Health Care, Utilities, Private Campuses

Ethernet Solutions

High Performance High Quality

Specifications

Interfaces

Ethernet (Network/User)

- 10/100Base-T
Connector: 4 ports
RJ45, Auto-MDIX
- 100Base-FX/1000Base-FX
Connector: 1 port (option)
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 1-45 Mbps (symmetrical)
- Number of Copper Pairs 1- 8
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
NICC ND1602 (ANFP)
BIPT BRUO 2005
- Sealing Current 48VDC/4mA nominal

Management

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

LAN Protocols

- Dynamic Bridging IEEE 802.1, 8K MAC addr.
- VLAN Tagging IEEE 802.1Q
- Double Tagging Q-in-Q, VMAN
- MSTP, RSTP, STP IEEE 802.1d
- OAM/CFM IEEE 802.3ah, 802.1ag

Quality of Service

- Classes of Service 4
- Scheduler WFQ, SP
- Classification L2 802.1p/Q priorities
L3 ToS/DiffServ

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

Applications

- EMS MetaASSIST EMS
- Craft GUI MetaASSIST View

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,
14-26 Watt (per model)
AC: 90-264 VAC, 47-63 Hz,
17-30 Watt (per model)

Environmental

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

Regulatory Approval/Certifications

Metro Ethernet Forum

- MEF 9 Compliant



Safety

- UL 60950, CSA C22.2 60950
- ETSI 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.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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