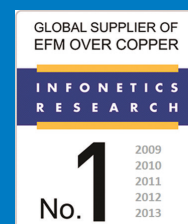




# Product Portfolio

Ethernet Business Services, DSLAM and Mobile Backhaul,  
Residential Broadband, and ITS Networking



High Performance Broadband Over Copper

# High Performance Broadband

*Deliver More High-Bandwidth Ethernet Services Faster and*

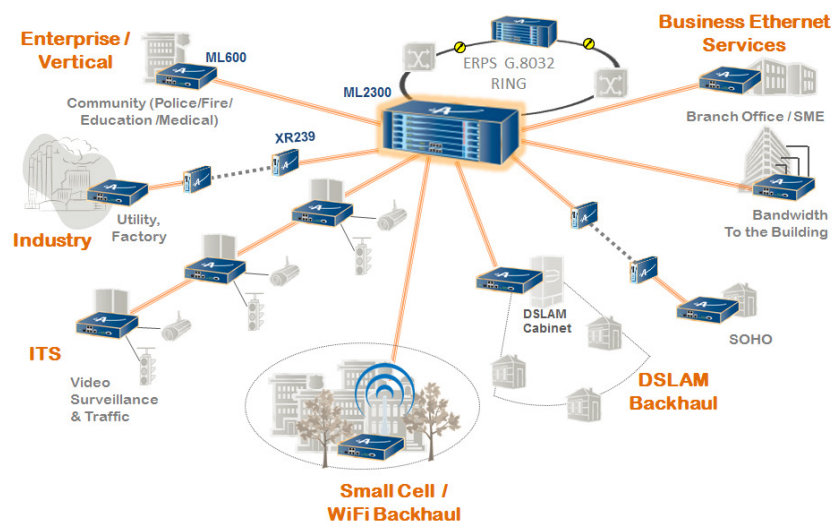
## Leveraging Your Greatest Strategic Asset: Copper

Built on a rich history of innovation and a reputation based on field proven performance and reliability, Actelis Networks' Ethernet over Copper aggregation switches, access devices, and repeaters enable network operators to get more high performance, reliable bandwidth to more places. By doing it over copper using our EFMplus suite of transmission technologies, we also do it quicker and at much lower cost.

Actelis makes both G.SHDSL and DMT (VDSL2)-based EFM over Copper solutions, as well as ADSL and VDSL Broadband Amplifiers (the VBA and ABA). These BBAs enable delivering higher speed access to residential subscribers by enhancing the performance of any vendor's DSLAMs.

Actelis' Industrial Ethernet Switches provide hardened, small form factor equipment designed with flexibility in mind to solve a broad range of intelligent traffic system, surveillance network, and industrial applications ranging from pipeline, railway, and utility applications.

Offering EFM over Copper solutions with the utmost reliability and bandwidth/distance per pair, Actelis is the building block for high performance Ethernet.



## About EFMplus and Symmetrical Vectoring

EFMplus turns existing copper into high speed Ethernet links, doing so by overcoming variable quality, disturbers from other services in the binder, and noise. Actelis' Symmetrical Vectoring complements EFMplus to further optimize transmission and enhance bandwidth and coverage area.

Learn more @ [Actelis.com](http://Actelis.com)

### Applications

- Business Ethernet services
- Intelligent Traffic Systems (ITS)
- Surveillance Networks
- Residential Broadband
- WiFi and Small Cell Backhaul
- DSLAM backhaul

### Benefits

- High Reliability
- High Performance Bandwidth
- Low TCO
- Fast Time to Market

# over Copper and Fiber

Farther With the Greatest Quality of Experience.



## ML230, ML2300 (ANSI & ETSI) Aggregation Switches

Delivering Ethernet business services using bonded G.SHDSL transmission technology, these Aggregation Switches support up to 256 pairs per chassis and up to 128 customers (links).



## ML690E/ES Aggregation Switch

Compact high-density aggregation switch that delivers Ethernet business services over existing copper networks using G.SHDSL transmission technology.



## ML600 EADs

Actelis' award-winning product family of EADs. Delivering up to 230Mbps of Ethernet business services over existing copper networks using G.SHDSL transmission technology.



## ML700 EAD

Delivers up to 750 Mbps of bandwidth using standard EFM bonding over DMT (ADSL2/2+ and VDSL2) transmission technologies.



## ML680Dx and ML680DFx

Hardened, fanless, compact DIN-rail mount device, supporting drop and continue and ring topologies over bonded copper or fiber.



## Carrier Ethernet Aggregation Switches

Actelis' Carrier Ethernet Aggregation Switches for the central office offer a variety of cost-effective systems for delivering Ethernet services over different copper network topologies and scenarios. These platforms can be used with Actelis' ML600 EADs, and support EFMplus, Symmetrical Vectoring (DRB) and DSS technologies.

| Feature   | ML2300    | ML230 <sup>1</sup> | ML2424 <sup>1 3</sup> | ML600 <sup>1</sup> | ML700 <sup>1</sup> |
|---|-----------|--------------------|-----------------------|--------------------|--------------------|
| Chassis   | CHS-2000B | CHS-200            | NA                    | NA                 | NA                 |
| Height & Width  | 4U, 19"   | 2U, 19"            | 1U, 19"               | 1U, ½ 19"          | 1U, ½ 19"          |
| # of Slots  | 6         | 3                  | NA                    | NA                 | NA                 |
| # of SDUs   | 2         | 1                  | NA                    | NA                 | NA                 |
| Max # of Card Slots   | 4         | 2                  | NA                    | NA                 | NA                 |
| Max Number of Copper Pairs                                  | 256       | 128                | fiber only            | 16                 | 8                  |
| Max # of High Speed Links (HSLs)                            | 128       | 128                | fiber only            | 1-4 <sup>2</sup>   | 1                  |
| Ethernet SFP Ports<br>(100/1000Base-FX or 1000/2500Base-FX) | 4 or 8    | 4 or 8             | 24 (1G) + 4 (10G)     | 1 or 2             | 2                  |
| Ethernet Copper Ports<br>(10/100BaseT or 10/100/1000BaseT)  | 2         | 2                  | 4                     | 5                  | 5                  |

<sup>1</sup> Units can be used as CO or CPEs    <sup>2</sup> ML600 - 1xHSL, ML680/D - 2xHSLs, ML690E/ES- 4xHSLs    <sup>3</sup> SyncE&1588v2

## Carrier Ethernet Access Devices

Actelis' Carrier Ethernet Access Devices are built on Actelis' patented EFMplus technology to deliver high-performance, highly reliable Carrier Ethernet services over existing copper and fiber infrastructures. These EADS provides a low cost per bit with speeds ranging up to 230 Mbps with our G.SHDSL EADs and up to 750 Mbps (DS+US) with our VDSL/ADSL2 EADs.

| EADs           | Product Group   | Model <sup>1</sup>             | Description and Applications<br>(All can be used as CO-only for PTP configurations)  |
|----------------|-----------------|--------------------------------|--|
| Bonded G.shdsl | ML640<br>ML640E | ML6416/E<br>ML648/E<br>ML644/E | CE 2.0 Certified <sup>2</sup> ; Up to 230 Mbps per link, Advanced QoS features (CIR/EIR per EVC), 4x10/100 BT (ML640), 4x10/100/1000 (ML640E) + 2x FE/Gig SFP <sup>3</sup>   |
|                | ML630           | ML638                          | CO/CPE EADs, Up to 100 Mbps per link<br>4x10/100 BT + Optional FE/Gig SFP <sup>3</sup> port.   |
|                | ML620           | ML628<br>ML624<br>ML622        | CO/CPE Devices , Up to 100 Mbps per link<br>4x10/100 BT+ Optional FE SFP <sup>3</sup> port on ML624/8.   |
|                | ML620i          | ML624i<br>ML622i<br>ML621i     | Optimized CO/CPE Devices , Up to 60 Mbps per link<br>4x10/100 BT, Fanless, 12/24V/48V.   |
|                | ML650S          | ML658<br>ML654                 | Mobile / DSLAM / PBX Backhaul Devices, CO/CPE, Up to 100 Mbps per link<br>4x10/100 BT, 4x E1/T1 ports, Advanced Sync. interfaces and 2x FE/Gig SFP <sup>3</sup> ports. Advanced QoS features (CIR/EIR per EVC).              |
|                | ML680/D         | ML688<br>ML684<br>ML68xDx      | Drop & Continue: DSLAM Backhaul & ITS Networks, Up to 60 Mbps per link<br>4-6 x 10/100 BT + 1-2 x FE/Gig SFP <sup>3</sup> port. 2+2 and 4+4 for add/drop functionality.<br>ML68xDx - Fanless with DIN railing and 24/48V DC. |
| Bonded DMT     | ML700           | ML748<br>ML744<br>ML742        | Advanced QoS CO/CPE Devices , Up to 750 Mbps per link<br>Advanced QoS features (CIR/EIR per EVC), 4x10/100 BT + 2x FE/Gig SFP <sup>3</sup> ports<br>Interoperable with 3 <sup>rd</sup> party DSLAMs.                         |
| Fiber (only)   | ML540E          | ML540E                         | CO/CPE EADs, 4x10/1000/1000 BT + 2x FE/Gig SFP <sup>3</sup> ports.   |
|                | ML540           | ML540L<br>ML540S               | CE 2.0 certified. CO/CPE EADs, 4x100/1000BT + 2x FE/Gig SFP <sup>3</sup> ports.<br>+ 2x 1PPS/CLK, SyncE&1588v2, 4x 100/1000BT& 6x 100/1000FX (ML540S)  |
|                | ML550           | ML550GS                        | CE 2.0 certified. CO/CPE EADs, 4x100/1000BT + 2x FE/Gig SFP <sup>3</sup> ports.<br>1x1PPS/CLK, GPS RX , SyncE &1588v2, 8x E1/T1 PWE.   |
|                | ML680DF         | ML680DFx                       | Compact, fanless, DIN railing CO/CPE EADs, 6x10/100 BT + 2x FE/Gig SFP <sup>3</sup>  |

<sup>1</sup> Note that the last digits of the ML600 model indicates the number of copper pairs supported    <sup>2</sup> ML644E/8E Certified, ML6416E CE 2.0 in progress  
<sup>3</sup> SFP modules are optional    \* ML698 can be also used as a CPE on PTMP or PTP configurations





## EFM Repeaters

Supporting up to 8 hops, Actelis' EFM Repeaters extend the reach of Ethernet services.



## Power Feeding Unit

Repeaters are line-powered from a remote Power Feeding Unit (PFU) directly connected to an Actelis Aggregation Switch or ML600 EAD.



## Broadband Amplifiers

Award-winning amplifiers significantly increase the reach of VDSL2, ADSL2+, ADSL2 and ADSL, delivering triple play services to residential customers.

## Ethernet in the First Mile (EFM) Repeaters

Actelis' EFM Repeaters are the world's most widely deployed 2-pair repeaters for 2Base-TL EFM systems. Actelis' XR239SE Repeater supports Dynamic Spectral Shaping (DSS) to ensure that it can be used in carrier EFM networks safely and reliably to significantly extend the reach of Carrier Ethernet services and minimize any spectral interference well below regional spectral requirements. Actelis' EFM Repeaters extend the distance service can be delivered to more than 9.5 miles, or 15 km, enabling more than 10 Mbps per pair of Ethernet services. They occupy a single slot in any industry-standard 239 mechanics enclosure or common European Carrier-grade enclosures. All Repeaters are compliant with IEEE 802.3ah EFM standards and global and regional spectral requirements, including the ANSI T1.417-2003 standard for Spectrum Management for Loop Transmission Systems by Telcordia.

## Broadband Amplifiers (BBA)

Actelis' family of Broadband Amplifiers (BBAs) includes ADSL (ABA) and VDSL (VBA) based models. Fully compatible with any vendors' DSLAM, these 'plug 'n play' line-powered devices enable service providers to offer triple play services to many more customers that were previously out of reach. Use of BBAs extends the operator's customer serving area (CSA), reducing the number of new and smaller DSLAMs that immediately translates into reduced CapEx, streamlines OpEx, and optimized roll out of triple play services. The BBAs can be used over one or two bonded pairs to extend and expand reach and rate of services.

The ABA can be used to expand ADSL/ADSL2/ADSL2+ services for loops up to 26 kft, when installed at a minimum of 5.3 kft from the CO and 2.7 kft from the CPE. The table below shows the differences between the various ABA models, each optimized for different loop scenarios. ABA 3.0 can be used to extend CAF II services up to 20 kft.

The VBA can be used to significantly enhance coverage and offer faster services for loops up to 10 kft, when installed at a minimum of 2.6 kft from the CO and 0.7 kft from CPE. VBA can be used to extend 25 Mbps up to 8.5 kft.

| BBA:                             | VBA-ER 3.0                     | ABA-SR 3.0  | ABA-SR 2.0                     | ABA-ER 2.0                    |
|----------------------------------|--------------------------------|---|--------------------------------|-------------------------------|
| DSL Standard                     | ITU G.993.2 VDSL2              | G.992.1 ADSL Annex A ; G.992.3 ADSL2 Annex A ; G.992.5 ADSL2+ Annex A |                                |                               |
| Loop Length Range                | 2.6 - 10.4 kft<br>0.8 - 3.3 km | 7.3 - 26.7 kft<br>2.2 - 6.1 km  | 9.3 - 26.7 kft<br>2.1 - 6.1 km | 15.3 - 34.7 kft<br>3.3 - 8 km |
| Placement distance from CO/DSLAM | 2.0 kft<br>0.6 km              | 5.3 - 16.7 kft<br>1.2 - 3.8 km  | 5.3 - 16.7 kft<br>1.2 - 3.8 km | 13.3 - 20 kft<br>1.8 - 4.5 km |
| Placement distance from CPE      | 0.6 kft<br>0.2 km              | 0.7 kft<br>0.2 km   | 2.7 kft<br>0.8 km              | 6.7 kft<br>2.0 km             |

1 - Assumes 24AWG or 0.4mm copper

## Network Management Simplified



With Actelis' MetaASSIST™ EMS and MetaASSIST™ View, network operators can easily scale and manage their network, accelerating time to service and increasing service availability while reducing OpEx and complexity. MetaASSIST EMS offers core management capabilities, including Redundancy, Fault, Configuration, Performance, and Security Management, all of which are in accordance with the ITU-Telecommunication Management Network (TMN) standard and FCAPS model. MetaASSIST View includes many enhancements far beyond conventional craft applications, thereby simplifying system installation and management. Features include Auto-Discovery, Graphical Bandwidth Utilization Tool, comprehensive on-line help, and step-by-step procedures.

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