	ML620i	ML620 / ML630	ML640/E ML540E	ML650S	ML740	ML520i
Description	• Ethernet Access Device for symmetrical, high-speed Ethernet over bonded copper • Optimized for CPE applications	• Ethernet Access Device for symmetrical, high-speed Ethernet over bonded-copper or fiber	• Advanced Ethernet Access Device for symmetrical, high-speed Ethernet over bonded-copper or fiber	• Integrated TDM & Ethernet Access Device for seamless migration from all-TDM to combined TDM and Ethernet Backhaul/ Service • Hybrid TDM/Copper/Fiber	• Advanced Ethernet Access Device for asymmetrical, high-speed Ethernet over bonded-copper or fiber	• Ethernet Access Device for symmetrical, high-speed Ethernet over fiber
Applications	Ethernet Services: • T1/E1 Line Replacement • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems	Backhaul: • DSLAM • MTU/MDU Ethernet Services: • T1/E1 Line Replacement • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems	Backhaul: • DSLAM • MTU/MDU Ethernet Services: • CE 2.0 services • T1/E1 Line Replacement • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems	Backhaul: • Mobile/Cell Site • DSLAM & PBX • MTU/MDU Ethernet Services: • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems	Backhaul: • DSLAM • MTU/MDU Ethernet Services: • T1/E1 Line Replacement • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems	Backhaul: • Mobile/Cell Site • DSLAM • MTU/MDU Ethernet Services: • T1/E1 Line Replacement • Transparent LAN Service • Fast Ethernet Access • Metro Ethernet Extension Private Campus Networks Intelligent Transportation Systems
Network Service I/F	• 4x10/100 Base-T	• 4x10/100 Base-T • 1x100/1000 Base-FX (ML638) • 1x100 Base-FX (ML628, ML624)	• 4x10/100/1000 Base-T (ML640E/540E) 4x10/100 Base-T (ML640) • 2x100/1000 Base-FX	• 4xE1/T1/CLK • 4x10/100 Base-T/CLK • 2x100/1000 Base-FX/CLK	• 4x10/100 Base-T • 2x100/1000 Base-FX	• 4x10/100 Base-T • 2x100/1000 Base-FX (ML530 only)
Copper I/Fs	• 4 , 2 or 1 copper pairs; 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• 8 copper pairs; 2Base-TL (IEEE 802.3ah / ITU-T G.998.2 over Extended G.SHDSL)	(Only ML640/E) • 16, 8 or 4 copper pairs • 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• 8 or 4 copper pairs; 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• 8, 4 or 2 copper pairs; 10BaseTS (IEEE 802.3ah /ITU-T G.998.2 over DSL/DMT)	• None
Topologies	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE)	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE)	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE) • Fiber Ring	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE) • Fiber Ring	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE) with 3rd party DSLAM • Fiber Ring	• Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE) • Fiber Ring (ML530 only)
Main Features	• IEEE 802.3ah Actelis EFMplus, Symmetrical Vectoring (DRB), Symmetrical Vectoring friendly and DSS - Symmetrical Vectoring /DSS only for ML6xx • Up to 1Gbps over Fiber • ML600 /ML640E - Up to 15 Mbps/pair, Up to 100 Mbps over 8 pairs • ML6416/E - Up to 15 Mbps/pair, Up to 230 Mbps over 16 pairs • ML700 - Up to 750 Mbps • Wire speed switching • L2 & L3 Classification • MEF 10 compliant, flexible service configuration capabilities • Advanced OA&M capabilities, including Y.1731, 802.1ag and 802.3ah ; Integrated test generator/analyzer with ML640E/ML640/ML6416/ML650S					
Regulatory Compliance/ Certifications	• CE 1.0 - MEF 9, 14 (ML600/E Series Certified; ML700/ML500 Compliant); MEF 18 (ML650 Certified) • CE 2.0 - ML640E: ML644E, ML648E, ML6416E - Certified, ML640 Certified (ML644, ML648, ML6416). ML500E, ML700, ML650 (ML658s, ML654s) Compliant • IEEE 802.3ah, ITU-T G.998.2 • ITU-T G.991.2, ETSI TS 101 524					
Spectral Compliance	• ITU-T G.991.2 (Annex A, B, F, G) • ETSI TS 101 524 (Annex E)					

CE 2.0 MEF CERTIFIED · **CE 1.0 MEF CERTIFIED** · **CARRIER ETHERNET MEF Certified Compliant** · **Pb RoHS 6 COMPLIANT**

	ML2300	ML230	ML690 /ML690E	XR239 Repeater	Broadband Amplifier (BBA)

Description	• Ethernet Aggregation Switch for symmetrical, high-speed Ethernet over bonded copper or fiber	• Ethernet Aggregation Switch for symmetrical, high-speed Ethernet over bonded copper or fiber	• Ethernet Access Device for symmetrical, high-speed Ethernet over bonded copper or fiber	• Industry's first EFM Repeater
				• Extend reach of high-bandwidth Ethernet services, covering 98% of all loops
					• Standards-based device installed at existing splice points of copper loops to deliver higher bandwidth DSL services much further from the CO or DSLAM
					  ° ADSL Broadband Amplifier (ABA) Supports ADSL2+/ADSL2/ADSL
					  ° VDSL2 Broadband Amplifier (VBA) Optimized for VDSL2

Applications	• Carrier-class, high availability applications • Optimized for high-density, medium-to-large COs • Intelligent Transportation Systems • Backhaul	• Carrier-class, high availability applications • Compact and optimized for high-density, medium-to-large COs or RTs • Intelligent Transportation Systems • Backhaul	• Carrier-class, high availability applications • Compact and optimized for small COs or RTs • Intelligent Transportation Systems • Backhaul	• Extending the reach and coverage of Ethernet over bonded-copper services for backhauling applications, and bushiness services	Broadband Services: • Delivering broadband services to unserved and under-served communities • Delivering higher bandwidth to support value-added services, like IPTV and OTT video • Delivering higher bandwidth further in the network for backhaul applications
Network Service I/F	• 10/100/1000 Base-T • 100/1000/2500 Base-FX	• 10/100/1000 Base-T • 100/1000/2500 Base-FX	• 10/100 Base-T • 100/1000 Base-FX	• N/A	• N/A
Copper I/Fs	• Up to 256 copper pairs, 128 HSLs per shelf • 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• Up to 128 copper pairs, 64 HSLs per shelf • 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• Up to 8 copper pairs per unit with ML690, Up to 16 copper pairs per unit with ML6916E • 2Base-TL (IEEE 802.3ah /ITU-T G.998.2 over Extended G.SHDSL)	• 2 copper pairs per repeater • 2Base-TL (IEEE 802.3ah / ITU-T G.998.2 over Extended G.SHDSL)	• Up to 2 ports per card
Topologies	• Point-to-multipoint (CO) • Stack • Ring	• Point-to-multipoint (CO) • Point-to-point (CO/RT) • Stack • Ring • Linear Add/Drop	• Point-to-multipoint (CO) • Point-to-point (CO/RT) • Point-to-multipoint (RT/CPE) • Stack • Linear Add/Drop	• Up to 8 repeaters (9 hops per link) • Up to 4 repeaters line powered with one Remote Power Feeding Unit (PFU) • Dual-side feeding Power feeding in both point-to-point and point-to-multipoint topologies	• Connected to DSLAM at the CO or Remote cabinet Flexible placement between CO and CPE • **ABA** - loop range is up to 26 kft (26 AWG). ABA solutions support short and long reach applications. • **VBA** - The VBA enables to expand high bandwidth services such as 25, 50 and 100 Mbps to more customers located further from the DSLAMs/COs Multiple • Various remote powering options inlcude: POTS, and +-190V as well as -48V
Main Features	• High-density solution: 64 ports /RU, up to 128 HSLs offering Ethernet over bonded-copper links • Bonding up to 32 pairs • Up to 15 Mbps/pair and in excess of 400 Mbps/link • Ethernet L2 network processor • Hybrid copper and fiber interfaces • Multiline card configuration • Fully redundant configuration • Carrier Grade		• Compact point-to-multipoint, Up to 4 HSLs • Up to 15 Mbps/pair, Up to 100 Mbps/link - ML698, up to 240 Mbps /link - ML6916E • Hybrid copper and fiber interfaces	• Above 10 Mbps/pair (Dependent on repeater spacing and/or copper quality) • DRB-friendly support • Fully managed • Outdoor hardened • Compliant to 239-based field enclosures and compatible with other customer-specific enclosures	• Transparent to existing CO and CPE equipment • No external power required; leverages POTS power • Passive Node Technology; no provisioning or active management required • Hardware bypass provides POTS protection • Environmentally hardened and waterproof for extreme environments • Very high MTBF • Enclosures 1 Card (2 ports) - Only for ABA card 2 cards (4 ports), 4 cards (8 ports) or 12 cards (24 ports)- E2-xx, E4-xx and E-12xx
Shared Features	• IEEE 802.3ah EFM • Actelis EFMplus, DRB, DRB-friendly and DSS • Up to 1Gbps over Fiber, Multiple fiber interfaces	• Wire speed switching • L2 & L3 Classification • IEEE 802.1Q VLAN and VLAN stacking			
Regulatory Compliance/ Certifications	• CE 1.0 - MEF 9, 14 • CE 2.0 - ML2300 / ML230 Certified • IEEE 802.3ah, ITU-T G.998.2 • ITU-T G.991.2 • ETSI TS 101 524 • FCC part 15 • UL 60950	• NEBS 3 • ITU-T K.20/K.21 • CE		• ANSI T1.417-2003 • IEEE 802.3ah, ITU-T G.998.2 • ITU-T G.991.2, ETSI TS 101 524 • FCC part 15 • UL 60950 • CE • ITU-T K.45 • NEBS 1	• ITU G.993.2 VDSL2 (bandplan 998, Annex A), G.992.5 ADSL2+ Annex A, G.992.3 ADSL2 Annex A, G.992.1 ADSL Annex A • CE–EMC and safety compliant • FCC part 15 class B certified • WEEE, RoHS compliant • IP-65 compliant
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			• Fully standards and spectrally compliant, including ANSI T1.417	• Fully standards and spectrally compliant

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