CHAPTER 26

ML-MR-10 Card Overview

This chapter provides an overview of the ML-MR-10 card for the Cisco ONS 15454 (SONET) and Cisco ONS 15454 SDH platforms. It lists Ethernet, SONET/SDH capabilities, Cisco IOS and Cisco Transport Controller (CTC) software features, with brief descriptions of selected features.

This chapter contains the following major sections:

ML-Series-Multirate (ML-MR-10) Card Description

The ML-MR-10 card is a multirate Layer 2 mapping module that provides 1:1 mapping of Ethernet ports to virtual circuits. The ML-MR-10 card has ten SFP connectors that support IEEE 802.3 compliant Ethernet ports at the ingress offering 10 Mbps, 100 Mbps, or 1000 Mbps rates.SFP modules are offered as separate orderable products for flexibility. The ML-MR-10 card supports only framed generic framing procedure (GFP-F) encapsulation for SONET.

The following section lists chapters that are common to the ML-Series (ML100T-2, ML100X-8, and ML1000-2) and the ML-MR-10 cards:

- Chapter 5, “Initial Configuration”
- Chapter 6, “Configuring Interfaces”
- Chapter 7, “Configuring CDP”
- Chapter 8, “Configuring POS”
- Chapter 12, “Configuring Link Aggregation”
- Chapter 14, “Configuring RMON”
- Chapter 15, “Configuring SNMP”

ML-MR-10 Card Feature List

Table 26-1 provides the list of features supported on the ML-MR-10 card.

Table 26-1 Features Supported on ML-MR-10 card

Feature	ML-MR-10
Layer 1 Data	Y (R 8.5 and above)
• IEEE 802.3z (Gigabit Ethernet) and IEEE 802.3x (Fast Ethernet) Flow Control	N
• IEEE 802.3ad Link Aggregation Control Protocol	Y
• 100BASE-FX full-duplex data transmission with Auto-MDIX (ML100X-8)	N
SONET/SDH	Y (R 8.5 and above)
• High-level data link control (HDLC)	N
• (GFP-F) framing mechanism for POS	Y
• POS virtual ports	Y (R 9.0 and above)
• LEX or Point-to-Point	Y
• Cisco HDLC	N
• Protocol/Bridging Control Protocol (PPP/BCP) encapsulation for POS	N
• VCAT with SW-LCAS	Y[1]
Layer 2 Feature Set	Y (R 8.5 and above)
• Transparent bridging	N
• MAC address learning, aging, and switching by hardware	N
• Protocol tunneling	N
• Multiple Spanning Tree (MST) protocol tunneling	N
• Integrated routing and bridging (IRB)	N
• IEEE 802.1Q-in-Q VLAN tunneling	Y
• IEEE 802.1D Spanning Tree Protocol (STP) and IEEE 802.1W Rapid Spanning Tree Protocol (RSTP)	N
• IEEE 802.1D STP instance per bridge group	N
• Ethernet over Multiprotocol Label Switching (EoMPLS)	N
• EoMPLS traffic engineering (EoMPLS-TE) with RSVP	N
• VLAN-transparent and VLAN-specific services (Ethernet Relay Multipoint Service [ERMS])	N
IEEE-RPR (802.17b)	Y (R 8.5 and above)

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Feature	ML-MR-10
• Bridging as specified in the IEEE 802.17b spatially aware sublayer amendment	N
• Shortest path forwarding through topology discovery	Y
• Addressing including unicast, multicast, and simple broadcast data transfers.	Y
• Bidirectional multicast frames flood around the ring using both east and west ringlets.	N
• The time to live (TTL) of the multicast frames is set to the equidistant span in a closed ring and the failed span in an open ring.	N
RPR-IEEE Service Qualities	Y (R 8.5 and above)
• Per-service-quality flow-control protocols regulate traffic introduced by clients.	Y
• Class A allocated or guaranteed bandwidth has low circumference-independent jitter.	Y
• Class B allocated or guaranteed bandwidth has bounded circumference-dependent jitter. This class allows for transmissions of excess information rate (EIR) bandwidths (with class C properties).	Y
• Class C provides best-effort services.	Y
RPR-IEEE Design Strategies Increase Effective Bandwidths Beyond Those of a Broadcast Ring	Y (R 8.5 and above)
• Clockwise and counterclockwise transmissions can be concurrent.	Y
• Bandwidths can be reallocated on nonoverlapping segments.	Y
• Bandwidth reclamation. Unused bandwidths can be reclaimed by opportunistic services.	Y
• Spatial bandwidth reuse. Opportunistic bandwidths are reused on nonoverlapping segments.	Y
• Temporal bandwidth reuse. Unused opportunistic bandwidth can be consumed by others.	Y
RPR-IEEE Fairness Features Ensure Proper Partitioning of Opportunistic Traffic	Y (R 8.5 and above)
• Weighted fairness allows a weighted fair access to available ring capacity.	Y
• Aggressive fairness is supported.	Y
• Single Choke Fairness Supports generation, termination, and processing of Single Choke Fairness frames on both spans.	Y

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Feature	ML-MR-10
• RPR-IEEE plug-and-play automatic topology discovery and advertisement of station capabilities allow systems to become operational without manual intervention.	Y
RPR-IEEE Multiple Robust Frame Transmissions	Y (R 8.5 and above)
• Service restoration time is less than 60 milliseconds after a station or link failure.	Y
• Queue and shaper specifications avoid frame loss in normal operation.	Y
• Fully distributed control architecture eliminates single points of failure.	Y
• Operations, administration, and maintenance support service provider environments.	Y
• EoMPLS on RPR-IEE	N
• IP forwarding on RPR-IEEE	N
• Wrapping, the optional IEEE 802.17b protection scheme	N
• Steering, the protection scheme	Y
• Layer 3 control path routing	N
Cisco Proprietary RPR	Y (R 8.5 and above)
• Ethernet frame check sequence (FCS) preservation for customers.	N
• Cyclic redundancy check (CRC) error alarm generation	N
• FCS detection and threshold configuration	N
• Shortest path determination	N
• Keep alives	N
EtherChannel Support	Y (R 8.5 and above)
• Bundling of ports	Y
• Load based on MAC addresses	Y
• Load Sharing based on incoming VLAN	Y
• Load sharing based on Port	N
• IRB	N
• IEEE 802.1Q trunking	Y
POS Channel	Y (R 8.5 and above)
• Bundling the two POS ports	N
• LEX encapsulation only	N
• IRB	N

Table 26-1 Features Supported on ML-MR-10 card

Feature	ML-MR-10
• IEEE 802.1Q trunking	N
Layer 3 Routing, Switching, and Forwarding	Y (R 8.5 and above)
• Default routes	N
• IP unicast and multicast forwarding	N
• Simple IP access control lists (ACLs) (both Layer 2 and Layer 3 forwarding path)	N
• Extended IP ACLs in software (control-plane only)	N
• IP and IP multicast routing and switching between Ethernet ports	N
• Reverse Path Forwarding (RPF) multicast (not RPF unicast)	N
• Load balancing among equal cost paths based on source and destination IP addresses	N
• IRB routing mode support	N
• IP host functionality	Y
Routing Protocols	Y (R 8.5 and above)
• Virtual Private Network (VPN) Routing and Forwarding Lite (VRF Lite)	N
• Intermediate System-to-Intermediate System (IS-IS) Protocol	N
• Routing Information Protocol (RIP and RIP II)	N
• Enhanced Interior Gateway Routing Protocol (EIGRP)	N
• Open Shortest Path First (OSPF) Protocol	N
• Protocol Independent Multicast (PIM)—Sparse, sparse-dense, and dense modes	N
• Secondary addressing	N
• Static routes	N
• Local proxy ARP	N
• Border Gateway Protocol (BGP)	N
• Classless interdomain routing (CIDR)	N
Quality of Service (QoS)	Y (R 8.5 and above)
• Multicast priority queuing classes	N
• Service level agreements (SLAs) with 1-Mbps granularity	Y
• Input policing	Y

Table 26-1 Features Supported on ML-MR-10 card

Feature	ML-MR-10
• Guaranteed bandwidth (weighted round-robin [WDRR] plus strict priority scheduling)	Y
• Low latency queuing support for unicast Voice-over-IP (VoIP)	Y
• Class of service (CoS) based on Layer 2 priority, Layer 3 Type of Service/DiffServ Code Point (TOS/DSCP)	Y
• CoS-based packet statistics	Y
Metro Ethernet Feature Set: Ethernet Virtual Circuits	Y (R 8.5 and above)
• Point-to-Point topology (UNI to UNI)	Y
• Attribute Discovery Frames (ATD) for VLAN mapping	Y
Security Features	Y (R 8.5 and above)
• Cisco IOS login enhancements	Y
• Secure Shell connection (SSH Version 2)	N
• Disabled console port	Y
• Authentication, Authorization, and Accounting/Remote Authentication Dial-In User Service (AAA/RADIUS) stand alone mode	Y
• AAA/RADIUS relay mode	Y
Additional Protocols	Y (R 8.5 and above)
• Cisco Discovery Protocol (CDP) support on Ethernet ports	Y
• Dynamic Host Configuration Protocol (DHCP) relay	N
• Hot Standby Router Protocol (HSRP) over 10/100 Ethernet, Gigabit Ethernet, FEC, GEC, and Bridge Group Virtual Interface (BVI)	N
• Internet Control Message Protocol (ICMP)	Y
Management Features	Y (R 8.5 and above)
• Cisco IOS	Y
• CTC	Y
• CTM	Y
• Remote monitoring (RMON)	Y
• Simple Network Management Protocol (SNMP)	Y
• Transaction Language 1 (TL1)	Y

Table 26-1 Features Supported on ML-MR-10 card

Feature	ML-MR-10
• Simultaneous performance monitoring (PM) counter clearing in Cisco IOS, CTC, and TL1	Y
System Features	Y (R 8.5 and above)
• Automatic field programmable gate array (FPGA) Upgrade	Y
• Network Equipment Building Systems 3 (NEBS3) compliant	Y
• Version up to independently upgrade individual cards	Y
CTC Features	Y (R 8.5 and above)
• Framing Mode Provisioning	N
• Standard STS/STM and VCAT circuit provisioning for POS virtual ports	Y (R 9.0 and above)
• SONET/SDH alarm reporting for path alarms and other ML-Series card specific alarms	Y
• Raw port statistics	Y
• Standard inventory and card management functions	Y
• J1 path trace	Y
• Cisco IOS CLI Telnet sessions from CTC	Y
• Cisco IOS startup configuration file management from CTC	Y

1. The ML-MR-10 card does not support interoperation between the LCAS and non-LCAS circuits..

The ML-MR-10 card was first released in version 8.5.