



## [Ether-Raptor Series ER-1010] 1Gb/10Gb Distributed Stacking Multilayer Ethernet Switch

*With its breakthrough distributed network technology, the ER-1010 is a high-performance, reliable, scalable, affordable switch.*

### Product Description

The ER-1010 is designed as a team player by scaling two to 16 interconnected members to create a single distributed switch fabric. A distributed switch fabric with two to 16 1U boxes provides unparalleled performance and reliability throughout its environment. The distributed switch can connect racks to racks in datacenters, floors to floors in enterprises, buildings to buildings and cities to cities in campus/metro environments. All of the capabilities and features of the ER-1010 are maintained even at distances of up to 80 km between switches (or further over CWDM/DWDM). Box-to-box communication is achieved through a Raptor Adaptive Switch Technology (RAST™) connection.

Physically, a RAST port is the high-performance interconnect link between boxes using standards-based off-the-shelf components for affordable connections. Conceptually, RAST is the high-performance backplane of the ER-1010 switch fabric. As each new box is RAST-connected, one contiguous distributed switch fabric is formed. This network appears to the outside world as a single switch with all switching and routing functions traversing the RAST backplane at wire speed.

### Performance

The ER-1010 is a high-performance 1-GbE and 10-GbE layer 2/3/4 switch with layer 2–4 data classification capabilities. In a fully loaded switch, the 1-GbE and 10-GbE wire-speed ports support a throughput of 119 million packets per second. The ER-1010's Quality of Service (QoS) packet processing combined with its low-latency hardware ensures an excellent solution for today's converged networks. QoS is deeply embedded with eight egress queues on each port to ensure priority to time-sensitive packets. Latency for a 64-byte packet going in and out of a single box is a remarkable 4.8 microseconds.

### Configurations

A fully loaded ER-1010 contains 24 1-Gbps Ethernet ports and six 10-Gbps ports with a modular design providing flexibility with options for copper and fiber ports. There are two slots with 12 ports each for the 1-Gbps Ethernet ports (copper or fiber) and two slots with three ports each for the 10-Gbps ports (copper, fiber, or RAST). Using 16U of rack space, a Raptor solution provides a 192-port GbE switch up to distances of 80 km. Ether-Raptor switches can also be configured with 32 10-GbE ports and 384 GbE ports with unsurpassed port density.

### Key Features:

• <b>Affordable</b>	• <b>Future Proof with Modular Construction</b>
• <b>Layer 2/3/4 Switch</b>	• <b>Data Classification Layer 2-4</b>
• <b>24 1-GbE Ports; Fiber and Copper Modules</b>	• <b>Six 10-Gbps Ports</b>
• <b>Distributed up to 80 km</b>	• <b>Up to 384 Gigabit Ethernet ports</b>
• <b>40 Gbps Trunks</b>	• <b>Jumbo Frames</b>

### Key Applications

• <b>Redundant 10-Gbps Backbone Switch</b>	• <b>Data Center</b>
• <b>Campus/Large Enterprise</b>	• <b>Metro Networks</b>
• <b>Server Farms</b>	• <b>Small-to-Medium Enterprise Solution</b>





## RaptorWare Specifications

### Switching

- IEEE 802.3ac – VLAN Tagging
- IEEE 802.3ad – Link Aggregation
- IEEE 802.1d – Spanning Tree
- IEEE 802.1w – Rapid Spanning Tree
- IEEE 802.1s – Multiple Spanning Tree GARP \ GMRP \ GVRP
- IEEE 802.1q – Virtual VLANs Port and Protocol based VLANs
- IEEE 802.1p – Priority
- IEEE 802.1x – Port Authentication
- IEEE 802.3x – Flow Control
- RFC 2865 - RADIUS Client
- RFC 2866 - RADIUS Accounting
- RFC 2868 - RADIUS Tunnel Support
- RFC 2869 - RADIUS Extensions
- rfc2869bis - RADIUS support for EAP
- IGMP Snooping
- Port Mirroring
- Broadcast Storm Recovery
- RFC 768 – UDP
- RFC 783 – TFTP
- RFC 791 – IP
- RFC 792 – ICMP
- RFC 793 – TCP
- RFC 826 – ARP
- RFC 951 – BOOTP
- RFC 2131 – DHCP Client

### Routing

- RFC 826 – Ethernet ARP
- RFC 894 – Transmission of IP over Ethernet
- RFC 896 – Congestion Control in IP/TCP Networks
- RFC 1058 – RIP v1
- RFC 1256 – ICMP Router Discovery Messages
- RFC 1321 – Message Digest Algorithm (MD5)
- RFC 1519 – CIDR

- RFC 1583 – OSPF v2
- RFC 1723 – RIP v2
- RFC 1812 – Requirements for IPv4 Routers
- RFC 2328 – OSPF v2 w/ Equal Cost Multipath support
- RFC 2338 – VRRP – Virtual Router Redundancy Protocol
- RFC 2453 – RIP v2
- RFC 3046 – DHCP/BootP Relay

### Multicast

- RFC 1112 – Host Ext for IP Multicasting IGMPv1
- RFC 2236 – IGMPv2
- RFC 2362 – PIM-SM
- IP Multicast Traceroute
- RFC 2365 – Administratively Scoped Multicast
- Draft-ietf-pim-v2-dm-03 – PIM-DM
- Draft-ietf-idmr-dvmp-v3-10 – DVMRP

### QoS

- Bandwidth Policing (Min and Max; per port/per VLAN)
- Committed Information Rate (CIR)
- Maximum Burst Rate (MBR)
- Per Port (Interface)
- Per VLAN
- Filtering (L3/L4 Access Lists)
- IP Classification – 6 Tuple Classification
- RFC 2474 – DiffServ Definition
- RFC 2475 – DiffServ Architecture
- RFC 2597 – Assured Forwarding PHB
- RFC 3246 – An Expedited Forwarding PHB
- RFC 3260 – New Terminology and Clarifications for DiffServ

### Management

- RFC 854 – Telnet
- RFC 855 – Telnet Option
- RFC 1155 – SMI v1
- RFC 1157 – SNMP v1
- RFC 1212 – Concise MIB Definitions
- RFC 1901 – Community based SNMP v2

- RFC 1905 – Protocol Operations for SNMP v2
- RFC 1906 – Transport Mappings for SNMP v2
- RFC 1907 – MIB for SNMP v2
- RFC 1908 – Coexistence between SNMPv1 & SNMP v2
- RFC 2576 – Coexistence between SNMP v1,v2, & v3
- RFC 1867 – HTML/2.0 Forms w/file upload extensions
- RFC 2068 – HTTP/1.1 protocol as updated by draft-ietf-http-v11-spec-rev-03
- RFC 2295 – Transparent Content Negotiation
- RFC 2296 – Remote Variant Selection
- RFC 3289 – Differentiated Services MIB
- RSVA/1.0 State Management cookies
- HTML 4.0 Specification - December 1997 Java & Script 1.3

### Switching Package MIBs

- RFC 1213 – MIB-II
- RFC 1493 – Bridge MIB
- RFC 1643 – Ethernet-like MIB
- RFC 2618 – RADIUS Authentication Client MIB
- RFC 2620 – RADIUS Accounting MIB
- RFC 2674 – VLAN MIB
- RFC 2819 – RMON Groups 1, 2, 3 & 9
- IEEE 802.1x MIB (IEEE8021-PAE-MIB)
- Ether-Raptor Enterprise MIB

### Routing Package MIBs

- RFC 1724 – RIP v2 MIB Extension
- RFC 1850 – OSPF MIB
- RFC 2233 – The Interfaces Group MIB Using SMI v2
- RFC 2787 – VRRP MIB

### Multicast Package MIBs

- Draft-ietf-idmr-dvmp-mib-11.txt - DVMRP
- RFC 2933 – IGMP
- RFC 2934 – PIM MIB for IPv4

## Product Specifications

### Certifications

IEC 60950-1	EN 60950-1
ANSI/UL 60950-1	CAN/CSA-C22.2 & 60950-1
EN 55024 Class A	EN 55022 Class A
EN 61000-3-2	EN 61000-3-3
FCC Subpart B, Class A	ILES-003, Class A

### Reliability

- Minimum 200,000 hrs MTBF, calculated

### Physical Dimensions

- (H) 1.75 in x (W) 17.50 in x (D) 20 in x 50.80 cm
- (H) 4.45 cm x (W) 44.50 cm x (D) 38.1 cm

### Environmental

- Storage Temperature: -40° to 70°C
- Operating Humidity: 10% to 95% relative humidity, non-condensing

### Electrical

- AC input 100–240 Vac, 3.5A, 50–60 Hz

Part Number	Description
ER-1010	Layer 2/3/4 switch w/ (2) open 12-port 1Gbps bays and (2) open 3-port 10Gbps bays, AC, 1U
1010-1GEC-12	1Gbps copper 10/100/1000Base-T RJ-45, 12-port
1010-1GEF-12	1Gbps fiber 1000Base-X SFP, 12-port (requires: SFP optic)
1010-10GRC-3	10Gbps copper RAST, 3-port (requires: copper RAST cable)
1010-10GRF-3	10Gbps fiber RAST, 3-port (requires: XFP Optic)
1010-10GEF-3	10Gbps fiber 10GBase-X, 3-port (requires: XFP Optic)
CAB-RAST-C1	RAST copper cable 1 Meter
SFP Pluggables	
OPT-SFP-300	1000 Base-X, 850nm up to 300m on MMF, LC connector
OPT-SFP-10K	1000 Base-X, 1310nm up to 10km on SMF, LC connector
OPT-SFP-55K	1000 Base-X, 1310nm up to 55km on SMF, LC connector
OPT-SFP-90K	1000 Base-X, 1550nm up to 90km on SMF, LC connector
OPT-SFP-BIDI	Bi-directional optic pair, 1000GBase-X, 1310nm and 1490nm, LC connector
XFP Pluggables	
OPT-XFP-300	10GBase-X, 850nm up to 300m on MMF, LC connector
OPT-XFP-10K	10GBase-X, 1310nm up to 10km on SMF, LC connector
OPT-XFP-40K	10GBase-X, 1310nm up to 40km on SMF, LC connector
OPT-XFP-80K	10GBase-X, 1310nm up to 80km on SMF, LC connector



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