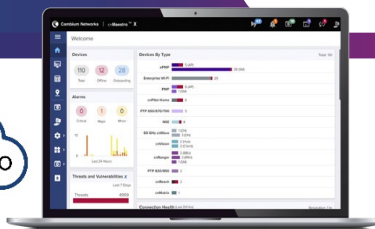


cnMatrix EX2000 Series Switches

EX2000 Series Quick Look

- Zero-touch deployments
- Policy-based automation
- Auto-device profiling and segmentation
- Non-blocking, line-rate architecture with fully featured L2/L3 switching



Cloud-Managed, Secure, Enterprise-Grade Switching

Cambium Networks' next-generation switching platform offers a cloud-managed, high-performance, feature-rich, enterprise-grade ethernet switching solution.

The cnMatrix™ platform of switches provides:

- Easy and simple, free cloud (or on-premise) management with cnMaestro™ Network Management.
- Zero-touch deployment of switches makes installation easy.
- Policy-based automation eliminates manual and time consuming configuration, during adds, moves, and changes of network devices.
- Enhanced security with automated device profiling and segmentation.
- Unified wired-wireless access solution.

The cnMatrix series of fully managed switches delivers full Layer 2 and Layer 3 capabilities with enhanced access security. Depending on the model, the cnMatrix EX2000 Series offers flexibility with SFP+ (10 Gbps) or SFP (1 Gbps) uplink ports. These switches come with a 5-year limited lifetime warranty.



cnMatrix EX2000 Series Switches

Specifications					
	EX2052-P	EX2016M-P	EX2028-P	EX2028	EX2010-P
Throughput	176 Gbps	86 Gbps	128 Gbps	128 Gbps	20 Gbps
Non-Blocking Throughput	✓	✓	✓	✓	✓
Forwarding Rate in Mpps (64 Byte Packets)	120	120	120	120	120
Packet Buffer	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB
10/100/1000 Ports	48	8	24	24	8
2.5G Ports (60W)	n/a	6	n/a	n/a	n/a
Energy-Efficient Ethernet	✓	✓	✓	✓	✓
Uplink Ports	4 SFP+	2 SFP+	4 SFP+	4 SFP+	2 SFP
PoE+ Enabled Ports 802.3af/at	48	8	24	n/a	8
PoE+ Enabled Ports 802.3af/at/bt (60W)	0	6	0	0	0
Serial Console	✓	✓	✓	✓	✓
USB	✓	✓	✓	✓	✓
Out-of-Band Management Port	✓	✓	✓	✓	✓
Rack Mount Kit	✓	✓	✓	✓	Optional
Internal Fans	3	2	2	Fanless	Fanless
Reset Button	✓	✓	✓	✓	✓
MAC Address Table Size	16K	16K	16K	16K	16K
Flash Storage	128 MB	128 MB	128 MB	128 MB	128 MB
DRAM	512 MB	512 MB	512 MB	512 MB	512 MB
VLANs (simultaneous)	4K	4K	4K	4K	4K
QinQ	Yes	Yes	Yes	Yes	Yes
QoS Priority Queues	8	8	8	8	8
PVRST	64	64	64	64	64
Ingress/Egress ACL	145	145	145	145	145
Static ARP Entries	512	512	512	512	512
ARP Entries	1000	1000	1000	1000	1000
Static Routes	64	64	64	64	64
Dynamic Routing	512	512	512	512	512
IGMP Multicast Groups	512	512	512	512	512
L3 Interfaces	64	64	64	64	64
Policy-Based Automation (PBA)	✓	✓	✓	✓	✓

cnMatrix EX2000 Series Switches

Specifications – All Models

Quality of Service	ACL mapping/marking of ToS/DSCP (COS)	Layer 2 Feature Set	802.1d, RSTP, 802.1s - MSTP, PVRST
	ACL mapping marking of 802.1p		ERPSv1–Ethernet Ring Protection Switching
	ACL mapping to priority queue		VLAN, port, protocol, 802.1q
	DiffServ support		QinQ
	Honoring DSCP and 802.1p (CoS)		Auto MDI/MDIX
	Traffic shaping/metering		BPDU guard, root guard, loop guard
	Priority queue management using Weighted Round Robin (WRR), Strict Priority (SP) and a combination of WRR and SP		BPDU filtering
Traffic Management	ACL-based inbound rate-limiting policies		IGMP snooping v1/v2/v3*, fast leave
	Broadcast, multicast, and unknown unicast rate limiting (storm control)		IGMP proxy
	Inbound rate limiting per port		LLDP/LLDP MED
	Outbound rate limiting per port/queue		Static MAC
Security	802.1x authentication		Flow control per port
	MAC authentication/MAB		Port mirroring/SPAN: Port based, ACL based, VLAN based
	Guest VLAN/failover VLAN authorization		Port isolation/private VLAN edge
	Local/radius authentication/authorization (dynamic VLAN assignment)		Link aggregation groups (static/LACP)
	Radius/Tacacs/Tacacs+		Jumbo frame (9K)
	Secure shell		DoS protection
	Secure copy (SCP)		Ping/Trace Route/ICMPv6
	Local username/password		
	Port security		
	DHCP snooping		
	Dynamic ARP inspection		
Security (ACL) Permit/deny actions for inbound IP and layer 2 traffic classification based on:	Source/destination IP address	Layer 3 Feature Set	Inter-VLAN routing
	TCP/UDP source/destination port		Static ARPs
	IP protocol type		Static routes
	Type of Service (ToS) or differentiated services (DSCP) field		DHCP relay w/multiple helpers per VLAN
	Source/destination MAC address		Dynamic routing – RIPv1/v2
	EtherType		Dynamic routing – OSPFv2
	IEEE 802.1p user priority		Route redistribution
	VLAN ID		
	RFC 1858—Security considerations for IP fragment filtering		
Management	cnMaestro	Out-of-band Ethernet management	TFTP/SFTP
	Industry standard Command Line Interface (CLI)	SSH/SSH v2	Telnet client/server
	DHCP client	SNMP v1/v2/v3	IPv6 management
	Embedded web management (HTTP/HTTPS)	Simple Network Time Protocol (SNTP)	Password management
	DHCP server	Local/remote system logging (syslog client)	
	USB file management and storage	Policy-based automation (PBA)	

* Feature to be included in a future release.

cnMatrix EX2000 Series Switches

Hardware Specifications

	EX2052-P	EX2016M-P	EX2028-P	EX2028	EX2010-P
Power Supply	100–240 VAC	100–240 VAC	100–240 VAC	100–240 VAC	100–240 VAC
Max Switch Power (with Traffic)	39.24W	26.76W	25.10W	19.50W	10.54W
MTBF (Hours)	238,063	385,242	285,350	432,283	338,917
Flash Storage	128 MB	128 MB	128 MB	128 MB	128 MB
DRAM	512 MB	512 MB	512 MB	512 MB	512 MB
Weight	5.4 kg (11.90 lb)	3.6 kg (7.93 lb)	3.96 kg (8.75 lb)	2.77 kg (6.1 lb)	1.99 kg (4.375 lb)
Dimensions	44 x 4.4 x 35 cm (17.3 x 1.75 x 13.78 in)	44 x 4.4 x 25 cm (17.3 x 1.75 x 9.85 in)	44 x 4.4 x 25 cm (17.3 x 1.75 x 9.85 in)	44 x 4.4 x 20.9 cm (17.3 x 1.75 x 8.22 in)	21 x 4.4 x 25 cm (8.26 x 1.75 x 9.85 in)
CPU Speed	800 MHz	800 MHz	800 MHz	800 MHz	800 MHz
LEDs per Port	Link/Activity, PoE	Link/Activity, PoE	Link/Activity, PoE	Link/Activity	Link/Activity, PoE
PoE+ Power Budget	400W	240W	400W	n/a	100W
PoE + Voltage	54V	5V	54V	n/a	54V
PoE Max Power per Port	30W	30W, 60W	30W	n/a	30W
Rack Mountable	Yes 1U	Yes 1U	Yes 1U	Yes 1U	Yes 1U
Temperature Ranges	0° to 50°C (32° to 122°F)	0° to 50°C (32° to 122°F)	0° to 50°C (32° to 122°F)	0° to 50°C (32° to 122°F)	0° to 50°C (32° to 122°F)
Operating Humidity	55° at 95% RH	55° at 95% RH	55° at 95% RH	55° at 95% RH	55° at 95% RH
Storage Temperature	-40° to 70°C (-40° to 158°F)	-40° to 70°C (-40° to 158°F)	-40° to 70°C (-40° to 158°F)	-40° to 70°C (-40° to 158°F)	-40° to 70°C (-40° to 158°F)

Acoustic Noise dBA per Switch (Ambient Temperature)

EX2052-P	48.5 dB - < 33°C, 51.3 dB - 30°C-40°C, 54.0 dB - > 43°C
EX2016M-P	44.4 dB - < 33°C, 46.9 dB - 30°C-40°C, 49.3 dB - > 43°C
EX2028-P	40 dB - < 33°C, 44.3 dB - 30°C-40°C, 52 dB - > 43°C
EX2028	Fanless
EX2010-P	Fanless

cnMatrix EX2000 Series Switches

IEEE Standards

Core Switching Features

IEEE 802.1ab—Link Layer Discovery Protocol (LLDP)
IEEE 802.1D—Spanning tree compatibility
IEEE 802.1p—Ethernet priority with user provisioning and mapping
IEEE 802.1s—Multiple spanning tree compatibility
IEEE 802.1Q—Virtual LANs with port-based VLANs
IEEE 802.1X—Port-based authentication
802.3az—Energy-efficient Ethernet

Advanced Layer 2 Features

Authentication, Authorization, and Accounting* (AAA)
IEEE 802.1ad (QinQ)
Broadcast/Multicast/Unknown unicast storm recovery
DHCP Snooping
IGMP Snooping Querier
Independent VLAN Learning (IVL) support
Jumbo Ethernet frame support
Port MAC locking
Port mirroring
Protected ports
Static MAC filtering

VLAN Support

IEEE 802.1W—Rapid spanning tree compatibility
IEEE 802.3—10BASE-T
IEEE 802.3u—100BASE-T
IEEE 802.3ab—1000BASE-T
IEEE 802.3ac—VLAN tagging
IEEE 802.3ad—Link aggregation
IEEE 802.3x —Flow control
Bridged Local Area Networks - Amendment 07: Multiple Registration Protocol

Layer 3 Features

Inter-VLAN Routing
Static ARP
Static Routes
RFC 2131 – DHCP Relay
RFC 2328 – OSPF Version 2
RFC 2453 – RIP Version 2

IEEE 802.1Q-2003

RFC 4541—Considerations for Internet, Group Management Protocol (IGMP), Snooping switches
ANSI/TIA-1057—LLDP-media endpoint discovery (MED)

*Feature to be included in a future release.

cnMatrix EX2000 Series Switches

System Facilities

Event and error logging facility	RFC 896—Congestion control in IP/TCP networks	RFC 2132—DHCP options and BOOTP vendor extensions
Run-time and configuration download capability	RFC 951—BOOTP	RFC 2819—Remote Network Monitoring Management Information Base
PING utility	RFC 1034—Domain names - concepts and facilities	RFC 2865—RADIUS client
FTP Transfers via IPv4/IPv6	RFC 1035—Domain names - implementation and specification	RFC 2869—RADIUS Extensions
RFC 768—UDP	RFC 1321—Message digest algorithm	RFC 3579—RADIUS support for EAP
RFC 783—TFTP	RFC 1534—Interoperability between BOOTP and DHCP	RFC 3580—IEEE 802.1X RADIUS usage guidelines
RFC 791—IP	RFC 2021—Remote network monitoring management information base version 2	RFC 3164—BSD syslog protocol
RFC 792—ICMP	RFC 2030—Simple Network Time Protocol (SNTP)	RFC 3580—802.1X RADIUS Usage Guidelines
RFC 793—TCP		
RFC 826—ARP		
RFC 894—Transmission of IP datagrams over Ethernet networks		

Management

SNMP v1, v2, and v3	RFC 4251—SSH protocol architecture	RFC 2818—HTTP over TLS
SSH 1.5 and 2.0	RFC 4716—SECSH public key file format	RFC 3268—AES cipher suites for transport layer security
RFC 4252—SSH authentication protocol	RFC 4419—Diffie-Hellman group exchange for SSH transport layer protocol	Telnet
RFC 4253—SSH transport layer protocol	RFC 2246—TLS protocol, version 1.0	Web GUI
RFC 4254—SSH connection protocol		

SNMP MIBs

Enterprise MIBs for Full Configuration Support of Switching Features	RFC 1213—MIB II	RFC 2618—RADIUS authentication client MIB	RFC 3273—RMON groups 1, 2, and 3
	RFC 1493—Bridge MIB	RFC 2674—VLAN MIB	RFC 3291—Textual conventions for internet network addresses
	RFC 1612—DNS resolver MIB extensions	RFC 2737—Entity MIB version 2*	RFC 3434—RMON Groups 1, 2, and 3
	RFC 1643—Definitions of managed objects for Ethernet-like interface types	RFC 2819—RMON groups 1, 2, 3, and 9	RFC 4022—TCP-MIB
	RFC 2233—Interfaces group MIB using SMI v2	RFC 2863—IF-MIB	RFC 4113—UDP-MIB
	RFC 2233—Interfaces group MIB using SMI v2	RFC 2925—Definitions of managed objects for remote ping, traceroute, and lookup operations	
	RFC 2613—SMON MIB		

Quality of Service MIBs	MIBs for full configuration support of DiffServ, ACL, and Cos functionality
	RFC 3289—Management information base for DiffServ architecture (read-only)

* Feature to be included in a future release.

cnMatrix EX2000 Series Switches

Quality of Service

Classify Traffic Based on Same Criteria as ACLs and Optionally

Mark the IP DSCP or precedence header fields

Police the flow to a specific rate with two- color aware support

RFC 2474—Definition of the differentiated services field (DS field) in the IPv4 and IPv6 headers

RFC 2475—An architecture for differentiated services

RFC 2597—Assured forwarding per-hop behavior



EX2010-P



EX2016M-P



EX2028



EX2028-P



EX2052-P



EX2052R-P / CRPS

cnMatrix EX2000 Series Switches

Ordering Information		
Type	Part #	Description
Switch	MXEX2052GxxA00	Intelligent Ethernet Switch, 48 x 1 Gbps and 4 SFP+ - no power cord
Switch	MXEX2052GxPA00	Intelligent Ethernet PoE Switch, 48 x 1 Gbps and 4 SFP+ Fixed 540 - no power cord
Switch	MXEX2016MxPA00	Intelligent Ethernet PoE Switch, 8 x 1 Gbps + 6 x 2.5 Gbps + 2 x SFP+, no power cord
Switch	MX-EX2028PxA-0	Intelligent Ethernet PoE Switch, 24 x 1 Gbps and 4 SFP+ fiber ports - no power cord
Switch	MX-EX2028xxA-0	Intelligent Ethernet Switch, 24 x 1 Gbps and 4 SFP+ fiber ports - no power cord
Switch	MX-EX2010PxA-0	Intelligent Ethernet PoE Switch, 8 x 1 Gbps and 2 SFP fiber ports - no power cord
Switch	MX-EX2010xxA-0	Intelligent Ethernet Switch, 8 x 1 Gbps and 2 SFP fiber ports - no power cord
CRPS	MXCRPSAC600A0	600W total Power, no power cord
CRPS	MXCRPSAC930A0	930W total Power, no power cord
CRPS	MXCRPSAC1200A0	1200W total Power, no power cord
CRPS	MXCRPSDC600A0	600W total Power, 36v–72v, includes 3m cable connector
CRPS	MXCRPSDC930A0	930W total Power, 36v–72v, includes 3m cable connector
CRPS	MXCRPSDC1200A0	1200W total Power, 36v–72v, includes 3m cable connector
Power Cord	N000900L092A	AC line cord, US Type B, 15A, 1.2 m C13 connector
Rack Mount	MX-EXTXHALFA-0	Half-width switch rack mount kit
Rack Mount	MX-EXTXFULLA-1	Full-width switch rack mount kit
Transceiver	SFP-10G-SR	10G SFP+ MMF SR Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F)
Transceiver	SFP-1G-SX	1G SFP MMF SX Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F)
Transceiver	SFP-10G-LR	10G SFP+ SMF LR Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F)
Transceiver	SFP-1G-LX	1G SFP SMF LX Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F)
Transceiver	SFP-1G-Copper	1000Base-T (RJ45) SFP Transceiver. -40°C to 85°C (-40°F to 185°F)
Transceiver	SFP-10G-Copper	10G Base-T (RJ45) SFP Transceiver. 0°C to 70°C (-40°F to 185°F)
Cambium Care Advanced	CCADV-SUP-xxx	Cambium Care Advanced, 1, 3 or 5-year support for one cnMatrix switch. 24x7 TAC support, SW updates, and NBDS advance replacement for HW
Cambium Care Pro	CCPRO-SUP-xxx	Cambium Care Pro, 1, 3 or 5-year support for one cnMatrix switch. 24x7 TAC support and SW updates

ABOUT CAMBIUM NETWORKS

Cambium Networks enables service providers, enterprises, industrial organizations, and governments to deliver exceptional digital experiences and device connectivity with compelling economics. Our ONE Network platform simplifies management of Cambium Networks' wired and wireless broadband and network edge technologies. Our customers can focus more resources on managing their business rather than the network. We make connectivity that just works.

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