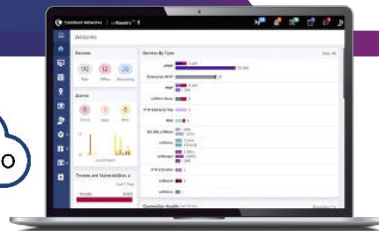


cnMatrix EX2000 Series Switches

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

Access Point Specifications								
	EX2052	EX2052-P	EX2052R-P	EX2016M-P	EX2028-P	EX2028	EX2010-P	EX2010
Throughput	176 Gbps	176 Gbps	176 Gbps	86 Gbps	128 Gbps	128 Gbps	20 Gbps	20 Gbps
Forwarding Rate in Mpps (64 Byte Packets)	120	120	120	120	120	120	120	120
Packet Buffer	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB	1.5 MB
10/100/1000 Ports	48	48	48	8	24	24	8	8
2.5 G Ports	n/a	n/a	n/a	6	n/a	n/a	n/a	n/a
Energy Efficient Ethernet	✓	✓	✓	✓	✓	✓	✓	✓
Uplink Ports	4 SFP+	4 SFP+	4 SFP+	2 SFP+	4 SFP+	4 SFP+	2 SFP	2 SFP
PoE+ Enabled Ports 802.3af/at	n/a	48	48	8	24	n/a	8	n/a
PoE+ Enabled Ports 802.3af/at/bt	0	0	0	6	0	0	0	0
Serial Console	✓	✓	✓	✓	✓	✓	✓	✓
USB	✓	✓	✓	✓	✓	✓	✓	✓
Out-of-Band Management Port	✓	✓	✓	✓	✓	✓	✓	✓
Rack Mount Kit	✓	✓	✓	✓	✓	✓	Optional	Optional
Internal Fans	1	3	2	2	2	Fanless	Fanless	Fanless
Reset Button	✓	✓	✓	✓	✓	✓	✓	✓
MAC Address Table Size	16K	16K	16K	16K	16K	16K	16K	16K
Flash Storage	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB
DRAM	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB
VLANs (simultaneous)	4K	4K	4K	4K	4K	4K	4K	4K
QinQ	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
LACP/Trunking	8 LAGs/8 links per LAG							
QoS Priority Queues	8	8	8	8	8	8	8	8
PVRST	64	64	64	64	64	64	64	64
Ingress/Egress ACL	145	145	145	145	145	145	145	145
Static ARP Entries	512	512	512	512	512	512	512	512
ARP Entries	1000	1000	1000	1000	1000	1000	1000	1000
Static Routes	64	64	64	64	64	64	64	64
Dynamic Routing	512	512	512	512	512	512	512	512
IGMP Multicast Groups	512	512	512	512	512	512	512	512
Policy Based Automation	✓	✓	✓	✓	✓	✓	✓	✓

cnMatrix EX2000 Series Switches

Specifications – All Models

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

* Feature to be included in a future release.

cnMatrix EX2000 Series Switches

Hardware Specifications								
	EX2052	EX2052-P	EX2052R-P	EX2016M-P	EX2028-P	EX2028	EX2010-P	EX2010
Power Supply	100–240 VAC	100–240 VAC	CRPS dependent	100–240 VAC	100–240 VAC	100–240 VAC	100–240 VAC	100–240 VAC
Max Switch Power (with Traffic)	38.88W	39.24W	46.98W	26.76W	25.10W	19.50W	10.54W	9.88W
MTBF (Hours)	393,648	238,063	202,977	385,242	285,350	432,283	338,917	806,354
Flash Storage	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB	128 MB
DRAM	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB	512 MB
Weight	3.6 kg (7.93 lb)	5.4 kg (11.90 lb)	4.3 kg (9.48 lb) or 5.2 kg (11.46 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)	1.6 kg (3.5375 lb)
Dimensions	44 x 4.4 x 25 cm (17.3 x 1.75 x 9.85 in)	44 x 4.4 x 35 cm (17.3 x 1.75 x 13.78 in)	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)	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	800 MHz	800 MHz	800 MHz
LEDs per Port	Link/Activity	Link/Activity, PoE	Link/Activity, PoE	Link/Activity, PoE	Link/Activity, PoE	Link/Activity	Link/Activity, PoE	Link/Activity
PoE+ Power Budget	n/a	400W	CRPS dependent	240W	400W	n/a	100W	n/a
PoE + Voltage	n/a	54V	54V	5V	54V	n/a	54V	n/a
PoE Max Power per Port	n/a	30W	30W	30W, 60W	30W	n/a	30W	n/a
Rack Mountable	Yes 1U	Yes 1U	Yes 1U	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)	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	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)	-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	40.9 dB - < 33°C, 44.2 dB - 30°C-40°C, 47.3 dB - > 43°C
EX2052-P	48.5 dB - < 33°C, 51.3 dB - 30°C-40°C, 54.0 dB - > 43°C
EX2052R-P	1200W CRPS: 74.5 dB - < 33°C, 74.3 dB - 30°C-40°C, 74.3 dB - >43°C, 930W CRPS: 70.8 dB - < 33°C, 70.7 dB - 30°C-40°C, 70.7 dB - > 43°C, 600W CRPS: 67.2 dB - < 33°C, 67.3 dB - 30°C-40°C, 67.5 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
EX2010	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
	RVC 2613—SMON MIB	RFC 2925—Definitions of managed objects for remote ping, traceroute, and lookup operations	
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



EX2010-P



EX2016M-P



EX2028



EX2028-P



EX2052



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	MXEX2052GxPA10	Intelligent Ethernet PoE Switch, 48 x 1 Gbps and 4 SFP+, Removable Power Supply (not included) - 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.

cambiumnetworks.com