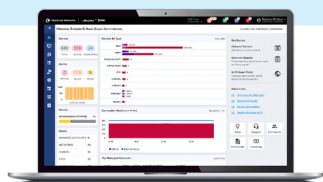


cnMatrix™ TX2000 Series Switches

QUICK LOOK:

- **Cloud Managed**
- **Non-Blocking, Fully Managed, Enterprise Grade, L2/L3 switch**
- **Cambium (GPS) Sync – Redundant dual sources**
- **Comprehensive/Intelligent PoE Solution**
- **Dual redundant AC/DC removable Power supplies**



cnMaestro™
XMS

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:

- Full Line Rate, non-blocking architecture
- Easy and simple, free cloud (or on premise) management with cnMaestro™ or XMS*
- Zero-touch deployment of switches makes installation easy
- Policy Based Automation eliminates manual and time consuming configuration
- Enhanced Security with automated device profiling and segmentation
- Policy Based Automation eliminates manual configuration during adds, moves and changes of network devices
- Unified Wired-Wireless access solution

* Feature to be included in a future release.



The cnMatrix TX Series of Switches provides the following addition functionality:

Cambium Sync

- Redundant Input Sync sources
 - » Internal GPS module (with external antenna)
 - » cnPulse
- Full per-port control with stats available

Comprehensive/Intelligent PoE solution

- 802.3af/at/bt - up to 90W
- 24V Passive PoE - up to 15W
- 54V Passive PoE - up to 90W

Dual redundant removable power supplies AC supplies

- 600W, 930W, & 1200W options

DC supplies

- Fully Isolated – Supports positive/negative input voltages
- 36V–72V
- 600W, 930W, & 1200W options
- Grounding lug nut located on front panel

All interfaces located on front panel

The cnMatrix series of fully managed switches delivers full Layer 2 and Layer 3 capabilities with enhanced access security. The cnMatrix series offers flexibility with SFP+ (10 Gbps) or SFP (1 Gbps) uplink ports. These switches come with a 3-Year Limited Lifetime Warranty.

cnMatrix™ TX2000 Series Switches

Specifications			
	TX2012R-P	TX2020R-P	TX2028RF-P
Throughput	96 Gbps	112 Gbps	128 Gbps
Forwarding Rate in Mpps (64 Byte Packets)	120	120	120
10/100/1000 Mbps RJ45 Ports	8	16	16
1 Gbps Fiber Ports (SFP)	0	0	8
10 Gbps Fiber Ports (SFP+)	4	4	4
PoE+ Enabled Ports 802.3af/at/bt	8	16	16
Low Voltage Passive PoE (24 V)	4	8	8
High Power 4 PPoE (up to 90 W)	4	8	8
Serial Console	Yes	Yes	Yes
USB	Yes	Yes	Yes
Rack Mount Kit	No (optional accessory)	Yes	Yes
Internal Fans	2	2	2
Reset Button	Yes	Yes	Yes
MAC Address Table Size	16K	16K	16K
Flash Storage	128 MB	128 MB	128 MB
DRAM	512 MB	512 MB	512 MB
VLANs	4K	4K	4K
QinQ*	Yes	Yes	Yes
LACP/Trunking	8 LAGs/8 links per LAG	8 LAGs/8 links per LAG	8 LAGs/8 links per LAG
QoS Priority Queues	8	8	8
PVRST	32	32	32
Ingress/Egress ACL	128	128	128
Static ARP Entries	512	512	512
ARP Entries	512	512	512
Static Routes	64	64	64
Dynamic Routing	512	512	512
IGMP Multicast Groups	256	256	256
Policy Based Automation	Yes	Yes	Yes
Cambium Sync (via RJ45 ports)	8	16	16
Redunant Sync Sources	Yes	Yes	Yes
External Antenna Port	Yes	Yes	Yes
cnPulse Port	Yes	Yes	Yes
Removable Power Supply (CRPS)	1	2	1
Redundant Power Supplies	No	Yes	No

* Feature to be included in a future release.

cnMatrix™ TX2000 Series Switches

Hardware Specifications			
	TX2012R-P	TX2020R-P	TX2028RF-P
Power Supply	CRPS dependent	CRPS dependent	CRPS dependent
Max Switch Power (WITH TRAFFIC)	38.88W	39.24W	46.98W
MTBF (hours)	393648	250744	202977
Unit Weight	2.24 kg (4.98 lbs)	4.3 kg (9.46 lbs)	TBD
Unit Dimensions (H x L x W)	4.4 x 25 x 26 cm (1.73 x 9.84 x 10.24 in)	4.4 x 35 x 44 cm (17.3 x 1.75 x 17.32 in)	4.4 x 35 x 44 cm (17.3 x 1.75 x 17.32 in)
Boxed Weight	2.73 kg (6 lbs)	5.35 kg (11.77 lbs)	TBD
Boxed Dimensions (H x L x W)	9.2 x 37.5 x 31.5 cm (3.62 x 14.76 x 12.4 in)	12.8 x 55.1 x 48.5 cm (5.04 x 21.69 x 19.09 in)	12.8 x 55.1 x 48.5 cm (5.04 x 21.69 x 19.09 in)
CPU Speed	800 MHz	800 MHz	800 MHz
LEDs per port	Link/Activity, PoE	Link/Activity, PoE	Link/Activity, PoE
PoE Power Budget	CRPS dependent (see table)	CRPS dependent (see table)	CRPS dependent (see table)
802.3af/at/bt PoE (54V)	Ports 1–8	Ports 1–16	Ports 1–16
24V Passive PoE - up to 15W	Ports 5–8	Ports 9–16	Ports 9–16
54V Passive PoE - up to 90W	Ports 1–4	Ports 1–8	Ports 1–8
54V Passive PoE - up to 30W	Ports 1–4	Ports 9–16	Ports 9–16
PoE Max Power Per Port	30W/90W	30W/90W	30W/90W
Rack Mountable	Not included	Yes 1U	Yes 1U
Wall Mountable	Yes (Optional Accessory)	Yes	Yes
Temperature Ranges	-10°C up to 65°C	-10°C up to 65°C	-10°C up to 65°C
Operating Humidity	55°C at 95% RH	55°C at 95% RH	55°C at 95% RH
Storage Temperature	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)	-40°C to 70°C (-40°F to 158°F)

cnMatrix™ TX2000 Series Switches

Specifications - All Models

Quality of Service	ACL mapping and marking of ToS/DSCP (COS)	Layer 2 Feature Set	802.1s multiple spanning tree
	ACL mapping marking of 802.1p		VLAN, Port, Protocol, 802.1q
	ACL mapping to priority queue		QinQ*
	DiffServ support		802.1d
	Honoring DSCP and 802.1p (CoS)		802.1x authentication
	Traffic shaping/metering		Auto MDI/MDIX
	Priority queue management using Weighted Round Robin (WRR), Strict Priority (SP) and a combination of WRR and SP		BPDU Guard, Root Guard
Traffic Management	ACL-based inbound rate limiting policies		IGMP Snooping v1/v2/v3*, Fast Leave
	Broadcast, multicast and unknown unicast rate limiting		LLDP/LLDP MED
	Inbound rate limiting per port		IGMP Proxy
	Outbound rate limiting per port/queue		Static MAC
Security	802.1x authentication		Flow Control per port
	MAC authentication*		Per VLAN STP (PVST/PVRST)
	DHCP snooping		Port Mirroring: port based, ACL based, VLAN based
	RADIUS authentication/authorization		Port Isolation/Private VLAN Edge
	Radius/Tacacs/Tacacs+		Link Aggregation Groups (Static/LACP)
	Authentication, Authorization, and Accounting (AAA)		Rate Limiting/Storm Control
	Secure shell		Jumbo frame (9k)
	Secure copy (SCP)*		DHCP Snooping
	Local username/password		BPDU filtering
			Broadcast/Multicast/Unlearned Unicast (Storm Control)
Layer 3 Feature Set	Inter-VLAN Routing		DoS Protection
	Static ARPs		Ping/TraceRoute/ICMPv6
	Static Routes		
	DHCP Relay		
		Dynamic Routing – RIPv1/v2	
		Dynamic Routing – OSPFv2	
		Route Redistribution	

* Feature to be included in a future release.

cnMatrix™ TX2000 Series Switches

Specifications - All Models cont'd

Management

cnMaestro cloud management	DHCP relay
XMS* cloud management	Simple Network Time Protocol (SNTP)
Industry standard Command Line Interface (CLI)	Local/remote system logging
DHCP Client	Policy Based Automation
Embedded web management (HTTP/HTTPS)	Display log messages multiple terminals*
Embedded DHCP server	TFTP/SFTP
USB file management and storage	Telnet client/server
Out-of-Band Ethernet Management	IPv6 management
SSH / SSH v2	Password management
SNMP v1/v2/v3	Autoinstall support for firmware images and config files

Security

PERMIT/DENY
ACTIONS FOR
INBOUND IP AND
LAYER 2 TRAFFIC
CLASSIFICATION
BASED ON:

Source/Destination IP address	EtherType
TCP/UDP Source/Destination port	IEEE 802.1p user priority
IP Protocol Type	VLAN ID
Type of Service (ToS) or differentiated services (DSCP) field	RFC 1858—Security Considerations for IP Fragment Filtering
Source/Destination MAC address	

* Feature to be included in a future release.

Acoustic Noise dBA Per Switch (Ambient Temperature)

TX2012R-P

AC CRPS

1 x 1200W AC: 52.7 dB < 33°C, 52.8 dB 33°C-43°C, 53.5dB - >43°C,

1 x 930W AC: 51.3 dB < 33°C, 51.6 dB 33°C-43°C, 52dB - >43°C,

1 x 600W AC: 60 dB < 33°C, 59.8dB 33°C-43°C, 59.6dB - >43°C,

DC CRPS

1 x 1200W DC: 69.2 dB < 33°C, 70.5dB 33°C-43°C, 70.6dB - >43°C,

1 x 930W DC: 64.3 dB < 33°C, 68.5 dB 33°C-43°C, 68.5dB - >43°C,

1 x 600W DC: 59 dB < 33°C, 65.5 dB 33°C-43°C, 65.5dB - >43°C,

TX2028RF-P

AC CRPS

1 x 1200W AC: 70.3dB < 33°C, 70.3dB 33°C-43°C, 70.1dB - >43°C

1 x 930W AC: 68.6 dB < 33°C, 68.6dB 33°C-43°C, 68.6dB - >43°C,

1 x 600W AC: 58.6 dB < 33°C, 58.7dB 33°C-43°C, 58.9dB - >43°C,

DC CRPS

1 x 1200W DC: 69.2 dB < 33°C, 73.7 dB 33°C-43°C, 73.9 dB - >43°C,

1 x 930W DC: 66.5 dB < 33°C, 69.7dB 33°C-43°C, 69.8dB - >43°C,

1 x 600W DC: 59.3 dB < 33°C, 67dB 33°C-43°C, 67.1dB - >43°C,

TX2020R-P

AC CRPS

1 x 1200W AC : 71.4 dB < 33°C, 71.5dB 33°C-43°C, 71.5dB - >43°C,

2 x 1200W AC : 55.6 dB < 33°C, 55.7dB 33°C-43°C, 56.1dB - >43°C,

1 x 930W AC : 67.9 dB < 33°C, 68.0dB 33°C-43°C, 68.1dB - >43°C,

2 x 930W AC : 54.8 dB < 33°C, 55.1dB 33°C-43°C, 55.4dB - >43°C,

1 x 600W AC : 58.2 dB < 33°C, 58.4dB 33°C-43°C, 58.6dB - >43°C,

2 x 600W AC : 52.8 dB < 33°C, 53.3dB 33°C-43°C, 53.9dB - >43°C,

DC CRPS

1 x 1200W DC : 68.9 dB < 33°C, 71.2dB 33°C-43°C, 71.2dB - >43°C,

2 x 1200W DC : 72.9 dB < 33°C, 74.0dB 33°C-43°C, 74.0dB - >43°C,

1 x 930W DC : 64.3 dB < 33°C, 68.9dB 33°C-43°C, 68.9dB - >43°C,

2 x 930W DC : 61.3 dB < 33°C, 68.6dB 33°C-43°C, 68.7dB - >43°C,

1 x 600W DC : 60.7 dB < 33°C, 66.6dB 33°C-43°C, 66.7dB - >43°C,

2x600W DC : 55.8 dB < 33°C, 67.3dB 33°C-43°C, 67.3dB - >43°C,

cnMatrix™ TX2000 Series Switches

Type (AC/DC) PoE Load Temperature

AC < 700W up to 65

AC > 700W up to 60

DC < 700W up to 60

DC > 700W up to 55

Power Supply	Type (AC/DC)	Available PoE Load	PoE Load	Temperature
1200W	AC	~1000W	<700W	-10°C up to 65°C
1200W	AC	~1000W	>700W	-10°C up to 65°C
1200W	DC	~960W	<700W	-10°C up to 65°C
1200W	DC	~960W	>700W	-10°C up to 65°C
930W	AC	~800W	<600W	-10°C up to 65°C
930W	AC	~800W	>600W	-10°C up to 65°C
930W	DC	~840W	<600W	-10°C up to 65°C
930W	DC	~840W	>600W	-10°C up to 65°C
600W	AC	~500W	<450W	-10°C up to 65°C
600W	AC	~500W	>450W	-10°C up to 65°C
600W	DC	~500W	<450W	-10°C up to 65°C
600W	DC	~500W	>450W	-10°C up to 65°C

Part #	Power Supply	Type (AC/DC)	DC-in Voltage	Available PoE Load	High-Temp Mode	Normal Mode
MXCRPSAC1200A0	1200W (110V)	AC	NA	900W	700W	900W
MXCRPSAC1200A0	1200W (220V)	AC	NA	960W	700W	960W
MXCRPSDC1200A0	1200W	DC	48–72V	960W	700W	960W
MXCRPSDC1200A0	1200W	DC	36–47V	740W	700W	740W
MXCRPSAC930A0	930W	AC	NA	840W	600W	840W
MXCRPSDC930A0	930W	DC	48–72V	840W	600W	840W
MXCRPSDC930A0	930W	DC	36–47V	740W	600W	740W
MXCRPSAC600A0	600W	AC	NA	500W	450W	500W
MXCRPSDC600A0	600W	DC	48–72V	500W	450W	500W
MXCRPSDC600A0	600W	DC	36–47V	500W	450W	500W

cnMatrix™ TX2000 Series Switches

IEEE Standards

Switching

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

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

IEEE 802.1Q-2003

RFC 4541—Considerations for Internet Group Management Protocol (IGMP) Snooping Switches
ANSI/TIA-1057—LLDP-MEDia Endpoint Discovery (MED)

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

Layer 3 Features

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

* Feature to be included in a future release.

cnMatrix™ TX2000 Series Switches

System Facilities

Event and error logging facility

Run-time and configuration download capability

PING utility

FTP Transfers via IPv4/IPv6

RFC 768—UDP

RFC 783—TFTP

RFC 791—IP

RFC 792—ICMP

RFC 793—TCP

RFC 826—ARP

RFC 894—Transmission of IP datagrams over Ethernet networks

RFC 896—Congestion control in IP/TCP networks

RFC 951—BOOTP

RFC 1034—Domain names - concepts and facilities

RFC 1035—Domain names - implementation and specification

RFC 1321—Message digest algorithm

RFC 1534—Interoperability between BOOTP and DHCP

RFC 2021—Remote network monitoring management information base version 2

RFC 2030—Simple Network Time Protocol (SNTP)

RFC 2132—DHCP options and BOOTP vendor extensions

RFC 2819—Remote Network Monitoring Management Information Base

RFC 2865—RADIUS client

RFC 2869—RADIUS Extensions

RFC 3579—RADIUS support for EAP

RFC 3580—IEEE 802.1X RADIUS usage guidelines

RFC 3164—BSD syslog protocol

RFC 3580—802.1X RADIUS Usage Guidelines

* Feature to be included in a future release.

Management

SNMP v1, v2, and v3

SSH 1.5 and 2.0

RFC 4252—SSH authentication protocol

RFC 4253—SSH transport layer protocol

RFC 4254—SSH connection protocol

RFC 4251—SSH protocol architecture

RFC 4716—SECSH public key file format

RFC 4419—Diffie-Hellman group exchange for SSH transport layer protocol

SSL 3.0 and TLS 1.2

RFC 2246—TLS protocol, version 1.2

RFC 2818—HTTP over TLS

RFC 3268—AES cipher suites for transport layer security

Telnet

Web GUI

cnMatrix™ TX2000 Series Switches

SNMP MIBs

Enterprise MIBs for Full Configuration Support of Switching Features

RFC 1213—MIB II

RFC 1493—Bridge MIB

RFC 1612—DNS resolver MIB extensions

RFC 1643—Definitions of managed objects for Ethernet-like interface types

RFC 2233—Interfaces group MIB using SMI v2

RFC 2613—SMON MIB

RFC 2618—RADIUS authentication client MIB

RFC 2674—VLAN MIB

RFC 2737—Entity MIB version 2*

RFC 2819—RMON groups 1, 2, 3, and 9

RFC 2863—IF-MIB

RFC 2925—Definitions of Managed Objects for Remote Ping, Traceroute, and Lookup Operations

RFC 3273—RMON Groups 1, 2, and 3

RFC 3291—Textual conventions for Internet network addresses

RFC 3434—RMON Groups 1, 2, and 3

RFC 4022—TCP-MIB

RFC 4113—UDP-MIB

* Feature to be included in a future release.

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)

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

cnMatrix™ TX2000 Series Switches

Ordering Information

Type	Model	Part Number	Description
Switch	TX2012R-P	MXTX2012GxPA10	Intelligent Ethernet PoE Switch, Cambium Sync, 8 x 1 Gbps, and 4 SFP+, Removable Power Supply (not included) - no pwr cord
Switch	TX2020R-P	MXTX2020GxPA10	Intelligent Ethernet PoE Switch, Cambium Sync, 16 x 1 Gbps and 4 SFP+, Removable & Redundant Power Supplies (not included) - no pwr cord
Switch	TX2028RF-P	MXTX2028GFPA10	Intelligent Ethernet PoE Switch, Cambium Sync, 16 x 1 Gbps, 8 x SFP, and 4 SFP+, Removable Power Supply (not included) - no pwr cord
CRPS	AC	MXCRPSAC600A0	600W total power, no power cord
CRPS	AC	MXCRPSAC930A0	930W total power, no power cord
CRPS	AC	MXCRPSAC1200A0	1200W total power, no power cord
CRPS	DC	MXCRPSDC600A0	600W total Power, 36v–72v, includes 3m cable connector
CRPS	DC	MXCRPSDC930A0	930W total Power, 36v–72v, includes 3m cable connector
CRPS	DC	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
Power Cord		N000900L040A	AC line cord, US Type B, 1.2m C13 connector
Rack Mounts		MX-RACK-TX2K-0	48.26 cm (19 in) Rack mount kit for cnMatrix TX2012R-P
Rack Mounts		MX-EXTXFULLA-1	Full-width switch rack mount kit for cnMatrix TX2020R-P and TX2028RF-P
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	1000 Base-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)

ABOUT CAMBIUM NETWORKS

Cambium Networks empowers millions of people with wireless connectivity worldwide. Its wireless portfolio is used by commercial and government network operators as well as broadband service providers to connect people, places and things. With a single network architecture spanning fixed wireless and Wi-Fi, Cambium Networks enables operators to achieve maximum performance with minimal spectrum. End-to-end cloud management transforms networks into dynamic environments that evolve to meet changing needs with minimal physical human intervention. Cambium Networks empowers a growing ecosystem of partners who design and deliver gigabit wireless solutions that just work.