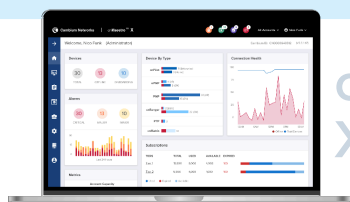


# cnMatrix™ TX2020R-P Switch

## QUICK LOOK:

- **Cloud Managed**
- **Non-Blocking, Fully Managed, Enterprise Grade, L2/L3 switch**
- **Cambium Sync – Redundant GPS input 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

### 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 3/5-Year Limited Lifetime Warranty.

\* Feature to be included in a future release.

## cnMatrix™ TX2020R-P Switch

### Specifications

<b>Throughput</b>	112 Gbps
<b>Forwarding Rate in Mpps (64 Byte Packets)</b>	120
<b>10/100/1000 Mbps RJ45 Ports</b>	16
<b>1 Gbps Fiber Ports (SFP)</b>	0
<b>10 Gbps Fiber Ports (SFP+)</b>	4
<b>802.3af/at/bt PoE - up to 90 W</b>	Ports 1–16
<b>24 V Passive PoE - up to 15 W</b>	Ports 9–16
<b>54 V Passive PoE - up to 90 W</b>	Ports 1–8
<b>54 V Passive PoE - up to 30 W</b>	Ports 9–16
<b>Serial Console</b>	Yes
<b>USB</b>	Yes
<b>Rack Mount Kit</b>	Yes
<b>Internal Fans</b>	2
<b>Reset Button</b>	Yes
<b>MAC Address Table Size</b>	16K
<b>Flash Storage</b>	128 MB
<b>DRAM</b>	512 MB
<b>VLANs</b>	4K

<b>Port Based VLANs</b>	4K
<b>LACP/Trunking</b>	8 LAGs/8 links per LAG
<b>QoS Priority Queues</b>	8
<b>PVRST</b>	32
<b>Ingress/Egress ACL</b>	128
<b>Static ARP Entries</b>	512
<b>ARP Entries</b>	512
<b>Static Routes</b>	64
<b>Dynamic Routing</b>	512
<b>IGMP Multicast Groups</b>	256
<b>Policy Based Automation</b>	Yes
<b>Cambium Sync (via RJ45 ports)</b>	16
<b>Redunant Sync Sources</b>	Yes
<b>External Antenna Port</b>	Yes
<b>cnPulse Port</b>	Yes
<b>Removable Power Supply (CRPS)</b>	2
<b>Redundant Power Supplies</b>	Yes

<b>Quality of Service</b>	ACL mapping and 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

<b>Traffic Management</b>	ACL-based inbound rate limiting policies
	Broadcast, multicast and unknown unicast rate limiting
	Inbound rate limiting per port
	Outbound rate limiting per port/queue

<b>Security</b>	802.1x authentication
	MAC authentication*
	DHCP snooping
	RADIUS authentication/authorization
	Radius/Tacacs/Tacacs+
	Authentication, Authorization, and Accounting (AAA)
	Secure shell
	Secure copy (SCP)*
	Local username/password

## cnMatrix™ TX2020R-P Switch

### Specifications - All Models

#### Layer 2 Feature Set

802.1s multiple spanning tree

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VLAN, Port, Protocol, 802.1q

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802.1d

---

802.1x authentication

---

Auto MDI/MDIX

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BPDU Guard, Root Guard

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IGMP Snooping v1/v2/v3\*, Fast Leave

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LLDP/LLDP MED

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IGMP Proxy

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Static MAC

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Flow Control per port

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Per VLAN STP (PVST/PVRST)

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Port Mirroring: port based, ACL based, VLAN based

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Port Isolation/Private VLAN Edge

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Link Aggregation Groups (Static/LACP)

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Rate Limiting/Storm Control

---

Jumbo frame (9k)

---

DHCP Snooping

---

BPDU filtering

---

Broadcast/Multicast/Unlearned Unicast (Storm Control)

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DoS Protection

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Ping/TraceRoute/ICMPv6

#### Layer 3 Feature Set

Inter-VLAN Routing

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Static ARPs

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Static Routes

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DHCP Relay

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Dynamic Routing – RIPv1/v2

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Dynamic Routing – OSPFv2

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Route Redistribution

\* Feature to be included in a future release.

## cnMatrix™ TX2020R-P Switch

### Specifications - All Models cont'd

<b>Management</b>	cnMaestro (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
	DHCP relay	
<b>Security</b> 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.

### Hardware Specifications

<b>Power Supply</b>	CRPS dependent	<b>802.3af/at/bt PoE (54V)</b>	Ports 1–16
<b>Max Switch Power (WITH TRAFFIC)</b>	39.24W	<b>24V Passive PoE - up to 15W</b>	Ports 9–16
<b>MTBF (hours)</b>	250744	<b>54V Passive PoE - up to 90W</b>	Ports 1–8
<b>Unit Weight</b>	4.3 kg (9.46 lbs)	<b>54V Passive PoE - up to 30W</b>	Ports 9–16
<b>Unit Dimensions (H x L x W)</b>	4.4 x 35 x 44 cm (17.3 x 1.75 x 117.32 in)	<b>PoE Max Power Per Port</b>	30W/90W
<b>Boxed Weight</b>	5.35 kg (11.77 lbs)	<b>Rack Mountable</b>	Yes 1U
<b>Boxed Dimensions (H x L x W)</b>	12.8 x 55.1 x 48.5 cm (5.04 x 21.69 x 19.09 in)	<b>Wall Mountable</b>	Yes
<b>CPU Speed</b>	800 MHz	<b>Temperature Ranges</b>	-10°C up to 65°C
<b>LEDs per port</b>	Link/Activity, PoE	<b>Operating Humidity</b>	55°C at 95% RH
<b>PoE Power Budget</b>	CRPS dependent (see table)	<b>Storage Temperature</b>	-40°C to 70°C (-40°F to 158°F)

## cnMatrix™ TX2020R-P Switch

### Power Supply

Part Number	Power Supply	Type (AC/DC)	DC - in Voltage	Available PoE Load
<b>MXCRPSAC1200A0</b>	1200W (110V)	AC	NA	900W
<b>MXCRPSAC1200A0</b>	1200W (220V)	AC	NA	960W
<b>MXCRPSDC1200A0</b>	1200W	DC	48-72V	960W
<b>MXCRPSDC1200A0</b>	1200W	DC	36-47V	740W
<b>MXCRPSAC930A0</b>	930W	AC	NA	840W
<b>MXCRPSDC930A0</b>	930W	DC	48-72V	840W
<b>MXCRPSDC930A0</b>	930W	DC	36-47V	740W
<b>MXCRPSAC600A0</b>	600W	AC	NA	500W
<b>MXCRPSDC600A0</b>	600W	DC	48-72V	500W
<b>MXCRPSDC600A0</b>	600W	DC	36-47V	500W

### Acoustic Noise dBA Per Switch (AMBIENT TEMPERATURE)

1x1200W AC CRPS: 71.4 dB < 33°C, 71.5dB 33°C-43°C, 71.5dB - >43°C,  
 2x1200W AC CRPS: 55.6 dB < 33°C, 55.7dB 33°C-43°C, 56.1dB - >43°C,  
 1x930W AC CRPS: 67.9 dB < 33°C, 68.0dB 33°C-43°C, 68.1dB - >43°C,  
 2x930W AC CRPS: 54.8 dB < 33°C, 55.1dB 33°C-43°C, 55.4dB - >43°C,  
 1x600W AC CRPS: 58.2 dB < 33°C, 58.4dB 33°C-43°C, 58.6dB - >43°C,  
 2x600W AC CRPS: 52.8 dB < 33°C, 53.3dB 33°C-43°C, 53.9dB - >43°C,

1x1200W DC CRPS: 68.9 dB < 33°C, 71.2dB 33°C-43°C, 71.2dB - >43°C,  
 2x1200W DC CRPS: 72.9 dB < 33°C, 74.0dB 33°C-43°C, 74.0dB - >43°C,  
 1x930W DC CRPS: 64.3 dB < 33°C, 68.9dB 33°C-43°C, 68.9dB - >43°C,  
 2x930W DC CRPS: 61.3 dB < 33°C, 68.6dB 33°C-43°C, 68.7dB - >43°C,  
 1x600W DC CRPS: 60.7 dB < 33°C, 66.6dB 33°C-43°C, 66.7dB - >43°C,  
 2x600W DC CRPS: 55.8 dB < 33°C, 67.3dB 33°C-43°C, 67.3dB - >43°C,

### 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

## cnMatrix™ TX2020R-P Switch

### 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)
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



## cnMatrix™ TX2020R-P Switch

### 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™ TX2020R-P Switch

### 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

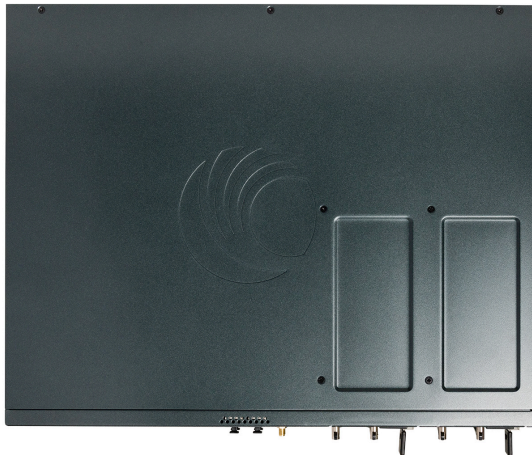
RFC 2474—Definition of the differentiated services field (DS field) in the IPv4 and IPv6 headers

RFC 2475—An architecture for differentiated services

RFC 2597—Assured forwarding Per-Hop Behavior



## cnMatrix™ TX2020R-P Switch



## cnMatrix™ TX2020R-P Switch

### Ordering Information

Type	Model	Part Number	Description
<b>Switch</b>	TX2020R-P	MXTX2020GxPA10	Intelligent Ethernet PoE Switch, Cambium Sync, 16 x 1 Gbps and 4 SFP+, Removable & Redundant Power Supplies (not included) - no power cord
<b>CRPS - AC</b>		MXCRPSAC600A0	AC 600W total power, no power cord
<b>CRPS - AC</b>		MXCRPSAC930A0	AC 930W total power, no power cord
<b>CRPS - AC</b>		MXCRPSAC1200A0	AC 1200W total power, no power cord
<b>CRPS - DC</b>		MXCRPSDC600A0	DC 600W total power, 37V - 60V, includes 1.5 m cable connector
<b>CRPS - DC</b>		MXCRPSDC930A0	DC 930W total power, 37V - 60V, includes 1.5 m cable connector
<b>CRPS - DC</b>		MXCRPSDC1200A0	DC 1200W total power, 37V - 60V, includes 1.5 m cable connector
<b>Power Cord</b>		N000900L092A	AC line cord, US Type B, 15A, 1.2 m C13 connector
<b>Power Cord</b>		N000900L040A	AC line cord, US Type B, 1.2 m C13 connector
<b>Rack Ears</b>		MX-EXTXFULLA-1	cnMatrix rack mount kit: Full-width switch
<b>Transceiver</b>		SFP-10G-SR	10G SFP+ MMF SR Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F)
<b>Transceiver</b>		SFP-1G-SX	1G SFP MMF SX Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F)
<b>Transceiver</b>		SFP-10G-LR	10G SFP+ SMF LR Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F)
<b>Transceiver</b>		SFP-1G-LX	1G SFP SMF LX Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F)
<b>Transceiver</b>		SFP-1G-Copper	1000 Base-T (RJ45) SFP Transceiver. -40°C to 85°C (-40°F to 185°F)
<b>Transceiver</b>		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.