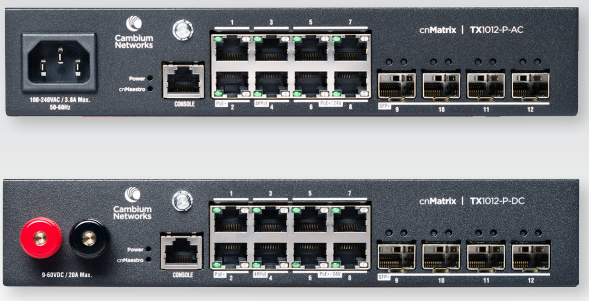
# cnMatrix™ TX1000 Series Switches

## QUICK LOOK:

- **Cloud Managed**
- **Non-Blocking, Fully Managed, Enterprise Grade, L2/L3 switch**
- **Comprehensive/Intelligent PoE Solution**
- **AC and DC models available**
- **Zero Touch Simplicity with automated configuration**
- **Automated security with device profiling and policy enforcement**




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 TX1000 Series Switches provides the following functionality:**

**Comprehensive/Intelligent PoE solution**

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

**Available with either AC or DC power supply**

**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™ TX1000 Series Switches

## Specifications

| | TX1012-AC-P | TX1012-DC-P |
|---|---|---|
| **Throughput** | 96 Gbps | 96 Gbps |
| **Forwarding Rate in Mpps (64 Byte Packets)** | 120 | 120 |
| **10/100/1000 Mbps RJ45 Ports** | 8 | 8 |
| **1 Gbps Fiber Ports (SFP)** | 0 | 0 |
| **10 Gbps Fiber Ports (SFP+)** | 4 | 4 |
| **PoE+ Enabled Ports 802.3af/at/bt** | 8 | 8 |
| **Low Voltage Passive PoE (24V)** | 4 | 4 |
| **High Power 4 PPoE (up to 90W)** | 2 | 2 |
| **Serial Console** | Yes | Yes |
| **Rack Mount Kit** | Yes, optional | Yes, optional |
| **Internal Fans** | 1 | 1 |
| **Reset Button*** | Yes | Yes |
| **MAC Address Table Size** | 16K | 16K |
| **Flash Storage** | 128 MB | 128 MB |
| **DRAM** | 512 MB | 512 MB |
| **VLANs** | 4K | 4K |
| **QinQ*** | Yes | Yes |
| **LACP/Trunking** | 8 LAGs/8 links per LAG | 8 LAGs/8 links per LAG |
| **QoS Priority Queues** | 8 | 8 |
| **PVRST** | 32 | 32 |
| **Ingress/Egress ACL** | 128 | 128 |
| **Static ARP Entries** | 512 | 512 |
| **ARP Entries** | 512 | 512 |
| **Static Routes** | 64 | 64 |
| **Dynamic Routing** | 512 | 512 |
| **IGMP Multicast Groups** | 256 | 256 |
| **Policy Based Automation** | Yes | Yes |

* Feature to be included in a future release.

# cnMatrix™ TX1000 Series Switches

## Hardware Specifications

| | TX1012-AC-P | TX1012-DC-P |
|---|---|---|
| **Power Supply** | 260W | 200W |
| **Max Switch Power (WITH TRAFFIC)** | 260W | 200W |
| **MTBF @25°C (hours)** | 741,409 | 749,495 |
| **MTBF @60°C (hours)** | 223,619 | 207,122 |
| **Unit Weight** | 2.22 kg (4.89 lbs) | 2.1 kg (4.63 lbs) |
| **Unit Dimensions H x L x W** | 4.4 x 28.0 x 23.0 cm (1.7 x 11.2 x 9.05 in) | 4.4 x 28.0 x 23.0 cm (1.7 x 11.2 x 9.05 in) |
| **Boxed Weight** | 2.75 kg (6.05 lbs) | 2.65 kg (5.83 lbs) |
| **Boxed Dimensions H x L x W** | 10.1 x 35.1 x 33 cm (4.04 x 13.82 x 13.00 in) | 10.1 x 35.1 x 33 cm (4.04 x 13.82 x 13.00 in) |
| **CPU Speed** | 800 MHz | 800 MHz |
| **LEDs per port** | Link/Activity, PoE | Link/Activity, PoE |
| **PoE Power Budget** | 200W | 170W @ 30-65Vin, 120W @ 9–29Vin |
| **802.3af/at/bt PoE (54V)** | Ports 1–8 | Ports 1–8 |
| **24V Passive PoE - up to 15W** | Ports 5–8 | Ports 5–8 |
| **54V Passive PoE - up to 90W** | Ports 3–4 | Ports 3–4 |
| **54V Passive PoE - up to 30W** | Ports 1–2, 5–8 | Ports 1–2, 5–8 |
| **PoE Max Power Per Port** | Ports 1–2, 5–8: 30W<br>Ports 3–4: 90W | Ports 1–2, 5–8: 30W<br>Ports 3–4: 90W |
| **Rack Mountable** | Yes (Optional Accessory) | Yes (Optional Accessory) |
| **DIN Rail Mountable** | Yes (Optional Accessory) | Yes (Optional Accessory) |
| **Wall Mountable** | Yes (Optional Accessory) | Yes (Optional Accessory) |
| **Temperature Ranges** | -30°C to 60°C / Sea level | -30°C to 60°C / Sea level |
| **Operating Humidity** | 20% to 90% RH | 20% to 90% RH |
| **Storage Temperature** | -40°C to 70°C | -40°C to 70°C |

# cnMatrix™ TX1000 Series Switches

## Specifications - All Models

| | |
|---|---|
| **Quality of Service** | 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 |
| **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* |
| | DHCP snooping |
| | RADIUS authentication/authorization |
| | Radius/Tacacs/Tacacs+ |
| | Authentication, Authorization, and Accounting (AAA) |
| | Secure shell |
| | Secure copy (SCP)* |
| | Local username/password |

* Feature to be included in a future release.

| | |
|---|---|
| **Layer 2 Feature Set** | 802.1s multiple spanning tree |
| | VLAN, Port, Protocol, 802.1q |
| | QinQ* |
| | 802.1d |
| | 802.1x authentication |
| | Auto MDI/MDIX |
| | BPDU Guard, Root Guard |
| | IGMP Snooping v1/v2/v3*, Fast Leave |
| | LLDP/LLDP MED |
| | IGMP Proxy |
| | Static MAC |
| | Flow Control per port |
| | Per VLAN STP (PVST/PVRST) |
| | 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 |

| | | |
|---|---|---|
| **Layer 3 Feature Set** | Inter-VLAN Routing | Dynamic Routing – RIPv1/v2 |
| | Static ARPs | Dynamic Routing – OSPFv2 |
| | Static Routes | Route Redistribution |
| | DHCP Relay | |

# cnMatrix™ TX1000 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 |
| 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.

# cnMatrix™ TX1000 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™ TX1000 Series Switches

## System Facilities

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

* Feature to be included in a future release.

## Management

| | |
|---|---|
| SNMP v1, v2, and v3 | RFC 4419—Diffie-Hellman group exchange for SSH transport layer protocol |
| SSH 1.5 and 2.0 | SSL 3.0 and TLS 1.2 |
| RFC 4252—SSH authentication protocol | RFC 2246—TLS protocol, version 1.2 |
| RFC 4253—SSH transport layer protocol | RFC 2818—HTTP over TLS |
| RFC 4254—SSH connection protocol | RFC 3268—AES cipher suites for transport layer security |
| RFC 4251—SSH protocol architecture | Telnet |
| RFC 4716—SECSH public key file format | Web GUI |

# cnMatrix™ TX1000 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™ TX1000 Series Switches

## TX1012-P-AC

## TX1012-P-DC

# cnMatrix™ TX1000 Series Switches

## Ordering Information

| Type | Model | Part Number | Description |
|---|---|---|---|
| **Switch** | TX1012-AC-P | MXTX1012GxPA00 | AC Powered Intelligent Ethernet PoE Switch, 8 x 1 Gbps, and 4 SFP+, no pwr cord |
| **Switch** | TX1012-DC-P | MXTX1012GxPA20 | DC Powered Intelligent Ethernet PoE Switch, 8 x 1 Gbps, and 4 SFP+, no pwr cord |
| **Switch** | TX1012-AC-P | MXTX1012GxPA01 | AC Powered Intelligent Ethernet PoE Switch, 8 x 1 Gbps, and 4 SFP+, no pwr cord, USA Only |
| **Switch** | TX1012-DC-P | MXTX1012GxPA21 | DC Powered Intelligent Ethernet PoE Switch, 8 x 1 Gbps, and 4 SFP+, no pwr cord, USA Only |
| **Power Cord** | n/a | N000900L092A | AC line cord, US Type B, 15A, 1.2 m C13 connector |
| **Power Cord** | n/a | N000900L040A | AC line cord, US Type B, 1.2 m C13 connector |
| **Rack Ears** | n/a | MX-Rack-TX1K-0 | cnMatrix 19” Rack mount kit: TX1012-P-AC / TX1012-P-DC |
| **Rack Ears** | n/a | MX-DIN-TX1K-0 | cnMatrix DIN Rail mount kit: TX1012-P-AC / TX1012-P-DC |
| **Transceiver** | n/a | SFP-10G-SR | 10G SFP+ MMF SR Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F) |
| **Transceiver** | n/a | SFP-1G-SX | 1G SFP MMF SX Transceiver, 850 nm. -40°C to 85°C (-40°F to 185°F) |
| **Transceiver** | n/a | SFP-10G-LR | 10G SFP+ SMF LR Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F) |
| **Transceiver** | n/a | SFP-1G-LX | 1G SFP SMF LX Transceiver, 1310 nm. -40°C to 85°C (-40°F to 185°F) |
| **Transceiver** | n/a | SFP-1G-Copper | 1000 Base-T (RJ45) SFP Transceiver. -40°C to 85°C (-40°F to 185°F) |
| **Transceiver** | n/a | 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.

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