Cisco ME 3600X 24CX Switch

Product Overview

The Cisco® ME 3600X 24CX Switch is a member of the Cisco ME 3600X Series Ethernet Access Switches product series, a multiservice access platform optimized for Carrier Ethernet deployments. As Carrier Ethernet access networks converge, a versatile platform like the Cisco ME 3600X 24CX allows service providers to offer multiple services from the same access device. Built for the convergence of wireline and wireless services, the Cisco ME 3600X 24CX offers a combination of Gigabit Ethernet, 10-Gigabit Ethernet, time-division multiplexing (TDM), and timing services. Build upon an architecture that is similar to existing switches in the Cisco ME 3600X Series, the 24CX allows service providers to initiate Multiprotocol Label Switching (MPLS) -based VPN services from within the access layer. Designed around crucial Carrier Ethernet features that simplify network operation, the Cisco ME 3600X 24CX supports premium services with enhanced service-level agreement (SLA) capabilities. An optional “pay-as-you-grow” feature and service activation model gives service providers a flexible, cost-effective solution.

The Cisco ME 3600X-24CX Switch (Figure 1) is 2-rack-unit (2RU), fixed-form-factor platform with the following interface build into the system:

- 24 GE ports including 8 dual-purpose ports (10/100/1000 and Small Form-Factor Pluggable [SFP]) and 16 SFP ports
- 4 10-Gigabit Ethernet Small Form-Factor Pluggable (XFP) ports
- 16 T1/E1 ports
- 4 OC3 ports

Figure 1. Cisco ME 3600X 24CX Switch

Benefits

Created for the delivery of today and tomorrow's access services, the Cisco ME 3600X 24CX supports existing and next-generation features and technology while remaining operationally simple to deploy and manage. It offers the following major benefits.

Powered by the Cisco Carrier Ethernet ASIC

Powered by the Cisco Carrier Ethernet application-specific integrated circuit (ASIC), designed specifically for service providers, the Cisco ME 3600X 24CX delivers essential Carrier Ethernet technologies including hierarchical quality of service (HQoS), MPLS, and Virtual Private LAN Services (VPLS). This custom and advanced ASIC design provides uninterrupted line rate performance while delivering complex and taxing services such as access control list (ACL) and HQoS. The Carrier Ethernet ASIC integrates Cisco traffic management innovation to deliver intelligent packet switching and routing operations.

MPLS in the Access Layer

The Cisco ME 3600X 24CX extends MPLS into the access layer by allowing service providers to initiate MPLS-based Layer 2 and Layer 3 VPN services from within the access layer. The Cisco ME 3600X 24CX gives service providers the ability to expand MPLS toward their network edge to gain the advantages of a single unified MPLS control plane across their networks. The Cisco ME3600X 24CX offers full VPLS support allowing multipoint services definition. For additional flexibility, VPLS can be deployed as a full mesh or with a hierarchy (HVPLS).

Pay-as-You-Grow Investment Model

The use of licensing to activate features on the Cisco ME 3600X 24CX allows service providers to customize and schedule their investment in access features for a time when network growth and customer demand justify the investment. Unlike investments in the core and edge, where the physical location of network assets has minimal impact on their accessibility and usage, the ROI on an access element is heavily influenced by its location in the network and proximity to customers. The ability to deploy the Cisco ME 3600X 24CX and later activate features as demand and growth or service activation dictate, with little if any need for service calls, delivers highly measureable investment protection. This allows flexible timing for deploying MPLS, TDM or 10-Gigabit Ethernet services, and boosting service capacity.

Advanced Service-Level Agreements

Service-aware quality of service (QoS) allows service providers to expand and differentiate their services portfolio with highly advanced and differentiating SLAs. The HQoS capabilities of the Cisco ME 3600X 24CX scale to eight queues per service, three levels of scheduling, and buffer volumes capable of accommodating today's most demanding wireline and wireless applications.

Mobile Timing and Synchronization Services

The Cisco ME 3600X 24CX provides the timing services required in today's converged access network to support mobile solutions including Radio Access Network (RAN) applications, and offers integrated support for the Building Integrated Timing Supply (BITS), 10 MHz, 1 Pulse Per Second (1PPS) and Time Of Day (ToD) interfaces. The Cisco ME 3600X 24CX also supports synchronous Ethernet (SyncE) with Ethernet Synchronization Messaging Channel (ESMC) and Synchronization Status Messages (SSM) to allow excellent clock source traceability. The Cisco ME 3600X 24CX hardware is ready for IEEE-1588, and can act as the source for network clocking for TDM, SDH and SONET interfaces and SyncE.

Operational Efficiency for Carrier Ethernet Access Deployments

The Cisco ME 3600X 24CX features major enhancements that help service providers simplify and facilitate the management of their networks, resulting in diminishing operational costs. This unique feature set allows the Cisco ME 3600X 24CX to be deployed in a variety of applications including business service with 10-Gigabit Ethernet User Network Interface (UNI) and Ethernet mobile backhaul. These features enhance performance awareness, facilitate troubleshooting, and simplify service turn-up and restoration, ultimately reducing operational costs. “Dying gasp” for power indicators and four external alarm inputs to detect changes in remote sites further help service providers manage the health of network elements.

High-Performance Hardware

Based on the Cisco Carrier Ethernet ASIC, the Cisco ME 3600X 24CX is a nonblocking switching system providing line-rate Carrier Ethernet performance. The custom Cisco Carrier Ethernet ASIC technology delivers next-generation Carrier Ethernet service integration without impacting line-rate performance. The 2RU switch holds two slots for hot-swappable and redundant power supplies. Three fans are integrated into each power supply, providing fan redundancy. High availability is also achieved on the Cisco ME 3600X 24CX through proactive diagnostic tools including Generic On-Line Diagnostics (GOLD) and Onboard Failure Logging (OBFL). These tools help service providers avoid potential problems before they occur and troubleshoot and diagnose problems once identified.

Universal Customer Premises Equipment

With all interfaces build in, this fixed-form-factor platform is versatile and can cover many deployment scenarios including Gigabit Ethernet and 10-Gigabit Ethernet along with TMD deployments. The licensing mechanism supports enabling TDM or additional 10-Gigabit Ethernet interfaces as required for a particular deployment, allowing service providers to customize the configuration of the device and pay only when their services grow. This mechanism also allows for investment protection, as one can always turn on additional services or interfaces on demand. With support for extended temperatures, the Cisco ME 3600X 24CX can be deployed in harsh environments and remote locations, allowing service providers to extend their Carrier Ethernet networks and also save money on air conditioning.

Table 1 lists the hardware parts available for the Cisco ME 3600X 24CX.

Table 1. Cisco ME 3600X 24CX Switch Hardware Options

Part Number	Product Name
ME-3600X-24CX-M	Cisco ME 3600X 24CX Switch
PWR-ME3KX-AC	Cisco ME 3800X Series field-replaceable AC power supply and fan module
PWR-ME3KX-DC	Cisco ME 3800X Series field-replaceable DC power supply and fan module
PWR-ME3KX-AC=	Cisco ME 3800X Series spare field-replaceable AC power supply and fan module
PWR-ME3KX-DC=	Cisco ME 3800X Series spare field-replaceable DC power supply and fan module
ME-FANTRAY=	Cisco ME 3800X Series spare fan tray
ME-FANTRAY-XL=	Cisco ME 3600X 24CX XL spare fan tray
RCKMNT-ME3CX-ETSI	ETSI Rack mount option for the Cisco ME 3600X 24CX
RCKMNT-ME3CX-ETSI=	Spare ETSI rack mount option for the Cisco ME 3600X 24CX
RCKMNT-ME3CX-19IN=	Spare 19-in. rack mount option for Cisco ME 3600X 24CX
ME-3600X-24CX-M=	Spare Cisco ME 3600X 24CX Switch
MEM-ME3K-2GB	Cisco ME 3600X and ME3800X SD Memory Card 2GB
MEM-ME3K-2GB=	Cisco ME 3600X and ME3800X SD Memory Card 2GB Spare

Part Number	Product Name
MEM-ME3K-4GB	Cisco ME 3600X and ME3800X SD Memory Card 4GB
MEM-ME3K-4GB=	Cisco ME 3600X and ME3800X SD Memory Card 4GB Spare

The Cisco ME 3600X 24CX Switch supports a wide range of SFP and XFP optic modules. Table 2 lists their part numbers.

Table 2. SFP and XFP Modules Supported with Cisco ME 3600X 24CX

	Part number
SFP	SFP-GE-L, SFP-GE-S, SFP-GE-Z, GLC-LH-SM, GLC-SX-MM, GLC-SX-MMD, GLC-LH-SMD, GLC-T, SFP-GE-T, GLC-FE-100FX-RGD, GLC-FE-100LX-RGD, GLC-LX-SM-RGD, GLC-SX-MM-RGD, GLC-ZX-SM-RGD, GLC-BX-U (CPN 10-2094-02), GLC-BX-D (CPN 10-2093-02), GLC-EX-SMD, GLC-ZX-SM, GLC-FE-100FX, GLC-FE-100EX, GLC-FE-100ZX, GLC-FE-100LX, GLC-FE-100BX-U, GLC-FE-100BX-D, CWDM-SFP-1470, CWDM-SFP-1490, CWDM-SFP-1510, CWDM-SFP-1530, CWDM-SFP-1550, CWDM-SFP-1570, CWDM-SFP-1590, CWDM-SFP-1610, DWDM-SFP-6061, DWDM-SFP-5979, DWDM-SFP-5898, DWDM-SFP-5817, DWDM-SFP-5736, DWDM-SFP-5655, DWDM-SFP-5575, DWDM-SFP-5413, DWDM-SFP-5494, DWDM-SFP-5332, DWDM-SFP-5252, DWDM-SFP-5172, DWDM-SFP-5092, DWDM-SFP-5012, DWDM-SFP-4931, DWDM-SFP-4851, DWDM-SFP-4772, DWDM-SFP-4692, DWDM-SFP-4612, DWDM-SFP-4532, DWDM-SFP-4453, DWDM-SFP-4373, DWDM-SFP-4294, DWDM-SFP-4214, DWDM-SFP-4134, DWDM-SFP-4056, DWDM-SFP-3977, DWDM-SFP-3898, DWDM-SFP-3819, DWDM-SFP-3739, DWDM-SFP-3661, DWDM-SFP-3582, DWDM-SFP-3504, DWDM-SFP-3425, DWDM-SFP-3346, DWDM-SFP-3268, DWDM-SFP-3190, DWDM-SFP-3112, DWDM-SFP-3033, DWDM-SFP-6141
XFP	XFP-10G-MM-SR, XFP10GLR192SR-RGD, XFP10GER192IR-RGD, XFP10GZR192LR-RGD, XFP10GLR-192SR-L, XFP10GER-192IR-L, XFP-10GZR-OC192LR, and DWDM-XFP-C

Flexible Software Options

The Cisco ME 3600X 24CX supports the Cisco IOS® Software activation feature. With this feature, Cisco IOS Software feature sets can be activated by Cisco software licenses. This flexibility allows service providers to invest in software resources only when their businesses need it. The Cisco ME 3600X 24 CX offers two different Cisco IOS Software licenses:

- The **Metro IP Access** license offers advanced QoS, Carrier Ethernet Layer 2 features, Ethernet operations, administration, and maintenance (OAM), Layer 3 features for advanced IP routing protocols, multi-VPN routing, and Forwarding Customer Edge (multi-VRF CE) capabilities.
- The **Advanced Metro IP Access** license adds the following capabilities to the Metro IP Access image: MPLS, Ethernet over MPLS (EoMPLS) pseudowires, VPLS, MPLS traffic engineering (TE), Fast Reroute (FRR), and MPLS VPN support.

In addition, the following feature license is available:

- The **IEEE 1588-2008 Boundary Clock** license provides support for 1588-2008 Boundary Clock functionality.

Table 3 lists the main features in the Cisco IOS Software licenses for the Cisco ME 3600X 24CX Switch.

Table 3. Feature Sets in Cisco ME 3600X 24CX Licenses

Metro IP Access	Advanced Metro IP Access	IEEE 1588-2008 BC
Layer 2: Ethernet virtual circuit (EVC) and 802.1Q	All features in Metro IP Access	IEEE 1588-2008 Boundary Clock
IP routing: Routing Information Protocol (RIP), Open Shortest Path First (OSPF), Enhanced IGRP (EIGRP), Intermediate System to Intermediate System (IS-IS), Border Gateway Protocol (BGP), and Bidirectional Forwarding Detection (BFD)	MPLS MPLS TE and FRR	
PIM (SM, DM, and SSM), SSM mapping	MPLS OAM	
Ethernet OAM (802.1ag, 802.3ah, E-LMI, 1731 FM and PM)	MPLS VPN (MVPN	
MST, REP, Flexlink, G.8032	EoMPLS	

Metro IP Access	Advanced Metro IP Access	IEEE 1588-2008 BC
SyncE, ESMC, SSM, T1/E1 line timing, BITS and IEEE 1588v2	Pseudowire redundancy	
Switch Database Management (SDM) templates	VPLS and HVPLS	
Multi-VRF CE (VRF-lite) with service awareness :Address Resolution Protocol (ARP), ping, Simple Network Management Protocol (SNMP), syslog, traceroute, FTP, and Trivial FTP (TFTP)	MPLS Transport (TP) TDM pseudowire	

With all interfaces build in the chassis, service providers can enable TDM and additional 10-Gigabit Ethernet interfaces only when needed using the interfaces license. The Cisco ME 3600X 24CX supports the following interface licenses.

- The **2 Ports 10GE Upgrade** license enables the third and fourth 10-Gigabit Ethernet interfaces. The first two interfaces are enabled by default and do not require licenses. Table 4 shows the modes of operation supported with their respective interface configurations. To provide more flexibility, the mode of operation is software-selectable by the user.
- The **4 Ports T1/E1** license enables four T1/E1 interfaces.
- The **16 Ports T1/E1** license enables all 16 T1/E1 interfaces.

Table 4. Cisco ME 3600X 24CX Switch Modes of Operation

	Mode of Operation 1: 24GE + 2 10GE Interfaces	Mode of Operation 2: 8GE + 4 10GE Interfaces	Mode of Operation 3: 16GE + 3 10GE Interfaces
2 port 10GE Upgrade license	Not required	Required	Required
GE Interfaces	24	8	16
10GE Interfaces	2	4	3
T1/E1 Interfaces	Supported; Require T1/E1 license	Supported; Require T1/E1 license	Supported; Require T1/E1 license
OC3 / STM1 Interfaces	Not supported currently	Not Supported currently	Not Supported currently

Table 5 lists all the feature and interface licenses options available.

Table 5. Cisco ME 3600X 24CX Switch Software Options

Part Number	Product Name
License Options	
ME3600X-I	Cisco ME 3600X Series Metro IP Access Software Paper License
ME3600X-A	Cisco ME 3600X Series Advanced Metro IP Access Software Paper License
ME3600X-2X10G-CX	2 Ports 10G License PAK for ME 3600X 24CX Switch
ME3600X-4T1E1	4 Port T1/E1 License Paper PAK for ME 3600 24CX Series
ME3600X-16T1E1	16 Port T1/E1 License E-Delivery PAK for ME 3600 24CX Series
ME3600X-1588BC	IEEE 1588-2008 BC License PAK for ME3600 24CX Series
Product Activation Keys	
ME3600X-LIC=	Product activation key for ME 3600X Series (Paper Delivery)
L-ME3600X-LIC=	Product activation key for ME 3600X Series (E-Delivery)
License Upgrade Options	
L-ME3600X-A	Cisco ME 3600X Series Advanced Metro IP Access Software E-License
L-ME3600X-2X10G-CX	2 Ports 10G License E-delivery PAK for ME 3600X 24CX Switch
L-ME3600X-4T1E1	4 Port T1/E1 License Paper PAK for ME 3600X Series
L-ME3600X-16T1E1	16 Port T1/E1 License E-Delivery PAK for ME 3600X Series

Part Number	Product Name
L-ME3600X-1588BC	IEEE 1588-2008 BC License E-Delivery PAK for ME3600 24CX Series
Software Options	
S360XTVT-15202S	Cisco ME 3600 24CX IOS Universal Without Crypto TAR, Release 15.2(2)S
S360XTVT-15204S	Cisco ME 3600 24CX IOS Universal Without Crypto TAR, Release 15.2(4)S
S360XTVK9T-15202S	Cisco ME 3600 24CX IOS Universal TAR, Release 15.2(2)S
S360XTVK9T-15204S	Cisco ME 3600 24CX IOS Universal TAR, Release 15.2(4)S
S360XTVT-15301S	Cisco ME 360X 24CX SERIES IOS UNIVERSAL W/O CRYPTO TAR –Release 15.3(1)S
S360XTVK9T-15301S	Cisco ME 360X 24CX SERIES IOS UNIVERSAL TAR –Release 15.3(1)S
S360XTVT-15302S	Cisco ME 360X 24CX SERIES IOS UNIVERSAL W/O CRYPTO TAR –Release 15.3(2)S
S360XTVK9T-15302S	Cisco ME 360X 24CX SERIES IOS UNIVERSAL TAR –Release 15.3(2)S

Main Features

Table 6 lists the features of the Cisco ME 3600X 24CX Switch.

Table 6. Cisco ME 3600X 24CX Features

Features	Specification

Ethernet Services	• EVCs for:
	  ◦ QinQ
	  ◦ Selective QinQ
	  ◦ Inner and outer VLAN classification
	  ◦ EVC Push and Pop rewrite
	  ◦ EVC local connect
	• Layer 2 Protocol Tunneling (L2PT)
	• HVPLS, VPLS, VPLS with Border Gateway protocol [BGP] signaling,
	• Virtual Private Wire Service (VPWS), EoMPLS, pseudowire redundancy
	• Ethernet Data Plane loopback (Terminal and Facility)

Layer 3 Services	• Layer 3 routing • IPv4 and IPv6 dual stack • IPv4 routing: BGP, IS-IS, OSPF • Hot Standby Router Protocol (HSRP) • Virtual Router Redundancy Protocol (VRRP) • IPv6 routing: BGP, IS-IS, OSPF • IPv6 Provider Edge (6PE) • IPv6 VPN over MPLS (6VPE) • MPLS • Label Distribution Protocol (LDP) • Targeted LDP (TLDP) • Resource Reservation Protocol (RSVP) • Differentiated Services (DiffServ)-aware traffic engineering • MPLS L3VPN • MPLS Traffic Engineering (including TE-FRR) • Carrier Supporting Carrier (CsC) with BGP as CE-PE routing protocol • BGP with label distribution (RFC 3107) • Routed pseudowire • Integrated Routing and Bridging (IRB) • Policy Based Routing (PBR) • IP Fast Reroute (IP FRR) • Remote Loop Free Alternate (LFA)

Features	Specification
TDM Pseudowire	• Support for MPLS • Pseudowire setup and maintenance using LDP: RFC 4447 • Structure-Agnostic TDM over Packet (SAToP): RFC 4553 • Circuit Emulation Service over Packet Switched Network (CESoPSN): RFC 5086
QoS	• Up to 4000 egress queues per system • Class-Based Weighted Fair Queuing (CBWFQ) • Priority queuing • 2-rate 3-color (2R3C) ingress policing, egress policing (1R2C) for low latency queuing (LLQ) • Ingress and egress marking class of service (CoS), differentiated services code point (DSCP), and MPLS experimental bits • Egress shaping per port and per queue • Modular QoS CLI (MQC) • 3-level HQoS • Classification based on inner and outer CoS or VLAN ID • Copy inner to outer CoS • Weighted Random Early Detection (WRED) • IPV6 QoS
Multicast	• IPv4 multicast • Protocol Independent Multicast sparse mode (PIM-SM), PIM Source-Specific Multicast (PIM SSM), and PIM SSM mapping • Internet Group Management Protocol Versions 1, 2, and 3 (IGMPv1, v2, and v3) • IGMPv1, v2, and v3 snooping on switchport, EVC interfaces, and pseudowires. • PIMs snooping • IPv4 multicast per VRF Lite • Multicast VPN (MVPN)
Security	• Authentication, authorization and accounting (AAA); TACACS+; Secure Shell (SSH) Protocol; MAC limiting per Ethernet flow point (EFP) or bridge domain; and unicast, multicast, and broadcast storm control blocking on any interface or port • Layer 2 ACLs • Layer 3 ACLs • ACL on switchport, EVC, and routed interfaces • Mac limit per bridge domain or VPLS instance • Control plane policing • DHCP snooping with option 82 • Dynamic ARP Inspection (DAI) • SPAN • 802.1x Authenticator
Availability	• Resilient Ethernet Protocol (REP) • ITU-T G.8032 Ethernet Ring Protection Switching • IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) • IEEE 802.1s Multiple Spanning Tree Protocol (MST) • Per-VLAN Rapid Spanning Tree (PVRST+) • MPLS TE FRR • Flexlink • BFD for Static, ISIS, OSPF, and BGP • BFD over Switched Virtual Interface (SVI) • BFD triggered FRR • 802.3ad link aggregation bundles • MPLS IGP-LDP synchronization • LACP 1-1 redundancy with Fast Switchover • EoMPLS Link Path Through

Features	Specification
Operations, Administration, and Maintenance	• CFM (802.1ag) • Link OAM (802.3ah) • MPLS OAM • E-LMI (CE and PE) • ITU-T Y.1731 FM and PM (ETH-DM and ETH-SLM) with concurrent and on demand operations
Management	• SNMP • RMON • MIBs • Embedded Event Manager (EEM 4.0) • Switch Database Management (SDM) • 60 days build-in evaluation licenses • External SD Flash Cards support
Timing	• ITU-T Synchronous Ethernet (SyncE) with Ethernet Synchronization Messaging Channel (ESMC) and Synchronization Status Messages (SSM) • T1/E1 line timing • BITS • 10MHz • IEEE 1588v2 Ordinary Clock (OC), Boundary Clock (BC), Transparent Clock (TC) • IEEE 1588v2 over MPLS interfaces

Product Specifications

Tables 7 through 9 list product, power, and environmental specifications for the Cisco ME 3600X 24CX Switch. Table 10 lists standards and protocols, and Table 11 gives safety and compliance information.

Table 7. Product Specifications

Description	Cisco ME 3600X-24CX Switch Specifications
Performance	Forwarding bandwidth: Cisco ME 3600X 24CX AC or DC: 48 Gbps Forwarding rate: Cisco ME 3600X 24CX AC or DC: 65 Mpps Configurable maximum transmission unit (MTU) of up to 9800 bytes, for bridging on Gigabit and 10 Gigabit
Memory	DRAM: 2 GB Flash: 128 MB Packet buffer: 44 MB External SD Flash: 2GB and 4GB SD Flash cards (optional)
Connectors and cabling	10/100/1000 Ports: RJ-45 connectors, 4-pair category 5 UTP cabling SFP ports: • 100BASE-FX and -LX: duplex LC receptacle fiber connectors (multimode and single-mode) • 1000BASE-BX: single-fiber LC receptacle connector (single-mode fiber) • 1000BASE-SX, -LX, -EX, and -ZX: duplex LC receptacle fiber connectors (multimode and single-mode fiber) XFP ports: • 10000BASE-SR, -LR, -ER, and -ZR: • Duplex LC receptacle fiber connectors (multimode and single-mode fiber) T1/E1 ports: RJ-45 connectors OC3 and STM1 ports: duplex LC receptacle fiber connectors (multimode and single-mode fiber). Currently not supported as software support not yet available. Management console port: RJ-45-to-DB9 cable for PC connections Management 10/100/1000 Ethernet: RJ-45 connector BITS and alarm ports: RJ-45 connector 1PPS input: mini-coax connector port 1PPS output: mini-coax connector port 2.048/10MHz input: mini-coax connector port 2.048/10MHz output: mini-coax connector port 1PPS input or output and ToD input or output: RJ45 connector port

Description	Cisco ME 3600X-24CX Switch Specifications
Indicators	Per-port status LEDs: link integrity, port disabled, and activity indications Power input/output status LED Alarm status LED SyncE status LED System status LED
Dimensions	Height: 3.5-in (88.9 mm) – 2RU Width: 17.5-in (444.5 mm) Depth: 15.5-in (393.7 mm)
Weight	ME-3600X-24CX-M with FANTRAY-XL and two PWR-ME3KX-AC: 25.5 lb (11.6 kg) ME-3600X-24CX-M 17.6 lb (8.0 kg) PWR-ME3KX-AC 2.86 lb (1.3 kg) PWR-ME3KX-DC 3.10 lb (1.40 kg) ME-FANTRAY 1.65 lb (0.74 kg) ME-FANTRAY-XL 2.42 lb (1.1 kg)
Mean time between failure (MTBF)	ME3600X-24CX-M: 227,840 hours PWR-ME3KX-DC: 319,000 hours (48V input at 40ºC) PWR-ME3KX-AC: 328,000 hours (120V at 40ºC) 342,000 hours (230V at 40ºC) ME-FANTRAY: 2,177,000 hours (12V input at 40ºC) ME-FANTRAY-XL: 2,298,000 hours (12V input at 40ºC)

Table 8. Power Specifications

Description	Cisco ME 3600X-24CX Switch Specifications
Power consumption	Cisco ME 3600X-24CX, one AC and one fan tray: 176W (typical), 278W (maximum), 600 BTUs per hour (typical), 949 BTUs per hour (maximum) Cisco ME 3600X-24CX, two AC: 287W (maximum), 980 BTUs per hour (maximum) Cisco ME 3600X-24CX, one DC and one FT: 334W (maximum), 1140 BTUs per hour (maximum) Cisco ME 3600X-24CX, two DC: 343W (maximum), 1171 BTUs per hour (maximum)
AC input voltage and frequency	100–240VAC, 50–60Hz
DC input voltages	18V to 32VDC, 36V to 72VDC

Table 9. Environmental Specifications

Description	Cisco ME 3600X-24CX Switch Specifications
Operating environment and altitude[1]	Normal operating temperature and altitudes: • –40 to +65ºC, up to 6000 feet (1800m) • –40 to +55ºC, up to 13,000 feet (4000m) • –40 to +65C with single fan failure, operational for up to 4 hours
Relative humidity[2]	5% to 85%, noncondensing
Acoustic noise[3]	Maximum: 78 dBA Lwad at 27ºC Typical: 55 dBA Lwad
Storage environment:	Temperature: –40 to +70ºC altitude: 15,000 ft

1. For extended temperature support, use only ruggedized SFP and XFPs.
2. This may be limited by specification of optical modules.
3. Acoustic noise is measured per ISO 7779 and declared per ISO 9296.

Table 10. Standards and Protocols

Description	Specification
Standards and Protocols	• IEEE 802.1s • IEEE 802.1w • IEEE 802.3ad • IEEE 802.3ah • IEEE 802.1ag • IEEE 802.3x full duplex on 10BASE-T, 100BASE-TX, and 1000BASE-T ports • IEEE 802.1D Spanning Tree Protocol • IEEE 802.1p CoS classification • IEEE 802.1Q VLAN • IEEE 802.3 10BASE-T • IEEE 802.3u 100BASE-T • IEEE 802.3ab 1000BASE-T • IEEE 802.3z 1000BASE-X • BFD for OSPF, IS-IS, BGP, HSRP, EIGRP • IP routing: Static, RIP versions 1 and 2, EIGRP, OSPF, BGPv4, PIM-SM, and PIM-DM (metro IP access only) • Management: SNMP versions 1, 2, and 3 • MEF 9 & 14 certified • MEF CE 2.0 certified (E-LINE, E-LAN, E-TREE)

Table 11. Safety and Compliance

Type	Standards
Electromagnetic	FCC Part 15 Class
Emissions compliance	• EN 55022 Class A (CISPR22 Class A) • EN 55024 • EN 300 386 • VCCI Class A • AS/NZS 3548 Class A or AS/NZS CISPR22 Class A • KCC • CE Marking
Safety	• UL 60950-1 • UL to CAN/CSA 22.2 No.60950-1 • TUV/GS to EN 60950-1 with all amendments • CB to IEC 60950-1 with all country deviations • NOM to NOM-019-SCFI (through distributors) • CE Marking • CCC
ETSI	EN 300 019 – Storage: Class 1.2, Transportation: Class 2.3, In-Use: Class 3.2

Service and Support

Cisco offers a wide range of services programs to accelerate customer success. These innovative services programs are delivered through a unique combination of people, processes, tools and partners, resulting in high levels of customer satisfaction. Cisco Services help you protect your network investment, optimize network operations, and prepare your network for new applications to extend network intelligence and the power of your business. For more information about Cisco Services, refer to Cisco Technical Support Services or Cisco Advanced Services.

Cisco is committed to minimizing your total cost of ownership. Cisco offers a portfolio of technical support services to help ensure that Cisco products operate efficiently, remain highly available, and benefit from the most up-to-date system software. The services and support programs described in Table 12 are available as part of the Cisco Carrier Ethernet Switching Service and Support solution, and are available directly from Cisco and through resellers.

Table 12. Service and Support

Service and Support	Features	Benefits
Advanced Services		
Cisco Total Implementation Solutions (TIS), available directly from Cisco Cisco Packaged TIS, available through resellers	• Project management • Site survey, configuration, and deployment • Installation, text, and cutover • Training • Major moves, additions, and changes • Design review and product staging	• Supplements existing staff • Helps ensure functions meet needs • Mitigates risk
Cisco SP Base Support and Service Provider-Based Onsite Support, available directly from Cisco Cisco Packaged Service Provider-Based Support, available through resellers	• 24-hour access to software updates • Web access to technical repositories • Telephone support through the Cisco Technical Assistance Center (TAC) • Advance replacement of hardware parts	• Facilitates proactive or expedited problem resolution • Lowers total cost of ownership by taking advantage of Cisco expertise and knowledge • Minimizes network downtime

Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV Amsterdam,
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

Printed in USA C78-708663-05 04/13