

# Summit X450e Series



Summit X450e series switches are based on the revolutionary ExtremeXOS core-class operating system from Extreme Networks®. ExtremeXOS highly resilient, modular operating system provides continuous uptime, manageability and operational efficiency.

Summit X450e provides high availability and performance with its advanced traffic management capabilities to support a large-scale rollout of a converged network that supports devices such as IP telephones, wireless APs and other devices that require power from a LAN connection. With low-latency line-rate performance, Summit X450e-24p/48p supports the 802.3af standards-based Power over Ethernet (PoE) on every port.

Summit X450e supports hardware-based routing for both IPv4 and IPv6 which helps provide investment protection by allowing the rollout of IPv6 in your network now or in the future.

The flexible Summit X450e switches provide high-density Gigabit Ethernet ports plus dedicated 40 Gbps high-speed stacking ports and optional 10 Gigabit Ethernet ports in a compact 1RU format, supporting a full range of Layer 2 to Layer 4 functionalities on every port for high productivity. Optional redundant power supplies are offered with each switch to protect against power anomalies, providing a continuous operational network.

## Target Application

- PoE and non-PoE edge switches providing intelligent 10/100/1000BASE-T connectivity to the desktop in a network running ExtremeXOS from the core to the edge.



*Summit® X450e—The industry's first PoE and non-PoE edge switches with the revolutionary modular operating system, ExtremeXOS®.*

## Voice-Class Availability

- Modular ExtremeXOS operating system
- Ethernet Automatic Protection Switching (EAPS) resiliency protocol
- SummitStack™ and SummitStack-V—highly available, high-speed stacking support

## Designed for Converged Network Applications

- High bandwidth, non-blocking architecture for demanding edge applications
- Exceptional Quality of Service (QoS) with advanced traffic management capabilities for converged applications
- Convergence-ready connectivity with Voice-over-IP (VoIP) automatic provisioning
- Efficient management to handle convergence-driven network changes with Power over Gigabit Ethernet

## Comprehensive Security

- User policy and host integrity enforcement and Identity Management
- Universal Port dynamic security profile to provide fine granular security policy in the network
- Threat detection and response instrumentation to react to network intrusion with CLEAR-Flow Security Rules Engine



*Make Your Network Mobile*

## Voice-Class Availability

Powered by the ExtremeXOS modular operating system, the Summit X450e switch supports process recovery and application upgrades without the need for a system reboot. Summit X450e provides the high network availability required for converged applications.

## Modular Operating System for Non-Stop Operation

### Preemptive Multitasking and Protected Memory

Summit X450e switches allow each of many applications—such as Open Shortest Path First (OSPF) and Spanning Tree Protocol (STP)—to run as separate Operating System (OS) processes that are protected from each other. This drives increased system integrity and inherently protects against Denial of Service (DoS) attacks.

### Process Monitoring and Restart

The ExtremeXOS modular OS increases network availability using process monitoring and restart. Each independent OS process is monitored in real time. If a process becomes unresponsive or stops running, it can be automatically restarted.

### Loadable Software Modules

The modular design of ExtremeXOS allows the upgrading of individual software modules, should this be necessary, leading to higher availability in the network (see Figure 1).

## High Availability Network Protocols

### Ethernet Automatic Protection Switching (EAPS)

EAPS allows the IP network to provide the level of resiliency and uptime that users expect from their traditional voice network. EAPS is more adaptable than Spanning Tree or Rapid Spanning Tree protocols and offers sub-second (less than 50 milliseconds) recovery that delivers consistent failover regardless of the number of VLANs, network nodes or network topology. Since EAPS allows the network to recover almost transparently, VoIP calls will not drop and digital video feeds will not freeze or pixelize in most situations.

### Spanning Tree/Rapid Spanning Tree Protocols

Summit X450e switches support Spanning Tree (802.1D), Per VLAN Spanning Tree (PVST+), Rapid Spanning Tree (802.1w) and Multiple Instances of Spanning Tree (802.1s) protocols for Layer 2 resiliency.

## Software-Enhanced Availability

Software-enhanced availability allows users to remain connected to the network even if part of the network infrastructure is down. Summit X450e switches continuously check for problems in the uplink connections using advanced Layer 3 protocols such as OSPF, VRRP and Extreme Standby Router Protocol™ (ESRP, supported in Layer 2 or Layer 3), and dynamically route traffic around the problem.

## Equal Cost Multipath Routing

Equal Cost Multipath (ECMP) routing allows uplinks to be load balanced for performance and cost savings while also supporting redundant failover. If an uplink fails, traffic is automatically routed to the remaining uplinks and connectivity is maintained.

## Link Aggregation (802.3ad)

Link aggregation allows trunking of up to eight links on a single logical connection, for up to 20 gigabits per second (Gbps) of redundant bandwidth per logical connection.

## Multi-Switch LAG (M-LAG)

M-LAG can address bandwidth limitations and improve network resiliency, in part by routing network traffic around bottlenecks, reducing the risks of a single point of failure, and allowing load balancing across multiple switches.

## Voice-Grade Stacking with SummitStack

Summit X450e offers dual stacking interfaces to provide high-speed 40 Gbps stacking bandwidth. SummitStack stacking architecture is designed to support converged services such as VoIP and video by its highly available, rapid failover capability with n-1 master redundancy, distributed Layer 2 and Layer 3 switching, link aggregation across the stack and distributed uplinks. SummitStack supports up to eight units in a stack and the mixture of the units can be Summit X250e, X450e, X450a, X460, X480, and X650 switches running the same version of ExtremeXOS. It provides sub-second failover for path failure and hitless master/backup failover along with hitless protocol support such as OSPF graceful restart, PoE configuration and Network Login user authentication.



## Voice-Class Availability

### SummitStack-V Flexible Stacking Over 10 Gigabit Ethernet

SummitStack-V capability utilizes 10 GbE ports as stacking ports, enabling the use of standard cabling and optics technologies used for 10 GbE such as XFP, SFP+, 10GBASE-T and XENPAK. SummitStack-V provides long-distance stacking connectivity of up to 40 km while reducing the cable complexity of implementing a stacking solution.

SummitStack-V enabled 10 GbE ports must be physically direct-connected. SummitStack-V is compatible with Summit X450e, X450a, X460, X480, X650, X670 and X670V switches running the same version of ExtremeXOS. Summit X450e provides chassis-like management and availability with its SummitStack stacking technology (see Figure 2).

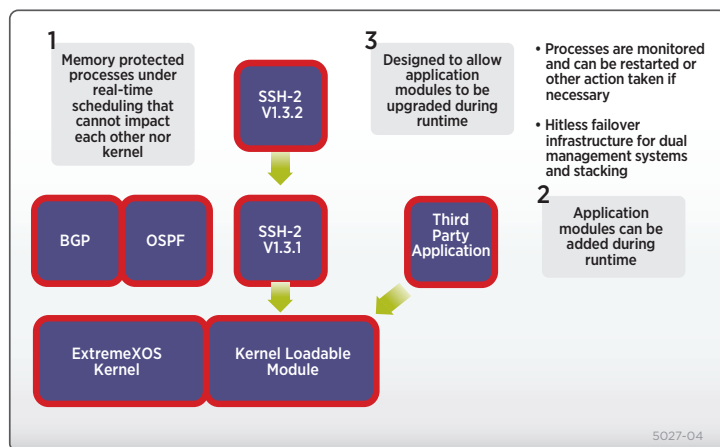


Figure 1: ExtremeXOS Modular Design

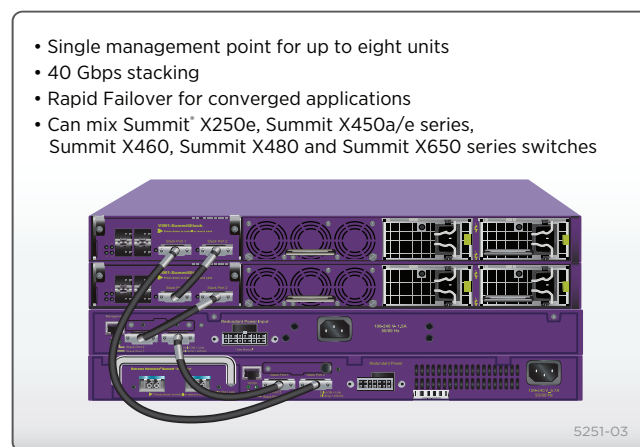


Figure 2: SummitStack Stacking Architecture



## Designed for Converged Network Applications

**Summit X450e provides a high bandwidth, non-blocking architecture with tri-speed copper Gigabit Ethernet ports in PoE and non-PoE versions for demanding edge applications.**

### High Density Gigabit Ports with Optional 10 Gigabit Uplinks

The Summit X450e series provides ideal performance and functionalities for access switches. They eliminate the need to funnel traffic through a low bandwidth gigabit trunk by providing non-blocking 10 gigabit links to the core. As an option module, Summit X450e provides a variety of choices for 10 Gigabit Ethernet uplinks: dual port 10GBASE-T for UTP connectivity, dual port SFP+ for fiber and passive copper connectivity and dual port XFP.

### Exceptional Policy-based QoS

PoE enabled Summit X450e switches provide eight hardware queues per port to support granular traffic classification with bandwidth allocation. 1024 centralized classifiers per 24 ports can use information from Layers 1 through 4 to prioritize and meter incoming packets at line-rate. When metering traffic, the switches can drop out-of-spec traffic or flag it for later action. To expedite upstream traffic handling, a packet's classification can be carried forward with Layer 2 (802.1p) and Layer 3 (DiffServ) markings. Summit X450e switches provide advanced traffic management features that support the highest-quality triple play of voice, video and data services.

### Efficient Management to Handle Convergence-Driven Network Changes

#### Universal Port—Voice-over-IP Auto-Provisioning

PoE enabled Summit X450e switches set the stage for convergence applications by allowing enterprises to add new access devices in a plug-and-play fashion. Voice and wireless services can be easily implemented without major network upgrades. Summit X450e supports automatic provisioning of VoIP using LLDP and event-based command scripting capability. It allows dynamic configuration of voice VLANs and QoS. This auto-configuration capability allows you to configure VoIP phone settings such as voice VLAN settings, call server IP address configuration, etc. This level of simplicity in managing network changes can greatly reduce operating expenses.

### Power over Gigabit Ethernet (PoE)

Deployments of IP Telephony depend on reliable, consistent power from the Ethernet jack. Summit X450e-24p/48p is the basis for a reliable LAN telephony infrastructure with fully redundant 15.4 watts per port, and QoS and resiliency to match the failover requirements for latency-sensitive services like VoIP phones. With Summit X450e, deployment of powered LAN devices is quick and easy with its support of the IEEE 802.3af standard and full Class 3 power availability on all ports, backed up 100% by the optional EPS-500 redundant power supply (Summit X450e-24p). Summit X450e-48p can provide up to 370W of PoE power and can be increased up to 740W of PoE power to support full 15.4W Class 3 devices on all 48 ports by adding the External Power System (EPS-C and EPS-600LS).

### Voice-Grade Connections

Summit X450e supports a range of QoS technologies that can prioritize and predictably handle high-priority traffic policing or rate limiting on ingress, 802.1q tagging and DiffServ marking, and shaping on egress with eight queues per port. The Extreme Networks tradition of building products with low latency and jitter continues with Summit X450e.

### Universal Connectivity

Summit X450e-24p/48p switches offer universal connectivity with high-performance gigabit to the desktop, PoE and wireless support from every RJ-45 port. Installing universal services ports everywhere for data and device power greatly simplifies installations and moves, and helps to future-proof your edge network. Summit X450e-24p/48p provides universal attachment at any desktop Ethernet speed, and any power level from none to full 15.4 Watts.

### Comprehensive Network Management

Summit X450e switches support comprehensive network management through Command Line Interface (CLI), SNMP v1, v2c, v3, and an embedded XML-based Web User Interface, ExtremeXOS ScreenPlay™. With a variety of management options and consistency across other Extreme Networks modular and stackable switches, Summit X450e series switches provide ease of management for demanding converged applications.



## Designed for Converged Network Applications

Extreme Networks has developed tools that simplify and help in efficiently managing your network. Ridgeline™ network and service management provides fault, configuration, accounting, performance and security functions, allowing more effective management of Extreme Networks products, solutions and third-party devices, in a converged network.

### Advanced Routing Capabilities for the Edge

Summit X450e switches support advanced protocols for an efficient and productive network. Summit X450e switches provide static and RIP routing for simple IPv4 and IPv6 Layer 3

deployment. An optional ExtremeXOS Advanced Edge license extends the feature set to include other important edge functions such as:

- Edge OSPF for much greater extensibility than RIP can provide
- Edge PIM sparse modes for routing of multicast streams
- Policy-based routing
- Virtual Router Redundancy Protocol (VRRP) to provide routing redundancy

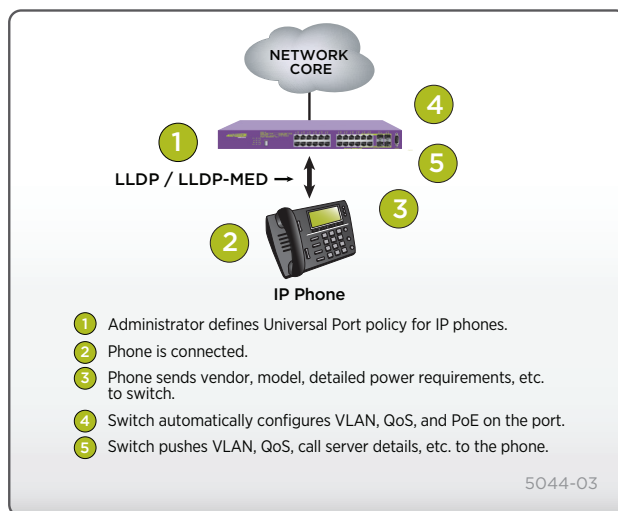


Figure 3: Universal Port Voice-over-IP Provisioning



## Comprehensive Security Management

Implementing a secure network means providing protection at the network perimeter as well as the core. Summit X450e uses advanced security functions in protecting your network from known or potential threats. Extreme Networks security offerings encompass three key areas: user and host integrity, threat detection and response, and hardened network infrastructure. Furthermore, with policy-based routing, measures can be taken to provide confidentiality of selective data in transit between internal network nodes.

### User Authentication and Host Integrity Checking

#### Network Login and Dynamic Security Profile

Network Login capability implemented in ExtremeXOS enforces user admission and usage policies. Summit X450e series switches support a comprehensive range of Network Login options by providing an 802.1x agent-based approach, a Web-based (agent-less) login capability for guests, and a MAC-based authentication model for devices. With these modes of Network Login, only authorized users and devices can connect to the network and be assigned to the appropriate VLAN. The Universal Port scripting framework available in Summit X450e lets you implement Dynamic Security Profiles, which in sync with Network Login allows you to implement fine-grained and robust security policies. Upon authentication, the switch can load dynamic ACLs/QoS profiles for a user or group of users, to deny/allow the access to the application servers or segments within the network.

#### Multiple Supplicant Support

Shared ports represent a potential vulnerability in a network. Multiple supplicant capability on a switch allows it to uniquely authenticate and apply the appropriate policies and VLANs for each user or device on a shared port.

Multiple supplicant support secures IP Telephony and wireless access. Converged network designs often involve the use of shared ports.

#### Media Access Control (MAC) Lockdown

MAC lockdown secures printers, wireless APs and servers. The MAC address security/lockdown feature allows Summit X450e to block access to any Ethernet port when the MAC address of a station attempting to access the port is different from the configured MAC address. This feature is used to “lock down” any device to a specific port.

#### Host Integrity Checking

Host integrity checking helps keep infected or non-compliant machines off the network. Summit X450e series switches support a host integrity or endpoint integrity solution that is based on the model from the Trusted Computing Group.

### Identity Manager

Identity Manager allows network managers to track users who access their network. User identity is captured based on NetLogin authentication, LLDP discovery and Kerberos snooping. ExtremeXOS uses the information to then report on the MAC, VLAN, computer hostname, and port location of the user. Further, Identity Manager can create both roles and policies, and then bind them together to create role-based profiles based on organizational structure or other logical groupings, and apply them across multiple users to allow appropriate access to network resources. In addition, support for Wide Key ACLs further improves security by going beyond the typical source/destination and MAC address as identification criteria access mechanism to provide filtering capabilities.

### Network Intrusion Detection and Response

#### CLEAR-Flow Security Rules Engine

CLEAR-Flow Security Rules Engine provides first order threat detection and mitigation, and mirrors traffic to appliances for further analysis of suspicious traffic in the network.

#### Hardware-based sFlow Sampling

sFlow is a sampling technology that provides the ability to continuously monitor application-level traffic flows on all interfaces simultaneously. The sFlow agent is a software process that runs on Summit X450e and packages data into sFlow datagrams that are sent over the network to an sFlow collector. The collector gives an up-to-the-minute view of traffic across the entire network, providing the ability to troubleshoot network problems, control congestion and detect network security threats.

#### Port Mirroring

To allow threat detection and prevention, Summit X450e switches support many-to-one and one-to-many port mirroring. This allows the mirroring of traffic to an external network appliance such as an intrusion detection device for trend analysis or for utilization by a network administrator for diagnostic purposes. Port mirroring can also be enabled across switches in a stack.



## Comprehensive Security Management

### Line-Rate ACLs

ACLs are one of the most powerful components used in controlling network resource utilization as well as protecting the network. Summit X450e switches support 1,024 centralized ACLs per 24-port block based on Layer 2, 3 or 4 header information such as the MAC or IP source/destination address. ACLs are used for filtering the traffic, as well as classifying the traffic flow to control bandwidth, priority, mirroring, and policy-based routing/switching.

### Denial of Service Protection

Summit X450e switches effectively handle DoS attacks. If the switch detects an unusually large number of packets in the CPU input queue, it will assemble ACLs that automatically stop these

packets from reaching the CPU. After a period of time, these ACLs are removed, and reinstalled if the attack continues. ASIC-based LPM routing eliminates the need for control plane software to learn new flows, allowing more network resilience against DoS attacks.

### Secure Management

To prevent management data from being intercepted or altered by unauthorized access, Summit X450e switches support SSH2, SCP and SNMPv3 protocols. The MD5 hash algorithm used in authentication prevents attackers from tampering with valid data during routing sessions.

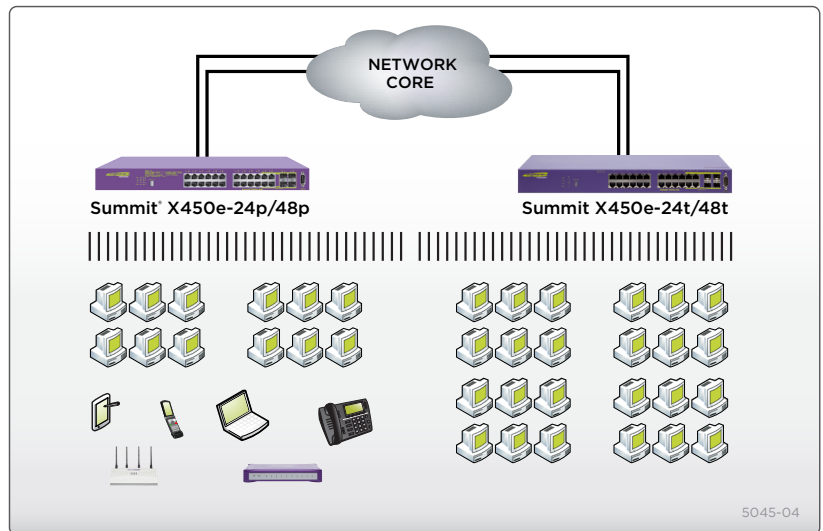




## Target Application

### PoE and Non-PoE Edge Switches for High-Bandwidth Applications

With line-rate performance and low latency, all Summit X450e switches extend the benefits of the ExtremeXOS operating system to the network edge. This uniformity provides consistent quality and performance throughout your converged network while reducing operational inefficiencies. The Summit X450e-24p/48p PoE edge switches connect wireless devices, LAN telephony, PDAs and other equipment without compromising security, scalability, availability, mobility or management. The Summit X450e-24t/48t non-PoE edge switches provide the same uncompromising service when PoE is not a requirement.



## Supported Protocols and Standards

A list of supported protocols and standards is available on the Extreme Networks website at:  
<http://www.extremenetworks.com/go/xos>





## Technical Specifications

### Summit X450e-24p/ Summit X450e-24p-TAA/ Summit X450e-24t

#### General Specifications

##### Performance

- 128 Gbps switch fabric bandwidth
- 95.2 Mpps frame forwarding rate
- 9,216 Byte maximum packet size (Jumbo Frame)
- 128 load sharing trunks, up to 8 members per trunk
- 8 QoS queues/port
- 4,094 VLANs (Port, Protocol, IEEE 802.1Q)
- 1,024 centralized ACL rules per switch

##### Forwarding Tables

- Layer 2/MAC Addresses: 8K
- IPv4 LPM Entries: 512
- IPv6 LPM Entries: 256

##### Rate Limiting

- Ingress bandwidth policing/rate limiting per flow
- Egress bandwidth rate shaping per egress queue and per port
- Rate Limiting Granularity: 64Kbps
- Available Rate Limiters: 1,024 per switch

##### Indicators

- Per port status LED including power status
- System Status LEDs: management, fan and power

##### Ports

- 24 ports 10/100/1000BASE-T PoE with auto-speed and auto-polarity (Summit X450e-24p/ Summit X450e-24p-TAA)
- 24 ports 10/100/1000BASE-T with auto-speed and auto-polarity (Summit X450e-24t)
- 4 ports SFP (shared PHY with 4 10/100/1000BASE-T ports)
- 1 port Serial (control port)
- 110/100BASE-T out-of-band management port
- Per port status LED including power status

##### Option Slot

- Slot for XGM2 dual 10 gigabit option module

##### External Power Supply Support

- EPS-500

#### Physical Specifications

##### Dimensions

- Height: 1.73 Inches/4.4 Cm
- Width: 17.35 Inches/44.1 Cm
- Depth: 15.3 Inches/38.7 Cm
- Weight: 14 lbs/6.35 Kg (Summit X450e-24p/ Summit X450e-24p-TAA)
- Weight: 13.75 lbs/6.24 Kg (Summit X450e-24t)

#### Operating Specifications

##### Temperature

- Operating Temperature Range: 0° C to 40° C (32° F to 104° F)
- Operating Humidity: 10% to 93% relative humidity, non-condensing
- Operational Shock (Half Sine): 30 m/s<sup>2</sup> (3g), 11ms, 60 Shocks
- Operational Random Vibration: 3-500 MHz @ 1.5g rms

##### Storage & Transportation Conditions (Packaged)

- Transportation Temperature: -40° C to 70° C (- 40° F to 158° F)
- Storage and Transportation Humidity: 10% to 95% RH, non-condensing
- Packaged Shock (Half Sine): 180 m/s<sup>2</sup> (18g), 6ms, 600 shocks
- Packaged Sine Vibration: 5 – 62 Hz @ Velocity 5mm/s, 62-500 Hz @ 0.2 G
- Packaged Random Vibration: 5 – 20 Hz @ 1.0 ASD w/-3dB/oct. from 20-200 Hz
- 14 drops min on sides & corners @ 42" (<15kg box)

#### Power & Acoustic Sound

##### All Summit X450e 24-port Models

- Voltage Input Range: 90 – 264V
- Maximum In-Rush Current: 30A @115V/60A@ 280V
- Efficiency: 80% with 60% – 100% load
- Line Frequency Range: 47 – 63 Hz
- Nominal Frequency Range: 50 – 60 Hz
- Power Supply Input Socket: IEC 320 C14
- Power Cord Input Plug: IEC 320 C13
- Sound Power in accordance with EN 300 753 (10-1997)
- Sound Power: 62 dBA per ISO 7779
- Declared Sound Power: 6.4 belsA per ISO 7779 & ISO 9296
- Bystander Sound Pressure in accordance with NEBS GR-63 Issue 2
- Bystander Sound Pressure: 54 dBA right side @ .6m

##### Summit X450e-24p/ Summit X450e-24p-TAA

- Nominal Input Ratings: 100 – 240V, 50/60Hz, 5.25A
- Nominal Input Current: 4.25A @ 115V- (lowline) 2.0A @ 230V- (highline)
- Heat Dissipation (with PoE full load): 120W (410 BTU/hr)
- Power Consumption (with PoE full load): 488W (1,665 BTU/hr)
- Heat Dissipation (without PoE): 54W (184 BTU/hr)
- Power Consumption (without PoE): 54W (184 BTU/hr)

##### Summit X450e-24t

- Nominal Input Ratings: 100 – 240V, 50/60Hz, 1A
- Nominal Input Current: 1.5A @ 115V- (lowline) 0.75A @ 230V- (highline)
- Heat Dissipation: 54W (184 BTU/hr)
- Power Consumption: 54W (184 BTU/hr)

## Technical Specifications

### Summit X450e-48p/ SummitX450e-48p-TAA/ Summit X450e-48t

#### General Specifications

##### Performance

- 256 Gbps switch fabric bandwidth
- 130.9 Mpps frame forwarding rate
- 9,216 Byte maximum packet size (Jumbo Frame)
- 128 load sharing trunks, up to 8 members per trunk
- 8 QoS queues/port
- 4,094 VLANs (Port, Protocol, IEEE 802.1Q)
- 1,024 centralized ACL rules per 24-ports

##### Forwarding Tables

- Layer 2/MAC Addresses: 8K
- IPv4 LPM Entries: 512
- IPv6 LPM Entries: 256

##### Rate Limiting

- Ingress bandwidth policing/rate limiting per flow
- Egress bandwidth rate shaping per egress queue and per port
- Rate Limiting Granularity: 64Kbps
- Available Rate Limiters: 1,024 per 24-ports

##### Indicators

- Per port status LED including power status
- System Status LEDs: management, fan and power

##### Ports

- 48 ports 10/100/1000BASE-T PoE with auto-speed and auto-polarity (Summit X450e-48p/ Summit X450e-48p-TAA)
- 48 ports 10/100/1000BASE-T with auto-speed and auto-polarity (Summit X450e-48t)
- 4 ports SFP (shared PHY with 4 10/100/1000BASE-T ports)
- 1 port Serial (control port)
- 1 10/100BASE-T out-of-band management port

##### Option Slot

- Slot for XGM2 dual 10 gigabit option module

##### External Power Supply Support

- EPS-C with EPS-600LS (Summit X450e-48p)
- EPS-500 (Summit X450e-48t)

#### Physical Specifications

##### Dimensions

- Height: 1.73 Inches/4.4 Cm
- Width: 17.35 Inches/44.1 Cm
- Depth: 17.0 Inches/43.2 Cm
- Weight: 16.25 lbs/7.4 Kg (Summit X450e-48p/ Summit X450e-48p-TAA)
- Weight: 15.75 lbs/7.14 Kg (Summit X450e-48t)

#### Operating Specifications

##### Temperature

- Operating Temperature Range: 0° C to 40° C (32° F to 104° F)
- Operating Humidity: 10% to 93% relative humidity, non-condensing
- Operational Shock (Half Sine): 30 m/s<sup>2</sup> (3g), 11ms, 60 Shocks
- Operational Random Vibration: 3-500 MHz @ 1.5g rms

##### Storage & Transportation Conditions (Packaged)

- Transportation Temperature: -40° C to 70° C (- 40° F to 158° F)
- Storage and Transportation Humidity: 10% to 95% RH, non-condensing
- Packaged Shock (Half Sine): 180 m/s<sup>2</sup> (18g), 6ms, 600 shocks
- Packaged Sine Vibration: 5 – 62 Hz @ Velocity 5mm/s, 62 – 500 Hz @ 0.2 G
- Packaged Random Vibration: 5 – 20 Hz @ 1.0 ASD w/-3dB/oct. from 20 – 200 Hz
- 14 drops min on sides & corners @ 42" (<15kg box)

#### Power & Acoustic Sound

##### All Summit X450e 48-port Models

- Voltage Input Range: 90 – 264V
- Nominal Input Ratings: 100-240V, 50/60 Hz, 6.0A
- Maximum In-Rush Current: 30A @115V/60A@ 230V
- Efficiency: 80% with 60% – 100% load
- Line Frequency Range: 47 – 63 Hz
- Nominal Frequency Range: 50 – 60 Hz
- Power Supply Input Socket: IEC 320 C14
- Power Cord Input Plug: IEC 320 C13
- Sound Power in accordance with EN 300 753 (10-1997)
- Sound Power: 62 dBA per ISO 7779
- Declared Sound Power: 6.4 belsA per ISO 7779 & ISO 9296
- Bystander Sound Pressure in accordance with NEBS GR-63 Issue 2
- Bystander Sound Pressure: 54 dBA right side @ .6m

##### Summit X450e-48p/ Summit X450e-48p-TAA

- Nominal Input Current: 5.25A @ 100V- (lowline) 2.5A @ 230V- (highline)
- Heat Dissipation (with PoE full load): 180W (614 BTU/hr)
- Power Consumption (with PoE full load): 507W (1,730 BTU/hr)
- Heat Dissipation (without PoE): 73W (250 BTU/hr)
- Power Consumption (without PoE): 73W (250 BTU/hr)

##### Summit X450e-48t

- Nominal Input Current: 2.25A @ 115V- (lowline) 1.0A @ 230V- (highline)
- Heat Dissipation: 73W (250 BTU/hr)
- Power Consumption: 73W (250 BTU/hr)

## Technical Specifications

### Summit X450e Series – All

#### Regulatory/Safety Standards

##### North American Safety of ITE

- UL 60950-1 1st Ed., Listed Device (U.S.)
- CSA 22.2#60950-1-03 1st Ed. (Canada)
- Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
- CDRH Letter of Approval (U.S. FDA Approval)

##### European Safety of ITE

- EN60950-1:2001+A11
- EN 60825-1+A2:2001 (Lasers Safety)
- TUV-R GS Mark by German Notified Body
- 2006/95/EC Low Voltage Directive

##### International Safety of ITE

- CB Report & Certificate per IEC 60950-1:2001 + National Differences
- AS/NZS 60950-1 (Australia/New Zealand)

#### EMI/EMC Standards

##### North America EMC for ITE

- FCC CFR 47 part 15 Class A (U.S.)
- ICES-003 Class A (Canada)

##### European EMC Standards

- EN 55022:2003 Class A
- EN 55024:A2-2003 Class A includes IEC 61000-4-2, 3, 4, 5, 6, 11
- EN 61000-3-2,8-2000(Harmonics)
- EN 61000-3-3 1995+A1:2001(Flicker)
- ETSI EN 300 386 v1.3.3, 2005-04 (EMC Telecommunications)
- 2004/108/EC EMC Directive

#### International EMC Certifications

- CISPR 22: 2005, Class A (International Emissions)
- CISPR 24:A2:2003 Class A (International Immunity)
- IEC/EN 61000-4-2:2001 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A
- EC/EN 61000-4-3:2002 Radiated Immunity 10V/m, Criteria A
- EC/EN 61000-4-4:2004 Transient Burst, 1 kV, Criteria A
- IEC/EN 61000-4-5:2001 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A
- IEC/EN 61000-4-6:2004 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria A
- EC/EN 61000-4-11:2004 Power Dips & Interruptions, >30%, 25 periods, Criteria C

#### Country Specific

- VCCI Class A (Japan Emissions)
- ACMA (C-Tick) (Australia Emissions)
- KCC Mark EMC Approval (Korea)

#### Telecom Standards

- EN/ETSI 300 386:2001 (EMC Telecommunications)
- EN/ETSI 300 019 (Environmental for Telecommunications)

#### IEEE 802.3 Media Access Standards

- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3an 10GBASE-T

#### Environmental Standards

- EN/ETSI 300 019-2-1 v2.1.2 (2000-09) – Class 1.2 Storage
- EN/ETSI 300 019-2-2 v2.1.2 (1999-09) – Class 2.3 Transportation
- EN/ETSI 300 019-2-3 v2.1.2 (2003-04) – Class 3.1e Operational
- EN/ETSI 300 753 (1997-10) – Acoustic Noise
- ASTM D3580 Random Vibration Unpackaged 1.5G

#### Warranty

- Ltd. Lifetime with express Advanced Hardware Replacement (for products shipped from Extreme Networks on or after June 29, 2009)
- For warranty details, visit [www.extremenetworks.com/go/warranty](http://www.extremenetworks.com/go/warranty)

## Accessories

### Summit X450e Series Redundant PSUs

#### EPS-500

EPS-500 is the redundant AC Power Supply for higher power consuming AC PSU-based switches including Power-over-Ethernet enabled switches. EPS-500 is one rack unit height and works in standalone. EPS-500 can be rack mounted in a regular 19 inch rack system. EPS-500 comes with a DC output cable to connect between the Summit switch and EPS-500.



Front View



Rear View

#### EPS-600LS and EPS-C

EPS-600LS is a power module that works with the EPS-C External Power System Chassis. EPS-C has three slots for EPS-600LS and one DC output to connect to high-density PoE Summit switches. Depending upon the number of EPS-600LS installed in EPS-C, it can provide 1) Redundant configuration for up to 370 watts of PoE power with one EPS-600LS installed; 2) Non-Redundant configuration for up to 740 watts of PoE power with two EPS-600LS installed; and 3) Redundant configuration for up to 740 watts of PoE power with three EPS-600LS installed. EPS-C comes with a DC output cable to connect between the Summit switch and EPS-C with EPS-600LS installed.



Front View



Rear View



Configured View

### Redundant PSU Compatibility Matrix

Summit Switch Models	Summit Switch Part Number(s)	External Redundant PSU options
Summit X450e-24t	16141	EPS-500 external power supply (10911)
Summit X450e-24p	16142	EPS-500 external power supply (10911)
Summit X450e-48t	16147	EPS-500 external power supply (10911)
Summit X450e-48p	16148	EPS-C (10912) and EPS-600LS (10913)
Summit X450e-48p-TAA	16150	EPS-C (10912) and EPS-600LS (10913)

## Accessories

### Power Supply Units

#### EPS-500

##### Dimensions and Weight

##### EPS-500

- Height: 1.73 Inches/4.4 Cm
- Width: 17.4 Inches/44 Cm
- Depth: 7.6 Inches/19.3 Cm
- Weight: 10.8 Lbs/4.9 Kg

##### Power

- Voltage Input Range: 90 – 264V
- Nominal Input Ratings: 100 – 240V~, 50 – 60Hz, 10A
- Line Frequency Range: 47 – 63 Hz
- Maximum Input Current: 5.75A at 115 VAC, 2.80A at 230 VAC
- Maximum Inrush Current: 30A at 115 VAC, 60A at 230 VAC

- Output: -50 VDC, 7.5A max, 375 Watts 12 VDC, 7.5A max, 90 Watts
- Power Supply Input Socket: IEC 320 C14
- Power Cord Input Plug: IEC 320 C13
- Heat Dissipation: 158W (539.1 BTU/h)
- Power Consumption: 659W (2448.6 BTU/h)

#### EPS-C/EPS-600LS

##### Dimensions and Weight

##### EPS-C

- Height: 1.73 Inches/4.4 Cm
- Width: 17.32 Inches/44.0 Cm
- Depth: 11.81 Inches/30.0 Cm
- Weight: 7.17 Lbs/3.16 Kg

##### EPS-600LS

- Height: 1.69 Inches/4.3 Cm
- Width: 4.61 Inches/11.7 Cm
- Depth: 11.81 Inches/30.9 Cm
- Weight: 3.74 Lbs/1.70 Kg




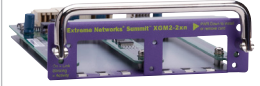
##### Power – EPS-600LS

- Voltage Input Range: 90 – 264 V
- Nominal Input Voltage/Hz: 115V~/60Hz & 230V~/50Hz, 10.0A
- Line Frequency Range: 47 – 63 Hz
- Maximum Input Current Rating: 7.0A at 115 VAC, 3.5A at 230 VAC
- Maximum Inrush Current: 30A at 115 VAC, 60A at 230 VAC
- Power Supply Input Socket: IEC 320 C14
- Power Cord Input Plug: IEC 320 C13
- Heat Dissipation: 219W (747.7BTU/h)
- Power Consumption: 801W (2733.1BTU/h)

##### External Power Supply Chassis System – EPS-C with three EPS-600LS installed

- Heat Dissipation: 360W (1228.4BTU/h)
- Power Consumption: 1620W (5527.7BTU/h)

### XGM2 Dual 10 Gigabit Ethernet Modules

				
<b>XGM2 Dual 10 Gigabit Ethernet Module</b>	<b>XGM2-2bt</b>	<b>XGM2-2sf</b>	<b>XGM2-2xf</b>	<b>XGM2-2xn</b>
<b>Interface Type</b>	10GBASE-T	SFP+	XFP	XENPAK
<b>Supported Media</b>	UTP	SFP+ Passive Copper SFP+ Optics	XFP Optics	XENPAK Optics
<b>Distance</b>	100 meters (Category 6a) 55 meters (Category 6 and 5e)	1-10 meters (Passive Copper) 300m-40km	300m-80km	300m-80km
<b>Optics Support</b>	N/A	10GBASE-SR/LR/ER/LRM	10GBASE-SR/LR/ER/ZR	10GBASE-SR/LR/ER/ZR/LW

## Ordering Information

Part Number	Name	Description
16141	Summit X450e-24t	24 10/100/1000BASE-T; 4 unpopulated 1000BASE-X SFP ports (shared); slot for XGM2 10 Gigabit Ethernet module; 2 SummitStack stacking ports; 1 AC PSU; connector for EPS-500 external redundant PSU; ExtremeXOS Edge license
16142	Summit X450e-24p	24 10/100/1000BASE-T Power over Ethernet; 4 unpopulated 1000BASE-X SFP ports (shared); slot for XGM2 10 Gigabit Ethernet module; 2 SummitStack stacking ports; 1 AC PSU; connector for EPS-500 external redundant PSU; ExtremeXOS Edge license
16142T	Summit X450e-24p-TAA	U.S. Federal TAA; 24 10/100/1000BASE-T Power over Ethernet; 4 unpopulated 1000BASE-X SFP ports; dual 10G option slot; 2 dedicated 10G stacking ports; AC PSU; connector for EPS-500 external redundant PSU; ExtremeXOS Edge license
16147	Summit X450e-48t	48 10/100/1000BASE-T; 4 unpopulated 1000BASE-X SFP ports (shared); slot for XGM2 10 Gigabit Ethernet module; 2 SummitStack stacking ports; 1 AC PSU; connector for EPS-500 external redundant PSU; ExtremeXOS Edge license
16148	Summit X450e-48p	48 10/100/1000BASE-T with PoE; 4 unpopulated 1000BASE-X SFP ports (shared); slot for XGM2 10 Gigabit Ethernet module; 2 SummitStack stacking ports; 1 AC PSU; ExtremeXOS Edge license; connector for EPS-C external power system chassis (Requires EPS-600LS)
16148T	Summit X450e-48p-TAA	U.S. Federal TAA; 48 10/100/1000BASE-T with PoE; 4 unpopulated SFP ports; option slot for 10 Gigabit option card XGM2; 2 SummitStack stacking ports; 1 AC PSU; ExtremeXOS Edge license; connector for EPS-C external power system chassis (Requires EPS-600-LS)
16171	Summit X450 Advanced Edge License	ExtremeXOS Advanced Edge License for Summit X450e series switches
16112	XGM2-2xf	Option Card, Two Unpopulated 10 Gigabit XFP Slots, compatible with Summit X450e, and Summit X450a
16113	XGM2-2xn	Option Card, Two Unpopulated 10 Gigabit XENPAK Slots, compatible with Summit X450e and Summit X450a
16114	XGM2-2sf	Option Card, Two Unpopulated 10 Gigabit SFP+ Slots, compatible with Summit X350, Summit X450e and Summit X450a
16115	XGM2-2bt	Option Card, two 10GBASE-T ports, compatible with Summit X350, Summit X450e and Summit X450a
10911	EPS-500 <sup>1</sup>	External Power Supply Unit 500 Watts, Power cord ordered separately
10912	EPS-C <sup>2</sup>	External Power Supply Unit, Power cord ordered separately, Accepts up to three EPS-600LS Power Modules
10913	EPS-600LS	External Power System Power Module for EPS-C, 600 Watts
10110	SR XENPAK	10GBASE-SR XENPAK Transceiver, 850 nm, up to 300 m on Multimode Fiber, SC Connector
10111	LR XENPAK	10GBASE-LR XENPAK Transceiver, 1310 nm, up to 10 km on Single-mode Fiber, SC Connector
10112	ER XENPAK	10GBASE-ER XENPAK Transceiver, 1550 nm, up to 40 km on Single-mode Fiber, SC Connector
10113	ZR XENPAK	10GBASE-ZR XENPAK Transceiver, 1550 nm, up to 80 km on Single-mode Fiber, SC Connector
10114	LX4 XENPAK	10GBASE-LX4 XENPAK Transceiver, 1310 nm, up to 300 m on Multi-mode Fiber and up to 10 km on a Single-mode Fiber, SC Connector
10121	SR XFP	10GBASE-SR XFP Transceiver, 850nm, up to 300m on Multimode Fiber, LC Connector
10122	LR XFP	10GBASE-LR XFP Transceiver, 1310nm, up to 10km on Single-mode Fiber, LC Connector

<sup>1</sup> Compatible with Summit X450e-24t, X450e-48t, and X450e-24p

<sup>2</sup> Compatible with Summit X450e-48p and Summit X450e-48p-TAA

## Ordering Information

Part Number	Name	Description
10124	ER XFP	10GBASE-ER XFP Transceiver, 1550nm, up to 40km on Single-mode Fiber, LC Connector
10125	ZR XFP	10GBASE-ZR XFP Transceiver, 1550nm, up to 80km on Single-mode Fiber, LC Connector
10301	10GBASE-SR SFP+	10GBASE-SR SFP+, 850nm, LC Connector, transmission length of up to 300m on MMF
10302	10GBASE-LR SFP+	10GBASE-LR SFP+, 1310nm, LC Connector, transmission length of up to 10km on SMF
10303	SFP+ LRM Module	10 Gigabit Ethernet SFP+ module, 1310nm, legacy MMF 220m link, LC connector
10309	10GBASE-ER SFP+	10GBASE-ER SFP+, 1550nm, LC connector, transmission length of up to 40km on SMF
10304	10GBASE-CR SFP+ 1m	10GBASE-ER XFP Transceiver, 1550nm up to 40km on Single-mode Fiber, LC Connector
10305	10GBASE-CR SFP+ 3m	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 3m
10306	10GBASE-CR SFP+ 5m	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 5m
10307	10GBASE-CR SFP+ 10m	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 10m
10051	SX SFP	1000BASE-SX SFP, 1000BASE-SX, LC Connector
10052	LX SFP	1000BASE-LX SFP, 1000BASE-LX, LC Connector
10053	ZX SFP	1000BASE-ZX SFP, Extra Long Distance SMF 70 km/21 dB Budget, LC Connector
10056	1000BX SFP BX-D	1000BASE-BX-D SFP, SMF (1490 nm TX/1310 nm RX Wavelength)
10057	1000BX SFP BX-U	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 5m
16106	Stacking Cable, 0.5M	SummitStack/UniStack™ Stacking Cable, 0.5M
16107	Stacking Cable, 1.5M	SummitStack/UniStack Stacking Cable, 1.5M
16108	Stacking Cable, 3.0M	SummitStack/UniStack Stacking Cable, 3.0M
16105	Stacking Cable, 5.0M <sup>3</sup>	SummitStack Stacking Cable, 5.0M

<sup>3</sup> Not supported when using with Summit X650 and UniStack



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