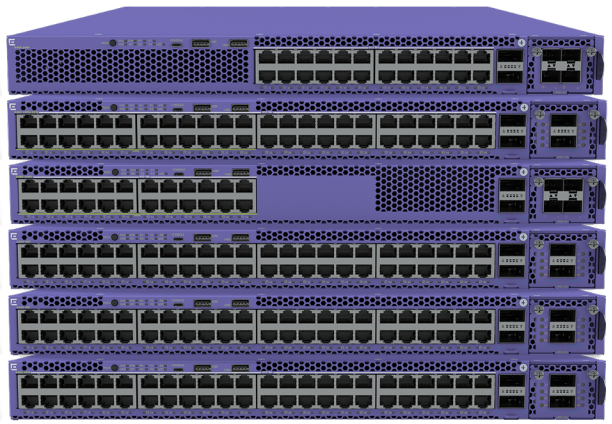
Extreme™
Customer-Driven Networking

Data Sheet

Highlights

- Versatile fixed-form switch for advanced edge access and aggregation applications
- Compact 1U form factor
- 24- and 48-port Gigabit Ethernet connectivity
- 24-port 1/2.5/5 Gigabit Multi-rate Ethernet connectivity
- Non-blocking, wire-speed switching architecture
- Up to 8-unit 160Gb stacking via SummitStackV-160
- Flexible 10Gb/25Gb/40Gb uplinks via optional VIM module
- 30W, 60W, and 90W PoE support (IEEE 802.3at / IEEE 802.3bt)
- MACsec on 10/100/1000 access and modular uplink ports for secure link encryption
- Extreme Insight Architecture with VM-based real-time monitoring, analysis, and troubleshooting
- Hot-swappable, redundant power supplies and fans
- New 2000W AC power supply along with legacy 350W, 715W and 1100W power supply options



ExtremeSwitching™ X465 Series

Premium Smart OmniEdge™ Switching Platform

Product Overview

The ExtremeSwitching X465 Series is a premium stackable switch family providing high-performance, convergence-ready, resilient and secure Gigabit and multi-Gigabit Ethernet connectivity. Powered by ExtremeXOS, the X465 Series offers sophisticated routing and switching, high-speed stacking, modular uplink options, advanced PoE, and comprehensive security. This makes the X465 Series an ideal choice for high-end wiring closet and network edge deployments.

Future-Proof Switches for Flexible Deployment

The X465 Series includes both 24- and 48-port 1 Gigabit models, as well as multi-rate models with 1, 2.5 and 5 Gigabit ports – for connecting a range of edge access devices. The family also includes 30W, 60W, and 90W PoE model options for powering connected devices. Together, this makes the X465 an ideal wired back-end for Wave 2 or Wi-Fi 6 wireless APs or for connecting any next-generation edge device. The X465 also provides modular uplink options – at 10G, 25G, and 40G – for flexible linkage to other switches or devices over a range of media.

PoE for the Next Generation Edge

The X465 Series provides standards-based IEEE 802.3at 30W, as well as IEEE 802.3bt 60W and 90W Power over Ethernet (PoE) options. These PoE options not only eliminate the need for additional electrical cabling and circuits, but also enable the X465 to power next-gen Ethernet edge devices, such as point-of-sale terminals, pan-tilt-zoom cameras, LED lighting or Wi-Fi 6 access points.

The X465 Series also provides the following capabilities to address the unique needs of powered edge devices:

- **Perpetual PoE** which enables PoE power to be maintained during a switch re-start, preventing attached IoT devices from being disrupted or rebooted during the switch reset.
- **Fast PoE** which enables power to be supplied to connected edge or IoT devices before switch boot-up completion, speeding the time for powered end-points to start up.

Extreme Insight Architecture

X465 Series multi-rate models support Extreme's Insight Architecture. This architecture – also available on Extreme's SLX and VSP Series – leverages the X465 Series X86-based multi-core processor design to provide network visibility without impacting network operations or performance. This architecture allows X465 multi-rate models to run one or more Guest VMs. Organizations can use these Guest VMs to deploy their choice of third-party or customized monitoring/troubleshooting tools—providing real-time visibility to meet specific business or operational needs across the network. This can help to improve service and application assurance, as well as reduce operational impact and cost.

Extended Edge Switching

All X465 models support Extended Edge Switching, an innovative solution that simplifies the deployment and operation of edge switches. As the controlling bridge of an Extended Edge solution, the X465 can be combined with Extreme's V400 Series access devices to create a single logical switch architecture. The result is a simplified operational model that reduces costs.

Intelligent L2/L3 Switching

The X465 family supports sophisticated Layer 2 switching, as well as Layer 3 IPv4/IPv6 routing. Routing support includes static and dynamic routing (RIP and OSPF), as well as PIM-SM multicast, BGP and VXLAN.

High-Performance 160Gb Stacking

High-speed stacking on the X465 Series is provided via SummitStack-V160. Up to eight X465 switches can be stacked using two dedicated 40Gb QSFP+ ports on the X465's front panel. Stacking provides a single point of management across the stack collection operating across 160Gbps of aggregate bandwidth.

VIM5 Options for Flexible Uplinks

The X465 Series supports Versatile Interface Modules (VIM5) for its uplink ports – in addition to its two dedicated stacking ports. Each X465 model has a single VIM5 slot that can be optionally used for uplinks. VIM5 options include both 2 and 4-port modules that support 10Gb, 25Gb and 40Gb data rates.

MACsec Link Encryption

The X465 Series supports IEEE 802.1AE MACsec on its 10/100/1000 access ports. MACsec is also supported on select VIM5 modules at 10Gb and 25Gb data rates. MACsec is a hop-by-hop security capability which encrypts/decrypts packets between connected switches or devices. As a link-only encryption, the switches can still apply services to the packet, such as policy or QoS, without compromising the security of packets across the link. With support for both 128-bit and 256-bit Advanced Encryption Standard (AES) support, the X465 provides the most secure link encryption.

Fabric Attach

Fabric Attach on the X465 Series helps automate connections within Extreme's Automated Campus (Fabric Connect) solution. With Fabric Attach, network administrators can avoid modifying uplinks/downlinks between edge devices and the Fabric Connect core. And when combined with ExtremeControl, they can fully automate the edge device provisioning process. The X465 Series, using Fabric Attach, can also take full advantage of the resiliency and security features of the Fabric Connect infrastructure.

Role-Based Policy

The X465 Series supports role-based policies that can be centrally administered through the ExtremeControl policy manager. This policy framework empowers network administrators to define distinct roles or profiles to represent specific operational groups that may exist in an enterprise. Each defined role can then be granted individualized access to specific network services or applications – and these access privileges remain associated with users as they move across both wired and wireless network access points.

Management

The X465 Series can be managed in a variety of ways. Simple on-box management functions are delivered by a web-based GUI, and a generic CLI is available for manual configuration.

For centralized management, the Extreme Management Center (XMC) delivers a comprehensive unified management capability. XMC provides a consolidated view of users, devices, and applications for wired and wireless networks – from edge to data center. Zero-touch provisioning lets one quickly bring new infrastructure online. A granular view of users, devices and applications with an easy to understand dashboard enables efficient inventory and network topology management.

Location LED

A location LED on the front panel of the X465 chassis can be used to quickly identify a specific X465 switch deployed in a wiring closet or stack.

Ordering Notes

X465 Series switches are ordered and shipped as a bundled offering. Each bundle includes the base X465 switch along with a single designated Power Supply, Fan Modules and an Advanced Edge software license. VIM5 modules, additional power supply, power cords, transceiver/optics and optional Software Feature Packs must be separately ordered.

Specifications

Performance and Scale

Switch Model	Max Active 10/100/ 1000Mb ports	Max Active 100Mb/1Gb/ 2.5Gb/5Gb ports	Max Active 1/ 10Gb SFP+ ports	Max Active 10/25Gb SPF28 ports	Max Active 40Gb QSFP+ VIM5 ports*	Max Active QSFP+ Stacking Ports	Aggregated Switch Bandwidth	Frame Forwarding Rate
X465-24W	24	0	4	2	1	2	316 Gbps	235.1 Mpps
X465-48T	48	0	4	2	1	2	364 Gbps	270.8 Mpps
X465-48P	48	0	4	2	1	2	364 Gbps	270.8 Mpps
X465-48W	48	0	4	2	1	2	364 Gbps	270.8 Mpps
X465-24MU	0	24	4	4	2	2	648 Gbps	482.1 Mpps
X465-24MU-24W	24	24	4	4	2	2	696 Gbps	517.9 Mpps

* 40Gb ports on the VIM5 module can also be broken out individually into 4 x 10Gb ports.

- Layer 2/MAC Addresses: 272K
- IPv4 LPM Entries: 256K max w/ALPM
- IPv4 Hosts
  - With min LPM IPv4 entries: 146K
  - With max LPM IPv4 entries: 3K
- IPv6 LPM (/64) Entries: 128K max w/ ALPM
- IPv6 Hosts: 32K max
- IP Multicast Groups: 4K
- IP Multicast (s,v,g) entries – 130K max
- Flexible Universal Forwarding Tables (UFT)
- 4092 user-created VLAN/VMANs
- 9216 Byte Max Packet Size (Jumbo Frame)
- 8 queues per port
- 8K ingress ACL rules
- 1K egress ACL rules
- OnePolicy Scaling
  - Up to 24,576 authenticated policy users per switch
  - Policy Profiles: 63
  - Unique Permit/Deny Rules per switch: 1976
  - Default OnePolicy Profile
    - MAC Rules: 512
    - IPv4 Rules: 512
    - IPv6 Rules: 512
    - L2 Rules: 400

Key Features

- VxLAN Tunneling End Point (VTEP)
- MPLS/VPLS
- Extended Edge Switching Controlling Bridge
- Priority Flow Control (PFC)
- SummitStack-V160 160GB stacking (full duplex)
  - Stacking with up to 8 X465/X590 systems
  - 2 dedicated 40Gb ports for stacking
- SFlow/Application Telemetry
- Y.1731 OAM in Hardware

External Ports/Slots

Switch Model	Ports/Slots
X465-24W	24 x 10/100/1000BASE-T 802.3bt Type4 (90W) ports - Full / Half-Duplex - MACsec-capable 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
X465-48T	48 x 10/100/1000BASE-T ports - Full / Half-Duplex - MACsec-capable 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
X465-48P	48 x 10/100/1000BASE-T 802.3at (30W) ports - Full / Half-Duplex - MACsec-capable 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
X465-48W	48 x 10/100/1000BASE-T 802.3bt (90W) ports - Full / Half-Duplex - MACsec-capable 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
X465-24MU	24 x 100M/1/2.5/5GBASE-T 802.3bt Type3 (60W) ports 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
X465-24MU-24W	24 x 100M/1/2.5/5GBASE-T 802.3bt Type3 (60W) ports 24 x 10/100/1000BASE-T 802.3bt Type4 (90W) ports - Full Duplex on 100M/1/2.5/5GBASE-T ports - Full / Half-Duplex on 10/100/1000BASE-T ports - MACsec-capable 2 x 40GBASE-X QSFP+ dedicated stacking ports (unpopulated) 1 x Serial (console port RJ-45) 1 x 10/100/1000BASE-T out-of-band management port 1 x USB Micro-B console port 2 x USB A ports for external USB flash 1 x VIM5 slot
VIM5-4X*	4 x 1/10GBASE-X SFP+ (unpopulated ports)
VIM5-4XE*	4 x 1/10GBASE-X SFP+ (unpopulated ports) - LRM capable - MACsec capable
VIM5-2Y	2 x 10/25GBASE-X SFP28 (unpopulated ports)
VIM5-4Y**	4 x 10/25GBASE-X SFP28 (unpopulated ports)
VIM5-4YE**	4 x 10/25GBASE-X SFP28 (unpopulated ports) - MACsec capable
VIM5-2Q***	2 x 40GBASE-X QSFP+ (unpopulated ports)

* VIM5-4x and VIM5-4XE only support 10Gb operation (no 1Gb) when installed in X465 24MU and 24MU-24W models

* VIM5-4Y and VIM5-4YE only support 2 x 25Gb port operation when installed in X465 24W, 48T, 48P and 48W models

** VIM5-2Q only supports 1 x 40Gb when installed in X465 24W, 48T, 48P and 48W models

Weight and Dimensions

Part Number	Weight	Physical Dimensions
Switches		
X465-24W	17.35 lb / 7.87 kg	17.34 in W / 1.7 in H / 19.23 in D 440mm / 43.6mm / 488mm
X465-48T	17.64 lb / 8.0 kg	
X465-48P	18.49 lb / 8.39 kg	
X465-48W	18.46 lb / 8.38 kg	
X465-24MU	17.5 lb / 7.94	
X465-24MU-24W	18.45 lb / 8.37 kg	
VIM Modules		
VIM5-4X	0.37 lb / 0.17 kg	1.92 in W / 1.61 in H / 5.76 in D 48.8mm / 40.8mm / 146.3mm
VIM5-4XE	0.41 lb / 0.19 kg	
VIM5-2Q	0.37 lb / 0.17 kg	
VIM5-2Y	0.38 lb / 0.17 kg	
VIM5-4Y	0.44 lb / 0.20 kg	
VIM5-4YE	0.43 lb / 0.19 kg	
Power Supplies		
10953 (350W AC)	2.38 lb / 1.08 kg	3.25 in W / 1.56 in H / 11.5 in D 40mm / 82.5mm / 287mm
10951 (715W AC)	2.55 lb / 1.16 kg	
10941 (1100W AC)	2.55 lb / 1.16 kg	
XN-ACPWR-2000W-F (2000W AC)	2.56 lb / 1.16kg	3.25 in W / 1.56 in H / 11.5 in D 40mm / 75mm / 292mm

Power Supply Unit Specifications

	350W AC PSU	715W AC PSU	1100W AC PSU	2000W AC PSU*
Voltage Input Range (nominal)	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC	100-127/200-240 VAC*
Line Frequency Range	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz	47 to 63 Hz
Power Supply Input Socket	IEC/EN 60320 C14	IEC/EN 60320 C16	IEC/EN 60320 C16	IEC/EN 60320 C16
Power Cord Input Plug	IECEN 60320 C13	IEC/EN 60320 C15	IEC/EN 60320 C15	IEC/EN 60320 C15
Operating Temperature	0^{0} C to 50^{0} C normal operation	0^{0} C to 50^{0} C normal operation	0^{0} C to 50^{0} C normal operation	0^{0} C to 45^{0} C**

* 200-240 VAC input voltage is required to to achieve full 2000W output. If run at 100-120VAC, output is limited to 1100W

** At sea-level; 0^{0} C to 40^{0} C at 1500m; 0^{0} C to 35^{0} C at 3000m

PoE Power Budget

Switch Model	1 x 1100W	2 x 1100W	1 x 2000W @ 200- 240VAC	1 x 2000W @ 100- 120VAC	2 x 2000W @ 200-240VAC	2 x 2000W @ 100-120VAC
X465-24W	871W	1771W	1771W	871W	2160W	1865W
X465-48P	845W	1440W	1440W	845W	1440W	1440W
X465-48W	815W	1715W	1715W	815W	3523W	1809W
X465-24MU	825W	1440W	1440W	825W	1440W	1440W
X465-24MU-24W	768W	1668W	1668W	768W	3476W	1762W

NOTE: It's recommended that primary and secondary power supply units (PSUs) be of the same type to support optimal PoE operation.

Minimum/Maximum Power Consumption and Heat Dissipation

Switch Model	Minimum Heat Dissipation (BTU/hr)	Minimum Power Consumption (Watts)	Maximum Power Consumption (Watts)*	Maximum Heat Dissipation (BTU/hr)**
X465-24W	247	72	2485	1110
X465-48T	250	73	176	600
X465-48P	280	82	1746	1046
X465-48W	316	93	4016	1708
X465-24MU	257	75	1722	963
X465-24MU-24W	327	96	3941	1614

* Includes maximum PoE load (W) through the switch
** Does not include PoE load heat dissipated through external electronic load

CPU/Memory

X465 10M/100M/1000M models

- Dual Core x86 CPU
- 2GB DRAM
- 8GB eMMC NVRAM

X465 100M/1G/2.5G/5G models

- Quad Core x86 CPU
- 8GB DRAM
- 8GM eMMC NVRAM

Environmental

Environmental Specifications

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

Environmental Compliance

- EU RoHS 2011/65/EU
- EU WEEE 2012/19/EU
- China RoHS SJ/T 11363-2006
- Taiwan RoHS CNS 15663(2013.7)

Operating Conditions

- Temp: 0° C to 45° C (32° F to 113° F)
- Humidity: 10% to 95% relative humidity, non-condensing
- Altitude: 0 to 3,000 meters (9,850 feet)
- Shock (half sine) 30m/s2 (3G), 11ms, 60 shocks
- Random vibration: 3 to 500 Hz at 1.5 G rms

Packaging and Storage Specifications

- Temp: -40° C to 70° C (-40° F to 158° F)
- Humidity: 10% to 95% relative humidity, non-condensing
- Packaged Shock (half sine): 180 m/s2 (18 G), 6 ms, 600 shocks
- Packaged Vibration: 5 to 62 Hz at velocity 5 mm/s, 62 to 500 Hz at 0.2 G
- Packaged Random Vibration: 5 to 20 Hz at 1.0 ASD w/–3 dB/oct. from 20 to 200 Hz
- Packaged Drop Height: 14 drops minimum on sides and corners at 42 inches (<15 kg box)

Regulatory and Safety

North American ITE

- UL 60950-1
- UL 62368-1
- Complies with FCC 21CFR 1040.10 (U.S. Laser Safety)
- CDRH Letter of Approval (US FDA Approval)
- CAN/CSA 22.2 No. 60950-1
- CAN/CSA No. 22.2 62368-1-14

European ITE

- EN 60950-1, EN 62368-1
- EN 60825-1Class 1 (Lasers Safety)
- 2014 / 35/ EU Low Voltage Directive

International ITE

- CB Report & Certificate per IEC 60950-1 AS/NZS 60950-1 (Australia /New Zealand)
- IEC 62368-1
- GB 4943.1-2011
- CNS 14336-1

EMI/EMC Standards

North American EMC for ITE

- FCC CFR 47 part 15 Class A (USA)
- ICES-003 Class A (Canada)

European EMC Standards

- EN 55032 Class A
- EN 55024
- EN 61000-3-2,2014 (Harmonics)
- EN 61000-3-3 2013 (Flicker)
- EN 300 386 v1.6.1 (EMC Telecommunications)
- 2014/30/EU EMC Directive
- EN 55011 Class A

International EMC Certifications

- CISPR 32, Class A (International Emissions)
- AS/NZS CISPR32
- CISPR 24 Class A (International Immunity)
- IEC 61000-4-2 / EN 61000-4-2 Electrostatic Discharge, 8kV Contact, 15 kV Air, Criteria A
- IEC 61000-4-3 /EN 61000-4-3 Radiated Immunity 10V/m, Criteria A
- IEC 61000-4-4 / EN 61000-4-4 Transient Burst, 1 kV, Criteria A

International EMC Certifications (cont.)

- IEC 61000-4-5 /EN 61000-4-5 Surge, 2 kV L-L, 2 kV L-G, Level 3, Criteria A
- IEC 61000-4-6 Conducted Immunity, 0.15-80 MHz, 10V/m unmod. RMS, Criteria AIEC/EN 61000-4-11 Power Dips & Interruptions, >30%, 25 periods, Criteria C
- IEC 61000-4-8 / EN 61000-4-8
- CISPER 11 Class A
- GB/T 9254-2008

Country Specific

- VCCI Class A (Japan Emissions)
- ACMA RCM (Australia Emissions)
- CCC Mark (China)
- KCC Mark, EMC Approval (Korea)
- EAC Mark (Custom Union)
- NRCS / SABS Mark (South Africa)
- BSMI Mark (Taiwan)

Telecom Standards

- CE 2.0 Compliant

IEEE 802.3 Media Access Standards

- IEEE 802.3ab 1000BASE-T
- IEEE 802.3bz 2.5G/5GBASE-T
- IEEE 802.3ae 10GBASE-X
- IEEE 802.3aq 10GBASE-LRM
- IEEE 802.3at PoE Plus
- IEEE 802.3bt Type3/Type4 PoE
- IEEE 802.3az Energy Efficient Ethernet
- 25Gb Ethernet implemented per Ethernet Consortium specification and IEEE 802.3 standard
- IEEE 802.3ba / 802.3bm 40GBASE-X

Ordering Information

Part Number	Product Name	Product Description
ExtremeSwitching X465 Systems		
X465-24W-B1	X465-24W + 1100W PSU Bundle	X465-24W with 24 10/100/1000Base-T full/half duplex 802.3bt Type 4 90W PoE MACsec-capable ports, includes 2 fan modules, 1 VIM5 slot, 1 x 1100W AC PSU FB (10941), rack-mount kit, EXOS Advanced Edge license
X465-24W-B2	X465-24W+ 2000W PSU Bundle	X465-24W with 24 10/100/1000Base-T full/half duplex 802.3bt Type 4 90W PoE MACsec-capable ports, includes 2 fan modules, 1 VIM5 slot, 1 x 2000W AC PSU FB (XN-ACPWR-2000W-F), rack-mount kit, EXOS Advanced Edge license
X465-48T-B3	X465-48T + 350W PSU Bundle	X465-48T with 48 10/100/1000Base-T full/half duplex MACsec-capable ports, includes 3 fan modules, 1 VIM5 slot, 1 x 350W AC PSU FB (10953), rack-mount kit, EXOS Advanced Edge license
X465-48P-B1	X465-48P + 1100W PSU Bundle	X465-48P with 48 10/100/1000Base-T full/half duplex 802.3at 30W PoE MACsec-capable ports, includes 3 fan modules, 1 VIM5 slot, 1 x 1100W AC PSU FB (10941), rack-mount kit, EXOS Advanced Edge license
X465-48W-B1	X465-48W + 1100W PSU Bundle	X465-48W with 48 10/100/1000Base-T full/half duplex 802.3bt Type 4 90W PoE ports, MACsec-capable, includes 3 fan modules, 1 VIM5 slot, 1 x 1100W AC PSU FB (10941), rack-mount kit, EXOS Advanced Edge license
X465-48W-B2	X465-48W + 2000W PSU Bundle	X465-48W with 48 10/100/1000Base-T full/half duplex 802.3bt Type 4 90W PoE ports, MACsec-capable, includes 3 fan modules, 1 VIM5 slot, 1 x 2000W AC PSU FB (XN-ACPWR-2000W-F), rack-mount kit, EXOS Advanced Edge license

Ordering Information (cont.)

Part Number	Product Name	Product Description
X465-24MU-B1	X465-24MU + 1100W PSU Bundle	X465-24MU with 24 100Mb/1Gb/2.5Gb/5Gb 802.3bt Type 3 60W PoE ports, includes 2 fan modules, 1 VIM5 slot, 1 x 1100W AC PSU FB (10941), rack-mount kit, EXOS Advanced Edge license, Insight Architecture-ready
X465-24MU-B2	X465-24MU + 2000W PSU Bundle	X465-24MU with 24 100Mb/1Gb/2.5Gb/5Gb 802.3bt Type 3 60W PoE ports, includes 2 fan modules, 1 VIM5 slot, 1 x 2000W AC PSU FB (XN-ACPWR-2000W-F), rack-mount kit, EXOS Advanced Edge license, Insight Architecture-ready
X465-24MU-24W-B1	X465-24MU-24W + 1100W PSU Bundle	X465-24MU-24W with 24 100Mb/1Gb/2.5Gb/5Gb 802.3bt Type 3 60W PoE ports and 24 10/100/1000MB full/half-duplex 802.3 Type 4 90W MACsec-capable ports, includes 3 fan modules, 1 VIM5 slot, 1 x 1100W AC PSU FB (10941), rack-mount kit, EXOS Advanced Edge license, Insight Architecture-ready
X465-24MU-24W-B2	X465-24MU-24W + 2000W PSU Bundle	X465-24MU-24W with 24 100Mb/1Gb/2.5Gb/5Gb 802.3bt Type 3 60W PoE ports and 24 10/100/1000MB full/half-duplex 802.3 Type 4 90W MACsec-capable ports, includes 3 fan modules, 1 VIM5 slot, 1 x 2000W AC PSU FB (XN-ACPWR-2000W-F), rack-mount kit, EXOS Advanced Edge license, Insight Architecture-ready
VIM5 Modules		
VIM5-4X*	4-port SFP+ module	4 x 1G*/10G SFP+ VIM supported on X465
VIM5-4XE*	4-port SFP+ module LRM/MACsec capable	4 x 1G*/10G SFP+ LRM and MACsec-capable VIM supported on X465
VIM5-2Y	2-port SFP28 module	2 x 10G/25G SFP28 VIM supported on X465
VIM5-4Y**	4-port SFP28 module*	4 x 10G/25G SFP28 VIM supported on X465
VIM5-4YE**	4-port SFP28 module MACsec capable*	4 x 10G/25G SFP28 MACsec-capable VIM supported on X465
VIM5-2Q***	2-port QSFP+ module**	2 x 10G/40G QSFP+ VIM supported on X465
Accessories		
10953	350W AC PS FB	350W AC PSU supported on X465-48T, also used on X450-G2, X460-G2
10941	1100W AC PS FB	1100W PoE PSU supported on all PoE models of X465, also used on X450-G2 and X460-G2
XN-ACPWR-2000W-F	2000W AC PS FB	2000W PoE PSU supported on all PoE models of the X465 Series
XN-FAN-002-F	Spare Fan module	Spare Fan module used in X465 Series switches
XN-4P-RKMT-001	Spare Four Post Rack Mount Kit	Spare Four Post Rack Mount Kit for use with X465 Series switches
XN-2P-RMKIT-001	Optional Two Post Rack Mount Kit	Optional Two Post Rack Mount Kit for use with X465 Series switches
EXOS-MACSEC-FP-X465	X465 MACsec Feature Pack	MACsec Feature Pack for ExtremeSwitching X465 Series
EXOS-MPLS-FP-X465	X465 MPLS Feature Pack	MPLS Feature Pack for ExtremeSwitching X465 Series
EXOS-CORE-FP-X465	X465 Core License from Advanced Edge	Advanced Edge to Core Feature Pack for ExtremeSwitching X465 Series (includes VXLAN)
40Gb Optical Transceivers and Direct Attach Cables		
10319	QSFP+ SR4 module	40Gb QSFP+ SR4 optical module, MPO connector (8 fiber), 100m MMF OM3, 140m MMF OM4
10320	QSFP+ LR4	40Gb QSFP+ LR4 optical module, LC, 10km SMF
10326	QSFP+ PSM Optical Module	40Gb QSFP+ Parallel Single Mode (PSM) LR4, MPO connector (8 fiber), SMF, 10km
10334	40Gb LM4 QSFP+	40Gb QSFP+ LM4, 140m OM3 MMF, 1km SMF, QSFP+, LC
10335	40Gb ER4 QSFP+	40Gb QSFP+ ER4, 40km SMF, QSFP+, LC
40GB-ESR4-QSFP	QSFP+ ESR4	40Gb QSFP+ Extended Reach SR4, MMF, 300m OM3, 400m OM4 MMF

* X465 24MU and 24MU-24W models only support 10Gb operation (no 1Gb) on VIM5-4X and VIM5-4XE modules

** X465 24W, 48T, 48P and 48W models are limited to 2 x 25GbE ports on VIM5-4Y and VIM5-4YE modules

*** X465 24W, 48T, 48P and 48W models are limited to 1 x 40GbE port on VIM5-2Q module

Ordering Information (cont.)

Part Number	Product Name	Product Description
40Gb Transceivers (continued)		
10311	QSFP+ passive copper cable, 0.5M	40Gb Ethernet QSFP+ passive copper cable assembly, 0.5m length
10312	QSFP+ passive copper cable, 1.0M	40Gb Ethernet QSFP+ passive copper cable assembly, 1m length
10313	QSFP+ passive copper cable, 3.0M	40Gb Ethernet QSFP+ passive copper cable assembly, 3m length
10323	QSFP+ passive copper cable, 5.0M	40Gb Ethernet QSFP+ passive copper cable assembly, 5m length
10315	10m QSFP+ Active Optical Cable	40Gb Ethernet QSFP+ active optical cable assembly, 10m length
10316	20m QSFP+ Active Optical Cable	40Gb Ethernet QSFP+ active optical cable assembly, 20m length
10202	QSFP+ - 4xSFP+ fan-out cbl, 1m	QSFP+ to 4 x SFP+ fan-out copper cable, 1m
10321	QSFP+ - 4xSFP+ fan-out cbl, 3m	QSFP+ to 4 x SFP+ fan-out copper cable, 3m
10322	QSFP+ - 4xSFP+ fan-out cbl, 5m	QSFP+ to 4 x SFP+ fan-out copper cable, 5m
25Gb Optical Transceivers and Direct Attach Cables		
10501	25Gb SFP28 SR MMF	25Gb, 25GBASE-SR, 70m OM3/ 100m OM4 MMF, SFP28, duplex LC
10502	25Gb SFP28 SR-Lite MMF	25Gb, 25GBASE-SR-Lite, 30m/ 50m/ 70m OM3, 40m/ 70m/ 100m OM4 (no FEC/ BASE-R/ RS FEC), SFP28, Duplex LC
10503	25Gb SFP28 ESR MMF	25Gb, Extended SR (ESR), 200m OM3/400m OM4 MMF, SFP28, duplex LC
10504	25Gb SFP28 LR 10km	25Gb, 100GBASE-LR, 10km SMF, SFP28, LC
10520	25Gb, DAC SFP28-SFP28 1m	25Gb, SFP28-SFP28 Direct attach passive copper cable, 1m
10521	25Gb, DAC SFP28-SFP28 3m	25Gb, SFP28-SFP28 Direct attach passive copper cable, 3m
10522*	25Gb, DAC SFP28-SFP28 5m	25Gb, SFP28-SFP28 Direct attach passive copper cable, 5m
10530	25Gb AOC SFP28-SFP28 10m	25Gb, SFP28-SFP28 Active optical breakout cable, 10m
10531	25Gb AOC SFP28-SFP28 20m	25Gb, SFP28-SFP28 Active optical breakout cable, 20m
10Gb Transceivers and Direct Attach Cables		
10301	SR SFP+ module	10GBASE-SR SFP+, 850nm, LC, 300m OM3 MMF, 400m OM4 MMF
10302	LR SFP+ module	10GBASE-LR SFP+, 1310nm, LC, 10km SMF
10303	LRM SFP+ module	LRM SFP+ Module0 Gigabit Ethernet SFP+ module, 1310nm, MMF 220m link, LC connector
10309	10GBASE-ER SFP+	10GBASE-ER SFP+, 1550nm, LC connector, transmission length of up to 40km on SMF
10310	10GBASE-ZR SFP+	10Gb, 10GBASE-ZR, SMF, 1550nm, up to 80Km, LC SFP+
10325	10Gb SFP+ DWDM Tunable	10Gb DWDM Tunable, 80km SMF, LC SFP+
10GB-BX10-U	10 GB, SINGLE FIBER SM, -U 10 KM	10Gb, Single Fiber SM, Bidirectional, 1270nm Tx / 1330nm RX, 10Km, Simplex LC SFP+ (must be paired with 10GB-BX10-D)
10GB-BX10-D	10 GB, SINGLE FIBER SM, -D 10 KM	10Gb, Single Fiber SM, Bidirectional, 1330nm Tx / 1270nm RX, 10Km, Simplex LC SFP+ (must be paired with 10GB-BX10-U)
10GB-BX40-U	10 GB, SINGLE FIBER SM, -U 40 KM	10Gb, Single Fiber SM, Bidirectional, 1330nm Tx / 1330nm RX, 40Km, Simplex LC SFP+ (must be paired with 10GB-BX40-D)
10GB-BX40-D	10 GB, SINGLE FIBER SM, -D 40 KM	10Gb, Single Fiber SM, Bidirectional, 1270nm Tx / 1270nm RX, 40Km, Simplex LC SFP+ (must be paired with 10GB-BX40-U)
10304	10GBASE-CR SFP+ 1m	10GBASE-CR SFP+ pre-terminated twin-ax copper cable with link lengths of 1m
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
10338	10Gb SFP+ 10GBASE-T	10Gb SFP+, 10GBASE-T RJ45, 30m with Cat6a

* 10522 is supported on VIM5-4YE module only

Ordering Information (cont.)

Part Number	Product Name	Product Description
1Gb Transceivers		
10051H	1000BASE-SX SFP, Hi	1000BASE-SX SFP, MMF 220 & 550 meters, LC connector, Industrial Temp
10052H	1000BASE-LX SFP, Hi	1000BASE-LX SFP, MMF 220 & 550 meters, SMF 10km, LC connector, Industrial Temp
10053H	1000BASE-ZX SFP, Hi	1000BASE-ZX SFP, SMF 70km, LC connector, Industrial Temp
MGBIC-BX40-U	1000BASE-BX-U BiDi SFP 40Km	1000BASE-BX-U SFP, single fiber, 1310-nm TX/1490-nm RX wavelength, 40Km Industrial Temp
MGBIC-BX40-D	1000BASE-BX-D BiDi SFP 40Km	1000BASE-BX-D SFP, single fiber, 1490-nm TX/1310-nm RX wavelength, 40Km Industrial Temp
MGBIC-BX120-U	1000BASE-BX-U BiDi SFP 120Km	1000BASE-BX-U SFP, single fiber, 1490-nm TX/1590-nm RX wavelength, 120Km Industrial Temp
MGBIC-BX120-D	1000BASE-BX-D BiDi SFP 120Km	1000BASE-BX-U SFP, single fiber, 1590-nm TX/1490-nm RX wavelength, 120Km Industrial Temp

Warranty

The X465 Series is covered under Extreme's Limited Lifetime Warranty Express. For warranty details, please visit: http://www.extremenetworks.com/support/policies

Power Cords

In support of the Extreme Networks Green initiatives, power cords can be ordered separately, but need to be specified at time of ordering. Please refer to www.extremenetworks.com/product/powercords for details on power cord availability for this product.

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