Cisco Catalyst 4500 Series Line Cards

High-Performance, Mobile, and Secure User Experience

Product Benefits

Cisco® Catalyst® 4500 Series Switches enable borderless unified wired and wireless networks, providing high-performance, mobile, and secure user experiences through Layer 2-4 switching. Enabling security, mobility, application performance, video, and energy savings over your network infrastructure, the Cisco Catalyst 4500 Switch supports resiliency, virtualization, and automation, further improving the ease of network use. Cisco Catalyst 4500 Series Switches provide borderless performance, scalability, and services with reduced total cost of ownership (TCO) and superior investment protection.

The Cisco Catalyst 4500 Switch delivers predictable and scalable high performance, with advanced dynamic quality of service (QoS) capabilities and configuration flexibility for deploying borderless networks. Integrated resiliency features in both hardware and software maximize network availability, helping to ensure workforce productivity, profitability, and customer success. Its centralized, innovative, and flexible system design helps ensure smooth migration to wire-speed IPv6 and 10 Gigabit Ethernet (GE). The forward and backward compatibility between generations of the Cisco Catalyst 4500 Series extends deployment life, providing exceptional investment protection, while reducing the (TCO).

The Cisco Catalyst 4500E Series is a high-performance, next-generation extension to the Cisco Catalyst 4500 Series. The new E-Series is composed of the Cisco Catalyst 4500E Series supervisor engines, E-Series line cards, and E-Series chassis, which are designed for a high-performance, mobile, and secure user experience with superior backward and forward compatibility, delivering exceptional investment protection for organizations of all sizes.

Cisco Catalyst 4500E Series and Classic Line Cards

The Cisco Catalyst 4500 Series offers two classes of line cards: classic and E-Series. Classic line cards provide 6 gigabits of switching capacity per slot. E-Series line cards provide increased switching capacity per slot. This increase in per-slot switching capacity with the E-Series line cards requires the Cisco Catalyst 4500E Series chassis and the Cisco Catalyst 4500E Series Supervisor. Two types of E-Series line cards are available based on the per-slot switching capacity. E-Series line cards numbered 47xx operate at 48 gigabits per slot, while E-Series line cards numbered 46xx operate at 24 gigabits per slot. Classic line cards may be deployed in both classic and E-Series chassis with either classic Cisco Catalyst 4500 Series supervisor engines or with the Cisco Catalyst 4500E Series Supervisor Engine. With the E-Series supervisor engine, the per-slot switching capacity for classic line cards remains at 6 gigabits per slot. However, because of the centralized switching architecture of the Cisco Catalyst 4500, the classic line cards will adopt all of the new E-Series supervisor engine features such as eight queues per port, dynamic QoS, and hardware-based IPv6 routing. For more feature details, refer to the E-Series supervisor engine data sheet. Classic line cards and E-Series line cards may be mixed and matched within a Cisco Catalyst 4500E Series chassis with no performance degradation: classic line cards will operate at 6 gigabits per slot, and E-Series line cards operate at either 48 gigabits per slot or 24 gigabits per slot based on whether they belong to the 47xx or 46xx family of line cards. Table 1 summarizes the chassis and supervisor support for both classic and E-Series line cards.

Table 1. Cisco Catalyst 4500 Line-Card Support Options

Line-Card Type	Per-Slot Bandwidth	Chassis Support	Supervisor Support
Cisco Catalyst 4500 47xx E-Series Line Cards	48 Gbps	Cisco Catalyst 4503-E, 4506-E, 4507R+E, and 4510R+E	Supervisor Engine 8-E, Supervisor Engine 8L-E, Supervisor Engine 7-E, Supervisor Engine 7L-E
Cisco Catalyst 4500 47xx E-Series Line Cards **Note:** WS-X4712-SFP+E and WS-X4748-12X48U+E are not supported on 4507R-E and 4510R-E	24 Gbps	Cisco Catalyst 4507R-E and 4510R-E	Supervisor Engine 8-E, Supervisor Engine 7-E, Supervisor Engine 7L-E
Cisco Catalyst 4500 46xx E-Series Line Cards	24 Gbps	Cisco Catalyst 4503-E, 4506-E, 4507R-E, 4507R+E, 4510R-E, and 4510R+E[1]	Supervisor Engine 8-E, Supervisor Engine 8L-E, Supervisor Engine 7-E, Supervisor Engine 7L-E, Supervisor Engine 6-E, Supervisor Engine 6L-E
Cisco Catalyst 4500 Series Classic Line Cards	6 Gbps	Cisco Catalyst 4503, 4506, 4507R, and 4510R Switches Cisco Catalyst 4503-E, 4506-E, 4507R-E, 4507R+E, 4510R-E, and 4510R+E Switches	Supervisor Engine 8-E[2], Supervisor Engine 7-E[3], Supervisor Engine 7L-E[4], Supervisor Engine 6-E, Supervisor Engine 6L-E[3], Supervisor Engine V-10GE

Power over Ethernet on Cisco Catalyst 4500E

The Cisco Catalyst 4500E Series offers line cards, power supplies, and accessories required to deploy and operate standards-based Power over Ethernet/Power over Ethernet Plus (PoE/PoEP) and Universal POEP (UPOE). PoE provides power over 100 m of standard unshielded twisted-pair (UTP) cables when an IEEE 802.3af/at-compliant or Cisco pre-standard powered device is attached to the PoE/PoEP and UPOE line-card port. Instead of requiring wall power, attached devices such as IP phones, wireless base stations, video cameras, and other IEEE-compliant appliances can use power provided from the Cisco Catalyst 4500 Series PoE/PoEP and UPOE line cards. For the regular DC (Direct Current) device that doesn't support PoE/PoEP natively, Cisco Catalyst 4500 Series provides the UPOE Power Splitter that enables an UPOE port to power a 12V DC power device and another PoE/PoEP appliance. This capability gives network administrators centralized control over power and eliminates the need to install outlets in ceilings and other out-of-the-way places where a powered device can be installed. Table 2 shows the PoE options for Cisco Catalyst 4500 Series line cards.

Although all references to "PoE/PoEP/UPOE," "inline power," and "voice" power supplies and line cards are synonymous, there are currently four versions: Cisco prestandard, IEEE 802.3af compliant, IEEE 802.3at compliant, and UPOE. Every Cisco Catalyst 4500 Series chassis and PoE power supply supports the IEEE 802.3af/at standard and the Cisco prestandard power implementation, helping ensure backward compatibility with existing devices powered by Cisco. UPOE line cards require E series chassis. All IEEE 802.3af/at-compliant and UPOE line cards can distinguish an IEEE or Cisco prestandard powered device from an unpowered network interface card (NIC), helping ensure power is applied only when an appropriate device is connected.

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[1] Slots 8-10 on 4510R-E and 4510R+E chassis do not support E-Series line cards with Supervisor Engine 6-E.
[2] Supervisor Engine 8-E does not support non-E-Series chassis: 4503, 4506, 4507R, and 4510R.
[3] Supervisor Engine 7-E does not support non-E-Series chassis: 4503, 4506, 4507R, and 4510R.
[4] Supervisor Engine 7L-E does not support non-E-Series chassis: 4503, 4506, 4507R, and 4510R.

Cisco Catalyst 4500E Series 10/100/1000/Multigigabit Line Cards

Figure 11 shows the WS-X4748-12X48U+E.

Figure 11.   WS-X4748-12X48U+E Cisco Catalyst 4500E Series 48-Port (RJ-45) Line Card with 12 Multigigabit Ports and 36 10/100/1000 Ports with 802.3af PoE, 802.3at PoEP, and UPOE

WS-X4748-12X48U+E:

- 48 ports with 12 multigigabit ports and 36 10/100/1000 ports
- Campus ready for next-generation wireless connectivity to NBASE-TTM compatible endpoints such as 802.11ac Wave2 multigigabit access points, multigigabit switches, network interface cards (NICs), and adapters
- Speeds of 100/1000/2.5G/5G/10GBASE-T on the multigigabit ports and 10/100/100 on the other ports
- Three flexible software-configurable modes to optimize for 10/100/1000 or multigigabit operation
- Nonblocking up to 1000 Mbps on all ports
- RJ-45 support on all the ports
- Cisco IOS XE Release IOS-XE3.7.1E or later
- UPOE: capable of up to 60W per port up to 1440W
- Energy Efficient Ethernet 802.3az on all the 10/100/1000 ports
- IEEE 802.3af/at and Cisco prestandard PoE, IEEE 802.3x flow control
- IEEE 802.1AE and Cisco TrustSec capability in hardware
- L2-4 Jumbo Frame support (up to 9216 bytes)
- Capable of up to 30W of inline power per port on all ports simultaneously
- Enterprise and commercial: designed to power next-generation IP phones, wireless access points, wireless base stations, video cameras, virtual desktop clients, and other PoE/UPOE devices
- Campus and branch applications requiring enhanced performance for large file transfers and network backups

Figure 12 shows the WS-X4748-UPOE+E.

Figure 12.   WS-X4748-UPOE+E Cisco Catalyst 4500E Series 48-Port 802.3af PoE, 802.3at PoEP, and UPOE 10/100/1000 (RJ-45)

Specification Summary

Table 3 summarizes product specifications.

Table 3. Port Information for Line Cards

Line Card	Number of Ports	Port Speed	Port Type	Wire Rate	Cisco Catalyst 4500 Series Min/Max Ports		
					4503-E	4506-E/ 4507R-E/ 4507R+E	4510R-E/ 4510R+E
E-Series 10 Gigabit Ethernet Line Cards							
WS-X4712-SFP+E[5]	12	10GBASE-R	SFP+ or SFP	2.5-to-1 with SFP+ 1:1 with SFP	12/24[6]	12/60[5]	12/96[5]
WS-X4606-X2-E	6	10GBASE-X	X2 or SFP with TwinGig Converter Module	2.5-to-1 with X2 1:1 with SFP	6/12[5] 12/24[5]	6/30[5] 12/60[5]	6/30[5] 12/60[5]
E-Series 10/100/1000/Multigigabit Line Cards							
WS-X4748-12X48U+E	48	12 Multigigabit 100/1000/2.5G/5G/ 10GBASE-T ports and 36 10/100/1000 ports	RJ-45 UPOE IEEE 802.3at, IEEE 802.3af, Cisco prestandard	1:1 for speeds up to 1000Mbps on all ports Multigigabit ports for 10G speeds: Mode1: 10-to-1 Mode2[7]: 5-to-1 Mode3[7]: 2.5-to-1	48/96[6]	48/240[5,6]	48/384[5,6,8]
WS-X4748-UPOE+E	48	10/100/1000	RJ-45 UPOE IEEE 802.3at, IEEE 802.3af, Cisco prestandard	1:1	48/96[6]	48/240[6]	48/384[6,9]
WS-X4748-RJ45V+E	48	10/100/1000	RJ-45 PoE IEEE 802.3at, IEEE 802.3af, Cisco prestandard	1:1	48/96[6]	48/240[6]	48/384[6,9]
WS-X4748-RJ45-E	48	10/100/1000	RJ-45	1:1	48/96[6]	48/240[6]	48/384[6,9]
WS-X4648-RJ45V+E	48	10/100/1000	RJ-45 PoE IEEE 802.3at, IEEE 802.3af, Cisco prestandard	2-to-1	48/96[6]	48/240[6]	48/384[6,9]
WS-X4648-RJ45V-E	48	10/100/1000	RJ-45 PoE IEEE 802.3af, Cisco prestandard	2-to-1	48/96[6]	48/240[6]	48/384[6,9]
WS-X4648-RJ45-E	48	10/100/1000	RJ-45	2-to-1	48/96[6]	48/240[6]	48/384[6,9]

[5] WS-X4712-SFP+E and WS-X4748-12X48U+E are not supported on 4507R-E and 4510R-E chassis.
[6] E-Series line cards require E-Series chassis.
[7] In Mode2, ports 13-24 are inactive, in Mode3, ports 13-48 are inactive.
[8] Requires Supervisor Engine 8-E/7-E to support greater than 240 ports on 4510R+E chassis.
[9] Requires Supervisor Engine 8-E/7-E to support greater than 240 ports on 4510R+E and 4510R-E chassis.

Optics

Cisco Catalyst 4500 line cards provide a variety of optical port types and port speeds: SFP+, X2, SFP, GBIC, 100BASE-FX, and so on. For details about the different optical modules supported by each line card and the minimum Cisco IOS Software release required for each of the supported optical modules, visit www.cisco.com/en/US/products/hw/modules/ps5455/products_device_support_tables_list.html.

Product Specification

Table 4 lists product specifications.

Table 4.   Product Specifications

Feature	Description
Standards	• Gigabit Ethernet: IEEE 802.3z, IEEE 802.3x, IEEE 802.3ab, IEEE 803.3at, IEEE 802.3af, IEEE 802.3az • 1000BASE-X (GBIC), 1000BASE-SX, 1000BASE-LX/LH, 1000BASE-ZX, CWDM
EtherChannel Technology	• Gigabit EtherChannel: All 1000 Mbps ports • 10 Gigabit EtherChannel: All 10Gbps ports • IEEE 802.3ad (Link Aggregation Control Protocol): All 1000 Mbps ports • Port Aggregation Protocol (PagP): Yes • Number of ports per tuple: 8 • EtherChannel and IEEE 802.3ad technology across line cards: Yes
Physical Dimensions	• Occupies one slot in the Cisco Catalyst 4500 Series platform • Dimensions (H x W x D): 1.2 x 14.25 x 10.75 in. (3.0 x 36.2 x 27.3 cm)
Environmental Conditions	• Operating temperature: 32° to 104°F (0° to 40°C) • Storage temperature: -40° to 167°F (-40° to 75°C) • Relative humidity: 10 to 90%, noncondensing • Operating altitude: -60 to 3000m
Safety Conditions	Fiber optic lasers: Class 1 laser products
Safety Certifications	• UL 1950 • EN 60950 • CSA-C22.2 no 950 • IEC 950 • IEC 60950-1, 2nd Ed. EN 60950-1, 2nd Ed. UL 60950-1, 2nd Ed. CAN/CSA-C22.2 No. 60950-1 2nd Ed.[11]
Electromagnetic Emissions Certifications	• FCC 15J Class A • VCCI Class A • CE Marking • EN 55022 Class A • EN 55024 Class A • CISPR 22 Class A • AS/NZ 3548 • NEBS Level 3 (GR-1089-CORE, GR-63-CORE) • ETSI ETS-300386-2 • EN 50121-4
ROHS Compliance	ROHS5

[11] Applicable only to WS-X4748-12X48U+E.

Power and MTBF Information

Table 5 gives power and MTBF information for different line cards.

Table 5.   Power and MTBF Information

Part Number	Max Rated Power (W)	Rated MTBF (Hours)
WS-X4748-12X48U+E	118	524,630
WS-X4748-UPOE+E	75	140,696
WS-X4748-RJ45V+E	75	183,330
WS-X4748-RJ45-E	75	402,386
WS-X4712-SFP+E	90	387,172
WS-X4748-SFP-E	92	876,100
WS-X4724-SFP-E	40	1,139,510
WS-X4712-SFP-E	25	1,329,480
WS-X4624-SFP-E	45	591,109
WS-X4612-SFP-E	30	676,740
WS-X4640-CSFP-E	120	347,724
WS-X4648-RJ45-E	89	280,365
WS-X4648-RJ45V-E	92	280,365
WS-X4648-RJ45V+E	92	280,365
WS-X4606-X2-E	50	535,717
WS-X4548-GB-RJ45V	60	434,646
WS-X4548-RJ45V+	60	239,436
WS-X4548-GB-RJ45	60	171,356
WS-X4506-GB-T	30	392,098
WS-X4306-GB	35	570,262
WS-X4418-GB	80	355,330
WS-X4448-GB-SFP	65	290,732
WS-X4248-FE-SFP	53	687,828
WS-X4148-RJ	65	350,860
WS-X4248-RJ45V	60	187,594

Note: All power numbers shown in Table 5 are maximum values recommended for facility power and cooling capacity planning. These figures are not indicative of the actual power draw during operation. Typical power draw is about 20 percent lower than the maximum value shown.

Ordering Information

To place an order, visit the Cisco Ordering homepage. Table 6 gives ordering information.

Table 6.   Ordering Information

Part Number ("=" Indicates "Spare")	Product Name
WS-X4748-12X48U+E (=)	Cisco Catalyst 4500E Series 48-Port UPOE w/ 12p multigigabit and 36p 10/100/1000 (RJ-45)
WS-X4748-UPOE+E (=)	Cisco Catalyst 4500E Series 48-Port UPOE 10/100/1000 (RJ-45)
WS-UPOE-12VPSPL(=)	Cisco Catalyst 4500E Series UPOE Power Splitter
WS-X4748-RJ45V+E (=)	Cisco Catalyst 4500E Series 48-Port 802.3at PoEP 10/100/1000 (RJ-45)