Cisco eXpandable Power System: XPS 2200

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Product Overview

Q. What is an eXpandable Power System, or XPS 2200?

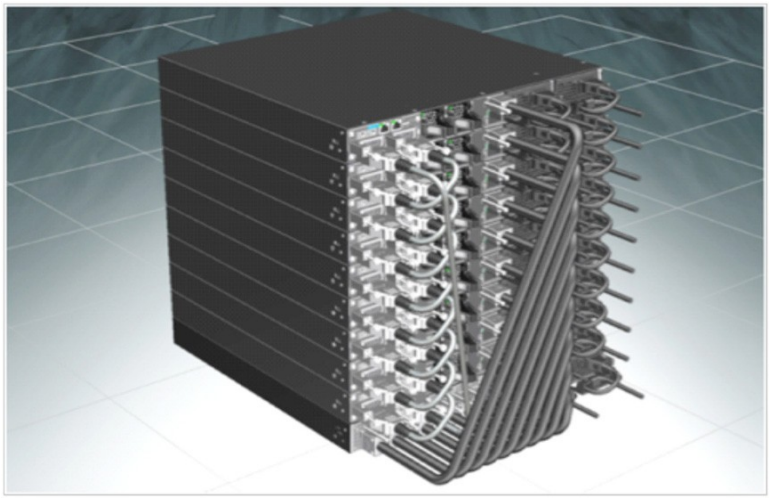
A. The Cisco® XPS 2200 is a unique power system designed by Cisco to offer a flexible set of power features to the Cisco Catalyst® 3750X switches. Those features include StackPower and RPS (Redundant Power System) functionality. This power system extends a power stack to up to nine switches and supports the same modes of operation as a StackPower. The XPS 2200 supports the following modes:

- Power-sharing mode: same as StackPower in a ring topology (up to four switches can be part of a power stack)
- Redundant mode
- RPS mode

For more information, see the StackPower white paper. For comparison to an RPS, see "XPS Architecture," later in this Q&A.

Q. How many switches can be protected by one XPS?

A. A combination of nine: that is, nine Cisco Catalyst 3750X and/or 3560X switches can be attached to the same XPS 2200.



Q. Will the XPS 2200 replace the RPS 2300?

A. No. The XPS is designed to support the Cisco Catalyst 3750X and 3560X switches only.

Q. How many power supplies can be installed in the XPS?

A. One, two, or no power supplies can be deployed in any combination (see Table 1).

Table 1. Power Supply Product numbers

Product Number	Product Description
C3KX-PWR-350WAC	Cisco Catalyst 3K-X 350W AC Power Supply
C3KX-PWR-715WAC	Cisco Catalyst 3K-X 715W AC Power Supply
C3KX-PWR-1100WAC	Cisco Catalyst 3K-X 1100W AC Power Supply
C3KX-PWR-440WDC	Cisco Catalyst 3K-X 440W DC Power Supply

Q. How many power supplies are required in the XPS 2200?

A. None. The XPS 2200 may be able to run without its own power supplies and draw power from the switches attached to it. In this scenario, the XPS would not support a Catalyst 3560X but it would work as a power bus for the entire power stack of up to nine Catalyst 3750X switches.

Q. What powers the XPS 2200?

A. The XPS 2200 does not use a separate power supply to power up itself; instead the XPS 2200 draws power from the same power supplies used to protect the switches attached to the XPS. A maximum of two power supplies can be installed the system.

Q. Does the XPS 2200 have a management port?

A. There is no management port built on the XPS 2200. That is, there is no Ethernet port or console port. There is a communications channel between each switch and the XPS 2200 through the XPS cable attached to each switch.

Q. Does the XPS 2200 have an Ethernet port?

A. No. Hence, it cannot be managed directly. Instead it has a serial communication channel from the XPS 2200 to the each switch through the XPS cable. This communication channel allows the switch to manage the XPS 2200 and to track different status and events.

Q. For what is the service port used?

A. The XPS has a special serial port in the front for the purpose of downloading firmware update. This port does not provide any other service.

Q. Does the XPS have LED for status?

A. Yes. The XPS has a set of buttons and LEDs that can help the administrator monitor the status of the system as well as select and set some devices to online or offline for manual operation (Front Panel LED) For more information, see the Architecture section.

Q. Is the XPS 2200 designed for Cisco Catalyst 3750X switches only?

A. No. The XPS 2200 is designed to support both Cisco Catalyst 3750X and 3560X switches. The difference is that only the stackable switches, Cisco Catalyst 3750X, can take advantage of StackPower features, while the Cisco Catalyst 3560X can only use the RPS functionality.

Q. Can the XPS 2200 support both Cisco Catalyst 3750X and 3560X concurrently?

A. Yes. Both Cisco Catalyst 3750X and 3560X switches can be connected to the XPS 2200 at the same time on different ports. The XPS 2200 has the intelligence to detect the type of switch attached to each port and provide proper functionality, StackPower or RPS, depending on the switch type.

Q. Can the XPS support switches other than Cisco Catalyst 3750X and 3560X?

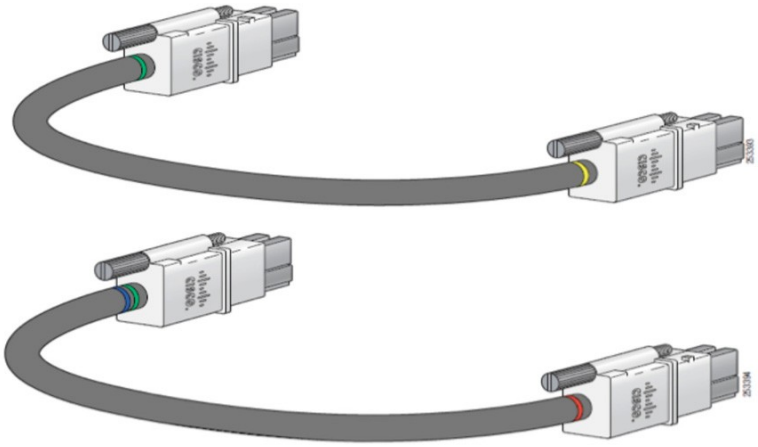
A. No. The XPS 2200 has been designed to work with the X-Series switches only.

Q. What are the XPS and StackPower cables?

A. Two types of cables work with XPS 2200. The XPS cable is used to attach any Cisco Catalyst X-Series switch to the XPS, that is, Cisco Catalyst 3750X or 3560X.

The StackPower cable is used to interconnect the Cisco Catalyst 3750X switches among themselves to create a power stack (ring topology). This cable can also be used to attach the same switch to the XPS 2200, and the second cable is used to attach a Cisco Catalyst 3560X switch to the XPS 2200.

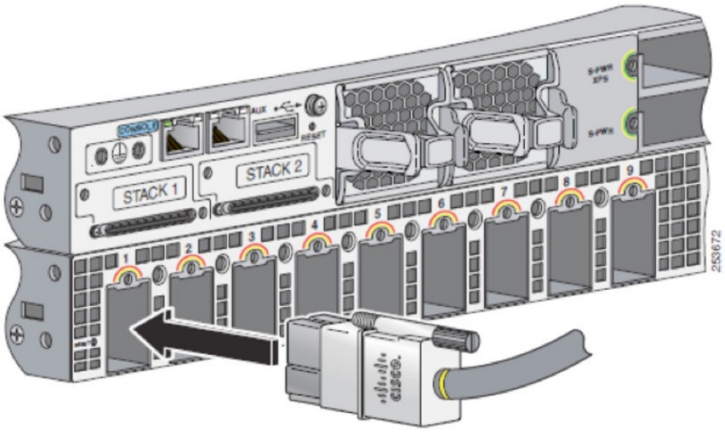
Note: These cables look similar; therefore you must pay attention to the colored bands toward the end of the connectors. See Table 2.



Q. What do the color bands at the end of the StackPower and XPS cable mean?

A. The StackPower and XPS cables are keyed for the proper application. That is, the cables with green and yellow color bands are specific for the Cisco Catalyst 3750X switches and can also be used to attach the Cisco Catalyst 3750X to the XPS 2200.

These color bands are also displayed above the switch's port connectors as well as the XPS port connectors for guidance.



The cable with the blue and red color bands is for the Cisco Catalyst 3560X switch to attach to the XPS 2200. These cables are keyed to prevent an accidental attachment to the wrong device.

Table 2. StackPower and XPS cables

			Color Bands on the end of the cables			
Switch to XPS	**Product ID**	**Description**	**Cat 3750X Connector**	**Cat 3750X or XPS Connector**	**Cat 3560X Connector**	**XPS Connector**
Catalyst 3750X	CAB-SPWR-30CM	30-cm StackPower cable	**Green or Yellow**	**Green or Yellow**	**X**	**Yellow**
	CAB-SPWR-150CM	150-cm StackPower cable	**Green or Yellow**	**Green or Yellow**	**X**	**Yellow**
Catalyst 3760X	CAB-XPS-58CM	Short XPS cable	**X**	**X**	**Blue**	**Red**
	CAB-XPS-150CM	Long XPS cable	**X**	**X**	**Blue**	**Red**

Q. Is the XPS cable included with the XPS or switch?

A. No, XPS cables to attach a Cisco Catalyst 3560X to the XPS do not come included with the switch and must be ordered. See Table 2 for options available.

A StackPower cable is included with each Cisco Catalyst 3750X switch. By default, one 30cm StackPower cable is included; optionally, a 1.5M cable is also available. See Table 2 for more details.

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XPS Architecture

This section addresses details of the XPS 2200 and some differences from the traditional RPS.

Q. Why is it called an XPS and not an RPS?

A. The XPS 2200 is a more sophisticated power system that provides StackPower functionality to nine Cisco Catalyst 3750X switches, or RPS functionality to nine Cisco Catalyst 3560X switches, or both functionalities to a mix of Cisco Catalyst 3750X and 3560X concurrently.

Q. What are the differences between the Cisco XPS 2200 and the RPS 2300?

A. The XPS 2200 is a power system with superior capabilities. The XPS 2200 provides StackPower functionality as well as traditional RPS functionality, whereas the RPS 2300 is a plain RPS only. Both units support up to two power supplies, but they are different types of power supplies. The RPS 2300 provides one-to-one redundancy to up to six switches, while the XPS 2200 can work in a mixed mode and provide StackPower functionality to Cisco Catalyst 3750X switches and redundancy functionality to Cisco Catalyst 3560X switches concurrently; obviously, one power supply is dedicated to each type of functionality.

Q. Can I interchange power supplies between the XPS 2200 and the RPS 2300?

A. No. The power supplies are different and incompatible.

Q. Is a Cisco IOS® Software upgrade required on existing X-Series switches already in the field to attach to the XPS 2200?

A. Yes. The firmware must be updated on existing switches running Cisco IOS Software Release 12.2(55)SE or older. Switches shipped with newer Cisco IOS Software Release 12.2(55)SE1 and newer will contain the updated firmware, which gets downloaded automatically into the StackPower logic.

Q. Does the XPS ever need to be upgraded?

A. Yes, there is possibility that the XPS 2200's firmware might need to be upgraded in the future but not upon fist-customer-shipment. The upgrade is done by upgrading the IOS Software release but if the IOS Software release upgrade is not wanted, then a customer can download the firmware into the XPS 2200 via the service port connector provided in the fornt of the RPS. This port is called the Service port and it is not to be confused as a console port. Note there is no console port built into the XPS 2200. See the Hardware Installation Guide HIG.

This procedure will seldom be required and may take as long as 25 minutes.

Q. Can multiple data stacks attach to the same XPS?

A. Yes. That is, more than one stack of switches can be attached to the same XPS. However, it is not a recommended deployment due to the difficulty for the administrator to manage power budgets for different data stacks since both data stack masters share power information with the same XPS, which leads to confusion and potentially load sheds during failures.

Q. What do the LED colors represent?

A. The XPS has LEDs for visual representation of the system status, that is, system operation, fan, temperature, and two LEDS per port to represent the operation mode of the port. See Table 3.

The select and Online/Offline buttons are used to manually control a power supply in the XPS 2200.

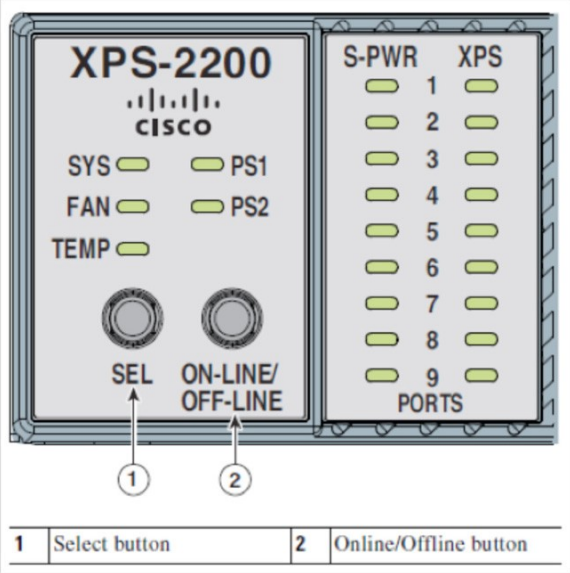

Table 3. Front Panel LED

	System	Fan	Temp	S-PWR	RPS	Pwr Supply 1	Pwr Supply 2
Solid Green	Normal Oper.	Normal	Normal < 55°C	Connect Any SP Sharing mode	Can Backup	Ok In SP mode	Ok In SP mode
Blink Green	Booting			Connecting	Active Backup	Ok In RPS mode	Ok In RPS mode
Solid Amber	Any Fault	Failed Fan	Alert > 55°C	Port Off-line	Not-able Backup	Failing or Unpowered and In SP mode	Failing or Unpowered and In SP mode
Blink Amber	During SW update			Any Port Fault	Not-able or Switch Port disabled	Failing or Unpowered and In RPS mode	Failing or Unpowered and In RPS mode
Both LED: Alternate Gren/Amber				Port Selected via Push Button			

Q. How does the XPS cool down?

A. The XPS comes with three fan modules. Although these modules look identical to the modules used in the X-Series switches, they are different, and they can not be interchanged. The XPS can withstand one fan failure. These fans have been programmed with a temperature curve that adjusts fan speed based on the ingress/egress temperature and the status of all the other fans.

Q. Are the fan modules hot swappable?

A. Yes. Fan modules are field replaceable and can be inserted and removed while in service. The mechanism is identincal to fan modules used in the X-series switches although the fan modules characteristics are different.

Q. Is the airflow reversible on the XPS 2200?

A. No. The airflow is not reversible. The air enters in the front and exists toward the back of the XPS.

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XPS: Operations

This section discusses the workings and configuration modes of XPS. In addition, it compares the XPS and an RPS.

Q. How is the XPS configured?

A. All configuration of the XPS can be done from any switch attached to the XPS. The X-Series switches are attached to the XPS 2200 using a StackPower or XPS cable, which provides an electrical path to share power as well as a communications channel for the switches to share with the XPS 2200.

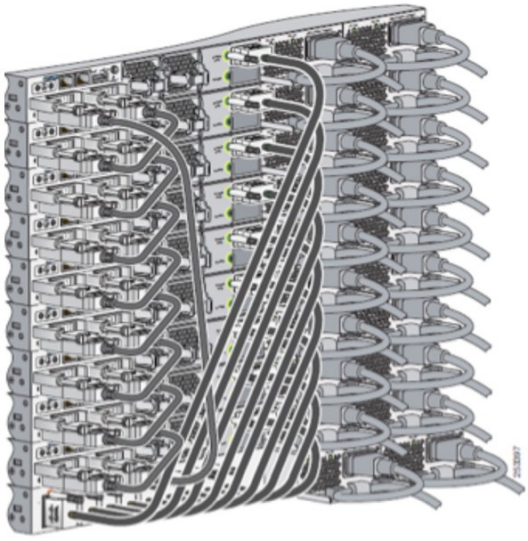
Q. What is the default configuration?

A. By default, there is no configuration needed. The XPS discovers the switches attached to it and provides the power-sharing functionality for Cisco Catalyst 3750X or/and RPS functionality if it detects a Cisco Catalyst 3560X attached to the XPS.

Q. Do I give up Cisco StackPower by deploying an XPS 2200?

A. No. Cisco StackPower can be deployed in a ring or star topology. An XPS 2200 allows us to build a star topology with up to nine switches, either Stackpower or RPS functionality for Catalyst 3750X and 3560X respectively, or a combination of Stackpower and RPS functionality for a combination of switches attached to the same XPS 2200.

The ring topology is limited to four switches while the star topology can create a large power stack of up to nine switches by using the XPS 2200



Star Topology
XPS is the center of the Star

Ring Topology (Catalyst 3750X Only)
No XPS needed

Q. How many Cisco Catalyst X-Series Switches can be attached to an XPS 2200?

A. Up to nine switches can be attached to an XPS. That is a combination of Cisco Catalyst 3750X and 3560X. The XPS discovers each one of them and sets the default mode on the XPS port for that type of switch. By using an XPS, you can build a larger Cisco StackPower stack consisting of nine Cisco Catalyst 3750-X Series Switches, using a star topology.

Q. Can the XPS share power across all nine switches?

A. Yes. An XPS can build a large power stack (up to nine switches). The entire system can be formed of up to 20 power supplies in total. That is, two power supplies per Catalyst 3750X attached to the XPS 200 plus two power supplies installed in the XPS 2200 itself.

Q. What modes does the Cisco XPS 2200 support?

A. The Cisco XPS 2200 can only support star topologies, up to nine switches. It has the flexibility to support Cisco Catalyst 3750X and 3560X concurrently; hence the XPS supports the following modes:

- Power-sharing mode
- Redundant mode
- RPS mode

See StackPower white paper for more details.

Cisco Catalyst 3750X

Power-sharing mode allows the XPS to aggregate and share the entire amount of power available among all the switches attached to the XPS and the XPS power supplies. If needed, all power gets allocated until the entire power budget is depleted.

Redundant mode allows a customer to plan for potential power supply failures. When this mode is configured, Cisco StackPower sets aside an amount of power equal to the capacity of the largest power supply in the system, in case a power supply fails or the power source of that power supply fails. That includes the power supplies into the XPS and the power supplies of the switches attached to the XPS.

RPS mode allows a customer to configure a one-to-one redundancy; that is, one specific power supply is designated to back up one switch and nothing else. This mode is available only on the XPS.

Cisco Catalyst 3560X

RPS mode allows a customer to configure a one-to-one redundancy; that is, one specific power supply is designated to back up one switch and nothing else. This mode is available only on the XPS.

Q. Is the XPS 2200 required to build a power stack?

A. No. The XPS just allows for a larger power stack and/or a mix of switch types attached to the same XPS.

Q. Can I share power on my Cisco Catalyst 3560-X Series Switches by using an XPS?

A. No. Power sharing is a feature of StackPower, and it is only supported on the Cisco Catalyst 3750X switches.

Q. Can I configure the XPS 2200 in any mode other than RPS mode when attaching a Cisco Catalyst 3560X?

A. No. The XPS automatically discovers the Cisco Catalyst 3560X, and it knows that the switch only supports RPS mode.

Q. Can the XPS 2200 be configured in RPS mode when deployed with only one power supply?

A. Yes. The XPS is capable to provide RPS functionality to one switch and, if it has two power supplies installed, the XPS would be able to provide RPS functionality to two Catalyst 3560X swtiches. The restriction would be the size of the power supplies installed, that is, the power supply being protected must match the size of the XPS 2200 that is protecting the switch.

Q. Can you mix power supplies in a Cisco XPS 2200?

A. Yes. You can mix the power supply types either in an XPS 2200, standalone switch, or in a stack. That is, you can combine a 350W AC power supply (the default for a data-only switch) with an 1100W AC power supply (the default in a full PoE switch) or with a 440W DC power supply when available.

Q. Why would you mix a DC and an AC power supply in the same XPS 2200?

A. You can mix power supplies and increase your resiliency by using different power sources. For example, you can power up the AC power supply using the standard AC power source available and then power up the DC power supply using an uninterruptible power supply system (UPS) for increased protection.

Q. Can the XPS 2200 be managed using SNMP directly?

A. No. The XPS does not have an IP stack; hence, the XPS must rely on status detection by Cisco IOS Software through the StackPower or XPS cable.

Q. Is there a Cisco XPS 2200 MIB?

A. No. The XPS status and notifications are contemplated in a new StackPower MIB scheduled for a later Cisco IOS Software release.

Q. Can the Cisco XPS 2200 back up a switch supplying PoE?

A. Yes. The XPS through StackPower can complement and/or provide redundancy for any PoE+ deployment.

Q. What is the maximum amount of power that a Cisco XPS 2200 can supply per XPS port?

A. The XPS follows the same rules as StackPower; that is, each XPS port is limited to a maximum of 2000W. Also, a mixed topology is not supported even if more power is available. That is, you cannot attach two Cisco Catalyst 3750X switches in series attached to the XPS.

Q. Is a mixed topology supported, that is, an open ring power stack of Cisco Catalyst 3750X switches attached to the XPS?

A. No. Only single devices, either Cisco Catalyst 3750X or 3560X, can attach directly to the XPS.

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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

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