



Switch Installation

For initial switch setup, assigning the switch IP address, and powering on information, see the switch getting started guide on Cisco.com.

This chapter contains these topics:

- [Preparing for Installation, on page 1](#)
- [Planning a Switch Data Stack, on page 4](#)
- [Data Stack Cabling Configurations, on page 6](#)
- [Planning a StackPower Stack, on page 8](#)
- [StackPower Cabling Configurations, on page 9](#)
- [Installing the Switch, on page 11](#)
- [Connecting to the StackWise Ports, on page 15](#)
- [Connecting to the StackPower Ports, on page 16](#)
- [Installing a Network Module in the Switch, on page 17](#)
- [Installing and Removing Cisco Pluggable Transceiver Modules, on page 17](#)
- [Connecting Devices to the Ethernet Ports, on page 17](#)
- [Where to Go Next, on page 19](#)

Preparing for Installation

Safety Warnings

This section includes the basic installation caution and warning statements. Read this section before you start the installation procedure. Translations of the warning statements appear in the Regulatory Compliance and Safety Information guide on Cisco.com.



Warning

Before working on equipment that is connected to power lines, remove jewelry (including rings, necklaces, and watches). Metal objects will heat up when connected to power and ground and can cause serious burns or weld the metal object to the terminals. Statement 43



Warning Do not stack the chassis on any other equipment. If the chassis falls, it can cause severe bodily injury and equipment damage. Statement 48



Warning Ethernet cables must be shielded when used in a central office environment. Statement 171



Warning Do not work on the system or connect or disconnect cables during periods of lightning activity. Statement 1001



Warning Read the installation instructions before connecting the system to the power source. Statement 1004



Warning Class 1 laser product. Statement 1008



Warning This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. Statement 1017



Warning The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device. Statement 1019



Warning Use copper conductors only. Statement 1025



Warning This unit might have more than one power supply connection. All connections must be removed to de-energize the unit. Statement 1028



Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. Statement 1030



Warning Ultimate disposal of this product should be handled according to all national laws and regulations. Statement 1040

**Warning**

To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: <113°F (45°C). Statement 1047

**Warning**

Installation of the equipment must comply with local and national electrical codes. Statement 1074

**Warning**

To prevent airflow restriction, allow clearance around the ventilation openings to be at least: 3 inches (7.6 cm). Statement 1076

**Note**

The grounding architecture of this product is DC-isolated (DC-I).

Installation Guidelines

When determining where to install the switch, verify that these guidelines are met:

- Clearance to the switch front and rear panel meets these conditions:
 - Front-panel LEDs can be easily read.
 - Access to ports is sufficient for unrestricted cabling.
 - AC power cord can reach from the AC power outlet to the connector on the switch rear panel.
 - The pluggable transceiver module minimum bend radius and connector length is met. See the Cisco pluggable transceiver module documentation for more information.
- Cabling is away from sources of electrical noise, such as radios, power lines, and fluorescent lighting fixtures. Make sure that the cabling is safely away from other devices that might damage the cables.
- For switches with the optional 1100 W power supply module, first rack-mount the switch before installing the power-supply module.
- Make sure power supply modules and fan modules are securely inserted in the chassis before moving the switch.
- When connecting or disconnecting the power cord on a switch installed with a 350 W or a 715 W power supply that is installed above or below a 1100-W power supply equipped switch, you might need to remove the 1100 W power supply from the switch to access the power cord.
- Airflow around the switch and through the vents is unrestricted.
- For copper connections on Ethernet ports, cable lengths from the switch to connected devices can be up to 328 feet (100 meters).
- Temperature around the unit does not exceed 113°F (45°C). If the switch is installed in a closed or multirack assembly, the temperature around it might be greater than normal room temperature.

- Humidity around the switch does not exceed 95 percent.
- Altitude at the installation site is not greater than 10,000 feet.
- Cooling mechanisms, such as fans and blowers in the switch, can draw dust and other particles causing contaminant buildup inside the chassis, which can result in system malfunction. You must install this equipment in an environment as free from dust and foreign conductive material (such as metal flakes from construction activities) as is possible.

Box Contents

The switch getting started guide describes the box contents. If any item is missing or damaged, contact your Cisco representative or reseller for support.

Tools and Equipment

Obtain these necessary tools:

- A Number-2 Phillips screwdriver.

Verifying Switch Operation

Before you install the switch in a rack, or on a table or shelf, you should power on the switch and verify that the switch passes POST. See the “Running Express Setup” section in the getting started guide for the steps required to connect a PC to the switch and to run Express Setup.

Powering Off the Switch

After a successful POST, disconnect the power cord from the switch. Install the switch in a rack, on a table, or on a shelf as described in [Installing the Switch, on page 11](#).

Planning a Switch Data Stack

Catalyst 3850 switches can share bandwidth by using data stacking.



Note The following switch models do not support StackWise-480:

- WS-C3850-48XS-S
 - WS-C3850-48XS-E
 - WS-C3850-48XS-F-S
 - WS-C3850-48XS-F-E
-

Switch Stacking and Power Stacking Guidelines

Before connecting the switches in a stack, keep in mind these stacking guidelines:

- Size of the switch and any optional power-supply module. The 1100-W power-supply module is longer than the other modules. Stacking switches with the same power-supply modules together makes it easier to cable the switches.
- Length of cable. Depending on the configurations that you have, you might need different-sized cables. If you do not specify the length of the StackWise cable, the 0.5-meter cable is supplied. If you need the 1-meter cable or the 3-meter cable, you can order it from your Cisco supplier. For cable part numbers, see [StackWise Ports](#). The [Data Stack Cabling Configurations, on page 6](#) provides examples of recommended configurations.
- For rack-mounted switch stacks that are members of a StackPower stack as well as a data stack, see [Planning a StackPower Stack, on page 8](#).
- You can create data stacks with up to nine switches in a stack.



Note Special considerations for the following switch models:

- WS-C3850-24XS-E
- WS-C3850-24XS-S
- WS-C3850-24XU-E
- WS-C3850-24XU-L
- WS-C3850-24XU-S
- WS-C3850-12X48U-L
- WS-C3850-12X48U-S
- WS-C3850-12X48U-E

Information:

- If you set up a stack with these switches, the stack can have a maximum of 8 switches only. Each of the above switch models have 4 ASIC chips, and the maximum number of ASIC chips per stack cannot exceed 32.
- If you set up a stack that contains the above switches and other Catalyst 3850 switches, ensure that the maximum number of ASIC chips is 32.

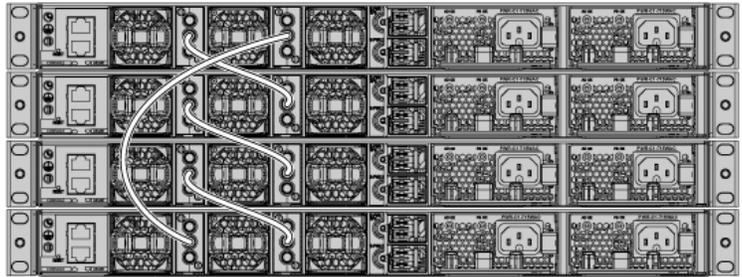


Note The Catalyst WS-C3850-48XS switch models do not support power stacking.

Data Stack Cabling Configurations

This is an example of a recommended configuration that uses the supplied 0.5-meter StackWise cable. In this example, the switches are stacked in a vertical rack or on a table. This configuration provides redundant connections. The configuration example uses the supplied 0.5-meter StackWise cable. The example shows the full-ring configuration that provides redundant connections.

Figure 1: Data Stacking the Switches in a Rack or on a Table Using the 0.5-meter StackWise Cables



This example shows a recommended configuration when the switches are mounted side-by-side. Use the 1-meter and the 3-meter StackWise cables to connect the switches. This configuration provides redundant connections.

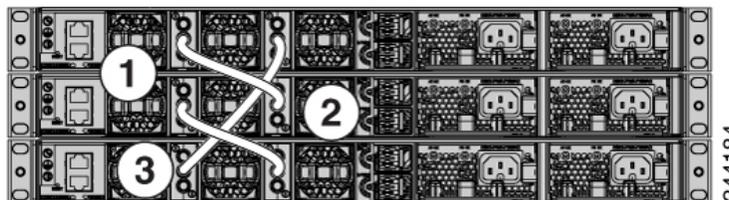
Figure 2: Data Stacking in a Side-by-Side Mounting



Data Stack Bandwidth and Partitioning Examples

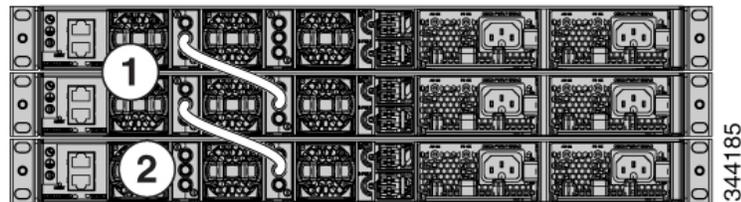
This section provides examples of data stack bandwidth and possible data stack partitioning. The figure shows a data stack of switches that provides full bandwidth and redundant StackWise cable connections.

Figure 3: Example of a Data Stack with Full Bandwidth Connections



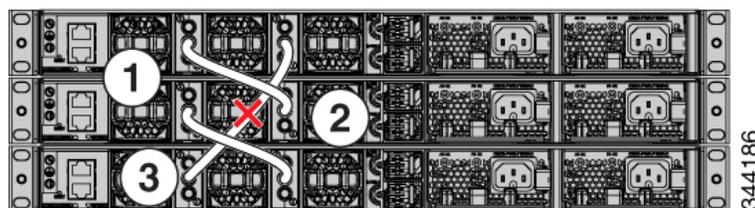
This figure shows an example of a stack of switches with incomplete StackWise cabling connections. This stack provides only half bandwidth and does not have redundant connections.

Figure 4: Example of a Data Stack with Half Bandwidth Connections



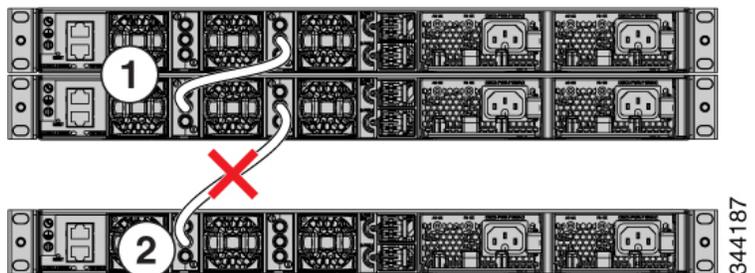
The figures below show data stacks of switches with failover conditions. In this figure, the StackWise cable is bad in link 2. Therefore, this stack provides only half bandwidth and does not have redundant connections.

Figure 5: Example of a Data Stack with a Failover Condition



In this figure, link 2 is bad. Therefore, this stack partitions into two stacks, and the top and bottom switches become the active switch in the stack. If the bottom switch is a member (not active or standby switch), it reloads.

Figure 6: Example of a Partitioned Data Stack with a Failover Condition



Power-On Sequence for Switch Stacks

Consider these guidelines before you power on the switches in a stack:

- The sequence in which the switches are first powered on might affect the switch that becomes the stack master.
- There are two ways to elect an active switch:
 - If you want a particular switch to become the active switch, configure it with the highest priority. Among switches with same priority, the switch with the lowest MAC address becomes the active switch.
 - If you want a particular switch to become the active switch, power on that switch first. This switch remains the active switch until a reelection is required. After 2 minutes, power on the other switches in the stack. If you have no preference as to which switch becomes the active switch, power on all

the switches in the stack within 1 minute. These switches participate in the active switch election. Switches powered on after 2 minutes do not participate in the election.

If changes are made to the stack without powering down the switches, the following results can occur:

- If two operating partial ring stacks are connected together using a stack cable, a stack merge can take place. This situation reloads the whole stack (all switches in the stack).
- If some switches in the stack are completely separated from the stack, a stack split can occur.
- A stack split can occur on a full ring stack if:
 - More than one running switch is removed without powering down.
 - More than one stack cable is removed without powering down.
- A stack split can occur in a partial ring stack if:
 - A switch is removed without powering down.
 - A stack cable is removed without powering down.
- In a split stack, depending on where the active and standby switches are located, either two stacks might be formed (with the standby taking over as the new active switch in the newly formed stack) or all the members in the newly formed stack might reload.



Note These results depend on how the switches are connected. You can remove two or more switches from the stack without splitting the stack.

For conditions that can cause a stack reelection or to manually elect the active switch, see the stacking software configuration guide on Cisco.com at this URL: <http://www.cisco.com/c/en/us/support/switches/catalyst-3850-series-switches/products-installation-and-configuration-guides-list.html>.

Planning a StackPower Stack

StackPower Stacking Guidelines

You can configure a StackPower stack for either power sharing or redundancy. In power-sharing mode, the power of all the power supplies in the stack is aggregated and distributed among the stack members.

In redundant mode, when the total power budget of the stack is calculated, the wattage of the largest power supply is not included. That power is held in reserve and used to maintain power to switches and attached devices when one power supply fails. Following the failure of a power supply, the StackPower mode becomes power sharing.



Note Power-sharing mode is the recommended configuration for Cisco Catalyst 3850 Series Switches .

For general concepts and management procedures for switch power stacks, see the Software Configuration Guide on Cisco.com.

Before connecting the switches in a power stack, keep in mind these guidelines:

- A switch power stack can include a maximum of four switches in a ring topology and nine switches in a star topology.
- Size of the switch and any optional power supply module. The 1100-W power-supply module is 1.5 inches (3.81 cm) longer than the other modules, and with the attached cable retention clip, it extends 3 inches (7.62 cm) from the switch chassis. Stacking switches with the same power-supply modules together makes it easier to cable the switches. For switch dimensions, see Appendix A, “Technical Specifications.”
- Length of cable. Depending on the configurations that you have, you might need different-sized cables. If you do not specify the length of the StackPower cable, the 0.3 meter cable is supplied. If you need the 1.5 meter cable, you can order it from your Cisco supplier. For cable part numbers, see [StackPower Connector](#). The [StackPower Cabling Configurations, on page 9](#) provides examples of recommended configurations.
- For rack-mounted switch stacks that are members of a data stack and a StackPower stack, see [Switch Stacking and Power Stacking Guidelines, on page 5](#)

StackPower Cabling Configurations

This section describes the recommended cabling configurations for a StackPower stack. There are two types of StackPower cables.

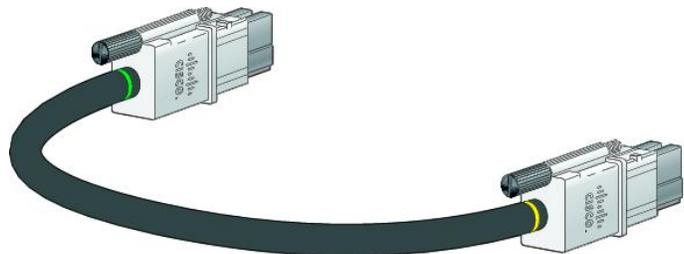
The cable in the figure connects a switch to another switch in a power stack or with an XPS. StackPower cables have color bands on the cable ends:

- The cable end with the green band can connect only to a switch.
- The cable end with the yellow band can connect to a switch or an XPS.

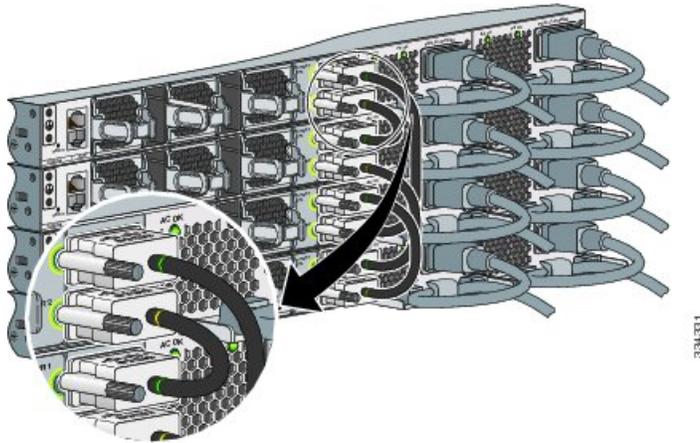
The cable is available in two lengths.

Part Number	Cable Type	Length
CAB-SPWR-30CM	StackPower Cable	0.3 meter
CAB-SPWR-150CM	StackPower Cable	1.5 meter

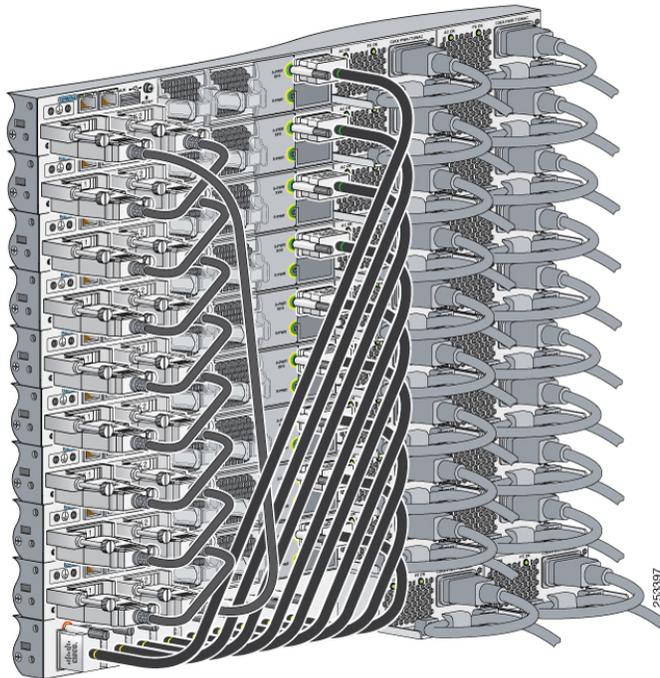
Figure 7: StackPower Cable for Use with Cisco Catalyst 3850 Series Switches



This figure shows a ring configuration using both of the supplied 0.3-meter StackPower cables and one 1.5-meter cable. In the examples that follow, the switches are stacked in a vertical rack or on a table.

Figure 8: StackPower Ring Topology

This figure shows 9 switches connected in a star topology.

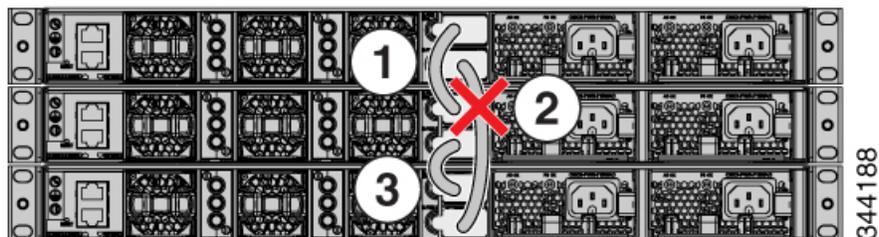
Figure 9: StackPower Star Topology

StackPower Partitioning Examples

These figures show StackPower stacks of switches with failover conditions.

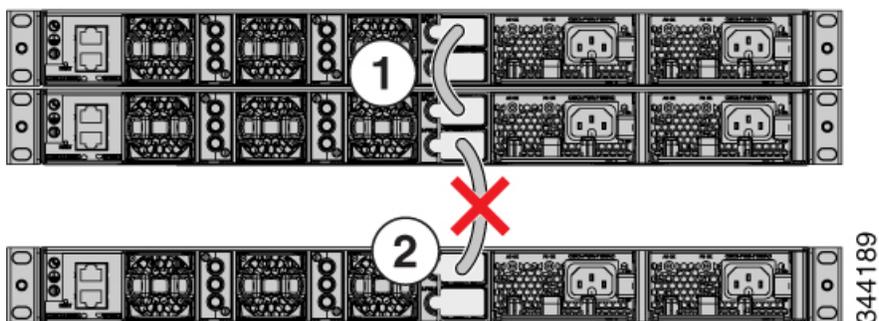
In the following figure, the StackPower cable 2 is faulty. Therefore, this stack does not provide redundancy.

Figure 10: Example of a StackPower Stack with a Failover Condition



In the following figure, StackPower port B on the center switch has failed and this stack partitions into two stacks. The top two switches share power, and the bottom switch is now a separate stack.

Figure 11: Example of a Partitioned StackPower Stack with a Failover Condition



Installing the Switch

Rack-Mounting

Installation in racks other than 19-inch racks requires a bracket kit not included with the switch.



Warning

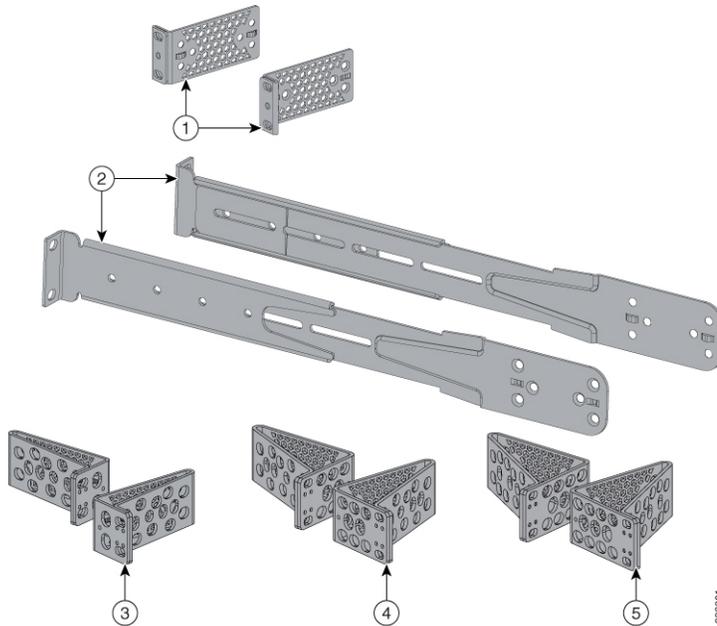
To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:

- This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
- When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
- If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.

Statement 1006

Figure 12: Rack-Mounting Brackets

This figure shows the standard 19-inch brackets and other optional mounting brackets. You can order the optional brackets from your Cisco sales representative.



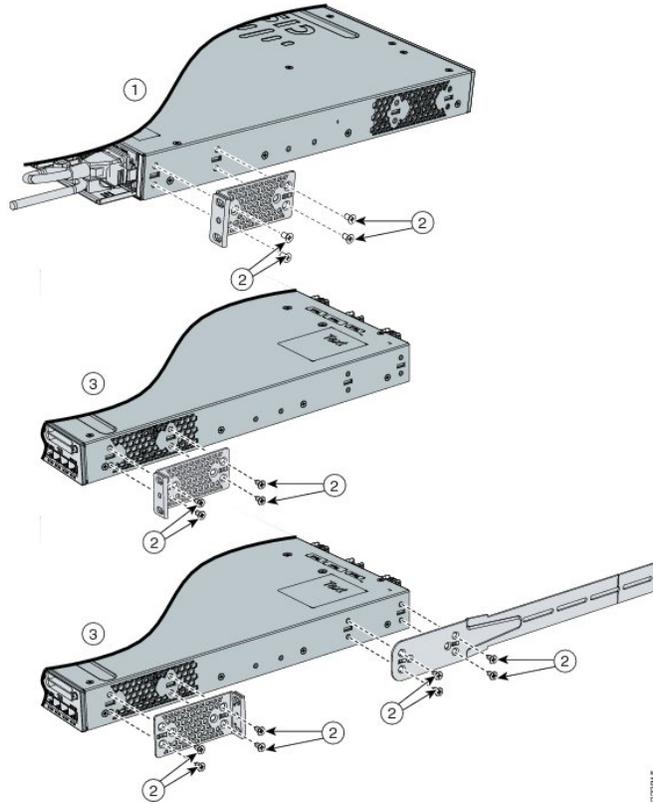
1	19-inch brackets (C3850-RACK-KIT=)	4	23-inch brackets (C3850-RACK-KIT=)
2	Extension rails and brackets for four-point mounting, includes 19-inch brackets. (C3850-4PT-KIT=)	5	24-inch brackets (C3850-RACK-KIT=)
3	ETSI brackets (C3850-RACK-KIT=)		

Attaching the Rack-Mount Brackets

Procedure

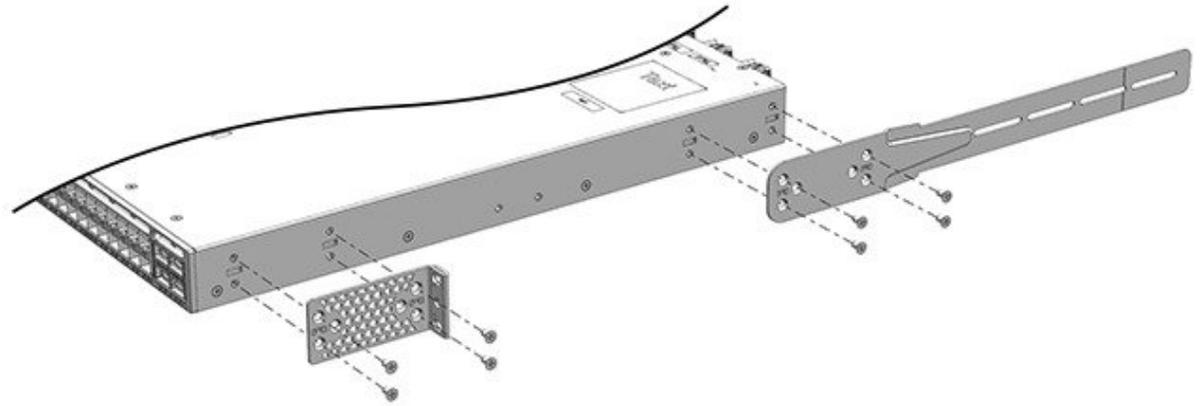
Use four Phillips flat-head screws to attach the long side of the bracket to each side of the switch for the front- or rear-mounting positions.

Figure 13: Attaching Brackets for 19-inch Racks



1	Rear-mounting position	3	Front-mounting position
2	Number-8 Phillips flat-head screws		

Figure 14: Attaching Brackets for Catalyst WS-C3850-48XS Switches

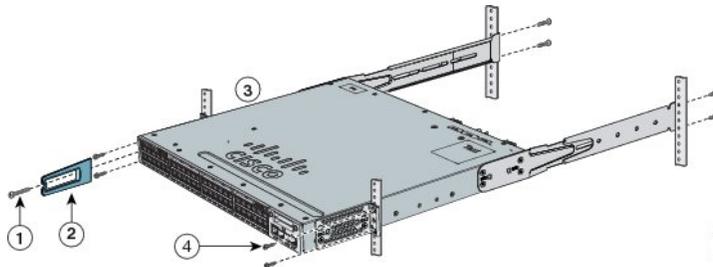


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Mounting the Switch a Rack

Procedure

- Step 1** Use the four supplied Phillips machine screws to attach the brackets to the rack.
- Step 2** Use the black Phillips machine screw to attach the cable guide to the left or right bracket.



1	Phillips machine screw, black	4	Front-mounting position
2	Cable guide	5	Number-12 or number-10 Phillips machine screws

Installing the Switch on a Table or Shelf

Procedure

- Step 1** To install the switch on a table or shelf, locate the adhesive strip with the rubber feet in the mounting-kit envelope.
- Step 2** Attach the four rubber feet to the four circular etches on the bottom of the chassis.
- Step 3** Place the switch on the table or shelf near an AC power source.
- Step 4** When you complete the switch installation, see [After Switch Installation, on page 15](#) for information on switch configuration.
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After Switch Installation

- If you are running Cisco IOS XE Denali 16.1.1 and later releases, see the "Configuring the Switch" chapter in this guide, for information about configuring the switch using the Web User Interface.
If you are running earlier Cisco IOS XE 3.x.xE releases, see the "Running Express Setup" section of the *Catalyst 3850 Switch Getting Started Guide* on cisco.com.
- Use the CLI setup program to enter the initial switch configuration.
- Connect to the front-panel ports.

Connecting to the StackWise Ports

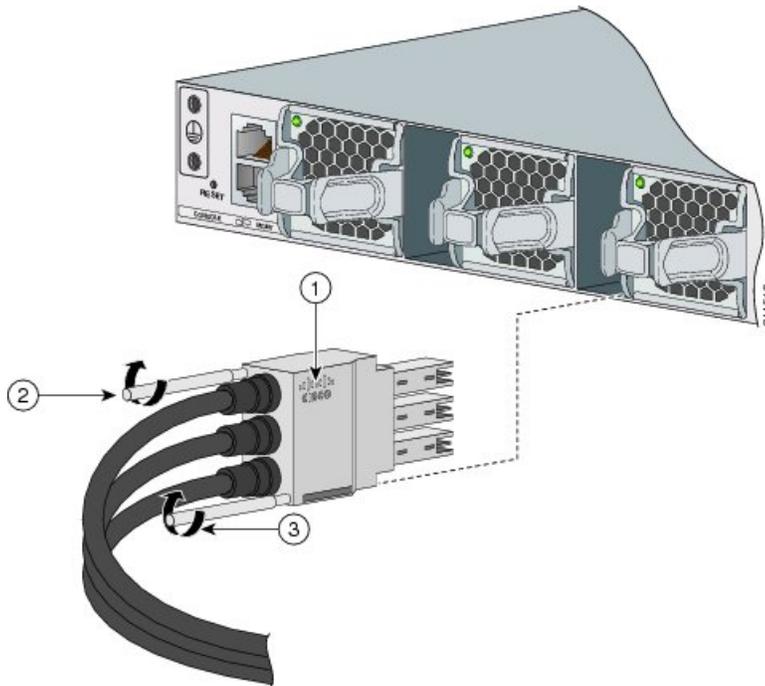
Before you begin

Before connecting the StackWise cables, review the [Planning a Switch Data Stack, on page 4](#). Always use a Cisco-approved StackWise cable to connect the switches.

Procedure

- Step 1** Remove the dust covers from the StackWise cables and StackWise ports, and store them for future use.
- Step 2** Connect the cable to the StackWise port on the switch rear panel. Align the connector and connect the StackWise cable to the StackWise port on the switch rear panel and finger-tighten the screws (clockwise direction). Make sure the Cisco logo is on the top side of the connector as shown in the figure.
- Step 3** Connect the other end of the cable to the port on the other switch and finger-tighten the screws. Avoid overtightening the screws.

Figure 15: Connecting the StackWise Cable in a StackWise Port



1	Cisco logo	3	Connector screw
2	Connector screw		

Caution Removing and installing the StackWise cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary (installing and removing it up to 200 times is supported).

When you need to remove the StackWise cable from the connector, make sure to fully unscrew the correct screws. When the connectors are not being used, replace the dust covers.

Connecting to the StackPower Ports

Before you begin

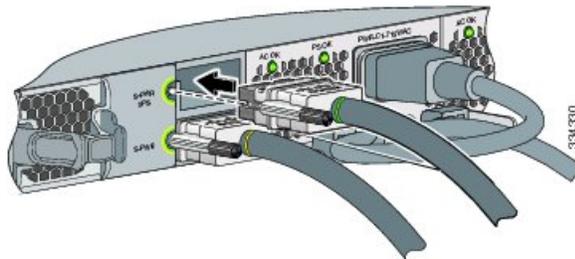
Before connecting the StackPower cables, review [Planning a Switch Data Stack, on page 4](#). Always use a Cisco-approved StackPower cable to connect the switches. To prevent misconfiguration, the StackPower ports on the switch are keyed and have colored bands that match the keying and bands on the StackPower cable connectors.

Procedure

Step 1 Remove the dust covers from the StackPower cable connectors.

- Step 2** Connect the end of the cable with a green band to either StackPower port on the first switch. Align the connector correctly, and insert it into a StackPower port on the switch rear panel.
- Step 3** Connect the end of the cable with the yellow band to another switch (to configure StackPower power sharing).
- Step 4** Hand-tighten the captive screws to secure the StackPower cable connectors in place.

Figure 16: Connecting the StackPower Cable to a StackPower Port



Caution Removing and installing the StackPower cable can shorten its useful life. Do not remove and insert the cable more often than is absolutely necessary.

Installing a Network Module in the Switch

For information on network modules, see:

-

Installing and Removing Cisco Pluggable Transceiver Modules

See these sections for information on Cisco pluggable transceiver modules (SFP, SFP and QSFP+ modules):

- [Installing SFP and SFP+ Modules](#)
- [Removing Cisco Pluggable Transceiver Modules](#)
- [Cisco 40-Gigabit QSFP+ Transceiver Modules Installation Note](#)

Connecting Devices to the Ethernet Ports

- [10/100/1000/Multigigabit Ethernet Port Connections, on page 17](#)
- [PoE+ and Cisco UPOE Port Connections, on page 18](#)

10/100/1000/Multigigabit Ethernet Port Connections

The switch 10/100/1000 and Multigigabit Ethernet port configuration changes to operate at the speed of the attached device. If the attached ports do not support autonegotiation, you can manually set the speed and

duplex parameters. Connecting devices that do not autonegotiate or that have the speed and duplex parameters manually set can reduce performance or result in no linkage.

To maximize performance, choose one of these methods for configuring the Ethernet ports:

- Let the ports autonegotiate both speed and duplex.
- Set the interface speed and duplex parameters on both ends of the connection.

Auto-MDIX Connections

The autonegotiation and the auto-MDIX features are enabled by default on the switch.

With autonegotiation, the switch port configurations change to operate at the speed of the attached device. If the attached device does not support autonegotiation, you can manually set the switch interface speed and duplex parameters.

With auto-MDIX, the switch detects the required cable type for copper Ethernet connections and configures the interface accordingly.

If auto-MDIX is disabled, use the guidelines in this table to select the correct cable.

Table 1: Recommended Ethernet Cables (When Auto-MDIX is Disabled)

Device	Crossover Cable	Straight-Through Cable
Switch to switch	Yes	No
Switch to hub	Yes	No
Switch to computer or server	No	Yes
Switch to router	No	Yes
Switch to IP phone	No	Yes

¹ 100BASE-TX and 1000BASE-T traffic requires twisted four-pair, Category 5 or higher. 10BASE-T traffic can use Category 3 cable or higher.

PoE+ and Cisco UPOE Port Connections

The 10/100/1000/Multigigabit Ethernet PoE+ and Cisco UPOE ports have the same autonegotiation settings and cabling requirements that are described in the [10/100/1000/Multigigabit Ethernet Port Connections](#), on page 17. These ports can provide PoE, PoE+, or Cisco UPOE inline power.



Note Be careful when connecting a “snagless” Ethernet cable to port 1 on a 48-port switch. The protective boot of the cable might inadvertently press the Mode button, which might cause the switch to erase its startup configuration and reboot. See this field notice for more information: <http://www.cisco.com/c/en/us/support/docs/field-notices/636/fn63697.html>

This issue does not occur if you are using Cisco IOS XE Release 3E or later releases.

PoE inline power supports devices compliant with the IEEE 802.3af standard, as well as prestandard Cisco IP Phones and Cisco Aironet Access Points. Each port can deliver up to 15.4 W of PoE. PoE+ inline power supports devices compliant with the IEEE 802.3at standard, by delivering up to 30 W of PoE+ power per port to all switch ports.

See [Power Supply Modules](#) for the power supply modules required to support PoE, PoE+, and Cisco UPOE on 24- and 48-port switches.

**Warning**

Voltages that present a shock hazard may exist on Power over Ethernet (PoE) circuits if interconnections are made using uninsulated exposed metal contacts, conductors, or terminals. Avoid using such interconnection methods, unless the exposed metal parts are located within a restricted access location and users and service people who are authorized within the restricted access location are made aware of the hazard. A restricted access area can be accessed only through the use of a special tool, lock and key or other means of security. Statement 1072

**Warning**

Voice over IP (VoIP) service and the emergency calling service do not function if power fails or is disrupted. After power is restored, you might have to reset or reconfigure equipment to regain access to VoIP and the emergency calling service. In the USA, this emergency number is 911. You need to be aware of the emergency number in your country. Statement 371

**Caution**

Ethernet twisted pair cables can store high levels of static electricity. Always ground the cables to a suitable and safe earth ground before connecting them to the switch or other devices.

**Caution**

Noncompliant cabling or powered devices can cause a PoE port fault. Use only standard-compliant cabling to connect Cisco prestandard IP Phones and wireless access points, IEEE 802.3af, or 802.3at (PoE+)-compliant devices. You must remove any cable or device that causes a PoE fault.

Where to Go Next

If the default configuration is satisfactory, the switch does not need further configuration. You can use any of these management options to change the default configuration:

- Start the Network Assistant application, which is described in the getting started guide. Through this GUI, you can configure and monitor a switch cluster or an individual switch.
- Use the CLI to configure the switch as a member of a cluster or as an individual switch from the console.
- Use the Cisco Prime Infrastructure application.
- If you are using Cisco IOS XE Denali 16.1.x and later releases, see the *Configuring the Switch* chapter in this guide for information about setting up the switch.

