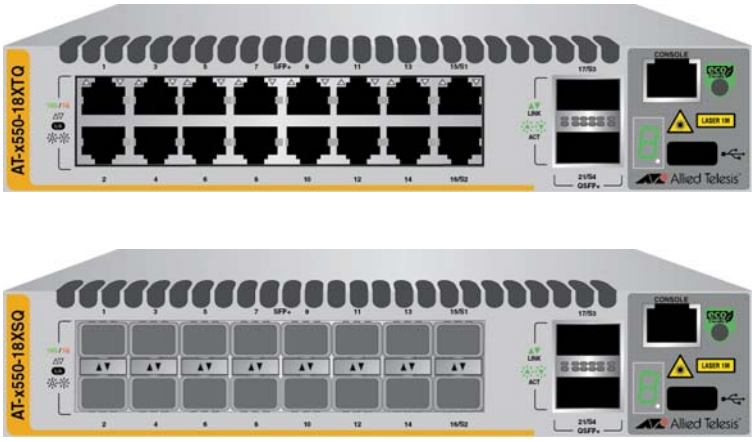
x550 Series

Stackable 10Gigabit Intelligent Access Ethernet Switches
AlliedWare Plus™ v5.4.7A-0

AT-x550-18XTQ

AT-x550-18XSQ



Installation Guide for Virtual Chassis Stacking

the solution : the network

613-002435 Rev. A

Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission
Radiated Energy Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada
This Class A digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

RFI Emissions: FCC Class A, EN55032 Class A, EN61000-3-2, EN61000-3-3, VCCI Class A, C-TICK, CE

> **Warning:** In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

EMC (Immunity): EN55024

Electrical Safety: EN60950-1 (TUV), UL 60950-1 ($_{C}UL_{US}$)

 Laser Safety EN60825

Translated Safety Statements

Important: Safety statements that have the ⍾ symbol are translated into multiple languages in the *Translated Safety Statements* document at **www.alliedtelesis.com/support**.

Contents

Figures

Tables

Preface

This guide contains the installation instructions for the x550 Series of stackable 10 Gigabit, Layer 3 Ethernet switches. This preface contains the following sections:

Note

This guide explains how to install the switches in a virtual stack with the Virtual Chassis Stacking (VCStack™) feature. For instructions on how to install the switches as stand-alone units, refer to the *x550 Series Installation Guide for Stand-alone Switches*.

Document Conventions

This document uses the following conventions:

Note
Notes provide additional information.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Warning
Warnings inform you that performing or omitting a specific action may result in bodily injury.

Contacting Allied Telesis

If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **www.alliedtelesis.com/support**. You can find links for the following services on this page:

- 24/7 Online Support — Enter our interactive support center to search for answers to your product questions in our knowledge database, to check support tickets, to learn about RMAs, and to contact Allied Telesis technical experts.
- USA and EMEA phone support — Select the phone number that best fits your location and customer type.
- Hardware warranty information — Learn about Allied Telesis warranties and register your product online.
- Replacement Services — Submit a Return Merchandise Authorization (RMA) request via our interactive support center.
- Documentation — View the most recent installation and user guides, software release notes, white papers, and data sheets for your products.
- Software Downloads — Download the latest software releases for your managed products.

For sales or corporate information, go to **www.alliedtelesis.com/purchase** and select your region.

Chapter 1
Overview

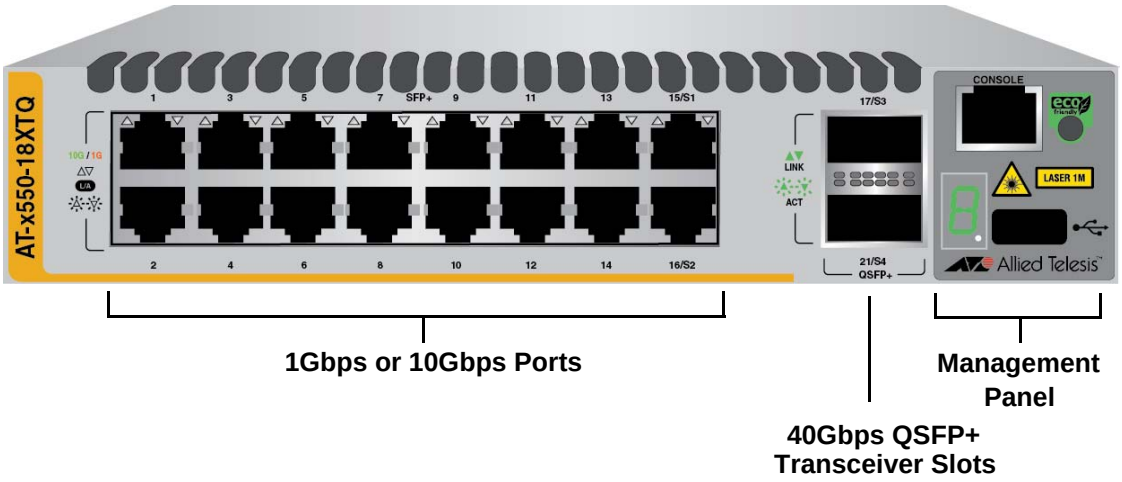
This chapter contains the following sections:

Note
This guide explains how to install the switches as a virtual stack with the Virtual Chassis Stacking (VCStack™) feature. For instructions on how to install switches as stand-alone units, refer to the *x550 Series Installation Guide for Stand-alone Switches*.

Front and Rear Panels

The front panels of the x550 Series switches are shown in Figure 1.

AT-x550-18XTQ



AT-x550-18XSQ

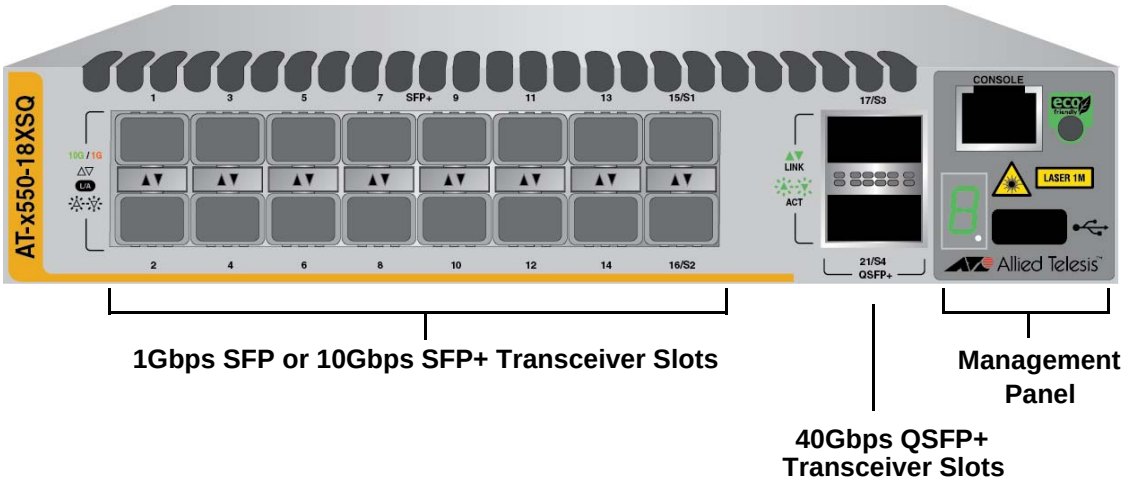
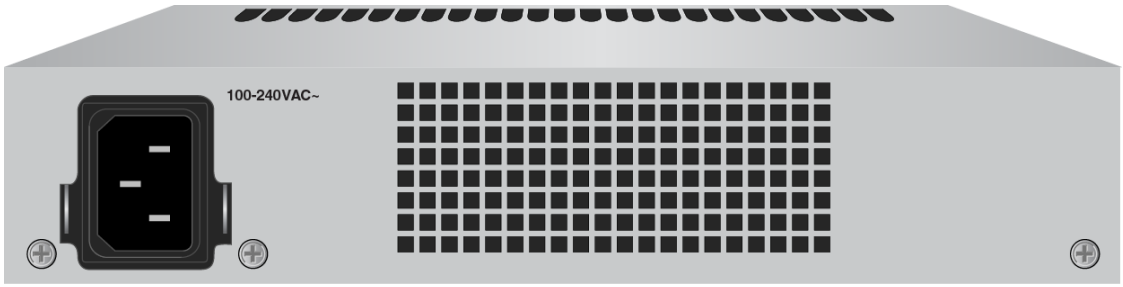


Figure 1. Front Panels of the AT-x550-18XTQ and AT-x550-18XSQ Switches

The rear panel of the switches is shown in Figure 2 on page 17.



AC Power Supply Connector

Figure 2. Back Panel

Management Panel

Figure 3 identifies the components on the management panel.

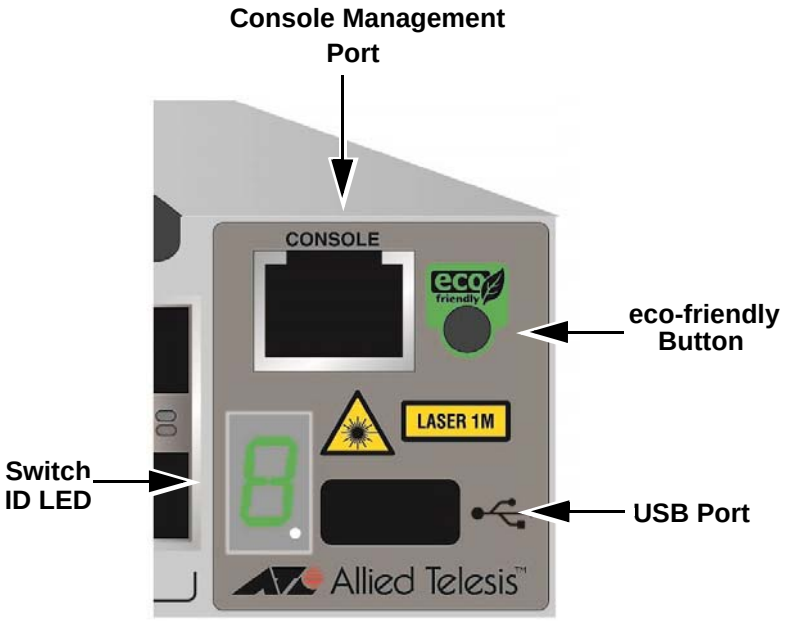


Figure 3. Management Panel

Features

The Allied Telesis x550 Series switches are stackable 10 Gigabit, Layer 3 Ethernet switches. The following sections lists the features of the switches:

x550 Models

Table 1 lists the basic features of the x550 Switches.

Table 1. Basic Features

Model	1Gbps or 10Gbps Twisted Pair Ports	1GBbps SFP or 10Gbps SFP+ Transceiver Slots	40Gbps QSFP+ Transceiver Slots	VCStack
AT-x550-18XTQ	16	0	2	Yes
AT-x550-18XSQ	0	16	2	Yes

Additional information is listed here:

- The 40Gbps QSFP+ slots can be used as either regular networking ports or stacking ports with the VCStack feature.
- When used as regular networking ports the 40Gbps QSFP+ slots support 40Gbps transceivers or breakout cables, which convert the slots into four 10Gbps ports.
- The switches come with one pre-installed power supply. It is not field-replaceable.

1Gbps/10Gbps Twisted Pair Ports

The sixteen twisted pair ports on the AT-x550-18XTQ Switch have these features:

- 1Gbps or 10Gbps operation
- 100 meters (328 feet) maximum operating distance per port
- Auto-Negotiation for speed
- Full-duplex mode only
- Port Link/Activity (L/A) LEDs

1Gbps SFP or 10Gbps SFP+ Transceiver Slots

The sixteen 1Gbps/10Gbps transceiver slots in the AT-x550-18XSQ Switch support the following types of transceivers:

- 1Gbps SX/LX SFP transceivers
- 10Gbps SR/LR SFP+ fiber optic transceivers
- 10Gbps AT-SP10TW direct connect twinax cables with SFP+

transceiver-style connectors

Additional information about the transceiver slots is given here:

- They do not support 100Mbps transceivers.
- They support full-duplex mode only.

SFP or SFP+ transceivers must be purchased separately. For a list of supported transceivers, refer to the x550 Series product sheet on the Allied Telesis web site.

40Gbps QSFP+ Transceiver Slots

The two QSFP+ transceiver slots support the following types of transceivers:

- AT-QSFPSR4 transceiver - 150m using multi-mode fiber optic cable
- AT-QSFPLR4 transceiver - 10k with single-mode fiber optic cable
- AT-QSFP1CU and AT-QSFP3CU direct connect cables in lengths of 1 and 3 meters, respectively
- AT-QSFP-4SFP10G-3CU and AT-QSFP-4SFP10G-5CU breakout cables in lengths of 3 and 5 meters, respectively

Note
The QSFP+ slots are initially configured as stacking slots for the VCStack feature. If you plan to use the switch as a stand-alone unit, you can use the slots and transceivers as regular networking ports by disabling the VCStack feature. For instructions, refer to *x550 Series Installation Guide for Stand-alone Switches*.

QSFP+ transceivers must be purchased separately. For a list of supported transceivers, refer to the x550 Series data sheet on the Allied Telesis web site.

For instructions on the VCStack feature, refer to the *x550 Series Installation Guide for Virtual Chassis Stacking*.

LEDs

Here are the port LEDs:

- Link/activity LEDs for the 1Gbps/10Gbps twisted pair ports on the AT-x550-18XTQ Switch
- Link/activity LEDs for the SFP and SFP+ transceiver slots on the AT-x550-18XSQ Switch
- Link/activity LEDs for the QSFP+ transceiver slots
- Stack ID number LED
- eco-friendly button turns off the LEDs to conserve electricity

Installation Options

Here are the installation options for the switches:

- Desk or tabletop
- 19-inch equipment rack
- Wooden or concrete wall

Management Software and Interfaces

Here are the management software and interfaces:

- AlliedWare Plus Management Software
- Command line interface
- Web browser interface

Management Methods

Here are the methods for managing the switches:

- Local management through the Console port
- Remote Telnet or Secure Shell management
- Remote HTTP or HTTPS web browser management
- SNMPv1, v2c, and v3

1Gbps/10Gbps Twisted Pair Ports

The specifications of the sixteen twisted pair ports on the AT-x550-18XTQ Switch are listed in Table 2.

Table 2. Twisted Pair Ports on the AT-x550-18XTQ Switch

State	Description
Port Speed	1Gbps or 10Gbps You can set port speed with Auto-Negotiation or manually. The default is Auto-Negotiation.
Duplex Mode	Full-duplex only
Cabling	1Gbps - Standard TIA/EIA 568-B-compliant Category 6 shielded cabling or better. 10Gbps - Standard TIA/EIA 568-C-compliant Category 6a shielded cabling or better.
Maximum Distance	100 meters (328 feet)
Connector	8-pin RJ-45

Note
The ports must be set to Auto-Negotiation to function at 1000 Mbps and are not compatible with devices that are not IEEE 802.3u compliant.

Refer to Table 16 on page 134 for the port pinouts of the twisted pair ports.

1Gbps SFP or 10Gbps SFP+ Transceiver Slots

The transceiver slots numbered 1 to 16 on the AT-x550-18XSQ Switch support the following types of 1Gbps SFP and 10Gbps SFP+ transceivers:

- 1Gbps SX/LX SFP transceivers
- 10Gbps SR/LR fiber optic transceivers
- 10GBbps AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors

Additional information about the SFP+ transceiver slots is listed here:

- They do not support 100Mbps-FX transceivers.
- They support full-duplex mode only.
- You can set the port speeds with Auto-Negotiation or manually. The default is Auto-Negotiation.

SFP or SFP+ transceivers must be purchased separately. For a list of supported transceivers, refer to the x550 Series product sheet on the Allied Telesis web site.

QSFP+ Transceiver Slots

The switches have two QSFP+ transceiver slots that support the following types of 40Gbps transceivers:

- AT-QSFPSR4 transceiver - requires 12-strand OM4 fiber optic cable and has a maximum operating distance of 150m (492 ft).
- AT-QSFPLR4 transceiver - requires single-mode fiber optic cable and has an operating range of 2m (6.6 ft) to 10km (6.2 mi).
- AT-QSFP1CU and AT-QSFP3CU direct connect cables in lengths of 1 and 3 meters, respectively
- AT-QSFP-4SFP10G-3CU and AT-QSFP-4SFP10G-5CU breakout cables in lengths of 3 and 5 meters, respectively

You can use QSFP+ transceivers as standard networking ports or as stacking ports for the VCStack feature.

Note
The QSFP+ transceiver slots are initially configured as stacking slots for the VCStack feature. For instructions on how to install the switches as stand-alone units, refer to the *x550 Series Installation Guide for Stand-alone Switches*.

For a list of supported QSFP+ transceivers, refer to the x550 Series product sheet on the Allied Telesis web site.

When the switch is operating as a stand-alone device and the VCStack feature is disabled, you can use the QSFP+ transceiver slots with the AT-QSFP-4SFP10G-3CU and AT-QSFP-4SFP10G-5CU breakout cables. Refer to Figure 4. A breakout cable converts a QSFP+ transceiver slot from one 40Gbps port to four 10Gbps ports.

Figure 4. QSFP+ to SFP+ Breakout Cable

The QSFP+ slots are numbered 17 and 21 on the front panel. Here are the port numbering guidelines:

- A QSFP+ transceiver in slot 17 has the port number 17.
- A QSFP+ transceiver in slot 21 has the port number 21.
- The four 10Gbps transceivers on a breakout cable in slot 17 have

the port numbers 17, 18, 19, and 20.

- The four 10Gbps transceivers on a breakout cable in slot 21 have the port numbers 21, 22, 23, and 24.

eco-friendly Button

The eco-friendly button on the front panel of the switch is used to toggle the port LEDs on or off. You might turn off the LEDs to conserve electricity when you are not monitoring the device. You can also toggle the LEDs with the ECOFRIENDLY LED and NO ECOFRIENDLY LED commands in the Global Configuration mode of the command line interface of the AlliedWare Plus management software. The switch is said to be operating in a low power mode when the LEDs are turned off.

Operating the switch in the low power mode with the LEDs turned off does not interfere with the network operations of the device.

The management software on the switch has a command that blinks the LEDs so that you can quickly and easily identify a specific unit among the devices in an equipment rack. It is the FINDME command. The command works on the switch even if you turned off the LEDs with the eco-friendly button or NO ECOFRIENDLY LED command.

The Switch ID LED is always on, but it displays different information depending on whether the LEDs are on or off. When the LEDs are on, the ID LED displays the ID number of the switch. When the switch is operating in the low power mode with the LEDs off, the ID LED indicates whether the switch is a stand-alone unit or the master or member switch of a VCStack, as detailed in Figure 10 on page 33.

Note
Before checking or troubleshooting the network connections to the ports on the switch, you should always check to be sure that the LEDs are on by either pressing the eco-friendly button or issuing the ECOFRIENDLY LED and NO ECOFRIENDLY LED commands in the Global Configuration mode of the command line interface.

VCStack Feature

You can use the switches as stand-alone units or join multiple units together with the QSFP+ transceiver slots and the VCStack feature. The switches of a VCStack act as a single virtual unit. They synchronize their actions so that switching operations, like spanning tree protocols, virtual LANs, and static port trunks, span across all of the units and ports. Two advantages of stacks are listed here:

- You can manage multiple units simultaneously, which can simplify network management.
- You have more flexibility in how you configure some of the features. For instance, a static port trunk on a stand-alone switch can consist of ports from the same switch. In contrast, a static trunk on a stack can have ports from different switches in the same stack.

Note
This guide explains how to install the switches in a virtual stack with the Virtual Chassis Stacking (VCStack™) feature. For instructions on how to install switches as stand-alone units, refer to the *x550 Series Installation Guide for Stand-alone Switches*.

LEDs

The LEDs are described in the following sections.

LEDs for the 1Gbps/10Gbps Twisted Pair Ports

The 1Gbps/10Gbps twisted pair ports on the AT-x550-18XTQ Switch have one LED that displays link and activity information. The LED is shown in Figure 5.

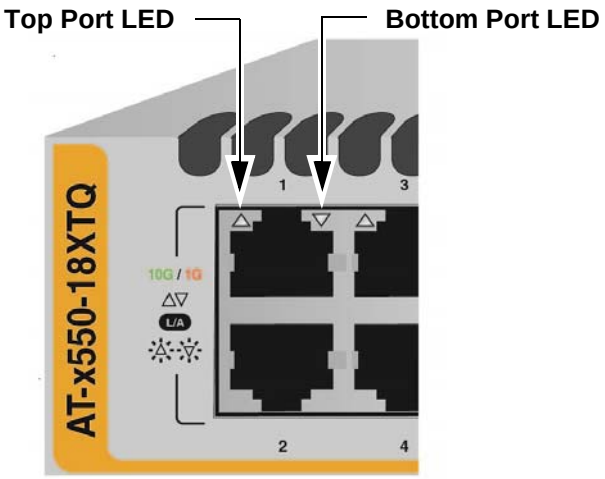


Figure 5. Link and Activity LEDs for the 1Gbps/10Gbps Ports on the AT-x550-18XTQ, Switch

The states of the link and activity LEDs are described in Table 3.

Table 3. Link and Activity LEDs on the 1Gbps/10Gbps Ports on the AT-x550-18XTQ Switch

State	Description
Solid Green	The port has established a 10Gbps link to a network device.
Flashing Green	The port is transmitting or receiving data at 10Gbps.
Solid Amber	The port has established a 1Gbps link to a network device.
Flashing Amber	The port is transmitting or receiving data at 1Gbps.

Table 3. Link and Activity LEDs on the 1Gbps/10Gbps Ports on the AT-x550-18XTQ Switch (Continued)

State	Description
Off	Possible causes of this state are listed here: - The port has not established a link with another network device. - The LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

LEDs for the 1Gbps SFP and 10Gbps SFP+ Transceiver Slots

The 1Gbps SFP and 10Gbps SFP+ transceiver slots on the AT-x550-18XSQ Switch have one LED. The LEDs are located between the slots. Refer to Figure 6.

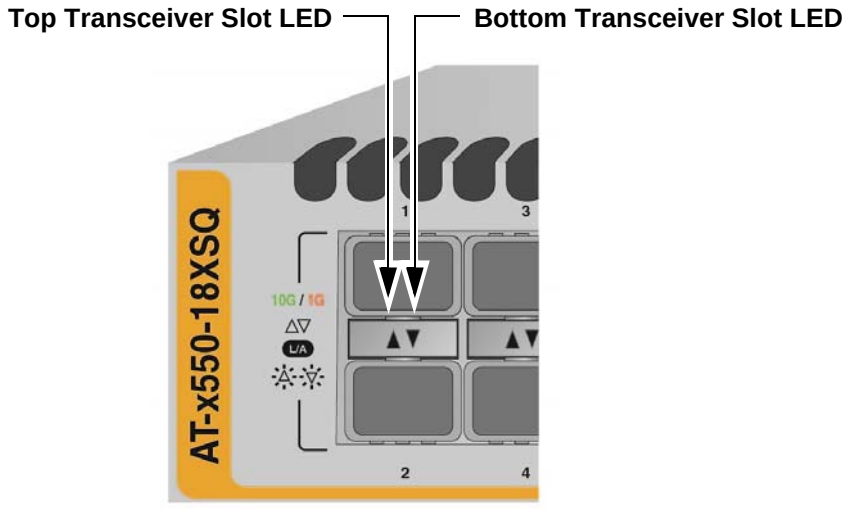


Figure 6. Link and Activity LEDs for the 1Gbps SFP and 10Gbps Slot+ Slots on the AT-x550-18XSQ Switch

The LED displays link status and activity. The possible LED states are described in Table 4.

Table 4. Link and Activity Status LEDs on the 1Gbps and 10Gbps Ports on the AT-x550-18XTQ Switch

State	Description
Solid Green	The transceiver has established a 10Gbps link to a network device.
Flashing Green	The transceiver is transmitting or receiving data in 10Gbps.

Table 4. Link and Activity Status LEDs on the 1Gbps and 10Gbps Ports on the AT-x550-18XTQ Switch (Continued)

State	Description
Solid Amber	The transceiver has established a 1Gbps link to a network device.
Flashing Amber	The transceiver is transmitting or receiving data in 1Gbps.
Off	Possible causes of this state are listed here: - The slot is empty. - The transceiver has not established a link to a network device. - The LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

LEDs for the 40Gbps QSFP+ Transceiver Slots

The 40Gbps QSFP+ transceiver slots on the switch have one LED. The LEDs are located between the slots. Refer to Figure 7.

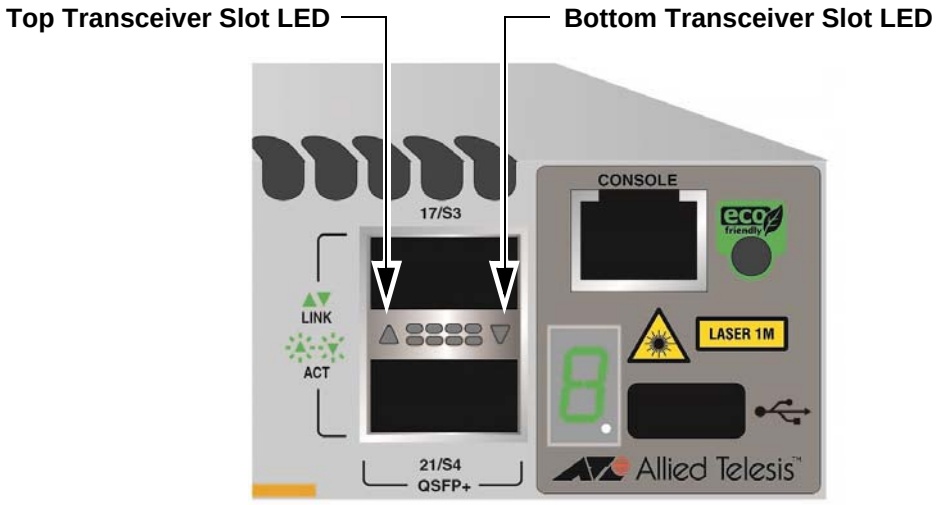


Figure 7. LEDs for the 40Gbps QSFP+ Slots

The LED displays link and activity status. The LED states when the slots have QSFP+ transceivers are described in Table 5 on page 31.

Table 5. Link and Activity Status LEDs for the 40Gbps QSFP+ Transceiver Slots with QSFP+ Transceivers

State	Description
Solid Green	The transceiver has established a 40Gbps link to a network device.
Flashing Green	The transceiver is transmitting or receiving data.
Off	Possible causes of this state are listed here: - The slot is empty. - The transceiver has not established a link to a network device. - The LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

The L:ED states when the QSFP+ slots contain breakout cables are described in Table 6 on page 31.

Table 6. Link and Activity Status LEDs for the 40Gbps QSFP+ Transceiver Slots with Breakout Cables

State	Description
Solid Green	At least one of the four ports on the breakout cable has established a 10Gbps link to a network device.
Flashing Green	At least one of the four ports on the breakout cable is sending or receiving data.
Off	Possible causes of this state are listed here: - The slot is empty. - None of the ports on the breakout cable have established a link to a network device. - The LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

Switch ID LED

The Switch ID LED, shown in Figure 8, displays the ID number of the switch. A stand-alone switch has the ID number 0. Switches in a VCStack have the numbers 1 to 4. The procedures in Chapter 8, “Powering On and Verifying the Stack” on page 105 explain you can control the assignments of the ID numbers when you power on the stack for the first time.

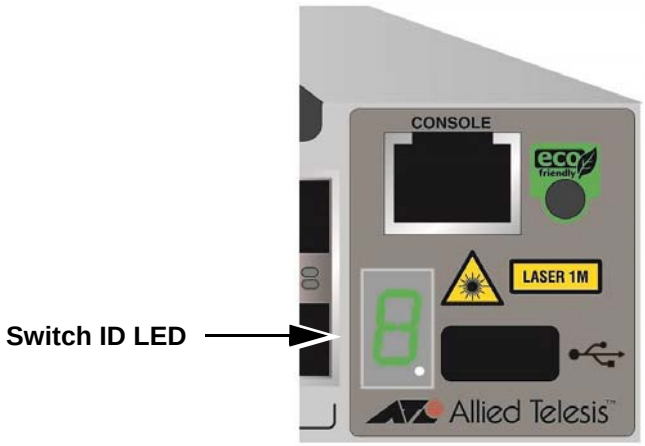
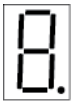


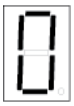
Figure 8. Switch ID LED

The states of the LED when the switch is not operating in the low power mode are shown in Figure 9.

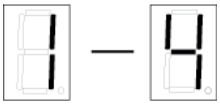


The switch is booting up.

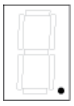
The switch has encountered a fault condition.



The switch is operating as a stand-alone unit, with the ID number 0.



The switch has an ID number of 1 to 4 as part of a VCStack.



The dot in the lower right corner flashes when the switch accesses USB memory.

Figure 9. Switch ID LED

The switch displays the letter “F” for fault on the ID LED if it detects one of the following problems:

- A cooling fan has failed.

- ❒ The internal temperature of the switch has exceeded the normal operating range and the switch may shut down.

Note
You can use the SHOW SYSTEM ENVIRONMENT command in the command line interface to identify the source of the problem.

The states of the LED when the switch is operating in the low power mode are shown in Figure 10.

The switch is the master switch of a VCStack.

The switch is operating as a stand-alone unit.

The switch is a member switch of a VCStack.

Figure 10. Switch ID LEDs in Low Power Mode

USB Port

The management panel has a USB port. You may use the port to store configuration files on flash drives or to restore configuration files to switches whose settings have been lost or corrupted, or to quickly configure replacement units. You may also use the port and flash drives to update the management firmware on the switch.

The port is USB2.0 compatible.

Console Port

The Console port is an RS232 serial management port. You use the port to access the AlliedWare Plus management software on the switch to configure the feature settings or monitor status or statistics. This type of management is commonly referred to as local management because you have to be at the physical location of the switch and use the management cable included with the unit. The switch does not have to have an IP address for local management.

To establish a local management session with the switch, you use the provided management cable to connect a terminal or a personal computer with a terminal emulation program to the Console port, which has an RJ-45 style (8P8C) connector. The cable has RJ-45 style (8P8C) and DB-9 (D-sub 9-pin) connectors.

The Console port has the following settings:

- Default baud rate: 9600 bps (Range is 9600 to 115200 bps)
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

Note
These settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulation program.

Power Supply

The switch comes with a pre-installed power supply. Refer to “Technical Specifications” on page 129 for the input voltage ranges.

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. E3

Note
The power supply is not field-replaceable.

Chapter 2

Virtual Chassis Stacking

The sections in this chapter are listed here:

Note
For more information on VCStack, refer to the *Stacking Introduction and Stacking Commands* chapters in the *Software Reference for x550 Series Switches, AlliedWare Operating System* from **www.alliedtelesis.com**.

Overview

The Virtual Chassis Stacking (VCStack) feature allows you to connect together two x550 Series switches so that they function as a single networking unit. Some of the benefits of the VCStack feature are listed here:

- Simplifies management - You can manage the devices of the stack as a single unit, rather than individually. Your local and remote management sessions automatically give you management access to all the devices.
- Reduces IP addresses - A stack requires only one IP address for remote management access, thereby reducing the number of IP addresses you have to assign to network devices.
- Adds feature flexibility and resiliency - A stack gives you more flexibility in the available configurations of features. For instance, you can create port aggregators of ports from different switches in the stack, rather than from only one switch. If you distribute the ports of an aggregator across two or more switches in a stack, you increase its resiliency because the aggregator continues to function, though at a reduced bandwidth, if one of the switches stops functioning.
- Reduces protocol requirements - Building a stack might eliminate your need to configure some protocols, such as the Virtual Router Redundancy Protocol and Spanning Tree Protocol.

Stacking Guidelines

Here are the stacking guidelines:

- A stack can have up to two x550 Series switches.
- No additional software or licenses are required for stacking.
- The switches of a stack can be the same or different x550 models.
- Any x550 Series switch model can be the master switch of a stack.
- A stack of x550 Series switches may not contain other stacking switches, such as x600 or x610 Series switches.
- Stacking is enabled by default on the switches.
- The two switches of a stack are connected together with a stack trunk consisting of four 40Gbps QSFP+ transceivers. You install the transceivers in slots 17 and 21 in the switches.
- You must use Allied Telesis 40Gbps QSFP+ transceivers for the stack trunk. The switches will not form a stack with QSFP+ transceivers from other network equipment providers. For a list of supported transceivers, refer to the product's data sheet on the Allied Telesis web site.
- You may use Allied Telesis AT-QSFPCU Cables series direct connect cables for the stack trunk if the switches are in the same equipment rack or wiring room.
- You may not install a networking device, such as a media converter or Ethernet switch, between two stacking transceivers.

Stack Trunk

The two switches of a stack are connected together with a trunk of QSFP+ transceivers installed in slots 17 and 21. The transceivers must be from Allied Telesis and be approved for use as a stack trunk for x550 Series switches. The following transceivers were approved at the time this manual was written:

- AT-QSFPSR4 transceiver - requires 12-strand OM4 fiber optic cable and has a maximum operating distance of 150m (492 ft).
- AT-QSFPLR4 transceiver - requires single-mode fiber optic cable and has an operating range of 2m (6.6 ft) to 10km (6.2 mi).
- AT-QSFP1CU and AT-QSFP3CU direct connect cables in lengths of 1 and 3m, respectively

The connections of the QSFP+ transceivers in slots 17 and 21 in the two switches of a stack must cross over. The transceiver in slot 17 in one switch has to connect to the transceiver in slot 21 in the other switch. An example is illustrated in Figure 11.

Figure 11. Stack of Two Switches

Caution

The switches will not form the stack if the connections to the QSFP+ transceivers in slots 17 and 21 do not cross over. They will instead operate as stand-alone devices. E78

Note

Transceivers must be purchased separately.

Master and Member Switches

A stack has a master switch and a member switch. The main functions of the master switch are listed here:

- Coordinate and monitor stack operations.
- Configure the parameter settings of the switches using its configuration file in flash memory, whenever the stack is reset or powered on.
- Verify that the switches are using the same version of management software. It automatically downloads its management software to the member switch over the stacking cables if the member switch has a different version of the management software.
- Verify that the switches have different ID numbers. It automatically assigns new ID numbers to resolve situations where two or more switches have the same ID number.
- Verify that the stacking transceivers are from Allied Telesis and they are cabled correctly.

The parameter settings of the switches of the stack are stored in configuration files in the flash memories of the master and member switches. Each file contains all the settings for the switches in the stack. The switches update the files with the latest parameter settings whenever you issue the WRITE command to save your changes.

When you reset or power on the stack, the master switch uses the configuration file in its flash memory to restore its own parameter settings as well as the parameter settings of the member switch in the stack. A member switch uses its configuration file to restore parameter settings only if the master switch is removed or fails, and it becomes the new master switch of the stack.

Selection of the Master Switch

The switches of a stack select the master switch during the initialization process, which they perform whenever they are powered on or reset. They base the selection on the following parameters:

- Stack priority numbers
- MAC addresses

The stack priority number is an adjustable value of 0 to 255. The lower the number, the higher the priority. The switch with the lowest priority number (highest priority) becomes the master switch of a stack. The default priority value is 128.

When switches have the same priority values, they compare their MAC addresses to select the master switch. As with the priority value, the lower

the MAC address, the higher the priority. The switch with the lowest MAC address becomes the master switch.

If you power on the stack for the first time without adjusting the priority values, the master switch is selected based on the MAC addresses if the units are powered on simultaneously. If you power on the switches one at a time, the master switch is the first switch to be powered on. This is explained in Chapter 8, “Powering On and Verifying the Stack” on page 105.

You can set the priority values of the switches either before or after you build the stack. Changing the values after the stack is operating does not change the parameter settings of the stack or the ID numbers of the devices.

It should be noted that the master switch of a stack does not have to have the ID number 1. The master switch can have any ID number.

Switch ID Numbers

Each switch must have an ID number. The numbers are 1 and 2. The default is 1. The ID numbers are displayed on the ID LEDs on the front panels of the units. You may assign the numbers yourself or let the master switch assign the numbers automatically when you initially power on the stack, as explained in Chapter 8, “Powering On and Verifying the Stack” on page 105.

You use the ID numbers to identify the individual switches and ports when configuring the devices with the commands in the management software. For further information, refer to “Specifying Ports in the Command Line Interface for Stacks” on page 116.

The ID numbers are also used to identify the parameter settings of the switches in the configuration files. When the stack is reset or power cycled, the master switch uses the ID numbers to identify the devices to which the parameter settings belong.

Caution

You should not change the ID numbers of the switches after configuring the parameter settings. Otherwise, the parameter settings might be applied to the wrong devices when you reset or power cycle the stack. E79

The switches do not use the ID numbers to select the master switch. The selection of the master switch is based on the priority numbers and MAC addresses, as previously explained.

Optional Feature Licenses

The x550 Series switches comes with the AlliedWare Plus™ operating system and a base set of features that are available as soon as you install the devices. Allied Telesis also offers additional features and capabilities for the switches. These features come with the AlliedWare Plus operating system, but they have to be unlocked before you can use them. The features are unlocked with feature licenses from Allied Telesis. For a list of optional feature licenses for this product, refer to its product sheet on the Allied Telesis web site.

Here are the guidelines to feature licenses for a stack of x550 Series switches:

- The VCStack feature is part of the base features of the switch. It does not require an additional feature license.
- You may install feature licenses while the switches are operating as stand-alone units or as a stack.
- When ordering feature licenses for the switches of a stack, you must order one license for each switch.
- The switches will form a stack even if they have different feature licenses. However, the additional features are only available on those switches that have the necessary licenses. The stack generates a warning message if it detects that the switches do not have the same optional feature licenses. To resolve the issue, you can use the ATMF REMOTE-LOGIN command to log onto the switch without the license, and install the license. For more information, refer to the *Software Reference for x550 Series Switches, AlliedWare Operating System* from **www.alliedtelesis.com**.

Chapter 3

Beginning the Installation

The chapter contains the following sections:

Reviewing Safety Precautions

Please review the following safety precautions before beginning the installation procedure.

Note
Safety statements that have the ☞ symbol are translated into multiple languages in the *Translated Safety Statements* document at **www.alliedtelesis.com/support**.

Warning
Class 1 Laser product. ☞ L1

Warning
Laser Radiation.
Class 1M Laser product.

Warning
Do not stare into the laser beam. ☞ L2

Warning
Do not look directly at the fiber optic ends or inspect the cable ends with an optical lens. ☞ L6

Warning
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables. ☞ E1

Warning
Do not work on equipment or cables during periods of lightning activity. ☞ E2

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. E3

Warning
Class I Equipment. This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts. E4

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

Caution
Air vents must not be blocked and must have free access to the room ambient air for cooling. E6

Warning
Operating Temperatures. This product is designed for a maximum ambient temperature of 45° degrees C. E52

Note
All Countries: Install product in accordance with local and National Electrical Codes. E8

Warning
Only trained and qualified personnel are allowed to install or replace this equipment. E14

Caution
Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E21

Caution
Risk of explosion if battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Attention: Le remplacement de la batterie par une batterie de type incorrect peut provoquer un danger d'explosion. La remplacer uniquement par une batterie du même type ou de type équivalent recommandée par le constructeur. Les batteries doivent être éliminées conformément aux instructions du constructeur. E22

Warning
Mounting of the equipment in the rack should be such that a hazardous condition is not created due to uneven mechanical loading. E25

Warning
The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E28

Note
Use dedicated power circuits or power conditioners to supply reliable electrical power to the device. E27

Warning
This unit might have more than one power cord. To reduce the risk of electric shock, disconnect all power cords before servicing the unit. E30

Note
If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (Tmra). E35

Caution

Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. E36

Warning

Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuits (e.g., use of power strips). E37

Warning

This product may have multiple AC power cords installed. To de-energize this equipment, disconnect all power cords from the device. E41

Caution

An Energy Hazard exists inside this equipment. Do not insert hands or tools into open chassis slots or plugs. E44

Warning

This equipment shall be installed in a Restricted Access location. E45

Caution

The unit does not contain serviceable components. Please return damaged units for servicing. E42

Warning

The temperature of an operational SFP or SFP+ transceiver may exceed 70° C (158° F). Exercise caution when removing or handling a transceiver with unprotected hands. E43

Choosing a Site for the Switch

Observe these requirements when planning the installation of the switch.

- ❒ If you plan to install the switch in an equipment rack, check that the rack is safely secured so that it will not tip over. Devices in a rack should be installed starting at the bottom, with the heavier devices near the bottom of the rack.
- ❒ If you plan to install the switch on a table, check that the table is level and stable.
- ❒ The power outlet should be located near the switch and be easily accessible.
- ❒ The site should allow for easy access to the ports on the front of the switch, so that you can easily connect and disconnect cables, and view the port LEDs.
- ❒ The site should allow for adequate air flow around the unit and through the cooling vents on the front and rear panels. (The ventilation direction is from front to back.)
- ❒ The site should not expose the switch to moisture or water.
- ❒ The site should be a dust-free environment.
- ❒ The site should include dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.
- ❒ Do not install the switch in a wiring or utility box because it might overheat and fail from inadequate airflow.

Warning
Switches should not be stacked on a table or desktop. They could present a physical safety hazard if you need to move or replace switches. E91

Unpacking the Switch

Figure 12 shows the shipping box for the switch.

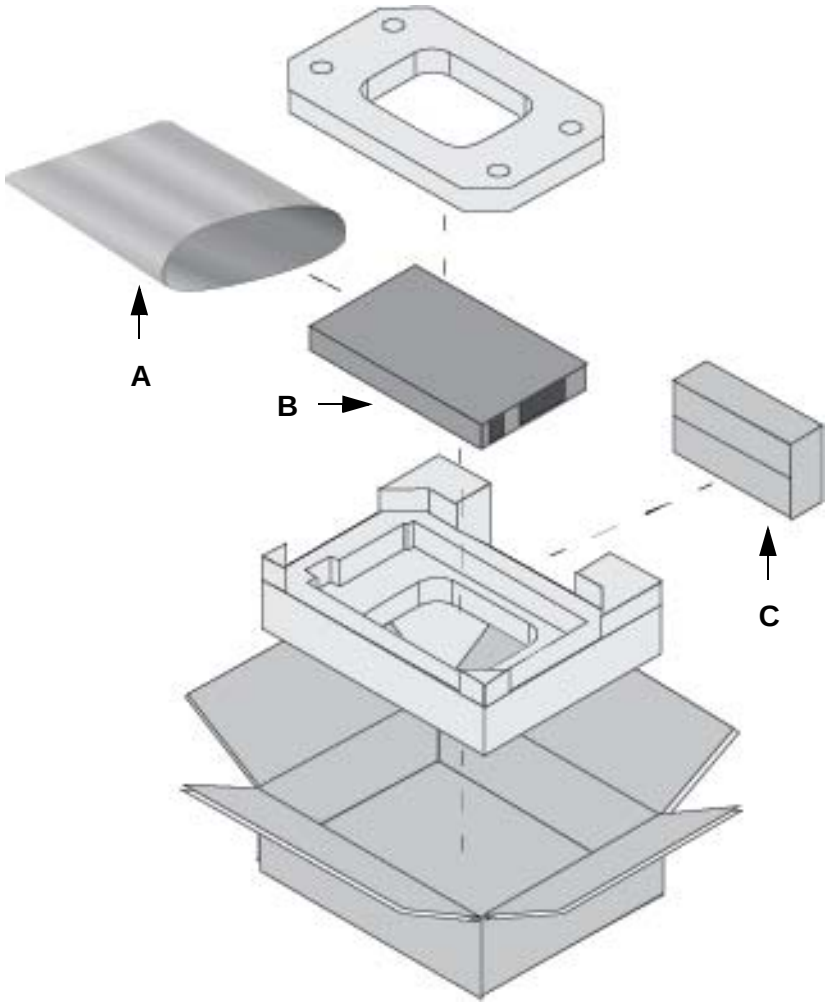


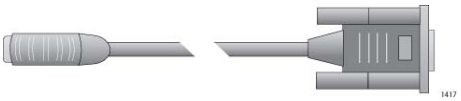
Figure 12. AT-x550-18XTQ or AT-x550-18XSQ Switch Shipping Box

The items in the box are listed here:

- A - Protective bag
- B - AT-x550 Switch
- C - Accessory kit

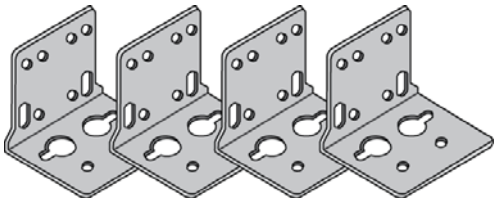
Note
You should retain the original packaging material in case you need to return the unit to Allied Telesis.

Figure 13 here and Figure 14 on page 53 list the items in the accessory kit that comes with the switch. Contact your Allied Telesis sales representative for assistance if any item is missing or damaged.



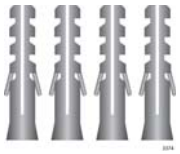
One 2m (6.6 ft) local management cable with RJ-45 (8P8C) and DB-9 (D-sub 9-pin) connectors.

One regional AC power cord



Four AT-RKMT-J24 wall-mounting brackets

Sixteen screws for attaching the AT-RKMT-J24 wall brackets to the switch.
Length: 6.0mm (0.2 in.)
Diameter: 4.0mm (0.2 in.)

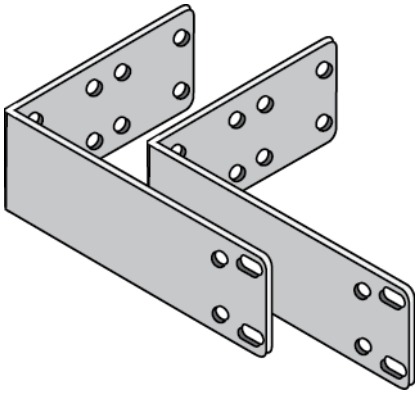


Four anchors for concrete walls:
Length: 29.6mm (1.2 in.)
Diameter: 6.0mm (0.2 in.)

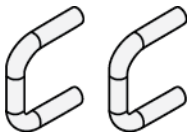
Four screws for wood or concrete walls:
Length: 32mm (1.3 in.)
Diameter: 4mm (0.2 in.)

Power cord retaining clip

Figure 13. Accessory Kit



Two AT-RKMT-J14 equipment rack brackets



Two handles for the AT-RKMT-J14 equipment rack brackets

Four screws for attaching the handles to the equipment rack brackets:
Length: 6.0mm (0.2 in.)
Diameter: 4.0mm (0.2 in.)

Figure 14. Accessory Kit (Continued)

Chapter 4

Installing the Switch on a Table or in an Equipment Rack

This chapter contains the instructions for installing the switch on a table or in an equipment rack. The procedures in this chapter are listed here:

Installing the Switch on a Table or Desktop

This section contains the procedure for installing the switch on a table.

Note
The rubber feet on the bottom of the chassis should be left on for table installation.

Warning
Switches should not be stacked on a table or desktop. They could present a physical safety hazard if you need to move or replace switches. E91

To install the chassis on a table, perform the following procedure:

1. Review the procedure in Chapter 3, “Choosing a Site for the Switch” on page 50to verify that the selected site is suitable for the unit.
2. Check to be sure that the table is strong enough to support the weight of the switch.
3. Lift the chassis onto the table.
4. Check to be sure that all of the appropriate components are included in the shipping container. Refer to “Unpacking the Switch” on page 51.

After placing the switch on the table or desktop, go to Chapter 6, “Verifying the Status of the Switches” on page 85.

Overview of Installing the Switch in an Equipment Rack

You can install the switch in a 19-inch equipment rack two ways. One way is with the two AT-RKMT-J14 brackets that come with the switch. Refer to Figure 15.

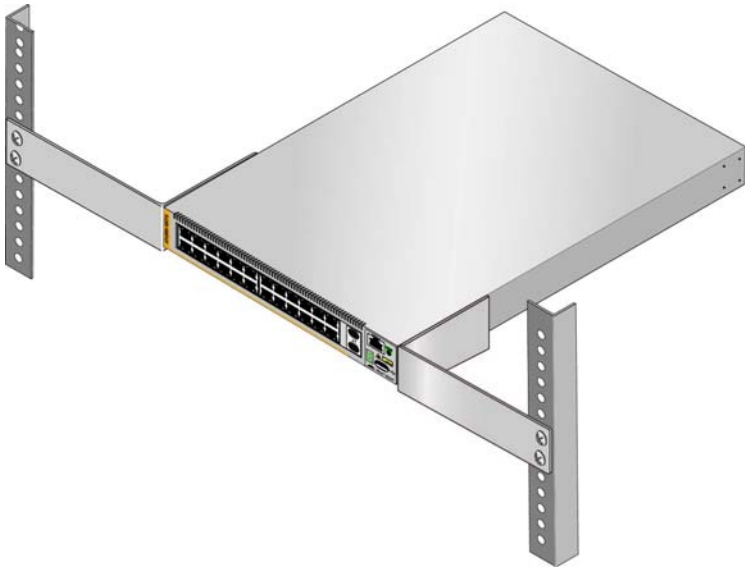


Figure 15. AT-RKMT-J14 Brackets and Switch

For installation instructions, refer to “Installing the Switch in an Equipment Rack with the AT-RKMT-J14 Brackets” on page 59

You can also install the switch in an equipment rack with the optional AT-RKMT-J15 bracket. Refer to Figure 16.

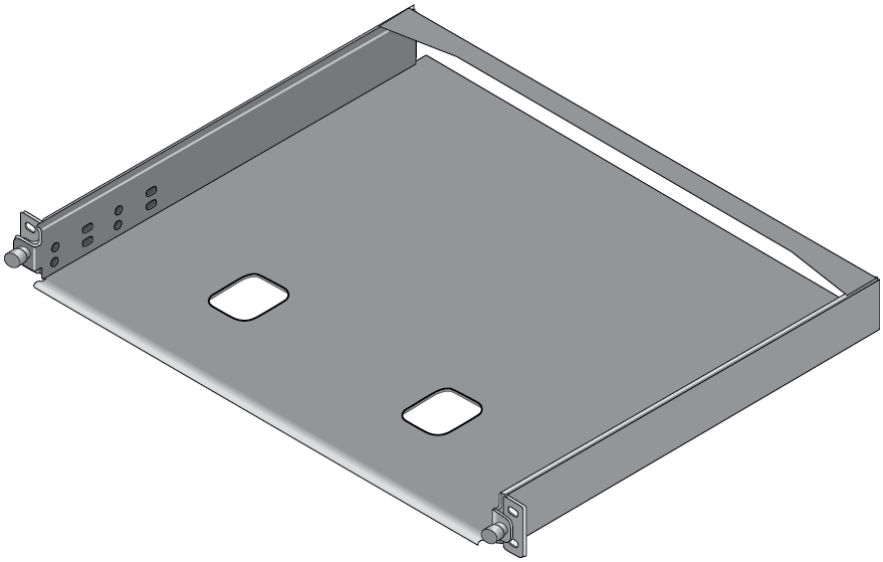


Figure 16. AT-RKMT-J15 Bracket

The bracket lets you install two switches side-by-side. Refer to Figure 17.

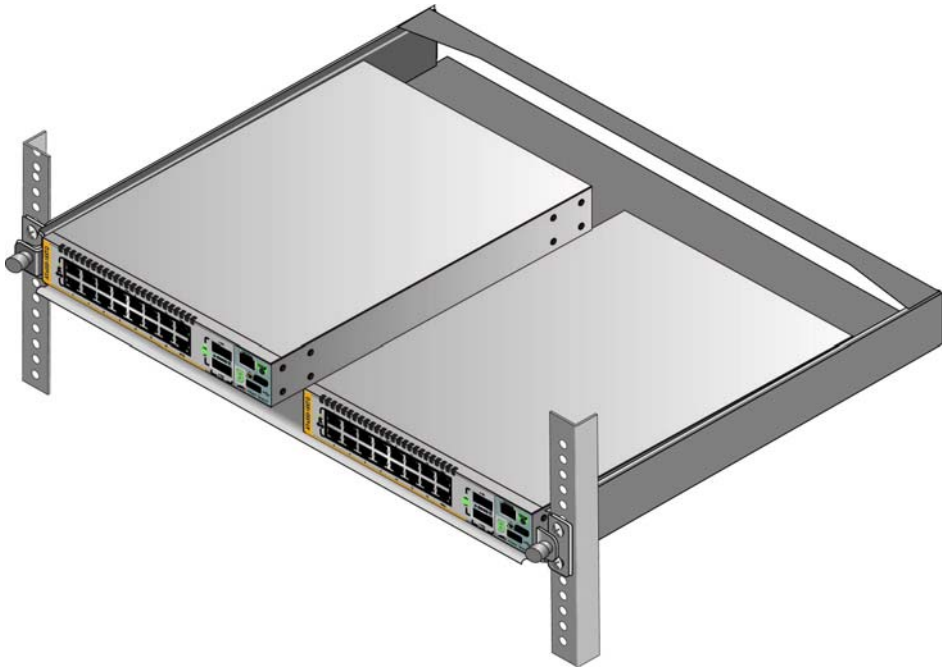


Figure 17. AT-RKMT-J15 Bracket with Switches

Note
The AT-RKMT-J15 Bracket is purchased separately.

For installation instructions refer to “Installing the Switch in an Equipment Rack with the AT-RKMT-J15 Bracket” on page 64

Installing the Switch in an Equipment Rack with the AT-RKMT-J14 Brackets

This section contains the procedure for installing the switch in a standard 19-inch equipment rack, with the two AT-RKMT-J14 Brackets included with the switch.

Required Items for the AT-RKMT-J14 Brackets

The following items are required to install the switch in an equipment rack with the AT-RKMT-J14 Brackets:

- Two AT-RKMT-J14 equipment rack brackets (included with the switch)
- Eight M4x6mm bracket screws (included with the switch)
- Four M3x6mm screws (included with the switch)
- Two bracket handles (included with the switch)
- Cross-head screwdriver (not provided)
- Four standard equipment rack screws (not provided)

Switch Orientations in the Equipment Rack

The switch has two sets of four screw holes on the left and right sides, for attaching the AT-RKMT-J14 Brackets. Refer to Figure 18.

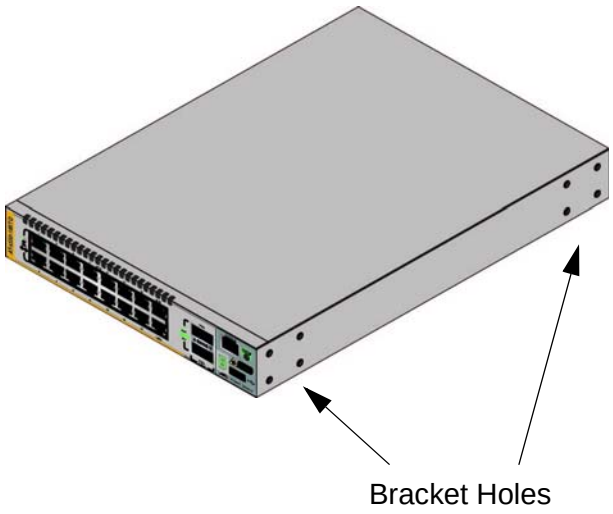


Figure 18. Bracket Holes

The brackets also have two sets of four holes. Refer to Figure 19 on page 60.

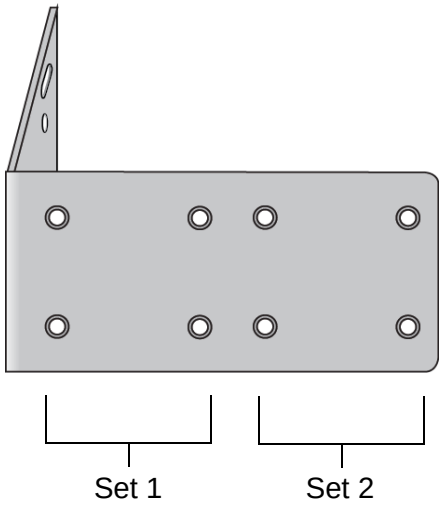


Figure 19. AT-RKMT-J14 Bracket Holes

You can use the different sets of holes on the switch and brackets to install the switch in the equipment rack in a variety of orientations. You can install it with the front panel flush with, extending in front of, or recessed behind the front of the equipment rack. The illustrations in Figure 20 show the switch orientations with the front panel facing the front of the equipment rack.

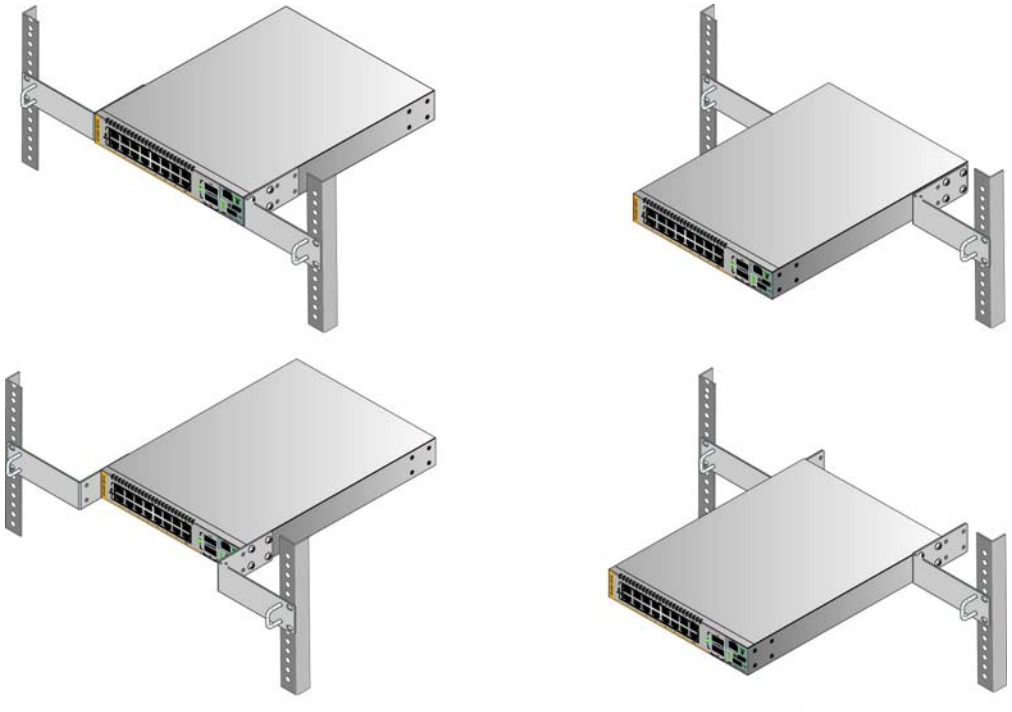


Figure 20. Switch Orientations with the Front Panel Facing the Front of the Equipment Rack

You can also orient the switch with the rear panel facing the front of the equipment rack. Refer to Figure 21.

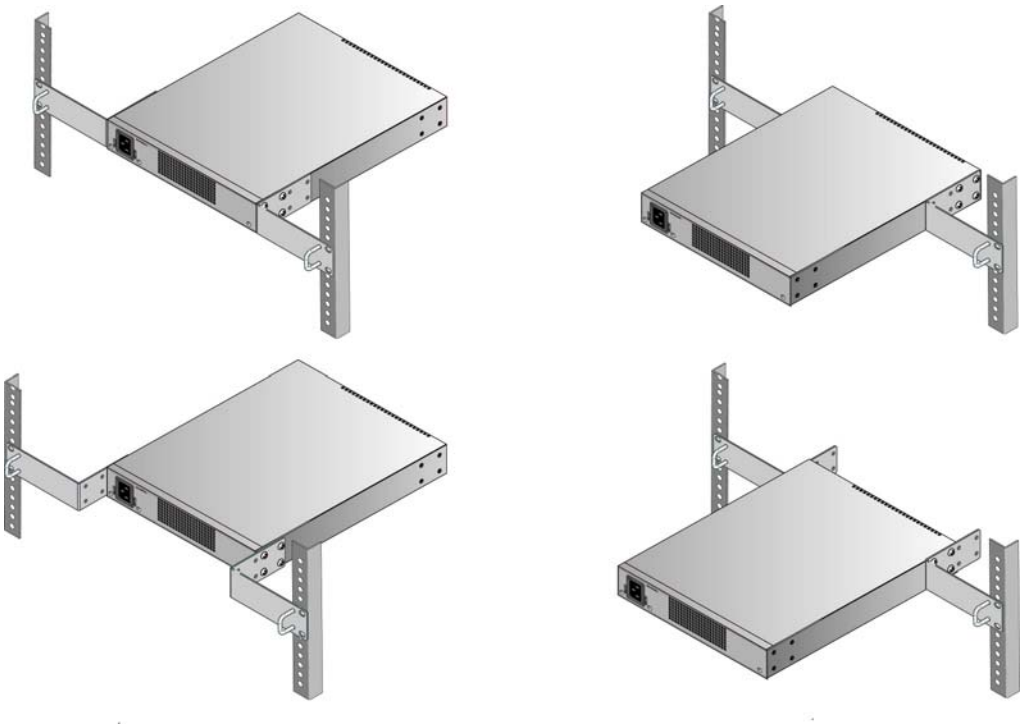


Figure 21. Switch Orientations with the Rear Panel Facing the Front of the Equipment Rack

Installing the Switch with the AT-RKMT-J14 Brackets

If you have not chosen an orientation for the switch in the equipment rack, review “Switch Orientations in the Equipment Rack” on page 59.

Please review the installation guidelines in “Choosing a Site for the Switch” on page 50 before installing the switch in an equipment rack.

Caution

The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. E28

To install the switch in a 19-inch equipment rack with the AT-RKMT-J14 Brackets, perform the following procedure:

1. Attach the two handles to the AT-RKMT-J14 Brackets using the four M3x6mm screws included with the switch. Refer to Figure 22 on page 62.

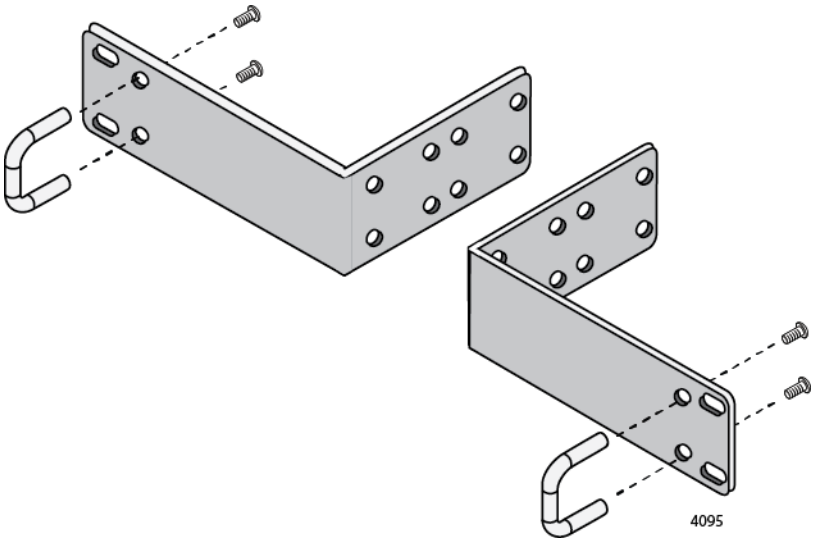


Figure 22. Attaching the Handles to the AT-RKMT-J14 Brackets

2. Place the switch on a level, secure surface.

3. Attach the two brackets to the sides of the switch in the selected position, using the eight M4x6mm screws included with the unit. The illustration in Figure 23 shows the installation of the brackets such that the front panel of the switch is even with the front of the equipment rack.

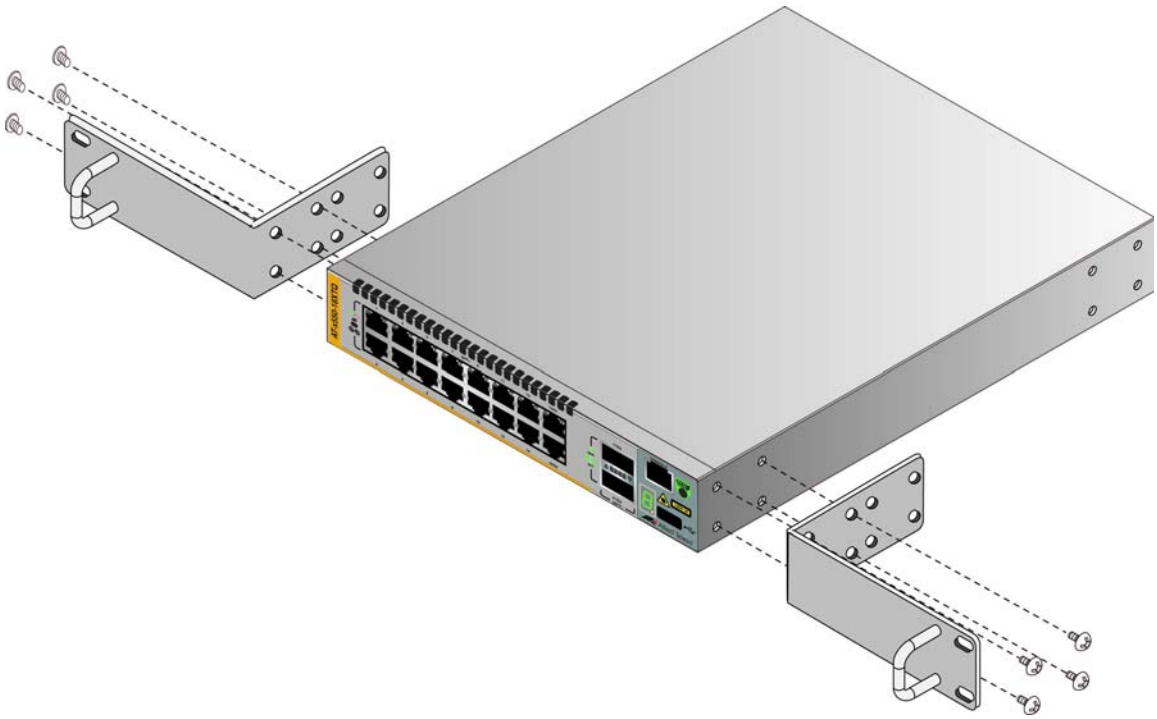


Figure 23. Attaching the AT-RKMT-J14 Brackets to the Switch

4. Have another person hold the switch in the equipment rack at the desired location while you secure it using four standard equipment rack screws (not provided). Refer to Figure 24.

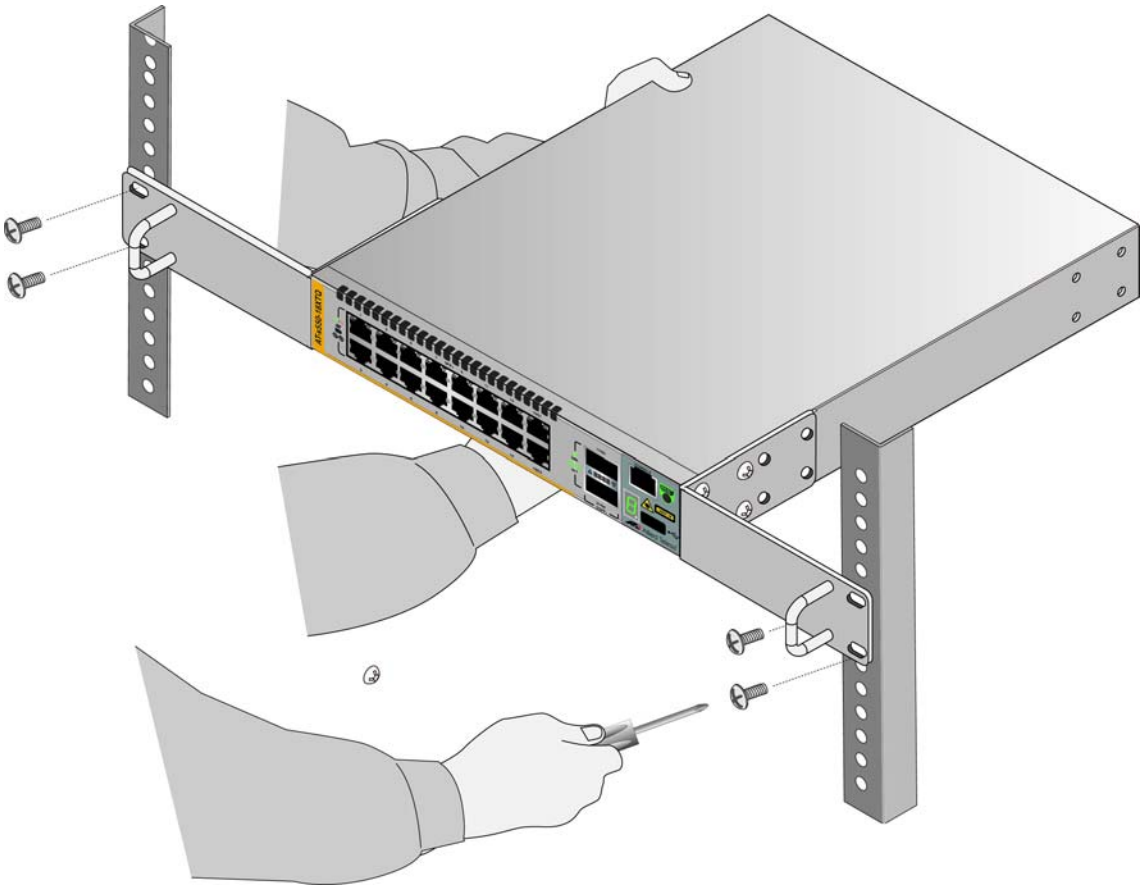


Figure 24. Installing the Switch in an Equipment Rack

5. Go to Chapter 6, “Verifying the Status of the Switches” on page 85.

Installing the Switch in an Equipment Rack with the AT-RKMT-J15 Bracket

This section contains the procedure for installing the switch in a standard 19-inch equipment rack, with the optional AT-RKMT-J15 Bracket.

Required Items for the AT-RKMT-J15 Bracket

The following items are required to install the switch in an equipment rack with the AT-RKMT-J15 Bracket:

- One AT-RKMT-J15 equipment rack bracket (sold separately)
- Four M4x6mm bracket screws (included with the switch)
- Cross-head screwdriver (not provided)
- Flat-head screwdriver (not provided)
- Four standard equipment rack screws (not provided)

Installing the Switch with the AT-RKMT-J15 Bracket

To install the switch in a 19-inch equipment rack with the AT-RKMT-J15 Bracket, perform the following procedure:

1. Have another person hold the AT-RKMT-J15 Bracket at the desired location in the equipment rack while you secure it using four standard equipment rack screws (not provided). Refer to Figure 25.

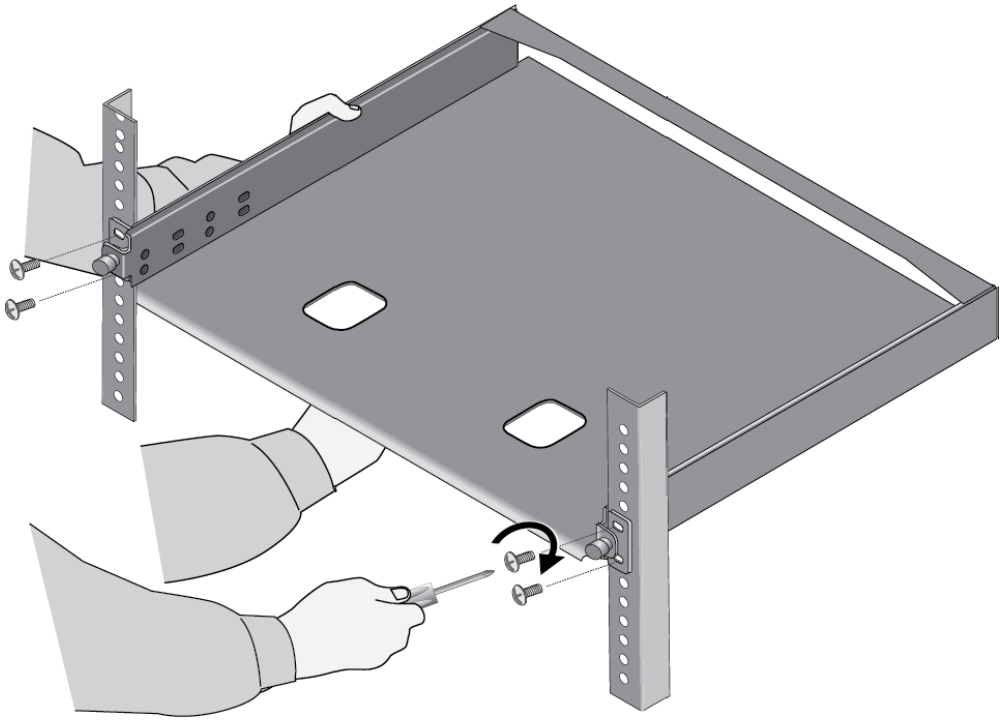


Figure 25. Installing the AT-RKMT-J15 Bracket in the Equipment Rack

2. Loosen the two thumbscrews on the front of the bracket. Refer to Figure 26.

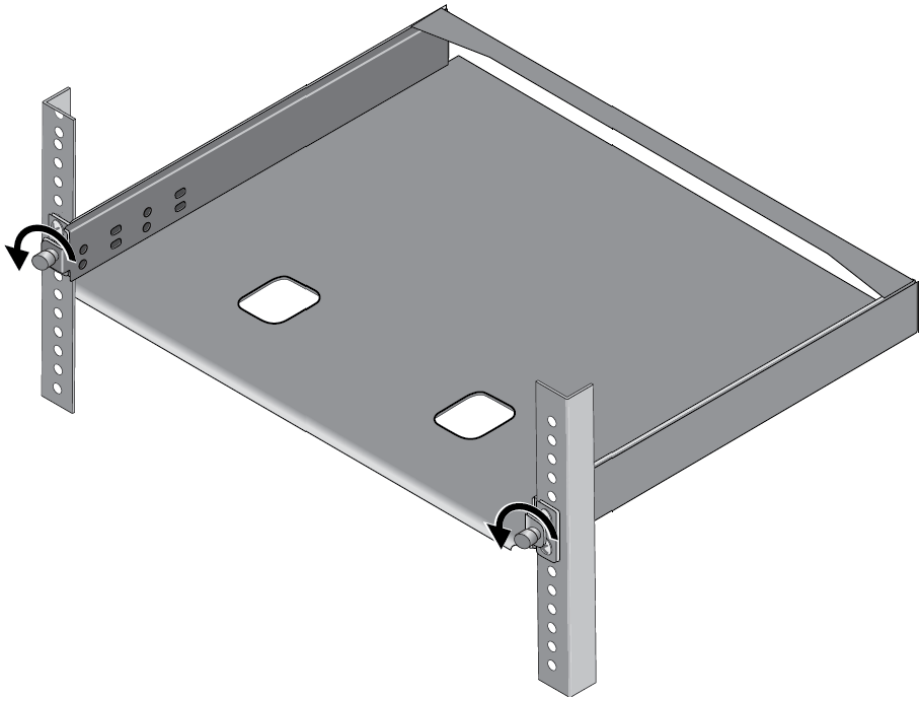


Figure 26. Loosening the Two Thumbscrews on the Front of the AT-RKMT-J15 Bracket

3. Slide out the bracket tray. Refer to Figure 27.

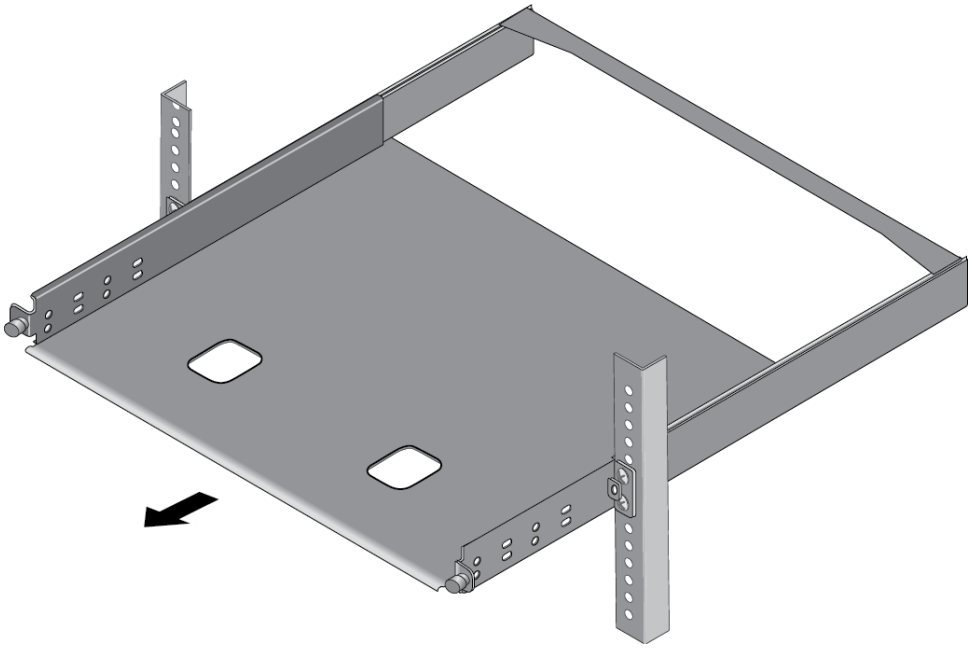


Figure 27. Sliding Out the Tray from the AT-RKMT-J15

Note
Steps 4 to 6 remove the plastic feet from the bottom of the switch. You must remove the plastic feet to install the switch in the AT-RKMT-J15 Bracket.

4. Place the switch upside-down on a table.

5. Use a small flat-head screwdriver to pry the four plastic feet from the bottom of the switch. Refer to Figure 28.

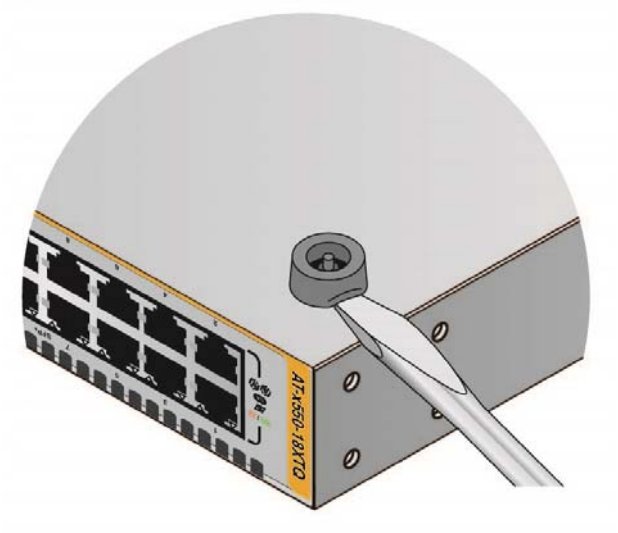


Figure 28. Removing the Plastic Feet from the Bottom Panel of the Switch

6. Turn the switch over so that it is right-side up.

7. Place the switch in the left or right side of the bracket, with its front panel facing the front of the bracket. If you are installing only one switch, you may install it on either the left or right side. Refer to Figure 29 on page 67.

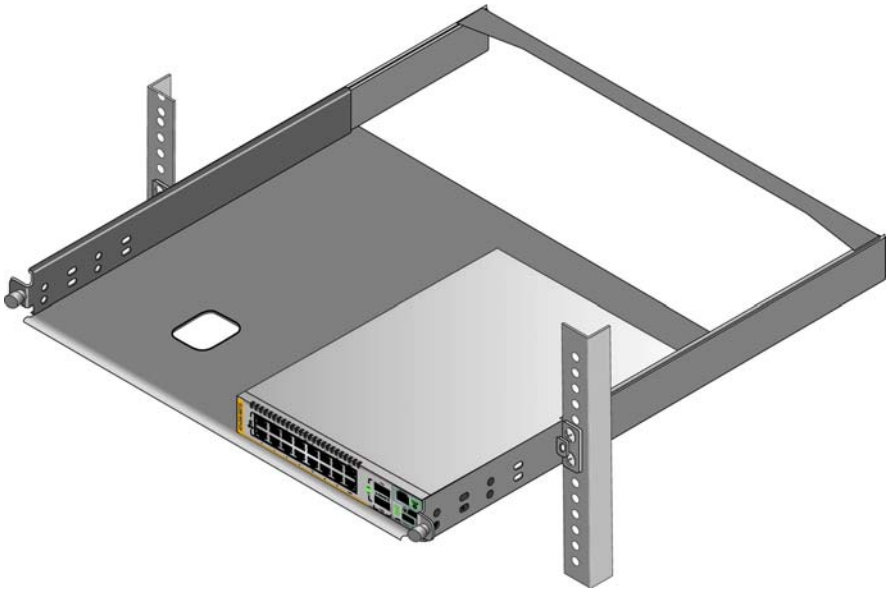


Figure 29. Placing a Switch in the AT-RKMT-J15 Bracket

8. Install two M4x6mm screws included with the switch to secure the switch to the bracket. Refer to Figure 30.

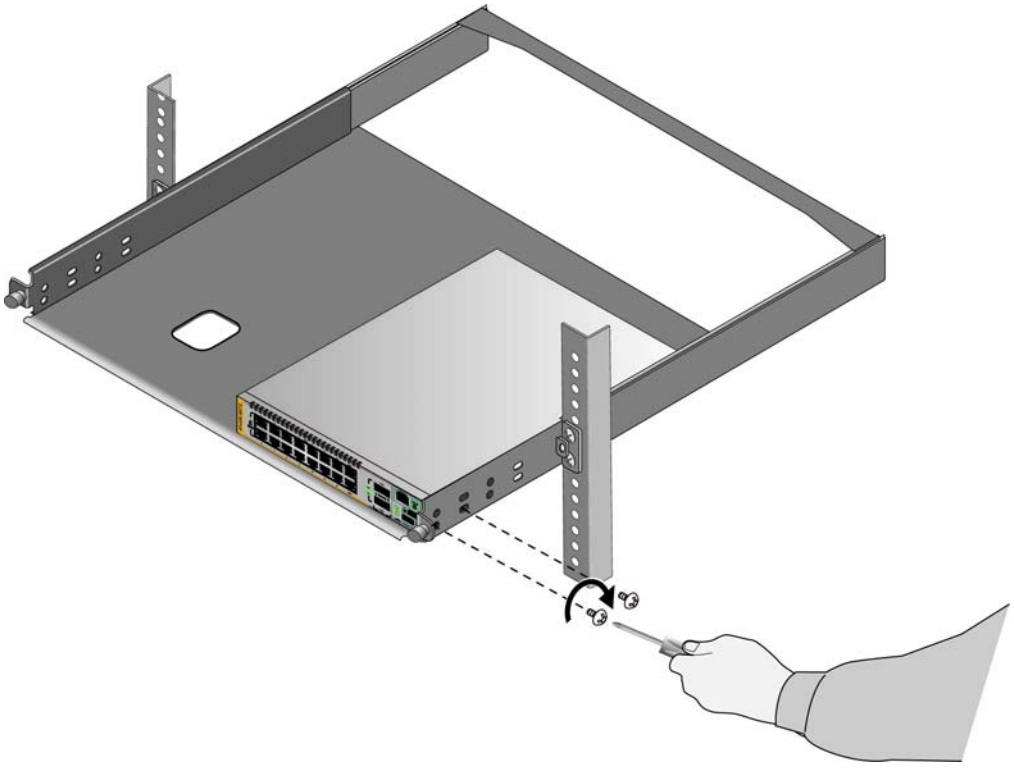


Figure 30. Securing the Switch to the AT-RKMT-J15 Bracket

9. To install a second switch in the bracket, repeat steps 4 to 8.

10. Slide in the bracket tray. Refer to Figure 31.

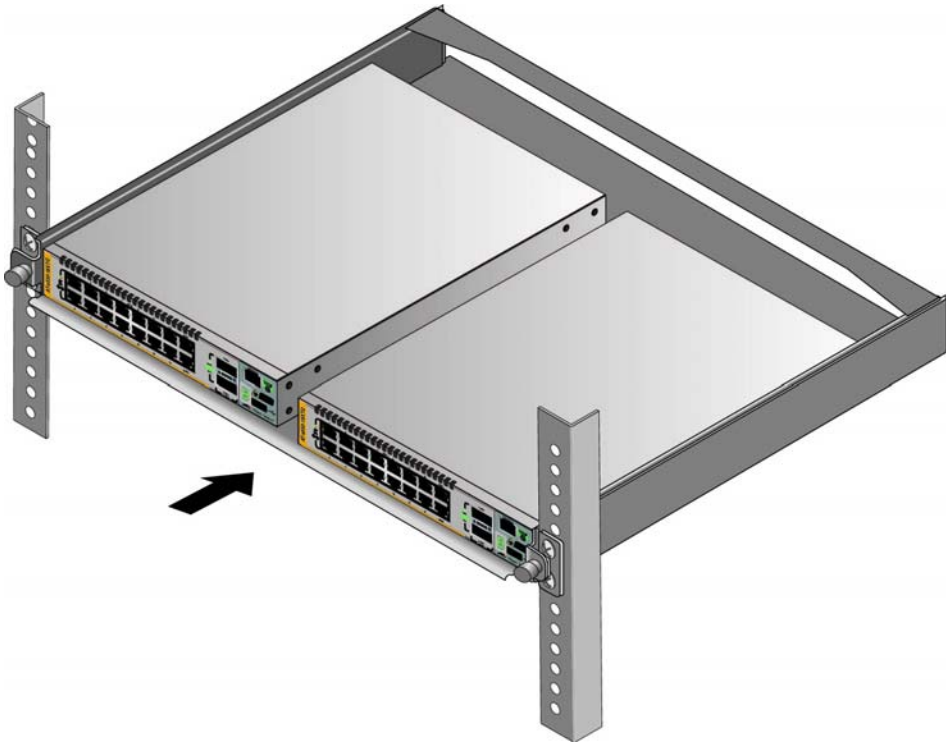


Figure 31. Sliding in the Bracket Tray

11. Tighten the two thumbscrews to secure the tray to the bracket. Refer to Figure 32 on page 69.

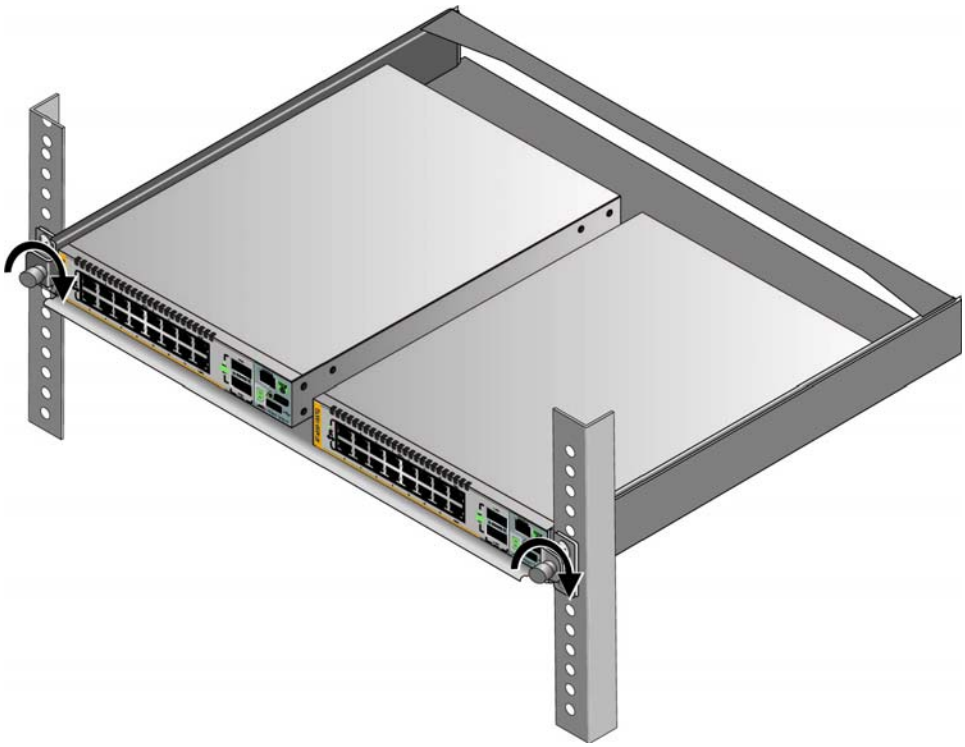


Figure 32. Tightening the Two Thumbscrews on the AT-RKMT-J15 Bracket

12. Go to Chapter 6, “Verifying the Status of the Switches” on page 85.

Chapter 5

Installing the Switch on a Wall

The procedures in this chapter are listed here:

Switch Orientations on a Wall

You can install the switch on a wall with the front panel on the left or right, as shown in Figure 33. You should not install it with the front panel on the top or bottom.

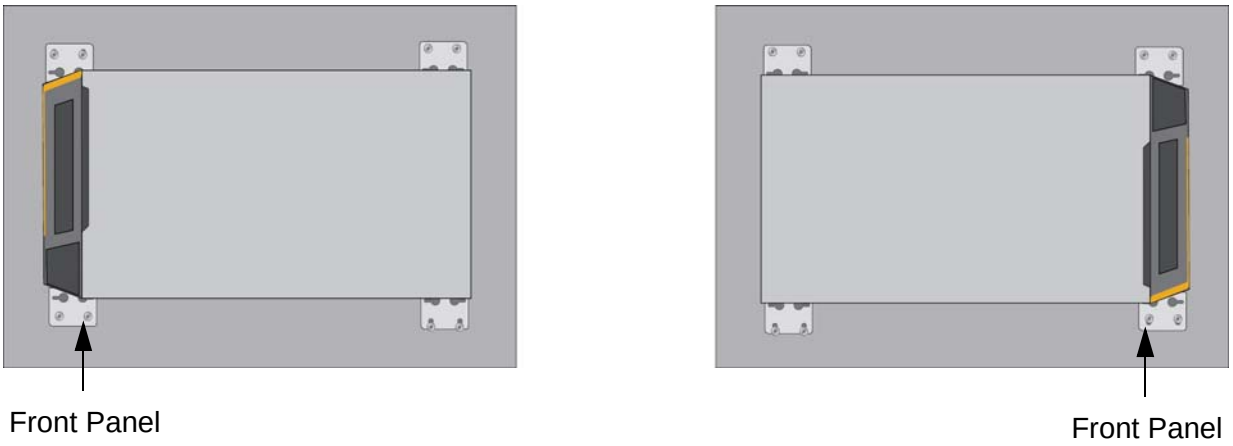


Figure 33. Positions of the Switch on the Wall

The two wall mounting brackets should be installed diagonally across from each other, with the front bracket above the chassis and the rear bracket below it.

Installation Guidelines

Here are the guidelines to installing the switch on a wall:

- You may install the switch on a wall that has wooden studs or on a concrete wall.
- If you are installing the switch on a wall with wooden studs, you should use a plywood base to support the switch. For more information, refer to “Plywood Base for a Wall with Wooden Studs” on page 75. A plywood base is not required for a concrete wall.
- You should not install the switch on a wall that has metal studs. Metal studs may not be strong enough to safely support the device.
- You should not install the switch only on sheetrock or similar material. Sheetrock is not strong enough to safely support the device.

Warning
The device is heavy. Always ask for assistance before moving or lifting it to avoid injuring yourself or damaging the equipment.

Warning
The device should be installed on the wall by a qualified building contractor. Serious injury to yourself or others or damage to the equipment may result if it is not properly fastened to the wall. E105

Tools and Material

Here are the required tools and material for installing the switch on a wall:

- Four AT-BRKT-J24 wall brackets (included with the switch)
- Sixteen screws (included with the switch) to attach the AT-BRKT-J24 brackets to the switch.
- Four wall screws (included with the switch)
- Four anchors for a concrete wall (included with the switch)
- Cross-head screwdriver (not provided)
- Stud finder for a wooden wall, capable of identifying the middle of wall studs and hot electrical wiring (not provided)
- Drill and 1/4” carbide drill bit for a concrete wall (not provided)
- Plywood base if you are installing the switch on a wall with wooden studs (not provided.) Refer to “Plywood Base for a Wall with Wooden Studs” on page 75 for illustrations.
- Four screws for attaching the plywood base to the wall (not

provided)

Caution

The supplied screws and anchors might not be appropriate for all walls. A qualified building contractor should determine the hardware requirements for your wall prior to installing the switch. E88

Plywood Base for a Wall with Wooden Studs

If you are installing the switch on a wall that has wooden studs, Allied Telesis recommends using a plywood base to attach the device to it. (A plywood base is not required for a concrete wall.) Refer to Figure 34.

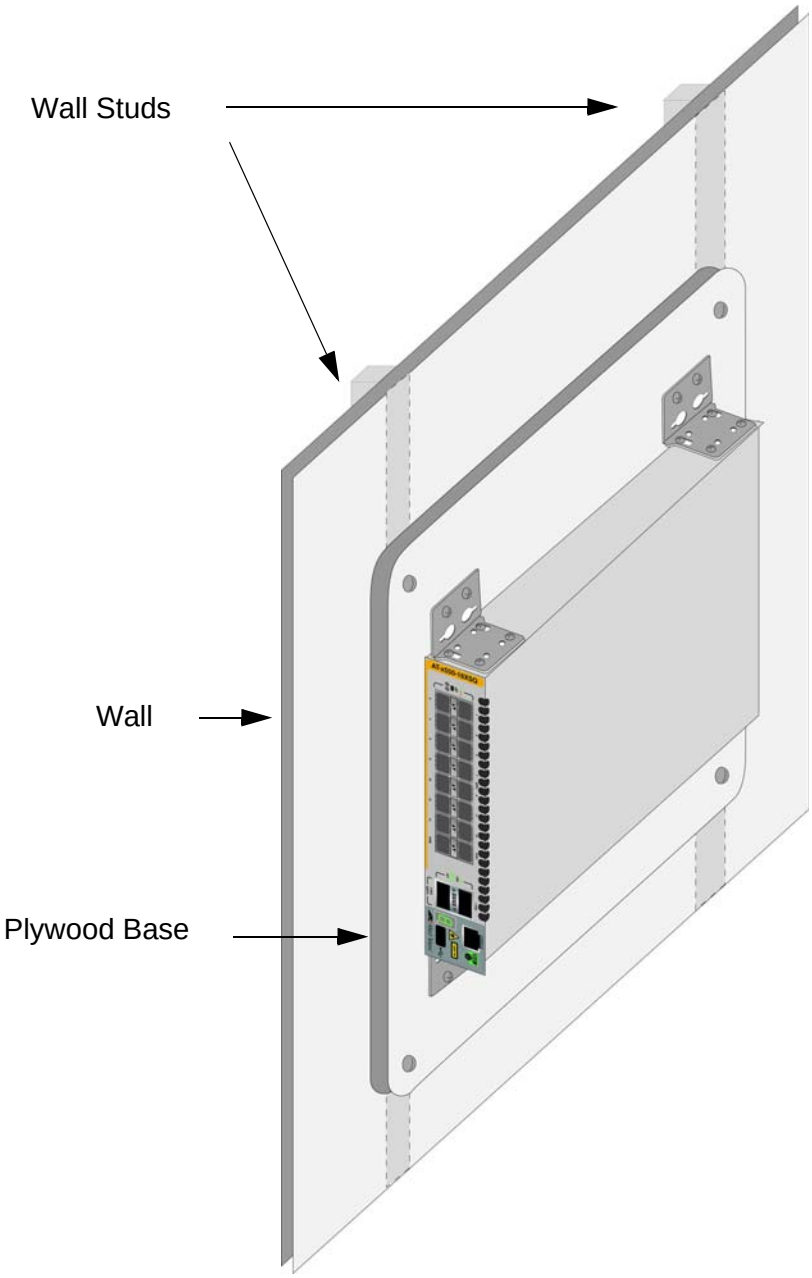


Figure 34. Switch on the Wall with a Plywood Base

The plywood base allows you to mount the switch on two wall studs. The standard distance between two studs in a wall is 41 centimeters (16

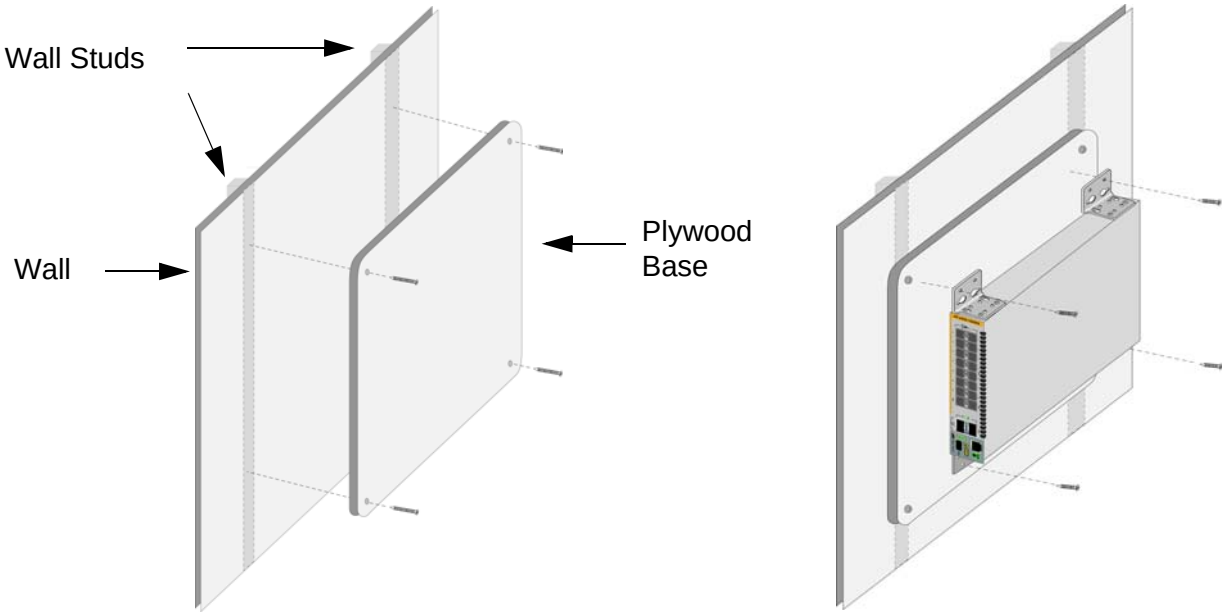
inches) while the distance between the front and rear brackets on the switch is 34.4 centimeters (13,6 inches). If you install the switch without the base, only two brackets on the switch would be on a wall stud.

The recommended minimum dimensions of the plywood base are listed here:

- Width: 55.9 centimeters (22 inches)
- Height:35.6 centimeters (14 inches)
- Thickness: 5.1 centimeters (2 inches)

The dimensions assume the wall studs are 41 centimeters (16 inches) apart. You might need to adjust the width of the base if the distance between the studs in your wall is different than the industry standard.

You should install the plywood base on the wall and then install the switch on the base. Refer to Figure 35.



Step 1: Install the plywood base on the wall.

Step 2: Install the switch on the plywood base.

Figure 35. Steps to Installing the Switch with a Plywood Base

Installing a Plywood Base

A plywood base is recommended when installing the switch on a wall that has wooden studs. Refer to “Plywood Base for a Wall with Wooden Studs” on page 75. Consult a qualified building contractor for installation instructions for the plywood base. The installation guidelines are listed here:

- You should use a stud finder to identify the middle of studs and hot electrical wiring in the wall.
- You should attach the base to two wall studs with a minimum of four screws.
- The selected wall location for the base should provide sufficient space from other devices or walls so that you can access the front and back panels.

Installing the Switch on a Plywood Base

This procedure assumes that the plywood base for the switch is already installed on the wall. Please review “Reviewing Safety Precautions” on page 46 and “Choosing a Site for the Switch” on page 50 before performing this procedure. Allied Telesis recommends a minimum of two people for this procedure.

Warning
The device is heavy. Always ask for assistance before moving or lifting it to avoid injuring yourself or damaging the equipment.

Warning
The device should be installed on the wall by a qualified building contractor. Serious injury to yourself or others or damage to the equipment may result if it is not properly fastened to the wall. E105

To install the switch on the plywood base, perform the following procedure:

1. Place the switch in a table.
2. Install the four wall brackets to the sides of the unit, with the sixteen M4x6mm screws included with the switch. Refer to Figure 36 on page 79.

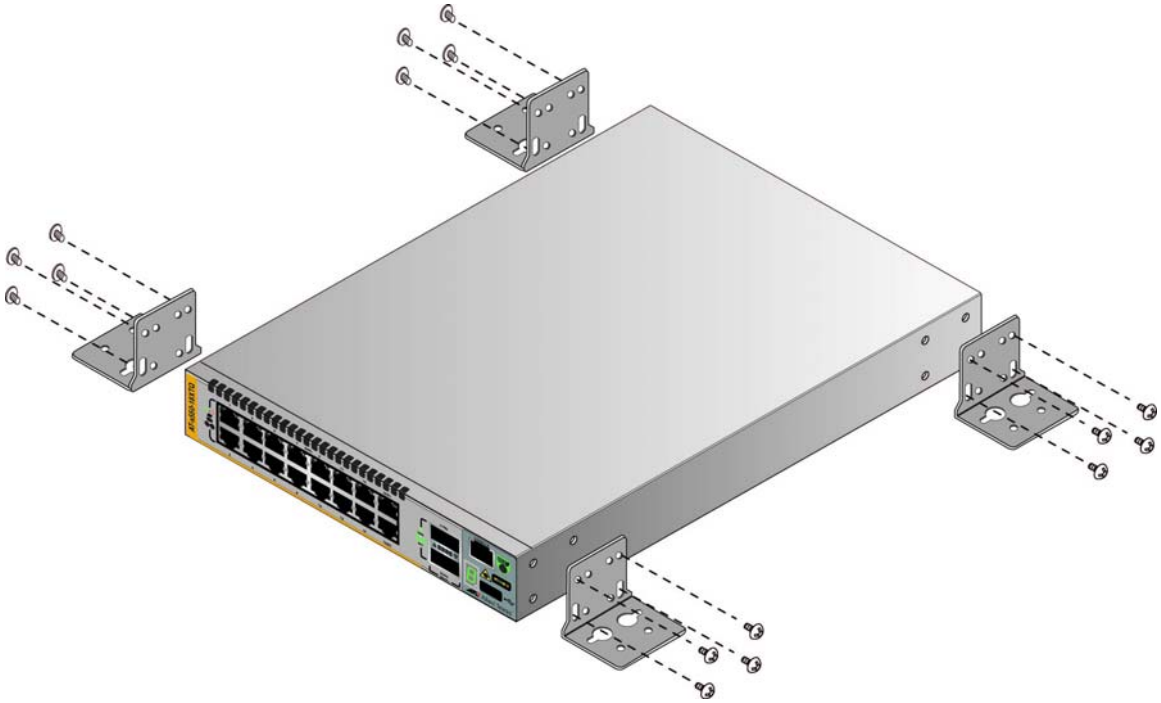


Figure 36. Installing the Wall Brackets

3. After attaching the brackets to the side of the switch, have another person hold the switch on the plywood base on the wall while you secure it with the four M4x32.3mm screws included with the switch. Refer to Figure 37 on page 80.

   Please follow these guidelines as you position the switch on the wall:

   - ❒ Position the switch so that the front panel is either on the left or right. Refer to Figure 36. You may not install the switch with the front panel facing up or down.
   - ❒ Leave sufficient space from other devices or walls so that you can access the front and back panels.

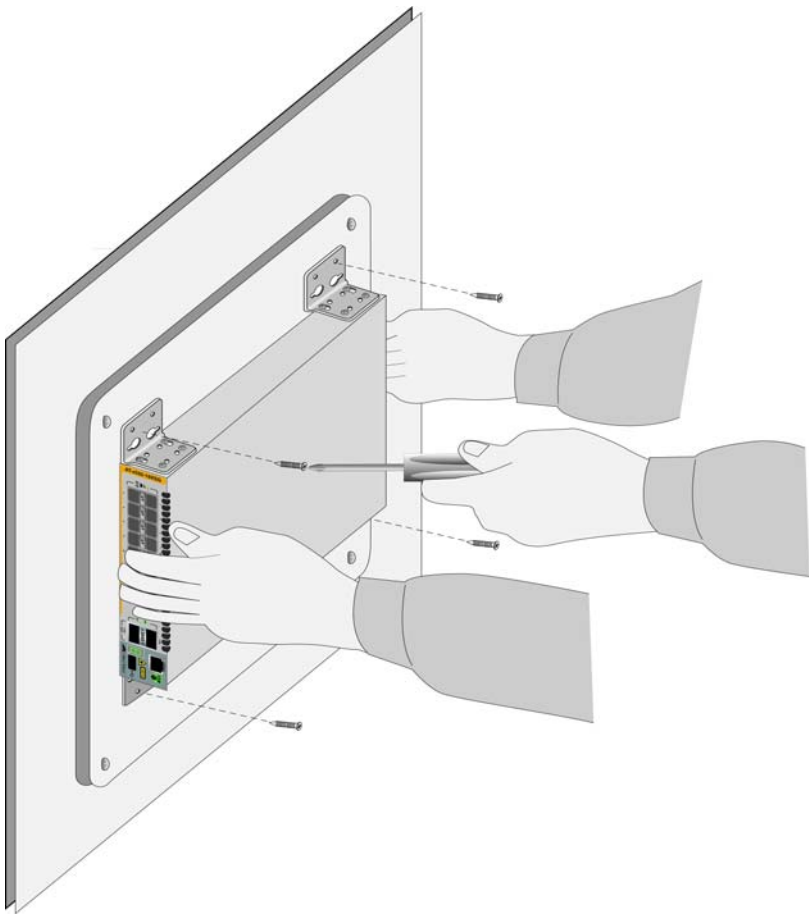


Figure 37. Securing the Switch to the Plywood Base

4. Go to Chapter 6, “Verifying the Status of the Switches” on page 85.

Installing the Switch on a Concrete Wall

This section contains the instructions for installing the switch on a concrete wall. Please review the information in the following sections before performing the procedure:

- “Switch Orientations on a Wall” on page 72
- “Installation Guidelines” on page 73

Warning
The device is heavy. Always ask for assistance before moving or lifting it to avoid injuring yourself or damaging the equipment.

Warning
The device should be installed on a wall by a qualified building contractor. Serious injury to yourself or others or damage to the equipment may result if it is not properly fastened to the wall. E105

To install the switch on a concrete wall, perform the following procedure:

1. Place the switch in a table.
2. Install the four AT-BRKT-J24 wall brackets to the sides of the unit with the eight M4x6mm screws that come with the switch.
3. Have another people hold the switch on the concrete wall at the selected location for the device while you use a pencil or pen to mark the wall with the locations of the four screw holes in the four brackets (one screw per bracket). Refer to Figure 38 on page 82.

   Please follow these guidelines as you position the switch on the wall:

   - Position the switch so that the front panel is either on the left or the right. Refer to Figure 33 on page 72. You may not install the switch with the front panel facing up or down.
   - Leave sufficient space from other devices or walls so that you can access the front and back panels.

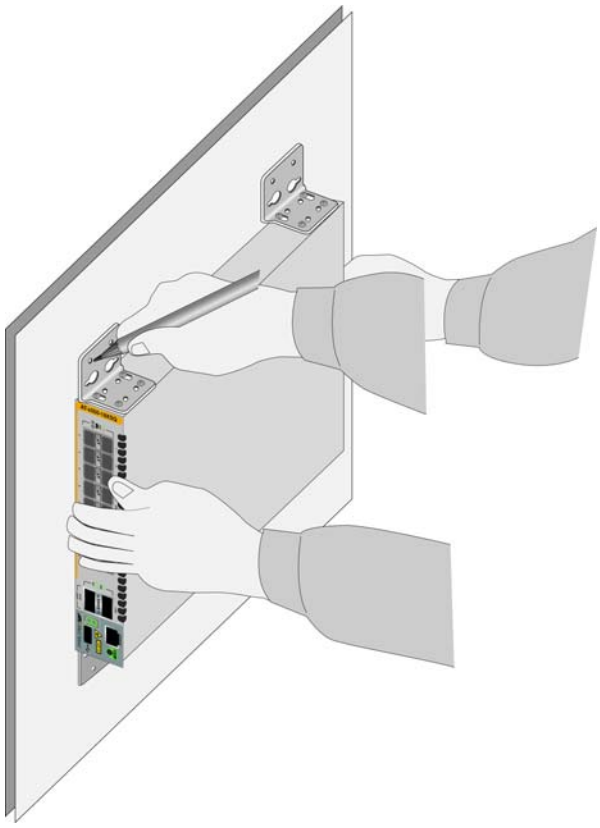


Figure 38. Marking the Locations of the Bracket Holes on a Concrete Wall

4. Place the switch on a table or desk.

5. Use a drill and 1/4” carbide drill bit to pre-drill the four holes you marked in step 3. Please review the following guidelines:

   - ❒ Prior to drilling, set the drill to hammer and rotation mode. The modes break up the concrete and clean out the hole.
   - ❒ Allied Telesis recommends cleaning out the holes with a brush or compressed air.

6. Insert the four anchors into the holes.

7. Have another person hold the switch at the selected wall location while you secure it to the wall with the four M4x32mm provided screws. Refer to Figure 39 on page 83.

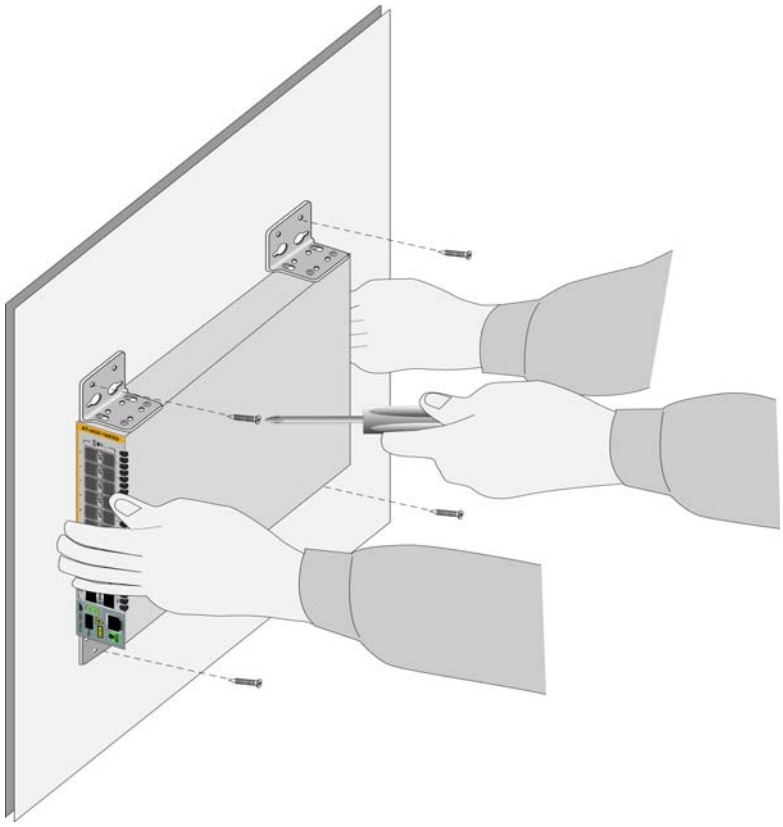


Figure 39. Installing the Switch on a Concrete Wall

8. Go to Chapter 6, “Verifying the Status of the Switches” on page 85.

Chapter 6

Verifying the Status of the Switches

The procedures in this chapter are listed here:

Introduction

This chapter contains several procedures you might want to perform on the switches before you connect them with the stack trunk. The procedures are listed here:

- "Verifying the Status of the VCStack Feature" on page 87 - Before building a stack, you should check the status of the VCStack feature on the switches. It is easy to do. You power on the switches and watch the ID LEDs. The LED displays a number of 1 to 8 when the feature is enabled or 0 when it is disabled. The default setting for the feature is enabled and the default ID number is 1.
- "Starting a Local Management Session" on page 91 - The procedure in this section explains how to start a local management session on a switch, using the Console port. You can perform this procedure to enable the VCStack feature on switches where the feature is disabled or to compare the version numbers of the management software and option feature licenses on the switches.
- "Enabling the VCStack Feature" on page 93- The procedure in this section explains how to enable the VCStack feature on switches where the feature is disabled. You probably will not need to perform this procedure because the default setting for the feature is enabled.
- "Comparing the AlliedWare Plus Version Numbers and Feature Licenses" on page 95 - This procedure is optional, but you may find the information it provides about the switches useful prior to building the stack. It explains how to determine whether the two switches have the same version of the management software and the same optional feature licenses.

Verifying the Status of the VCStack Feature

Before cabling the QSFP+ transceivers you should test the switches to determine whether the VCStack feature is enabled or disabled, and enable it on any units where it is disabled. The default setting for the feature is enabled, so the feature should already be activated on new switches. But on switches that were previously used as stand-alone units, the feature is probably disabled and needs to be enabled.

Testing the status of VCStack is simple. You power on a switch, wait two minutes, and examine the ID LED. If it is displaying a number from 1 to 8, VCStack is already enabled on a switch. If the LED displays the number 0, the feature is disabled and needs to be enabled. The default ID number is 1.

Before powering on the switch, review the information in “Power Specifications” on page 132 for the power specifications of the switches.

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. E3

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

To power on the switch, perform the following procedure:

1. Install the power cord retaining clip on the AC power connector on the rear panel of the switch. Refer to Figure 40.

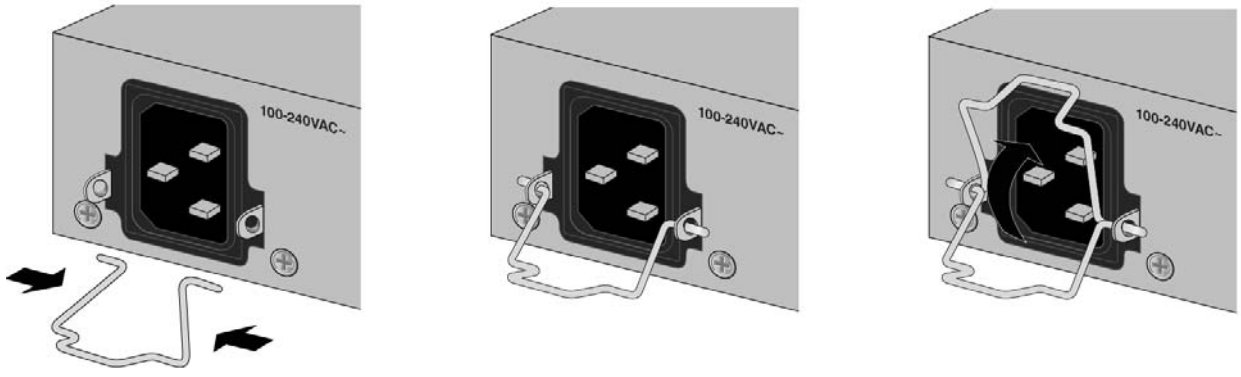


Figure 40. Installing the Power Cord Retaining Clip

2. Connect the AC power cord to the AC power connector on the rear panel of the switch. Refer to Figure 41.

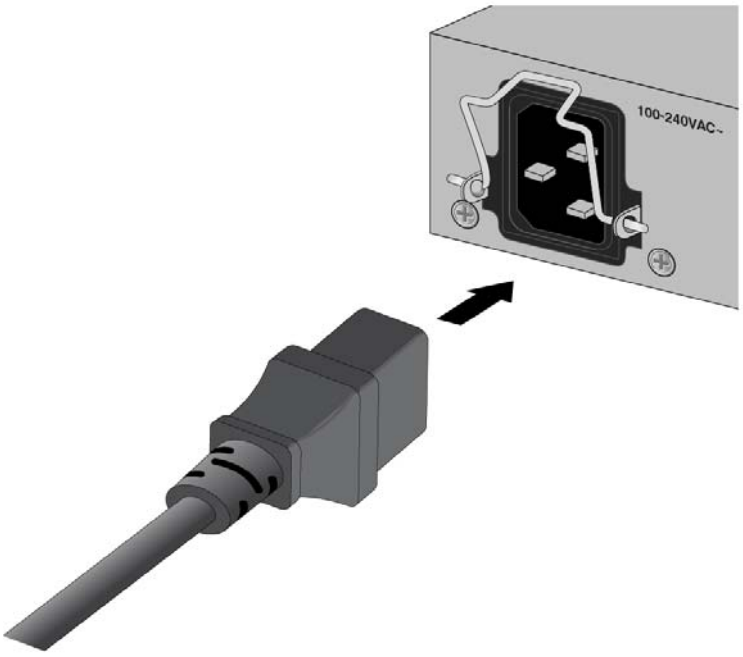


Figure 41. Connecting the AC Power Cord to the Switch

3. Lower the power cord retaining clip to secure the cord to the switch. Refer to Figure 42.

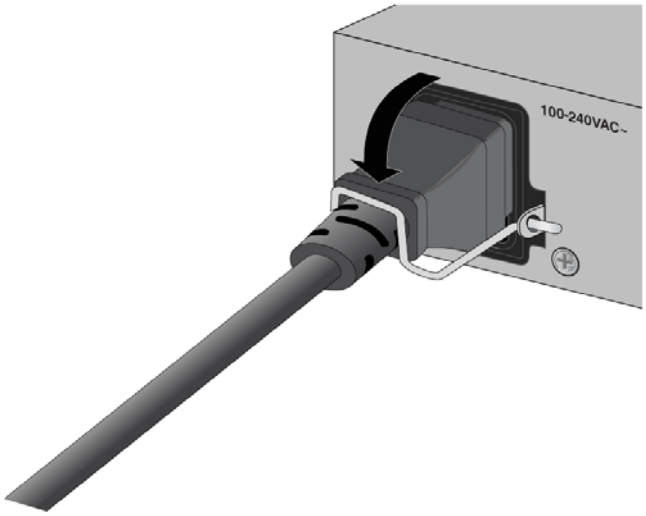


Figure 42. Lowering the Power Cord Retaining Clip

4. Connect the power cord to an appropriate AC power source. Refer to Figure 43.

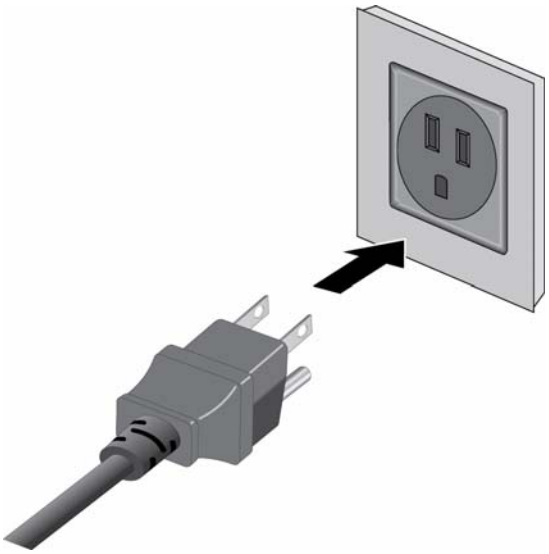


Figure 43. Connecting the Power Cord to an AC Power Source

Note
The illustration shows a North American power cord. Your power cord may be different.

5. Wait two minutes for the switch to initialize its management software.
6. View the ID LED and do one of the following:
   - ❒ If the ID LED is displaying a number from 1 to 8 (1 is the default), VCStack is already enabled on the switch. Continue with the next step.
   - ❒ If the ID LED is displaying “0,” the VCStack feature is disabled on the switch. Perform the procedures “Starting a Local Management Session” on page 91 and “Enabling the VCStack Feature” on page 93 to enable it.
7. Power off the switch by disconnecting the power cord from the power source. Refer to Figure 44 on page 90.

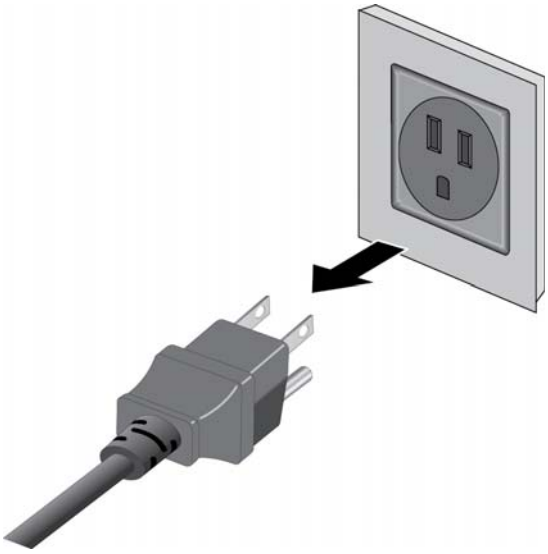


Figure 44. Disconnecting the Power Cord from an AC Power Source

8. Repeat this procedure on the second switch.

9. Once you have confirmed that the VCStack feature is enabled on both switches of the stack, do one of the following:

   - If you want to confirm that the switches have the same version of management software and feature licenses, go to “Starting a Local Management Session” on page 91 and then “Comparing the AlliedWare Plus Version Numbers and Feature Licenses” on page 95.
   - Otherwise, go to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.

Starting a Local Management Session

To start a local management session on the switch, perform the following procedure:

1. Connect the RJ-45 connector on the management cable to the Console port on the front panel of the switch, as shown in Figure 45.

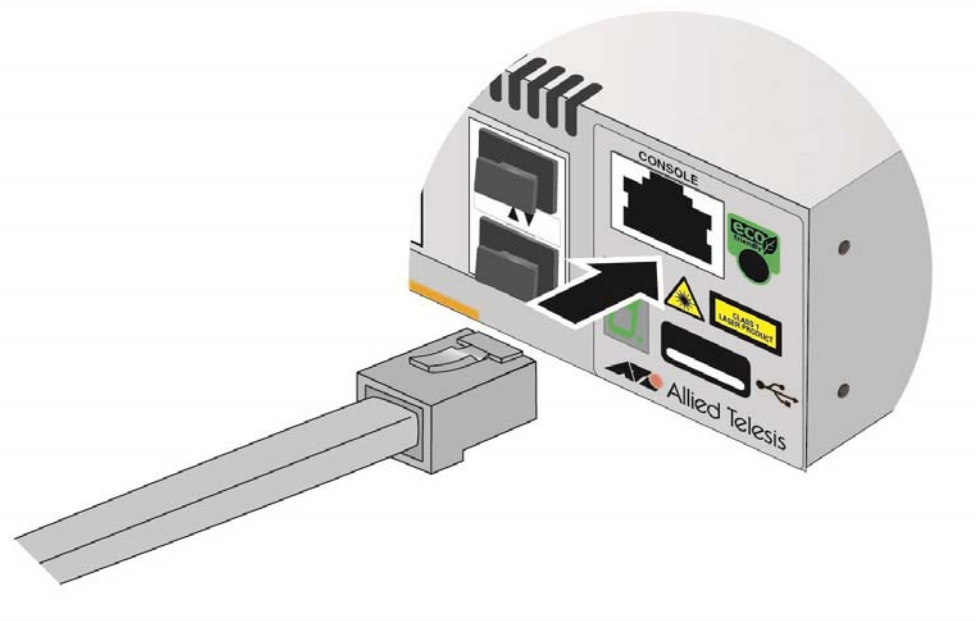


Figure 45. Connecting the Management Cable to the Console Port

2. Connect the other end of the cable to an RS-232 port on a terminal or PC with a terminal emulator program.
3. Configure the terminal or terminal emulator program as follows:
   - ❒ Baud rate: 9600 bps (The baud rate of the Console Port is adjustable from 1200 to 115200 bps. The default is 9600 bps.)
   - ❒ Data bits: 8
   - ❒ Parity: None
   - ❒ Stop bits: 1
   - ❒ Flow control: None

   Note
   The port settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulator program.

4. Press Enter.

You are prompted for a user name and password.

5. If this is the initial management session of the switch, enter “manager” as the user name and “friend” as the password. The user name and password are case sensitive.

   The local management session starts when the User Exec mode prompt, shown in Figure 46. is displayed.

```
awplus>
```

Figure 46. User Exec Mode Prompt

   The User Exec mode is the first level in the command mode interface. For complete information on the modes and commands, refer to the *Software Reference for x550 Series Switches, AlliedWare Plus Operating System*.

6. Do one of the following:

   - If you need to enable the VCStack feature on the switch, perform the procedure in “Enabling the VCStack Feature” on page 93.
   - If you want to confirm that this switch has the same version of management software and feature licenses as the other switch, go to “Comparing the AlliedWare Plus Version Numbers and Feature Licenses” on page 95.
   - Otherwise, go to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99

Enabling the VCStack Feature

If the switch is displaying the number “0” on its ID LED, the VCStack feature is disabled and needs to be enabled. To enable the VCStack feature from the local management session, perform the following procedure:

1. Start a local or remote management session on the switch. For instructions on how to start a local management session, refer to “Starting a Local Management Session” on page 91.

2. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode, as shown in Figure 47.

```
awplus> enable
awplus#
```

Figure 47. Moving to the Privileged Exec Mode with the ENABLE Command

3. Enter the CONFIGURE TERMINAL command to move to the Global Configuration mode, as shown in Figure 48.

```
awplus# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
awplus(config)#
```

Figure 48. Moving to the Global Configuration Mode with the CONFIGURE TERMINAL Command

4. Enter the STACK ENABLE command to activate VCStack on the switch, as shown in Figure 49:

```
awplus(config)# stack enable
% The device needs to be restarted for this change to take effect.
awplus(config)#
```

Figure 49. Activating VCStack with the STACK ENABLE Command

5. Enter the EXIT command to return to the Privileged Exec mode, as shown in Figure 50.

```
awplus(config)# exit
awplus#
```

Figure 50. Returning to the Privileged Exec Mode with the EXIT Command

6. Enter the WRITE command to save your change, as shown in Figure 51.

```
awplus# write
Building configuration ...
[OK]
awplus#
```

Figure 51. Saving the Change with the WRITE Command

Note
If this is the initial management session of the switch, the WRITE command automatically creates in flash memory a new configuration file called DEFAULT.CFG in which it stores your configuration change. You may change the name of the file or designate a different file after you create the stack.

7. Restart the switch with the REBOOT command, as shown in Figure 52.

```
awplus# reboot
reboot system? (y/n):
awplus#
```

Figure 52. Rebooting the Switch with the REBOOT Command

8. Type “Y” for yes.
9. Wait one minute for the switch to initialize its management software.
10. Check the ID LED and do one of the following:
    - If the ID LED is displaying a number from 1 to 8, VCStack is now enabled on the switch. Go to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.
    - If the ID LED is still displaying “0,” repeat this procedure. If the procedure was not successful, it might be because you did not issue the WRITE command in step 5 to save your change.

Comparing the AlliedWare Plus Version Numbers and Feature Licenses

This procedure is optional. It explains how to compare the following information about the two switches of the stack:

- AlliedWare Plus Version Number: The procedure explains how to view the version numbers of the AlliedWare Plus management software on the switches. This is important because when the switches of a stack are powered on or reset, the master switch compares the version number of its AlliedWare Plus management software with the software on the member switch. If the two units have different versions, it automatically downloads its management software to the member switch over the stack trunk, so that both switches have the same version. By determining ahead of time whether the two switches have different software versions, you can select the master switch of the stack to be the switch with the newer version of the operating system, thus avoiding the situation where a master switch with an older version of the management software replaces newer software on a member switch.
- Optional feature licenses: It is also a good idea to check whether the switches have optional Allied Telesis feature licenses. If one switch has an optional feature license and the other does not, the switches can still operate as a stack, but the additional features are only available on the switch with the license. To resolve the issue, you can add the license to the switch without it either before or after connecting the stacking cables.

To view the management software version numbers and optional feature licenses on the switches, perform the following procedure:

1. Start a local or remote management session on one of the switches to be in the stack. For instructions on how to start a local management session, refer to “Starting a Local Management Session” on page 91.

2. When prompted, enter the manager name and password to log on. The default values are “manager” and “friend”, respectively.

   The switch displays the Use Exec mode prompt, shown here:

```
awplus>
```

3. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode:

```
awplus> enable
awplus#
```

4. In the Privileged Exec mode, enter the SHOW SYSTEM command:

```
awplus# show system
```

Examine the command output for the lines in Figure 53.

```
Current software: x550-5.4.7A-20170417-1.rel
Software version : 5.4.7A-20170417-1
```

Figure 53. SHOW SYSTEM Command

5. Write down on paper the software version number on the switch.
6. In the Privileged Exec mode, enter the SHOW LICENSE BRIEF command:

```
awplus# show license brief
```

The command output has the following two sections:

- ❒ Feature licenses on stack member
- ❒ Release licenses on stack member

Figure 54 is an example of the feature licenses section.

```
Board region: Global

Feature licenses on stack member 1:

-------------------------------------------------------------------
Index License name        Quantity        Customer name
      Type                                Period
-------------------------------------------------------------------
1         Base License     -              Base License
          Full                            N/A
```

Figure 54. SHOW LICENSE BRIEF Command

7. Write down on paper the names of the feature licenses on the switch. The switch comes with the base license.
8. Repeat this procedure on the second switch. Afterwards, continue with the next step.
9. Compare their management software version numbers and do one of the following:
   - ❒ If they are both the same, go to the next step.
   - ❒ If they are different, mark the switch with the newer management software so that you can identify it. You will probably want that switch to be the initial master switch when you power on the stack for the first time. Then go to the next step.

10. Compare their feature licenses and do one of the following:

    - If the switches have the same feature licenses, go to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.
    - If they have different licenses, add or delete licenses from one or both switches so they have the same licenses. Afterwards, go to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.

Chapter 7

Installing the Stacking QSFP+ Transceivers

This chapter contains the following procedures:

Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers

This section contains the procedure for installing AT-QSFPSR4 or AT-QSFPLR4 transceivers in the QSFP+ slots 17 and 21.

Note
The cables of the stack trunk must crossover to different QSFP+ slots. The transceiver in slot 17 in one switch must connect to slot 21 in the other switch. For more information, refer to Figure 11 on page 40.

Please review “Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers” on page 119 before performing this procedure.

To build a stack trunk with AT-QSFPSR4 or AT-QSFPLR4 transceivers, perform the following procedure:

1. Remove the dust covers from QSFP+ slots 17 and 21 from one of the switches to be in the stack. Refer to Figure 55.
2. Slide the QSFP+ transceivers into the slots until they click into place.
3. Repeat steps 1 and 2 to install QSFP+ transceivers in the other switch in the stack.
4. Attach the fiber optic cables to the transceivers in both switches. When connecting the cables, remember that the cables must crossover to different slots. For more information, refer to Figure 11 on page 40.
5. Go to Chapter 8, “Powering On and Verifying the Stack” on page 105.

Note
To remove the connector and cable from the slot, gently push on the connector, pull on the release tab, and slide the connector from the slot.

Installing AT-QSFPCU Cables

This section contains instructions on how to build the stack trunk with AT-QSFPCU Cables. You can use the cables to build a stack trunk between two switches that are physically near each other, in the same or adjoining equipment racks. The model names of the cables are listed here:

- AT-QSFP1CU - 1 meter
- AT-QSFP3CU - 3 meters

Note
The cables of the stack trunk must crossover to different QSFP+ slots. The transceiver in slot 17 in one switch must connect to slot 21 in the other switch. For more information, refer to Figure 11 on page 40.

Please review “Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers” on page 119 before performing this procedure.

To build the stack trunk with AT-QSFPCU Cables, perform the following procedure:

1. Remove the dust cover from the QSFP+ slot 17 in one of the x550 Switches. Refer to Figure 55.

Figure 55. Removing the Dust Cover from Slot 17

2. Orient the connector on the AT-QSFPCU Cable with the release tab on top and slide it into the slot until it clicks into place. Refer to Figure 56 on page 102.

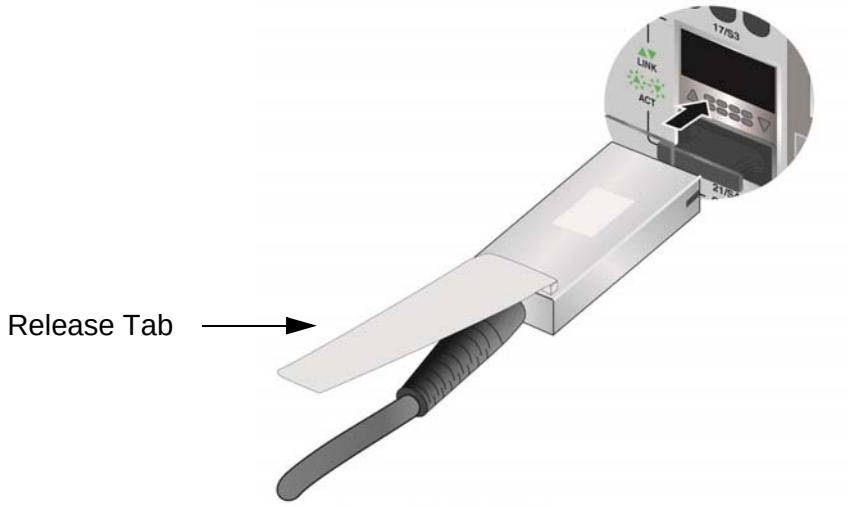


Figure 56. Sliding the AT-QSFPCU Cable into Slot 17

3. Remove the dust cover from slot 21 on the other x550 Switch to be in the stack. Refer to Figure 57.

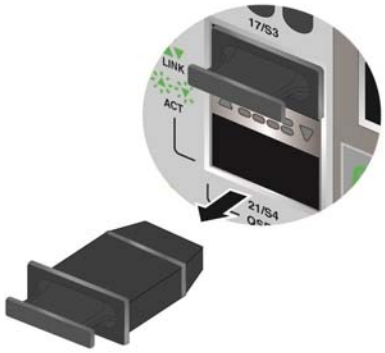


Figure 57. Removing the Dust Cover from Slot 21

4. Orient the transceiver with the release tab on the bottom and slid it into the QSFP+ slot until it clicks into place. Refer to Figure 58 on page 103.

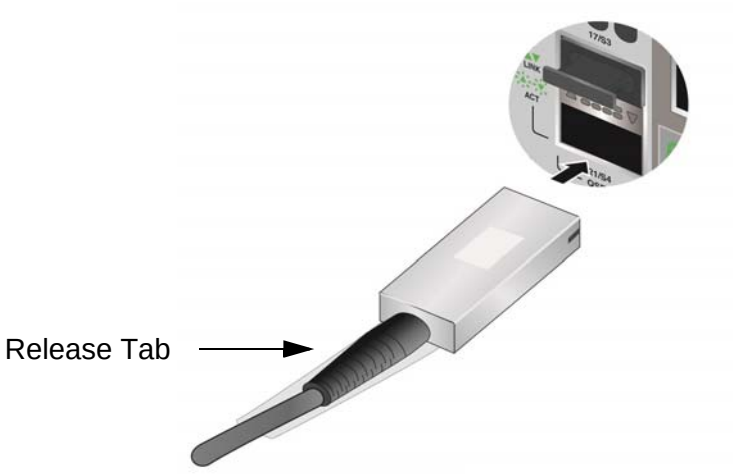


Figure 58. Installing the AT-QSFPCU Cable in Slot 21

5. Repeat this procedure to install the second cable in QSFP+ slots 21 and 17 in the two switches.

6. Go to Chapter 8, “Powering On and Verifying the Stack” on page 105.

Note
To remove the connector and cable from the slot, gently push on the connector, pull on the release tab, and slide the connector from the slot.

Chapter 8

Powering On and Verifying the Stack

This chapter contains the following procedures:

Perform “Powering On the Switches Sequentially” on page 106 if you want to control the assignment of the ID numbers to the switches of the stack. The numbers are assigned in the order in which you power on the units. Otherwise, perform “Powering On the Switches Simultaneously” on page 108 to have the switches assign the numbers automatically. After the ID numbers are assigned, you may change them with the STACK RENUMBER command, described in the *Software Reference for x550 Series Switches, AlliedWare Plus Operating System*.

Caution

You should not change the ID numbers of the switches after configuring the parameter settings. Otherwise, the stack might assign configuration settings to the wrong units. E79

Powering On the Switches Sequentially

This procedure explains how to control the assignment of the ID numbers of the switches by powering on the units one at a time, during the initial power-on sequence. The first switch powered on is assigned the ID number 1 and the second unit is given the ID number 2. Once the ID numbers are assigned, the switches retain them even when you power off or reset the stack.

Powering on the switches in sequence can be useful in the following situations:

- You want a switch to retain its stand-alone configuration when it becomes part of a stack. This is useful if you are building a stack where one switch is already operating as a stand-alone unit in your network. If you power on that switch first, it is assigned the ID number 1 and retains its configuration. This saves you from having to reconfigure its parameter settings once it becomes part of the stack.
- If the switches are installed in the same equipment rack, you can number them in sequence, such as from top to bottom, to make them easier to identify.

The first switch to be powered on during the initial power-on sequence becomes the master switch of the stack. However, if you do not change the priority values of the units, the next time you reset or power cycle the stack the units use their MAC addresses to select the master switch. This might result in a different switch being assigned that role. However, this does not affect their ID numbers, the configuration of the switches, or the manner in which you manage the stack.

This procedure assumes the following:

- This is the initial power-on sequence of the stack.
- You verified that VCStack is enabled on the switches, as explained in Chapter 6, “Verifying the Status of the Switches” on page 85.
- The switches are stacked together with QSFP+ transceivers in slots 17 and 21. For instructions, refer to Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.
- The ID numbers are set to the default 1.
- All the switches are powered off.

If you want to monitor the power on sequence, you may connect a terminal or PC with a terminal emulator program to the Console port on the switch you intend to power on first. The messages are found in “Monitoring the Initialization Processes” on page 113.

To power on the switches, perform the following procedure:

1. Power on the switch you want assigned ID number 1.

   Connect the power cord to an appropriate AC power source. Refer to Figure 43 on page 89.

   Refer to “Power Specifications” on page 132 for the power specifications of the switches.

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. E3

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

2. Wait two minutes for the switch to initialize its management software.

   The switch should now be displaying the number 1 on its ID LED.

3. Power on the second switch.

4. Wait four minutes for the new switch to join the stack as a member.

   As the new switch boots up, the first switch, which has the ID number 1 and at this point is the master switch of the stack, notifies the new switch that its current ID number is already being used and that it should change its number to the next available number, which is 2. The new switch automatically changes its ID number to 2 and reboots. So the new switch is booting up twice, once with the ID number 1 and again with its new ID number 2, which is why it takes four minutes before the device becomes a full member of the stack.

   The stack is operational after the second switch displays the ID number 2 on its Switch ID LED. The switches automatically store their ID numbers in special files in the flash memories and retain them even when you reset or power cycle the devices.

5. To continue with the installation, go to “Verifying the Stack” on page 110.

Powering On the Switches Simultaneously

If, during the initial power-on sequence of the stack, you want the switches to automatically assign the ID numbers themselves using their MAC addresses, you can power them on simultaneously. Here are the steps the switches perform:

- ❒ They initialize their management software and compare their MAC addresses.
- ❒ The switch with the lowest address is designated as the master switch of the stack.
- ❒ The master switch assigns itself the ID number 1.
- ❒ The master switch assigns the ID number 2 to the other switch, which becomes a member switch of the stack.
- ❒ The member switch resets and initialize its management software again, with its new ID number 2.

The process takes about four minutes. This procedure assumes the following:

- ❒ This is the initial power-on sequence of the stack.
- ❒ You verified that VCStack is enabled on the switches, as explained in Chapter 6, “Verifying the Status of the Switches” on page 85.
- ❒ You connected the QSFP+ transceivers in slots 17 and 21 of the switches, as explained in Chapter 7, “Installing the Stacking QSFP+ Transceivers” on page 99.
- ❒ The switches are powered off.

If you want to monitor the power on sequence, you may connect a terminal or PC with a terminal emulator program to the Console port on either of the switches. The messages are found in “Monitoring the Initialization Processes” on page 113.

To have the switches automatically assign the ID numbers, perform the following procedure:

1. Power on both the switches of the stack at the same time.

   Connect the power cords to appropriate power sources. Refer to Figure 43 on page 89.

   Refer to “Power Specifications” on page 132 for the power specifications of the switches.

Warning
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. E3

Note
Pluggable Equipment. The socket outlet shall be installed near the equipment and shall be easily accessible. E5

2. Wait four minutes for the switches to select a master switch and to assign the ID numbers.

   At this point, the stack is operational. The ID numbers are automatically stored in special files in the flash memories of the switches and are retained by the devices even if you reset or power cycle the stack.

3. To continue with the installation, go to “Verifying the Stack” on page 110.

Verifying the Stack

To verify the operations of the stack, perform the following procedure:

1. Establish a local management session using the Console port on either switch in the stack. For instructions, refer to “Starting a Local Management Session” on page 91.

2. From the User Exec mode, enter the SHOW STACK command:

```
awplus> show stack
```

   The command lists the switches in the stack. An example is shown in Figure 59.

```
awplus> show stack
Virtual Chassis Stacking summary information
ID    Pending ID     MAC address       Priority   Status   Role
1     -              e01a:ea20:8011    128        Ready    Active Master
2     -              e01a:ea20:8012    128        Ready    Member
Operational Status                     Normal operations
Stack MAC address    0015:774f:ed30
awplus(config)#
```

Figure 59. SHOW STACK Command

Please review the following items:

- The command should list both switches in the stack. If the list is incomplete, refer to Chapter 10, “Troubleshooting” on page 125.
- The Operational Status field should be displaying “Normal operations,” which indicates the stacking ports are operating normally.
- If the Operational Status field is displaying “Not all stack ports are up,” the master switch has determined that one or more QSFP+ stacking ports are not being used or cannot establish links with their counterparts. For more information, refer to Chapter 10, “Troubleshooting” on page 125.
- The priority values will be 128, the default value, if they have not been changed on the switches.
- The active master in the SHOW STACK command can be either switch. It does not have to be the switch with ID number 1. For more information, refer to “Master and Member Switches” on page 41.

3. Do one of the following:

   - If you want to change the priority values of the switches, go to "Setting the Priority Numbers" on page 111. The procedure is optional.
   - Otherwise, go to Chapter 9, "Cabling the Networking Ports" on page 117, to continue with the installation.

Setting the Priority Numbers

This procedure is optional. It explains how to configure the priority settings of the switches. The switches use the priority settings to select the master switch when you reset or powered the stack. For background information, refer to "Master and Member Switches" on page 41.

This procedure assumes you are continuing directly on from the previous procedure. To set the priority values of the switches, perform the following procedure:

1. Use the CONFIGURE TERMINAL command to move from the Privileged Exec mode to the Global Configuration mode. Refer to Figure 60.

```
awplus# configure terminal
Enter configuration commands, one per line. End with CNTL/Z.
awplus(config)#
```

Figure 60. Moving to the Global Configuration Mode with the CONFIGURE TERMINAL Command

2. Use the STACK PRIORITY command to set the priority numbers. The command has this format:

```
stack ID_number priority priority
```

   The ID_NUMBER parameter is the ID number of the switch whose priority value you are setting. The range is 1 to 4. The PRIORITY parameter is the new priority value for the switch. The range is 0 to 255. The default is 128.

   Here are a couple examples. To assign the priority value 1 to the switch with the ID number 1, you enter this command:

```
awplus(config)# stack 1 priority 1
```

   To set the priority value to 2 on the switch with the ID number 2, you enter:

```
awplus(config)# stack 2 priority 2
```

3. After setting the priority values, enter the EXIT command to return to the Privileged Exec mode, as shown in Figure 61.

```
awplus(config)# exit
awplus#
```

Figure 61. Returning to the Privileged Exec Mode

4. Enter the WRITE command to save your change in the configuration file. The switch displays the confirmation prompt in Figure 62.

```
awplus# write
Building configuration ...
[OK]
awplus#
```

Figure 62. Saving the Priority Values with the WRITE Command

5. To end the management session, enter the EXIT command.

6. Go to Chapter 9, “Cabling the Networking Ports” on page 117, to continue with the installation.

Monitoring the Initialization Processes

You may monitor the initialization sequence of the stack by connecting a terminal or computer that has a terminal emulator program to the Console port on either switch in the stack. You will see the messages in Figure 63 here to Figure 65 on page 115.

```
Bootloader 6.2.1 loaded
Press <Ctrl+B> for the Boot Menu
Loading flash:x550-cap_x550-20170315-1.rel...
Verifying release... OK
Booting...
Uncompressing Linux... done, booting the kernel
Starting base/first...                                  [  OK  ]
Mounting virtual filesystems...                         [  OK  ]
          _______________   ____
        /\ \             / /______\
      /   \ \_       __/ /| _______ |
    /      \ |     |  /  | _______ |
  /         \ \   / /     \ ____ /
/______/\____\ \/ /_____________/

Allied Telesis Inc.
AlliedWare Plus (TM) v0.0.0
Current release filename: x550-cap_20170315-1.rel
Built: Tue Mar 14 23:31:58 UTC 2017
Mounting static filesystems...                          [  OK  ]
Attaching to /dev/mtd0...                               [  OK  ]
Checking flash filesystem...                            [  OK  ]
Mounting file system...                                 [  OK  ]
Checking for last gasp debug output...                  [  OK  ]
Checking NVS filesystem...                              [  OK  ]
Mounting NVS filesystem...                              [  OK  ]
Initializing random number generator...                 [  OK  ]
Starting base/arm_sysctl...                             [  OK  ]
Starting base/dbus...                                   [  OK  ]
```

Figure 63. Switch Initialization Messages

```
Starting base/syslog...                                    [  OK  ]
Starting base/loopback...                                  [  OK  ]
Starting base/poe_done...                                  [  OK  ]
Starting base/sysctl...                                    [  OK  ]
Received event poefw.done
Starting base/portmapper...                                [  OK  ]
Received event syslog.done
Starting base/modules...                                   [  OK  ]
Received event modules.done
Starting base/reboot-stability...                          [  OK  ]
Checking system reboot stability...                        [  OK  ]
Starting base/apteryx...                                   [  OK  ]
Starting base/crond...                                     [  OK  ]
Starting base/appmond...                                   [  OK  ]
Starting base/clockcheck...                                [  OK  ]
Starting hardware/timeout...                               [  OK  ]
Starting base/inet...                                      [  OK  ]
Received event apteryx.done
Starting base/alfred...                                    [  OK  ]
Starting base/kernond...                                   [  OK  ]
Starting base/plugman...                                   [  OK  ]
Starting base/apteryx-sync...                              [  OK  ]
Starting base/openhpi...                                   [  OK  ]
Received event apteryx-sync.done
00:47:23 awplus Pluggable[430]: Pluggable DM-317-100 Inserted into
port1.0.17
00:47:23 awplus Pluggable[430]: Pluggable DM-317-100 Inserted into
port1.0.21
Received event board.inserted
Starting hardware/hardware-done...                         [  OK  ]
Received event hardware.done
Starting network/startup...                                [  OK  ]
Starting base/external-media...                            [  OK  ]
Received event hostcfg.done
Starting network/stackd...                                 [  OK  ]
Starting network/election.timeout...                       [  OK  ]
Received event network.enabled
```

Figure 64. Switch Initialization Messages (Continued)

```
Initializing HA processes:
atmfd_agentd, hostd, atmfd, auth, cntrd, hsl, imi
imiproxyd, irdpd, lacp, lldpd, loopprot, nsm, ospf6d
pdmd, pim6d, ripd, ripngd, rmon, sflowd, udldd
vrrpd, bgpd, epsr, mstp, ospfd, pimd
Received event network.initialized

00:50:36 awplus-1 VCS[627]: Member 2 (e01a.ea20.80de) has joined the stack
00:50:36 awplus-1 VCS[627]: Please configure stack ‘virtual-mac’ to minimize
network disruption from failovers.
00:50:36 awplus-1 VCS[627]: Member 1 (e01a.ea20.80dd) has become the Active
Master
Received event vcs.elected-master
Assigning Active Workload to HA processes:
hsl, authd, epsrd, irdpd, lacpd, lldpd, loopprotd
mstpd, nsm, rmond, sflowd, vrrpd, imi, imiproxyd

Received event network.activated

Loading default configuration
Warning: flash:/default.cfg does not exist, loading factory defaults.
..
done!
Received event network.configured

awplus login:
```

Figure 65. Switch Initialization Messages (Continued)

Specifying Ports in the Command Line Interface for Stacks

The individual ports on the switches in a stack are specified in the command line interface with the PORT parameter. The format of the parameter is shown in Figure 66.

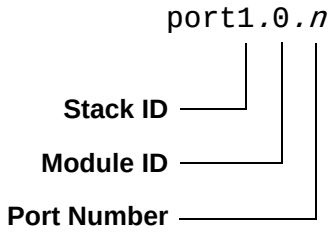


Figure 66. PORT Parameter in the Command Line Interface

The three parts of the PORT parameter are described in Table 7.

Table 7. PORT Parameter Format

Number	Description
Stack ID	Designates the switch's ID number. The number is either 1 or 2. To determine the ID number of a switch, examine its Switch ID LED.
Module ID	Designates the module number of a port. The x550 Series switches do not have modules, Consequently, this value is always 0 (zero).
Port Number	Designates a port number.

Here is an example of the PORT parameter on a switch in a stack. It uses the INTERFACE command to enter the Port Interface mode for ports 15 and 17 on the front panel of the switch with the ID number 2:

```
awplus> enable
awplus# configure terminal
awplus(config)# interface port2.0.15,port2.0.17
```

For instructions on the command line interface and the PORT parameter, refer to the *Software Reference for x550 Series Switches, AlliedWare Plus Operating System*.

Chapter 9

Cabling the Networking Ports

This chapter contains the following procedures:

Cabling the 1Gbps/10Gbps Ports on the AT-x550-18XTQ Switch

Here are guidelines to cabling the 1Gbps/10Gbps twisted pair ports on the AT-x550-18XTQ Switch:

- The cable specifications for the ports are listed in Table 2 on page 22.
- The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Aut-Negotiation.
- The ports must be set to Auto-Negotiation, the default setting, to operate at 1Gbps.
- The ports support full-duplex only.
- Do not attach cables to ports of static or LACP port trunks until after you configure the trunks on the switch. Otherwise, the ports will form network loops that can adversely affect network performance.

Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers

Please review the following guidelines before installing SFP, SFP+, or QSFP+ transceivers in the switches:

- The transceivers are hot-swappable. You can install them while the switch is powered on.
- For a list of supported transceivers, refer to the product data sheet on the Allied Telesis web site.
- The operational specifications and fiber optic cable requirements of the transceivers are provided in the documents included with the devices.
- You should install a transceiver before connecting its fiber optic cable.
- Fiber optic transceivers are dust sensitive. Always keep the plug in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove the plug, keep it for future use.
- Unnecessary removal and insertion of a transceiver can lead to premature failure.

Caution
Transceivers can be damaged by static electricity. Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the devices. E92

Note
QSFP+ transceiver slots 17 and 21 are initially configured as stacking slots for the VCStack feature. If you are using the switch as a stand-alone unit, you can use the slots and QSP+ transceivers as regular networking ports by disabling the VCStack feature. For instructions, refer to the *x550 Series Installation Guide for Stand-alone Switches*.

Installing 1Gbps SFP or 10Gbps SFP+ Transceivers in the AT-x550-18XSQ Switch

This section contains the instructions for installing 1Gbps SFP or 10Gbps SFP+ transceivers in slots 1 to 16 in the AT-x550-18XSQ Switch.

The illustrations show a transceiver with a duplex LC connector. The connectors on your transceivers may be different.

To install transceivers, perform the following procedure:

1. Remove the dust plug from a transceiver slot on the switch. Refer to Figure 67.

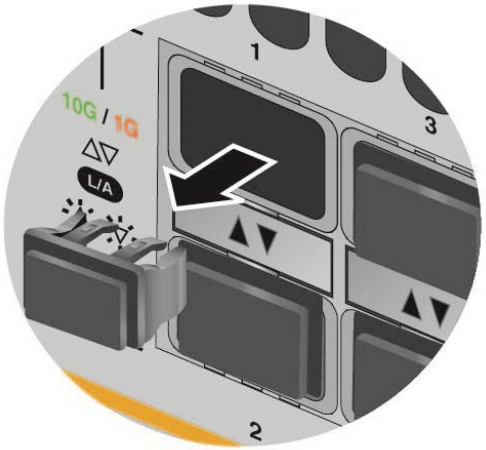


Figure 67. Removing the Dust Plug from an SFP Slot

2. Remove the transceiver from its shipping container and store the packaging material in a safe location.
3. If you are installing the transceiver in a top slot, position the transceiver with the Allied Telesis label facing up. If you are installing the transceiver in a bottom slot, position the transceiver with the label facing down.
4. Slide the transceiver into the slot until it clicks into place. Refer to Figure 68 on page 121.

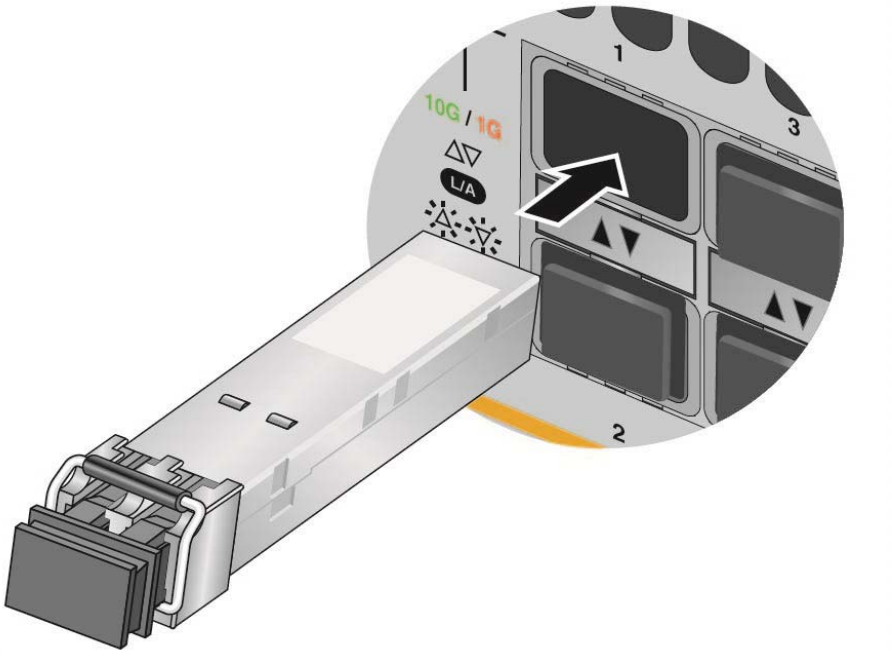


Figure 68. Installing an SFP Transceiver

Note
If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 4 to install the remaining transceivers in the switch.

5. Remove the dust cover from the transceiver, as shown in Figure 69.

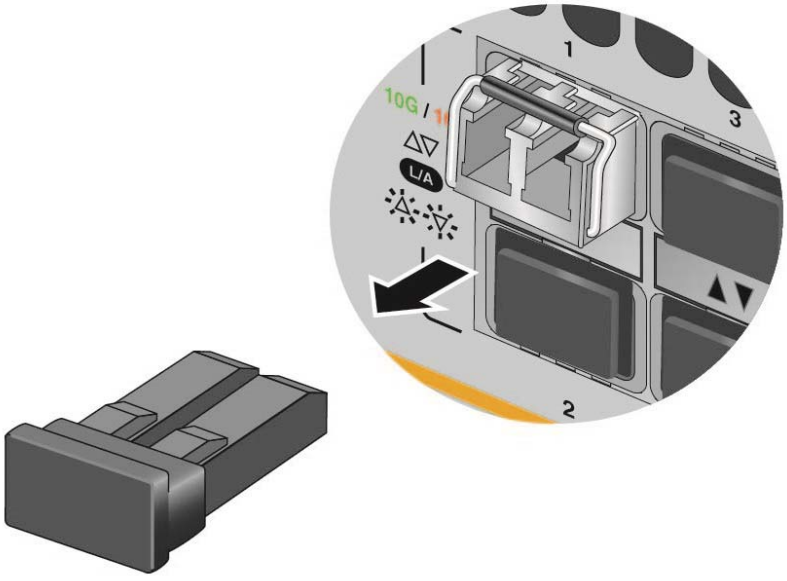


Figure 69. Removing the Dust Cover from an SFP or SFP+ Transceiver

6. Verify the position of the handle on the transceiver. If the transceiver is in a top slot, the handle should be in the upright position, as shown in Figure 70. If the transceiver is in a bottom slot, the handle should be in the down position.

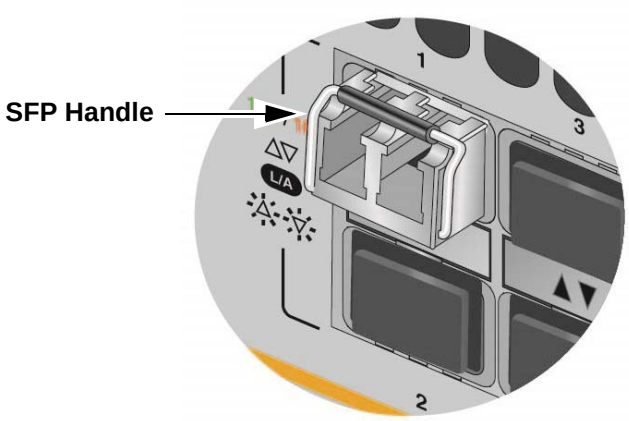


Figure 70. Positioning the SFP or SFP+ Handle in the Upright Position

7. Connect the fiber optic cable to the transceiver, as shown in Figure 71. The connector on the cable should fit snugly into the port, and the tab should lock the connector into place.

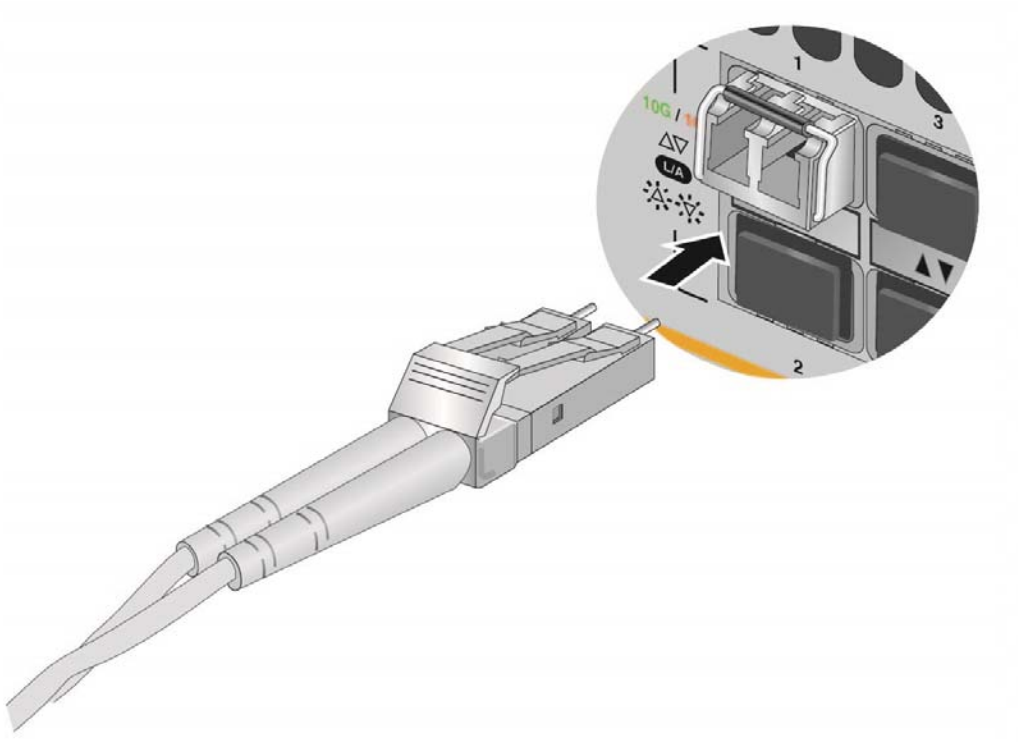


Figure 71. Connecting a Fiber Optic Cable to an SFP or SFP+ Transceiver

8. Repeat this procedure to install additional transceivers.

Installing AT-SP10TW Direct Connect Twinax Cables in the AT-x550-18XSQ Switch

The SFP and SFP+ transceiver slots 1 to 16 on the AT-x550-18XSQ Switch support AT-SP10TW direct connect twinax cables. The cables are an economical way to add 10Gbps connections over short distances. They have SFP+ transceivers on both ends and come in lengths of 1, 3, and 7 meters.

To install AT-SP10TW cables, perform the following procedure:

1. Remove the dust plug from a transceiver slot on the switch. Refer to Figure 67 on page 120.
2. Remove the transceiver from its shipping container and store the packaging material in a safe location.
3. To install the transceiver in a slot in the top row, position the transceiver with the Allied Telesis label facing up. To install the transceiver in a slot in the bottom row, position the transceiver with the label facing down. Refer to Figure 72.

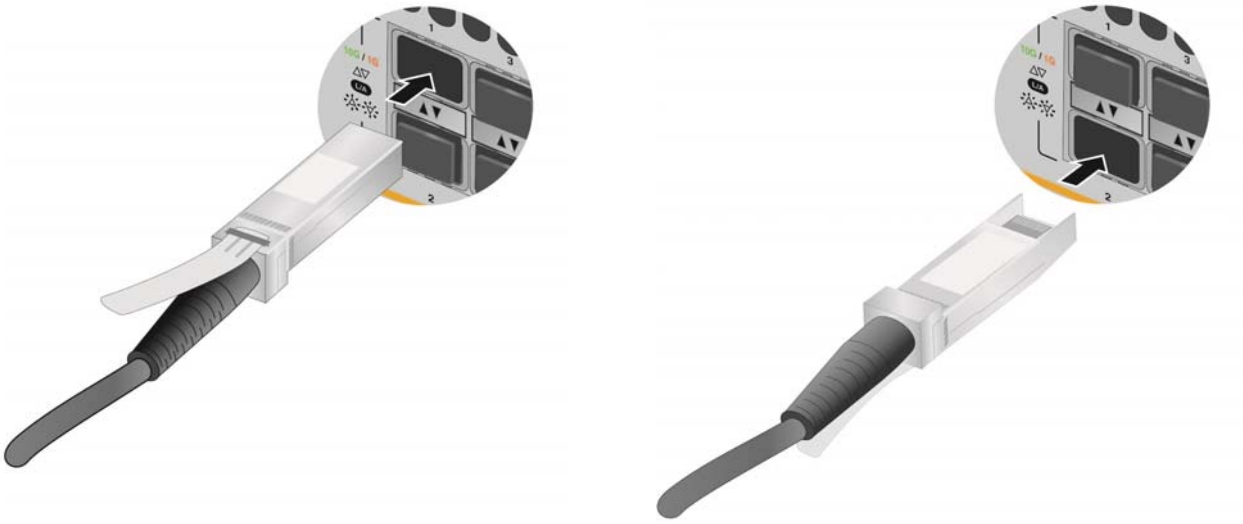


Figure 72. Installing AT-SP10TW Cables

4. Slide the transceiver into the slot until it clicks into place.
5. Connect the other end of the cable into an SFP+ slot on another network device.
6. Repeat this procedure to install additional transceivers.

Note
To remove the connector and cable from the slot, gently push on the connector, pull on the release tab, and slide the connector from the slot.

Chapter 10
Troubleshooting

This chapter contains suggestions on how to troubleshoot problems with the switch.

> **Note**
> For further assistance, please contact Allied Telesis Technical Support at **www.alliedtelesis.com/support**.

Problem 1: All of the port LEDs and the Switch ID LED are off, and the fans are not operating.

Solutions: The unit is not receiving power. Try the following:

- Verify that the power cord is securely connected to the power source and the AC connector on the back panel of the switch.
- Verify that the power outlet has power by connecting another device to it.
- Try connecting the unit to another power source.
- Try a different power cord.
- Verify that the voltage from the power source is within the required levels for your region. The power requirements for the switch are listed in “Power Specifications” on page 132.

Problem 2: All of the port LEDs are off even though the ports are connected to active network devices.

Solution: The switch may be operating in the low power mode. To toggle on the LEDs, press the eco-friendly button on the front panel of the switch. You may also toggle the LEDs off and on with the ECOFRIENDLY LED and NO ECOFRIENDLY LED commands in the command line interface.

Problem 3: A 1Gbps/10Gbps twisted pair port on the AT-x550-18XTQ switch is connected to a network device but the port’s LINK/ACT LED is off.

Solutions: The port is unable to establish a link to a network device. Try the following:

- Verify that the network device connected to the twisted pair port is powered on and is operating properly.

- ❒ Try connecting another network device to the twisted pair port with a different cable. If the twisted pair port is able to establish a link, then the problem is with the cable or the other network device.
- ❒ Verify that the twisted pair cable does not exceed 100 meters (328 feet).
- ❒ Verify that you are using the appropriate category of twisted pair cable. Cable requirements are listed in Table 2 on page 22.
- ❒ Verify that the port is connected to the correct twisted pair cable.

Note
A 1Gbps/10Gbps connection may require five to ten seconds to establish a link.

Problem 4: The LINK/ACT LED for an SFP, SFP+, or QSFP+ transceiver is off.

Solutions: The fiber optic port on the transceiver is unable to establish a link to a network device. Try the following:

- ❒ Verify that the remote network device connected to the fiber optic port is operating properly.
- ❒ Verify that the fiber optic cable is securely connected to the port on the transceiver and to the port on the remote network device.
- ❒ Check that the transceiver is fully inserted in the slot.
- ❒ Verify that the operating specifications of the fiber optic ports on the transceiver and remote network device are compatible.
- ❒ Verify that the correct type of fiber optic cabling is being used.
- ❒ Verify that the port is connected to the correct fiber optic cable.
- ❒ Try connecting another network device to the fiber optic port using a different cable. If the port is able to establish a link, then the problem is with the cable or with the other network device.
- ❒ Use the switch’s management software to verify that the port is enabled.
- ❒ If the remote network device is a managed device, use its management firmware to determine whether its port is enabled.
- ❒ Test the attenuation of both directions on the fiber optic cable with a fiber optic tester to determine whether the optical signal is too weak (sensitivity) or too strong (maximum input power).

Problem 5: The SHOW STACK command is not displaying all the switches in the stack.

Solutions: The switches are unable to form the stack. Try the following:

- ❒ Verify that the transceivers are fully inserted into transceiver slots

17 and 21.

- ❒ Verify that the fiber optic cables are securely connected to the ports on the transceivers.
- ❒ Verify that the AT-QSFPLR4 or AT-QSFPSR4 transceivers or AT-QSFPICU Cables are from Allied Telesis. The trunk will not work with cables from other network equipment manufacturers.
- ❒ Verify that the transceivers are properly cabled. The cables must crossover to different slots on the switches. The cable for the transceiver in slot 17 must connect to slot 21 on the other switch. Refer to Figure 11 on page 40.
- ❒ For AT-QSFPSR4 Transceivers, verify that you are using 12-strand OM4 fiber optic cable and that the cables are not longer than 150 m (492 ft).
- ❒ For AT-QSFPLR4 Transceivers, verify that you are using SMF cables and that the cables are in range of 2 m (6.6 ft) to 10 km (6.2 mi).
- ❒ Verify that VCStack is activated on the switches. For instructions, refer to Chapter 6, “Verifying the Status of the Switches” on page 85.

If the switches are stacked with AT-StackQS Cards and AT-QSFPSR4 or AT-QSFPLR4 Transceivers, try the following:

Problem 6: The switch functions intermittently.

Solutions: Check the system hardware status through the management software:

- ❒ Use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that the input voltage from the power source to the switch is stable and within the approved operating range. The unit will shut down if the input voltage fluctuates above or below the approved operating range.
- ❒ Use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that the fan is operating correctly.
- ❒ Verify that the location of the switch allows for adequate airflow. The unit will shut down if it is overheating.

Problem 7: The Switch ID LED is flashing the letter “F.”

Solutions: One or more of the following problems has occurred:

- ❒ A cooling fan has failed.
- ❒ The internal temperature of the switch has exceeded the normal operating range and the switch might have to shut down.

Contact your Allied Telesis sales representative for assistance.

Appendix A
Technical Specifications

This appendix contains the following sections:

Physical Specifications

Dimensions (H x W x D)

Table 8 lists the dimensions of the switches.

Table 8. Product Dimensions

AT-x550-18XTQ	4.4 cm x 21.0 cm x 34.4 cm (1.7 in. x 8.3 in. x 13.6 in.)
AT-x550-18XSQ	4.4 cm x 21.0 cm x 34.4 cm (1.7 in. x 8.3 in. x 13.6 in.)

Weights

Table 9 lists the weights of the switches and power supplies.

Table 9. Product Weights

AT-x550-18XTQ	3.11 kg (6.85 lb.)
AT-x550-18XSQ	3.18 kg (7.00 lb.)

Ventilation

Table 10 lists the ventilation requirements.

Table 10. Ventilation Requirements

Recommended Minimum Ventilation on All Sides	10 cm (4.0 in)

Environmental Specifications

Table 11 lists the environmental specifications of the switches.

Table 11. Environmental Specifications

Operating Temperature	0° C to 45° C (32° F to 113° F)
Storage Temperature	-25° C to 70° C (-13° F to 158° F)
Operating Humidity	5% to 90% noncondensing
Storage Humidity	5% to 95% noncondensing
Maximum Operating Altitude	3,000 m (9,842 ft)
Maximum Nonoperating Altitude	4,000 m (13,100 ft)

Power Specifications

This section contains the maximum power consumption values, input voltages, and heat dissipation values.

Maximum Power Consumption

Table 12 lists the maximum power consumptions of the switches.

Table 12. Maximum Power Consumptions

AT-x550-18XTQ	128.0 watts
AT-x550-18XSQ	111.0 watts

Input Voltages

Table 13 lists the input voltages for the switches.

Table 13. Input Voltages

AT-x550-18XTQ	100-240 VAC~, 1.5A maximum, 50/60 Hz
AT-x550-18XSQ	100-240 VAC~, 1.5A maximum, 50/60 Hz

Heat Dissipation

Table 14 lists the heat dissipation for the switches.

Table 14. Heat Dissipation

AT-x550-18XTQ	436 BTU/hr
AT-x550-18XSQ	378f BTU/hr

Certifications

Table 15 lists the product certificates.

Table 15. Product Certifications

EMI (Emissions)	FCC Class A, EN55032 Class A, EN61000-3-2, EN61000-3-3, VCCI Class A, CISPR Class A, C-TICK, CE
EMC (Immunity)	EN55024
Electrical and Laser Safety	EN60950-1 (TUV), UL 60950-1 ($_{C}UL_{US}$), EN60825
Compliance Marks	CE, $_{C}UL_{US}$, TUV, C-Tick

RJ-45 Twisted Pair Port Pinouts

Figure 73 illustrates the pin layout of the RJ-45 connectors on the front panel of the switch.

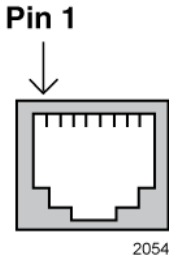


Figure 73. RJ-45 Socket Pin Layout (Front View)

Table 16 lists the pin signals when a port operating at 1Gbps or 10Gbps.

Table 16. Pin Signals for 1Gbps or 10Gbps

Pinout	Pair
1	Pair 1 +
2	Pair 1 -
3	Pair 2 +
4	Pair 3 +
5	Pair 3 -
6	Pair 2 -
7	Pair 4 +
8	Pair 4 -

RJ-45 Style Serial Console Port Pinouts

Table 17 lists the pin signals of the RJ-45 style serial Console port.

Table 17. RJ-45 Style Serial Console Port Pin Signals

Pin	Signal
1	Looped to pin 8.
2	Looped to pin 7.
3	Transmit Data
4	Ground
5	Ground
6	Receive Data
7	Looped to pin 2.
8	Looped to pin 1.