

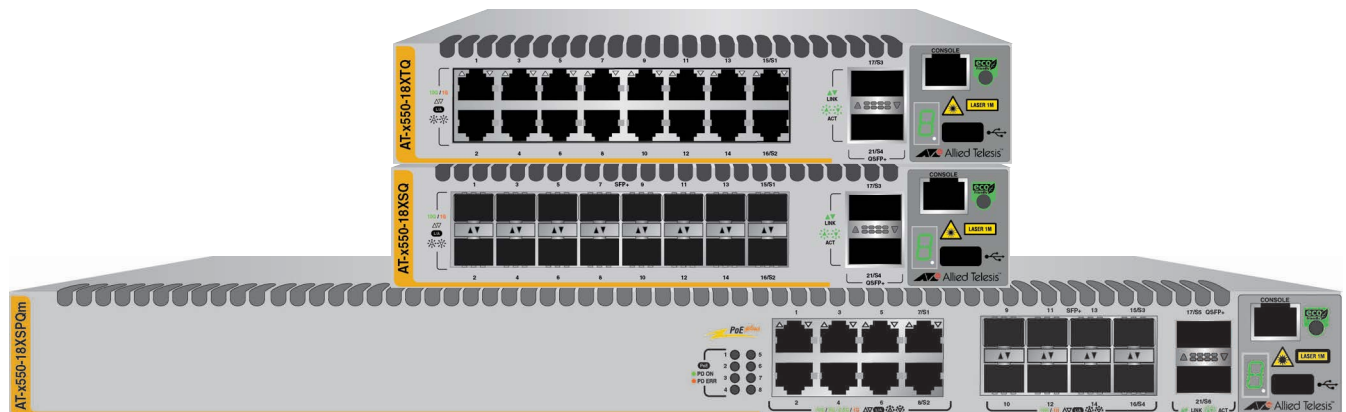
x550 Series

Stackable 10 Gigabit Intelligent Ethernet Switches
AlliedWare Plus™ v5.4.8-0.2

AT-x550-18XTQ

AT-x550-18XSQ

AT-x550-18XSPQm



Virtual Chassis Stacking Installation Guide

Copyright © 2023 Allied Telesis, Inc.

All rights reserved. No part of this publication may be reproduced without prior written permission from Allied Telesis, Inc.

Allied Telesis, VCStack, and the Allied Telesis logo are trademarks of Allied Telesis, Incorporated. All other product names, company names, logos or other designations mentioned herein are trademarks or registered trademarks of their respective owners.

Allied Telesis, Inc. reserves the right to make changes in specifications and other information contained in this document without prior written notice. The information provided herein is subject to change without notice. In no event shall Allied Telesis, Inc. be liable for any incidental, special, indirect, or consequential damages whatsoever, including but not limited to lost profits, arising out of or related to this manual or the information contained herein, even if Allied Telesis, Inc. has been advised of, known, or should have known, the possibility of such damages.

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 (CUL_{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 alliedtelesिस.com/library/search.

Übersetzte Sicherheitshinweise

Wichtig: Sicherheitshinweise mit dem -Symbol werden in **Translated Safety Statements** bei alliedtelesिस.com/library/search in mehrere Sprachen übersetzt.


Declaraciones de seguridad traducidas

Importante: Las declaraciones de seguridad con el símbolo  se traducen a varios idiomas en **Translated Safety Statements** en alliedtelesिस.com/library/search.

Consignes de sécurité traduites

Important: Les déclarations de sécurité avec le symbole  sont traduites en plusieurs langues en **Translated Safety Statements** sur alliedtelesिस.com/library/search.

Dichiarazioni di sicurezza tradotte

Importante: Le dichiarazioni di sicurezza con il simbolo  sono tradotte in più lingue in **Translated Safety Statements** su alliedtelesिस.com/library/search.

Översatta säkerhetsförklaringar

Viktig: Säkerhetsföreskrifter med -symbolen översätts till flera språk på **Translated Safety Statements** vid alliedtelesिस.com/library/search.

Contents

Preface	13
Document Conventions	14
Contacting Allied Telesis	15
Chapter 1: Overview	17
Front and Rear Panels	18
Management Panel	20
Features	21
x550 Models	21
1Gbps and 10Gbps Twisted Pair Ports	21
1/2.5/5/10Gbps Twisted Pair Ports	22
Power Over Ethernet	22
1Gbps SFP or 10Gbps SFP+ Transceiver Ports	22
40Gbps QSFP+ Transceiver Slots	23
LEDs	23
Installation Options	23
Management Software and Interfaces	23
Management Methods	24
1Gbps/10Gbps Twisted Pair Ports on the AT-x550-18XTQ Switch	25
Cable Requirements	25
LEDs	25
1/2.5/5/10Gbps Twisted Pair Ports on the AT-x550-18XSPQm Switch	27
Cable Requirements	27
LEDs	28
PoE LEDs	29
Power Over Ethernet on the AT-x550-18XSPQm Switch	30
PoE Standards	30
Powered Device Classes	30
Power Budget	31
Port Prioritization	31
Mode A Wiring Configuration	32
SFP+ Transceiver Ports on the AT-x550-18XSQ and AT-x550-18XSPQm Switches	33
SFP and SFP+ Transceivers	33
LEDs	33
QSFP+ Transceiver Ports	35
QSFP+ Transceivers	35
Breakout Cables	35
Port Numbering	36
LEDs	36
Port Numbering	38
eco-friendly Button	39
VCStack Feature	40
Switch ID LED	41
USB Port	43
Console Port	44
Power Supply	45
Designating Ports in the Command Line Interface for Stacks	46
Software and Hardware Releases	47

Chapter 2: Virtual Chassis Stacking	49
Overview	50
Stacking Guidelines	51
Stack Trunk	52
40Gbps Stack Trunks	52
10Gbps Stack Trunks	59
Invalid Stack Trunks	66
Master and Member Switches	69
Selection of the Master Switch	69
Switch ID Numbers	71
Optional Feature Licenses	72
Planning the Stack	73
Stacking Worksheet	74
 Chapter 3: Beginning the Installation	 77
Reviewing Safety Precautions	78
Choosing a Site for the Switch	82
Unpacking the AT-x550-18XTQ or AT-x550-18XSQ Switch	83
Unpacking the AT-x550-18XSPQm Switch	86
 Chapter 4: Installing the Switch on a Table or in an Equipment Rack	 89
Installing the Switch on a Table or Desktop	90
Overview to Installing AT-x550-18XTQ and AT-x550-18XSQ Switches in Equipment Racks	91
Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J14 Brackets	93
Required Items	93
Switch Orientations in the Equipment Rack	93
Installing the Switch	95
Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J15 Bracket	98
Required Items	98
Installing the Switch	98
Installing the AT-x550-18XSPQm Switch in an Equipment Rack	104
Required Items	104
Switch Orientations in the Equipment Rack	104
Installing the Switch	105
 Chapter 5: Installing the Switch on a Wall	 109
Switch Orientations on a Wall	110
Installation Guidelines	111
Tools and Material	111
Plywood Base for a Wall with Wooden Studs	113
Installing a Plywood Base	115
Installing the Switch on a Plywood Base	116
Installing the Switch on a Concrete Wall	119
 Chapter 6: Building the Trunk with Default Stacking Ports 17 and 21	 123
Introduction	124
Powering On the Switches Individually	125
Powering On the Switches Simultaneously	128
Starting a Local Management Session	130
Verifying the Stack	132
Setting the Priority Numbers	133
Powering On a Switch	135
Monitoring the Initialization Process	138
 Chapter 7: Building the Trunk with Optional Stacking Ports	 141
Introduction	142
Command Summary	143
STACKPORT	143
STACK ENABLE	143
STACK PRIORITY	144
STACK RENUMBER	144
SWITCH PROVISION	145

Configuring the Master Switch.....	146
General Steps for the Master Switch.....	146
Configuring the Master Switch - Part I.....	147
Configuring the Master Switch - Part II.....	150
Verifying the Master Switch.....	152
What to Do Next.....	153
Configuring Member Switches.....	155
General Steps for the Member Switch.....	155
Configuring Member Switches - Part I.....	156
Configuring Member Switches - Part II.....	158
Verifying Member Switches.....	160
What to Do Next.....	161
Powering on the Stack.....	163
Verifying the Stack.....	164
Chapter 8: Cabling the Networking Ports	165
Cabling Twisted Pair Ports in AT-x550-18XTQ and AT-x550-18XSPQm Switches.....	166
Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers.....	167
Installing 1Gbps SFP or 10Gbps SFP+ Transceivers.....	168
Installing AT-SP10TW Direct Connect Twinax Cables.....	172
Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers.....	174
Installing AT-QSFPCU Cables.....	175
Chapter 9: Troubleshooting	177
Appendix A: Technical Specifications	181
Physical Specifications.....	182
Environmental Specifications.....	183
Power Specifications.....	184
Certifications.....	185
RJ-45 Twisted Pair Port Pinouts.....	186
RJ-45 Style Serial Console Port Pinouts.....	187

Figures

Figure 1: Front Panels of the x550 Switches	18
Figure 2: Back Panels	19
Figure 3: Management Panel	20
Figure 4: Link and Activity LEDs for Ports 1 to 16 on the AT-x550-18XTQ Switch	26
Figure 5: Link and Activity LEDs for Ports 1 to 8 on the AT-x550-18XSPQm Switch	28
Figure 6: PoE LEDs for Ports 1 to 8 on the AT-x550-18XSPQm, Switch	29
Figure 7: Link/Activity LEDs for 1/10Gbps Ports 1 to 16 on the AT-x550-18XSQ Switch and Ports 9 to 16 on the AT-x550-18XSPQm Switch	33
Figure 8: QSFP+ to SFP+ Breakout Cable	35
Figure 9: LEDs for the 40Gbps QSFP+ Slots	36
Figure 10: Switch ID LED	41
Figure 11: Switch ID LED	41
Figure 12: Switch ID LEDs in Low Power Mode	42
Figure 13: PORT Parameter in the Command Line Interface	46
Figure 14: 40Gbps Linear and Ring Trunk Paths	54
Figure 15: Cabling QSFP+ Ports 17 and 21 for a Stack Trunk	55
Figure 16: Example of a 40Gbps Stack Trunk with Different Switch Models	56
Figure 17: Example of a 40Gbps Trunk with Fiber Optic and Direct Connect Cables	57
Figure 18: Example of a 40Gbps Trunk with Short and Long Distance Fiber Optic Transceivers	58
Figure 19: Cabling 10Gbps Ports as a Stack Trunk	60
Figure 20: Example of a 10Gbps Stack Trunk with AT-x550-18XSQ and AT-x550-18XSPQm Switches	61
Figure 21: Example of a 10Gbps Stack Trunk with AT-x550-18XTQ and AT-x550-18XSPQm Switches	62
Figure 22: Example of a 10Gbps Stack Trunk for AT-x550-18XTQ and AT-x550-18XSQ Switches with SP10 Transceivers	63
Figure 23: Example of a 10Gbps Stack Trunk for All Switches with SP10 Transceivers	64
Figure 24: Example of a 10Gbps Stack Trunk with AT-SP10TW1 and AT-SP10TW3 Direct Connect Cables	65
Figure 25: Invalid Stack Trunk with 10Gbps and 40Gbps Links	66
Figure 26: Invalid 10Gbps Stack Trunk with Ports from Both Stacking Pairs on AT-x550-18XSPQm Switches	67
Figure 27: Invalid Stack Trunk with an Intermediary Networking Device	68
Figure 28: AT-x550-18XTQ or AT-x550-18XSQ Switch Shipping Box	83
Figure 29: Accessory Kit	84
Figure 30: Accessory Kit (Continued)	85
Figure 31: AT-x550-18XSPQm Switch Shipping Box	86
Figure 32: Accessory Items	87
Figure 33: AT-RKMT-J14 Brackets and Switch	91
Figure 34: AT-RKMT-J15 Bracket	91
Figure 35: AT-RKMT-J15 Bracket with Switches	92
Figure 36: Bracket Holes	93
Figure 37: AT-RKMT-J14 Bracket Holes	94
Figure 38: Switch Orientations with the Front Panel Facing the Front of the Equipment Rack	94
Figure 39: Switch Orientations with the Rear Panel Facing the Front of the Equipment Rack	95
Figure 40: Attaching the Handles to the AT-RKMT-J14 Brackets	96
Figure 41: Attaching the AT-RKMT-J14 Brackets to the Switch	96
Figure 42: Installing the Switch in an Equipment Rack	97
Figure 43: Installing the AT-RKMT-J15 Bracket in the Equipment Rack	98
Figure 44: Loosening the Two Thumbscrews on the Front of the AT-RKMT-J15 Bracket	99
Figure 45: Sliding Out the Tray from the AT-RKMT-J15	99
Figure 46: Removing the Plastic Feet from the Bottom Panel of the Switch	100
Figure 47: Placing a Switch in the AT-RKMT-J15 Bracket	101

Figure 48: Securing the Switch to the AT-RKMT-J15 Bracket.....	101
Figure 49: Sliding in the Bracket Tray.....	102
Figure 50: Tightening the Two Thumbscrews on the AT-RKMT-J15 Bracket.....	103
Figure 51: Bracket Holes on the AT-x550-18XSPQm Switch.....	104
Figure 52: AT-x550-18XSPQm Switch Orientations in an Equipment Rack.....	105
Figure 53: Example of Attaching the Brackets to the AT-x550-18XSPQm Switch.....	106
Figure 54: Installing the Switch in an Equipment Rack.....	106
Figure 55: Positioning the Switches on the Wall.....	110
Figure 56: Switch on the Wall with a Plywood Base.....	113
Figure 57: Steps to Installing the Switch with a Plywood Base.....	114
Figure 58: Installing the Wall Brackets.....	116
Figure 59: Installing the Brackets on the AT-x550-18XSPQm Switch.....	117
Figure 60: Securing the Switch to the Plywood Base.....	118
Figure 61: Marking the Locations of the Bracket Holes on a Concrete Wall.....	120
Figure 62: Installing the Switch on a Concrete Wall.....	121
Figure 63: Connecting the Management Cable to the Console Port.....	130
Figure 64: User Exec Mode Prompt.....	131
Figure 65: SHOW STACK Command.....	132
Figure 66: Moving to the Global Configuration Mode with the CONFIGURE TERMINAL Command.....	133
Figure 67: Returning to the Privileged Exec Mode.....	134
Figure 68: Saving the Priority Values with the WRITE Command.....	134
Figure 69: Installing the Power Cord Retaining Clip.....	135
Figure 70: Connecting the AC Power Cord to the Switch.....	136
Figure 71: Lowering the Power Cord Retaining Clip.....	136
Figure 72: Connecting the Power Cord to an AC Power Source.....	136
Figure 73: Switch Initialization Messages.....	138
Figure 74: Switch Initialization Messages (Continued).....	139
Figure 75: Switch Initialization Messages (Continued).....	140
Figure 76: Powering Off the Switch.....	153
Figure 77: SHOW STACK Command.....	164
Figure 78: Removing the Dust Plug from an SFP Slot.....	168
Figure 79: Installing an SFP Transceiver.....	169
Figure 80: Removing the Dust Cover from an SFP or SFP+ Transceiver.....	170
Figure 81: Positioning the SFP or SFP+ Handle in the Upright Position.....	170
Figure 82: Connecting a Fiber Optic Cable to an SFP or SFP+ Transceiver.....	171
Figure 83: Installing AT-SP10TW Cables.....	172
Figure 84: Removing the Dust Cover from a QSFP+ Transceiver Slot.....	175
Figure 85: Sliding the AT-QSFP+ Cable into the Slot.....	175
Figure 86: Pin Layout for the RJ-45 Twisted Pair Ports (Front View).....	186

Tables

Table 1: Basic Features	21
Table 2: Twisted Pair Ports 1 to 16 on the AT-x550-18XTQ Switch	25
Table 3: Link and Activity LEDs for Ports 1 to 16 on the AT-x550-18XTQ Switch	26
Table 4: Twisted Pair Ports 1 to 8 on the AT-x550-18XSPQm Switch	27
Table 5: Link and Activity LEDs Ports 1 to 8 on the AT-x550-18XSPQm Switch	28
Table 6: PoE LEDs for Ports 1 to 8 on the AT-x550-18XSPQm Switch	29
Table 7: IEEE Powered Device Classes	30
Table 8: Link/Activity LEDs for 1/10Gbps Ports 1 to 16 on the AT-x550-18XSQ Switch and Ports 9 to 16 on the AT-x550-18XSPQm Switch	34
Table 9: Link and Activity Status LEDs for the 40Gbps QSFP+ Transceiver Slots with QSFP+ Transceivers	36
Table 10: Link and Activity Status LEDs for the 40Gbps QSFP+ Transceiver Slots with Breakout Cables	37
Table 11: Port Numbers for Transceiver Ports 17 and 21	38
Table 12: PORT Parameter Format	46
Table 13: Software and Hardware Releases	47
Table 14: Default (40Gbps) and Optional (10Gbps) Trunk Ports	52
Table 15: 10Gbps Stacking Ports and Transceiver Slots	59
Table 16: Stacking Worksheet	74
Table 17: Stacking Worksheet Columns	74
Table 18: Configuring the Master Switch for Optional Stacking Ports - Part I	147
Table 19: Configuring the Master Switch for Optional Stacking Ports - Part II	150
Table 20: Verifying the Master Switch	152
Table 21: Configuring Member Switches - Part I	156
Table 22: Configuring Member Switches - Part II	158
Table 23: Verifying Member Switches	160
Table 24: Product Dimensions	182
Table 25: Product Weights	182
Table 26: Ventilation Requirements	182
Table 27: Environmental Specifications	183
Table 28: Maximum Power Consumptions	184
Table 29: Input Voltages	184
Table 30: Heat Dissipation	184
Table 31: Product Certifications	185
Table 32: Pin Signals for the Twisted Pair Ports	186
Table 33: RJ-45 Style Serial Console Port Pin Signals	187

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:

- “Document Conventions” on page 14
- “Contacting Allied Telesis” on page 15

Note

This guide explains how to install switches as a stack with Virtual Chassis Stacking (VCStack™). For instructions on how to install the devices as standalone switches, refer to the *x550 Series Installation Guide for Standalone 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

For assistance with this product, you can 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:

- ❑ “Front and Rear Panels” on page 18
- ❑ “Management Panel” on page 20
- ❑ “Features” on page 21
- ❑ “1Gbps/10Gbps Twisted Pair Ports on the AT-x550-18XTQ Switch” on page 25
- ❑ “1/2.5/5/10Gbps Twisted Pair Ports on the AT-x550-18XSPQm Switch” on page 27
- ❑ “Power Over Ethernet on the AT-x550-18XSPQm Switch” on page 30
- ❑ “SFP+ Transceiver Ports on the AT-x550-18XSQ and AT-x550-18XSPQm Switches” on page 33
- ❑ “QSFP+ Transceiver Ports” on page 35
- ❑ “eco-friendly Button” on page 39
- ❑ “VCStack Feature” on page 40
- ❑ “Switch ID LED” on page 41
- ❑ “USB Port” on page 43
- ❑ “Console Port” on page 44
- ❑ “Power Supply” on page 45
- ❑ “Designating Ports in the Command Line Interface for Stacks” on page 46
- ❑ “Software and Hardware Releases” on page 47

Note

This guide explains how to install switches as a stack with Virtual Chassis Stacking (VCStack™). For instructions on how to install the devices as standalone units, refer to the *x550 Series Installation Guide for Standalone Switches*.

Front and Rear Panels

The front panels on the x550 Switches are shown in Figure 1.

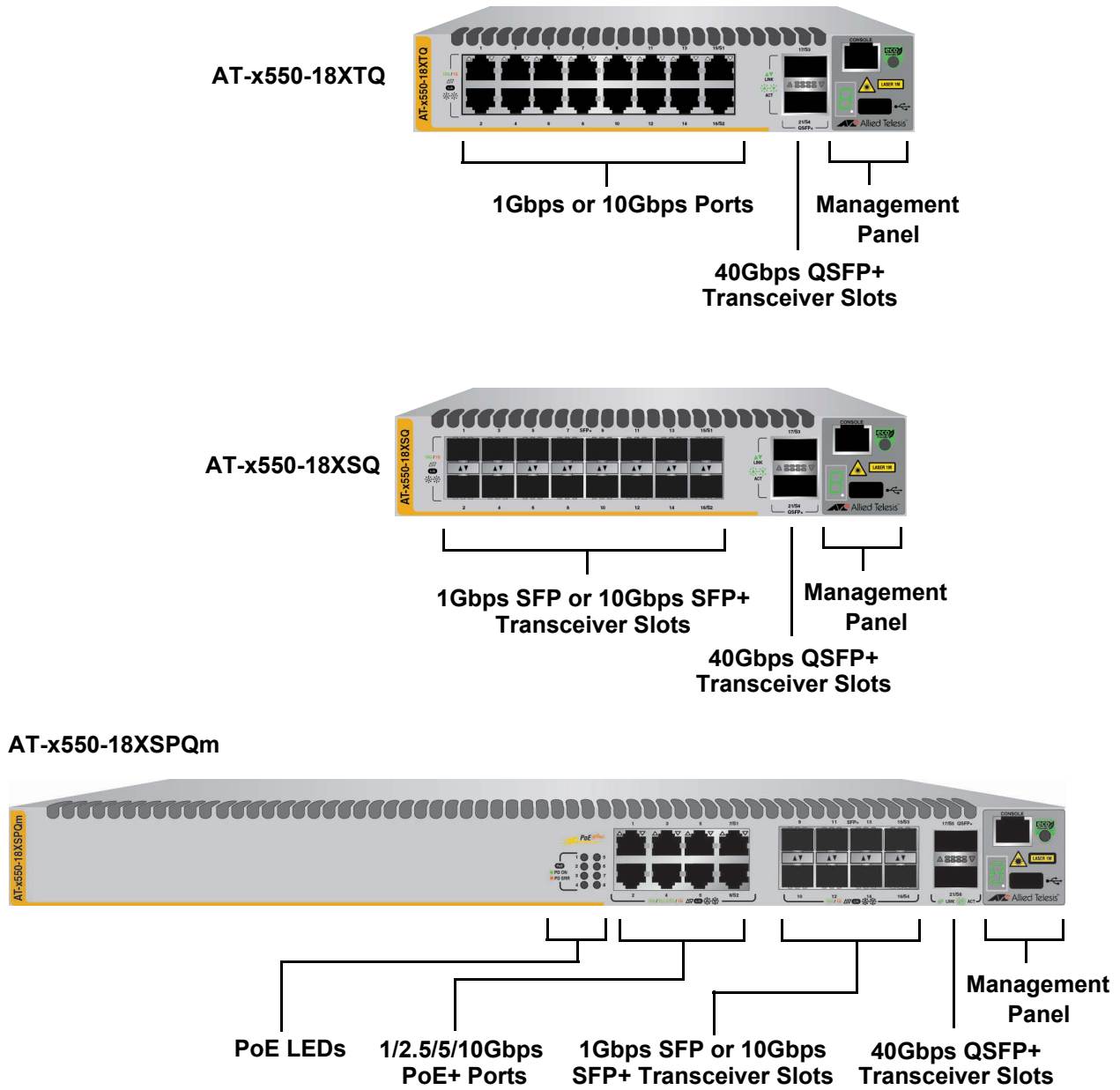


Figure 1. Front Panels of the x550 Switches

The rear panels are shown in Figure 2.

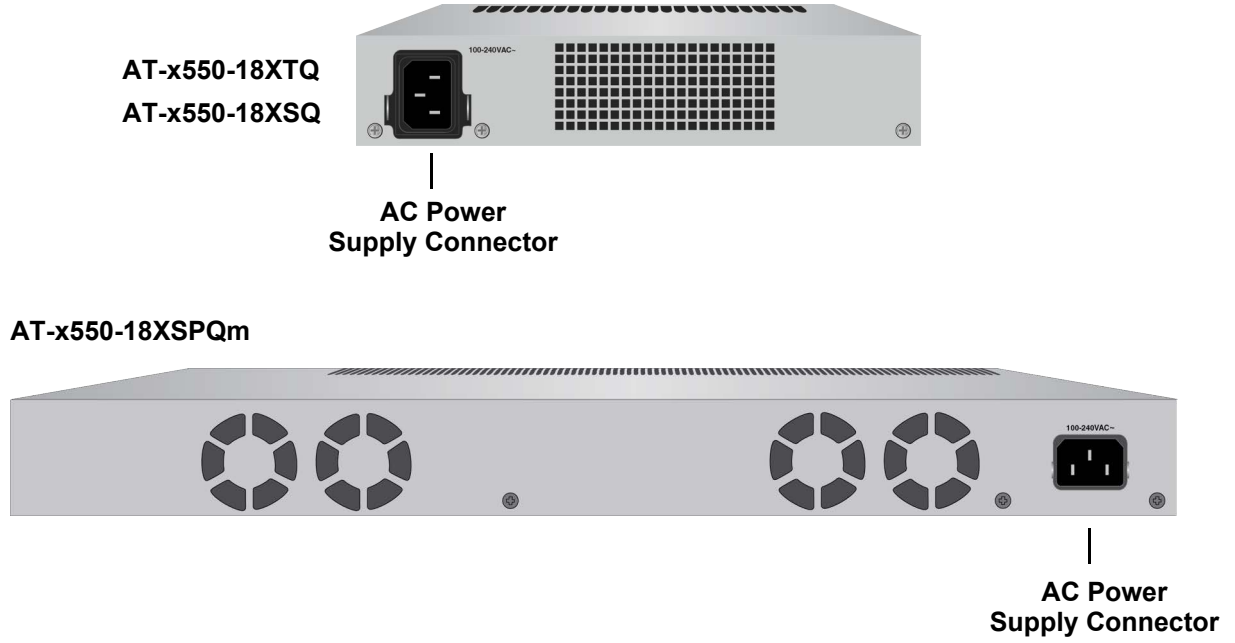


Figure 2. Back Panels

Management Panel

Figure 3 identifies the components on the management panel.

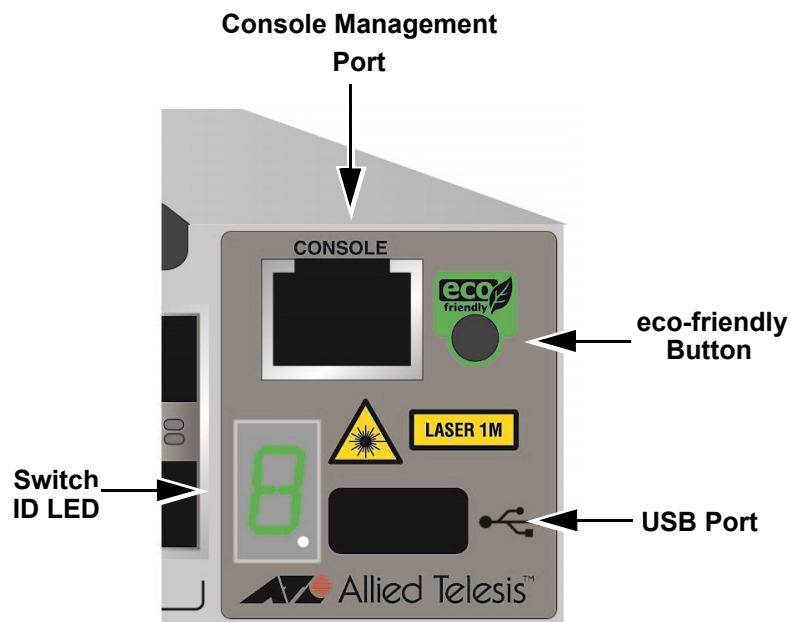


Figure 3. Management Panel

Features

The Allied Telesis x550 Switches are stackable 10 Gigabit, Layer 3 Ethernet switches. The features are listed in the following sections:

x550 Models Table 1 lists the basic features.

Table 1. Basic Features

Model	1/2.5/5/10 Gbps PoE+ Twisted Pair Ports	1Gbps or 10Gbps Twisted Pair Ports	1Gbps SFP or 10Gbps SFP+ Transceiver Slots	40Gbps QSFP+ Transceiver Slots	VCStack
AT-x550-18XTQ	0	16	0	2	Yes
AT-x550-18XSQ	0	0	16	2	Yes
AT-x550-18XSPQm	8	0	8	2	Yes

The following items provide additional information:

- ❑ The 40Gbps QSFP+ slots 17 and 21 can be used as regular Ethernet networking ports or stacking ports with the VCStack feature. The default setting for the ports is VCStack stacking ports. To use the ports as regular Ethernet networking ports, you need to disable the VCStack feature or designate other ports as stacking ports.
- ❑ When used as regular networking ports the 40Gbps QSFP+ slots can support either 40Gbps transceivers or breakout cables, which convert the ports into four 10Gbps ports.
- ❑ The switches come with one pre-installed power supply. It is not field-replaceable.

1Gbps and 10Gbps Twisted Pair Ports

Twisted pair ports 1 to 16 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

1/2.5/5/10Gbps Twisted Pair Ports

Ports 1 to 8 on the AT-x550-18XSPQm Switch have these features:

- 1Gbps, 2.5Gbps, 5Gbps, 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
- Power over Ethernet (PoE+)

Power Over Ethernet

Ports 1 to 8 on the AT-x550-18XSPQm Switch also have these PoE+ features:

- Supported on ports 1 to 8.
- Supports PoE (15.4 watts maximum) and PoE+ (30 watts maximum) powered devices
- 240W power budget for powered devices
- Supports powered device classes 0 to 4
- Port prioritization
- Mode A wiring
- IEEE802.3at compliant

1Gbps SFP or 10Gbps SFP+ Transceiver Ports

Ports 1 to 16 on the AT-x550-18XSQ Switch and ports 9 to 16 on the AT-x550-18XSPQm Switch support these 1/10Gbps transceivers:

- 1Gbps SX/LX SFP transceivers
- 10Gbps SR/LR SFP+ fiber optic transceivers
- 10Gbps 1-meter AT-SP10TW1 and 3-meter AT-SP10TW3 direct connect twinax cables with SFP+ transceiver-style connectors

Note

The switches do not support the 7-meter AT-SP10TW7 direct connect cable.

These items provide additional information:

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

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

40Gbps QSFP+ Transceiver Slots

Ports 17 and 21 on all switches support the following 40Gbps QSFP+ transceivers:

- AT-QSFP4SR4 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

Ports 17 and 21 are initially configured as trunk ports for the VCStack feature. To use them as regular networking ports, either disable the VCStack feature or designate other ports as the stacking ports. Refer to “Stack Trunk” on page 52.

QSFP+ transceivers are purchased separately. For a list of supported transceivers, refer to the product data sheet on the Allied Telesis web site.

LEDs

Here are the port LEDs:

- Link/activity LEDs for twisted pair ports 1 to 16 on the AT-x550-18XTQ Switch and ports 1 to 8 on the AT-x550-18XSPQm Switch
- Link/activity LEDs for SFP and SFP+ transceiver ports 1 to 16 on the AT-x550-18XSQ Switch and ports 9 to 16 on the AT-x550-18XSPQm Switch
- Link/activity LEDs for the QSFP+ transceiver ports 17 and 21
- PoE+ LEDs on the AT-x550-18XSPQm Switch
- Stack ID number LED
- eco-friendly button turns off the LEDs to conserve electricity

Installation Options

Here are the installation options:

- 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 on the AT-x550-18XTQ Switch

Twisted pair ports 1 to 16 on the AT-x550-18XTQ Switch have the specifications listed in Table 2.

Table 2. Twisted Pair Ports 1 to 16 on the AT-x550-18XTQ Switch

Specification	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
Maximum Distance	100 meters (328 feet)
Connector	8-pin RJ-45

Note

The ports must be set to Auto-Negotiation to function at 1Gbps. The network devices connected to the ports must be IEEE 802.3u-compliant.

Cable Requirements

The minimum cable requirements for the ports are listed in here:

- ❑ 1Gbps - Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) unshielded cabling.
- ❑ 10Gbps -Standard TIA/EIA 568-C-compliant Category 6a unshielded cabling.

Refer to Table 32 on page 186 for the port pinouts of the twisted pair ports.

LEDs

Each 1Gbps/10Gbps twisted pair port on the AT-x550-18XTQ Switch has an LED that displays link and activity information. The LED is shown in Figure 4 on page 26.

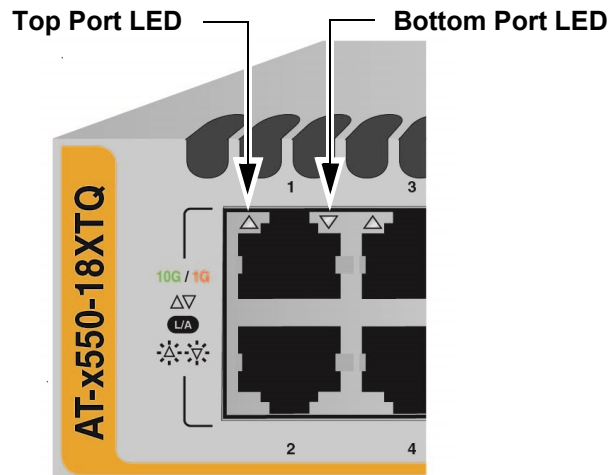


Figure 4. Link and Activity LEDs for Ports 1 to 16 on the AT-x550-18XTQ Switch

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

Table 3. Link and Activity LEDs for Ports 1 to 16 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.
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.

1/2.5/5/10Gbps Twisted Pair Ports on the AT-x550-18XSPQm Switch

The specifications for twisted pair ports 1 to 8 on the AT-x550-18XSPQm Switch are listed in Table 4.

Table 4. Twisted Pair Ports 1 to 8 on the AT-x550-18XSPQm Switch

Specification	Description
Port Speed	1Gbps, 2.5Gbps, 5Gbps, or 10Gbps You can set port speed with Auto-Negotiation or manually. Guidelines are given here: - 1Gbps and 10Gbps can be set either manually or with Auto-Negotiation. - 2.5Gbps and 5Gbps must be set with Auto-Negotiation. The default port setting is Auto-Negotiation.
Duplex Mode	Full-duplex only
Maximum Distance	100 meters (328 feet)
Power over Ethernet	PoE (15.4 watts maximum) and PoE+ (30 watts maximum)
Power Budget	240W
PoE Mode	Mode A
Connector	8-pin RJ-45

Note

The network devices connected to the ports must be IEEE 802.3u-compliant.

Cable Requirements

The minimum cable requirements for the PoE+ twisted pair ports on the AT-x550-18XSPQm Switch are listed here:

- ❑ 1/2.5/5Gbps - Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) unshielded cabling.
- ❑ 10Gbps -Standard TIA/EIA 568-C-compliant Category 6a unshielded cabling.

LEDs This section explains the LEDs for the 1/2.5/5/10Gbps twisted pair ports on the AT-x550-18XSPQm Switch. Each port has one LED that displays link and activity information. The LEDs are shown in Figure 5.

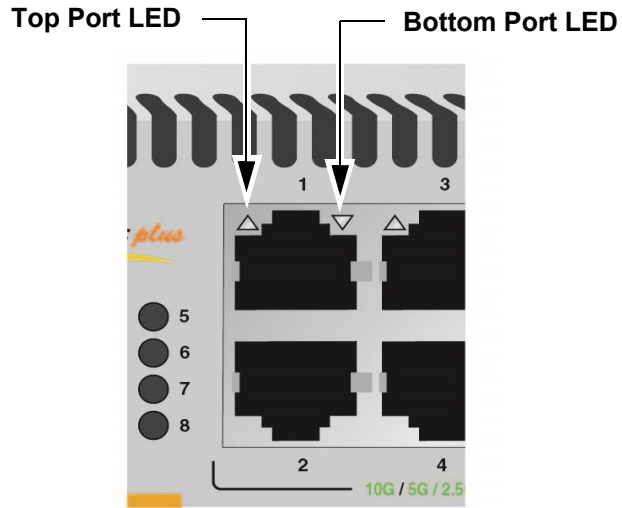


Figure 5. Link and Activity LEDs for Ports 1 to 8 on the AT-x550-18XSPQm Switch

The states of the link and activity LEDs are described in Table 5.

Table 5. Link and Activity LEDs Ports 1 to 8 on the AT-x550-18XSPQm Switch

State	Description
Solid Green	The port has established a 2.5Gbps, 5Gbps, or 10Gbps link to a network device.
Flashing Green	The port is transmitting or receiving data at 2.5Gbps, 5Gbps or 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.
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.

PoE LEDs This section explains the PoE LEDs for the 1/2.5/5/10Gbps twisted pair ports on the AT-x550-18XSPQm Switch. Each port has one LED. Refer to Figure 6.

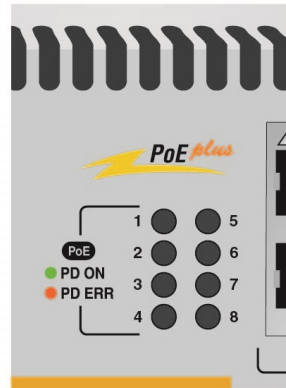


Figure 6. PoE LEDs for Ports 1 to 8 on the AT-x550-18XSPQm, Switch

The states of the PoE LEDs are described in Table 6.

Table 6. PoE LEDs for Ports 1 to 8 on the AT-x550-18XSPQm Switch

State	Description
Green	The switch is delivering power to a powered device (PD) on the port.
Solid Amber	The switch has shut down PoE on the port because of a fault condition.
Off	This LED state can result from the following conditions: <ul style="list-style-type: none"> - The port is not connected to a PD. - The PD is powered off. - The port is disabled in the management software. - PoE is disabled on the port. - The LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

Power Over Ethernet on the AT-x550-18XSPQm Switch

The AT-x550-18XSPQm Switch features PoE on the eight 1/2.5/5/10Gbps twisted pair ports. With PoE, the switch supplies DC power to network devices over the same twisted pair cables that carry the network traffic.

PoE can make it easier to install networks. The selection of a location for a network device is often limited by whether there is a power source nearby. This often limits equipment placement or requires the added time and cost of having additional electrical sources installed. But with PoE, you can install PoE-compatible devices wherever they are needed without having to worry about whether there are power sources nearby.

A device that provides PoE to network devices, such as the AT-x550-18XSPQm Switch, is referred to as *power sourcing equipment (PSE)*. It functions as a central power source for other network devices.

Devices that receive their power from a PSE are called *powered devices (PD)*. Examples include wireless access points, IP telephones, webcams, and even other Ethernet switches.

The switch automatically determines whether or not devices connected to its ports are powered devices. Ports that are connected to network nodes that are not powered devices (that is, devices that receive their power from another power source) function as regular Ethernet ports, without PoE. The PoE feature remains activated on the ports but no power is delivered to the devices.

PoE Standards

The AT-x550-18XSPQm Switch supports these PoE standards:

- ❑ PoE (IEEE 802.3af): This standard provides up to 15.4 watts at the switch port for powered devices that require up to 12.95 watts.
- ❑ PoE+ (IEEE 802.3at): This standard provides up to 30.0 watts at the switch port for powered devices that require up to 25.5 watts.

Powered Device Classes

Powered devices are grouped into the five classes listed in Table 7. The classes are based on the amount of power the devices require. The switches support all five classes.

Table 7. IEEE Powered Device Classes

Class	Maximum Power Output from a Switch Port	PD Power Range
0	15.4W	0.44W to 12.95W
1	4.0W	0.44W to 3.84W

Table 7. IEEE Powered Device Classes (Continued)

Class	Maximum Power Output from a Switch Port	PD Power Range
2	7.0W	3.84W to 6.49W
3	15.4W	6.49W to 12.95W
4	30.0W	12.95W to 25.5W

Power Budget

The AT-x550-18XSPQm Switch has a DC power budget of 240W. This is the total maximum amount of power that the switch can supply to powered devices on the eight PoE+ twisted pair ports. Under normal operating conditions this power budget enables the switch to support eight Class 4 devices with the maximum 25.5W on all eight PoE+ ports, simultaneously.

Port Prioritization

If the power requirements of the powered devices exceed the switch's power budget, the switch denies power to some ports based on a system called port prioritization. You can use this mechanism to ensure that powered devices critical to the operations of your network are given preferential treatment by the switch in the distribution of power should the demands of the devices exceed the available capacity.

There are three priority levels:

- Critical
- High
- Low

Ports set to the Critical level, the highest priority level, are guaranteed power before any of the ports assigned to the other two priority levels. Ports assigned to the other priority levels receive power only if all the Critical ports are receiving power. Ports that are connected to your most critical powered devices should be assigned to this level. If there is not enough power to support all the ports set to the Critical priority level, power is provided to the ports based on port number, in ascending order.

The High level is the second highest level. Ports set to this level receive power only if all the ports at the Critical level are receiving power. If there is not enough power to support all the ports set to the High priority level, power is provided to the ports based on port number, in ascending order.

The lowest priority level is Low. This is the default setting. Ports set to this level only receive power if all of the ports assigned to the other two levels are already receiving power. As with the other levels, if there is not enough power to support all of the ports set to the Low priority level, power is provided to the ports based on port number, in ascending order.

Power allocation is dynamic. Ports supplying power to powered devices may cease power transmission if the switch's power budget is at maximum usage and new powered devices, connected to ports with higher priorities, become active.

Mode A Wiring Configuration

The IEEE 802.3af standard defines two methods for delivering DC power over twisted pair cable by a switch to powered devices. These methods are known as Modes A and B, and identify the individual wires that carry the DC power within the cable from the switch to powered devices.

Twisted pair cabling typically consists of eight wires. With 10Base-T and 100Base-TX devices, the wires connected to pins 1, 2, 3, and 6 on the RJ-45 connectors carry the network traffic while the wires connected to pins 4, 5, 7, and 8 are unused. With 1000Base-T devices, all eight wires are used to carry network data.

It takes four wires to deliver DC power to a powered device. With Mode A, power is delivered on pins 1, 2, 3, and 6. These are the same pins in 10Base-T and 100Base-TX devices that carry the network data. With Mode B, power is provided over the spare wires.

The ports on the AT-x550-18XSPQm Switch deliver power using Mode A.

Powered devices that comply with the IEEE 802.3af standard are required to support both Modes A and B. Legacy devices that do not comply with the standard will work with the switch if they are powered on pins 1, 2, 3, and 6.

SFP+ Transceiver Ports on the AT-x550-18XSQ and AT-x550-18XSPQm Switches

Transceiver ports 1 to 16 on the AT-x550-18XSQ Switch and ports 9 to 16 on the AT-x550-18XSPQm Switch support SFP and SFP+ transceivers.

SFP and SFP+ Transceivers

The ports support the following types of transceivers:

- ❑ 1Gbps SX/LX SFP transceivers
- ❑ 10Gbps SR/LR SFP+ fiber optic transceivers
- ❑ 10Gbps 1-meter AT-SP10TW1 and 3-meter AT-SP10TW3 direct connect twinax cables with SFP+ transceiver-style connectors

Guidelines for the ports are 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.

Note

The switches do not support the AT-SP10TW7 direct connect cable.

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

LEDs

Each transceiver port has one LED. The LEDs are located between the ports. Refer to Figure 7.

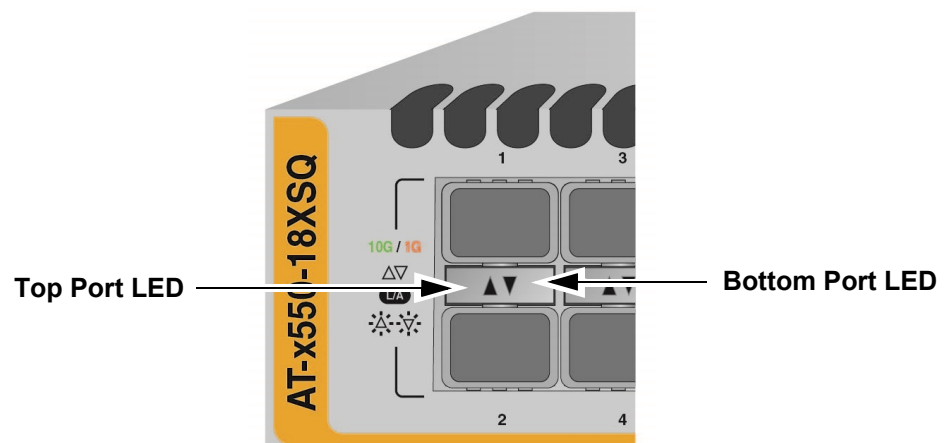


Figure 7. Link/Activity LEDs for 1/10Gbps Ports 1 to 16 on the AT-x550-18XSQ Switch and Ports 9 to 16 on the AT-x550-18XSPQm Switch

The LEDs displays link status and activity. The possible LED states are described in Table 8.

Table 8. Link/Activity LEDs for 1/10Gbps Ports 1 to 16 on the AT-x550-18XSQ Switch and Ports 9 to 16 on the AT-x550-18XSPQm 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.
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: <ul style="list-style-type: none"> - 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.

QSFP+ Transceiver Ports

All AT-x550 Switch models have two 40Gbps QSFP+ transceiver ports, 17 and 21.

QSFP+ Transceivers

The ports support the following 40Gbps transceivers:

- ❑ AT-QSFP4SR4 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 the QSFP+ transceiver ports as standard networking ports or as stacking ports with the VCStack feature.

Note

The QSFP+ transceiver ports are initially configured as the default trunk ports for the VCStack feature. For instructions on how to configure the units for standalone operation, refer to the *x550 Series Installation Guide for Standalone Switches*.

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

Breakout Cables

When the VCStack feature is disabled and the switch is operating as a standalone device, the QSFP+ transceiver ports support the AT-QSFP-4SFP10G-3CU and AT-QSFP-4SFP10G-5CU breakout cables. Refer to Figure 8. A breakout cable converts a QSFP+ transceiver port from one 40Gbps port to four 10Gbps ports.



Figure 8. QSFP+ to SFP+ Breakout Cable

Port Numbering

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

- ❑ A QSFP+ transceiver in slot 17 has the port number 17.
- ❑ A QSFP+ transceiver in slot 21 has the port number 21.
- ❑ A breakout cable in slot 17 has the port numbers 17, 18, 19, and 20.
- ❑ A breakout cable in slot 21 has the port numbers 21, 22, 23, and 24.

LEDs

Each 40Gbps QSFP+ transceiver slot has one LED. The LEDs are located between the transceiver slots. Refer to Figure 9.

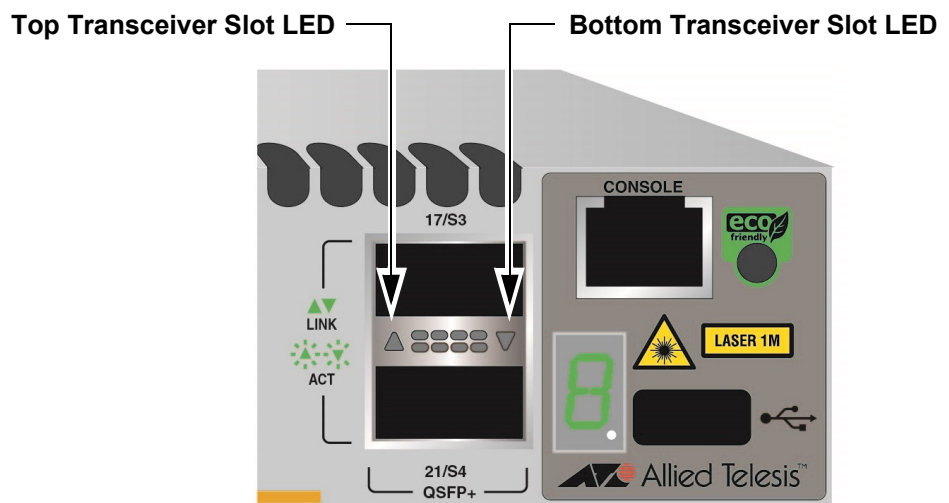


Figure 9. LEDs for the 40Gbps QSFP+ Slots

The LED displays link and activity status. Refer to Table 9.

Table 9. 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.

Table 9. Link and Activity Status LEDs for the 40Gbps QSFP+ Transceiver Slots with QSFP+ Transceivers (Continued)

State	Description
Off	<p>Possible causes of this state are listed here:</p> <ul style="list-style-type: none"> - 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 LED states for breakout cables are described in Table 10.

Table 10. 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	<p>Possible causes of this state are listed here:</p> <ul style="list-style-type: none"> - 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.

Port Numbering

Table 11 lists the port numbers for transceiver ports 17 and 21 when the switch is operating in a stack with the VCStack feature:

Table 11. Port Numbers for Transceiver Ports 17 and 21

Port	With Fiber Optic Transceiver or Direct Attach Cable	With Breakout Cable
17	portn.0.17	portn.0.17 portn.0.18 portn.0.19 portn.0.20
21	portn.0.21	portn.0.21 portn.0.22 portn.0.23 portn.0.24

The “*n*” variable is the switch’s ID number, displayed on the switch ID LED on the front panel. For more information, refer to “Designating Ports in the Command Line Interface for Stacks” on page 46.

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 can 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 operating in a low power mode when the LEDs are turned off. Operating the switch in the low power mode 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 standalone unit or the master or member switch of a VCStack, as detailed in Figure 12 on page 42.

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 in the command line interface.

VCStack Feature

You can use the switches as standalone units or join multiple units together with 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 standalone 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.

For more information, refer to Chapter 2, “Virtual Chassis Stacking” on page 49.

Switch ID LED

The switch ID LED, shown in Figure 10, displays the ID number of the switch. A standalone switch has the ID number 0. Switches in a VCStack have the numbers 1 to 4.

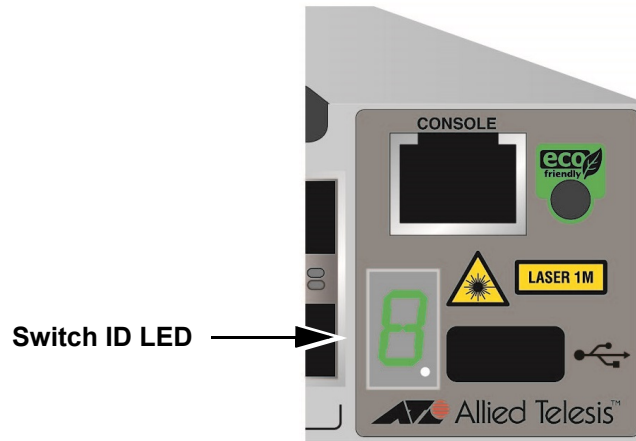
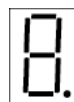


Figure 10. Switch ID LED

The states of the LED when the switch is not operating in the low power mode are shown in Figure 11.



The switch is booting up.



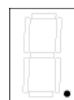
The switch has encountered a fault condition.



The switch is operating as a standalone unit.



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 11. Switch ID LED

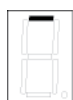
The switch displays the letter “F” for fault on the ID LED if it detects one of the following problems:

- ❑ A cooling fan has failed.
- ❑ The internal temperature of the switch has exceeded the normal operating range and the switch may shut down.

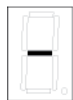
Note

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

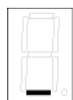
The states of the LED when the switch is operating in the low power mode are shown in Figure 12.



The switch is the master switch of a VCStack.



The switch is operating as a standalone unit.



The switch is a member switch of a VCStack.

2667

Figure 12. Switch ID LEDs in Low Power Mode

USB Port

The USB port on the management panel is typically used for the following functions:

- ❑ Store configuration files on flash drives.
- ❑ Restore configuration files to switches whose settings have been lost or corrupted.
- ❑ Configure replacement units by downloading configuration files from a flash drive.
- ❑ Update the management firmware.

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 181 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.

Designating 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 13.

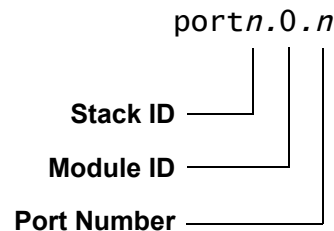


Figure 13. PORT Parameter in the Command Line Interface

The three parts of the PORT parameter are described in Table 12.

Table 12. PORT Parameter Format

Number	Description
Stack ID	Designates the switch's ID number, 1 to 4, displayed on the Switch ID LED.
Module ID	Designates the module number of a port. This value is always 0 (zero) for x550 Switches. The series does not support modules.
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 1 and 7 in the switch with the ID number 2:

```
awplus> enable
awplus# configure terminal
awplus(config)# interface port2.0.1,port2.0.7
```

For instructions on the command line interface and the PORT parameter, refer to the *Command Reference: x550 Series Switches Running AlliedWare Plus*.

Software and Hardware Releases

Software and hardware releases for the AlliedWare Plus operating software and x550 Switch Series are listed Table 13. Version 5.4.7A-0 of the AlliedWare Plus operating software was the initial release for this product.

Table 13. Software and Hardware Releases

AlliedWare Plus Version	Hardware / VCStack
v5.4.7A-0	AT-x550-18XTQ Switch AT-x550-18XSQ Switch
	VCStack feature: Maximum number of switches in a stack: 2 Trunk ports: 40Gbps QSFP+ transceiver slots 17 and 21 (S3 and S4).
v5.4.7-1	VCStack feature: Maximum number of switches in a stack: 4 Trunk ports: 40Gbps QSFP+ transceiver slots 17 and 21 (S3 and S4) or 10Gbps ports 15 and 16 (S1 and S2)
v5.4.8-0.2	AT-x550-18XSPQm Switch

Chapter 2

Virtual Chassis Stacking

The sections in this chapter are listed here:

- “Overview” on page 50
- “Stacking Guidelines” on page 51
- “Stack Trunk” on page 52
- “Master and Member Switches” on page 69
- “Switch ID Numbers” on page 71
- “Optional Feature Licenses” on page 72
- “Planning the Stack” on page 73
- “Stacking Worksheet” on page 74

Note

For more information on VCStack, refer to the *Virtual Chassis Stacking (VCStack) Feature Overview and Configuration Guide* and the *Command Reference: x550 Series Switches Running AlliedWare Plus* from www.alliedtelesis.com.

Overview

The Virtual Chassis Stacking (VCStack) feature is used to connect multiple x550 Switches into a single, virtual 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 give you management access to all the switches in the stack.
- ❑ 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 a stack, rather than from only one switch. Distributing the ports of an aggregator across two or more switches in a stack increases its resiliency because it can continue to function, though at a reduced bandwidth, even if one of the switches stops functioning.
- ❑ Reduces protocol requirements - Building a stack might eliminate the need to configure some protocols, such as the Virtual Router Redundancy Protocol or Spanning Tree Protocol.

Stacking Guidelines

This section lists general guidelines to building a VCStack of x550 Switches. Stacking guidelines differ depending on the version of the AlliedWare Plus management software on the switches. (Instructions in Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 and Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141 explain how to display the version numbers of the management software.)

Here are general stacking guidelines that apply regardless of the AlliedWare Plus version number:

- ❑ The default setting for stacking on x550 Switches is enabled.
- ❑ No additional software or licenses are required.
- ❑ The switches of a stack can be the same or different x550 Series models.
- ❑ A stack of x550 Switches cannot contain other stacking switches, such as x600 or x610 Switches.
- ❑ The switches of a stack must be connected with a stack trunk consisting of two ports or transceiver slots on each device.
- ❑ The stack trunk must be direct connections between the switches. Do not install any networking devices, such as media converters or Ethernet switches, between two stacking ports or transceivers.

Here are stacking guidelines for AlliedWare Plus v5.4.7A-0 management software:

- ❑ A stack cannot have more than two x550 Switches.
- ❑ You must use the 40Gbps QSFP+ transceiver ports 17 and 21 for the stack trunk.

Here are stacking guidelines for AlliedWare Plus v5.4.8-0.2 or later management software:

- ❑ A stack can have up to four x550 Switches.
- ❑ You can use either two 10Gbps ports or the two 40Gbps QSFP+ transceiver ports 17 and 21 for the stack trunk. Ports 17 and 21 are the default stack trunk.
- ❑ SFP+ or QSFP+ transceivers used for a stack trunk must be from Allied Telesis. Switches will not form a stack with 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.

Stack Trunk

A stack trunk connects the switches of a stack together. It consists of two ports on each device. For switches with AlliedWare Plus v5.4.8-0.2 or later, you can choose the two ports. Refer to Table 14:

Table 14. Default (40Gbps) and Optional (10Gbps) Trunk Ports

Switch	Optional Trunk Ports (10Gbps)		Default Trunk Ports (40Gbps)
AT-x550-18XTQ		15/S1, 16/S2 ¹	17/S3, 21/S4
AT-x550-18XSQ		15/S1, 16/S2 ²	17/S3, 21/S4
AT-x550-18XSPQm	7/S1, 8/S2 ³	15/S3, 16/S4 ³	17/S5, 21/S6

1. 1Gbps and 10Gbps twisted pair ports.
2. 1Gbps SFP and 10Gbps SFP+ transceiver slots.
3. 1/2.5/5/10Gbps PoE+ twisted pair ports.

Note

For switches with AlliedWare Plus v5.4.7A-0, you have to use QSFP+ ports 17 and 21 for the stack trunk.

The guidelines are discussed in the following sections:

- “40Gbps Stack Trunks,” next
- “10Gbps Stack Trunks” on page 59

Note

The following discussions apply to AlliedWare Plus v5.4.8-0.2 or later. Earlier versions of the operating system have different trunk rules and restrictions.

40Gbps Stack Trunks

Here are the stacking guidelines for 40Gbps trunks:

- 40Gbps trunks use the two QSFP+ ports 17 and 21.
- The 40Gbps QSFP+ ports are the default stacking ports.
- You can use the QSFP+ ports to build stacks of two, three, or four AT-x550 Switches.
- The QSFP+ ports can be used as regular Ethernet networking ports by disabling the stacking feature or using 10Gbps ports for the stack trunk.

- The 40Gbps transceivers must be from Allied Telesis and be approved for use in the product. Listed here are the 40Gbps transceivers that were approved when this manual was written. For the latest information, refer to the product data sheet on the Allied Telesis web site:
 - 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 1m and 3m, respectively

Note

Transceivers are purchased separately.

- ❑ Trunk paths can be either linear or ring. Refer to Figure 14. Ring trunks are recommended because they add redundancy. Switches can continue to function as a stack even if a trunk link fails.

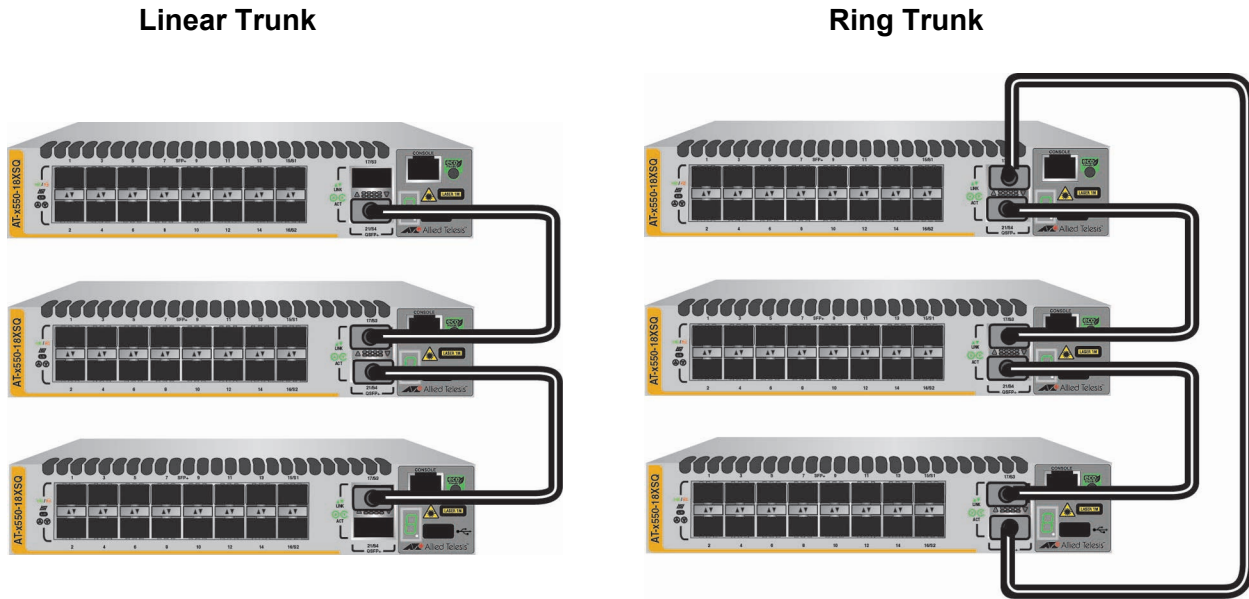


Figure 14. 40Gbps Linear and Ring Trunk Paths

The following examples show the ring path only.

- ❑ The cables of 40Gbps QSFP+ stack trunks must cross over to different slots 17 and 21 on the switches. That is, the connection of the transceiver in slot 17 must connect to the transceiver in slot 21 in the next switch. Figure 15 shows the correct wiring configurations for stacks of two, three, and four switches.



Caution

The switches will not form a stack if the connections do not cross over to different QSFP+ ports, but will instead operate as standalone devices. E78

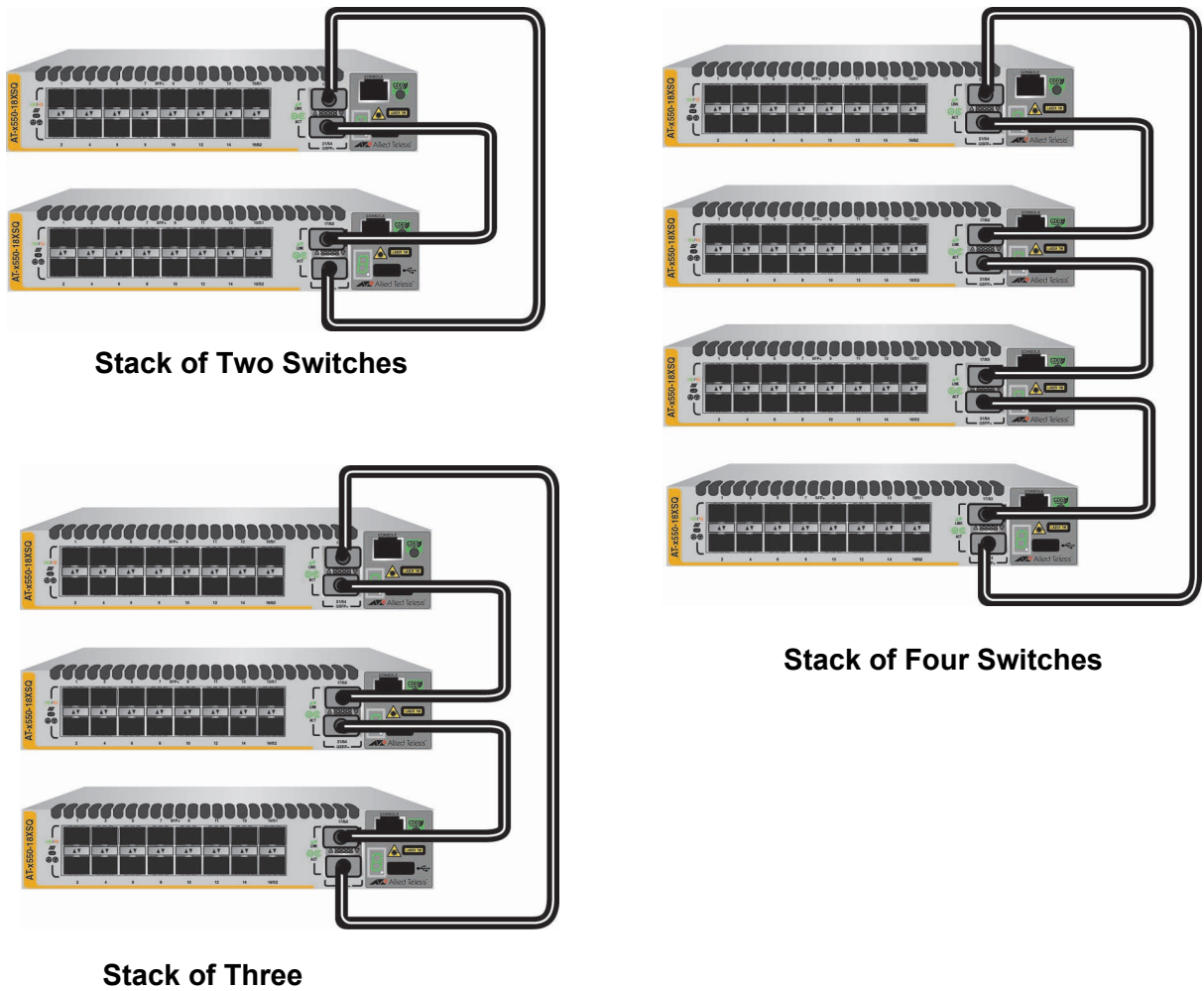


Figure 15. Cabling QSFP+ Ports 17 and 21 for a Stack Trunk

- Stacks with 40Gbps trunks can have different x550 Series models. An example is shown in Figure 16.

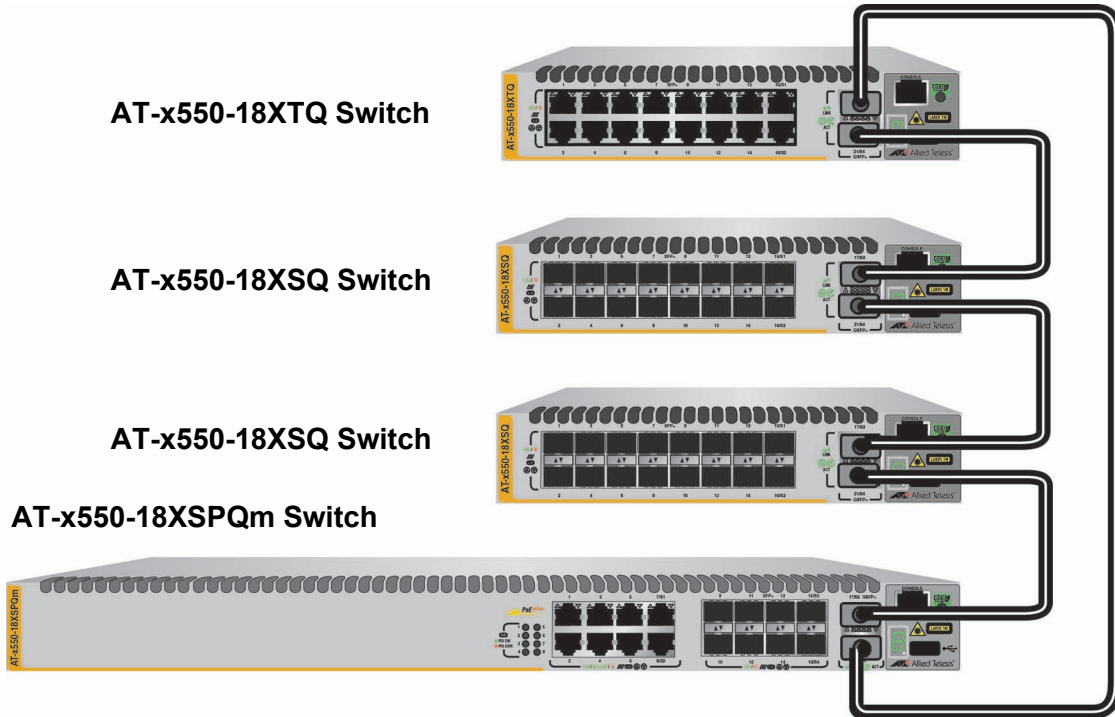


Figure 16. Example of a 40Gbps Stack Trunk with Different Switch Models

- ❑ 40Gbps trunks can have both fiber optic transceivers and AT-QSFP1CU or AT-QSFP3CU direct connect cables. This is useful in situations where switches are at different distances from each other. Refer to Figure 17.

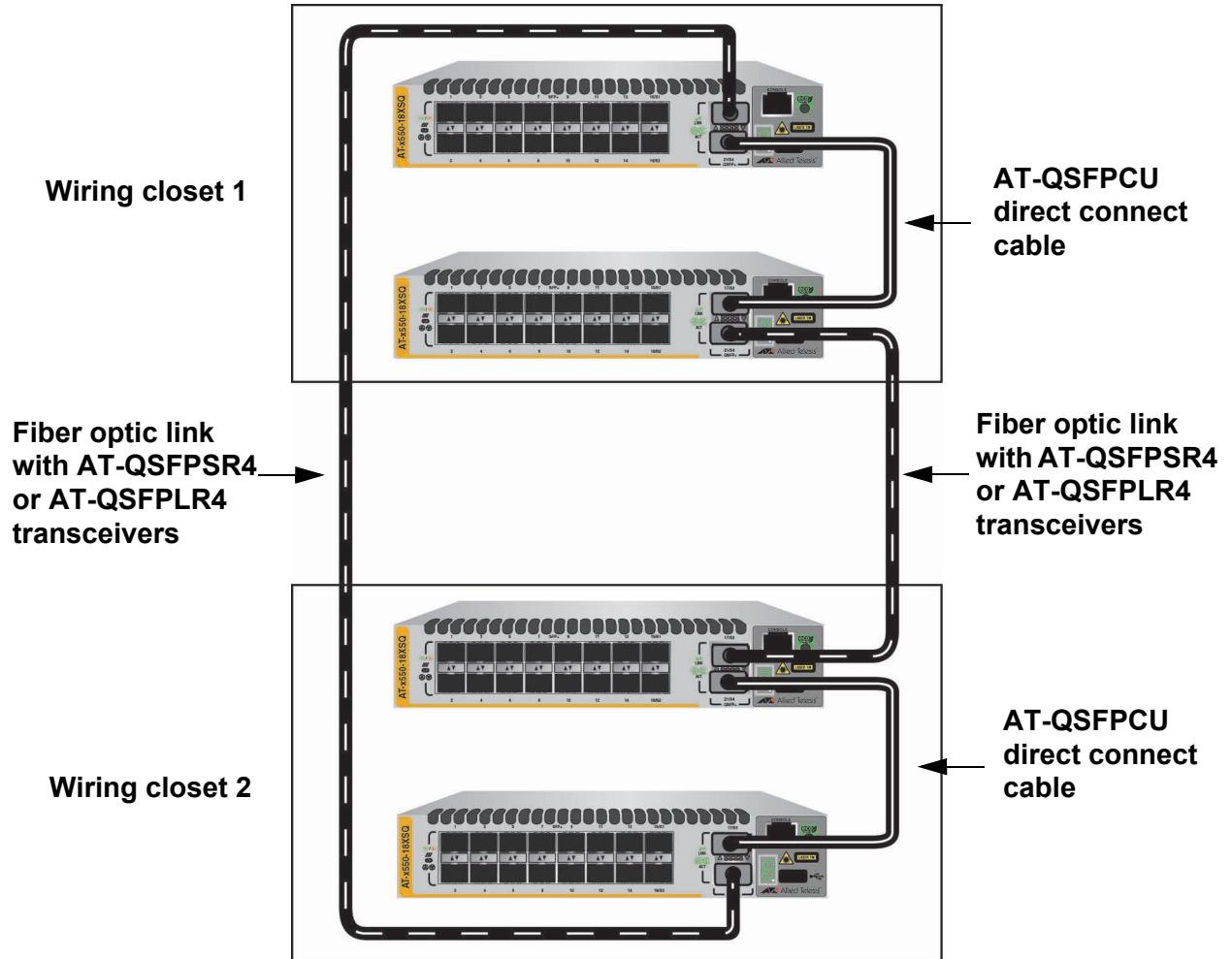


Figure 17. Example of a 40Gbps Trunk with Fiber Optic and Direct Connect Cables

- 40Gbps trunks can also have both AT-QSFPSR4 and AT-QSFPLR4 fiber optic transceivers. Refer to Figure 18.

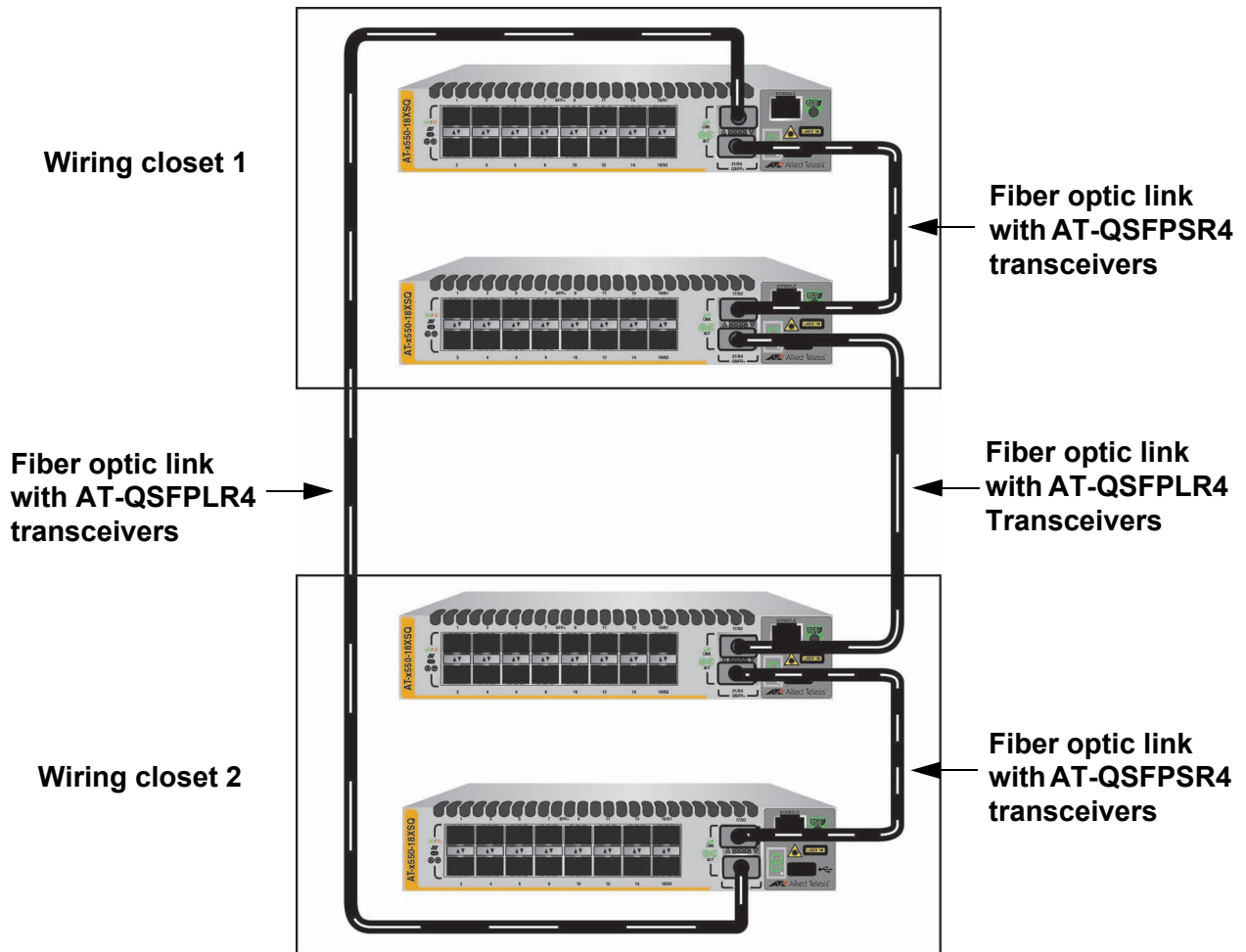


Figure 18. Example of a 40Gbps Trunk with Short and Long Distance Fiber Optic Transceivers

10Gbps Stack Trunks

You can also build stack trunks with 10Gbps twisted pair ports or SFP+ transceiver slots on the switches. The guidelines are described here:

- ❑ Stacks with 10Gbps trunks can have up to four switches.
- ❑ The 10Gbps stacking ports are listed in Table 15.

Table 15. 10Gbps Stacking Ports and Transceiver Slots

Model	1/2.5/5/10 Gbps PoE+ Twisted Pair Ports	1Gbps and 10Gbps Twisted Pair Ports	1Gbps SFP and 10Gbps SFP+ Transceiver Slots
AT-x550-18XTQ		15/S1, 16/S2	
AT-x550-18XSQ			15/S1, 16/S2
AT-x550-18XSPQm	7/S1, 8/S2		15/S3, 16/S4

- ❑ As shown in the table, the AT-x550-18XTQ and AT-x550-18XSQ Switches have one set each of 10Gbps stacking ports, 15/S1 and 16/S2. The stacking pair on the AT-x550-18XTQ Switch consists of 10Gbps twisted pair ports while the pair on the AT-x550-18XSQ has SFP+ transceiver slots.
- ❑ The AT-x550-18XSPQm Switch has two 10Gbps stacking pairs. Pair 7/S1 and 8/S2 are twisted pair ports and 15/S3 and 16/S4 are SFP+ transceiver slots. You can use either pair to build a 10Gbps trunk for the switches of a stack.
- ❑ SFP+ transceivers must be from Allied Telesis and be approved for use in the product. For a list of supported 10Gbps SFP+ transceivers, refer to the product data sheet on the Allied Telesis web site:

Note

Transceivers are purchased separately.

- ❑ The 10Gbps stacking ports and transceiver slots can be used as regular networking ports by disabling the stacking feature or using the 40Gbps transceiver slots as the stacking trunk.
- ❑ A stack trunk can be either linear or ring. Ring is recommended because it adds redundancy. The stack can continue to function even if a trunk link fails. The following examples show the ring configuration only.

- As with 40Gbps trunks, the stack cables of 10Gbps trunks must cross over to different stack ports on the switches. For example, when cabling two AT-x550-18XSQ Switches, the connection of the transceiver in slot 17 has to connect to the transceiver in slot 18 in the next switch. Figure 19 shows the correct wiring configurations for stacks of two, three, and four switches.



Caution

The switches will not form the stack if the connections do not cross over, but will instead operate as standalone devices. E78

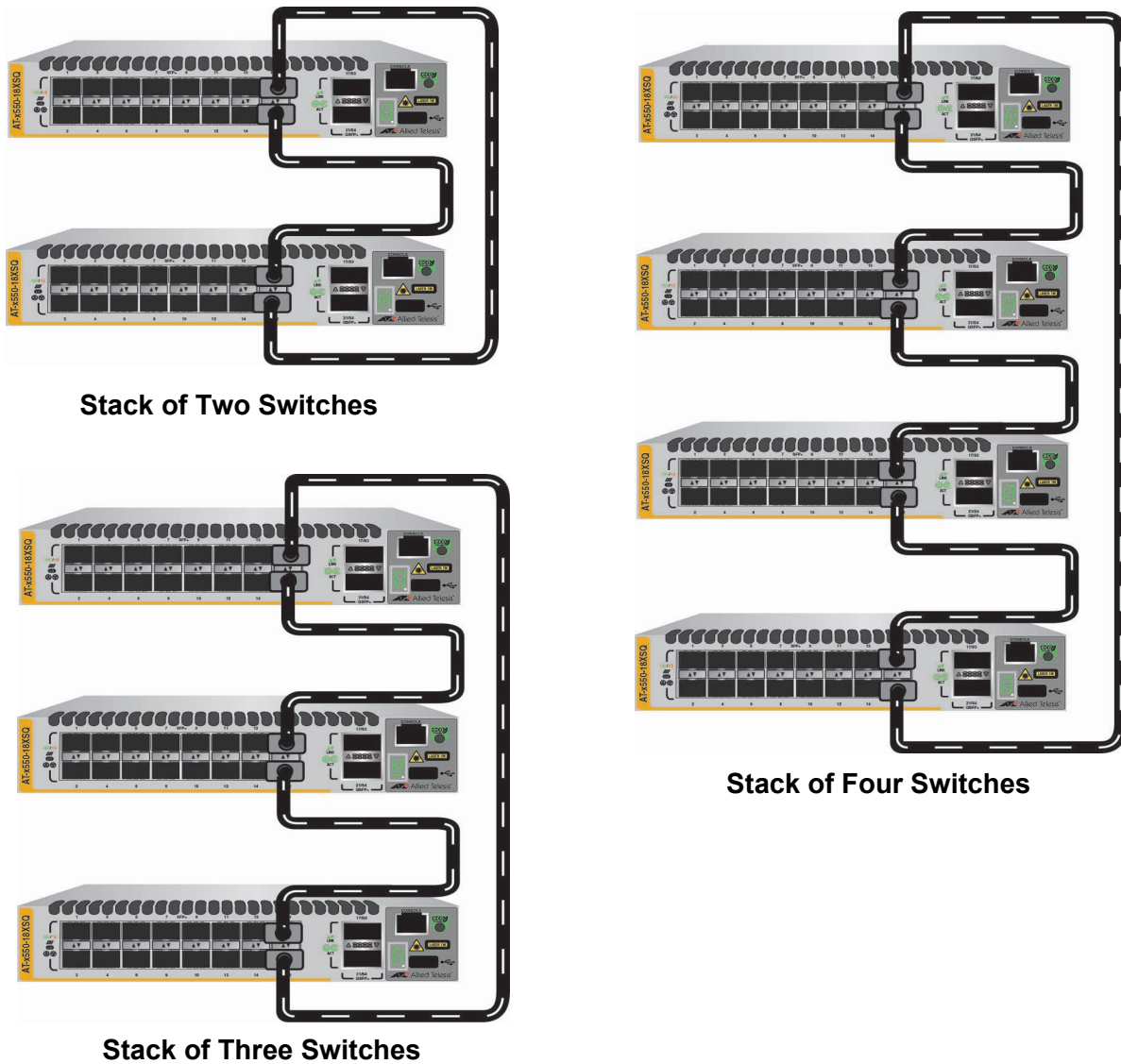


Figure 19. Cabling 10Gbps Ports as a Stack Trunk

- ❑ Stacks with 10Gbps trunks can have different switch models. Figure 20 is an example of a mixed stack of AT-x550-18XSQ and AT-x550-18XSPQm Switches.

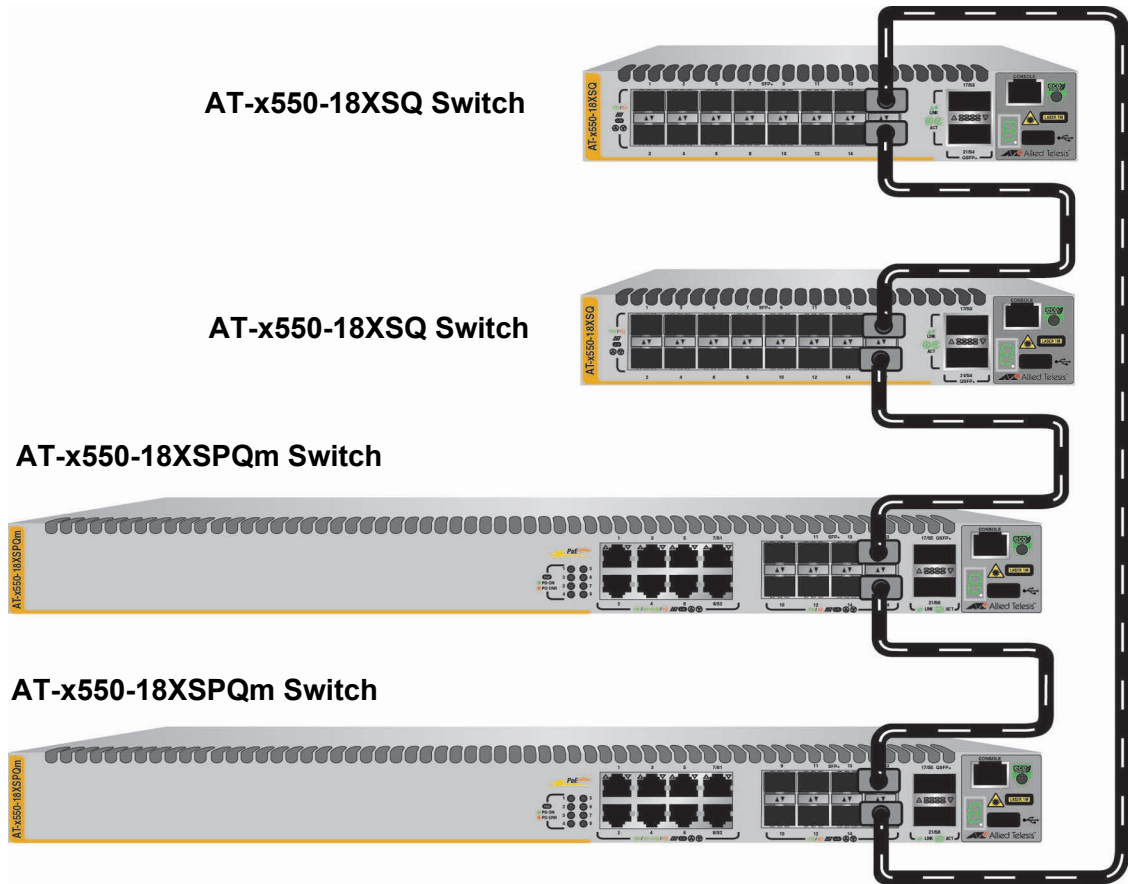


Figure 20. Example of a 10Gbps Stack Trunk with AT-x550-18XSQ and AT-x550-18XSPQm Switches

- Figure 21 is an example of a 10Gbps stack of AT-x550-18XTQ and AT-x550-18XSPQm Switches.

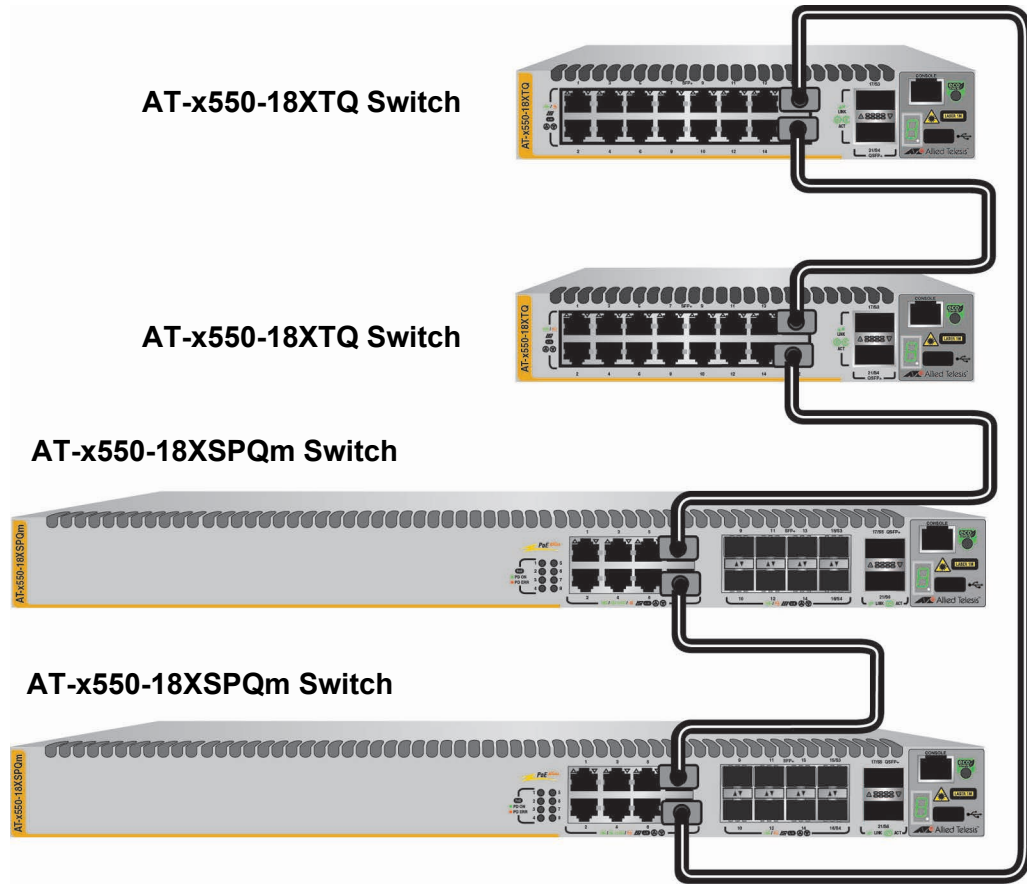


Figure 21. Example of a 10Gbps Stack Trunk with AT-x550-18XTQ and AT-x550-18XSPQm Switches

- Building 10Gbps trunks for stacks that have both AT-x550-18XTQ and AT-x550-18XSQ Switches requires the optional SP10 transceiver. It converts SFP+ transceiver slots into 100Mbps/1Gbps/10Gbps RJ-45 twisted pair ports. You use the transceiver to connect a 10Gbps stacking SFP+ transceiver slot in the AT-x550-18XSQ Switch to a 10Gbps stacking port on the AT-x550-18XTQ Switch. An example of a 10Gbps trunk for a stack with both switches is shown in Figure 22.

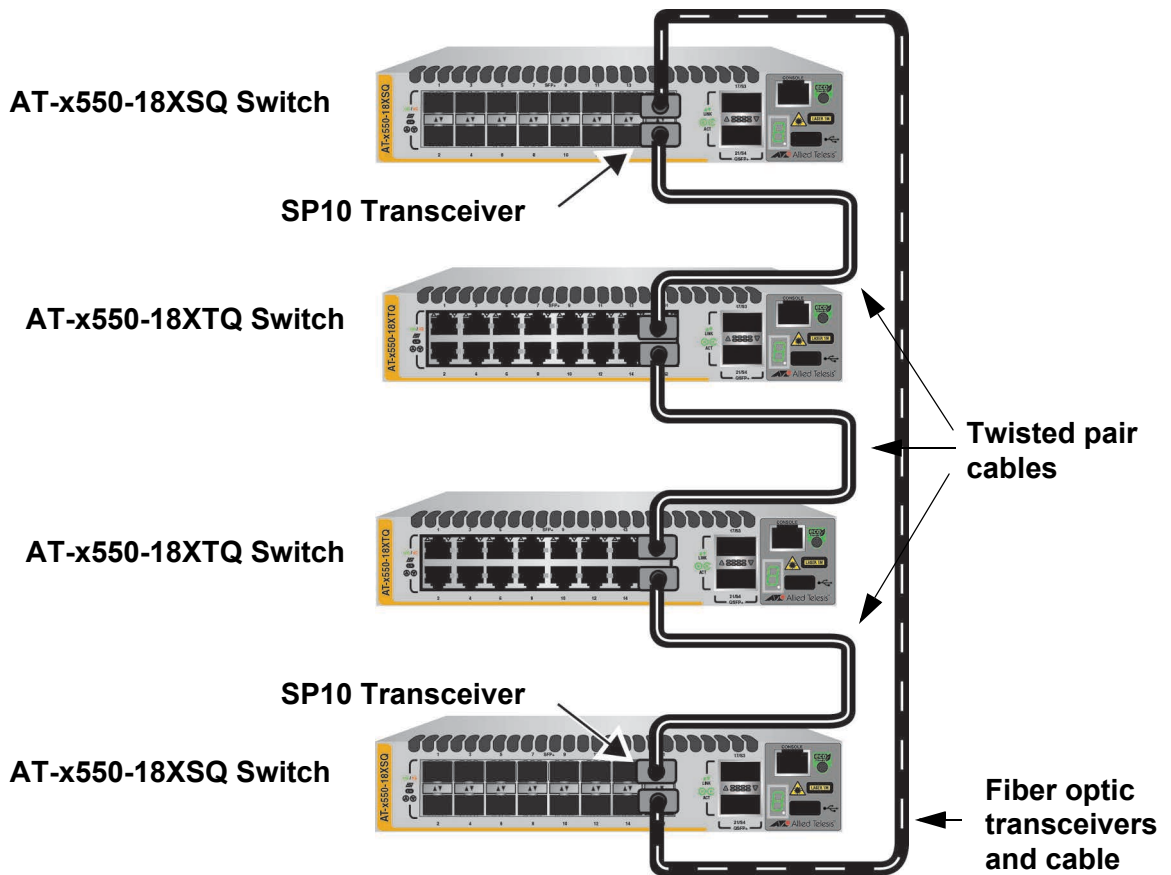


Figure 22. Example of a 10Gbps Stack Trunk for AT-x550-18XTQ and AT-x550-18XSQ Switches with SP10 Transceivers

- The example in Figure 23 uses SP10 transceivers to build a stack of all three AT-x550 models, with a 10Gbps trunk.

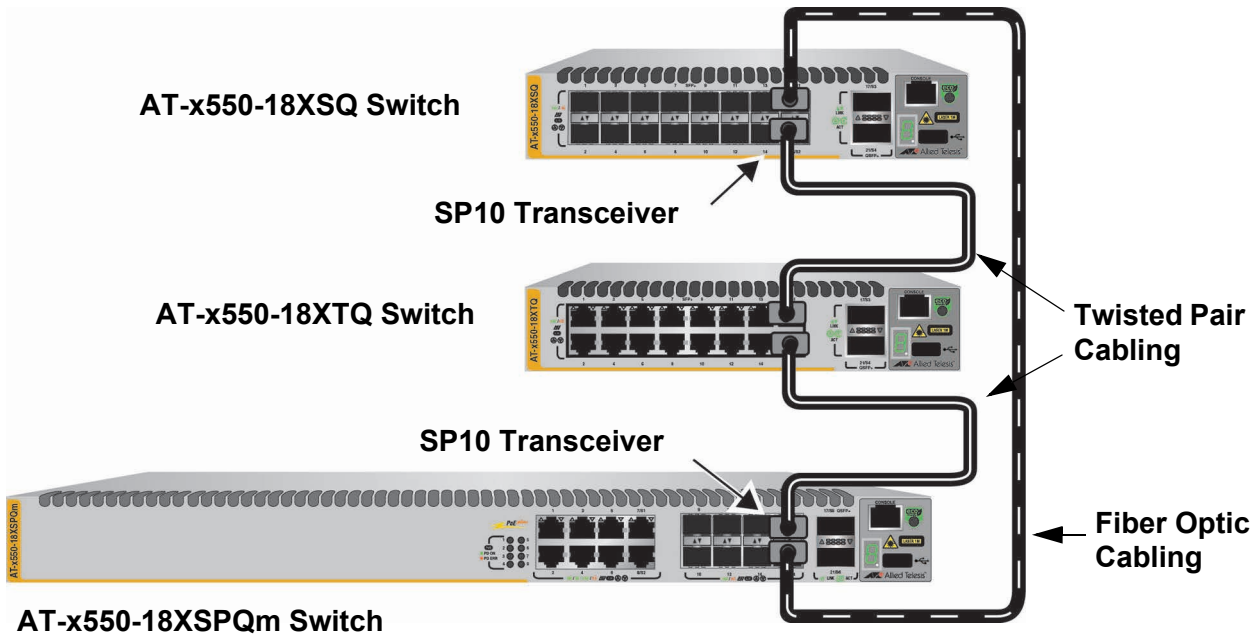


Figure 23. Example of a 10Gbps Stack Trunk for All Switches with SP10 Transceivers

- ❑ You can use the 1-meter AT-SP10TW1 and 3-meter AT-SP10TW3 direct connect twinax cables to build 10Gbps trunks for AT-x550-18XSQ and AT-x550-18XSPQm Switches that are in the same or adjacent equipment racks. Refer to Figure 24.

Note

The AT-x550 Switches do not support the 7-meter AT-SP10TW7 direct connect cable.

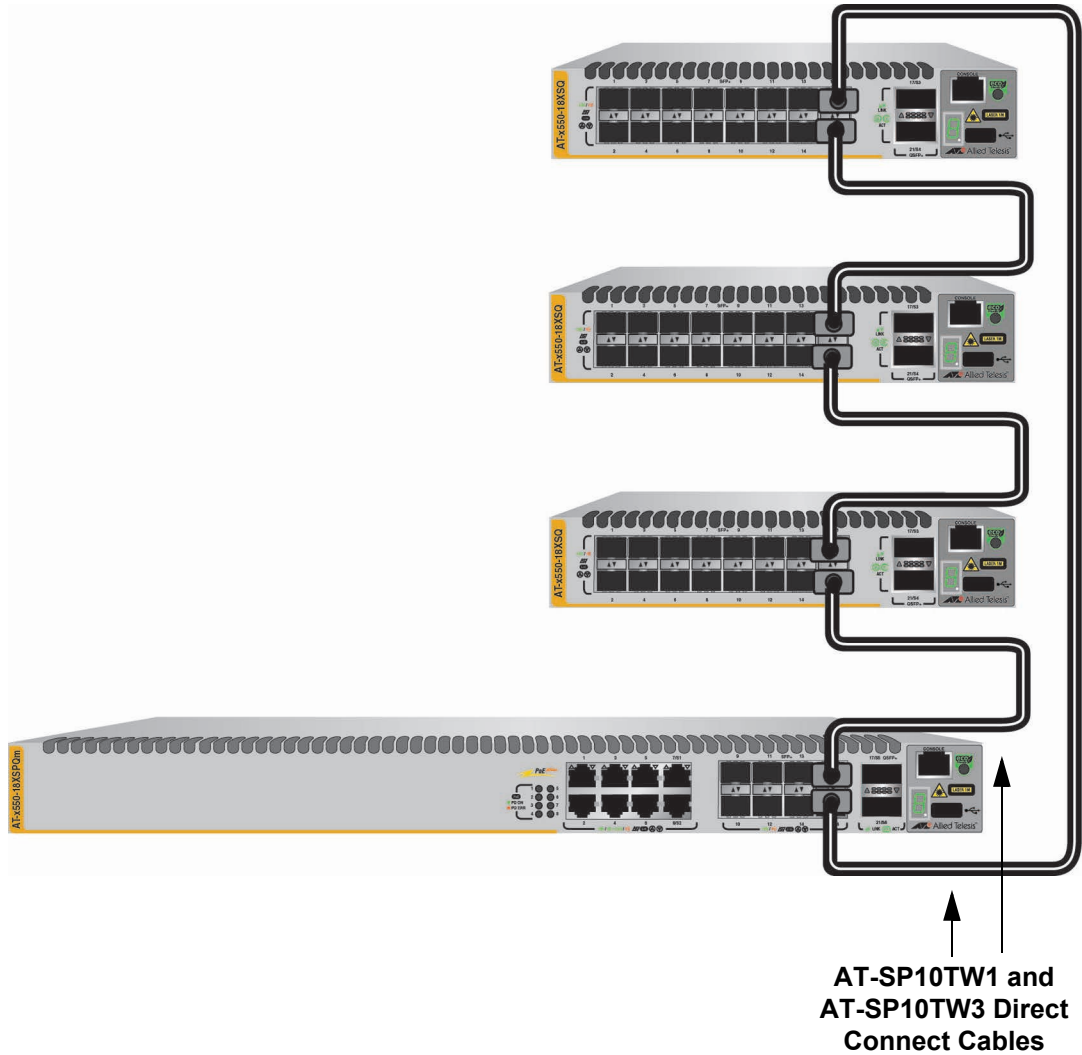


Figure 24. Example of a 10Gbps Stack Trunk with AT-SP10TW1 and AT-SP10TW3 Direct Connect Cables

Invalid Stack Trunks

Here are invalid stack trunks:

- ❑ A trunk on a switch cannot have more than two stacking ports.
- ❑ Stack trunks cannot have both 10Gbps and 40Gbps links. An example is shown in Figure 25.

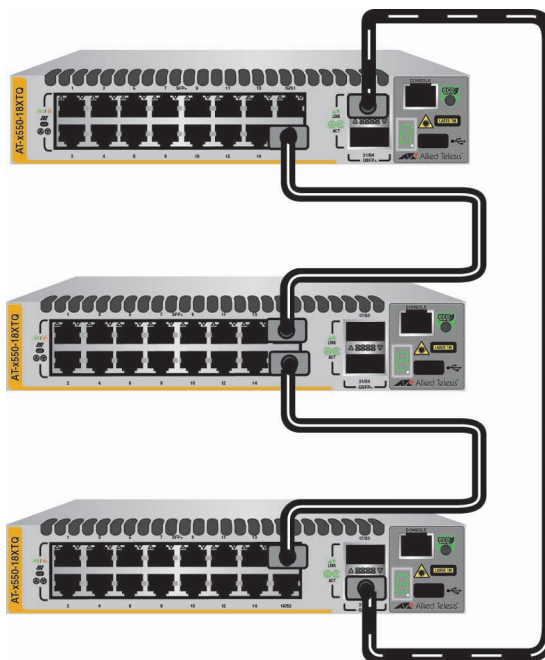


Figure 25. Invalid Stack Trunk with 10Gbps and 40Gbps Links

- ❑ 10Gbps stack trunks on AT-x550-18XSPQm Switches cannot use ports from both sets of 10Gbps stacking ports, listed in Table 15 on page 59. Figure 26 is an example of this type of invalid trunk.

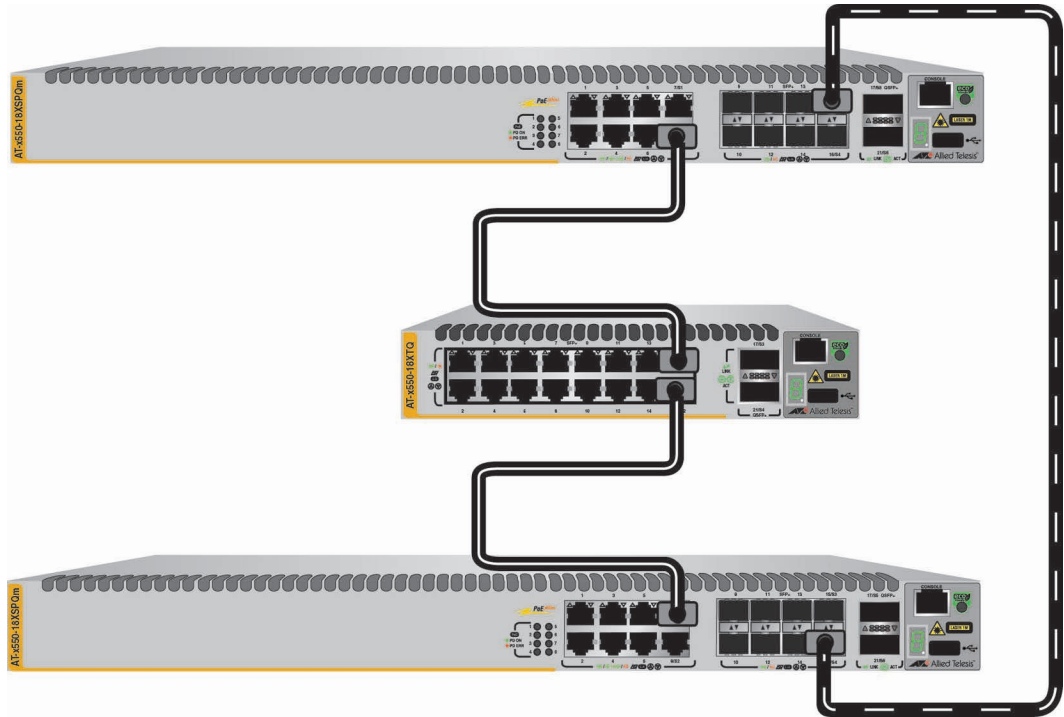


Figure 26. Invalid 10Gbps Stack Trunk with Ports from Both Stacking Pairs on AT-x550-18XSPQm Switches

- ❑ Stack trunks must be direct links between trunk ports. There cannot be any intermediary networking devices, such as media converters, Ethernet switches, or routers, between trunk ports. Figure 27 is an example of this type of invalid trunk.

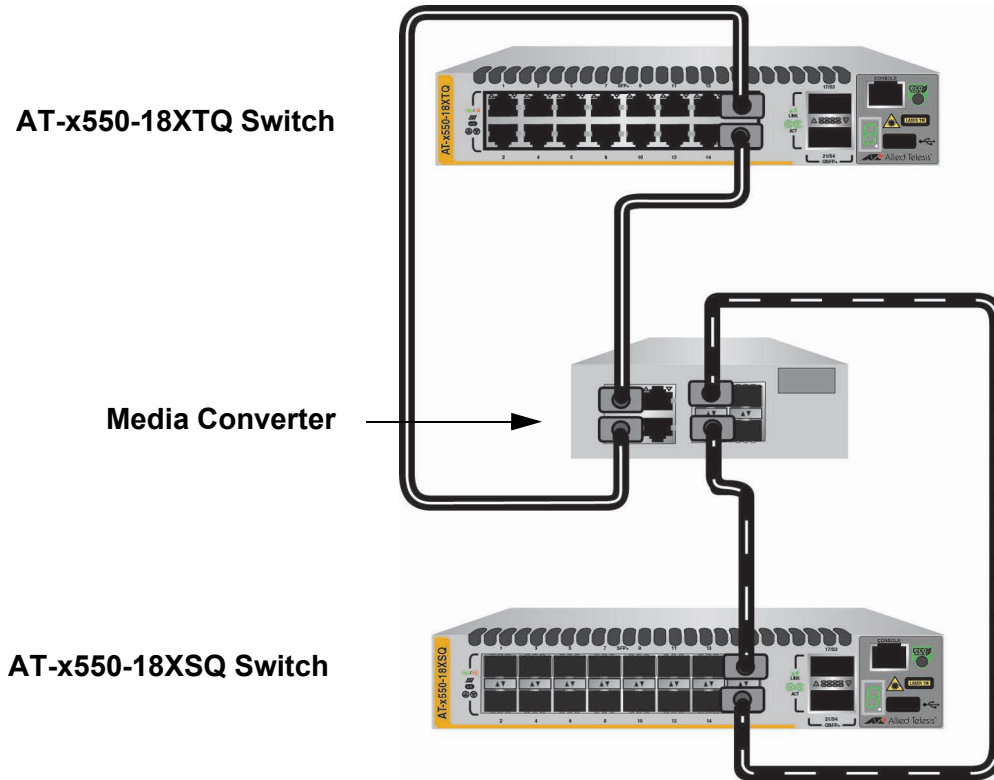


Figure 27. Invalid Stack Trunk with a Intermediary Networking Device

Master and Member Switches

A stack has one master switch. The other switches are member switches. 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 switches 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. The master switch is selected using 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.

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. It can have any ID number.

Switch ID Numbers

Each switch in a stack has to have a unique ID number. The numbers are displayed on the ID LEDs on the front panels of the units. The possible ID numbers depend on the version number of the AlliedWare Plus management software. The ID numbers are 1 and 2 for the two switches in a stack with AlliedWare Plus v5.4.7A-0, and 1 to 4 for the four switches in a stack with AlliedWare Plus v5.4.8-0.2 or later. The default is 1.

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 “Designating Ports in the Command Line Interface for Stacks” on page 46.

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 of the stack. 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 their priority numbers and MAC addresses, as explained in “Selection of the Master Switch” on page 69. The master switch can have any ID number.

Optional Feature Licenses

The x550 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 offers additional features and capabilities for the switches. They come with the AlliedWare Plus operating system, but have to be unlocked before you can use them. Unlocking optional features requires licenses from Allied Telesis. For a list of optional feature licenses for the product, refer to its product sheet on the Allied Telesis web site.

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

- ❑ The VCStack feature is part of the base features of the switch. It does not require a feature license.
- ❑ You can install feature licenses while the switches are operating as standalone units or 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 feature licenses. To resolve the issue, you can use the `ATMF REMOTE-LOGIN` command to log onto the individual switches in a stack to install new licenses. For more information, refer to the *Command Reference: x550 Series Switches Running AlliedWare* from www.alliedtelesis.com.

Planning the Stack

Here are factors to consider when planning a stack:

- ❑ How many AT-x550 Switches will be in the stack? The maximum is four devices.
- ❑ Which ports will be the stack trunk? Refer to “Stack Trunk” on page 52.
- ❑ Which switch will be the master switch? This can be any switch. If the switches has different versions of the AlliedWare Plus management software, the master switch should have the most recent version. Refer to “Master and Member Switches” on page 69.
- ❑ What will be the ID numbers of the switches? The range is 1 to 4. Refer to “Switch ID Numbers” on page 71.
- ❑ Do all the switches have the same version of the AlliedWare Plus management software, preferably v5.4.8-0.2 or later? Instructions in Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 and Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141 explain how to view this information.

Note

Before adding an AT-x550-18XSPQm Switch to an existing stack, verify that the stack switches have AlliedWare Plus v5.4.8-0.2 or later. An AT-x550-18XSPQm Switch cannot join a stack that has an earlier version of the management software.

- ❑ If the stack will have both AT-x550-18XTQ and AT-x550-18XSQ Switches with a 10Gbps trunk, have you determined the required number of SP10 transceivers for the trunk? Refer to Figure 22 on page 63 and Figure 23 on page 64.

Stacking Worksheet

Configuring and maintaining a stack will be easier if you use the worksheet in Table 16.

Table 16. Stacking Worksheet

Switch	Switch Model/ Location	ID	Priority	AW+ Version Number	Trunk Ports
Master		1	1		
Member		2	2		
Member		3	3		
Member		4	4		

The table columns are described in Table 17.

Table 17. Stacking Worksheet Columns

Column	Description
Location	You use this column to write down the physical locations of the devices, such as their buildings or equipment rooms. The information can be useful in locating the switches of the stack if they are in different locations.
ID	Each switch in a stack has to have a unique ID number, in the range of 1 to 4. They display the numbers on the ID LEDs on the front panels and you use the numbers to configure the individual ports. Allied Telesis recommends assigning the ID 1, the default value, to the master switch. You should decide ahead of time, before beginning the configuration procedures, the ID assignments of the switches.

Table 17. Stacking Worksheet Columns (Continued)

Column	Description
Priority	<p>When the switches of a stack are reset or powered on, they perform an initialization process that involves, in part, choosing the master switch. The selection is based on their priority numbers and MAC addresses. The former is an adjustable parameter with a range of 0 to 255 and a default value of 128. The lower the value, the higher the priority. Thus, the switch with the lowest value becomes the stack master.</p> <p>If switches have the same priority number, the master is selected based on their MAC addresses. Again, as with priority numbers, the lower the MAC address, the higher the priority.</p> <p>Allied Telesis recommends setting each switch's priority value to match its ID value. This is to ensure that the switch you have chosen to be the master unit will indeed function in that role. Additionally, it will make it possible for you to know the order in which the switches assume the master role if the primary master should fail or be powered off.</p>
AW+ Version Number	<p>This column is for writing down the version numbers of the AlliedWare Plus management software on the switches. The switches might not be able to form the stack if they have different versions. The configuration instructions explain how to view the version numbers. If they have different versions, you should update them to the most recent release before building the stack.</p>
Trunk Ports	<p>This column is for the ports of the trunk. This will be the default ports 17 and 21 or the optional trunk ports. Refer to Table 14 on page 52. If you have not yet chosen the ports yet, you should do so before beginning the configuration procedures.</p>

Chapter 3

Beginning the Installation


The chapter contains the following sections:

- “Reviewing Safety Precautions” on page 78
- “Choosing a Site for the Switch” on page 82
- “Unpacking the AT-x550-18XTQ or AT-x550-18XSQ Switch” on page 83
- “Unpacking the AT-x550-18XSPQm Switch” on page 86

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 (T_{mra}).  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**

To reduce the risk of electric shock, the PoE ports on this product must not connect to cabling that is routed outside the building where this device is located.  E40


**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.

- ❑ Before installing 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.
- ❑ Before installing 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. *ES* E91

Unpacking the AT-x550-18XTQ or AT-x550-18XSQ Switch

Figure 28 shows the shipping box for the AT-x550-18XTQ or AT-x550-18XSQ Switch.

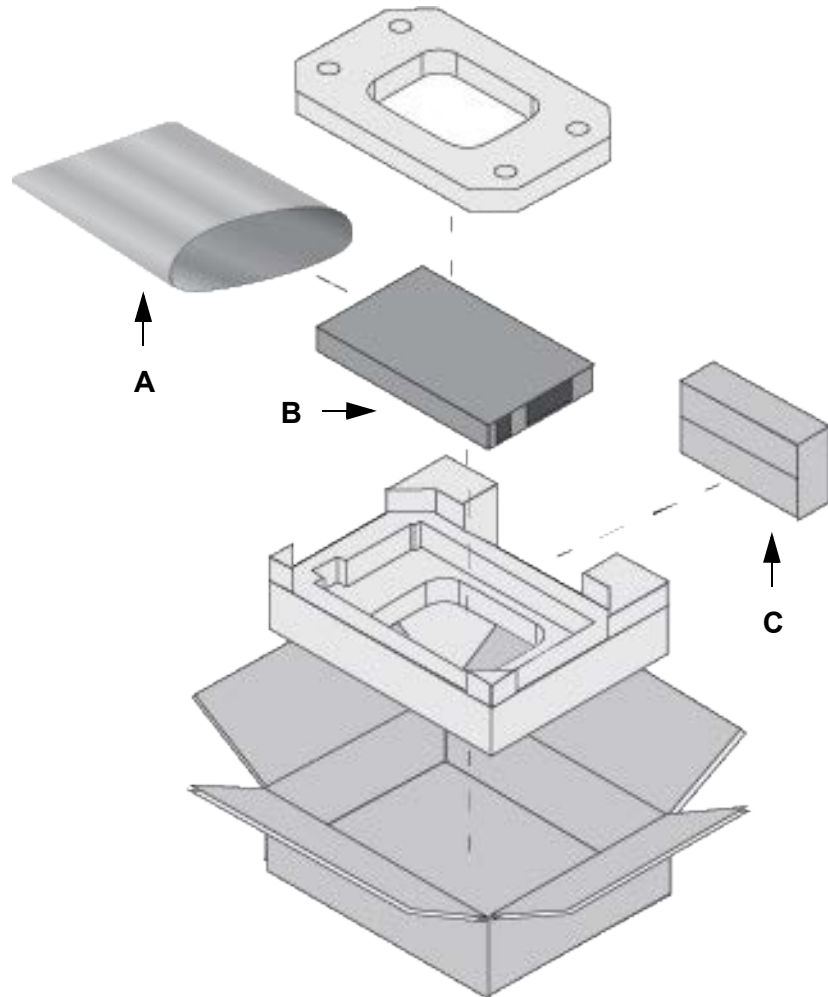


Figure 28. AT-x550-18XTQ or AT-x550-18XSQ Switch Shipping Box

The items in the box are listed here:

- A - Protective bag
- B - AT-x550-18XTQ or AT-x550-18XSQ Switch
- C - Accessory kit

Note

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

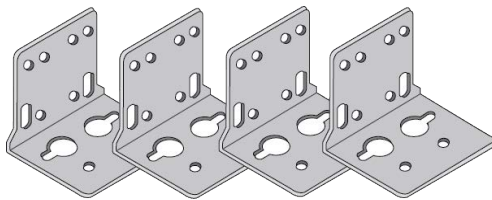
Figure 29 here and Figure 30 on page 85 list the items in the accessory kit. Contact your Allied Telesis sales representative for assistance if any item is missing or damaged.



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



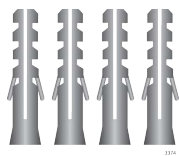
One regional AC power cord



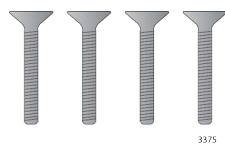
Four AT-RKMT-J24 wall-mounting brackets



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.)

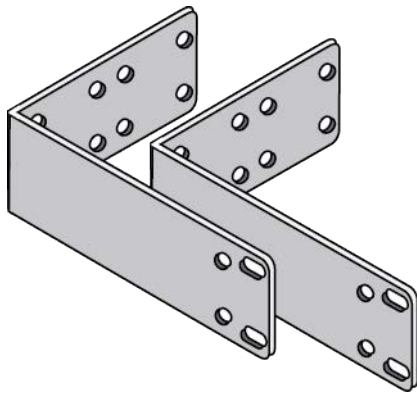


Four screws for wood or concrete walls:
Length: 32mm (1.3 in.)
Diameter: 4mm (0.2 in.)

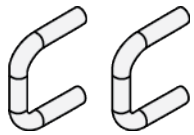


Power cord retaining clip

Figure 29. 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 AT-RKMT-J14 equipment rack brackets:

Length: 6.0mm (0.2 in.)

Diameter: 3.0mm (0.1 in.)

Figure 30. Accessory Kit (Continued)

Unpacking the AT-x550-18XSPQm Switch

Figure 31 shows the shipping box for the AT-x550-18XSPQm Switch.

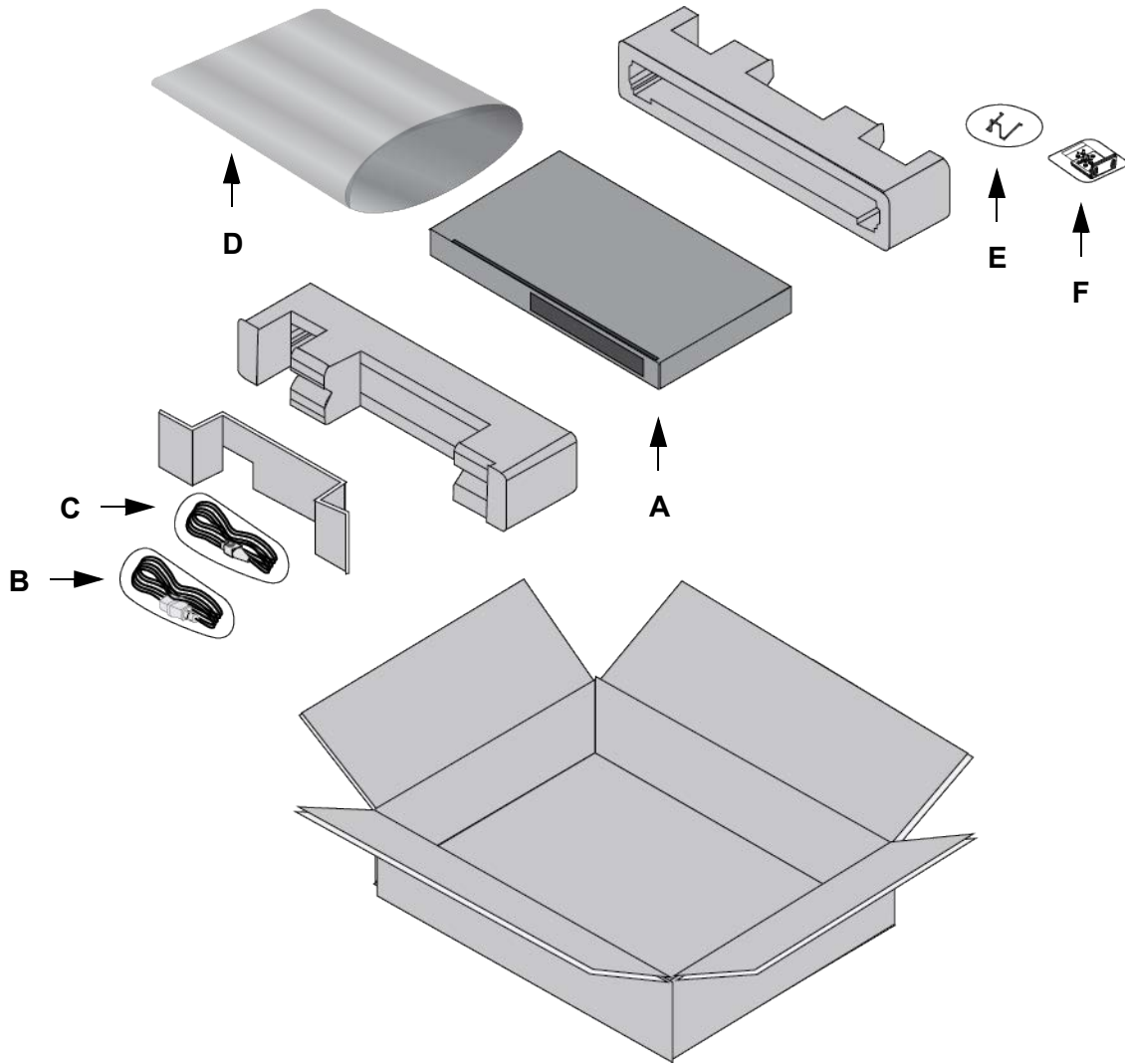


Figure 31. AT-x550-18XSPQm Switch Shipping Box

The items in the box are listed here:

- A - AT-x550-18XSPQm Switch
- B - AC power cord
- C - Management cable
- D - Protective bag
- E - Power cord retaining clip
- F - Brackets and screws

Note

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

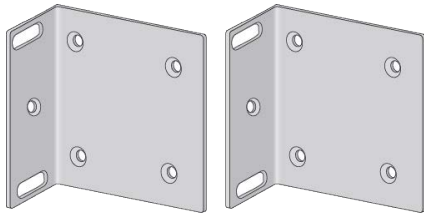
Figure 32 list the accessory items included with the switch. Contact your Allied Telesis sales representative for assistance if any item is missing or damaged.



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



Two wall/equipment rack brackets



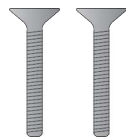
Eight screws for attaching the wall/equipment rack brackets to the switch.

Length: 6.0mm (0.2 in.)
Diameter: 4.0mm (0.2 in.)



Two anchors for concrete walls:

Length: 29.6mm (1.2 in.)
Diameter: 6.0mm (0.2 in.)



Two screws for wood or concrete walls:

Length: 32mm (1.3 in.)
Diameter: 4mm (0.2 in.)



Power cord retaining clip

Figure 32. Accessory Items

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” on page 90
- ❑ “Overview to Installing AT-x550-18XTQ and AT-x550-18XSQ Switches in Equipment Racks” on page 91
- ❑ “Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J14 Brackets” on page 93
- ❑ “Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J15 Bracket” on page 98
- ❑ “Installing the AT-x550-18XSPQm Switch in an Equipment Rack” on page 104

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 “Choosing a Site for the Switch” on page 82 to 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 AT-x550-18XTQ or AT-x550-18XSQ Switch” on page 83 or “Unpacking the AT-x550-18XSPQm Switch” on page 86.
5. Install the other switches of the stack with the appropriate instructions in this chapter and Chapter 5, “Installing the Switch on a Wall” on page 109.
6. After installing the switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

Overview to Installing AT-x550-18XTQ and AT-x550-18XSQ Switches in Equipment Racks

You can install AT-x550-18XTQ and AT-x550-18XTQ Switches in 19-inch equipment racks two ways. One way is with the AT-RKMT-J14 brackets that come with the switch. Refer to Figure 33.

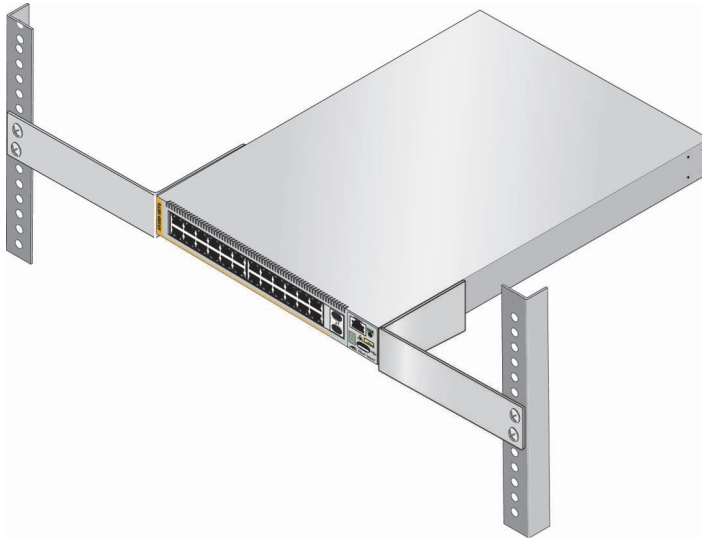


Figure 33. AT-RKMT-J14 Brackets and Switch

For installation instructions, refer to “Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J14 Brackets” on page 93.

You can also install the switch in an equipment rack with the optional AT-RKMT-J15 bracket. Refer to Figure 34.

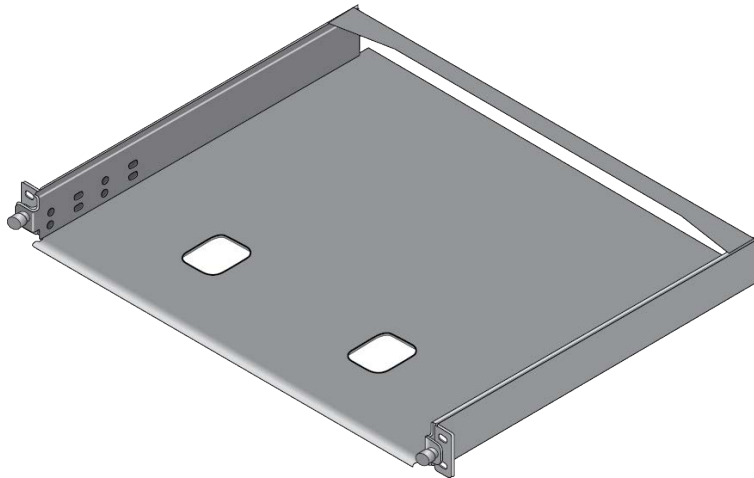


Figure 34. AT-RKMT-J15 Bracket

The bracket lets you install two switches side-by-side. Refer to Figure 35.

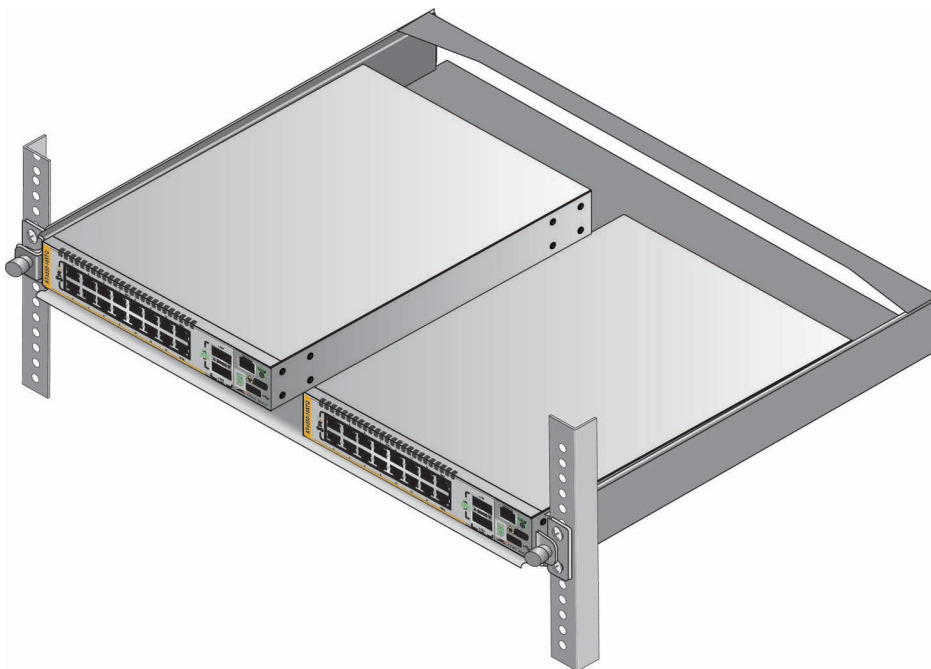


Figure 35. AT-RKMT-J15 Bracket with Switches

Note

The AT-RKMT-J15 Bracket is purchased separately.

For installation instructions refer, to “Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J15 Bracket” on page 98.

Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J14 Brackets

This section contains the procedure for installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in a standard 19-inch equipment rack, with the AT-RKMT-J14 Brackets included with the switch.

Required Items

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 36.

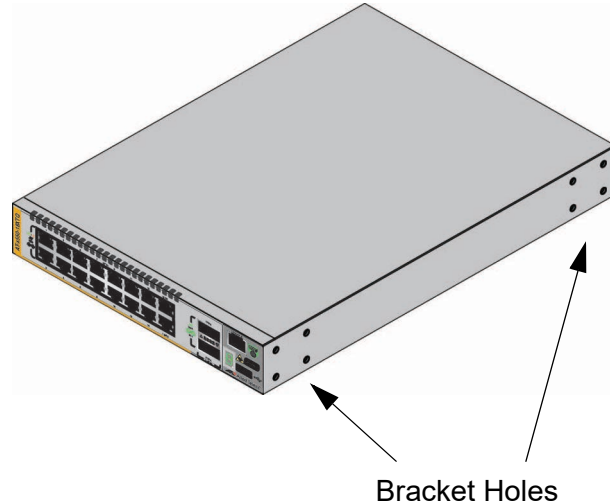


Figure 36. Bracket Holes

The brackets also have two sets of four holes. Refer to Figure 37 on page 94.

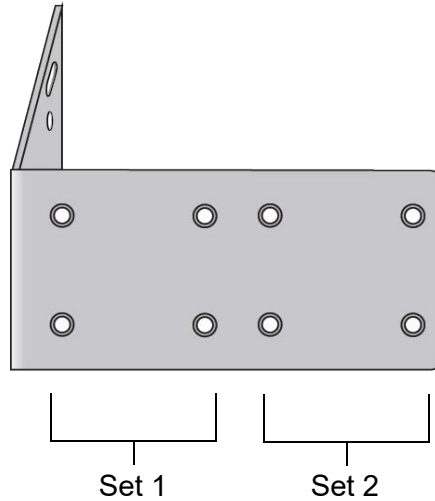


Figure 37. AT-RKMT-J14 Bracket Holes

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 38 show the switch orientations with the front panel facing the front of the equipment rack.

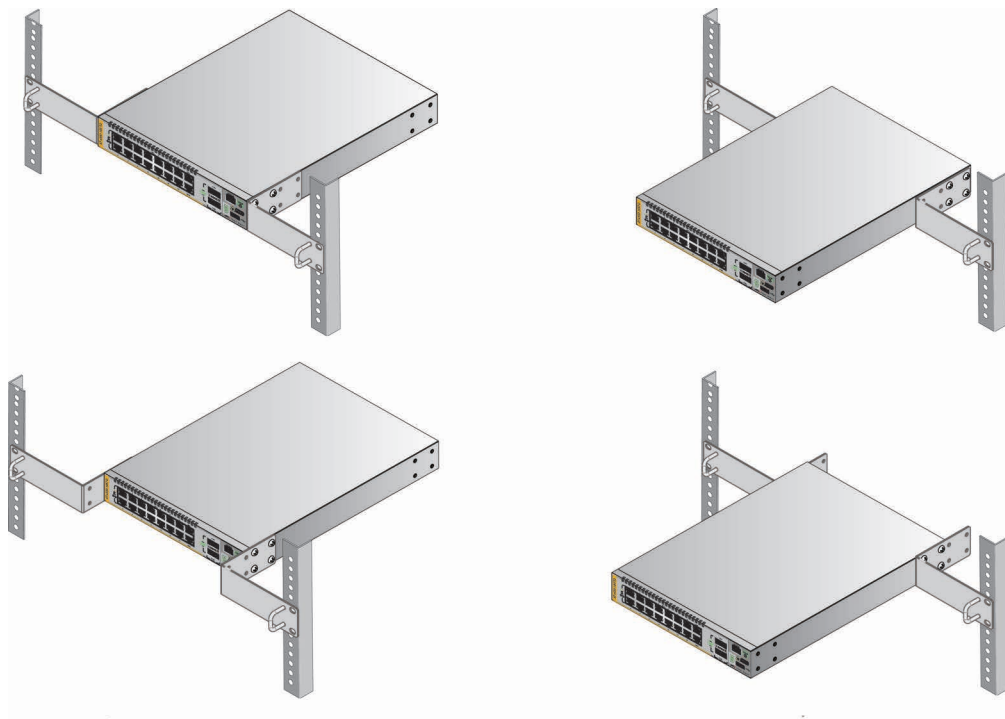


Figure 38. Switch Orientations with the Front Panel Facing the Front of the Equipment Rack

You can also orient the switch with the rear panel facing the front of the equipment rack. Refer to Figure 39.

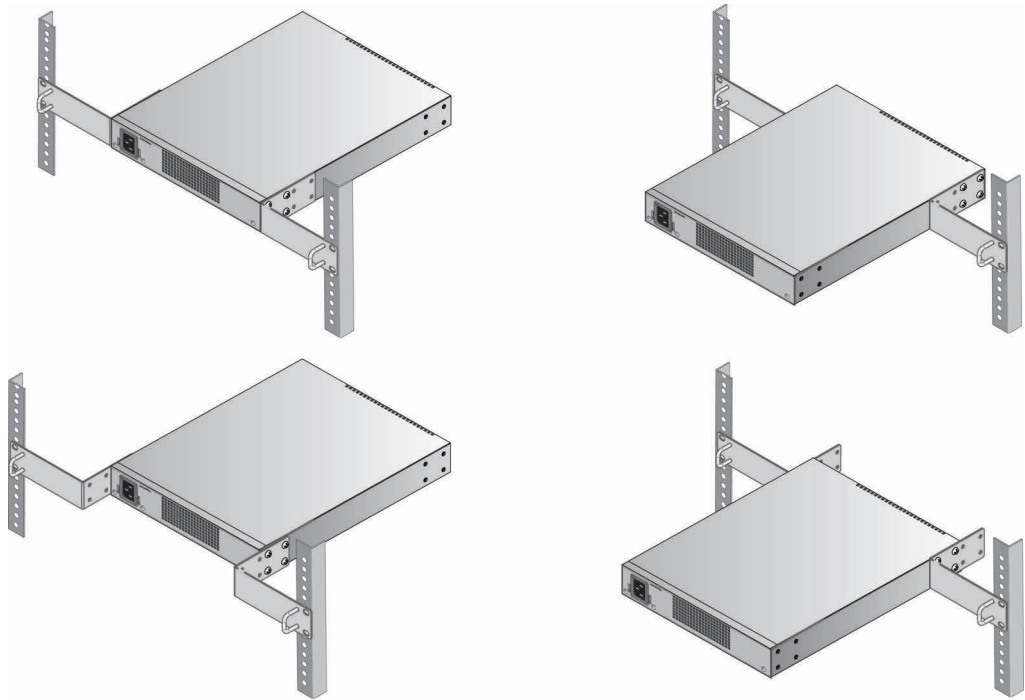


Figure 39. Switch Orientations with the Rear Panel Facing the Front of the Equipment Rack

Installing the Switch

If you have not chosen an orientation for the switch in the equipment rack, review “Switch Orientations in the Equipment Rack” on page 93.

Please review the installation guidelines in “Choosing a Site for the Switch” on page 82 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 40 on page 96.

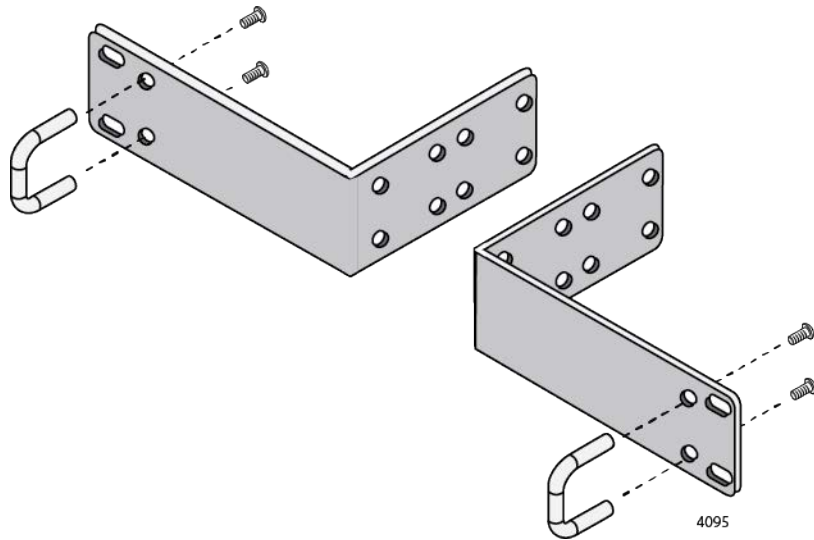


Figure 40. Attaching the Handles to the AT-RKMT-J14 Brackets

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. (Refer to Figure 38 on page 94 and Figure 39 on page 95.) The illustration in Figure 41 shows the installation of the brackets such that the front panel of the switch is even with the front of the equipment rack.

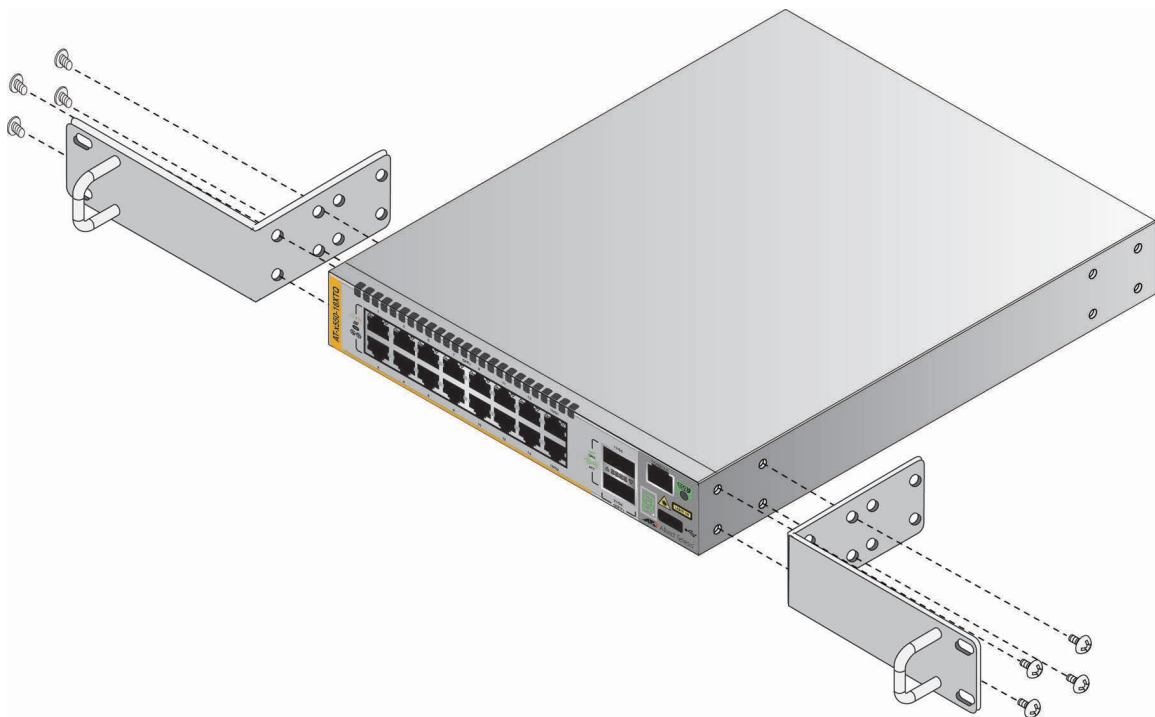


Figure 41. Attaching the AT-RKMT-J14 Brackets to the Switch

4. Have another person hold the switch at the desired location in the equipment rack while you secure it using four standard equipment rack screws (not provided). Refer to Figure 42.

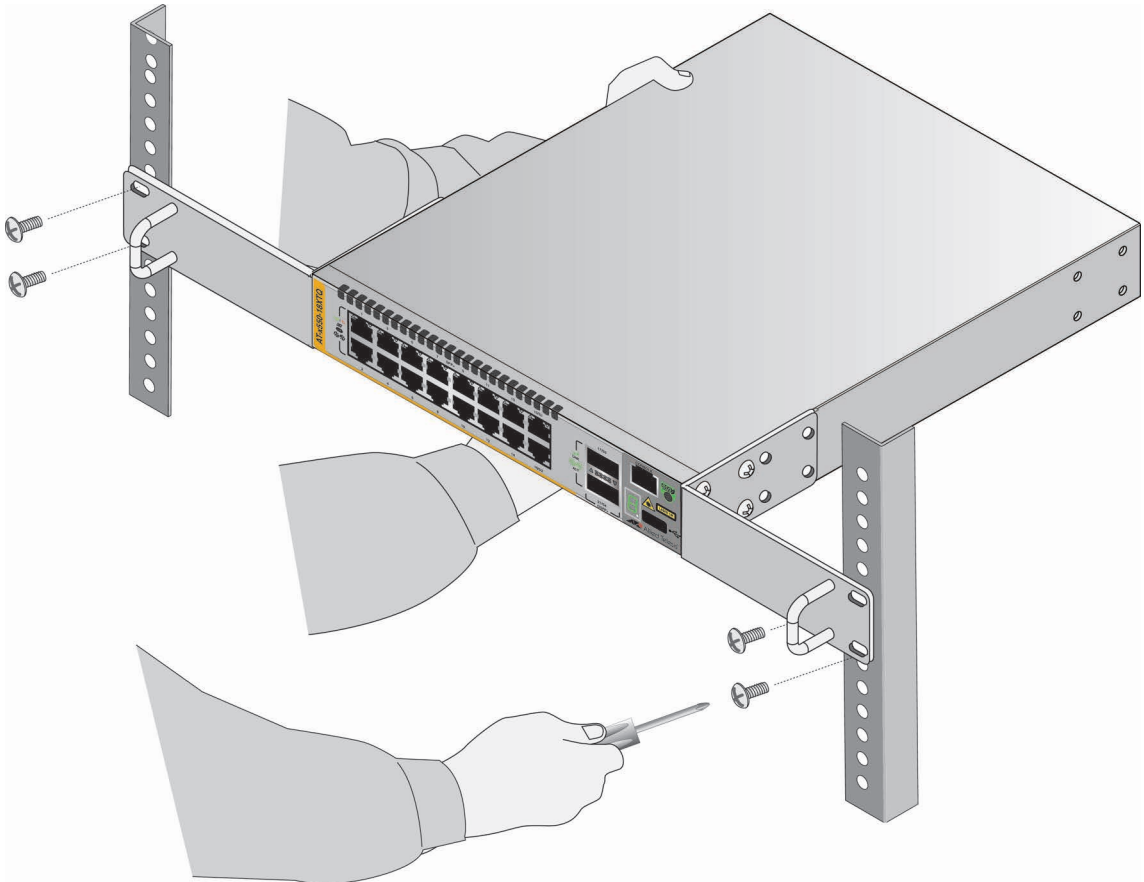


Figure 42. Installing the Switch in an Equipment Rack

5. Install the other switches of the stack with the appropriate instructions in this chapter and Chapter 5, “Installing the Switch on a Wall” on page 109.
6. After installing the switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

Installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in an Equipment Rack with the AT-RKMT-J15 Bracket

This section contains the procedure for installing the AT-x550-18XTQ or AT-x550-18XSQ Switch in a standard 19-inch equipment rack, with the optional AT-RKMT-J15 Bracket.

Required Items

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

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 43.

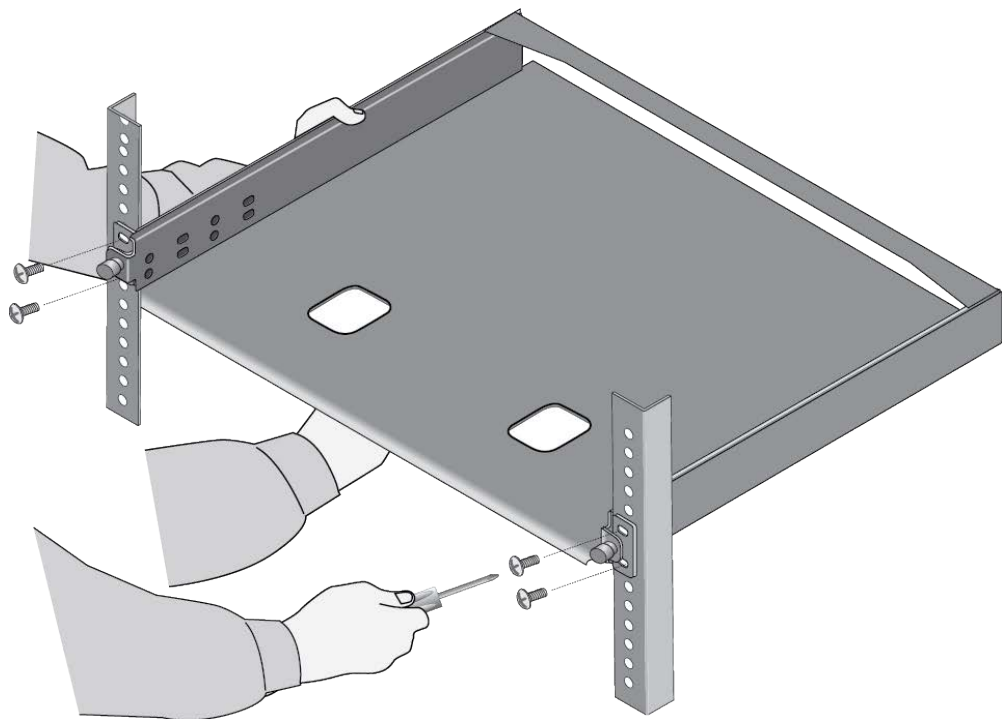


Figure 43. Installing the AT-RKMT-J15 Bracket in the Equipment Rack

2. Loosen the two thumbscrews on the front of the bracket. Refer to Figure 44.

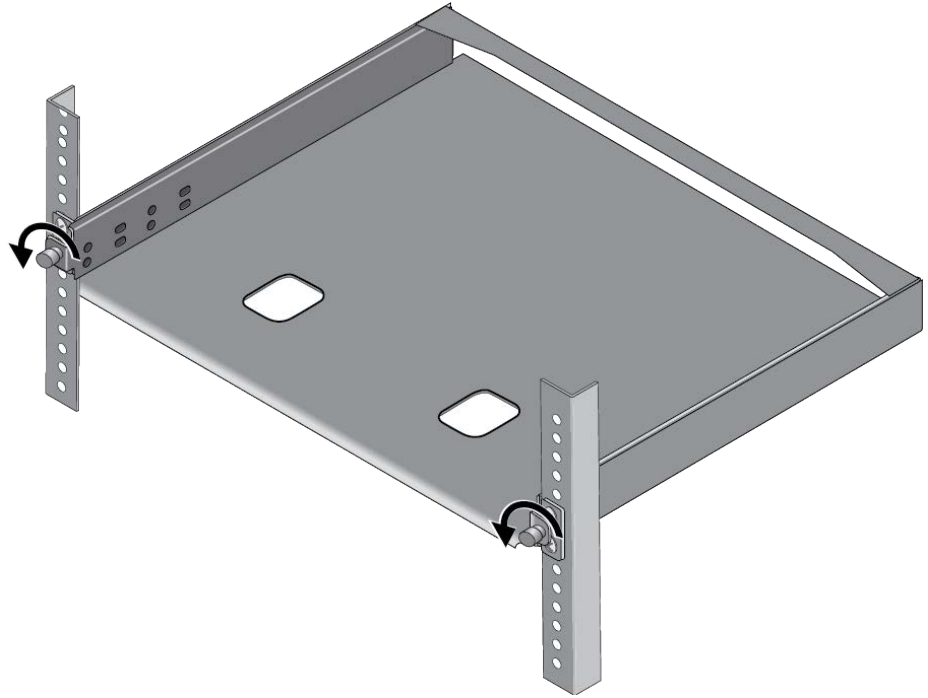


Figure 44. Loosening the Two Thumbscrews on the Front of the AT-RKMT-J15 Bracket

3. Slide out the bracket tray. Refer to Figure 45.

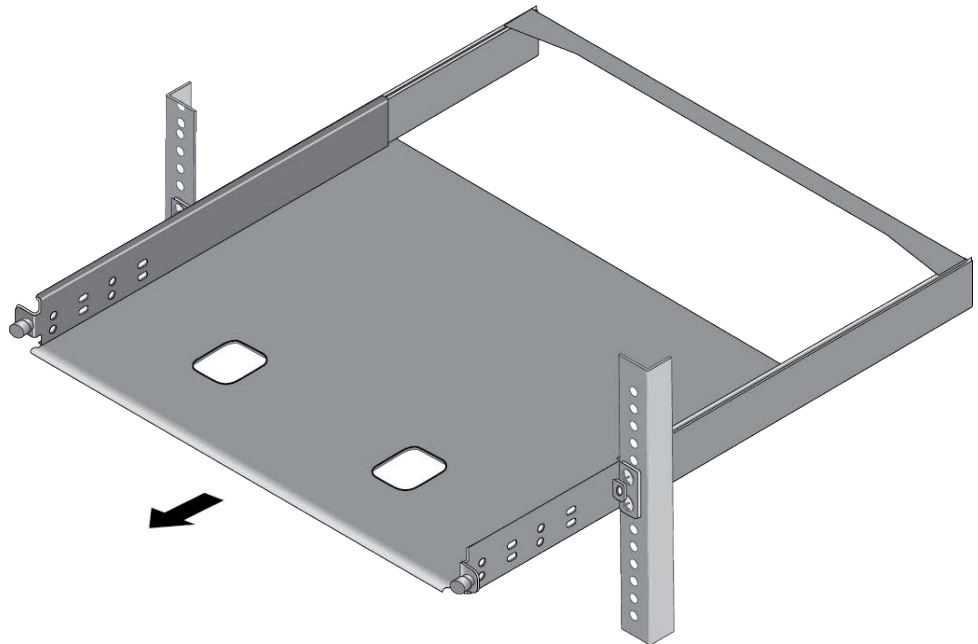


Figure 45. Sliding Out the Tray from the AT-RKMT-J15

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 46.

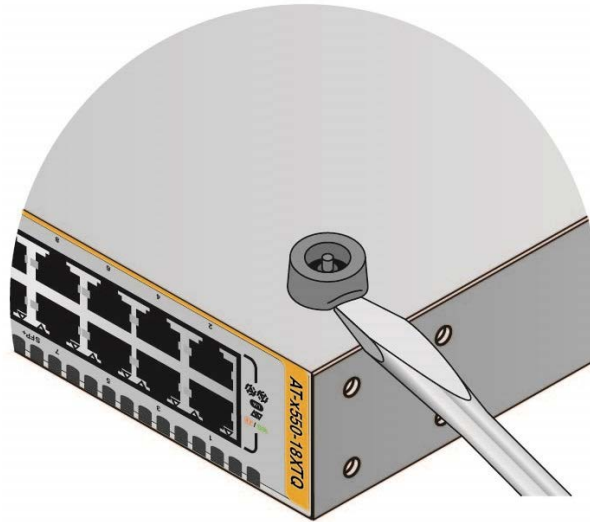


Figure 46. Removing the Plastic Feet from the Bottom Panel of the Switch

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 can install it on either the left or right side. Refer to Figure 47 on page 101.

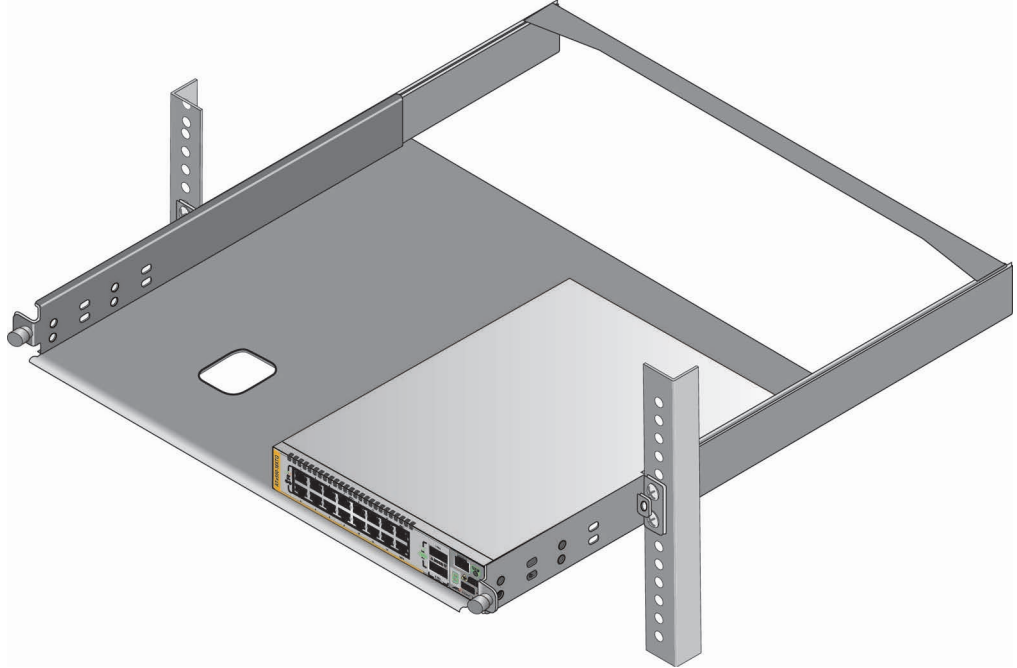


Figure 47. Placing a Switch in the AT-RKMT-J15 Bracket

8. Install two M4x6mm screws included with the switch to secure the switch to the bracket. Refer to Figure 48.

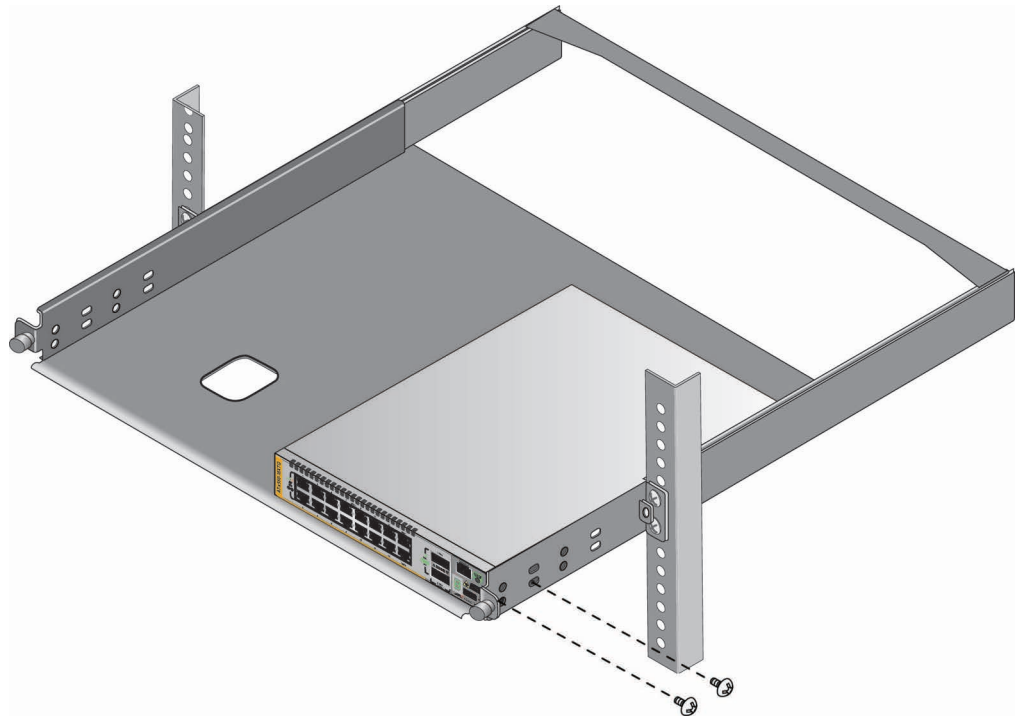


Figure 48. Securing the Switch to the AT-RKMT-J15 Bracket

9. To install a second switch in the bracket, repeat steps 4 to 8.
10. Slide in the bracket tray. Refer to Figure 49.

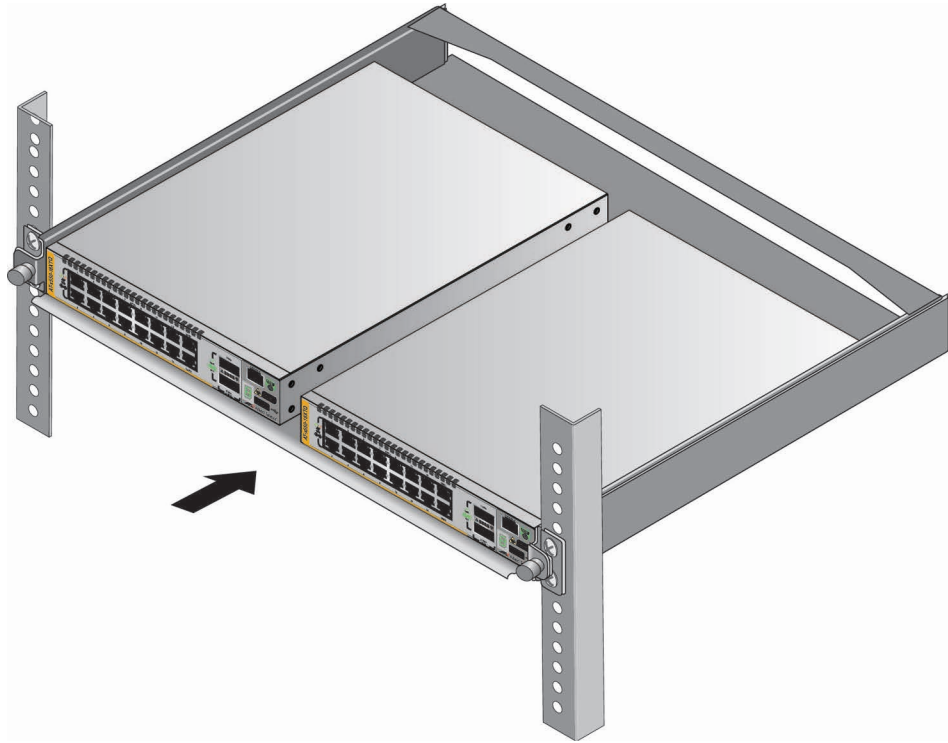


Figure 49. Sliding in the Bracket Tray

11. Tighten the two thumbscrews to secure the tray to the bracket. Refer to Figure 50 on page 103.

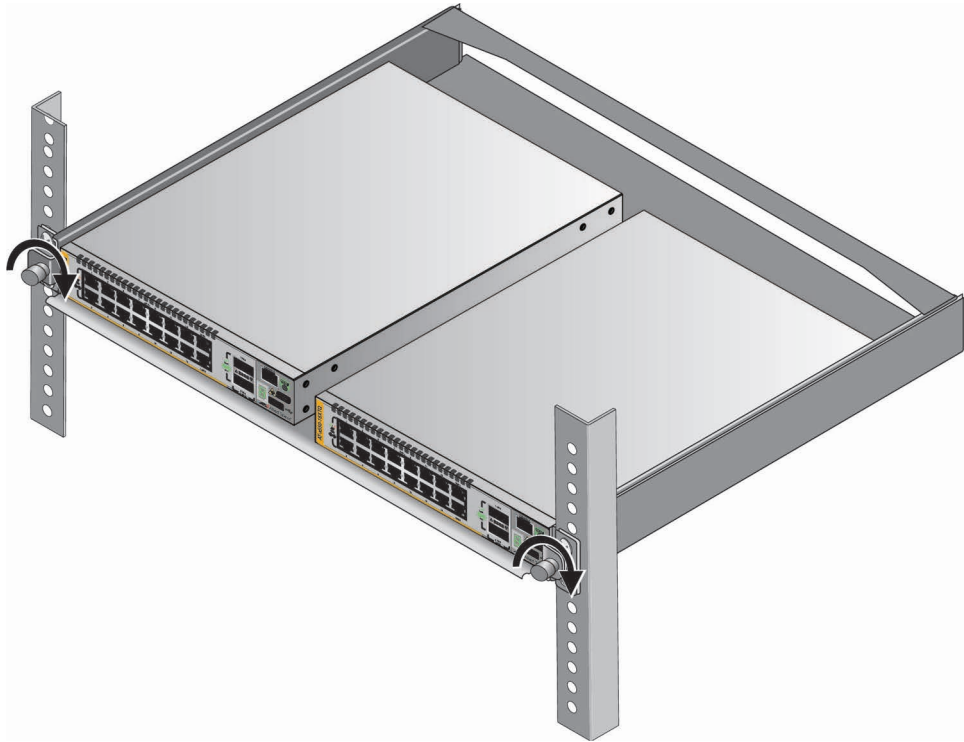


Figure 50. Tightening the Two Thumbscrews on the AT-RKMT-J15 Bracket

12. Install the other switches of the stack with the appropriate instructions in this chapter and Chapter 5, “Installing the Switch on a Wall” on page 109.
13. After installing the switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

Installing the AT-x550-18XSPQm Switch in an Equipment Rack

This section contains the procedure for installing the AT-x550-18XSPQm Switch in a standard 19-inch equipment rack, with the brackets included with the unit.

Required Items

The following items are required to install the switch in an equipment rack:

- ❑ Two equipment rack brackets (included with the switch)
- ❑ Eight M4x6mm bracket screws (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 brackets. Refer to Figure 51.

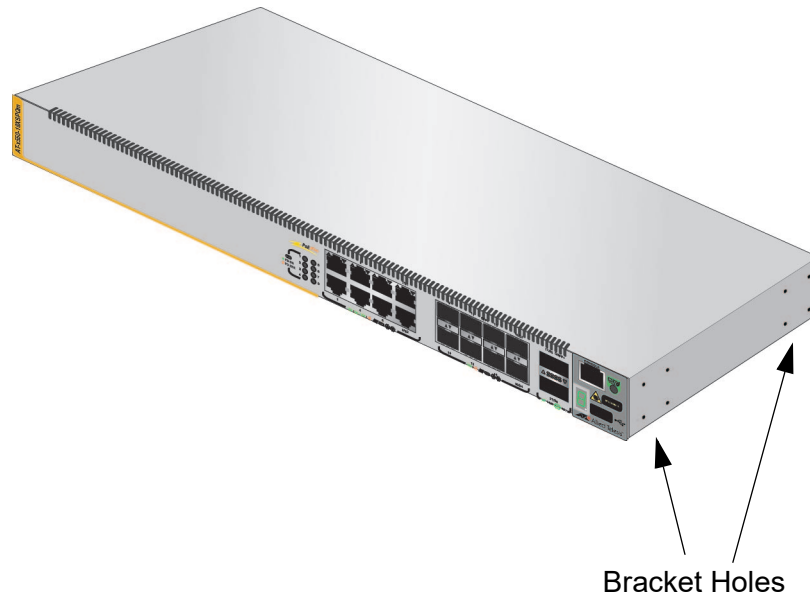


Figure 51. Bracket Holes on the AT-x550-18XSPQm Switch

You can use the different sets of holes on the switch 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 52 on page 105 show the switch orientations with the front panel facing the front of the equipment rack.

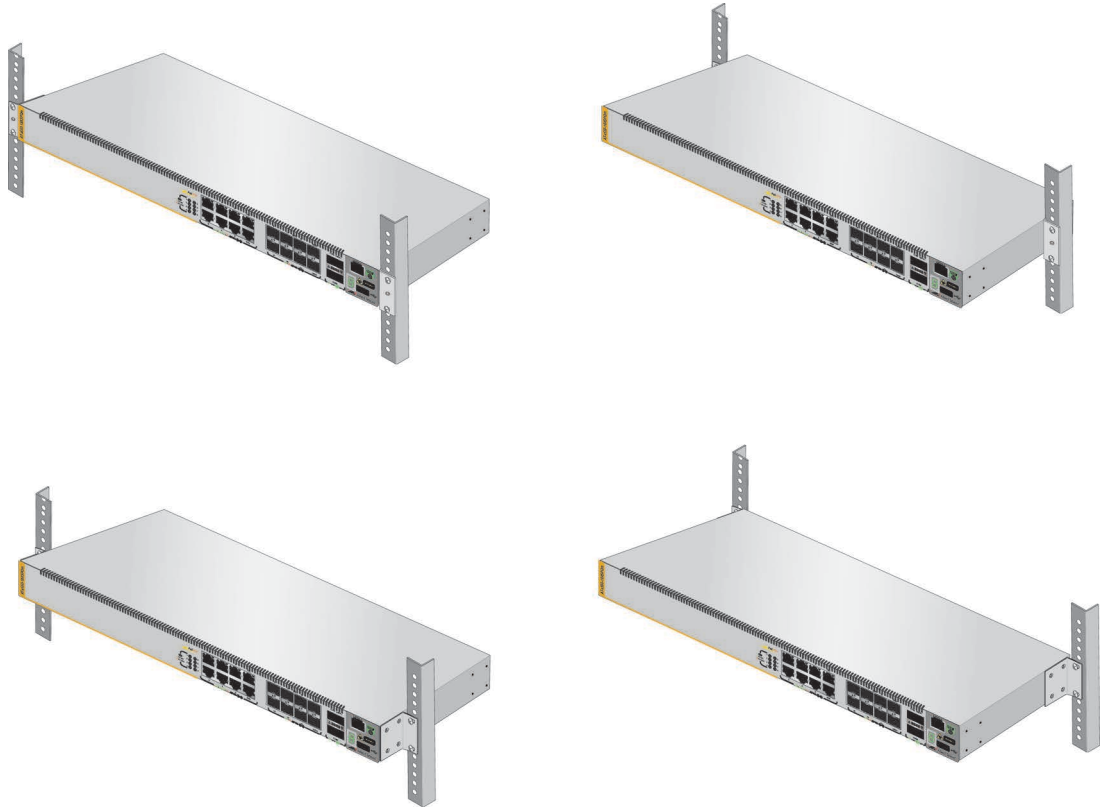


Figure 52. AT-x550-18XSPQm Switch Orientations in an Equipment Rack

Installing the Switch

If you have not chosen an orientation for the switch in the equipment rack, review “Switch Orientations in the Equipment Rack” on page 104.

Please review the installation guidelines in “Choosing a Site for the Switch” on page 82 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. *GE* E28

To install the switch in a 19-inch equipment rack, perform the following procedure:

1. Place the switch on a level, secure surface.
2. 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 53 on page 106 shows the installation of the brackets such that the front panel of the switch is even with the front of the equipment rack.



Figure 53. Example of Attaching the Brackets to the AT-x550-18XSPQm Switch

3. Have another person hold the switch at the desired location in the equipment rack while you secure it using four standard equipment rack screws (not provided). Refer to Figure 54.

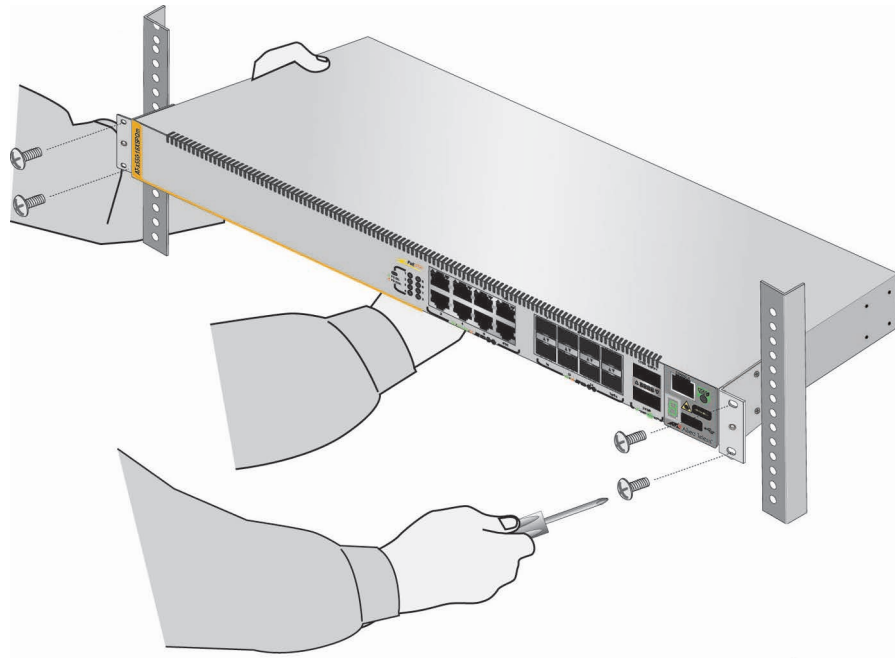


Figure 54. Installing the Switch in an Equipment Rack

4. Install the other switches of the stack with the appropriate instructions in this chapter and Chapter 5, “Installing the Switch on a Wall” on page 109.

5. After installing the switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

Chapter 5

Installing the Switch on a Wall

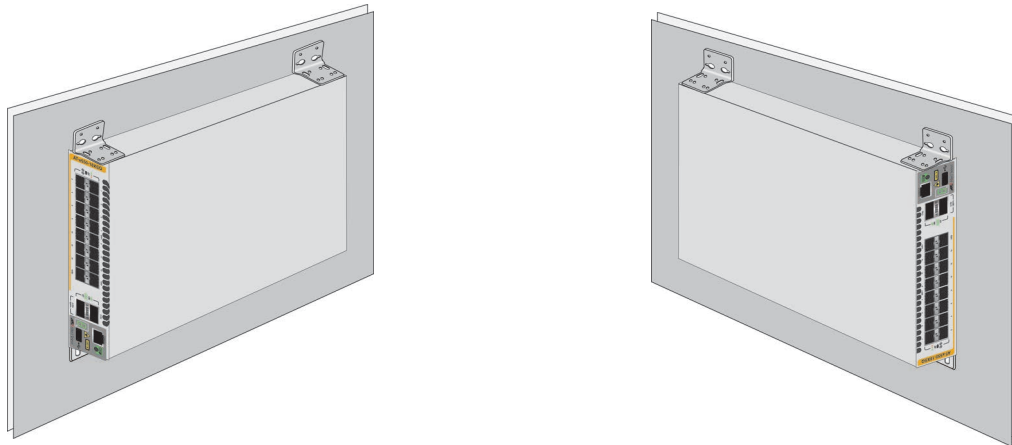
The procedures in this chapter are listed here:

- ❑ “Switch Orientations on a Wall” on page 110
- ❑ “Installation Guidelines” on page 111
- ❑ “Plywood Base for a Wall with Wooden Studs” on page 113
- ❑ “Installing a Plywood Base” on page 115
- ❑ “Installing the Switch on a Plywood Base” on page 116
- ❑ “Installing the Switch on a Concrete Wall” on page 119

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 55. Do not install it with the front panel on the top or bottom.

AT-x550-18XTQ or AT-x550-18XSQ Switch



AT-x550-18XSPQm Switch

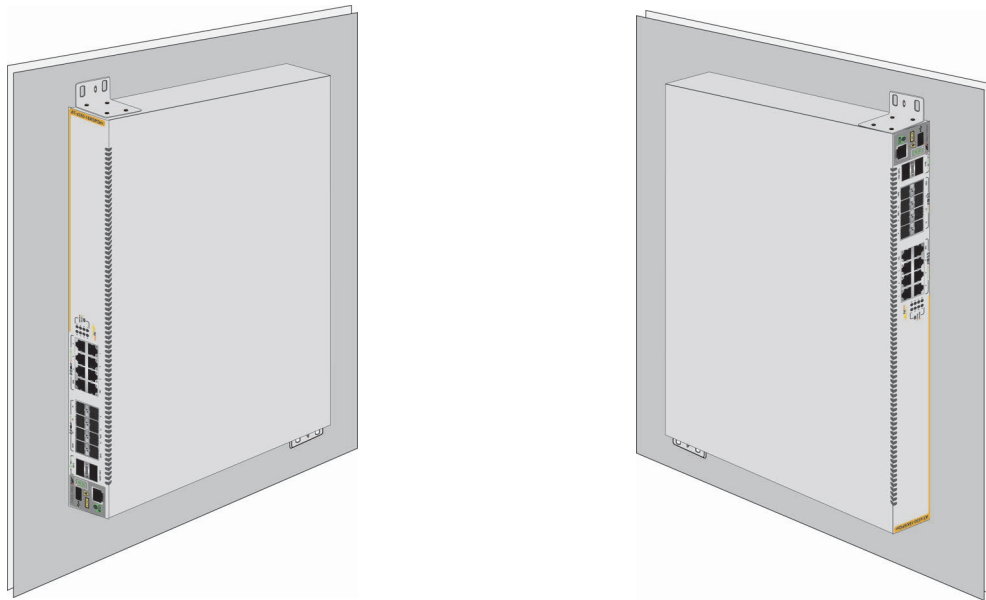


Figure 55. Positioning the Switches on the Wall

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, use a plywood base to support the switch. For more information, refer to “Plywood Base for a Wall with Wooden Studs” on page 113. A plywood base is not required for a concrete wall.
- ❑ Do not install the switch on a wall that has metal studs. Metal studs may not be strong enough to safely support the device.
- ❑ Do not install the switch 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 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*

Tools and Material


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

- ❑ For the AT-x550-18XTQ or AT-x550-18XSQ Switch, four AT-BRKT-J24 wall brackets and sixteen screws (included with switch)
- ❑ For the AT-x550-18XSPQm Switch, two wall/equipment rack brackets and eight screws (included with the switch)
- ❑ For the AT-x550-18XTQ or AT-x550-18XSQ Switch, four wall anchors and screws (included with the switch)
- ❑ For the AT-x550-18XSPQm Switch, two wall anchors and screws (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 113 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, use a plywood base for the device. (A plywood base is not required for a concrete wall.) Refer to Figure 56.

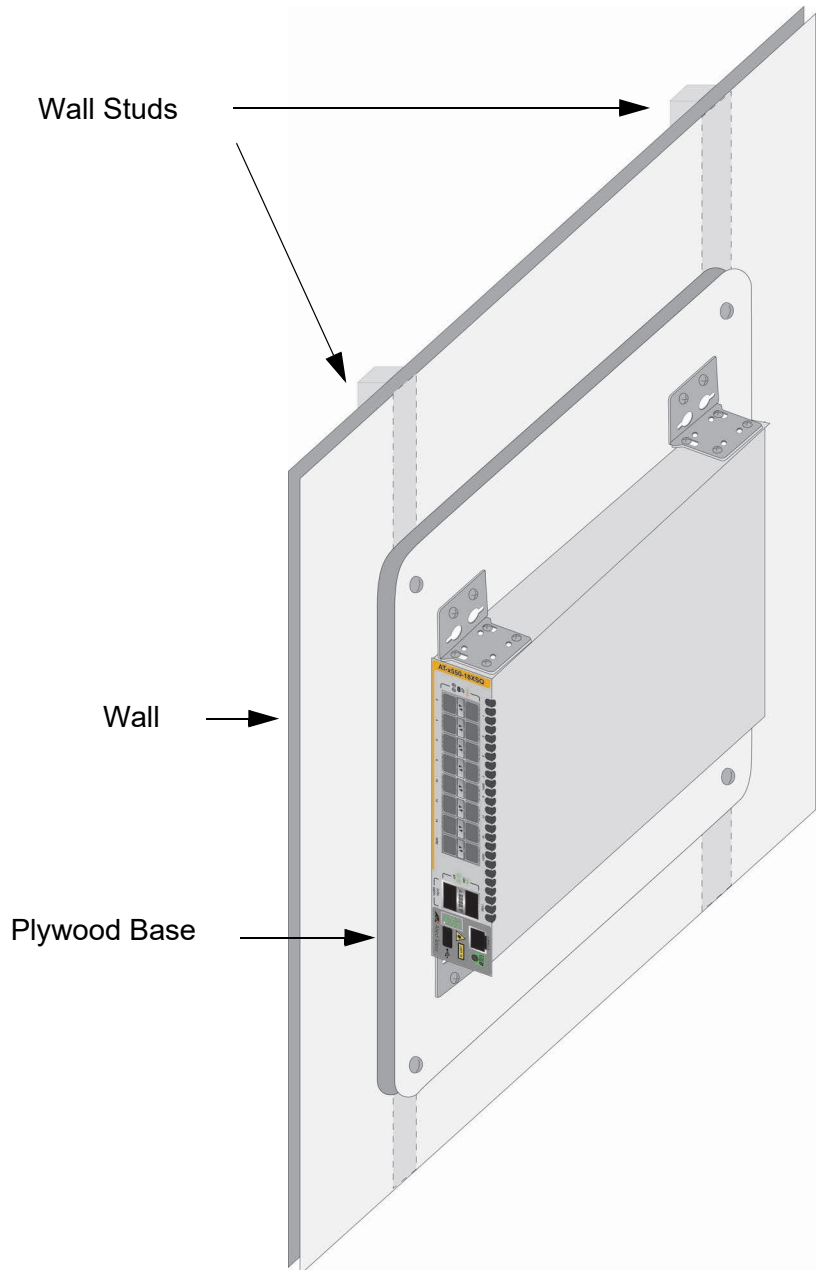


Figure 56. Switch on the Wall with a Plywood Base

Mount the plywood base on two studs in the wall. The recommended minimum dimensions of the plywood base for the AT-x550-18XTQ or AT-x550-18XSQ Switch are listed here:

- ❑ Width: 55.9 centimeters (22 inches)
- ❑ Height: 35.6 centimeters (14 inches)
- ❑ Thickness: 2.5 centimeters (1 inch)

The recommended minimum dimensions of the plywood base for the AT-x550-18XSPQm Switch are listed here:

- ❑ Width: 55.9 centimeters (22 inches)
- ❑ Height: 61.0 centimeters (24 inches)
- ❑ Thickness: 2.5 centimeters (1 inch)

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.

Install the plywood base on the wall first and then install the switch on the base. Refer to Figure 57.

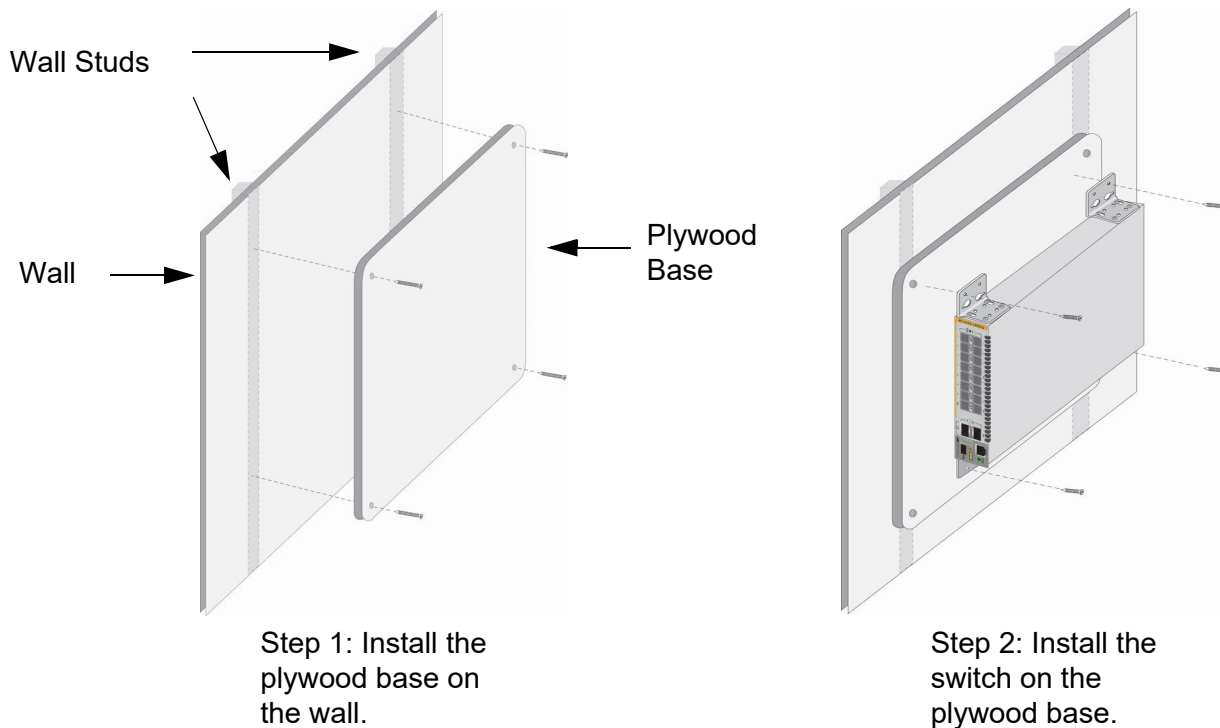


Figure 57. Steps to Installing the Switch with a Plywood Base

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 113. Consult a qualified building contractor for installation instructions for the plywood base. The installation guidelines are listed here:

- ❑ Use a stud finder to identify the middle of studs and hot electrical wiring in the wall.
- ❑ 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, and for adequate air flow for ventilation.

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 78 and “Choosing a Site for the Switch” on page 82 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. *GS* E105

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

1. Place the switch on a table.
2. For the AT-x550-18XTQ or AT-x550-18XSQ Switch, install the four AT-BRKT-J24 wall brackets to the sides of the unit, with the sixteen M4x6mm screws included with the switch. Refer to Figure 58.

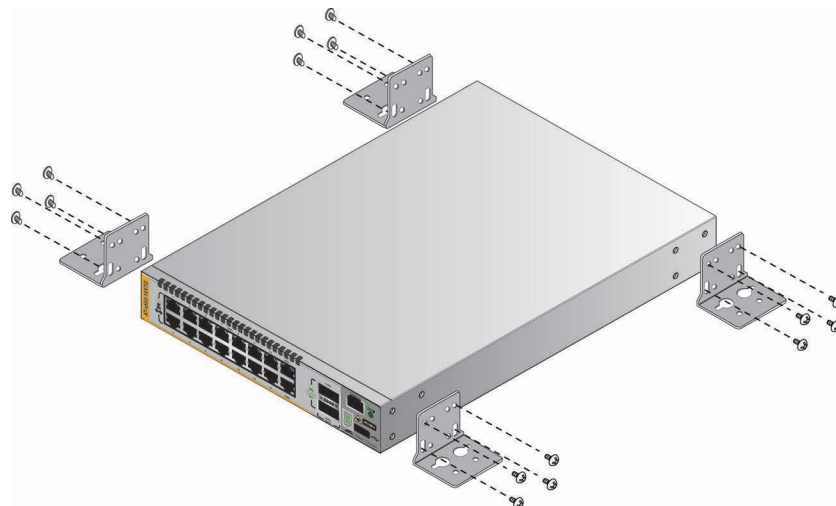


Figure 58. Installing the Wall Brackets

- For the AT-x550-18XSPQm Switch, install the two wall/equipment rack brackets to the sides of the unit with the eight M4x6mm screws included with the switch. The brackets should be installed diagonally across from each other. Refer to Figure 59.

Brackets positions
to install the switch with
the front panel on the left.



Brackets positions
to install the switch with
the front panel on the right.



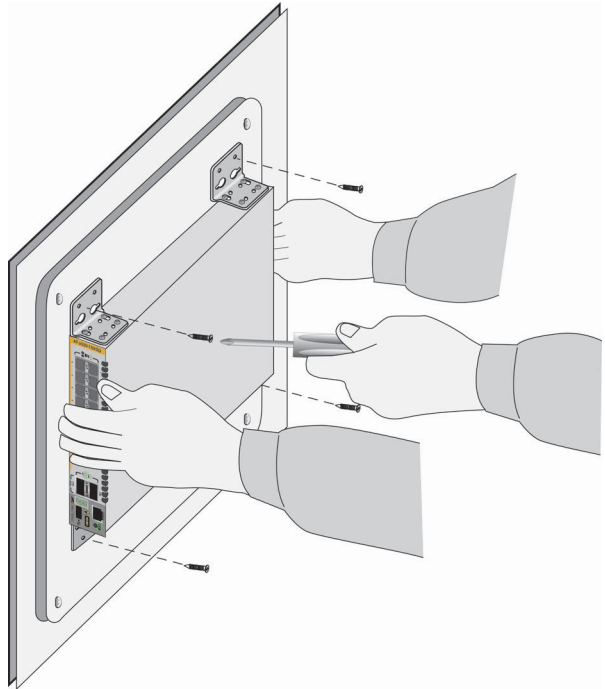
Figure 59. Installing the Brackets on the AT-x550-18XSPQm Switch

- After attaching the brackets, have another person hold the switch on the plywood base on the wall while you secure it with the M4x32mm screws included with the switch. Refer to Figure 60 on page 118.

Follow these guidelines when positioning the switch on the wall:

- Position it so that the front panel is either on the left or right. Refer to Figure 58. Do not install it 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, and for adequate air ventilation.

AT-x550-18XTQ
AT-x550-18XSQ



AT-x550-18XSPQm

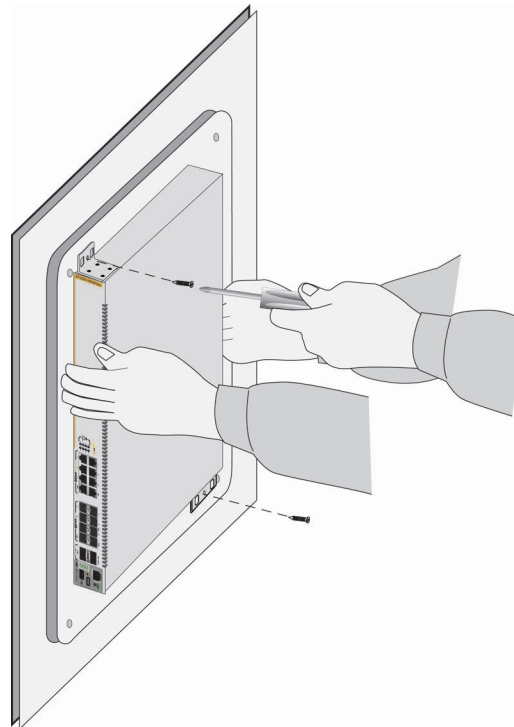


Figure 60. Securing the Switch to the Plywood Base

5. After installing all the stack switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

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 110
- ❑ “Installation Guidelines” on page 111



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 a concrete wall, perform the following procedure:

1. Place the switch on a table.
2. For the AT-x550-18XTQ or AT-x550-18XSQ Switch, install the four AT-BRKT-J24 wall brackets to the sides of the unit, with the sixteen M4x6mm screws included with the switch. Refer to Figure 58 on page 116.
3. For the AT-x550-18XSPQm Switch, install the two wall/equipment rack brackets to the sides of the unit with the eight M4x6mm screws included with the switch. The brackets should be installed diagonally across from each other. Refer to Figure 59 on page 117.
4. Have another person 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 61 on page 120.

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 55 on page 110. Do 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, and for adequate air ventilation.

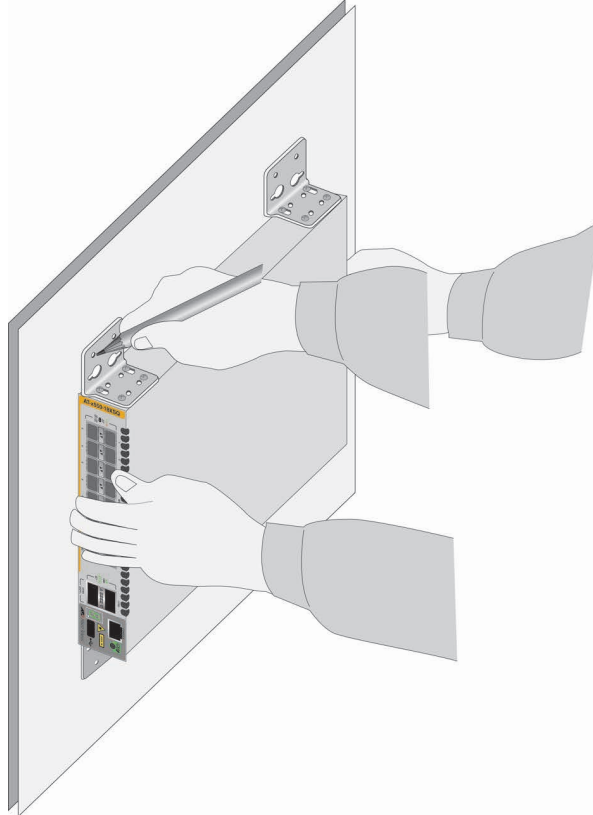


Figure 61. Marking the Locations of the Bracket Holes on a Concrete Wall

5. Place the switch on a table or desk.
6. Use a drill and 1/4" carbide drill bit to pre-drill the holes you marked in step 4. 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.
 - ❑ Clean out the holes with a brush or compressed air.
7. Insert the anchors into the holes.
8. Have another person hold the switch at the selected wall location while you secure it to the wall with the supplied M4x32mm screws. Refer to Figure 62 on page 121.

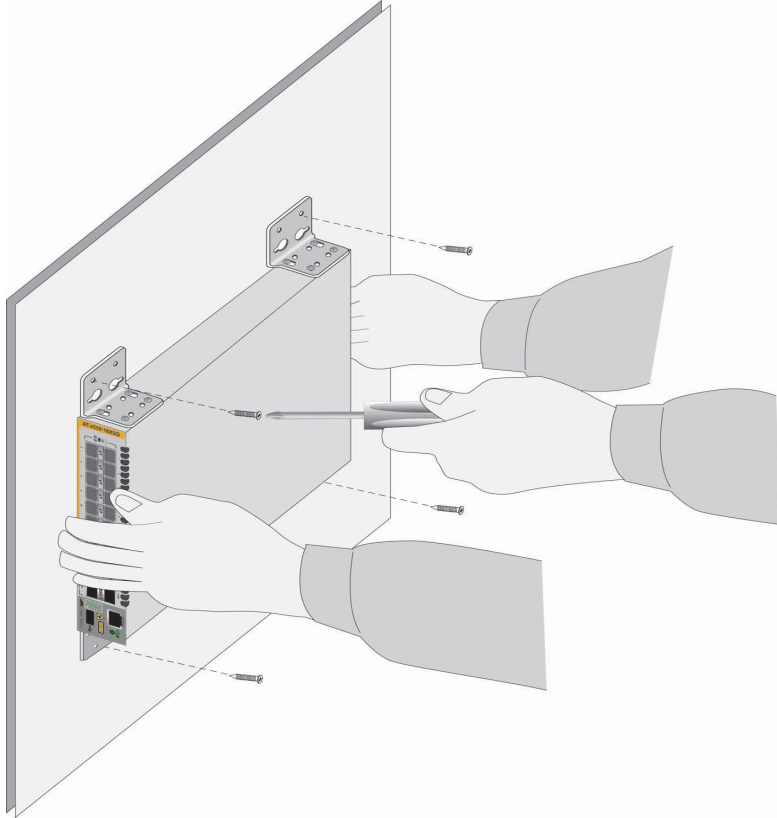


Figure 62. Installing the Switch on a Concrete Wall

9. After installing all the stack switches, go to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

Chapter 6

Building the Trunk with Default Stacking Ports 17 and 21

This chapter contains the following procedures:

- ❑ “Introduction” on page 124
- ❑ “Powering On the Switches Individually” on page 125
- ❑ “Powering On the Switches Simultaneously” on page 128
- ❑ “Starting a Local Management Session” on page 130
- ❑ “Verifying the Stack” on page 132
- ❑ “Powering On a Switch” on page 135
- ❑ “Monitoring the Initialization Process” on page 138

Introduction

This chapter contains procedures for building the stack using the stacking ports 17 and 21. The procedures do not require any configuration steps because the stacking feature is enabled by default and ports 17 and 21 are the default stacking ports. To build the stack, you cable the stacking ports and power on the switches.

As explained in the following procedures, the assignments of the switch ID numbers are determined by the manner in which you power on the devices:

- ❑ To control the assignment of the switch ID numbers yourself, perform “Powering On the Switches Individually” on page 125. The numbers are assigned in the order in which you power on the units.
- ❑ To have the switches assign the ID numbers automatically, perform “Powering On the Switches Simultaneously” on page 128.



Caution

Do not change the switch ID numbers after beginning to configure the parameter settings of the stack. Otherwise, the stack might assign configuration settings to the wrong units.

Note

To use the optional stacking ports for the stack trunk instead of the default ports, refer to Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141. For background information, refer to “Stack Trunk” on page 52.

Powering On the Switches Individually

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 first power-on sequence. The first switch is assigned ID number 1, the next unit is assigned ID number 2, and so on. This procedure is useful when the switches are installed in the same equipment rack and you want to number them in sequence, such as from top to bottom, to make them easier to identify. The switches retain their ID numbers even when you power off or reset the stack.

During the first power-on sequence of the stack, the first switch powered on becomes the master switch. 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 number assignments, 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 cabled ports 17 and 21 on the switches. For background information, refer to “Stack Trunk” on page 52, For cabling instructions, refer to “Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers” on page 174 or “Installing AT-QSFPCU Cables” on page 175.
- The ID numbers are set to the default 1.
- All the switches are powered off.

Note

When cabling ports 17 and 21, remember that the cables must cross-over to different ports. That is, port 17 on one switch has to be connected to port 21 on the next switch.

To monitor the power-on sequence, connect a terminal or computer 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 Process” on page 138.

Before powering on a switch, refer to “Power Specifications” on page 184 for the power specifications.

To power on the stack for the first time and control the assignment of the ID numbers, perform the following procedure:

1. If you have not already cabled ports 17 and 21, do so now. For

background information, refer to “Stack Trunk” on page 52, For cabling instructions, refer to “Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers” on page 174 or “Installing AT-QSFPCU Cables” on page 175.

2. Power on the switch you want assigned ID number 1. Connect its power cord to the AC connector on the back panel and to an appropriate power source. Refer to “Powering On a Switch” on page 135.



Warning

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

Note

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

Note

Refer to “Power Specifications” on page 184 for the power specifications of the switches.

3. Wait one minute for the switch to initialize its management software.

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

4. Power on the switch to be assigned ID number 2.
5. Wait two 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 responds by automatically changing its ID number to 2 and reboots. So the new switch is actually booting up twice, once with the ID number 1 and again with its new ID number 2, which is why it takes two minutes before the device becomes a full member of the stack.

6. If there is a third switch, power it on and wait another two minutes for it to join the stack as a member with the ID number 3.
7. If there is a fourth switch, power it on and wait two minutes for it to join the stack as a member with the ID number 4.

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.

8. To continue with the installation, go to “Starting a Local Management Session” on page 130 and “Verifying the Stack” on page 132.

Powering On the Switches Simultaneously

If you want the switches of the stack to use their MAC addresses to automatically assign the ID numbers during the first power-on sequence, all you have to do is power them on simultaneously, rather than one at a time as in the previous procedure. 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 ID numbers to the other switches.
- ❑ The other switches reset and initialize their management software again, with their new ID numbers.

This procedure assumes the following:

- ❑ This is the initial power-on sequence of the stack.
- ❑ You cabled ports 17 and 21 for the stack trunk on the switches. For background information, refer to “Stack Trunk” on page 52, For cabling instructions, refer to “Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers” on page 174 or “Installing AT-QSFPCU Cables” on page 175.
- ❑ The ID numbers are set to the default 1.
- ❑ All the switches are powered off.

Note

When cabling ports 17 and 21, remember that the cables must cross-over to different ports. That is, port 17 on one switch has to be connected to port 21 on the next switch.

To monitor the power-on sequence, connect a terminal or PC with a terminal emulator program to the Console port on any of the switches. The messages are found in “Monitoring the Initialization Process” on page 138.

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

1. If you have not already cabled ports 17 and 21, do so now. For background information, refer to “Stack Trunk” on page 52, For cabling instructions, refer to “Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers” on page 174 or “Installing AT-QSFPCU Cables” on page 175.

2. Power on all the switches in the stack at the same time. Refer to “Powering On a Switch” on page 135.

Refer to “Power Specifications” on page 184 for the power specifications of the switches.

**Warning**

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

Note

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

3. Wait two or three minutes for the switches to select a master switch and to assign the ID numbers.

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.

4. To continue with the installation, go to “Starting a Local Management Session” on page 130 and “Verifying the Stack” on page 132.

Starting a Local Management Session

This section contains the procedure for starting a local management session on a stack. You can perform the procedure on any switch in a stack. To start a local management session, perform the following procedure:

1. Connect the RJ-45 connector on the management cable to the Console port on the front panel of one of the switches in the stack. It can be the master switch or a member switch. Refer to Figure 63.

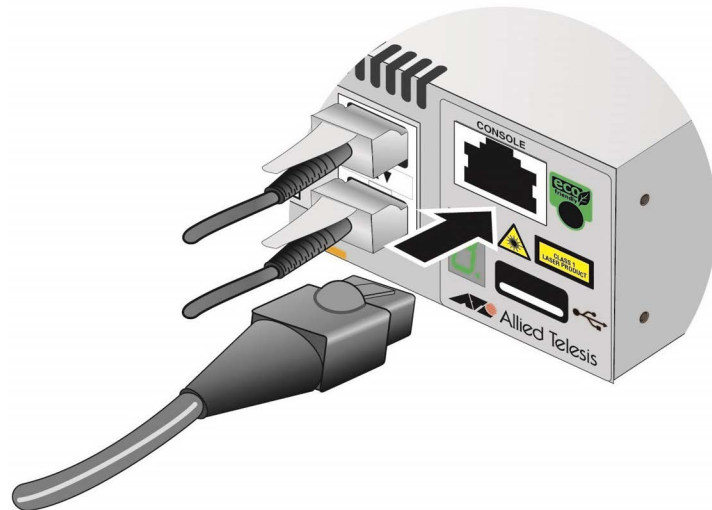


Figure 63. Connecting the Management Cable to the Console Port

2. Connect the other end of the cable to an RS-232 port on a terminal or computer 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 64. is displayed.

A rounded rectangular box containing the text 'awp1us>' which represents the User Exec mode prompt.

```
awp1us>
```

Figure 64. 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 *Command Reference: x550 Series Switches Running AlliedWare Plus*.

6. Go to “Verifying the Stack” on page 132.

Verifying the Stack

To verify stack operations, perform the following procedure:

1. Establish a local management session on any switch in the stack. For instructions, refer to “Starting a Local Management Session” on page 130.
2. From the User Exec mode, enter the SHOW STACK command:

```
awplus> show stack
```

The command lists the switches in the stack. An example of a stack of four switches is show in Figure 65.

```
awplus> show stack
Virtual Chassis Stacking summary information
ID      Pending ID  MAC address      Priority  Status  Role
1       -            eccd:6dc1:ed30  128     Ready  Active Master
2       -            eccd:6dc1:65ab  128     Ready  Backup Member
3       -            eccd:6dc1:d4a7  128     Ready  Backup Member
4       -            eccd:6dc1:c431  128     Ready  Backup Member
Operational Status      Normal operations
Stack MAC address       eccd:6dc1:ed30
awplus(config)#
```

Figure 65. SHOW STACK Command

Here are a couple items to consider:

- The command should list all the switches in the stack. If the list is incomplete, refer to Chapter 9, “Troubleshooting” on page 177.
 - The Operational Status field displays “Normal operations” when the switches are connected in the ring topology and “Not all stack ports are up” when the switches are connected in the linear topology.
 - The priority values will be 128, the default value, if you did not change them.
 - There is no relationship between the ID numbers and the selection of the master switch. Consequently, the active master in the SHOW STACK command might not have the ID number 1.
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 133. The procedure is optional.

- ❑ Otherwise, go to Chapter 8, “Cabling the Networking Ports” on page 165, to complete with the installation.

Setting the Priority Numbers

This procedure is optional. It explains how to configure the priority settings of the switches. Changing the priority settings protects the stack configuration should you ever power on the stack with a new member switch that has a lower MAC address than an existing master or member switch.

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. From the User Exec mode, enter the ENABLE command to move to the Privileged Exec mode:

```
awplus# enable
```

2. Use the CONFIGURE TERMINAL command to move to the Global Configuration mode, as shown in Figure 66.

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

Figure 66. Moving to the Global Configuration Mode with the CONFIGURE TERMINAL Command

3. 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
```

4. After setting the priority values, enter the EXIT command to return to the Privileged Exec mode, as shown in Figure 67 on page 134.

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

Figure 67. Returning to the Privileged Exec Mode

5. Enter the WRITE command to save your change in the configuration file. The switch displays the confirmation prompt in Figure 68.

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

Figure 68. Saving the Priority Values with the WRITE Command

6. To end the management session, enter the EXIT command.
7. Go to Chapter 8, “Cabling the Networking Ports” on page 165, to continue with the installation.

Powering On a Switch

Before powering on a switch, review the information in “Power Specifications” on page 184 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 a 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 69.

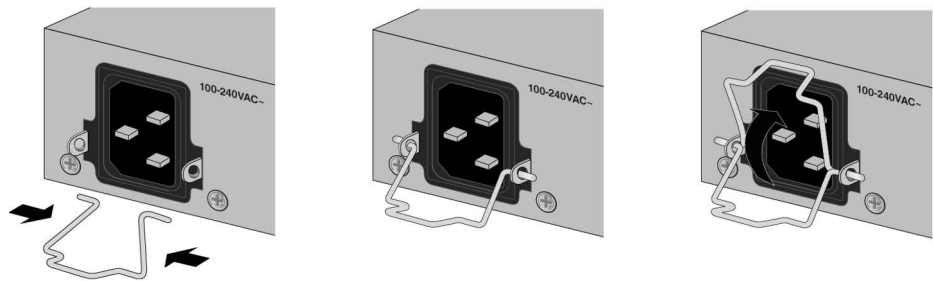


Figure 69. Installing the Power Cord Retaining Clip

2. Connect the AC power cord to the AC power connector on the rear panel of the switch. Refer to Figure 70.

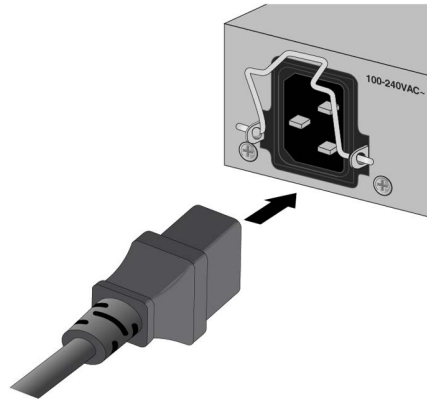


Figure 70. Connecting the AC Power Cord to the Switch

3. Lower the power cord retaining clip to secure the cord to the switch. Refer to Figure 71.

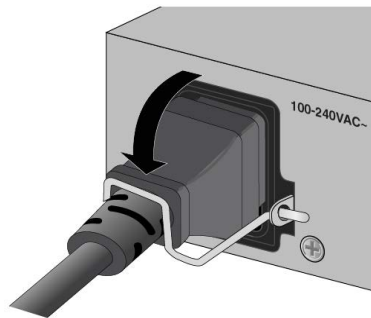


Figure 71. Lowering the Power Cord Retaining Clip

4. Connect the power cord to an appropriate AC power source. Refer to Figure 72.

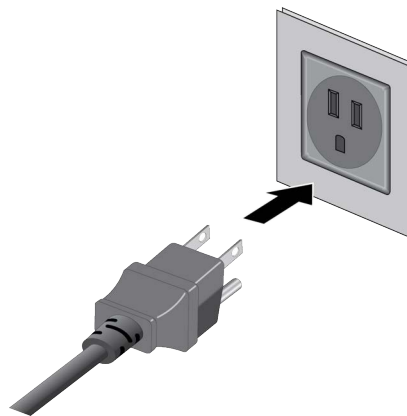


Figure 72. Connecting the Power Cord to an AC Power Source

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.

Monitoring the Initialization Process

You can monitor the initialization sequence of the stack by connecting a terminal or computer that has a terminal emulator program to the Console port on any of the switches. You will see the messages in Figure 73 here to Figure 75 on page 140.

```

Bootloader 6.2.3 loaded
Press <Ctrl+B> for the Boot Menu
Loading flash:x550-cap_x550-5.4.8-0.1.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) v5.4.8
Current release filename: x550-5.4.8-0.2.rel
Built: Mon Apr 21 11:30:30 UTC 2018
Mounting static filesystems... [ OK ]
Attaching to /dev/mtd0... [ 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/hwrandom... [ OK ]
Starting base/dbus... [ OK ]
Starting base/linux... [ OK ]
Starting base/syslog... [ OK ]
Starting base/loopback... [ OK ]
Starting base/poe_done... [ OK ]

```

Figure 73. Switch Initialization Messages

```

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 base/inet... [ OK ]
Received event apteryx.done
Starting hardware/early_host_info... [ OK ]
Starting base/eventwatch... [ OK ]
Starting base/alfred... [ OK ]
Starting base/kernond... [ OK ]
Starting base/apteryx-sync... [ OK ]
Starting base/logconf... [ OK ]
Received event apteryx-sync.done
Starting hardware/plugin... [ OK ]
Starting base/openhpi... [ OK ]
Starting hardware/timeout... [ OK ]
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/licd... [ OK ]
Starting network/stackd... [ OK ]
Starting network/election.timeout... [ OK ]
Received event network.enabled
Initializing HA processes:
hostd, atmfd_agentd, auth, epsr, imiproxyd, lldpd, mstp
ospf6d, atmfd_agentd, rmon, sflowd, atmfd, cntrd, irdpd
lacp, loopprot, nsm, onm, pdmd, pim6d, ripd
udldd, vrrpd, bgpd, hsl, imi, ospfd, pimd

```

Figure 74. Switch Initialization Messages (Continued)

```
Received event network.initialized
```

```
00:50:36 awplus-1 VCS[688]: No Neighboring members found, unit may be in a  
standalone configuration
```

```
Received event vcs.elected-master
```

```
00:50:36 awplus-1 VCS[688]: Startup speed can be improved by adding 'no stack  
1 enable' to configuration
```

```
00:50:36 awplus-1 VCS[688]: Member 1 has become the Active Master
```

```
Assigning Active workload to HA processes:
```

```
hsl, nsm, epsrd, lacpd, lldpd, loopprotd, mstp
```

```
onmd, ospf6d, ospfd, pdmd, ripd, ripngd, rmond
```

```
vrrpd, ayuthd, bgpd, irdpd, pim6d, pimd, pimd, sflowd
```

```
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 75. Switch Initialization Messages (Continued)

Chapter 7

Building the Trunk with Optional Stacking Ports

This chapter contains the following sections:

- ❑ “Introduction” on page 142
- ❑ “Command Summary” on page 143
- ❑ “Configuring the Master Switch” on page 146
- ❑ “Configuring Member Switches” on page 155
- ❑ “Powering on the Stack” on page 163
- ❑ “Verifying the Stack” on page 164

Introduction

As explained in “Stack Trunk” on page 52, you can choose the ports of the stack trunk. The default trunk ports are the 40Gbps ports 17 and 21. Directions on how to use those ports as the stack trunk are provided in Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123.

This chapter contains the procedures for configuring switches to use optional 10Gbps ports for the stack trunk. Here are the general steps:

1. Fill in “Stacking Worksheet” on page 74.
2. Review the configuration commands in “Command Summary” on page 143.
3. Perform “Configuring the Master Switch” on page 146.
4. Perform “Configuring Member Switches” on page 155.
5. Perform “Powering on the Stack” on page 163
6. Perform “Verifying the Stack” on page 132

Please review the following information before performing the instructions:

- The procedures should be performed in the order presented here.
- You should choose the master switch before beginning the procedure. It can be any of the switches. Refer to “Master and Member Switches” on page 69.
- If you have not selected the trunk ports yet, you should do so before continuing. Refer to “Stack Trunk” on page 52.
- If you have already connected network cables to the ports of the stack trunk, disconnect them before continuing. You should cable the ports after configuring the switches for stacking.

Note

Cabling the ports of the stack trunk before configuring the switches may result in loops in your network topology, which can cause poor network performance.

Command Summary

The following sections briefly describe the commands for configuring the master and member switches for stacking with the optional stacking ports. For further instructions, refer to the *Software Reference for x550 Switch, AlliedWare Plus Operating System*. After reviewing the commands, go to “Configuring the Master Switch” on page 146 to start the configuration procedures.

STACKPORT

This command is used to designate the ports of the stack trunk. After you enter the command, the designated ports stop functioning as regular Ethernet ports and function instead as the stack trunk. If you are using the QSFP+ ports 17 and 21 as the stack trunk, you do not have to perform this command because those ports are the default trunk ports. However, if you want to use the optional 10Gbps ports as trunk ports, you have to designate them with this command. Refer to Table 14 on page 52 for a list of the default and optional trunk ports.

The command is performed in the Interface mode of the selected ports. In this example, the optional stacking ports 15 to 16 on the switch are designated as the stack trunk:

```
awplus(config)# interface port1.0.15-1.0.16
awplus(config-if)# stackport
```

To remove the stacking function from ports and return them to regular Ethernet networking ports, use the NO version of the command. You might perform this command if you are not using QSFP+ ports 17 and 21 as the stack trunk and want to use them instead as regular Ethernet ports, or if you inadvertently assign the stacking function to the wrong ports. This example removes the stacking function from the default stacking ports 17 and 21:

```
awplus(config)# interface port1.0.17-1.0.21
awplus(config-if)# no stackport
```

STACK ENABLE

This command is used to enable the VCStack feature on the switch. You will probably not have to perform this command because the default setting for the feature is enabled. However, if for any reason the feature was disabled, you can enable it by entering the command in the Global Configuration mode. Here is the command:

```
awplus(config)# stack enable
```

If you ever want to disable stacking, such as to use the switch as a stand-alone unit, enter the NO version of the command, shown here:

```
awplus(config)# no stack enable
```

STACK PRIORITY

This command is used to assign priority numbers to the switches of the stack. The switches use the numbers to select the master switch. The lower the number the higher the priority. The unit with the lowest number becomes the master. If they have the same priority value, they use their MAC addresses to determine the master. As with priority numbers, the lower the MAC address, the higher the priority. A switch can have only one priority number.

Allied Telesis recommends changing a switch's priority number to match its ID number. For example, the switch with ID 1 should be assigned priority 1, switch with ID 2 should be assigned priority 2, and so on. This is not required, but it can make managing and troubleshooting the stack easier.

The command is found in the Global Configuration mode and has the following format:

```
stack switch_ID priority priority_number
```

The variables are defined here:

- ❑ *switch_ID* - This is the ID number of the switch. The range is 1 to 8. You can specify only one ID number.
- ❑ *priority_number* - This is the new priority number for the switch. You can specify only one number. The range is 0 to 255. The default is 128.

This example assigns the priority 1 to the switch with ID 1:

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

STACK RENUMBER

Every switch in a stack has to have a unique ID number. The range is 1 to 4. The default is 1. The master switch should use the default value. The number is set on the member switches with the STACK RENUMBER command. Here is the format.

```
stack current_switch_ID renumber new_switch_ID
```

The variables are defined here:

- ❑ *current_switch_ID* - This is the current ID number of the switch. You can specify only one ID number.
- ❑ *new_switch_ID* - This is the new ID number for the switch. You can specify only one number. The range is 1 to 8. The default is 1.

Changing the ID number requires resetting the switch.

This example changes a switch's ID from 1, the default, to 2:

```
awplus(config)# stack 1 renumber 2
```


**SWITCH
PROVISION**

The master switch needs to know about the member switches before you power on the stack for the first time. This involves using the SWITCH PROVISION command to add the member switches as provisioned units to the master switch. Here is the format of the command:

```
switch switch_ID provision x550-18
```

This example adds a provisioned member switch with the ID 2 to the master switch:

```
awplus(config)# switch 2 provision x550-18
```

Configuring the Master Switch

This section contains the following procedures for configuring the master switch of the stack:

- ❑ “General Steps for the Master Switch,” next
- ❑ “Configuring the Master Switch - Part I” on page 147
- ❑ “Configuring the Master Switch - Part II” on page 150
- ❑ “Verifying the Master Switch” on page 152
- ❑ “What to Do Next” on page 153

Note

The procedures require resetting the switch. Some network traffic will be lost if the unit is already connected to an active network.

You need to know the following to perform these procedures:

- ❑ How many member switches will be in the stack?
- ❑ Which optional stacking ports will be used as the stack trunk on the master and member switches? Refer to “Stack Trunk” on page 52.

The procedures should be performed in the order presented here.

General Steps for the Master Switch

The procedure for configuring the master switch for the optional stacking ports is divided into two parts. Here are the general steps to Part I:

1. Start a local management session on the switch.
2. Display the hardware status and management software version number with the `SHOW SYSTEM ENVIRONMENT` and `SHOW VERSION INSTALLED` commands, respectively, in the Privilege Exec mode.
3. Enable the VCStack feature with the `STACK ENABLE` command in the Global Configuration mode. You will probably not have to perform this step because the default setting for the feature is enabled.
4. Assign the master switch the priority 1 with the `STACK PRIORITY` command in the Global Configuration mode. This is to ensure that it is selected as the master switch during the first power-on of the stack.
5. Remove the stacking function from the default stacking ports 17 and 21 on the master switch with the `NO STACKPORT` command.
6. Designate the optional stacking ports as the stack trunk on the master switch, with the `STACKPORT` command.

Here are the general steps to Part II:

1. Add the member switches as provisioned units to the master switch, with the SWITCH PROVISION command. This step is to ensure that the master switch knows about the member switch during the first power-on of the stack.
2. Remove the stacking function from the default stacking ports 17 and 21 on the provisioned member switches with the NO STACKPORT command.
3. Designate the optional stacking ports as the stack trunk on the provisioned member switches, with the STACKPORT command.
4. Save your changes with the WRITE command in the Privilege Exec mode.
5. Reboot the switch with the REBOOT command.
6. Start a new local management session.
7. Verify the changes with the SHOW STACK and SHOW RUNNING-CONFIG command.

Configuring the Master Switch - Part I

To configure the master switch to use the optional stacking ports for the stack trunk, perform the procedure in Table 18.

Table 18. Configuring the Master Switch for Optional Stacking Ports - Part I

Step	Description and Command
1	Power on the master switch and wait two minutes for it to initialize the management software. Refer to “Powering On a Switch” on page 135.
2	Start a local management session. Refer to “Starting a Local Management Session” on page 130.
3	Move to the Privileged Exec mode with the ENABLE command. awplus> enable
Steps 4 to 6 display the status of the switch hardware and the version number of the AlliedWare Plus management software.	

Table 18. Configuring the Master Switch for Optional Stacking Ports - Part I (Continued)

Step	Description and Command
4	<p>Verify that the switch hardware is operating correctly by entering the SHOW SYSTEM ENVIRONMENT command. All components should have the status Ok.</p> <pre>awplus# show system environment Environment Monitoring Status Overall Status: Normal Resource ID: 1 Name: AT-x550-18XSQ ID Sensor (Units) Reading Low Limit High Limit Status 1 Fan: Fan 1 (RPM) 5980 4800 - ok 2 Voltage: 1.0V (Volts) 1.040 0.891 1.090 ok .</pre>
5	<p>Display the version number of the AlliedWare Plus operating software on the switch by entering the SHOW VERSION INSTALLED command. Write down the version number in the worksheet in Table 16 on page 74. After viewing the version numbers on all the switches, you will compare them to confirm they all have the same version. Switches with different versions will have to be updated.</p> <pre>awplus# show version installed Current software ----- Software version : value Build date : value Installed software ----- Build name : value Build version : value Build date : value</pre>
6	<p>Move to the Global Configuration mode with the CONFIGURE TERMINAL command.</p> <pre>awplus# configure terminal Enter configuration commands, one per line. End with CNTL/Z.</pre>
<p>Step 7 enables the VCStack feature on the switch. You probably do not need to perform this step because the feature is enabled by default. If the Switch ID LED is displaying "0", perform the step. Otherwise, go to step 8.</p>	
7	<p>Activate VCStack on the switch with the STACK ENABLE command.</p> <pre>awplus(config)# stack enable % Automatically enabling 'stack virtual-mac' to minimize disruption form failovers. % Please check that the new MAC 0000.cd37.0431 is unique within the network. % Save the config and restart the system for this change to take effect.</pre>

Table 18. Configuring the Master Switch for Optional Stacking Ports - Part I (Continued)

Step	Description and Command
	Step 8 assigns priority 1 to the switch with the STACK PRIORITY command, so that it functions as the master unit of the stack.
8	Assign priority 1 to the switch with the STACK PRIORITY. awplus(config)# stack 1 priority 1
	Steps 9 to 10 remove stacking from the default stacking ports 17 and 21 so that they function as regular networking ports.
9	Enter the Interface modes for the default stacking ports 17 and 21 on the master switch: awplus(config)# interface port1.0.17-1.0.21 % port1.0.17 is currently configured as a stack-port. Use caution when altering its config. % port1.0.21 is currently configured as a stack-port. Use caution when altering its config.
10	Remove the stacking function from the ports with the NO STACKPORT command, so that they function as regular networking ports: awplus(config-if)# no stackport % Save the config and restart the system for this change to take effect.
	Steps 11 and 12 designate the optional stacking ports as the active stacking ports.
11	Enter the Interface mode of the optional stacking ports to be used as the stack trunk. Refer to Table 14 on page 52. If you filled out the worksheet in Table 16 on page 74, refer there for the ports. This example assumes you want to use optional stacking ports 15 and 16 as the stack trunk. awplus(config-if)# interface port1.0.15-1.0.16
12	Designate the ports as the stack trunk with the STACKPORT command: awplus(config-if)# stackport % Save the config and restart the system for this change to take effect.
	The remaining steps save your changes.
13	Return to the Global Configuration mode with the EXIT command: awplus(config-if)# exit
14	Return to the Privileged Exec mode. awplus(config)# exit

Table 18. Configuring the Master Switch for Optional Stacking Ports - Part I (Continued)

Step	Description and Command
15	<p>Enter the WRITE command to save your change. If this is the first management session, the switch adds the configuration file DEFAULT.CFG to flash memory, for storing your configuration changes. If you do not save your changes, they will be discarded and you will have to reenter them when you reboot the switch later in these procedures.</p> <pre>awplus# write Building configuration ... [OK]</pre>
16	Go to “Configuring the Master Switch - Part II,” next.

Configuring the Master Switch - Part II

In Part II, you add the member switches as provisioned units to the master switch and designate their optional stacking ports. Adding member switches as provisioned devices ensures that the master switch knows about them during the first stack power-on. The procedure assumes you are continuing directly from the previous procedure.

Table 19. Configuring the Master Switch for Optional Stacking Ports - Part II

Step	Description and Command
Steps 1 to 2 add the member switches as provisioned switches on the master switch. This is so the master switch is aware of the switches when the stack is powered on for the first time.	
1	<p>Move to the Global Configuration mode with the CONFIGURE TERMINAL command.</p> <pre>awplus# configure terminal Enter configuration commands, one per line. End with CNTL/Z.</pre>
2	<p>Add the member switches to the master switch as provisioned switches with the SWITCH PROVISION command. Assign a unique ID number, in the range of 2 to 4, to each unit. The following examples add three provisioned member switches to the master switch, with the IDs 2 to 4:</p> <pre>awplus(config)# switch 2 provision x550-18 awplus(config)# switch 3 provision x550-18 awplus(config)# switch 4 provision x550-18</pre>
Steps 3 and 4 remove the stacking function from the default stacking ports 17 and 21 on the provisioned member switches.	
3	<p>Enter the port Interface modes of the default stacking ports 17 and 21 on the provisioned member switches. The example here assumes there are three provisioned member switches, with the IDs 2 to 4:</p> <pre>awplus(config)# interface port2.0.17-2.0.21,port3.0.17-3.0.21,port4.0.17-4.0.21</pre>

Table 19. Configuring the Master Switch for Optional Stacking Ports - Part II (Continued)

Step	Description and Command
4	<p>Remove the stacking function from the ports to convert them into regular Ethernet ports, with the NO STACKPORT command:</p> <pre>awplus(config-if)# no stackport % Save the config and restart the system for this change to take effect.</pre>
Steps 5 and 6 add the stacking function to the selected optional stacking ports on the provisioned member switches.	
5	<p>Enter the Interface modes of the optional stacking ports to be used as the stack trunk on the provisioned member switches. If you filled out the worksheet on Table 16 on page 74, refer there for the stacking ports. This example assumes that three member switches are using ports 15 and 16 as the stack trunk.</p> <pre>awplus(config)# interface port2.0.15-2.0.16,port3.0.15-3.0.16,port4.0.15-4.0.16</pre>
6	<p>Designate the ports as stacking ports with the STACKPORT command.</p> <pre>awplus(config-if)# stackport % Save the config and restart the system for this change to take effect.</pre>
Steps 7 to 13 save your changes on the master switch and reboot it.	
7	<p>Return to the Global Configuration mode.</p> <pre>awplus(config-if)# exit</pre>
8	<p>Return to the Privileged Exec mode.</p> <pre>awplus(config)# exit</pre>
9	<p>Enter the WRITE command to save your changes.</p> <pre>awplus# write Building configuration ... [OK]</pre>
10	<p>Restart the switch with the REBOOT command.</p> <pre>awplus# reboot reboot system? (y/n): awplus#</pre>
11	<p>Type "Y" for yes.</p>
12	<p>Wait two minutes for the switch to initialize the management software.</p>

Table 19. Configuring the Master Switch for Optional Stacking Ports - Part II (Continued)

Step	Description and Command
13	Go to “Verifying the Master Switch” on page 152.

Verifying the Master Switch Perform the steps in Table 20 to confirm the configuration of the master switch.

Table 20. Verifying the Master Switch

Step	Description and Command
1	Start a new local management session on the master switch. Refer to “Starting a Local Management Session” on page 130.
2	Move to the Privileged Exec mode with the ENABLE command. awplus> enable
3	<p>Enter the SHOW STACK command. Here is an example of the display:</p> <pre>awplus# show stack Virtual Chassis Stacking Summary Information ID Pending ID MAC address Priority Status Role 1 - e01a.ba56.c208 1 Ready Active Master 2 - - - - Provisioned 3 - - - - Provisioned 4 - - - - Provisioned Operational Status Standalone unit Stack MAC address e01a.ba56.c208</pre> <p>Check the display for the following:</p> <ul style="list-style-type: none"> - Switch ID 1 is the master switch. - The master switch should have the priority 1. If it does not, repeat “Configuring the Master Switch - Part I” on page 147. Be sure to perform the STACK PRIORITY command and to save your changes with the WRITE command. - The other ID entries are for the provisioned member switches. There should be one entry for each member switch that will be in the stack. Their fields are empty because the master switch is not yet part of a stack. If the table does not include these fields, repeat “Configuring the Master Switch - Part II” on page 150. Be sure to perform the SWITCH PROVISION command and to save your changes with the WRITE command. - The Operational Status should be Standalone Unit, indicating that stacking is enabled, but that the unit is operating as a stack of one switch. If the status is Stacking Hardware Disabled, the stacking feature is disabled. Repeat “Configuring the Master Switch - Part I” on page 147. Be sure to perform the STACK ENABLE command and to save your changes with the WRITE command.

Table 20. Verifying the Master Switch (Continued)

Step	Description and Command
4	<p>Enter the SHOW RUNNING-CONFIG command to display the running configuration of the master switch.</p> <pre>awplus# show running-config</pre> <p>Use the display to confirm that you designated the correct trunk ports for the master and member switches. The ports should be designated with INTERFACE PORT and STACKPORT commands. In the following example, ports 15 and 16 on the master and member switches will be the stack trunk:</p> <pre>interface port1.0.15-1.0.16 stackport . interface port2.0.15-2.0.16 stackport . interface port3.0.15-3.0.16 stackport . interface port4.0.15-4.0.16 stackport</pre>
5	Go to “What to Do Next” on page 153.

What to Do Next After configuring the master switch, do the following:

1. Power off the switch by disconnecting its AC power cords from the AC power sources. Refer to Figure 76 on page 153.

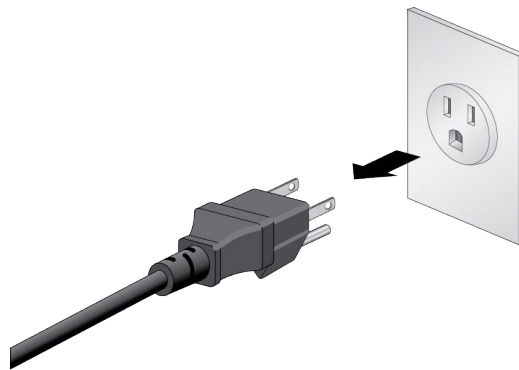


Figure 76. Powering Off the Switch

2. Configure the member switches. Refer to “Configuring Member Switches” on page 155.

3. After configuring the master and member switches, cable the ports of the stack trunk on all the switches. Refer to “Installing 1Gbps SFP or 10Gbps SFP+ Transceivers” on page 168 or “Installing AT-SP10TW Direct Connect Twinax Cables” on page 172.

Note

When cabling the stack trunk, remember that the cables must crossover to different ports. For example, if you are using ports 15 and 16 for the stack trunk, port 15 on a switch has to connect to port 16 on the next switch.

4. Power on the master and member switches of the stack. Refer to “Powering on the Stack” on page 163.
5. Verify that the switches formed the stack by referring to “Verifying the Stack” on page 164.
6. Cable the networking ports. Refer to Chapter 8, “Cabling the Networking Ports” on page 165.

Configuring Member Switches

Here are the procedures for configuring member switches of the stack.

- “General Steps for the Member Switch” on page 155
- “Configuring Member Switches - Part I” on page 156
- “Configuring Member Switches - Part II” on page 158
- “Verifying Member Switches” on page 160
- “What to Do Next” on page 161

Note

The procedures require resetting the member switch twice. Some network traffic will be lost if the switch is already connected to an active network.

The procedures should be performed in the order presented here.

General Steps for the Member Switch

The procedure for configuring member switches for stacking is divided into two parts. The general steps to Part I are listed here:

1. Start a local management session on the switch.
2. View the hardware status and management software version number with the `SHOW SYSTEM ENVIRONMENT` and `SHOW VERSION INSTALLED` commands in the Privilege Exec mode.
3. Enable the VCStack feature with the `STACK ENABLE` command in the Global Configuration mode. You will probably not have to perform this step because the default setting for the feature is enabled.
4. Assign an ID number in the range of 2 to 4 to the member switch with the `SWITCH RENUMBER` command in the Global Configuration mode.

Note

Changing a member switch’s ID does not delete the default ID 1 from its configuration. Instead, the member switch retains it and uses default ID 1 as the provisioned master switch.

5. Save your changes with the `WRITE` command in the Privilege Exec mode.
6. Restart the switch with the `REBOOT` command.

The general steps in Part II are listed here:

1. Start a new local management session with the switch.
2. Assign the member switch a priority number equal to its ID number, with the STACK PRIORITY command in the Global Configuration mode.
3. Remove the stacking function from the default stacking ports 17 and 21, with the NO STACKPORT command.
4. Designate the ports of the stack trunk on both the provisioned master switch and member switch, with the STACKPORT command in the port Interface mode.
5. Save your changes with the WRITE command in the Privilege Exec mode.
6. Restart the switch with the REBOOT command.
7. Start a new local management session.
8. Verify the changes with the SHOW STACK and SHOW RUNNING-CONFIG command.

Configuring Member Switches - Part I

The instructions for configuring member switches are divided into two parts. You do the following in Part I:

- Display the hardware status and management software version number.
- Enable VCStack.
- Set the switch ID number.

To configure a member switch, perform the procedure in Table 21.

Table 21. Configuring Member Switches - Part I

Step	Description and Command
1	Power on a member switch and wait two minutes as it initializes the management software. Refer to "Powering On a Switch" on page 135.
2	Start a local management session. Refer to "Starting a Local Management Session" on page 130.
3	Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode. awplus> enable

Table 21. Configuring Member Switches - Part I (Continued)

Step	Description and Command
4	<p>Verify that the switch hardware is operating correctly, with the SHOW SYSTEM ENVIRONMENT command. All components should have the status Ok.</p> <pre>awplus# show system environment Environment Monitoring Status Overall Status: Normal Resource ID: 1 Name: AT-x550-18XSQ ID Sensor (Units) Reading Low Limit High Limit Status 1 Fan: Fan 1 (RPM) 5980 4800 - ok 2 voltage: 1.0V (Volts) 1.040 0.891 1.090 ok .</pre>
5	<p>Display the version number of the AlliedWare Plus operating software on the member switch by entering the SHOW VERSION INSTALLED command. Write down the version number in the worksheet in Table 16 on page 74. After viewing the version numbers on all the switches, you will compare them to confirm they all have the same version. Switches with different versions will have to be updated.</p>
5	<p>Move to the Global Configuration mode with the CONFIGURE TERMINAL command.</p> <pre>awplus# configure terminal</pre> <p>Enter configuration commands, one per line. End with CNTL/Z.</p>
<p>Step 6 enables the VCStack feature on the switch. You will probably not need to perform the step because the feature is enabled by default. If the Switch ID LED is displaying "0", perform the step. Otherwise, go to step 7.</p>	
6	<p>Activate VCStack on the switch with the STACK ENABLE command.</p> <pre>awplus(config)# stack enable % Automatically enabling 'stack virtual-mac' to minimize disruption form failovers. % Please check that the new MAC 0000.cd37.0431 is unique within the network. % Save the config and restart the system for this change to take effect.</pre>
<p>Steps 7 to 13 set the member switch's ID number, save your changes, and reboot the unit.</p>	
7	<p>Set the ID number of the member switch with the STACK RENUMBER command. If you are using the worksheet on Table 16 on page 74, refer there for the ID numbers. This example assigns the ID number 2 to the member switch.</p> <pre>awplus(config)# stack 1 renumber 2 % warning: the new ID will not become effective until the stack- member reboots. % warning: the boot configuration may now be invalid.</pre>

Table 21. Configuring Member Switches - Part I (Continued)

Step	Description and Command
8	Return to the Privileged Exec mode. awplus(config)# exit
9	Enter the WRITE command to save your change. If this is the first management session, the switch adds the configuration file DEFAULT.CFG to flash memory, for storing your configuration changes. awplus# write Building configuration ... [OK]
10	Restart the switch with the REBOOT command. awplus# reboot reboot system? (y/n): awplus#
11	Type “Y” for yes.
12	Wait two minutes for the switch to initialize its management software.
13	Check the ID LED on the front panel and do one of the following: - If the ID LED is displaying the switch’s new ID number, go to “Configuring Member Switches - Part II,” next. - If the ID LED is displaying a different number, repeat this procedure. Enter the STACK RENUMBER command and save your changes with the WRITE command.

Configuring Member Switches - Part II

This section contains instructions to the second part to configuring member switches. The instructions explain how configure the following parameters:

- ❑ Set the priority number. For background information, refer to “Selection of the Master Switch” on page 69.
- ❑ Designate the optional stacking ports for the stack trunk. Refer to “Stack Trunk” on page 52.

To configure a member switch, perform the procedure in Table 22.

Table 22. Configuring Member Switches - Part II

Step	Description and Command
1	Start a new local management session on the member switch. Refer to “Starting a Local Management Session” on page 130.

Table 22. Configuring Member Switches - Part II (Continued)

Step	Description and Command
2	Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode. <pre>awplus> enable</pre>
Steps 3 and 4 set the switch's priority value to be the same as its ID number.	
3	Move to the Global Configuration mode with the CONFIGURE TERMINAL command. <pre>awplus# configure terminal</pre> Enter configuration commands, one per line. End with CNTL/Z.
4	Assign a priority value to the switch equal to its ID number, with the STACK PRIORITY. This example assigns priority 2 to a member switch with the ID 2: <pre>awplus(config)# stack 2 priority 2</pre>
Steps 5 and 6 remove the stacking function from the default stacking ports 17 and 21 on the member switch.	
5	Enter the port Interface modes of the default stacking ports 17 and 21 on the member switch. The example here assumes the member switch has the ID 2: <pre>awplus(config)# interface port2.0.17-2.0.21</pre> % port1.0.17 is currently configured as a stack-port. Use caution when altering its config. % port1.0.21 is currently configured as a stack-port. Use caution when altering its config.
6	Remove the stacking function from the ports to convert them into regular Ethernet ports, with the NO STACKPORT command: <pre>awplus(config-if)# no stackport</pre> % Save the config and restart the system for this change to take effect.
Steps 7 and 8 add the stacking function to the optional stacking ports on the member switch.	
7	Enter the Interface modes of the optional stack ports on the member switch. If you filled out the worksheet in Table 16 on page 74, refer there for the ports. The example command here assumes the switch has the ID 2 and will be using ports 15 and 16 for the stack trunk. Be sure to modify the command with the ports you selected for the stack trunk. <pre>awplus(config-if)# interface port2.0.15-1.0.16</pre>

Table 22. Configuring Member Switches - Part II (Continued)

Step	Description and Command
8	Designate the ports as the stack trunk with the STACKPORT command. awplus(config-if)# stackport % Save the config and restart the system for this change to take effect.
The remaining steps save your changes and reboot the switch.	
9	Return to the Global Configuration mode. awplus(config-if)# exit
10	Return to the Privileged Exec mode. awplus(config)# exit
11	Save your changes with the WRITE command. awplus# write Building configuration ... [OK]
12	Restart the switch. awplus# reboot reboot system? (y/n):
13	Type "Y" for yes.
14	Wait two minutes for the switch to initialize its management software.
15	Go to "Verifying Member Switches," next.

Verifying Member Switches Perform the steps in Table 23 to confirm the configuration of a member switch.

Table 23. Verifying Member Switches

Step	Description and Command
1	Start a local management session. Refer to "Starting a Local Management Session" on page 130.
2	Move to the Privileged Exec mode. awplus> enable

Table 23. Verifying Member Switches (Continued)

Step	Description and Command
3	<p>Enter the SHOW STACK DETAIL command. Examine the display for the entry that has the same ID number as the member switch you are currently configuring. Here is an example for the member switch with the ID 2:</p> <pre>awplus# show stack detail . . Stack member 2: ----- ID 2 MAC address e01a:ea20:8011 Last role change Thur Nov 23 21:15:20 2018 Product type AT-x550-18XSPqm Role Active Master Status Ready Priority 2 Host name awplus S/W version auto synchronization On Resiliency link status Not configured Stack port2.0.15 status Down Stack port2.0.16 status Down . .</pre> <p>Examine the entry for the following:</p> <ul style="list-style-type: none"> - The “Priority” value should be the same as the switch’s ID number. If they are not the same, repeat “Configuring Member Switches - Part II” on page 158. Be sure to perform the STACK PRIORITY command and save your changes with the WRITE command. - The “Stack port status” fields, the last two lines, should identify the selected optional stack ports. If they identify the wrong ports, such as the default ports 17 and 21, repeat “Configuring Member Switches - Part II” on page 158. (The status of the ports is Down because the stack ports are not cabled yet.)
4	Go to “What to Do Next,” next.

What to Do Next After configuring a member switch, do the following:

1. Power off the switch by disconnecting its AC power cords from the AC power sources. Refer to Figure 76 on page 153.
2. Repeat this procedure to configure any additional member switches.
3. If you have not already configured the master switch, perform “Configuring the Master Switch” on page 146.

4. Cable the optional stacking ports of the stack trunk, on the master and member switches. Refer to “Installing 1Gbps SFP or 10Gbps SFP+ Transceivers” on page 168 or “Installing AT-SP10TW Direct Connect Twinax Cables” on page 172.

Note

When cabling the stack trunk, remember that the cables must crossover to different ports. For example, if you are using ports 15 and 16 for the stack trunk, port 15 on a switch has to connect to port 16 on the next switch.

5. Power on the master and member switches of the stack, as explained in “Powering on the Stack” on page 163.
6. Verify that the switches successfully formed the stack by performing “Verifying the Stack” on page 164.
7. Cable the networking ports, as explained in Chapter 8, “Cabling the Networking Ports” on page 165.

Powering on the Stack

After configuring the master and member switches, you are ready to cable the ports of the stack trunk and power on the stack for the first time. (If you want to monitor the power-on sequence, connect a terminal or computer with a terminal emulator program to the Console port on either switch).

To power on the stack for the first time, perform the following procedure:

1. Verify that the master and member switches are powered off.
2. Cable the ports of the stack trunk on the switches. Refer to Chapter 8, “Cabling the Networking Ports” on page 165.
3. Power on all the switches at the same time or within thirty seconds of each other. Refer to “Powering On a Switch” on page 135.

Refer to “Power Specifications” on page 184 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

4. Wait two minutes for the switches to form the stack.
5. Go to “Verifying the Stack” on page 164.

Verifying the Stack

To verify the stack, perform the following procedure:

1. Start a local management session on any switch in the stack. Refer to “Starting a Local Management Session” on page 130.
2. From the User Exec mode, enter the SHOW STACK command:

```
awplus> show stack
```

An example of the command for a stack of four switches is shown in Figure 77.

```
awplus> show stack
Virtual Chassis Stacking summary information
ID      Pending ID  MAC address      Priority  Status  Role
1       -            e01a:ea20:8011  1        Ready   Active Master
2       -            e01a:ea20:8023  2        Ready   Backup Member
3       -            e01a:ea20:9a45  3        Ready   Backup Member
4       -            e01a:ea20:1b8a  4        Ready   Backup Member
Operational Status      Normal operations
Stack MAC address       e01a:ea20:8011
```

Figure 77. SHOW STACK Command

Review the following items:

- ❑ The command should list all the switches. If the list is incomplete, refer to Chapter 9, “Troubleshooting” on page 177.
 - ❑ The Operational Status field should be “Normal operations” to indicate that all the stacking ports are operating normally.
 - ❑ If the Operational Status field is displaying “Not all stack ports are up,” one or more stacking ports are not being used or cannot establish links with their counterparts. For more information, refer to Chapter 9, “Troubleshooting” on page 177.
3. Go to Chapter 8, “Cabling the Networking Ports” on page 165, to complete the installation.

Chapter 8

Cabling the Networking Ports

This chapter contains the following procedures:

- ❑ “Cabling Twisted Pair Ports in AT-x550-18XTQ and AT-x550-18XSPQm Switches” on page 166
- ❑ “Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers” on page 167
- ❑ “Installing 1Gbps SFP or 10Gbps SFP+ Transceivers” on page 168
- ❑ “Installing AT-SP10TW Direct Connect Twinax Cables” on page 172
- ❑ “Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers” on page 174
- ❑ “Installing AT-QSFPCU Cables” on page 175

Cabling Twisted Pair Ports in AT-x550-18XTQ and AT-x550-18XSPQm Switches

Here are the guidelines to cabling the twisted pair ports on AT-x550-18XTQ and AT-x550-18XSPQm switches:

- ❑ The cable specifications for the ports on the AT-x550-18XTQ switch are listed in “Cable Requirements” on page 25.
- ❑ The cable specifications for the ports on the AT-x550-18XSPQm switch are listed in “Cable Requirements” on page 27.
- ❑ PoE is enabled by default on the ports on the AT-x550-18XSPQm switch.
- ❑ 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 Auto-Negotiation.
- ❑ The ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- ❑ 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. *ES* E92

Installing 1Gbps SFP or 10Gbps SFP+ Transceivers

This section contains installation instructions for SFP or SFP+ transceivers in slots 1 to 16 in the AT-x550-18XSQ Switch and slots 9 to 16 in the AT-x550-18XSPQm 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. Select a slot for the transceiver.
2. If the slot has a dust cover, remove it. Refer to Figure 78.

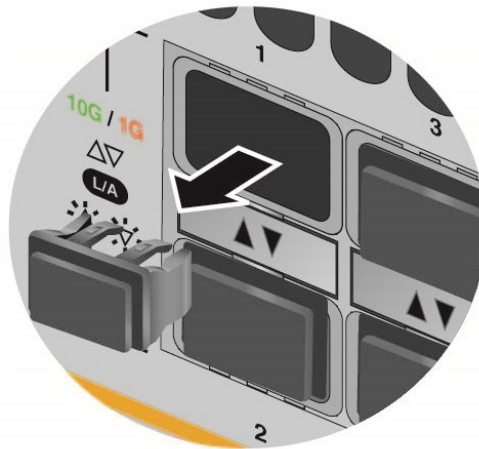


Figure 78. Removing the Dust Plug from an SFP Slot

3. Remove the transceiver from its shipping container and store the packaging material in a safe location.
4. 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. Refer to Figure 79 on page 169.

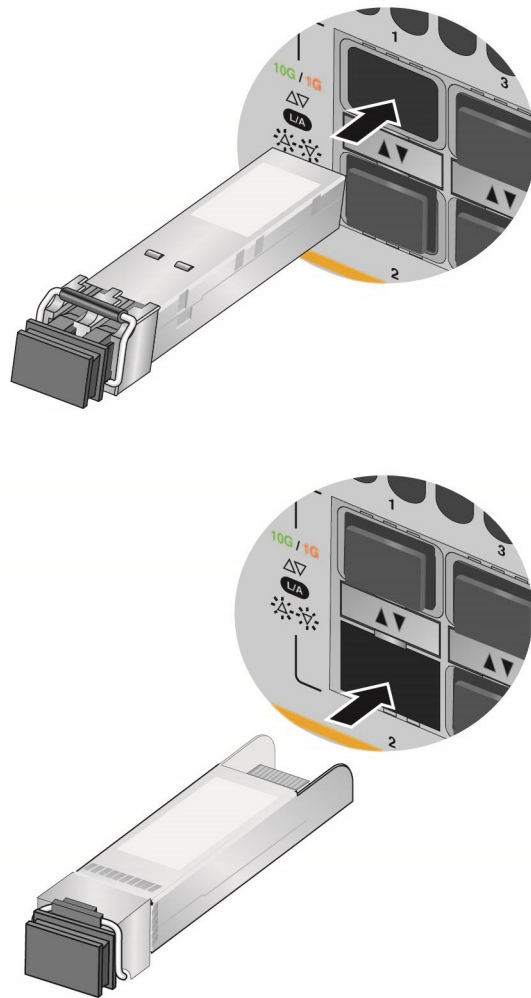


Figure 79. Installing an SFP Transceiver

5. Slide the transceiver into the slot until it clicks into place.

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.

6. Remove the dust cover from the transceiver, as shown in Figure 80 on page 170.

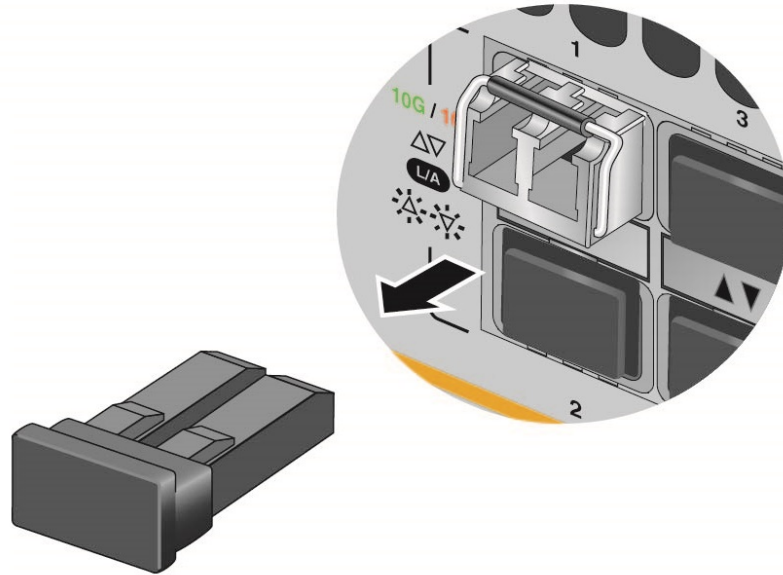


Figure 80. Removing the Dust Cover from an SFP or SFP+ Transceiver

7. 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 81. If the transceiver is in a bottom slot, the handle should be in the down position.

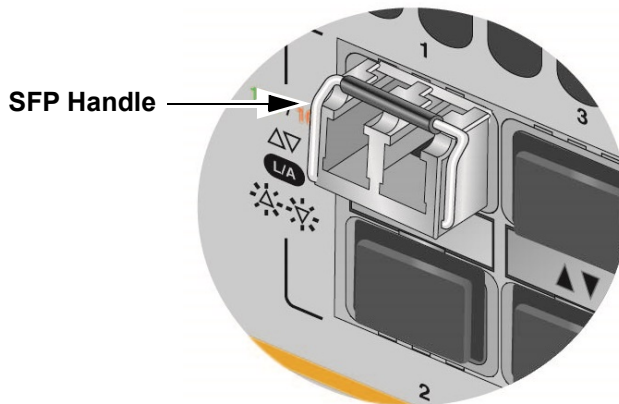


Figure 81. Positioning the SFP or SFP+ Handle in the Upright Position

8. Connect the fiber optic cable to the transceiver, as shown in Figure 82 on page 171. The connector on the cable should fit snugly into the port, and the tab should lock the connector into place.

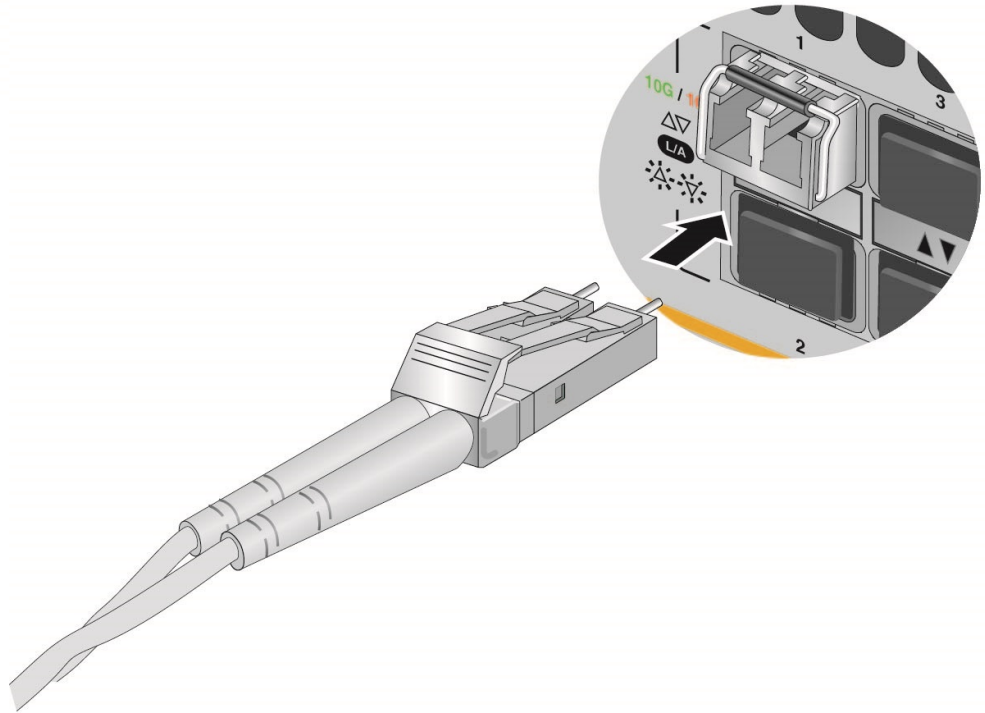


Figure 82. Connecting a Fiber Optic Cable to an SFP or SFP+ Transceiver

9. Repeat this procedure to install additional transceivers.

Installing AT-SP10TW Direct Connect Twinax Cables

The SFP and SFP+ transceiver ports 1 to 16 on the AT-x550-18XSQ Switch and ports 9 to 16 on the AT-x550-18XSPQm Switch support the 1-meter AT-SP10TW1 and 3-meter AT-SP10TW3 direct connect twinax cables. The cables are an economical way to add 10Gbps connections over short distances.

Note

The switches do not support the 7-meter AT-SP10TW7 direct connect cable.

To install AT-SP10TW cables in AT-x550-18XSQ or AT-x550-18XSPQm switches, perform the following procedure:

1. Select a slot for the transceiver.
1. If the slot has a dust cover, remove the cover. Refer to Figure 78 on page 168.
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 83 on page 172.

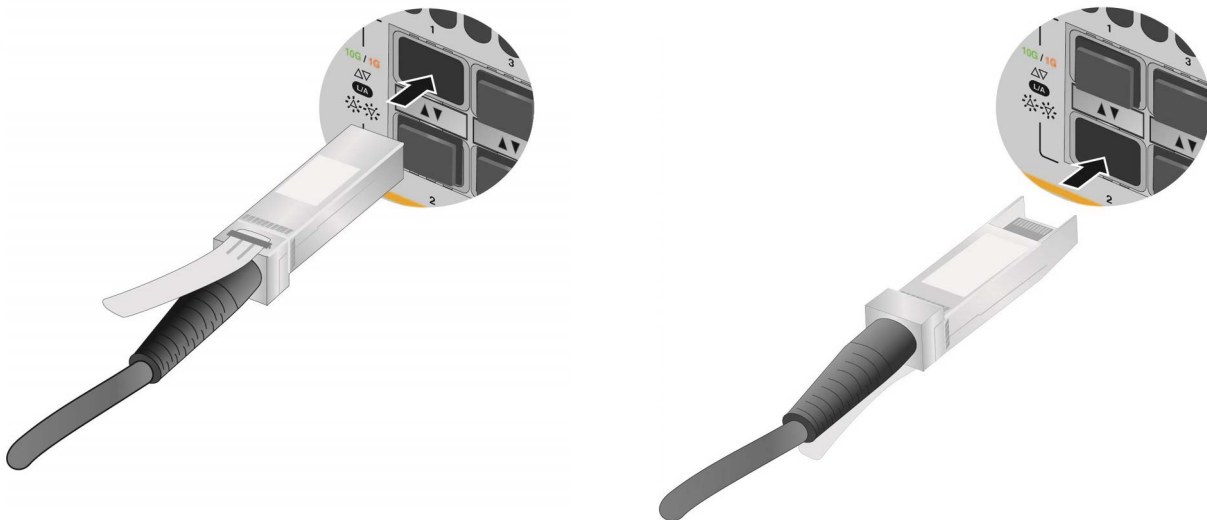


Figure 83. Installing AT-SP10TW Cables

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.

Installing AT-QSFPSR4 or AT-QSFPLR4 Transceivers

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

Please review “Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers” on page 167 before performing this procedure.

To install AT-QSFPSR4 or AT-QSFPLR4 transceivers, perform the following procedure:

1. Remove the dust cover from QSFP+ slot 17 or 21. Refer to Figure 84 on page 175.
2. Slide a QSFP+ transceiver into the slot until it clicks into place.
3. Attach fiber optic cable to the transceiver.
4. Connect the other end of the cable to a compatible QSFP+ port in another network device.
5. Repeat this procedure to install a second QSFP+ transceiver.

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 installing AT-QSFPCU Cables in QSFP+ ports 17 and 21. The cables are used in place of fiber optic cables and transceivers for 40GbE links of up to 1 or 3 meters. The cable model names are listed here:

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

Please review “Guidelines to Handling SFP, SFP+, and QSFP+ Transceivers” on page 167 before performing this procedure.

To install AT-QSFPCU Cables, perform the following procedure:

1. Remove the dust cover from a QSFP+ slot in the switch. Figure 84 shows the removal of the dust cover from slot 17.

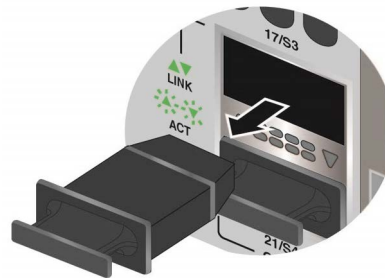


Figure 84. Removing the Dust Cover from a QSFP+ Transceiver Slot

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 85.

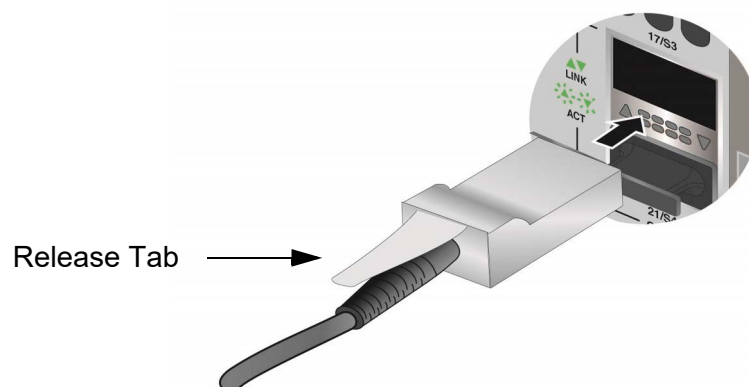


Figure 85. Sliding the AT-QSFPCU Cable into the Slot

3. Install the other end of the cable into a compatible QSFP+ slot on another network device.
4. Repeat this procedure to install additional AT-QSFPCU Cables.

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 9

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 the port LEDs and 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 184.

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

Solution: The switch might 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 can also toggle the LEDs off and on with the ECOFRIENDLY LED and NO ECOFRIENDLY LED commands in the command line interface.

Problem 3: A twisted pair port on the AT-x550-18XTQ or AT-x550-18XSPQm Switch is connected to an active 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 25.
- ❑ Verify that the port is connected to the correct twisted pair cable.

Note

Twisted pair ports 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. If you are using the 40Gbps transceiver slots 17 and 21 (S3 and S4) for the stack trunk, try the following:

- ❑ Verify that the transceivers are fully inserted into the transceiver slots.
- ❑ 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. Refer to “40Gbps Stack Trunks” on page 52.
- ❑ 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, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141.

If you are using 10Gbps ports for the stack trunk, try the following:

- ❑ Verify that the stacking ports are properly cabled. Refer to “10Gbps Stack Trunks” on page 59.
- ❑ If you are using SFP+ transceivers for the stack trunk, verify that they are fully inserted into the transceiver slots.
- ❑ If you are using AT-SPI0TW direct connect twinax cables, verify that they are from Allied Telesis. The trunk will not work with cables from other network equipment manufacturers.
- ❑ Verify that VCStack is activated on the switches. For instructions, refer to Chapter 6, “Building the Trunk with Default Stacking Ports 17 and 21” on page 123 or Chapter 7, “Building the Trunk with Optional Stacking Ports” on page 141..
- ❑ Verify that all switches have AlliedWare Plus v5.4.8-0.2. To display the version number, use the SHOW VERSION command in the Privileged Exec mode.

Problem 5: The AT-x550-18XSPQm Switch is not providing power to a PoE or PoE+ device.

Solutions: Try the following:

- ❑ Review the powered device’s documentation to confirm that it supports Mode A of the IEEE 802.3at standard. Mode A is one of two modes that define the connector pins that deliver the power from the port in the switch to the powered device. In Mode A, the

power is carried on pins 1, 2, 3, and 6 on the RJ-45 port, the same pins that carry the network traffic. The second mode, Mode B, defines pins 4, 5, 7, and 8 as the power carriers. The AT-x550-18XSPQm Switch does not support Mode B. Most powered devices are designed to accept power by either mode, but some legacy devices may only support one mode. This can be verified by reviewing the device's documentation or data sheet. Legacy devices that only support Mode B will not work with the switch.

- ❑ Check that the device's power requirements do not exceed 30 W. This can be verified by reviewing the device's documentation or data sheet.
- ❑ Verify that you are using the appropriate category of twisted-pair cable by referring to "Cable Requirements" on page 27.
- ❑ Use the management software on the switch to determine whether PoE is enabled on the port. The default setting for PoE is enabled.
- ❑ Use the management software on the switch to determine whether the PoE power setting for the port has been reduced to a value below the power requirements of the device.
- ❑ Try connecting the device to a different port on the switch.

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 on the front of the switch is flashing the letter "F."

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

- ❑ A cooling fan has failed.
- ❑ The switch might be overheating and may have to shut down.

Contact your Allied Telesis sales representative for assistance.

Appendix A

Technical Specifications

This appendix contains the following sections:

- "Physical Specifications" on page 182
- "Environmental Specifications" on page 183
- "Power Specifications" on page 184
- "Certifications" on page 185
- "RJ-45 Twisted Pair Port Pinouts" on page 186
- "RJ-45 Style Serial Console Port Pinouts" on page 187

Physical Specifications

Dimensions (H x W x D)

Table 24 lists the dimensions of the switches.

Table 24. 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.)
AT-x550-18XSPQm	4.4 cm x 44.0 cm x 26.0 cm (1.7 in. x 17.3 in. x 10.2 in.)

Weights

Table 25 lists the weights of the switches and power supplies.

Table 25. Product Weights

AT-x550-18XTQ	3.11 kg (6.85 lb.)
AT-x550-18XSQ	3.18 kg (7.00 lb.)
AT-x550-18XSPQm	4.15 kg (9.15 lb.)

Ventilation

Table 26 lists the ventilation requirements.

Table 26. Ventilation Requirements

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

Environmental Specifications

Table 27 lists the environmental specifications of the switches.

Table 27. 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 28 lists the maximum power consumptions for the switches.

Table 28. Maximum Power Consumptions

AT-x550-18XTQ	128.0 watts
AT-x550-18XSQ	111.0 watts
AT-x550-18XSPQm	391.0 watts (with PoE)

Input Voltages

Table 29 lists the input voltages for the switches.

Table 29. 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
AT-x550-18XSPQm	100-240 VAC~, 4A maximum, 50/60 Hz

Heat Dissipation

Table 30 lists the heat dissipation for the switches.

Table 30. Heat Dissipation

AT-x550-18XTQ	436 BTU/hr
AT-x550-18XSQ	378 BTU/hr
AT-x550-18XSPQm	1334 BTU/hr

Certifications

Table 31 lists the product certificates.

Table 31. 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 (CULUS), EN60825
Compliance Marks	CE, CULUS, TUV, C-Tick

RJ-45 Twisted Pair Port Pinouts

Figure 86 illustrates the pin layout of the RJ-45 twisted pair ports on the AT-x550-18XTQ and AT-x550-18XSPQm Switches.

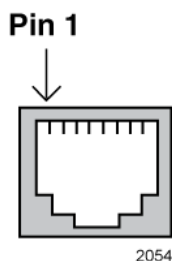


Figure 86. Pin Layout for the RJ-45 Twisted Pair Ports (Front View)

Twisted pair ports 1 to 16 on the AT-x550-18XTQ Switch can operate at 1Gbps or 10Gbps. Twisted pair ports 1 to 8 on the AT-x550-18XSPQm Switch can operate at 1Gbps, 2.5Gbps, 5Gbps, or 10Gbps. The pin signals are the same for all speeds. Refer to Table 32.

Table 32. Pin Signals for the Twisted Pair Ports

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

Table 33. 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.

