

# x930 Series

Gigabit Layer 3 Ethernet Switches

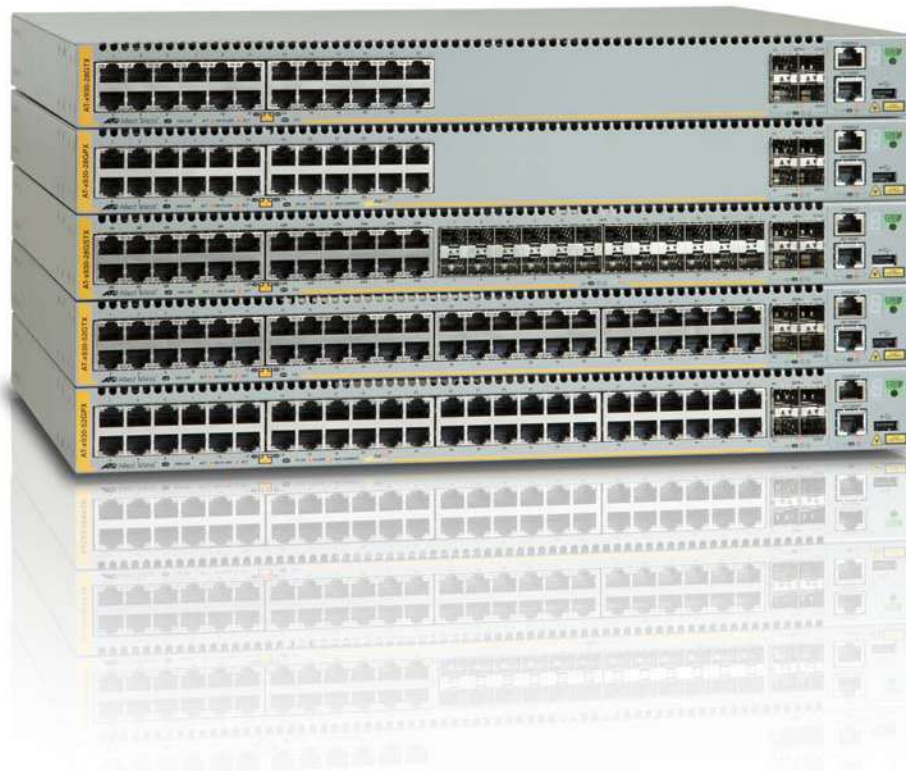
AT-x930-28GTX

AT-x930-28GPX

AT-x930-28GSTX

AT-x930-52GTX

AT-x930-52GPX



## Installation Guide for Stand-alone Switches

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# Electrical Safety and Emissions Standards

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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, EN55022 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<sub>US</sub>)




Laser Safety

EN60825

## Translated Safety Statements

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

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# Preface

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This guide contains the installation instructions for the x930 Series of Layer 3, Gigabit Ethernet switches. This preface contains the following sections:

- ❑ “Document Conventions” on page 12
- ❑ “Contacting Allied Telesis” on page 13

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**Note**

This guide explains how to install the switches as stand-alone units. For instructions on how to build a stack with Virtual Chassis Stacking (VCStack™), refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.

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## Document Conventions

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This document uses the following conventions:

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**Note**

Notes provide additional information.

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**Caution**

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

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**Warning**

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

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## Contacting Allied Telesis

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If you need assistance with this product, you may contact Allied Telesis technical support by going to the Support & Services section of the Allied Telesis web site at **[www.alliedtelesis.com/support](http://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](http://www.alliedtelesis.com/purchase)** and select your region.



# Chapter 1

## Overview

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This chapter contains the following sections:

- ❑ “Models” on page 16
- ❑ “Features” on page 17
- ❑ “Front and Back Panels” on page 21
- ❑ “Management Panel” on page 24
- ❑ “Power Supplies” on page 25
- ❑ “10/100/1000Base-T Twisted Pair Ports” on page 29
- ❑ “Power Over Ethernet” on page 31
- ❑ “SFP Slots” on page 37
- ❑ “SFP+ Slots” on page 38
- ❑ “Stacking S1 and S2 SFP+ Slots” on page 39
- ❑ “Ethernet Management Port (NET MGMT)” on page 40
- ❑ “eco-friendly Button” on page 41
- ❑ “LEDs” on page 42
- ❑ “USB Port” on page 50
- ❑ “Console Port” on page 51
- ❑ “Optional Cards” on page 52

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### **Note**

This guide explains how to install the switches as stand-alone units. For instructions on how to build a stack with Virtual Chassis Stacking (VCStack™), refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.

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## Models

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Table 1 lists the models and basic features of the x930 Series of stackable Gigabit Layer 3 switches.

Table 1. Models and Basic Features

Model	10/100/1000 Base-T Ports	SFP Slots	SFP+ Slots	PoE+	VCStack
AT-x930-28GTX	24	0	4	No	Yes
AT-x930-28GPX	24	0	4	Yes	Yes
AT-x930-28GSTX	24	24	4	No	Yes
AT-x930-52GTX	48	0	4	No	Yes
AT-x930-52GPX	48	0	4	Yes	Yes

Additional information is listed here:

- ❑ The switches do not come with power supplies. The power supplies must be ordered separately. For more information, refer to “Power Supplies” on page 25.
- ❑ The power budgets of the AT-x930-28GPX and AT-x930-52GPX Switches for PoE+ powered devices depend on the number and types of power supplies installed in the units. For more information, refer to “Power Budget” on page 33.
- ❑ You may use the VCStack feature to stack the switches with either the S1 and S2 ports, which come standard with the units, or with the optional AT-StackQS card. For more information, refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.
- ❑ The twisted pair ports and SFP slots on AT-x930-28GSTX Switch are paired together. Only one port or slot in a pair is operational at a time. For more information, refer to “SFP Slots” on page 37.



## Features

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Here are the switches and their features:

### **x930 Models**

Here are the switches in the x930 Series:

- ☐ AT-x930-28GTX
- ☐ AT-x930-28GPX
- ☐ AT-x930-28GSTX
- ☐ AT-x930-52GTX
- ☐ AT-x930-52GPX

### **10/100/1000 Mbps Twisted Pair Ports**

Here are the basic features of the 10/100/1000 Mbps twisted pair ports:

- ☐ 24 or 48 ports per switch
- ☐ 10Base-T, 100Base-TX, and 1000Base-T compliant
- ☐ IEEE 802.3u Auto-Negotiation compliant
- ☐ Auto-MDI/MDIX
- ☐ 100 meters (328 feet) maximum operating distance
- ☐ IEEE 802.3x flow control in 10/100Base-TX full-duplex mode
- ☐ IEEE 802.3x backpressure in 10/100Base-TX half-duplex mode
- ☐ IEEE 802.3ab 1000Base-T
- ☐ Jumbo frames up to 13KB
- ☐ RJ-45 connectors

### **Power Over Ethernet**

Here are the basic features of Power over Ethernet (PoE) on the twisted pair ports on the AT-x930-28GPX and AT-x930-52GPX Switches:

- ☐ Supported on ports 1 to 24 on the AT-x930-28GPX Switch and ports 1 to 48 on the AT-x930-52GPX Switch
- ☐ Supports PoE (15.4 watts maximum) and PoE+ (30 watts maximum) powered devices
- ☐ Supports powered device classes 0 to 4
- ☐ Port prioritization
- ☐ Mode A wiring

### **SFP Slots**

Here are the basic features of the twenty four SFP slots on the AT-x930-28GSTX Switch:

- ☐ Supports 100Base-FX, 1000Base-T, and 1000Base-SX/LX SFP transceivers

- ❑ Supports single-port BiDi 100Base-FX and 1000Base-LX SFP transceivers
- ❑ Supports 1000Base-ZX SFP transceivers

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**Note**

The SFP slots and twisted pair ports on the AT-x930-28GSTX Switch are paired together. Only one slot or port in a pair is active at a time. For more information, refer to “SFP Slots” on page 37.

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**Note**

SFP transceivers must be purchased separately. For a list of supported transceivers, contact your Allied Telesis distributor or reseller.

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## **SFP+ Slots**

Here are the basic features of the four SFP+ slots on the switches:

- ❑ Supports 10Gbps, 10GBase-SR/LR fiber optic transceivers
- ❑ Supports 10Gbps AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors
- ❑ Supports 1000Base-SX/LX SFP transceivers
- ❑ Supports single-port BiDi 1000Base-LX SFP transceivers
- ❑ Supports 1000Base-ZX SFP transceivers

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**Note**

The SFP+ slots do not support 100Mbps 100Base-FX transceivers.

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**Note**

The slots support full-duplex mode only. They do not support half-duplex mode.

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**Note**

SFP and SFP+ transceivers must be purchased separately. For a list of supported transceivers, contact your Allied Telesis distributor or reseller.

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**Note**

SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/S1 and 52/S2 on the 52-port switches are initially configured as stacking slots for the VCSStack feature. If you plan to use the switch as a stand-alone unit, you may disable the VCSStack feature and use the slots with standard SFP or SFP+ transceivers. The configuration instructions are provided later in this guide, in Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.

**S1 and S2  
Stacking Slots**

SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/S1 and 52/S2 on the 52-port switches can be used with the VCSStack feature to build a stack of up to eight switches. For instructions on the VCSStack feature, refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.

**LEDs**

Here are the port LEDs:

- ☐ Link/activity and duplex mode LEDs for the twisted pair ports on non-PoE switches
- ☐ Link/activity and PoE status LEDs for the twisted pair ports on PoE switches
- ☐ Link/activity LEDs for SFP and SFP+ slots
- ☐ Stack ID number LED
- ☐ eco-friendly button turns off the LEDs to conserve electricity

**Optional  
Expansion Cards**

Here are optional expansion cards:

- ☐ AT-StackQS Card - Contains two transceiver slots for building a VCSStack of up to eight switches. For more information, refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.
- ☐ AT-x9EM/XT4 Card - Contains four twisted pair ports that operate at 1Gbps or 10Gbps.

**Installation  
Options**

Here are the installation options for the switches:

- ☐ 19-inch equipment rack
- ☐ Desk or tabletop
- ☐ Wall

**MAC Address  
Table**

Here are the basic features of the MAC address tables of the switches:

- ☐ Storage capacity of 61,440 dynamic and static entries
- ☐ Automatic learning and aging

## **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 and Secure Shell management
- ☐ Remote HTTP and HTTPS web browser management
- ☐ SNMPv1, v2c, and v3

## **Power Supplies**

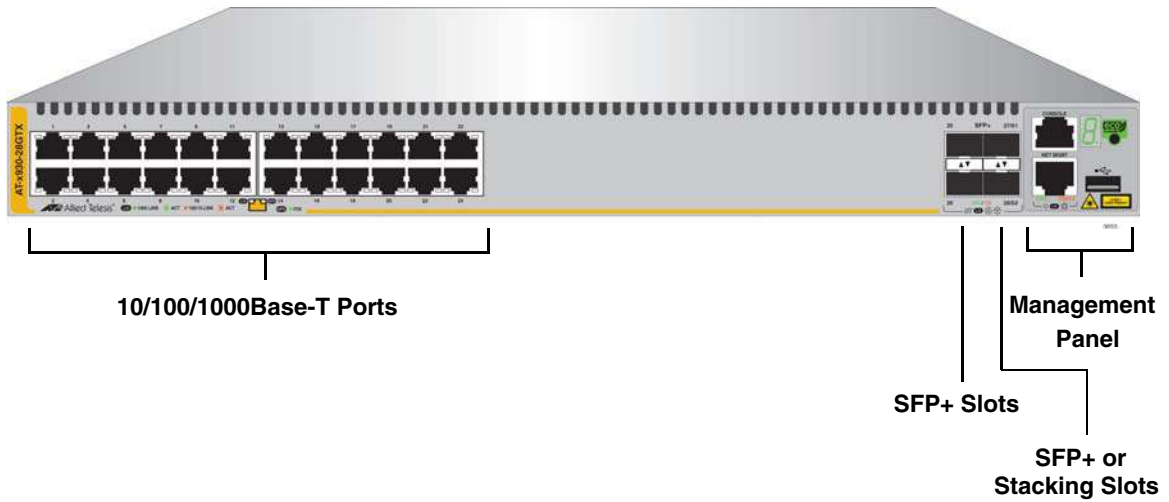
Here are the power supplies:

- ☐ AT-PWR150
- ☐ AT-PWR250
- ☐ AT-PWR250-80
- ☐ AT-PWR800
- ☐ AT-PWR1200

## Front and Back Panels

The front panels of the x930 Series switches are shown in Figure 1 and Figure 2 on page 22.

**AT-x930-28GTX**



**AT-x930-28GPX**

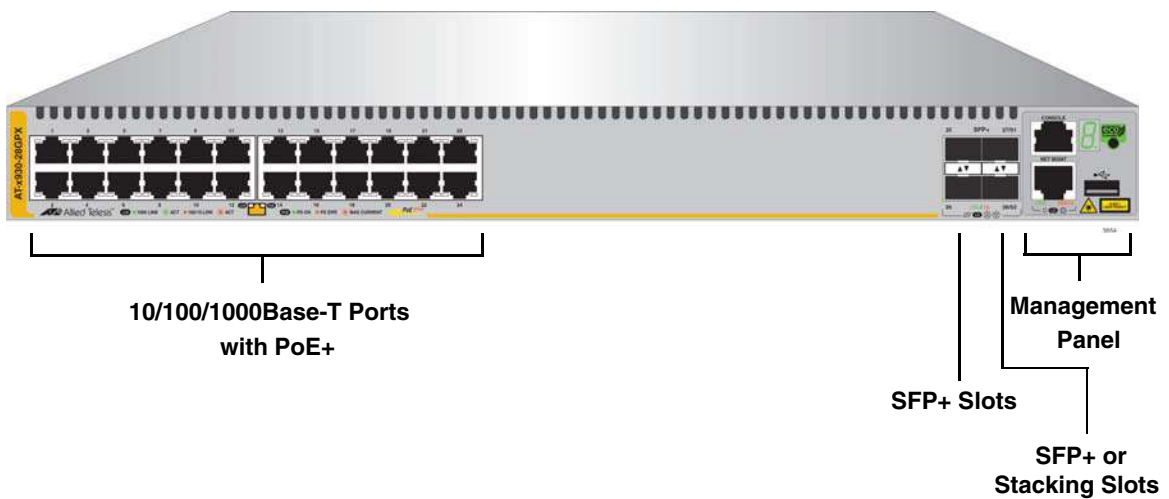


Figure 1. Front Panels of the AT-x930-28GTX and AT-x930-28GPX Switches

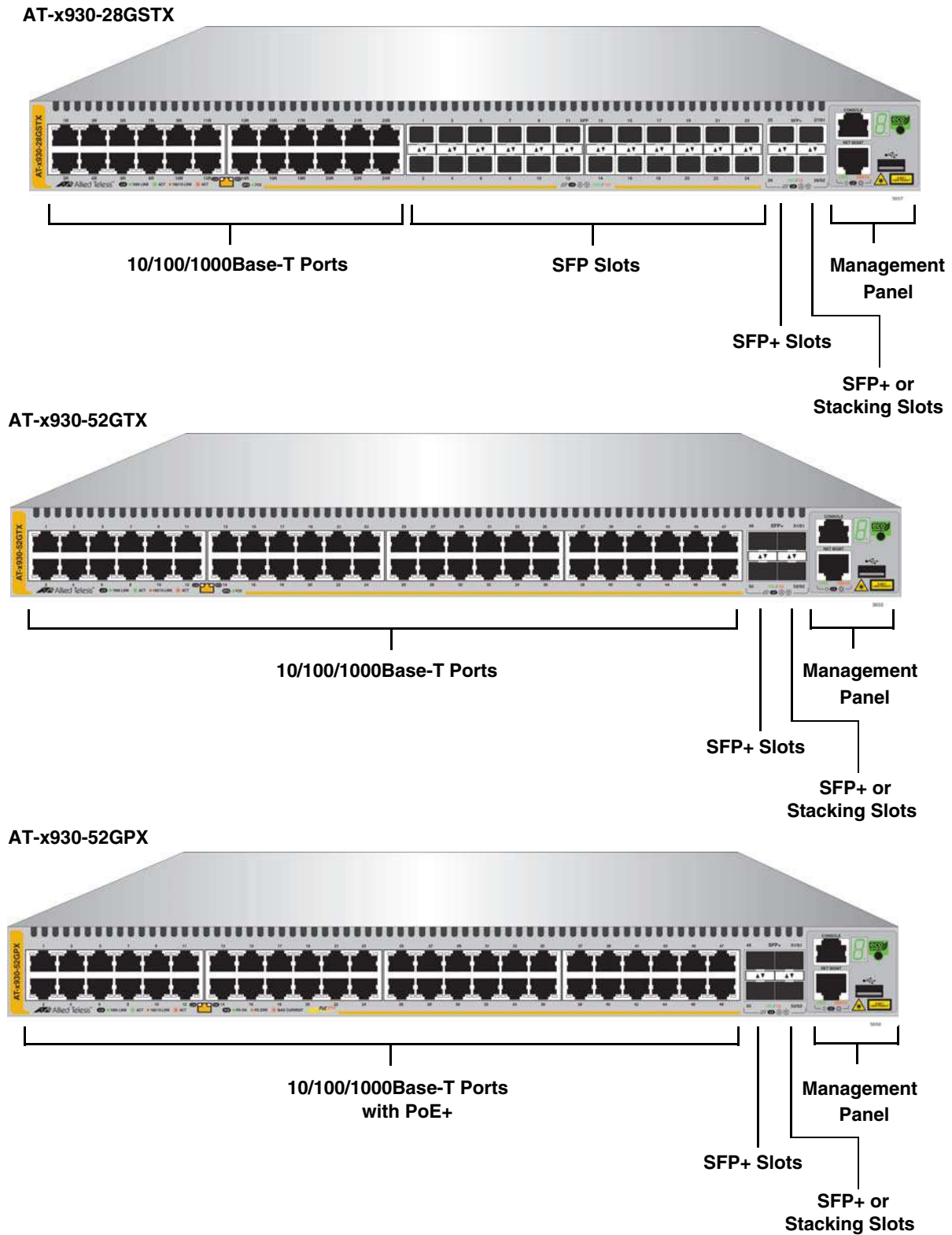


Figure 2. Front Panels of the AT-x930-28GSTX, AT-x930-52GTX, and AT-x930-52GPX Switches

Figure 3 shows the back panel. The back panel is the same on all of the switches.

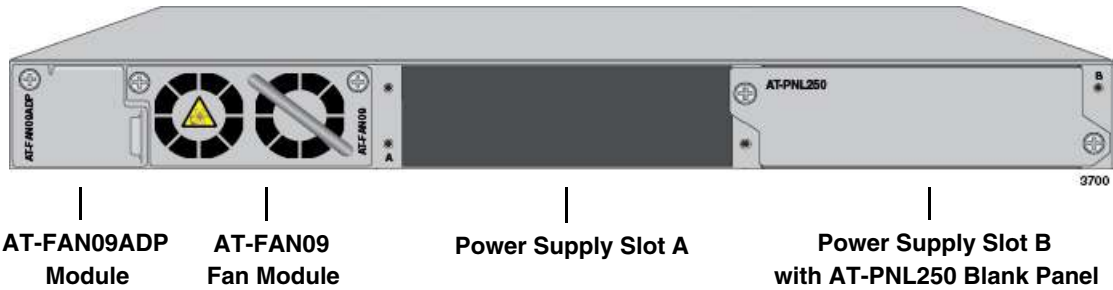


Figure 3. Back Panel

## Management Panel

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Figure 4 identifies the components in the management panel on the x930 Series switches.

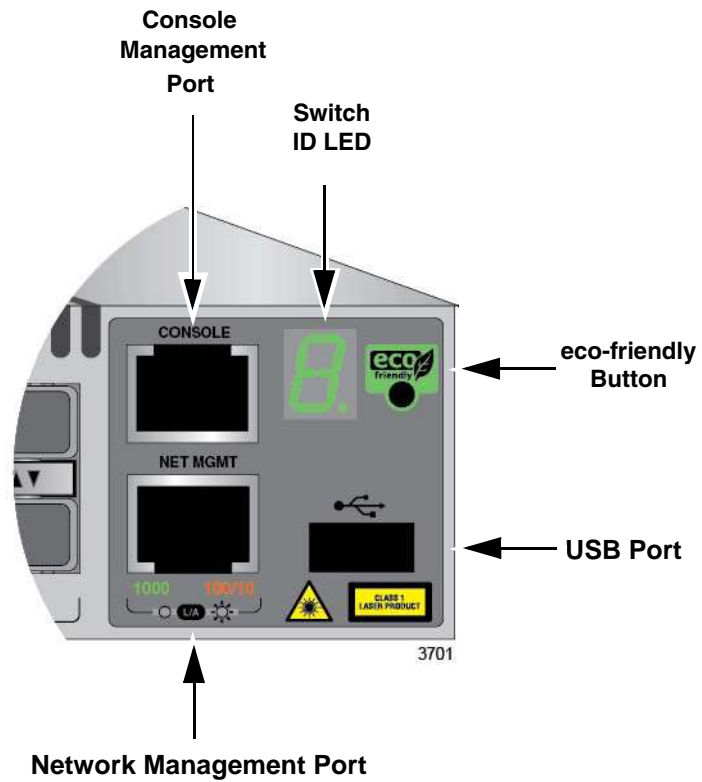


Figure 4. Management Panel



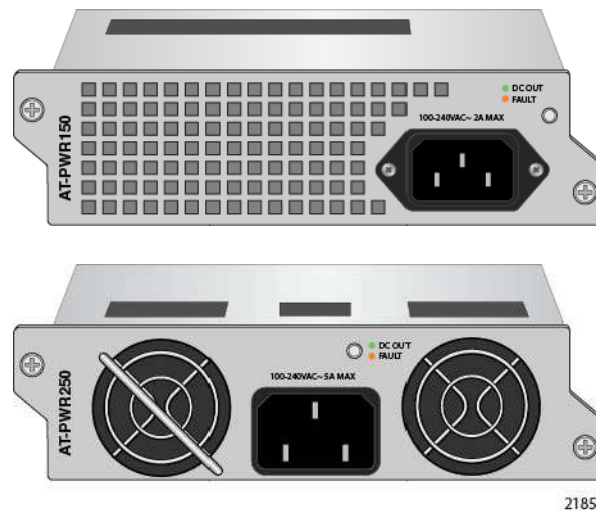
## Power Supplies

There are five power supply models for the x930 Series switches. The models are listed here:

- ❑ AT-PWR150
- ❑ AT-PWR250
- ❑ AT-PWR250-80
- ❑ AT-PWR800
- ❑ AT-PWR1200

The top three models are primarily intended for the non-PoE AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-52GTX Switches. The bottom two power supplies are for the PoE AT-x930-28GPX and AT-x930-52GPX Switches.

Figure 5 illustrates the AT-PWR150 and AT-PWR250 Power Supplies. The two power supplies are functionally identical.



2185

Figure 5. AT-PWR150 and AT-PWR250 Power Supplies

The two power supplies are primarily designed for the non-PoE switches and have these operating characteristics:

- ❑ The power supplies provide system power, but no PoE power.
- ❑ A single power supply can power an entire non-PoE switch.
- ❑ Installing two power supplies in a switch adds power redundancy.
- ❑ The power supplies are not recommended for the PoE AT-x930-28GPX and AT-x930-52GPX Switches because they do not have power for PoE devices. You may install them into PoE switches, but the switches will not be able to support PoE powered devices.

The AT-PWR250-80 DC Power Supply illustrated in Figure 6 has the same operating characteristics as the AT-PWR150 and AT-PWR250 Power Supplies. It, too, is intended for the non-PoE switches because it can supply system power, but no PoE power. The only difference is that this power supply has a DC wiring connector instead of an AC connector, for DC wiring environments.



Figure 6. AT-PWR250-80 Power Supply

Figure 7 illustrates the AT-PWR800 Power Supply. This power supply is primarily intended for the PoE AT-x930-28GPX and AT-x930-52GPX Switches. It provides both system power to the switch as well as up to 380 watts of PoE power for the powered devices connected to the network ports.

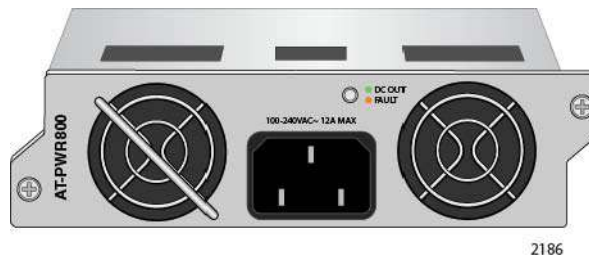


Figure 7. AT-PWR800 Power Supply

A PoE switch with one AT-PWR800 Power Supply has the following power characteristics:

- ☐ Full system power
- ☐ 380 watts of PoE power

A switch with two AT-PWR800 Power Supplies has these power characteristics:

- ☐ Full system power and redundant system power
- ☐ Either 740 watts of PoE power or 380 watts of active PoE power and 380 watts of redundant PoE power.

You may install the AT-PWR800 Power Supply in the non-PoE AT-x930-28GTX and AT-x930-52GTX Switches. But because the switches do not support PoE, the power supply will provide system power but no PoE power.

The AT-PWR1200 Power Supply is shown in Figure 8. It is similar to the AT-PWR800 Power Supply in that it is intended for the PoE AT-x930-28GPX and AT-x930-52GPX Switches because it provides both system power and power for PoE devices. The difference between them is the amount of PoE power. The AT-PWR1200 Power Supply can provide up to 740 watts compared to 380 watts for the AT-PWR800 Power Supply.



Figure 8. AT-PWR1200 Power Supply

A PoE switch with one AT-PWR1200 Power Supply has the following power characteristics:

- ☐ Full system power
- ☐ 740 watts of power for PoE devices

A switch with two AT-PWR1200 Power Supplies has these power characteristics:

- ☐ Full system power and redundant system power
- ☐ Either 1440 watts of PoE power or 740 watts of active PoE power and 740 watts of redundant PoE power.

## Guidelines

Please review the following guidelines concerning power supplies:

- ☐ The x930 Series Switches do not come with power supplies. The power supplies must be ordered separately.
- ☐ If you install two power supplies in the switch, they must both be the same model. For example, you may install two AT-PWR800 Power Supplies or two AT-PWR1200 Power Supplies in a switch. You may not install two different power supply models in the switch.
- ☐ The non-PoE AT-x930-28GTX AT-x930-28GSTX, and AT-x930-52GTX Switches require only one power supply for full operations. Installing a second power supply adds power redundancy, which protects against interruptions to network operations in the event one power supply loses power or fails. Power redundancy is available only when both AC or DC connectors on the switch are connected to power sources.

- ❑ The PoE AT-x930-28GPX and AT-x930-52GPX Switches also require only one power supply for network operations, excluding PoE. The switches can continue to operate even if one power supply fails or loses power.
- ❑ The second power supply in the PoE switches either increases the amount of power for PoE or adds PoE redundancy. For further information, refer to “Power Budget” on page 33.
- ❑ The DC wires for the AT-PWR250-80 DC Power Supply should be routed from a DC load center containing appropriate overcurrent branch protection for each DC feed, as required by the cognizant local electrical authority.

Refer to “Technical Specifications” on page 149 for the input voltage ranges.



**Warning**

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

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**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

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**Note**

The AT-PWR150, AT-PWR250, AT-PWR800, and AT-PWR1200 Power Supplies are powered on or off by connecting or disconnecting the power cords. The AT-PWR250-80 Power Supply is powered on or off with its On/Off power switch or by deactivating the DC circuit.

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## 10/100/1000Base-T Twisted Pair Ports

---

The twisted pair ports on the switches are described in this section.

**Speed** The ports can operate at 10, 100, or 1000 Mbps. The speeds may be set manually using the management software or automatically with Auto-Negotiation (IEEE 802.3u), the default setting.

---

**Note**

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

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**Duplex Mode** The twisted pair ports can operate in either half- or full-duplex mode. The duplex mode of a port, like port speed, may be set manually using the management software or automatically with Auto-Negotiation (IEEE 802.3u), the default setting.

The speed and duplex mode settings of a port may be set independently of each other. For example, a port may be configured such that its speed is set manually while its duplex mode is established through Auto-Negotiation.

---

**Note**

A switch port should not use Auto-Negotiation to set its duplex mode if it is connected to a network device that does not support Auto-Negotiation for 10 or 100 Mbps operation and has a fixed duplex mode of full-duplex. Otherwise, a duplex-mode mismatch may occur in which a switch port and a network device operate at different duplex modes. The duplex modes of switch ports that are connected to network devices that do not support Auto-Negotiation should be set manually through the management software.

---

**Wiring Configuration** The wiring configuration of a port operating at 10 or 100 Mbps can be MDI or MDI-X. The wiring configurations of a switch port and a network device connected with straight-through twisted pair cabling have to be opposite, such that one device is using MDI and the other MDI-X. For instance, a switch port has to be set to MDI-X if it is connected to a network device set to MDI.

You may set the wiring configurations of the ports manually or let the switch configure them automatically with auto-MDI/MDI-X (IEEE 802.3ab-compliant). This feature enables the switch to automatically negotiate with network devices to establish their proper settings.

The MDI and MDI-X settings do not apply when ports are operating at 1000 Mbps.

## Maximum Distance

The ports have a maximum operating distance of 100 meters (328 feet).

## Cable Requirements

The cable requirements of the ports are given in Table 2.

Table 2. Twisted Pair Cable for the 10/100/1000Base-T Ports

Cable Type	10Mbps	100Mbps	1000Mbps
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	Yes	No
Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes

### Note

For the cable requirements for the ports on the AT-x930-28GPX and AT-x930-52GPX Switches for PoE devices, refer to Table 4 on page 32.

## Port Pinouts

Refer to Table 29 on page 156 and Table 30 on page 156 for the port pinouts of the 10/100/1000Base-T twisted pair ports.

## Power Over Ethernet

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The AT-x930-28GPX and AT-x930-52GPX Switches feature Power over Ethernet (PoE) on the 10/100/1000Base-T ports. PoE is used to supply power to network devices over the same twisted pair cables that carry the network traffic.

The main advantage of PoE is that it can make it easier to install a network. 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 other network devices is referred to as *power sourcing equipment* (PSE). The AT-x930-28GPX and AT-x930-52GPX Switches act as PSE units by adding DC power to the network cable, thus functioning 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 a device connected to a port is a powered device. 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-x930-28GPX and AT-x930-52GPX Switches support these PoE standards:

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

### Powered Device Classes

Powered devices are grouped into the five classes listed in Table 3 on page 32. The classes are based on the amount of power the devices require. The switches support all five classes.

Table 3. 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
2	7.0W	3.84W to 6.49W
3	15.4W	6.49W to 12.95W
4	30.0W	12.95W to 25.5W

**Cable Requirements** The cable requirements for ports operating at 10 or 100Mbps are given in Table 4.

Table 4. Twisted Pair Cable Requirements for the 10/100/1000Base-T Ports at 10 or 100Mbps

Cable Type	10Mbps			100Mbps		
	Non-PoE	PoE	PoE+	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	Yes	Yes	No	Yes	Yes	No
Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	No	Yes	Yes	No
Standard TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes	Yes	Yes	Yes



The cable requirements for ports operating at 1000Mbps are given in Table 5.

Table 5. Twisted Pair Cable Requirements for the 10/100/1000Base-T Ports at 1000Mbps

Cable Type	1000Mbps		
	Non-PoE	PoE	PoE+
Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.	No	No	No
Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	No
Standard TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.	Yes	Yes	Yes
Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling.	Yes	Yes	Yes

## Power Budget

The power budget is the maximum amount of power the switch can supply to the powered devices on its ports. The higher the budget, the more PoE devices the switch can support at one time.

The power budgets of the AT-x930-28GPX and AT-x930-52GPX Switches depend on several factors. The first is the power supply model. The power budgets of the five power supplies are listed in Table 6.

Table 6. Power Supply Budgets of the Power Supplies

Power Supply	Power Budget for PoE Devices
AT-PWR150	0 watts
AT-PWR250	0 watts
AT-PWR250-80	0 watts
AT-PWR800	380 watts
AT-PWR1200	740 watts

**Note**

The AT-PWR250 and AT-PWR250-80 Power Supplies are intended for the non-PoE AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-52GTX Switches. They are not intended for the AT-x930-28GPX and AT-x930-52GPX Switches because they do not provide power for PoE + devices. You may install them in the PoE+ switches, but the switches will not support PoE devices.

Another factor that determines the power budget of the switch is the number of PoE power supplies in the device. The power budget of a PoE switch that has only one PoE power supply is equal to the budget of the power supply. For example, a switch that has one AT-PWR1200 Power Supply has a power budget of 740W for powered devices.

A PoE switch with two AT-PWR800 or AT-PWR1200 Power Supplies has either redundant PoE power or nearly double the power budget. This is controlled by the power boost feature, which has a status of either enabled or disabled. When the power boost feature is enabled, a PoE switch with two power supplies actively uses the PoE power from both supplies to increase its available power budget. When the feature is disabled, the switch uses the PoE power of only one of its power supplies and keeps the other in reserve in case the primary power supply should fail or lose power.

As an example, assume that a PoE switch has one AT-PWR1200 Power Supply, which has a power budget of 740W for powered devices. Thus, the switch would have a total power budget of 740W. Now assume the switch has two AT-PWR1200 Power Supplies. When the power boost mode is enabled, the switch uses the PoE power from both supplies, for a total power budget of 1440W. When the power boost mode is disabled, the switch has an active PoE power of 740W and a redundant budget of the same amount. The switch activates the redundant power budget only if the power supply providing the active power budget fails or loses power.

Table 7 lists the power budgets for the switch with one or two AT-PWR800 Power Supplies and the power boost mode.

Table 7. Power Budgets of the AT-PWR800 Power Supply

Number of Power Supplies in the Switch	State of Power Boost	Power Budget of the Switch	Redundant Power
One	NA	380 watts	0 watts
Two	Enabled	740 watts	0 watts
Two	Disabled	380 watts	380 watts

Table 8 lists the power budgets for the switch with one or two AT-PWR1200 Power Supplies and the power boost mode.

Table 8. Power Budgets of the AT-PWR1200 Power Supply

Number of Power Supplies in the Switch	State of Power Boost	Power Budget of the Switch	Redundant Power
One	NA	740 watts	0 watts
Two	Enabled	1440 watts	0 watts
Two	Disabled	740 watts	740 watts

The maximum number of PoE devices the switch can support at one time is determined by its power budget and the power requirements of the devices. The switch can supply power to all of the devices as long as their total power requirements is less than its power budget. If the switch determines that the power requirements of the devices exceed its power budget, it denies power to one or more ports using a mechanism referred to as port prioritization.

To determine whether the power requirements of the PoE devices you plan to connect to the switch exceed its power budget, refer to their documentation for their power requirements and add the requirements together. The switch should be able to power all of the devices simultaneously as long as the total is below its power budget. If the total exceeds the available power budget, you should consider reducing the number of PoE devices so that all of the devices receive power. Otherwise, the switch powers a subset of the devices, based on port prioritization.

The switch can handle different power requirements on different ports. This enables you to connect different classes of PoE equipment to the ports on the switch.

## 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 may 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 set to the Critical level are already receiving power. If there is not enough power to support all of 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.

## **Wiring Implementation**

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

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, the 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, the power is provided over the spare wires.

The ports on the AT-x930-28GPX and AT-x930-52GPX Switches deliver the power using pins 1, 2, 3, and 6, which corresponds to mode A in the IEEE 802.3af standard. Powered devices that comply with the IEEE 802.3af standard are required to support both power delivery methods. 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 Slots

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The twenty four SFP slots on the AT-x930-28GSTX Switch support the following types of transceivers:

- ❑ 100Base-FX, 1000Base-T, and 1000Base-SX/LX SFP transceivers
- ❑ Single-port BiDi 100Base-FX and 1000Base-LX SFP transceivers
- ❑ 1000Base-ZX SFP transceivers

The slots are paired with the twenty four 10/100/1000Base-T twisted pair ports. SFP slot 1 is paired with twisted pair port 1R, slot 2 with twisted pair port 2R, and so on. Only one slot or port in a pair can be active at a time. For example, if you install an SFP transceiver in slot 3 and connect it to an active network device, the switch deactivates twisted pair port 3R.

Please review the following guidelines for using the SFP slots on the AT-x930-28GSTX Switch:

- ❑ Each SFP slot is paired with a twisted pair port.
- ❑ You may not change the pairings of the ports and slots.
- ❑ Only one port or slot in a pair can be active at a time.
- ❑ The twisted pair port is the default active port of a pair.
- ❑ An SFP slot automatically becomes active when you install and connect an SFP transceiver to an active network device.
- ❑ The switch automatically reactivates the twisted pair port of a pair when the transceiver in the corresponding SFP slot loses its link to a remote network device. For example, the switch reactivates twisted pair port 4R if you disconnect the fiber optic cable from a transceiver in slot 4.
- ❑ The letter “R” in the numbering of the twisted pair ports on the front of the switch refers to the “redundant” function of the ports. The twisted pair ports are only available when their corresponding SFP slots are empty or the SFP transceivers have not established links with network devices.

## SFP+ Slots

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The four SFP+ slots on the switches support the following types of SFP 1000Mbps and SFP+ 10Gbps transceivers:

- ❑ 1000Base-SX/LX SFP transceivers
- ❑ Single-port BiDi 1000Base-LX SFP transceivers
- ❑ 1000Base-ZX SFP transceivers
- ❑ 10Gbps, 10GBase-SR/LR fiber optic transceivers
- ❑ 10Gbps AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors

You may use the slots and transceivers to connect switches to other network devices over large distances, build high-speed backbone networks between network devices, or connect high-speed devices, such as servers, to your network.

The switches support a variety of short or long distance SFP or SFP+ modules. For a list of supported modules, contact your Allied Telesis representative or visit our web site.

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**Note**

The SFP+ slots do not support 100Mbps 100Base-FX transceivers.

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**Note**

The slots support full-duplex mode only. They do not support half-duplex mode.

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**Note**

SFP and SFP+ transceivers must be purchased separately.

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**Note**

SFP+ slots 27/S1 and 28/S2 on the AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-28GPX Switches and slots 51/S1 and 52/S2 on the AT-x930-52GTX and AT-x930-52GPX Switches are initially configured as stacking slots for the VCStack feature. If you intend to use the switch as a stand-alone unit, you must disable the VCStack feature before you can use the slots with standard SFP or SFP+ transceivers. The configuration instructions are provided later in this guide, in Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.

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## Stacking S1 and S2 SFP+ Slots

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As explained in the previous section, you may use the four SFP+ slots on the front panel of the switch with SFP 1000Mbps or SFP+ 10Gbps transceivers to add high speed links from the switch to other network devices. However, SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/S1 and 52/S2 on the 52-port switches have an additional function. They can also be used with SFP+ transceivers and the VCStack feature to build a stack of up to eight switches. 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. The two main advantages of stacks are listed here:

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

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### Note

SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/S1 and 52/S2 on the 48-port switches are initially configured as stacking slots for the VCStack feature. If you intend to use the switch as a stand-alone unit, you must disable the VCStack feature before you can use the slots with standard SFP or SFP+ transceivers. The configuration instructions are provided later in this guide, in Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.

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### Note

This guide explains how to install the devices as stand-alone units. For instructions on how to install the switches in a VCStack with the S1 and S2 slots, refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*.

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## Ethernet Management Port (NET MGMT)

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The NET MGMT port in the management panel of the switch is a separate routed eth0 interface. The interface is not part of the switching matrix of the Ethernet line cards, but the CPU on the controller card can route traffic in or out of the port from the line cards.

Here are the guidelines to using the port:

- ❑ The port should only be used for initial configuration and maintenance access to the chassis.
- ❑ The NET MGMT port has a standard RJ-45 8-pin connector and operates at 10, 100, or 1000 Mbps in either half- or full-duplex mode.
- ❑ The cable requirements for the port are the same as for the 10/100/1000-T ports, listed in Table 2 on page 30. For the port pinouts, refer to “RJ-45 Twisted Pair Port Pinouts” on page 156.
- ❑ The default setting for the port is Auto-Negotiation, which sets the speed and duplex mode automatically. You may disable Auto-Negotiation and configure the port manually.
- ❑ The wiring configuration of the NET MGMT port is set automatically with automatic MDIX detection. You may disable automatic MDIX detection and set the wiring configuration manually.
- ❑ The port is referred to as eth0 in the management software.

For instructions on how to configure the NET MGMT port, refer to the Software Reference for x930 Series Switches.

### NET MGMT LEDs

The Network Management (NET MGMT) port on the switch has two Status LEDs, described in Table 9.

Table 9. NET MGMT Port LED

LED	State	Description
Left LED	Solid Green	The port has a valid 1000 Mbps link.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
Right LED	Solid Amber	The port has a valid 10 or 100 Mbps link.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.



## eco-friendly Button

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

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

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

The Switch ID LED is always on, but it displays different information depending on whether the LEDs are on or off. When the LEDs are on, the ID LED displays the ID number of the switch. When the switch is operating in the low power mode with the LEDs off, the ID LED indicates whether the switch is a stand-alone unit or the master or member switch of a VCStack, as detailed in Figure 15 on page 49.

---

### Note

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

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## LEDs

Here are descriptions of the LEDs.

### LEDs for the Twisted Pair Ports

The twisted pair ports on the AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-52GTX Switches have two LEDs that display link, activity and duplex mode information. The LEDs are shown in Figure 9.

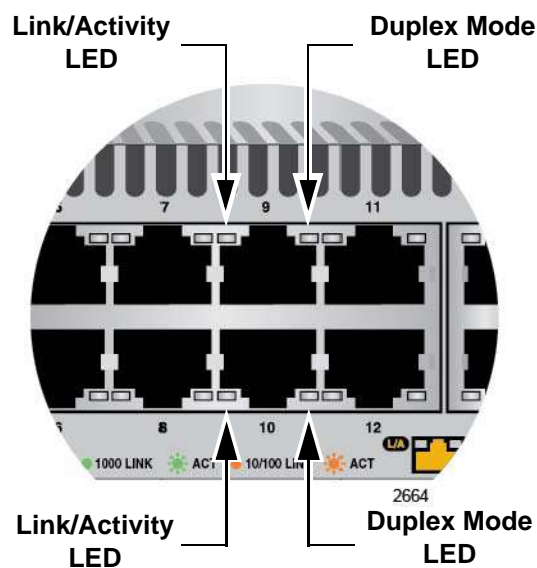


Figure 9. LEDs for the 10/100/1000Base-T Ports on the AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-52GTX Switches

The LEDs are described in Table 10 on page 43.

Table 10. LEDs on the 10/100/1000Base-T Ports on the AT-x930-28GTX, AT-x930-28GSTX, and AT-x930-52GTX Switches

LED	State	Description
Link/ Activity LED	Solid Green	A port has established a 1000 Mbps link to a network device.
	Flashing Green	A port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	A port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	A port is transmitting or receiving data at 10 or 100 Mbps.
	Off	A port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
Duplex Mode LED	Green	A port is operating in full duplex mode.
	Amber	A port is operating in half-duplex mode at 10 or 100 Mbps. (Half-duplex mode does not apply to 1000 Mbps operation.)
	Flashing Amber	Collisions are occurring on a port operating at 10 or 100 Mbps.

The twisted pair ports on the AT-x930-28GPX and AT-x930-52GPX Switches have two LEDs that display link, activity and PoE information. The LEDs are shown in Figure 10 on page 44.

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**Note**

You can view the duplex mode information for the ports on the AT-x930-28GPX and AT-x930-52GPX Switches with the management software.

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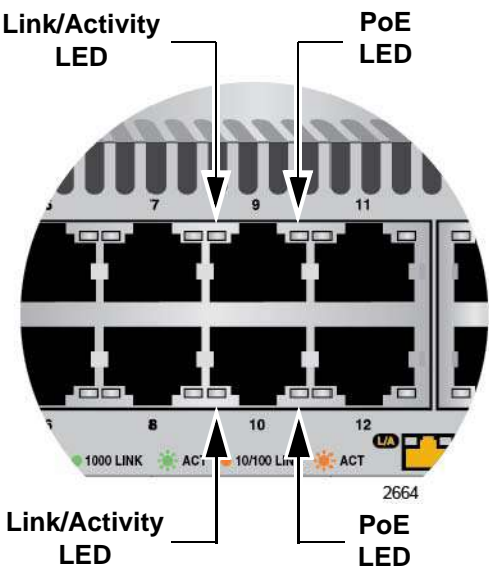


Figure 10. LEDs for the 10/100/1000Base-T Ports on the AT-x930-28GPX and AT-x930-52GPX Switches

The LEDs are described in Table 11.

Table 11. LEDs on the 10/100/1000Base-T Ports on the AT-x930-28GPX and AT-x930-52GPX Switches

LED	State	Description
Link/ Activity LED	Solid Green	A port has established a 1000 Mbps link to a network device.
	Flashing Green	A port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	A port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	A port is transmitting or receiving data at 10 or 100 Mbps.
	Off	A port has not established a link with another network device or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

Table 11. LEDs on the 10/100/1000Base-T Ports on the AT-x930-28GPX and AT-x930-52GPX Switches (Continued)

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

## LEDs for the SFP Slots

The LEDs for the twenty four SFP slots on the AT-x930-28GSTX Switch are located between the slots. Refer to Figure 11. Each SFP slot has one LED. The left-hand LED is for the top slot and the right-hand LED is for the bottom slot.

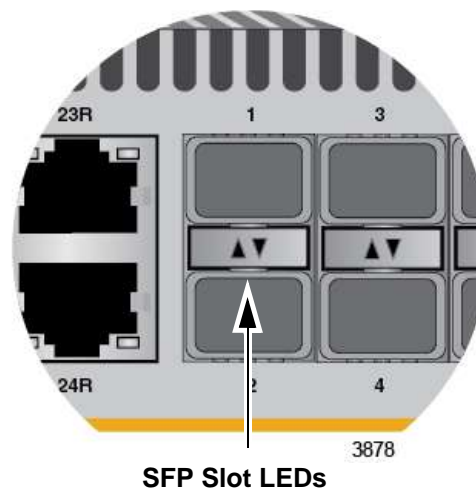


Figure 11. SFP Slot LEDs

The possible states of the LED for the SFP slots are described in Table 12.

Table 12. SFP Slot LEDs on the AT-x930-28GSTX Switch

LED	State	Description
Link/Activity	Solid green	The SFP transceiver in the slot has established a link at 1000 Mbps to a network device.
	Flashing green	The SFP transceiver is receiving or transmitting packets to a network device at 1000 Mbps.
	Solid amber	The SFP transceiver in the slot has established a link at 100 Mbps to a network device.
	Flashing amber	The SFP transceiver is receiving or transmitting packets to a network device at 100 Mbps.
	Off	The slot is empty, the SFP transceiver has not established a link to a network device, or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

**LEDs for the SFP+ Slots**

The LEDs for the SFP+ slots are located between the slots, as shown in Figure 12. Each SFP+ slot has one LED. The left-hand LED is for the top slot and the right-hand LED is for the bottom slot.

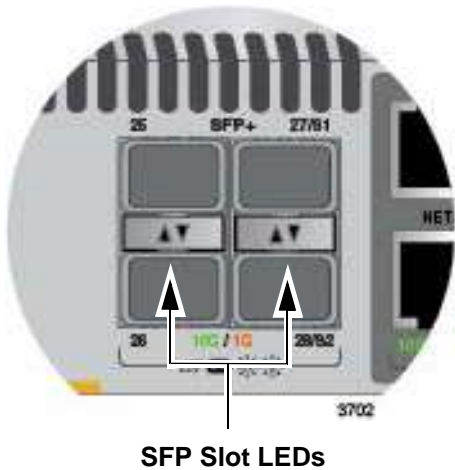


Figure 12. SFP+ Slot LEDs

The LEDs are described in Table 13 on page 47.

Table 13. SFP+ Slot LEDs

LED	State	Description
Link/Activity	Solid green	The SFP+ transceiver in the slot has established a link at 10 Gbps to a network device.
	Flashing green	The SFP+ transceiver is receiving or transmitting packets to a network device at 10 Gbps.
	Solid amber	The SFP transceiver in the slot has established a link at 1000 Mbps to a network device.
	Flashing amber	The SFP transceiver is receiving or transmitting packets to a network device at 1000 Mbps.
	Off	The slot is empty, the SFP or SFP+ transceiver has not established a link to a network device, or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.

## LEDs for the Stacking Slots

SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/I and 52/S2 on the 52-port switches may be used as stacking slots to build a VCS stack of up to eight switches. For background information, refer to the *x930 Series Installation Guide for Virtual Chassis Stacking*. Table 14 defines the LED states when the slots are used to build a stack of switches.

Table 14. Stacking Slot LEDs

LED	State	Description
Link/Activity	Off	The slot is empty, the stacking transceiver has not established a link to a network device, or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
	Solid green	The stacking transceiver has established a 10 Gbps link to another switch in the stack.
	Flashing green	The stacking transceiver is receiving or transmitting packets.

## Switch ID LED

The Switch ID LED, shown in Figure 13 on page 48, displays the ID number of the switch. A stand-alone switch has the ID number 0. Switches in a VCStack have the numbers 1 to 8. Chapter 9, “Powering On the Switch” on page 115 has the procedure for verifying and, if necessary, changing the ID number of the switch.

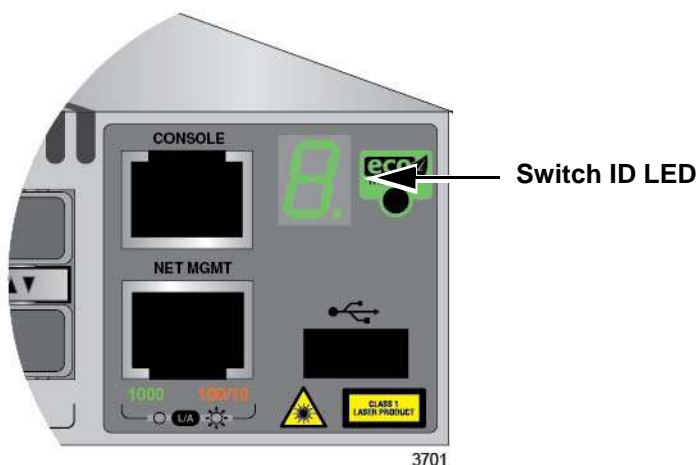


Figure 13. Switch ID LED

The states of the LED when the switch is not operating in the low power mode are shown in Figure 14.

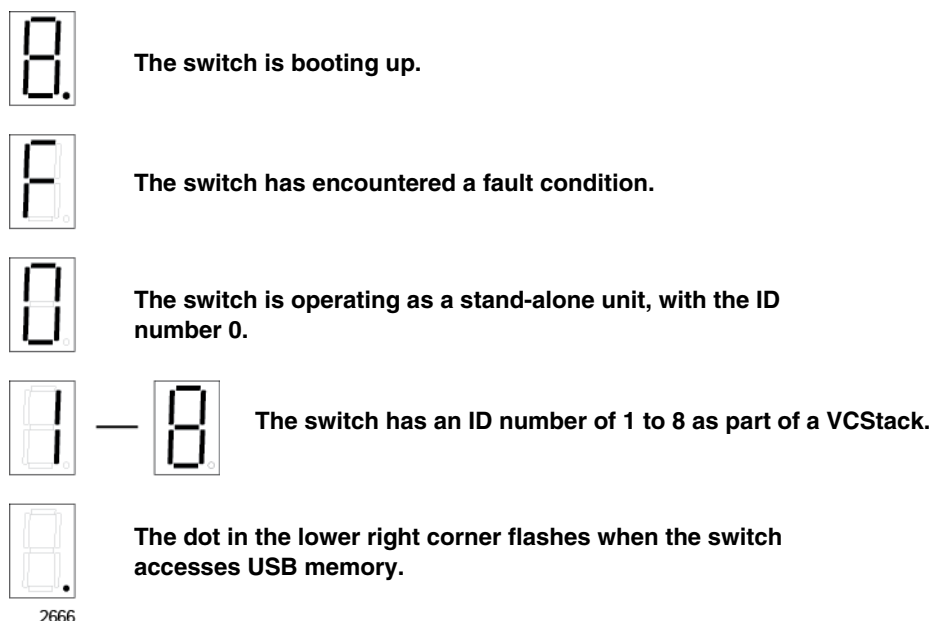


Figure 14. Switch ID LED

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 15.



**The switch is the master switch of a VCS stack.**



**The switch is operating as a stand-alone unit.**



**The switch is a member switch of a VCS stack.**

2667

Figure 15. Switch ID LEDs in the Low Power Mode

## USB Port

---

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

The port is USB2.0 compatible.

## Console Port

---

You use the Console port to manage the switch and configure its features and parameter settings. This type of management uses serial RS-232 and is commonly referred to as local management because it is not conducted over your network. To perform local management, you must be at the location of the switch and use the management cable included with the device.

To establish a local management session with the switch, you have 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, using the provided management cable. The cable has RJ-45 style (8P8C) and DB-9 (D-sub 9-pin) connectors.

The Console port is set to the following specifications:

- ☐ 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.

---

# Optional Cards

The switches have two optional cards:

- ❑ AT-StackQS Card
- ❑ AT-x9EM/XT4 Card

## AT-StackQS Card

This card is used to build a VCStack of up to eight switches. The card has two slots for transceivers. The transceivers are used to build the trunk that connects the switches of a stack together. The trunk has a speed of 160Gbps. The card is shown in Figure 16.

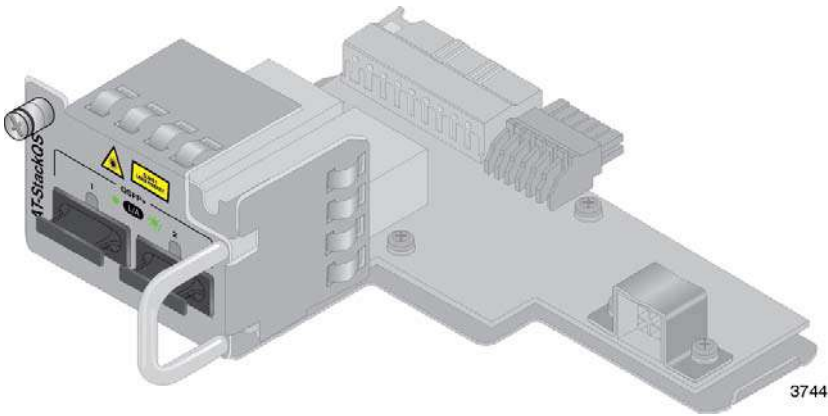


Figure 16. Optional AT-StackQS Card

The cabling options for the card are provided in the *x930 Series Installation Guide for Virtual Chassis Stacking*.

Each transceiver slot has one LED. The LED states are defined in Table 15.

Table 15. AT-StackQS Card LEDs

LED	State	Description
L/A (Link/Activity)	Off	The port is not connected to another network device, the device is not powered on, or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
	Solid green	The port has established a 10Gbps link to network device.
	Flashing green	The port is transmitting or receiving network packets.

For installation instructions for the card and VCStack, refer to *x930 Series Installation Guide for Virtual Chassis Stacking*.

## AT-x9EM/XT4 Card

This card adds four additional networking ports to the switch. The ports can operate at either 1Gbps (1000Base-T) or 10Gbps (10Base-T) and have RJ-45 connectors for twisted pair cables. The card is shown in Figure 17.

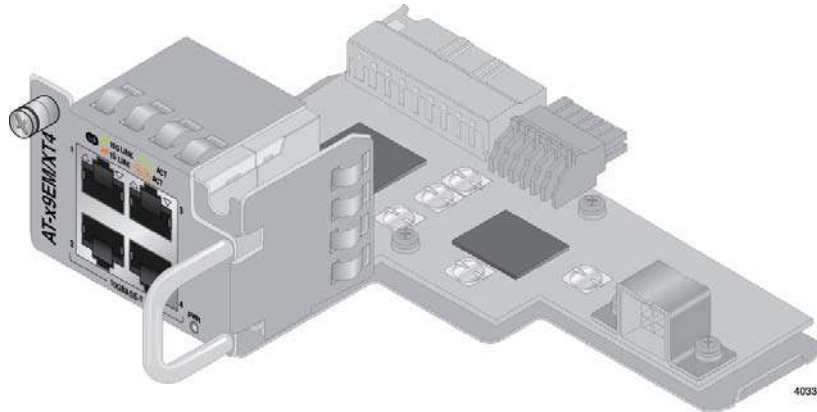


Figure 17. Optional AT-x9EM/XT4 Card

### Note

The card requires version 5.4.5-2 or later of the management software. The instructions in “Verifying Support for Hardware Options” on page 132 explain how to determine the version number of the software on the switch.

The cable requirements for the ports are given in Table 16.

Table 16. Twisted Pair Cable for the AT-x9EM/XT4 Card

Port Speed	Cable Type	Maximum Operating Distance
1Gbps	Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling	100 m (328 ft)
10Gbps	Standard TIA/EIA-568-C.1 compliant Category 6a (Cat 6a) shielded or unshielded cabling	100 m (328 ft)

Each port has one LED. The states of the LED are defined in Table 17 on page 54.

Table 17. AT-x9EM/XT4 Card LEDs

LED	State	Description
L/A (Link/ Activity)	Off	The port is not connected to another network device, the device is not powered on, or the LEDs are turned off. To turn on the LEDs, use the eco-friendly button.
	Solid green	The port has established a 10Gbps link to a network device.
	Flashing green	The port is transmitting or receiving network traffic at 10Gbps.
	Solid amber	The port has established a 1Gbps link to a network device.
	Flashing amber	The port is transmitting or receiving network traffic at 1Gbps.

You can install only one AT-x9EM/XT4 Card in the switch. It replaces the AT-FAN09ADP Module in the back panel. The installation instructions are provided in Chapter 4, “Installing the AT-x9EM/XT4 Card” on page 75.

## Chapter 2

# Beginning the Installation

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The chapter contains the following sections:

- ❑ “Reviewing Safety Precautions” on page 56
- ❑ “Choosing a Site for the Switch” on page 61
- ❑ “Unpacking the Switch” on page 62


## Reviewing Safety Precautions

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

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### Note


Safety statements that have the  symbol are translated into multiple languages in the *Translated Safety Statements* document at [www.alliedtelesis.com/support](http://www.alliedtelesis.com/support).

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### Warning

Class 1 Laser product.  L1

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### Warning

Laser Radiation.  
Class 1M Laser product.

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### Warning


Do not stare into the laser beam.  L2

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### Warning


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

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### 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

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### 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

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**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

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**Warning**

When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. ⚡ E11

---

**Warning**

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

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**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

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**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

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**Warning**

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

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**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

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**Note**

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

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**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

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**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<sub>mra</sub>).  E35

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**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

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**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

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**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

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**Warning**


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

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**Caution**


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

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**Warning**


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

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---

**Caution**


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

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**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

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## Choosing a Site for the Switch

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Observe these requirements when planning the installation of the switch.

- ☐ If you plan to install the switch in an equipment rack, check to be sure that the rack is safely secured so that it will not tip over. Devices in a rack should be installed starting at the bottom, with the heavier devices near the bottom of the rack.
- ☐ If you plan to install the switch on a table, check to be sure 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 in units that have a cooling fan is from front to back, with the fan on the back panel drawing the air out of the unit.)
- ☐ 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 will overheat and fail from inadequate airflow.



### Warning

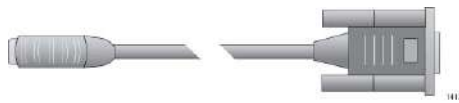
Switches should not be stacked on a table or desktop because that could present a personal safety hazard if you need to move or replace switches. ⚡ E91

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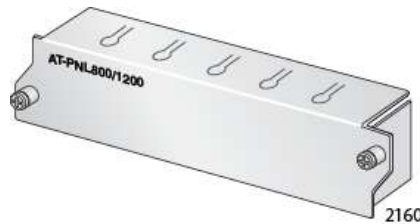
## Unpacking the Switch

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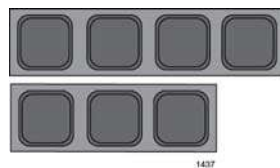
Figure 18 lists the items in the accessory kit that comes with the switch. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



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



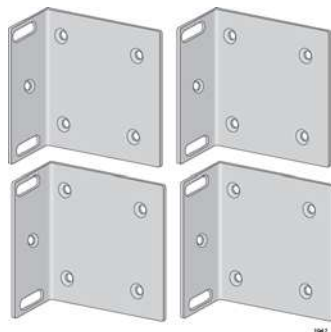
One AT-PNL800/1200 blank panel



Seven bumper feet



Sixteen bracket screws



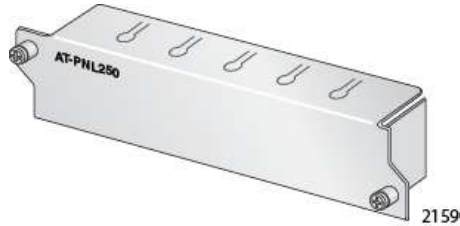
Four equipment rack or wall mounting brackets

Figure 18. Accessory Kit

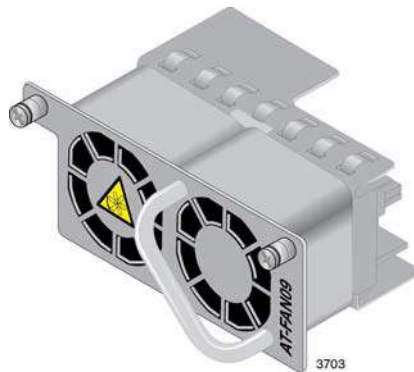
Figure 19 lists the items that come pre-installed in the switch.



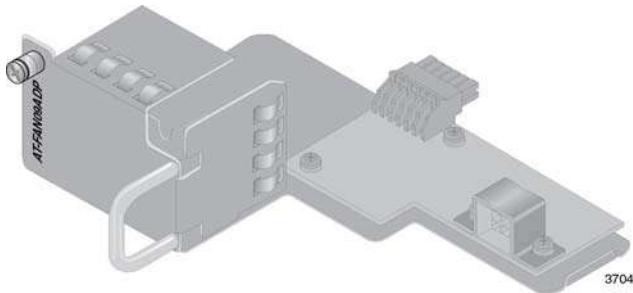
Four dust covers in the SFP+ slots on the front panel



One AT-PNL250 blank panel on the back panel



One AT-FAN09 Fan Module in the back panel



One AT-FAN09ADP Module in the back panel

Figure 19. Pre-installed Items

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**Note**

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

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**Note**

The product does not come with power supplies. Power supplies must be ordered separately.

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After unpacking the switch, go to Chapter 3, “Installing the Power Supplies” on page 65.





## Chapter 3

# Installing the Power Supplies

---

The sections in this chapter are listed here:

- ❑ “Installing the Power Supplies” on page 66
- ❑ “Installing a Blank Power Supply Slot Cover” on page 72

## Installing the Power Supplies

---

This section contains the procedure for installing the power supplies in the switch. If you are planning to install the switch in an equipment rack, you may install the power supplies either before or after installing the device in the rack.



### Caution

The device can be damaged by electrostatic discharge (ESD). Be sure to follow standard ESD protections procedures, such as wearing a wrist or foot strap, when installing the device. *See* E106

---



### Caution

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

---

To install the power supplies, perform the following procedure:

1. Place the switch on a level, secure table or desk.
2. Use a cross-head screwdriver to loosen the two captive screws on the AT-PNL250 blank panel covering power supply slot B on the back panel and remove it from the switch. Refer to Figure 20 on page 67.

---

### Note

You may skip this step and leave the blank panel on the switch if you are installing only one AT-PWR150, AT-PWR250, or AT-PWR250-80 Power Supply. The panel is not compatible with the AT-PWR800 and AT-PWR1200 Power Supplies and must be removed even if you are installing only one of those power supplies.

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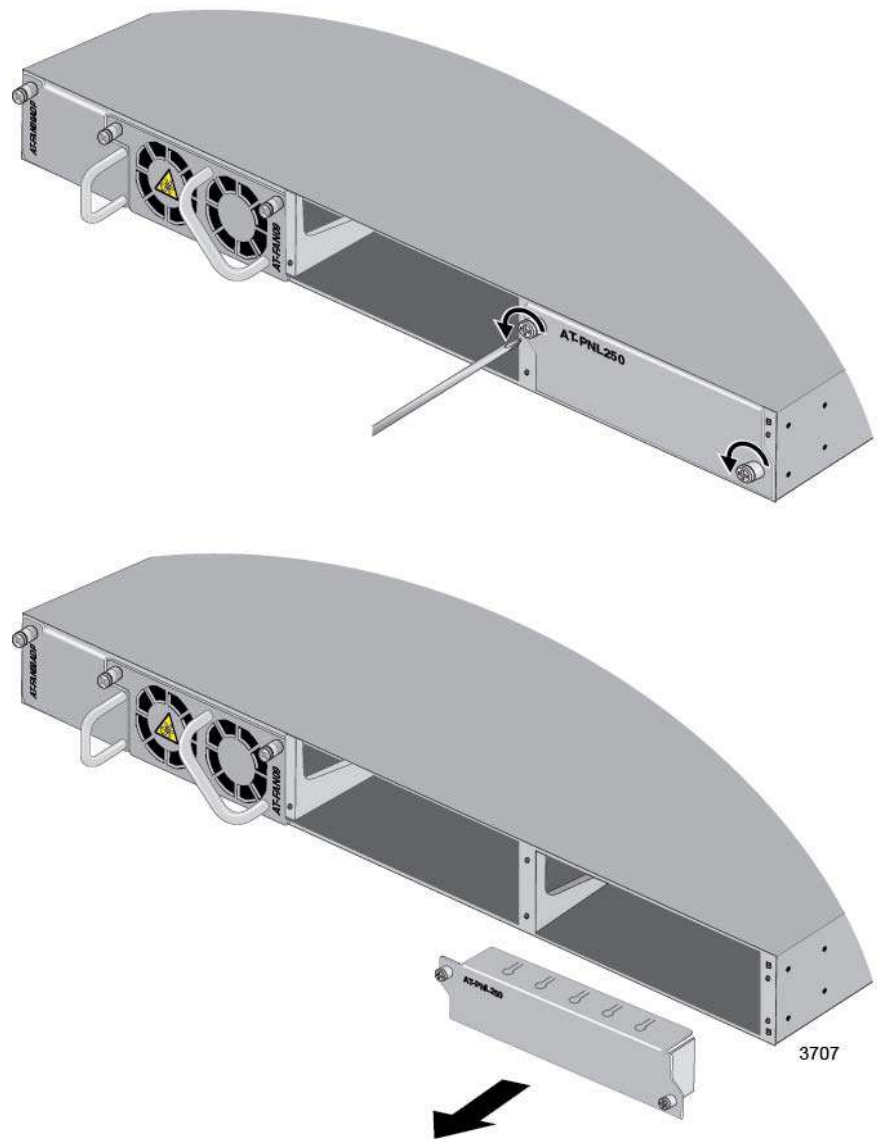


Figure 20. Removing the AT-PNL250 Blank Panel

3. Unpack the power supply from its shipping container.

**Caution**

The device is heavy. Use both hands to lift it. You might injure yourself or damage the device if you drop it. E94

4. Check the shipping container for the accessory items.

Refer to Table 18 on page 68 to determine the accessory items that come with your power supply. The items are shown in Figure 21 on page 68.

Table 18. Accessory Items Included with the Power Supplies

Power Supply	One Power Cord Retaining Clip	One Power Cord
AT-PWR150	Yes	Yes
AT-PWR250	Yes	Yes
AT-PWR250-80	No	No
AT-PWR800	Yes	Yes
AT-PWR1200	No	Yes

Power Cord  
Retaining Clip

Power Cord



Figure 21. Power Supply Accessory Items

**Note**

The power cord that comes with the AT-PWR1200 Power Supply for installations in North America has a 20 Amp, 125 V NEMA 5-20P plug that is only compatible with an NEMA 5-20R receptacle.

5. Slide the new power supply into slot A or B in the back panel of the switch. Refer to Figure 22 on page 69.

Please review the following guidelines before installing the module:

- ☐ If you are installing only one power supply, you may install it in either slot A or B.
- ☐ The handle on the power supply should be on the left as you install the module in the switch. Refer to Figure 22 on page 69.
- ☐ When installed, the AT-PWR1200 Power Supply extends 5.6 cm (2.2 in.) from the back panel of the chassis.
- ☐ The power supply is fully installed in the slot when the tabs with the captive screws are flush with the back panel of the switch. Light pressure may be required to properly seat the module on the power connector inside the chassis.

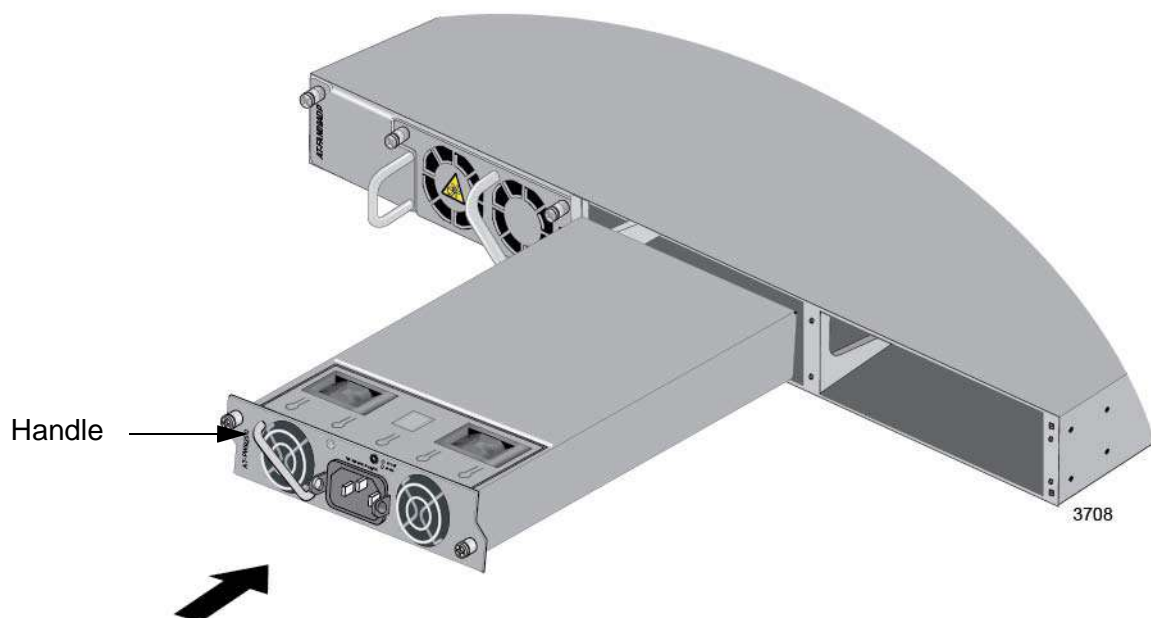



Figure 22. Installing a Power Supply

**Caution**

Do not use excessive force when seating the module, because this may damage the system or the module. If the module resists seating, remove it from the system, realign it, and try again.  E47

**Caution**

The power supply is not hot-swappable. It might be damaged if it is installed in the switch while it is powered on. Refer to Figure 23 on page 70.

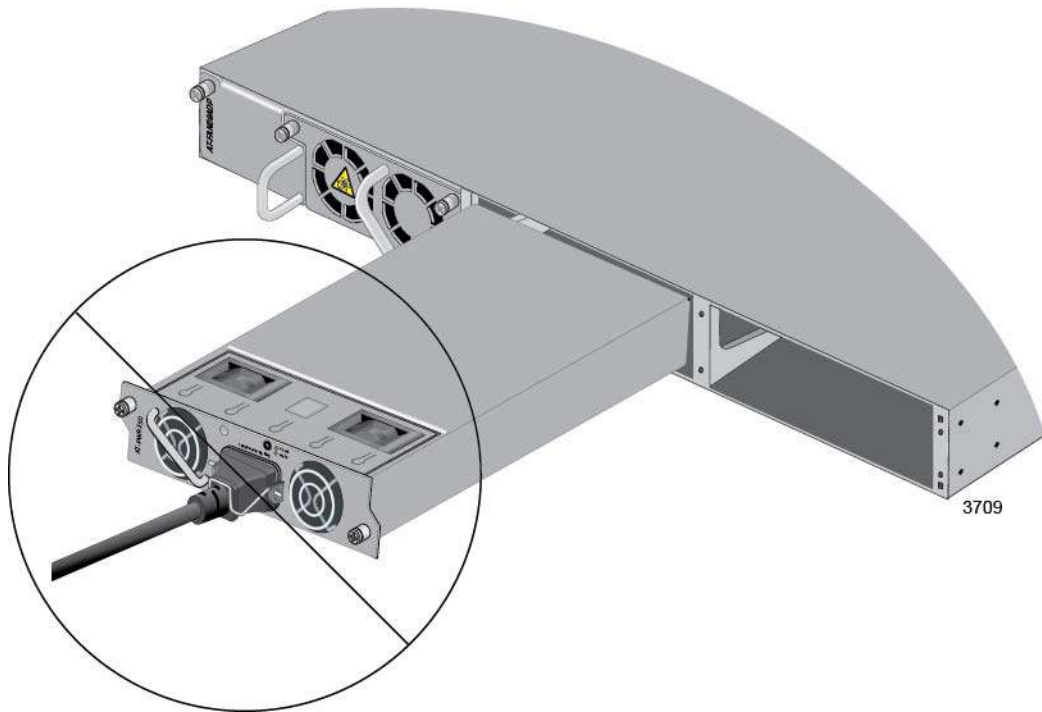


Figure 23. Improper Installation of a Power Supply

6. Secure the power supply to the switch by tightening the two captive screws with a cross-head screwdriver. Refer to Figure 24.

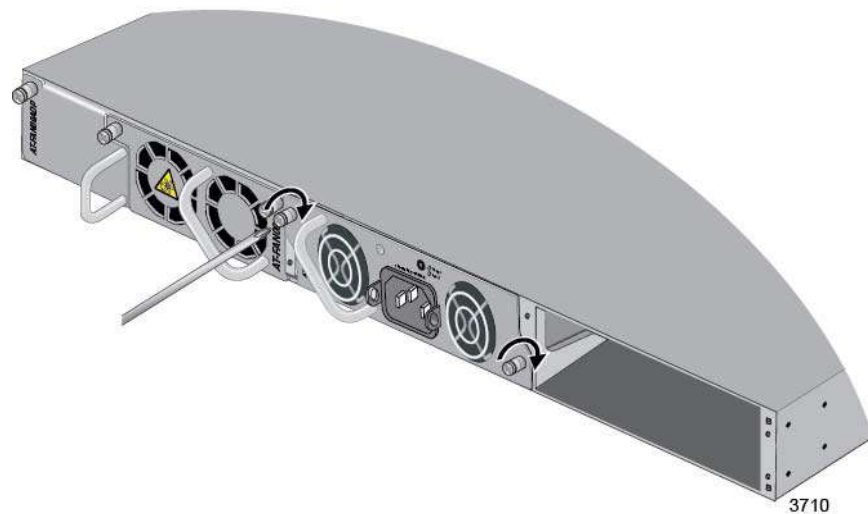


Figure 24. Tightening the Captive Screws on the Power Supply

7. If you installed the AT-PWR150, AT-PWR250, or AT-PWR800 Power Supply, install the power cord retaining clip on the AC plug. Press the sides of the clip inward and insert the two ends into the holes on the AC socket. Refer to Figure 25.

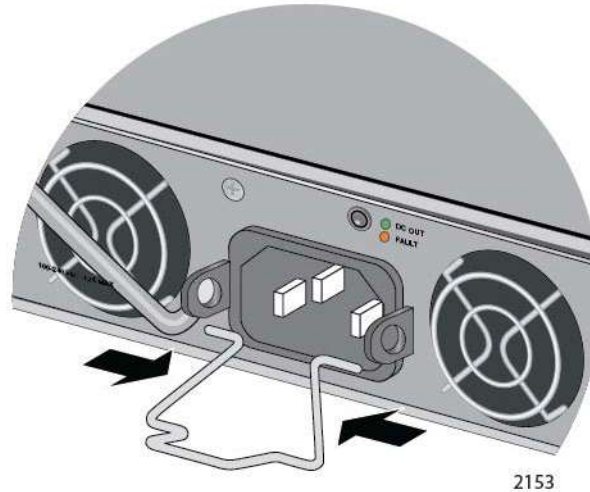


Figure 25. Installing the Power Cord Retaining Clip

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**Note**

The AT-PWR250-80 and AT-PNL800/1200 Power Supplies do not come with a retaining clip.

---

8. To install a second power supply, repeat this procedure, starting with step 3.
9. If you installed only one power supply in the switch, perform the procedure in “Installing a Blank Power Supply Slot Cover” on page 72.
10. Do one of the following:
  - ☐ To install the switch on a table, go to Chapter 5, “Installing the Switch on a Table” on page 87.
  - ☐ To install the switch in an equipment rack, refer to Chapter 6, “Installing the Switch in an Equipment Rack” on page 89.
  - ☐ To install the switch on a wall, refer to Chapter 7, “Installing the Switch on a Wall” on page 95.

## Installing a Blank Power Supply Slot Cover

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If you installed only one power supply in the switch, perform this procedure to install a blank panel over the empty power supply slot:

1. Position the appropriate blank panel over the empty power supply slot. Use the AT-PNL800/1200 Blank Panel included in the accessory kit if the switch has only one AT-PWR800 or AT-PWR1200 Power Supply. Use the AT-PNL250 Blank Panel if the switch has one AT-PWR150, AT-PWR250, or AT-PWR250-80 Power Supply. Refer to Figure 26.

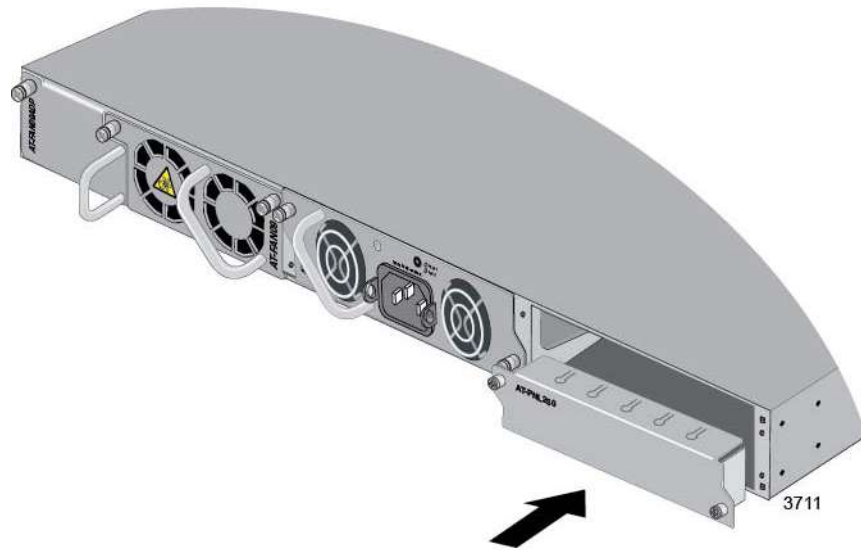


Figure 26. Installing a Blank Panel on a Power Supply Slot

2. Tighten the two captive screws with a cross-head screwdriver to secure the panel to the switch. Refer to Figure 27 on page 73.



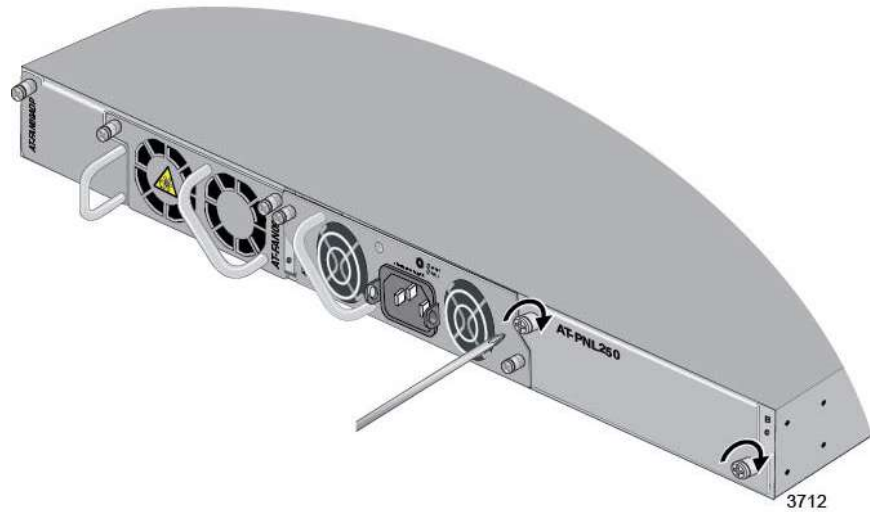


Figure 27. Tightening the Captive Screws on the Power Supply Blank Panel

3. Do one of the following:

- ☐ To install the switch on a table, go to Chapter 5, “Installing the Switch on a Table” on page 87.
- ☐ To install the switch in an equipment rack, refer to Chapter 6, “Installing the Switch in an Equipment Rack” on page 89.
- ☐ To install the switch on a wall, refer to Chapter 7, “Installing the Switch on a Wall” on page 95.



## Chapter 4

# Installing the AT-x9EM/XT4 Card

---

This chapter contains the installation instructions for the optional AT-x9EM/XT4 Card. The sections in the chapter are listed here:

- ❑ “Guidelines” on page 76
- ❑ “Installing the AT-x9EM/XT4 Card” on page 77

## Guidelines

---


Please observe the following guidelines when handling the AT-x9EM/XT4 Card.

- ☐ Wear an anti-static device when handling the card.



---

### Caution

The device can be damaged by electrostatic discharge (ESD). Be sure to follow standard ESD protections procedures, such as wearing a wrist or foot strap, when installing the device.  E106

---

- ☐ Hold the card by its faceplate or edges.
- ☐ Never touch the electronic components on the top or bottom of the card.
- ☐ Do not remove the card from its anti-static bag until you are ready to install it in the switch.
- ☐ If you need to remove the card from the switch, immediately return it in its anti-static bag and packaging container.

## Installing the AT-x9EM/XT4 Card

---

To install the AT-x9EM/XT4 Card in the switch, perform the following procedure:

---

**Note**

The card is hot-swappable. However, Allied Telesis recommends powering off the switch before installing the card because the installation procedure requires temporarily removing the AT-FAN09 Fan Module.

---

---

**Note**

If the switch is already powered on, power it off by performing step 1 and then skip step 2. If the switch is not powered on, start with step 2.

---

1. If the switch is powered on, power it off by doing one of the following:
  - ☐ For the AC AT-PWR250, AT-PWR800, or AT-PWR1200 Power Supply, disconnect the power cord from the AC power source.
  - ☐ For the DC AT-PWR250-80 Power Supply, either turn Off the power switch on the power supply or power off the DC circuit.



---

**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

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2. Place the switch on a table, with the back panel facing you.
3. Loosen the two captive screws on the AT-FAN09 Fan Module with a cross-head screwdriver. Refer to Figure 28 on page 78.

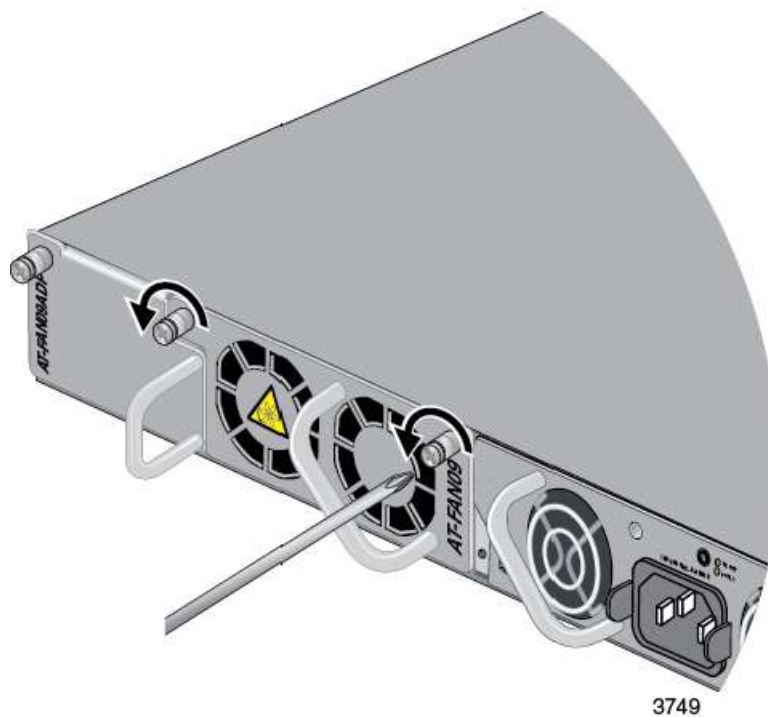


Figure 28. Loosening the Two Captive Screws on the AT-FAN09 Module

4. Carefully pull the AT-FAN09 Module from the switch. Refer to Figure 29 on page 79.

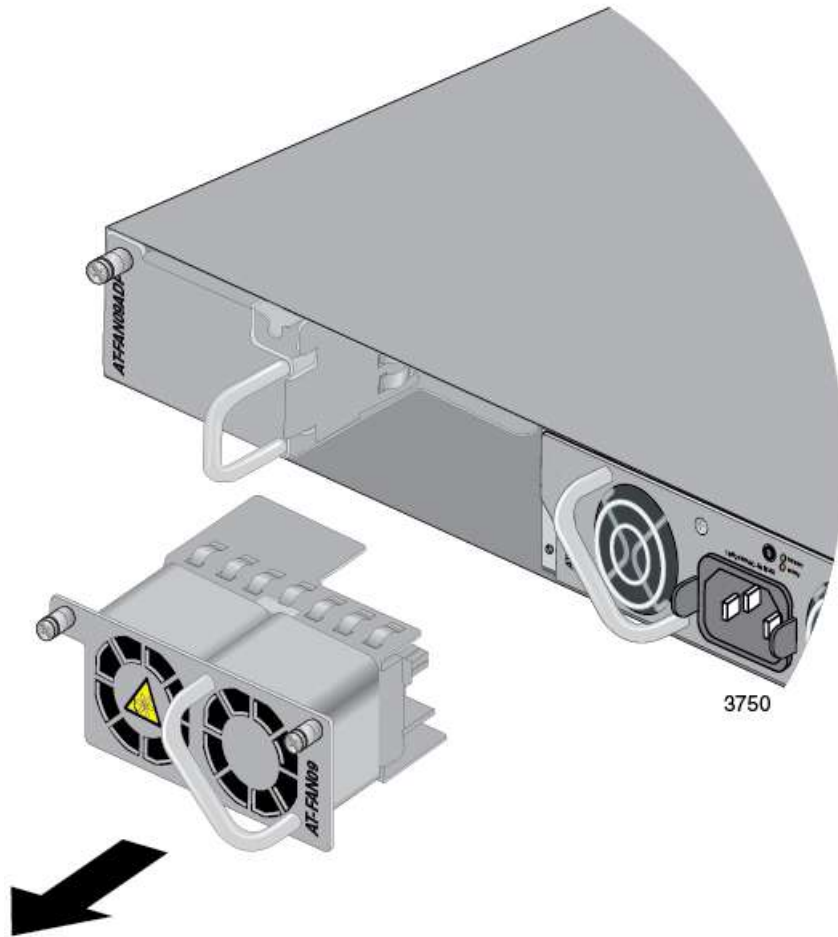


Figure 29. Removing the AT-FAN09 Module

5. Use a cross-head screwdriver to loosen the captive screw on the AT-FAN09ADP Module. Refer to Figure 30 on page 80.

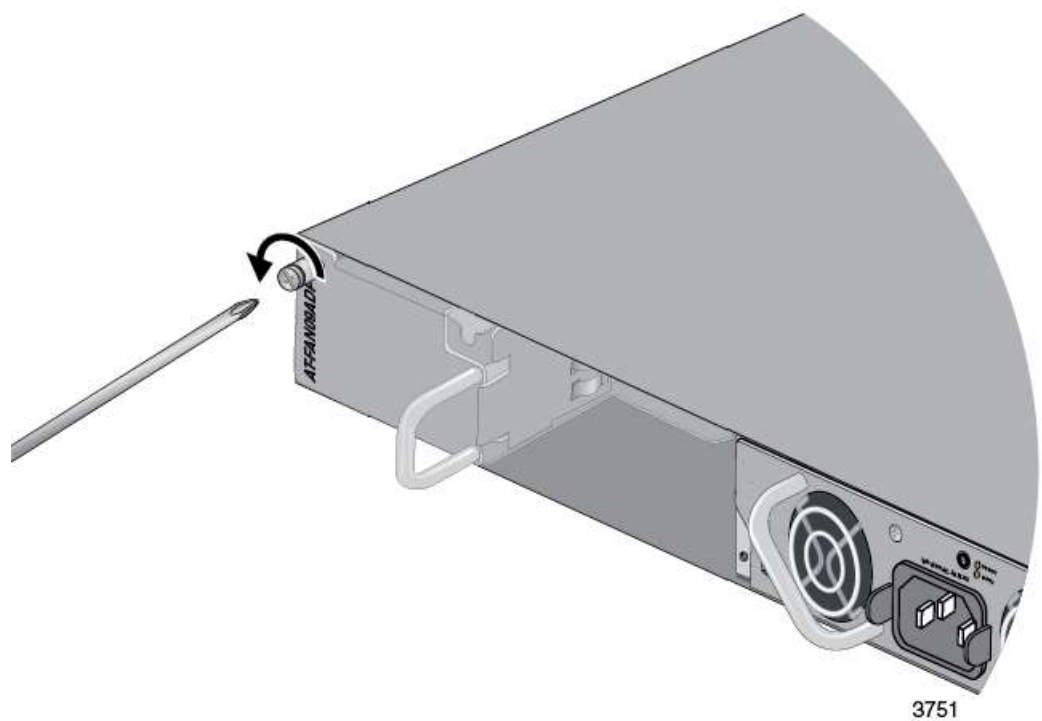


Figure 30. Loosening the Captive Screw on the AT-FAN09ADP Module

6. Carefully pull the AT-FAN09ADP Module from the switch. Refer to Figure 31 on page 81.



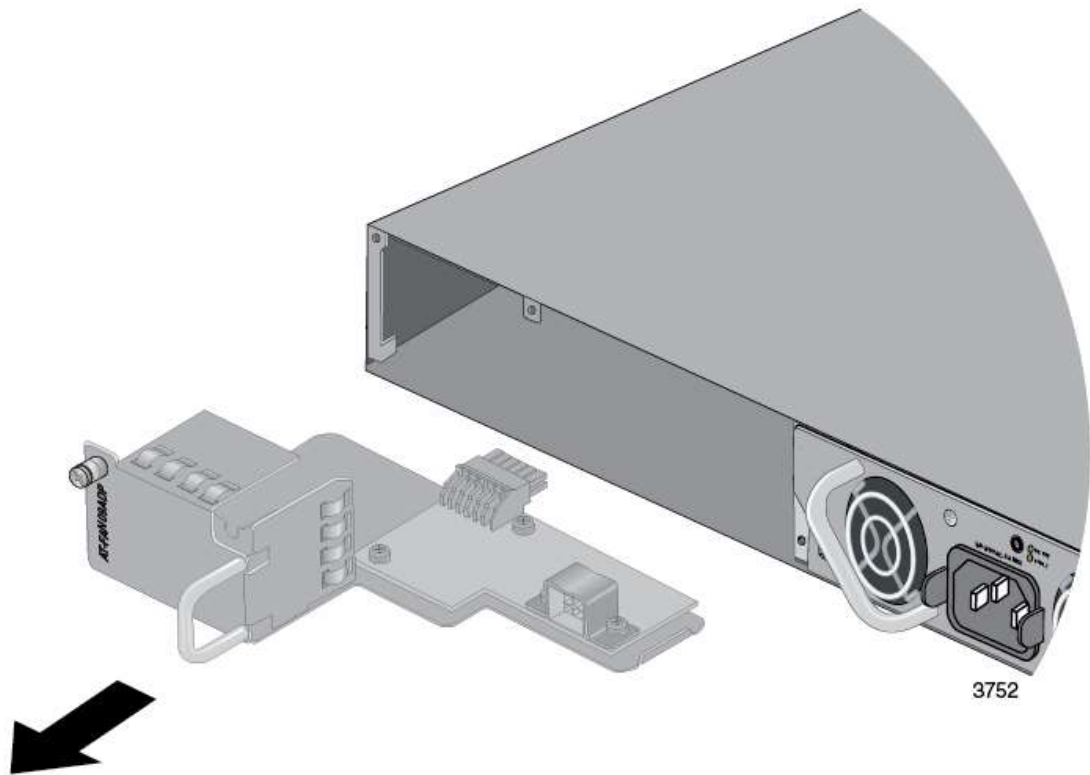


Figure 31. Removing the AT-FAN09ADP Module

7. Remove the AT-x9EM/XT4 Card from the anti-static bag. Refer to Figure 32.

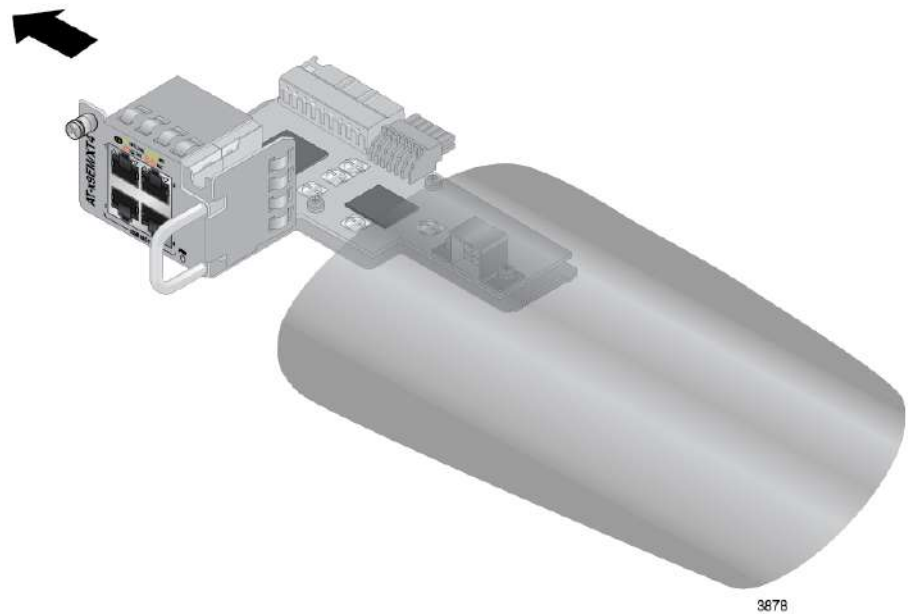


Figure 32. Removing the AT-x9EM/XT4 Card from the Anti-static Bag

8. Carefully align the AT-x9EM/XT4 Card in the slot and slide it into the switch. The left edge of the card fits into the slot in the bottom corner of the switch. Refer to Figure 33.

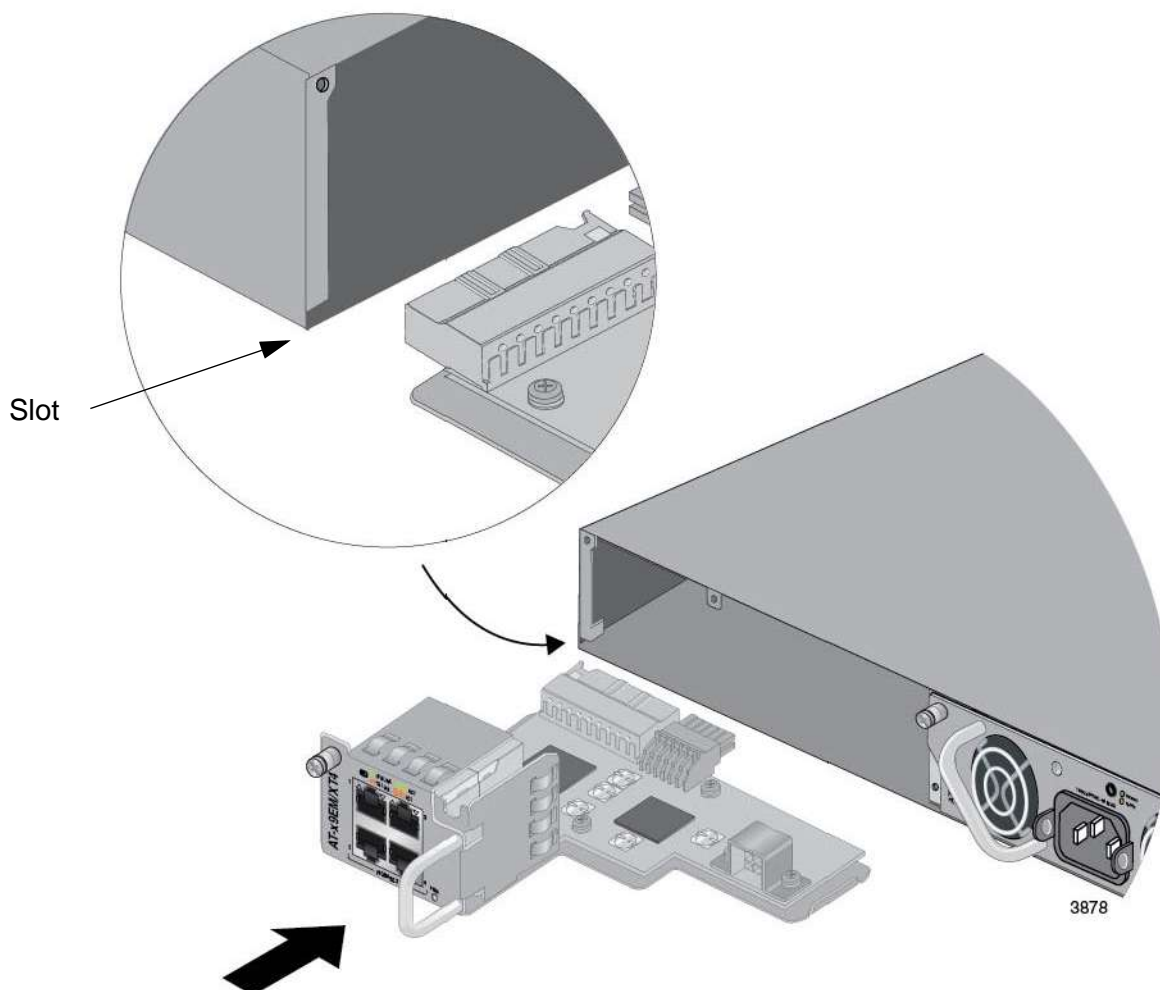


Figure 33. Aligning the AT-x9EM/XT4 Card in the Slot

9. When you feel the card make contact with the connector inside the switch, gently press on the handle to seat it on the connector. Refer to Figure 34 on page 83.

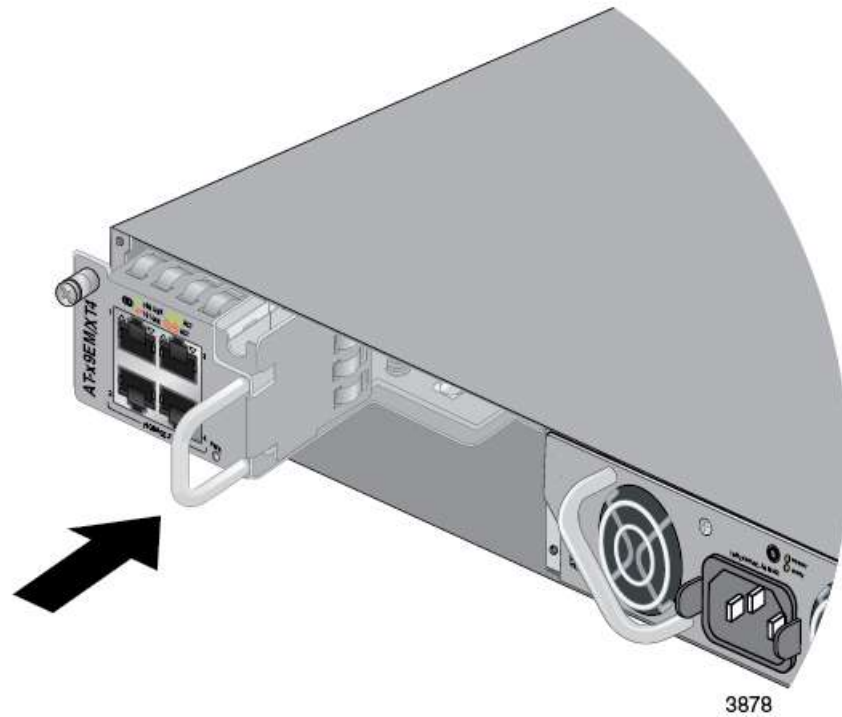


Figure 34. Seating the AT-x9EM/XT4 Card in the Switch

10. Tighten the captive screw to secure the AT-x9EM/XT4 Card in the switch. Refer to Figure 35.

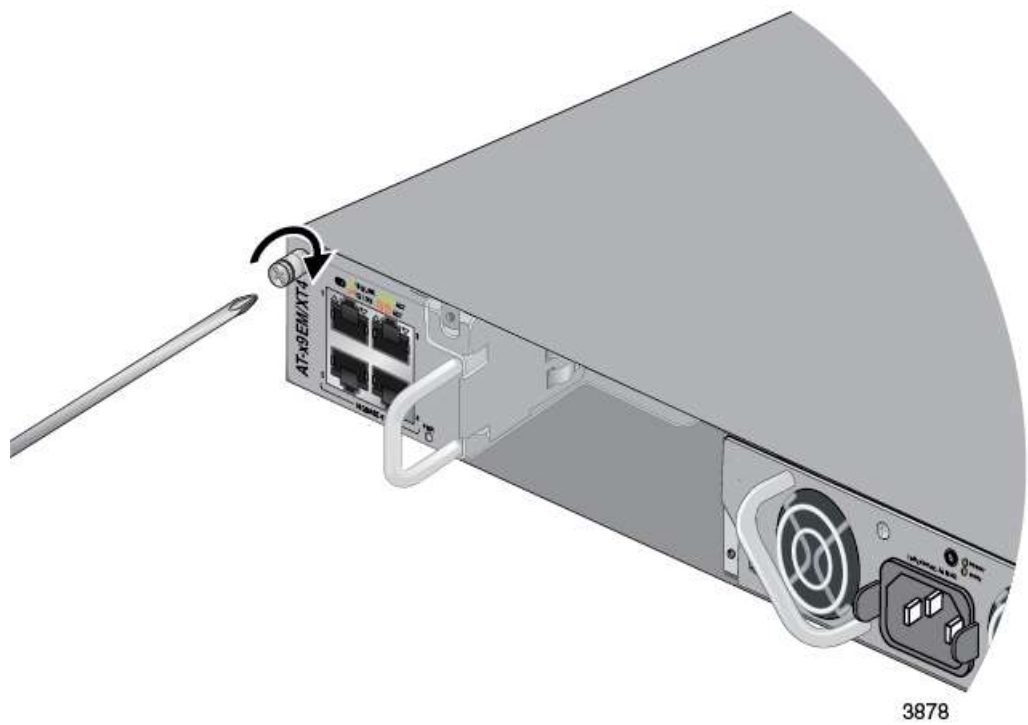


Figure 35. Tightening the Captive Screw on the AT-x9EM/XT4 Card

11. Align the AT-FAN09 Module in the slot and carefully slide it into the switch. Refer to Figure 36.

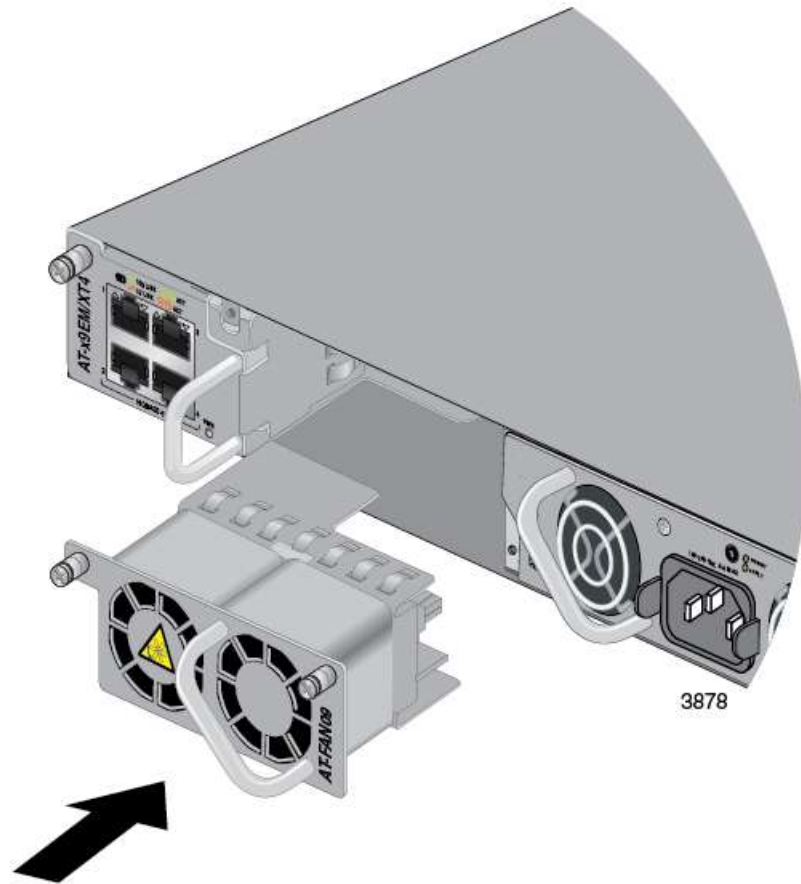


Figure 36. Aligning the AT-FAN09 Module in the Slot

12. Tighten the two captive screws on the AT-FAN09 Module to secure it to the switch. Refer to Figure 37 on page 85.

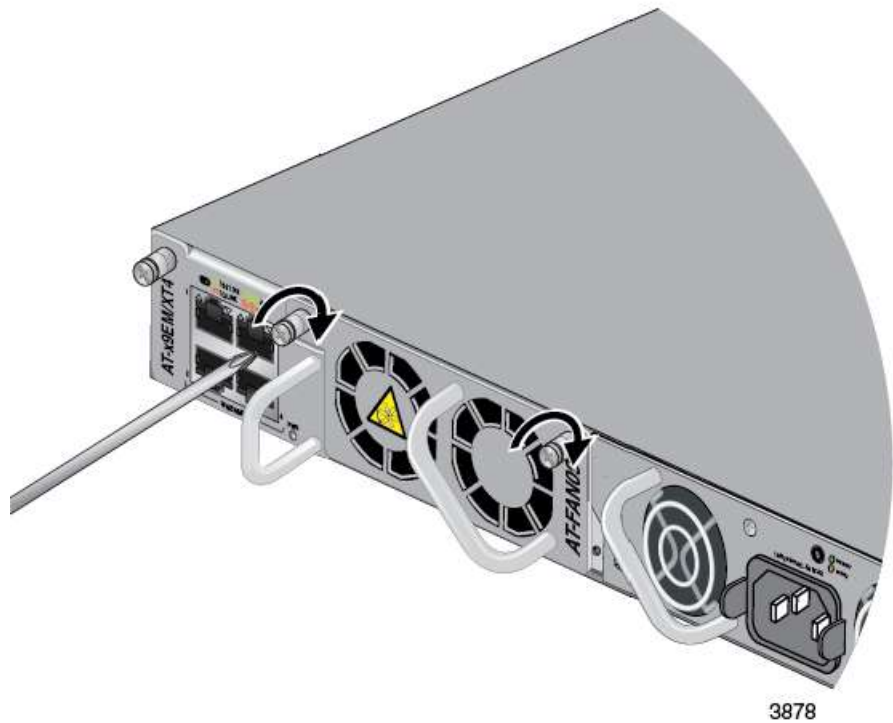


Figure 37. Tightening the Two Captive Screws on the AT-FAN09 Module

13. Store the AT-FAN09ADP Module in an anti-static bag and place it in a safe location. Refer to Figure 38.

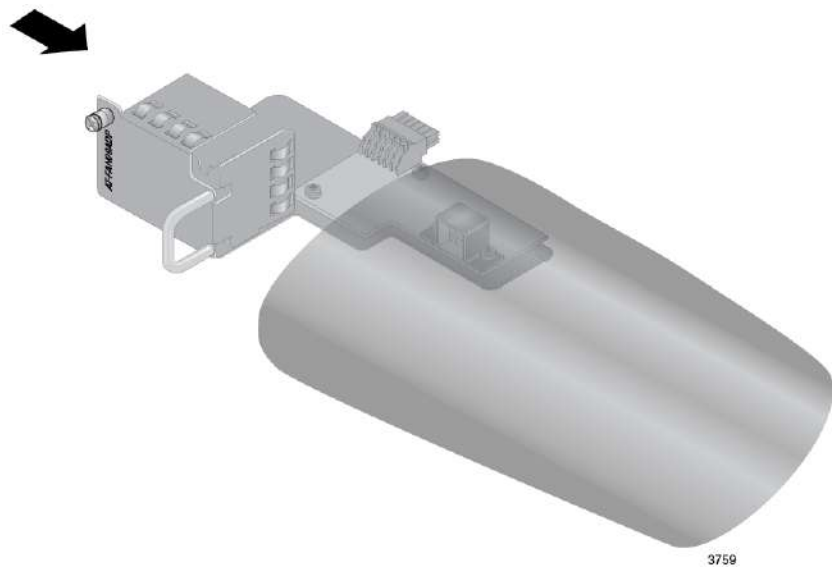


Figure 38. Storing the AT-FAN09ADP Module in an Anti-static Bag

14. Perform one of the following:

- ☐ To install the switch on a table, go to Chapter 5, "Installing the

Switch on a Table” on page 87.

- ❑ To install the switch in an equipment rack, refer to Chapter 6, “Installing the Switch in an Equipment Rack” on page 89.
- ❑ To install the switch on a wall, refer to Chapter 7, “Installing the Switch on a Wall” on page 95.

## Chapter 5

# Installing the Switch on a Table

---

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



### Warning

Switches should not be stacked on a table or desktop because that could present a personal safety hazard if you need to move or replace switches. *See* E91

---



### Warning

The switch is heavy. Always ask for assistance when moving or lifting the device so as to avoid injuring yourself or damaging the equipment.

---

1. Review the procedure in “Choosing a Site for the Switch” on page 61 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. Check to be sure that all of the appropriate components are included in the shipping container. Refer to “Unpacking the Switch” on page 62.
4. Place the switch upside down on a level, secure table or desk.
5. Install the seven bumper feet to the bottom of the switch, as shown in Figure 39.

Three bumper feet should be installed along the front edge of the bottom panel and four feet along the rear edge.

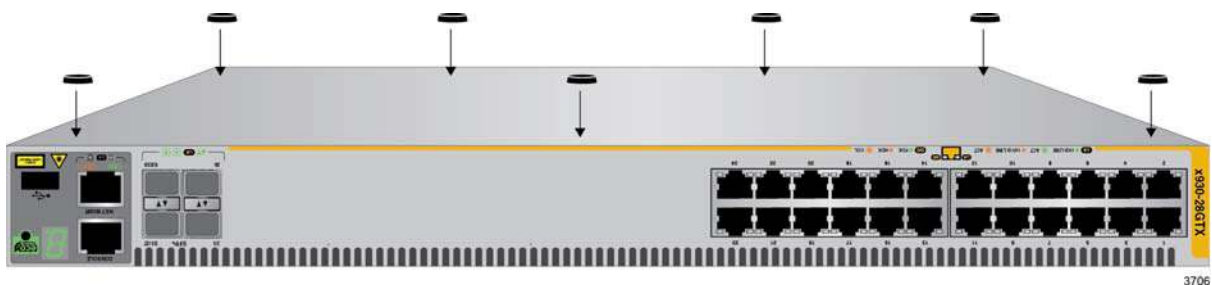


Figure 39. Installing the Bumper Feet

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**Note**

The bumper feet are only to be used if you are installing the switch on a table. Do not install the bumper feet if you are installing the switch in an equipment rack or on a wall.

---

6. Turn the chassis over.
7. Do one of the following:
  - ❑ If you have not installed the power supplies, go to Chapter 3, “Installing the Power Supplies” on page 65.
  - ❑ If the switch contains the AT-PWR250-80 DC Power Supply, go to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.
  - ❑ Otherwise, go to Chapter 9, “Powering On the Switch” on page 115.



## Chapter 6

# Installing the Switch in an Equipment Rack

---

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

- ❑ “Required Items” on page 90
- ❑ “Installing the Switch in an Equipment Rack” on page 91

## Required Items

---

This procedure requires the following items:

- ☐ Two equipment rack brackets (included with the switch)
- ☐ Eight bracket screws (included with the switch)
- ☐ Cross-head screwdriver (not provided)
- ☐ Four standard equipment rack screws (not provided)

---

### **Note**

The switch comes with four equipment rack brackets and sixteen screws. Two brackets and eight screws are used to install the unit in an equipment rack. The extra brackets and screws are used to install the device on a wall.

---

## Installing the Switch in an Equipment Rack

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

Installation guidelines may be found in “Choosing a Site for the Switch” on page 61. Here is the procedure for installing the switch in a 19-inch 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. *See* E28

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**Note**

The x930 Series switches can be installed in an equipment rack with the AT-RKMT-SL01 Sliding Rack Mount Kit. For instructions, refer to the AT-RKMT-SL01 Sliding Rack Mount Kit Installation Guide.

---

1. Place the unit on a level, secure surface.
2. Attach two of the rack mount brackets to the sides of the switch using eight of the bracket screws included with the unit. Figure 40 on page 92 and Figure 41 on page 93 illustrate the four possible bracket positions.

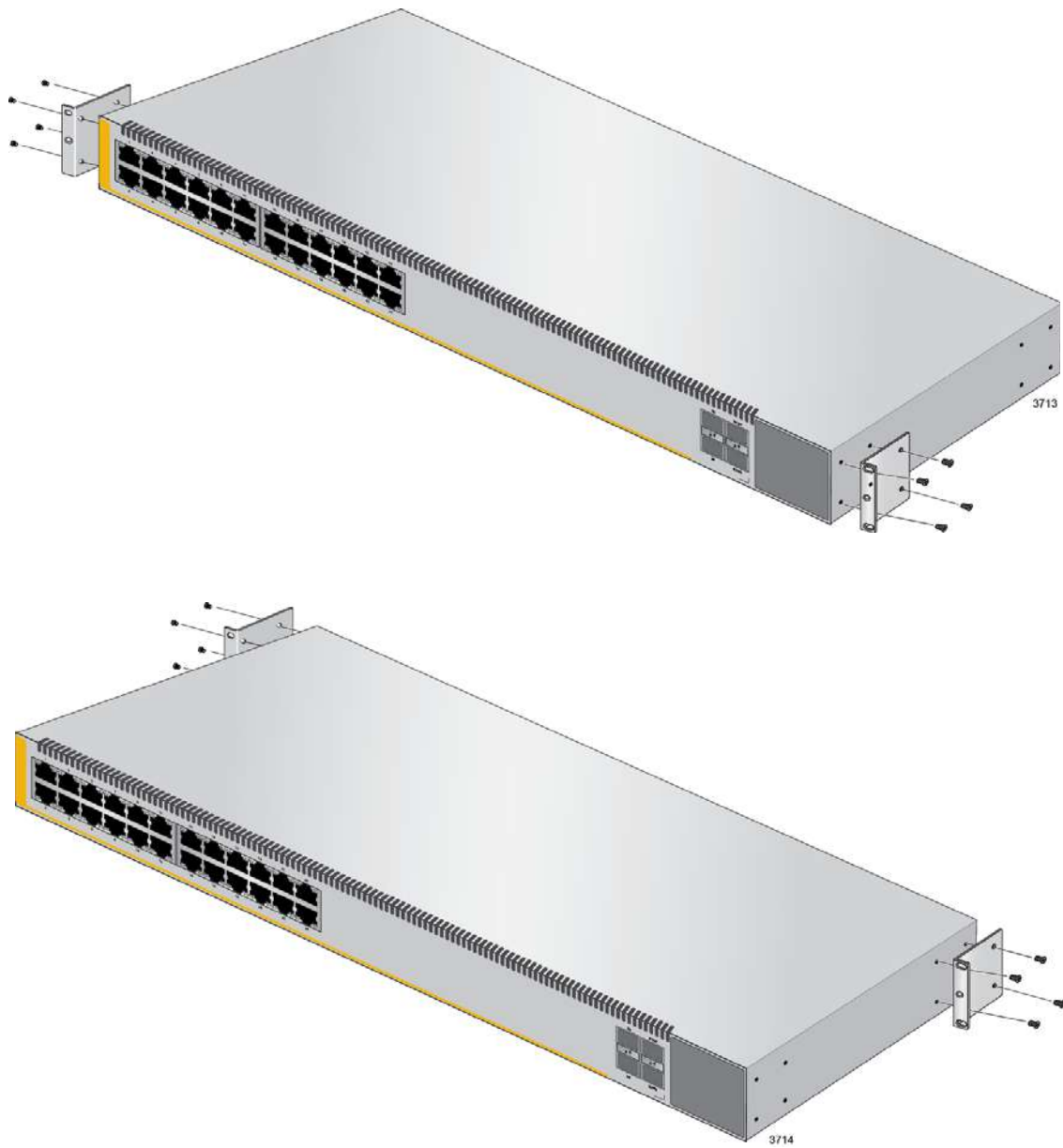


Figure 40. Attaching the Equipment Rack Brackets

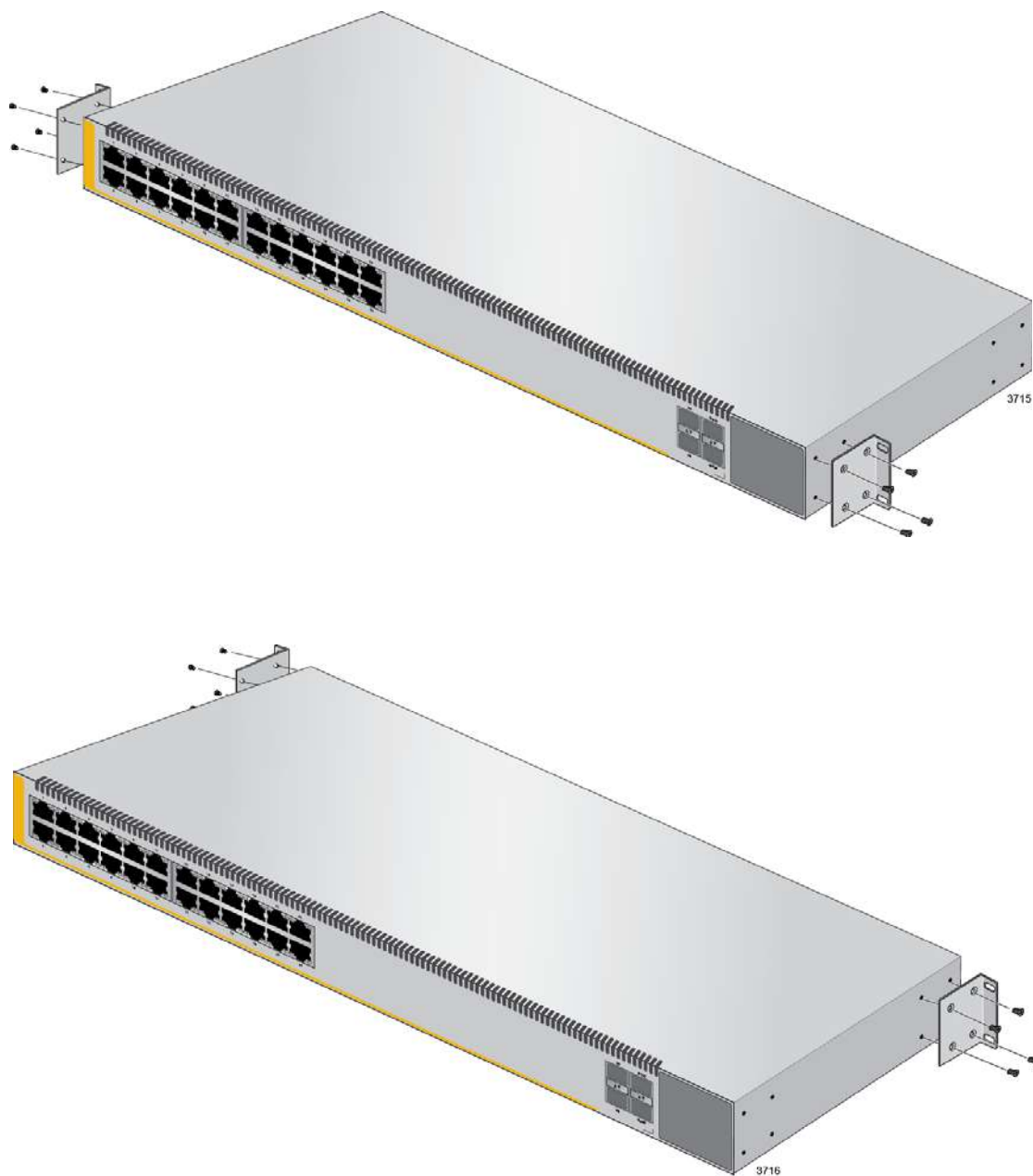


Figure 41. Attaching the Equipment Rack Brackets (Continued)

3. Have two people hold the switch in the equipment rack while you secure it using standard equipment rack screws (not provided), as shown in Figure 42 on page 94.



Figure 42. Installing the Switch in an Equipment Rack

4. Do one of the following:
  - ❑ If you have not installed the power supplies, go to Chapter 3, “Installing the Power Supplies” on page 65.
  - ❑ If the switch contains the AT-PWR250-80 DC Power Supply, go to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.
  - ❑ Otherwise, go to Chapter 9, “Powering On the Switch” on page 115.

## Chapter 7

# Installing the Switch on a Wall

---

The procedures in this chapter are listed here:

- ❑ “Switch Orientation on the Wall” on page 96
- ❑ “Recommended Minimum Wall Area Dimensions” on page 97
- ❑ “Plywood Base for a Wall with Wooden Studs” on page 99
- ❑ “Installation Guidelines” on page 101
- ❑ “Installing the Plywood Base” on page 103
- ❑ “Installing the Switch on the Plywood Base” on page 104
- ❑ “Installing the Switch on a Concrete Wall” on page 107

## Switch Orientation on the Wall

---

You may install the switch on a wall with the front panel on the left or right, as shown in Figure 43. You may not install it with the front panel on the top or bottom.

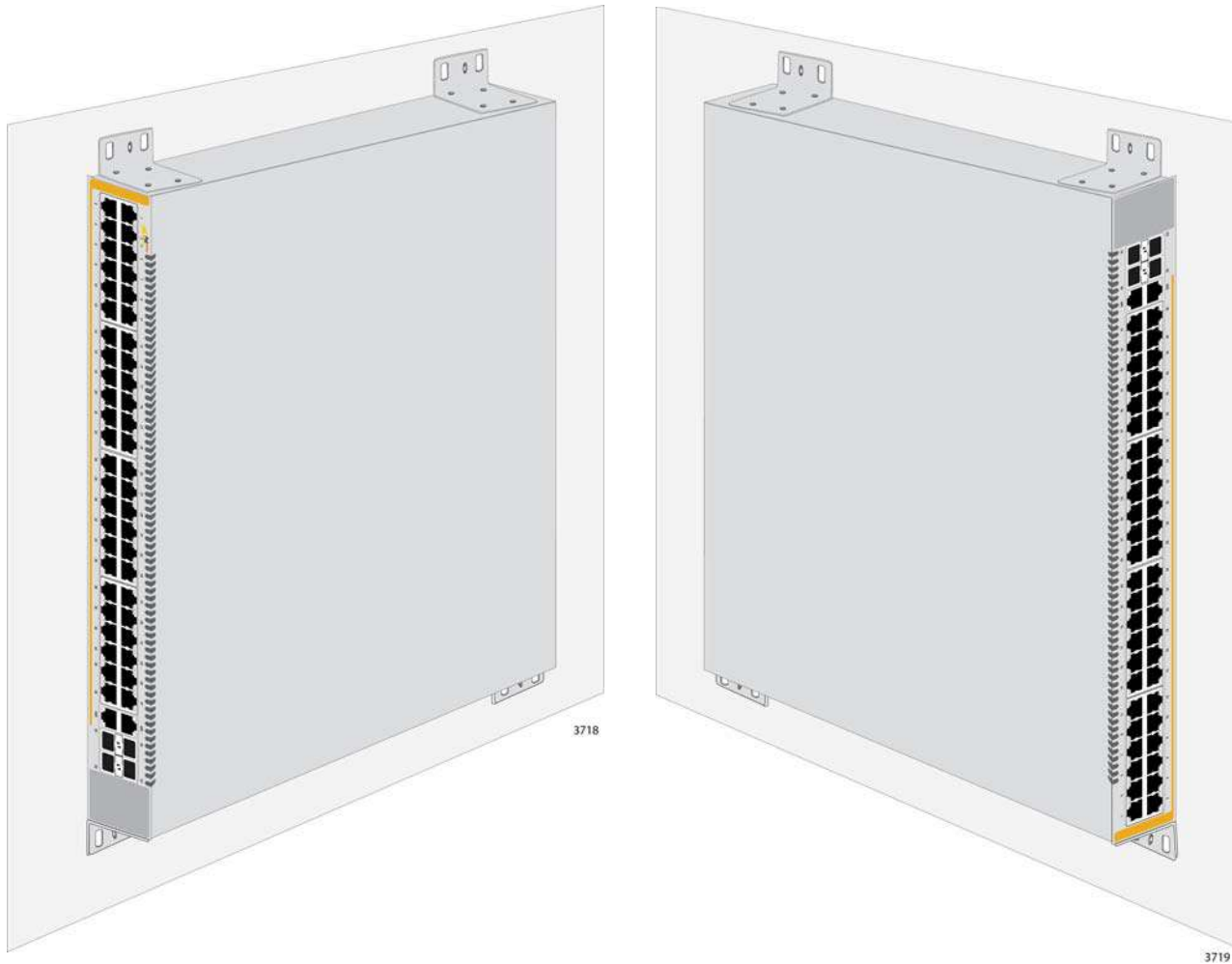


Figure 43. Positions of the Switch on the Wall



## Recommended Minimum Wall Area Dimensions

The recommended minimum dimensions for the reserved wall area for the switch are listed here:

- ❑ Width: 68.0 centimeters (27 inches)
- ❑ Height: 58.4 centimeters (23 inches)

You should position the switch in the reserved wall area such that the front panel has more space than the rear panel. This may make it easier for you to service and maintain the unit. Figure 44 and Figure 45 on page 98 illustrate the recommended positions of the switch in the reserved area when the front panel is on the left and right, respectively.

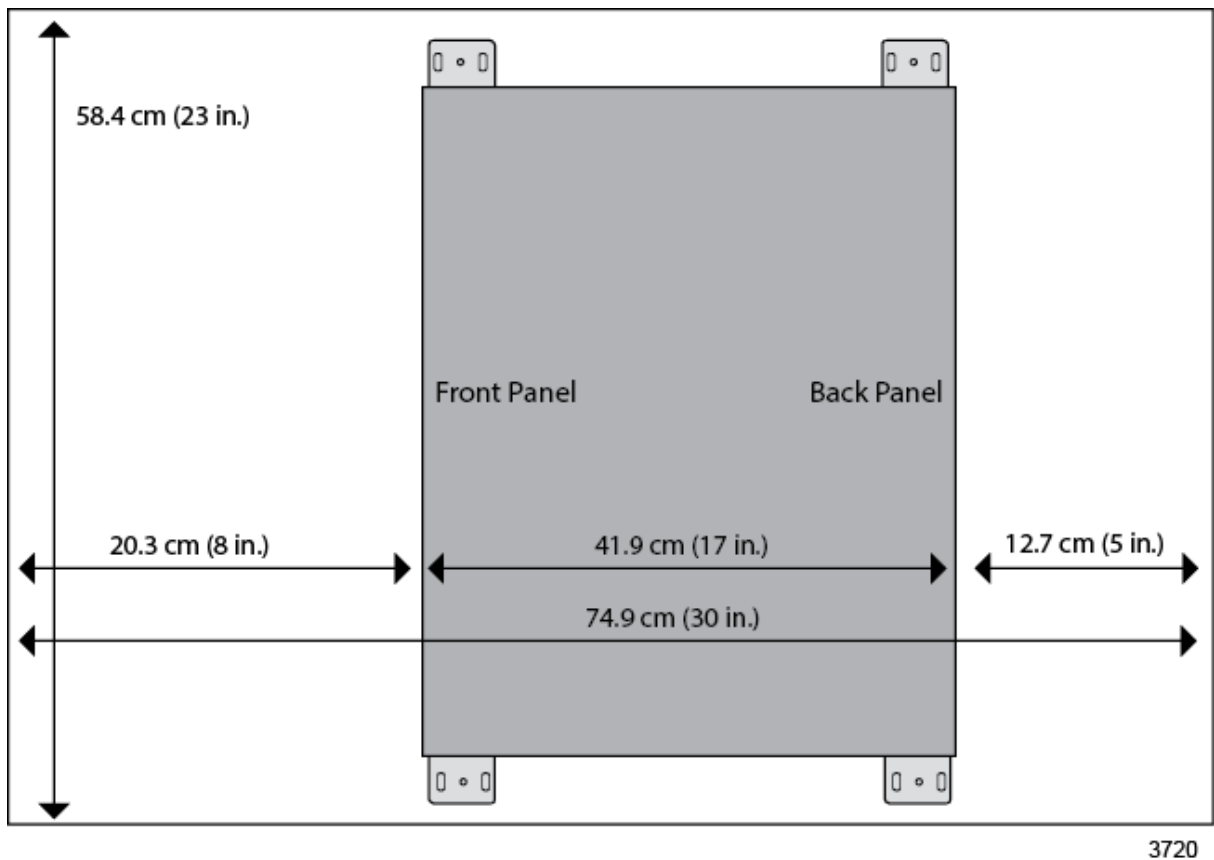
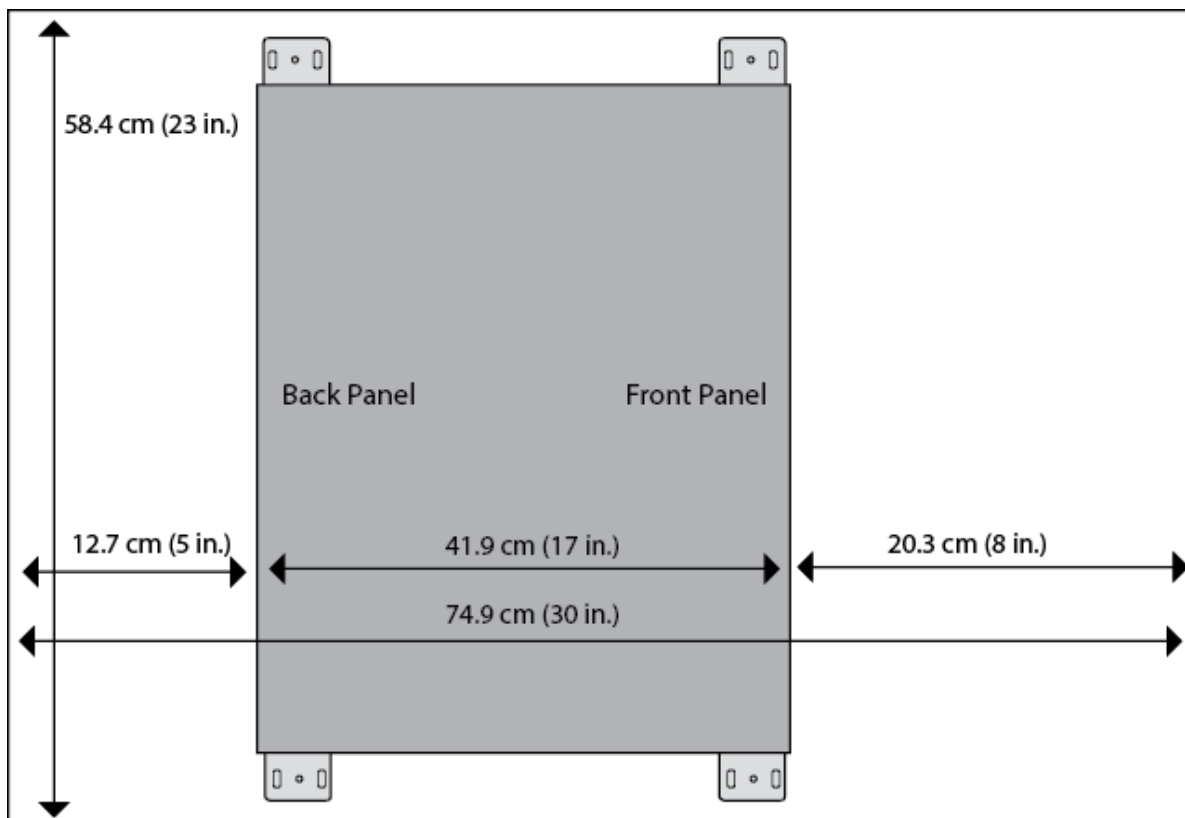


Figure 44. Minimum Wall Area Dimensions with the Front Panel on the Left



3721

Figure 45. Minimum Wall Area Dimensions with the Front Panel on the Right

## Plywood Base for a Wall with Wooden Studs

---

If you are installing the switch on a wall that has wooden studs, Allied Telesis recommends using a plywood base to attach the device to the wall. (A plywood base is not required for a concrete wall.) Refer to Figure 46.

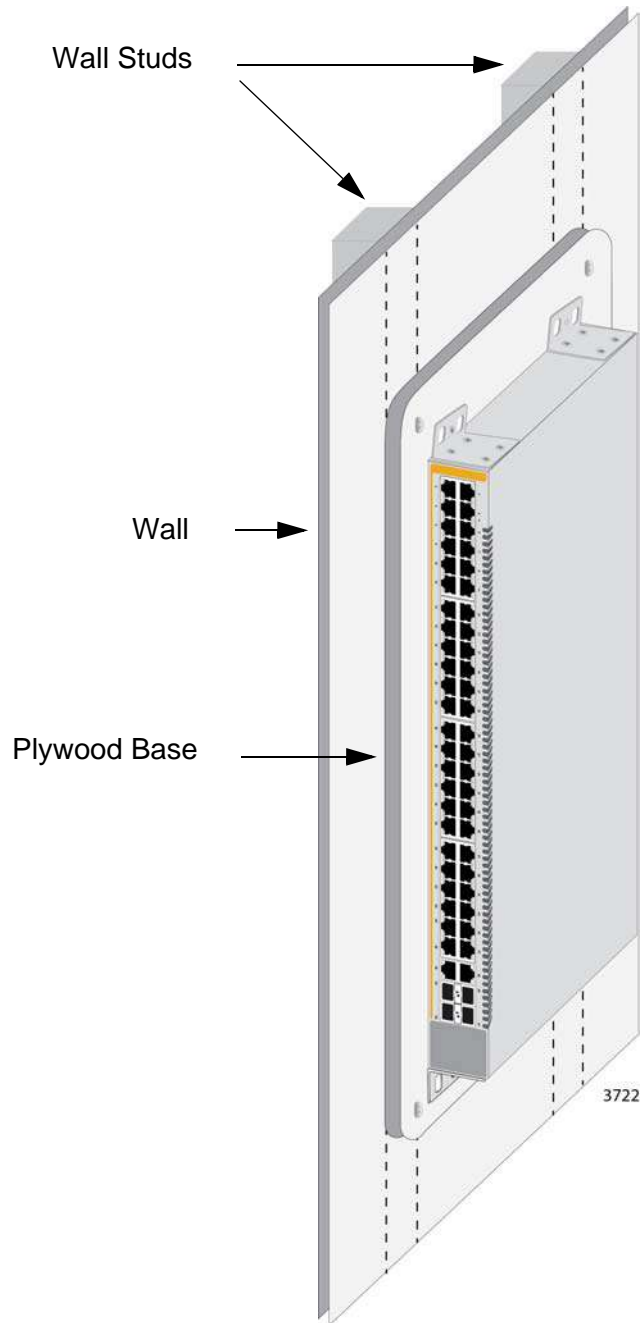


Figure 46. Switch on the Wall with a Plywood Base

The plywood base allows you to mount the switch on two wall studs. If you install the switch without the base, only one side of it would be attached to a stud. This is because the standard distance between two studs in a wall is 41 centimeters (16 inches) while the distance between the left and right brackets on the switch is 36.2 centimeters (14 1/4 inches).

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

- ❑ Width: 58.4 centimeters (23 inches)
- ❑ Height: 55.9 centimeters (22 inches)
- ❑ Thickness: 5.1 centimeters (2 inches)

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

You should install the plywood base to the wall and then install the switch on the base. Refer to Figure 47.

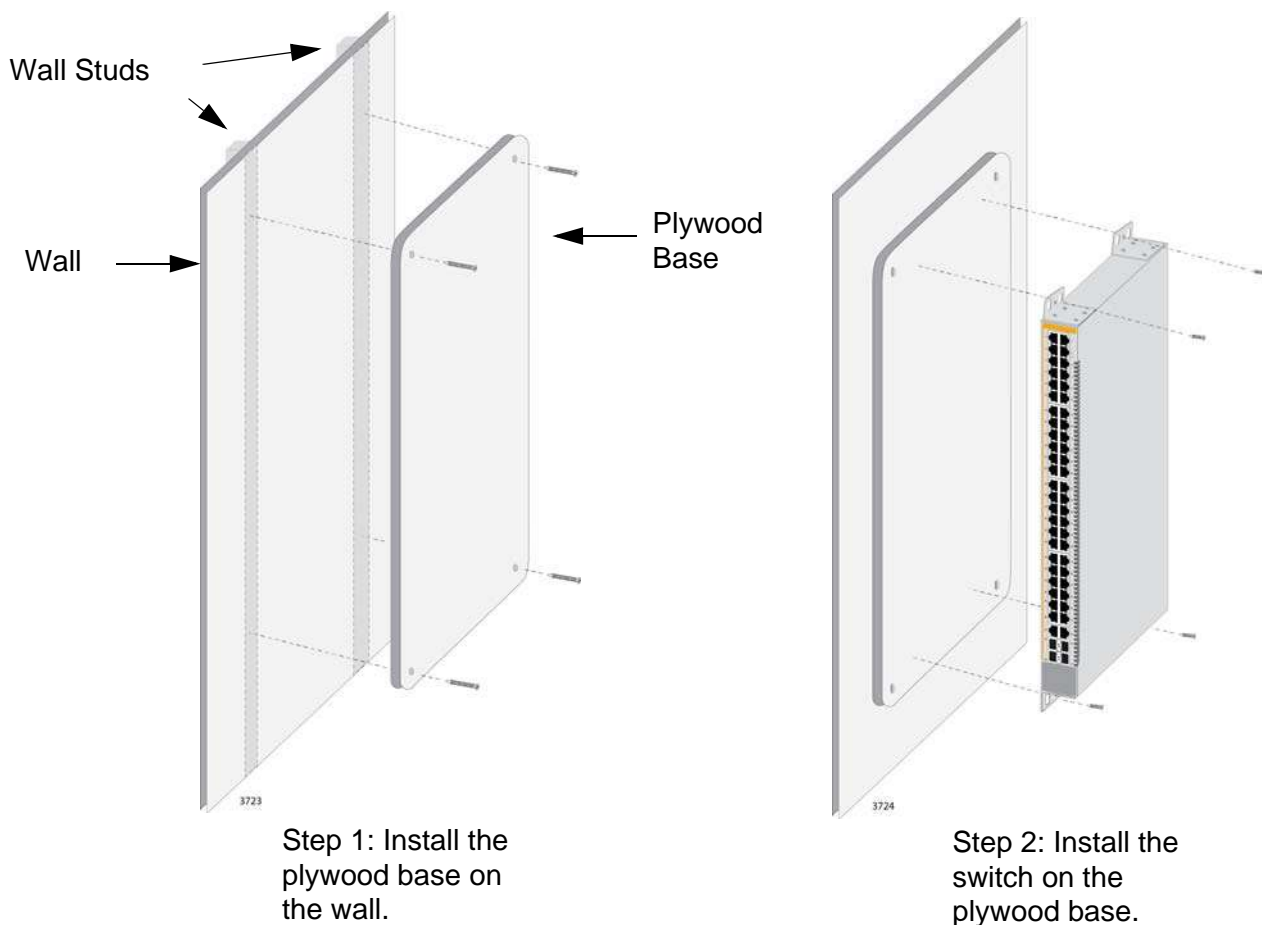


Figure 47. Steps to Installing the Switch with a Plywood Base

## 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.
- ☐ You may install it on a concrete wall.
- ☐ If you are installing the switch on a wall with wooden studs, you should use a plywood base to support the switch. For more information, refer to “Plywood Base for a Wall with Wooden Studs” on page 99. A plywood base is not required for a concrete wall.
- ☐ You should not install the switch on a wall that has metal studs. Metal studs may not be strong enough to safely support the device.
- ☐ You should not install the switch only on sheetrock or similar material. Sheetrock is not strong enough to safely support the device.
- ☐ You should install the power supplies before installing the switch on the wall. For instructions, refer to Chapter 3, “Installing the Power Supplies” on page 65.




### 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:


- ☐ Sixteen bracket screws (included with the switch)
- ☐ Four wall or equipment rack brackets (included with the switch)
- ☐ Four wall screws (included with the switch)
- ☐ Four anchors for a concrete wall (included with the switch)
- ☐ Cross-head screwdriver (not provided)
- ☐ Stud finder for a wooden wall, capable of identifying the middle of wall studs and hot electrical wiring (not provided)
- ☐ Drill and 1/4" carbide drill bit for a concrete wall (not provided)
- ☐ Plywood base if you are installing the switch on a wall with wooden studs (not provided.) Refer to “Plywood Base for a Wall with

Wooden Studs” on page 99 for illustrations.

- ❑ Four screws and anchors for attaching the plywood base to the wall (not provided)



**Caution**

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

---

## Installing the 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 99. Consult a qualified building contractor for installation instructions for the plywood base. The installation guidelines are listed here:

- ☐ You should use a stud finder to identify the middle of studs and hot electrical wiring in the wall.
- ☐ You should attach the base to two wall studs with a minimum of four screws.
- ☐ The selected wall location for the base should adhere to the recommendations in “Choosing a Site for the Switch” on page 61 and “Recommended Minimum Wall Area Dimensions” on page 97.

## Installing the Switch on the 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 56 and “Choosing a Site for the Switch” on page 61 before performing this procedure. Allied Telesis recommends a minimum of three people for this procedure.



### Warning

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



### Warning

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

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

1. Place the switch in a table.
2. Install the four brackets with the sixteen screws that come with the switch to the sides of the unit, as shown in Figure 48.



Figure 48. Installing the Brackets to the Switch for Wall Installation

The sides of the switch have two sets of holes. One set is for installing the switch on a wall with the brackets and the other is for the AT-



RKMT-SL01 Rack Mounting Kit. For this procedure, you need to use the holes for the brackets. The holes are identified in Figure 49.

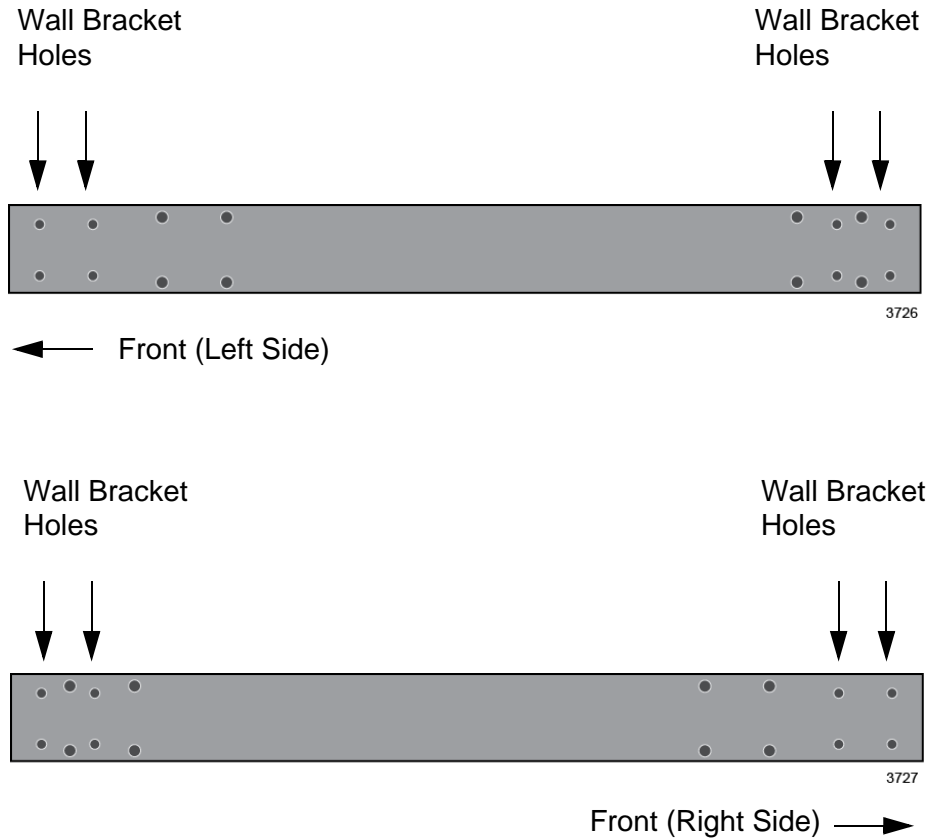


Figure 49. Mounting Holes

3. After attaching the brackets to the side of the switch, have two people hold the switch on the plywood base on the wall while you secure it with the four provided screws. Refer to Figure 50 on page 106.

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

- ☐ Position the switch so that the front panel is either on the left or the right. Refer to Figure 43 on page 96. You may not install the switch with the front panel facing up or down.
- ☐ Leave sufficient space from other devices or walls so that you can access the front and back panels. Refer to “Recommended Minimum Wall Area Dimensions” on page 97.

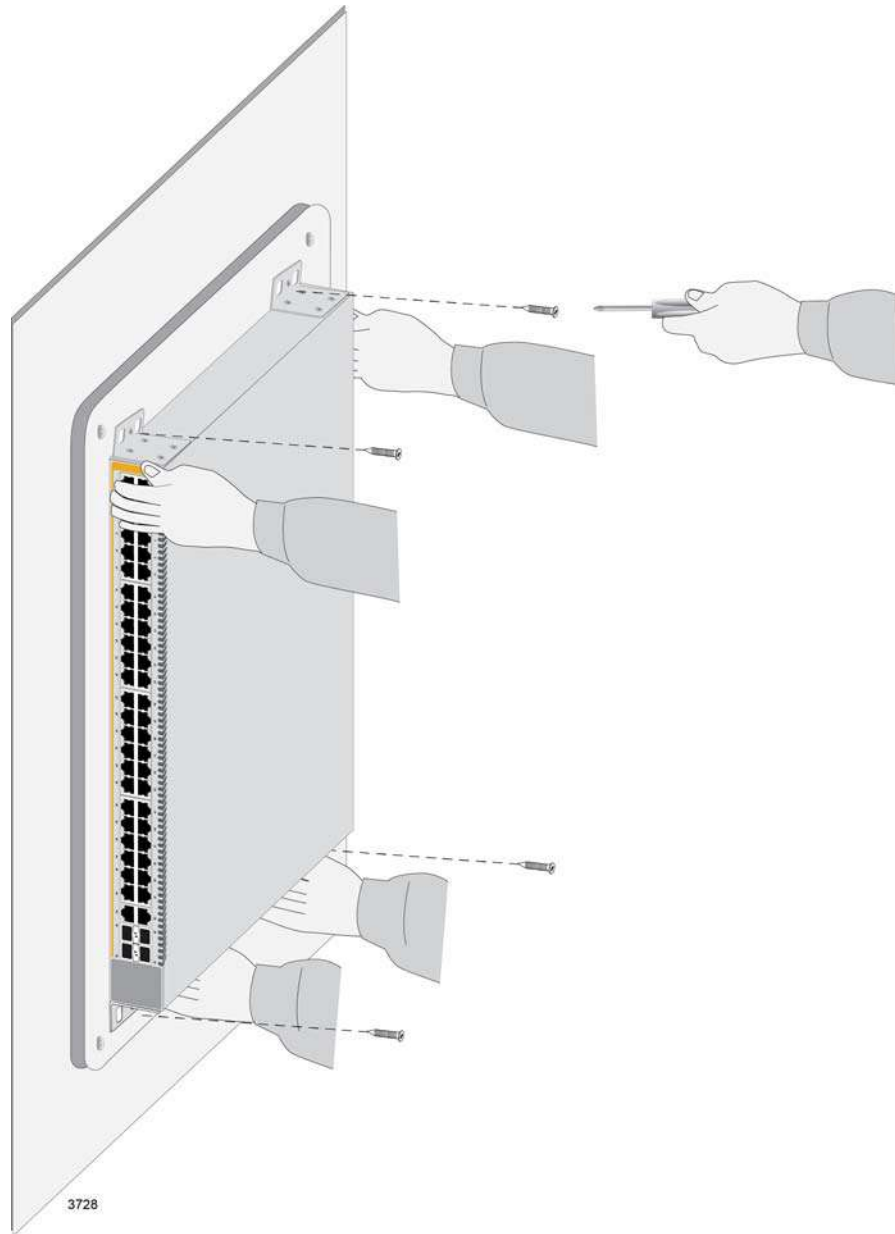


Figure 50. Securing the Switch to the Plywood Base

4. Do one of the following:
  - ❑ If the switch contains the AT-PWR250-80 DC Power Supply, go to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.
  - ❑ Otherwise, go to Chapter 9, “Powering On the Switch” on page 115.

## Installing the Switch on a Concrete Wall

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Allied Telesis recommends a minimum of three people for this procedure. To install the switch on a concrete wall, perform the following procedure:



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**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. *ES*  
E105

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1. Place the switch in a table.
2. Install the four brackets with sixteen screws that come with the switch to the sides of the unit, as shown in Figure 48 on page 104 and Figure 49 on page 105.
3. Have two people hold the switch on the concrete wall at the selected location for the device while you use a pencil or pen to mark the wall with the locations of the four screw holes in the four brackets. Refer to Figure 51 on page 108.

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

- ☐ Position the switch so that the front panel is either on the left or the right. Refer to Figure 43 on page 96. You may not install the switch with the front panel facing up or down.
- ☐ Leave sufficient space from other devices or walls so that you can access the front and back panels. Refer to “Recommended Minimum Wall Area Dimensions” on page 97.

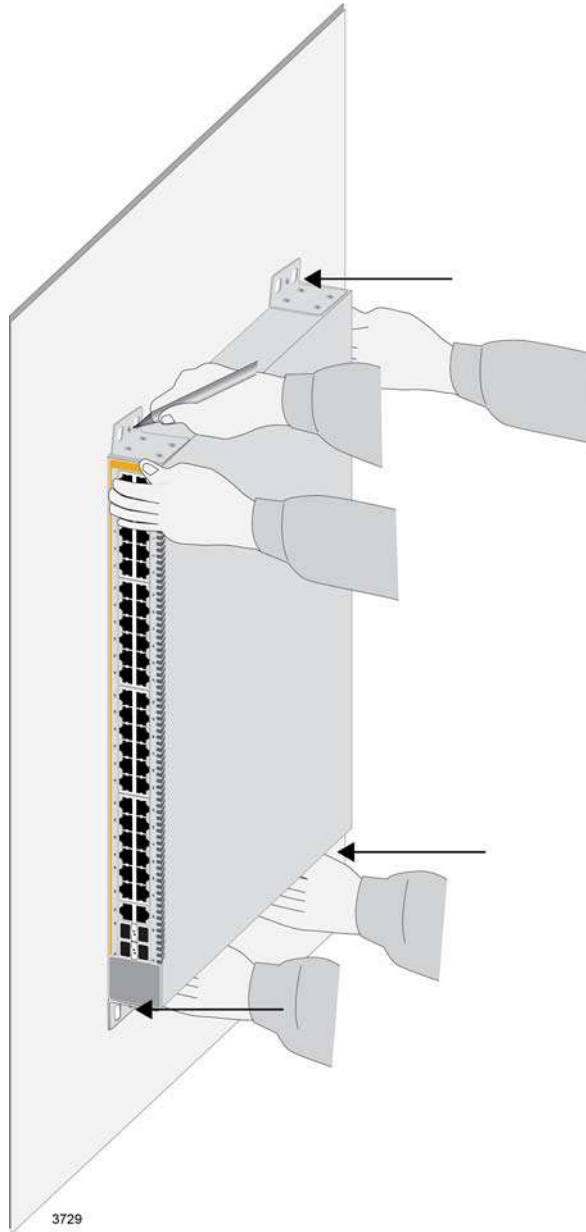


Figure 51. Marking the Locations of the Bracket Holes on a Concrete Wall

4. Place the switch on a table or desk.
5. Use a drill and 1/4" carbide drill bit to pre-drill the four holes you marked in step 3. Please review the following guidelines:
  - ❑ Prior to drilling, set the drill to hammer and rotation mode. The modes break up the concrete and clean out the hole.
  - ❑ Allied Telesis recommends cleaning out the holes with a brush or compressed air.

6. Insert the four anchors into the holes.
7. Have two people hold the switch at the selected wall location while you secure it to the wall with the four provided screws. Refer to Figure 52.

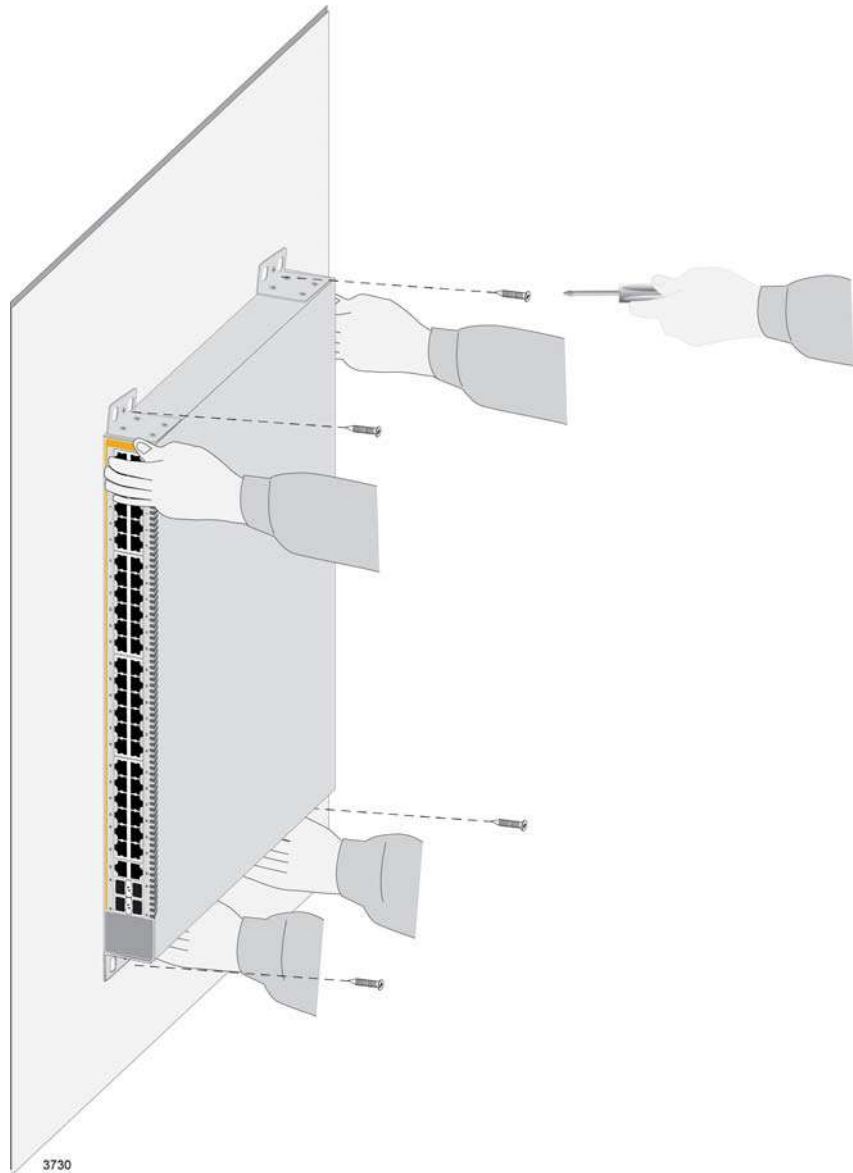


Figure 52. Installing the Switch on a Concrete Wall

8. Do one of the following:
  - ☐ If the switch contains the AT-PWR250-80 DC Power Supply, go to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.
  - ☐ Otherwise, go to Chapter 9, “Powering On the Switch” on page 115.



## Chapter 8

# Wiring the DC Connector on the AT-PWR250-80 Power Supply

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This chapter contains the procedure for wiring the DC connector on the AT-PWR250-80 DC power supply.



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**Warning**

As a safety precaution, install a circuit breaker with a minimum value of 15 Amps between the equipment and the DC power source.

*⌘* E9

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**Warning**

Always connect the wires to the LAN equipment first before connecting them to the circuit breaker. Do not work with HOT feeds to avoid the danger of physical injury from electrical shock. Always verify that the circuit breaker is in the OFF position before connecting the wires to the circuit breaker. *⌘* E9

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**Warning**

For centralized DC power connection, install only in a restricted access area. *⌘* E23

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**Warning**

This equipment must be installed in a Restricted Access location. *⌘* E45

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**Note**

A tray cable is required to connect the power source if the unit is powered by centralized DC power. The tray cable must be a UL listed Type TC tray cable and rated at 600 V and 90 degrees C, with three conductors, minimum 14 AWG. *⌘* E24

---

To wire the DC connector on the AT-PWR250-80 DC Power Supply, perform the following procedure:

1. Power off the DC circuit to which the switch will be connected.

2. Verify that the On/Off switch on the power supply is in the Off position. Refer to Figure 53.

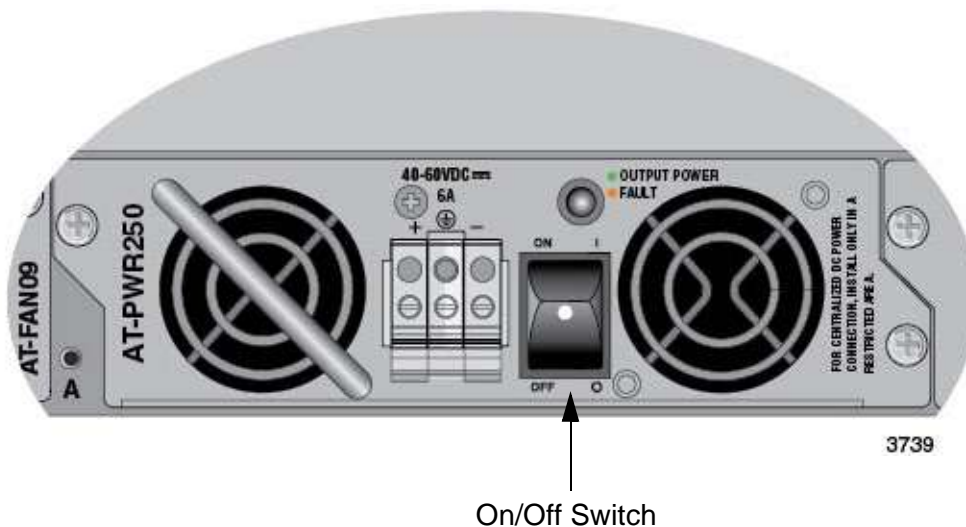


Figure 53. On/Off Switch on AT-PWR250-80 Power Supply

3. Use the legend above the terminal block to identify the terminals. The terminals are **positive**, **power supply ground** and **negative**, from left to right, as shown in Figure 54.

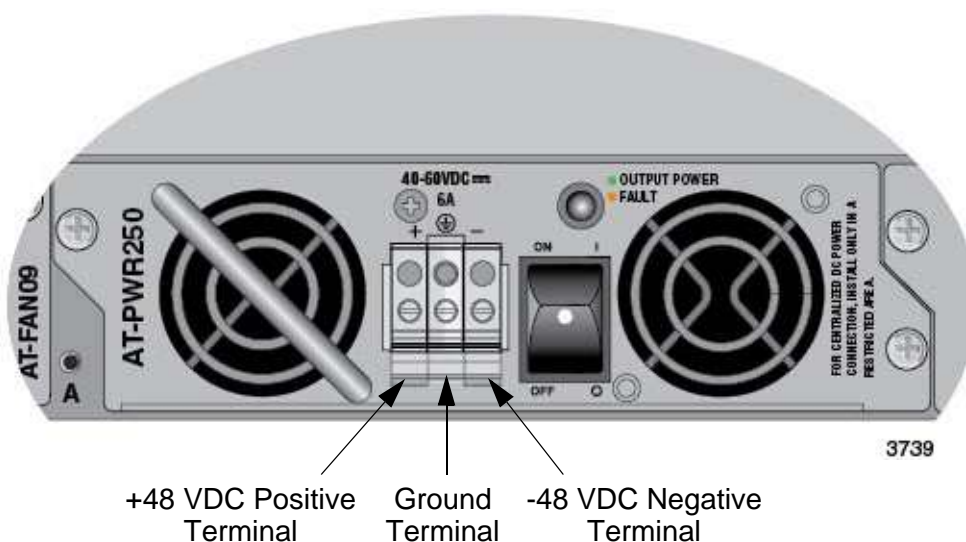



Figure 54. DC Terminal Block

4. With a 14-gauge wire-stripping tool, strip the three wires in the tray cable coming from the DC input power source to  $8\text{mm} \pm 1\text{mm}$  (0.31 in.,  $\pm 0.039$  in.), as shown in Figure 55 on page 113.



**Warning**

Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation.  E10

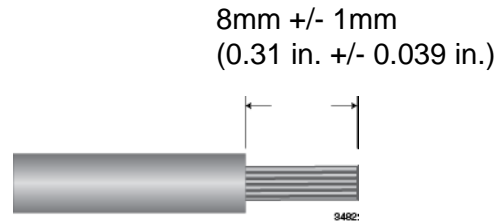


Figure 55. Stripped Wire

5. Insert the power supply ground wire into the middle connector of the DC terminal and tighten the connection with a flathead screwdriver, as shown in Figure 56.

**Warning**


When installing this equipment, always ensure that the power supply ground connection is installed first and disconnected last.  E11



Figure 56. Connecting the Ground Wire to the DC Terminal Block

6. Connect the +48 VDC (RTN) feed wire to the terminal block marked + (plus).
7. Connect the -48 VDC feed wire to the terminal block marked - (minus).



**Warning**

Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. *See* E12

---

8. Secure the tray cable near the rack framework using multiple cable ties to minimize the chance of the connections being disturbed by casual contact with the wiring. Use at least four cable ties, separated four inches apart. Locate the first one within six inches of the terminal block.

---

**Note**

This system will work with a positive grounded or negative grounded DC system. *See* E13

---

9. Verify that the circuit breaker is in the OFF position.
10. Connect the supply-cable wires to the circuit breaker.
11. If the switch has two AT-PWR250-80 Power Supplies, repeat this procedure to wire the DC connector on the second power supply.
12. Go to Chapter 9, "Powering On the Switch" on page 115.



**Warning**

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

---

## Chapter 9

# Powering On the Switch

---

This chapter contains the following procedures:

- ❑ “Powering On AC Power Supplies” on page 116
- ❑ “Powering On the AT-PWR250-80 DC Power Supply” on page 120
- ❑ “Monitoring the Initialization Processes” on page 122

## Powering On AC Power Supplies

---

This section contains the procedure for powering on the AT-PWR250, AT-PWR800, or AT-PWR1200 Power Supply. Please review the following items before you power on the device:

- ❑ Connecting the power cords of the switch with two power supplies to different circuits can protect the unit from a power circuit failure.
- ❑ If the switch has two power supplies, you may power them on at the same time or individually.
- ❑ Refer to “Power Specifications” on page 153 for the power specifications of the switches.



### Warning

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

---

---

### Note

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

---

To power on the switch, perform the following procedure:

1. Raise the power cord retaining clip on the power supply. Refer to Figure 57 on page 117. (The AT-PWR1200 Power Supply does not have a retaining clip.)

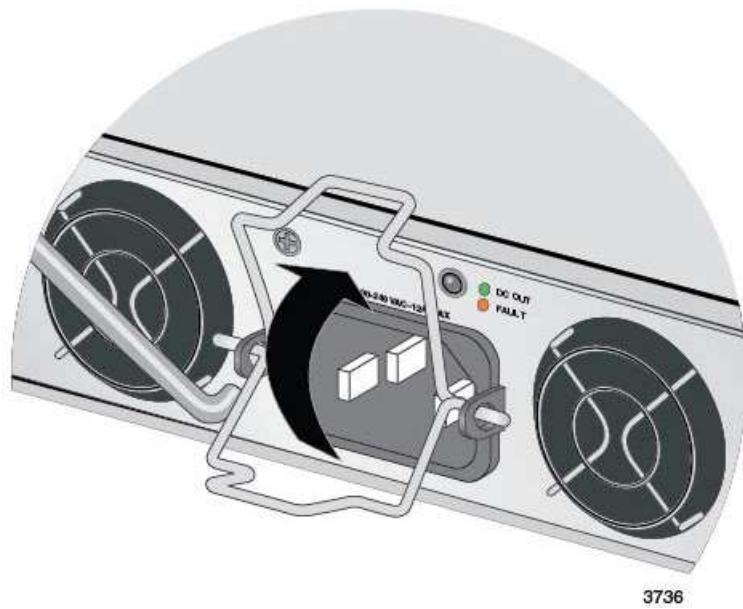


Figure 57. Raising the Power Cord Retaining Clip

2. Connect the AC power cord to the connector on the power supply and to an appropriate power source. Refer to Figure 58 on page 118.

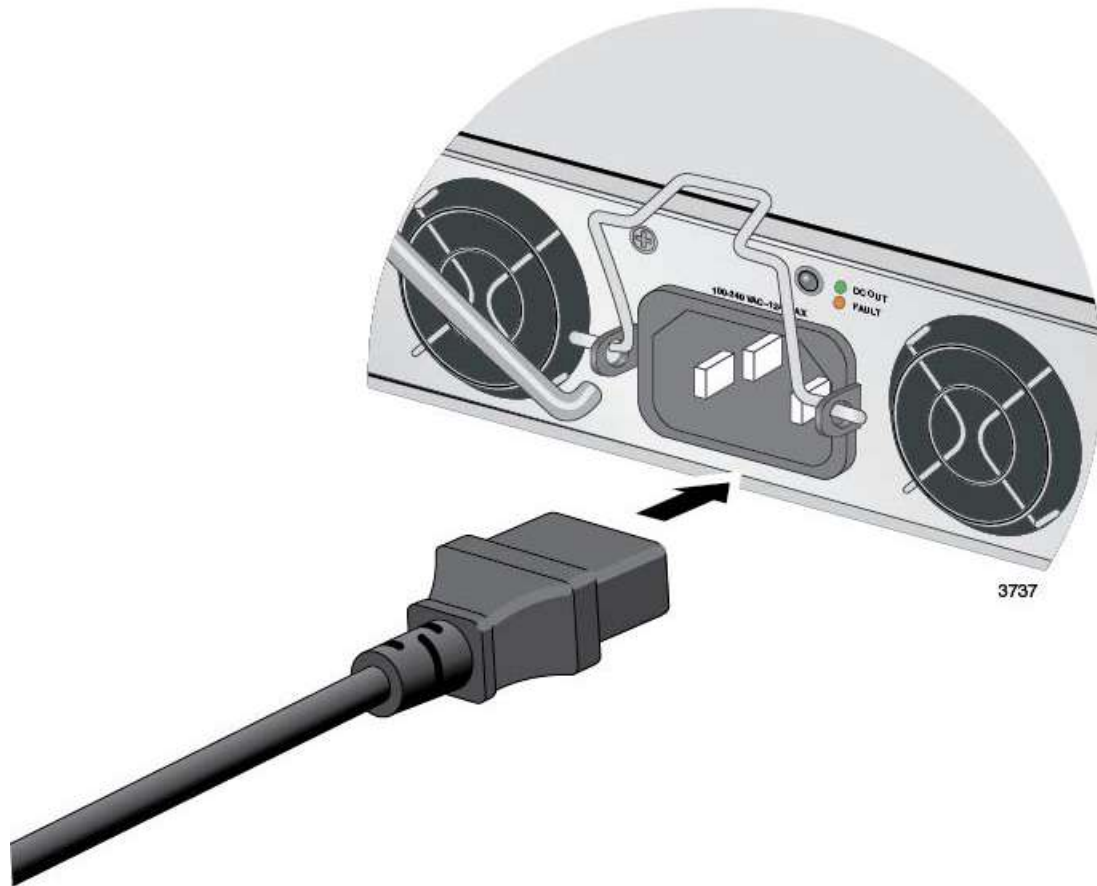


Figure 58. Connecting the AC Power Cord

3. Lower the power cord retaining clip to secure the cord to the switch. Refer to Figure 59 on page 119.



Figure 59. Lowering the Power Cord Retaining Clip

4. Examine the DC OUT/FAULT LED on the power supply. The module is operating normally when the LED is green. If the LED is amber or off, refer to Chapter 12, "Troubleshooting" on page 143 for troubleshooting suggestions.
5. If the switch has two AC power supplies, repeat this procedure to power on the second power supply.
6. Do one of the following:
  - ☐ To monitor the switch as it initializes the management software, go to "Monitoring the Initialization Processes" on page 122.
  - ☐ If you do not want to monitor the initialization process, wait two minutes for the switch to initialize its management software and then go to Chapter 10, "Configuring the Switch for Stand-alone Operation" on page 125.

## Powering On the AT-PWR250-80 DC Power Supply

---

This section contains the procedure for powering on the AT-PWR250-80 DC Power Supply. Please review the following items before powering on the device:

- ❑ This procedure assumes you have already wired the DC connector on the AT-PWR250-80 DC Power Supply. For instructions, refer to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.
- ❑ If the switch has two power supplies, you may power them on at the same time or individually.
- ❑ Refer to “Power Specifications” on page 153 for the power specifications of the switches.

To power on the AT-PWR250-80 Power Supply, perform the following procedure:

1. Power on the DC circuit to which the power supply is connected.
2. Set the On/Off switch on the power supply to On. Refer to Figure 60.

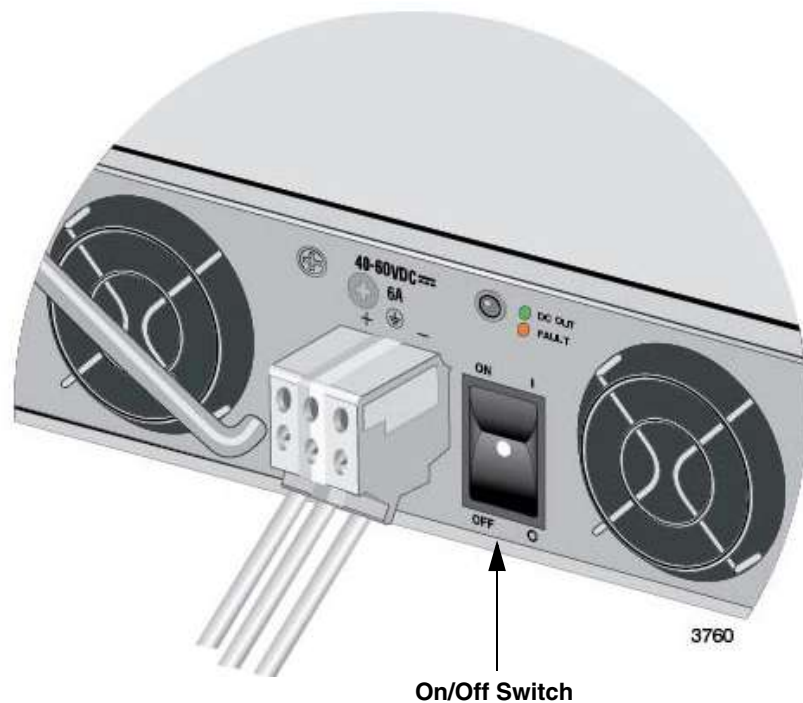


Figure 60. On/Off Switch on the AT-PWR250-80 DC Power Supply



3. Examine the DC OUT/FAULT LED on the power supply module. The module is operating normally when the LED is green. If the LED is amber or off, refer to Chapter 12, “Troubleshooting” on page 143 for troubleshooting suggestions.
4. If the switch has two AT-PWR250-80 Power Supplies, repeat this procedure to power on the second power supply.
5. Do one of the following:
  - ❑ To monitor the switch as it initializes the management software, go to “Monitoring the Initialization Processes” on page 122.
  - ❑ If you do not want to monitor the initialization process, wait two minutes for the switch to initialize its management software and then go to Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.

## Monitoring the Initialization Processes

It takes about two minutes for the switch to initialize its management software programs and features, and load the default configuration. You may monitor the bootup sequence by connecting a terminal or computer that has a terminal emulator program, to the Console port on the master switch. You will see the messages in Figure 61 here to Figure 63 on page 124.

```

Bootloader 3.0.6 loaded
Press <Ctrl+B> for the Boot Menu

Reading filesystem...
Loading flash: x930-broadcomdev-20140626-1.rel...
Verifying release... OK
Booting...
Starting base/first... [ OK ]
Mounting virtual filesystems... [ OK ]

```

```
Allied Telesis Inc.
AlliedWare Plus (TM) v0.0.0
Current release filename: x930-broadcomdev-20140626-1.rel
Original release filename: x930-broadcomdev-20140626-1.rel
Built: Thu Jun 26 01:44:29 NZST 2014
Mounting static filesystems... [ OK ]
Checking flash filesystem... [ OK ]
Mounting flash filesystem... [ OK ]
Checking for last gasp debug output... [ OK ]
Checking NVS filesystem... [ OK ]
Mounting NVS filesystem... [ OK ]
Starting base/dbus... [ OK ]
Starting base/syslog... [ OK ]
Starting base/loopback... [ OK ]
```

### Figure 61. Switch Initialization Messages

```

Starting base/poe_done... [ OK ]
Starting base/sysctl... [ OK ]
Received event poefw.done
Starting base/portmapper... [ OK ]
Received event syslog.done
Starting base/reboot-stability... [ OK ]
Checking system reboot stability... [ OK ]
Starting base/cron... [ OK ]
Starting base/appmond... [ OK ]
Starting hardware/openhpi... [ OK ]
Starting hardware/timeout... [ OK ]
Starting base/inet... [ OK ]
Starting base/modules... [ OK ]
Received event modules.done
Received event board.inserted
Received event hardware.done
Starting network/startup... [ OK ]
Starting base/external-mdeia... [ OK ]
Starting network/stackd... [ OK ]
Starting network/election.timeout... [ OK ]
Received event network.enabled

Initializing HA processes:
atmfd, auth, bgpd, cntrd, epsr, hostd, hsl
imiproxyd, irdpd, lacp, lldpd, loopprot, mstp, nsm
ospf6d, ospfd, pdmd, pim6d, ripd, ripngd
rmon, sflowd, udlld, vrrpd, imi

Received event network.initialized
17:50:25 awplus-1 VCS[2119]: No neighboring members found, unit may be in a
stand alone configuration
Received event vcs.elected-master
17:50:25 awplus-1 VCS[2119]: Startup speed can be improved by adding 'no
stack 1 enable' to configuration
03:44:11 awplus-1 VCS[2119]: Member 1 (eccd.edd1.64ab) has become the Active
Master
Assigning Active Workload to HA processes:
hsl, authd, epsrd, irdpd, lacpd, loopprotd
mstpd, nsm, ospfd, ripd, rmond, sflowd, vrrpd
imi, imiproxyd

```

Figure 62. Switch Initialization Messages (Continued)

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 63. Switch Initialization Messages (Continued)

After the switch has initialized its management software, go to Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.

## Chapter 10

# Configuring the Switch for Stand-alone Operation

---

This chapter contains the following procedures:

- ❑ “Determining the Status of the Switch” on page 126
- ❑ “Starting a Local Management Session” on page 127
- ❑ “Disabling VCStack” on page 129
- ❑ “Verifying Support for Hardware Options” on page 132

## Determining the Status of the Switch


---

After the switch has initialized its management software, examine the switch ID LED on the front panel and do one of the following:

- ❑ If the LED is displaying “0”, the VCStack feature is already disabled and the switch is operating as a stand-alone unit. Do one of the following:
  - If the switch contains the optional AT-x9EM/XT4 Card, go to “Verifying Support for Hardware Options” on page 132.
  - If the switch does not contain the optional AT-x9EM/XT4 Card, go to Chapter 11, “Cabling the Networking Ports” on page 133.
- ❑ If the LED is displaying the number “1” or higher, the VCStack feature is enabled on the unit. You need to disable it. For instructions, begin with “Starting a Local Management Session,” next.



### Caution

You have to reset the switch to disable the VCStack feature. Some network traffic may be lost if the device is already connected to a live network.  E89

---

---

### Note

The initial management session of the switch must be from the Console port.

---

## Starting a Local Management Session

---

This procedure requires a terminal or a terminal emulator program and the management cable that comes with the switch. To start a local management session on the switch, perform the following procedure:

1. Connect the RJ-45 connector on the management cable to the Console port on the front panel of the switch, as shown in Figure 64.

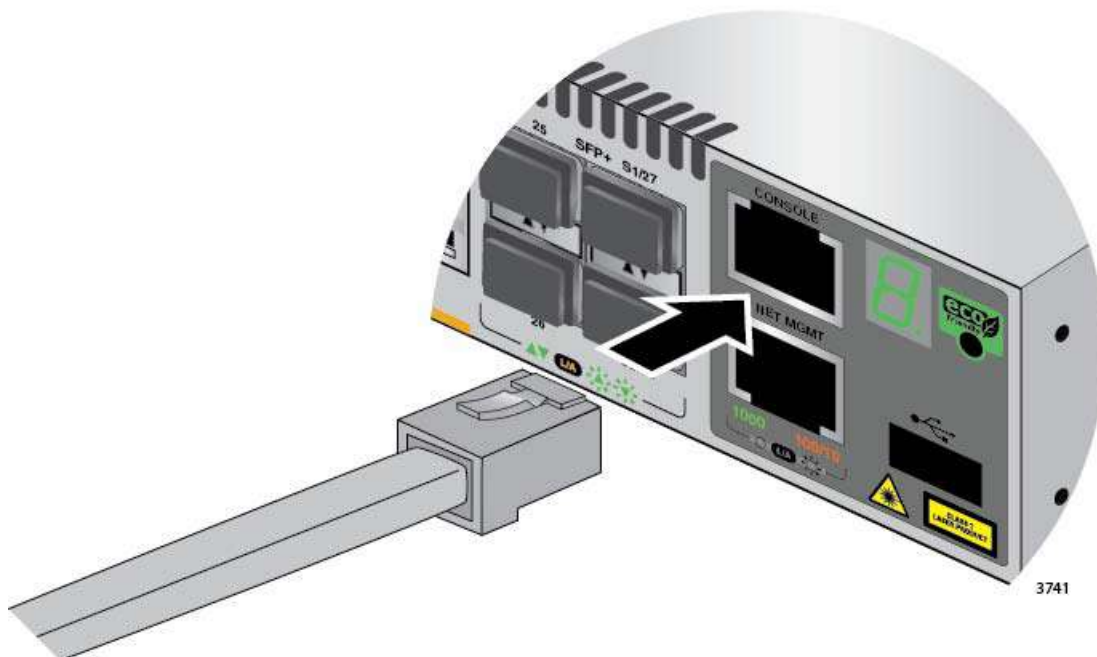


Figure 64. Connecting the Management Cable to the Console Port

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

---

**Note**

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

---

4. Press Enter.


You are prompted for a user name and password.

5. When prompted for a user name, go to “Disabling VCStack” on page 129.



# Disabling VCStack

To disable the VCStack feature to use the switch as a stand-alone unit, perform the following procedure:

**Caution**  
You have to reset the switch to disable the VCStack feature. Some network traffic may be lost if the device is already connected to a live network. ⚡ E89

1. Start a local management session on the switch. For instructions, refer to “Starting a Local Management Session” on page 127.
2. When prompted, enter a user name and password to log on the switch. 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 65. is displayed.

```
awpl us>
```

Figure 65. User Exec Mode Prompt

**Note**  
The User Exec mode is the first level in the command mode interface. For complete information on the modes and commands, refer to the *Software Reference for x930 Series Switches, AlliedWare Plus Operating System* at [www.alliedtelesis.com](http://www.alliedtelesis.com).

3. Enter the SHOW STACK command to display the status of the VCStack feature. Figure 66 is an example of the command.

```
awplus> show stack
Virtual Chassis Stacking summary information
ID      Pending ID  MAC address      Priority  Status  Role
1        -            eccd: 6dd1: 64a2  128      Ready   Active Master
Operational Status      Standalone Unit
Stack MAC address        eccd: 6dd1: 64a2
awpl us>
```

Figure 66. SHOW STACK Command

## 4. Review the following items:

- ❑ If the Operational Status is “Stacking Hardware Disabled,” the VCSStack feature is already disabled on the switch and the SFP+ S1 and S2 stacking slots may be used with regular SFP or SFP+ transceivers. Do one of the following:
  - If the switch contains the optional AT-x9EM/XT4 Card, go to “Verifying Support for Hardware Options” on page 132.
  - If the switch does not contain the optional AT-x9EM/XT4 Card, go to Chapter 11, “Cabling the Networking Ports” on page 133.
- ❑ If the Operational Status is “Standalone Unit,” as shown in Figure 66 on page 129, the VCSStack feature is active on the unit. You must disable it by performing the steps in the rest of this procedure before using the SFP+ S1 and S2 stacking slots with regular SFP or SFP+ transceivers. The reason the status says “standalone” is because the switch is functioning as a stack of one switch.

## 5. Move to the Global Configuration mode by entering the ENABLE and CONFIGURE TERMINAL commands, as shown in Figure 67.

```
awpl us> enable
awpl us# configure terminal
Enter configuration commands, one per line. End with CNTL/Z
awpl us#
```

Figure 67. Moving to the Global Configuration Mode

## 6. To disable the VCSStack feature on the switch, enter the NO STACK ENABLE command, which has this format:

```
no stack /d enable
```

The ID parameter is the ID number of the switch, displayed on the ID LED. Replace the parameter with whatever number is on the ID LED. For example, if the ID number of the switch is 1, the default value, enter the command as follows:

```
awpl us(config)# no stack 1 enable
```

This confirmation prompt in Figure 68 is displayed.

```
Warning: This will disable the stacking hardware on member-1.
Are you sure you want to continue? (y/n):
```

Figure 68. Confirmation Prompt for the NO STACK ENABLE Command

## 7. Type Y to disable VCSStack on the switch or N to cancel the procedure.

The switch displays the message in Figure 69.

```
awpl us(confi g)#18: 04: 12 awpl us VCS[2119]: Deacti vating
Stacking Ports on stack member 1.
```

Figure 69. Disabling VCStack.

8. Press the Return key to re-display the Global Configuration mode prompt.
9. Enter the EXIT command to return to the Privileged Exec mode, as shown in Figure 70.

```
awpl us(confi g)# exi t
awpl us#
```

Figure 70. Returning to the Privileged Exec Mode

10. Enter the WRITE command to save your change in the configuration file. The switch displays the confirmation prompt in Figure 71.

```
awpl us# wri te
Bui l di ng confi gurati on . . .
[OK]
awpl us#
```

Figure 71. Saving the Changes with the WRITE Command

If this is the initial management session, the switch automatically creates the Default.cfg configuration file and stores your change in the file.

11. Enter the REBOOT command to reboot the switch.
12. At the confirmation prompt, type “Y” for yes.
13. Wait two minutes for the switch to initialize its management software and afterwards examine the Switch ID LED again. The switch is ready for normal network operations as a stand-alone unit when its ID number is “0.” If the number is not “0,” repeat this procedure. Be sure to save the configuration change with the WRITE command in step 10.
14. Do one of the following:
  - ❑ If the switch contains the optional AT-x9EM/XT4 Card, go to “Verifying Support for Hardware Options” on page 132.
  - ❑ If the switch does not contain the optional AT-x9EM/XT4 Card, go to Chapter 11, “Cabling the Networking Ports” on page 133.

## Verifying Support for Hardware Options

---

This section contains the procedure for viewing the version number of the management software on the switch. Allied Telesis recommends performing this procedure if you installed the optional AT-x9EM/XT4 Module. The module requires version 5.4.5-2 or later of the management software.

To view the version number of the management software, perform the following procedure. If the switch is powered off, start with step 1. If the switch is already powered on, start with step 3:

1. Power on one of the switches by doing one of the following:
  - ❑ If the switch has an AC power supply, connect the AC power cord to the power supply on the back panel and to an AC power source. If the switch has two power supplies, you need to power on only one of them for this procedure.
  - ❑ If the switch has the DC AT-PWR250-80 Power Supply, power on the DC circuit and the On/Off switch on the power supply. (If you have not yet wired the DC connector on the power supply, refer to Chapter 8, “Wiring the DC Connector on the AT-PWR250-80 Power Supply” on page 111.)
2. Wait one minute for the switch to initialize the management software.
3. Start a local management session on the switch. For instructions, refer to “Starting a Local Management Session” on page 127.
4. In the User Exec mode, enter either the `SHOW SYSTEM` or `SHOW VERSION` command.
5. Examine the Software Version field in the information the command displays on your screen and do one of the following:
  - ❑ If the field says “545-2” or later, the management software on the switch supports the AT-x9EM/XT4 Module. Go to Chapter 11, “Cabling the Networking Ports” on page 133.
  - ❑ If the field says “545” or “545-1”, the management software does not support the optional module. You must update the operating software on the switch to the latest release before you can use the module. For upgrade instructions, refer to the *Software Reference for x930 Series Switches, AlliedWare Operating System* from [www.alliedtelesis.com](http://www.alliedtelesis.com).

## Chapter 11

# Cabling the Networking Ports

---

This chapter contains the following procedures:

- ❑ “Cabling the Twisted Pair Ports” on page 134
- ❑ “Guidelines to Handling SFP or SFP+ Transceivers” on page 136
- ❑ “Installing SFP or SFP+ Transceivers” on page 137
- ❑ “Specifying Ports in the Command Line Interface for Stand-alone Switches” on page 141

## Cabling the Twisted Pair Ports

---

Here are the guidelines to cabling the 10/100/1000Base-T twisted pair ports:

- ❑ The cable specifications for the 10/100/1000Base-T twisted pair ports are listed in Table 2 on page 30.
- ❑ The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- ❑ The default setting for the wiring configurations of the ports is auto-MDI/MDI-X. The default setting is appropriate for switch ports that are connected to 10/100Base-TX network devices that also support auto-MDI/MDI-X.
- ❑ The default auto-MDI/MDI-X setting is not appropriate for switch ports that are connected to 10/100Base-TX network devices that do not support auto-MDI/MDI-X and have a fixed wiring configuration. For switch ports connected to those types of network devices, you should disable auto-MDI/MDI-X and set the wiring configurations manually.
- ❑ The appropriate MDI/MDI-X setting for a switch port connected to a 10/100Base-TX network device with a fixed wiring configuration depends on the setting of the network device and whether the switch and network device are connected with straight-through or crossover cable. If you are using straight-through twisted pair cable, the wiring configurations of a port on the switch and a port on a network device must be opposite each other, such that one port uses MDI and the other MDI-X. For example, if a network device has a fixed wiring configuration of MDI, you must disable auto-MDI/MDI-X on the corresponding switch port and manually set it to MDI-X. If you are using crossover twisted pair cable, the wiring configurations of a port on the switch and a port on a network device must be the same.
- ❑ 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 default speed setting of Auto-Negotiation is not appropriate for ports connected to 10/100Base-TX network devices that do not support Auto-Negotiation and have fixed speeds. For those switch ports, you should disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- ❑ The 10/100/1000Base-T ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- ❑ The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.

- ❑ The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. You should disable Auto-Negotiation on those ports and set their duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation, which can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- ❑ Do not attach cables to ports of static or LACP port trunks until after you have configured the trunks on the switch. Otherwise, the ports will form network loops that can adversely affect network performance.

## Guidelines to Handling SFP or SFP+ Transceivers

---

Please review the following guidelines before installing SFP or SFP+ transceivers in the switch:

- ❑ SFP and SFP+ transceivers are hot-swappable. You may install them while the chassis is powered on.
- ❑ Your Allied Telesis sales representative can provide you with a list of supported transceivers for the units.
- ❑ 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 the fiber optic cable.
- ❑ Fiber optic transceivers are dust sensitive. Always keep the plug in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove the plug, keep it for future use.
- ❑ Unnecessary removal and insertion of a transceiver can lead to premature failure.



### Caution

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

---

---

### Note

SFP+ slots 27/S1 and 28/S2 on the 28-port switches and slots 51/S1 and 52/S2 on the 52-port switches are initially configured as stacking slots for the VCStack feature. If you intend to use the switch as a stand-alone unit, you must disable the VCStack feature before using the slots with standard SFP or SFP+ transceivers. For instructions, refer to Chapter 9, “Powering On the Switch” on page 115.

---



## Installing SFP or SFP+ Transceivers

This section contains instructions for installing SFP or SFP+ transceivers in the slots on the switch. Please review the following information before installing the transceivers:

- ❑ Slots 1 to 24 of the AT-x930-28GSTX support 100 and 1000 Mbps SFP transceivers. They do not support 10 Gbps transceivers.
- ❑ Slots 25 to 28 of the 28-port switches and slots 49 to 52 of the 52-port switches support 1000 Mbps and 10 Gbps transceivers. They do not support 100 Mbps transceivers.

The illustrations in the procedure show the installation of a transceiver in slot 25 of a 28-port switch. The procedure is the same for all SFP slots.

To install transceivers, perform the following procedure:

1. Remove the dust plug from a transceiver slot on the switch. Refer to Figure 72.



Figure 72. Removing the Dust Plug from an SFP Slot

2. Remove the transceiver from its shipping container and store the packaging material in a safe location.
3. If you are installing the transceiver in a top slot, position the transceiver with the Allied Telesis label facing up. If you are installing the transceiver in a bottom slot, position the transceiver with the label facing down.
4. Slide the transceiver into the slot until it clicks into place, as shown in Figure 73 on page 138.

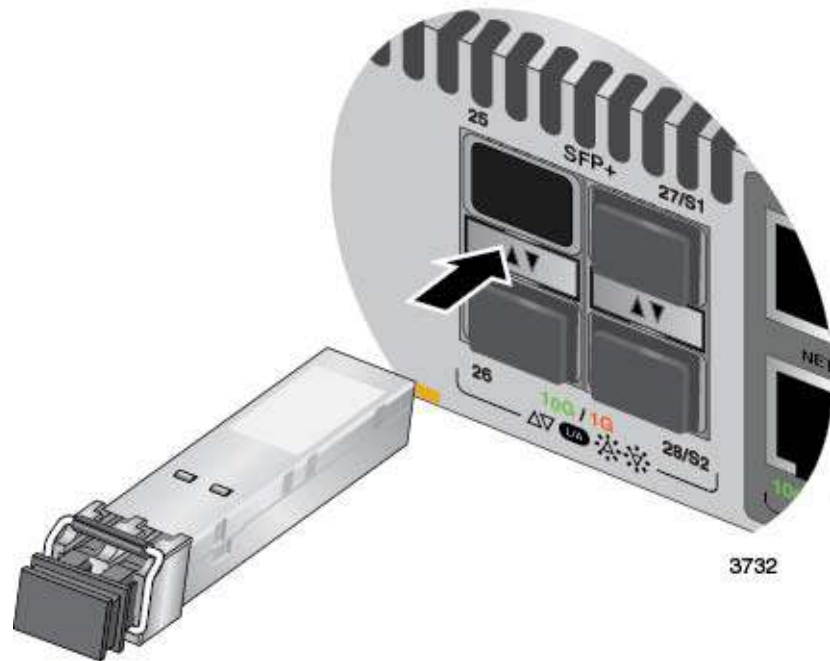


Figure 73. Installing an SFP Transceiver

## Note

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

- Remove the dust cover from the transceiver, as shown in Figure 74.

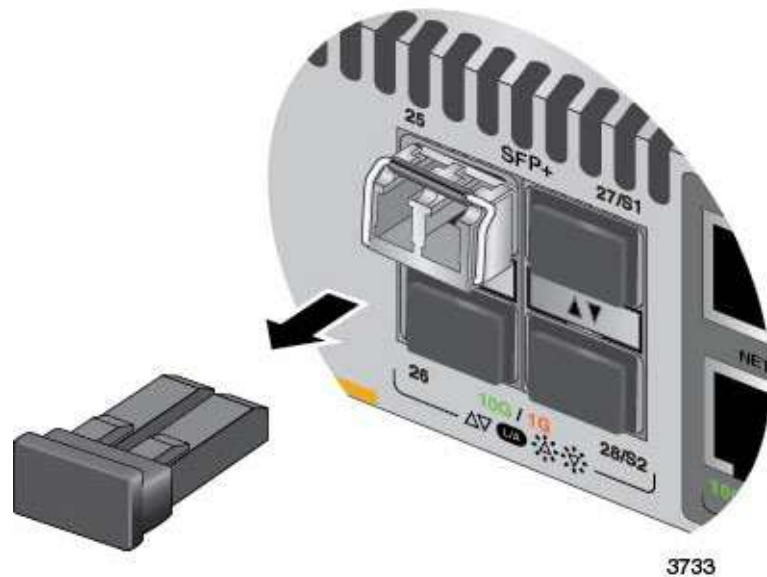


Figure 74. Removing the Dust Cover from an SFP or SFP+ Transceiver

6. Verify the position of the handle on the transceiver. If the transceiver is in a top slot, the handle should be in the upright position, as shown in Figure 75. If the transceiver is in a bottom slot, the handle should be in the down position.



Figure 75. Positioning the SFP or SFP+ Handle in the Upright Position

7. Connect the fiber optic cable to the transceiver, as shown in Figure 76 on page 140. The connector on the cable should fit snugly into the port, and the tab should lock the connector into place.

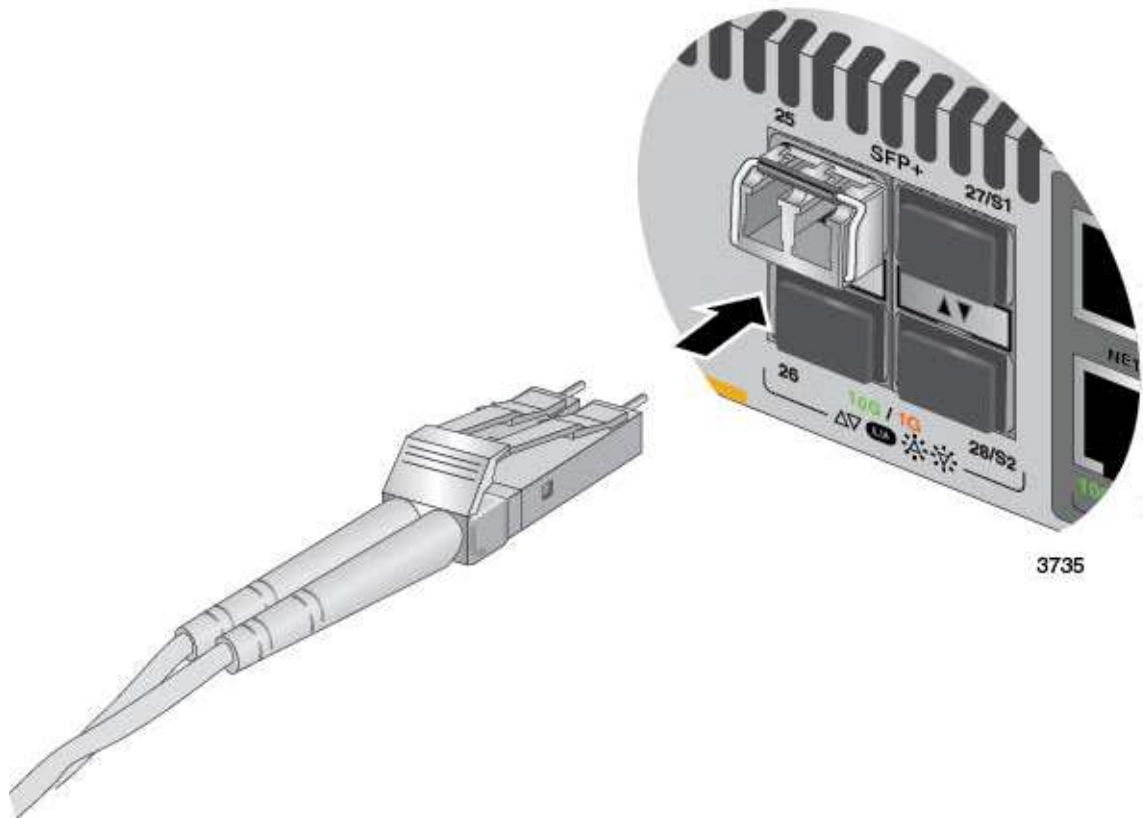


Figure 76. Connecting a Fiber Optic Cable to an SFP or SFP+ Transceiver

8. Repeat this procedure to install additional transceivers.

## Specifying Ports in the Command Line Interface for Stand-alone Switches

The individual ports on the switches of the stack are specified in the command line interface with the PORT parameter. The format of the parameter is shown in Figure 77.

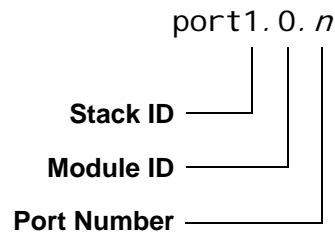


Figure 77. PORT Parameter in the Command Line Interface

The three parts of the PORT parameter are described in Table 19.

Table 19. PORT Parameter Format

Number	Description
Stack ID	Designates the switch's ID number. You must always enter 1 for this value for a stand-alone switch. Do not enter 0 for the stack ID of a stand-alone switch even though that is the value on the Switch ID LED.
Module ID	Designates the module number of a port. The possible values are listed here:  - Enter 0 for the module ID to designate a port on the front panel of the switch.  - Enter 1 to designate a port on the optional AT-x9EM/XT4 Card.
Port Number	Designates a port number.

Here is an example of the PORT parameter on a stand-alone switch. It uses the INTERFACE command to enter the Port Interface mode for ports 15 and 17 on the front panel of the switch:

```
awpl us> enable
awpl us# configure terminal
awpl us(config)# interface port1.0.15, port1.0.17
```

This example enters the Port Interface mode for ports 1 and 2 on the optional AT-x9EM/XT4 Card:

```
awpl us> enable
awpl us# configure terminal
awpl us(config)# interface port1.1.1-port1.1.2
```

For instructions on the command line interface and the PORT parameter, refer to the *Software Reference for x930 Series Switches, AlliedWare Plus Operating System*.

## Chapter 12

# Troubleshooting

---

This chapter contains suggestions on how to troubleshoot the switch if a problem occurs.

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**Note**

For further assistance, please contact Allied Telesis Technical Support at [www.alliedtelesis.com/support](http://www.alliedtelesis.com/support).

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

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

- ☐ Verify that the power cord is securely connected to the power source and to 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.

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

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

**Problem 3:** A twisted pair port on the switch is connected to a network device but the port's LINK/ACT LED is off.

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

- ☐ Verify that the port is connected to the correct twisted pair cable. This is to eliminate the possibility that the port is connected to the wrong network device.
- ☐ 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. The cable types are listed in Table 2 on page 30 for the 10/100/1000Base-T ports.
- ❑ Verify that the companion SFP slot of the twisted pair port is empty. This applies only to the AT-x930-28GSTX Switch. For example, if twisted pair port 2R is connected to an active network device but cannot establish a connection to it, verify that SFP slot 2 is empty. For more information, refer to “SFP Slots” on page 37.

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**Note**

A 1000Base connection may require five to ten seconds to establish a link.

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**Problem 4:** The LINK/ACT LED for an SFP or SFP+ 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 SFP or SFP+ module and to the port on the remote network device.
- ❑ Check that the transceiver is fully inserted in the slot.
- ❑ If you are using SFP+ slots 27 or 28 on the 28-port switches or slots 51 and 52 on the 52-port switches, check that VCStack is disabled on the switch. The VCStack feature has to be disabled before you can use these slots for regular SFP or SFP+ transceivers. For instructions, refer to Chapter 10, “Configuring the Switch for Stand-alone Operation” on page 125.
- ❑ 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. This is to eliminate the possibility that the port is connected to the wrong remote network device.
- ❑ 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:** Network performance between a twisted pair port on the switch and a network device is slow.

**Solution:** There might be a duplex mode mismatch between the port and the network device. This can occur when a twisted pair port using Auto-Negotiation is connected to a remote device that has a fixed speed of 10 or 100 Mbps and a fixed duplex mode of full duplex. If this is the cause of the problem, adjust the duplex mode of the port on the network device or switch so that both ports are using the same duplex mode. You can use either the LEDs or management software on the switch to determine the duplex mode settings of the ports. The LEDs are described in Table 10 on page 43.

**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 in danger of 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 internal temperature of the switch has exceeded the normal operating range and the switch may shut down.

Contact your Allied Telesis sales representative for assistance.

**Problem 8:** A port on the AT-x930-28GPX or AT-x930-52GPX Switch is not providing power to a PoE device.

**Solutions:** Try the following:

- ❑ Review the PD's documentation to confirm that the device 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-x930-28GPX and AT-x930-52GPX Switches do 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 switches.
- ❑ 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 Table 4 on page 32.
- ❑ 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 9:** One or more ports on the optional AT-x9EM/XT Card cannot establish connections to network devices or do not forward traffic.

**Solutions:** Try the following:

- ❑ Verify that the switch has version 5.4.5-2 or later of the x930 operating system. Earlier versions of the management software do not support the card. For instructions, refer to "Verifying Support for Hardware Options" on page 132.
- ❑ Check that the cables do not exceed 100 m (328 ft).
- ❑ Verify that you are using UTP or STP Cat. 5e for 1Gbps links and UTP or STP Cat. 6e cable for 10Gbps links.
- ❑ Verify that the port is connected to the correct twisted pair cable. This is to eliminate the possibility that the port is connected to the wrong network device.
- ❑ Verify that the network device connected to the port is powered on and is operating properly.
- ❑ Try connecting another network device to the port with a different cable. If the 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).



## Appendix A

# Technical Specifications

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This appendix contains the following sections:

- ❑ "Physical Specifications" on page 150
- ❑ "Environmental Specifications" on page 152
- ❑ "Power Specifications" on page 153
- ❑ "Certifications" on page 155
- ❑ "RJ-45 Twisted Pair Port Pinouts" on page 156
- ❑ "RJ-45 Style Serial Console Port Pinouts" on page 158

## Physical Specifications

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### Dimensions (H x W x D)

Table 20 lists the dimensions of the switches and power supplies.

Table 20. Product Dimensions

AT-x930-28GTX	4.4 cm x 44.0 cm x 42.0 cm (1.7 in. x 17.3 in. x 16.5 in.)
AT-x930-28GPX	4.4 cm x 44.0 cm x 42.0 cm (1.7 in. x 17.3 in. x 16.5 in.)
AT-x930-28GSTX	4.4 cm x 44.0 cm x 42.0 cm (1.7 in. x 17.3 in. x 16.5 in.)
AT-x930-52GTX	4.4 cm x 44.0 cm x 42.0 cm (1.7 in. x 17.3 in. x 16.5 in.)
AT-x930-52GPX	4.4 cm x 44.0 cm x 42.0 cm (1.7 in. x 17.3 in. x 16.5 in.)
AT-PWR150	4.2 cm x 14.8 cm x 25.2 cm (1.7 in. x 5.8 in. x 9.8 in.)
AT-PWR250	4.2 cm x 14.8 cm x 25.2 cm (1.7 in. x 5.8 in. x 9.8 in.)
AT-PWR250-80	4.2 cm x 14.8 cm x 25.2 cm (1.7 in. x 5.8 in. x 9.8 in.)
AT-PWR800	4.2 cm x 14.8 cm x 25.2 cm (1.7 in. x 5.8 in. x 9.8 in.)
AT-PWR1200	4.2 cm x 14.8 cm x 30.7 cm (1.7 in. x 5.8 in. x 12.1 in.)

### Weights

Table 21 lists the weights of the switches and power supplies.

Table 21. Product Weights

AT-x930-28GTX	5.1 kg (11.2 lb.)
AT-x930-28GPX	5.1 kg (11.2 lb.)
AT-x930-28GSTX	5.1 kg (11.2 lb.)
AT-x930-52GTX	5.1 kg (11.2 lb.)

Table 21. Product Weights (Continued)

AT-x930-52GPX	5.2 kg (11.5 lb.)
AT-PWR150	1.3 kg (2.8 lb.)
AT-PWR250	1.5 kg (3.3 lb.)
AT-PWR250-80	1.5 kg (3.3 lb.)
AT-PWR800	1.8 kg (4.0 lb.)
AT-PWR1200	2.2 kg (4.9 lb.)

The weights of the switches do not include the power supplies.

### Ventilation

Table 22 lists the ventilation requirements.

Table 22. Ventilation Requirements

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

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Table 23 lists the environmental specifications of the switches.

Table 23. 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

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

### Maximum Power Consumption

Table 24, Table 25, and Table 26 list the maximum power consumptions of the switches with the different power supplies.

Table 24. Maximum Power Consumption with the AT-PWR150, AT-PWR250 or AT-PWR250-80 Power Supply

AT-x930-28GTX	83.6 watts
AT-x930-28GPX	83.8 watts
AT-x930-28GSTX	96.5 watts
AT-x930-52GTX	94.6 watts
AT-x930-52GPX	96.8 watts

Table 25. Maximum Power Consumption with the AT-PWR800 Power Supply

AT-x930-28GTX	83.8 watts
AT-x930-28GPX	564.2 watts
AT-x930-28GSTX	96.6 watts
AT-x930-52GTX	96.6 watts
AT-x930-52GPX	577.0 watts

Table 26. Maximum Power Consumption with the AT-PWR1200 Power Supply

AT-x930-28GTX	86.8 watts
AT-x930-28GPX	808.4 watts
AT-x930-28GSTX	97.9 watts
AT-x930-52GTX	98.5 watts
AT-x930-52GPX	880.0 watts

## Input Voltages

Table 27 lists the input voltages for the five power supplies.

Table 27. Input Voltages

AT-PWR150	100-240 VAC~, 2.0A maximum, 50/60 Hz
AT-PWR250	100-240 VAC~, 5.0A maximum, 50/60 Hz
AT-PWR250-80	40-60 VDC, 6.0A maximum
AT-PWR800	100-240 VAC~, 10.0A maximum, 50/60 Hz
AT-PWR1200	100-240 VAC~, 15.0-7A maximum, 50/60 Hz

## Certifications

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Table 28 lists the product certificates.

Table 28. Product Certifications

EMI (Emissions)	FCC Class A, EN55022 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 (CUL <sub>US</sub> ), EN60825
Compliance Marks	CE, CUL <sub>US</sub> , TUV, C-Tick

# RJ-45 Twisted Pair Port Pinouts

Figure 78 illustrates the pin layout of the RJ-45 connectors and ports on the front panel of the switch.

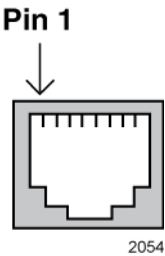


Figure 78. RJ-45 Socket Pin Layout (Front View)

Table 29 lists the pin signals for 10 and 100 Mbps.

Table 29. Pin Signals for 10 and 100 Mbps

Pin	MDI Signal	MDI-X Signal
1	TX+	RX+
2	TX-	RX-
3	RX+	TX+
4	Not used	Not used
5	Not used	Not used
6	RX-	TX-
7	Not used	Not used
8	Not used	Not used

Table 30 lists the pin signals when a port operating at 1000 Mbps.

Table 30. Pin Signals for 1000 Mbps

Pinout	Pair
1	Pair 1 +
2	Pair 1 -
3	Pair 2 +

Table 30. Pin Signals for 1000 Mbps (Continued)

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

## RJ-45 Style Serial Console Port Pinouts

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Table 31 lists the pin signals of the RJ-45 style serial Console port.

Table 31. 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.