

# SwitchBlade x8112

Layer 3+ Chassis Switch

## AT-SBx81CFC960

Versions 1 and 2 Controller Fabric Cards with AlliedWare Plus

(Release 5.4.9 or later)

### Ethernet Line Cards with Twisted Pair Ports

AT-SBx81GT24

AT-SBx81GT40

AT-SBx81GP24

### AT-SBx81XLEM Expansion Modules

AT-SBx81XLEM/GT8

AT-SBx81XLEM/XS8

AT-SBx81XLEM/Q2

AT-SBx81XLEM/XT4

### Ethernet Line Cards with SFP or SFP+ Ports

AT-SBx81GS24a

AT-SBx81XS6

AT-SBx81XS16

AT-SBx81XLEM

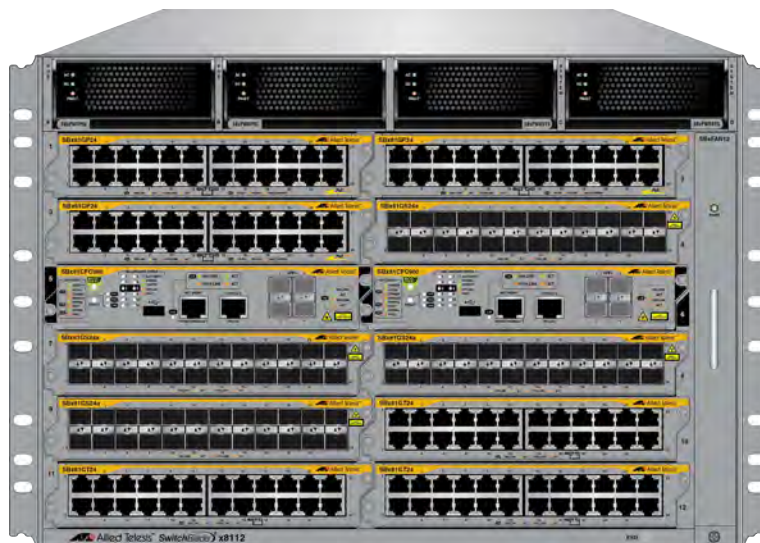
### Power Supplies

AT-SBxPWRSYS1 AC

AT-SBxPWRSYS2 AC

AT-SBxPWRPOE1 AC for PoE

AT-SBxPWRSYS1 DC



# Installation Guide

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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.

## European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment

This Allied Telesis RoHS-compliant product conforms to the European Union Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment. Allied Telesis ensures RoHS conformance by requiring supplier Declarations of Conformity, monitoring incoming materials, and maintaining manufacturing process controls.

EMI/RFI Emissions: FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A

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

Immunity: EN55024

Electrical Safety: EN60950-1 (TUV), UL 60950-1 (cUL<sub>US</sub>), EN60825

Safety Agency Approvals: cUL<sub>US</sub>, TUV, C-TICK, CE



Laser Safety

EN60825



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# Preface

---

This guide contains the hardware installation instructions for the Layer 3+ SwitchBlade x8112 Chassis Switch. The preface contains the following sections:

- ❑ “Structure of the Installation Guide” on page 16
- ❑ “Safety Symbols Used in this Document” on page 17
- ❑ “Translated Safety Statements” on page 18

---

**Note**

This version of the installation guide applies to release 5.4.9 and later of the AlliedWare Plus™ Operating System for the SwitchBlade x8112 Chassis Switch and AT-SBx81CFC960 Controller Fabric Card.

---

## Structure of the Installation Guide

---

This guide has the following three sections:

❑ **Section I: Hardware Overview**

The chapters in this section describe the hardware components of the product, including the Ethernet line cards, AT-SBx81CFC960 Controller Fabric Card, and power supplies. You should start here if you are unfamiliar with the switch.

❑ **Section II: Installing the Chassis**

The chapters in this section contain the hardware installation instructions for the device. They explain how to select a site, assemble the hardware components, cable the ports, power on the unit, and confirm the hardware operations of the various components. After completing the instructions in this section, you may either begin to configure the operating parameters and features of the chassis with the commands in the command line interface of the AlliedWare Plus™ operating systems, as described in the Software Reference for SwitchBlade x8100 Series Switches, or proceed to Section III to build a stack of two chassis with the VCStack Plus™ feature.

❑ **Section III: Building a Stack with the VCStack Plus Feature**

The chapters in this section describe the VCStack Plus feature and the additional hardware and software components required to build a stack. The section also contains step-by-step instructions on how to configure the AlliedWare Plus operating systems on the switches for the stacking feature. You should perform these instructions after you have installed the two chassis of the stack at their respective sites and confirmed their operations with the instructions in the chapters in Section II of this guide. You might want to review the information in Chapter 15, “VCStack Plus Overview” on page 315 prior to installing the chassis to acquaint yourself with the feature and guidelines.



## Safety Symbols Used in this Document

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This document uses the following conventions.

---

**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.

---



---

**Warning**

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

---



---

**Warning**

Laser warnings inform you that an eye or skin hazard exists due to the presence of a Class 1 laser device.

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## Translated Safety Statements


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**Important:** The  indicates that translations of the safety statement are available in the PDF document **Translated Safety Statements** posted on the Allied Telesis website at [alliedtelesis.com/library/search](http://alliedtelesis.com/library/search).


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**Importante:**  indica che le traduzioni della dichiarazione di sicurezza sono disponibili nelle **Translated Safety Statements** in PDF pubblicate sul sito Web di Allied Telesis all'indirizzo [alliedtelesis.com/us/en/library/search](http://alliedtelesis.com/us/en/library/search).

☐ Översatta säkerhetsförklaringar

**Viktig:**  anger att översättningar av säkerhetsförklaringen finns tillgängliga i PDF-dokumentet **Translated Safety Statements** som publicerats på Allied Telesis webbplats på [alliedtelesis.com/us/en/library/search](http://alliedtelesis.com/us/en/library/search).

## Section I

# Hardware Overview

---

This section contains the following chapters:

- ❑ Chapter 1, “Chassis and Power Supplies” on page 21
- ❑ Chapter 2, “Ethernet Line Cards” on page 37
- ❑ Chapter 3, “AT-SBx81CFC960 Controller Fabric Cards” on page 73



## Chapter 1

# Chassis and Power Supplies

---

This chapter describes the Layer 3+ SwitchBlade x8112 Chassis Switch in the following sections:

- ❑ “AT-SBx8112 Chassis” on page 22
- ❑ “Slots for the Ethernet Line and Controller Cards” on page 25
- ❑ “Power Supplies and Power Supply Slots” on page 27
- ❑ “AT-SBxFAN12 Module” on page 32
- ❑ “Power Supply Interfaces (Opto-couplers)” on page 34

---

### **Note**

This version of the installation guide applies to release 5.4.9-0 and later of the AlliedWare Plus™ Operating System for the SwitchBlade x8112 Chassis Switch and AT-SBx81CFC960 Controller Fabric Card.

---

## AT-SBx8112 Chassis

---

The SwitchBlade x8112 product is a modular Layer 3+ Ethernet switch. The main components are the AT-SBx8112 Chassis, Ethernet line cards, a controller card, system power supply, Power over Ethernet Plus (PoE+) power supply, and fan module.

The AT-SBx8112 Chassis is shown in Figure 1.

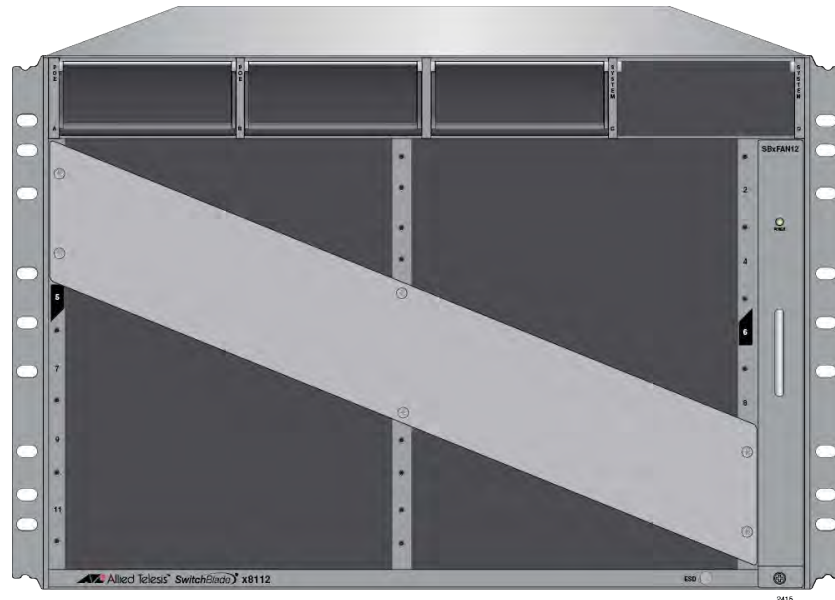


Figure 1. AT-SBx8112 Chassis

The chassis has slots for the following components:

- ☐ Ten Ethernet line cards
- ☐ Two AT-SBx81CFC960 Controller Fabric Cards
- ☐ Two AC or DC system power supplies
- ☐ Two Power over Ethernet Plus (PoE+) power supplies
- ☐ One AT-SBxFAN12 Fan Module

The chassis components are identified in Figure 2 on page 23 and Figure 3 on page 24.

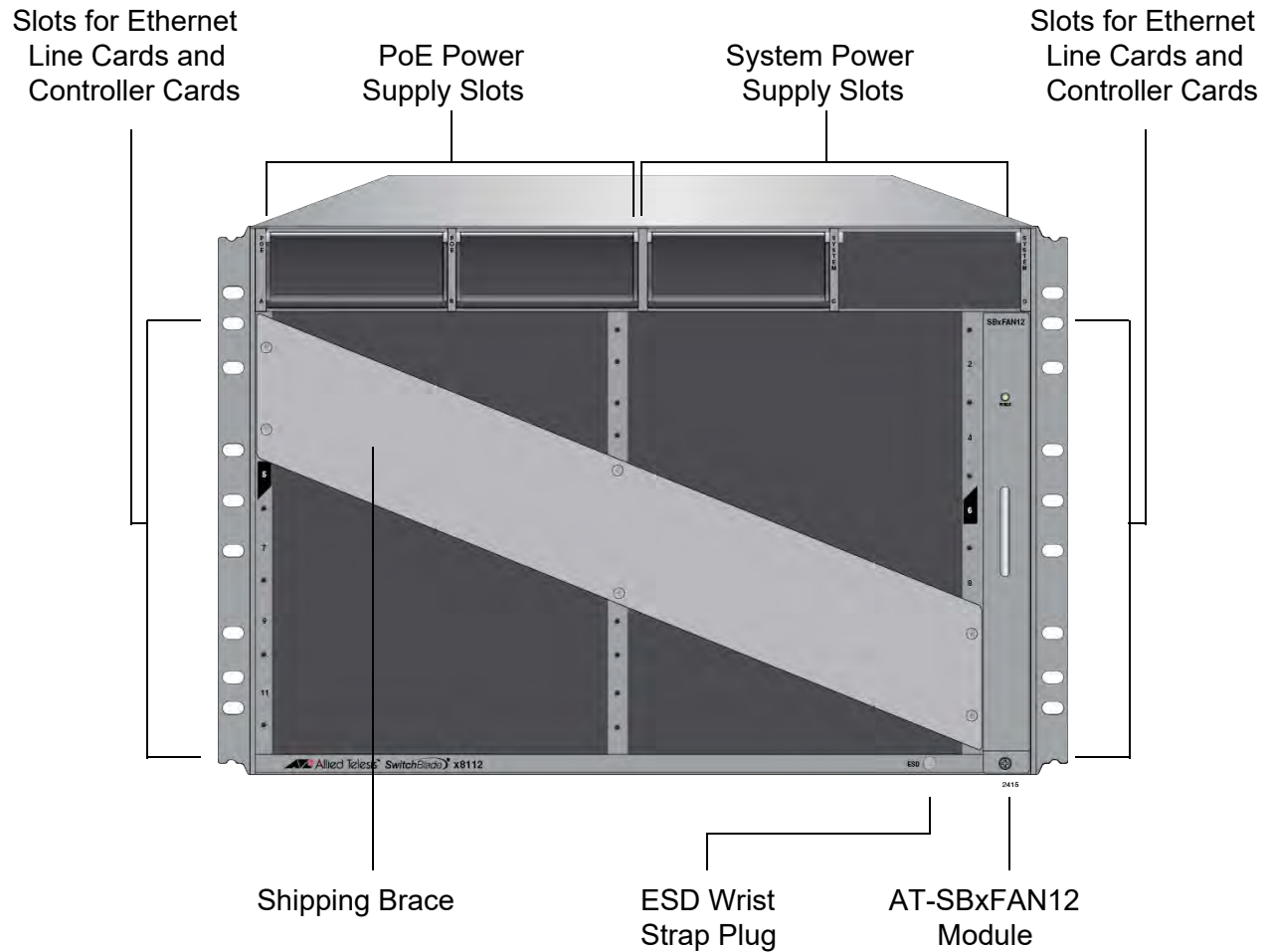


Figure 2. Front View of the AT-SBx8112 Chassis

**Note**

Do not remove the shipping brace from the front of the chassis until the unit is installed in the equipment rack. You might bend the chassis and cause misalignment of the slots and card guides if you lift the chassis into the equipment rack without the shipping brace.

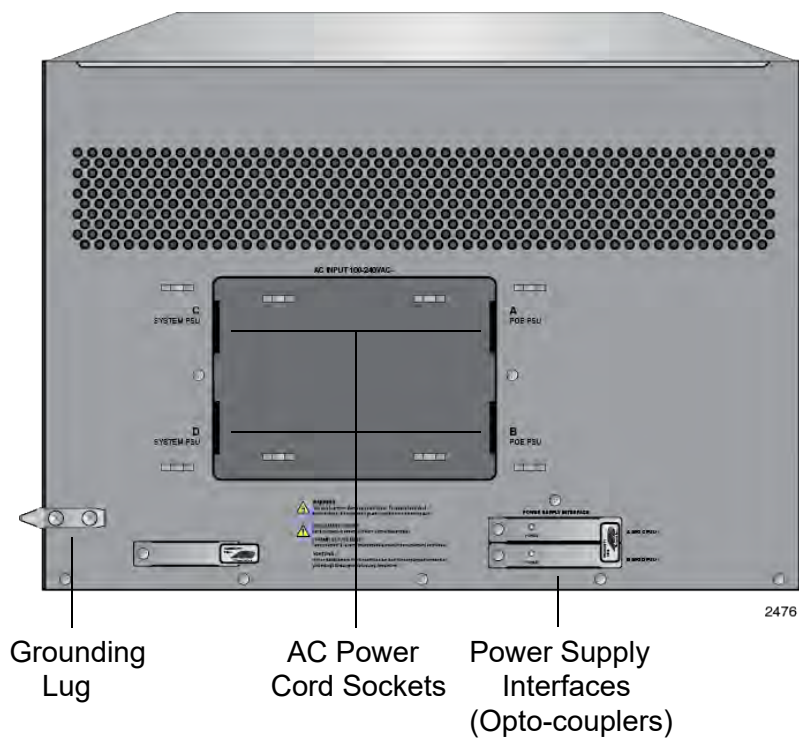


Figure 3. Rear View of the AT-SBx8112 Chassis

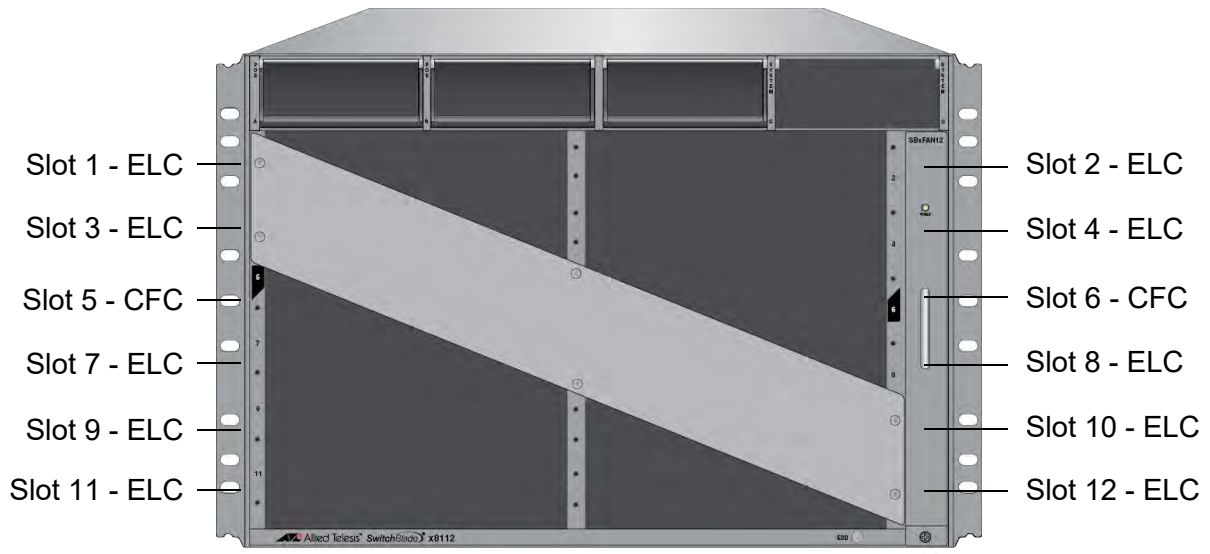
Figure 4 is an example of a fully populated chassis.

Figure 4. AT-SBx8112 Chassis with Line Cards, Controller Cards, and Power Supplies



## Slots for the Ethernet Line and Controller Cards

The chassis has slots for ten Ethernet line cards and two AT-SBx81CFC960 Controller Cards. The slot definitions are predefined and cannot be changed. Figure 5 identifies the slots.



ELC - Ethernet Line Card slot  
CFC - Controller Fabric Card slot

Figure 5. Ethernet Line and Controller Cards Slots

Slots 1 to 4 and 7 to 12 in the AT-SBx8112 Chassis are for the Ethernet line cards. Each slot can accommodate one line card. The cards may be installed in any order or variety in the slots. There are two exceptions:

- ❑ The AT-SBx81XS16 Line Card is supported in slots 1 to 4, 8 and 10, but not slots 7, 9, 11 and 12.
- ❑ In AlliedWare Plus v5.4.6, the AT-SBx81XLEM Line Card is supported in slots 1 to 4, 8, and 10, but not slots 7, 9, 11, and 12. In AlliedWare Plus v5.4.6.1-1 or later, the line card is supported in all ten line card slots.

For more information on the Ethernet cards, refer to Chapter 2, “Ethernet Line Cards” on page 37

Slots 5 and 6 are for AT-SBx81CFC960 Controller Fabric Cards. Each slot can accommodate one controller card. The chassis must have at least one controller card. Installing a second controller card in the chassis provides these benefits:

- ❑ Management redundancy
- ❑ Four additional SFP+ slots
- ❑ Increased traffic bandwidth

For more information on the controller card, refer to Chapter 3, “AT-SBx81CFC960 Controller Fabric Cards” on page 73.

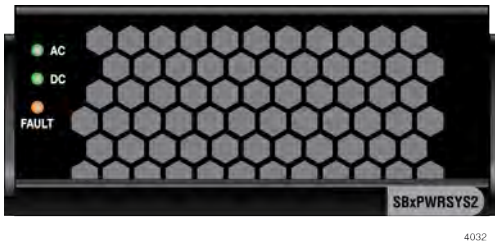
## Power Supplies and Power Supply Slots

There are four available power supplies for the chassis. They are shown in Figure 6.



2342

AT-SBxPWRSYS1 AC Power Supply for the Ethernet line cards, controller card, and fan module.



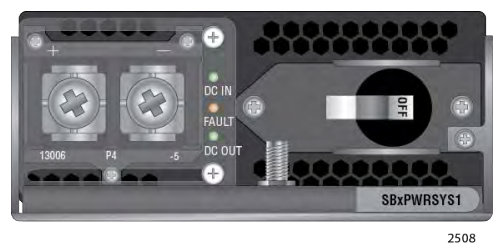
4032

AT-SBxPWRSYS2 AC Power Supply for the Ethernet line cards, controller card, and fan module.



2344

AT-SBxPWRPOE1 AC Power Supply with 1200 W PoE budget for the ports on the AT-SBx81GP24 PoE Ethernet Line Card.



2508

AT-SBxPWRSYS1 DC Power Supply for the Ethernet line cards, controller card, and fan module.

Figure 6. Power Supply Units

### Note

Allied Telesis is discontinuing the AT-SBxPWRSYS1 AC Power Supply and replacing it with the AT-SBxPWRSYS2 AC Power Supply.

The power supplies are installed in the four slots across the top of the front of the chassis. The slots are labeled A to D. Refer to Figure 7.

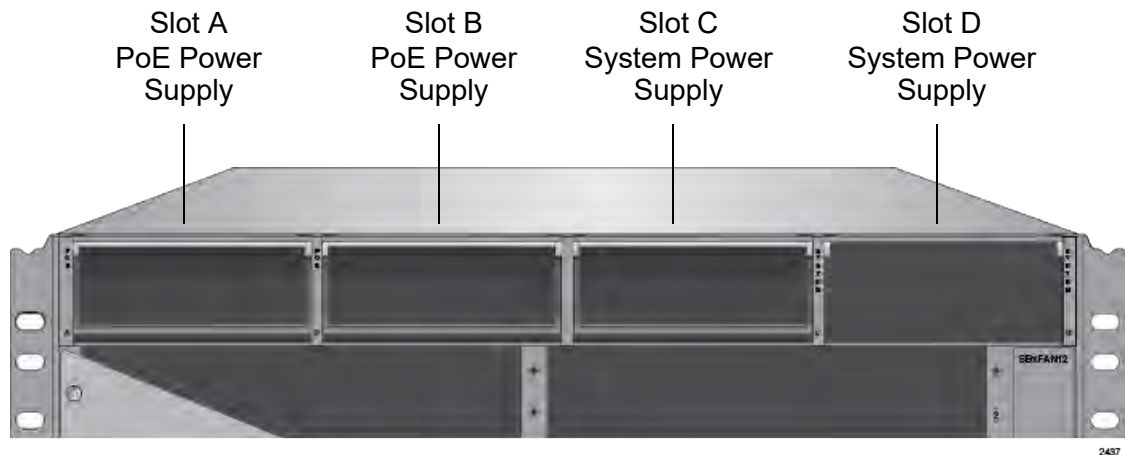


Figure 7. Power Supply Slots

Slots C and D are for system power supplies. The three system power supplies are listed here:

- ❑ AT-SBxPWRSYS1 AC Power Supply
- ❑ AT-SBxPWRSYS2 AC Power Supply
- ❑ AT-SBxPWRSYS1 DC Power Supply

System power supplies provide power for all the hardware components of the chassis, except for the PoE feature on the ports of the AT-SBx81GP24 PoE Line Card. Please review the following items concerning the system power supplies:

- ❑ The chassis must have at least one system power supply.
- ❑ A single power supply can power a fully populated chassis.
- ❑ Installing a second system power supply adds power redundancy to the chassis.
- ❑ System power supplies are installed in slots C and D of the chassis.
- ❑ If you are installing only one system power supply, you may install it in either slot.
- ❑ The AT-SBxPWRSYS1 and AT-SBxPWRSYS2 AC System Power Supplies use the AC connectors on the back panel of the chassis and are intended for AC environments.
- ❑ The AT-SBxPWRSYS1 DC System Power Supply has DC power connectors on its front panel and is intended for DC environments.
- ❑ The system power supplies are hot swappable. You do not have to power off the unit to replace a power supply.

- ❑ The AT-SBxPWRSYS1 AC and AT-SBxPWRSYS2 AC System Power Supplies are compatible and can be used in the same chassis.
- ❑ The AT-SBxPWRSYS2 AC System Power Supply was added to the management software in release 5.4.5-1. It will work with earlier releases, but Allied Telesis recommends updating the software on controller cards with previous versions to the latest release to ensure full compatibility.

---

**Note**

The AT-SBxPWRSYS1 DC Power Supply is not compatible with the other system or PoE power supplies and should not be operated in the same chassis with other power supplies. You may, however, operate the chassis for a short period of time with AC and DC power supplies if you are converting it from one type of power supply to another, such as from AC to DC. This allows you to transition the chassis without having to power it off.

---

Slots A and B are for the AT-SBxPWRPOE1 AC Power Supply. The unit provides power to the PoE feature on the twisted pair ports on the AT-SBx81GP24 Line Card. For more information, refer to “Power over Ethernet on the Ports in the AT-SBx81GP24 Line Card” on page 70. Please review the following items concerning the PoE power supply:

- ❑ You may install either one or two power supplies in the chassis.
- ❑ PoE power supplies are installed in slots A and B of the chassis.
- ❑ If you are installing only one power supply, you may install it in either slot A or B.
- ❑ A single PoE power supply provide up to 1200 watts of power for PoE. Two PoE power supplies provide up to 2400 watts of power.
- ❑ The PoE power supply is hot swappable. You do not have to power off the chassis to install or replace it.
- ❑ The total number of powered devices the chassis can support on the ports on AT-SBx81GP24 Line Cards depends on the number of AT-SBxPWRPOE1 AC Power Supplies in the chassis and the power requirements of the devices. For instance, a chassis can support 40 ports of Class 4, PoE+ (IEEE 802.3at) powered devices with one power supply or 80 ports with two power supplies. For further information, refer to “Power over Ethernet on the Ports in the AT-SBx81GP24 Line Card” on page 70.

---

**Note**

Power supplies are not included with the chassis and must be purchased separately.

---

**LEDs** The LEDs on the AT-SBxPWRSYS1 and AT-SBxPWRSYS2 System Power Supplies are described in Table 1.

Table 1. LEDs on the AT-SBxPWRSYS1 and AT-SBxPWRSYS2 Power Supplies

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.
DC	Solid Green	The power supply is providing DC power that is within the normal operating range.
	Off	The power supply is not generating DC power or the power is outside the normal operating range.
Fault	Solid Amber	A power supply has detected a fault condition, such as an under-voltage, or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

The LEDs on the AT-SBxPWRSYS1 DC System Power Supply are described in Table 2.

Table 2. LEDs on the AT-SBxPWRSYS1 DC System Power Supply

LED	State	Description
DC IN	Solid Green	The power supply is receiving DC power that is within the normal operating range.
	Off	The power supply is not receiving power from the DC power source.
DC OUT	Solid Green	The DC power that the module is providing to the chassis components is within the normal operating range.
	Off	The power supply is not generating DC power or the power is outside the normal operating range.
Fault	Solid Amber	The power supply has detected a fault condition, such as an under-voltage, or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

The LEDs on the AT-SBxPWRPOE1 PoE Power Supply are described in Table 3.

Table 3. LEDs on the AT-SBxPWRPOE1 PoE Power Supply

LED	State	Description
AC	Solid Green	The power supply is receiving AC power that is within the normal operating range.
	Off	The power supply is not receiving power from the AC power source.
DC	Solid Green	The DC power provided by the power supply to the line cards over the backplane is within the normal operating range.
	Off	The power supply is not providing any DC power or the power is not within the normal operating range.
Fault	Solid Amber	The power supply has detected a fault condition, such as an under-voltage or over-temperature condition.
	Off	The power supply is operating normally or is powered off.

## AT-SBxFAN12 Module

---

The AT-SBxFAN12 Module, shown in Figure 8, is the cooling unit for the chassis. It is a field- replaceable assembly that is factory installed and shipped with the AT-SBx8112 Chassis.

The module is controlled by the AT-SBx81CFC960 Controller Fabric Card. The fan speeds are automatically adjusted according to the internal operating temperature of the switch. The fans are at their lowest speed when the ambient temperature coming into the fans is approximately 20° C. The fan speeds increase to provide additional cooling as the ambient temperature rises.



Figure 8. AT-SBxFAN12 Module

---

**Note**

Only an authorized service technician should replace the fan module.

---

### Fan Module Versions

There are two versions of the fan module. The model names are AT-SBxFAN12 and AT-SBxFAN12 v2. Refer to Figure 9 on page 33. The modules are functionally identical and interchangeable. Replacing the AT-SBxFAN12 Module with the AT-SBxFAN12 v2 Module does not require updating the AlliedWare Plus Operating System.





Figure 9. AT-SBxFAN12 and AT-SBxFAN12 v2 Fan Modules

**LED** The POWER LED on the AT-SBxFAN12 and AT-SBxFAN12 v2 Modules is described in Table 4.

Table 4. Power LED on the AT-SBxFAN12 and AT-SBxFAN12 v2 Modules

LED	State	Description
Power	Solid Green	The AT-SBxFAN12 Module is receiving power.
	OFF	The AT-SBxFAN12 Module is not receiving power or has failed.

# Power Supply Interfaces (Opto-couplers)

The chassis has two power supply interfaces, also referred to as opto-couplers, in the lower right corner on the rear panel. The interfaces, labeled Power Supply Interface, are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 10.

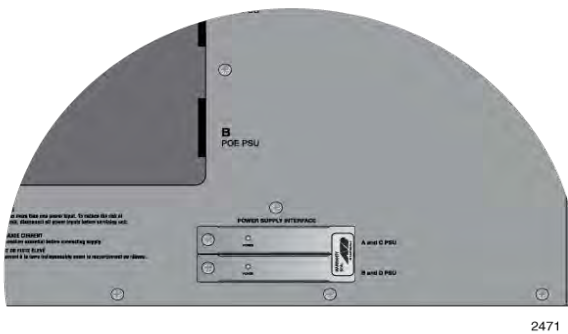



Figure 10. Power Supply Interfaces (Opto-couplers)

The controller card uses the top interface to communicate with the power supplies in slots A and C, and the bottom interface for the power supplies in slots B and D.

**Caution**

Power supply modules are hot swappable, but power supply interfaces are not hot swappable. Power supply interfaces should only be serviced by an authorized service technician.

**LED** Each interface has one LED, labeled Power. The LED is described in Table 5 on page 35.

Table 5. Power LED on the Power Supply Interface

LED	State	Description
Power	Solid Green	The interface is operating normally.
	Off	<p>Here are the possible conditions for this LED state:</p> <ul style="list-style-type: none"> <li>❑ The corresponding power supply slots of the interface are empty.</li> <li>❑ The power supplies in the power supply slots are powered off or have failed.</li> <li>❑ The power supplies are powered on and functioning normally, but a power supply interface has failed.</li> </ul>



## Chapter 2

# Ethernet Line Cards

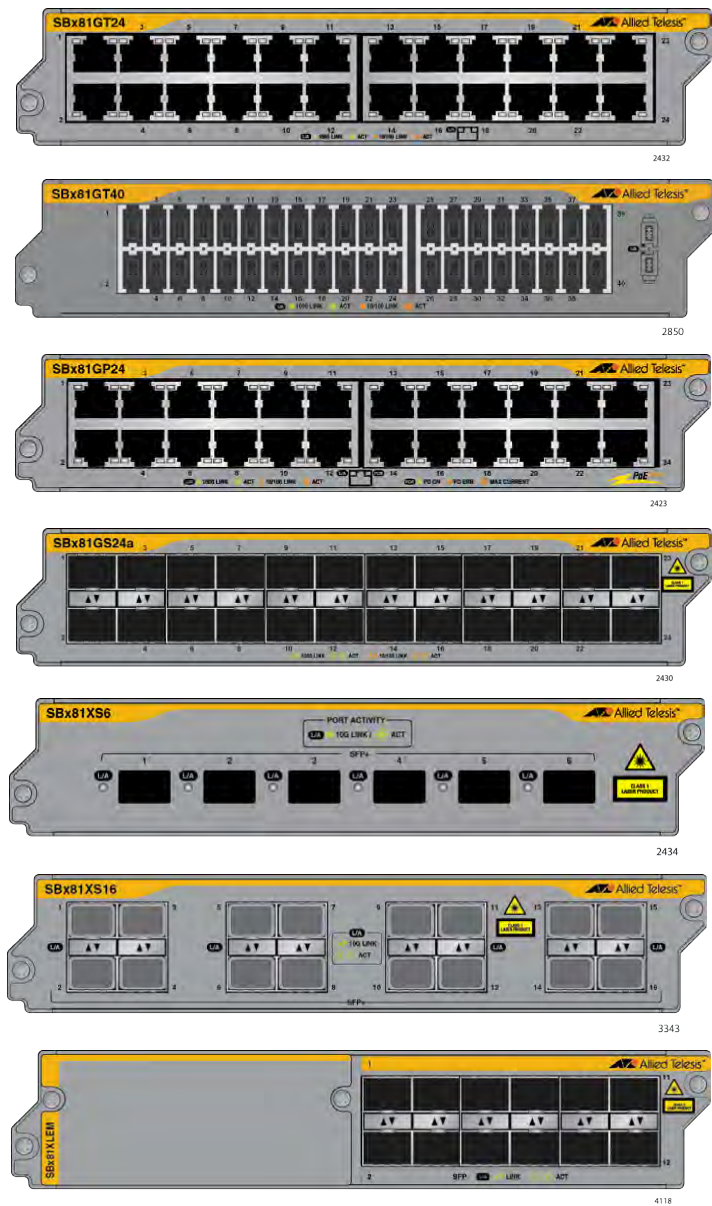
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This chapter describes the Ethernet line cards and expansion modules for the SwitchBlade x8112 Chassis Switch in the following sections:

- ❑ “Ethernet Line Cards” on page 38
- ❑ “AT-SBx81GT24 Line Card” on page 41
- ❑ “AT-SBx81GT40 Line Card” on page 43
- ❑ “AT-SBx81GP24 Versions 1 and 2 PoE Line Cards” on page 46
- ❑ “AT-SBx81GS24a SFP Line Card” on page 50
- ❑ “AT-SBx81XS6 SFP+ Line Card” on page 52
- ❑ “AT-SBx81XS16 SFP+ Line Card” on page 54
- ❑ “AT-SBx81XLEM SFP Line Card” on page 56
- ❑ “AT-SBx81XLEM/GT8 Expansion Module” on page 59
- ❑ “AT-SBx81XLEM/Q2 Expansion Module” on page 61
- ❑ “AT-SBx81XLEM/XS8 Expansion Module” on page 63
- ❑ “AT-SBx81XLEM/XT4 Expansion Module” on page 65
- ❑ “Twisted Pair Ports” on page 67
- ❑ “Power over Ethernet on the Ports in the AT-SBx81GP24 Line Card” on page 70

# Ethernet Line Cards

The Ethernet line cards are shown in Figure 11.



AT-SBx81GT24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports.

AT-SBx81GT40 Ethernet Line Card with 40 10/100/1000Base-T twisted pair ports, with RJ point 5 connectors.

AT-SBx81GP24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports, with PoE+.

AT-SBx81GS24a SFP Ethernet Card with 24 ports for 100 or 1000Mbps, fiber optic or twisted pair SFP transceivers.

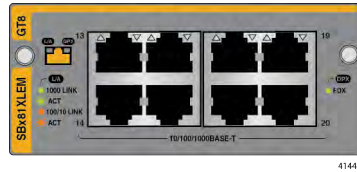
AT-SBx81XS6 SFP+ Ethernet Card with six ports for 10Gbps fiber optic SFP+ transceivers or Twinax direct connect cables.

AT-SBx81XS16 Ethernet Card with sixteen ports for 10Gbps SFP+ fiber optic transceivers or Twinax direct connect cables.

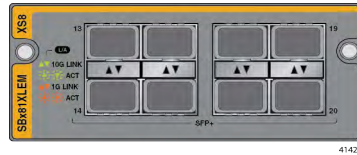
AT-SBx81XLEM SFP Ethernet Card with twelve ports for 1000Mbps, fiber optic or twisted pair SFP transceivers, and one expansion slot.

Figure 11. Ethernet Line Cards

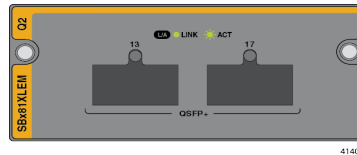
The expansion modules for the AT-SBx81XLEM Card are illustrated in Figure 12.



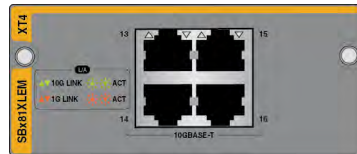
AT-SBx81XLEM/GT8 Module with eight 10/100/1000Base-T twisted pair ports.



AT-SBx81XLEM/XS8 Module with eight slots for 1Gbps SFP or 10Gbps SFP+ transceivers, or AT-SP10TW Direct Connect Cables.



AT-SBx81XLEM/Q2 Module with two slots for 40Gbps QSFP+ transceivers or AT-QSFPCU Direct Connect Cables.



AT-SBx81XLEM/XT4 Module with four 1Gbps or 10Gbps twisted pair ports.

Figure 12. Expansion Modules for the AT-SBx81XLEM Line Card

Table 6 lists the types of transceivers and cables supported by line cards and expansion modules with transceiver slots. For a list of transceivers, refer to the SwitchBlade x8112 data sheet on the Allied Telesis web site.

Table 6. Transceiver and Cable Support

Device	100Mbps SFP	1Gbps SFP	1Gbps CSFP BiDi	10Gbps <sup>1</sup>	40Gbps
AT-SBx81GS24a Line Card	Yes	Yes	No	No	No
AT-SBx81XS6 Line Card	No	No	No	Yes	No
AT-SBx81XS16 Line Card	No	No	No	Yes	No
AT-SBx81XLEM Line Card <sup>2</sup>	No	Yes	No	No	No
AT-SBx81XLEM/XS8 Expansion Module	No	Yes	No	Yes	No

Table 6. Transceiver and Cable Support (Continued)

<b>Device</b>	<b>100Mbps SFP</b>	<b>1Gbps SFP</b>	<b>1Gbps CSFP BiDi</b>	<b>10Gbps<sup>1</sup></b>	<b>40Gbps</b>
AT-SBx81XLEM/ Q2 Expansion Module	No	No	No	No	Yes <sup>3</sup>

1. The line cards support 10Gbps, fiber optic SFP+ transceivers or AT-SP10TW Twinax direct connect cables. The AT-SP10TW cables are available in lengths of 1, 3, and 7 meters.
2. Transceiver slots 1 to 12.
3. The AT-SBx81XLEM/Q2 Line Card supports 40Gbps AT-QSFP transceivers or AT-QSFPCU direct connect cables. The AT-QSFPCU cables are available in lengths of 1 and 3 meters.



## AT-SBx81GT24 Line Card

The AT-SBx81GT24 Line Card, shown in Figure 13, is a Gigabit Ethernet switch.



Figure 13. AT-SBx81GT24 Line Card

Here are the main features of the line card:

- ☐ 24 10/100/1000Base-T ports
- ☐ RJ-45 connectors
- ☐ 100 meters (328 feet) maximum operating distance per port
- ☐ Auto-Negotiation for speed and duplex mode
- ☐ Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- ☐ Port Link/Activity (L/A) LEDs
- ☐ 16K entry MAC address table
- ☐ 12 Mb buffer memory
- ☐ Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- ☐ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- ☐ Hot swappable

The cable requirements for the ports on the AT-SBx81GT24 Line Card are listed in “Cable Requirements” on page 68.

### Note

There are two releases of the AT-SBx81GT24 Line Card. The front panels on the cards are the same. The new card requires AlliedWare Plus version 5.5.0 or later. Allied Telesis recommends updating the operating software on the controller cards before installing AT-SBx81GT24 Line Cards in an operational chassis. This is to ensure that the operating system supports the card.

If you install the new card in a chassis that has a previous version of the AlliedWare Plus operating software, the controller card generates a log message. The message states that the new card is not compatible. The card remains inactive until you update the operating software.

**LEDs** The ports on the AT-SBx81GT24 Line Card have two LEDs. Only the left LED on each port is functional. The LEDs are shown in Figure 14 and described in Table 7.

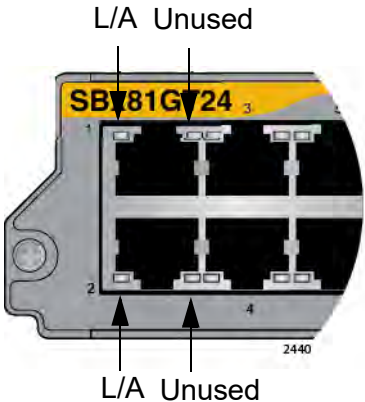


Figure 14. Port LEDs on the AT-SBx81GT24 Line Card

Table 7. Port LEDs on the AT-SBx81GT24 Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The 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.
Unused	-	-

## AT-SBx81GT40 Line Card

The AT-SBx81GT40 Line Card, shown in Figure 15, is a Gigabit Ethernet switch.

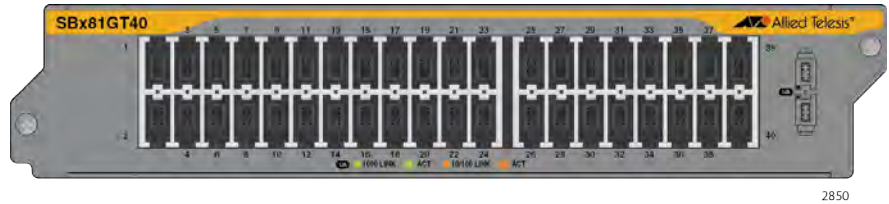


Figure 15. AT-SBx81GT40 Line Card

### Note

The AT-SBx81GT40 Line Card is no longer available for purchase.

Here are the main features of the line card:

- ❑ 40 10/100/1000Base-T ports
- ❑ RJ point 5 connectors
- ❑ 100 meters (328 feet) maximum operating distance per port
- ❑ Auto-Negotiation for speed
- ❑ Full-duplex mode only
- ❑ Automatic MDIX detection for ports operating at 10/100Base-TX. (Automatic MDIX detection does not apply to 1000Base-T operation.)
- ❑ Port Link/Activity (L/A) LEDs
- ❑ 32K entry MAC address table
- ❑ 32 Mb buffer memory
- ❑ Jumbo frame support:
  - 10240 bytes for tagged and untagged traffic between ports on the same line card
  - 10232 bytes for untagged traffic between ports on different line cards
  - 10236 bytes for tagged traffic between ports on different line cards
- ❑ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- ❑ Hot swappable

### Note

The ports on the line card do not support half-duplex operation.

The cable requirements for the ports on the AT-SBx81GT40 Line Card are listed in “Cable Requirements” on page 68.

**LEDs** The LEDs for a port on the AT-SBx81GT40 Line Card are found on the RJ point 5 cable connector. The LEDs are shown in Figure 16.

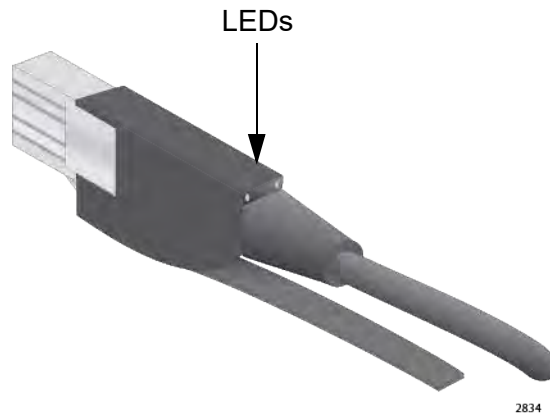


Figure 16. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

Only the left LED is active. Refer to Figure 17. It displays link and activity information about a port. The states of the LED are defined in Table 8 on page 45.

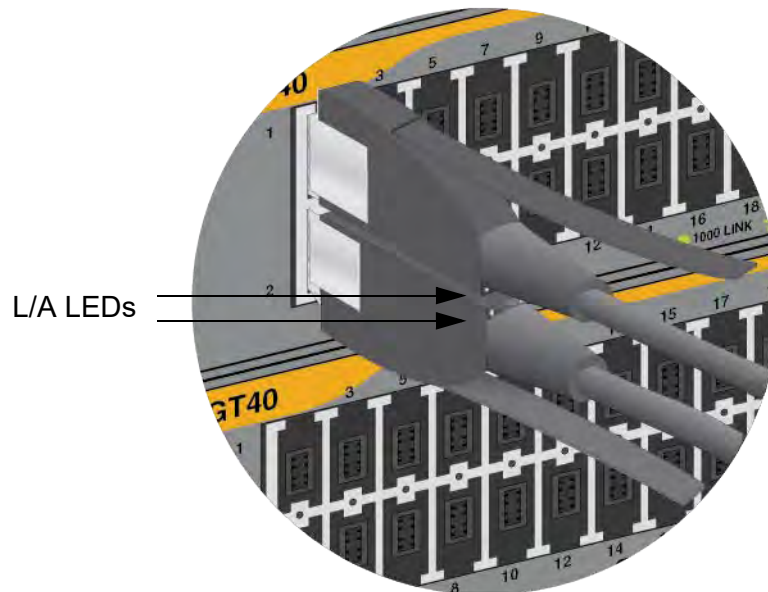


Figure 17. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

Table 8. Port LEDs on the AT-SBx81GT40 Line Card

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The 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.
Right LED	-	This LED is not used.

## AT-SBx81GP24 Versions 1 and 2 PoE Line Cards

The AT-SBx81GP24 PoE Line Cards, versions 1 and 2, are Gigabit Ethernet switches with Power over Ethernet Plus (PoE+) on all ports. Refer to Figure 18.



Figure 18. AT-SBx81GP24 PoE Line Cards

You can identify their version numbers by their names in the upper left corners on the front panels. Refer to Figure 19.

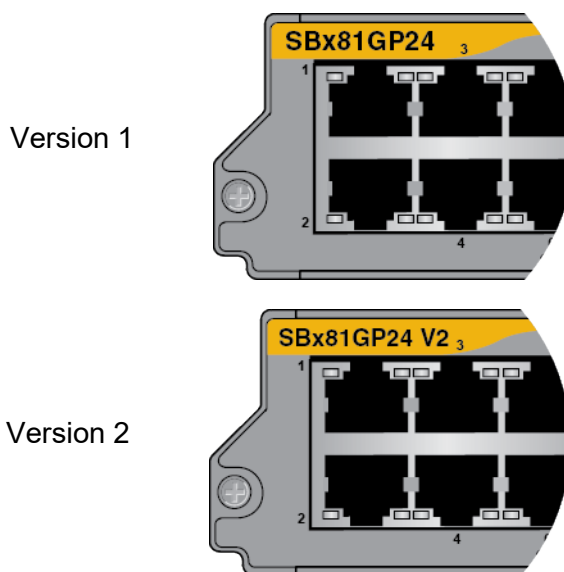


Figure 19. Identifying the AT-SBx81GP24 PoE Line Cards

The two cards are functionally identical.

### Note

Allied Telesis is discontinuing the AT-SBx81GP24 PoE Line Card and replacing it with the AT-SBx81GP24 v2 Card.

Here are the main features of the cards:

- ❑ 24 10/100/1000Base-T ports
- ❑ RJ-45 connectors
- ❑ 100 meters (328 feet) maximum operating distance per port
- ❑ Auto-Negotiation for speed and duplex mode
- ❑ Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- ❑ Port Link/Activity (L/A) and PoE+ LEDs
- ❑ 16K entry MAC address table
- ❑ 12 Mb buffer memory
- ❑ PoE+ on all ports
- ❑ Up to 30W per port for PoE+
- ❑ PoE device classes 0 to 4
- ❑ Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- ❑ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- ❑ Hot swappable

The cable requirements of the PoE ports are listed in “Cable Requirements” on page 68.

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**Note**

The AT-SBx81GP24 v2 Line Card requires AlliedWare Plus version 5.5.0 or later. Allied Telesis recommends updating the operating software on the controller cards to the most recent version before installing it in an operational chassis. This is to ensure that the operating system supports the card.

If you install the new card in a chassis that has a previous version of the AlliedWare Plus operating software, the controller card generates a log message. The message states that the new card is not compatible. The card remains inactive until you update the operating software.

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**LEDs** The ports on the AT-SBx81GP24 PoE Line Cards have two LEDs. The LEDs are shown in Figure 20 on page 48 and described in Table 9 on page 48.

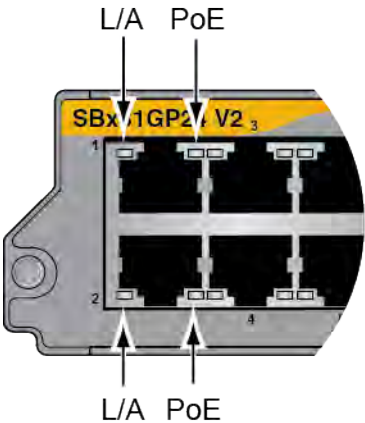


Figure 20. Port LEDs on the AT-SBx81GP24 Versions 1 and 2 PoE Line Cards

Table 9. Port LEDs on the AT-SBx81GP24 Versions 1 and 2 PoE Line Cards

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100 Mbps.
	Off	The 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.
PoE	Green	The switch is detecting a powered device (PD) on the port and is delivering power to it.
	Solid Amber	The switch has shutdown PoE+ on the port because of a fault condition.
	Flashing Amber	The switch is detecting a PD on the port but is not delivering power to it because the maximum power budget has been reached.



Table 9. Port LEDs on the AT-SBx81GP24 Versions 1 and 2 PoE Line Cards (Continued)

LED	State	Description
PoE	Off	<p>This LED state can result from the following conditions:</p> <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>

## AT-SBx81GS24a SFP Line Card

The AT-SBx81GS24a SFP Line Card, shown in Figure 21, is a Gigabit Ethernet switch.

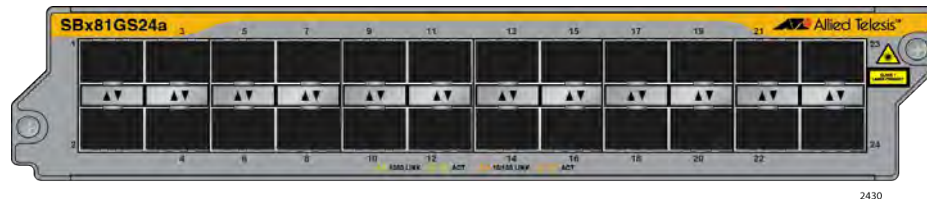


Figure 21. AT-SBx81GS24a SFP Line Card

Here are the main features of the line card:

- ❑ 24 slots for small form-factor pluggable (SFP) transceivers
- ❑ Supports 100Base-FX and 1000Base-SX/LX fiber optic transceivers
- ❑ Supports 100Base-BX and 1000Base-BX bidirectional (BiDi) fiber optic transceivers
- ❑ Supports 10/100/1000Base-T and 1000Base-T twisted pair transceivers
- ❑ Port Link/Activity (L/A) LEDs
- ❑ 32K entry MAC address table
- ❑ 24 Mb buffer memory
- ❑ Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- ❑ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards.
- ❑ Hot swappable

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

**LEDs** The SFP slots on the AT-SBx81GS24a SFP Line Card have one LED each, as shown in Figure 22 on page 51 and described in Table 10 on page 51.

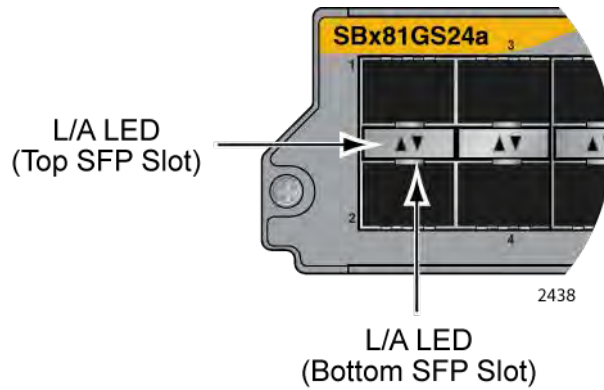


Figure 22. Port LEDs on the AT-SBx81GS24a SFP Line Card

Table 10. Port LEDs on the AT-SBx81GS24a SFP Line Card

LED State	Description
Solid Amber	The SFP transceiver in the slot has established a 10 or 100 Mbps link to a network device.
Blinking Amber	The SFP transceiver is transmitting and/or receiving data at 10 or 100 Mbps.
Solid Green	The SFP transceiver in the slot has established an 1000 Mbps link to a network device.
Blinking Green	The SFP transceiver is transmitting and/or receiving data at 1000 Mbps.
Off	The slot is empty or the SFP transceiver has not established a link to a network device.

## AT-SBx81XS6 SFP+ Line Card

The AT-SBx81XS6 Line Card, shown in Figure 23, is a 10Gbps Ethernet switch.

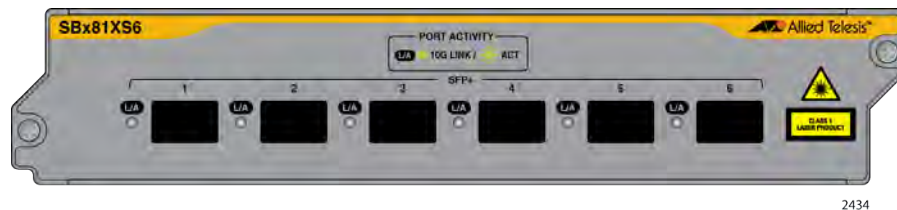


Figure 23. AT-SBx81XS6 Line Card

### Note

The AT-SBx81XS6 Line Card is no longer available for purchase.

Here are the main features of the line card:

- ❑ Six ports for 10Gbps SFP+ transceivers
- ❑ Supports 10GBase-SR/LR fiber optic transceivers
- ❑ Supports AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors
- ❑ Port Link/Activity (L/A) LEDs
- ❑ 32K entry MAC address table
- ❑ 24 Mb buffer memory
- ❑ Jumbo frame support:
  - 9710 bytes for ports operating at 10 or 100 Mbps.
  - 10240 bytes for ports operating at 1000 Mbps
- ❑ Hot swappable

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

**LEDs** The AT-SBx81XS6 Line Card has one LED for each SFP+ port. The LED is shown in Figure 24 on page 53 and described in Table 11 on page 53.

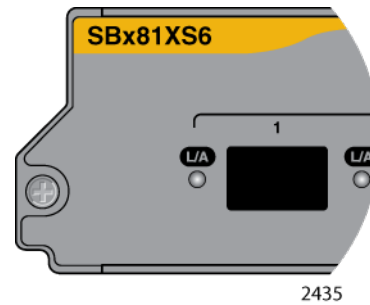


Figure 24. SFP+ Port LEDs on the AT-SBx81XS6 Line Card

Table 11. SFP+ Slot LEDs on the AT-SBx81XS6 Line Card

LED	State	Description
L/A	Solid Green	The transceiver has established a link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10 Gbps.
	Off	This LED state can result from the following conditions: <ul style="list-style-type: none"> <li><input type="checkbox"/> The port does not have a transceiver.</li> <li><input type="checkbox"/> The transceiver has not established a link with a network device.</li> <li><input type="checkbox"/> The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.</li> </ul>

## AT-SBx81XS16 SFP+ Line Card

The AT-SBx81XS16 Line Card, shown in Figure 25, is an Ethernet switch that supports 10Gbps SFP+ transceivers.

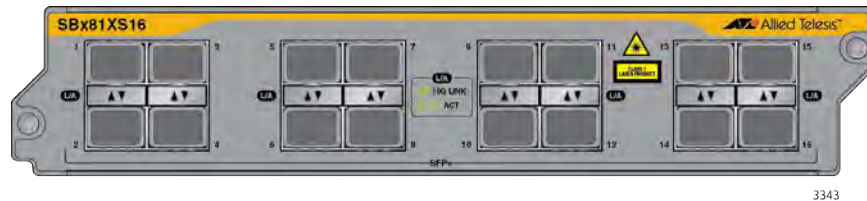


Figure 25. AT-SBx81XS16 Line Card

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### Note

The AT-SBx81XS16 Line Card is no longer available for purchase.

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Here are the main features of the line card:

- ❑ Sixteen ports for 10Gbps SFP+ transceivers
- ❑ Supports 10GBase-SR/LR fiber optic transceivers
- ❑ Supports AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors
- ❑ Port Link/Activity (L/A) LEDs
- ❑ 32K entry MAC address table
- ❑ 32 Mb buffer memory
- ❑ Jumbo frame support of up to 10240 bytes
- ❑ Hot swappable

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

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### Note

The AT-SBx81XS16 Line Card is supported in slots 1 to 4, 8, and 10 in the AT-SBx8112 Chassis. The card is not supported in slots 7, 9, 11, and 12.

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### Note

The line card is not supported by the AT-SBx81CFC400 Controller Fabric Card.

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**LEDs** The AT-SBx81XS16 Line Card has one LED for each SFP+ port. The LED is shown in Figure 26 and described in Table 12.

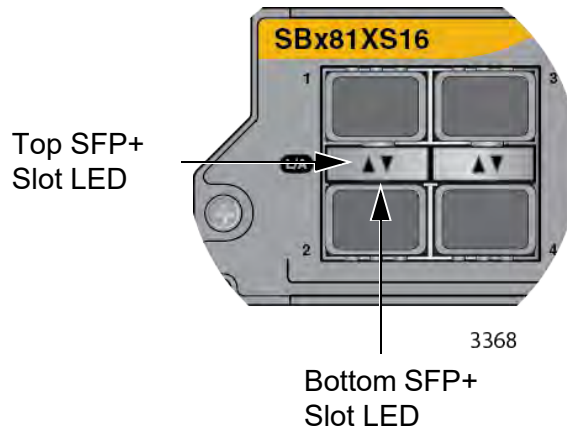


Figure 26. SFP+ Port LEDs on the AT-SBx81XS16 Line Card

Table 12. SFP+ Port LEDs on the AT-SBx81XS16 Line Card

LED	State	Description
L/A	Solid Green	The transceiver has established a 10 Gbps link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10 Gbps.
	Off	This LED state can result from the following conditions: <ul style="list-style-type: none"> <li>❑ The port does not have a transceiver.</li> <li>❑ The transceiver has not established a link with a network device.</li> <li>❑ The LEDs on the Ethernet line cards are turned off. To turn on the LEDs, use the eco-friendly button.</li> </ul>

## AT-SBx81XLEM SFP Line Card

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The AT-SBx81XLEM SFP Line Card, shown in Figure 21, is a Gigabit Ethernet switch with a slot for an expansion module.

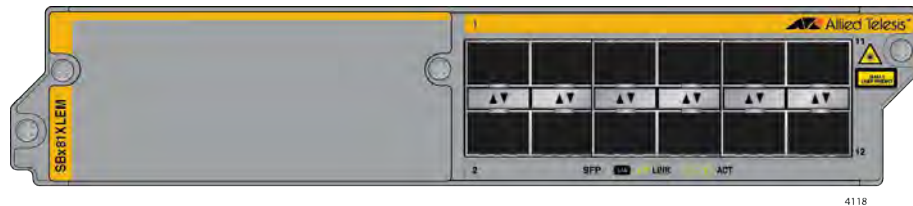


Figure 27. AT-SBx81XLEM SFP Line Card

Here are the main features of the line card:

- ☐ Twelve ports for small form-factor pluggable (SFP) transceivers
- ☐ Supports 1000Base-SX/LX fiber optic transceivers
- ☐ Supports 1000Base-BX bidirectional (BiDi) fiber optic transceivers
- ☐ Supports 1000Base-T twisted pair transceivers (full-duplex mode only)
- ☐ One slot for an expansion module
- ☐ Port Link/Activity (L/A) LEDs
- ☐ 128K entry MAC address table
- ☐ 32 Mb buffer memory
- ☐ Jumbo frame support up to 10240 bytes
- ☐ Hot swappable

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

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### Note

The AT-SBx81XLEM SFP Line Card is hot swappable. However, installing, removing, or replacing an expansion module requires removing the line card from the chassis.

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### Note

The twelve SFP ports do not support 10 or 100Mbps transceivers.

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Please review the following guidelines when selecting chassis slots for AT-SBx81XLEM Line Cards:

- ❑ For AlliedWare Plus v5.4.6-1.1 or later, the AT-SBx81XLEM Line Card is supported in all ten line card slots in the AT-SBx8112 Chassis. The bandwidth of the card differs depending on the slot. The card operates at its highest bandwidth in slots 1 to 4, 8, and 10, and at a lower bandwidth in slots 7, 9, 11, and 12.
- ❑ For earlier AlliedWare Plus v5.4.6, the line card is supported in slots 1 to 4, 8, and 10, but not slots 7, 9, 11, and 12.

## Large Address Table Modes

The AT-SBx81XLEM Line Card has two selectable, large address table modes. You can improve the performance of the card by selecting the mode that best represents the type of network traffic it will forward. The two modes are listed here:

- ❑ Large Layer 2 Switching and Layer 3 Routing mode - Optimizes AT-SBx81XLEM Line Cards for remote Layer 3 subnets.
- ❑ Large Layer 3 Host mode - Optimizes AT-SBx81XLEM Line Cards for local Layer 3 hosts.

Here are the guidelines for the large address table modes:

- ❑ The large table modes are supported only when the AT-SBx8112 Chassis has AT-SBx81XLEM Line Cards. The large table modes are not supported on any of the other SwitchBlade x8100 Ethernet line cards.
- ❑ You have to specify the silicon profile “profile3” for the chassis with the PLATFORM SILICON-PROFILE command in the AlliedWare Plus operating system.



### Caution

Profile3 is only compatible with AT-SBx81XLEM Line Cards. Do not activate the profile if the chassis contains other models of SwitchBlade x8100 Ethernet line cards.

- ❑ Only one large table mode can be active at a time in a chassis.
- ❑ The large table mode is set at the chassis level. All AT-SBx81XLEM Line Cards in the chassis use the same table mode setting.
- ❑ The SFP+ slots on the front panel of the AT-SBx81CFC960 Controller Fabric Card cannot be used for regular network traffic when silicon profile Profile3 is active. They must be unused or used for the trunk in a VCStack Plus. The AlliedWare Plus operating system disables the SFP+ slots for regular network traffic when you designate “profile3” as the silicon profile for the chassis.

- ❑ The large address table modes require AlliedWare Plus v5.4.6.1-1 or later.
- ❑ Using the large table modes is optional.
- ❑ The large table modes require the AT-SBx81CFC960 Controller Fabric Card. The AT-SBx81CFC400 Controller Fabric Card does not support the large table modes.

For descriptions of the large table modes and how to activate them, refer to “Command Reference: SwitchBlade x8100 Series Switches and AlliedWare Plus.”

**LEDs** Each SFP port on the AT-SBx81XLEM Line Card has one LED. The LED is shown in Figure 28 and described in Table 13.

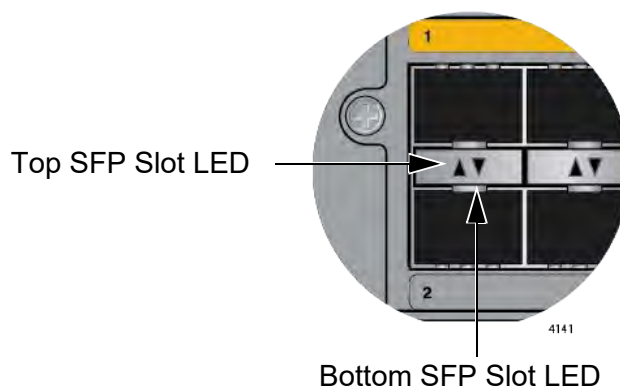


Figure 28. SFP Port LEDs on the AT-SBx81XLEM Line Card

Table 13. SFP Port LEDs on the AT-SBx81XLEM Line Card

LED State	Description
Solid Green	The SFP transceiver has established a 1000 Mbps link to a network device.
Blinking Green	The transceiver is transmitting and/or receiving data at 1000 Mbps.
Off	The slot is empty or the transceiver has not established a link to a network device.

## AT-SBx81XLEM/GT8 Expansion Module

The AT-SBx81XLEM/GT8 Module is an expansion module for the AT-SBx81XLEM Line Card. Refer to Figure 29.

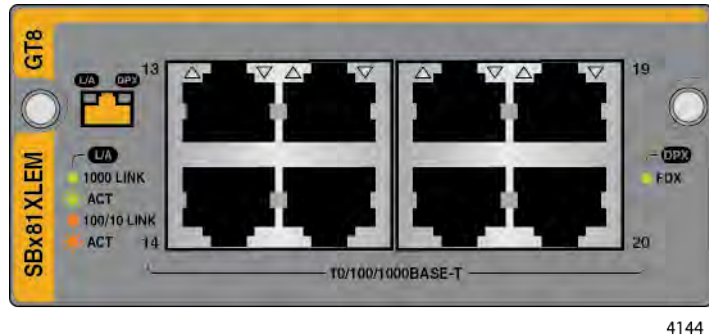


Figure 29. AT-SBx81XLEM/GT8Expansion Module

The main features of the module are listed here:

- ❑ Eight 10/100/1000Base-T ports
- ❑ RJ-45 connectors
- ❑ 100 meters (328 feet) maximum operating distance per port
- ❑ Auto-Negotiation for speed
- ❑ Automatic MDIX detection for ports operating at 10/100Base-TX, (Automatic MDIX detection does not apply to 1000Base-T operation.)
- ❑ Port Link/Activity (L/A) LEDs
- ❑ Jumbo frame support: of 10240 bytes for ports operating at 10, 100, or 1000 Mbps
- ❑ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards
- ❑ Full-duplex mode at 10, 100, or 1000 Mbps

### Note

The AT-SBx81XLEM/GT8 Expansion Module does not support half-duplex mode.

**LEDs** The ports on the AT-SBx81XLEM/GT8 Expansion Module have two LEDs. The LEDs are described in Table 14 on page 60.

Table 14. Port LEDs on the AT-SBx81XLEM/GT8 Module

LED	State	Description
L/A	Solid Green	The port has established an 1000 Mbps link to a network device.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	Solid Amber	The port has established a 10 or 100 Mbps link to a network device.
	Flashing Amber	The port is transmitting or receiving data at 10 or 100.
	Off	The 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	Solid Green	The port is operating in full duplex-mode.
	Off	The 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.

## AT-SBx81XLEM/Q2 Expansion Module

The AT-SBx81XLEM/Q2 Module, shown in Figure 30, is an expansion module for the AT-SBx81XLEM Line Card. It installs in the slot in the card.

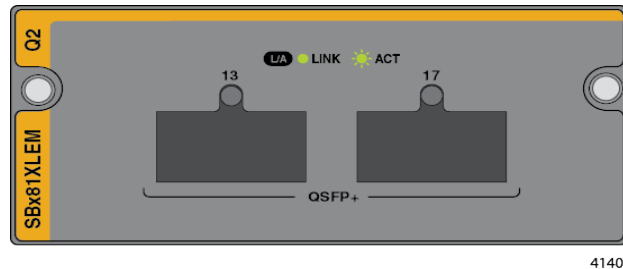


Figure 30. AT-SBx81XLEM/Q2 Expansion Module

The features of the module are listed here:

- ❑ Two slots for 40Gbps QSFP+ transceivers
- ❑ Supports AT-QSFPSR, AT-QSFPSR4, and AT-QSFPLR4 transceivers
- ❑ Supports AT-QSFP1CU and AT-QSFP3CU direct connect cables
- ❑ Port Link/Activity (L/A) LEDs
- ❑ Jumbo frame support up to 10240 bytes

### Note

The AT-SBx81XLEM/Q2 Module supports revision B of the AT-QSFPSR4 transceiver. It does not support revision A. The revision level of the transceiver is printed on the transceiver label, after the serial number. You can also display it with the `SHOW SYSTEM PLUGGABLE DETAIL` command in the AlliedWare Plus operating system.

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

**LED** Each slot has one LED. The states of the LED are described in Table 15.

Table 15. QSFP+ Slot LEDs for the AT-SBx81XLEM/Q2 Expansion Module

LED State	Description
Solid Green	The QSFP+ transceiver in the slot has established a 40 Gbps link to a network device.

Table 15. QSFP+ Slot LEDs for the AT-SBx81XLEM/Q2 Expansion Module (Continued)

LED State	Description
Blinking Green	The transceiver is transmitting and/or receiving data.
Off	The slot is empty or the transceiver has not established a link to a network device.

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**Note**

The AT-SBx81XLEM/Q2 Module does not support 40Gbps DAC auto-negotiation. Allied Telesis recommends disabling auto-negotiation on transceiver link partners to ensure proper operation.

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## AT-SBx81XLEM/XS8 Expansion Module

The AT-SBx81XLEM/XS8 Module is another expansion module for the AT-SBx81XLEM Line Card. Refer to Figure 31.

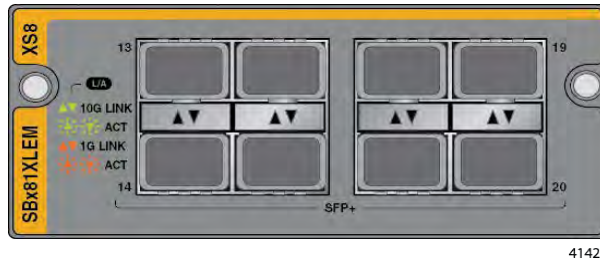


Figure 31. AT-SBx81XLEM/XS8 Expansion Module

The main features of the module are listed here:

- ❑ Eight slots for 1Gbps SFP or 10Gbps SFP+ transceivers
- ❑ Supports 10GBase-SR/LR fiber optic transceivers
- ❑ Supports AT-SP10TW direct connect twinax cables with SFP+ transceiver-style connectors
- ❑ Supports 1000Base-SX/LX fiber optic transceivers
- ❑ Supports 1000Base-BX bidirectional (BiDi) fiber optic transceivers
- ❑ Supports 1000Base-T twisted pair transceivers (full-duplex mode only)
- ❑ Port Link/Activity (L/A) LEDs
- ❑ Jumbo frame support up to 10240 bytes

For a list of supported transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

**LED** Each slot has one LED. The LED states are defined in Table 16.

Table 16. Slot LEDs on the AT-SBx81XLEM/XS8 Module

LED State	Description
Solid Amber	The SFP transceiver in the slot has established a 1Gbps link to a network device.
Blinking Amber	The transceiver is transmitting and/or receiving data at 1Gbps.
Solid Green	The transceiver in the slot has established a 10Gbps link to a network device.

Table 16. Slot LEDs on the AT-SBx81XLEM/XS8 Module (Continued)

LED State	Description
Blinking Green	The transceiver is transmitting and/or receiving data at 10Gbps.
Off	The slot is empty or the transceiver has not established a link to a network device.



## AT-SBx81XLEM/XT4 Expansion Module

The AT-SBx81XLEM/XT4 Module is an expansion module for the AT-SBx81XLEM Line Card. Refer to Figure 32.

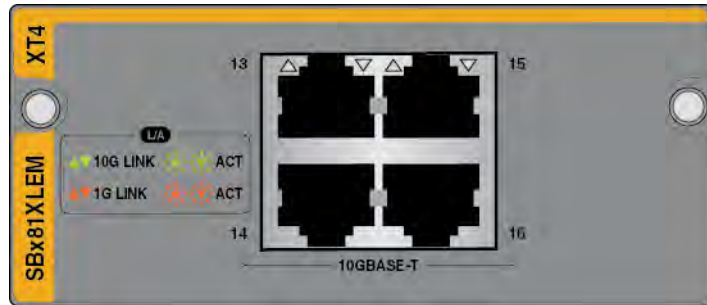


Figure 32. AT-SBx81XLEM/XT4 Expansion Module

The main features of the module are listed here:

- ❑ Four ports with RJ-45 connectors for twisted pair cables
- ❑ Ports support 1000Base-T or 10GBase-T operation
- ❑ 100 meters (328 feet) maximum operating distance per port
- ❑ Auto-Negotiation for speed
- ❑ Full-duplex mode only
- ❑ Port Link/Activity (L/A) LEDs
- ❑ Jumbo frame support up to 10240 bytes
- ❑ Non-blocking full wire speed switching on all packet sizes, with two AT-SBx81CFC960 Controller Fabric Cards

**LEDs** Each port has one LED. The LED states are defined in Table 17.

Table 17. Port LEDs on the AT-SBx81XLEM/XT4 Module

LED State	Description
Solid Amber	The port in the slot has established a 1Gbps link to a network device.
Blinking Amber	The port is transmitting and/or receiving data at 1Gbps.
Solid Green	The port has established a 10Gbps link to a network device.
Blinking Green	The port is transmitting and/or receiving data at 10Gbps.

Table 17. Port LEDs on the AT-SBx81XLEM/XT4 Module (Continued)

LED State	Description
Off	The port is not connected to a network device or the device is not powered on.

## Twisted Pair Ports

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This section applies to the twisted pair ports on the following line cards and expansion modules:

- ❑ AT-SBx81GT24 Ethernet Line Card
- ❑ AT-SBx81GT40 Ethernet Line Card
- ❑ AT-SBx81GP24 Ethernet Line Card
- ❑ AT-SBx81XLEM/XT4 Expansion Module
- ❑ AT-SBx81XLEM/GT8 Expansion Module

### Connector Type

The ports on the line cards and expansion module have 8-pin RJ-45 connectors, except for the ports on the AT-SBx81GT40 Line Card, which have 8-pin RJ point 5 connectors.

The ports use four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps or 10 Gbps. The pin assignments are listed in “Port Pinouts” on page 367.

### Speed

The port speeds are listed here:

- ❑ AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards, and AT-SBx81XLEM/GT8 Expansion Module - 10, 100, or 1000 Mbps
- ❑ AT-SBx81XLEM/XT4 Expansion Module - 1000 Mbps or 10 Gbps

The switch can set the speeds automatically through Auto-Negotiation, the default setting, or you can manually set them with the AlliedWare Plus Operating System.

---

#### Note

Twisted-pair ports have to be set to Auto-Negotiation to operate at 1000 Mbps or 10 Gbps. You cannot manually set twisted-pair ports to 1000 Mbps or 10 Gbps.

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### Duplex Mode

The twisted pair ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards AT-SBx81XLEM/GT8 Expansion Module can operate in either half- or full-duplex mode at 10 or 100 Mbps. Ports operating at 1000 Mbps can only operate in full-duplex mode. The twisted pair ports are IEEE 802.3u-compliant and Auto-Negotiate the duplex mode setting.

You can disable Auto-Negotiation on the ports and set the duplex mode manually.

**Note**

Switch ports that are connected to 10 or 100 Mbps end nodes that are not using Auto-Negotiation should not use Auto-Negotiation to set their speed and duplex mode settings, because duplex mode mismatches might occur. You should disable Auto-Negotiation and set the speed and duplex mode settings manually with the AlliedWare Plus Operating System.

**Note**

The ports on the AT-SBx81GT40 Line Card and AT-SBx81XLEM/XT4 Expansion Module support full-duplex mode only.

**Maximum Distance**

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

**Cable Requirements**

Here are the minimum cable requirements for the ports:

- ☐ 10 or 100Mbps - Standard TIA/EIA 568-B-compliant Category 3 unshielded cabling.
- ☐ 1Gbps - Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) unshielded cabling.
- ☐ 10Gbps - Standard TIA/EIA 568-C-compliant Category 6a unshielded cabling.

**Note**

Patch cables for the AT-SBx81GT40 Line Card, in lengths of 1 meter and 3 meters with RJ point 5 and RJ-45 connectors, are available from Allied Telesis. Contact your Allied Telesis sales representative for information.

**Automatic MDIX Detection**

The 10/100/1000 Mbps twisted pair ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards are IEEE 802.3ab compliant and feature automatic MDIX detection when operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to 1000 Mbps.) This feature automatically configures the ports to MDI or MDI-X depending on the wiring configurations of the end nodes.

Ports connected to network devices that do not support automatic MDIX detection default to MDIX.

You can disable automatic MDIX detection on the individual ports and configure the MDI/MDI-X settings manually with the POLARITY command.

**Port Pinouts**

Refer to Table 49 on page 367 for the pinouts of the twisted pair ports when they operate at 10 or 100 Mbps in the MDI configuration and Table 50 on page 368 for the MDI-X configuration. For the port pinouts when they operate at 1000 Mbps or 10 Gbps, refer to Table 51 on page 368.

## Power over Ethernet on the Ports in the AT-SBx81GP24 Line Card

This section applies to the AT-SBx81GP24 PoE Line Card. The twisted pair ports on the line card support Power over Ethernet (PoE). PoE is a mechanism by which the ports supply power to network devices over the twisted pair cables that carry the network traffic. This feature can simplify network installation and maintenance because it allows you to use the switch as a central power source for other network devices.

Devices that receive their power over Ethernet cables are called powered devices (PD), examples of which include wireless access points, IP telephones, web cams, and even other Ethernet switches. A PD connected to a port on the switch receives both network traffic and power over the same twisted-pair cable.

The AT-SBx81GP24 Line Card automatically determines whether a device connected to a port is a PD. A PD has a signature resistor or signature capacitor that the line card can detect over the Ethernet cabling. If the resistor or capacitor is present, the switch assumes that the device is a PD.

A port connected to a network node that is not a PD (that is, a device that receives its power from another power source) functions as a regular Ethernet port, without PoE. The PoE feature remains enabled on the port but no power is delivered to the device.

### Powered Device Classes

The IEEE 802.3af and 802.3at standards define five powered device classes. The classes are defined by the power requirements of the powered devices. The classes are shown in Table 18. The AT-SBx81GP24 Line Card supports all five classes.

Table 18. IEEE802.3af and IEEE802.3at Powered Device Classes

Class	Usage	Maximum Power Output on the PoE Port	PD Power Range
0	Default	15.4W	.044W to 12.95W
1	Optional	4.0W	0.44W to 3.84W
2	Optional	7.0W	3.84W to 6.49W
3	Optional	15.4W	6.49W to 12.95W
4	Optional	30.0W	12.95W to 25.9W

## Power Budget

The power for PoE on the ports on the AT-SBx81GP24 Line Card is provided by the AT-SBxPWRPOE1 Power Supply. A single power supply can provide up to 1200 watts of power for powered devices. You may install two power supplies in the chassis for a total of 2400 watts for powered devices.

The number of powered devices the chassis can support at one time depends on the number of AT-SBxPWRPOE1 Power Supplies in the chassis and the power requirements of the powered devices in your network. Table 19 lists the maximum number of powered devices by class, for one or two power supplies. The numbers assume that the powered devices require the maximum amount of power for their classes.

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### Note

The maximum number of PoE ports in the SwitchBlade x8112 Switch is 240 ports.

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Table 19. Maximum Number of Powered Devices

Class	Maximum Number of Ports with One PoE PSU (1200 W)	Maximum Number of Ports with Two PoE PSU's (2400 W)
0	77	155
1	240	240
2	171	240
3	77	155
4	40	80

## PoE Wiring

The IEEE 802.3af and 802.3at standards define two methods for delivering power to powered devices over the four pairs of strands that comprise a standard Ethernet twisted-pair cable. The methods are called Alternatives A and B. In Alternative A, power is supplied to powered devices on strands 1, 2, 3, and 6, which are the same strands that carry the 10/100Base-TX network traffic. In Alternative B, power is delivered on strands 4, 5, 7, and 8. These are the unused strands.

---

### Note

1000BASE-T cables carry the network traffic on all eight strands of the Ethernet cable.

---

The PoE implementation on the AT-SBx81GP24 Line Card is Alternative A. Power is transmitted on strands 1, 2, 3, and 6. Thus, the line card can support PDs that receive power using Alternative A.

PDs that comply with the IEEE 802.3af and 802.3at standards are required to support both power delivery methods and thus are compatible with the AT-SBx81GP24 PoE Line Card. However, non-standard PDs and PDs that were manufactured before the completion of the IEEE 802.3af and 802.3at standards and that support only Alternative B are not supported by the AT-SBx81GP24 PoE Line Card.



## Chapter 3

# AT-SBx81CFC960 Controller Fabric Cards

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This chapter describes the AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards in the following sections:

- ❑ “Controller Fabric Cards for the AT-SBx8112 Chassis” on page 74
- ❑ “Front Panel Components” on page 78
- ❑ “Guidelines” on page 81
- ❑ “Dual Controller Cards” on page 83
- ❑ “SYS Status LEDs” on page 85
- ❑ “eco-friendly Button” on page 87
- ❑ “SBx Linecard Status LEDs” on page 88
- ❑ “SFP+ Ports” on page 89
- ❑ “Console (RS-232) Port” on page 91
- ❑ “Ethernet Management Port (NET MGMT)” on page 92
- ❑ “USB Port” on page 94
- ❑ “Reset Button” on page 95
- ❑ “Hardware and Software Releases” on page 97

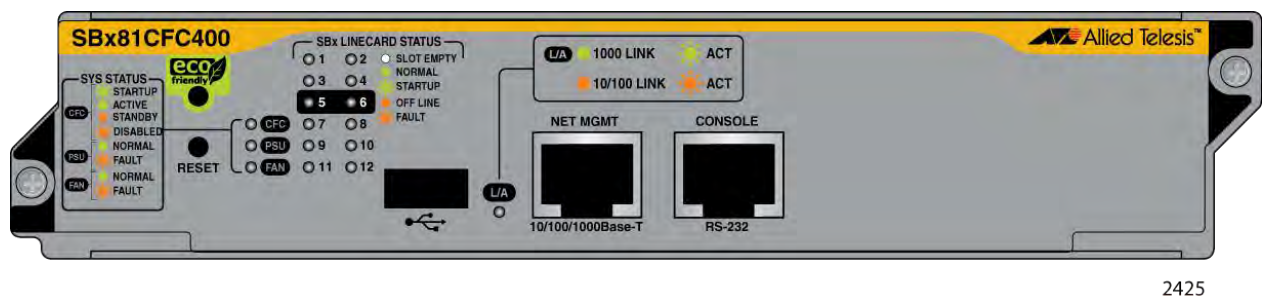
## Controller Fabric Cards for the AT-SBx8112 Chassis

Listed here are the three controller fabric cards for the AT-SBx8112 Chassis:

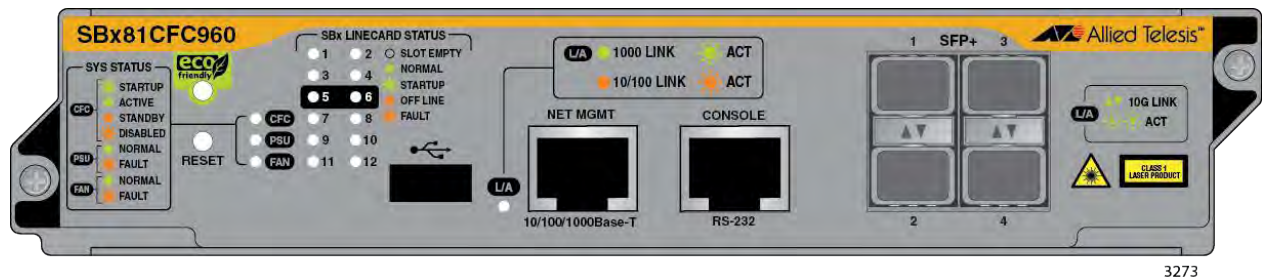
- ❑ AT-SBx81CFC400
- ❑ AT-SBx81CFC960 Version 1
- ❑ AT-SBx81CFC960 Version 2

They are shown in Figure 33.

AT-SBx81CFC400 Controller Fabric Card



AT-SBx81CFC960 Version 1 Controller Fabric Card



AT-SBx81CFC960 Version 2 Controller Fabric Card

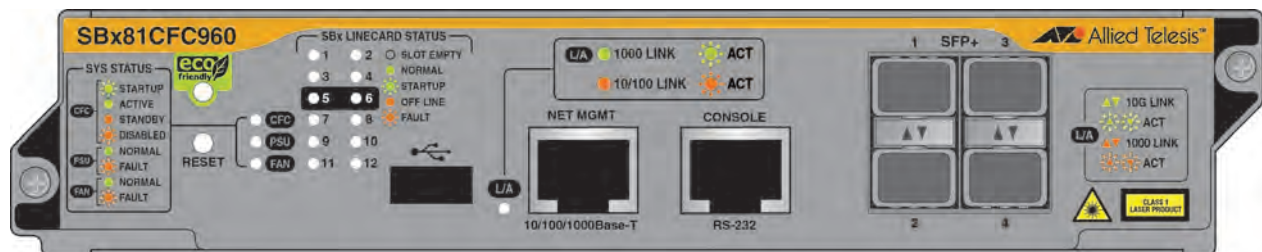


Figure 33. Controller Fabric Cards for the AT-SBx8112 Chassis

The AT-SBx81CFC960 Versions 1 and 2 Cards have four SFP+ ports that can be used as additional networking ports or with the VCStack Plus feature to build a stack of two chassis. The AT-SBx81CFC960 Version 1 Card supports 10Gbps transceivers in the SFP+ ports. The AT-SBx81CFC960 Version 2 Card supports both 1000Mbps and 10Gbps transceivers.

The AT-SBx81CFC400 Controller Fabric Card does not have SFP+ ports and does not support the VCStack Plus feature.

You can determine the version of the AT-SBx81CFC960 Card by examining the legend of its four SFP+ ports. The legend for the version 1 card has “10G LINK”. The legend for the version 2 card has both “10G LINK” and “1G LINK.” Refer to Figure 34.

AT-SBx81CFC960 Version 1  
Controller Card



AT-SBx81CFC960 Version 2  
Controller Card



Figure 34. Legends for the SFP+ Ports on the AT-SBx81CFC960 Versions 1 and 2 Controller Cards

AT-SBx81CFC960 Version 2 Cards might also have “v2” in their model names on the face plates. Refer to Figure 35 on page 76. However, some early version 2 cards do not have this identifier.

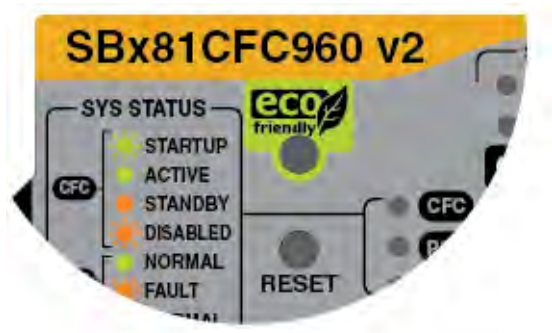


Figure 35. Model Name of the AT-SBx81CFC960 Version 2 Card on the Faceplate

Another way to determine the version of a controller card is by viewing its board ID number with the SHOW SYSTEM command in the AlliedWare Plus management software. The board IDs are 376 for the AT-SBx81CFC960 Version 1 Card and 379 for the version 2 card.

This manual describes the AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards. For information about the AT-SBx81CFC400 Card, refer to the SwitchBlade x8112 *Chassis Switch and AT-SBx81CFC400 Card Installation Guide*.

**Note**  
The AT-SBx81CFC400 Controller Card is not compatible with the AT-SBx81CFC960 Versions 1 and 2 Controller Cards. Do not install it in the same chassis with the AT-SBx81CFC960 Controller Card.

**Note**  
Unless stated otherwise, “AT-SBx81CFC960 Card” refers to both AT-SBx81CFC960 Versions 1 and 2 Cards.

**Combining  
Versions 1 and 2  
Controller Cards  
in a Chassis**

The two versions of the AT-SBx81CFC960 Controller Card are compatible and can be installed in the same AT-SBx8106 or AT-SBx8112 Chassis, provided the version 1 controller card has one of the releases of the AlliedWare Plus management software in Table 20.

Table 20. AlliedWare Plus Management Software Releases Supported by Both AT-SBx81CFC960 Versions 1 and 2 Controller Cards

Management Software Release	Releases Supported on Both Controller Cards
5.4.7-2	Starts at 5.4.7-2.14 and includes all later 5.4.7-2.n releases.

Table 20. AlliedWare Plus Management Software Releases Supported by Both AT-SBx81CFC960 Versions 1 and 2 Controller Cards

Management Software Release	Releases Supported on Both Controller Cards
5.4.8-2	Starts at 5.4.8-2.9 and includes all later 5.4.8-2. <i>n</i> releases.
5.4.9-0	Starts at 5.4.9-0.6 and includes all later releases.

The version 2 controller card ships with release 5.4.9-0.6 or later of the AlliedWare Plus management software, but is compatible with several earlier releases, as listed in Table 20.

Before hot-swapping a version 2 controller card in a chassis that has a version 1 card, you should first determine whether the version 1 card has one of the releases of the AlliedWare Plus management software in Table 20. You can display the release number of the AlliedWare Plus management software by entering the SHOW VERSION command in the User or Exec Privileged mode, from a local or remote management session. If the version 1 card does not have one of the releases in the table, you need to update its AlliedWare Plus management software before installing the version 2 controller card.

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**Note**

The version 2 controller card will not become operational if you hot-swap it in a chassis that has a version 1 card with a release of the management software that it does not support.

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If you are installing a new chassis that will have one version 1 controller card and one version 2 card, Allied Telesis recommends installing the version 2 card in slot 5 so that it becomes the master controller card and downloads its release of the AlliedWare Plus management software to the version 1 card during the first power-on of the chassis.

If you are planning to build a stack of two SwitchBlade x8100 chassis with the VCStack feature, and one chassis has version 1 controller cards and the other version 2 cards, the version 1 cards must have one of the releases in Table 20 on page 76. Otherwise, you will need to update their management software.

## Front Panel Components

The front panel components on the controller fabric cards are identified in Figure 36 and briefly described in Table 21 on page 79.

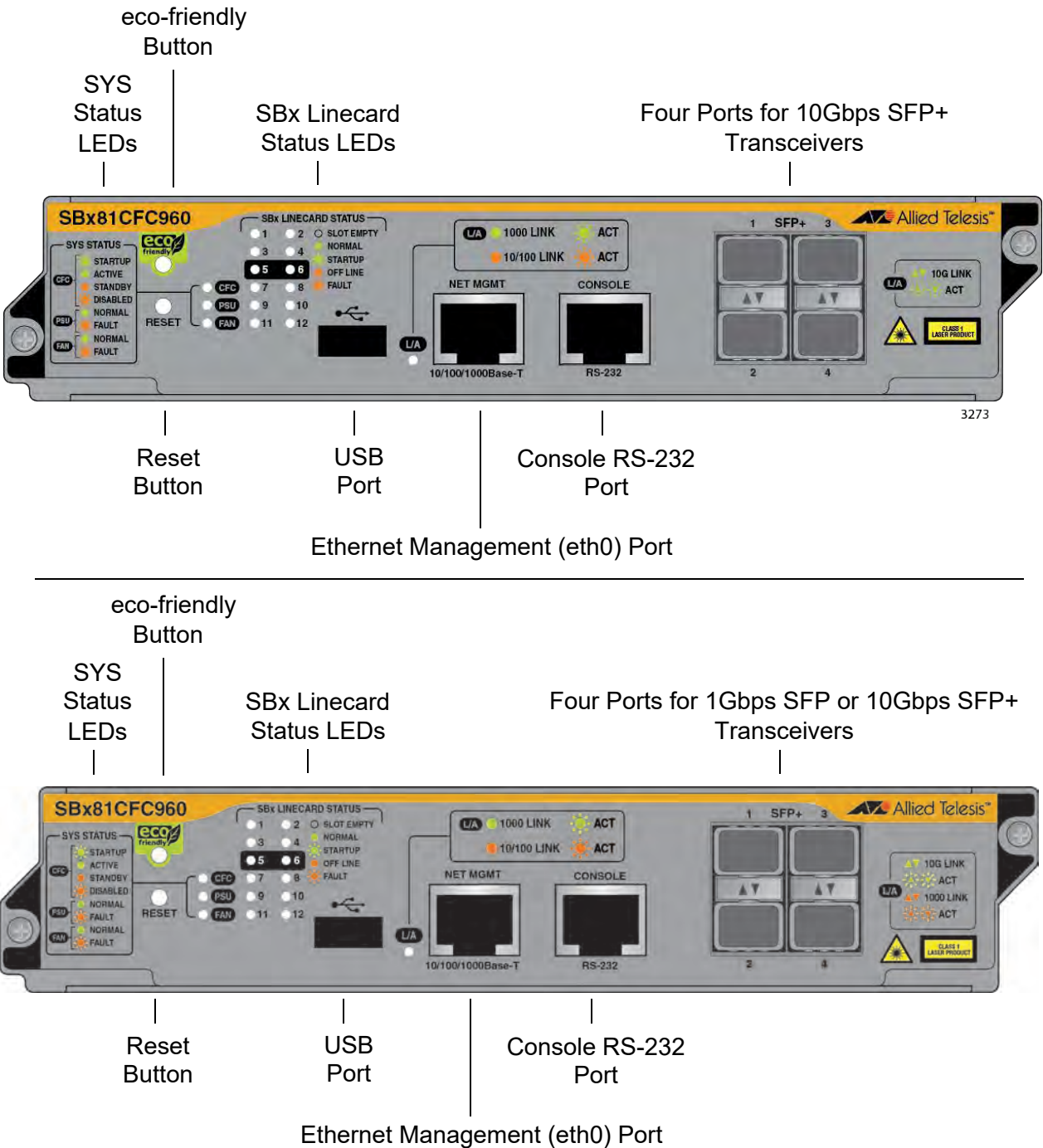


Figure 36. Components on the AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards

Table 21. Front Panel Components on AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards

Component	Description
SYS Status LEDs	Displays general status information about the controller card, power supplies, and fan module. For more information, refer to “SYS Status LEDs” on page 85.
eco-friendly Button	Turns the LEDs on and off. For more information, refer to “eco-friendly Button” on page 87.
SBx Linecard Status LEDs	Displays general information about the controller and Ethernet line cards. For more information, refer to “SBx Linecard Status LEDs” on page 88.
Four Transceiver Ports	<p>Supports four transceivers for the following functions:</p> <ul style="list-style-type: none"> <li>- Uplink ports for the Ethernet line cards.</li> <li>- Stack trunk between two chassis for the VCSStack Plus feature.</li> </ul> <p>Please review the following:</p> <ul style="list-style-type: none"> <li>- The ports in the AT-SBx81CFC960 Version 1 Card support 10Gbps transceivers only.</li> <li>- The ports in the AT-SBx81CFC960 Version 2 Card support 1Gbps and 10Gbps transceivers.</li> </ul> <p>Transceivers are ordered separately. For a list of supported transceivers, refer to the Allied Telesis web site. For more information, refer to “SFP+ Ports” on page 89.</p>
Console RS-232 Port	Provides local management of the switch. The switch does not require an IP address for local management. For more information, refer to “Console (RS-232) Port” on page 91.

Table 21. Front Panel Components on AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards (Continued)

Component	Description
NET MGMT (eth0) Port	Provides maintenance access to the controller card. For more information, refer to “Ethernet Management Port (NET MGMT)” on page 92.
USB Port	Used with a USB flash memory drive for management functions, such as storing backup copies of the switch configuration and transferring configurations between switches. For more information, refer to “USB Port” on page 94.
Reset Button	Resets the controller and Ethernet line cards. For more information, refer to “Reset Button” on page 95.



## Guidelines

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The controller card has the following functions:

- ❑ Chassis Management — You use the controller card to monitor and configure the parameter settings on the Ethernet line cards. The controller card supports local management sessions through the Console RS-232 port and remote management sessions with Telnet, Secure Shell (SSH), or SNMP clients on workstations on your network.
- ❑ Management software — The controller card stores its own management software as well as the management software for the Ethernet line cards. It downloads the firmware to the cards over the backplane in the chassis when the chassis is powered on or reset, or when line cards are hot swapped in the chassis.
- ❑ Configuration Settings — The controller card also maintains a configuration database in which it stores its own settings as well as the settings of all the Ethernet line cards. When a change is made to a configuration setting on a line card, the controller card transmits the change over the backplane to the appropriate line card and updates its configuration database. The database is stored in nonvolatile memory and is retained even when the chassis is powered off. You can download the database to a management workstation or network server to maintain a history of configurations or to transfer a configuration to multiple chassis.
- ❑ Backplane Control — The chassis has a backplane. The Ethernet line cards use the backplane to forward traffic to each other when the ingress and egress ports of packets are located on different cards. The backplane is managed by the controller card. The bandwidth of the backplane depends on the number of controller cards in the chassis. Each line card slot has up to 80Gbps of backplane bandwidth when the chassis has one controller card and up to 160Gbps with two controller cards.
- ❑ VCStack Plus feature — The controller card can be used to create a stack of two chassis that operate as a single, virtual switch, which can simplify network operation and management. For more information, refer to Chapter 15, “VCStack Plus Overview” on page 315.
- ❑ SFP+ ports — The SFP+ ports on the front panel can be used to add high speed uplink ports for the Ethernet line cards or to build a trunk between two chassis for the VCStack Plus feature.

Here are the guidelines for the controller card:

- ❑ The chassis must have at least one controller card. The line cards cannot forward traffic without a controller card.
- ❑ The chassis can have either one or two controller cards.
- ❑ Two controller cards are recommended for redundancy and to increase the per slot backplane bandwidth from up to 80 to 160Gbps.
- ❑ The controller cards are installed in slots 5 and 6 in the chassis.

Here are other controller card features:

- ❑ LEDs for monitoring the status of the Ethernet line cards.
- ❑ Power-saving eco-friendly button for turning the port and status LEDs on and off on the line cards and control cards.
- ❑ Reset switch for resetting the chassis.
- ❑ USB port for data storage and retrieval.
- ❑ Console RS-232 for local management.
- ❑ NET MGMT port and inband interface for remote Telnet, SSH, and SNMP management.
- ❑ Hot swappable.

## Dual Controller Cards

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You can install either one or two controller cards in the chassis. Here are the advantages to having two controller cards in the chassis.

- ❑ Having a second controller card improves the performance of the chassis by increasing the backplane bandwidth for the Ethernet line cards. Two controller cards provide up to 160 Gbps non-blocking throughput for each line card.
- ❑ Installing a second controller card adds redundancy. If a controller card fails in the chassis, the second card enables the Ethernet line cards to maintain network operations.
- ❑ Installing a second controller card adds four additional SFP+ ports in the chassis.

Here are the guidelines to dual controller cards:

- ❑ One card operates as the active master card and the other as the standby master card. You can determine the state of a controller card by the M/S LED. For information, refer to “SYS Status LEDs” on page 85.
- ❑ The controller cards automatically determine their states when the chassis is powered on or reset. The card that boots up first is designated as the active master card. If both cards boot up at the same time, the card in slot 5 is designated as the active master card.
- ❑ All management sessions have to be conducted through the active master controller card.
- ❑ To establish a local management session, you have to use the Console RS-232 port on the active master controller card.
- ❑ When the chassis is powered on or reset, the two controller cards perform an initialization process, part of which involves the inactive card synchronizing its management files with the active card. During this phase of the initialization process, which may take several minutes, the inactive card does not participate with the active card in forwarding traffic over the backplane and its SFP+ ports are nonfunctional. After the inactive card has finished the initialization process, it joins with the active card in forwarding traffic on the backplane and activates its SFP+ ports. For more information, refer to “Monitoring the Initialization Process” on page 233.

Two controller cards provide an active/active architecture. The packet processors on both controller cards are fully utilized, doubling the available backplane bandwidth to up to 160 Gbps per line card slot.

The active master controller in a chassis with two controller cards is typically the card in slot 5. It manages the system and processes CPU bound network traffic. The standby master runs all network protocol modules and is kept in sync with the active master card, so as to be available in hot-standby for near instantaneous fail over, if required.

If the active master card is hot-swapped out, the standby master becomes the active master, taking over all control functions almost instantaneously. Testing has shown no noticeable disruption to streaming video.

You can determine the state of a controller card by viewing the CFC LED on the card. A controller card is the active master when the LED is solid green. The CFC LED for the standby master is solid amber.

## SYS Status LEDs

The SYS (System) Status LEDs on the controller fabric card display general status information about the controller card, power supplies, and fan module. The LEDs are defined in Table 22 on page 85.

Table 22. SYS (System) Status LEDs

LED	State	Description
CFC	Solid Green	Indicates that the AT-SBx81CFC960 Controller Fabric Card is operating normally as the active master controller card.
	Flashing Green	Indicates that the controller card is initializing its management software or synchronizing its database with the active master controller card.
	Solid Amber	Indicates that the controller card is operating normally as the standby master controller card.
	Flashing Amber	Indicates that the controller card is disabled. An active master controller card might disable a standby master controller card if the two cards have incompatible versions of the management software and are unable to resolve the problem, possibly because of insufficient free flash memory.
PSU	Solid Green	Indicates that the power supplies are operating properly.
	Flashing Amber	<p>Indicates that a power supply is experiencing a problem. Possible causes are:</p> <ul style="list-style-type: none"> <li>- The input AC voltage from a power source is not within the normal operating range of a power supply module.</li> <li>- The output DC voltage from a power supply module to the line cards is not within the normal operating range.</li> <li>- A power supply is experiencing high temperature.</li> <li>- A power supply has failed.</li> </ul> <p>Check the status LEDs on the individual power supply modules to determine which module has a fault condition.</p>

Table 22. SYS (System) Status LEDs (Continued)

LED	State	Description
FAN	Solid Green	Indicates that the fan module is operating properly.
	Flashing Amber	Indicates that the fan module has a problem. The fans are operating below the normal operating range or have stopped.

## eco-friendly Button

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You can use the eco-friendly button on the controller card to turn the LEDs on or off. You may turn off the LEDs when you are not using them to monitor the control and Ethernet line cards, to conserve electricity. When the LEDs are off, the overall power consumption of the chassis is slightly reduced, approximately 3 watts in a system with 240 active copper ports.

The button controls all of the port LEDs on the Ethernet line cards and controller card, except for the CFC LED, which is always on, and the L/A LED for the NET MGMT port. The button does not control the LEDs on the fan module and power supply systems.

## SBx Linecard Status LEDs

The SBx Linecard Status LEDs, numbered 1 to 12, display general status information about the Ethernet line cards and controller cards. There is one LED for each chassis slot. If the chassis has two controller cards, the SBx Status LEDs on both cards are active. The LEDs are defined in Table 23.

Table 23. SBx Linecard Status LEDs

State	Description
Off	Indicates that the slot is empty.
Solid Green	Indicates that the Ethernet line or controller card is operating normally.
Flashing Green	Indicates that the card is booting up, running in test mode, or loading its configuration settings.
Solid Amber	<p>Indicates that the card is in an off-line state. Possible causes are:</p> <ul style="list-style-type: none"> <li>- An Ethernet line card that displays this LED state may have encountered a problem initializing the management software.</li> <li>- An Ethernet line card that displays this LED state might not be able to boot up because the controller card does not have the appropriate load file and needs to be updated to the most recent release of the AlliedWare Plus Operating System.</li> <li>- A standby master controller card that displays this LED state may have been disabled by the active master controller card because the cards have incompatible versions of the AlliedWare Plus Operating System and were unable to resolve the problem, possibly because of insufficient free flash memory.</li> </ul> <p>You may remove a line or controller card from the chassis when it is in this state.</p>
Flashing Amber	Indicates that the card is reporting a fault condition. Use the management commands to determine the specific problem.



## SFP+ Ports

---

The four SFP+ ports, numbered 1 to 4, on the front panel of the controller card have the following functions.

- ❑ Add high speed uplink ports for the Ethernet line cards.
- ❑ Build a trunk between two chassis to form a stack with the VCStack Plus feature. For more information on stacking, refer to Chapter 15, “VCStack Plus Overview” on page 315.

---

### Note

The AT-SBx81CFC960 Controller Card supports 10Gbps transceivers in the SFP+ ports. The AT-SBx81CFC960 Version 2 Card supports 1Gbps and 10Gbps transceivers.

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For a list of supported transceivers, refer to the product data sheet or the Allied Telesis web site.

Here are SFP+ port guidelines:

- ❑ The SFP+ ports can be used as uplink ports for the Ethernet line cards when the VCStack Plus feature is disabled on the switch.
- ❑ The SFP+ ports are used for the stack trunk when the VCStack Plus feature is enabled.
- ❑ You must use direct connect twinax cables or SFP+ transceivers from Allied Telesis to use the ports as the stack trunk for the VCStack Plus feature. The two chassis might not form the stack with cables or transceivers from other network equipment manufacturers.

---

### Note

To build a stack with v5.4.4 of the AlliedWare Plus Operating System, you must use AT-Stack/OP transceivers. That restriction does not apply to v5.4.5 or later. You can use direct connect twinax cables or SFP+ transceivers that are from Allied Telesis and have been approved for the SFP+ ports.

---

- ❑ When a chassis has two controller cards, the SFP+ ports on both cards are active. Consequently, a chassis with two controller cards has eight active SFP+ ports.
- ❑ You can use the ports in any order when used as uplink ports for the Ethernet line cards.
- ❑ The trunk cabling configurations for the SFP+ ports with the VCStack Plus feature are given in “Cabling Configurations for the Trunk” on page 319.

Each SFP+ port has one LED. The SFP+ port LEDs for the AT-SBx81CFC960 Version 1 Card are defined in Table 24.

Table 24. LEDs for the SFP+ Ports on the AT-SBx81CFC960 Version 1 Controller Card

LED	State	Description
L/A	Solid Green	The transceiver has established a 10Gbps link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10Gbps.
	Off	The port is empty or the transceiver has not established a link with a network device.

The SFP+ port LEDs for the AT-SBx81CFC960 Version 2 Card are defined in Table 24.

Table 25. LEDs for the SFP+ Ports on the AT-SBx81CFC960 Version 2 Controller Card

LED	State	Description
L/A	Solid Green	The transceiver has established a 10Gbps link with a network device.
	Flashing Green	The transceiver is transmitting or receiving data at 10Gbps.
	Solid Amber	The transceiver has established a 1Gbps link with a network device.
	Flashing Amber	The transceiver is transmitting or receiving data at 1Gbps.
	Off	The port is empty or the transceiver has not established a link with a network device.

## Console (RS-232) Port

---

The Console Port is used to conduct local management sessions with the switch. Local management sessions are established with a terminal or PC with a terminal emulation program, and the management cable that comes with the card. The AT-SBx81CFC960 Controller Fabric Card does not need an Internet Protocol (IP) address for this type of management.

Your initial management session with the switch must be a local management session. For instructions on how to start a local management session, refer to “Using Local Management to Verify the Chassis” on page 240 or the Software Reference for SwitchBlade x8100 Series Switches.

## Ethernet Management Port (NET MGMT)

---

The controller card uses the NET MGMT port as 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.
- ❑ If the chassis has two controller cards, you must use the NET MGMT port on the active controller card to access the switch. The NET MGMT port on the standby controller card is inactive. To determine the status of the controller cards, refer to the CFC LEDs, described in Table 22 on page 85.
- ❑ 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 listed in “Cable Requirements” on page 68. For the port pinouts, refer to “Port Pinouts” on page 367.
- ❑ 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 SwitchBlade x8100 Series Switches.

### NET MGMT LED

The Network Management (NET MGMT) port on the AT-SBx81CFC960 Controller Fabric Card has one Status LED, described in Table 26 on page 93.

Table 26. NET MGMT Port LED

LED	State	Description
L/A	Solid Green	The port has a valid 1000 Mbps link.
	Flashing Green	The port is transmitting or receiving data at 1000 Mbps.
	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.
	Off	The port has not established a link to a network device.

## USB Port

---

The USB port supports a flash drive. You may use a flash drive to perform the following management functions:

- ❑ Use Allied Telesis Management Framework to provide a centralized network backup location.
- ❑ Store backup copies of the configuration files on the AT-SBx81CFC960 Controller Fabric Card.
- ❑ Transfer configuration files between controller cards in different chassis that are to have similar configurations.
- ❑ Transfer release and GUI files between controller cards.
- ❑ Store or transfer log files.
- ❑ Store or transfer debug files (for example, the output of the SHOW TECH-SUPPORT command).
- ❑ Boot the AlliedWare Plus Operating System and master configuration file from flash drive.

The port is compatible with USB v1.0 and v2.0 flash drives. Operating the controller card with a flash drive is optional.

## Reset Button

---

You can use the Reset button to reset either the controller card or all of the cards in the chassis. The action depends on the number of AT-SBx81CFC960 Controller Cards in the chassis and, if the chassis has two controller cards, whether you reset the active or standby master controller card.

The possible actions are described here:

- ❑ If the chassis has only one controller card, pressing the Reset button resets the controller card and all of the Ethernet line cards in the chassis. You might perform this function if the chassis and line cards are experiencing a problem.



### Caution

The controller and Ethernet line cards do not forward network traffic for about three minutes while they initialize the AlliedWare Plus Operating System and configure their parameter settings. Some network traffic may be lost.

---

- ❑ If the chassis has two controller cards, pressing the Reset button on the active master controller card resets the controller card, but not the Ethernet line cards. The standby master controller card immediately becomes the new active master card and the Ethernet line cards continue to forward traffic. The reset controller card is unavailable for about two minutes while it initializes its AlliedWare Plus Operating System, after which it becomes the standby master controller card in the chassis.

---

### Note

The available bandwidth of the backplane in the chassis is reduced for about one minute while the reset controller card initializes its management software. This may reduce network performance.

---

- ❑ If the chassis has two controller cards, pressing the Reset button on the standby master controller card resets that card, but not the active master controller card or the Ethernet line cards.

---

### Note

The available bandwidth of the backplane in the chassis is reduced for about one minute while the standby master controller card initializes its management software and synchronizes its database with the active master controller card. This may reduce network performance.

---

---

**Note**

To reset individual line cards in the chassis, use the REBOOT or RELOAD command in the AlliedWare Plus Operating System.

---



## Hardware and Software Releases

The AT-SBx8112 hardware products are listed in Table 27 along with the version numbers of the AlliedWare Plus operating system that initially supported them. Before installing a new line card in an existing chassis, confirm that the version of the AlliedWare Plus operating system on the controller cards supports the new card.

Table 27. Hardware and Software Releases

Hardware	Software Release
Chassis	
AT-SBx8112 Chassis	5.4.2
Ethernet Line Cards	
AT-SBx81GT24 Line Card	5.4.2
AT-SBx81GP24 Line Card	5.4.2
AT-SBx81GS24a Line Card	5.4.2
AT-SBx81XS6 Line Card	5.4.2
AT-SBx81GT40 Line Card	5.4.3
AT-SBx81XS16 Line Card	5.4.4
AT-SBx81XLEM Line Card	5.4.6
AT-SBx81XLEM Line Card with large address table modes	5.4.6-1.1
AT-SBx81GT24 Line Card (Revised)	5.5.0
AT-SBx81GP24 V2 Line Card	5.5.0
AT-SBx81XLEM Expansion Modules	
AT-SBx81XLEM/Q2 Expansion Module	5.4.6
AT-SBx81XLEM/XS8 Expansion Module	5.4.6
AT-SBx81XLEM/XT4 Expansion Module	5.4.6-1.1

Table 27. Hardware and Software Releases (Continued)

Hardware	Software Release
AT-SBx81XLEM/GT8 Expansion Module	5.4.6-2.1
Controller Cards	
AT-SBx81CFC960 Version 1 Controller Card	5.4.4
AT-SBx81CFC960 Version 2 Controller Card	5.4.9
Power Supplies and Fan Modules	
AT-SBxPWRSYS1 AC System Power Supply	5.4.2
AT-SBxPWRPOE1 PoE Power Supply	5.4.2
AT-SBxPWRSYS1 DC System Power Supply	5.4.3
AT-SBxPWRSYS2 AC System Power Supply	5.4.5-1
AT-SBxFAN12 Fan Module	5.4.2
AT-SBxFAN12 v2 Fan Module	5.4.8-2.6 <sup>a</sup>

a. The AT-SBxFAN12 v2 Fan Module is compatible with all earlier versions of the AlliedWare Plus operating system. The SHOW SYSTEM command in versions 5.4.8-2.6 and later displays the model name as AT-SBxFAN12 v2. The command in earlier versions displays the model name as AT-SBxFAN12.

## Section II

# Installing the Chassis

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This section contains the following chapters:

- ❑ Chapter 4, “Safety Precautions and Site Requirements” on page 101
- ❑ Chapter 5, “Installing the Chassis in an Equipment Rack” on page 109
- ❑ Chapter 6, “Installing the Power Supplies” on page 125
- ❑ Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 145
- ❑ Chapter 8, “Cabling the Ethernet Line Cards” on page 169
- ❑ Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 187
- ❑ Chapter 10, “Powering On the Chassis” on page 197
- ❑ Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 237
- ❑ Chapter 12, “Troubleshooting” on page 245
- ❑ Chapter 13, “Replacing Modules” on page 265
- ❑ Chapter 14, “Upgrading the Controller Fabric Card” on page 305



## Chapter 4

# Safety Precautions and Site Requirements

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This chapter contains the safety precautions and guidelines for selecting a site for the chassis. The chapter contains the following sections:

- ❑ “Reviewing Safety Precautions” on page 102
- ❑ “Selecting a Site for the SwitchBlade x8112” on page 106
- ❑ “Installation Tools and Material” on page 108


## Reviewing Safety Precautions

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Please review the following safety precautions before you begin to install the switch.

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### Note


The  indicates that a translation of the safety statement is available for viewing in portable document format (PDF) titled **Translated Safety Statements** from our web site 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


Do not stare into the laser beam.  L2

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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

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### Warning


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

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---

### 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

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**Note**

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

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**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 Temperature. This product is designed for a maximum ambient temperature of 40° degrees C. ⚡ E7

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**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

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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 over current 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. *See* E25

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**Warning**

Remove all metal jewelry, such as rings and watches, before installing or removing a line card from a powered-on chassis. *See* E26

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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. *See* E28

---



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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. *See* E30

---

---

**Note**

If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than the room ambient temperature. Therefore, consideration should be given to installing the equipment in an environment compatible with the manufacturer's maximum rated ambient temperature (T<sub>mra</sub>). *See* E35

---



---

**Caution**

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

---



---


**Warning**

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


---




**Warning**

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


**Warning**

This product may have multiple AC power cords installed. To de-energize this equipment, disconnect all power cords from the device.  E43


**Caution**

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

**Warning**

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

**Warning**

High Leakage Current exists in this chassis. Connect external ground wire before connecting AC power supply(s).  E46

## Selecting a Site for the SwitchBlade x8112

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Please perform the following procedure to determine the suitability of the site for the chassis:

1. Verify that the equipment rack is safely secured so that it will not tip over. You should install devices starting at the bottom of the rack, with the heavier devices near the bottom.
2. Verify that the power outlets for the chassis are located near the unit and are easily accessible.
3. Verify that the power sources are on different A/C circuits to protect the unit from a power circuit failure.
4. Verify that the site has dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.
5. Verify that the site allows for easy access to the ports on the front of the chassis so that you can easily connect and disconnect the network cables, as well as view the unit's LEDs.
6. Verify that the site allows for adequate air flow around the unit and through the cooling vents. The ventilation direction for the main section of the chassis is from left to right (when facing the front of the chassis), with the fan module drawing air out of the chassis. The power supplies have fans that draw air from the front to the back.
7. Verify that the site has a reliable and earth (grounded) power supply source, preferably dedicated and filtered.
8. Verify that the twisted pair cabling is not exposed to sources of electrical noise, such as radio transmitters, broadband amplifiers, power lines, electric motors, and fluorescent fixtures.
9. Verify that the site protects the chassis from moisture, water, and dust.

Here are other guidelines to consider:

- ☐ Switch ports are suitable for intra-building connections, or where non-exposed cabling is required.
- ☐ Do not place objects on top of the chassis.
- ☐ The power cords provided with the AT-SBxPWRSYS1 and AT-SBxPWRPOE1 Power Supplies for 100-125 VAC installations have 20 Amp, 125 V NEMA 5-20P plugs. The plugs are only compatible with NEMA 5-20R receptacles. See Figure 37 on page 107.

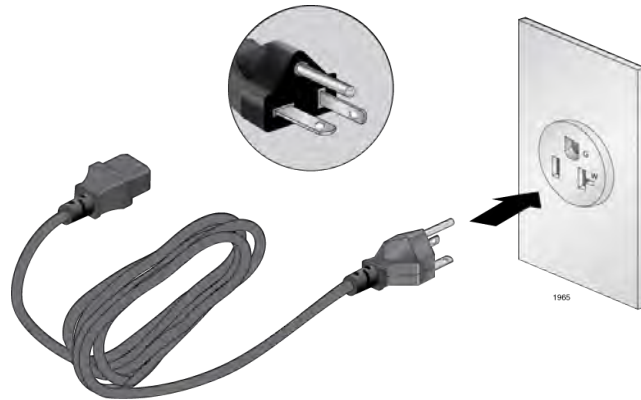


Figure 37. 100 - 125 VAC 125 V NEMA 5-20 Plug and Receptacle

## Installation Tools and Material

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Here are the installation tools and material you need to have to install the product.

Installing the chassis in an equipment rack requires the following items:

- ☐ #2 Phillips-head screwdriver
- ☐ Six equipment rack screws
- ☐ Flat-head screwdriver
- ☐ #2 Phillips-head 10 inch-lbs torque screwdriver (optional)

The grounding wire requires the following items:

- ☐ #2 Phillips-head screwdriver
- ☐ Crimping tool
- ☐ 10 AWG stranded grounding wire
- ☐ #2 Phillips-head 20 inch-lbs torque screwdriver (optional)

The AT-SBxPWRSYS1 DC Power Supply requires the following items:

- ☐ Two 8 AWG power wires
- ☐ One 10 AWG stranded grounding wire
- ☐ 8 mm wrench
- ☐ #1 Phillips-head screwdriver
- ☐ #3 Phillips-head screwdriver
- ☐ #3 Phillips-head 30 to 40 inch-lbs torque screwdriver (optional)

The AT-SBx81CFC960 Controller Fabric Card and Ethernet line cards require the following items:

- ☐ #2 Phillips-head screwdriver
- ☐ #2 Phillips-head, 5 inch-lbs torque screwdriver (optional)

## Chapter 5

# Installing the Chassis in an Equipment Rack

---

This chapter describes how to install the AT-SBx8112 Chassis in an equipment rack. This chapter contains the following sections:

- ❑ “Required Tools and Material” on page 110
- ❑ “Preparing the Equipment Rack” on page 111
- ❑ “Unpacking the AT-SBx8112 Chassis” on page 114
- ❑ “Adjusting the Equipment Rack Brackets” on page 116
- ❑ “Installing the AT-SBx8112 Chassis in the Equipment Rack” on page 118
- ❑ “Removing the Shipping Brace” on page 121
- ❑ “Installing the Chassis Grounding Wire” on page 122

## Required Tools and Material

---

Here is a list of the tools and screws for mounting the chassis in an equipment rack:

- ❑ #2 Phillips-head screwdriver
- ❑ Eight equipment rack screws
- ❑ #2 Phillips-head 10 inch-lbs torque screwdriver (optional)

Here is a list of the tools and wire for installing the grounding wire on the chassis:

- ❑ #2 Phillips-head screwdriver
- ❑ Crimping tool
- ❑ 10 AWG stranded grounding wire
- ❑ #2 Phillips-head 20 inch-lbs torque screwdriver (optional)



### 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. *See* E30

---

## Preparing the Equipment Rack

---

This section explains how to prepare the equipment rack for the chassis. The procedure requires the following items:

- ❑ #2 Phillips-head screwdriver (not provided)
- ❑ Two equipment rack screws (not provided)

To prepare the equipment rack for the AT-SBx8112 Chassis, perform the following procedure:



### Caution

The chassis is heavy and should be mounted as low as possible in the equipment rack to maximize vertical stability.

---

1. Reserve 311.1 mm (12.25") of vertical rack space for the installation of the AT-SBx8112 Chassis, as shown in Figure 38 on page 112.
2. Do not mount any other equipment within 152.4 mm (6") above this space during installation. This additional vertical space is temporary and allows you enough room to lift and tilt the chassis into its position in the equipment rack without hitting other equipment, as shown in Figure 44 on page 119. You may use this additional space for other network equipment after the chassis is installed.

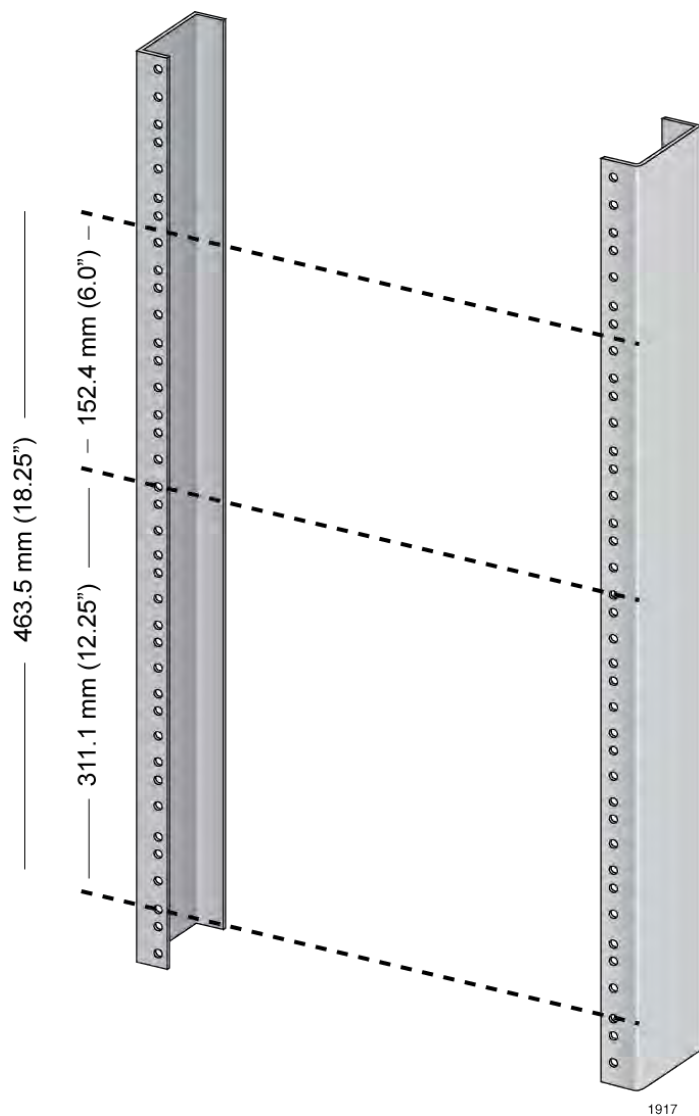


Figure 38. Reserving Vertical Rack Space



3. Identify the lowest 1/2" screw hole pattern on the rack mounting rails within the space reserved for the AT-SBx8112 Chassis.
4. Install one rack mount screw in each vertical rail, at the same height in the top screw hole of the lowest 1/2" hole pattern, as shown in Figure 39. The screws are used to support the chassis while you secure it to the rack. Do not fully tighten these two screws at this time. The screw heads should protrude from the rack approximately 6.4 mm (.25 in).

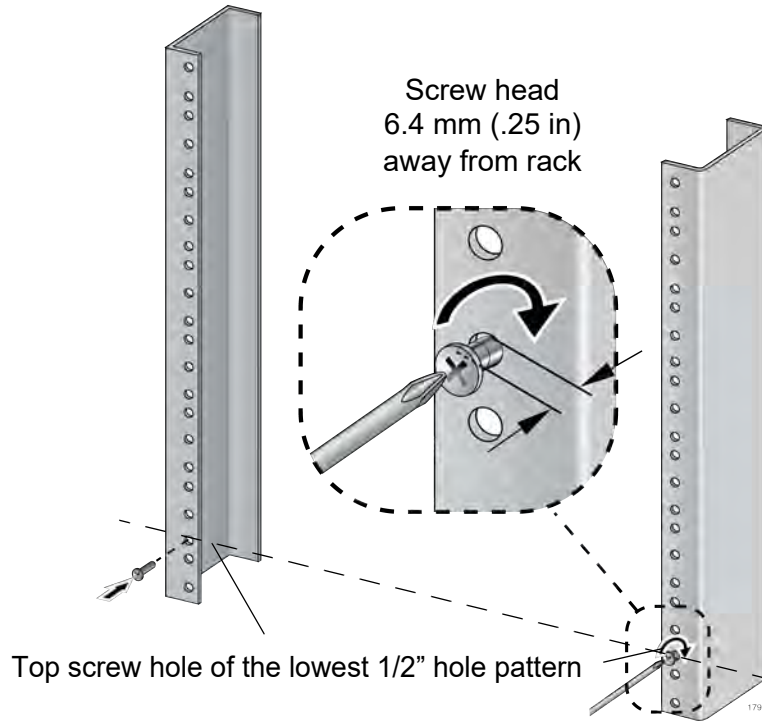


Figure 39. Rack Mounting Hole Locations

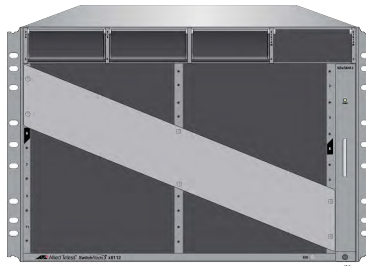
5. After installing the two screws in the equipment rack, go to “Unpacking the AT-SBx8112 Chassis” on page 114.

## Unpacking the AT-SBx8112 Chassis

---

To unpack the AT-SBx8112 Chassis, perform the following procedure:

1. Remove all components from the shipping package.
2. Verify the contents of the shipping container by referring to Figure 40 here and Figure 41 on page 115. If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBx8112 Chassis



One AT-SBxFAN12 Module pre-installed in the vertical slot on the right side of the front panel



Ten blank line card slot covers

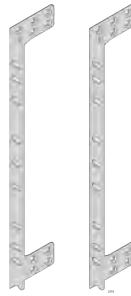


Three blank power supply slot covers pre-installed in power supply slots A to C on the front panel

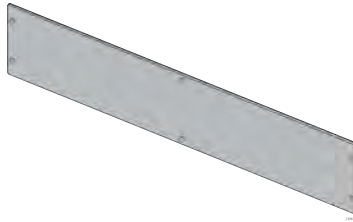


One grounding lug pre-installed in the lower left corner on the back panel

Figure 40. Components of the AT-SBx8112 Chassis



Two equipment rack brackets pre-installed on the sides of the chassis.



One shipping brace pre-installed diagonally across the line card slots on the front panel



One wrist strap

Figure 41. Components of the AT-SBx8112 Chassis (Continued)

## Adjusting the Equipment Rack Brackets

The chassis has two pre-installed equipment rack brackets. You may adjust the brackets so that the front of the chassis is flush with, extends beyond, or is recessed behind the front of the equipment rack. You may also install the brackets so that the rear panel of the chassis is flush with the front of the equipment rack.

You adjust the brackets by removing them and re-installing them in different positions on the sides of the chassis. The different bracket positions are listed in Table 28 and illustrated in Figure 42 on page 117 and Figure 43 on page 117. Please review the following information before moving the brackets:

- ❑ Position A, the default position, positions the chassis so that the front of the unit is flush with the front of the equipment rack.
- ❑ Position B recesses the front of the chassis by 27.39 mm (1.1 in).
- ❑ Positions C to E extend the front of the chassis beyond the front of the rack from 27.39 mm (1.1 in) to 140.85 mm (5.545 in).
- ❑ Position F installs the chassis with the rear panel flush with the front of the equipment rack.
- ❑ To install the rack mount brackets in position “E,” you have to remove the two chassis screws from the bottom-middle section of the chassis and re-install them in front where the rack mount bracket screws were originally, as shown in Figure 42 on page 117.
- ❑ The dimension (X) between the front panel and the rack rails is given for each rack mounting bracket position in Table 28.

Table 28. Front Panel to Rack Rail Dimensions

Figure #	Front Panel Position	Dimension X Front Panel to Rack Rail
42	A (Factory Installed - Flush)	3.69 mm (0.145 in)
42	B (Recessed)	-27.39 mm (-1.078 in)
42	C	27.39 mm (1.078 in)
42	D	47.71 mm (1.878 in)
42	E	140.85 mm (5.545 in)
43	F (Reverse Position)	374.16 mm (14.731 in)

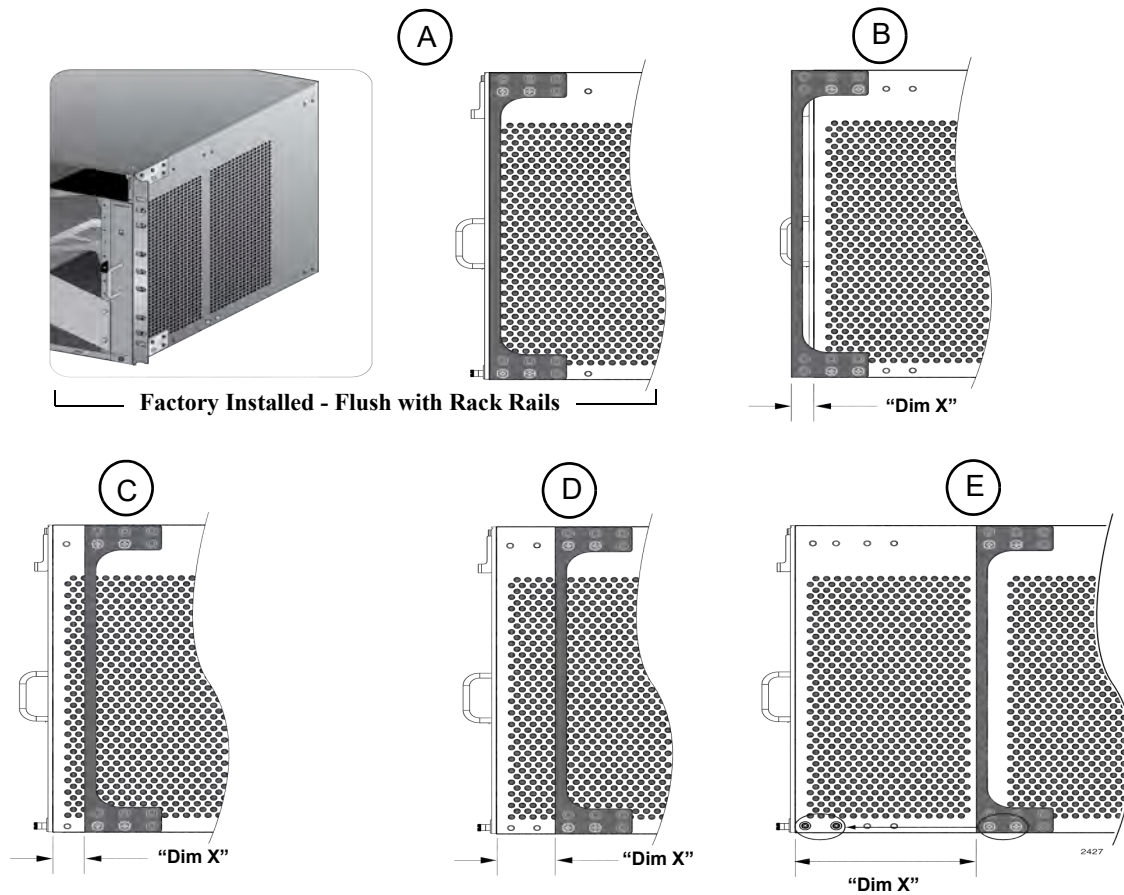


Figure 42. Rack Mounting Bracket Locations

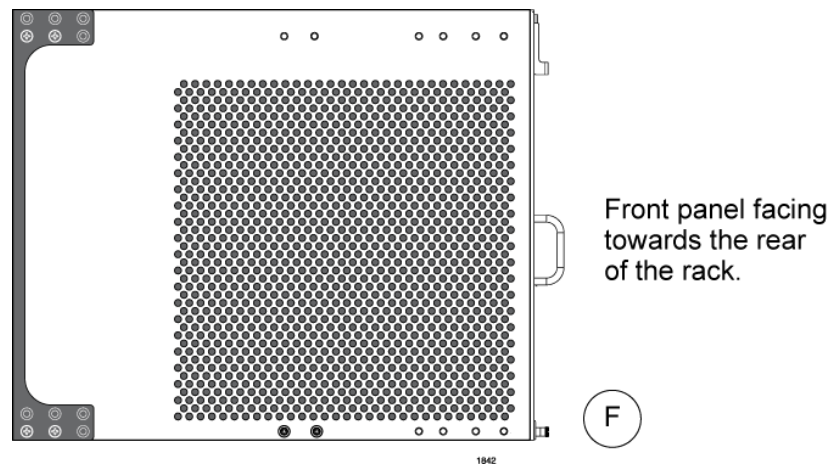


Figure 43. Rack Bracket Locations for Reverse Position of Chassis

## Installing the AT-SBx8112 Chassis in the Equipment Rack

---

The procedure in this section explains how to install the chassis in the equipment rack. The procedure requires the following items:

- ☐ #2 Phillips-head screwdriver (not provided)
- ☐ Six equipment rack screws (not provided)
- ☐ #2 Phillips-head, 10 inch-lbs torque screwdriver (optional — not provided)



### Caution

Do not remove the shipping brace from the front of the AT-SBx8112 Chassis until after the unit is securely mounted in the rack. The plate prevents twisting of the chassis frame and mechanical misalignment of the line card slots during shipping and installation.

---



### 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. *See* E30

---



### Warning

To prevent injuring yourself or damaging the device, do not attempt to install the chassis in the equipment rack alone. Allied Telesis recommends a minimum of three people for this procedure.

---

Before installing the chassis in the rack, review the following checklist:

- ☐ Did you reserve sufficient space in the equipment rack for the chassis and install two screws in the rack on which to rest the chassis while securing it to the rack? If not, then perform “Preparing the Equipment Rack” on page 111.
- ☐ Did you adjust the brackets so that the front of the chassis will be positioned correctly in the equipment rack for your installation? If not, then perform “Adjusting the Equipment Rack Brackets” on page 116.

To install the AT-SBx8112 Chassis in the equipment rack, perform the following procedure:

1. While facing the front of the chassis, tilt the top of the chassis toward you, as shown in Figure 44 on page 119.

2. Lift the AT-SBx8112 Chassis into the equipment rack and set the bottom of the equipment rack brackets firmly on the two equipment rack screws you installed in “Preparing the Equipment Rack” on page 111, as shown in Figure 44.

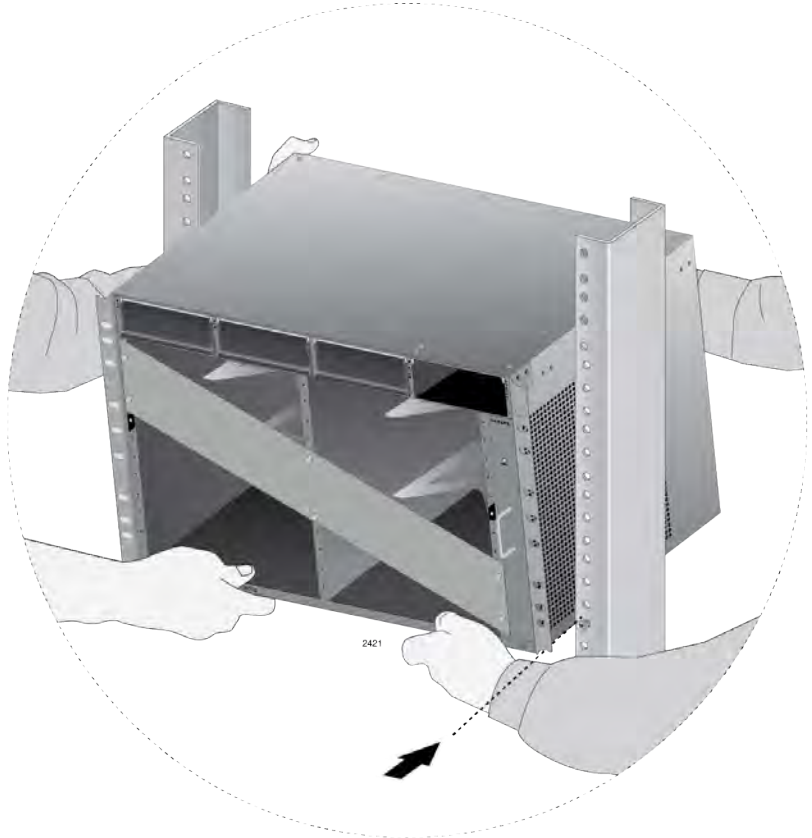


Figure 44. Lifting the AT-SBx8112 Chassis into the Equipment Rack

3. With the bottom of the rack mount ears resting on the two rack mount screws, tilt the top of the chassis back until both rackmount brackets are flush and parallel with the vertical rack rails.
4. Install six rack mount screws (not provided) to secure the chassis to the equipment rack, as shown in Figure 45 on page 120.

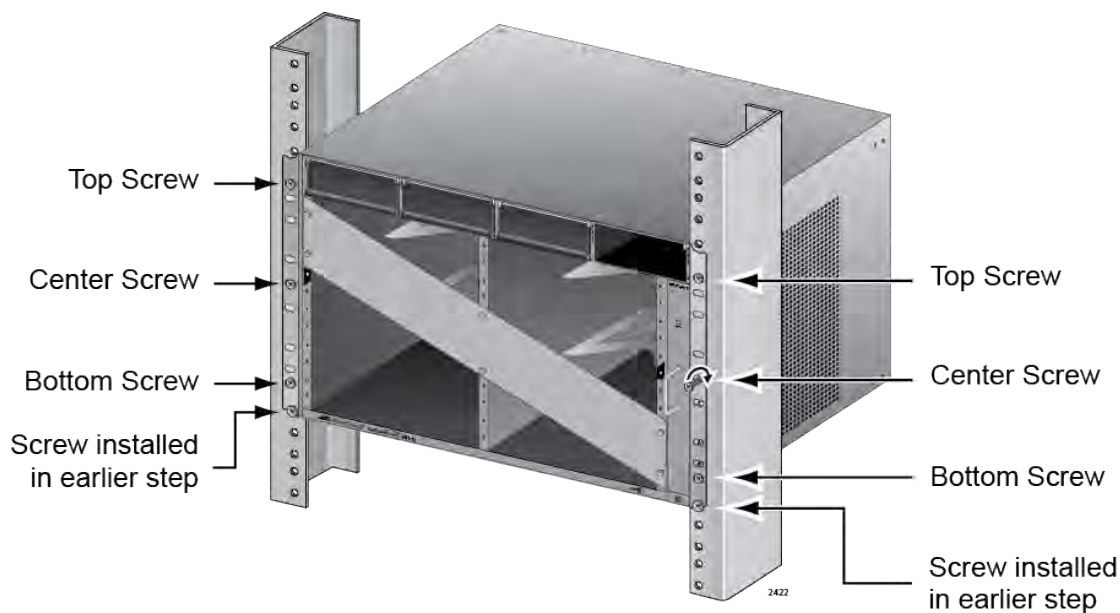


Figure 45. Installing the Rack Mount Screws

5. Tighten all eight screws to secure the chassis to the equipment rack, Allied Telesis recommends tightening the screws to 10 inch-lbs.
6. Go to “Removing the Shipping Brace” on page 121.



## Removing the Shipping Brace

Now that the chassis is installed in the equipment rack, you may remove the shipping brace from the front of the unit. To remove the shipping brace, remove the six mounting screws with a #2 Phillips-head screwdriver (not provided). Refer to Figure 46.

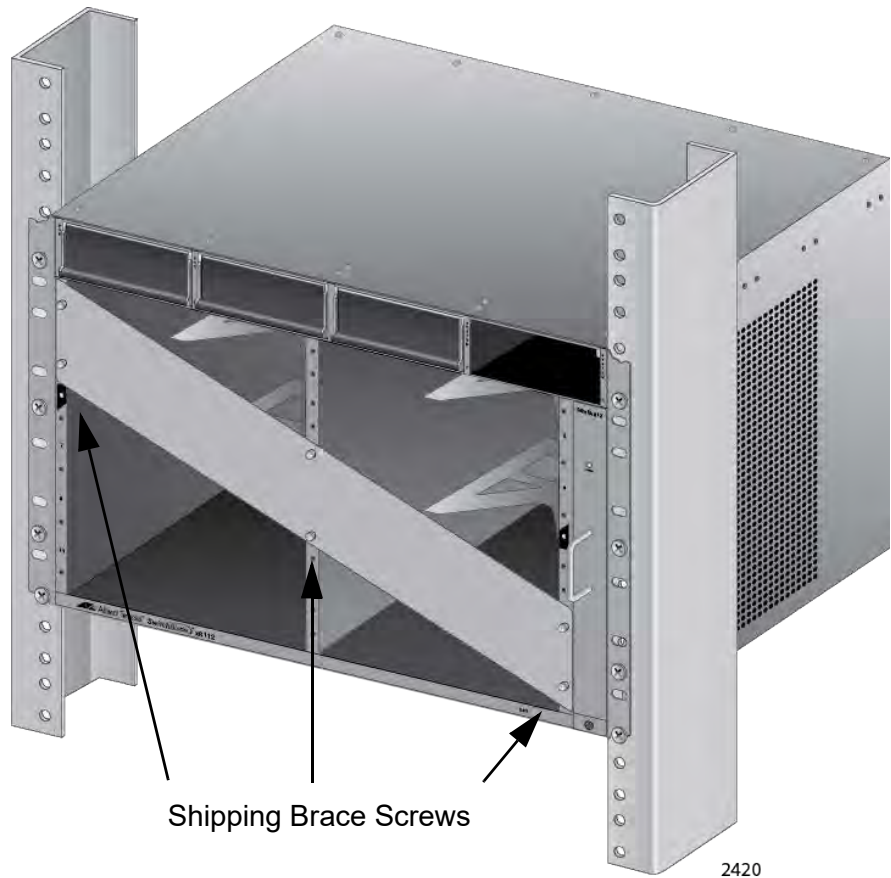


Figure 46. Removing the Shipping Brace

After removing the shipping plate, go to “Installing the Chassis Grounding Wire” on page 122.

## Installing the Chassis Grounding Wire

---

This procedure explains how to connect a grounding wire to the chassis. The chassis requires a permanent connection for the line cards and power supplies to a good earth ground. The procedure requires the following items:

- ❑ Grounding lug (pre-installed on the rear panel of the chassis)
- ❑ #2 Phillips-head screwdriver (not provided)
- ❑ Crimping tool (not provided)
- ❑ 10 AWG stranded grounding wire (not provided)
- ❑ #2 Phillips-head, 20 inch-lbs torque screwdriver (optional — not provided)

To connect the chassis to an earth ground, perform the following procedure:

1. Prepare an adequate length of stranded grounding wire (10 AWG) for the ground connection by stripping it as shown in Figure 47.

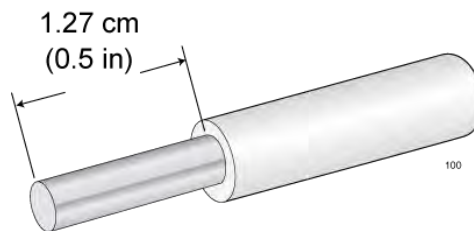


Figure 47. Stripping the Grounding Wire

2. Remove the two screws that secure the grounding lug to the rear panel of the chassis, as shown in Figure 48.

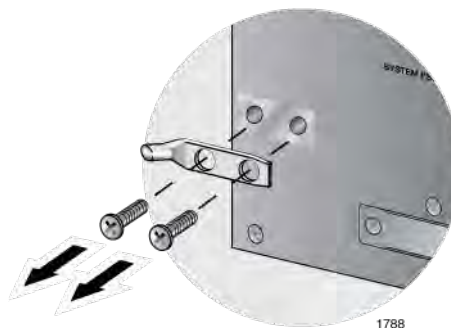


Figure 48. Removing the Grounding Lug

3. Insert one end of the grounding wire into the grounding lug, as shown in Figure 49, and use a crimping tool to secure the wire to the grounding lug.

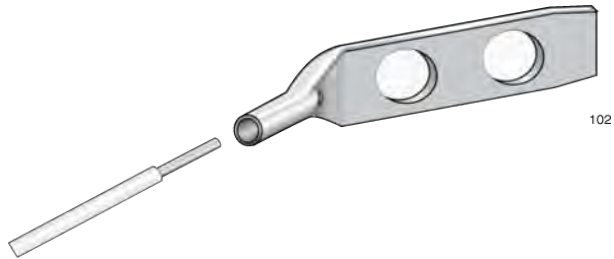


Figure 49. Attaching the Grounding Wire to the Grounding Lug

4. Install the grounding lug on the rear panel of the chassis, as shown in Figure 50.

Allied Telesis recommends tightening the screws to 20 inch-lbs.

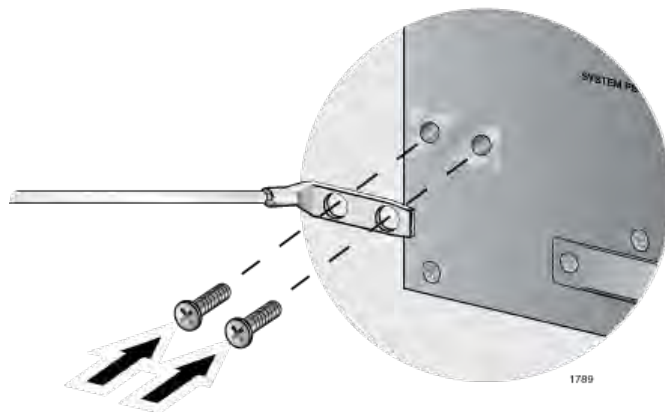


Figure 50. Installing the Grounding Lug and Wire

5. Connect the other end of the grounding wire to the building protective earth.
6. Go to Chapter 6, "Installing the Power Supplies" on page 125.



## Chapter 6

# Installing the Power Supplies

---

This chapter explains how to install the power supplies. It has the following sections:

- ❑ “Protecting Against Electrostatic Discharge (ESD)” on page 126
- ❑ “Installing AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 127
- ❑ “Installing AT-SBxPWRPOE1 PoE Power Supplies” on page 133
- ❑ “Installing AT-SBxPWRSYS1 DC System Power Supplies” on page 138

## Protecting Against Electrostatic Discharge (ESD)

---

To protect the equipment from damage by Electrostatic Discharge (ESD) during the installation procedure, observe proper ESD protection when handling the SwitchBlade x8112 line cards and power supplies. You should be properly grounded with a wrist or foot strap.



### Caution

Electrostatic Discharge (ESD) can damage the components on the SwitchBlade x8112 line cards and power supplies. Be sure to follow proper ESD procedures during the installation.

---

To guard against ESD, perform this procedure:

1. Verify that the chassis is electrically connected to earth ground.
2. Connect the wrist strap that comes with the chassis to the ESD socket in the bottom right corner of the AT-SBx8112 Chassis, shown in Figure 51. This ensures that ESD voltages safely flow to ground.



Figure 51. ESD Socket and Wrist Strap

3. When you put on the ESD-preventive wrist strap, be sure it makes good contact with your skin.

## Installing AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies

---

The chassis must have at least one system power supply. For background information, refer to “Power Supplies and Power Supply Slots” on page 27.



---

**Caution**

The electronic components in the power supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 126 to guard against ESD damage when unpacking and installing the power supply.

---



---

**Caution**

The following procedure assumes that this is the initial installation of the chassis and that the chassis is powered off. However, if you are installing a new AT-SBxPWRSYS2 Power Supply in an active, operational chassis, you should connect the AC power cord to the appropriate connector on the back panel of the unit before installing the power supply. Otherwise, the active master controller card might restart its operating system when you install the power supply. This can result in a temporary interruption of network operations of the chassis if it has only one controller card. This guideline does not apply to the AT-SBxPWRSYS1 AC or DC Power Supply or the AT-SBxPWRPOE1 Power Supply.

---

To install AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies, perform the following procedure:

1. Choose a slot in the chassis for the system power supply.

System power supplies are installed in slots C and D in the chassis. Refer to Figure 52 on page 128. If you are installing only one power supply, you may install it in either slot, but Allied Telesis recommends slot D because the slot does not come with a blank power supply panel.

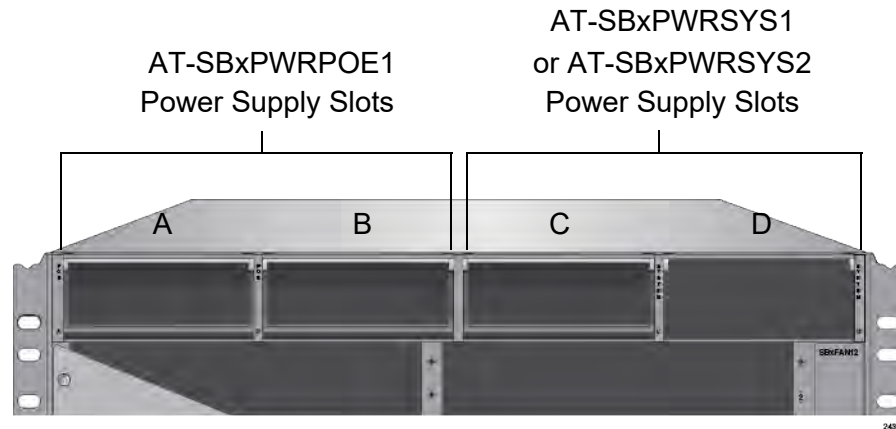


Figure 52. Power Supply Slots



**Caution**

The AT-SBxPWRSYS1 and AT-SBxPWRSYS2 AC System Power Supplies will not work in slot A or B.

2. If the chassis already has a power supply in slot D, remove the blank power supply panel from slot C by lifting the blank panel handle and sliding it out of the slot, as shown in Figure 53.

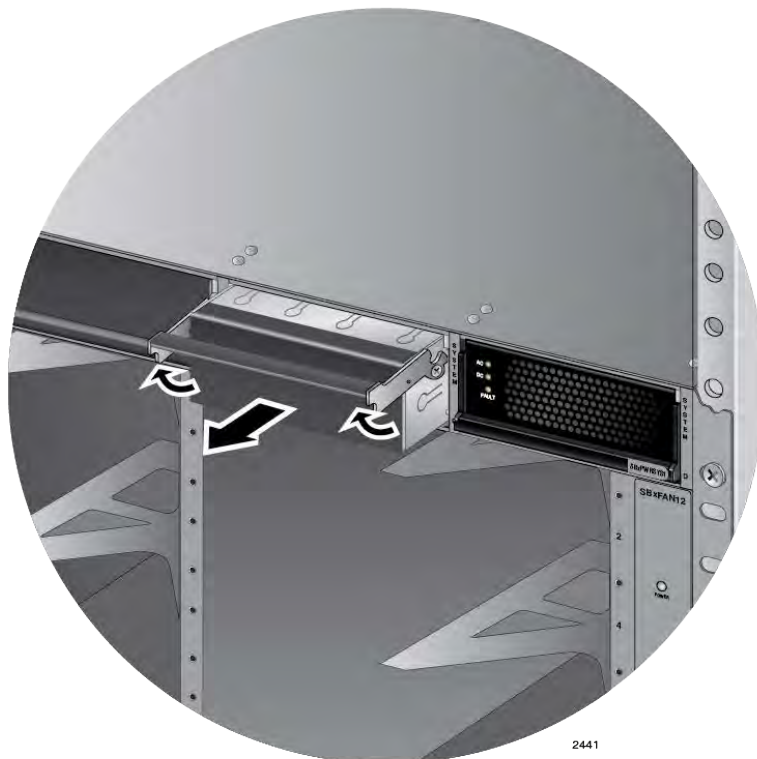


Figure 53. Removing the Blank Slot Cover from Power Supply Slot C



3. Remove the new power supply from the shipping package and verify the package contents, listed in Figure 54.

If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



Figure 54. Items Included with the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supply

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**Note**

Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

---

---

**Note**

The tie wrap is used to secure the power cord to the chassis in “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 199.

---

4. Move the locking handle on the power supply to the unlocked or up position. See Figure 55.



Figure 55. Unlocking the Handle on the Power Supply

5. Align and insert the power supply into the power supply slot. Figure 56 shows the power supply installed in slot D.



Figure 56. Inserting the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supply

6. Lower the power supply locking handle to secure the power supply to the chassis, as shown in Figure 57.



Figure 57. Lowering the Handle on the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supply

---

**Note**

If the module does not fully seat in the chassis slot, check to be sure you are installing a system power supply and not a PoE power supply. The model name of the module is included on a label on the locking handle. For more information, refer to “Power Supplies and Power Supply Slots” on page 27.

---

7. To install a second system power supply, repeat this procedure.
8. After installing the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies, do one of the following:
  - ☐ If you purchased the AT-SBxPWRPOE1 Power Supply for the ports on the AT-SBx81GP24 PoE Line Cards, go to “Installing AT-SBxPWRPOE1 PoE Power Supplies” on page 133.
  - ☐ Otherwise, go to Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 145.

---

**Note**

Retain the tie wrap that comes with the power supply. You will use it to secure the power cord to the chassis when you power on the unit in “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 199.

---

## Installing AT-SBxPWRPOE1 PoE Power Supplies

---

This section contains the installation procedure for the AT-SBxPWRPOE1 Power Supply, for the PoE+ ports on the AT-SBx81GP24 PoE Line Card. For background information, refer to “Power Supplies and Power Supply Slots” on page 27.



---

**Caution**

The electronic components in the power supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 126 to guard against ESD damage when unpacking and installing the power supply.

---

To install the power supply, perform the following procedure:

1. Choose a slot for the AT-SBxPWRPOE1 System Power Supply in the chassis.

You may install it in either slot A or B, shown in Figure 52 on page 128.

2. Raise the handle on the blank panel covering the selected slot and slide the panel from the chassis. Figure 58 on page 134 illustrates the removal of the blank panel from slot A.



Figure 58. Removing the Blank Slot Cover from Power Supply Slot A

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 59 on page 135.

If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



Figure 59. Items Included with the AT-SBxPWRPOE1 Power Supply Module

---

**Note**

Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

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**Note**

The tie wrap is used to secure the power cord to the chassis in “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203.

---

4. Raise the locking handle on the AT-SBxPWRPOE1 Power Supply, as shown Figure 60 on page 136.



Figure 60. Unlocking the Handle on the AT-SBxPWRPOE1 Power Supply

5. Align and insert the AT-SBxPWRPOE1 Module into slot A or B.  
Figure 61 shows the power supply module aligned in slot A.



**Caution**

The AT-SBxPWRPOE1 AC Power Supply will not work in slot C or D.



Figure 61. Inserting the AT-SBxPWRPOE1 Power Supply



6. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 62.



Figure 62. Locking the Handle on the AT-SBxPWRPOE1 Power Supply

---

**Note**

If the module does not fully seat in the chassis slot, check to be sure you are installing a PoE power supply and not a system power supply. The model name of the module is included on a label on the locking handle. For more information, refer to “Power Supplies and Power Supply Slots” on page 27.

---

7. To install a second AT-SBxPWRPOE1 Power Supply, repeat this procedure.
8. After installing the AT-SBxPWRPOE1 Power Supplies, go to Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 145.

---

**Note**

Retain the tie wrap that comes with the power supply. You use it to secure the power cord to the chassis when you power on the unit in “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203.

---

## Installing AT-SBxPWRSYS1 DC System Power Supplies

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This section contains the installation procedure for AT-SBxPWRSYS1 DC System Power Supplies. For background information, refer to “Power Supplies and Power Supply Slots” on page 27.



---

**Caution**

The electronic components in the power supply can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 126 to guard against ESD damage when unpacking and installing the power supply.

---

To install the power supply, perform the following procedure:

1. Choose a slot in the chassis for the AT-SBxPWRSYS1 DC System Power Supply.

System power supplies are installed in slots C and D in the chassis. Refer to Figure 52 on page 128. If you are installing only one power supply, you may install it in either slot, but Allied Telesis recommends slot D because the slot does not come with a blank power supply panel.



---

**Caution**

The AT-SBxPWRSYS1 DC System Power Supply will not work in slot A or B.

---

2. If the chassis already has a power supply in slot D, remove the blank power supply panel from slot C by lifting the blank panel handle and sliding it out of the slot, as shown in Figure 63 on page 139.

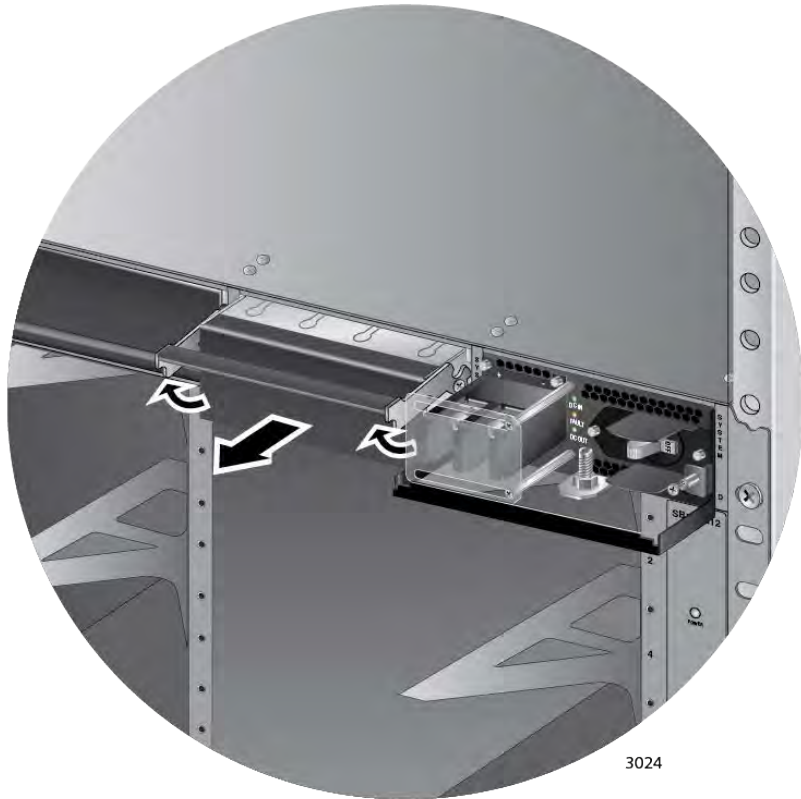
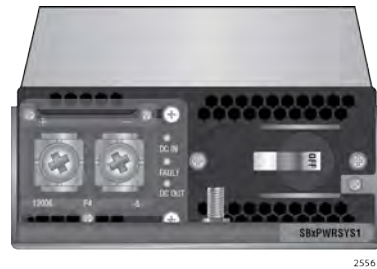


Figure 63. Removing the Blank Slot Cover from Power Supply Slot C

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 64 on page 140.

If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBxPWRSYS1 DC System Power Supply



Two straight power wire ring lugs



One grounding wire ring lug



Two right angle power wire ring lugs

Figure 64. Items Included with the AT-SBxPWRSYS1 DC Power Supply Module

---

**Note**

Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

---

4. Verify that the On/Off switch on the power supply is in the Off position. Refer to Figure 65 on page 141.

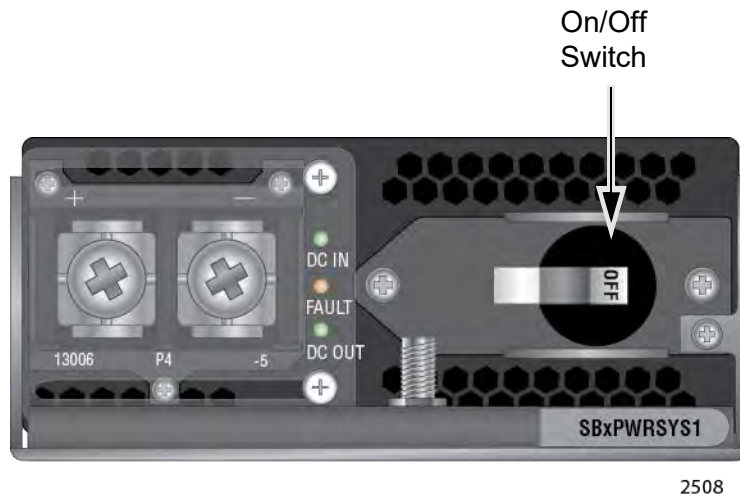


Figure 65. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

5. With a #2 Phillips-head screwdriver, loosen the handle locking screw on the power supply, as shown in Figure 66.

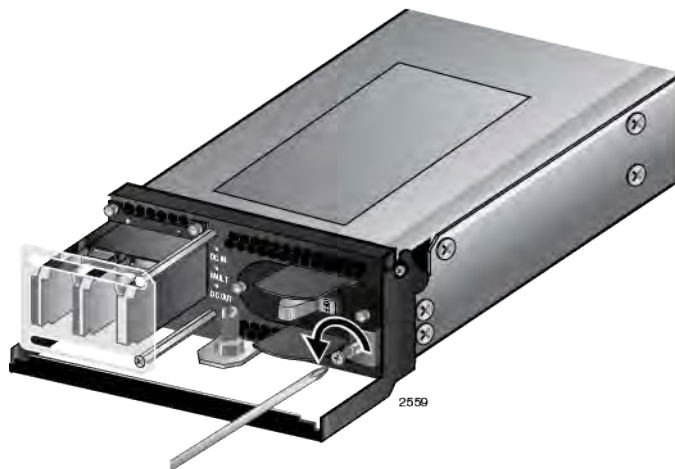


Figure 66. Loosening the Handle locking Screw on the AT-SBxPWRSYS1 DC System Power Supply

6. Raise the locking handle on the power supply, as shown Figure 67 on page 142.



Figure 67. Raising Handle on the AT-SBxPWRSYS1 DC Power Supply

7. Align and insert the AT-SBxPWRSYS1 Module into slot C or D.  
Figure 68 shows the power supply installed in slot D.



**Caution**

The AT-SBxPWRSYS1 DC System Power Supply will not work in slot A or B.

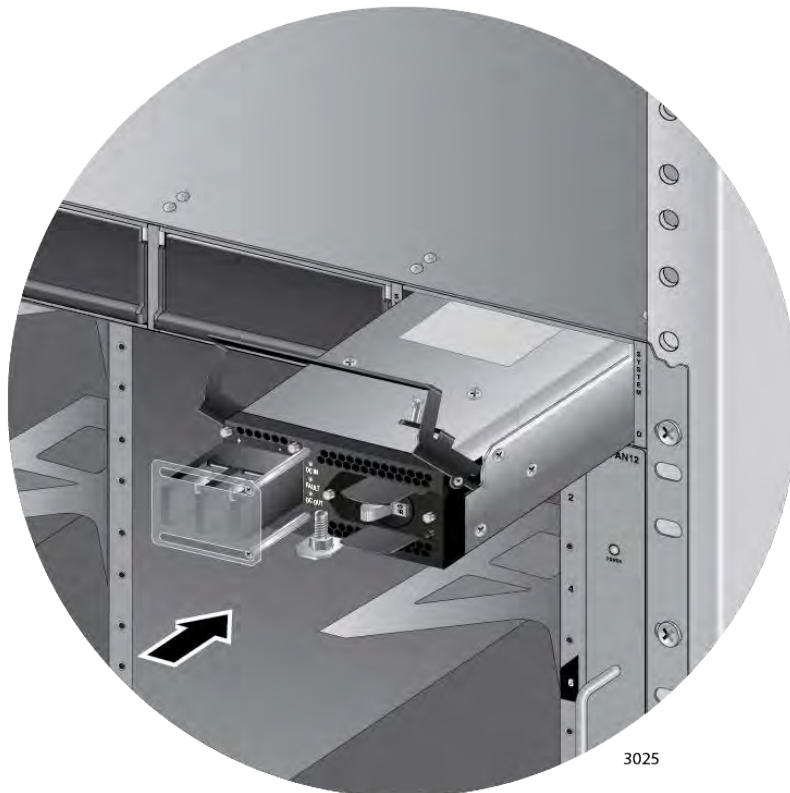


Figure 68. Inserting the AT-SBxPWRSYS1 DC System Power Supply

8. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 69.

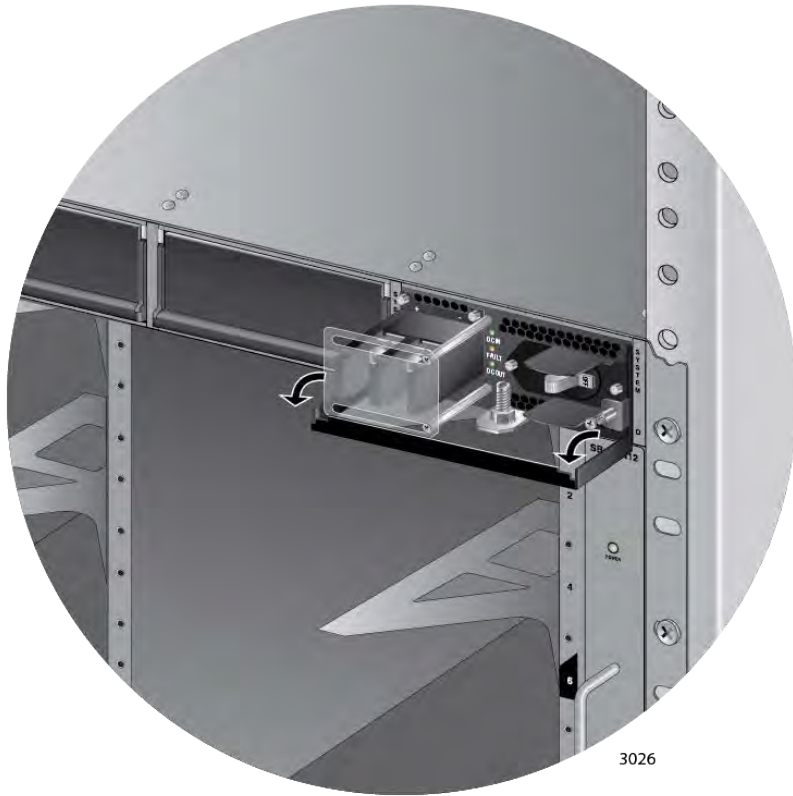


Figure 69. Locking the Handle on the AT-SBxPWRSYS1 DC System Power Supply

---

**Note**

Do not tighten the handle locking screw yet. You may need to slightly lift the handle to move the plastic guard panel when you connect the positive and negative wires in “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 206.

---

9. To install a second AT-SBxPWRSYS1 DC System Power Supply, repeat this procedure.
10. After installing the power supplies, go to Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 145.

---

**Note**

Retain the five wire ring lugs that come with the power supply. You use them to wire the power supply in “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 206.

---





## Chapter 7

# Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards

---

This chapter describes how to install the controller and Ethernet line cards. The chapter has the following sections:

- ❑ “Guidelines to Handling the Controller and Line Cards” on page 146
- ❑ “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 148
- ❑ “Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards” on page 154
- ❑ “Installing Ethernet Line Cards” on page 162
- ❑ “Installing Blank Slot Covers” on page 167

## Guidelines to Handling the Controller and Line Cards

---

Please observe the following guidelines when handling controller cards, Ethernet line cards, and expansion modules:

- ❑ The controller and line cards are hot swappable and can be installed or removed while the chassis is powered on.



### Caution

The expansion modules for the AT-SBx81XLEM Line Card are not hot-swappable. You have to install the modules before installing the line cards in the chassis. For instructions, refer to “Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards” on page 154 or “Replacing Expansion Modules in AT-SBx81XLEM Line Cards” on page 285.

---

- ❑ Always wear an anti-static device when handling the cards.



### Caution

The electronic components on the devices can be damaged by electro-static discharges (ESD). Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 126 to guard against ESD damage when handling the devices.

---

- ❑ Hold a card by its faceplate and edges.
- ❑ Never touch the electronic components on the top or bottom of a card.
- ❑ To avoid damaging the components on the bottom of a card, do not set it down on a table or desk. If you need to set down a card, return it to its anti-static bag and packaging container.
- ❑ Do not remove a card from its anti-static bag until you are ready to install it in the chassis.
- ❑ If you need to remove a card from the chassis, immediately return it in its anti-static bag and packaging container.
- ❑ Never hold or lift a controller card by the handles on the front faceplate. You might bend or damage the handles.

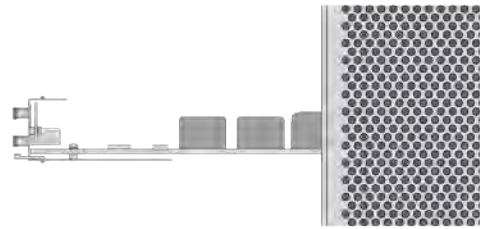


### Caution

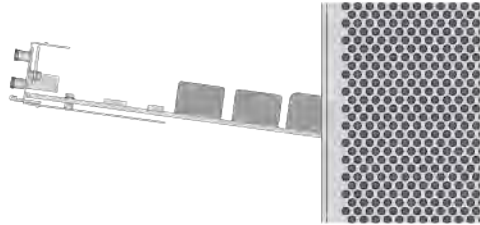
You must keep controller and Ethernet line cards level as you slide them into or out of the chassis. You might damage the components on the top or bottom of a card if you slide it at an angle. Refer to Figure 70 on page 147.

---

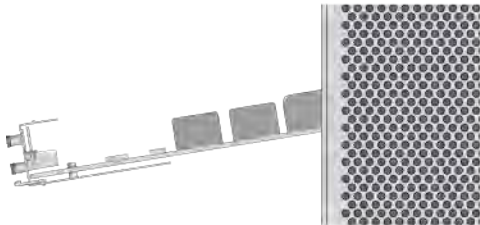
CORRECT



INCORRECT



INCORRECT



2978

Figure 70. Aligning a Card in a Slot

## Installing AT-SBx81CFC960 Controller Fabric Cards

---

This section contains the installation procedure for AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards.

---

**Note**

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---

Please review the following information before installing controller cards:

- ☐ You can install either one or two controller cards in the unit. The chassis must have at least one controller card.
- ☐ The cards are installed in slots 5 and 6.
- ☐ If you are installing only one AT-SBx81CFC960 Controller Card, Allied Telesis recommends installing it in slot 5.
- ☐ Please review “Controller Fabric Cards for the AT-SBx8112 Chassis” on page 74 if you will be installing two controller cards in the chassis or hot-swapping a controller card.

This procedure requires the following tools:

- ☐ #2 Phillips-head screwdriver (not provided)
- ☐ #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided))

To install the AT-SBx81CFC960 Card, perform the following procedure:

1. Choose a slot in the chassis for the AT-SBx81CFC960 Controller Fabric Card.

The cards are installed in slots 5 and 6, shown in Figure 71. If you are installing only one controller card, Allied Telesis recommends installing it in slot 5.

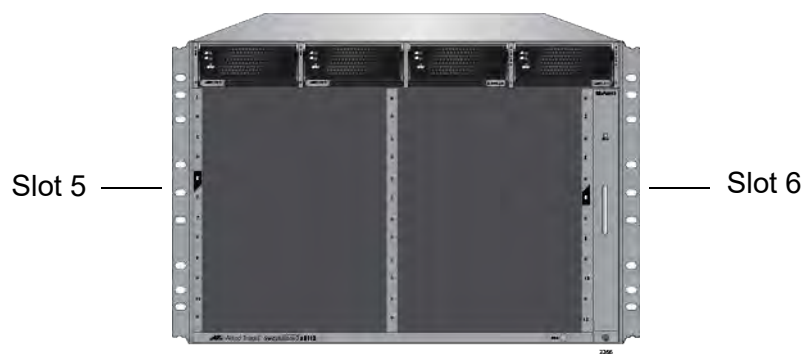


Figure 71. Slots 5 and 6 for the AT-SBx81CFC960 Versions 1 and 2 Cards

2. Remove the new AT-SBx81CFC960 Controller Fabric Card from the shipping package and verify the package contents, listed in Figure 72.

If any item is missing or damaged, contact your Allied Telesis sales representative for assistance.



One AT-SBx81CFC960  
Control Card



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

Figure 72. Items Included with the AT-SBx81CFC960 Controller Card

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**Note**

Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

---

3. Carefully remove the controller card from the anti-static bag. Refer to Figure 73.



Figure 73. Removing the AT-SBx81CFC960 Controller Fabric Card from  
the Anti-static Bag

4. Carefully remove the battery insulator tab on the controller card by sliding it out from between the battery and battery clip, as shown in Figure 74.

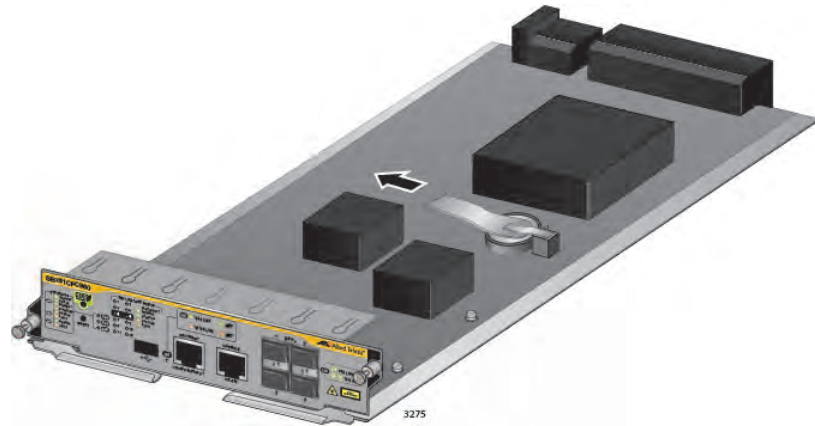


Figure 74. Removing the Battery Insulator

5. Move the locking handles on the front panel to the open position, as shown in Figure 75.

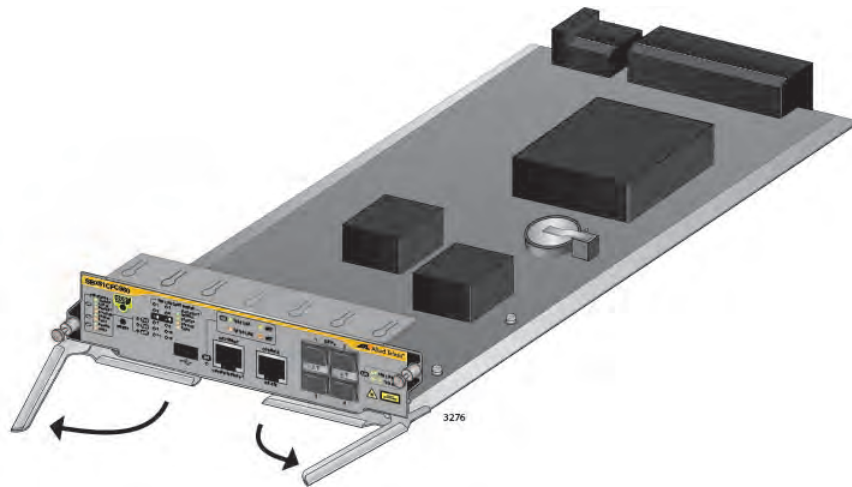


Figure 75. Opening the Locking Handles on the AT-SBx81CFC960 Controller Fabric Card

6. Align the edges of the AT-SBx81CFC960 Controller Fabric Card with the internal chassis card guides in slot 5 or 6 of the AT-SBx8112 Chassis. Figure 76 on page 151 shows the AT-SBx81CFC960 Card aligned in slot 5.

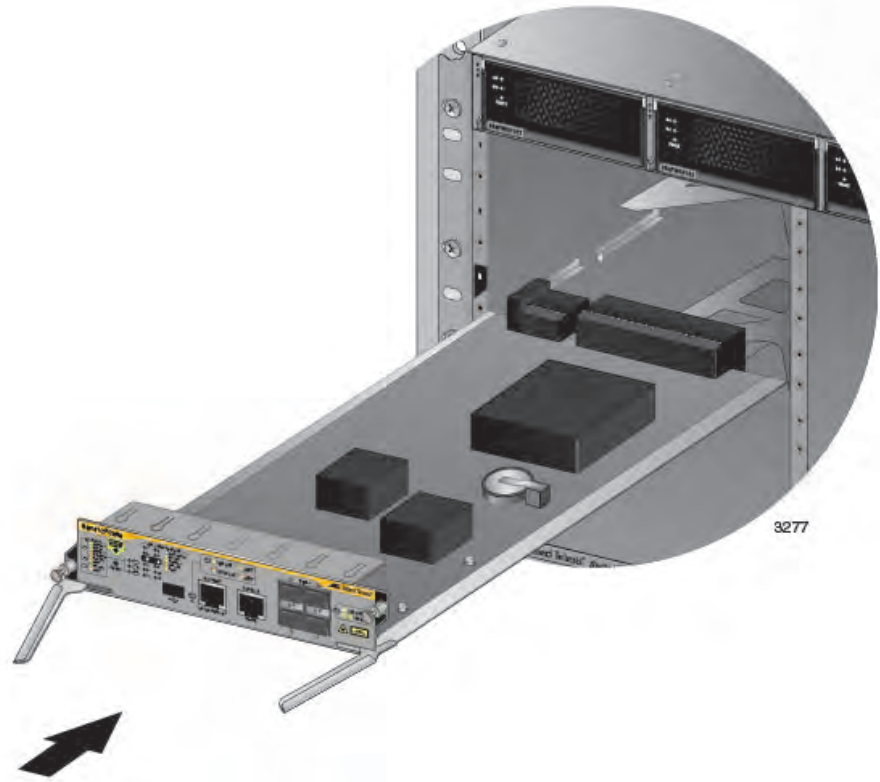


Figure 76. Aligning the AT-SBx81CFC960 Card in the Chassis Slot

7. Carefully slide the card into the slot.



---

**Caution**

Keep the card level with the chassis as you slide it into the slot. You might damage the components on the top or bottom of the card if you slide it in at an angle. Refer to Figure 70 on page 147.

---



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**Caution**

Do not force the AT-SBx81CFC960 Card into the slot. If you feel resistance, remove it and try again. Be sure that the edges of the card are properly aligned with the card guides.

---

8. When you feel the card make contact with the connector on the backplane of the chassis, carefully close the two locking levers on the front panel of the controller card to secure it in the chassis, as shown in Figure 77 on page 152.

---

**Note**

When hot-swapping a new controller card, you should *immediately* close its locking levers after its connectors make contact with the backplane. Otherwise, the active controller card might enter kernel error messages in the log.

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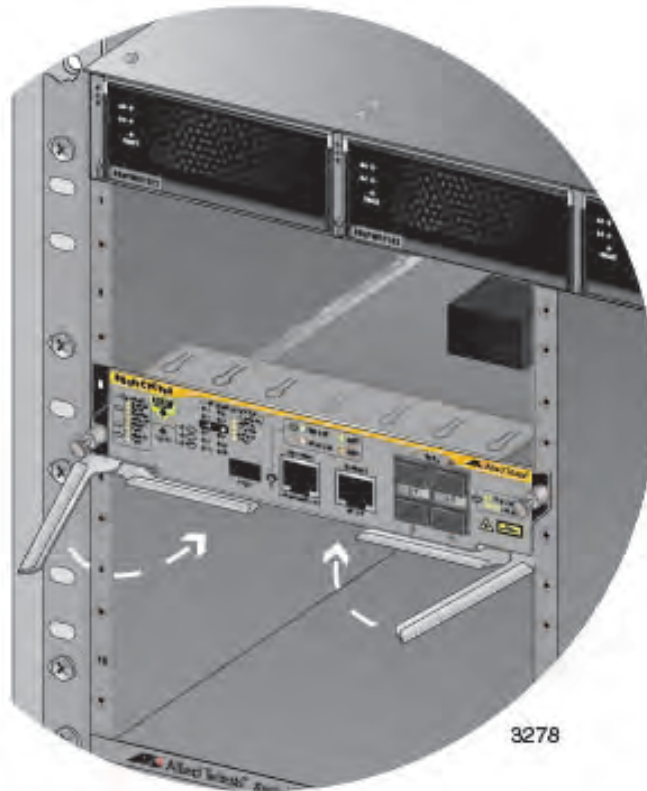


Figure 77. Closing the Locking Levers on the AT-SBx81CFC960 Controller Fabric Card

9. Finger tighten the two thumbscrews on the card to secure the card to the chassis, as shown in Figure 78 on page 153.





Figure 78. Tightening the Thumb Screws on the AT-SBx81CFC960 Card

10. Tighten the screws with a # 2 Phillips-head screwdriver to secure the controller card to the chassis.

Allied Telesis recommends tightening the screws to 5 inch-lbs.

11. if the chassis is to have two AT-SBx81CFC960 Controller Fabric Cards, repeat this procedure to install the second card.
12. After installing the controller cards, do one of the following:
  - ☐ If you purchased AT-SBx81XLEM Ethernet Line Cards with expansion modules, go to “Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards” on page 154.
  - ☐ Otherwise, go to “Installing Ethernet Line Cards” on page 162.

## Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards

---

This section contains the procedure for installing an expansion module in the AT-SBx81XLEM Ethernet Line Card. If you did not purchase AT-SBx81XLEM Ethernet Line Cards, skip this procedure and go to “Installing Ethernet Line Cards” on page 162.



---

### Caution

You must install the expansion module before installing the AT-SBx81XLEM Ethernet Line Card in the chassis. Attempting to install the module when the line card is in the chassis will damage the module and card. If the card is already installed in the chassis, remove it by performing the procedure “Replacing Ethernet Line Cards” on page 283.

---

---

### Note

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---

The illustrations in the procedure show the AT-SBx81XLEM/XS8 Expansion Module. The procedure is the same for all expansion modules.

To install an expansion module in the AT-SBx81XLEM Ethernet Line Card, perform the following procedure:

1. Remove the AT-SBx81XLEM Ethernet Line Card from the shipping package. If it is missing or damaged, contact your Allied Telesis sales representative for assistance.

---

### Note

Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

---

2. Carefully remove the card from the anti-static bag. Refer to Figure 79 on page 155.

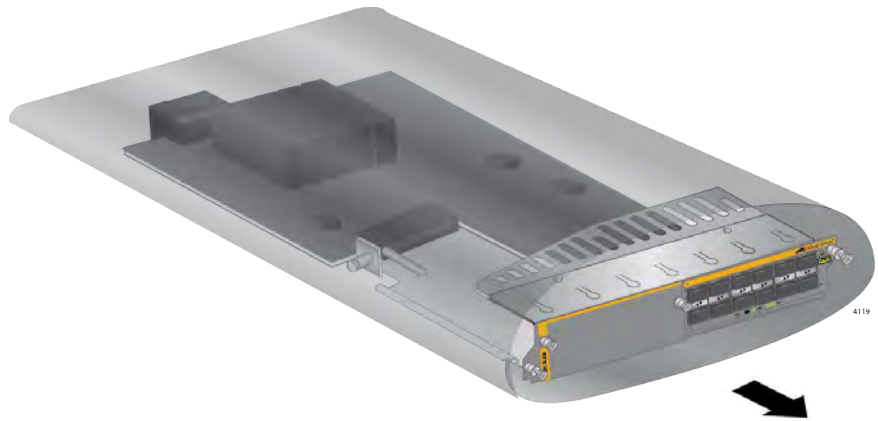


Figure 79. Removing the AT-SBx81XLEM Line Card from the Anti-static Bag

3. Place the card on a level surface.
4. With a #2 Phillips-head screwdriver, remove the two screws that secure the blank slot cover to the card. Refer to Figure 80.



Figure 80. Removing the Screws on the Blank Slot Cover on the AT-SBx81XLEM Line Card

5. Slide the blank slot cover from the slot. Refer to Figure 81 on page 156.

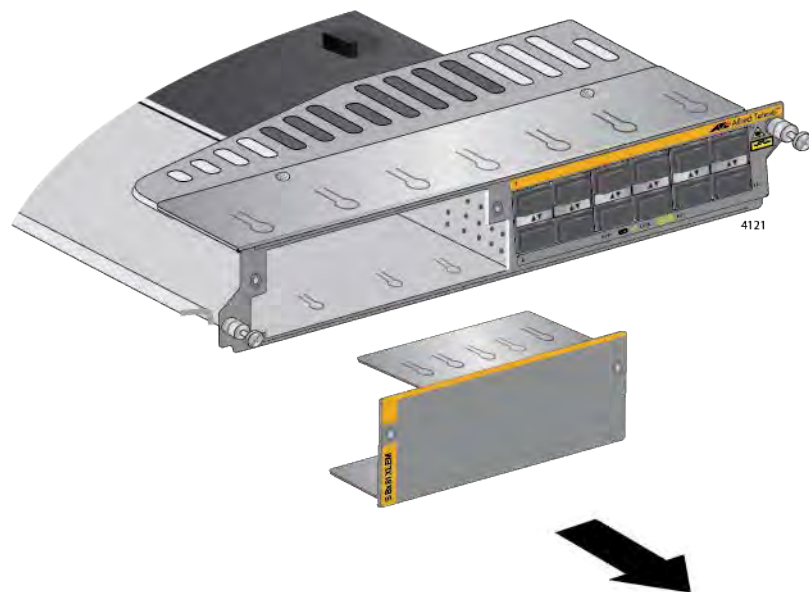


Figure 81. Removing the Blank Slot Cover from the AT-SBx81XLEM Line Card

6. With your thumb and forefinger, pull out the retaining pin on the side of the line card and turn it clockwise one quarter turn so that it remains in the retracted position. Refer to Figure 82 on page 157.

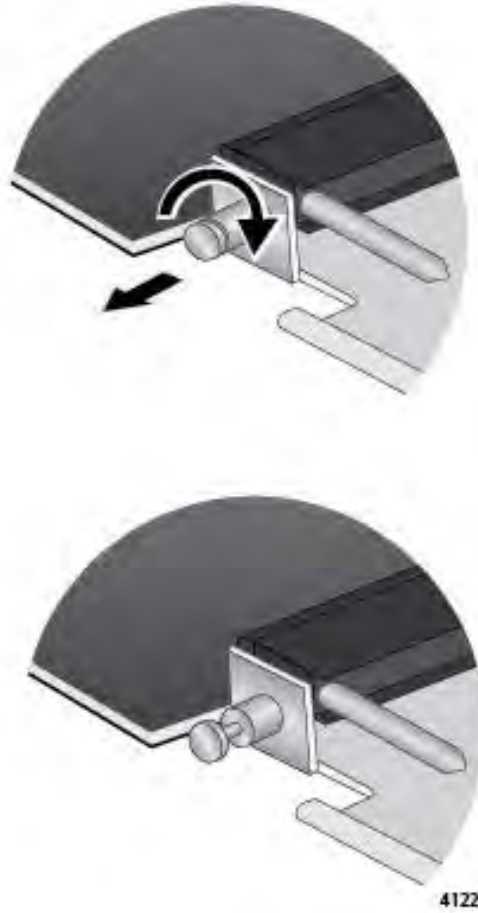


Figure 82. Retracting the Retaining Pin on the AT-SBx81XLEM Line Card

7. Remove the expansion module from its shipping container and anti-static bag. Refer to Figure 83.



Figure 83. Removing the Expansion Module from the Anti-static Bag

8. Carefully align the expansion module in the slot, as shown in Figure 84, and slide it into the line card.



**Caution**

Keep the module level with the line card as you slide it into the slot. You might damage the components on the top or bottom of the module if you slide it in at an angle. Refer to Figure 70 on page 147.



**Caution**

Do not force the card into the slot. If you feel resistance, remove the card and try again.

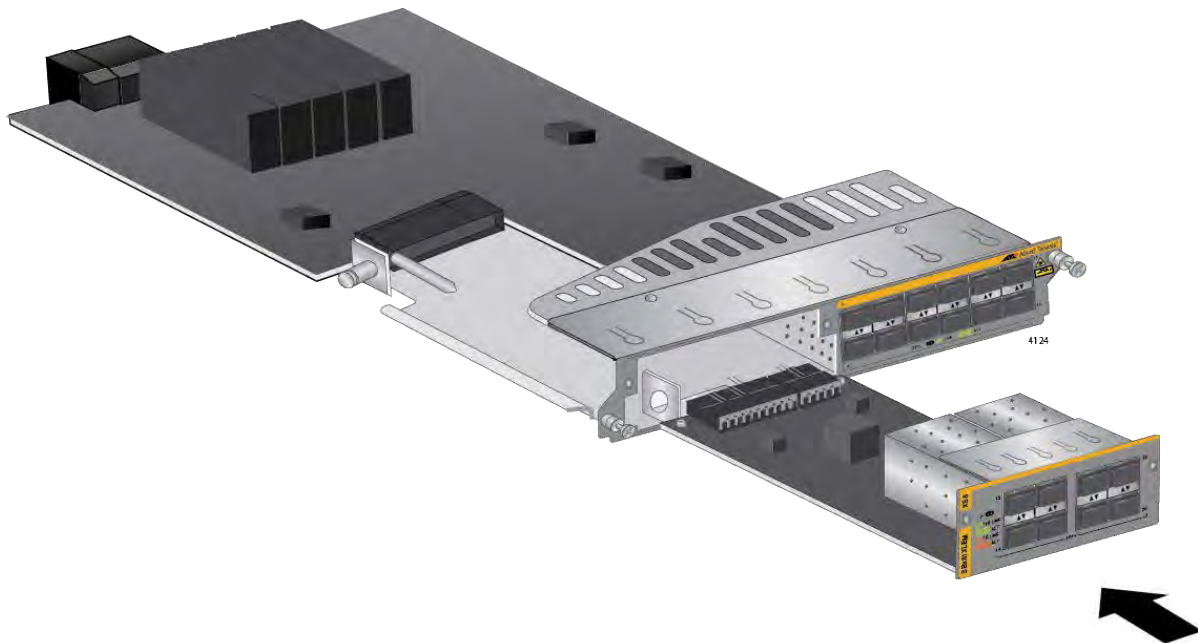


Figure 84. Sliding the Expansion Module into the AT-SBx81XLEM Line Card

9. When the expansion module makes contact with the connector inside the line card, gently press on both sides of the faceplate to seat the module on the connector. Refer to Figure 85 on page 159. The module is fully installed when its faceplate is flush against the faceplate of the AT-SBx81XLEM Line Card.

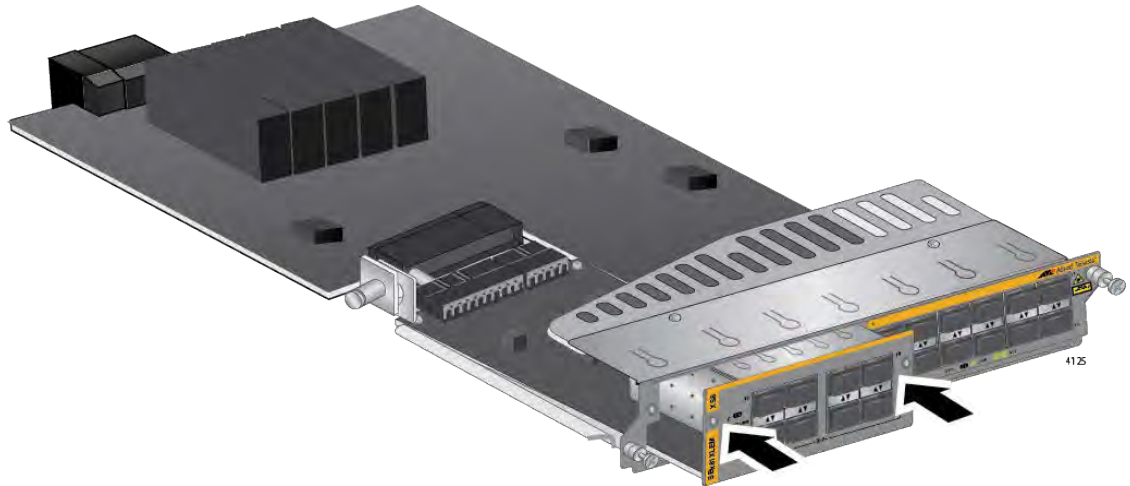


Figure 85. Seating the Expansion Module on the Connector in the AT-SBx81XLEM Line Card

10. With a Phillips-head screwdriver, install the two screws from step 4 to secure the expansion module to the line card. Refer to Figure 86.

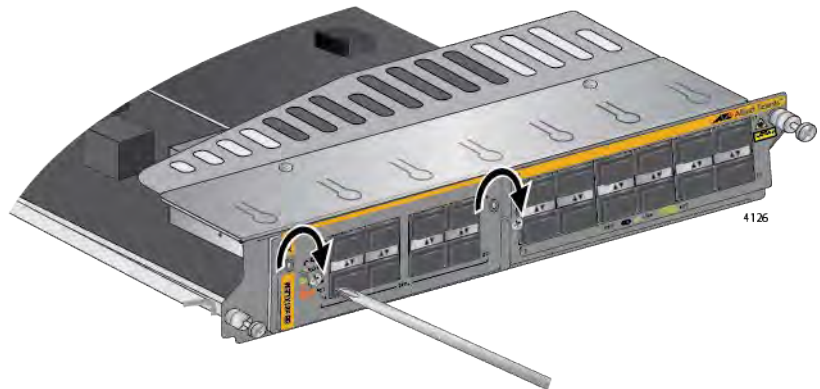


Figure 86. Securing the Expansion Module

11. Turn the retaining pin on the side of the line card one quarter turn to release it. Refer to Figure 87 on page 160.



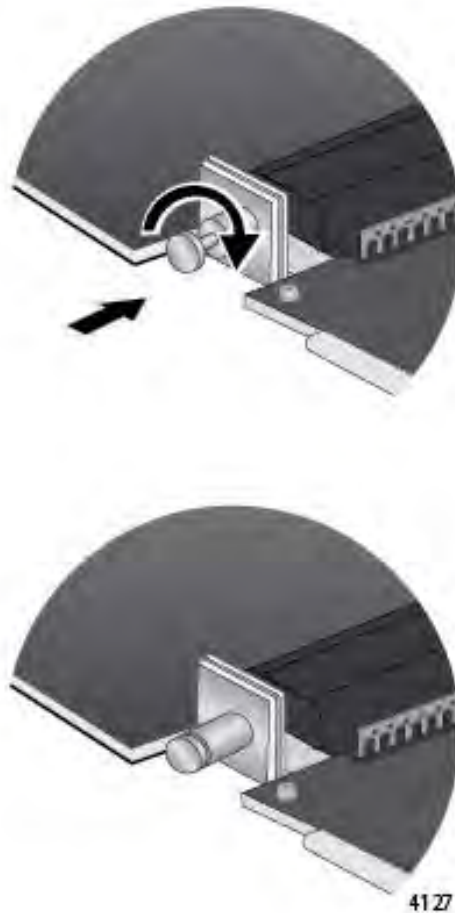


Figure 87. Releasing the Retaining Pin

12. Retain the blank slot cover removed in step 5 and shown in Figure 88 by storing it in a safe location. You should reinstall it on the AT-SBx81XLEM Line Card if, at a later date, you remove the expansion module.



Figure 88. Blank Slot Cover for the AT-SBx81XLEM Line Card

13. If you are not installing the line card in the chassis now, return it to its anti-static bag and shipping container to protect it from damage. Refer to Figure 89 on page 161.



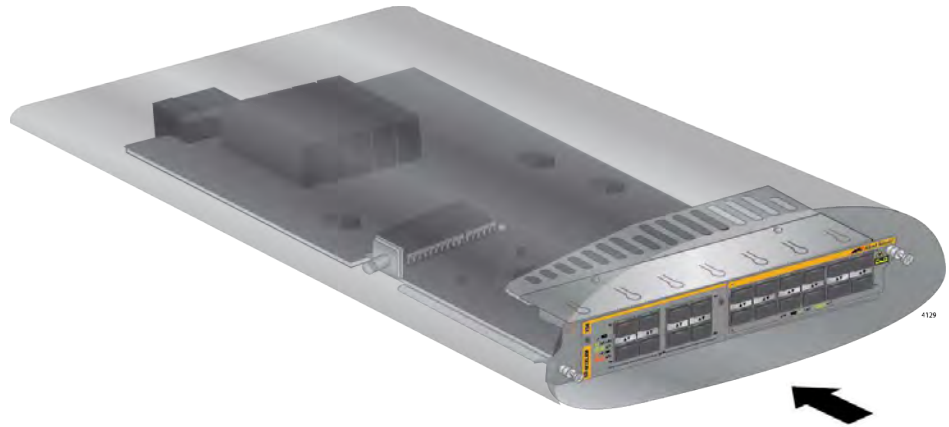


Figure 89. Returning the Line Card to its Anti-static Bag

14. For instructions on how to install the line card in the chassis, go to “Installing Ethernet Line Cards” on page 162.

---

**Note**

In AlliedWare Plus v5.4.6, the AT-SBx81XLEM Line Card was supported in slots 1 to 4, 8, and 10 in the AT-SBx8112 Chassis, but not slots 7, 9, 11, and 12. In AlliedWare Plus v5.4.6.1-1 or later, the line card is supported in all ten line card slots.

---

## Installing Ethernet Line Cards

This section contains the installation procedure for Ethernet line cards. The illustrations show the AT-SBx81GP24 Line Card, but the procedure is the same for all cards.

---

### Note

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---

This procedure requires the following tools:

- ❑ #2 Phillips-head screwdriver (not provided)
- ❑ #2 Phillips-head, 5 inch-lbs torque screwdriver (optional — not provided)

---

### Note

Before installing a new Ethernet line card in an active chassis, Allied Telesis recommends confirming that the version of the AlliedWare Plus management software on the controller cards support the card. For instructions, perform steps 1 and 2 in “Verifying the Chassis with the AlliedWare Plus Commands” on page 241.

---

To install the Ethernet line cards, perform the following procedure:

1. Choose a slot in the chassis for the Ethernet line card. The Ethernet line cards can be installed in slots 1 to 4 and 7 to 12. The slots are shown in Figure 90.

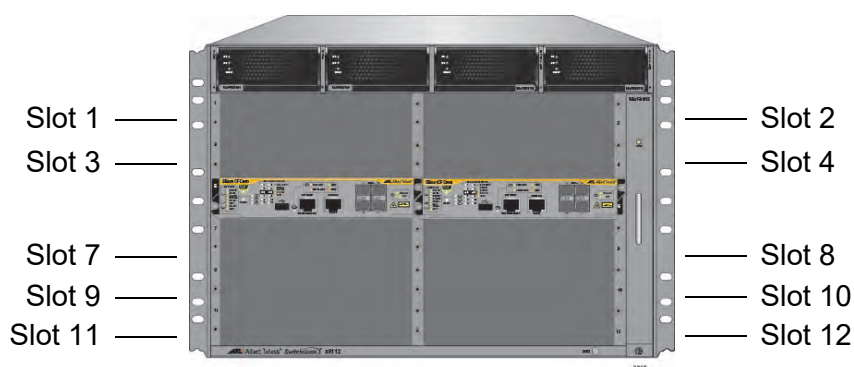


Figure 90. Slots 1 to 4 and 7 to 12 for the Ethernet Line Cards

Please review the following information:

- ❑ The AT-SBx81XS16 Line Card is supported in slots 1 to 4, 8, and 10. It is not supported in slots 7, 9, 11, and 12.

- ❑ For AlliedWare Plus v5,4,6, the AT-SBx81XLEM Line Card is restricted to slots 1 to 4, 8, and 10. For AlliedWare Plus v5,4,6-1.1 or later, the card can be installed in any of the line card slots.
2. If the selected slot for the line card is covered with a blank slot cover, use a #2 Phillips-head screwdriver to loosen the two captive screws on the cover and remove it from the chassis. Refer to Figure 91.

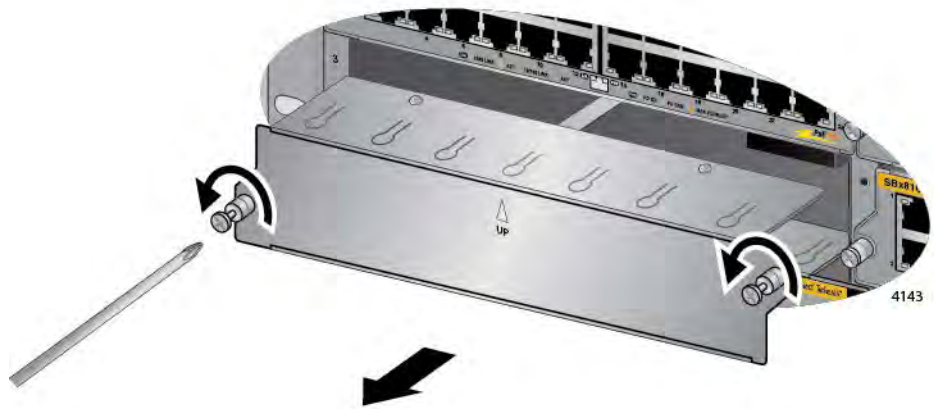


Figure 91. Removing a Blank Slot Cover

3. Remove the line card from the shipping package. If it is missing or damaged, contact your Allied Telesis sales representative for assistance.

---

**Note**

Store the packaging material in a safe location. You should use the original shipping material if you need to return the unit to Allied Telesis.

---

4. Carefully remove the Ethernet line card from the anti-static bag. Refer to Figure 92.

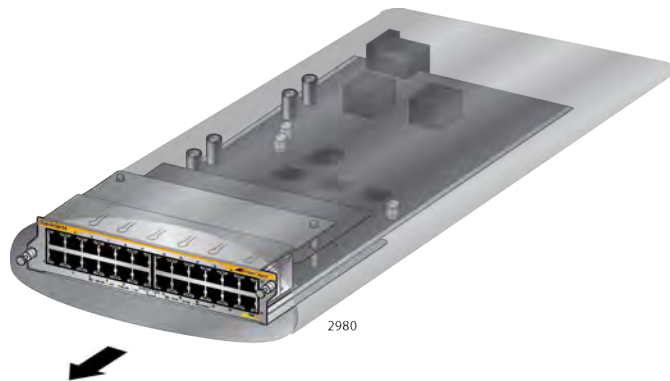


Figure 92. Removing the Ethernet Line Card from the Anti-static Bag

5. Align the line card with the internal chassis card guides in the selected slot in the chassis.

Figure 93 shows an Ethernet line card aligned with slot 1.

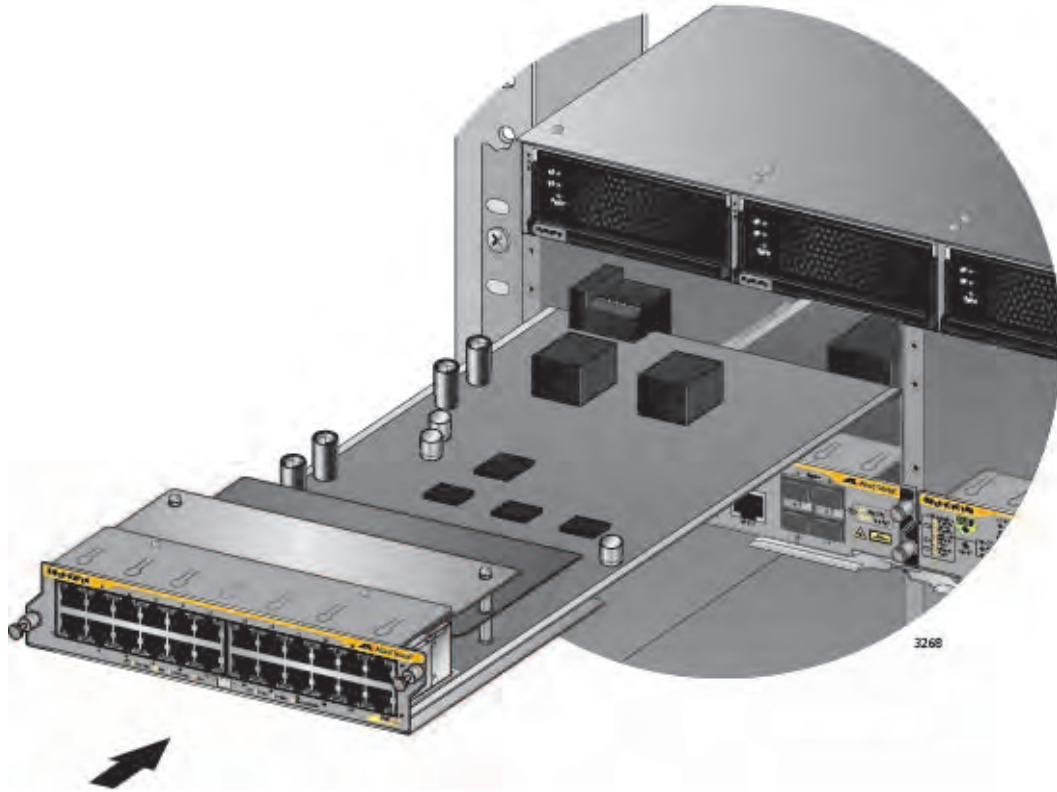


Figure 93. Aligning an Ethernet Line Card in a Chassis Slot

6. Carefully slide the card into the slot.



**Caution**

Keep the card level with the chassis as you slide it into the slot. You might damage the components on the top or bottom of the card if you slide it in at an angle. Refer to Figure 70 on page 147.



**Caution**

Do not force the card into the slot. If you feel resistance, remove the card and try again. Be sure that the edges of the card are properly aligned with the card guides.

7. When you feel the line card make contact with the connector on the backplane of the chassis, gently press on both sides of the faceplate to seat the card on the connector. Refer to Figure 94 on page 165.

**Note**

When hot-swapping a new Ethernet line card, you should *immediately* perform step 7 to fully seat the card in the chassis slot, after its connectors make contact with the backplane. Otherwise, the active controller card might enter kernel error messages in the log.

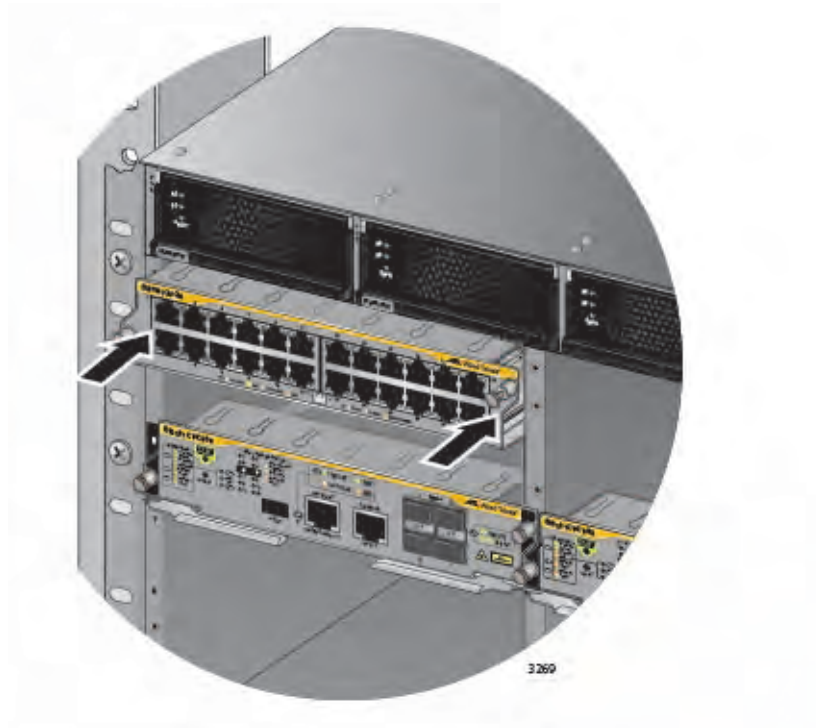


Figure 94. Seating an Ethernet Line Card on the Backplane Connector

8. Finger tighten the two thumbscrews on the sides of the line card to secure it to the chassis, as shown in Figure 95 on page 166.

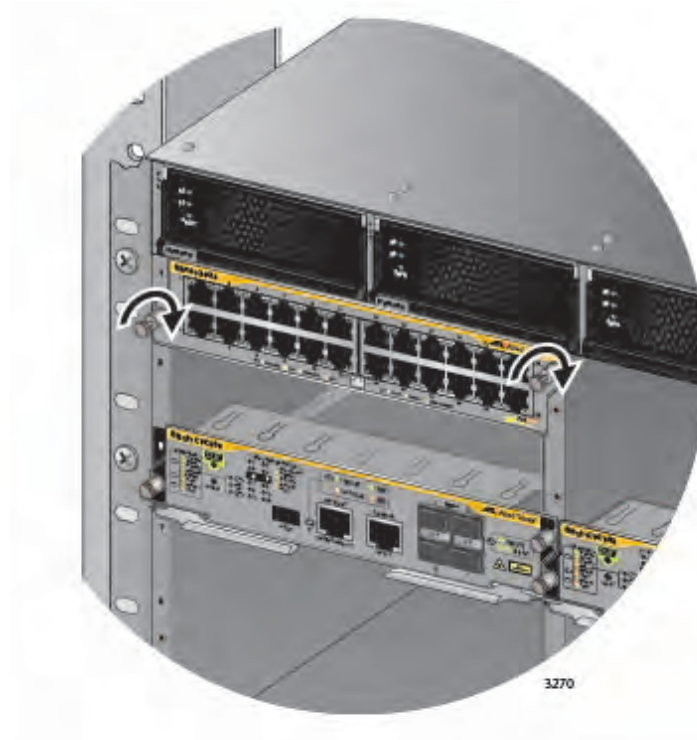


Figure 95. Tightening the Thumb Screws on an Ethernet Line Card

9. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the line card to the chassis.

Allied Telesis recommends tightening the screws to 5 inch-lbs.

10. Repeat this procedure to install the remaining Ethernet line cards.
11. After installing the line cards, go to “Installing Blank Slot Covers” on page 167.

## Installing Blank Slot Covers

After installing the AT-SBx81CFC960 Controller Fabric Cards and Ethernet line cards, check the front panel for unused slots and cover them with the blank slot covers included with the chassis, as explained in this procedure. The fan module may not be able to maintain adequate airflow across the control and line cards if the chassis is not completely enclosed. If there are no unused slots, go to Chapter 8, “Cabling the Ethernet Line Cards” on page 169.

To install the blank panels on the unused slots, perform the following procedure:

1. Position a blank slot cover over an unused slot, as shown in Figure 96. The up arrow on the panel must be pointing up.

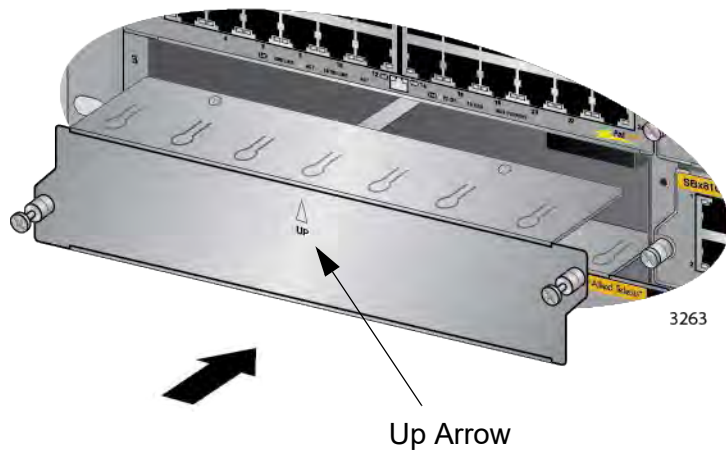


Figure 96. Installing a Blank Slot Cover

2. Finger tighten the two thumbscrews to attach the blank panel to the chassis, as shown in Figure 97.



Figure 97. Tightening the Thumbscrews on a Blank Slot Cover

3. Tighten the two screws with a # 2 Phillips-head screwdriver to secure the blank slot cover to the chassis.

Allied Telesis recommends tightening the screws to 5 inch-lbs.

4. Repeat this procedure to cover the remaining empty slots with blank slot covers.
5. Store any unused blank panels in a secure location for future use.
6. Go to Chapter 8, "Cabling the Ethernet Line Cards" on page 169.



## Chapter 8

# Cabling the Ethernet Line Cards

---

This chapter contains instructions on how to cable the ports and slots on the Ethernet line cards. The chapter has the following sections:

- ❑ “Cabling Guidelines for Twisted Pair Ports” on page 170
- ❑ “Guidelines to Installing Fiber Optic Transceivers” on page 173
- ❑ “Installing SFP and SFP+ Transceivers” on page 174
- ❑ “Installing AT-SP10TW Direct Connect Cables” on page 180
- ❑ “Installing AT-QSFPCU Cables” on page 183
- ❑ “Installing AT-QSFPSR, AT-QSFPSR4, or AT-QSFPLR4 Transceivers” on page 185

## Cabling Guidelines for Twisted Pair Ports

---

This section applies to the twisted pair ports on the following line cards and expansion modules:

- ❑ AT-SBx81GT24 Line Card
- ❑ AT-SBx81GP24 Line Card
- ❑ AT-SBx81GT40 Line Card
- ❑ AT-SBx81XLEM/GT8 Expansion Module
- ❑ AT-SBx81XLEM/XT4 Expansion Module

Here are the guidelines to cabling the ports:

- ❑ The 10/100/1000Mbps ports on the AT-SBx81GT24 and AT-SBx81GP24 Line Cards and AT-SBx81XLEM/GT8 Expansion Module have 8-pin RJ45 connectors.
- ❑ The 1Gbps and 10Gbps ports on the AT-SBx81XLEM/XT4 Expansion Module also have 8-pin RJ45 connectors.
- ❑ The ports on the AT-SBx81GT40 Line Card have 8-pin RJ point 5 connectors.
- ❑ The cable requirements are listed in “Cable Requirements” on page 68.
- ❑ The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- ❑ The default setting for PoE on the ports on the AT-SBx81GP24 Line Card is enabled.
- ❑ 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 network devices that do not support Auto-Negotiation and have fixed speeds or 10 or 100 Mbps. For those switch ports, disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- ❑ The 10/100/1000Mbps 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. 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. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

- ❑ The default wiring configuration of the ports is automatic MDIX detection, which configures the MDI/MDIX setting automatically. This setting is appropriate for switch ports that are connected to network devices that also support the feature.
- ❑ The default wiring configuration of automatic MDIX detection is not appropriate for ports that are connected to network devices that do not support the feature. On those ports, you should disable automatic MDIX detection and set the wiring configuration manually with the POLARITY command.

### Connecting Cables to the AT- SBx81GT40 Line Card

Here are a additional guidelines to connecting cables to ports on the AT-SBx81GT40 Line Card:

- ❑ The ports require the RJ point 5 cable connector shown in Figure 98.



Figure 98. RJ Point 5 Cable Connector for AT-SBx81GT40 Line Card

- ❑ To connect a cable to a port in the top role on the line card, orient the connector with the release tab on top. To connect a cable to a port in the bottom role, orient the connector with the release tab on the bottom. Refer to Figure 99 on page 172.
- ❑ To remove a cable from a port, pull gently on the release tab and slide the cable connector from the port.

---

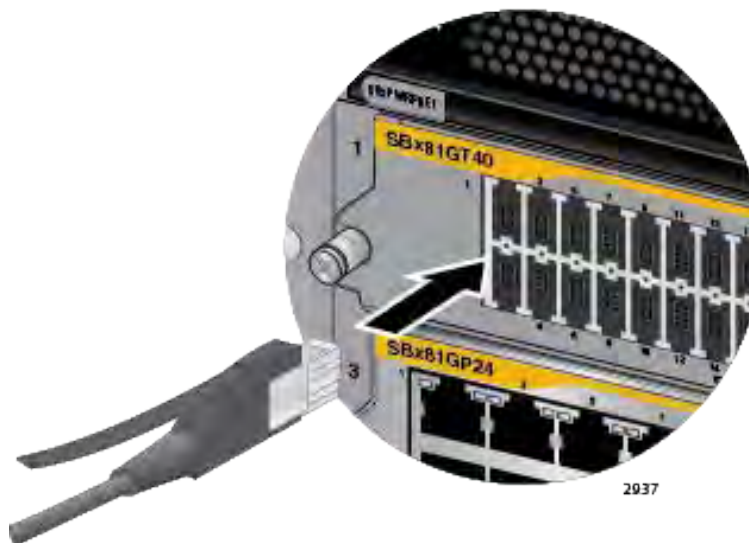
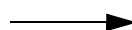
#### Note

Patch cables for the AT-SBx81GT40 Line Card, in lengths of 1 meter and 3 meters with RJ point 5 and RJ-45 connectors, are available from Allied Telesis. Contact your Allied Telesis sales representative for information.

---

Connecting a cable to a port in the top row.

Release Tab



Connecting a cable to a port in the bottom row.



Figure 99. Connecting Cables to Ports on the AT-SBx81GT40 Line Card

## Guidelines to Installing Fiber Optic Transceivers

---

Please review the following guidelines before installing fiber optic transceivers in the line cards and expansion modules:

- ❑ You should verify that the transceivers are supported by the devices. Refer to Table 6 on page 39 and the SwitchBlade x8100 data sheet on the Allied Telesis web site.
- ❑ You should install a transceiver in a line card before connecting its network cable.
- ❑ A fiber optic transceiver is dust sensitive. Always keep the protective cover in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove this cover, retain it for future use.
- ❑ Your Allied Telesis sales representative can provide you with a list of supported transceivers for the line cards and expansion modules.
- ❑ The operational specifications and fiber optic cable requirements of the transceivers are provided in the documents included with the devices.
- ❑ The transceivers and direct connect cables are hot-swappable. You can install them while the chassis is powered on.
- ❑ Unnecessary removal or insertion of transceivers can lead to premature failures.



### Warning

Transceivers can be damaged by static electricity. Follow the procedure in “Protecting Against Electrostatic Discharge (ESD)” on page 126 to guard against ESD damage when unpacking and installing the devices.

---



### Caution

The temperature of an operational transceiver can exceed 70 C (158 F). Exercise caution when removing or handling transceivers with unprotected hands.

---

## Installing SFP and SFP+ Transceivers

This section applies to the following line cards and expansion module:

- ❑ AT-SBx81GS24a Line Card
- ❑ AT-SBx81XS6 Line Card
- ❑ AT-SBx81XS16 Line Card
- ❑ AT-SBx81XLEM Line Card
- ❑ AT-SBx81XLEM/XS8 Expansion Module

Table 29 lists the basic types of transceivers supported by the above Ethernet line cards. For model names of specific transceivers, refer to the SwitchBlade x8100 data sheet on the Allied Telesis web site.

Table 29. Transceiver Support

Device	100Mbps SFP Transceivers	1Gbps SFP Transceivers	10Gbps SFP+ Transceivers or AT-SP10TW Cables <sup>1</sup>
AT-SBx81GS24a Line Card	Yes	Yes	No
AT-SBx81XS6 Line Card	No	No	Yes
AT-SBx81XS16 Line Card	No	No	Yes
AT-SBx81XLEM Line Card <sup>2</sup>	No	Yes	No
AT-SBx81XLEM/XS8 Expansion Module	No	Yes	Yes

1. Available in lengths of 1, 3, and 7 meters.

2. Transceiver slots 1 to 12.

Please review “Guidelines to Installing Fiber Optic Transceivers” on page 173 before performing this procedure.

The illustrations show the AT-SBx81XS16 Line Card. The procedure is the same for all the devices.

To install SFP or SFP+ transceivers, perform the following procedure:

1. Remove the dust plug from the slot chosen for the SFP or SFP+ transceiver. Figure 100 shows the dust plug removed from slot 1 on the AT-SBx81XS16 Line Card.



Figure 100. Removing the Dust Cover from a Transceiver Slot

---

**Note**

Do not remove the dust plug from a transceiver slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

---

2. Slide the transceiver in the slot until it clicks into place.

To install the transceiver into an odd numbered slot, position it with the handle is on top as you slide it into the slot. To install the transceiver into an even numbered slot, position it with the handle on the bottom. Refer to Figure 101 on page 176.

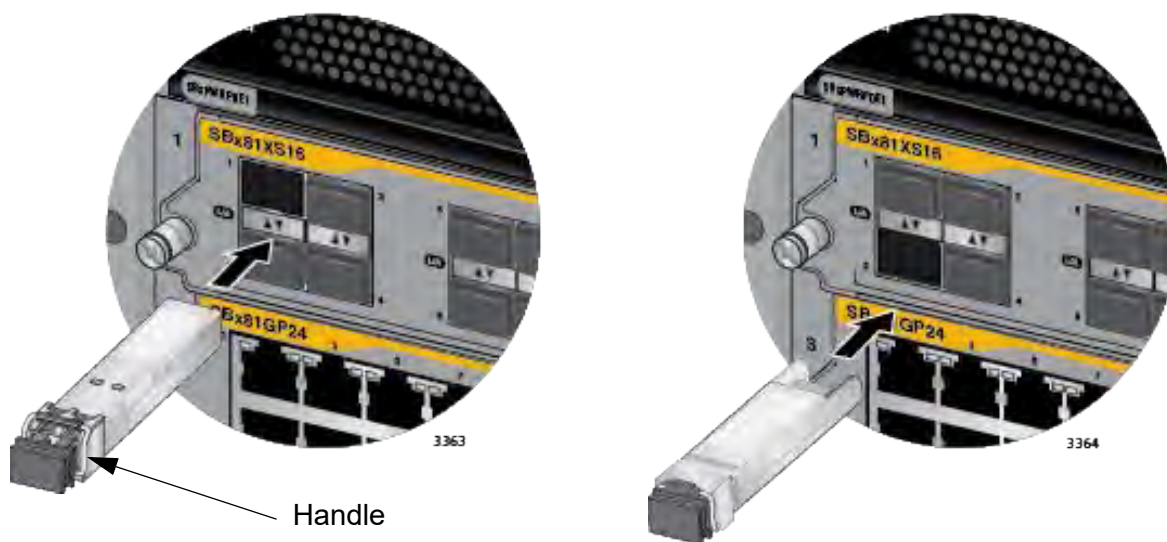


Figure 101. Installing an SFP or SFP+ Transceiver

For slots on the AT-SBx81XS6 Line Card, position the handle on top. Refer to Figure 102.



Figure 102. Installing an SFP+ Transceiver in the AT-SBx81XS6 Line Card



---

**Note**

If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 2 to install the remaining SFP transceivers in the line cards.

---

3. Remove the protective cover from the + transceiver. Refer to Figure 103.



Figure 103. Removing the Dust Cover from a Transceiver

---

**Note**

The dust cover protects the fiber optic port on the transceiver from dust contamination. It should not be removed until you are ready to connect the fiber optic cable.

---

4. Before connecting the cable, verify the position of the handle on the transceiver. If the transceiver is in an odd numbered slot, the handle should be in the upright position, as shown in Figure 104 on page 178. If the transceiver is in an even numbered slot, the handle should be in the down position.

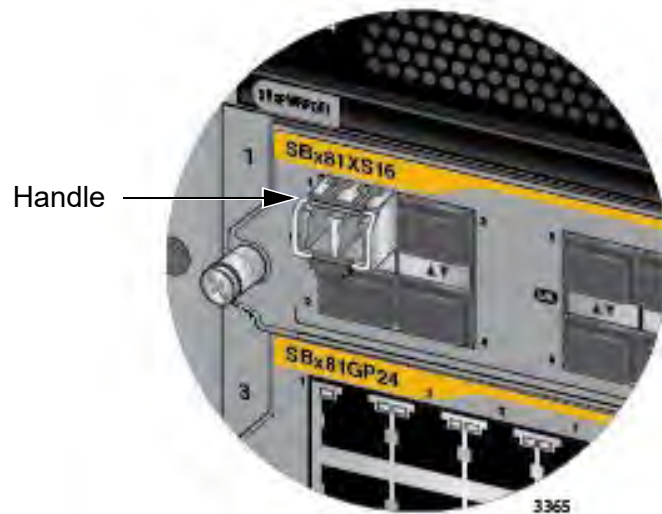


Figure 104. Verifying the Position of the Handle on the Transceiver in the AT-SBx81XS16 Line Card

5. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 105. The connector should snap into the port.

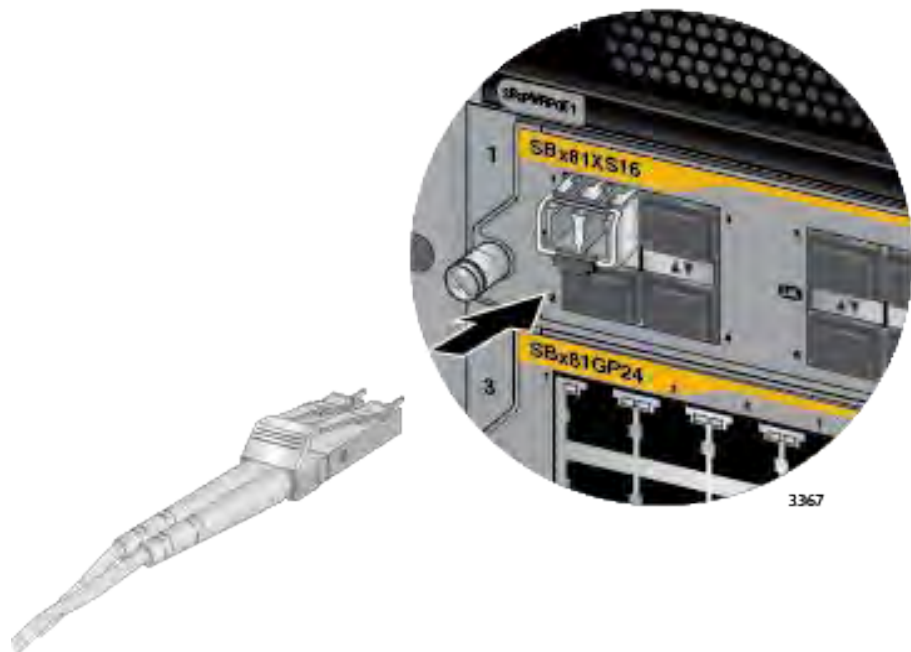


Figure 105. Attaching a Fiber Optic Cable to a Transceiver in the AT-SBx81XS16 Line Card

6. Repeat this procedure to install additional SFP or SFP+ transceivers in the line cards.

7. After installing and cabling the transceivers, do one of the following:
  - ❑ To install and cable additional transceivers in the Ethernet line cards, go to the appropriate section in this chapter for instructions.
  - ❑ To cable the ports on the controller card, go to Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 187.
  - ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.

## Installing AT-SP10TW Direct Connect Cables

---

This procedure explains how to connect AT-SP10TW direct connect Twinax cables to the SFP+ slots in the following line cards and expansion module:

- ❑ AT-SBx81XS6 Line Card
- ❑ AT-SBx81XS16 Line Card
- ❑ AT-SBx81XLEM/XS8 Expansion Module

The cables can be used in place of fiber optic cables and transceivers for 10Gbps links of up to seven meters.

---

**Note**

The AT-SP10TW Cables are not supported in the AT-SBx81GS24a Line Card or slots 1 to 12 in the AT-SBx81XLEM Line Card.

---

Please review “Guidelines to Installing Fiber Optic Transceivers” on page 173 before performing this procedure.

The illustrations in the procedure show the AT-SBx81XS16 Line Cards. The procedure is the same for all the devices.

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

1. Remove the dust plug from one of the SFP+ slots. You may install AT-SP10TW Cables in any of the slots on the line card or expansion module. Refer to Figure 106.



Figure 106. Removing the Dust Cover from an SFP+ Slot

**Note**

Do not remove the dust plug from an SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

2. Slide the connector on the AT-SP10TW Cable into the slot until it clicks into place.

To install the cable into an odd numbered slot in the AT-SBx81XS16 Line Card or AT-SBx81XLEM/XS8 Expansion Module, position the release tab on top as you slide the connector into the slot. To install the cable in an even numbered slot, position the connector so that the release tab is on the bottom. Refer to Figure 107.

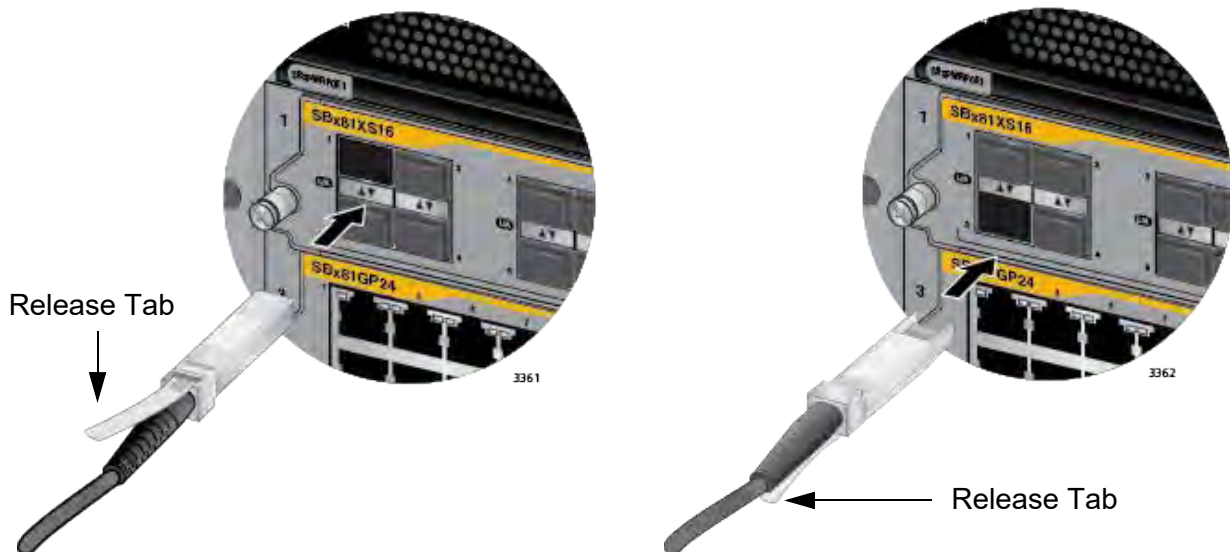


Figure 107. Installing the AT-SP10TW Cable in the AT-SBx81XS16 Line Card or AT-SBx81XLEM/XS8 Expansion Module

To install the cable in the AT-SBx81XS6 Line Card, position the release tab on top as you slide the connector into the slot. Refer to Figure 108 on page 182.



Figure 108. Installing the AT-SP10TW Cable in the AT-SBx81XS6 Line Card

3. Install the other end of the cable into an SFP+ slot on another network device.
4. Repeat this procedure to install additional AT-SP10TW Cables.

---

**Note**

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

---

5. After installing the AT-SP10TW Cables, do one of the following:
  - ❑ To install and cable additional transceivers in the Ethernet line cards, go to the appropriate section in this chapter for instructions.
  - ❑ To cable the ports on the controller card, go to Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 187.
  - ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.

## Installing AT-QSFPCU Cables

---

This section contains instructions on how to install AT-QSFPCU Cables in the AT-SBx81XLEM/Q2 Expansion Module for the AT-SBx81XLEM Line Card. You can use the cables in place of fiber optic cables and transceivers for 40GbE links of up to 1 or 3 meters. The model names of the cables are listed here:

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

---

**Note**

The AT-QSFPCU Cables are only supported in the AT-SBx81XLEM/Q2 Expansion Module.

---

Please review “Guidelines to Installing Fiber Optic Transceivers” on page 173 before performing this procedure.

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

1. Remove the dust cover from a slot on the AT-SBx81XLEM/Q2 Expansion Module. Refer to Figure 109.



Figure 109. Removing the Dust Cover from a Slot on the AT-SBx81XLEM/Q2 Expansion Module

2. Orient the connector on the AT-QSFPCU Cable with the release tab on top and slide it into the slot until it clicks into place. Refer to Figure 110 on page 184.

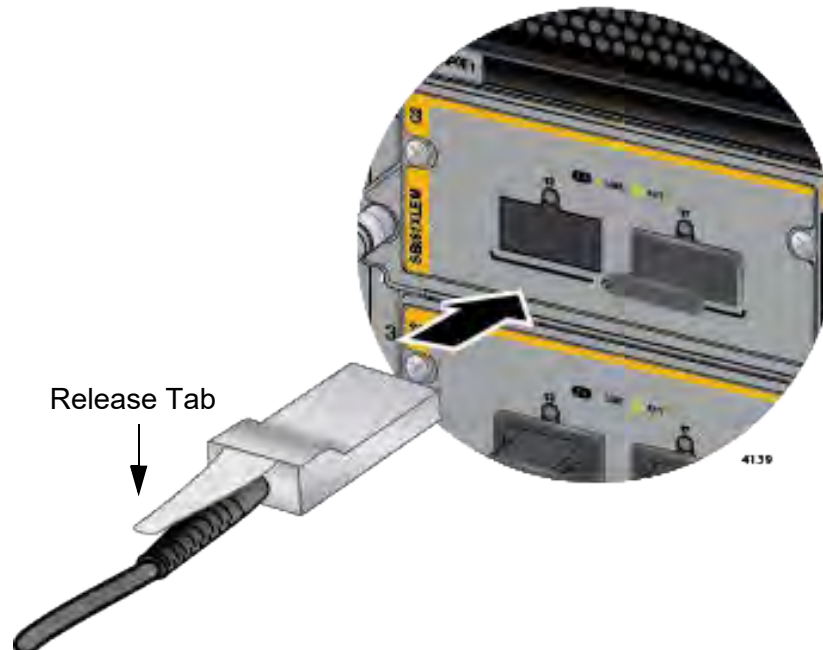


Figure 110. Sliding the AT-QSFPCU Cable into the Slot

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

---

**Note**

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

---

5. After installing the AT-QSFPCU Cables, do one of the following:
  - ☐ To install and cable additional transceivers in the Ethernet line cards, go to the appropriate section in this chapter for instructions.
  - ☐ To cable the ports on the controller card, go to Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 187.
  - ☐ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.



## Installing AT-QSFPSR, AT-QSFPSR4, or AT-QSFPLR4 Transceivers

---

This section contains the procedure for installing AT-QSFPSR, AT-QSFPSR4, or AT-QSFPLR4 transceivers in the slots on the AT-SBx81XLEM/Q2 Expansion Module.

---

**Note**

The AT-QSFPSR, AT-QSFPSR4, and AT-QSFPLR4 transceivers are only supported in the AT-SBx81XLEM/Q2 Expansion Module.

---

Please review “Guidelines to Installing Fiber Optic Transceivers” on page 173 before performing this procedure.

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

1. Remove the dust cover from a slot on the AT-SBx81XLEM/Q2 Expansion Module. Refer to Figure 109 on page 183.
2. Slide a transceiver into the slot until it clicks into place.
3. Attach fiber optic cable to the transceiver.
4. Repeat steps 1 to 3 to install and cable transceivers in the other slots of the expansion module.
5. Connect the cables to compatible QSFP ports in other network devices.

---

**Note**

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

---

6. After installing the transceivers, do one of the following:
  - ☐ To install and cable additional transceivers in the Ethernet line cards, go to the appropriate section in this chapter for instructions.
  - ☐ To cable the ports on the controller card, go to Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 187.
  - ☐ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.



## Chapter 9

# Cabling the AT-SBx81CFC960 Controller Fabric Card

---

This chapter contains instructions on how to cable the ports on the AT-SBx81CFC960 Controller Fabric Card. The chapter has the following sections:

- ❑ “Cabling the NET MGMT Port” on page 188
- ❑ “Installing SFP+ Transceivers” on page 190
- ❑ “Installing AT-SP10TW Cables” on page 195

## Cabling the NET MGMT Port

---

For background information on the NET MGMT port on the controller card, refer to “Ethernet Management Port (NET MGMT)” on page 92.

---

**Note**

The NET MGMT port is referred to as “eth0” in the management software.

---

Here are the guidelines to using the NET MGMT port:

- ❑ The cabling requirements of the port are the same as the ports on the AT-SBx81GT24 Line Card, in “Cable Requirements” on page 68.
- ❑ The default speed setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation.
- ❑ The default speed setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed speed of 10 or 100 Mbps. In this situation, disable Auto-Negotiation and set the port’s speed manually to match the speed of the network device.
- ❑ The port must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- ❑ The default duplex mode setting for the port is Auto-Negotiation. This setting is appropriate if the port is connected to a network device that also support Auto-Negotiation for the duplex mode.
- ❑ The default duplex mode setting of Auto-Negotiation is not appropriate if the port is connected to a network device that does not support Auto-Negotiation and has a fixed duplex mode. In this situation, you should disable Auto-Negotiation on the port and set its duplex mode manually to avoid the possibility of a duplex mode mismatch. With Auto-Negotiation, the port defaults to half-duplex if it detects that the end node is not using Auto-Negotiation. This can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- ❑ The default wiring configuration of the port is automatic MDIX detection, which configures the MDI/MDIX setting automatically. This setting is appropriate for port if it is connected to a network device that also support the feature.
- ❑ The default wiring configuration of automatic MDIX detection is not appropriate for the NET MGMT port if it is connected to a network device that does not support the feature. You should disable automatic MDIX detection and set the wiring configuration

manually with the POLARITY command.

After cabling the NET MGMT port, do one of the following:

- ❑ To install and cable additional transceivers, go to the appropriate section in this chapter for instructions.
- ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.

## Installing SFP+ Transceivers

---

The AT-SBx81CFC960 Controller Fabric Card has four slots for 10Gbps SFP+ transceivers. You may use the slots for the following functions:

- ❑ Build high-speed links to network servers, switches, routers, or other network devices.
- ❑ Connect two chassis together to form a stack with the VCStack Plus feature.

For background information on the SFP+ slots on the controller card, refer to “SFP+ Ports” on page 89. A list of supported SFP+ transceivers can be found on the Allied Telesis web site.

---

**Note**

The transceiver slots on the controller card do not support 1000Mbps SFP transceivers.

---

---

**Note**

If you are building a stack with the VCStack Plus feature, do not install the transceivers in the SFP+ slots of the controller cards until after you have configured both chassis for the stacking feature. For further information, refer to Chapter 15, “VCStack Plus Overview” on page 315 and Chapter 16, “Building a Stack” on page 329. The cabling configurations for the SFP+ slots on the controller cards for a stack can be found in “Cabling Configurations for the Trunk” on page 319.

---

To install a 10Gbps SFP+ transceiver in an SFP+ slot in the controller card, perform the following procedure:

1. Remove the dust plug from the slot chosen for the SFP+ transceiver. Refer to Figure 111 on page 191.



Figure 111. Removing a Dust Cover from an SFP+ Slot in the AT-SBx81CFC960 Controller Fabric Card

---

**Note**

To protect the controller card from dust contamination, do not remove the dust plug from a transceiver slot until you are ready to install the transceiver.

---

2. If you are installing the SFP+ transceiver in slot 1 or 3, orient it with the handle on top, as shown in Figure 112. To install it in slot 2 or 4, orient it with the handle on the bottom.

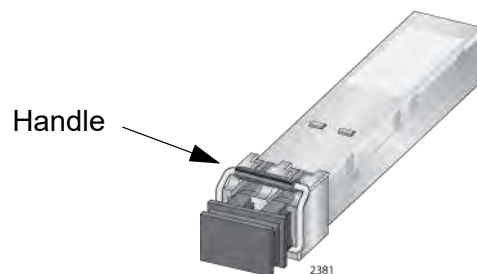


Figure 112. Handle on an SFP+ Transceiver

3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 113 on page 192.

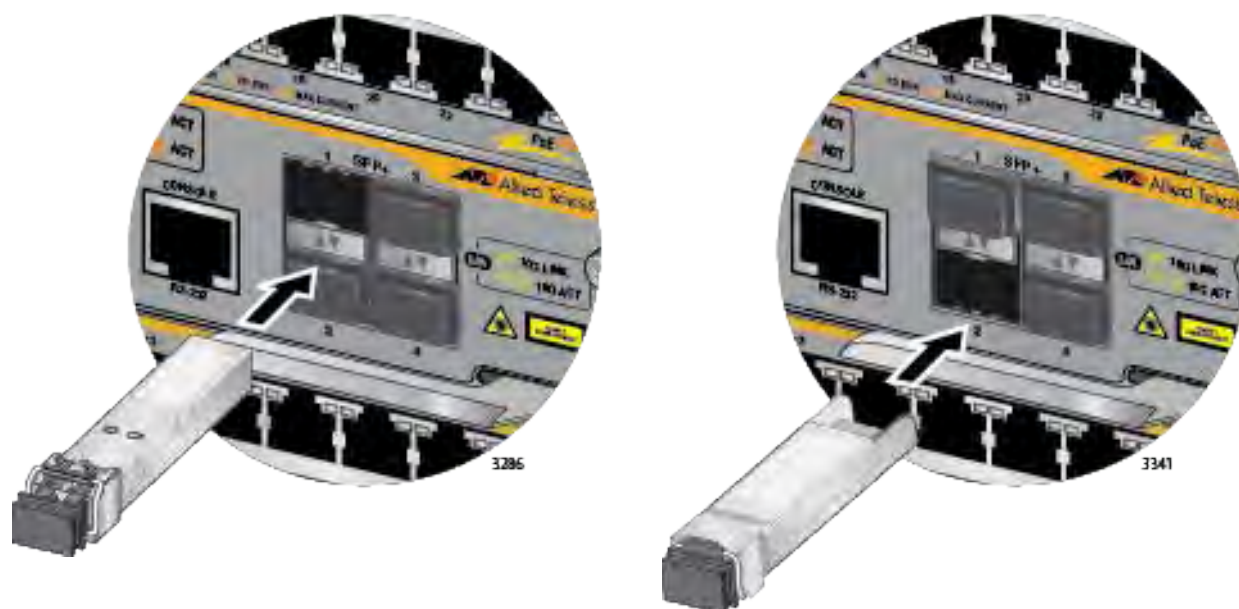


Figure 113. Installing an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

## Note

If you are ready to attach the fiber optic cable to the transceiver, continue with the next step. Otherwise, repeat steps 1 to 3 to install additional SFP+ transceivers in the card.

- Remove the protective cover from the SFP+ transceiver, as shown in Figure 114.



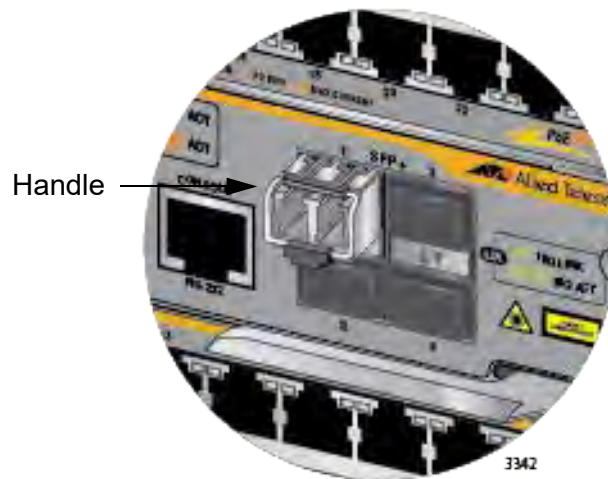
Figure 114. Removing the Dust Cover from an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card



## Note

The dust cover protects the fiber optic port on the SFP+ transceiver from dust contamination. Do not remove it until you are ready to connect the fiber optic cable.

5. Verify the position of the handle on the transceiver. If the transceiver is in slot 1 or 3, the handle should be in the upright position, as shown in Figure 115. If the transceiver is in slot 2 or 4, the handle should be in the down position.



### Figure 115. Positioning the Handle on the Transceiver

6. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 116 on page 194. The connector should snap into the port.

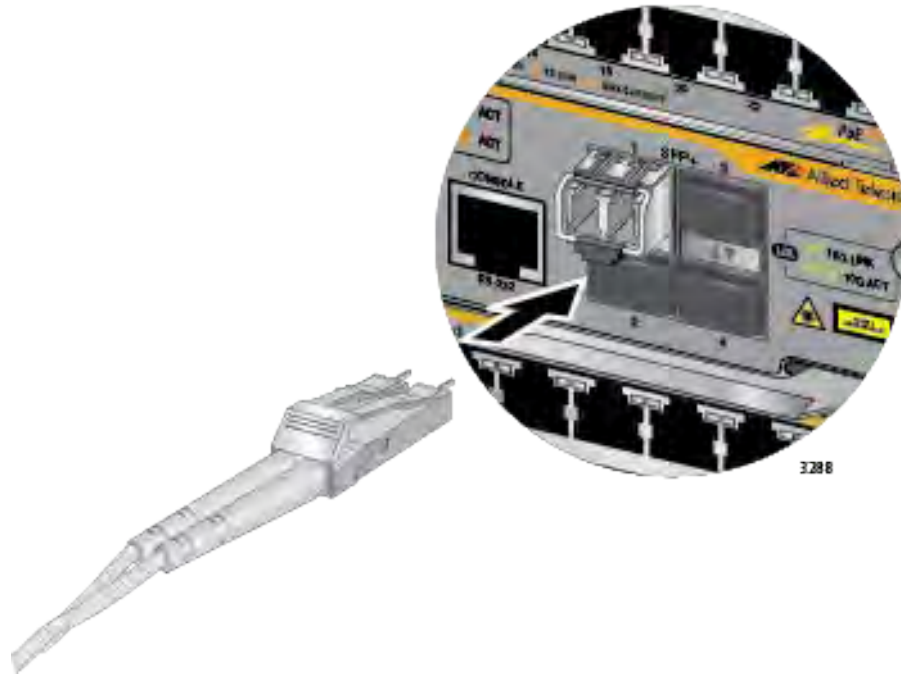


Figure 116. Attaching a Fiber Optic Cable to an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

7. Repeat this procedure to install additional SFP+ transceivers in the AT-SBx81CFC960 Controller Fabric Card.
8. If you are not building a stack with the VCStack Plus feature, do one of the following:
  - ☐ To install and cable additional transceivers in the chassis, go to the appropriate section in this chapter for instructions.
  - ☐ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.
9. If you are building a stack with the VCStack Plus feature, do the following:
  - ☐ Double-check the wiring of the cables of the trunk between the SFP+ slots of the controller cards of the two chassis to be sure they are correctly connected. The possible wiring configurations are given in “Cabling Configurations for the Trunk” on page 319.
  - ☐ Afterwards, go to “Powering On the Stack” on page 347.

## Installing AT-SP10TW Cables

---

This procedure explains how to connect AT-SP10TW Cables to the SFP+ slots in the AT-SBx81CFC960 Controller Fabric Card. The cables may be used in place of fiber optic cables and transceivers for 10 Gbps links of up to seven meters.

For background information on the SFP+ slots on the controller card, refer to “SFP+ Ports” on page 89.

Please review the following information if you are using the SFP+ slots on the controller cards to build a stack with the VCStack Plus feature:

- ❑ Do not install the cables in the SFP+ slots of the controller cards until after you have configured both chassis for the stacking feature. For further information, refer to Chapter 15, “VCStack Plus Overview” on page 315 and Chapter 16, “Building a Stack” on page 329.
- ❑ The cabling configurations for the SFP+ slots on the controller cards of a stack is given in “Cabling Configurations for the Trunk” on page 319.

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

1. Remove the dust plug from one of the SFP+ slots. You may install AT-SP10TW Cables in any of the SFP+ slots on the controller card. Refer to Figure 111 on page 191.

---

**Note**

Do not remove the dust plug from an SFP+ slot if you are not installing the transceiver at this time. The dust plug protects the line card from dust contamination.

---

2. Slide the connector on the AT-SP10TW Cable into the slot until it clicks into place.

To install the cable in slot 1 or 3, position the release tab on top as you slide the connector into the slot. To install the cable in slot 2 or 4, position the connector so that the release tab is on the bottom. Refer to Figure 117 on page 196.

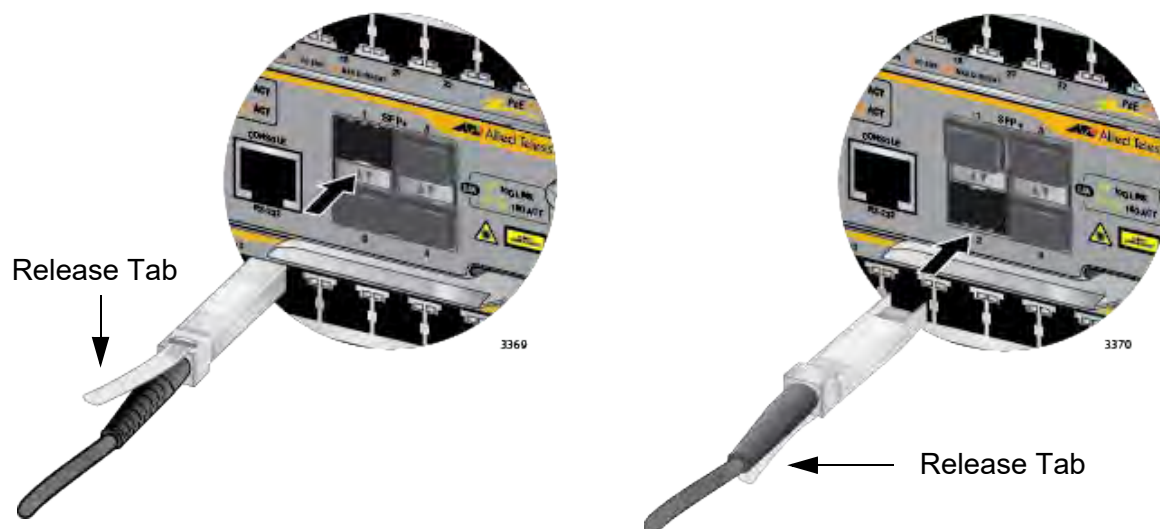


Figure 117. Installing an AT-SP10TW Cable in the AT-SBx81CFC960 Controller Fabric Card

3. Install the other end of the cable into an SFP+ slot on another network device.
4. Repeat this procedure to install additional AT-SP10TW Cables.

---

**Note**

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

---

5. If you are not building a stack with the VCStack Plus feature, do one of the following:
  - ☐ To install and cable additional transceivers in the chassis, go to the appropriate section in this chapter or Chapter 8, “Cabling the Ethernet Line Cards” on page 169 for instructions.
  - ☐ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 197.
6. If you are building a stack with the VCStack Plus feature, do the following:
  - ☐ Double-check the wiring of the cables of the trunk between the SFP+ slots of the controller cards of the two chassis to be sure they are correctly connected. The possible wiring configurations are given in “Cabling Configurations for the Trunk” on page 319.
  - ☐ Afterwards, go to “Powering On the Stack” on page 347.

## Chapter 10

# Powering On the Chassis

---

This chapter describes how to power on the chassis and monitor the initialization process. The chapter contains the following sections:

- ❑ “Verifying the Installation” on page 198
- ❑ “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 199
- ❑ “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203
- ❑ “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 206
- ❑ “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 232
- ❑ “Monitoring the Initialization Process” on page 233

## Verifying the Installation

---

Please perform the following procedure before powering on the chassis:

1. Verify that the grounding lug on the back panel of the chassis is properly grounded. For instructions, refer to “Installing the Chassis Grounding Wire” on page 122.
2. Verify that all empty slots on the front panel of the chassis are covered with slot covers. If there are open slots, perform the procedure “Installing Blank Slot Covers” on page 167.
3. Verify that dust plugs are installed in all empty SFP, SFP+, and QSFP slots in the AT-SBx81GS24a, AT-SBx81XS6, AT-SBx81XS16, and AT-SBx81XLEM Line Cards and AT-SBx81CFC960 Controller Fabric Card.
4. Verify that dust covers are installed on all SFP, SFP+, and QSFP transceivers that do not have cables.
5. Verify that the chassis has at least one AT-SBx81CFC960 Controller Fabric Card in slot 5 or 6.
6. Verify that the chassis has at least one system power supply in slot C or D.
7. If the chassis has AT-SBx81GP24 Line Cards, verify that the chassis has at least one AT-SBxPWRPOE1 Power Supply in slot A or B.
8. When you installed the AT-SBx81CFC960 Controller Fabric Card, did you remove the battery insulator, shown in Figure 74 on page 150? If not, remove the controller card from the chassis, remove the insulator from the battery, and reinstall the card.

You may now power on the chassis. For instructions, refer to the appropriate section in this chapter:

- ❑ “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 199
- ❑ “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203
- ❑ “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 206

If the chassis has both system and PoE power supplies, you may power them on in any order or simultaneously.

## Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies

---

The procedure in this section explains how to power on AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies in slots C and D on the front panel. If you have not already installed the power supplies, refer to “Installing AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 127 for installation instructions.

---

**Note**

If the chassis has both system and PoE power supplies, you may power them on in any order or simultaneously.

---



---

**Caution**

If the chassis has two AT-SBxPWRSYS2 System Power Supplies, you must power them on within 90 seconds of each other. Otherwise, the active master controller card might restart its operating software, which will delay the initialization process of the chassis.

---

To power on the AC system power supplies, perform the following procedure:

1. Identify AC sockets C and D in the recessed panel on the back panel of the chassis, shown in Figure 118 on page 200. These sockets are for the AC system power supplies in slots C and D on the front panel of the chassis.



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Figure 118. AC Sockets on the Rear Panel of the AT-SBx8112 Chassis

2. Plug the AC power cord that comes with the power supply into a plug whose corresponding slot on the front panel has a system power supply.

If there are two system power supplies, you may power on either supply first. In the illustration in Figure 119 on page 201 an AC power cord is connected to connector D for the system power supply in slot D on the front panel.





Figure 119. Connecting the AC Power Cord for the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supply

3. Use the twist tie included with the power supply to secure the cord to an anchor on the chassis to protect it from being accidentally pulled out, as shown in Figure 120 on page 202.

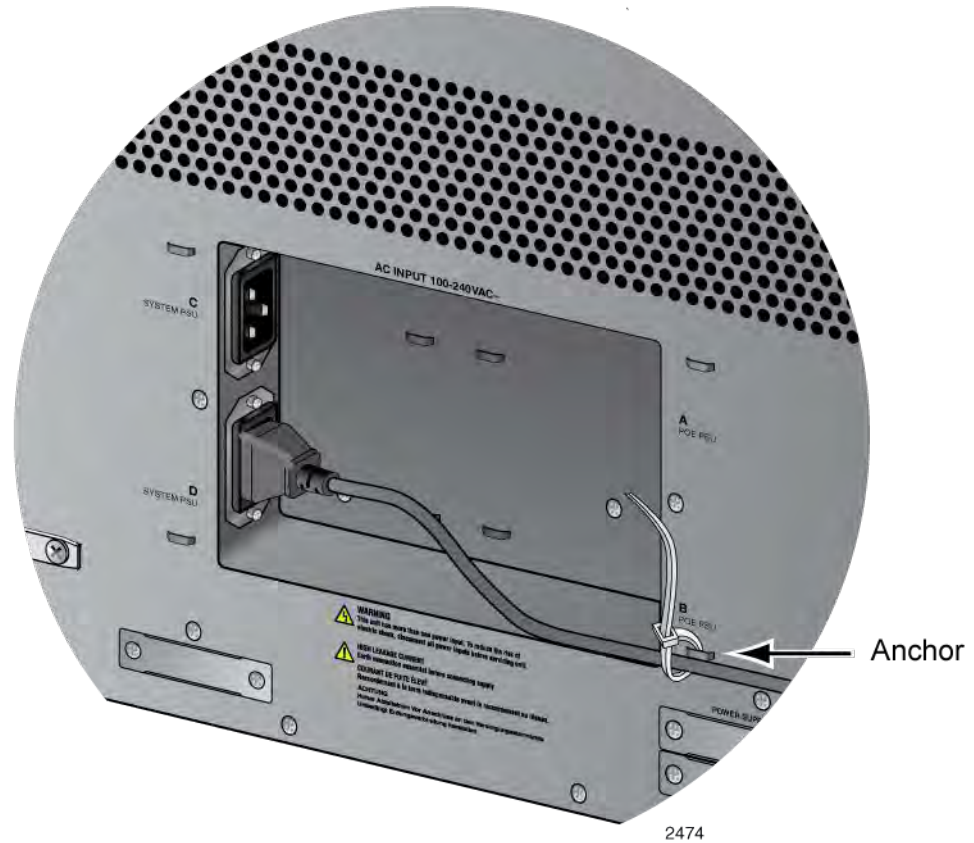


Figure 120. Securing the Power Cord for the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.
5. If the chassis has two AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies, repeat this procedure to power on the second power supply.

After powering on the AC system power supplies, do one of the follow:

- ☐ If the chassis has AT-SBxPWRPOE1 PoE Power Supplies, perform the procedure in “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203.
- ☐ Otherwise, go to “Monitoring the Initialization Process” on page 233.

## Powering On AT-SBxPWRPOE1 Power Supplies

If you have not already installed the AT-SBxPWRPOE1 Power Supplies, refer to “Installing AT-SBxPWRPOE1 PoE Power Supplies” on page 133 for installation instructions. To power on the power supplies, perform the following procedure:

1. Identify AC sockets A and B in the recessed panel on the back panel of the chassis, shown in Figure 118 on page 200. The sockets are for the AT-SBxPWRPOE1 Power Supplies in slots A and B on the front panel of the chassis.
2. Plug the AC power cord that comes with the power supply into one of the plugs, as shown in Figure 121.

The plug should have a power supply in the corresponding slot in the front panel. If the chassis has two AT-SBxPWRPOE1 Power Supplies, you may power on either supply first.

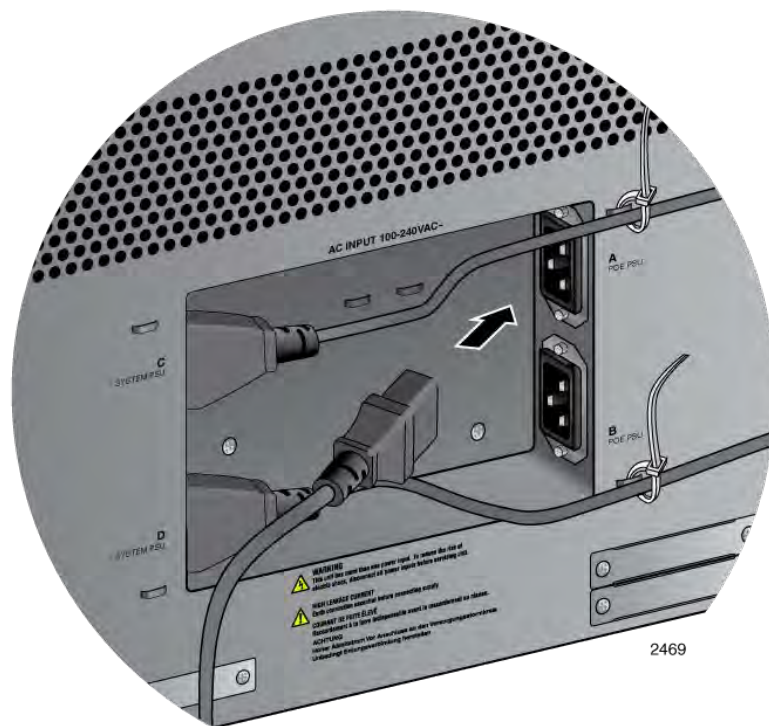


Figure 121. Connecting the AC Power Cord for the AT-SBxPWRPOE1 Power Supply

3. Use the twist tie that comes with the power supply to secure the cord to an anchor on the chassis, as shown in Figure 122.

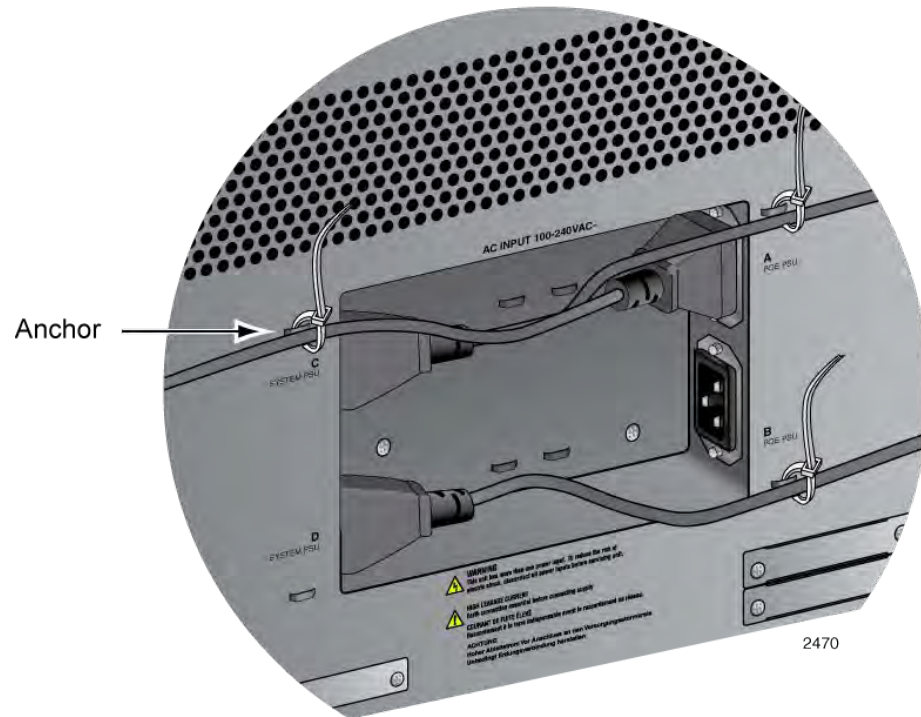
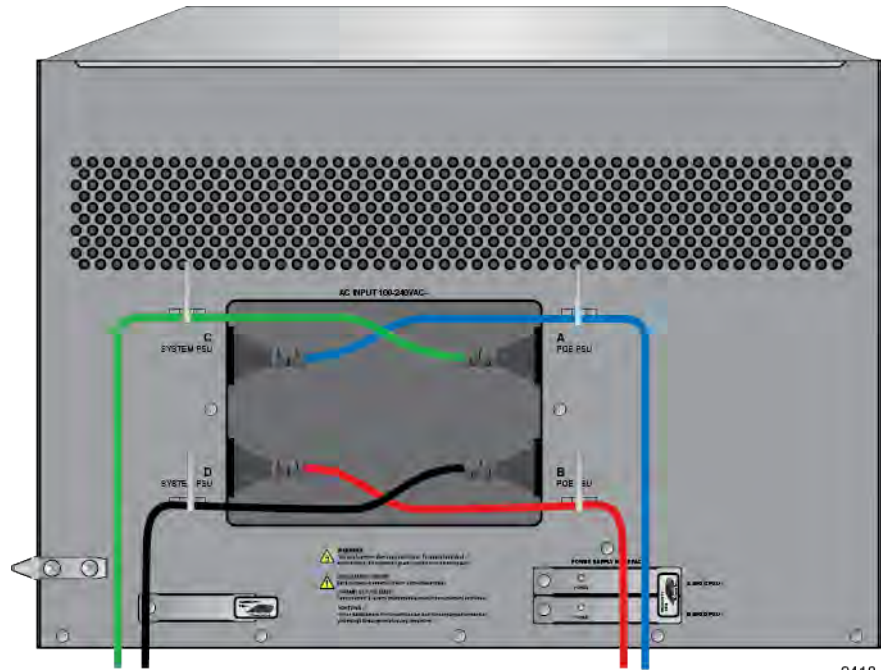


Figure 122. Securing the Power Cord for the AT-SBxPWRPOE1 Power Supply to an Anchor

4. Connect the power cord to an appropriate AC power source to power on the power supply.
5. If the chassis has two AT-SBxPWRPOE1 Power Supplies, repeat this procedure to power on the second power supply.

Figure 123 on page 205 is an illustration of the power cords for a chassis with four power supplies.



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- A POE PSU power cord —
- B POE PSU power cord —
- C System PSU power cord —
- D System PSU power cord —

NOTE: The power cords shown in this figure are in color for clarity only.  
All power cords are black.

Figure 123. Dress and Secure AC Power Cords

6. Go to “Monitoring the Initialization Process” on page 233.

## Wiring the AT-SBxPWRSYS1 DC System Power Supply

---

This section contains instructions on how to wire the AT-SBxPWRSYS1 DC Power Supply. For installation instructions, refer to “Installing AT-SBxPWRSYS1 DC System Power Supplies” on page 138.

The power supply unit has a ground connection and positive and negative DC terminals. You may install the ground and power lead wires with the terminal lugs that come with the unit or with bare wire. The wire requirements are slightly different for terminal installation versus bare wire installation. Here are the wire requirements if you are using the terminals that come with the power supply:

- ❑ Two 8 AWG stranded power wires (not provided)
- ❑ One 10 AWG stranded grounding wire (not provided)

Here are the wire requirements for bare wire installation:

- ❑ Two 8 AWG solid or stranded power wires (not provided)
- ❑ One 10 AWG solid or stranded grounding wire (not provided)

Here is a list of the required tools:

- ❑ Crimping tool (not provided)
- ❑ 8 mm wrench (not provided)
- ❑ #1, #2, and #3 Phillips-head screwdrivers (not provided)
- ❑ #3 Phillips-head 30 to 40 inch-lbs Phillips-head torque screwdriver (optional - not provided)

Here are the procedures for wiring the AT-SBxPWRSYS1 DC Power Supply:

- ❑ “Choosing a Method for Attaching the Grounding Wire” on page 208
- ❑ “Connecting the Grounding Wire with the Grounding Terminal” on page 208
- ❑ “Connecting the Grounding Wire with Bare Wire” on page 211
- ❑ “Choosing a Method for Attaching the Power Wires” on page 213
- ❑ “Connecting the DC Power Wires with the Straight Terminals” on page 213
- ❑ “Connecting the DC Power Wires with the Right Angle Terminals” on page 222
- ❑ “Connecting Bare DC Power Wires” on page 228



The components of the power supply are identified in Figure 124.

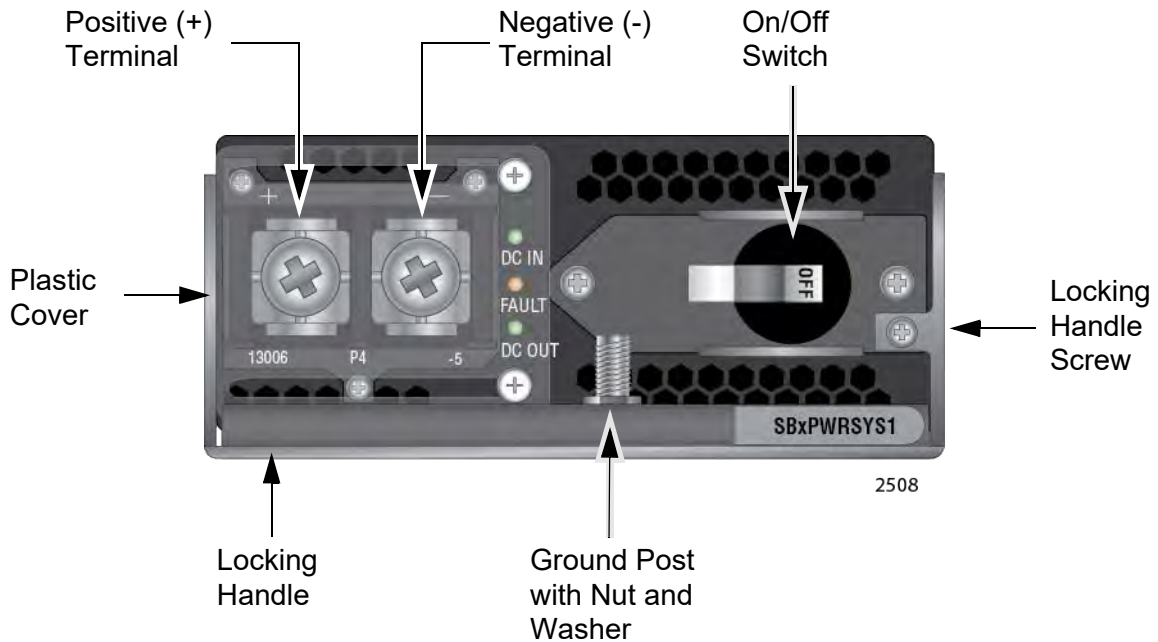


Figure 124. Components of the AT-SBxPWRSYS1 DC Power Supply



#### Warning

As a safety precaution, install a circuit breaker with a minimum value of 50 Amps between the equipment and the DC power source.

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



#### Warning

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

#### 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 two conductors, 8 AWG. *E24*

## Choosing a Method for Attaching the Grounding Wire

You can attach the grounding wire to the power supply using the supplied terminal, shown in Figure 125, or bare wire.



Figure 125. Grounding Wire Terminal

The two methods are described in the following sections:

- ❑ “Connecting the Grounding Wire with the Grounding Terminal”
- ❑ “Connecting the Grounding Wire with Bare Wire” on page 211

## Connecting the Grounding Wire with the Grounding Terminal

To attach a grounding wire with the grounding terminal provided with the power supply, perform the following procedure:

1. Prepare an adequate length of stranded 10 AWG grounding wire by stripping it as shown in Figure 126.

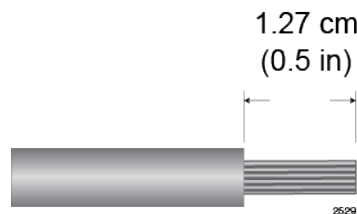


Figure 126. Stripping the Stranded Grounding Wire

### Note

You must use stranded wire when using the grounding terminal to connect the ground wire to the grounding post. You may not use solid wire.

2. Insert the grounding wire into the grounding terminal provided with the power supply and use a crimping tool to secure it to the grounding terminal. See Figure 127,

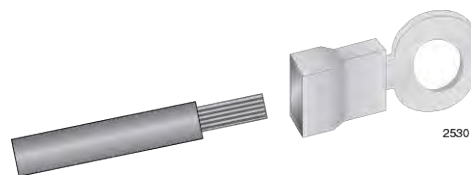


Figure 127. Attaching the Stranded Grounding Wire to the Grounding Terminal



3. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 128, from the power supply.

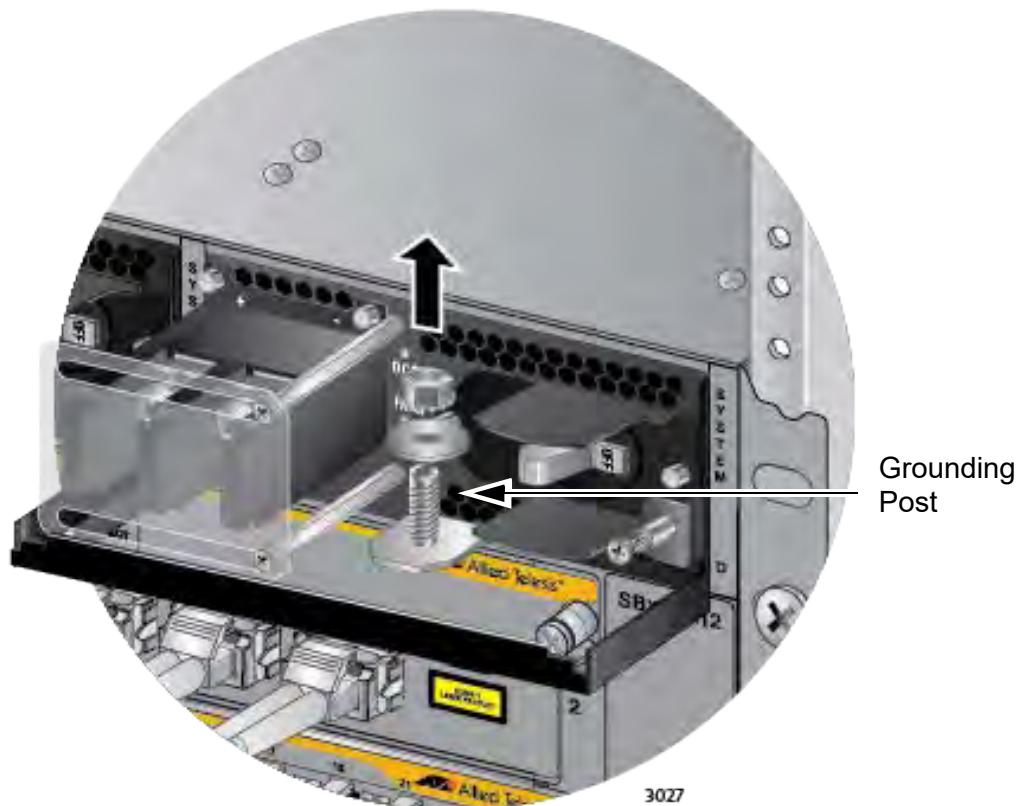


Figure 128. Removing the Nut and Washer from the Grounding Post

4. Attach the grounding lug and wire to the grounding post and secure them with the nut and washer removed in the previous step, and an 8 mm wrench.

Review the following before installing the grounding wire:

- ☐ You should angle the wire to the right so that you can open the plastic window to access the positive and negative terminals on the terminal block.
- ☐ You may route the cable either above or below the locking handle.
- ☐ Allied Telesis recommends tightening the nut and washer to 26 inch-lbs.

The grounding wire is illustrated in Figure 129 on page 210.

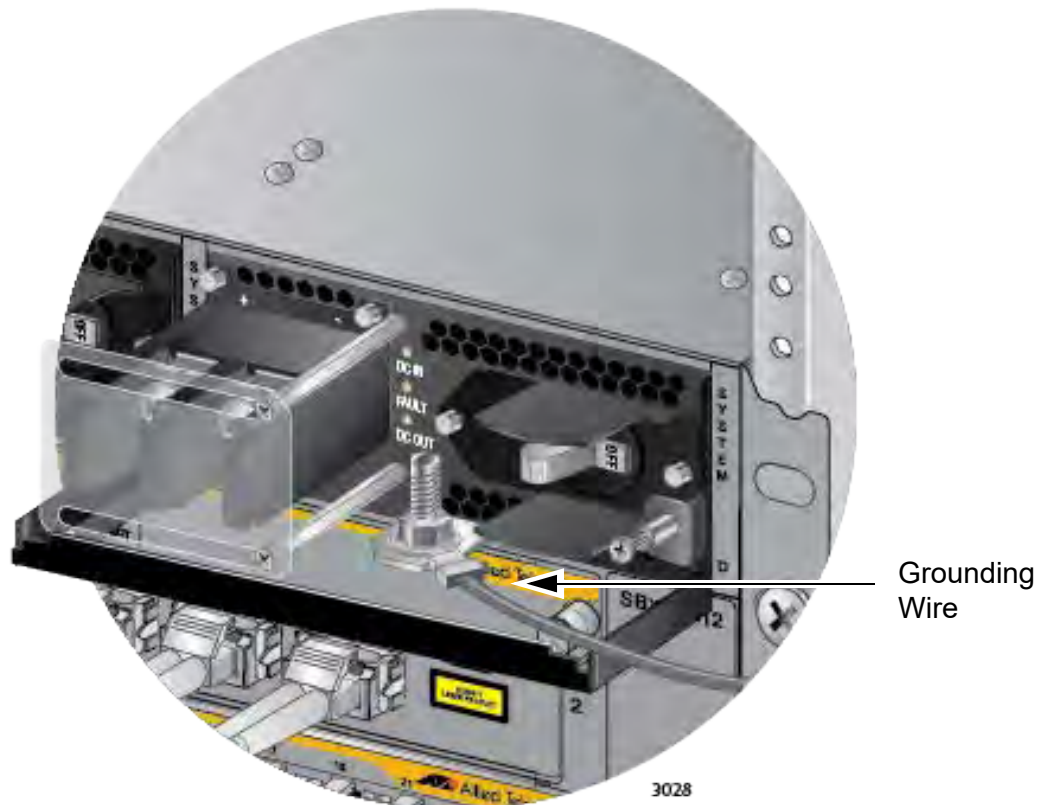



Figure 129. Installing the Grounding Wire


5. Connect the other end of the grounding wire to the building protective earth.



**Warning**

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

**Note**

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

After connecting the grounding wire, go to “Choosing a Method for Attaching the Power Wires” on page 213.

## Connecting the Grounding Wire with Bare Wire

To attach the grounding wire to the power supply with bare wire, perform the following procedure:

1. Prepare an adequate length of solid or stranded 10 AWG grounding wire by stripping it as shown in Figure 130.

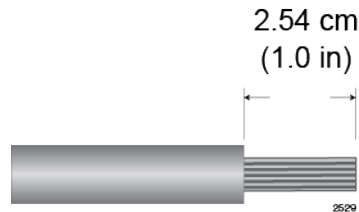


Figure 130. Stripping the solid or Stranded Grounding Wire

2. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 128 on page 209, from the grounding post on the power supply.
3. Wrap the grounding wire clockwise around the base of the grounding post, as shown in Figure 131.



Figure 131. Attaching the Bare Grounding Wire to the Grounding Post

4. Secure the wire with the nut and washer removed in step 2, and an 8 mm wrench, as shown in Figure 132.

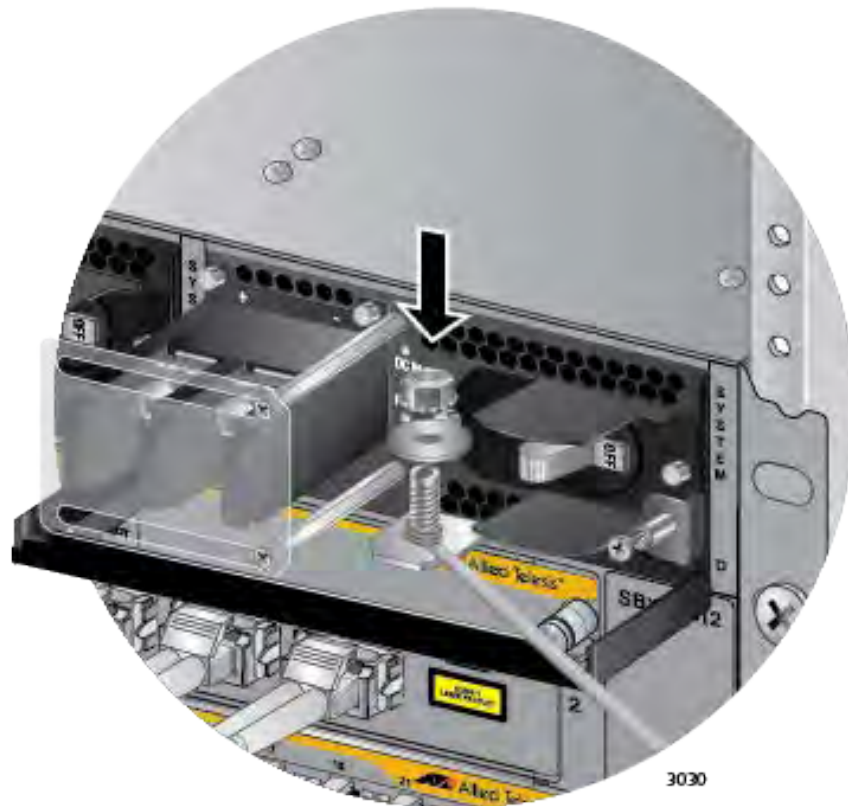


Figure 132. Securing the Bare Grounding Wire to the Grounding Post

Allied Telesis recommends tightening the nut and washer to 26 inch-lbs.

After connecting the grounding wire, go to “Choosing a Method for Attaching the Power Wires” on page 213.

## Choosing a Method for Attaching the Power Wires

The AT-SBxPWRSYS1 DC Power Supply comes with the two sets of power wire terminals shown in Figure 133. You may use either set to connect the positive (+) and negative (-) wires to the terminal block on the power supply. The straight terminals are used to route the wires above or below the terminal block. The right angle terminals are used to route the power wires directly away from the terminal block.



Figure 133. Power Wire Terminals

---

### Note

The right angle terminals require the removal of the plastic cover from the terminal block.

---

You may also install the wires using bare wires.

Here are the procedures to wiring the positive and negative terminal block on the power supply:

- ❑ “Connecting the DC Power Wires with the Straight Terminals”
- ❑ “Connecting the DC Power Wires with the Right Angle Terminals” on page 222
- ❑ “Connecting Bare DC Power Wires” on page 228

## Connecting the DC Power Wires with the Straight Terminals

To use the straight terminals to connect the DC power wires to the positive and negative terminals on the power supply, perform the following procedure:

1. Prepare adequate lengths of two stranded 8 AWG power wires by stripping them as shown in Figure 134 on page 214.



### 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

---

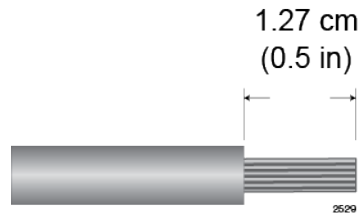


Figure 134. Stripping the Power Wires

---

**Note**

You must use stranded wires with the terminal lugs. You may not use solid wires.

---

2. Insert the power wires into the terminals included with the power supply and use a crimping tool to secure the wires to the terminals. See Figure 135.

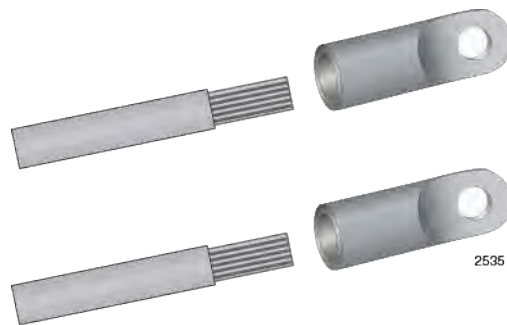


Figure 135. Attaching the Power Wires to the Straight Terminal Lugs

3. Verify that the On/Off switch on the AT-SBxPWRSYS1 DC Power Supply is in the Off position. Refer to Figure 136 on page 215.

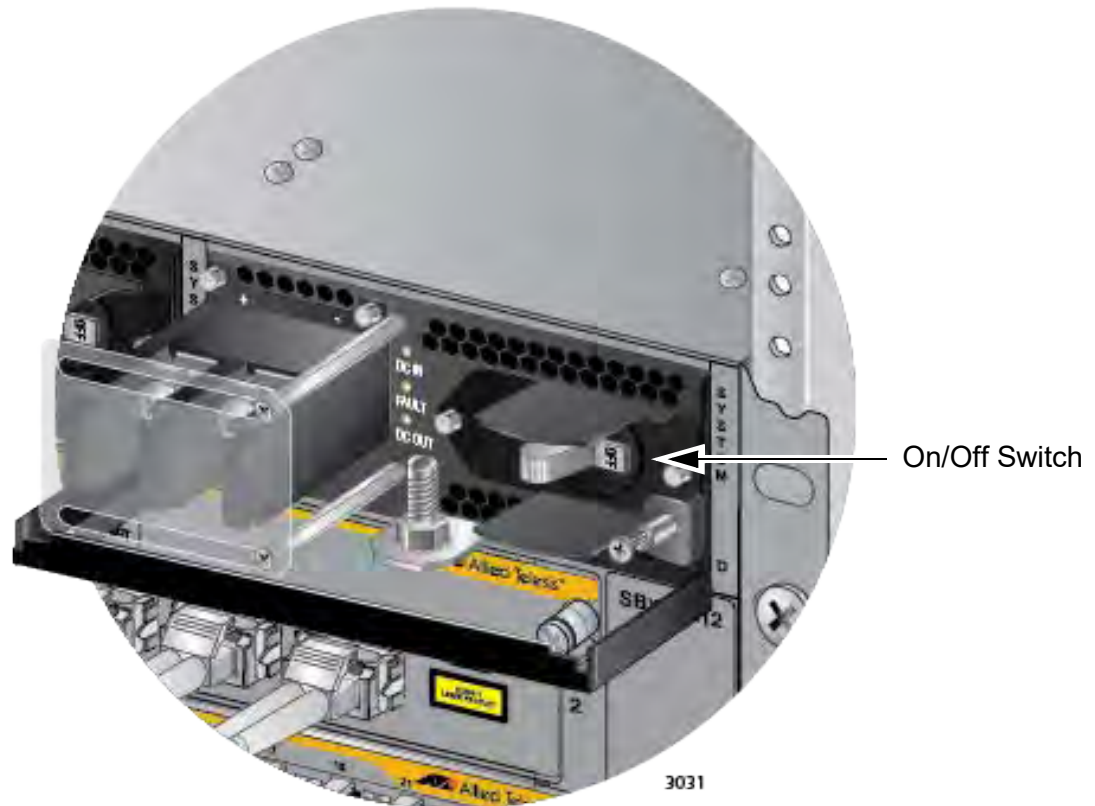


Figure 136. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

4. Use a #1 Phillips-head screwdriver to loosen the two screws on the plastic cover over the positive and negative terminals on the power supply and slide the cover to the right, as shown in Figure 137 on page 216. You may need to lift the locking handle slightly to access the bottom screw.





Figure 137. Opening the Plastic Cover

5. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 138 on page 217.





Figure 138. Removing the Terminal Screws

6. With a #3 Phillips-head screwdriver, connect the positive (+) power lead wire to the positive terminal on the power supply, with one of the terminal screws removed in the previous step. The positive terminal is on the left. You may attach the terminals with the wires either above or below the terminal block. Figure 139 on page 218 shows the positive wire above the terminal block.

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

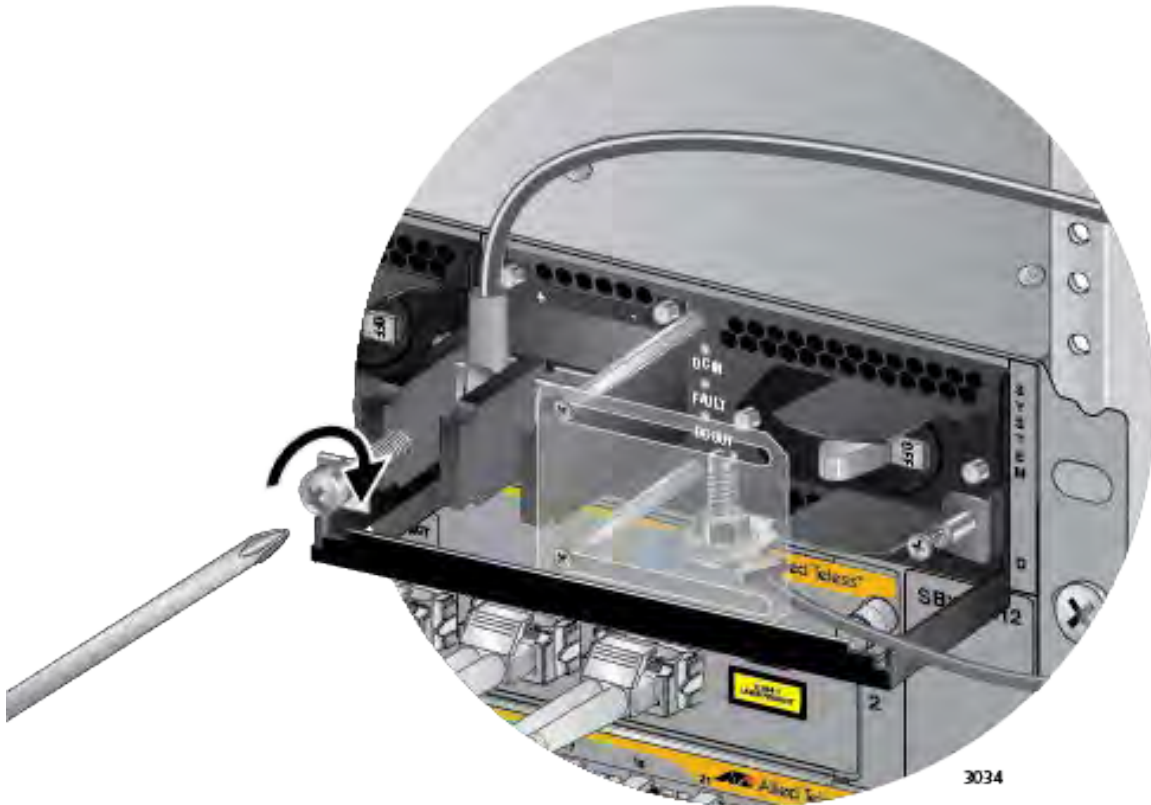


Figure 139. Connecting the Positive (+) Power Wire with a Straight Terminal

7. With a #3 Phillips-head screwdriver, connect the negative (-) power lead wire to the negative terminal on the power supply, with the remaining terminal screw removed in step 5. The negative terminal is on the right. You may attach the terminals with the wires either above or below the terminal block. Figure 140 on page 219 shows the wires above the terminal block.

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.

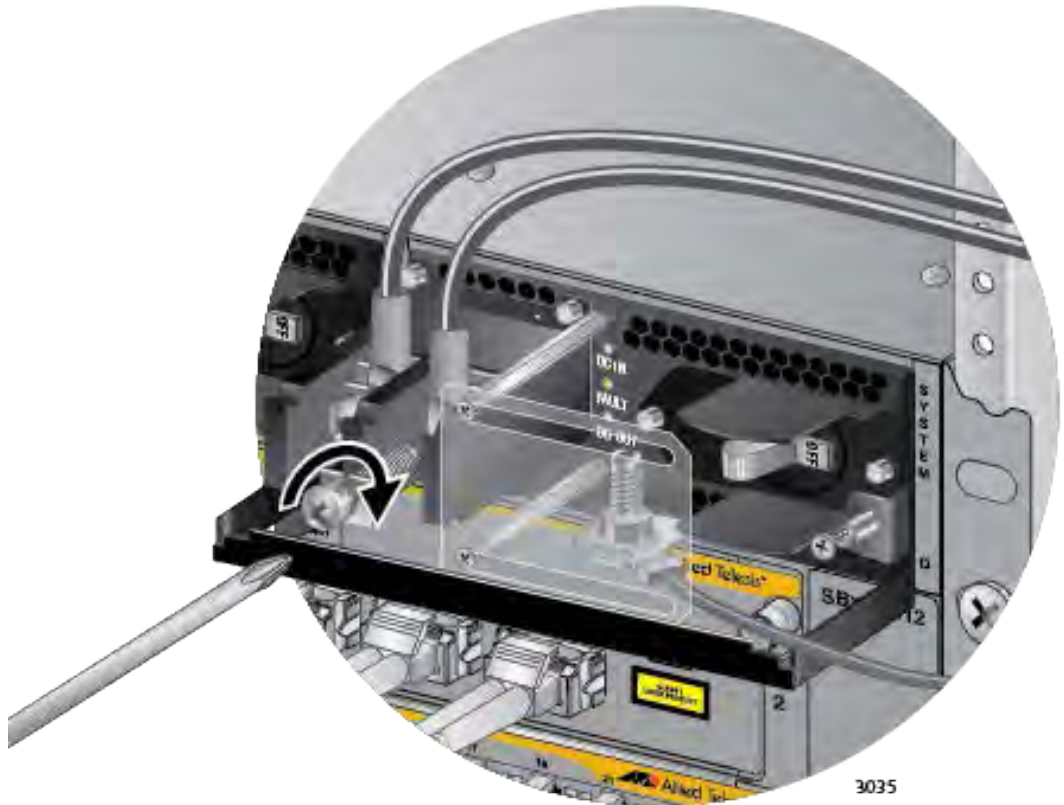


Figure 140. Connecting the Negative (-) Power Wire with a Straight Terminal



#### 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. ⚡ E12

8. Slide the plastic cover to the left and lightly tighten the two screws with a #1 Phillips-head screwdriver to secure the cover. See Figure 141 on page 220. You might need to lift the locking handle slightly to access the bottom screw.



#### Caution

Do not over tighten the screws or you may crack or break the plastic cover.

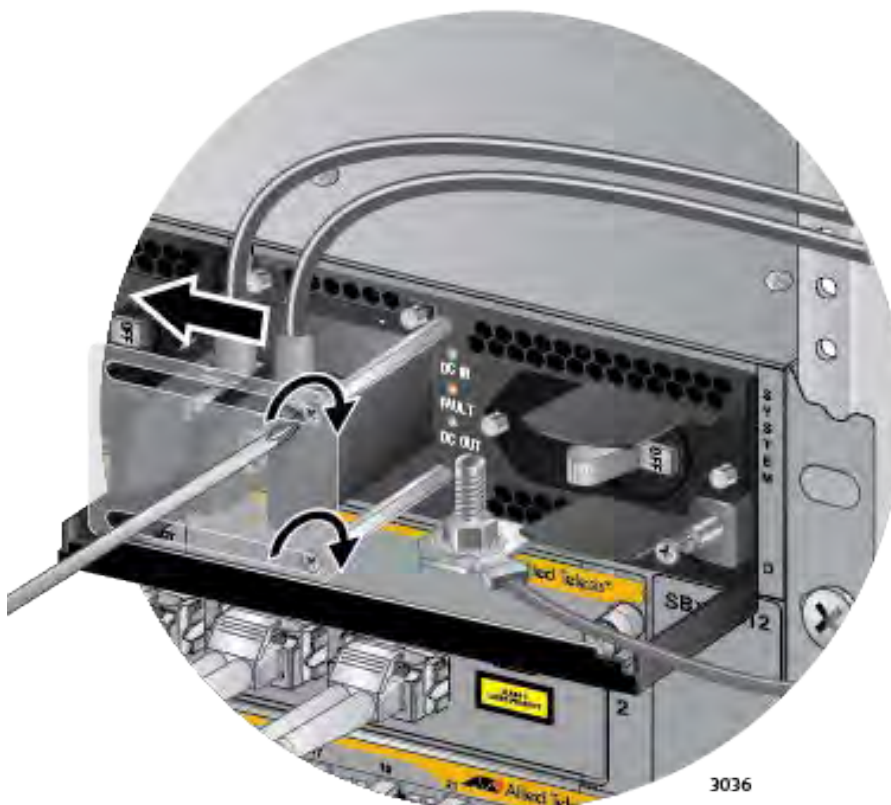


Figure 141. Closing the Plastic Cover over the Terminal Connectors

9. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 142 on page 221.

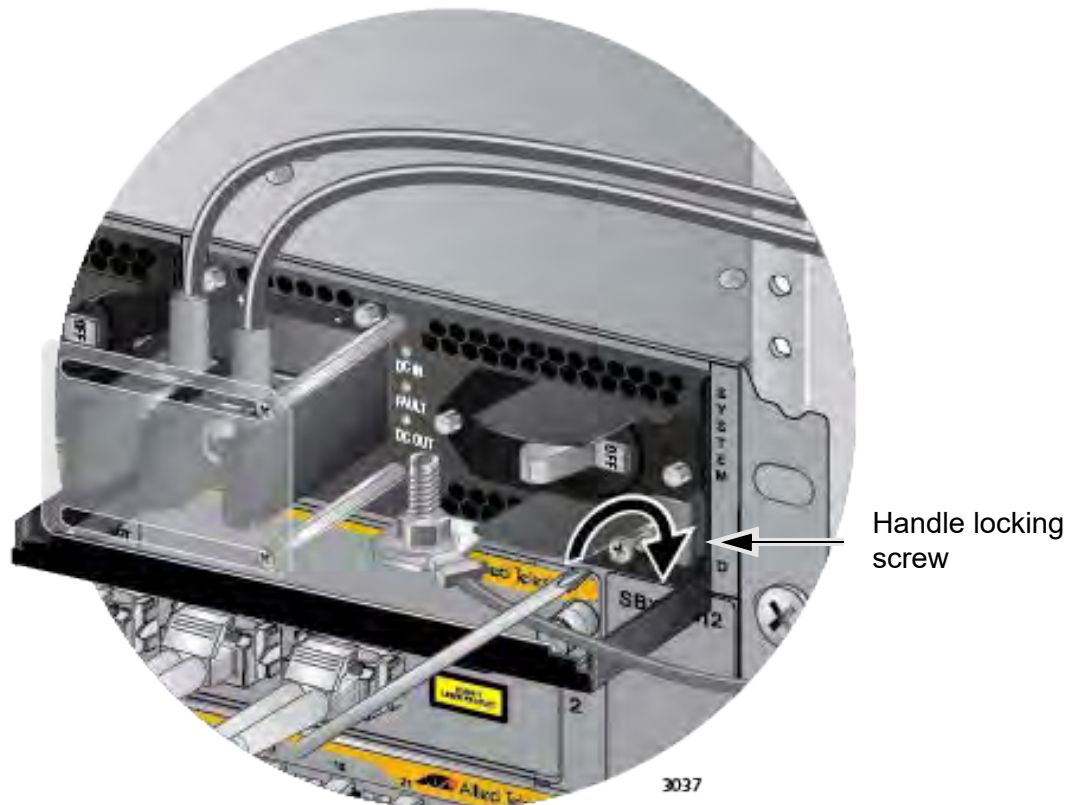


Figure 142. Tightening the Handle Locking Screw

10. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.
11. Connect the power wires to the DC circuit breaker.
12. If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to wire the second supply.
13. To power on the chassis, go to “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 232.

## Connecting the DC Power Wires with the Right Angle Terminals

To connect the DC power wires to the positive and negative terminals on the power supply with the right angle terminals, perform the following procedure:

1. Prepare adequate lengths of two stranded 8 AWG power wires by stripping them as shown in Figure 143.



### 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

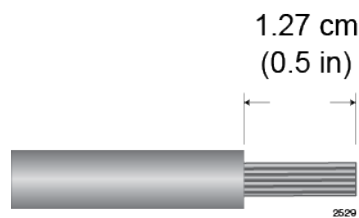


Figure 143. Stripping the Power Wires

### Note

You must use stranded wires with the terminal lugs. You may not use solid wires.

2. Verify that the On/Off switch on the AT-SBxPWRSYS1 DC Power Supply is in the Off position. Refer to Figure 136 on page 215.
3. Insert the power wires into the right angle terminals included with the power supply and use a crimping tool to secure the wires to the terminals. See Figure 144,

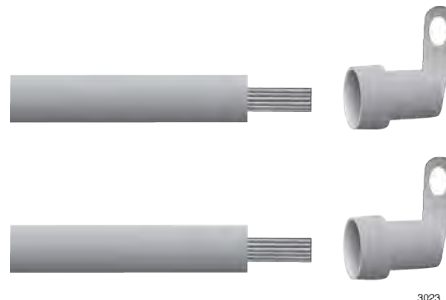


Figure 144. Attaching the Power Wires to the Right Angle Terminals



4. Using a #1 Phillips-head screwdriver, remove the two screws that secure the plastic cover over the positive and negative terminals and remove the plastic cover from the power supply, as shown in Figure 145. You may need to lift the locking handle slightly to access the bottom screw.

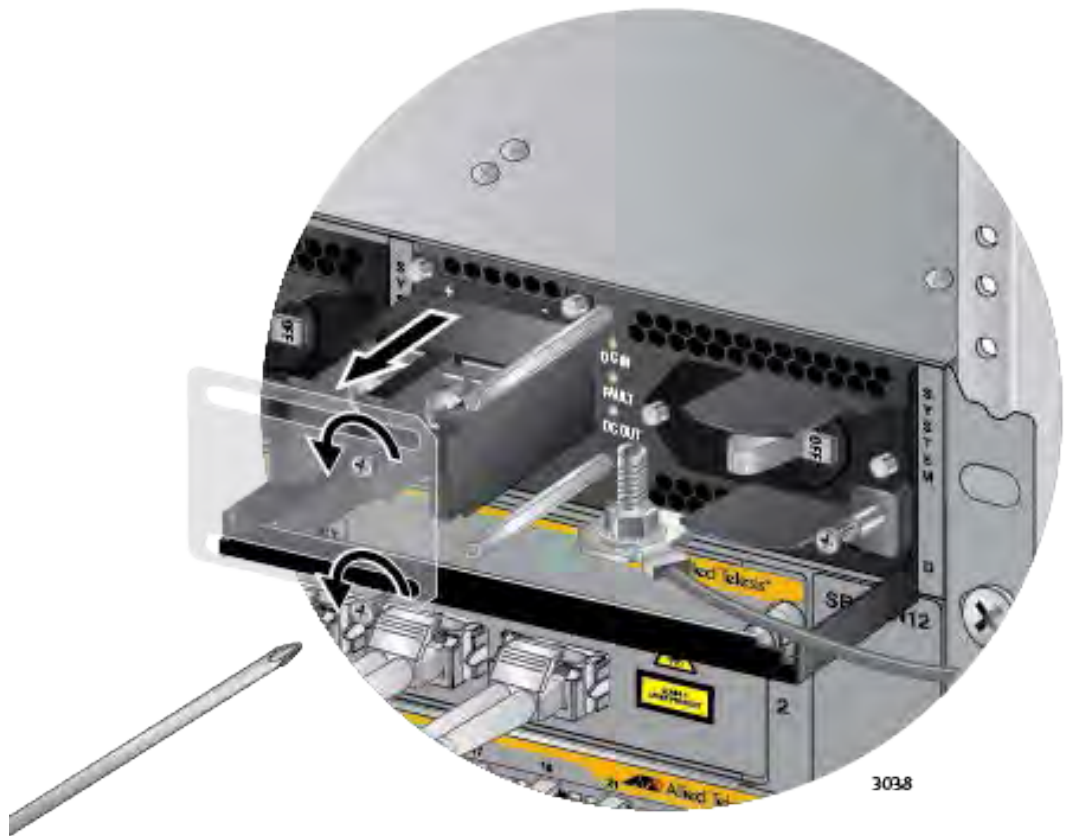


Figure 145. Removing the Plastic Cover

---

**Note**

The plastic cover is not used with the right angle terminals.

---

5. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 146 on page 224.



Figure 146. Removing the Terminal Screws

6. With a #3 Phillips-head screwdriver, connect the positive (+) power lead wire to the positive terminal on the power supply, with one of the terminal screws removed in the previous step. The positive terminal is on the left. Refer to Figure 147 on page 225.

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.





Figure 147. Connecting the Positive (+) Power Wire with a Right Angle Terminal

7. With a #3 Phillips-head screwdriver, connect the negative (-) power lead wire to the negative terminal on the power supply, with the remaining terminal screw removed in step 5. The negative terminal is on the right. Refer to Figure 148 on page 226.

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.



Figure 148. Connecting the Negative (-) Power Wire with a Right Angle Terminal



**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. ⚡ E12

8. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 149 on page 227.

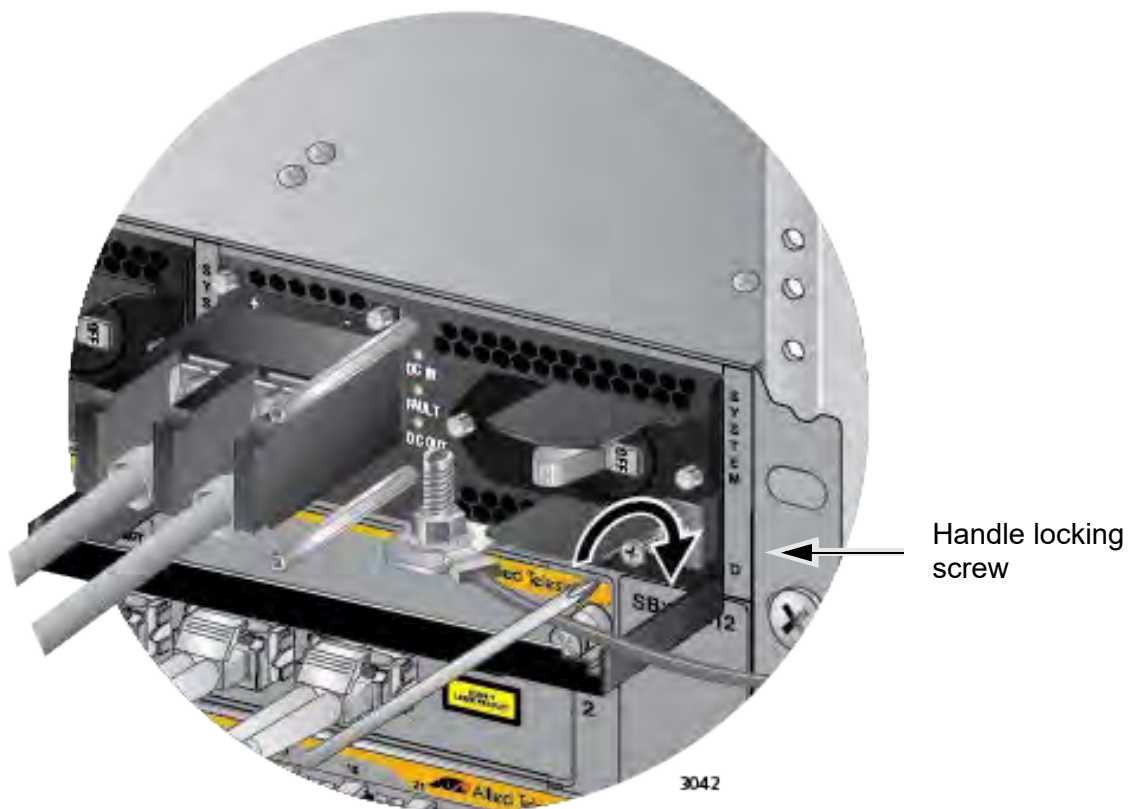


Figure 149. Tightening the Handle Locking Screw

9. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.
10. Connect the power wires to the DC circuit breaker.
11. If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to wire the second supply.
12. To power on the chassis, go to "Powering On the AT-SBxPWRSYS1 DC System Power Supply" on page 232.

## Connecting Bare DC Power Wires

To attach bare lead wires to the positive and negative terminals on the power supply, perform the following procedure:

1. Prepare adequate lengths of two solid or stranded 8 AWG DC power wires by stripping them as shown in Figure 150.

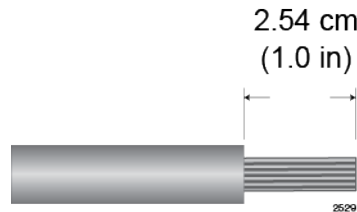


Figure 150. Stripping Solid or Stranded DC Power Wires

2. Use a #1 Phillips-head screwdriver to loosen the two screws on the plastic cover over the positive and negative terminals on the power supply and slide the cover to the right, as shown in Figure 137 on page 216. You may need to lift the locking handle slightly to access the bottom screw.
3. Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 138 on page 217.
4. Wrap the positive lead wire clockwise around one of the terminal screws and secure the screw and wire to the positive terminal connection on the terminal block with a #3 Phillips-head screwdriver. The positive terminal is on the left.

You may attach the wire to the terminal so that it extends either above or below the terminal block. Figure 151 on page 229 shows the wire above the terminal block. Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.



Figure 151. Connecting the Positive Wire With Bare Wire

5. Wrap the negative lead wire clockwise around the remaining terminal screw and secure the screw and wire to the negative terminal connection on the terminal block with a #3 Phillips-head screwdriver, as shown in Figure 152 on page 230. The negative terminal is on the right.



Figure 152. Connecting the Negative Lead Wire with Bare Wire

Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.



#### 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. E12

- Slide the plastic cover to the left and lightly tighten the two screws with a #1 Phillips-head screwdriver to secure the cover. See Figure 141 on page 220. You might need to lift the locking handle slightly to access the bottom screw.



#### Caution

Do not over tighten the screws or you may crack or break the plastic cover.

7. With a #2 Phillips-head screwdriver, tighten the handle locking screw to secure the power supply to the chassis. See Figure 142 on page 221.
8. Before attaching the power wires from the power supply to the circuit breaker in the wiring closet, check that the circuit breaker is off.
9. Connect the power wires to the DC circuit breaker.
10. If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to wire the second supply.
11. To power on the chassis, go to “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 232.

## **Powering On the AT-SBxPWRSYS1 DC System Power Supply**

---

To power on the AT-SBxPWRSYS1 DC Power Supply, perform the following procedure:

1. Turn the DC circuit breaker on.
2. Turn the On/Off switch on the power supply to the On position. Refer to Figure 136 on page 215.
3. If the chassis has two AT-SBxPWRSYS1 DC Power Supplies, repeat this procedure to power on the second unit.
4. Go to “Monitoring the Initialization Process” on page 233 or Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 237.



## Monitoring the Initialization Process

---

The line and controller cards perform an initialization process whenever you power or reset the chassis. The initialization process takes approximately three minutes to complete. The line cards do not begin to forward traffic from their ports until the process is finished.

The process has two phases:

- ❑ In the first phase, which takes approximately two minutes, the controller card loads and initializes its AlliedWare Plus Operating System and, if there are two controller cards in the chassis, set its active or standby state.
- ❑ In the second phase, the Ethernet line cards receive their management software from the active controller card, initialize the software, and configure their parameter settings according to the configurations provided by the active controller card. This phase takes one minute, after which the line cards begin to forward traffic.

You can monitor the initialization process by viewing either the LEDs on the cards or the messages on the Console port, as explained here.

### Using the LEDs to Monitor the Initialization Process

To monitor the first phase of the initialization process in which the controller card initializes its AlliedWare Plus Operating System and establishes its active master or standby master state, examine the CFC LED in the System Status LEDs on the card. The LED flashes green while the card initializes its management software. When this phase is finished, the card changes the LED to solid green if it is the active master or solid amber if it is the standby master.

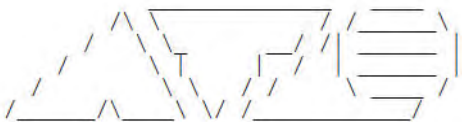
To monitor phase 2 in which the line cards initialize and configure their management software, watch the SBx Linecard Status LEDs. There are twelve LEDs (numbered 1 to 12), one for each slot. The LED for a slot flashes green while the corresponding line card initializes its management software and configures its settings in accordance with the settings from the active controller card. The LED changes to solid green when the line card completes the initialization process and begins forwarding traffic.

### Using the Console Port to Monitor the Initialization Process

Another way to monitor the initialization process of the chassis is to connect a terminal or PC with a terminal emulator program to the Console port on the controller card and watch the status messages. If the chassis has two controller cards, you should use the Console port on the controller card in slot 5. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 240.) Figure 153 on page 234 and Figure 154 on page 235 illustrate the messages. The controller and line cards are fully initialized and forwarding network traffic when the Console port displays the “awplus login” prompt.

```

Verifying release... OK
Booting...
Starting base/first... [ OK ]
Mounting virtual filesystems... [ OK ]



Allied Telesis Inc.
Alliedware Plus (TM) v5.4.4
Current release filename: SBx81CFC960-5.4.4-0.0.re1
Original release filename: SBx81CFC960-5.4.4-.0.re1
Built: Thu Dec 19 21:30:52 NZDT 2013
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/setup-eth.. [ OK ]
Starting base/dbus... [ OK ]
Starting base/syslog... [ OK ]
Starting base/lif_ok... [ OK ]
Starting base/loopback... [ OK ]
Starting base/poe_done... [ OK ]
Starting base/sysctl... [ OK ]
.
.
.
Received event modules.done
Received event board.inserted
Received event hardware.done
Starting network/startup... [ OK ]
Starting base/external-media... [ OK ]
Starting network/stackd... [ OK ]
Starting network/internal-tftpd... [ OK ]
Starting network/internal-boop... [ OK ]
08:00:46 awplus-1.5 chassis[2138]: Card 1.6 (AT-SBx81CFC960) has joined the
chassis
Received event network enabled

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

```

Figure 153. Initialization Messages for a Stand-alone Switch

```

Received event network.active
08:00:54 awplus-1.5 chassis[2138]: Card 1.2 (AT-SBx81GT24) has joined the
chassis
08:00:54 awplus-1.5 chassis[2138]: Card 1.1 (AT-SBx81GT24) has joined the
chassis
08:00:55 awplus-1.5 chassis[2138]: Card 1.3 (AT-SBx81XS6) has joined the
chassis
08:00:55 awplus-1.5 chassis[2138]: Card 1.4 (AT-SBx81GP24) has joined the
chassis
08:00:56 awplus-1.5 chassis[2138]: Card 1.5 (AT-SBx81CFC960) has become the
Active CFC
08:00:56 awplus-1.5 chassis[2138]: Stack Virtual MAC is 0000.cd37.0131
.
.
.
08:03:10 awplus-1.5 chassis[2138]: Card 1.12 (AT-SBx81GP24) has joined the
chassis
Received event vcs.elected-master

Assigning Active Workload to HA processes:
hsl, nms, sflowd, authd, bgpd, epsrd, imi
imiproxyd, irdpd, lacpd, lldpd, loopprot, mstpd, ospf6d
ospfd, pdmd, pim6d, pimd, ripd, ripngd, rmond
vrrpd

Received event network.activated

Loading default configuration

done!
Received event network.configured

awplus login:

```

Figure 154. Initialization Messages for a Stand-alone Switch (Continued)



## Chapter 11

# Verifying the Hardware Operations of the Chassis

---

This chapter describes how to verify the operations of the chassis. The chapter contains the following sections:

- ❑ “Using the LEDs to Verify the Chassis” on page 238
- ❑ “Using Local Management to Verify the Chassis” on page 240

---

**Note**

Allied Telesis recommends using both methods to confirm the initial operations of the chassis, controller cards, and line cards.

---

## Using the LEDs to Verify the Chassis

---

After powering on the chassis for the first time and waiting a minimum of three minutes for the line and controller cards to complete the initialization process, check the operational status of the various hardware components by examining the LEDs, as explained in this procedure:

1. Check the LEDs on the power supplies:
  - ❑ AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 AC Power Supplies: The power supplies are operating properly when the AC and DC LEDs are solid green and Fault LEDs are off. If there is a problem, refer to “AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 246 for troubleshooting suggestions.
  - ❑ AT-SBxPWRSYS1 DC Power Supply: The power supply is operating properly when the DC IN and DC OUT LEDs are solid green and the Fault LED is off. If there is a problem, refer to “AT-SBxPWRSYS1 DC System Power Supply” on page 248 for troubleshooting suggestions.
2. Check the Power LED on the AT-SBxFAN12 module. The module is operating normally when the LED is solid green. If the LED is off, the fan module has a problem or failed. Power off the chassis and contact your Allied Telesis representative for assistance. Do not operate the chassis without a fully operational fan unit.
3. If the chassis has one controller card, check the CFC LED on the card. It should be solid green. If the LED is flashing green, the card is still initializing its AlliedWare Plus Operating System. Wait another minute and check the LED again. If the LED is still flashing green, the card may have encountered a problem that prevents it from completing the initialization process. Power off the chassis and replace the controller card.

---

### Note

If all the LEDs on the controller card are off, they may have been turned off. Try pressing the eco-friendly button on the card to turn them on.

---

4. If the chassis has two controller cards, check the CFC LEDs on both cards. The cards are operating correctly when the LEDs are solid green on one card and solid amber on the other. If both LEDs are flashing green, the controller cards are still completing the initialization process. If the LEDs do not change to solid green and amber after another minute, the cards may have encountered a problem that

prevents them from completing the initialization process. Power off the chassis and replace the cards.

5. To check the status of the Ethernet line cards, inspect the SBx Linecard Status LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) A line card is operating normally when its corresponding LED is solid green. The LED flashes green as the card initializes its management software. If an LED is flashing green after two minutes, the corresponding line card may have a problem and cannot complete the initialization process. For example, the line card in slot 8 of the chassis is operating normally when the SBx Linecard Status, number 8 LED is solid green. For troubleshooting suggestions, refer to “Ethernet Line Cards” on page 250.
6. To check the status of the links of the individual ports on the line cards, inspect the L/A LEDs on the cards. The LEDs should be solid or flashing green on ports that are connected to active network devices. If there is a problem with a link, refer to “Twisted Pair Ports” on page 253 and “Fiber Optic or Twisted Pair Transceivers” on page 257 for troubleshooting suggestions.
7. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the PoE LEDs, shown in Figure 20 on page 48. The LEDs are solid green when ports are delivering power to powered devices on your network. If there is a problem, refer to “Power Over Ethernet” on page 255 for troubleshooting suggestions.

## Using Local Management to Verify the Chassis

This section explains how to use the commands in the AlliedWare Plus Operating System on the controller card to confirm the operations of the chassis. The section has the following procedure:

- ❑ “Starting a Local Management Session” on page 240
- ❑ “Verifying the Chassis with the AlliedWare Plus Commands” on page 241

The initial management session of the switch must be a local management session. For instructions on how to configure the chassis for remote management with a Telnet or Secure Shell client, refer to the *Software Reference for SwitchBlade x8100 Series Switches*.

### Starting a Local Management Session

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

1. Connect the RJ-45 end of the management cable included with the AT-SBx81CFC960 Controller Fabric Card to the Console RS-232 port on the front panel of the AT-SBx81CFC960 Control Card, as shown in Figure 155. If the chassis has two controller cards, you may use the Console RS-232 port on either card to establish a local management session with the chassis.

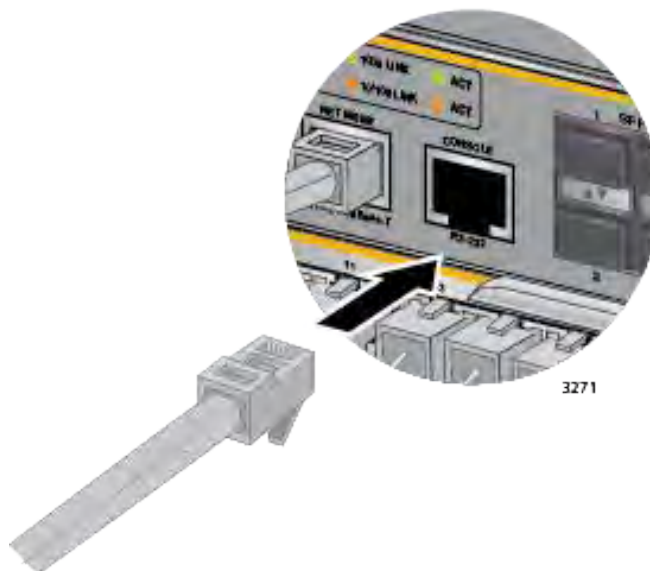


Figure 155. Connecting the Management Cable to the Console RS-232 Port

2. Connect the other end of the cable to an RS-232 port on a terminal or personal computer with a terminal emulation program.



3. Configure the VT-100 terminal or terminal emulation program as follows:

- ☐ Baud rate: 115,200 bps
- ☐ Data bits: 8
- ☐ Parity: None
- ☐ Stop bits: 1
- ☐ Flow controller: 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. Enter the default user name and password. They are “manager” and “friend” (without the quotes), respectively

---

**Note**

User names and passwords are case sensitive.

---

The local management session starts and the switch displays the prompt for the User Exec mode, “awplus>”.

### Verifying the Chassis with the AlliedWare Plus Commands

To confirm the operations of the chassis with the commands in the AlliedWare Plus Operating System, perform the following procedure:

1. Enter the SHOW VERSION command in the User Exec or Privileged Exec mode to display the software version number of the management software on the controller cards. An example is shown in Figure 156.

```
awplus> show version

AlliedWare Plus (TM) 5.4.4

Build name : SBx81CFC960-5.4.4.rel
Build date : Wed Dec 15 12:13:19 NZDR 2013
Build type : RELEASE
NEW-SNMP SNMP agent software
(c) 1996, 1998-2000 The Regents of the University of California.
All rights reserved;
.
.
.
```

Software Version  
Number

Figure 156. SHOW VERSION Command

2. Compare the version number displayed by the `SHOW VERSION` command with the information in Table 27 on page 97 to confirm that the version of the AlliedWare Plus Operating System on the controller card supports all the hardware components in the chassis. If necessary, update the management software on the controller card.
3. To display the status of the power supplies, fan module, and AT-SBx81CFC960 Controller Fabric Cards, use the `SHOW SYSTEM ENVIRONMENT` command in the User Exec or Privileged Exec mode. The Status column in the display provides the states of the modules. Components are operating normally when they have an “Ok” status.

---

**Note**

The next command, `SHOW CARD`, has to be performed from the Privileged Exec mode. If you are still in the User Exec mode, enter the `ENABLE` command to move to the Privileged Exec mode. The prompt for the mode is “awplus#”.

---

4. To display the status of the line cards, use the `SHOW CARD` command in the Privileged Exec mode. A line card has a state of “Online” when it is operating normally. An example of the status information is shown in Figure 157.

```
awplus# show card
```

Slot	Card Type	State
-----		
1	AT-SBx81GP24	Online
2	AT-SBx81XS6	Online
3	AT-SBx81GP24	Online
4	AT-SBx81GS24a	Online
5	AT-SBx81CFC960	Online (Active)
6	AT-SBx81CFC960	Online (Standby)
7	AT-SBx81GP24	Online
8	AT-SBx81GS24a	Online
9	AT-SBx81GP24	Online
10	AT-SBx81XS6	Online
11	AT-SBx81GP24	Online
12	AT-SBx81GS24a	Online

Figure 157. `SHOW CARD` Command

5. To display the states of the individual ports on the Ethernet line cards, use the `SHOW INTERFACE STATUS` command in the Privileged Exec mode.
6. To check the status of PoE on the ports of the AT-SBx81GP24 Line Card, use the `SHOW POWER-INLINE` or `SHOW POWER-INLINE INTERFACE` command in the User Exec or Privileged Exec mode.

For information about the command line interface, refer to the *Software Reference for SwitchBlade x8100 Series Switches* on the Allied Telesis web site.



## Chapter 12

# Troubleshooting

---

This chapter contains information on how to troubleshoot the SwitchBlade x8112 product. The following troubleshooting information is available:

- ❑ “AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 246
- ❑ “AT-SBxPWRSYS1 DC System Power Supply” on page 248
- ❑ “Ethernet Line Cards” on page 250
- ❑ “Twisted Pair Ports” on page 253
- ❑ “Power Over Ethernet” on page 255
- ❑ “Fiber Optic or Twisted Pair Transceivers” on page 257
- ❑ “AT-SBx81CFC960 Controller Fabric Card” on page 259
- ❑ “AT-SBxFAN12 Fan Module” on page 261
- ❑ “Local (Console) Management Session” on page 262
- ❑ “Power Supply Interfaces (Opto-couplers)” on page 263

## AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies

---

The AT-SBxPWRSYS1 and AT-SBxPWRSYS2 AC System Power Supplies and AT-SBxPWRPOE1 PoE Power Supply are operating normally when the AC and DC LEDs are solid green and the Fault LED is off. Possible fault conditions and their solutions are described here:

Fault Condition 1: If the AC LED is off, the power supply is not receiving power, has overheated and been disabled, or has failed and needs to be replaced. Try the following:

- ❑ Verify that there is a power cord connected to the power supply's connector on the back panel of the chassis. For example, if a power supply in slot C does not have power, check for a power cord on connector C on the back panel.
- ❑ Verify that the power cord is securely connected to the chassis and the AC power source.
- ❑ Verify that the AC power has power by connecting another device to it.
- ❑ Verify that the power from the AC power source is within the required levels for your region.
- ❑ If the chassis is still operating, use the SHOW SYSTEM ENVIRONMENT command in the User Exec or Privileged Exec mode to determine if the power supply has overheated and shutdown. The Status column in the display provides the states of the chassis modules. Components that have an "Ok" status are operating normally.

Fault Condition 2: If the AC LED is solid green and the DC LED is off, the power unit is generating insufficient DC power. Replace the power supply.

Fault Condition 3: If the Fault LED is solid amber, try the solutions in Fault Condition 1. If they do not resolve the problem, replace the power supply.

---

### Note

The power supplies are hot swappable in a redundant configuration. This allows the AT-SBx8112 Chassis to continue operating while you exchange power supplies.

---

Fault Condition 4: If the LEDs on the power supply indicate normal operations but the PSU LED on the active master controller card is showing a fault condition, the problem may be with one of the two power supply interfaces (opto-couplers) on the rear panel of the chassis. For troubleshooting suggestions, refer to "Power Supply Interfaces (Opto-couplers)" on page 263.



---

**Caution**

The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

---

## AT-SBxPWRSYS1 DC System Power Supply

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If you suspect a problem with the DC power supply, examine its LEDs. The power supply is operating normally when the DC IN and DC OUT LEDs are solid green and the Fault LED is off. Possible fault conditions and their solutions are described here:

Fault Condition 1: If the DC IN LED is off, the power supply is not receiving power, has overheated and been disabled, or has failed and needs to be replaced. Try the following:

- ❑ Verify that the On/Off switch on the power supply is in the On position.
- ❑ Verify that the DC circuit breaker is on.
- ❑ Verify that the positive and negative power wires are correctly and securely connected to the terminal block on the power supply and circuit breaker.
- ❑ Verify that the DC circuit break has power by attaching another device to it.
- ❑ Verify that the power from the DC circuit break is within the required levels of the power supply. Refer to “Power Specifications” on page 362.
- ❑ If the chassis is still operating, use the SHOW SYSTEM ENVIRONMENT command in the User Exec or Privileged Exec mode to determine if the power supply has overheated and shutdown. The Status column in the display provides the states of the chassis modules. Components that have an “Ok” status are operating normally.

Fault Condition 2: If the DC IN LED is solid green but the DC OUT LED is off, the power unit is generating insufficient DC power. Replace the power supply.

Fault Condition 3: If the Fault LED is solid amber, try the solutions in Fault Condition 1. If they do not resolve the problem, replace the power supply.

---

### Note

The power supply is hot swappable. If the chassis has two power supplies and one of them fails, you do not have to power off the operational power supply to replace the failed unit.

---

Fault Condition 4: If the LEDs on the power supply indicate normal operations but the PSU LED on the active master control card is off or is showing a fault condition, try the following suggestions:



- ❑ The controller card might have an older version of the management software that cannot detect the DC power supply. For instructions on how to verify the software version on the control card, refer to “Using Local Management to Verify the Chassis” on page 240 and “Hardware and Software Releases” on page 97.
- ❑ The problem might be with one of the two power supply interfaces (opto-couplers) on the rear panel of the chassis. For troubleshooting suggestions, refer to “Power Supply Interfaces (Opto-couplers)” on page 263.

**Caution**

The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

---

## Ethernet Line Cards

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A quick and easy way to check the overall health of the Ethernet line cards in the chassis is with the SBx STATUS LEDs on the controller card. (If the chassis has two controller cards, you may use the LEDs on either card.) There are twelve LEDs, one for each slot. The LEDs are numbered 1 to 12, just like the slots. The cards in the slots are operating normally when the LEDs are green. The Ethernet line card in slot 8 of the chassis, for example, is operating normally when the SBx STATUS LED 8 on the controller card is solid green.

If you suspect a problem with an Ethernet line card, try the following:

- ❑ If all the L/A LEDs on the card are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- ❑ Check the card's status LED in the SBx STATUS LEDs on the controller card. If the LED is flashing amber, the card is initializing its management software. Wait one to two minutes for the card to complete the process. If the LED does not change to green, the card cannot complete the initialization process. Try removing and reinstalling the card.
- ❑ If the card's status LED in the SBx STATUS LEDs on the controller card is solid amber, the card might not be able to boot up because the controller card does not have its load file and needs to be updated. Refer to "Hardware and Software Releases" on page 97.
- ❑ Remove the card and visually inspect it for damage.

Here are some other steps to try:

- ❑ Check that the card is completely installed in the slot and that the front plate is flush with the front of the chassis.
- ❑ Try resetting the card with the REBOOT CARD command. The example of the command restarts the card in slot 2:

```
awplus# reboot card 2
Reboot card 2 system? (y/n)? y
awplus#
```

- ❑ Try removing and reinstalling the card in the same slot.
- ❑ Try installing the card in a different slot. If it works in the new slot, the problem is with the previous slot.
- ❑ Try installing the card in a different chassis. If it works in the new chassis, the problem is with the previous chassis. If the problem persists, the problem is with the card.
- ❑ Use the SHOW CARD command to display card status

information, as shown in Figure 157 on page 242.

A new line card that you hot-swapped in an active chassis appears to be functioning normally, but the `SHOW SYSTEM` command does not display it. The card may have encountered an initialization error when it was hot-swapped. Try removing and reinstalling the card.

If the problem is with the AT-SBx81XS16 Line Card, check the following items:

- ❑ Verify that the AlliedWare Plus Operating System on the AT-SBx81CFC960 Controller Fabric Card is version 5.4.4 or later. To determine the version number of the operating system on the controller card, start a management session on the chassis and issue the `SHOW SYSTEM` command in the Privileged Exec mode. For instructions, refer to “Displaying the Management Software Version Number” on page 331. If necessary, update the operating system on the controller card. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches.
- ❑ Verify that the line card is installed in a supported slot in the AT-SBx8112 Chassis. The AT-SBx81XS16 Line Card is supported in slots 1 to 4, 8, and 10. The card is not supported in slots 7, 9, 11, and 12. The controller card generates an error message if a card is installed in an unsupported slot.
- ❑ Verify that the controller card in the chassis is the AT-SBx81CFC960 Controller Fabric Card. The AT-SBx81CFC400 Controller Fabric Card does not support the AT-SBx81XS16 Line Card.

If the problem is with the AT-SBx81XLEM Line Card or an expansion module, check the following items:

- ❑ Verify that the AlliedWare Plus Operating System on the AT-SBx81CFC960 Controller Fabric Card supports the card or expansion module. Refer to Table 30.

Table 30. AlliedWare Plus Operating System Releases for the AT-SBx81XLEM Line Card

Model Name	Initial Release
AT-SBx81XLEM Line Card	5.4.6
AT-SBx81XLEM Line Card with large address table modes	5.4.6-1.1
AT-SBx81XLEM/Q2 Expansion Module	5.4.6

Table 30. AlliedWare Plus Operating System Releases for the AT-SBx81XLEM Line Card (Continued)

Model Name	Initial Release
AT-SBx81XLEM/XS8 Expansion Module	5.4.6
AT-SBx81XLEM/XT4 Expansion Module	5.4.6-1.1
AT-SBx81XLEM/GT8 Expansion Module	5.4.6-2.1

To determine the version number of the operating system on the controller card, start a management session on the chassis and issue the SHOW SYSTEM command in the Privileged Exec mode.

- ❑ If the AT-SBx8112 Chassis has AlliedWare Plus v5.4.6, verify that the AT-SBx81XLEM Line Card is installed in a supported slot. The supported slots for the card are slots 1 to 4, 8, and 10. (This restriction does not apply to AlliedWare Plus v5.4.6-1 or later, which supports the line card in all ten line card slots.)

If the problem is with a new AT-SBx81GT24 or AT-SBx81GP24 v2 Line Card, verify that the AlliedWare Plus Operating System on the controller card is version 5.5.0 or later.

## Twisted Pair Ports

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This section applies to the twisted pair ports on the following devices:

- ☐ AT-SBx81GT24 Line Card
- ☐ AT-SBx81GT40 Line Card
- ☐ AT-SBx81GP24 Line Card
- ☐ AT-SBx81XLEM/XT4 Expansion Module
- ☐ AT-SBx81XLEM/GT8 Expansion Module

If a twisted pair port is cabled to a network device but the L/A LED is off, try the following:

- ☐ If all the L/A LEDs on the cards are off, try pressing the eco-friendly button on the active master controller card to verify that the LEDs on the line cards are on.
- ☐ Verify that the network device connected to the port is powered on and operating properly.
- ☐ Check that the twisted pair cable is securely connected to the ports on the line card and the end node.
- ☐ Make sure that the twisted pair cable does not exceed 100 m (328 ft).
- ☐ Verify that you are using the appropriate category of cable by referring to the appropriate table in “Cable Requirements” on page 68.
- ☐ Verify that the twisted-pair cable is not faulty by replacing it with a known good cable.
- ☐ Make sure that the operating parameters of the ports on the line card and network device are compatible.

If the L/A LED for a port is on, signalling a link to the network device, but link performance is poor or intermittent, the problem may be from a bad cable. Try replacing the cable.

Another source of poor or intermittent performance on a link can be a speed or duplex mode mismatch between a port and network device. Here are some items to consider when resolving this type of problem:

- ☐ The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Aut-Negotiation.
- ☐ The default speed setting of Auto-Negotiation is not appropriate for ports connected to 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 ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps or 10Gbps.
- ❑ 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. Disable Auto-Negotiation on those ports and set the 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.

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**Note**

The AT-SBx81GT40 Line Card does not support half-duplex mode.

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Yet another source for a poor or intermittent link can be a MDI/MDIX wiring configuration mismatch. The wiring configurations of the ports on the AT-SBx81GT24, AT-SBx81GT40, and AT-SBx81GP24 Line Cards are set automatically with automatic MDIX detection when the ports are operating at 10 or 100 Mbps. (Automatic MDIX detection does not apply to the ports when they are operating at 1000 Mbps.) You may not disable this feature on the ports. For automatic MDIX detection to work successfully, the network device connected to a port must also support the feature. If it does not, a port on the switch defaults to MDIX. This may require the use of a crossover cable. Here are the guidelines to choosing straight-through or crossover cables for the ports:

- ❑ You may use straight-through cables on ports that are connected to network devices that operate at 1000 Mbps.
- ❑ You may use straight-through or crossover cables on ports that are connected to network devices that support automatic MDIX detection and that operate at 10 or 100 Mbps.
- ❑ You *must* use straight-through cables on ports that are connected to network devices that have a fixed wiring configuration of MDI and that operate at 10 or 100 Mbps.
- ❑ You *must* use crossover cables on ports that are connected to network devices that have a fixed wiring configuration of MDIX and that operate at 10 or 100 Mbps.

## Power Over Ethernet

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This section applies only to the AT-SBx81GP24 Line Card. Each port has two LEDs. The left LED provides port link and activity status and the right LED provides PoE status information. The PoE LED is solid green when a port is delivering power to a powered device (PD). The PoE LED of a port that is not delivering power will be flashing amber, steady amber, or off. If a powered device is not receiving power from a port on the line card, try the following:

- ❑ If all the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- ❑ Check to be sure that the chassis has at least one AT-SBxPWRPOE1 Power Supply and that the unit is operating properly. The AC and DC LEDs should be solid green and the Fault LED should be off. For troubleshooting suggestions, refer to “AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 246.
- ❑ Review the PD’s documentation to confirm that it supports Mode A of the IEEE 802.3at standard. Mode A is one of two modes that define the connector pins that deliver the power from the port on the line card to the PD. 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-SBx81GP24 Line Card does not support Mode B. Most powered devices are designed to accept power by either mode, but some legacy devices may only support one mode. This can be verified by reviewing the device’s documentation or data sheet. Legacy devices that only support Mode B will not work with this line card.
- ❑ Review the device’s documentation or data sheet to confirm that its power requirements do not exceed 30 W.
- ❑ Verify that you are using the appropriate category of twisted-pair cable by referring to “Cable Requirements” on page 68.
- ❑ Try replacing the twisted-pair cable.
- ❑ Use the SHOW POWER-INLINE command in the management software to determine whether PoE is enabled on the port. The default setting for PoE is enabled.
- ❑ Use the SHOW POWER-INLINE command to determine whether the PoE power setting for the port has been reduced from the default setting of 30 W, to a value below the power requirements of the device.
- ❑ Use the SHOW POWER-INLINE command to determine whether the switch has reach its maximum power budget.

- ❑ Try connecting the PD to a port on a different AT-SBx81GP24 Line Card.



## Fiber Optic or Twisted Pair Transceivers

---

This section applies to Ethernet line cards and expansion modules with transceiver slots.

The L/A LEDs on the transceiver slots are solid or flashing green when transceivers have links to end nodes. If a transceiver is cabled to an end node but the L/A LED is off, try the following:

- ❑ If all the L/A LEDs on the line cards in the chassis are off, try pressing the eco-friendly button on the active master controller card to turn on the LEDs.
- ❑ Check that the transceiver is firmly inserted into the slot on the line or controller card.
- ❑ Check that both ends of the cable are securely connected to the ports on the transceiver and end node.
- ❑ Verify that the end node is powered on and operating properly.
- ❑ Try replacing the cable.

Here are additional steps for fiber optic transceivers:

- ❑ Verify that the Ethernet line card or expansion module supports the transceiver. A list of supported transceivers can be found in the SwitchBlade x8112 data sheet on the Allied Telesis web site. You should also check the error log for the following message:

`portn.n.n doesn't support this module type.`

The message indicates that the switch does not support the designated transceiver.

---

### Note

The AT-SBx81XLEM/Q2 Module supports revision B of the AT-QSFPSR4 transceiver. It does not support revision A. The revision level of the transceiver is printed on the transceiver label, after the serial number. You can also display it with the `SHOW SYSTEM PLUGGABLE DETAIL` command in the AlliedWare Plus operating system.

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- ❑ Review the operating specifications of the transceiver and end node to verify that the devices have the same speed and duplex mode.
- ❑ Check that the operating specifications, including wavelength and maximum operating distance, of the transceiver are compatible with the fiber optic port on the end node.

- ❑ Make sure that you are using the appropriate type of fiber optic cable and that the cable length does not exceed the allowed maximum distance. The cable specifications for the transceivers are provided in the installation instructions that ship with the modules.
- ❑ Use a fiber optic tester to test whether the optical signal is too weak (i.e., sensitivity) or too strong (i.e., maximum input power). The operating specifications of the fiber optic transceivers are shipped with the units.
- ❑ Check the two strands of the fiber optic cable to be sure that the receive fiber connector is connected to the transmit connector on the remote end node, and that the transmit fiber connector is connected to the receive connector on the end node.

## AT-SBx81CFC960 Controller Fabric Card

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If the chassis has one controller card and the card fails, all network operations stop. The Ethernet line cards stop forwarding all network traffic until the controller card is replaced.

If the chassis has two controller cards and one fails, the Ethernet line cards continue to forward traffic, but the bandwidth of the backplane is reduced, which, depending on the number of Ethernet line cards present and the amount of traffic traversing the backplane, may result in slower network operations.

If the chassis has one controller card, examine the M/S LED on the card. The LED should be solid green. If the LED is flashing amber, the card is initializing its management software. Wait one or two minutes for the card to complete the process and check the LED again. If it has not changed to solid green, the card cannot complete the initialization process. Try the following:

- ☐ Move the controller card to the other controller card slot, slot 5 or 6, to see if it works in a different slot.
- ☐ Install the controller card in another chassis.
- ☐ Connect a terminal or PC with a terminal emulator program to the Console RS232 port to watch for error messages.

If the chassis has two controller cards, check the M/S LEDs on both cards. The LEDs should be solid green on one card and solid or flashing amber on the other. If the LEDs are both flashing amber, they are initializing their management software. Wait one or two minutes for the cards to complete the process and check the LEDs again. If both LEDs are still flashing amber, they cannot complete the initialization process. Try replacing the cards.

The controller card has an on-board battery to maintain the date and time when the chassis is powered off or reset. If you manually set the date and time but the card loses the information after you power off or reset the unit, you may have forgotten to remove the battery insulator when you installed the card in the chassis. The insulator is shown in Figure 74 on page 150. The only way to remedy the problem is to remove the controller card from the chassis and remove the battery insulator. If the chassis has only one controller card, removing the card causes the Ethernet line cards to stop forwarding traffic.

If you installed a second controller card in a chassis but only one card is operating, it might be because they are different versions, and the version 1 card has a release of the AlliedWare Plus management software not supported by the version 2 card. For more information, refer to "Controller Fabric Cards for the AT-SBx8112 Chassis" on page 74.

If you hot-swap a controller card in an active chassis but the card does not appear in the `SHOW SYSTEM` command even though it is fully functional, it may have encountered an initialization error. Try removing and reinstalling the card.

## AT-SBxFAN12 Fan Module

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The AT-SBxFAN12 Fan Module is operating correctly when the POWER LED on the module is solid green. If the LED on the fan module is off, check the FAN LED in the SYS STATUS section on the active master controller card. The LED should be green. If the FAN LED is off or flashing amber, one or more fans in the module are no longer operating properly. You may also view the status of the unit with the SHOW SYSTEM ENVIRONMENT command in the management software.

You may notice changes in the fan speeds. This is normal. The active master controller card automatically adjusts the fan speeds according to the internal temperature of the chassis.

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**Note**

The AT-SBxFAN12 Fan Module is hot swappable. You do not have to power off the AT-SBx8112 Chassis to replace the module.

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## Local (Console) Management Session

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If you are unable to establish a local management session with the switch through the Console RS-232 port on the controller card, do the following:

- ❑ Check to be sure that the RJ-45 serial management cable is securely connected to the Console RS-232 port on the active master controller card and the RS-232 port on the terminal or personal computer.
- ❑ If the chassis has two controller cards, you should be able to use the Console RS-232 port on either card to establish a local management session with the chassis. If you are unsuccessful establishing a session on one of the controller cards, try connecting to the Console RS-232 port on the other card.
- ❑ Check to be sure that the operating parameters on the terminal or the terminal emulation program, if you are using a personal computer, have been set correctly. The default settings for the RJ-45 serial terminal port are located in “Using Local Management to Verify the Chassis” on page 240.
- ❑ Check to be sure that the terminal emulator application is compatible with a VT-100 terminal.

## Power Supply Interfaces (Opto-couplers)

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The two power supply interfaces in the lower right corner of the rear panel are used by the active master controller card to obtain status information from the power supplies. The interfaces are shown in Figure 10 on page 34.

Each power supply interface supports two power units. The top interface supports the power supplies in slots A and C. The bottom interface supports the supplies in slots B and D.

An interface is operating normally when its Power LED is solid green. The LED of an interface is off if the two corresponding power supply slots are empty or the power supplies are not powered on. For example, the LED for the bottom interface will be off if power supply slots B and D are empty or the power supplies are off.

The network operations of the chassis are not affected if one or both of the interfaces fail. However, the active master controller card changes the PSU LED to flashing amber to signal that it cannot communicate with the power supplies.

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### Note

The power supply interfaces are *not* hot swappable and can only be serviced by an authorized service technician.

---

If the Power LED on a power supply interface is off, do the following:

1. Check that there are power supplies in the corresponding slots in the front panel and that the power supplies are powered on. (The Power LED on an interface is off when the slots are empty or the power supplies are not powered on.)
2. Inspect the LEDs on the power supplies to check for a fault condition. If there is a fault condition, go to “AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 246 for troubleshooting suggestions. If the LEDs indicate the power supplies are operating normally, go to step 3.
3. Check the PSU LED on the active master controller card. If the LED is solid green, the power supplies and interfaces are operating normally. No corrective steps are required. If the PSU LED is solid amber but the LEDs on the power supplies indicate normal operations, there may be a problem with a power supply interface. Contact your Allied Telesis sales representative for assistance.





## Chapter 13

# Replacing Modules

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This chapter contains procedures on how to replace modules in the chassis. The chapter has the following sections:

- ❑ “Replacing AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 266
- ❑ “Replacing the AT-SBxPWRSYS1 DC Power Supply” on page 272
- ❑ “Replacing Ethernet Line Cards” on page 283
- ❑ “Replacing Expansion Modules in AT-SBx81XLEM Line Cards” on page 285
- ❑ “Replacing AT-SBx81CFC960 Controller Fabric Cards” on page 291
- ❑ “Replacing the AT-SBxFAN12 Fan Module” on page 296

## Replacing AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies

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This section contains the procedure for removing AT-SBxPWRSYS1 and AT-SBxPWRSYS2 AC System Power Supplies, and AT-SBxPWRPOE1 PoE Power Supplies from the AT-SBx8112 Chassis.

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**Note**

The illustrations in the procedure show the AT-SBxPWRSYS1 AC System Power Supply from slot D. The procedure is the same for all the power supply slots.

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**Note**

Allied Telesis recommends creating a backup copy of the configuration file in the controller card before removing or replacing a power supply. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches on the Allied Telesis web site.

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**Note**

The power supplies are hot swappable.

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**Caution**

If you are installing the AT-SBxPWRSYS2 Power Supply in an active, operational chassis, you should connect the AC power cord to the chassis before installing the power supply. Attaching the power cord after installing the AT-SBxPWRSYS2 Power Supply might cause the active master controller card to restart its operating system. This can result in a temporary interruption of network operations of the chassis if it has only one controller card. This guideline does not apply to the AT-SBxPWRSYS1 AC or DC Power Supply or AT-SBxPWRPOE1 Power Supply.

---

To remove power supplies from the chassis, perform the following procedure:

1. Disconnect the AC power cord for the power supply from the AC power source and the corresponding AC socket on the back panel of the chassis. The figure in Figure 158 on page 267 shows the removal of the power cord from connector D, which corresponds to slot D on the front panel.



Figure 158. Disconnecting the AC Power Cord from the AC Socket on the Back Panel

2. Lift the locking hand on the power supply. Refer to Figure 159 on page 268.



Figure 159. Lifting the Locking Handle on the Power Supply

3. Carefully pull on the locking handle to slide the power supply from the chassis. Refer to Figure 160 on page 269.



**Warning**

The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.



Figure 160. Removing the Power Supply from the Chassis

4. Do one of the following:
  - ☐ To install a new power supply, refer to Chapter 6, “Installing the Power Supplies” on page 125.
  - ☐ If you are not installing a new power supply, continue with the rest of this procedure to install a blank slot cover.
5. Place the locking handle on the slot cover in the up position and slide the cover into the empty power supply slot, as shown in Figure 161 on page 270.

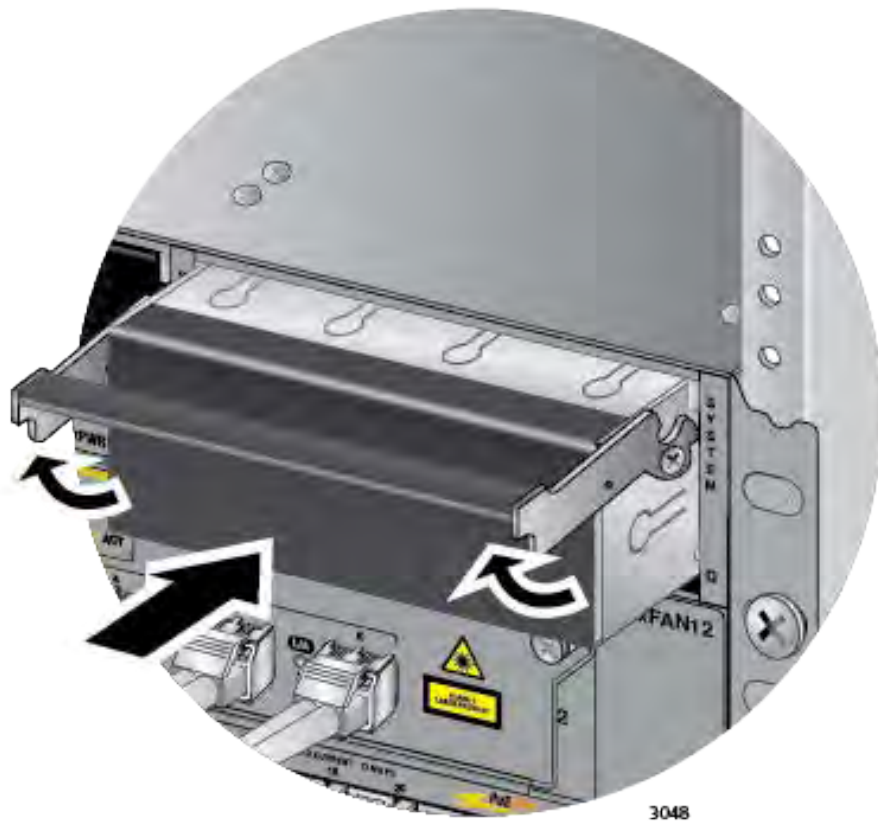


Figure 161. Installing a Blank Power Supply Slot Cover

6. Lower the locking handle to secure the slot cover to the slot. Refer to Figure 162 on page 271.



Figure 162. Lowering the Locking Handle on the Power Supply Slot Cover

## Replacing the AT-SBxPWRSYS1 DC Power Supply

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To remove an AT-SBxPWRSYS1 DC Power Supply from the chassis, perform the following procedure:

1. Turn off the circuit breaker to the AT-SBxPWRSYS1 DC Power Supply.
2. Turn off the On/Off switch on the front panel of the power supply. Refer to Figure 124 on page 207.
3. Use a #2 screwdriver to loosen the screw on the locking handle. Refer to Figure 163.

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**Note**

Do not lift the locking handle yet.

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Figure 163. Loosening the Screw on the Locking Handle



**Note**

If the power wires are connected to the terminal block with the right angle terminals, go to step 5.

4. Use a #1 screwdriver to loosen the two screws that secure the plastic cover over the terminal block and slide the cover to the right. You may need to slightly lift the locking handle to access the bottom screw. Refer to Figure 164.

The plastic cover may not be present if you used the right angle terminals to connect the lead wires to the terminal block. If this is the case, you may skip this step.



Figure 164. Opening the Plastic Window over the Terminal Block

5. Use a #3 screwdriver to remove the negative (-) lead wire from the terminal block. The negative lead wire is on the right. Refer to Figure 165 on page 274.

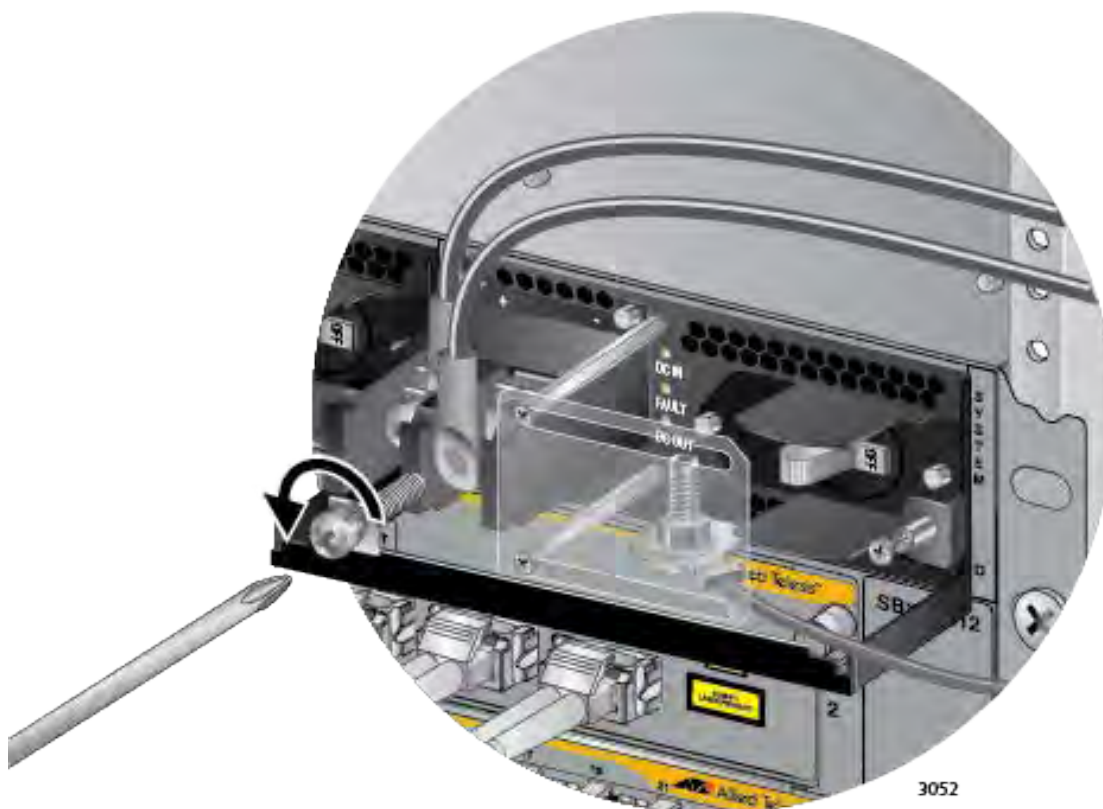


Figure 165. Removing the Negative Lead Wire

6. Use a #3 screwdriver to remove the positive (+) lead wire from the terminal block. Refer to Figure 166 on page 275.



Figure 166. Removing the Positive Lead Wire from the Terminal Block

7. Reinstall the two screws on the negative (-) and positive (+) terminals. Refer to Figure 167 on page 276.



Figure 167. Reinstalling the Screws on the Positive and Negative Terminals

8. Slide the plastic cover to the left and lightly tighten the two screws to secure it in place. Refer to Figure 168 on page 277.



**Caution**

Do not over tighten the screws or you may crack or break the plastic cover.

The plastic cover may not be present if the lead wires were connected to the terminal block with the right angle terminals. If this is the case, you may either skip this step or reinstall the plastic cover on the power supply.



Figure 168. Closing the Plastic Cover

9. Use an 8 mm wrench to remove the grounding wire from the grounding post. Refer to Figure 169 on page 278.



Figure 169. Removing the Grounding Wire

10. Reinstall the nut and washer on the grounding post. Refer to Figure 170 on page 279.



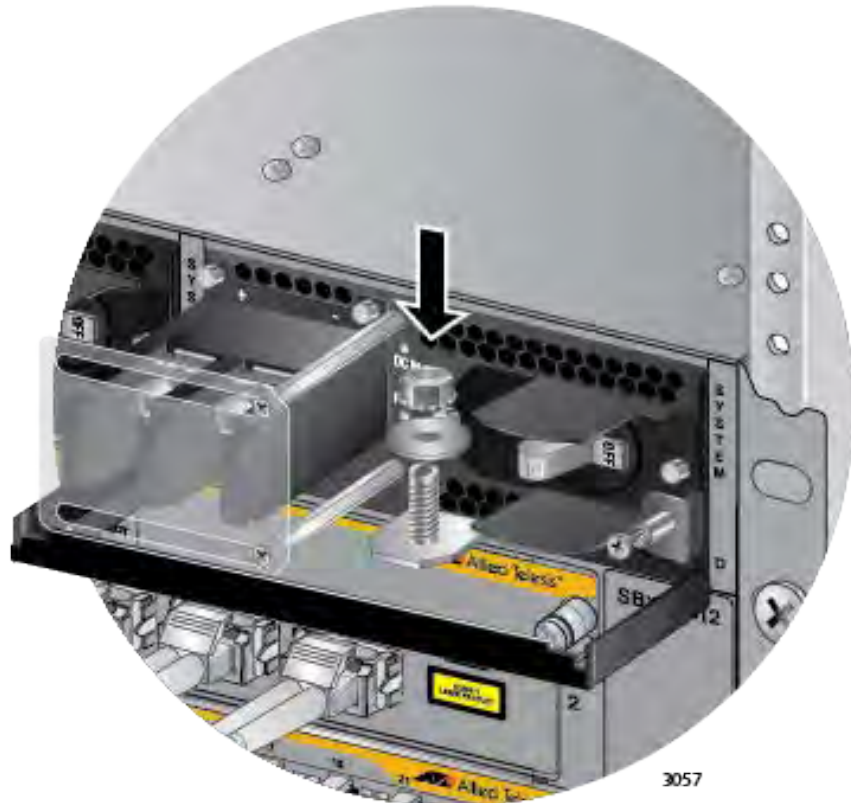


Figure 170. Reinstalling the Nut and Washer on the Grounding Post

11. Lift the locking handle and slide the power supply from the chassis. Refer to Figure 171 on page 280.

**Warning**

The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.

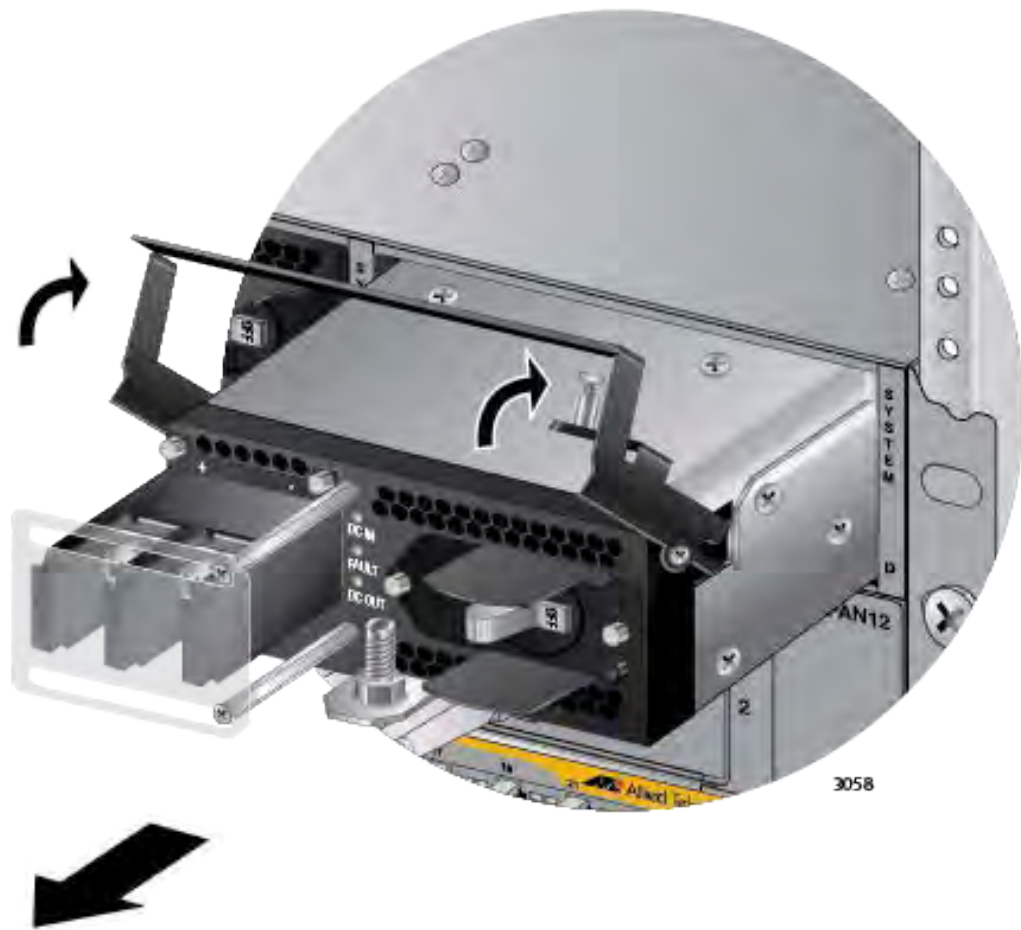


Figure 171. Lifting the Locking Handle and Removing the Power Supply

12. Do one of the following:

- ☐ To install a new power supply, refer to Chapter 6, “Installing the Power Supplies” on page 125.
- ☐ If you are not installing a new power supply, continue with this procedure to install a blank slot cover.

13. Place the locking handle on the slot cover in the up position and slide the cover into the empty power supply slot. Refer to Figure 172 on page 281.



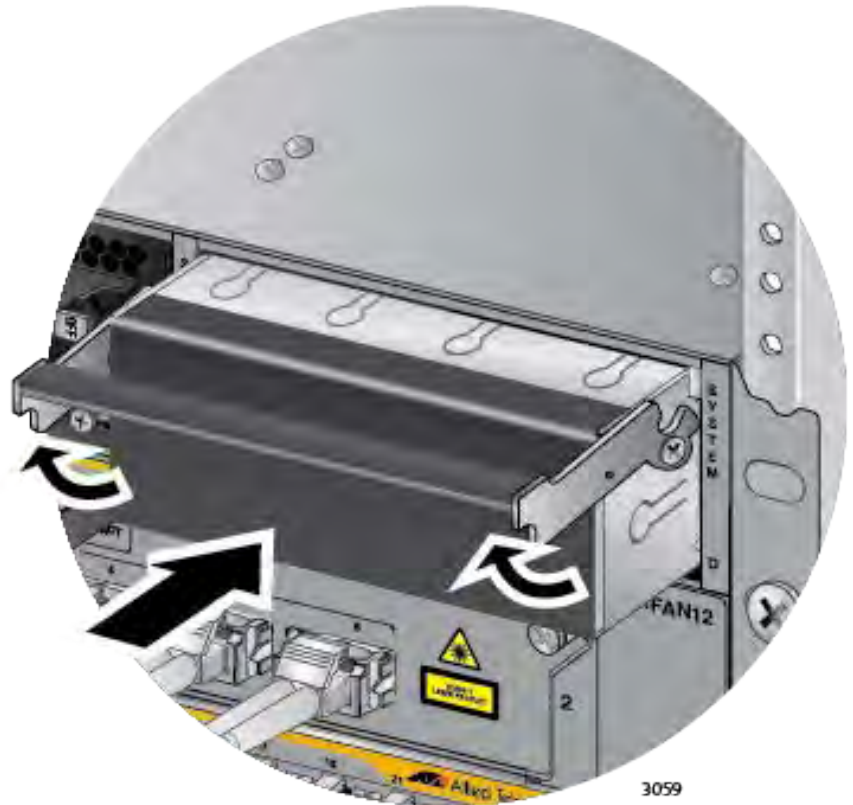


Figure 172. Installing a Blank Power Supply Slot Cover

14. Lower the locking handle to secure the slot cover to the slot. Refer to Figure 173 on page 282.



Figure 173. Lowering the Locking Handle on the Power Supply Slot Cover

## Replacing Ethernet Line Cards

---

This section contains the procedure for replacing Ethernet line cards from the chassis.

---

**Note**

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---

The Ethernet line cards are hot-swappable. You do not have to power off the chassis to install or replace line cards.



---

**Caution**

The expansion modules for the AT-SBx81XLEM Line Card are not hot-swappable. You must remove the line card from the chassis to install or remove a module. For instructions, refer to “Replacing Expansion Modules in AT-SBx81XLEM Line Cards” on page 285.

---

This procedure requires the following tool:

- ❑ #2 Phillips-head screwdriver (not provided)

The Ethernet line cards are hot swappable and can be removed while the chassis is powered on.

To remove an Ethernet line card from the chassis, perform the following procedure:

1. Label and remove the cables from the Ethernet line card.
2. If the line card has fiber optic transceivers, install dust covers on the ports.
3. If the line card has transceivers, label and remove the transceivers.
4. Use a #2 Phillips-head screwdriver to loosen the two screws on the faceplate of the card.
5. Carefully pull on the screws to disconnect the line card from the connector on the backplane.
6. Carefully slide the card from the chassis.



---

**Caution**

Keep the card level as you slide it out of the chassis. You might damage the components on the top or bottom of the card if you slide it out at an angle. Refer to Figure 70 on page 147.

---

7. Do one of the following:
  - ☐ For instructions on how to install the line card in another slot of the chassis or a different chassis, refer to “Installing Ethernet Line Cards” on page 162.
  - ☐ If you do not plan to immediately install another line card in the same slot, cover the slot with a blank cover. For instructions, refer to “Installing Blank Slot Covers” on page 167.
  - ☐ If you do not plan to immediately install the card in another chassis, continue with this procedure.
8. Store the line card in an anti-static bag.
9. Return the line card to its shipping container.

## Replacing Expansion Modules in AT-SBx81XLEM Line Cards

---

This section contains the procedure for replacing expansion modules in AT-SBx81XLEM Line Cards.

---

**Note**

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---



---

**Caution**

The expansion modules are not hot-swappable. You must remove the AT-SBx81XLEM Line Card from the chassis to service a module. Installing or replacing a module while the line card is installed in the chassis will damage the devices.

---

This procedure requires the following tools:

- ☐ #2 Phillips-head screwdriver (not provided)
- ☐ Flat-head screwdriver (not provided)

The illustrations in the procedure show the AT-SBx81XLEM/XS8 Expansion Module. The procedure is the same for all modules.

To replace an expansion module in the AT-SBx81XLEM Line Card, perform the following procedure:

1. Remove the AT-SBx81XLEM Line Card from the chassis by performing steps 1 to 6 in “Replacing Ethernet Line Cards” on page 283.
2. Place the line card on a level, secure surface.
3. With a Phillips-head screwdriver, remove the two screws that secure the expansion module to the line card. Refer to Figure 174 on page 286.

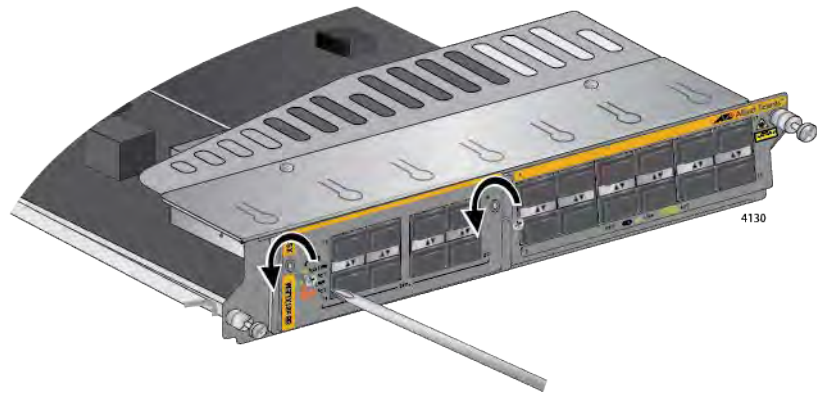


Figure 174. Removing the Screws from the Expansion Module

4. With your thumb and forefinger, pull out the retaining pin on the side of the line card and turn it clockwise one quarter turn until it remains in the retracted position. Refer to Figure 175.

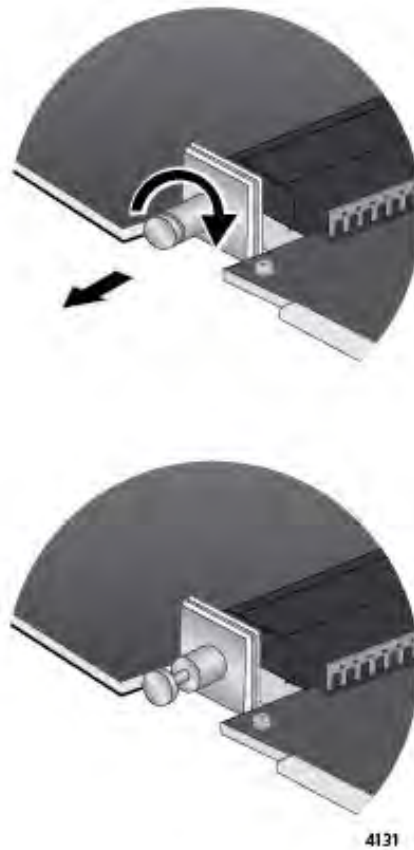


Figure 175. Retracting the Retaining Pin on the AT-SBx81XLEM Line Card

5. Lift the front of the line card and carefully insert the tip of a flathead screwdriver into the slot beneath the expansion module on the bottom panel. Gently twist the screwdriver to disconnect the module from the connector in the line card. Refer to Figure 176.

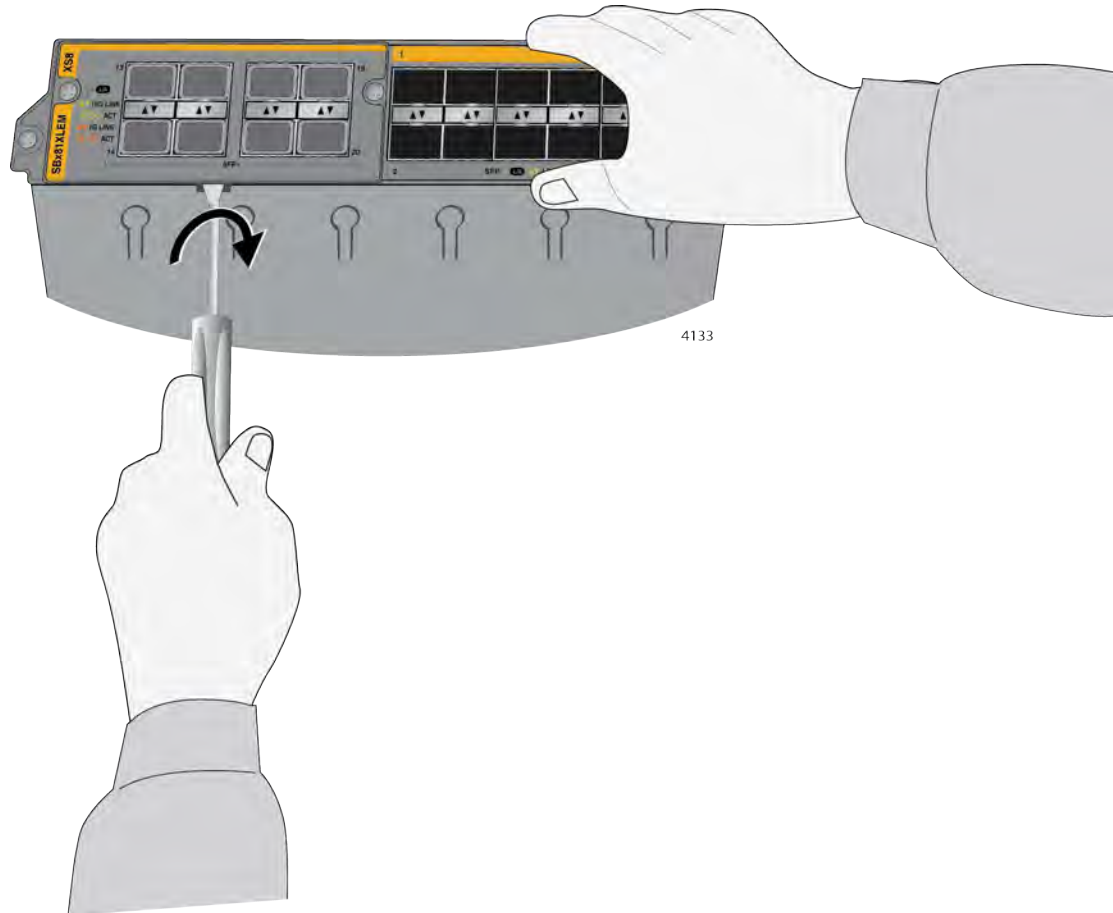


Figure 176. Disconnecting the Expansion Module from the AT-SBx81XLEM Line Card

6. Slide the expansion module from the line card. Refer to Figure 177 on page 288.

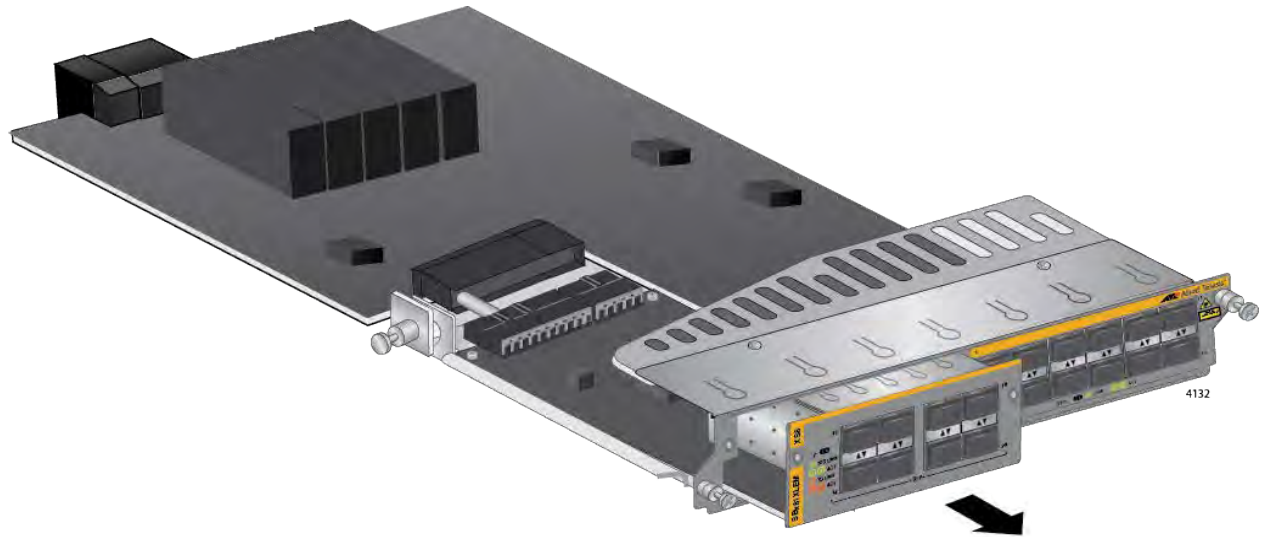


Figure 177. Sliding the Expansion Module from the AT-SBx81XLEM Line Card

7. If you are not installing the expansion module in another AT-SBx81XLEM Line Card, store it in an anti-static bag. Refer to Figure 178.



Figure 178. Storing the Expansion Module in an Anti-static Bag

8. Do one of the following:
  - ☐ To install a different expansion module in the line card, go to “Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards” on page 154 and start with step 7.
  - ☐ To install the line card in the chassis without an expansion module, continue with this procedure.
9. Slide the blank slot cover that comes with the line card into the slot on the card. Refer to Figure 179 on page 289.



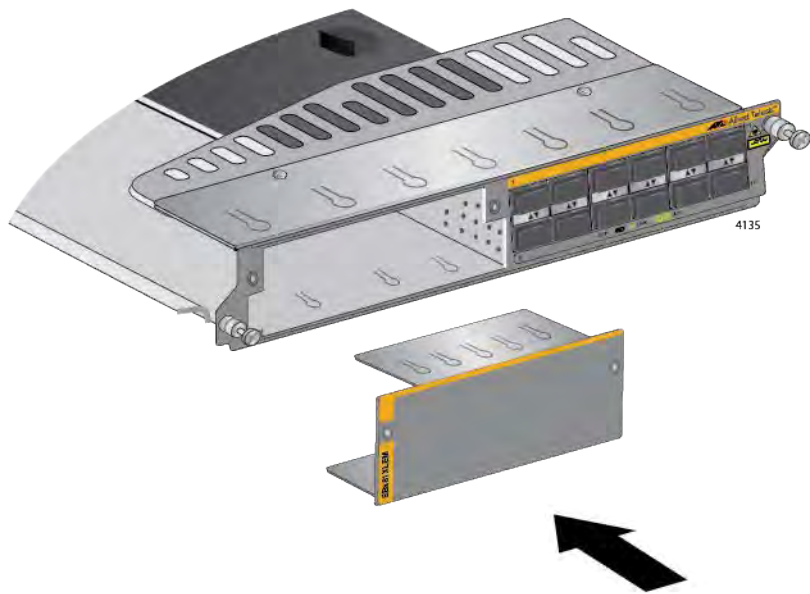


Figure 179. Sliding the Blank Slot Cover into the AT-SBx81XLEM Line Card

10. Secure the blank slot cover to the card with a Phillips-head screwdriver and the two screws removed in step 3. Refer to Figure 180.



Figure 180. Securing the Blank Slot Cover

11. Turn the retaining pin on the side of the card a quarter turn to release it. Refer to Figure 181 on page 290.

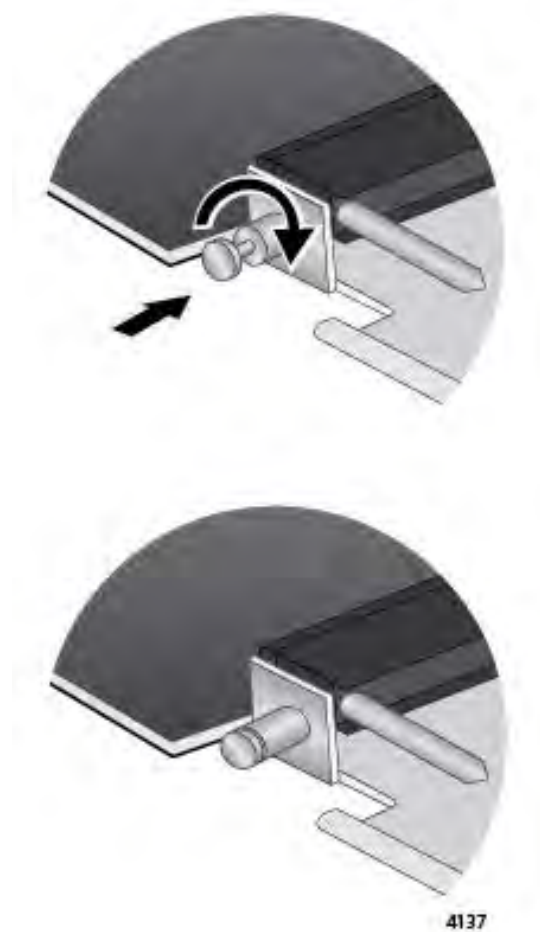


Figure 181. Releasing the Retaining Pin

12. To install the line card back in the chassis, go to “Installing Ethernet Line Cards” on page 162 and start with step 5.

## Replacing AT-SBx81CFC960 Controller Fabric Cards

---

This section contains procedures for replacing the controller fabric cards in the AT-SBx8112 Chassis. There are different procedures depending on the number of controller cards in the chassis:

- ❑ For a chassis with only one controller card, the recommended procedure is to power off the chassis and then replace the controller card with a new card. Refer to “One Controller Card”.
- ❑ For a chassis with two controller cards, the recommended procedure is to hot-swap the new card, thus avoiding a disruption to network operations. Refer to “Two Controller Cards” on page 292.

### One Controller Card

Here are the general steps to replacing a controller card in a chassis that has only one controller card:

1. Power off all power supplies in the chassis:
  - ❑ For AT-SBxPWRSYS1, AT-SBxPWRSYS2 AC, and AT-SBxPWRPOE1 Power Supplies, disconnect the power cords from the AC power sources.
  - ❑ For AT-SBxPWRSYS1 DC Power Supplies, turn the power switches on the power supplies to the Off position. Refer to Figure 136 on page 215.
2. Remove the controller card from the chassis. Refer to “Removing a Controller Card” on page 293.
3. Install the new controller card. Refer to “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 148.

---

#### Note

You should install the new controller card in the same slot as the card it is replacing.

---

4. Power on the chassis power supplies:
  - ❑ For AT-SBxPWRSYS1, AT-SBxPWRSYS2 AC, and AT-SBxPWRPOE1 Power Supplies, connect the power cords to the AC power sources.
  - ❑ For AT-SBxPWRSYS1 DC Power Supplies, turn the power switches on the power supplies to the On position. Refer to Figure 136 on page 215.

5. Wait a minimum of three minutes for the line and controller cards to complete the initialization process.
6. Restore the configuration to the Ethernet line and controller cards by uploading the latest archived copy of the configuration file to the new controller card. Refer to “Command Reference: SwitchBlade x8100 Series Switches and AlliedWare Plus.

## Two Controller Cards

This section contains the general steps for hot-swapping a controller card in an active chassis. The procedure is appropriate in these situations:

- ☐ You want to install a second controller card in a chassis that until now has had only one controller card.
- ☐ You need to replace a faulty controller card in a chassis that has two controller cards.

Before beginning the replacement procedure, it is important to determine whether the new AT-SBx81CFC960 Controller Card and the active controller card in the chassis are the same version. As explained in “Controller Fabric Cards for the AT-SBx8112 Chassis” on page 74, there are two versions of the AT-SBx81CFC960 Controller Card -- Versions 1 and 2. They can be installed in the same chassis, but you might need to update the AlliedWare Plus management software on Version 1 cards.

To determine the version of a controller card, examine the legend on the faceplate for its SFP+ slots. Version 1 cards have “10G LINK” for the legend while Version 2 cards have “10G LINK and “1000 LINK.” Refer to Figure 34 on page 75.

After determining the versions of the new and active controller cards, do one of the following:

- ☐ If the new and active master controller cards are the same version, proceed with the replacement. Refer to the following procedure.
- ☐ If the new controller card is Version 1 and the active master controller card in the chassis is Version 2, proceed with the replacement. Refer to the following procedure.
- ☐ If the new controller card is Version 2 and the active master controller card in the chassis is Version 1, review “Combining Versions 1 and 2 Controller Cards in a Chassis” on page 76. You need to determine if the Version 1 card has one of the AlliedWare Plus releases in Table 20 on page 76. If it does not, you will need to update its management software before hot-swapping the new Version 2 card.

Here are the general steps to replacing a controller card in a chassis that has two controller cards:

1. If the chassis is powered off, power it on.

---

**Note**

You should not replace a controller card in a chassis that has a functional controller card while the unit is powered off, especially if you are installing the new controller card in slot 5. Otherwise, the chassis might lose its configuration settings if the new card becomes the active master controller card when you power on the unit.

---

2. If you are replacing a faulty controller card, remove the card. Refer to “Removing a Controller Card”.

---

**Note**

If the new controller card is Version 2 and the active controller card in the chassis is Version 1, perform step 3. Otherwise, go to step 4.

---

3. Start a management session on the chassis and issue the SHOW VERSION command. If the AlliedWare Plus management software on the active controller card is not listed in Table 20 on page 76, update its software to the latest version before installing the new controller card. Refer to “Command Reference: SwitchBlade x8100 Series Switches and AlliedWare Plus.
4. Install the new controller card. Refer to “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 148.

## Removing a Controller Card

This procedure requires a #2 Phillips-head screwdriver (not provided). The following illustrations shown the removal of the controller card from slot 5. The procedure is the same for the controller card in slot 6.

---

**Note**

Please review “Guidelines to Handling the Controller and Line Cards” on page 146 before performing this procedure.

---

To remove a controller card from the chassis, perform the following procedure:

1. Disconnect the cables from the NET MGMT and Console ports on the controller card.
2. Disconnect the cables from the SFP+ transceivers in the controller card and remove the transceivers.
3. Use a #2 Phillips-head screwdriver to loosen the two screws on the faceplate of the card. Refer to Figure 182 on page 294.



Figure 182. Loosening the Screws on the AT-SBx81CFC960 Controller Card

4. Carefully pull out the handles of the faceplate to disconnect the controller card from the internal connector on the backplane of the chassis. Refer to Figure 183.



Figure 183. Pulling out the Retaining Handles on the AT-SBx81CFC960 Controller Card

5. Carefully remove the card from the chassis. Refer to Figure 184 on page 295.



#### Caution

Keep the card level as you slide it out of the chassis. You might damage the components on the top or bottom of the card if you slide it out at an angle. Refer to Figure 70 on page 147.

**Caution**

Do not hold the controller card by its retaining handles. You might bend them.

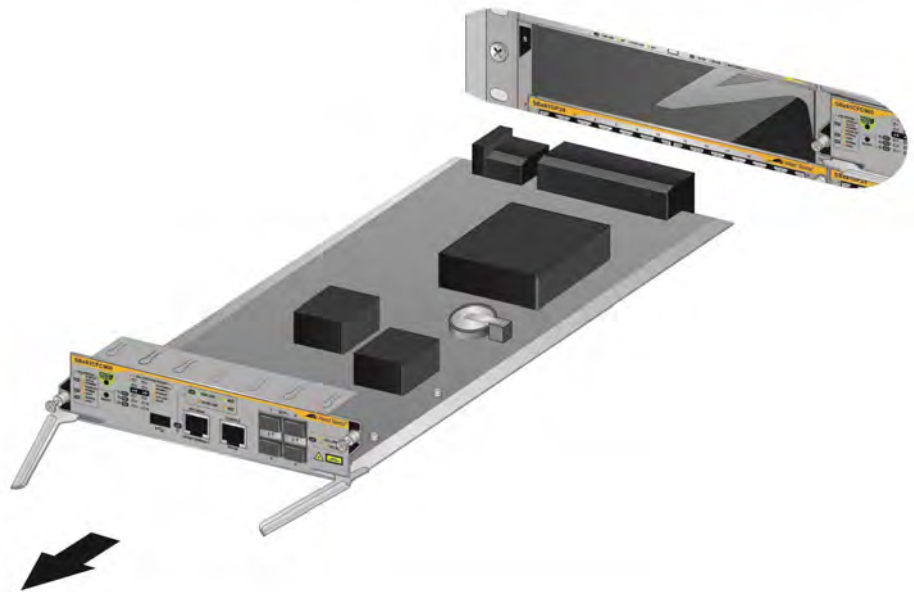


Figure 184. Removing the AT-SBx81CFC960 Controller Card

6. Do one of the following:
  - ☐ For instructions on how to install a new controller card in the chassis, refer to “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 148.
  - ☐ If you do not plan to immediately install another controller card, cover the slot with a blank cover. For instructions, refer to “Installing Blank Slot Covers” on page 167.
  - ☐ If you do not plan to immediately install the controller card in another chassis, continue with this procedure.
7. Store the controller card in an anti-static bag.
8. Return the card to its shipping container.

## Replacing the AT-SBxFAN12 Fan Module

---

This section contains the procedures for replacing the AT-SBxFAN12 or AT-SBxFAN12 v2 Fan Module, located in the slot on the right side of the front panel.



---

**Caution**

The fan module is hot swappable and can be replaced while the chassis is powered on. However, the chassis may overheat if it is operated for more than one or two minutes without a fan module.

---



---

**Warning**

The fan module has hazardous moving parts. Keep fingers away from moving fan blades.

---

---

**Note**

Only authorized service technicians should replace the fan module.

---



---

**Caution**

The fan module is heavy. Be sure to use both hands to hold the module as you remove it from the chassis.

---

---

**Note**

The AT-SBxFAN12 and AT-SBxFAN12 v2 Modules are fully interchangeable. No update is required to the AlliedWare Plus Operating System when replacing the AT-SBxFAN12 Module with the AT-SBxFAN12 v2 Module.

---

### Removing the AT-SBxFAN12 Fan Module

To remove the fan module from the chassis, perform the following procedure:

1. If necessary, disconnect or reroute network cables that are blocking access to the fan module.
2. Use a #2 Phillips head screwdriver to loosen the screw at the base of the fan module. Refer to Figure 185 on page 297.





Figure 185. Loosening the Screw on the AT-SBxFAN12 Fan Module

3. Carefully pull on the handle to disconnect the fan module from the connector on the backplane of the chassis. Refer to Figure 186 on page 298.



Figure 186. Loosening the AT-SBxFAN12 Fan Module from the Backplane Connector

4. Slowly pull out the module 51 mm (2 in.). Refer to Figure 187 on page 299.



Figure 187. Withdrawing the AT-SBx81CFC960 Card 51 mm (2 In.) from the Chassis

5. Wait ten seconds for the fans to stop.

**Warning**

The fan module has hazardous moving parts. Keep fingers away from moving fan blades.

6. After the fans have stopped, slide the module from the chassis. Refer to Figure 188 on page 300.

**Caution**

The fan module is heavy. Be sure to use both hands to hold it as you remove it from the chassis.



Figure 188. Removing the AT-SBxFAN12 Fan Module from the Chassis

### **Installing a New AT-SBxFAN12 Fan Module**

This procedure assumes that you have already removed the old fan module from the chassis and are continuing directly from the previous procedure, “Removing the AT-SBxFAN12 Fan Module” on page 296. To install the new fan module, perform the following procedure:

1. Orient the new module with the LED and module name on top and carefully slide the new module into the slot in the chassis. Refer to Figure 189 on page 301.

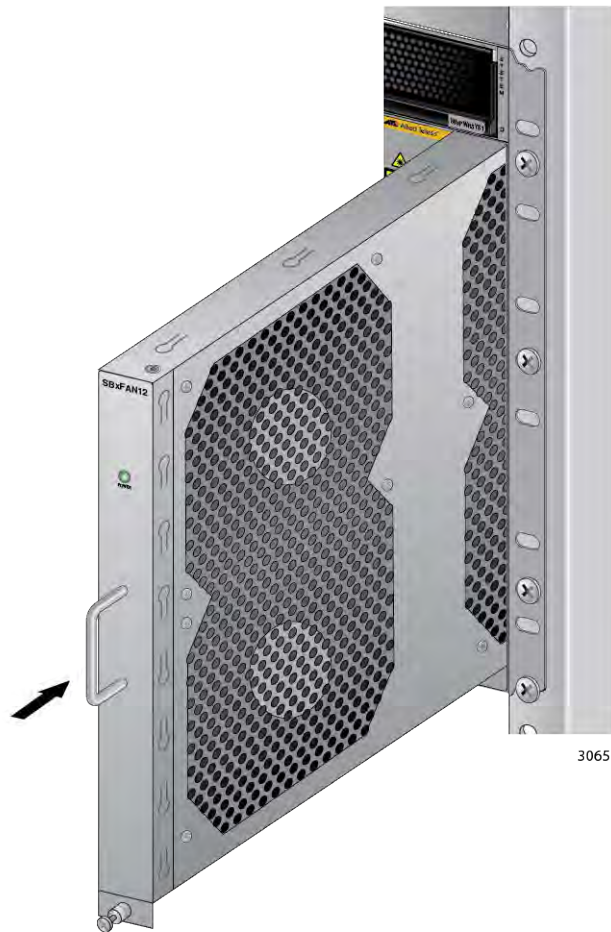


Figure 189. Installing a New AT-SBxFAN12 Fan Module

2. When you feel the fan module make contact with the connector on the backplane, gently push on the top and bottom of the faceplate to seat the module on the connector. Refer to Figure 190 on page 302.



Figure 190. Securing the AT-SBxFAN12 Fan Module on the Backplane Connector

3. With a #2 Phillips-head screwdriver, tighten the screw at the base of the module to secure the module to the chassis. Refer to Figure 191 on page 303.



Figure 191. Tightening the Screw on the AT-SBxFAN12 Fan Module

4. Reconnect any network cables you may have disconnected to access the fan module.





## Chapter 14

# Upgrading the Controller Fabric Card

---

This chapter contains the procedure for upgrading the AT-SBx8112 Chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card. The chapter contains the following sections:

- ❑ “Before You Begin” on page 306
- ❑ “Upgrading the Controller Fabric Card” on page 308

## Before You Begin

---

The instructions in this chapter explain how to update a chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card. Here are the basic steps to the procedure:

1. Download the configuration file on the AT-SBx81CFC400 Controller Fabric Card to a flash drive with the COPY command in the Privileged Exec mode of the command line interface.
2. Power off the chassis.
3. Remove the AT-SBx81CFC400 Controller Fabric Cards from the chassis.
4. Install the new AT-SBx81CFC960 Cards in the chassis.

---

**Note**

Do not operate the chassis with both AT-SBx81CFC400 and AT-SBx81CFC960 Controller Fabric Cards. The controller cards are not compatible.

---

5. Power on the chassis.
6. Upload the configuration file from the flash drive to the AT-SBx81CFC960 Controller Fabric Card with the COPY command.
7. Designate the configuration file as the active configuration file for the controller card with the BOOT CONFIG-FILE command in the Global Configuration mode.
8. Reboot the chassis with the REBOOT command in the Privileged Exec mode.
9. Use the appropriate SHOW commands to confirm the configuration settings of the Ethernet line cards.
10. Install optional feature licenses.

For step-by-step instructions, refer to “Upgrading the Controller Fabric Card” on page 308.

Please review the following information before performing the upgrade procedure:

- ❑ The premium and AMF master feature licenses for the AT-SBx81CFC400 Controller Fabric Card are not compatible with the AT-SBx81CFC960 Card. Consequently, if the AT-SBx81CFC400

Card in the chassis has a feature license, you must order a new license from Allied Telesis for the AT-SBx81CFC960 Card and install it after installing the new controller card.

- ❑ The command formats are presented in abbreviated versions to simplify the procedure. To learn the complete formats of the commands, refer to the Software Reference for SwitchBlade x8100 Series Switches.
- ❑ The procedure requires a flash drive to temporarily store the configuration file from the old controller card prior to transferring it to the new card. If you prefer to store the file on a different network device, such as a TFTP server, refer to the description of the COPY command in the Software Reference for SwitchBlade x8100 Series Switches for directions.
- ❑ This procedure assumes that the configuration file for the chassis is stored in the root directory of flash memory on the AT-SBx81CFC400 Controller Fabric Card. If the file is stored in a subdirectory or on another network device, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions.
- ❑ The procedure stores the configuration file in the root directory of flash memory of the AT-SBx81CFC960 Controller Fabric Card. If you prefer to store the file in a subdirectory of flash memory or on a different network device, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions.

## Upgrading the Controller Fabric Card

---

This section contains step-by-step instructions on how to upgrade the chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card.



### Caution

This procedure is disruptive to network operations because it requires powering off the chassis. It should be performed during periods of low network activity, such as during non-business hours, to minimize the disruption to your network users.

---

To upgrade the chassis from the AT-SBx81CFC400 Controller Fabric Card to the AT-SBx81CFC960 Card, perform the following procedure:

1. Start a local or remote management session with the active AT-SBx81CFC400 Card in the chassis.
2. Insert a flash drive into the USB port on the AT-SBx81CFC400 Card in the chassis. If the chassis has two controller cards, use the USB port on the active master controller. To determine the status of the controller cards, examine the CFC LEDs. The LEDs are solid green on the active master card and solid amber on the inactive master card.
3. Wait ten seconds for the controller card to mount the flash drive.
4. Move from the User Exec mode to the Privileged Exec mode with the ENABLE command:

```
awplus> enable
awplus#
```

5. Use the COPY command in the Privileged Exec mode to copy the running configuration of the controller card to the flash drive.

The format of the COPY command for copying files to a flash drive is shown here:

```
copy running-config usb:/filename>
```

The filename parameter specifies a filename for the configuration file. The filename must include the “.cfg” suffix.

This example of the command stores the configuration file in the root directory of the flash drive and names it “Engineering\_1.cfg”.

```
awplus# copy running-config usb:/Engineering_1.cfg
```

6. Remove the flash drive from the controller card.

7. Power off the chassis.
8. Remove the AT-SBx81CFC400 Controller Fabric Card from the unit. If the unit has two controller cards, remove both cards.
9. Install the new AT-SBx81CFC960 Card. If there are two cards, install both cards. For instructions, refer to “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 148.

---

**Note**

Do not operate the chassis with both AT-SBx81CFC400 and AT-SBx81CFC960 Controller Fabric Cards. The controller cards are not compatible.

---

10. Power on the chassis. For instructions, refer to Chapter 10, “Powering On the Chassis” on page 197.
11. Verify the hardware operations of the chassis with the new controller card by performing the instructions in Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 237.
12. Start a local or remote management session with the active master controller card in the chassis.
13. Insert the flash drive into the USB port on the controller card. If the chassis has two controller cards, be sure to use the USB port on the active master controller card. The CFC LEDs are solid green on the active card and solid amber on the inactive card.
14. Wait ten seconds for the controller card to mount the flash drive.
15. Move from the User Exec mode to the Privileged Exec mode with the ENABLE command:

```
awplus> enable
awplus#
```

16. Copy the configuration file from the flash drive to the new controller card with the COPY command.

The format of the command is shown here:

```
copy usb: /<source_filename> <destination_filename>
```

The `source_filename` parameter specifies the name of the configuration file stored on the flash drive on the USB port. If you have forgotten the filename, use the DIR command to display it. The `destination_filename` parameter specifies the name to be assigned to the configuration file when it is stored in the flash memory of the

controller card. The name can be the same as or different from the source filename. The filename must include the suffix “.cfg”.

This example of the command copies the Engineering\_sw1.cfg configuration file from flash drive to the controller card:

```
copy usb:/Engineering_sw1.cfg Engineering_sw1.cfg
```

This example of the command copies the switch2a\_rm12.cfg configuration file from flash drive to the controller card, and renames it Sales4\_rm12.cfg:

```
copy usb:/switch2a_rm12.cfg sales4_rm12.cfg
```

17. Move to the Global Configuration mode with the CONFIGURE TERMINAL command:

```
awplus# configure terminal
awplus(config)#
```

18. Designate the file as the boot configuration for the chassis with the BOOT CONFIG-FILE command in the Global Configuration mode.

The format of the command is given here:

```
boot config-file flash:/filename
```

This example of the command designates the configuration file Engineering\_sw1.cfg as the boot configuration file for the chassis.

```
boot config-file flash:/Enginerring_sw1.cfg
```

19. Enter the EXIT command to return to the Privileged Exec mode.

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

20. Enter the REBOOT command in the Privileged Exec mode to reboot the chassis.

```
awplus# reboot
```

21. Enter Y for yes at the confirmation prompt.

22. Wait three minutes for the controller and Ethernet line cards to initialize the management software.

23. Start a new management session and use the appropriate SHOW commands to confirm the configurations of the components and features of the chassis.

24. To install optional feature licenses, use the LICENSE command in the Privileged Exec mode of the command line interface. For instructions,

refer to the Software Reference for SwitchBlade x8100 Series Switches.





## Section III

# Building a Stack with VCStack Plus

---

This section contains the following chapters:

- ❑ Chapter 15, “VCStack Plus Overview” on page 315
- ❑ Chapter 16, “Building a Stack” on page 329



## Chapter 15

# VCStack Plus Overview

---

This chapter contains a brief overview of the VCStack Plus feature. For more information, refer to the Software Reference for SwitchBlade x8100 Series Switches. The chapter contains the following sections:

- ❑ “Overview” on page 316
- ❑ “Stack Trunk” on page 317
- ❑ “Cabling Configurations for the Trunk” on page 319
- ❑ “VCStack Plus Feature License” on page 322
- ❑ “Optional Feature Licenses” on page 323
- ❑ “Chassis ID Numbers” on page 324
- ❑ “Priority Numbers” on page 325
- ❑ “Stacking Guidelines” on page 327

## Overview

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The VCStack Plus feature is an optional feature for the AT-SBx8112 Chassis. The feature is used to connect two chassis together so that the devices function as a single networking unit. This is referred to as a virtual switch. The benefits of the feature are mentioned here:

- ❑ Simplifies management - The two switches of the stack are managed as a single unit, rather than individually. Local and remote management sessions automatically provide management access to both chassis.
- ❑ Reduces IP addresses - The stack requires only one IP address for remote management access, thereby reducing the number of IP addresses in the network.
- ❑ Adds feature flexibility and resiliency - The stack adds flexibility to some features. For instance, a port aggregator can consist of ports from both switches in the stack. This increases the resiliency of the aggregator because it can continue to function if one of the switches stops functioning, though at a reduced bandwidth.
- ❑ Reduces protocol requirements - Creating a stack might eliminate the need for some protocols in your network, such as the Virtual Router Redundancy Protocol and Spanning Tree Protocol.

## Stack Trunk

---

The two chassis of a stack are connected with a stack trunk. A trunk has the following components:

- ❑ The SFP+ slots on the front panels of the AT-SBx81CFC960 Controller Fabric Cards in the switches.
- ❑ Allied Telesis direct connect cables or 10G SFP+ fiber optic transceivers.

---

### Note

The AT-SBx81CFC960 Version 2 supports both 1Gbps and 10Gbps transceivers in its SFP+ ports. However, you have to use 10Gbps transceivers for a stack trunk.

---

There are two factors to consider in determining the type and number of transceivers needed to build the trunk of a stack. The first factor is the distance between the two switches. They can be close together, such as in the same equipment rack, or kilometers apart. If the switches are in the same wiring closet, you can use direct connect cables, which come in three lengths and are listed in Table 31.

Table 31. Direct Connect Cables

Transceiver	Maximum Distance
AT-SP10TW1	1 meter (3.3 feet)
AT-SP10TW3	3 meters (9.8 feet)
AT-SP10TW7	7 meters (23.0 feet)

If the switches are further apart, you can build the trunk with short or long distance Allied Telesis 10G SFP+ fiber optic transceivers. A list of supported transceivers is available from the product data sheet or the Allied Telesis web site.

The second factor to consider is the number of direct connect cables or fiber optic transceivers needed for the trunk. This is determined by the number of AT-SBx81CFC960 Controller Fabric Cards in the switches and the number of SFP+ slots, which is four slots per card. A trunk between two switches, each of which has only one controller card, will have four links. Thus, you will need either four direct connect cables or eight 10G SFP+ transceivers. A trunk between two switches, each of which has two controller cards, will have eight links. For this you will need either eight direct connect cables or sixteen 10G SFP+ transceivers.

Please review the following information:

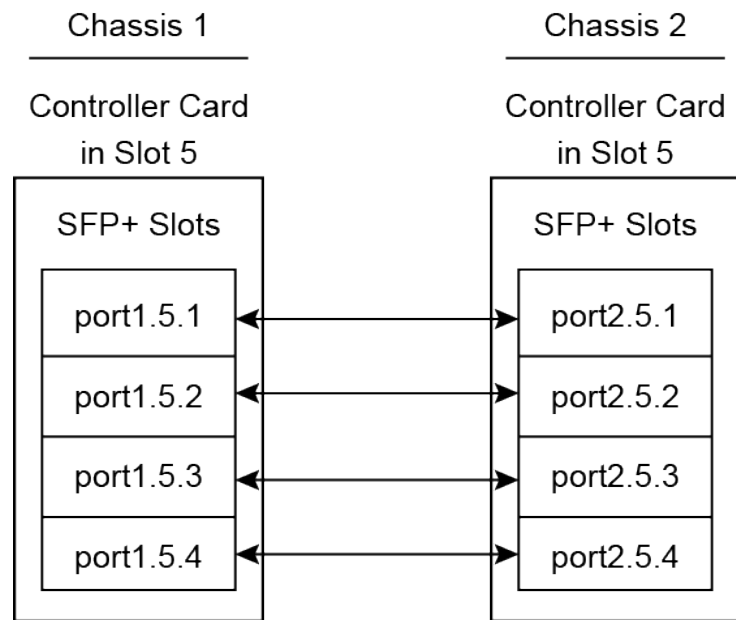
- ❑ You must build the trunk with Allied Telesis 10Gbps SFP+ transceivers or direct connect cables. The switches will not form the stack with transceivers or cables from other network equipment manufacturers.
- ❑ The stack uses all the links in the trunk to actively forward traffic between the switches.
- ❑ The bandwidth of the trunk is 40Gbps with four links and 80Gbps with eight links.
- ❑ Prior to AlliedWare Plus version 5.4.5 you had to use the AT-StackOP/0.3 and AT-StackOP/9.0 stacking transceivers to build the trunk of the stack. Starting with version 5.4.5 that restriction no longer applies.
- ❑ You do not have to replace the AT-StackOP/0.3 or AT-StackOP/9.0 stacking transceivers if you are upgrading a stack to AlliedWare Plus version 5.4.5 or later. The stacking transceivers are compatible with newer versions of the management software.

## Cabling Configurations for the Trunk

This section illustrates the cabling configurations for the trunk of the stack.

### One Controller Card Per Chassis

Figure 192 illustrates the correct wiring configuration for the trunk when each chassis has only one AT-SBx81CFC960 Controller Fabric Card. The transceiver in SFP+ slot 1 in the controller card in the first chassis is connected to the transceiver in SFP+ slot 1 in the card in the second chassis, the transceiver in SFP+ slot 2 is connected to the transceiver in SFP+ slot 2 in the second chassis, and so on.



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Figure 192. Cabling the SFP+ Slots When Both Switches have One Controller Card

Please note the following:

- ❑ A trunk of four links has a bandwidth of 40Gbps.
- ❑ The switches will form the stack even if the transceivers are cabled incorrectly (for example, the transceiver in SFP+ slot 1 is connected to the transceiver in SFP+ slot 2). However, the bandwidth of the trunk is reduced.

Two Controller Cards Per Chassis

Figure 193 illustrates the wiring configuration of the trunk when both switches have two controller cards.

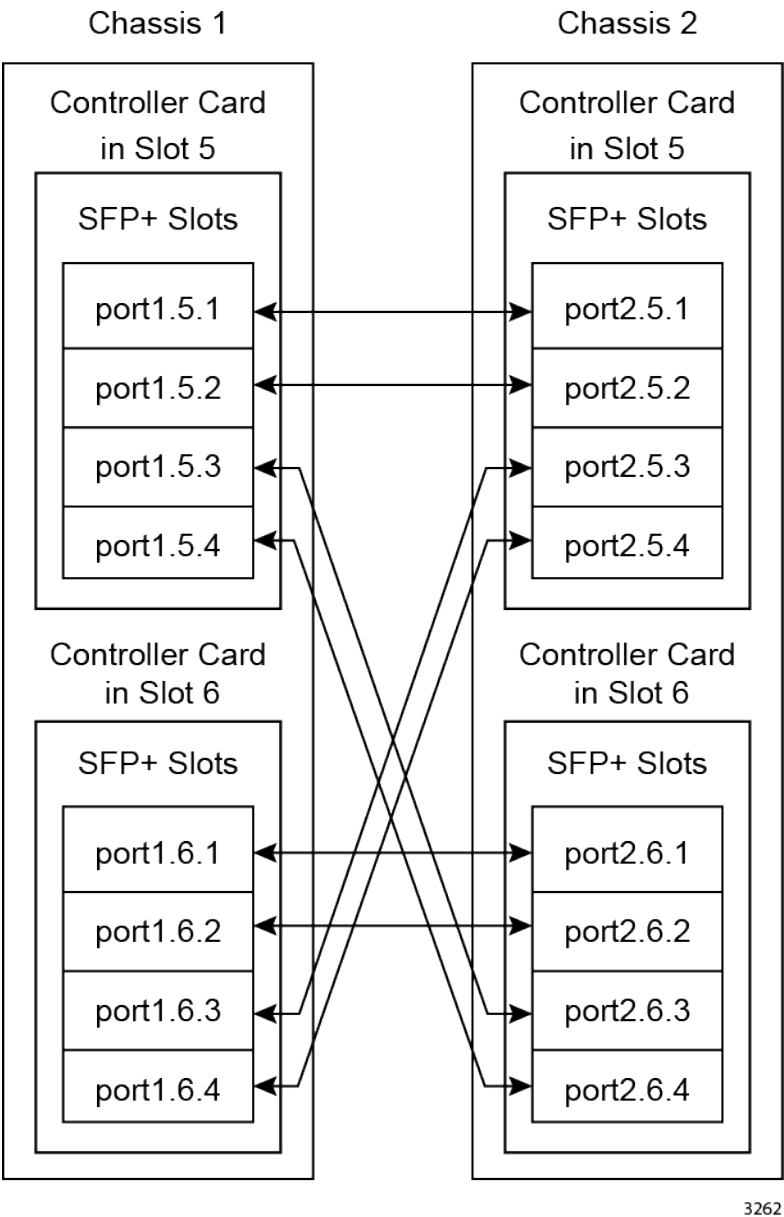


Figure 193. Cabling the SFP+ Slots When Both Switches have Two Controller Cards

Table 32 on page 321 presents the same information, in table format.



Table 32. Cabling the SFP+ Slots When Both Switches have Two Controller Cards

Chassis 1	Connects to	Chassis 2
port1.5.1	<----->	port2.5.1
port1.5.2	<----->	port2.5.2
port1.5.3	<----->	port2.6.3
port1.5.4	<----->	port2.6.4
port1.6.1	<----->	port2.6.1
port1.6.2	<----->	port2.6.2
port1.6.3	<----->	port2.5.3
port1.6.4	<----->	port2.5.4

Please note the following:

- ❑ The trunk has a bandwidth of 80Gbps in both directions when both chassis have two controller cards.
- ❑ The switches can form the stack even if the transceivers are cabled incorrectly (for example, the transceiver in SFP+ slots 1 is connected to the transceiver in SFP+ slot 2). However, the bandwidth of the trunk is reduced.

## VCStack Plus Feature License

---

An important component of the stack is the VCStack Plus feature license from Allied Telesis. The license contains an activation code that activates the stacking feature in the management software on the controller cards in the chassis.

Each chassis must have its own VCStack Plus license. The licenses must be installed while the switches are operating as stand-alone units. A chassis that has two controller cards needs only one license because the active master controller card shares the license with the standby master card in the same chassis at the time you install the license. But the license is not shared between different switches, which is why the two chassis of the stack have to have their own licenses.

Here are the VCStack Plus feature license guidelines:

- ❑ Each chassis must have a license.
- ❑ A chassis that has two controller cards needs only one license.
- ❑ The licenses from Allied Telesis may have the same or different activation codes. The switches will form the stack regardless of whether they have the same or different activation codes.
- ❑ The licenses have to be installed while the units are operating as stand-alone switches.

## Optional Feature Licenses

---

The SwitchBlade x8112 product has two optional feature licenses that activate additional features on the switch:

- ☐ Premium license
- ☐ AMF Master license

You may install optional feature licenses while the switches are operating as stand-alone units or a stack. However, when you are building the stack, both switches must have the same optional feature licenses. Otherwise, the two units will not form the stack. So if you install an optional feature license on one of the switches while it is operating as a stand-alone unit, you have to install the same feature license on the second unit as well before building the stack.

Once the two chassis are operating as a stack, you only have to install a feature license once because the active master controller card automatically shares it with all the controller cards in the stack.

Here are the guidelines to ordering and installing feature licenses.

- ☐ Feature licenses are ordered from Allied Telesis on a per chassis basis.
- ☐ A chassis that has two controller cards needs only one feature license.
- ☐ You have to order two features licenses, one for each chassis, when building a stack, even though you might only use one of the licenses.
- ☐ You may install optional feature licenses either while the switches are operating as stand-alone units or after they are operating as a stack.
- ☐ If the two chassis don't have any optional feature licenses or have the same licenses, you might as well wait until after you build the stack before installing any additional licenses. That way, you only have to install one feature license for the entire stack.
- ☐ You cannot build a stack of two chassis that have different feature licenses. You need to remove or install licenses on the switches before you build the stack, so they both have the same licenses. For example, if one chassis has the premium feature license while the second chassis does not, you have to install the premium license on the second unit while it is operating as a stand-alone unit.

The instructions in Chapter 16, "Building a Stack" on page 329 explain how to determine whether the switches have the same feature licenses.

## Chassis ID Numbers

---

The switches in the stack have to be assigned ID numbers. The valid ID numbers are 1 and 2. A switch can have only one ID number. The two switches of the stack must be assigned different ID numbers. The switches will not form a stack if they have the same ID number. The value is set at the chassis level. A chassis that has two controller cards has one ID number.

You use the numbers in the commands in the command line interface to identify the two units of the stack when you configure the parameters of the ports and modules of the switches. The chassis ID number is the first number in the numbering format, shown in Figure 194.

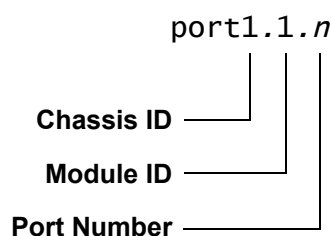


Figure 194. Chassis ID Number in the Numbering Format

You should decide on the ID numbers of the units before starting the configuration procedure and place labels with the numbers on the units to make it easier for you to remember their assignments.

In most cases, it does not matter which switch is assigned ID number 1 and which switch is given ID number 2. You just need to be sure to assign them different numbers during the configuration procedure and to use the appropriate numbers when configuring the devices with the command line interface.

There is, however, one situation where the assignments of the ID numbers can be important. If one of the switches is operating as a stand alone unit and you want it to maintain its configuration settings when it joins the stack, you should assign it the ID number 1. That way, the chassis maintains its configuration when it becomes a part of the stack. For example, you might install a chassis as a stand-alone unit and later decide to add a second unit to form a stack. In this case you might want the first switch to maintain its configuration settings when you add the second unit and build the stack. By assigning the ID number 1 to the existing switch and the ID number 2 to the new switch, the existing switch maintains the configuration settings that it had as a stand-alone unit, after it joins the stack. (You would also need to assign the existing switch a low priority number, so that its controller card become the master card of the stack. For more information, refer to “Priority Numbers” on page 325.)

## Priority Numbers

---

The switches of the stack perform an initialization procedure whenever they are reset or powered on. During the process, which involves activating the management software and forming the stack, the units select the active master controller card. This card is responsible for maintaining the configuration file that contains the parameter settings for all the devices in the stack and for periodically sharing the configuration file with the other controller cards.

The stack can have only one active master controller card. The other cards are referred to as standby master controller cards. If, for instance, the stack has four controller cards, one of the cards acts as the active master card and the other three function as standby master cards.

Standby master controller cards are not inactive. Rather, they forward traffic between the Ethernet line cards on the backplanes of their chassis and manage traffic on their SFP+ slots and the stack trunk.

The method by which the controller cards select the active master controller card depends on whether the switches are rebooted simultaneously or one after the other.

If the switches are powered on or reset simultaneously, the controller cards use the following values to select the active master controller card for the stack:

- ☐ Slot numbers
- ☐ Priority numbers
- ☐ MAC addresses

At the start of the selection process, the switches, if they both have two controller cards, select an active card for their respective chassis, by slot number. In most cases, preference is given to the controller card in slot 5.

After each switch has selected an active controller card, the two active cards in the switches communicate over the stack trunk to select the active master controller card for the entire stack. To accomplish this, they first compare their priority numbers. The number has a range of 0 to 255. The default is 128. The lower the number, the higher the priority. If one of the controller cards has a lower priority number, it becomes the active controller card for the stack and the other card is placed in the standby master mode, along with the other controller cards.

If the controller cards have the same priority number, they compare their MAC addresses. The controller card with the lower MAC address becomes the active master controller card for the stack.

Setting the priority number during the stack configuration procedure is optional. If you choose not to set the value, the controller cards use their MAC addresses to select the active master controller card for the stack.

The process for selecting the active master controller card is different if the two switches are reset or power on one after the other. Here, the controller card that initializes its management software first becomes the active master controller card for the stack.

Once the active controller card is selected, it remains the active card unless it fails or is removed from its chassis, at which point another controller card becomes the active controller card for the stack.

## Stacking Guidelines

---

Here are the stacking guidelines:

- ❑ The stack can have two switches.
- ❑ The switches of the stack must be the same model. The stack can have two AT-SBx8112 chassis or two AT-SBx8106 chassis. A stack cannot have one AT-SBx8112 chassis and one AT-SBx8106 chassis.
- ❑ The trunk that connects the two switches of the stack are built with SFP+ transceivers in the SFP+ slots in the controller cards. The transceivers must be from Allied Telesis.
- ❑ There cannot be any network devices, such as other switches or media converters, between the stacking transceivers in the two switches.
- ❑ The bandwidth of the trunk depends on the number of controller cards and transceivers in the switches. The trunk has a bandwidth of 40 Gbps when each switch has one controller card, and 80 Gbps when each switch has two controller cards. For more information, refer to “Stack Trunk” on page 317.
- ❑ The default setting for stacking is disabled.
- ❑ The switches have to be assigned the ID numbers. The numbers are 1 and 2. The switches must be assigned different numbers. For more information, refer to “Chassis ID Numbers” on page 324.
- ❑ A stack should not have more than 400 Ethernet ports.
- ❑ If both switches of the stack have two controller cards, the SFP+ slots on both the active master and inactive master controller cards are active in linking the units together and forwarding traffic.
- ❑ The two switches of the stack must have the same OEM territory and feature licenses.
- ❑ The two switches of a stack do not share the AlliedWare Plus operating system.





# Building a Stack

---

This chapter contains step-by-step instructions on how to configure the switches to build a stack with the VCSStack Plus feature. The chapter contains the following sections:

- ❑ “Before You Begin” on page 330
- ❑ “Displaying the Management Software Version Number” on page 331
- ❑ “Activating the VCSStack Plus Feature License” on page 333
- ❑ “Enabling the Stacking Feature” on page 335
- ❑ “Displaying the Feature Licenses” on page 337
- ❑ “Setting the ID Number” on page 339
- ❑ “Setting the Priority Number” on page 343
- ❑ “Powering Off the Chassis” on page 344
- ❑ “Configuring the Second Chassis” on page 345
- ❑ “Cabling the SFP+ Slots on the Controller Cards” on page 346
- ❑ “Powering On the Stack” on page 347
- ❑ “Verifying the Stack” on page 351
- ❑ “Installing Optional Feature Licenses” on page 353
- ❑ “Troubleshooting the Stack” on page 354

## Before You Begin

---

Please review the following information before you begin to configure the switches for stacking:

- ❑ You must perform the procedures in the order presented here.
- ❑ You should configure only one chassis at a time.
- ❑ The procedures are the same regardless of whether a chassis has one or two controller cards.

---

**Note**

This procedure requires power cycling or resetting the switches. Some network traffic may be lost if the units are already connected to an active network.

---

The procedures assume the following:

- ❑ All hardware components have been installed in the two switches, including Ethernet line cards, controller cards, and power supplies. For installation instructions, refer to the previous chapters in this guide.
- ❑ The switches are powered on. For instructions, refer to Chapter 10, “Powering On the Chassis” on page 197.
- ❑ You verified the operations of the chassis with the procedures in Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 237.
- ❑ There are no transceivers in the SFP+ slots on the AT-SBx81CFC960 or AT-SBx81CFC960 Version 2 Controller Fabric Cards. If there are transceivers in the slots, you should remove them before performing the procedure.

A stack requires these additional items:

- ❑ Two VCStack Plus feature licenses: Each chassis must have its own license. For more information, refer to “VCStack Plus Feature License” on page 322.
- ❑ Eight stacking-approved transceivers if each switch in the stack has one controller card or sixteen transceivers if each switch has two controller cards. The transceivers form the trunk that connects the two switches together. For more information, refer to “Stack Trunk” on page 317.

## Displaying the Management Software Version Number

---

This procedure explains how to display the version number of the AlliedWare Plus operating software on the active controller card in the chassis. The two chassis of the stack must have the same version of operating system. To display the management software version number, perform the following procedure:

1. Start a local or remote management session on the switch. For instructions on how to start a local session, refer to “Starting a Local Management Session” on page 240.

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

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

```
awplus>
```

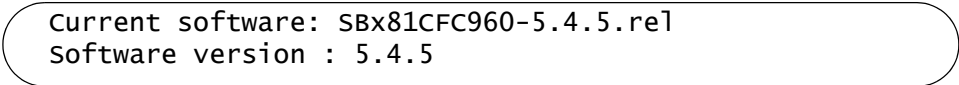
3. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode:

```
awplus> enable
awplus#
```

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

```
awplus# show system
```

5. Examine the output of the command for the lines in Figure 195.



```
Current software: SBx81CFC960-5.4.5.rel
Software version : 5.4.5
```

Figure 195. SHOW SYSTEM Command

6. Do one of the following:
  - ☐ If the management software is version 5.4.5 or later, continue with the next step.
  - ☐ If the management software is version 5.4.4, Allied Telesis recommends upgrading the controller card to version 5.4.5 or later. Version 5.4.4 supports stacking, but only with AT-Stack/OP transceivers for the stack trunk. Newer versions of the operating system support a variety of short and long distance transceivers for the trunk. For information, refer to “Stack Trunk” on page 317.
  - ☐ If the management software is version 5.4.3 or earlier, do not continue. The switch has the older AT-SBx81CFC400 Controller Fabric Card, which does not support stacking.

## 7. Do one of the following:

- ❑ If you are configuring the first chassis of the stack, write down on paper the software version number of the AlliedWare Plus operating software on the active controller card. You will compare it with the same information on the second chassis to confirm that both units have the same version of management software. After writing the information, go to “Activating the VCStack Plus Feature License” on page 333.
- ❑ If you are configuring the second chassis, compare the version number displayed by the `SHOW SYSTEM` command against the version number you wrote down on paper from the first chassis. If the two chassis have the same management software and the version number is 5.4.4 or later, you may go to “Activating the VCStack Plus Feature License” on page 333. If they are different, you must upgrade the management software on one or both units so that they have the same version. For upgrade instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches. After updating the management software, go to “Activating the VCStack Plus Feature License” on page 333.

## Activating the VCStack Plus Feature License

---

This procedure explains how to use the VCStack Plus feature license you obtained from Allied Telesis to activate the VCStack Plus feature license on the active controller card in the chassis. The license consists of an alphanumeric key and a recommendation for the license name.

Please note the following before performing this procedure:

- ❑ The two chassis in the stack must have their own licenses.
- ❑ A chassis that has two controller cards needs only one VCStack Plus feature license because the active master card automatically shares it with the inactive master card.
- ❑ The encryption keys on the VCStack Plus feature licenses you receive from Allied Telesis may be the same or different. The two switches can form a stack regardless of whether the encryption keys are the same or different.

The procedure assumes you are continuing directly from the previous procedure.

To activate the VCStack Plus feature license on the active controller card in the chassis, perform the following procedure:

1. In the Privileged Exec mode, use the LICENSE command to activate the VCStack Plus feature on the active controller card.

.Here is the format of the command:

```
license name key
```

The NAME parameter is the name of the license. You may use the name that comes with the license or you may enter a different name. The name can be from one to fifteen characters. Spaces are not allowed. An example of a name for this feature is VCStackPlus.

The KEY parameter is the alphanumeric key that comes with the license. It activates the feature license on the switch. The key is case sensitive, meaning that you have to use uppercase and lowercase characters when you specify the key in the command.

Here is an example of the command. The license is assigned the name VCStackPlus and has the key 1234ABCD:

```
awplus# license VCStackPlus 1234ABCD
```

**Note**

If the chassis has two controller cards, the active controller automatically activates the VCSStack Plus feature license on the standby controller.

After you enter the command, the switch displays the prompt in Figure 196:

A restart of affected modules may be required.  
would you like to continue? (y/n)

Figure 196. LICENSE Command

2. Type Y for yes to activate the license on the controller card. (This does not reset the chassis or modules. You will reboot the chassis later in these instructions.)

If the chassis has two controller cards, the active controller card automatically shares the VCSStack Plus feature license with the standby card and displays the messages in Figure 197.

Card 1.5 installed 1 license  
Card 1.6 installed 1 license  
  
2 licenses installed

Figure 197. LICENSE Command Message with Two Controller Cards

If the chassis has only one controller card, the controller card displays the message in Figure 198.

Card 1.5 installed 1 license  
  
1 license installed

Figure 198. LICENSE Command Message with One Controller Card

3. Go to “Enabling the Stacking Feature” on page 335.

## Enabling the Stacking Feature

Now that you have activated the VCSStack Plus feature license on the controller card, you may enable the stacking feature, as explained in this section.

To activate the stacking feature, perform the following procedure:

1. Enter the `CONFIGURE TERMINAL` command to move from the Privileged Exec mode to the Global Configuration mode:

```
awplus# configure terminal
awplus(config)#
```

2. Enter the `STACK ENABLE` command to activate the VCSStack Plus feature:

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

The switch displays the messages in Figure 199

% Automatically enabling 'stack virtual-mac' to minimize disruption from failovers.  
 % Please check that the new MAC 0000.cd37.0c22 is unique within the network.  
 % Save the config and restart the system for this change to take affect.

Figure 199. STACK ENABLE Command Messages

The messages are described in Table 33.

Table 33. Descriptions of the STACK ENABLE Command Messages

Message	Description
Automatically enabling 'stack virtual-mac' to minimize disruption from failovers.	This message informs you that enabling the stacking feature also activates the virtual MAC address feature, which allows the two switches of the stack to use a single MAC address to communicate with other network devices.
Please check that the new MAC 0000.cd37.0c22 is unique within the network.	This message displays the virtual MAC address of the switch. The address is randomly selected from the range of 0000.cd37.0000 to 0000.cd37.0fff.

Table 33. Descriptions of the STACK ENABLE Command Messages

Message	Description
Save the config and restart the system for this change to take effect.	This message reminds you that you need to save the configuration change and reboot the switch to activate stacking. The next two steps have you save your changes, You will reboot the switch later in these procedures.

3. Enter the EXIT command to return to the Privileged Exec mode.

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

4. Enter the COPY RUNNING-CONFIG command to save your changes:

```
awplus# copy running-config startup-config
```

5. Continue to the next procedure to check the feature licenses on the switch.



## Displaying the Feature Licenses

The two switches of a stack must have the same feature licenses. Otherwise, they will not form a stack. To compare the licenses of the switches, perform the following procedure:

1. Enter the SHOW LICENSE BRIEF command in the Privileged Exec mode to display the licenses on the switch.

```
awplus# show license brief
```

Figure 200 is an example of the information.

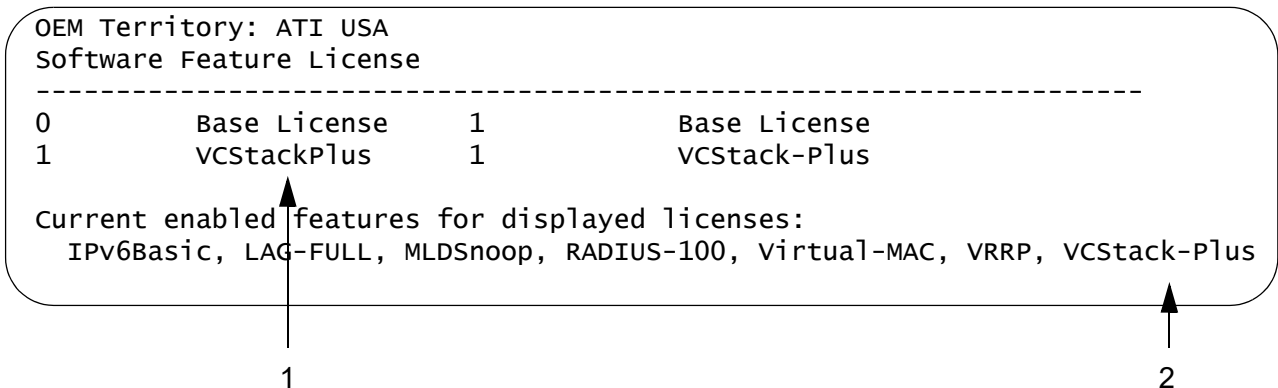


Figure 200. SHOW LICENSE BRIEF Command

2. Check the SHOW LICENSE BRIEF command for the following information:
  - ☐ (1) Verify that the VCStack Plus feature license is included in the list of licenses. If it is not included, repeat “Activating the VCStack Plus Feature License” on page 333.
  - ☐ (2) Verify that the VCStack Plus feature is enabled on the switch. If it is not enabled, repeat “Enabling the Stacking Feature” on page 335
3. Do one of the following:
  - ☐ If you are configuring the first chassis of the stack, write down on paper the OEM territory, licenses, and enabled features from the SHOW LICENSE BRIEF command. You will compare this information with the license information on the second chassis to be sure that both units have the same features. After writing the information, go to “Setting the ID Number” on page 339.
  - ☐ If you are configuring the second chassis, compare the information displayed by the SHOW LICENSE BRIEF command against the license information you wrote down on paper when you configured

the first chassis. If the two chassis have the same licenses and enabled features, you may go to “Setting the ID Number” on page 339. If they are different, do not continue. The two chassis cannot form a stack if they do not have identical features. Before continuing with this procedure, add or delete features or licenses from one or both chassis so that they have the same feature set.

---

**Note**

Two switches that have different OEM territories probably have different feature sets. The two switches will form a stack but only if they have the same features. This may require the installation or deletion of features or licenses from one or both units.

---

## Setting the ID Number

The chassis must be assigned the ID number 1 or 2. The ID number is used to identify the chassis when you configure the device with the command line interface. The two chassis of the stack must be assigned different ID numbers. To set the ID number on the chassis, perform the following procedure:

1. From the Privileged Exec mode, enter the `SHOW STACK` command to view the current ID number of the switch:

```
awplus# show stack
```

Figure 201 is an example of the command.

Virtual Chassis Stacking summary information					
ID	Pending ID	MAC address	Priority	Status	Role
1.5	-	eccd.6d9e.07e1	128	Ready	Active CFC
1.6	-	eccd.6d9e.0145	128	Ready	Backup Member



 Current ID Numbers

Figure 201. SHOW STACK Command

The command lists the AT-SBx81CFC960 Controller Fabric Cards in the stack. Given that the switch is not operating as part of a stack yet, the command lists only the controller cards in the switch you are currently configuring. The switch in Figure 201 has two controller cards. The command displays only one controller card if the chassis has only one card.

The ID number of a controller card contains two numbers. The first number is the chassis ID number. This number is always 1 or 2. If the chassis has two controller cards, both cards have the same chassis ID number. The second number is the slot number in which the controller card is installed. For example, the first controller card in the example has the ID number 1.5, meaning that the card has the chassis ID number 1 and is installed in slot 5 of the unit. The second controller card has the same chassis ID number and is installed in slot 6.

2. Check the chassis ID number of the controller cards. (As just explained, the chassis ID number is the first number in the ID number.) The chassis ID number can be 1 or 2. The default value is 1. The two chassis of a stack must have different ID numbers. Do one of the following:
  - ❑ If the ID number is already set correctly for the chassis, go to “Setting the Priority Number” on page 343. For example, if you are

configuring the first switch of the stack and want to assign it the number 1, you probably do not need to set the number because that is the default value.

- ❑ If you need to change the ID number for the chassis, continue with step 3. For example, if you are configuring the second chassis and want to assign it the ID number 2, you need to perform the rest of this procedure to change it from the default value 1 to the new value 2.

3. Enter the `CONFIGURE TERMINAL` command to enter the Global Configuration mode:

```
awplus# configure terminal
awplus(config)#
```

4. To assign the switch a new ID number (for instance, to change it from 1 to 2), enter the `STACK RENUMBER` command, which has this format:

```
stack <member's-existingID> renumber <member's-newID>
```

The `member's-existingID` variable is the switch's current ID number, displayed with the `SHOW STACK` command in step 9. The `member's-newID` variable is the new ID number you want to assign it. This example of the command changes the ID number of the switch from 1 to 2:

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

---

#### Note

If the chassis has two controller cards, the command changes the chassis ID number on both cards.

---

The command displays the messages in Figure 202.

```
% Warning: Stacking is currently disabled.
% Warning: The new ID will not become effective until the stack-member
reboots.
% Warning: The boot configuration may now be invalid.
```

Figure 202. STACK RENUMBER Command Messages

The messages are described in Table 34 on page 341.

Table 34. Descriptions of the STACK RENUMBER Command Messages

Message	Description
Warning: Stacking is currently disabled.	This message reminds you that even though you activated the stacking feature with the STACK ENABLE command in an earlier procedure, the feature is disabled because the chassis has not been reset. You will reboot the switch later in these instructions.
Warning: The new ID will not become effective until the stack-member reboots.	This message informs you that the switch needs to be reset before it begins to use its new ID number. You will reboot the switch later in these instructions.
Warning: The boot configuration may now be invalid.	This message informs you that if you have already configured parameter settings on the switch, some of the settings may be lost when you reset the unit. The ID number is used in the commands in the configuration file to identify the individual switch ports. When the ID number is changed, commands in the configuration file that use the old ID number are no longer valid.

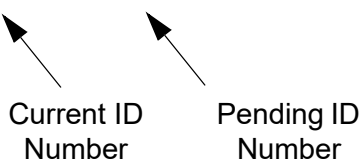
- After changing the ID number, enter the EXIT command to return to the Privileged Exec mode:

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

- Enter the SHOW STACK command again to confirm your change.

An example of the window is shown in Figure 203 on page 342.

Virtual Chassis Stacking summary information						
ID	Pending ID	MAC address	Priority	Status	Role	
1.5	2.5	eccd.6d9e.07e1	128	Ready	Active	CFC
1.6	2.6	eccd.6d9e.0145	128	Ready	Backup	Member



Current ID  
Number

Pending ID  
Number

Figure 203. SHOW STACK Command

7. Verify the pending ID number change.

Each controller card should now have two ID numbers. The number in the ID column is the current number of the chassis and the number in the Pending ID column is the number you just assigned it. The new number takes effect when you reboot the chassis later in these instructions.

Do one of the following:

- ☐ If the Pending ID column is empty or is not displaying the correct number, repeat the procedure starting with step 3.
- ☐ If the Pending ID column is displaying the correct ID number, continue with the next step.

8. Enter the COPY RUNNING-CONFIG command to save your change:

```
awplus# copy running-config startup-config
```

9. Continue to the next procedure to set the priority number on the chassis.

## Setting the Priority Number

---

This procedure is optional. It explains how to set the stack priority number on the chassis, which controls the selection of the active controller card for the stack. For background information, refer to “Priority Numbers” on page 325. If you do not want to set the priority number, go to “Powering Off the Chassis” on page 344.

To configure the priority number, perform the following procedure:

1. Enter the `CONFIGURE TERMINAL` to move from the Privileged Exec mode to the Global Configuration mode.

```
awplus# configure terminal
awplus(config)#
```

2. Enter the `STACK PRIORITY` command to set the priority number of the chassis. The format of the command is as follows:

```
stack <ID_number> priority <priority_number>
```

The `ID_number` variable is the switch’s current ID number, displayed with the `SHOW STACK` command. The `priority_number` variable is the new priority number for the chassis. The range is 0 to 255. The lower the number, the higher the priority. This example sets the priority number of the chassis to 1:

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

The switch displays the following prompt:

```
% warning: stacking is currently disabled.
```

3. Enter the `EXIT` command to return to the Privileged Exec mode:

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

4. Enter the `SHOW STACK` command to confirm your change. Refer to Figure 203 on page 342. The Priority column should now be displaying the new priority number for the chassis.

5. Enter the `COPY RUNNING-CONFIG` command to save your change:

```
awplus# copy running-config startup-config
```

This completes the procedure for configuring the chassis for the stacking feature. Go to “Powering Off the Chassis” on page 344.

## Powering Off the Chassis

---

Now that you have configured the chassis, you should power it off. To power off the unit, do one of the following:

- ❑ For the AC AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 PoE power supplies, disconnect the AC power cords from the power sources.
- ❑ For the AT-SBxPWRSYS1 DC power supply, turn the power switch on the power supply to off. Refer to Figure 65 on page 141.

Be sure to power off all the power supplies in the chassis.

After powering off the chassis, do one of the following:

- ❑ To configure the second chassis, go to “Configuring the Second Chassis” on page 345.
- ❑ If you are finished configuring both chassis, go to “Cabling the SFP+ Slots on the Controller Cards” on page 346.

---

### Note

Powering off the chassis to install the SFP+ transceivers for the trunk is optional. The transceivers are hot-swappable and can be installed while the chassis is powered on. However, Allied Telesis recommends that both chassis be powered off when you power on the stack for the first time.

---

---

### Note

If you decide not to power off the chassis, you must reset both units with the REBOOT command in the Privileged Exec mode after installing the SFP+ transceivers in “Cabling the SFP+ Slots on the Controller Cards” on page 346.

---



## Configuring the Second Chassis

---

Configure the second chassis by repeating the previous procedures, starting with “Displaying the Management Software Version Number” on page 331. Please note the following as you configure the second unit:

- ❑ In “Displaying the Management Software Version Number” on page 331, be sure that the management software on the switch is version 5.4.5 or greater and that it is the same version as management software on the first chassis.
- ❑ In “Activating the VCStack Plus Feature License” on page 333, be sure to assign the second chassis a VCStack Plus license.
- ❑ In “Activating the VCStack Plus Feature License” on page 333, be sure to check that the second chassis has the same licenses and features as the first chassis.
- ❑ In “Setting the ID Number” on page 339, be sure to assign the second chassis a different ID number. For instance, you should assign the second chassis the ID number 2 if the first chassis has the ID number 1.

After configuring the second chassis, go to “Cabling the SFP+ Slots on the Controller Cards” on page 346.

## Cabling the SFP+ Slots on the Controller Cards

---

Now that you have configured both chassis for the stacking feature, you are ready to cable the SFP+ slots on the controller cards to build the trunk between the two units.

---

**Note**

Please review the background information in “Stack Trunk” on page 317 and “Cabling Configurations for the Trunk” on page 319 before cabling the SFP+ slots on the controller cards.

---

For installation instructions, refer to the following sections:

- ❑ For fiber optic SFP+ transceivers, refer to “Installing SFP+ Transceivers” on page 190.
- ❑ For AT-SP10TW Cables, refer to “Installing AT-SP10TW Cables” on page 195.

---

**Note**

The transceivers and direct connect cables must be from Allied Telesis. The two chassis will not form the stack if the transceivers are from another network equipment manufacturer.

---

After cabling the SFP+ slots on the controller cards, go to “Powering On the Stack” on page 347.

## Powering On the Stack

---

The two switches are now ready to operate as a stack. But before powering on the stack for the first time, you may find it useful to review the information in “Controlling the Selection of the Initially Active Master Controller Card” on page 347. The information is important if one of the switches was a stand-alone unit in your network and you want it to retain its configuration when it becomes part of the stack.

---

### Note

If you did not power off the chassis earlier in these instructions, you must reset both units with the REBOOT command in the Privileged Exec mode. After resetting the units, go to “Monitoring the Boot Up Sequence” on page 348 or “Verifying the Stack” on page 351.

---

### Controlling the Selection of the Initially Active Master Controller Card

The manner in which you initially power on the units can determine which controller card becomes the active master controller card for the stack. This, in turn, can determine the initial configuration of the stack. In some situations you may want to control which controller card becomes the initially active master card.

There are two ways to power on the switches of the stack, either simultaneously or one after the other:

- ❑ If you power on the units simultaneously, the controller cards use their priority values or MAC addresses to determine the active master card for the stack. The selected active card uses the settings in its configuration file as the initial configuration for the stack. For background information, refer to “Priority Numbers” on page 325.
- ❑ If you power on one switch, wait a minimum of ten seconds, and then power on the second unit, the active master controller card in the unit first powered on becomes the master controller card for the stack. Its configuration file becomes the initial configuration for the stack.

The selection of the active master card might not be important to you if the units and controller cards of the stack are new. Here, the stack uses the default settings regardless of which controller card becomes the active card. If this is the case, you can power on the units either way,

However, if one of the switches was a stand-alone unit in your network and you are adding a new chassis to build a stack, you might want to retain the stand-alone configuration on the first switch to avoid having to reconfigure it when it becomes part of the stack. You can do this by powering it on first so that its active master controller card becomes the active card for the

stack and its configuration file is used as the initial configuration for the stack.

After the stack is operating, the active master card periodically shares its configuration file with all the other controller cards in the stack. Thus, the order in which the units are subsequently reset or powered on is not important because all the controller cards have the same configuration file.

## Powering On the Switches

To power on the two chassis of the stack, do one of the following:

- ❑ To power on AC AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 PoE Power Supplies, connect the power cords to the appropriate connectors on the back panel and to power sources. For instructions, refer to “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 199 and “Powering On AT-SBxPWRPOE1 Power Supplies” on page 203, respectively.
- ❑ To power on the AT-SBxPWRSYS1 DC Power Supply, turn the power switch to on. Refer to Figure 65 on page 141.

Be sure to power on all the power supplies in the chassis.

---

### Note

To power on the two chassis in sequence to control the selection of the active master controller card, power on the unit with the controller card to be the active master controller card, wait a minimum of ten seconds, and then power on the second unit.

---

The boot up sequence for the stack takes approximately four minutes. The amount of time may vary, depending on the number and types of Ethernet line cards in the two switches. The ports do not begin to forward traffic until the stack has completed the initialization process. Do one of the following:

- ❑ If you want to monitor the switches as they perform the initialization process, go to “Monitoring the Boot Up Sequence” on page 348.
- ❑ If you do not want to monitor the initialization process, go to “Verifying the Stack” on page 351.

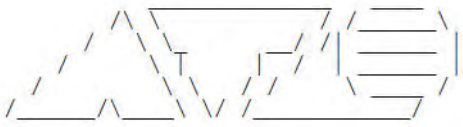
## Monitoring the Boot Up Sequence

You may monitor the initialization process by connecting a terminal or PC with a terminal emulator program to the Console port on any of the controller cards and watch the status messages, shown in Figure 204 on page 349 and Figure 205 on page 350. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 240.)

After the stack has completed the initialization process, go to “Verifying the Stack” on page 351.

```

Verifying release... OK
Booting...
Starting base/first... [ OK ]
Mounting virtual filesystems... [ OK ]



Allied Telesis Inc.
Alliedware Plus (TM) v5.4.5
Current release filename: SBx81CFC960-5.4.5-0.0.re1
Original release filename: SBx81CFC400-5.4.5-.0.re1
Built: Thu Dec 19 21:30:52 NZDT 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/setup-eth.. [ OK ]
Starting base/dbus... [ OK ]
Starting base/syslog... [ OK ]
Starting base/lif_ok... [ OK ]
Starting base/loopback... [ OK ]
Starting base/poe_done... [ OK ]
Starting base/sysctl... [ OK ]
Received event poefw.done
starting base/portmapper... [ OK ]
Received event syslog.done
Starting base/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-media... [ OK ]
Starting network/stackd... [ OK ]
Starting network/election.timeout... [ OK ]
Starting network/internal-tftpd... [ OK ]
Starting network/internal-boop... [ OK ]
08:00:46 awplus-1.5 chassis[2105]: Card 1.6 (AT-SBx81CFC960) has joined the
chassis

```

Figure 204. Initialization Messages for the Stack

Received event network enabled

Initializing HA processes:

cbtrd, hostd, nms, atmfd, bgpd, epsr  
exfx, hsl, imi, imiproxyd, irdpd, lacp, lldpd  
loopprot, mstp, ospf6d, ospfd, pdmd, pim6d, pimd  
ripd, ripngd, rmon, sflowd, udidd, vrrpd

Received event network.initialized

08:00:54 awplus-1.5 chassis[2105]: waiting for all chassis cards to initialize.

08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.4 hotswapped in AT-StackOP

08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.3 hotswapped in AT-StackOP

08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.2 hotswapped in AT-StackOP

08:00:54 awplus-1.6 HPI: HOTSWAP Pluggable 1.6.1 hotswapped in AT-StackOP

08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.4 hotswapped in AT-StackOP

08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.3 hotswapped in AT-StackOP

08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.2 hotswapped in AT-StackOP

08:00:54 awplus-1.5 HPI: HOTSWAP Pluggable 1.5.1 hotswapped in AT-StackOP

08:00:54 awplus-1.5 chassis[2105]: Card 1.1 (AT-SBx81XS6) has joined the chassis

08:00:54 awplus-1.5 chassis[2105]: Card 1.3 (AT-SBx81GT24) has joined the chassis

08:00:54 awplus-1.5 chassis[2105]: Card 1.2 (AT-SBx81GP24) has joined the chassis

.  
.  
.

08:00:55 awplus-1.5 chassis[2105]: Card 2.12 (AT-SBx81GP24) has joined the chassis

08:00:56 awplus-1.5 chassis[2105]: Card 1.5 (AT-SBx81CFC960) has become the Active CFC

08:00:56 awplus-1.5 chassis[2105]: Stack Virtual MAC is 0000.cd37.0c22

Received event vcs.elected-master

Assigning Active workload to HA processes:

authd, bgpd, epsrd, imi, hsl, irdpd, lacpd, lldpd  
loopprot, mstdp, nms, ospf6d, ospfd, pdmd, pim6d  
pimd, ripd, ripngd, rmond, sflowd, vrrpd, imi  
vrrpd

Received event network activated

Loading default configuration

done!

Received event network.configured

awplus login:

Figure 205. Initialization Messages for the Stack (Continued)

## Verifying the Stack

After resetting or powering on the devices and waiting four minutes for the switches to complete initializing the management software and form the stack, you should verify the stack. To verify the stack, perform the following procedure:

1. Start a local or remote management session on the stack. You may use the RS-232 Console port on any of the controller cards in the stack to establish a local management session. You do not have to use the RS-232 Console port on the active master controller card.

---

### Note

If you prefer to use the RS-232 Console port on the active master controller card for the management session, you can determine the active card by examining the CFC LEDs. The LEDs are green on the active master controller card and amber on the standby master controller cards.

---

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

```
awplus> enable
awplus#
```

3. In the Privileged Exec mode, enter the SHOW STACK command.

```
awplus# show stack
```

Figure 206 is an example of the command for a stack that has four controller cards.

#### Virtual Chassis Stacking summary information

ID	Pending ID	MAC address	Priority	Status	Role
1.5	-	eccd.6d9e.331c	128	Ready	Active CFC
1.6	-	eccd.6d9e.3308	128	Ready	Backup Member
2.5	-	eccd.6d9e.3328	128	Ready	Backup Member
2.6	-	eccd.6d9e.3302	128	Ready	Backup Member

Figure 206. SHOW STACK Command

The stack is operating properly if the command lists all of the controller cards in both switches of the stack. For instance, the command should list four controller cards if there are two controller cards in each chassis, or two controllers if each switch has only one controller card.

4. Do one of the following:
  - ❑ If the `SHOW STACK` command is displaying all the controller cards in the stack, the stack is operating normally. If you have optional feature licenses to install, go to “Installing Optional Feature Licenses” on page 353. Otherwise, you may begin to configure the parameter settings of the ports and features of the stack with the commands in the command line interface. For instructions, refer to Software Reference for SwitchBlade x8100 Series Switches.
  - ❑ If the `SHOW STACK` command is displaying the controller cards from only one chassis, the switches were not successful in forming the stack. Go to “Troubleshooting the Stack” on page 354.



## Installing Optional Feature Licenses

---

You may now install the optional premium and AMF master licenses. Please review the following information before installing a feature license:

- ❑ When ordering a feature license from Allied Telesis for the stack, you must order two licenses, one for each chassis. However, you use only one license to activate the feature. The active controller card automatically copies new feature license to all the controller cards in the stack, thereby activating the license on both switches.

For example, to install the premium feature license on a stack, you have to order two premium licenses from Allied Telesis and then use one of the licenses to activate the feature on the stack.

- ❑ Feature licenses are installed with the `LICENSE` command in the Privileged Exec mode. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches.
- ❑ Feature licenses for the AT-SBx81CFC400 Controller Fabric Card are not compatible with the AT-SBx81CFC960 Card.

## Troubleshooting the Stack

---

The best way to determine if the switches are operating as a stack is with the `SHOW STACK` command, as explained in “Verifying the Stack” on page 351. If the command indicates that the switches are not operating as a stack, you may be able to identify and resolve the problem with the suggestions in this section.

The first thing to check is the stacking trunk that links the switches together. Here are some things to check:

- ❑ If the switches are using AlliedWare Plus v5.4.5 or later, verify that the SFP+ transceivers of the trunk are from Allied Telesis. The switches will not form the stack with transceivers from another network equipment manufacturer.
- ❑ If the switches are using AlliedWare Plus v5.4.4 or earlier, verify that the transceivers of the trunk are either AT-StackOP/0.3 or AT-StackOP/9.0 transceivers. You may not use standard SFP+ transceivers for the trunk when the switches are using earlier versions of AlliedWare Plus.
- ❑ Verify that the transceivers are firmly inserted into the SFP+ slots and that the fiber optic cables are properly secured to the transceivers.
- ❑ Inspect the L/A LEDs for the slots. They should be solid or flashing green.
- ❑ Verify that there are no network devices, such as media converters or other switches, between the SFP+ transceivers of the trunk.
- ❑ Verify that you are using the correct type of fiber optic cable and are not exceeding the maximum operating distance of the transceivers.

Refer to “Fiber Optic or Twisted Pair Transceivers” on page 257 for additional troubleshooting suggestions for the trunk SFP+ transceivers.

If the trunk is operating correctly, the switches may have a configuration problem that is preventing them from forming the stack. You may be able to identify the problem with the following suggestions. It is important to remember that at this point the switches, having been unsuccessful at forming the stack, are operating as stand-alone units, which means that you have to manage them with separate local management sessions.

- ❑ Use the `SHOW SYSTEM` command in the Privileged Exec mode of the command line interface to confirm that the switches have the same version of the AlliedWare Plus management software. If they have different versions, refer to the Software Reference for SwitchBlade x8100 Series Switches for instructions on how to upgrade the software.

- ❑ Use the `SHOW LICENSE BRIEF` command in the Privileged Exec mode to confirm that you installed the VcStack Plus licenses and enabled the feature on the switches. If a switch does not have the license, perform “Activating the VcStack Plus Feature License” on page 333 to install it. If the command shows that the license is activated but the feature is not enabled, perform “Enabling the Stacking Feature” on page 335.
- ❑ Use the `SHOW LICENSE BRIEF` command to confirm that they have the same feature licenses. If they have different licenses, add or delete licenses so that they have the same feature licenses.
- ❑ Use the `SHOW STACK` command to compare the ID numbers of the switches. One switch should have the ID 1 and the other ID 2. To configure the ID numbers, perform “Setting the ID Number” on page 339.

You might also try watching for error messages on the Console port on one of the controller cards when you power on or reset the switches. Here are the messages:

- ❑ The following error message indicates that the two chassis have different feature licenses. Switches cannot form a stack if they have different licenses. Perform “Displaying the Feature Licenses” on page 337 on both switches to determine which switch needs a license. For example, if, after performing the procedure, you determine that one of the switches has the premium license and the other one does not, obtain and install the premium license on the other unit.

```
chassis[nnnn] Software feature licensing incompatible. Card
n.n will boot as a standalone system
```

- ❑ Switches running AlliedWare Plus 5.4.5 or later display the following message if one or more of the SFP+ transceivers in the stack trunk are not from Allied Telesis. Replace the transceivers with transceivers from Allied Telesis.

```
Only ATI qualified SFP+ modules are support in this port.
Please remove.
```

- ❑ Switches running AlliedWare Plus 5.4.4 or earlier display the following message if one or more of the SFP+ transceivers in the stack trunk are not AT-StackOP/0.3 or AT-StackOP/9.0 transceivers. Remove the standard transceivers and replace with stacking transceivers.

```
EXFX[nnn]: ERROR: stack port n.n.n - Only AT-StackOP support
in this port. Please remove
```

- ❑ The following error message indicates that the two switches cannot form the stack because they have different versions of the AlliedWare Plus management software. To resolve the problem, update the software on one of both systems so that they have the same version.

```
chassis[nnn]: Neighbor on link portn.n.n cannot join stack -  
incompatible stack S/W versions.
```

## Appendix A

# Technical Specifications

---

The sections in the appendix are listed here:

- ❑ “Physical Specifications” on page 358
- ❑ “Environmental Specifications” on page 361
- ❑ “Power Specifications” on page 362
- ❑ “Safety and Electromagnetic Emissions Certifications” on page 366
- ❑ “Port Pinouts” on page 367
- ❑ “Fiber Optic Specifications of the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers” on page 369

## Physical Specifications

### Dimensions (W x D x H)

Table 35. Product Dimensions

AT-SBx8112 Chassis	48.03 cm x 38.79 cm x 17.63 cm (18.91 in x 15.27 in x 6.94 in)
AT-SBxPWRSYS1 AC System Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRSYS2 AC System Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRPOE1 PoE Power Supply	10.16 cm x 32.21 cm x 4.34 cm (4.00 in x 12.68 in x 1.71 in)
AT-SBxPWRSYS1 DC System Power Supply	10.16 cm x 34.2 cm x 4.34 cm (4.00 in x 13.46 in x 1.71 in)
AT-SBx8112 Fan Module	2.62 cm x 29.81 cm x 10.30 cm (1.03 in x 11.73 in x 4.05 in)
AT-SBx8112 v2 Fan Module	2.62 cm x 29.81 cm x 10.30 cm (1.03 in x 11.73 in x 4.05 in)
Line Cards	20.67 x 31.32 cm x 4.06 cm (8.14 in x 12.33 in x 1.6 in)
AT-SBx81GT24	
AT-SBx81GT24 (Revised)	
AT-SBx81GT40	
AT-SBx81GP24	
AT-SBx81GP24 v2	
AT-SBx81GS24a	
AT-SBx81XS6	
AT-SBx81XS16	
AT-SBx81XLEM	

Table 35. Product Dimensions (Continued)

AT-SBx81XLEM Expansion Modules	9.4 cm x 16.0 cm x 3.6 cm (3.7 in x 6.3 in x 1.4 in)
AT-SBx81XLEM/GT8	
AT-SBx81XLEM/Q2	
AT-SBx81XLEM/XS8	
AT-SBx81XLEM/XT4 Module	
Controller Cards	20.67 x 31.32 cm x 4.06 cm (8.14 in x 12.33 in x 1.6 in)
AT-SBx81CFC960	
AT-SBx81CFC960 Version 2	

**Weights (Kilograms)**

Table 36. Product Weights

AT-SBx8112 Chassis	17.77 kg (39.10 lb) with 3 PSU and 10 Line Card blank panels
AT-SBx81GT24 Line Card	0.93 kg (2.05 lb)
AT-SBx81GT24 Line Card (Revised)	0.93 kg (2.05 lb)
AT-SBx81GT40 Line Card	1.04 kg (2.30 lb)
AT-SBx81GP24 PoE Line Card	1.06 kg (2.34 lb)
AT-SBx81GP24 v2 PoE Line Card	1.04 kg (2.30 lb)
AT-SBx81GS24a SFP Line Card	1.06 kg (2.34 lb)
AT-SBx81XS6 SFP+ Line Card	1.06 kg (2.34 lb)
AT-SBx81XS16 SFP+ Line Card	1.4 kg (3.09 lb)
AT-SBx81XLEM Line Card Line Card	1.2 kg (2.70 lb)
AT-SBx81XLEM/GT8 Expansion Module	0.25 kg (0.55 lb)
AT-SBx81XLEM/Q2 Expansion Module	0.2 kg (0.5 lb)

Table 36. Product Weights (Continued)

AT-SBx81XLEM/XS8 Expansion Module	0.3 kg (0.65 lb)
AT-SBx81XLEM/XT4 Expansion Module	0.3 kg (0.65 lb)
AT-SBx81CFC960 Version 1 Controller Fabric Card	1.13 kg (2.50 lb)
AT-SBx81CFC960 Version 2 Controller Fabric Card	1.13 kg (2.50 lb)
AT-SBxPWRSYS1 AC System Power Supply	2.75 kg (6.05 lb) with power cord
AT-SBxPWRSYS2 AC System Power Supply	2.70 kg (6.00 lb) with power cord
AT-SBxPWRPOE1 PoE Power Supply	2.73 kg (6.00 lb) with power cord
AT-SBxPWRSYS1 DC System Power Supply	1.9 kg (4.2 lb)
AT-SBxFAN12 Fan Module	1.82 kg (4.00 lb)



## Environmental Specifications

---

Table 37. Environmental Specifications

Operating Temperature	-0° C to 40° C (32° F to 104° F)
Storage Temperature	-25° C to 70° C (-13° F to 158° F)
Operating Humidity	5% to 90% non-condensing
Storage Humidity	5% to 95% non-condensing
Operating Altitude Range	Up to 3,000 m (9,843 ft)
Acoustic Noise	75.7 dB

---

**Note**

The acoustic noise was measured at 40° C with the following products installed:

---

Table 38. Acoustic Noise Test Components

Product	Quantity
AT-SBx8112 Chassis	1
AT-SBx81CFC960 Controller Fabric Card	2
AT-SBx81GP24 PoE Line Card	5
AT-SBx81XS6 SFP+ Line Card	5
AT-SBxPWRSYS1 AC System Power Supply	2
AT-SBxPWRPOE1 PoE Power Supply	2
AT-SBxFAN12 Fan Module	1

## Power Specifications

### AC Voltage, Frequency Requirements (Volts, Hertz)

Table 39. AC Voltage and Frequency Requirements

AT-SBxPWRSYS1 AC Power Supply	100 - 120 / 200 - 240 VAC, 16/8A, 50/60 Hz, (per input)
AT-SBxPWRSYS2 AC Power Supply	100 - 120 / 200 - 240 VAC, 18/8A, 50/60 Hz, (per input)
AT-SBxPWRPOE1 AC Power Supply	100 - 120 / 200 - 240 VAC, 16/8A, 50/60 Hz, (per input)

### DC Voltage Requirements

Table 40. DC Voltage Requirements

AT-SBxPWRSYS1 DC Power Supply	40 - 60V dc (-0% - +20%), 36A (maximum per input)
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### Typical power savings in eco-Friendly mode (Watts)

Table 41. Typical Power Savings in eco-friendly Mode

AT-SBx81GT24	0.12 W
AT-SBx81GT24 (Revised)	0.12 W
AT-SBx81GT40	0.79 W
AT-SBx81GP24	0.24 W
AT-SBx81GP24 v2	0.24 W
AT-SBx81GS24a	0.20 W
AT-SBx81XS6	0.10 W
AT-SBx81XS16	0.66 W
AT-SBx81XLEM (no expansion module)	0.14 W
AT-SBx81XLEM and AT-SBx81XLEM/GT8	0.25 W
AT-SBx81XLEM and AT-SBx81XLEM/Q2	0.17 W

Table 41. Typical Power Savings in eco-friendly Mode (Continued)

AT-SBx81XLEM and AT-SBx81XLEM/XS8	0.20 W
AT-SBx81XLEM and AT-SBx81XLEM/XT4	0.09 W

**Maximum power consumption (Watts)**

Table 42. Maximum Power Consumption

AT-SBx81GT24	34.4 W
AT-SBx81GT24 (Revised)	34.4 W
AT-SBx81GT40	53.9 W
AT-SBx81GP24	34.4 W
AT-SBx81GP24 v2	34.4 W
AT-SBx81GS24a	56.3 W
AT-SBx81XS6	54.8 W
AT-SBx81XS16	78.4 W
AT-SBx81XLEM (no expansion module)	43.7 W
AT-SBx81XLEM and AT-SBx81XLEM/GT8	48.6 W
AT-SBx81XLEM and AT-SBx81XLEM/Q2	64.4 W
AT-SBx81XLEM and AT-SBx81XLEM/XS8	65.1 W
AT-SBx81XLEM and AT-SBx81XLEM/XT4	65.5 W
AT-SBx81CFC960	75.0 W
AT-SBx81CFC960 Version 2	75.0 W

**Maximum power supply efficiency (based on 100V input voltage)**

Table 43. Maximum Power Efficiency

AT-SBxPWRSYS1 AC	Up to 90%
AT-SBxPWRSYS2 AC	Up to 85%
AT-SBxPWRPOE1 AC	Up to 90%
AT-SBxPWRSYS1 DC	Up to 90%

**Heat dissipation (British Thermal Units/hour)**

Table 44. Heat Dissipation

AT-SBx81GT24	117.39 BTU/hr
AT-SBx81GT24 (Revised)	117.39 BTU/hr
AT-SBx81GT40	183.93 BTU/hr
AT-SBx81GP24	117.39 BTU/hr
AT-SBx81GP24 v2	117.39 BTU/hr
AT-SBx81GS24a	192.12 BTU/hr
AT-SBx81XS6	187.00 BTU/hr
AT-SBx81XS16	267.6 BTU/hr
AT-SBx81XLEM (no expansion module)	149.19 BTU/hr
AT-SBx81XLEM and AT-SBx81XLEM/GT8	165.88 BTU/hr
AT-SBx81XLEM and AT-SBx81XLEM/Q2	219.8 BTU/hr
AT-SBx81XLEM and AT-SBx81XLEM/XS8	222.15 BTU/hr
AT-SBx81XLEM and AT-SBx81XLEM/XT4	223.42 BTU/hr
AT-SBx81CFC960	255.91 BTU/hr
AT-SBx81CFC960 Version 2	255.91 BTU/hr
AT-SBxPWRSYS1 AC	5118.21 BTU/hr

Table 44. Heat Dissipation (Continued)

AT-SBxPWRSYS2 AC	5118.21 BTU/hr
AT-SBxPWRPOE1 AC	5118.21 BTU/hr
AT-SBxPWRSYS1 DC	5118.21 BTU/hr

**Available Power over Ethernet (Watts/port):**

Table 45. Available Power Over Ethernet with One PoE Power Supply

One PoE Power Supply Installed	1200 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	40 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	77 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	171 ports Maximum
IEEE 802.3af Class 1 (4.0 W /port)	240 ports Maximum

Table 46. Available Power Over Ethernet with Two PoE Power Supplies

Two PoE Power Supply Installed	2400 W @ 56 VDC
IEEE 802.3at Class 4 (30 W /port)	80 ports Maximum
IEEE 802.3af Class 3 (15.4 W /port)	155 ports Maximum
IEEE 802.3af Class 2 (7.3 W /port)	240 ports Maximum
IEEE 802.3af Class 1 (4.0 W /port)	240 ports Maximum

**PoE Mode**

Table 47. PoE Mode on the AT-SBx81GP24 Versions 1 and 2 PoE Line Cards

IEEE 802.3af / IEEE 802.3at:	Alternative Mode A
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## Safety and Electromagnetic Emissions Certifications

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### Safety and Electromagnetic Emissions:

Table 48. Safety and Electromagnetic Emissions

EMI/RFI	FCC Class A, EN55022 Class A, EN61000-3-2, EN61000-3-3, CISPR Class A, VCCI Class A, AS/NZS Class A
Immunity	EN55024
Electrical Safety	EN60950-1 (TUV), UL60950-1 (cUL <sub>us</sub> ), EN60825
Safety Agency Approvals	cUL <sub>us</sub> , TUV, C-TICK, CE

## Port Pinouts

This section has the pinouts for the RJ-45 and RJ point 5 ports on the following devices:

- ❑ AT-SBx81GT24 Line Card
- ❑ AT-SBx81GT40 Line Card
- ❑ AT-SBx81GP24 Versions 1 and 2 Line Cards
- ❑ AT-SBx81XLEM/XT4 Expansion Module
- ❑ AT-SBx81XLEM/GT8 Expansion Module
- ❑ NET MGMT port on the AT-SBx81CFC960 Controller Fabric Card.

Figure 207 illustrates the pin layouts for the ports.

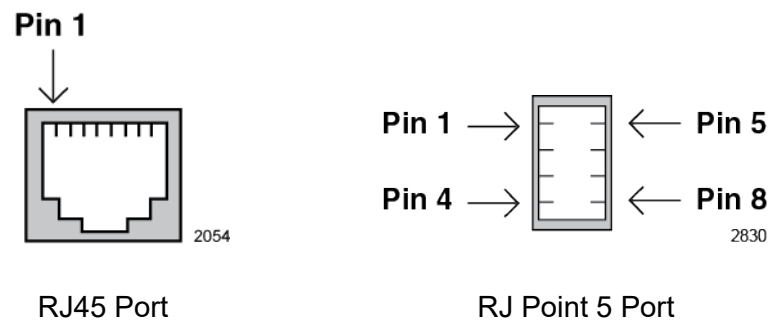


Figure 207. Pin Numbers for RJ-45 and RJ Point 5 Ports (Front View)

Table 49 lists the pin signals when a twisted-pair port is operating in the MDI configuration.

Table 49. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 50 lists the port pin signals for the MDI-X configuration.

Table 50. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 51 lists the port pin signals for twisted pair ports operating at 1000 Mbps or 10 Gbps.

Table 51. 1000Base-T or 10GBase-T Connector Pinouts

Pin	Pair	Signal
1	1	TX and RX+
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-



## Fiber Optic Specifications of the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers

Table 52 lists the fiber optic port specifications for the AT-StackOP/0.3 transceiver.

Table 52. Fiber Optic Port Specifications for the AT-StackOP/0.3 Module

General	
Maximum Distances	33 m with 62.5/125 $\mu\text{m}$ (core/cladding) multimode fiber optic cable 300 m with 50/125 $\mu\text{m}$ (core/cladding) multimode fiber optic cable
Fiber Optic Cable	50/125 $\mu\text{m}$ or 62.5/125 $\mu\text{m}$ (core/cladding) multimode fiber optic cable
Transmitter	
Wavelength	850 nm
Output Optical Power	-7.3 dBm min.
Receiver	
Wavelength	850 nm
Maximum Sensitivity	-9.9 dBm
Maximum Input Power	-1 dBm

Table 53 lists the fiber optic port specifications for the AT-StackOP/9.0 transceiver.

Table 53. Fiber Optic Port Specifications for the AT-StackOP/9.0 Transceiver

General	
Maximum Distances	9 km
Fiber Optic Cable	9/125 $\mu\text{m}$ (core/cladding) single-mode fiber optic cable

Table 53. Fiber Optic Port Specifications for the AT-StackOP/9.0 Transceiver (Continued)

Transmitter	
Wavelength	1310 nm
Output Optical Power	-8.2 dBm min. +0.5 dBm max.
Receiver	
Wavelength	1310 nm
Maximum Sensitivity	-14.4 dBm
Maximum Input Power	0.5 dBm