

# SwitchBlade x8 | 12

Layer 3+ Chassis Switch

## AT-SBx8 | CFC960

Versions 1 and 2 Controller Fabric Cards (AlliedWare Plus v5.4.9-0)

AT-SBx8 | 12 Chassis

AT-SBx8 | GT24 Ethernet Line Card

AT-SBx8 | GT40 Ethernet Line Card

AT-SBx8 | GP24 Ethernet PoE Line Card

AT-SBx8 | GS24a Ethernet SFP Line Card

AT-SBx8 | GC40 Ethernet SFP and CSFP BiDi Line Card

AT-SBx8 | XS6 Ethernet SFP+ Line Card

AT-SBx8 | XS16 Ethernet SFP+ Line Card

AT-SBx8 | XLEM Ethernet SFP Line Card and Expansion Slot

AT-SBx8 | XLEM/GT8 Expansion Module

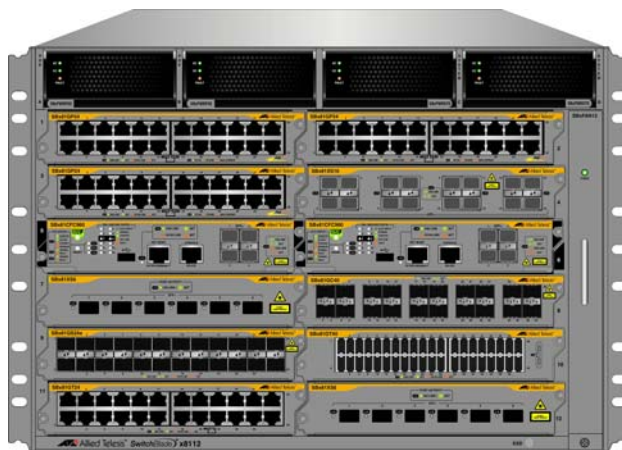
AT-SBx8 | XLEM/Q2 Expansion Module

AT-SBx8 | XLEM/XS8 Expansion Module

AT-SBx8 | XLEM/XT4 Expansion Module

AT-SBxPWRSYS1 and AT-SBxPWRSYS2 System Power Supplies

AT-SBxPWRPOE1 PoE Power Supply



## 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

## Translated Safety Statements

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**Important:** The  indicates that a translation of the safety statement is available in a PDF document titled “Translated Safety Statements” on our web site at <http://www.alliedtelesis.com/support>.

**Remarque:** Les consignes de sécurité portant le symbole  sont traduites dans plusieurs langues dans le document *Translated Safety Statements*, disponible à l'adresse [www.alliedtelesis.com/library](http://www.alliedtelesis.com/library).

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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
- “Contacting Allied Telesis” on page 18

---

**Note**

This version of the installation guide applies to release 5.4.9 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 319 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.

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**Note**

Notes provide additional information.

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**Caution**

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

---



---

**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.

---

## Contacting Allied Telesis

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

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

For sales or corporate information, go to [www.alliedtelesis.com/purchase](http://www.alliedtelesis.com/purchase) and select your region.

## 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 35
- ❑ Chapter 3, “AT-SBx81CFC960 Controller Fabric Cards” on page 77



## 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 26
- ❑ “AT-SBxFAN12 Module” on page 31
- ❑ “Power Supply Interfaces (Opto-couplers)” on page 33

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**Note**

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

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## 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.

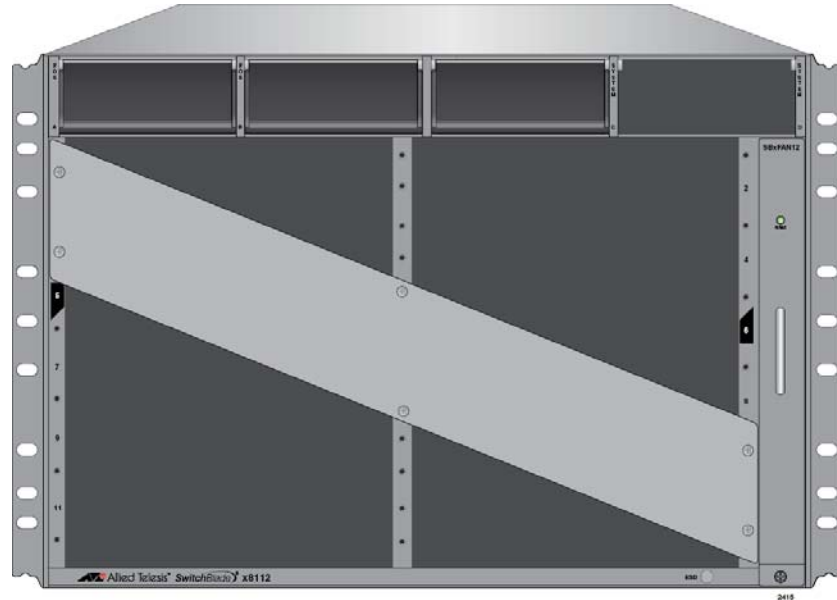


Figure 1. AT-SBx8112 Chassis

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.

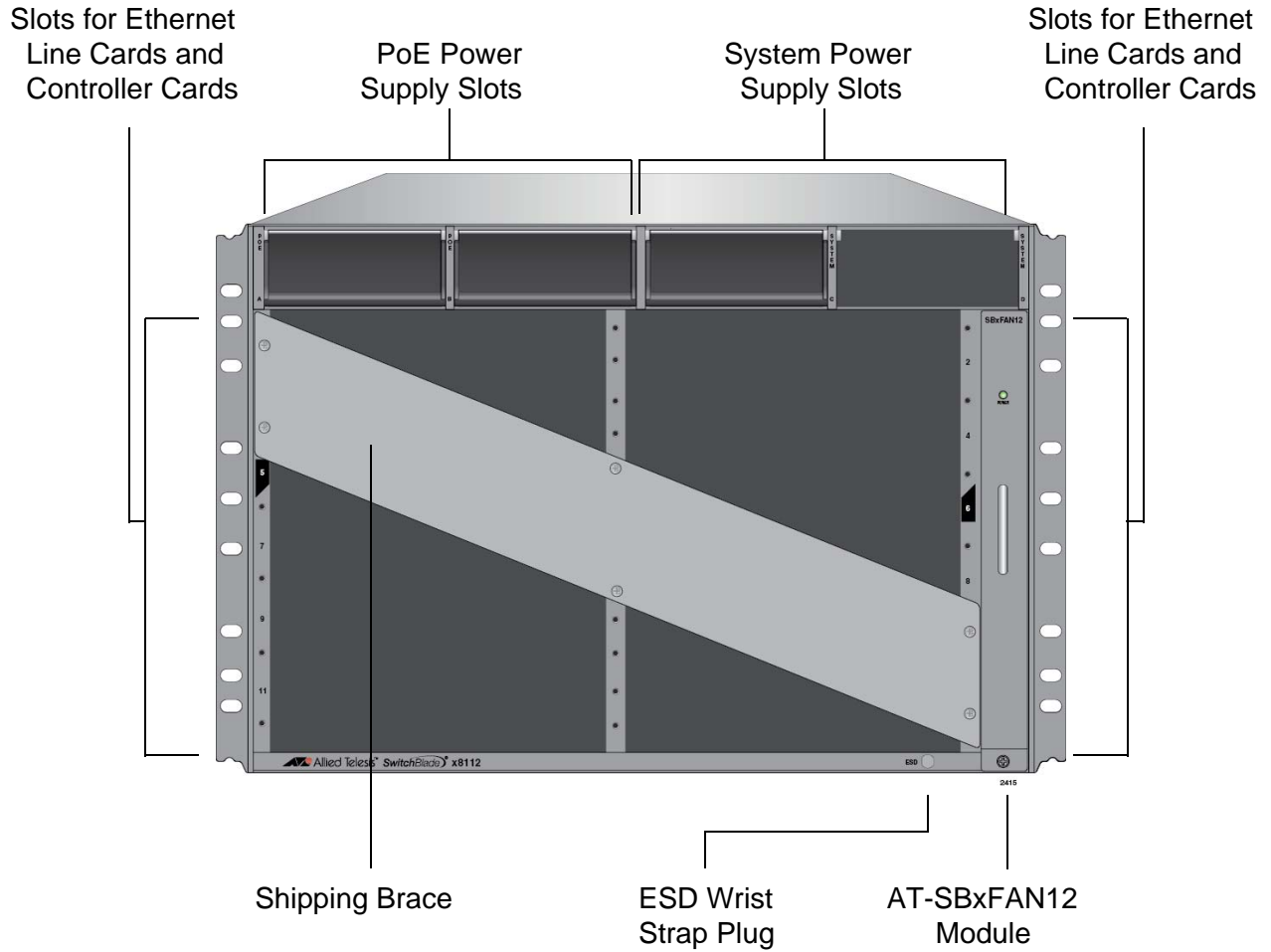


Figure 2. Front View of the AT-SBx8112 Chassis

**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.

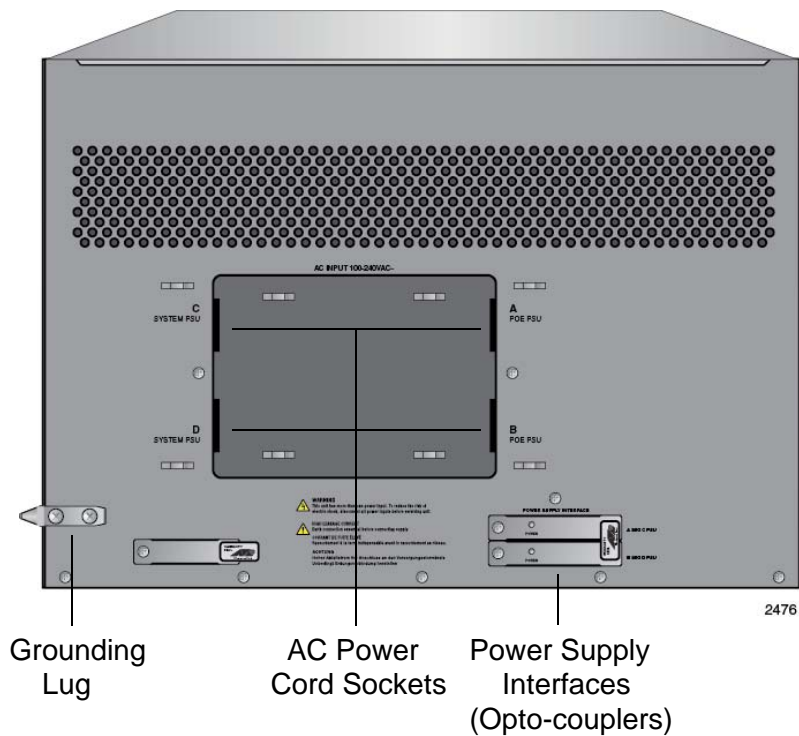


Figure 3. Rear View of the AT-SBx8112 Chassis

Figure 4 is an example of a fully populated chassis.

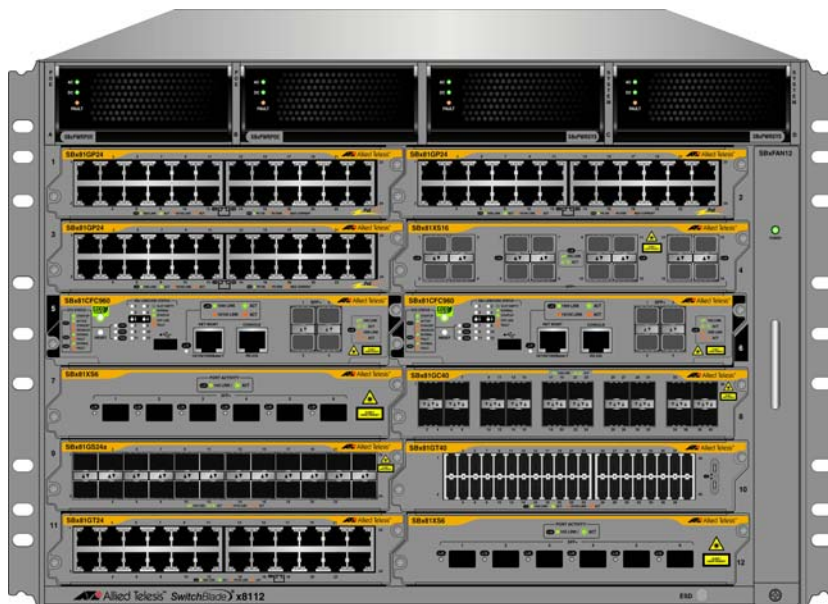
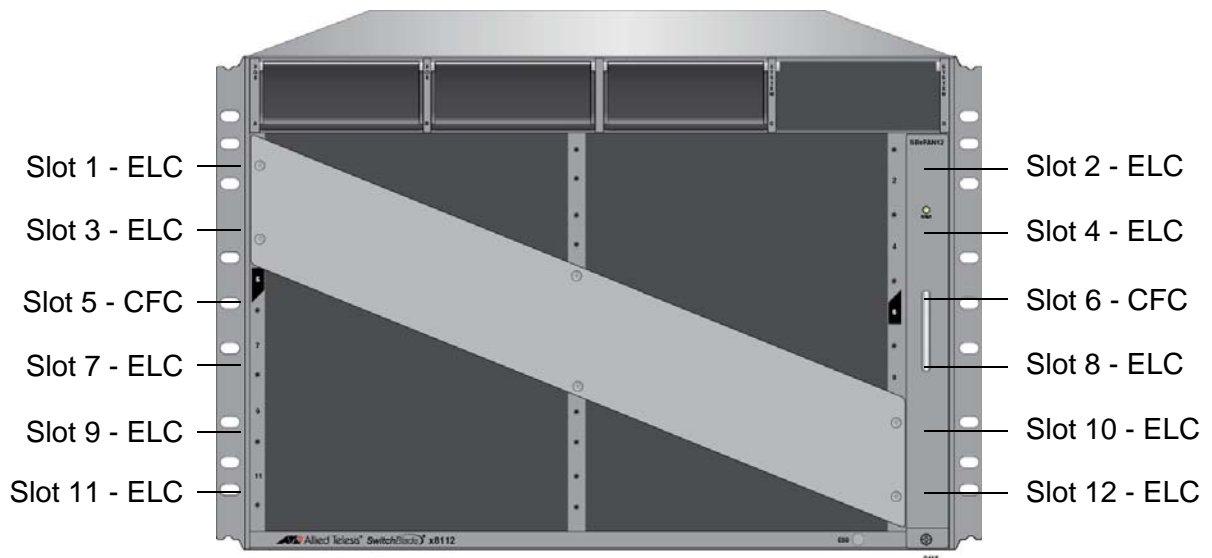


Figure 4. AT-SBx8112 Chassis with Line Cards, Controller Cards, and Power Supplies



## 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 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. The only exceptions are the AT-SBx81XS16 and AT-SBx81XLEM Line Cards, which are supported in slots 1 to 4, 8 and 10, but not slots 7, 9, 11 and 12. For more information on the Ethernet cards, refer to Chapter 2, “Ethernet Line Cards” on page 35

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 77.

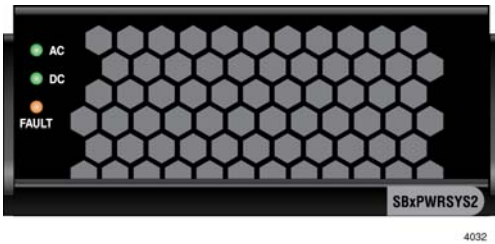
## Power Supplies and Power Supply Slots

---

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



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



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



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



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 on page 27.

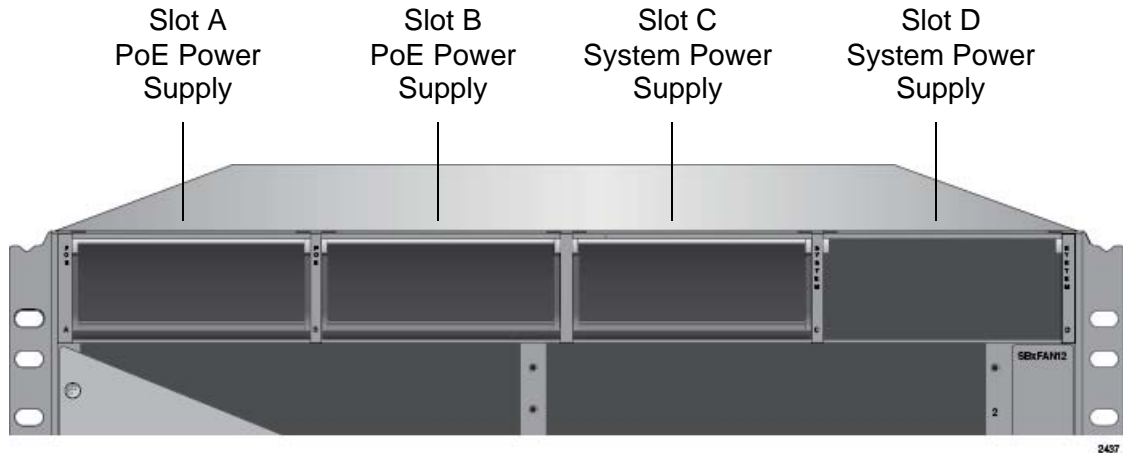


Figure 7. Power Supply Slots

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 73. 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 73.

---

**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 on page 29.

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

<b>LED</b>	<b>State</b>	<b>Description</b>
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 32. 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.

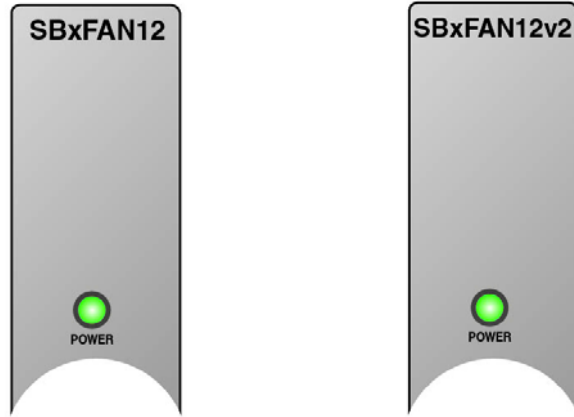


Figure 9. AT-SBxFAN12 and AT-SBxFAN12 v2 Fan Modules

**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.

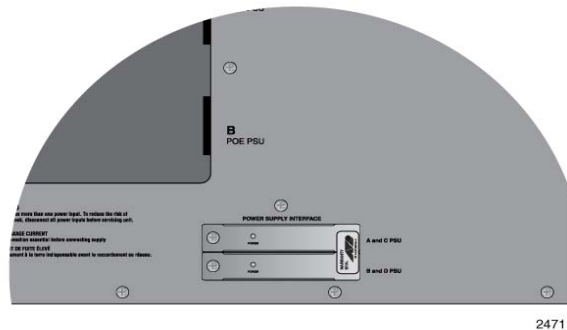


Figure 10. Power Supply Interfaces (Opto-couplers)

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 34.

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

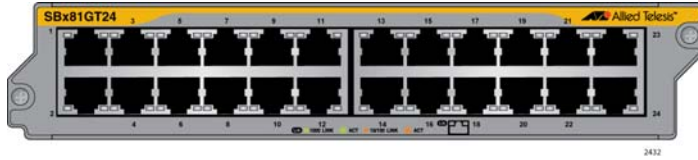
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This chapter describes the Ethernet line cards and expansion modules for the SwitchBlade x8112 Chassis Switch in the following sections:

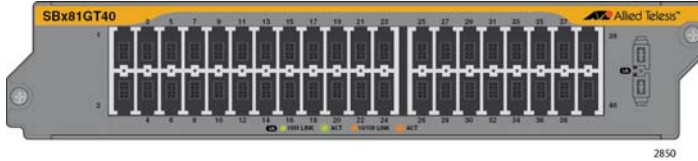
- ❑ “Ethernet Line Cards” on page 36
- ❑ “AT-SBx81GT24 Line Card” on page 39
- ❑ “AT-SBx81GT40 Line Card” on page 41
- ❑ “AT-SBx81GP24 PoE Line Card” on page 44
- ❑ “AT-SBx81GS24a SFP Line Card” on page 47
- ❑ “AT-SBx81GC40 SFP and CSFP Line Card” on page 49
- ❑ “AT-SBx81XS6 SFP+ Line Card” on page 55
- ❑ “AT-SBx81XS16 SFP+ Line Card” on page 57
- ❑ “AT-SBx81XLEM SFP Line Card” on page 59
- ❑ “AT-SBx81XLEM/GT8 Expansion Module” on page 62
- ❑ “AT-SBx81XLEM/Q2 Expansion Module” on page 64
- ❑ “AT-SBx81XLEM/XS8 Expansion Module” on page 66
- ❑ “AT-SBx81XLEM/XT4 Expansion Module” on page 68
- ❑ “Twisted Pair Ports” on page 70
- ❑ “Power over Ethernet on the Ports in the AT-SBx81GP24 Line Card” on page 73

# Ethernet Line Cards

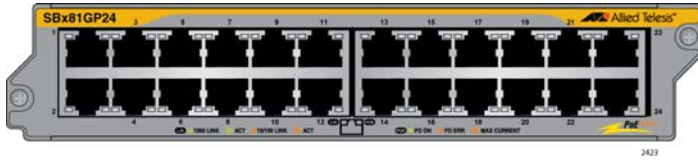
The Ethernet line cards are shown in Figure 11.



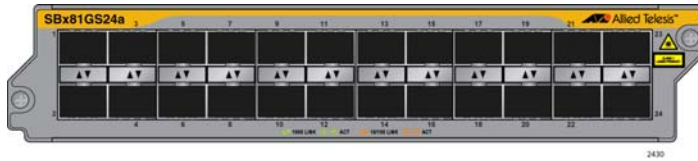
AT-SBx81GT24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports.



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



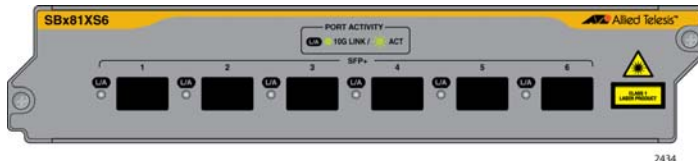
AT-SBx81GP24 Ethernet Line Card with 24 10/100/1000Base-T twisted pair ports, with PoE+.



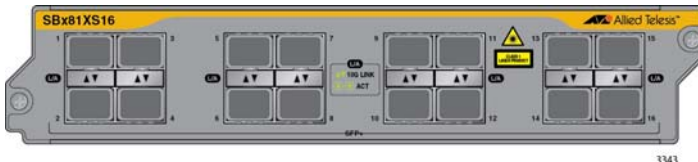
AT-SBx81GS24a SFP Ethernet Card with 24 ports for 100 or 1000Mbps, fiber optic or twisted pair SFP transceivers.



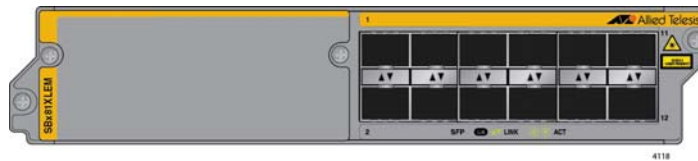
AT-SBx81GC40 Ethernet Card with 20 ports for 1000Mbps standard SFP or compact SFP (CSFP) BiDi transceivers.



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



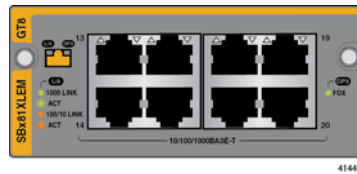
AT-SBx81XS16 Ethernet Card with sixteen ports for 10Gbps SFP+ fiber optic transceivers or Twinax direct connect cables.



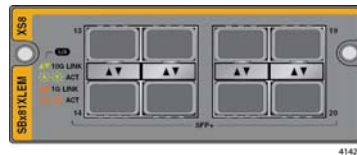
AT-SBx81XLEM SFP Ethernet Card with twelve ports for 1000Mbps, fiber optic or twisted pair SFP transceivers, and one expansion slot.

Figure 11. Ethernet Line Cards

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



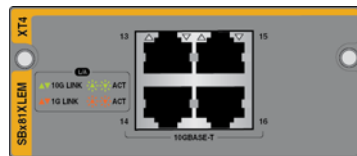
AT-SBx81XLEM/GT8 Module with eight 10/100/1000Base-T twisted pair ports.



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-SBx81GC40 Line Card	No	Yes	Yes	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

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/ XS8 Expansion Module	No	Yes	No	Yes	No
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.

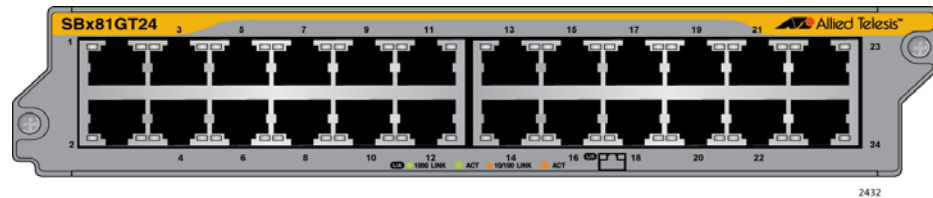


Figure 13. AT-SBx81GT24 Line Card

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 71.

**LEDs** Each port on the AT-SBx81GT24 Line Card has two LEDs. The LEDs are shown in Figure 14 on page 40 and described in Table 7 on page 40.

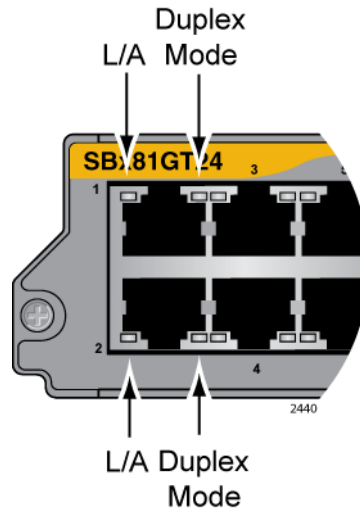


Figure 14. Port LEDs on the AT-SBx81GT24 Line Card

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.
Duplex Mode	Solid Green	The port is operating in full duplex mode.
	Solid Amber	The port is operating in half duplex mode.
	Flashing amber	The port is operating in half duplex mode, with collisions.
	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-SBx81GT40 Line Card

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

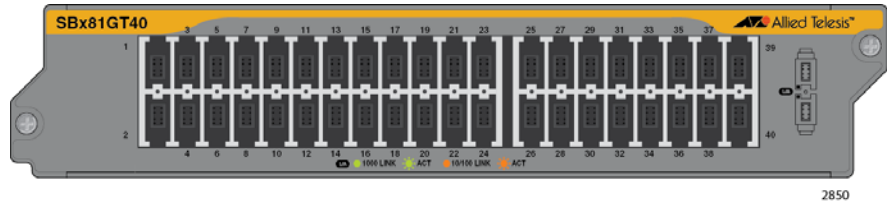


Figure 15. AT-SBx81GT40 Line Card

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

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### 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 71.

**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.

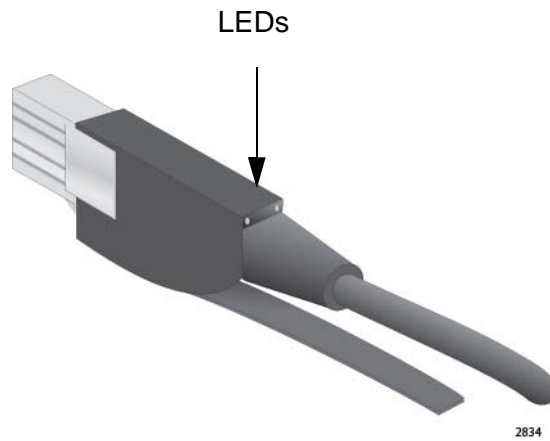


Figure 16. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

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 43.

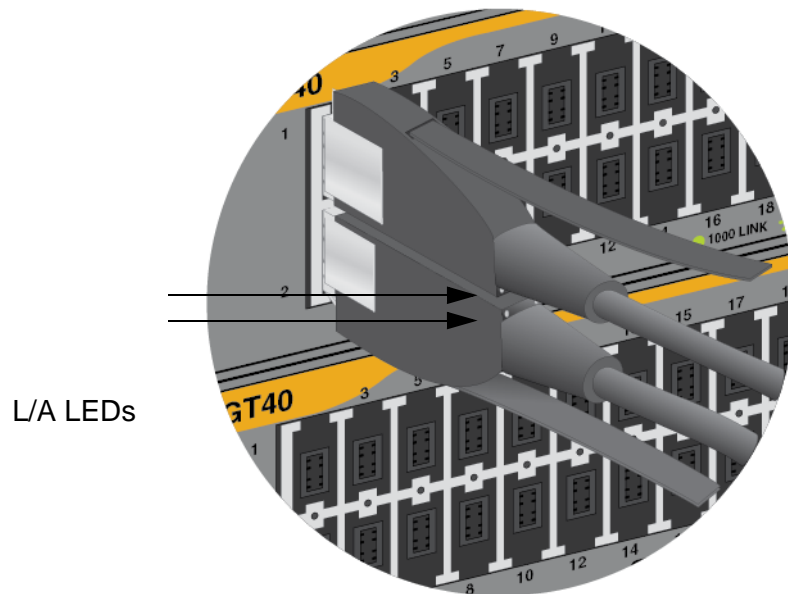


Figure 17. Port LEDs on an RJ Point 5 Cable Connector for the AT-SBx81GT40 Line Card

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 PoE Line Card

The AT-SBx81GP24 PoE Line Card, shown in Figure 18, is a Gigabit Ethernet switch with Power over Ethernet Plus (PoE+) on all the ports.

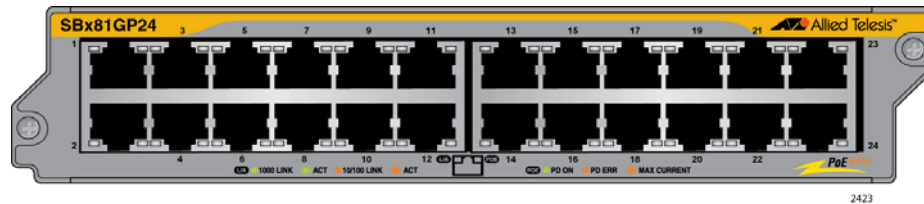


Figure 18. AT-SBx81GP24 PoE Line Card

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) 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 on the AT-SBx81GP24 Ethernet Line Card are listed in “Cable Requirements” on page 71.

**LEDs** Each port on the AT-SBx81GP24 PoE Line Card has two LEDs. The LEDs are shown in Figure 19 and described in Table 9.

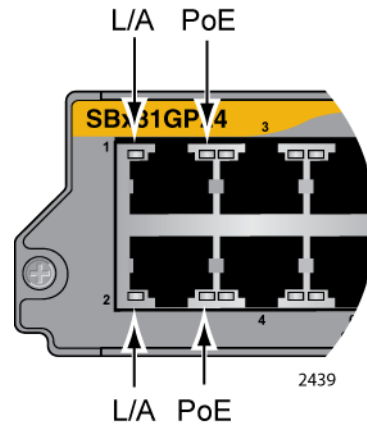


Figure 19. Port LEDs on the AT-SBx81GP24 PoE Line Card

Table 9. Port LEDs on the AT-SBx81GP24 PoE 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 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 PoE Line Card (Continued)

<b>LED</b>	<b>State</b>	<b>Description</b>
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 20, is a Gigabit Ethernet switch.

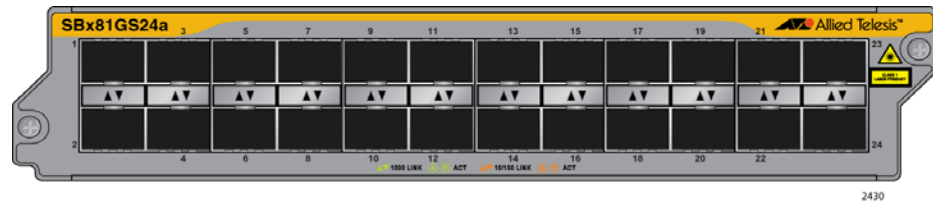


Figure 20. AT-SBx81GS24a SFP Line Card

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 21 on page 48 and described in Table 10 on page 48.

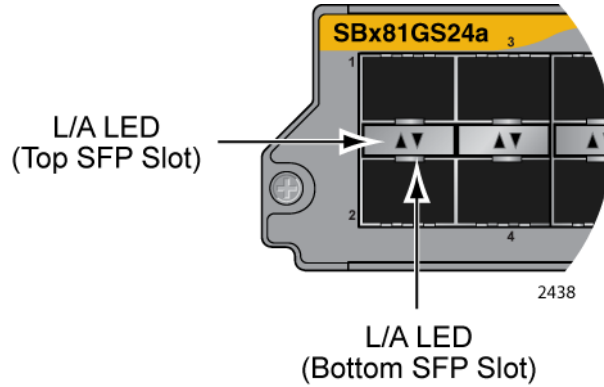


Figure 21. Port LEDs on the AT-SBx81GS24a SFP Line Card

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-SBx81GC40 SFP and CSFP Line Card

The AT-SBx81GC40 Line Card, shown in Figure 22, is a Gigabit Ethernet switch.

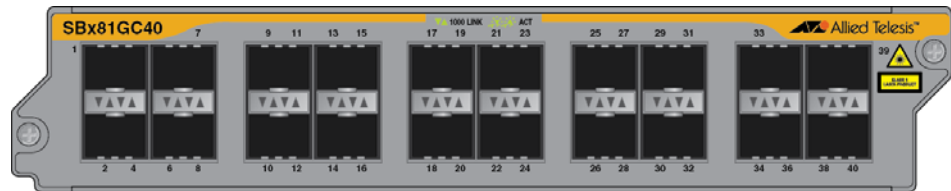


Figure 22. AT-SBx81GC40 Line Card

Here are the main features:

- ❑ 20 slots for 1000Mbps, standard SFP or compact SFP (CSFP) bidirectional (BiDi) transceivers
- ❑ Adheres to the CSFP Multi-Source Agreement (MSA) standard, Option 2, which defines support for both SFP and CSFP transceivers
- ❑ Supports 1000Base-LX, BiDi compact SFP (CSFP), transceivers
- ❑ Supports 1000Base-SX/LX, fiber optic SFP transceivers
- ❑ Supports 10/100/1000Base-T twisted pair SFP transceivers

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### Note

Standard 10/100/1000Base-T twisted pair SFP transceivers are only supported at 1000 Mbps.

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- ❑ 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

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**Note**

The AT-SBx81GC40 Line Card does not support 10 or 100 Mbps transceivers.

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The AT-SBx81GC40 Line Card has 20 slots for standard SFP or CSFP transceivers, and supports 20 or 40 networking ports, depending on the types of transceivers. The line card has 20 ports when the slots have standard SFP transceivers, because each SFP transceiver functions as one port. In contrast, the line card has 40 ports when the 20 slots have CSFP transceivers, because the two fiber connectors on CSFP transceivers function as independent, bidirectional networking ports that can be connected to different network devices.

You do not have to install the same type of transceiver into all 20 slots. The card can support both SFP and CSFP transceivers at the same time.

Contact your Allied Telesis sales representative for a list of supported transceivers.

## Port Numbers

The AT-SBx81GC40 Line Card has two port numbers for each transceiver port. The numbers are displayed on the front panel alongside and above the ports in the top row and alongside and below the ports in the bottom row. For instance, the first transceiver port in the top row has the port numbers 1 and 3 and the port beneath it has the port numbers 2 and 4. (Port numbers 3 and 5 are omitted from the first two ports in the top row on the faceplate to allow for the model name.)

A transceiver uses either one or both port numbers, depending on whether it is an SFP or a CSFP transceiver. A CSFP transceiver is assigned two port numbers because its two connectors function as independent network connections. You can use the two port numbers of a transceiver to configure the ports independently. The left-hand fiber connector is assigned the lower number of a slot and the right-hand connector is given the higher port number. For example, the left-hand fiber connector of an CSFP transceiver in the first top slot is assigned the port number 1 and the right-hand connector is given the port number 3.

Figure 23 on page 51 illustrates the port numbers for the first two slots when they contain CSFP transceivers.

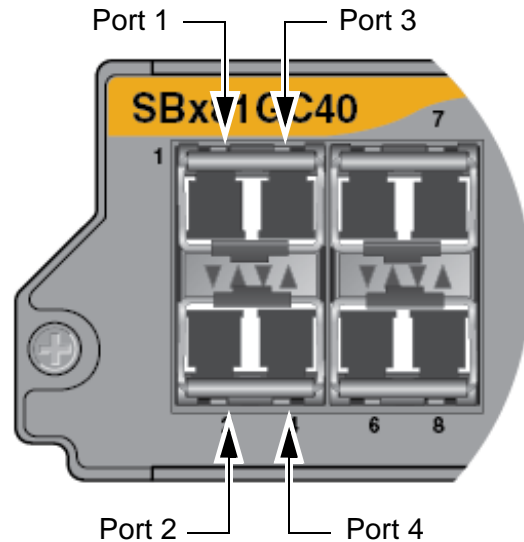


Figure 23. Port Numbers with CSFP Transceivers

In contrast, the two connectors on an SFP transceiver function as a single port, not as individual ports. Consequently, the switch assigns that type of module one port number instead of two.

The port number of an SFP module depends on whether the module is installed in a slot in the top or bottom row of the line card. An SFP module in a slot in the top row is assigned the lower of the two port numbers of a slot. For example, the port number of an SFP module installed in the first slot in the top row is port number 1 because it is the lower of the two port numbers of the slot. To configure the transceiver, you have to specify port 1 in the management software.

In contrast, an SFP module in a slot in the bottom row is assigned the higher number of the slot's two numbers. For instance, an SFP transceiver installed in the first slot in the bottom row is assigned the port number 4 by the switch.

Figure 24 on page 52 illustrates the port numbers for the first four slots when they contain standard SFP transceivers.

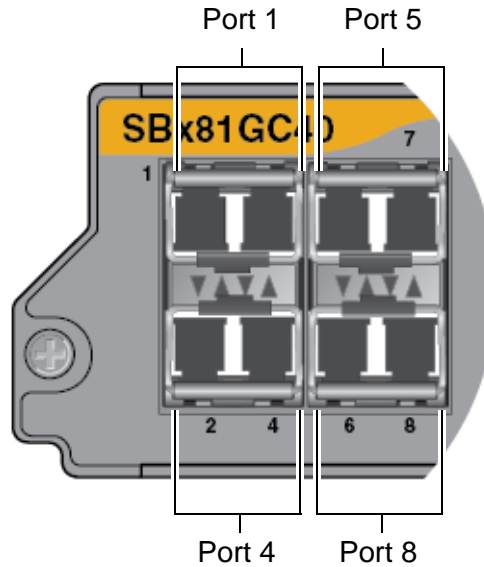


Figure 24. Port Numbers for Standard SFP Transceivers

**LEDs** The AT-SBx81GC40 Line Card has two LEDs for each port. The LEDs, which display link and activity information, are located between the ports, in sets of four. The first and third LEDs of each set are for the bottom port and the second and fourth LEDs are for the top port, as shown in Figure 25.

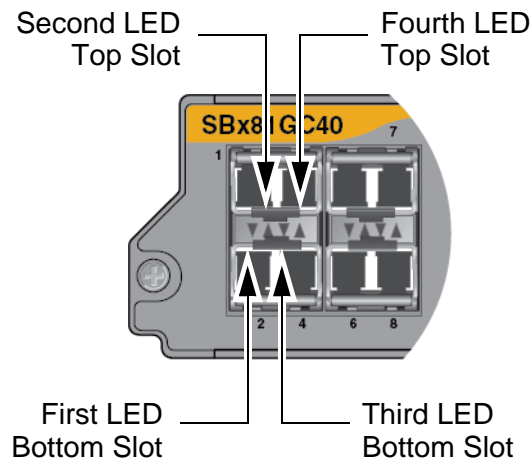


Figure 25. LEDs for the AT-SBx81GC40 Line Card

When a slot contains a CSFP transceiver, both slot LEDs are active. Each LED displays link and activity status information for its respective BiDi connector on a module. As an example, if the first top and bottom slots of the line card contain CSFP transceivers, the first LED between the slots displays link and activity status for port 2, which is the left-hand fiber connector on the bottom transceiver. The second LED displays the same information for port 1, the left-hand fiber connector on the top transceiver.

The third and fourth LEDs display the same information for ports 4 and 3, the right-hand connectors on the bottom and top transceivers, respectively. See Figure 26.

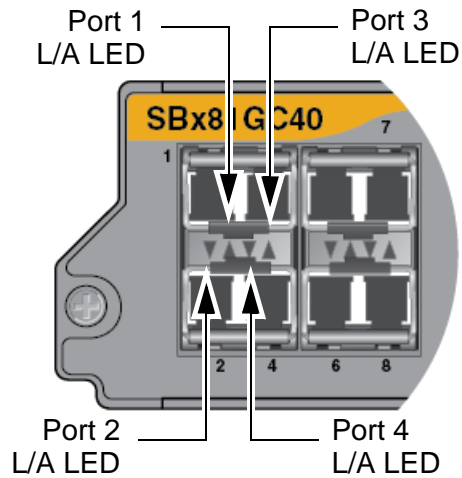


Figure 26. LEDs for the AT-SBx81GC40 Line Card, with CSFP Transceivers

When a slot has a standard SFP, only one LED of a pair is active. The other LED is not used. The active LED is different depending on whether the slot containing the transceiver is in the top or bottom row. When an SFP transceiver is installed in a slot in the top row, the first LED is active and the second inactive. When an SFP transceiver is installed in a slot in the bottom row, the first LED is inactive and the second active. See Figure 27.

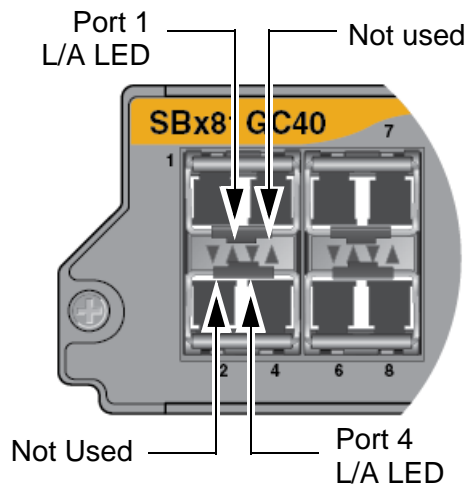


Figure 27. LEDs for the AT-SBx81GC40 Line Card, with SFP Transceivers

The LED states are described in Table 11 on page 54.

Table 11. Transceiver Slot LEDs on the AT-SBx81GC40 Line Card

LED	State	Description
L/A	Solid Green	The SFP transceiver or CSFP transceiver fiber port has established a link with a network device.
	Flashing Green	The SFP transceiver or CSFP transceiver fiber port is transmitting or receiving data.
	Off	<p>This LED state can result from the following conditions:</p> <ul style="list-style-type: none"> <li>❑ The transceiver slot is empty.</li> <li>❑ The SFP transceiver or CSFP fiber port has not established a link to 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-SBx81XS6 SFP+ Line Card

The AT-SBx81XS6 Line Card, shown in Figure 28, is a 10Gbps Ethernet switch.

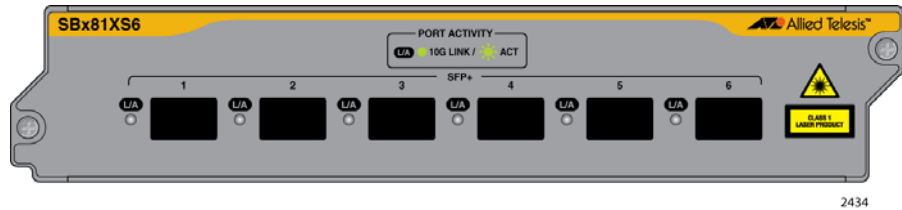


Figure 28. AT-SBx81XS6 Line Card

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 29 and described in Table 12 on page 56.

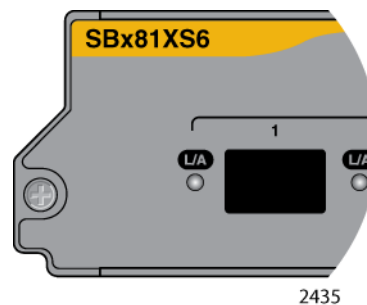


Figure 29. SFP+ Port LEDs on the AT-SBx81XS6 Line Card

Table 12. 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	<p>This LED state can result from the following conditions:</p> <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-SBx81XS16 SFP+ Line Card

The AT-SBx81XS16 Line Card, shown in Figure 30, is an Ethernet switch that supports 10Gbps SFP+ transceivers.

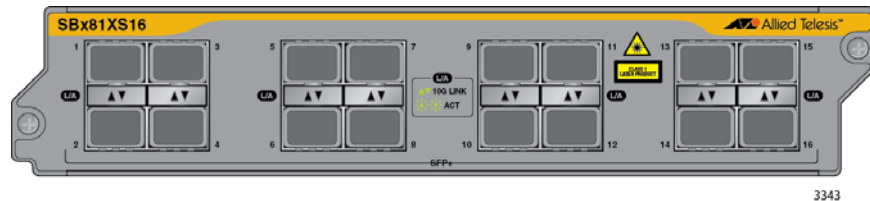


Figure 30. AT-SBx81XS16 Line Card

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 31 on page 58 and described in Table 13 on page 58.

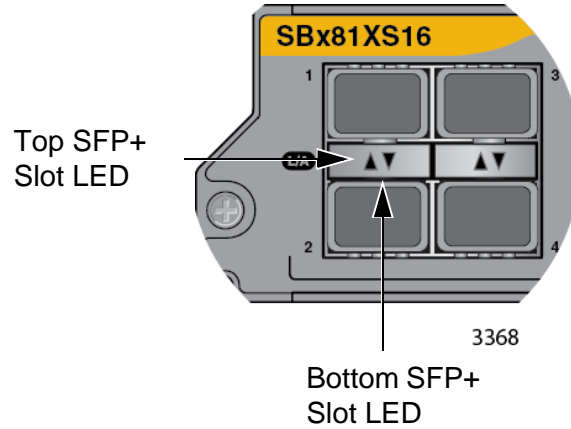


Figure 31. SFP+ Port LEDs on the AT-SBx81XS16 Line Card

Table 13. 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

The AT-SBx81XLEM SFP Line Card, shown in Figure 20, is a Gigabit Ethernet switch with a slot for an expansion module.

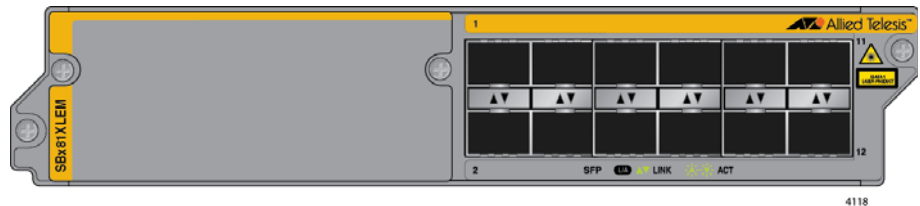


Figure 32. AT-SBx81XLEM SFP Line Card

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.

---

### 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.

---

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 33 and described in Table 14.

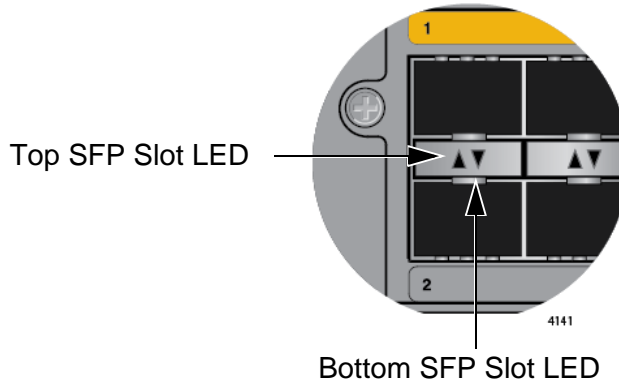


Figure 33. SFP Port LEDs on the AT-SBx81XLEM Line Card

Table 14. 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 34.

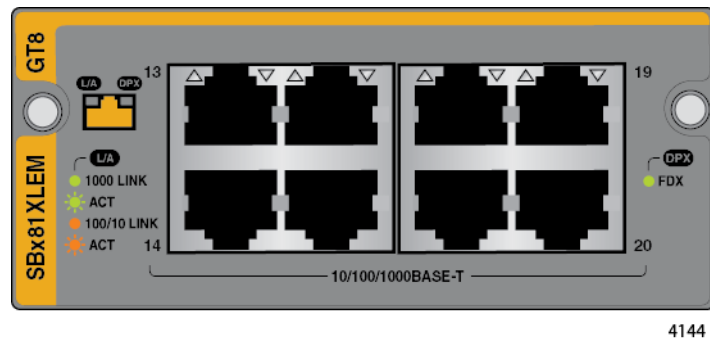


Figure 34. AT-SBx81XLEM/GT8Expansion Module

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 15 on page 63.

Table 15. 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 35, is an expansion module for the AT-SBx81XLEM Line Card. It installs in the slot in the card.

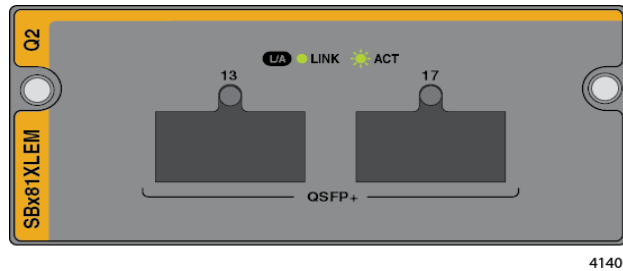


Figure 35. AT-SBx81XLEM/Q2 Expansion Module

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 16.

Table 16. 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 16. 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.

---

**Note**

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

---

## AT-SBx81XLEM/XS8 Expansion Module

The AT-SBx81XLEM/XS8 Module is another expansion module for the AT-SBx81XLEM Line Card. Refer to Figure 36.

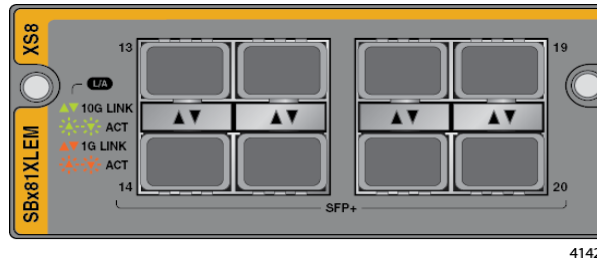


Figure 36. AT-SBx81XLEM/XS8 Expansion Module

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 17.

Table 17. 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 17. Slot LEDs on the AT-SBx81XLEM/XS8 Module (Continued)

<b>LED State</b>	<b>Description</b>
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 37.

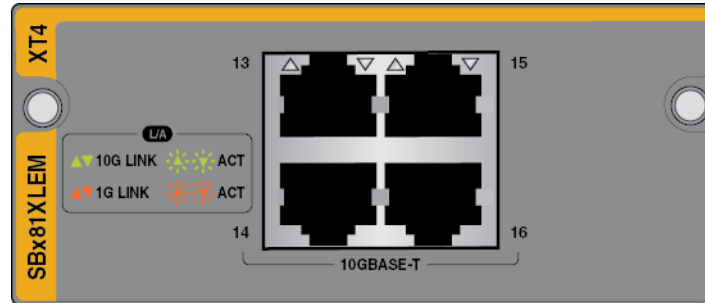


Figure 37. AT-SBx81XLEM/XT4 Expansion Module

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 18.

Table 18. 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 18. Port LEDs on the AT-SBx81XLEM/XT4 Module (Continued)

<b>LED State</b>	<b>Description</b>
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 371.

### 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.

---

### 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.

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**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 50 on page 371 for the pinouts of the twisted-pair ports

when they operate at 10 or 100 Mbps in the MDI configuration and Table 51 on page 372 for the MDI-X configuration. For the port pinouts when they operate at 1000 Mbps or 10 Gbps, refer to Table 52 on page 372.



## 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 19. The AT-SBx81GP24 Line Card supports all five classes.

Table 19. 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 20 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.

---

### Note

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

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Table 20. 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. 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 will not work with 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 78
- ❑ “Front Panel Components” on page 82
- ❑ “Guidelines” on page 85
- ❑ “Dual Controller Cards” on page 87
- ❑ “SYS Status LEDs” on page 89
- ❑ “eco-friendly Button” on page 91
- ❑ “SBx Linecard Status LEDs” on page 92
- ❑ “SFP+ Ports” on page 93
- ❑ “Console (RS-232) Port” on page 95
- ❑ “Ethernet Management Port (NET MGMT)” on page 96
- ❑ “USB Port” on page 98
- ❑ “Reset Button” on page 99
- ❑ “Hardware and Software Releases” on page 101

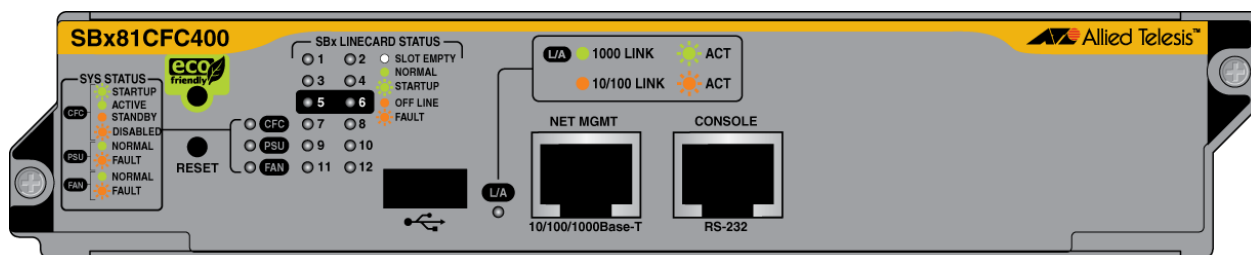
## Controller Fabric Cards for the AT-SBx8112 Chassis

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

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

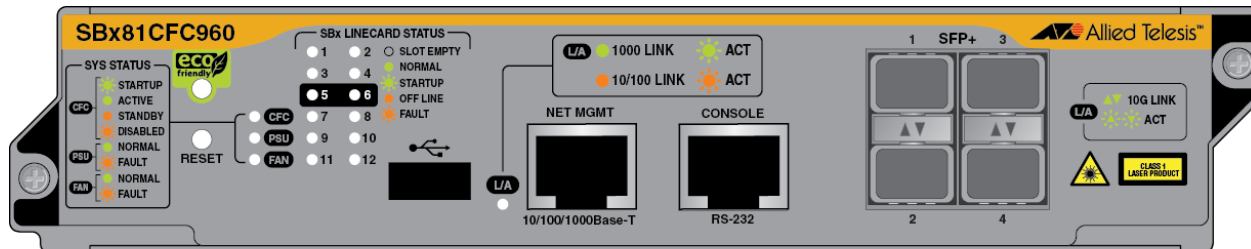
They are shown in Figure 38.

AT-SBx81CFC400 Controller Fabric Card



2425

AT-SBx81CFC960 Version 1 Controller Fabric Card



3273

AT-SBx81CFC960 Version 2 Controller Fabric Card

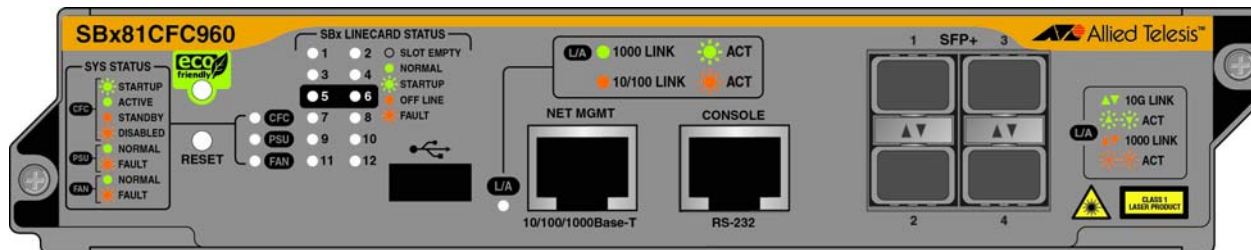


Figure 38. Controller Fabric Cards for the AT-SBx8112 Chassis

The AT-SBx81CFC960 Versions 1 and 2 Cards are different from the AT-SBx81CFC400 Controller Fabric Card in that they have four SFP+ ports. You can use the ports as additional networking ports or with the VCStack Plus feature to build a stack of two chassis. The AT-SBx81CFC400 Controller Fabric Card does not have SFP+ ports and does not support the VCStack Plus feature.

The AT-SBx81CFC960 Versions 1 and 2 Cards are nearly identical. The only difference is the types of transceivers supported by their four SFP+ ports. The AT-SBx81CFC960 Version 1 Card supports 10Gbps transceivers in its ports while the AT-SBx81CFC960 Version 2 Card supports both 1000Mbps and 10Gbps transceivers.

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 39.

AT-SBx81CFC960 Version 1  
Controller Card



AT-SBx81CFC960 Version 2  
Controller Card



Figure 39. Legends for the SFP+ Ports on the AT-SBx81CFC960 Versions 1 and 2 Controller Cards

Another way to determine the version of the controller card is with the SHOW SYSTEM command in the AlliedWare Plus management software. Among other information, the command displays the board ID numbers of the Ethernet line and controller cards in the chassis. The board IDs are 376 for the AT-SBx81CFC960 Version 1 Card and 379 for the AT-SBx81CFC960 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*.

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**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 an AT-SBx81CFC960 Controller Card.

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**Note**

Unless stated otherwise, in this manual “AT-SBx81CFC960 Card” refers to both AT-SBx81CFC960 Versions 1 and 2 Cards.

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

AT-SBx81CFC960 Versions 1 and 2 controller cards 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 21.

Table 21. 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.
5.4.8-2	Starts at 5.4.8-2.9 and includes all later 5.4.8-2.n 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 21.

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 21. You can display the release number of the AlliedWare Plus management software by entering the SHOW VERSION command in the User and 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 21 on page 80. 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 40 and briefly described in Table 22 on page 83.

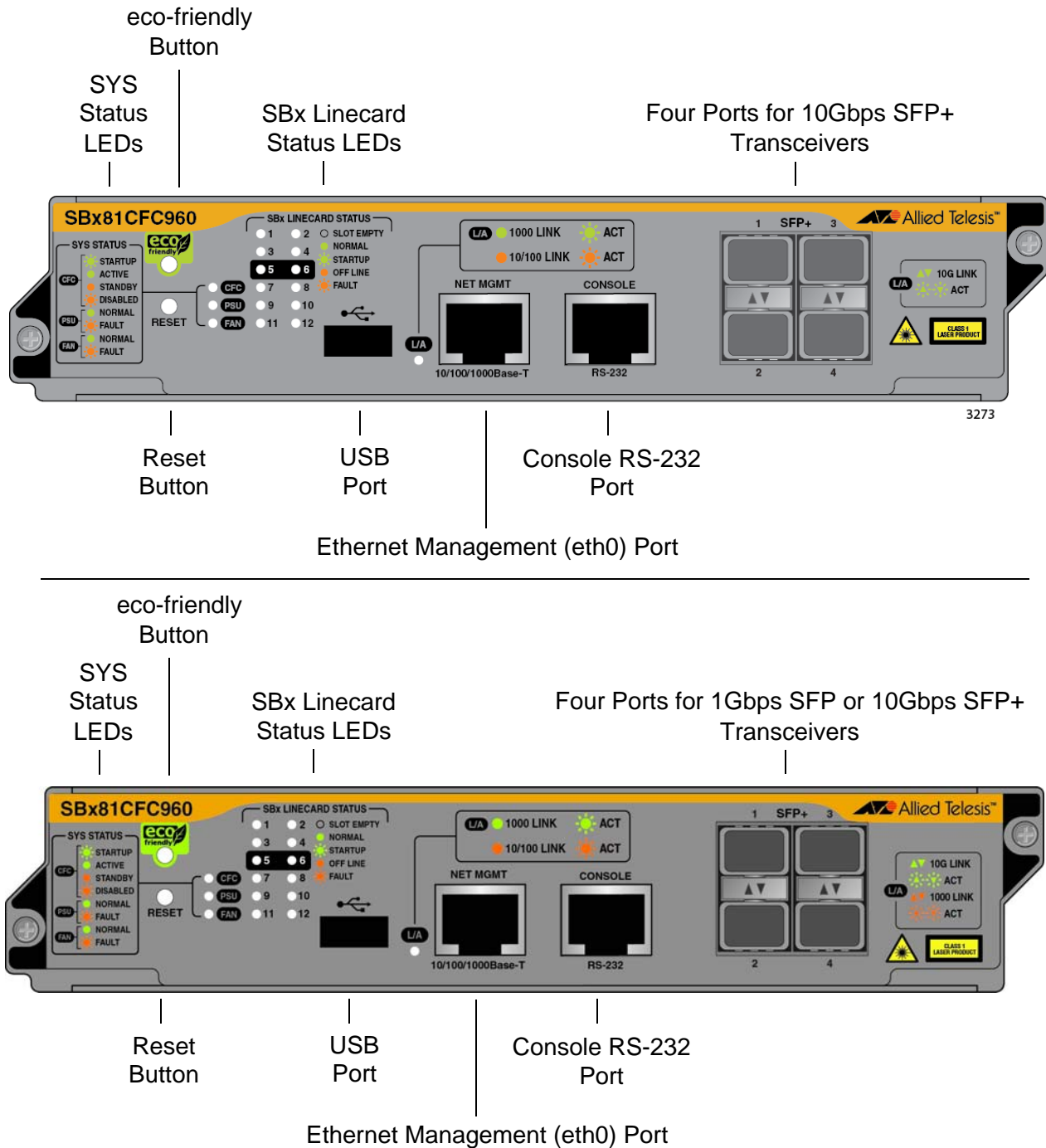


Figure 40. AT-SBx81CFC960 Version2 1 and 2 Controller Fabric Cards

Table 22. 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 89.
eco-friendly Button	Turns the LEDs on and off. For more information, refer to “eco-friendly Button” on page 91.
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 92.
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 VCStack 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 93.</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 95.

Table 22. Front Panel Components on AT-SBx81CFC960 Versions 1 and 2 Controller Fabric Cards (Continued)

<b>Component</b>	<b>Description</b>
NET MGMT (eth0) Port	Provides maintenance access to the controller card. For more information, refer to “Ethernet Management Port (NET MGMT)” on page 96.
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 98.
Reset Button	Resets the controller and Ethernet line cards. For more information, refer to “Reset Button” on page 99.

## Guidelines

---

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 319.
- ❑ 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

---

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 89.
- ❑ 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 237.

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 23 on page 89.

Table 23. 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 23. SYS (System) Status LEDs (Continued)

<b>LED</b>	<b>State</b>	<b>Description</b>
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 24.

Table 24. 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

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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 319.

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### 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.

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### 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.

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- ❑ 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 323.

Each SFP+ port has one LED. The SFP+ port LEDs for the AT-SBx81CFC960 Version 1 Card are defined in Table 25.

Table 25. 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 25.

Table 26. 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

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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 244 or the Software Reference for SwitchBlade x8100 Series Switches.

## Ethernet Management Port (NET MGMT)

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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 23 on page 89.
- ❑ 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 71. For the port pinouts, refer to “Port Pinouts” on page 371.
- ❑ 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 27 on page 97.



Table 27. 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

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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.

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- ❑ 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.

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- ❑ 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.

---

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**Note**

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

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## Hardware and Software Releases

The hardware and software releases for the AT-SBx8112 hardware products and AlliedWare Plus operating system are listed in Table 28.

Table 28. 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-SBx81GC40 Line Card	5.4.9
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
AT-SBx81XLEM/GT8 Expansion Module	5.4.6-2.1
Controller Cards	
AT-SBx81CFC960 Version 1 Controller Card	5.4.4

Table 28. Hardware and Software Releases (Continued)

Hardware	Software Release
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>1</sup>

1. 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 105
- ❑ Chapter 5, “Installing the Chassis in an Equipment Rack” on page 113
- ❑ Chapter 6, “Installing the Power Supplies” on page 129
- ❑ Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 149
- ❑ Chapter 8, “Cabling the Ethernet Line Cards” on page 173
- ❑ Chapter 9, “Cabling the AT-SBx81CFC960 Controller Fabric Card” on page 191
- ❑ Chapter 10, “Powering On the Chassis” on page 201
- ❑ Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 241
- ❑ Chapter 12, “Troubleshooting” on page 249
- ❑ Chapter 13, “Replacing Modules” on page 269
- ❑ Chapter 14, “Upgrading the Controller Fabric Card” on page 309





## 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 106
- “Selecting a Site for the SwitchBlade x8112” on page 110
- “Installation Tools and Material” on page 112


## 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. *↪* 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. *↪* 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. *↪* 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. *↪* E30

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**Note**

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

---



**Caution**

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

---




**Warning**

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


---

**Warning**

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


---

**Warning**

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

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## 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 41 on page 111.

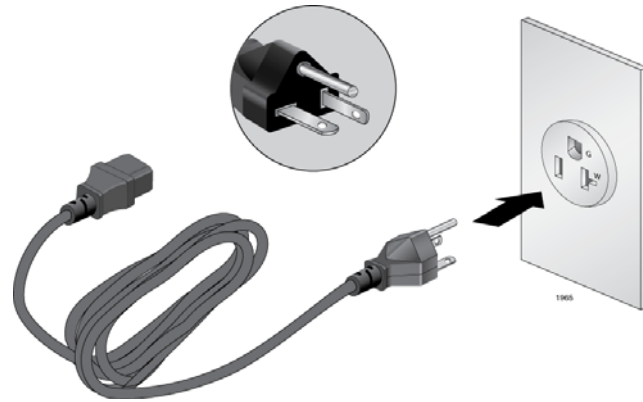


Figure 41. 100 - 125 VAC 125 V NEMA 5-20 Plug and Receptacle

## 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 114
- ❑ “Preparing the Equipment Rack” on page 115
- ❑ “Unpacking the AT-SBx8112 Chassis” on page 118
- ❑ “Adjusting the Equipment Rack Brackets” on page 120
- ❑ “Installing the AT-SBx8112 Chassis in the Equipment Rack” on page 122
- ❑ “Removing the Shipping Brace” on page 125
- ❑ “Installing the Chassis Grounding Wire” on page 126

## 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. *ES* 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 42 on page 116.
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 48 on page 123. You may use this additional space for other network equipment after the chassis is installed.

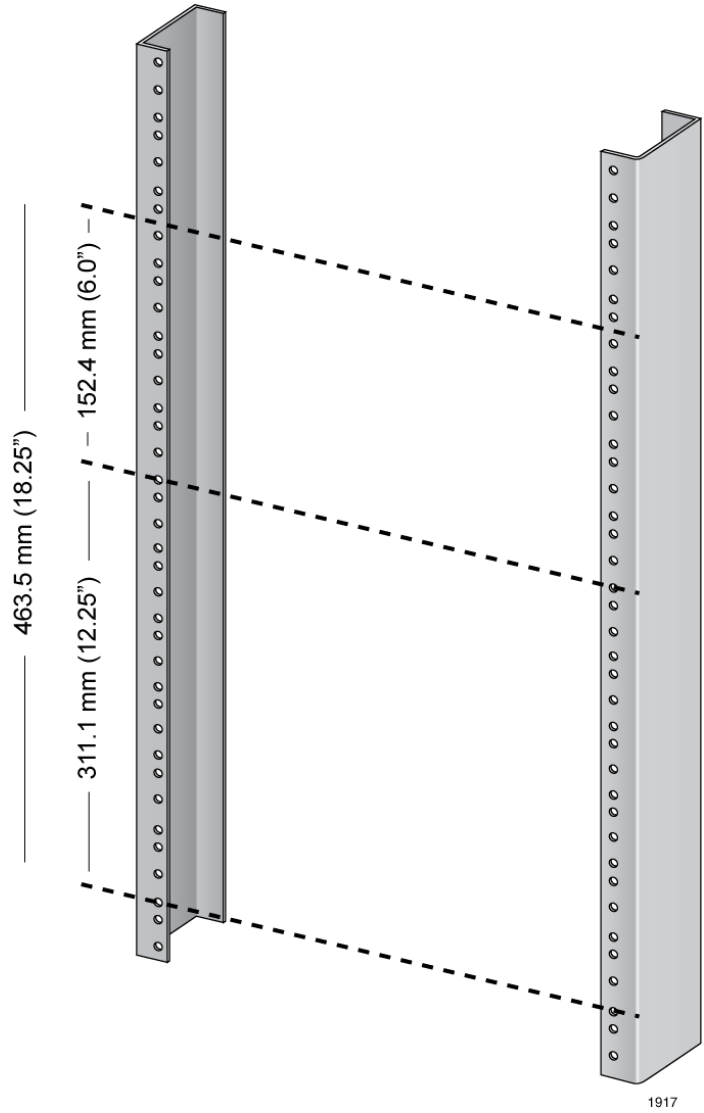


Figure 42. Reserving Vertical Rack Space

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 43. 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).

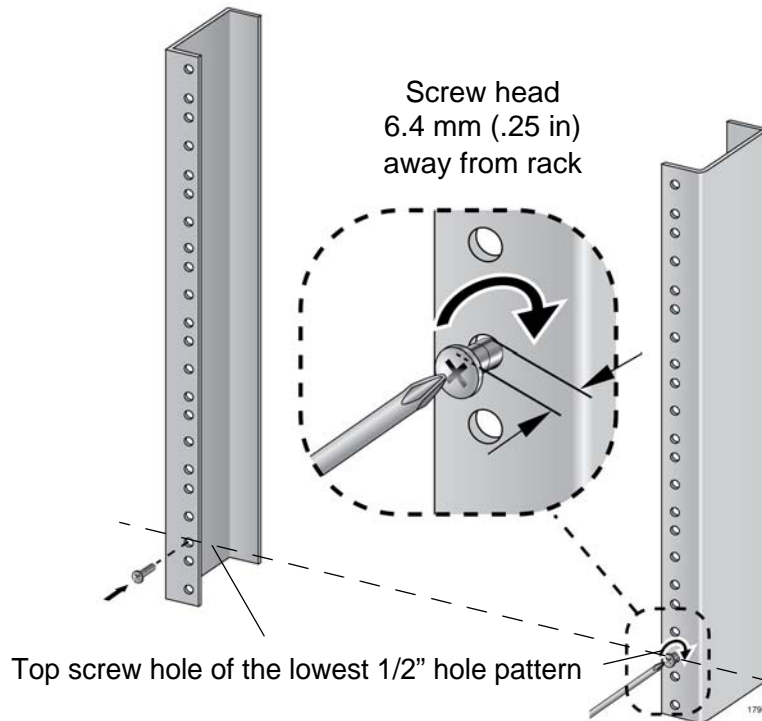


Figure 43. Rack Mounting Hole Locations

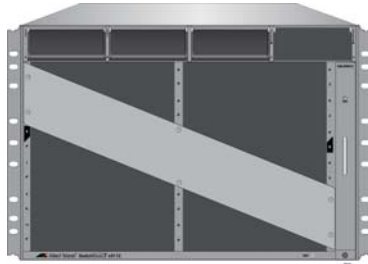
5. After installing the two screws in the equipment rack, go to "Unpacking the AT-SBx8112 Chassis" on page 118.

## 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 44 here and Figure 45 on page 119. 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

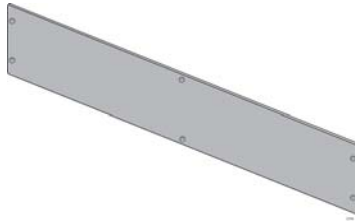


One grounding lug pre-installed in the lower left corner on the back panel

Figure 44. 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 45. 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 29 and illustrated in Figure 46 on page 121 and Figure 47 on page 121. 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 46 on page 121.
- The dimension (X) between the front panel and the rack rails is given for each rack mounting bracket position in Table 29.

Table 29. Front Panel to Rack Rail Dimensions

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



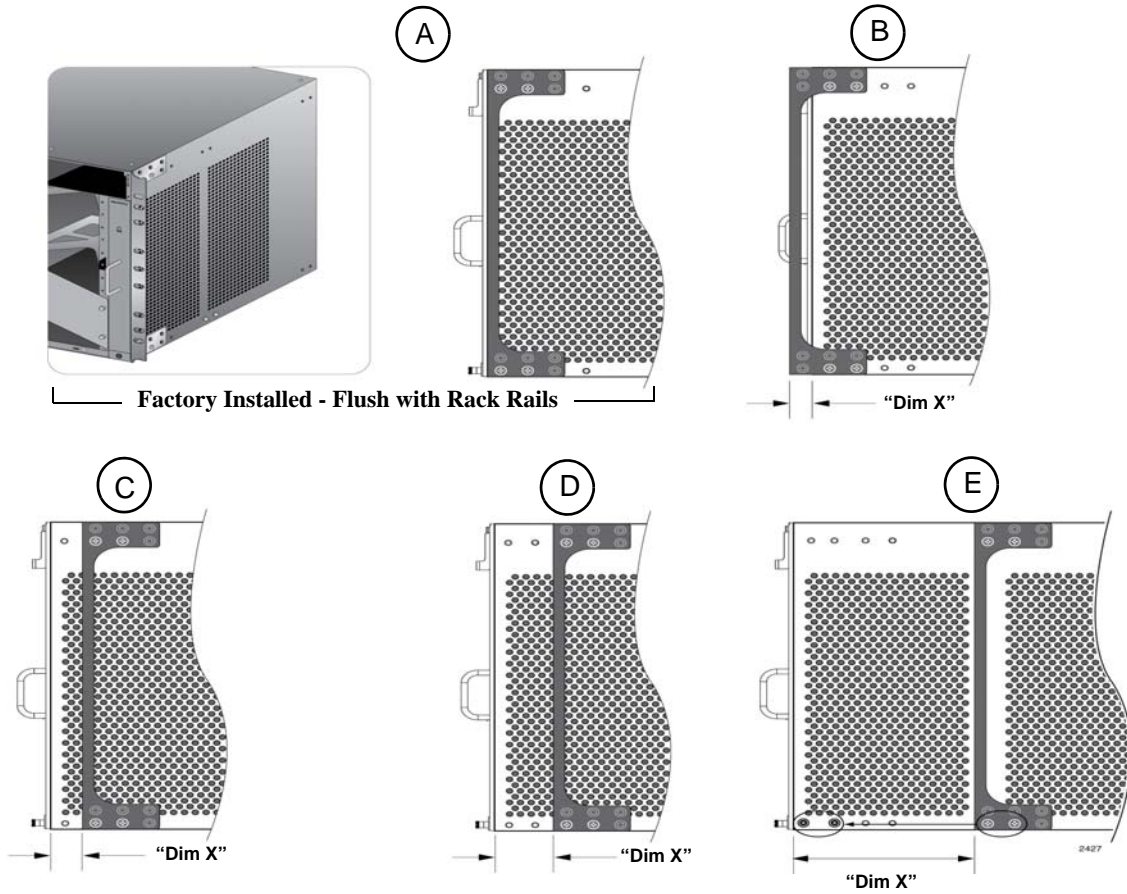


Figure 46. Rack Mounting Bracket Locations

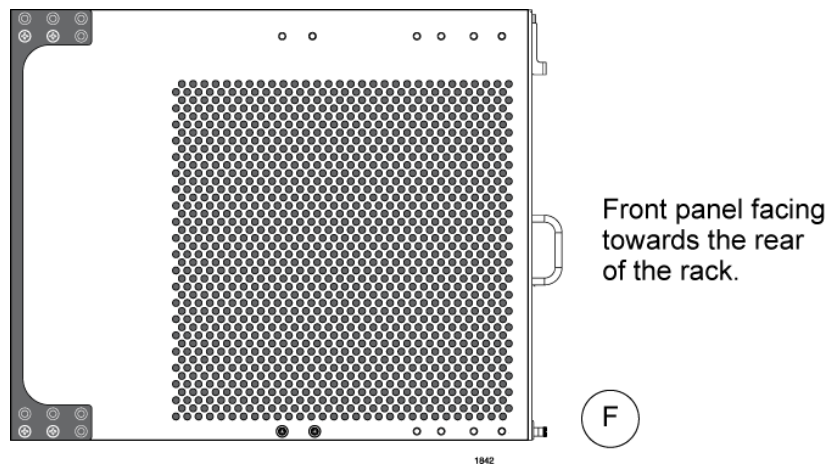


Figure 47. Rack Bracket Locations for Reverse Position of Chassis

## 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 115.
- 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 120.

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 48 on page 123.

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 115, as shown in Figure 48.

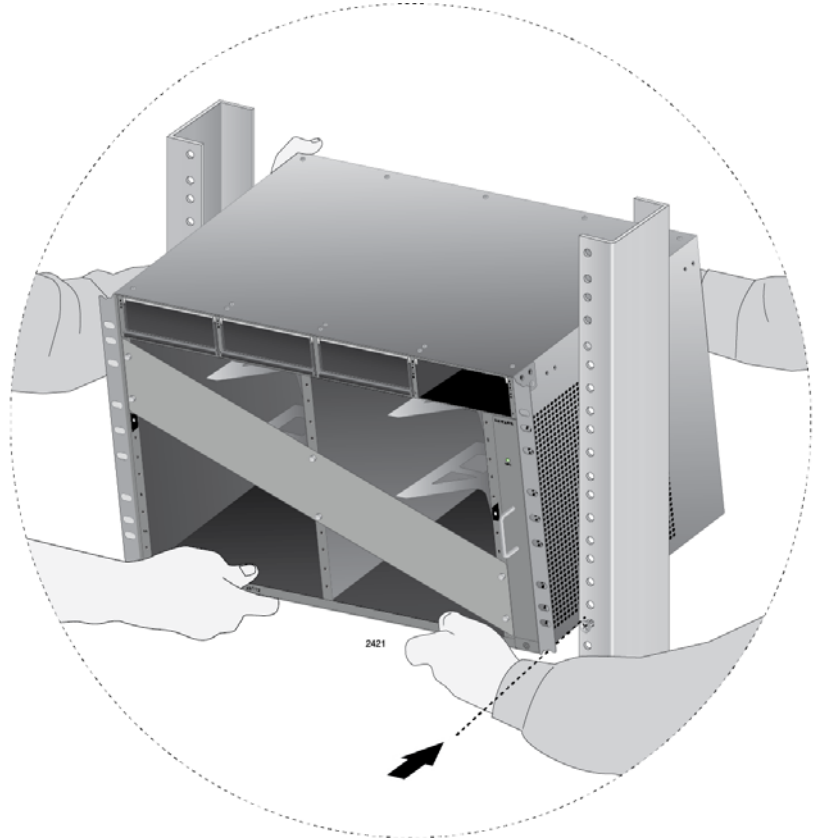


Figure 48. Lifting the AT-SBx8112 Chassis into the Equipment Rack

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 49 on page 124.

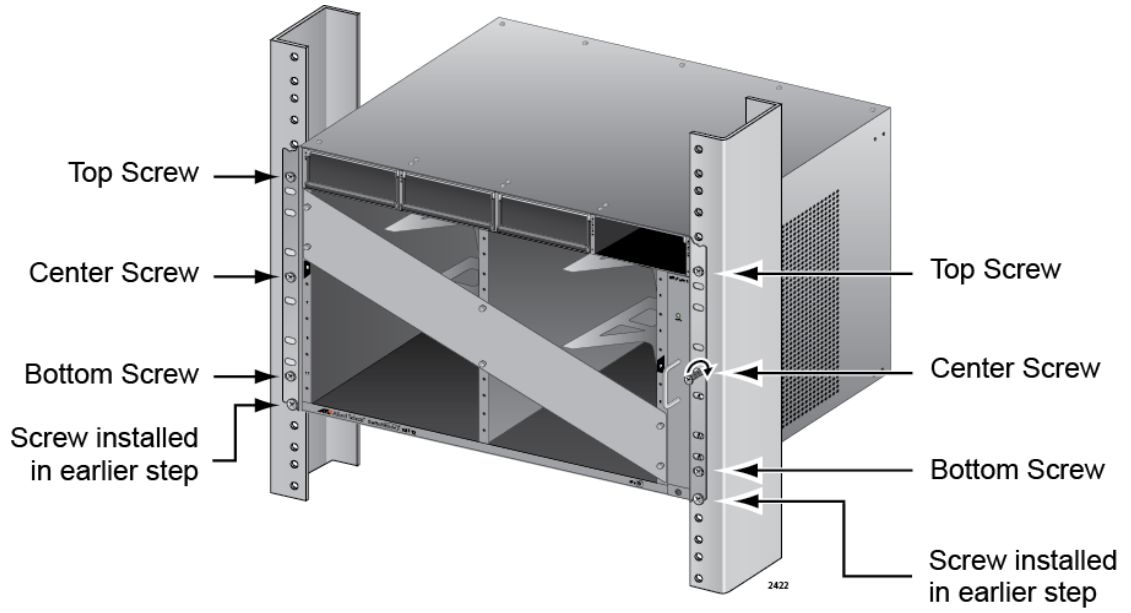


Figure 49. Installing the Rack Mount Screws

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 125.

## 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 50.

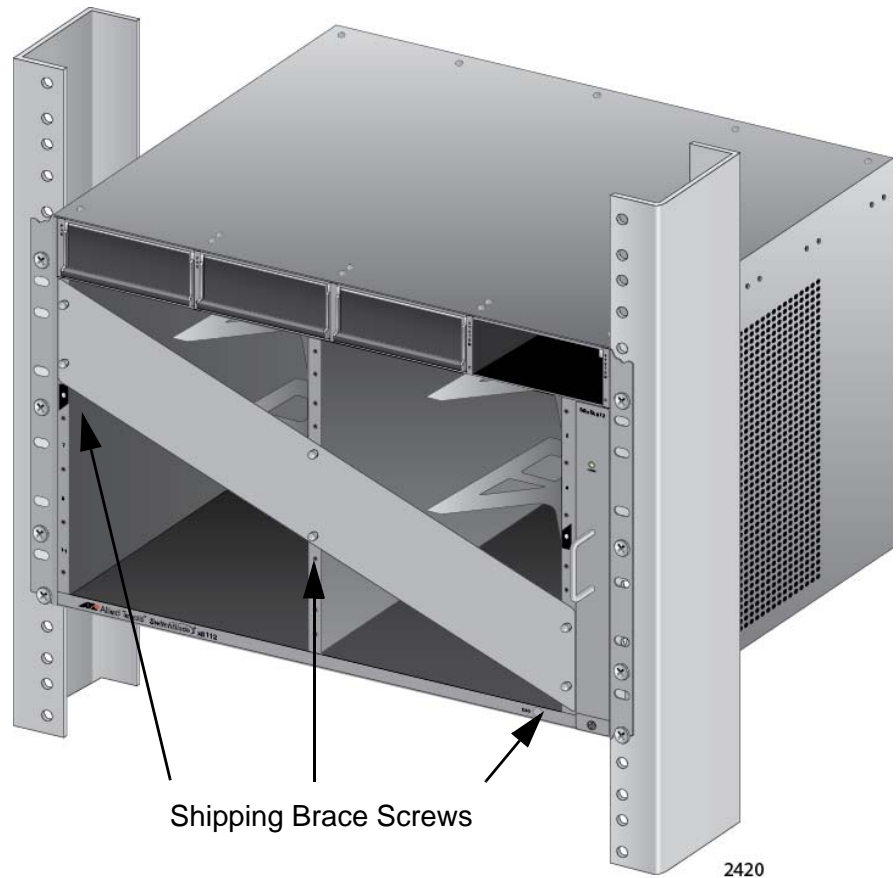


Figure 50. Removing the Shipping Brace

After removing the shipping plate, go to “Installing the Chassis Grounding Wire” on page 126.

## 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 51.

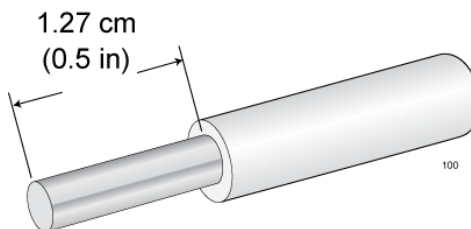


Figure 51. Stripping the Grounding Wire

2. Remove the two screws that secure the grounding lug to the rear panel of the chassis, as shown in Figure 52.

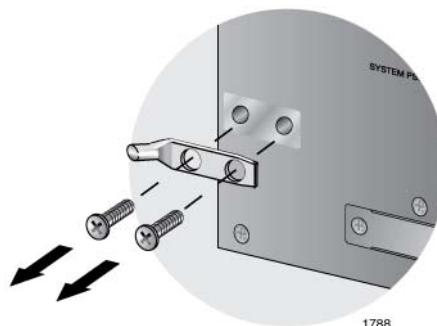


Figure 52. Removing the Grounding Lug

3. Insert one end of the grounding wire into the grounding lug, as shown in Figure 53, and use a crimping tool to secure the wire to the grounding lug.

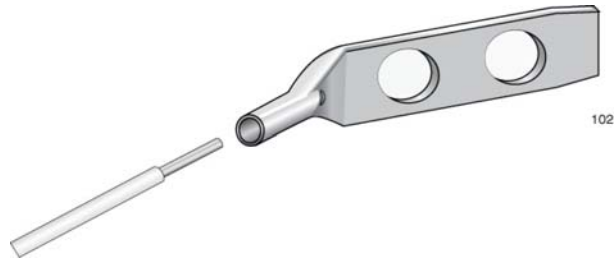


Figure 53. Attaching the Grounding Wire to the Grounding Lug

4. Install the grounding lug on the rear panel of the chassis, as shown in Figure 54.

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

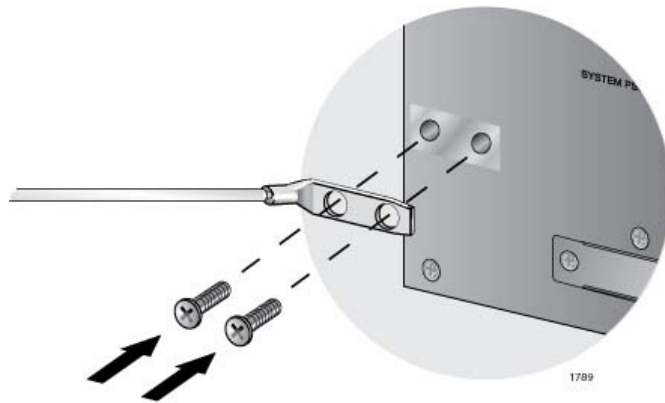


Figure 54. Installing the Grounding Lug and Wire

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 129.





## 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 130
- ❑ “Installing AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 131
- ❑ “Installing AT-SBxPWRPOE1 PoE Power Supplies” on page 137
- ❑ “Installing AT-SBxPWRSYS1 DC System Power Supplies” on page 142

## 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 55. This ensures that ESD voltages safely flow to ground.



Figure 55. 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

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The chassis must have at least one system power supply. For background information, refer to “Power Supplies and Power Supply Slots” on page 26.



---

**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 130 to guard against ESD damage when unpacking and installing the power supply.

---



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**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 56 on page 132. 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.

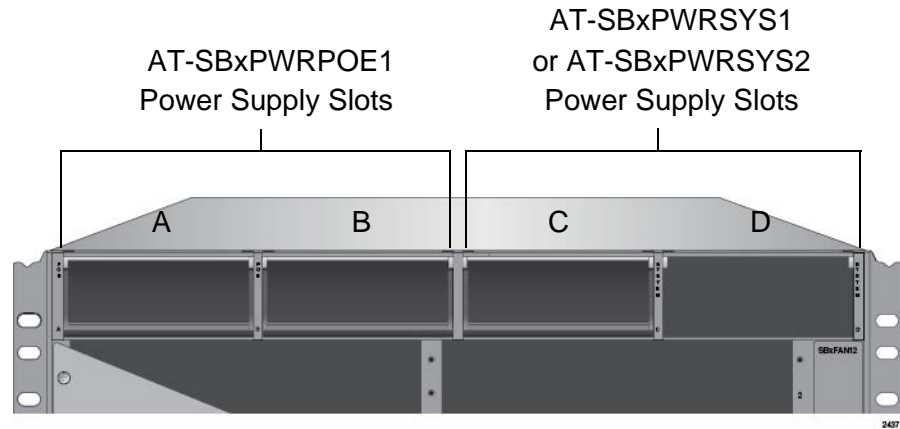


Figure 56. Power Supply Slots



**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 57.

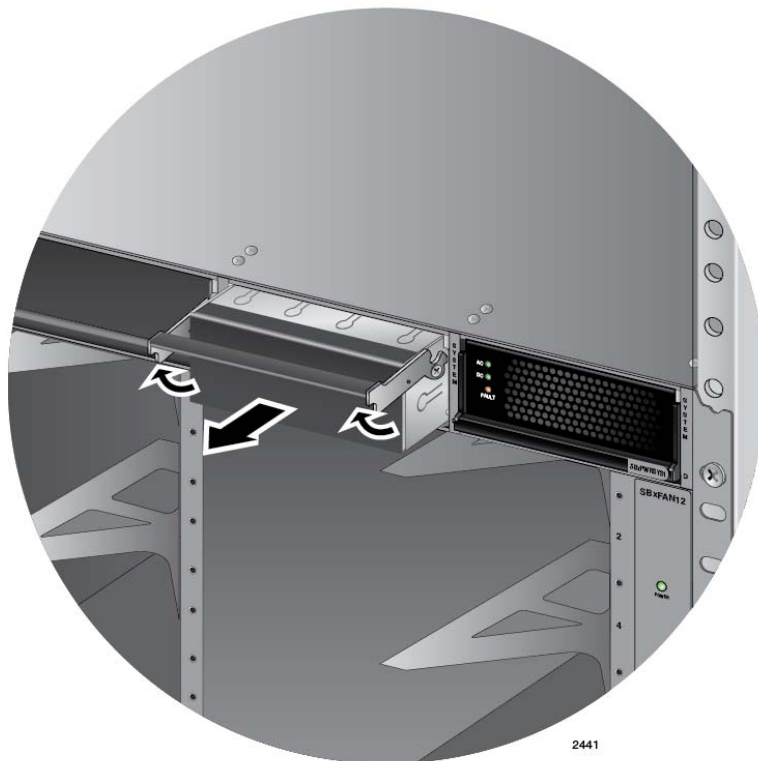


Figure 57. Removing the Blank Slot Cover from Power Supply Slot C

- Remove the new power supply from the shipping package and verify the package contents, listed in Figure 58.

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



Figure 58. 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.

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**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 203.

---

4. Move the locking handle on the power supply to the unlocked or up position. See Figure 59.



Figure 59. Unlocking the Handle on the Power Supply

5. Align and insert the power supply into the power supply slot. Figure 60 shows the power supply installed in slot D.

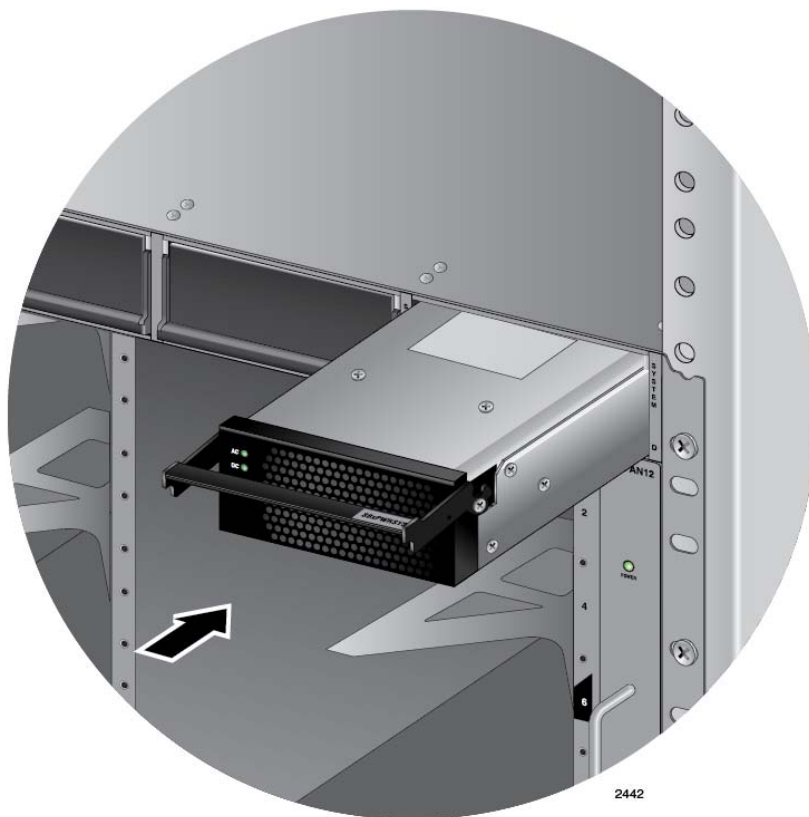


Figure 60. Inserting the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supply

6. Lower the power supply locking handle to secure the power supply to the chassis, as shown in Figure 61.



Figure 61. 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 26.

---

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 137.
  - Otherwise, go to Chapter 7, “Installing AT-SBx81CFC960 Controller Cards and Ethernet Line Cards” on page 149.

---

**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 203.

---



## Installing AT-SBxPWRPOE1 PoE Power Supplies

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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 26.



---

**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 130 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 56 on page 132.

2. Raise the handle on the blank panel covering the selected slot and slide the panel from the chassis. Figure 62 on page 138 illustrates the removal of the blank panel from slot A.

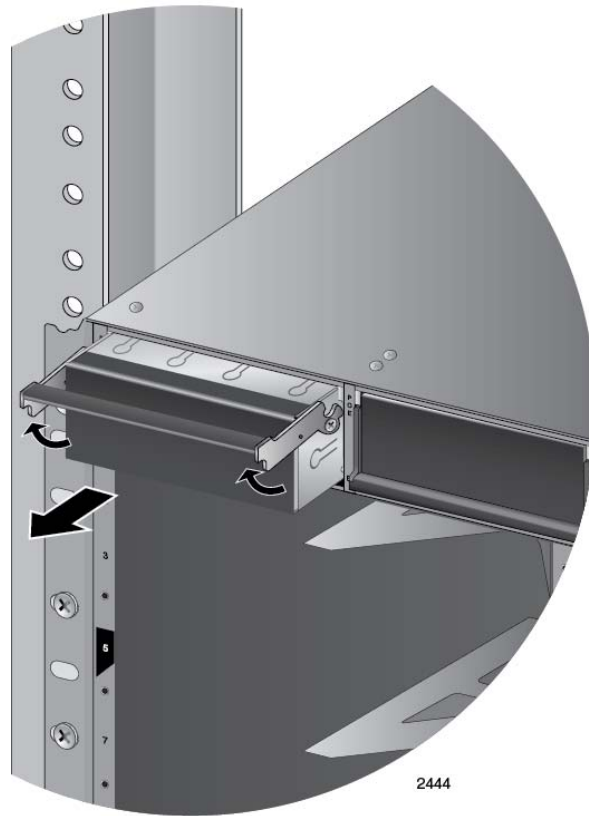


Figure 62. Removing the Blank Slot Cover from Power Supply Slot A

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 63 on page 139.

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



One AT-SBxPWRPOE1  
Power Supply Module



One regional AC power cord



One tie wrap

Figure 63. Items Included with the AT-SBxPWRPOE1 Power Supply Module

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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.

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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 207.

---

4. Raise the locking handle on the AT-SBxPWRPOE1 Power Supply, as shown Figure 64 on page 140.

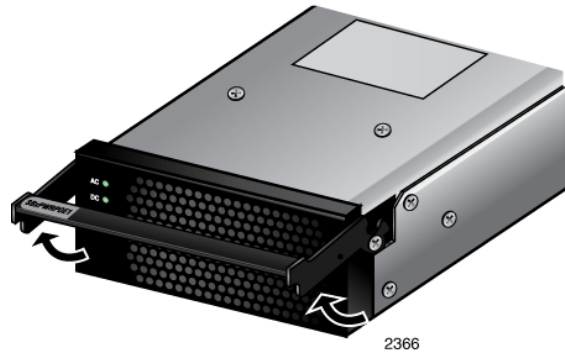


Figure 64. Unlocking the Handle on the AT-SBxPWRPOE1 Power Supply

5. Align and insert the AT-SBxPWRPOE1 Module into slot A or B. Figure 65 shows the power supply module aligned in slot A.



**Caution**

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

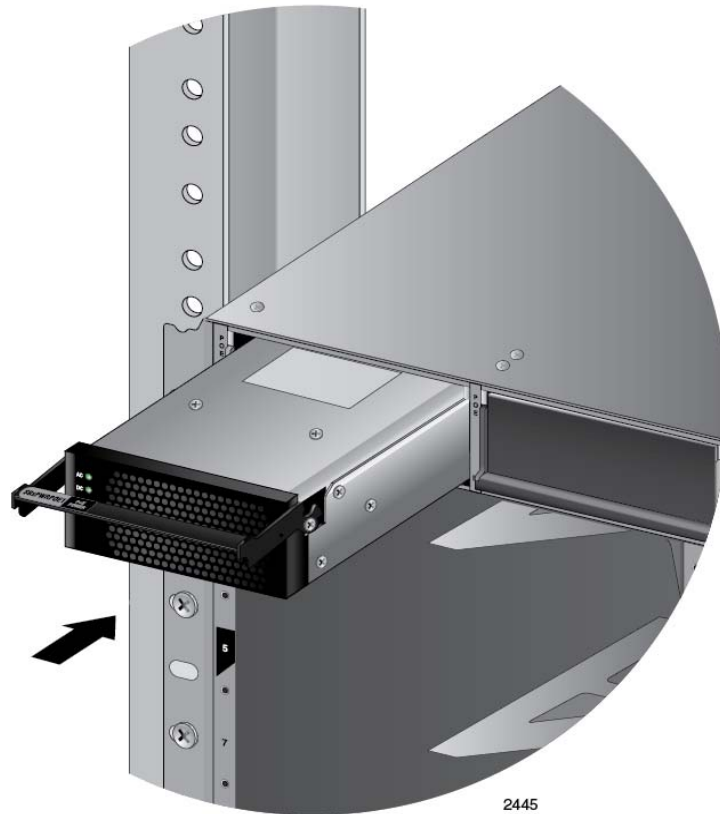


Figure 65. Inserting the AT-SBxPWRPOE1 Power Supply

6. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 66.

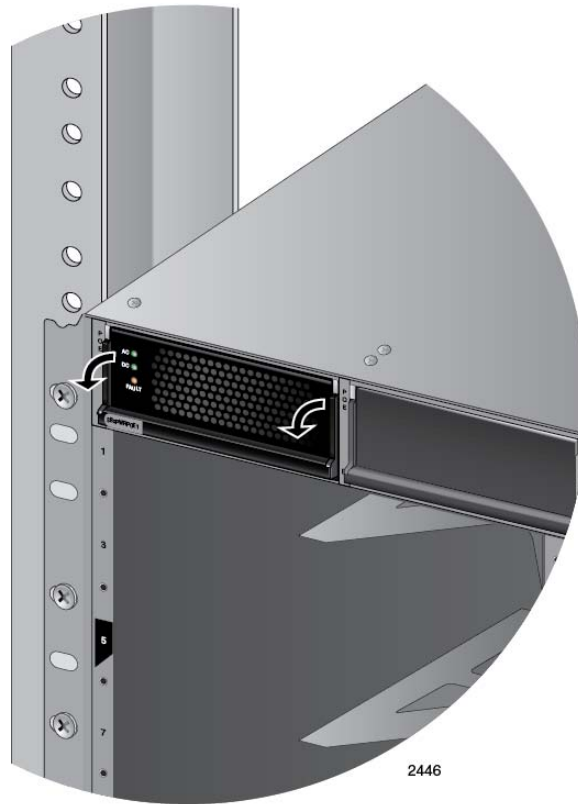


Figure 66. Locking the Handle on the AT-SBxPWRPOE1 Power Supply

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**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 26.

---

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 149.

---

**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 207.

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## 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 26.



### 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 130 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 56 on page 132. 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.

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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 67 on page 143.

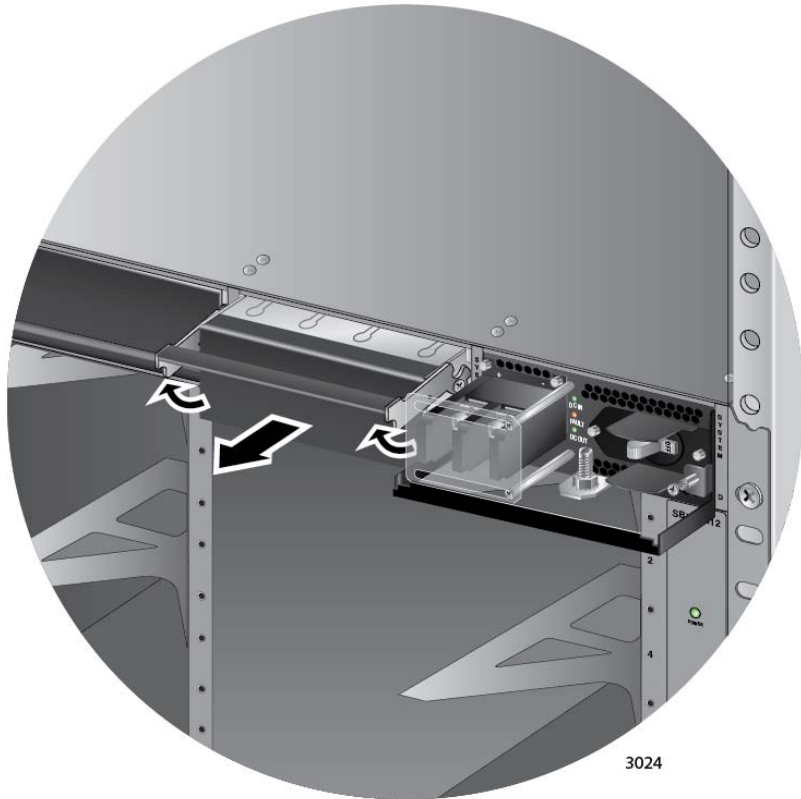
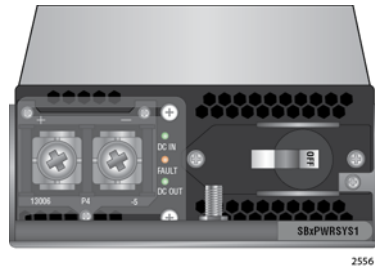


Figure 67. Removing the Blank Slot Cover from Power Supply Slot C

3. Remove the power supply from the shipping package and verify that the shipping package contains the items listed in Figure 68 on page 144.

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 68. 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.

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4. Verify that the On/Off switch on the power supply is in the Off position. Refer to Figure 69 on page 145.



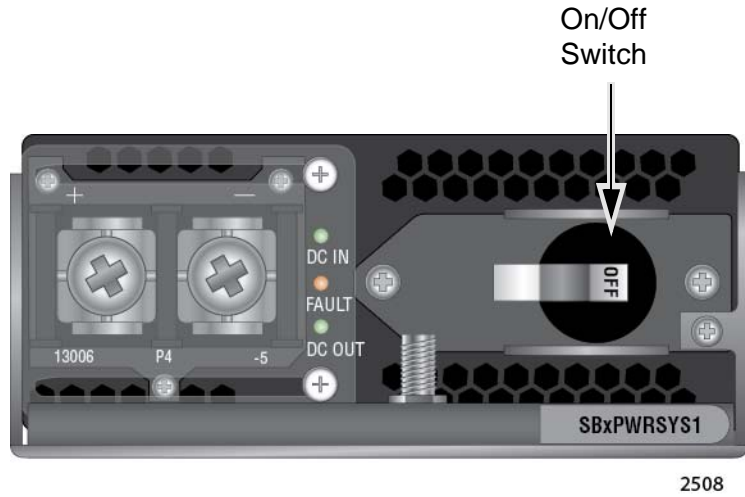


Figure 69. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

5. With a #2 Phillips-head screwdriver, loosen the handle locking screw on the power supply, as shown in Figure 70.

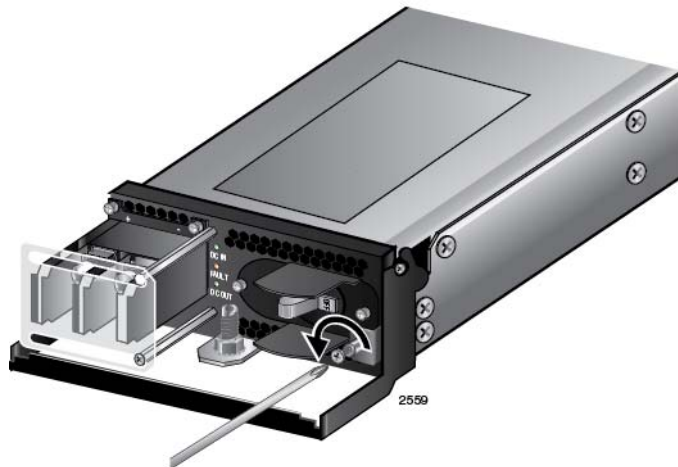


Figure 70. Loosening the Handle locking Screw on the AT-SBxPWRSYS1 DC System Power Supply

6. Raise the locking handle on the power supply, as shown Figure 71 on page 146.



Figure 71. Raising Handle on the AT-SBxPWRSYS1 DC Power Supply

7. Align and insert the AT-SBxPWRSYS1 Module into slot C or D. Figure 72 shows the power supply installed in slot D.



**Caution**

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

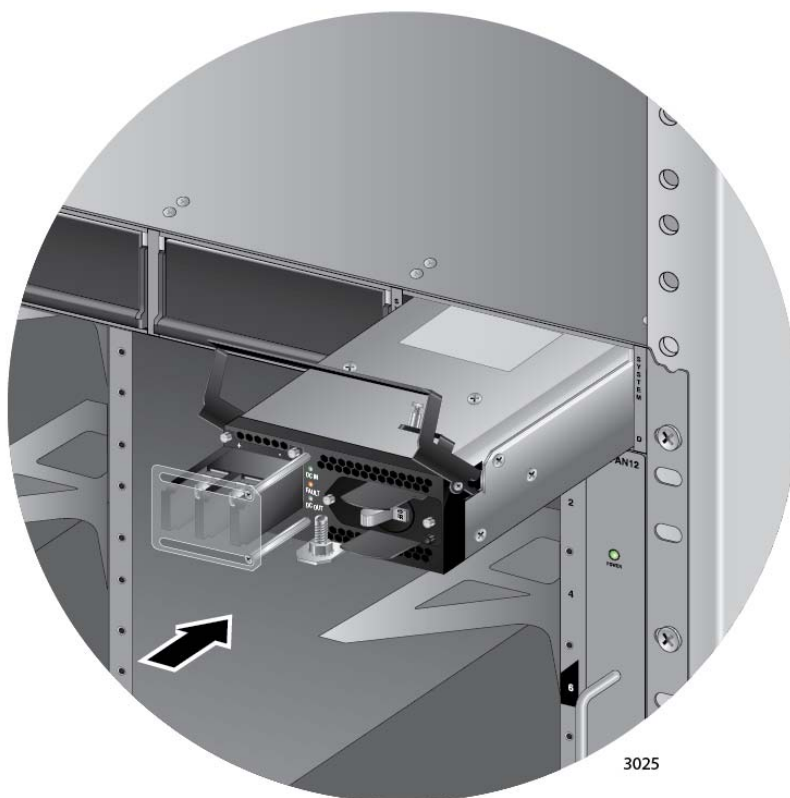


Figure 72. Inserting the AT-SBxPWRSYS1 DC System Power Supply

8. Lower the locking handle of the power supply module to secure the module in the slot, as shown in Figure 73.

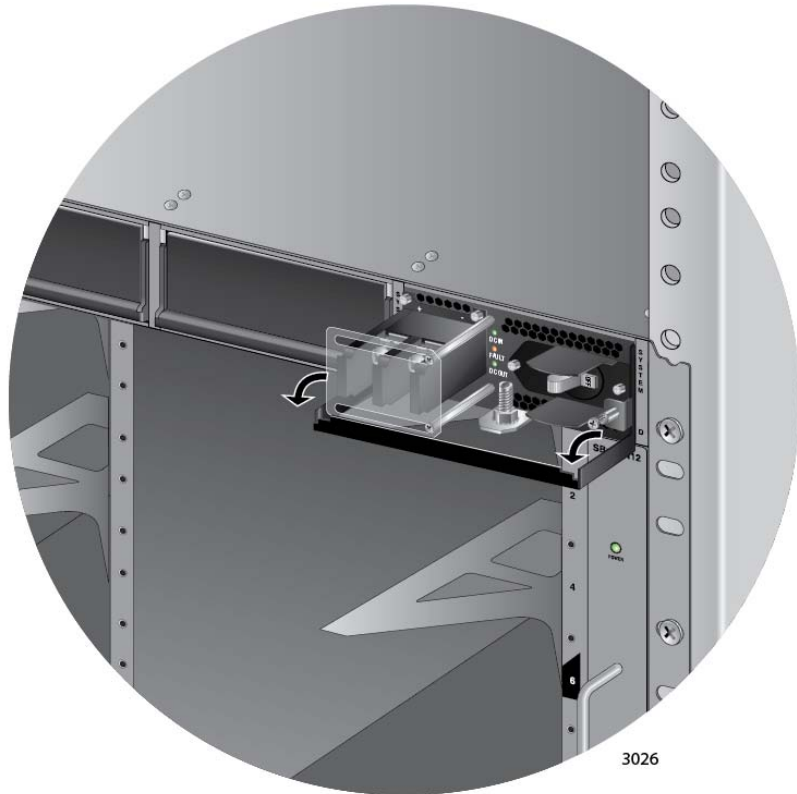


Figure 73. Locking the Handle on the AT-SBxPWRSYS1 DC System Power Supply

---

**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 210.

---

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 149.

---

**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 210.

---



## 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 150
- ❑ “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 152
- ❑ “Installing Expansion Modules in AT-SBx81XLEM Ethernet Line Cards” on page 158
- ❑ “Installing Ethernet Line Cards” on page 166
- ❑ “Installing Blank Slot Covers” on page 171

## 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 158 or “Replacing Expansion Modules in AT-SBx81XLEM Line Cards” on page 289.

---

- ❑ 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 130 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 a controller or Ethernet line card level as you slide it 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 74 on page 151.

---

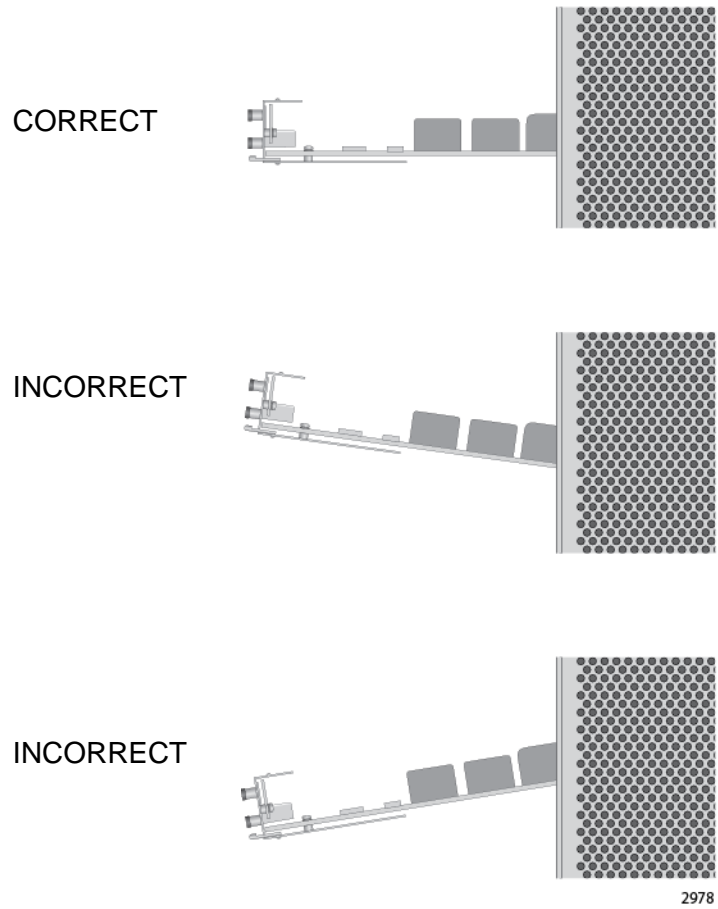


Figure 74. Aligning a Card in a Slot

## 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 150 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 78 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 75. If you are installing only one controller card, Allied Telesis recommends installing it in slot 5.

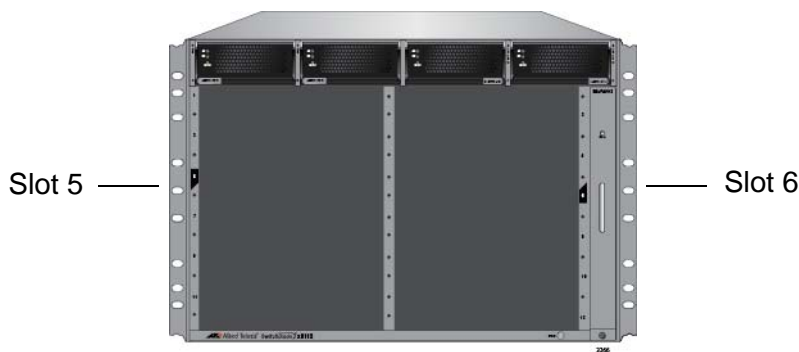


Figure 75. Slots 5 and 6 for the AT-SBx81CFC960 Versions 1 and 2 Cards



2. Remove the new AT-SBx81CFC960 Controller Fabric Card from the shipping package and verify the package contents, listed in Figure 76.

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

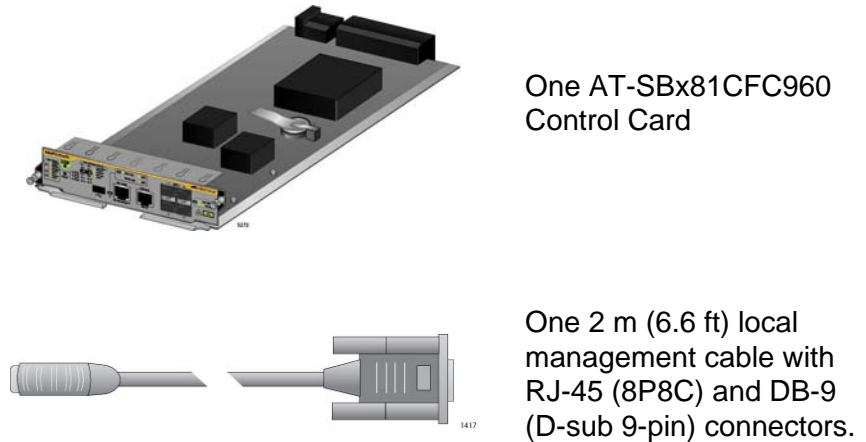


Figure 76. Items Included with the AT-SBx81CFC960 Controller Card

---

**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 77.

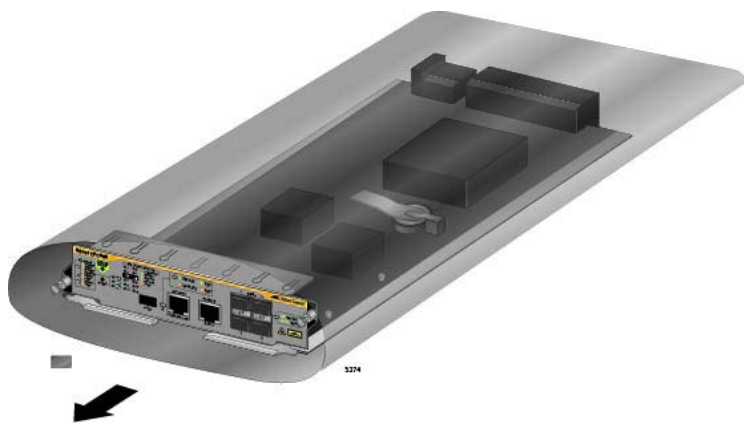


Figure 77. Removing the AT-SBx81CFC960 Controller Fabric Card from the Anti-static Bag

- 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 78.

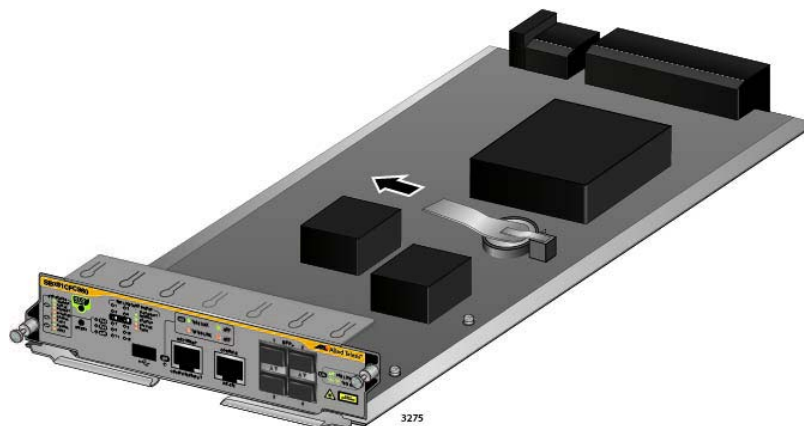


Figure 78. Removing the Battery Insulator

- Move the locking handles on the front panel to the open position, as shown in Figure 79.

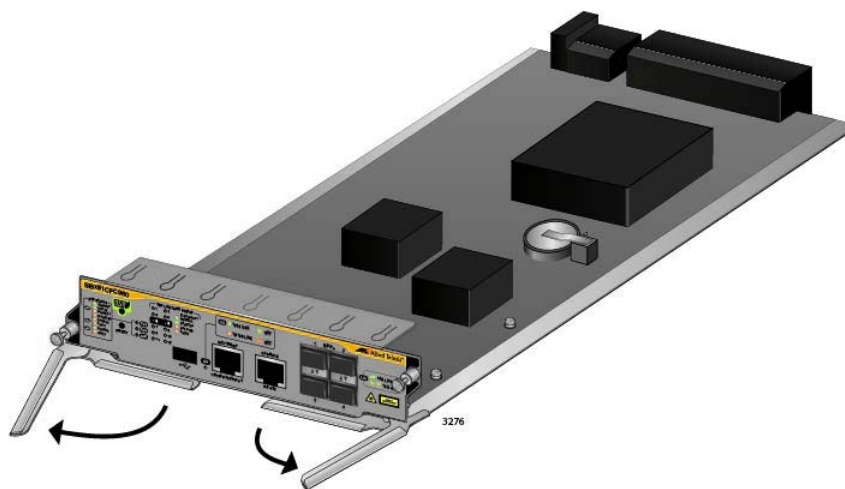


Figure 79. Opening the Locking Handles on the AT-SBx81CFC960 Controller Fabric Card

- 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 80 on page 155 shows the AT-SBx81CFC960 Card aligned in slot 5.

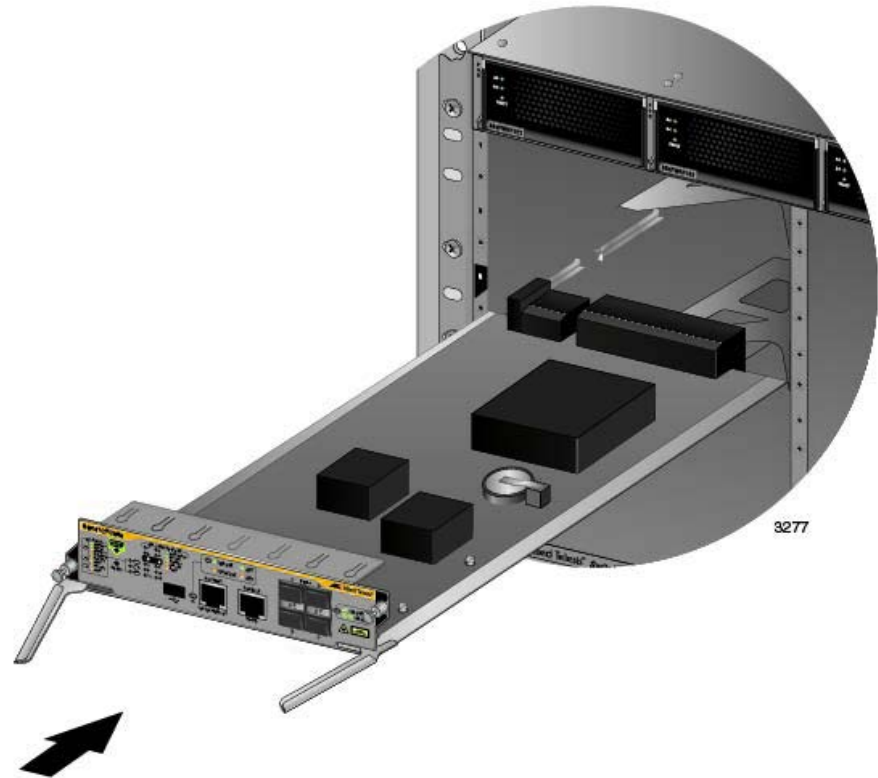


Figure 80. Aligning the AT-SBx81CFC960 Card in the Chassis Slot

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 74 on page 151.



**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 81 on page 156.

---

**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.

---

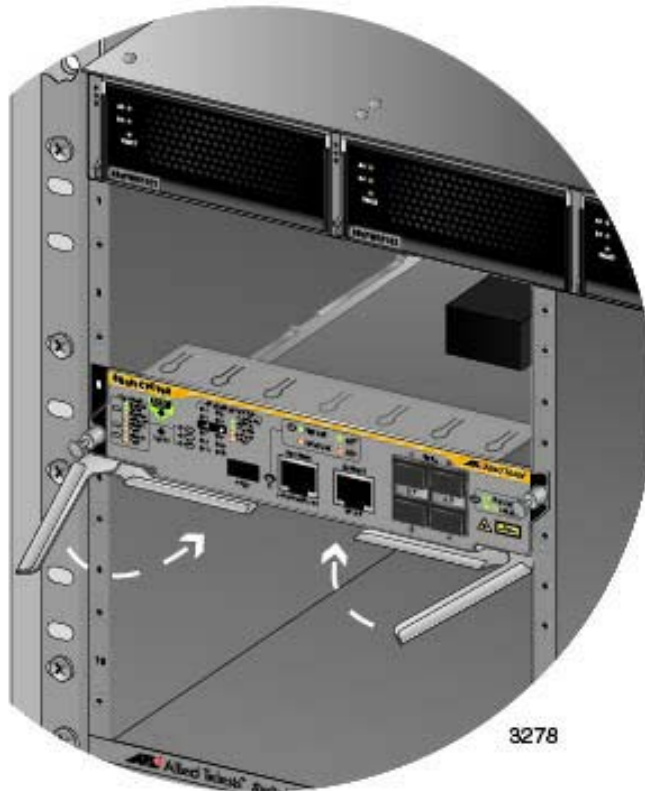


Figure 81. Closing the Locking Levers on the AT-SBx81CFC960 Controller Fabric Card

9. Finger tighten the two thumbscrews on the card to secure the card to the chassis, as shown in Figure 82 on page 157.



Figure 82. 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 158.
  - Otherwise, go to “Installing Ethernet Line Cards” on page 166.

## 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 166.



### 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 287.

---

### Note

Please review “Guidelines to Handling the Controller and Line Cards” on page 150 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 83 on page 159.



Figure 83. 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 84.

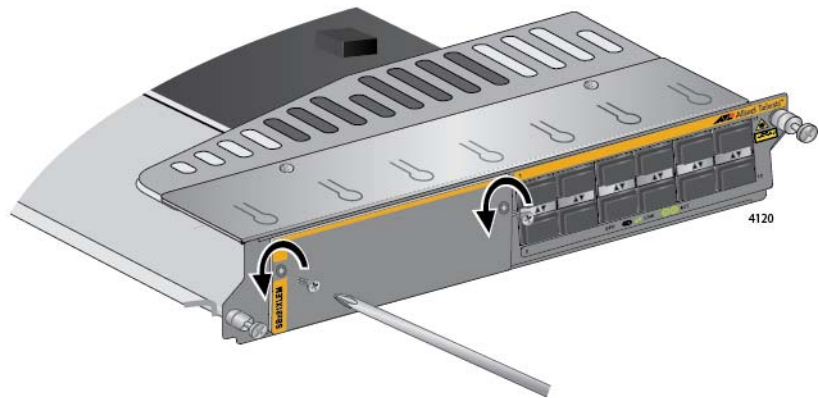


Figure 84. Removing the Screws on the Blank Slot Cover on the AT-SBx81XLEM Line Card

5. Slide the blank slot cover from the slot. Refer to Figure 85 on page 160.

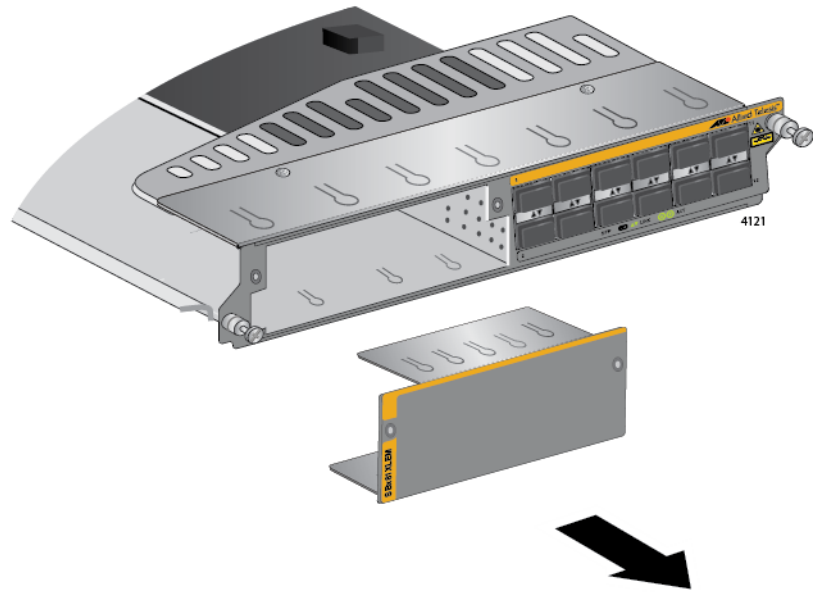


Figure 85. Removing the Blank Slot Cover from the AT-SBx81XLEM Line Card

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 86 on page 161.





Figure 86. 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 87.



Figure 87. Removing the Expansion Module from the Anti-static Bag

- Carefully align the expansion module in the slot, as shown in Figure 88, 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 74 on page 151.



**Caution**

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

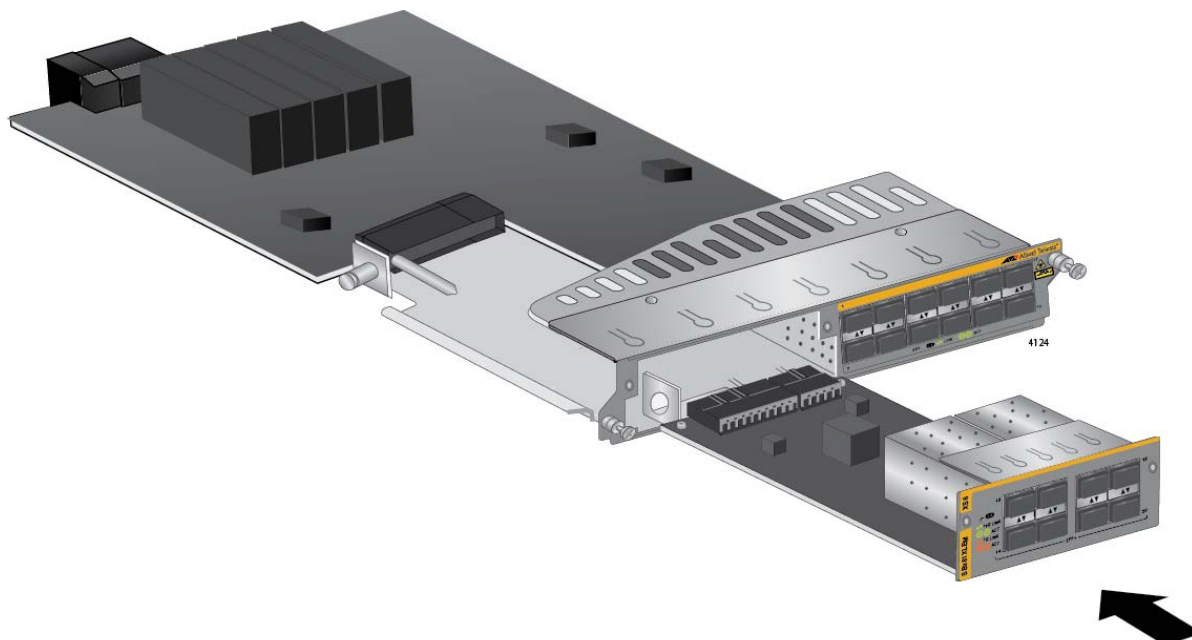


Figure 88. Sliding the Expansion Module into the AT-SBx81XLEM Line Card

- 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 89 on page 163. The module is fully installed when its faceplate is flush against the faceplate of the AT-SBx81XLEM Line Card.

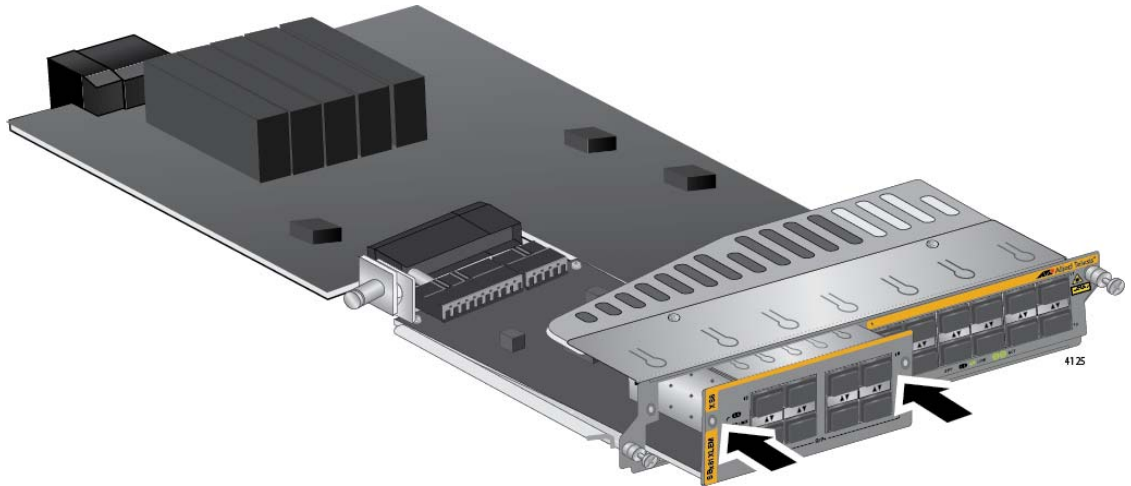


Figure 89. Seating the Expansion Module on the Connector in the AT-SBx81XLEM Line Card

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 90.

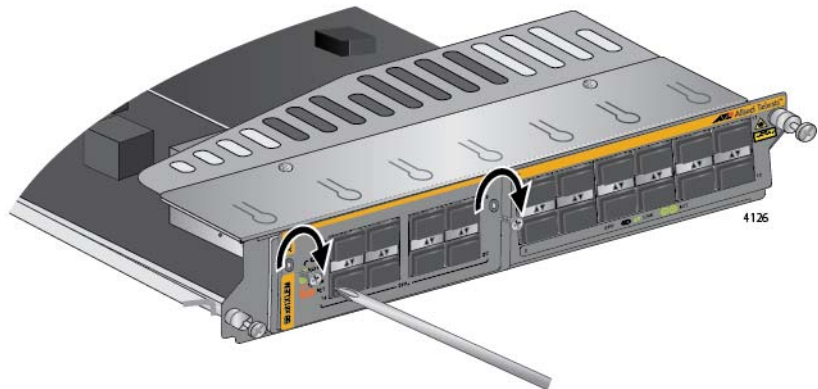


Figure 90. Securing the Expansion Module

11. Turn the retaining pin on the side of the line card one quarter turn to release it. Refer to Figure 91 on page 164.

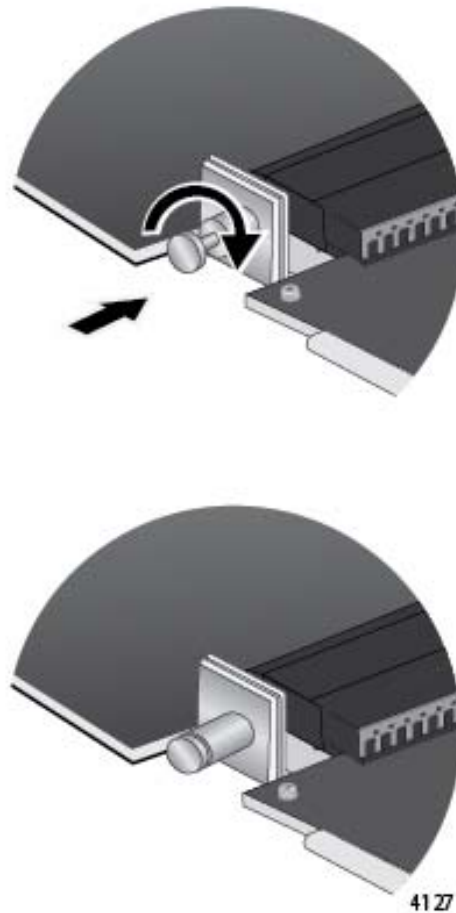


Figure 91. Releasing the Retaining Pin

12. Retain the blank slot cover removed in step 5 and shown in Figure 92 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 92. 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 93 on page 165.



Figure 93. 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 166.

---

**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 150 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 245.

---

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 94.

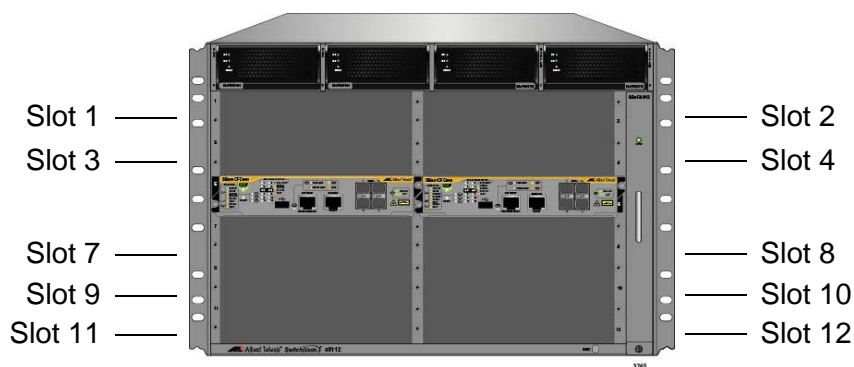


Figure 94. Slots 1 to 4 and 7 to 12 for the Ethernet Line Cards

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 95.

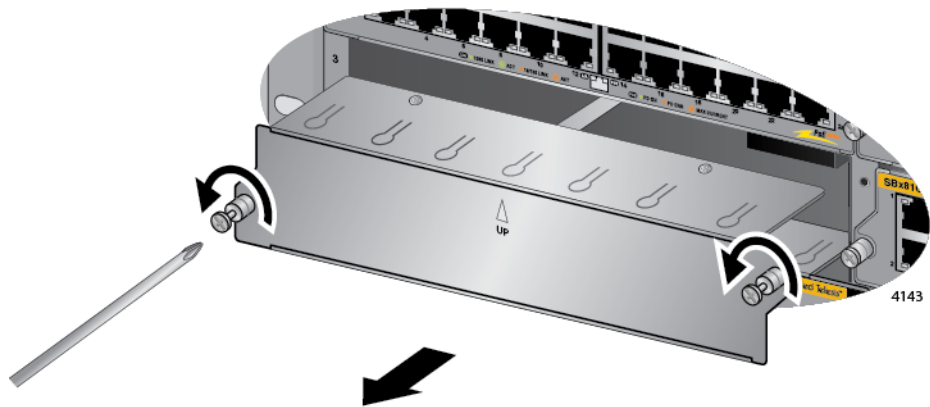


Figure 95. Removing a Blank Slot Cover

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 96.

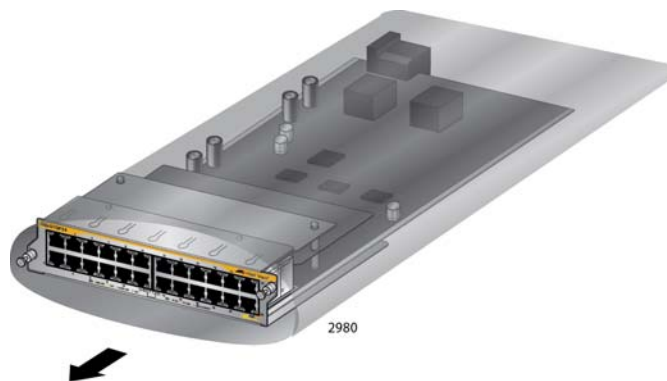


Figure 96. Removing the Ethernet Line Card from the Anti-static Bag

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

Figure 97 shows an Ethernet line card aligned with slot 1.

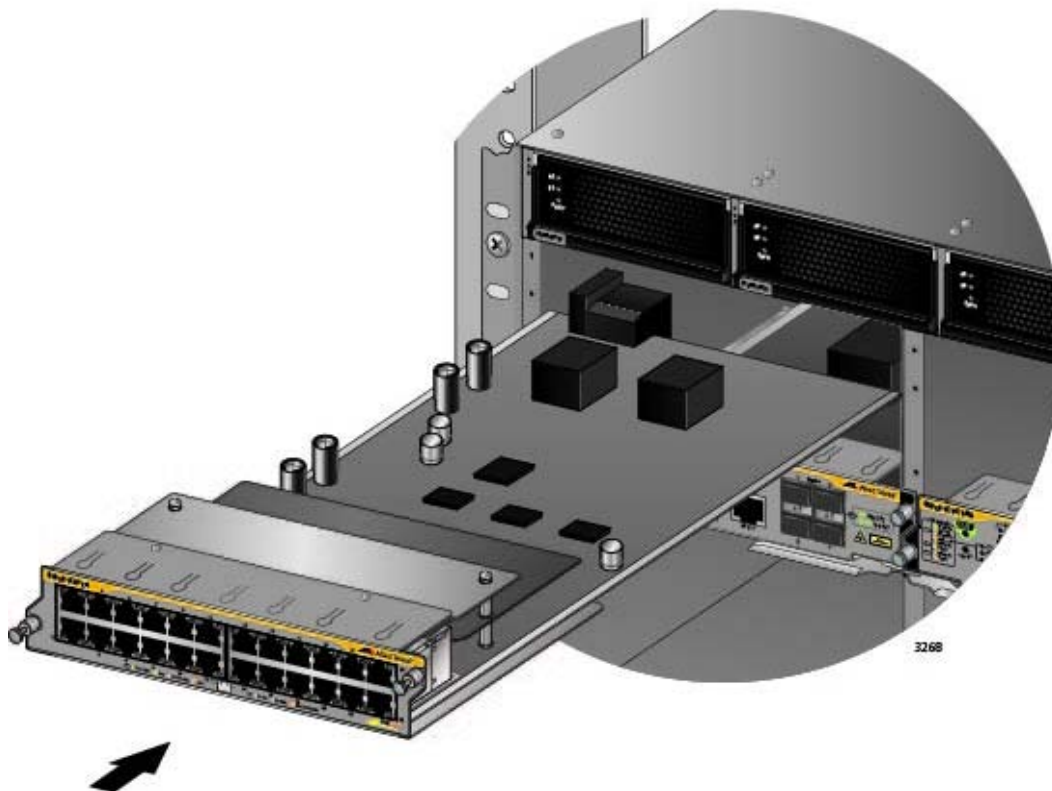


Figure 97. Aligning an Ethernet Line Card in a Chassis Slot

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 74 on page 151.



**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 98 on page 169.



**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.

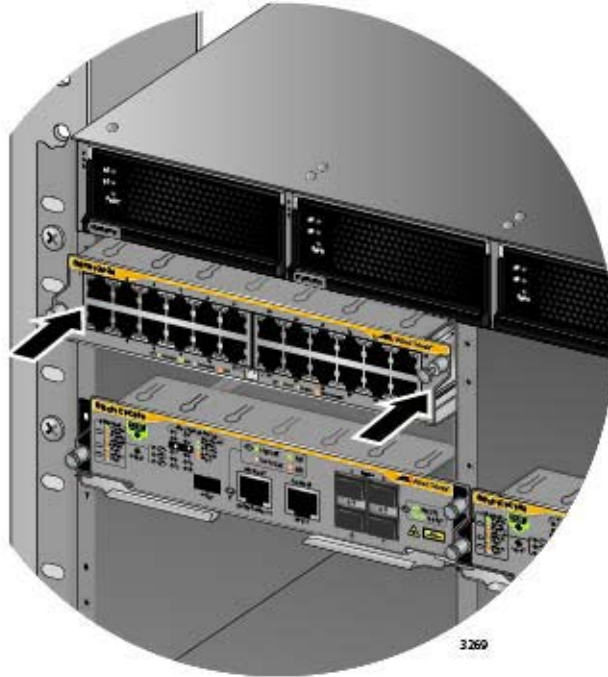


Figure 98. Seating an Ethernet Line Card on the Backplane Connector

8. Finger tighten the two thumbscrews on the sides of the line card to secure it to the chassis, as shown in Figure 99 on page 170.

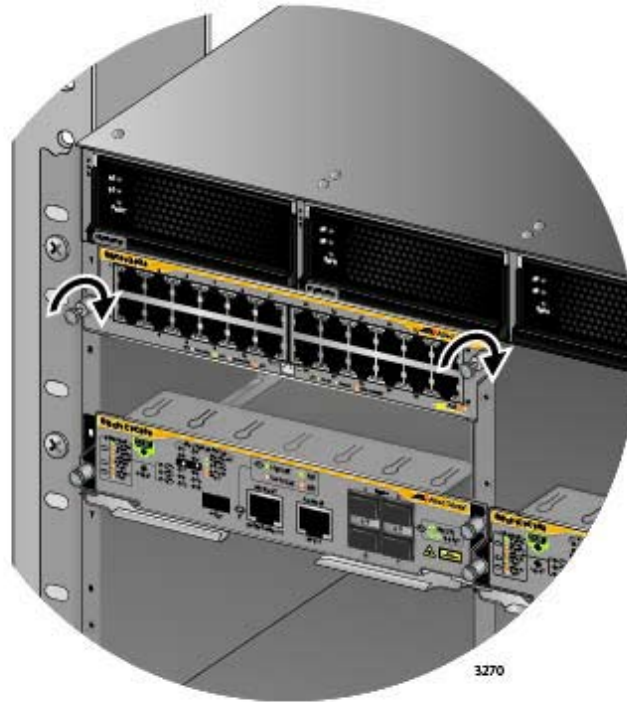


Figure 99. Tightening the Thumb Screws on an Ethernet Line Card

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 171.

## 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 173.

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 100. The up arrow on the panel must be pointing up.

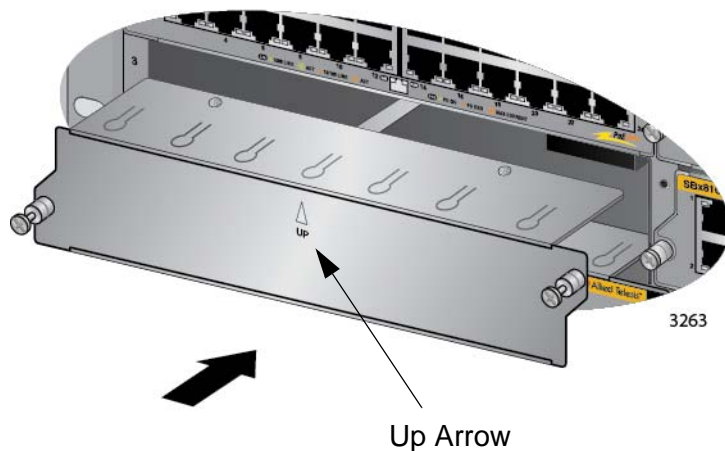


Figure 100. Installing a Blank Slot Cover

2. Finger tighten the two thumbscrews to attach the blank panel to the chassis, as shown in Figure 101.

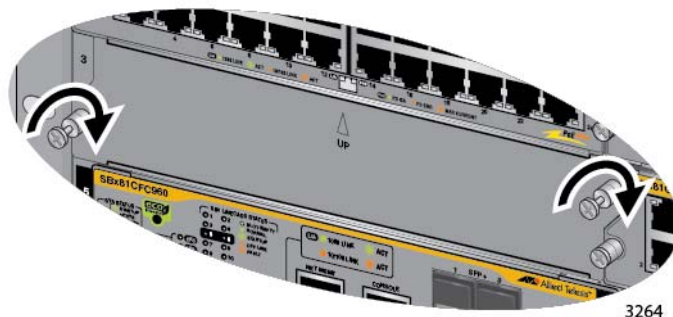


Figure 101. Tightening the Thumbscrews on a Blank Slot Cover

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 173.

## 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 174
- ❑ “Guidelines to Installing Fiber Optic Transceivers” on page 177
- ❑ “Installing SFP, SFP+, or CSFP Transceivers” on page 178
- ❑ “Installing AT-SP10TW Direct Connect Cables” on page 184
- ❑ “Installing AT-QSFPCU Cables” on page 187
- ❑ “Installing AT-QSFPSR, AT-QSFPSR4, or AT-QSFPLR4 Transceivers” on page 189

## 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 71.
- ❑ 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 102.



Figure 102. 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 103 on page 176.
- ❑ To remove a cable from a port, pull gently on the release tab and slide the cable connector from the port.

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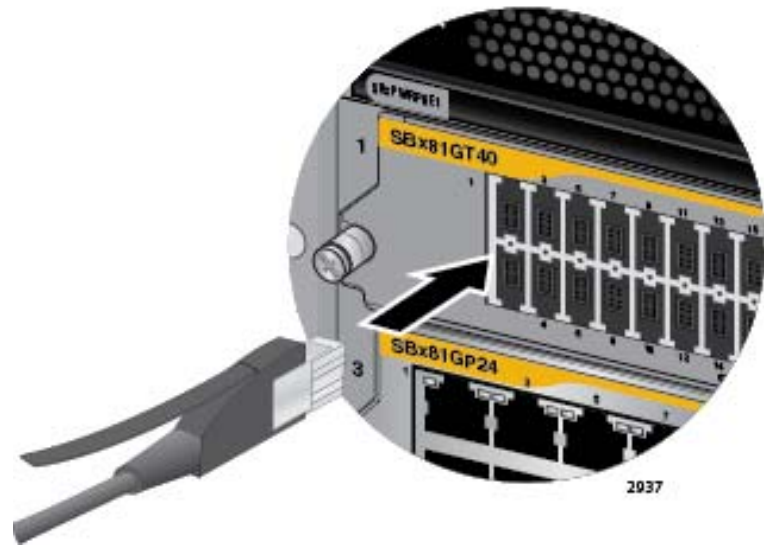
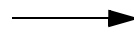
#### Note

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 103. 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 37 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 130 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, SFP+, or CSFP Transceivers

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

- ❑ AT-SBx81GS24a Line Card
- ❑ AT-SBx81GC40 Line Card
- ❑ AT-SBx81XS6 Line Card
- ❑ AT-SBx81XS16 Line Card
- ❑ AT-SBx81XLEM Line Card
- ❑ AT-SBx81XLEM/XS8 Expansion Module

Table 30 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 30. Transceiver Support

Device	100Mbps SFP Transceivers	1Gbps SFP Transceivers	1Gbps CSFP BiDi Transceivers	10Gbps SFP+ Transceivers or AT-SP10TW Cables <sup>1</sup>
AT-SBx81GS24a Line Card	Yes	Yes	No	No
AT-SBx81GC40 Line Card	No	Yes	Yes	No
AT-SBx81XS6 Line Card	No	No	No	Yes
AT-SBx81XS16 Line Card	No	No	No	Yes
AT-SBx81XLEM Line Card <sup>2</sup>	No	Yes	No	No
AT-SBx81XLEM/XS8 Expansion Module	No	Yes	No	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 177 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 104 shows the dust plug removed from slot 1 on the AT-SBx81XS16 Line Card.



Figure 104. 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 105 on page 180.

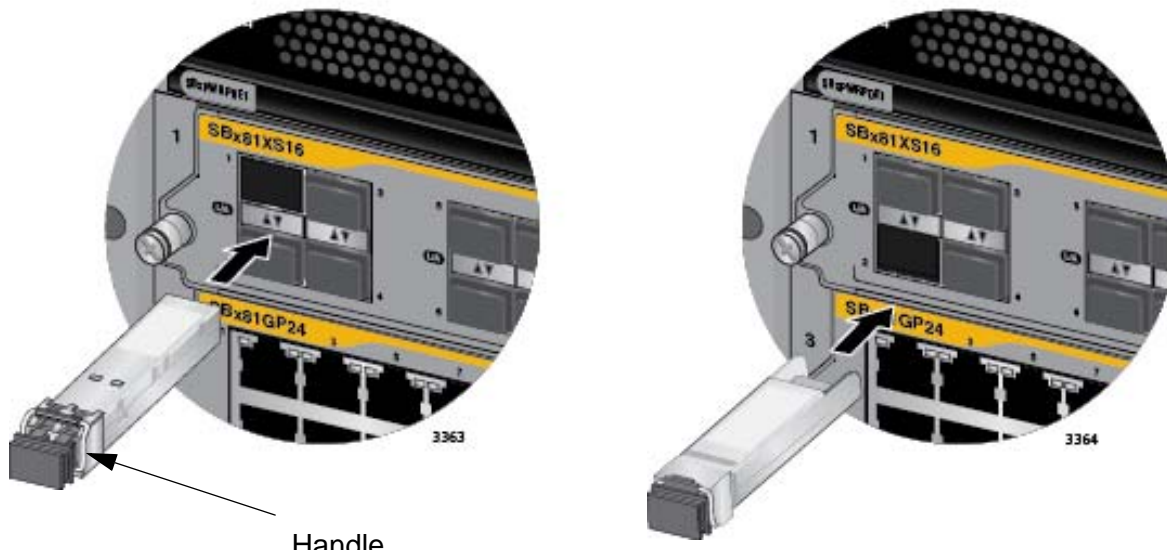


Figure 105. Installing an SFP or SFP+ Transceiver

For slots on the AT-SBx81XS6 Line Card, position the handle on top. Refer to Figure 106.



Figure 106. 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 107.

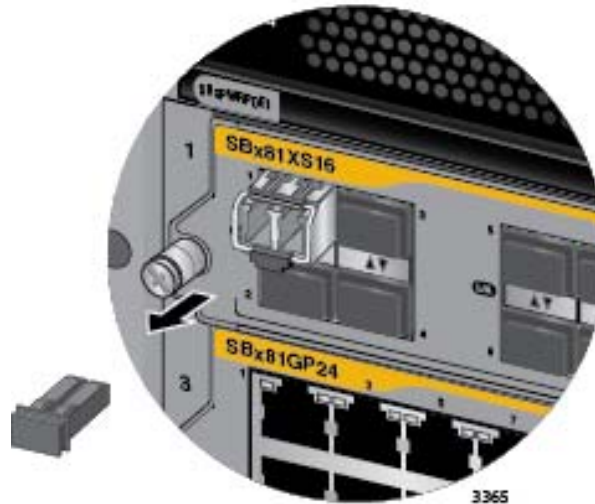


Figure 107. Removing the Dust Cover from a Transceiver

---

**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 108 on page 182. If the transceiver is in an even numbered slot, the handle should be in the down position.

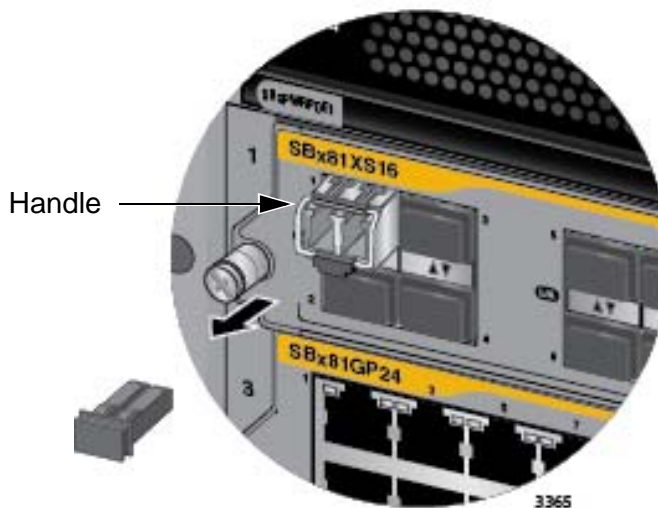


Figure 108. Verifying the Position of the Handle on the Transceiver in the AT-SBx81XS16 Line Card

5. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 109. The connector should snap into the port.



Figure 109. Attaching a Fiber Optic Cable to a Transceiver in the AT-SBx81XS16 Line Card

6. Repeat this procedure to install additional SFP, SFP+, or CSFP 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 191.
  - ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 201.

## 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 177 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 110.



Figure 110. 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.

- 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 111.



Figure 111. 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 112 on page 186.



Figure 112. 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 191.
  - ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 201.

## 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 177 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 113.



Figure 113. 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 114 on page 188.

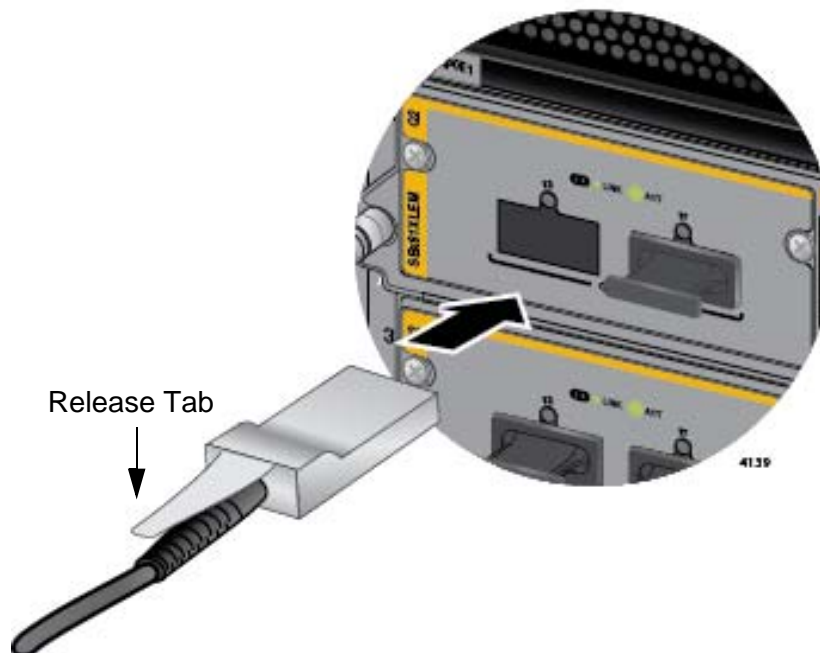


Figure 114. Sliding the AT-QSFPCU Cable into the Slot

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 191.
  - ❑ After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 201.

## 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 177 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 113 on page 187.
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 191.
  - After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 201.



## 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 192
- ❑ “Installing SFP+ Transceivers” on page 194
- ❑ “Installing AT-SP10TW Cables” on page 199

## 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 96.

---

### 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 71.
- ❑ 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 201.

## 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 93. 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 319 and Chapter 16, “Building a Stack” on page 333. 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 323.

---

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 115 on page 195.

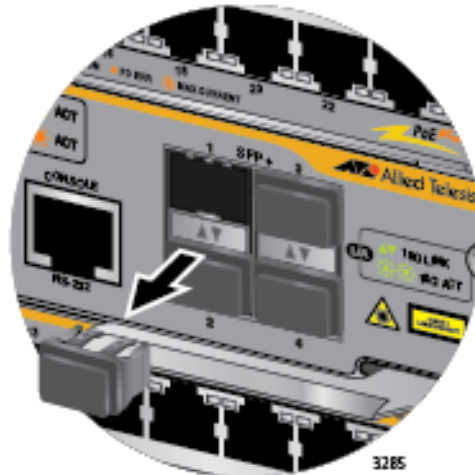


Figure 115. Removing a Dust Cover from an SFP+ Slot in the AT-SBx81CFC960 Controller Fabric Card

---

**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 116. To install it in slot 2 or 4, orient it with the handle on the bottom.

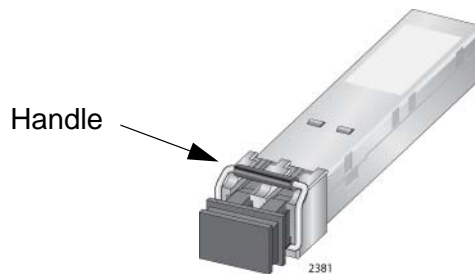


Figure 116. Handle on an SFP+ Transceiver

3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 117 on page 196.

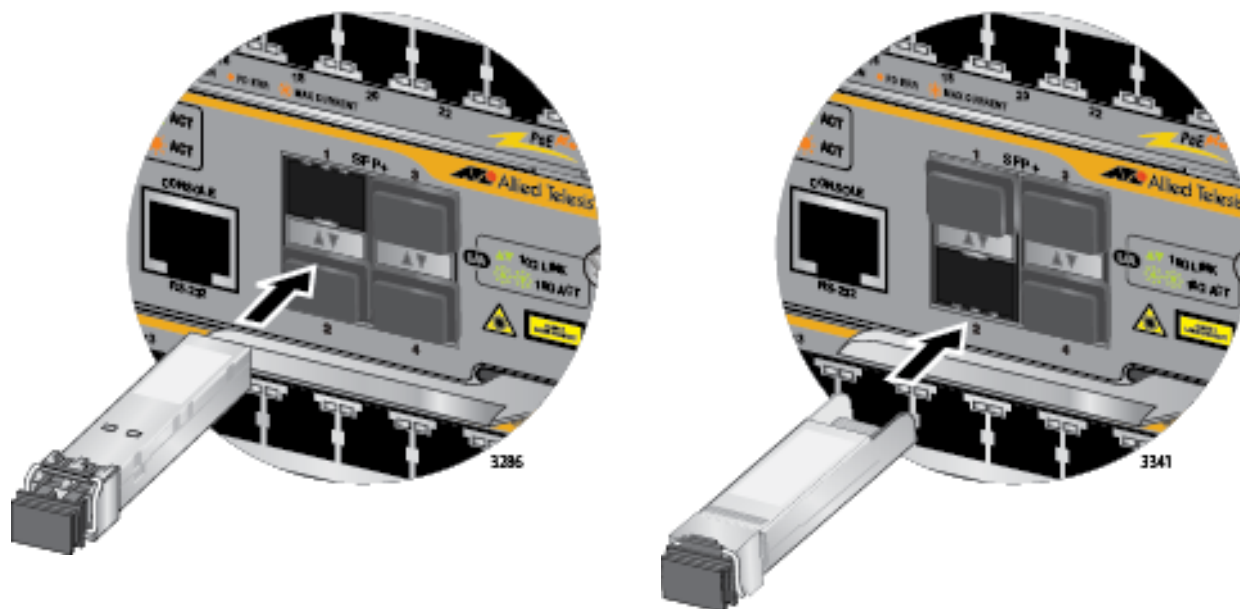


Figure 117. Installing an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

---

**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.

---

4. Remove the protective cover from the SFP+ transceiver, as shown in Figure 118.



Figure 118. 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 119. If the transceiver is in slot 2 or 4, the handle should be in the down position.

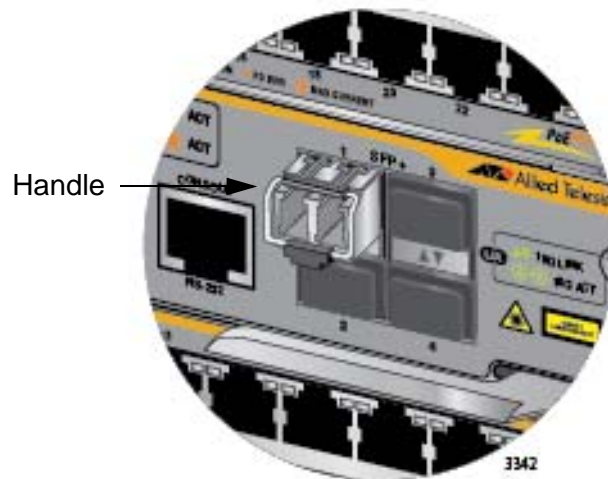


Figure 119. Positioning the Handle on the Transceiver

6. Connect the fiber optic cable to the port on the transceiver, as shown in Figure 120 on page 198. The connector should snap into the port.

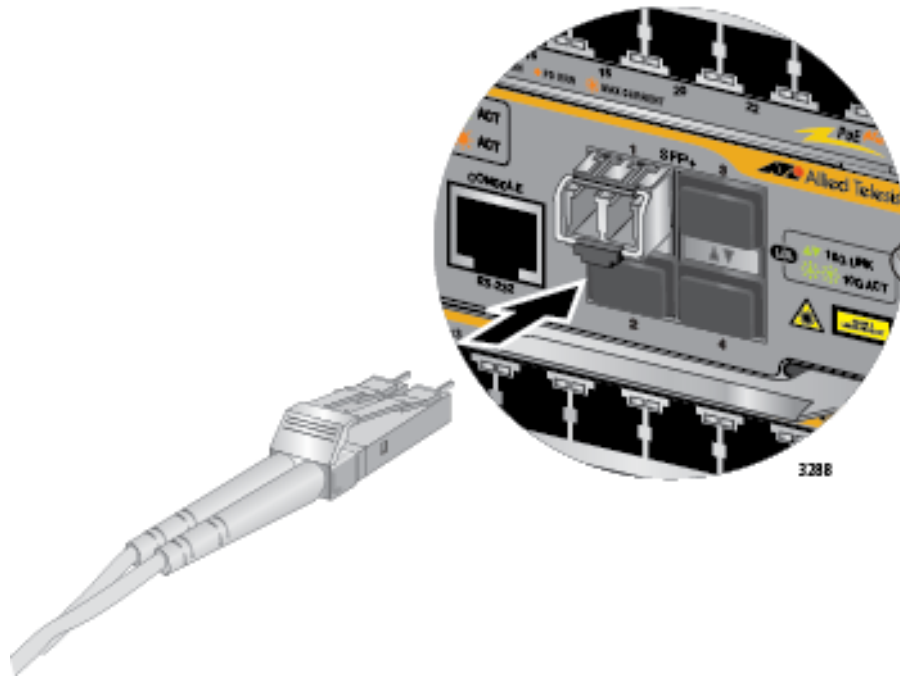


Figure 120. Attaching a Fiber Optic Cable to an SFP+ Transceiver in the AT-SBx81CFC960 Controller Fabric Card

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 201.
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 323.
  - Afterwards, go to “Powering On the Stack” on page 351.

## 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 93.

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 319 and Chapter 16, “Building a Stack” on page 333.
- ❑ The cabling configurations for the SFP+ slots on the controller cards of a stack is given in “Cabling Configurations for the Trunk” on page 323.

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 115 on page 195.

---

**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 121 on page 200.

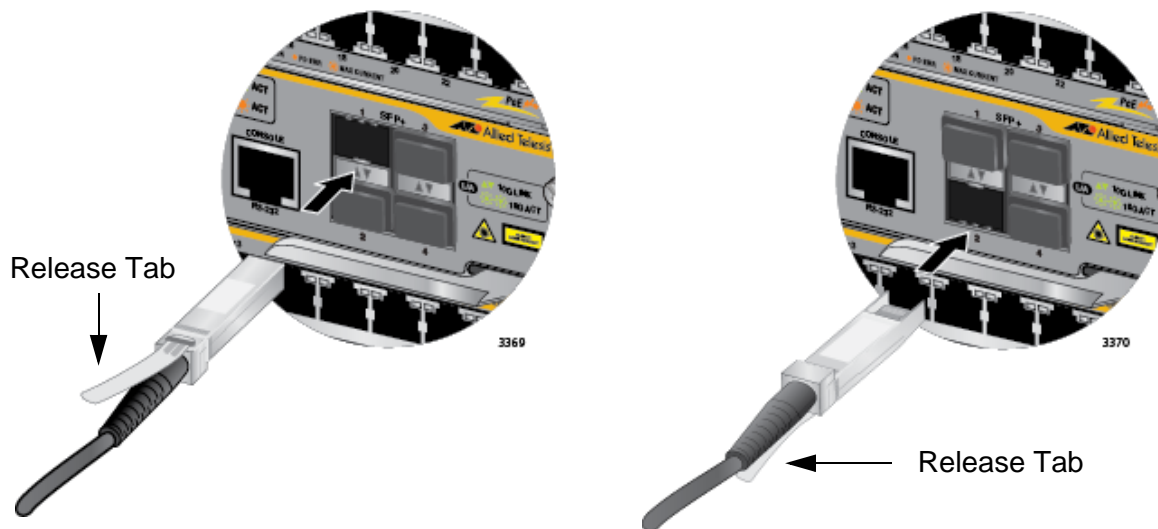


Figure 121. Installing an AT-SP10TW Cable in the AT-SBx81CFC960 Controller Fabric Card

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 173 for instructions.
  - After cabling all the ports in the chassis, go to Chapter 10, “Powering On the Chassis” on page 201.
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 323.
  - Afterwards, go to “Powering On the Stack” on page 351.



## 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 202
- ❑ “Powering On AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC System Power Supplies” on page 203
- ❑ “Powering On AT-SBxPWRPOE1 Power Supplies” on page 207
- ❑ “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 210
- ❑ “Powering On the AT-SBxPWRSYS1 DC System Power Supply” on page 236
- ❑ “Monitoring the Initialization Process” on page 237

## 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 126.
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 171.
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 78 on page 154? 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 203
- ❑ “Powering On AT-SBxPWRPOE1 Power Supplies” on page 207
- ❑ “Wiring the AT-SBxPWRSYS1 DC System Power Supply” on page 210

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 131 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 122 on page 204. 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 122. 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 123 on page 205 an AC power cord is connected to connector D for the system power supply in slot D on the front panel.



Figure 123. 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 124 on page 206.

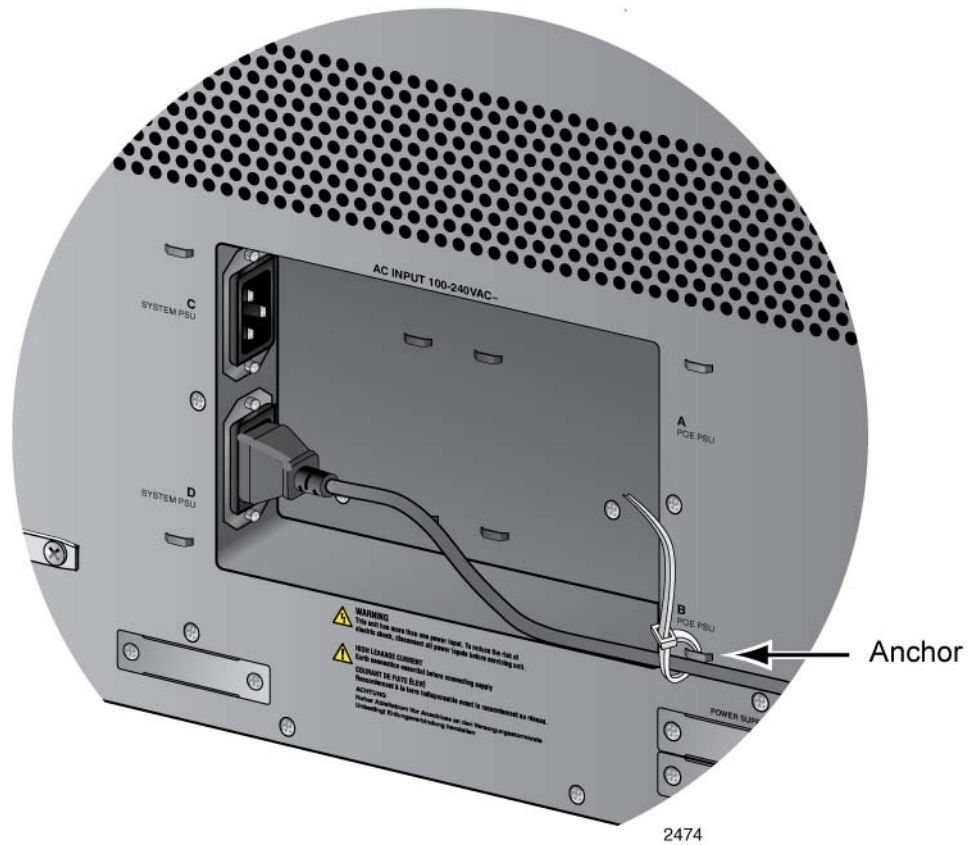


Figure 124. Securing the Power Cord for the AT-SBxPWRSYS1 or AT-SBxPWRSYS2 AC Power Supply to an Anchor

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 207.
- ❑ Otherwise, go to “Monitoring the Initialization Process” on page 237.

## 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 137 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 122 on page 204. 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 125.

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.

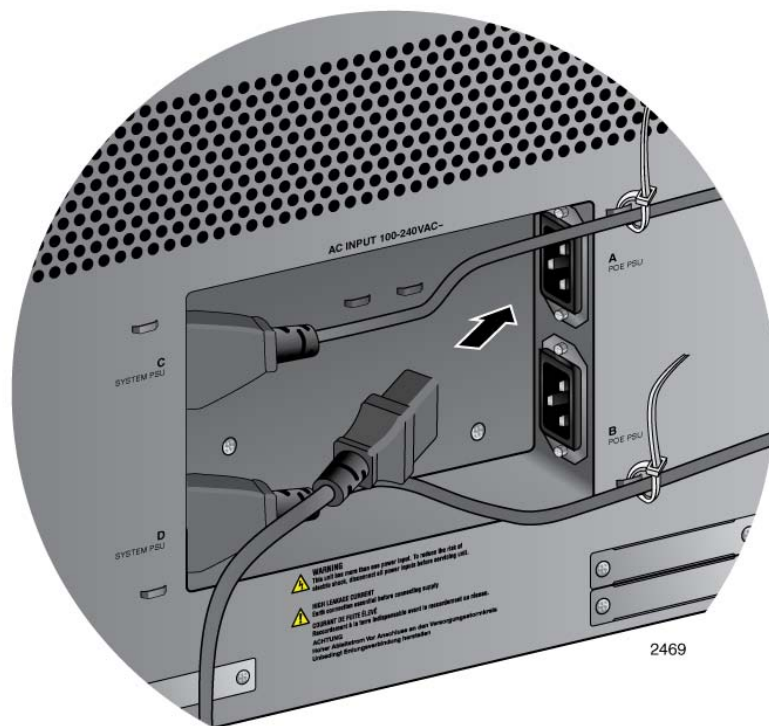


Figure 125. Connecting the AC Power Cord for the AT-SBxPWRPOE1 Power Supply

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 126.

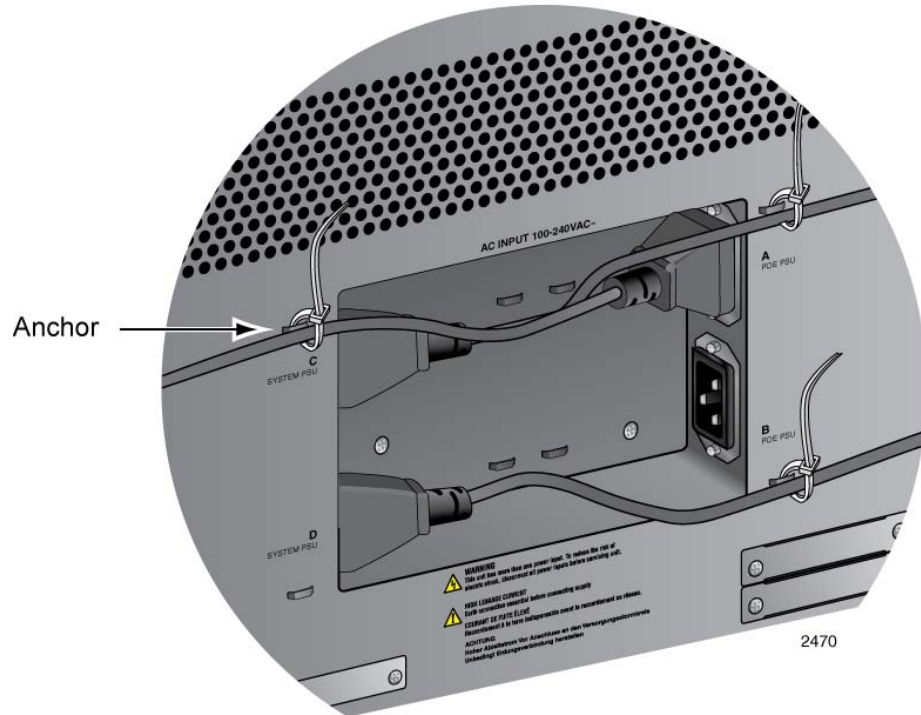
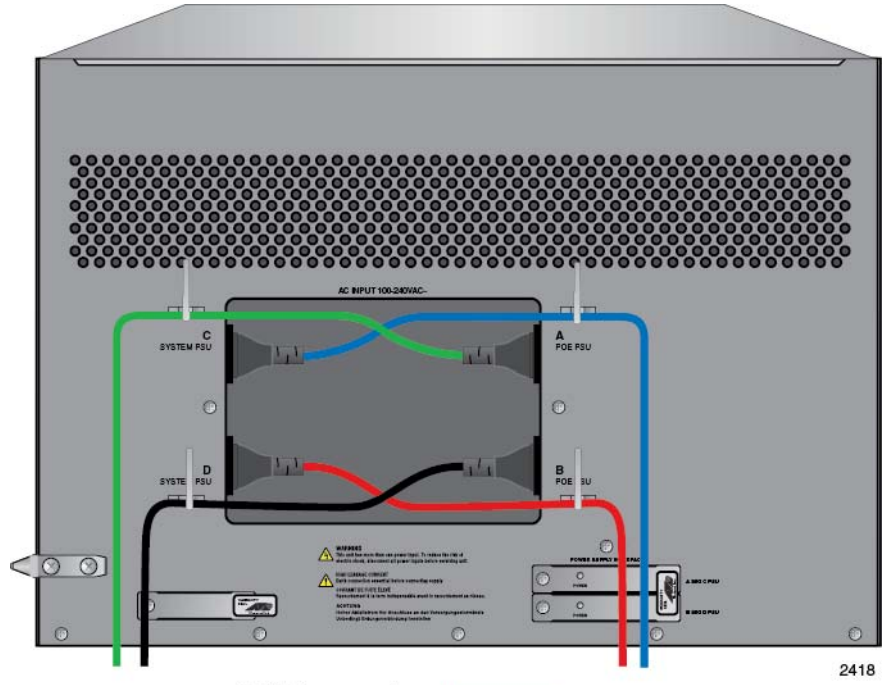


Figure 126. Securing the Power Cord for the AT-SBxPWRPOE1 Power Supply to an Anchor

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 127 on page 209 is an illustration of the power cords for a chassis with four power supplies.





- 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 127. Dress and Secure AC Power Cords

6. Go to “Monitoring the Initialization Process” on page 237.

## 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 142.

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 212
- ❑ “Connecting the Grounding Wire with the Grounding Terminal” on page 212
- ❑ “Connecting the Grounding Wire with Bare Wire” on page 215
- ❑ “Choosing a Method for Attaching the Power Wires” on page 217
- ❑ “Connecting the DC Power Wires with the Straight Terminals” on page 217
- ❑ “Connecting the DC Power Wires with the Right Angle Terminals” on page 226
- ❑ “Connecting Bare DC Power Wires” on page 232

The components of the power supply are identified in Figure 128.

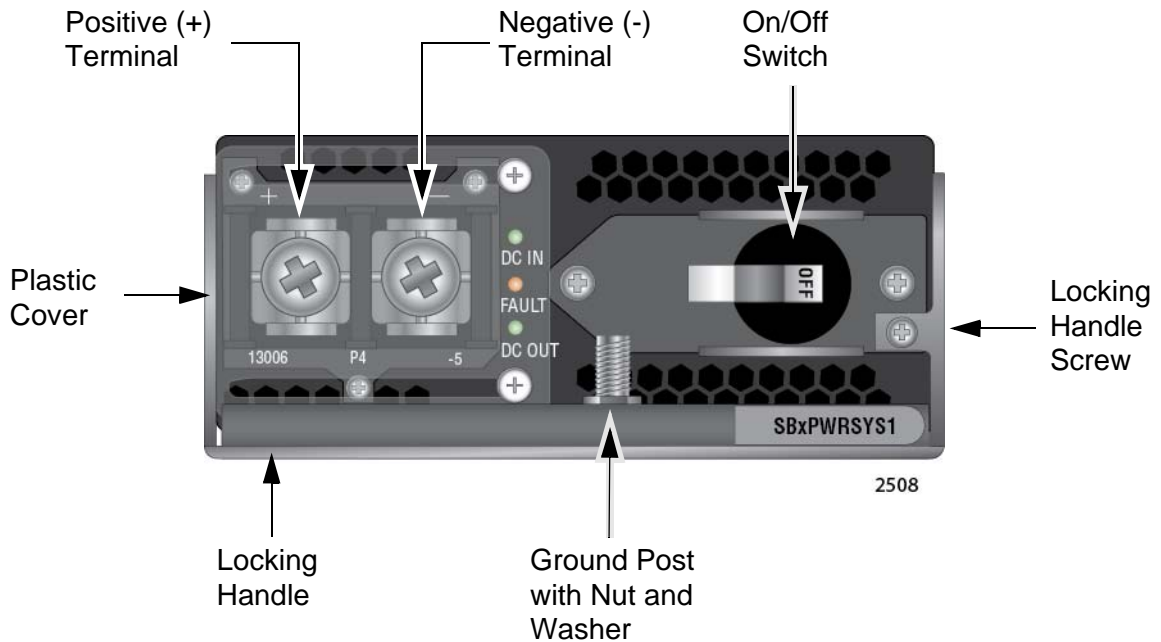


Figure 128. Components of the AT-SBxPWRSYS1 DC Power Supply



#### 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 129, or bare wire.

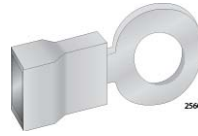


Figure 129. Grounding Wire Terminal

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 215

### 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 130.

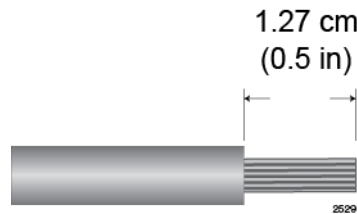


Figure 130. Stripping the Stranded Grounding Wire

---

**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 131,

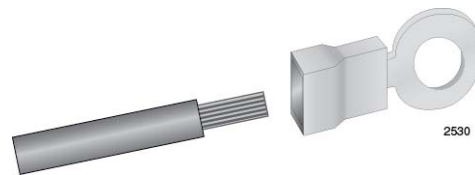


Figure 131. Attaching the Stranded Grounding Wire to the Grounding Terminal

3. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 132, from the power supply.

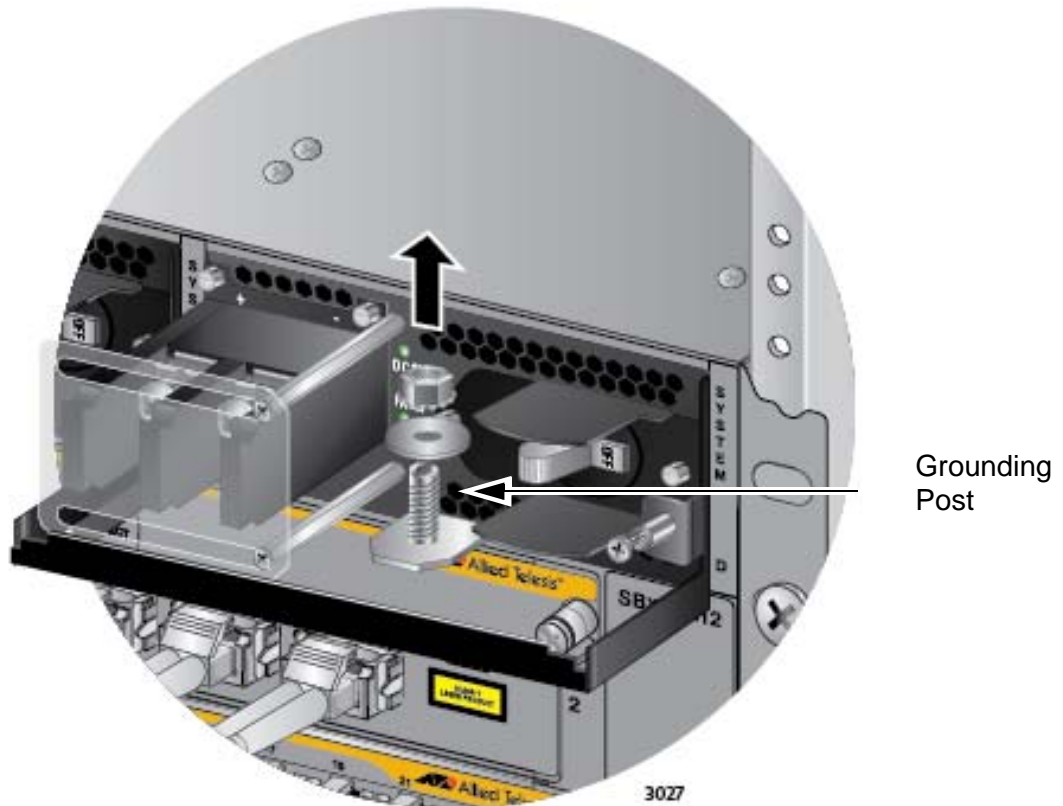


Figure 132. Removing the Nut and Washer from the Grounding Post

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 133 on page 214.

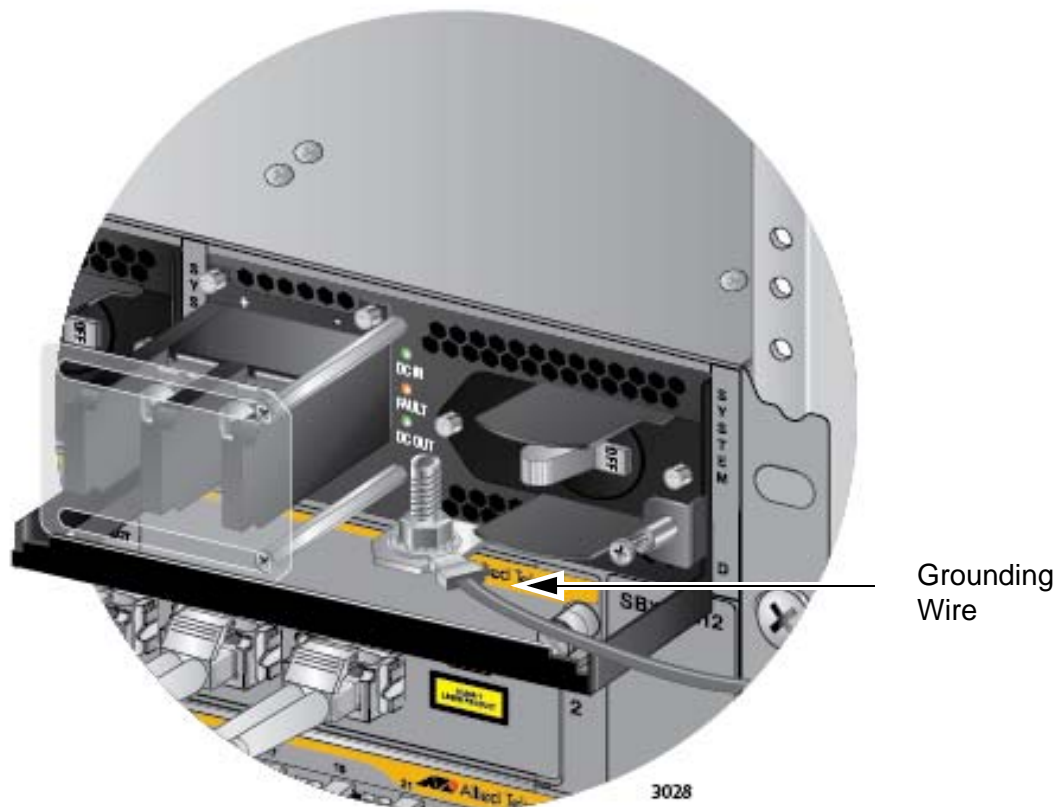


Figure 133. Installing the Grounding Wire

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 217.

## 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 134.

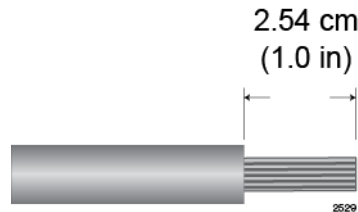


Figure 134. Stripping the solid or Stranded Grounding Wire

2. Use an 8 mm wrench to remove the grounding post nut and washer, shown in Figure 132 on page 213, 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 135.



Figure 135. Attaching the Bare Grounding Wire to the Grounding Post

- Secure the wire with the nut and washer removed in step 2, and an 8 mm wrench, as shown in Figure 136.

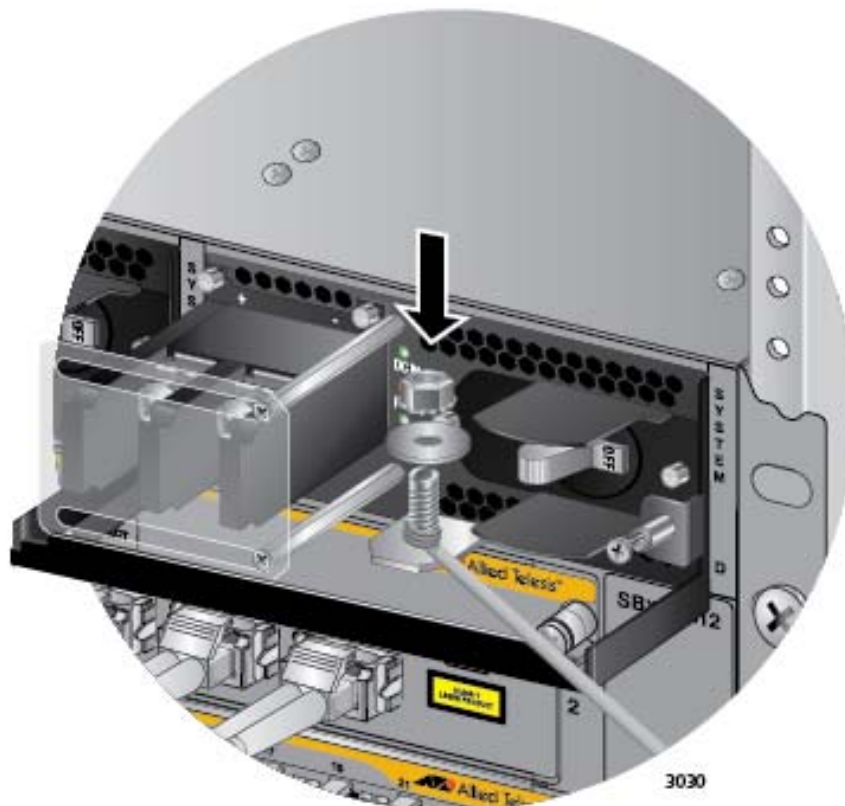


Figure 136. Securing the Bare Grounding Wire to the Grounding Post

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 217.



## 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 137. 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.

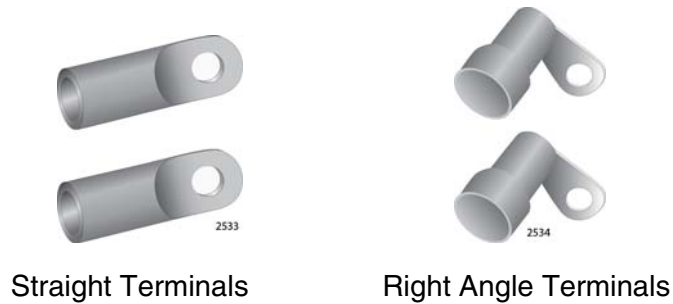


Figure 137. Power Wire Terminals

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### 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 226
- “Connecting Bare DC Power Wires” on page 232

## 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 138 on page 218.



### 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

---

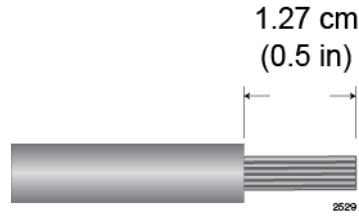


Figure 138. Stripping the Power Wires

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**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 139.

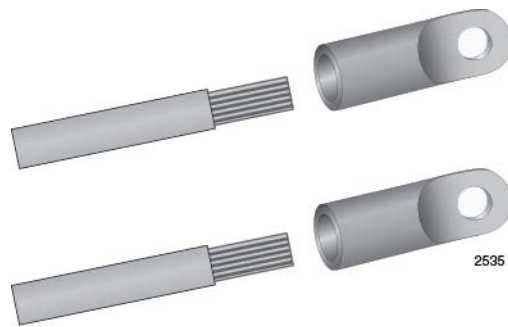


Figure 139. Attaching the Power Wires to the Straight Terminal Lugs

3. Verify that the On/Off switch on the AT-SBxPWRSYS1 DC Power Supply is in the Off position. Refer to Figure 140 on page 219.

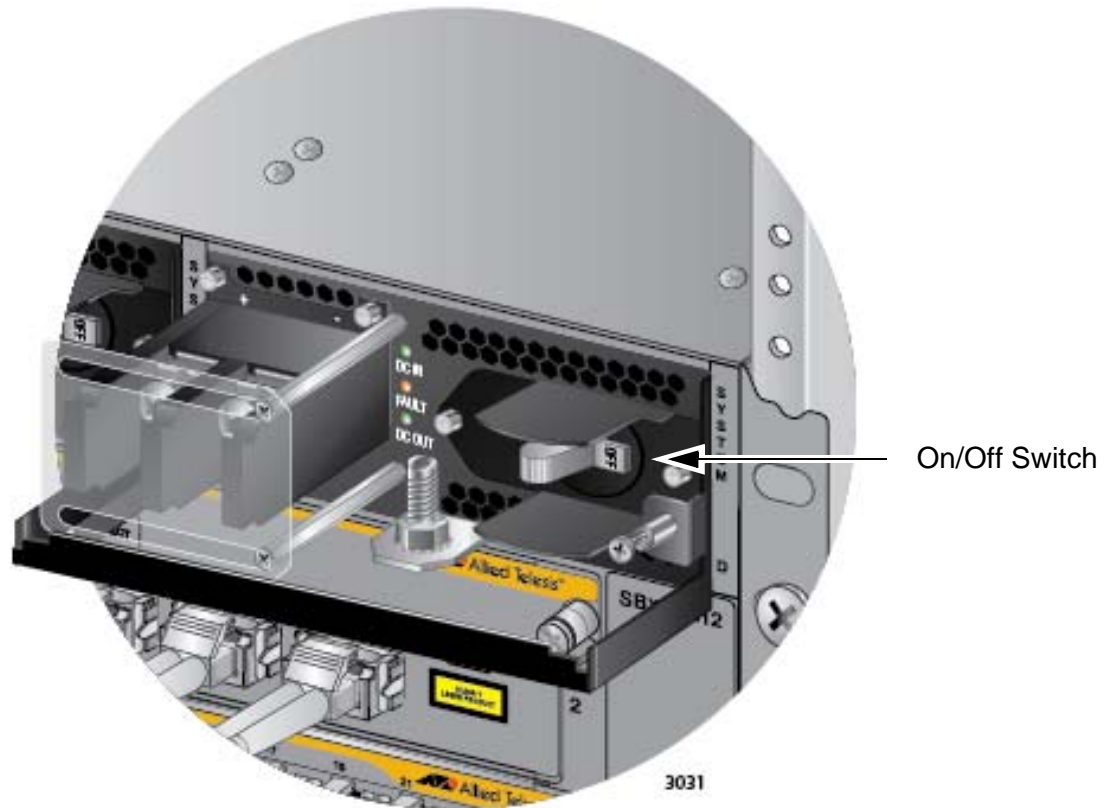


Figure 140. On/Off Switch on the AT-SBxPWRSYS1 DC Power Supply

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 141 on page 220. You may need to lift the locking handle slightly to access the bottom screw.



Figure 141. 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 142 on page 221.



Figure 142. 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 143 on page 222 shows the positive wire above the terminal block.

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

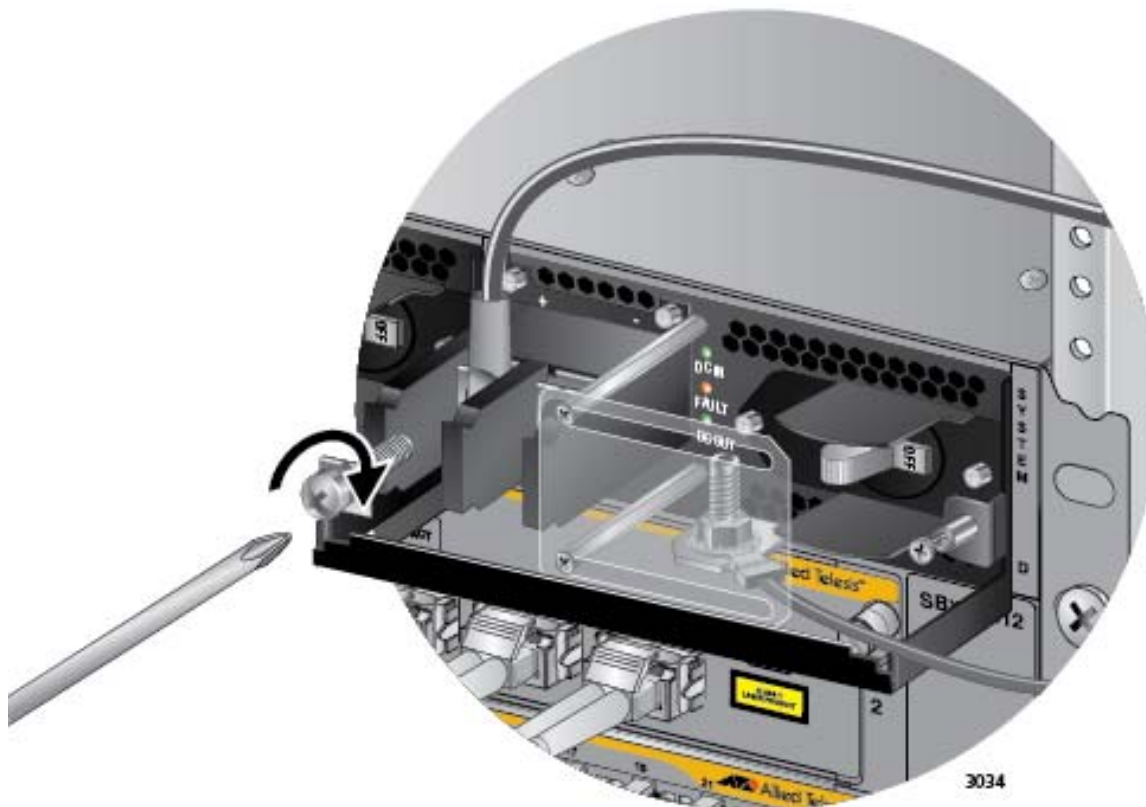


Figure 143. Connecting the Positive (+) Power Wire with a Straight Terminal

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 144 on page 223 shows the wires above the terminal block.

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

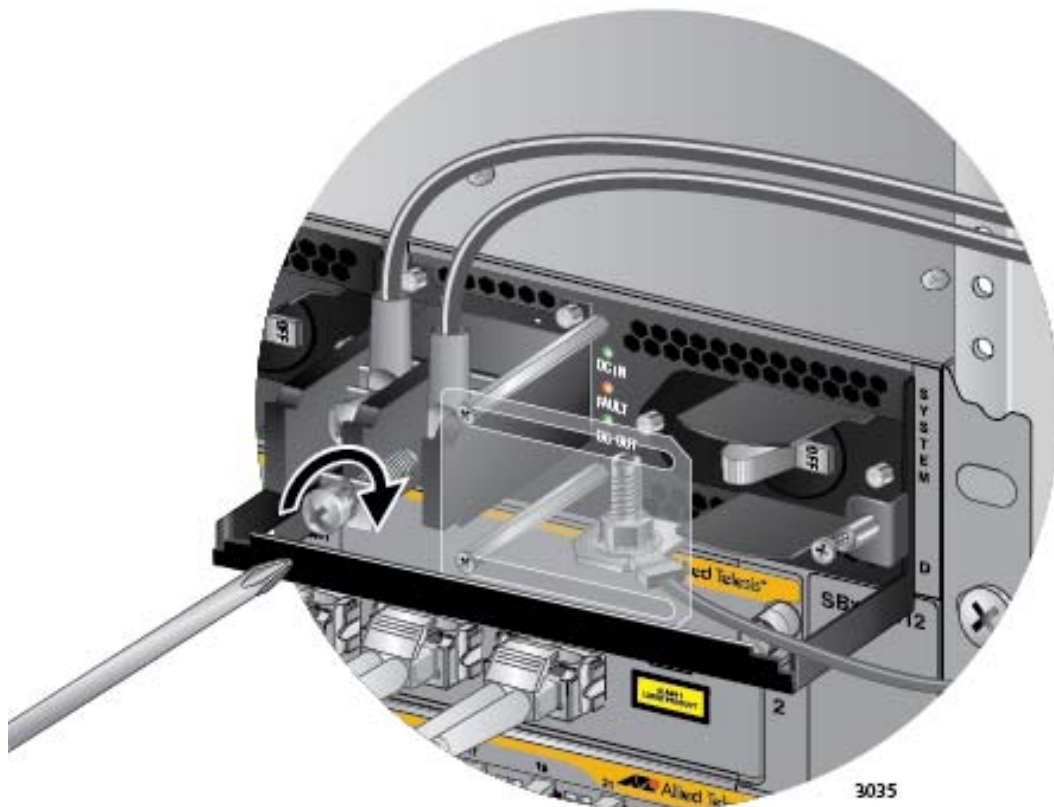


Figure 144. Connecting the Negative (-) Power Wire with a Straight Terminal



#### 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 145 on page 224. 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 145. 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 146 on page 225.



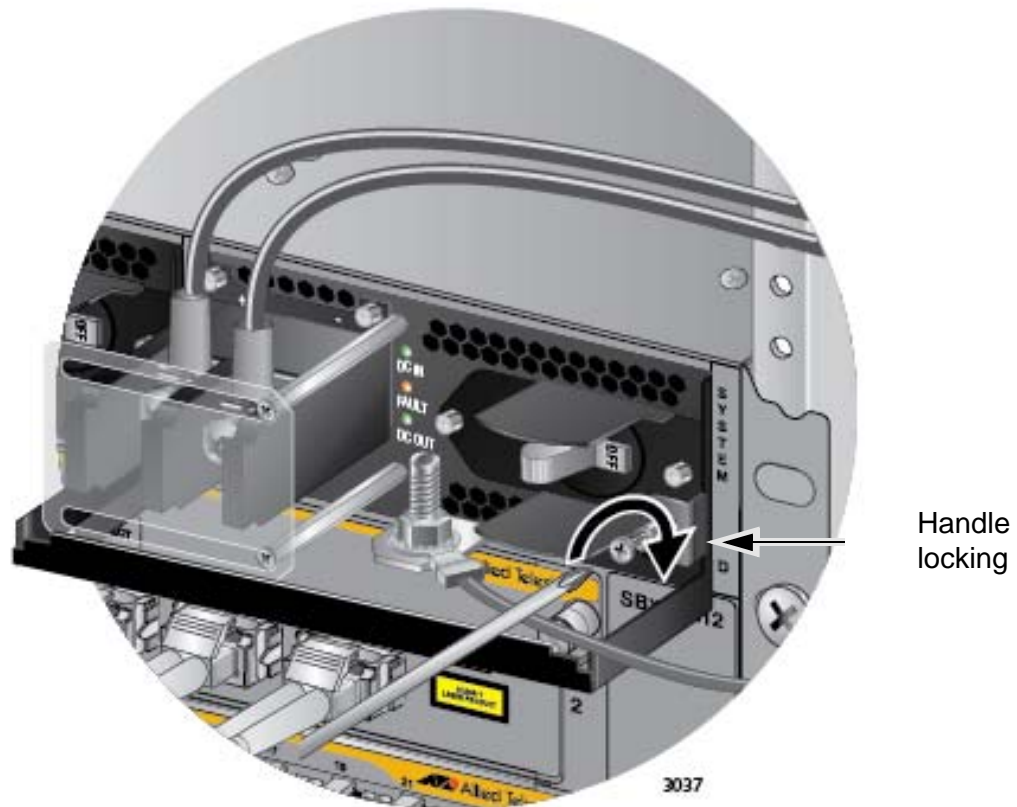


Figure 146. Tightening the Handle Locking Screw

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 236.

## 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 147.



### 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

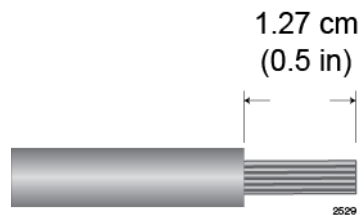


Figure 147. Stripping the Power Wires

### 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 140 on page 219.
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 148,

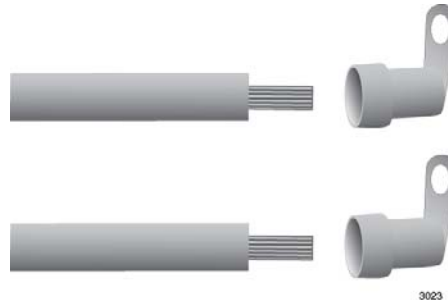


Figure 148. Attaching the Power Wires to the Right Angle Terminals

- 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 149. You may need to lift the locking handle slightly to access the bottom screw.

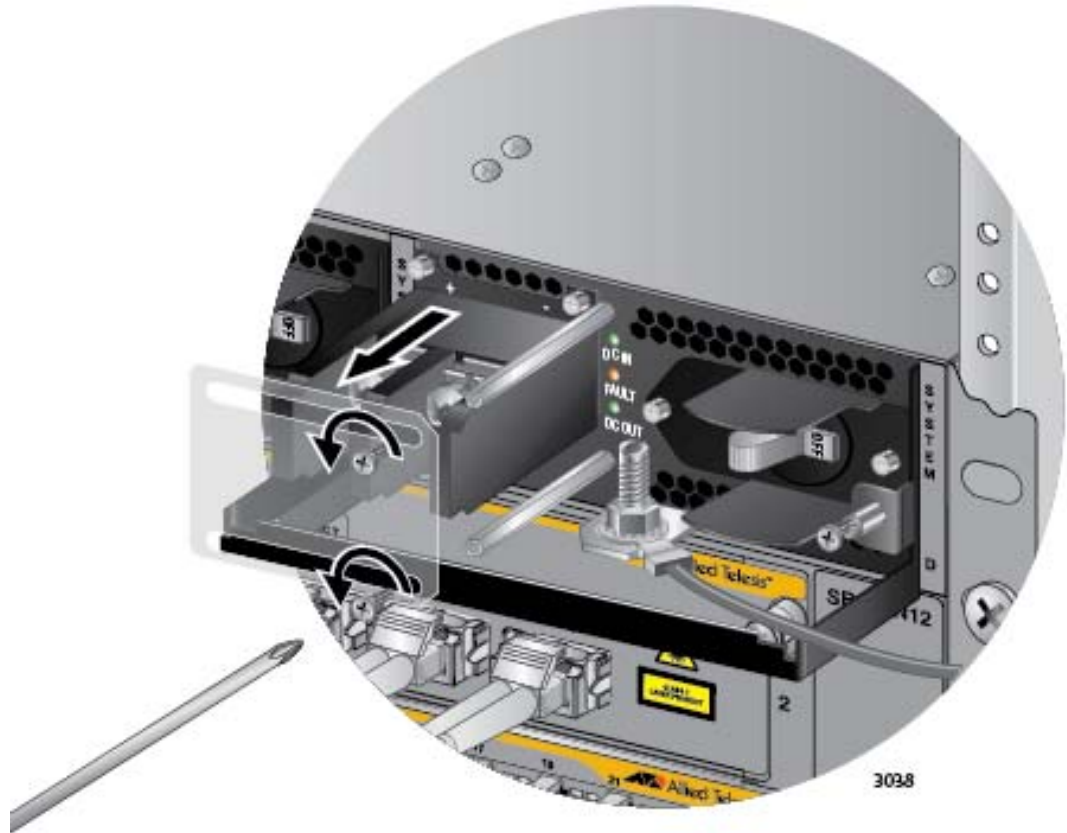


Figure 149. Removing the Plastic Cover

---

**Note**

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

---

- Use a #3 Phillips-head screwdriver to remove the two screws from the positive and negative terminals, as shown in Figure 150 on page 228.



Figure 150. 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 151 on page 229.

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



Figure 151. 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 152 on page 230.

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



Figure 152. 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 153 on page 231.

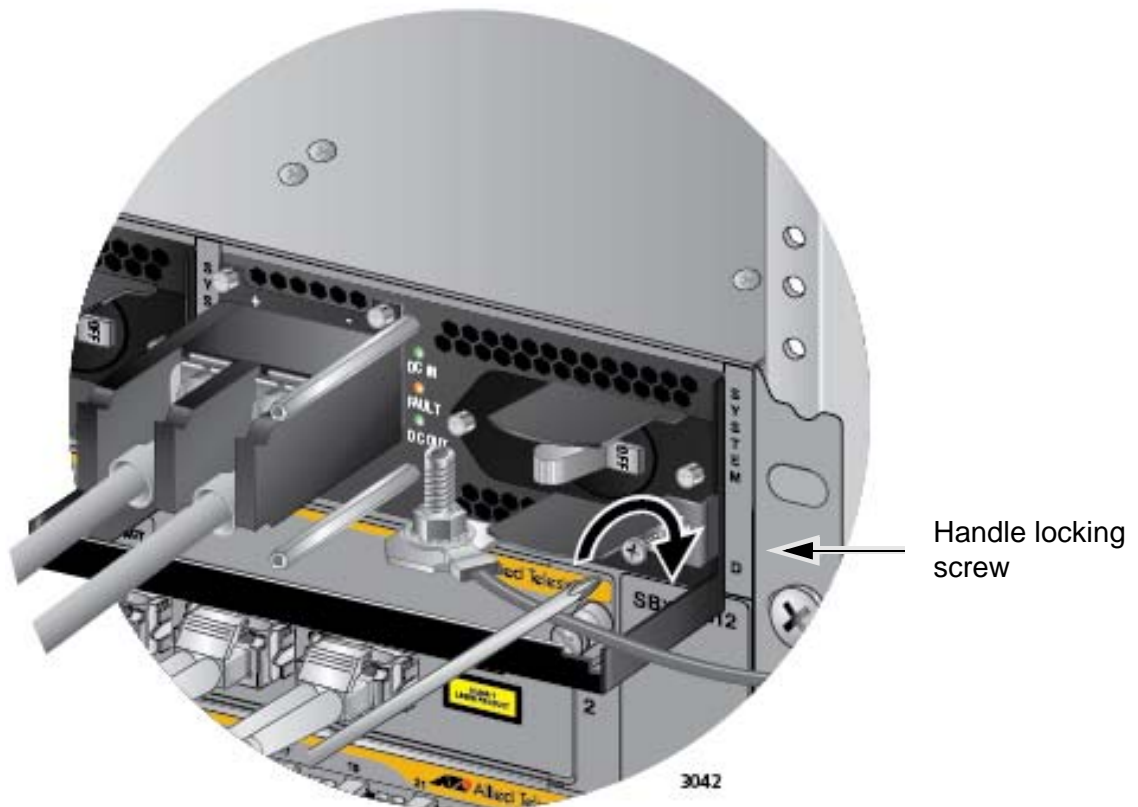


Figure 153. Tightening the Handle Locking Screw

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 236.

## 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 154.

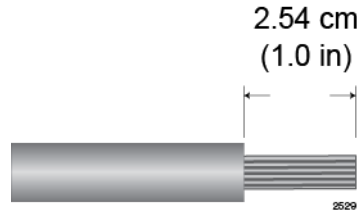


Figure 154. Stripping Solid or Stranded DC Power Wires

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 141 on page 220. 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 142 on page 221.
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 155 on page 233 shows the wire above the terminal block. Allied Telesis recommends tightening the screw to 30 to 40 inch-lbs.





Figure 155. 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 156 on page 234. The negative terminal is on the right.



Figure 156. 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. *ES E12*

6. 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 145 on page 224. 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 146 on page 225.
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 236.

## **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 140 on page 219.
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 237 or Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 241.

## 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 in the following sections

### 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.

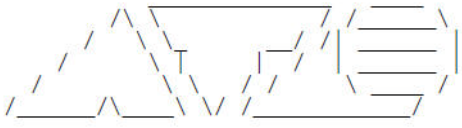
### Using the Console Port to Monitor the Initialization Process

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 244.) Figure 157 on page 238 and Figure 158 on page 239 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.rel
Original release filename: SBx81CFC960-5.4.4-.0.rel
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, udi dd, vrrpd

```

Figure 157. 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 158. 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 242
- “Using Local Management to Verify the Chassis” on page 244

---

**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 250 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 252 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 254.
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 257 and “Fiber Optic or Twisted Pair Transceivers” on page 261 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 19 on page 45. 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 259 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 244
- “Verifying the Chassis with the AlliedWare Plus Commands” on page 245

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 card 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 159. 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.

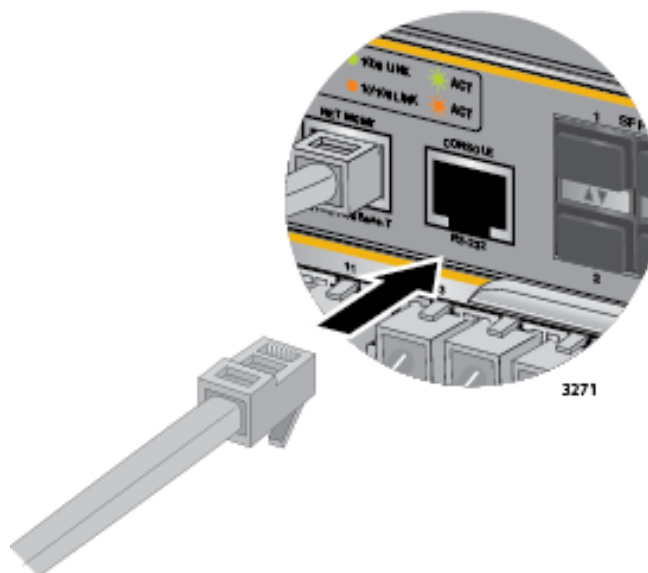


Figure 159. Connecting the Management Cable to the Console RS-232 Port

2. Connect the other end of the cable to an RS-232 port on a terminal or personal computer with a terminal emulation program.

- 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.

---

- Press Enter. You are prompted for a user name and password.
- 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:

- 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 160.

```
awplus> show version

AlliedWare Plus (TM) 5.4.4

Build name : SBx81CFC960-5.4.4.rel ← Software Version Number
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;
.
.
.
```

Figure 160. SHOW VERSION Command

2. Compare the version number displayed by the `SHOW VERSION` command with the information in Table 28 on page 101 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 161.

```
awpl us# 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 161. 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.

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**Note**

If you are unable to resolve a hardware problem with the instructions in this chapter, contact Allied Telesis Technical Support for further assistance. Refer to “Contacting Allied Telesis” on page 18 for contact information.

---

The following troubleshooting information is available:

- ❑ “AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies” on page 250
- ❑ “AT-SBxPWRSYS1 DC System Power Supply” on page 252
- ❑ “Ethernet Line Cards” on page 254
- ❑ “Twisted Pair Ports” on page 257
- ❑ “Power Over Ethernet” on page 259
- ❑ “Fiber Optic or Twisted Pair Transceivers” on page 261
- ❑ “AT-SBx81CFC960 Controller Fabric Card” on page 263
- ❑ “AT-SBxFAN12 Fan Module” on page 265
- ❑ “Local (Console) Management Session” on page 266
- ❑ “Power Supply Interfaces (Opto-couplers)” on page 267

## 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 267.



---

**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 366.
- ❑ 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 244 and “Hardware and Software Releases” on page 101.
- ❑ 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 267.



**Caution**

The power supply interfaces are *not* hot swappable and should only be serviced by an authorized service technician.

---

## Ethernet Line Cards

---

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 or controller 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.
- ❑ 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 101.
- ❑ 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:

```
awpl us# reboot card 2
Reboot card 2 system? (y/n)? y
awpl us#
```

- ❑ 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 161 on page 246.

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 version of the AlliedWare Plus Operating System on the AT-SBx81CFC960 Controller Fabric Card supports the card. The AT-SBx81XS16 Line Card requires 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 335. 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 version of the AlliedWare Plus Operating System on the AT-SBx81CFC960 Controller Fabric Card supports the card or expansion module. The AT-SBx81XLEM Line Card and expansion modules require the versions listed in Table 31.

Table 31. 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

Table 31. AlliedWare Plus Operating System Releases for the AT-SBx81XLEM Line Card (Continued)

Model Name	Initial Release
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
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. For instructions, refer to “Displaying the Management Software Version Number” on page 335. If necessary, update the operating system on the controller card. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches.

- ❑ 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 the AT-SBx81GC40 Line Card, verify that the version of the AlliedWare Plus Operating System on the controller card supports the card. The AT-SBx81GC40 Line Card requires v5.4.9 or later. To determine the version number of the operating system on the controller card, start a management session and issue the SHOW SYSTEM command in the Privileged Exec mode. For instructions, refer to “Displaying the Management Software Version Number” on page 335. If necessary, update the operating system on the controller card. For instructions, refer to the Software Reference for SwitchBlade x8100 Series Switches.



## Twisted Pair Ports

---

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 71.
- 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 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. 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.

---

**Note**

The AT-SBx81GT40 Line Card does not support half-duplex mode.

---

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

---

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 250.
- ❑ 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 71.
- ❑ 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:

```
port n.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.

---

- ❑ 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 78 on page 154. 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 78.

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

---

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.

---

**Note**

The AT-SBxFAN12 Fan Module is hot swappable. You do not have to power off the AT-SBx8112 Chassis to replace the module.

---

## 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 244.
- ❑ Check to be sure that the terminal emulator application is compatible with a VT-100 terminal.

## Power Supply Interfaces (Opto-couplers)

---

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 33.

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.

---

### 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 250 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

---

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 270
- ❑ “Replacing the AT-SBxPWRSYS1 DC Power Supply” on page 276
- ❑ “Replacing Ethernet Line Cards” on page 287
- ❑ “Replacing Expansion Modules in AT-SBx81XLEM Line Cards” on page 289
- ❑ “Replacing AT-SBx81CFC960 Controller Fabric Cards” on page 295
- ❑ “Replacing the AT-SBxFAN12 Fan Module” on page 300

## Replacing AT-SBxPWRSYS1, AT-SBxPWRSYS2, and AT-SBxPWRPOE1 Power Supplies

---

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.

---

**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.

---

---

**Note**

The power supplies are hot swappable.

---



---

**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 162 on page 271 shows the removal of the power cord from connector D, which corresponds to slot D on the front panel.



Figure 162. 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 163 on page 272.



Figure 163. 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 164 on page 273.



**Warning**

The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.





Figure 164. 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 129.
  - 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 165 on page 274.

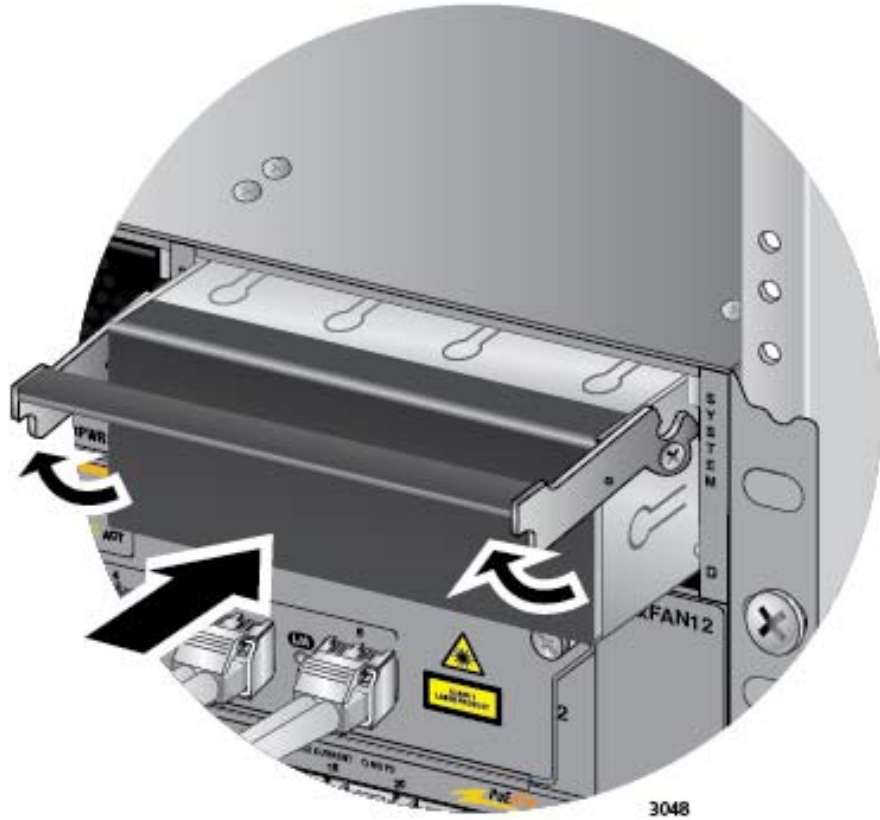


Figure 165. Installing a Blank Power Supply Slot Cover

6. Lower the locking handle to secure the slot cover to the slot. Refer to Figure 166 on page 275.



Figure 166. Lowering the Locking Handle on the Power Supply Slot Cover

## Replacing the AT-SBxPWRSYS1 DC Power Supply

---

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 128 on page 211.
3. Use a #2 screwdriver to loosen the screw on the locking handle. Refer to Figure 167.

---

**Note**

Do not lift the locking handle yet.

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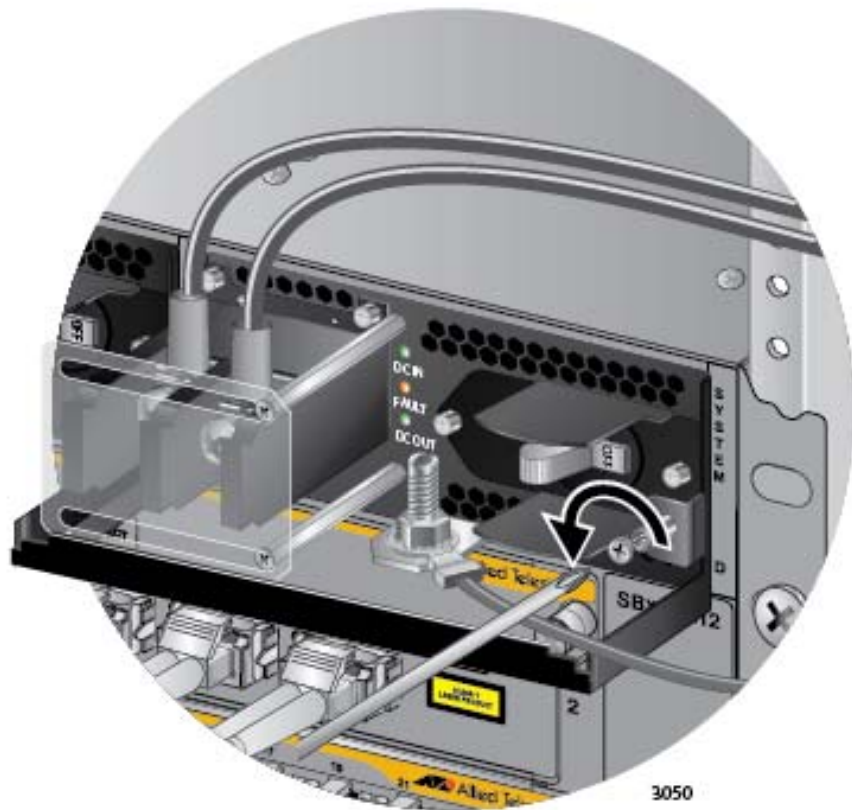


Figure 167. Loosening the Screw on the Locking Handle

**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 168.

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.

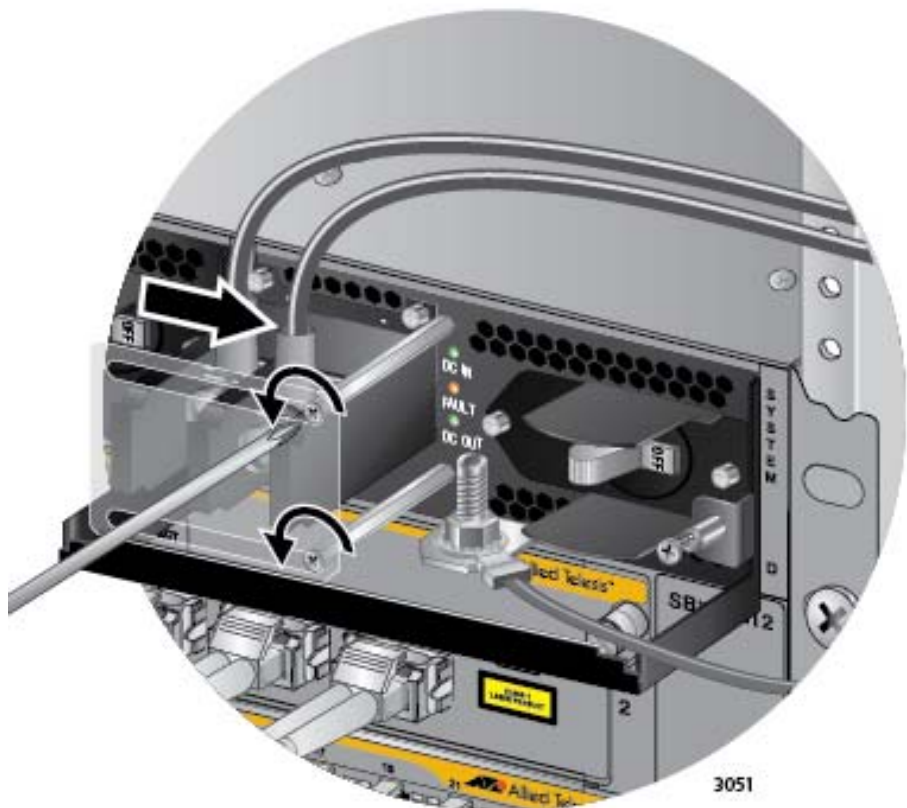


Figure 168. Opening the Plastic Window over the Terminal Block

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 169 on page 278.

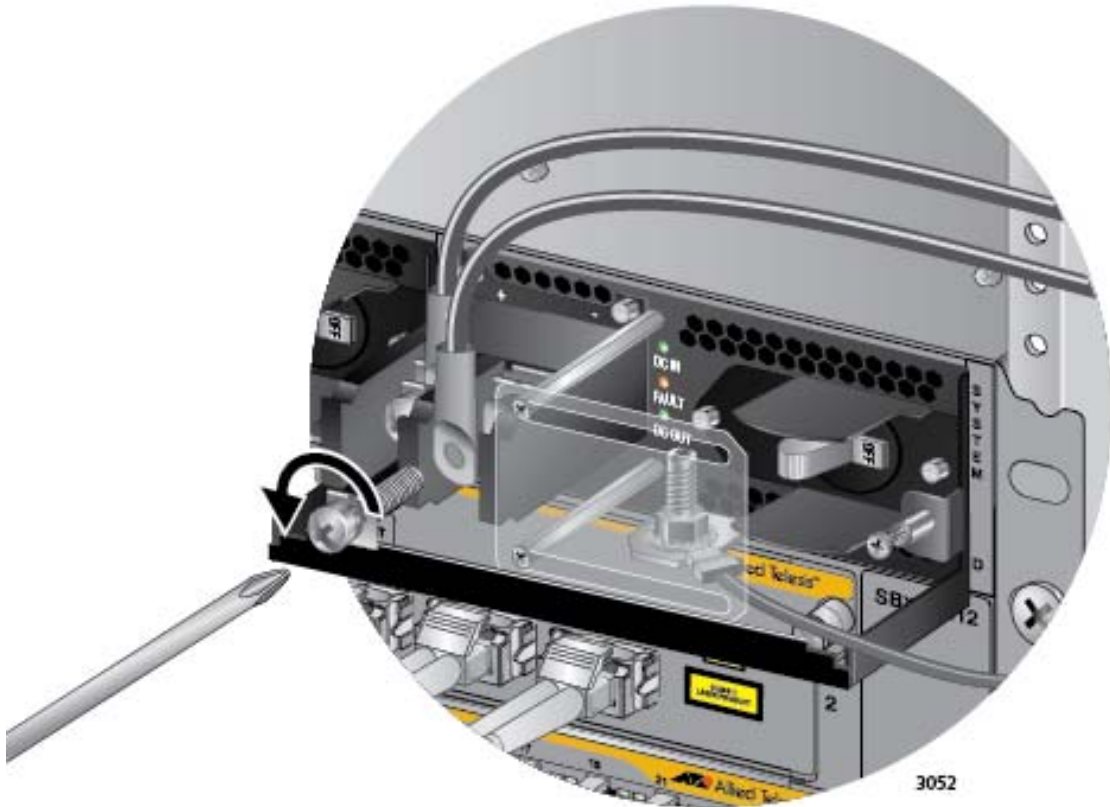


Figure 169. Removing the Negative Lead Wire

6. Use a #3 screwdriver to remove the positive (+) lead wire from the terminal block. Refer to Figure 170 on page 279.

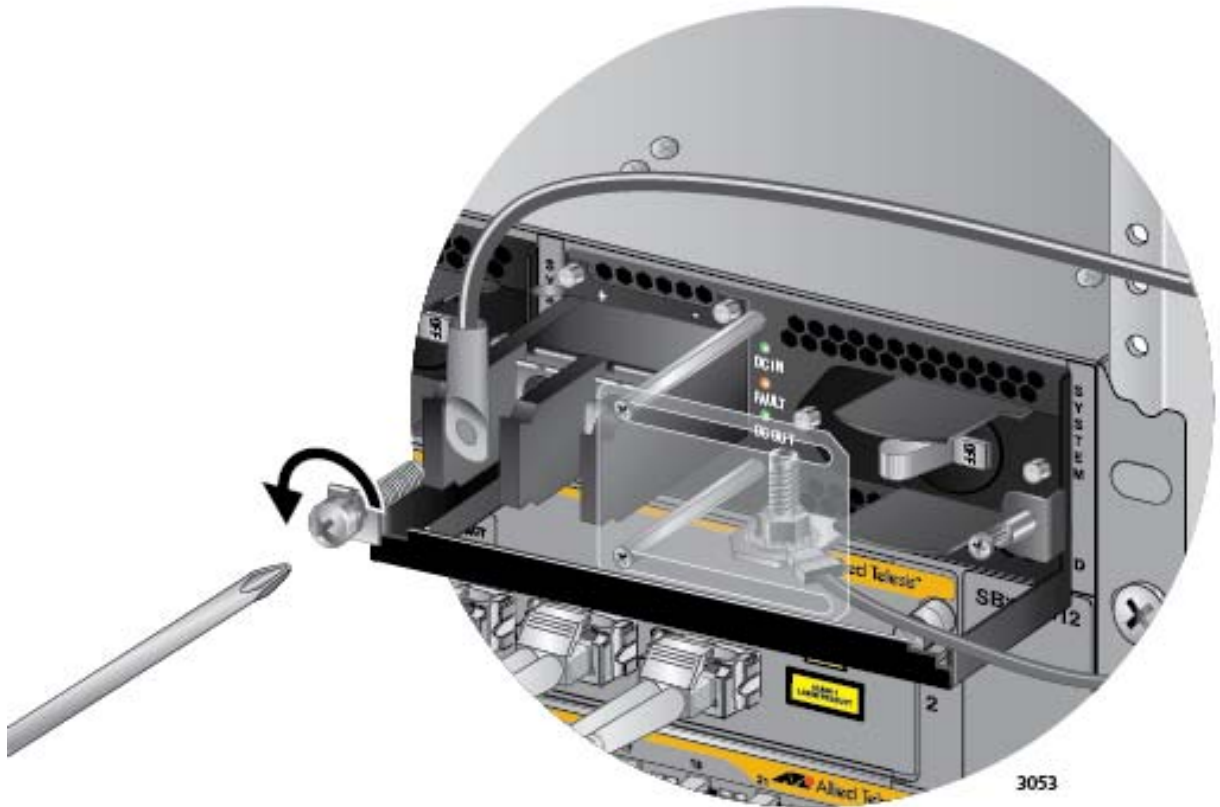


Figure 170. Removing the Positive Lead Wire from the Terminal Block

7. Reinstall the two screws on the negative (-) and positive (+) terminals. Refer to Figure 171 on page 280.



Figure 171. 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 172 on page 281.



**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 172. Closing the Plastic Cover

9. Use an 8 mm wrench to remove the grounding wire from the grounding post. Refer to Figure 173 on page 282.

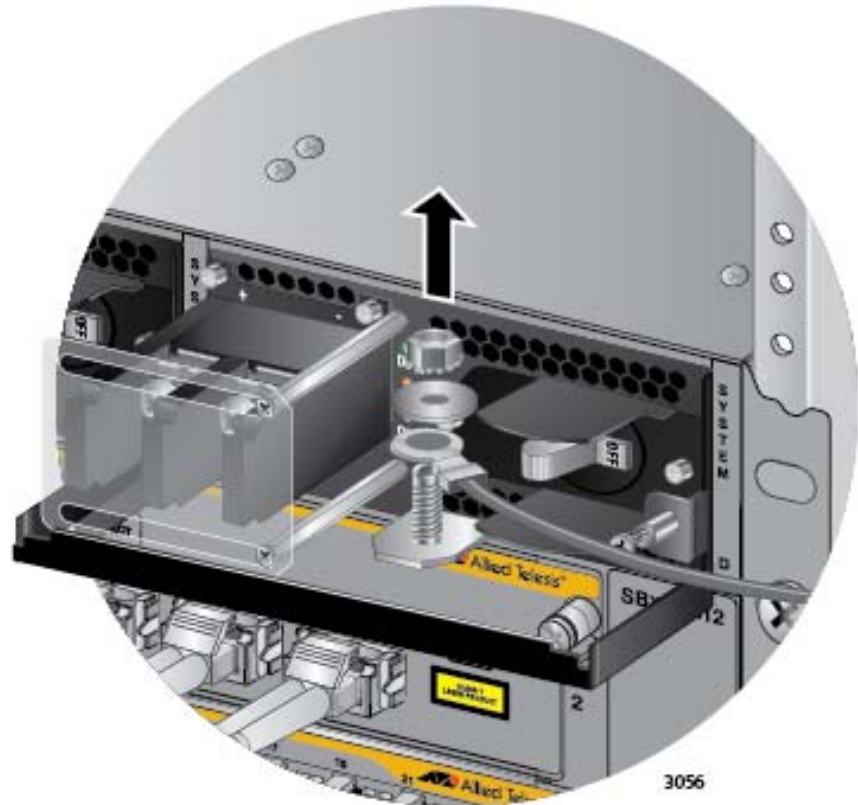


Figure 173. Removing the Grounding Wire

10. Reinstall the nut and washer on the grounding post. Refer to Figure 174 on page 283.



Figure 174. 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 175 on page 284.



**Warning**

The power supply is heavy. Use both hands to hold the module as you remove it from the chassis.

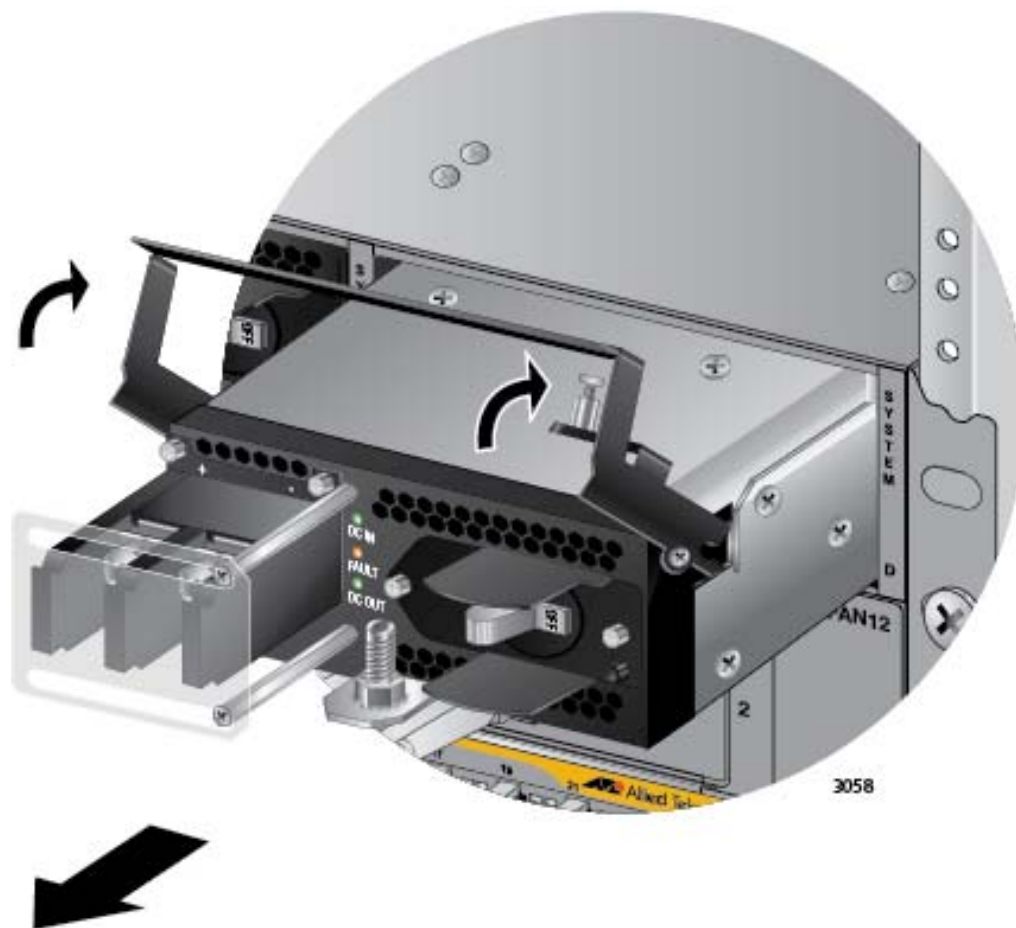


Figure 175. Lifting the Locking Handle and Removing the Power Supply

12. Do one of the following:

- To install a new power supply, refer to Chapter 6, “Installing the Power Supplies” on page 129.
- 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 176 on page 285.

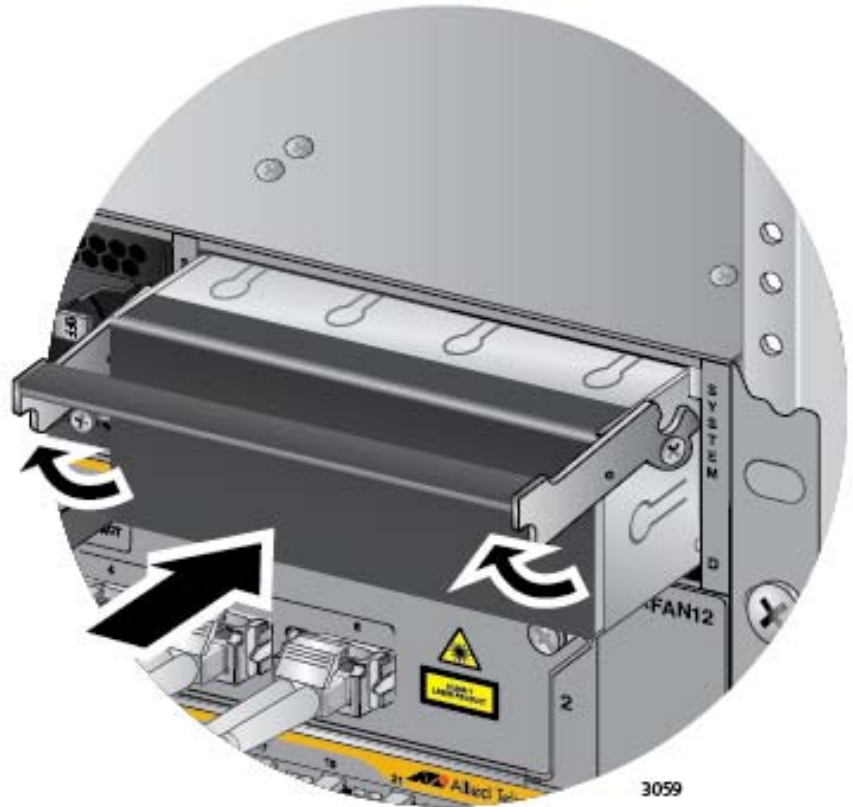


Figure 176. Installing a Blank Power Supply Slot Cover

14. Lower the locking handle to secure the slot cover to the slot. Refer to Figure 177 on page 286.



Figure 177. 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 150 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 289.

---

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 74 on page 151.

---

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 166.
  - 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 171.
  - 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 150 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 287.
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 178 on page 290.

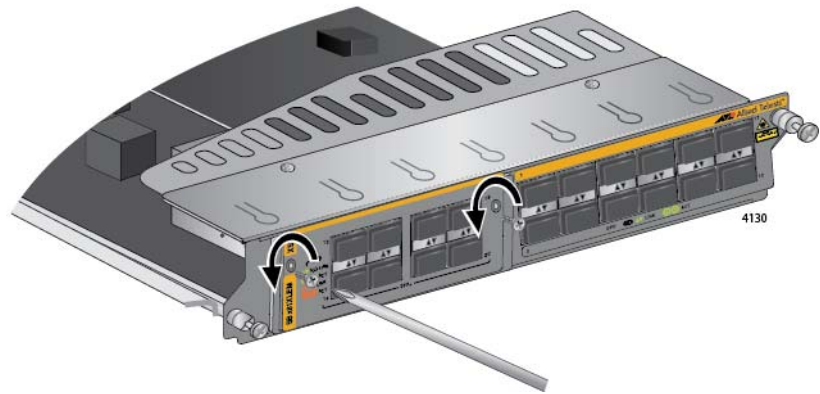


Figure 178. Removing the Screws from the Expansion Module

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 179.

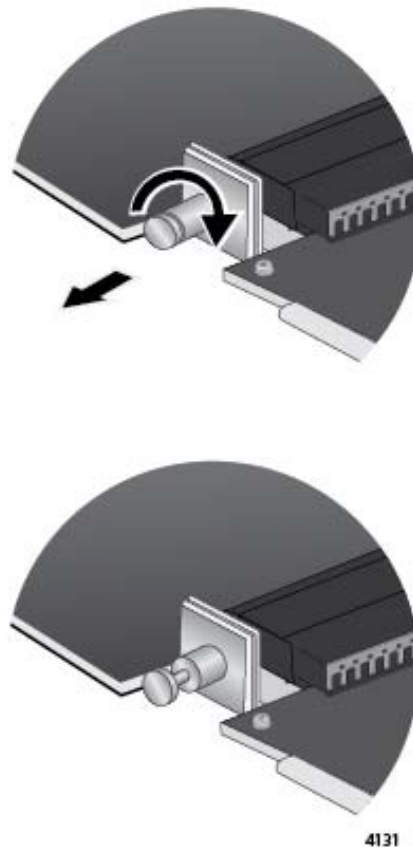


Figure 179. Retracting the Retaining Pin on the AT-SBx81XLEM Line Card

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 180.

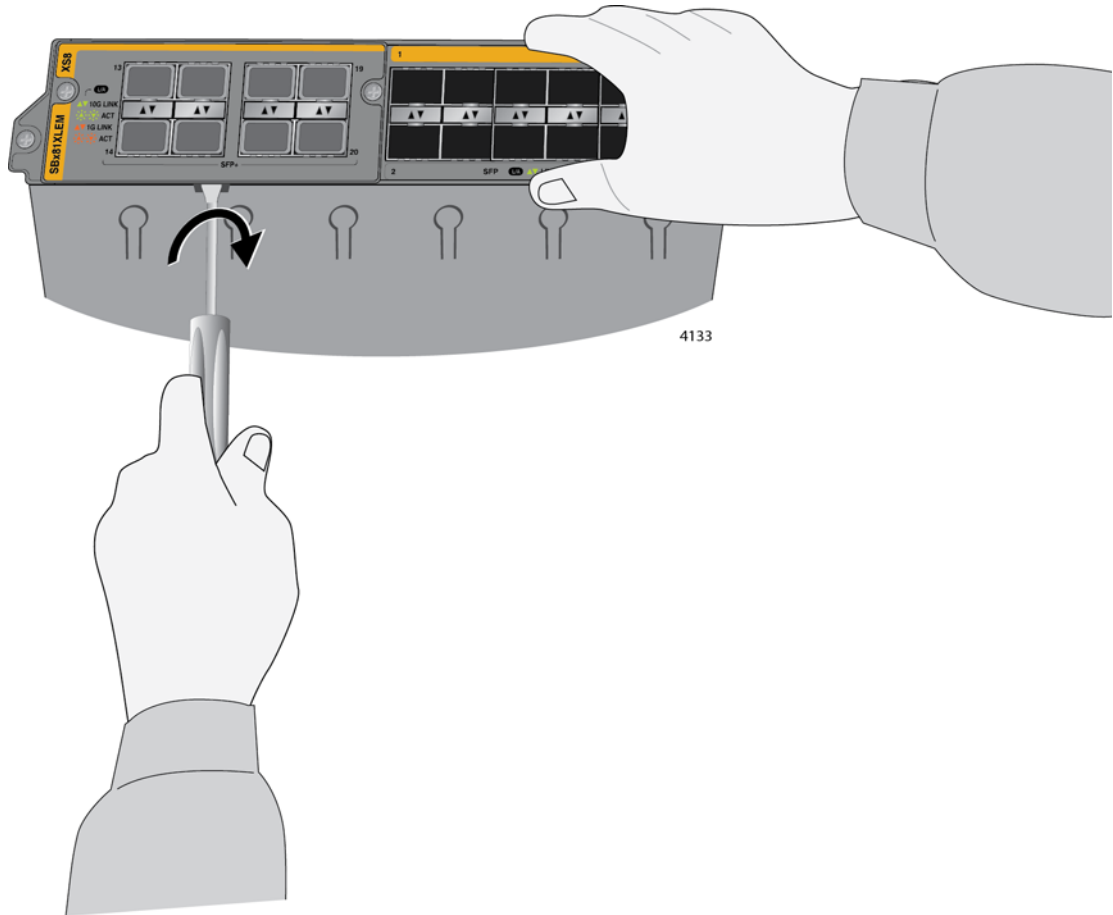


Figure 180. Disconnecting the Expansion Module from the AT-SBx81XLEM Line Card

6. Slide the expansion module from the line card. Refer to Figure 181 on page 292.

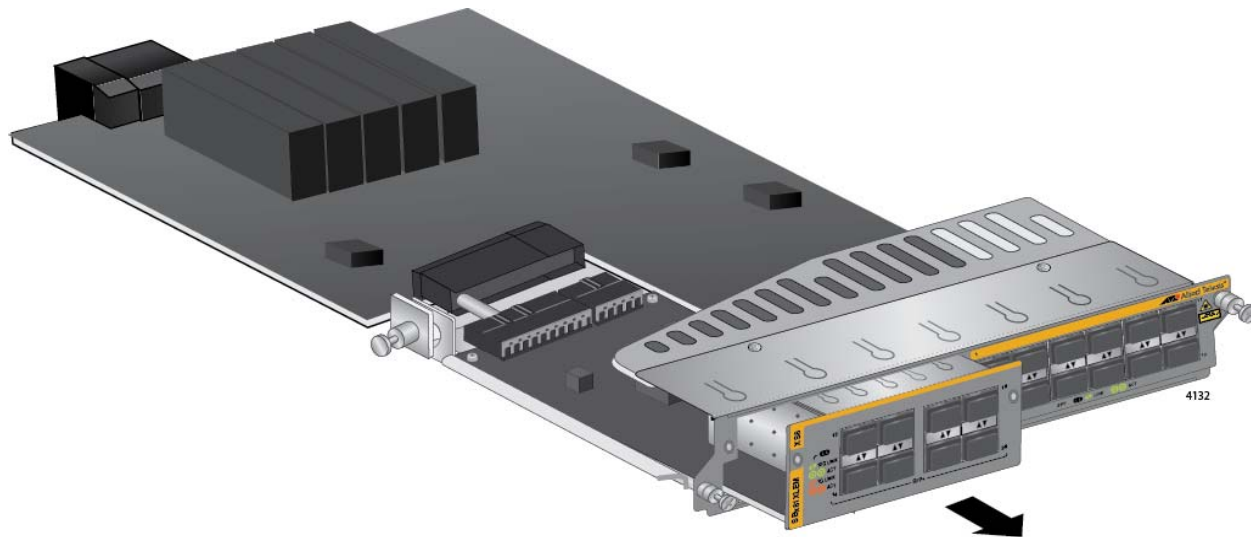


Figure 181. Sliding the Expansion Module from the AT-SBx81XLEM Line Card

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 182.



Figure 182. 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 158 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 183 on page 293.

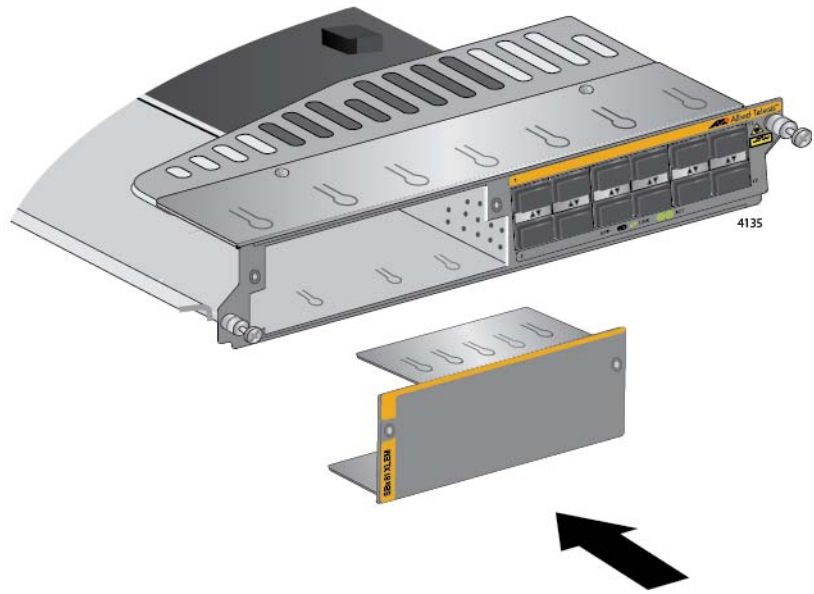


Figure 183. Sliding the Blank Slot Cover into the AT-SBx81XLEM Line Card

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 184.

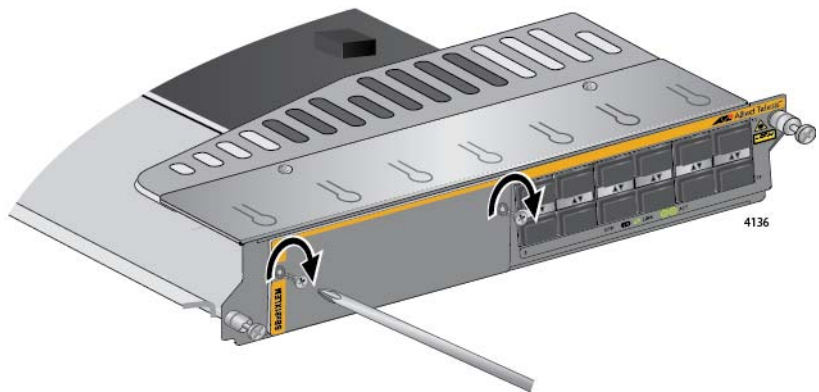


Figure 184. Securing the Blank Slot Cover

11. Turn the retaining pin on the side of the card a quarter turn to release it. Refer to Figure 185 on page 294.

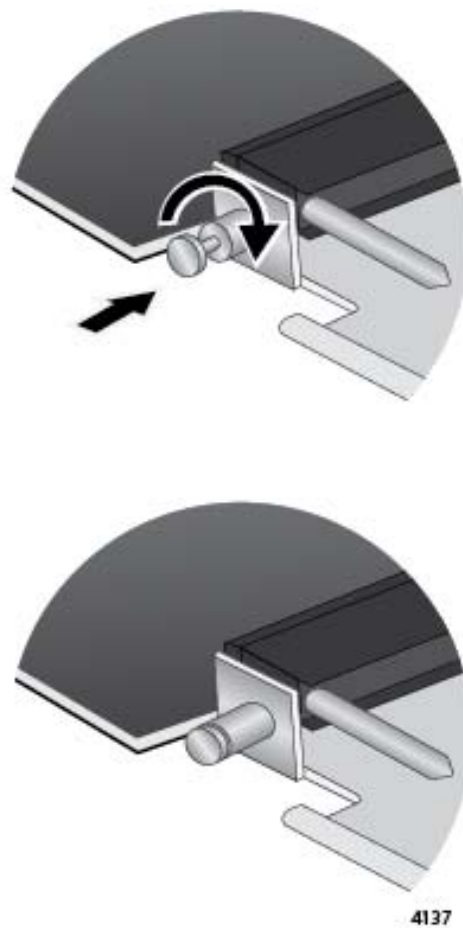


Figure 185. Releasing the Retaining Pin

12. To install the line card back in the chassis, go to “Installing Ethernet Line Cards” on page 166 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 296.

### 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 140 on page 219.
2. Remove the controller card from the chassis. Refer to “Removing a Controller Card” on page 297.
3. Install the new controller card. Refer to “Installing AT-SBx81CFC960 Controller Fabric Cards” on page 152.

---

#### 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 140 on page 219.

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 78, 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 39 on page 79.

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 80. You need to determine if the Version 1 card has one of the AlliedWare Plus releases in Table 21 on page 80. 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 21 on page 80, 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 152.

## 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 150 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 186 on page 298.



Figure 186. 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 187.

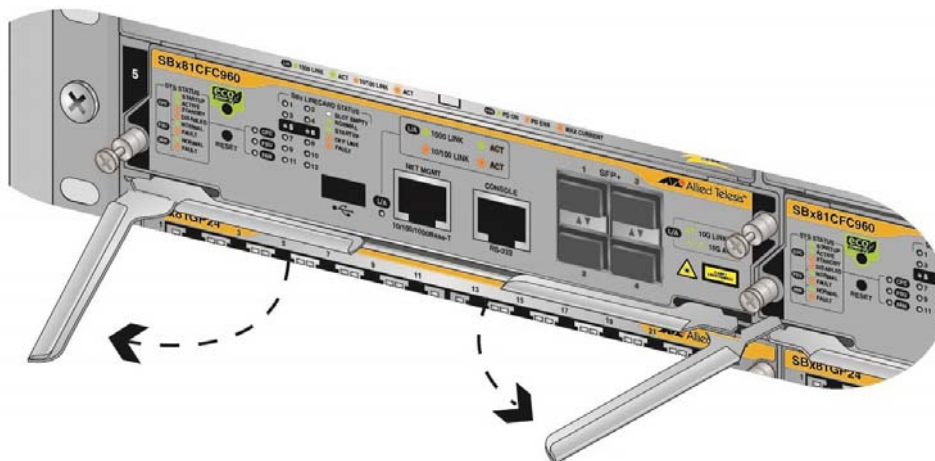


Figure 187. Pulling out the Retaining Handles on the AT-SBx81CFC960 Controller Card

5. Carefully remove the card from the chassis. Refer to Figure 188 on page 299.



**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 74 on page 151.

**Caution**

Do not hold the controller card by its retaining handles. You might bend them.

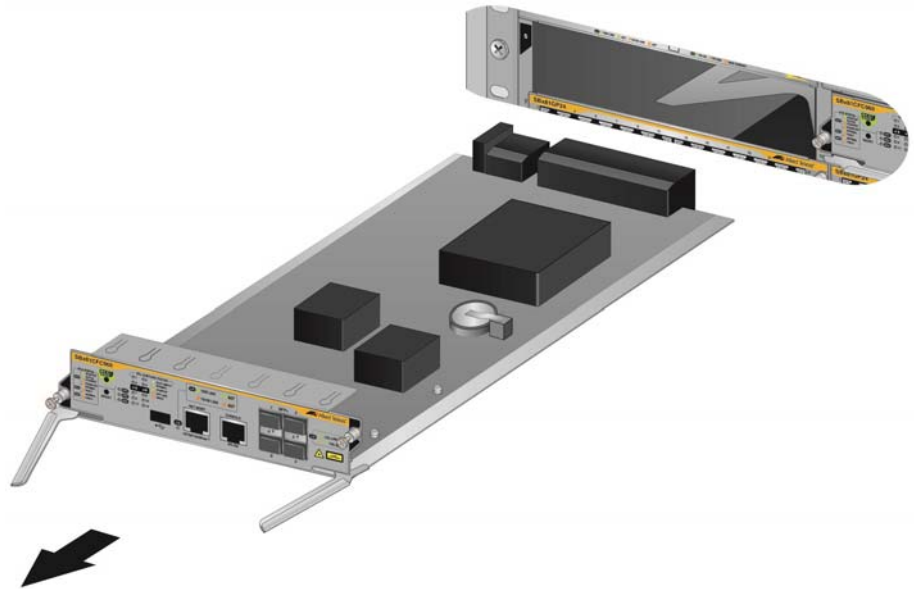


Figure 188. Removing the AT-SBx81CFC960 Controller Card

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 152.
  - 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 171.
  - 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 189 on page 301.

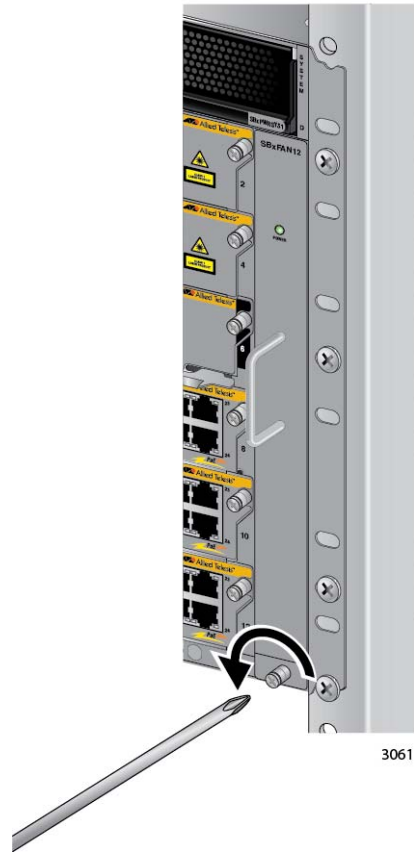


Figure 189. Loosening the Screw on the AT-SBxFAN12 Fan Module

3. Carefully pull on the handle to disconnect the fan module from the connector on the backplane of the chassis. Refer to Figure 190 on page 302.



Figure 190. Loosening the AT-SBxFAN12 Fan Module from the Backplane Connector

4. Slowly pull out the module 51 mm (2 in.). Refer to Figure 191 on page 303.



Figure 191. Withdrawing the AT-SBxFAN12 Fan Module 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 192 on page 304.



**Caution**

The fan module is heavy. Be sure to use both hands to hold it as you remove it from the chassis.

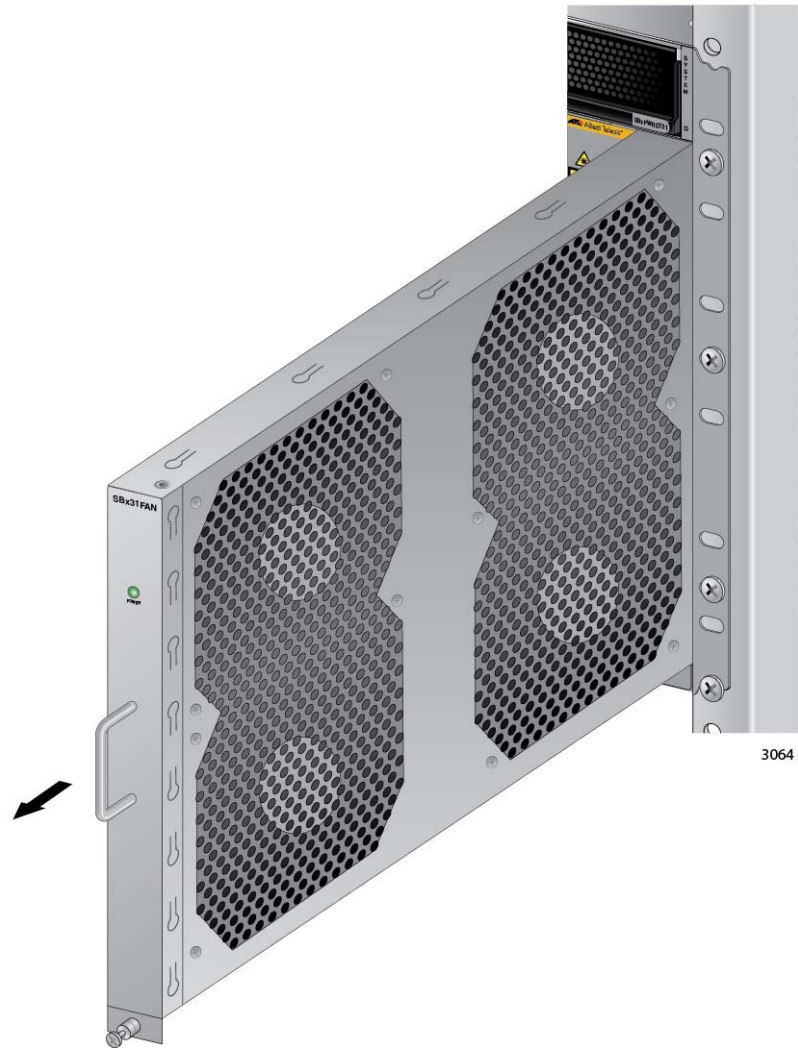


Figure 192. Removing the AT-SBxFAN12 Fan Module from the Chassis

### **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 300. 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 193 on page 305.



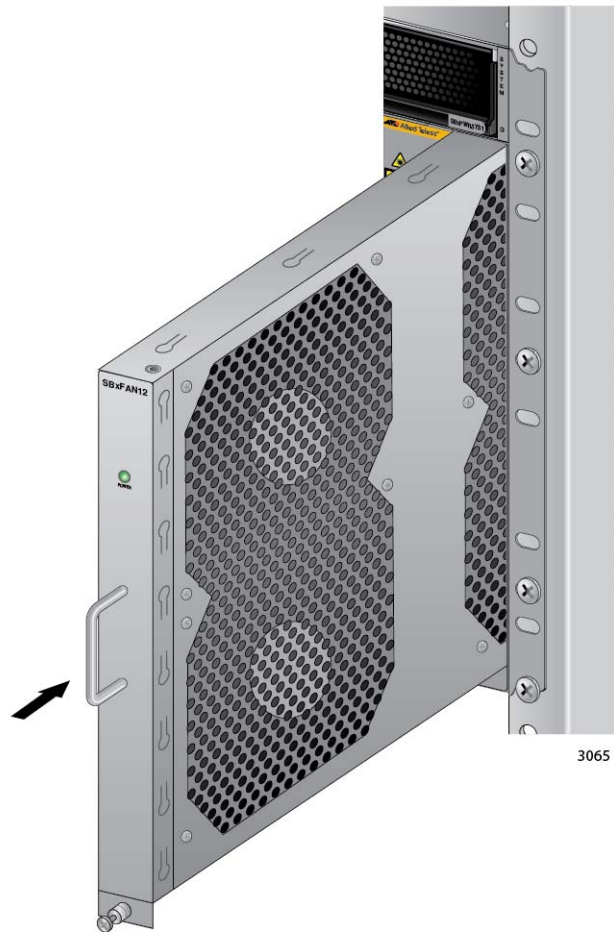


Figure 193. Installing a New AT-SBxFAN12 Fan Module

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 194 on page 306.



Figure 194. 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 195 on page 307.

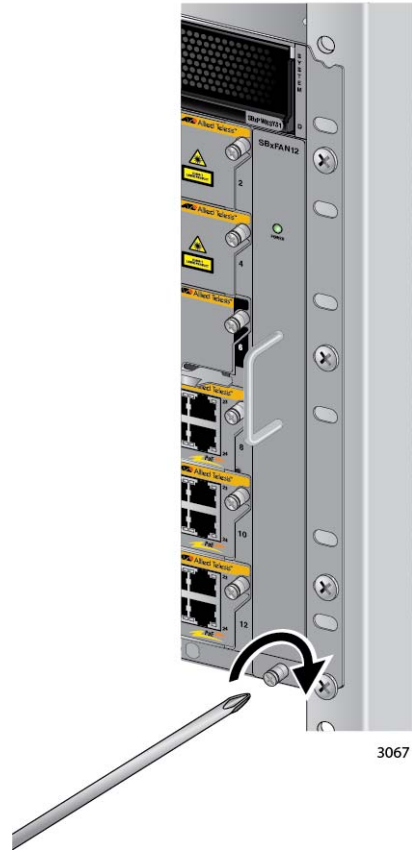


Figure 195. Tightening the Screw on the AT-SBx81CFC960 Fan Module

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 310
- ❑ “Upgrading the Controller Fabric Card” on page 312

## 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 312.

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:

```
awpl us> enabl e
awpl us#
```

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 runni ng-confi g usb: /fi l ename>
```

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”.

```
awpl us# copy runni ng-confi g usb: /Engi nneri ng_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 152.

---

**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 201.
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 241.
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:

```
awpl us> enabl e
awpl us#
```

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:

```
awpl us# configure terminal
awpl us(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: /Engineering_sw1.cfg
```

19. Enter the `EXIT` command to return to the Privileged Exec mode.

```
awpl us(config)# exit
awpl us#
```

20. Enter the `REBOOT` command in the Privileged Exec mode to reboot the chassis.

```
awpl us# 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

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This section contains the following chapters:

- ❑ Chapter 15, “VCStack Plus Overview” on page 319
- ❑ Chapter 16, “Building a Stack” on page 333



## 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 320
- ❑ “Stack Trunk” on page 321
- ❑ “Cabling Configurations for the Trunk” on page 323
- ❑ “VCStack Plus Feature License” on page 326
- ❑ “Optional Feature Licenses” on page 327
- ❑ “Chassis ID Numbers” on page 328
- ❑ “Priority Numbers” on page 329
- ❑ “Stacking Guidelines” on page 331

## Overview

---

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 32.

Table 32. 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:

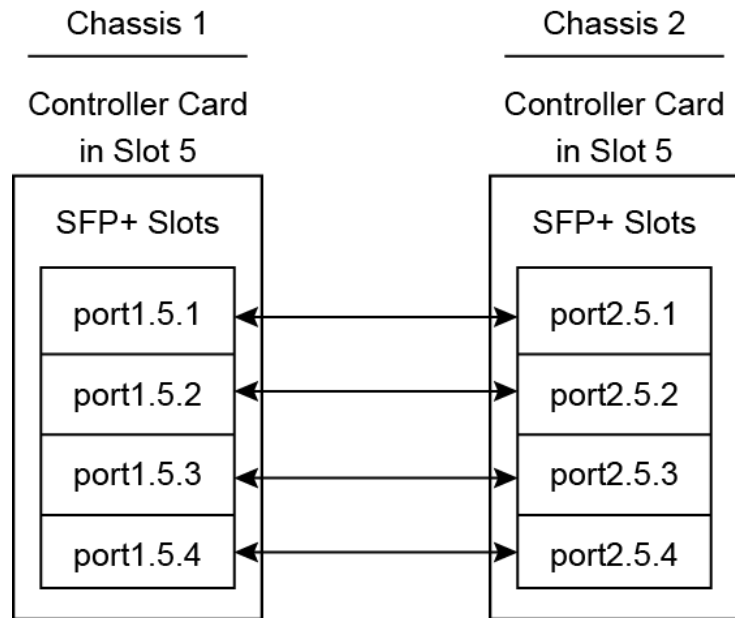
- ❑ You must build the trunk with Allied Telesis 10Gbps SFP+ transceivers or direct connect cables. The switches will not form the stack with transceivers or cables from other network equipment manufacturers.
- ❑ The stack uses all the links in the trunk to actively forward traffic between the switches.
- ❑ 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 196 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.



3260

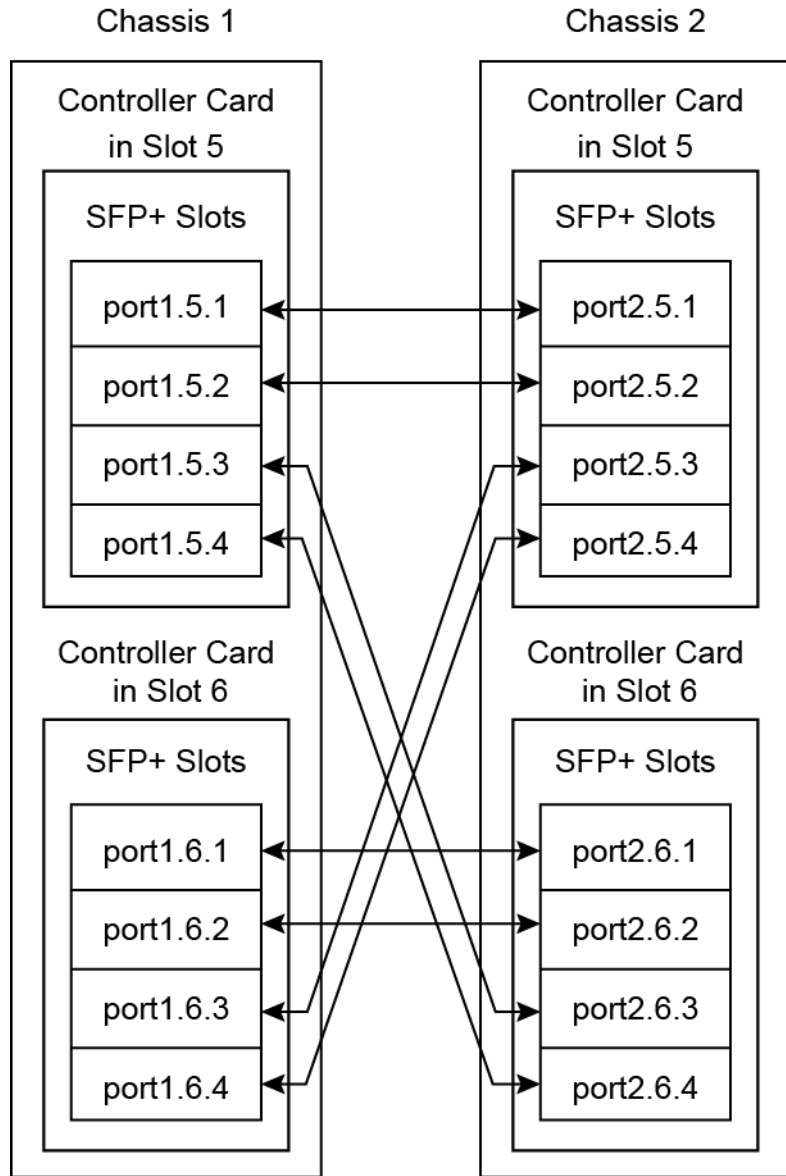
Figure 196. Cabling the SFP+ Slots When Both Switches have One Controller Card

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 197 illustrates the wiring configuration of the trunk when both switches have two controller cards.



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Figure 197. Cabling the SFP+ Slots When Both Switches have Two Controller Cards

Table 33 on page 325 presents the same information, in table format.

Table 33. 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 333 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 198.

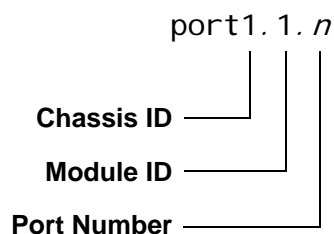


Figure 198. Chassis ID Number in the Numbering Format

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 329.)



## 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 321.
- ❑ The default setting for stacking is disabled.
- ❑ The switches have to be assigned 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 328.
- ❑ 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.



## Chapter 16

# Building a Stack

---

This chapter contains step-by-step instructions on how to configure the switches to build a stack with the VCStack Plus feature. The chapter contains the following sections:

- ❑ “Before You Begin” on page 334
- ❑ “Displaying the Management Software Version Number” on page 335
- ❑ “Activating the VCStack Plus Feature License” on page 337
- ❑ “Enabling the Stacking Feature” on page 339
- ❑ “Displaying the Feature Licenses” on page 341
- ❑ “Setting the ID Number” on page 343
- ❑ “Setting the Priority Number” on page 347
- ❑ “Powering Off the Chassis” on page 348
- ❑ “Configuring the Second Chassis” on page 349
- ❑ “Cabling the SFP+ Slots on the Controller Cards” on page 350
- ❑ “Powering On the Stack” on page 351
- ❑ “Verifying the Stack” on page 355
- ❑ “Installing Optional Feature Licenses” on page 357
- ❑ “Troubleshooting the Stack” on page 358

## 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 201.
- ❑ You verified the operations of the chassis with the procedures in Chapter 11, “Verifying the Hardware Operations of the Chassis” on page 241.
- ❑ 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 326.
- ❑ 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 321.

## 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 244.

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:

```
awpl us>
```

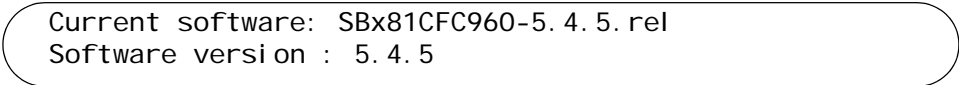
3. Enter the ENABLE command to move from the User Exec mode to the Privileged Exec mode:

```
awpl us> enabl e
awpl us#
```

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

```
awpl us# show system
```

5. Examine the output of the command for the lines in Figure 199.



```
Current software: SBx81CFC960-5. 4. 5. rel
Software versi on : 5. 4. 5
```

Figure 199. 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 321.
  - 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 337.
- ❑ 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 337. 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 337.



## 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:

```
l i cense 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:

```
awpl us# l i cense VCStackPI us 1234ABCD
```

---

**Note**

If the chassis has two controller cards, the active controller automatically activates the VCStack Plus feature license on the standby controller.

---

After you enter the command, the switch displays the prompt in Figure 200:

```
A restart of affected modules may be required.  
Would you like to continue? (y/n)
```

Figure 200. 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 VCStack Plus feature license with the standby card and displays the messages in Figure 201.

```
Card 1.5 installed 1 license  
Card 1.6 installed 1 license  
  
2 licenses installed
```

Figure 201. LICENSE Command Message with Two Controller Cards

If the chassis has only one controller card, the controller card displays the message in Figure 202.

```
Card 1.5 installed 1 license  
  
1 license installed
```

Figure 202. LICENSE Command Message with One Controller Card

3. Go to “Enabling the Stacking Feature” on page 339.

## Enabling the Stacking Feature

Now that you have activated the VCStack 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:

```
awpl us# confi gure termi nal
awpl us(confi g)#
```

2. Enter the STACK ENABLE command to activate the VCStack Plus feature:

```
awpl us(confi g)# stack enabl e
```

The switch displays the messages in Figure 203

% 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 203. STACK ENABLE Command Messages

The messages are described in Table 34.

Table 34. 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 34. 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.

```
awpl us(config)# exit
awpl us#
```

4. Enter the COPY RUNNING-CONFIG command to save your changes:

```
awpl us# 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.

```
awpl us# show li cense bri ef
```

Figure 204 is an example of the information.

```
OEM Terri tory: ATI USA
Software Feature Li cense
-----
0          Base Li cense      1          Base Li cense
1          VCStackPI us      1          VCStack-PI us

Current enabled features for di splayed li censes:
I Pv6Basi c, LAG-FULL, MLDSnoop, RADI US-100, Vi rtual -MAC, VRRP, VCStack-PI us
```

Figure 204. 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 337.
  - ❑ (2) Verify that the VCStack Plus feature is enabled on the switch. If it is not enabled, repeat “Enabling the Stacking Feature” on page 339
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 343.
  - ❑ 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 343. 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:

```
awpl us# show stack
```

Figure 205 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 205. 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 205 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 347. 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:

```
awpl us# configure terminal
awpl us(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:

```
awpl us(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 206.

```
% 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 206. STACK RENUMBER Command Messages

The messages are described in Table 35 on page 345.



Table 35. 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.

5. After changing the ID number, enter the EXIT command to return to the Privileged Exec mode:

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

6. Enter the SHOW STACK command again to confirm your change.

An example of the window is shown in Figure 207 on page 346.

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

Figure 207. 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 329. If you do not want to set the priority number, go to “Powering Off the Chassis” on page 348.

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.

```
awpl us# confi gure termi nal
awpl us(confi g)#
```

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> pri ori ty <pri ori ty_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:

```
awpl us(confi g)# stack 1 pri ori ty 1
```

The switch displays the following prompt:

```
% Warni ng: Stacki ng i s currentl y di sabl ed.
```

3. Enter the `EXIT` command to return to the Privileged Exec mode:

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

4. Enter the `SHOW STACK` command to confirm your change. Refer to Figure 207 on page 346. 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:

```
awpl us# copy runni ng-confi g startup-confi g
```

This completes the procedure for configuring the chassis for the stacking feature. Go to “Powering Off the Chassis” on page 348.

## 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 69 on page 145.

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 349.
- ❑ If you are finished configuring both chassis, go to “Cabling the SFP+ Slots on the Controller Cards” on page 350.

---

### 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 350.

---

## Configuring the Second Chassis

---

Configure the second chassis by repeating the previous procedures, starting with “Displaying the Management Software Version Number” on page 335. Please note the following as you configure the second unit:

- ❑ In “Displaying the Management Software Version Number” on page 335, 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 337, be sure to assign the second chassis a VCStack Plus license.
- ❑ In “Activating the VCStack Plus Feature License” on page 337, 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 343, 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 350.

## 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 321 and “Cabling Configurations for the Trunk” on page 323 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 194.
- ❑ For AT-SP10TW Cables, refer to “Installing AT-SP10TW Cables” on page 199.

---

**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 351.

## 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 351. 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 352 or “Verifying the Stack” on page 355.

---

### 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 329.
- ❑ 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 203 and “Powering On AT-SBxPWRPOE1 Power Supplies” on page 207, respectively.
- ❑ To power on the AT-SBxPWRSYS1 DC Power Supply, turn the power switch to on. Refer to Figure 69 on page 145.

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 352.
- ❑ If you do not want to monitor the initialization process, go to “Verifying the Stack” on page 355.

## Monitoring the Boot Up Sequence

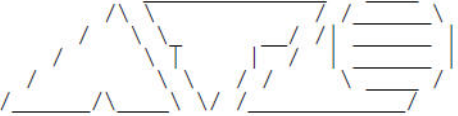
You may monitor the initialization process by connecting a terminal or PC with a terminal emulator program to the Console port on any of the controller cards and watch the status messages, shown in Figure 208 on page 353 and Figure 209 on page 354. (The settings for the terminal or terminal emulator program are found in “Using Local Management to Verify the Chassis” on page 244.)

After the stack has completed the initialization process, go to “Verifying the Stack” on page 355.



```

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.rel
Original release filename: SBx81CFC400-5.4.5-.0.rel
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 208. 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, uidd, 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, mstp, 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 209. 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:

```
awpl us> enable
awpl us#
```

3. In the Privileged Exec mode, enter the SHOW STACK command.

```
awpl us# show stack
```

Figure 210 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 210. 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 357. 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 358.

## 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 355. 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 261 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 337 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 339.
- ❑ 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 343.

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 341 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 port 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 362
- “Environmental Specifications” on page 365
- “Power Specifications” on page 366
- “Safety and Electromagnetic Emissions Certifications” on page 370
- “Port Pinouts” on page 371
- “Fiber Optic Specifications of the AT-StackOP/0.3 and AT-StackOP/9.0 Transceivers” on page 373

## Physical Specifications

### Dimensions (W x D x H)

Table 36. 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-SBx81GT40	
AT-SBx81GP24	
AT-SBx81GS24a	
AT-SBx81GC40	
AT-SBx81XS6	
AT-SBx81XS16	
AT-SBx81XLEM	

Table 36. 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 37. 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-SBx81GT40 Line Card	1.04 kg (2.30 lb)
AT-SBx81GP24 PoE Line Card	1.06 kg (2.34 lb)
AT-SBx81GS24a SFP Line Card	1.06 kg (2.34 lb)
AT-SBx81GC40 SFP and CSFP Line Card	1.11 kg (2.45 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)
AT-SBx81XLEM/XS8 Expansion Module	0.3 kg (0.65 lb)

Table 37. Product Weights (Continued)

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

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Table 38. 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 39. 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 40. 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 41. 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 42. Typical Power Savings in eco-friendly Mode

AT-SBx81GT24	0.12 W
AT-SBx81GT40	0.79 W
AT-SBx81GP24	0.24 W
AT-SBx81GS24a	0.20 W
AT-SBx81GC40	0.42 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 42. Typical Power Savings in eco-friendly Mode

AT-SBx81XLEM and AT-SBx81XLEM/XS8	0.20 W
AT-SBx81XLEM and AT-SBx81XLEM/XT4	0.09 W

**Maximum power consumption (Watts)**

Table 43. Maximum Power Consumption

AT-SBx81GT24	34.4 W
AT-SBx81GT40	53.9 W
AT-SBx81GP24	34.4 W
AT-SBx81GS24a	56.3 W
AT-SBx81GC40	64.0 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 44. Maximum Power Efficiency

AT-SBxPWRSYS1 AC	Up to 90%
AT-SBxPWRSYS2 AC	Up to 85%

Table 44. Maximum Power Efficiency (Continued)

AT-SBxPWRPOE1 AC	Up to 90%
AT-SBxPWRSYS1 DC	Up to 90%

**Heat dissipation (British Thermal Units/hour)**

Table 45. Heat Dissipation

AT-SBx81GT24	117.39 BTU/hr
AT-SBx81GT40	183.93 BTU/hr
AT-SBx81GP24	117.39 BTU/hr
AT-SBx81GS24a	192.12 BTU/hr
AT-SBx81GC40	272.8 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
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 46. 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 47. 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 48. PoE Mode on the AT-SBx81GP24 PoE Line Card

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 49. 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 Line Card
- ❑ AT-SBx81XLEM/XT4 Expansion Module
- ❑ AT-SBx81XLEM/GT8 Expansion Module
- ❑ NET MGMT port on the AT-SBx81CFC960 Controller Fabric Card.

Figure 211 illustrates the pin layouts for the ports.

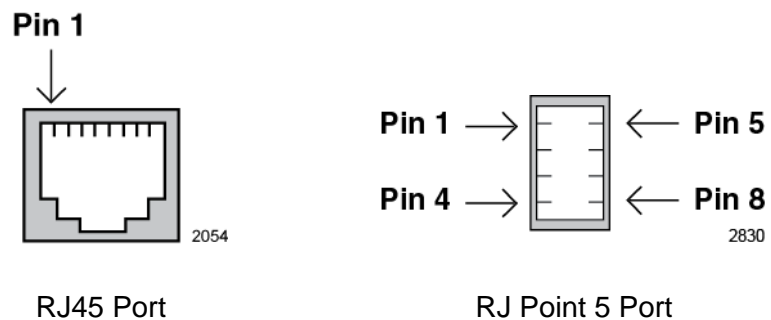


Figure 211. Pin Numbers for RJ-45 and RJ Point 5 Ports (Front View)

Table 50 lists the pin signals when a twisted-pair port is operating in the MDI configuration.

Table 50. MDI Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-

Table 51 on page 372 lists the port pin signals for the MDI-X configuration.

Table 51. MDI-X Pin Signals (10Base-T or 100Base-TX)

Pin	Signal
1	RX+
2	RX-
3	TX+
6	TX-

Table 52 lists the port pin signals for twisted pair ports operating at 1000 Mbps or 10 Gbps.

Table 52. 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 53 lists the fiber optic port specifications for the AT-StackOP/0.3 transceiver.

Table 53. 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 54 lists the fiber optic port specifications for the AT-StackOP/9.0 transceiver.

Table 54. 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 54. 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