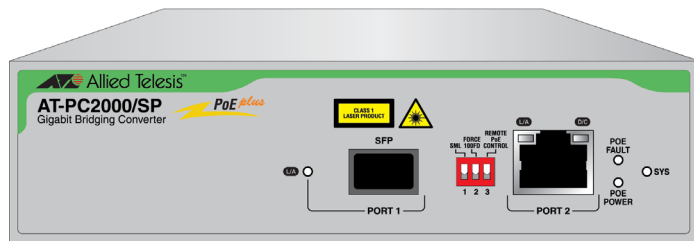
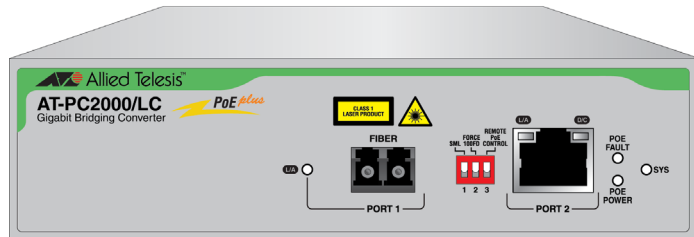
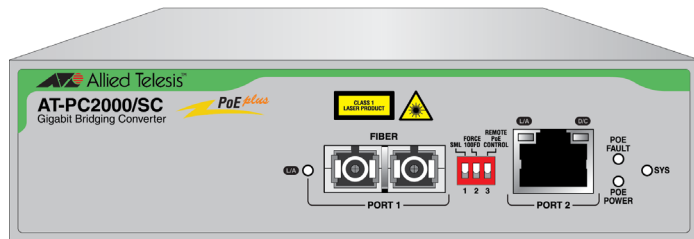
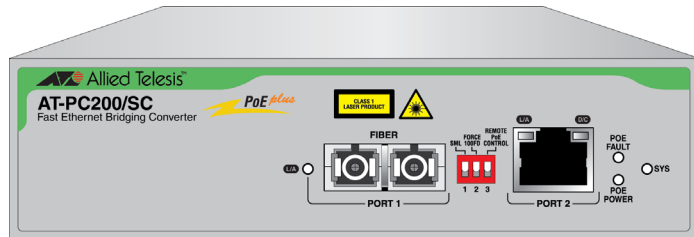


# PC2000/200 Series

## PoE+ Switching Media Converters

- ❑ AT-PC2000/SC
- ❑ AT-PC2000/LC
- ❑ AT-PC2000/SP
- ❑ AT-PC200/SC



# Installation Guide

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# Electrical Safety and Emissions Standards

---

This section contains the following:

- “US Federal Communications Commission”
- “Industry Canada”
- “Emissions, Immunity and Electrical Safety Standards” on page 4
- “Translated Safety Statements” on page 4

## US 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

---

### Radiated Energy

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.

## Emissions, Immunity and Electrical Safety Standards

---

RFI Emissions    FCC Class A, EN55022 Class A, CISPR 22 Class A, VCCI Class A, RCM



### Warning

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. ⚡ E84

---

EMC (Immunity)    EN55024, EN61000-3-2, EN61000-3-3

Electrical Safety    EN60950-1 (TUV), UL 60950-1 (CULUS)



### Warning

Laser Safety: EN60825 ⚡ L7

---

## 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 the Allied Telesis website at [www.alliedtelesis.com/support](http://www.alliedtelesis.com/support).

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# Preface

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This preface contains the following sections:

- “Symbol Conventions” on page 12
- “Contacting Allied Telesis” on page 13

This guide contains the installation instructions for the following PoE+ Switching Media Converters.

- AT-PC2000/SC
- AT-PC2000/SP
- AT-PC2000/LC
- AT-PC200/SC

## Symbol Conventions

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This document uses the following conventions:

---

**Note**

Notes provide additional information.

---



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**Caution**

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

---



---

**Warning**

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

---



---

**Warning**

Laser warnings inform you that an eye and 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 questions in our knowledge database, check support tickets, learn about Return Merchandise Authorizations (RMAs), and 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 an RMA request via our interactive support center.
- Documentation - View the most recent installation guides, user guides, software release notes, white papers and data sheets for your product.
- Software Updates - Download the latest software releases for your product.

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



## Chapter 1

# Overview

---

This chapter contains the following sections:

- “Introduction” on page 16
- “Features” on page 17
- “Front and Back Panels” on page 25
- “Twisted-Pair Port” on page 27
- “Reset the Media Converter” on page 28

This chapter describes the following Switching Media Converters:

- AT-PC2000/SC
- AT-PC2000/SP
- AT-PC2000/LC
- AT-PC200/SC

## Introduction

---

The PC2000/200 Series Switching Media Converters include the following models:

- AT-PC2000/SC
- AT-PC2000/SP
- AT-PC2000/LC
- AT-PC200/SC

The PC2000/200 Series Switching Media Converters are designed to extend the distance of your network by interconnecting LAN devices that are physically separated by large distances. These converters also can provide power to network devices via the Power over Ethernet (PoE+) twisted-pair port.

These media converters:

- Provide a smaller-sized space-saving alternative that allows enterprises to connect copper networks to fiber networks, offering a cost-effective method for integrating fiber-optic cabling into a 10/100/1000 or 10/100 UTP environment:
  - The AT-PC2000/SC and AT-PC2000/LC connect 10/100/1000Mbps copper networks to 1000Mbps fiber networks.
  - The AT-PC2000/SP connects 10/100/1000Mbps copper networks to 100/1000Mbps fiber networks.
  - The AT-PC200/SC connects 10/100Mbps copper networks to 100Mbps fiber networks.
- Operate at 1000Mbps full duplex (AT-PC2000/SC and AT-PC2000/LC), 100/1000 Mbps full duplex (AT-PC2000/SP, depending on the SFP type), or 100Mbps full duplex (AT-PC200/SC).
- Can be installed on a desktop or can be wall mounted: easy to install and do not require any software configuration or management.
- Optional Speed/Duplex, Smart MissingLink™ (SML), and remote PoE settings may be configured using DIP switches.
- Internal AC power supply.



## Features

---

Here are the key features of the PC2000/200 Series converters:

### **AT-PC2000/SC and AT-PC2000/LC**

- 1000Base-SX fiber-optic port
- PoE+ via twisted-pair port
- Auto Negotiation or fixed 100Mbps full duplex and Auto MDI/MDI-X on 10/100/1000 twisted-pair port. The 10/100/1000 twisted-pair port will auto-negotiate to match the existing copper infrastructure or can be forced to 100Mbps full-duplex operation.
- Support for Jumbo frames up to 10kB
- LEDs for unit and port status
- SML DIP switch for activating the SML feature which notifies end nodes of connection failures
- DIP switch for activating remote PoE which allows you to remotely power cycle your PoE device.
- 35W internal AC power supply

### **AT-PC2000/SP**

- SFP port supporting 1000-SF/LX and 100-FX/LX SFP modules
- PoE+ via twisted-pair port
- Auto Negotiation or fixed 100Mbps full duplex and Auto MDI/MDI-X on 10/100/1000 twisted-pair port. The 10/100/1000 twisted-pair port will auto-negotiate to match the existing copper infrastructure or can be forced to 100Mbps full-duplex operation.
- Support for Jumbo frames up to 10kB
- LEDs for unit and port status
- SML DIP switch for activating the SML feature which notifies end nodes of connection failures
- DIP switch for activating remote PoE which allows you to remotely power cycle your PoE device.
- 35W internal AC power supply

### **AT-PC200/SC**

- 100Base-FX fiber-optic port
- PoE+ via twisted-pair port
- Auto Negotiation or fixed 100Mbps full duplex and Auto MDI/MDI-X on 10/100 twisted-pair port. The 10/100 twisted-pair port will auto-

negotiate to match the existing copper infrastructure or can be forced to 100Mbps full-duplex operation.

- Support for Jumbo frames up to 10kB
- LEDs for unit and port status
- SML DIP switch for activating the SML feature which notifies end nodes of connection failures
- DIP switch for activating remote PoE which allows you to remotely power cycle your PoE device.
- 35W internal AC power supply

## Twisted-Pair Port

Here are the basic features of the twisted-pair (copper) port:

- 10/100/1000 Mbps (AT-PC2000/SC, AT-PC2000/LC, AT-PC2000/SP) or 10/100 Mbps (AT-PC200/SC)
- 10/100/1000Base-T compliant (AT-PC2000/SC, AT-PC2000/LC, AT-PC2000/SP) or 10/100Base-T compliant (AT-PC200/SC)
- IEEE 802.3u Auto-Negotiation compliant
- IEEE 802.3at PoE compatible
- Auto MDI/MDI-X
- 100 meters (328 feet) maximum operating distance
- RJ45 connector

## Power over Ethernet

Power over Ethernet (PoE+) technology permits both power and data to be transmitted over an Ethernet cable. Both PoE (IEEE802.3af) and PoE+ (IEEE802.3at) are supported on the twisted-pair port of the media converter. Here is a summary of the PoE feature:



### 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

---

Powered device classes 0, 1, 2, 3 and 4 are supported.

PoE is enabled by default: REMOTE PoE CONTROL DIP switch 3 in the down (off) position. If DIP switch 3 is set to the up (on) position, PoE is only enabled when the fiber link is up: this allows you to remotely power cycle your PoE device. See Figure 1.

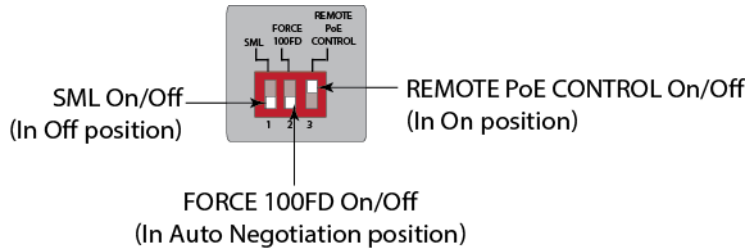


Figure 1. PC2000/200 Series Converter DIP Switches - Enabling Remote PoE

## Fiber Connection

The PC2000/200 Series converters support the following transceiver fiber connections:

- The AT-PC2000/SC has a fixed dual fiber SC 1000-X connection.
- The AT-PC2000/LC has a fixed dual fiber LC 1000-X connection.
- The AT-PC200/SC has a fixed dual fiber SC 100-FX connection.

For the maximum operating distance, refer to Table 12 on page 56.

- The AT-PC2000/SP has a plug-in SFP cage fiber connection. 1000-X and 100-FX modules are supported.

---

### Note

For the AT-PC2000/SP, you must purchase the SFP transceiver separately. For a list of supported transceivers, contact your Allied Telesis distributor or reseller.

---

## Auto MDI/ MDI-X

An RJ45 twisted-pair port on a 100 Mbps Ethernet network device can have one of two possible wiring configurations: MDI or MDI-X. The RJ45 port on a PC, router, or bridge is typically wired as MDI, while the twisted-pair port on a switch or hub is usually MDI-X.

The media converter features Auto MDI/MDI-X. The twisted-pair port automatically determines the configuration of the port on the device to which it is connected and then configures itself appropriately.

For example, if a port on a media converter is connected to a port on a bridge, which is typically wired as MDI, the port on the media converter automatically configures itself as MDI-X.

This feature allows you to use a straight-through cable when connecting any type of device to the media converter, regardless of the wiring configuration of the port on the device.

**LEDs** Figure 2 shows the media converter LEDs.

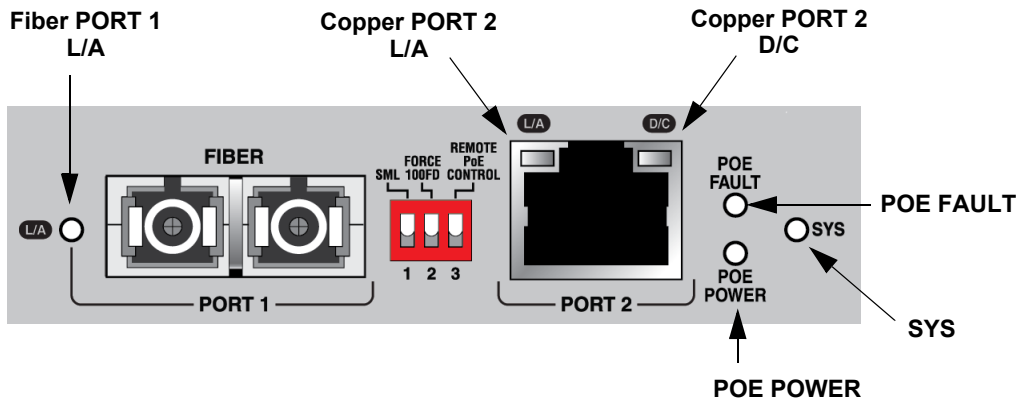


Figure 2. LEDs

Table 1 describes the media converter's LEDs.

Table 1. Media Converter LED Functional Descriptions

LED	State	Description
SYS	Off	The media converter is not operational and not passing traffic.
	Solid Green (with Heartbeat)	The media converter is operational. Note: The SYS LED flickers briefly at a regular interval. This "heartbeat" indicates that the internal system is running normally.
	Slow Blinking Green	An error is present on the media converter.
POE POWER	Off	The media converter is not supplying PoE power.
	Steady Green	The media converter is supplying power to the active PoE Powered Device. PoE is enabled.
POE FAULT	Steady Red	PoE fault condition.

Table 1. Media Converter LED Functional Descriptions (Continued)

LED	State	Description
Copper PORT 2 L/A (L = Link; A = Activity)	Off	The port has not established a link.
	Steady Green	The port has an established link to a network device, but it is not transmitting or receiving network packets.
	Rapid Blinking Green	The port is transmitting or receiving network packets.
	Slow Blinking Green	SML is on and detects a failure on the fiber port.
Copper PORT 2 D/C (Duplex/ Collision)	Off	The port has not established a link or the link is in Half-Duplex mode.
	Steady Green	The port has established a link in Full-Duplex mode.
	Slow Blinking Green	If slow blinking is unison with the Copper PORT 2 L/A LED, SML is on and detects a failure on the fiber port.
	Rapid Blinking Green	Collisions are occurring on the port.
Fiber PORT 1 L/A (L = Link; A = Activity)	Off	The port has not established a link.
	Steady Green	The port has an established link to a network device, but it is not transmitting or receiving network packets.
	Rapid Blinking Green	The port is transmitting or receiving network packets.
	Slow Blinking Green	SML is on and detects a failure on the local copper port or the remote copper port when operating in a back-to-back configuration with another media converter.

### Smart MissingLink™ (SML)

If one of the Ethernet connections to the media converter loses link, the Smart MissingLink™ (SML) feature allows you to determine which port still has a valid connection and which port requires troubleshooting. The value to this type of network monitoring and fault notification is that you can quickly determine which media converter port has failed and troubleshoot the specific area where the problem is occurring.

When the media converter detects a loss of connection on one of the ports, the port's L/A LED is turned off. At the same time, the media converter causes the opposite port's L/A LED to blink while simultaneously turning OFF that port's Ethernet connection to its end node. This occurs even though the properly operating port had a valid connection before the failure occurred: The reason for this is so that its end node is notified that the data path has been compromised, and immediate action is required.

For example, if the network connection to the media converter's twisted-pair port fails (as shown in Figure 5 on page 23), the fiber PORT 1 L/A LED blinks slowly while the fiber port's link is turned OFF. The copper PORT 2 L/A LED is turned OFF, indicating a failed connection on the twisted-pair port.

If the failure had started with the fiber-optic cabling (as shown in Figure 4), then the copper PORT 2 L/A LED would blink slowly, and the fiber PORT 1 L/A LED would turn OFF.

#### SML Example Scenarios

Following are example scenarios with one SML enabled media converter connected between two end nodes.

Figure 3 shows media converter and end node L/A LED behavior with SML enabled under normal conditions.

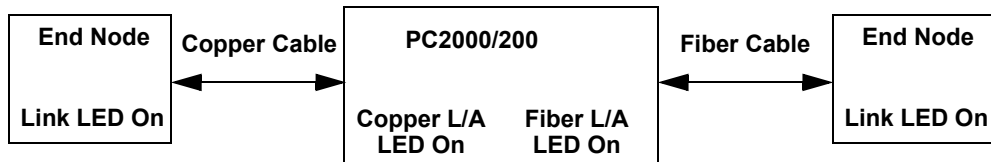


Figure 3. SML in Normal Condition

Figure 4 shows media converter and end node L/A LED behavior with SML enabled with a fiber connection down.

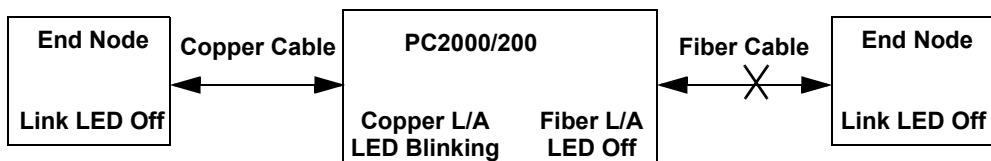


Figure 4. SML with Fiber Connection Down

Figure 5 shows media converter and end node L/A LED behavior with SML enabled with a copper connection down.

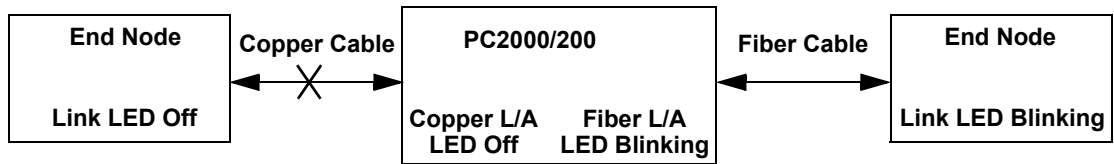


Figure 5. SML with Copper Connection Down

**SML Example Scenarios with Two Connected Media Converters**

Following are example scenarios with the PC 2000/200 series media converter and another SML enabled media converter connected back-to-back (bookend mode).

Figure 6 shows media converter and end node L/A LED behavior with SML enabled under normal conditions.

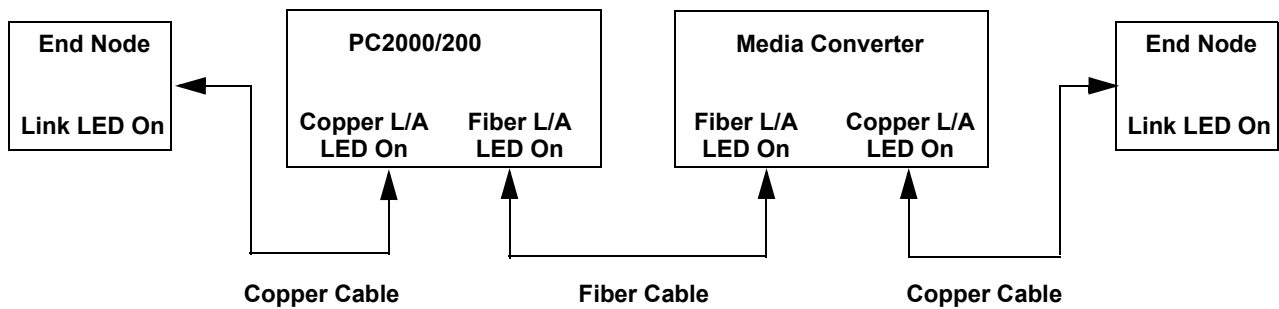


Figure 6. SML in Normal Condition with Two Media Converters

Figure 7 shows media converter and end node L/A LED behavior with SML enabled with a copper connection down between the PC2000/200 series media converter and an end node.

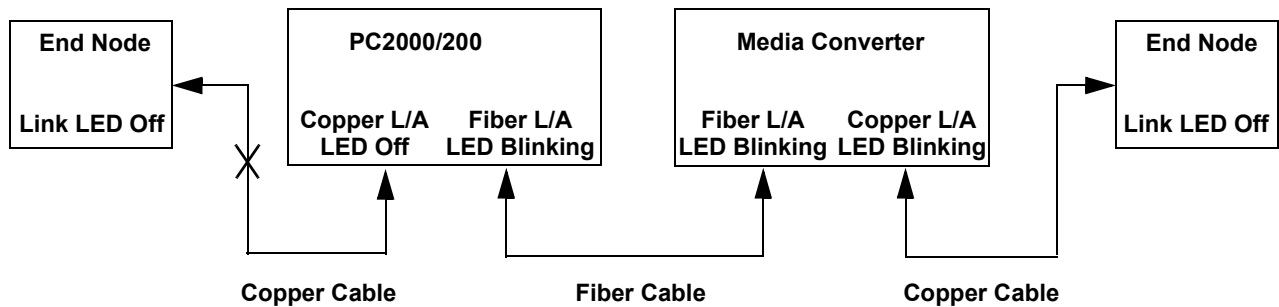


Figure 7. SML with Copper Connection to End Node Down

Figure 8 shows media converter and end node L/A LED behavior with SML enabled with a fiber connection down between the PC2000/200 series media converter and the other media converter.

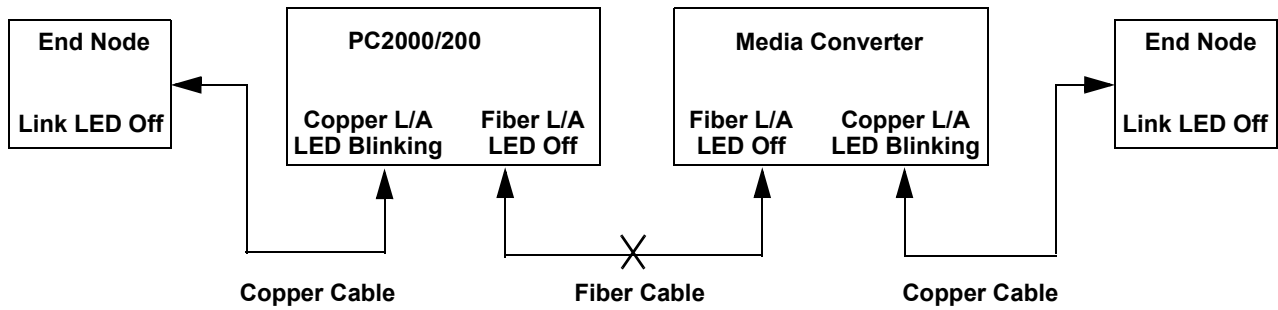


Figure 8. SML with Fiber Connection Between Media Converters Down

### Enabling SML

To enable SML on the unit, set the SML On/Off DIP switch on the front panel of the unit to the on (up) position. See Figure 9.

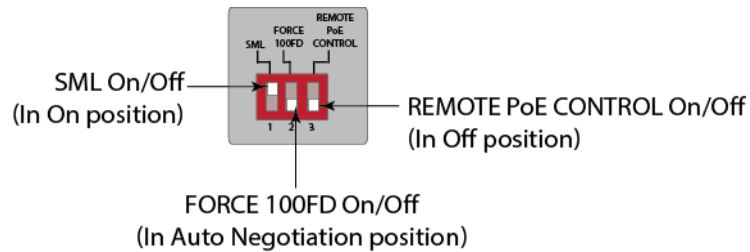


Figure 9. Enabling SML

### Power Supply

Each media converter has an internal power supply with a single AC power supply socket on the back panel. To power the switch on or off, connect or disconnect the power cord provided with the media converter. A power cord is supplied with the switch.

---

#### Note

For the power requirements, refer to “Power Specifications” on page 54.

---



## Front and Back Panels

The front panel features of the AT-PC2000/SC and AT-PC200/SC Media Converters are shown in Figure 10.

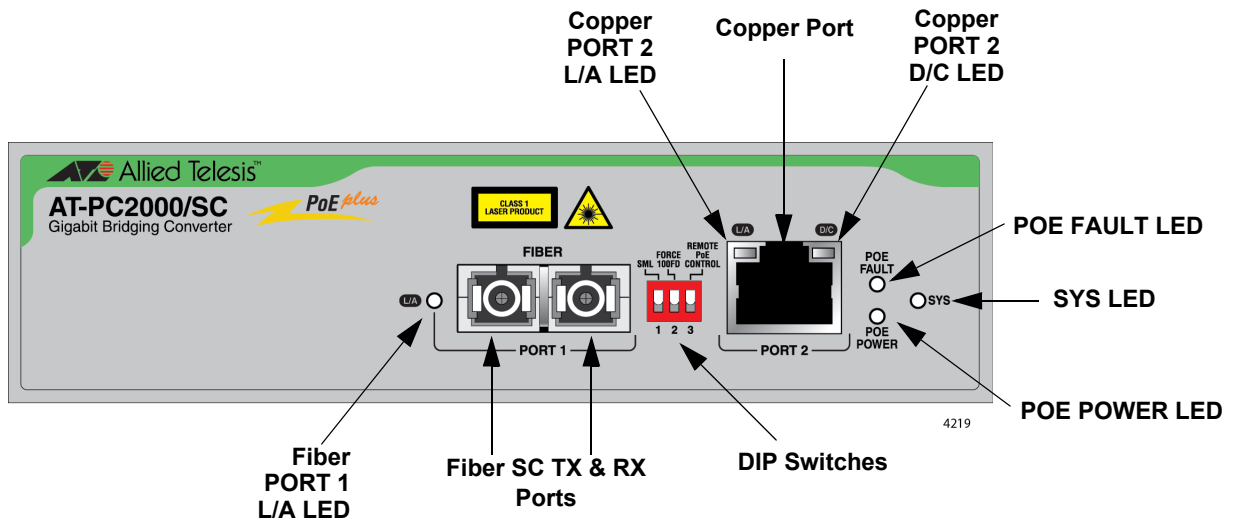


Figure 10. AT-PC2000/SC and AT-PC200/SC Front Panel Features

The front panel features of the AT-PC2000/LC Media Converter are shown in Figure 11.

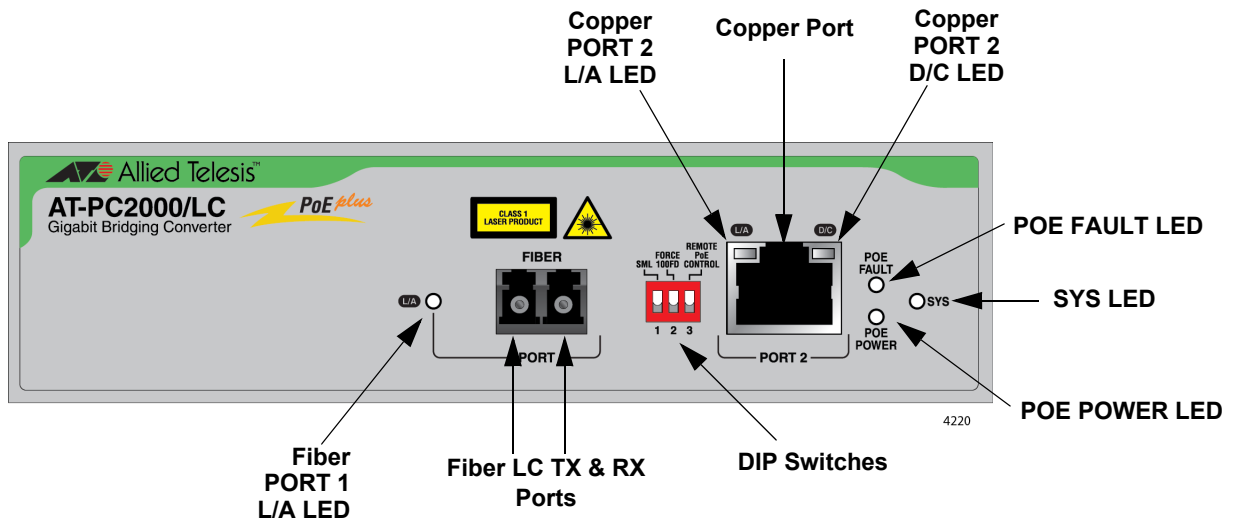


Figure 11. AT-PC2000/LC Front Panel Features

The front panel features of the AT-PC2000/SP Media Converter are shown in Figure 12.

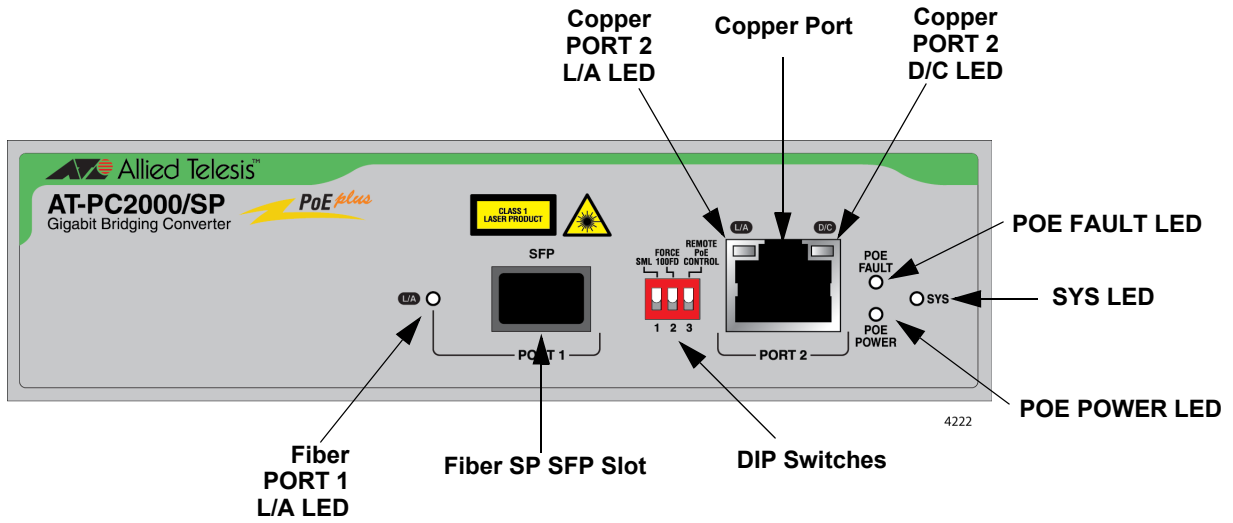


Figure 12. AT-PC2000/SP Front Panel Features

Figure 13 illustrates the media converter back panel.

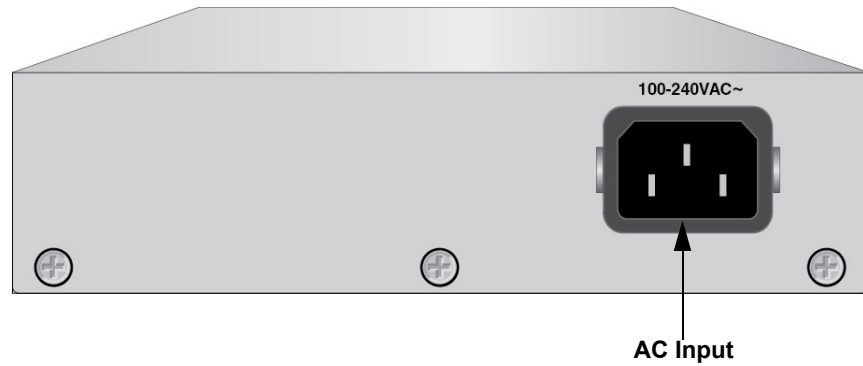


Figure 13. Media Converter Back Panel

## Twisted-Pair Port

---

The twisted-pair port features an eight-pin RJ45 connector that uses four pins at 10 or 100 Mbps and all eight pins at 1000 Mbps. For the port pinouts, see “RJ45 Connector and Port Pinouts” on page 54.

The port has a maximum operating distance of 100 meters (328 feet). For twisted-pair port cabling specifications, refer to Table 2 on page 34.

You can set the twisted-pair port to 100 Mbps full-duplex mode or Auto-Negotiation mode using DIP switch 2 (middle) of the three DIP switches on the rear panel. See Figure 9 on page 24.

- When this DIP switch is in the FORCE 100 F/D (up) position, the twisted-pair port is forced to 100 Mbps full-duplex mode, and Auto Negotiation is disabled.
- When in the AUTO NEG (down) position, the twisted-pair port operates in Auto-Negotiation mode.

---

### Note

100 Mbps full-duplex mode should not be used unless absolutely necessary because forcing 100 Mbps full-duplex in most applications is likely to cause a duplex mismatch, in turn, causing poor network performance. 100 Mbps full-duplex mode should only be used when the link partner is already forced to 100 Mbps full-duplex operation, and Auto Negotiation is disabled on the link partner. In this specific case, using Auto Negotiation on the media converter would result in a duplex mismatch.

---

## **Reset the Media Converter**

---

Reset the media converter by powering OFF then powering ON the unit.

## Chapter 2

# Installation

---

This chapter contains the following sections:

- “Reviewing Safety Precautions” on page 30
- “Selecting a Site for the Media Converter” on page 33
- “Planning the Installation” on page 34
- “Unpacking the Media Converter” on page 37
- “Installing the Power Cord Retaining Clip” on page 41
- “Installing the Media Converter on a Desktop” on page 42
- “Installing the Media Converter on a Wall” on page 43
- “Installing the SFP Transceiver” on page 44
- “Powering On and Cabling the Media Converter” on page 47

## Reviewing Safety Precautions

---

Review the following safety precautions before you begin to install the chassis or any of its components.

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
### Note

The  indicates that a translation of the safety statement is available in a PDF document titled *Translated Safety Statements* on the Allied Telesis website at [www.alliedtelesis.com/support](http://www.alliedtelesis.com/support).

---




### Warning

To prevent electric shock, do not remove the cover. No userserviceable 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 cables.  E1

---




### Warning

Do not work on equipment or cables during periods of lighting activity.  E2

---




### Warning

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

---




### Warning

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

---

---

### Note

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

---

**Caution**

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

---

**Note**

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

---

**Note**

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

---

**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**

Operating Temperature. This product is designed for a maximum ambient temperature of 50° degrees C. ⌘ E57

---

**Caution**

Failing to pick up the ferrule tip when you reach the bottom of the cleaning surface can result in static electricity that can damage the fiber-optic cable. ⌘ E82

---

**Warning**

In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. ⌘ E84

---



**Warning**

An SFP transceiver can be damaged by static electricity. Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the transceiver. *⌘* E86

---



**Warning**

Do not stare into the laser beam. *⌘* L2

---



**Warning**

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

---



**Warning**

Laser Safety: EN60825-1. *⌘* L7

---



## Selecting a Site for the Media Converter

---

Observe the following requirements when choosing a site for your media converter:

- If you are installing the media converter on a table, verify that the table is level and secure.
- The power outlet for the media converter should be located near the unit and should be easily accessible.
- The site should provide for easy access to the ports on the front of the media converter. This will make it easier for you to connect and disconnect cables, as well as view the media converter's LEDs.
- Air flow around the unit and through its vents on the side should not be restricted so that the media converter can maintain adequate cooling.
- Do not place objects on top of the media converter.
- Do not expose the media converter to moisture or water.
- You should use dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.

## Planning the Installation

---

Be sure to observe the following guidelines when planning the installation of your media converter.

- On the AT-PC2000 media converters, the end node connected to the fiber connector on the media converter must operate at 1000 Mbps, except for the AT-PC2000/SP when using a 100 Mbps SFP module.
- On the AT-PC200 media converters, the end node connected to the fiber connector on the media converter must operate at 100 Mbps.
- The two end-nodes connected to the ports of the media converter must operate with the same duplex mode, either half- or full-duplex. The twisted-pair port on the media converter can operate in either mode with Auto Negotiation enabled.
- The devices connected to the two ports on the media converter can be a network adapter card, repeater, switch, media converter, or router.
- The twisted-pair port has a maximum operating distance of 100 meters (328 feet).

Table 2 contains the cable specifications for the twisted-pair port.

Table 2. Twisted-Pair Port Cabling Specifications

Speed	Type of Cable
10 Mbps	Standard TIA/EIA 568-B-compliant Category 3 or better shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz.
100 Mbps	Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.
1000 Mbps	Standard TIA/EIA 568-A-compliant Category 5 or TIA/EIA 568-B-compliant Enhanced Category 5 (Cat 5e) shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz.

For speed/duplex interactions between the copper port on the AT-PC2000 and the copper link partner, refer to Table 3 for allowable speed/duplex combinations.

Table 3. Copper Connection Speed/Duplex Settings and Resulting Speed - AT-PC2000

<b>AT-PC2000 Copper Port Speed/Duplex Setting</b>	<b>Copper Link Partner Port Setting</b>			
	Auto Negotiation	100Mbps Force Full Duplex	100Mbps Force Half Duplex	1000Mbps Force Full Duplex*
Auto Negotiation	1000Mbps full duplex connection for Gigabit Link Partners  100Mbps full duplex connection for 100Mbps Link Partners	Duplex mismatch – not supported	100Mbps half duplex connection	1000Mbps full duplex connection
100Mbps Full Duplex	Duplex mismatch – not supported	100Mbps full duplex connection	Duplex mismatch – not supported	No connection
<p>*Although 1000Mbps connections require Auto Negotiation, some switches allow the option of only advertising 1000Mbps speed.</p> <p>Note: The fiber port always runs at 1000Mbps full duplex.</p>				

For speed/duplex interactions between the copper port on the AT-PC200 and the copper link partner, refer to Table 4 on page 36 for allowable speed/duplex combinations.

Table 4. Copper Connection Speed/Duplex Settings and Resulting Speed - AT-PC200

<b>AT-PC200 Copper Port Speed/Duplex Setting</b>	<b>Copper Link Partner Port Setting</b>			
	Auto Negotiation	100Mbps Force Full Duplex	100Mbps Force Half Duplex	1000Mbps Force Full Duplex*
Auto Negotiation	100Mbps full duplex connection	Duplex mismatch – not supported	100Mbps half duplex connection	No connection
100Mbps Full Duplex	Duplex mismatch – not supported	100Mbps full duplex connection	Duplex mismatch – not supported	No connection
*Although 1000Mbps connections require Auto Negotiation, some switches allow the option of only advertising 1000Mbps speed.				
Note: The fiber port always runs at 100Mbps full duplex.				

**Note**

The twisted-pair port on the media converter features Auto MDI/MDI-X when operating at 10, 100, or 1000 Mbps. The port is configured as MDI or MDI-X when it is connected to an end node. Consequently, you can use a straight-through twisted-pair cable when connecting any type of network device to the twisted-pair port on the media converter.

For the fiber-optic port specifications, refer to “Fiber-Optic Port Specifications” on page 56.

## Unpacking the Media Converter

---

To unpack the media converter, perform the following procedure:

1. Remove all of the components from the shipping package.

---

**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.

---

2. Place the media converter on a level, secure surface.
3. In addition to the media converter, verify that the shipping container includes the following items as follows:
  - Figure 14 on page 38 shows shipping container items for the AT-PC2000/SC and AT-PC200/SC.
  - Figure 15 on page 39 shows shipping container items for the AT-PC2000/LC.
  - Figure 16 on page 40 shows shipping container items for the AT-PC2000/SP.



Four wall screws



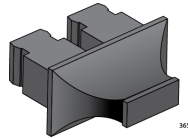
Four rubber feet (for desktop installation)



One regional AC power cord



One power cord retaining clip



One fiber port dust cover (pre-installed)

Figure 14. AT-PC2000/SC and AT-PC200/SC Shipping Package Contents

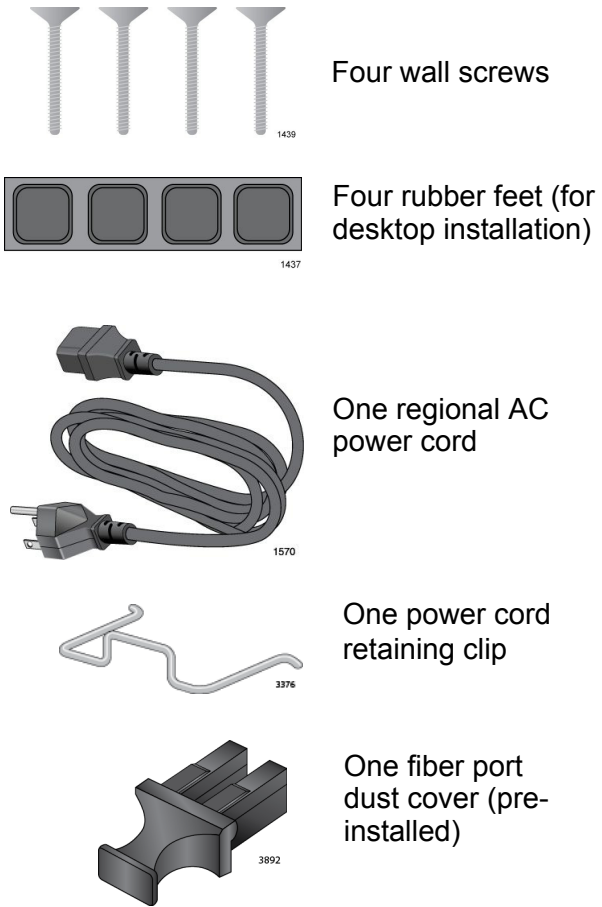


Figure 15. AT-PC2000/LC Shipping Package Contents

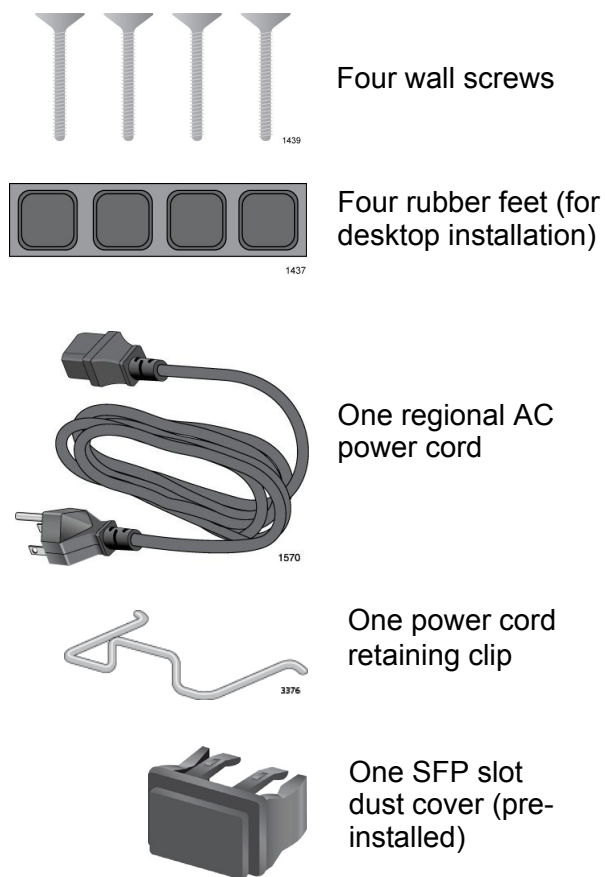


Figure 16. AT-PC2000/SP Shipping Package Contents



## Installing the Power Cord Retaining Clip

---

Perform the following procedure to install the power cord retaining clip on the media converter:

1. Locate the power cord retaining clip, as shown in Figure 17.



Figure 17. Power Cord Retaining Clip

2. Install the clip on the AC power connector on the back panel of the media converter. With the “u” of the clip facing down, press the sides of the clip toward the center and insert the short ends into the holes in the retaining bracket, as shown in Figure 19.

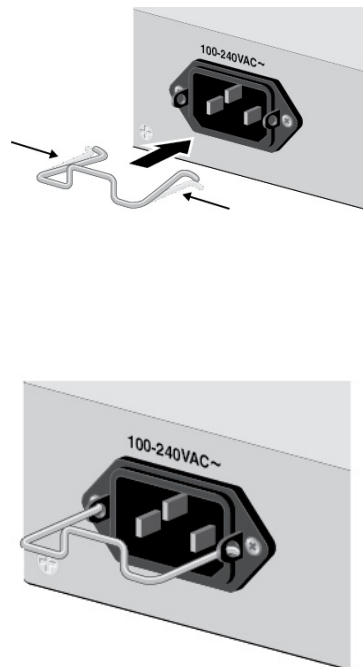


Figure 18. Inserting the Retaining Clip into the Retaining Bracket

## Installing the Media Converter on a Desktop

---

You may install the media converter on a desktop or on a wall. To install the media converter on a wall, see “Installing the Media Converter on a Wall” on page 43.

To install the media converter on a desktop, perform the following procedure:

1. Turn the media converter over and place it on a secure surface.
2. Attach the four rubber feet included with the unit to the corners of the bottom of the media converter.
3. Place the media converter on a flat, secure surface (such as a desk or table), leaving ample space around the unit for ventilation.
4. Depending on the model, do one of the following:
  - For the AT-PC2000/SP, go to “Installing the SFP Transceiver” on page 44.
  - For all other models, go to “Powering On and Cabling the Media Converter” on page 47.

## Installing the Media Converter on a Wall

---

To install the media converter on a wall, perform the following procedure:

1. Place the media converter on a table.
2. Install the two wall anchors into the wall so that they are level with each other and are spaced 64 mm (2.52 in) apart.
3. Install the two Phillips flat-head screws into the wall anchors. The screws should protrude from the wall approximately 5 mm (0.2 in).
4. Place the two keyholes in the unit over the two wall screws and slide the bracket down to secure the bracket on the screws.

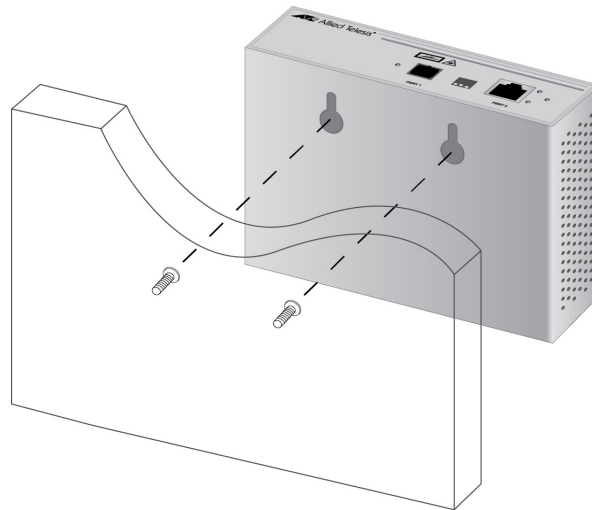


Figure 19. Positioning the Media Converter on the Wall Screws

5. Depending on the model, do one of the following:
  - For the AT-PC2000/SP, go to “Installing the SFP Transceiver” on page 44.
  - For all other models, go to “Powering On and Cabling the Media Converter” on page 47.

## Installing the SFP Transceiver

---

To install an SFP transceiver, perform the following procedure:

---

**Note**

The transceiver can be hot-swapped; you do not need to power off the media converter to install a transceiver. However, always remove the cable before removing the transceiver.

---

---

**Note**

You should always install the transceiver before connecting the fiber-optic cable to it.

---

1. Remove the transceiver from its shipping container and store the packaging material in a safe location.

**Warning**

An SFP transceiver can be damaged by static electricity. Be sure to observe all standard electrostatic discharge (ESD) precautions, such as wearing an antistatic wrist strap, to avoid damaging the transceiver. ⚡ E86

---

2. Remove the dust plug from the SFP slot. See Figure 20.

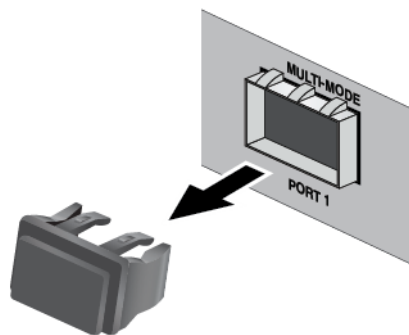


Figure 20. Removing the Dust Plug from an SFP Slot

3. Position the SFP transceiver with the label facing up.

- Slide the transceiver into the SFP slot until it clicks into place. See Figure 21.

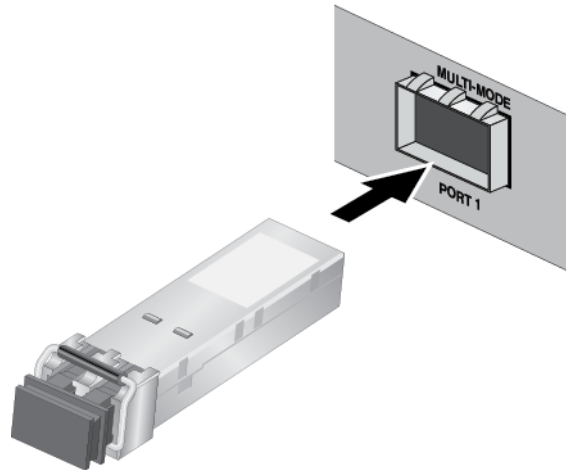


Figure 21. Inserting the SFP

- Verify that the handle on the transceiver is in the upright position, as shown in Figure 22. This secures the transceiver and prevents it from being dislodged from the slot.

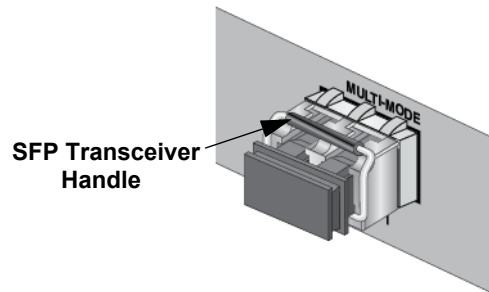


Figure 22. Positioning the SFP Handle in the Upright Position

---

**Note**

SFP transceivers are dust-sensitive. Always keep the plug in the optical bores when a fiber-optic cable is not installed, or when storing the SFP. When you do remove the plug, keep it for future use.

---

---

**Note**

Unnecessary removal and insertion of an SFP can lead to premature failure.

---

For information on the cable specifications of the SFP, consult the documentation shipped with the SFP.

6. Go to “Powering On and Cabling the Media Converter” on page 47.

## Powering On and Cabling the Media Converter

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### Cabling Guidelines

Observe the following guidelines when connecting twisted-pair and fiber-optic cables to the ports on the media converter:

- The connector on the cable should fit snugly into the port on the media converter. The tab on the connector should lock the connector into place.
- Because the twisted-pair port has Auto MDI/MDI-X, you may use straight-through twisted-pair cable to connect any type of network device to that port.
- For the fiber optic cables, refer to the cable manufacturer specification for the minimum bend radius.

### Applying Power and Connecting the Network Cables

To apply power to the media converter and connect the network cables, perform the following steps:

1. Lift up the retaining clip and insert the power cord into the AC power connector on the back of the media converter, as shown in Figure 23.

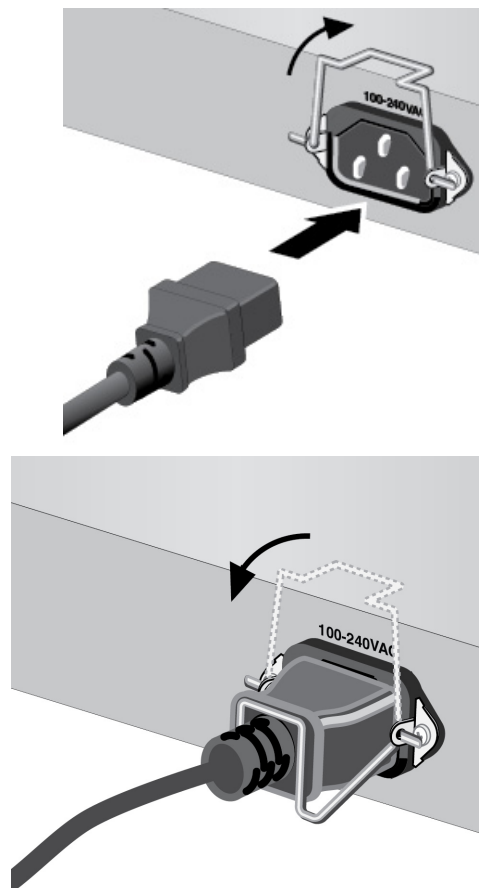


Figure 23. Plugging in the AC Power Cord

2. Lower the retaining clip over the AC Power Cord as shown in Figure 23 on page 47.
3. Plug the other end of the power cord into a wall outlet.



**Warning**

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

---

---

**Note**

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

---

4. Verify that the PWR LED is green. If the LED is OFF, see Chapter 3, “Troubleshooting” on page 49.
5. Verify that the SYS LED is lit green. If the SYS LED is off, refer to “Troubleshooting” on page 49.
6. Remove the dust cover from the fiber-optic connector and connect the cable to the fiber-optic port.

On media converters other than the AT-PC2000/SP: Verify that the media converter’s transmitter port (TX) is connected to the end node’s receiver port (RX) and that the media converter’s receiver port (RX) is connected to the end node’s transmitter port (TX).

7. Connect the twisted-pair cable to the twisted-pair port. For speed/duplex interactions between the copper port and the copper link partner, refer to Table 3 on page 35 for allowable speed/duplex combinations.
8. Power on the end nodes.

The media converter is now ready for use.



## Chapter 3

# Troubleshooting

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This chapter contains information on how to troubleshoot the media converter if a problem occurs.

---

**Note**

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

---

**Problem 1:** The POE POWER LED on the media converter is off.

**Solutions:** The PoE port on the unit is not supplying power. Try the following:

- Verify a PoE device is plugged into the port.
- The PoE device may be faulty: try using another PoE device.

**Problem 2:** The POE FAULT LED on the media converter is lit red.

**Solution:** The PoE device is attempting to draw over 30 W. Use a PoE device that does not draw over 30 W.

**Problem 3:** The SYS LED on the media converter is off.

**Solution:** An internal component on the unit is damaged or not working properly. Try power cycling the unit. If power cycling does not clear the fault, return the unit to Allied Telesis.

**Problem 4:** The SYS LED on the media converter is blinking slowly.

**Solutions:** An error is present on the unit. Try power cycling the unit.

If an AT-PC2000/SP unit, a transmit fault may be occurring on the SFP module. The media converter will try to clear this error, but if the error persists, try the following:

- Remove and re-seat the SFP module.
- Try a different SFP module.
- Verify the SFP module is the correct type for your application.

**Problem 5:** The twisted-pair port on the media converter is connected to an end node, but the copper port's PORT 2 L/A LED is off.

**Solutions:** The port is unable to establish a link to an end node. Try the following:

- Verify that the end node connected to the twisted-pair port is powered on and is operating properly.
- Verify that the twisted-pair cable is securely connected to the port on the media converter channel and to the port on the remote end-node.
- Verify that the port is connected to the correct twisted-pair cable. This is to eliminate the possibility that the port is connected to the wrong end-node, such as a powered-off device.
- Try connecting another end node to the twisted-pair port with a different cable. If the twisted-pair port is able to establish a link, then the problem is with the cable or the other end-node.
- Verify that the twisted-pair cable does not exceed 100 meters (328 feet).
- Verify that the end node connected to the media converter is operating at the same speed.
- Verify that you are using the appropriate category of twisted-pair cable: Category 3 or better for 10 Mbps operation and Category 5 and Category 5E for 100 and 1000 Mbps operation.

---

**Note**

A 1000Base connection may require 5 to 10 seconds to establish a link.

---

**Problem 6:** The PORT 1 L/A LED for the fiber-optic port is off.

**Solutions:** The fiber-optic port on the transceiver is unable to establish a link to an end node. Try the following:

- Verify that the end node connected to the fiber-optic port is operating properly.
- Verify that the fiber-optic cable is securely connected to the port on the media converter channel and to the port on the remote end-node.
- Verify that the end node connected to the media converter is operating at the same speed.
- On media converters other than the AT-PC2000/SP: Verify that the media converter's transmitter port (TX) is connected to the end node's receiver port (RX) and that the media converter's receiver port (RX) is connected to the end node's transmitter port (TX).
- On the AT-PC2000/SP, check that the SFP module is fully inserted in the slot.

- On the AT-PC2000/SP, verify that the operating specifications and wave lengths of the fiber-optic port on the SFP transceiver and the remote end-node are compatible.
- Verify that the correct type of fiber-optic cabling is being used.
- Verify that the wavelength between the media converter and end node matches, and the media converter fiber port is connected to a multi-mode (not single-mode) port on the end node.
- Verify that the port is connected to the correct fiber-optic cable. This is to eliminate the possibility that the port is connected to the wrong remote end-node, such as a powered-off device.
- Try connecting another end node to the fiber-optic port using a different cable. If the port is able to establish a link, then the problem is with the cable or with the other end node.
- If the remote end-node is a management device, use its management firmware to determine whether its port is enabled.
- Test the attenuation on the fiber-optic cable with a fiber-optic tester to determine whether the optical signal is too weak (sensitivity) or too strong (maximum input power).

**Problem 7:** Network performance between the twisted-pair port on the media converter and an end node is slow.

**Solution:** There might be a duplex mode mismatch between the port and the end node. This occurs when a twisted-pair port using Auto Negotiation is connected to a device with a fixed duplex mode of full duplex. If this is the cause of the problem, adjust the duplex mode of the port on the end node or on the media converter so that both ports are using the same duplex mode.



## Appendix A

# Technical Specifications

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Below are the technical specifications for the media converters. The specification categories are as follows:

- “Physical Specifications”
- “Environmental Specifications”
- “Power Specifications” on page 54
- “Safety and Electromagnetic Emissions Certifications” on page 54
- “RJ45 Connector and Port Pinouts” on page 54
- “Fiber-Optic Port Specifications” on page 56

## Physical Specifications

---

Table 5. Physical Specifications

Dimensions W x D x H	155 mm x 149 mm x 40 mm (6.1 in x 5.9 in x 1.6 in)
Weight	0.8 kg (1.7 lb)

## Environmental Specifications

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Table 6. Environmental Specifications

Operating Temperature	0° C to 50° C (32° F to 122° F)
Storage Temperature	-15° C to 65° C (-5° F to 149° 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)

## Power Specifications

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Table 7. Power Specifications

Max power consumption (including PoE power)	50 W
Input voltage range	100-240 VAC

## Safety and Electromagnetic Emissions Certifications

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Table 8. Safety and Electromagnetic Emissions Certifications

Safety	UL60950-1, EN60950-1, EN60825-1
Emissions (EMI)	FCC Class A, CISPR 22 Class A, EN55022 Class A, RCM, VCCI Class A
Immunity	EN55024, EN61000-3-2, EN61000-3-3
Environmental Compliance	EU-RoHS compliant, WEEE China RoHS compliant

## RJ45 Connector and Port Pinouts

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Figure 24 illustrates the pin layout for the RJ45 connector and port.

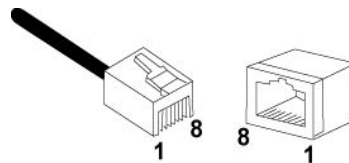


Figure 24. RJ45 Connector and Port Pin Layout

Table 9 lists the pin signals when a port is operating in the MDI configuration at 10 or 100 Mbps.

Table 9. MDI Pin Signals (10 or 100 Mbps)

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

Table 10 lists the pin signals when a port is operating in the MDI-X configuration at 10 or 100 Mbps.

Table 10. MDI-X Pin Signals (10 or 100 Mbps)

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

Table 11 lists the pin signals when a port is operating at 1000 Mbps.

Table 11. Pin Signals (1000 Mbps)

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 Port Specifications

The fiber type for the media converter is multimode.

Table 12 lists fiber-optic port specifications for the AT-PC2000 media converters.

**Note**

Fiber optic port specifications for the AT-PC2000/SP are dependent upon the type of SFP inserted.

Table 12. AT-PC2000 Fiber-Optic Port Specifications

Fiber Optic Diameter (microns)	Optical Wavelength	Launch Power (dBm) <sup>1</sup>		Receive Power (dBm)			Max. Distance
		Min.	Max.	Min.	Typical	Saturation	
50/125	850 nm	-9.5	-4	-17	-20	-3	500 m (1,640 ft)
62.5/125	850 nm	-9	-4	-17	-20	-3	220 m (722 ft)

1. The launch power is measured 1 meter (3.28 feet) from the transmitter.

Table 13 lists fiber-optic port specifications for the AT-PC200 media converters.

Table 13. AT-PC200 Fiber-Optic Port Specifications

Fiber Optic Diameter (microns)	Optical Wavelength	Launch Power (dBm) <sup>1</sup>		Receive Power (dBm)			Max. Distance
		Min.	Max.	Min.	Typical	Saturation	
50/125	1310 nm	-19	-14	-32	-34	-3	2 km (6,562 ft)
62.5/125	1310 nm	-22.5	-14	-32	-34	-3	2 km (6,562 ft)

1. The launch power is measured 1 meter (3.28 feet) from the transmitter.



## Appendix B

# Cleaning Fiber-Optic Connectors

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This appendix contains the following sections:

- “Introduction”
- “Using a Cartridge-Type Cleaner” on page 58
- “Using a Swab” on page 60

This appendix describes how to clean fiber-optic connectors.

## Introduction

---

The fiber-optic connector consists of a fiber-optic plug and its adapter. The end of the fiber-optic cable is held in the core of the ferrule in the plug. Light signals are transmitted through the core of the fiber. Even minor smudges, or dirt, on the end face of the fiber (completely invisible to the naked eye) can disrupt light transmission and lead to failure of the component or of the entire system. Therefore, it is of utmost importance to clean all fiber-optic connectors before use.

Figure 25 shows the ferrule in an SC connector.

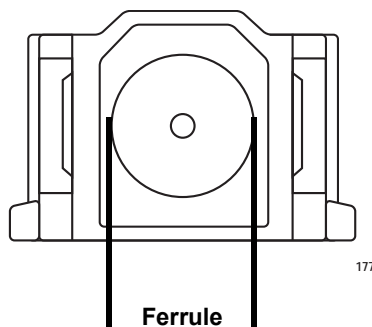


Figure 25. Ferrule in an SC Connector Plug

The end face of an unclean and clean ferrule are shown in Figure 26.

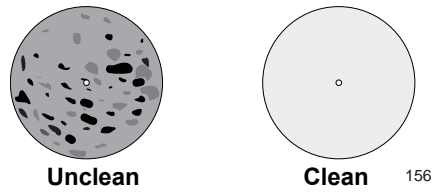


Figure 26. Unclean and Clean Ferrule

## Using a Cartridge-Type Cleaner

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Fiber-optic cartridge cleaners, shown in Figure 27, are available from many vendors and are typically called “cartridge cleaners”.



Figure 27. Cartridge Cleaner

---

### Note

Do not use compressed air or aerosol air to clean a fiber-optic connector.

---

To clean a fiber-optic connector using a cartridge cleaner, perform the following procedure.

1. With one hand, hold the cartridge cleaner and push the lever on the cleaning cartridge in the direction of the arrow to expose the cleaning surface, as shown in Figure 28 on page 59.
2. Place the ferrule tip on the exposed cleaning surface and rub the ferrule in a downward direction, as shown in Figure 28 on page 59.

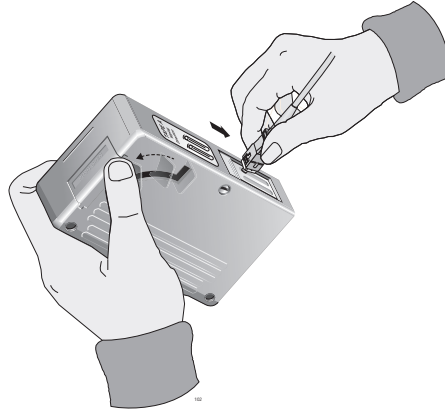


Figure 28. Rubbing the Ferrule Tip on the Cleaning Surface

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**Note**

Rub the ferrule tip on the cleaning surface in one direction only.

---

3. When you reach the end of the cleaning surface, pick up the ferrule tip, rotate and place it at the top, and rub downwards at least two times.




---

**Caution**

Failing to pick up the ferrule tip when you reach the bottom of the cleaning surface can result in static electricity that can damage the fiber-optic cable. ⚡ E82

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4. If desired, repeat Step 2 and Step 3.
5. If a fiber inspection scope is available, use the scope to inspect the ferrule end face to make sure that it is clean.
6. Reconnect the cable to the port or protect the ferrule tip with a dust cap.

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**Note**

Always keep a dust cap on a fiber-optic cable when it is not in use.

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**Note**

Do not touch the end face of the ferrule in the connector.

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**Warning**

Do not stare into the laser beam. ⚡ L2

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**Warning**

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

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## Using a Swab

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Specially treated swabs, or stick cleaners, are available for cleaning inside connector adapters or hard-to-reach ferrule tips. These swabs, often referred to as “lint-free” or “alcohol-free” swabs, shown in Figure 29, are available from many vendors. Stick cleaners are available in both 2.5 mm and 1.25 mm sizes for use on SC and MU connectors, respectively.

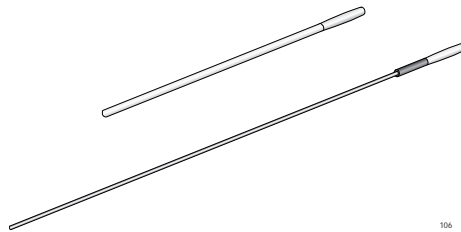


Figure 29. Lint-Free and Alcohol-Free Swabs

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**Note**

Never use a household cotton swab and alcohol to clean a fiber-optic connector. This may leave a residue on the ferrule tip.

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**Note**

Do not use compressed air or aerosol air to clean a fiber-optic connector.

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To clean a recessed ferrule using a swab, perform the following procedure.

1. Insert the swab into the adapter as shown in Figure 30. Rub the ferrule tip with the swab.

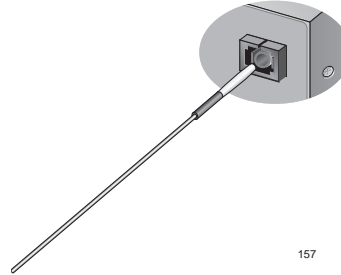


Figure 30. Cleaning a Recessed Ferrule

2. If desired, repeat Step 1.
3. If a fiber inspection scope is available, use the scope to inspect the connector to make sure that it is clean and to check for scratches, pits, or other problems that may affect performance.

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**Note**

Always keep a dust cap on a fiber-optic cable when it is not in use.

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**Warning**

Do not stare into the laser beam. ⚡ L2

---



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**Warning**

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

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