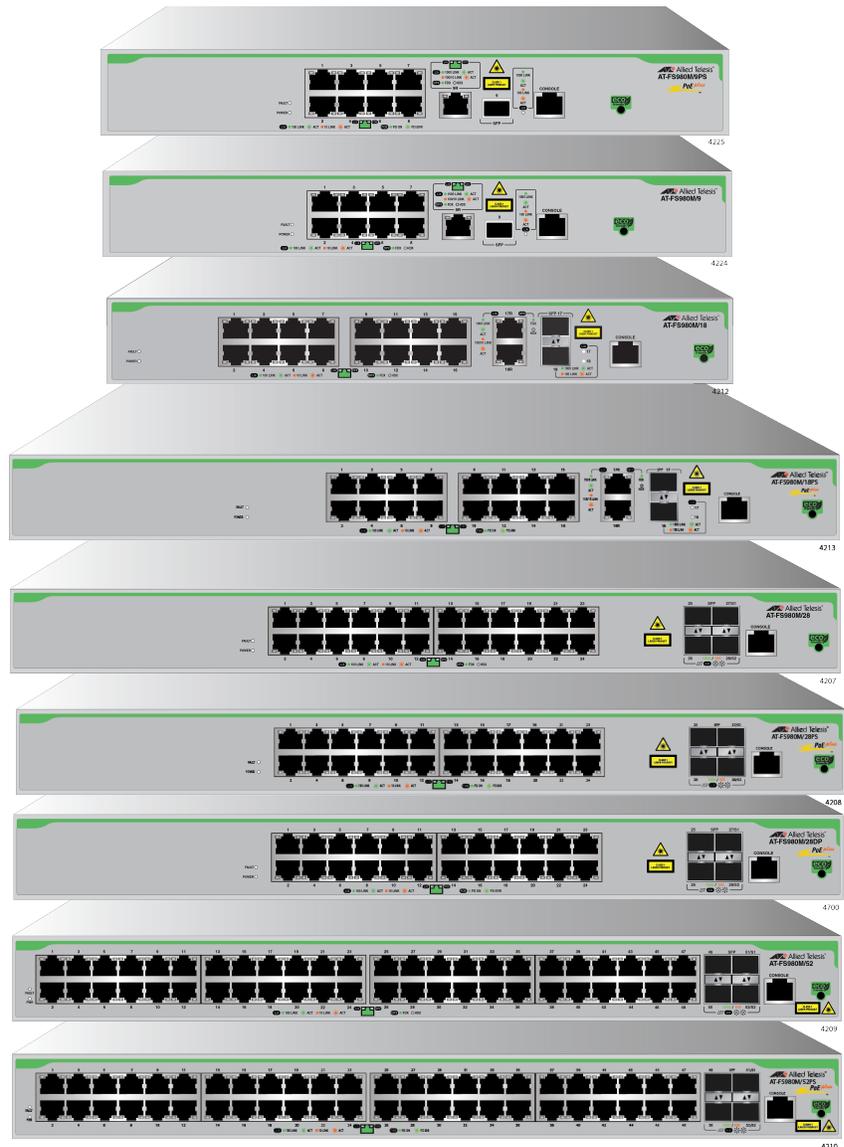


# FS980M Series

## FAST ETHERNET MANAGED SWITCHES

AT-FS980M/9	AT-FS980M/9PS	
AT-FS980M/18	AT-FS980M/18PS	
AT-FS980M/28	AT-FS980M/28PS	AT-FS980M/28DP
AT-FS980M/52	AT-FS980M/52PS	



# 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, EN55032 Class A, CISPR 22 Class A,  
CISPR 32 Class A, VCCI, RCM, CE



### 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    UL60950-1 (CULUS), EN60950-1 (TUV)

## Translated Safety Statements

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**Important:** The ⚡ indicates that translations of the safety statement are available in the PDF document ***Translated Safety Statements*** posted on the Allied Telesis website at ***alliedtelesis.com/support***.

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# Preface

---

This guide contains the installation instructions for the FS980M Series of Fast Ethernet switches. The switch models included in this manual are:

- ❑ AT-FS980M/9
- ❑ AT-FS980M/9PS
- ❑ AT-FS980M/18
- ❑ AT-FS980M/18PS
- ❑ AT-FS980M/28
- ❑ AT-FS980M/28PS
- ❑ AT-FS980M/28DP
- ❑ AT-FS980M/52
- ❑ AT-FS980M/52PS

The preface contains the following sections:

- ❑ “Document Conventions” on page 8
- ❑ “Contacting Allied Telesis” on page 9

## Document Conventions

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This document uses the following conventions:

---

**Note**

Notes provide additional information.

---



---

**Caution**

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

---



---

**Warning**

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

---

## Contacting Allied Telesis

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

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

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



## Chapter 1

# Overview

---

This chapter contains the following sections:

- ❑ “Product Overview” on page 12
- ❑ “SFP Modules” on page 23
- ❑ “Model Naming Conventions” on page 24
- ❑ “10/100Base-TX Twisted Pair Ports” on page 25
- ❑ “10/100/1000Base-T Twisted Pair Ports” on page 28
- ❑ “Combo Ports” on page 31
- ❑ “Power Over Ethernet” on page 32
- ❑ “LEDs” on page 36
- ❑ “Console Port” on page 40

## Product Overview

---

The FS980M Series switch is a managed Fast Ethernet switch with SFP slots. This series switch provides a simple solution to replace an edge switch in small and medium-sized enterprises.

The eco-friendly feature automatically saves power consumption on each port when the port has not established a link.

### AT-FS980M/9 Switch

The AT-FS980M/9 switch is equipped with:

- ❑ 8 10/100Mbps twisted pair ports
- ❑ One 10/100/1000Mbps twisted pair port (Combo port)
- ❑ 1 SFP slot (Combo port)
- ❑ 1 console port

---

#### Note

The 10/100/1000Mbps twisted pair port and SFP slot form one pair of combo ports. For more information, see “Combo Ports” on page 31.

---

See Figure 1 for the port layout of the AT-FS980M/9 switch.

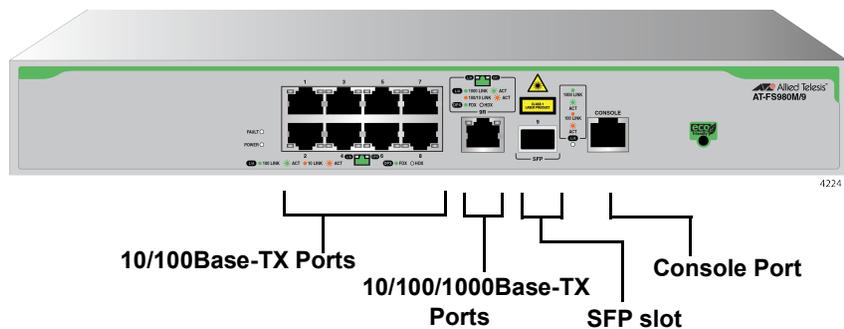


Figure 1. AT-FS980M/9 Switch Front Panel

The AT-FS980M/9 switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 2.



Figure 2. AT-FS980M/9 Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



### Warning

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

## AT-FS980M/9PS Switch

The AT-FS980M/9PS switch is equipped with:

- ❑ 8 PoE+ supported 10/100Mbps twisted pair ports
- ❑ One 10/100/1000Mbps twisted pair port (Combo port)
- ❑ 1 SFP slot (Combo port)
- ❑ 1 console port

### Note

The 10/100/1000Mbps twisted pair port and SFP slot form one pair of combo ports. For more information, see “Combo Ports” on page 31.

See Figure 3 for the port layout of the AT-FS980M/9PS switch.

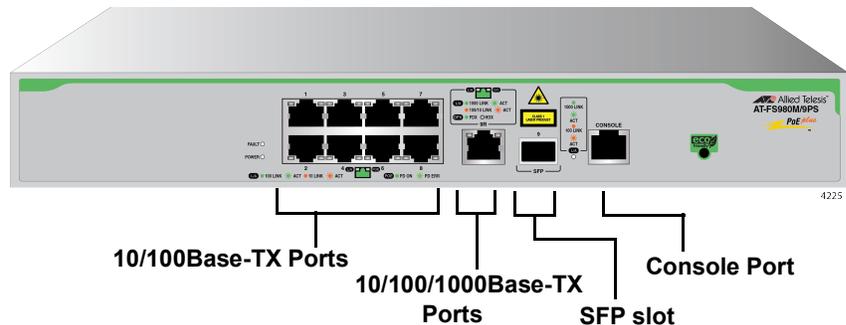


Figure 3. AT-FS980M/9PS Switch Front Panel

The AT-FS980M/9PS switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 4.



Figure 4. AT-FS980M/9PS Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



**Warning**

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

**AT-FS980M/18  
Switch**

The AT-FS980M/18 switch is equipped with:

- ❑ 16 10/100Mbps twisted pair ports
- ❑ 2 10/100/1000Mbps twisted pair ports (Combo ports)
- ❑ 2 SFP slots (Combo ports)
- ❑ 1 console port

**Note**

The 10/100/1000Mbps twisted pair ports and SFP slots form two pairs of combo ports. For more information, see “Combo Ports” on page 31.

See Figure 5 for the port layout of the AT-FS980M/18 switch.

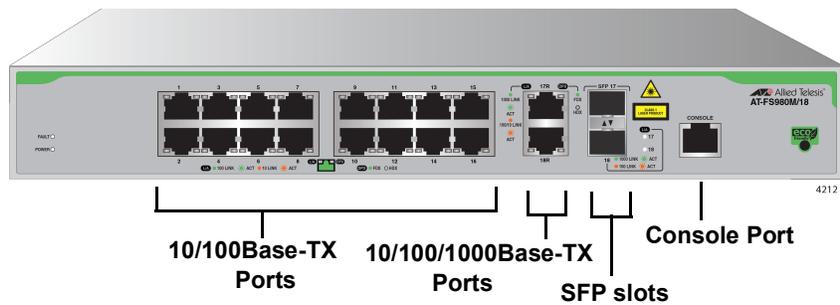


Figure 5. AT-FS980M/18 Switch Front Panel

The AT-FS980M/18 switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 6.



Figure 6. AT-FS980M/18 Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.

**Warning**

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

## AT-FS980M/ 18PS Switch

The AT-FS980M/18PS switch is equipped with:

- ❑ 16 PoE+ supported 10/100Mbps twisted pair ports
- ❑ 2 10/100/1000Mbps twisted pair ports (Combo ports)
- ❑ 2 SFP slots (Combo ports)
- ❑ 1 console port

**Note**

The 10/100/1000Mbps twisted pair ports and SFP slots form two pairs of combo ports. For more information, see “Combo Ports” on page 31.

See Figure 7 for the port layout of the AT-FS980M/18PS switch.

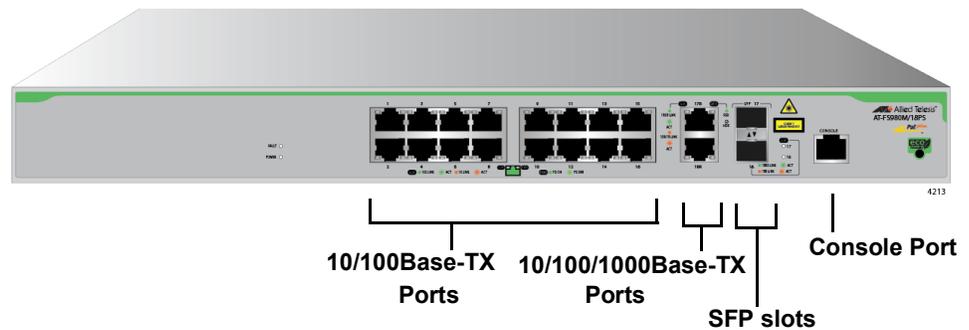


Figure 7. AT-FS980M/18PS Switch Front Panel

The AT-FS980M/18PS switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 8.



Figure 8. AT-FS980M/18PS Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



**Warning**

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

**AT-FS980M/28 Switch**

The AT-FS980M/28 switch is equipped with:

- ❑ 24 10/100Mbps twisted pair ports
- ❑ 4 SFP slots
- ❑ 1 console port

**Note**

Two SFP slots can be used as stacking ports. For more information, see “Stacking Ports” on page 21.

See Figure 9 for the port layout of the AT-FS980M/28 switch.

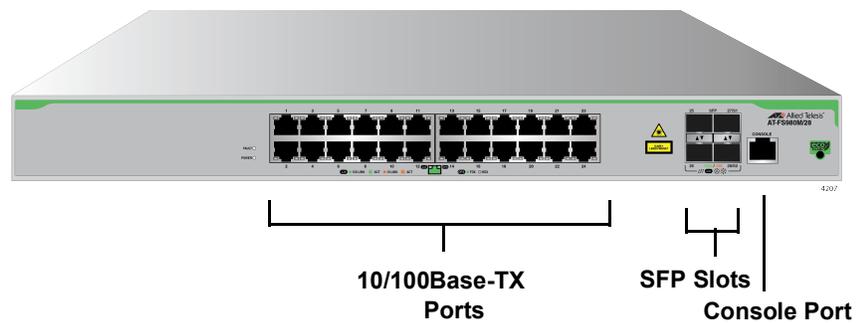


Figure 9. AT-FS980M/28 Switch Front Panel

The AT-FS980M/28 switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 10.

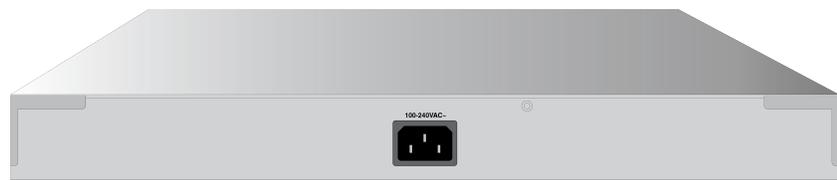


Figure 10. AT-FS980M/28 Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



**Warning**

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

## AT-FS980M/ 28PS Switch

The AT-FS980M/28PS switch is equipped with:

- ❑ 24 PoE+ supported 10/100Mbps twisted pair ports
- ❑ 4 SFP slots
- ❑ 1 console port

---

### Note

Two SFP slots can be used as stacking ports. For more information, see “Stacking Ports” on page 21.

---

See Figure 11 for the port layout of the AT-FS980M/28PS switch.

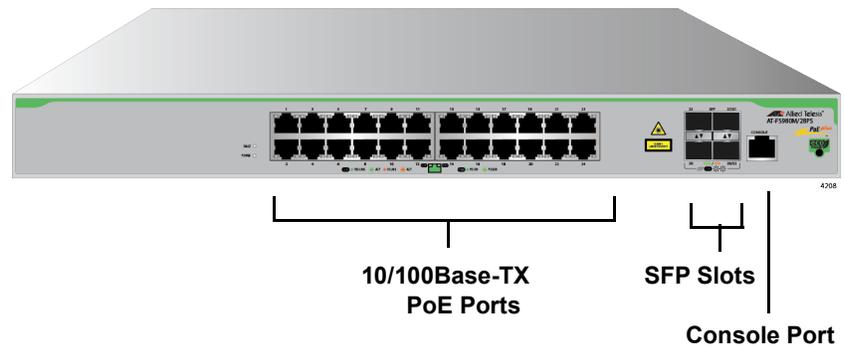


Figure 11. AT-FS980M/28PS Switch Front Panel

The AT-FS980M/28PS switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 12.



Figure 12. AT-FS980M/28PS Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



### Warning

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

---

## AT-FS980M/ 28DP Switch

The AT-FS980M/28DP switch is equipped with:

- ❑ 24 PoE+ supported 10/100Mbps twisted pair ports
- ❑ 1 console port
- ❑ 2 AC power supply units
- ❑ 4 SFP slots

---

### Note

Two SFP slots can be used as stacking ports. For more information, see “Stacking Ports” on page 21.

---

See Figure 13 for the port layout of the AT-FS980M/28DP switch.

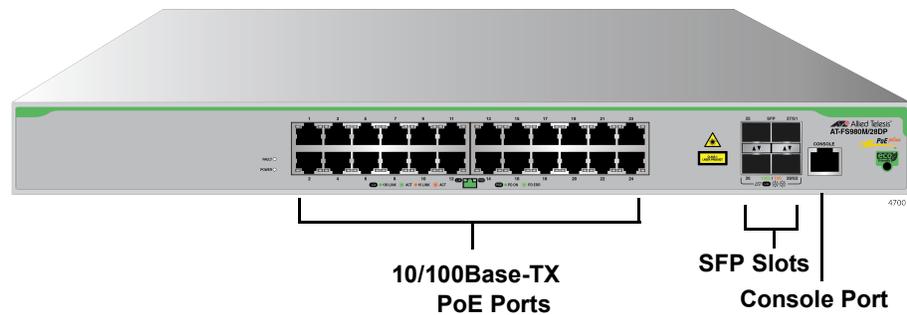


Figure 13. AT-FS980M/28DP Switch Front Panel

The AT-FS980M/28DP switch has an internal power supply with two AC power supply sockets on the rear panel as shown in Figure 14.

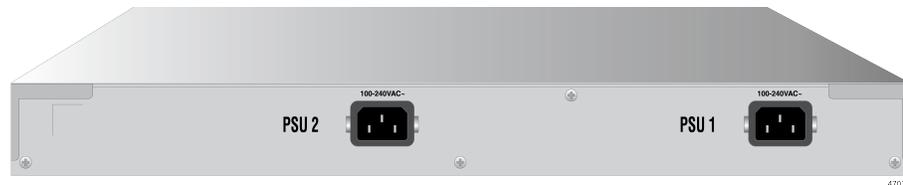


Figure 14. AT-FS980M/28DP Switch Rear Panel

Retainer clips are included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



### Warning

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

---

## Redundant Power Supply

The AT-FS980M/28DP switch is equipped with two AC power supply units. When both AC power supply units are plugged in, the power system is redundant. When one power supply unit fails, the other starts running seamlessly so that the switch's operation is not interrupted.

## AT-FS980M/52 Switch

The AT-FS980M/52 switch is equipped with:

- ❑ 48 10/100Mbps twisted pair ports
- ❑ 4 SFP slots
- ❑ 1 console port

---

### Note

Two SFP slots can be used as stacking ports. For more information, see "Stacking Ports" on page 21.

---

See Figure 15 for the port layout of the AT-FS980M/52 switch.

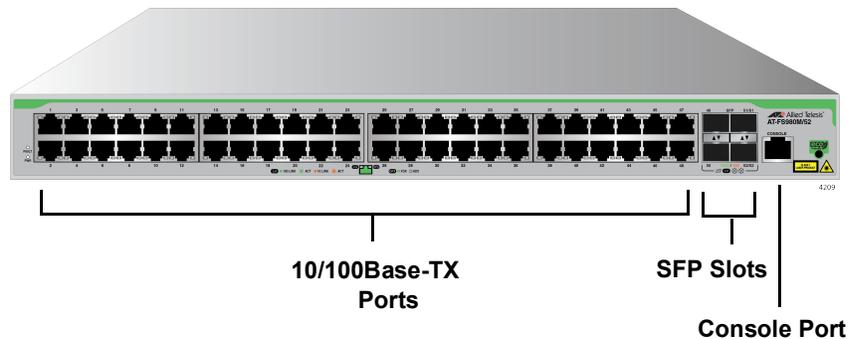


Figure 15. AT-FS980M/52 Switch Front Panel

The AT-FS980M/52 switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 16 on page 19.

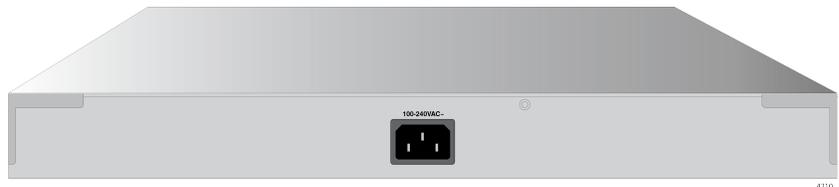


Figure 16. AT-FS980M/52 Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see "Powering On the Switch" on page 66.



**Warning**

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

**AT-FS980M/  
52PS Switch**

The AT-FS980M/52PS switch is equipped with:

- ❑ 48 10/100Mbps twisted pair ports including 24 PoE+ supported ports
- ❑ 4 SFP slots
- ❑ 1 console port

**Note**

Two SFP slots can be used as stacking ports. For more information, see “Stacking Ports” on page 21.

See Figure 17 for the port layout of the AT-FS980M/52PS switch.

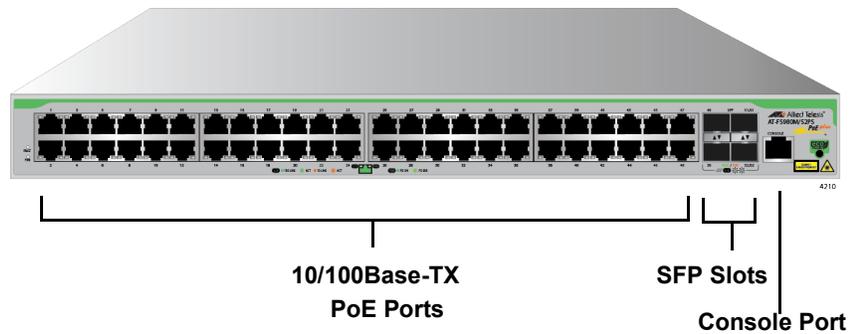


Figure 17. AT-FS980M/52PS Switch Front Panel

The AT-FS980M/52PS switch has an internal power supply with a single AC power supply socket on the rear panel as shown in Figure 18.



Figure 18. AT-FS980M/52PS Switch Rear Panel

A retainer clip is included in the accessory kit. To install the retainer clip, see “Powering On the Switch” on page 66.



**Warning**

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

**SFP Slots**

Here is the basic feature of the SFP slots:

- ❑ Support only 1000Mbps speed.

**Note**

SFP transceivers must be purchased separately. For a list of supported transceivers, see “SFP Modules” on page 23.

**Stacking Ports**

The two SFP slots can be used as stacking ports. Table 1 shows the stacking ports and SFP slots per model.

**Note**

The SFP slots can be used as stacking ports only on the AT-FS980M/28, AT-FS980M/28PS, AT-FS980M/52 and AT-FS980M/52PS switches.

Table 1. Stacking Ports

Model	SFP Slot	Stacking Port
AT-FS980M/28, AT-FS980M/28PS, and AT-FS980M/28DP	27	S1
	28	S2
AT-FS980M/52 and AT-FS980M/52PS	51	S1
	52	S2

**Power Saving**

The power saving button on the front panel is used to turn on and off the LEDs to conserve electricity. Figure 19 shows the power saving button.

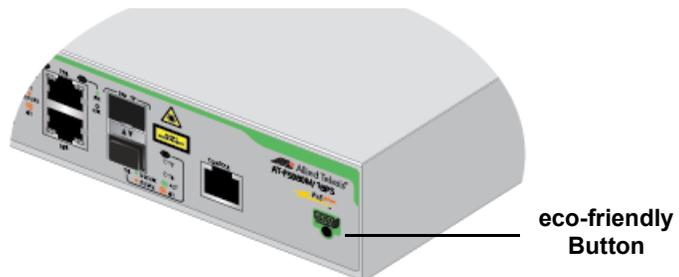


Figure 19. FS980M Series Management Panels

## **Installation Options**

Here are the installation options:

- Desktop or tabletop
- Wall
- 19-inch equipment rack

## **MAC Address Table**

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

- Storage capacity of 16,384 MAC address entries
- Automatic learning and aging

## **Management Software and Interfaces**

Here are the management software and management interfaces:

- AlliedWare Plus Management Software
- Command line interface
- Web browser interface

## **Management Methods**

Here are the methods for managing the switches:

- Local management through the Console port
- Remote Telnet and Secure Shell management
- Remote HTTP and HTTPS web browser management
- SNMPv1, v2c, and v3

## **Other Features**

The FS980M series switches have the following key features:

- Allied Telesis Management Frame (AMF) node support
- UDLD
- Up to 256 entries for IGMP Snooping
- Store-and-forward switching
- Jumbo frame

## SFP Modules

---

Allied Telesis supports its SFP products. Before installing SFP modules into the FS980M series switch, review a list of the supported SFP products and restrictions.

### Supported SFP Modules

Here is a list of supported Allied Telesis SFP products:

- AT-SPTX (See "Guidelines for Using the AT-SPTX Module".)
- AT-SPSX
- AT-SPSX/I
- AT-SPSX2
- AT-SPEX
- AT-SPLX10
- AT-SPLX10/I
- AT-SPLX40
- AT-SPZX80
- AT-SPBD10-13
- AT-SPBD10-14
- AT-StackXS/1.0
- AT-SP10TW1

---

#### Note

The SFP slots support 1000Mbps speed only.

---

### Guidelines for Using the AT-SPTX Module

Allied Telesis supports the AT-SPTX module on the AT-FS980M/28 switch with some restrictions. The AT-FS980M/28 switch has four SFP slots. Before using the AT-SPTX SFP module on the AT-FS980M/28 switch, review the following guidelines:

- The AT-FS980M/28 switch can have up to two AT-SPTX modules.
- When you use two AT-SPTX modules on the AT-FS980M/28 switch, you must use port 25 and port 26.
- When two AT-SPTX modules are used on port 25 and port 26, you can use only the AT-SP10TW1 or AT-StackXS/1.0 module on port 27 and port 28.
- The operating temperature of the AT-FS980M/28 switch using the AT-SPTX module must be between 0° C to 40° C (32° F to 104° F).

## Model Naming Conventions

---

The hardware features of the switches are represented by the letters and numbers in the model names. The conventions for the twisted pair switches are identified in Figure 20.

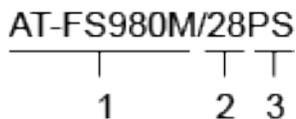


Figure 20. Model Naming Conventions for the Twisted Pair Switches

The conventions are defined in Table 2.

Table 2. Model Naming Conventions for the Twisted Pair Switches

Convention	Definition
1	The series name
2	The number of 10/100Base-TX ports and SFP slots
3	The extension:  PS - This extension indicates support for Power over Ethernet (PoE).  DP- This extension indicates support for dual-fixed PSU and PoE.

## 10/100Base-TX Twisted Pair Ports

---

The switches have 8, 16, 24, or 48 10/100Base-TX ports.

### Basic Features

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

- 10Base-T and 100Base-TX compliant
- IEEE 802.3u Auto-Negotiation compliant
- Auto-MDI/MDIX
- 100 meters (328 feet) maximum operating distance
- IEEE 802.3x flow control in 10/100Base-TX full-duplex operation
- Support for jumbo frames up to 10KB
- Support for store-and-forward switching
- RJ-45 connectors

### Backpressure

Support for IEEE 802.3x backpressure in 10/100Base-TX half-duplex operation depends upon a switch model:

- Backpressure is supported on the AT-FS980M/9, AT-FS980M/9PS, AT-FS980M/18, and AT-FS980M/18PS switches.
- To support backpressure on the AT-FS980M/28 or AT-FS980M/28PS switch, you must upgrade the management software to version 5.4.6-2.1 or later.
- Backpressure is not supported on the AT-FS980M/52 and AT-FS980M/52PS switches.

### Speed

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

### Duplex Mode

The twisted pair ports can operate in either half- or full-duplex mode. The duplex mode determines the manner in which a port transmits data. A port set to half-duplex can either transmit or receive data at one time, while a port operating in full-duplex can transmit and receive data at the same time. The best network performance is achieved with the full-duplex setting, but not all network equipment is designed to support that duplex mode.

The duplex modes, like port speeds, may be set manually using the management software or automatically with Auto-Negotiation (IEEE 802.3u), the default setting.

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

---

**Note**

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

---

**Wiring Configuration**

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

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

**Maximum Distance**

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

**Power Over Ethernet**

The 10/100Base-TX ports on the AT-FS980M/9PS, AT-FS980M/18PS, AT-FS980M/28PS, AT-FS980M/28DP, and AT-FS980M/52PS switches support Power over Ethernet (PoE), which is a standard whereby DC power is provided by the switch to network devices over the network twisted pair cables. The switches support PoE (IEEE 802.3af) and PoE+ (IEEE 802.3at). For background information, refer to “Power Over Ethernet” on page 32.

**Cable Requirements** The cable requirements of the ports are given in Table 3.

Table 3. Twisted Pair Cable for the 10/100Base-TX Ports

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

**Port Pinouts** See Table 20 on page 76 for the port pinouts of the 10/100Base-TX twisted pair ports.

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

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The AT-FS980M/9, AT-FS980M/9PS, AT-FS980M/18 and AT-FS980M/18PS switches have one or two 10/100/1000Base-T ports. The two ports of the AT-FS980M/9, AT-FS980M/9PS, AT-FS980M/18, and AT-FS980M/18PS switches are paired with SFP slots to form combo ports.

### Basic Features

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

- 10Base-T, 100Base-TX, and 1000Base-T compliant
- IEEE 802.3u Auto-Negotiation compliant
- Auto-MDI/MDIX
- 100 meters (328 feet) maximum operating distance
- IEEE 802.3x flow control in 10/100Base-TX full-duplex operation
- IEEE 802.3x backpressure in 10/100Base-TX half-duplex operation
- Support for jumbo frames up to 10KB
- Support for store-and-forward switching
- RJ-45 connectors

### Speed

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

---

#### Note

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

---

### Duplex Mode

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

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

---

**Note**

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

---

**Wiring  
Configuration**

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

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

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

**Maximum  
Distance**

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

**Power Over  
Ethernet**

The 10/100/1000Base-T ports do not support PoE.

**Cable Requirements**

The cable requirements of the ports are given in Table 4.

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

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

**Port Pinouts**

See Table 20 on page 76 and Table 21 on page 76 for the port pinouts of the 10/100/1000Base-T twisted pair ports.

## Combo Ports

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The AT-FS980M/9, AT-FS980M/9PS, AT-FS980M/18, and AT-FS980M/18PS switches have one or two pairs of combo ports. Each combo port consists of one 10/100/1000Base-T twisted-pair port and one slot for an SFP transceiver. The twisted-pair port of combo ports is identified with the letter “R” for “Redundant” on the front panel of the switch. The combo ports and SFP slots are listed in Table 5.

Table 5. Combo Ports

Switch	Combo Ports	
	Twisted-Pair Port	SFP Slot
AT-FS980M/9 and AT-FS980M/9PS	9R	9
AT-FS980M/18 and AT-FS980M/18PS	17R	17
	18R	18

The combo ports have the guidelines listed here:

- ❑ Only one port in a pair, either the twisted-pair port or a corresponding SFP module, can be active at a time.
- ❑ The twisted-pair port is the active port when its SFP slot is empty, or when an SFP module is installed, but has not established a link to an end node.
- ❑ The twisted-pair port automatically changes to the redundant status mode when an SFP module establishes a link with an end node.
- ❑ A twisted-pair port automatically transitions back to the active status when the link is lost on the SFP module.
- ❑ In nearly all cases, a twisted-pair port and an SFP module share the same configuration settings, including port settings, VLAN assignments, access control lists, and spanning tree.
- ❑ An exception to the shared settings is port speed. If you disable Auto-Negotiation on a twisted-pair port and set the speed and duplex mode manually, the speed reverts to Auto-Negotiation when an SFP module establishes a link with an end node.

## Power Over Ethernet

---

PoE is used to supply power to network devices over the same twisted pair cables that carry the network traffic. The main advantage of PoE is to make it easier to install a network. The placement of network devices is often limited by whether there are power sources nearby. This often limits equipment placement or requires the added time and cost of having additional electrical sources installed. But with PoE, you can install PoE-compatible devices wherever they are needed without having to worry about whether there are power sources nearby.

A device that provides PoE to other network devices is referred to as *power sourcing equipment* (PSE). The PoE switches act as PSE units by adding DC power to the network cable, thus functioning as a central power source for other network devices.

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

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

### PoE Standards

The AT-FS980M/9PS, AT-FS980M/18PS, AT-FS980M/28PS, AT-FS980M/28DP, and AT-FS980M/52PS switches support these PoE standards:

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

### Power Budget

The power budget is the maximum amount of power the switch can provide at one time to the powered devices. The AT-FS980M/9PS, AT-FS980M/18PS, AT-FS980M/28PS, AT-FS980M/28DP, and AT-FS980M/52PS switches support both Power over Ethernet (PoE) and Power over Ethernet Plus (PoE+) on 10/100Mbps twisted pair ports.

Table 6 shows PoE specifications for each model.

Table 6. PoE+ Switches

PoE+ Switch Model	Power Budget	Powered Device Classes	Number of PoE Ports	Number of PoE+ Ports
AT-FS980M/9PS	150 watts	0 to 4	8	5
AT-FS980M/18PS	250 watts	0 to 4	16	8
AT-FS980M/28PS	375 watts	0 to 4	24	12
AT-FS980M/28DP				
AT-FS980M/52PS				

The power requirements of the PoE devices determine the maximum number of devices the switch can support at one time. So long as the total power requirements of the powered devices is less than the power budget of the switch, the switch can supply power to all of the devices. If the total power requirements exceed the power budget, the switch denies power to one or more ports using a mechanism referred to as port prioritization.

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

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

### Powered Device Classes

Powered devices are grouped into the five classes listed in Table 7 on page 34. The classes are based on the amount of power the devices require. The switches support all five classes.

Table 7. IEEE Powered Device Classes

Class	Maximum Power Output from a Switch Port	PD Power Range
0	15.4W	0.44W to 12.95W
1	4.0W	0.44W to 3.84W
2	7.0W	3.84W to 6.49W
3	15.4W	6.49W to 12.95W
4	30.0W	12.95W to 25.5W

**Note**

PoE+ Class 4 powered devices (IEEE 802.3at) with a power range of 12.95 to 25.5 watts must use LLDP to identify their power requirements to the switch. Non-compliant PoE+ powered devices that do not support LLDP will be limited to 802.3af (15.4 watts) power levels.

## Port Prioritization

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

There are three priority levels:

- Critical
- High
- Low

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

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

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

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

You can use port prioritization on dual power supply PoE switches to protect your important networking devices from loss of power should one of the power supplies fail or lose power. By limiting the power requirements of the critical devices connected to a switch to less than 185 watts, the PoE power provided by a single power supply, a switch will have sufficient power to support the critical devices even if it has only one functional power supply.

# LEDs

Here are descriptions of the switch's LEDs.

**System LEDs** The switch has power and fault LEDs as shown in Figure 22.

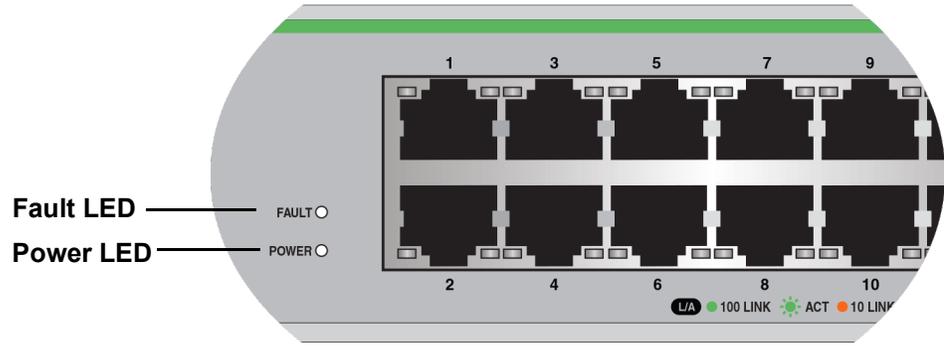


Figure 21. System LEDs

The System LEDs are described in Table 9.

Table 8. System LEDs

LED	State	Description
PWR	Off	The switch is not receiving power.
	Solid green	Power is on.
Fault	Off	The switch is operating normally or the switch's power is off.
	Solid red	An error occurs. The fan failed or the temperature exceeded the limit.
	Flashing red	The switch is loading the firmware.

### 10/100Base-TX Twisted Pair Port LEDs

The 10/100Base-TX twisted pair ports have link/activity and duplex mode/PoE status LEDs. See Figure 22.

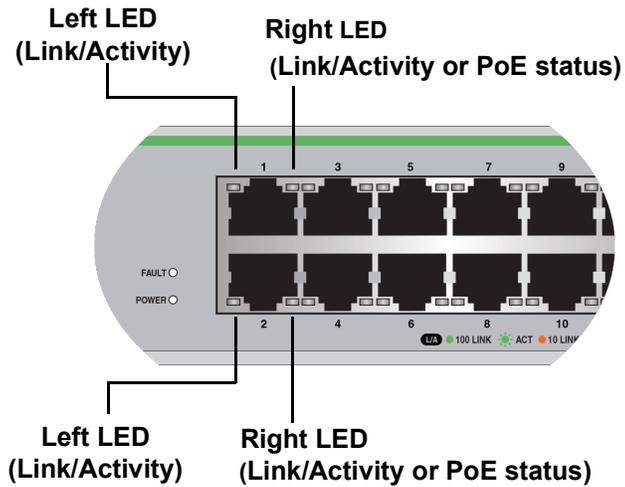


Figure 22. 10/100Base-TX Port LEDs

The LEDs are described in Table 9.

Table 9. 10/100Base-TX Port LEDs

LED	State	Description
Left (Link/Activity)	Off	The port has not established a link to an end node, or the switch is in the power saving mode.
	Solid green	The port has established a link at 100Mbps speed.
	Flashing green	The port is receiving or transmitting frames at 100Mbps speed.
	Solid orange	The port has established a link at 10Mbps speed.
	Flashing orange	The port is receiving or transmitting frames at 10Mbps speed.
Right (Duplex Mode for non-PoE switches)	Off	The port is operating in half-duplex mode, or the switch is in the power saving mode.
	Solid green	The port is operating in full-duplex mode.

Table 9. 10/100Base-TX Port LEDs (Continued)

LED	State	Description
Right (PoE status for PoE switches)	Off	No powered device (PD) is connected, or the switch is in the power saving mode.
	Solid green	The connected PD is powered on.
	Flashing green	The PD has an error status.

**10/100/1000Base-TX Twisted Pair Port LEDs**

The 10/100/1000Base-TX twisted pair ports have link/activity and duplex mode LEDs. Refer to Figure 22.

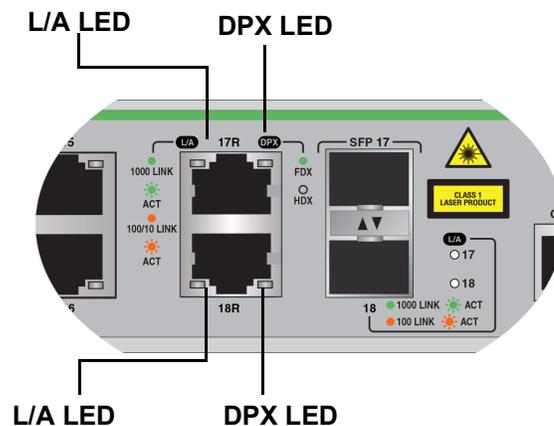


Figure 23. 10/100/1000Base-TX Port LEDs

The LEDs are described in Table 9.

Table 10. 10/100/1000Base-TX Port LEDs

LED	State	Description
L/A	Off	The port has not established a link to an end node, or the switch is in the power saving mode.
	Solid green	The port has established a link at 1000Mbps speed.
	Flashing green	The port is receiving or transmitting frames at 1000Mbps speed.
	Solid orange	The port has established a link at 10/100Mbps speed.
	Flashing orange	The port is receiving or transmitting frames at 10/100Mbps speed.

Table 10. 10/100/1000Base-TX Port LEDs (Continued)

LED	State	Description
DPX	Off	The port is operating in half-duplex mode, or the switch is in the power saving mode.
	Solid green	The port is operating in full-duplex mode.

### SFP Slot LED

Each SFP slot has one LED. Refer to Figure 24.



Figure 24. SFP Slot LEDs

#### Note

The last two SFP slots on the AT-FS980M/28, AT-FS980M/28PS, AT-FS980M/28DP, AT-FS980M/52, and AT-FS980M/52PS switches can be used as stacking ports. When an SFP slot is used as a stacking port, the LED indicates the status of the link for stacking.

The SFP slot LED is described in Table 11.

Table 11. SFP Slot LED

LED	State	Description
Link/ Activity	Off	The SFP slot is empty, the SFP module has not established a link to a network device, or the switch is in the power saving mode..
	Solid green	The port has established a link at 1000Mbps speed.
	Flashing green	The port is receiving or transmitting frames at 1000Mbps speed.

## Console Port

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

To establish a local management session with the switch, you connect a terminal or a personal computer with a terminal emulation program to the Console port, which has an RJ-45 style (8P8C) connector, using the provided management cable. The cable which has RJ-45 RJ-style (8P8C) and DB-9 (D-sub 9-pin) connectors.

The Console port is set to the following specifications:

- Default baud rate: 9600 bps
- Data bits: 8
- Parity: None
- Stop bits: 1
- Flow control: None

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**Note**

These settings are for a DEC VT100 or ANSI terminal, or an equivalent terminal emulation program.

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## Chapter 2

# Installing the Switch

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This chapter contains the following procedures:

- “Reviewing Safety Precautions” on page 42
- “Choosing a Site for the Switch” on page 47
- “Unpacking the Switch” on page 48
- “Installing the Switch on a Table or Desktop” on page 50
- “Installing the Switch on a Wall” on page 51
- “Installing the Switch in an Equipment Rack” on page 56

## Reviewing Safety Precautions

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Please review the following safety precautions before you begin the installation procedure.

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### Note

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

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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

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

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### Warning

To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables.  E1

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### Warning

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

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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

---

**Attention**

Équipement de classe I. Ce matériel doit être relié à la terre. La fiche d'alimentation doit être raccordée à une prise de terre correctement câblée. Une prise de courant mal câblée pourrait induire des tensions dangereuses sur des parties métalliques accessibles.

---

**Warning**

Suitable for installation in Information Technology Rooms in accordance with Article 645 of the National Electrical Code and NFPA 75.

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**Attention**

Convient pour une installation dans les salles informatiques conformément à l'article 645 du National Electrical Code et à la norme NFPA 75.

---

**Warning**

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

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**Attention**

Pour réduire les risques d'électrocution, les ports PoE de ce produit ne doivent pas être connectés à un câble acheminé à l'extérieur du bâtiment dans lequel ce périphérique est situé. ⚡ E40

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**Note**

Product shall be used with Class 1 laser device modules.

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**Annotation**

Le produit doit être utilisé avec des modules de dispositifs laser de classe 1.

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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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**Note**

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

---



**Warning**

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

---



**Caution**

Circuit Overloading: Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern. E21

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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

---

**Note**

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

---

**Caution**

The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. *↪* E28

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**Note**

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

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**Caution**

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

---

**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

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**Caution**

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

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**Warning**

When you remove an SFP module from this product, the case temperature of the SFP may exceed 40° C (158° F). Exercise caution when handling with unprotected hands. *↪* E43

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**Warning**

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

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## Choosing a Site for the Switch

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Observe these requirements when planning the installation of the switch.

- ❑ If you plan to install the switch in an equipment rack, the rack should be safely secured so that it will not tip over. Devices in a rack should be installed starting at the bottom, with the heavier devices near the bottom of the rack.
- ❑ If you plan to install the switch on a table, the table should be level and stable.
- ❑ The power outlet should be located near the switch and be easily accessible.
- ❑ The site should allow for easy access to the ports on the front of the switch, so that you can easily connect and disconnect cables, and view the port LEDs.
- ❑ The site should allow for adequate air flow around the unit and through the cooling vents on the front and rear panels. (The ventilation direction in units that have a cooling fan is from front to back, with the fan on the back panel drawing the air out of the unit.)
- ❑ The site should not expose the switch to moisture or water.
- ❑ The site should be a dust-free environment.
- ❑ The site should include dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.
- ❑ The site should not be a wiring or utility box because the switch will overheat and fail from inadequate airflow.



### Warning

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

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## Unpacking the Switch

To unpack the FS980M series switch, perform the following procedure:

1. Remove all 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 switch on a level, secure surface.
3. Verify that the hardware components are included in your switch package. Table 12 shows a list of the hardware components.

Table 12. Components in the Bracket Kit

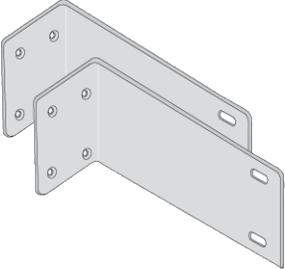
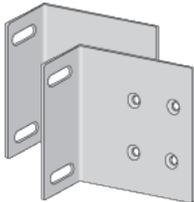
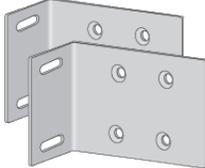
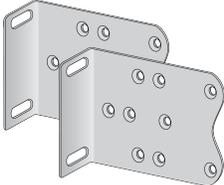
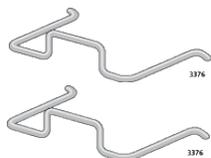
	AT-FS980M/9 AT-FS980M/9PS AT-FS980M/18	AT-FS980M/18PS AT-FS980M/28 AT-FS980M/52	AT-FS980M/28PS AT-FS980M/52PS	AT-FS980M/ 28DP
Brackets				
Eight bracket screws	 <p>M4 x 6.8mm flat-head screw</p>			
Four rack screws				
Four rubber feet				

Table 12. Components in the Bracket Kit (Continued)

	<b>AT-FS980M/9 AT-FS980M/9PS AT-FS980M/18</b>	<b>AT-FS980M/18PS AT-FS980M/28 AT-FS980M/52</b>	<b>AT-FS980M/28PS AT-FS980M/52PS</b>	<b>AT-FS980M/ 28DP</b>
Four wall mount screws	 <p>M4 x 32mm round-head wood screws</p>			
Four wall mount anchors	 <p>6mm x 30mm nylon anchors</p>			
Power code retaining clip	 <p>3376</p>			 <p>3376</p>
Regional AC power cords	 <p>1570</p>			 <p>1570</p>
One console cable				

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

## **Installing the Switch on a Table or Desktop**

---

You may install the switch on a table or desktop. To install the switch on a table or desktop, perform the following procedure:

1. Remove all the items from the packing.
2. Store the packaging material in a safe place.
3. Place the switch on a flat and secure surface, leaving ample space around the switch for ventilation.
4. Proceed to Chapter 3, “Cabling the Networking Ports” on page 59 for the cable installation.

## Installing the Switch on a Wall

---

The following FS980M series switches can be mounted on a wall using the brackets that come with each switch:

- AT-FS980M/9
- AT-FS980M/9PS
- AT-FS980M/18
- AT-FS980M/18PS
- AT-FS980M/28
- AT-FS980M/52

---

**Note**

The AT-FS980M/28PS, AT-FS980M/28DP, and AT-FS980M/52PS switches can be mounted on a wall using the AT-BRKT-J22 brackets. The AT-BRKT-J22 brackets must be purchased separately.

---

### Guidelines for Installing the Switch on a Wall

Before planning to install the switch on a wall, review the following guidelines:

- The switch must be mounted on the wall in portrait orientation with the front panel facing up. See Figure 25.

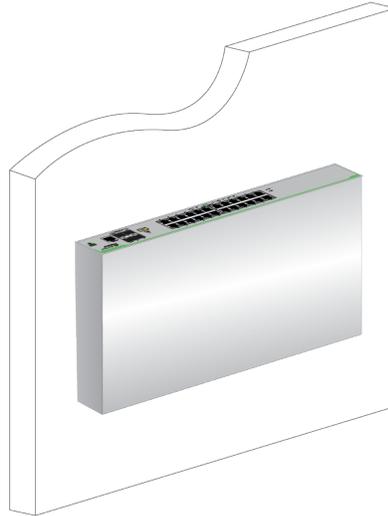


Figure 25. Correct Wall Installation

- Mounting the front panel facing down, left or right on the wall is incorrect. See Figure 26 on page 52 as examples.



Figure 26. Incorrect Wall Installation

## What to Prepare for Installation

You need the following items to install the switch on a wall:

- One FS980M switch
- One set of brackets
- Screws to attach the brackets to the switch
- Two rubber feet (only for AT-FS980M/18PS, AT-FS980M/28, and AT-FS980M/52 switches)
- Four screws and anchors that hold the switch to the wall
- Phillip-head screwdriver (not provided)
- Pencil (not provided)

---

### Note

A Phillip-head screwdriver and pencil are not included in the shipping box.

---

Installation guidelines can be found in “Choosing a Site for the Switch” on page 47.

## Installing the Switch on a Wall

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

1. Place all the items from the packaging on a work table.
2. Orient the brackets against the sides of the switch and secure them to the switch with the eight screws as shown in Figure 27 on page 53.

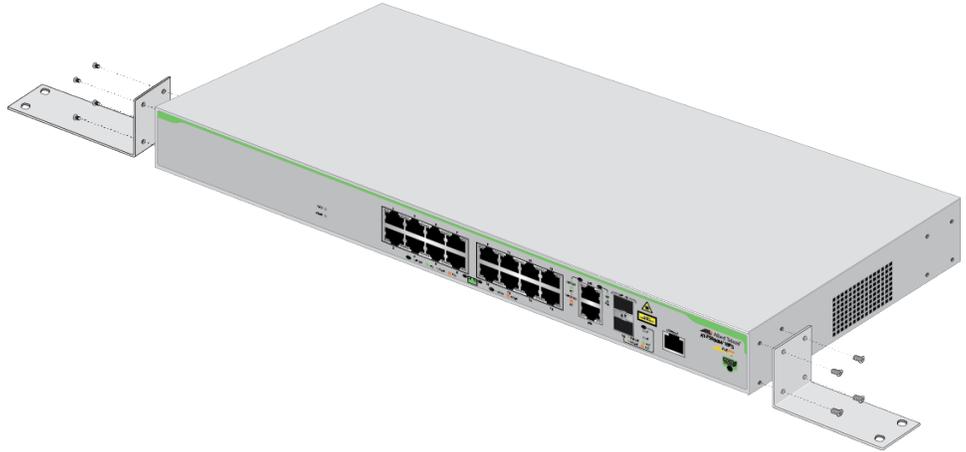


Figure 27. Attaching the Brackets to the Switch

3. Go to the following step:

For the AT-FS980M/9, AT-FS980M/9PS, and AT-FS980M/18 switches, go to Step 6.

These switches are *not* required to attach rubber feet.

For the AT-FS980M/18PS, AT-FS980M/28, and AT-FS980M/52 switches, go to Step 4.

You must attach two rubber feet to fill the gap between the switch and the wall for these switches.

4. Flip over the switch.
5. Attach two rubber feet at the corners where the brackets are not installed. See Figure 28.

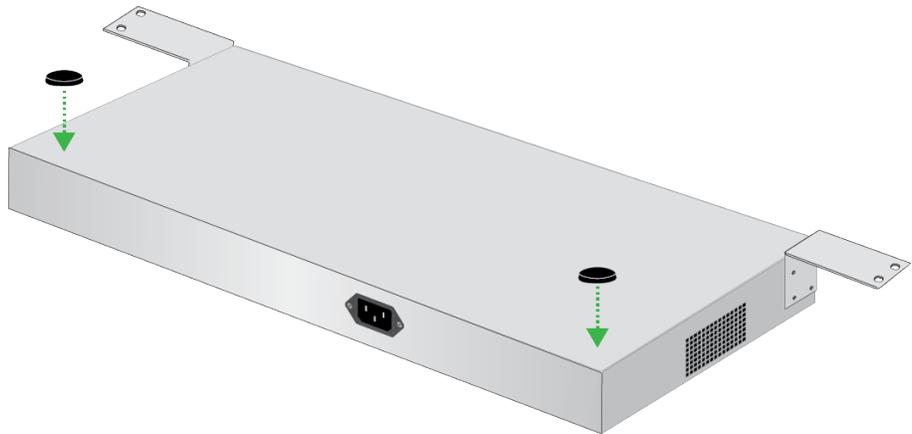


Figure 28. Attaching the Rubber Feet

6. Have another person hold the switch with the brackets at the wall location where the switch is to be installed, while you use a pencil to mark the wall with the locations of the four holes in the brackets. See Figure 29.

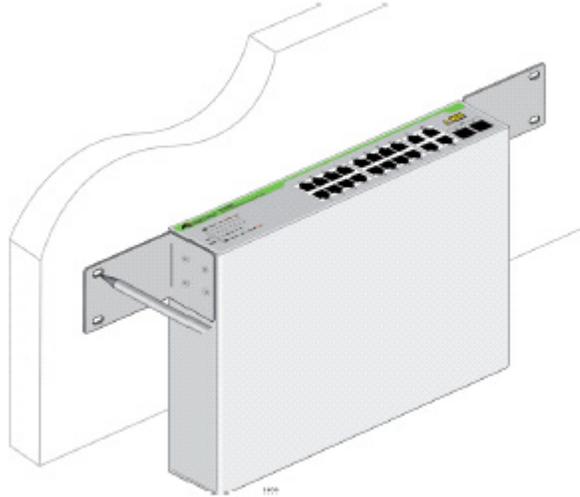


Figure 29. Marking the Screw Hole Locations

7. Pre-drill the holes where you marked on the wall in Step 6.
8. Install the anchors into the holes.
9. Position the switch on the wall and drive screws through the holes to attach the brackets on the wall. See Figure 30.

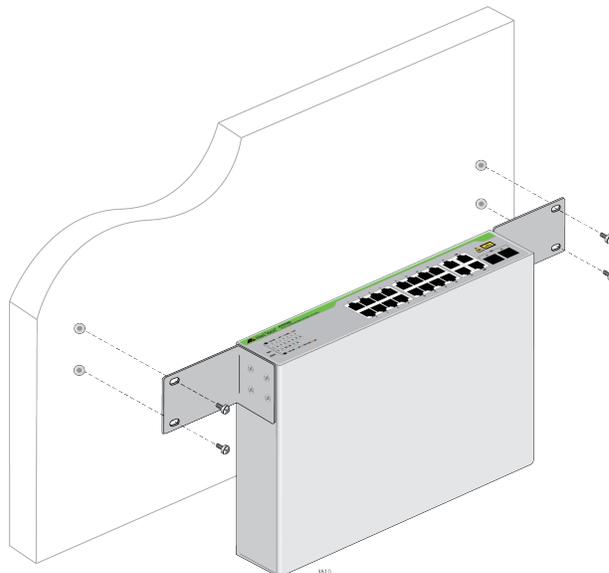


Figure 30. Driving the Screws through the Holes

10. Make sure that the two brackets are installed securely.
11. Proceed to Chapter 3, “Cabling the Networking Ports” on page 59 for the cable installation.

## Installing the Switch in an Equipment Rack

---

The FS980M series switch can be installed in an equipment rack.

### What to Prepare for Installation

You need the following items to install the switch in an equipment rack:

- One FS980M switch
- One set of brackets
- Screws for brackets
- Screws for an equipment rack
- Phillip-head screwdriver (not provided)
- Cross-head screwdriver (not provided)

---

#### Note

Phillip-head and cross-head screwdrivers are not included in the shipping box.

---

Installation guidelines can be found in “Choosing a Site for the Switch” on page 47.

### Installing the Switch in an Equipment Rack

Here is the procedure for installing the switch in a 19-inch equipment rack.



#### Caution

The chassis may be heavy and awkward to lift. Allied Telesis recommends that you get assistance when mounting the chassis in an equipment rack. *ES* E28

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1. Place all the items from the packaging on a work table.
2. Orient the brackets against the sides of the switch and secure them to the switch with the eight screws as shown in Figure 31 on page 57.

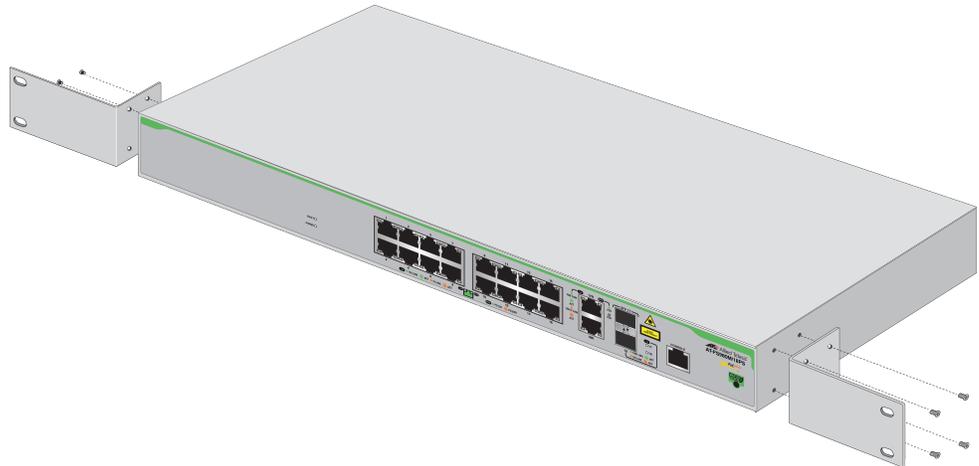


Figure 31. Attaching the Equipment Rack Brackets

3. While another person holds the switch in the equipment rack, secure it using the equipment rack screws. See Figure 32.

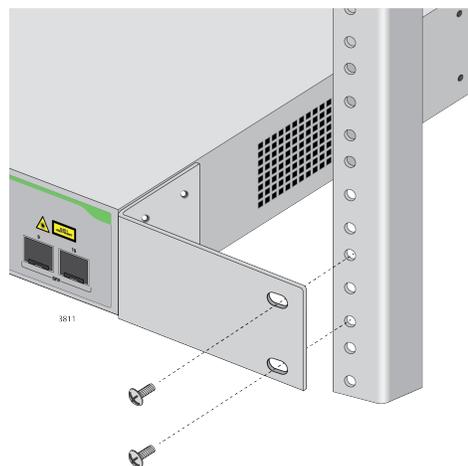


Figure 32. Mounting the Switch in an Equipment Rack

4. Go to Chapter 3, “Cabling the Networking Ports” on page 59 to connect the network cables to the ports on the switch.



## Chapter 3

# Cabling the Networking Ports

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This chapter contains the following procedures:

- “Cabling the Twisted Pair Ports” on page 60
- “Installing Optional SFP Transceivers” on page 62

## Cabling the Twisted Pair Ports

---

This section contains the guidelines to cabling the twisted pair and fiber optic ports.

### Twisted Pair Ports

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

- ❑ The cable specifications are listed in Table 3 on page 27 and Table 4 on page 30.
- ❑ The connectors on the cables should fit snugly into the ports, and the tabs should lock the connectors into place.
- ❑ The default setting for the wiring configurations of the ports is auto-MDI/MDI-X. The default setting is appropriate for switch ports that are connected to 10/100Base-TX network devices that also support auto-MDI/MDI-X.
- ❑ The default auto-MDI/MDI-X setting is not appropriate for switch ports that are connected to 10/100Base-TX network devices that do not support auto-MDI/MDI-X and have a fixed wiring configuration. For switch ports connected to those types of network devices, you should disable auto-MDI/MDI-X and set the wiring configurations manually.
- ❑ The appropriate MDI/MDI-X setting for a switch port connected to a 10/100Base-TX network device with a fixed wiring configuration depends on the setting of the network device and whether the switch and network device are connected with straight-through or crossover cable. If you are using straight-through twisted pair cable, the wiring configurations of a port on the switch and a port on a network device must be opposite each other, such that one port uses MDI and the other MDI-X. For example, if a network device has a fixed wiring configuration of MDI, you must disable auto-MDI/MDI-X on the corresponding switch port and manually set it to MDI-X. If you are using crossover twisted pair cable, the wiring configurations of a port on the switch and a port on a network device must be the same.
- ❑ The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation.
- ❑ The default speed setting of Auto-Negotiation is not appropriate for ports connected to 10/100Base-TX network devices that do not support Auto-Negotiation and have fixed speeds. For those switch ports, you should disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- ❑ The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.

- ❑ The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. You should disable Auto-Negotiation on those ports and set their duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation, which can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.

## Installing Optional SFP Transceivers

---

Review the following guidelines before installing optional SFP transceivers in the switch:

- ❑ SFP transceivers can be hot-swapped while the switch is powered on. However, you should always disconnect the fiber optic cable first before removing a transceiver.
- ❑ You should install the transceiver before connecting the fiber optic cable.
- ❑ Fiber optic transceivers are dust sensitive. Always keep the plug in the optical bores when a fiber optic cable is not installed, or when you store the transceiver. When you do remove the plug, keep it for future use.
- ❑ Unnecessary removal and insertion of a transceiver can lead to premature failure.



### **Warning**

A 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 device. *E87*

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To install an SFP transceiver:

1. Remove the transceiver from its shipping container and store the packaging material in a safe location.
2. If you are installing the transceiver in the top SFP slot, position the transceiver with the Allied Telesis label facing up. If you are installing the transceiver in the bottom slot, position the transceiver with the label facing down.
3. Slide the transceiver into the slot until it clicks into place, as shown in Figure 33 on page 63.

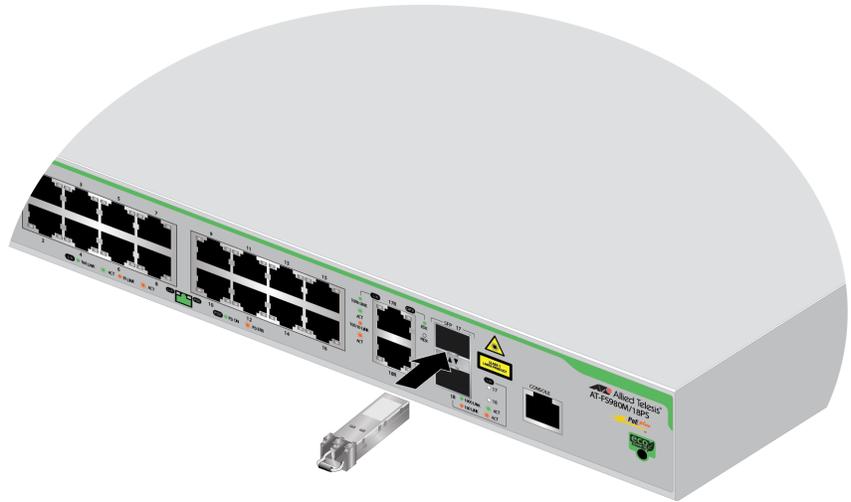


Figure 33. Installing an SFP Transceiver

4. If the transceiver is installed in the top slot, verify that the handle is in the upright position, as shown in Figure 34. If the transceiver is installed in the bottom slot, verify that the handle is in the down position.

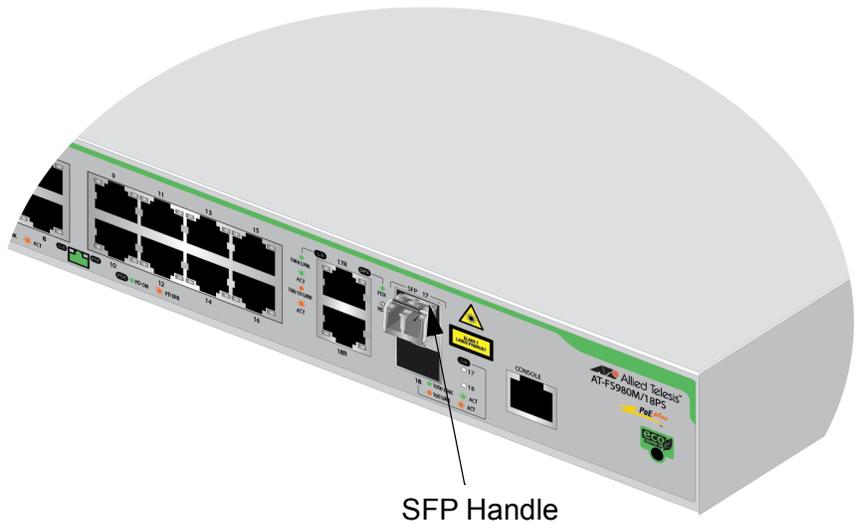


Figure 34. Positioning the SFP Handle in the Upright Position

5. Connect the fiber optic cable to the SFP module, as shown in Figure 35 on page 64.

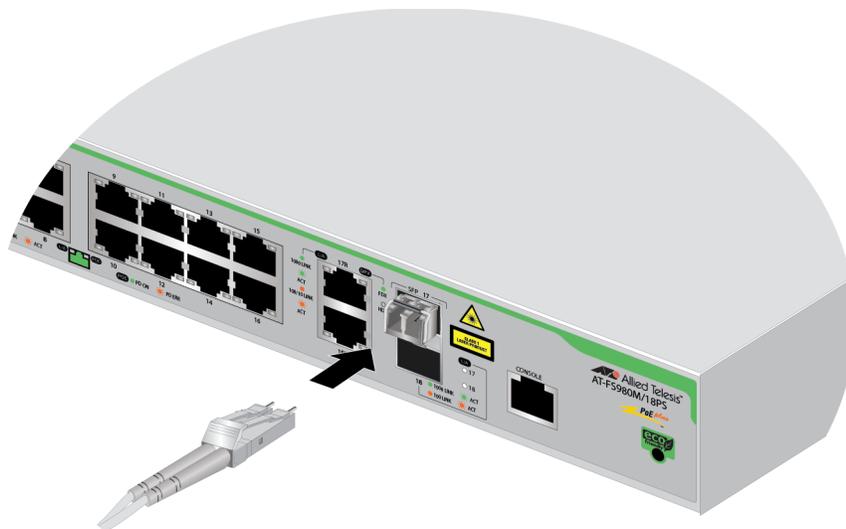


Figure 35. Connecting the Fiber Optic Cable to the SFP Module

6. Repeat this procedure if you have another SFP transceiver to install.

## Chapter 4

# Powering On the Switch

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This chapter contains the following procedures:

- “Powering On the Switch” on page 66

## Powering On the Switch

---

Before powering on the switch, refer to “Power Specifications” on page 75 for the power specifications. To install the power cord retaining clip and power on the switch, perform the following procedure:

1. Position the power cord retaining clip with the “u” part facing down, press in the sides, and insert the ends of the clip into the holes in the retaining bracket on the AC connector. See Figure 36.

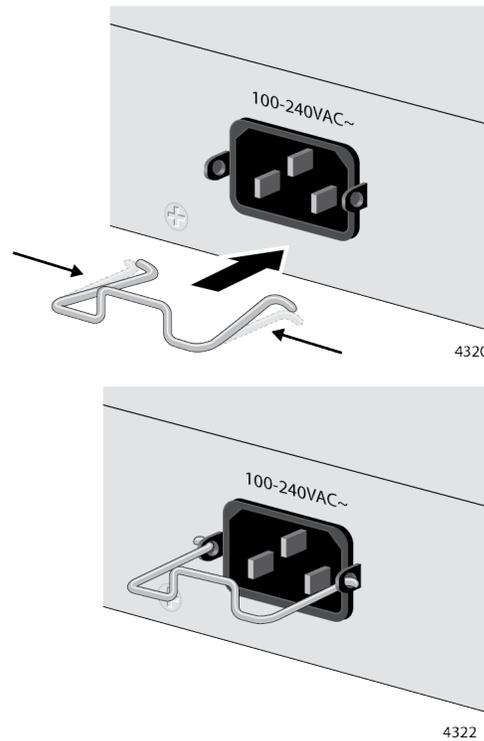


Figure 36. Installing the Retaining Clip

2. Raise the retaining clip. See Figure 37.

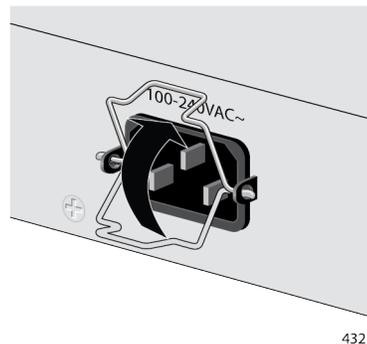


Figure 37. Raising the Retaining Clip

3. Connect the power cord to the connector. See Figure 38.

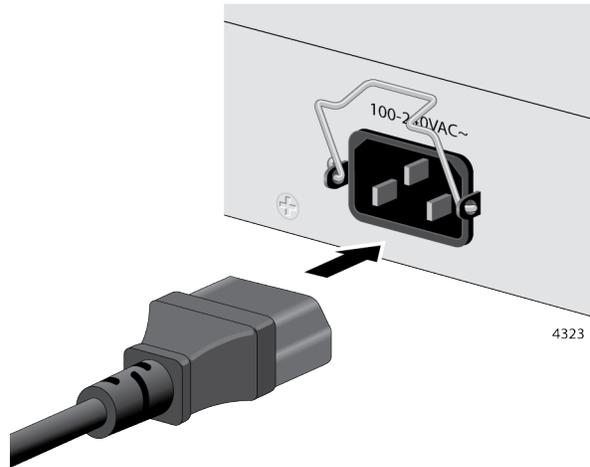


Figure 38. Plugging in the AC Power Cord

4. Lower the retaining clip to secure the power cord to the switch. See Figure 39.

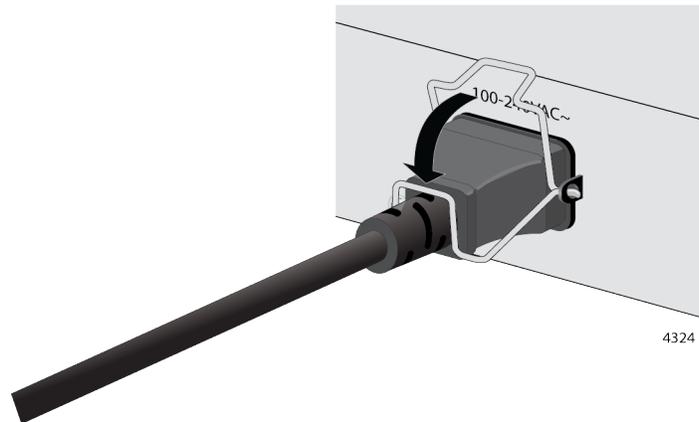


Figure 39. Lowering the Retaining Clip

5. If you are powering on the AT-FS980M/28DP switch, repeat step 1 to step 5 on the other AC connector.



## Chapter 5

# Troubleshooting

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

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**Note**

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

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**Problem 1:** All the LEDs on the switch are off.

**Solutions:** Try the following:

- ❑ Press the eco-friendly button on the front panel to see if the switch is operating in the low power mode with the LEDs off. You can also toggle the LEDs off and on with the ECOFRIENDLY LED and NO ECOFRIENDLY LED commands in the Global Configuration mode of the command line interface.
- ❑ Verify that the power cord is securely connected to the power source and the AC connector on the back panel of the switch.
- ❑ Verify that the power outlet has power by connecting another device to it.
- ❑ Try connecting the unit to another power source.
- ❑ Try a different power cord.
- ❑ Verify that the voltage from the power source is within the required levels for your region.

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

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

- ❑ Verify that the cable is securely connected to the ports on the switch and network device.
- ❑ Verify that the port is connected to the correct twisted pair cable.
- ❑ Verify that the network device connected to the twisted pair port is powered on and is operating properly.

- ❑ Try connecting another network device to the twisted pair port with a different cable. If the twisted pair port is able to establish a link, then the problem is with the cable or the other network device.
- ❑ Verify that the twisted pair cable does not exceed 100 meters (328 feet).
- ❑ Verify that you are using the appropriate category of twisted pair cable. The cable types are listed in Table 3 on page 27 and Table 4 on page 30.

**Problem 4:** The LINK/ACT LED for an SFP transceiver is off.

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

- ❑ Check that the SFP module is fully inserted in the slot.
- ❑ Verify that the remote network device connected to the fiber optic port is powered on and operating properly.
- ❑ Verify that the fiber optic cable is securely connected to the ports on the SFP module and remote network device.
- ❑ Verify that the operating specifications of the fiber optic ports on the SFP transceiver and the remote network device are compatible.
- ❑ Verify that the correct type of fiber optic cabling is being used.
- ❑ Verify that the port is connected to the correct fiber optic cable.
- ❑ Try connecting another network device to the fiber optic port using a different cable. If the port is able to establish a link, then the problem is with the cable or network device.
- ❑ Use the switch's management software to verify that the port is enabled.
- ❑ If the remote network device is a managed device, use its management firmware to determine whether its port is enabled.
- ❑ Test the attenuation of both directions on the fiber optic cable with a fiber optic tester to determine whether the optical signal is too weak (sensitivity) or too strong (maximum input power).

**Problem 5:** Network performance between a twisted pair port on the switch and a network device is slow.

**Solution:** There might be a duplex mode mismatch between the port and the network device. This 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 network device or switch so that both ports are using the same duplex mode.

**Problem 6:** The switch functions intermittently.

**Solutions:** Check the system hardware status through the management software:

- ❑ Use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that the input voltage from the power source to the switch is stable and within the approved operating range. The unit will shutdown if the input voltage fluctuates above or below the approved operating range.
- ❑ For switches that have a ventilation fan, use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that it is operating correctly.
- ❑ Verify that the location of the switch provides adequate airflow. The unit will shutdown if it is in danger of overheating.



## Appendix A

# Technical Specifications

---

This section contains the following product technical specifications:

- "Physical Specifications" on page 73
- "Environmental Specifications" on page 74
- "PoE Power Specifications" on page 75
- "Power Specifications" on page 75
- "RJ-45 Twisted Pair Port Pinouts" on page 76
- "RJ-45 Style Serial Console Port Pinouts" on page 77

## Physical Specifications

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### Dimensions (Width x Depth x Height)

Table 13. Product Dimensions

Model	Dimensions
AT-FS980M/9 AT-FS980M/9PS	210 mm x 275 mm x 42.5 mm (8.3 in. x 10.8 in. x 1.7 in.)
AT-FS980M/18	330 mm x 204 mm x 43.6 mm (13 in. x 8 in. x 1.7 in.)
AT-FS980M/18PS AT-FS980M/28 AT-FS980M/52	440 mm x 257 mm x 43.2 mm (17.3 in. x 10.1 in. x 1.7 in.)
AT-FS980M/28PS AT-FS980M/52PS	440 mm x 345 mm x 43.2 mm (17.3 in. x 13.6 in. x 1.7 in.)
AT-FS980M/28DP	440 mm x 425mm x 44 mm (17.3 in. x 16.7 in. x 1.7 in.)

## Weights

Table 14. Product Weights

Model	Weight
AT-FS980M/9	2.0 kg (4.4 lb.)
AT-FS980M/9PS	2.5 kg (5.5 lb.)
AT-FS980M/18	2.15 kg (4.7 lb.)
AT-FS980M/18PS	3.6 kg (7.9 lb.)
AT-FS980M/28	3.2 kg (7.1 lb.)
AT-FS980M/28PS	5.1 kg (11.2 lb.)
AT-FS980M/28DP	6.95 kg (15.3 lb.)
AT-FS980M/52	3.4 kg (7.5 lb.)
AT-FS980M/52PS	5.4 kg (11.9 lb.)

## Ventilation

Table 15. Ventilation Requirements

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

## Environmental Specifications

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Table 16. Environmental Specifications

Description	Specification
Operating Temperature*1	0° C to 50° C (32° F to 122° F)
Storage Temperature	-20° C to 60° C (-4° F to 140° F)
Operating Humidity	5% to 80% noncondensing
Storage Humidity	5% to 95% noncondensing
Maximum Operating Altitude	3,048 m (10,000 ft.)

\*1 The operating temperature of the AT-FS980M/28 switch using the AT-SPTX module is between 0° C to 40° C (32° F to 104° F).

## PoE Power Specifications

Table 17. PoE Power Specifications

Product	PoE Power Available	Maximum PoE Ports Supported	
		IEEE 802.3af	IEEE 802.3at
AT-FS980M/9PS	150 watts	8	5
AT-FS980M/18PS	250 watts	16	8
AT-FS980M/28PS AT-FS980M/28DP AT-FS980M/52PS	375 watts	24	12

## Power Specifications

### Maximum Power Consumptions

Table 18. Maximum Power Consumptions (watt)

Model	Max Power Consumption without PoE Load	Max Power Consumption with Full PoE Load
AT-FS980M/9	6.3 watts	N/A
AT-FS980M/9PS	13 watts	190 watts
AT-FS980M/18	12 watts	N/A
AT-FS980M/18PS	24 watts	320 watts
AT-FS980M/28	19 watts	N/A
AT-FS980M/28PS	49 watts	520 watts
AT-FS980M/28DP	49 watts	520 watts
AT-FS980M/52	36 watts	N/A
AT-FS980M/52PS	63 watts	540 watts

### Input Voltages

Table 19. Input Voltages

Model	Specification
All models	100-240 VAC

## RJ-45 Twisted Pair Port Pinouts

Figure 40 illustrates the pin layout of the RJ-45 connectors and ports.

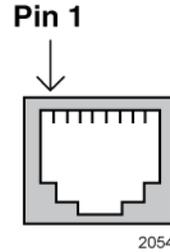


Figure 40. RJ-45 Socket Pin Layout (Front View)

Table 20 lists the pin signals for 10 and 100 Mbps.

Table 20. Pin Signals for 10 and 100 Mbps

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

Table 21 lists the pin signals when a port operating at 1000 Mbps.

Table 21. Pin Signals for 1000 Mbps

Pinout	Pair
1	TP0 +
2	TP0 -
3	TP1 +
4	TP2 +

Table 21. Pin Signals for 1000 Mbps (Continued)

Pinout	Pair
5	TP2 -
6	TP1 -
7	TP3 +
8	TP3 -

## RJ-45 Style Serial Console Port Pinouts

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Table 22 lists the pin signals of the RJ-45 style serial Console port.

Table 22. RJ-45 Pin Signals

Pin	Signal
1	Request to send
2	Not used
3	Transmit Data
4	Ground
5	Ground
6	Receive Data
7	Not used
8	Clear to send

