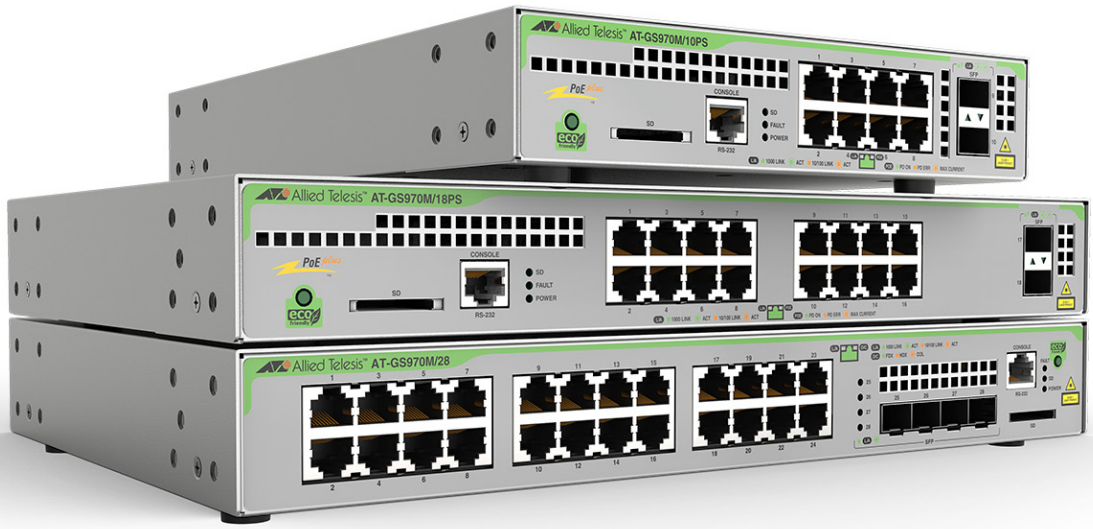
CentreCOM® GS970M Series

MANAGED GIGABIT ETHERNET SWITCH

GS970M/10
GS970M/10PS

GS970M/18
GS970M/18PS

GS970M/28
GS970M/28PS



Installation Guide

the solution : the network

613-002439 REV A

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Electrical Safety and Emissions Standards

This product meets the following standards.

U.S. Federal Communications Commission
Radiated Energy Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

EMC	EN 55022 Class A EN 55024 EN 61000-3-2 EN 61000-3-3 EN 62311 FCC Part 15 (CFR 47) Class A VCCI Class A CISPR 22 Class A ICES-003

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

Environmental Compliance	RoHS WEEE
Electrical Safety	EN 60950-1 (edition 2) IEC 60950-1 (edition 2) UL 60950-1 (edition 2)
Laser Safety	EN 60825
Regulatory Compliance	RCM CE C-UL-US UL-EU

Translated Safety Statements

Important: 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**.

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Preface

This guide contains the installation instructions for the following GS9790M Series Switches:

- GS970M/10
- GS970M/10PS
- GS970M/18
- GS970M18PS
- GS970M/28
- GS970M/28PS

This preface contains the following sections:

- "Symbol conventions" on page 2
- "Contacting Allied Telesis" on page 3

Symbol conventions

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.



Warning
Warnings inform you that an eye and skin hazard exists due to the presence of a Class 1 laser device.

Contacting Allied Telesis

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**. 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 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 a Return Merchandise Authorization (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/how-to-buy** and select your region.

Chapter 1: Overview

This chapter provides descriptions of the GS970M/10, GS970M/10PS, GS970M/18, GS970M/18PS, GS970M/28, and GS970M/28PS Gigabit Ethernet Switches and contains the following sections:

- "Features" on page 6
- "Package contents for the GS970M/10 and GS970M/10PS Switch" on page 8
- "Package contents for GS970M/18 and GS970M/18PS Switches" on page 9
- "Package contents for the GS970M/28 Switch" on page 10
- "Package contents for the GS970M/28PS Switch" on page 11
- "Front and back panels on the GS970M/10 Switch" on page 12
- "Front and back panels on the GS970M/10PS Switch" on page 14
- "Front and back panels on the GS970M/18 Switch" on page 16
- "Front and back panels on the GS970M/18PS Switch" on page 18
- "Front and back panels on the GS970M/28 Switch" on page 20
- "Front and back panels on the GS970M/28PS Switch" on page 22
- "Twisted pair ports" on page 25
- "Power over Ethernet (PoE)" on page 27
- "LEDs" on page 32
- "ecofriendly button" on page 41
- "Power supply" on page 42
- "Fans" on page 43

Features

This section describes the hardware features of the GS970M Series Gigabit Ethernet Switches.

Twisted pair ports

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

- GS970M/10, GS970M/18 or GS970M/28 switches: 8, 16 or 24 non-PoE ports per switch
- GS970M/10PS, GS970M/18PS, or GS970M/28PS switches: 8, 16 or 24 PoE ports per switch
- 10BASE-T (IEEE 802.3i), 100BASE-TX (IEEE 802.3u) and 1000BASE-T (IEEE 802.3ab) compliant
- IEEE 802.3u Auto-Negotiation compliant
- Auto-MDI/MDIX
- PoE Plus
- Full wire-speed non-blocking
- IEEE 802.3x Flow Control in 10BASE-T/100BASE-TX full-duplex operation
- IEEE 802.3x Back Pressure in 10BASE-T/100BASE-TX half-duplex operation
- IEEE803.3z 1000BASE-T Flow Control
- Support for jumbo packets up to 10KB
- One RJ45 connector on front panel for RS232 console purposes.

SFP slots

Here are the basic features of the SFP ports:

- GS970M/10, GS970M/10PS,GS970M/18 and GS970M/18PS switches: 2 SFP ports per switch
- GS970M/28 and GS970M/28PS switches: 4 SFP ports per switch.
- Available for 100Mbps or 1000Mbps of fiber, and 1000Mbps of copper
- Support 100BASE-FX and 1000BASE-SX/LX transceivers.

You need to purchase SFP transceivers separately. For a list of supported transceivers, contact your Allied Telesis distributor or reseller.

Note

See the product data sheets for the specific ATI SFP modules supported by the GS970M Series switches.

LEDs

Here is a brief description of the port LEDs:

- POWER and FAULT LEDs; refer to “POWER and FAULT LEDs” on page 32.
- Link/Activity/Speed/PoE LEDs for the PoE twisted pair ports; see “10/1000BASE-T/100BASE-TX Link/Activity/Speed LED and PoE status LED” on page 34.
- Link/Activity/Speed/Duplex/Collision LEDs for the non-PoE twisted pair ports; see “10/1000BASE-T/100BASE-TX Link/Activity/Speed LED and Duplex/Collision LED” on page 36.
- Link/Activity LEDs for the SFP slots; see “SFP LEDs” on page 38.
- SD card LED: refer to “SD card LED” on page 39.

Note

The ecofriendly button turns off the LEDs (excluding the POWER LED and SD card LED) to conserve electricity. See “ecofriendly button” on page 41.

Installation options

The switches can be installed in the following ways:

- Rack mounted in a 19-inch equipment rack
- Mounted on a desk or tabletop
- Wall mounted

Power conservation

The switches implement Eco-Switch Green Power saving features and use less power than the METI specification. The switches have the following power conservation features:

- ecofriendly button to turn off the port LEDs when the system is not being monitored
- High efficiency power supply
- Power scaling based on traffic loads on ports operating at 1000Mbps (port power scaling not available at 10 or 100Mbps)
- Power shutdown on unused ports

MAC address table

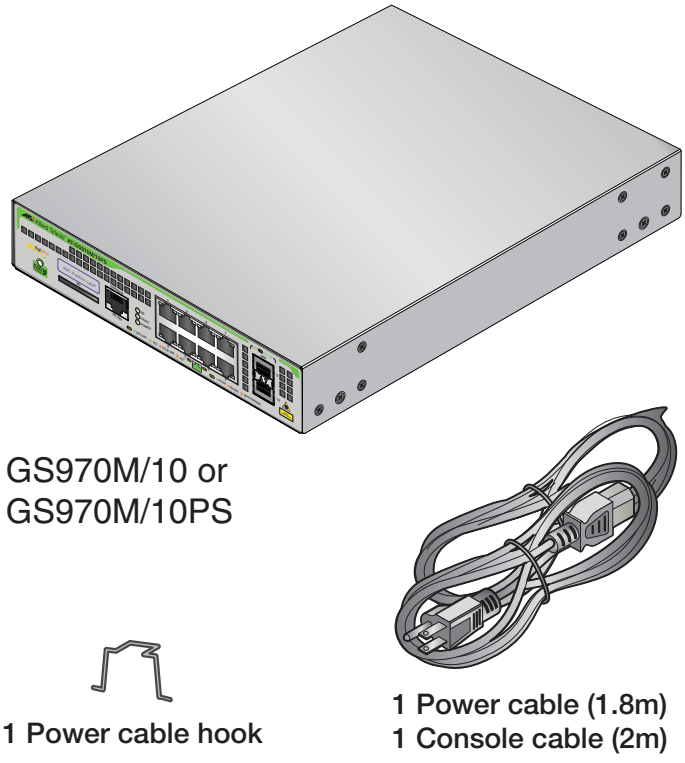
Here are the basic features of the MAC address table:

- Storage capacity up to 16K MAC address entries
- Automatic learning and aging

Package contents for the GS970M/10 and GS970M/10PS Switch

Figure 1 illustrates the package contents for the GS970M/10 and GS970M/10PS Gigabit Ethernet Switch.

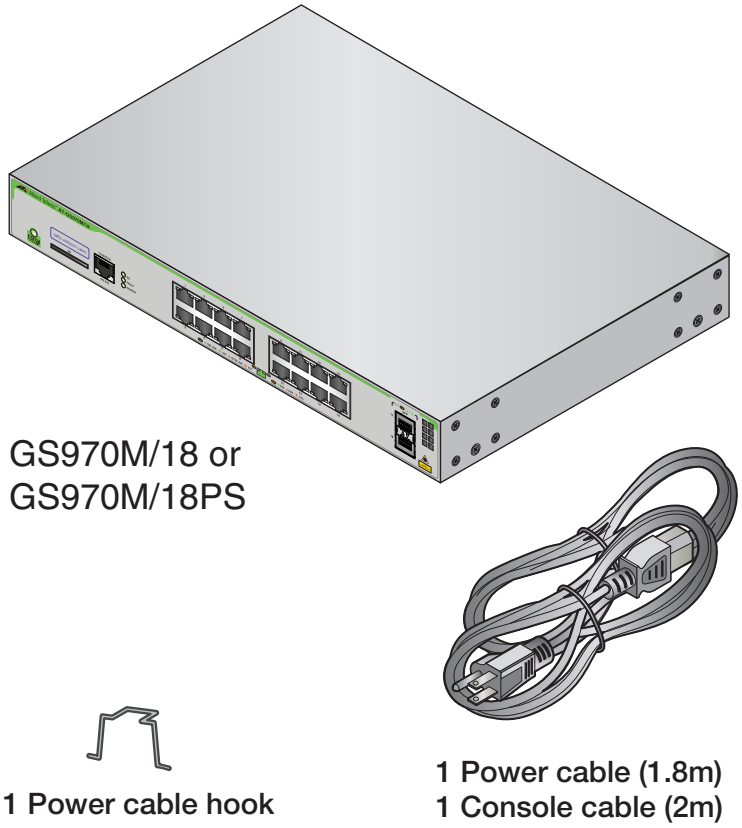
FIGURE 1. GS970M/10 AND GS970M/10PS PACKAGING



Package contents for GS970M/18 and GS970M/18PS Switches

Figure 2 illustrates the package contents for the GS970M/18 and GS970M/18PS Gigabit Ethernet Switches.

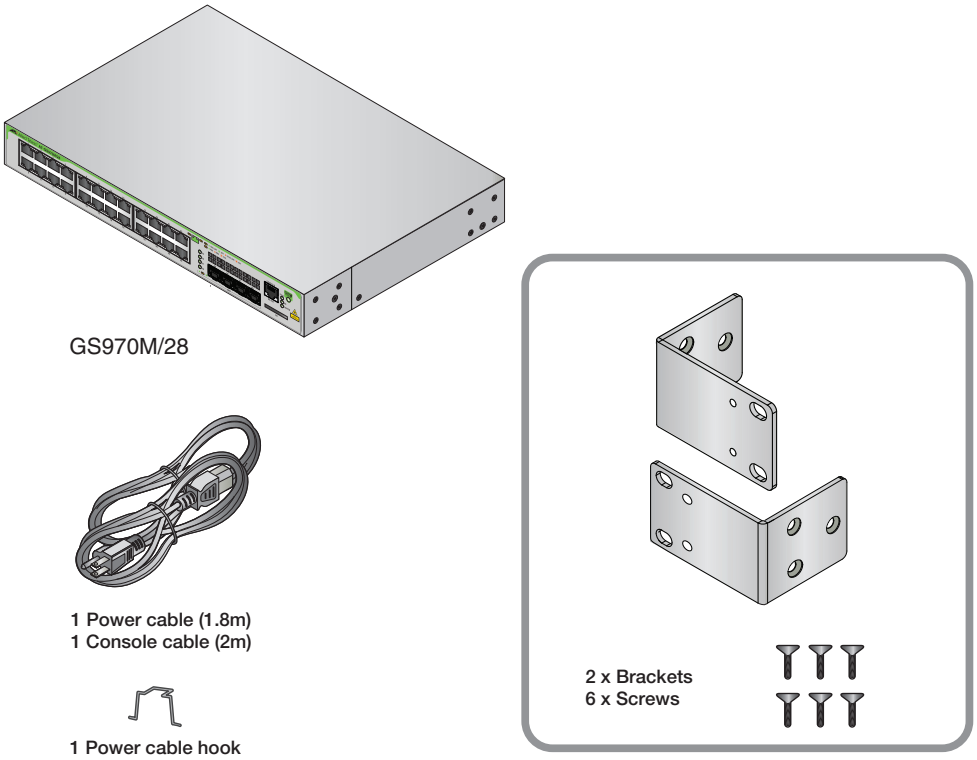
FIGURE 2. GS970M/18 AND GS970M/18PS PACKAGING



Package contents for the GS970M/28 Switch

Figure 3 illustrates the package contents for the GS970M/28 Gigabit Ethernet Switch.

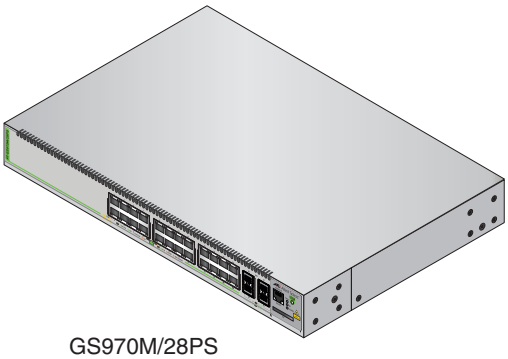
FIGURE 3. GS970M/28 PACKAGING



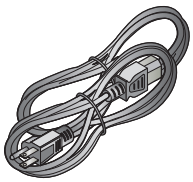
Package contents for the GS970M/28PS Switch

Figure 4 illustrates the package contents for the GS970M/28PS Gigabit Ethernet Switch.

FIGURE 4. GS970M/28PS PACKAGING



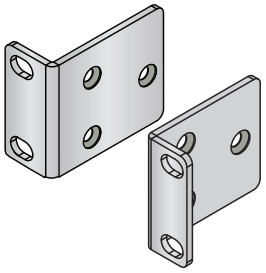
GS970M/28PS



1 Power cable (1.8m)
1 Console cable (2m)



1 Power cable hook





2 x Brackets
6 x Screws

Front and back panels on the GS970M/10 Switch

Figure 5 illustrates the front panel of the GS970M/10 Gigabit Ethernet Switch.

FIGURE 5. GS970M/10 FRONT PANEL

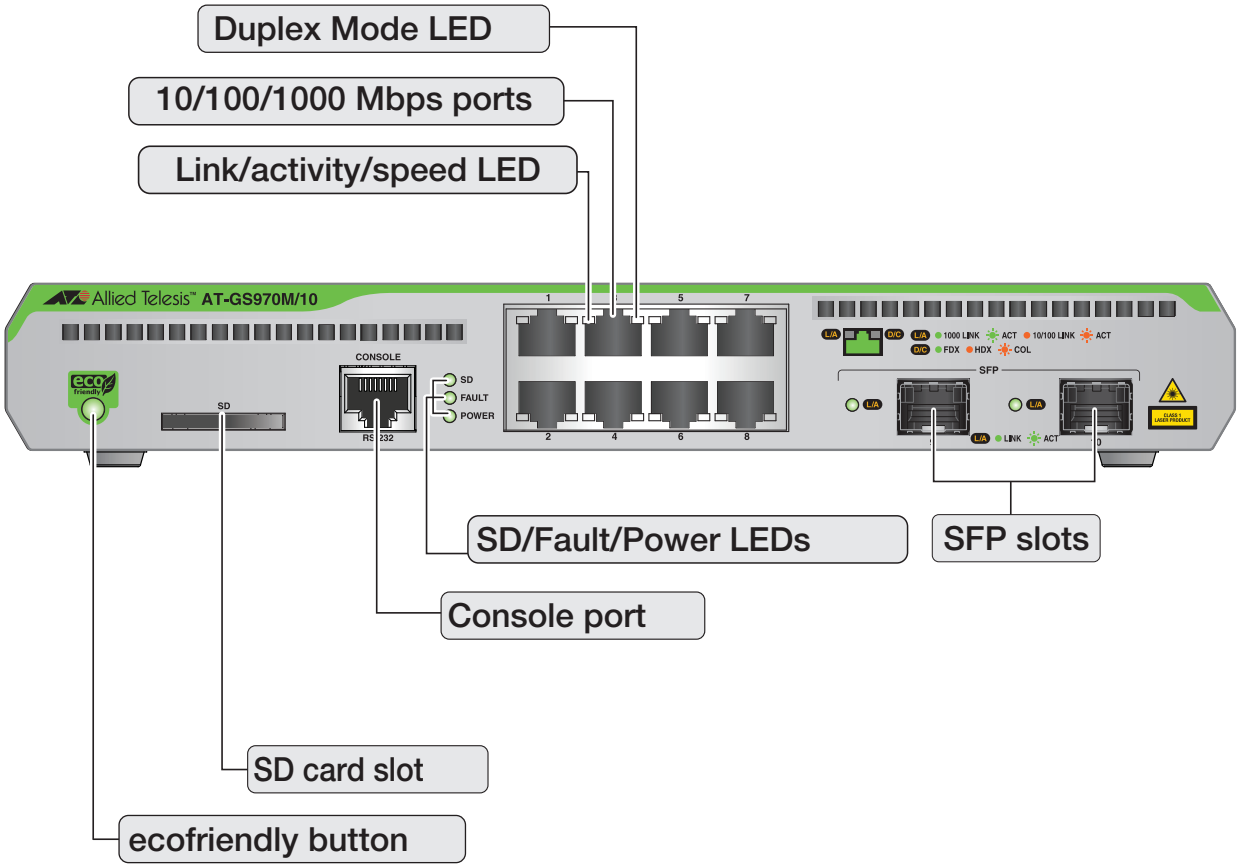
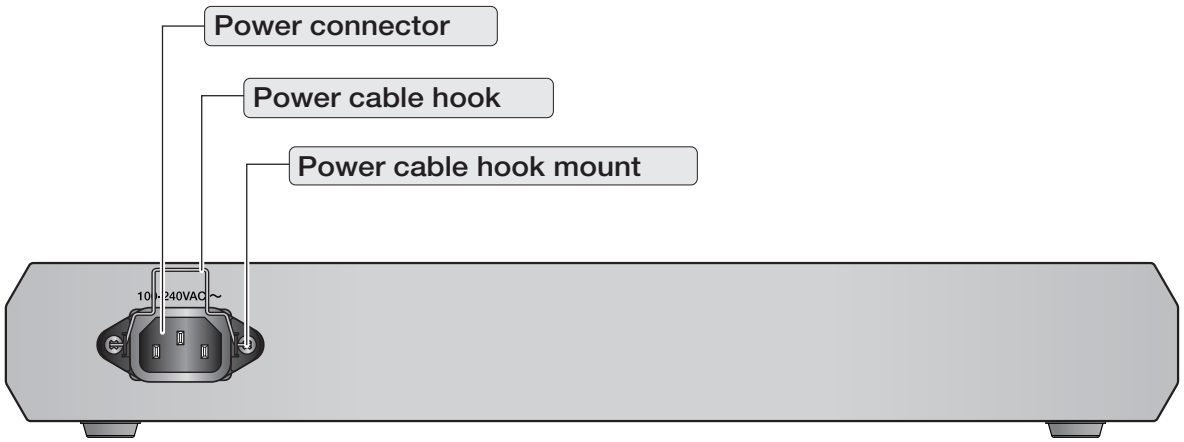


Figure 6 illustrates the back panel of the GS970M/10 Gigabit Ethernet Switch.

FIGURE 6. GS970M/10 BACK PANEL



Front and back panels on the GS970M/10PS Switch

Figure 7 illustrates the front panel of the GS970M/10PS Gigabit Ethernet Switch.

FIGURE 7. GS970M/10PS FRONT PANEL

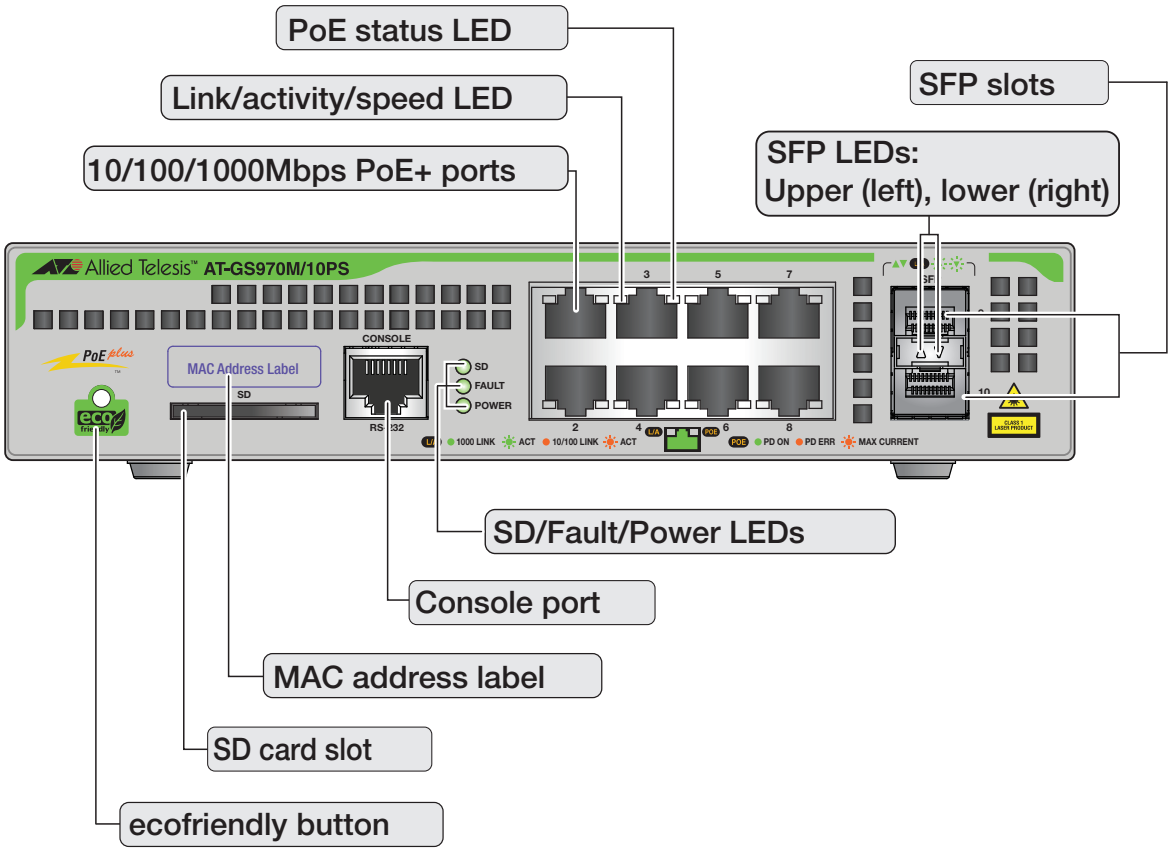
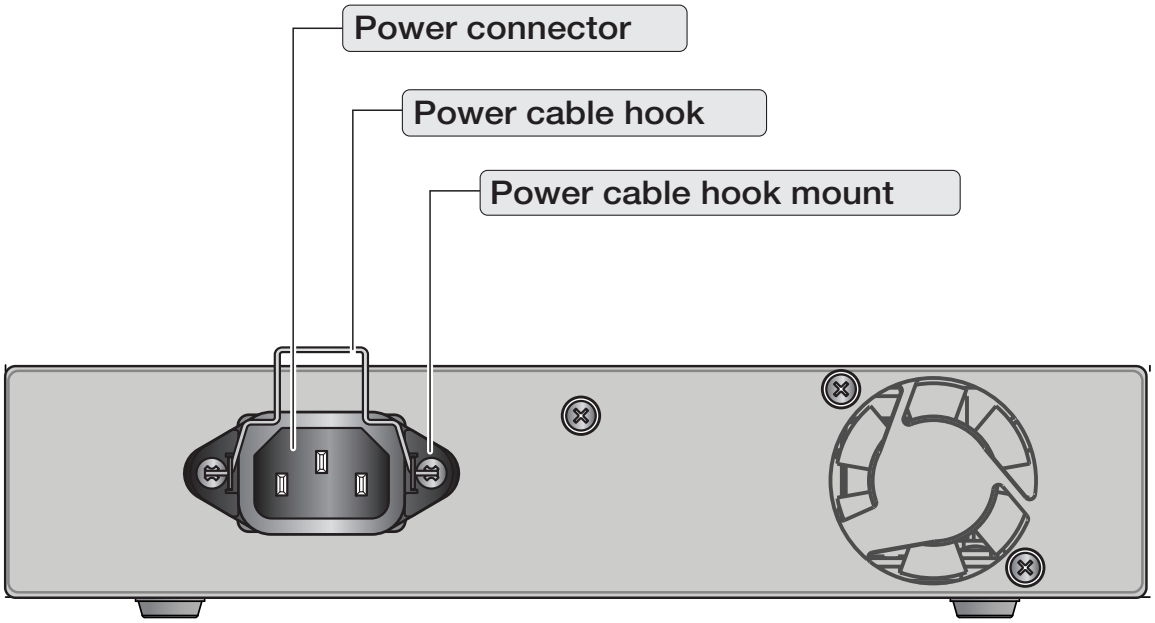


Figure 8 illustrates the back panel of the GS970M/10PS Gigabit Ethernet Switch.

FIGURE 8. GS970M/10PS BACK PANEL



Front and back panels on the GS970M/18 Switch

Figure 9 illustrates the front panel of the GS970M/18 Gigabit Ethernet Switch.

FIGURE 9. GS970M/18 FRONT PANEL

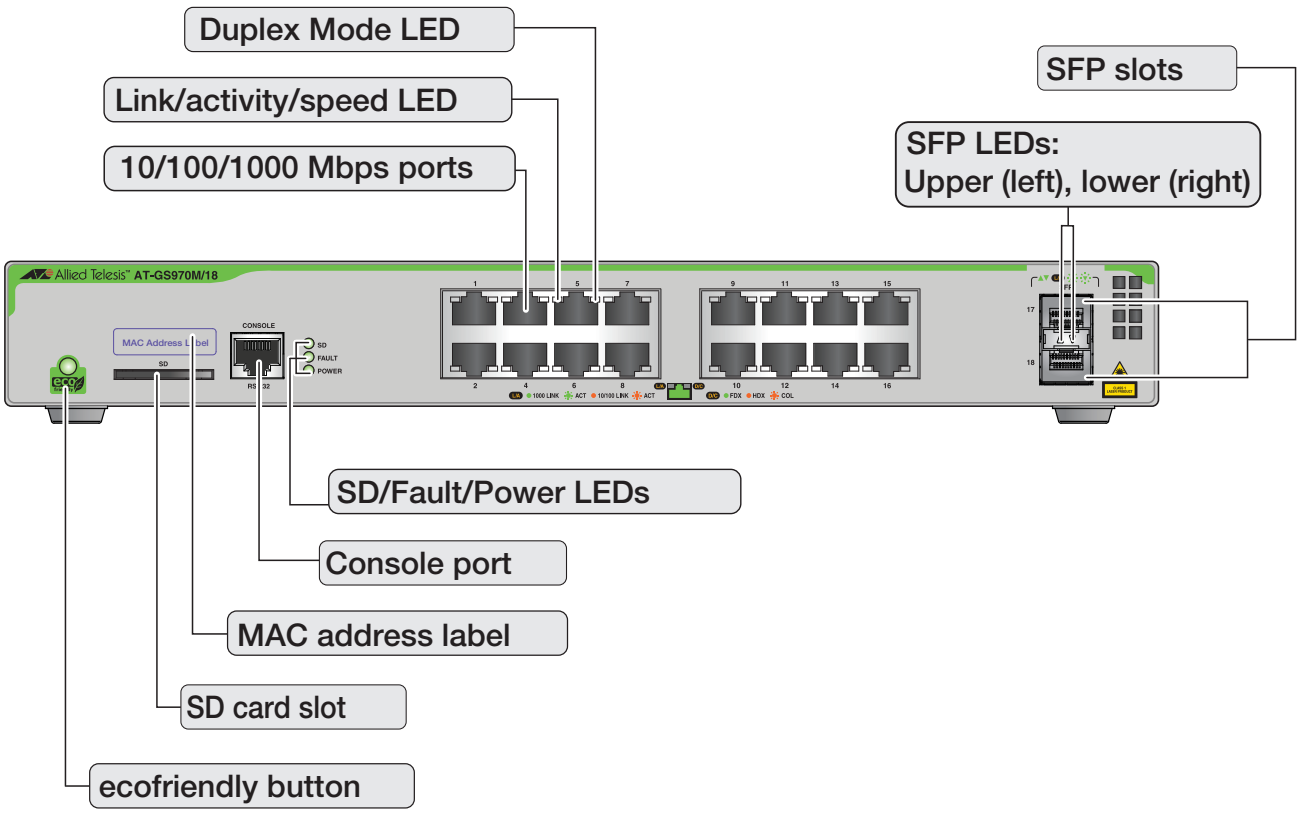
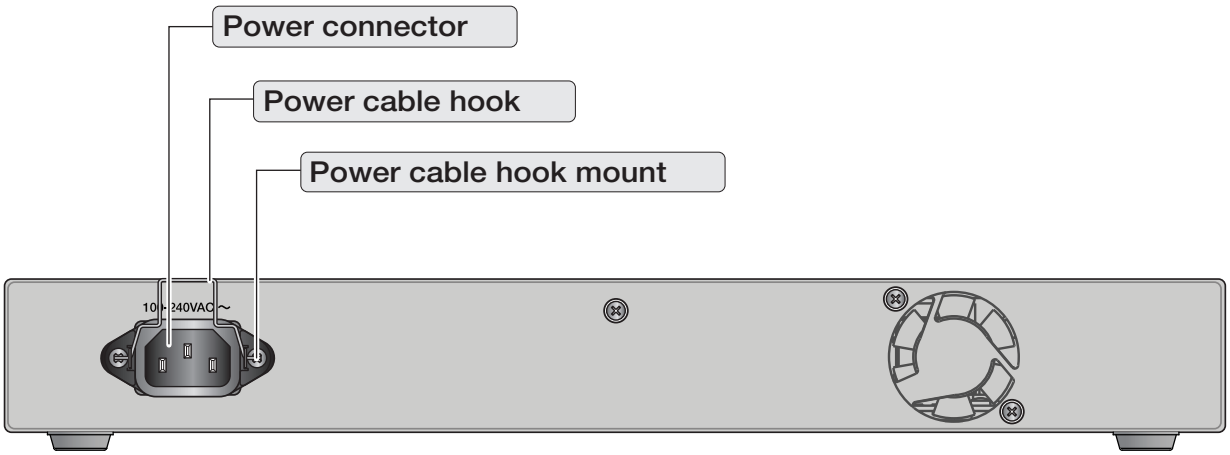


Figure 10 illustrates the back panel of the GS970M/18 Gigabit Ethernet Switch.

FIGURE 10. GS970M/18 BACK PANEL



Front and back panels on the GS970M/18PS Switch

Figure 11 illustrates the front panel of the GS970M/18PS Gigabit Ethernet Switch.

FIGURE 11. GS970M/18PS FRONT PANEL

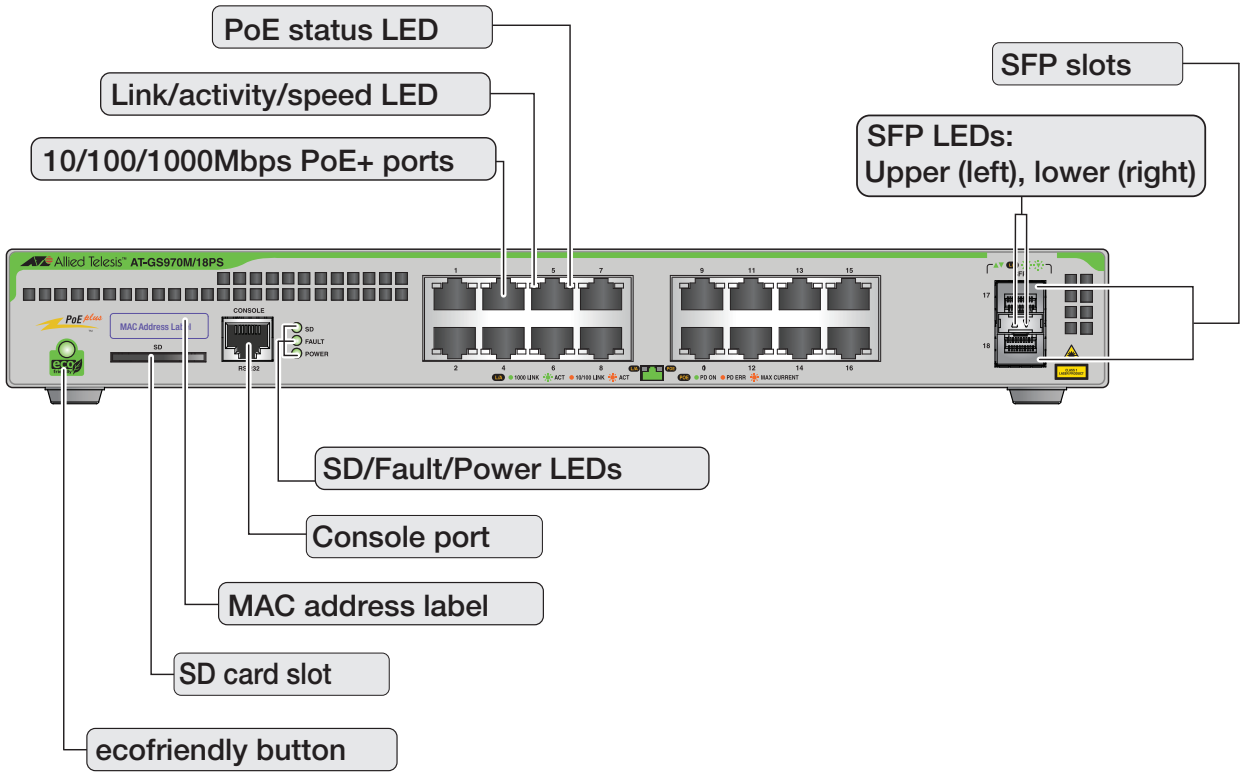
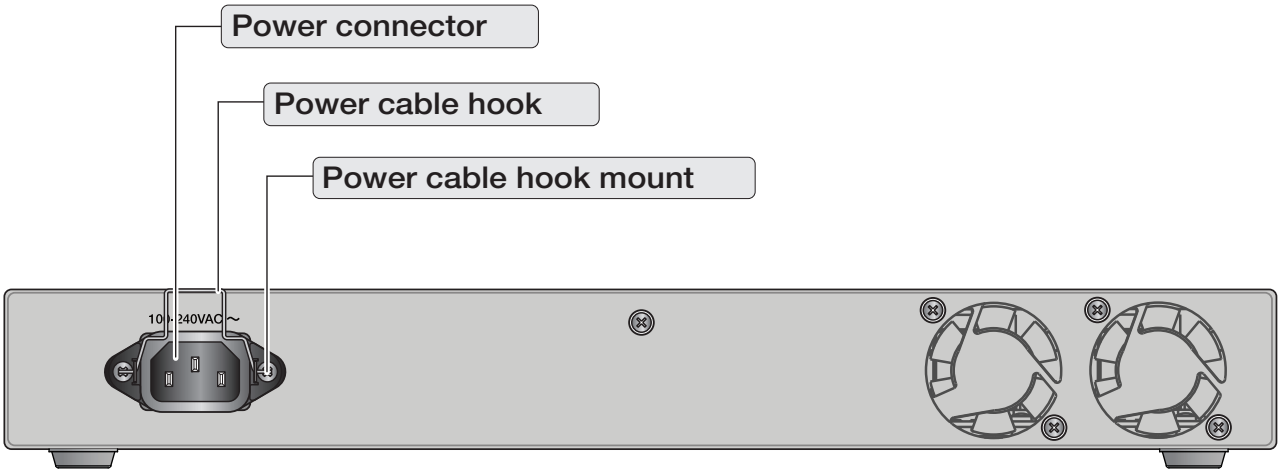


Figure 12 illustrates the back panel of the GS970M/18PS Gigabit Ethernet Switch.

FIGURE 12. GS970M/18PS BACK PANEL



Front and back panels on the GS970M/28 Switch

Figure 13 illustrates the front panel of the GS970M/28 Gigabit Ethernet Switch.

FIGURE 13. GS970M/28 FRONT PANEL

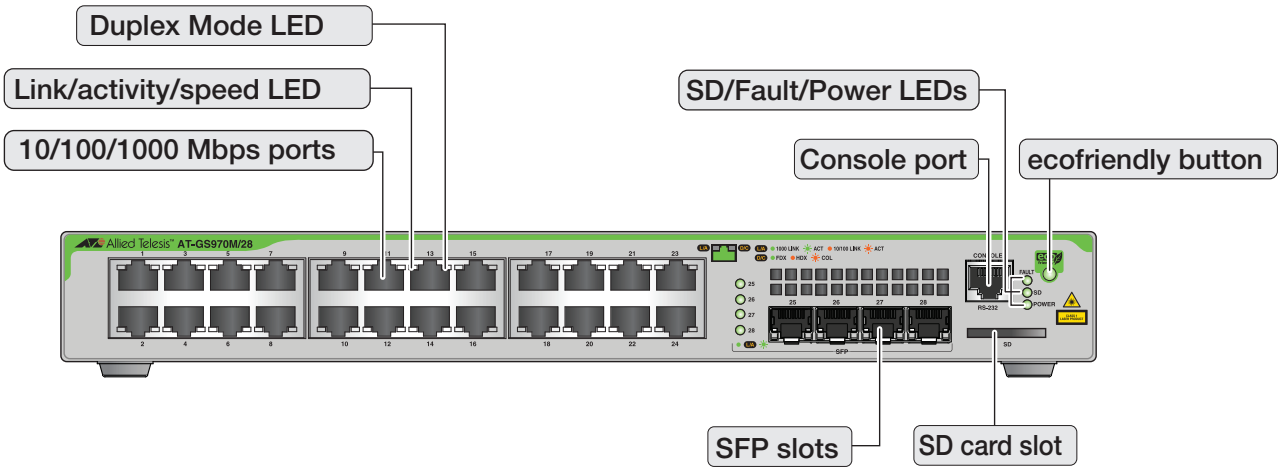
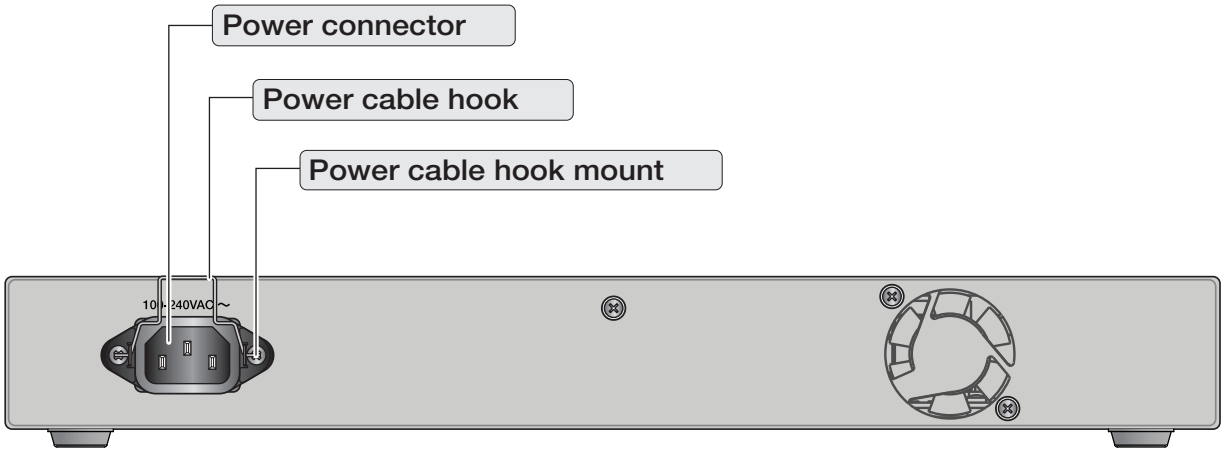


Figure 14 illustrates the back panel of the GS970M/28 Gigabit Ethernet Switch.

FIGURE 14. GS970M/28 BACK PANEL



Front and back panels on the GS970M/28PS Switch

Figure 15 illustrates the front panel of the GS970M/28PS Gigabit Ethernet Switch.

FIGURE 15. GS970M/28PS FRONT PANEL

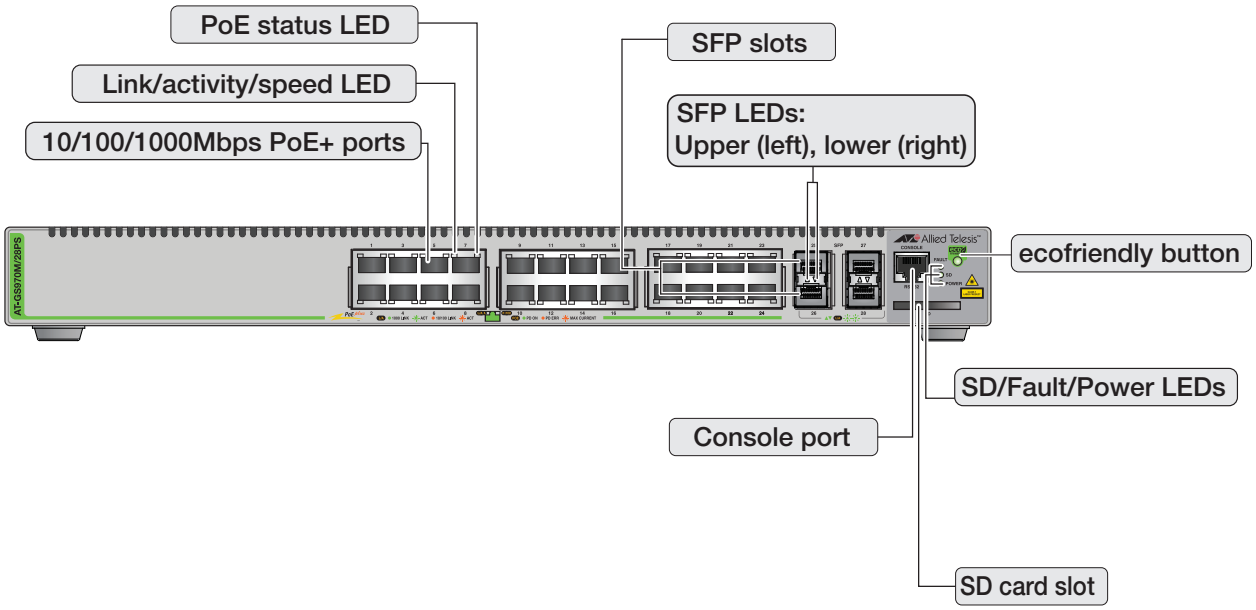
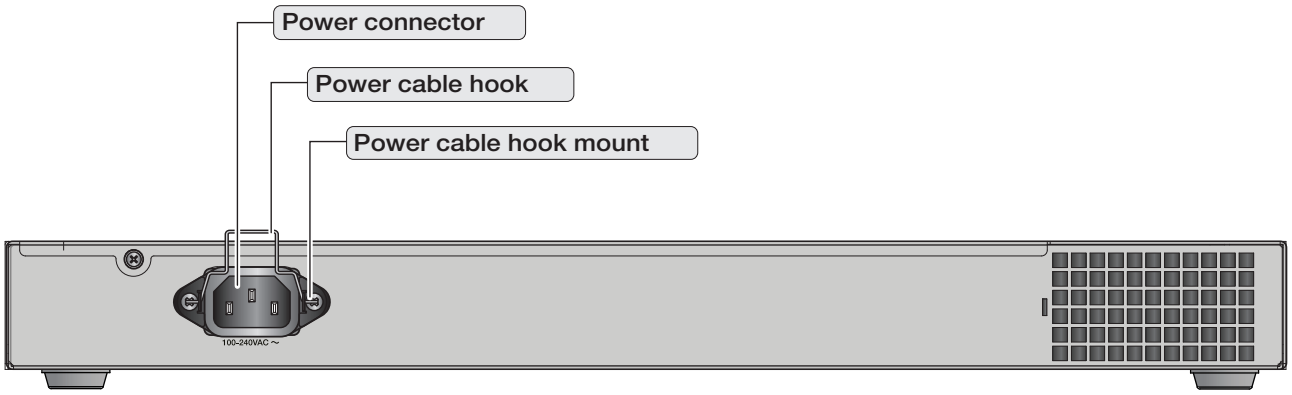


Figure 16 illustrates the back panel of the GS970M/28PS Gigabit Ethernet Switch.

FIGURE 16. GS970M/28PS BACK PANEL



Management software

The switches are shipped with the management software pre-installed. The software provides a command line interface and a GUI (Graphical User Interface) for in-band, over-the-network management.

For full product documentation, see our online documentation Library. For AlliedWare Plus products, the Library includes the following documents:

- Feature Overview and Configuration Guides - find these by clicking **here** and searching for the feature name.
- Datasheet - find this by clicking **here** and searching for GS970M.
- Command References - find these by clicking **here** and searching for GS970M.

In the unlikely event that the management software becomes corrupted or damaged on the switch, you can download the software from the Allied Telesis corporate web site and reinstall it on the switch. For instructions on how to install new management software, see the product documentation.

Twisted pair ports

The number of twisted pair ports supported by each GS970M Series switch is:

- 8 ports: GS970M/10 and GS970M/10PS
- 16 ports: GS970M/18 and GS970M/18PS
- 24 ports: GS970M/28 and GS970M/28PS

All ports are 10BASE-T, 100BASE-TX, and 1000BASE-T compliant. You can set the port speeds and duplex modes either automatically with IEEE 802.3u Auto-Negotiation or manually with the management software.

The twisted pair ports feature 8-pin RJ45 connectors. For the port pinouts, see “Connectors and port pinouts” on page 88.

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

The ports feature auto-MDI, which automatically configures the ports as MDI or MDIX. This feature allows you to use straight-through twisted pair cables regardless of the wiring configurations of the ports on the end nodes.

Note

A switch port connected to an end node that is not using Auto-Negotiation should not use Auto-Negotiation to set the speed and duplex mode, as a duplex mode mismatch may occur. In this case, disable Auto-Negotiation and set the port’s speed and duplex mode manually.

Cable requirements for non-PoE ports

Cable requirements for the non-PoE twisted pair ports are in Table 1.

TABLE 1. TWISTED PAIR CABLE REQUIREMENTS FOR THE NON-POE PORTS

Cable type	10 Mbps	100 Mbps	1000 Mbps
Cat 3: Standard TIA/EIA 568-B-compliant Category 3 shielded or unshielded cabling with 100 ohm impedance and a frequency of 16 MHz	Yes	Yes	No
Cat 5: Standard TIA/EIA 568-A-compliant Category 5 shielded or unshielded cabling with 100 ohm impedance and a frequency of 100 MHz	Yes	Yes	Yes

TABLE 1. TWISTED PAIR CABLE REQUIREMENTS FOR THE NON-POE PORTS

Cable type	10 Mbps	100 Mbps	1000 Mbps
Cat 5e: 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
Cat 6 or 6a: Standard TIA/EIA 568-B-compliant Category 6 or 6a shielded cabling	Yes	Yes	Yes

Power over Ethernet (PoE)

The GS970M/10PS, GS970M/18PS and GS970M/28PS switches feature Power over Ethernet (PoE) on the 10/1000BASE-T and 100BASE-TX ports. PoE is used to supply power to network devices over the same twisted pair cables that carry the network traffic.

The main advantage of PoE is that it can make it easier to install a network. The selection of a location for a network device is often limited by whether there is a power source nearby. This often limits equipment placement or requires the added time and cost of having additional electrical sources installed. But with PoE, you can install PoE-compatible devices wherever they are needed without having to worry about whether there are power sources nearby.

A device that provides PoE to other network devices is referred to as *power sourcing equipment* (PSE). The GS970M Series 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 PSE are called *powered devices* (PD). Examples of PD include wireless access points, IP telephones, webcams, and even other Ethernet switches.

The switch automatically determines if 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 GS970M Series PoE switches support these PoE standards:

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

Powered device classes

Powered devices are grouped into the five classes listed in Table 2 on page 28. The classes are based on the amount of power the devices require. The GS970M Series PoE switches support all five classes.

TABLE 2. IEEE POWERED DEVICE CLASSES

Class	Maximum power output from a switch port	PD power range	Margin of cable loss
0	15.4W	0.44W to 12.95W	0.8W
1	4.0W	0.44W to 3.84W	0.2W
2	7.0W	3.84W to 6.49W	0.4W
3	15.4W	6.49W to 12.95W	0.8W
4	30.0W	12.95W to 25.5W	1.2W

Cable requirements

Cable requirements for ports operating at 10 or 100Mbps are in Table 3.

Cable requirements for ports operating at 1000Mbps are in Table 4.

TABLE 3. TWISTED PAIR CABLE REQUIREMENTS FOR THE 10BASE-T AND 100BASE-TX PORTS AT 10 OR 100MBPS

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

TABLE 4. TWISTED PAIR CABLE REQUIREMENTS FOR THE 10/1000BASE-T AND 100BASE-TX PORTS AT 1000MBPS

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

Power budget

The GS970M Series PoE switches have the following power budgets:

GS970M/10PS: 124 watts

GS970M/18PS: 247 watts

GS970M/28PS: 370 watts

This is the maximum amount of power the switches can provide at one time to the powered devices.

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 the devices. But 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.

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. If the switch's power budget is at its maximum, ports may stop supplying power to powered devices if new powered devices, connected to ports with higher priorities, become active.

Wiring implementation

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

Twisted pair cabling typically consists of eight wires. With 10BASE-T and 100BASE-TX devices, the wires connected to pins 1, 2, 3, and 6 on the RJ- 45 connectors carry the network traffic while the wires connected to pins 4, 5, 7, and 8 are unused. With 1000BASE-T devices, all eight wires are used to carry network data.

It takes four wires to deliver DC power to a PD. With Mode A, the power is delivered on pins 1, 2, 3, and 6. These are the same pins in 10BASE-T and 100BASE-TX devices that carry the network data. With mode B, the power is provided over the spare wires.

The ports on GS970M Series PoE switches deliver the power using pins 1, 2, 3, and 6, which corresponds to mode A in the IEEE 802.3af standard. Powered devices that comply with the IEEE 802.3af standard are required to support both power delivery methods. Legacy devices that do not comply with the standard will work with the switch if they are powered on pins 1, 2, 3, and 6.

LEDs

This section describes the four types of LEDs on GS970M Series switches:

- “POWER and FAULT LEDs” on page 32
- “10/1000BASE-T/100BASE-TX Link/Activity/Speed LED and PoE status LED” on page 34
- “10/1000BASE-T/100BASE-TX Link/Activity/Speed LED and Duplex/Collision LED” on page 36
- “SFP LEDs” on page 38
- “SD card LED” on page 39

POWER and FAULT LEDs

The POWER LED reports the status of AC power and is located on the front panel of the of the switches beside the console port. See Figure 17.

Note

All port LEDs are OFF when the switch is operating in the low power mode. To toggle on the LEDs, use the ecofriendly button. See “ecofriendly button” on page 41 for more information.

FIGURE 17. POWER LED ON A GS970M SERIES SWITCH

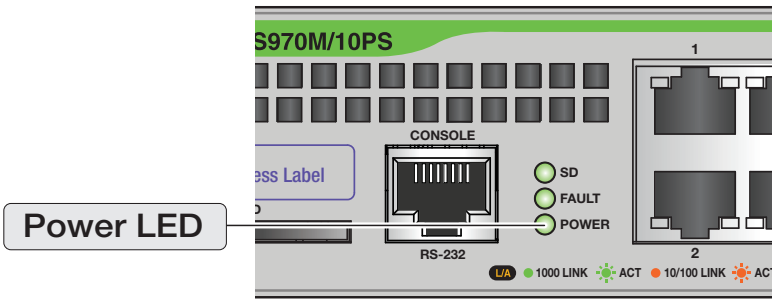


Table 5 describes the POWER LED for GS970M Series switches.

TABLE 5. POWER LED FUNCTIONAL DESCRIPTIONS

LED	State	Description
POWER	Off	Indicates either the switch is not receiving AC power or the AC input power is operating outside the normal range
	Steady green	The switch is receiving AC input power and is operating normally

Figure 18 shows the location of the FAULT LED.

FIGURE 18. FAULT LED ON A GS970M SERIES SWITCH

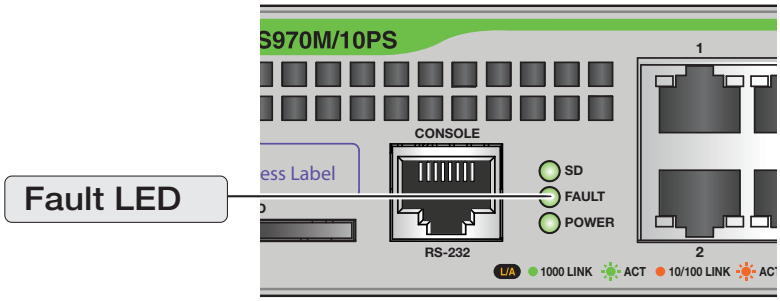


Table 6 describes the functions of the FAULT LED.

TABLE 6. FAULT LED FUNCTIONAL DESCRIPTIONS

LED	State	Description
FAULT	Off	The switch is receiving AC input power and is operating normally
	Red flashing once	Indicates fan failure
	Red flashing six times	Indicates the switch's temperature has exceeded the threshold

10/1000BASE-T/ 100BASE-TX Link/Activity/ Speed LED and PoE status LED

On GS970M/10PS, GS970M/18PS and GS970M/28PS switches, the Link/Activity/Speed and PoE LEDs provide information about the 10/1000BASE-T and the 100BASE-TX ports.

GS970M Series PoE switches indicate Link/Activity/Speed and PoE status with two LEDs for each port (Figure 19). For each port:

- the left LED corresponds to Link/Activity/Speed
- the right LED corresponds to PoE status

Note

All of the port LEDs are OFF when the switch is operating in the low power mode. To toggle on the LEDs, use the ecofriendly button. See “ecofriendly button” on page 41 for more information.

FIGURE 19. LINK/ACTIVITY/SPEED AND POE LEDS

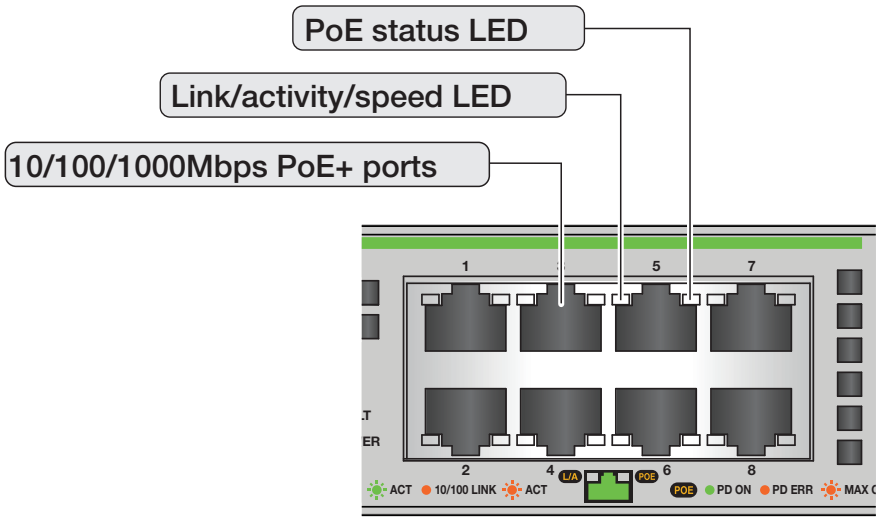


Table 7 describes the Link/Activity/Speed and PoE status LEDs.

TABLE 7. LINK/ACTIVITY/SPEED AND POE LED DESCRIPTIONS

LED	State	Description
Link/Activity/ Speed **(LEFT LED)**	Off	The port has not established a link with a network device, or the ecofriendly feature is enabled
	Flashing green	Rx or Tx activities at 1000M
	Steady green	The port has established a link with a network device and is active (1000M)
	Flashing amber	Rx or Tx activities at 10/100M
	Steady amber	The port has established a link with a network device and is active (10/100M)
PoE **(RIGHT LED)**	Off	No link, no power output, or ecofriendly feature is enabled
	Steady green	PD is on
	Flashing amber	PD maximum current
	Steady amber	PD error

10/1000BASE-T/ 100BASE-TX Link/Activity/ Speed LED and Duplex/Collision LED

On GS970M/10, GS970M/18 and GS970M/28 switches, the Link/Activity/ Speed and Duplex/Collision LEDs provide information about the 10/ 1000BASE-T and the 100BASE-TX ports.

These switches indicate Link/Activity/Speed and Duplex/Collision status with two LEDs for each port (Figure 20). For each port:

- the left LED corresponds to Link/Activity/Speed
- the right LED corresponds to Duplex/Collision status

Note

All of the port LEDs are OFF when the switch is operating in the low power mode. To toggle on the LEDs, use the ecofriendly button. See “ecofriendly button” on page 41 for more information.

FIGURE 20. LINK/ACTIVITY/SPEED AND DUPLEX/COLLISION LEDS

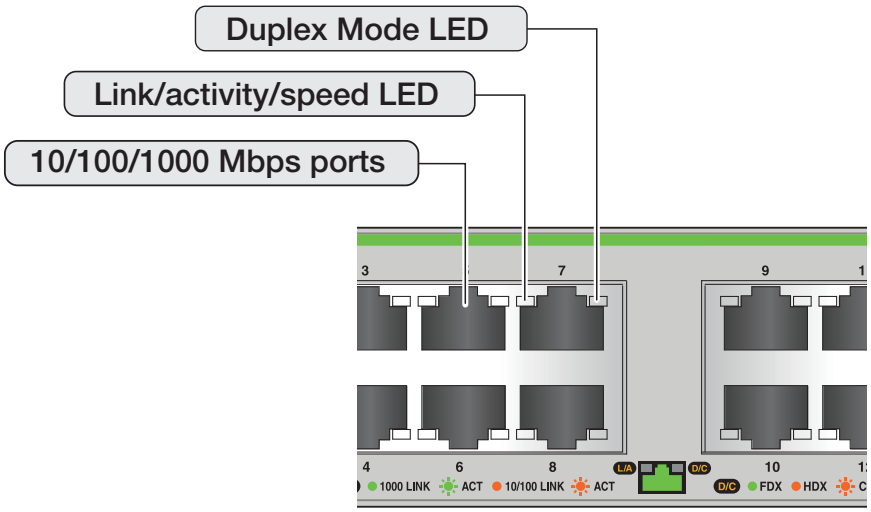


Table 8 describes the Link/Activity/Speed and Duplex/Collision LEDs.

TABLE 8. LINK/ACTIVITY/SPEED AND DUPLEX/COLLISION LED DESCRIPTIONS

LED	State	Description
Link/Activity/ Speed **(LEFT LED)**	Off	The port has not established a link with a network device, or the ecofriendly feature is enabled
	Flashing green	Rx or Tx activities at 1000M
	Steady green	The port has established a link with a network device and is active (1000M)
	Flashing amber	Rx or Tx activities at 10/100M
	Steady amber	The port has established a link with a network device and is active (10/100M)
Duplex/ Collision **(RIGHT LED)**	Off	The port has not established a link with a network device, or the ecofriendly feature is enabled
	Steady green	A port is operating in full duplexmode
	Steady amber	A port is operating in half-duplex mode at 10 or 100 Mbps (Half-duplex mode does not apply to 1000 Mbps operation)
	Flashing amber	Collisions are occurring on a port operating at 10 or 100 Mbps

SFP LEDs

The GS970M Series switches have SFP Link/Activity LEDs on the front panel. See Figure 21.

The SFP Link/Activity LEDs indicate the activity status for each SFP slot. Each SFP slot has ONE uni-color LED:

- The LEFT LED corresponds to the UPPER SFP port
- The RIGHT LED corresponds to the LOWER SFP port

Note

All of the port LEDs are OFF when the switch is operating in the low power mode. To toggle on the LEDs, use the ecofriendly button. See “ecofriendly button” on page 41 for more information.

FIGURE 21. SFP LINK/ACTIVITY LEDS ON A GS970M SERIES SWITCH

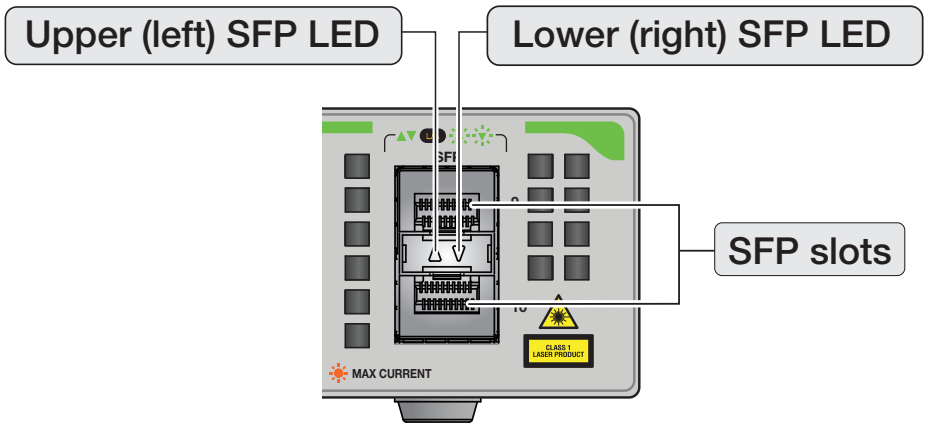


Table 9 describes the functions of the SFP Link/Activity LEDs

TABLE 9. SFP LINK/ACTIVITY LED FUNCTIONAL DESCRIPTIONS

LED	State	Description
SFP	Off	The port on the SFP transceiver has not established a link with an end node, OR the ecofriendly feature is enabled
	Flashing green	Rx or Tx activities
	Steady green	The SFP transceiver has established a link with a network device

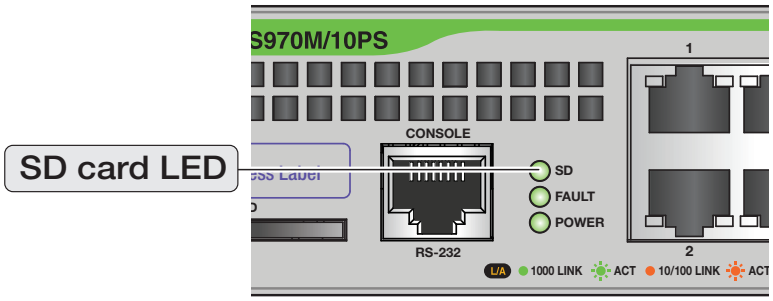
SD card LED

GS970M Series switches have an SD card LED on the front panel (see Figure 22)

Note

All of the port LEDs are OFF when the switch is operating in the low power mode. To toggle on the LEDs, use the ecofriendly button. See “ecofriendly button” on page 41 for more information.

FIGURE 22. SD CARD SLOT LED ON A GS970M SERIES SWITCH



The SD card LED indicates whether the SD card slot has a card inserted, or is reading or writing. Table 10 describes the functions of the SD card LED.

TABLE 10. SD CARD LED FUNCTIONAL DESCRIPTIONS

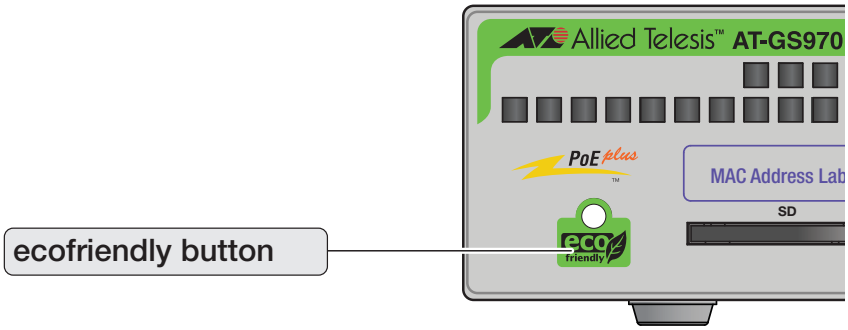
LED	State	Description
SD card	Off	SD card is not inserted OR the ecofriendly feature is enabled
	Flashing green	Writing or reading
	Steady green	SD card is inserted
	Flashing amber	Writing or reading error

ecofriendly button

By pressing the ecofriendly button you can conserve energy.

When you press the ecofriendly button for 1 to 4 seconds, the front panel port LEDs are disabled. You may use the button to turn off the LEDs when you are not monitoring the switch. To turn the port LEDs on, press the ecofriendly button for 1 to 4 seconds again. Toggling the LEDs does not affect the network operations of the switch.

FIGURE 23. ECOFRIENDLY BUTTON ON A GS970M SERIES SWITCH



Note

The ecofriendly button does not control the POWER LED or SD card LED.

Power supply

Each switch 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 switch. A power cord and a power cord retainer hook are supplied with the switch.

For the power requirements, see **“Power specifications” on page 86**.

Fans

The switches have internal fans as follows:

- GS970M/10: no fan
- GS970M/10PS, GS970M/18 and GS970M/28: one fan
- GS970M/18PS and GS970M/28PS: two fans

You cannot remove or replace these fans in the field. The fan status is indicated with the FAULT LED. See “POWER and FAULT LEDs” on page 32 and Table 6 on page 33 for more information.

Chapter 2: Installation

This chapter contains the following sections:

- "Reviewing safety precautions" on page 46
- "Selecting a site for the switch" on page 48
- "Cable specifications" on page 49
- "Unpacking the switch:GS970M/10 and GS970M/10PS" on page 50
- "Unpacking the switch: GS970M/18 and GS970M/18PS" on page 51
- "Unpacking the switch: GS970M/28" on page 52
- "Unpacking the switch: GS970M/28PS" on page 53
- "Installing the switch on a table or a desktop" on page 54
- "Removing the feet from a switch before installing it in an equipment rack or on a wall" on page 55
- "Installing a GS970M/10 switch in an equipment rack" on page 56
- "Installing a GS970M/10PS switch in an equipment rack" on page 59
- "Installing a GS970M/18, GS970M/18PS or GS970M/28 switch in an equipment rack" on page 61
- "Installing a GS970M/28PS switch in an equipment rack" on page 63
- "Installing a GS970M/10 switch on a wall" on page 65
- "Installing a GS970M/18, GS970M/28 or AT-GS970M PS Series switch on a wall" on page 67
- "Cabling the switch" on page 69
- "Powering on the switch" on page 71
- "Starting a local management session" on page 73
- "Monitoring the initialization processes" on page 75
- "Installing optional SFP transceivers" on page 78

Reviewing safety precautions

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

Note
The ✍ indicates that a translation of the safety statement is available in a PDF document titled **Translated Safety Statements**.



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 cables. ✍ E1



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



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



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

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

Operating temperature: This product is designed for a maximum ambient temperature of 50° degrees C. ✍ E7

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

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



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

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 (Tmra). E35



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



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



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

Selecting a site for the switch

You can install a GS970M Series switch on a desktop, in a standard 19-inch equipment rack, or on a wall.

Observe the following requirements when choosing a site for your switch:

- If you plan to install the switch in an equipment rack, verify that the rack is safely secured and 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 are installing the switch on a table, verify that the table is level and secure.
- If you are installing the switch on a wall, ensure that the wall is sturdy enough to hold the switch's weight. You may need to position the switch so that it can be screwed into the wall's framing timber or an equivalent structural element.
- The power outlet for the switch 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 switch. This will make it easier for you to connect and disconnect cables, as well as view the switch's LEDs.
- Air flow around the unit and through its vents on the side and rear should not be restricted so that the switch can maintain adequate cooling.
- Do not place objects on top of the switch.
- Do not expose the switch to moisture or water.
- Ensure that the site is in a dust-free environment.
- You should use dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.

Cable specifications

Table 11 contains the cable specifications for the twisted pair ports.

TABLE 11. TWISTED PAIR CABLING AND DISTANCES

Speed	Type of cable	Maximum operating distance
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 m (328 ft)
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.	100 m (328 ft)
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.	100 m (328 ft)

Note
The twisted pair ports on the switch feature auto-MDI when operating at 10, 100, or 1000 Mbps. A port is configured as MDI or MDIX 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 a port on the switch.

Unpacking the switch:GS970M/10 and GS970M/10PS

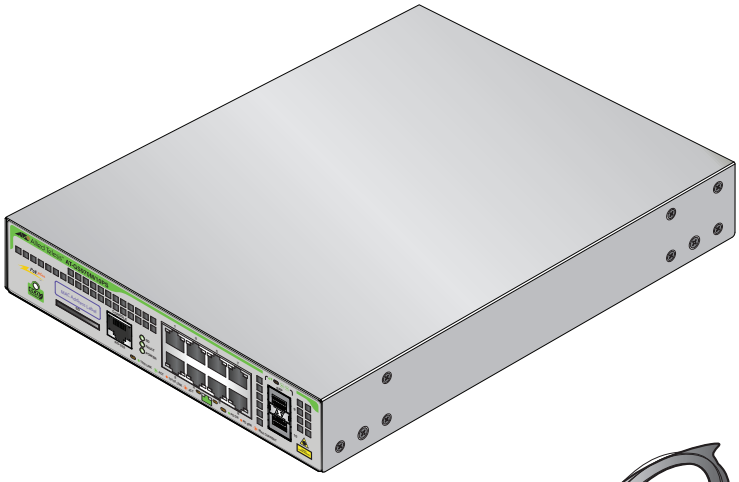
To unpack the switch, perform the following procedure:

1. Remove all of the components from the shipped 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.

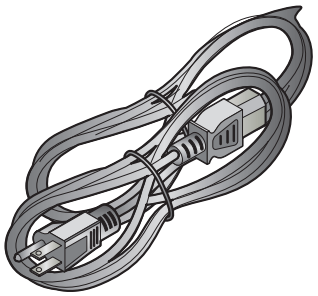
3. Verify that the shipped package includes the following items:



GS970M/10 or
GS970M/10PS



1 Power cable hook



1 Power cable (1.8m)
1 Console cable (2m)

Unpacking the switch: GS970M/18 and GS970M/18PS

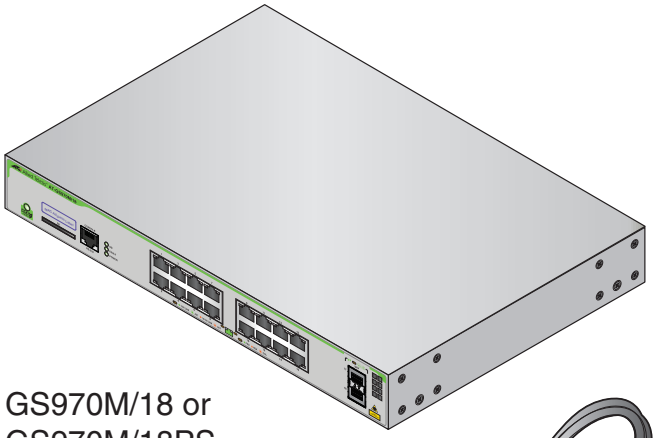
To unpack the switch, perform the following procedure:

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

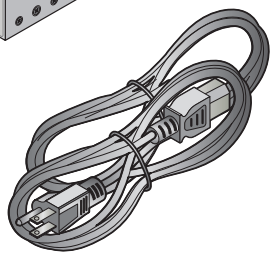
> **Note**
> Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Place the switch on a level, secure surface.

3. Verify that the shipped package includes the following items:



GS970M/18 or
GS970M/18PS





1 Power cable hook

1 Power cable (1.8m)
1 Console cable (2m)

Unpacking the switch: GS970M/28

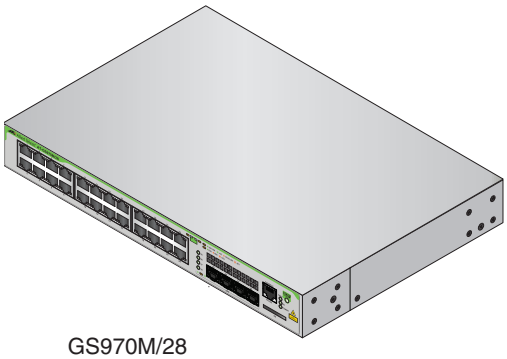
To unpack the switch, perform the following procedure:

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

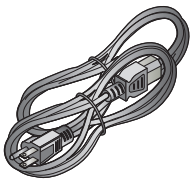
> **Note**
> Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Place the switch on a level, secure surface.

3. Verify that the shipped package includes the following items:



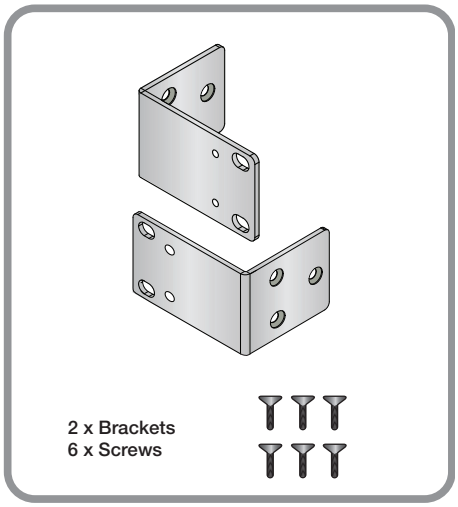
GS970M/28



1 Power cable (1.8m)
1 Console cable (2m)



1 Power cable hook



2 x Brackets
6 x Screws

Unpacking the switch: GS970M/28PS

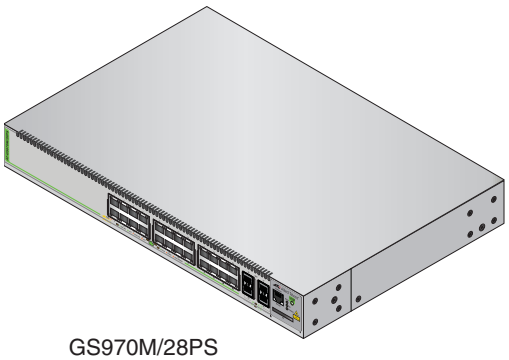
To unpack the switch, perform the following procedure:

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

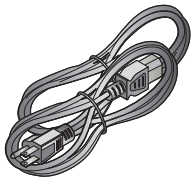
> **Note**
> Store the packaging material in a safe location. You must use the original shipping material if you need to return the unit to Allied Telesis.

2. Place the switch on a level, secure surface.

3. Verify that the shipped package includes the following items:



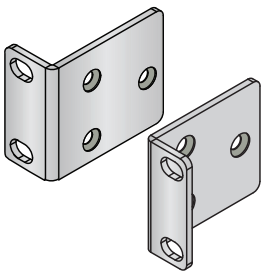
GS970M/28PS



1 Power cable (1.8m)
1 Console cable (2m)



1 Power cable hook



2 x Brackets
6 x Screws

Installing the switch on a table or a desktop

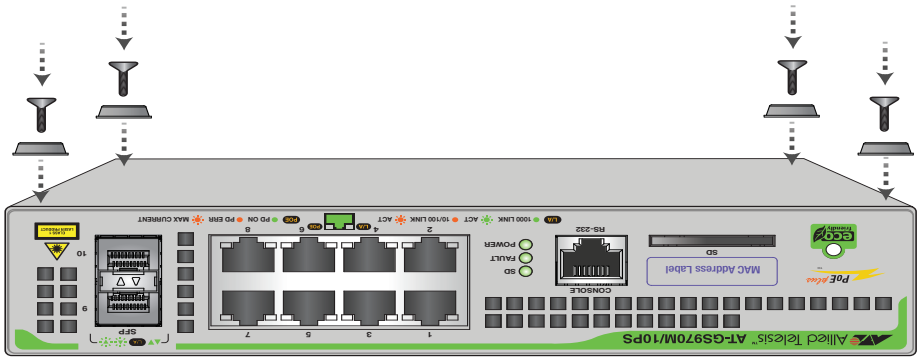
Here are the guidelines to selecting a suitable site for desktop or table use:

- The table should be level and stable and the power outlets should be located near the switches and be easily accessible.
- The site should allow for easy access to the ports on the front of the switches, so that you can easily connect and disconnect cables, and view the port LEDs.
- The site should allow for adequate air flow around the units and through the cooling vents on the front and rear panels (the ventilation direction 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 switches to moisture or water and 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 rubber feet on the base of the switches should be left on for table or desktop installation.

If your switch does not already have rubber feet fitted, fit these as follows:

1. Turn the switch over and place it on a table.
2. Remove the rubber feet from the packaging and screw them firmly onto the base of the switch, as shown on Figure 24 on page 54:

FIGURE 24. ATTACHING THE RUBBER FEET TO A SWITCH



3. Turn the switch over again and place it on a flat, secure surface (such as a desk or table) leaving ample space around the unit for ventilation.
4. Go to “Cabling the switch” on page 69.

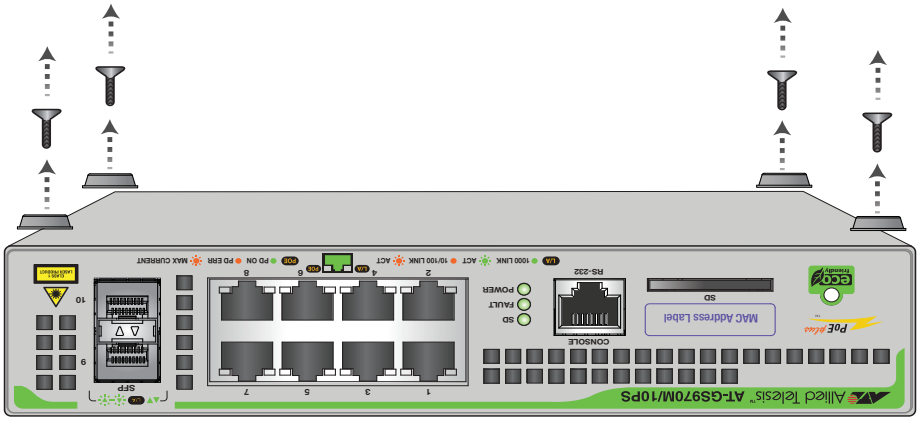
Removing the feet from a switch before installing it in an equipment rack or on a wall

Before you install the switch in a 19-inch equipment rack or on a wall, you need to remove the rubber feet, if they are attached to the base of the switch. To do this, follow these steps:

1. Place the unit upside down on a level, secure surface.

2. Remove the rubber feet with a screwdriver. Figure 25 shows how to do this on a GS970M/10PS switch.

FIGURE 25. REMOVING THE RUBBER FEET FROM A SWITCH



3. Turn the switch back over.

Installing a GS970M/10 switch in an equipment rack

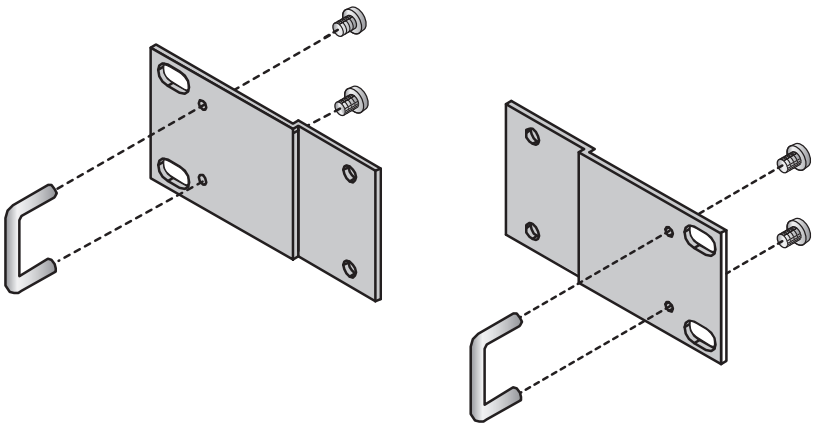
These instructions show you how to install a GS970M/10 switch in an equipment rack. The rack mount kit is AT-RKMT-J05 and can be purchased separately from your Allied Telesis dealer.

To install a GS970M/10 switch in a 19-inch equipment rack, follow these steps:

1. If rubber feet are attached to the base of the switch, remove them (Figure 25 on page 55).

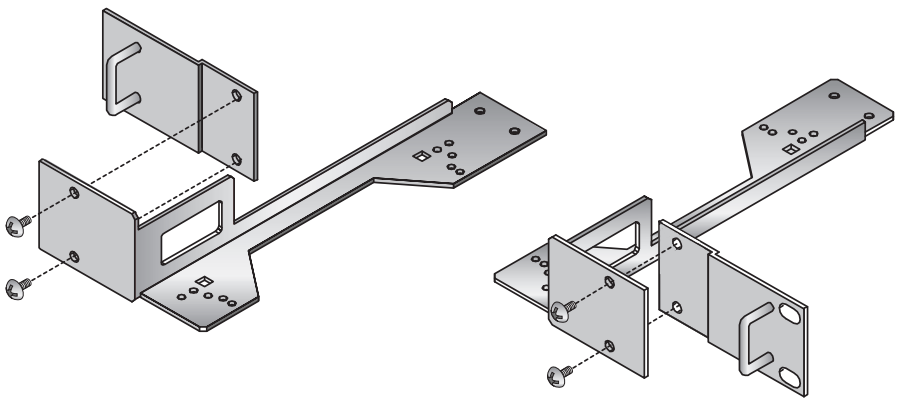
2. First fit the rack mount handles to the brackets using the supplied M3x6mm pan head screws (Figure 26).

FIGURE 26. FITTING HANDLES TO RACK MOUNT BRACKETS



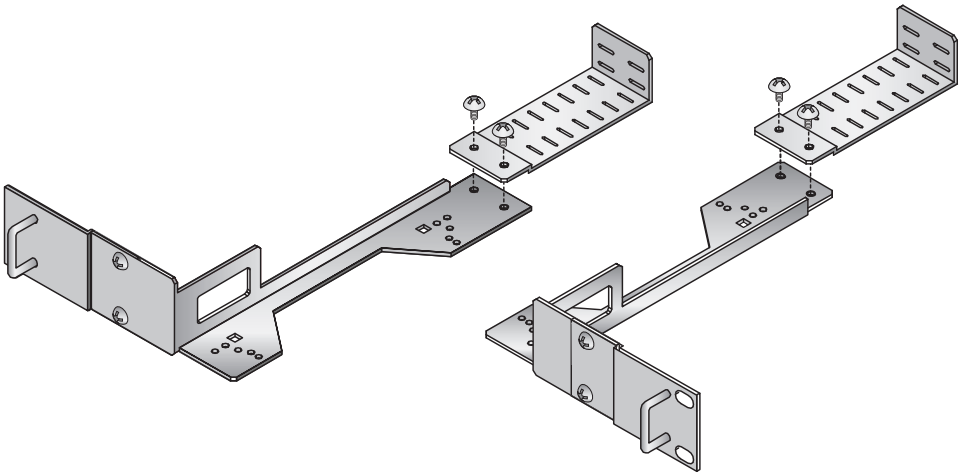
3. Fit the brackets with handles to the mounting using the supplied M4x6mm countersunk screws (Figure 27).

FIGURE 27. FITTING BRACKETS TO THE MOUNTING



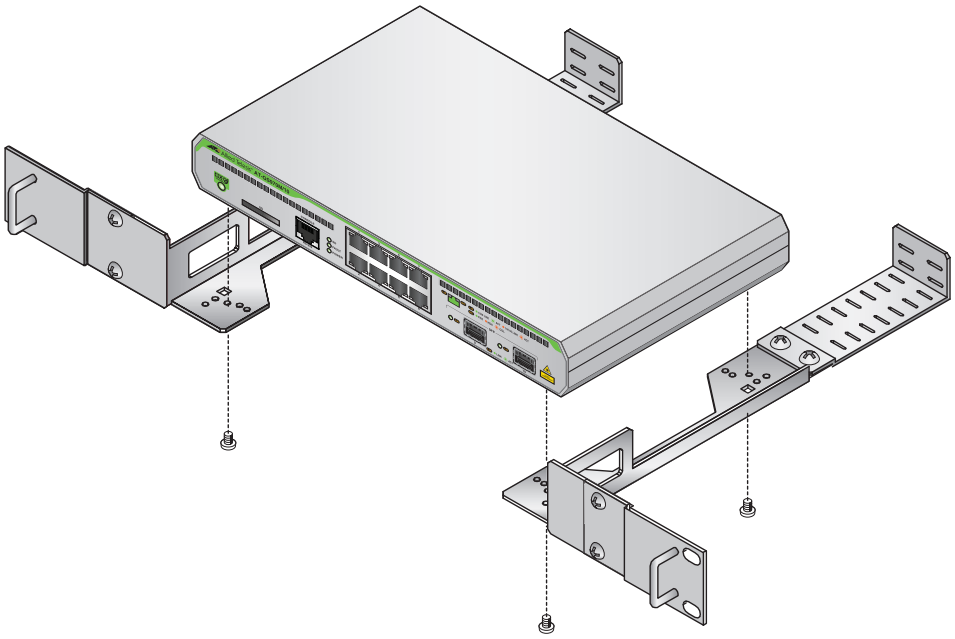
4. Next attach the cable tray brackets (Figure 28).

FIGURE 28. ATTACHING CABLE TRAY BRACKETS



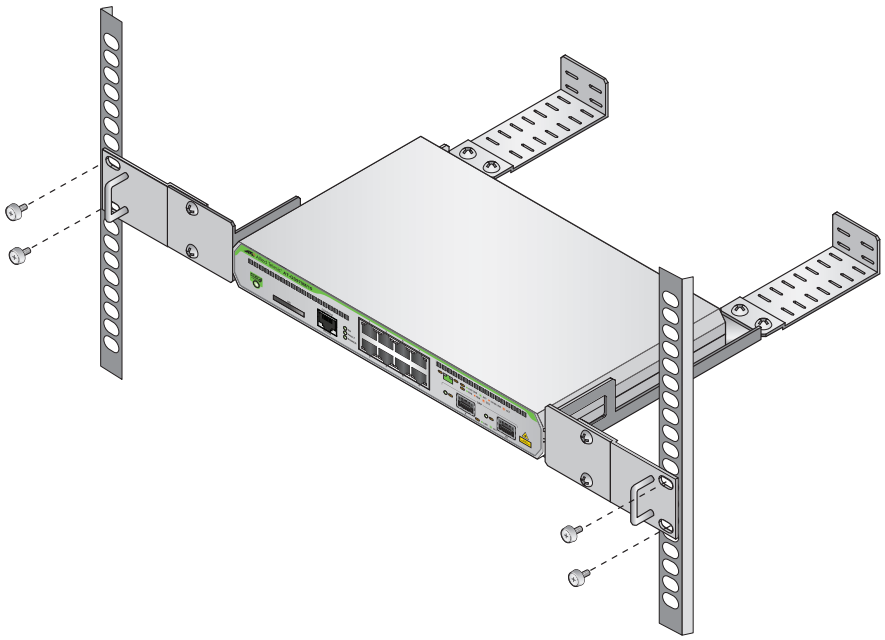
5. Mount the GS970M/10 switch on the brackets (Figure 29). Screw it in with the screws from the rubber feet which you removed earlier (Figure 25 on page 55).

FIGURE 29. MOUNTING A GS970M/10 SWITCH IN THE BRACKETS



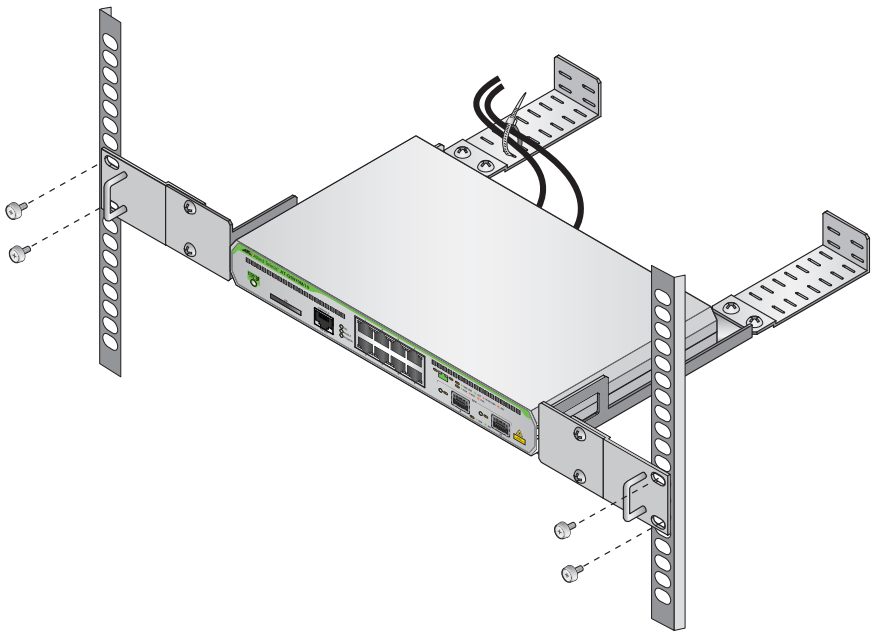
6. Mount the GS970M/10 switch in a 19-inch equipment rack using the provided spacer bracket mounts with four equipment rack screws (Figure 30).

FIGURE 30. MOUNTING A GS970M/10 SWITCH IN THE RACK



7. Secure cables to the cable tray (Figure 31).

FIGURE 31. SECURING CABLES TO THE CABLE TRAY



9. Go to “Cabling the switch” on page 69

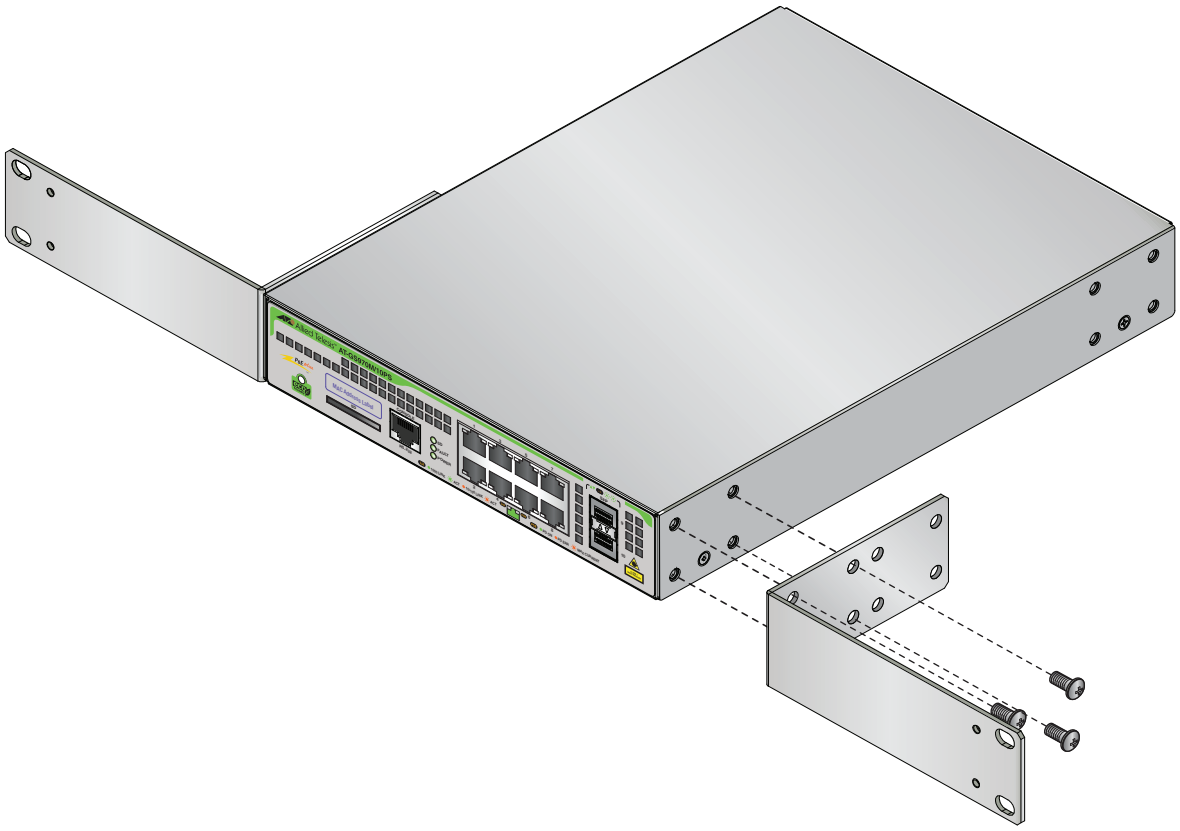
Installing a GS970M/10PS switch in an equipment rack

These instructions show you how to install a GS970M/10PS switch in an equipment rack. The rack mount kit is AT-RKMT-J14 and can be purchased separately from your Allied Telesis dealer.

To install a GS970M/10PS switch in a 19-inch equipment rack, follow these steps:

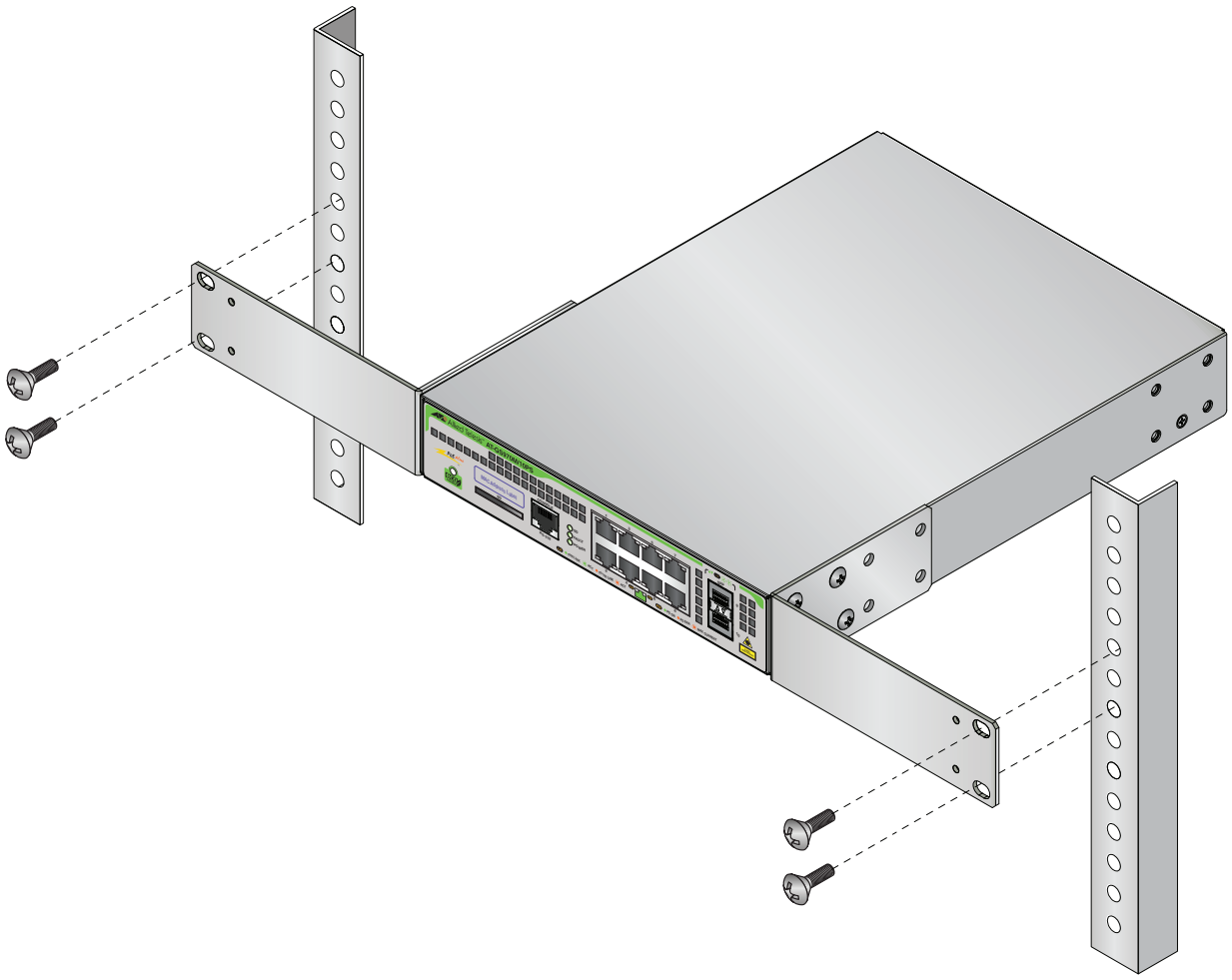
1. If rubber feet are attached to the base of the switch, remove them (Figure 25 on page 55).
2. Attach two rack mount brackets to the sides of the switch using the eight bracket screws that come with the rack mount kit AT-RKMT-J14 (Figure 32).

FIGURE 32. ATTACHING RACK MOUNT BRACKETS TO A GS970M/10PS



3. Mount the GS970M/10PS switch in a 19-inch equipment rack using four equipment rack screws (supplied with the equipment rack) (Figure 33).

FIGURE 33. MOUNTING A GS970M/10PS SWITCH IN AN EQUIPMENT RACK



4. Go to “Cabling the switch” on page 69

Installing a GS970M/18, GS970M/18PS or GS970M/28 switch in an equipment rack

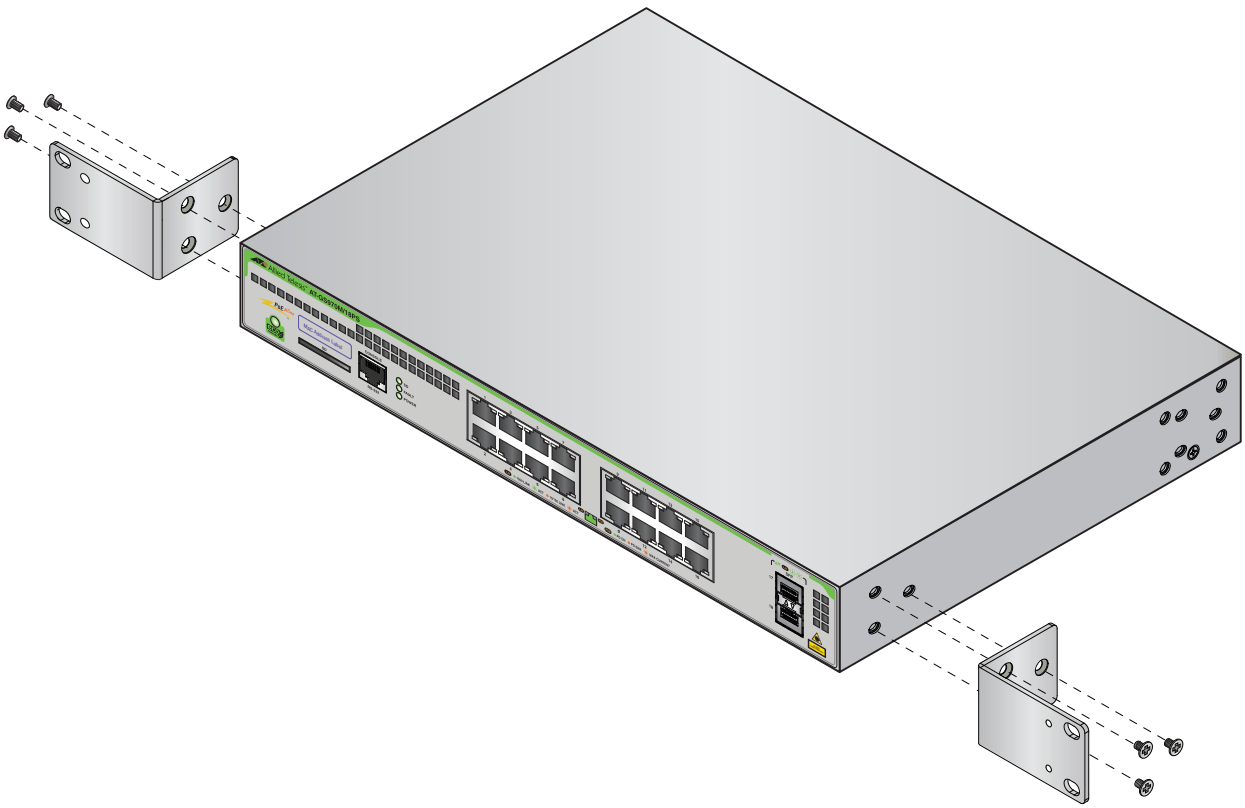
These instructions show you how to install a GS970M/18PS, GS970M/18, or GS970M/28 switch in an equipment rack. The rack mount kit is AT-RKMT-J13 and can be purchased separately from your Allied Telesis dealer. A rack mount kit is included with your GS970M/28 switch.

To install one of these switches in a 19-inch equipment rack, follow these steps:

1. If rubber feet are attached to the base of the switch, remove them (Figure 25 on page 55).

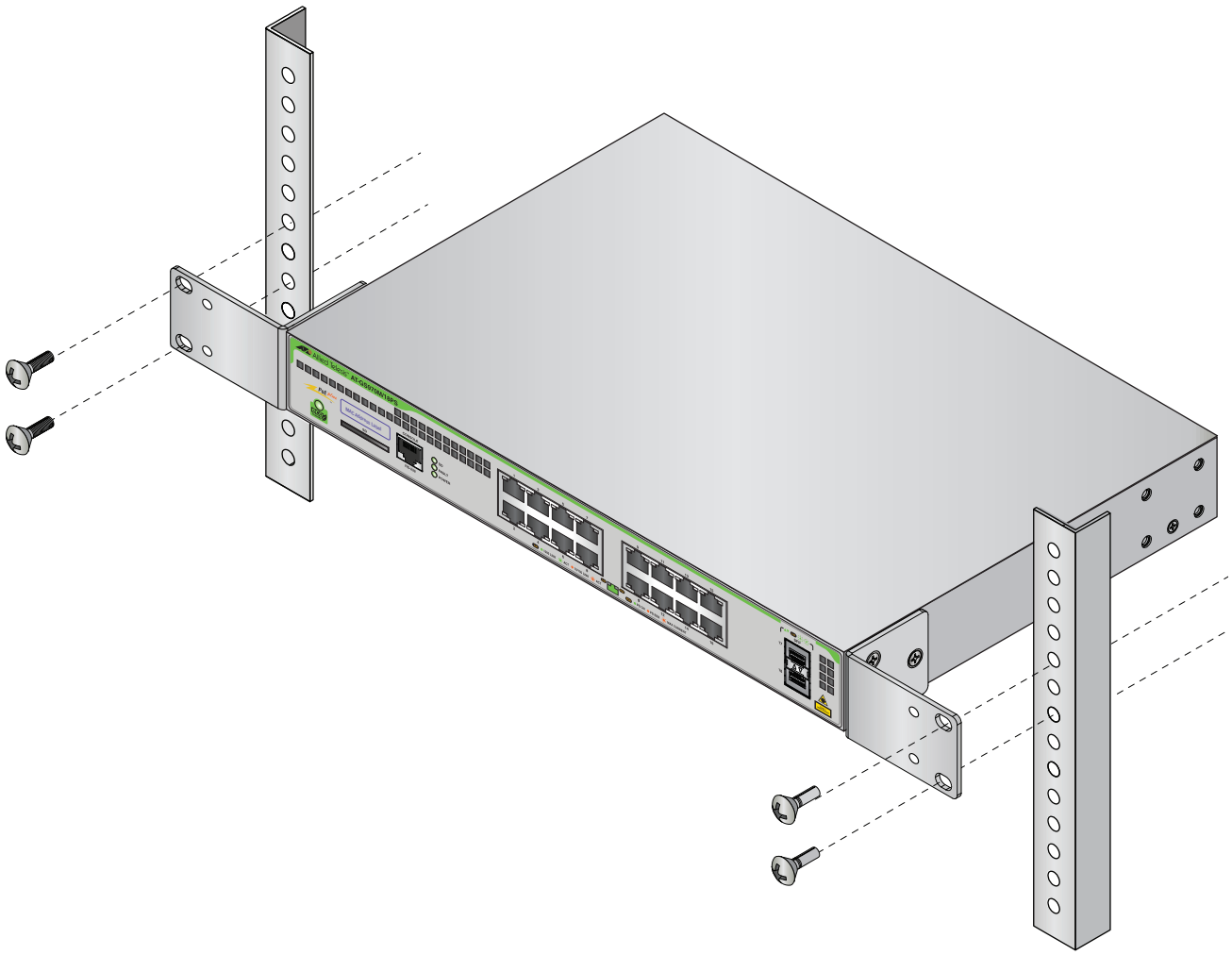
2. Attach two rack mount brackets to the sides of the switch using the six bracket screws that come with the rack mount kit AT-RKMT-J13 (Figure 34).

FIGURE 34. ATTACHING RACK MOUNT BRACKETS TO THE GS970M/18, GS970M/18PS OR GS970M/28 SWITCH



3. Mount the switch in a 19-inch equipment rack using four equipment rack screws (supplied with the equipment rack) (Figure 35).

FIGURE 35. MOUNTING A GS970M/18, GS970M/18PS OR GS970M/28 SWITCH IN AN EQUIPMENT RACK



4. Go to “Cabling the switch” on page 69

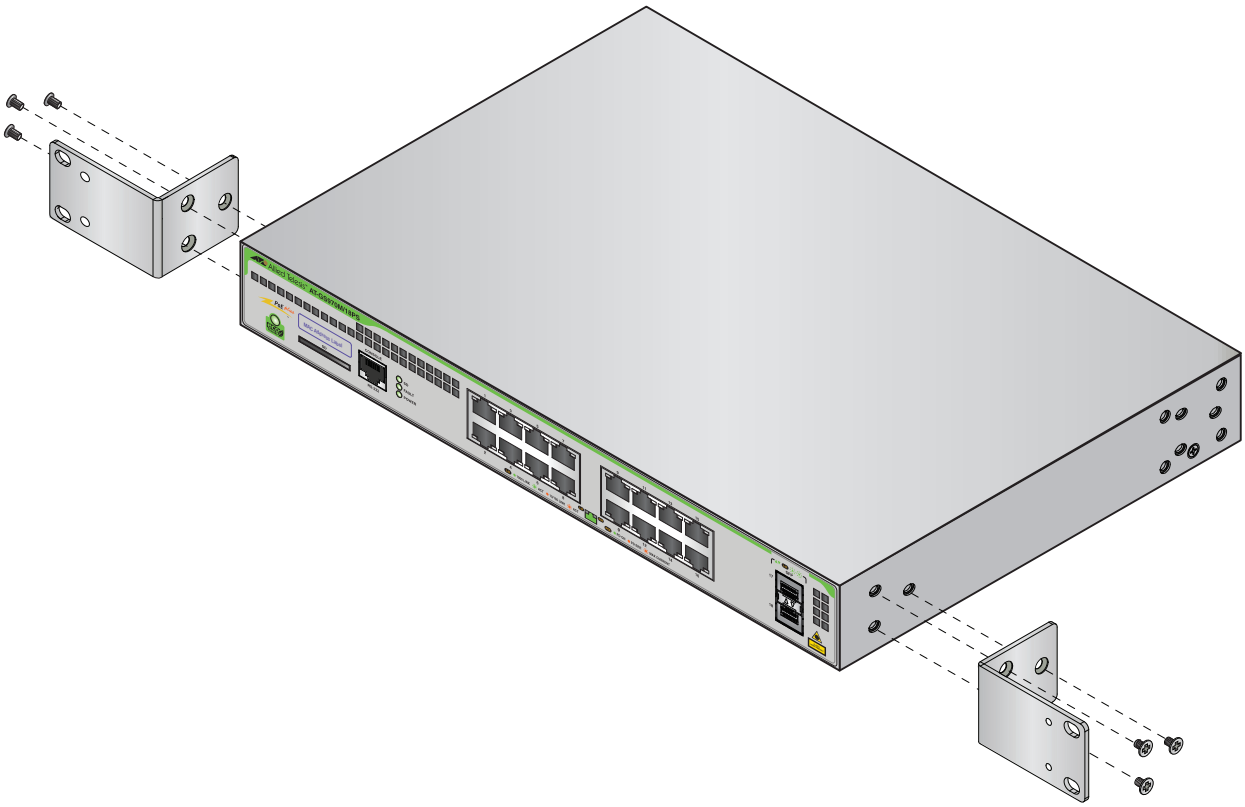
Installing a GS970M/28PS switch in an equipment rack

These instructions show you how to install a GS970M/28PS switch in an equipment rack. A rack mount kit is included with your GS970M/28PS switch.

To install a GS970M/28PS switch in a 19-inch equipment rack, follow these steps:

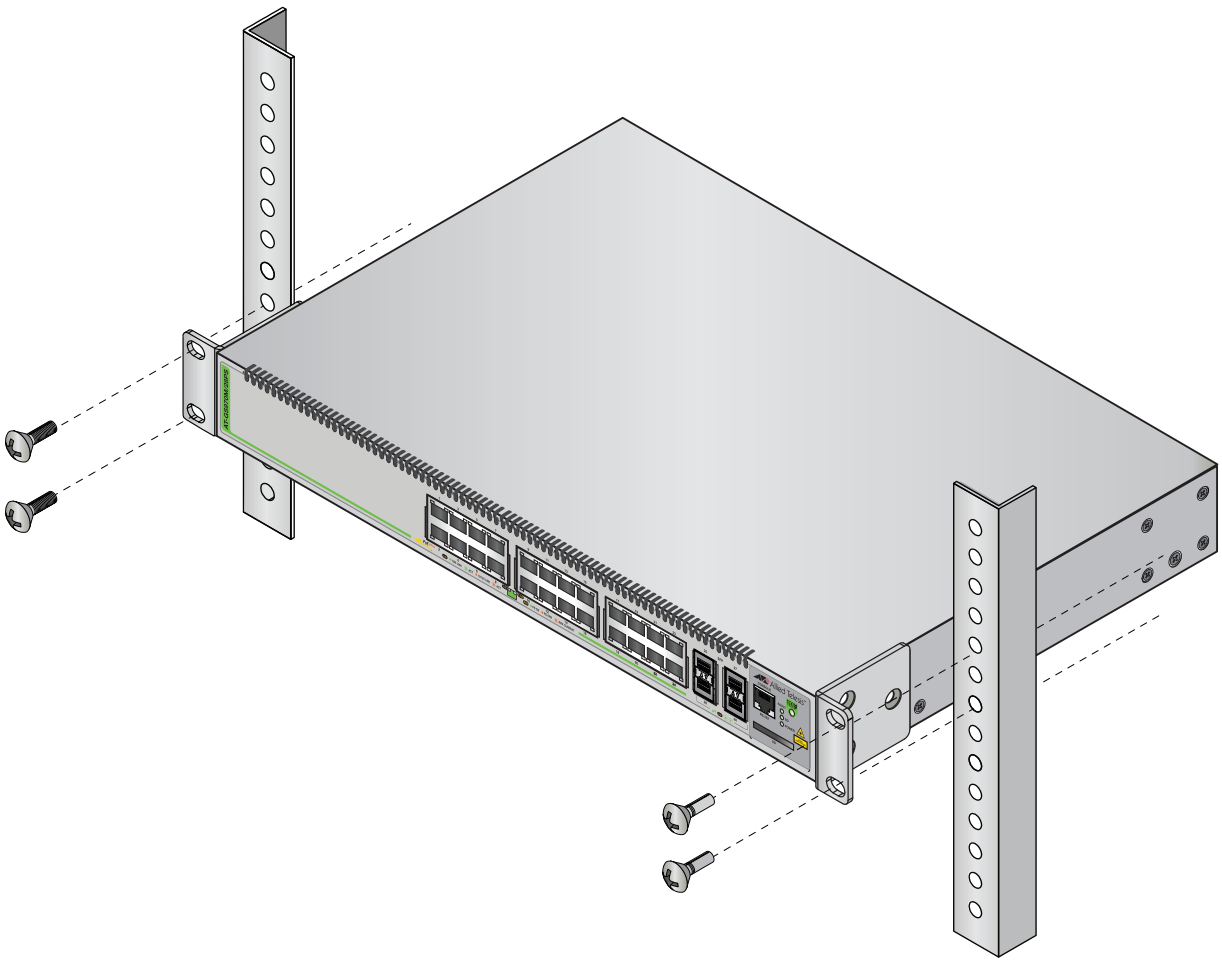
1. If rubber feet are attached to the base of the switch, remove them (Figure 25 on page 55).
2. Attach two rack mount brackets to the sides of the switch using the six provided bracket screws (Figure 36).

FIGURE 36. ATTACHING RACK MOUNT BRACKETS TO THE GS970M/28PS SWITCH



3. Mount the GS970M/28PS switch in a 19-inch equipment rack using four equipment rack screws (supplied with the equipment rack) (Figure 37).

FIGURE 37. MOUNTING A GS970M/28PS SWITCH IN AN EQUIPMENT RACK



4. Go to “Cabling the switch” on page 69

Installing a GS970M/10 switch on a wall

These instructions show you how to install a GS970M/10 switch on a wall. The wall mount kit is AT-BRKT-J23 and can be purchased separately from your Allied Telesis dealer.

Before you start, ensure that the wall is sturdy enough to hold the switch's weight. You may need to position the switch so that the brackets can be screwed into the wall's framing timber or an equivalent structural element.

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

1. If the rubber feet are attached to the bottom of the switch, remove them with a screwdriver (Figure 25 on page 55), then turn the switch back over.

2. Determine the desired bracket position on the wall and screw the brackets to the wall with the screws included in the wall mount kit.

   You can install the switch with the front panel facing up (as shown in Figure 39 on the next page), left, or right (as shown in Figure 40 on the next page). Do not install the switch with the front panel facing down.

   Note that the brackets are not attached to the switch, but only to the wall.

   If you install the switch with the front panel facing up, the switch will rest on the edges of the bracket, as shown in Figure 38.

FIGURE 38. RIDGES ON THE AT-BRKT-J23 THAT THE SWITCH RESTS ON WHEN INSTALLED WITH THE FRONT PANEL FACING UP

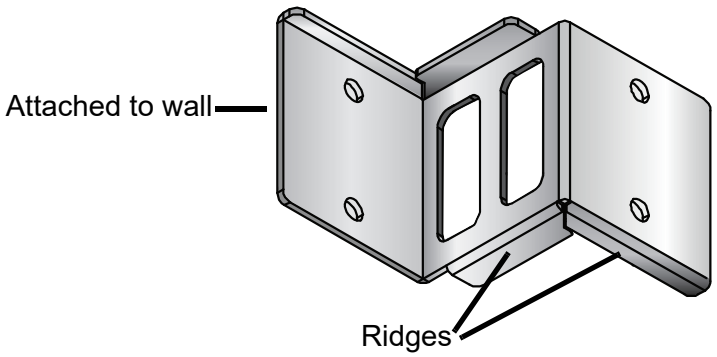
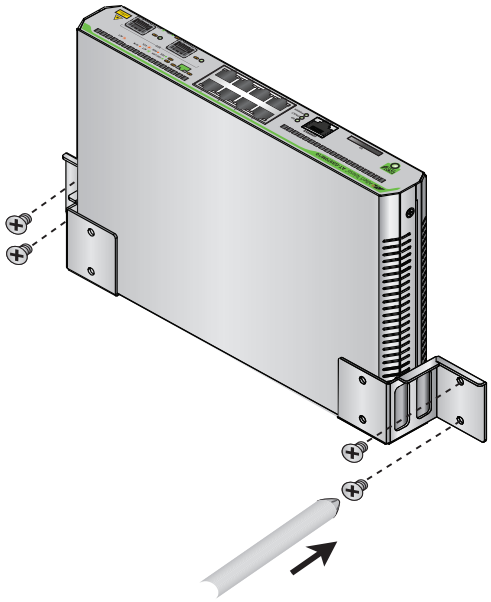


FIGURE 39. SECURING THE GS970M/10 SWITCH TO THE WALL WITH THE FRONT PANEL FACING UP

Bracket position, viewed from above:



Bracket position, viewed from below:

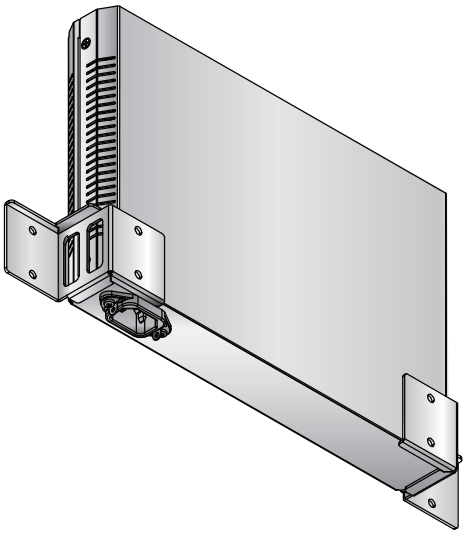
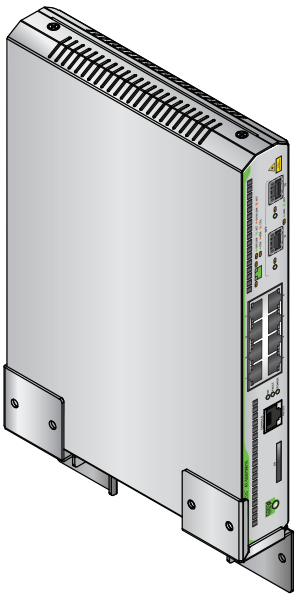
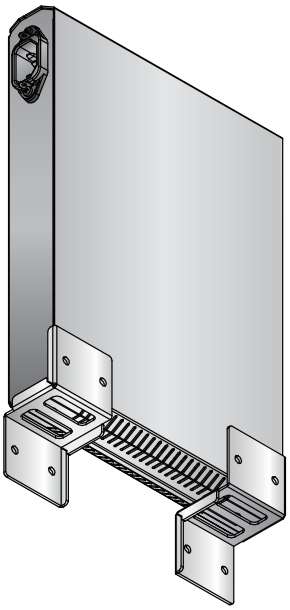


FIGURE 40. SECURING THE GS970M/10 SWITCH TO THE WALL WITH THE FRONT PANEL FACING RIGHT

Bracket position,
viewed from above:



Bracket position,
viewed from below:



3. Slide the switch between the brackets so that it rests against the bracket, as shown in the figures above.

4. Go to “Cabling the switch” on page 69.

Installing a GS970M/18, GS970M/28 or AT-GS970M PS Series switch on a wall

These instructions show you how to install a GS970M/18, GS970M/28 or AT-GS970M PS Series switch on a wall. The wall mount kit is AT-BRKT-J24 and can be purchased separately from your Allied Telesis dealer.

> **Note**
> This section shows a GS970M/10PS switch as an example.

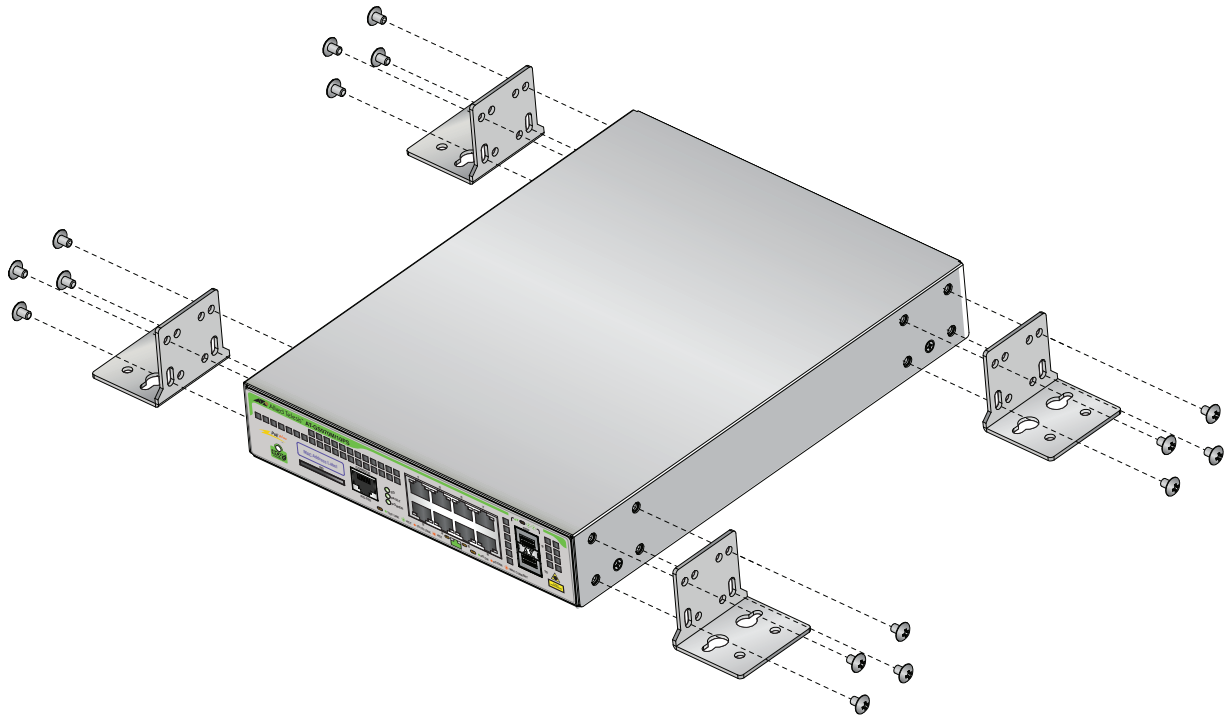
Before you start, ensure that the wall is sturdy enough to hold the switch's weight. You may need to position the switch so that it can be screwed into the wall's framing timber or an equivalent structural element.

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

1. If the rubber feet are attached to the bottom of the switch, remove them with a screwdriver (Figure 25 on page 55), then turn the switch back over.

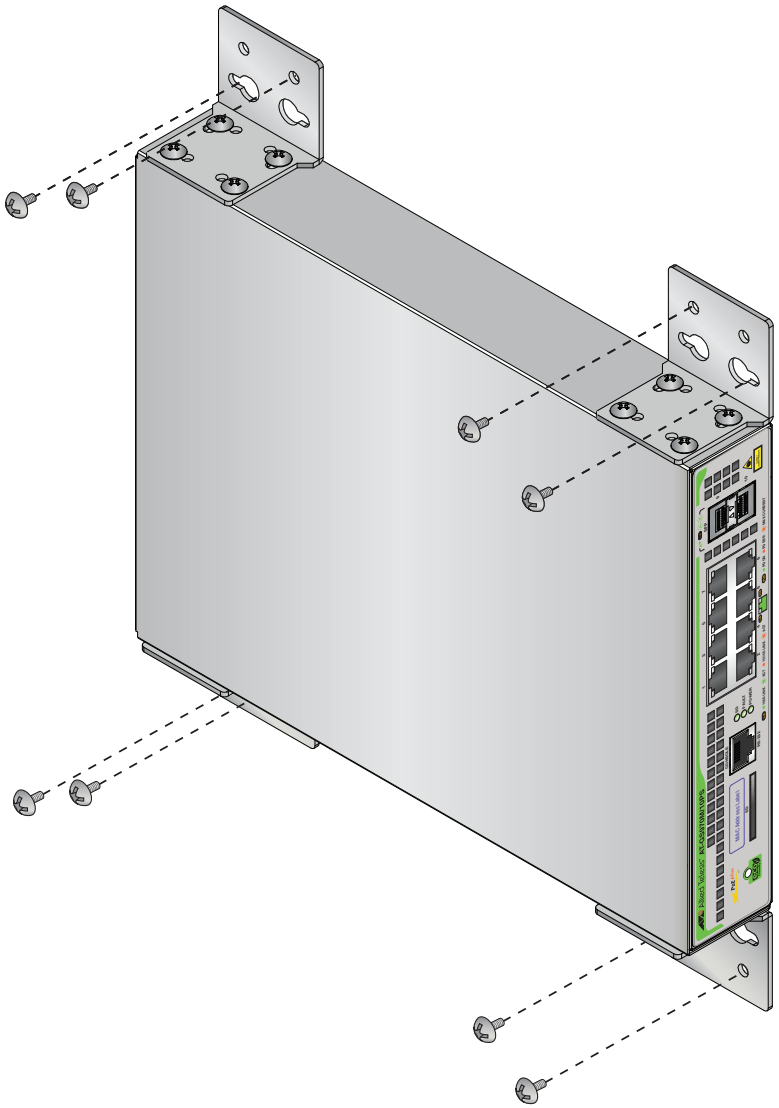
2. Orient the brackets against the sides of the switch as shown in Figure 41, and secure them to the unit with the 16 brackets screws included in the wall mount kit.

FIGURE 41. ATTACHING WALL MOUNT BRACKETS TO THE SIDE OF THE SWITCH



3. While another person holds the switch at the wall location, secure it to the wall using the eight wall mounting screws (Figure 42).

FIGURE 42. SECURING THE SWITCH TO THE WALL



4. Go to “Cabling the switch” on page 69.

Cabling the switch

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

- The connector on the cable should fit snugly into the port on the switch. The tab on the connector should lock the connector into place.
- Because the twisted pair ports have auto-MDI/MDIX, you may use straight-through twisted pair cable to connect any type of network device to the switch.
- If your network topology contains a loop where two or more network devices can communicate with each other over more than one network path, do not connect the network cables that form the loop until after you activate a spanning tree protocol on the switch. Data loops can adversely affect network performance.
- If you are creating a port trunk, do not connect the cables of the trunk to the switch until after you have created the trunk in the switch's management software. Otherwise, a network loop will result which can adversely affect network performance.
- The default setting for the wiring configurations of the ports is auto-MDI/MDIX. The default setting is appropriate for switch ports that are connected to 10BASE-T and 100BASE-TX network devices that also support auto-MDI/MDIX.
- The default auto-MDI/MDIX setting is not appropriate for switch ports that are connected to 10BASE-T and 100BASE-TX network devices that do not support auto-MDI/MDIX and have a fixed wiring configuration. For switch ports connected to those types of network devices, you should disable auto-MDI/MDIX and set the wiring configurations manually.
- The appropriate MDI/MDIX setting for a switch port connected to a 10BASE-T and 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 MDIX. For example, if a network device has a fixed wiring configuration of MDI, you must disable auto-MDI/MDIX on the corresponding switch port and manually set it to MDIX. 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.

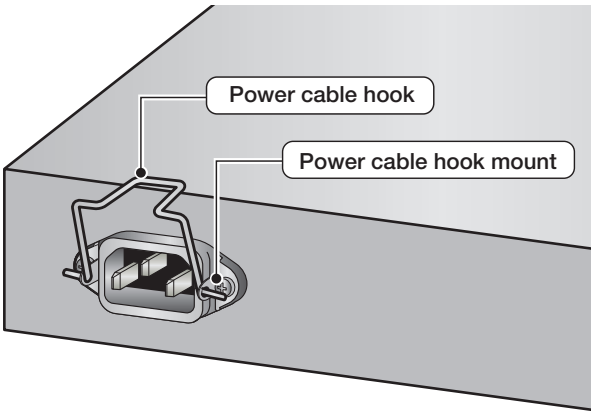
- The default speed setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation.
- The default speed setting of Auto-Negotiation is not appropriate for ports connected to 10BASE-T and 100BASE-TX network devices that do not support Auto-Negotiation and have fixed speeds. For those switch ports, you should disable Auto-Negotiation and set the port's speed manually to match the speeds of the network devices.
- The 10/1000BASE-T and 100BASE-TX ports must be set to Auto-Negotiation, the default setting, to operate at 1000Mbps.
- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting for the ports is Auto-Negotiation. This setting is appropriate for ports connected to network devices that also support Auto-Negotiation for duplex modes.
- The default duplex mode setting of Auto-Negotiation is not appropriate for ports connected to network devices that do not support Auto-Negotiation and have a fixed duplex mode. You should disable Auto-Negotiation on those ports and set their duplex modes manually to avoid the possibility of duplex mode mismatches. A switch port using Auto-Negotiation defaults to half-duplex if it detects that the end node is not using Auto-Negotiation, which can result in a mismatch if the end node is operating at a fixed duplex mode of full-duplex.
- Do not attach cables to ports of static or LACP port trunks until after you have configured the trunks on the switch. Otherwise, the ports will form network loops that can adversely affect network performance.

Powering on the switch

To power on the switch, perform the following procedure:

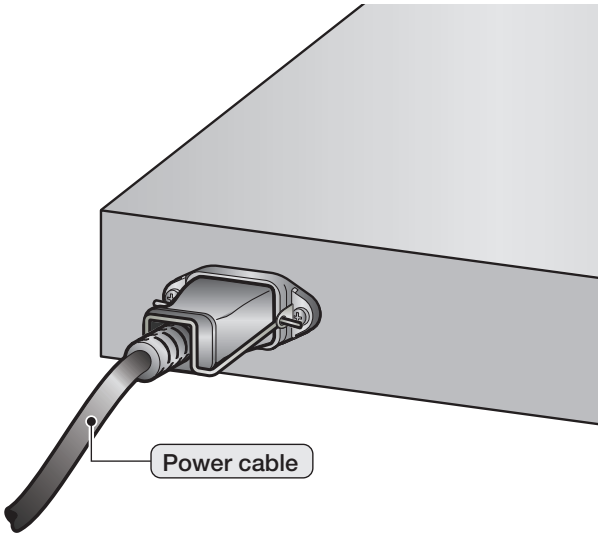
1. Lift the power cable hook, as shown in Figure 43, on the back of the switch.

FIGURE 43. LIFTING THE AC POWER CABLE HOOK ON A GS970M SERIES SWITCH



2. Plug the power cord into the AC power connector, as shown in Figure 44, on the back of the switch.

FIGURE 44. PLUGGING IN THE AC POWER CORD ON A GS970M SERIES SWITCH



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

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

4. Verify that the POWER LED is green. If the LED is OFF, see Chapter 3, “Chapter 3: Troubleshooting” on page 81.

The switch is now powered on and ready for network operations.

The switches are shipped with the management software pre-installed. The software provides a command line interface and a GUI (Graphical User Interface) for in-band, over-the-network management.

For full product documentation, see our online documentation Library. For AlliedWare Plus products, the Library includes the following documents:

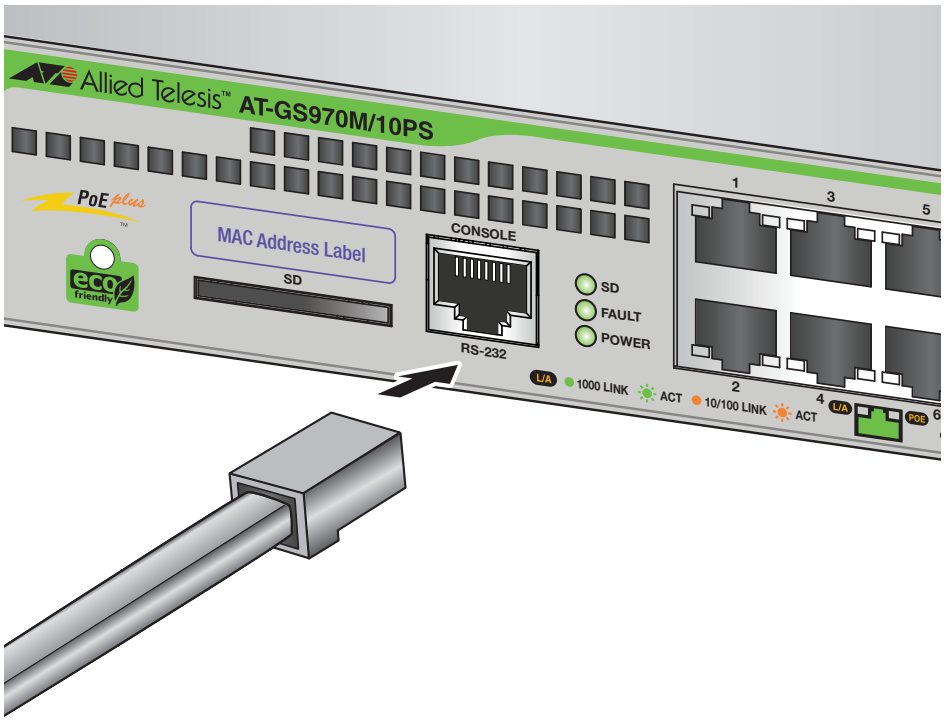
- Feature Overview and Configuration Guides - find these by clicking **here** and searching for the feature name.
- Datasheet - find this by clicking **here** and searching for GS970M.
- Command References - find these by clicking **here** and searching for GS970M.

Starting a local management session

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

1. Connect the RJ45 connector on the management cable to the console port on the front panel of the switch, as shown below.

FIGURE 45. CONNECTING THE MANAGEMENT CABLE TO THE CONSOLE PORT OF A GS970M SERIES SWITCH



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

3. Configure the terminal or terminal emulator program as follows:

   - Baud rate: 9600 bps (The baud rate of the Console Port is adjustable from 1200 to 115200 bps. The default is 9600 bps.)
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: None

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

4. If you have not already done so, power up the switch as described in the previous steps.

Monitoring the initialization processes

It takes about thirty seconds for the switch to initialize its management software programs and features, and load the default configuration.

You may also monitor the bootup sequence by connecting a terminal or computer that has a terminal emulator program, to the console port on the master switch. You will see the messages from Figure 46 below to Figure 48 on page 77.

FIGURE 46. SWITCH INITIALIZATION MESSAGES

```
Verifying release... OK
Booting...
Starting base/first...                                    [  OK  ]
Mounting virtual filesystems...                           [  OK  ]


          _______________   ____
        /\ \             / /______\
      /   \ \_       __/ /| _______ |
    /       \ |      |  /  | _______ |
  /          \ \    / /     \ ____ /
/_______/\____\ \/ /_____________/

Allied Telesis Inc.
AlliedWare Plus (TM) v0.0.0
Current release filename:GS970-5.4.7-01.rel
Original release filename: GS970-5.4.7-01.rel
Built: Mon Mar 14 12:15:15 NZDT 2017
Mounting static filesystems...                            [  OK  ]
Checking flash filesystem...                              [  OK  ]
Mounting flash filesystem...                              [  OK  ]
Checking for last gasp debug output...                    [  OK  ]
Checking NVS filesystem...                                [  OK  ]
Formatting NVS...                                         [  OK  ]
Mounting NVS filesystem (second attempt)...               [  OK  ]
Starting base/dbus...                                     [  OK  ]
Starting base/syslog...                                   [  OK  ]
Starting base/loopback...                                 [  OK  ]
Starting base/poe_done...                                 [  OK  ]
Starting base/sysctl...                                   [  OK  ]
```

FIGURE 47. SWITCH INITIALIZATION MESSAGES (CONTINUED)

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

Initializing HA processes:
cntrd, hostd, hsl, nsm, sflowd, atmfd, auth
epsr, imi, lacp, lldpd, loopprot, mstp, rmon
udldd

Received event network.initialized
Received event standalone

Assigning Active Workload to HA processes:
hsl, lacpd, loopprotd, nsm, rmond, authd, epsrd
lldpd, mstpd, sflowd, imi

Received event network.activated

Loading default configuration
Warning: flash:/default.cfg does not exist, loading factory defaults.
...

done!
```

FIGURE 48. SWITCH INITIALIZATION MESSAGES (CONTINUED)

```
Received event network.configured


awplus login:
```

Installing optional SFP transceivers

To install an SFP transceiver, perform the following procedure:

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

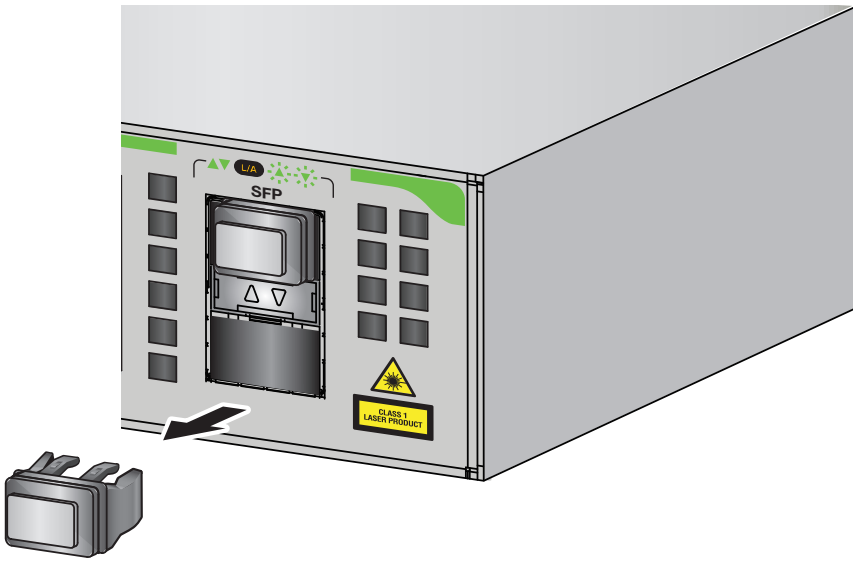
Note
You should always install the transceiver before connecting the fiber optic cables to it.

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.

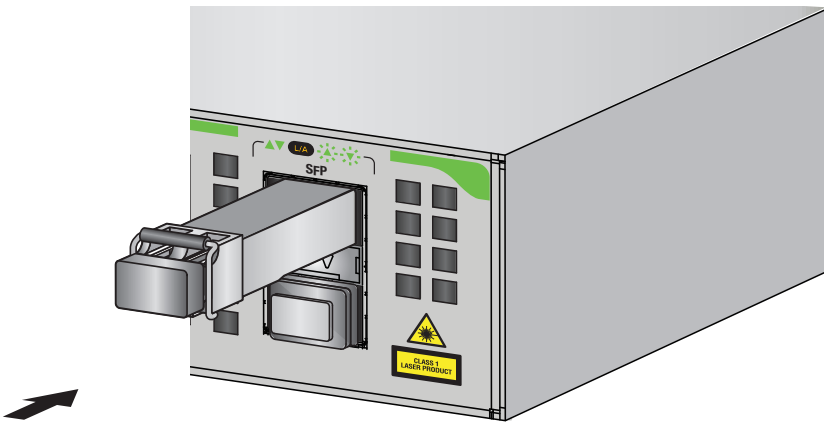
2. Remove the dust plug from an SFP slot. See Figure 49.

FIGURE 49. REMOVING THE DUST PLUG FROM AN SFP SLOT



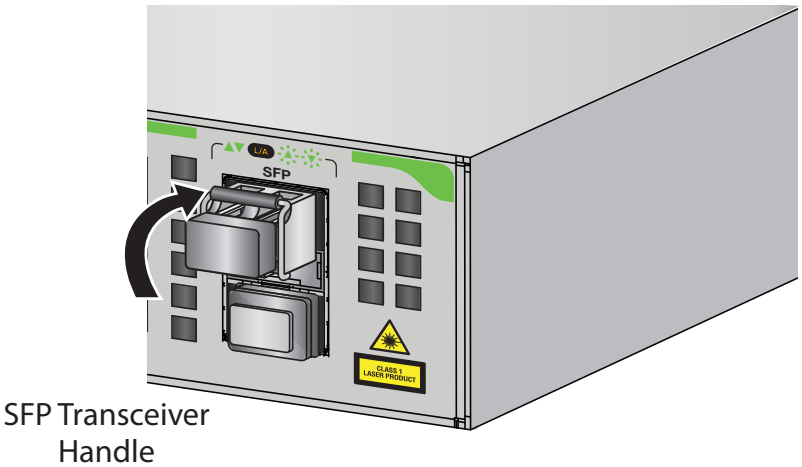
3. Position the SFP transceiver with the label facing up.
4. Gently slide the transceiver into the SFP slot until it clicks into place as shown in Figure 50.

FIGURE 50. INSERTING AN SFP TRANSCEIVER INTO AN SFP SLOT



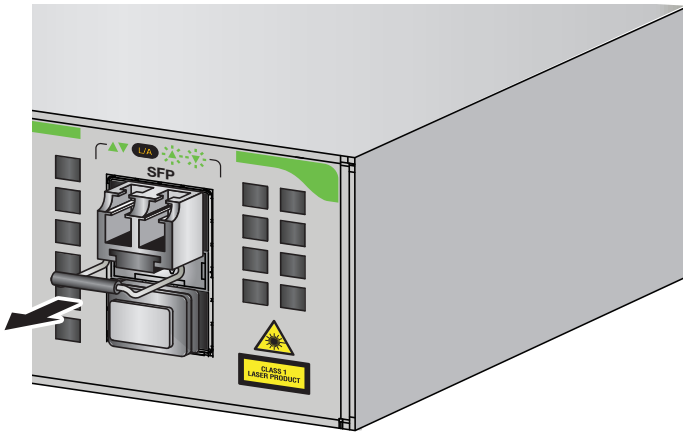
5. Verify that the handle on the transceiver is in the upright position, as shown in Figure 51. This secures the transceiver and prevents it from being dislodged from the slot.

FIGURE 51. POSITIONING THE SFP HANDLE IN THE UPRIGHT POSITION



6. Eject SFP transceivers, as shown in Figure 52. First lower the SFP transceiver handle, then gently remove the SFP transceiver.

FIGURE 52. EJECTING AN SFP TRANSCEIVER AFTER LOWERING THE SFP HANDLE TO THE DOWNWARDS POSITION



7. Repeat steps 2 through 6 to install an additional SFP transceiver.

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 transceiver can lead to premature failure.

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

8. Go to “Cabling the switch” on page 69.

Chapter 3: Troubleshooting

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

> **Note**
> For further assistance, please contact Allied Telesis Technical Support at **www.alliedtelesis.com/support**.

Problem 1: The POWER LED on the front of the switch is off.

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

- Verify that the power cord is securely connected to the power source and to the AC connector on the back panel of the switch.
- Verify that the power outlet has power by connecting another device to it.
- Try connecting the unit to another power source.
- Try a different power cord.
- Verify that the voltage from the power source is within the required levels for your region.

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

Solution: The switch is probably operating in low power mode. To toggle on the LEDs, press the ecofriendly button on the front panel for 1 to 4 seconds.

Problem 3: A twisted pair port on the switch is connected to a network device but the port's Link/Activity/Speed LED is off.

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

- Verify that the network device 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 network device.
- Verify that the port is connected to the correct twisted pair cable. This is to eliminate the possibility that the port is connected to the wrong network device, such as a powered off device.
- 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. Cable requirements can be found in Table 1, Table 3 and Table 4.

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

Problem 4: **The Link/Activity/Speed 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:

- Verify that the network device connected to the fiber optic port is operating properly.
- Verify that the fiber optic cable is securely connected to the port on the media converter channel and to the port on the remote network device.
- Check that the SFP module is fully inserted in the slot.
- 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. This is to eliminate the possibility that the port is connected to the wrong remote network device, such as a powered off device.
- Try connecting another network device to the fiber optic port using a different cable. If the port is able to establish a link, then the problem is with the cable or with the other network device.
- Use the switch’s management software to verify that the port is enabled.
- If the remote network device is a 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 5: The switch functions intermittently.

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

- Use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that the input voltage from the power source to the switch is stable and within the approved operating range. The unit will shut down if the input voltage fluctuates above or below the approved operating range.
- Use the SHOW SYSTEM ENVIRONMENT command in the Privileged Exec mode to verify that the fan is operating correctly.
- Verify that the location of the switch allows for adequate airflow. The unit will shut down if it is in danger of overheating.

Problem 6: A port on the GS970M/10PS, GS970M/18PS, or GS970M/28PS switch is not providing power to a PoE device.

Solutions: Check the following:

- Review the PD's documentation to confirm that the device supports Mode A of the IEEE 802.3at standard. Mode A is one of two modes that define the connector pins that deliver the power from the port in the switch to the powered device. In Mode A, the power is carried on pins 1, 2, 3, and 6 on the RJ-45 port, the same pins that carry the network traffic. The second mode, Mode B, defines pins 4, 5, 7, and 8 as the power carriers. The GS970M Series switches do not support Mode B. Most powered devices are designed to accept power by either mode, but some legacy devices may only support one mode. This can be verified by reviewing the device's documentation or data sheet. Legacy devices that only support Mode B will not work with the switches.
- Check that the device's power requirements do not exceed 30 W. This can be verified by reviewing the device's documentation or data sheet.
- Verify that you are using the appropriate category of twisted-pair cable by referring to Table 3 and Table 4.
- Use the management software on the switch to determine whether PoE is enabled on the port. The default setting for PoE is enabled.
- Use the management software on the switch to determine whether the PoE power setting for the port has been reduced to a value below the power requirements of the device.
- Try connecting the device to a different port on the switch.

Problem 7: 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 on the switch so that both ports are using the same duplex mode.

Problem 8: **A port's Link/Activity/Speed LED is blinking.**

Solutions: The link between the port and the network device is intermittent. Try the following:

- Connect another network device with a different cable to the port. If the Link LED remains steady on, then the problem is with the original cable or the network device.
- If the problem is with an SFP transceiver, check that the transceiver is fully inserted in the slot.

Appendix A: Technical Specifications

This appendix describes the technical specifications of the GS970M Series switches.

Physical specifications

Dimensions

TABLE 12. CHASSIS DIMENSIONS

Model	W x D x H mm (in)
GS970M/10	263 mm x 179 mm x 38 mm (10.35 in x 7.05 in x 1.50 in)
GS970M/10PS	210 mm x 275mm x 42.5 mm (8.27 in x 10.83 in x 1.67 in)
GS970M/18	341 mm x 231mm x 44mm (13.42 in x 9.10 in x 1.73 in)
GS970M/18PS	341 mm x 231mm x 44mm (13.42 in x 9.10 in x 1.73 in)
GS970M/28	341 mm x 231mm x 44mm (13.42 in x 9.10 in x 1.73 in)
GS970M/28PS	440 mm x 290 mm x 44 mm (17.32 in x 11.42 in x 1.73 in)

Weight

TABLE 13. CHASSIS WEIGHT

Model	Weight
GS970M/10	760g (1.68 lb)
GS970M/10PS	2.1 kg (4.63 lb)
GS970M/18	2.4 kg (5.29 lb)
GS970M/18PS	3.0 kg (6.61 lb)
GS970M/28	2.4 kg (5.29 lb)
GS970M/28PS	4.7 kg (10.4 lb)

Environmental specifications

TABLE 14. ENVIRONMENTAL SPECIFICATIONS

Operating temperature	0° C to +50° C (32° F to 122° F)
Storage temperature	-20° C to 70° C (-4° F to 158° F)
Operating humidity	< 80% non-condensing
Storage humidity	< 95% non-condensing
Operating altitude range	Up to 2,000 m (6,651 ft)

Power specifications

TABLE 15. INPUT SUPPLY VOLTAGE

Model	Input supply voltage
GS970M/10	100-240 VAC, 50 - 60 Hz, 0.40A maximum
GS970M/18	
GS970M/28	100-240 VAC, 50 - 60 Hz, 0.60A maximum
GS970M/10PS	100-240 VAC, 50 - 60 Hz, 2.4A maximum
GS970M/18PS	
GS970M/28PS	100-240 VAC, 50 - 60 Hz, 6.4A maximum

TABLE 16. POWER SPECIFICATIONS

Model	Power budget	Maximum power consumption
GS970M/10	n/a	16 W
GS970M/18	n/a	18 W
GS970M/28	n/a	26 W
GS970M/10PS	124 W	161 W
GS970M/18PS	247 W	296 W
GS970M/28PS	370 W	459 W

Electrical safety and electromagnetic certifications

TABLE 17. SAFETY AND ELECTROMAGNETIC EMISSIONS CERTIFICATIONS

EMC	EN 55022 Class A EN 55024 EN 61000-3-2 EN 61000-3-3 EN 62311 FCC Part 15 (CFR 47) Class A VCCI Class A CISPR 22 Class A ICES-003
Environmental compliance	RoHS WEEE
Electrical safety	EN 60950-1 (edition 2) IEC 60950-1 (edition 2) UL 60950-1 (edition 2)
Laser safety	EN 60825
Regulatory Compliance	RCM CE C-UL-US UL-EU

Connectors and port pinouts

This section lists the connectors and connector pinouts.

Figure 53 illustrates the pin layout for an RJ45 connector and port.

FIGURE 53. RJ45 CONNECTOR AND PORT PIN LAYOUT

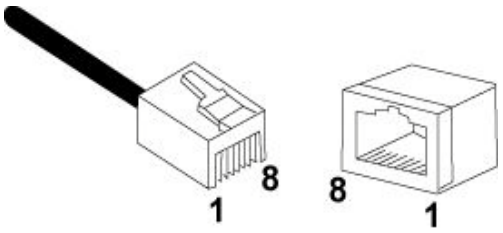


Table 18 lists the RJ45 pin signals when a twisted pair port is operating in the MDI configuration.

TABLE 18. MDI PIN SIGNALS (10BASE-T OR 100BASE-TX)

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

Table 19 lists the RJ45 port pin signals when a twisted pair port is operating in the MDIX configuration.

TABLE 19. MDIX PIN SIGNALS (10BASE-T OR 100BASE-TX)

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

Table 20 lists the RJ45 connector pins and their signals when a 1000BASE-T port is operating at 1000Mbps.

TABLE 20. RJ-45 1000BASE-T CONNECTOR PINOUTS

Pin	Pair	Signal
1	1	TX and RX+
2	1	TX and RX-
3	2	TX and RX+
4	3	TX and RX+
5	3	TX and RX-
6	2	TX and RX-
7	4	TX and RX+
8	4	TX and RX-