

**NETGEAR®**

# Hardware Installation Guide

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## S350 Series 24-Port (PoE+) and 48-Port Gigabit Ethernet Smart Managed Pro Switches with 2 or 4 SFP Ports

### Models

GS324T

GS324TP

GS348T

February 2019  
202-11911-01

**NETGEAR, Inc.**

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# 1

## Introduction

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This hardware installation guide is for the following NETGEAR switches:

- **S350 Series 24-Port Gigabit Ethernet Smart Managed Pro Switch with 2 SFP Ports (GS324T)**  
This model provides twenty-four Gigabit RJ-45 copper ports and two dedicated SFP fiber ports.
- **S350 Series 24-Port Gigabit PoE+ Ethernet Smart Managed Pro Switch with 2 SFP Ports (GS324TP)**  
This model provides twenty-four Gigabit PoE+ RJ-45 copper ports and two dedicated SFP fiber ports. Power over Ethernet (PoE) lets you provide power to PoE-capable devices such as WiFi access points, VoIP phones, and IP security cameras so that you do not need to use power supplies for those devices. The model can supply up to 30W PoE+ (IEEE 802.3at) to each copper port, with a maximum PoE power budget of 190W across all active PoE+ copper ports.
- **S350 Series 48-Port Gigabit Ethernet Smart Managed Pro Switch with 4 SFP Ports (GS348T)**  
This model provides forty-eight Gigabit RJ-45 copper ports and four dedicated SFP fiber ports.

This hardware installation guide complements the installation guide that came with your switch. This chapter serves as an introduction to the switch and includes the following sections:

- [Overview](#)
- [Features](#)
- [Safety instructions and warnings](#)

**Note:** For more information about the topics that are covered in this manual, visit the support website at [netgear.com/support/](http://netgear.com/support/).

**Note:** For technical specifications, see the data sheet at [netgear.com/business/products/switches/smart/](http://netgear.com/business/products/switches/smart/). For switch documentation, visit [netgear.com/support/download/](http://netgear.com/support/download/).

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# Overview

The switch provides twenty-four or forty-eight 10/100/1000BASE-T RJ-45 copper ports that support nonstop 10/100/1000M Layer 2 networks. For model GS324TP, all RJ-45 ports support PoE+. Two or four additional fiber ports can accept small form-factor pluggable (SFP) gigabit interface converters (GBICs) for 1G fiber connectivity.

**Note:** For information about application samples, see [Applications](#) on page 21.

The switch provides administrative management options that let you configure, monitor, and control the network. Using the local browser-based management interface, in this guide referred to as the local browser interface, you can configure the switch and the network, including the ports, the management VLAN, VLANs for traffic control, link aggregation for increased bandwidth, Quality of Service (QoS) for prioritizing traffic, and network security.

For initial discovery of the switch on the network, use one of the following methods, all of which are described in detail in the user manual:

- NETGEAR Insight mobile app
- NETGEAR Smart Control Center Utility
- NETGEAR Switch Discovery Tool

You can also get the IP address of the switch from the DHCP server in the network or use an IP scanner utility.

After discovery, you can configure the switch using the local browser interface for advanced setup and configuration of features, or the Smart Control Center program for very basic setup. For more information, see the user manual, which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

You can install the switch freestanding or rack mounted in a wiring closet or equipment room. The switch is IEEE compliant and offers low latency. All ports can automatically negotiate to the highest speed, which makes the switch very suitable for a mixed environment with Fast Ethernet and Gigabit Ethernet.

Use Category 5e (Cat 5e) or higher-rated Ethernet cables terminated with RJ-45 connectors to make Gigabit connections.

# Features

The switch supports the following key hardware features:

- 24 or 48 Gigabit Ethernet ports:
  - Models GS324T and GS324TP provide 24 Gigabit Ethernet ports
  - Model GS348T provides 48 Gigabit Ethernet ports
- 2 or 4 dedicated SFP fiber ports:
  - Models GS324T and GS324TP provide 2 dedicated SFP fiber ports
  - Model GS348T provides 4 dedicated SFP fiber ports
- PoE support (model GS324TP):
  - 24 PoE+ (802.3at) ports
  - Total PoE power budget of 190W for the switch
- MAC table size of 16K.
- 52 Gbps or 104 Gbps full-duplex, nonblocking switch fabric:
  - Models GS324T and GS324TP provide 52 Gbps full-duplex, nonblocking switch fabric
  - Model GS348T provides 104 Gbps full-duplex, nonblocking switch fabric
- Variable speed fan that can lower the noise level during low temperatures (models GS324TP and GS348T):
  - For model GS324TP, the acoustic noise is equal to or less than 32.8 dBA at 77°F (25°C)
  - For model GS348T, the acoustic noise is equal to or less than 26.0 dBA at 77°F (25°C)
- Includes the following mounting hardware:
  - Four rubber footpads for tabletop installation
  - Rack-mount kit (brackets and screws) for rack installation

- Full compatibility with IEEE standards:
  - IEEE 802.3 Ethernet
  - IEEE 802.3u 100BASE-T
  - IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX
  - IEEE 802.3ab 1000BASE-T
  - IEEE 802.3i 10BASE-T
  - IEEE 802.1Q VLAN tagging
  - IEEE 802.3x Full-duplex flow control
  - IEEE 802.3ad Link Aggregation Control Protocol (LACP)
  - IEEE 802.1ab LLDP
  - IEEE 802.1p Class of Service (QoS)
  - IEEE 802.1D Spanning Tree Protocol (STP)
  - IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
  - IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
  - IEEE 802.1x RADIUS network access control
  - IEEE 802.3az Energy Efficient Ethernet (EEE)
  
- AutoSensing and autonegotiating capabilities for all ports.
- Auto Uplink technology is supported on all ports.
- Automatic address learning function to build the packet-forwarding information table. The table contains up to 16K Media Access Control (MAC) addresses.
- Store-and-forward transmission to remove bad packets from the network.
- Active flow control to minimize packet loss and frame drops.
- Half-duplex backpressure control.
- Per-port status LEDs and system status LEDs.
- Per-port PoE status LEDs and system PoE Max LED (model GS324TP)
- NETGEAR green power-saving features:
  - Energy efficiency mode that fully conforms to the IEEE802.3az standard
  - Per-port automatic change to a lower power mode when the port link is down



# Safety instructions and warnings

Use the following safety guidelines to ensure your own personal safety and to help protect your system from potential damage.

To reduce the risk of bodily injury, electrical shock, fire, and damage to the equipment, observe the following precautions:

- This product is designed for indoor use only in a temperature-controlled and humidity-controlled environment. For more information, see the environmental specifications in the appendix or the data sheet.  
Any device that is located outdoors and connected to this product must be properly grounded and surge protected.  
Failure to follow these guidelines can result in damage to your NETGEAR product, which might not be covered by NETGEAR's warranty, to the extent permissible by applicable law.
- Observe and follow service markings:
  - Do not service any product except as explained in your system documentation. Some devices should never be opened.
  - If applicable to your device, opening or removing covers that are marked with the triangular symbol with a lightning bolt can expose you to electrical shock. We recommend that only a trained technician services components inside these compartments.
- If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:
  - Depending on your device, the power adapter, power adapter cable, power cable, extension cable, or plug is damaged.
  - An object fell into the product.
  - The product was exposed to water.
  - The product was dropped or damaged.
  - The product does not operate correctly when you follow the operating instructions.
- Keep your system away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment. If the system gets wet, see the appropriate section in your troubleshooting guide, or contact your trained service provider.

## S350 Series 24- (PoE+) and 48-Port Gigabit Ethernet Smart Managed Pro Switches

- Do not push any objects into the openings of your system. Doing so can cause fire or electric shock by shorting out interior components.
  - Use the product only with approved equipment.
  - If applicable to your device, allow the product to cool before removing covers or touching internal components.
  - Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
  - To avoid damaging your system, if your device uses a power supply with a voltage selector, be sure that the selector is set to match the power at your location:
    - 115V, 60 Hz in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
    - 100V, 50 Hz in eastern Japan and 100V, 60 Hz in western Japan
    - 230V, 50 Hz in most of Europe, the Middle East, and the Far East
  - Be sure that attached devices are electrically rated to operate with the power available in your location.
  - Depending on your device, use only a supplied power adapter or approved power cable:  
If your device uses a power adapter:
    - If you were not provided with a power adapter, contact your local NETGEAR reseller.
    - The power adapter must be rated for the product and for the voltage and current marked on the product electrical ratings label.  
If your device uses a power cable:
    - If you were not provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable approved for your country.
    - The power cable must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cable must be greater than the ratings marked on the product.
  - To help prevent electric shock, plug the system and peripheral power cables into properly grounded electrical outlets.
  - If applicable to your device, the peripheral power cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a three-wire cable with properly grounded plugs.
-

## **S350 Series 24- (PoE+) and 48-Port Gigabit Ethernet Smart Managed Pro Switches**

- Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
- To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Position system cables, power adapter cables, or power cables carefully. Route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
- Do not modify power adapters, power adapter cables, power cables or plugs. Consult a licensed electrician or your power company for site modifications.
- Always follow your local and national wiring rules.

# 2

## Hardware Overview

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This chapter describes the switch hardware features.

The chapter includes the following sections:

- [Hardware overview of model GS324T](#)
- [Hardware overview of model GS324TP](#)
- [Hardware overview of model GS348T](#)
- [RJ-45 ports for 10/100/1000M BASE-T Ethernet connectivity](#)
- [SFP ports for fiber connectivity](#)
- [Reset button](#)

# Hardware overview of model GS324T

Model GS324T provides twenty four 10/100/1000BASE-T RJ-45 ports and two dedicated Gigabit SFP fiber ports.

## Model GS324T: Front panel with ports and LEDs

The following figure shows the front panel of model GS324T.

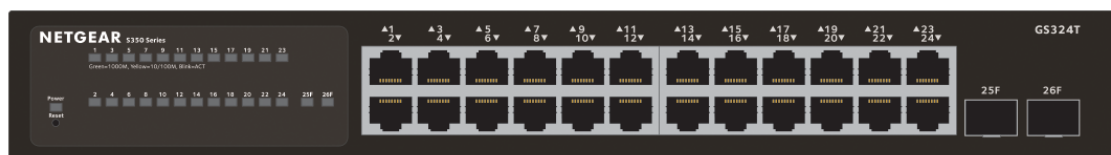


Figure 1. Model GS324T front panel

From left to right, the front panel of model GS324T provides the following components:

- Power LED (see [Model GS324T: LEDs](#) on page 14).
- Recessed **Reset** button (see [Reset button](#) on page 20).
- Twenty four port LEDs (1-24), one for each associated RJ-45 port, and two port LEDs (25F and 26F), one for each associated fiber port. For the RJ-45 ports, each LED functions as the combined link, speed, and activity LED for its associated port. For the fiber ports, each LED functions as the link and activity LED for its associated port. (See [Model GS324T: LEDs](#) on page 14.)
- Twenty four independent 10/100/1000BASE-T RJ-45 ports (1-24, see [RJ-45 ports for 10/100/1000M BASE-T Ethernet connectivity](#) on page 19).
- Two dedicated Gigabit SFP fiber ports (25F and 26F) that can accept optional transceiver modules (see [SFP ports for fiber connectivity](#) on page 19).

## Model GS324T: Back panel

The back panel of model GS324T contains a Kensington lock slot for an optional security cable and a 100–240VAC, 50/60Hz, 1.0A AC power connector for the AC power cable that came in the switch package.

The following figure shows the back panel of model GS324T.

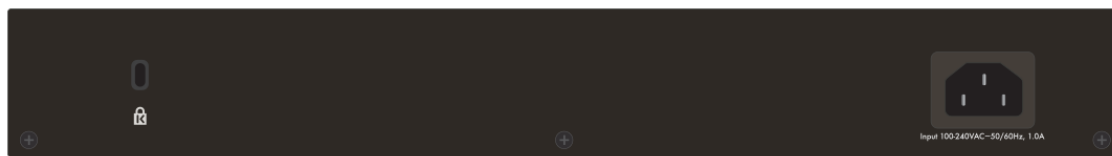


Figure 2. Model GS324T back panel

## Model GS324T: LEDs

This section describes the LED designations of model GS324T. All LEDs are to the left of the ports.

Table 1. Model GS324T LEDs on the front panel

LED	Description
Power LED	<p><b>Solid green.</b> The switch is powered on and operating normally.</p> <p><b>Solid yellow.</b> The switch is booting.</p> <p><b>Off.</b> Power is not supplied to the switch.</p>
RJ-45 port LED Link, speed, and activity for Ethernet ports 1 to 24	<p><b>Off.</b> No link is established.</p> <p><b>Solid green.</b> A valid 1 Gbps link is established.</p> <p><b>Blinking green.</b> The port is transmitting or receiving packets at 1 Gbps.</p> <p><b>Solid yellow.</b> A valid 10 Mbps or 100 Mbps link is established.</p> <p><b>Blinking yellow.</b> The port is transmitting or receiving packets at 10 Mbps or 100 Mbps.</p>
Fiber port LED Link and activity for SFP fiber ports 25F and 26F	<p><b>Off.</b> No SFP module link is established.</p> <p><b>Solid green.</b> A valid 1 Gbps link is established.</p> <p><b>Blinking green.</b> The SFP fiber port is transmitting or receiving packets at 1 Gbps.</p>

# Hardware overview of model GS324TP

Model GS324TP provides twenty four 10/100/1000BASE-T RJ-45 PoE+ ports and two dedicated Gigabit SFP fiber ports.

## Model GS324TP: Front panel with ports and LEDs

The following figure shows the front panel of model GS324TP.

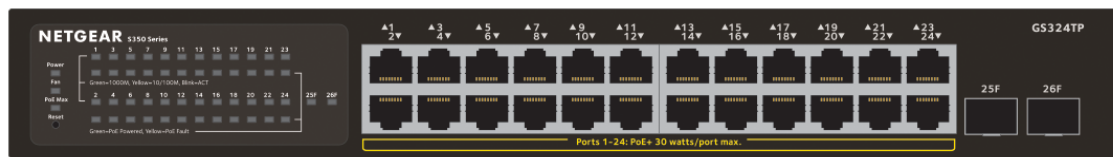


Figure 3. Model GS324TP front panel

From left to right, the front panel of model GS324TP provides the following components:

- Power LED (see [Model GS324TP: LEDs](#) on page 16).
- Fan LED (see [Model GS324TP: LEDs](#) on page 16).
- PoE Max LED (see [Model GS324TP: LEDs](#) on page 16).
- Recessed **Reset** button (see [Reset button](#) on page 20).
- Port LEDs:
  - Twenty four upper port LEDs (1-24), each LED functioning as the combined link, speed, and activity LED for its associated RJ-45 port.
  - Twenty four lower port LEDs (1-24), each LED functioning as the PoE status LED for its associated RJ-45 port.
  - Two port LEDs (25F and 26F), each LED functioning as the link and activity LED for its associated fiber port.

For more information about the port LEDs, see [Model GS324TP: LEDs](#) on page 16.

- Twenty four independent 10/100/1000BASE-T PoE+ RJ-45 ports (1-24, see [RJ-45 ports for 10/100/1000M BASE-T Ethernet connectivity](#) on page 19).
- Two dedicated Gigabit SFP fiber ports (25F and 26F) that can accept optional transceiver modules (see [SFP ports for fiber connectivity](#) on page 19).

## Model GS324TP: Back panel

The back panel of model GS324TP contains a Kensington lock slot for an optional security cable and a 100-240VAC, 50/60Hz, 5A AC power connector for the AC power cable that came in the switch package.

The following figure shows the back panel of model GS324TP.

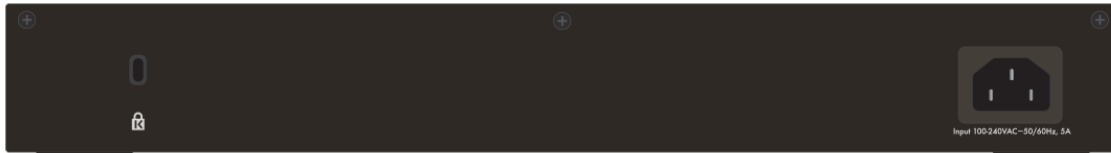


Figure 4. Model GS324TP back panel

## Model GS324TP: LEDs

This section describes the LED designations of model GS324TP. All LEDs are to the left of the ports.

Table 2. Model GS324TP LEDs on the front panel

LED	Description
Power LED	<p><b>Solid green.</b> The switch is powered on and operating normally.</p> <p><b>Solid yellow.</b> The switch is booting.</p> <p><b>Off.</b> Power is not supplied to the switch.</p>
Fan LED	<p><b>Off.</b> The fan is operating normally.</p> <p><b>Solid yellow.</b> A problem occurred with the fan.</p>
PoE Max LED	<p><b>Off.</b> Sufficient (more than 7W of) PoE power is available.</p> <p><b>Solid yellow.</b> Less than 7W of PoE power is available.</p> <p><b>Blinking yellow.</b> At least once during the previous two minutes, less than 7W of PoE power was available.</p>
RJ-45 upper LED Link, speed, and activity for Ethernet ports 1 to 24	<p><b>Off.</b> No link is established.</p> <p><b>Solid green.</b> A valid 1 Gbps link is established.</p> <p><b>Blinking green.</b> The port is transmitting or receiving packets at 1 Gbps.</p> <p><b>Solid yellow.</b> A valid 10 Mbps or 100 Mbps link is established.</p> <p><b>Blinking yellow.</b> The port is transmitting or receiving packets at 10 Mbps or 100 Mbps.</p>



Table 2. Model GS324TP LEDs on the front panel (Continued)

LED	Description
RJ-45 lower LED PoE status for Ethernet ports 1 to 24.	<b>Off.</b> The port is not delivering PoE power. <b>Solid green.</b> The port is delivering PoE power. <b>Solid yellow.</b> A PoE fault occurred.
Fiber port LED Link and activity for SFP fiber ports 25F and 26F	<b>Off.</b> No SFP module link is established. <b>Solid green.</b> A valid 1 Gbps link is established. <b>Blinking green.</b> The SFP fiber port is transmitting or receiving packets at 1 Gbps.

## Hardware overview of model GS348T

Model GS348T provides forty eight 10/100/1000BASE-T RJ-45 ports and four dedicated Gigabit SFP fiber ports.

### Model GS348T: Front panel with ports and LEDs

The following figure shows the front panel of model GS348T.

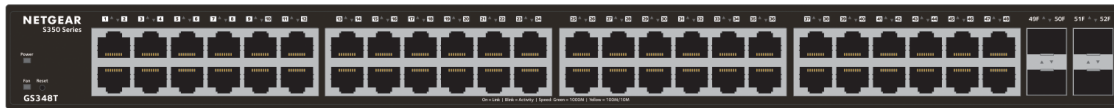


Figure 5. Model GS348T front panel

From left to right, the front panel of model GS348T provides the following components:

- Power LED (see [Model GS348T: LEDs](#) on page 18).
- Fan LED (see [Model GS348T: LEDs](#) on page 18).
- Recessed **Reset** button (see [Reset button](#) on page 20).
- Forty eight 10/100/1000BASE-T RJ-45 ports (1-48, see [RJ-45 ports for 10/100/1000M BASE-T Ethernet connectivity](#) on page 19), each with a LED that functions as the combined link, speed, and activity LED (see [Model GS348T: LEDs](#) on page 18). All RJ-45 port LEDs are above the ports.
- Four dedicated Gigabit SFP fiber ports (49F-52F) that can accept optional transceiver modules (see [SFP ports for fiber connectivity](#) on page 19), each with a single LED that functions as the combined link and activity LED (see [Model GS348T: LEDs](#) on page 18). All fiber port LEDs are above the ports.

## Model GS348T: Back panel

The back panel of model GS348T contains a Kensington lock slot for an optional security cable and a 100–240VAC, 50/60Hz, 1.5A AC power connector for the AC power cable that came in the switch package.

The following figure shows the back panel of model GS348T.



Figure 6. Model GS348T back panel

## Model GS348T: LEDs

This section describes the LED designations of model GS348T. All port LEDs are above the ports.

Table 3. Model GS348T LEDs on the front panel

LED	Description
Power LED	<p><b>Solid green.</b> The switch is powered on and operating normally.</p> <p><b>Solid yellow.</b> The switch is booting.</p> <p><b>Off.</b> Power is not supplied to the switch.</p>
Fan LED	<p><b>Off.</b> The fan is operating normally.</p> <p><b>Solid yellow.</b> A problem occurred with the fan.</p>
RJ-45 LED Link, speed, and activity for Ethernet ports 1 to 48	<p><b>Off.</b> No link is established.</p> <p><b>Solid green.</b> A valid 1 Gbps link is established.</p> <p><b>Blinking green.</b> The port is transmitting or receiving packets at 1 Gbps.</p> <p><b>Solid yellow.</b> A valid 10 Mbps or 100 Mbps link is established.</p> <p><b>Blinking yellow.</b> The port is transmitting or receiving packets at 10 Mbps or 100 Mbps.</p>
Fiber port LED Link and activity for SFP fiber ports 49F, 50F, 51F, and 52F	<p><b>Off.</b> No SFP module link is established.</p> <p><b>Solid green.</b> A valid 1 Gbps link is established.</p> <p><b>Blinking green.</b> The SFP fiber port is transmitting or receiving packets at 1 Gbps.</p>

## RJ-45 ports for 10/100/1000M BASE-T Ethernet connectivity

All RJ-45 copper ports support autosensing. When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed (10 Mbps, 100 Mbps, or 1 Gbps) and duplex mode (half-duplex or full-duplex) of the attached device. All ports support a Cat 5e cable (or higher-rated Ethernet cable) terminated with an 8-pin RJ-45 connector.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink technology. This technology allows attaching devices to the RJ-45 ports with either straight-through or crossover cables.

When you insert a cable into the switch's RJ-45 port, the switch automatically performs the following actions:

- Senses whether the cable is a straight-through or crossover cable.
- Determines whether the link to the attached device requires a normal connection (such as when you are connecting the port to a computer) or an uplink connection (such as when you are connecting the port to a router, switch, or hub).
- Automatically configures the RJ-45 port to enable communications with the attached device. The Auto Uplink technology compensates for setting uplink connections while eliminating concern about whether to use crossover or straight-through cables when you attach devices.

All RJ-45 copper ports on model GS324TP support PoE+.

## SFP ports for fiber connectivity

To enable fiber connections, SFP fiber ports accommodate standard small form-factor pluggable (SFP) gigabit interface converters (GBICs, also referred to as transceiver modules). GBICs are sold separately from the switch.

The switch supports the NETGEAR SFP transceiver modules that are listed in the following table.

Table 4. Supported SFP transceiver modules

Speed and Medium	Model	Description
1G Ethernet short-reach fiber	AGM731F	SFP transceiver 1000BASE-SX
1G Ethernet long-reach fiber	AGM732F	SFP transceiver 1000BASE-LX
1G Ethernet copper	AGM734	SFP transceiver 1000BASE-T

For more information about NETGEAR SFP transceiver modules, visit [netgear.com/business/products/switches/modules-accessories](http://netgear.com/business/products/switches/modules-accessories).

**Note:** If you use a third-party passive direct-attach cable (DAC), the length of the cable must not exceed 5 meters (16.4 feet).

## Reset button

The switch provides a recessed **Reset** button on the front panel so that you can either restart (power-cycle) the switch or return the switch to its factory default settings, causing all custom settings to be erased.

### To restart the switch or return the switch to its factory default settings:

1. Insert a device such as a straightened paper clip into the opening.
2. Do one of the following:
  - **Restart the switch.** Press the **Reset** button for about two seconds. (Do not press the button for more than five seconds!)  
The switch restarts but retains its custom settings. During this process, the Power LED lights amber.
  - **Return the switch to its factory default settings.** Press the **Reset** button for at least five seconds.  
The switch restarts and returns to its factory default settings. During this process, the Power LED lights amber.

# 3

## Applications

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The switch is designed to provide flexibility in configuring network connections. The switch can be used as your only network traffic-distribution device for PoE and non-PoE devices or with 10 Mbps, 100 Mbps, and 1 Gbps Ethernet and fiber hubs, routers, access points, and other switches.

This chapter includes the following sections:

- [Network switching](#)
- [PoE overview \(model GS324TP\)](#)
- [PoE and network switching \(model GS324TP\)](#)

# Network switching

You can use the switch as a network switch to build a network that provides up to 1 Gbps access to desktop computers, access points, non-PoE surveillance cameras, a NAS, servers such as a file server, an IPTV, and so on. Connect the switch to a network router that is connected to the Internet.

With 1 Gbps connections, the switch always functions in full-duplex mode. Any switch port that is connected to a computer or file server can provide up to 2 Gbps bidirectional throughput.

You must connect one LAN port on the switch to a LAN port on a network router (see device 2 in the following figure) that is connected to the Internet (see 3). You can also make a 1 Gbps fiber connection to a network router that supports fiber and that is connected to the Internet.

If you connect a WiFi access point (see device 4 in the following figure) to the switch, you can connect a tablet (see device 5) or smartphone (see device 6) to the WiFi network and use NETGEAR Insight to discover the switch.

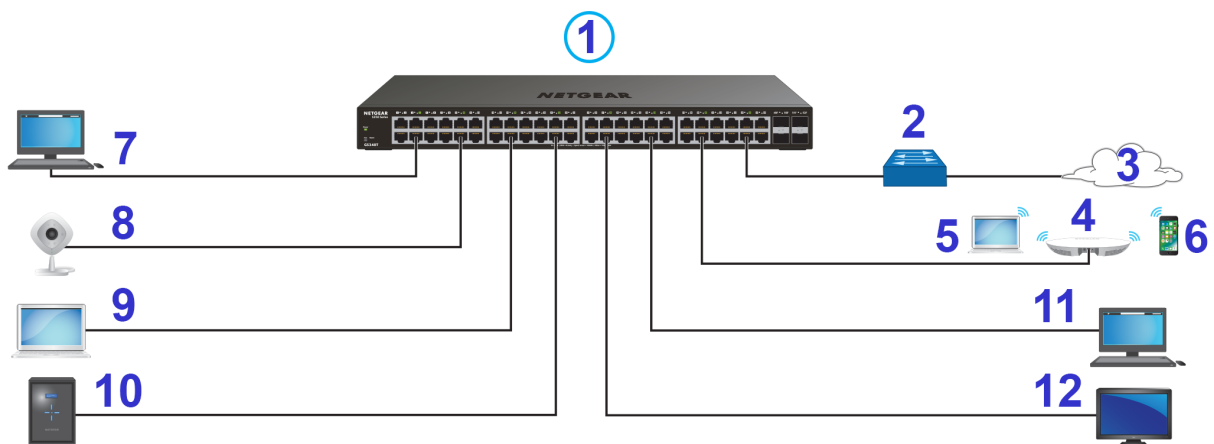


Figure 7. Sample network switching with model GS348T

Number	Device	Number	Device
1	Switch model GS348T	7	Desktop
2	Network router	8	IP camera
3	Internet	9	Laptop
4	WiFi access point	10	ReadyNAS storage system

(Continued)

Number	Device	Number	Device
5	Tablet, which allows you to use NETGEAR Insight to discover the switch.	11	Desktop
6	Smartphone, which allows you use NETGEAR Insight to discover the switch.	12	Smart TV

## PoE overview (model GS324TP)

Model GS324TP supports twenty four Power over Ethernet plus (PoE+) ports. The switch can supply up to 30W PoE+ (IEEE 802.3at) to each port up to its total maximum PoE power budget of 190W across all active PoE+ ports. The switch is also compatible with PoE (IEEE 802.3af).

Supplied power is prioritized according to the port order, up to the total power budget of the device. Port 1 receives the highest PoE priority, while port 24 is relegated to the lowest PoE priority.

If the power requirements for attached devices exceed the total power budget of the switch, the PoE power to the device on the highest-numbered active PoE+ port is disabled to make sure that the devices connected to the higher-priority, lower-numbered PoE+ ports are supported first.

Although a device is listed as an 802.3at PoE+-or 802.3af PoE-powered device, it might not require the maximum power limit that is specified by its IEEE standard. Many devices require less power, allowing more than six PoE+ devices or more than twelve PoE devices to active be simultaneously.

For more information about PoE, see the installation guide and user manual, both of which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

## PoE and network switching (model GS324TP)

Model GS324TP supports both PoE and non-PoE equipment. The following figure shows an example of how you can connect a PoE WiFi access point (see device 4), a PoE IP camera (see device 7), a PoE IP video phone (see device 8), and a PoE IP phone (see device 9) to the switch. In the following figure, non-PoE equipment is also attached to the switch (see devices 10 and 11).

You must connect one LAN port on the switch to a LAN port on a network router (see device 2 in the following figure) that is connected to the Internet (see 3). You can also

## S350 Series 24- (PoE+) and 48-Port Gigabit Ethernet Smart Managed Pro Switches

make a 1 Gbps fiber connection from port 25F or port 26F to a network router that supports fiber and that is connected to the Internet.

If you connect a WiFi access point (see device 4 in the following figure) to the switch, you can connect a tablet (see device 5) or smartphone (see device 6) to the WiFi network and use NETGEAR Insight to discover the switch.

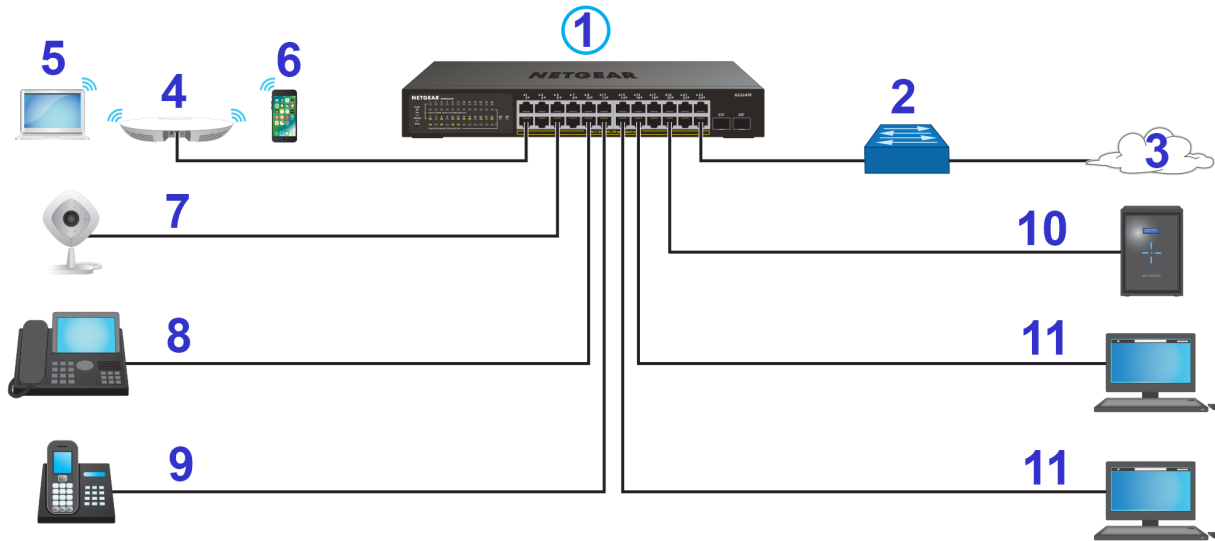


Figure 8. Sample PoE and network switching with model GS324TP

Number	Device	Number	Device
1	Switch model GS324TP	7	PoE IP camera
2	Network router	8	PoE IP video phone
3	Internet	9	PoE IP phone
4	PoE WiFi access point	10	ReadyNAS storage system
5	Tablet, which allows you to use NETGEAR Insight to discover the switch.	11	Desktop
6	Smartphone, which allows you use NETGEAR Insight to discover the switch.	11	Desktop



# 4

## Installation

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This chapter describes the installation procedures for the switch. Switch installation involves the steps described in the following sections:

- [Step 1: Prepare the site](#)
- [Step 2: Protect against electrostatic discharge](#)
- [Step 3: Unpack the switch](#)
- [Step 4: Install the switch](#)
- [Optional Step 5: Install SFP transceiver modules](#)
- [Step 6: Connect devices to the switch](#)
- [Step 7: Check the installation](#)
- [Step 8: Apply power and check the LEDs](#)
- [Step 9: Manage the switch](#)

# Step 1: Prepare the site

Before you install the switch, make sure that the operating environment meets the site requirements that are listed in the following table.

Table 5. Site requirements

Characteristics	Requirements
Mounting	<p><b>Desktop installations.</b> Provide a flat table or shelf surface.</p> <p><b>Rack-mount installations.</b> Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit that is supplied with the switch.</p>
Access	Locate the switch in a position that allows you to access the front panel ports, view the front panel LEDs, and access the power connector on the back panel.
Power source	Use the AC power cord that is supplied with the switch. Make sure that the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Cabling	Route cables to avoid sources of electrical noise such as radio transmitters, broadcast amplifiers, power lines, and fluorescent lighting fixtures.
Environmental	<p><b>Temperature.</b> Install the switch in a dry area with an ambient temperature between 32°F and 113°F (0°C and 45°C). Keep the switch away from heat sources such as direct sunlight, warm-air exhausts, hot-air vents, and heaters.</p> <p><b>Operating humidity.</b> The maximum relative humidity of the installation location must not exceed 90 percent, noncondensing.</p> <p><b>Ventilation.</b> Do not restrict airflow by covering or obstructing air inlets on the sides of the switch. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. The room or wiring closet in which you install the switch must provide adequate airflow.</p> <p><b>Operating conditions.</b> Keep the switch at least 6 feet (1.83 meters) away from the nearest source of electromagnetic noise, such as a photocopy machine.</p>

## Step 2: Protect against electrostatic discharge

**WARNING:** Static electricity can harm delicate components inside your switch. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components. You can do so by periodically touching an unpainted metal surface on the switch.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, leave it in the antistatic package until you are ready to install it. Just before unwrapping the antistatic package, discharge static electricity from your body.
- Before moving a sensitive component, place it in an antistatic container or package.
- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, workbench pads, and an antistatic grounding strap.

## Step 3: Unpack the switch

Check the contents of the boxes to make sure that all items are present before installing the switch.

### **To check the package contents:**

1. Place the container on a clean flat surface, and cut all straps securing the container.
2. Unpack the hardware from the boxes by carefully removing the hardware and placing it on a secure and clean surface.
3. Remove all packing material.
4. Verify that the package contains the following items:
  - a. Switch of the model that you ordered.
  - b. AC power cable (varies by region).

- c. A plastic bag (also called mounting kit) that contains the following items so you can install the switch to best suit your environment:
    - Rack-mount installation components:
      - Two brackets.
      - Eight small screws to attach the brackets to the switch (four small screws for each side).
      - Four large screws and four washers to attach the brackets to the rack (two screws and two washers for each side).  
For model GS324T and model GS324TP, the bag contains an extra set of four screws to attach the brackets to the rack, allowing you to select the most suitable set of screws for the rack.
    - Rubber feet for desktop or table installation.
  - d. Installation guide.
5. If any item is missing or damaged, contact your local NETGEAR reseller for replacement.

## Step 4: Install the switch

You can install the switch in a standard 19-inch (48.26-centimeter) network equipment rack or on a flat surface.

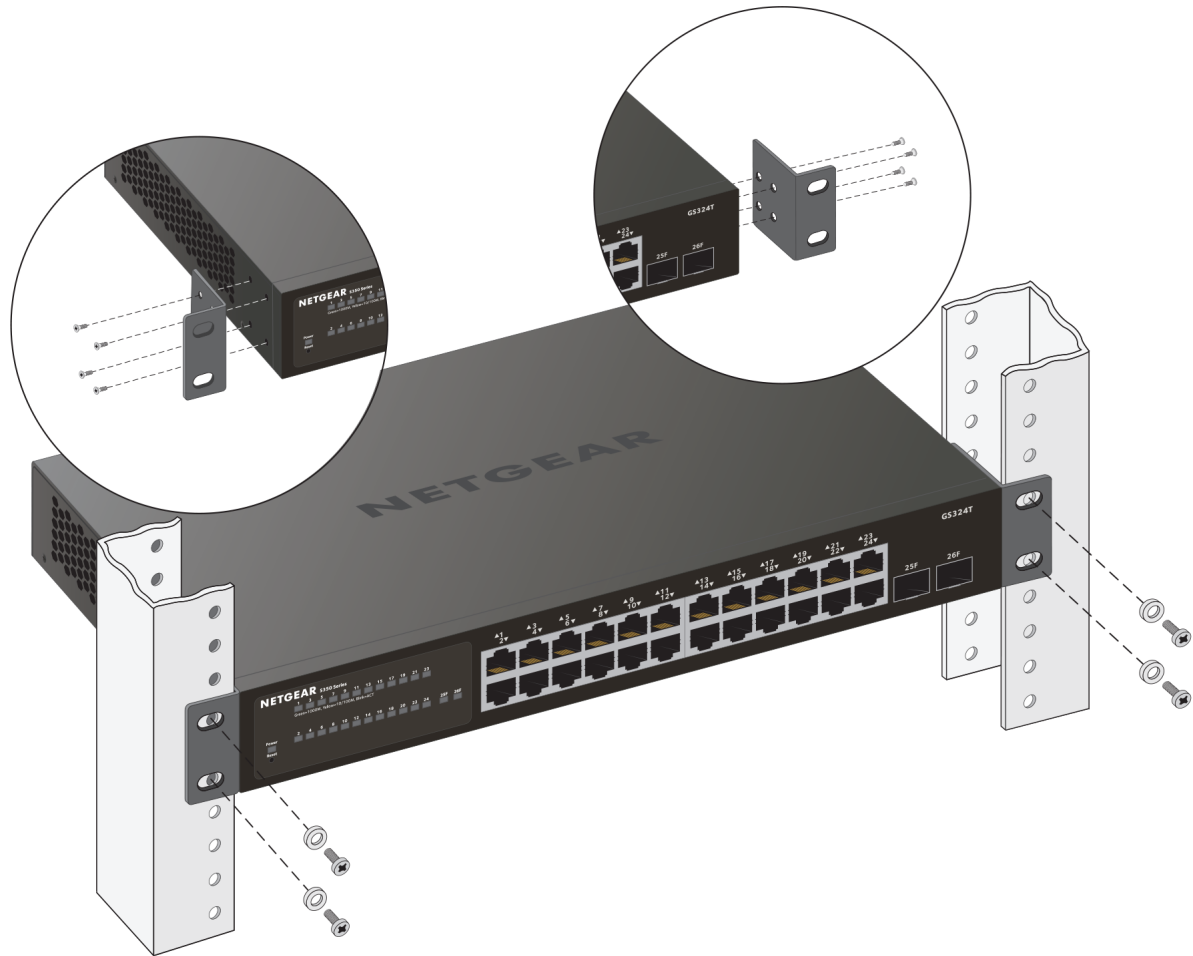
### Install the switch in a rack

To install the switch in a rack, you need the 19-inch rack-mount kit supplied with the switch.

#### **To install the switch in a rack:**

1. Attach the supplied mounting brackets to the side of the switch.
2. Insert the screws provided in the product package through each bracket and into the bracket mounting holes in the switch.
3. Tighten the screws with a No. 2 Phillips screwdriver to secure each bracket.
4. Align the mounting holes in the brackets with the holes in the rack, and insert two pan-head screws with nylon washers through each bracket and into the rack.

5. Tighten the screws with a No. 2 Phillips screwdriver to secure mounting brackets to the rack.



## Install the switch on a flat surface

The switch comes with four self-adhesive rubber footpads.

### **To install the switch on a flat surface:**

Stick one rubber footpad on each of the four concave spaces on the bottom of the switch.

The rubber footpads cushion the switch against shock and vibrations. They also provide ventilation space between stacked switches.

## Optional Step 5: Install SFP transceiver modules

The following optional procedure describes how to install an optional SFP transceiver module into one of the SFP ports. For information about SFP transceiver modules, see [SFP ports for fiber connectivity](#) on page 19.

**Note:** Contact your NETGEAR sales office to purchase these modules. If you do not want to install an SFP module, skip this procedure.

### To install an SFP transceiver module:

1. Insert the transceiver into the SFP port.  
On models GS324T and GSA324TP, the SFP ports are numbered 25F and 26F. On model GS348T, the SFP ports are numbered 49F, 50F, 51F, and 52F.  
You can install an SFP transceiver module in each SFP port.
2. Press firmly on the flange of the module to seat it securely into the connector.

## Step 6: Connect devices to the switch

The following procedure describes how to connect devices to the switch's RJ-45 ports. The switch supports Auto Uplink technology, which allows you to attach devices using either straight-through or crossover cables. Use a Category 5 (Cat 5), Cat 5e, or Cat 6 cable that is terminated with an RJ-45 connector.

**Note:** Ethernet specifications limit the cable length between the switch and the attached device to 328 feet (100 meters). On model GS324TP, if you use a PoE connection and the powered device (PD) receives insufficient PoE power from the switch, consider using a shorter cable.

### To connect devices to the switch's RJ-45 ports:

1. Connect a device to an RJ-45 network port on the switch.  
Models GS324T and GS348T support non-PoE devices. Model GS324TP supports both PoE and non-PoE devices.
2. Verify that all cables are installed correctly.

## Step 7: Check the installation

Before you apply power to the switch, perform the following steps.

### To check the installation:

1. Inspect the equipment thoroughly.
2. Verify that all cables are installed correctly.
3. Check cable routing to make sure that cables are not damaged or creating a safety hazard.
4. Make sure that all equipment is mounted properly and securely.

## Step 8: Apply power and check the LEDs

The switch does not provide an on/off power switch. The AC power cable connection controls the power.

Before connecting the AC power cable to the AC power receptacle on the switch, select an AC outlet for the AC power cable. Make sure that the AC outlet is not controlled by a wall switch, which can turn off power to the switch.

### To apply power:

1. Connect the plug of the AC power cable to the AC power receptacle on the back of the switch.
2. Plug the AC power cable into a power source such as a wall socket or power strip.
3. Check to see that the LEDs on the switch light correctly.

When you apply power, the Power LED on the switch front panel lights and the port LEDs for attached devices light.

**Note:** After you apply power, the Power LED lights solid yellow while the switch starts. After about two minutes, the switch completes its startup process and the Power LED turns from yellow to solid green.

If the Power LED does not light, check to see that the AC power cable is plugged in correctly and that the power source is good.

## Step 9: Manage the switch

The switch contains built-in web browser-accessible software for viewing, changing, and monitoring the way it functions. This management software is not required for the switch to work. You can use the ports without using the management software. However, the management software enables the setup of VLAN and trunking features and also improves the efficiency of the switch, which results in the improvement of its overall performance as well as the performance of the network.

After you power on the switch for the first time, you can configure the switch using the local browser interface for advanced setup and configuration of features, or the Smart Control Center program (which requires a Windows-based computer) for very basic setup. For more information about managing the switch, including information about tools to discover the switch IP address in your network, see the user manual, which you can download from [netgear.com/support/download/](http://netgear.com/support/download/).

**Note:** The switch's default IP address is 192.168.0.239 and its default subnet mask is 255.255.255.0. By default, the DHCP client of the switch is enabled.



# 5

## Troubleshooting

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This chapter provides information about troubleshooting the switch.

The chapter includes the following sections:

- [Troubleshooting chart](#)
- [PoE troubleshooting suggestions \(model GS324TP\)](#)
- [Additional troubleshooting suggestions](#)

# Troubleshooting chart

The following table lists symptoms, possible causes, and possible solutions for problems that might occur.

Table 6. Troubleshooting chart

Symptom	Possible Cause	Possible Solution
The Power LED is off.	Power is not supplied to the switch.	<ul style="list-style-type: none"> <li>• Check the power cable connections at the switch and the power source.</li> <li>• Make sure that all cables are used correctly and comply with the Ethernet specifications.</li> </ul>
The combined link, speed, and activity LED for a port is off although the port is connected to a powered-on device.	The port connection is not working.	<ul style="list-style-type: none"> <li>• Check the crimp on the connectors and make sure that the plug is properly inserted and locked into the port at both the switch and the connecting device.</li> <li>• Make sure that all cables are used correctly and comply with the Ethernet specifications.</li> <li>• Check for a defective port, cable, or module by testing them in an alternate environment where all products are functioning.</li> </ul>
A file transfer is slow or performance is degraded.	One possible cause is that a broadcast storm occurred and that a network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device. After you connect to the switch local browser interface, you can configure the Spanning Tree Protocol (STP) to prevent network loops.
A segment or device is not recognized as part of the network.	One or more devices are not properly connected, or cabling does not meet Ethernet guidelines.	<ul style="list-style-type: none"> <li>• Verify that the cabling is correct.</li> <li>• Make sure that all connectors are securely positioned in the required ports. It is possible that equipment was accidentally disconnected.</li> </ul>
The combined link, speed, and activity LEDs for all connected ports are blinking continuously and the network is disabled.	A network loop (redundant path) was created.	Break the loop by making sure that only one path exists from any networked device to any other networked device. After you connect to the switch local browser interface, you can configure the Spanning Tree Protocol (STP) to prevent network loops.

# PoE troubleshooting suggestions (model GS324TP)

Here are some tips for correcting PoE problems that might occur on model GS324TP:

- Make sure that the PoE Max LED is off. If the PoE Max LED is solid yellow, disconnect one or more PoE devices to prevent PoE oversubscription. Start by disconnecting the device from the highest-numbered port.
- Make sure that the Ethernet cables are plugged in correctly. For each powered device (PD) that is connected to the switch, the right port LED on the switch lights solid green. If the right port LED lights solid yellow, a PoE fault occurred and PoE halted because of one of the conditions that are listed in the following table.

Table 7. PoE fault conditions and possible solutions

PoE Fault Condition	Possible Solution
A PoE-related short circuit occurred on the port.	The problem is most likely with the attached PD. Check the condition of the PD or restart the PD by disconnecting and reconnecting the PD.
The PoE power demand of the PD exceeded the maximum level that the switch permits. The maximum level is 15.4W for a PoE connection or 30W for a PoE+ connection.	
The PoE current on the port exceeded the classification limit of the PD.	
The PoE voltage of the port is outside the range that the switch permits.	Restart the switch to see if the condition resolves itself.

## Additional troubleshooting suggestions

If the suggestions in the troubleshooting chart do not resolve the problem, see the following troubleshooting suggestions:

- **Network adapter cards.** Make sure that the network adapters that are installed in the computers are in working condition and the software driver was installed.
- **Configuration.** If problems occur after you alter the network configuration, restore the original connections and determine the problem by implementing the new changes, one step at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet limitations.

- **Switch integrity.** If necessary, verify the integrity of the switch by resetting it. To reset the switch, disconnect the AC power cord from the switch and then reconnect the AC power cord. If the problem continues, contact NETGEAR technical support. For more information, visit the support website at [netgear.com/support/](http://netgear.com/support/).
- **Autonegotiation.** The RJ-45 ports negotiate the correct duplex mode, speed, and flow control if the device at the other end of the link supports autonegotiation. If the device does not support autonegotiation, the switch determines only the speed correctly, and the duplex mode defaults to half-duplex. The Gigabit Ethernet ports negotiate speed, duplex mode, and flow control if the attached device supports autonegotiation.