

NETGEAR[®]

48-Port Gigabit Ethernet Smart Managed Plus Switch Hardware Installation Guide

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USA



48-Port Gigabit Ethernet Smart Managed Plus Switch

Support

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Conformity

For the current EU Declaration of Conformity, visit http://kb.netgear.com/app/answers/detail/a_id/11621.

Compliance

For regulatory compliance information, visit <http://www.netgear.com/about/regulatory>.

See the regulatory compliance document before connecting the power supply.

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This hardware installation guide is for the NETGEAR GS750E 48-Port Gigabit Smart Managed Plus Switch with two SFP ports. The GS750E provides forty-eight 10/100/1000M BASE-T RJ-45 copper ports with two dedicated 100 Mb or 1 Gb SFP fiber ports. The switch can be mounted in a rack or on a desktop.

The 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 support.netgear.com.

Note For technical specifications, see the data sheet at netgear.com/business/products/switches/web-managed/. For additional switch documentation, visit downloadcenter.netgear.com.

Overview

The switch provides forty-eight 10/100/1000M BASE-T RJ-45 copper ports that support nonstop Layer 2 networks. Two additional ports can accept small form-factor pluggable (SFP) 100M or 1G fiber optical modules.

You can create high-speed connections using the 1G ports. For example, you can do the following:

- Connect switches to each other with high-speed links (using link aggregation)
- Link to high-speed servers
- Provide 10/100/1000M copper and 100M or 1G fiber connectivity

The switch provides administrative management options that let you configure, monitor, and control the network. Using the web management 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.

You can use the web browser-based management interface to enable initial discovery of the switch on the network and to configure the switch, or you can install the configuration utility on your Windows-based computer. If you do not use a Windows-based computer, get the IP address of the switch from the DHCP server in the network or use an IP scanner utility.

Note The configuration utility runs on Windows-based computers. Visit netgear.com/support/product/PCU to download the utility to configure your switch.

After discovery, you can configure the switch using the web management interface or the configuration utility for basic or advanced setup. For more information, see the user manual which you can download from downloadcenter.netgear.com.

You can install the switch on a desktop or rack-mount it in a wiring closet or equipment room. The switch is IEEE compliant and offers low latency for high-speed networking. 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 1-Gigabit connections.

Features

The switch includes the following key hardware features:

- Forty-eight 10M/100M/1G Ethernet ports.
- Two dedicated SFP fiber ports.
- MAC table size of 16K entries.
- 100 Gbps switch fabric full duplex nonblocking.
- System password.
- DHCP client.
- Includes the following mounting hardware:

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- Rack-mount kit
- Rubber feet (desktop mounting).
- Full compatibility with IEEE standards:
 - IEEE 802.3 Ethernet
 - IEEE 802.3u 100BASE-T
 - IEEE 802.3i 10BASE-T
 - IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX
 - IEEE 802.3ab 1000BASE-T
 - IEEE 802.1Q VLAN tagging
 - IEEE 802.3x Full-duplex flow control
 - IEEE 802.3ad Link aggregation (LAG with LACP)
 - IEEE 802.1p Class of Service (QoS and DSCP)
 - 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.
- Full-duplex IEEE 802.3x pause frame flow control.
- Active flow control to minimize packet loss and frame drops.
- Half-duplex backpressure control.
- 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 (0–50°C) and humidity-controlled (90 percent maximum relative humidity, noncondensing) environment.

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Any device that is located outdoors and connected to this product must be properly grounded and surge protected.

To the extent permissible by applicable law, failure to follow these guidelines can result in damage to your NETGEAR product, which might not be covered by NETGEAR's warranty.

- Observe and follow service markings:
 - Do not service any product except as explained in your system documentation.
 - 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:
 - The 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.
- 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.
- 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, be sure that the voltage selection switch (if provided) on the power supply 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.
- Use only approved power cables. 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

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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.
- 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.
- 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 and 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 cables or plugs. Consult a licensed electrician or your power company for site modifications.
- Always follow your local and national wiring rules.

This chapter describes the switch hardware features.

The chapter includes the following sections:

- *Front Panel*
- *Back Panel*
- *LEDs*
- *Switch Hardware Interfaces*

Front Panel

The GS750E switch provides forty-eight 10/100/1000M BASE-T RJ-45 ports. The following figure shows the front panel.

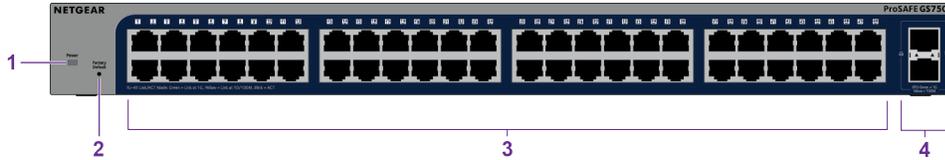


Figure 1. Front panel

Number	Description
1	Power LED (see LEDs on page 10)
2	Recessed Factory Defaults button
3	Forty-eight independent 10/100/1000M BASE-T RJ-45 ports (see LEDs on page 10)
4	Two SFP ports (see LEDs on page 10)

Back Panel

The switch integrates a fixed, internal power supply unit (PSU).

The back panel contains a Kensington lock slot and the AC power connector.

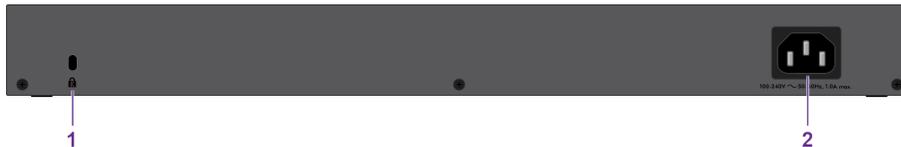


Figure 2. Back panel

Number	Description
1	Kensington lock slot
2	AC power connector

LEDs

This section describes the LEDs on the front panel of the switch.

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Table 1. Front panel LEDs

LED	Description
Power LED	Solid green. The device is powered on. Off. Power is not supplied to the device.
RJ-45 LEDs 1–48. These LEDs indicate the link status, speed, and activity of an associated port.	Off. No link is established. Solid green. A valid 1000 Mbps link is established. Blinking green. The port is transmitting or receiving packets at 1000 Mbps. Solid amber. A valid 10 Mbps or 100 Mbps link is established. Blinking amber. The port is transmitting or receiving packets at 10 Mbps or 100 Mbps.
Link and ACT Mode LEDs for SFP fiber ports	Off. No link is established. Solid green. A valid 1000 Mbps link is established. Blinking green. The port is transmitting or receiving packets at 1000 Mbps. Solid amber. A valid 100 Mbps link is established. Blinking amber. The port is transmitting or receiving packets at 100 Mbps.

Switch Hardware Interfaces

The following sections describe the hardware interfaces on the switch.

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 Category 5e (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.

Factory Defaults Button

The switch provides a **Factory Defaults** button on the front panel so that you can return the switch to its factory default settings, causing all custom settings to be erased.

▶ **To return the switch to its factory default settings:**

1. Insert a device such as a straightened paper clip into the opening.
2. Press the recessed **Factory Defaults** button for more than three seconds.
The switch reboots and returns to its factory default settings.

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: Check the Installation*
- *Step 7: Apply Power and Check the LEDs*
- *Step 8: 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 2. Site requirements

Characteristics	Requirements
Mounting	<p>Desktop installations. Provide a flat table or shelf surface.</p> <p>Rack-mount installations. 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>Temperature. Install the switch in a dry area with an ambient temperature between 32°F and 122°F (0°C and 50°C). Keep the switch away from heat sources such as direct sunlight, warm-air exhausts, hot-air vents, and heaters.</p> <p>Operating humidity. The maximum relative humidity of the installation location must not exceed 90 percent, noncondensing.</p> <p>Ventilation. 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>Operating conditions. 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 system. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components, such as the microprocessor. 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):

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- 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

The following figure shows the package contents.



Figure 3. Switch package contents

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:
 - Switch of the correct model
 - Power cord
 - Rubber protection caps
 - Rack-mounting kit

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- Rubber footpads for tabletop installation
 - 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.

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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.

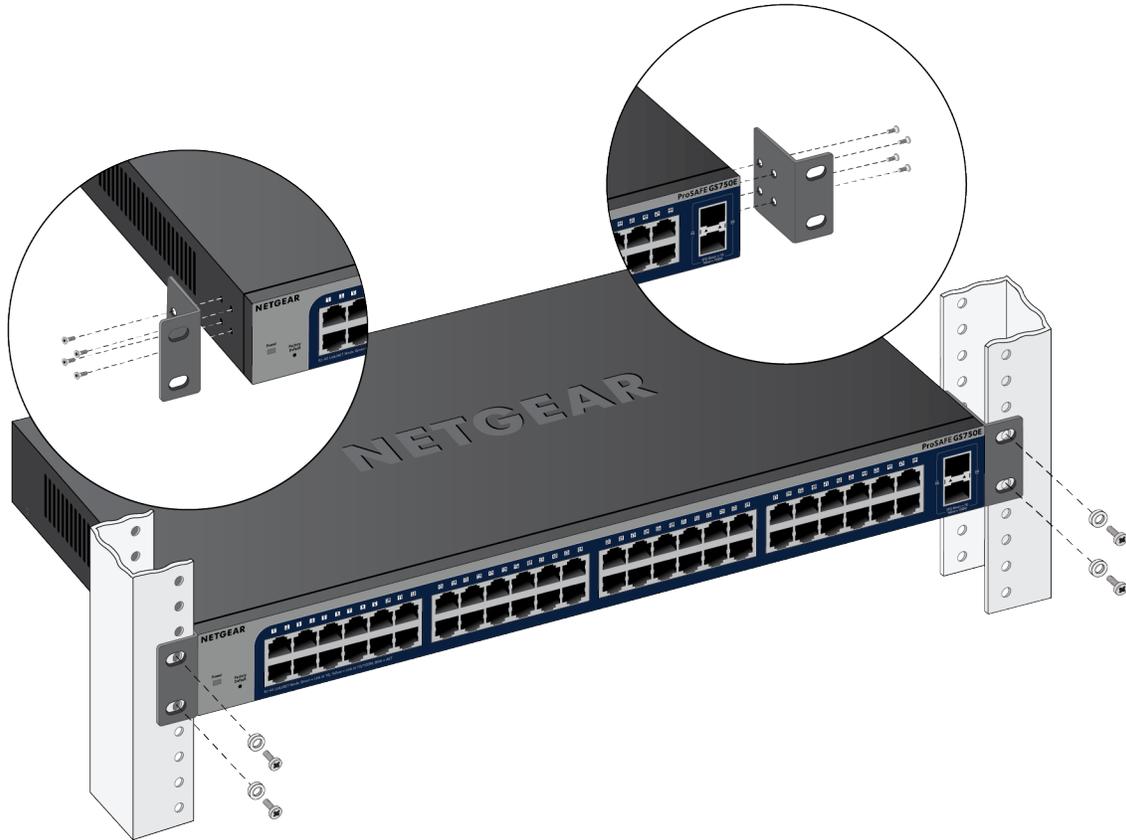


Figure 4. Switch package contents

Install the Switch on a Flat Surface

The switch ships 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.

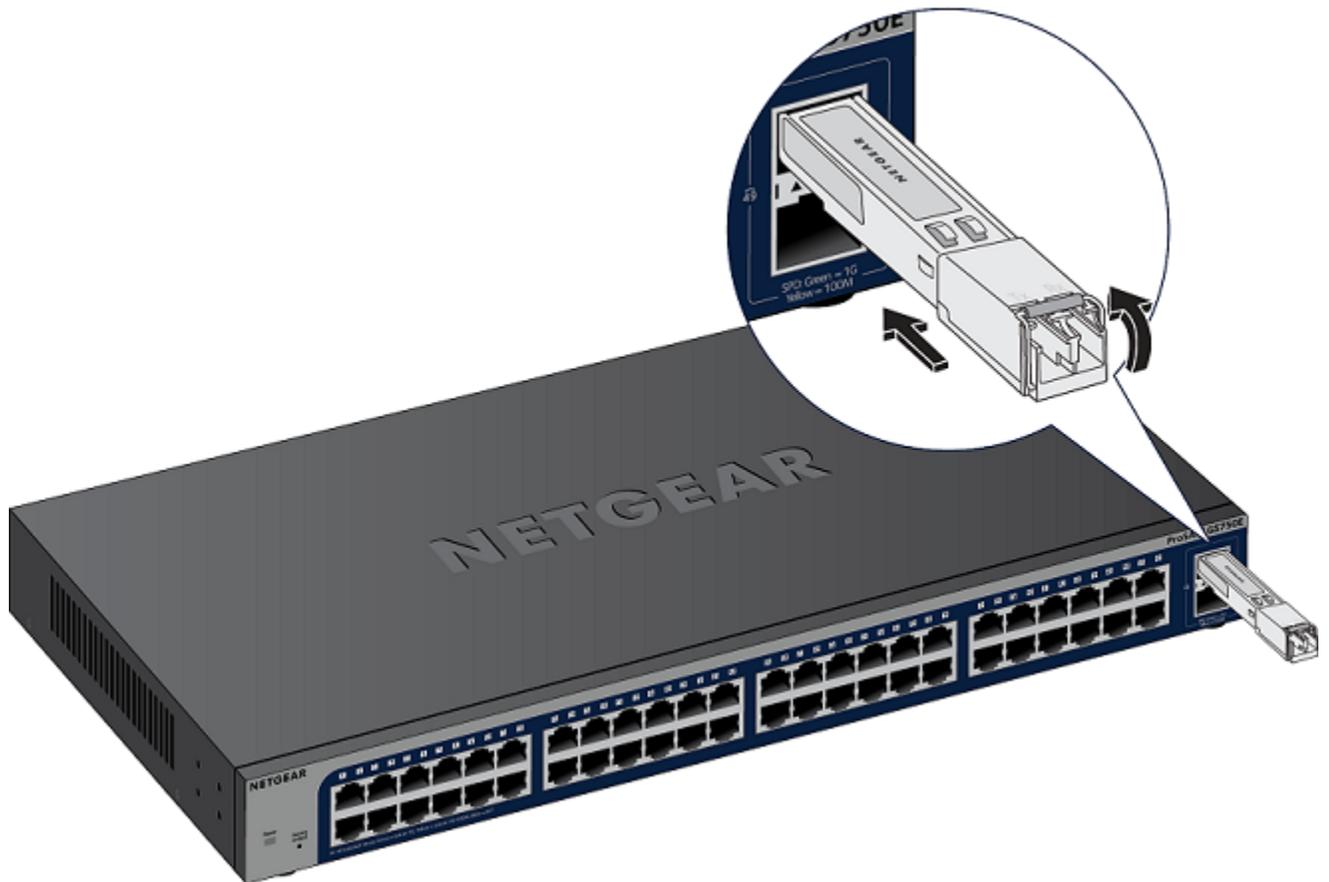
Optional Step 5: Install SFP Transceiver Modules

The following optional procedure describes how to install an optional SFP transceiver module into one of the SFP ports of the switch.

Note Contact your NETGEAR reseller 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.
2. Press firmly on the flange of the module to seat it securely into the connector.



Step 6: Check the Installation

Before you apply power to the switch, perform the steps that are described in this section.

► **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 7: Apply Power and Check the LEDs

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

Before connecting the power cord, select an AC outlet that is not controlled by a wall switch, which can turn off power to the switch.

▶ **To apply power:**

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

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

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

Step 8: 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 smart managed switch using the web management 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, see the installation guide and the user manual, which you can download from downloadcenter.netgear.com.

Note The switch's default IP address is 192.168.0.239 and its default subnet mask is 255.255.255.0.

Desktop Switching

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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 or with 10 Mbps, 100 Mbps, and 1 Gbps hubs, routers, and switches.

You can use the switch as a desktop switch to build a small network that provides up to 1 Gbps access to a file server.

With 1G 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.

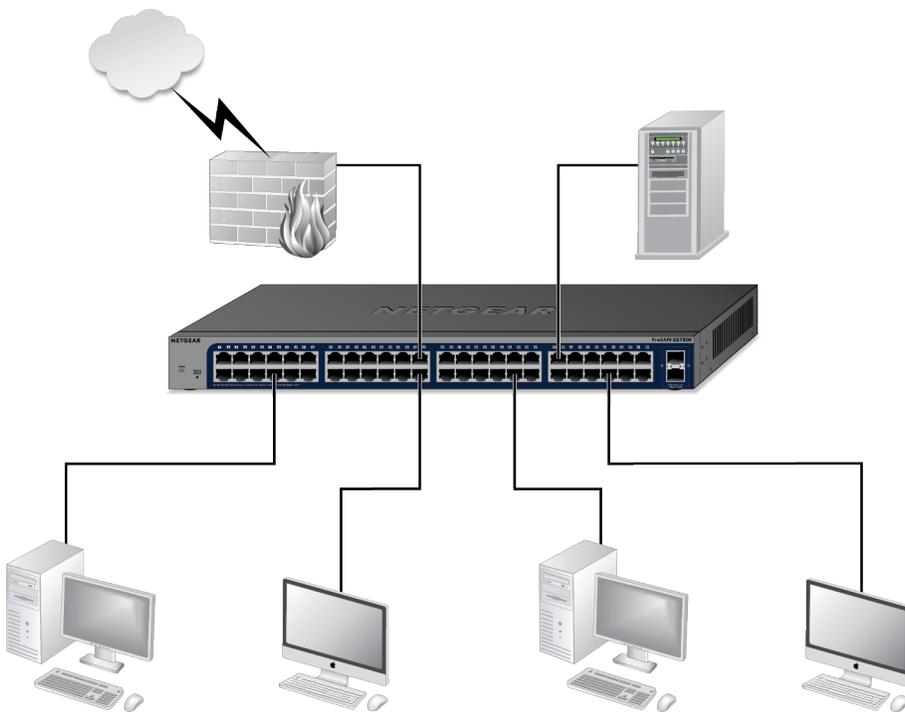


Figure 5. Desktop switching

This chapter provides information about troubleshooting the switch. The chapter includes the following sections:

- *Troubleshooting Chart*
- *Additional Troubleshooting Suggestions*

Troubleshooting Chart

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

Table 3. Troubleshooting chart

Symptom	Possible Cause	Possible Solution
Power LED is off.	Power is not supplied to the switch.	Check the power cable connections at the switch and the power source. Make sure that all cables are used correctly and comply with the Ethernet specifications.
A combined speed and activity LED is off when the port is connected to a device.	Port connection is not working.	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. Make sure that all cables are used correctly and comply with the Ethernet specifications. Check for a defective port, cable, or module by testing them in an alternate environment where all products are functioning.
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 web management interface, you can configure loop prevention 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.	Verify that the cabling is correct. Make sure that all connectors are securely positioned in the required ports. It is possible that equipment was accidentally disconnected.
A combined speed and activity LED is blinking continuously on all connected ports 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 web management interface, you can configure loop prevention to prevent network loops.

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.

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- **Switch integrity.** If necessary, verify the integrity of the switch by resetting it. To reset the switch, disconnect the AC power from the switch and then reconnect the AC power. If the problem continues, contact NETGEAR technical support. For more information, visit the support website at support.netgear.com.
- **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.