NETGEAR®

GS728TXS/GS752TXS
Smart Switch

Hardware Installation Guide

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Introduction

1

Congratulations on the purchase of your NETGEAR® ProSafe™ GS728TXS/GS752TXS Smart Switch! Your GS728TX/GS752TXS Smart Switch is a state-of-the-art, high-performance, IEEE-compliant network solution designed for users who require many ports and want the power of Gigabit connectivity to eliminate bottlenecks, boost performance, and increase productivity. There are either 24 (GS728TXS) or 48 (GS752TXS) twisted-pair ports on the front panel of the switch that support nonstop 10/100/1000 networks. The front panel also has 4 SFP+ ports that support 1000M and 10G optical modules or up to two stacking modules. To simplify installation, the switch is shipped ready for use out of the box.

This installation guide describes how to install and power on the smart switch. The information in this manual is intended for readers with intermediate computer and Internet skills.

This chapter serves as an introduction to the smart switch and includes the following sections:

- *Overview*
- *Features*
- *Package Contents*

Overview

The NETGEAR GS728TXS/GS752TXS Smart Switch provides either 24 (GS728TXS) or 48 (GS752TXS) twisted-pair ports that support nonstop 10/100/1000M networks. The switch also has four built-in enhanced small form factor pluggable (SFP+) GBIC slots that support 1000M and 10G optical modules or up to two stacking modules.

Using these Gigabit slots, you can create high-speed connections to a server or network backbone. For example, you can:

- Connect switches to each other with high-speed links
- Link to high-speed servers
- Provide 10/100/1000M copper and 1000M/10G fiber connectivity
- Connect up to six switches in a stack to create a high-port-capacity solution with a single point of administration

The smart switch also provides the benefit of administrative management with a complete package of features for the observation, configuration, and control of the network. You can use the simple and intuitive web-based graphical user interface (GUI) to view and use the switch's many capabilities. The switch's management features include configuration for port and switch information, VLAN for traffic control, port trunking for increased bandwidth, and Class of Service (CoS) for prioritizing traffic. These features provide better understanding and control of the network. Initial discovery of the switch on the network requires the Smart Control Center program, a utility that runs on a Windows computer.

The smart switch can be freestanding, stacked with other switches, or rack-mounted in a wiring closet or equipment room. It is IEEE-compliant and offers low latency for high-speed networking. All ports can automatically negotiate to the highest speed which makes the switch ideal for environments that have a mix of Ethernet, Fast Ethernet, Gigabit Ethernet, or 10-Gigabit Ethernet devices. All RJ-45 ports operate in half-duplex or full-duplex mode. The maximum segment length is 328 feet (100 meters) over Category 5 unshielded twisted-pair (UTP) cable.

Features

The following lists the key features of the smart switch:

- 24 (GS728TXS) or 48 (GS752TXS) 10/100/1000-Mbps autosensing Gigabit Ethernet switching ports.
- 4 dedicated 1000M/10G SFP+ fiber ports.
- Full NETGEAR Smart Switch functionality.
- Full compatibility with IEEE standards:
  - IEEE 802.3i (10BASE-T)
  - IEEE 802.3u (100BASE-TX)
  - IEEE 802.3ab (1000BASE-T)

- IEEE 802.3z (1000BASE-x)
- IEEE 802.3 Clause 49 (10GBASE-LR and 10GBASE-SR)
- IEEE802.aq (10GBASE-LRM)
- IEEE802.3ae (10GBASE Ethernet)
- IEEE802.3az (Energy Efficient Ethernet)
- IEEE 802.3x (Full-duplex flow control)
- AutoSensing and autonegotiating capabilities for all ports.
- Auto Uplink™ on all ports to make the right connection.
- 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.
- Per port LEDs and power LED.
- Internal open frame power supply.
- Standard NETGEAR 7xx series chassis (1U high).
- NETGEAR Green product series power-saving features:
  - Automatic power consumption adjustment based on the RJ-45 cable length (GS752TXS only)
  - Per port automatic power down when the port link is down.

Stacking

A stack can be controlled and managed from a single unit called the master unit. Any other unit member of the stack is called a stack slave member.

In particular, firmware can be downloaded from the stack master to the other units in the stack.

A unit serving as stack master runs the fully operational software of a switch. In addition, it runs the master part of the distributed switching application that configures and manages all other units in the stack. Generally, the master operates the remote slave's low-level drivers, through the distributed switching application part that is running in the context of the slave.

During stacking setup, the switches autoselect one device as the stacking master. All other devices are named as slave stack members and assigned unique unit IDs. One of the slave units is designated as the backup master. The backup master acts as a slave stack master, but can become a stack master if the stack master fails. In the default configuration, the master and backup master are assigned unit IDs of 1 and 2, respectively. The administrator can use the web interface to configure different ID assignments. The stack master provides a single point of control and management as well as a single interface in which to control and manage the stack.

Switch software is downloaded separately for each stack member. However, all units in the stack must be running the same software version.

A stack unit can operate in one of the following modes:

- A standalone unit runs as a general switch. The standalone unit does not run the stacking application until it is connected to a stack.
- The master unit manages the entire stack, and is responsible for the entire stack configuration. All protocols run in the context of the master unit. It updates and synchronizes the backup master.
- A master-backup unit runs as a slave unit as described earlier, and in addition, it continuously monitors the existence and operation of the stack master. If the master unit fails, the master-backup unit assumes the stack-master role (switchover).
- A slave unit runs only a slave version of the distributed switching algorithm, which allows the applications running on the master unit's CPU to control and manage the resources of the slave unit.

A stack can contain a mix of up to six GS728TXS and GS752TXS switches.

Package Contents

The following figure shows the package contents of the smart switch. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch has the same package contents.)
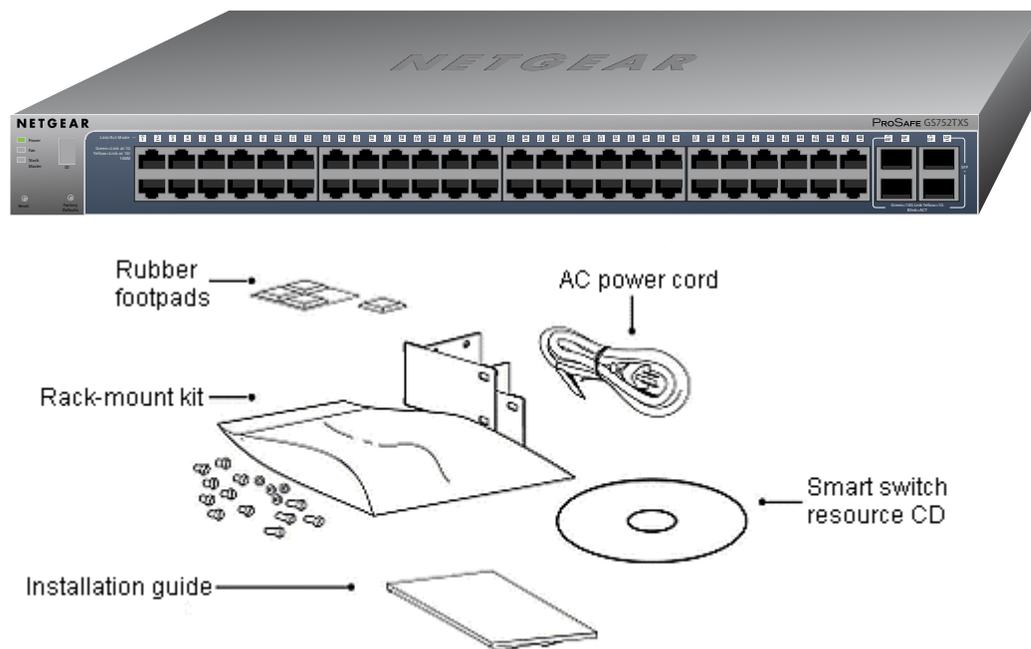
Figure 1. Package contents

Verify that the package contains the following:

- GS728TXS/GS752TXS Smart Switch
- Rubber footpads for tabletop installation
- Rack-mounting kits
- Power cord
- Installation guide
- Smart switch resource CD with NETGEAR Smart Control Center and user's manual

If any item is missing or damaged, contact the place of purchase immediately.

Physical Description

2

This chapter describes the GS728TXS/GS752TXS Smart Switch hardware features. Topics include:

- *GS728TXS Description*
- *GS752TXS Description*

GS728TXS Description

This section describes the smart switch hardware features.

GS728TXS Front Panel and Back Panel Configuration

The GS728TXS has 24 10/100/1000-Mbps copper ports and 4 dedicated
1000 Mbps/10 Gbps SFP+ fiber ports. Up to 2 fiber ports (port 27 and 28) at a time can be used as stacking ports.

Each port is capable of sensing the line speed and negotiating the duplex mode with the link partner automatically.

The following figure illustrates the front panel of the smart switch.
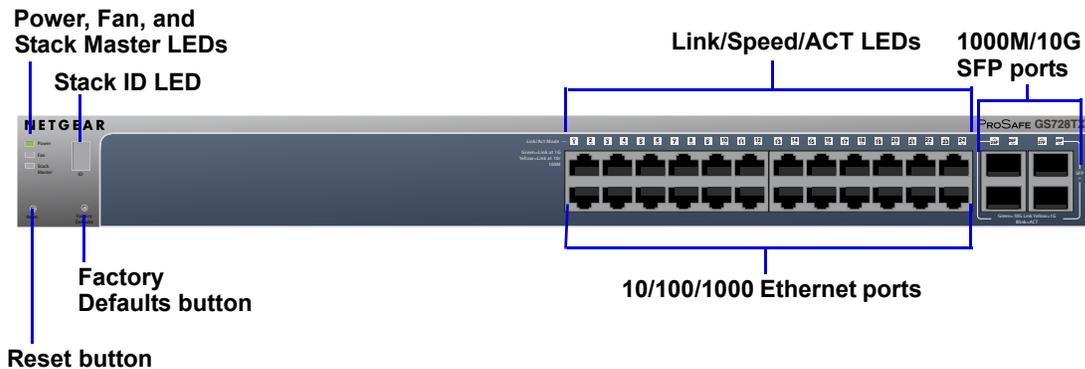
Figure 2. GS728TXS front panel

The front panel contains the following:

- 24 RJ-45 connectors for 10/100/1000-Mbps autosensing Gigabit Ethernet switching ports.
- Four dedicated 1000 Mbps/10Gbps SFP+ Gigabit Ethernet switching ports. Up to two of these ports (ports 27 and 28) can alternatively be used as stacking ports.
- Reset button to restart the device.
- Recessed Factory Defaults button to restore the device back to the factory defaults.
- Link, Speed, and Activity LEDs for each port.
- Power, Fan, Stack Master, and Stack ID LEDs.

The following figure illustrates the smart switch back panel.

Kensington Lock™ slot   **Power connector**

Figure 3. GS728TXS back panel

The back panel contains a power connector.

LED Designations

This section describes the LEDs on the smart switch.

Port LEDs

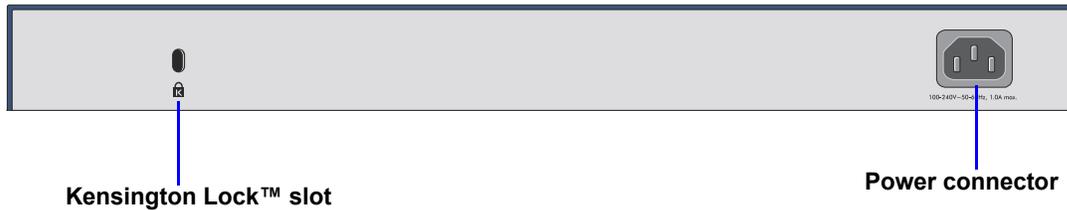The following table describes the RJ-45 and dedicated SFP port LED designations. Each RJ-45 port has one LED. Each SFP port has its own LED.

Table 1. Port LEDs

LED	Designation
Link/Speed/ACT LED mode for copper ports 1 to 24	• **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 yellow**. A valid 10/100-Mbps link is established. • **Blinking yellow**. The port is transmitting or receiving packets at 10/100 Mbps.
Link/ACT LED for SFP+ ports 25 to 28	• **Off**. No SFP+ module link is established. • **Solid green**. A valid 10-Gbps link is established. • **Blinking green**. The port is transmitting or receiving packets at 10 Gbps. • **Solid yellow**. A valid 1000-Mbps link is established. • **Blinking yellow**. The port is transmitting or receiving packets at 1000 Mbps.

System LEDs

The following table describes the system LED designations.

Table 2. System LEDs

LED	Designation
Power	• **Solid green**. The device is powered on; runtime code is operating. • **Solid yellow**. The device is booting up. • **Off**. Power is not supplied to the device.
Fan	• **Solid yellow**. The fan has failed. • **Off**. The fan is operating normally.
Stack Master LED	• **Solid green**. The switch acts as a master unit in a stack of GS7XXTXS series switches. • **Off**. The switch acts as a slave in a stack of GS7XXTXS series switches, or the stack is operating in standalone mode.
Stack ID	Displays the stack ID, from 1 to 6.

Device Hardware Interfaces

This section describes the hardware interfaces on the smart switch.

RJ-45 Ports

RJ-45 ports are AutoSensing ports. When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed (10, 100, or 1000 Mbps) and duplex mode (half-duplex or full-duplex) of the attached device. All ports support only an unshielded twisted-pair (UTP) cable terminated with an 8-pin RJ-45 plug.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink. 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:

• 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.

SFP+ Ports

To enable you to have fiber connections on your network, four SFP+ ports (25 through 28) accommodate standard 1000M and 10G SFP+ transceiver modules, which are sold separately.

The SFP+ ports can alternatively be used to connect the switch to a stack. Up to two ports (ports 27 and 28) can be used at a time as stacking ports.

Reset Button

The smart switch has a Reset button on the front panel to allow you to manually reboot the switch. This action is equivalent to powering the unit off and back on. The last saved configuration is loaded into the switch as it resets. To use the Reset button, insert a device such as a straightened paper clip into the opening to press the recessed button. The front panel LEDs should turn off and light again as the switch performs its power-on self-test (POST).

Factory Defaults Button

The smart switch has a Factory Defaults button on the front panel so that you can remove the current configuration and return the device to its factory settings. When you enable the Factory Defaults button, all settings including the password, VLAN settings, and port configurations are removed. To use the Factory Defaults button, insert a device such as a straightened paper clip into the opening to press the recessed button for over 2 seconds.

Note: Switches that are part of stack will retain the stacking configuration.

GS752TXS Description

This section describes the smart switch hardware features.

GS752TXS Front Panel and Back Panel Configuration

The GS752TXS has 48 10/100/1000-Mbps copper ports and 4 dedicated 1000 Mbps/10 Gbps SFP+ fiber ports. Up to 2 fiber ports (port 51 and 52) at a time can be used as stacking ports.

Each port is capable of sensing the line speed and negotiating the duplex mode with the link partner automatically.

The following figure illustrates the front panel of the NETGEAR GS752TXS Smart Switch.
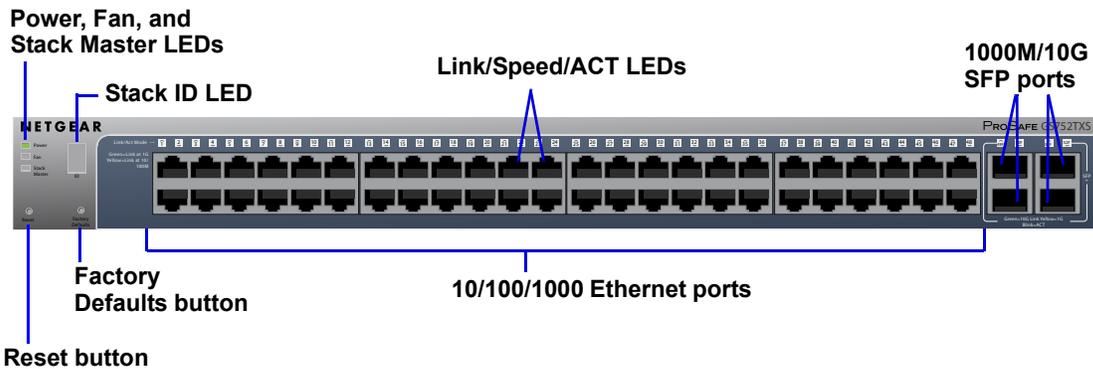
Power, Fan, and Stack Master LEDs

Stack ID LED

Link/Speed/ACT LEDs

1000M/10G SFP ports

Factory Defaults button

10/100/1000 Ethernet ports

Reset button

Figure 4. GS752TXS front panel

The front panel contains the following:

- 48 RJ-45 connectors for 10/100/1000-Mbps autosensing Gigabit Ethernet switching ports.

- Four dedicated 1000 Mbps/10Gbps SFP+ Gigabit Ethernet switching ports. Up to two of these ports (ports 51 and 52) can alternatively be used as stacking ports.

- Reset button to restart the device.

- Recessed Factory Default button to restore the device back to the factory defaults.

- Link, Speed, and ACT LEDs for each port.

- Power, Fan, Stack Master, and Stack ID LEDs.

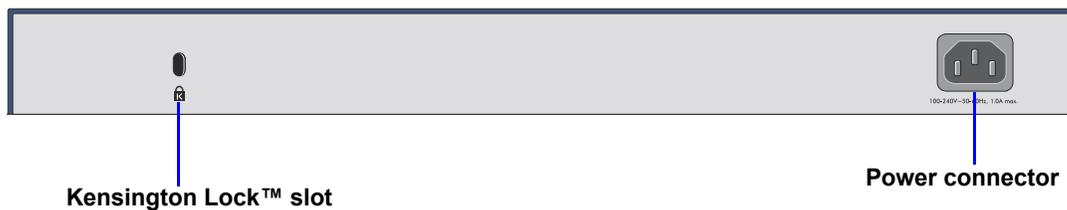The following figure illustrates the smart switch back panel.

Kensington Lock™ slot

Power connector

Figure 5. Back panel

The back panel contains a power connector.

LED Designations

This section describes the LEDs on the smart switch.

Port LEDs

The following table describes the RJ-45 and dedicated SFP port LED designations. Each RJ-45 port has one LED. Each SFP port has its own LED.

Table 3. Port LEDs

LED	Designation
Link/Speed/ACT LED mode for copper ports 1 to 48	• **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 yellow**. A valid 10/100-Mbps link is established. • **Blinking yellow**. The port is transmitting or receiving packets at 10/100 Mbps.
Link/ACT LED for SFP+ ports 49 to 52	• **Off**. No SFP+ module link is established. • **Solid green**. A valid 10-Gbps link is established. • **Blinking green**. The port is transmitting or receiving packets at 10 Gbps. • **Solid yellow**. A valid 1000-Mbps link is established. • **Blinking yellow**. The port is transmitting or receiving packets at 1000 Mbps.

System LEDs

The following table describes the system LED designations.

Table 4. System LEDs

LED	Designation
Power	• **Solid green**. The device is powered on; runtime code is operating. • **Solid yellow**. The device is booting up. • **Off**. Power is not supplied to the device.
Fan	• **Solid yellow**. The fan has failed. • **Off**. The fan is operating normally.
Stack Master LED	• **Solid green**. The switch acts as a master unit in a stack of GS7XXTXS series switches. • **Off**. The switch acts as a slave in a stack of GS7XXTXS series switches, or the stack is operating in standalone mode.
Stack ID	Displays the stack ID, from 1 to 6.

Device Hardware Interfaces

This section describes the hardware interfaces on the smart switch.

RJ-45 Ports

RJ-45 ports are AutoSensing ports. When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed (10, 100, or 1000 Mbps) and duplex mode (half-duplex or full-duplex) of the attached device. All ports support only an unshielded twisted-pair (UTP) cable terminated with an 8-pin RJ-45 plug.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink. 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:

- 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.

SFP+ Ports

To enable you to have fiber connections on your network, four SFP+ ports (49 through 52) accommodate standard 1000M and 10G SFP+ transceiver modules, which are sold separately.

The SFP+ ports can alternatively be used to connect the switch to a stack. Up to two ports (ports 51 and 52) can be used at a time as stacking ports.

Reset Button

The smart switch has a Reset button on the front panel to allow you to manually reboot the switch. This action is equivalent to powering the unit off and back on. The last saved configuration is loaded into the switch as it resets. To use the Reset button, insert a device such as a straightened paper clip into the opening to press the recessed button. The front panel LEDs turn off and light again as the switch performs its power-on self-test (POST).

Factory Defaults Button

The smart switch has a Factory Defaults button on the front panel so that you can remove the current configuration and return the device to its factory settings. When you press the Factory Defaults button, all settings including the password, VLAN settings, and port configurations are removed. To use the Factory Defaults button, insert a device such as a straightened paper clip into the opening to press the recessed button for over 2 seconds.

> **Note:** Switches that are part of stack will retain the stacking configuration.

Applications

3

Your GS728TXS/GS752TXS Smart Switch is designed to provide flexibility in configuring your network connections. It can be used as your only network traffic-distribution device or with 10 Mbps, 100 Mbps, 1000 Mbps, and 10-Gbps hubs and switches. Topics include:

- *Desktop Switching*
- *Backbone Switching*

Desktop Switching

The smart switch can be used as a desktop switch to build a small network that enables users to have 1000-Mbps access to a file server. With full duplex enabled, the switch port connected to the server or computer can provide 2000 Mbps throughput. If a 10-Gbps module is used to connect the switch to the file server in full-duplex operation, then the server can provide up to 20 Gbps throughput. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch can also be used for desktop switching.)

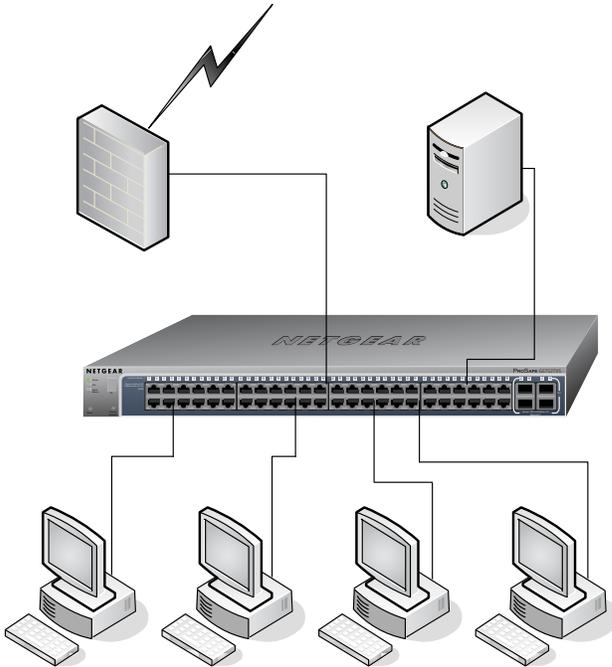
Figure 6. Desktop switching

Backbone Switching

You can use the smart switch as a backbone switch in a small network that gives users high-speed access to servers and other network devices. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch can also be used for backbone switching.)

GS728TXS/GS752TXS

Model FS728TP

Model GS108T
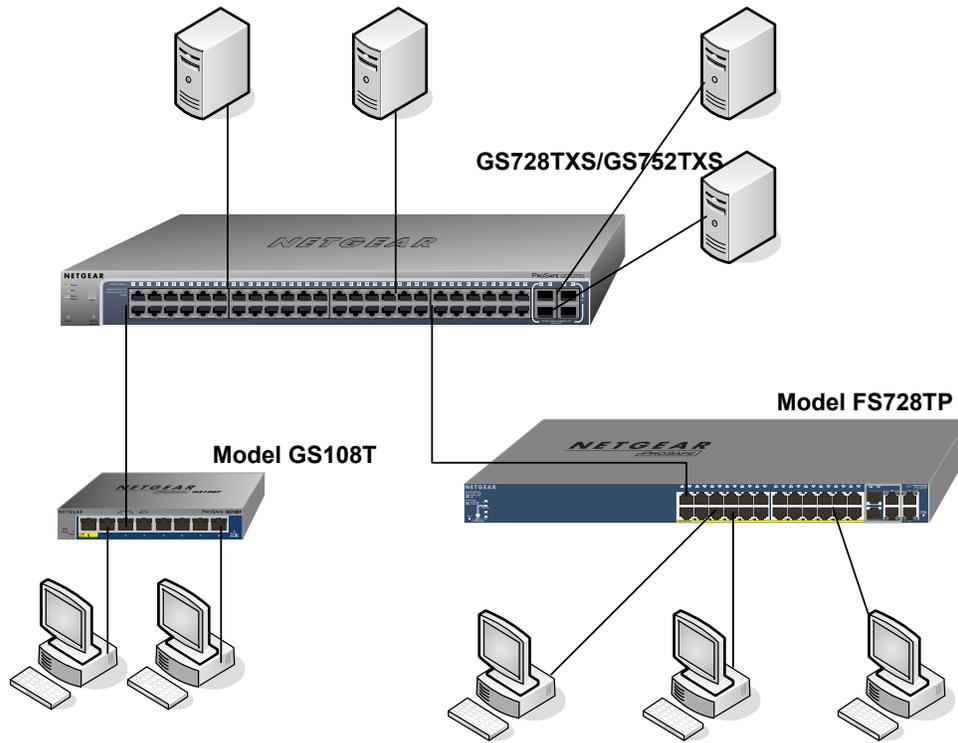
Figure 7. Backbone switching

Installation

4

This chapter describes the installation procedures for your GS728TXS/GS752TXS Smart Switch. Switch installation involves the steps described in the following sections:

Step 1: Prepare the Site

Step 2: Install the Switch

Step 3: Check the Installation

Step 4: Connect Devices to the Switch

Step 5: Install an SFP Transceiver Module

Step 6: Install Device as Standalone or Stack Master

Step 7: Apply AC Power

Step 8: Manage the Switch Using a Web Browser or the Smart Control Center Utility

Step 1: Prepare the Site

Before you install the switch, ensure that the operating environment meets the site requirements in the following table.

Table 5. Site requirements

Characteristics	Requirements
Mounting	• Desktop installations. Provide a flat table or shelf surface. • Rack-mount installations. Use a 19 inch (48.3 centimeter) EIA standard equipment rack that is grounded and physically secure. The rack-mount kit supplied with the switch is also required.
Access	Locate the switch in a position that allows you to access the front panel RJ-45 ports, view the front panel LEDs, and access the power connector.
Power source	Provide a power connection cord. Power specifications for the switch are shown in *Appendix B, Technical Specifications*. Ensure that the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Environmental	• Temperature. Install the switch in a dry area, with ambient temperature between 0ºC and 50ºC (32ºF and 122ºF). Keep the switch away from heat sources such as direct sunlight, warm air exhausts, hot-air vents, and heaters. • Operating humidity. The installation location should have a maximum relative humidity of 90%, non-condensing. • 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. Be sure that there is adequate airflow in the room or wiring closet where the switch is installed. • Operating conditions. Keep the switch at least 6 feet (1.83 meters) away from nearest source of electromagnetic noise, such as a photocopy machine.

Step 2: Install the Switch

The smart switch can be used on a flat surface or mounted in a standard network equipment rack.

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.

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 rack-mount kit through each bracket and into the bracket mounting holes in the switch.
3. Tighten the screws with a No. 1 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.

Note: The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch is installed in the same manner.

Step 3: Check the Installation

Before applying power to the switch, perform the steps 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. Ensure that all equipment is mounted properly and securely.

Step 4: Connect Devices to the Switch

The following procedure describes how to connect computers to the switch's RJ-45 ports. The smart switch contains Auto Uplink technology, which allows the attaching of devices using either straight-through or crossover cables. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch is connected in the same manner.)
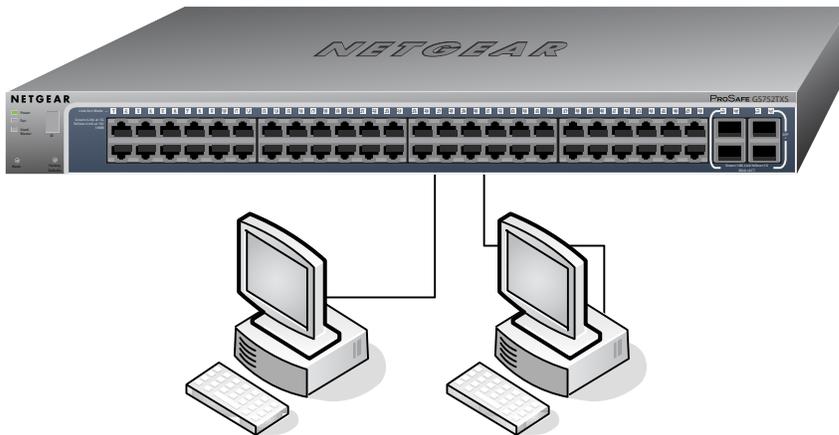
Figure 8. Connecting devices to the switch

Note: Ethernet specifications limit the cable length between the switch and the attached device to 100 meters (328 feet).

➢ **To connect devices to the switch:**

Using a Category 5 (Cat 5) unshielded twisted-pair (UTP) cable terminated with an RJ-45 connector, connect each computer to an RJ-45 network port on the switch front panel.

See the previous figure.

Step 5: Install an SFP Transceiver Module

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

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

➢ **To install an SFP transceiver:**

1. Insert the transceiver into the SFP port.
2. Press firmly on the flange of the module to seat it securely into the connector.

   You can install up to three additional Gigabit or 10-Gigabit Ethernet modules using this procedure. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch is connected in the same manner.)
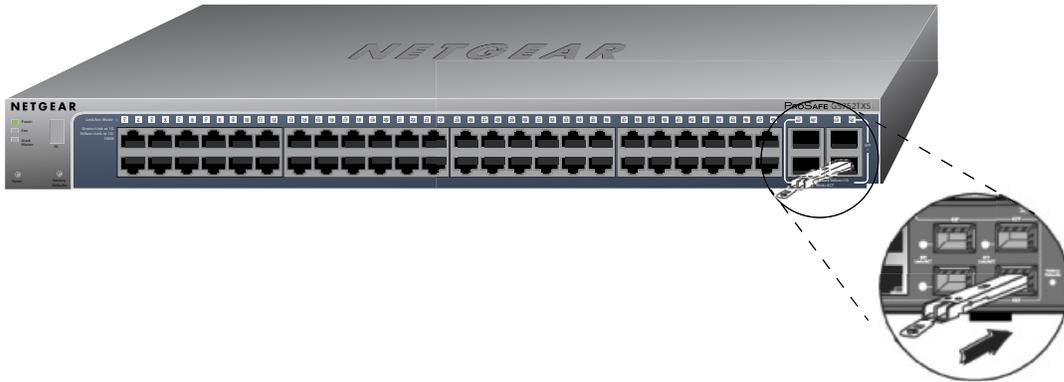
Figure 9. Installing an SFP transceiver module

Step 6: Install Device as Standalone or Stack Master

A master-backup unit runs as a slave unit. (For more information, see *Stacking* on page 7.) In addition, it continuously monitors the existence and operation of the stack master. If the master unit fails, the master-backup unit assumes the stack-master role (switchover). In the default configuration, the master and backup switches are assigned unit ID 1 and 2, respectively; however, the administrator can use the web interface to assign different unit IDs. The goal for switchover time is under 30 seconds.

If a stacking cable fails or a stack unit is extracted in a chain topology, slave units could be disconnected from the stack (which puts them in an ambiguous state), and they will set all their ports to the down state.

Each unit can work in one of two modes: standalone, or stack mode. The operational mode is determined at software boot time, and can be changed only by a unit reset. The 7-segment Stack ID LED remains lit in both modes.

The device supports two stacking topologies: ring topology or chain topology. (The figure shows the GS752TXS Smart Switch; however, the GS728TXS Smart Switch is connected in the same manner.)
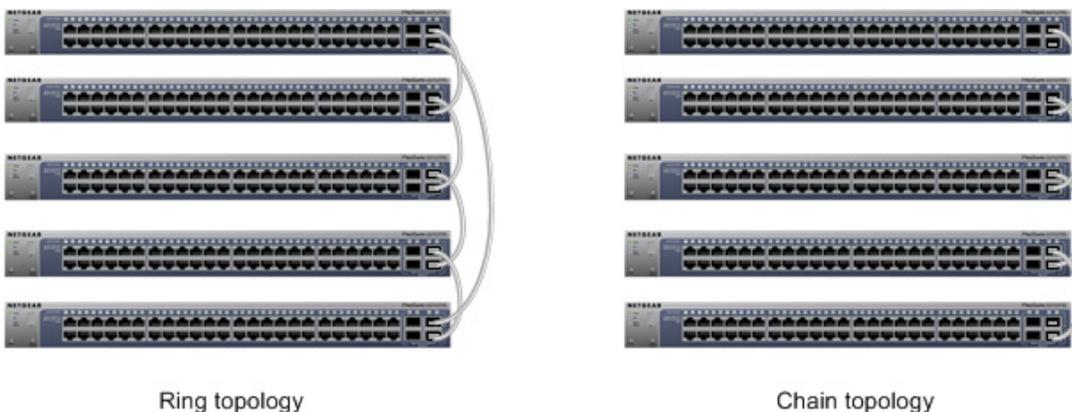
Ring topology   Chain topology

Figure 10. Stacking topologies

The device is Plug and Play in terms of stacking configuration. Before powering up the device, connect the devices into the required stacking topology. Then power up the devices. By default, the switch is configured to allow the master and slave designations to be determined through automatic discovery. You can use the web interface to configure the stack to select a particular switch as master after the device has been booted and is operational (use the Stacking screen, which you access from the System menu).

For more information about stacking, see the software administration manual. A link to this document is on your resource CD.

Step 7: Apply AC Power

The smart switch does not have an on/off switch. Power is controlled by the power cord connection.

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 AC power:**

1. Connect the end of the power connection cable to the power receptacle on the back of the switch.
2. Connect the AC power connection cable into a power source such as a wall socket or power strip.

When you apply power, the Power LED on the switch's front panel lights.

If the Power LED does not light, check that the power cable is plugged in correctly and that the power source is good. If this does not resolve the problem, see *Appendix A, Troubleshooting*.

Step 8: Manage the Switch Using a Web Browser or the Smart Control Center Utility

The smart switch contains software for viewing, changing, and monitoring the way it works. 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 up the switch for the first time, you can configure the smart switch using a web browser or a program called Smart Control Center. For more information about managing the switch, see the software administration manual on the smart switch resource CD.

Note: The switch is configured with a default IP address of 192.168.0.239 and a subnet mask of 255.255.255.0.

Troubleshooting

A

This appendix provides information about troubleshooting the NETGEAR smart switch. Topics include the following:

- *Troubleshooting Chart*
- *Additional Troubleshooting Suggestions*

Troubleshooting Chart

The following table lists symptoms, causes, and solutions of possible problems.

Table 6. Troubleshooting chart

Symptom	Cause	Solution
Power LED is off.	No power is received.	Check the power cord connections and the connected device. Ensure that all cables used are correct and comply with Ethernet specifications.
Link LED is off or blinking.	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. Ensure that all cables used are correct and comply with Ethernet specifications. Check for a defective computer adapter card, cable, or port by testing them in an alternate environment where all products are functioning.
File transfer is slow, or performance degradation is a problem.	Half-duplex or full-duplex setting on the switch and the connected device are not the same.	Make sure that the attached device is set to autonegotiate.
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. Ensure that all connectors are securely positioned in the required ports. Equipment might have been accidentally disconnected.
ACT LED is blinking continuously on all connected ports and the network is disabled.	A network loop (redundant path) has been created.	Break the loop by ensuring that there is only one path from any networked device to any other networked device. After you connect to the switch management interface, you can configure the Spanning Tree Protocol (STP) to prevent network loops.
A unit is linked to a stack, but does not join the stack.	The stacking ports of the new unit are configured differently from the stack, or the unit is configured as a standalone unit.	Remove the unit from the stack. Use the web management interface to configure the unit as a stackable unit, with combo links used as the stacking ports. See the *GG728TXS/GS752TXS Smart Switch Software Administration Manual* for information about using the web interface.

Additional Troubleshooting Suggestions

If the suggestions in the troubleshooting chart do not resolve the problem, see the troubleshooting suggestions in this section.

Network Adapter Cards

Ensure that the network adapter cards installed in the computers are in working condition and the software driver has been 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. Ensure 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 the switch. To reset the switch, remove the AC power from the switch and then reapply AC power. If the problem continues, contact NETGEAR technical support. In North America, call 1-888-NETGEAR. If you are outside of North America, refer to the support information card included with your product.

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.

Technical Specifications

B

This appendix lists the specifications for the NETGEAR smart switch. Topics include the following:

- *Network Protocol and Standards Compatibility*
- *Management*
- *Interface*
- *LEDs*
- *Performance Specifications*
- *Power Supply*
- *Physical Specifications*
- *Environmental Specifications*
- *Electromagnetic Emissions*
- *Safety*

Network Protocol and Standards Compatibility

- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-TX
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3z 1000BASE-X
- IEEE 802.3 Clause 49 (10GBASE-LR and 10GBASE-SR)
- IEEE802.3aq (10GBASE-LRM)
- IEEE802.3ae (10GBASE Ethernet)
- IEEE 802.3x full-duplex flow control
- IEEE802.3az (Energy Efficient Ethernet)

Management

- Windows 2000 + XP, Vista; Windows 7, Microsoft Explorer 8.0 or later; Firefox 3.0 or later
- IEEE 802.1Q VLAN
- IEEE 802.3ad link aggregation
- IEEE 802.1D Spanning Tree Protocol
- IEEE 802.1w Rapid Spanning Tree Protocol
- IEEE 802.3s MSTP
- IEEE 802.1X port security
- IEEE 802.1AB LLDP, LLDP-MED
- SNMP v1, v2c, and v3
- TFTP, HTTP, and HTTPS
- Port mirroring (RX, TX, and both)
- IGMP snooping v1/v2/v3
- IEEE 802.1p Class of Service (CoS)
- SNTP (Simple Network Time Protocol) 3 servers; disabled by default.
- Jumbo frame support (9K)
- IPv6 management, multicast, and QoS
- Static routing
- MLD snooping
- DHCP snooping
- Protocol and MAC-based VLAN
- DoS and Auto DoS prevention
- ACLs (MAC, IPv4, IPv6, and TCP/UDP based)

Interface

This section lists the interfaces specifications for the GS728TXS Smart Switch and the GS752TXS Smart Switch.

GS728TXS Smart Switch

- 24 RJ-45 connectors for 10BASE-T, 100BASE-TX, and 1000BASE-T (Auto Uplink on all ports).
- Four 10 Gbps SFP+ slots (ports 25–29) to support 10-Gbps optical module and 1G optical module. Ports 28 and 29 can be used as stacking ports or as uplink ports.

GS752TXS Smart Switch

- 48 RJ-45 connectors for 10BASE-T, 100BASE-TX, and 1000BASE-T (Auto Uplink on all ports).
- Four 10 Gbps SFP+ slots (ports 49–52) to support 10-Gbps optical module and 1G optical module. Ports 51 and 52 can be used as stacking ports or as uplink ports.

LEDs

- Per RJ-45 port: Speed/Link/ACT
- Per SFP+ port: Speed/Link/ACT
- Per device: Power, Fan, Stack Master, Stack ID

Performance Specifications

- Forwarding modes: Store-and-forward
- Stacking up to 6 switches, which is 156 ports (GS728TXS Smart Switch) or 300 ports (GS752TXS Smart Switch) per stack
- Address database size: 16K Media Access Control (MAC) addresses per system
- Mean time between failure (MTBF):
  - GS728TXS Smart Switch: 677,816 hours (77.4 years) at 25°C
  - GS752TXS Smart Switch: 256,119 hours (29.3 years) at 25°C

Power Supply

100 VAC–240 VAC/50 Hz–60 Hz, 1.4A maximum, universal input

Physical Specifications

- Dimensions (H x W x D): 43 mm x 440 mm x 257 mm (1.7 in. x 17.3 in. x10.1 in.)
- Weight:
    - GS728TXS Smart Switch: 3.55 kg (7.83 lbs)
    - GS752TXS Smart Switch: 4.50 kg (9.92 lbs)

Environmental Specifications

- Operating temperature: 0°C to 50°C (32°F to 104°F)
- Operating humidity: 10% to 90% maximum relative humidity, noncondensing
- Storage temperature: –20°C to 70°C (–4°F to 158°F)
- Storage humidity: 5% to 95% maximum relative humidity, noncondensing

Electromagnetic Emissions

- CE Class A, including EN 55022 (CISPR 22), EN 55024, and EN 50082-1
- FCC Part 15 Class A
- VCCI Class A
- C-Tick

Safety

- UL/cUL
- CE EN 60950-1
- CB
- CCC

Notification of Compliance

C

NETGEAR Wired Products

Regulatory Compliance Information

This section includes user requirements for operating this product in accordance with National laws for usage of radio spectrum and operation of radio devices. Failure of the end-user to comply with the applicable requirements may result in unlawful operation and adverse action against the end-user by the applicable National regulatory authority.

This product's firmware limits operation to only the channels allowed in a particular Region or Country. Therefore, all options described in this user's guide may not be available in your version of the product.

Europe – EU Declaration of Conformity

Products bearing the C€ marking comply with the following EU directives:

- EMC Directive 2004/108/EC
- Low Voltage Directive 2006/95/EC

If this product has telecommunications functionality, it also complies with the requirements of the following EU Directive:

- R&TTE Directive 1999/5/EC

Compliance with these directives implies conformity to harmonized European standards that are noted in the EU Declaration of Conformity.

FCC Requirements for Operation in the United States

FCC Information to User

This product does not contain any user serviceable components and is to be used with approved antennas only. Any product changes or modifications will invalidate all applicable regulatory certifications and approvals

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Guidelines for Human Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Declaration Of Conformity

We, NETGEAR, Inc., 350 East Plumeria Drive, San Jose, CA 95134, declare under our sole responsibility that the GS728TXS/GS752TXS Smart Switch complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions:

*   This device may not cause harmful interference, and
*   This device must accept any interference received, including interference that may cause undesired operation.

FCC Radio Frequency Interference Warnings & Instructions

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following methods:

*   Reorient or relocate the receiving antenna.
*   Increase the separation between the equipment and the receiver.
*   Connect the equipment into an electrical outlet on a circuit different from that which the radio receiver is connected.
*   Consult the dealer or an experienced radio/TV technician for help.

Modifications made to the product, unless expressly approved by NETGEAR, Inc., could void the user's right to operate the equipment.