



# GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch

## Hardware Installation Guide

350 East Plumeria Drive  
San Jose, CA 95134  
USA

January 2012  
202-10994-01  
v1.0

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## Revision History

Publication Part Number	Version	Publish Date	Comments
202-10994-01	v1.0	January 2012	First publication

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# Introduction

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# 1

Congratulations on the purchase of your NETGEAR® ProSafe™ GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch! Your Smart Switch is a state-of-the-art, high-performance, IEEE-compliant network solution designed for users who require a large number of ports and want the power of Gigabit connectivity to eliminate bottlenecks, boost performance, and increase productivity. There are either 24 (GS728TS and GS728TPS) or 48 (GS752TS and GS752TPS) twisted-pair ports on the front panel of the switch which support nonstop 10/100/1000 networks. The front panel also has six SFP ports, 2 of which are combo ports, 2 are dedicated 1000M ports, and the last 2 ports can be used for 1000M uplink or 2.5 Gbps stacking.

The *GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch Hardware 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 provides the following information:

- [Overview](#)
- [Features](#)
- [Package Contents](#)

## Overview

The NETGEAR GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch provides either 24 (GS728TS and GS728TPS) or 48 (GS752TS and GS752TPS) twisted-pair ports that support nonstop 10/100/1000M networks. The switch also has six built-in Small Form Factor Pluggable (SFP) GBIC slots, 2 of which are combo ports, 2 of which are dedicated 1000M ports, and the last 2 ports can be used for 1000M uplink or 2.5 Gbps stacking.

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 100M/1000M fiber connectivity
- Connect up to six switches in a stack to create a high-port-capacity solution with a single point of administration

The NETGEAR GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch also provides the benefit of administrative management with a complete package of features for the observation, configuration, and control of the network. With a Web-based Graphical User Interface (GUI), the switch's many capabilities can be viewed and used in a simple and intuitive manner. 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 traffic prioritization. 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 PC.

The NETGEAR GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch can be free standing, 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. This capability makes the switch ideal for environments that have a mix of Ethernet, Fast Ethernet, or Gigabit Ethernet devices. In addition, 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 list identifies the key features of the Smart Switch:

- Interfaces:
  - GS728TS/GS752TS
    - 24/48 x 10/100/1000 Mbps copper ports.
    - 2 x Combo ports to support 10/100/1000 Mbps copper ports or 1G/100M optical module.
    - 2 x SFP (slot) to support 1G optical module.

- 2 x SFP (slot) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- GS728TPS/GS752TPS
  - 24/48 PoE-capable 10/100/1000 Mbps copper ports (8 PoE+ capable)
  - 2 x Combo ports to support 10/100/1000 Mbps copper ports or 1G/100M optical module.
  - 2 x SFP (slot) to support 1G optical module.
  - 2 x SFP (slot) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- Stacking ports
  - GS728TS/GS728TPS: Port 27 and port 28 can be used as the stacking ports or as uplink ports.
  - GS752TS/GS752TPS: Port 51 and port 52 can be used as the stacking ports or as uplink ports.
- Six 100/1000Mbps SFP slots and two 2.5Gbps ports for stacking.
- Full NETGEAR Smart Switch functionality.
- Stack will support up to a maximum of 6 switches.
- Mix and match stacking supported on the GS7xxTS/GS7xxTPS family (GS728TS, GS752TS, GS728TPS and GS752TPS).
- 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)
  - IEEE802.3az (Energy Efficient Ethernet)
  - IEEE 802.3x (Full-duplex flow control)
  - IEEE802.3af (DTE Power via MDI)
  - IEEE802.3at (DTE Power via MDI Enhancements)
- PoE
  - GS728TPS: Port 1-8 support both IEEE802.3 at and af, and port 9-24 support IEEE802.3af.
  - GS752TPS: Port 1-8 support both IEEE802.3 at and af, and port 9-48 support IEEE802.3af.
- Autosensing and auto-negotiating 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.
- GS7xxTS Model LEDs: Port LED, Power and Status LED, FAN status LED and Master LED.



- GS7xxTPS model LEDs: Power and Status LED, FAN status LED, Master LED, LED mode LED and Max PoE LED.
- Stack ID LED to display stack member ID (1-6).
- 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.
- NETGEAR Green product series power-saving features:
  - Automatic power consumption adjustment based on the RJ-45 cable length.
  - Per port automatic power down when the port link is down.
  - IEEE802.3az, EEE (Energy Efficient Ethernet) compliance.

## Stacking

A stack can be controlled and managed from a single unit called the master unit. Any other unit member of the stack is named 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 the Stacking setup, the switches will auto-select one as the Stacking Master. All other devices are named as slave stack members, and assigned a unique Unit ID. 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 in the event of failure of the stack master. 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.

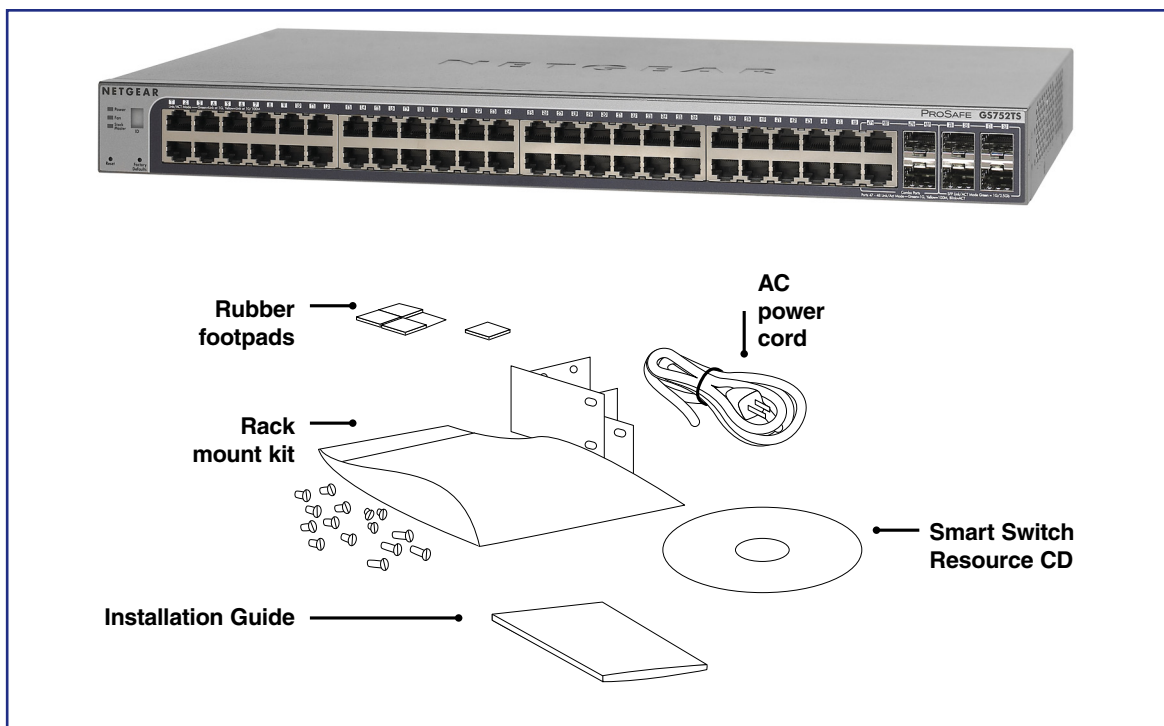
A stack unit can operate in one of the following Modes:

- 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 above, and in addition, it continuously monitors the existence and operation of the stack master. If the master unit fails, the master-backup unit will assume the stack-master role. (“Switchover”).
- A slave unit only runs 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.

## Package Contents

**Figure 1** shows the package contents of the GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch (the GS752TS is shown in this example).



**Figure 1. Package Contents (GS752TS Shown)**

Verify that the package contains the following:

- GS728TS, GS728TPS, GS752TS, or GS752TPS Smart Switch
- Rubber footpads for tabletop installation
- Rackmounting 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 GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch hardware features. Topics include:

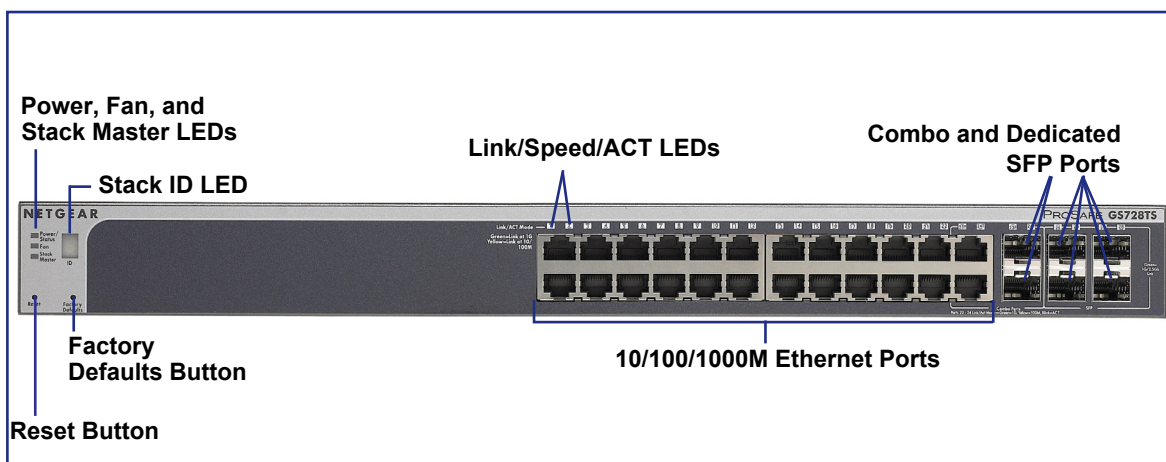
- *GS728TS Front-Panel and Back-Panel Configuration*
- *GS728TPS Front-Panel and Back-Panel Configuration*
- *GS752TS Front-Panel and Back-Panel Configuration*
- *GS752TPS Front-Panel and Back-Panel Configuration*
- *LED Designations*
- *Device Hardware Interfaces*

## GS728TS Front-Panel and Back-Panel Configuration

The GS728TS Smart Switch has 24 10/100/1000 Mbps copper ports and 6 SFP fiber ports, 2 of which are combo ports. Up to two SFP 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.

**Figure 2** illustrates the front panel of the NETGEAR GS728TS Smart Switch.

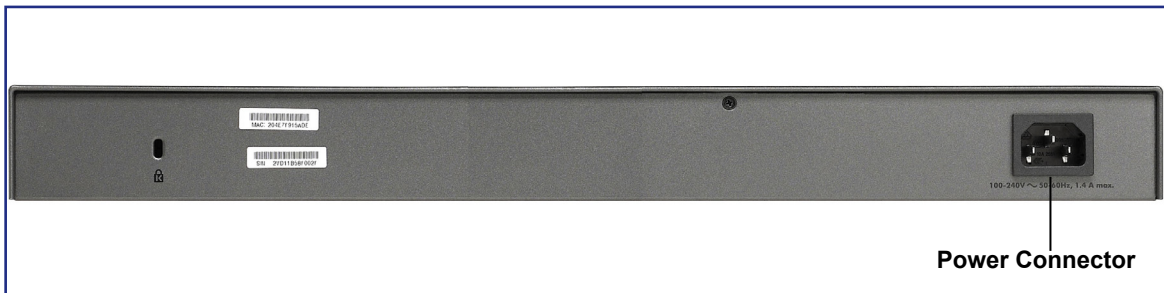


**Figure 2.** GS728TS Front Panel

The front panel contains the following:

- 24 RJ-45 connectors for 10/100/1000 Mbps autosensing Gigabit Ethernet switching ports.
- 2 combo ports (port 23 and 24) to support 10/100/1000 Mbps copper or 100M/1G optical module.
- 2 dedicated SFP ports (port 25 and 26) to support 1G optical module.
- 2 dedicated SFP ports (port 27 and 28) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- Up to two of these ports (ports 27 and 28) can alternatively be used as stacking ports
- Reset button to restart the device.
- Recessed default reset button to restore the device back to the factory defaults.
- Link, Speed, and Activity LEDs for each port.
- Power, Fan Status, Stack Master, and Stack ID LEDs.

**Figure 3** illustrates the NETGEAR GS728TS Smart Switch back panel.



**Figure 3. GS728TS Back Panel**

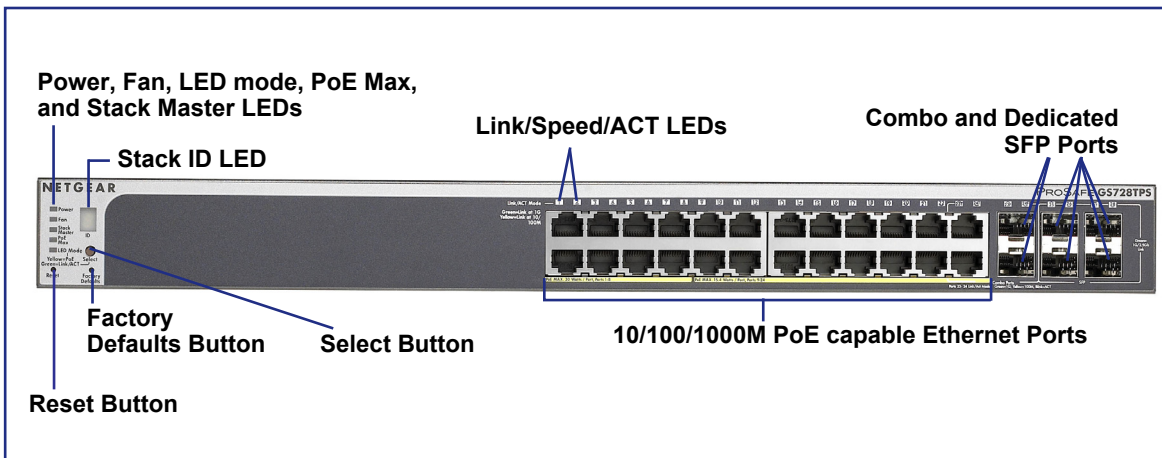
The back panel contains a power connector.

## GS728TPS Front-Panel and Back-Panel Configuration

The GS728TPS Smart Switch has 24 10/100/1000 Mbps PoE capable copper ports and 6 SFP fiber ports, 2 of which are combo ports. Up to two SFP 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.

**Figure 4** illustrates the front panel of the NETGEAR GS728TPS Smart Switch.

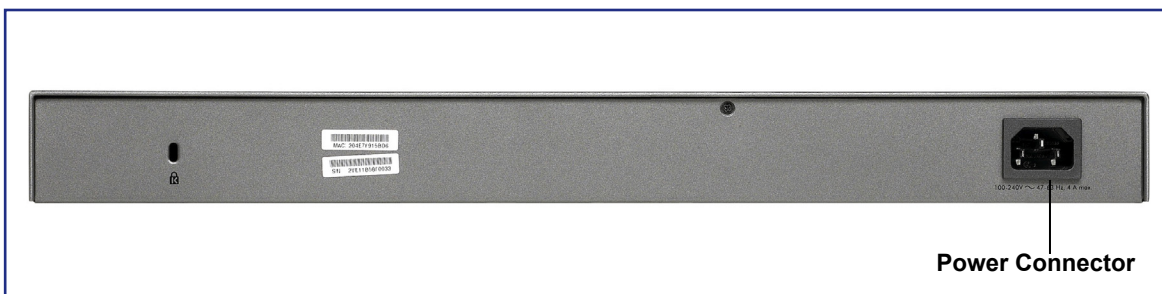


**Figure 4. GS728TPS Front Panel**

The front panel contains the following:

- 24 RJ-45 connectors for 10/100/1000 Mbps autosensing Gigabit Ethernet switching ports.
- 2 Combo ports (port 23 and 24) to support 10/100/1000 Mbps copper or 100M/1G optical module.
- 2 dedicated SFP ports (port 25 and 26) to support 1G optical module.
- 2 dedicated SFP ports (port 27 and 28) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- Up to two of these ports (ports 27 and 28) can alternatively be used as stacking ports
- Reset button to restart the device.
- Select button to change the working mode of the port LEDs with either PoE Mode or Ethernet Mode.
- Recessed default reset button to restore the device back to the factory defaults.
- Link, Speed, and Activity LEDs for each port.
- Power, Fan Status, Stack Master, LED mode, PoE Max, and Stack ID LEDs.

**Figure 5** illustrates the NETGEAR GS728TPS Smart Switch back panel.



**Figure 5. GS728TPS Back Panel**

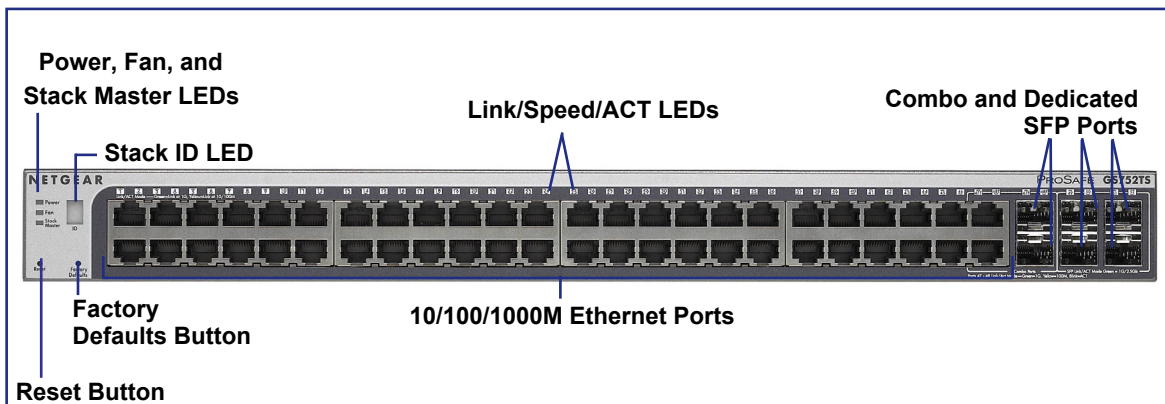
The back panel contains a power connector.

## GS752TS Front-Panel and Back-Panel Configuration

The GS752TS Smart Switch has 48 10/100/1000 Mbps copper ports and 6 SFP fiber ports, 2 of which are combo ports. Up to two SFP 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.

**Figure 6** illustrates the front panel of the NETGEAR GS752TS Smart Switch.

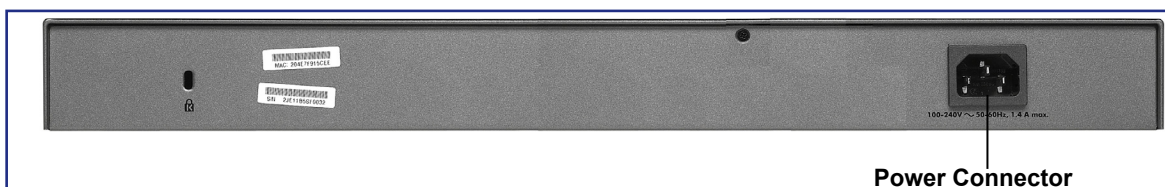


**Figure 6. GS752TS Front Panel**

The front panel contains the following:

- 48 RJ-45 connectors for 10/100/1000 Mbps autosensing Gigabit Ethernet switching ports
- 2 dedicated SFP ports (port 49 and 50) to support 1G optical module
- 2 dedicated SFP ports (port 51 and 52) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- Up to two of these ports (ports 51 and 52) can alternatively be used as stacking ports
- Reset button to restart the device
- Recessed default reset button to restore the device back to the factory defaults
- Link, Speed, and Activity LEDs for each port
- Power, Fan Status, Stack Master, and Stack ID LEDs

**Figure 7** illustrates the NETGEAR GS752TS Smart Switch back panel.



**Figure 7. GS752TS Back Panel**

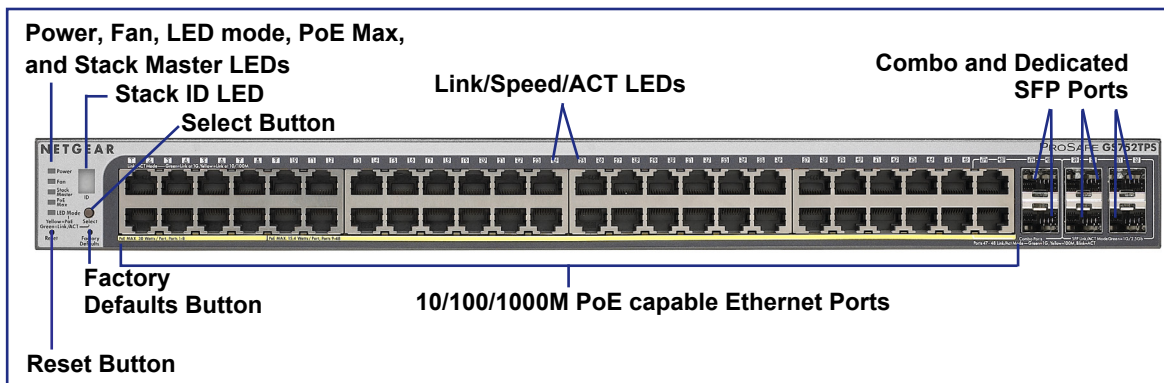
The back panel contains a power connector.

## GS752TPS Front-Panel and Back-Panel Configuration

The GS752TPS Smart Switch has 48 10/100/1000 Mbps PoE capable copper ports and 6 SFP fiber ports, 2 of which are combo ports. Up to two SFP 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.

**Figure 8** illustrates the front panel of the NETGEAR GS752TPS Smart Switch.



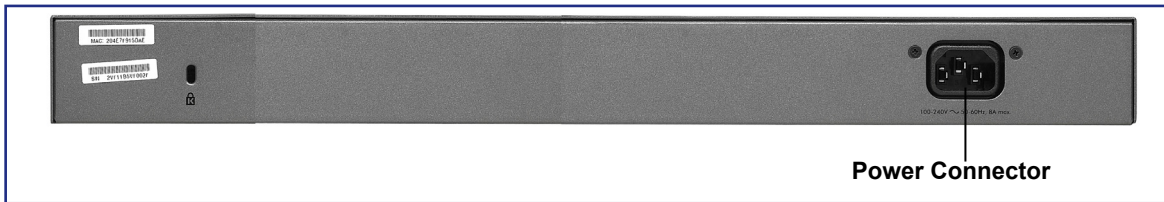
**Figure 8. GS752TPS Front Panel**

The front panel contains the following:

- 48 RJ-45 connectors for 10/100/1000 Mbps autosensing Gigabit Ethernet switching ports.
- 2 Combo ports (port 47 and 48) to support 10/100/1000 Mbps copper or 100M/1G optical module.
- 2 dedicated SFP ports (port 49 and 50) to support 1G optical module.
- 2 dedicated SFP ports (port 51 and 52) to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).
- Up to two of these ports (ports 51 and 52) can alternatively be used as stacking ports
- Reset button to restart the device.
- Select button to change the working mode of the port LEDs with either PoE Mode or Ethernet Mode.
- Recessed default reset button to restore the device back to the factory defaults
- Link, Speed, and Activity LEDs for each port.
- Power, Fan Status, Stack Master, LED mode, PoE Max, and Stack ID LEDs.

**Figure 9** illustrates the NETGEAR GS752TPS Smart Switch back panel.





**Figure 9. GS752TPS Back Panel**

The back panel contains a power connector.

## LED Designations

### RJ-45 Port LEDs

The following table describes the RJ-45 port LED designations. There is one LED for each RJ-45 port.

LED	Designation
Ethernet Mode: SPD/Link/ACT LED	<ul style="list-style-type: none"> <li>• <b>Off</b>—No link established.</li> <li>• <b>Solid Green</b>—A valid 1000 Mbps link is established.</li> <li>• <b>Blinking Green</b>—The port is transmitting or receiving packets at 1000 Mbps.</li> <li>• <b>Solid Yellow</b>—A valid 10/100 Mbps link is established.</li> <li>• <b>Blinking Yellow</b>—The port is transmitting or receiving packets at 10/100 Mbps.</li> </ul>
PoE Mode: PoE Status LED	<ul style="list-style-type: none"> <li>• <b>Off</b>—No PoE powered device (PD) is connected.</li> <li>• <b>Solid Green</b>—The PoE powered device (PD) is connected and the port is supplying power successfully.</li> <li>• <b>Solid Yellow</b>—Indicates one of the following failures resulted in stopping power to that port: <ul style="list-style-type: none"> <li>- Short circuit on the PoE power circuit.</li> <li>- PoE power demand exceeds the power available.</li> <li>- PoE current exceeds the PD's classification.</li> <li>- Out of proper voltage band (44 ~ 57 VDC for af, 50~57 VDC for at).</li> </ul> </li> </ul>

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**Note:** If the port media is changed to fiber, the Ethernet LED will change to the OFF status.

---

## SFP Port LEDs

The following table describes the dedicated SFP port LED designations. Each SFP port has its own indication LED.

LED	Designation
SFP Mode for 2 Combo Ports: SPD/Link/ACT LED	<ul style="list-style-type: none"> <li>• <b>Off</b>—No SFP module link is established.</li> <li>• <b>Solid Green</b>— A valid 1000Mbps SFP module link is established.</li> <li>• <b>Blinking Green</b>—The port is transmitting or receiving packets at 1000Mbps.</li> <li>• <b>Solid Yellow</b>—A valid 100Mbps SFP module link is established.</li> <li>• <b>Blinking Yellow</b>—The port is transmitting or receiving packets at 100Mbps.</li> </ul>
SFP Mode for last 4 SFP Ports: SPD/Link/ACT LED	<ul style="list-style-type: none"> <li>• <b>Off</b>—No SFP module link is established on the port.</li> <li>• <b>Solid Green</b>—A valid 1000/2500Mbps SFP module link is established on the port.</li> <li>• <b>Blinking Green</b>—Packets transmission or reception is occurring on the port at 1000/2500Mbps.</li> </ul>

---

**Note:** If the port media change to copper, the SFP port LED will change to the OFF status.

---

## System LEDs

The following table describes the system LED designations.

LED	Designation
Power	<ul style="list-style-type: none"> <li>• <b>Solid Green</b>—Device is powered on, run-time code is up and running.</li> <li>• <b>Solid Yellow</b>—Device is booting up.</li> <li>• <b>Off</b>—Power is not supplied to the device</li> </ul>
Fan	<ul style="list-style-type: none"> <li>• <b>Solid Yellow</b>—Fan has experienced a fail.</li> <li>• <b>Off</b>—Fan is operating normally.</li> </ul>
Stack Master LED	<ul style="list-style-type: none"> <li>• <b>Solid Green</b>—The switch acts as a master unit in a stack of GS700TS series switches.</li> <li>• <b>Off</b>—The switch acts as a slave in a stack of GS700TS series switches, or the stack is operating in standalone mode.</li> </ul>
Stack ID	Displays the stack ID, from 1 to 6.

LED	Designation
Max PoE LED	<ul style="list-style-type: none"> <li>• <b>Solid Green</b>—Less than 7W of PoE power is available.</li> <li>• <b>Solid Yellow</b>—The PoE MAX LED was active in the previous two minutes.</li> <li>• <b>Off</b>—There is at least 7W of PoE power available for another device.</li> </ul>
LED Mode LED	<ul style="list-style-type: none"> <li>• <b>Solid Green</b>—The Port LED is in Ethernet Mode</li> <li>• <b>Solid Yellow</b>—The Port LED is in PoE Mode.</li> </ul>

## Device Hardware Interfaces

### RJ-45 Ports

RJ-45 ports are autosensing ports. When inserting a cable into an RJ-45 port, the switch automatically detects the maximum speed (10, 100, or 1000 Mbps) and duplex mode (half-duplex or full-duplex) of the attached device. All ports support only 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 inserting 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 connecting the port to a PC) or an “uplink” connection (such as when connecting the port to a router, switch, or hub).
- Configures the RJ-45 port to enable communications with the attached device, without requiring user intervention. In this way, the Auto Uplink technology compensates for setting uplink connections, while eliminating concern about whether to use crossover or straight-through cables when attaching devices.

### SFP Ports

To enable you to have fiber connections on your network, there are 6 SFP ports that accommodate standard 100M or 1000M transceiver modules, which are sold separately.

- 2 combo ports to support 10/100/1000 Mbps copper or 100M/1G optical module.
- 2 dedicated SFP ports to support 1G optical module.
- 2 dedicated SFP ports to support 1G optical module (uplink) or 2.5G stacking (via stacking cable).

The last two SFP ports can alternatively be used to connect the switch with a 2.5G direct attach cable to a stack. Up to two ports (ports 27 and 28 or 51 and 52) can be used at a time as stacking ports.

---

**Note:** Direct attach cable AGC761 (2.5G) is recommended to be used as a stacking cable. The AGC761 cable is sold separately.

---

## 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 operate the Reset button, insert a device such as a paper clip into the opening to press the recessed button. The front-panel LEDs should extinguish 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 operate the Factory Defaults button, insert a device such as a paper clip into the opening to press the recessed button for over two seconds.

## Select Button

The Smart Switch GS728TP and GS752TP have a LED Mode Select button on the front panel so that you can change the LED mode of the ports between Ethernet and PoE status. You need to press the button for more than 1 second to change the LED mode.



Your GS728TS, GS728TPS, GS752TS, and GS752TPS 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, and 1000 Mbps hubs and switches.

## 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 PC can provide 2000 Mbps throughput.

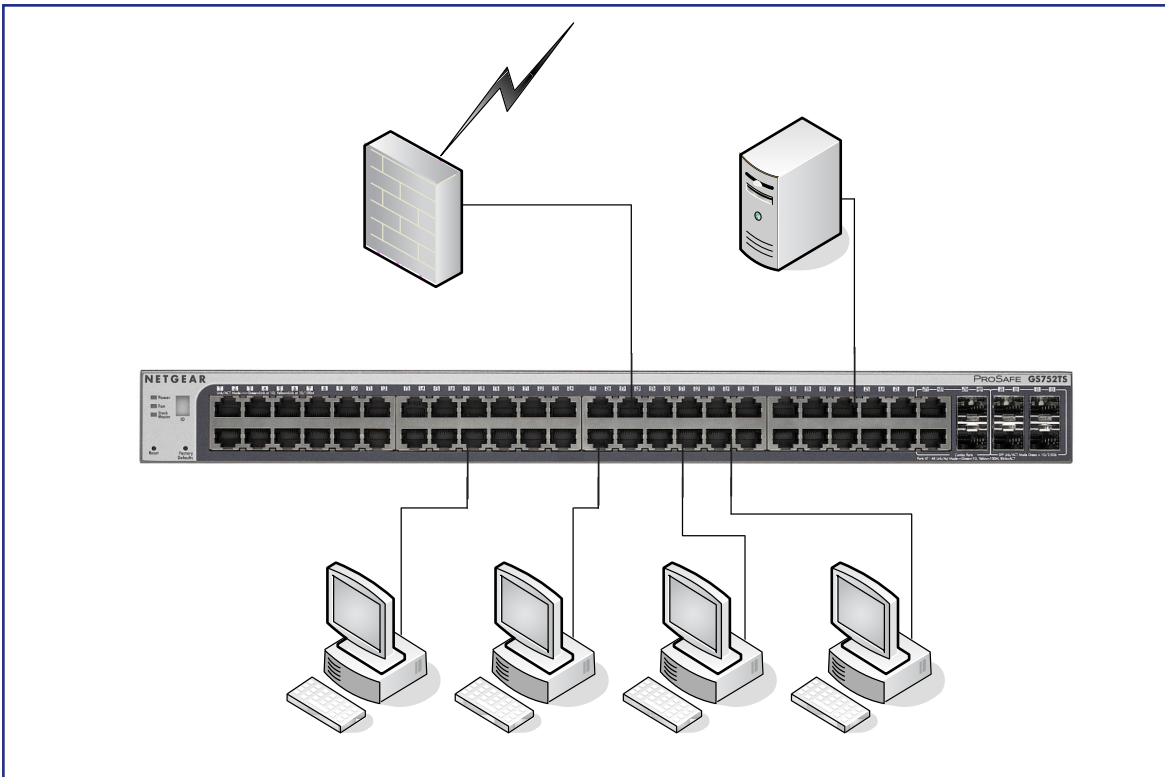


Figure 10. Desktop Switching

## Backbone Switching

You can use the GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch as a backbone switch in a small network that gives users high-speed access to servers and other network devices.

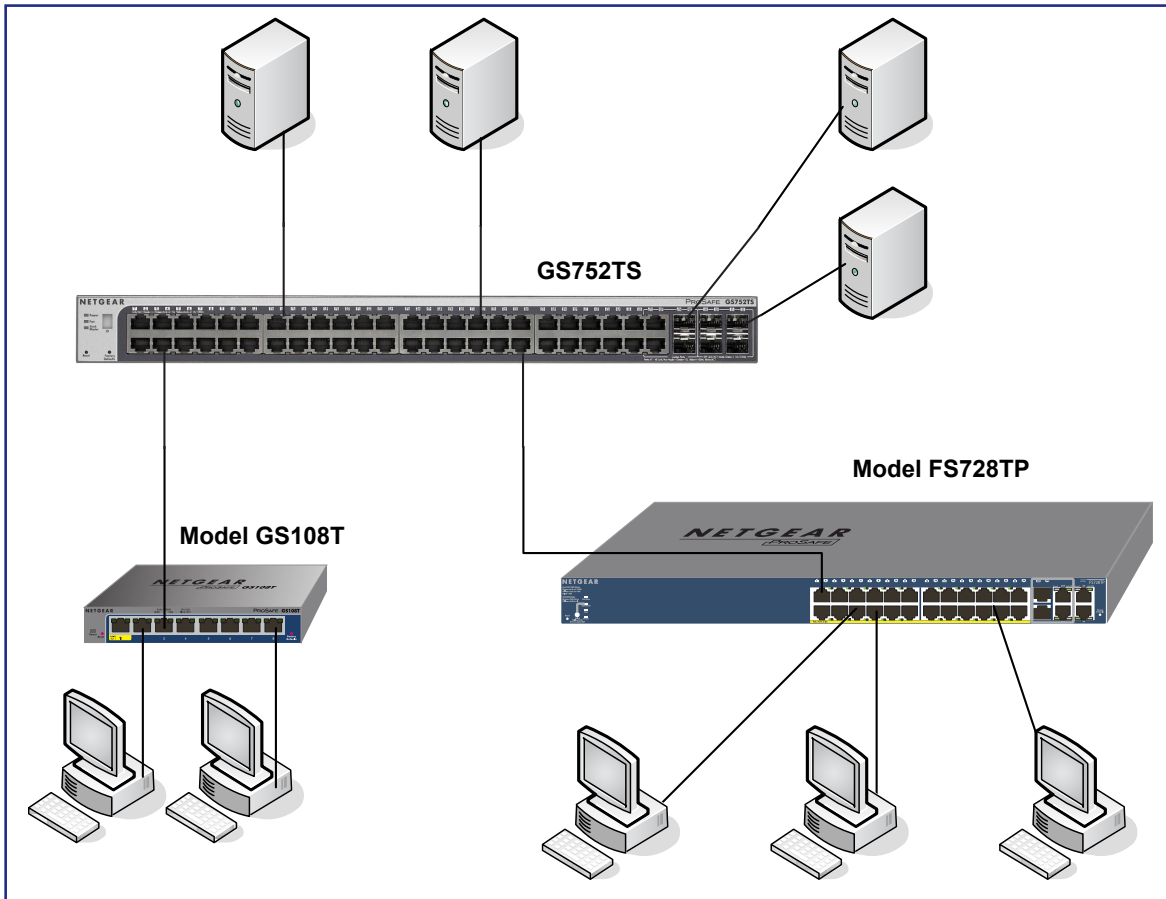


Figure 11. Backbone Switching

This chapter describes the installation procedures for your GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch. Switch installation involves the following steps:

*Step 1: Preparing the Site*

*Step 2: Installing the Switch*

*Step 3: Checking the Installation*

*Step 4: Connecting Devices to the Switch*

*Step 5: Installing an SFP Transceiver Module*

*Step 6: Installing Device as Stand-alone or Stack Master*

*Step 7: Applying AC Power*

*Step 8: Managing the Switch using a Web Browser or the PC Utility*



## Step 1: Preparing the Site

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

Characteristics	Requirements
Mounting	<ul style="list-style-type: none"> <li>• <b>Desktop installations</b> - Provide a flat table or shelf surface.</li> <li>• <b>Rackmount installations</b> - Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. The rackmount kit supplied with the switch is also required.</li> </ul>
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 <a href="#">Appendix A</a> . Ensure the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Environmental	<ul style="list-style-type: none"> <li>• <b>Temperature</b> - Install the switch in a dry area, with ambient temperature between 0 and 50°C (32°F and 122°F). Keep the switch away from heat sources such as direct sunlight, warm air exhausts, hot-air vents, and heaters.</li> <li>• <b>Operating humidity</b> - The installation location should have a maximum relative humidity of 10 to 90%, non-condensing.</li> <li>• <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. Be sure there is adequate airflow in the room or wiring closet where the switch is installed.</li> <li>• <b>Operating conditions</b> - Keep the switch at least 6 ft. (1.83 meters) away from nearest source of electromagnetic noise, such as a photocopier machine.</li> </ul>

## Step 2: Installing the Switch

The GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch can be used on a flat surface or mounted in a standard network equipment rack.

### Installing the Switch on a Flat Surface

The switch ships with four self-adhesive rubber footpads. 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.

### Installing the Switch in a Rack

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

1. Attach the supplied mounting brackets to the side of the switch.
2. Insert the screws provided in the rackmount kit through each bracket and into the bracket mounting holes in the switch.
3. Tighten the screws with a #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 #2 Phillips screwdriver to secure mounting brackets to the rack.

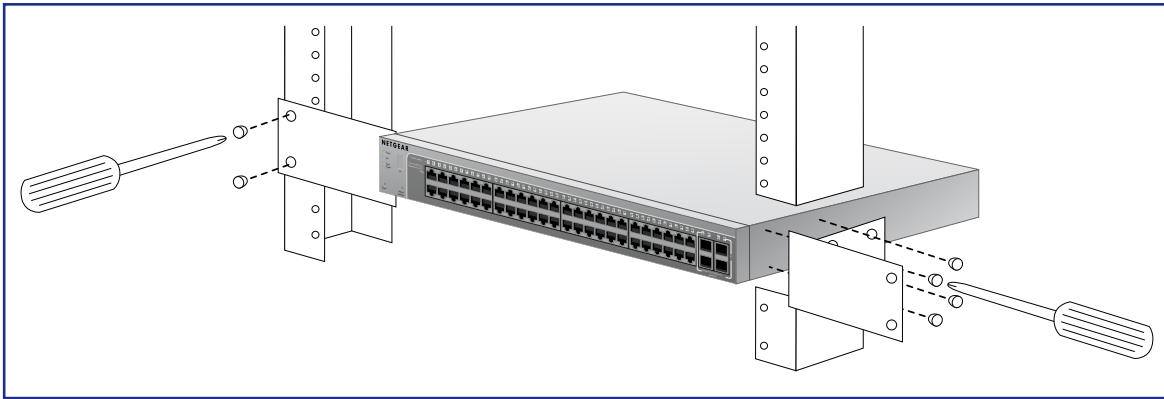


Figure 12. Rack Mount

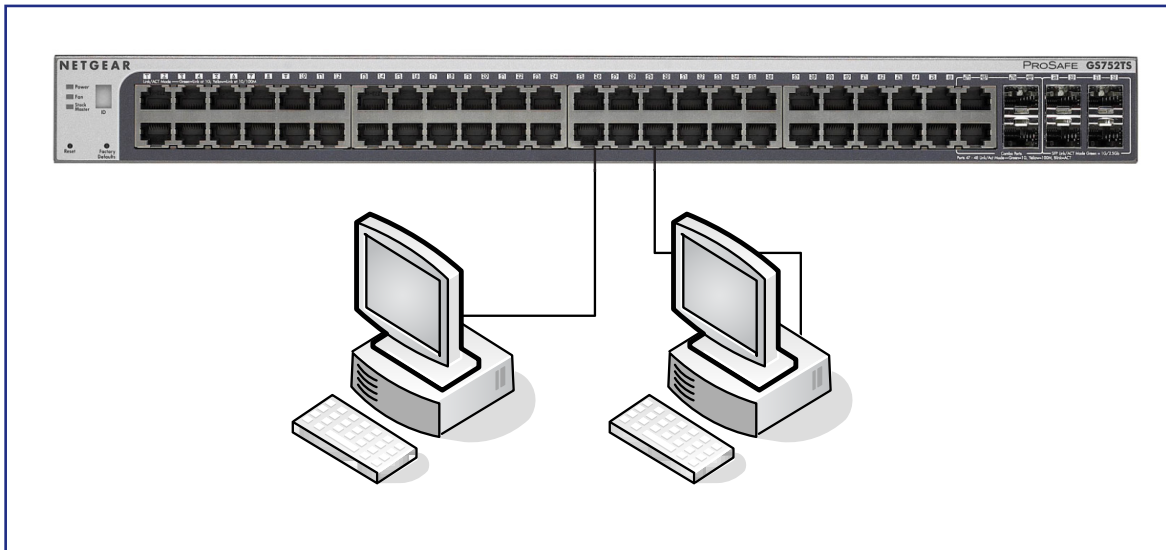
## Step 3: Checking the Installation

Before applying power to the switch, perform the following steps:

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

## Step 4: Connecting Devices to the Switch

The following procedure describes how to connect PCs to the switch's RJ-45 ports. The GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch contains Auto Uplink technology, which allows the attaching of devices using either straight-through or crossover cables.



**Figure 13. Connecting Devices to the Switch**

Connect each PC to an RJ-45 network port on the Switch front panel (**Figure 13**). Use Category 5 (Cat5) Unshielded Twisted-Pair (UTP) cable terminated with an RJ-45 connector to make these connections.

---

**Note:** Ethernet specifications limit the cable length between the switch and the attached device to 100m (328 ft.).

---

## Step 5: Installing an SFP Transceiver Module

The following procedure describes how to install an optional 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, insert the transceiver into the SFP port. Press firmly on the flange of the module to seat it securely into the connector.



Figure 14. Installing and SFP Transceiver Module (GS752TPS Shown)

## Step 6: Installing Device as Stand-alone or Stack Master

A master-backup unit runs as a slave unit as described above. In addition, it continuously monitors the existence and operation of the stack master. If the master unit fails, the master-backup unit will assume 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 may use the Web interface to assign different unit IDs. The time cost for switchover 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.

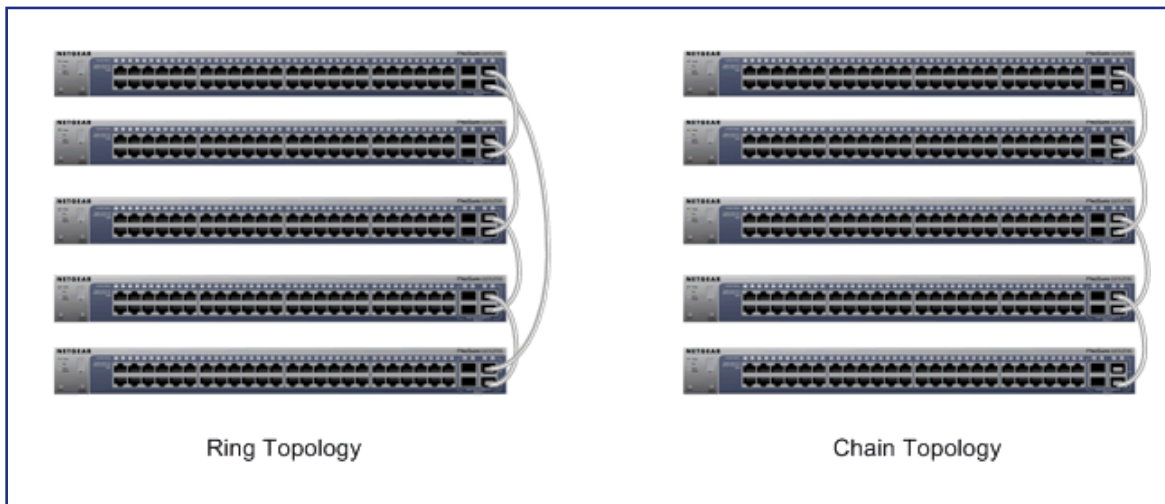
Each unit may work in one of two modes: Stand-alone, or Stack mode. The operational mode is determined at software boot time, and can only be changed by a unit reset. The 7-segment stacking ID LED remains illuminated in both modes.

The device supports two stacking topologies: Ring topology or Chain topology.

---

**Note:** The direct attach cable AGC761 (2.5G) is recommended to be used as a stacking cable. The AGC761 cable is sold separately.

---



**Figure 15. 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 (see the *System > Stacking* page).

For more information on stacking see the *Software Administration Manual*. A link to this document is on your Resource CD.

## Step 7: Applying AC Power

The GS728TS, GS728TPS, GS752TS, and GS752TPS 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. After selecting an appropriate outlet, use the following procedure 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 illuminates.

If the Power LED does not go on, check that the power cable is plugged in correctly and that the power source is good. If this does not resolve the problem, refer to [Appendix A](#).

## Step 8: Managing the Switch using a Web Browser or the PC Utility

The GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch contains software for viewing, changing, and monitoring the way it works. This management software is not required for the switch to work. The ports can be used 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 powering up the switch for the first time, the Smart Switch can be configured 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.

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

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# Troubleshooting

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This chapter 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.

Symptom	Cause	Solution
Power LED is off.	No power is received.	Check the power cord connections and the connected device. Ensure all cables used are correct and comply with Ethernet specifications.
Link LED is off or intermittent.	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 all cables used are correct and comply with Ethernet specifications. Check for a defective PC 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 the attached device is set to auto-negotiate.
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 all connectors are securely positioned in the required ports. Equipment may have been accidentally disconnected.

Symptom	Cause	Solution
ACT LED is flashing 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 stand-alone unit.	Remove the unit from the stack. Use the Web Management to configure the unit as a stackable unit, with last two ports used as the stacking ports. Refer to the <i>Smart Switch Software Administration Manual</i> for information about using the Web interface.

## Additional Troubleshooting Suggestions

If the suggestions in Troubleshooting Chart do not resolve the problem, refer to the troubleshooting suggestions in this section.

### Network Adapter Cards

Ensure the network adapter cards installed in the PCs are in working condition and the software driver has been installed.

### Configuration

If problems occur after altering 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 required, 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, please refer to the support information card included with your product.

### Auto-Negotiation

The RJ-45 ports negotiate the correct duplex mode, speed, and flow control if the device at the other end of the link supports auto negotiation. If the device does not support auto negotiation, the switch determines only the speed correctly, and the duplex mode defaults to half-duplex.



# Technical Specifications

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## *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 802.3x full-duplex flow control

IEEE802.3az (Energy Efficient Ethernet)

IEEE802.3af (DTE Power via MDI)

IEEE802.3at (DTE Power via MDI Enhancements)

## *Management*

Windows 2000 + XP, Vista; Windows 7, Microsoft Explorer 7.0 or above

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***

GS728TS/GS752TS:

- 24/48 x 10/100/1000 Mbps copper ports.
- 2 x Combo ports to support 10/100/1000 Mbps copper ports or 1G/100M optical module.
- 2 x SFP (slot) to support 1G optical module.
- 2 x SFP (slot) to support 1G optical module (uplink) and 2.5G stacking (via stacking cable).

GS728TPS/GS752TPS:

- 24/48 PoE-capable 10/100/1000 Mbps copper ports (8 PoE+ capable).
- 2 x Combo ports to support 10/100/1000 Mbps copper ports or 1G/100M optical module
- 2 x SFP (slot) to support 1G optical module.
- 2 x SFP (slot) to support 1G optical module (uplink) and 2.5G stacking (via stacking cable).

Stacking Ports:

- GS728TS/GS728TPS: Port 27 and port 28 can be used as the stacking ports or as uplink ports.
- GS752TS/GS752TPS: Port 51 and port 52 can be used as the stacking ports or as uplink ports.

## ***LEDs***

Per RJ-45 port: Speed/Link/Activity

Per SFP port: Speed/Link/Activity

Per device: Power, Fan, Stack Master, Stack ID

Per device (for GS7xxTPS): LED mode and PoE Max

## ***Performance Specifications***

Forwarding modes: Store-and-forward

Bandwidth (per unit): 56 Gbps for GS728TS/TPS, 104 Gbps for GS752TS/TPS

Stacking up to 6 switches

Address database size: 16K media access control (MAC) addresses per system

PoE power budget:

- GS728TPS: Maximum 192W
- GS752TPS: Maximum 384W

Mean Time Between Failure (MTBF):

- GS728TS:
  - 595422.68 hours (~68.9 years) at 25°C
  - 174069.75 hours (~20.1 years) at 55°C
- GS728TPS:
  - 530911.26 hours (~62.3 years) at 25°C
  - 153808.90 hours (~17.8 years) at 55°C
- GS752TS:
  - 303219.7 hours (~35.1 years) at 25°C
  - 102616.4 hours (~11.8 years) at 55°C
- GS752TPS:
  - 206539.3 hours (~23.9 years) at 25°C
  - 67929.0 hours (~7.8 years) at 55°C

## ***Power Supply***

GS752TPS

- AC Voltage: 100-240 V
- Frequency: 50-60 Hz
- Amperage (max): 8A

GS728TPS

- AC Voltage: 100-240 V
- Frequency: 47-63 Hz
- Amperage (max): 4A

GS752TS

- AC Voltage: 100-240 V
- Frequency: 50-60 Hz

- Amperage (max): 1.4A

#### GS728TS

- AC Voltage: 100-240 V
- Frequency: 50-60 Hz
- Amperage (max): 1.4A

### ***Physical Specifications***

Dimensions (H x W x D):

- GS752TPS 440 x 310 x 43 mm
- GS728TPS 440 x 257 x 43 mm
- GS752TS 440 x 257 x 43 mm
- GS728TS 440 x 257 x 43 mm

Weight:

- GS728TS: 3.34 kg
- GS728TPS: 3.88 kg
- GS52TS: 4.31 kg
- GS752TPS: 5.48 kg

### ***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

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## 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.

### **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 GS728TS, GS728TPS, GS752TS, and GS752TPS 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.

### **Canadian Department of Communications Radio Interference Regulations**

This digital apparatus, GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch, does not exceed the Class B limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

### **European Union**

The GS728TS, GS728TPS, GS752TS, and GS752TPS Smart Switch complies with essential requirements of EU EMC Directive 2004/108/EC and Low Voltage Directive 2006/95/EC as supported by applying the following test methods and standards:

- EN55022: 2006 / A1: 2007
- EN55024: 1998 / A1: 2001 / A2: 2003
- EN60950-1: 2005 2nd Edition
- EN 61000-3-2:2006
- EN 61000-3-3:1995 w/A1: 2001+A2: 2005

### **GPL License Agreement**

GPL may be included in this product; to view the GPL license agreement go to <http://downloads.netgear.com/files/GPLnotice.pdf>.

For GNU General Public License (GPL) related information, please visit [http://support.netgear.com/app/answers/detail/a\\_id/2649](http://support.netgear.com/app/answers/detail/a_id/2649).



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