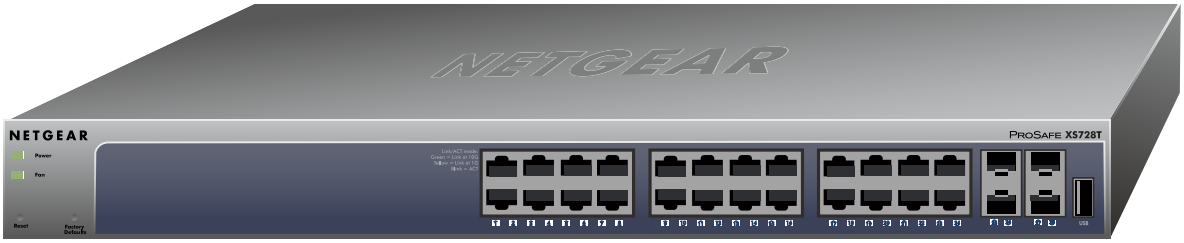
NETGEAR®

XS728T Smart Managed Switch

Hardware Installation Guide



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USA

Support

Thank you for selecting NETGEAR products.

After installing your device, locate the serial number on the label of your product and use it to register your product at *https://my.netgear.com*. You must register your product before you can use NETGEAR telephone support. NETGEAR recommends registering your product through the NETGEAR website.

For product updates and web support, visit *http://support.netgear.com*.

Phone (US & Canada only): 1-888-NETGEAR.

Phone (Other Countries): Check the list of phone numbers at *http://support.netgear.com/general/contact/default.aspx*.

For regulatory compliance information, visit *http://www.netgear.com/about/regulatory/*. See the regulatory compliance document before connecting the power supply.

For current DoC, visit the NETGEAR EU Declaration of conformity website at *http://support.netgear.com/app/answers/detail/a_id/11621*.

Trademarks

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Appendix B Technical Specifications

Introduction

1

Congratulations on the purchase of your NETGEAR® ProSAFE™ XS728T Smart Managed Switch. Your XS728T Smart Managed 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 10-Gigabit connectivity to eliminate bottlenecks, boost performance, and increase productivity. The 24 twisted-pair ports on the front panel of the switch support nonstop 1000M/10G networks. The 4 SFP+ ports on the front panel also support 1000M and 10G optical 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 managed switch. The information in this manual is intended for users with intermediate computer and Internet skills. For more information about the topics that are covered in this manual, visit the support website at *support.netgear.com*.

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

Overview

The NETGEAR XS728T Smart Managed Switch provides 24 twisted-pair ports that support nonstop 1000M/10G networks. The switch also provides four built-in enhanced small form factor pluggable (SFP+) GBIC slots that support 1000M and 10G optical modules.

Using these 10G 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 1000M/10G copper and fiber connectivity

The smart managed switch also provides the benefit of administrative management with a complete package of features for monitoring, configuring, and controlling the network. Using the simple and intuitive web-based graphical user interface (GUI) or the Windows computer–based Smart Control Center program, you can view and use the switch's many capabilities. The switch's management features include configuration of 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 managed switch can be freestanding 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 with a mix of Gigabit Ethernet and 10-Gigabit Ethernet devices. You can use Category 5e (CAT 5e) or better Ethernet cable (CAT 6, CAT 6a, or CAT 7) to make 10G connections. NETGEAR recommends that you use CAT 6a or CAT 7 cables if the cable distance is greater than 148 feet (45 meters).

Features

The XS728T Smart Managed Switch provides the following key features:

- Twenty-four 1000M/10G AutoSensing 10-Gigabit Ethernet switching ports.
- Four dedicated 1000M/10G SFP+ ports.
- Full NETGEAR Smart Managed Switch functionality.
- Full compatibility with IEEE standards:
  - IEEE 802.3ab (1000BASE-T)
  - IEEE 802.3z (1000BASE-x)
  - IEEE 802.3an (10GBASE-T)
  - IEEE 802.3 Clause 49 (10GBASE-LR and 10GBASE-SR)
  - 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.
- Per-port LEDs and Power LED.
- Internal open frame power supply.
- Standard NETGEAR 7xx series chassis (1U high).
- NETGEAR green power-saving features:
  - Energy efficiency mode that fully conforms to the IEEE 802.3az standard
  - Per-port automatic change to a lower power mode when the port link is down

Package Contents

The following figure shows the package contents of the smart managed switch.

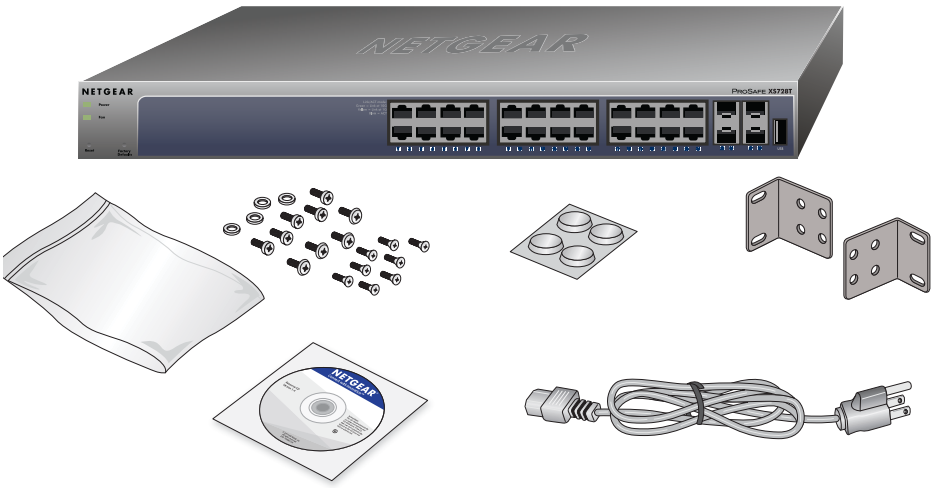

Figure 1. Package contents

Verify that the package contains the following:

- XS728T Smart Managed Switch
- Rubber footpads for tabletop installation
- Rack-mounting kit
- Power cord

- Installation guide
- Smart managed 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.

2 Physical Description

This chapter describes the XS728T Smart Managed Switch hardware features. This chapter includes the following topics:

- *Front Panel and Back Panel Configuration*
- *LED Designations*
- *Device Hardware Interfaces*

Front Panel and Back Panel Configuration

The smart managed switch provides 24 1000M/10G copper ports and 4 dedicated1000M/10G SFP+ fiber 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 managed switch.

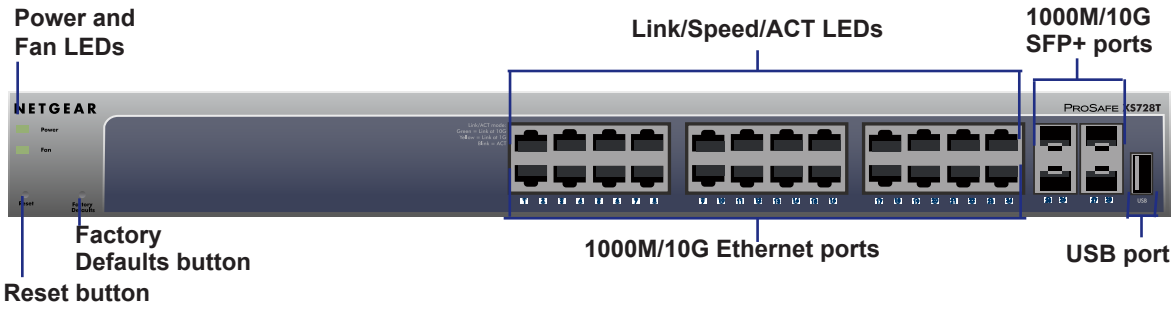

Figure 2. Front panel

The front panel contains the following:

- Twenty-four RJ-45 connectors for 1000M/10G AutoSensing 10-Gigabit Ethernet switching ports
- Four dedicated 1000M/10G SFP+ 10-Gigabit Ethernet switching ports
- One USB 2.0 port that supports FAT32 file systems
- **Reset** button to restart the device
- Recessed **Factory Defaults** button to restore the device back to the factory defaults
- Link, Speed, and ACT LEDs for each port
- Power and Fan LEDs

The following figure illustrates the smart managed switch back panel.

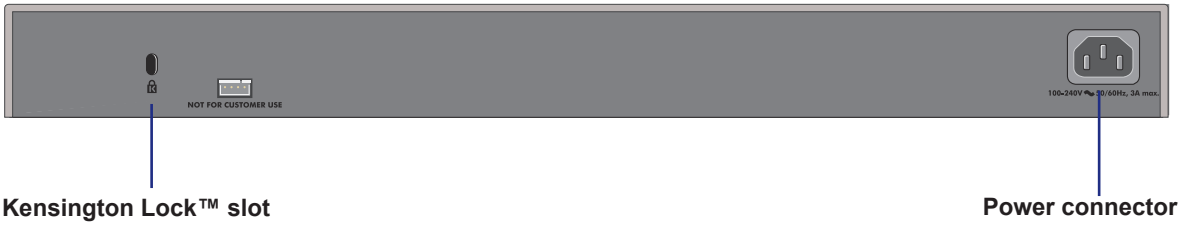

Figure 3. Back panel

The back panel contains the power connector and the Kensington Lock slot.

Note: The serial console port is not for customer use.

LED Designations

The following sections describe the LED designations.

Port LEDs

The following table describes the RJ-45 and SFP+ port LED designations. A separate indicator LED is associated with each port.

Table 1. Port LEDs

LED	Designation
Link/Speed/ACT LED mode for copper ports 1 to 24	• **Off**. No link established. • **Solid green**. A valid 10G link is established. • **Blinking green**. The port is transmitting or receiving packets at 10 Gbps. • **Solid yellow**. A valid 1000M link is established. • **Blinking yellow**. The port is transmitting or receiving packets at 1000 Mbps.
Link/ACT LED for SFP+ ports 25 to 28	• **Off**. No SFP+ module link is established. • **Solid green**. A valid 10G link is established. • **Blinking green**. The port is transmitting or receiving packets at 10 Gbps. • **Solid yellow**. A valid 1000M 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. • **Off**. Power is not supplied to the device.
Fan	• **Solid yellow**. The fan experienced a failure. • **Off**. The fan is operating normally.

Device Hardware Interfaces

The following sections describe the hardware interfaces on the device.

RJ-45 Ports

RJ-45 ports are AutoSensing ports. When you insert a cable into an RJ-45 port, the switch automatically determines the maximum speed (1000 Mbps or 10 Gbps) 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 does the following:

- 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 concerns about whether to use crossover or straight-through cables when you attach devices.

SFP+ Ports

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

Reset Button

The Smart Managed Switch provides 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 Managed Switch provides 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 and hold the recessed button for more than two seconds.

3 Applications

Your XS728T Smart Managed Switch is designed to provide flexibility in configuring your network connections. It can be used as your only network traffic-distribution device or with 1000M and 10G hubs and switches. This chapter includes the following topics:

- *Desktop Switching*
- *Backbone Switching*

Desktop Switching

The smart managed switch can be used as a desktop switch to build a small network that provides up to 10 Gbps access to a file server. With full duplex enabled, the switch port connected to the server or computer can provide up to 20 Gbps throughput. If a 10 Gbps module is used to connect the switch to the file server in full-duplex operation, then the switch can provide up to 20 Gbps throughput.

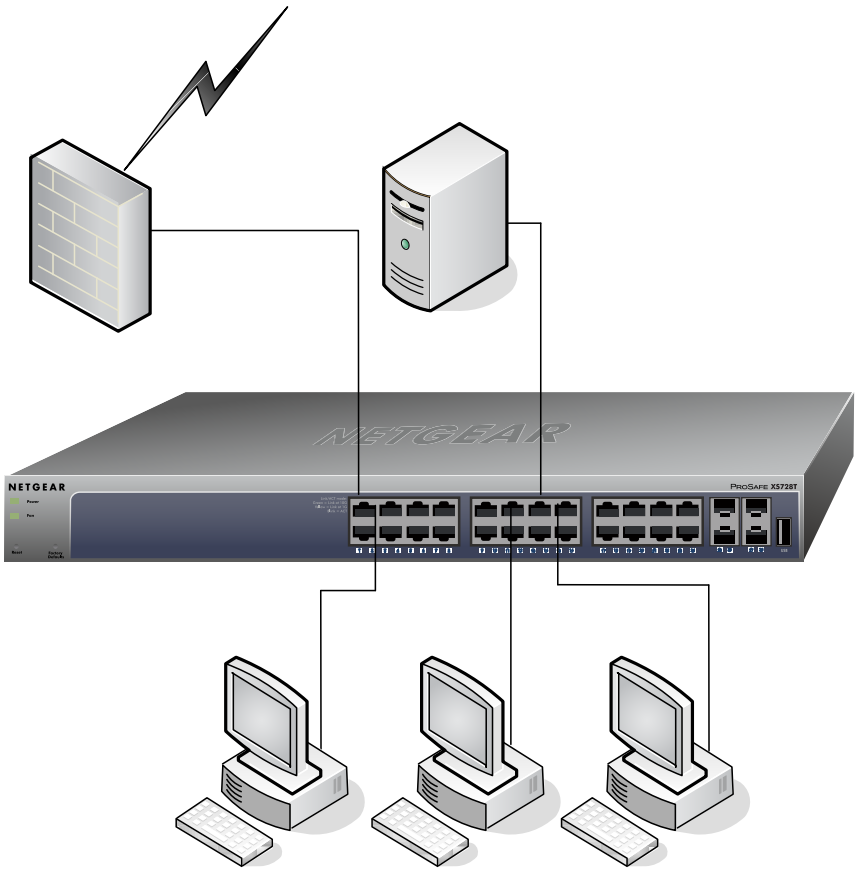

Figure 4. Desktop switching

Backbone Switching

You can use the smart managed switch as a backbone switch in a small network that gives users high-speed access to servers and other network devices.

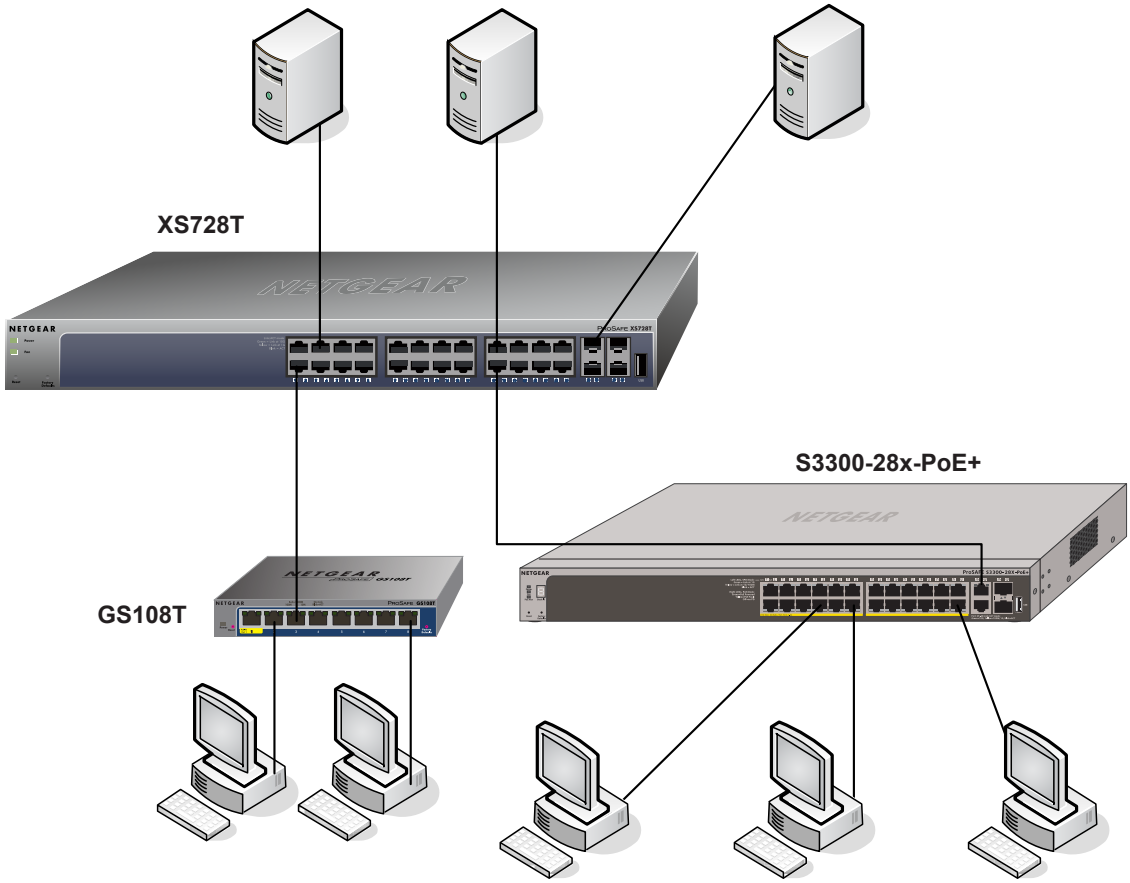

Figure 5. Backbone switching

Installation

4

This chapter describes the installation procedures for your XS728T Smart Managed Switch. Switch installation involves the steps described in the following sections:

Step 1: Prepare the Site

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

Table 3. 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	Place 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 maximum relative humidity of the installation location is 90%, noncondensing. • **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 the room or wiring closet where the switch is installed provides adequate airflow. • **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 managed 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. The rubber footpads cushion the switch against shock and vibrations.

This procedure explains how to install the switch on a flat surface.

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

1. Stick one of the provided rubber footpads on each of the four concave spaces on the bottom of the switch.
2. Place the switch 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 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.

Figure 6. Rack mount

Step 3: Check the Installation

Perform the steps in this section before applying power to the switch.

➢ **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 managed switch contains Auto Uplink technology, which allows the attaching of devices using either straight-through or crossover cables.

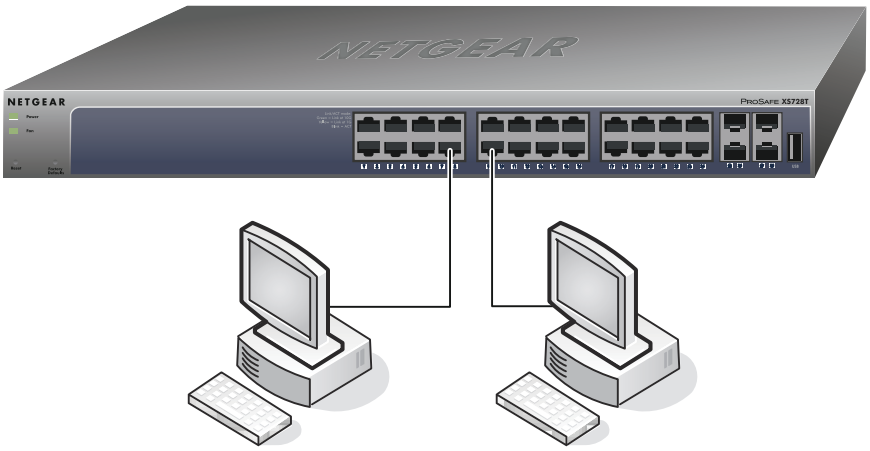

Figure 7. Connecting devices to the switch

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

➢ **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.

Note: For 10GBASE-T connections, and in particular for connections over 100 feet (30 meters), NETGEAR recommends that you use a Category 6a cable or a higher-rated cable.

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+ or SFP module, skip this procedure.

➢ **To install an SFP+ or 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 four 10G or 1G Ethernet modules using this procedure.

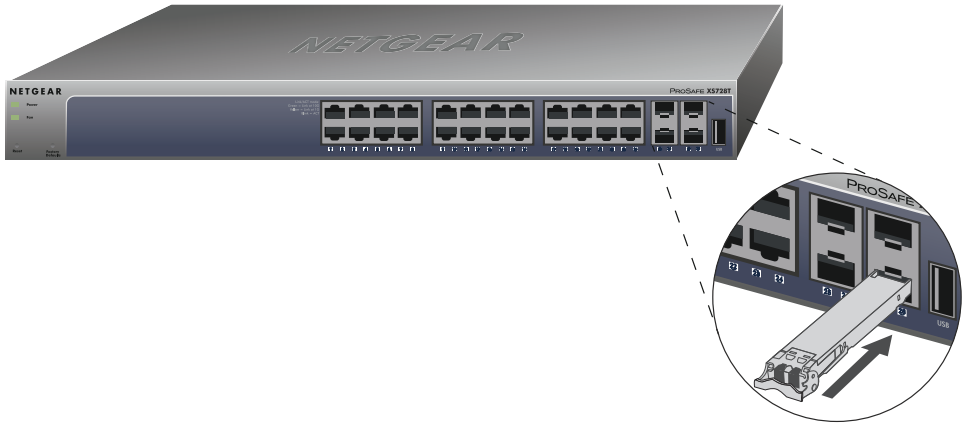

Figure 8. Installing an SFP transceiver module

Step 6: Apply AC Power

The smart managed switch does not provide 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. Plug 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 to make sure that the power cable is plugged in correctly and that the power source is functioning. If this does not resolve the problem, see *Appendix A, Troubleshooting*.

Step 7: Manage the Switch

The smart managed 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 improves 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 managed switch using a web browser or the included Smart Control Center program (requires a Windows computer). For more information about managing the switch, see the software administration manual on the smart managed 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 Managed Switch. The appendix includes the following topics:

- *Troubleshooting Chart*
- *Additional Troubleshooting Suggestions*

Troubleshooting Chart

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

Table 4. 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. It is possible that equipment was accidentally disconnected.
ACT LED is blinking continuously on all connected ports, and the network is disabled.	A network loop (redundant path) was created.	Break the loop by ensuring that only one path exists 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.

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 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. 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 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 Managed Switch. The appendix includes the following topics:

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

Management

- MS Windows 7, 8, 8.1; MAC OS X version 10.10
- Web browser:
  - MS Internet Explorer 9–11
  - Mozilla Firefox 31–33
  - Chrome 38–40
  - Safari on Windows: 5.1.7
  - Safari on MAC: 8.0.2
- 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; dynamic VLAN assignment
- 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 (10K)
- IPv6 management, multicast, and QoS
- Static routing
- MLD snooping
- DHCP snooping

- Protocol and MAC-based VLAN
- ACLs (MAC-based, IPv4-based, IPv6-based, and TCP/UDP-based)
- Private VLAN
- DNS
- TACACS+
- Protected ports
- Syslog
- USB
- GVRP
- Cable test
- Ping and traceroute

Interface

- 24 RJ-45 connectors for 1000BASE-T and 10GBASE-T (Auto Uplink™ on all ports)
- Four 10 Gbps dedicated SFP+ slots (ports 25–28) to support 10 Gbps (SPF+) or 1 Gbps (SFP) optical module.

LEDs

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

Performance Specifications

- Forwarding modes: Store-and-forward
- Address database size: 16K Media Access Control (MAC) addresses per system
- Mean time between failure (MTBF): 514,977 hours (~58.8 years) at 25°C

Power Supply

100 VAC–240 VAC/50 Hz–60 Hz, 3.0A maximum, universal input

Physical Specifications

- Dimensions (H x W x D): 43 mm x 440 mm x 310mm (1.7 in. x 17.3 in. x 12.2 in.)

- Weight: 5.04 kg (11.11 lb)

Environmental Specifications

- Operating temperature: 0°C to 50°C (32°F to 122°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