

**NETGEAR®**

# Hardware Installation Guide

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## 8-Port Multi-Gigabit/10G Ethernet (Ultra60 PoE++) Smart Managed Pro Switch with 2 SFP+ Ports

### Models

MS510TXM

MS510TXUP

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# 1

## Introduction

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This hardware installation guide complements the installation guide that came with your switch and applies to the following NETGEAR switch models:

- **MS510TXM:** 8-Port Multi-Gigabit/10G Ethernet Smart Managed Pro Switch with 2 SFP+ Ports
- **MS510TXUP:** 8-Port Multi-Gigabit/10G Ethernet Ultra60 PoE++ Smart Managed Pro Switch with 2 SFP+ Ports

The switch provides eight Gigabit Ethernet multispeed copper ports and two dedicated SFP+ fiber uplink ports that support 1G and 10G. Four of the multispeed copper ports support 100M, 1G, and 2.5G and each of the other four multispeed copper ports supports 100M, 1G, 2.5G, 5G, and 10G.

Model MS510TXUP can provide Ultra60 PoE++ (802.3bt) on its eight multispeed copper ports so that you can let the switch deliver power to PoE++ devices such as WiFi 6 access points, security cameras, PoE speakers, and LED lighting. Model MS510TXUP can supply up to 60W PoE++ to each copper port, with a maximum PoE power budget of 295W across all active PoE++ ports.

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

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

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

**Note:** For technical specifications, see the data sheet at [netgear.com/business/products/switches/smart](https://netgear.com/business/products/switches/smart). For switch documentation, including the installation guide and user manual, visit [netgear.com/support/download](https://netgear.com/support/download).

# Overview

The switch provides eight Gigabit Ethernet multispeed copper ports and two dedicated SFP+ fiber uplink ports that support 10G and 1G. Four of the multispeed copper ports support both 1G and 2.5G and each of the other four multispeed copper ports supports 1G, 2.5G, 5G, and 10G. All copper ports use RJ-45 connectors.

The SFP+ ports require standard small form-factor pluggable (SFP) gigabit interface converters (GBICs, also referred to as a transceiver modules), which are sold separately from the switch. The switch integrates 140 Gbps line-rate, full-duplex, nonblocking switch fabric.

The PoE model supports Ultra60 PoE++ (802.3bt) on all copper ports (that is, up to 60W PoE++ to each port) with a maximum PoE power budget of 295W across all active PoE++ ports.

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

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

For speeds of 10 Gbps, use Category 6 (Cat 6) cables terminated with RJ-45 connectors; for speeds from 5 Gbps to 10 Gbps, use Cat 5e cables terminated with RJ-45 connectors; and for speeds from 10 Mbps to 5 Gbps, including 2.5 Gbps, use Cat 5e or higher-rated Ethernet cables terminated with RJ-45 connectors.

# Features

The switch supports the following key hardware features:

- Four multispeed Ethernet ports (5-8), each of which supports 10G, 5G, 2.5G, 1G, and 100M.
- Four multispeed Ethernet ports (1-4), each of which supports 2.5G, 1G, and 100M.
- Two dedicated SFP+ fiber uplink ports (9F and 10F), each of which is capable of 10G and 1G.
- PoE support for model MS510TXUP:
  - Eight Ultra60 PoE++ (802.3bt) ports
  - Total PoE power budget of 295W for the switch

## 8-Port Multi-Gigabit/10G Ethernet (Ultra60 PoE++) Smart Managed Pro Switch with 2 SFP+ Ports

- MAC table size of 32K.
- Two fans for model MS510TXM and three fans for model MS510TXUP with variable-speeds that can lower the noise level during low temperatures.
- Acoustic noise at 25°C is equal to or less than 25 dBA for model MS510TXM and 33 dBA for model MS510TXUP.
- 140 Gbps line-rate, full-duplex, nonblocking switch fabric.
- Includes 19-inch rack-mount kit for rack installation.
- Full compatibility with IEEE standards:
  - IEEE 802.3 Ethernet
  - IEEE 802.3u 100BASE-T
  - IEEE 802.3z Gigabit Ethernet 1000BASE-SX/LX
  - IEEE 802.3bz NBASE-T and MGBASE-T
  - IEEE 802.3an (10GBASE-T)
  - IEEE 802.3ae 10-Gigabit Ethernet over fiber (10GBASE-SR, 10GBASE-LR)
  - IEEE 802.3ab 1000BASE-T
  - IEEE 802.3i 10BASE-T
  - IEEE 802.1Q VLAN tagging
  - IEEE 802.3x Full-duplex flow control
  - IEEE 802.3ad Link aggregation (LAG with LACP)
  - IEEE 802.1ab LLDP
  - IEEE 802.1p Class of Service (QoS)
  - IEEE 802.1D Spanning Tree Protocol (STP)
  - IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
  - IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
  - IEEE 802.1x RADIUS network access control
  - IEEE 802.3az Energy Efficient Ethernet (EEE)
  - IEEE 802.1af (PoE, model MS510TXUP)
  - IEEE 802.1at (PoE+, model MS510TXUP)
  - IEEE 802.1bt (PoE++, model MS510TXUP)
- AutoSensing and autonegotiating capabilities for all ports.
- Auto Uplink™ technology is supported on all ports.

- Automatic address learning function to build the packet-forwarding information table. The table contains up to 32K Media Access Control (MAC) addresses.
- Store-and-forward transmission to remove bad packets from the network.
- Active flow control to minimize packet loss and frame drops.
- Half-duplex backpressure control.
- Per-port status LEDs and system status LEDs.
- NETGEAR green power-saving features:
  - Energy efficiency mode that fully conforms to the IEEE802.3az standard
  - Per-port automatic change to a lower power mode when the port link is down

## Safety instructions and warnings

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

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

- This product is designed for indoor use only in a temperature-controlled and humidity-controlled environment. Note the following:
  - For more information about the environment in which this product must operate, see the environmental specifications in the appendix or the data sheet.
  - If you want to connect the product to a device located outdoors, the outdoor device must be properly grounded and surge protected, and you must install an Ethernet surge protector inline between the indoor product and the outdoor device. Failure to do so can damage the product.
  - Before connecting the product to outdoor cables or devices, see <https://kb.netgear.com/000057103> for additional safety and warranty information.

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

- Observe and follow service markings:
  - Do not service any product except as explained in your product documentation. Some devices should never be opened.
  - If applicable to your product, opening or removing covers that are marked with the triangular symbol with a lightning bolt can expose you to electrical shock.

We recommend that only a trained technician services components inside these compartments.

- If any of the following conditions occur, unplug the product from the power outlet, and then replace the part or contact your trained service provider:
  - Depending on your product, the power adapter, power adapter cable, power cable, extension cable, or plug is damaged.
  - An object fell into the product.
  - The product was exposed to water.
  - The product was dropped or damaged.
  - The product does not operate correctly when you follow the operating instructions.
- Keep the product away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your product components, and never operate the product in a wet environment. If the product gets wet, see the appropriate section in your troubleshooting guide, or contact your trained service provider.
- Do not push any objects into the openings of your product. Doing so can cause fire or electric shock by shorting out interior components.
- Use the product only with approved equipment.
- If applicable to your product, allow the product to cool before removing covers or touching internal components.
- Operate the product only from the type of external power source indicated on the electrical ratings label. If you are not sure of the type of power source required, consult your service provider or local power company.
- To avoid damaging your system, if your product uses a power supply with a voltage selector, be sure that the selector is set to match the power at your location:
  - 115V, 60 Hz in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
  - 100V, 50 Hz in eastern Japan and 100V, 60 Hz in western Japan
  - 230V, 50 Hz in most of Europe, the Middle East, and the Far East
- Be sure that attached devices are electrically rated to operate with the power available in your location.
- Depending on your product, use only a supplied power adapter or approved power cable:

If your product uses a power adapter:

- If you were not provided with a power adapter, contact your local NETGEAR reseller.
- The power adapter must be rated for the product and for the voltage and current marked on the product electrical ratings label.

If your product uses a power cable:

- If you were not provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable approved for your country.
  - The power cable must be rated for the product and for the voltage and current marked on the product electrical ratings label. The voltage and current rating of the cable must be greater than the ratings marked on the product.
- To help prevent electric shock, plug the system and peripheral power cables into properly grounded power outlets.
  - If applicable to your product, the peripheral power cables are equipped with three-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a three-wire cable with properly grounded plugs.
  - Observe extension cable and power strip ratings. Make sure that the total ampere rating of all products plugged into the extension cable or power strip does not exceed 80 percent of the ampere ratings limit for the extension cable or power strip.
  - To help protect your system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
  - Position system cables, power adapter cables, or power cables carefully. Route cables so that they cannot be stepped on or tripped over. Be sure that nothing rests on any cables.
  - Do not modify power adapters, power adapter cables, power cables or plugs. Consult a licensed electrician or your power company for site modifications.
  - Always follow your local and national wiring rules.

# 2

## Hardware Overview

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This chapter describes the switch hardware features.

The chapter includes the following sections:

- [Hardware overview of model MS510TXM](#)
- [Hardware overview of model MS510TXUP](#)
- [Switch hardware interfaces](#)

# Hardware overview of model MS510TXM

Model MS510TXM provides eight Gigabit Ethernet multispeed copper ports and two dedicated SFP+ fiber uplink ports that support 10G and 1G. Four of the multispeed copper ports support 2.5G, 1G, and 100M and each of the other four multispeed copper ports supports 10G, 5G, 2.5G, 1G, and 100M.

## Front panel model MS510TXM

The following figure shows the front panel of model MS510TXM.

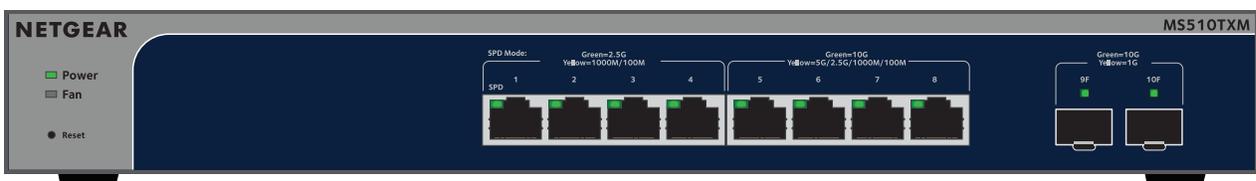


Figure 1. Front panel model MS510TXM

The following table describes the components on the front panel from left to right. The components are clearly labeled on the front panel.

Table 1. Front panel components model MS510TXM

Component	Description
System LEDs	Power LED and Fan LED. For more information about the LEDs, see <a href="#">LEDs model MS510TXM</a> on page 13.
Reset button	Recessed multi-function <b>Reset</b> button (see <a href="#">Multi-function Reset button</a> on page 18).
Ports 1, 2, 3, and 4	Four independent 2.5GBASE-T RJ-45 ports that also support 100/1000BASE-T. Each port provides a left LED that functions as the combined link, speed, and activity LED. (The port does not provide a right LED.) For more information about the LEDs, see <a href="#">LEDs model MS510TXM</a> on page 13.
Ports 5, 6, 7, and 8	Four independent 2.5G/5G/10GBASE-T RJ-45 ports that also support 100/1000BASE-T. Each port provides a left LED that functions as the combined link, speed, and activity LED. (The port does not provide a right LED.) For more information about the LEDs, see <a href="#">LEDs model MS510TXM</a> on page 13.
Ports 9F and 10F	Two independent SFP+ ports in which you can install transceiver modules and direct attach cables (see <a href="#">Transceiver modules and cables for SFP+ fiber ports</a> on page 18). These ports support 10G or 1G fiber transceiver modules. Each port provides a single LED that functions as the combined link, speed, and activity LED. For more information about the LEDs, see <a href="#">LEDs model MS510TXM</a> on page 13.

## LEDs model MS510TXM

The following table describes the LEDs on the front panel of model MS510TXM. Ports 1-8 each provide a left LED only. Ports 9F and 10F each provide a single LED.

Table 2. LEDs on the front panel of model MS510TXM

LED	Description
Power LED	<p><b>Blinking green:</b> The switch is booting.</p> <p><b>Solid green:</b> The switch is powered on and operating normally. If you changed the management mode of the switch to NETGEAR Insight, the switch is not yet added to an Insight managed network or not yet connected to the Insight cloud management server.</p> <p><b>Solid blue:</b> The management mode of the switch is NETGEAR Insight, the switch is added to an Insight managed network, and the switch is connected to the Insight cloud management server. You can manage and monitor the switch using the NETGEAR Insight app or Insight Cloud portal.</p> <p><b>Off:</b> Power is not supplied to the switch.</p>
Fan LED	<p><b>Solid green:</b> The fans are operating normally.</p> <p><b>Solid yellow:</b> A problem occurred with the fans.</p>
Ports 1-4, left LEDs Link, speed, and activity	<p><b>Off:</b> No link is established.</p> <p><b>Solid green:</b> A valid link at a speed of 2.5 Gbps is established.</p> <p><b>Blinking green:</b> The port is transmitting or receiving packets at 2.5 Gbps.</p> <p><b>Solid yellow:</b> A valid link at a speed of 100 Mbps or 1000 Mbps is established.</p> <p><b>Blinking yellow:</b> The port is transmitting or receiving packets at 100 Mbps or 1000 Mbps.</p>
Ports 5-8, left LEDs Link, speed, and activity	<p><b>Off:</b> No link is established.</p> <p><b>Solid green:</b> A valid link at a speed of 10 Gbps is established.</p> <p><b>Blinking green:</b> The port is transmitting or receiving packets at 10 Gbps.</p> <p><b>Solid yellow:</b> A valid link at a speed of 5 Gbps, 2.5 Gbps, 1000 Mbps, or 100 Mbps is established.</p> <p><b>Blinking yellow:</b> The port is transmitting or receiving packets at 5 Gbps, 2.5 Gbps, 1000 Mbps, or 100 Mbps.</p>
Ports 9F and 10F, LEDs Link, speed, and activity	<p><b>Off:</b> No module is installed in the SFP+ port or no link is established on the SFP+ port.</p> <p><b>Solid green:</b> The module in the SFP+ port established a valid link at a speed of 10 Gbps.</p> <p><b>Blinking green:</b> The module in the SFP+ is transmitting or receiving packets at 10 Gbps.</p> <p><b>Solid yellow:</b> The module in the SFP+ port established a valid link at a speed of 1 Gbps.</p> <p><b>Blinking yellow:</b> The module in the SFP+ is transmitting or receiving packets at 1 Gbps.</p>

## Back panel model MS510TXM

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

The back panel contains a Kensington lock slot and the AC power connector for power input of 100-240V ~ 50-60Hz. The PSU draws 2.0A max.



Figure 2. Back panel model MS510TXM

## Hardware overview of model MS510TXUP

Model GS510TXUP provides eight Gigabit Ethernet Ultra60 PoE++ (802.3bt) multispeed copper ports and two dedicated SFP+ fiber uplink ports that support 10G and 1G. Four of the multispeed copper ports support 2.5G, 1G, and 100M and each of the other four multispeed copper ports support 10G, 5G, 2.5G, 1G, and 100M. This model can supply up to 60W PoE++ to each copper port, with a maximum PoE power budget of 295W across all active PoE++ ports.

### Front panel model MS510TXUP

The following figure shows the front panel of model MS510TXUP.

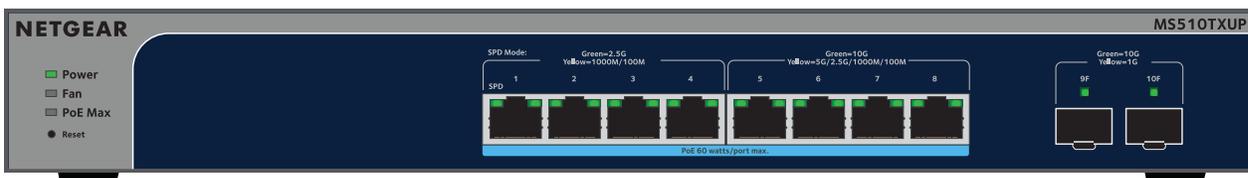


Figure 3. Front panel model MS510TXUP

The following table describes the components on the front panel from left to right. The components are clearly labeled on the front panel.

Table 3. Front panel components model MS510TXUP

Component	Description
System LEDs	Power LED, Fan LED, and PoE Max LED. For more information about the LEDs, see <a href="#">LEDs model MS510TXUP</a> on page 15.
Reset button	Recessed multi-function <b>Reset</b> button (see <a href="#">Multi-function Reset button</a> on page 18).

Table 3. Front panel components model MS510TXUP (Continued)

Component	Description
Ports 1, 2, 3, and 4	Four independent 2.5GBASE-T RJ-45 PoE++ ports that also support 100/1000BASE-T. Each port provides a left LED that functions as the combined link, speed, and activity LED and a right LED that provides PoE information. For more information about the LEDs, see <a href="#">LEDs model MS510TXUP</a> on page 15. For more information about the PoE++ ports, see <a href="#">PoE port capacities and budget for model MS510TXUP</a> on page 19.
Ports 5, 6, 7, and 8	Four independent 2.5G/5G/10GBASE-T RJ-45 PoE++ ports (also supporting 100/1000BASE-T). Each port provides a left LED that functions as the combined link, speed, and activity LED and a right LED that provides PoE information. For more information about the LEDs, see <a href="#">LEDs model MS510TXUP</a> on page 15. For more information about the PoE++ ports, see <a href="#">PoE port capacities and budget for model MS510TXUP</a> on page 19.
Ports 9F and 10F	Two independent SFP+ ports in which you can install transceiver modules and direct attach cables (see <a href="#">Transceiver modules and cables for SFP+ fiber ports</a> on page 18). These ports support 10G or 1G fiber transceiver modules. Each port provides a single LED that functions as the combined link, speed, and activity LED. For more information about the LEDs, see <a href="#">LEDs model MS510TXUP</a> on page 15.

## LEDs model MS510TXUP

The following table describes the LEDs on the front panel of model MS510TXUP. Ports 1-8 each provide a left LED and right LED. Ports 9F and 10F each provide a single LED.

Table 4. LEDs on the front panel of model MS510TXUP

LED	Description
Power LED	<p><b>Blinking green:</b> The switch is booting.</p> <p><b>Solid green:</b> The switch is powered on and operating normally. If you changed the management mode of the switch to NETGEAR Insight, the switch is not yet added to an Insight managed network or not yet connected to the Insight cloud management server.</p> <p><b>Solid blue:</b> The management mode of the switch is NETGEAR Insight, the switch is added to an Insight managed network, and the switch is connected to the Insight cloud management server. You can manage and monitor the switch using the NETGEAR Insight app or Insight Cloud portal.</p> <p><b>Off:</b> Power is not supplied to the switch.</p>
Fan LED	<p><b>Solid green:</b> The fans are operating normally.</p> <p><b>Solid yellow:</b> A problem occurred with the fans.</p>
PoE Max LED	<p><b>Off:</b> More than 7W of PoE power is available.</p> <p><b>Solid yellow:</b> Less than 7W of PoE power is available.</p> <p><b>Blinking yellow:</b> The PoE Max LED was active in the previous two minutes.</p>

## 8-Port Multi-Gigabit/10G Ethernet (Ultra60 PoE++) Smart Managed Pro Switch with 2 SFP+ Ports

Table 4. LEDs on the front panel of model MS510TXUP (Continued)

LED	Description
Ports 1-4, left LEDs Link, speed, and activity	<b>Off:</b> No link is established. <b>Solid green:</b> A valid link at a speed of 2.5 Gbps is established. <b>Blinking green:</b> The port is transmitting or receiving packets at 2.5 Gbps. <b>Solid yellow:</b> A valid link at a speed of 100 Mbps or 1000 Mbps is established. <b>Blinking yellow:</b> The port is transmitting or receiving packets at 100 Mbps or 1000 Mbps.
Ports 1-4, right LEDs PoE status	<b>Off:</b> The port is not delivering PoE. <b>Solid green:</b> The port is delivering PoE. <b>Solid yellow:</b> A PoE fault occurred. For more information, see <a href="#">PoE troubleshooting suggestions</a> on page 37.
Ports 5-8, left LEDs Link, speed, and activity	<b>Off:</b> No link is established. <b>Solid green:</b> A valid link at a speed of 10 Gbps is established. <b>Blinking green:</b> The port is transmitting or receiving packets at 10 Gbps. <b>Solid yellow:</b> A valid link at a speed of 5 Gbps, 2.5 Gbps, 1000 Mbps, or 100 Mbps is established. <b>Blinking yellow:</b> The port is transmitting or receiving packets at 5 Gbps, 2.5 Gbps, 1000 Mbps, or 100 Mbps.
Ports 5-8, right LEDs PoE status	<b>Off:</b> The port is not delivering PoE. <b>Solid green:</b> The port is delivering PoE. <b>Solid yellow:</b> A PoE fault occurred. For more information, see <a href="#">PoE troubleshooting suggestions</a> on page 37.
Ports 9F and 10F, LEDs Link, speed, and activity	<b>Off:</b> No module is installed in the SFP+ port or no link is established on the SFP+ port. <b>Solid green:</b> The module in the SFP+ port established a valid link at a speed of 10 Gbps. <b>Blinking green:</b> The module in the SFP+ is transmitting or receiving packets at 10 Gbps. <b>Solid yellow:</b> The module in the SFP+ port established a valid link at a speed of 1 Gbps. <b>Blinking yellow:</b> The module in the SFP+ is transmitting or receiving packets at 1 Gbps.

## Back panel model MS510TXUP

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

The back panel contains a Kensington lock slot and the AC power connector for power input of 100-240V ~ 50-60Hz. The PSU draws 7.0A max.



Figure 4. Back panel model MS510TXUP

# Switch hardware interfaces

The following sections describe the hardware interfaces on the switch.

## RJ-45 ports for 100/1000M and 2.5G/5G/10G BASE-T Ethernet connectivity

All RJ-45 copper ports support autosensing. When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed. Depending on the port, the switch can autodetect 100 Mbps or 1 Gbps and duplex mode (half-duplex or full-duplex), or 2.5 Gbps, 5 Gbps, or 10 Gbps of the attached device. All ports support Ethernet cables that are terminated with 8-pin RJ-45 connectors.

Use Category 5e (Cat 5e) Ethernet cables terminated with RJ-45 connectors to make 1G, 2.5G, and 5G connections. For 10G connections, use Cat 6a or higher-rated Ethernet cables terminated with RJ-45 connectors.

Table 5. Network cables and supported speeds

Cable Type	Supported Speeds
Category 5e (Cat 5e)	Speeds from 1 Gbps to 5 Gbps
Category 6e (Cat 6e)	Speeds of 10 Gbps and higher speeds

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

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

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

For model MS510TXUP, all copper ports (1 through 8) also support PoE++ (up to 60W per port).

## Transceiver modules and cables for SFP+ fiber ports

To enable fiber connections on the switch, SFP+ fiber ports accommodate standard small form-factor pluggable (SFP) gigabit interface converters (GBICs, also referred to as transceiver modules) and direct attach cables (DACs) for fiber connectivity. GBICs and DACs are sold separately from the switch.

The switch supports the following NETGEAR SFP and SFP+ transceiver modules and cables:

- Short-reach fiber transceiver modules:
  - **AGM731F**: SFP transceiver 1000BASE-SX, SFP multimode LC GBIC
- Long-reach fiber transceiver modules:
  - **AGM732F**: SFP transceiver 1000BASE-LX, SFP single mode LC GBIC
  - **AXM761**: SFP+ transceiver 10GBASE-SR, SFP+ multimode LC GBIC
  - **AXM762**: SFP+ transceiver 10GBASE-LR, SFP+ single mode LC GBIC
  - **AXM764**: SFP+ transceiver 10GBASE-LR Lite, SFP+ single mode LC GBIC
- Gigabit transceiver modules:
  - **AGM734**: SFP transceiver 1000BASE-T, SFP copper RJ-45 GBIC
- Direct attach cables:
  - **AXC761**: SFP+ 1 m (about 3.3 ft) direct attach cable
  - **AXC763**: SFP+ 3 m (about 10 ft) direct attach cable

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

## Multi-function Reset button

The switch provides a recessed, multi-function **Reset** button on the front panel. Depending on how long you press the button (for details, see the following procedure), this button lets you perform the following tasks:

- **Restart (power-cycle) the switch**: The switch restarts. All saved settings are retained. We recommend that you save the settings before you press the **Reset** button to restart the switch.

- **Reset the switch to factory default settings but maintain the registration status:** All settings are erased and the switch restarts with factory default settings. The NETGEAR registration status is maintained and not reset.
- **Reset the switch to factory default settings and reset the registration status:** This option can be useful if you want to register the switch under a different name or account. This option requires you to first contact NETGEAR support at [netgear.com/support](https://netgear.com/support) so that the NETGEAR registration status on the NETGEAR server can be reset. Then, you can use this option to erase all settings, reset the switch to factory defaults, go through the initial log-in process again, and reregister the switch with NETGEAR.

### To restart or reset the switch using the Reset button:

1. Insert a tool such as a straightened paper clip into the opening.
2. Do one of the following:
  - **Restart the switch:** Press the **Reset** button for less than 5 seconds. (Do not press the button for more than 5 seconds!)
  - **Reset the switch to factory default settings but maintain the registration status:** Press the **Reset** button for more than 5 seconds but less than 10 seconds. (Do not press the button for more than 10 seconds!)
  - **Reset the switch to factory default settings and reset the registration status:** Press the **Reset** button for more than 10 seconds.

During the restart or reset process, the Power LED lights yellow.

## PoE port capacities and budget for model MS510TXUP

Model MS510TXUP supports eight Ultra60 PoE++ copper ports with the port capacities that are described in the following table. The maximum PoE power budget for the switch is 295W across all active PoE++ ports.

Supplied power is prioritized according to the port order, up to the total power budget of the switch. Port 1 receives the highest PoE priority, while port 8 is relegated to the lowest PoE priority.

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

Although a device might be listed as an 802.3bt PoE++-powered or 802.3at PoE+-powered device, it might not require the maximum power limit that is specified by its IEEE standard. Many devices require less power, allowing all 8 PoE ports to be active simultaneously when the devices correctly report their PoE class to the switch.

Table 6. PoE classes and PoE power allocations

Device Class	Compatible PoE Standard	Class Description	Maximum Power Reserved for the PD	Power Delivered to the PD
0	PoE, PoE+, and PoE++	Default power (full)	15.4W	0.44W-13.0W
1	PoE, PoE+, and PoE++	Very low power	4.0W	0.44W-3.84W
2	PoE, PoE+, and PoE++	Low power	7.0W	3.84W-6.49W
3	PoE, PoE+, and PoE++	Mid power	15.4W	6.49W-13.0W
4	PoE+ and PoE++	High power	30.0W	13.0W-25.5W
5	PoE++	Ultra high power	45.0W	25.5W-40.0W
6	PoE++	Ultra high power	60.0W	40.0W-51.0W

The previous table shows the standard power ranges, calculated with the maximum cable length of 328 feet (100 meters). If a powered device (PD) receives insufficient PoE power from the switch, consider using a shorter cable.

For more information about PoE, see the user manual, which you can download by visiting [netgear.com/support/download](http://netgear.com/support/download).

# 3

## Applications

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The switch is designed to provide flexibility in configuring multispeed network connections. This chapter shows application examples with 10G, 5G, 2.5G, and 1G connections and, for model MS510TXUP, multispeed PoE++ connections.

The chapter includes the following sections:

- [Multispeed PoE++ and PoE+ access points and cameras](#)
- [Multispeed backbone switching](#)
- [10G network storage and redundancy](#)

# Multispeed PoE++ and PoE+ access points and cameras

Model MS510TXUP supports 8 PoE++ ports. The switch can supply up to 60W PoE++ (802.3bt) to each port up to its total maximum PoE power budget of 295W across all active PoE++ ports.

The following figure shows an example of how you can connect multispeed (1G and 2.5G) PoE++ and PoE+ access points and cameras. The speed icons indicate the speed of the connection. The switch is connected to a network router and to the Internet.

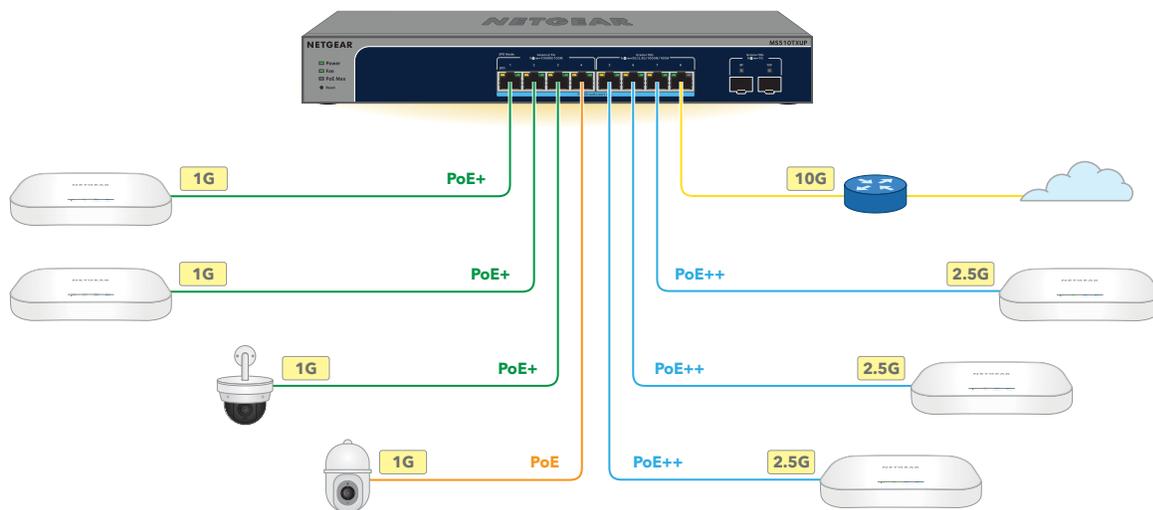


Figure 5. Multispeed PoE++ and PoE+ access points and cameras

Table 7. Line colors in the figure

Line Color	Description
Blue	PoE++ (802.3bt) connection, for example, to a PoE++ WiFi 6 access point.
Green	PoE+ (802.3at) connection, for example, to a PoE+ WiFi access point or PoE+ pan-tilt-zoom (PTZ) camera.
Orange	PoE (802.3af) connection, for example, to a PoE IP camera.
Yellow	Non-PoE uplink connection to a network router and to the Internet.

Supplied power is prioritized according to the port order, up to the total power budget of the device. Port 1 receives the highest PoE priority, while port 8 is relegated to the lowest PoE priority.

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

**Note:** Although a device is listed as an 802.3bt PoE++ powered or 802.3atPoE+ powered device, it might not require the maximum power limit that is specified by its IEEE standard. Many devices require less power, allowing all 8 PoE++ ports to be active simultaneously when the devices correctly report their PoE class to the switch.

## Multispeed backbone switching

You can use the switch as a multispeed backbone switch in a network that serves network components such as high-speed servers, high-speed storage platforms, and 1G and 2.5G computers. The switch supports speeds from 100 Mbps all the way up to 10G.

In the following figure, the speed icons indicate the speed of the connection. The yellow cable indicates the uplink connection to a network router and to the Internet.

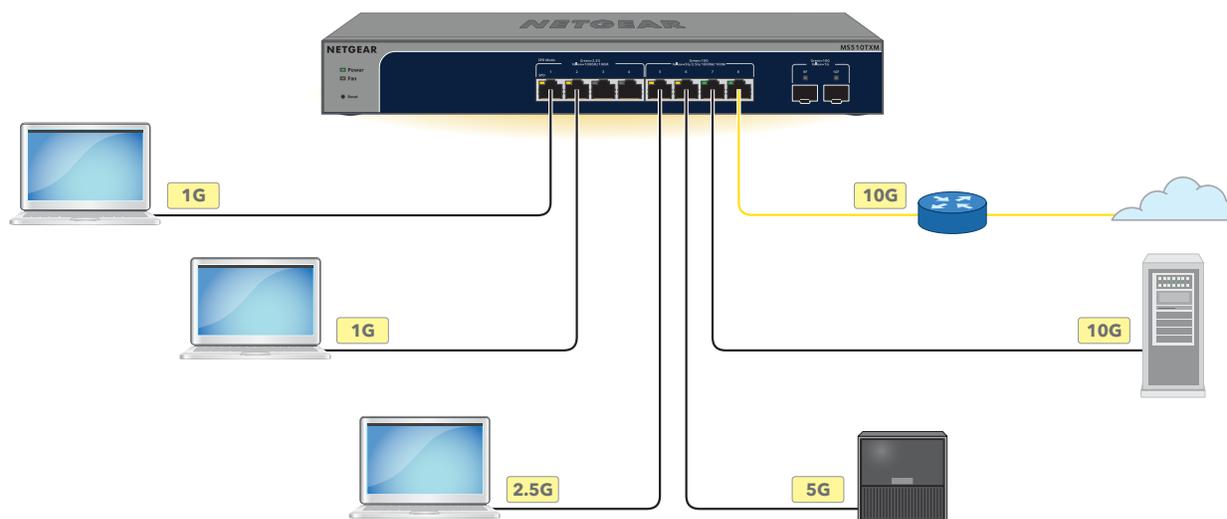


Figure 6. Multi-speed backbone switching

# 10G network storage and redundancy

You can use two switches in a data redundancy configuration to provide 10G redundant connections for 10G storage platforms and 10G servers. Each system consists of one switch, one server, and one storage platform. Both systems together provide full data redundancy with exact replication.

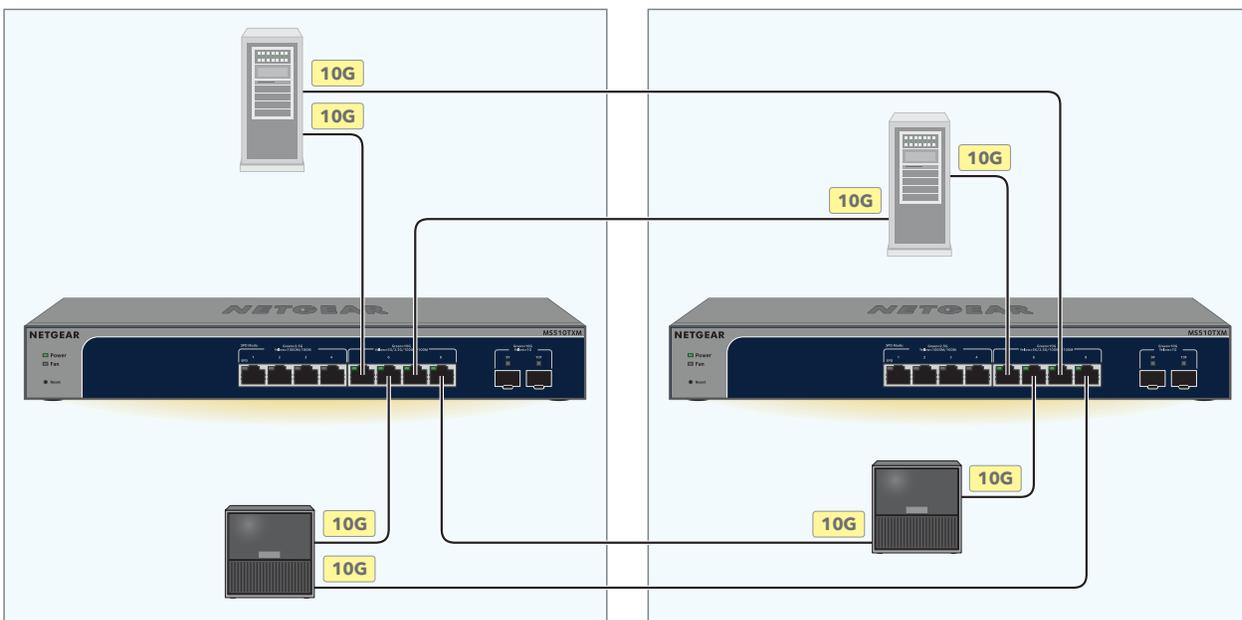


Figure 7. High-speed network storage switching in a redundant configuration

# 4

## Installation

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

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

## Step 1: Prepare the site

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

Table 8. Site requirements

Characteristics	Requirements
Mounting	<p><b>Desktop installations:</b> Provide a flat table or shelf surface.</p> <p><b>Rack-mount installations:</b> Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit that is supplied with the switch.</p>
Access	Locate the switch in a position that allows you to access the front panel ports, view the front panel LEDs, and access the power connector on the back panel.
Power source	Use the AC power cord that is supplied with the switch. Make sure that the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Cabling	Route cables to avoid sources of electrical noise such as radio transmitters, broadcast amplifiers, power lines, and fluorescent lighting fixtures.
Environmental	<p><b>Temperature:</b> Install the switch in a dry area with an ambient temperature between 32°F and 122°F (0°C and 50°C). Keep the switch away from heat sources such as direct sunlight, warm-air exhausts, hot-air vents, and heaters.</p> <p><b>Operating humidity:</b> The maximum relative humidity of the installation location must not exceed 95 percent, noncondensing.</p> <p><b>Ventilation:</b> Do not restrict airflow by covering or obstructing air inlets on the sides of the switch. Keep at least 2 inches (5.08 centimeters) free on all sides for cooling. The room or wiring closet in which you install the switch must provide adequate airflow.</p> <p><b>Operating conditions:</b> Keep the switch at least 6 feet (1.83 meters) away from the nearest source of electromagnetic noise, such as a photocopy machine.</p>

## Step 2: Protect against electrostatic discharge

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

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

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

### Step 3: Unpack the switch

The following figure shows the package contents.



Figure 8. Switch package contents

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

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

1. Place the container on a clean flat surface, and cut all straps securing the container.
2. Unpack the hardware from the boxes by carefully removing the hardware and placing it on a secure and clean surface.
3. Remove all packing material.

4. Verify that the package contains the following items:
  - Switch of the correct model.
  - Detachable power cord (varies by region).
  - Rubber footpads for tabletop installation.
  - Two rack-mount installation brackets.
  - Rack-mount installation screws and washers:
    - Eight small screws to attach the brackets to the switch (four small screws for each side).
    - Four large screws and four washers to attach the brackets to the rack (two screws and two washers for each side).
    - Four additional large screws of a different size to attach the brackets to the rack, allowing you to select the most suitable set of screws for the rack.
  - Installation guide.
5. If any item is missing or damaged, contact your local NETGEAR reseller for replacement.

## Step 4: Install the switch

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

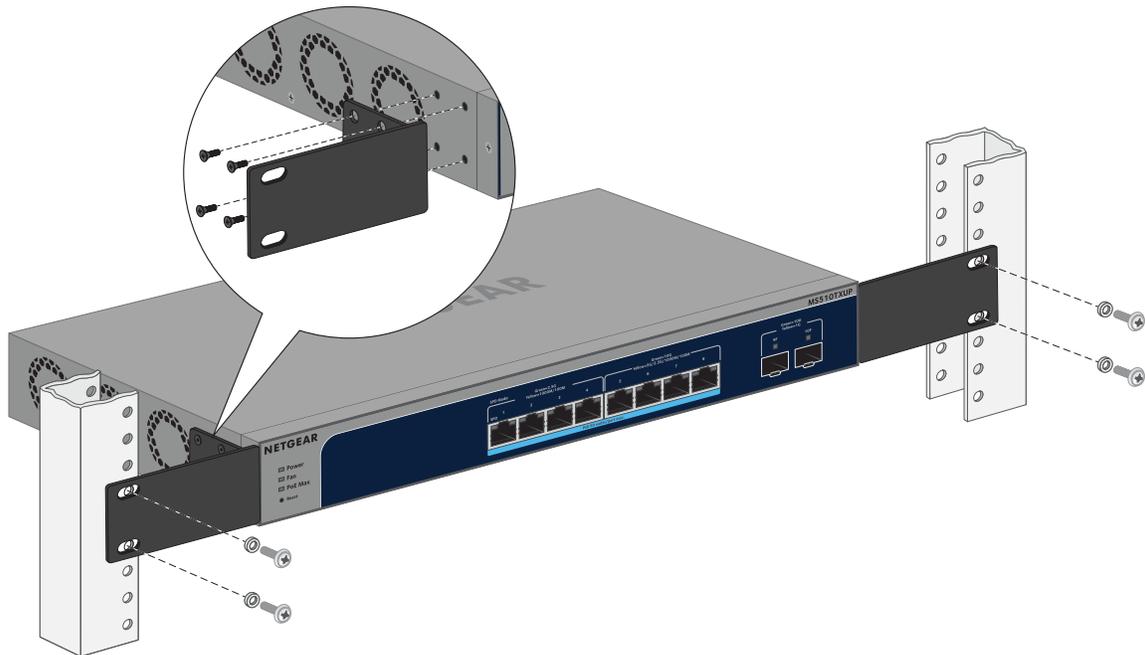
### Install the switch in a rack

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

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

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

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

## Optional Step 5: Install an SFP transceiver module or cable

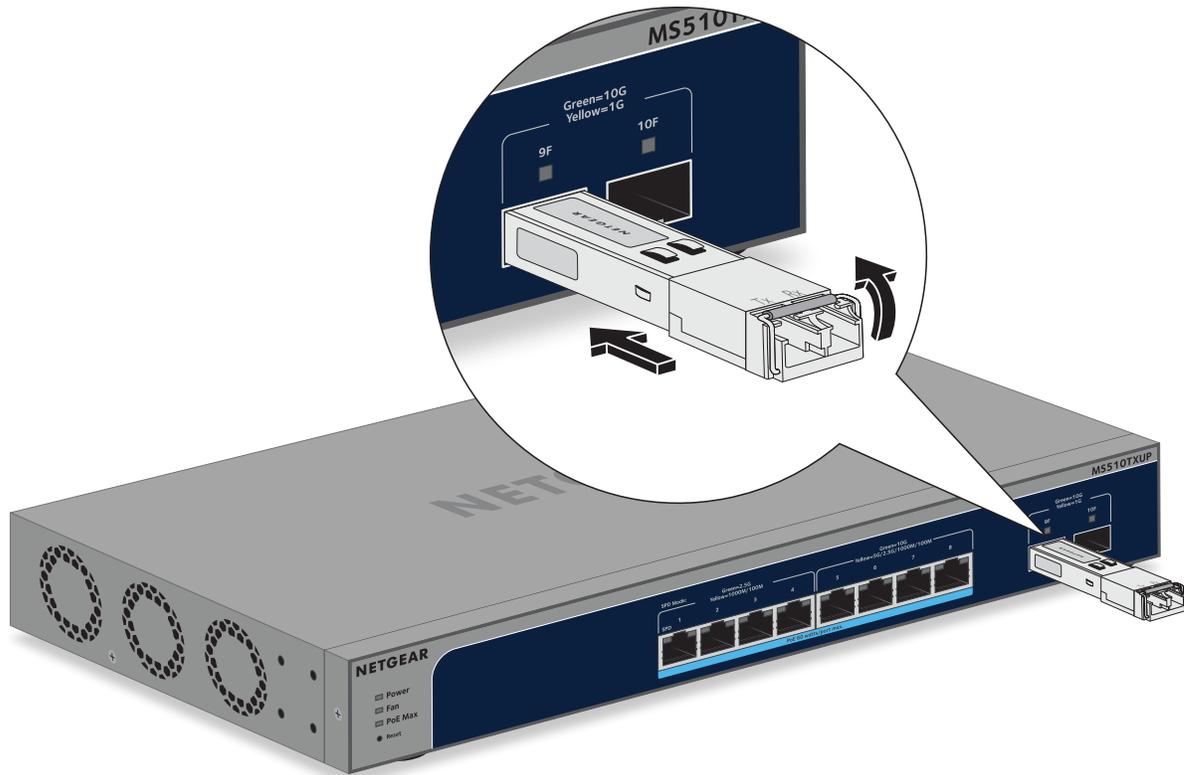
For more information about transceiver modules and direct attach cables (DACs), see [Transceiver modules and cables for SFP+ fiber ports](#) on page 18. Contact NETGEAR or your NETGEAR reseller to purchase these modules and cables.

If you do not want to install an SFP module, skip the following procedure.

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

**To install an SFP transceiver module or cable:**

1. Insert the transceiver or cable into the SFP+ port 9F or 10F.
2. Press firmly on the flange of the module or cable connector to seat it securely into the switch connector.



## Step 6: Connect devices to the switch

**WARNING:** This switch is designed for indoor use only. If you want to connect it to a device located outdoors, the outdoor device must be properly grounded and surge protected, and you must install an Ethernet surge protector inline between the switch and the outdoor device. Failure to do so can damage the switch.

**Note:** Before connecting this switch to outdoor cables or devices, see <https://kb.netgear.com/000057103> for safety and warranty information.

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

cable that is terminated with an RJ-45 connector. For more information, see [RJ-45 ports for 100/1000M and 2.5G/5G/10G BASE-T Ethernet connectivity](#) on page 17.

**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's RJ-45 Ethernet ports:

1. Connect one RJ-45 Ethernet port with an Ethernet cable to your network.  
The network connection can be to a hub, another switch, router, or Internet gateway.

**Note:** Instead of using an RJ-45 Ethernet port, you can connect an SFP+ port with an SFP or SFP+ transceiver module and cable to your network. For more information, see [Optional Step 5: Install an SFP transceiver module or cable](#) on page 29.

2. Connect devices to the RJ-45 Ethernet ports on the switch.
3. Verify that all cables are installed correctly.

## Step 7: Check the installation

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

### To check the installation:

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

## Step 8: Apply power and check the LEDs

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

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

### To apply power:

1. Connect the end of the power cord to the AC power receptacle on the back of the switch.

2. Plug the AC power cord into a power source such as a wall socket or power strip.
3. Check to see that the LEDs on the switch light correctly.

When you apply power, the Power LED on the switch front panel lights and the port LEDs for attached devices light. For more information, see [LEDs model MS510TXM](#) on page 13 or [LEDs model MS510TXUP](#) on page 15.

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

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

## Step 9: Manage the switch

The switch contains built-in web browser-accessible software for viewing, changing, and monitoring the way it functions. This management software is not required for the switch to work. You can use the ports without using the management software. However, the management software enables the setup of multiple features (such as VLANs and LAGs) 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.

**Note:** By default, the DHCP client of the switch is enabled. If the switch cannot get an IP address from a DHCP server, the switch's default IP address is 192.168.0.239 and the default subnet mask is 255.255.255.0.

The switch provides the following management options that let you discover the switch on the network and configure, monitor, and control the switch:

- **Device user interface (UI):** By default, the management mode of the switch is set to Directly Connect to Web Browser Interface, which lets you access the device UI. In this mode, you can change all settings of the switch. For more information about the device UI, see the user manual, which you can download from [netgear.com/support/download](http://netgear.com/support/download).

**Note:** If you plan to use the NETGEAR Insight app or Insight Cloud portal to manage the switch, we recommend that you do not use the device UI to change settings that are *Insight manageable* because they would not be synchronized with Insight or to the network location and other devices to which you assigned the switch.

- **NETGEAR Insight app and Insight Cloud portal:** If you set the management mode of the switch to NETGEAR Insight Mobile App and Insight Cloud Portal, you can use the following applications to manage the switch remotely:
  - **NETGEAR Insight app:** With the NETGEAR Insight app, you can discover the switch on the network and add the switch to the NETGEAR Insight app so that you can set up the switch in the network and manage and monitor the switch remotely from your smartphone or tablet. You can choose from four methods to add the switch to the NETGEAR Insight app: You can scan your network for the switch, scan the QR code or the barcode of the switch, or add the serial number of the switch.
  - **Insight Cloud portal:** As an Insight Premium or Insight Pro subscriber, you can use the NETGEAR Insight Cloud portal to set up the switch in the network, perform advanced remote setup, configuration, and management, monitor the switch, analyze the switch and network usage, and, if necessary, troubleshoot the switch and the network.

For more information about NETGEAR Insight, visit [netgear.com/insight](https://netgear.com/insight) and see the NETGEAR knowledge base articles at [netgear.com/support](https://netgear.com/support).

By default, the management mode is set to Directly Connect to Web Browser Interface (which is the same as the device UI). Note the following about changing the management mode:

- **Changing to NETGEAR Insight Mobile App and Insight Cloud Portal mode:** The first time that you change to this mode, the switch is set to factory default settings so that you can manage the switch using the Insight app or the Insight Cloud portal. However, if you added the switch to a network on the Insight app or Insight portal before, all Insight-manageable device settings are returned to the last configuration saved on the cloud server, including the switch password (that is, the password is reset to the Insight network password).

**Note:** If you use the NETGEAR Insight app or the Insight Cloud portal, you can temporarily change the management mode of the switch back to Directly Connect to Web Browser Interface and access the device UI for settings that are not Insight-manageable, for complex tasks such as integrating with an existing network of devices that are not managed through Insight, and for debugging purposes. When you are done, you can change the management mode back to NETGEAR Insight Mobile App and Insight Cloud Portal.

- **Changing back to Directly Connect to Web Browser Interface mode:** The NETGEAR Insight Mobile App and Insight Cloud Portal management mode is disabled and the current Insight-manageable device settings are saved to the cloud server.

Any changes that you make using the Directly Connect to Web Browser Interface management mode are not saved to the cloud server.

# 5

## Troubleshooting

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This chapter provides information about troubleshooting the switch.

The chapter includes the following sections:

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

# Troubleshooting chart

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

Table 9. Troubleshooting chart

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

## PoE troubleshooting suggestions

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

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

Table 10. PoE fault conditions and possible solutions

PoE Fault Condition	Possible Solution
A PoE-related short circuit occurred on the port.	The problem is most likely with the attached PD. Check the condition of the PD or restart the PD by disconnecting and reconnecting the PD.
The PoE power demand of the PD exceeded the maximum level that the switch permits. The maximum level is 15.4W for a PoE connection, 30W for a PoE+ connection, and 60W for a PoE++ connection.	
The PoE current on the port exceeded the classification limit of the PD.	
The PoE voltage of the port is outside the range that the switch permits.	Restart the switch to see if the condition resolves itself.

## Additional troubleshooting suggestions

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

- **Network adapter cards:** Make sure that the network adapters that are installed in the computers are in working condition and the software driver was installed.
- **Configuration:** If problems occur after you alter the network configuration, restore the original connections and determine the problem by implementing the new changes, one step at a time. Make sure that cable distances, repeater limits, and other physical aspects of the installation do not exceed the Ethernet limitations.
- **Switch integrity:** If necessary, verify the integrity of the switch by restarting it. To restart the switch, disconnect the power from the switch and then reconnect the power. If the problem continues, contact NETGEAR technical support. For more information, visit the support website at [netgear.com/support/](http://netgear.com/support/).
- **Autonegotiation:** The RJ-45 ports negotiate the correct duplex mode, speed, and flow control if the device at the other end of the link supports autonegotiation. If the device does not support autonegotiation, the switch determines only the speed correctly, and the duplex mode defaults to half-duplex. The Ethernet ports negotiate speed, duplex mode, and flow control if the attached device supports autonegotiation.