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It is hereby certified that the NETGEAR Model FSM7328S Managed Fast Ethernet Switch has been suppressed in accordance with the conditions set out in the BMPT-AmtsblVfg 243/1991 and Vfg 46/1992. The operation of some equipment (for example, test transmitters) in accordance with the regulations may, however, be subject to certain restrictions. Please refer to the notes in the operating instructions.

Federal Office for Telecommunications Approvals has been notified of the placing of this equipment on the market and has been granted the right to test the series for compliance with the regulations.

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This equipment is in the first category (information equipment to be used in commercial and/or industrial areas) and conforms to the standards set by the Voluntary Control Council for Interference by Data Processing Equipment and Electronic Office Machines that are aimed at preventing radio interference in commercial and/or industrial areas.

Consequently, when this equipment is used in a residential area or in an adjacent area thereto, radio interference may be caused to equipment such as radios and TV receivers.

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This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A 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 generates, 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 measures:

Reorient or relocate the receiving antenna.

Increase the separation between the equipment and receiver.

Connect the equipment into an outlet on a circuit different from that which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

EN 55 022 Declaration of Conformance

This is to certify that the NETGEAR Model FSM7328S Managed Fast Ethernet Switch is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55024 Class A (CISPR 22).

EN 55 022 and EN 55 024 Statements

This is to certify that the NETGEAR Model FSM7328S Managed Fast Ethernet Switch is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22) and EN 55 024.



Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take appropriate measures.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (NETGEAR Model FSM7328S Managed Fast Ethernet Switch) do not exceed the Class A limits for radio-noise emissions from digital apparatus as set out in the Radio Interference Regulations of the Canadian Department of Communications.

Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (NETGEAR Model FSM7328S Managed Fast Ethernet Switch) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

Customer Support

For assistance with installing and configuring your NETGEAR system or with questions or problems following installation:

- Check the NETGEAR Web page at <http://www.NETGEAR.com>.
- Call Technical Support in North America at 1-888-NETGEAR. If you are outside North America, please refer to the phone numbers listed on the Support Information Card that shipped with your switch.
- Email Technical Support at support@NETGEAR.com.

Defective or damaged merchandise can be returned to your point-of-purchase representative.

Internet/World Wide Web

NETGEAR maintains a World Wide Web home page that you can access at the uniform resource locator (URL) <http://www.NETGEAR.com>. A direct connection to the Internet and a Web browser such as Internet Explorer or Netscape are required.

CONTENTS

CHAPTER 1: INTRODUCTION.....	5
<i>Overview.....</i>	<i>5</i>
<i>Features.....</i>	<i>6</i>
<i>Package Contents.....</i>	<i>7</i>
<i>Verify that your package contains the following:.....</i>	<i>8</i>
CHAPTER 2: PHYSICAL DESCRIPTION	9
<i>Front and Back Panels.....</i>	<i>9</i>
<i>10/100/1000 Mbps RJ-45 Ports.....</i>	<i>9</i>
SFP module bay.....	10
<i>LED Descriptions.....</i>	<i>11</i>
<i>Console Port.....</i>	<i>12</i>
CHAPTER 3: INSTALLATION.....	13
<i>Step 1: Preparing the Site.....</i>	<i>13</i>
<i>Step 2: Installing the Switch.....</i>	<i>14</i>
<i>Step 3: Checking the Installation.....</i>	<i>14</i>
<i>Step 4: Applying AC Power.....</i>	<i>14</i>
<i>Step 5: Connecting Devices to the Switch.....</i>	<i>15</i>
<i>Step 6: Installing a SFP Module.....</i>	<i>15</i>
<i>Step 7: Connecting to the Console Port to Manage the Switch (initial configuration).....</i>	<i>16</i>
APPENDIX A: TECHNICAL SPECIFICATIONS	19
APPENDIX B: TROUBLESHOOTING	22
<i>Troubleshooting Chart.....</i>	<i>22</i>
<i>Additional Troubleshooting Suggestions.....</i>	<i>22</i>
<i>Network Adapter Cards.....</i>	<i>22</i>
APPENDIX C: Default Settings.....	24

Figures

FIGURE 1-1. PACKAGE CONTENTS.....	8
FIGURE 2-1. FRONT PANEL OF THE FSM7328S MANAGED STACKABLE LAYER 3 FAST ETHERNET SWITCH	9
FIGURE 2-2. BACK PANEL OF THE FSM7328S MANAGED STACKABLE LAYER 3 FAST ETHERNET SWITCH	9
FIGURE 2-3. WARNING! CREATING REDUNDANT PATHS BETWEEN NETWORK DEVICES	10
FIGURE 3-1. ATTACHING MOUNTING BRACKETS	14
FIGURE 3-2. CONNECTING DEVICES TO THE SWITCH.....	15
FIGURE 3-3. INSTALLING A GIGABIT ETHERNET FIBER MODULE INTO AN FSM7328S.....	16
FIGURE 3-4. SYSTEM INFORMATION.....	17

Tables

TABLE 2-1. FRONT PANEL LEDS:	11
TABLE 3-1. SITE REQUIREMENTS	13
TABLE B-1. TROUBLESHOOTING CHART	22

CHAPTER 1: INTRODUCTION

Congratulations on your purchase of a NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch! Your NETGEAR Switch is a state-of-the-art, high-performance, IEEE-compliant network solution designed for users who want ease of use along with powerful management features you can use to eliminate bottlenecks, boost performance, and increase productivity.

This Installation Guide will assist you in getting your switch up and running. For a detailed description of the management features in this switch, refer to the User Manual, located on your Resource CD for Layer 3 Managed Switches that came with your switch.

This chapter serves as the introduction for using your NETGEAR FSM7328S Switch and provides the following information:

Overview

Switch Features

Package contents

Overview

Your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch provides the benefit of management with a complete package of features for the observation, configuration, and control of your 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. For those who prefer a more traditional interface, there is Command Line Interface (CLI) available through the console port on the front or a telnet connection via the network. The switch's management features include SNMP and RMON for port and switch information, VLAN for traffic control, port trunking for increased bandwidth, and Class of Service (CoS) for traffic prioritization. These features and more will allow you to better understand and better control your network.

Your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch also provides four fiber Gigabit Ethernet ports using miniGBIC fiber connector located on the front panel. The SFP module bays will accept any standard SFP module. Using these Gigabit ports, 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
- High-speed servers
- Fiber and copper Gigabit Ethernet networks

Your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch can be free-standing, or rack mounted in a wiring closet or equipment room. It is IEEE-compliant and offers low latency for high-speed networking. It includes 24 10/100 ports and 4 auto-sensing 10/100/1000 ports. The ports are shielded RJ-45 ports that automatically negotiate to the highest speed. In addition, all 10/100/1000 Mbps ports operate in half- or full-duplex mode, increasing the maximum bandwidth of each connection up to 20 Mbps or 200 Mbps or 2000Mbps, respectively. Using Auto Uplink™ technology, every RJ-45 port will automatically detect the proper MDI or MDI-X configuration to make the connection, eliminating the need for crossover cables. 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 NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch.

- Twenty-four 10/100Mbps and four 10/100/100 Mbps auto sensing Fast Ethernet TP ports
- Four SFP modules combo (shared with TP) with GTP for a variety of fiber connections
- The four gigabit ports can be configured with stacking function to allow up to 8 switches to form a stack with single management IP address
- Full compatibility with IEEE standards:
 - IEEE 802.3i, (10BASE-T)
 - IEEE 802.3u (100BASE-TX)
 - IEEE 802.3ab (1000BASE-T)
 - IEEE 802.3z (1000BASE-X)
 - IEEE 802.3x (full-duplex flow control)
- Full Layer 2 switch management including:
 - SNMP v3
 - RMON (groups 1,2,3 and 9)
 - IEEE 802.1Q (up to 512 Static VLAN groups)
 - IEEE 802.1D (Spanning Tree)
 - IEEE 802.1w (rapid spanning tree)
 - IEEE 802.1s (multiple spanning tree)
 - IEEE802.3ad Link Aggregation (LACP)
 - Port Mirroring
 - DHCP/Bootp Client for automatic IP address set up
 - Configuration file export/import
 - TFTP firmware upgrade
- Layer 3 switch management including:
 - RIP I, II
 - IP Routing
- Security to better safeguard your network
 - Password Access Control
 - IP Access Control List
 - RADIUS Client Support
 - Port Access Control
 - SNMPv3
 - Secure Sockets Layer (SSLv3)
 - Transport Layer Security (TLSv1)
 - Secured Shell (SSHv1,v2)
- Traffic management to better manage traffic flows through your switch
 - IEEE 802.1p (Class of Service)
 - DiffServ traffic prioritization
 - Broadcast Storm Control
 - IGMP snooping
 - Half-duplex back-pressure control

- Full-duplex IEEE 802.3x pause frame flow control
- Multiple interfaces to access the management features
 - Browser-based Graphical User Interface (GUI)
 - Command Line Interface (CLI)
 - Telnet or Console
 - Standards-based and Private Enterprise SNMP MIBs
- Automatic hardware configuration on all Ethernet RJ-45 ports
 - Auto-sensing and auto-negotiating speed
 - Auto Uplink™ on all ports to automatically make the right connection (MDI/MDI-X)
 - Full- and half-duplex functions
- Automatic address learning function to build the packet-forwarding information table. The table contains up to 16,000 media access control (MAC) addresses (that is, the switch can support networks with as many as 16,000 devices).
- Store-and-Forward transmission to remove bad packets from the network
- LED indicators for monitoring of power, link, activity, speed
- Flexible installation:
 - Standalone desktop installation
 - 19-inch standard rack-mount
- Standard 1U case size

Package Contents

Figure 1-1 shows the package contents for the Managed Switch.

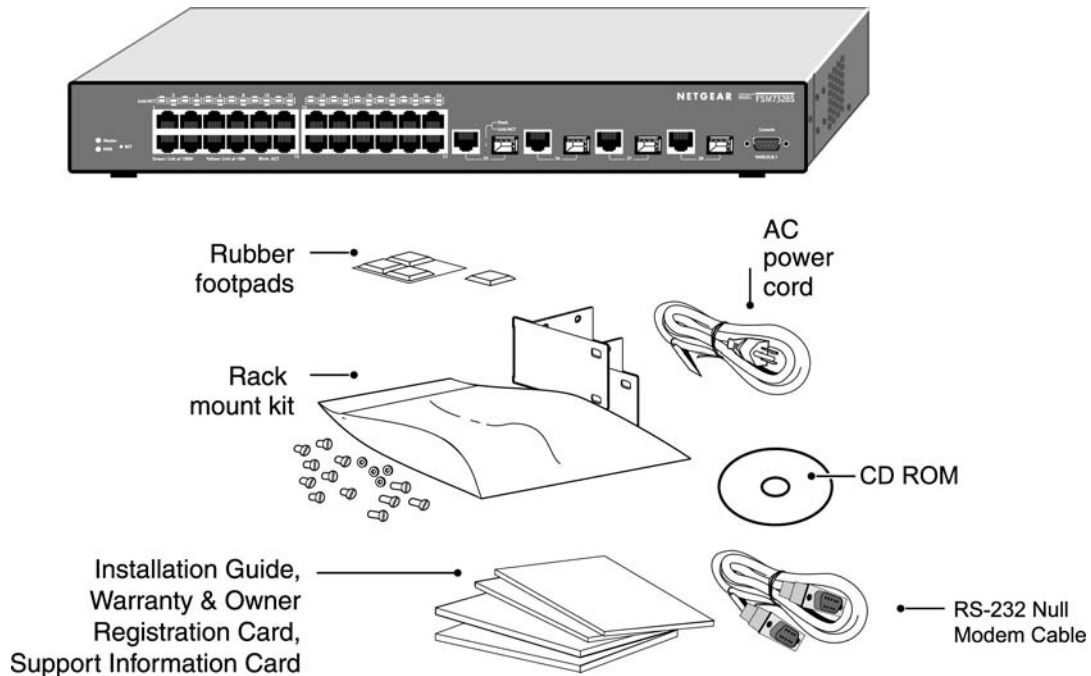


Figure 1-1. Package Contents

Verify that your package contains the following:

- FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch
- Rubber footpads for tabletop installation
- Rubber caps for the 4 SFP sockets
- Power cord
- Null-modem console cable
- Rack-mount kit for installing the switch in a 19-inch rack
- This Installation Guide
- CD ROM
- Support Information Card
- Warranty

If you ordered additional SFP modules with your switch, they are provided in a separate package. If any item is missing or damaged, contact your place of purchase immediately.

CHAPTER 2: PHYSICAL DESCRIPTION

This chapter describes the hardware features of the NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch. Topics include:

- Front and back panels
- 24 10/100 Mbps and 4 10/100/1000 Mbps auto-sensing RJ-45 ports
- SFP module bay
- LED descriptions
- Console port

Front and Back Panels

Figures 2-1 and 2-2 show the key components on the front and back panels of the NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch

The front panel contains LEDs, RJ-45 jacks, SFP module bays, and a console port. The back panel has a standard AC power receptacle for accommodating the supplied power cord.

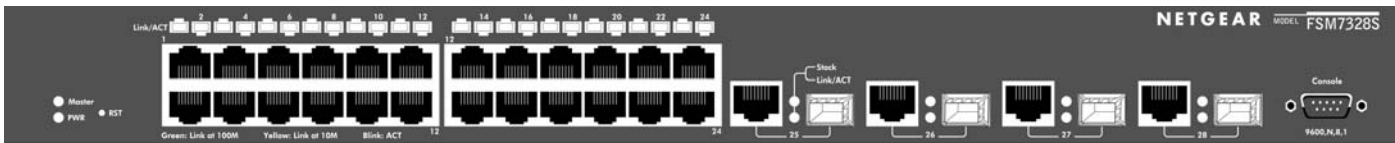


Figure 2-1. Front Panel of the FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch



Figure 2-2. Back Panel of the FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch

10/100/1000 Mbps RJ-45 Ports

As Figures 2-1 and 2-3 shows, the FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch has 24 10/100 Mbps and 4 10/100/1000 Mbps RJ-45 ports. These 4 ports are auto-sensing 10/100/1000 Mbps ports: When you insert a cable into an RJ-45 port, the switch automatically ascertains the maximum speed (10, 100, or 1000 Mbps) and duplex mode (half- or full-duplex) of the attached device.

To simplify the procedure for attaching devices, all RJ-45 ports support Auto Uplink. This technology lets you attach devices to the RJ-45 ports using either straight-through or crossover cables. When you insert a cable into the switch's RJ-45 port, the switch automatically:

- Senses whether the cable is a straight-through or crossover cable.
- Determines whether the link to the attached device requires a “normal” connection (such as when connecting the port to a PC) or an “uplink” connection (such as when connecting the port to a router, switch, or hub).

[SPECIAL NOTE: Ports 27 and 28 are in stacking mode by default. While you may connect and

establish a link with non-stacking interfaces no traffic will pass across the interface. These interfaces are available to quickly and easily build a stack of switches by simply connecting two or more FSM7300 switches together with either Category 5 copper Ethernet cables or with SFP-based fiber connections.

- After ascertaining this information, the switch automatically configures the RJ-45 port to enable communications with the attached device, without requiring user intervention. In this way, the Auto Uplink technology eliminates the need for setting uplink connections or being concerned about whether to use crossover or straight-through cables when attaching devices.

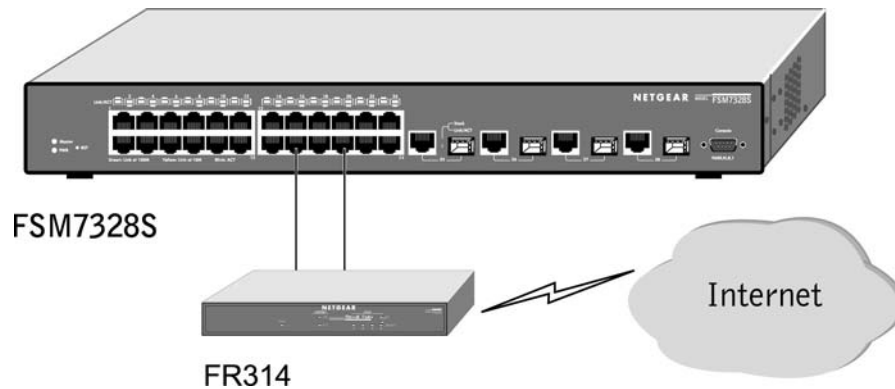


Figure 2-3. Warning! Creating Redundant Paths between Network Devices

SFP module bay

The last four ports (25,26,27,28) on FSM7328S can be used for either STP (RJ45) or SFP (fiber) type cable. However, both port types cannot be used at the same time. The switch will detect the port in use automatically simply by the first connected interface. If both connectors are plugged the SFP interface will operate normally while the copper interface will be disabled. The SFP bay accommodates a standard SFP module which has an SC connector that is compatible with the IEEE 802.3z 1000BASE-SX standard.

LED Descriptions

The front panel of the NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch has LEDs that provide a quick and accurate display of port speed, activity, and link state. The Gigabit Ethernet SFP ports also have LEDs that show link and activity status. Table 2-1 summarizes the LEDs on the switch and Gigabit Ethernet module.

Table 2-1. Front Panel LEDs:

Label	Description
Power	<p>Solid Green- Power is supplied to the switch & operating normally Blinking Green- Runtime code load in progress Solid Yellow- POST in progress. Blinking Yellow- POST fail or CPU fail . Off- Power is Disconnected.</p>
Fan	<p>Solid Red- Fan has failed Off- Fan is present and operating normally</p>
Status	<p>Green on- Switch is operating normally Amber on- Switch has failed to bootup</p>
Master	<p>Green – Switch is the master of the stack Off – Switch is not the master of the stack</p>
24-10/100M Ports One LED /Port	<p>Link/ACT/SPD LED:</p> <ul style="list-style-type: none"> • Off- No 10/100Mbps link is established on the port. • Solid Green- A valid 100Mbps link is established on the port. • Blinking Green- Packets transmission or reception is occurring on the port at 100Mbps. • Solid Yellow- A valid 10Mbps link is established on the port. • Blinking Yellow- Packets transmission or reception is occurring on the port at 10Mbps.
4-10/100/1000M Ports two LED / Port	<p>Link/ACT LED:</p> <ul style="list-style-type: none"> • Off- No 10/100/1000Mbps link is established on the port. • Solid Green- A valid 1000Mbps link is established on the port. • Solid Yellow- A valid 10/100Mbps link is established on the port. • Blinking Green- Packets transmission or reception is occurring on the port at 1000Mbps. • Blinking Yellow- Packets transmission or reception is occurring on the port at 10/100Mbps. <p>Stack LED:</p> <ul style="list-style-type: none"> • Green- Stack port has a valid link connection. • OFF- Stack port does not have a valid link connection
SFP Port (1000M bps only)	<ul style="list-style-type: none"> • Solid Green- Link up • Blink Green- Activity, transmitting or receiving packet in link up status • Off- No Link detected

Console Port

Your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch has a console port on the front panel. This port is labeled **Console** and is **required for initial management configuration** of the switch. It also lets you manage the switch using a directly connected VT-100 terminal, personal computer (PC), Apple Macintosh, or UNIX workstation. The terminal, computer, or workstation connects to the console port using the null-modem cable supplied with your switch.

The console port is configured to use the following settings:

- Baud rate: 9,600 bps
- Data bits: 8
- Parity: none
- Stop bit: 1
- Flow control: none

These settings appear below the connector on the switch front panel.

In addition to using the console port, you can manage the switch using a Web browser or a Simple Network Management Protocol (SNMP) management program.

For more information about console-port connections, see “Connecting to the Console Port” in Chapter 3 Installation. For more information about managing the switch, see the User Manual located on the CD-ROM.

CHAPTER 3: INSTALLATION

This chapter describes the installation procedures for your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch. Switch installation involves the following steps:

Step 1: Preparing the site

Step 2: Installing the switch

Step 3: Checking the installation

Step 4: Applying AC power

Step 5: Connecting devices to the switch

Step 6: Installing a SFP module

Step 7: Connecting to the console port to manage the switch for initial configuration

Step 1: Preparing the Site

Before you install your switch, be sure your operating environment meets the operating environment requirements in Table 3-1.

Table 3-1. Site Requirements

Characteristics	Requirements
Mounting Desktop installations: Rack-mount installations:	Provide a flat table or shelf surface. Use a 19-inch (48.3-centimeter) EIA standard equipment rack that is grounded and physically secure. You also need the rack-mount kit supplied with your switch.
Access	Locate the switch in a position that lets you access the front panel RJ-45 ports, view the front panel LEDs, and access the rear-panel power connector.
Power source	Provide a power source within 6 feet (1.8 meters) of the installation location. Power specifications for the switch is shown in Appendix C. Be sure the AC outlet is not controlled by a wall switch, which can accidentally turn off power to the outlet and the switch.
Environmental Temperature: Operating humidity:	Install the switch in a dry area, with ambient temperature between 0 and 40°C (32 and 104°F). Keep the switch away from heat sources such as direct sunlight, warm air exhausts, hot-air vents, and heaters. The installation location should have a maximum relative humidity of 90%, non-condensing.
Ventilation: Operating conditions:	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 you intend to install the switch. Keep the switch at least 6 ft (1.83 m) away from nearest source of electromagnetic noise, such as a photocopy machine.

Step 2: Installing the Switch

You can install your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch on a flat surface or in a standard 19-inch 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/vibrations.

Installing the Switch in a Rack

To install the switch in a rack, use the following procedure (and refer to Figure 3-1). To perform this procedure, you need the 19-inch rack-mount kit supplied with your switch.

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 #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 the switch in the rack.



Figure 3-1. Attaching Mounting Brackets

Step 3: Checking the Installation

Before you apply power:

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

Step 4: Applying AC Power

NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch does not have an ON/OFF switch; the only method of applying or removing AC power is by connecting or disconnecting the power cord. Before you connect the power cord, select an AC outlet that is not controlled by a wall switch, which can turn off power to the switch. After you select an appropriate outlet, use the following procedure to apply AC power.

1. Connect the female end of the supplied AC power adapter cable to the power receptacle on the back of the switch.
2. Connect the 3-pronged end of the AC power adapter cable to a grounded 3-pronged AC outlet.

When you apply power, the **Power** LED on the switch's front panel will be Yellow, as it conducts a Power On Self Test (POST). After the switch passes the POST, the **Power** LED will change to Green and the switch is functional and ready to pass data. If the POST failed, the **Power** LED will become blinking yellow.

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 B, Troubleshooting.

Step 5: Connecting Devices to the Switch

The following procedure describes how to connect devices to the switch's network RJ-45 ports. Your NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch contains Auto Uplink™ technology, which allows you to attach devices using either straight-through or crossover cables.

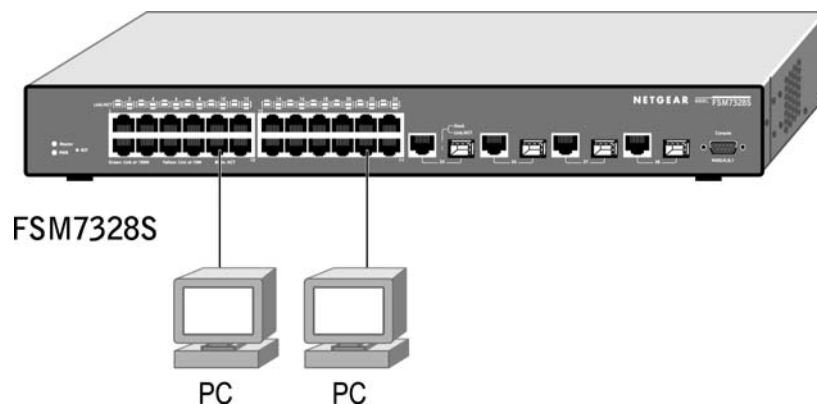


Figure 3-2. Connecting Devices to the Switch

Connect each device to an RJ-45 network port on the switch's front panel (see Figure 3-2). 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 100 m (328 ft).

Step 6: Installing a SFP Module

The following procedure describes how to install a SFP Gigabit Ethernet module in the switch's Gigabit module bays. The Standard SFP Module is sold separately from the FSM7328S. If you do not want to install a SFP module at this time, skip this procedure.

To install a SFP module:

1. Insert the SFP module into the SFP module bay. Press firmly to ensure the module seats into the connector.

To install additional Gigabit Ethernet module, repeat this procedure

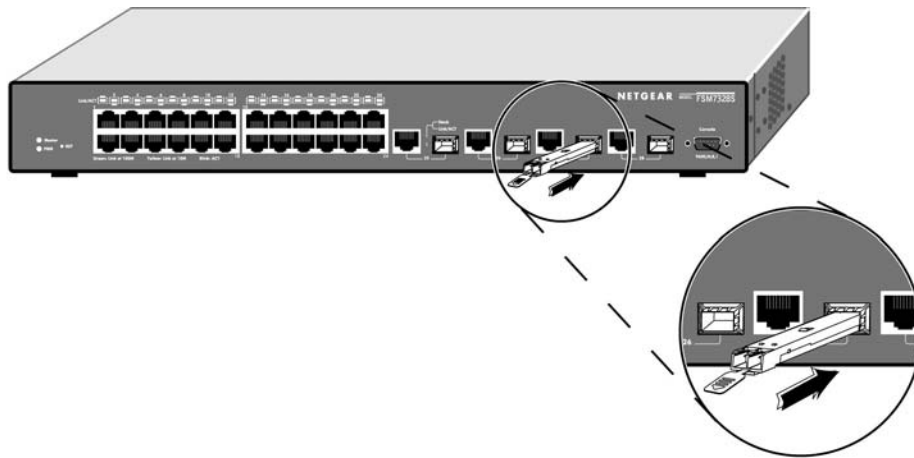


Figure 3-3. Installing a Gigabit Ethernet fiber Module into an FSM7328S

Step 7: Connecting to the Console Port to Manage the Switch (initial configuration)

To learn the IP address, you must first access the Command Line management via the console interface.

After you power-up the switch for the first time, you can connect to it using a VT100/ANSI terminal or a PC, Apple Macintosh, or UNIX workstation that is directly connected to the switch's console port.

To connect a console to the switch:

1. Connect a VT100/ANSI terminal or a PC, Apple Macintosh, or UNIX workstation to the switch's console port, labeled Console, using the null-modem cable supplied with the switch. The supplied null-modem cable has 9-pin connectors on each end.
2. If you attached a PC, Apple Macintosh, or UNIX workstation, start a terminal-emulation program.
 - Microsoft Windows users can use HyperTerminal, which comes with the Windows operating systems.
 - Macintosh users can use ZTerm.
 - UNIX users can use a terminal emulator such as TIP.
3. Configure the terminal-emulation program to use the following settings:
 - Baud rate: 9,600 bps
 - Data bits: 8
 - Parity: none
 - Stop bit: 1
 - Flow control: none

4. Hit the return key, and the below screen should appear.

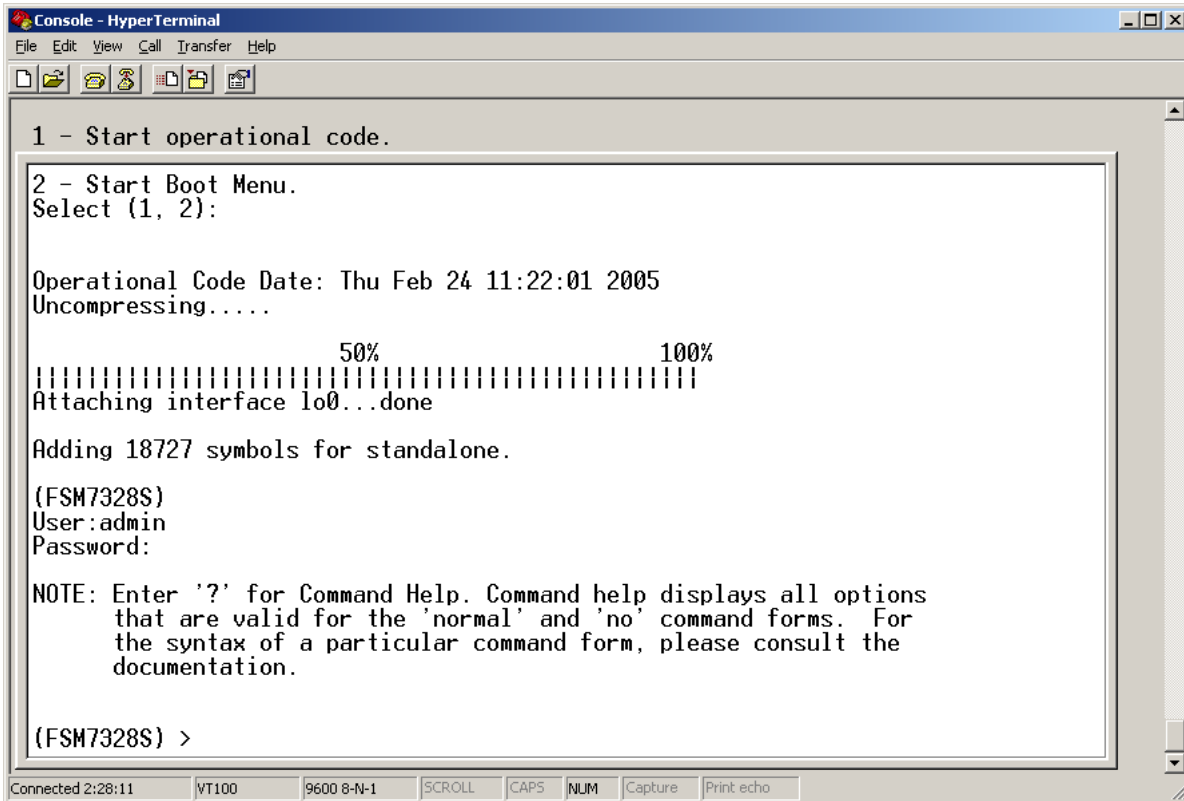


Figure 3-4. System Information.

5. The login name is “admin”. And there is no password assigned. We strongly recommend you enable password for admin access to secure access to the switch management function. After successful login, the screen should show **(FSM7328S)>** prompt. Enter “**show sysinfo**”, and it will display the management CPU’s IP address. The switch is shipped with DHCP as default to receive its IP address. To manually set a static IP address, you must first disable DHCP as follows:

```
(FSM7328S ) >en
```

```
Password: <just hit enter>
```

```
(FSM7328S )# network protocol none
```

```
Changing protocol mode will reset ip configuration.
```

```
Are you sure you want to continue? (y/n)y
```

After system prompt return, enter the following command

```
( FSM7328S ) # network parms 192.168.1.100 255.255.255.0 192.168.1.1
```

The example above uses “192.168.1.100” as IP address, and “192.168.1.1” as gateway IP address. You

should provide your own IP address in the above command.

If you want to use your web browser, or telnet session to manage your switch, note the IP address on the **Sysinfo** page. To use your web browser, simply type the IP address in the URL address bar and hit enter. If you want to use an SNMP management application, you will need to note the IP address and to configure the SNMP settings in your switch so that it will respond to SNMP requests. This configuration can be done through either the console or web browser GUI. See User Guide on how to enable SNMP access.

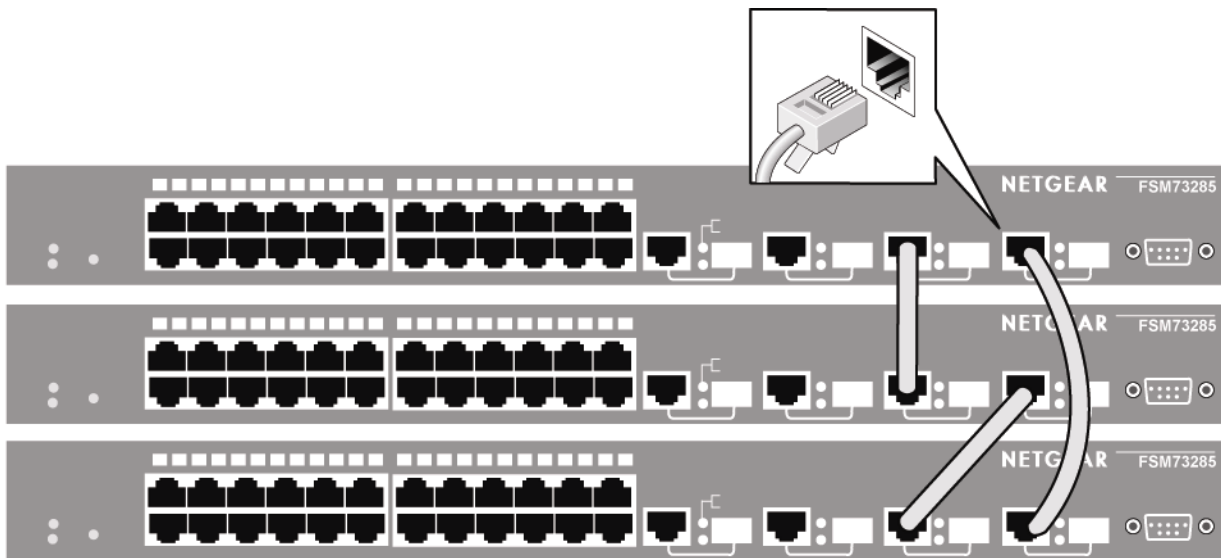
Note: The switch IP address is by default using DHCP mode to assign its address. If you leave the switch IP mode in the default DHCP mode, the IP address of your switch could change, and you would have to reconnect to the switch via the console port to discover the new IP address. Change the IP mode to Manual for a more reliable connection. If you need help changing the IP mode, please refer the User Manual on the Resource CD for Layer 3 Managed Switches.

To learn more about the managed features on your switch, refer to the manual on the Resource CD.

Step 8: Connecting the stacking modules

Perform this step only you are setting up a stack.

FSM7328S can be setup as part of a stack. The last two ports, port 27 and 28, are pre-configured for stacking functionality. To setup the stack, simply connect the switches using standard Category 5 Ethernet cable on ports 27 or 28. The switches will automatically select the master unit whose console will be accessible as normal, and other non-master unit console will no longer provide the normal CLI access. For further detail please refer to the User Guide on the Resource CD.



To disable a port's stacking mode and change it into regular gigabit Ethernet port, do the following commands (using port 27 as an example):

```
(FSM7328S) #config
```

```
(FSM7328S Config) #stack
```

```
(FSM7328S Config-stack) #stack-port 1/0/27 ethernet
```

APPENDIX A: TECHNICAL SPECIFICATIONS

This appendix provides technical specifications for the NETGEAR Model FSM7328S Managed Layer 3 Gigabit Ethernet Switch.

Network Protocol and Standards Compatibility

- IEEE 802.3 10BASE-T
- IEEE 802.3u 100BASE-TX
- IEEE 802.3z 1000BASE-SX
- IEEE 802.3ab 1000BASE-T
- IEEE 802.3x flow control

Layer 2 Services

- IEEE 802.1Q Static VLAN (Up to 4k)
- IEEE 802.1p Class of Service (CoS)
- IEEE 802.1D Spanning Tree Protocol (STP)
- IEEE 802.1w Rapid Spanning Tree Protocol (RSTP)
- IEEE 802.1s Multiple Spanning Tree Protocol (MSTP)
- IEEE802.3ad Link Aggregation (LACP)
- IGMP v1, v2 Snooping Support

Layer 3 Services

- VLAN routing: 512 routes
- Port routing
- RIP v1/v2
- ACL
- DiffServ QOS
- DHCP/Bootp Relay

Switch Management

- Port Mirroring support
- SNMP v3
- RFC1757 RMON 1 groups 1,2,3, and 9
- RFC1213 MIB II
- RFC1643 Ethernet Interface MIB
- RFC1493 Bridge MIB
- RFC2131 DHCP client (& BootP)
- RFC2138 RADIUS client
- Broadcast storm control
- Telnet sessions for management CPU (5)
- Ping support
- ARP support
- Private Enterprise MIB
- Configuration file upload, download (TFTP)
- Runtime Image download (TFTP)
- Command Line Interface
- Web-based Graphic User Interface
- Simple Network Time Protocol (SNTP)
- Syslog
- SSLv3/TLSv1.0 Web security

Secured Shell (SSHv1,v2)

Interface

24 RJ-45 connectors for 10BASE-T and 100BASE-TX (Auto Uplink™ on all ports)
4 RJ-45 connectors for 10BASE-T, 100BASE-TX, and 1000BASE-T (Auto Uplink™ on all ports)
4 Gigabit Interface Converter (SFP) slots for SFP modules
RS-232 Console Port

LEDs

Per port (10/100 for TP): Link, Speed, and Activity.
Per port (10/100/1000 for TP and fiber): Link, Speed, Activity, and Stack.
Per device: Power, master, fan, and status.

Performance Specifications

Forwarding modes: Store-and-forward
Bandwidth: 12.8 Gbps
Network latency: Less than 80 microseconds for 64-byte frames in store-and-forward mode for 10 Mbps to 100 Mbps transmission
Address database size: 16,384 media access control (MAC) addresses per system
Addressing: 48-bit MAC address
10/100/1000 buffer memory: 8MB embedded memory for 24 ports
Acoustic noise: (ANSI-S10.12): 56.07 dB
Heat Dissipation: 18.99 Btu/hr
Mean Time Between Failure (MTBF): 125,503 hours (~ 14.3 years)

Power Supply

Power Consumption: 54 W maximum
100-240VAC/50-60 Hz universal input

Physical Dimensions

440 x 205 x 43 mm (W x D x H)
17.3 x 8.1 x 1.6 inch

Environmental Specifications

Operating temperature: 0 to 40°C
Storage temperature: -20 to 70°C
Operating humidity: 90% maximum relative humidity, non-condensing
Storage humidity: 95% maximum relative humidity, non-condensing
Operating altitude: 10,000 ft (3,000 m) maximum
Storage altitude: 10,000 ft (3,000 m) maximum

Electromagnetic Emissions

CE mark, commercial
FCC Part 15 Class A
VCCI Class A
EN 55022 (CISPR 22), Class A
C-Tick

Electromagnetic Immunity

EN 50082-1

EN 55024

Safety

CE mark, commercial

CSA certified (CSA 22.2 #950)

UL listed (UL 1950)/cUL IEC950/EN60950

APPENDIX B: TROUBLESHOOTING

This chapter provides information about troubleshooting the NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch. Topics include:

- Troubleshooting chart
- Additional troubleshooting suggestions

Troubleshooting Chart

Table B-1 lists symptoms, causes, and solutions of possible problems.

Table B-1. Troubleshooting Chart

Symptom	Cause	Solution
Power LED is off.	No power is received	Check the power cord connections for the switch at the switch and the connected device. Make sure 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. Make sure all cables used are correct and comply with Ethernet specifications. See Appendix D. Check for a defective 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- 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. Check System message log.
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. Be sure all connectors are securely positioned in the required ports. Equipment may have been accidentally disconnected.
ACT LED is flashing continuously on all connected ports and the network is disabled	A network loop (redundant path) has been created (see Figure 2-3).	Break the loop by ensuring that there is only one path from any networked device to any other networked device.

Additional Troubleshooting Suggestions

If the suggestions in Table B-1 do not resolve your problem, refer to the troubleshooting suggestions in this section.

Network Adapter Cards

Make sure 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. Make sure 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, use the Tools> Reset command or remove 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 10/100/1000 Mbps ports negotiate the correct duplex mode and speed if the device at the other end of the link supports auto negotiation. If the device does not support auto negotiation, the switch only determines the speed correctly and the duplex mode defaults to half-duplex.

The gigabit port on the Gigabit module negotiates speed, duplex mode, and flow control, provided that the attached device supports auto-negotiation.

APPENDIX C: Default Settings

This appendix provides the default settings for the NETGEAR Model FSM7328S Managed Stackable Layer 3 Fast Ethernet Switch.

Feature	FSM7328S Default Setting
Port Speed	Auto-negotiation
Port Duplex	Auto-negotiation
Flow Control (half duplex)	Enabled
Flow Control (full duplex)	Disabled
Broadcast Storm Control	Disabled
Gigabit port type	Auto detect
Management IP Configuration	DHCP
Password protection	Disabled
User Name	Admin
Password	(none)
Web Access	Enabled
Java Mode	Enabled
VLAN	All ports belong to Default VLAN (VLAN 1) as untagged ports
IP Multicast Filtering	Disabled
Spanning Tree Protocol	Enabled (IEEE 802.1s)
Admin Edge Port	Enabled
Link Aggregation	Disabled
Port Mirroring	Disabled
Traffic Prioritization	Disabled
ACL	Disabled
GVRP	Disabled
GMRP	Disabled
IP Routing	Disabled
RIP	Disabled
MAC address aging	300 seconds
SNMP Community	Public read only
Stacking Mode	Enabled on port 27 and 28 Disabled on all other interfaces