NETGEAR®

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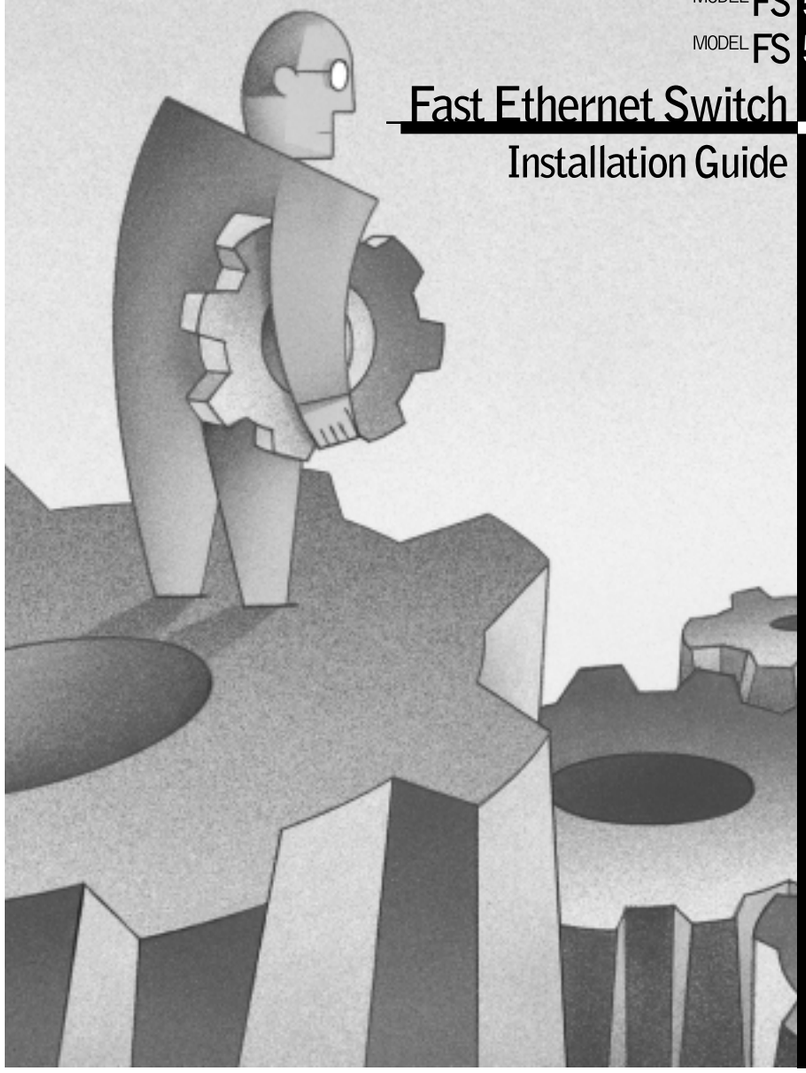
NETGEAR®

MODEL FS 516
MODEL FS 524

Fast Ethernet Switch
Installation Guide



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Start Here

The NETGEAR® Model FS516 16-Port Fast Ethernet Switch and Model FS524 24-Port Fast Ethernet Switch provide you with a low-cost, high-performance network solution and are designed to support power workgroups operating at either 10 megabits per second (Mbps) or 100 Mbps.

Ethernet switches provide private, dedicated, 10 Mbps (or 100 Mbps) capacity to each connected PC/server or hub/workgroup segment, which is significantly higher than in a shared environment. The higher bandwidth enables the use of applications such as multimedia, imaging, video, or high-performance client-server functions among users who are spread out over the network.

With both the Model FS516 switch and the Model FS524 switch, improvement is accomplished very easily, with no change to the desktop (the network interface cards or software and the network wiring). As a result, the performance upgrade and the applications it enables are obtained very quickly and at a low cost.

Features

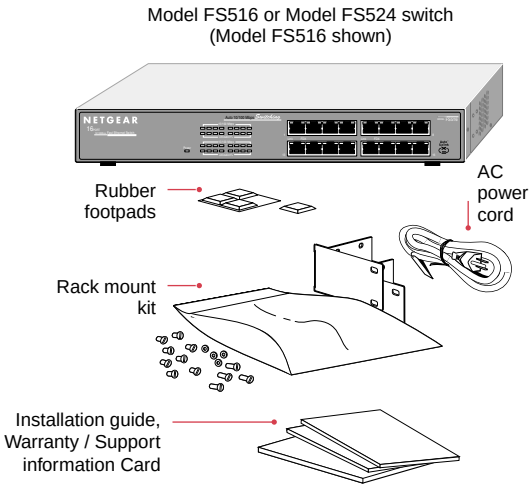
The Model FS516 and Model FS524 switches have the following key features:

- Sixteen (Model FS516) or twenty-four (Model FS524) automatic speed-sensing (autosensing) 10/100 Mbps Ethernet ports to provide fast information exchange, resource sharing, and client or peer-to-peer communication using simple Category 5 unshielded twisted pair (UTP) cable
- Automatic address learning function to build the packet-forwarding information table

  The table contains up to 4,000 MAC addresses; that is, the switch can support networks with as many as 4,000 devices.
- Autosensing full- or half-duplex mode, with N-way negotiation

  Full-duplex mode doubles throughput of point-to-point connections by letting individual ports transmit and receive concurrently when the other end also supports full-duplex mode. The default is half-duplex mode if the connected device does not support autonegotiation.
- Wire-speed filtering and forwarding to provide a "traffic cop" function by directing traffic to the appropriate route without slowing down the traffic
- Store-and-forward forwarding node to minimize erroneous packets on the network
- Half-duplex back pressure
- Easy Plug-and-Play installation with no software to configure, which saves time and minimizes the potential for configuration errors
- Auto Uplink™ in all ports to make the right connection
- Protocol independence and compatibility with all common protocols such as TCP/IP, NetWare, DECnet, and Microsoft Networks
- Monitoring of individual port status by vista RJ-45 network ports with built-in LEDs

Package Contents



Verify that your package contains the following:

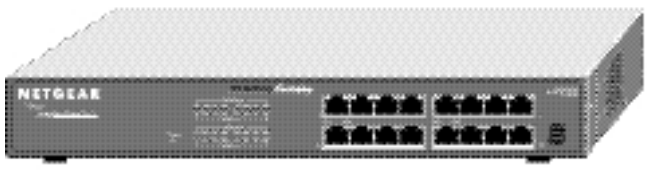
- Model FS516 or FS524 switch
- Rubber footpads for desktop installation
- Rack mount kit for 19-inch rack installation
- Warranty / Support Information Card
- Power cord

Product Illustration

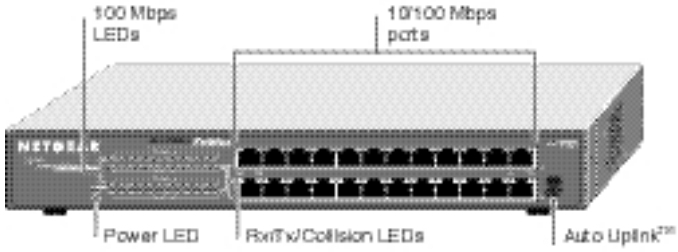
Front Panel

The front panel of the Model FS516/FS524 switch contains the following LEDs that correspond to each network port located on the switch: Rx/Tx/Collision, Power, and 100 Mbps. Each vista RJ-45 network port has its own Link LED (located at the top left corner of each 10/100 Mbps port) and full-duplex (FDX) LED (located at the top right corner of each 10/100 Mbps port).

Front Panel of the Model FS516 Switch



Front Panel of the Model FS524 Switch



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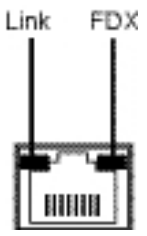
LEDs

The table below describes the activity of the LEDs.

Label	Color	Activity	Description
Power	Green	On	Power is supplied to the hub.
		Off	Power is disconnected.
Rx/Tx/ Collision	Green	Blinking	Packet transmission or reception is occurring on the port. The blinking action corresponds to the number of packets that are transmitted or received.
	Yellow	Blinking	Data collision is occurring on the port. The blinking corresponds to the number of collisions. When a collision occurs, the connected device pauses and transmits again after waiting a specified time.
100 Mbps	Green	On	The port is operating in 100 Mbps mode.
		Off	The port is operating in 10 Mbps mode.
Link	Green	On	A valid link is established on the port.
		Off	A link is not established on the port.
FDX	Green	On	The port is operating in full-duplex mode.
		Off	The port is operating in half-duplex mode.

RJ-45 Network Ports with Built-in LEDs

All ports on the switch are 10/100 Mbps capable autosensing Ethernet ports. Each port supports only unshielded twisted pair (UTP) cable using an 8-pin RJ-45 plug. Each port uses RJ-45 connectors that have two LEDs-the Link LED and the FDX LED.

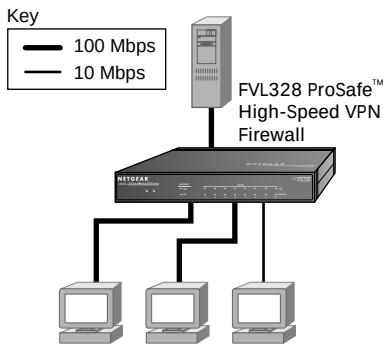


Applications

The Model FS516/FS524 switch is designed to provide flexibility in configuring your network connections. Each switch can be used as a standalone device or can be used with 10 Mbps or 100 Mbps hubs or other interconnection devices in various configurations. The configuration examples in this section illustrate the integration of the switches in network environments of all sizes and types. These examples include a network of a few workstations connected to a printer or a segmented network with multiple users or workgroups and other networking devices.

Desktop Switching

The Model FS516/FS524 switch is used as a desktop switch to build a small network that enables users to have 100 Mbps access to a file server. If a full-duplex adapter card is installed in the server or PC, a 200 Mbps connection is possible on the port where the server or PC is connected.



1 Prepare the site

Before you begin installing your switch, prepare the installation site. Make sure your operating environment meets the operating environment requirements of the equipment.

Characteristic	Requirement
Temperature	Ambient temperature between 0° and 40° C (32° and 104° F). No nearby heat sources such as direct sunlight, warm air exhausts, or heaters.
Operating humidity	Maximum relative humidity of 90%, noncondensing.
Ventilation	Minimum 2 inches (5.08 cm) on all sides for cooling. Adequate airflow in room or wiring closet.
Operating conditions	At least 6 feet (1.83 m) to nearest source of electromagnetic noise (such as photocopy machine).
Power	Adequate power source within 6 feet (1.83 m).

2 Install the Switch

To install your switch on a flat surface, you do not need any special tools. Be sure the switch is positioned with at least 2 inches of space on all sides for ventilation.

To install the switch in a rack, first attach the mounting brackets to the side of the switch. Insert the screws provided in the rack mount kit through each bracket and into the bracket mounting holes in the switch. Tighten the screws with a #1 Phillips screwdriver to secure each bracket. 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. Tighten the screws with a #2 Phillips screwdriver to secure the switch in the rack.

3 Connect the Devices

Before connecting the switch, be sure you review "Applications" for information about determining the appropriate configuration for your networking needs. Refer to the following steps and illustration when connecting the switch. Each of the steps has a corresponding reference number in the illustration.

To connect devices to the switch:

1. **Connect the devices to the 10/100 Mbps ports on the switch, using Category 5 UTP cable and an RJ-45 plug.**

Note: Ethernet specifications limit the cable length between your PC or server and the switch to 328 feet (100 meters) in length.

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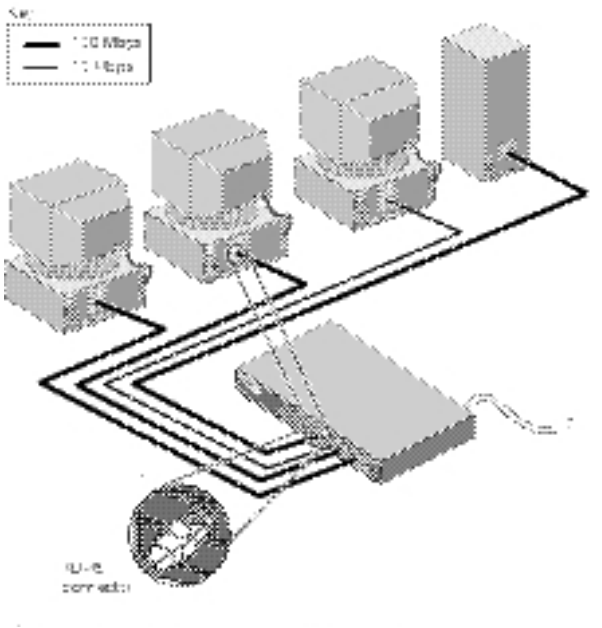
2. **Connect one end of the AC power cord cable to the power outlet on the rear panel of the switch and the other end of the AC power cord to the wall outlet.**



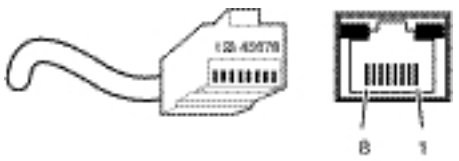
Auto Uplink™

The Auto Uplink technology that NETGEAR has included in this product will automatically sense whether the straight-through cable plugged into any port should have a normal connection, e.g.connecting to a PC; or an uplink connection, e.g. connecting to a router, switch , or hub. That port will then configure itself to the correct configuration. This feature also eliminates the need to worry about crossover cables, as Auto Uplink will accommodate either type of cable to make the right connection.

Note: Auto Uplink will compensate for setting uplink connections, and crossover or straight-through cables. Using Auto Uplink to create multiple paths between any two network devices will disable your network.

RJ-45 Connector

The RJ-45 connector (shown in the illustration with an RJ-45 plug) is used to connect workstations, hubs, and switches through unshielded twisted pair cable. The RJ-45 connector accepts four-pair Category 3 (10 Mbps) or Category 5(100 Mbps) UTP cable.



RJ-45 Connector Pin Assignment	Normal Assignment	Uplink Assignment
1	Input Receives Data +	Output Transmits Data +
2	Input Receives Data -	Output Transmits Data -
3	Output Transmits Data +	Input Receives Data +
6	Output Transmits Data -	Input Receives Data -
4,5,7,8	Not used	Not used

Note: Auto Uplink will automatically determine which assignment is needed to make the right link.

4 Connect Hubs at 10/100 Mbps

When power has been applied to the switch:

- The green Power LED on the front panel is on.
- The green Link LED on each connected port is on.

When the switch is connected and operating, refer to the table in "LEDs" for information about the LEDs and their activity.

Troubleshooting Information

Symptom	Cause	Solution
Power LED is off	No power is received at the switch	Check the power cord connections for the switch and the connected device. Check for a defective adapter card, cable, or port by testing them in an alternate environment where all products are functioning. Make sure all cables used are correct and comply with Ethernet specifications.
Link LED is off or intermittent	Port connection is not functioning	Check the crimp on the RJ-45 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.
One or more components are malfunctioning	Not all system components are properly installed	Test the components in an alternate environment where all other components are functioning properly.
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 cable connectors are securely positioned in the required ports. Make sure all devices are connected to the network. Equipment may have been accidentally disconnected.
Rx/Tx/Collision LED is blinking yellow.	Collisions are occurring on the connected segment	This situation is normal in Ethernet operation when ports/segments are configured for half-duplex mode.

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Technical Specifications

General Specifications	Model FS516 Fast Ethernet Switch	Model FS524 Fast Ethernet Switch
Network Protocol and Standards compatibility	ISO/IEC 802-3 (ANSI/IEEE 802.3i) 10BASE-T Ethernet IEEE 802.3u, 100BASE-TX Fast Ethernet	
Data Rate	100 Mbps with 4B/5B encoding and MLT-3 physical interface for 100BASE-TX 10Mbps differential Manchester encoded	
Interface	RJ-45 connector for 10BASE-T or 100BASE-TX Ethernet interface	
Power Consumption	12W	24W
Input Voltage	100-240VAC	
Physical Specifications		
Dimensions:	13.0 x 1.7 x 8.0 in 33.0 x 4.3 x 20.7 cm	
Weight:	5.5 lb; 2.5 kg	6.0 lb; 2.6 kg
Environmental Specifications		
Operating temperature:	0° to 40° C (32° to 104° F)	
Operating humidity:	90% maximum relative humidity, noncondensing	
Electromagnetic Compliance	CE mark, commercial	
	FCC Part 15 Class A	
	EN 55022 (CISPR 22) Class A, EN50082-1	
	VCCI Class A	
	C-Tick	
Safety Agency Approvals	UL listed (UL 1950), cUL TUV licensed (EN 60 950), IEC 950	
Performance Specifications		
Frame filter rate:	14,800 frames/second, maximum on 10Mbps port 148,000 frames/second, maximum on 100Mbps port	
Frame forward rate:	14,800 frames/second, maximum on 10Mbps port 148,000 frames/second, maximum on 100Mbps port	
Address database size:	4,000 media access control (MAC) addresses	
Addressing:	48-bit MAC address	
Queue buffer:	256 KB memory per port	

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Trademarks

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Statement of Conditions

In the interest of improving internal design, operational function, and/or reliability, NETGEAR reserves the right to make changes to the products described in this document without notice.
NETGEAR does not assume any liability that may occur due to the use or application of the product(s) or circuit layout(s) described herein.

Certificate of the Manufacturer/Importer

It is hereby certified that the NETGEAR Model FS516/FS524 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.

Voluntary Control Council for Interference (VCCI) Statement

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.

EN 55 022 Declaration of Conformance

This is to certify that the NETGEAR Model FS516/FS524 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).

Federal Communications Commission (FCC) Compliance Notice: Radio Frequency Notice

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 to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Canadian Department of Communications Radio Interference Regulations

This digital apparatus (NETGEAR Model FS516/FS524 Fast Ethernet Switch) does 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 numerique (NETGEAR Model FS516/FS524 Fast Ethernet Switch) respecte les limites de bruits radioelectriques visant les appareils numeriques de classe A prescrites dans le Reglement sur le brouillage radioelectrique du ministere des Communications du Canada.