

D-Link™ DGS-1016D

DGS-1024D

16/24-Port 10/100/1000Mbps
Gigabit Ethernet Switch

Manual



RECYCLABLE
(Oct 2007)

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CE Mark 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 adequate measures.

Warnung!

Dies ist ein Produkt der Klasse A. Im Wohnbereich kann dieses Produkt Funkstörungen verursachen. In diesem Fall kann vom Benutzer verlangt werden, angemessene Massnahmen zu ergreifen.

Precaución!

Este es un producto de Clase A. En un entorno doméstico, puede causar interferencias de radio, en cuyo caso, puede requerirse al usuario para que adopte las medidas adecuadas.

Attention!

Ceci est un produit de classe A. Dans un environnement domestique, ce produit pourrait causer des interférences radio, auquel cas l'utilisateur devrait prendre les mesures adéquates.

Attenzione!

Il presente prodotto appartiene alla classe A. Se utilizzato in ambiente domestico il prodotto può causare interferenze radio, nel cui caso è possibile che l'utente debba assumere provvedimenti adeguati.

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Preface

The *DGS-1016D/DGS-1024D Manual* is divided into sections that describe the system installation and operating instructions with examples.

Section 1, Introduction - A description of the physical features of the Switch, including LED indicators, ports and panel descriptions.

Section 2, Installation – A description of the physical installation of the Switch, mounting the Switch in a equipment rack and powering on the Switch.

Section 3, Connecting the Switch – A description of how to connect your Switch to an end node, hub, another switch or backbone server.

Appendix Technical Specifications - The technical specifications of the DGS-1016D/DGS-1024D.

Notes, Notices, and Cautions



NOTE: A NOTE indicates important information that helps you make better use of your device.




NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



CAUTION: A CAUTION indicates the potential for property damage, personal injury or death.

Safety Instructions

Use the following safety guidelines to ensure your own personal safety and to help protect your system from potential damage. Throughout this safety section, the caution icon () is used to indicate cautions and precautions that you need to review and follow.



Safety Cautions

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

Observe and follow service markings. Do not service any product except as explained in your system documentation. Opening or removing covers that are marked with the triangular symbol with a lightning bolt may expose you to an electrical shock. Only a trained service technician should service components inside these compartments.

If any of the following conditions occur, unplug the product from the electrical outlet and replace the part or contact your trained service provider:

- The power cable, extension cable, or plug is damaged.
 - An object has fallen into the product.
 - The product has been exposed to water.
 - The product has been dropped or damaged.
 - The product does not operate correctly when you follow the operating instructions.
- Keep your system away from radiators and heat sources. Also, do not block cooling vents.
- Do not spill food or liquids on your system components, and never operate the product in a wet environment. If the system 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 system. Doing so can cause a fire or an electric shock by shorting out interior components.
- Use the product only with approved equipment.
- 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.

Safety Instructions (continued)

- To help avoid damaging your system, be sure the voltage selection Switch (if provided) on the power supply is set to match the power available at your location:
 - 115 volts (V)/60 hertz (Hz) in most of North and South America and some Far Eastern countries such as South Korea and Taiwan
 - 100 V/50 Hz in eastern Japan and 100 V/60 Hz in western Japan.
 - 230 V/50 Hz in most of Europe, the Middle East, and the Far East.
- Also be sure that attached devices are electrically rated to operate with the power available in your location.
- Use only approved power cable(s). If you have not been provided with a power cable for your system or for any AC-powered option intended for your system, purchase a power cable that is approved for use in your country. The power cable must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cable should be greater than the ratings marked on the product.
- To help prevent an electric shock, plug the system and peripheral power cables into properly grounded electrical outlets. These 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 3-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 and 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 cables or plugs. Consult a licensed electrician or your power company for site modifications. Always follow your local/national wiring rules.
- When connecting or disconnecting power to hot-pluggable power supplies, if offered with your system, observe the following guidelines:
 - Install the power supply before connecting the power cable to the power supply.
 - Unplug the power cable before removing the power supply.
 - If the system has multiple sources of power, disconnect power from the system by unplugging *all* power cables from the power supplies.
- Move products with care; ensure that all casters and/or stabilizers are firmly connected to the system. Avoid sudden stops and uneven surfaces.



General Precautions for Rack-Mountable Products

- Observe the following precautions for rack stability and safety. Also refer to the rack installation documentation accompanying the system and the rack for specific caution statements and procedures.
- Systems are considered to be components in a rack. Thus, "component" refers to any system as well as to various peripherals or supporting hardware.



CAUTION: Installing systems in a rack without the front and side stabilizers installed could cause the rack to tip over, potentially resulting in bodily injury under certain circumstances. Therefore, always install the stabilizers before installing components in the rack.

After installing system/components in a rack, never pull more than one component out of the rack on its slide assemblies at one time. The weight of more than one extended component could cause the rack to tip over and may result in serious injury.

- Before working on the rack, make sure that the stabilizers are secured to the rack, extended to the floor, and that the full weight of the rack rests on the floor. Install front and side stabilizers on a single rack or front stabilizers for joined multiple racks before working on the rack.

Safety Instructions (continued)

- Always load the rack from the bottom up, and load the heaviest item in the rack first.
- Make sure that the rack is level and stable before extending a component from the rack.
- Use caution when pressing the component rail release latches and sliding a component into or out of a rack; the slide rails can pinch your fingers.
- After a component is inserted into the rack, carefully extend the rail into a locking position, and then slide the component into the rack.
- Do not overload the AC supply branch circuit that provides power to the rack. The total rack load should not exceed 80 percent of the branch circuit rating.
- Ensure that proper airflow is provided to components in the rack.
- Do not step on or stand on any component when servicing other components in a rack.



CAUTION: Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.



CAUTION: The system chassis must be positively grounded to the rack cabinet frame. Do not attempt to connect power to the system until grounding cables are connected. Completed power and safety ground wiring must be inspected by a qualified electrical inspector. An energy hazard will exist if the safety ground cable is omitted or disconnected.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your system. To prevent static damage, discharge static electricity from your body before you touch any of the electronic components, such as the microprocessor. You can do so by periodically touching an unpainted metal surface on the chassis.

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

1. When unpacking a static-sensitive component from its shipping carton, do not remove the component from the antistatic packing material until you are ready to install the component in your system. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.
2. When transporting a sensitive component, first place it in an antistatic container or packaging.
3. Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads, workbench pads, and an antistatic grounding strap.

SECTION 1

Introduction

Switch Description

Switch Features

D-Link Green Ethernet Technology

Ports

Front-Panel Components

LED Indicators

Power Input on Rear Panel

Switch Description

The 16-port DGS-1016D and 24-port DGS-1024D Switches provide dedicated 10, 100 or 1000 Mbps Ethernet bandwidth on each port. The ports will automatically detect the speed, duplex and MDI/MDIX status of the device it is connecting to, and adjust these settings accordingly. The Switch ports can be used to network computers, printers, servers, routers, other switches or any device equipped with an Ethernet port. For best performance, use Category 5 or better Ethernet cabling.

This stand-alone Switch is very easy to set up, there is no network management required. Just power on the Switch and connect the cables. Keep in mind however that the standard rules of Ethernet regarding cable length apply to this and all Ethernet devices. The length of an Ethernet cable from one device to another cannot exceed 100 meters (or 300 feet).

Switch Features

The DGS-1016D 16-Port and DGS-1024D 24-port Switches do not require any management. Both Switches are designed for easy installation, flexibility and high performance. Connect devices to the Switch as the scale and volume of network traffic increases.

- Sixteen (DGS-1016D) or twenty-four (DGS-1024D) 10/100/1000 Mbps Ethernet ports
- Cable Diagnostic function at Switch boot up
- D-Link Green Ethernet Technology
- Auto-Negotiation for 10/100/1000Mbps and duplex mode
- Auto-MDI/MDIX for each port
- Supports Full/Half-duplex transfer mode for 10 and 100Mbps
- Supports Full-duplex transfer mode for 1000Mbps
- Full wire speed reception and transmission
- Store-and-Forward Switching method
- Supports 8K absolute MAC addresses
- DGS-1016D Supports 340KB RAM for data buffering
- DGS-1024D Supports 500KB RAM for data buffering
- Easy to read diagnostic LEDs
- IEEE 802.3x flow control for Full-duplex
- Back pressure flow control for Half-duplex
- IEEE 802.1p QoS support (4 Queues, Strict Mode)
- Jumbo Frame support (9600Bytes)

Gigabit Ethernet Technology

Gigabit Ethernet is an extension of IEEE 802.3 Ethernet utilizing the same packet structure, format, and support for CSMA/CD protocol, full duplex, flow control, and management objects, but with a tenfold increase in theoretical throughput over 100-Mbps Fast Ethernet and a hundredfold increase over 10-Mbps Ethernet. Since it is compatible with all 10-Mbps and 100-Mbps Ethernet environments, Gigabit Ethernet provides a straightforward upgrade without wasting a company's existing investment in hardware, software and trained personnel.

The increased speed and extra bandwidth offered by Gigabit Ethernet is essential to coping with the network bottlenecks that frequently develop as computers and their bus speeds get faster and more users use applications that generate more traffic. Upgrading key components, such as your backbone and servers to Gigabit Ethernet can greatly improve network response times as well as significantly speed up the traffic between your subnets.

Gigabit Ethernet supports video conferencing, complex imaging and similar data-intensive applications. Likewise, since data transfers occur 10 times faster than Fast Ethernet, servers outfitted with Gigabit Ethernet NIC's are able to perform 10 times the number of operations in the same amount of time.

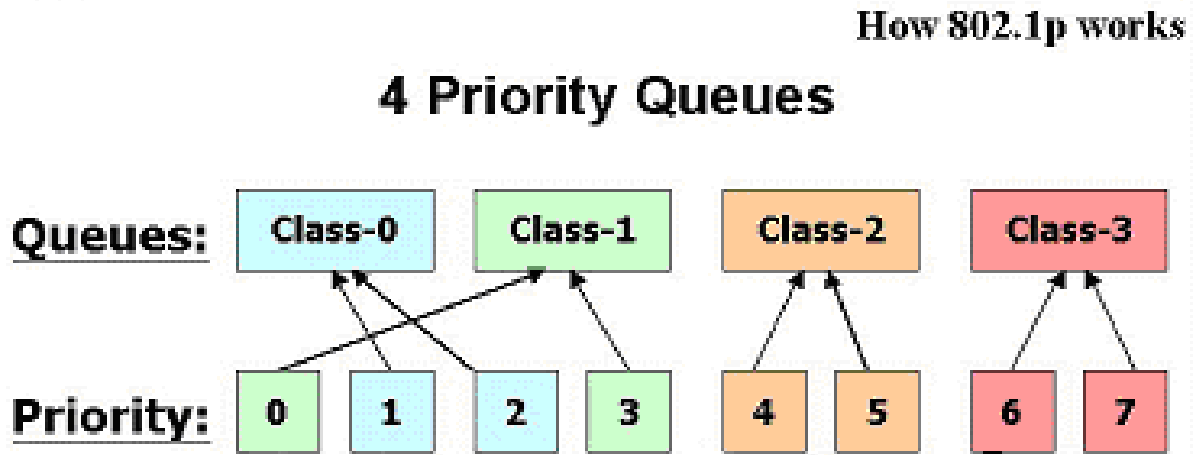
802.1P and QoS

The DGS-1024D and DGS-1016D Switches support 802.1p priority queuing Quality of Service. The implementation of QoS (Quality of Service) and benefits of using 802.1p priority queuing are described here.

Advantages of QoS

QoS is an implementation of the IEEE 802.1p standard that allows network administrators a method of reserving bandwidth for important functions that require a large bandwidth or have a high priority, such as VoIP (voice-over Internet Protocol), web browsing applications, file server applications or video conferencing. Not only can a larger bandwidth be created, but other less critical traffic can be limited, so bandwidth can be

saved. The Switch has separate hardware queues on every physical port to which packets from various applications are mapped to and assigned a priority. The illustration below shows how 802.1P priority queuing is implemented on the Switch. The eight IEEE 802.1P priority levels defined by the standard are mapped to the four class queues used in the Switch.



Mapping QoS on the Switch

The picture above shows the default priority setting for the Switch. Class-3 has the highest priority of the four priority queues on the Switch. In order to implement QoS, the user is required to instruct the Switch to examine the header of a packet to see if it has the proper identifying tag tagged. Then the user may forward these tagged packets to designated queues on the Switch where they will be emptied, based on priority.

"The DUT support strict mode for 802.1p QoS. The untagged pkt will follow the priority 0 to work (i.e. class 1)."

Understanding QoS

The Switch has four priority queues. These priority queues are labeled as 3, the high queue to 0, the lowest queue. The eight priority tags, specified in IEEE 802.1p are mapped to the Switch's priority tags as follows:

- Priority 0 is assigned to the Switch's Q1 queue.
- Priority 1 is assigned to the Switch's Q0 queue.
- Priority 2 is assigned to the Switch's Q0 queue.
- Priority 3 is assigned to the Switch's Q1 queue.
- Priority 4 is assigned to the Switch's Q2 queue.
- Priority 5 is assigned to the Switch's Q2 queue.

- Priority 6 is assigned to the Switch's Q3 queue.
- Priority 7 is assigned to the Switch's Q3 queue.

The Switch uses strict priority for Scheduling. Strict priority-based scheduling, any packets residing in the higher priority queues are transmitted first.

D-Link Green Ethernet Technology

D-Link Green Ethernet implements special power-saving features under speed at 1000Mbps that detect cable length and link status and adjust power usage accordingly.

Green Ethernet Technology saves energy in two specific ways:

Method 1: If there is no link on a port, such as when there is no computer connected to the port or the connected computer is powered off, Green Ethernet Technology will enter a "sleep mode", drastically reducing power used for that port.

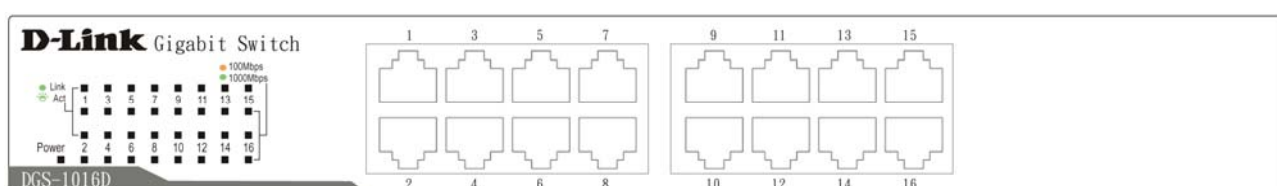
Method 2: D-Link Green Ethernet detects the length of connected Ethernet cable and adjusts power usage accordingly without affecting performance. This way, a port connected to a 20m cable only uses as much power as it needs, instead of using full power, which is only needed for 100m cables.

Front-Panel Components

Note: The Switch illustrations used for this manual depict only the model DGS-1016D Switch.

On the front panel of the Switch you will see the following.

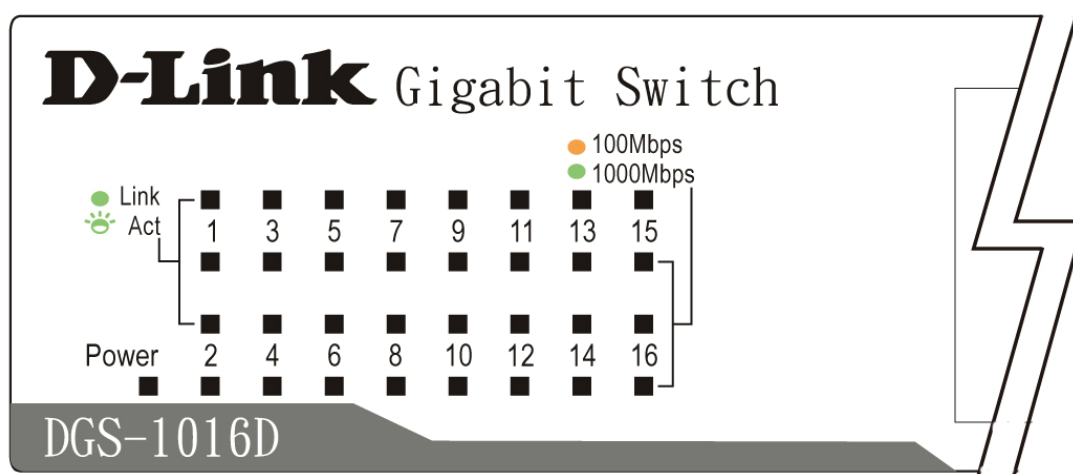
- LED status indicators
- 16 Auto-Negotiating 10/100/1000Mbps ports on the DGS-1016D
- 24 Auto-Negotiating 10/100/1000Mbps ports on the DGS-1024D



Front Panel View of the Switch

LED Indicators

The LED indicators of the Switch include a Power status indicator, one Link/Act indicator for each port as well as one speed 100/1000Mbps indicator for each port. When the Switch is powered on or restarted, it initiates a diagnostic function as part of the boot up process. The speed indicators are also used to display cable diagnostic information when the Switch boots up.



LED Indicators

Cable Diagnostic

Upon booting up the Switch, a **Cable Diagnostic** is used to detect three problems that may prevent successful connection. This feature operates only on ports that are connected to 1000Mbps devices. If there are problems on a port connected to a Gigabit Ethernet device (1000Mbps), try restarting the Switch and watch the speed (100/1000Mbps) LED indicators to determine if the problem is a fault in the cable or connecting hardware. For ports operating at 10 or 100Mbps, the LED indicators can be used for less specific troubleshooting.

The faults detected by the cable diagnostic for 1000Mbps operation are as follows:

- Open circuit - a lack of continuity between the pins at each end of the Ethernet cable or a disconnected cable.
- Short circuit - two or more conductors short-circuited.
- Connectivity is checked for each of the eight wires of a cable to ensure its capability for running 1000Mbps.

During the diagnostic, each port is scanned to determine if the Ethernet cable and connectors are in good working order. During the diagnostic process the speed LED for each port blinks green in sequential order. This port scan takes about 3 seconds. If a cable fault is detected, the corresponding port's speed LED will light amber for 5 seconds. The Switch is then reset for normal operation. It takes about 2 seconds for the Switch to reset. The entire Cable Diagnostic process takes about 10 seconds from the time the Switch is powered on.

The table below summarizes Cable Diagnostic information.



NOTE: the cable diagnostic function does not detect the length of Ethernet cabling. Remember that the length of cabling between two Ethernet devices may not exceed 100 meters (or 300 feet).

LED Indicator	Description
Power	This lights green while the Switch is receiving power.
Link/Act	A steady green light indicates the corresponding port is connected and a valid link is established. This will blink green when there is activity on the port.
100Mbps/1000Mbps	The speed indicator will light green if the corresponding port is connected and operating at 1000Mbps. An amber light indicates the port is operating at 100Mbps. If the port is connected (as indicated by the Link/Act indicator) and the speed indicator does not light, the port is operating at 10Mbps.
Cable Diagnostic (during boot up only)	Open or short circuit, or hardware connectivity problem – 100/1000Mbps LED blinks amber for 5 seconds

Power Input on Rear Panel

The power cable connection is located on the rear panel of the Switch.



Rear panel view of the Switch

Switch power input is provided by an internal universal power supply (100-240VAC : 12V/3.3A).

The AC power connector is a standard three-pronged connector that supports the power cord. Please see the Power On section below for instructions on how to properly connect the Switch to a power source.

SECTION 2

Installation

Package Contents

Before You Connect to the Network

Installing the Switch

Power On

Package Contents

Open the shipping carton of the Switch and carefully unpack its contents. The carton should contain the following items:

- One DGS-1016D 16-Port/DGS-1024D 24-Port 10/100/1000BASE-T Gigabit Ethernet Switch
- Four rubber feet with adhesive backing
- One power Cord
- Mounting ears for rack-mounting
- CD-ROM with product documentation

If any item is found missing or damaged, please contact your local D-Link reseller for replacement.

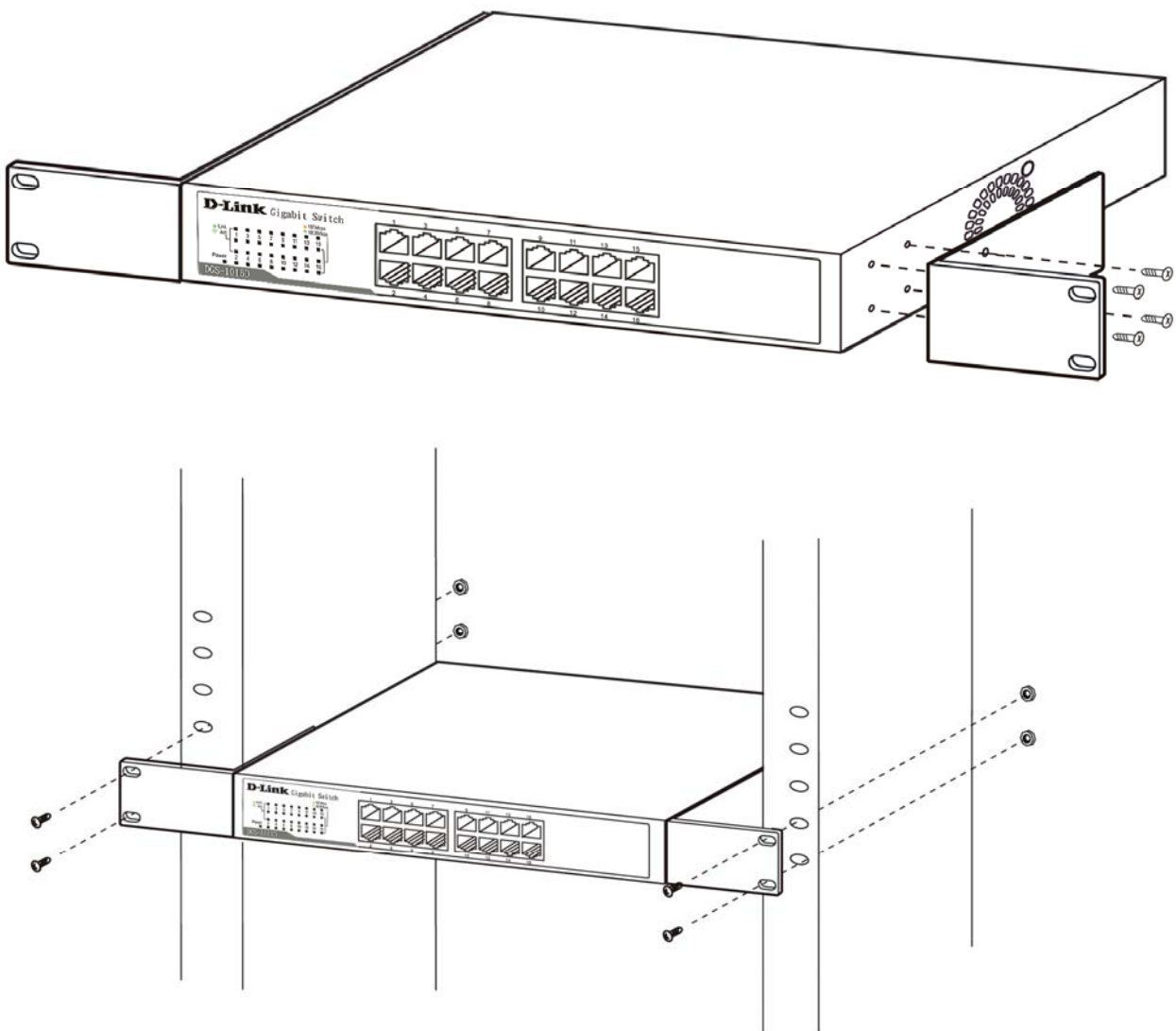
Before You Connect to the Network

The site where you install the Switch may greatly affect its performance. Please follow these guidelines for setting up the Switch.

- Install the Switch on a sturdy, level surface that can support at least 3 kg (6.6 lbs) of weight. Do not place heavy objects on the Switch.
- The power outlet should be within 1.82 meters (6 feet) of the Switch.
- Visually inspect the power cord and see that it is fully secured to the AC power port.
- Make sure that there is adequate space for proper heat dissipation from and adequate ventilation around the Switch. Leave at least 10 cm (4 inches) of space at the front and rear of the Switch for ventilation.
- Install the Switch in a fairly cool and dry place for the acceptable temperature and humidity operating ranges.
- Install the Switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight.
- When installing the Switch on a level surface, attach the rubber feet to the bottom of the device. The rubber feet cushion the Switch, protect the casing from scratches and prevent it from scratching other surfaces.

Mounting the Switch on a Rack

The DGS-1016D/1024D can easily be mounted on a rack. Two mounting ears are provided for this purpose. Make sure that the front panel is exposed in order to view the LEDs. Please refer to the following illustrations:

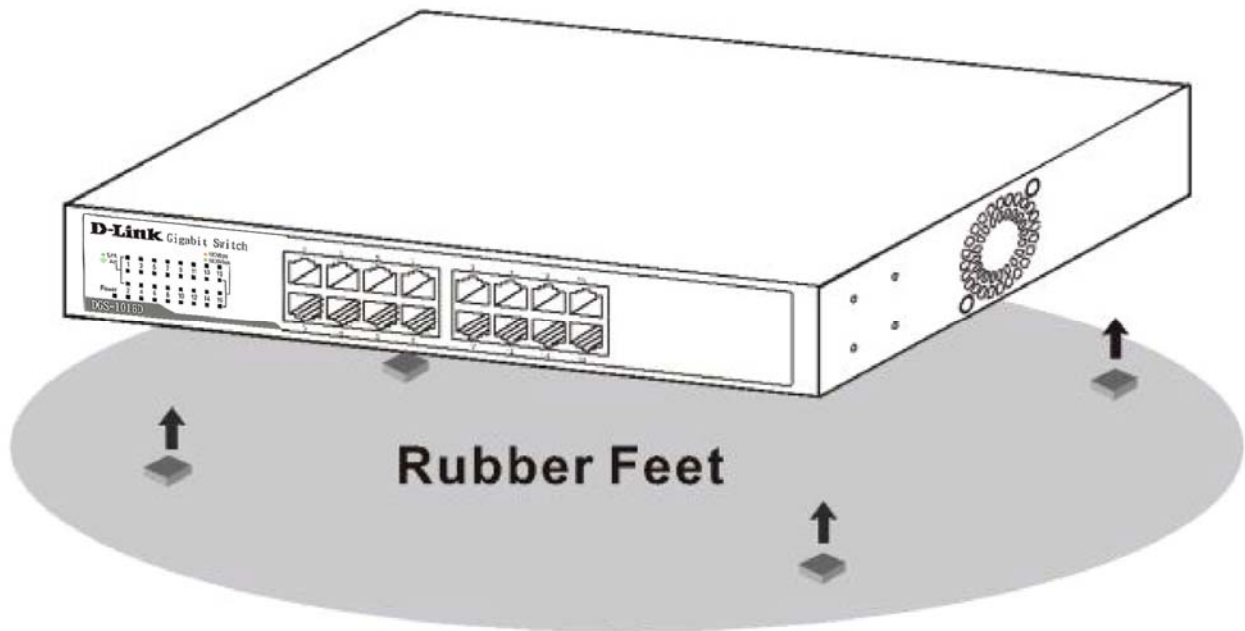


Mounting the Switch to a Rack

1. Attach the ears to each side of the Switch, using the screw-holes located on the side of the device.
2. Firmly attach the ears to the rack as shown. Please follow the usual safety precautions for rack-mountable products

Attaching the Rubber Feet

Use rubber feet provided. Position and apply rubber feet to the underside of the DGS-1016D/1024D Switch.



Attaching the Rubber Feet

Provide for Adequate Ventilation



CAUTION: Do not place any device on top of Switch, or place the Switch on top of any device or object that will block the free flow of air through the ventilation slots on the sides, top, and bottom of the Switch's case. In addition, care should be taken not to locate the Switch next to, on top of, or underneath any device that generates a significant amount of heat. For the Switch to perform at its optimal level, the Switch must have adequate ventilation to prevent the Switch from overheating and becoming damaged.

Power On

To power on the Switch, Plug-in the female connector of the provided power cord into this socket, and the male side of the cord into a suitable power source.

After the Switch is powered on, the LED indicators will blink briefly while the system resets.

Power Failure

As a precaution, in the event of a power failure, unplug the Switch. When power is resumed, plug the Switch back in.

Section 3

Connecting the Switch

Switch to End Node

Switch to Hub or Switch

Connecting to a Server



NOTE: All Ethernet ports auto-detect MDI-II/MDI-X, port speed (10, 100, 1000Mbps) and duplex of the device connected to the Switch.

Cable Quality

For all connections to the Switch, use these rules to determine the

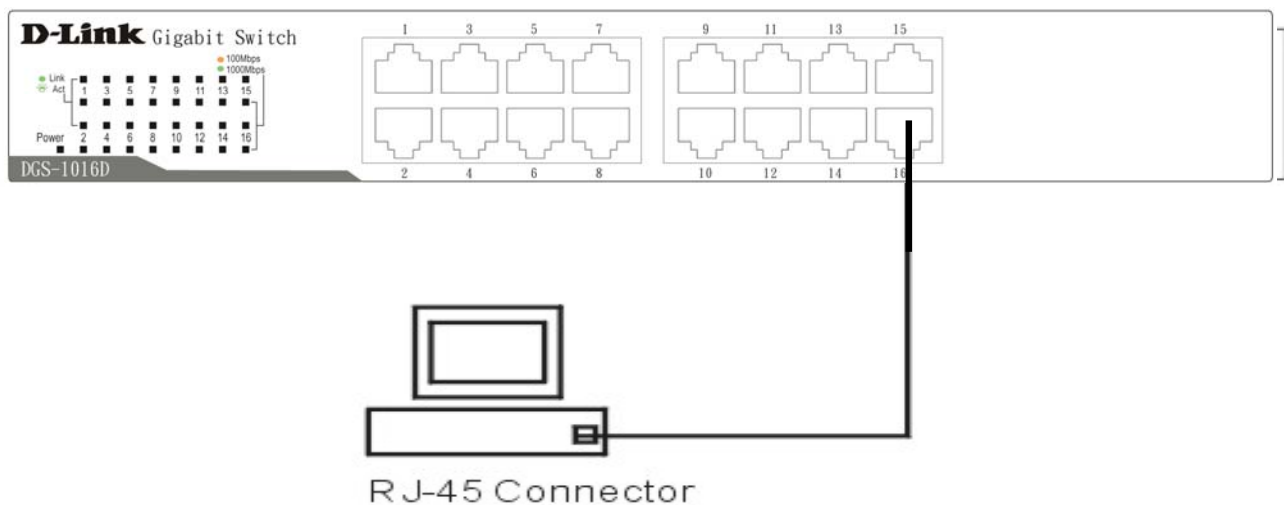
- For connections to 10BASE-T and 100BASE-TX devices, use Category 5 or 5e UTP/STP cable.
- For connections to 1000BASE-T and 100BASE-TX devices, use Category 5e or better UTP/STP cable. All 1000BASE-T connections operate in full duplex mode.



NOTE: UTP (Unshielded Twisted Pair) Ethernet cabling is adequate for most small office environments. More expensive STP (Shielded Twisted Pair) can also be used, but is generally only needed where there will be risk of strong Electromagnetic or Radio Frequency Interference.

Switch to End Node

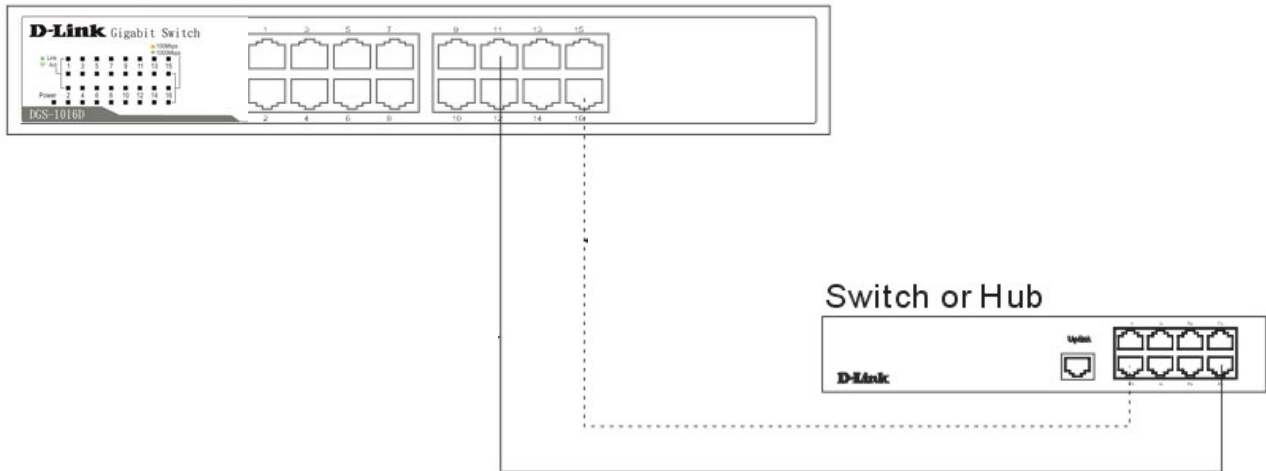
End nodes include PCs outfitted with a 10, 100 or 1000 Mbps RJ-45 Ethernet/Fast Ethernet Network Interface Card (NIC) and Ethernet ready routers. Use standard Ethernet cable to connect the Switch to end nodes. Switch ports will automatically adjust to the hardware characteristics (MDI-II/MDI-X, speed, duplex) of the device to which it is connected.



Switch connected to an end node

Observe the guidelines for cable quality stated at the beginning of this section. The **Link/Act** LEDs for each port lights green when the link is valid.

Switch to Hub or Switch

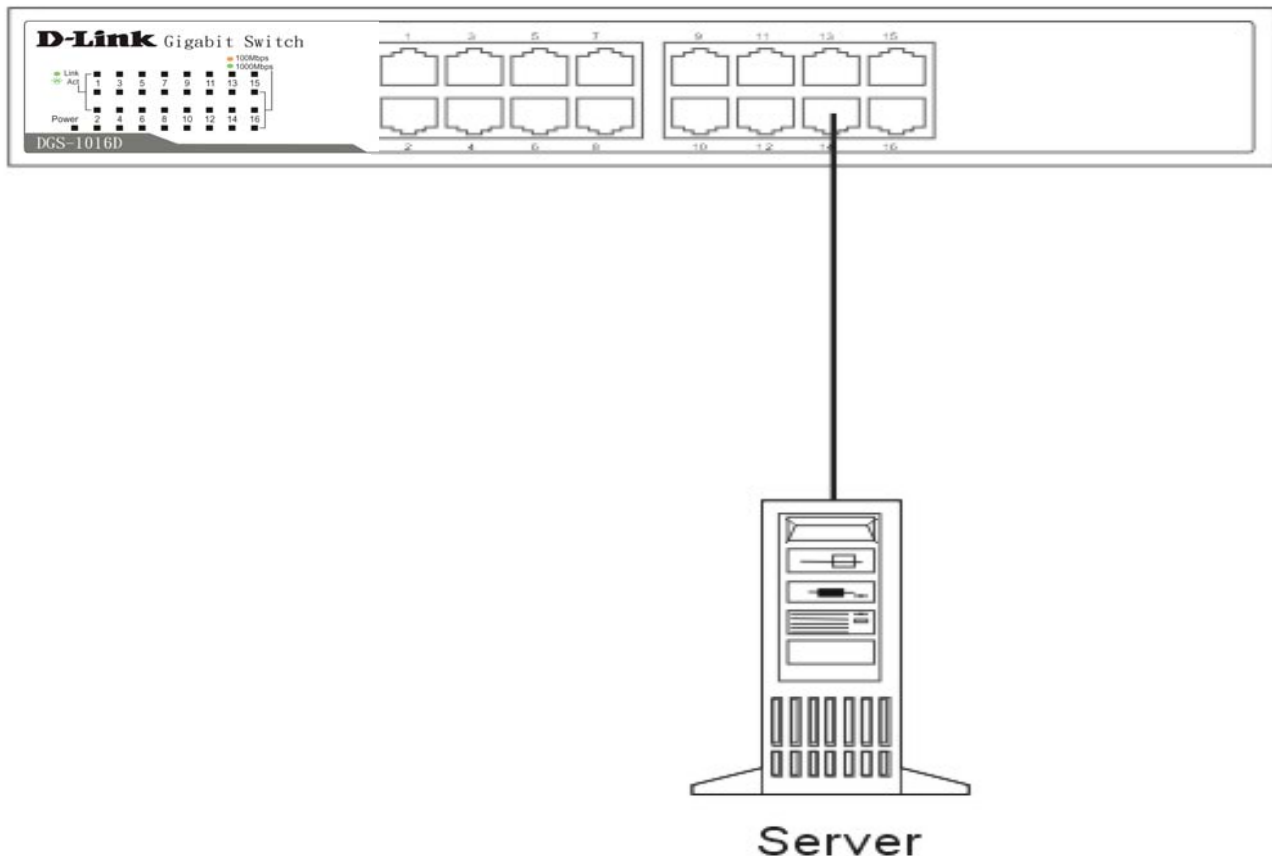


Connect to another switch or hub

Observe the guidelines for cable quality stated at the beginning of this section. The **Link/Act** LEDs for each port lights green when the link is valid.

Connecting to Network Backbone or Server

Any port may be used to uplink the Switch to a network backbone or network server. When linking to a 1000BASE-T device the port operates in full duplex mode.



Connection to a Server

Observe the guidelines for cable quality stated at the beginning of this section. The **Link/Act** LEDs for each port lights green when the link is valid.

Appendix

Technical Specifications

General			
Standards:	IEEE 802.3 10BASE-T IEEE 802.3u compliance IEEE 802.3ab compliance IEEE 802.1p compliance Half or Full-Duplex operations at 10/100Mbps Full-Duplex operations at 1000Mbps IEEE 802.3x Flow Control supports for Full Duplex Support back pressure for Half-Duplex operation		
Protocol:	CSMA/CD		
Data Transfer Rate:	Ethernet:	10Mbps	(Half-duplex)
		20Mbps	(Full-duplex)
	Fast Ethernet:	100Mbps	(Half-duplex)
		200Mbps	(Full-duplex)
	Gigabit Ethernet:	2000Mbps	(Full-duplex)
Topology:	Star		
Network Cables:	Ethernet:	2-pair UTP Cat. 3,4,5, Unshield Twisted Pair (UTP)Cable	
	Fast Ethernet:	2-pair UTP Cat. 5, Unshield Twisted Pair (UTP)Cable	
	Gigabit Ethernet:	4-pair UTP Cat. 5e, Unshield Twisted Pair (UTP)Cable	
Number of Ports:	Sixteen (16) or twenty-four (24) 10/100/1000BASE-T Gigabit Ethernet ports		

Physical and Environmental

AC Inputs:	100~240VAC; 12V/3.3A Internal universal power supply
Power Consumption:	30.2 watts maximum
Fans	1 Built-in 40 x 40 x 10 mm Fans
Operating Temperature:	32°F ~ 104°F ° (0 °C ~ 40 °C)
Storage Temperature:	14°F ~ 158°F (-10°C ~ 70°C)
Humidity:	5% ~ 95% RH, non-condensing
Dimensions:	11.02 in. x 7.09 in. x 1.73 in. (280 mm x 180 mm x 44 mm)
Weight	DGS-1024D: 1.79 kg / DGS-1016D: 1.69 kg
EMI	FCC Class A, CE Class A, VCCI Class A, ICES-003 Class A
Safety:	CSA International

Performance	
Transmission Method:	Store-and-forward
RAM Buffer:	DGS-1016D Supports 340KB RAM per device DGS-1024D Supports 500KB RAM per device
Filtering Address Table:	8K MAC address per device
Packet Filtering/ Forwarding Rate:	Full wire speed
MAC Address Learning:	Self-learning, auto-aging
Jumbo Frame 9600Bytes support	9.6 KBytes support

Glossary

1000BASE-LX – A short laser wavelength on multimode fiber optic cable for a maximum length of 550 meters.

1000BASE-SX – A long wavelength for a "long haul" fiber optic cable for a maximum length of 10 kilometers.

100BASE-FX – 100Mbps Ethernet implementation over fiber.

100BASE-TX – 100Mbps Ethernet implementation over Category 5 and Type 1 Twisted Pair cabling.

10BASE-T – The IEEE 802.3 specification for Ethernet over Unshielded Twisted Pair (UTP) cabling.

aging – The automatic removal of dynamic entries from the Switch Database which have timed-out and are no longer valid.

ATM – Asynchronous Transfer Mode. A connection oriented transmission protocol based on fixed length cells (packets). ATM is designed to carry a complete range of user traffic, including voice, data, and video signals.

auto-negotiation – A feature on a port, which allows it to advertise its capabilities for speed, duplex, and flow control. When connected to an end station that also supports auto-negotiation, the link can self-detect its optimum operating setup.

backbone port – A port that does not learn device addresses, and that receives all frames with an unknown address. Backbone ports are normally used to connect the Switch to the backbone of your network. Note that backbone ports were formerly known as designated downlink ports.

backbone – The part of a network used as the primary path for transporting traffic between network segments.

Bandwidth – Information capacity, measured in bits per second, that a channel can transmit. The bandwidth of Ethernet is 10Mbps. the bandwidth of Fast Ethernet is 100Mbps.

baud rate – The switching speed of a line. Also known as *line speed*.

BOOTP – The BOOTP protocol allows you to automatically map an IP address to a given MAC address each time a device is started. In addition, the protocol can assign the subnet mask and default gateway to a device.

bridge – A device that interconnects local or remote networks no matter what higher level protocols are involved. Bridges form a single logical network, centralizing network administration.

broadcast – A message sent to all destination devices on the network.

broadcast storm – Multiple simultaneous broadcasts that typically absorb available network bandwidth and can cause network failure.

console port – The port on the Switch accepting a terminal or modem connector. It changes the parallel arrangement of data within computers to the serial form used on data transmission links. This port is most often used for dedicated local management.

CSMA/CD – Channel access method used by Ethernet and IEEE 802.3 standards, in which devices transmit only after finding the data channel clear for some period of time. When two devices transmit simultaneously, a collision occurs and the colliding devices delay their retransmissions for a random amount of time.

data center switching – The point of aggregation within a corporate network where a switch provides high-performance access to server farms, a high-speed backbone connection, and a control point for network management and security.

Ethernet – A LAN specification developed jointly by Xerox, Intel, and Digital Equipment Corporation. Ethernet networks operate at 10Mbps using CSMA/CD to run over cabling.

Fast Ethernet – 100Mbps technology based on the Ethernet/CD network access method.

Flow Control – (IEEE 802.3z) A means of holding packets back at the transmit port of the connected end station. Prevents packet loss at a congested switch port.

forwarding – The process of sending a packet toward its destination by an internetworking device.

Full-duplex – A system that allows packets to be transmitted and received at the same time and, in effect, doubles the potential throughput of a link.

Half-duplex – A system that allows packets to be transmitted and received, but not at the same time. Contrast with *full-duplex*.

IP address – Internet Protocol address. A unique identifier for a device attached to a network using TCP/IP. The address is written as four octets separated with full-stops (periods), and is made up of a network section, an optional subnet section and a host section.

IPX – Internetwork Packet Exchange. A protocol allowing communication in a NetWare network.

LAN – Local Area Network. A network of connected computing resources (such as PCs, printers, servers) covering a relatively small geographic area (usually not larger than a floor or building). Characterized by high data rates and low error rates.

latency – The delay between the time a device receives a packet and the time the packet is forwarded out of the destination port.

line speed – See *baud rate*.

main port – The port in a resilient link that carries data traffic in normal operating conditions.

MDI – Medium Dependent Interface. An Ethernet port connection where the transmitter of one device is connected to the receiver of another device.

MDI-X – Medium Dependent Interface Cross-over. An Ethernet port connection where the internal transmit and receive lines are crossed.

MIB – Management Information Base. Stores a device's management characteristics and parameters. MIBs are used by the Simple Network Management Protocol (SNMP) to contain attributes of their managed systems. The Switch contains its own internal MIB.

multicast – Single packets copied to a specific subset of network addresses. These addresses are specified in the destination-address field of the packet.

protocol – A set of rules for communication between devices on a network. The rules dictate format, timing, sequencing, and error control.

resilient link – A pair of ports that can be configured so that one will take over data transmission should the other fail. See also *main port* and *standby port*.

RJ-45 – Standard 8-wire connectors for IEEE 802.3 10BASE-T networks.

RMON – Remote Monitoring. Subset of SNMP MIB II, which allows monitoring and management capabilities by addressing up to ten different groups of information.

RPS – Redundant Power System. A device that provides a backup source of power when connected to the Switch.

server farm – A cluster of servers in a centralized location serving a large user population.

SLIP – Serial Line Internet Protocol. A protocol that allows IP to run over a serial line connection.

SNMP – Simple Network Management Protocol. A protocol originally designed to be used in managing TCP/IP internets. SNMP is presently implemented on a wide range of computers and networking equipment and may be used to manage many aspects of network and end station operation.

Spanning Tree Protocol – (STP) A bridge-based system for providing fault tolerance on networks. STP works by allowing you to implement parallel paths for network traffic, and to ensure that redundant paths are disabled when the main paths are operational and enabled if the main paths fail.

stack – A group of network devices that are integrated to form a single logical device.

standby port – The port in a resilient link that will take over data transmission if the main port in the link fails.

switch – A device that filters, forwards, and floods packets based on the packet's destination address. The Switch learns the addresses associated with each switch port and builds tables based on this information to be used for the switching decision.

TCP/IP – A layered set of communications protocols providing Telnet terminal emulation, FTP file transfer, and other services for communication among a wide range of computer equipment.

Telnet – A TCP/IP application protocol that provides virtual terminal service, letting a user log in to another computer system and access a host as if the user were connected directly to the host.

TFTP – Trivial File Transfer Protocol. Allows you to transfer files (such as software upgrades) from a remote device using your switch's local management capabilities.

UDP – User Datagram Protocol. An Internet standard protocol that allows an application program on one device to send a datagram to an application program on another device.

VLAN – Virtual LAN. A group of location- and topology-independent devices that communicate as if they are on a common physical LAN.

VLTrunk – Virtual LAN Trunk. A Switch-to-Switch link which carries traffic for all the VLANs on each Switch.

VT100 – A type of terminal that uses ASCII characters. VT100 screens have a text-based appearance.