

Dimension

GS-1008/GS-1016

Gigabit Ethernet Switch

User's Guide

Version 1.0

May 2003

ZyXEL
Unleash Networking Power

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- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operations.

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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 commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Taiwanese BCIQ A Warning

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這是甲類的資訊產品, 在居住的環境使用時, 可能會造成射頻干擾, 在這種情況下, 使用者會被要求採取某些適當的對策。

Certifications

Refer to the product page at www.zyxel.com.

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If you have questions about your ZyXEL product or desire assistance, contact ZyXEL Communications Corporation offices worldwide, in one of the following ways:

Contacting Customer Support

When you contact your customer support representative, have the following information ready:

Product model and serial number

- Warranty information
- Date you received your product.
- Brief description of the problem and the steps you took to solve it.

METHOD	E-MAIL SUPPORT/SALES	TELEPHONE/FAX	WEB SITE/ FTP SITE	REGULAR MAIL
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Preface

Congratulations on your purchase of the Dimension GS-1008/GS-1016 Gigabit Ethernet Switch.

This preface introduces you to the Dimension GS-1008/GS-1016 Gigabit Ethernet Switch and discusses the organization and conventions of this User's Guide. It also provides information on other related documentation.

About Gigabit Ethernet

Gigabit Ethernet is a 1Gbps (1000Mbps) extension of the IEEE 802.3 Ethernet networking standard. Its primary applications are in corporate LANs, campus networks and service provider networks where it can be used to tie together existing 100Mbps Ethernet networks.

About the Dimension GS-1008/GS-1016 Gigabit Ethernet Switch

The GS-1008/GS-1016 is designed to improve your network performance with high-speed data transmission over copper wire. As an alternative to ATM, the GS-1008/GS-1016 provides an ideal upgrade path for existing Ethernet-based networks that need more bandwidth. It can be installed as a backbone network while retaining existing investments in Ethernet hubs, switches and wiring infrastructure.

General Syntax Conventions

For brevity's sake, we will use "e.g." as shorthand for "for instance", and "i.e." as shorthand for "that is" or "in other words" throughout this manual.

The Dimension GS-1008/GS-1016 Gigabit Ethernet Switch may be referred to as the switch in this manual.

Related Documentation

ZyXEL Web Site

The ZyXEL download library at www.zyxel.com contains additional support documentation and an online glossary of networking terms.

Chapter 1

Getting to Know the GS-1008/ GS-1016

This chapter describes the key features, benefits and applications of the GS-1008/GS-1016.

The GS-1008/GS-1016 is designed for the campus or building environment as a high bandwidth backbone. With the eight auto-negotiating 100/1000Base-T gigabit Ethernet ports on the GS-1008 (16 on the GS-1016), you can connect the GS-1008/GS-1016 to existing Ethernet routers, switches or hubs without additional expensive wiring or equipment installation.



Figure 1-1 GS-1008

1.1 Features

- Conforms to IEEE 802.3, 802.3u, 802.3ab and 802.3x standards
- Eight auto-negotiating 100/1000Base-T Ethernet ports on the GS-1008

- 16 1000Base-T Ethernet ports on the GS-1016
- Auto-sensing (auto MDI/MDIX) for all ports
- Embedded MAC address table GS-1008: 8K entry, GS-1016: 4K entry
- Supports auto address learning
- Supports Store-and-Forward switching
- Full-duplex and half-duplex flow control
- Plug-and-Play
- LEDs for displaying real-time status
- Standard 19-inch rack mount design

1.2 Package Contents

Compare the contents of your Dimension Gigabit Ethernet switch package with the list below. If any item is missing or damaged, please contact your local dealer.

- Dimension Gigabit Ethernet switch
- Power cord
- Four self-adhesive rubber feet
- This User's Guide
- Rack mount kit

1.3 Backbone Switch Network Application

This section provides a sample of network topology in which the switch is used as a high-bandwidth backbone. The switch is an ideal upgrade for 100Mbps Ethernet networks. You can connect existing switches, hubs or computers with Gigabit 1000Base-T Ethernet adapters to the switch.

The following figure depicts a typical backbone application of the switch in an enterprise environment. Workgroup A, Workgroup B, the standalone workstation with gigabit Ethernet adapter and the two servers can all communicate with each other at speed reaching 1000Mbps.

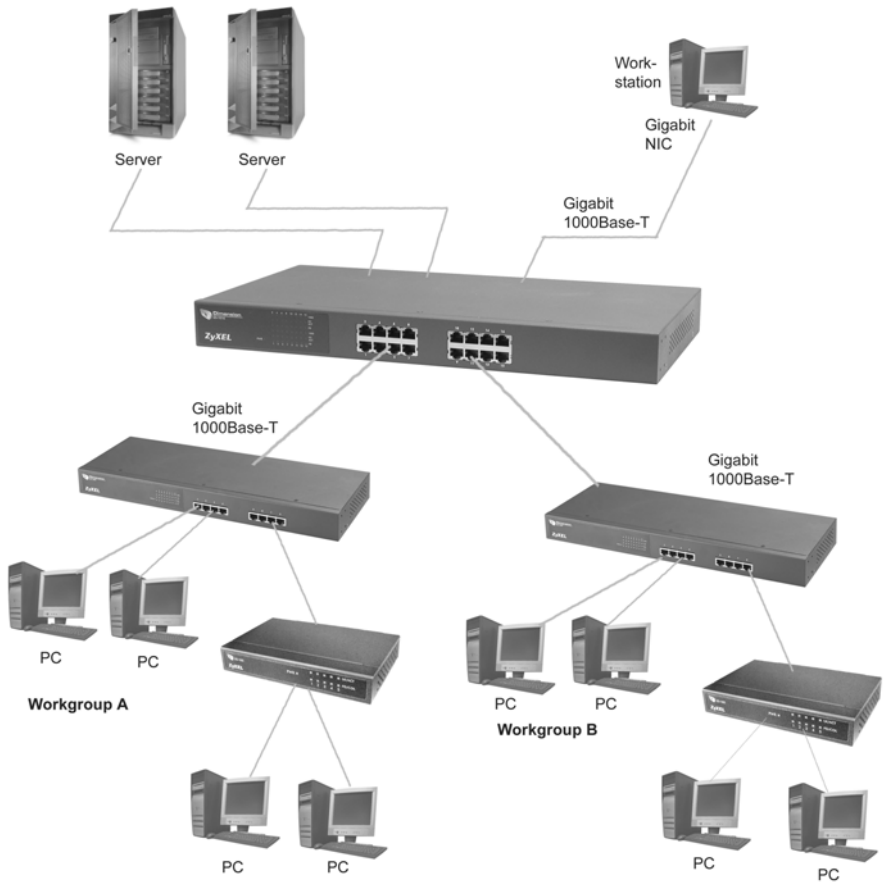


Figure 1-2 Backbone Switch Application

Chapter 2

Hardware Description and Installation

This section shows two switch installations, describes the switch hardware and gives a functional overview of the switch.

The switch is suited to an office environment where it can be rack mounted on standard EIA racks or as a standalone.

For proper ventilation, allow at least 4 inches (10 cm) of clearance at the front, 3.4 inches (8 cm) at the back of the switch. This is especially important for enclosed rack installations.

2.1 Desktop Installation

- Step 1.** Set the switch upside-down on a study level space with a power outlet nearby.
- Step 2.** Make sure there is enough clearance around the switch to allow air circulation and the attachment of cables and the power cord.
- Step 3.** Remove the adhesive backing from the supplied rubber feet.
- Step 4.** Attach the rubber feet to each corner on the bottom of the switch. These rubber feet help protect the switch from shock or vibration and ensure space between devices when stacking.
- Step 5.** Turn the switch right-side up after you attach the rubber feet.



Figure 2-1 Attaching Rubber Feet

Do not block the ventilation holes. Leave space between switches when stacking.

2.2 Rack-mounted Installation

The switch can be mounted on an EIA standard size, 19-inch rack or in a wiring closet with other equipment. Follow the steps below to mount your switch on a standard EIA rack using the included rack-mounting kit.

- Step 1.** Align one bracket with the holes on one side of the switch and secure it with the bracket screws. Similarly, attach the other bracket.



Figure 2-2 Attaching Mounting Brackets and Screws

2. After attaching both mounting brackets, position the switch in the rack by lining up the holes in the brackets with the appropriate holes on the rack. Secure the switch to the rack with the rack's mounting screws.



Figure 2-3 Mounting the Switch to an EIA Standard 19-inch Rack

2.3 Rear Panel

The ventilation fan and three-pronged power receptacle are located on the rear panel of the switch.



Figure 2-4 GS-1008 Rear Panel



Figure 2-5 GS-1016 Rear Panel

2.3.1 Rear Panel Power Connection

Connect one end of the supplied power cord to the power receptacle on the back of the switch and the other end to the 100-240V AC, 50-60Hz power source. For the GS-1016, push the power switch to the **ON** position.

2.4 Front Panel

The following graphics show the front panels of the GS-1008 and the GS-1016.



Figure 2-6 GS-1008 Front Panel

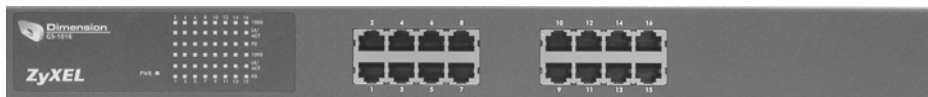


Figure 2-7 GS-1016 Front Panel

2.4.1 100/1000Mbps RJ-45 Auto-negotiating Ports

The GS-1016 has 16 1000Mbps RJ-45 ports. The GS-1008 has eight 100/1000Mbps RJ-45 ports. The GS-1008's auto-negotiation feature allows the switch to detect the speed of incoming transmission and adjust appropriately without manual intervention. It allows data transfers of either 100 Mbps or 1000Mbps in either half-duplex or full-duplex mode depending on your Ethernet network.

2.4.2 Auto-sensing (Auto MDI/MDIX) Ports

You can connect each RJ-45 auto-sensing port to a computer, hub or switch using either a straight-through or a crossover Ethernet cable.

2.4.3 Front Panel Connections

You can use unshielded twisted pair (UTP) or shielded twisted-pair (STP) Ethernet cables for RJ-45 ports. The following table describes the types of network cable used for the different connection speeds.

Table 2-1 Network Cable Types

SPEED	NETWORK CABLE TYPE
100Mbps	100Ω 2-pair UTP/STP Category 5
1000Mbps	100Ω 4-pair UTP/STP Category 5

Make sure the cable length between connections does not exceed 100 meters (328 feet).

2.4.4 Front Panel LEDs

The LEDs give real-time status information. The following table provides LED descriptions.

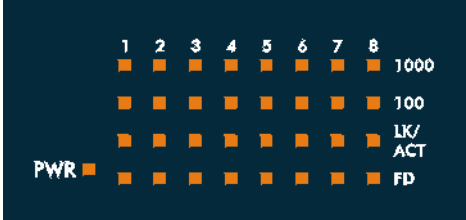


Figure 2-8 GS-1008 LEDs

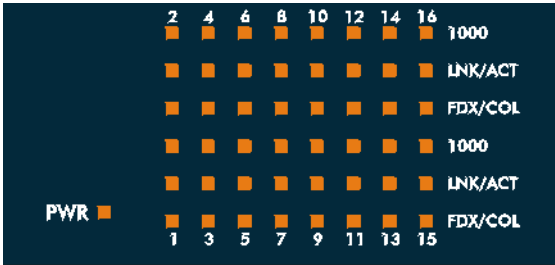


Figure 2-9 GS-1016 LEDs

Table 2-2 Front Panel LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	On	The switch is turned on and receiving power.
		Off	The switch is off or not receiving power.
1000	Green	On	A link to a 1000Mbps Ethernet device is up.
		Off	The port is not connected to a 1000Mbps Ethernet device.
100 (GS-1008 only)	Green	On	A link to a 100Mbps Ethernet network is up.
		Off	The port is not connected to a 100Mbps Ethernet device.
LK/ACT (or LNK/ACT)	Green	On	The port is connecting with an Ethernet device.
		Blinking	The port is receiving or transmitting data.
		Off	No Ethernet device is attached.
FD (or FDX/COL)	Orange	On	The port is operating in full-duplex mode.
		Blinking (GS-1016)	The port is operating in half-duplex mode and collisions are occurring. The more collisions there are, the faster the LED blinks.
		Off	No device is attached or the device is in half-duplex mode.

Chapter 3

Troubleshooting

This section describes common problems you may encounter with the switch in your network and possible solutions.

3.1 Introduction

Troubleshoot the switch using the LEDs to detect problems.

3.1.1 PWR LED

The **PWR** LED on the front panel does not light up.

Table 3-1 Troubleshooting PWR LED

STEPS	CORRECTIVE ACTION
1	Check the connections from your switch to the power source. Make sure you are using the supplied power cord and that you are using a 100 - 240V AC, 50/60Hz power source.
2	Make sure the power source is turned on and that the switch is receiving sufficient power.
3	If these steps fail to correct the problem, contact your local distributor for assistance.

3.1.2 LK/ACT or LNK/ACT LED

The **LK/ACT** (or **LNK/ACT**) LED does not light up when a device is connected.

Table 3-2 Troubleshooting LK/ACT LED

STEPS	CORRECTIVE ACTION
1	Verify that the attached device(s) is turned on and properly connected to your switch.

Table 3-2 Troubleshooting LK/ACT LED

STEPS	CORRECTIVE ACTION
2	Make sure the Ethernet adapters are working on the attached devices.
3	Verify that proper network cable type is used and its length does not exceed 100 meters. For more information on network cable types, see <i>2.4.3 Front Panel Connections</i> .

3.1.3 100, 1000 LEDs

The LEDs do not show the speed of my Ethernet device.

Table 3-3 Troubleshooting 100, 1000 LEDs

STEPS	CORRECTIVE ACTION
1	Check the connection between the switch and your Ethernet device(s).
2	Verify that you are using the proper cable type and that its length does not exceed 100 meters. For more information on network cable types, see <i>2.4.3 Front Panel Connections</i> .

3.1.4 FD or FDX/COL LED

What is the duplex mode of the Ethernet device?

Table 3-4 Troubleshooting FD LED

STEPS	CORRECTIVE ACTION
1	The Ethernet device is connected at full-duplex mode if the FD LED is orange but not blinking.
2	The Ethernet device is connected at half-duplex mode if the FD LED is off but the LK/ACT LED is on or blinking.

3.2 Improper Network Cabling and Topology

Improper network cabling or topology setup is a common cause of poor network performance and network failure.

Table 3-5 Troubleshooting Improper Network Cabling and Topology

DESCRIPTION	PROBLEMS AND CORRECTIVE ACTION
Faulty cables	Using faulty network cables may affect data rates and have an impact on your network performance. Replace with new standard network cables.
Non-standard network cables	Non-standard cables may increase the number of packet collisions and cause other network problems that affect your network performance. Refer to 2.4.3 <i>Front Panel Connections</i> for more information on network cable types.
Cabling Length	If you use longer cables than are needed, transmission quality may be affected. The network cables should not be longer than the limit of 100 meters.
Too many hubs between the computers in the network	Too many hubs (or repeaters) between the connected computers in the network may increase the number of packet collisions or other network problems. Remove unnecessary hubs from the network.
A loop in the data path	A data path loop forms when there is more than one path or route between two networked computers. This results in broadcast storms that will severely affect your network performance. Make sure there are no loops in your network topology.

Appendix A

Product Specifications

This section provides the specifications of the switch.

GENERAL	
Standards	IEEE802.3u 100Base-TX Fast Ethernet (twisted-pair copper) ANSI/IEEE802.3 Auto-negotiation IEEE802.3x Flow Control IEEE802.3ab 1000Base-T Gigabit Ethernet
Interface	1000BASE-T Ethernet ports (GS-1008: 8, GS-1016:16)
Media Interface Exchange	All ports auto-sensing (auto MDI-/MDI-X)
Data Transfer Rate	Fast Ethernet: 100Mbps (half duplex)/200Mbps (full duplex) Gigabit Ethernet: 2000Mbps(full duplex)
Network Cables	100BASE-T: UTP Cat.5 (100 m max.) EIA/TIA-568 100-ohm STP (100m max.) 1000Base-T: 4-pair UTP/STP Cat. 5 cable EIA/TIA-568 100-ohm (100m)
PERFORMANCE AND MANAGEMENT	
Back plane	Non-blocking full wire speed data rates GS-1008: 16Gbps, GS-1016 32Gbps
Packet Forwarding Rate	148800PPS for 100BASE-TX 1488000PPS for 1000BASE-T
Switching Method	Store-and-forward
MAC Address Table (Auto-learning)	GS-1008: 8K entries GS-1016: 4K entries
Data Buffer	GS-1008: 256KB, GS-1016: 272KB
PHYSICAL ENVIRONMENT	
Weight	Main switch: GS-1008: 2.9Kg, GS-1016: 3.0Kg

Dimension GS-1008/GS-1016 Gigabit Ethernet Switch

LED	Per Port (GS-1008: (4 LEDs) 100, 1000, LK/ACT (Link/Activity), FD (Full-duplex) Per Port (GS-1016: (3 LEDs) 1000, LNK/ACT (Link/Activity), FDX/COL (Full-duplex) Per Unit: Power
Dimensions	440(W) x 224(D) x 44(H) mm (19" in width rack mountable)
Power Supply	100 - 240V AC, 50/60Hz internal universal power supply
Power Consumption	GS-1008: 35W max, GS-1016: 60W max
Operating Temperature	0°C to 45°C (32°F to 113°F)
Operational Humidity	10% to 90% (Non-condensing)
EMI	FCC Class A, CE
Safety	UL, cUL

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