Dimension

ES-1016/ES-1024

Ethernet Switch

User's Guide

January 2003

ZyXEL

TOTAL INTERNET ACCESS SOLUTION

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

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North America	support@zyxel.com sales@zyxel.com	+1-714-632-0882 800-255-4101 +1-714-632-0858	www.zyxel.com ftp.zyxel.com	ZyXEL Communications Inc., 1650 Miraloma Avenue, Placentia, CA 92870, U.S.A.
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Preface

Congratulations on your purchase of the Dimension ES-1016/ES-1024 Ethernet Switch.

About the Dimension ES-1016/ES-1024 Ethernet Switches

The Dimension ES-1016/ES-1024 switch is a cost effective Fast Ethernet switch ideal for setting up a small workgroup or for bridging two separate networks.

The ES-1016 comes with 16 10/100M ports and the ES-1024 with 24 10/100M ports.

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 ES-1016/ES-1024 Ethernet Switch will be referred to as ES-1016/ES-1024 or the switch in this manual.

Unless specified, images of the ES-1024 are used throughout this document. The ES-1016 has 16 available Ethernet ports however the images used in this User's Guide show the 24 available ports that are featured on the ES-1024. Images that directly relate to the ES-1016 are used when referring to the key differences between the two models.

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 Your switch

This chapter describes the key features, benefits and applications of your switch.

1.1 Introduction

The switch is a multi-port switch that can be used to build high-performance switched workgroup networks. The switch is a store-and-forward device that offers low latency for high-speed networking. The switch is designed for workgroups, departments or backbone computing environments for SME (small, medium enterprise) businesses.

Figure 1-1 The ES-1016

Figure 1-2 The ES-1024

1.2 Features

The following are the essential features of the switch.

- Conforms to IEEE 802.3, 802.3u, and 802.3x standards.
- Auto-negotiating 10/100Mbps Ethernet RJ-45 ports.
- Auto-sensing crossover for all 10/100Mbps Ethernet RJ-45 ports.
- Supports Back-Pressure-Base flow control on Half-duplex ports.
- Supports Pause-Frame-Base flow control on Full-duplex ports.
- Supports store-and-forward switching.
- Supports automatic address learning.
- Full wire speed forwarding rate.
- Embedded 8K MAC address table providing 8000 MAC addresses entries.
- Power, LK/ACT and FD/COL LEDs.
- Standard 19-inch rack-mount design.

1.3 Package Contents

Compare the contents of your ES-1016/ES-1024 Ethernet Switch package with the checklist below. If any item is missing or damaged, please contact your local dealer.

- ES-1016/ES-1024 Ethernet switch
- Power cord
- This User's Guide
- Four self-adhesive rubber feet
- Rack mount brackets

1.4 Applications

This section provides two network topology examples in which the switch is used.

1.4.1 Standalone Workgroup

The switch can be used as a standalone switch to which computers, servers and printer server are directly connected to form a small workgroup.

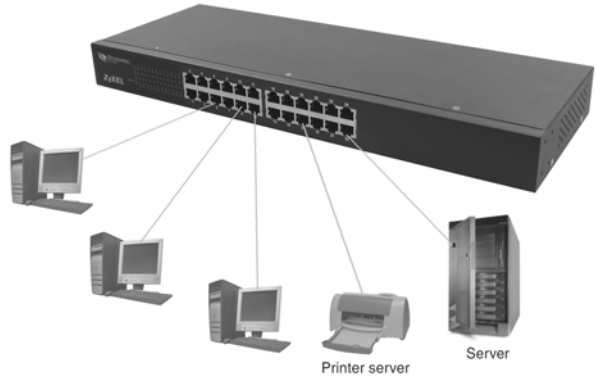

Figure 1-3 Standalone ES-1024 Workgroup Example

1.4.2 Bridging

With its large address table (8000 MAC address entries) and high performance, the switch is an ideal solution for department networks to connect to the corporate backbone or for connecting network segments.

The following figure depicts a typical segment bridge application of the switch in an enterprise environment. The two workgroups, the standalone server and the two servers can all communicate with each other and share all network resources.

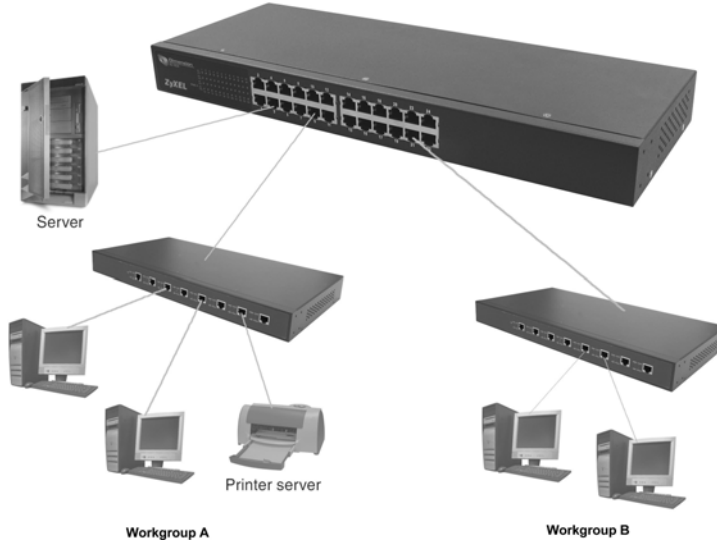

Figure 1-4 Bridging Example

Chapter 2
Hardware Description and Installation

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

The switch is suitable for 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 and 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. Make sure the switch is clean and dry.

Step 2. Set the switch on a smooth, leveled and sturdy flat space strong enough to support the weight of the switch and the connected cables. Make sure there is a power outlet nearby.

Step 3. Make sure there is enough clearance around the switch to allow air circulation and the attachment of cables and the power cord.

Step 4. Remove the adhesive backing from the supplied rubber feet.

Step 5. 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.

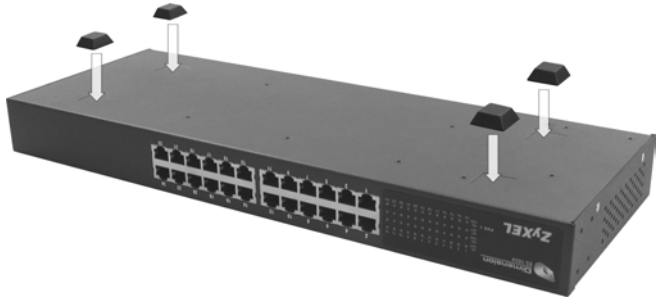

Figure 2-1 Attaching Rubber Feet

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

2.2 Rack-Mount 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 smaller than the rack-mouting screws. Similarly, attach the other brackets.

Figure 2-2 Attaching Mounting Brackets and Screws

Step 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-mounting screws.

Figure 2-3 Mounting the ES to an EIA standard 19-inch rack

2.3 Rear Panel

The three-pronged power receptacle is located on the rear panel of the switch. Refer to the *Product Specifications* for power specification.

Figure 2-4 Rear Panel of the ES-1016/ES-1024

2.4 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 appropriate power source.

2.5 Front Panel

The front panel of the switch includes the auto-negotiating 10Base-T/100Base-TX RJ-45 ports and the LEDs.

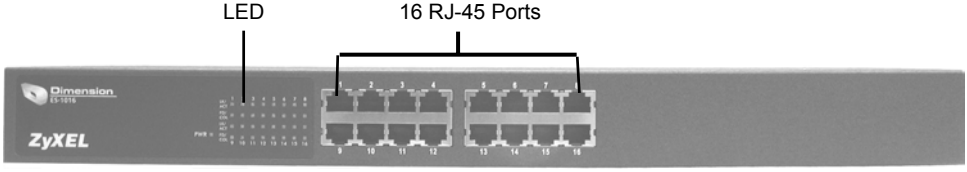

Figure 2-5 The Front Panel of the ES-1016

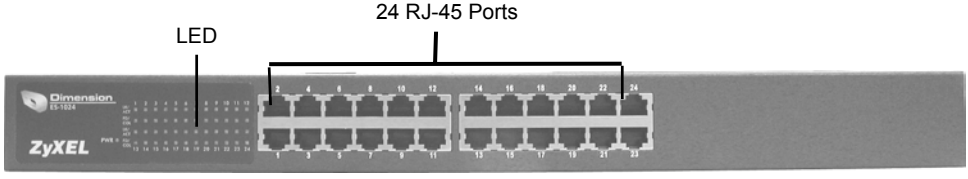

Figure 2-6 The Front Panel of the ES-1024

2.5.1 10Base-T/100Base-TX RJ-45 auto-negotiating ports

Your switch comes with 16 or 24 10Base-T/100Base-TX RJ-45 ports depending on the model of your switch. The 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 10 Mbps or 100 Mbps in either half- duplex or full-duplex mode depending on your Ethernet network.

2.5.2 Auto-sensing MDI/MDIX ports

Each 10Base-T/100Base-TX RJ-45 MDI/MDIX port allows you to connect to a computer or to a hub using either a straight-through or a crossover Ethernet cable.

2.5.3 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.

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

Table 2-1 Network Cable Types

SPEED	NETWORK CABLE TYPE
10 Base-T	100Ω 2-pair UTP/STP Category 3, 4 or 5
100 Base-TX	100Ω 2-pair UTP/STP Category 5

2.5.4 Front Panel LEDs

The LED Indicators give real-time information about the status of the switch. The following table provides descriptions of the LEDs.

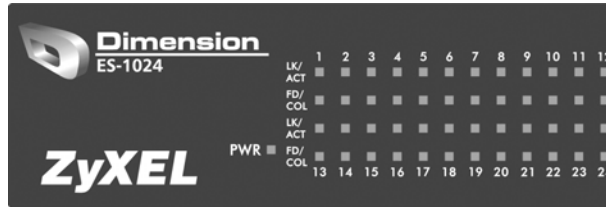

Figure 2-7 The Front Panel LEDs of the ES-1024

Table 2-2 The Front Panel LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	On	The switch is on and receiving power.
		Off	The switch is not receiving power.
LK/ACT	Green	On	The port is connected to an Ethernet network.
		Off	The port is not connected to an Ethernet network.
		Blinking	The port is receiving or transmitting data.
FD/COL	Orange	On	The port is operating in full-duplex mode.
		Blinking	Packet collision occurred on this port.
		Off	The port is operating in half-duplex mode.

Chapter 3
Troubleshooting

This section describes common problems you may encounter with the switch 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 Power 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 an appropriate power source. Refer to the *Product Specifications* section.
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 LED

The LK/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.
2	Make sure the Network Interface Cards (NICs) 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 the *Front Panel Connections* section.

3.1.3 FD/COL LED

The FD/COL LED blinks.

Table 3-3 Troubleshooting FD/COL LED

STEP	CORRECTIVE ACTION
0	Some collisions in the network are normal. If the FD/COL LED blinks continuously, proceed to the steps below.
1	Verify that proper network cable type is used and its length does not exceed 100 meters. For more information on network cable types, see the *Front Panel Connections* section.

Table 3-3 Troubleshooting FD/COL LED

STEP	CORRECTIVE ACTION
2	Your network is busy. Try sending large files later, reduce the number of users or segment your network.

3.2 Improper Network Cabling and Topology

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

Table 3-4 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 network collisions and cause other network problems that affect your network performance. Refer to the *Front Panel Connections* section 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 network collision 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	IEEE802.3 10BASE-T Ethernet (twisted-pair copper) IEEE802.3u 100BASE-TX Fast Ethernet (twisted-pair copper) ANSI/IEEE802.3 Auto-negotiation IEEE802.3x Flow Control
Interface	ES-1024: 24 10/100BASE-T Ethernet ports ES-1016: 16 10/100BASE-T Ethernet ports
Data Transfer Rate	Ethernet: 10Mbps(half duplex) 20Mbps (full duplex) Fast Ethernet: 100Mbps (half duplex) 200Mbps(full duplex)
Network Cables	10BASE-T: UTP Cat.3, 4, 5 (100 m) EIA/TIA-586 100-ohm STP (100 m) 100BASE-TX: UTP Cat.5 (100 m max.) EIA/TIA-568 100-ohm STP (100 m max.)
Full/Half Duplex	Full/Half duplex for 10/100Mbps speeds
Media Interface Exchange	All ports MDI/MDIX auto-sensing
PERFORMANCE AND MANAGEMENT	
Back plane	Non-Blocking full wire speed forwarding rate 3.2Gbps
Packet Forwarding Rate	14880PPS for 10BASE-T 148800PPS for 100BASE-TX
Switching Method	Store-and-forward
MAC Address Table	8K entries per main switch
Data Buffer	ES-1024: 512 KB ES-1016: 4MB
PHYSICAL AND ENVIRONMENTAL	
Weight	2Kg
LED	Per port: LK/ACT, FD/COL Per unit: Power
Dimensions	440(W) x 160(D) x 44(H) mm
Power Supply	100 - 240VAC 50/60Hz internal universal power supply
Power Consumption	Main switch: 17W max. ES-1016: 10W max. ES-1024: 16W max.
Operating Temperature	0℃~45℃ (32ºF to 113ºF)

Operational Humidity	10% to 90% (Non-condensing)
EMI	FCC Class A, CE
Safety	UL, cUL

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