Dimension
GS-1116A and GS-1124A

Unmanaged 16 or 24 Port Gigabit Switch with 2 mini-GBIC Ports

User's Guide

Version 1
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Edition 2

ZyXEL
Unleash Networking Power

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Preface

Congratulations on your purchase of the Dimension GS-1116A or GS-1124A unmanaged 16 or 24 port Gigabit switch with 2 mini-GBIC ports.

This preface introduces you to the Dimension GS-1116A and GS-1124A 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-1116A and GS-1124A Gigabit Switch

The GS-1116A or GS-1124A is designed to improve your network performance with high-speed data transmission over copper wire. The GS-1116A or GS-1124A 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-1116A or GS-1124A unmanaged 16 or 24 port gigabit switch with 2 mini-GBIC Ports may be referred to as "the switch" in this manual except where we refer to a specific switch.

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 Switch

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

1.1   Introduction

The switch is designed for the campus or building environment as a high bandwidth backbone. The GS-1116A has 16 100/1000 Mbps RJ-45 ports. The GS-1124A has twenty-four 100/1000 Mbps RJ-45 ports. You can connect the switch to existing Ethernet routers, switches or hubs without additional expensive wiring or equipment installation.
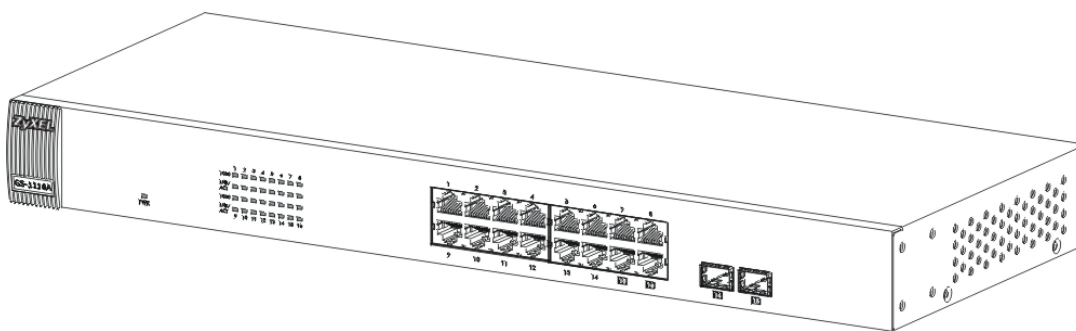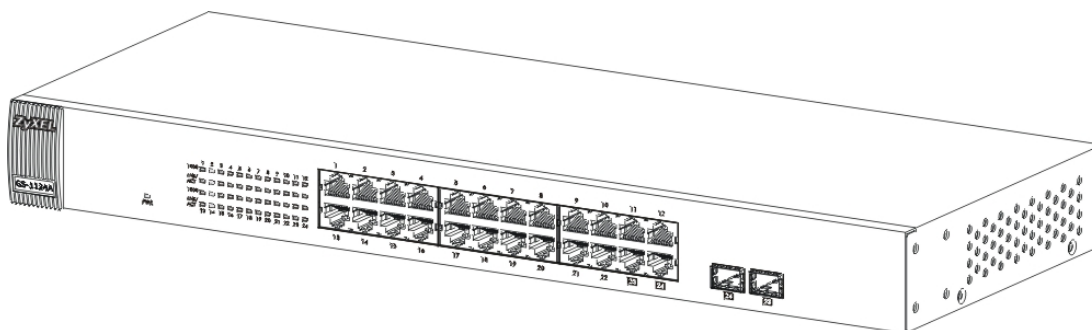

Figure 1-1 GS-1116A

Figure 1-2 GS-1124A

Gigabit Ethernet over copper technology is a cost effective way of upgrading network equipment from fast Ethernet to Gigabit speed by using standard 4-pair Category 5 copper cabling. The Mini GBIC slots allow for fiber optic high-speed backbone connections.

Both ports 15 and 16 in the GS-1116A (or 23 and 24 in the GS-1124A) support 3.3V Mini GBIC. The GBIC port auto detects between Giga copper and Mini GBIC. The Mini GBIC module is optional. When the Mini GBIC module is not installed, these act as Giga copper connections.

The switch is an ideal solution for solving traffic block at the core of the network. It offers auto-negotiation 100/1000Base-T Gigabit Ethernet ports that can significantly improve your network backbone performance.

1.2   Features

- Conforms to IEEE 802.3 10Base-T, IEEE 802.3u 100Base-TX, IEEE 802.3z Gigabit fiber and IEEE 802.3ab 1000Base-T standards.

- IEEE 802.1p supports two priority queues for outgoing traffic helping improving network efficiency and performance.

- Auto-negotiating 100/1000Mbps Ethernet RJ-45 ports.

- Automatic MDI/MDIX supported.

- Switching fabric of 32Gbps in the GS-1116A and 48Gbps in the GS-1124A.

- N-way Auto-negotiation supported.

- Embedded 8K MAC address table providing 8000 MAC address entries.

- Two 3.3V Mini GBIC ports for Gigabit fiber transceiver.

- Two Gigabit copper ports.

- Supports auto address learning.

- Supports store-and-forwarding switching architecture for abnormal packet filtering.

- Back-Pressure-Base flow control on Half-duplex mode Ethernet ports.

- Pause-Frame-Base flow control on Full-duplex mode Ethernet ports.

- No-Blocking full wire speed architecture.

- One fan for good ventilation and to increase system heat sink performance.

- Power, 1000 and LNK/ACT LEDs.

- Standard 19-inch rack mount design

1.2.1   IEEE 802.1p Class of Service

The IEEE 802.1p Class of Service (CoS) provides two queues for high and low priority traffic. This improves network efficiency and performance by giving higher priority to outgoing traffic. The lower queue has a priority value in the range of zero to three and the higher queue has a priority value in the range of four to seven.

☞   **When the Mini GBIC module is installed, the Mini GBIC (Giga fiber) port has higher priority than Giga copper port. When the Mini GBIC port is connected, the Giga copper port is disabled.**

1.3 Package Contents

Compare the contents of your GS-1116A/GS-1124A Gigabit Switch package with the checklist below. If any item is missing or damaged, please contact your local dealer.

- GS-1116A or GS-1124A Gigabit switch

- Power cord

- Quick Start Guide

- This User's Guide in CD-ROM format.

- Four rubber feet

- Rack mount brackets

1.4 Gigabit Switch Network Applications

This section provides a sample of network topologies in which the Gigabit switch functions as a high-bandwidth backbone switch for a server farm or as a high-bandwidth backbone switch for a super user workgroup. 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.

1.4.1 Gigabit Switch for Server Farm

The following figure depicts the GS-1124A (Z) connected to a computer network (via switches A, B and C) and a server farm (via Gigabit switch G). For enterprise networks where large data broadcasts are constantly processed, this switch is suitable for connecting departmental switches to the core Gigabit switch through a number of servers. Connecting servers to the core Gigabit switch allows each end station to rapidly access the server's data and to smoothly communicate with all the devices in the network.
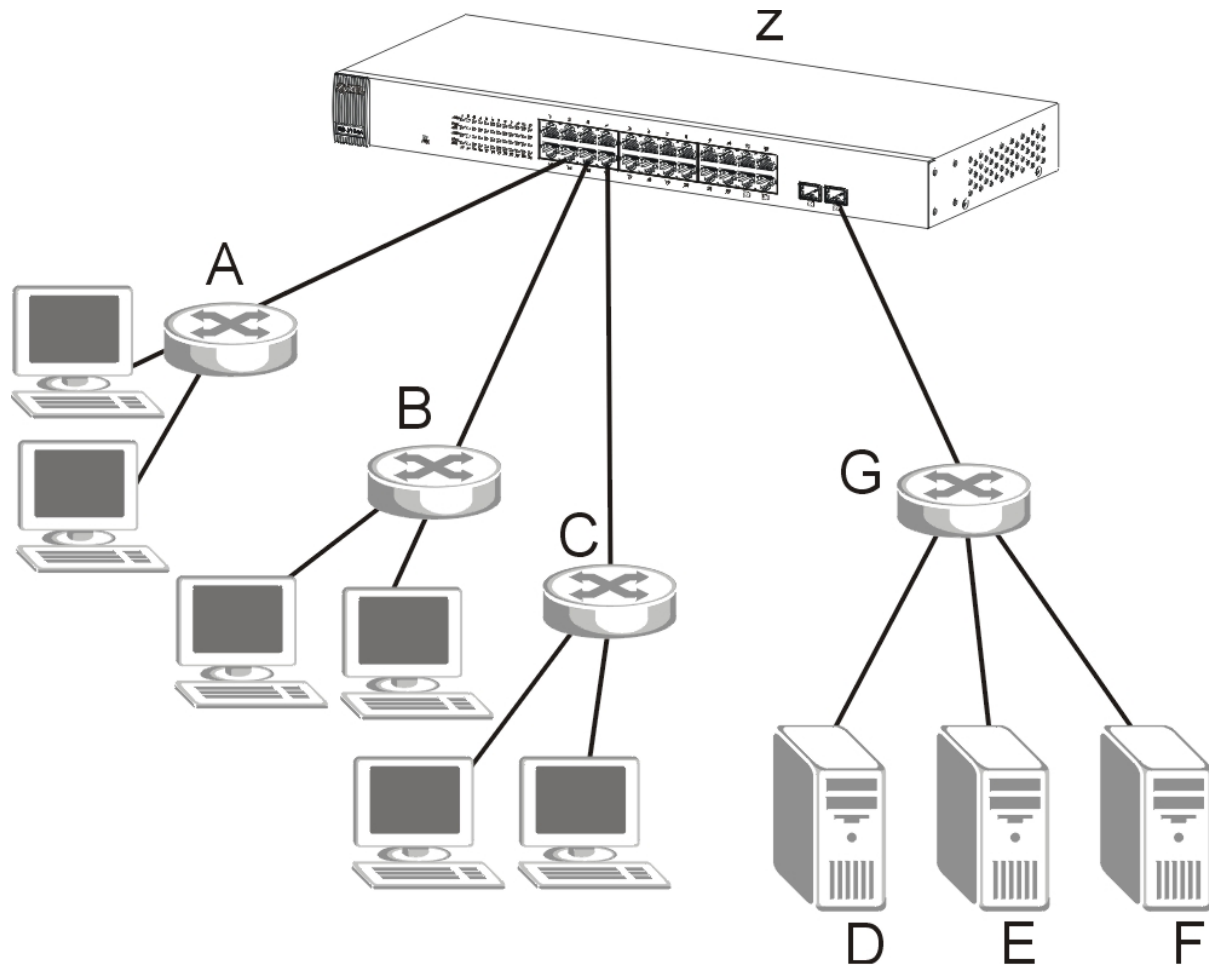
Figure 1-3 Gigabit Switch for Server Farm

1.4.2 Gigabit Switch for "Super User" Work Groups

You can use the GS-1116A or the GS-1124A to connect servers, switches, workstations and computers (the Gigabit 1000Base-T NIC must be installed onto the computer) to each other.

The following figure depicts a typical backbone application of the switch in an enterprise environment. The "Normal User" workgroup (A, B, C) is connected to a switch via a 10/100Mbps and the "Super User" workgroup (D, E, F) is connected to a Gigabit switch (G). This enables the two networks to communicate with each other, prioritizing the "Super User" network with higher connection speeds though a Gigabit switch.

The "Normal User" workgroup runs applications that are not time sensitive and do not require large amounts of bandwidth, such as Internet browsing and e-mail.

The "Super User" workgroup runs bandwidth-hungry applications like large FTP file transfers and real time applications such as video conferencing.

The switch automatically learns node addresses, which are subsequently used to filter and forward all traffic based on the destination address. You can use the Mini GBIC slots to connect with a fiber optic

network that extends your Ethernet network and to separate "Normal User" and "Super User" networks.
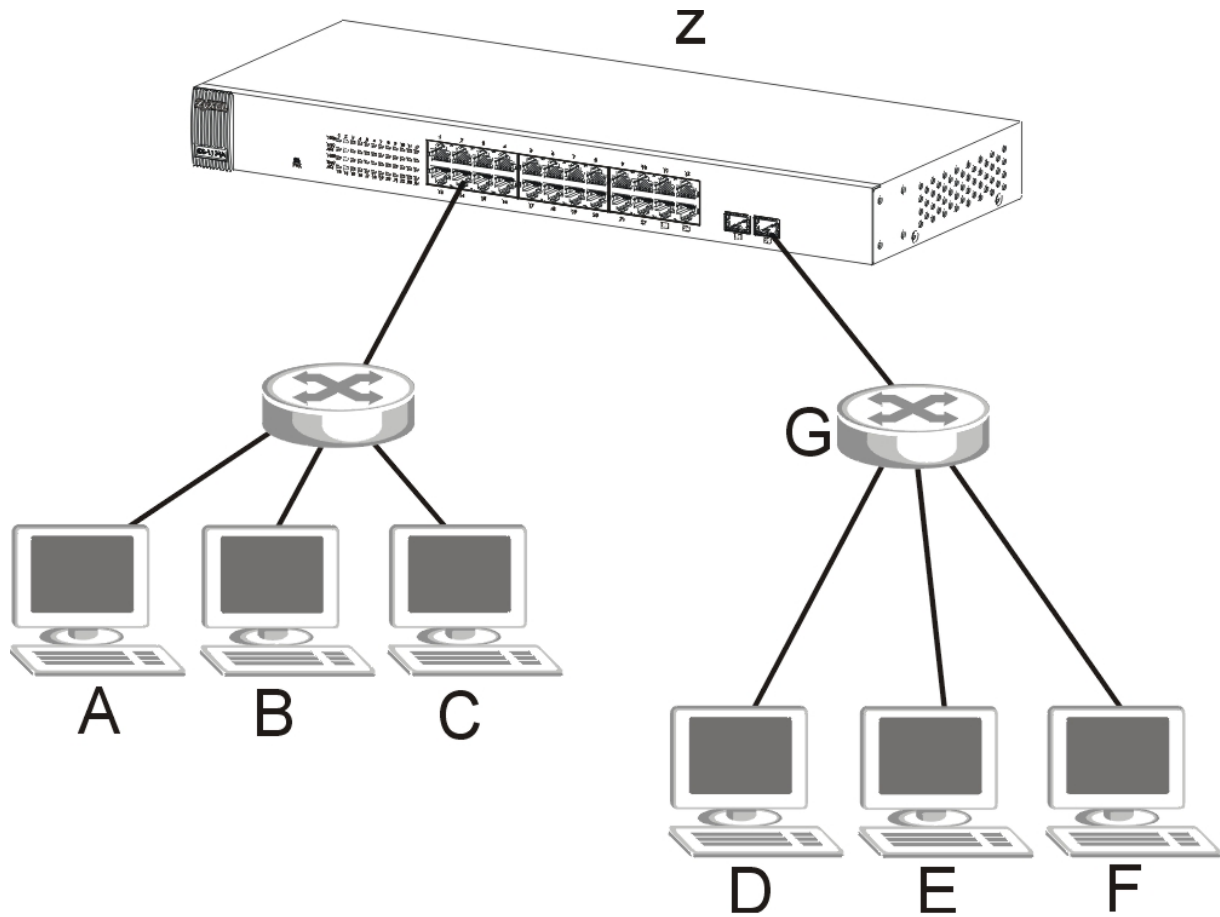

Figure 1-4 Gigabit Switch for Super User Work Groups

Chapter 2
Hardware Description and Installation

This section discusses switch installations, hardware and functional overview.

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

☞ **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

1. Set the switch upside-down on a study level space with a power outlet nearby.

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

3. Remove the adhesive backing from the supplied rubber feet.

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.

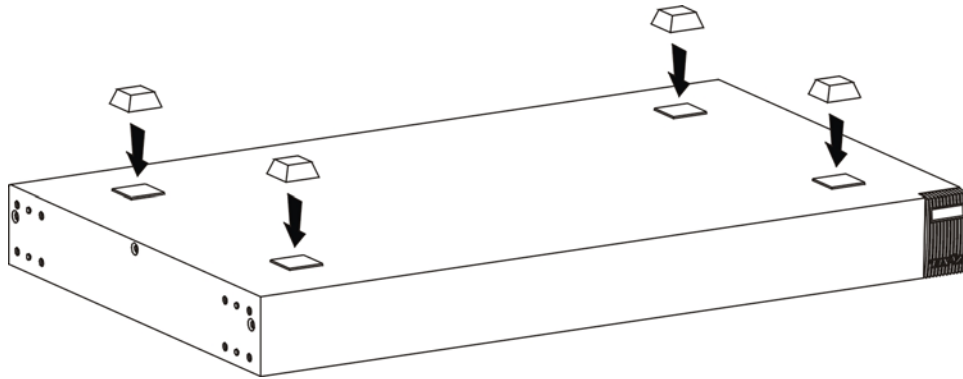5. Turn the switch right side up after you attach the rubber feet.

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.

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.
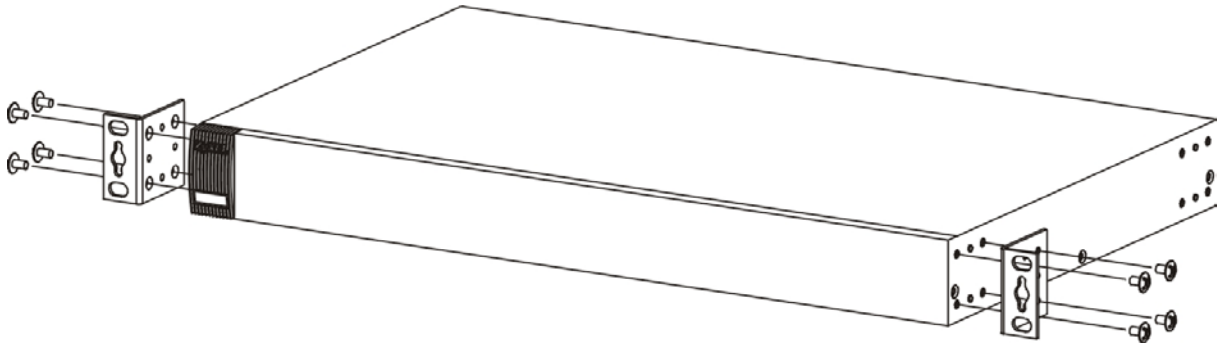

Figure 2-2 Attaching Mounting Brackets and Screws

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.
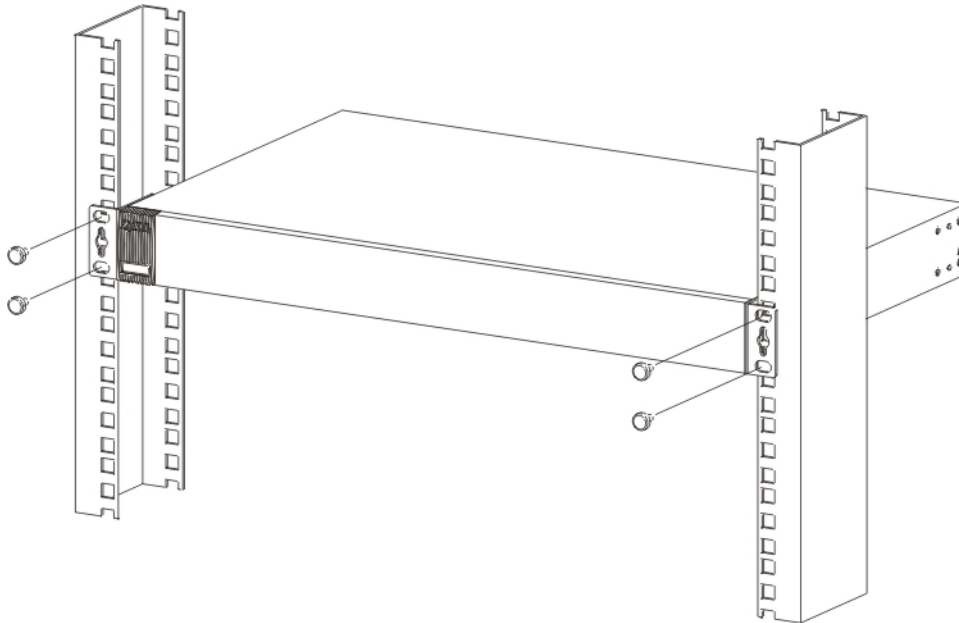

Figure 2-3 Switch Mounting to an EIA Standard 19-inch Rack

2.3   Rear Panel

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

Figure 2-4 Switch 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 100-240 VAC, 50-60 Hz power source. Push the power switch to the **ON** position.

2.4   Front Panel

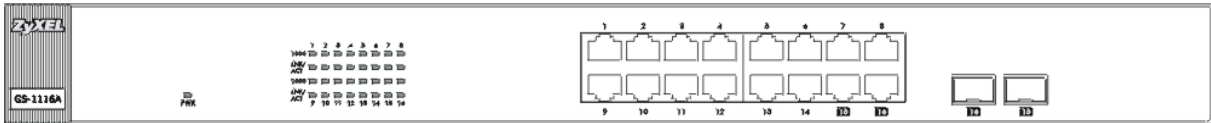The following graphics show the front panels of the GS-1116A and the GS-1124A.

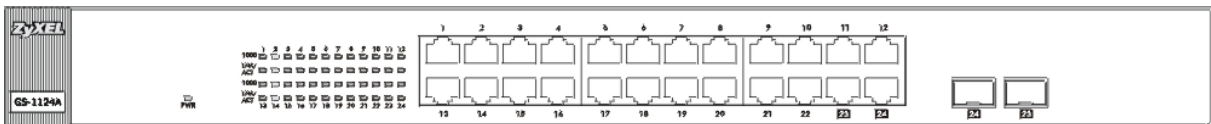

Figure 2-5 GS-1116A Front Panel

Figure 2-6 GS-1124A Front Panel

Table 2-1 GS-1116A/GS-1124A: Front Panel Ports

CONNECTOR	DESCRIPTION
RJ-45 ports	Connect these 100/1000 Mbps RJ-45 Ethernet ports to computers, hubs, Ethernet switches or routers.
Mini GBIC ports	Use mini GBIC transceivers in these ports for fiber-optical connections to backbone Ethernet switches.

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

The GS-1116A has 16 100/1000 Mbps RJ-45 ports. The GS-1124A has twenty-four 100/1000 Mbps RJ-45 ports. The auto-negotiation feature allows the switches to detect the speed of incoming transmission and adjust appropriately without manual intervention. It allows data transfers of either

- 100Mbps in half-duplex mode

- 100Mbps or 1000Mbps in 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 Mini GBIC Slots

These are slots for Mini GBIC (Gigabit Interface Converter) transceivers. A transceiver is a single unit that houses a transmitter and a receiver. The switch does not come with transceivers. You must use transceivers that comply with the Small Form-factor Pluggable (SFP) Transceiver MultiSource Agreement (MSA). See the SFF committee's INF-8074i specification Rev 1.0 for details.

You can change transceivers while the switch is operating. You can use different transceivers to connect to Ethernet switches with different types of fiber-optic connectors.

☞   **To avoid possible eye injury, do not look into an operating fiber-optic module's connectors.**

- Type: SFP connection interface
- Connection speed: 1 gigabit per second (Gbps)

Transceiver Installation

Use the following steps to install a mini GBIC transceiver (SFP module).

1. Insert the transceiver into the slot with the exposed section of PCB board facing down.

2. Press the transceiver firmly until it clicks into place.

3. The switch automatically detects the installed transceiver. Check the LEDs to verify that it is functioning properly.
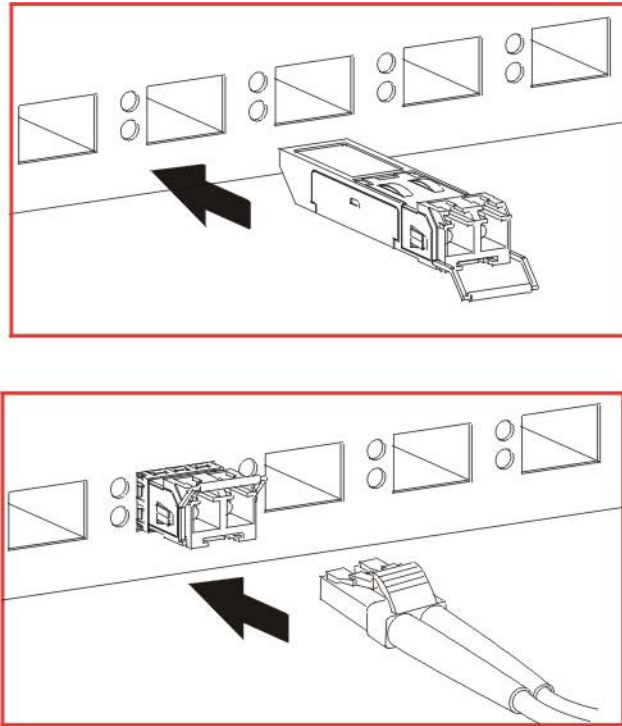
Figure 2-7 Transceiver Installation Procedure

Transceiver Removal

Use the following steps to remove a mini GBIC transceiver (SFP module) from the GBIC port.

1. Remove the fiber-optic cables from the transceiver.

2. Unlock the transceiver's latch (latch styles vary).

3. Pull the transceiver out of the slot.
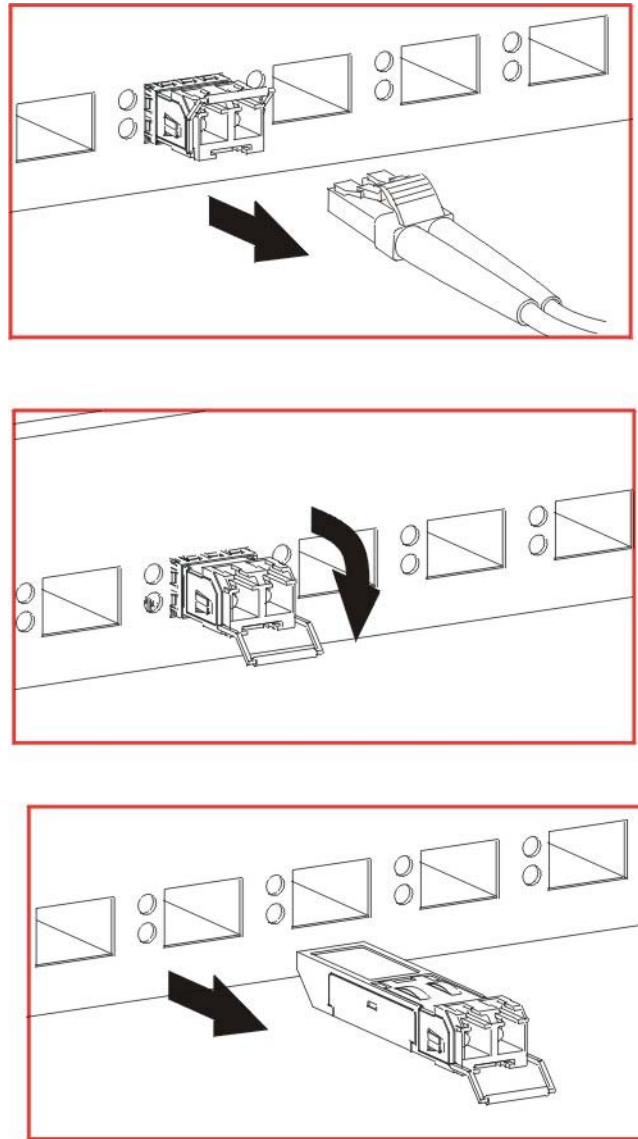
4. Put the transceiver's dust cover on the transceiver.

Figure 2-8 Transceiver Removal Example

☞ **Keep the dust cover on a fiber optic module until you connect it.**

Use the appropriate Ethernet or fiber-optic cables to connect the module to an Ethernet switch. With a fiber-optic module, remove the dust covers from the connectors. You may need to clean the fiber-optic cable's connectors with a cotton swab dipped in alcohol.

2.4.4 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.
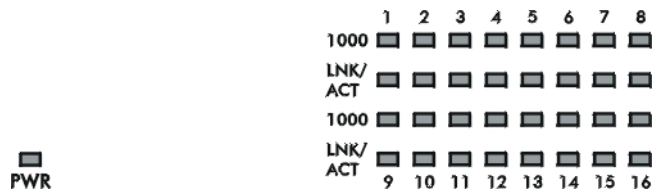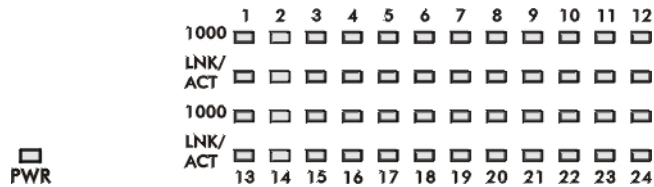
Table 2-2 Network Cable Types

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).**

2.4.5 Front Panel LEDs

The LEDs give real-time status information.

Figure 2-9 GS-1116A Front Panel LEDs

Figure 2-10 GS-1124A Front Panel LEDs

The following table provides LED descriptions.

Table 2-3 Front Panel LED Descriptions

SYSTEM			
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.
		Blinking	A link to a 1000Mbps Ethernet device is up, and the port is receiving or transmitting data.
		Off	The port is not connected to a 1000Mbps Ethernet device.
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.

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 LNK/ACT LED

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

Table 3-2 Troubleshooting LNK/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 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 *Table 2-2.*

3.1.3 1000 LED

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

Table 3-3 Troubleshooting 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 *Table 2-2*.

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 3-4 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 packet collisions and cause other network problems that affect your network performance. Refer to *Table 2-2* 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.

Product Specifications

This section provides the specifications of the switch.

GENERAL	
Standards	IEEE 802.3 10BASE-T Ethernet
	IEEE 802.3u 100BASE-TX Fast Ethernet
	IEEE 802.3ab 1000Base-T
	IEEE 802.3z Gigabit Fiber
	IEEE 802.1p Class of Service
Subscriber Interface	GS-1116A: 14x 1000Base-T Ethernet Ports
	GS-1124A: 22x 1000Base-T Ethernet Ports
	➢ Connector type: RJ-45
	➢ Auto-MDIX
	➢ Compliant with IEEE 802.3/3u
	➢ Back pressure flow control for half duplex
	➢ Flow control for full duplex (IEEE 802.3x)
Uplink Interface	2 GbE Dual Personality interface (Each dual personality has one 1000Base-T copper port and one Small Form-Factor Pluggable (SFP) fiber port, with one port active at a time.)
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	10BASE-T: 2-pair UTP/STP Cat. 3, 4, 5 cable
	EIA/TIA-568 100-ohm (100m)
	100BASE-TX: 2-pair UTP/STP CAT. 5 cable
	EIA/TIA-568 100-ohm (100m)
	Gigabit Copper: 4 pair UTP/STP CAT. 5 cable
	EIA/TIA 568 100-ohm (100M)
Performance and Management	
Packet Forwarding Rate	148800PPS for 100BASE-TX
	1488000PPS for 1000BASE-T
Switching Method	Store-and-Forward switching architecture
MAC Address Table (Auto-learning)	GS-1116A: 8K entries
	GS-1124A: 8K entries
Data Buffer	GS-1116A: 340KB
	GS-1124A: 500 KB

Layer 2 features	GS-1116A Switching fabric: 32Gbps. GS-1124A Switching fabric: 48Gbps GS-1116A Memory Buffer: 340KB GS-1124A Memory Buffer: 500KB Support Frame size: 1522 bytes 8K MAC addresses table Jumbo frame support: Support 9Kbytes Jumbo frame size CoS: Support 802.1p provided Tag based priority and per port 4 queues Broadcast storm control
Physical Environment	

LED	Power (green): Light on or off: Power on or off
	
	1000Base-T Ethernet ports:
	
	● 1000M green LED
	
	   ➤Light off: port is not connected at 1000M
	
	   ➤Light on: port is connected at 1000M
	
	   ➤Blinking: activity
	
	● LNK/ACT: Green LED
	
	   ➤Light off: port disconnected
	
	   ➤Light on: port connected at 10M, 100M or 1000M
	
	   ➤Blinking: activity

Power Supply	100 - 240V AC, 50/60Hz internal universal power supply
Power Consumption	GS-1116A: 13.25 W max GS-1124A: 23.2 W max
Operating Temperature	0ºC to 45ºC (32ºF to 113ºF)
Operational Humidity	10% to 90% (Non-condensing)
EMI	FCC Class A, CE

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