

FriendlyNET[®] GX5-424W

24+4 WebManaged[™] Gigabit Ethernet Switch

User's Manual

FriendlyNET® GX5-424W

24+4 WebManaged Gigabit Ethernet Switch User's Manual

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Table of Contents

Chapter 1 Introduction	5
Features.....	Error! Bookmark not defined.
Chapter 2 Unpacking and Installation	6
Unpacking.....	6
Installation.....	6
Rack Mounting.....	6
Connecting Network Cable.....	7
AC Power.....	7
Chapter 3 Identifying External Components	8
Front Panel.....	8
Rear Panel.....	8
Chapter 4 Understanding LED Indicators	10
Power and System LEDs.....	10
Ports 1–24 10/100 Status LEDs.....	10
Ports 25–26 Gigabit Status LEDs.....	11
Ports 27–28 SFP Mini-GBIC Status LEDs.....	11
Chapter 5 GX5W Management Utility	12
Installing the GX5W Management Utility.....	12
Discovery List.....	12
Monitor List.....	13
Device Setting.....	14
Toolbar.....	15
Chapter 6 Configuring the Switch	16
Login.....	16
Setup Menu.....	17
Configuring the Setup Setting.....	18
Logout.....	28
Chapter 7 Technical Specifications	29
Appendix A FCC and Warranty Statements	31
FCC Compliance.....	31
FriendlyNET Warranty Statement.....	31
FriendlyCare Technical Support.....	32
Appendix B About Gigabit Ethernet	33
Gigabit Ethernet Technology.....	33
Fast Ethernet Technology.....	33
Switching Technology.....	33
Virtual Local Area Network (VLAN).....	34

Chapter 1 Introduction

Congratulations on the purchase of the FriendlyNET GX5-424W 24+4 WebManaged Gigabit Ethernet switch. This device integrates 1000 Mbps Gigabit Ethernet, 100 Mbps Fast Ethernet, and 10 Mbps Ethernet network capabilities in a highly flexible package.

The versatile GX5 uses its on-board CPU to take the complexity out of configuring a workgroup. Using any popular web browser, you're only a few clicks of your mouse away from enabling high-end services, like trunking, mirroring, virtual LANs (VLANs) and quality of service (QoS).

Highlights

- 24 × 10/100 Mbps auto-negotiating Fast Ethernet RJ45 ports
- 2 × 10/100/1000 Mbps auto-negotiating Gigabit RJ45 ports
- 2 × SFP Mini-GBIC ports
- Up to 4000 unicast addresses entities per device, self-learning, and table aging
- 1152 KB total buffer
- Supports IEEE 802.3x flow control for full duplex mode ports; back pressure flow control for half duplex mode ports
- Supports port-based VLAN and QoS
- Supports trunking on 1000BaseT ports
- Supports port mirroring
- Supports port-settings for speed/disable and flow control
- Easy configuration via web browser
- Easy monitoring via GX5W Management Utility for Windows
- Standard 19" rackmount size (rackmount kit included)

Chapter 2 Unpacking and Installation

This chapter provides unpacking and installation information for the GX5-424W switch.

Unpacking

Open the shipping cartons of the GX5-424W switch and carefully unpack its contents. The carton should contain the following items:

- One FriendlyNET GX5-424W WebManaged switch
- One AC power cord, suitable for your area's electrical power connections
- Four rubber feet to be used for desktop mounting
- Screws and two mounting brackets
- CD-ROM with GX5W Management Utility and User's Manual
- Quick Start Guide

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

Installation

The site where you install the hub stack may greatly affect its performance. When installing, consider the following pointers:

- Install the GX5-424W switch in a fairly cool and dry place. See "Technical Specifications" for the acceptable temperature and humidity operating ranges.
- Install the GX5-424W switch in a site free from strong electromagnetic field generators (such as motors), vibration, dust, and direct exposure to sunlight
- Leave at least 4" of space at the front and rear of the hub for ventilation
- Install the GX5-424W switch on a sturdy, level surface that can support its weight, or in an EIA standard-size equipment rack
- When installing the GX5-424W switch on a level surface, attach the rubber feet to the bottom of each device. The rubber feet protect the bottom of the switch.

Rack Mounting

The switch can be mounted in an EIA standard-size, 19" rack, which can be placed in a wiring closet with other equipment. Attach the mounting brackets at the switch's front panel (one on each side), and secure them with the screws provided.

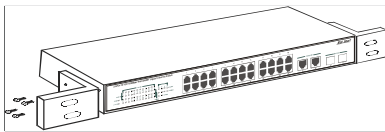


Figure 1. Secure the mounting brackets with the screws provided.

Then, use the screws provided with the equipment rack to mount each switch in the rack.

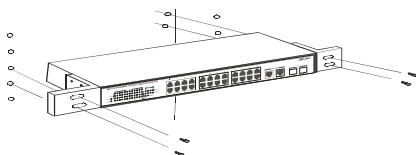


Figure 2. Mount the GX5-424W switch in the rack.

Connecting Network Cable

The GX5-424W switch supports 10 Mbps Ethernet or 100 Mbps Fast Ethernet and runs both in half and full duplex mode using Category 5 cable.

The GX5-424W switch also supports 2 port 1000 Mbps Gigabit Ethernet that runs in auto-negotiation mode and 10 Mbps Ethernet or 100 Mbps Fast Ethernet that runs both in half and full duplex mode and 1000 Mbps Gigabit Ethernet runs in full duplex mode using four pair of Category 5 Cable.

These RJ45 ports support Auto-Uplink. The switch can automatically detect and correct common wiring errors; you can use either standard or crossover RJ45 Category 5 UTP cable.

An additional 2-port SFP Mini-GBIC slot is included for an optional SFP Mini-GBIC module.

AC Power

The GX5-424W switch uses the AC power supply 100–240 VAC, 50–60 Hz. The power switch is located at the rear of the unit adjacent to the AC power connector and the system fan. The switch's power supply will adjust to the local power source automatically and may be turned on without having any or all LAN segment cables connected.

Chapter 3 Identifying External Components

This chapter describes the front panel, rear panel, and LED indicators of the GX5-424W switch.

Front Panel

The figure below shows the front panel of the GX5-424W switch.



Figure 3. Front panel of the FriendlyNET GX5-424W 24+4 WebManaged switch.

LED Indicator

Comprehensive LED indicators display the status of the switch and the network (see the following “LED Indicators” chapter).

Fast Ethernet Ports (Ports 1-24)

These ports support network speeds of either 10 Mbps or 100 Mbps, and can operate in half and full duplex transfer modes. These ports also supports automatic MDI/MDIX crossover detection function and give true “plug-and-play” capability. Just plug in the network cable to the hub directly. The end node may be a Network Interface Card (NIC), switch, or hub.

Gigabit Ethernet Ports (Ports 25–26)

The GX5-424W switch is equipped with two Gigabit twisted pair ports, supporting auto-negotiable 10/100/1000 Mbps and auto MDI/MDIX crossover detection function. These two ports can operate in half duplex mode for 10/100 Mbps and full duplex mode for 10/100/1000 Mbps.

SFP Mini-GBIC Ports (Ports 27–28)

The GX5-424W switch is equipped with 2 SFP Mini-GBIC ports and a supporting optional 1000BaseSX/LX SFP Mini-GBIC module.

Note: When the port is set to “Forced Mode,” the Auto MDI/MDIX will be disabled.

Rear Panel



Figure 4. Rear panel of the GX5-424W switch.

Power Switch

You can enable or disable the power with this switch.

AC Power Connector

This three-pronged connector supports the power cord. Plug in the female connector of the provided power cord into this connector, and the male into a power outlet. Supported input voltages range from 100–240 VAC at 50–60Hz.

Reset to Factory Default

This button resets all the settings back to the factory default, including:

- IP Address: 192.168.123.253
- Password: admin

Note: Be sure to record the settings of your device. All of the settings will be erased when the reset button is pressed.

Chapter 4 Understanding LED Indicators

The front panel LEDs provide instant status feedback, helping to monitor and troubleshoot when needed.



Figure 5. LED indicators on the GX5-424W switch.

Power and System LEDs

POWER: Power Indicator

On	The GX5-424W switch is receiving power.
Off	The power is off or the power cord has an improper connection.

SYSTEM: Management Indicator

Blinking	The CPU is working or the switch is ready.
On	The CPU is not working or the unit is hanging and needs to be reset.
Off	The power is off or the power cord has an improper connection.

Ports 1–24 10/100 Status LEDs

Link/ACT: Link/Activity

On	The respective port is successfully connected to an Ethernet network.
Blinking	The port is transmitting or receiving data on the Ethernet network.
Off	No link.

100 Mbps

On	The respective port is connected to a 100 Mbps Fast Ethernet network.
Off	The respective port is connected to a 10 Mbps Ethernet network.

Ports 25–26 Gigabit Status LEDs

Link/ACT: Link/Activity

On	The respective port is successfully connected to an Ethernet network.
Blinking	The port is transmitting or receiving data on the Ethernet network.
Off	No link.

100 Mbps

On	The respective port is connected to a 100 Mbps Fast Ethernet network.
Off	The respective port is connected to a 10 Mbps Ethernet or 1000 Mbps Gigabit Ethernet network.

1000 Mbps

On	The respective port is connected to a 1000 Mbps Gigabit Ethernet network.
Off	The respective port is connected to a 10 Mbps Ethernet or 100 Mbps Fast Ethernet network.

Ports 27–28 SFP Mini-GBIC Status LEDs

Link/ACT: Link/Activity

On	The SFP Mini-GBIC module is installed and connected to a network.
Blinking	The SFP Mini-GBIC module is receiving data on a network.
Off	No link.

1000 Mbps

On	The respective port is connected to a 1000 Mbps Gigabit Ethernet network.
Off	The respective port is disconnected from the network.

Chapter 5 GX5W Management Utility

You can configure the GX5-424W switch through the Web browser.

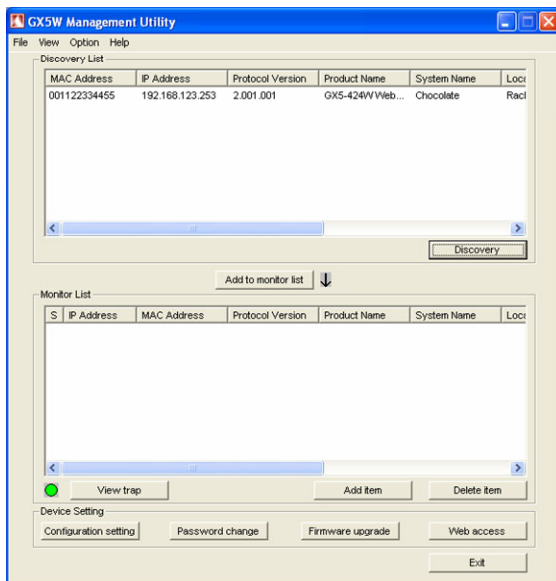
With the GX5W Management Utility, you can easily assign the IP address, change the password, and upgrade to new firmware. It is most important to find out the IP of the switch in the network, even though your PC's IP is not in the same group as the switch's IP.

For best performance, use the management screens to configure the switch before placing it into service. Under heavy network traffic, the first priority is to handle network activity; management screens will appear later.

Installing the GX5W Management Utility

The following gives instructions to guide you through the installation of the GX5W Management Utility.

1. Insert the Utility CD in the CD-ROM drive.
2. From the **Start** menu on the Windows desktop, choose *Run*.
3. In the *Run* dialog box, type **D:\GX5W Management Utility\setup.exe** (note that **D:** depends on where your CD-ROM drive is located) and click **OK**.
4. Follow the on-screen instructions to install the utility.
5. Upon completion, go to **Program Files > GX5W_Management_UTILITY** and execute the program.



The Management Utility is divided into four parts: Discovery List, Monitor List, Device Setting, and Toolbar.

Discovery List

This is the list where you can discover all the GX5W Management devices in the entire network.

By pressing the **Discovery** button, you can list all the GX5W Management devices in the discovery list.

Double-click or press the **Add to monitor list** button to select a device from the Discovery List to add to the Monitor List.


System word definitions in the Discovery List show:

- **MAC Address:** the device MAC address
- **IP Address:** the current IP address of the device
- **Protocol Version:** the version of the Utility protocol
- **Subnet Mask:** the subnet mask of the device
- **Gateway:** the gateway of the device
- **Product Name:** the device product name
- **System Name:** the device system name configured
- **Location:** configured device location
- **Trap IP:** the IP where traps are sent

Monitor List

All of the WebManaged devices in the Monitor List can be monitored; you can also receive the trap and show the status of the device.

System word definitions in the Monitor List show:


- **S:** the system symbol of the Web-Smart device,  means device is not alive or your PC's IP is not in the same group as your switch's IP
- **IP Address:** the current IP address of the device
- **MAC Address:** the device MAC Address
- **Protocol Version:** the version of the Utility protocol
- **Product Name:** the device product name
- **System Name:** the device system name configured
- **Location:** configured device location
- **Trap IP:** the IP where traps are to be sent
- **Subnet Mask:** the subnet mask of the device
- **Gateway:** the gateway of the device

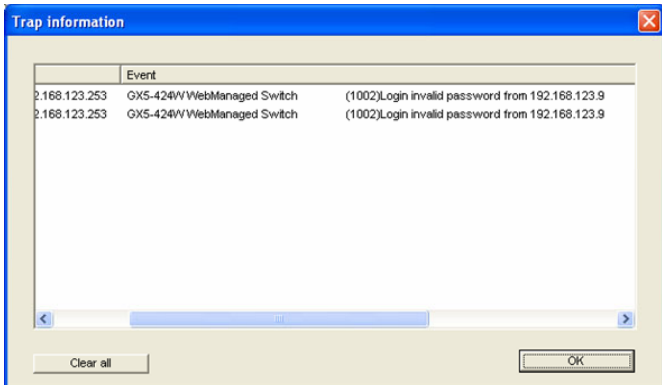
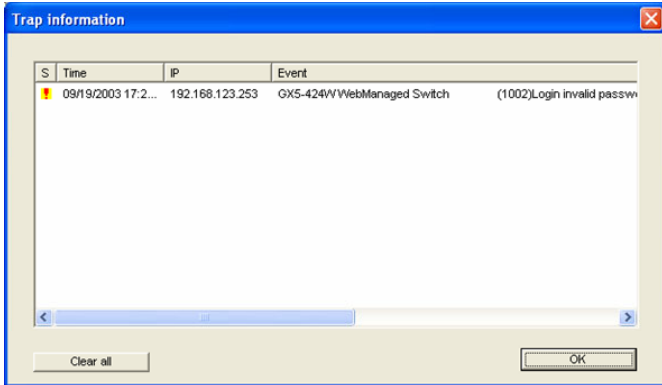
Also, the View Trap function can receive the events that happen from the WebManaged switch in the Monitor List.

Notice the light indicator behind the **View trap** button. When the light is green, no trap is transmitted. When the light is red, a new trap is transmitted and should be viewed.



When the **View trap** button is clicked, a Trap Information window will appear, showing trap information such as the Symbol, Time, Device IP, and the Event that occurred.

The symbol  represents the trap signal; this symbol disappears after you review and click on the event record.



Note: In order to receive trap information, the switch must be configured with Trap IP and Trap Events in the Web browser. These are available in the Trap Setting Menu.

Add Item: To add a device to the Monitor List manually, enter the IP Address of the device that you want to monitor.

Delete Item: To delete the device in the Monitor List.

Device Setting

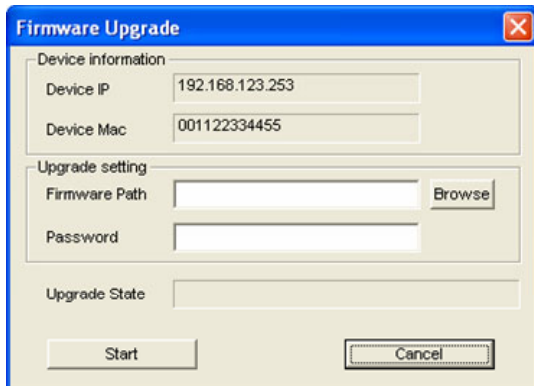
You can set the device by using the function key in the Device Setting Dialog box.

Configuration Setting: In this Configuration Setting, you can set the IP Address, Subnet Mask, Gateway, Set Trap to (Trap IP Address), System name, and Location.

Select the device in the Discovery List or Monitor List and press the appropriate button. The Configuration Setting window will appear. After filling in the data that you want to change, you must fill in the password and press **Set** to process the changed data.



Firmware Upgrade: Occasionally, Asanté may release new firmware for the GX5-424W. To upgrade your current version, fill in the Firmware Upgrade's dialog boxes and press **Start**.



Web Access: Double-click the device in the Monitor List or select a device in the Monitor List and press the **Web Access** button to access the device in Web browser.

Toolbar

The toolbar in the GX5W Management Utility has four main tabs: File, View, Options, and Help.

The File Tab includes Monitor Save, Monitor Save As, Monitor Load, and Exit.

- **Monitor Save:** to record the setting of the Monitor List to the default, when you open the GX5W Management Utility next time, it will auto-load the default recorded setting
- **Monitor Save As:** to record the setting of the Monitor List in appointed filename and file path
- **Monitor Load:** to manually load the setting file of the Monitor List
- **Exit:** to exit the GX5W Management Utility

The View TAB contains the View Log and Clear Log Functions that help you to show trap settings.

- **View Log:** to show the event of the GX5W Management Utility and the device
- **Clear Log:** to clear the log

The Option TAB contains the Refresh Time function, which helps you to refresh the time of monitoring the device. Choose *15 secs*, *30 secs*, *1 min*, *2 min*, or *5 min* to select the time of monitoring.

The Help TAB contains the About function, which shows the version of the GX5W Management Utility.

Chapter 6 Configuring the Switch

You can use any popular web browser to configure the GX5-424W switch for your network. A network administrator can manage, control, and monitor the switch from the local LAN. This section indicates how to configure the GX5-424W switch to enable its smart functions.

Login

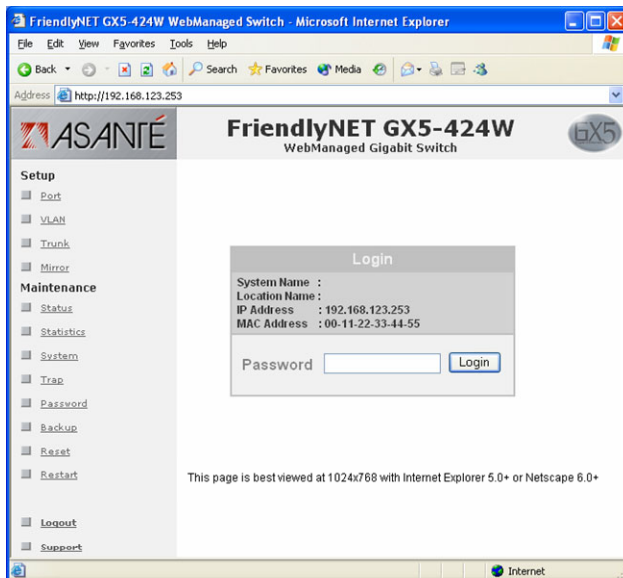
Before you configure this device, note that when the GX5-424W switch is configured through an Ethernet connection, the manager PC must be set on the same IP network. For example, when the default network address of the default IP address of the switch is **192.168.123.253**, the manager PC should be set at **192.168.123.x** (where **x** is a number between 2 and 252), and the default subnet mask at **255.255.255.0**.

Open your web browser (Internet Explorer 5, Netscape 6, Safari 1 and later). A screen resolution of 1024x768 (or higher) is recommended.

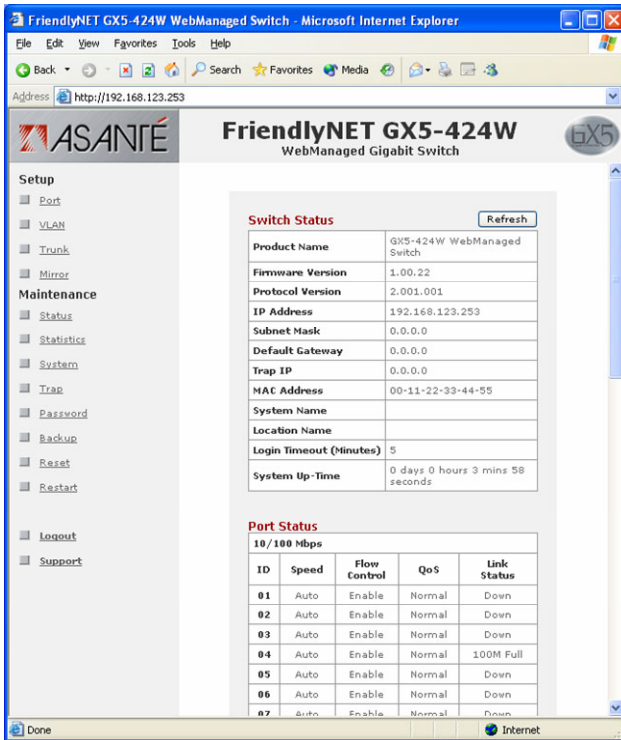
Enter IP address **<http://192.168.123.253>** (the factory-default IP address setting) in the address location.

When using the GX5W Management Utility, you do not need to remember the IP address. Select the device shown in the Monitor List of the GX5W Management Utility to settle the device on the Web browser.

When the following dialog page appears, enter the default password **admin** and press **Login** to enter the status window.

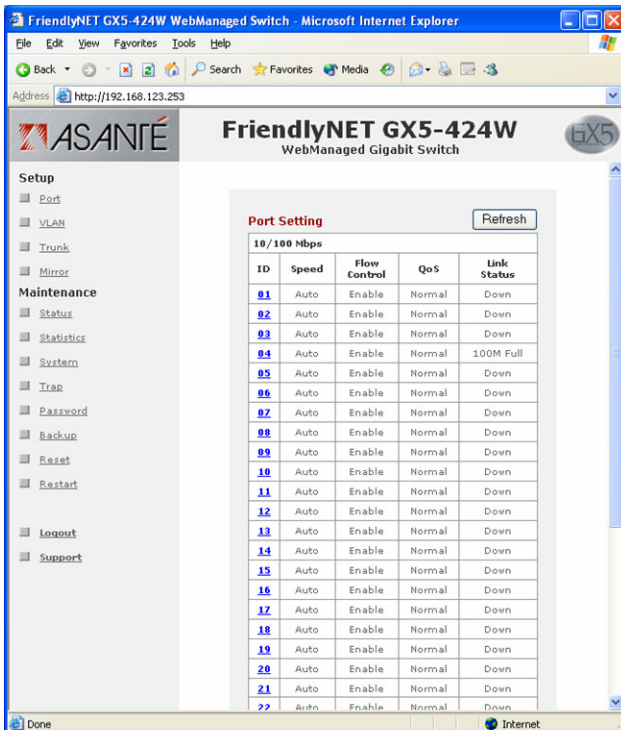


After entering the password, the main page comes up and the screen displays the device status.



Setup Menu

When the main page appears, find the *Setup menu* on the left side of the screen. Click on the setup item that you want to configure.



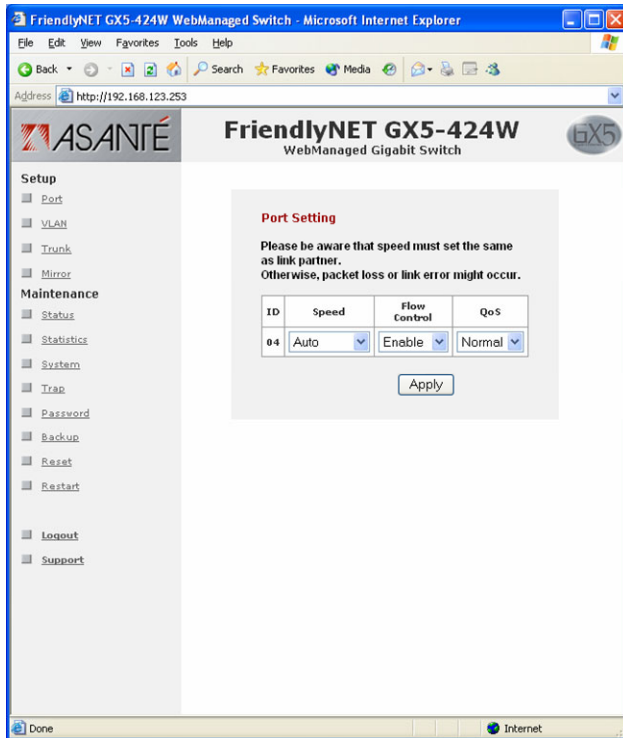
Configuring the Setup Setting

The Setup menu contains four items: Port Settings, VLAN Settings, Trunk Settings, and Mirror Settings.

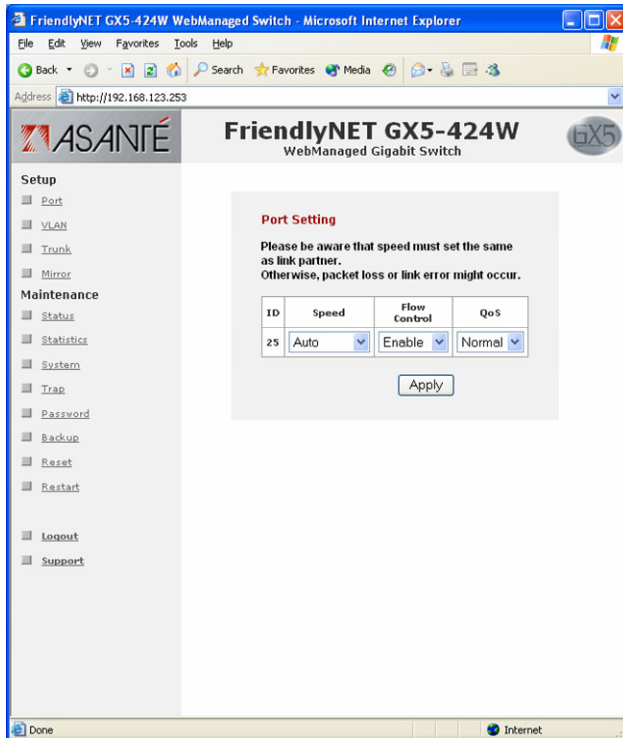
Port Settings

The Port Settings menu shows each port's status. Press the **ID parameter** to set each port's Speed, Flow Control, QoS Priority, and Link Status. When the posted information needs to be reviewed, press the **Refresh** button.

The Link Status in the screen will show the connection speed and duplex mode; otherwise, this dialog box will show **Down** when the port is disconnected.



To change the port setting, click on the **ID parameter** to enter the selected port to configure its Speed/Disable, Flow Control, and QoS Setting.



Speed/Disable

This setting has six modes—100M Full, 100M Half, 10M Full, 10M Half, Auto, and Disable—for speed or port disable selections.

Flow Control

This setting determines whether or not the GX5-424W switch will handle flow control. Set *FlowCtrl* to **Enable** for avoiding data transfer overflow. Otherwise, it sets to **Disable**, providing either no flow control or other hardware/software management.

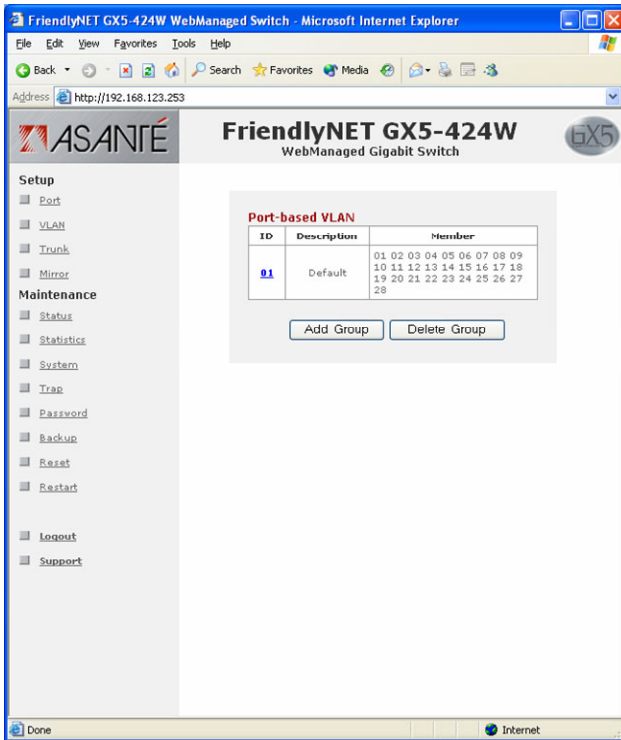
When the port is set to **forced mode**, the flow control will automatically set to **Disable**.

QoS

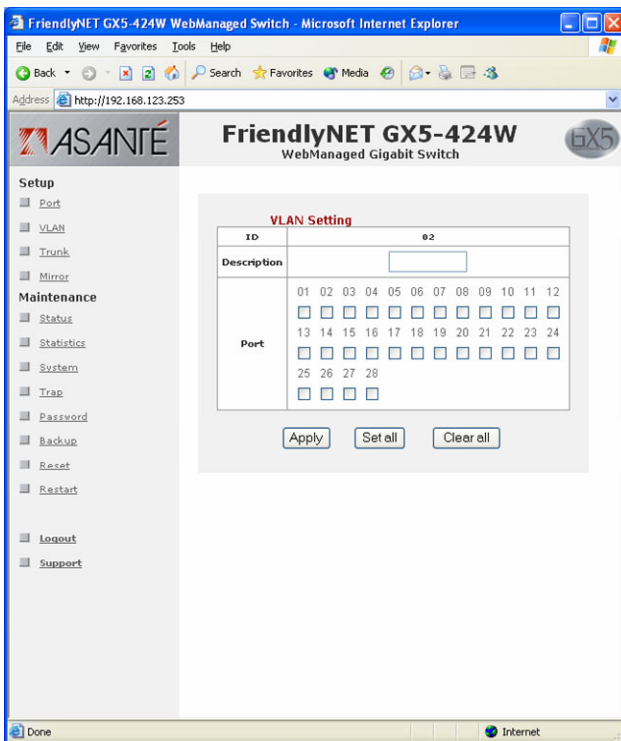
In some ports that need to have a high priority to manage the data transfer, QoS should be changed. Set the port's QoS to **high** to determine that the port will always transfer its data first.

VLAN Settings

Group individual ports into a small virtual network to be independent of the other ports. To add a VLAN group, press the **Add Group** button. The new VLAN configuration window will appear, and you can fill in the description in order to describe this VLAN Group. Check that the port is a member of this VLAN Group, and press the **Apply** button to execute the setting.



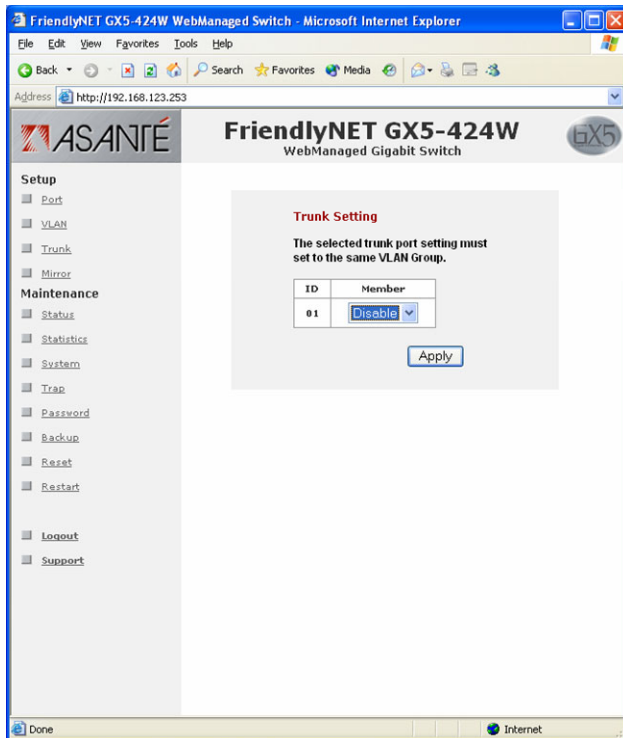
After modifying the VLAN Group, check on the ID parameter. The ID VLAN configuration window will appear.



Trunk Settings

The Trunk function enables cascading two devices with a double times bandwidth (up to 4000Mbps in full duplex mode).

The only selection available for the trunk setting is *port 25 and port 26*. To close this function, select *disable*.



The selected trunk setting port must connect to the device with the same VLAN group.

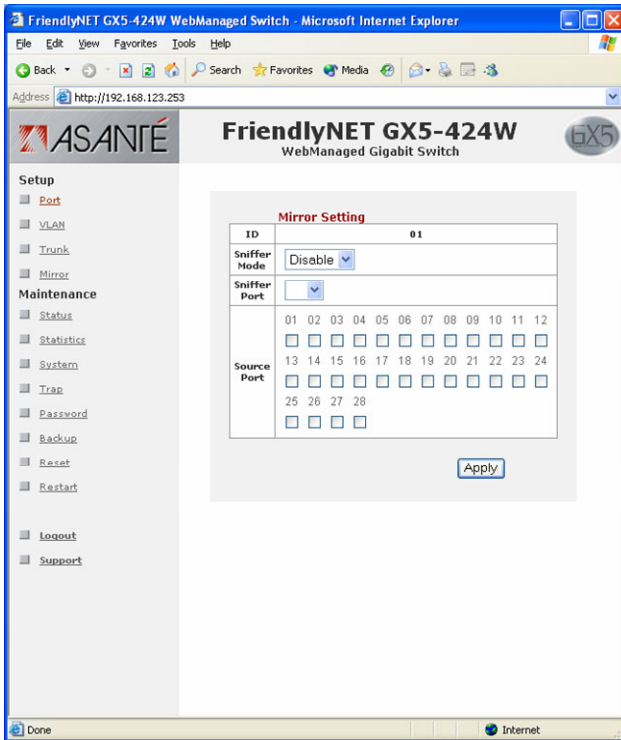
Mirror Settings

Port Mirroring is a way to send network traffic to a port that wouldn't ordinarily receive it, so that a network manager can troubleshoot the network by analyzing the traffic.

Configure Port Mirroring by selecting a port to be monitored and a sniffer port to which that traffic will be sent.

Choose from one of these three modes:

- **TX (Transmit) Mode:** all traffic transmitted by the source port will also be sent to the sniffer port
- **RX (Receive) Mode:** all traffic received by the source port will also be sent to the sniffer port
- **Both (Transmit and Receive) Mode:** all traffic either transmitted or received by the source port will also be sent to the sniffer port



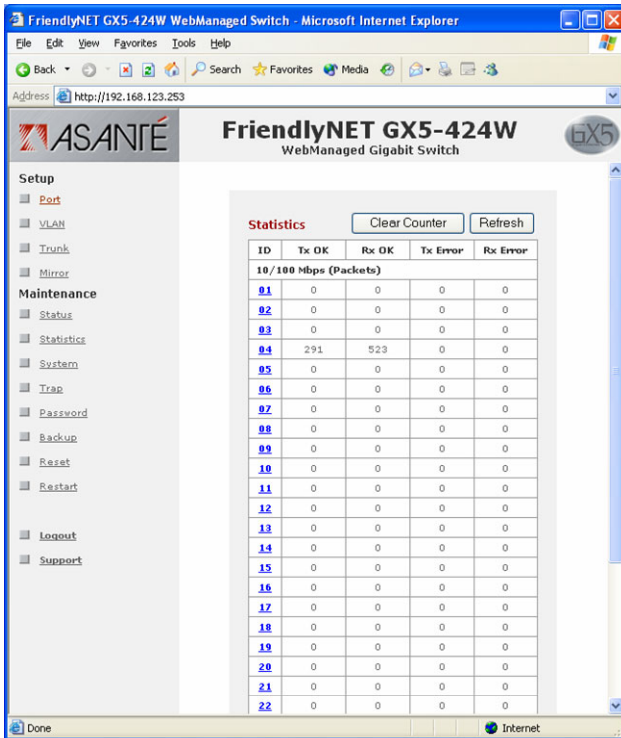
Device Status

Click on **Status** to present the device status on this screen, which will show the System Status, Port Status, VLAN Status, Trunk Status, and Mirror Status.

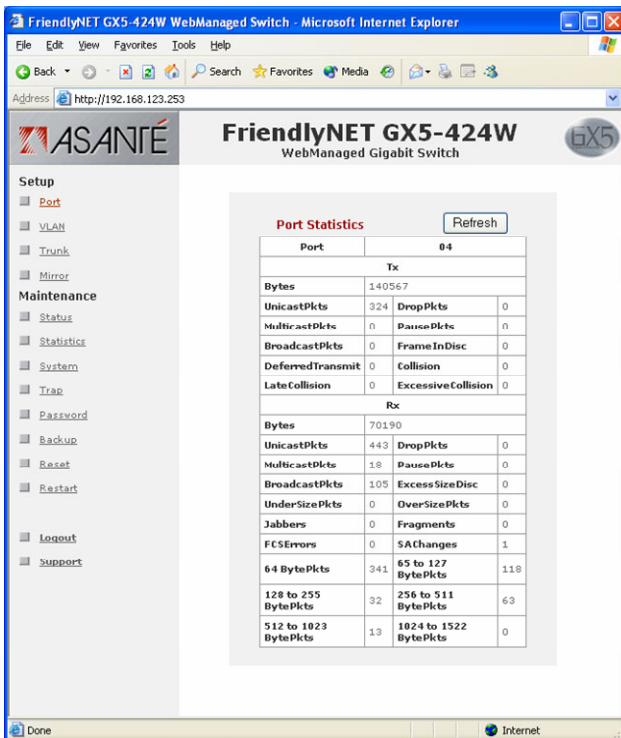
Press **Refresh** when you need to renew the posted information.

Statistics

The Statistics Menu screen will show the status of each port packet count.



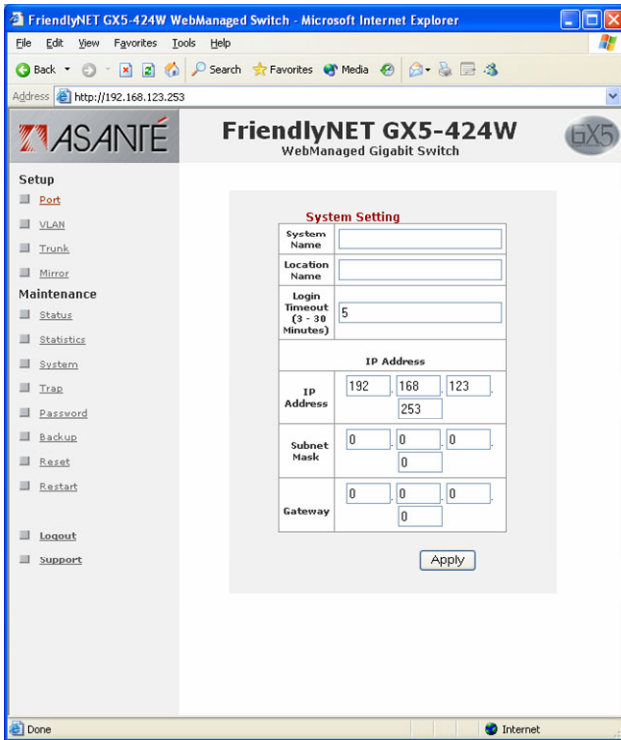
For detailed packet information, click on the **ID** parameter.



System Setting

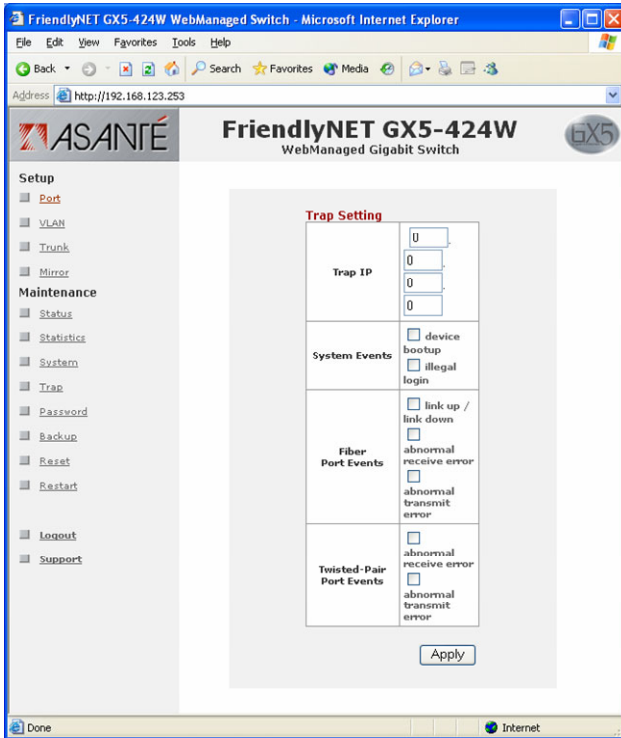
The System Setting includes the System Name, Location Name, Login Timeout, IP Address, Subnet Mask, and Gateway. Through the GX5W Management Utility, you can easily recognize the device by using the System Name and the Location Name.

The Login Timeout is set to the idle timeout for security reasons. If no recent action has occurred when running the Utility and the time is up, you must re-login before setting the Utility.



Trap Setting

Traps are messages sent by the switch to a trap receiver. You may set any SNMP management station to receive traps, or use the GX5W Management Utility as your trap receiver. You can configure the switch to send traps to the trap receiver for several kinds of events. Select each of the following trap types by clicking its check box.



Trap IP

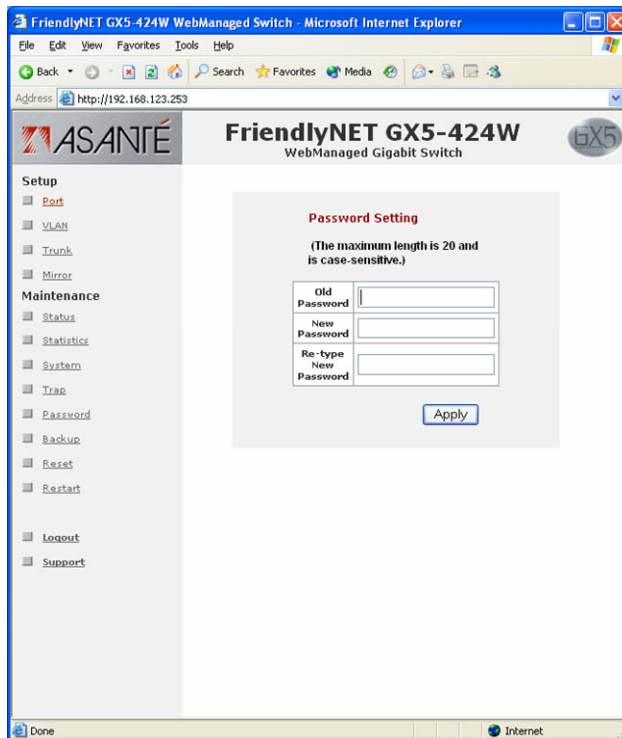
Enter the IP address of the device to which you would like to send traps.

- **System Events:** monitoring the system's trap
 - Device Bootup—a trap will be sent each time the device boots up
 - Illegal Login—if a login attempt is made with an invalid password, the system will send a trap, and include the IP address from which the invalid attempt was made
- **Fiber Port Events:** sent for signal faults on the fiber ports
 - Link Up/Link Down—sent each time a fiber port notes a new link or loses a previously established link
 - Abnormal receive error—a trap is sent when more than 50 errors are noted within 10 seconds
 - Abnormal transmit error—a trap is sent when more than 50 errors are noted within 10 seconds
- **Copper Port Events:** sent for signal faults on the twister pair ports
 - Link Up/Link Down—sent each time a fiber port notes a new link or loses a previously established link
 - Abnormal receive error—a trap is sent when more than 50 errors are noted within 10 seconds
 - Abnormal transmit error—a trap is sent when more than 50 errors are noted within 10 seconds

Set Password

Password is a valuable tool for the manager to secure the GX5-424W switch; use this function to change the password.

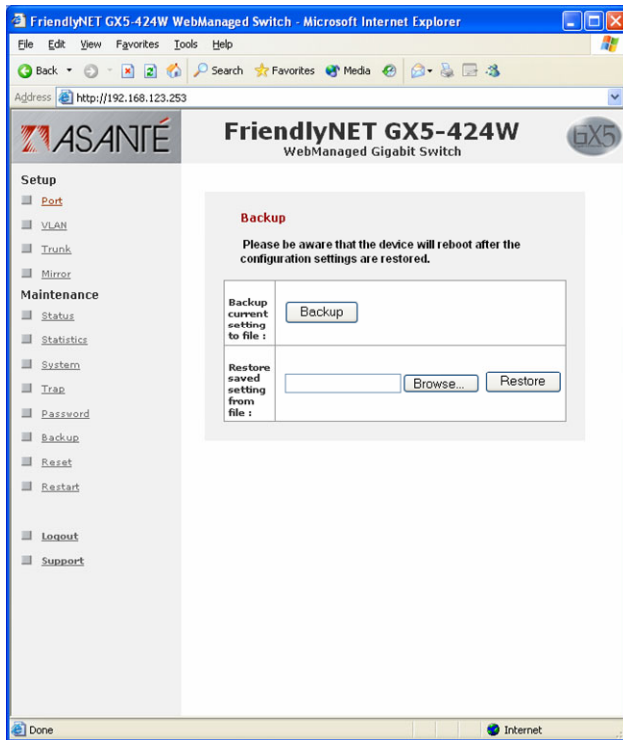
If you forget the password, press the **Reset (to Default)** button in the rear panel of the GX5-424W switch. The current setting (including VLAN and Port Setting) will be lost and the switch will restore to the default setting.



Backup Setting

The backup tools help you to back up the current setting of the GX5-424W switch. If you need to back up the setting, press the **Backup** button to save the setting.

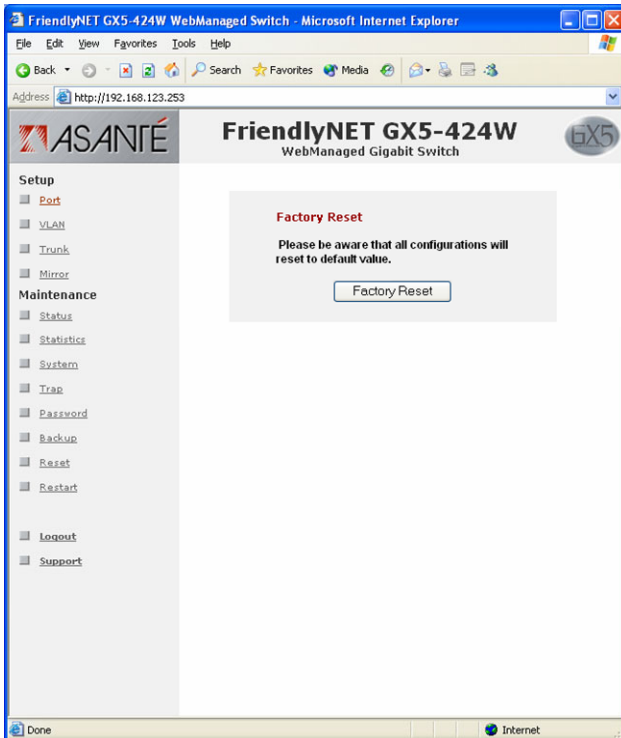
To restore a current setting file to the device, you must specify the backup file and press the **Restore** button to proceed with the setting of the recorded file.



Note: When restoring a recorded file, the current password will not be erased.

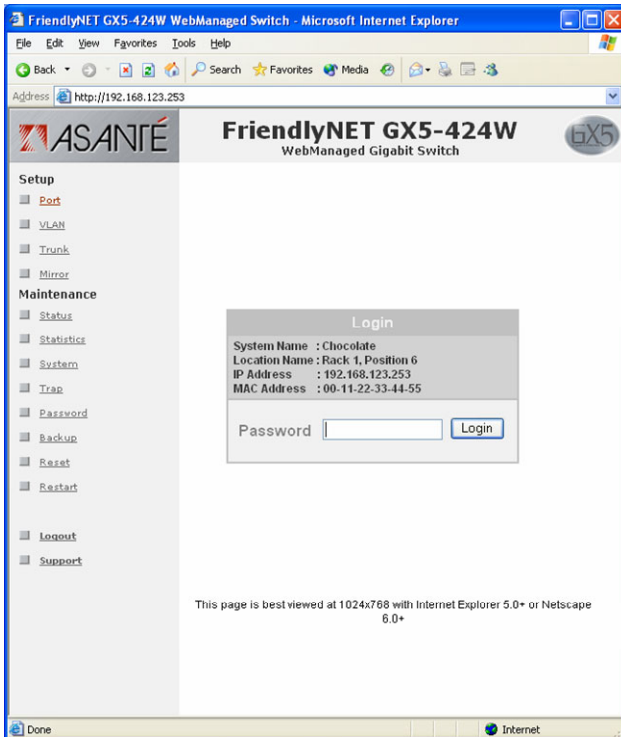
Reset Setting

The Factory Reset button helps you to reset the device back to the default setting from the factory. Be aware that the entire configuration will be reset; the IP address of the device will be set to default setting 192.168.123.253.



Logout

After pressing the **Logout** button, the web configuration will go back to the first Login page.



Chapter 7 Technical Specifications

Ports

Fast Ethernet:	24 x 10/100BaseTX Fast Ethernet ports with Auto-Uplink: RJ-45 shielded connectors
Gigabit Ethernet:	2 x 10/100/1000BaseT Gigabit Ethernet ports with Auto-Uplink: RJ-45 shielded connectors 2 x 1000BaseX Gigabit Ethernet ports: SFP Mini-GBIC
Configuration:	IEEE Auto Negotiation (sets 10/100/1000 Mbps speed and half/full duplex) or manual configuration via web management
Expansion:	Uplink using Gigabit Ethernet ports. Selectable trunking for 4000 Mbps aggregate bandwidth using 1000BaseT ports

Status Indicators

System:	Power
Per 10/100 Port:	Link (solid)/activity (blink) and 100 Mbps
Per 1000 Port:	Link (solid)/activity (blink), 1000 Mbps and 100 Mbps (1000BaseT only)

Performance

Efficiency:	Wire-speed Gigabit Ethernet switch
Switch Fabric:	12.8 Gbps aggregate
Switch Architecture:	3-chip set with store-forward and integrated broadcast storm filtering
Flow Control:	IEEE 802.3x flow control (full duplex) and back pressure (half-duplex)
Link Aggregation:	1 trunk/2 ports
Forwarding MAC Table:	4000 addresses with automatic learning and aging
Buffer:	1152 KB total (768 KB packet, 384 KB control)

Web Management

System Requirements:	Internet Explorer 5, Netscape 6, Apple Safari 1 and later. Windows 98/Me/2000/NT/XP and Mac OS X
Port Settings:	Speed (disable, auto, 10 or 100 Mbps, full or half-duplex), flow control, QoS (normal or high)
Port-Based VLAN:	Add or delete group, select members
Trunk:	Aggregate 1000BaseT ports into 1 trunk (4000 Mbps bandwidth, full duplex)
Mirror:	Sniffer mode (receive, transmit or both), port and source port(s)
Overview:	Transmit (OK and error) and receive (OK and error),
Port Statistics:	Transmit (bytes, unicast, multicast, broadcast, drop, pause, deferred, late collision, collision, excessive collision), receive (bytes, unicast, multicast, broadcast, undersize, jabber, FCS error, drop, pause, excess size, oversize, fragment, SA change, count by size)
System:	Name, location, timeout, IP address, subnet mask and gateway
Trap Settings:	IP of monitoring station running GX5W Management utility, system events, SFP and 1000BaseT port events
Backup:	Save/restore configuration and upgrade firmware
Reset:	Reset to factory defaults and reboot switch

GX5W Management Utility

System Requirements:	Windows 98/Me/NT and XP
Supported Switches:	FriendlyNET GX5-424W
Discovery:	Automatic switch discovery or manually add switches. Save settings to a default file
Traps:	View system (boot-up, illegal login) and Gigabit port events
Gigabit Port Events:	Detects abnormal receive error and abnormal transmit error. Also detects link up/down on SFP Mini-GBIC ports
Firmware:	Upgrade firmware
Settings:	Save configuration settings
Password:	Change password
Web Management:	Open web browser to manage switch

Physical

Case:	Metal
Color:	Asanté Titanium Silver
Dimensions (W x D x H):	15.8 x 7.8 x 1.7 inches, 44 x 20 x 4.4 cm
Mounting:	Desktop or rack (rackmount kit included)
Operating Temperature:	32° to 104° F (0° to 40° C)
Relative Humidity:	10% to 90% non-condensing
Power:	Internal universal switching, 100-240 VAC, 50/60 Hz, maximum 19 watts
<i>Standards Compliance</i>	
Network:	IEEE 802.3 10BaseT IEEE 802.3u 100BaseTX IEEE 802.3ab 1000BaseT IEEE 802.1p Class of Service Prioritization IEEE 802.1Q Virtual LAN (VLAN)
Safety:	UL, CUL, CB (IEC 60950)
Emissions:	FCC Class A, CE Mark Class A, VCCI-A

Support

Technical Support:	24-hour support via web and ftp. 2-year email and telephone support
Product Warranty:	2-year product warranty covers defects in manufacturing and workmanship

Appendix A FCC and Warranty Statements

Please read the following for FCC rules and limits. GX5-424W FriendlyNET warranty and support information is also included in this section.

FCC Compliance

This equipment has been tested and found to comply with the specifications for a Class A digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

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 according to 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 is found 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 or devices
- Connect the equipment to an outlet other than the receiver's
- Consult a dealer or an experienced radio/TV technician for assistance

FCC Caution: Any change or modification to the product not expressly approved by Asanté could void the user's authority to operate the device.

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.

FriendlyNET Warranty Statement

Subject to the following limitations and exclusions, Asanté warrants to the original end user purchaser that the covered products will be free from defects in title, materials, and manufacturing workmanship for a period of two (2) years from the date of purchase. This warranty excludes fans, power supplies, non-integrated software, and accessories. Asanté warrants that the fans and power supplies will be free from defects in title, materials, and manufacturing workmanship for two years from date of purchase. Asanté warrants that non-integrated software included with its products will be free from defects in title, materials, and workmanship for a period of 90 days from date of purchase, and the company will support such software for the purpose for which it was intended for a period of 90 days from the date of purchase. This warranty expressly excludes problems arising due to compatibility with other vendors' products, or future compatibility due to third-party software or driver updates.

To take advantage of this warranty, you must contact Asanté for a return materials authorization (RMA) number. The RMA number must be clearly written on the outside of the returned package. Product must be sent to Asanté postage paid. In the event of a defect, Asanté will repair or replace defective product or components with new, refurbished, or equivalent product or components as deemed appropriate by Asanté. The foregoing is your sole remedy, and Asanté's only obligation, with respect to any defect or non-conformity. Asanté makes no warranty with

respect to accessories (including but not limited to cables, brackets, and fasteners) included with the covered product, nor to any discontinued product, i.e., product purchased more than thirty days after Asanté has removed such product from its price list or discontinued shipments of such product.

This warranty is exclusive and is limited to the original end user purchaser only. This warranty shall not apply to secondhand products or to products that have been subjected to abuse, misuse, abnormal electrical or environmental conditions, or any condition other than what can be considered normal use.

ASANTÉ MAKES NO OTHER WARRANTIES, EXPRESS, IMPLIED, OR OTHERWISE, REGARDING ASANTÉ PRODUCTS. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ALL WARRANTIES OR CONDITIONS OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. ASANTÉ'S LIABILITY ARISING FROM OR RELATING TO THE PURCHASE, USE, OR INABILITY TO USE THE PRODUCTS IS LIMITED TO A REFUND OF THE PURCHASE PRICE PAID. IN NO EVENT WILL ASANTÉ BE LIABLE FOR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES FOR THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY, INCLUDING ECONOMIC LOSS, DAMAGE TO PROPERTY AND, TO THE EXTENT PERMITTED BY LAW, DAMAGES FOR PERSONAL INJURY, HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY (INCLUDING NEGLIGENCE). THESE LIMITATIONS SHALL APPLY EVEN IF ASANTÉ HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR IF THIS WARRANTY IS FOUND TO FAIL OF ITS ESSENTIAL PURPOSE.

Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages or limitations on how long an implied warranty lasts, so the previous limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights, which vary according to jurisdiction.

FriendlyCare Technical Support

Asanté offers a comprehensive support plan to help you get the most from your FriendlyNET products.

On-line Support

These resources are available 24/7 via www.asante.com/support:

- Web (including forums, support guides, and white papers)
- TechInfo Library (knowledgebase)
- Downloads (manuals, drivers and firmware)

Personalized Support

If you have a question about the use or configuration of an Asanté product, complete the contact form at www.asante.com/support/contact with a detailed description of your configuration. Most questions are answered within 1–2 business days.

Telephone support is available during business hours (Mountain Standard Time) at 801-566-8991; check with your telephone company about toll charges.

Appendix B About Gigabit Ethernet

This appendix provides some background information about Ethernet/Fast Ethernet/Gigabit Ethernet switching technology.

Gigabit Ethernet Technology

Gigabit Ethernet is an extension of IEEE 802.3 Ethernet. It utilizes 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 buses 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 enables fast optical fiber connections to support 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 NICs are able to perform 10 times the number of operations in the same amount of time.

In addition, the phenomenal bandwidth delivered by Gigabit Ethernet is the most cost-effective method to take advantage of rapidly improving switching and routing internetworking technologies. And with advances in silicon technology and digital signal processing that enable Gigabit Ethernet to operate over unshielded twisted-pair (UTP) cabling, outfitting your network with a powerful 1000 Mbps-capable backbone/server connection creates a flexible foundation for the next generation of network technology products.

Fast Ethernet Technology

The growing importance of LANs and the increasing complexity of desktop computing applications are fueling the need for high-performance networks. A number of high-speed LAN technologies have been proposed to provide greater bandwidth and improve client/server response times. Among them, 100BaseT (Fast Ethernet) provides a non-disruptive, smooth evolution from the current 10BaseT technology.

100 Mbps Fast Ethernet is a standard specified by the IEEE 802.3 LAN committee. It is an extension of the 10 Mbps Ethernet standard with the ability to transmit and receive data at 100 Mbps, while maintaining the CSMA/CD Ethernet protocol. Since the 100 Mbps Fast Ethernet is compatible with all other 10 Mbps Ethernet environments, it provides a straightforward upgrade and takes advantage of the existing investment in hardware, software, and personnel training.

Switching Technology

Another approach to pushing beyond the limits of Ethernet technology is the development of switching technology. A switch bridges Ethernet packets at the MAC address level of the Ethernet protocol transmitting among connected Ethernet or Fast Ethernet LAN segments.

Switching is a cost-effective way of increasing the total network capacity available to users on a local area network. A switch increases capacity and decreases network loading by dividing a local area network into different segments that don't compete with each other for network transmission capacity.

The switch acts as a high-speed selective bridge between the individual segments. The switch, without interfering with any other segments, automatically forwards traffic that needs to go from one segment to another. By doing this, the total network capacity is multiplied, while still maintaining the same network cabling and adapter cards.

Switching LAN technology is a marked improvement over the previous generation of network bridges, which were characterized by higher latencies. Routers have also been used to segment local area networks, but the cost of a router, setup and required maintenance make routers relatively impractical. Today switches are an ideal solution to most kinds of local area network congestion problems.

Virtual Local Area Network (VLAN)

A VLAN is a group of end-stations that is not constrained by physical location and can communicate as if in a common broadcast domain. The primary utility of using VLAN is to reduce latency and need for routers, using faster switching instead. Other VLAN utilities include:

- **Security:** Security is increased with the reduction of opportunity in eavesdropping on a broadcast network because data will be switched to only those confidential users within the VLAN.
- **Cost Reduction:** VLANs can be used to create multiple broadcast domains—thus eliminating the need for expensive routers.

Port-based (or port-group) VLAN is the common method of implementing a VLAN, and is the one supplied in the GX5-424W switch.