SFE1000P 8-port 10/100 Ethernet Switch with PoE Administration Guide
March 2008
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Preface

Audience

This publication is designed for people who have some experience installing networking equipment such as routers, hubs, servers, and switches. We assume the person installing and troubleshooting the SFE1000P is familiar with electronic circuitry and wiring practices and has experience as an electronic or electromechanical technician.

Purpose

This guide documents the features of the Linksys Business Series SFE1000P Gigabit Ethernet Switch (SFE1000P). It describes the administration of the SFE1000P, explains how to install the SFE1000P, and provides configuration information.

Organization

This guide is organized into the following chapters:

- Chapter 2, "Getting Started," is an introduction to the user interface.
- Chapter 3, "Managing Device Information," provides information for defining both basic and advanced system information.
- Chapter 4, "Managing Power-over-Ethernet Devices," describes configuring PoE settings.
- Chapter 5, "Configuring Device Security," describes password management, defining authentication, access method, traffic control, 802.1x protocols, access control, and Denial of service prevention.
- Chapter 6, "Configuring Device Interfaces," describes defining port settings, LAG management, LAG settings, and configuring LACP.
- Chapter 7, "Configuring VLANs," provides information for defining VLAN properties, VLAN memberships, interface settings, and GVRP settings.
- Chapter 8, "Configuring IP Information," provides information for defining device IP addresses.
- Chapter 9, "Defining Address Tables," contains information for defining both static and dynamic Forwarding Database entries.
- Chapter 10, "Configuring Multicast Forwarding," contains information on configuring IGMP snooping, defining multicast bridging groups, and multicast forwarding.
- Chapter 11, "Configuring Spanning Tree," contains information on configuring Spanning Tree Protocol with classic STP, Rapid STP, and Multiple STP.
- Chapter 12, "Configuring SNMP," describes how to configure SNMP security and define trap management.
• Chapter 13, "Configuring Quality of Service," shows how to define Quality of Service general settings, advanced mode settings, and basic mode settings. It also describes configuring policy tables.

• Chapter 14, "Managing System Files," describes working with file management, logs, and diagnostics.

• Chapter 15, "Managing System Logs," shows how to enable system logs, view device memory logs, flash logs, and remote logs.

• Chapter 16, "Configuring System Time," provides information for configuring the system time, and includes defining system time, SNTP settings, and SNTP authentication.

• Chapter 17, "Viewing Statistics," describes viewing and managing device statistics for RMON, interfaces, GVRP, EAP, and Etherlike statistics.

• Chapter 18, "Managing Device Diagnostics," contains information for configuring port mirroring, running cable tests, and viewing device operational information.

• Appendix B, "Contacts," is a listing of support resources and contact information for such.

• Appendix C, "Warranty Information," is the Linksys warranty.
Getting Started

This section provides an introduction to the user interface, and includes the following topics:

- Starting the Application
- Understanding the Interface
- Using the Linksys Management Buttons
- Using Screen and Table Options
- Resetting the Device
- Logging Off The Device

The following diagram illustrates how the SFE1000P fits into your network.

Starting the Application

This section contains information for starting the Linksys User Interface.

**NOTE:** By default, the IP address of the device is assigned dynamically. The IP address can be changed.

To open the User Interface:

1. Open a web browser.
2. Enter the device’s IP address in the address bar and press Enter. An "Enter Network Password Page" opens:
3. Enter a user name and password. The default user name is "admin". The device is not configured with a default password, and can be configured without entering a password. Passwords are both case sensitive and alpha-numeric.

4. Click Login The *Embedded Web System Home Page* opens:

**NOTE:** If you have logged in automatically via the Service Router user interface, the Tree and Device views appear and allow you to navigate through the various areas of the web interface. However, the following page will appear within the frame provided by the Service Router user interface.
Understanding the Interface

The following table lists the interface components with their corresponding numbers:

**Interface Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tree View</td>
<td>The Tree View provides easy navigation through the configurable device features. The main branches expand to provide the subfeatures.</td>
</tr>
<tr>
<td>2 Device View</td>
<td>The device view provides information about device ports, current configuration and status, table information, and feature components. The device view also displays other device information and dialog boxes for configuring parameters.</td>
</tr>
<tr>
<td>3 Table Area</td>
<td>The Table area enables navigating through the different device features. Click the tabs to view all the components under a specific feature.</td>
</tr>
<tr>
<td>4 EWS Information</td>
<td>The EWS information tabs provide access to the online help, contains information about the EWS.</td>
</tr>
</tbody>
</table>
This section provides the following additional information:

- **Device Representation** — Provides an explanation of the Linksys user interface buttons, including both management buttons and task icons.

- **Using the Linksys Management Buttons** — Provides instructions for adding, modifying, and deleting device parameters.

### Device Representation

The Linksys home page displays a graphical representation of the device:

The Linksys home page contains a graphical SFE1000 and SFE1000P front panel illustration.
Using the Linksys Management Buttons

Device Management buttons and icons provide an easy method of configuring device information, and include the following:

**Device Management Buttons**

<table>
<thead>
<tr>
<th>Button Name</th>
<th>Button</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apply</td>
<td><img src="image" alt="Apply" /></td>
<td>Applies changes to the device.</td>
</tr>
<tr>
<td>Clear Counters</td>
<td><img src="image" alt="Clear Counters" /></td>
<td>Clears statistic counters</td>
</tr>
<tr>
<td>Clear Logs</td>
<td><img src="image" alt="Clear Logs" /></td>
<td>Clears log files</td>
</tr>
<tr>
<td>Add</td>
<td><img src="image" alt="Add" /></td>
<td>Opens an Add page</td>
</tr>
<tr>
<td>Delete</td>
<td><img src="image" alt="Delete" /></td>
<td>Removes entries from tables</td>
</tr>
<tr>
<td>Reset</td>
<td><img src="image" alt="Reset" /></td>
<td>Resets the settlings of a selected port to the default settings</td>
</tr>
<tr>
<td>Test</td>
<td><img src="image" alt="Test" /></td>
<td>Performs cable tests immediately.</td>
</tr>
</tbody>
</table>

Using Screen and Table Options

Linksys contains screens and tables for configuring devices. This section contains the following topics:

- Adding Device Information
- Modifying Device Information
- Deleting Device Information

**Adding Device Information**

User defined information can be added to specific EWS pages, by opening a new Add page. To add information to tables or EWS pages:
1. Open an EWS page.

2. Click the **Add** button. An add page opens, for example, the **Add SNTP Server Page**:

![Add SNTP Server](image)

3. Define the fields.

4. Click **Apply**. The configuration information is saved, and the device is updated.

**Modifying Device Information**

1. Open the EWS page.

2. Select a table entry.

3. Click the **Edit** Button. A Modify page opens, for example, the **Interface Priority Page** opens:

![Edit Interface Priority](image)

4. Define the fields.

5. Click **Apply**. The fields are modified, and the information is saved to the device.

**Deleting Device Information**

1. Open the EWS page.

2. Select a table row.

3. Check the Remove checkbox.
Chapter 2: Getting Started

Resetting the Device

The Reset page enables the device to be reset from a remote location. Save all changes to the Running Configuration file before resetting the device. This prevents the current device configuration from being lost. To reset the device:

1. Click System > General > Reset. The Reset page opens.

2. Click the Reset button. The device is reset, and a prompt for a user name and password is displayed.

3. Enter a user name and password to reconnect to the Web Interface, if the device is not part of a full Linksys One system. If the device is part of a Linksys One system, login is automatically done from the Service Router.

Logging Off The Device

Click Logout. The system logs off. The Embedded Web System Home Page closes.
Managing Device Information

This section provides information for defining both basic and advanced system information. This section contains the following topics:

- Understanding the Device Zoom View
- Defining General System Information
- Resetting the Device

Understanding the Device Zoom View

The Zoom Page is the main window used for viewing the device. To open the Zoom Page:

Click the System > System Management > Zoom. The Zoom Page opens:

The Zoom Page contains the following port indicators:

- Green — Indicates the port is currently operating.
Defining General System Information

The System Information Page contains parameters for configuring general device information.

1. Click the System > System Management > System Information. The System Information Page opens:

   ![System Information Page](image)

2. Enter information into the appropriate fields and press Apply.

Resetting the Device

The Reset page enables the device to be reset from a remote location. Save all changes to the Startup Configuration file before resetting the device. This prevents the current device configuration from being lost.

To reset the device:

1. Click System > General > Reset. The Reset page opens.
2. Click the **Reset** button.

3. Enter a user name and password to reconnect to the Web Interface. If the device is part of a Linksys One system, login is automatically done from the Service Router.
Managing Power-over-Ethernet Devices

Power-over-Ethernet (PoE) provides power to devices over existing LAN cabling, without updating or modifying the network infrastructure. Power-over-Ethernet removes the necessity of placing network devices next to power sources.

Power-over-Ethernet can be used in the following applications:

- IP Phones
- Wireless Access Points
- IP Gateways
- PDAs
- Audio and video remote monitoring

Defining PoE Settings

Powered Devices are devices which receive power from the device power supplies, for example IP phones. Powered Devices are connected to the device via Ethernet ports. Guard Band protects the device from exceeding the maximum power level. For example, if 400W is maximum power level, and the Guard Band is 20W, if the total system power consumption exceeds 380W no additional PoE components can be added. The accumulated PoE components power consumption is rounded down for display purposes, therefore remove value after decimal point.

NOTE: Due to hardware limitations, the power measurement accuracy is 4%.

The PoE Settings Page contains system PoE information for enabling PoE on the device, monitoring the current power usage, and enabling PoE traps.

1. Click Bridging > Port Management > PoE Settings. The PoE Settings Page opens:
2. Click the Edit button. The Edit PoE opens:

![Edit PoE](image)

3. Define the relevant fields.

4. Click Apply. The PoE Settings are defined, and the device is updated.
Configuring Device Security

The Security Suite contains the following sections:

- Passwords Management
- Defining Authentication
- Defining Access Method
- Defining Traffic Control
- Defining 802.1x
- Defining Access Control
- Defining DoS Prevention

Passwords Management

This section contains information for defining passwords. Passwords are used to authenticate users accessing the device.

**NOTE:** By default, a single user name is defined, "admin", with no password. An additional user name/password is configured for use in the system.

1. Click **Security Suite > Passwords Management > User Authentication**. The **User Authentication Page** opens:
2. Click the **Add** button. The Add Local User Page opens:

![Add Local User Page](image)

3. Define the relevant fields.

4. Click **Apply**. The local user settings are modified.
Modifying the Local User Settings

1. Click Security Suite > Passwords Management > User Authentication. The User Authentication Page Opens:

2. Click the Edit Button. The Edit Local User Page opens:

   ![Edit Local User Page]

3. Define the relevant fields.

4. Click Apply. The local user settings are modified, and the device is updated.

Defining Authentication

The Authentication section contains the following pages:

- Defining Authentication Profiles
- Mapping Authentication Profiles
- Defining TACACS+
- Defining RADIUS
Defining Authentication Profiles

Authentication profiles allow network administrators to assign authentication methods for user authentication. User authentication can be performed locally or on an external server. User authentication occurs in the order the methods are selected. If the first authentication method is not available, the next selected method is used. For example, if the selected authentication methods are RADIUS and Local, and the RADIUS server is not available, then the user is authenticated locally.

1. Click Security Suite > Authentication > Profiles. The Profiles Page opens:

   Profiles Page

2. Click the Add button. The Add Authentication Profile Page opens:

   Add Authentication Profile Page

3. Define the relevant fields.

4. Click Apply. The settings are modified, and the device is updated.
**Modify the Authentication Profile**

1. Click **Security Suite > Authentication > Profiles**. The **Profiles Page** opens:

2. Click the **Edit** Button. The **Edit Authentication Profile Page** opens:

   ![Edit Authentication Profile Page]

3. Define the relevant fields.

4. Click **Apply**. The authentication profile is defined, and the device is updated.

**Mapping Authentication Profiles**

After authentication profiles are defined, they can be applied to management access methods. For example, console users can be authenticated by one authentication profile, while Telnet users are authenticated by another authentication profile.

Authentication methods are selected using arrows. The order in which the methods are selected is the order by which the authentication methods are used.

The **Mapping Profiles Page** contains parameters for mapping authentication methods.

1. Click **Security Suite > Authentication > Mapping Profiles**. The **Mapping Profiles Page** opens:
2. Define the relevant fields.

3. Click **Apply**. Mapping Profiles is defined, and the device is updated.

### Defining TACACS+

The devices provide Terminal Access Controller Access Control System (TACACS+) client support. TACACS+ provides centralized security for validation of users accessing the device. TACACS+ provides a centralized user management system, while still retaining consistency with RADIUS and other authentication processes. TACACS+ provides the following services:

- **Authentication** — Provides authentication during login and via user names and user-defined passwords.

- **Authorization** — Performed at login. Once the authentication session is completed, an authorization session starts using the authenticated user name. The TACACS server checks the user privileges.

The TACACS+ protocol ensures network integrity through encrypted protocol exchanges between the device and TACACS+ server.

The TACACS+ default parameters are user-assigned defaults. The default settings are applied to newly defined TACACS+ servers. If default values are not defined, the system defaults are applied to the new TACACS+ new servers. The TACACS+ Page contains fields for assigning the Default Parameters for the TACACS+ servers.
To define TACACS+:

1. Click **Security Suite > Authentication > TACACS+**. The **TACACS+ Page** opens:

   ![TACACS+ Page](image)

2. Click the **Add** button. The **Add TACACS+ Server Page** opens:

   ![Add TACACS+ Server Page](image)

3. Add a TACACS+ server.

4. Click **Apply**. The TACACS+ server is added, and the device is updated.
Modifying TACACS+ Settings

1. Click Security Management > Security Suite > Authentication. The TACACS+ Page opens:

2. Click the Edit Button. The TACACS+ Page opens:

   **TACACS+ Page**

   ![TACACS+ Page](image)

   - Host IP Address: 10.6.250.67
   - Priority: 20
   - Source IP Address: Default
   - Key String: Default
   - Authentication Port: 49
   - Timeout for Reply: Default (sec)
   - Status: Not Connected

   ![Apply Button]

   3. Define the relevant fields.

   4. Click Apply. The TACACS+ settings are modified, and the device is updated.

Defining RADIUS

Remote Authorization Dial-In User Service (RADIUS) servers provide additional security for networks. RADIUS servers provide a centralized authentication method for web access. The default parameters are user-defined, and are applied to newly defined RADIUS servers. If new default parameters are not defined, the system default values are applied to newly defined RADIUS servers.

To define RADIUS:

1. Click Security Suite > Authentication > RADIUS. The RADIUS Page opens:
2. Click the **Add** button. The **Add Radius Server Page** opens:

### Add Radius Server Page

3. Define the relevant fields.

4. Click **Apply**. The Radius Server is added, and the device is updated.
Modifying RADIUS Server Settings

1. Click Security Suite > Authentication > RADIUS. The RADIUS Page opens:

2. Click the Edit button. The Edit RADIUS Settings Page opens:

![Edit RADIUS Settings Page]

3. Define the relevant fields.

4. Click Apply. The RADIUS Server settings are modified, and the device is updated.

Defining Access Method

The access method section contains the following pages:

- Defining Access Profiles
- Defining Profile Rules

Defining Access Profiles

Access profiles are profiles and rules for accessing the device. Access to management functions can be limited to user groups. User groups are defined for interfaces according to IP addresses or IP subnets. Access profiles contain management methods for accessing and managing the device. The device management methods include:

- All
- Telnet
- Secure Telnet (SSH)
- HTTP
Chapter 5: Configuring Device Security

Defining Access Method

- Secure HTTP (HTTPS)
- SNMP

Management access to different management methods may differ between user groups. For example, User Group 1 can access the switch module only via an HTTPS session, while User Group 2 can access the switch module via both HTTPS and Telnet sessions. The Access Profile Page contains the currently configured access profiles and their activity status. Assigning an access profile to an interface denies access via other interfaces. If an access profile is assigned to any interface, the device can be accessed by all interfaces.

To define access profiles:


   ![Access Profiles Page](image)

   2. Click the Add button. The Add Access Profile Page opens:
3. Define the relevant fields.

4. Click **Apply**. The access profile is added, and the device is updated.

**Defining Profile Rules**

Access profiles can contain up to 128 rules that determine which users can manage the switch module, and by which methods. Users can also be blocked from accessing the device. Rules are composed of filters including:

- Rule Priority
- Interface
- Management Method
- IP Address
- Prefix Length
- Forwarding Action
To define profile rules:

1. Click **Security Suite > Access Method > Profile Rules**. The Profile Rules Page opens:

   ![Profile Rules Page](image1.jpg)

   **Profile Rules Page**

   To define the relevant fields:

   2. Click the **Add** button. The Add Profile Rule Page opens:

      ![Add Profile Rule Page](image2.jpg)

      **Add Profile Rule Page**

      3. Define the relevant fields.

      4. Click **Apply**. The profile rule settings are added, and the device is updated.
Modifying Profile Rules

1. Click Security Suite > Access Method > Profile Rules. The Profile Rules Page opens:

2. Click the Edit button. The Edit Profile Rule Page opens:

   Edit Profile Rule Page

   ![Edit Profile Rule Page]

   - Access Profile Name: AP1
   - Priority: 
   - Management Method: All
   - Interface: Port, LAG, VLAN
   - Source IP Address: 
   - Action: Permit

3. Define the relevant fields.
4. Click Apply. The profile rules are defined, and the device is updated.
Defining Traffic Control

The Traffic Control section contains the following pages:

- Defining Storm Control
- Defining Port Security

Defining Storm Control

Storm Control enables limiting the amount of Multicast and Broadcast frames accepted and forwarded by the device. When Layer 2 frames are forwarded, Broadcast and Multicast frames are flooded to all ports on the relevant VLAN. This occupies bandwidth, and loads all nodes connected on all ports.

A Broadcast Storm is a result of an excessive amount of broadcast messages simultaneously transmitted across a network by a single port. Forwarded message responses are heaped onto the network, straining network resources or causing the network to time out.

Storm Control is enabled per all ports by defining the packet type and the rate the packets are transmitted. The system measures the incoming Broadcast and Multicast frame rates separately on each port and discards the frames when the rate exceeds a user-defined rate.

The Storm Control Page provides fields for configuring Broadcast Storm Control.

To define storm control:

1. Click Security Suite > Traffic Control > Storm Control. The Storm Control Page opens:

   ![Storm Control Page](image)

2. Define the relevant fields.

3. Click Apply. Storm control is enabled, and the device is updated.
Modifying Storm Control

1. Click Security Suite > Traffic Control > Storm Control. The Storm Control Page opens:

2. Click the Edit Button. The Edit Storm Control Page opens:

   Edit Storm Control Page

   ![Edit Storm Control Page](image)

3. Modify the relevant fields.

4. Click Apply. Storm control is modified, and the device is updated.

Defining Port Security

Network security can be increased by limiting access on a specific port only to users with specific MAC addresses. The MAC addresses can be dynamically learned or statically configured. Locked port security monitors both received and learned packets that are received on specific ports. Access to the locked port is limited to users with specific MAC addresses. These addresses are either manually defined on the port, or learned on that port up to the point when it is locked. When a packet is received on a locked port, and the packet source MAC address is not tied to that port (either it was learned on a different port, or it is unknown to the system), the protection mechanism is invoked, and can provide various options. Unauthorized packets arriving at a locked port are either:

- Forwarded
- Discarded with no trap
- Discarded with a trap
- Cause the port to be shut down.

Locked port security also enables storing a list of MAC addresses in the configuration file. The MAC address list can be restored after the device has been reset. Disabled ports are activated from the Port Management page.

NOTE: To configure port lock, 802.1x multiple host mode must be enabled.
Perform the following to define port security:

1. Click **Security Suite > Traffic Control > Port Security**. The Port Security Page opens:

   ![Port Security Page](image)

   - **Port Security Page**
     - **SFE 1000P**
     - **Port Security**
       - **Interface**
         - **Interface Status**
           - **Learning Mode**
             - **Max Entries**
               - **Action**
                 - **Trap Frequency** (Sec)

2. Define the relevant fields.

3. Click **Apply**. Port security is defined, and the device is updated.

Modifying Port Security

1. Click **Security Suite > Traffic Control > Port Security**. The Port Security Page opens:

2. Click the **Edit** Button. The **Edit Port Security Page** opens:

   ![Edit Port Security Page](image)

   - **Edit Port Security Page**
     - **SFE 1000P**
     - **Edit Port Security**
       - **Interface**
         - **Lock Interface**
           - **Learning Mode**
             - **Max Entries**
               - **Actions on Violation**
                 - **Enable Trap**
                   - **Trap Frequency**

3. Modify the relevant fields.

4. Click **Apply**. Port security is modified, and the device is updated.
Defining 802.1x

Port based authentication enables authenticating system users on a per-port basis via an external server. Only authenticated and approved system users can transmit and receive data. Ports are authenticated via the RADIUS server using the Extensible Authentication Protocol (EAP). Port Authentication includes:

- **Authenticators** — Specifies the port, which is authenticated before permitting system access.
- **Supplicants** — Specifies host connected to the authenticated port requesting to access the system services.
- **Authentication Server** — Specifies the external server, for example, the RADIUS server that performs the authentication on behalf of the authenticator, and indicates whether the supplicant is authorized to access system services.

Port based authentication creates two access states:

- **Controlled Access** — Permits communication between the supplicant and the system, if the supplicant is authorized.
- **Uncontrolled Access** — Permits uncontrolled communication regardless of the port state.

The 802.1x page configures port to use Extensible Authentication Protocol (EAP).

The 802.1x section contains the following pages:

- Defining 802.1X Properties
- Defining Port Authentication
- Defining Multiple Hosts
- Defining Authenticated Host

The 802.1x page configures port to use Extensible Authentication Protocol (EAP).
1. Click **Security Suite > 802.1X > Properties**. The **802.1X Properties Page** opens:

   **802.1X Properties Page**

2. Define the relevant fields.

3. Click **Apply**. The 802.1X properties are defined, and the device is updated.

**Defining Port Authentication**

1. Click **Security Suite > 802.1X > Port Authentication**. The **802.1X Port Authentication Page** opens:

   **802.1X Port Authentication Page**

2. Define the relevant fields.

3. Click **Apply**. The port authentication settings are modified, and the device is updated.
Modifying 8021X Security

1. Click **Security Suite > 802.1X > Properties**. The **802.1X Properties Page** opens:

2. Click the **Edit** button. The **Port Authentication Settings Page** opens:

![Port Authentication Settings Page](image)

3. Modify the relevant fields.

4. Click **Apply**. The port authentication settings are defined, and the device is updated.
Defining Multiple Hosts

The 802.1X Multiple Host Page allows network managers to configure advanced port-based authentication settings for specific ports and VLANs.

1. Click Security Suite > 802.1X > Multiple Host. The 802.1X Multiple Host Page opens:

   802.1X Multiple Host Page

2. Define the relevant fields.

3. Click Apply. The host settings are modified, and the device is updated.

Modifying Multiple Host Settings

1. Click Security Suite > 802.1X > Multiple Host. The 802.1X Properties Page opens:

2. Click the Edit button. The Edit Multiple Host Page opens:

   Edit Multiple Host Page

3. Modify the relevant fields.

4. Click Apply. The multiple host settings are defined, and the device is updated.
Defining Authenticated Host

The Authenticated Host Page contains a list of authenticated users.

1. Click Security Suite > 802.1X > Authenticated Host. The Authenticated Host Page opens:

   **Authenticated Host Page**

   ![Authenticated Host Page](image)

   - Define the relevant fields.
   - Click **Apply**. The authenticated host settings are defined, and the device is updated.

Defining Access Control

Access Control Lists (ACL) allow network managers to define classification actions and rules for specific ingress ports. Your switch supports up to 256 ACLs. Packets entering an ingress port, with an active ACL, are either admitted or denied entry. If they are denied entry, the user can disable the port. ACLs are composed of access control entries (ACEs) that are made of the filters that determine traffic classifications. The total number of ACEs that can be defined in all ACLs together is 256.

The Access Control section contains the following pages:

- Defining MAC Based ACL
- Defining IP Based ACL
- Defining ACL Binding
Defining MAC Based ACL

The MAC Based ACL Page page allows a MAC-based Access Control List (ACL) to be defined. The table lists Access Control Elements (ACE) rules, which can be added only if the ACL is not bound to an interface.

To define the MAC Based ACL:

1. Click Security Suite >Access Control > MAC Based ACL. The MAC Based ACL Page opens:

   **MAC Based ACL Page**

2. Click the Add ACL button. The Add MAC Based ACL Page opens:

   **Add MAC Based ACL Page**

3. Define the relevant fields.

4. Click Apply. The MAC Based ACL is defined, and the device is updated.
Adding Rule to MAC Based ACL

1. Select an existing ACL.
2. Click the Add Rule button. The Add MAC Based Rule Page opens:

   **Add MAC Based Rule Page**

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACL Name</td>
<td>New ACL</td>
</tr>
<tr>
<td>Source MAC Address</td>
<td></td>
</tr>
<tr>
<td>Destination MAC Address</td>
<td></td>
</tr>
<tr>
<td>VLAN ID</td>
<td></td>
</tr>
<tr>
<td>CoS</td>
<td></td>
</tr>
<tr>
<td>CoS Mask</td>
<td></td>
</tr>
<tr>
<td>Ether Type</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>Permit</td>
</tr>
</tbody>
</table>

   Wild Card Mask

   Any

3. Define the relevant fields.
4. Click Apply. The ACL Rule is defined, and the device is updated.

Defining IP Based ACL

The IP Based ACL Page contains information for defining IP Based ACLs, including defining the ACEs defined for IP Based ACLs.
1. Click **Security Suite > Access Control > IP Based ACL**. The **IP Based ACL Page** opens:

![IP Based ACL Page](image)

2. Click the **Add** Button. The **Add IP Based ACL Page** opens:

![Add IP Based ACL Page](image)

3. Define the relevant fields,

4. Click **Apply**. The IP Based ACL is defined, and the device is updated.
Adding an IP Based Rule

1. Click **Security Suite > Access Control > IP Based ACL**. The **IP Based ACL Page** opens:

2. Click the **Add ACL Rule** button. The **Add IP Based Rule Page** opens:

   ![Add IP Based Rule Page](image)

   **Add IP Based Rule**

| ACL Name | ip1 |
| Protocol | Select from List | Protocol ID | 1 |
| Source Port |  | Any |
| Destination Port |  | Any |
| TCP Flags | Urg | Ack | Psh | Syn | Rst | Est | Fst |
| ICMP | Select from List | Echo-Reply | 1 | Any |
| ICMP Code |  | Any |
| IGMP | Select from List | IGMP Type | 9 | Any |
| Source IP Address |  | Any | Any | Any |
| Dest. IP Address |  | Any | Any | Any |
| Match DSCP |  |  |
| Match IP Precedence |  |  |
| Action | Permit |

3. Select either **Match DSCP** or **Match IP**.

4. Click **Apply**. The IP based rule settings are modified, and the device is updated.

**Defining ACL Binding**

When an ACL is bound to an interface, all the ACE rules that have been defined are applied to the selected interface. Whenever an ACL is assigned on a port or a LAG flows from that ingress interface that do not match the ACL are matched to the default rule, which is Drop unmatched packets.
1. Click Security Suite > Access Control > ACL Binding. The ACL Binding Page opens

   **ACL Binding Page**

   ![](image)

2. Define the relevant fields.

3. Click **Apply**. The ACL binding settings are modified, and the device is updated.

**Modifying ACL Binding**

1. Click Security Suite > Access Control > ACL Binding. The ACL Binding Page opens:

2. Click the **Edit** button. The Edit ACL Binding Page opens:

   **Edit ACL Binding Page**

   ![](image)

3. Define the relevant fields.

4. Click **Apply**. ACL binding is defined, and the device is updated.

**Defining DoS Prevention**

The DoS Prevention section contains the following pages:

- Global Settings
- Defining Martian Addresses
Global Settings

1. Click Security Suite > Dos Prevention > Global Settings. The Global Settings Page opens:

   ![Global Settings Page](image)

   2. Define the relevant fields.

   3. Click Apply. The DoS prevention global settings are defined, and the device is updated.

Defining Martian Addresses

1. Click Security Suite > Dos Prevention > Martian Addresses. The Martian Addresses Page opens:

   ![Martian Addresses Page](image)
2. Click the **Add** button. The *Add Martian Addresses Page* opens:

![Add Martian Addresses Page](image)

3. Define the relevant fields.

4. Click **Apply**. The martian addresses are added, and the device is updated.
Configuring Device Interfaces

This section contains information for configuring ports and contains the following topic:

- Defining Port Settings
- Defining LAG Management
- Defining LAG Settings
- Configuring LACP

Defining Port Settings

The Port Settings Page contains fields for defining port parameters.

To define port settings:

1. Click Bridging > Port Management > Port Settings. The Port Settings Page opens:

2. Define the relevant fields.

3. Click Apply. Port Settings are defined, and the device is updated.

Modifying Port Settings

1. Click Bridging > Port Management > Port Settings. The Port Settings Page opens:

2. Click the Edit button. The Edit Port Settings Page opens:
3. Define the relevant fields.

4. Click Apply. The Port Settings are modified, and the device is updated.

**Defining LAG Management**

Link Aggregation optimizes port usage by linking a group of ports together to form a single LAG. Aggregating ports multiplies the bandwidth between the devices, increases port flexibility, and provides link redundancy.

The device supports both static LAGs and Link Aggregation Control Protocol (LACP) LAGs. LACP LAGs negotiate aggregating port links with other LACP ports located on a different device. If the other device ports are also LACP ports, the devices establish a LAG between them. Ensure the following:

- All ports within a LAG must be the same media type.
- A VLAN is not configured on the port.
- The port is not assigned to a different LAG.
- Auto-negotiation mode is not configured on the port.
The port is in full-duplex mode.

All ports in the LAG have the same ingress filtering and tagged modes.

All ports in the LAG have the same back pressure and flow control modes.

All ports in the LAG have the same priority.

All ports in the LAG have the same transceiver type.

The device supports up to 8 LAGs, and eight ports in each LAG.

Ports can be configured as LACP ports only if the ports are not part of a previously configured LAG.

Ports added to a LAG lose their individual port configuration. When ports are removed from the LAG, the original port configuration is applied to the ports.

To define LAG management:

1. Click **Bridging > Port Management > LAG Management**. The LAG Management Page opens:

![LAG Management Page](image)

2. Define the relevant fields.

3. Click **Apply**. LAG Management is defined, and the device is updated.
Modifying LAG Membership

1. Click **Bridging** > **Port Management** > **LAG Management**. The **LAG Management Page** opens:

2. Click the **Edit** button. The **Edit LAG Membership Page** opens:

   ![Edit LAG Membership Page](image)

3. Define the relevant fields.

4. To assign ports to a LAG, click the port numbers in the Port List and then click the Right Arrow button. The port number then appears in the LAG Members list.

   Conversely, to remove a port from a LAG, click the port number in the LAG Members list and then click the Left Arrow button.

5. Click **Apply**. The LAG membership is defined, and the device is updated.
Defining LAG Settings

Link Aggregated Groups optimize port usage by linking a group of ports together to form a single aggregated group. Link aggregated groups multiply the bandwidth between the devices, increase port flexibility, and provide link redundancy.

The LAG Settings Page contains fields for configuring parameters for configured LAGs. The device supports up to eight ports per LAG, and eight LAGs per system.

1. Click Bridging > Port Management > LAG Settings. The LAG Settings Page opens:

   ![LAG Settings Page]

2. Click the Edit button. The LAG Configuration Settings opens:
3. Define the relevant fields.

4. Click **Apply**. The LAG configuration settings are modified, and the device is updated.

**Configuring LACP**

Aggregate ports can be linked into link-aggregation port-groups. Each group is comprised of ports with the same speed, set to full-duplex operations.

Aggregated Links can be manually setup or automatically established by enabling Link Aggregation Control Protocol (LACP) on the relevant links. Aggregate ports can be linked into link-aggregation port-groups. Each group is comprised of ports with the same speed.
To define LACP:

1. Click **Bridging > Port Managing > LACP**. The **LACP Page** opens:

   ![LACP Page](image)

2. Define the relevant fields.

3. Click **Apply**. The LACP settings are modified, and the device is updated.

### Modify LACP Parameter Settings

1. Click **Bridging > Port Managing > LACP**. The **LACP Page** opens:

2. Click the **Edit** button. The **Edit LACP Page** opens:

   ![Edit LACP Page](image)

3. Define the relevant fields.

4. Click **Apply**. The LACP Parameters settings are defined, and the device is updated.
Chapter 7: Configuring VLANs

VLANs are logical subgroups with a Local Area Network (LAN) which combine user stations and network devices into a single unit, regardless of the physical LAN segment to which they are attached. VLANs allow network traffic to flow more efficiently within subgroups. VLANs use software to reduce the amount of time it takes for network changes, additions, and moves to be implemented.

VLANs have no minimum number of ports, and can be created per unit, per device, or through any other logical connection combination, since they are software-based and not defined by physical attributes.

VLANs function at Layer 2. Since VLANs isolate traffic within the VLAN, a Layer 3 router working at a protocol level is required to allow traffic flow between VLANs. Layer 3 routers identify segments and coordinate with VLANs. VLANs are Broadcast and Multicast domains. Broadcast and Multicast traffic is transmitted only in the VLAN in which the traffic is generated.

VLAN tagging provides a method of transferring VLAN information between VLAN groups. VLAN tagging attaches a 4-byte tag to packet headers. The VLAN tag indicates to which VLAN the packets belong. VLAN tags are attached to the VLAN by either the end station or the network device. VLAN tags also contain VLAN network priority information.

Combining VLANs and GARP (Generic Attribute Registration Protocol) allows network managers to define network nodes into Broadcast domains. The VLAN Management section contains the following pages:

- Defining VLAN Properties
- Defining VLAN Membership
- Defining Interface Settings
- Configuring GVRP Settings
Defining VLAN Properties

The VLAN Properties Page provides information and global parameters for configuring and working with VLANs.


2. Click the Add button. The Add VLAN Page opens:

3. Define the relevant fields.

4. Click Apply. The add VLAN settings are modified, and the device is updated.
Modifying VLANs

2. Click Edit. The Edit VLAN Page opens:

   **Edit VLAN Page**
   
   ![Edit VLAN Page](image)

3. Define the relevant fields.
4. Click Apply. The VLAN Settings are defined, and the device is updated.

Defining VLAN Membership

The VLAN Membership Page contains a table that maps VLAN parameters to ports. Ports are assigned VLAN membership by toggling through the Port Control settings.

1. Click Bridging > VLAN Management > Membership. The VLAN Membership Page opens:

   **Membership Page**
   
   ![Membership Page](image)

2. Define the relevant fields.
3. Click Apply. VLAN membership is defined, and the device is updated.
Modifying VLAN Membership

1. Click Bridging > VLAN Management > Membership. The VLAN Membership Page opens:

2. Click the Edit button. The Edit VLAN Membership Page opens:

   ![Edit VLAN Membership Page]

   **Edit VLAN Membership Page**

   - VLAN ID
   - VLAN Name
   - Interface
   - Interface Status
   - Apply

3. Define the relevant fields.

4. Click Apply. VLAN Membership is modified, and the device is updated.

Defining Interface Settings

The VLAN Interface Setting Page provides parameters for managing ports that are part of a VLAN. The port default VLAN ID (PVID) is configured on the VLAN Port Settings page. All untagged packets arriving to the device are tagged by the ports PVID.

1. Click Bridging > VLAN Management > Interface Setting. The VLAN Interface Setting Page opens:

   ![Interface Setting Page]

   **Interface Setting Page**

   - Port
   - VLAN
   - VLAN Mode
   - PVID
   - Frame Type
   - Tagging

2. Define the relevant fields.
3. Click **Apply**. The VLAN Interface Settings are defined, and the device is updated.

**Modifying VLAN Interface Settings**

1. Click **Bridging > VLAN Management > Interface Setting**. The VLAN Interface Setting Page opens:

2. Click the **Edit** button. The Edit Ports Page opens:

   ![Edit Ports Page]

3. Define the relevant fields.

4. Click **Apply**. The VLAN Interface settings are modified, and the device is updated.

**Configuring GVRP Settings**

GARP VLAN Registration Protocol (GVRP) is specifically provided for automatic distribution of VLAN membership information among VLAN-aware bridges. GVRP allows VLAN-aware bridges to automatically learn VLANs to bridge ports mapping, without having to individually configure each bridge and register VLAN membership.

**NOTE:** The Global System LAG information displays the same field information as the ports, but represent the LAG GVRP information.
To define GVRP:

1. Click **Bridging > VLAN Management > GVRP Settings**. The **GVRP Settings Page** opens:

   ![GVRP Settings Page](image)

2. Define the relevant fields.
3. Click **Apply**. The GVRP Settings are defined, and the device is updated.

### Modifying GVRP Settings

1. Click **Bridging > VLAN Management > GVRP Settings**. The **GVRP Settings Page** opens:
2. Click the **Edit** button. The **Edit GVRP Page** opens:

   ![Edit GVRP Page](image)

3. Define the relevant fields.
4. Click **Apply**. GVRP settings are modified, and the device is updated.
Defining VLAN Protocol Group

The Protocol Group Page contains information defining protocol names and the VLAN Ethernet type. Interfaces can be classified as a specific protocol based interface.


   Protocol Group Page

2. Click the Add Button. The Add Protocol Group Page opens:

   Add Protocol Group Page

3. Define the relevant fields.

4. Click Apply. The Protocol Group is added, and the device is updated.
Modifying Protocol Groups

The Protocol Group Settings Page provides information for configuring existing VLAN protocol groups.


2. Click the Edit Button. The Protocol Group Settings Page opens:

![Protocol Group Settings Page]

3. Define the relevant fields.

4. Click Apply. The Protocol group is modified, and the device is updated.

Defining VLAN Protocol Port

The Protocol Port Page adds interfaces to Protocol groups.

To define the protocol port:

1. Click Bridging > VLAN Management > Protocol Port. The Protocol Port Page opens:

![Protocol Port Page]

2. Click the Add Button. The Add Protocol Port to VLAN Page opens:
3. Define the relevant fields.
4. Click **Apply**. The protocol ports are mapped to VLANs, and the device is updated.
Configuring IP Information

This section provides information for defining device IP addresses, and includes the following topics:

- Domain Name System
- Configuring Layer 2 IP Addresses
- Configuring Layer 3

Domain Name System

Domain Name System (DNS) converts user-defined domain names into IP addresses. Each time a domain name is assigned, the DNS service translates the name into a numeric IP address. For example, www.ipexample.com is translated into 192.87.56.2. DNS servers maintain databases of domain names and their corresponding IP addresses. The Domain Name System contains the following windows:

- Defining DNS Server
- Mapping DNS Hosts

Defining DNS Server

Domain Name System (DNS) converts user-defined domain names into IP addresses. Each time a domain name is assigned, the DNS service translates the name into a numeric IP address. For example, www.ipexample.com is translated into 192.87.56.2. DNS servers maintain databases of domain names and their corresponding IP addresses.

The DNS Servers Page contains fields for enabling and activating specific DNS servers.
To enable a DNS client:

1. Click **System > System Management > Domain Name System > DNS Servers**. The **DNS Servers Page** opens:

   ![DNS Servers Page](image)

   - Click **Add**. The **Add DNS Server Page** opens:

     ![Add DNS Server Page](image)

   - Define the relevant fields.

   - Click **Apply**. The DNS server is added, and the device is updated.
Mapping DNS Hosts

The Host Mapping Page provides information for defining DNS Host Mapping.

1. Click System > System Management > Domain Name System > Host Mapping. The Host Mapping Page opens:

   **Host Mapping Page**

2. Click the Add button. The Add DNS Host Page opens:

   The Add DNS Host Page provides information for defining DNS Host Mapping.

   **Add DNS Host Page**

3. Define the relevant fields.

4. Click Apply. The DNS Host settings are defined, and the device is updated.
Configuring Layer 2 IP Addresses

The IP address and default gateway can be either dynamically or statically configured. In Layer 2, a static IP address is configured on the VLAN Management Properties Page. The Management VLAN is set to VLAN 100 by default, but can be modified.

This section provides information for configuring Layer 2 features, and includes the following topics:

- Configuring IP Addressing
- Defining IP Routing

Configuring IP Addressing

The IP Addressing subsection contains the following pages:

- Defining IP Interfaces
- Enabling ARP

Defining IP Interfaces

The IP Interface Page contains fields for assigning IP addresses. Packets are forwarded to the default IP when frames are sent to a remote network. The configured IP address must belong to the same IP address subnet of one of the IP interfaces.

1. Click System > System Management > IP Addressing > IP Interface. The IP Interface Page opens:

   ![](IP_Interface.png)

   **IP Interface Page**

2. Define the relevant fields.

3. Click Apply. The IP Interface settings are modified, and the device is updated.
Enabling ARP

The Address Resolution Protocol (ARP) is a TCP/IP protocol that converts IP addresses into physical addresses. The ARP table is used to maintain a correlation between each MAC address and its corresponding IP address. The ARP table can be filled in statically by the user. When a static ARP entry is defined, a permanent entry is put in the table, which the system uses to translate IP addresses to MAC addresses.

To define ARP:

1. Click System > System Management > IP Addressing > ARP. The ARP Page opens:

   ![ARP Page](image)

2. Click on the Add ARP button. The Add ARP Page opens:

   ![Add ARP Page](image)

3. Define the relevant fields.

4. Click Apply. The ARP Settings are defined, and the device is updated.
Modifying ARP Settings

1. Click System > System Management > IP Addressing > ARP. The ARP Page opens:

2. Click the Edit button. The Edit ARP Page opens:

3. Define the relevant fields.

4. Click Apply. The ARP Settings are modified, and the device is updated.
Defining Address Tables

MAC addresses are stored in either the Static Address or the Dynamic Address databases. A packet addressed to a destination stored in one of the databases is forwarded immediately to the port. The Dynamic Address Table can be sorted by interface, VLAN, and MAC Address. MAC addresses are dynamically learned as packets from sources arrive at the device. Addresses are associated with ports by learning the ports from the frames source address. Frames addressed to a destination MAC address that is not associated with any port, are flooded to all ports of the relevant VLAN. Static addresses are manually configured. In order to prevent the bridging table from overflowing, dynamic MAC addresses, from which no traffic is seen for a certain period, are erased.

This section contains information for defining both static and dynamic Forwarding Database entries, and includes the following topics:

- Defining Static Addresses
- Defining Dynamic Addresses

Defining Static Addresses

A static address can be assigned to a specific interface on this switch. Static addresses are bound to the assigned interface and cannot be moved. When a static address is seen on another interface, the address will be ignored and will not be written to the address table.

To define static addresses:

1. Click Bridging > Address Tables > Static. The Static Page opens:

   ![Static Page]

2. Click the Add button. The Add Static MAC Address Page opens:
3. Define the relevant fields.

4. Click **Apply**. The Static MAC Address is added, and the device is updated.

**Defining Dynamic Addresses**

The Dynamic Address Table contains the MAC addresses learned by monitoring the source address for traffic entering the switch. When the destination address for inbound traffic is found in the database, the packets intended for that address are forwarded directly to the associated port. Otherwise, the traffic is flooded to all ports.

The **Dynamic Page** contains parameters for querying information in the Dynamic MAC Address Table, including the interface type, MAC addresses, VLAN, and table storing. The Dynamic MAC Address table contains information about the aging time before a dynamic MAC address is erased, and includes parameters for querying and viewing the Dynamic MAC Address table. The Dynamic MAC Address table contains address parameters by which packets are directly forwarded to the ports. The Dynamic Address Table can be sorted by interface, VLAN, and MAC Address.
1. Click **Bridging > Address Tables > Dynamic**. The *Dynamic Page* opens:

   **Dynamic Page**

   ![Dynamic Page Screenshot]

   Dynamic
   
<table>
<thead>
<tr>
<th>VLAN ID</th>
<th>MAC Address</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLAN 100</td>
<td>00:00:5A:001716</td>
<td>e1</td>
</tr>
<tr>
<td>VLAN 100</td>
<td>00:00:5A:001393</td>
<td>e1</td>
</tr>
<tr>
<td>VLAN 100</td>
<td>00:12222341-63</td>
<td>e1</td>
</tr>
<tr>
<td>VLAN 100</td>
<td>00:xt000Debadc</td>
<td>e1</td>
</tr>
</tbody>
</table>

2. Define the relevant fields.

3. Click **Query**. The Dynamic MAC Address Table is queried, and the results are displayed.

4. Click **Apply**. Dynamic addressing is defined, and the device is updated.
Configuring Multicast Forwarding

The Multicast section contains the following pages:

- IGMP Snooping
- Defining Multicast Bridging Groups
- Defining Multicast Forwarding

IGMP Snooping

When IGMP Snooping is enabled globally, all IGMP packets are forwarded to the CPU. The CPU analyzes the incoming packets and determines:

- Which ports want to join which Multicast groups.
- Which ports have Multicast routers generating IGMP queries.
- Which routing protocols are forwarding packets and Multicast traffic.

Ports requesting to join a specific Multicast group issue an IGMP report, specifying that Multicast group is accepting members. This results in the creation of the Multicast filtering database.

To enable IGMP Snooping:

1. Click Bridging > Multicast > IGMP Snooping. The IGMP Snooping Page opens:

   ![IGMP Snooping Page](image)

2. Define the relevant fields.

3. Click Apply. The IGMP Global Parameters are updated, and the device is updated.
**Modifying IGMP Snooping**

1. Click **Bridging > Multicast > ICMP Snooping**. The **IGMP Snooping Page** opens:
2. Click the **Edit** button. The **Edit IGMP Snooping Page**: 

   ![Edit IGMP Snooping Page](image)

3. Define the relevant fields.
4. Click **Apply**. The IGMP Global Parameters are modified, and the device is updated.

**Defining Multicast Bridging Groups**

The **Multicast Group page** displays the ports and LAGs that are members of Multicast service groups. The Port and LAG tables also reflect the manner in which the port or LAGs joined the Multicast group. Ports can be added either to existing groups or to new Multicast service groups. The **Multicast Group Page** permits new Multicast service groups to be created. The **Multicast Group Page** also assigns ports to a specific Multicast service address group.
To define Multicast groups:

1. Click **Bridging > Multicast> Multicast Groups**. The **Multicast Group Page** opens:

   ![Multicast Group Page](image)

   To define Multicast groups:

2. Click the **Add** button. The **Add Multicast Group Page** opens:

   ![Add Multicast Group Page](image)

3. Define the relevant fields.

4. Click **Apply**. The Multicast Group settings are modified, and the device is updated.
Modifying a Multicast Group

1. Click Bridging > Bridge Multicast> Multicast Groups. The Multicast Group Page opens:

2. Click the Edit button. The Edit Multicast Group Page opens.

   **Edit Multicast Group Page**

   ![Edit Multicast Group Page](image)

3. Define the Multicast Group Port Settings.

4. Click Apply. The Multicast group parameters are saved, and the device is updated.

Defining Multicast Forwarding

The Multicast Forward Page contains fields for attaching ports or LAGs to a device that is attached to a neighboring Multicast router/switch. Once IGMP Snooping is enabled, Multicast packets are forwarded to the appropriate port or VLAN.

To define Multicast forward settings:

1. Click Bridging > Multicast > Forward. The Multicast Forward Page opens:
2. Define the relevant fields.

3. Click **Apply**. The multicast forward all settings are defined, and the device is updated.

**Modifying Multicast Forwarding**

1. Click **Bridging > Multicast > Forward**. The **Multicast Forward Page** opens:

2. Click the **Edit** button. The **Edit Multicast Forward All Page** opens:

3. Define the relevant fields.

4. Click **Apply**. The multicast forward all settings are defined, and the device is updated.
Configuring Spanning Tree

The Spanning Tree Protocol (STP) provides tree topography for any arrangement of bridges. STP also provides one path between end stations on a network, eliminating loops.

Loops occur when alternate routes exist between hosts. Loops in an extended network can cause bridges to forward traffic indefinitely, resulting in increased traffic and reducing network efficiency.

The device supports the following Spanning Tree versions:

- **Classic STP** — Provides a single path between end stations, avoiding and eliminating loops.
- **Rapid STP** — Detects and uses network topologies that provide faster convergence of the spanning tree, without creating forwarding loops.
- **Multiple STP** — Provides full connectivity for packets allocated to any VLAN. Multiple STP is based on the RSTP. In addition, Multiple STP transmits packets assigned to different VLANs through different MST regions. MST regions act as a single bridge.

The Spanning Tree section contains the following pages:

- Defining STP Properties
- Defining Interface Settings
- Defining Rapid Spanning Tree
- Defining Multiple Spanning Tree
Defining STP Properties

The STP Properties Page contains parameters for enabling STP on the device. The STP Properties Page is divided into three areas, Global Settings, Bridge Settings, and Designated Root.

1. Click Bridging > Spanning Tree > Properties. The STP Properties Page opens:

   ![STP Properties Page](image)

2. Define the relevant fields.

3. Click Apply. STP is enabled, and the device is updated.
Defining Interface Settings

Network administrators can assign STP settings to specific interfaces using the STP Interface Settings Page.

To assign STP settings to an interface:

1. Click Bridging > Spanning Tree > Interface Settings. The Interface Settings Page opens:

2. Define the relevant fields.

3. Click Apply. STP is enabled on the interface, and the device is updated.
Modifying Interface Settings

1. Click Bridging > Spanning Tree > Interface Settings. The Interface Settings Page opens:

2. Click the Edit button. The Edit Interface Settings Page opens:

   ![Edit Interface Settings Page]

3. Define the relevant fields.

4. Click Apply. The interface settings are modified, and the device is updated.
Defining Rapid Spanning Tree

While the classic spanning tree prevents Layer 2 forwarding loops in a general network topology, convergence can take between 30-60 seconds. This time may delay detecting possible loops, and propagating status topology changes. Rapid Spanning Tree Protocol (RSTP) detects and uses network topologies that allow a faster STP convergence without creating forwarding loops.

1. Click **Bridging > Spanning Tree > RSTP**. The **RSTP Page** opens:

   ![RSTP Page](image)

2. Define the relevant fields.

3. Click **Apply**. The Rapid Spanning Tree Settings are defined, and the device is updated.
Modifying RTSP

1. Click Bridging > Spanning Tree > RSTP. The RSTP Page opens:

2. Click the Edit button. The Edit Rapid Spanning Tree Page opens:

   **Edit Rapid Spanning Tree Page**

   - Interface
   - Role: Designated
   - Mode: STP
   - Fast Link Operational Status: Disable
   - Port State: Forwarding
   - Point to Point Admin Status: Auto
   - Point to Point Operational Status: Enable
   - Activate Protocol Migration Test

   [Apply button]

3. Define the relevant fields.

4. Click **Apply**. The Rapid Spanning Tree Settings are modified, and the device is updated.

Defining Multiple Spanning Tree

MSTP provides differing load balancing scenarios. For example, while port A is blocked in one STP instance, the same port is placed in the Forwarding State in another STP instance. The MSTP Properties page contains information for defining global MSTP settings, including region names, MSTP revisions, and maximum hops.

The MSTP section contains the following pages:

- Defining MSTP Properties
- Mapping MSTP Instances to VLAN
- Defining MSTP Instance Settings
- Defining MSTP Interface Settings
Defining MSTP Properties

The MSTP Properties Page contains information for defining global MSTP settings, including region names, MSTP revisions, and maximum hops.

To define MSTP:

1. Click Bridging > Spanning Tree > MSTP > Properties. The MSTP Properties Page opens:

   MSTP Properties Page

2. Define the relevant fields.

3. Click Apply. The MSTP properties are defined, and the device is updated.
Mapping MSTP Instances to VLAN

MSTP maps VLANs into STP instances. Packets assigned to various VLANs are transmitted along different paths within Multiple Spanning Tree Regions (MST Regions). Regions are one or more Multiple Spanning Tree bridges by which frames can be transmitted. In configuring MSTP, the MST region to which the device belongs is defined. A configuration consists of the name, revision, and region to which the device belongs.

The VLAN screen enables mapping VLANs to MSTP Instances.

1. Click Bridging > Spanning Tree > MSTP > Instance to VLAN. The Instance to VLAN Page opens:

   ![Instance to VLAN Page](image)

2. Define the relevant fields.

3. Click Apply. The local user settings are modified, and the device is updated.
Defining MSTP Instance Settings

MSTP maps VLANs into STP instances. Packets assigned to various VLANs are transmitted along different paths within Multiple Spanning Tree Regions (MST Regions). Regions are one or more Multiple Spanning Tree bridges by which frames can be transmitted. In configuring MSTP, the MST region to which the device belongs is defined. A configuration consists of the name, revision, and region to which the device belongs.

Network Administrators can define MSTP Instances settings using the MSTP Instance Settings Page.

1. Click Bridging > Spanning Tree > MSTP > Instance Settings. The MSTP Instance Settings Page opens:

   **MSTP Instance Settings Page**

2. Define the relevant fields.

3. Click **Apply**. The local user settings are modified, and the device is updated.
Defining MSTP Interface Settings

Network Administrators can define MSTP Instances settings using the MSTP Interface Settings Page.

1. Click Bridging > Spanning Tree > MSTP > Interface Settings. The MSTP Interface Settings Page opens:

![MSTP Interface Settings Page]

2. Click the Interface Table button. The Interface Table Page opens:

![Interface Table Page]
3. Define the relevant fields.

4. Click **Apply**. The Interface settings are modified, and the device is updated.
Configuring SNMP

The Simple Network Management Protocol (SNMP) provides a method for managing network devices. The device supports the following SNMP versions:

**SNMP v1 and v2**

SNMP agents maintain a list of variables that are used to manage the device. The variables are defined in the Management Information Base (MIB). The MIB presents the variables controlled by the agent. The SNMP agent defines the MIB specification format, as well as the format used to access the information over the network. Access rights to the SNMP agents are controlled by access strings.

**SNMP v3**

SNMP v3 also applies access control and a new traps mechanism to SNMPv1 and SNMPv2 PDUs. In addition, User Security Model (USM) is defined for SNMPv3 and includes:

- **Authentication** — Provides data integrity and data origin authentication.
- **Privacy** — Protects against disclosure message content. Cipher Block-Chaining (CBC) is used for encryption. Either authentication is enabled on an SNMP message, or both authentication and privacy are enabled on a SNMP message. However privacy cannot be enabled without authentication.
- **Timeliness** — Protects against message delay or message redundancy. The SNMP agent compares the incoming message to the message time information.
- **Key Management** — Defines key generation, key updates, and key use. The device supports SNMP notification filters based on Object IDs (OID). OIDs are used by the system to manage device features. SNMP v3 supports the following features:
  - Security
  - Feature Access Control
  - Traps

The device generates copy traps.

The SNMP section contains the following sections:

- Configuring SNMP Security
- Defining Trap Management
Configuring SNMP Security

The Security section contains the following pages:

- Defining the SNMP Engine ID
- Defining SNMP Views
- Defining SNMP Users
- Define SNMP Groups
- Defining SNMP Communities

Defining the SNMP Engine ID

The *Engine ID Page* provides information for defining the device engine ID.

1. Click **System > SNMP > Security > Engine IP**. The *Engine ID Page* opens:

   ![Engine ID Page](image)

2. Define the relevant fields.

3. Click **Apply**. The Engine ID settings are modified, and the device is updated.
Defining SNMP Views

SNMP Views provide access or block access to device features or feature aspects. For example, a view can be defined that states that SNMP Group A has Read Only (R/O) access to Multicast groups, while SNMP Group B has Read-Write (R/W) access to Multicast groups. Feature access is granted via the MIB name, or MIB Object ID.

To define SNMP views:

1. Click System > SNMP > Security > Views. The SNMP Views Page opens:

2. Click the Add button. The Add SNMP View Page opens:

3. Define the relevant fields.

4. Click Apply. The SNMP views are defined, and the device is updated.
Defining SNMP Users

The SNMP Users Page provides information for creating SNMP groups, and assigning SNMP access control privileges to SNMP groups. Groups allow network managers to assign access rights to specific device features, or feature aspects.

1. Click System > SNMP > Security > Users. The SNMP Users Page opens:

2. Click the Add button. The Add SNMP Group Membership Page opens:

3. Define the relevant fields.

4. Click Apply. The SNMP Group Membership settings are modified, and the device is updated.
Modifying SNMP Users

The Edit SNMP User Page provides information for assigning SNMP access control privileges to SNMP groups. The Edit SNMP User Page contains the following fields.

1. Click System > SNMP > Security > Users to open the Edit SNMP User Page
2. Define the relevant fields.
3. Click Apply. The SNMP User is modified, and the device is updated.

Define SNMP Groups

The SNMP Groups Profile Page provides information for creating SNMP groups and assigning SNMP access control privileges to SNMP groups. Groups allow network managers to assign access rights to specific device features, or features aspects.

1. Click System > SNMP > Security > Groups. The SNMP Groups Profile Page opens:

   ![SNMP Groups Profile Page](image)

2. Click the Add button. The Add SNMP Group Profile Page opens:
3. Define the relevant fields.

4. Click Apply. The SNMP settings are modified, and the device is updated.

**Modifying SNMP Group Profile Settings**

1. Click System > SNMP > Security > Groups. The **SNMP Groups Profile Page** opens:

2. Click the Edit Button. The **Edit SNMP Group Profile Page** opens:

3. Define the relevant fields.

4. Click **Apply**. The SNMP settings are modified, and the device is updated.
Defining SNMP Communities

The Access rights are managed by defining communities in the SNMP Communities Page. When the community names are changed, access rights are also changed. SNMP communities are defined only for SNMP v1 and SNMP v2c.

To define SNMP Communities:

1. Click **System > SNMP > Security > Communities**. The SNMP Communities Page opens:

   ![SNMP Communities Page](image)

   **SNMP Communities Page**

   - **Communities**
     - **Basic Table**
       - Management Station
       - Community String
       - Access Mode
       - View Name
     - **Advanced Table**
       - Management Station
       - Community String
       - Group Name

2. Click the **Add** button. The Add SNMP Community Page opens.

   ![Add SNMP Community Page](image)

   **Add SNMP Community Page**

   - **SNMP Management Station**
     - IPv4
   - **Community String**
   - **Access Mode**
     - Read Only
   - **View Name**
     - Default
   - **Group Name**

3. Define the relevant fields.

4. Click **Apply**. The SNMP settings are modified, and the device is updated.
Modifying SNMP Community Settings

1. Click **System > SNMP > Security > Communities**. The **SNMP Communities Page** opens:

2. Click the **Edit** Button. The **Edit SNMP Community Page**:

   **Edit SNMP Community Page**

   ![Edit SNMP Community Page](image)

   3. Define the relevant fields.

   4. Click **Apply**. The SNMP Community settings are defined, and the device is updated.
Defining Trap Management

The Defining Trap Management section contains the following pages:

- Defining Trap Settings
- Configuring Station Management
- Defining SNMP Filter Settings

Defining Trap Settings

The Trap Settings Page contains parameters for defining SNMP notification parameters.

1. Click System > SNMP > Security > Trap Management > Trap Settings. The Trap Settings Page opens:

![Trap Settings Page](image)

2. Define the relevant fields.

3. Click Apply. The trap settings are modified, and the device is updated.

Configuring Station Management

The Station Management Page contains information for defining filters that determine whether traps are sent to specific users, and the trap type sent. SNMP notification filters provide the following services:

- Identifying Management Trap Targets
- Trap Filtering
- Selecting Trap Generation Parameters
- Providing Access Control Checks
Traps indicating status changes are issued by the switch to specified trap managers. Specify the trap managers so that key events are reported by this switch to the management station. Specify up to five management stations that receive authentication failure messages and other trap messages from the switch.

1. Click **System > SNMP > Security > Trap Management > Station Management**. The *Station Management Page* opens:

   ![Station Management Page](image)

   **Station Management Page**

   - Click the **Add** button. The *Add SNMP Notification Recipient Page* opens.

   ![Add SNMP Notification Recipient Page](image)
3. Define the relevant fields.

4. Click **Apply**. The SNMP Notification Recipient settings are defined, and the device is updated.
Modifying SNMP Notifications Settings

The Edit SNMP Notification Page allows system administrators to define notification settings. The Edit SNMP Notification Page is divided into four areas, Notification Recipient, SNMPv1,2 Notification Recipient, SNMPv3 Notification Recipient and UDP Port Notification Recipient.

1. Click System > SNMP > Security > Trap Management > Station Management.
2. Click the Edit button. The Edit SNMP Notification Page opens:

![Edit SNMP Notification Page]

3. Define the relevant fields.
4. Click Apply. The SNMP Notification Receivers are defined, and the device is configured.

Defining SNMP Filter Settings

The Filter Settings Page permits filtering traps based on OIDs. Each OID is linked to a device feature or a feature aspect. The Filter Settings Page also allows network managers to filter notifications.

1. Click System > SNMP > Security > Trap Management > Filter Settings. The Filter Settings Page opens:
2. Click the **Add** button. The **Add SNMP Notification Filter Page** opens:

![Add SNMP Notification Filter Page](image1)

3. Define the relevant fields.

4. Click **Apply**. The SNMP Notification Filter is added to the list, and the device is updated.
Configuring Quality of Service

Network traffic is usually unpredictable, and the only basic assurance that can be offered is best effort traffic delivery. To overcome this challenge, Quality of Service (QoS) is applied throughout the network. This ensures that network traffic is prioritized according to specified criteria, and that specific traffic receives preferential treatment. QoS in the network optimizes network performance and entails two basic facilities:

- Classifying incoming traffic into handling classes, based on an attribute, including:
  - The ingress interface
  - Packet content
  - A combination of these attributes

- Providing various mechanisms for determining the allocation of network resources to different handling classes, including:
  - The assignment of network traffic to a particular hardware queue
  - The assignment of internal resources
  - Traffic shaping

The terms Class of Service (CoS) and QoS are used in the following context:

- CoS provides varying Layer 2 traffic services. CoS refers to classification of traffic to traffic-classes, which are handled as an aggregate whole, with no per-flow settings. CoS is usually related to the 802.1p service that classifies flows according to their Layer 2 priority, as set in the VLAN header.

- QoS refers to Layer 2 traffic and above. QoS handles per-flow settings, even within a single traffic class.

The QoS facility involves the following elements:

- **Access Control Lists (ACLs)** — Used to decide which traffic is allowed to enter the system, and which is to be dropped. Only traffic that meets this criteria are subject to CoS or QoS settings. ACLs are used in QoS and network security.

- **Traffic Classification** — Classifies each incoming packet as belonging to a given traffic class, based on the packet contents and/or the context.

- **Assignment to Hardware Queues** — Assigns incoming packets to forwarding queues. Packets are sent to a particular queue for handling as a function of the traffic class to which they belong, as defined by the classification mechanism.

- **Traffic Class-Handling Attributes** — Applies QoS/CoS mechanisms to different classes, including: Bandwidth Management
The Quality of Service section contains the following section:

- Defining General Settings
- Defining Advanced Mode
- Defining QoS Basic Mode

The section also contains the following pages:

- Configuring Policy Table
- Configuring Policy Table

**Defining General Settings**

The QoS General Settings section contains the following pages:

- Defining CoS
- Defining Queue
- Mapping CoS to Queue
- Mapping DSCP to Queue
- Configuring Bandwidth
Defining CoS

The CoS Page contains fields for enabling or disabling CoS (Basic or Advanced mode). In addition, the default CoS for each port or LAG is definable.

1. Click Quality of Service > General > CoS. The CoS Page opens:

   ![CoS Page]

2. Define the relevant fields.

3. Click Apply. The CoS settings are modified, and the device is updated.

Modifying Interface Priorities

1. Click Quality of Service > General > CoS. The CoS Page opens:

2. Click the Edit button. The Edit Interface Priority Page opens:

   ![Edit Interface Priority Page]

3. Modify the Interface priority.

4. Click Apply. The Interface priority is set, and the device is updated.
Defining Queue

The Queue Page contains fields for defining the QoS queue forwarding types.

1. Click Quality of Service > General > Queues. The Queue Page opens:

   ![Queue Page]

2. Define the queues.

3. Click Apply. The queues are defined, and the device is updated.

Mapping CoS to Queue

The Cos to Queue Page contains fields for classifying CoS settings to traffic queues.

1. Click Quality of Service > General > CoS to Queue. The Cos to Queue Page opens:
2. Define the relevant fields.

3. Click **Apply**. CoS to queues are mapped, and the device is updated.

**Mapping DSCP to Queue**

The **DSCP to Queue Page** enables mapping DSCP values to specific queues.

To map DCSP to Queues:

1. Click **Quality of Service > General > DSCP to Queue**. The **DSCP to Queue Page** opens:

2. Define the relevant fields.

3. Click **Apply**. DSCP to queues are mapped, and the device is updated.
Configuring Bandwidth

The Bandwidth Page allows network managers to define the bandwidth settings for specified egress and ingress interfaces.

Rate Limits and Shaping are defined per interface:

- Rate Limit sets the maximum bandwidth allowed on ingress interfaces.
- Shaping Rate sets the maximum bandwidth allowed on egress interfaces. On GE ports, traffic shape for burst traffic (CbS) can also be defined.

1. Click Quality of Service > General > Bandwidth. The Bandwidth Page opens:

   **Bandwidth Page**

   ![Bandwidth Page](image)

2. Click the Edit button. The Edit Bandwidth Page opens:

   **Edit Bandwidth Page**

   ![Edit Bandwidth Page](image)

3. Modify the relevant fields.
4. Click **Apply**. The bandwidth settings are modified, and the device is updated.

### Defining Advanced Mode

Advanced QoS mode provides rules for specifying flow classification and assigning rule actions that relate to bandwidth management. The rules are defined in classification control lists (CCL).

CCLs are set according to the classification defined in the ACL, and they cannot be defined until a valid ACL is defined. When CCLs are defined, ACLs and CCLs can be grouped together in a more complex structure, called policies. Policies can be applied to an interface. Policy ACLs/CCLs are applied in the sequence they appear within the policy. Only a single policy can be attached to a port.

In advanced QoS mode, ACLs can be applied directly to an interface. However, a policy and ACL cannot be simultaneously applied to an interface.

After assigning packets to a specific queue, services such as configuring output queues for the scheduling scheme, or configuring output shaping for burst size, CIR, or CbS per interface or per queue, can be applied.

The **Advanced Mode** section contains the following pages:

- Configuring DSCP Mapping
- Defining Class Mapping
- Defining Aggregate Policer
- Configuring Policy Table
- Defining Policy Binding
Configuring DSCP Mapping

The DSCP Mapping Page enables mapping Differentiated Services Code Point (DSCP) values from incoming packets to DSCP values in outgoing packets. This information is important when traffic exceeds user-defined limits.

1. Click Quality of Service > Advanced Mode > DSCP Mapping. The DSCP Mapping Page opens:

2. Define the relevant fields.

3. Click Logout. The DSCP settings are modified, and the device is updated.
Defining Class Mapping

The Class Mapping Page contains parameters for defining class maps. One IP ACL and/or one MAC ACL comprise a class map. Class maps are configured to match packet criteria, and are matched to packets on a first-fit basis. For example, Class Map A is assigned to packets based only on an IP-based ACL or a MAC-based ACL. Class Map B is assigned to packets based on both an IP-based and a MAC-based ACL.

1. Click Quality of Service > Advanced Mode > Class Mapping. The Class Mapping Page opens:

Class Mapping Page

2. Click the Add button. The Add QoS Class Map Page opens:

Add QoS Class Map Page

3. Define the relevant fields.

4. Click Apply. QoS mapping is added, and the device is updated.
Defining Aggregate Policer

A policy is a collection of classes, each of which is a combination of a class map and a QoS action to apply to matching traffic. Classes are applied in a first-fit manner within a policy.

Before configuring policies for classes whose match criteria are defined in a class map, a class map must first be defined, or the name of the policy map to be created, added to, or modified must first be specified. Class policies can be configured in a policy map only if the classes have defined match criteria.

An aggregate policer can be applied to multiple classes in the same policy map, but an aggregate policer cannot be used across different policy maps. Define an aggregate policer if the policer is shared with multiple classes. Policers in one port cannot be shared with other policers in another device. Traffic from two different ports can be aggregated for policing purposes.

1. Click Quality of Service > Advanced Mode > Aggregate Policer. The Aggregate Policer Page opens:

2. Click the Add button. The Add QoS Aggregate Policer Page opens:
Add QoS Aggregate Policer Page

3. Define the relevant fields.
4. Click Apply. The Aggregate policer is added, and the device is updated.

Modifying QoS Aggregate Policer

1. Click Quality of Service > Advanced > Aggregate Policer. The Aggregate Policer Page opens:
2. Click the Edit Button. The Edit QoS Aggregate Policer Page opens:

3. Modify the relevant fields.
4. Click Apply. QoS aggregate policer settings are modified, and the device is updated.
Configuring Policy Table

In the Policy Table Page, QoS policies are set up and assigned to interfaces.

1. Click Quality of Service > Advanced > Policy Table. The Policy Table Page opens:

   ![Policy Table Page]

2. Click the Add button. The Add QoS Policy Profile Page opens:

   ![Add QoS Policy Profile Page]

   Add a QoS policy profile.

3. Click Apply. The QoS policy profile is added, and the device is updated.
Modifying the QoS Policy Profile

1. Click **Quality of Service > Advanced > QoS Policy Profile**. The *Edit QoS Aggregate Policer Page* opens:

   ![Edit QoS Policy Profile Page](image)

2. Define the relevant fields.

3. Click **Apply**. The QoS policy profile is defined, and the device is updated.
Defining Policy Binding

In the Policy Binding Page, QoS policies are associated with specific interfaces.

1. Click Quality of Service > Advanced > Policy Binding. The Policy Binding Page opens:

   ![Policy Binding Page](image)

   1. Click the Add button. The Add QoS Policy Binding Page opens:

      ![Add QoS Policy Binding Page](image)

   2. Define the relevant fields.

   3. Click Apply. The QoS Policy Binding is defined, and the device is updated.
Modifying QoS Policy Binding Settings

1. Click Quality of Service > Advanced > Policy Binding. The Policy Binding Page opens:

2. Click the Edit button. The Edit QoS Policy Binding Page opens:

   Edit QoS Policy Binding Page

3. Define the relevant fields.

4. Click Apply. The QoS policy binding is defined, and the device is updated.

Defining QoS Basic Mode

The Basic Mode Page contains information for enabling Trust on the device. Packets entering a QoS domain are classified at the edge of the QoS domain.

1. Click Quality of Service > Basic Mode. The Basic Mode Page opens:

   Basic Mode Page

   In the DSCP Mapping Page, define the Differentiated Services Code Point (DSCP) tag to use in place of the incoming DSCP tags.

2. Click the DSCP Rewrite button. The DSCP Mapping Page opens:
3. Define the DSCP mappings.

4. Click **Apply**. The DSCP mappings are defined, and the device is updated.
Managing System Files

The Managing System Files section contains the following sections:

- File Management
- Logs
- Diagnostics

File Management Overview

The configuration file structure consists of the following configuration files:

- Startup Configuration File — Contains the commands required to reconfigure the device to the same settings as when the device is powered down or rebooted. The Startup file is created by copying the configuration commands from the Running Configuration file or the Backup Configuration file.

- Running Configuration File — Contains all configuration file commands, as well as all commands entered during the current session. After the device is powered down or rebooted, all commands stored in the Running Configuration file are lost. During the startup process, all commands in the Startup file are copied to the Running Configuration File and applied to the device. During the session, all new commands entered are added to the commands existing in the Running Configuration file. Commands are not overwritten. To update the Startup file, before powering down the device, the Running Configuration file must be copied to the Startup Configuration file. The next time the device is restarted, the commands are copied back into the Running Configuration file from the Startup Configuration file.

- Backup Configuration File — Contains a backup copy of the device configuration. The Backup file is generated when the Running Configuration file or the Startup file is copied to the Backup file. The commands copied into the file replaces the existing commands saved in the Backup file. The Backup file contents can be copied to either the Running configuration or the Startup Configuration files.

- Image files — Software upgrades are used when a new version file is downloaded. The file is checked for the right format, and that it is

This section contains information for defining File maintenance and includes both configuration file management as well as device access.
File Management

The File Management section contains the following pages:

- Firmware Upgrade
- Save Configuration
- Copy Files
- Active Image

Firmware Upgrade

Firmware files are downloaded as required for upgrading the firmware version or for backing up the system configuration. File names cannot contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for file names on the TFTP server is 127 characters or 31 characters for files on the switch. (Valid characters: A-Z, a-z, 0-9, ".", ",", ",")

The Firmware Upgrade Page contains parameters for downloading system files.

1. Click Admin > File Management > Firmware Upgrade. The Firmware Upgrade Page opens:

   Firmware Upgrade Page

2. Define the relevant fields.

3. Click Apply. Firmware upgrade is defined, and the device is updated.
Save Configuration

The configuration files control the operation of the switch, and contain the functional settings at the device and the port level. Configuration files are one of the following types:

- **Factory Default** — Contains preset default parameter definitions which are downloaded with a new or upgraded version.

- **Running Configuration** — Contains the parameter definitions currently defined on the device. This includes any configuration changes made since the device was started or rebooted. When the device shuts down or reboots the next time, this configuration becomes the Starting Configuration.

- **Starting configuration** — Contains the parameter definitions which were valid in the Running Configuration when the system last rebooted or shut down.

- **Backup configuration** — Contains a copy of the system configuration for protection against system shutdown, or for maintenance of a specific operating state.

File names cannot contain slashes (\ or /), the leading letter of the file name should not be a period (.), and the maximum length for file names on the TFTP server is 127 characters or 31 characters for files on the switch. (Valid characters: A-Z, a-z, 0-9, ",", ",", ","). In the Save Configuration Page, define the parameters of the system configuration files.

1. Click Admin > File Management > Save Configuration. The Save Configuration Page opens:

   ![Save Configuration Page](image)

2. Define the relevant files.

3. Click Apply. The save configuration is defined, and the device is updated.
Copy Files

In the Copy Files Page, network administrators can copy configuration files from one device to another.

1. Click Admin > File Management > Copy Files. The Copy Files Page opens:

   ![Copy Files Page](image)

2. Define the relevant fields.

3. Click Apply. Copy Files is configured, and the device is updated.
Active Image

The Active Image Page allows network managers to select the Image files.

1. Click Admin > File Management > Active Image. The Active Image Page opens:

   Active Image Page

2. Define the relevant fields.

3. Click Apply. Active image is define, and the device is updated.
Managing System Logs

The System Logs enable viewing device events in real time, and recording the events for later usage. System Logs record and manage events and report errors or informational messages.

Event messages have a unique format, as per the SYSLOG protocols recommended message format for all error reporting. For example, Syslog and local device reporting messages are assigned a severity code, and include a message mnemonic, which identifies the source application generating the message. It allows messages to be filtered based on their urgency or relevancy. Each message severity determines the set of event logging devices that are sent per each event logging.

This section contains the following pages:

- Enabling System Logs
- Viewing the Device MemoryLogs
- Viewing the Flash Logs
- Viewing Remote Logs

Enabling System Logs

In the Log Settings Page, define the levels of event severity that are recorded to the system event logs.

The event severity levels are listed on this page in descending order from the highest severity to the lowest. When a severity level is selected to appear in a log, all higher severity events will automatically be selected to appear in the log. Conversely, when a security level is not selected, no lower severity events will appear in the log.

For example, if Warning is selected, all severity levels higher and including Warning will appear in the log. Additionally, no events with a lower severity level than Warning will be listed.
To define Log Global Parameters:

1. Click **Admin > Logs > Logs Settings**. The *Log Settings Page* opens.

2. Define the relevant fields.

3. Click **Apply**. The global log parameters are set, and the device is updated.
Viewing the Device Memory Logs

The Memory Page contains all system log entries in chronological order that are saved in RAM (Cache). After restart, these log entries are deleted.

To open the Memory Page:

1. Click Admin > Logs > Memory. The Memory Page opens.

   Memory Page

2. Observe the log files and look for any pertinent information.

Clearing Message Logs

Message Logs can be cleared from the Memory Page. To clear the Memory Page:

1. Click Admin > Logs > Memory. The Memory Page opens.

2. Click the Clear Logs button. The message logs are cleared.
Viewing the Flash Logs

The Flash Page contains information about log entries saved to the Log File in FLASH, including the time the log was generated, the event severity, and a description of the log message. The Message Log is available after reboot.

To view the Flash Logs:

1. Click **Admin > Logs > Flash**. The Flash Page opens:

   ![Flash Page](image)

   2. Observe the log files and look for any pertinent information.

Clearing Message Logs

Message Logs can be cleared from the FLASH Log Page. To clear the Flash Page:

1. Click **Admin > Logs > FLASH**. The Flash Page opens.

2. Click **Clear Logs**. The message logs are cleared.
Viewing Remote Logs

The Remote Log Servers Page contains information for viewing and configuring the Remote Log Servers. New log servers and the minimum severity level of events sent to them may be added.

1. Click Admin > Logs > Remote Log Servers. The Remote Log Servers Page opens:

   Remote Log Servers Page

2. Click the Add button. The Add Syslog Server Page opens:

   Add Syslog Server Page


3. Define the relevant fields.

4. Click Apply. The Add Syslog Server Page closes, the syslog server is added, and the device is updated.
Modify Syslog Server Settings

1. Click **Admin > Logs > Remote Log Servers**. The **Remote Log Servers Page** opens:

2. Click the **Edit** button. The **Edit Syslog Server Page** opens:

   ![Edit Syslog Server Page](image)

   The **Edit Syslog Server Page** contains fields for modifying Remote Log Server settings.

3. Define the relevant fields.

4. Click **Apply**. The Syslog Server settings are modified, and the device is updated.
Configuring System Time

The device supports the Simple Network Time Protocol (SNTP). SNTP assures accurate network device clock time synchronization up to the millisecond. Time synchronization is performed by a network SNTP server. The device operates only as an SNTP client, and cannot provide time services to other systems.

This section provides information for configuring the system time, and includes the following topics:

- Defining System Time
- Defining SNTP Settings
- Defining SNTP Authentication

Defining System Time

The System Time Page contains fields for defining system time parameters for both the local hardware clock, and the external SNTP clock. If the system time is kept using an external SNTP clock, and the external SNTP clock fails, the system time reverts to the local hardware clock. Daylight Savings Time can be enabled on the device. To define system time:

1. Click System > System Management > Time > System Time. The System Time Page opens:

2. Define the relevant fields.
3. Click Apply. The Time Settings are defined, and the device is updated.
Defining SNTP Settings

The SNTP Settings Page contains information for enabling SNTP servers, as well as adding new SNTP servers. In addition, the SNTP Settings Page enables the device to request and accept SNTP traffic from a server.

To define SNTP global settings:

1. Click System > System Management > Time > SNTP Settings. The SNTP Settings Page opens:

   ![SNTP Settings Page](image)

2. Click the Add button. The Add SNTP Server Page opens:

   ![Add SNTP Server Page](image)

3. Define the relevant fields.
4. Click Apply. The SNTP Server is added, and the device is updated.
Defining SNTP Authentication

The SNTP Authentication Page provides parameters for performing authentication of the SNTP server.

1. Click System > System Management > Time > SNTP Authentication. The SNTP Authentication Page opens:

![SNTP Authentication Page]

2. Click the Add button. The Add SNTP Authentication Page opens:

![Add SNTP Authentication Page]

3. Define the relevant fields.

4. Click Apply. The SNTP Authentication is defined, and the device is updated.
Viewing Statistics

This section describes device statistics for RMON, interfaces, GVRP, EAP, and Etherlike statistics. This section contains the following topics:

- Viewing Ethernet Statistics
- Managing RMON Statistics

Viewing Ethernet Statistics

The Ethernet section contains the following pages:

- Defining Ethernet Interface
- Viewing Etherlike Statistics
- Viewing GVRP Statistics
- Viewing EAP Statistics

Defining Ethernet Interface

The Interface Page contains statistics for both received and transmitted packets. The Interface Page is divided into three areas, General Information, Receive Statistics and Transmit Statistics.

1. Click Statistics > Ethernet > Interface. The Interface Page opens:

   ![Interface Page]

2. Click the appropriate radio buttons and pulldowns to select an interface.
Resetting Interface Statistics Counters

1. Click Statistics > Ethernet > Interface. The Interface Page opens:

2. Click the Clear Counters button. The interface statistics counters are cleared.

Viewing Etherlike Statistics

The Etherlike Page contains interface statistics.

To view Etherlike Statistics:

1. Click Statistics > Ethernet > Etherlike. The Etherlike Page opens:

   Etherlike Page

2. Click the appropriate radio buttons and pulldowns to select an interface.

Resetting Etherlike Statistics Counters

1. Click Statistics > Ethernet > Etherlike. The Etherlike Page opens:

2. Click the Clear Counters button. The interface statistics counters are cleared.
Viewing GVRP Statistics

The GVRP Page contains statistics for GVRP communication on the device.

To view GVRP statistics:


2. Click the appropriate radio buttons and pulldowns to select an interface.

Resetting GVRP Statistics Counters


2. Click Clear Counters. The GVRP statistics counters are cleared.
Viewing EAP Statistics

The *EAP Page* contains information about EAP packets received on a specific port.

To view the EAP Statistics:

1. Click **Statistics > Ethernet > EAP Statistics**. The *EAP Page* opens.

2. Click the appropriate pulldowns to select an interface.
Managing RMON Statistics

The RMON section contains the following pages:

- Viewing RMON Statistics
- Configuring RMON History
- Configuring RMON Events
- Viewing the RMON Events Logs

Viewing RMON Statistics

The RMON Statistics Page contains fields for viewing information about device utilization and errors that occurred on the device.

To view the RMON statistics:

1. Click Statistics > RMON > Statistics. The RMON Statistics Page opens:

   ![RMON Statistics Page]

   2. Select an interface in the Interface field. The RMON statistics are displayed.

Resetting RMON Statistics Counters

1. Click Statistics > RMON > Statistics. The RMON Statistics Page opens:
2. Click the Reset Counters button. The RMON statistics counters are cleared.
Configuring RMON History

This section contains the following topics:

- Defining RMON History Control
- Viewing the RMON History Table

Defining RMON History Control

The RMON History Control Page contains information about samples of data taken from ports. For example, the samples may include interface definitions or polling periods. To view RMON history information:

1. Click **Statistics > RMON > History**. The RMON History Control Page opens.

   ![RMON History Control Page](image)

2. Click the **Add** button. The Add RMON History Page opens:

   ![Add RMON History Page](image)

3. Define the relevant fields.
4. Click **Apply**. The entry is added to the **RMON History Control Page**, and the device is updated.

### Modify History Control Settings

1. Click **Statistics > RMON > History**. The **RMON History Control Page** opens.

2. Click the **Edit** button. The **Edit RMON History Page** opens:

   ![Edit RMON History Page](image)

   - **Edit RMON History Page**

3. Define the relevant fields.

4. Click **Apply**. The history control settings are defined, and the device is updated.

### Viewing the RMON History Table

The **RMON History Table Page** contains interface specific statistical network samplings. Each table entry represents all counter values compiled during a single sample.

1. Click **Statistics > RMON > History**. The **RMON History Control Page** opens:

2. Click the **History Table** button. The **RMON History Table Page** opens:
3. To return to the RMON History Control Page, click the Interface Table button.

**Configuring RMON Events**

This section includes the following topics:

- Defining RMON Events Control
- Viewing the RMON Events Logs

**Defining RMON Events Control**

The RMON Events Page contains fields for defining RMON events.

To view RMON events:

1. Click Statistics > RMON > Events. The RMON Events Page opens:
2. Click the Add button. The Add RMON Events Page opens:

Add RMON Events Page

3. Define the relevant fields.

4. Click Apply. The RMON event is added, and the device is updated.

Modify Event Control Settings

1. Click Statistics > RMON > Events. The RMON Events Page opens:

2. Click Edit. The Edit RMON Events Page opens:
3. Define the relevant fields.

4. Click Apply. The event control settings are modified, and the device is updated.

**Viewing the RMON Events Logs**

The RMON Events Log Page contains a list of RMON events.

1. Click Statistics > RMON > Events. The Events Log Page opens:

2. Click the Events Log button. The Events Log Page opens:

3. To return to the RMON Events Page, click the RMON Events Control button.

**Defining RMON Alarms**

The RMON Alarms Page contains fields for setting network alarms. Network alarms occur when a network problem, or event, is detected. Rising and falling thresholds generate events.

To set RMON alarms:
1. Click **Statistics** > **RMON** > **Alarms**. The **RMON Alarms Page** opens:

![RMON Alarms Page](image)

2. Click the **Add** button. The Add RMON Alarm Page opens:

![Add RMON Alarm Page](image)

3. Define the relevant fields.

4. Click **Apply**. The RMON alarm is added, and the device is updated.
Modify RMON Alarm Settings

1. Click Statistics > RMON > Alarms. The RMON Alarms Page opens:

2. Click the Edit Button. The Edit RMON Alarms Page opens:

   **Edit RMON Alarms Page**

   ![Edit RMON Alarms Page](image)

   - **Alarm Entry**: 1
   - **Interface**: Port 1
   - **Counter Name**: Total Bytes (Octets): Receive
   - **Counter Value**: 0
   - **Sample Type**: Absolute
   - **Rising Threshold**: 100
   - **Rising Event**: 1 - Default Description
   - **Falling Threshold**: 20
   - **Falling Event**: 1 - Default Description
   - **Startup Alarm**: Rising and Falling
   - **Interval (Sec)**: 100
   - **Owner**: 

3. Define the relevant fields.

4. Click Apply. The RMON alarms are modified, and the device is updated.
Managing Device Diagnostics

This section contains information for configuring port mirroring, running cable tests, and viewing device operational information, and includes the following topics:

- Viewing Integrated Cable Tests
- Performing Optical Tests
- Configuring Port Mirroring
- Defining CPU Utilization

Viewing Integrated Cable Tests

The Copper Ports Page contains fields for performing tests on copper cables. Cable testing provides information about where errors occurred in the cable, the last time a cable test was performed, and the type of cable error that occurred. The tests use Time Domain Reflectometry (TDR) technology to test the quality and characteristics of a copper cable attached to a port. Cables up to 100 meters long can be tested. Cables are tested when the ports are in the down state, with the exception of the Approximated Cable Length test.

To test cables:

1. Click Admin > Diagnostics > Copper Ports. The Copper Ports Page opens:

2. Click the Test button to run the cable test. The results of the test appear.
Performing Optical Tests

The Optical Test Page allows network managers to perform tests on Fiber Optic cables. Optical transceiver diagnostics can be performed only when the link is present. During the port test, the port moves to a down state.

1. Click Admin > Diagnostics > Optical Test. The Optical Tests Page opens:

   **Optical Test Page**

2. Observe the output for any discrepancies.
Configuring Port Mirroring

Port Mirroring monitors and mirrors network traffic by forwarding copies of incoming and outgoing packets from one port to a monitoring port. Port mirroring can be used as diagnostic tool and/or a debugging feature. Port mirroring also enables switch performance monitoring.

Network administrators configure port mirroring by selecting a specific port to copy all packets, and different ports from which the packets are copied.

To enable port mirroring:

1. Click Admin > Diagnostics > Port Mirroring. The Port Mirroring Page opens:

   ![Port Mirroring Page](image1)

2. Click the Add button. The Add Port Mirroring Page opens:

   ![Add Port Mirroring Page](image2)

3. Define the relevant fields.

4. Click Apply. Port mirroring is added, and the device is updated.
Modifying Port Mirroring

1. Click Admin > Diagnostics > Port Mirroring. The Port Mirroring Page opens:

2. Click the Edit Button. The Edit Port Mirroring Page opens:

   **Edit Port Mirroring Page**
   
   ![Edit Port Mirroring Page]

3. Define the relevant fields.

4. Click Apply. The Port mirroring is modified, and the device is updated.

Defining CPU Utilization

The CPU Utilization Page contains information about the system’s CPU utilization.


   **CPU Utilization Page**
   
   ![CPU Utilization Page]

2. Click the appropriate pulldowns and observe the output.
Console Interface Configuration

Overview

The SFE1000P features a menu-driven console interface for basic configuration of the Switch and management of your network. The Switch can be configured using CLI through the console interface or through a telnet connection. This chapter describes console interface configuration. Configuration can also be performed through the web utility.

Configuring the HyperTerminal Application

Before you use the console interface, you will need to configure the HyperTerminal application on your PC.

1. Click the Start button. Select Programs and choose Accessories. Select Communications. Select HyperTerminal from the options listed in this menu.
2. On the Connection Description screen, enter a name for this connection. In the example, the name of connection is SFE1000P. Select an icon for the application. Then, click the OK button.

3. On the Connect To screen, select a port to communicate with the Switch: COM1, COM3, or TCP/IP.
4. Set the serial port settings as follows:

   Bits per second: **38400**
   
   Data bits: **8**
   
   Parity: **None**
   
   Stop bits: **1**
   
   Flow control: **None**

   ![Serial Port Settings](image)

   **Serial Port Settings**

   Then, click the **OK** button.
Connecting to the SFE1000P through a Telnet Session

1. Open a command line editor and enter `telnet <ip address of the device>`. Then, press the Enter key.

2. The Login screen will now appear. The first time you open the command line interface, select Edit and hit Enter. Enter `admin` in the User Name field. Leave the Password field blank.

3. Press the Esc button and you will return to the login screen. Use the right arrow button to navigate to Execute and press the Enter button to enter the CLI interface.
Contacts

For additional information or troubleshooting help, refer to the User Guide on the CD-ROM. Additional support is also available by phone or online.

US/Canada Contacts

- 24-Hour Technical Support: 800-326-7114
- Website: http://www.linksys.com
- Support: http://www.linksys.com/support
- Sales Information: 800-546-5797 (800-LINKSYS)

EU Contacts

- Website: http://www.linksys.com/international
- Product Registration: http://www.linksys.com/registration
Warranty Information

LIMITED WARRANTY

Linksys warrants this Linksys hardware product against defects in materials and workmanship under normal use for the Warranty Period, which begins on the date of purchase by the original end-user purchaser and lasts for the period specified for this product at www.linksys.com/warranty. The internet URL address and the web pages referred to herein may be updated by Linksys from time to time; the version in effect at the date of purchase shall apply.

This limited warranty is non-transferable and extends only to the original end-user purchaser. Your exclusive remedy and Linksys entire liability under this limited warranty will be for Linksys, at its option, to (a) repair the product with new or refurbished parts, (b) replace the product with a reasonably available equivalent new or refurbished Linksys product, or (c) refund the purchase price of the product less any rebates. Any repaired or replacement products will be warranted for the remainder of the original Warranty Period or thirty (30) days, whichever is longer. All products and parts that are replaced become the property of Linksys.

Exclusions and Limitations

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LIMITED TO THE DURATION OF THE WARRANTY PERIOD. ALL OTHER EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF NON-INFRINGEMENT, ARE DISCLAIMED. Some jurisdictions do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you. This limited warranty gives you specific legal rights, and you may also have other rights which vary by jurisdiction.

TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL LINKSYS BE LIABLE FOR ANY LOST DATA, REVENUE OR PROFIT, OR FOR SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, REGARDLESS OF THE THEORY OF LIABILITY (INCLUDING NEGLIGENCE), ARISING OUT OF OR RELATED TO THE USE OF OR INABILITY TO USE THE PRODUCT (INCLUDING ANY SOFTWARE), EVEN IF LINKSYS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL LINKSYS' LIABILITY EXCEED THE AMOUNT PAID BY YOU FOR THE PRODUCT. The foregoing limitations will apply even if any warranty or remedy provided under this limited warranty fails of its essential purpose. Some jurisdictions do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

**Obtaining Warranty Service**

If you have a question about your product or experience a problem with it, please go to www.linksys.com/support where you will find a variety of online support tools and information to assist you with your product. If the product proves defective during the Warranty Period, contact the Value Added Reseller (VAR) from whom you purchased the product or Linksys Technical Support for instructions on how to obtain warranty service. The telephone number for Linksys Technical Support in your area can be found in the product User Guide and at www.linksys.com. Have your product serial number and proof of purchase on hand when calling. A DATED PROOF OF ORIGINAL PURCHASE IS REQUIRED TO PROCESS WARRANTY CLAIMS. If you are requested to return your product, you will be given a Return Materials Authorization (RMA) number. You are responsible for properly packaging and shipping your product to Linksys at your cost and risk. You must include the RMA number and a copy of your dated proof of original purchase when returning your product. Products received without a RMA number and dated proof of original purchase will be rejected. Do not include any other items with the product you are returning to Linksys. Defective product covered by this limited warranty will be repaired or replaced and returned to you without charge. Customers outside of the United States of America and Canada are responsible for all shipping and handling charges, custom duties, VAT and other associated taxes and charges. Repairs or replacements not covered under this limited warranty will be subject to charge at Linksys' then-current rates.
Technical Support

This limited warranty is neither a service nor a support contract. Information about Linksys’ current technical support offerings and policies (including any fees for support services) can be found at: www.linksys.com/support. This limited warranty is governed by the laws of the jurisdiction in which the Product was purchased by you. Please direct all inquiries to: Linksys, P.O. Box 18558, Irvine, CA 92623
Regulatory Information

This appendix includes the following regulatory statements:

- “Federal Communications Commission Interference Statement,” on page 152
- “Industry Canada Statement,” on page 152
- “Règlement d’Industry Canada,” on page 153
- “EC Declaration of Conformity (Europe),” on page 153

Federal Communications Commission Interference Statement

This product has been tested and complies with the specifications 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 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

Industry Canada Statement

This device complies with Industry Canada ICES-003 rule. Operation is subject to the following two conditions:

This device may not cause interference and
This device must accept any interference, including interference that may cause undesired operation of the device.
Règlement d’Industry Canada

Cet appareil est conforme à la norme NMB003 d’Industrie Canada.

Le fonctionnement est soumis aux conditions suivantes :

• Ce périphérique ne doit pas causer d’interférences;

• Ce périphérique doit accepter toutes les interférences reçues, y compris celles qui risquent d’entraîner un fonctionnement indésirable.

EC Declaration of Conformity (Europe)

In compliance with the EMC Directive 89/336/EEC, Low Voltage Directive 73/23/EEC, and Amendment Directive 93/68/EEC, this product meets the requirements of the following standards:

• EN55022 Emission

• EN55024 Immunity

The following acknowledgements pertain to this software license.


This document contains important information for users with regards to the proper disposal and recycling of Linksys products. Consumers are required to comply with this notice for all electronic products bearing the following symbol:

English - Environmental Information for Customers in the European Union
European Directive 2002/96/EC requires that the equipment bearing this symbol on the product and/or its packaging must not be disposed of with unsorted municipal waste. The symbol indicates that this product should be disposed of separately from regular household waste streams. It is your responsibility to dispose of this and other electric and electronic equipment via designated collection facilities appointed by the government or local authorities. Correct disposal and recycling will help prevent potential negative consequences to the environment and human health. For more detailed information about the disposal of your old equipment, please contact your local authorities, waste disposal service, or the shop where you purchased the product.

Български (Bulgarian) - Информация относно опазването на околната среда за потребители в Европейския съюз
Европейска директива 2002/96/EC изисква уредите, носещи този символ върху изделието и/или опаковката му, да не се изхвърлят с несортирани битови отпадъци. Символът обозначава, че изделието трябва да се изхвърля отделно от сместосъбирането на обикновените битови отпадъци. Ваша е отговорността този и другите електрически и електронни уреди да се изхвърлят в предварително определени от държавните или общинските органи специализирани пунктове за събиране. Правилното изхвърляне и рециклиране ще спомогнат да се предотвратят евентуални вредни за околната среда и здравето на населението последствия. За по-подробна информация относно изхвърлянето на вашите стари уреди се обърнете към местните власти, службите за сместосъбиране или магазина, от който сте закупили уреда.

Ceština (Czech) - Informace o ochraně _ivotního prostøedí pro zákazníky v zemích Evropské unie

Dansk (Danish) - Miljøinformation for kunder i EU
Deutsch (German) - Umweltinformation für Kunden innerhalb der Europäischen Union


Wenn Sie weitere Informationen zur Entsorgung Ihrer Altgeräte benötigen, wenden Sie sich bitte an die örtlichen Behörden oder städtischen Entsorgungsdienste oder an den Händler, bei dem Sie das Produkt erworben haben.

Eesti (Estonian) - Keskkonnaalane informatsioon Euroopa Liidus asuvatele klientidele


Español (Spanish) - Información medioambiental para clientes de la Unión Europea

La Directiva 2002/96/CE de la UE exige que los equipos que lleven este símbolo en el propio aparato y/o en su embalaje no deben eliminarse junto con otros residuos urbanos no seleccionados. El símbolo indica que el producto en cuestión debe separarse de los residuos domésticos convencionales con vistas a su eliminación. Es responsabilidad suya desechar este y cualesquiera otros aparatos eléctricos y electrónicos a través de los puntos de recogida que ponen a su disposición el gobierno y las autoridades locales. Al desechar y reciclar correctamente estos aparatos estará contribuyendo a evitar posibles consecuencias negativas para el medio ambiente y la salud de las personas. Si desea obtener información más detallada sobre la eliminación segura de su aparato usado, consulte a las autoridades locales, al servicio de recogida y eliminación de residuos de su zona o pregunte en la tienda donde adquirió el producto.
Français (French) - Informations environnementales pour les clients de l’Union européenne

La directive européenne 2002/96/CE exige que l’equipement sur lequel est apposé ce symbole sur le produit et/ou son emballage ne soit pas jeté avec les autres ordures ménagères. Ce symbole indique que le produit doit être éliminé dans un circuit distinct de celui pour les déchets des ménages. Il est de votre responsabilité de jeter ce matériel ainsi que tout autre matériel électrique ou electronique par les moyens de collecte indiqués par le gouvernement et les pouvoirs publics des collectivités territoriales. L’élimination et le recyclage en bonne et due forme ont pour but de lutter contre l’impact néfaste potentiel de ce type de produits sur l’environnement et la santé publique. Pour plus d’informations sur le mode d’élimination de votre ancien équipement, veuillez prendre contact avec les pouvoirs publics locaux, le service de traitement des déchets, ou l’endroit où vous avez acheté le produit.

Italiano (Italian) - Informazioni relative all’ambiente per i clienti residenti nell’Unione Europea

La direttiva europea 2002/96/EC richiede che le apparecchiature contrassegnate con questo simbolo sul prodotto e/o sull’imballaggio non siano smaltite insieme ai rifiuti urbani non differenziati. Il simbolo indica che questo prodotto non deve essere smaltito insieme ai normali rifiuti domestici. È responsabilità del proprietario smaltire sia questi prodotti sia le altre apparecchiature elettriche ed elettroniche mediante le specifiche strutture di raccolta indicate dal governo o dagli enti pubblici locali. Il corretto smaltimento ed il riciclaggio aiuteranno a prevenire conseguenze potenzialmente negative per l’ambiente e per la salute dell’essere umano. Per ricevere informazioni più dettagliate circa lo smaltimento delle vecchie apparecchiature in Vostro possesso, Vi invitiamo a contattare gli enti pubblici di competenza, il servizio di smaltimento rifiuti o il negozio nel quale avete acquistato il prodotto.
Appendix D:
User Information for Consumer Products Covered by EU

Latviešu valoda (Latvian) - Ekoloģiska informācija klientiem Eiropas Savienības jurisdikcijā

Direktīvā 2002/96/EEK ir prasība, ka aprīkojumu, kam pievienota zīme uz paša izstrādājuma vai uz tā iesainojuma, nedrīkst izmest nešķirātā viedā kopā ar komunālajiem atkritumiem (tiem, ko rada vietēji iedzīvotāji un uzņēmumi). Šī zīme nozīmē to, ka šī ierīce ir jāatkrita atskarāt pārstrādājot savākšanas veidus un lidzekļus, ko nodrošina valsts un pašvaldību iestādes. Ja izmēsāma atkritumos un pārstrāde tiek veikta pareizi, tad mazinās iespējams kaitējums dabai un cilvēku veselībai. Daugiaus įvairaus informacijos apie šiuos termošanas veidus gali pateikti vietinės valdības atkritumu savākšanas dienastās vai veikalu, kur iegādājāties šo izstrādājumu.

Lietuviškai (Lithuanian) - Aplinkosaugos informacija, skirta Europos Sąjungos vartotojams

Europos direktyva 2002/96/EC numato, kad įrangos, kuri ir kuriuos pakuočius yra pažymėta šiuo simboliu (iveskite simbolį), negalima šalinti kartu su nerūšiuotomis komunalinėmis atliekomis. Šis simbolis rodo, kad įrankį reikia atskirti nuo bendrų buitinės atliekos. Jūs privalote užtikrinti, kad šį įrankį ir kita elektros ar elektroninė įranga būtų šalinama per tam tikras nacionalinės ar vietinės valdžios nustatytas atliekos rinkimo sistemas. Tinkamai šalinant įrangą perdirbant atliekas, bus išvengta galimos žalos aplinkai ir žmonių sveikatai. Daugiau informacijos apie jūsų senos įrangos šalinimą gali pateikti vietinės valdžios institucijos, atliekos šalinimo tarnybos arba parduotuvės, kuriose įsigijote šį įrankį.

Magyar (Hungarian) - Környezetvédelmi információ az európai uniós vásárlók számára

A 2002/96/EK számú európai uniós irányelv megkívánja, hogy azokat a termékeket, amelyeken, és/vagy amelyek csoportosításán az alábbi címke megjelenik, tilos a többi szelektálatlan lakossági hulladékkal együtt kidobni. A címke azt jelenti, hogy az adott termék kidobásakor a szokványos háztartási hulladékszállítási rendszerekből elkölönített eljárást kell alkalmazni. Az Ön felelőssége, hogy ezt, és más elektromos és elektronikus berendezéseit a kormányzati vagy a helyi hatóságok által kijelölt gyűjtőhelyeken keresztül számlálja fel. A megfelelő hulladékfeldolgozás segít a környezetre és az emberi egészségre potenciálisan ártalmas negatív hatások megelőzésében. Ha elavult berendezéseinek felszámolásához további részletes információra van szüksége, kérjük, lépjen kapcsolatba a helyi hatóságokkal, a hulladékfeldolgozási szolgálattal, vagy azzal üzlettel, ahol a terméket vásárolta.
Nederlands (Dutch) - Milieu-informatie voor klanten in de Europese Unie

De Europese Richtlijn 2002/96/EC schrijft voor dat apparatuur die is voorzien van dit symbool op het product of de verpakking, niet mag worden ingezameld met niet-gescheiden huishoudelijk afval. Dit symbool geeft aan dat het product apart moet worden ingezameld. U bent zelf verantwoordelijk voor de vernietiging van deze en andere elektrische en elektronische apparatuur via de daarvoor door de landelijke of plaatselijke overheid aangewezen inzamelingskanalen. De juiste vernietiging en recycling van deze apparatuur voorkomt mogelijke negatieve gevolgen voor het milieu en de gezondheid. Voor meer informatie over het vernietigen van uw oude apparatuur neemt u contact op met de plaatselijke autoriteiten of afvalverwerkingsdienst, of met de winkel waar u het product hebt aangeschaft.

Norsk (Norwegian) - Miljøinformasjon for kunder i EU


Polski (Polish) - Informacja dla klientów w Unii Europejskiej o przepisach dotyczących ochrony środowiska

Dyrektwa Europejska 2002/96/EC wymaga, aby sprzęt oznaczony symbolem znajdującym się na produkcie i/lub jego opakowaniu nie był wyrzucany razem z innymi niesortowanymi odpadami komunalnymi. Symbol ten wskazuje, że produkt nie powinien być usuwany razem ze zwykłymi odpadami z gospodarstw domowych. Na Państwu spoczywa obowiązek wyrzucania tego i innych urządzeń elektrycznych oraz elektronicznych w punktach odbioru wyznaczonych przez władze krajowe lub lokalne. Pozbywanie się sprzętu we właściwym sposób i jego recykling pomogą zapobiec potencjalnie negatywnym konsekwencjom dla środowiska i zdrowia ludzkiego. W celu uzyskania szczegółowych informacji o usuwaniu starego sprzętu, prosimy zwrócić się do lokalnych władz, służb oczyszczania miasta lub sklepu, w którym produkt został nabyty.

Português (Portuguese) - Informação ambiental para clientes da União Europeia

A Directiva Europeia 2002/96/CE exige que o equipamento que exibe este símbolo no produto e/ou na sua embalagem não seja eliminado junto com os resíduos municipais não separados. O símbolo indica que este produto deve ser eliminado separadamente dos resíduos domésticos regulares. É da sua responsabilidade eliminar este e qualquer outro equipamento elétrico e electrónico através das instalações de recolha designadas pelas autoridades governamentais ou locais. A eliminação e reciclagem correctas ajudarão a prevenir as consequências negativas para o ambiente e para a saúde humana. Para obter informações mais detalhadas sobre a forma de eliminar o seu equipamento antigo, contacte
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Română (Romanian) - Informații de mediu pentru clienții din Uniunea Europeană


Slovenčina (Slovak) - Informácie o ochrane životného prostredia pre zákazníkov v Európskej únii

Podľa európskej smernice 2002/96/ES zariadenie s týmto symbolom na produkte a/alebo jeho balení nesmie byť likvidované spolu s netriedeným komunálnym odpadom. Symbol znamená, že produkt by sa mal likvidovať oddelene od bežného odpadu z domácností. Je vašou povinnosťou likvidovať toto i ostatné elektrické a elektronické zariadenia prostredníctvom špecializovaných zbarných zariadení určených vládou alebo miestnymi orgánmi. Správna likvidácia a recyklácia pomôže zabrániť prípadným negatívnym dopadom na životné prostredie a zdravie lúd. Ak máte záujem o podrobnšie informácie o likvidácii starého zariadenia, obráťte sa, prosím, na miestne orgány, organizácie zaoborávajúce sa likvidáciou odpadov alebo obchod, v ktorom ste si produkt zakúpili.

Slovenèina (Slovene) - Okoljske informacije za stranke v Evropski uniji

Evropska direktiva 2002/96/EC prepoveduje odlaganje opreme, označene s tem simbolom na izdelku in/ali na embalaži – med običajne, nerazvrščene odpadke. Ta simbol opozarja, da je treba izdelek odvreči lošeno od preostalih gospodinjskih odpadkov. Vaša odgovornost je, da to in preostalo električno in elektronsko opremo odnesete na posebna zbiralniša, ki jih določijo državne ustanove ali lokalna uprava. S pravilnim odlaganjem in recikliranjem boste preprečili morebitne škodljive vplive na okolje in zdravje ljudi. Ėeelite izvedeti več o odlaganju stare opreme, se obrnete na lokalno upravo, odpad ali trgovino, kjer ste izdelek kupili.

Suomi (Finnish) - Ympäristöä koskevia tietoja EU-alueen asiakkaille

Svenska (Swedish) - Miljöinformation för kunder i Europeiska unionen

# Environmental Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>12.01”x1.73”x6.69” (305 mm x 44 mm x 170 mm)</td>
</tr>
<tr>
<td>Unit Weight</td>
<td>3.02 lbs. or 48.33 oz (1.37 kg)</td>
</tr>
<tr>
<td>Power</td>
<td>48 VDC, 100-240V 3.5A</td>
</tr>
<tr>
<td>Certification</td>
<td>UL (UL 60950), CSA (CSA 22.2), CE mark,</td>
</tr>
<tr>
<td></td>
<td>FCC Part 15 (CFR 47), Class A EN60950 (2001)</td>
</tr>
<tr>
<td>Security</td>
<td>ACL, 802.1x</td>
</tr>
<tr>
<td>Operating Temp</td>
<td>0°C to 40°C (32°F to 104°F)</td>
</tr>
<tr>
<td>Storage Temp</td>
<td>-20°C to 70°C (-4°F to 158°F)</td>
</tr>
<tr>
<td>Operating Humidity</td>
<td>10% to 90% relative humidity, Non-Condensing</td>
</tr>
<tr>
<td>Storage Humidity</td>
<td>10% to 95% relative humidity, Non-Condensing</td>
</tr>
</tbody>
</table>
Safety Information

The following statements are warnings or safety guidelines. A warning means danger. You are in a situation that could cause bodily injury. Before working on equipment, be aware of the hazards involved with electrical circuitry and standard safety practices to prevent accidents.

Meaning of the Warning Symbol

**IMPORTANT SAFETY INSTRUCTIONS**
This warning symbol means danger. This symbol is used to indicate a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

General Safety Information

**WARNING: Work During Lightning Activity**
Do not work on the system or connect or disconnect cables during periods of lightning.

**WARNING: Installation Instructions**
Read the installation instructions before connecting the system to the power source.

**WARNING: SELV Circuit**
To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.

**WARNING: Equipment Installation**
Only trained and qualified personnel should be allowed to install, replace, or service this equipment.
Power Safety Information

**WARNING: Local National Electrical Codes**
Installation of the equipment must comply with local and national electrical codes.

**WARNING: Product Disposal**
Ultimate disposal of this product should be handled according to all national laws and regulations.

**WARNING: TN Power**
The device is designed to work with TN power systems.

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

**WARNING: Power Supply Installation Warning**
The power supply must be placed indoors.

**WARNING: Circuit Breaker**
This product relies on the building’s installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 120 VAC, 15A U.S. (240 VAC, 10A international)

**WARNING: Main Disconnecting Device**
The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.
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