NEC

N8406-022A 1Gb Intelligent L2 Switch

Smart Panel Reference Guide

Part number: 856-126757-406-00
First edition: July 2008

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Introduction

The 1Gb Intelligent L2 Switch provides two switch modes: The conventional L2 switch mode, and SmartPanel mode. The switch can store up to two different software image, called image1 and image2. Normally, the conventional L2 switch software image is stored in image1, and the SmartPanel software is stored in image2. You can select which software image (image1 or image2) you want to run in switch memory. By default, the switch software is loaded from image1. To run the SmartPanel software, you need to change a software image to image2 and reboot the switch. See additional references for configuration to select a software image.

This guide explains how to configure the switch in running the SmartPanel software. The SmartPanel provides a simple Ethernet interface option for connecting to the network infrastructure. The number and type of configuration options on the SmartPanel are restricted to reduce the initial setup complexity and to minimize the impact on upstream networking devices.

Additional references

Additional information about installing and configuring the switch is available in the following guides, which are attached in this product.

- *N8406-022A 1Gb Intelligent L2 Switch User's Guide*
- *N8406-022A 1Gb Intelligent L2 Switch Application Guide*
- *N8406-022A 1Gb Intelligent L2 Switch Command Reference Guide (AOS)*
- *N8406-022A 1Gb Intelligent L2 Switch Command Reference Guide (ISCLI)*
- *N8406-022A 1Gb Intelligent L2 Switch Browser-based Interface Reference Guide*

Typographical conventions

The following table describes the typographic styles used in this guide:

Table 1 Typographic conventions

Typeface or symbol	Meaning	Example
`AaBbCc123`	This type depicts onscreen computer output and prompts.	`Main#`
`AaBbCc123`	This type displays in command examples and shows text that must be typed in exactly as shown.	`Main# sys`
<AaBbCc123>	This italicized type displays in command examples as a parameter placeholder. Replace the indicated text with the appropriate real name or value when using the command. Do not type the brackets. This also shows guide titles, special terms, or words to be emphasized.	To establish a Telnet session, enter: `host# telnet <IP address>` Read the user guide thoroughly.
`[ ]`	Command items shown inside brackets are optional and can be used or excluded as the situation demands. Do not type the brackets.	`host# ls [-a]`

Management Network

The 1Gb Intelligent L2 Switch is a Switch Module within the Blade Enclosure. The Blade Enclosure includes an Enclosure Manager Card which manages the modules and CPU Blades in the enclosure.

The 1Gb Intelligent L2 Switch communicates with the Enclosure Manager Card through its internal management port (port 19). The factory default settings permit management and control access to the switch through the 10/100 Mbps Ethernet port on the Blade Enclosure, or the built-in console port.

The switch management network has the following characteristics:

- Port 19 — Management port 19 has the following configuration:
  - Flow control: both
  - Auto-negotiation
  - Untagged
  - Port VLAN ID (PVID): 4095
- VLAN 4095 — Management VLAN 4095 isolates management traffic within the switch. VLAN 4095 contains only one member port (port 19). No other ports can be members of VLAN 4095.
- Interface 256 — Management interface 256 is associated with VLAN 4095. No other interfaces can be associated with VLAN 4095. The IP address of the management interface is assigned through Dynamic Host Control Protocol (DHCP).
- Gateway 4 — This gateway is the default gateway for the management interface.

Connecting to the switch

You can access the command line interface in one of the following ways:

- Using a console connection via the console port
- Using a Telnet connection over the network
- Using a Secure Shell (SSH) connection to securely log in over a network
- Using a HTTP connection over the network

Establishing a console connection

To establish a console connection with the switch, you need:

- A null modem cable with a female DB-9 connector (See the *User's Guide* for more information.)
- An ASCII terminal or a computer running terminal emulation software set to the parameters shown in the table below

Table 2 Console configuration parameters

Parameter	Value
Baud Rate	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

To establish a console connection with the switch:

1. Connect the terminal to the console port using the null modem cable.
2. Power on the terminal.
3. Press the Enter key a few times on the terminal to establish the connection.
4. You will be required to enter a password for access to the switch. (For more information, see the "Accessing the switch" section later in this chapter.)

Setting an IP address

To access the switch via a Telnet, an SSH connection, or an HTTP connection, you need to have an Internet Protocol (IP) address set for the switch. You can assign the IP address only to the management interface (interface 256), associated with port 19. The management interface requests its IP address from a Dynamic Host Control Protocol (DHCP) server on the Enclosure Manager Card. See the User's Guide of the Enclosure Manager Card for configuration to assign the IP address to the switch modules.

NOTE: You can assign the IP address only on the management port 19.

Establishing a Telnet connection

A Telnet connection offers the convenience of accessing the switch from any workstation connected to the network. Telnet provides the same options for user, operator, and administrator access as those available through the console port. By default, Telnet is enabled on the switch. The switch supports four concurrent Telnet connections.

Once the IP parameters are configured, you can access the CLI using a Telnet connection. To establish a Telnet connection with the switch, run the Telnet program on the workstation and enter the telnet command, followed by the switch IP address:

```
telnet <1Gb Intelligent L2 Switch IP address>
```

You will then be prompted to enter a password. The password entered determines the access level: administrator, operator, or user. See the "Accessing the switch" section later in this chapter for description of default passwords.

Establishing an SSH connection

Although a remote network administrator can manage the configuration of a switch via Telnet, this method does not provide a secure connection. The Secure Shell (SSH) protocol enables you to securely log into the switch over the network.

As a secure alternative to using Telnet to manage switch configuration, SSH ensures that all data sent over the network is encrypted and secure. In order to use SSH, you must first configure it on the switch. See the "Secure Shell Server configuration" section in the "Configuration Menu" chapter for information on how to configure SSH.

Establishing an HTTP connection

By default, HTTP is enabled on the switch. You can configure the switch using the Web browser. For more information, see the "Browser-based interface" chapter.

Accessing the switch

To enable better switch management and user accountability, the switch provides different levels or classes of user access. Levels of access to the CLI and Web management functions and screens increase as needed to perform various switch management tasks. The three levels of access are:

- User—User interaction with the switch is completely passive; nothing can be changed on the switch. Users may display information that has no security or privacy implications, such as switch statistics and current operational state information.
- Operator—Operators can only effect temporary changes on the switch. These changes will be lost when the switch is rebooted/reset. Operators have access to the switch management features used for daily switch operations. Because any changes an operator makes are undone by a reset of the switch, operators cannot severely impact switch operation, but do have access to the Maintenance menu.
- Administrator—Only administrators can make permanent changes to the switch configuration, changes that are persistent across a reboot/reset of the switch. Administrators can access switch functions to configure and troubleshoot problems on the switch. Because administrators can also make temporary (operator-level) changes as well, they must be aware of the interactions between temporary and permanent changes.

Access to switch functions is controlled through the use of unique usernames and passwords. Once you are connected to the switch via the local console, Telnet, or SSH, you are prompted to enter a password. The password entered determines the access level. The default user names/password for each access level is listed in the following table. Once you are connected to the switch via HTTP, you are prompted to enter a user account and password.

NOTE: It is recommended that you change default switch passwords after initial configuration and as regularly as required under your network security policies. For more information, see the "Setting passwords" section in the "First-time configuration" chapter.

Table 3 User access levels

User account	Description and tasks performed
user	The user has no direct responsibility for switch management. He or she can view all switch status information and statistics, but cannot make any configuration changes to the switch. The user account is enabled by default, and the default password is `user`.
oper	The operator manages all functions of the switch. The operator can reset ports or the entire switch. By default, the operator account is disabled and has no password.
admin	The super user administrator has complete access to all menus, information, and configuration commands on the switch, including the ability to change both the user and administrator passwords. The admin account is enabled by default, and the default password is `admin`.

NOTE: With the exception of the admin user, setting the password to an empty value can disable access to each user level.

Browser-based interface

Introduction

This chapter explains how to access the switch browser-based interface (BBI) for the SmartPanel and configure the switch.

Requirements

To use the browser-based interface, you need the following:

- PC or workstation with network access to the switch
- Frame-capable Web-browser software, such as the following:
  - Netscape Navigator 4.7x or higher
  - Internet Explorer 6.0x or higher
- JavaScript enabled in your Web browser

Web browser setup

Most modern Web browsers work with frames and JavaScript by default, and require no additional set up. However, you should check your Web browser's features and configuration to be sure frames and JavaScript are enabled.

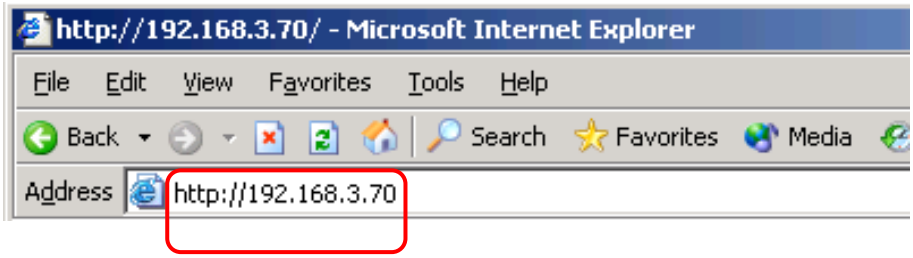
NOTE: JavaScript is not the same as Java™. Be sure that JavaScript is enabled in your Web browser.

Starting the BBI

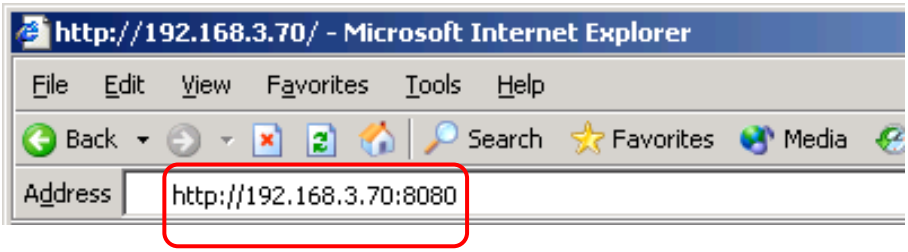
When the switch and browser setup is complete, follow these steps to launch the BBI:

1. Start your Web browser.
2. Enter the switch IP interface address in the Web browser Uniform Resource Locator (URL) field.

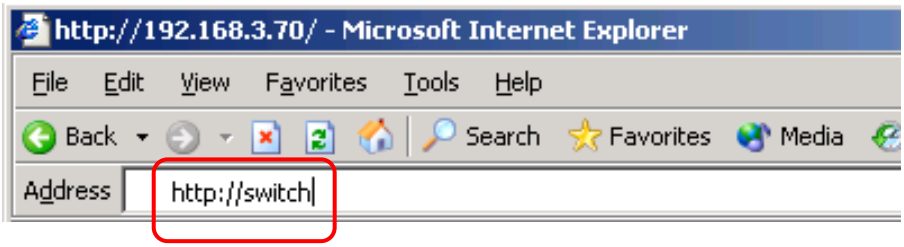
   For example, if the switch IP interface has a network IP address of 192.168.3.70. Using Internet Explorer, you could enter the following (for secure BBI access, use https://).



   If you do not use the default TCP port number (80) for BBI access, you can include the port number when you enter the IP address:

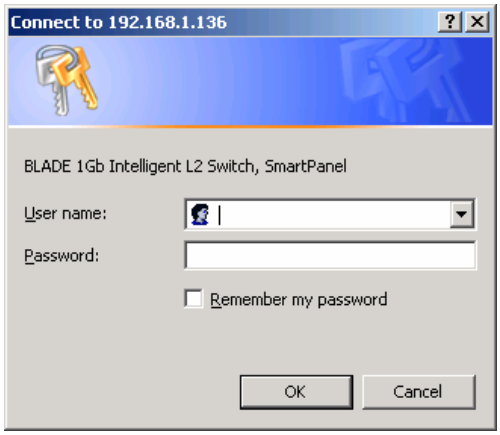


If the switch IP interface address has a name on your local domain name server, you can enter the name instead. Using Internet Explorer, you can enter the following:



3. Log in to the switch.

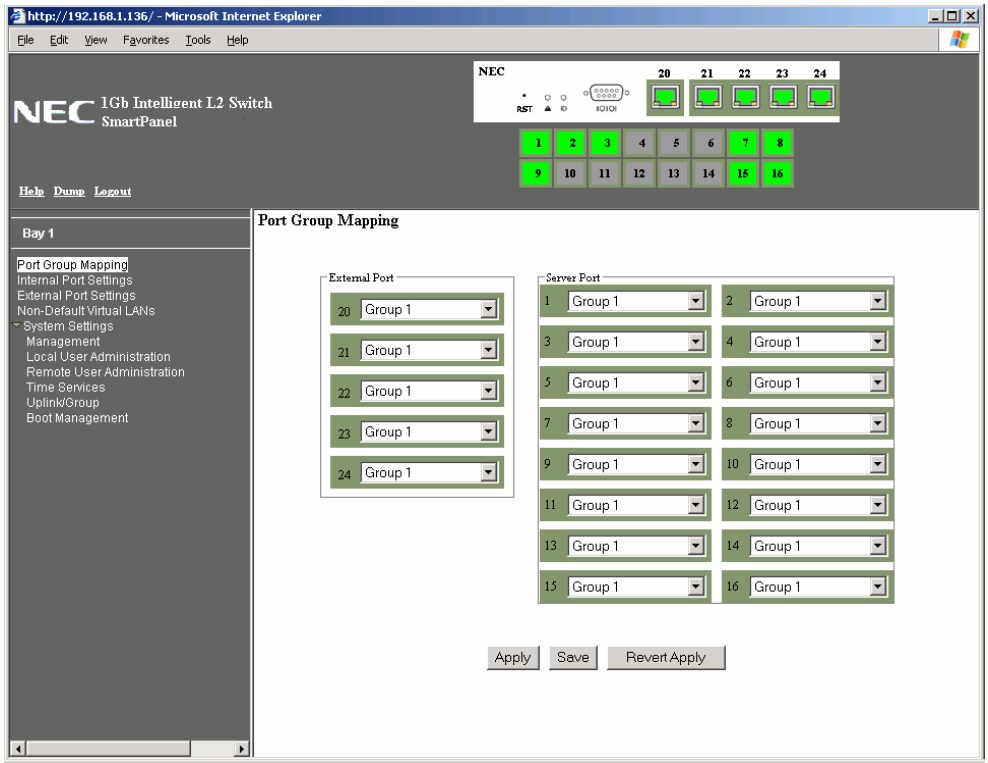
   If your switch and browser are properly configured, you will be asked to enter a password.



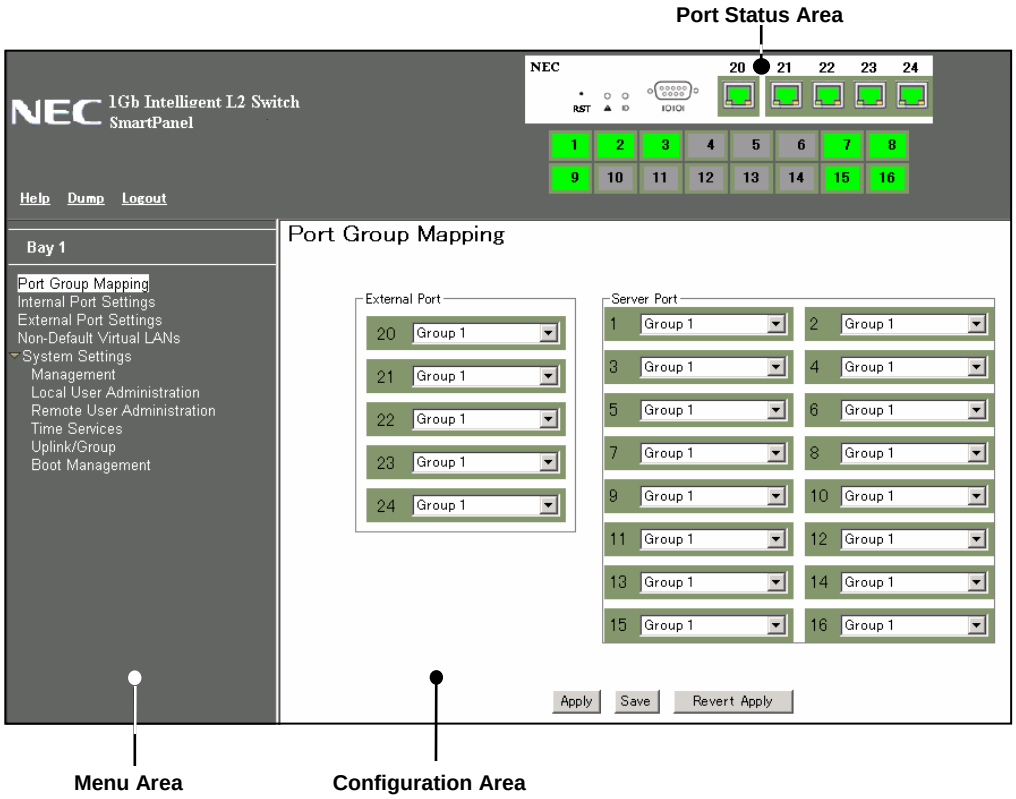
   Enter the account name and password for the switch.

4. Allow the BBI Dashboard page to load.

   When the proper account name and password combination is entered, the BBI Port Group Mapping page is displayed in the browser viewing area.



NOTE: There may be a slight delay while the Port Group Mapping page is initializing. You should not stop the browser while loading is in progress.



There are three main regions on the screen.

- The Port Status Area is used to view port status. Click a port icon to view details.
- The Menu Area is used to select particular items or features to act upon.
- The Configuration Area is used to configure selected items.

Port Status Area

The Status Area contains port icons that display status information about each port. Click a port icon to display detailed information about the port.

A color box indicates the Port Group in which each port resides.

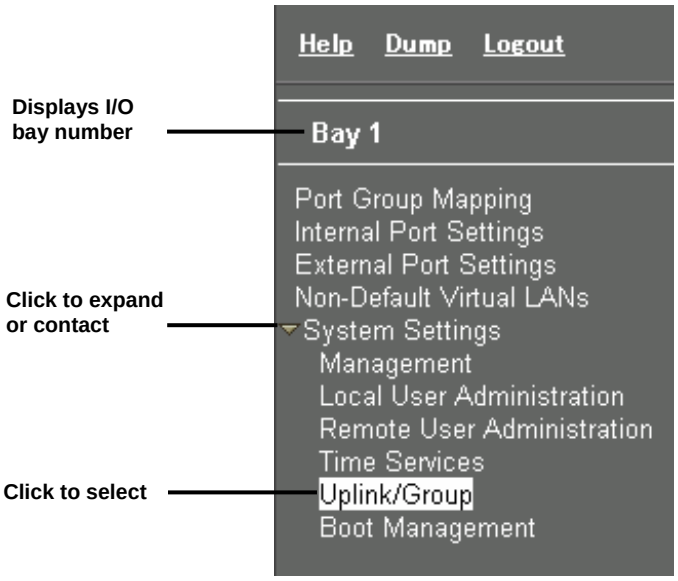
Table 4 Link status

Color	Description
Green	Link up
White	No link
Gray	Disabled

Menu Area

The Menu Area is used for selecting a particular feature to act upon. Configuration forms for the selected item appear in the Configuration Window.

The Menu Area contains a tree of feature folders and names.



Click on System Settings to open it and reveal its contents. Click it again to close it. Click on any feature to load the configuration form in the Configuration Area.

Command Buttons

The following general commands are available at the top of the Menu Area.

Table 5 Menu Area command buttons

Command	Description
Help	Opens a new Web-browser window for displaying the basic online help information. Close the help browser when finished.
Dump	Writes current switch configuration to the screen. Configuration information is displayed with parameters that have been changed from default values.
Logout	Logs off the switch and exits the BBI.

Configuration Area

Use the Configuration Area to configure SmartPanel settings.

When a feature is selected from the Menu Area, a configuration form is displayed in the Configuration Area. The exact nature of the form depends on the type of information available.

Configuration forms display information and allow you to make configuration change to SmartPanel parameters.

Command Buttons

The following general commands are available at the bottom of the Configuration Area.

Table 6 Configuration Area command buttons

Command	Description
Apply	Pending configuration changes do not take effect until you select the Apply command. Once applied, all changes take effect on the switch immediately. If you do not save the changes, however, they will be lost the next time the switch is rebooted.
Save	Writes applied configuration changes to non-volatile flash memory on the switch (with the option of not overlaying the current backup).
Revert Apply	Removes pending configuration changes between save commands. Use this command to restore configuration parameters set since last save command.

Port Group Mapping

SmartPanel ports can be combined into Port Groups. Up to five Port Groups are available in the SmartPanel. A Spare Ports Group is available for unused ports.

VLANs and Link Aggregation Groups (trunks) are configured automatically for each Port Group. No network loops are allowed in the configuration. All external ports in the Port Group form a trunk group (static trunk or Link Aggregation Group).

Port Group Characteristics

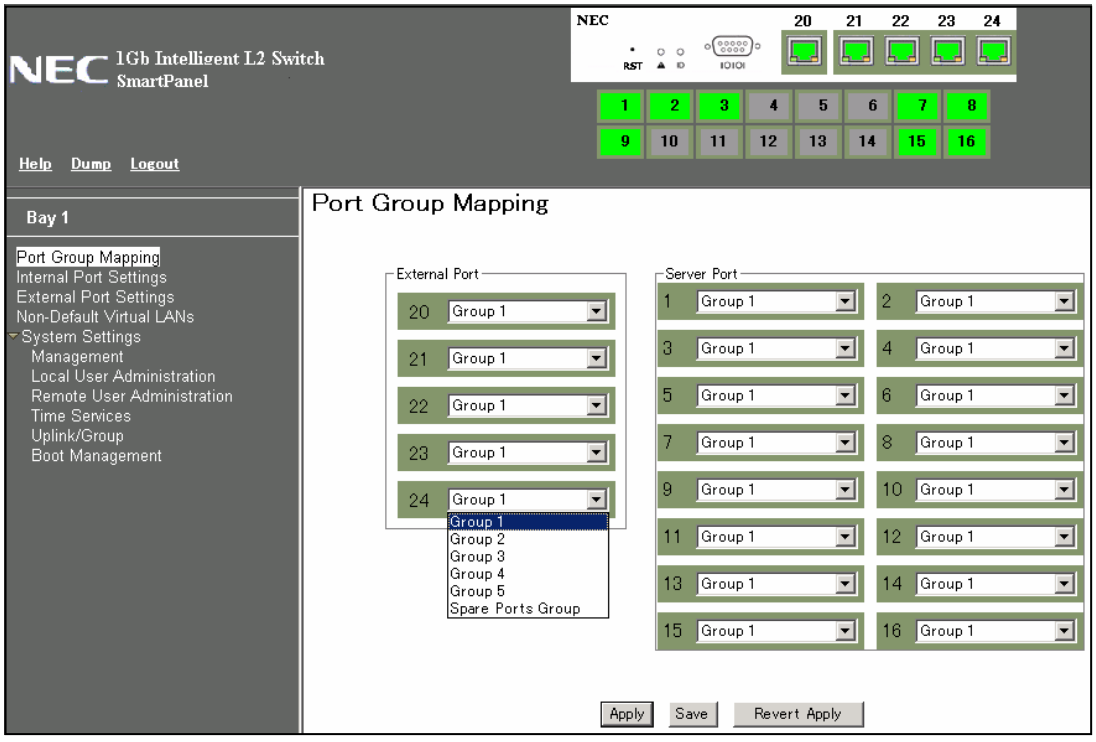
SmartPanel Port Groups must have the following characteristics.

- Each Port Group must contain at least one external port (20-24) and one internal server blade port (1-16).
- All external ports in a Port Group must have the same configuration.
- Each port in the Port Group is a member of a unique, untagged VLAN.
- Tagged VLANs (1-4094) can be assigned to each Port Group. Tagged VLANs cannot be configured across multiple Port Groups.
- All external ports in the Port Group form a trunk group.

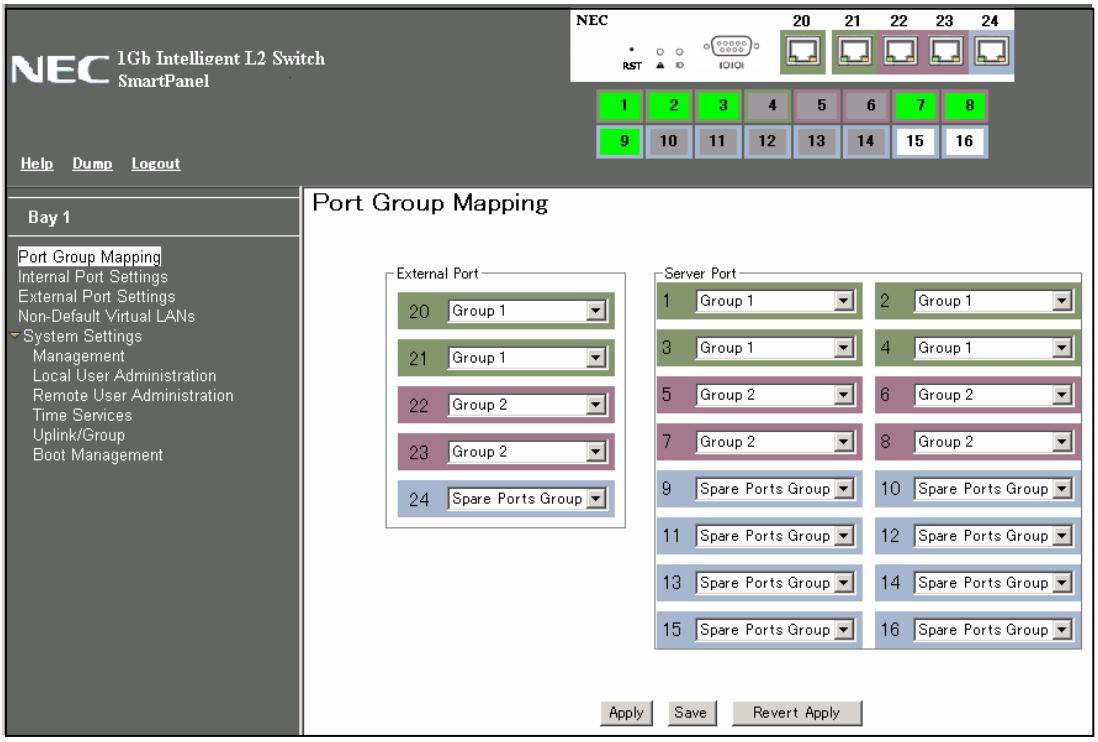
NOTE: Cross-connect ports (17-18) are not available in the SmartPanel.

Port Group configuration

On the BBI, choose Port Group Mapping to select the Port Group for each of the external ports and server blade ports. Click Apply to make the changes active. Click Save to write the configuration to flash memory.

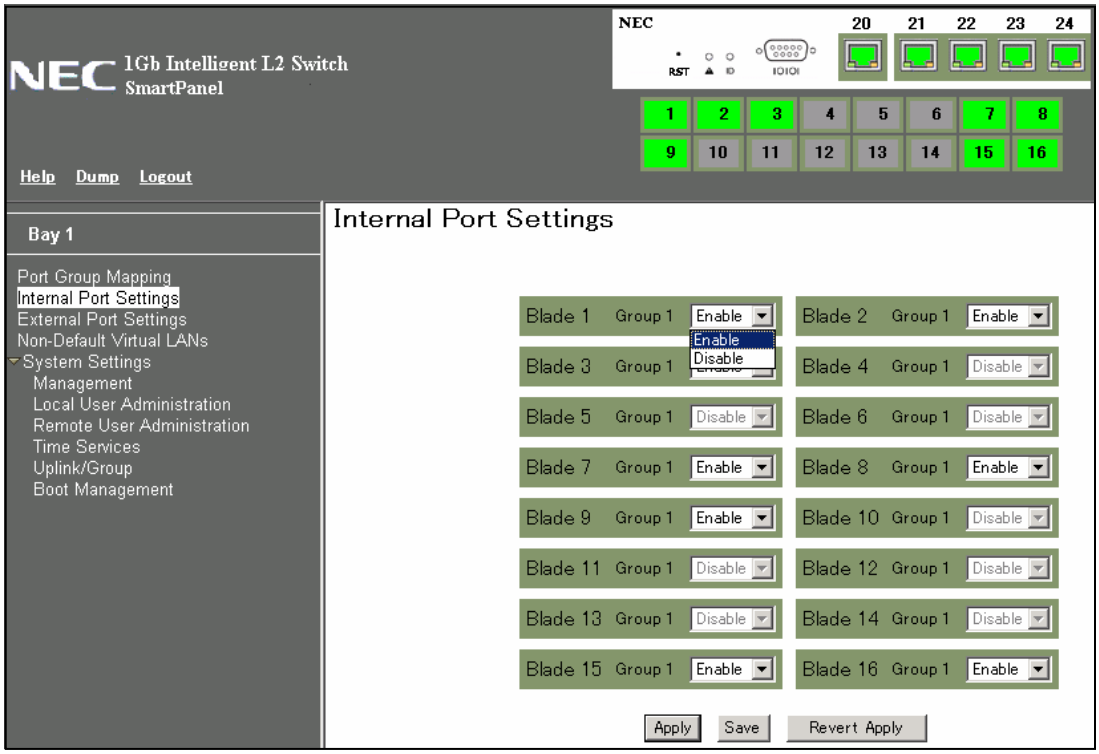


In this example, Port 1-4, 20-21 are assigned to Group1, and Port 5-8, 22-23 are assigned to Group2. The others are assigned to Spare Ports Group.



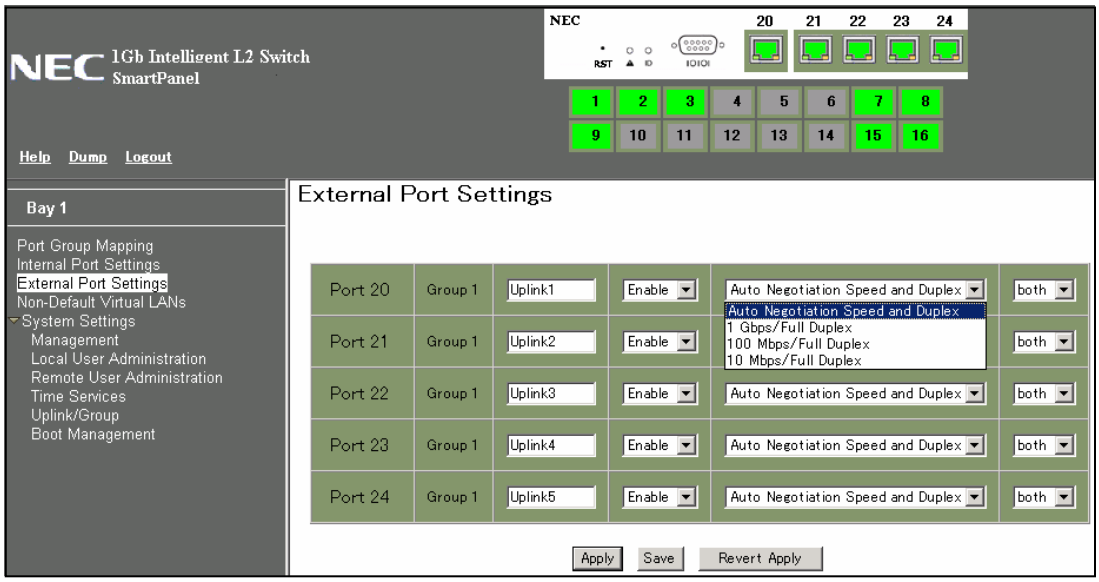
Internal Port Settings

On the BBI, choose Internal Port Settings to enable or disable the server blade port.



External Port Settings

On the BBI, choose External Port Settings to configure the external port.



The following table describes the external port configuration.

Table 7 External Port Settings

Command	Description
Port Name	Sets a name for the port. The assigned port name appears next to the port number on some information and statistics screens.
Switch Port State	Enables or disables the port.
Link configuration	Sets the link speed. The choices include: • Auto Negotiation Speed and Duplex (default) • 1Gbps / Full Duplex • 100Mbps / Full Duplex • 10Mbps / Full Duplex
Flow Control	Sets the flow control. The choices include: • Rx: Receive flow control • Tx: Transmit flow control • both: Receive and transmit flow control (default) • none: No flow control

VLAN

Virtual LANs (VLANs) are commonly used to split up groups of network users into manageable broadcast domains, to create logical segmentation of workgroups, and to enforce security policies among logical segments. This switch supports up to 1,000 VLANs per switch. Even though the maximum number of VLANs supported at any given time is 1,000, each can be identified with any number between 1 and 4095. VLAN 4095 is used by the management network, which includes the management port 19. VLAN 4095 configuration cannot be modified.

PVID

Each Port Group has a configurable default VLAN number, known as its PVID (Port VLAN ID). All ports are set as untagged members of PVID. By default, all ports except port 19 are configured as Group1. The PVID of Group1 is 1.

The unique value of PVID is assigned to the Port Group, which contains at least one external port and one internal server blade port. For the configuration, see the “Port VLAN ID configuration” section later in this chapter.

NOTE: Spare Ports Group for unused ports is assigned a PVID.

802.1Q VLAN Tagging

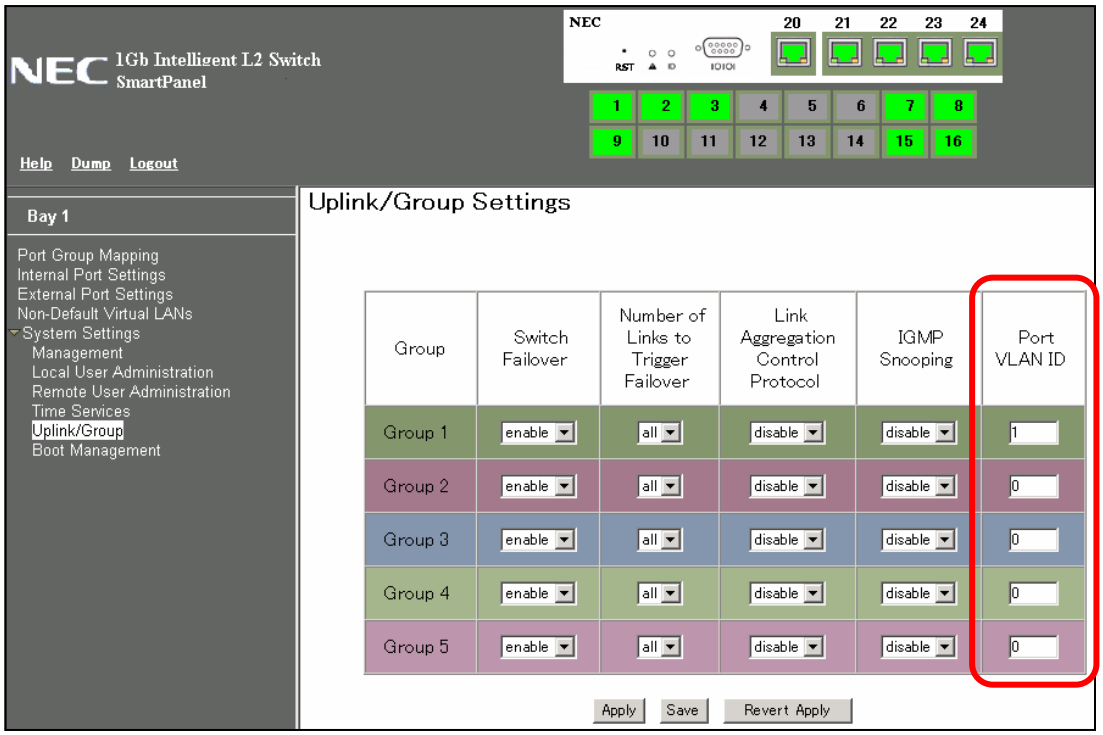
802.1Q VLAN tagging provides standards-based VLAN support for Ethernet systems. This standard permits multiple VLANs to be transmitted over a single Ethernet connection.

Tagging places the VLAN identifier in the frame header of a packet, allowing each port to belong to multiple VLANs. For the configuration to add the VLAN ID to the Port Group, see the “Non-Default Virtual LANs” section later in this chapter.

NOTE: The SmartPanel does not permit configuration of tagged VLANs across multiple Ports Groups.

Port VLAN ID configuration

Assign at lease one external port and one internal blade server port to the Port Group to use it and assign a unique value of PVID. On the BBI, choose System settings > Uplink/Group to change the PVID. Edit the value of the following Port VLAN ID. The value of unused Port Group is 0.

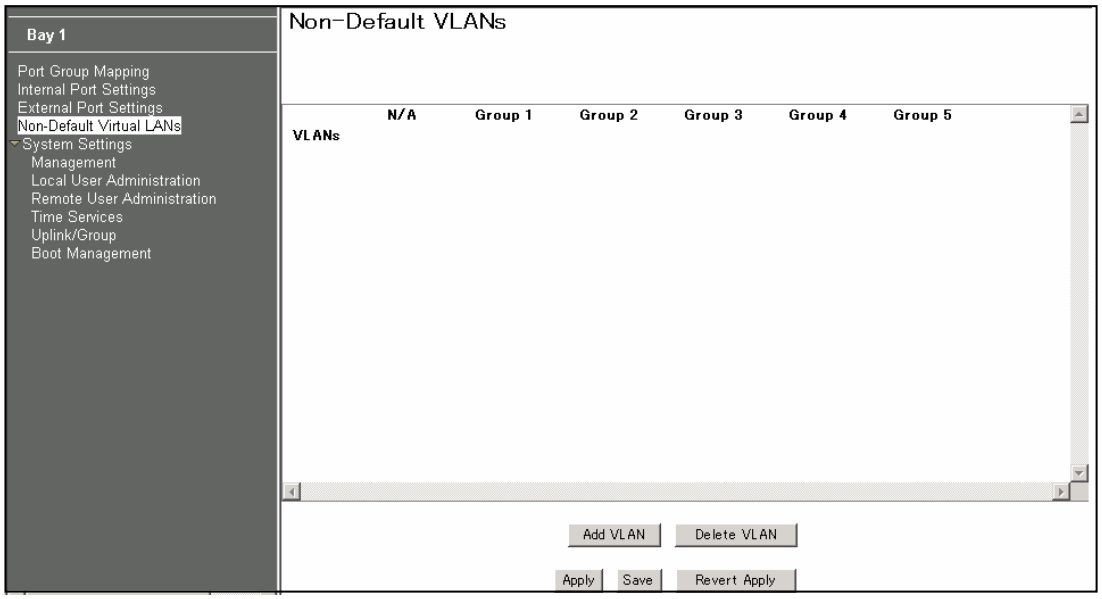


Non-Default Virtual LANs

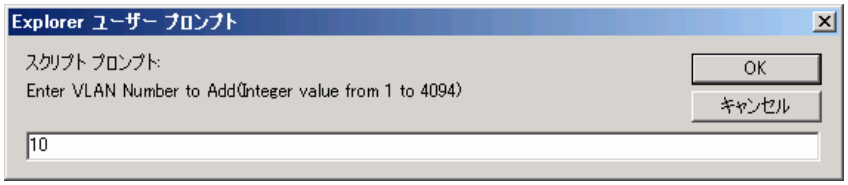
On the BBI, choose Non-Default Virtual LANs to create VLANs and assign them to Port Groups. The non-default VLAN ID is placed in the frame header of a packet in forwatding from the port.

The following describes the steps to add VLAN ID.

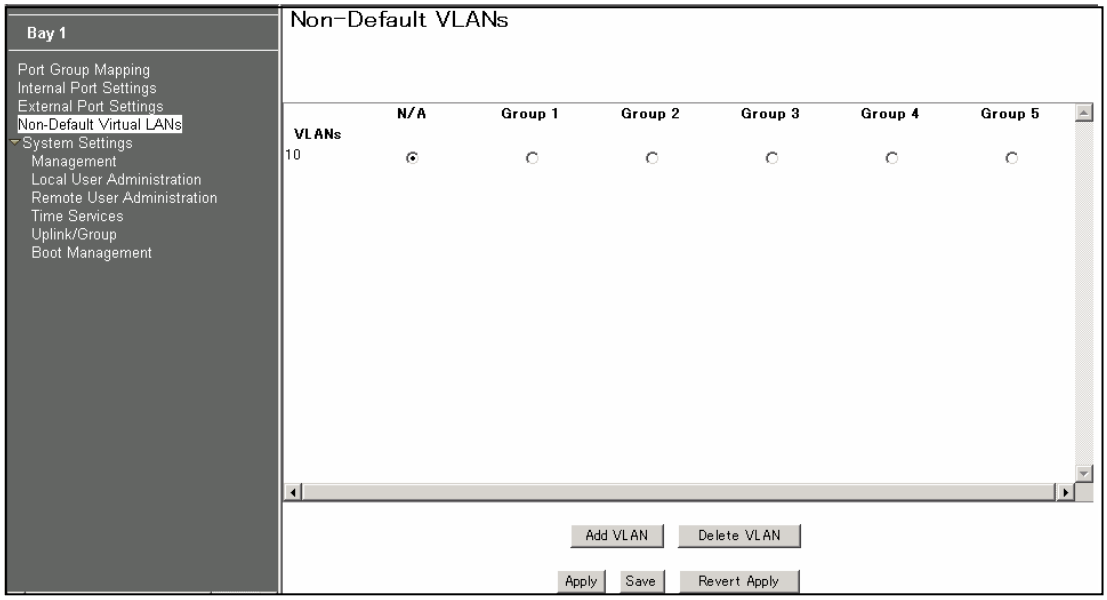
1. Click Add VLAN to configure a new VLAN.



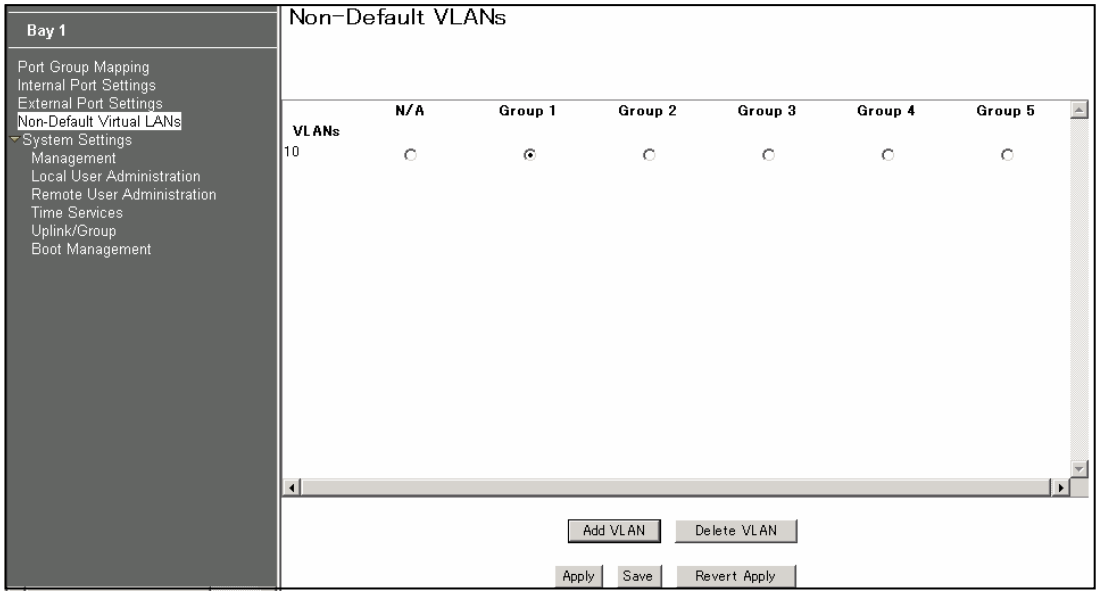
2. Enter a VLAN number and click OK.



The following is displayed.



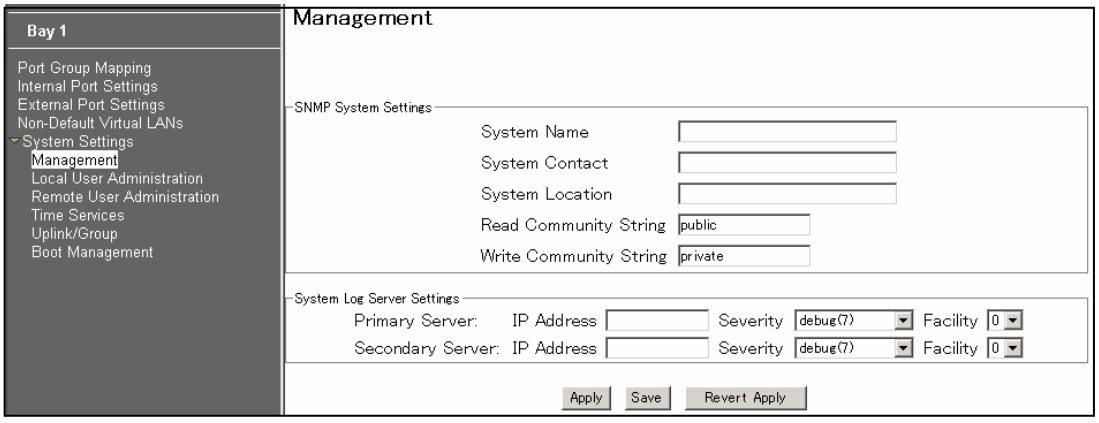
3. Select the corresponding radio button to assign the VLAN to a Port Group.



4. Click Apply to make the changes active.

Management

On the BBI, choose System Settings > Management to configure SNMP System Settings and System Log Server Settings.



The following table describes the management configuration.

Table 8 Management

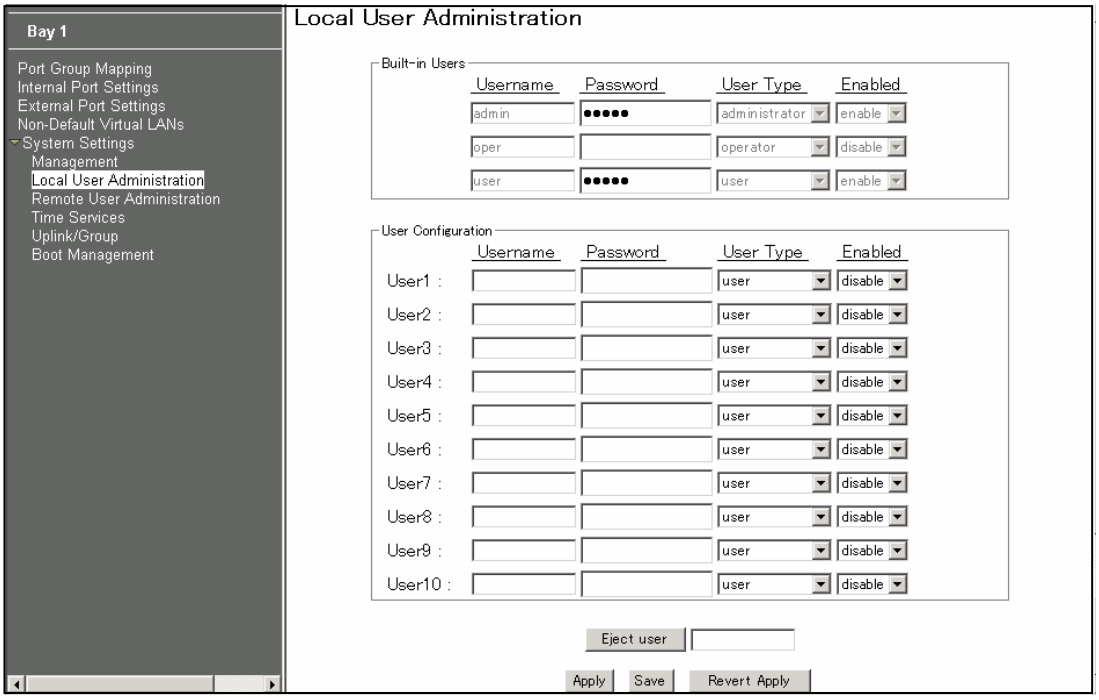
Command	Description
SNMP System Settings	
System Name	Configures the name for the system. The name can have a maximum of 64 characters.
System Contact	Configures the name of the system contact. The contact can have a maximum of 64 characters.
System Location	Configures the name of the system location. The location can have a maximum of 64 characters.
System Log Server Settings	
IP Address of Primary Server	Sets the IP address of the primary syslog server.
Severity of Primary Server	This option sets the severity level of the primary syslog server displayed. The default is 7, which means log all the seven severity levels.
Facility of Primary Server	This option sets the facility level of the primary syslog server displayed. The default is 0.
IP Address of Secondary Server	Sets the IP address of the secondary syslog server.
Severity of Secondary Server	This option sets the severity level of the secondary syslog server displayed. The default is 7, which means, log all seven severity levels.

Table 8 Management

Command	Description
Facility of Secondary Server	This option sets the facility level of the secondary syslog server displayed. The default is 0.

Local User Administration

On the BBI, choose System Settings > Local User Administration to configure the user.



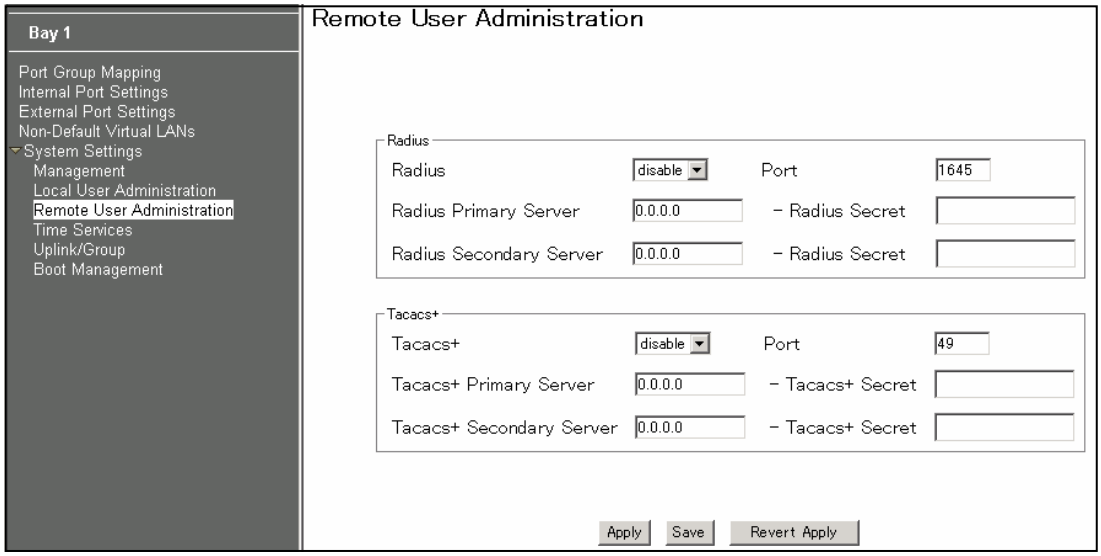
The following table describes the user configuration.

Table 9 Local User Administration

Command	Description
Username	Defines the user name of maximum eight characters.
Password	Sets the user password of up to 128 characters maximum.
User Type	Sets the Class-of-Service to define the user's authority level.
Enabled	Enables or disables the user.
Eject user	Eject the specified user to access the switch.

Remote User Administration

On the BBI, choose System Settings > Remote User Administration to configure the RADIUS server or the TACACS+ server.



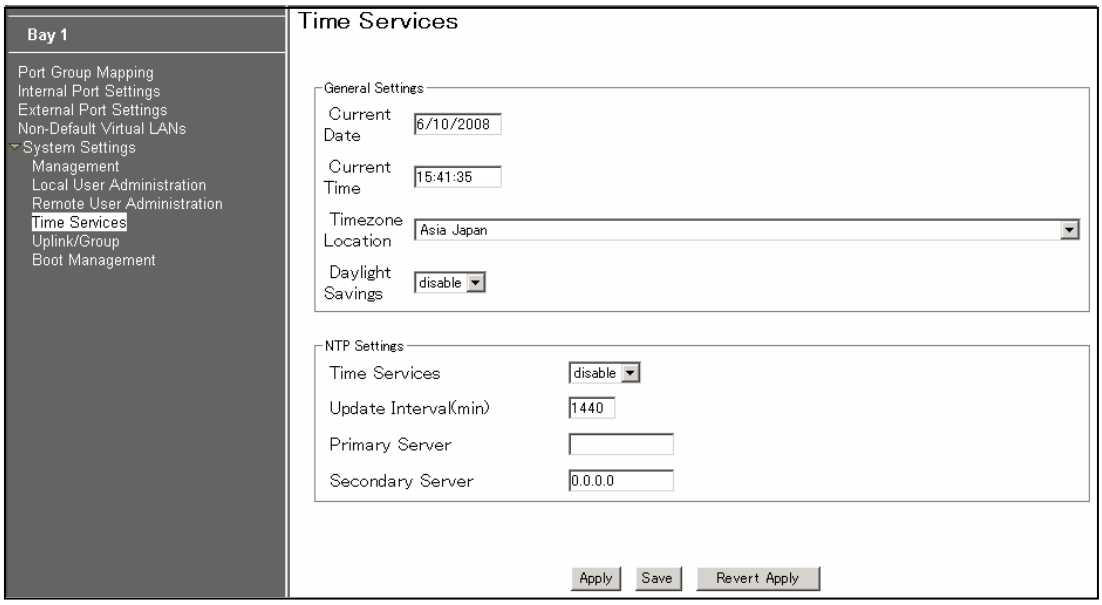
The following table describes the configuration.

Table 10 Remote User Administration

Command	Description
Radius	
Radius disable/enable	Enables or disables the Radius server.
Port	Configures the number of the UDP port to be configured, between 1500 - 3000. The default is 1645.
Radius Primary Server	Configures the primary Radius server address.
Radius Secret for Primary Server	Defines the shared secret (up to 32 characters) between the switch and the RADIUS server(s).
Radius Secondary Server	Configures the secondary Radius server address.
Radius Secret for Secondary Server	Defines the secondary shared secret (up to 32 characters) between the switch and the Radius server(s).
Tacacs+	
Tacacs+ disable/enable	Enables or disables the Tacacs+ server.
Port	Configures the number of the TCP port to be configured, between 1 and 65000. The default is 49.
Tacacs+ Primary Server	Configures the primary TACACS+ server address.
Tacacs+ Secret for Primary Server	Configures the shared secret (up to 32 characters) between the switch and the TACACS+ server.
Tacacs+ Secondary Server	Configures the secondary TACACS+ server address.
Tacacs+ Secret for Secondary Server	Configures the secondary shared secret (up to 32 characters) between the switch and the TACACS+ server.

Time Services

On the BBI, choose System Settings > Time Services to configure the NTP server.



The following table describes the configuration.

Table 11 Time Services

Command	Description
General Settings	
Current Date	Configures the system date.
Current Time	Configures the system time using a 24-hour clock format.
Timezone Location	Configures the time zone where the switch resides. You are prompted to select your location (continent, country, region) by the timezone wizard. Once a region is selected, the switch updates the time to reflect local changes to Daylight Savings Time, etc.
Daylight Savings	Disables or enables daylight savings time in the system clock. When enabled, the switch will add an extra hour to the system clock so that it is consistent with the local clock. By default, this option is disabled.
NTP Settings	
Time Services	Enables or disables the NTP synchronization service.
Update Internal (min)	Specifies the interval, that is, how often, in minutes (1-44640), to re-synchronize the switch clock with the NTP server.
Primary Server	Configures the IP address of the primary NTP server to which you want to synchronize the switch clock.
Secondary Server	Configures the IP address of the secondary NTP server to which you want to synchronize the switch clock.

Trunking

Trunk groups provide super-bandwidth, multi-link connections between SmartPanel or other trunk-capable devices. A trunk group is a group of ports that act together, combining their bandwidth to create a single, larger virtual link.

SmartPanel trunk groups are static link aggregation groups that are compatible with Cisco's EtherChannel technology.

The SmartPanel is statically configured to place each Port Group into a separate trunk group.

NOTE: Because all ports in a Port Group belong to the same trunk group, individual external ports cannot be used as a regular 802.3 link. Do not plug a workstation directly into one of the SmartPanel's external ports, unless that is the only device plugged into the ports.

When using port trunk groups between the SmartPanel and a switch, you can create a virtual link, operating at up to 5 Gigabits per second, depending on how many physical ports are combined.

Statistical Load Distribution

Network traffic is statistically distributed between ports in a trunk group. The SmartPanel uses the source and destination IP address information present in each transmitted IP frame to determine load distribution. If the frame is not an IP frame, then Layer 2 MAC addresses are used.

Each packet's particular combination of source and destination addresses results in selecting one line in the trunk group for data transmission. If there are enough devices feeding the trunk lines, then traffic distribution becomes relatively even.

Built-In Fault Tolerance

Since trunk groups are comprised of multiple physical links, each trunk group is inherently fault tolerant. As long as one connection is available, the trunk remains active.

Statistical load balancing is maintained whenever a port in a trunk group is lost or returned to service.

Trunk group configuration rules

The trunking feature operates according to specific configuration rules. When working with trunks, consider the following rules that determine how a trunk group reacts in any network topology.

- All trunks must originate from one device, and lead to one destination device.
- Trunking from third-party devices must comply with Cisco® EtherChannel® technology.
- All external ports in a Port Group must have the same configuration.
- Only external ports in a Port Group are trunked. For Port Group configuration, see the "Port Group configuration".

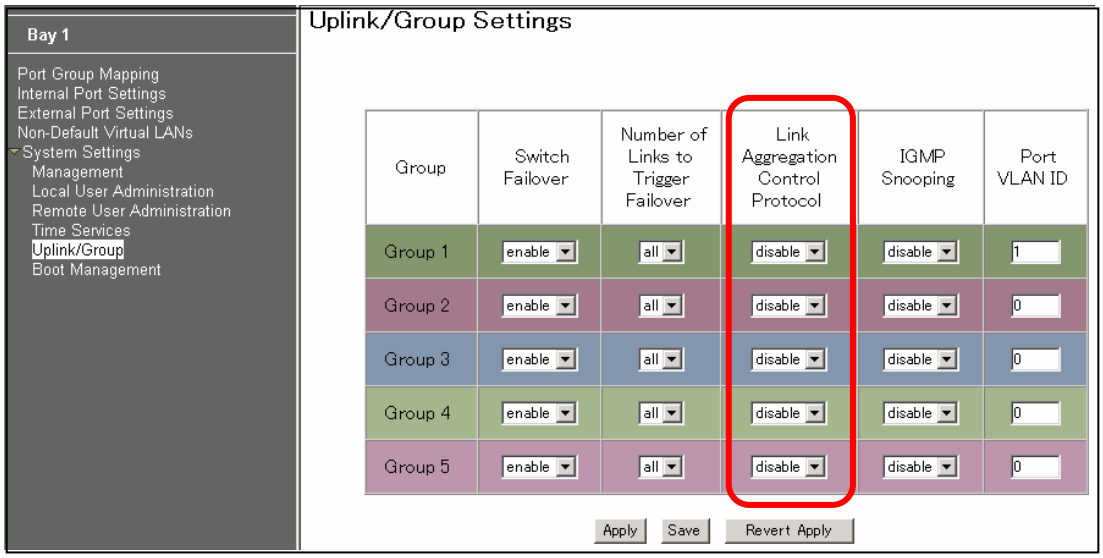
Link Aggregation Control Protocol

Link Aggregation Control Protocol (LACP) is an IEEE 802.3ad standard for grouping several physical ports into one logical port (known as a dynamic trunk group or Link Aggregation Group) with any device that supports the standard. Please refer to IEEE 802.3ad-2002 for a full description of the standard.

The 802.3ad standard allows standard Ethernet links to form a single Layer 2 link using the Link Aggregation Control Protocol (LACP). Link aggregation is a method of grouping physical link segments of the same media type and speed in full duplex, and treating them as if they were part of a single, logical link segment. If a link in a LACP trunk group fails, traffic is reassigned dynamically to the remaining link/s of the dynamic trunk group.

Trunk Group configuration

On the BBI, choose System Settings > Uplink/Group to enable or disable the Link Aggregation Control Protocol. When enabled, the external ports are configured as a LACP trunk group. When disabled, they are configured as a static trunk group. The default is disabled.



Failover

The primary application for Failover is to support Network Adapter Teaming. With Network Adapter Teaming, the NICs on each server all share the same IP address, and are configured into a team. One NIC is the primary link, and the other is a standby link.

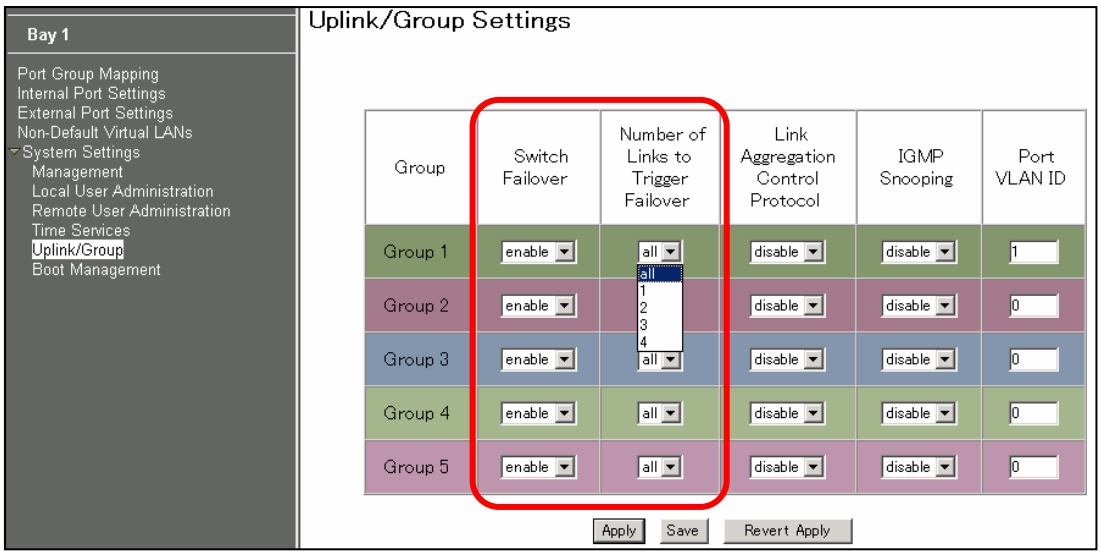
Failover is enabled by default. You can enable or disable Failover on a Port Group. When enabled, Failover works as follows.

- If some (or all) of the links fail in the failover trigger, the SmartPanel disables all internal ports of the Port Group. When the internal ports are disabled, it causes the NIC team on the affected server blade to failover from the primary to the backup NIC. This process is called a failover event.
- When the appropriate links return to service, the SmartPanel enables the internal ports of the Port Group. This causes the NIC team on the affected server blades to fail back to the primary SmartPanel (unless Auto-Fallback is disabled on the NIC team). The backup processes traffic until the primary's internal links come up, which takes up to five seconds.

The failover limit lets you specify the minimum number of operational links required within the failover trigger before the trigger initiates a failover event. For example, if the limit is four, a failover event occurs when the number of operational links in the trigger is four or fewer. When you set the limit to all, the SmartPanel triggers a failover event only when no links in the trigger are operational. The default is all.

Failover configuration

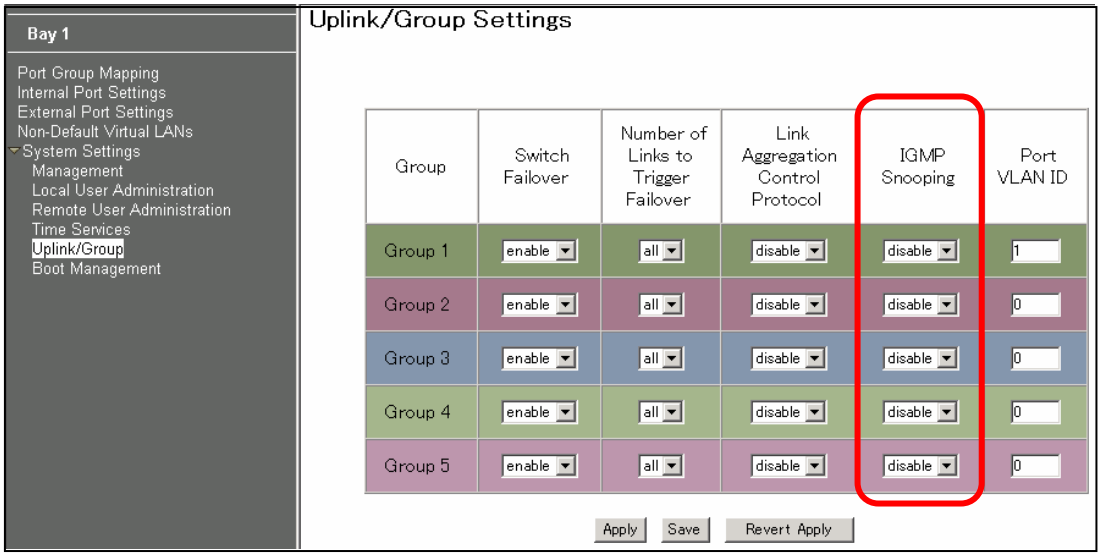
On the BBI, choose System Settings > Uplink/Group to configure the Switch Failover and Number of Links to Trigger Failover.



IGMP Snooping

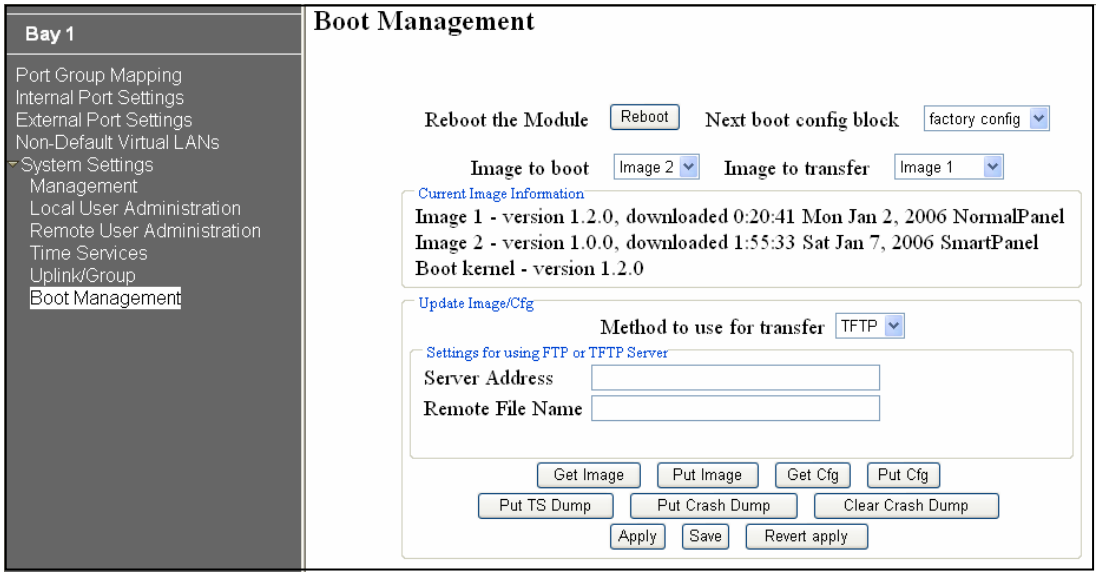
IGMP Snooping allows the SmartPanel to forward multicast traffic only to those ports that request it. IGMP Snooping prevents multicast traffic from being flooded to all ports. The SmartPanel learns which server hosts are interested in receiving multicast traffic, and forwards it only to ports connected to those servers.

On the BBI, choose System Settings > IGMP Snooping to enable IGMP Snooping. The default is disabled.



Boot Management

On the BBI, choose System Settings > Boot Management to backup or restore the switch configuration, update the switch software image, or get dump file.



The following table describes the configuration.

Table 12 Boot Management

Command	Description
Reboot the Module button	Reboots the switch.
Next boot config block	Selects the Configuration Block file (active, backup or factory) that will run after the next reboot.
Image to boot	Selects which software image (`image1` or `image2`) you want to run in switch memory for the next reboot.
Image to transfer	Selects a software image to replace with the downloaded software.
Current Image Information	
Image 1	Displays information about the current Image 1 software. When NormalPanel is displayed, the conventional Layer 2 switch software is stored in Image1.
Image 2	Displays information about the current Image 2 software. When SmartPanel is displayed, the SmartPanel software is stored in Image2.
Boot kernel	Displays the version number of the current Boot software.
Update Image/Cfg	
Method to use for transfer	Select the method to use for transfer (TFTP, FTP or HTTP). HTTP is available only for Get Image.
Settings for using FTP or TFTP Server	
Server Address	Enter the IP address of the TFTP or FTP server from which you will transfer the file.
Remote File Name	Enter the name of the file on a TFTP or FTP server that contains the file you want to transfer.
Button	
Get Image	Starts download of the software image file indicated in Remote File Name field from the specified TFTP or FTP server.
Put Image	Starts upload of the software image file indicated in Remote File Name field from the specified TFTP or FTP server.
Get Cfg	Downloads a previously saved switch Configuration Block file indicated in Remote File Name from the specified the TFTP or FTP server. The active configuration will be replaced with the commands found in the downloaded configuration file. The file can contain a full switch configuration or a partial switch configuration. The new configuration is not activated until the apply command is used. If the apply command is found in the configuration script file loaded using this command, the apply action is performed automatically.
Put Cfg	Uploads the switch's active configuration to the script configuration file specified in Remote File Name. The file is placed on the TFTP or FTP server.

Table 12 Boot Management

Command	Description
Put TS Dump	Uploads the TS (tech support) dump file to the TFTP or FTP server specified in Remote File Name.
Put Crash Dump	Uploads the core (PANIC) dump file to the TFTP or FTP server specified in Remote Filename.
Clear Crash Dump	Deletes the core dump in flash memory.

IMPORTANT: When the switch software is changed (NormalPanel or SmartPanel) and the switch is rebooted, the switch configuration is removed and the switch runs factory configuration block. Backup the switch configuration if needed.

Command Line Interface

Introduction

The CLI is used for viewing switch information and statistics. In addition, the administrator can use the CLI for performing all levels of switch configuration.

To make the CLI easy to use, the various commands have been logically grouped into a series of menus and submenus. Each menu displays a list of commands and/or submenus that are available, along with a summary of what each command will do. Below each menu is a prompt where you can enter any command appropriate to the current menu.

This chapter describes the Main Menu commands, and provides a list of commands and shortcuts that are commonly available from all the menus within the CLI.

Main Menu

The Main Menu displays after a successful connection and login. The following table shows the Main Menu for the administrator login. Some features are not available under the user login.

```
[Main Menu]
      info    - Information Menu
      stats   - Statistics Menu
      cfg     - Configuration Menu
      oper    - Operations Command Menu
      boot    - Boot Options Menu
      maint   - Maintenance Menu
      diff    - Show pending config changes  [global command]
      apply   - Apply pending config changes [global command]
      save    - Save updated config to FLASH [global command]
      revert  - Revert pending or applied changes [global command]
      exit    - Exit  [global command, always available]
```

Menu summary

The Main Menu displays the following submenus:

- Information Menu

  The Information Menu provides submenus for displaying information about the current status of the switch.

- Statistics Menu

  This menu provides submenus for displaying switch performance statistics.

- Configuration Menu

  This menu is available only from an administrator login. It includes submenus for configuring every aspect of the switch. Changes to configuration are not active until explicitly applied. Changes can be saved to non-volatile memory (NVRAM).

- Operations Command Menu

  Operations-level commands are used for making immediate and temporary changes to switch configuration. This menu is used for bringing ports temporarily in and out of service. This menu is available only from an administrator and operator login.

- Boot Options Menu

  The Boot Options Menu is available only from an administrator login. This menu is used for upgrading switch software, selecting configuration blocks, and for resetting the switch when necessary. This menu is also used to set the switch back to factory settings.

- Maintenance Menu

  This menu is used for debugging purposes, enabling you to generate a technical support dump of the critical state information in the switch, and to clear entries in the Forwarding Database and the Address Resolution Protocol (ARP). This menu is available only from an administrator and operator login.

Global commands

Some basic commands are recognized throughout the menu hierarchy. These commands are useful for obtaining online Help, navigating through menus, and for applying and saving configuration changes.

For help on a specific command, type help. The following screen displays:

```
Global Commands: [can be issued from any menu]
help              up               print            pwd
lines             verbose          exit             quit
diff              apply            save             revert
ping              traceroute       telnet           history
pushd             popd             who

The following are used to navigate the menu structure:
   .  Print current menu
  ..  Move up one menu level
   /  Top menu if first, or command separator
   !  Execute command from history
```

The following table describes the global commands.

Table 13 Global commands

Command	Action
`? command` or `help`	Provides usage information about a specific command on the current menu. When used without the command parameter, a summary of the global commands is displayed.
`.` or `print`	Displays the current menu.
`..` or `up`	Moves up one level in the menu structure.
`/`	If placed at the beginning of a command, displays the Main Menu. Otherwise, this is used to separate multiple commands placed on the same line.
`lines`	Sets the number of lines (n) that display on the screen at one time. The default is 24 lines. When used without a value, the current setting is displayed.
`diff`	Shows any pending configuration changes that have not been applied. `diff flash` displays all pending configuration changes that have been applied but not saved to flash memory (NVRAM), as well as those that have not been applied.
`apply`	Applies pending configuration changes.
`save`	Saves the active configuration to backup, and saves the current configuration as active. `save n` saves the current configuration as active, without saving the active configuration to backup.
`revert`	Removes changes that have been made, but not applied. `revert apply` removes all changes that have not been saved.
`exit` or `quit`	Exits from the command line interface and logs out.
`ping`	Verifies station-to-station connectivity across the network. The format is: `ping` *<host name>* | *<IP address>* `[` *<number of tries>* `[` *<msec delay>* `]]` • IP address is the hostname or IP address of the device. • number of tries (optional) is the number of attempts (1-32). • msec delay (optional) is the number of milliseconds between attempts.
`traceroute`	Identifies the route used for station-to-station connectivity across the network. The format is: `traceroute` *<host name>* | *<IP address>* `[`*<max-hops>* `[` *<msec delay>* `]]` • IP address is the hostname or IP address of the target station. • max-hops (optional) is the maximum distance to trace (1-16 devices) • msec delay (optional) is the number of milliseconds to wait for the response.
`pwd`	Displays the command path used to reach the current menu.
`verbose n`	Sets the level of information displayed on the screen: • 0 = Quiet: Nothing displays except errors, not even prompts. • 1 = Normal: Prompts and requested output are shown, but no menus. • 2 = Verbose: Everything is shown. This is the default. • When used without a value, the current setting is displayed.
`telnet`	This command is used to Telnet out of the switch. The format is: `telnet` *<hostname>* | *<IP address>* `[port]`
`history`	Displays the history of the last ten commands.
`pushd`	Remembers the current location in the directory of menu commands.
`popd`	Returns to the last pushd location.

Table 13 Global commands

Command	Action
`who`	Displays users who are logged in.

Command line history and editing

Using the command line interface, you can retrieve and modify previously entered commands with just a few keystrokes. The following options are available globally at the command line:

Table 14 Command line history and editing options

Option	Description
`history`	Displays a numbered list of the last ten previously entered commands.
`!!`	Repeats the last entered command.
`!n`	Repeats the nth command shown on the history list.
`<Ctrl-p>` or Up arrow key	Recalls the previous command from the history list. This can be used multiple times to work backward through the last ten commands. The recalled command can be entered as is, or edited using the options below.
`<Ctrl-n>` or Down arrow key	Recalls the next command from the history list. This can be used multiple times to work forward through the last ten commands. The recalled command can be entered as is, or edited using the options below.
`<Ctrl-a>`	Moves the cursor to the beginning of the command line.
`<Ctrl-e>`	Moves cursor to the end of the command line.
`<Ctrl-b>` or Left arrow key	Moves the cursor back one position to the left.
`<Ctrl-f>` or Right arrow key	Moves the cursor forward one position to the right.
`<Backspace>` or Delete key	Erases one character to the left of the cursor position.
`<Ctrl-d>`	Deletes one character at the cursor position.
`<Ctrl-k>`	Erases all characters from the cursor position to the end of the command line.
`<Ctrl-l>`	Redisplays the current line.
`<Ctrl-u>`	Clears the entire line.
Other keys	Inserts new characters at the cursor position.
`.`	Prints the current level menu list.
`..`	Moves to the previous directory level.

Command line interface shortcuts

The following shortcuts allow you to enter commands quickly and easily.

Command stacking

As a shortcut, you can type multiple commands on a single line, separated by forward slashes (/). You can connect as many commands as required to access the menu option that you want.

For example, the keyboard shortcut to access the Simple Network Management Protocol (SNMP) Configuration Menu from the Main# prompt is:

```
Main# cfg/sys/ssnmp/name
```

Command abbreviation

Most commands can be abbreviated by entering the first characters that distinguish the command from the others in the same menu or submenu.

For example, the command shown above could also be entered as:

```
Main# c/sys/ssn/n
```

Tab completion

By entering the first letter of a command at any menu prompt and pressing the Tab key, the CLI will display all commands or options in that menu that begin with that letter. Entering additional letters will further refine the list of commands or options displayed.

If only one command fits the input text when the Tab key is pressed, that command will be supplied on the command line, waiting to be entered. If the Tab key is pressed without any input on the command line, the currently active menu displays.

Information Menu

Introduction

You can view configuration information for the switch in the user, operator, and administrator command modes. This chapter discusses how to use the CLI to display switch information.

Menu overview

Command: `/info`

```
[Information Menu]
     sys      - System Information Menu
     l2       - Layer 2 Information Menu
     l3       - Layer 3 Information Menu
     link     - Show link status
     port     - Show port information
     group    - Show group information
     dump     - Dump all information
```

The following table describes the Information Menu options.

Table 15 Information Menu options

Command	Usage
`sys`	Displays system information.
`l2`	Displays the Layer 2 Information Menu.
`l3`	Displays the Layer 3 Information Menu.
`link`	Displays configuration information about each port, including: • Port number • Port speed (10 Mb/s, 100 Mb/s, 1000 Mb/s, or any) • Duplex mode (half, full, or any) • Flow control for transmit and receive (no, yes, or any) • Link status (up or down)
`port`	Displays port status information, including: • Port number • Port name • VLAN membership
`group`	Displays the group information
`dump`	Dumps all switch information available from the Information Menu (10K or more, depending on your configuration). If you want to capture dump data to a file, set your communication software on your workstation to capture session data prior to issuing the dump commands.

System Information Menu

Command: `/info/sys`

```
[System Menu]
     snmpv3    - SNMPv3 Information Menu
     general   - Show general system information
     log       - Show last 100 syslog messages
     user      - Show current user status
     dump      - Dump all system information
```

The following table describes the System Information Menu options.

Table 16 System Information Menu options

Command	Usage
`snmpv3`	Displays the SNMP v3 Menu.
`general`	Displays system information, including: • System date and time • Switch model name and number • Switch name and location • MAC address of the switch management processor • IP address of IP interface • Hardware version and part number • Software image file and version number • Configuration block name
`log`	Displays 100 most recent syslog messages.
`user`	Displays the User Access Information Menu.
`dump`	Dumps all switch information available from the Information Menu (10K or more, depending on your configuration).

SNMPv3 Information Menu

Command: `/info/sys/snmpv3`

```
[SNMPv3 Information Menu]
     usm       - Show usmUser table information
     view      - Show vacmViewTreeFamily table information
     access    - Show vacmAccess table information
     group     - Show vacmSecurityToGroup table information
     comm      - Show community table information
     taddr     - Show targetAddr table information
     tparam    - Show targetParams table information
     notify    - Show notify table information
     dump      - Show all SNMPv3 information
```

SNMP version 3 (SNMPv3) is an extensible SNMP Framework that supplements the SNMPv2 Framework by supporting the following:

- a new SNMP message format
- security for messages
- access control
- remote configuration of SNMP parameters

For more details on the SNMPv3 architecture, see RFC2271 to RFC2276.

The following table describes the SNMPv3 Information Menu options.

Table 17 SNMPv3 Information Menu options

Command	Usage
`usm`	Displays User Security Model (USM) table information.
`view`	Displays information about view name, subtrees, mask and type of view.
`access`	Displays View-based Access Control information.
`group`	Displays information about the group that includes the security model, user name, and group name.
`comm`	Displays information about the community table.
`taddr`	Displays the Target Address table.
`tparam`	Displays the Target parameters table.
`notify`	Displays the Notify table.

Table 17 SNMPv3 Information Menu options

Command	Usage
dump	Displays all the SNMPv3 information.

SNMPv3 USM User Table information

Command: /info/sys/snmpv3/usm

```
usmUser Table:
User Name                       Protocol
------------------------------- --------------------------------
adminmd5                        HMAC_MD5, DES PRIVACY
adminsha                        HMAC_SHA, DES PRIVACY
v1v2only                        NO AUTH,  NO PRIVACY
```

The User-based Security Model (USM) in SNMPv3 provides security services such as authentication and privacy of messages. This security model makes use of a defined set of user identities displayed in the USM user table. The USM user table contains information like:

- the user name
- a security name in the form of a string whose format is independent of the Security Model
- an authentication protocol, which is an indication that the messages sent on behalf of the user can be authenticated
- the privacy protocol

The following table describes the SNMPv3 User Table information.

Table 18 SNMPv3 User Table parameters

Field	Description
User Name	This is a string that represents the name of the user that you can use to access the switch.
Protocol	This indicates whether messages sent on behalf of this user are protected from disclosure using a privacy protocol. switch software supports DES algorithm for privacy. The software also supports two authentication algorithms: MD5 and HMAC-SHA.

SNMPv3 View Table information

Command: /info/sys/snmpv3/view

```
View Name          Subtree                      Mask          Type
------------------ ---------------------------  ------------  --------
iso                  1                                       included
v1v2only             1                                       included
v1v2only             1.3.6.1.6.3.15                          excluded
v1v2only             1.3.6.1.6.3.16                          excluded
v1v2only             1.3.6.1.6.3.18                          excluded
```

The user can control and restrict the access allowed to a group to only a subset of the management information in the management domain that the group can access within each context by specifying the group's rights in terms of a particular MIB view for security reasons.

The following table describes the SNMPv3 View Table information.

Table 19 SNMPv3 View Table parameters

Field	Description
View Name	Displays the name of the view.
Subtree	Displays the MIB subtree as an OID string. A view subtree is the set of all MIB object instances which have a common Object Identifier prefix to their names.
Mask	Displays the bit mask.
Type	Displays whether a family of view subtrees is included or excluded from the MIB view.

SNMPv3 Access Table information

Command: `/info/sys/snmpv3/access`

```
Group Name  Model   Level         ReadV     WriteV   NotifyV
----------  ------- ------------ --------- -------- -------
v1v2grp     snmpv1  noAuthNoPriv iso        iso     v1v2only
admingrp    usm     authPriv     iso        iso     iso
```

The access control sub system provides authorization services.

The vacmAccessTable maps a group name, security information, a context, and a message type, which could be the read or write type of operation or notification into a MIB view.

The View-based Access Control Model defines a set of services that an application can use for checking access rights of a group. This group's access rights are determined by a read-view, a write-view, and a notify-view. The read-view represents the set of object instances authorized for the group while reading the objects. The write-view represents the set of object instances authorized for the group when writing objects. The notify-view represents the set of object instances authorized for the group when sending a notification.

The following table describes the SNMPv3 Access Table information.

Table 20 SNMPv3 Access Table parameters

Field	Description
`Group Name`	Displays the name of group.
`Model`	Displays the security model used, for example, SNMPv1, or SNMPv2 or USM.
`Level`	Displays the minimum level of security required to gain rights of access. For example, noAuthNoPriv, authNoPriv, or auth-Priv.
`ReadV`	Displays the MIB view to which this entry authorizes the read access.
`WriteV`	Displays the MIB view to which this entry authorizes the write access.
`NotifyV`	Displays the Notify view to which this entry authorizes the notify access.

SNMPv3 Group Table information

Command: `/info/sys/snmpv3/group`

```
Sec Model  User Name                    Group Name
---------- ---------------------------- ------------------------------
snmpv1     v1v2only                     v1v2grp
usm        adminmd5                     admingrp
usm        adminsha                     admingrp
```

A group is a combination of security model and security name that defines the access rights assigned to all the security names belonging to that group. The group is identified by a group name.

The following table describes the SNMPv3 Group Table information.

Table 21 SNMPv3 Group Table parameters

Field	Description
`Sec Model`	Displays the security model used, which is any one of: USM, SNMPv1, SNMPv2, and SNMPv3.
`User Name`	Displays the name for the user.
`Group Name`	Displays the access name of the group.

SNMPv3 Community Table information

Command: `/info/sys/snmpv3/comm`

```
Index      Name       User Name            Tag
---------- ---------- -------------------- ----------
trap1      public     v1v2only             v1v2trap
```

This command displays the community table information stored in the SNMP engine.

The following table describes the SNMPv3 Community Table information.

Table 22 SNMPv3 Community Table parameters

Field	Description
`Index`	Displays the unique index value of a row in this table.

Table 22 SNMPv3 Community Table parameters

Field	Description
Name	Displays the community string, which represents the configuration.
User Name	Displays the User Security Model (USM) user name.
Tag	Displays the community tag. This tag specifies a set of transport endpoints from which a command responder application accepts management requests and to which a command responder application sends an SNMP trap.

SNMPv3 Target Address Table information

Command: `/info/sys/snmpv3/taddr`

```
Name       Transport Addr  Port Taglist    Params
---------- --------------- ---- ---------- ---------------
trap1      47.81.25.66     162  v1v2trap   v1v2param
```

This command displays the SNMPv3 target address table information, which is stored in the SNMP engine.

The following table describes the SNMPv3 Target Address Table information.

Table 23 SNMPv3 Target Address Table parameters

Field	Description
Name	Displays the locally arbitrary, but unique identifier associated with this snmpTargetAddrEntry.
Transport Addr	Displays the transport addresses.
Port	Displays the SNMP UDP port number.
Taglist	This column contains a list of tag values which are used to select target addresses for a particular SNMP message.
Params	The value of this object identifies an entry in the snmpTargetParamsTable. The identified entry contains SNMP parameters to be used when generating messages to be sent to this transport address.

SNMPv3 Target Parameters Table information

Command: `/info/sys/snmpv3/tparam`

```
Name                MP Model User Name            Sec Model Sec Level
------------------- -------- -------------------- --------- -----------
v1v2param           snmpv2c  v1v2only             snmpv1    noAuthNoPriv
```

The following table describes the SNMPv3 Target Parameters Table information.

Table 24 SNMPv3 Target Parameters Table

Field	Description
Name	Displays the locally arbitrary, but unique identifier associated with this snmpTargeParamsEntry.
MP Model	Displays the Message Processing Model used when generating SNMP messages using this entry.
User Name	Displays the securityName, which identifies the entry on whose behalf SNMP messages will be generated using this entry.
Sec Model	Displays the security model used when generating SNMP messages using this entry. The system may choose to return an inconsistentValue error if an attempt is made to set this variable to a value for a security model which the system does not support.
Sec Level	Displays the level of security used when generating SNMP messages using this entry.

SNMPv3 Notify Table information

Command: `/info/sys/snmpv3/notify`

```
Name                 Tag
-------------------- --------------------
v1v2trap             v1v2trap
```

The following table describes the SNMPv3 Notify Table information.

Table 25 SNMPv3 Notify Table

Field	Description
Name	The locally arbitrary, but unique identifier associated with this snmpNotifyEntry.
Tag	This represents a single tag value which is used to select entries in the snmpTargetAddrTable. Any entry in the snmpTargetAddrTable that contains a tag value equal to the value of this entry is selected. If this entry contains a value of zero length, no entries are selected.

SNMPv3 dump

Command: `/info/sys/snmpv3/dump`

```
Engine ID = 80:00:07:50:03:00:0F:6A:F8:EF:00
usmUser Table:
User Name                       Protocol
------------------------------- -------------------------------
admin                           NO AUTH, NO PRIVACY
adminmd5                        HMAC_MD5, DES PRIVACY
adminsha                        HMAC_SHA, DES PRIVACY
v1v2only                        NO AUTH, NO PRIVACY

vacmAccess Table:
Group Name Model   Level        ReadV   WriteV   NotifyV
---------- ------- ------------ ------- -------- ------
admin      usm     noAuthNoPriv org     org      org
v1v2grp    snmpv1  noAuthNoPriv org     org      v1v2only
admingrp   usm     authPriv     org     org      org

vacmViewTreeFamily Table:
View Name            Subtree          Mask          Type
-------------------- ---------------- ------------ --------------
org                  1.3                           included
v1v2only             1.3                           included
v1v2only             1.3.6.1.6.3.15                excluded
v1v2only             1.3.6.1.6.3.16                excluded
v1v2only             1.3.6.1.6.3.18                excluded

vacmSecurityToGroup Table:
Sec Model  User Name                       Group Name
---------- ------------------------------ ------------------------
snmpv1     v1v2only                       v1v2grp
usm        admin                          admin
usm        adminsha                       admingrp

snmpCommunity Table:
Index      Name       User Name            Tag
---------- ---------- -------------------- ----------

snmpNotify Table:
Name                 Tag
-------------------- --------------------

snmpTargetAddr Table:
Name       Transport Addr  Port Taglist    Params
---------- --------------- ---- ---------- ---------------

snmpTargetParams Table:
Name                 MP Model User Name          Sec Model Sec Level
-------------------- -------- ------------------ --------- -------
```

System information

Command: `/info/sys/gen`

```
System Information at  6:56:22 Thu Jan 11, 2006
Time zone: Asia/Tokyo

Blade Network Technologies 1Gb Intelligent L2 Switch, SmartPanel
sysName:
sysLocation:
RackId: NEC01A 6X00125
RackName: Default_Rack_Name
EnclosureSerialNumber: NEC01A 6X00125
EnclosureName: Default_Chassis_Name
BayNumber:  1

Switch is up 0 days, 14 hours, 56 minutes and 22 seconds.
Last boot: power cycle

MAC address: 00:17:ef:80:7a:00    IP (If 256) address: 10.14.4.16
Revision:
Switch Serial No: MY3644052B
Spare Part No: 856-126690-001-A
Software Version 1.0.0 (FLASH image2), active configuration.
```

System information includes:

- System date and time
- Switch model name and number
- Rack name and location
- MAC address of the switch management processor
- IP address of the switch
- Software image file and version number
- Current configuration block (active, backup, or factory default)

Show last 100 syslog messages

Command: `/info/sys/log`

```
Date   Time            Severity level                  Message
----   ----         -----------------                  -------
Jul 8 17:25:41            NOTICE              system: link up on port 1
Jul 8 17:25:41            NOTICE              system: link up on port 8
Jul 8 17:25:41            NOTICE              system: link up on port 7
Jul 8 17:25:41            NOTICE              system: link up on port 12
Jul 8 17:25:41            NOTICE              system: link up on port 11
Jul 8 17:25:41            NOTICE              system: link up on port 14
Jul 8 17:25:41            NOTICE              system: link up on port 13
Jul 8 17:25:41            NOTICE              system: link up on port 16
Jul 8 17:25:41            NOTICE              system: link up on port 15
Jul 8 17:25:41            NOTICE              system: link up on port 17
Jul 8 17:25:41            NOTICE              system: link up on port 20
Jul 8 17:25:41            NOTICE              system: link up on port 22
Jul 8 17:25:41            NOTICE              system: link up on port 23
Jul 8 17:25:41            NOTICE              system: link up on port 21
Jul 8 17:25:42            NOTICE              system: link up on port 4
Jul 8 17:25:42            NOTICE              system: link up on port 3
Jul 8 17:25:42            NOTICE              system: link up on port 6
Jul 8 17:25:42            NOTICE              system: link up on port 5
Jul 8 17:25:42            NOTICE              system: link up on port 10
Jul 8 17:25:42            NOTICE              system: link up on port 9
```

Each message contains a date and time field and has a severity level associated with it. One of eight different prefixes is used to indicate the condition:

- EMERG—indicates the system is unusable
- ALERT—indicates action should be taken immediately
- CRIT—indicates critical conditions
- ERR—indicates error conditions or eroded operations
- WARNING—indicates warning conditions
- NOTICE—indicates a normal but significant condition
- INFO—indicates an information message
- DEBUG—indicates a debug-level message

System user information

Command: `/info/sys/user`

```
Usernames:
  user     - enabled
  oper     - disabled
  admin    - Always Enabled
Current User ID table:
  1: name tech1   , ena, cos user    , password valid, online
  2: name tech2   , ena, cos user    , password valid, offline
```

The following table describes the User Name information.

Table 26 User Name Information menu

Field	Usage
`user`	Displays the status of the `user` access level.
`oper`	Displays the status of the `oper` (operator) access level.
`admin`	Displays the status of the `admin` (administrator) access level.
`Current User ID Table`	Displays the status of configured User ID

Layer 2 information

Command: `/info/l2`

```
[Layer 2 Menu]
     fdb      - Forwarding Database Information Menu
     trunk    - Show Trunk Group information
     dump     - Dump all layer 2 information
```

The following table describes the Layer 2 Information menu options.

Table 27 Layer 2 information menu options

Command	Usage
`fdb`	Displays the Forwarding Database Information Menu.
`trunk`	When trunk groups are configured, you can view the state of each port in the various trunk groups.
`dump`	Dumps all switch information available from the Layer 2 menu (10K or more, depending on your configuration). If you want to capture dump data to a file, set your communication software on your workstation to capture session data prior to issuing the dump commands.

FDB information menu

Command: `/info/l2/fdb`

```
[Forwarding Database Menu]
      find    - Show a single FDB entry by MAC address
      port    - Show FDB entries on a single port
      vlan    - Show FDB entries on a single VLAN
      state   - Show FDB entries by state
      dump    - Show all FDB entries
```

The forwarding database (FDB) contains information that maps the media access control (MAC) address of each known device to the switch port where the device address was learned. The FDB also shows which other ports have seen frames destined for a particular MAC address.

NOTE: The master forwarding database supports up to 8K MAC address entries on the management processor (MP) per switch.

Table 28 FDB information menu

Command	Usage
`find <MAC address> [<VLAN>]`	Displays a single database entry by its MAC address. You are prompted to enter the MAC address of the device. Enter the MAC address using the format: xx:xx:xx:xx:xx:xx. (For example: 08:00:20:12:34:56) You can also enter the MAC address using the format: xxxxxxxxxxxx. (For example: 080020123456)
`port <port number>`	Displays all FDB entries for a particular port.
`vlan <1-4095>`	Displays all FDB entries on a single VLAN. The range is 1-4095.
`state unknown|forward|trunk`	Displays all FDB entries that match a particular state.
`dump`	Displays all entries in the Forwarding Database.

Show all FDB information

Command: `/info/l2/fdb/dump`

```
     MAC address      VLAN  Port  Trnk  State
  ----------------   ----  ----  ----  -----
  00:02:01:00:00:00   300          1    TRK
  00:02:01:00:00:01   300   23           FWD
  00:02:01:00:00:02   300   23           FWD
  00:02:01:00:00:03   300   23           FWD
  00:02:01:00:00:04   300   23           FWD
  00:02:01:00:00:05   300   23           FWD
  00:02:01:00:00:06   300   23           FWD
  00:02:01:00:00:07   300   23           FWD
  00:02:01:00:00:08   300   23           FWD
  00:02:01:00:00:09   300   23           FWD
  00:02:01:00:00:0a   300   23           FWD
  00:02:01:00:00:0b   300   23           FWD
  00:02:01:00:00:0c   300   23           FWD
```

An address that is in the forwarding (FWD) state indicates that the switch has learned it. When in the trunking (TRK) state, the Trnk field displays the trunk group number. If the state for the port is listed as unknown (UNK), the MAC address has not yet been learned by the switch, but has only been seen as a destination address. When an address is in the unknown state, no outbound port is indicated.

Clearing entries from the forwarding database

To delete a static MAC address from the forwarding database (FDB), see the “Static FDB configuration” section in the “Configuration Menu” chapter. To clear the entire forwarding database (FDB), see the “Forwarding Database options” section in the “Maintenance Menu” chapter.

Trunk group information

Command: `/info/l2/trunk`

```
Trunk group 1, Enabled
Protocol - Static
port state:
 20: forwarding
 21: forwarding
 22: forwarding
 23: forwarding
 24: forwarding
```

When trunk groups are configured, you can view the state of each port in the various trunk groups.

Layer 3 information

Command: `/info/l3`

```
[Layer 3 Menu]
     arp      - ARP Information Menu
     ip       - Show IP information
     igmp     - Show IGMP Snooping Multicast Group information
     dump     - Dump all layer 3 information
```

The following table describes the Layer 3 Information Menu options.

Table 29 Layer 3 information menu options

Command	Usage
`arp`	Displays the Address Resolution Protocol (ARP) Information Menu.
`ip`	Displays IP Information. IP information, includes: • IP interface information: Interface number, IP address, subnet mask, VLAN number, and operational status. • Default gateway information: Metric for selecting which configured gateway to use, gateway number, IP address, and health status • IP forwarding information: Enable status, lnet and lmask • Port status
`igmp`	Displays IGMP Information Menu.
`dump`	Dumps all switch information available from the Layer 3 Menu (10K or more, depending on your configuration). If you want to capture dump data to a file, set your communication software on your workstation to capture session data prior to issuing the dump commands.

ARP information

Command: `/info/arp`

```
[Address Resolution Protocol Menu]
      find    - Show a single ARP entry by IP address
      port    - Show ARP entries on a single port
      vlan    - Show ARP entries on a single VLAN
      addr    - Show ARP entries for switch's interface
      dump    - Show all ARP entries
```

The Address Resolution Protocol (ARP) information includes IP address and MAC address of each entry, address status flags, VLAN, and port for the address, and port referencing information.

The following table describes the Address Resolution Protocol Menu options.

Table 30 ARP information

Command	Usage
`find <IP address>`	Displays a single ARP entry by IP address. For example, 192.4.17.101
`port <port number>`	Displays the ARP entries on a single port.
`vlan <1-4095>`	Displays the ARP entries on a single VLAN.
`addr`	Displays the ARP address list: IP address, IP mask, MAC address, and VLAN flags.
`dump`	Displays all ARP entries, including: • IP address and MAC address of each entry • Address status flag • The VLAN and port to which the address belongs The ports which have referenced the address (empty if no port has routed traffic to the IP address shown)

ARP address list information

Command: `/info/arp/addr`

```
   IP address         IP mask         MAC address     VLAN
---------------  ---------------  -----------------  ----
205.178.18.66    255.255.255.255  00:70:cf:03:20:04  4095
```

Show all ARP entry information

Command: `/info/arp/dump`

```
IP address      Flags     MAC address                VLAN      Port
--------------- -----    -----------------           ----      ----
192.168.2.4             00:50:8b:b2:32:cb           4095      19
192.168.2.19            00:0e:7f:25:89:b5           4095      19
192.168.2.61    P       00:0f:6a:ed:46:00           4095
```

The Flag field provides additional information about an entry. If no flag displays, the entry is normal.

Table 31 ARP dump flag parameters

Flag	Description
P	Permanent entry created for switch IP interface.
R	Indirect route entry.
U	Unresolved ARP entry. The MAC address has not been learned.

IP information

Command: `/info/l3/ip`

```
Interface information:
  1: 47.80.23.243    255.255.254.0   47.80.23.255,    vlan 1, up
Default gateway information: metric strict
  4: 47.80.23.254,   vlan 4095,   up  active
```

The following interface and default gateway information is displayed:

- Interface number
- IP address
- IP mask
- IP broadcast address
- Operational status

IGMP multicast group information

Command: `/info/l3/igmp`

```
[IGMP Multicast Group Menu]
      mrouter - Show IGMP Snooping Multicast Router Port information
      find    - Show a single group by IP group address
      vlan    - Show groups on a single vlan
      port    - Show groups on a single port
      trunk   - Show groups on a single trunk
      dump    - Show all groups
```

The following table describes the commands used to display information about IGMP groups learned by the switch.

Table 32 IGMP Multicast Group menu options

Command	Usage
`mrouter`	Displays the Multicast Router Menu.
`find <IP address>`	Displays a single IGMP multicast group by its IP address.
`vlan <1-4094>`	Displays all IGMP multicast groups on a single VLAN.
`port <port number>`	Displays all IGMP multicast groups on a single port.
`trunk <1-40>`	Displays all IGMP multicast groups on a single trunk group.
`dump`	Displays information for all multicast groups.

IGMP multicast router port information

Command: `/info/l3/igmp/mrouter`

```
[IGMP Multicast Router Menu]
      vlan - Show all multicast router ports on a single vlan
      dump - Show all multicast router ports
```

The following table describes the commands used to display information about multicast routers learned through IGMP Snooping.

Table 33 IGMP Multicast Router menu options

Command	Usage
`vlan <1-4094>`	Displays information for all multicast groups on a single VLAN.
`dump`	Displays information for all multicast groups learned by the switch.

Link status information

Command: `/info/link`

```
-------------------------------------------------------------------
Port   Speed    Duplex     Flow Ctrl      Link
----   -----   --------  --TX-----RX--    ------
  1    1000      full     yes    yes       up
  2    1000      full     yes    yes       up
  3    1000      full     yes    yes       up
  4    1000      full     yes    yes       up
  5     any       any     yes    yes      down
  6     any       any     yes    yes      down
  7     any       any     yes    yes      down
  8     any       any     yes    yes       up
  9     any       any     yes    yes      down
 10     any       any     yes    yes      down
 11     any       any     yes    yes      down
 12     any       any     yes    yes      down
 13     any       any     yes    yes      down
 14     any       any     yes    yes      down
 15     any       any     yes    yes      down
 16     any       any     yes    yes      down
 19     100      full      no     no       up
 20    1000      full      no     no       up
 21    1000      full      no     no       up
 22     any       any     any    yes      down
 23     any       any     yes    yes      down
 24     any       any     yes    yes      down
```

Use this command to display link status information about each port on a switch, including:

- Port number
- Port speed (10 Mb/s, 100 Mb/s, 1000 Mb/s, or any)
- Duplex mode (half, full, or any)
- Flow control for transmit and receive (no or yes)
- Link status (up or down)

Port information

Command: `/info/port`

```
Port      NAME                 VLAN(s)
---- -------------- -------------------------------
  1  Downlink1      1
  2  Downlink2      1
  3  Downlink3      1
  4  Downlink4      1
  5  Downlink5      1
  6  Downlink6      1
  7  Downlink7      1
  8  Downlink8      1
  9  Downlink9      1
 10  Downlink10     1
 11  Downlink11     1
 12  Downlink12     1
 13  Downlink13     1
 14  Downlink14     1
 15  Downlink15     1
 16  Downlink16     1
 19  Mgmt           4095
 20  Uplink1        1
 21  Uplink2        1
 22  Uplink3        1
 23  Uplink4        1
 24  Uplink5        1
```

Port information includes:

- Port number
- Port name
- VLAN membership

Group information

Command: `/info/group`

```
Group 1:
Internal Ports:  1-16
External Ports:  20-24
Port VLAN ID: 1
Number of nondefault vlans in group: 0
VLANs:  empty
Default Group Vlan: 1
Trunk group 13: Enabled
port state:
  20: forwarding
  21: forwarding
  22: forwarding
  23: forwarding
  24: forwarding
LACP Enabled
IGMP Disabled
Failover Enabled
Failover Limit = 0
```

This displays the information of Port Group 1-5 and Spare Ports Group.

Information dump

Command: `/info/dump`

Use the dump command to dump all switch information available from the Information Menu (10K or more, depending on your configuration). This data is useful for tuning and debugging switch performance.

If you want to capture dump data to a file, set the communication software on your workstation to capture session data prior to issuing the dump commands.

Statistics Menu

Introduction

You can view switch performance statistics in the user, operator, and administrator command modes. This chapter discusses how to use the CLI to display switch statistics.

Menu information

Command: `/stats`

```
[Statistics Menu]
     port     - Port Stats Menu
     clrports – Clear stats for all ports
     l2       - Layer 2 Stats Menu
     l3       - Layer 3 Stats Menu
     mp       - MP-specific Stats Menu
     ntp      - Show NTP stats
     dump     - Dump all stats
```

The following table describes the Statistics Menu options.

Table 34 Statistics Menu options

Command	Usage
`port <port number>`	Displays the Port Statistics Menu for the specified port. Use this command to display traffic statistics on a port-by-port basis. Traffic statistics are included in SNMP Management Information Base (MIB) objects.
`clrports`	Clears the statistics for all ports.
`l2`	Displays the Layer 2 Statistics Menu.
`l3`	Displays the Layer 3 Statistics Menu.
`mp`	Displays the Management Processor Statistics Menu. Use this command to view information on how switch management processes and resources are currently being allocated.
`ntp <clear>`	Displays Network Time Protocol (NTP) Statistics. Add the argument, `clear`, to clear NTP statistics
`dump`	Dumps all switch statistics. Use this command to gather data for tuning and debugging switch performance. If you want to capture dump data to a file, set your communication software on your workstation to capture session data prior to issuing the dump command.

Port Statistics Menu

Command: `/stats/port <port number>`

```
[Port Statistics Menu]
      brg     - Show bridging ("dot1") stats
      ether   - Show Ethernet ("dot3") stats
      if      - Show interface ("if") stats
      ip      - Show Internet Protocol ("IP") stats
      link    - Show link stats
      clear   - Clear all port stats
```

This menu displays traffic statistics on a port-by-port basis.

The following table describes the Port Statistics Menu options:

Table 35 Port Statistics Menu options

Command	Usage
`brg`	Displays bridging (“dot1”) statistics for the port.
`ether`	Displays Ethernet (“dot3”) statistics for the port.
`if`	Displays interface statistics for the port.
`ip`	Displays Internet Protocol statistics for the port.
`link`	Displays link statistics for the port.
`clear`	Clears all the statistics on the port.

Bridging statistics

Command: `/stats/port <port number>/brg`

```
Bridging statistics for port 1:
dot1PortInFrames:                    63242584
dot1PortOutFrames:                   63277826
dot1PortInDiscards:                         0
dot1TpLearnedEntryDiscards:                 0
dot1StpPortForwardTransitions:              0
```

The following table describes the bridging statistics for a selected port:

Table 36 Bridging statistics for port

Statistics	Description
`dot1PortInFrames`	The number of frames that have been received by this port from its segment. A frame received on the interface corresponding to this port is counted by this object, if and only if, it is for a protocol being processed by the local bridging function, including bridge management frames.
`dot1PortOutFrames`	The number of frames that have been transmitted by this port to its segment. A frame transmitted on the interface corresponding to this port is counted by this object, if and only if, it is for a protocol being processed by the local bridging function, including bridge management frames.
`dot1PortInDiscards`	Count of valid frames received which were discarded (that is, filtered) by the forwarding process.
`dot1TpLearnedEntryDiscards`	The total number of Forwarding Database entries, which have been or would have been learned, but have been discarded due to a lack of space to store them in the Forwarding Database. If this counter is increasing, it indicates that the Forwarding Database is regularly becoming full (a condition which has adverse performance effects on the sub network). If this counter has a significant value but is not presently increasing, it indicates that the problem has been occurring but is not persistent.
`dot1StpPortForwardTransitions`	The number of times this port has transitioned from the Learning state to the Forwarding state.

Ethernet statistics

Command: `/stats/port <port number>/ether`

```
Ethernet statistics for port 1:
dot3StatsAlignmentErrors:                   0
dot3StatsFCSErrors:                         0
dot3StatsSingleCollisionFrames:             0
dot3StatsMultipleCollisionFrames:           0
dot3StatsLateCollisions:                    0
dot3StatsExcessiveCollisions:               0
dot3StatsInternalMacTransmitErrors:         0
dot3StatsFrameTooLongs:                     0
dot3StatsInternalMacReceiveErrors:          0
```

The following table describes the Ethernet statistics for a selected port:

Table 37 Ethernet statistics for port

Statistics	Description
dot3StatsAlignmentErrors	A count of frames received on a particular interface that are not an integral number of octets in length and do not pass the Frame Check Sequence (FCS) check. The count represented by an instance of this object is incremented when the alignmentError status is returned by the MAC service to the Logical Link Control (LLC) (or other MAC user). Received frames for which multiple error conditions obtained are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.
dot3StatsFCSErrors	A count of frames received on a particular interface that are an integral number of octets in length but do not pass the Frame Check Sequence (FCS) check. The count represented by an instance of this object is incremented when the frameCheckError status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions obtained are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.
dot3StatsSingleCollisionFrames	A count of successfully transmitted frames on a particular interface for which transmission is inhibited by exactly one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, and is not counted by the corresponding instance of the dot3StatsMultipleCollisionFrame object.
dot3StatsMultipleCollisionFrames	A count of successfully transmitted frames on a particular interface for which transmission is inhibited by more than one collision. A frame that is counted by an instance of this object is also counted by the corresponding instance of either the ifOutUcastPkts, ifOutMulticastPkts, or ifOutBroadcastPkts, and is not counted by the corresponding instance of the dot3StatsSingleCollisionFrames object.
dot3StatsLateCollisions	The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet. Five hundred and twelve bit-times corresponds to 51.2 microseconds on a 10 Mbit/s system. A (late) collision included in a count represented by an instance of this object is also considered as a (generic) collision for purposes of other collision-related statistics.
dot3StatsExcessiveCollisions	A count of frames for which transmission on a particular interface fails due to excessive collisions.

Table 37 Ethernet statistics for port

Statistics	Description
dot3StatsInternalMacTransmitErrors	A count of frames for which transmission on a particular interface fails due to an internal MAC sublayer transmit error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of either the dot3StatsLateCollisions object, the dot3StatsExcessiveCollisions object, or the dot3StatsCarrierSenseErrors object. The precise meaning of the count represented by an instance of this object is implementation specific. In particular, an instance of this object may represent a count of transmission errors on a particular interface that are not otherwise counted.
dot3StatsFrameTooLongs	A count of frames received on a particular interface that exceeds the maximum permitted frame size. The count represented by an instance of this object is incremented when the frameTooLong status is returned by the MAC service to the LLC (or other MAC user). Received frames for which multiple error conditions obtained are, according to the conventions of IEEE 802.3 Layer Management, counted exclusively according to the error status presented to the LLC.
dot3StatsInternalMacReceiveErrors	A count of frames for which reception on a particular interface fails due to an internal MAC sublayer receive error. A frame is only counted by an instance of this object if it is not counted by the corresponding instance of the dot3StatsFrameTooLongs object, the dot3StatsAlignmentErrors object, or the dot3StatsFCSErrors object. The precise meaning of the count represented by an instance of this object is implementation specific. In particular, an instance of this object may represent a count of received errors on a particular interface that are not otherwise counted.

Interface statistics

Command: `/stats/port <port number>/if`

```
Interface statistics for port 1:
                    ifHCIn Counters       ifHCOut Counters
Octets:                 51697080313            51721056808
UcastPkts:                 65356399               65385714
BroadcastPkts:                    0                   6516
MulticastPkts:                    0                      0
Discards:                         0                      0
Errors:                           0                  21187
```

The following table describes the interface (IF) statistics for a selected port:

Table 38 Interface statistics for port

Statistics	Description
Octets—IfHCIn	The total number of octets received on the interface, including framing characters.
UcastPkts—IfHCIn	The number of packets, delivered by this sublayer to a higher sublayer, which were not addressed to a multicast or broadcast address at this sublayer.
BroadcastPkts—IfHCIn	The number of packets, delivered by this sublayer to a higher sublayer, which were addressed to a broadcast address at this sublayer.
MulticastPkts—IfHCIn	The total number of packets, delivered by this sublayer. These are the packets that higher-level protocols requested to be transmitted, and which were addressed to a multicast address at this sublayer, including those that were discarded or not sent. For a MAC layer protocol, this includes both group and functional addresses.
Discards—IfHCIn	The number of inbound packets which were chosen to be discarded even though no errors were detected to prevent their being delivered to a higher-layer protocol. One possible reason for discarding such a packet could be to free up buffer space.

Table 38 Interface statistics for port

Statistics	Description
Errors—IfHCIn	For packet-oriented interfaces, the number of inbound packets that contained errors preventing them from being delivered to a higher-layer protocol. For character-oriented or fixed-length interfaces, the number of inbound transmission units that contained errors preventing them from being deliverable to a higher-layer protocol.
Octets—IfHCOut	The total number of octets transmitted out of the interface, including framing characters.
UcastPkts—IfHCOut	The total number of packets that higher-level protocols requested to be transmitted, and which were not addressed to a multicast or broadcast address at this sublayer, including those that were discarded or not sent.
BroadcastPkts—IfHCOut	The total number of packets that higher-level protocols requested to be transmitted, and which were addressed to a broadcast address at this sublayer, including those that were discarded or not sent. This object is a 64-bit version of ifOutBroadcastPkts.
MulticastPkts—IfHCOut	The total number of packets that higher-level protocols requested to be transmitted, and which were addressed to a multicast address at this sublayer, including those that were discarded or not sent. For a MAC layer protocol, this includes both group and functional addresses. This object is a 64-bit version of ifOutMulticastPkts.
Discards—IfHCOut	The number of outbound packets that were chosen to be discarded even though no errors had been detected to prevent their being transmitted. One possible reason for discarding such a packet could be to free up buffer space.
Errors—IfHCOut	For packet-oriented interfaces, the number of outbound packets that could not be transmitted because of errors. For character-oriented or fixed-length interfaces, the number of outbound transmission units that could not be transmitted because of errors.

Internet Protocol (IP) statistics

Command: `/stats/port <port number>/ip`

```
GEA IP statistics for port 1:
ipInReceives   :          0
ipInHeaderError:          0
ipInDiscards   :          0
```

The following table describes the Internet Protocol (IP) statistics for a selected port:

Table 39 IP statistics for port

Statistics	Description
ipInReceives	The total number of input datagrams received from interfaces, including those received in error.
ipInHeaderError	The number of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity (the switch).
ipInDiscards	The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). Note that this counter does not include any datagrams discarded while awaiting re-assembly.

Link statistics

Command: `/stats/port <port number>/link`

```
Link statistics for port 1:
linkStateChange:              2
```

The following table describes the link statistics for a selected port:

Table 40 Link statistics for port

Statistic	Description
linkStateChange	The total number of link state changes.

Layer 2 statistics Menu

Command: `/stats/l2`

```
[Layer 2 Statistics Menu]
     fdb      - Show FDB stats
     lacp     - Show LACP stats
```

The following table describes the Layer 2 statistics menu options.

Table 41 Layer 2 statistics menu options

Command	Usage
fdb	Displays the Forwarding Database statistics.
lacp	Displays the Link Aggregation Control Protocol statistics.

FDB statistics

Command: `/stats/l2/fdb`

```
FDB statistics:
 current:            91   hiwat:               91
```

This menu option enables you to display statistics regarding the use of the forwarding database, including the number of current entries and the maximum number of entries ever recorded.

The following table describes the Forwarding Database (FDB) statistics:

Table 42 Forwarding Database statistics

Statistic	Description
current	Current number of entries in the Forwarding Database.
hiwat	Highest number of entries recorded at any given time in the Forwarding Database.

LACP statistics

Command: /stats/l2/lacp *<port number>*

```
Valid LACPDUs received         - 0
Valid Marker PDUs received     - 0
Valid Marker Rsp PDUs received - 0
Unknown version/TLV type       - 0
Illegal subtype received       - 0
LACPDUs transmitted            - 0
Marker PDUs transmitted        - 0
Marker Rsp PDUs transmitted    - 0
```

Layer 3 statistics Menu

Command: `/stats/l3`

```
[Layer 3 Statistics Menu]
     ip       - Show IP stats
     route    - Show route stats
     arp      - Show ARP stats
     icmp     - Show ICMP stats
     tcp      - Show TCP stats
     udp      - Show UDP stats
     igmp     - Show IGMP stats
     clrigmp  - Clear IGMP stats
     ipclear  - Clear IP stats
     dump     - Dump layer 3 stats
```

The following table describes the Layer 3 statistics menu options. Layer 3 functionality is limited in this release.

Table 43 Layer 3 statistics menu options

Command	Usage
`ip`	Displays IP statistics
`route`	Displays route statistics
`arp <clear>`	Displays Address Resolution Protocol (ARP) statistics. Add the argument, clear, to clear ARP statistics.
`icmp`	Displays ICMP statistics.
`tcp`	Displays Transmission Control Protocol (TCP) statistics. Add the argument, clear, to clear TCP statistics.
`udp`	Displays User Datagram Protocol (UDP) statistics. Add the argument, clear, to clear UDP statistics.
`igmp`	Displays IGMP statistics.
`clrigmp <1-4095>|all`	Clears all IGMP statistics for the selected VLANs.
`ipclear`	Clears IP statistics. Use this command with caution as it will delete all the IP statistics.
`dump`	Displays all Layer 3 statistics.

IP statistics

Command: `/stats/l3/ip`

```
IP statistics:
ipInReceives:        36475      ipInHdrErrors:         0
ipInAddrErrors:        905
ipInUnknownProtos:       0      ipInDiscards:          0
ipInDelivers:         4103      ipOutRequests:     30974
ipOutDiscards:           0
ipDefaultTTL:          255
```

The following table describes the IP statistics:

Table 44 IP statistics

Statistics	Description
`ipInReceives`	The total number of input datagrams received from interfaces, including those received in error.
`ipInHdrErrors`	The number of input datagrams discarded due to errors in their IP headers, including bad checksums, version number mismatch, other format errors, time-to-live exceeded, errors discovered in processing their IP options, and so on.
`ipInAddrErrors`	The number of input datagrams discarded because the IP address in their IP header destination field was not a valid address to be received at this switch. This count includes invalid addresses (for example, 0.0.0.0) and addresses of unsupported classes (for example, Class E). For entities which are not IP gateways and therefore do not forward datagrams, this counter includes datagrams discarded because the destination address was not a local address.
`ipInUnknownProtos`	The number of locally addressed datagrams received successfully but discarded because of an unknown or unsupported protocol.

Table 44 IP statistics

Statistics	Description
ipInDiscards	The number of input IP datagrams for which no problems were encountered to prevent their continued processing, but which were discarded (for example, for lack of buffer space). This counter does not include any datagrams discarded while awaiting re-assembly.
ipInDelivers	The total number of input datagrams successfully delivered to IP user-protocols (including ICMP).
ipOutRequests	The total number of IP datagrams that local IP user-protocols (including ICMP) supplied to IP in requests for transmission. This counter does not include any datagrams counted in ipForwDatagrams.
ipOutDiscards	The number of output IP datagrams for which no problem was encountered to prevent their transmission to their destination, but which were discarded (for example, for lack of buffer space). This counter would include datagrams counted in ipForwDatagrams if any such packets met this (discretionary) discard criterion.
ipDefaultTTL	The default value inserted into the Time-To-Live (TTL) field of the IP header of datagrams originated at this switch, whenever a TTL value is not supplied by the transport layer protocol.

Route statistics

Command: `/stats/l3/route`

```
Route statistics:
ipRoutesCur:               7  ipRoutesHighWater:          7
ipRoutesMax:             512
```

The following table describes the Route statistics:

Table 45 Route statistics

Statistics	Description
ipRoutesCur	The total number of outstanding routes in the route table.
ipRoutesMax	The maximum number of supported routes.
ipRoutesHighWater	The highest number of routes ever recorded in the route table.

ARP statistics

Command: `/stats/l3/arp`

```
ARP statistics:
arpEntriesCur:             2  arpEntriesHighWater:          4
arpEntriesMax:          2047
```

The following table describes the Address Resolution Protocol (ARP) statistics:

Table 46 ARP statistics

Statistic	Description
arpEntriesCur	The total number of outstanding ARP entries in the ARP table.
arpEntriesMax	The maximum number of supported ARP entries.
arpEntriesHighWater	The highest number of ARP entries ever recorded in the ARP table.

ICMP statistics

Command: `/stats/l3/icmp`

```
ICMP statistics:
icmpInMsgs:              245802   icmpInErrors:               1393
icmpInDestUnreachs:          41   icmpInTimeExcds:               0
icmpInParmProbs:              0   icmpInSrcQuenchs:              0
icmpInRedirects:              0   icmpInEchos:                  18
icmpInEchoReps:          244350   icmpInTimestamps:              0
icmpInTimestampReps:          0   icmpInAddrMasks:               0
icmpInAddrMaskReps:           0   icmpOutMsgs:              253810
icmpOutErrors:                0   icmpOutDestUnreachs:          15
icmpOutTimeExcds:             0   icmpOutParmProbs:              0
icmpOutSrcQuenchs:            0   icmpOutRedirects:              0
icmpOutEchos:            253777   icmpOutEchoReps:              18
icmpOutTimestamps:            0   icmpOutTimestampReps:          0
icmpOutAddrMasks:             0   icmpOutAddrMaskReps:           0
```

The following table describes the Internet Control Messaging Protocol (ICMP) statistics:

Table 47 ICMP statistics

Statistics	Description
`icmpInMsgs`	The total number of ICMP messages which the switch received. Note that this counter includes all those counted by icmpInErrors.
`icmpInErrors`	The number of ICMP messages which the switch received but determined as having ICMP specific errors (for example bad ICMP checksums and bad length).
`icmpInDestUnreachs`	The number of ICMP Destination Unreachable messages received.
`icmpInTimeExcds`	The number of ICMP Time Exceeded messages received.
`icmpInParmProbs`	The number of ICMP Parameter Problem messages received.
`icmpInSrcQuenchs`	The number of ICMP Source Quench (buffer almost full, stop sending data) messages received.
`icmpInRedirects`	The number of ICMP Redirect messages received.
`icmpInEchos`	The number of ICMP Echo (request) messages received.
`icmpInEchoReps`	The number of ICMP Echo Reply messages received.
`icmpInTimestamps`	The number of ICMP Timestamp (request) messages received.
`icmpInTimestampReps`	The number of ICMP Timestamp Reply messages received.
`icmpInAddrMasks`	The number of ICMP Address Mask Request messages received.
`icmpInAddrMaskReps`	The number of ICMP Address Mask Reply messages received.
`icmpOutMsgs`	The total number of ICMP messages which this switch attempted to send. Note that this counter includes all those counted by icmpOutErrors.
`icmpOutErrors`	The number of ICMP messages that this switch did not send due to problems discovered within ICMP such as a lack of buffer. This value should not include errors discovered outside the ICMP layer such as the inability of IP to route the resultant datagram. In some implementations there may be no types of errors that contribute to this counter's value.
`icmpOutDestUnreachs`	The number of ICMP Destination Unreachable messages sent.
`icmpOutTimeExcds`	The number of ICMP Time Exceeded messages sent.
`icmpOutParmProbs`	The number of ICMP Parameter Problem messages sent.
`icmpOutSrcQuenchs`	The number of ICMP Source Quench (buffer almost full, stop sending data) messages sent.
`icmpOutRedirects`	The number of ICMP Redirect messages sent.
`icmpOutEchos`	The number of ICMP Echo (request) messages sent.
`icmpOutEchoReps`	The number of ICMP Echo Reply messages sent.
`icmpOutTimestamps`	The number of ICMP Timestamp (request) messages sent.
`icmpOutTimestampReps`	The number of ICMP Timestamp Reply messages sent.
`icmpOutAddrMasks`	The number of ICMP Address Mask Request messages sent.
`icmpOutAddrMaskReps`	The number of ICMP Address Mask Reply messages sent.

TCP statistics

Command: `/stats/l3/tcp`

```
TCP statistics:
tcpRtoAlgorithm:         4   tcpRtoMin:               0
tcpRtoMax:          240000   tcpMaxConn:            512
tcpActiveOpens:     252214   tcpPassiveOpens:         7
tcpAttemptFails:       528   tcpEstabResets:          4
tcpInSegs:          756401   tcpOutSegs:         756655
tcpRetransSegs:          0   tcpInErrs:               0
tcpCurBuff:              0   tcpCurConn:              3
tcpOutRsts:            417
```

The following table describes the Transmission Control Protocol (TCP) statistics:

Table 48 TCP statistics

Statistics	Description
`tcpRtoAlgorithm`	The algorithm used to determine the timeout value used for retransmitting unacknowledged octets.
`tcpRtoMin`	The minimum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the LBOUND quantity described in Request For Comments (RFC) 793.
`tcpRtoMax`	The maximum value permitted by a TCP implementation for the retransmission timeout, measured in milliseconds. More refined semantics for objects of this type depend upon the algorithm used to determine the retransmission timeout. In particular, when the timeout algorithm is rsre(3), an object of this type has the semantics of the UBOUND quantity described in RFC 793.
`tcpMaxConn`	The limit on the total number of TCP connections the switch can support. In entities where the maximum number of connections is dynamic, this object should contain the value -1.
`tcpActiveOpens`	The number of times TCP connections have made a direct transition to the SYN-SENT state from the CLOSED state.
`tcpPassiveOpens`	The number of times TCP connections have made a direct transition to the SYN-RCVD state from the LISTEN state.
`tcpAttemptFails`	The number of times TCP connections have made a direct transition to the CLOSED state from either the SYN-SENT state or the SYN-RCVD state, plus the number of times TCP connections have made a direct transition to the LISTEN state from the SYN-RCVD state.
`tcpEstabResets`	The number of times TCP connections have made a direct transition to the CLOSED state from either the ESTABLISHED state or the CLOSE- WAIT state.
`tcpInSegs`	The total number of segments received, including those received in error. This count includes segments received on currently established connections.
`tcpOutSegs`	The total number of segments sent, including those on current connections but excluding those containing only retransmitted octets.
`tcpRetransSegs`	The total number of segments retransmitted, that is, the number of TCP segments transmitted containing one or more previously transmitted octets.
`tcpInErrs`	The total number of segments received in error (for example, bad TCP checksums).
`tcpCurBuff`	The total number of outstanding memory allocations from heap by TCP protocol stack.
`tcpCurConn`	The total number of outstanding TCP sessions that are currently opened.
`tcpOutRsts`	The number of TCP segments sent containing the reset (RST) flag.

UDP statistics

Command: `/stats/l3/udp`

```
UDP statistics:
udpInDatagrams:         54    udpOutDatagrams:         43
udpInErrors:             0    udpNoPorts:         1578077
```

The following table describes the User Datagram Protocol (UDP) statistics:

Table 49 UDP statistics

Statistics	Description
udpInDatagrams	The total number of UDP datagrams delivered to the switch.
udpOutDatagrams	The total number of UDP datagrams sent from this switch.
udpInErrors	The number of received UDP datagrams that could not be delivered for reasons other than the lack of an application at the destination port.
udpNoPorts	The total number of received UDP datagrams for which there was no application at the destination port.

IGMP Multicast Group statistics

Command: `/stats/l3/igmp`

```
Enter VLAN number:  (1-4094) 1
------------------------------------------------------------
IGMP Snoop vlan 1 statistics:
------------------------------------------------------------
rxIgmpValidPkts:                    0    rxIgmpInvalidPkts:              0
rxIgmpGenQueries:                   0    rxIgmpGrpSpecificQueries:       0
rxIgmpLeaves:                       0    rxIgmpReports:                  0
txIgmpReports:                      0    txIgmpGrpSpecificQueries:       0
txIgmpLeaves:                       0    rxIgmpV3CurrentStateRecords:    0
rxIgmpV3SoruceListChangeRecords:    0    rxIgmpV3FilterChangeRecords:    0
```

This menu option enables you to display statistics regarding the use of the IGMP Multicast Groups.

The following table describes the IGMP statistics:

Table 50 IGMP statistics

Statistic	Description
rxIgmpValidPkts	Total number of valid IGMP packets received
rxIgmpInvalidPkts	Total number of invalid packets received
rxIgmpGenQueries	Total number of General Membership Query packets received
rxIgmpGrpSpecificQueries	Total number of Membership Query packets received from specific groups
rxIgmpLeaves	Total number of Leave requests received
rxIgmpReports	Total number of Membership Reports received
txIgmpReports	Total number of Membership reports transmitted
txIgmpGrpSpecificQueries	Total number of Membership Query packets transmitted to specific groups
txIgmpLeaves	Total number of Leave messages transmitted
rxIgmpV3CurrentStaateRecords	Total number of Current State Record
rxIgmpV3SourceListChangeRecords	Total number of Source List Record
rxIgmpV3FilterChangeRecords	Total number of Filter Change Record

Management Processor statistics

Command: `/stats/mp`

```
[MP-specific Statistics Menu]
      i2c     - Show i2c stats
      pkt     - Show Packet stats
      tcb     - Show All TCP control blocks in use
      ucb     - Show All UDP control blocks in use
      cpu     - Show CPU utilization
```

The following table describes the MP-specific Statistics Menu options:

Table 51 MP-specific Statistics Menu

Command	Usage
`i2c`	Displays i2c statistics.
`pkt`	Displays packet statistics, to check for leads and load.
`tcb`	Displays all Transmission Control Protocol (TCP) control blocks (TCB) that are in use.
`ucb`	Displays all User Datagram Protocol (UDP) control blocks (UCB) that are in use.
`cpu`	Displays CPU utilization for periods of up to 1, 4, and 64 seconds.

Packet statistics

Command: `/stats/mp/pkt`

```
Packet counts:
 allocs:          36692     frees:                       36692
 mediums:             0     mediums hi-watermark:            3
 jumbos:              0     jumbos hi-watermark:             0
 smalls:              0     smalls hi-watermark:             2
 failures:            0
```

The following table describes the packet statistics.

Table 52 MP specific packet statistics

Description	Example statistic
allocs	Total number of packet allocations from the packet buffer pool by the TCP/IP protocol stack.
frees	Total number of times the packet buffers are freed (released) to the packet buffer pool by the TCP/IP protocol stack.
mediums	Total number of packet allocations with size between 128 to 1536 bytes from the packet buffer pool by the TCP/IP protocol stack.
mediums hi-watermark	The highest number of packet allocation with size between 128 to 1536 bytes from the packet buffer pool by the TCP/IP protocol stack.
jumbos	Total number of packet allocations with more than 1536 bytes from the packet buffer pool by the TCP/IP protocol stack.
jumbos hi-watermark	The highest number of packet allocation with more than 1536 bytes from the packet buffer pool by the TCP/IP protocol stack.
smalls	Total number of packet allocations with size less than 128 bytes from the packet buffer pool by the TCP/IP protocol stack.
smalls hi-watermark	The highest number of packet allocation with size less than 128 bytes from the packet buffer pool by the TCP/IP protocol stack.
failures	Total number of packet allocation failures from the packet buffer pool by the TCP/IP protocol stack.

TCP statistics

Command: `/stats/mp/tcb`

```
All TCP allocated control blocks:
10ad41e8:  0.0.0.0             0 <=> 0.0.0.0            80  listen
10ad5790:  47.81.27.5       1171 <=> 47.80.23.243       23  established
```

The following table describes the Transmission Control Protocol (TCP) control block (TCB) statistics shown in this example:

Table 53 MP specified TCP statistics

Description	Example statistic
Memory	`10ad41e8/10ad5790`
Destination IP address	`0.0.0.0/47.81.27.5`
Destination port	`0/1171`
Source IP	`0.0.0.0/47.80.23.243`
Source port	`80/23`
State	`listen/established`

UDP statistics

Command: `/stats/mp/ucb`

```
All UDP allocated control blocks:
  161:  listen
```

The following table describes the User Datagram Protocol (UDP) control block (UCB) statistics shown in this example:

Table 54 UDP statistics

Description	Example Statistic
Control block	`161`
State	`listen`

CPU statistics

Command: `/stats/mp/cpu`

```
CPU utilization:
cpuUtil1Second:            8%
cpuUtil4Seconds:           9%
cpuUtil64Seconds:          8%
```

The following table describes the management port CPU utilization statistics:

Table 55 CPU statistics

Statistics	Description
`cpuUtil1Second`	The utilization of MP CPU over 1 second. This is shown as a percentage.
`cpuUtil4Seconds`	The utilization of MP CPU over 4 seconds. This is shown as a percentage.
`cpuUtil64Seconds`	The utilization of MP CPU over 64 seconds. This is shown as a percentage.

NTP statistics

Command: `/stats/ntp`

```
NTP statistics:
        Primary Server:
                Requests Sent:               17
                Responses Received:          17
                Updates:                     1
        Secondary Server:
                Requests Sent:               0
                Responses Received:          0
                Updates:                     0
        Last update based on response from primary server.
        Last update time: 18:04:16 Tue Mar 13, 2006
        Current system time: 18:55:49 Tue Mar 13, 2006
```

The switch uses NTP (Network Timing Protocol) version 3 to synchronize the switch's internal clock with an atomic time-calibrated NTP server. With NTP enabled, the switch can accurately update its internal clock to be consistent with other devices on the network and generates accurate syslogs.

The following table describes the NTP statistics:

Table 56 NTP statistics

Statistics	Description
`Primary Server`	Requests Sent: The total number of NTP requests the switch sent to the primary NTP server to synchronize time. Responses Received: The total number of NTP responses received from the primary NTP server. Updates: The total number of times the switch updated its time based on the NTP responses received from the primary NTP server.
`Secondary Server`	Requests Sent: The total number of NTP requests the switch sent to the secondary NTP server to synchronize time. Responses Received: The total number of NTP responses received from the secondary NTP server. Updates: The total number of times the switch updated its time based on the NTP responses received from the secondary NTP server.
`Last update based on response from primary server`	Last update of time on the switch based on either primary or secondary NTP response received.
`Last update time`	The time stamp showing the time when the switch was last updated.
`Current system time`	The switch system time when the command `/stats/ntp` was issued.

Statistics dump

Command: `/stats/dump`

Use the dump command to dump all switch statistics available from the Statistics Menu (40K or more, depending on your configuration). This data can be used to tune or debug switch performance.

If you want to capture dump data to a file, set your communication software on your workstation to capture session data prior to issuing the dump commands.

Configuration Menu

Introduction

The Configuration Menu is only available from an administrator login. It includes submenus for configuring every aspect of the switch. Changes to configuration are not active until explicitly applied. Changes can be saved to non-volatile memory (NVRAM).

Menu information

Command: `/cfg`

```
[Configuration Menu]
     sys       - System-wide Parameter Menu
     port      - Port Menu
     spgroup   - Spare Ports Group Menu
     group     - Group Menu
     dump      - Dump current configuration to script file
     ptcfg     - Backup current configuration to FTP/TFTP server
     gtcfg     - Restore current configuration from FTP/TFTP server
```

The following table describes the Configuration Menu options.

Table 57 Configuration Menu options

Command	Usage
`sys`	Displays the System Menu.
`port <port number>`	Displays the Port Menu.
`spgroup`	Displays the Spare Ports Group Menu.
`group <group number>`	Displays the Group Menu.
`dump`	Dumps current configuration to a script file.
`ptcfg <server IP address> <filename on host>`	Backs up current configuration to TFTP or FTP server.
`gtcfg <server IP address> <filename on host>`	Restores current configuration from TFTP or FTP server.

Viewing, applying, reverting, and saving changes

As you use the configuration menus to set switch parameters, the changes you make do not take effect immediately. All changes are considered pending until you explicitly apply them. Also, any changes are lost the next time the switch boots unless the changes are explicitly saved.

While configuration changes are in the pending state, you can:

- View the pending changes
- Apply the pending changes
- Revert to restore configuration parameters set with the last apply command
- Save the changes to flash memory

Viewing pending changes

You can view all pending configuration changes by entering `diff` at any CLI prompt:

```
# diff
```

You can view all pending configuration changes that have been applied but not saved to flash memory by entering `diff flash` at any CLI prompt:

```
# diff flash
```

Applying pending changes

To make your configuration changes active, you must apply them. To apply configuration changes, enter the following command at any prompt:

```
# apply
```

NOTE: All configuration changes take effect immediately when applied.

Reverting changes

The revert command removes configuration changes that have been made, but not applied. Enter `revert apply` to remove all changes that have not been saved:

```
# revert
```

Saving the configuration

In addition to applying the configuration changes, you can save them to flash memory on the switch.

IMPORTANT: If you do not save the changes, they will be lost the next time the system is rebooted.

To save the new configuration, enter the following command at any prompt:

```
# save
```

When you save configuration changes, the changes are saved to the active configuration block. The configuration being replaced by the save is first copied to the backup configuration block. If you do not want the previous configuration block copied to the backup configuration block, enter the following instead:

```
# save n
```

You can decide which configuration you want to run the next time you reset the switch. Your options include:

- The active configuration block
- The backup configuration block
- Factory default configuration block

You can view all pending configuration changes that have been applied but not saved to flash memory using the diff flash command. It is a global command that can be executed from any prompt.

For instructions on selecting the configuration to run at the next system reset, see the “Selecting a configuration block” section in the “Boot Options Menu” chapter.

System configuration

Command: `/cfg/sys`

```
[System Menu]
     syslog    - Syslog Menu
     sshd      - SSH Server Menu
     radius    - RADIUS Authentication Menu
     tacacs+   - TACACS+ Authentication Menu
     ntp       - NTP Server Menu
     ssnmp     - System SNMP Menu
     access    - System Access Menu
     watchdog  - Watchdog Menu
     date      - Set system date
     time      - Set system time
     timezone  - Set system timezone (daylight savings)
     olddst    - Set system DST for US
     dlight    - Set system daylight savings
     idle      - Set timeout for idle CLI sessions
     notice    - Set login notice
     bannr     - Set login banner
     hprompt   - Enable/disable display hostname (sysName) in CLI prompt
     dhcp      - Enable/disable use of DHCP on Mgmt interface
     rstctrl   - Enable/disable System reset on panic
     cur       - Display current system-wide parameters
```

This menu provides configuration of switch management parameters such as user and administrator privilege mode passwords, browser-based management settings, and management access list.

The following table describes the System Configuration Menu options.

Table 58 System Configuration Menu options

Command	Usage
`syslog`	Displays the Syslog Menu.
`sshd`	Displays the SSH Server Menu.
`radius`	Displays the RADIUS Authentication Menu.
`tacacs+`	Displays the TACACS+ Authentication Menu.
`ntp`	Displays the Network Time Protocol (NTP) Server Menu.
`ssnmp`	Displays the System SNMP Menu.
`access`	Displays the System Access Menu.
`watchdog`	Displays the Watchdog Menu.
`date`	Prompts the user for the system date.
`time`	Configures the system time using a 24-hour clock format.
`timezone`	Configures the time zone where the switch resides. You are prompted to select your location (continent, country, region) by the timezone wizard. Once a region is selected, the switch updates the time to reflect local changes to Daylight Savings Time, etc.
`dlight`	Disables or enables daylight saving time in the system clock. When enabled, the switch will add an extra hour to the system clock so that it is consistent with the local clock. By default, this option is disabled.
`idle <1-60>`	Sets the idle timeout for CLI sessions, from 1 to 60 minutes. The default is 5 minutes. This setting affects both the console port and Telnet port.
`notice <1-1024 character multi-line> <'-' to end>`	Displays login notice immediately before the “Enter password:” prompt. This notice can contain up to 1024 characters and new lines.
`bannr <1-80 characters>`	Configures a login banner of up to 80 characters. When a user or administrator logs into the switch, the login banner is displayed. It is also displayed as part of the output from the `/info/sys/gen` command.
`hprompt disable|enable`	Enables or disables displaying of the host name (system administrator’s name) in the command line interface.
`dhcp`	Dynamic Host Control Protocol for setting the management IP address on interface 256 is enabled.You can not configure this option to be disabled.
`rstctrl`	Enables or disables reset when the panic occurs on the switch software. The default value is `enabled`.

Table 58 System Configuration Menu options

Command	Usage
cur	Displays the current system parameters.

System host log configuration

Command: /cfg/sys/syslog

```
[Syslog Menu]
     host     - Set IP address of first syslog host
     host2    - Set IP address of second syslog host
     sever    - Set the severity of first syslog host
     sever2   - Set the severity of second syslog host
     facil    - Set facility of first syslog host
     facil2   - Set facility of second syslog host
     console  - Enable/disable console output of syslog messages
     log      - Enable/disable syslogging of features
     cur      - Display current syslog settings
```

The following table describes the Syslog Configuration Menu options.

Table 59 Syslog Configuration Menu options

Command	Description
host <*IP address*>	Sets the IP address of the first syslog host. For example, 100.10.1.1
host2 <*IP address*>	Sets the IP address of the second syslog host. For example, 100.10.1.2
sever <*1-7*>	Sets the severity level of the first syslog host displayed. The default is 7, which means log all the severity levels.
sever2 <*1-7*>	Sets the severity level of the second syslog host displayed. The default is 7, which means log all the severity levels.
facil <*1-7*>	This option sets the facility level of the first syslog host displayed. The range is 0-7. The default is 0.
facil2 <*1-7*>	This option sets the facility level of the second syslog host displayed. The range is 0-7. The default is 0.
console disable|enable	Enables or disables delivering syslog messages to the console. When necessary, disabling console ensures the switch is not affected by syslog messages. It is enabled by default.
log <*feature*|all> <enable|disable>	Displays a list of features for which syslog messages can be generated. You can choose to enable/disable specific features or enable/disable syslog on all available features. Features include: • console • system • mgmt • cli • vlan • ssh • ntp • ip • web • cfg
cur	Displays the current syslog settings.

Secure Shell Server configuration

Command: `/cfg/sys/sshd`

```
[SSHD Menu]
      interval- Set Interval for generating the RSA server key
      scpadm  - Set SCP-only admin password
      hkeygen - Generate the RSA host key
      skeygen - Generate the RSA server key
      sshport - Set SSH server port number
      ena     - Enable the SCP apply and save
      dis     - Disable the SCP apply and save
      on      - Turn SSH server ON
      off     - Turn SSH server OFF
      cur     - Display current SSH server configuration
```

Telnet traffic on the network is not secure. This menu enables Secure Shell (SSH) access from any SSH client. The SSH program securely logs into another computer over a network and executes commands in a secure environment. All data using SSH is encrypted.

Secure Shell can be configured on the switch using the console port only. The menu options do not display if you access the switch using Telnet or the Browser-based Interface (BBI).

NOTE: See the *Application Guide* for information on SSH.

The following table describes the SSHD Configuration Menu options.

Table 60 SSHD Configuration Menu options

Command	Description
`intrval <0-24>`	Defines interval for auto-generating the RSA server key. The switch will auto-generate the RSA server key at the interval defined in this command. The value of zero (0) means the RSA server key auto-generation is disabled. If the switch has been busy performing any other key generation and the assigned time of interval expires, the RSA server will skip generating the key.
`scpadm`	Defines the administrator password that is for Secure Copy (SCP) only. The username for this SCP administrator is *scpadmin*. Typically, SCP is used to copy files securely from one machine to another. In the switch, SCP is used to download and upload the switch configuration using secure channels.
`hkeygen`	Generates the RSA host keys manually. The switch creates this key automatically while configuring the switch with Secure Shell (SSH). But you can generate the key manually by using this command if you need to overwrite the key for security reasons. The command will take effect immediately without executing the apply command.
`skeygen`	Generates the RSA server key. The switch creates this key automatically while configuring the switch with Secure Shell (SSH). You can generate the key manually by using this command if you need to overwrite the key for security reasons. The command will take effect immediately without executing the apply command.
`sshport <TCP port number>`	Sets the SSH server port number. The default is 22.
`ena`	Enables the SCP apply and save.
`dis`	Disables the SCP apply and save. This is the default for SCP.
`on`	Enables the SSH server.
`off`	Disables the SSH server. This is the default for the SSH server.
`cur`	Displays the current SSH server configuration.

RADIUS server configuration

Command: `/cfg/sys/radius`

```
[RADIUS Server Menu]
    prisrv   - Set primary RADIUS server address
    secsrv   - Set secondary RADIUS server address
    secret   - Set primary RADIUS server secret
    secret2  - Set secondary RADIUS server secret
    port     - Set RADIUS port
    retries  - Set RADIUS server retries
    timeout  - Set RADIUS server timeout
    bckdoor  - Enable/disable RADIUS backdoor for telnet/ssh/http/https
    secbd    - Enable/disable RADIUS secure backdoor for telnet/ssh/http/https
    on       - Turn RADIUS authentication ON
    off      - Turn RADIUS authentication OFF
    cur      - Display current RADIUS configuration
```

NOTE: See the *Application Guide* for information on RADIUS.

The following table describes the RADIUS Server Configuration Menu options.

Table 61 RADIUS Server Configuration Menu options

Command	Description
`prisrv <IP address>`	Sets the primary RADIUS server address.
`secsrv <IP address>`	Sets the secondary RADIUS server address.
`secret <1-32 characters>`	This is the shared secret between the switch and the RADIUS server(s).
`secret2 <1-32 characters>`	This is the secondary shared secret between the switch and the RADIUS server(s).
`port <UDP port number>`	Enter the number of the User Datagram Protocol (UDP) port to be configured, between 1500-3000. The default is 1645.
`retries <1-3>`	Sets the number of failed authentication requests before switching to a different RADIUS server. The range is 1-3 requests The default is 3 requests.
`timeout <1-10>`	Sets the amount of time, in seconds, before a RADIUS server authentication attempt is considered to have failed. The range is 1-10 seconds. The default is 3 seconds.
`bckdoor enable|disable`	Enables or disables the RADIUS back door for telnet/SSH/ HTTP/HTTPS. The default value is disabled. This command does not apply when secure backdoor (`secbd`) is enabled.
`secbd enable|disable`	Enables or disables the RADIUS back door using secure password for telnet/SSH/ HTTP/HTTPS. The default value is disabled. This command does not apply when backdoor (`bckdoor`) is enabled.
`on`	Enables the RADIUS server.
`off`	Disables the RADIUS server. This is the default.
`cur`	Displays the current RADIUS server parameters.

IMPORTANT: If RADIUS is enabled, you must login using RADIUS authentication when connecting via the console or Telnet/SSH/HTTP/HTTPS. Backdoor for console is always enabled, so you can connect using noradius and the administrator password even if the backdoor (`bckdoor`) or secure backdoor (`secbd`) are disabled.

If backdoor is enabled (`bckdoor ena`), type in `noradius` as a backdoor to bypass RADIUS checking, and use the administrator password to log into the switch. The switch allows this even if RADIUS servers are available.

If secure backdoor is enabled (`secbd ena`), type in `noradius` as a backdoor to bypass RADIUS checking, and use the administrator password to log into the switch. The switch allows this only if RADIUS servers are not available.

TACACS+ server configuration

Command: `/cfg/sys/tacacs+`

```
[TACACS+ Server Menu]
prisrv  - Set IP address of primary TACACS+ server
secsrv  - Set IP address of secondary TACACS+ server
secret  - Set secret for primary TACACS+ server
secret2 - Set secret for secondary TACACS+ server
port    - Set TACACS+ port number
retries - Set number of TACACS+ server retries
timeout - Set timeout value of TACACS+ server retries
bckdoor - Enable/disable TACACS+ backdoor for telnet/ssh/http/https
secbd   - Enable/disable TACACS+ secure backdoor
cmap    - Enable/disable TACACS+ new privilege level mapping
usermap - Set user privilege mappings
on      - Enable TACACS+ authentication
off     - Disable TACACS+ authentication
cur     - Display current TACACS+ settings
```

TACACS+ (Terminal Access Controller Access Control System) is an authentication protocol that allows a remote access server to forward a user's logon password to an authentication server to determine whether access can be allowed to a given system. TACACS+ and Remote Authentication Dial-In User Service (RADIUS) protocols are more secure than the TACACS encryption protocol. TACACS+ is described in RFC 1492.

TACACS+ protocol is more reliable than RADIUS, as TACACS+ uses the Transmission Control Protocol (TCP) whereas RADIUS uses the User Datagram Protocol (UDP). Also, RADIUS combines authentication and authorization in a user profile, whereas TACACS+ separates the two operations.

TACACS+ offers the following advantages over RADIUS as the authentication device:

- TACACS+ is TCP-based, so it facilitates connection-oriented traffic.
- It supports full-packet encryption, as opposed to password-only in authentication requests.
- It supports decoupled authentication, authorization, and accounting.

The following table describes the TACACS+ Server Configuration Menu options.

Table 62 TACACS+ Server Configuration Menu options

Command	Description
`prisrv <IP address>`	Defines the primary TACACS+ server address.
`secsrv <IP address>`	Defines the secondary TACACS+ server address.
`secret <1-32 characters>`	This is the shared secret between the switch and the TACACS+ server(s).
`secret2 <1-32 characters>`	This is the secondary shared secret between the switch and the TACACS+ server(s).
`port <TCP port number>`	Enter the number of the TCP port to be configured, between 1 - 65000. The default is 49.
`retries <1-3>`	Sets the number of failed authentication requests before switching to a different TACACS+ server. The range is 1-3 requests. The default is 3 requests.
`timeout <4-15>`	Sets the amount of time, in seconds, before a TACACS+ server authentication attempt is considered to have failed. The range is 4-15 seconds. The default is 5 seconds.
`bckdoor enable|disable`	Enables or disables the TACACS+ back door for telnet. The `te|net` command also applies to SSH/SCP connections and the Browser-based Interface (BBI). The default value is disabled. This command does not apply when secure backdoor (`secbd`) is enabled.
`secbd enable|disable`	Enables or disables the TACACS+ back door using secure password for telnet/SSH/ HTTP/HTTPS. The default value is disabled. This command does not apply when backdoor (`bckdoor`) is enabled.
`cmap enable|disable`	Enables or disables TACACS+ authorization-level mapping. The default value is `disabled`.
`usermap <0-15> user|oper|admin|none`	Maps a TACACS+ authorization level to this switch user level. Enter a TACACS+ authorization level (0-15), followed by the corresponding this switch user level.
`on`	Enables the TACACS+ server.
`off`	Disables the TACACS+ server. This is the default.
`cur`	Displays current TACACS+ configuration parameters.

IMPORTANT: If TACACS+ is enabled, you must login using TACACS+ authentication when connecting via the console or Telnet/SSH/HTTP/HTTPS. Backdoor for console is always enabled, so you can connect using `notacacs` and the administrator password even if the backdoor (`bckdoor`) or secure backdoor (`secbd`) are disabled.

If backdoor is enabled (`bckdoor ena`), type in `notacacs` as a backdoor to bypass TACACS+ checking, and use the administrator password to log into the switch. The switch allows this even if TACACS+ servers are available.

If secure backdoor is enabled (`secbd ena`), type in `notacacs` as a backdoor to bypass TACACS+ checking, and use the administrator password to log into the switch. The switch allows this only if TACACS+ servers are not available.

NTP server configuration

Command: `/cfg/sys/ntp`

```
[NTP Server Menu]
     prisrv   - Set primary NTP server address
     secsrv   - Set secondary NTP server address
     intrval  - Set NTP server resync interval
     on       - Turn NTP service ON
     off      - Turn NTP service OFF
     cur      - Display current NTP configuration
```

This menu enables you to synchronize the switch clock to a Network Time Protocol (NTP) server. By default, this option is disabled.

The following table describes the NTP Server Configuration Menu options.

Table 63 NTP Server Configuration Menu options

Command	Description
`prisrv <IP address>`	Configures the IP addresses of the primary NTP server to which you want to synchronize the switch clock.
`secsrv <IP address>`	Configures the IP addresses of the secondary NTP server to which you want to synchronize the switch clock.
`intrval <1-44640>`	Specifies the interval, that is, how often, in minutes (1-44640), to resynchronize the switch clock with the NTP server. The default is 1440 minutes.
`on`	Enables the NTP synchronization service.
`off`	Disables the NTP synchronization service. This is the default.
`cur`	Displays the current NTP service settings.

System SNMP configuration

Command: `/cfg/sys/ssnmp`

```
[SNMP Menu]
     snmpv3    - SNMPv3 Menu
     name      - Set SNMP "sysName"
     locn      - Set SNMP "sysLocation"
     cont      - Set SNMP "sysContact"
     rcomm     - Set SNMP read community string
     wcomm     - Set SNMP write community string
     timeout   - Set timeout for the SNMP state machine
     reqport   - Set SNMP request port number
     cur       - Display current SNMP configuration
```

The switch software supports SNMP-based network management. In SNMP model of network management, a management station (client/manager) accesses a set of variables known as MIBs (Management Information Base) provided by the managed device (agent). If you are running an SNMP network management station on your network, you can manage the switch using the following standard SNMP MIBs:

- MIB II (RFC 1213)
- Ethernet MIB (RFC 1643)
- Bridge MIB (RFC 1493)

An SNMP agent is a software process on the managed device that listens on UDP port 161 for SNMP messages. Each SNMP message sent to the agent contains a list of management objects to retrieve or to modify.

- SNMP parameters that can be modified include:
- System name
- System location
- System contact
- Use of the SNMP system authentication trap function
- Read community string
- Write community string

The following table describes the System SNMP Configuration Menu options.

Table 64 System SNMP Configuration Menu options

Command	Description
`snmpv3`	Displays SNMPv3 menu.
`name <1-64 characters>`	Configures the name for the system. The name can have a maximum of 64 characters.
`locn <1-64 characters>`	Configures the name of the system location. The location can have a maximum of 64 characters.
`cont <1-64 characters>`	Configures the name of the system contact. The contact can have a maximum of 64 characters.
`rcomm <1-32 characters>`	Configures the SNMP read community string. The read community string controls SNMP “get” access to the switch. It can have a maximum of 32 characters. The default read community string is *public*.
`wcomm <1-32 characters>`	Configures the SNMP write community string. The write community string controls SNMP “set” and “get” access to the switch. It can have a maximum of 32 characters. The default write community string is *private*.
`timeout <1-30>`	Sets the timeout value for the SNMP state machine. The range is 1-30 minutes. The default value is 5 minutes.
`report <request port number>`	Configures the request port number. The default setting is 161.
`cur`	Displays the current SNMP configuration.

SNMPv3 configuration

Command: `/cfg/sys/ssnmp/snmpv3`

```
[SNMPv3 Menu]
     usm      - usmUser Table Menu
     view     - vacmViewTreeFamily Table Menu
     access   - vacmAccess Table Menu
     group    - vacmSecurityToGroup Table Menu
     comm     - community Table Menu
     taddr    - targetAddr Table Menu
     tparam   - targetParams Table Menu
     notify   - notify Table Menu
     v1v2     - Enable/disable V1/V2 access
     cur      - Display current SNMPv3 configuration
```

SNMP version 3 (SNMPv3) is an extensible SNMP Framework that supplements the SNMPv2 Framework by supporting the following:

- a new SNMP message format
- security for messages
- access control
- remote configuration of SNMP parameters

For more details on the SNMPv3 architecture please see RFC2271 to RFC2275.

The following table describes the SNMPv3 Configuration Menu options.

Table 65 SNMPv3 Configuration Menu options

Command	Description
`usm <1-16>`	Configures a user security model (USM) entry for an authorized user. You can also configure this entry through SNMP. The range is 1-16.
`view <1-128>`	Configures different MIB views. The range is 1-128.
`access <1-32>`	Configures access rights. The View-based Access Control Model defines a set of services that an application can use for checking access rights of the user. You need access control when you have to process retrieval or modification request from an SNMP entity. The range is 1-32.
`group <1-16>`	Configures an SNMP group. A group maps the user name to the access group names and their access rights needed to access SNMP management objects. A group defines the access rights assigned to all names that belong to a particular group. The range is 1-16.
`comm <1-16>`	Configures a community table entry. The community table contains objects for mapping community strings and version-independent SNMP message parameters. The range is 1-16.
`taddr <1-16>`	Configures the destination address and user security levels for outgoing notifications. This is also called the transport endpoint. The range is 1-16.
`tparam <1-16>`	Configures SNMP parameters, consisting of message processing model, security model, security level, and security name information. There may be multiple transport endpoints associated with a particular set of SNMP parameters, or a particular transport endpoint may be associated with several sets of SNMP parameters.
`notify <1-16>`	Configures a notification index. A notification application typically monitors a system for particular events or conditions, and generates Notification-Class messages based on these events or conditions. The range is 1-16.
`v1v2 disable|enable`	Enables or disables the access to SNMP version 1 and version 2. This command is enabled by default.
`cur`	Displays the current SNMPv3 configuration.

SNMPv3 User Security Model configuration

Command: `/cfg/sys/ssnmp/snmpv3/usm <usm number>`

```
[SNMPv3 usmUser 1  Menu]
     name     - Set USM user name
     auth     - Set authentication protocol
     authpw   - Set authentication password
     priv     - Set privacy protocol
     privpw   - Set privacy password
     del      - Delete usmUser entry
     cur      - Display current usmUser configuration
```

You can make use of a defined set of user identities using this Security Model. An SNMP engine must have the knowledge of applicable attributes of a user.

This menu helps you create a user security model entry for an authorized user. You need to provide a security name to create the USM entry.

The following table describes the User Security Model Configuration Menu options.

Table 66 User Security Model Configuration Menu options

Command	Description
`name <1-32 characters>`	Configures a string up to 32 characters long that represents the name of the user. This is the login name that you need in order to access the switch.
`auth md5|sha|none`	Configures the authentication protocol between HMAC-MD5-96 or HMAC-SHA-96. The default algorithm except usmUser 1-2 is none.
`authpw`	Configures your password for authentication. If you selected an authentication algorithm using the above command, you need to provide a password; otherwise you will get an error message during validation.
`priv des|none`	Configures the type of privacy protocol on the switch. The privacy protocol protects messages from disclosure. The options are des (CBC-DES Symmetric Encryption Protocol) or none. If you specify des as the privacy protocol, then be sure that you have selected one of the authentication protocols (MD5 or HMAC-SHA-96). If you select none as the authentication protocol, you will get an error message.
`privpw`	Configures the privacy password.
`del`	Deletes the USM user entries.
`cur`	Displays the USM user entries.

SNMPv3 View configuration

Command: `/cfg/sys/ssnmp/snmpv3/view <view number>`

```
[SNMPv3 vacmViewTreeFamily 1 Menu]
  name     - Set view name
  tree     - Set MIB subtree(OID) which defines a family of view subtrees
  mask     - Set view mask
  type     - Set view type
  del      - Delete vacmViewTreeFamily entry
  cur      - Display current vacmViewTreeFamily configuration
```

The following table describes the SNMPv3 View Configuration Menu options.

Table 67 SNMPv3 View Configuration Menu options

Command	Description
`name <1-32 characters>`	Defines the name for a family of view subtrees up to a maximum of 32 characters.
`tree <1-64 characters>`	Defines the Object Identifier (OID), a string of maximum 64 characters, which when combined with the corresponding mask defines a family of view subtrees. An example of an OID is 1. 3. 6. 1. 2. 1. 1. 1. 0
`mask <1-32 characters>`	Defines the bit mask, which in combination with the corresponding tree defines a family of view subtrees. The mask can have a maximum of 32 characters.
`type included|excluded`	Selects whether the corresponding instances of `vacmViewTreeFamilySubtree` and `vacmViewTreeFamilyMask` define a family of view subtrees, which is included in or excluded from the MIB view.

Table 67 SNMPv3 View Configuration Menu options

Command	Description
`del`	Deletes the `vacmViewTreeFamily` group entry.
`cur`	Displays the current `vacmViewTreeFamily` configuration.

SNMPv3 View-based Access Control Model configuration

Command: `/cfg/sys/ssnmp/snmpv3/access <access number>`

```
[SNMPv3 vacmAccess 1  Menu]
     name      - Set group name
     model     - Set security model
     level     - Set minimum level of security
     rview     - Set read view index
     wview     - Set write view index
     nview     - Set notify view index
     del       - Delete vacmAccess entry
     cur       - Display current vacmAccess configuration
```

The view-based Access Control Model defines a set of services that an application can use for checking access rights of the user. Access control is needed when the user has to process SNMP retrieval or modification request from an SNMP entity.

The following table describes the User Access Control Configuration Menu options.

Table 68 View-based Access Control Configuration Menu options

Command	Description
`name <1-32 characters>`	Defines the name of the group, up to a maximum of 32 characters.
`model usm|snmpv1|snmpv2`	Selects the security model to be used.
`level noAuthNoPriv|authNoPriv|authPriv`	Defines the minimum level of security required to gain access rights. The level `noAuthNoPriv` means that the SNMP message will be sent without authentication and without using a privacy protocol. The level `authNoPriv` means that the SNMP message will be sent with authentication but without using a privacy protocol. The `authPriv` means that the SNMP message will be sent both with authentication and using a privacy protocol.
`rview <1-32 characters>`	Defines a 32 character long read view name that allows you read access to a particular MIB view. If the value is empty or if there is no active MIB view having this value then no access is granted.
`wview <1-32 characters>`	Defines a 32 character long write view name that allows you write access to the MIB view. If the value is empty or if there is no active MIB view having this value then no access is granted.
`nview <1-32 characters>`	Defines a 32 character long notify view name that allows you notify access to the MIB view.
`del`	Deletes the View-based Access Control entry.
`cur`	Displays the View-based Access Control configuration.

SNMPv3 Group configuration

Command: `/cfg/sys/ssnmp/snmpv3/group <group number>`

```
[SNMPv3 vacmSecurityToGroup 1 Menu]
     model    - Set security model
     uname    - Set USM user name
     gname    - Set group name
     del      - Delete vacmSecurityToGroup entry
     cur      - Display current vacmSecurityToGroup configuration
```

The following table describes the SNMPv3 Group Configuration Menu options.

Table 69 SNMPv3 Group Configuration Menu options

Command	Description
`model usm|snmpv1|snmpv2`	Defines the security model.
`uname <1-32 characters>`	Sets the user name as defined in `/cfg/sys/ssnmp/snmpv3/usm/name.` The user name can have a maximum of 32 characters.
`gname <1-32 characters>`	Configures the name for the access group as defined in `/cfg/sys/ssnmp/snmpv3/access/name.` The group name can have a maximum of 32 characters.
`del`	Deletes the `vacmSecurityToGroup` entry.
`cur`	Displays the current `vacmSecurityToGroup` configuration.

SNMPv3 Community Table configuration

Command: `/cfg/sys/ssnmp/snmpv3/comm <comm number>`

```
[SNMPv3 snmpCommunityTable 1  Menu]
     index    - Set community index
     name     - Set community string
     uname    - Set USM user name
     tag      - Set community tag
     del      - Delete communityTable entry
     cur      - Display current communityTable configuration
```

This command is used for configuring the community table entry. The configured entry is stored in the community table list in the SNMP engine. This table is used to configure community strings in the Local Configuration Datastore (LCD) of SNMP engine.

The following table describes the SNMPv3 Community Table Configuration Menu options.

Table 70 SNMPv3 Community Table Configuration Menu options

Command	Description
`index <1-32 characters>`	Configures the unique index value of a row in this table. The index can have a maximum of 32 characters.
`name <1-32 characters>`	Defines a readable 32 characters string that represents the corresponding value of an SNMP community name in a security model.
`uname <1-32 characters>`	Defines the name as defined in `/cfg/sys/ssnmp/snmpv3/usm/name.` The name can have a maximum of 32 characters.
`tag <1-255 characters>`	Configures a tag of up to 255 characters maximum. This tag specifies a set of transport endpoints to which a command responder application sends an SNMP trap.
`del`	Deletes the community table entry.
`cur`	Displays the community table configuration.

SNMPv3 Target Address Table configuration

Command: `/cfg/sys/ssnmp/snmpv3/taddr <taddr number>`

```
[SNMPv3 snmpTargetAddrTable 1  Menu]
     name     - Set target address name
     addr     - Set target transport address IP
     port     - Set target transport address port
     taglist  - Set tag list
     pname    - Set targetParams name
     del      - Delete targetAddrTable entry
     cur      - Display current targetAddrTable configuration
```

This menu allows you to configure an entry of a transport address that transmits SNMP traps.

The following table describes the SNMPv3 Target Address Table Configuration Menu options.

Table 71 SNMPv3 Target Address Table Configuration Menu options

Command	Description
`name <1-32 characters>`	Configures the locally arbitrary, but unique identifier, target address name associated with this entry.
`addr <transport address ip>`	Configures a transport address IP that can be used in the generation of SNMP traps.
`port <transport address port>`	Configures a transport address port that can be used in the generation of SNMP traps.
`taglist <1-255 characters>`	Configures a list of tags (up to 255 characters maximum) that are used to select target addresses for a particular operation.
`pname <1-32 characters>`	Defines the name as defined in /cfg/sys/ssnmp/snmpv3/tparam/name.
`del`	Deletes the Target Address Table entry.
`cur`	Displays the current Target Address Table configuration.

SNMPv3 Target Parameters Table configuration

Command: `/cfg/sys/ssnmp/snmpv3/tparam <tparam number>`

```
[SNMPv3 snmpTargetParamsTable 1  Menu]
     name     - Set targetParams name
     mpmodel  - Set message processing model
     model    - Set security model
     uname    - Set USM user name
     level    - Set minimum level of security
     del      - Delete targetParamsTable entry
     cur      - Display current targetParamsTable configuration
```

You can configure the target parameters entry and store it in the target parameters table in the SNMP engine. This table contains parameters that are used to generate a message. The parameters include the message processing model (for example: SNMPv3, SNMPv2c, SNMPv1), the security model (for example: USM), the security name, and the security level (`noAuthnoPriv`, `authNoPriv`, or `authPriv`).

The following table describes the SNMPv3 Target Parameters Table Configuration Menu options.

Table 72 SNMPv3 Target Parameters Table Configuration Menu options

Command	Description
`name <1-32 characters>`	Configures the locally arbitrary, but unique identifier that is associated with this entry.
`mpmodel snmpv1|snmpv2c|snmpv3`	Configures the message processing model that is used to generate SNMP messages.
`model usm|snmpv1|snmpv2`	Selects the security model to be used when generating the SNMP messages.
`uname <1-32 characters>`	Defines the name that identifies the user in the USM table, on whose behalf the SNMP messages are generated using this entry.
`level noAuthNoPriv|authNoPriv|authPriv`	Selects the level of security to be used when generating the SNMP messages using this entry. The level `noAuthNoPriv` means that the SNMP message will be sent without authentication and without using a privacy protocol. The level `authNoPriv` means that the SNMP message will be sent with authentication but without using a privacy protocol. The `authPriv` means that the SNMP message will be sent both with authentication and using a privacy protocol.
`del`	Deletes the `targetParamsTable` entry.
`cur`	Displays the current `targetParamsTable` configuration.

SNMPv3 Notify Table configuration

Command: `/cfg/sys/ssnmp/snmpv3/notify <notify number>`

```
[SNMPv3 snmpNotifyTable 1  Menu]
     name     - Set notify name
     tag      - Set notify tag
     del      - Delete notifyTable entry
     cur      - Display current notifyTable configuration
```

SNMPv3 uses Notification Originator to send out traps. A notification typically monitors a system for particular events or conditions, and generates Notification-Class messages based on these events or conditions.

The following table describes the SNMPv3 Notify Table Configuration menu options.

Table 73 SNMPv3 Notify Table Configuration Menu options

Command	Description
`name <1-32 characters>`	Defines a locally arbitrary but unique identifier associated with this SNMP notify entry.
`tag <1-255 characters>`	Defines a tag of 255 characters maximum that contains a tag value which is used to select entries in the Target Address Table. Any entry in the `snmpTargetAddrTable`, that matches the value of this tag, is selected.
`del`	Deletes the notify table entry.
`cur`	Displays the current notify table configuration.

System Access configuration

Command: `/cfg/sys/access`

```
[System Access Menu]
     mgmt      - Management Network Definition Menu
     user      - User Access Control Menu (passwords)
     http      - Enable/disable HTTP (Web) access
     https     - HTTPS Web Access Menu
     wport     - Set HTTP (Web) server port number
     snmp      - Set SNMP access control
     tnet      - Enable/disable Telnet access
     tnport    - Set Telnet server port number
     cur       - Display current system access configuration
```

The following table describes the System Access Configuration menu options.

Table 74 System Access Configuration Menu options

Command	Description
`mgmt`	Displays the Management Configuration Menu.
`user`	Displays the User Access Control Menu.
`http disable|enable`	Enables or disables HTTP (Web) access to the Browser-based Interface. It is enabled by default.
`https`	Displays the HTTPS Menu.
`wport <`*`TCP port number`*`>`	Sets the switch port used for serving switch Web content. The default is HTTP port 80.
`snmp disable|read-only|read-write`	Disables or provides read-only/write-read SNMP access.
`tnet`	Enables or disables Telnet access to the switch. It is enabled by default.
`tnport <`*`TCP port number`*`>`	Sets an optional telnet server port number for cases where the server listens for telnet sessions on a non-standard port. The default is telnet port 23.
`cur`	Displays the current system access parameters.

Management Networks configuration

Command: `/cfg/sys/access/mgmt`

```
[Management Networks Menu]
     add       - Add mgmt network definition
     rem       - Remove mgmt network definition
     cur       - Display current mgmt network definitions
     clear     - Clear current mgmt network definitions
```

The following table describes the Management Networks Configuration menu options. You can configure up to 10 management networks on the switch.

Table 75 Management Networks Configuration menu options

Command	Description
`add <`*`IP address`*`> <`*`IP mask`*`>`	Adds a defined network through which switch access is allowed through Telnet, SNMP, or the browser-based interface. A range of IP addresses is produced when used with a network mask address. Specify an IP address and mask address in dotted-decimal notation.
`rem <`*`IP address`*`> <`*`IP mask`*`>`	Removes a defined network, which consists of a management network address and a management network mask address.
`cur`	Displays the current management networks parameters.
`clear`	Clear the current configured management networks.

User Access Control configuration

Command: `/cfg/sys/access/user`

```
[User Access Control Menu]
     uid      - User ID Menu
     eject    - Eject user
     usrpw    - Set user password (user)
     opw      - Set operator password (oper)
     admpw    - Set administrator password (admin)
     cur      - Display current user status
```

The following table describes the User Access Control menu options.

Table 76 User Access Control Configuration menu options

Command	Description
`uid <1-10>`	Displays the User ID Menu for the selected user.
`eject <user-name>`	Ejects the selected user from the switch.
`usrpw <1-128 characters>`	Sets the user (`user`) password (maximum 128 characters). The user has no direct responsibility for switch management. He or she can view switch status information and statistics, but cannot make any configuration changes.
`opw <1-128 characters>`	Sets the operator (`oper`) password (maximum 128 characters). The operator manages all functions of the switch. He or she can view all switch information and statistics and can reset ports or the entire switch.
`admpw <1-128 characters>`	Sets the administrator (`admin`) password (maximum 128 characters). The super user administrator has complete access to all menus, information, and configuration commands on the switch, including the ability to change both the user and administrator passwords.
`cur`	Displays the current user status.

User ID configuration

Command: `/cfg/sys/access/user/uid <uid number>`

```
[User ID 1  Menu]
     cos      - Set class of service
     name     - Set user name
     pswd     - Set user password
     ena      - Enable user ID
     dis      - Disable user ID
     del      - Delete user ID
     cur      - Display current user configuration
```

The following table describes the User ID Configuration menu options.

Table 77 User ID Configuration menu options

Command	Description
`cos <user|oper|admin>`	Sets the Class-of-Service to define the user's authority level.
`name <1-8 characters>`	Defines the user name.
`pswd <1-128 characters>`	Sets the user password of up to 128 characters maximum.
`ena`	Enables the user ID.
`dis`	Disables the user ID.
`del`	Deletes the user ID.
`cur`	Displays the current user ID parameters.

HTTPS Access configuration

Command: `/cfg/sys/access/https`

```
[https Menu]
     access   - Enable/Disable HTTPS Web access
     port     - HTTPS WebServer port number
     generate - Generate self-signed HTTPS server certificate
     certSave - save HTTPS certificate
     cur      - Display current SSL Web Access configuration
```

The following table describes the HTTPS Access Configuration menu options.

Table 78 HTTPS Access Configuration menu options

Command	Description
`access enable|disable`	Enables or disables BBI access (Web access) using HTTPS. The default value is `disabled`.
`port <`*`TCP port number`*`>`	Defines the HTTPS Web server port number. The default is 443.
`generate`	Allows you to generate a certificate to connect to the SSL to be used during the key exchange. A default certificate is created when HTTPS is enabled for the first time. The user can create a new certificate defining the information that they want to be used in the various fields. For example: • Country Name (2 letter code) [ ]: JP • State or Province Name (full name) [ ]: Tokyo • Locality Name (for example, city) [ ]: Fuchu • Organization Name (for example, company) [ ]: NEC • Organizational Unit Name (for example, section) [ ]: SIGMABLADE • Common Name (for example, user's name) [ ]: Taro • Email (for example, email address) [ ]: info@nec.com You must confirm if you want to generate the certificate. It takes approximately 30 seconds to generate the certificate. Then the switch restarts SSL agent.
`certSave`	Allows the client, or the Web browser, to accept the certificate and save the certificate to Flash to be used when the switch is rebooted.
`cur`	Displays the current SSL Web Access configuration.

Watchdog configuration

Command: `/cfg/sys/watchdog`

```
[Watchdog Menu]
     interval - Set watchdog timeout interval
     enable   - Enable Watchdog
     disable  - Disable Watchdog
     cur      - Display current Watchdog configuration
```

The following table describes the HTTPS Access Configuration menu options.

Table 79 Watchdog Configuration menu options

Command	Description
`interval <5-120>`	Sets the watchdog timeout interval. The default is 30 seconds.
`enable`	Enables watchdog. The default is enabled.
`disable`	Disables watchdog.
`cur`	Displays the current Watchdog configuration.

Port configuration

Command: `/cfg/port <port number>`

```
[Port 1 Menu]
     speed    - Set link speed and force full duplex mode
     fctl     - Set flow control
     auto     - Set auto negotiation
     name     - Set port name
     ena      - Enable port
     dis      - Disable port
     cur      - Display current port configuration
```

This menu enables you to configure settings for individual switch ports. This command is enabled by default.

NOTE: Port 19 is a port for switch management interface (interface 256). Cross-link ports (17-18) are not available on the SmartPanel software.

The following table describes the Port Configuration Menu options.

Table 80 Port Configuration Menu options

Command	Description
`speed 10|100|1000|any`	Sets the link speed. Not all options are valid on all ports. The choices include: • 10 Mb/s • 100 Mb/s • 1000 Mb/s • "any," for automatic detection (default) Note: Ports 1-16 are set to 1000 Mb/s, and cannot be changed.
`fctl rx|tx|both|none`	Sets the flow control. The choices include: • Receive (rx) flow control • Transmit (tx) flow control • Both receive and transmit flow control (default) • No flow control
`auto on|off`	Enables or disables auto-negotiation for the port. The default is enabled.
`name <1-64 characters>|none`	Set the port name.
`ena`	Enables the port.
`dis`	Disables the port. To temporarily disable a port without changing its configuration attributes, see the "Operation Menu" section.
`cur`	Displays current port parameters.

Spare Ports Group configuration

Command: `/cfg/spgroup`

```
[Spare Ports Group Menu]
     addport  - Add ports to the group
     cur      - Display current group configuration
```

Use these menu options to set unused ports to Spare Ports Group. Set the ports, which Port Group 1-5 do not contain, to Spare Ports Group.

The following table describes the Spare Ports Group Configuration menu options.

Table 81 Spare Ports Group Configuration menu options

Command	Description
`add <port number>`	Adds the specified port to Spare Ports Group.
`cur`	Displays the current Spare Ports Group configuration.

Group configuration

Command: `/cfg/group <1-5>`

```
[Group 1 Menu]
     addport  - Add ports to the group
     remport  - Remove ports from the group
     addvlan  - Add non-default (tagged) VLANs to the group
     remvlan  - Remove non-default (tagged) VLANs from the group
     pvid     - Set default port VLAN id for the group
     igmp     - Enable/Disable IGMP Snooping for the group
     failover - Enable/Disable Failover for the group
     limit    - Number of External Links to trigger failover
     lacp     - Enable/Disable LACP for the group
     cur      - Display current group configuration
```

Use these menu options to set the Port Group. There are five Port Groups. Set the ports, which Port Group 1-5 do not contain, to Spare Ports Group.

The following table describes the Port Group Configuration menu options.

Table 82 Port Group Configuration menu options

Command	Description
`addport <port number>`	Adds the specified port to the Port Group.
`remport <port number>`	Removes the specified port from the Port Group.
`addvlan <1-4094>`	Adds the non-default (tagged) VLAN to the Port Group.
`remvlan <1-4094>`	Removes the non-default (tagged) VLAN from the Port Group.
`pvid <1-4094>`	Sets default port VLAN ID (PVID) to the Port Group. The default is automatically assigned when the Group is used.
`igmp disable|enable`	Enables or disables IGMP snooping for the Port Group.
`failover disable|enable`	Enables or disables Failover for the Port Group. The default is enabled. When it is enabled and the number of external links is the value of the limit or fewer, the switch disables the internal server blade port of the Port Group.
`limit <0-4>`	Sets the number of external links to trigger failover. The default is 0. The failover limit lets you specify the minimum number of operational links required within the failover trigger before the trigger initiates a failover event. For example, if the limit is four, a failover event occurs when the number of operational links in the trigger is four or fewer. When you set the limit to zero, the SmartPanel triggers a failover event only when no links in the trigger are operational.
`lacp disable|enable`	Enables or disables LACP for the Port Group. The default is disabled. When disabled, the external ports of the Port Group are configured as a static trunk group. When enabled, they are configured as a LACP trunk group.
`cur`	Displays the current Ports Group configuration.

NOTE: A Port Group must contain at least one external port (20-24) and one internal server blade port (1-16).

See the “Port Group Mapping” section in the “Browser-based interface” chapter for information.

Configuration Dump

Command: `/cfg/dump`

The dump program writes the current switch configuration to the terminal screen. To start the dump program, at the Configuration# prompt, enter:

```
Configuration# dump
```

The configuration is displayed with parameters that have been changed from the default values. The screen display can be captured, edited, and placed in a script file, which can be used to configure other switches. Paste the configuration commands from the script file at the command line prompt of the switch. The active configuration can also be saved or loaded via FTP or TFTP.

Saving the active switch configuration

Command: `/cfg/ptcfg <FTP/TFTP server> <filename>`

When the ptcfg command is used, the active configuration commands of the switch (as displayed using `/cfg/dump`) will be uploaded to the specified script configuration file on the TFTP server. To start the switch configuration upload, at the Configuration# prompt, enter:

```
Configuration# ptcfg <FTP/TFTP server> <filename>
```

Where *<FTP/TFTP server>* is the FTP/TFTP server IP address and *<filename>* is the name of the target script configuration file.

NOTE: The output file is formatted with line-breaks but no carriage returns. The file cannot be viewed with editors that require carriage returns (such as Microsoft Notepad).

NOTE: If the FTP/TFTP server is running SunOS™ or the Solaris™ operating system, the specified ptcfg file must exist prior to executing the ptcfg command and must be writable (set with proper permission, and not locked by any application). The contents of the specified file will be replaced with the current configuration data.

Restoring the active switch configuration

Command: `/cfg/gtcfg <FTP/TFTP server> <filename>`

When the gtcfg command is used, the active configuration will be replaced with the commands found in the specified configuration file. The file can contain a full switch configuration or a partial configuration. The configuration loaded using gtcfg is not activated until the apply command is used. If the apply command is found in the configuration script file loaded using this command, the apply action will be performed automatically.

To start the switch configuration download, at the Configuration# prompt, enter:

```
Configuration#  gtcfg <FTP/TFTP server> <filename>
```

Where *<FTP/TFTP server>* is the FTP/TFTP server IP address and *<filename>* is the name of the target script configuration file.

NOTE: The switch supports three configuration files: active, backup, and factory. See the “Selecting a configuration block” section in the “Boot Options Menu” chapter for information on how to set which configuration file to use upon boot up.

Operations Menu

Introduction

Operations-level commands are used for making immediate and temporary changes to switch configuration. The Operations Menu is used for bringing ports temporarily in and out of service. This menu is available only from an administrator and operator login.

Menu information

Command: `/oper`

```
[Operations Menu]
     port     - Operational Port Menu
     passwd   - Change current user password
     clrlog   - Clear syslog messages
     tnetsshc – Close telnet/SSH connections
     ntpreq   - Send NTP request
```

The following table describes the Operations Menu options.

Table 83 Operations Menu options

Command	Description
`port <port number>`	Displays the Operational Port Menu.
`passwd <1-128 characters>`	Allows the user to change the password. You need to enter the current password in use for validation.
`clrlog`	Clears all Syslog messages. This command is available only from an administrator login.
`tnetsshc`	Closes the telnet and SSH connections.
`ntpreq`	Allows the user to send requests to the NTP server. This command is available only from an administrator login.

Operations-level port options

Command: `/oper/port <port number>`

```
[Operations Port 1 Menu]
     ena      - Enable port
     dis      - Disable port
     cur      - Current port state
```

Operations-level port options are used for temporarily disabling or enabling a port.

Table 84 Operations-Level Port Menu options

Command	Description
`ena`	Temporarily enables the port. The port will be returned to its configured operation mode when the switch is reset.
NOTE: This command does not enable a port that has been disabled by an ekeying mismatch error.	
`dis`	Temporarily disables the port. The port will be returned to its configured operation mode when the switch is reset.
`cur`	Displays the current settings for the port.

Boot Options Menu

Introduction

You must be logged in to the switch as the administrator to use the Boot Options Menu.

The Boot Options Menu provides options for:

- Selecting a switch software image to be used when the switch is next reset.
- Selecting a configuration block to be used when the switch is next reset.
- Downloading or uploading a new software image to the switch via FTP or TFTP.

Menu information

Command: `/boot`

```
[Boot Options Menu]
       image  - Select software image to use on next boot
       conf   - Select config block to use on next boot
       gtimg  - Download new software image via FTP/TFTP
       ptimg  - Upload selected software image via FTP/TFTP
       reset  - Reset switch
       cur    - Display current boot options
```

Each of the Boot Options Menu commands is discussed in greater detail in the following sections.

Updating the switch software image

The switch software image is the executable code running on the switch. A version of the image ships with the switch, and comes pre-installed on the device. As new versions of the image are released, you can upgrade the software running on the switch.

Upgrading the software image on the switch requires the following:

- Loading the new image onto a FTP or TFTP server on your network
- Downloading the new image from the FTP or TFTP server to the switch
- Selecting the new software image to be loaded into switch memory the next time the switch is reset

Downloading new software to the switch

The switch can store up to two different software images, called image1 and image2, as well as boot software, called boot. When you download new software, you must specify where it should be placed: either into image1, image2, or boot.

By default, the software for conventional Layer2 switch mode is stored in image1 and the software for SmartPanel mode is stored in image2.

To download new software to the switch, you will need the following:

- The image or boot software loaded on a FTP or TFTP server on your network
- The IP address of the FTP or TFTP server
- The name of the new software image or boot file

When the above requirements are met, use the following procedure to download the new software to the switch.

1. At the Boot Options# prompt, enter:

```
Boot Options# gtimg
```

2. Enter the name of the switch software to be replaced:

```
Enter name of switch software image to be replaced
 ["image1"/"image2"/"boot"]: <image>
```

3. Enter the IP address of the FTP or TFTP server:

```
Enter IP address of FTP/TFTP server: <IP address>
```

4. Enter the name of the new software file on the server:

```
Enter name of file on FTP/TFTP server: <filename>
```

The exact form of the name will vary by FTP/TFTP server. However, the file location is normally relative to the FTP/TFTP directory.

5. Enter the username, if you are using a FTP server:

```
Enter username for FTP server or hit return for TFTP server: <userID>
```

6. Enter the password for the FTP server (if prompted):

```
Enter password for username on FTP server: <password>
```

7. The system prompts you to confirm your request.

   You should next select a software image to run, as described in the “Selecting a Soft Image to Run” section.

8. If you are loading an image from which you are not currently booted, the system prompts you to change the image.

```
image2 currently contains Software Version 1.0.0
 that was downloaded at 15:46:36 Wed Apr 23, 2006.
New download will replace image2 with file "1.0.1_OS.img"
 from TFTP server 192.168.2.4.
Confirm download operation [y/n]: y
Invoking TFTP over port 69...
Starting download...
File appears valid
Download in
progress.................................................
Image download complete (1333953 bytes)
Writing to flash...This takes about 90 seconds. Please wait
Write complete (1333953 bytes), now verifying FLASH...
Verification of new image2 in FLASH successful.
image2 now contains Software Version 1.0.1
Switch is currently set to boot software image1.
Do you want to change that to the new image2? [y/n] y
Next boot will use new software image2.
```

Selecting a software image to run

You can select which software image (image1 or image2) you want to run in switch memory for the next reboot.

1. At the Boot Options# prompt, enter:

```
Boot Options# image
```

2. Enter the name of the image you want the switch to use upon the next boot. The system informs you of which image is currently set to be loaded at the next reset, and prompts you to enter a new choice:

```
Currently set to use switch software "image1" on next reset.

Specify new image to use on next reset ["image1"/"image2"]:
```

IMPORTANT: When the switch software is changed (NormalPanel or SmartPanel) and the switch is rebooted, the switch configuration is removed and the switch runs factory configuration block. Backup the switch configuration if needed.

Uploading a software image from the switch

You can upload a software image from the switch to a FTP or TFTP server.

1. At the Boot Options# prompt, enter:

```
Boot Options# ptimg
```

2. The system prompts you for information. Enter the desired image:

```
Enter name of switch software image to be uploaded
["image1"|"image2"|"boot"]: <image>
```

3. Enter the name or the IP address of the FTP or TFTP server:

```
Enter hostname or IP address of FTP/TFTP server: <IP address>
```

4. Enter the name of the file into which the image will be uploaded on the FTP or TFTP server:

```
Enter name of file on FTP/TFTP server: <filename>
```

5. Enter the user name, if you are using a FTP server:

```
Enter username for FTP server or hit return for TFTP server: <userID>
```

6. Enter the password for the FTP server (if prompted):

```
Enter password for username on FTP server: <password>
```

7. The system then requests confirmation of what you have entered. To have the file uploaded, enter y.

```
image2 currently contains Software Version 1.0.0
Upload will transfer image2 (1889411 bytes) to file "test"
 on TFTP server 192.1.1.1.
Confirm upload operation [y/n]: y
```

Selecting a configuration block

When you make configuration changes to the switch, you must save the changes so that they are retained beyond the next time the switch is reset. When you execute the save command, your new configuration changes are placed in the active configuration block. The previous configuration is copied into the backup configuration block.

There is also a factory configuration block. This holds the default configuration set by the factory when the switch was manufactured. Under certain circumstances, it may be desirable to reset the switch configuration to the default. This can be useful when a custom-configured switch is moved to a network environment where it will be re-configured for a different purpose.

Use the following procedure to set which configuration block you want the switch to load the next time it is reset:

1. At the Boot Options# prompt, enter:

```
Boot Options# conf
```

2. Enter the name of the configuration block you want the switch to use.

   The system indicates which configuration block is currently set to be loaded at the next reset, and prompts you to enter a new choice:

```
Currently set to use active configuration block on next reset.
Specify new block to use ["active"/"backup"/"factory"]:
```

Resetting the switch

You can reset the switch to make your software image file and configuration block changes occur.

Resetting the switch causes the Spanning Tree Protocol to restart. This process can be lengthy, depending on the topology of your network.

To reset the switch, at the Boot Options# prompt, enter:

```
>> Boot Options# reset
```

You are prompted to confirm your request.

Current switch software information

To display the current switch software information, enter the following.

```
>> Boot Options# cur
Currently set to boot software image2, factory default config block.
Current FLASH software:
  image1: version 1.2.0, downloaded  0:15:51 Mon Jan  2, 2006
          NormalPanel
  image2: version 1.0.0, downloaded  1:32:08 Sun Jan  8, 2006
          SmartPanel
  boot kernel: version 1.2.0
```

Use this command to display the image running on the switch, the Configuration block which the switch runs after booted, and the switch software stored in image1 and image2.

When NormalPanel is displayed in the software information, the software for conventional Layer2 switch mode is stored in the image. When SmartPanel is displayed, the software for SmartPanel mode is stored in the image.

Maintenance Menu

Introduction

The Maintenance Menu is used for debugging purposes, enabling you to generate a technical support dump of the critical state information in the switch, and to clear entries in the Forwarding Database and the Address Resolution Protocol (ARP). This menu is available only from an administrator and operator login.

Menu information

Command: `/maint`

```
[Maintenance Menu]
      sys     - System Maintenance Menu
      fdb     - Forwarding Database Manipulation Menu
      debug   - Debugging Menu
      arp     - ARP Cache Manipulation Menu
      igmp    - IGMP Multicast Group Menu
      uudmp   - Uuencode FLASH dump
      ptdmp   - tftp put FLASH dump to tftp server
      cldmp   - Clear FLASH dump
      tsdmp   - Tech support dump
      pttsdmp - tftp put tech support dump to tftp server
```

The following table describes the Maintenance Menu options.

Table 85 Maintenance Menu options

Command	Usage
sys	Displays the System Maintenance Menu.
fdb	Displays the Forwarding Database Manipulation Menu.
debug	Displays the Debug Menu.
arp	Displays the ARP Cache Manipulation Menu.
igmp	Displays the IGMP Maintenance Menu.
uudmp	Displays dump information in uuencoded format.
ptdmp	Saves the system dump information via TFTP.
cldmp	Clears dump information from flash memory.
tsdmp	Dumps all switch information, statistics, and configuration.
pttsdmp	Redirects the technical support dump (tsdmp) to an external TFTP server.

System maintenance options

Command: `/maint/sys`

```
[System Maintenance Menu]
      flags   - Set NVRAM flag word
```

The System Maintenance Menu is reserved for use by NEC technical support. The options are used to perform system debugging.

The following table describes the System Maintenance Menu options.

Table 86 System Maintenance Menu options

Command	Usage
flags <*new NVRAM flags word as 0xXXXXXXXX*>	Sets the flags that are used for debugging purposes by NEC technical support.

Forwarding Manipulation options

Command: `/maint/fdb`

```
[FDB Manipulation Menu]
      find    - Show a single FDB entry by MAC address
      port    - Show FDB entries for a single port
      vlan    - Show FDB entries for a single VLAN
      dump    - Show all FDB entries
      add     - Add a FDB entry
      del     - Delete a FDB entry
      clear   - Clear entire FDB, then re-add static entries
```

The Forwarding Database (FDB) Manipulation Menu can be used to view information and to delete a MAC address from the Forwarding Database or clear the entire Forwarding Database. This is helpful in identifying problems associated with MAC address learning and packet forwarding decisions.

The following table describes the FDB Manipulation Menu options.

Table 87 FDB Manipulation Menu options

Command	Usage
`find <MAC address> [<1-4095>]`	Displays a single database entry by its MAC address. You are prompted to enter the MAC address of the device. Enter the MAC address using one of the following: • xx:xx:xx:xx:xx:xx format (for example: 08:00:20:12:34:56) • xxxxxxxxxxxx format (for example: 080020123456).
`port <port number>`	Displays all FDB entries for a particular port.
`vlan <1-4095>`	Displays all FDB entries on a single VLAN.
`dump`	Displays all entries in the Forwarding Database.
`add`	Adds a FDB entry.
`rem`	Removes a FDB entry.
`clear`	Clears the entire Forwarding Database from switch memory, then adds the static entries to the Forwarding Database.

Debugging options

Command: `/maint/debug`

```
[Miscellaneous Debug Menu]
      tbuf    - Show MP trace buffer
      snap    - Show MP snap (or post-mortem) trace buffer
      clrcfg  - Clear all flash configs
```

The Miscellaneous Debug Menu displays trace buffer information about events that can be helpful in understanding switch operation. You can view the following information using the Debug Menu:

- Events traced by the management processor (MP)
- Events traced to a buffer area when a reset occurs

If the switch resets for any reason, the management processor (MP) trace buffer is saved into the snap trace buffer area. The output from these commands can be interpreted by NEC technical support.

The following table describes the Miscellaneous Debug Menu options:

Table 88 Miscellaneous Debug Menu options

Command	Usage
`tbuf`	Displays the management processor trace buffer. Header information similar to the following is shown: MP trace buffer at 13:28:15 Fri May 25, 2002; mask: 0x2ffdf748 The buffer information is displayed after the header.
`snap`	Displays the management processor snap (or post-mortem) trace buffer. This buffer contains information traced at the time that a reset occurred.
`clrcfg`	Deletes all flash configuration blocks. The next time the switch is rebooted, it returns to the factory default settings.

ARP cache options

Command: `/maint/arp`

```
[Address Resolution Protocol Menu]
      find    - Show a single ARP entry by IP address
      port    - Show ARP entries on a single port
      vlan    - Show ARP entries on a single VLAN
      addr    - Show ARP entries for switch's interfaces
      dump    - Show all ARP entries
      clear   - Clear ARP cache
```

The following table describes the Address Resolution Protocol Menu options:

Table 89 Address Resolution Protocol Menu options

Command	Usage
`find <IP address>`	Shows a single ARP entry by IP address. For example, 192.4.17.35
`port <port number>`	Shows ARP entries on a single port.
`vlan <1-4095>`	Shows ARP entries on a single VLAN.
`addr`	Shows the list of IP addresses that the switch will respond to for ARP requests.
`dump`	Shows all ARP entries.
`clear`	Clears the entire ARP list from switch memory.

IGMP Multicast Group options

Command: `/maint/igmp`

```
[IGMP Multicast Group Menu]
     snoop    - IGMP Snooping Menu
     mrouter  - IGMP Multicast Router Port Menu
     clear    - Clear group and mrouter tables
```

The following table describes the IGMP Multicast Group Maintenance Menu options.

Table 90 IGMP Multicast Group Menu options

Command	Usage
`snoop`	Displays the IGMP Snooping maintenance menu.
`mrouter`	Displays the IGMP Multicast Router maintenance menu.
`clear`	Clears IGMP Multicast data from switch memory.

IGMP Snooping options

Command: `/maint/igmp/snoop`

```
[IGMP Multicast Group Menu]
     find     - Show a single group by IP group address
     vlan     - Show groups on a single vlan
     port     - Show groups on a single port
     trunk    - Show groups on a single trunk
     detail   - Show detail of a single group by IP address
     dump     - Show all groups
     clear    - Clear group tables
```

The following table describes the IGMP Snoop Maintenance Menu options.

Table 91 IGMP Snooping Menu options

Command	Usage
`find <IP address>`	Shows a single IGMP Multicast group by IP address.
`vlan <1-4094>`	Shows IGMP Multicast groups on a single VLAN.
`port <port number>`	Shows IGMP Multicast groups on a single port.
`detail <IP address>`	Shows the detail of IGMP Multicast groups by IP address.
`dump`	Shows all IGMP Multicast groups.
`clear`	Clears IGMP Multicast data from switch memory.

IGMP Multicast Routers options

Command: `/maint/igmp/mrouter`

```
[IGMP Multicast Routers Menu]
     vlan     - Show all multicast router ports on a single vlan
     dump     - Show all multicast router ports
     clear    - Clear multicast router port table
```

The following table describes the IGMP Multicast Routers Maintenance Menu options.

Table 92 IGMP Multicast Group Menu options

Command	Usage
`vlan <1-4094>`	Shows IGMP Multicast groups on a single VLAN.
`dump`	Shows all IGMP Multicast routers.
`clear`	Clears IGMP Multicast router data from switch memory.

Technical support dump

Command: `/maint/tsdmp`

Use this command to dump all switch information, statistics, and configuration.

If you want to capture dump information to a file, set your communication software on your workstation to capture session data prior to issuing the tsdmp command.

FTP/TFTP technical support dump put

Command: `/maint/pttsdmp`

Use this command to put (save) the technical support dump to a FTP/TFTP server.

Uuencode flash dump

Command: `/maint/uudmp`

Using this command, dump information is presented in uuencoded format. This format makes it easy to capture the dump information as a file or a string of characters.

If you want to capture dump information to a file, set your communication software on your workstation to capture session data prior to issuing the uudmp command. This will ensure that you do not lose any information. Once entered, the uudmp command will cause approximately 23,300 lines of data to be displayed on your screen and copied into the file.

Using the uudmp command, dump information can be read multiple times. The command does not cause the information to be updated or cleared from flash memory.

Dump information is not cleared automatically. In order for any subsequent dump information to be written to flash memory, you must manually clear the dump region. For more information on clearing the dump region, see the “Clearing dump information” section later in this chapter.

To access dump information, at the Maintenance# prompt, enter:

```
Maintenance# uudmp
```

The dump information is displayed on your screen and, if you have configured your communication software to do so, captured to a file. If the dump region is empty, the following displays:

```
No FLASH dump available.
```

FTP/TFTP system dump put

Command: `/maint/ptdmp <server> <filename>`

Use this command to put (save) the system dump to a FTP or TFTP server.

NOTE: If the FTP or TFTP server is running SunOS or the Solaris operating system, the specified ptdmp file must exist prior to executing the ptdmp command, and must be writable (set with proper permission, and not locked by any application). The contents of the specified file will be replaced with the current dump data.

To save dump information via FTP/TFTP, at the Maintenance# prompt, enter:

```
Maintenance#  ptdmp <server> <filename>
```

Type the FTP/TFTP server IP address as <*server*>, and the target dump file as <*filename*>.

Enter the user name, if you are using a FTP server:

```
Enter username for FTP server or hit return for TFTP server: <userID>
```

Enter the password for the FTP server (if prompted):

```
Enter password for username on FTP server: <password>
```

Clearing dump information

Command: `/maint/cldmp`

To clear dump information from flash memory, at the Maintenance# prompt, enter:

```
Maintenance# cldmp
```

The switch clears the dump region of flash memory and displays the following message:

```
FLASH dump region cleared.
```

If the flash dump region is already clear, the switch displays the following message:

```
FLASH dump region is already clear.
```

Unscheduled system dumps

If there is an unscheduled system dump to flash memory, the following message is displayed when you log on to the switch:

```
Note: A system dump exists in FLASH. The dump was saved
      at 13:43:22 Wednesday October 30, 2005. Use /maint/uudmp to
      extract the dump for analysis and /maint/cldmp to
      clear the FLASH region. The region must be cleared
      before another dump can be saved.
```