HP
Switch Software
Basic Operation Guide

Abstract

This switch software guide is intended for network administrators and support personnel, and applies to the switch models listed on this page unless otherwise noted. This guide does not provide information about upgrading or replacing switch hardware. The information in this guide is subject to change without notice.

Applicable Products

Applies to all switch series.

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Contents

1 Commands found in the Basic Operation Guide....7
2 Getting started....9
Initial switch set-up....9
Recommended minimal configuration....9
Using the switch setup screen....9
Login banners....11
Custom login banners....11
Banner operation with telnet, serial, or SSHv2 access....11
Banner operation with the WebAgent....11
Configuring and displaying a non-default banner....11
Example of configuring and displaying a banner....12
Operating notes....13
User-configurable banner message after authentication....14
Banner motd command with non-interactive mode....14
3 Using the Menu Interface....17
Overview....17
Starting and ending a menu session....18
How to start a menu interface session....18
How to end a menu session and exit from the console....19
Main Menu features....20
Screen structure and navigation....20
Rebooting the switch....22
Menu features list....24
Port-level configuration on HP 3800 switches with stacking enabled....24
Where to go from here....25
4 Using the Command Line Interface (CLI)....26
Overview....26
Accessing the CLI....26
Using the CLI....26
Privilege levels at logon....26
Privilege level operation....27
Operator privileges....28
Manager privileges....29
How to move between levels....30
Listing commands and command options....31
Listing commands available at any privilege level....31
Listing commands options....33
Displaying CLI “Help”....33
Configuration commands and the context configuration modes....34
Return message types with CLI commands....36
CLI interactive commands....37
Interactive commands requiring additional options....38
Menu commands....38
SNMPv3 special cases....38
Banner motd command with non-interactive mode....39
CLI control and editing....40
Executing a prior command—redo....40
Repeating execution of a command....40
Using a command alias....41
CLI shortcut keystrokes....43

5 Using the HP WebAgent....44
Overview....44
General features....45
Starting the WebAgent....46
Using a standalone web browser from a PC or UNIX workstation....46
Tasks for your first WebAgent session....47
Viewing the "First Time Install" window....47
Setting a username and password....47
If you lose the password....48
Online Help for the WebAgent....48
Downloading the WebAgent Help to a local server....48
Connecting to the WebAgent from HP PCM+....48
6 Switch memory and configuration....50
Overview....50
Configuration file management....50
Using the CLI to implement configuration changes....51
Creating a custom default configuration....54
Copying an existing configuration file to the custom default configuration file....55
Copying the custom default config file onto the switch....55
Using TFTP....55
Using XMODEM....56
Using USB....56
Copying the custom default config file off the switch....56
Using TFTP....56
Using XMODEM....56
Using USB....57
Using SFTP and SCP to transfer the custom configuration....57
Erasing a configuration file....57
Displaying the configuration files....58
Troubleshooting custom default configuration files....59
Using the menu and WebAgent to implement configuration changes configuration file....60
Menu: implementing configuration changes....60
Using Save and Cancel in the menu interface....60
Rebooting from the menu interface....61
WebAgent: implementing configuration changes....62
Zeroization....62
Zeroizing the file storage of the management module....62
Zeroizing from the ROM console....63
Zeroizing with HA....63
Using Primary and Secondary flash image options....64
Displaying the current flash image data....64
Switch software downloads....65
Local switch software replacement and removal....66
Rebooting the switch....68
Operating notes about booting....68
Boot and reload command comparison....68
Setting the default flash....69
Booting from the default flash (Primary or Secondary)....69
Booting from a specified flash....70
Using reload....71
Multiple configuration files....74
General operation....75
Transitioning to multiple configuration files....76
Listing and displaying startup-config files....77

Viewing the startup-config file status with multiple configuration enabled....77
Displaying the content of a specific startup-config file....77
Changing or overriding the reboot configuration policy....78
Managing startup-config files in the switch....79
Renaming an existing startup-config file....79
Creating a new startup-config file....80
Using the Clear + Reset button combination to reset the switch to its default configuration....82
Transferring startup-config files to or from a remote server....83
TFTP: copying a configuration file to a remote host....83
TFTP: Copying a configuration file from a remote host....83
Xmodem: copying a configuration file to a serially connected host....84
Xmodem: copying a configuration file from a serially connected host....84
Operating notes for multiple configuration files....84
Display configuration of selected interface....84
Running configuration output....84
Startup configuration output....90
Automatic configuration update with DHCP Option 66....92
CLI command....92
Possible scenarios for updating the configuration file....93
Operating notes....93
Log messages....94
7 Interface access and system information....95
Interface access: console/serial link, web, and inbound telnet....95
Modifying the interface access....95
Terminal line width and length settings....95
Listing the current console/serial link configuration....96
Reconfigure inbound telnet access....96
Outbound telnet to another device....96
Making window size negotiation available for a telnet session....97
Reconfigure WebAgent access....98
Reconfigure the console/serial link settings....98
Denying interface access by terminating remote management sessions....100
System information....101
Viewing and configuring system information....102
8 Configuring IP addressing....105
Overview....105
IP configuration....105
Just want a quick start with IP addressing?....106
IP addressing with multiple VLANs....106
Menu: configuring IP address, gateway, and Time-To-Live (TTL)....107
CLI: Configuring IP Address, Gateway, and Time-To-Live (TTL)....107
WebAgent: configuring IP addressing....111
How IP addressing affects switch operation....111
DHCP/Bootp operation....112
Network preparations for configuring DHCP/Bootp....114
Loopback interfaces....114
Introduction....114
Configuring a loopback interface....115
Displaying loopback interface configurations....116
IP Preserve: retaining VLAN-1 IP addressing across configuration file downloads....117
Operating rules for IP preserve....118
Enabling IP preserve....118
Configuring a single source IP address....120
Overview....120

Specifying the source IP address....121
The source IP selection policy....122
Displaying the source IP interface information....123
Error messages....127
9 Software management....128
Downloading switch documentation and software from the web....128
Viewing or downloading the software manual set....128
Downloading software updates for your switch....128
TFTP download from a server....128
Xmodem download from a PC or Unix workstation....129
Using USB to download switch software....130
Software signing and verification....131
Using the CLI to validate or bypass a signature verification....131
Saving configurations while using the CLI....132
Important: Best Practices for software updates....132
Updating the switch: overview....133
Updating the switch: detailed steps....134
Rolling back switch software....136
Viewing or transferring alternate configuration files....137
Index....139

1 Commands found in the Basic Operation Guide

NOTE: Certain commands are not supported on all switch models.

Table 1 List of commands

Command	Page
alias	41
banner exec	14
banner motd	11
boot [system flash]	135
boot set-default flash	69
config	51
console	98
copy config	83
copy flash	66
copy tftp config	83
copy tftp flash	128
copy usb flash	130
copy xmodem flash	129
dhcp config-file-update	92
enable	29
end	30
erase	81
erase flash	67
exit	29
fastboot	71
hostname	103
interface loopback <number>	115
ip address <ip-addr> <mask-bits>	109
ip address <ip-addr> / <mask-length>	109
ip address dhcp-bootp	109
ip default-gateway <ip-addr>	111
ip preserve	118
ip source-interface	121
ip ttl	111
kill	100
mac-age-time	103

Table 1 List of commands *(continued)*

Command	Page
menu	18
redo	40
reload after	71
reload at	71
rename config	79
repeat	41
session interactive-mode	37
session show-message-type	36
show <ip | ipv6>	107
show banner	15
show config	90
show config files	77
show config interface	90
show config status	51
show console	96
show flash	136
show ip route	116
show ip source-interface	124
show reload	73
show running-config	84
show running-config interface	84
show session	38
show system information	102
show version	64
snmp -server <contact | location>	103
startup-default	78
telnet	97
telnet-server	96
time	104
time daylight-time-rule	104
time timezone	104
vlan	29
web-management	98
write memory	52
write terminal	51

2 Getting started

Initial switch set-up

Initial setup includes:

- setting a Manager password
- assigning an IP (Internet Protocol) address and subnet mask
- configuring optional banners

Recommended minimal configuration

In the factory default configuration, the switch has no IP (Internet Protocol) address and subnet mask, and no passwords. In this state, it can be managed only through a direct console connection. To manage the switch through in-band (networked) access, you should configure the switch with an IP address and subnet mask compatible with your network. Also, you should configure a Manager password to control access privileges from the console and web browser interface. Other parameters in the Switch Setup screen can be left at their default settings or you can configure them with values you enter.

For more information on IP addressing, see "Configuring IP addressing" (page 105).

NOTE: By default, the switch is configured to acquire an IPv4 address configuration from a DHCP or Bootp server. To use DHCP/Bootp instead of the manual method described in this chapter, see DHCP/Bootp Operation in the *Management and Configuration Guide* for your switch.

For information on configuring IPv6 addressing, see to the latest *IPv6 Configuration Guide* for your switch.

Using the switch setup screen

The quickest and easiest way to minimally configure the switch for management and password protection is to use a direct console connection to the switch, start a console session, and access the Switch Setup screen.

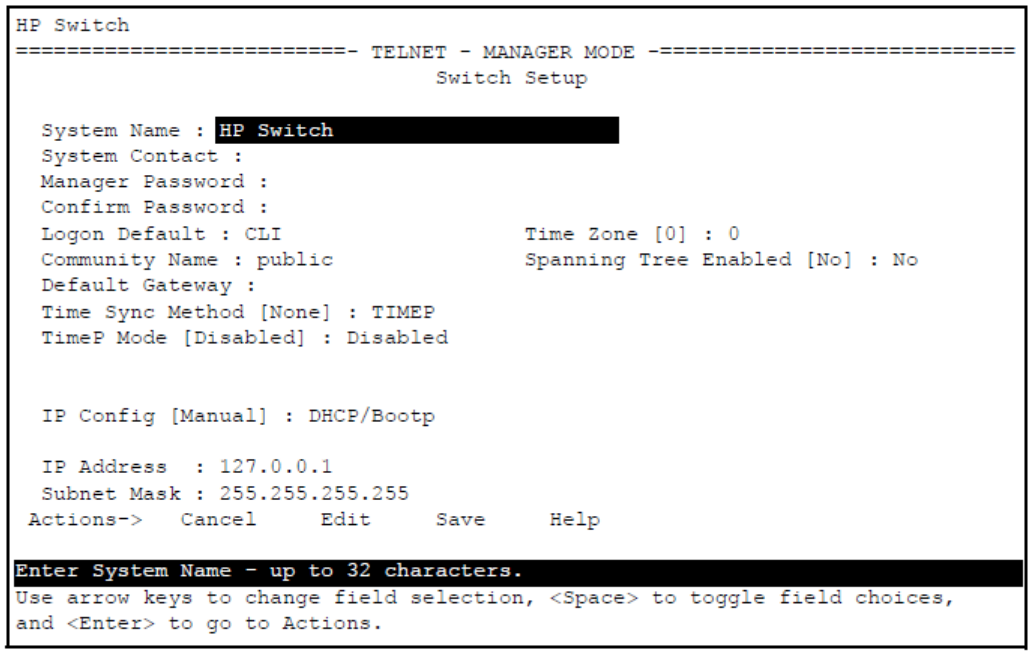
1. Using the method described in the *Installation and Getting Started Guide* for your switch, connect a terminal device to the switch and display the switch console command (CLI) prompt (the default display).

   The CLI prompt appears displaying the switch model number, for example:

   HP E8200zl#

2. Screen. The following illustration is an example of a Setup screen with default settings. Your screen may vary slightly.

Figure 1 Example Switch Setup screen



3. Use the Tab key to select the **Manager Password** field and enter a manager password of up to 16 characters.
4. Tab to the **IP Config (DHCP/Bootp)** field and use the Space bar to select the **Manual** option.
5. Tab to the **IP Address** field and enter the IP address that is compatible with your network.
6. Tab to the **Subnet Mask** field and enter the subnet mask used for your network.
7. Press Enter, then S (for **Save**).

Table 2 Setup screen field descriptions

Parameter	Default	
System Name	blank	Optional; up to 255 characters, including spaces
System Contact	blank	Optional; up to 255 characters, including spaces
Manager Password	blank	Recommended; up to 16 characters (no blank spaces)
Logon Default	CLI	The default setting selects the command line interface for console access. The alternative is the Menu interface.
Time Zone	0 (none)	Optional; 1440 to -1440. The number of minutes your location is to the West (-) or East (+) of GMT.
Community Name	public	Default setting recommended.
Spanning Tree Enabled	No	Default setting recommended unless STP is already running on your network or the switch will be used in complex network topologies.
Default Gateway	blank	Recommended; Enter the IP address of the next-hop gateway node if network traffic needs to be able to reach off-subnet destinations.
Time Sync Method	TimeP	Optional; The protocol the switch uses to acquire a time signal. The options are SNTP and TimeP.
TimeP Mode	Disabled	Synchronizes the time kept on the switch to the TimeP server.
IP Config	DHCP/Bootp	Set to Manual unless a DHCP/Bootp server is used on your network to configure IP addressing.
IP Address	xxx.xxx.xxx.xxx	Recommended; If you set IP Config to Manual, then enter an IP address compatible with your network.*

Table 2 Setup screen field descriptions *(continued)*

Parameter	Default	
Subnet Mask	xxx.xxx.xxx.xxx	Recommended; If you entered an IP address, then enter a subnet mask compatible with your network.*
* The IP address and subnet mask assigned for the switch must be compatible with the IP addressing used in your network. For more on IPv4 addressing, see "Configuring IP addressing" (page 105). For IPv6 addressing topics, refer to the latest IPv6 Configuration Guide for your switch.		

Login banners

Custom login banners

You can now configure the switch to display a login banner of up to 3070 characters when an operator initiates a management session with the switch through any of the following methods:

- Telnet
- serial connection
- SSHv2
- WebAgent

The default banner displays product registration information; the copyright splash is no longer displayed.

If a banner is configured, the banner page is displayed when you access the WebAgent. The default product registration information is not displayed as there is already a product registration prompt displayed in the WebAgent.

Banner operation with telnet, serial, or SSHv2 access

When a system operator begins a login session, the switch displays the banner above the prompts for local password and **Press any key to continue**. Entering a correct password or, if no password is configured, pressing any key clears the banner from the CLI and displays the CLI prompt.

Banner operation with the WebAgent

When a system operator uses the WebAgent to access the switch, the text of a non-default banner configured on the switch appears in a dedicated banner window with a **Continue** link to the next page. Clicking on **Continue** then displays either the Registration page or the switch's home page. If the banner feature is disabled or if the switch is using the factory-default banner, then the banner page does not appear in the WebAgent screen when an operator initiates a login session with the switch.

Configuring and displaying a non-default banner

You can enable or disable banner operation using either the switch's CLI or an SNMP application. The steps include:

1. Enable non-default banner operation and define the endpoint delimiter for the banner.
2. Enter the desired banner text, including any specific line breaks you want.
3. Enter the endpoint delimiter.

Use `show banner motd` to display the current banner status.

Syntax:

```
banner motd <delimiter>

no banner motd
```

This command defines the single character used to terminate the banner text and enables banner text input. You can use any character except a blank space as a delimiter. The `no` *form of the command disables the login banner feature.*

`<banner-text-string>`

*The switch allows up to 3070 banner characters, including blank spaces and CR-LF ([***Enter***]). (The tilde "~" and the delimiter defined by* `banner motd <delimiter>` *are not allowed as part of the banner text.) While entering banner text, you can backspace to edit the current line (that is, a line that has not been terminated by a CR-LF.) However, terminating a line in a banner by entering a CR-LF prevents any further editing of that line. To edit a line in a banner entry after terminating the line with a CR-LF requires entering the delimiter described above and then re-configuring new banner text.*

NOTE: *In redundant management, the banner is not seen on the standby module, only the active module.*

Example of configuring and displaying a banner

Suppose a system operator wanted to configure the following banner message on her company's switches:

```
This is a private system maintained by the

        Allied Widget Corporation

Unauthorized use of this system can result in

      civil and criminal penalties!
```

In this case, the operator will use the [Enter] key to create line breaks, blank spaces for line centering, and the **%** symbol to terminate the banner message.

Example 1 Configuring a login banner

```
HP Switch(config)# banner motd %
Enter TEXT message. End with the character'%'
  This is a private system maintained by the
        Allied Widget Corporation.
  Unauthorized use of this system can result in
        civil and criminal penalties!%
HP Switch(config)# write memory
```

To view the current banner configuration, use either the **show banner motd** or **show running** command.

Example 2 Show banner motd output

```
HP Switch(config)# show banner motd

Banner Information
Configured Banner:

     This is a private system maintained by the
            Allied Widget Corporation.
   Unauthorized use of this system can result in
          civil and criminal penalties!
```

Example 3 Banner in the switch's running-config file

```
HP Switch (config)# show running

Running configuration:

; J8697A Configuration Editor; Created on release #K.15.12.0001
; Ver #01:01:00

hostname "HP Switch"
module 1 type J8702A
vlan 1
  name "DEFAULT_VLAN"
  untagged A1-A24
  ip address dhcp-bootp
  exit
banner motd "This is a private system maintained by the\n Allied Widget
Corporation.\nUnauthorized use of this system can result in\n civil and
criminal penalties!"
password manager

HP Switch (config)#
```

The next time someone logs onto the switch's management CLI, the login screen displays the configured banner. Entering a correct password clears the banner and displays the CLI prompt.

Example 4 CLI result of the login banner configuration

```
     This is a private system maintained by the
            Allied Widget Corporation.
   Unauthorized use of this system can result in
            civil and criminal penalties!
```

Operating notes

- The default banner appears only when the switch is in the factory default configuration. Using `no banner motd` deletes the currently configured banner text and blocks display of the default banner. The default banner is restored only if the switch is reset to its factory-default configuration.
- The switch supports one banner at any time. Configuring a new banner replaces any former banner configured on the switch.
- If the switch is configured with **ssh version 1** or **ssh version 1-or-2**, configuring the banner sets the SSH configuration to ssh version 2 and displays the following message in the CLI:

  `Warning: SSH version has been set to v2.`

- If a banner is configured, the switch does not allow configuration with **ssh version 1** or **ssh version 1-or-2.** Attempting to do so produces the following error message in the CLI:

  ```
  Banner has to be disabled first.
  ```

- If a banner is enabled on the switch, the WebAgent displays the following link to the banner page:

  Notice to all users

User-configurable banner message after authentication

A text message that has been configured with the **banner motd** command displays with the authentication prompt when a user opens a console, telnet, SSH, or WebAgent session.

The `exec` option of the **banner** command allows a user-configurable message to be displayed after the user has been authenticated. If there is no password on the switch, the exec banner message displays immediately.

Syntax:

[no] `banner exec` *<ASCII-string>*
Sets the exec banner text. Text can be multiple lines up to 3070 characters, and can consist of any printable character except the tilde (~) and the delimiting character.

<ASCII-string>
The text must end with a delimiting character, which can be any single character except the tilde (~) character.

The **no** *version of the command removes the banner exec text.*

Example 5 The banner exec command

```
HP Switch(config)# banner exec &
Enter TEXT message. End with the character &
This is Switch A in the language lab &
```

To display the status and text for the exec banner configuration, use the **show banner exec** command.

Example 6 Displaying banner exec configuration

```
HP Switch(config)# show banner exec

Banner Information

Banner Status: Enabled
Configured Banner:

This is Switch A in the language lab
```

Banner motd command with non-interactive mode

The use of escape characters allows the **banner motd** command to be used in non-interactive mode for multiple message lines. In non-interactive mode, you can create a banner message enclosed in double quotes or other delimiter that uses escape characters within the delimiters. Other existing CLI commands do not support the escape characters. For more information on interactive and non-interactive mode, see "CLI interactive commands" (page 37) in this guide.

The following escape characters are supported:

\"	double q
\'	single quote
\`	forward quote
\\	backslash
\f	form feed
\n	newline
\r	carriage return
\t	horizontal tab
\v	vertical tab

Example 7 Configuring the banner message using escape characters within double quote delimiters

```
HP Switch(config)# banner motd "You can use the
\'banner motd\' CLI command in non-interactive mode.\n\n\tThe
banner motd command will support escape characters."

HP Switch(config)# show banner motd

Banner Information

Banner status: Enabled

Configured Banner:

You can use the 'banner motd' CLI command in non-interactive mode.

     The banner motd command will support escape characters."
```

The running configuration file contains the banner message as entered in the command line.

Example 8 The running config file with banner motd configured in non-interactive mode

```
HP Switch(config)# show running-config

Running configuration:

;J8693A Configuration Editor; Created on release #K.15.10.0002
;Ver #01:01:00

hostname 'HP Switch'
vlan 1 name "DEFAULT_VLAN"
  untagged 1-48, a1-a4
  ip address dhcp-bootp
  exit
banner motd "You can use the \'banner motd\' CLI command in non-interactive
mode.\n\n\tThe banner motd command will support escape characters."
```

You can use a delimiting character other than quotes as well, as shown in the example below.

Example 9 Configuring the banner message using an alternate delimiter of '#'

```
HP Switch(config)# banner motd #
Enter TEXT message. End with the character '#'
You can use the \'banner motd\' CLI command in non-interactive mode.\n\n\t
The banner motd command will support escape characters.#
```

3 Using the Menu Interface

Overview

This chapter describes the following features:

- Overview of the Menu Interface, 17
- Starting and ending a Menu session, 18
- The Main Menu, 20
- Screen structure and navigation, 20
- Rebooting the switch, 22

The menu interface operates through the switch console to provide you with a subset of switch commands in an easy-to-use menu format enabling you to:

- Perform a "quick configuration" of basic parameters, such as the IP addressing needed to provide management access through your network
- Configure these features:
  - Manager and Operator passwords
  - System parameters
  - IP addressing
  - Time protocol
  - Ports
  - Trunk groups
  - A network monitoring port
  - SNMP community names
  - IP authorized managers
  - VLANs (Virtual LANs) and GVRP
- View status, counters, and Event Log information
- Update switch software
- Reboot the switch

For a detailed list of menu features, see the "Menu features list" (page 24).

Privilege levels and password security. HP strongly recommends that you configure a Manager password to help prevent unauthorized access to your network. A Manager password grants full read-write access to the switch. An Operator password, if configured, grants access to status and counter, Event Log, and the Operator level in the CLI. After you configure passwords on the switch and log off of the interface, access to the menu interface (and the CLI and web browser interface) will require entry of either the Manager or Operator password. (If the switch has only a Manager password, then someone without a password can still gain read-only access.)

NOTE: If the switch has neither a Manager nor an Operator password, anyone having access to the console interface can operate the console with full manager privileges. Also, if you configure only an Operator password, entering the Operator password enables full manager privileges.

For more information on passwords, refer to the *Access Security Guide* for your switch.

Menu interaction with other interfaces.

- The menu interface displays the current running-config parameter settings. You can use the menu interface to save configuration changes made in the CLI only if the CLI changes are in the running config when you save changes made in the menu interface. (For more on how switch memory manages configuration changes, see Chapter 6, "Switch Memory and Configuration".)
- A configuration change made through any switch interface overwrites earlier changes made through any other interface.
- The Menu Interface and the CLI (Command Line Interface) both use the switch console. To enter the menu from the CLI, use the **menu** command. To enter the CLI from the Menu interface, select **Command Line (CLI)** option.)

Starting and ending a menu session

You can access the menu interface using any of the following:

- A direct serial connection to the switch's console port, as described in the installation guide you received with the switch
- A Telnet connection to the switch console from a networked PC or the switch's web browser interface. Telnet requires that an IP address and subnet mask compatible with your network have already been configured on the switch.

NOTE: This section assumes that either a terminal device is already configured and connected to the switch (see the *Installation and Getting Started Guide* shipped with your switch) or that you have already configured an IP address on the switch (required for Telnet access).

How to start a menu interface session

In its factory default configuration, the switch console starts with the CLI prompt. To use the menu interface with Manager privileges, go to the Manager level prompt and enter the **menu** command.

1. Use one of these methods to connect to the switch:
   - A PC terminal emulator or terminal
   - Telnet
2. Do one of the following:
   - If you are using Telnet, go to step 3.
   - If you are using a PC terminal emulator or a terminal, press **[Enter]** one or more times until a prompt appears.
3. When the switch screen appears, do one of the following:
   - If a password has been configured, the password prompt appears.

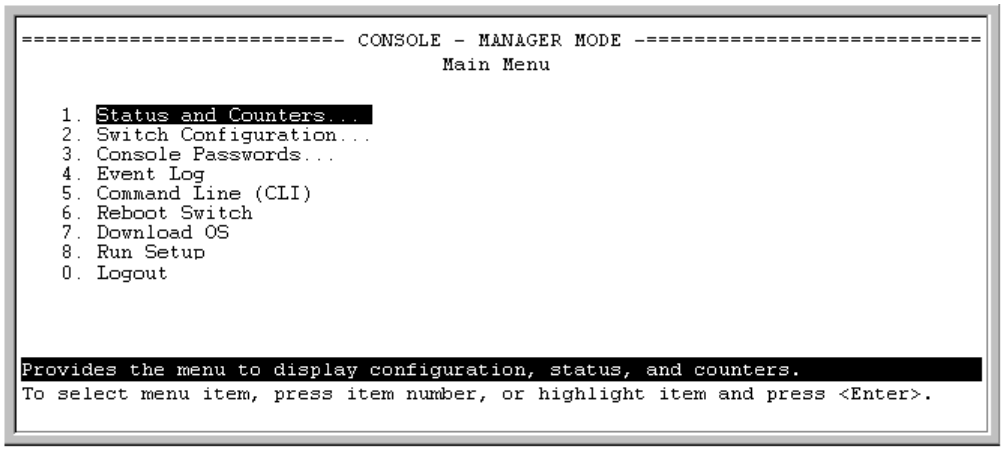
     ```
     Password: _
     ```

     Type the Manager password and press **[Enter]**. Entering the Manager password gives you manager-level access to the switch. (Entering the Operator password gives you operator-level access to the switch. Refer to the *Access Security Guide* for your switch.)
   - If no password has been configured, the CLI prompt appears. Go to the next step.
4. When the CLI prompt appears, display the Menu interface by entering the **menu** command. For example:

   ```
   HP Switch# menu [Enter]
   ```

   results in the following display:

Figure 2 Example of the Main Menu with Manager Privileges



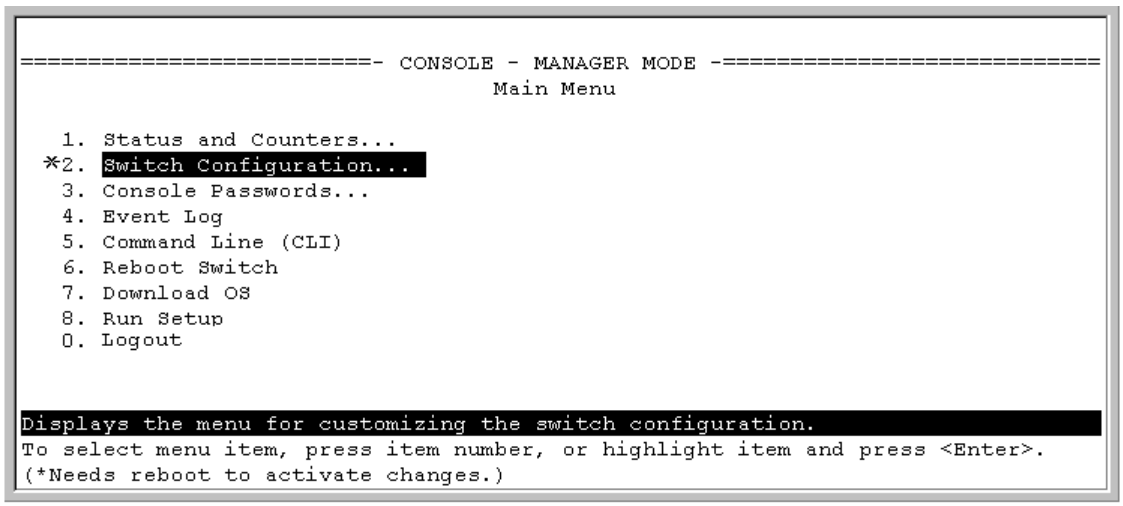
For a description of Main Menu features, see "Main Menu features" (page 20).

NOTE: To configure the switch to start with the menu interface instead of the CLI, go to the Manager level prompt in the CLI, enter the **setup** command, and in the resulting display, change the **Logon Default** parameter to **Menu**. For more information, see the *Installation and Getting Started Guide* you received with the switch.

How to end a menu session and exit from the console

The method for ending a menu session and exiting from the console depends on whether, during the session, you made any changes to the switch configuration that require a switch reboot to activate. (Most changes via the menu interface need only a **Save**, and do not require a switch reboot.) Configuration changes needing a reboot are marked with an asterisk (*) next to the configured item in the menu and also next to the **Switch Configuration** item in the Main Menu.

Figure 3 Example indication of a configuration change requiring a reboot



1. In the current session, if you have not made configuration changes that require a switch reboot to activate, return to the Main Menu and press **[0]** (zero) to log out. Then just exit from the terminal program, turn off the terminal, or quit the Telnet session.
2. If you *have* made configuration changes that require a switch reboot— that is, if an asterisk (*) appears next to a configured item or next to **Switch Configuration** in the Main Menu:
   a. Return to the Main Menu.
   b. Press **[6]** to select **Reboot Switch** and follow the instructions on the reboot screen.

Rebooting the switch terminates the menu session, and, if you are using Telnet, disconnects the Telnet session.

(See "Rebooting the switch" (page 22).)

3. Exit from the terminal program, turn off the terminal, or close the Telnet application program.

Main Menu features

The Main Menu gives you access to these Menu interface features:

- **Status and Counters:** Provides access to display screens showing switch information, port status and counters, and port and VLAN address tables. (See Appendix B, "Monitoring and Analyzing Switch Operation" in the Management and Configuration Guide for your switch.)
- **Switch Configuration:** Provides access to configuration screens for displaying and changing the current configuration settings. (See the Contents listing at the front of this manual.) For a listing of features and parameters configurable through the menu interface, see the "Menu features list" (page 24). For an index of the features covered in the software manuals for your switch, see the "Software Feature Index" in the Management and Configuration Guide for your switch.
- **Console Passwords:** Provides access to the screen used to set or change Manager-level and Operator-level passwords, and to delete Manager and Operator password protection. (Refer to the chapter on configuring user-names and passwords in the *Access Security Guide* for your switch.)
- **Event Log:** Enables you to read progress and error messages that are useful for checking and troubleshooting switch operation. (See Appendix C, "Using the Event Log for Troubleshooting Switch Problems" in the Management and Configuration Guide for your switch.)
- **Command Line (CLI):** Selects the Command Line Interface at the same level (Manager or Operator) that you are accessing in the Menu interface. (Refer to Chapter 4, "Using the Command Line Interface (CLI)".)
- **Reboot Switch:** Performs a "warm" reboot of the switch, which clears most temporary error conditions, resets the network activity counters to zero, and resets the system up-time to zero. A reboot is required to activate a change in the VLAN Support parameter. (See "Rebooting from the menu interface" (page 61).)
- **Download OS:** Enables you to download a new switch software version to the switch. (See Appendix A, "File Transfers" in the Management and Configuration Guide for your switch.)
- **Run Setup:** Displays the Switch Setup screen for quickly configuring basic switch parameters such as IP addressing, default gateway, logon default interface, and others. (Refer to the *Installation and Getting Started Guide* for your switch.)
- **Logout:** Closes the Menu interface and console session, and disconnects Telnet access to the switch. (See "How to end a menu session and exit from the console" (page 19).)

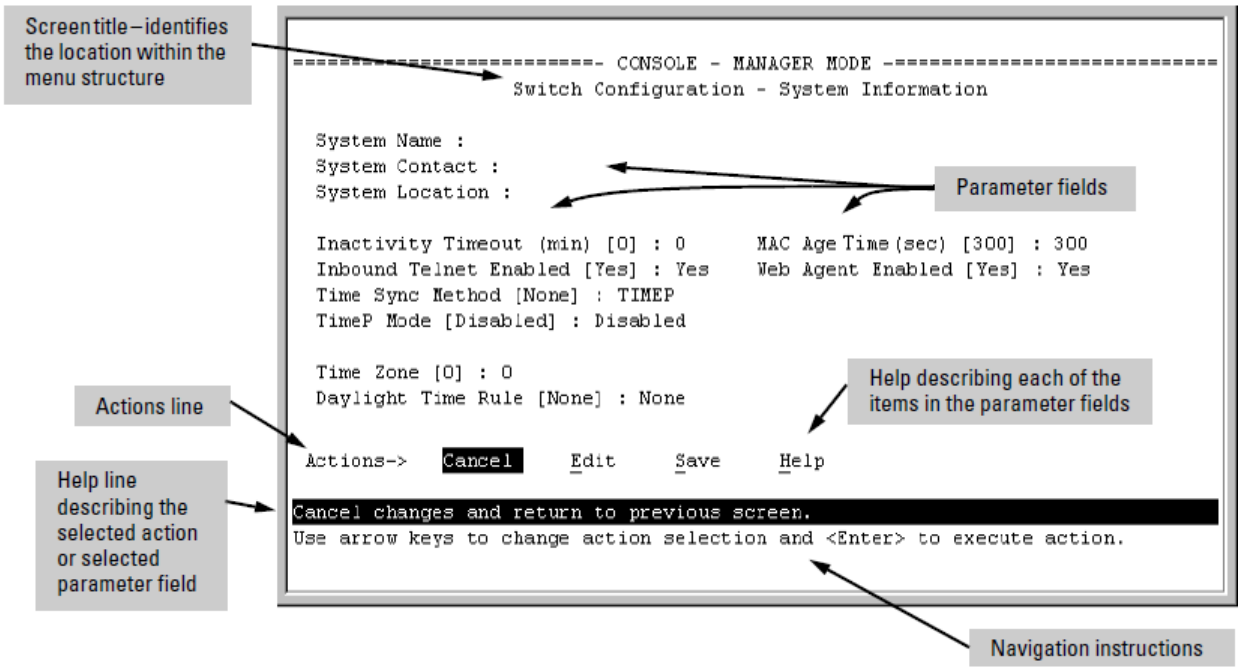
Screen structure and navigation

Menu interface screens include these three elements:

- Parameter fields and/or read-only information such as statistics
- Navigation and configuration actions, such as Save, Edit, and Cancel
- Help line to describe navigation options, individual parameters, and read-only data

For example, in the following System Information screen:

Figure 4 Elements of the screen structure



"Forms" design. The configuration screens, in particular, operate similarly to a number of PC applications that use forms for data entry. When you first enter these screens, you see the current configuration for the item you have selected. To change the configuration, the basic operation is to:

1. Press **[E]** to select the **Edit** action.
2. Navigate through the screen making all the necessary configuration changes. (See Table 3 on page 21.)
3. Press **[Enter]** to return to the **Actions** line. From there you can save the configuration changes or cancel the changes. Cancel returns the configuration to the values you saw when you first entered the screen.

Table 3 How to navigate the Menu interface

Task:	Actions:
Execute an action from the "Actions –>" list at the bottom of the screen:	
Reconfigure (edit) a parameter setting or a field:	1. Select a configuration item, such as **System Name**. 2. Press **[E]** (for **Edit** on the Actions line). 3. Use **[Tab]** or the arrow keys ([←], [→], [↑], or [↓]) to highlight the item or field. 4. Do one of the following: • If the parameter has preconfigured values, either use the Space bar to select a new option or type the first part of your selection and the rest of the selection appears automatically. (The help line instructs you to "Select" a value.) • If there are no preconfigured values, type in a value (the Help line instructs you to "Enter" a value). 5. If you want to change another parameter value, return to step 3.

Table 3 How to navigate the Menu interface *(continued)*

Task:	Actions:
	6. If you are finished editing parameters in the displayed screen, press **[Enter]** to return to the Actions line and do one of the following: • To save and activate configuration changes, press **[S]** (for the **Save** action). This saves the changes in the startup configuration and also implements the change in the currently running configuration. (See Chapter 6, "Switch Memory and Configuration".) • To exit from the screen without saving any changes that you have made (or if you have not made changes), press **[C]** (for the **Cancel** action). **Note:** In the menu interface, executing Save activates most parameter changes and saves them in the startup configuration (or flash) memory, and it is therefore not necessary to reboot the switch after making these changes. But if an asterisk appears next to any menu item you reconfigure, the switch will not activate or save the change for that item until you reboot the switch. In this case, rebooting should be done after you have made all desired changes and then returned to the Main Menu. 7. When you finish editing parameters, return to the Main Menu. 8. If necessary, reboot the switch by highlighting Reboot Switch in the Main Menu and pressing **[Enter]**. (See the **Note**, above.)
Exit from a read-only screen.	Press **[B]** (for the **Back** action).

To get Help on individual parameter descriptions. In most screens there is a **Help** option in the **Actions** line. Whenever any of the items in the **Actions** line is highlighted, press **[H]**, and a separate help screen is displayed.

To get Help on the actions or data fields in each screen: Use the arrow keys ([←], [→], [↑], or [↓]) to select an action or data field. The help line under the **Actions** items describes the currently selected action or data field.

For guidance on how to navigate in a screen: See the instructions provided at the bottom of the screen, or refer to "Screen structure and navigation" (page 20).)

Rebooting the switch

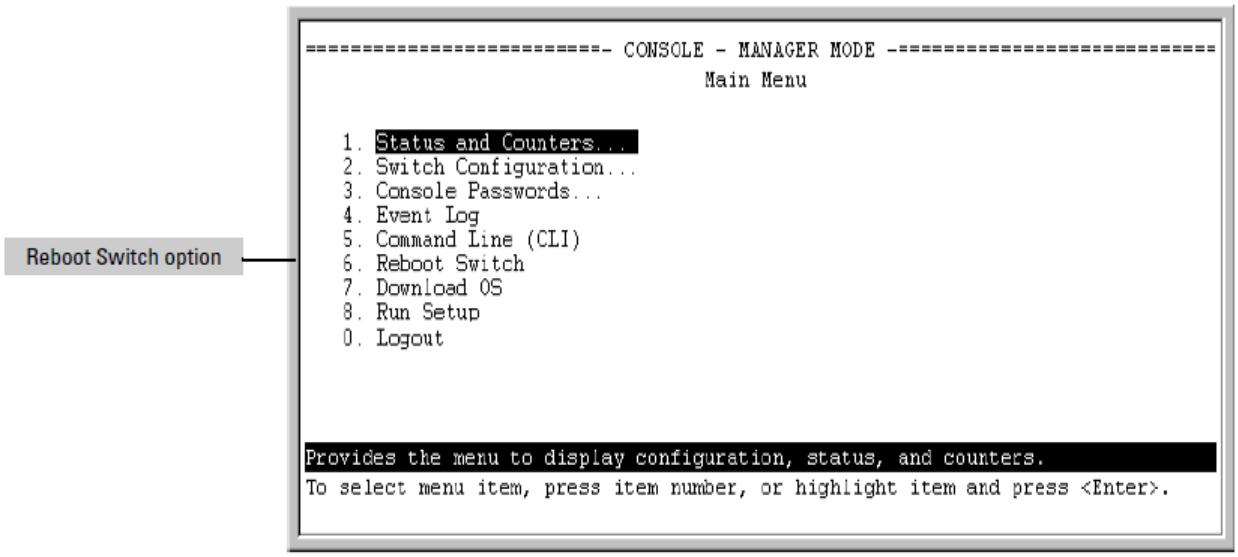
Rebooting the switch from the menu interface:

- Terminates all current sessions and performs a reset of the operating system
- Activates any menu interface configuration changes that require a reboot
- Resets statistical counters to zero

(Note that statistical counters can be reset to zero without rebooting the switch.)

To Reboot the switch, use the **Reboot Switch** option in the Main Menu. (Note that **Reboot Switch** is not available if you log on in Operator mode; that is, if you enter an Operator password instead of a manager password at the password prompt.)

Figure 5 The Reboot Switch option in the Main Menu



Rebooting to activate configuration changes. Configuration changes for most parameters in the menu interface become effective as soon as you save them. However, you must reboot the switch in order to implement a change in the **Maximum VLANs to support parameter**. To access this parameter, go to the Main Menu and select:

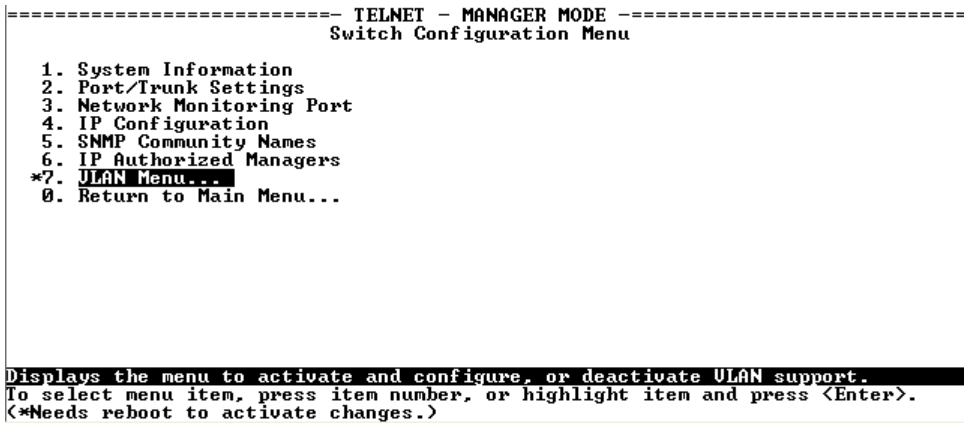
```
2. Switch Configuration

    8. VLAN Menu

        1. VLAN Support.
```

If you make configuration changes in the menu interface that require a reboot, the switch displays an asterisk (*) next to the menu item in which the change has been made. For example, if you change and save the value for the **Maximum VLANs to support** parameter, an asterisk appears next to the **VLAN Support** entry in the VLAN Menu screen, and also next to the **Switch Configuration** entry in the Main Menu.

Figure 6 Indication of a configuration change requiring a reboot



To activate changes indicated by the asterisk, go to the Main Menu and select the **Reboot Switch** option.

NOTE:
Executing the **write memory** command in the CLI does not affect pending configuration changes indicated by an asterisk in the menu interface. That is, only a reboot from the menu interface or a **boot** or **reload** command from the CLI will activate a pending configuration change indicated by an asterisk.

Menu features list

Status and Counters

- General System Information
- Switch Management Address Information
- Port Status
- Port Counters
- Address Table
- Port Address Table

Switch Configuration

- System Information
- Port/Trunk Settings
- Network Monitoring Port
- IP Configuration
- SNMP Community Names
- IP authorized Managers
- VLAN Menu

Console Passwords

Event Log

Command Line (CLI)

Reboot Switch

Download OS (Download Switch Software)

Run Setup

Logout

Port-level configuration on HP 3800 switches with stacking enabled

When stacking is enabled on an HP 3800 switch, the procedures for configuring specific switch ports are the same as for HP 3800 switches without stacking enabled. However, the port designations for the ports in the stack are modified. That is, each port is identified by its switch's stack member ID followed by a slash and then the port number, as it is shown on the switch. For example, for a switch with stack member ID 3, port 10 on that switch is identified as port 3/10 for CLI command input and output. Entering a CLI command on an HP 3800 switch configured for stacking without using the modified port designation results in the following message:

```
Module not present for port or invalid port
```

For more on this topic, see "Interaction with Other Switch Features" in the "Stack Management" chapter of the latest *Management and Configuration Guide* for HP 3800 switches.

Where to go from here

This chapter provides an overview of the menu interface and how to use it. The following table indicates where to turn for detailed information on how to use the individual features available through the menu interface.

Option:	**Turn to:**
To use the Run Setup option	Refer to the *Installation and Getting Started Guide* shipped with the switch.
To view and monitor switch status and counters	Appendix B, "Monitoring and Analyzing Switch Operation" in the *Management and Configuration Guide* for your switch.
To learn how to configure and use passwords and other security features	Refer to the *Access Security Guide* for your switch.
To learn how to use the Event Log	Appendix C, "Using the Event Log for Troubleshooting Switch Problems" in the Management and Configuration Guide for your switch.
To learn how the CLI operates	Chapter 4, "Using the Command Line Interface (CLI)"
To download switch software	Appendix A, "File Transfers" in the *Management and Configuration Guide* for your switch.
For a description of how switch memory handles configuration changes	Chapter 6, "Switch Memory and Configuration"

4 Using the Command Line Interface (CLI)

Overview

The CLI is a text-based command interface for configuring and monitoring the switch. The CLI gives you access to the switch's full set of commands while providing the same password protection that is used in the web browser interface (WebAgent) and the menu interface.

Accessing the CLI

Like the menu interface, the CLI is accessed through the switch console, and in the switch's factory default state, is the default interface when you start a console session. You can access the console out-of-band by directly connecting a terminal device to the switch, or in-band by using Telnet either from a terminal device or through the WebAgent.

Also, if you are using the menu interface, you can access the CLI by selecting the **Command Line (CLI)** option in the Main Menu.

Using the CLI

The CLI offers these privilege levels to help protect the switch from unauthorized access:

1. Operator
2. Manager
3. Global Configuration
4. Context Configuration

NOTE: CLI commands are not case-sensitive.

When you use the CLI to make a configuration change, the switch writes the change to the Running-Config file in volatile memory. This allows you to test your configuration changes before making them permanent. To make changes permanent, you must use the **write memory** command to save them to the Startup-Config file in non-volatile memory. If you reboot the switch without first using **write memory**, all changes made since the last reboot or **write memory** (whichever is later) will be lost. For more on switch memory and saving configuration changes, see Chapter 6, "Switch Memory and Configuration".

Privilege levels at logon

Privilege levels control the type of access to the CLI. To implement this control, you must set at least a Manager password. *Without a Manager password configured, anyone having serial port, Telnet, or web browser access to the switch can reach all CLI levels*. (For more on setting passwords, refer to the chapter on usernames and passwords in the *Access Security Guide* for your switch.)

When you use the CLI to log on to the switch, and passwords are set, you will be prompted to enter a password. For example:

Example 10 CLI log-on screen with password(s) set

```
HP J8697A Switch 5406zl
Software revision K.15.12.0001

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                    RESTRICTED RIGHTS LEGEND
Confidential computer software.  Valid license from HP required for possession,
use or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer
Software, Computer Software Documentation, and Technical Data for Commercial
Items are licensed to the U.S. Government under vendor's standard commercial
license.
                    HEWLETT-PACKARD DEVELOPMENT COMPANY, L.P.
                    20555 State Highway 249, Houston, TX 77070

We'd like to keep you up to date about:
  * Software feature updates
  * New product announcements
  * Special events
Please register your products now at:  www.hp.com/networking/register


Username:
```

In the above case, you will enter the CLI at the level corresponding to the password you provide (operator or manager).

If no passwords are set when you log onto the CLI, you will enter at the Manager level. For example:

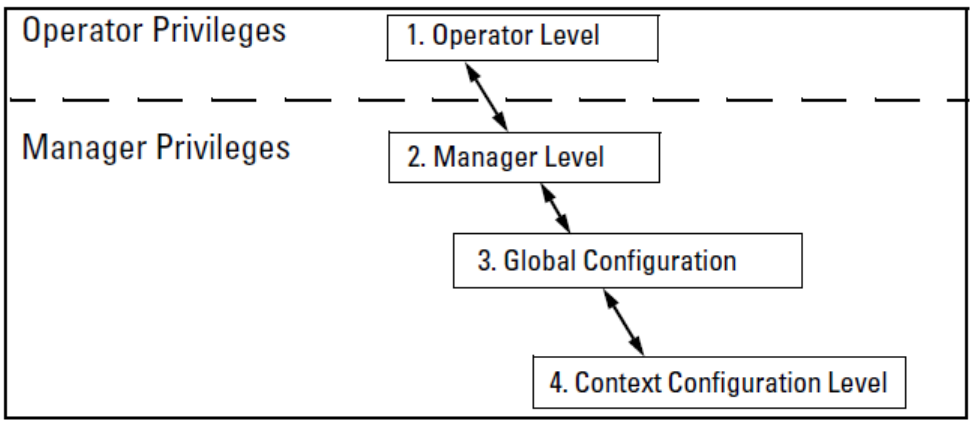
```
HP Switch# _
```

△ **CAUTION:** HP strongly recommends that you configure a Manager password. If a Manager password is not configured, then the Manager level is not password-protected, and anyone having in-band or out-of-band access to the switch may be able to reach the Manager level and compromise switch and network security. Note that configuring only an Operator password *does not* prevent access to the Manager level by intruders who have the Operator password.

Pressing the Clear button on the front of the switch removes password protection. *For this reason, it is recommended that you protect the switch from physical access by unauthorized persons*. If you are concerned about switch security and operation, you should install the switch in a secure location, such as a locked wiring closet.

Privilege level operation

Figure 7 Access sequence for privilege levels



Operator privileges

At the Operator level you can examine the current configuration and move between interfaces without being able to change the configuration. A ">" character delimits the Operator-level prompt. For example:

```
HP Switch>_
```

(*Example of the Operator prompt.*)

When using `enable` to move to the Manager level, the switch prompts you for the Manager password if one has already been configured.

Manager privileges

Manager privileges give you three additional levels of access: Manager, Global Configuration, and Context Configuration. A "#" character delimits any Manager prompt. For example:

```
HP Switch#_
```
(*Example of the Manager prompt.*)

- **Manager level:** Provides all Operator level privileges plus the ability to perform system-level actions that do not require saving changes to the system configuration file. The prompt for the Manager level contains only the system name and the "#" delimiter, as shown above. To select this level, enter the **enable** command at the Operator prompt and enter the Manager password, when prompted. For example:

```
HP Switch> enable
Password:
HP Switch# _
```
Enter enable at the Operator prompt. CLI prompt for the Manager password. The Manager prompt appears after the correct Manager password is entered.

- **Global configuration level:** Provides all Operator and Manager level privileges, and enables you to make configuration changes to any of the switch's software features. The prompt for the Global Configuration level includes the system name and "(config)". To select this level, enter the **config** command at the Manager prompt. For example:

```
HP Switch# config
HP Switch(config)#_
```
Enter `config` *at the Manager prompt. The Global Config prompt.*

- **Context configuration level:** Provides all Operator and Manager privileges, and enables you to make configuration changes in a specific context, such as one or more ports or a VLAN. The prompt for the Context Configuration level includes the system name and the selected context. For example:

```
HP Switch(eth-1)#
HP Switch(vlan-10)#
```
The Context level is useful, for example, for executing several commands directed at the same port or VLAN, or if you want to shorten the command strings for a specific context area. To select this level, enter the specific context at the Global Configuration level prompt. For example, to select the context level for an existing VLAN with the VLAN ID of 10, you would enter the following command and see the indicated result:

```
HP Switch(config)# vlan 10
HP Switch(vlan-10)#
```

Table 4 Privilege level hierarchy

Privilege Level	Example of Prompt and Permitted Operations		
Operator Privilege			
Operator Level	`HP Switch>`	`show <command> setup`	View status and configuration information.
		`ping <argument>` `link-test <argument>`	Perform connectivity tests.
		`enable`	Move from the CLI interface to the menu interface.
		`menu`	Move from the CLI interface to the menu interface.
		`logout`	Exit from the CLI interface and terminate the console session.

Table 4 Privilege level hierarchy *(continued)*

Privilege Level	Example of Prompt and Permitted Operations	
	`exit`	Terminate the current session (same as logout).
Manager Privilege		
Manager Level	`HP Switch#`	Perform system-level actions such as system control, monitoring, and diagnostic commands, plus any of the Operator-level commands. For a list of available commands, enter **?** at the prompt.
Global Configuration Level	`HP Switch(config)#`	Execute configuration commands, plus all Operator and manager commands. For a list of available commands, enter **?** at the prompt.
Context Configuration Level	`HP Switch(eth-5)#` `HP Switch(vlan-100)#`	Execute context-specific configuration commands, such as a particular VLAN or switch port. This is useful for shortening the command strings you type, and for entering a series of commands for the same context. For a list of available commands, enter **?** at the prompt.

How to move between levels

Change in Levels	Example of Prompt, Command, and Result	

Operator level *to* Manager level	`HP Switch> enable`
	`Password:_`
	`HP Switch#_`
		After you enter **enable**, the Password prompt appears. After you enter the Manager password, the system prompt appears with the # symbol:

Manager level *to* Global configuration level	`HP Switch# config` `HP Switch(config)#`	
Global configuration level *to a* Context configuration level	`HP Switch(config)# vlan 10` `HP Switch(vlan-10)#`	
Context configuration level *to another* Context configuration level	`HP Switch(vlan-10)# interface e 3` `HP Switch(int-3)#`	The CLI accepts "e" as the abbreviated form of "ethernet".

Move from any level to the preceding level	`HP Switch(int-3)# exit`
	`HP Switch(config)# exit`
	`HP Switch# exit`
	`HP Switch>`	

Move from any level to the Manager level	`HP Switch(int-3)# end`
	`HP Switch#`
	-or-
	`HP Switch(config)# end`
	`HP Switch#`	

Moving between the CLI and the Menu interface. When moving between interfaces, the switch retains the current privilege level (Manager or Operator). That is, if you are at the Operator level in the menu and select the **Command Line Interface (CLI)** option from the Main Menu, the CLI prompt appears at the Operator level.

Changing parameter settings. Regardless of which interface is used (CLI, menu interface, or WebAgent), the most recently configured version of a parameter setting overrides any earlier

settings for that parameter. For example if you use the menu interface to configure an IP address of "*X*" for VLAN 1 and later use the CLI to configure a different IP address of "*Y*" for VLAN 1, then "*Y*" replaces "*X*" as the IP address for VLAN 1 in the running-config file. If you subsequently execute `write memory` in the CLI, then the switch also stores "*Y*" as the IP address for VLAN 1 in the startup-config file. (For more on the startup-config and running config files, see Chapter 5, "Switch Memory and Configuration".)

Listing commands and command options

At any privilege level you can:

- List all of the commands available at that level
- List the options for a specific command

Listing commands available at any privilege level

At a given privilege level you can list and execute the commands that level offers, plus all of the commands available at preceding levels. For example, at the Operator level, you can list and execute only the Operator level commands. However, at the Manager level, you can list and execute the commands available at both the Operator and Manager levels.

Type "?" to list available commands. Typing the **?** symbol lists the commands you can execute at the current privilege level. For example, typing **?** at the Operator level produces this listing:

Example 11 The Operator-level command listing

```
HP Switch> ?

  enable
  exit
  link-test
  logout
  menu
  ping
  show
  traceroute

HP Switch>
```

Typing **?** at the Manager level produces the listing in the following example:

Example 12 The Manager-level command listing

```
HP Switch# ?
 boot                  Reboot the device.
 clear                 Clear table/statistics or authorized client public
                       keys.
 configure             Enter the Configuration context.
 copy                  Copy datafiles to/from the switch.
 debug                 Enable/disable debug logging.
 end                   Return to the Manager Exec context.
 erase                 Erase stored data files.
 getMIB                Retrieve and display the value of the MIB objects
                       specified
 kill                  Kill other active console, telnet, or ssh sessions.
 licenses              Manage premium features.
 log                   Display log events.
 print                 Execute a command and redirect its output to the device
                       channel for current session.
 redo                  Re-execute a command from history.
 redundancy            Redundancy configuration for management modules.
 reload                Warm reboot of the switch.
 rename                Change the name of the configuration OLDNAME to
                       NEWNAME.
 repeat                Repeat execution of a previous command.
 services              Display parameters for the services module or change
--MORE -- next page: Space, next line: Enter, quit: Control-C
```

When **- - MORE - -** appears, there are more commands in the listing. To list the next screen of commands, press the Space bar. To list the remaining commands one-by-one, repeatedly press **[Enter]**.

Typing **?** at the Global Configuration level or the Context Configuration level produces similar results.

Use [Tab] To search for or complete a command word. You can use **[Tab]** to help you find CLI commands or to quickly complete the current word in a command. To do so, type one or more consecutive characters in a command and then press **[Tab]** (with no spaces allowed). For example, at the Global Configuration level, if you press **[Tab]** immediately after typing "t", the CLI displays the available command options that begin with "t". For example:

```
HP Switch(config)# t  [Tab]
tacacs-server
telnet-server
time
timesync
trunk
telnet
terminal
traceroute
HP Switch(config)# t
```

As mentioned above, if you type part of a command word and press [Tab], the CLI completes the current word (if you have typed enough of the word for the CLI to distinguish it from other possibilities), including hyphenated extensions. For example:

```
HP Switch(config)# port- [Tab]
HP Switch(config)# port-security _
```

Pressing [Tab] after a completed command word lists the further options for that command.

```
HP Switch(config)# qos [Tab]
udp-portSet UDP port based priority.
tcp-portSet TCP port based priority.
device-priorityConfigure device-based priority.
dscp-mapDefine mapping between a DSCP
```

```
(Differentiated-Services Codepoint)
value and 802.1p priority.
type-of-serviceConfigure the Type-of-Service
method the device uses to
prioritize IP traffic.
```

Listing commands options

You can use the CLI to remind you of the options available for a command by entering command keywords followed by **?**. For example, suppose you want to see the command options for configuring the console settings:

Example 13 How to list the options for a specific command

```
HP Switch(config)# console
 baud-rate          Set the data transmission speed for the device connect
                    sessions initiated through the Console port.
 events             Set level of the events displayed in the device's Events
                    Log.
 flow-control       Set the Flow Control Method; default is xon-xoff.
 idle-timeout       The number of seconds of no activity detected before the
                    switch terminates a session.
 inactivity-timer   [deprecated] Set the number of minutes of no activity
                    detected before the switch terminates a communication
                    session.
 local-terminal     Set type of terminal being used for the current console
                    or telnet session (default is vt100).
 screen-refresh     Set refresh time for menu status and counters in
                    seconds.
 terminal           Set type of terminal being used for all console and
                    telnet sessions (default is vt100).
```

Displaying CLI “Help”

CLI Help provides two types of context-sensitive information:

- Command list with a brief summary of each command’s purpose
- Detailed information on how to use individual commands

Displaying command-list Help.

Syntax:

`help`

*Displays a listing of command Help summaries for all commands available at the current privilege level. That is, at the Operator level, executing **help** displays the Help summaries only for Operator-Level commands. At the Manager level, executing **help** displays the Help summaries for both the Operator and Manager levels, and so on.*

For example, to list the Operator-Level commands with their purposes:

Example 14 Context-sensitive command-list help

```
HP Switch> help

 enable          Enter the Manager Exec context.
 exit            Return to the previous context or terminate current
                 console/telnet session if you are in the Operator
                 context level.
 link-test       Test the connection to a MAC address on the LAN
 logout          Terminate this console/telnet session.
 .
 .
 .
```

Displaying Help for an individual command.

Syntax:

`<command-string> help`

This option displays Help for any command available at the current context level.

For example, to list the Help for the **interface** command in the Global Configuration privilege level:

Example 15 How to display help for a specific command

```
HP Switch(config)# interface help
Usage: [no] interface < [ethernet] PORT-LIST [...] | loopback <num> >

Description: Enter the Interface Configuration Level, or execute one
             command for that level. Without optional parameters
             specified, the 'interface' command changes the context to
             the Interface Configuration Context Level for execution of
             configuration changes to the port or ports in the PORT-LIST
             or with loopback keywork it will change context to loopback
             mode. Use 'interface ?' to get a list of all valid commands.
```

Note that trying to list the help for an individual command from a privilege level that does not include that command results in an error message. For example, trying to list the help for the **interface** command while at the global configuration level produces this result:

```
HP Switch# speed-duplex help
Invalid input: speed-duplex
```

Configuration commands and the context configuration modes

You can execute any configuration command in the global configuration mode or in selected context modes. However, using a context mode enables you to execute context-specific commands faster, with shorter command strings.

The switch offers interface (port or trunk group) and VLAN context configuration modes:

Port or trunk-group context. Includes port-or trunk-specific commands that apply only to the selected port(s) or trunk group, plus the global configuration, Manager, and Operator commands. The prompt for this mode includes the identity of the selected port(s):

```
HP Switch(config)# interface c3-c6
HP Switch(eth-C5-C8)#
HP Switch(config)# interface trk1
HP Switch(eth-Trk1)#
```

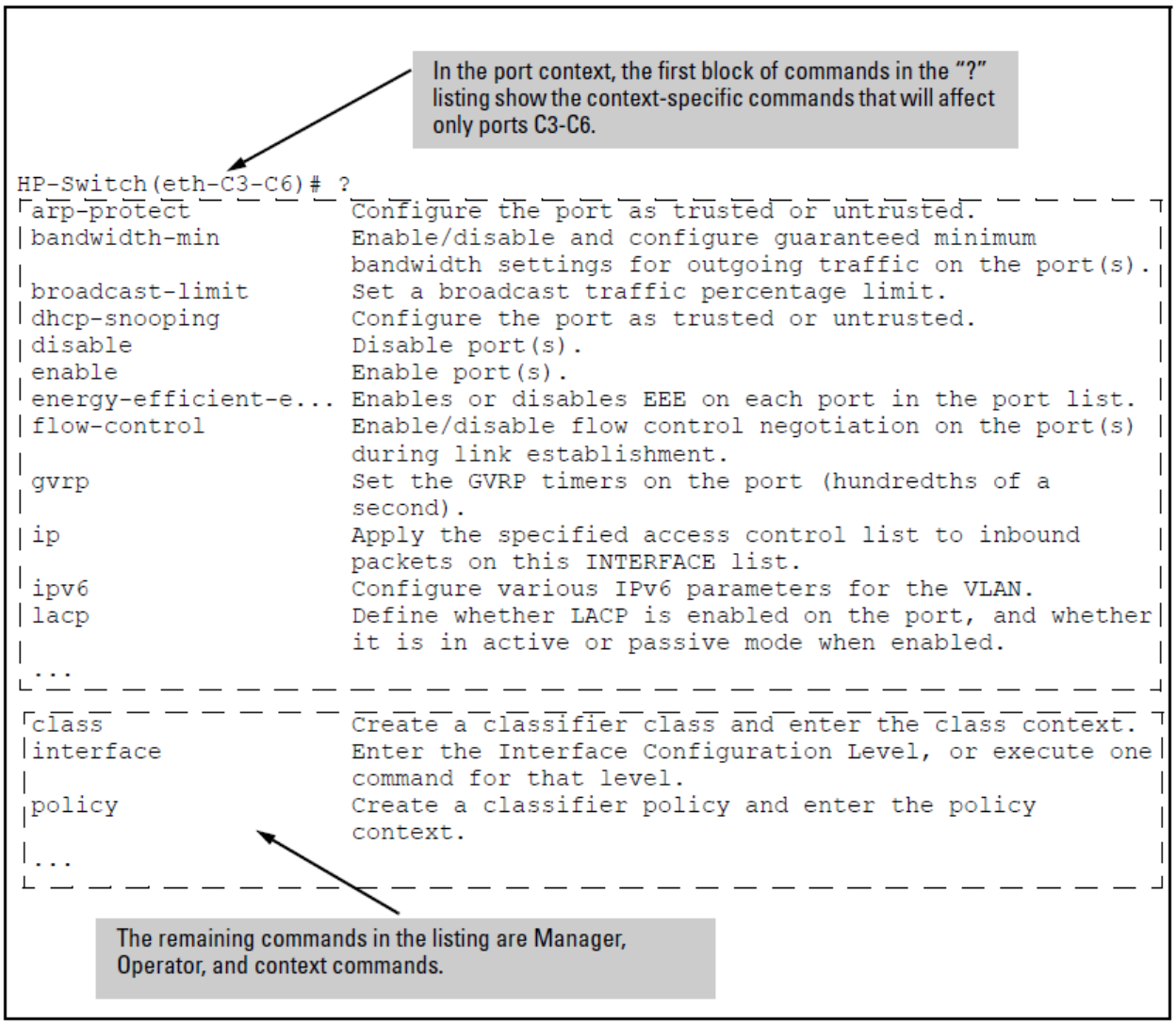
Commands executed at configuration level for entering port and **trk1** *static trunk-group contexts, and resulting prompts showing port or static trunk contexts..*

```
HP Switch(eth-C5-C8)#
```

```
HP Switch(eth-Trk1)#
HP Switch(eth-C5-C8)# ?
HP Switch(eth-C5-C8)# ?
```

Lists the commands you can use in the port or static trunk context, plus the Manager, Operator, and context commands you can execute at this level.

Figure 8 Context-specific commands affecting port context



VLAN context. Includes VLAN-specific commands that apply only to the selected VLAN, plus Manager and Operator commands. The prompt for this mode includes the VLAN ID of the selected VLAN. For example, if you had already configured a VLAN with an ID of 100 in the switch:

```
HP Switch(config)# vlan 100
```

Command executed at configuration level to enter VLAN 100 context.

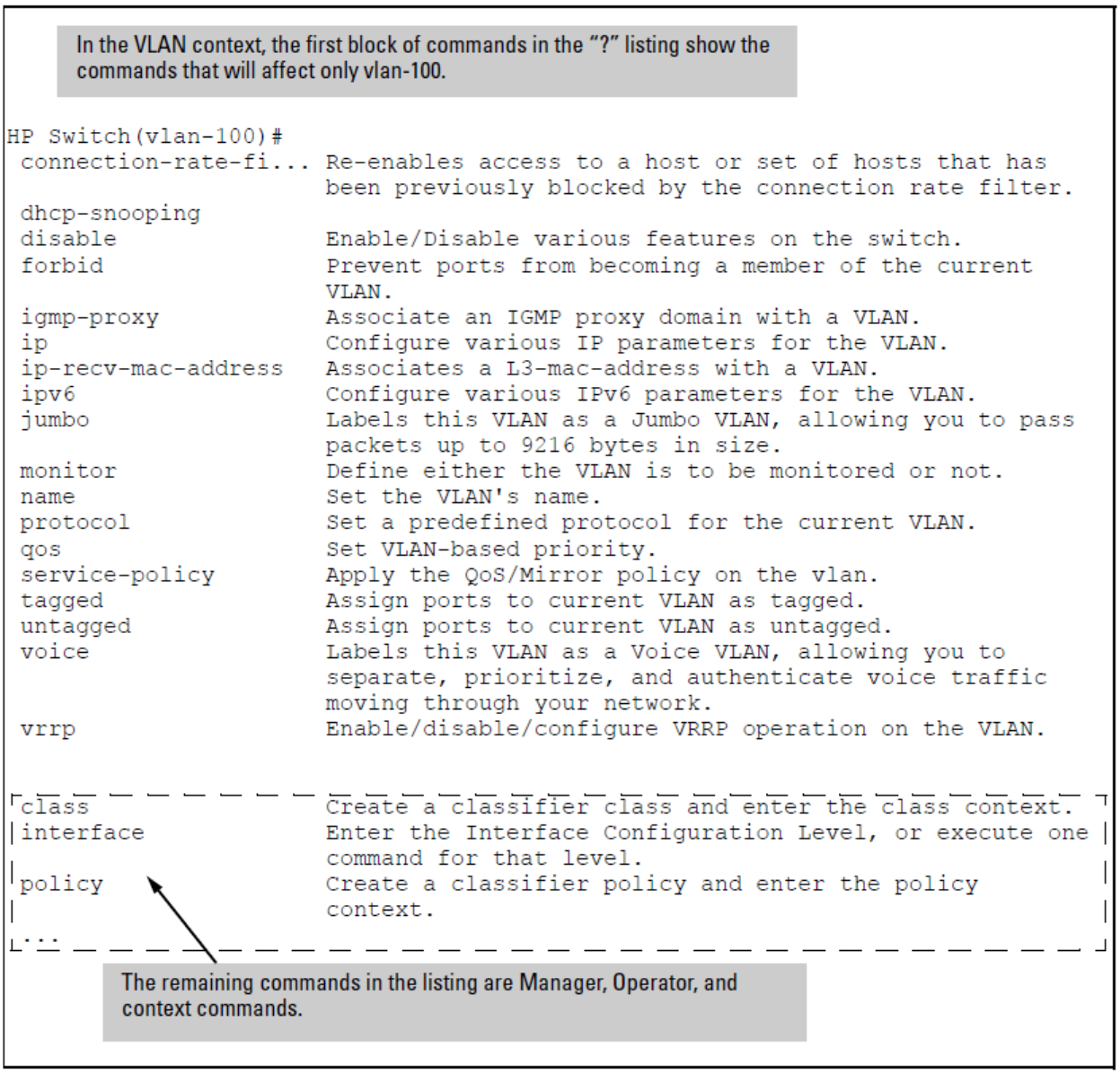
```
HP Switch(vlan-100)#
```

Resulting prompt showing VLAN 100 context.

```
HP Switch(vlan-100)# ?
```

Lists commands you can use in the VLAN context, plus Manager, Operator, and context commands you can execute at this level.

Figure 9 Context-specific commands affecting VLAN context



Return message types with CLI commands

When a CLI command returns a message, that message is now prefixed with a category describing the type, as follows:

- Error
- Warning
- Information

Syntax:

`session show-message-type [ enable | [disable]]`

When enabled, the CLI return messages are prefixed with string that indicates the type of message. Entered at the manager level.

The `disable` *option disables prefixing returned messages for the session for which this command is executed.*

Note: *This setting is not saved when the switch is rebooted.*

Default: Disabled on all CLI sessions

Example 16 Message prefixes

```
HP Switch(config)# router rip
Error: IP Routing support must be enabled first.

HP Switch(config)# qinq mixed vlan
Warning: This command will reboot the device. Any prior configuration
on this config file will be erased and the device will boot up with a
default configuration
for the new qinq mode.
Do you want to continue [y/n]? n

HP Switch(config)# snmp-server mib hpSwitchAuthMIB included
Information: For security reasons, network administrators are
encouraged to disable SNMPv2 before using the MIB.
```

To determine if message labeling is enabled, enter the **show session** command.

Example 17 The label cli-return-message command enabled

```
HP Switch(config)# show session
Show Message Type: Enabled
CLI Interactive Mode: Enabled
```

CLI interactive commands

When the CLI interactive command mode is enabled, you must explicitly enter the choice of yes ('y') or no ('n') for interactive commands. When interactive command mode is disabled, the default choice for all command is **yes**, except as noted below. The CLI interactive mode command enables or disables interactive mode for the CLI session.

Syntax:

`session interactive-mode [ enable | disable ]`

Enables or disables interactive mode for the CLI session.

The **disable** *option disables interactive mode. The default choice for yes/no interactive commands will be* **yes** *except for commands when there is a prompt to save the config. The default for that is* **no**.

The default choice for rebooting the switch is **yes**.

Note: *This setting is not saved when the switch is rebooted.*

Default: Enabled on all sessions.

Example 18 CLI interactive mode when disabled

```
HP Switch(config)# no password all
Password protection for all will be deleted, continue [y/n]? y

HP Switch(config)# boot system flash secondary
System will be rebooted from secondary image.
Do you want to continue [y/n]? y
Do you want to save current configuration [y/n]? n
```

To determine if the CLI interactive mode is enabled or disabled, enter the **show session** command.

Example 19 CLI interactive mode enabled

```
HP Switch(config)# show session
Show Message Type: Enabled
CLI Interactive Mode: Enabled
```

Interactive commands requiring additional options

Interactive commands that require input other than yes or no are not affected when CLI interactive mode is disabled. A warning message is displayed when these commands are executed, for example:

```
Interactive mode is disabled; This command will be ignored.
Enable cli-interactive-mode to use this command.
```

The following commands will issue this warning when interactive mode is disabled. An alternate way to enter the command (when one is available) is shown.

Command	Non-Interactive Alternate Command
`setup mgmt-interfaces`	No equivalent non-interactive command
`aaa port-access supplicant <port-list> secret`	`aaa port-access supplicant <port-list> secret <secret-string>`
`password manager`	`password manager plaintext <password-string>`
`password operator`	`password operator plaintext <password-string>`
`aaa port-access supplicant <port-list> secret`	`aaa port-access supplicant <port-list> secret <secret-string>`
`crypto host-cert generate self-signed`	`crypto host-cert generate self-signed <start-date> <end-date> <CNAME-STR> <ORG-UNIT-STR> <ORGANIZATION-STR> <CITY-STR> <STATE-STR> <CODE>`

Menu commands

When CLI interactive mode is disabled, all CLI commands that launch the menu interface will not be affected by the interactive mode. A warning message is displayed, for example:

```
HP Switch(config)# menu
Interactive mode is disabled; This command will be ignored.
Enable cli-interactive-mode to use this command.
```

Other menu-based commands that will not be affected are:

- setup
- show interfaces display

SNMPv3 special cases

The following are special cases when using SNMPv3 with interactive mode.

- **snmpv3 user**: In interactive mode, the command **snmpv3 user** will create snmpv3 users, even if snmpv3 has not been enabled.
- **snmpv3 user**: When interactive mode is disabled, this command only enables snmpv3. It does not prompt for an authentication password. When the command is first executed, a default initial user is created. A message displays:

  ```
  User 'initial' has been created.
  ```

Banner motd command with non-interactive mode

The use of escape characters allows the **banner motd** command to be used in non-interactive mode for multiple message lines. In non-interactive mode, you can create a banner message enclosed in double quotes or other delimiter that uses escape characters within the delimiters. Other existing CLI commands do not support the escape characters.

The following escape characters are supported:

\"	double q
\’	single quote
\`	forward quote
\\	backslash
\f	form feed
\n	newline
\r	carriage return
\t	horizontal tab
\v	vertical tab

Example 20 Configuring the banner message using escape characters within double quote delimiters

```
HP Switch(config)# banner motd "You can
use the \’banner motd\’ CLI command in non-interactive mode.\n\n\tThe banner
motd command will support escape characters."

HP Switch(config)# show banner motd

Banner Information

Banner status: Enabled

Configured Banner:

You can use the ‘banner motd’ CLI command in non-interactive mode.

     The banner motd command will support escape characters."
```

The running configuration file contains the banner message as entered in the command line.

Example 21 The running config file with banner motd configured in non-interactive mode

```
HP Switch(config)# show running-config

Running configuration:

;J8693A Configuration Editor; Created on release #K.15.10.0001

hostname "HP Switch"
vlan 1
  name "DEFAULT_VLAN"
  untagged 1-48, a1-a4
  ip address dhcp-bootp
  exit
banner motd "You can use the \'banner motd\' CLI command in
non-interactive mode.\n\n\tThe banner motd command will support
escape characters."
```

You can use a delimiting character other than quotes as well, as shown in the example below.

Example 22 Configuring the banner message using an alternate delimiter of '#'

```
HP Switch(config)# banner motd #
Enter TEXT message. End with the character '#'
You can use the \'banner motd\' CLI command in non-interactive mode.
\n\n\tThe banner motd command will support escape characters.#
```

CLI control and editing

Executing a prior command—redo

The **redo** command executes a prior command in the history list.

Syntax:

`redo [ number | command-str ]`

Re-executes a command from history. Executes the last command by default.

number: *The position of the command to execute in the history list. When* **number** *is specified, the nth command starting from the most recent command in the history is executed.*

command-str: *When* **command-str** *is specified, the most recent command whose name matches the specified string is executed.*

Example 23 The redo command

```
HP Switch(config)# show history
2       show arp
1       show flash

HP Switch(config)# redo 2

  IP ARP table

   IP Address      MAC Address       Type      Port
   --------------  ----------------  --------  ----
   15.255.128.1    00000c-07ac00     dynamic   A11
```

Repeating execution of a command

The **repeat** command executes a previous command in the history list.

Syntax:

`repeat [cmdlist] [count] [delay]`

Repeats execution of a previous command. Repeats the last command by default until a key is pressed.

`cmdlist`: *If a number or range of numbers is specified, the command repeats the nth most recent commands (where "n" is the position in the history list).*

`count`: *Repeats the command for the number of times specified.*

`delay`: *The command repeats execution after a delay for the number of seconds specified.*

For example:

```
HP Switch(config)# repeat 1-4,7-8,10 count 2 delay 3
```

Example 24 The repeat command using a range

```
HP Switch(config)# show history
3        show ver
2        show ip
1        show arp

HP Switch(config)# repeat 1-2

  IP ARP table

   IP Address      MAC Address       Type      Port
   --------------  ----------------  --------  ----
   15.255.128.1    000000-000000     dynamic


Internet (IP) Service

IP Routing : Disabled

Default Gateway :
Default TTL     : 64
Arp Age         : 20
Domain Suffix   :
DNS server      :


VLAN               | IP Config   IP Address      Subnet Mask    Proxy ARP
------------------ + ----------- --------------- -------------- ---------
DEFAULT_VLAN       | DHCP/Bootp  15.255.131.90   255.255.248.0  No No
```

Using a command alias

You can create a simple command alias to use in place of a command name and its options. Choose an alias name that is *not* an existing CLI command already. Existing CLI commands are searched before looking for an alias command; an alias that is identical to an existing command will not be executed.

The **alias** command is executed from the current configuration context (operator, manager, or global). If the command that is aliased has to be executed in the global configuration context, you must execute the alias for that command in the global configuration context as well. This prevents bypassing the security in place for a particular context.

HP recommends that you configure no more than 128 aliases.

Syntax:

`[no] alias <name> <command>`

Creates a shortcut alias name to use in place of a commonly used command. The **alias** *command is executed from the current config context.*

`name`: *Specifies the new command name to use to simplify keystrokes and aid memory.*

`command`: *Specifies an existing command to be aliased. The command must be enclosed in quotes.*

Use the **no** *form of the command to remove the alias.*

For example, if you use the **show interface custom** command to specify the output, you can configure an alias for the command to simplify execution. It is recommended that you use an alias that does not have an existing tab completion in the CLI. For example, using an alias that starts with "show" or "int" would complete to "show" and "interface" respectively when you use the tab completion function.

Example 25 Using the alias command with show int custom

```
HP Switch(config)# show int custom 1-4 port name:4 type vlan intrusion speed
enabled mdi

 Status and Counters - Custom Port Status

                                  Intrusion
Port Name     Type       VLAN  Alert     Speed   Enabled MDI-mode
---- -------- ---------- ----- --------- ------- ------- -------
1    Acco     100/1000T  1     No        1000FDx Yes     Auto
2    Huma     100/1000T  1     No        1000FDx Yes     Auto
3    Deve     100/1000T  1     No        1000FDx Yes     Auto
4    Lab1     100/1000T  1     No        1000FDx Yes     Auto


HP Switch(config)# alias sic "show int custom 1-4 port name:4 type vlan intrusion
speed enabled mdi"
HP Switch(config)#

HP Switch(config)# sic

Status and Counters - Custom Port Status

                                  Intrusion
Port Name     Type       VLAN  Alert     Speed   Enabled MDI-mode
---- -------- ---------- ----- --------- ------- ------- -------
1    Acco     100/1000T  1     No        1000FDx Yes     Auto
2    Huma     100/1000T  1     No        1000FDx Yes     Auto
3    Deve     100/1000T  1     No        1000FDx Yes     Auto
4    Lab1     100/1000T  1     No        1000FDx Yes     Auto
```

NOTE: Remember to enclose the command being aliased in quotes.

Command parameters for the aliased command can be added at the end of the alias command string. For example:

```
HP Switch(config)# alias sc "show config"
HP Switch(config)# sc status
```

To change the command that is aliased, re-execute the alias name with new command options. The new options are used when the alias is executed.

To display the alias commands that have been configured, enter the **show alias** command.

Example 26 Alias commands and their configurations

```
HP Switch(config)# show alias

  Name               Command
  ----------------   ------------------------------
  sc                 show config
  sic                show int custom 1-4 port name: 4 type vlan intrusion
                     speed enabled mdi
```

CLI shortcut keystrokes

Keystrokes	Functions
[Ctrl] [A]	Jumps to the first character of the command line.
[Ctrl] [B] or '←'	Moves the cursor back one character.
[Ctrl] [C]	Terminates a task and displays the command prompt.
[Ctrl] [D]	Deletes the character at the cursor.
[Ctrl] [E]	Jumps to the end of the current command line.
[Ctrl] [F] or '→'	Moves the cursor forward one character.
[Ctrl] [K]	Deletes from the cursor to the end of the command line.
[Ctrl] [L] or [Ctrl] [R]	Repeats current command line on a new line.
[Ctrl] [N] or '↓'	Enters the next command line in the history buffer.
[Ctrl] [P] or '↑'	Enters the previous command line in the history buffer.
[Ctrl] [U] or [Ctrl] [X]	Deletes from the cursor to the beginning of the command line.
[Ctrl] [W]	Deletes the last word typed.
[Esc] [B]	Moves the cursor backward one word.
[Esc] [D]	Deletes from the cursor to the end of the word.
[Esc] [F]	Moves the cursor forward one word.
[Backspace]	Deletes the first character to the left of the curser in the command line.
[Spacebar]	Moves the cursor forward one character.

5 Using the HP WebAgent

Overview

The HP web browser interface (WebAgent) built into the switch lets you easily access the switch from a web browser. You can do the following:

- Optimize your network uptime by using the Alert Log and other diagnostic tools
- Make configuration changes to the switch
- Maintain security by configuring usernames and passwords
- Monitor the status of system configurations, power management, and traffic management

This chapter covers the following:

- "General features" (page 45)
- "Starting the WebAgent" (page 46)
- "Tasks for your first WebAgent session" (page 47)
- "Online Help for the WebAgent" (page 48)
- "Connecting to the WebAgent from HP PCM+" (page 48)

NOTE: You can disable access to the WebAgent by either executing `no web-management` at the CLI prompt or changing the **Web Agent Enabled** parameter setting to **No** in the menu interface.

For information on operating system, browser, and Java versions for the switches covered in this guide, go to the HP Networking web site at _www.hp.com/networking/support, and enter the switch name, series, or number.

For users who do not have internet access, you can download and install help files on the PCM+ server or Web server. For ore information, go to the Download device help web site at www.hp.com/rnd/device_help/download.htm.

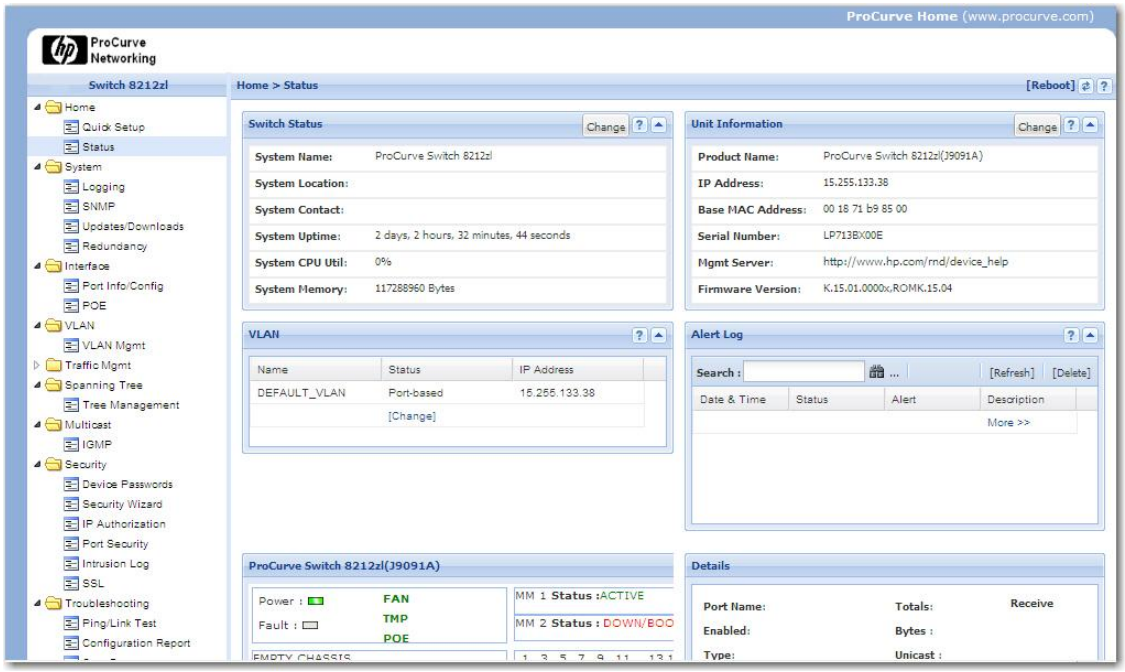
General features

The WebAgent includes this information:

- Home
  - Quick Setup—Name, contact, IP, and VLAN information
  - Status—Information about system uptime, switch addresses and serial number, VLANs, power, redundancy status, alert log, and utilization statistics
- System
  - Logging—Fault detection, alert log
  - SNMP—Community name and access, trap receivers, link status change
  - Updates/Downloads—Configuration files, software images
  - Redundancy—Management module status, fabric module status, failovers
- Interface
  - Port Info/Config—Port table, port properties, port statistics
  - PoE—System power status, port table show power usage and LLDP information, PoE statistics by port
- VLAN
  - VLAN Management—Primary and management VLAN, VLAN table, VLAN properties
- Traffic Management
  - QoS—Type of service, Quality of service, DSCP policies, DSCP priority
- Spanning Tree
  - Tree Management—Enabled or disabled
- Multicast
  - IGMP—VLAN information
- Security
  - Device Passwords—Authorized usernames and passwords
  - Security Wizard—Set up switch to prevent unauthorized access
  - IP Authorization—IP authorized manager addresses, methods, and levels, IP authorization details
  - Port Security—Port security table, security policy information
  - Intrusion Log—Details about intrusion events
  - SSL—Enabled/disabled for web management; SSL certificate status

- Troubleshooting
  - Ping/Link Test—Ping test details, link test details
  - Configuration Report—Running config file information
  - Core dump—Management/Interface modules enabled/disabled, list of core dump files for downloading
  - Port Mirroring—Enabled/disabled

Figure 10 Example of Status Screen for the WebAgent



Starting the WebAgent

Port Mirroring—Enabled/disabled

- Using a standalone web browser on a network connection from a PC or UNIX workstation that is directly connected to your network or connected through remote access to your network
- Using a network management station running PCM+ on your network

Using a standalone web browser from a PC or UNIX workstation

This procedure assumes that you are using a compatible web browser and that the switch is configured with an IP address accessible from your PC or workstation. (For more on assigning an IP address, refer to "IP configuration" (page 105).)

1. Ensure that the Java™applets are enabled for your browser. For more information on this topic, refer to your browser's online Help.
2. Use the web browser to access the switch. If your network includes a Domain Name Server (DNS), your switch's IP address may have a name associated with it (for example, **switch8212**) that you can type in the **URL** field instead of the IP address. Using DNS names typically improves browser performance. Contact your network administrator to enquire about DNS names associated with your HP switch.

   Type the IP address (or DNS name) of the switch in the browser's URL field and press **[Enter]**. (It is not necessary to include **http://**.)

   switch5308 [Enter] (example of a DNS-type name)

10.11.12.195 [Enter] (example of an IP address)

The **Home** page of the WebAgent displays in the right pane and a navigation tree displays in the left pane. You can access all the WebAgent features from the navigation tree.

Tasks for your first WebAgent session

Viewing the "First Time Install" window

When you access the WebAgent for the first time, the Alert log contains a "First Time Install" alert. This gives you information about first time installations and provides an immediate opportunity to set passwords for security. You can also specify a fault detection policy, which determines the types of messages that will be displayed in the Alert Log.

To view the Alert Log, click on **System** in the navigation tree, then click on **Logging**. Double click on **First Time Install** in the Alert log. The WebAgent displays the "First Time Install" window. This window is the launching point for setting WebAgent passwords for maintaining security, and also setting a fault detection policy.

You can also use the navigation tree to access these screens:

- To set WebAgent passwords, select **Security > Device Passwords** in the navigation tree.
- To set the fault detection policy, select **Security > Intrusion Log** in the navigation tree.

Setting a username and password

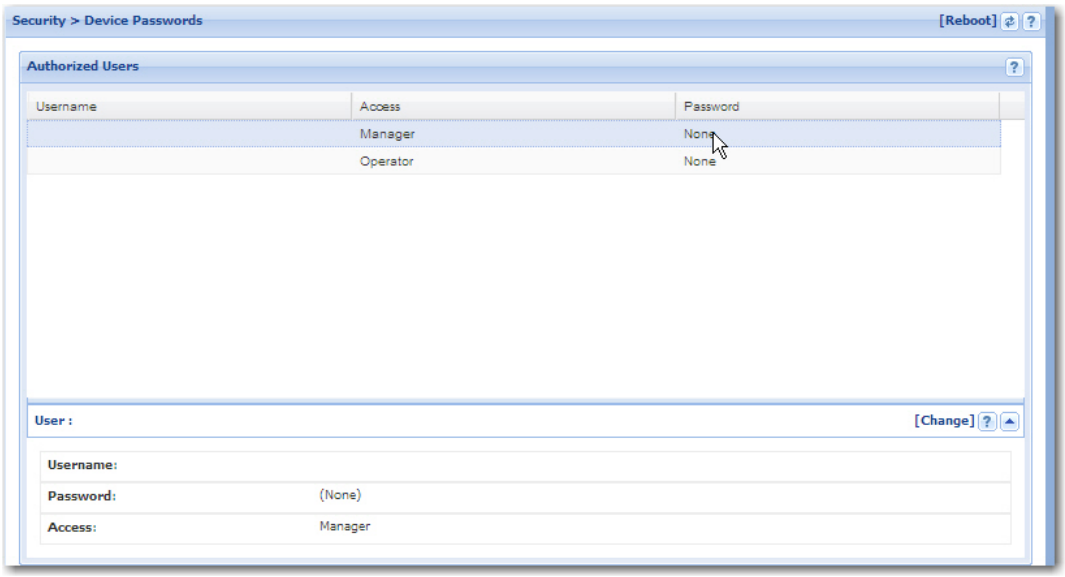
You can set a username in the Username field of the password pane. If you do not want to set a username, then leave the Username field in the password pane blank.

The manager and operator passwords are used to control access to all switch interfaces. The password you enter determines the capability you have during that session:

- Entering the manager password gives you full read/write/troubleshooting capabilities
- Entering the operator password gives you read and limited troubleshooting capabilities.

Note that the command prompt and switch console interface use only the password; you are not prompted for the username.

Figure 11 Example of the device passwords screen



To set the username and password:

1. In the navigation tree, select **Security > Device Passwords**. The Device Passwords screen displays.
2. Click on **Change** on the right side of the screen. The pane expands to allow you to enter information.
3. Enter a username, password, and access level.
4. Click on **Save** to save your entries.

NOTE: Passwords assigned in the WebAgent will overwrite previous passwords assigned in either the WebAgent, the CLI, or the menu interface. The most recently assigned passwords are the switch's passwords, regardless of which interface was used to assign them.

If you lose the password

If you lose the passwords, you can clear them by pressing the **Clear** button on the front of the switch. *This action deletes all password and user name protection from all of the switch's interfaces.*

The **Clear** button is provided for your convenience, but its presence means that if you are concerned with the security of the switch configuration and operation, you should make sure the switch is installed in a secure location, such as a locked wiring closet. (For more information, refer to "Front Panel Security" in the chapter titled "Configuring Username and Password Security" in the Access Security Guide for your switch.)

Online Help for the WebAgent

Online Help is available for the WebAgent. You can use it by clicking on the "**?**" in the upper right corner in any of the WebAgent panes. Context-sensitive help is provided for the pane you are on.

You can access the WebAgent online help at www.hp.com/rnd/device_help/

Downloading the WebAgent Help to a local server

To download the WebAgent help files to a local server, go to:

www.hp.com/rnd/device_help/download.htm

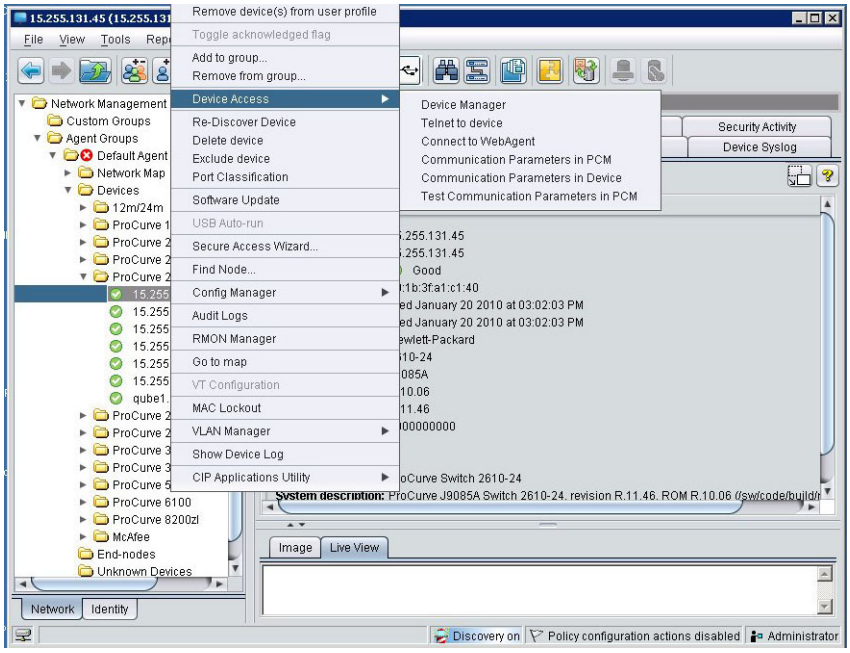
Follow the directions on the web page to download the WebAgent help for your device.

Connecting to the WebAgent from HP PCM+

To access the WebAgent with HP PCM+:

1. Select the device in the PCM+ navigation tree.
2. Right-click on **Device** in the navigation tree and select **Device Access > Connect to WebAgent**.

Figure 12 Example of WebAgent access from PCM+



6 Switch memory and configuration

Overview

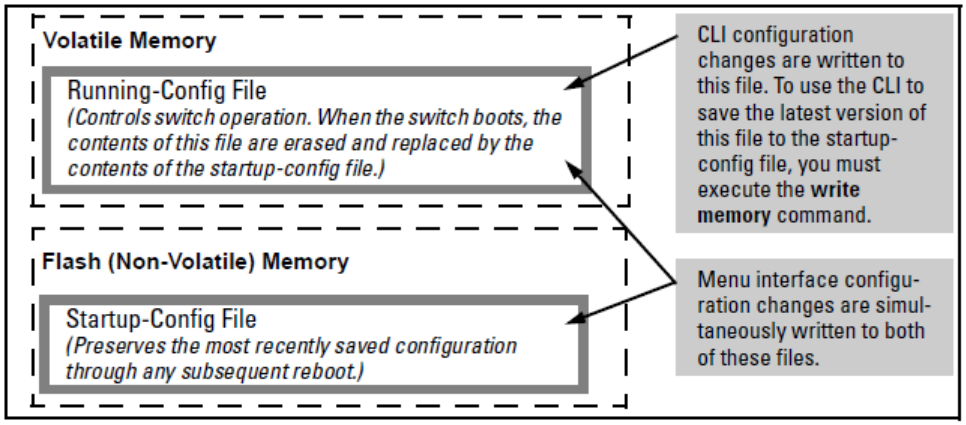
This chapter describes:

- How switch memory manages configuration changes
- How the CLI implements configuration changes
- How the menu interface and WebAgent implement configuration changes
- How the switch provides software options through primary/secondary flash images
- How to use the switch's primary and secondary flash options, including displaying flash information, booting or restarting the switch, and other topics

Configuration file management

The switch maintains two configuration files, the *running-config* file and the *startup-config* file.

Figure 13 Conceptual illustration of switch memory operation



- **Running Config File:** Exists in volatile memory and controls switch operation. If no configuration changes have been made in the CLI since the switch was last booted, the running-config file is identical to the startup-config file.
- **Startup-config File:** Exists in flash (non-volatile) memory and is used to preserve the most recently-saved configuration as the "permanent" configuration.

Booting the switch replaces the current running-config file with a new running-config file that is an exact copy of the current startup-config file.

NOTE: Any of the following actions boots the switch:

- Executing the **boot** or the **reload** command in the CLI
- Executing the **boot** command in the menu interface
- Pressing the Reset button on the front of the switch
- Removing, then restoring power to the switch

For more on reboots and the switch's dual-flash images, refer to "Using Primary and Secondary flash image options" (page 64).

Options for saving a new configuration. Making one or more changes to the running-config file creates a new operating configuration. *Saving* a new configuration means to overwrite (replace) the current startup-config file with the current running-config file. This means that if the switch

subsequently reboots for any reason, it will resume operation using the new configuration instead of the configuration previously defined in the startup-config file. There are three ways to save a new configuration:

- **In the CLI:** Use the **write memory** command. This overwrites the current startup-config file with the contents of the current running-config file.
- **In the menu interface:** Use the **Save** command. This overwrites *both* the running-config file and the startup-config file with the changes you have specified in the menu interface screen.
- **In the WebAgent:** Click on **Save**. This overwrites *both* the running-config file and the startup-config file with the changes you have specified in the WebAgent screen.

Note that using the CLI instead of the menu or WebAgent gives you the option of changing the running configuration without affecting the startup configuration. This allows you to test the change without making it "permanent". When you are satisfied that the change is satisfactory, you can make it permanent by executing the **write memory** command. For example, suppose you use the following command to disable port 5:

```
HP Switch(config)# interface ethernet 5 disable
```

The above command disables port 5 in the running-config file, but not in the startup-config file. Port 5 remains disabled only until the switch reboots. If you want port 5 to remain disabled through the next reboot, use write memory to save the current running-config file to the startup-config file in flash memory.

```
HP Switch(config)# write memory
```

If you use the CLI to make a configuration change and then change from the CLI to the Menu interface without first using write memory to save the change to the startup-config file, then the switch prompts you to save the change. For example, if you use the CLI to create VLAN 20, and then select the menu interface, VLAN 20 is configured in the running-config file, but not in the startup-config file. In this case you will see:

```
HP Switch(config)# vlan 20
HP Switch(config)# menu
Do you want to save current configuration [y/n]?
```

If you type 'y', the switch overwrites the startup-config file with the runningconfig file, and your configuration change(s) will be preserved across reboots. If you type 'n', your configuration change(s) will remain only in the runningconfig file. In this case, if you do not subsequently save the running-config file, your unsaved configuration changes will be lost if the switch reboots for any reason.

Storing and retrieving configuration files. You can store or retrieve a backup copy of the startup-config file on another device. For more information, see "Transferring Switch Configurations" in Appendix A of the *Management and Configuration Guide* for your switch.

USB autorun. This feature supports the ability to auto execute CLI commands stored on a USB flash drive (for example, to configure the switch, update software, retrieve diagnostics, etc.). For more information, see "Using USB to Download Switch Software" in the *Management and Configuration Guide* for your switch.

Using the CLI to implement configuration changes

The CLI offers these capabilities:

- Access to the full set of switch configuration features
- The option of testing configuration changes before making them permanent

How to use the CLI to view the current configuration files. Use **show** commands to view the configuration for individual features, such as port status or Spanning Tree Protocol. However, to view either the entire startupconfig file or the entire running-config file, use the following commands:

- **show config**— Displays a listing of the current startup-config file.
- **show running–config**— Displays a listing of the current running-config file.
- **write terminal**— Displays a listing of the current running-config file.
- **show default–config**— Displays a listing of a custom default config file.
- **show config status**— Compares the startup-config file to the runningconfig file and lists one of the following results:
  - If the two configurations are the same you will see:
    - Running configuration is the same as the startup configuration.
  - If the two needs to be configurations are different, you will see:
    - Running configuration has been changed and saved.

NOTE: **show config**, **show running–config**, and **write terminal** commands display the configuration settings that differ from the switch's factory-default configuration.

How to use the CLI to reconfigure switch features. Use this procedure to permanently change the switch configuration (that is, to enter a change in the startup-config file).

1. Use the appropriate CLI commands to reconfigure the desired switch parameters. This updates the selected parameters in the running-config file.
2. Use the appropriate **show** commands to verify that you have correctly made the desired changes.
3. Observe the switch's performance with the new parameter settings to verify the effect of your changes.
4. When you are satisfied that you have the correct parameter settings, use the **write memory** command to copy the changes to the startup-config file.

Syntax:

`write memory`

Saves the running configuration file to the startup-config. The saved configuration becomes the boot-up configuration of the switch on the next boot.

When using redundant management, saves the running configuration of the switch to flash on the active management module. The saved configuration becomes the boot-up configuration of the switch the next time it is booted. The saved configuration file is sync'd to the standby management module.

Note: If the active management module and the standby management module are running on different operating systems because the **boot set-default** command was executed and then the standby module was rebooted, the **write memory** command displays this warning: "Warning: The next reboot or failover is set to boot from a different software image. These config changes may be incompatible or not used after a reboot or failover."

For example, the default port mode setting is **auto**. Suppose that your network uses Cat 3 wiring and you want to connect the switch to another autosensing device capable of 100 Mbps operation. Because 100 Mbps over Cat 3 wiring can introduce transmission problems, the recommended port mode is **auto-10**, which allows the port to negotiate full- or half-duplex, but restricts speed to 10 Mbps. The following command configures port A5 to auto-10 mode in the running-config file, allowing you to observe performance on the link without making the mode change permanent.

```
HP Switch(config)# interface e a5 speed-duplex auto-10
```

After you are satisfied that the link is operating properly, you can save the change to the switch's permanent configuration (the startup-config file) by executing the following command:

```
HP Switch(config)# write memory
```

The new mode (**auto-10**) on port A5 is now saved in the startup-config file, and the startup-config and running-config files are identical. If you subsequently reboot the switch, the **auto-10** mode configuration on port A5 will remain because it is included in the startup-config file.

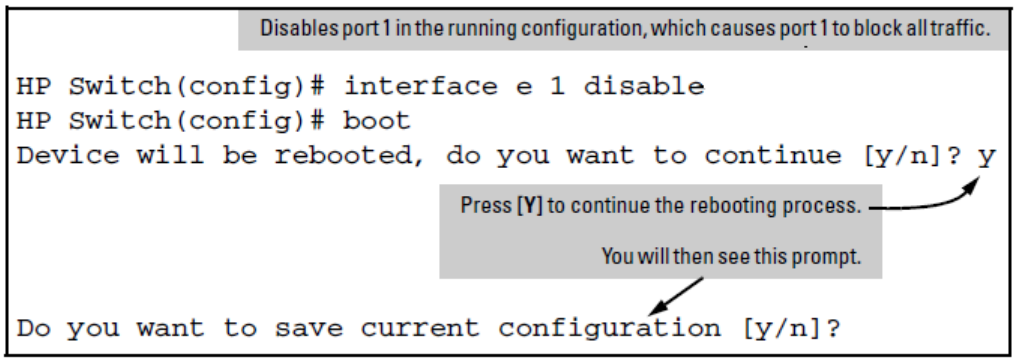
NOTE: Beginning with K.15.01.0031, configuration changes to ports may require up to 10 seconds to take effect, especially on switches with high CPU utilization. After a configuration command, perform an appropriate **show** or **show runningconfig** command to confirm the configuration change. If configuration scripts are used, the script should be modified either to check for successful completion of the previous command before executing the next command, or to sleep for 10 seconds after the configuration command is executed.

How to cancel changes you have made to the running-config file. If you use the CLI to change parameter settings in the running-config file, and then decide that you don't want those changes to remain, you can use either of the following methods to remove them:

- Manually enter the earlier values you had for the changed settings. (This is recommended if you want to restore a small number of parameter settings to their previous boot-up values.)
- Update the running-config file to match the startup-config file by rebooting the switch. (This is recommended if you want to restore a larger number of parameter settings to their previous boot-up values.)

If you use the CLI to change a parameter setting, and then execute the **boot** command without first executing the **write memory** command to save the change, the switch prompts you to specify whether to save the changes in the current running-config file. For example:

Figure 14 Boot prompt for an unsaved configuration



The above prompt means that one or more parameter settings in the runningconfig file differ from their counterparts in the startup-config file and you need to choose which config file to retain and which to discard.

- If you want to update the startup-config file to match the running-config file, press [Y] for "yes". (This means that the changes you entered in the running-config file will be saved in the startup-config file.)
- If you want to discard the changes you made to the running-config file so that it will match the startup-config file, then select [N] for "no". (This means that the switch will discard the changes you entered in the running-config file and will update the running-config file to match the startup-config file.)

NOTE: If you use the CLI to make a change to the running-config file, you should either use the **write memory** command or select the save option allowed during a reboot (Figure 17, above) to save the change to the startup-config file. That is, if you use the CLI to change a parameter setting, but then reboot the switch from either the CLI or the menu interface without first executing the **write memory** command in the CLI, the current startup-config file will replace the running-config file, and any changes in the running-config file will be lost.

Using the **Save** command in the menu interface does not save a change made to the running config by the CLI unless you have also made a configuration change in the menu interface. Also, the menu interface displays the current running-config values. Thus, where a parameter setting is accessible from both the CLI and the menu interface, if you change the setting in the CLI, the new value will appear in the menu interface display for that parameter. *However, as indicated above, unless you also make a configuration change in the menu interface, only the* **write memory** *command in the CLI will actually save the change to the startup-config file.*

How to reset the startup-config and running-config files to the factory default configuration. This command reboots the switch, replacing the contents of the current startup-config and running-config files with the factory-default startup configuration.

Syntax:

```
erase startup-config
```

Example 27 The `erase startup-config` command

```
HP Switch(config)# erase startup-config
Configuration will be deleted and device rebooted, continue [y/n]?
```

Press [y] to replace the current configuration with the factory default configuration and reboot the switch. Press [n] to retain the current configuration and prevent a reboot.

In a redundant management system, this command erases the startup config file on both the active and the standby management modules as long as redundancy has not been disabled. If the standby management module is not in standby mode or has failed selftest, the startup config file is not erased.

Creating a custom default configuration

NOTE: This feature is not supported on the HP 3800 switches.

The custom default configuration feature provides the ability to initialize a switch to a different state from the factory default state when you delete the active configuration file. The factory default configuration is not changed. If a custom configuration file has been created and the active configuration file is deleted, the switch will boot up using the custom configuration file.

The feature provides the ability to:

- Use a customized configuration file as a default configuration file
- Enable the switch to start up with the specified default configuration

The existence of a custom default configuration file does not affect the results of loading a remotely stored configuration file onto the switch.

Using a custom default configuration, you can configure the features you want to be in the default configuration. When the active configuration is deleted using the **erase startup** command, the active configuration is removed and the custom default configuration file will be used upon bootup. The standard default configuration file remains and is used if there is no custom default configuration.

NOTE: This feature does *not* change the system defaults. The custom default configuration file is automatically used when the startup configuration file is erased. It has no effect on what is loaded onto the switch when a remotely stored configuration file is restored.

The default configuration file can be customized using commands at the CLI prompt or by copying a configuration file with the desired configuration using TFTP, USB, or XMODEM copy commands. The existing default configuration file also can be transferred from the switch using these commands.

To start creating the configuration file to be used as the custom default configuration file, enter the commands that configure the features desired and then save the configuration file using the **write memory** command. An example is shown below.

Example 28 Creating a config file with the desired features

```
HP Switch(config)# spanning-tree
HP Switch(config)# interface 4 flow-control

HP Switch(config)# write memory
```

This configuration, which enables flow control on interface 4, and also spanning-tree on the switch, is stored in the startup configuration file.

To save this configuration as the custom default configuration, the startup configuration file is copied to the default configuration file, as shown below.

Example 29 Copying the startup configuration file to the custom default configuration file

```
HP Switch(config)# copy startup-config default-config
```

Copying an existing configuration file to the custom default configuration file

The switch can have up to 3 different configuration files stored in flash memory. (For more information about multiple configuration files, see "Multiple Configuration Files" in the *Management and Configuration Guide* for your switch.) To copy a configuration file that exists in flash memory to the custom default configuration file, use this command.

Syntax:

`copy config <source-filename> default-config`

Copies the configuration file specified in `[<source-filename>]` to the custom default configuration file.

Example 30 Copying the abc.cfg config file to the custom default config file

```
HP Switch(config)# copy abc.cfg default-config
```

Copying the custom default config file onto the switch

The following sections explains how to copy the custom default config file onto the switch using:

- TFTP
- XMODEM
- USB

Using TFTP

To copy a configuration file stored on a TFTP server to the custom default configuration file, use the **copy tftp default-config** command.

Syntax:

`copy tftp default-config <ip-addr> <stored config file name>`

Copies the stored configuration file on the TFTP server specified by **<ip-addr>** *to the custom default configuration file.*

Example 31 Copying a stored config file to the default config file using TFTP

```
HP Switch(config)# copy tftp default-config 10.10.10.1 stored_config.cfg
```

Using XMODEM

To copy a configuration file to the custom default configuration file using XMODEM, use the **copy xmodem default-config** command.

Syntax:

`copy xmodem default-config`

Copies the configuration file specified by the XMODEM server device to the custom default configuration file.

Example 32 Copying a stored config file to the custom default config file using XMODEM

```
HP Switch(config)# copy xmodem default-config
```

Using USB

To copy a configuration file to the custom default configuration file using USB, use the **copy usb default-config** command.

Syntax:

`copy usb default-config <stored config file name>`

Copies the stored configuration file on the USB stick to the custom default configuration file.

Example 33 Copying a stored config file to the custom default config file using USB

```
HP Switch# copy usb default-config stored_config.cfg
```

Copying the custom default config file off the switch

Using TFTP

To transfer a custom default configuration file off the switch using TFTP, enter the following command.

Syntax:

`copy default-config tftp <server ip-address>`
`stored_config.cfg`

Copies the custom default configuration file to the stored_config.cfg file on the TFTP server.

Using XMODEM

To transfer a custom default config file off the switch using XMODEM, enter the following command.

Syntax:

`copy default-config xmodem`

Copies the custom default configuration file to the configuration file specified by the XMODEM server device.

Using USB

To transfer a custom default configuration file off the switch using USB, enter the following command.

Syntax:

`copy default-config usb stored_config.cfg`

Copies the custom default configuration file to the stored_config.cfg file on the USB device.

Using SFTP and SCP to transfer the custom configuration

While the switch supports an SSH server with SCP and/or SFTP running on it, the switch is not an SCP or SFTP client. To transfer the default custom configuration file to or from the switch, you must connect to the switch's SSH server using any SCP or SFTP client. Instead of the actual name of the custom default configuration file, an alias name of "default-config" is displayed in the file listings and for get/store functions.

When you use an SCP client to connect to the switch, you must know the name of the file you wish to get or store. When you use SFTP client to connect to the switch, you are provided with a list of filenames that can be accessed by the switch.

NOTE: You must have an SCP/SFTP client implemented in order to execute **copy scp** or **copy sftp** commands on the switch.

The following example shows the output from running **puTTY psftp** on a remote PC.

Example 34 Using SFTP

```
C:\PuTTY> psftp 10.1.243.209


We'd like to keep you up to date about:
  * Software feature updates
  * New product announcements
  * Special events

Please register your product at: www.register.hp.com

Remote working directory is /
psftp> ls
Listing directory /
drwxr-xr-x    2 J9145A   J9145A    0 Jan 01 00:01 cfg
drwxr-xr-x    2 J9145A   J9145A    0 Jan 01 00:01 core
drwxr-xr-x    2 J9145A   J9145A    0 Jan 01 00:01 log
drwxrwxrwx    2 J9145A   J9145A    0 Jan 01 00:01 os
drwxrwxrwx    3 J9145A   J9145A    0 Jan 01 00:01 ssh

psftp> ls /cfg
Listing directory /cfg

-rwxrw-r--  1 J9145A  J9145A  1749 Jan 01 00:01 default-config
-rw-r--r--  1 J9145A  J9145A   745 Jan 01 01:19 running-config
-rwxrw-r--  1 J9145A  J9145A   360 Jan 01 01:19 startup-config

psftp>
```

Erasing a configuration file

If a custom default configuration file exists and the **erase startup-config** command is executed, the current active configuration is erased and the switch is booted with the custom default configuration.

Example 35 Erasing the startup config file when a default custom config file exists

```
HP Switch(config)# erase startup-config
Configuration will be deleted, and existing login passwords
removed, and device rebooted (using the custom default
configuration), continue [y/n]?
```

If a custom default configuration file does not exist and the **erase startup-config** command is executed, the current active configuration is erased and the switch is booted with the system default configuration.

Example 36 Erasing the startup config file when a default custom config file does not exist

```
HP Switch(config)# erase startup-config
Configuration will be deleted, and existing login passwords removed,
and device rebooted, continue [y/n]?
```

To erase the custom default configuration file, execute the **erase default-config** command.

Example 37 Erasing the custom default config file

```
HP Switch(config)# erase default-config
The custom default configuration will be erased. The "erase
startup-config" command will now use system generated default
configuration. Continue [y/n]?
```

Displaying the configuration files

The **show config files** command displays the existing configuration files and indicates that a custom default configuration file exists.

Example 38 Output displaying 3 configuration files

```
HP Switch(config)# show config files

Configuration files:

id | act pri sec | name
---+-------------+-------------------------
 1    *   *      | config
 2               | secondaryconfig
 3            *  | Kconfig
==================
A Custom default configuration file exists.
```

Enter the command **show default config** to display the custom default configuration.

NOTE:

For the 5400zl, 3800, and 8200zl switches, when the **show default config** *command is executed in enhanced secure mode the following prompt displays:*

```
Do you want to show sensitive information (y/n)?
```

*If "Y/y" is entered, the normal command output is displayed on the console. If "N/n" is entered, all the sensitive information is hidden and will be displayed as asterisks ("******"). The default option is "N/n" when interactive mode is disabled. For more information, see the chapter "Secure Mode (5400zl, 3800, and 8200zl)" in the* Access Security Guide *for your switch.*

Example 39 Output for custom default configuration file

```
HP Switch(config)# show default-config

Custom default configuration:

; J8693A Configuration Editor; Created on release #K.15.12.0001

; Ver #02:0b:ef:e6
hostname "HP Switch"
module 1 type J93x7
module 2 type J93x7
vlan 1
  name "DEFAULT-VLAN"
  untagged 1-24
  ip address dhcp-bootp
  exit
interface 4
  flow-control
  exit snmp-server community "public" unrestricted
spanning-tree
```

If a custom default configuration file exists and you erase the current active config file (using the **erase startup-config** command), then issue the **show running-config** command, the output will display the contents of the custom default configuration file. The custom default configuration file is loaded upon bootup.

Example 40 Output of custom default config file when current active config file erased

```
HP Switch(config)# show running-config

Custom default configuration:

; J8693A Configuration Editor; Created on release #K.15.12.0001
; Ver #02:0b:ef:e6
hostname "HP Switch"
module 1 type J93x7
module 2 type J93x7
vlan 1
  name "DEFAULT-VLAN"
  untagged 1-24
  ip address dhcp-bootp
  exit
interface 4
  flow-control
  exit
snmp-server community "public" unrestricted
spanning-tree
```

Troubleshooting custom default configuration files

- If the switch will not boot because of a problem with the custom default configuration file, the file can be removed using the ROM mode interface.
- The custom default configuration file cannot be erased using the front panel buttons on the switch. If the switch can be booted, use the **erase default-config** command to remove the custom default configuration file.

Using the menu and WebAgent to implement configuration changes configuration file

The menu and WebAgent offer these advantages:

- Quick, easy menu or window access to a subset of switch configuration features
- Viewing several related configuration parameters in the same screen, with their default and current settings
- Immediately changing both the running-config file and the startup-config file with a single command

Menu: implementing configuration changes

You can use the menu interface to simultaneously save and implement a subset of switch configuration changes without having to reboot the switch. That is, when you save a configuration change in the menu interface, you simultaneously change both the running-config file and the startup-config file.

NOTE: The only exception to this operation are two VLAN-related parameter changes that require a reboot, described under "Rebooting from the menu interface" (page 61).

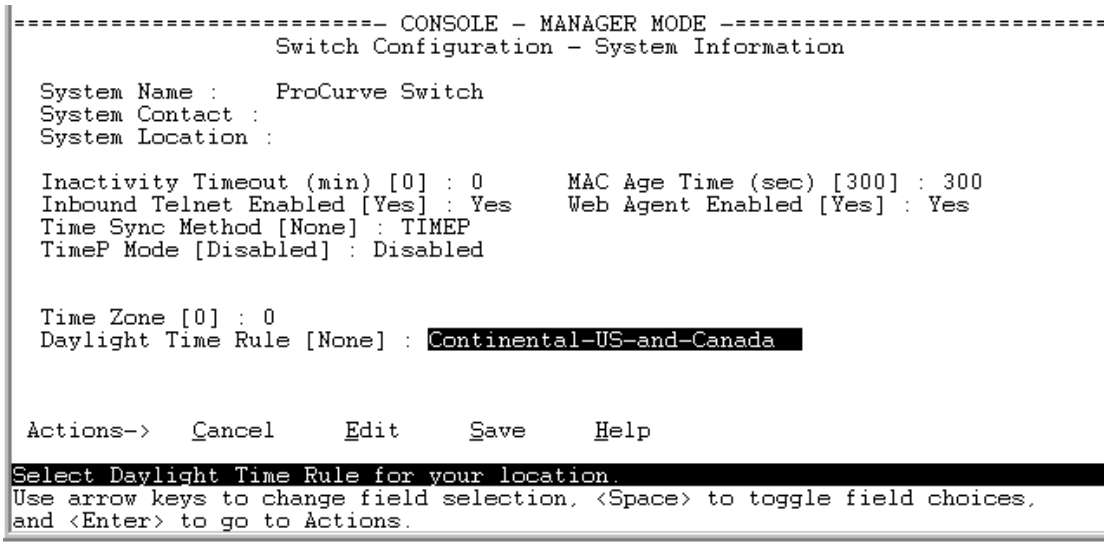
Using Save and Cancel in the menu interface

For any configuration screen in the menu interface, the **save** command:

1. Implements the changes in the running-config file
2. Saves your changes to the startup-config file

If you decide not to save and implement the changes in the screen, select **Cancel** to discard them and continue switch operation with the current operation. For example, suppose you have made the changes shown below in the System Information screen:

Figure 15 Example of pending configuration changes you can save or cancel



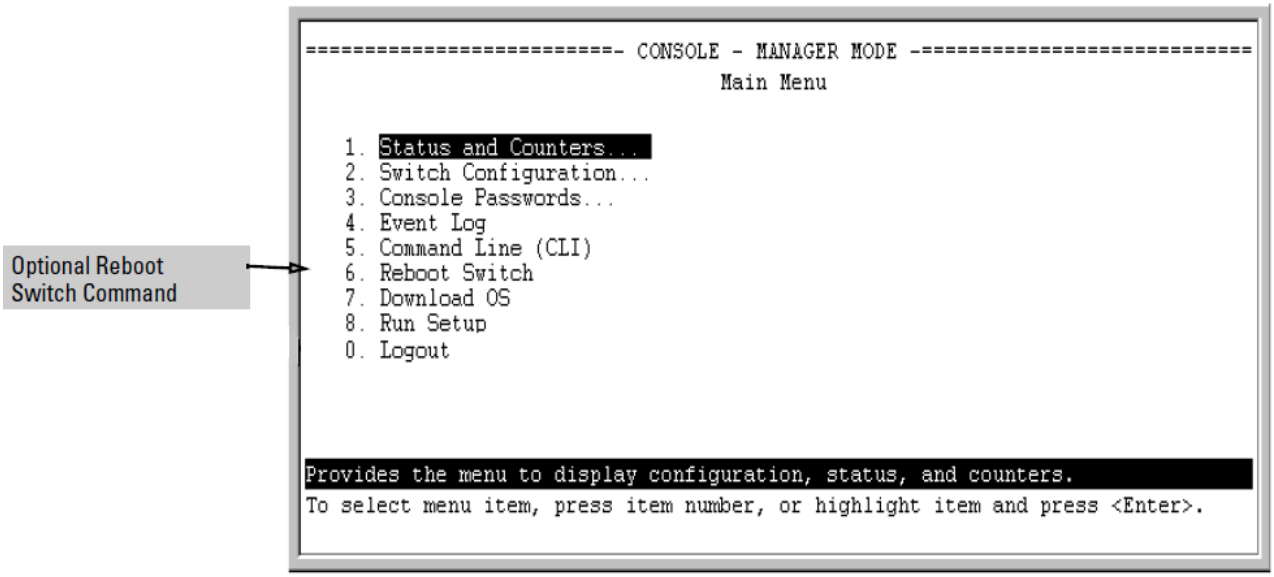
NOTE: If you reconfigure a parameter in the CLI and then go to the menu interface without executing a **write memory** command, those changes are stored only in the running configuration (even if you execute a Save operation in the menu interface). If you then execute a switch **boot** command in the menu interface, the switch discards the configuration changes made while using the CLI. To ensure that changes made while using the CLI are saved, execute **write memory** in the CLI before rebooting the switch.

Rebooting from the menu interface

- Terminates the current session and performs a reset of the operating system
- Activates any configuration changes that require a reboot
- Resets statistical counters to zero

To Reboot the switch, use the **Reboot Switch** option in the Main Menu. (Note that the Reboot Switch option is not available if you log on in Operator mode; that is, if you enter an Operator password instead of a manager password at the password prompt.)

Figure 16 The Reboot Switch option in the Main Menu

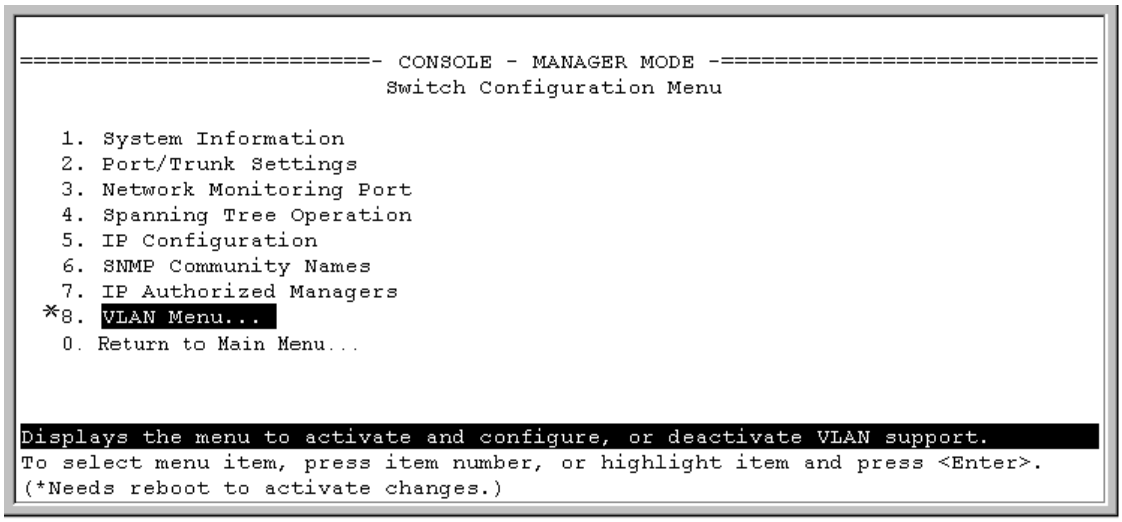


Rebooting To Activate Configuration Changes. Configuration changes for most parameters become effective as soon as you save them. However, you must reboot the switch in order to implement a change in the **Maximum VLANs to support** parameter.

(To access these parameters, go to the Main menu and select **2. Switch Configuration**, then **8. VLAN Menu**, then **1. VLAN Support**.)

If configuration changes requiring a reboot have been made, the switch displays an asterisk (*) next to the menu item in which the change has been made. For example, if you change and save parameter values for the **Maximum VLANs to support** parameter, an asterisk appears next to the **VLAN Support** entry in the VLAN Menu screen, and also next to the **Switch Configuration …** entry in the Main menu:

Figure 17 Indication of a configuration change requiring a reboot



WebAgent: implementing configuration changes

You can use the WebAgent to simultaneously save and implement a subset of switch configuration changes without having to reboot the switch. That is, when you save a configuration change, you simultaneously change both the running-config file and the startup-config file. For online help with configuring changes in the WebAgent, click on the "**?**" in the WebAgent screen.

NOTE: If you reconfigure a parameter in the CLI and then go to the WebAgent without executing a **write memory** command, those changes will be saved to the startupconfig file if you click on **Save** in the WebAgent.

Zeroization

Zeroizing the file storage of the management module

Sometimes it is desirable to completely remove the information stored in user files from flash storage. The zeroization feature will remove and "zeroize" all the files from flash storage except software images. Information removed includes the following:

- switch configurations
- system generated private keys
- user installed private keys
- legacy manager/operator password files
- crypto-key files
- fdr logs
- core dumps

Zeroization can be initiated in these ways:

- CLI command
- During Secure Mode transition, initiated through the `secure-mode` CLI command executed in a serial session
- ROM console command

The zeroization process takes some time, so it is performed during the initial process of a switch reboot. After zeroization, the configuration file is rebuilt from the default config file, which is similar to the config rebuilding process performed by the `erase startup-config` command.

Syntax:

`erase all [zeroize]`

Erases all management module files, including configuration files, core dumps, password files, crypto-key files, etc. Software images are not erased.

When executed without the `zeroize` *option, files are removed, but the flash storage is not zeroized. The data is still physically present in the flash. The flash can be removed from the switch and the data recovered with file recovery tools.*

`[zeroize]`: *Zeroizes the file storage of the management modules.*

NOTE: It is recommended that zeroization be performed from the serial console so that the status information can be viewed during the zeroization process.

Example 41 Zeroizing the management module files

```
HP Switch(config)# erase all zeroize

The system will be rebooted and all management module files
except software images will be erased and zeroized. This will
take up to 60 minutes and the switch will not be usable during
ing that time. Continue (y/n)? y
```

Zeroizing from the ROM console

It is also possible to zeroize the file storage from the ROM console of the switch, using the **erase-all zeroize** command at the prompt. This most likely occurs during a switch recovery process. The warning messages are the same as for the CLI command.

Example 42 Zeroizing the management module files from the ROM console

```
=> erase-all zeroize

The system will be rebooted and all management module files
except software images will be erased and zeroized. This will
take up to 60 minutes and the switch will not be usable during
that time. Continue (y/n)? y
```

Zeroizing with HA

When zeroization is triggered by a secure mode transition, HA handles zeroization on the AMM and SMM automatically.

When the CLI command (**erase all zeroize**) is used to start zeroization, the AMM syncs with the SMM and ensures that the SMM performs the same level of zeroization before the AMM starts the zeroization process on itself. The AMM before the zeroization process occurs remains the AMM, unless it takes over a minute for the AMM to boot up, in which case the prior SMM becomes the AMM.

When zeroization is started from the ROM console, there is no synchronization performed between the AMM and SMM, as zeroization from the ROM console is treated as a recovery facility. Each MM has to be zeroized individually.

For information about Secure Mode and zeroization, see the chapter "Secure Mode (5400zl, 3800, and 8200zl)" in the *Access Security Guide* for your switch.

Using Primary and Secondary flash image options

The switches covered in this guide feature two flash memory locations for storing switch software image files:

- **Primary Flash:** The default storage for a switch software image.
- **Secondary Flash:** The additional storage for either a redundant or an alternate switch software image.

With the Primary/Secondary flash option you can test a new image in your system without having to replace a previously existing image. You can also use the image options for troubleshooting. For example, you can copy a problem image into Secondary flash for later analysis and place another, proven image in Primary flash to run your system. The switch can use only one image at a time.

The following tasks involve primary/secondary flash options:

- Displaying the current flash image data and determining which switch software versions are available
- Switch software downloads
- Replacing and removing (erasing) a local switch software version
- System booting

Displaying the current flash image data

Use the commands in this section to:

- Determine whether there are flash images in both primary and secondary flash
- Determine whether the images in primary and secondary flash are the same
- Identify which switch software version is currently running

Viewing the currently active flash image version. This command identifies the software version on which the switch is currently running, and whether the active version was booted from the primary or secondary flash image.

Syntax:

```
show version
```

For example, if the switch is using a software version of K.12.XX stored in Primary flash, `show version` produces the following:

Example 43 The identity of the current flash image

```
HP Switch(config)# show version

Image stamp:   /su/code/build/info(s01)
               Dec 01 2006 10:50:26
               K.12.XX
               1223
Boot Image:    Primary
```

Determining whether the flash images are different versions. If the flash image sizes in primary and secondary are the same, then in almost every case, the primary and secondary images are identical. This command provides a comparison of flash image sizes, plus the boot ROM version and from which flash image the switch booted. For example, in the following case, the images are different versions of the switch software, and the switch is running on the version stored in the secondary flash image:

Example 44 Different flash image versions

```
HP Switch(config)# show flash
Image             Size(Bytes)   Date   Version
-----             -----------  -------- -------------
Primary Image     : 7493854    03/21/10 K.15.01.0001
Secondary Image   : 7463821    03/23/10 K.15.01.0001

Boot Rom Version: K.15.08
Default Boot    : Primary
```

Determining which flash image versions are installed. The **show version** command displays which software version the switch is currently running and whether that version booted from primary or secondary flash. Thus, if the switch booted from primary flash, you will see the version number of the software version stored in primary flash, and if the switch booted from secondary flash, you will see the version number of the software version stored in secondary flash. Thus, by using `show version`, then rebooting the switch from the opposite flash image and using `show version` again, you can determine the version(s) of switch software in both flash sources. For example:

Example 45 Determining the software version in Primary and Secondary flash

```
HP Switch(config)# show version
Management Module 1: Active
Image stamp:    /sw/code/build/btm(ec_K_15)
                Aug 2 2012 09:06:58
                K.15.12.001
                152
Boot Image:     Primary
HP Switch(config)# boot system flash secondary
Device will be rebooted, do you want to continue [y/n]? y
  .
  .
  .

HP Switch(config)# show version
Management Module 1: Active
Image stamp:    /sw/code/build/btm(ec_K_15)
                Aug 2 2012 09:06:58
                K.15.12.001
                1753
Boot Image:     Secondary
```

Switch software downloads

The following table shows the switch's options for downloading a software version to flash and booting the switch from flash.

Table 5 Primary/Secondary memory access

Action	Menu	CLI	Web Agent	SNMP
Download to Primary	Yes	Yes	Yes	Yes
Download to Secondary	No	Yes	No	Yes
Boot from Primary	Yes	Yes	Yes	Yes
Boot from Secondary	No	Yes	No	Yes

The different software download options involve different **copy** commands, plus **xmodem**, **usb**, and **tftp**. These topics are covered in Appendix A, "File Transfers".

Download interruptions. In most cases, if a power failure or other cause interrupts a flash image download, the switch reboots with the image previously stored in primary flash. In the unlikely

event that the primary image is corrupted, as a result of an interruption, the switch will reboot from secondary flash and you can either copy the secondary image into primary or download another image to primary from an external source.

Local switch software replacement and removal

This section describes commands for erasing a software version and copying an existing software version between primary and secondary flash.

NOTE: It is not necessary to erase the content of a flash location before downloading another software file. The process automatically overwrites the previous file with the new file. If you want to remove an unwanted software version from flash, HP recommends that you do so by overwriting it with the same software version that you are using to operate the switch, or with another acceptable software version. To copy a software file between the primary and secondary flash locations, refer to "Copying a switch software image from one flash location to another", below.

The local commands described here are for flash image management within the switch. To download a software image file from an external source, see "File Transfers" in the *Management and Configuration Guide* for your switch.

Copying a switch software image from one flash location to another. When you copy the flash image from primary to secondary or the reverse, the switch overwrites the file in the destination location with a copy of the file from the source location. This means you *do not* have to erase the current image at the destination location before copying in a new image.

△ **CAUTION:** Verify that there is an acceptable software version in the source flash location from which you are going to copy. Use the **show flash** command or, if necessary, the procedure under "Displaying the current flash image data" (page 64) to verify an acceptable software version. Attempting to copy from a source image location that has a corrupted flash image overwrites the image in the destination flash location. In this case, the switch will not have a valid flash image in either flash location, but will continue running on a temporary flash image in RAM. *Do not reboot the switch*. Instead, immediately download another valid flash image to primary or secondary flash. Otherwise, if the switch is rebooted without a software image in either primary or secondary flash, the temporary flash image in RAM will be cleared and the switch will go down. To recover, see "Restoring a Flash Image" in Appendix C of the *Management and Configuration Guide* for your switch.

Syntax:

`copy flash flash <destination flash>`

where: *destination flash* = **primary** or **secondary**:

For example, to copy the image in secondary flash to primary flash:

1. Verify that there is a valid flash image in the secondary flash location. The following figure indicates that a software image is present in secondary flash. (If you are unsure whether the image is secondary flash is valid, try booting from it before you proceed, by using `boot system flash secondary`.)

Example 46 Indicating two different software versions in Primary and Secondary flash

```
HP Switch(config)# show flash
Image              Size (bytes) Date     Version
------------------ ------------ -------- --------------------
Primary Image      : 10167529    10/14/11 K.14.89
Secondary Image    : 15085139    08/17/12 K.15.10.0001

Boot ROM Version : K.15.28
Default Boot     : Primary
```

Execute the copy command as follows:

```
HP Switch(config)# copy flash flash primary
```

Erasing the contents of Primary or Secondary flash. This command deletes the software image file from the specified flash location.

△ **CAUTION:** **No undo!** Before using this command in one flash image location (primary or secondary), ensure that you have a valid software file in the other flash image location (secondary or primary). If the switch has only one flash image loaded (in either primary or secondary flash) and you erase that image, then the switch does not have a software image stored in flash. In this case, if you do not reboot or power cycle the switch, you can recover by using xmodem or tftp to download another software image.

Syntax:

`erase flash` *<primary | secondary>*

For example, to erase the software image in primary flash, do the following:

1. First verify that a usable flash image exists in secondary flash. The most reliable way to ensure this is to reboot the switch from the flash image you want to retain. For example, if you are planning to erase the primary image, then first reboot from the secondary image to verify that the secondary image is present and acceptable for your system:

   ```
   HP Switch# boot system flash secondary
   ```

2. Then erase the software image in the selected flash (in this case, primary):

   Example 47 Erase Flash Prompt

   ```
   HP Switch# erase flash primary
   The Primary OS Image will be deleted, continue [y/n]?
   ```

3. Type ‘y’ at the prompt to complete the flash erase.
4. Use `show flash` to verify erasure of the selected software flash image. The “0” shows that the primary flash has been erased.

Example 48 Show flash listing after erasing Primary flash

```
HP Switch# show flash

Compressed Primary Code size    = 0
Compressed Secondary code size = 2555802
Boot ROM Version : K.15.19
Default Boot     : Secondary
```

In redundant management systems, this command will erase the selected flash in both the active and the standby management modules. If redundancy has been disabled or the standby module has failed selftest, this command only affects the active management module.

Rebooting the switch

Operating notes about booting

Default boot source. The switch reboots from primary flash by default unless you specify the secondary flash by entering either the **boot system flash [primary | secondary]** or **boot set-default flash [primary | secondary]** command. Both the **boot** command and the **reload** command will reboot based on how these options have been selected.

Boot attempts from an empty flash location. In this case, the switch aborts the attempt and displays:

```
Image does not exist
Operation aborted.
```

Interaction of Primary and Secondary flash images with the current configuration. The switch has one startup-config file (see "Configuration file management" (page 50)), which it always uses for reboots, regardless of whether the reboot is from primary or secondary flash. Also, for rebooting purposes, it is not necessary for the software image and the startup-config file to support identical software features. For example, suppose you have just downloaded a software upgrade that includes new features that are not supported in the software you used to create the current startup-config file. In this case, the software simply assigns factory-default values to the parameters controlling the new features. Similarly, If you create a startup-config file while using a version "Y" of the switch software, and then reboot the switch with an earlier software version "X" that does not include all of the features found in "Y", the software simply ignores the parameters for any features that it does not support.

Scheduled reload. If no parameters are entered after the **reload** command, an immediate reboot is executed. The **reload at** and **reload after** command information is not saved across reboots. If the switch is rebooted before a scheduled reload command is executed, the command is effectively cancelled. When entering a **reload at** or **reload after** command, a prompt will appear to confirm the command before it can be processed by the switch. For the **reload at** command, if mm/dd/yy are left blank, the current day is assumed.

The scheduled reload feature removes the requirement to physically reboot the switch at inconvenient times (for example, at 1:00 in the morning). Instead, a **reload at 1:00 mm/dd** command can be executed (where **mm/dd** is the date the switch is scheduled to reboot).

Boot and reload command comparison

The switch offers reboot options through the **boot** and **reload** commands, plus the options inherent in a dual-flash image system. Generally, using **boot** provides more comprehensive self-testing; using **reload** gives you a faster reboot time.

Table 6 Comparing the boot and reload commands

Actions	Included in Boot?	Included in Reload	Note
Save all configuration changes since the last boot or reload	Optional, with prompt	Optional with reload <cr>, when prompt displays. Not saved with **reload at/after** commands; No prompt is displayed.	Config changes saved to the startup-config file if "y" is selected (**reload** command).
Perform all system self-tests	Yes	No	The **reload** command provides a faster system reboot.
Choice of primary or secondary flash image	Yes	No—Uses the current flash image.	
Perform a scheduled reboot	No	Yes	Use the **reload** command with after/at parameters (see "Using reload" (page 71) for details).

Setting the default flash

You can specify the default flash to boot from on the next boot by entering the **boot set-default flash** command.

Syntax:

`boot set-default flash [ primary | secondary ]`

Upon booting, set the default flash for the next boot to primary or secondary.

Example 49 Boot set-default command with default flash set to Secondary (with a redundant management module present)

```
HP Switch(config)# boot set-default flash secondary
HP Switch(config)# show flash
Image            Size(Bytes)    Date     Version
------           ----------    -------  -------------
Primary Image    : 7476770     03/15/10 K.15.01.0001
Secondary Image  : 7476770     03/15/10 K.15.01.0001

Boot Rom Version: K.15.08
Default Boot     : Secondary

HP Switch(config)# boot
This management module will now reboot from secondary
and will become the standby module! You will need to
use the other management module's console interface.
Do you want to continue [y/n]?
```

Booting from the default flash (Primary or Secondary)

The **boot** command boots the switch from the flash image that you are currently booted on, or the flash image that was set either by the **boot set-default** command or by the last executed **boot system flash <primary | secondary>** command. This command also executes the complete set of subsystem self-tests. You have the option of specifying a configuration file.

Syntax:

`boot [system[flash | <primary | secondary> ]][config FILENAME]`

Reboots the switch from the flash that you are currently booted on (primary or secondary). You can select which image to boot from during the boot process itself. When using redundant management, the switch will failover to the standby management module.

Note: *This is changed from always booting from primary flash. You are prompted with a message which will indicate the flash being booted from.*

system: *Boots the switch. You can specify the flash image to boot from. When using redundant management, boots both the active and standby management modules.*

config: *You can optionally select a configuration file from which to boot.*

Example 50 Boot command (default Primary flash) with redundant management

```
HP Switch(config)# boot
This management module will now reboot from primary image
and will become the standby module! You will need to use
the other management module's console interface.
Do you want to continue [y/n]? y

Do you want to save current configuration [y/n]? n
```

In the above example, typing either a 'y' or 'n' at the second prompt initiates the reboot operation. (Entering 'y' saves any configuration changes from the running-config file to the startup-config file; entering 'n' discards them.)

Example 51 Boot command booting from a different flash than the current flash (with redundant management module present)

```
HP Switch(config)# show flash
Image Size(Bytes) Date Version
Primary Image : 7497114 03/29/10 K.15.01.0001
Secondary Image : 7497114 03/29/10 K.15.01.0001
Boot Rom Version: K.15.08
Default Boot : Primary


HP Switch(config)# boot set-default flash secondary
This command changes the location of the default boot.
This command will change the default flash image to boot from
secondary. Hereafter, 'reload' 'boot' commands will boot from
secondary. Do you want to continue [y/n]? y

HP Switch(config)# boot
This management module will now reboot from secondary image
and will become the standby module! You will need to use the
other management module's console interface.
Do you want to continue [y/n]? n
```

Booting from a specified flash

This version of the boot command gives you the option of specifying whether to reboot from primary or secondary flash, and is the required command for rebooting from secondary flash. This option also executes the complete set of subsystem self-tests.

Syntax:

`boot system flash [ <primary ] | [ secondary>]`

For example, to reboot the switch from secondary flash when there are no pending configuration changes in the running-config file:

Example 52 Boot command with secondary flash option

```
HP Switch(config)# boot system flash secondary
System will be rebooted from secondary image. Do you want to continue [y/n]?
```

In the above example, typing either a 'y' or 'n' at the second prompt initiates the reboot operation.

Using the fastboot feature. The **fastback** command allows a boot sequence that skips the internal power-on self-tests, resulting in a faster boot time. When using redundant management and fastboot is enabled, it is saved to the standby management module when the config files are synchronized. Fastboot is used during the next bootup on either management module.

Syntax:

[no] `fastboot`

Enables the fastboot option

The `no` *option disables the feature.*

Syntax:

`show fastboot`

Shows the status of the fastboot feature, either enabled or disabled.

The fastboot command is shown below.

```
HP Switch(config)# fastboot
```

Using reload

The **reload** command reboots the switch from the flash image that you are currently booted on (primary or secondary) or the flash image that was set either by the **boot set-default** command or by the last executed **boot system flash <primary | secondary>** command. Because **reload** bypasses some subsystem self-tests, the switch reboots faster than if you use either of the **boot** command options. If you are using redundant management and redundancy is enabled, the switch will failover to the other management module.

Syntax:

`reload`

For example, if you change the number of VLANs the switch supports, you must reboot the switch in order to implement the change. The **reload** command prompts you to save or discard the configuration changes.

Example 53 Using reload with redundant management and pending configuration changes

```
HP Switch(config)# max-vlans 12
Command will take effect after saving configuration and reboot.

HP Switch(config)# reload
This command will cause a switchover to the other management
module which may not be running the same software image and
configurations. Do you want to continue [y/n]? y
```

Scheduled reload. Beginning with software release K.11.34, additional parameters have been added to the **reload** command to allow for a scheduled reboot of the switch via the CLI.

Syntax:

[no] `reload [after <[dd:]hh:][mm>] | [at <hh:mm[:ss]>][<mm/dd[/[yy]yy]>]`

Enables a scheduled warm reboot of the switch. The switch boots up with the same startup config file and using the same flash image as before the reload.

△ **CAUTION:** *When using redundant management, the* **reload at/after** *command causes a switchover at the scheduled time to the other management module, which may not be running the same software image or have the same configurations.*

Parameters include:

- **after**: *Schedules a warm reboot of the switch after a given amount of time has passed.*
- **at**: *Schedules a warm reboot of the switch at a given time.*

The **no** *form of the command removes a pending reboot request.*

For more details and examples, see below.

The scheduled reload feature removes the requirement to physically reboot the switch at inconvenient times (for example, at 1:00 in the morning). Instead, a **reload at 1:00 mm/dd** command can be executed (where **mm/dd** is the date the switch is scheduled to reboot).

NOTE: Configuration changes are not saved with **reload at** or **reload after** commands. No prompt to save configuration file changes is displayed. See Table 6 on page 69.

Examples of scheduled **reload** commands:

- To schedule a reload in 15 minutes:

```
HP Switch# reload after 15
```

- To schedule a reload in 3 hours:

```
HP Switch# reload after 03:00
```

- To schedule a reload for the same time the following day:

```
HP Switch# reload after 01:00:00
```

- To schedule a reload for the same day at 12:05:

```
HP Switch# reload at 12:05
```

- To schedule a reload for some future date:

```
HP Switch# reload at 12:05 01/01/2008
```

Example 54 The reload command with a redundant management system

```
HP Switch(config)# reload after 04:14:00
    Reload scheduled in 4 days, 14 hours, 0 minutes
This command will cause a switchover at the scheduled
time to the other management module which may not be
running the same software image and configurations.
Do you want to continue [y/n]?
```

Module reload. The module reload feature allows you to reset a module by initiating a warm reboot of a specified module or modules. This saves time over rebooting the entire switch, which can take several minutes to complete and disrupts all users on the switch. The specified module has its power turned off, and then turned on again. This causes the module to reset to a known good state and reload its software.

Syntax:

`[no] reload [[after <[[DD:]HH:]MM>] | [[at HH:MM[:SS] [MM/DD[/[YY]YY]]]] | [[module <slot-id-range>]]]`

When specified with the **module** *parameter, initiates a reload of the module in the specified slot or slots by turning the slot power off, then on again. A valid slot or range of slots must be specified. The* **at** *and* **after** *parameters are not allowed with the* **module** *option. The* **no** *version of the command is not valid with the* **module** *option.*

When the **reload** *command is executed without any parameters, an immediate switch reload occurs.*

NOTE: This feature is not supported for HP One modules.

`module`: *Powers the module on or off, forcing a software reload of the specified module or modules.*

Example 55 Reloading a specified module

```
HP Switch(config)# reload module C
The 'reload module' command will shutdown the specified
modules. Ports on specified modules will no longer pass
traffic. Any management traffic to the switch which
passes through the affected modules will be interrupted
(e.g. ssh, telnet, snmp). This command may take up to 2
minutes to power down all specified modules. Please check
the event log for current status of module power down,
power up cycle. Continue [y/n]?
```

Displaying reload information. Use the **show reload** command to display the reload information. This can include:

- A scheduled, pending reload of the entire switch
- A statement that no reload is scheduled
- The time of the last reload of each module on the system

Example 56 The scheduled reload at information

```
HP Switch(config)# reload at 23:45
Reload scheduled at 23:45:47 6/16/2012
(in 0 days, 1 hours, 41 minutes

HP Switch(config)# show reload at
Reload scheduled for 23:45:47 06/16/2012
(in 0 days, 1 hours, 40 minutes)

HP Switch(config)# show reload after
Reload scheduled for 23:45:47 6/16/2012
(in 0 days, 1 hours, 40 minutes)
```

Example 57 The scheduled reload after information

```
HP Switch(config)# reload after 35
Reload scheduled in 0 days, 0 hours, 35 minutes

HP Switch(config)# show reload at
Reload scheduled in 0 days, 0 hours, 34 minutes

HP Switch(config)# show reload after
Reload scheduled in 0 days, 0 hours, 34 minutes
```

Example 58 The module reload information

```
HP Switch(config)# show reload module

Module Reload information:

Module | Last reload date
-------+---------------------
  C      10:50:51 01/13/2012
```

Multiple configuration files

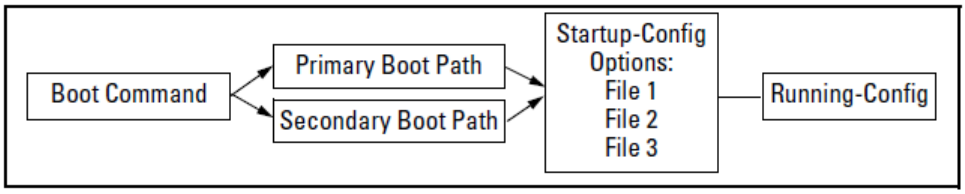
Action	Page
Listing and Displaying Startup-Config Files	77
Changing or Overriding the Reboot Configuration Policy	78
Managing Startup-Config Files	
Renaming Startup-Config Files	79
Copying Startup-Config Files	80
Erasing Startup-Config Files	81
Effect of Using the Clear + Reset Buttons	82
Copying Startup-Config Files to or from a Remote Server	83

This method of operation means that you cannot preserve different startupconfig files across a reboot without using remote storage.

The switch allows up to three startup-config files with options for selecting which startup-config file to use for:

- A fixed reboot policy using a specific startup-config file for a specific boot path (primary or secondary flash)
- Overriding the current reboot policy on a per-instance basis

Figure 18 Optional reboot process



While you can still use remote storage for startup-config files, you can now maintain multiple startup-config files on the switch and choose which version to use for a reboot policy or an individual reboot.

This choice of which configuration file to use for the startup-config at reboot provides the following new options:

- The switch can reboot with different configuration options without having to exchange one configuration file for another from a remote storage location.
- Transitions from one software release to another can be performed while maintaining a separate configuration for the different software release versions.
- By setting a reboot policy using a known good configuration and then overriding the policy on a per-instance basis, you can test a new configuration with the provision that if an unattended reboot occurs, the switch will come up with the known, good configuration instead of repeating a reboot with a misconfiguration.

General operation

Multiple configuration storage in the switch. The switch uses three memory "slots", with identity (**id**) numbers of **1**, **2**, and **3**.

Example 59 Output for show config files command

```
HP Switch(config)# show config files
Configuration files:

id | act pri sec | name
---+-------------+-----------------------------------------------
 1 |             | oldConfig
 2 |  *   *   *  | workingConfig
 3 |             |
```

A startup-config file stored in a memory slot has a unique, changeable file name. The switches covered in this guide can use the startup-config in any of the memory slots (if the software version supports the configured features).

Boot options. With multiple startup-config files in the switch you can specify a policy for the switch to use upon reboot. The options include:

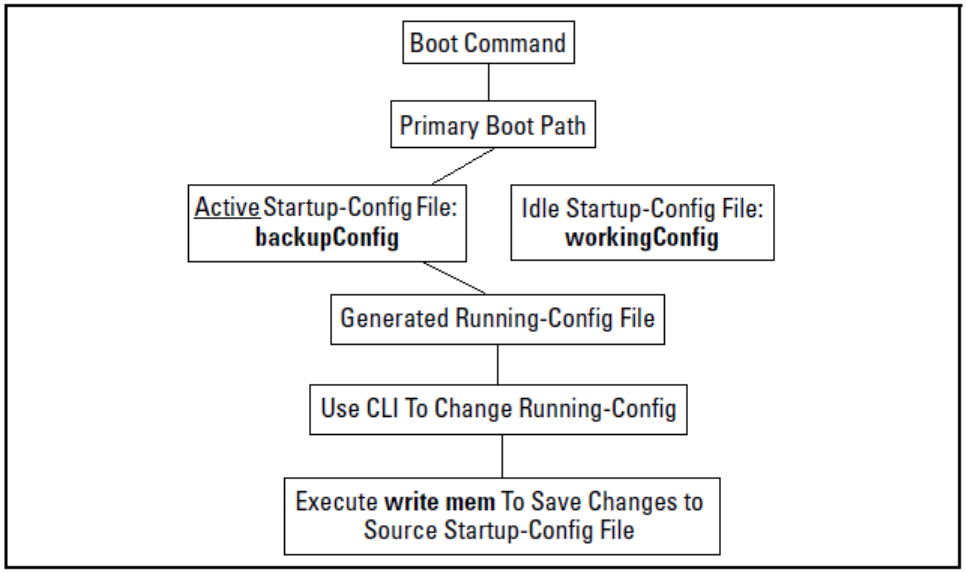
- Use the designated startup-config file with either or both reboot paths (primary or secondary flash)
- Override the current reboot policy for one reboot instance by specifying a boot path (primary or secondary flash) and the startup-config file to use.

Changing the startup-config file. When the switch reboots, the startupconfig file supplies the configuration for the running-config file the switch uses to operate. Making changes to the running-config file and then executing a **write-mem** command (or, in the Menu interface, the **Save** command) are written back to the startup-config file used at the last reboot. For example, suppose that a system administrator performs the following on a switch that has two startup-config files (**workingconfig** and **backupconfig**):

1. Reboot the switch through the Primary boot path using the startup-config file named **backupconfig**.
2. Use the CLI to make configuration changes in the running-config file, and then execute **write-mem**.

The result is that the startup-config file used to reboot the switch is modified by the actions in step 2.

Figure 19 Example of reboot process and making changes to the startup-config file



Creating an alternate startup-config file. There are two methods for creating a new configuration file:

- Copy an existing startup-config file to a new filename, then reboot the switch, make the desired changes to the running-config file, then execute `write memory`. (Refer to Figure 19, above.)
- Erase the active startup-config file. This generates a new, default startupconfig file that always results when the switch automatically reboots after deletion of the currently active startup-config file. (Refer to "Creating a new startup-config file" (page 80).)

Transitioning to multiple configuration files

At the first reboot with a software release supporting multiple configuration, the switch:

- Assigns the filename `oldConfig` to the existing startup-config file (which is stored in memory slot 1).
- Saves a copy of the existing startup-config file in memory slot 2 with the filename `workingConfig`.
- Assigns the `workingConfig` file as the active configuration and the default configuration for all subsequent reboots using either primary or secondary flash.

Example 60 Switch memory assignments after the first reboot from software supporting multiple configuration

```
HP Switch(config)# show config files
Configuration files:

id | act pri sec | name
---+-------------+-------------------------------------------------
 1 |             | oldConfig
 2 |  *   *   *  | workingConfig
 3 |             |
```

In the above state, the switch always:

- Uses the `workingConfig` file to reboot

The commands described later in this section enable you to view the current multiple configuration status, manage multiple startup-config files, configure reboot policies, and override reboot policies on a per-instance basis.

Listing and displaying startup-config files

Command	Page
`show config files`	Below
`show config <filename>`	78

Viewing the startup-config file status with multiple configuration enabled

Rebooting the switch automatically enables the multiple configuration feature.

Syntax:

`show config files`

This command displays the available startup-config files on the switch and the current use of each file.

`id`: *Identifies the memory slot for each startup-config file available on the switch.*

`act`: *An asterisk (*) in this column indicates that the corresponding startup-config file is currently in use.*

`pri`: *An asterisk (*) in this column indicates that the corresponding startup-config file is currently assigned to the primary boot path.*

`sec`: *An asterisk (*) in this column indicates that the corresponding startup-config file is currently assigned to the secondary boot path.*

`name`: *Shows the filename for each listed startup-config file in the switch. Refer to "Renaming an existing startup-config file" (page 79) for the command you can use to change existing startup-config filenames.*

In the default configuration, if the switch was shipped from the factory with software installed in both the primary and secondary boot paths, then one startup-config file named **config1** *is used for both paths and is stored in memory slot 1. Memory slots 2 and 3 are empty in this default configuration.*

Displaying the content of a specific startup-config file

With Multiple Configuration enabled, the switch can have up to three startupconfig files. Because the **show config** command always displays the content of the currently active startup-config file, the command extension shown below is needed to allow viewing the contents of any other startup-config files stored in the switch.

Syntax:

`show config <filename>`

This command displays the content of the specified startupconfig file in the same way that the **show config** *command displays the content of the default (currently active) startupconfig file.*

Changing or overriding the reboot configuration policy

Command	Page
`startup-default [ primary | secondary ] config <filename>`	Below
`boot system flash <primary | secondary> config <filename>`	79

You can boot the switch using any available startup-config file.

Changing the reboot configuration policy. For a given reboot, the switch automatically reboots from the startup-config file assigned to the flash location (primary or secondary) being used for the current reboot. For example, when you first download a software version that supports multiple configuration files and boot from the flash location of this version, the switch copies the existing startup-config file (named `oldConfig`) into memory slot 2, renames this file to `workingConfig`, and assigns `workingConfig` as:

- The active configuration file
- The configuration file to use when booting from either primary or secondary flash.

In this case, the switch is configured to automatically use the `workingConfig` file in memory slot 2 for all reboots.

You can use the following command to change the current policy so that the switch automatically boots using a different startup-config file.

Syntax:

`startup-default [ primary | secondary ] config <filename>`

Specifies a boot configuration policy option:
`[ primary | secondary ]config <filename>`

Designates the startup-config file to use in a reboot with the software version stored in a specific flash location. Use this option to change the reboot policy for either primary or secondary flash, or both.

`config <filename>`

Designates the startup-config file to use for all reboots, regardless of the flash version used. Use this option when you want to automatically use the same startup-config file for all reboots, regardless of the flash source used.

For redundant management systems, this command affects both the active management module and the standby management module. The config file is copied immediately to the standby management module and becomes the default on that module when the next bootup occurs, unless redundancy is disabled or the standby module has failed selftest.

Note: *To override the current reboot configuration policy for a single reboot instance, use the* **boot system flash** *command with the options described under "Changing or overriding the reboot configuration policy" (page 78).*

For example, suppose:

- Software release "A" is stored in primary flash and a later software release is stored in secondary flash.
- The system operator is using memory slot 1 for a reliable, minimal configuration (named `minconfig`) for the software version in the primary flash, and slot 2 for a modified startup-config file (named `newconfig`) that includes untested changes for improved network operation with the software version in secondary flash.

The operator wants to ensure that in case of a need to reboot by pressing the Reset button, or if a power failure occurs, the switch will automatically reboot with the minimal startup-config file in memory slot 1. Since a reboot due to pressing the Reset button or to a power cycle always uses the software version in primary flash, the operator needs to configure the switch to always boot from primary flash with the startup-config file named `minconfig` (in memory slot 1). Also, whenever the switch boots from secondary flash, the operator also wants the startup-config named `newconfig` to be used. The following two commands configure the desired behavior.

```
HP Switch(config)# startup-default pri config minconfig
HP Switch(config) # startup-default sec config newconfig
```

Overriding the default reboot configuration policy. This command provides a method for manually rebooting with a specific startup-config file other than the file specified in the default reboot configuration policy.

Syntax:

`boot system flash  <primary | secondary>`
`config <filename>`

Specifies the name of the startup-config file to apply for the immediate boot instance only. This command overrides the current reboot policy.

Using reload to reboot from the current flash image and startup-config file.

Syntax:

`reload`

This command boots the switch from the currently active flash image and startup-config file. Because **reload** *bypasses some subsystem self-tests, the switch boots faster than if you use a* `boot` *command.*

Note: *To identify the currently active startup-config file, use the* **show config files** *command.*

Managing startup-config files in the switch

Command	Page
`rename config <current-filename> <newname-str>`	79
`copy config <source-filename> config <dest-filename>`	79
`erase config [ <filename> | startup-config ]`	81
Erase startup-config using the front-panel Clear + Reset Buttons	82

Renaming an existing startup-config file

Syntax:

`rename config <current-filename> <newname-str>`

This command changes the name of an existing startupconfig file. A file name can include up to 63, alphanumeric characters. Blanks are allowed in a file name enclosed in quotes (" " or ' '). (File names are not case-sensitive.)

For redundant management systems, renaming a config file affects both the active management module and the standby management module, unless redundancy is disabled or the standby module failed selftest.

Creating a new startup-config file

The switch allows up to three startup-config files. You can create a new startup-config file if there is an empty memory slot or if you want to replace one startup-config file with another.

Syntax:

`copy config <source-filename>`
`config <target-filename>`

This command makes a local copy of an existing startupconfig file by copying the contents of an existing startupconfig file in one memory slot to a new startup-config file in another, empty memory slot. This enables you to use a separate configuration file to experiment with configuration changes, while preserving the source file unchanged. It also simplifies a transition from one software version to another by enabling you to preserve the startup-config file for the earlier software version while creating a separate startupconfig file for the later software version. With two such versions in place, you can easily reboot the switch with the correct startup-config file for either software version.

- *If the destination startup-config file already exists, it is overwritten by the content of the source startup-config file.*
- *If the destination startup-config file does not already exist, it will be created in the first empty configuration memory slot on the switch.*
- *If the destination startup-config file does not already exist, but there are no empty configuration memory slots on the switch, then a new startup-config file is not created and instead, the CLI displays the following error message:* `Unable to copy configuration to "target-filename".`

For example, suppose both primary and secondary flash memory contain software release "A" and use a startup-config file named `config1`:

Example 61 Using one startup-config file for both Primary and Secondary flash

```
HP Switch(config)# show config files
Configuration files:

id | act pri sec | name
---+-------------+-------------------------------------------------
 1 |  *   *   *  | Config1
 2 |             |
 3 |             |
```

If you wanted to experiment with configuration changes to the software version in secondary flash, you could create and assign a separate startupconfig file for this purpose.

Example 62 Creating and assigning a new startup-config file

```
HP Switch(config)# copy config config1 config config2
HP Switch(config)# startup-default secondary config config2
HP Switch(config)# show config files

Configuration files:

id | act pri sec | name
---+-------------+-----------------------------------------------
 1 |  *   *      | Config1
 2 |          *  | Config2
 3 |             |
```

NOTE: You can also generate a new startup-config file by booting the switch from a flash memory location from which you have erased the currently assigned startup-config file. Refer to "Erasing a Startup-Config File" in the next section.

Erasing a startup-config file. You can erase any of the startup-config files in the switch's memory slots. In some cases, erasing a file causes the switch to generate a new, default-configuration file for the affected memory slot.

In a redundant management system, this command erases the config or startup config file on both the active and the standby management modules as long as redundancy has not been disabled. If the standby management module is not in standby mode or has failed selftest, the config or startup config file is not erased.

Syntax:

`erase <config <filename>> | startup-config>`

`config <filename>`:

This option erases the specified startupconfig file. If the specified file is not the currently active startup-config file, then the file is simply deleted from the memory slot it occupies. If the specified file is the currently active startup-config file, then the switch creates a new, default startup-config file with the same name as the erased file, and boots using this file. (This new startup-config file contains only the default configuration for the software version used in the reboot.)

NOTE: *Where a file is assigned to either the primary or the secondary flash, but is not the currently active startupconfig file, erasing the file does not remove the flash assignment from the memory slot for that file. Thus, if the switch boots using a flash location that does not have an assigned startup-config, then the switch creates a new, default startup-config file and uses this file in the reboot. (This new startup-config file contains only the default configuration for the software version used in the reboot.) Executing* `write memory` *after the reboot causes a switch-generated filename of* `config x` *to appear in the* `show config files` *display for the new file, where* `x` *corresponds to the memory slot number.*

`startup-config`:

This option erases the currently active startupconfig file and reboots the switch from the currently active flash memory location. The erased startup-config file is replaced with a new startup-config file. The new file has the same filename as the erased file, but contains only the default configuration for the software version in the flash location (primary or secondary) used for the reboot. For example, suppose the last reboot was from primary flash using a configuration file named `minconfig`. *Executing* `erase startup-config` *replaces the current content of* `minconfig` *with a default configuration and reboots the switch from primary flash.*

The example below illustrates using `erase config <filename>` to remove a startup-config file.

Example 63 Erasing a non-active startup-config file

```
HP Switch(config)# show config files

Configuration files:

id | act pri sec | name
---+-------------+-----------------------------------------------
 1 |  *   *      | minconfig
 2 |          *  | config2
 3 |             | config3

HP Switch(config)# erase config config3
HP Switch(config)# show config files

Configuration files:

id | act pri sec | name
---+-------------+-----------------------------------------------
 1 |  *   *      | minconfig
 2 |          *  | config2
 3 |             |
```

With the same memory configuration as is shown in the bottom portion of the above example, executing `erase startup-config` boots the switch from primary flash, resulting in a new file named minconfig in the same memory slot. The new file contains the default configuration for the software version currently in primary flash.

Using the Clear + Reset button combination to reset the switch to its default configuration

The Clear + Reset button combination described in the *Installation and Getting Started Guide* produces these results. That is, when you press the Clear + Reset button combination, the switch:

- Overwrites the content of the startup-config file currently in memory slot 1 with the default configuration for the software version in primary flash, and renames this file to `config1`.
- Erases any other startup-config files currently in memory.
- Configures the new file in memory slot 1 as the default for both primary and secondary flash locations (regardless of the software version currently in secondary flash).
- Boots the switch from primary flash using the new startup-config file.

Example 64 Clear + Reset result

```
HP Switch(config)# show config files

Configuration files:

id | act pri sec | name
---+-------------+-------------------------------------------------
 1 |  *   *   *  | Config1
 2 |             |
 3 |             |
```

Transferring startup-config files to or from a remote server

Command	Page
`copy config <src-file> tftp <ip-addr> <remote-file> <pc | unix> [oobm]`	below
`copy tftp config <dest-file> <ip-addr> <remote-file> <pc | unix> [oobm]`	below
`copy config <src-file> xmodem <pc | unix>`	84
`copy xmodem config <dest-file> <pc | unix>`	84

TFTP: copying a configuration file to a remote host

Syntax:

`copy config <src-file>`
`tftp <ip-addr> <remote-file> <pc | unix> [oobm]`

This is an addition to the copy tftp command options. Use this command to upload a configuration file from the switch to a TFTP server.

For switches that have a separate out-of-band management port, the **oobm** *parameter specifies that the TFTP traffic will go out through the out-of-band management interface. If this parameter is not specified, the TFTP traffic goes out through the data interface. The* **oobm** *parameter is not available on switches that do not have a separate out-of-band management port.*

For more on using TFTP to copy a file to a remote server, see "TFTP: Copying a Configuration File to a Remote Host" in Appendix A of the Management and Configuration Guide for your switch.

For example, the following command copies a startup-config file named **test01** from the switch to a (UNIX) TFTP server at IP address 10.10.28.14:

```
HP Switch(config)# copy config test-01 tftp 10.10.28.14 test-01.txt unix
```

TFTP: Copying a configuration file from a remote host

Syntax:

`copy tftp config <dest-file> <ip-addr> <remote-file> <pc | unix> [oobm]`

This is an addition to the copy tftp command options. Use this command to download a configuration file from a TFTP server to the switch.

For switches that have a separate out-of-band management port, the **oobm** *parameter specifies that the TFTP traffic must come in through the out-of-band management interface. If this parameter is not specified, the TFTP traffic comes in through the data interface. The* **oobm** *parameter is not available on switches that do not have a separate out-of-band management port.*

Note: This command requires an empty memory slot in the switch. If there are no empty memory slots, the CLI displays the following message:

```
Unable to copy configuration to "<filename>".
```

*You can erase one or more configuration files using the **erase config <filename>** command.*

For more on using TFTP to copy a file from a remote host, see "TFTP: Copying a Configuration File from a Remote Host" in Appendix A of the Management and Configuration Guide for your switch.

For example, the following command copies a startup-config file named **test01.txt** from a (UNIX) TFTP server at IP address 10.10.28.14 to the first empty memory slot in the switch:

```
HP Switch(config)# copy tftp config test-01 10.10.28.14 test-01.txt unix
```

Xmodem: copying a configuration file to a serially connected host

Syntax:

```
copy config <filename>
xmodem   <pc | unix>
```

This is an addition to the **copy <config> xmodem** *command options. Use this command to upload a configuration file from the switch to an Xmodem host.*

For more on using Xmodem to copy a file to a serially connected host, see "Xmodem: Copying a Configuration File to a Serially Connected PC or UNIX Workstation" in Appendix A of the Management and Configuration Guide for your switch.

Xmodem: copying a configuration file from a serially connected host

Syntax:

```
copy xmodem config <dest-file>   <pc | unix>
```

*This is an addition to the **copy xmodem** command options. Use this command to download a configuration file from an Xmodem host to the switch.*

For more on using Xmodem to copy a file from a serially connected host, see "Xmodem: Copying a Configuration File from a Serially Connected PC or UNIX Workstation" in Appendix A of the Management and Configuration Guide for your switch.

Operating notes for multiple configuration files

- SFTP/SCP: The configuration files are available for sftp/scp transfer as **/cfg/<filename>**.

Display configuration of selected interface

The options provided in this feature allow you to display all the configurations on a specified interface or VLAN with a single command. You can use the options with the startup config command, **show config**, and the running config command, **show running-config**.

Running configuration output

You can display the running configuration using this command. An example of this output is shown in the 'Running Configuration Output for Interfaces A2–A4' example below.

Syntax:

```
show running-config [interface  <port-list | loopback <0-7> | vlan
vlan-id-list] [structured]
```

Displays running configuration information about the selected interface when one is specified. The interfaces can be ports, VLANs, or SVLANs.

Note: *For the 5400zl, 3800, and 8200zl switches, when the command is executed in enhanced secure mode the following prompt displays:*

```
Do you want to show sensitive information(y/n)?
```

*If 'y' is entered, the normal command output is displayed on the console. If 'n' is entered, all the sensitive information is hidden and will be displayed as asterisks ('*****'). The default option is 'n' when interactive mode is disabled. For more information, see the chapter "Secure Mode (5400zl, 3800, and 8200zl)" in the Access Security Guide for your switch.*

structured: *Groups the config command information output in a logical manner. When the structured option is entered, the output displays the configuration settings, such as spanning-tree, followed by a list of all the switch interfaces showing any configured settings for each interface. The VLAN configuration information is displayed after the interface information.*

When the structured option is not entered, the output first displays only the interfaces that have configuration settings. The other settings, such as spanning-tree, are displayed after the interfaces, and then the VLAN configuration information is displayed.

NOTE: The **show running config interface/vlan/svlan** command output cannot be downloaded to the switch; it will not download correctly. Copying and pasting the displayed configuration information into the switch configuration is not supported. This feature only provides a display of all the configuration information for a selected interface or range of interfaces in a single view.

Example 65 Running configuration output for interfaces A2 - A4

```
HP Switch(eth-A2-A4)# show running-config

Running configuration:

; J8698A Configuration Editor; Created on release #K.15.10.0001
; Ver #02:0b:ef:e6
hostname "HP Switch"
interface A2
   disable
   name "test1"
   flow-control
   broadcast-limit 80
   speed-duplex 100-full
   unknown-vlans Block
   qos priority 4
   lacp Passive
   gvrp join-timer 30
   gvrp leave-timer 60
   gvrp leaveall-timer 700
exit
interface A3
   disable name "test1"
   flow-control
   broadcast-limit 80
   speed-duplex 100-full
   unknown-vlans Block
   qos priority 4
   lacp Passive
   gvrp join-timer 30
   gvrp leave-timer 60
   gvrp leaveall-timer 700
exit
vlan 1
   name "DEFAULT_VLAN"
   untagged A1-A4,C1-C24,F1-F4
   ip address dhcp-bootp
   exit
interface A2
   dhcp-snooping trust
   bandwidth-min output 20 10 10 10 20 10 10 10
   rate-limit bcast in percent 75
   ipv6 access-group "check" in
   exit
interface A3
   dhcp-snooping trust
   bandwidth-min output 20 10 10 10 20 10 10 10
   rate-limit bcast in percent 75
   ipv6 access-group "check" in
   exit
```

The example below shows an example of the running config for a range of interfaces. The configuration information for interfaces A2 and A3 is now displayed together.

Example 66 Running config output for a specified interface range

```
HP Switch(config)# show running-config interface A2-A3

Running configuration:

interface A2
   disable
   name "test1"
   flow-control
   broadcast-limit 80
   speed-duplex 100-full
   unknown-vlans block
   qos priority 4
   gvrp join-timer 30 leave-timer 60 leaveall-timer 700
   dhcp-snooping trust
   lacp passive
   bandwidth-min output 20 10 10 10 20 10 10 10
   rate-limit bcast in percent 75
   ipv6 access-group "check" in
   untagged vlan 1
   exit
interface A3
   disable
   name "test1"
   flow-control
   broadcast-limit 80
   speed-duplex 100-full
   unknown-vlans block
   qos priority 4
   gvrp join-timer 30 leave-timer 60 leaveall-timer 700
   dhcp-snooping trust
   lacp passive
   bandwidth-min output 20 10 10 10 20 10 10 10
   rate-limit bcast in percent 75
   ipv6 access-group "check" in
   untagged vlan 1
   exit
```

The example below shows an example of the running config file for a range of interfaces after some configuration changes have been made.

Example 67 Running config output for a range of interfaces

```
HP Switch(config)# no stack
HP Switch(config)# mesh 2-3
Command will take effect after saving configuration and reboot.

HP Switch(config)# write memory
HP Switch(config)# reload

HP Switch# show running-config interface 2-3

Running configuration:

interface 2
   untagged vlan 1
   mesh
   exit
interface 3
   flow-control
   untagged vlan 1
   mesh
   exit
```

The example below is an example of the running config output showing VLAN information.

Example 68 Running config output showing VLAN information

```
HP Switch(config)# show running-config

Running configuration:
; J8698A Configuration Editor; Created on release #K.15.10.0001
; Ver #02:0b:ef:e6
hostname "HP Switch"
module 1 type J9309A
module 3 type J8702A
module 6 type J8702A
ip routing
vlan 1
   name "DEFAULT_VLAN"
   untagged A1-A4,C1-C24,F1-F24
   ip address dhcp-bootp
   exit
vlan 2
   name "test-vlan-2"
   ip helper-address 4.1.1.1
   ip helper-address 5.1.1.1
   ip address 1.1.1.1 255.255.255.0
   ipv6 address 2001::/64 anycast
   ipv6 enable
   exit
vlan 3
   name "VLAN3"
   ip helper-address 7.1.1.1
   ip forward-protocol udp 7.1.1.1 snmp
   ip forward-protocol udp 11.1.1.2 dns
   no ip address
   exit
vlan 4
   name "VLAN4"
   ip address 5.1.1.1 255.255.255.0
   ip bootp-gateway 5.1.1.1
   exit
logging 10.0.102.90
logging system-module ospf
ip route 5.1.1.0 255.255.255.0 vlan 4 distance 3
```

In the example below, the configuration information for VLAN 4 is now displayed in one place.

Example 69 Running config output for a range of VLANs

```
HP Switch(config)# show running-config vlan 3-4

Running configuration:

vlan 3
   name "VLAN3"
   ip helper-address 7.1.1.1
   ip forward-protocol udp 7.1.1.1 snmp
   ip forward-protocol udp 11.1.1.2 dns
   no ip address
   exit
vlan 4
   name "VLAN4"
   ip address 5.1.1.1 255.255.255.0
   ip bootp-gateway 5.1.1.1
   ip route 5.1.1.0 255.255.255.0 distance 3
   exit
```

Below is an example of the running config for a range of VLANs after configuration changes have been made to selected VLANs.

Example 70 Output for running config for a range of VLANs

```
HP Switch(config)# dhcp-snooping
HP Switch(config)# vlan 14
HP Switch(vlan-14)# exit
HP Switch(config)# vlan 15
HP Switch(vlan-15)# exit
HP Switch(config)# vlan 23
HP Switch(vlan-23)# exit
HP Switch(config)# dhcp-snooping vlan 14-15
HP Switch(config)# static-mac 00:11:22:33:44:55 vlan 23 interface A3
HP Switch(config)# spanning-tree instance 2 vlan 15

HP Switch(config)# show running-config vlan 14-15

Running configuration:

vlan 14
   name "VLAN14"
   no ip address
   dhcp-snooping
   exit
vlan 15
   name "VLAN15"
   no ip address
   dhcp-snooping
   spanning-tree instance 2
   exit
```

Startup configuration output

You can display the startup configuration using this command. An example of the startup configuration output is shown in the 'Startup Configuration Output' example below.

Syntax:

`show config [interface <port-list | loopback <0-7> | vlan <vlan-id-list> ]`

Displays startup configuration information about the selected interface when one is specified. The interfaces can be ports, VLANs, or SVLANs.

Note: *For the 5400zl, 3800, and 8200zl switches, when the command is executed in enhanced secure mode the following prompt displays:*

```
Do you want to show sensitive information(y/n)?
```

*If 'y' is entered, the normal command output is displayed on the console. If 'n' is entered, all the sensitive information is hidden and will be displayed as asterisks ('*****'). The default option is 'n' when interactive mode is disabled. For more information, see the chapter "Secure Mode (5400zl, 3800, and 8200zl)" in the* Access Security Guide *for your switch.*

Example 71 Startup configuration output

```
HP Switch(config)# show config

Startup configuration:

; J8698A Configuration Editor; Created on release #K.14.54C
; Ver #02:0b:ef:e6
hostname "HP Switch"
module 1 type J9309A
module 3 type J8702A
module 6 type J8702A
vlan 1
   name "DEFAULT_VLAN"
   untagged A1-A4,C1-C9,C15-C24,F1-F24
   ip address dhcp-bootp
   no untagged C10-C14
   exit
vlan 5
   name "VLAN5"
   untagged C10-C14
   ip address 5.1.1.1 255.255.255.128
   exit
interface loopback 5
   ip address 7.1.1.1
   exit
interface loopback 7
   ip address 12.1.1.1
   exit
snmp-server community "public" unrestricted
```

Below is an example of the startup config output for a selected VLAN.

Example 72 Startup config output for a specific VLAN

```
HP Switch(vlan-5)# show config vlan 5

Startup configuration:

vlan 5
   name "VLAN5"
   untagged C10-C14
   ip address 5.1.1.1 255.255.255.128
   exit
```

Below shows an example of the startup config output for a range of interfaces for a specific VLAN.

Example 73 Startup config output for a range of interfaces for a specific VLAN

```
HP Switch(vlan-5)# show config interface C10-C13

Startup configuration:

interface C10
   untagged vlan 5
   exit
interface C11
   untagged vlan 5
   exit
interface C12
   untagged vlan 5
   exit
interface C13
   untagged vlan 5
   exit
```

Automatic configuration update with DHCP Option 66

HP switches are initially booted up with the factory-shipped configuration file. This feature provides a way to automatically download a different configuration file from a TFTP server using DHCP Option 66. The prerequisites for this to function correctly are:

- One or more DHCP servers with Option 66 are enabled
- One or more TFTP servers has the desired configuration file

△ **CAUTION:** This feature must use configuration files generated on the switch to function correctly. If you use configuration files that were not generated on the switch, and then enable this feature, the switch may reboot continuously.

CLI command

The command to enable the configuration update using Option 66 is:

Syntax:

[no]`dhcp config-file-update`

Enables configuration file update using Option 66.

Default: Enabled

Example 74 Enabling configuration file update using Option 66

```
HP Switch(config)# dhcp config-file-update
```

Possible scenarios for updating the configuration file

The following table shows various network configurations and how Option 66 is handled.

Scenario	Behavior
Single Server serving Multiple VLANs	• Each DHCP-enabled VLAN interface initiates DHCPDISCOVER message, receives DHCPOFFER from the server, and send DHCPREQUEST to obtain the offered parameters. • If multiple interfaces send DHCPREQUESTs, it's possible that more than one DHCPACK is returned with a valid Option 66. • Evaluating and updating the configuration file occurs only on the primary VLAN. • Option 66 is ignored by any interfaces not belonging to the primary VLAN.
Multiple Servers serving a Single VLAN	• Each DHCP-enabled VLAN interface initiates one DHCPDISCOVER and receives one or more DHCPOFFER messages. • Each interface accepts the best offer. • Option 66 is processed only for the interface belonging to the primary VLAN.
Multiple Servers serving Multiple VLANs	• Each DHSP-enabled VLAN interface initiates DHCPDISCOVER and receives one or more DHCPOFFER messages. • Each interface accepts the best offer. • Option 66 is processed only for the interface belonging to the primary VLAN.
Multi-homed Server serving Multiple VLANs	• The switch perceives the multi-homed server as multiple separate servers. • Each DHCP-enabled VLAN interface initiates DHCPDISCOVER and receives one DHCPOFFER message. • Each interface accepts the offer. • Option 66 is processed only for the interface belonging to the primary VLAN.

Operating notes

Replacing the existing configuration file: After the DHCP client downloads the configuration file, the switch compares the contents of that file with the existing configuration file. If the content is different, the new configuration file replaces the existing file and the switch reboots.

Option 67 and the configuration file name: Option 67 includes the name of the configuration file. If the DHCPACK contains this option, it overrides the default name for the configuration file (switch.cfg)

Global DHCP parameters: Global parameters are processed only if received on the primary VLAN.

Best Offer: The "Best Offer" is the best DHCP or BootP offer sent by the DHCP server in response to the DHCPREQUEST sent by the switch. The criteria for selecting the "Best Offer" are:

- DHCP is preferred over BootP
- If two BootP offers are received, the first one is selected
- For two DHCP offers:
  - The offer from an authoritative server is selected
  - If there is no authoritative server, the offer with the longest lease is selected

Log messages

The file transfer is implemented by the existing TFTP module. The system logs the following message if an incorrect IP address is received for Option 66:

"Invalid IP address <*ip-address*> received for DHCP Option 66"

7 Interface access and system information

Interface access: console/serial link, web, and inbound telnet

The interface access features in the switch operate properly by default. However, you can modify or disable access features to suit your particular needs. Similarly, you can choose to leave the system information parameters at their default settings. However, modifying these parameters can help you to more easily distinguish one device from another in your network.

Interface access features:

Feature	Default	Menu	CLI
Idle-Timeout	0 Minutes (disabled)	page 96	page 98
Inbound Telnet Access	Enabled	page 96	page 96
Outbound Telnet Access	n/a	—	page 96
WebAgent Access	Enabled	page 96	page 98
Terminal type	VT-100	—	page 98
Event Log event types to list (Displayed Events)	All	—	page 98
Baud Rate	Speed Sense	—	page 98
Flow Control	XON/XOFF	—	page 98

In most cases, the default configuration is acceptable for standard operation.

NOTE: Basic switch security is through passwords. You can gain additional security by using the security features described in the Access Security Guide for your switch. You can also simply block unauthorized access via the WebAgent or Telnet (as described in this section) and installing the switch in a locked environment.

Modifying the interface access

Interface access commands used in this section:

`show console`	below
`[no] telnet-server`	below
`[no] web-management`	Page 98
`console`	Page 98

Terminal line width and length settings

For console/serial link and inbound telnet sessions, the switch output:

- Uses whatever width is set by the terminal program. If width is not specified, 80 characters is the default.
- Automatically wraps on word boundaries (such as spaces) for non-columnar output
- Automatically wraps on column boundaries for columnar output

HP recommends that you do not set your terminal width (`terminal width <y>`) above 150 columns. (Windows telnet displays up to 156 characters on 1280 pixel wide display, so 150 is comfortably within this).

Listing the current console/serial link configuration

This command lists the current interface access parameter settings.

Syntax:

```
show console
```

This example shows the default console/serial configuration.

Example 75 Listing of show console command

```
HP Switch (config)# show console

Console/Serial Link

Inbound Telnet Enabled [Yes] : Yes
Web Agent Enabled [Yes] : Yes

Terminal Type [VT100] : VT100
Screen Refresh Interval (sec) [3] : 3
Displayed Events [All] : All
Baud Rate [speed-sense] : speed-sense
Flow Control [XON/XOFF] : XON/XOFF
Global Session Idle Timeout (sec) [0] : 0
Serial/USB Console Idle Timeout (sec) [not set] : not set
Current Session Idle Timeout (sec) : 0
```

Reconfigure inbound telnet access

In the default configuration, inbound Telnet access is enabled.

Syntax:

[no] telnet-server [listen | <oobm | data | both>]

Enables or disables inbound Telnet access on a switch.

Use the **no** *version of the command to disable inbound Telnet access.*

The **listen** *parameter is available only on switches that have a separate out-of-band management port. Values for this parameter are:*

- **oobm**— *inbound Telnet access is enabled only on the out-of-band management port.(This port is available on selected switch models.)*
- **data**— *inbound Telnet access is enabled only on the data ports.*
- **both**— *inbound Telnet access is enabled on both the out-of-band management port and on the data ports. This is the default value.*

Refer to Appendix I, "Network Out-of-Band Management" in this guide for more information on out-of-band management.

The **listen** *parameter is not available on switches that do not have a separate out-of-band management port.*

To disable inbound Telnet access:

```
HP Switch(config)# no telnet-server
```

To re-enable inbound Telnet access:

```
HP Switch(config)# telnet-server
```

Outbound telnet to another device

This feature operates independently of the telnet-server status and enables you to Telnet to another device that has an IP address.

Syntax:

`telnet <ipv4-addr | ipv6-addr | hostname | switch-num> [oobm]`

Initiates an outbound telnet session to another network device. The destination can be specified as:

- *IPv4 address*
- *IPv6 address*
- *Hostname*
- *Stack number of a member switch (1-16) if the switch is a commander in a stack and stacking is enabled*

For switches that have a separate out-of-band management port, the **oobm** *parameter specifies that the Telnet traffic will go out from the out-of-band management interface. If this parameter is not specified, the Telnet traffic goes out from the data interface. The oobm parameter is not available on switches that do not have a separate out-of-band management port. Refer to Appendix I, "Network Out-of-Band Management" in this guide for more information on out-of-band management.*

Note*: If the* `console idle-timeout` *expires, any outbound Telnet or SSH sessions that are open on the switch are terminated. (For information on* `console idle-timeout`*, refer to* *"Reconfigure the console/serial link settings" (page 98).**)*

For example, if the host "Labswitch" is in the domain abc.com, you can enter the following command and the destination is resolved to "Labswitch.abc.com".

```
HP Switch(config)# telnet Labswitch
```

You can also enter the full domain name in the command:

```
HP Switch(config)# telnet Labswitch.abc.com
```

You can use the **show telnet** command to display the resolved IP address.

Example 76 The show telnet command displaying resolved IP addresses

```
HP Switch(config)# show telnet

  Telnet Activity

  ------------------------------------------------------
  Session  : **  1
  Privilege: Manager
  From     : Console
  To       :

  ------------------------------------------------------
  Session  : **  2
  Privilege: Manager
  From     : 12.13.14.10
  To       : 15.33.66.20

  ------------------------------------------------------
  Session  : **  3
  Privilege: Operator
  From     : 2001:db7:5:0:203:4ff:fe0a:251
  To       : 2001:db7:5:0:203:4ff1:fddd:12
```

Making window size negotiation available for a telnet session

When a telnet connection is established with a switch, the switch always uses the default values of 80 columns by 24 lines for the window dimensions. The window can be resized by either dragging the corner of the window, or by executing the `terminal length <x> width <y>`

CLI command and then configuring the telnet client with those dimensions. The new window dimensions are lost after that telnet session ends.

When the telnet connection is established with an HP switch, either the switch or the telnet client needs to initiate the inquiry about the availability of NAWS. If NAWS is available, you can resize the window by dragging the corner of the window to the desired size. The telnet software uses NAWS to tell the switch what the new window dimensions are. If the switch supports the requested window dimensions, it uses them for all future interactions. If the switch does not support those window dimensions, it refuses them and the telnet client requests an alternate set of window dimensions. The negotiation continues until the telnet client and the switch agree on the window dimensions.

The switch currently responds to a request from the remote telnet client to negotiate window size. However, some telnet clients do not request to negotiate window size unless the switch's telnet server suggests that NAWS is available.

This feature allows window size negotiation to occur with telnet clients that support NAWS but do not try to use it unless it is suggested by the switch's telnet server. The switch's telnet server will suggest to the telnet client that NAWS is available.

Reconfigure WebAgent access

In the default configuration, web browser access is enabled.

Syntax:

```
[no] web-management [listen |  <oobm | data | both> ]
```

Use the **no** *version of the command to disable inbound HTTP access.*

The **listen** *parameter is available only on switches that have a separate out-of-band management port. Values for this parameter are:*

- **oobm**— *inbound HTTP access is enabled only on the out-of-band management port.*
- **data**— *inbound HTTP access is enabled only on the data ports.*
- **both**— *inbound HTTP access is enabled on both the out-of-band management port and on the data ports. This is the default value.*

Refer to Appendix I, "Network Out-of-Band Management" in this guide for more information on out-of-band management.

The **listen** *parameter is not available on switches that do not have a separate out-of-band management port.*

To disable WebAgent access:

```
HP Switch(config)# no web-management
```

To re-enable WebAgent access:

```
HP Switch(config)# web-management
```

Reconfigure the console/serial link settings

Syntax:

```
console
[terminal  <vt100 | ansi | none>  ]
[screen-refresh  <1 | 3 | 5 | 10 | 20 | 30 | 45 | 60>  ]
[baud-rate  <speed-sense | 1200 | 2400 | 4800 | 9600 | 19200 | 38400 |
57600 | 1155200>  ]
[flow-control  <xon/xoff | none>  ]
[idle-timeout <0-7200>]
[events [<none] | all | not-info | critical | debug>  ]
```

```
[local-terminal  <vt 100 | none | ansi>  ]
```

NOTE:
If the **console idle-timeout** expires, any outbound Telnet or SSH sessions open on the switch are terminated.

If you change the Baud Rate or Flow Control settings, you should make the corresponding changes in your console access device. Otherwise, you may lose connectivity between the switch and your terminal emulator due to differences between terminal and switch settings for these two parameters.

All console parameter changes except **events** and **inactivity-timer** require that you save the configuration with **write memory** and then execute **boot** before the new console configuration will take effect.

The example below shows how to configure the switch with the following:

- VT100 operation
- 19,200 baud
- No flow control
- 600 second (10 minute) idle timeout
- Critical log events

Example 77 Executing a series of console commands

```
HP Switch(config)# console terminal vt100
This command will take effect after saving the
configuration and rebooting the system.

HP Switch(config)# console baud-rate 19200
This command will take effect after saving the
configuration and rebooting the system.

HP Switch(config)# console flow-control none
This command will take effect after saving the
configuration and rebooting the system.

HP Switch(config)# console idle-timeout 600
HP Switch(config)# console events critical
HP Switch(config)# write memory
HP Switch(config)# reload
```

NOTE: Switch models supporting redundant management, console settings, such as mode, flow-control and baud-rate, are the same on both management modules. There cannot be individual settings for each management module.

NOTE: In software release versions K.15.12 and greater, the **console inactivity-timer <minutes>** command has been deprecated and replaced by the **console idle-timeout <seconds>** command. As an example:

```
HP Switch(config)#console inactivity-timer 2
```

is now equivalent to:

```
HP Switch(config)#console idle-timeout 120
```

In addition, the serial or USB console idle timeout can be controlled separately if needed. The **console idle-timeout serial-usb seconds** command allows for this behavior. As an example:

```
HP Switch(config)#console idle-timeout 120
HP Switch(config)#console idle-timeout serial-usb 15
```

This sequence of commands will set the Telnet/SSH idle timeout to 120 seconds and the serial-usb idle timeout to 15 seconds. Another example:

```
HP Switch(config)#console idle-timeout 120
HP Switch(config)#console idle-timeout serial-usb 0
```

This sequence of commands will set the Telnet/SSH idle timeout to 120 seconds and the serial-usb idle timeout to 0, or, in other words, to never timeout.

The **console inactivity-timer minutes** command will continue to be accepted in version, but it will be converted to the new command format in the running configuration. This command conversion will also happen on a software update to version if the **console inactivity-timer minutes** command was part of the previous configuration.

These settings can be displayed using **show console**.

Denying interface access by terminating remote management sessions

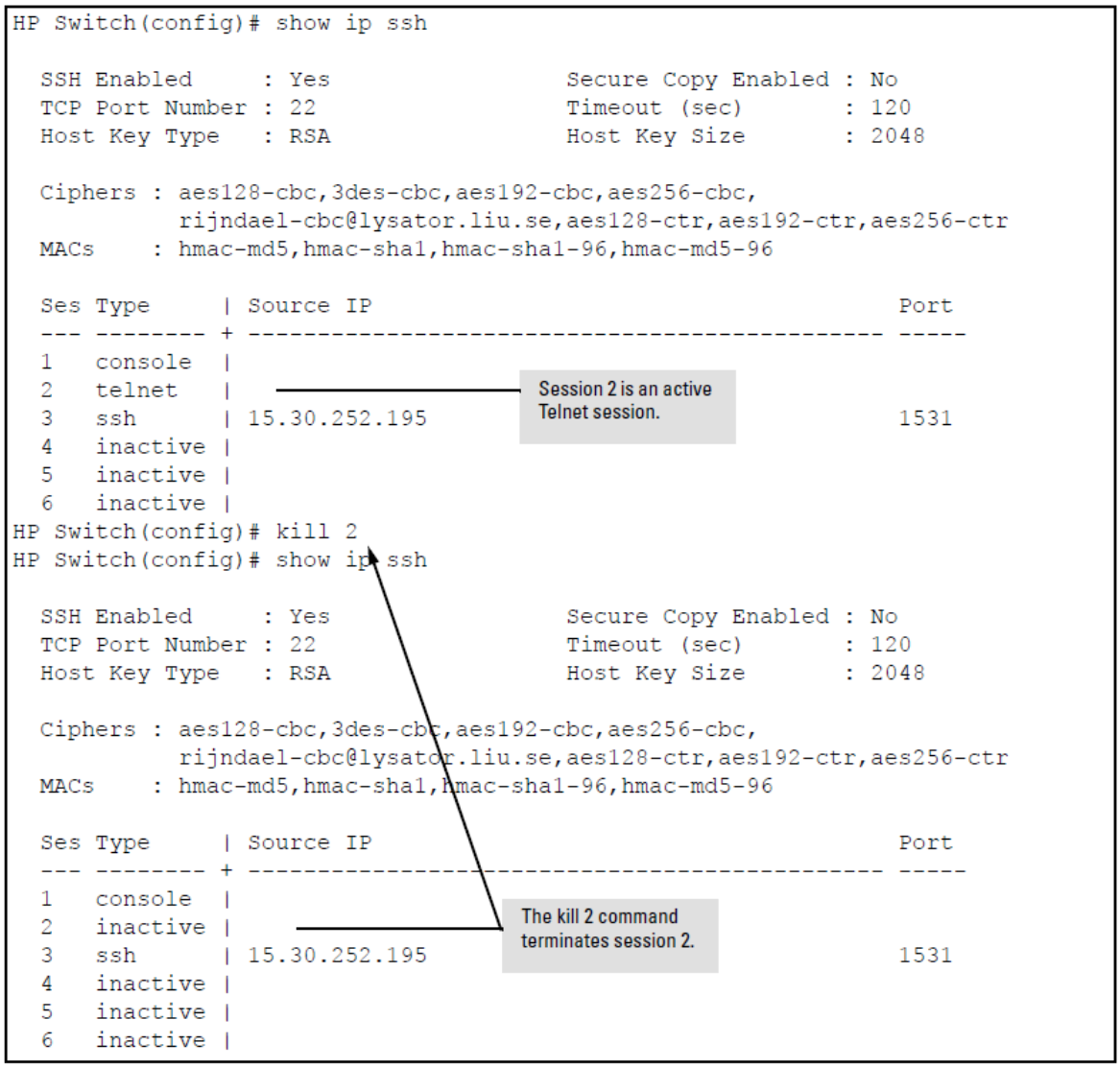
The switch supports up to five management sessions. `show ip ssh` lists the current management sessions, and `kill` terminates a currently running remote session. (`kill` does not terminate a Console session on the serial port, either through a direct connection or via a modem. It does not affect the console on the standby module.)

Syntax:

`kill [<session-number>]`

For example, if you are using the switch's serial port for a console session and want to terminate an active Telnet session, you would do the following:

Figure 20 Example of using the kill command to terminate a remote session



System information

System information features:

Feature	Default	CLI
System Name	*switch product name*	page 102
System Contact	n/a	page 102
System Location	n/a	page 102
MAC Age Time	300 seconds	page 103
Time Sync Method	None	See "Time Protocols" in the *Management and Configuration Guide*
Time Zone	0	page 104
Daylight Time Rule	None	page 104
Time	January 1, 1990 at 00:00:00 at last power reset	page 104

Configuring system information is optional, but recommended.

System Name: Using a unique name helps you to identify individual devices where you are using an SNMP network management tool such as HP PCM+.

System Contact and Location: This information is helpful for identifying the person administratively responsible for the switch and for identifying the locations of individual switches.

MAC Age Time: The number of seconds a MAC address the switch has learned remains in the switch's address table before being aged out (deleted). Aging out occurs when there has been no traffic from the device belonging to that MAC address for the configured interval.

Time Sync Method: Selects the method (TimeP or SNTP) the switch will use for time synchronization. For more on this topic, see "Time Protocols" in the Management and Configuration Guide.

Time Zone: The number of minutes your time zone location is to the West (+) or East (-) of Coordinated Universal Time (formerly GMT). The default **0** means no time zone is configured. For example, the time zone for Berlin, Germany is + 60 (minutes) and the time zone for Vancouver, Canada is - 480 (minutes).

Daylight Time Rule: Specifies the daylight savings time rule to apply for your location. The default is **None**. (For more on this topic, refer to Appendix D, "Daylight Savings Time on HP switches.)

Time: Used in the CLI to specify the time of day, the date, and other system parameters.

Viewing and configuring system information

System information commands used in this section:

`show system information`	below
`hostname`	below
`snmp-server`	below
`[contact] [location]`	
`mac-age-time`	page 103
`time`	
`timezone`	page 104
`daylight-time-rule`	page 104
`date time`	page 104

Listing the current system information. This command lists the current system information settings.

Syntax:

`show system information`

This example shows the switch's default console configuration.

Example 78 CLI system information listing configure a system name, contact, and location for the switch

```
HP Switch# show system information

  Status and Counters - General System Information

   System Name         : HP Switch
   System Contact      :
   System Location     :

   MAC Age Time (sec)  : 300

   Time Zone           : 0
   Daylight Time Rule  : None
```

To help distinguish one switch from another, configure a plain-language identity for the switch.

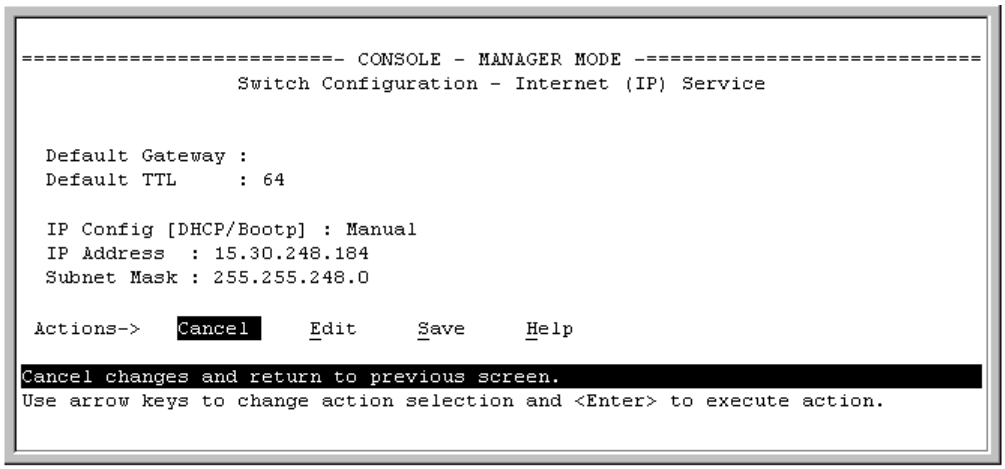
Syntax:

`hostname <name-string>`
`snmp-server [contact <system-contact>] [location <system-location>]`

Each field allows up to 255 characters. To help simplify administration, it is recommended that you configure **hostname** to a character string that is meaningful within your system.

For example, to name the switch "Blue" with "Next-4474" as the system contact, and "North-Data-Room" as the location:

Figure 21 System information listing after executing the preceding commands



Reconfigure the MAC age time for learned MAC addresses. This command corresponds to the MAC Age Interval in the menu interface, and is expressed in seconds.

Syntax:

`mac-age-time <10-1000000>`
(seconds)

Allows you to set the MAC address table's **age-out** *interval. An address is aged out if the switch does not receive traffic from that MAC address for the* `age-out` *interval, measured in seconds. Default: 300 seconds.*

For example, to configure the age time to seven minutes:

```
HP Switch(config)# mac-age-time 420
```

Configure the time zone and daylight time rule. These commands:

- Set the time zone you want to use
- Define the daylight time rule for keeping the correct time when daylight-saving-time shifts occur.

Syntax:

```
time timezone <-720 - 840> time daylight-time-rule  <none |
alaska | continental-us-and-canada |
middle-europe-and-portugal | southern-hemisphere |
western-europe | user-defined>
```

East of the 0 meridian, the sign is "+". West of the 0 meridian, the sign is "-".

For example, the time zone setting for Berlin, Germany is +60 (zone +1, or 60 minutes), and the time zone setting for Vancouver, Canada is -480 (zone -8, or -480 minutes). To configure the time zone and daylight time rule for Vancouver, Canada:

```
HP Switch(config)# time timezone -480 daylight-time-rule
continental-us-and-canada
```

Configure the time and date. The switch uses the time command to configure both the time of day and the date. Also, executing time without parameters lists the switch's time of day and date. Note that the CLI uses a 24-hour clock scheme; that is, hour (*hh*) values from 1 p.m. to midnight are input as 13 - 24, respectively.

Syntax:

`time [hh:mm [:ss]] [mm/dd/ [yy] yy ]`

For example, to set the switch to 9:45 a.m. on November 17, 2012:

```
HP Switch(config)# time 9:45 11/17/12
```

NOTE: Executing **reload** or **boot** resets the time and date to their default startup values.

8 Configuring IP addressing

Overview

You can configure IP addressing through all of the switch's interfaces. You can also:

- Easily edit a switch configuration file to allow downloading the file to multiple switches without overwriting each switch's unique gateway and VLAN 1 IP addressing.
- Assign up to 32 IP addresses to a VLAN (multinetting).
- Select an IP address to use as the source address for all outgoing traffic generated by a specified software application on the switch. This allows unique identification of the software application on the server site regardless of which local interface has been used to reach the destination server.

Why configure IP addressing? In its factory default configuration, the switch operates as a multiport learning bridge with network connectivity provided by the ports on the switch. However, to enable specific management access and control through your network, you will need IP addressing. Table 7 on page 111 shows the switch features that depend on IP addressing to operate.

IP configuration

IP configuration features:

Feature	Default	Menu	CLI	WebAgent
IP Address and Subnet Mask	DHCP/Bootp	page 107	page 107	page 111
Multiple IP Addresses on a VLAN	n/a	—	page 109	—
Default Gateway Address	none	page 107	page 107	page 111
Packet Time-To-Live (TTL)	64 seconds	page 107	page 107	—
Time Server (Timep)	DHCP	page 107	page 107	—
Single Source IP Addressing	outgoing IP address	—	page 120	—

IP address and subnet mask. TheConfiguring the switch with an IP address expands your ability to manage the switch and use its features. By default, the switch is configured to automatically receive IP addressing on the default VLAN from a DHCP/Bootp server that has been configured correctly with information to support the switch. (Refer to "DHCP/Bootp operation" (page 112) for information on setting up automatic configuration from a server.) However, if you are not using a DHCP/Bootp server to configure IP addressing, use the menu interface or the CLI to manually configure the initial IP values. After you have network access to a device, you can use the WebAgent to modify the initial IP configuration if needed.

For information on how IP addressing affects switch operation, refer to "How IP addressing affects switch operation" (page 111).

Multinetting: assigning multiple IP addresses to a VLAN. For a given VLAN you can assign up to 32 IP addresses. This allows you to combine two or more subnets on the same VLAN, which enables devices in the combined subnets to communicate normally through the network without needing to reconfigure the IP addressing in any of the combined subnets.

Default gateway operation. The default gateway is required when a router is needed for tasks such as reaching off-subnet destinations or forwarding traffic across multiple VLANs. The gateway value is the IP address of the next-hop gateway node for the switch, which is used if the requested destination address is not on a local subnet/VLAN. If the switch does not have a manually-configured default gateway and DHCP/Bootp is configured on the primary VLAN, then the default gateway

value provided by the DHCP or Bootp server will be used. If the switch has a manually configured default gateway, then the switch uses his gateway, even if a different gateway is received via DHCP or Bootp on the primary VLAN. This is also true for manually configured TimeP, SNTP, and Time-To-Live(TTL). (In the default configuration, VLAN 1 is the Primary VLAN.) Refer to the information on Primary VLANs in the *Advanced Traffic Management Guide* for your switch.

Packet Time-To-Live (TTL). This parameter specifies the maximum number of routers (hops) through which a packet can pass before being discarded. Each router decreases a packet's TTL by 1 before forwarding the packet. If decreasing the TTL causes the TTL to be 0, the router drops the packet instead of forwarding it. In most cases, the default setting (64) is adequate.

Just want a quick start with IP addressing?

If you just want to give the switch an IP address so that it can communicate on your network, or if you are not using VLANs, HP recommends that you use the Switch Setup screen to quickly configure IP addressing. To do so, do one of the following:

- Enter setup at the CLI Manager level prompt.

```
HP Switch# setup
```

- Select **8. Run Setup** in the Main Menu of the menu interface.

For more on using the Switch Setup screen, refer to the *Installation and Getting Started Guide* you received with the switch.

IP addressing with multiple VLANs

In the factory-default configuration, the switch has one, permanent default VLAN (named DEFAULT_VLAN) that includes all ports on the switch. Thus, when only the default VLAN exists in the switch, if you assign an IP address and subnet mask to the switch, you are actually assigning the IP addressing to the DEFAULT_VLAN.

NOTE:

- If multiple VLANs are configured, then each VLAN can have its own IP address. This is because each VLAN operates as a separate broadcast domain and requires a unique IP address and subnet mask. A default gateway (IP) address for the switch is optional, but recommended.
- In the factory-default configuration, the default VLAN (named DEFAULT_VLAN) is the switch's *primary* VLAN. The switch uses the primary VLAN for learning the default gateway address. The switch can also learn other settings from a DHCP or Bootp server, such as (packet) Time-To-Live (TTL), and Timep or SNMP settings. (Other VLANs can also use DHCP or BootP to acquire IP addressing. However, the switch's gateway, TTL, and TimeP or SNTP values, which are applied globally, and not per-VLAN, will be acquired through the primary VLAN only, unless manually set by using the CLI, Menu, or WebAgent. (If these parameters are manually set, they will *not* be overwritten by alternate values received from a DHCP or Bootp server.) For more on VLANs, refer to the chapter titled "Static Virtual LANs" in the *Advanced Traffic Management Guide* for your switch.
- The IP addressing used in the switch should be compatible with your network. That is, the IP address must be unique and the subnet mask must be appropriate for your IP network.
- If you change the IP address through either Telnet access or the WebAgent, the connection to the switch will be lost. You can reconnect by either restarting Telnet with the new IP address or entering the new address as the URL in your web browser.

Menu: configuring IP address, gateway, and Time-To-Live (TTL)

Do one of the following:

- To manually enter an IP address, subnet mask, set the `IP Config` parameter to `Manual` and then manually enter the IP address and subnet mask values you want for the switch.
- To use DHCP or Bootp, use the menu interface to ensure that the `IP Config` parameter is set to `DHCP/Bootp`, then refer to "DHCP/Bootp operation" (page 112).

To configure IP addressing.

1. From the Main Menu, select:

```
2. Switch Configuration...

    5. IP Configuration
```

NOTE: If multiple VLANs are configured, a screen showing all VLANs appears instead of the following screen.

The Menu interface displays the IP address for any VLAN. If you use the CLI to configure the IP address on a VLAN, use the CLI **show ip** command to list them.

See figure below:

2. Press **[E]** (for **Edit**).
3. If the switch needs to access a router, for example, to reach off-subnet destinations, select the **Default Gateway** field and enter the IP address of the gateway router.
4. If you need to change the packet Time-To-Live (TTL) setting, select **Default TTL** and type in a value between 2 and 255.
5. To configure IP addressing, select **IP Config** and do one of the following:
   - If you want to have the switch retrieve its IP configuration from a DHCP or Bootp server, at the **IP Config** field, keep the value as **DHCP/ Bootp** and go to step 8.
   - If you want to manually configure the IP information, use the Space bar to select **Manual** and use the **[Tab]** key to move to the other IP configuration fields.
6. Select the **IP Address** field and enter the IP address for the switch.
7. Select the **Subnet Mask** field and enter the subnet mask for the IP address.
8. Press **[Enter]**, then **[S]** (for **Save**).

CLI: Configuring IP Address, Gateway, and Time-To-Live (TTL)

IP commands used in this section	Page
`show ip`	107
`ip address <mask-bits>`	109
`ip address/ <mask-bits>`	109
`ip default-gateway`	111
`ip ttl`	111

Viewing the current IP configuration.

Syntax:

```
show ip
```

This command displays the IP addressing for each VLAN configured in the switch. If only the DEFAULT_VLAN exists, then its IP configuration applies to all ports in the switch. Where multiple VLANs are configured, the IP addressing is listed per VLAN. The display includes switch-wide packet time-to-live, and (if configured) the switch's default gateway and Timep configuration.

(You can also use the **show management** command to display the IP addressing and time server IP addressing configured on the switch. See the *Management and Configuration Guide* for your switch.)

For example, in the factory-default configuration (no IP addressing assigned), the switch's IP addressing appears as:

Example 79 The switch's default IP addressing

```
HP Switch> show ip

 Internet (IP) Service

   IP Routing : Disabled

   Default Gateway :
   Default TTL     : 64
   Arp Age         : 20
   Domain Suffix   :
   DNS server      :

                         |                                                 Proxy ARP
VLAN                     | IP Config  IP Address      Subnet Mask    Std Local
------------------------ + ---------- --------------- -------------- ----------
DEFAULT_VLAN             | DHCP/Bootp
```

With multiple VLANs and some other features configured, `show ip` provides additional information:

Example 80 Show IP listing with non-default IP addressing configured

```
HP Switch(config)# show ip

 Internet (IP) Service

   IP Routing : Disabled

   Default Gateway : 10.20.227.1
   Default TTL     : 64
   Arp Age         : 20
   Domain Suffix   :
   DNS server      :

                         |                                                 Proxy ARP
VLAN                     | IP Config  IP Address      Subnet Mask    Std Local
------------------------ + ---------- --------------- -------------- ----------
DEFAULT_VLAN             | Manual     10.28.227.101   255.255.248.0   No   No
VLAN22                   | Disabled
```

Configure an IP address and subnet mask. The following command includes both the IP address and the subnet mask. You must either include the ID of the VLAN for which you are configuring IP addressing or go to the context configuration level for that VLAN. (If you are not using VLANs on the switch—that is, if the only VLAN is the default VLAN—then the VLAN ID is always "1".)

NOTE: The default IP address setting for the DEFAULT_VLAN is `DHCP/Bootp`. On additional VLANs you create, the default IP address setting is `disabled`.

Syntax:

```
[no] vlan <vlan-id>
ip address <ip-address/mask-length>
```

or

```
[no] vlan <vlan-id>
ip address <ip-address> <mask-bits>
```

or

```
vlan <vlan-id>
ip address dhcp-bootp
```

This example configures IP addressing on the default VLAN with the subnet mask specified in mask bits.

```
HP Switch(config)# vlan 1 ip address 10.28.227.103
255.255.255.0
```

This example configures the same IP addressing as the preceding example, but specifies the subnet mask by mask length.

```
HP Switch(config)# vlan 1 ip address 10.28.227.103/24
```

This example deletes an IP address configured in VLAN 1.

```
HP Switch (config) no vlan 1 ip address 10.28.227.103/24
```

Configure multiple IP addresses on a VLAN (multinetting). The following is supported:

- Up to 2000 IP addresses for the switch
- Up to 32 IP addresses for the same VLAN
- Up to 512 IP VLANs, that is, VLANs on which you can configure IP addresses
- Each IP address on a VLAN must be for a separate subnet, whether on the same VLAN or different VLANs.

Syntax:

```
[no] vlan <vlan-id>
ip address <ip-address/mask-length>
[no] vlan <vlan-id>
ip address <ip-address> <mask-bits>
```

For example, if you wanted to multinet VLAN_20 (VID = 20) with the IP addresses shown below, you would perform steps similar to the following. (For this example, assume that the first IP address is already configured.)

IP Address	VID	IP Address	Subnet Mask
1st address	20	10.25.33.101	255.255.240.0
2nd address	20	10.26.33.101	255.255.240.0
3rd address	20	10.27.33.101	255.255.240.0

Example 81 Configuring and displaying a multinetted VLAN

```
HP Switch(config)# vlan 20
HP Switch(vlan-20)# ip address 10.26.33.101/20
HP Switch(vlan-20)# ip address 10.27.33.101/20

HP Switch(config)# show ip

 Internet (IP) Service

   IP Routing      : Disabled

   Default Gateway : 10.20.227.1
   Default TTL     : 64
   Arp Age         : 20
   Domain Suffix   :
   DNS server      :

                         |                                                Proxy ARP
   VLAN                  | IP Config  IP Address      Subnet Mask     Std Local
   --------------------- + ---------- --------------- --------------- ----------
   DEFAULT_VLAN          | Manual     10.20.30.100    255.255.240.0   No    No
   VLAN_20               | Manual     10.25.33.101    255.255.240.0   No    No
                         | Manual     10.26.33.101    255.255.240.0   No    No
                         | Manual     10.27.33.101    255.255.240.0   No    No
```

If you then wanted to multinet the default VLAN, you would do the following:

Example 82 Multinetting on the default VLAN

```
HP Switch(vlan-20)# vlan 1
HP Switch(vlan-1)# ip address 10.21.30.100/20

HP Switch(config)# show ip

 Internet (IP) Service

   IP Routing      : Disabled

   Default Gateway : 10.20.227.1
   Default TTL     : 64
   Arp Age         : 20
   Domain Suffix   :
   DNS server      :

                         |                                                Proxy ARP
   VLAN                  | IP Config  IP Address      Subnet Mask     Std Local
   --------------------- + ---------- --------------- --------------- ----------
   DEFAULT_VLAN          | Manual     10.20.30.100    255.255.240.0   No    No
                         | Manual     10.21.30.100    255.255.240.0   No    No
   VLAN_20               | Manual     10.25.33.101    255.255.240.0   No    No
                         | Manual     10.26.33.101    255.255.240.0   No    No
                         | Manual     10.27.33.101    255.255.240.0   No    No
```

NOTE: The Internet (IP) Service screen in the Menu interface (Figure 26 on page 1) displays the first IP address for each VLAN. You must use the CLI **show ip** command to display the full IP address listing for multinetted VLANs.

Removing or replacing IP addresses in a multinetted VLAN. To remove an IP address from a multinetted VLAN, use the **no** form of the IP address command shown on page 109. Generally, to replace one IP address with another, you should first remove the address you want to replace, and then enter the new address.

Configure the optional default gateway. Using the Global configuration level, you can manually assign one default gateway to the switch. (The switch does *not* allow IP addressing received from a DHCP or Bootp server to replace a manually configured default gateway.)

Syntax:

`ip default-gateway <ip-address>`

For example:

```
HP Switch(config)# ip default-gateway 10.28.227.115
```

NOTE: The switch uses the IP default gateway only while operating as a Layer 2 device. While routing is enabled on the switch, the IP default gateway is not used. Thus, to avoid loss of Telnet access to off-subnet management stations, you should use the **ip route** command to configure a static (default) route before enabling routing. For more information, refer to the chapter titled "IP Routing Features" in the *Multicast and Routing Guide* for your switch.

Configure Time-To-Live (TTL). The maximum number of routers (hops) through which a packet can pass before being discarded. (The default is 64.) Each router decreases a packet's TTL by 1 before forwarding the packet. If a router decreases the TTL to 0, the router drops the packet instead of forwarding it.

Syntax:

`ip ttl <number-of-hops>`

```
HP Switch(config)# ip ttl 60
```

In the CLI, you can execute this command only from the global configuration level. The TTL default is 64, and the range is 2 - 255.

WebAgent: configuring IP addressing

You can use the WebAgent to access IP addressing only if the switch already has an IP address that is reachable through your network.

1. In the navigation pane, click on **Home**.
2. Click on **Quick Setup**.
3. In the **Switch Quick Setup Parameters** box, click on **Change**.
4. Enter the IP address and any other information such as the Subnet mask and Gateway.
5. Click on **Save** to save your changes.
6. If you need further information on using the WebAgent, click on **[?]** to access the web-based help available for the switch.

How IP addressing affects switch operation

Without an IP address and subnet mask compatible with your network, the switch can be managed only through a direct terminal device connection to the Console RS-232 port. You can use direct-connect console access to take advantage of features that do not depend on IP addressing. However, to realize the full capabilities HP proactive networking offers through the switch, configure the switch with an IP address and subnet mask compatible with your network. The following table lists the general features available with and without a network-compatible IP address configured.

Table 7 Features available with and without IP addressing on the switch

Features Available Without an IP Address	Additional Features Available with an IP Address and Subnet Mask
• Direct-connect access to the CLI and the menu interface • DHCP or Bootp support for automatic IP address configuration, and DHCP support for automatic Timep server IP address configuration • Multiple Spanning Tree Protocol • Port settings and port trunking • Switch meshing	• WebAgent access, with configuration, security, and diagnostic tools, plus the Alert Log for discovering problems detected in the switch along with suggested solutions • SNMP network management access such as PCM+ for network configuration, monitoring, problem-finding and reporting, analysis, and recommendations for changes to increase control and uptime

Table 7 Features available with and without IP addressing on the switch *(continued)*

Features Available Without an IP Address	Additional Features Available with an IP Address and Subnet Mask
• Console-based status and counters information for monitoring switch operation and diagnosing problems through the CLI or menu interface • VLANs and GVRP • Serial downloads of software updates and configuration files (Xmodem) • Link test • Port monitoring • Password authentication • Quality of Service (QoS) • Authorized IP manager security	• TACACS+, RADIUS, SSH, SSL, and 802.1X authentication • Multinetting on VLANs • Telnet access to the CLI or the menu interface • IGMP • TimeP and SNTP server configuration • TFTP download of configurations and software updates • Access Control Lists (ACLs) • IP routing, Multicast Routing • VRRP router redundancy • PIM-DM and PIM-SM • Radius • Ping test

DHCP/Bootp operation

Overview. DHCP/Bootp is used to provide configuration data from a DHCP or Bootp server to the switch. This data can be the IP address, subnet mask, default gateway, Timep Server address, and TFTP server address. If a TFTP server address is provided, this allows the switch to TFTP a previously saved configuration file from the TFTP server to the switch. With either DHCP or Bootp, the servers must be configured prior to the switch being connected to the network.

NOTE: The switches covered in this guide are compatible with both DHCP and Bootp servers.

The DHCP/Bootp process. Whenever the `IP Config` parameter in the switch or in an individual VLAN in the switch is configured to `DHCP/Bootp` (the default), or when the switch is rebooted with this configuration:

1. DHCP/Bootp requests are automatically broadcast on the local network. (The switch sends one type of request to which either a DHCP or Bootp server can respond.)
2. When a DHCP or Bootp server receives the request, it replies with a previously configured IP address and subnet mask for the switch. The switch also receives an IP Gateway address if the server has been configured to provide one. In the case of Bootp, the server must first be configured with an entry that has the switch's MAC address. (To determine the switch's MAC address, refer to Appendix D, "MAC Address Management".) The switch properly handles replies from either type of server. If multiple replies are returned, the switch tries to use the first reply.)

NOTE: If you manually configure default gateway, TTL, TimeP, and/or SNTP parameters on the switch, it ignores any values received for the same parameters via DHCP or Bootp.

If the switch is initially configured for DHCP/Bootp operation (the default), or if it reboots with this configuration, it begins sending request packets on the network. If the switch does not receive a reply to its DHCP/Bootp requests, it continues to periodically send request packets, but with decreasing frequency. Thus, if a DHCP or Bootp server is not available or accessible to the switch when DHCP/Bootp is first configured, the switch may not immediately receive the desired configuration. After verifying that the server has become accessible to the switch, reboot the switch to re-start the process immediately.

DHCP operation. A significant difference between a DHCP configuration and a Bootp configuration is that an IP address assignment from a DHCP server is automatic. Depending on how the DHCP server is configured, the switch may receive an IP address that is temporarily leased. Periodically

the switch may be required to renew its lease of the IP configuration. Thus, the IP addressing provided by the server may be different each time the switch reboots or renews its configuration from the server. However, you can fix the address assignment for the switch by doing either of the following:

- Configure the server to issue an “infinite” lease.
- Using the switch’s MAC address as an identifier, configure the server with a “Reservation” so that it will always assign the same IP address to the switch. (For MAC address information, refer to Appendix D, “MAC Address Management”.)

For more information on either of these procedures, refer to the documentation provided with the DHCP server.

Bootp operation. When a Bootp server receives a request it searches its Bootp database for a record entry that matches the MAC address in the Bootp request from the switch. If a match is found, the configuration data in the associated database record is returned to the switch. For many Unix systems, the Bootp database is contained in the `/etc/bootptab` file. In contrast to DHCP operation, Bootp configurations are always the same for a specific receiving device. That is, the Bootp server replies to a request with a configuration previously stored in the server and designated for the requesting device.

Bootp Database Record Entries. A minimal entry in the Bootp table file `/etc/bootptab` to update an IP address and subnet mask to the switch or a VLAN configured in the switch would be similar to this entry:

```
8212switch:\
   ht=ether:\
   ha=0030c1123456:\
   ip=10.66.77.88:\
   sm=255.255.248.0:\
   gw=10.66.77.1:\
   hn:\
   vm=rfc1048
```

An entry in the Bootp table file /etc/bootptab to tell the switch or VLAN where to obtain a configuration file download would be similar to this entry:

```
8212switch:\
    ht=ether:\
    ha=0030c1123456:\
    ip=10.66.77.88:\
    sm=255.255.248.0:\
    gw=10.66.77.1:\
    lg=10.22.33.44:\
    T144="switch.cfg":\
    vm=rfc1048
```

where:

8212switch	is a user-defined symbolic name to help you find the correct section of the bootptab file. If you have multiple switches that will be using Bootp to get their IP configuration, you should use a unique symbolic name for each switch.
ht	is the "hardware type". For the switches covered in this guide, enter `ether` (for Ethernet). *This tag must precede the* ha *tag*.
ha	is the "hardware address". Use the switch's (or VLAN's) 12-digit MAC address.
ip	is the IP address to be assigned to the switch (or VLAN).
sm	is the subnet mask of the subnet in which the switch (or VLAN) is installed.
gw	is the IP address of the default gateway.
lg	TFTP server address (source of final configuration file)

T144	is the vendor-specific "tag" identifying the configuration file to download.
vm	is a required entry that specifies the Bootp report format. Use `rfc1048` for the switches covered in this guide.

NOTE: The above Bootp table entry is a sample that will work for the switch when the appropriate addresses and file names are used.

Network preparations for configuring DHCP/Bootp

In its default configuration, the switch is configured for DHCP/Bootp operation. However, the DHCP/Bootp feature will not acquire IP addressing for the switch unless the following tasks have already been completed:

- For Bootp operation
  - A Bootp database record has already been entered into an appropriate Bootp server
  - The necessary network connections are in place
  - The Bootp server is accessible from the switch
- For DHCP operation
  - A DHCP scope has been configured on the appropriate DHCP server
  - The necessary network connections are in place
  - A DHCP server is accessible from the switch

NOTE: Designating a primary VLAN other than the default VLAN affects the switch's use of information received via DHCP/Bootp. For more on this topic, refer to the chapter describing VLANs in the *Advanced Traffic Management Guide* for your switch.

After you reconfigure or reboot the switch with DHCP/Bootp enabled in a network providing DHCP/Bootp service, the switch does the following:

- Receives an IP address and subnet mask and, if configured in the server, a gateway IP address and the address of a Timep server.
- If the DHCP/Bootp reply provides information for downloading a configuration file, the switch uses TFTP to download the file from the designated source, then reboots itself. (This assumes that the switch or VLAN has connectivity to the TFTP file server specified in the reply, that the configuration file is correctly named, and that the configuration file exists in the TFTP directory.)

Loopback interfaces

This section describes how to configure and use user-defined loopback interfaces on the switch.

Introduction

By default, each switch has an internal loopback interface (`lo0`) with the IP address 127.0.0.1. This IP address is used only for internal traffic transmitted within the switch and is not used in packet headers in egress traffic sent to network devices.

You can configure up to seven other loopback interfaces (`lo1`, `lo2`, `lo3`, and so on) on the switch to use to transmit network across the network. Each loopback interface can have multiple IP addresses. Routing protocols, such as RIP and OSPF, advertise the configured loopback addresses throughout a network or autonomous system.

User-defined loopback addresses provide the following benefits:

- A loopback interface is a virtual interface that is always up and reachable as long as at least one of the IP interfaces on the switch is operational. As a result, a loopback interface is useful for debugging tasks since its IP address can always be pinged if any other switch interface is up.
- You can use a loopback interface to establish a Telnet session, ping the switch, and access the switch through SNMP, SSH, and HTTP (WebAgent).
- A loopback IP address can be used by routing protocols. For example, you can configure the loopback IP address as the router ID used to identify the switch in an OSPF area. Because the loopback interface is always up, you ensure that the switch's router ID remains constant and that the OSPF network is protected from changes caused by downed interfaces.

NOTE: OSPF does not require that you use an IP address as the router ID. OSPF only requires the router ID to be a unique value within the autonomous system (AS). However, if you configure the loopback IP address as the router ID, OSPF can reach the switch if any switch interface is up. (Normally, OSPF automatically configures the router ID with the IP address of a switch interface. The disadvantage is that if the interface goes down, OSPF can no longer ping the switch using the router ID even if other interfaces are operational.)

For more information about how to configure a loopback IP address to participate in an OSPF broadcast area, refer to the section titled "(Optional) Assigning Loopback Addresses to an Area" in the *Multicast and Routing Guide*.

Configuring a loopback interface

To configure a loopback interface, enter the **interface loopback** command at the global configuration level of the CLI:

Syntax:

[no] `interface loopback` *<number>*

Creates a loopback interface, where <number> is a value from 1 to 7. Use the **no** *form of the command to remove the loopback interface.*

Note: *You cannot remove the default loopback interface (number 0) with IP address 127.0.0.1.*

You can configure up to thirty-two IP addresses on a loopback interface. To configure an IP address for the loopback interface, enter the **ip address <ip address>** command at the loopback interface configuration level as shown in the following example.

Note that when you configure an IP address for a loopback interface, you do not specify a network mask. The default subnet mask 255.255.255.255 is used.

Example 83 A loopback interface configuration

```
HP Switch(config)# interface loopback 1
HP Switch(config)# ip address 10.1.1.1
```

NOTE:

- You can configure a loopback interface only from the CLI; you cannot configure a loopback interface from the WebAgent or Menu interface.
- Loopback interfaces share the same IP address space with VLAN configurations. The maximum number of IP addresses supported on a switch is 2048, which includes all IP addresses configured for both VLANs and loopback interfaces (except for the default loopback IP address 127.0.0.1).
- Each IP address that you configure on a loopback interface must be unique in the switch. This means that the address cannot be used by a VLAN interface or another loopback interface.
- For example, if you configure a VLAN with IP address 172.16.100.8/24, you cannot configure a loopback interface with IP address 172.16.100.8. In the same way, if you configure a loopback interface (`lo1`) with IP address 172.16.101.8, you cannot configure another loopback interface (`lo2`) with IP address 172.16.101.8.
- You can configure multiple IP addresses on a loopback interface (`lo0` to `lo7`). Up to thirty-two IP addresses are supported on a loopback interface. The following example shows valid IP address configurations on two loopback interfaces.

Example 84 Two loopback interfaces

```
HP Switch(config)# interface loopback 0
HP Switch(lo0)# ip address 172.16.101.8
HP Switch(lo0)# ip address 172.16.101.9
HP Switch(lo0)# exit
HP Switch(config)# interface loopback 1
HP Switch(lol)# ip address 172.16.102.1
HP Switch(lol)# ip address 172.16.102.2
```

Displaying loopback interface configurations

To display the list of loopback interfaces which have been assigned IP addresses, enter the **show ip** command.

In the **show ip** command output, information about configured loopback interfaces is displayed below other IP configuration parameters, such as packet TTL and ARP age-out values, and VLAN IP configurations. The following example displays the IP addresses configured for two user-defined loopback interfaces (**lo1**) and (**lo2**).

Example 85 The show ip command output

```
HP Switch# show ip

 IP Routing : Enabled

   Default Gateway : 15.255.128.1
   Default TTL     : 64
   Arp Age         : 20
   Domain Suffix   :
   DNS server      :

                    |                                                  Proxy ARP
   VLAN             | IP Config  IP Address      Subnet Mask     Std Local
   ---------------- + ---------- --------------- --------------- ----------
   DEFAULT_VLAN     | Manual     10.0.8.121     255.255.0.0     No    No
   VLAN2              Manual     192.168.12.1   255.255.255.0   No    No
   VLAN3              Disabled


                          Loopback Addresses
   Loopback    IP Config    IP Address           Subnet Mask
   --------    ----------   ------------------   ---------------
   lo1         Manual       172.16.110.2         255.255.255.255
   lo2         Manual       172.16.112.2         255.255.255.255
   lo2         Manual       172.16.114.1         255.255.255.255
```

NOTE: The default loopback interface (`lo0`) with IP address 127.0.0.1 is not displayed in the **show ip** command output because it is permanently configured on the switch. To display the default loopback address, enter the **show ip route** command as shown in the example below.

To display the loopback interfaces configured on the switch in a list of IP routing entries displayed according to destination IP address, enter the **show ip route** command.

The following example displays the configuration of the default loopback interface (**lo0**) and one user-defined loopback interface (**lo2**).

Example 86 The show ip route command output

```
HP Switch# show ip route

                                IP Route Entries

Destination         Gateway         VLAN Type      Sub-Type   Metric    Dist.
------------------- --------------- ---- --------- ---------- --------- ----
10.0.0.0/16         DEFAULT_VLAN    1    connected             1         0
127.0.0.0/8         reject               static                0         0
127.0.0.1/32        lo0                  connected             1         0
172.16.10.121/32    lo2                  static                1         0
172.16.100.0/24     10.0.8.11       1    ospf       IntraArea  1         1
172.16.102.0/24     VLAN2           2    connected             1         0
```

IP Preserve: retaining VLAN-1 IP addressing across configuration file downloads

For the switches covered in this guide, IP Preserve enables you to copy a configuration file to multiple switches while retaining the individual IP address and subnet mask on VLAN 1 in each switch, and the Gateway IP address assigned to the switch. This enables you to distribute the same configuration file to multiple switches without overwriting their individual IP addresses.

Operating rules for IP preserve

When `ip preserve` is entered as the last line in a configuration file stored on a TFTP server:

- If the switch's current IP address for VLAN 1 was not configured by DHCP/ Bootp, IP Preserve retains the switch's current IP address, subnet mask, and IP gateway address when the switch downloads the file and reboots. The switch adopts all other configuration parameters in the configuration file into the startup-config file.
- If the switch's current IP addressing for VLAN 1 is from a DHCP server, IP Preserve is suspended. In this case, whatever IP addressing the configuration file specifies is implemented when the switch downloads the file and reboots. If the file includes DHCP/Bootp as the IP addressing source for VLAN 1, the switch will configure itself accordingly and use DHCP/ Bootp. If instead, the file includes a dedicated IP address and subnet mask for VLAN 1 and a specific gateway IP address, then the switch will implement these settings in the startup-config file.
- The `ip preserve` statement does not appear in `show config` listings. To verify IP Preserve in a configuration file, open the file in a text editor and view the last line. For an example of implementing IP Preserve in a configuration file, see example below.

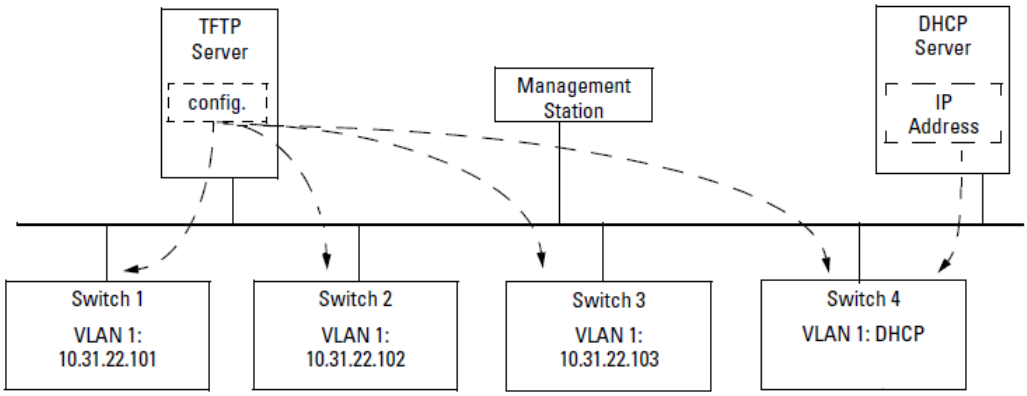
Enabling IP preserve

To set up IP Preserve, enter the `ip preserve` statement at the end of a configuration file. (Note that you do not execute IP Preserve by entering a command from the CLI).

Example 87 Implementing IP preserve in a configuration file

```
; J9091A Configuration Editor; Created on release #K.15.10.0001
hostname "HP Switch"
time daylight-time-rule None
.
.
.
password manager
password operator
ip preserve
```

Figure 22 Example of IP Preserve operation with multiple series switches



If you apply the following configuration file to Figure 24, switches 1 - 3 will retain their manually assigned IP addressing and switch 4 will be configured to acquire its IP addressing from a DHCP server.

Example 88 Configuration file in TFTP server with DHCP/Bootp specified as the IP addressing source

```
HP Switch(config)# show run

Running configuration:

; J9091A Configuration Editor; Created on release #K.15.10.0001

hostname "HP Switch"
module 1 type J8702A
module 2 type J8705A
trunk A11-A12 Trk1 Trunk
ip default-gateway 10.10.10.115
snmp-server community "public" Unrestricted
vlan 1
   name "DEFAULT_VLAN"
   untagged A1-A10,A13-A24,B1-B24,Trk1
   ip address dhcp-bootp
   exit
spanning-tree Trk1 priority 4
password manager
password operator
```

If you apply this configuration file to Figure 24, switches 1 - 3 will still retain their manually assigned IP addressing. However, switch 4 will be configured with the IP addressing included in the file.

Example 89 Configuration file in TFTP server with dedicated IP addressing, instead of DHCP/Bootp

```
HP Switch# show run

Running configuration:

; J9091A Configuration Editor; Created on release #K.15.10.0001

hostname "HP Switch"
module 1 type J8702A
module 2 type J8705A
trunk A11-A12 Trk1 Trunk
ip default-gateway 10.10.10.115
snmp-server community "public" Unrestricted
vlan 1
   name "DEFAULT_VLAN"
   untagged A1,A7-A10,A13-A24,B1-B24,Trk1
   ip address 10.12.17.175 255.255.255.0
   tagged A4-A6
   no untagged A2-A3
   exit
vlan 2
   name "VLAN2"
   untagged A2-A3
   no ip address
   exit
spanning-tree Trk1 priority 4
password manager
password operator
```

To summarize the IP Preserve effect on IP addressing:

- If the switch received its most recent VLAN 1 IP addressing from a DHCP/ Bootp server, it ignores the **ip preserve** command when it downloads the configuration file, and implements whatever IP addressing instructions are in the configuration file.
- If the switch did not receive its most recent VLAN 1 IP addressing from a DHCP/Bootp server, it retains its current IP addressing when it downloads the configuration file.
- The content of the downloaded configuration file determines the IP addresses and subnet masks for other VLANs.

Configuring a single source IP address

Overview

This feature applies to the following software applications:

- RADIUS
- SFlow
- SNTP
- System Logging applications
- TACACS
- Telnet
- TFTP

The above IP-based software applications use a client-server communication model, that is, the client's source IP address is used for unique client identification. The source IP address is determined by the system and is usually the IP address of the outgoing interface in the routing table. However, routing switches may have multiple routing interfaces due to load balancing or routing redundancy,

and outgoing packets can potentially be sent by different paths at different times. This results in different source IP addresses, which creates a client identification problem on the server site. For example, there is no way to designate a fixed IP address for outgoing packets for RADIUS or TACACS, so it is necessary to configure in the RADIUS or TACACS database all possible IP addresses that are configured on the switch as valid clients. When using system logging, it can be difficult to interpret the logging and accounting data on the server site as the same client can be logged with different IP addresses.

To decrease the amount of administrative work involved, a configuration model is provided that allows the selection of an IP address to use as the source address for all outgoing traffic generated by a specified software application on the switch. This allows unique identification of the software application on the server site regardless of which local interface has been used to reach the destination server.

Specifying the source IP address

The CLI command **ip source-interface** is used to specify the source IP address for an application. Different source IP addresses can be used for different software applications, but only one source IP address can be specified for each application.

Syntax:

[no] ip source-interface <radius | sflow | sntp | syslog | tacacs | telnet | tftp | all> <loopback*<id>* | vlan <*vlan-id*> address <*ip-address*>>

Determines the source IP address used by the specified software application when transmitting IP packets. The **all** *parameter can be used to set one IP address for all the listed applications.*

The **no** *version of the command cancels the configuration and the application reverts to its default behavior. The system determines the source IP address of outgoing application-specific IP packets at packet transmission time.*

loopback <id> : *Specifies that the IP address of the loopback interface is used as the source IP address in outgoing packets. If the loopback interface has no IP address, then the application reverts to the default behavior. If more than one IP address is configured, then the lowest IP address is used.*

vlan <vlan-id> : *Specifies that the IP address of the indicated VLAN interface is used as the source IP address of outgoing packets. If the specified VLAN interface has no IP address configured, or is down, then the application reverts to the default behavior. If more than one IP address is configured, then the lowest IP address is used.*

address<ip-address> : *Specifies the IP address that should be used as the source IP address of outgoing packets. The IP address must be a valid IP address configured on one of the switch's VLAN or loopback interfaces. If the interface is down, then the application reverts to the default behavior.*

The source IP selection policy

The source IP address selection for the application protocols is defined through assignment of one of the following policies:

- Outgoing Interface—the IP address of the outgoing IP interface is used as the source IP address. This is the default policy and the default behavior of applications.
- Configured IP Address—the specific IP address that is used as the source IP address. This address is configured on one of the switch's IP interfaces, either a VLAN interface or a Loopback interface.
- Configured IP Interface—the IP address from the specific IP interface (VLAN or Loopback) is used as the source IP address. If there are multiple IP addresses assigned (multinetting, for example), the lowest IP address is used.

If the selection policy cannot be executed because the interface does not have an IP address configured, does not exist, or is down, the application protocol uses the default Outgoing Interface policy. A warning message is displayed, but the configuration changes are accepted. When using the **show ip source-interface status** command to display information about the source IP address selection policy, the administratively-assigned source IP selection policy and the actual (operational) source IP selection policy in effect are displayed. The operational source IP selection policy may be different from the assigned source selection policy if the IP interface does not exist or is down. In this case, the default of Outgoing Interface appears as the operational policy (See example below).

Example 90 The administratively-assigned source IP selection policy differing from the operational policy

```
HP Switch(config)# show ip source-interface detail

 Source-IP Detailed Information

  Protocol : Tacacs
  Admin Policy           : Configured IP Interface
  Oper Policy            : Outgoing Interface
  Source IP Interface    : Vlan 22
  Source IP Address      : 10.10.10.4
  Source Interface State : Down
```

The **no** form of the **ip source-interface** command reverts the application protocols to the default behavior. The Outgoing Interface policy is used.

Below is an example of assigning a specific source IP address for a RADIUS application. The administrative policy is Configured IP Address.

Example 91 A specific IP address assigned for the RADIUS application protocol

```
HP Switch(config)# ip source-interface radius address 10.10.10.2

HP Switch(config)# show ip source-interface radius

  Source-IP Configuration Information

  Protocol | Admin Selection Policy  IP Interface   IP Address
  -------- + ---------------------- -------------- --------------
  Radius   | Configured IP Address   vlan 3         10.10.10.2
```

In the example below, a VLAN interface (VLAN 22) is specified as the source IP address for TACACS. The administrative policy is Configured IP Interface.

Example 92 Using a VLAN interface as the source IP address for TACACS

```
HP Switch(config)# ip source-interface tacacs vlan 22

HP Switch(config)# show ip source-interface tacacs

  Source-IP Configuration Information

   Protocol | Admin Selection Policy  IP Interface   IP Address
   -------- + ---------------------- -------------- --------------
   Tacacs   | Configured IP Interface vlan 22        10.10.10.4
```

The next example shows a VLAN interface being specified as the source IP address for logging. The administrative policy is Configured IP Interface.

Example 93 Using a VLAN interface as the source IP Address for logging (Syslog)

```
HP Switch(config)# ip source-interface syslog vlan 10

HP Switch(config)# show ip source-interface syslog

  Source-IP Configuration Information

   Protocol | Admin Selection Policy  IP Interface   IP Address
   -------- + ---------------------- -------------- --------------
   Syslog   | Configured IP Interface vlan 10        10.10.10.10
```

Displaying the source IP interface information

There are several **show** commands that can be used to display information about the source IP interface status.

Syntax:

`show ip source-interface status [ radius | sflow | sntp | tacacs | telnet | tftp | syslog ]`

Displays the operational status information for the source IP address selection policy. Both the administratively-assigned source IP selection policy and the operational source IP selection policy are displayed.

When no parameters are specified, policy information for all protocols is displayed.

Example 94 The data displayed for source IP interface status

```
HP Switch(config)# show ip source-interface status

 Source-IP Status Information

  Protocol | Admin Selection Policy  Oper Selection Policy
  -------- + ---------------------- ----------------------
  Tacacs   | Configured IP Interface Configured IP Interface
  Radius   | Configured IP Address   Configured IP Address
  Syslog   | Configured IP Interface Outgoing Interface
  Telnet   | Outgoing Interface      Outgoing Interface
  Tftp     | Outgoing Interface      Outgoing Interface
  Sntp     | Outgoing Interface      Outgoing Interface
  Sflow    | Configured IP Address   Configured IP Address
```

When executing the **show ip source-interface status** command without parameters, the configured IP interfaces (VLANs) and IP addresses are displayed for each protocol.

Example 95 The show ip source-interface command Output

```
HP Switch(config)# show ip source-interface

 Source-IP Configuration Information

  Protocol | Admin Selection Policy  IP Interface  IP Address
  -------- + ---------------------- ------------ ---------------
  Tacacs   | Configured IP Interface vlan 22
  Radius   | Configured IP Address                10.10.10.2
  Syslog   | Configured IP Interface vlan 10
  Telnet   | Outgoing Interface
  Tftp     | Outgoing Interface
  Sntp     | Outgoing Interface
  Sflow    | Outgoing Interface
```

The **show ip source-interface detail** command displays detailed information about the configured policies, source IP address, and interface state for each protocol.

Syntax:

`show ip source-interface detail [ radius | sflow | sntp | tacacs | telnet | tftp | syslog ]`

Displays detailed operational status information for the source IP address selection policy. Information about the configured policies, source IP address and interface state are displayed.

When no parameters are specified, policy information for all protocols is displayed.

Example 96 Detailed information displayed for each protocol

```
HP Switch(config)# show ip source-interface detail

  Source-IP Detailed Information

   Protocol : Tacacs
   Admin Policy           : Configured IP Interface
   Oper Policy            : Configured IP Interface
   Source IP Interface    : vlan 22
   Source IP Address      : 10.10.10.4
   Source Interface State : Up

   Protocol : Radius
   Admin Policy           : Configured IP Address
   Oper Policy            : Configured IP Address
   Source IP Interface    : vlan 3
   Source IP Address      : 10.10.10.2
   Source Interface State : Up

   Protocol : Syslog
   Admin Policy           : Configured IP Interface
   Oper Policy            : Configured IP Interface
   Source IP Interface    : vlan 10
   Source IP Address      : 10.10.10.10
   Source Interface State : Up

   Protocol : Telnet
   Admin Policy           : Configured IP Interface
   Oper Policy            : Configured IP Interface
   Source IP Interface    : loopback 1
   Source IP Address      : 10.10.10.11
   Source Interface State : Up

   Protocol : Tftp
   Admin Policy           : Outgoing Interface
   Oper Policy            : Outgoing Interface
   Source IP Interface    : N/A
   Source IP Address      : N/A
   Source Interface State : N/A

   Protocol : Sntp
   Admin Policy           : Outgoing Interface
   Oper Policy            : Outgoing Interface
   Source IP Interface    : N/A
   Source IP Address      : N/A
   Source Interface State : N/A

   Protocl : Sflow
   Admin Policy           : Outgoing Interface
   Oper Policy            : Outgoing Interface
   Source IP Interface    : N/A
   Source IP Address      : N/A
   Source Interface State : N/A
```

The **show** command can also be used with the application to display the source IP address selection information in effect for the application protocol.

Example 97 The show radius command displaying source IP selection information

```
HP Switch(config)# show radius

Status and Counters - General RADIUS Information

  Deadtime(min) : 0
  Timeout(secs) : 5
  Retransmit Attempts : 3
  Global Encryption Key :
  Dynamic Authorization UDP Port : 3799
  Source IP Selection : Configured IP address
```

Example 98 The show tacacs command displaying source IP selection information

```
HP Switch(config)# show tacacs

 Status and Counters - TACACS Information

   Timeout : 5
   Source IP Selection : Configured IP Interface
   Encryption Key :
```

Example 99 The show debug command displaying source IP selection information for Syslog

```
HP Switch(config)# show debug

Debug Logging

  Source IP Selection: Configured IP interface
  Destination:   None

  Enabled debug types:
   None are enabled.
```

Example 100 The show telnet command displaying source IP selection

```
HP Switch(config)# show telnet

  Telnet Activity

  Source IP Selection: 10.10.10.11

  ------------------------------------------------------
  Session  : **  1
  Privilege: Manager
  From     : Console
  To       :
```

Example 101 The show sntp command displaying source IP selection

```
HP Switch(config)# show sntp

SNTP Configuration

SNTP Authentication : Disabled
Time Sync Mode: Timep
SNTP Mode : disabled
Poll Interval (sec) [720] : 720
Source IP Selection: Outgoing Interface
```

Example 102 The sflow agent information

```
HP Switch(config)# show sflow agent
  Version              : 1.3;HP;K.15.07.0000x
  Agent Address        : 10.1.1.1
  Source IP Selection  : Configured IP Interface
```

Error messages

The following error messages may appear when configuring source IP selection if the interface does not exist, is not configured for IP, or is down.

Error Message	Description
Warning: Specified IP address is not configured on any interface	The IP address specified has not been assigned to any interface on the switch.
Warning: Specified IP interface is not configured	The IP interface has not been configured.
Warning: Specified IP interface is not configured for IP	An IP address has not been assigned to this interface.
Warning: Specified IP interface is down	The interface on the switch associated with this IP address is down.
Warning: Specified IP interface is configured for DHCP	The IP address has not been configured specifically (manually) for this interface and may change.

9 Software management

Downloading switch documentation and software from the web

You can download software updates and the corresponding product documentation from the HP Networking website. Check the website frequently for the latest software version available for your switch.

Viewing or downloading the software manual set

Go to: www.hp.com/networking/support

Downloading software updates for your switch

HP periodically provides switch software updates through the HP Networking website (www.hp.com/networking/support). After you acquire the new software file, you can use one of the following methods for downloading it to the switch:

- For a TFTP transfer from a server, do either of the following:
  - Select **Download OS** in the Main Menu of the switch's menu interface and use the (default) **TFTP** option.
  - Use the **copy tftp** command in the switch's CLI (see below).
- For an Xmodem transfer from a PC or Unix workstation, do either of the following:
  - Select **Download OS** in the Main Menu of the switch's menu interface and select the **XMODEM** option.
  - Use the **copy xmodem** command in the switch's CLI (page 129).
- Use the USB port to download a software file from a USB flash drive (page 130).
- Use the download utility in PCM+ management software.

NOTE: Downloading new software does not change the current switch configuration. The switch configuration is contained in a separate file that can also be transferred, for example, to archive or to be used in another switch of the same model.

This section describes how to use the CLI to download software to the switch. You can also use the menu interface for software downloads. For more information, see "Using the Menu Interface" (page 17) in this guide.

TFTP download from a server

Syntax:

`copy tftp flash <ip-address> <remote-os-file>[[<primary] | [secondary>]]`

Note that if you do not specify the flash destination, the TFTP download defaults to the primary flash.

For example, to download a software file named K_15_10_0001.swi from a TFTP server with the IP address of 10.28.227.103:

1. Execute the **copy** command as shown below:

```
HP Switch# copy tftp flash 10.28.227.103
K_15_10_0001.swi
The primary OS image will be deleted. continue
```

```
continue[y/n]? Y
03125K
```

2. When the switch finishes downloading the software file from the server, it displays the progress message

   ```
   Validating and Writing System Software to FLASH...
   ```

3. When the CLI prompt re-appears, the switch is ready to reboot to activate the downloaded software:
   a. Use the **show flash** command to verify that the new software version is in the expected flash area (primary or secondary)
   b. Reboot the switch from the flash area that holds the new software (primary or secondary), using the following command:

   Syntax:

   ```
   boot system flash [ [<primary] | secondary>  ]
   ```

   After the switch reboots, it displays the CLI or Main Menu, depending on the **Logon Default** setting last configured in the menu's Switch Setup screen.

4. Verify the software version by displaying the system information for the switch (for example, through the **show system-information** command), and viewing the Software revision field.

Xmodem download from a PC or Unix workstation

This procedure assumes that:

- The switch is connected via the Console RS-232 port to a PC operating as a terminal. (Refer to your switch *Installation and Getting Started Guide* for information on connecting a PC as a terminal and running the switch console interface.)
- The switch software is stored on a disk drive in the PC.
- The terminal emulator you are using includes the Xmodem binary transfer feature. (For example, in the HyperTerminal application included with most Windows systems, the Send File option in the Transfer drop-down menu supports the Xmodem protocol.)

Using Xmodem and a terminal emulator, you can download a switch software file to either primary or secondary flash using the CLI.

Syntax:

```
copy xmodem flash [ [<primary] | secondary>  ]
```

1. To reduce the download time, you may want to increase the baud rate in your terminal emulator and in the switch to a value such as 115200 bits per second. (The baud rate must be the same in both devices.) For example, to change the baud rate in the switch to 115200, execute this command:

   ```
   HP Switch(config)# console baud-rate 115200
   ```

   (If you use this option, be sure to set your terminal emulator to the same baud rate.)

   Changing the console baud-rate requires saving to the Startup Config with the **write memory** command. Alternatively, you can logout of the switch and change your terminal emulator speed and allow the switch to Auto-Detect your new higher baud rate (i.e., 115200 bps)

2. Execute the following command in the CLI:

   ```
   HP Switch# copy xmodem flash primary
   The primary OS image will be deleted. continue [y/n]? Y
   Press 'Enter' and start XMODEM on your host...
   ```

3. Execute the terminal emulator commands to begin the Xmodem transfer. For example, using HyperTerminal:
   a. Click on **Transfer**, then **Send File**.
   b. Type the file path and name in the **Filename** field.
   c. In the Protocol field, select **Xmodem**.
   d. Click on the **Send** button.

   The download can take several minutes, depending on the baud rate used in the transfer.
4. If you increased the baud rate on the switch (1), use the same command to return it to its previous setting. (A baud rate of 9600 bits per second is recommended for most applications.) Remember to return your terminal emulator to the same baud rate as the switch.
5. Use the **show flash** command to verify that the new software version is in the expected flash area (primary or secondary).
6. Reboot the switch from the flash area that holds the new software (primary or secondary).

   After the switch reboots, it displays the CLI or Main Menu, depending on the **Logon Default** setting last configured in the menu's Switch Setup screen.

Using USB to download switch software

To use the USB port on the switch to download a software version from a USB flash drive:

- The software version must be stored on the USB flash drive, and you must know the file name (such as K_15_10_0001.swi).
- The USB flash drive must be properly installed in the USB port on the switch.

NOTE: Some USB flash drives may not be supported on your switch. For information on USB device compatibility, refer to the HP networking support (www.hp.com/networking/support).

Syntax:

```
copy usb flash <filename> [  <primary | secondary>  ]
```

For example, to download a software file named K_15_10_0001.swi from a USB flash drive:

1. Execute the **copy** command as shown below:

```
HP Switch# copy usb flash K_15_10_0001.swi
secondary
The secondary OS image will be deleted. continue
[y/n]? Y
03125K
```

2. When the switch finishes downloading the software file from the server, it displays the progress message

```
Validating and Writing System Software to FLASH...
```

3. When the CLI prompt re-appears, the switch is ready to reboot to activate the downloaded software:
   a. Use the **show flash** command to verify that the new software version is in the expected flash area (primary or secondary)
   b. Reboot the switch from the flash area that holds the new software (primary or secondary), using the following command:

   Syntax:

```
boot system flash  [ [<primary] | secondary>  ]
```

After the switch reboots, it displays the CLI or Main Menu, depending on the **Logon Default** setting last configured in the menu's Switch Setup screen.

4. Verify the software version by displaying the system information for the switch (for example, through the **show system-information** command), and viewing the Software revision field.

Software signing and verification

As an enhanced security feature, you can verify whether a software image being downloaded to or stored in your switch has, in fact, been provided by HP Networking without any modification or corruption.

Validation is based on the image signature that is generated and attached to the switch software by HP Code Signing Service (HPCSS). HP Networking implemented digital signature validation starting with specific switch software versions. For a list of these software versions, go to: www.hp.com/networking/swvalidation.

NOTE: Once a switch software image has been digitally signed on a specific version, all later versions will also be signed.

Switches supporting digital signature verification will generate an error message if you attempt to download an image that is not digitally signed. For example, using the CLI commands described above to revert back to an image that isn't signed from an image that is signed and supports verification would result in the following message:

```
This software image does
not contain a digital signature and
cannot be validated as originating
from HP. You may bypass this
validation by using the
'allow no-signature' option. Please
see www.hp.com/networking/swvalidation
for information about which versions
of software contain digital signatures.
```

When you use the **copy** command to download a properly signed image, the CLI logs the following syslog message:

```
Update: Firmware image contains valid signature.
```

Errors related to signature validation will generate one of the following log messages:

```
Update: Aborted. Downloaded file invalid.
Update: Aborted. Firmware image does not contain a signature.
Update: Aborted. Firmware image signature is not valid.
```

Using the CLI to validate or bypass a signature verification

Manually validating software. If necessary, you can validate software that does not support signature verification by executing the following command:

```
verify signature flash { primary | secondary }
```

If the signature is valid, the following message will be displayed:

```
Signature is valid.
```

Bypassing verification. If necessary, you can use the **allow-no-signature** option to bypass signature verification. To do this, execute the **copy** command as follows:

```
copy { tftp | sftp | usb | xmodem }
flash [<hostname/IP>] [<filename>] { primary | secondary }
allow-no-signatures
```

NOTE: The **allow-no-signature** option is available on switches that support non-signed legacy software releases and should be used with caution. To determine support for your switch, go to: www.hp.com/networking/swvalidation.

Saving configurations while using the CLI

The switch operates with two configuration files:

- **Running-config file:** Exists in volatile memory and controls switch operation. Rebooting the switch erases the current running-config file and replaces it with an exact copy of the current startup-config file. To save a configuration change, you must save the running configuration to the startup-config file.
- **Startup-config file:** Exists in flash (non-volatile) memory and preserves the most recently-saved configuration as the "permanent" configuration. When the switch reboots for any reason, an exact copy of the current startup-config file becomes the new running-config file in volatile memory.

When you use the CLI to make a configuration change, the switch places the change in the running-config file. If you want to preserve the change across reboots, you must save the change to the startup-config file. Otherwise, the next time the switch reboots, the change will be lost. There are two ways to save configuration changes while using the CLI:

- Execute `write memory` from the Manager, Global, or Context configuration level.
- When exiting from the CLI to the Main Menu, press 'y' (for Yes) when you see the "save configuration" prompt:

```
Do you want to save current configuration [y/n]?
```

Important: Best Practices for software updates

NOTE: With version K.15.01.0031 and later software, you will notice a slight change in the versioning system.

Software updates that contain significant new features and enhancements may be designated by an increment to both the major and minor release version numbers. That is, K.15.01.0031 represents a major update to software version(s) K.14.*xx*, and K.14.*xx* represents a major update to K.13.*xx*, and so forth. In addition, a future version (such as K.15.02.*xxxx)* may represent a minor release to version K.15.01.*xxxx*, but may still contain significant changes. To mitigate against potential migration issues when performing such updates, this section documents best practices for updating the switch, including contingency procedures for rolling back to previous software versions and saved configurations.

Updating the switch: overview

CAUTION: Before you update the switch software to a new version:

- We strongly recommend that you save a copy of your config file to an external location.
- We advise against rolling back (going from a newer software version to an older software version) without copying a backup config file to the device.

If you do choose to downgrade software using your existing config file, unpredictable changes in the config file and switch behavior may occur. If booting a K.15.01.0031 or later config file into a K.14.*xx* or earlier versions of software, the following commands may be removed from your config file:

- Any commands that are present in K.15.01.0031 (or later) but are not present in earlier versions of software
- logging
- snmp-server
- mirror-session
- auto-tftp
- filter source-port
- fault-finder
- interface loopback

To perform an update to your switch software, follow the steps below (see "Updating the switch: detailed steps" (page 134) for detailed steps):

1. Download the image to your TFTP server.
2. Save your current configuration (Config1) to a backup configuration file (Config2).
3. Save your current configuration to an external tftp server.
4. Backup your current running image (Primary) to the secondary image.
5. Set your secondary image to boot with Config2.
6. Download the new image to the switch's primary image.
7. Verify that your images and configuration are set correctly.
8. Reload the switch.

After following these steps, you should end up with the following results:

- Primary image will hold the new software image you want to install (for example, K.15.01.0031)
- Secondary image will hold the image you are currently running (for example, K.14.47)
- Primary image will boot with Config1 (config file corresponding to new software version—in this example, K.15.01.0031)
- Secondary image will boot with Config2* (config file corresponding to previous software version—in this example, K.14.47)

* The current config file must be copied to Config2, or you will be unable to revert if the need arises.

NOTE: You might opt to use a different methodology in which the new software will be installed as the secondary and not the primary image, in which case you would use the commands **boot system flash secondary**, and/or **boot set-default flash secondary** to change the location of the default boot. However, since you will still need to take precautions to allow you to revert to your previous configuration, We strongly recommend that you follow the methods that are proposed in our update process. This will ensure that you can use our proposed roll back procedures should the need arise.

Updating the switch: detailed steps

The following detailed steps shows how to update the switch software from an existing version to a significant new version (in the example provided here, from version K.14.47 to version K.15.01.0031).

1. Download the latest software image to your TFTP server from the HP networking web site: www.hp.com/networking/support
2. Save your current configuration (Config1) to backup configuration file (Config2).
   a. Before copying the config, verify the current state of your system using the **show version**, **show flash** and **show config files** commands. For example:

```
Switch1# show version
Image stamp:   /sw/code/build/btm(t4a)
               Nov 6 2009 13:20:26
               K.14.47
               188
Boot Image:    Primary

Switch1# show flash
Image           Size(Bytes)   Date    Version
------          -----------  -------  -------
Primary Image   : 9839140    11/06/09 K.14.47
Secondary Image : 0
Boot Rom Version: K.12.20
Default Boot    : Primary

Switch1# show config files

Configuration files:

 id | act pri sec | name
 ---+-------------+-----------------------------
  1 | *    *   *  | config1
  2 |             |
  3 |             |
```

   b. Create a backup configuration file and verify the change.

```
Switch1# copy config config1 config config2
Switch1# show config files

Configuration files:

 id | act pri sec | name
 ---+-------------+-----------------------------
  1 | *    *   *  | config1
  2 |             | config2
  3 |             |
```

3. Save the current config to a tftp server using the **copy tftp** command. For example:

```
Switch1# copy startup-config tftp 10.1.1.60
Switch1_config_K_14_47.cfg
```

NOTE: This step is necessary because HP switches do not support roll back (going from a newer software version to an older software version) without the ability to copy a backup config file onto the device.

4. Backup your current running image (primary) to the secondary image.

```
Switch1# copy flash flash secondary

Switch1# show flash
Image           Size(Bytes)   Date    Version
------          -----------  -------  -------
Primary Image   :  9839140   11/06/09 K.14.47
Secondary Image :  9839140   11/06/09 K.14.47
Boot Rom Version: K.12.20
Default Boot    : Primary
```

5. Set your secondary image to boot with Config2.

```
Switch1# startup-default secondary config config2

Switch1# show config files

Configuration files:

 id | act pri sec | name
 ---+-------------+-----------------------------
  1 | *    *      | config1
  2 |          *  | config2
  3 |             |
```

NOTE: Step 5 will enable you to revert from K.15.01.*xxxx* to your previous image with your previous configuration just by invoking the command **boot system flash secondary**.

6. Download the new primary image.

```
Switch1# copy tftp flash 192.168.1.60
K_15_10_0001.swi primary
The Primary OS Image will be deleted, continue [y/n]?
```

At the prompt, enter 'y' for yes, and the new image will be downloaded and written to the File system. Once tftp download has been completed you will see the following message:

```
Validating and Writing System Software to the
Filesystem ...
```

7. Verify that your images and configuration are set correctly. For example, if you updated from K.14.47 to K.15.01.0031, you should see the following outputs from the switch show commands:

```
Switch1# show version
Image stamp:   /sw/code/build/btm(t4a)
               Nov 6 2009 13:20:26
               K.14.47
               188
Boot Image:    Primary


Switch1# show flash
Image           Size(Bytes)   Date    Version
------          -----------  -------  -------
Primary Image   : 11537788   04/23/10 K.15.01.0031
Secondary Image :  9839140   11/06/09 K.14.47
Boot Rom Version: K.15.09
Default Boot    : Primary
```

```
Switch1# show config files

Configuration files:

 id | act pri sec | name
 ---+-------------+-----------------------------
  1 | *    *      | config1
  2 |          *  | config2
  3 |             |
```

8. Reload the new switch image.

```
Switch1# reload
System will be rebooted from primary image. Do you want
to continue [y/n]? y
```

At the prompt, enter 'y', for yes, and the switch will boot with the new image.

NOTE: As an additional step, we recommend saving the startup-config to a tftp server using the **copy tftp** command. For example:

```
Switch1# copy startup-config tftp 10.1.1.60
Switch1_config_K_15_10_0001.cfg
```

Rolling back switch software

If you have followed the update procedures documented in the previous section, you should be able to revert to your previous configuration and software version using the steps below.

CAUTION: **Long usernames and passwords.** Software versions K.15.01.0032 and later support the longer usernames and passwords introduced in K.14.59.

Before downgrading to a software version that does not support long user-names and passwords, use one of the following procedures:

- Using the **password** CLI command or the Web browser interface, change usernames or passwords to be no more than 16 characters in length, and without any special characters. Then execute a CLI **write memory** command (required if the **include-credentials** feature has ever been enabled).
- Clear the values using the **no password all** CLI command. Then execute a CLI **write memory** command (required if the **include-credentials** feature has ever been enabled).
- Clear password values by using the "Clear" button on the switch. Then execute a CLI **write memory** command (required if the **include-credentials** feature has ever been enabled).

Note: The procedures above should be used only when downgrading from a software version that supports long usernames and passwords to a version that does not.

To roll back your switch from K.15.01.0031 to K.14.47, for example, follow the steps below:

1. Verify that your images and configuration are set correctly using the **show version**, **show flash** and **show config files** commands.

```
Switch1# show version
Image stamp:    /sw/code/build/btm(t5a)
                Apr 23 2010 05:43:42
                K.15.01.0031
                67
Boot Image:     Primary


Switch1# show flash
```

```
Image            Size(Bytes)   Date    Version
------           -----------  -------  -------
Primary Image    : 11537788   04/23/10 K.15.01.0031
Secondary Image  :  9839140   11/06/09 K.14.47
Boot Rom Version: K.15.09
Default Boot     : Primary


Switch1# show config files

Configuration files:

 id | act pri sec | name
 ---+-------------+---------------------------
  1 | *    *      | config1
  2 |          *  | config2
  3 |             |
```

2. Boot the switch using the secondary image (with config2).

```
Switch1# boot system flash secondary
System will be rebooted from secondary image. Do
you want to continue [y/n]? y
```

Enter 'y' for yes, and the switch will boot from the secondary image (K.14.47, in this example) with the corresponding configuration for that software version (Config2).

Viewing or transferring alternate configuration files

Viewing or copying an alternate configuration saved to the switch will always be accomplished through the software currently running on the switch. This may result in a misleading portrayal of the configuration. For example, if a configuration is created on K.14.47 and saved as config2, and if it is then viewed or transferred while the switch is running K.15.01.0031, it will appear as though K.15.01.0031 has converted the configuration. However, the alternate configuration file, config2, will still be intact on the switch and load properly when the switch is booted into the same software version from which the configuration file originated.

When an enhancement introduces a feature that did not previously exist in the switch, it may present several challenges to the user.

Backwards compatibility of the configuration created with a version of software that supports a new feature or parameter is not guaranteed. Software versions that did not recognize or support a particular command or parameter will not be able to interpret that line in the configuration. For this reason, it is strongly recommended that network administrators always save their configuration *while still running the switch with the original software version*, and with a notation indicating the software version on which the configuration was saved. For example, a user might save a configuration for a switch running K.14.47 to a TFTP server with an IP address of 10.10.10.15 as follows:

```
HP Switch-onK1447# copy running-config tftp
10.10.10.15 5406onK1447
```

If, for example, the user deems it necessary to revert to the use of K.14.47, the user can boot into it and then restore the saved config from the TFTP server.

Viewing or copying an alternate configuration that is saved to the switch flash can be accomplished only with the software that is currently running on the switch.

Here, for example, a configuration is created on K.14.47 and then saved to flash:

```
HP Switch-onK1447# copy config config2 config
K1447config <cr>
```

And later, the configuration that was created on K.14.47 is viewed while the switch is running K.15.01.0031:

```
HP Switch-onK1501# show config K1447config <cr>
```

The command output will show how the K.14.47 config would be interpreted *if it were to be used by the K.15.01.0031 software*. Copying the K1447config file to a TFTP server would similarly trigger an interpretation by the software performing the file transfer. Note, however, that this does not actually *change* the configuration. If the version is rolled back from K.15.01.0031 to K.14.47 with a command like the following (given that K.14.47 is stored in secondary flash), the K.14.*xx* formatted config is still intact and valid.

```
HP Switch# boot system flash secondary config
K1447config
```

This "interpretation" during a TFTP or **show** command execution is inherent in the architecture of the switch. When switch features change significantly (such as the move from IPv4 support to IPv6 support), there may be configuration parameters from the previous config that cannot be translated by the switch for viewing while it is running the new software. This necessitates storing configurations for each version of software to an external location, if the user would like to view the stored config prior to reloading it.

Index

A

alias
  command, 41
ARP
  arp age, default, 107
asterisk
  meaning in show config, 77

B

banner
  configuring, 12
  default, 11
  exec option, 14
  non-default, 11
  operation, 11
  redundant management, 11
  user-configurable, 14
basic switch configuration
  IP address, 10
  manager password, 9
  subnet mask, 11
  Switch Setup screen, 9
Best Offer, 93
boot, 20
  see also reboot
boot command, 50, 68
Bootp, 112
  see also DHCP
bootp
  automatic switch configuration, 9
  Bootp table file, 113
  Bootptab file, 113
  operation, 112, 113
  server, 105
  using with Unix system, 113
Bootp/DHCP differences, 113

C

Clear + Reset button combination, 82
Clear button, 48
CLI
  accessing from menu console, 20
  context configuration level, 29
  global configuration level, 29
  Help, 33
  interactive mode, 37
  keystroke shortcuts, 43
  listing command options, 31
  message types, 36
  moving to or from the menu, 30
  port or trunk-specific commands, 34
  privilege levels, 26
  VLAN-specific commands, 35
config files
  oobm, 83
configuration
  Bootp, 113
  comparing startup to running, 52
  console, 95
  custom default config, 54
  DHCP Option 66, 92
  DHCP, Best Offer, 93
  DHCP/Bootp, 9
  factory default, 54, 105
  file update with Option 66, 92
  file updating with Option 66, 93
  IP, 105
  IP address, 10
  IP address, manually, 10
  manager password, 9
  Option 67, 93
  permanent, 52
  permanent change defined, 50
  quick, 20
  reboot to activate changes, 23
  running-config file, 132
  saving from CLI, 132
  saving from menu interface, 22
  serial link, 95
  show default-config, 52
  startup, 22
  startup-config file, 132
  subnet mask, 11
  Switch Setup screen, 9
  system, 101
  Telnet access configuration, 95
  Time-To-Live, 111
  TTL, 111
  updating the file using Option 66, 93
  using for web browser interface, 46
  using Menu interface, 20
  viewing, 52
  web access, 111
  web browser access, 95
configuration file, multiple
  after first reboot, 76
  applications, 74
  asterisk, 77
  change policy, 78
  Clear + Reset button combination, 82
  copy from tftp host, 83
  copy to tftp host, 83
  create new file, 76, 80, 81
  current file in use, 77
  default reboot from primary, 78
  erasing, 81
  memory assignments, 76
  memory slot, 75, 77, 79
  minconfig, 79, 81
  newconfig, 79
  oldConfig, 76

override reboot policy, 78
policy, override, 79
power cycle, 79
primary boot path, 77
reboot policy options, 75
reboot policy, overide, 78
reboot process, 75
reload, 79
rename config file, 79
reset, 79
running-config file, 75
running-config file operation, 75
secondary boot path, 77
show config file content, 77
show multiple files, 77
ss, 74
startup-config, 75
startup-config file, 76
transition to multiple files, 76
unable to copy, 80
workingConfig, 76
xmodem from host, 84
xmodem to host, 84
configuration, multiple
backupConfig, 75
workingConfig, 75
console
Actions line, 21, 22
configuring, 95
ending a session, 19
Help, 20, 22
inactivity-timer, 99
Main Menu interface, 20
meaning of asterisk, 22, 23
navigation, 20, 22
operation, 20, 22
starting a session, 18
statistics, clear counters, 22
status and counters access, 20
Switch Setup screen, 9
context level
global config, 29, 110
manager level, 29
moving between contexts, 30
port or trunk-group, 34
VLAN-specific, 35
copy
custom config file, 54
multiple config file, tftp, 83

D

date, configure, 104
default custom config file, 54
default gateway, 105
see also gateway
default settings
banner, 11, 13
baud rate
speed sense, 95
boot flash
primary, 68
configuration file name
switch.cfg, 93
console/serial configuration, 96
default gateway
none, 105
DHCP Option 66
enabled, 92
flow control
XON/XOFF, 95
inactivity timer
0 Minutes, 95
interface access features, 95
IP address
DHCP/Bootp, 105
IP configuration features, 105
loopback interface le0, 114
MAC age time
300 seconds, 101
system information features, 101
system name
switch product name, 101
Telnet access
enabled, 95
terminal type
VT-100, 95
time sync method
none, 101
time zone
0, 101
Time-To-Live (TTL)
64, 106
Web browser access
enabled, 95
default VLAN, 106
DHCP
automatic switch configuration, 9
Best Offer, 93
Bootp operation, 112
manual gateway precedence, 112
DHCP/Bootp differences, 112
DHCP/Bootp process, 112
DNS
name, using in web browser, 46
Domain Name Server *see* DNS
download
TFTP, 128
Xmodem, 129

E

enhanced secure mode, 58, 85, 91
erase
config file, 84
erase all zeroize, 62
event log
console menu, 20

F
factory default configuration
  restoring, 54
fastboot command, 71
fault detection policy, 47
flash memory, 22, 50
flow control
  terminal, 95

G
gateway
  configuring, 107
  default gateway, 105
  IP address, 106, 107
  manual config priority, 112
  on primary VLAN, 106
  precedence of manual gateway over DHCP/Bootp, 112
global config level, 110

H
Help
  for CLI, 33
  for menu interface, 20, 22
hop, router, 111
hostname parameter, 103

I
idle-timeout, 95, 99
in-band
  managing the switch, 9
inactivity-timer, 99
interactive mode
  Banner motd cmd, 39
  menu commands, 38
interactive mode, CLI, 37
IP
  CLI access, 107
  configuration, 105
  DHCP/Bootp, 105
  effect when address not used, 111
  features available with and without, 111
  gateway, 105
  gateway (IP) address, 106
  menu access, 107
  multinetting, 105
  multiple addresses in VLAN, 105, 109
  single source addressing, 121
  source IP address, 121
  source-interface command, 122
  subnet, 105, 108
  subnet mask, 105, 107
  Time-To-Live, 107
  TTL, 107
IP address
  Configured IP address, 122
  Configured IP interface, 122
  configuring, 10
  displaying source IP information, 123
  displaying source-interface status, 122
  loopback interface configuration, 115
  manually configure, 107
  multiple in a VLAN, 109
  outgoing interface, 122
  quick start, 106
  removing or replacing, 110
  setup screen, 106
  show management command, 108
  single source, 121
  source IP address, 121
  source IP with debug, 126
  source IP with radius, 125
  source IP with tacacs, 126
  source-interface option, 121
IP perserve
  summary of effect, 120
IP preserve
  DHCP server, 118
  overview, 117
  rules, operating, 118

K
kill command, 100

L
link, serial, 95
loopback interface
  benefits, 114
  default, 114
  multiple interfaces supported, 114
lost password, 48

M
MAC address, 113
manager access, 29
manager password, 47
manager privileges, 29
memory
  flash, 22, 50
  startup configuration, 22
menu interface
  configuration changes, saving, 22
  moving to or from the CLI, 30
  see also console
message
  types, 36
module
  not present with stacking, 24
module not present, 24
multinetting, 109
  see also ACLs
multiple configuration file *see* configuration file, multiple

O
oobm
  telnet, 96
  telnet-server, 96
  tftp traffic, 83
  transferring files, 83

web-management, 98
operator access, 26, 28, 29
operator password, 47
operator privileges, 28, 29
Option 66, DHCP, 92
OSPF
using loopback interface as router ID, 115

P

password, 47
console, 20
delete, 48
if you lose the password, 48
lost, 48
manager, 26
operator, 26
setting, 48
passwords
configuring, 10
PCM
starting web browser, 46
port
default loopback interface, 117
displaying loopback interface, 116
loopback interface configuration, 114, 115
numbering with stacking, 24
privilege levels, 26

Q

quick configuration, 20

R

reboot, 20
see also boot
actions causing, 50
faster boot time, 71
obtaining faster reboot time, 68
scheduling remotely, 71
via menu console, 20
via menu interface, 22
redo, command description, 40
reload, 50
command, 68
modules (5400, 8200), 72
remote session, terminate, 100
repeat, command description, 40
reset
operating system, 22
Reset button, 50
rolling back switch software, 136
router
gateway, 107
router, hop, 111
running-config
show for VLANs, 84
viewing, 52
see also configuration
running-config file, 132

S

scheduled reboot, 71
SCP/SFTP
transfer of config files, 84
secure mode, enhanced, 58, 85, 90
security
Clear button, 48
privilege levels in CLI, 26
SFTP/SCP transfer, 84
show
telnet, 97
SNTP
manual config priority, 112
Software verification, 131
SSH
session timeout, 97
stacking
member ID, 24
module not present, 24
port designations, 24
start-up config
viewing, 52
starting a console session, 18
startup-config
show for VLANs, 90
startup-config file, 132
statistics, 20
clear counters, 61
status and counters
access from console, 20
subnet, 108
subnet mask, 107
see also IP masks
subnet mask, configuring, 11
switch console *see* console
switch setup menu, 20
Switch Setup screen, 9
configuring a subnet mask, 11
configuring an IP address, 10
system configuration screen, 101

T

Telnet
connecting to switch, 18
domain name address, 96
hostname, 96
ipv6 address, 96
oobm, 96
outbound, 96
session timeout, 96
show command, 96
switch-num, 96
terminate session, kill command, 100
telnet
NAWS, 97
negotiating window size, 97
terminal access, lose connectivity
inactivity-timer, 99
terminal type, 95

terminate remote session, 100
TFTP server, 92
time server, 105
time zone, 101, 104
time, configure, 104
Time-To-Live, 106, 107, 111
  see also TTL
  on primary VLAN, 106
TimeP, 105
  manual config priority, 112
Timep, 106
TTL, 106, 107
  see also Time-To-Live (TTL)
  IP, 111
  manual config priority, 112
  on primary VLAN, 106

U
Unix, Bootp, 113

V
Viewing or transferring alternate configuration files, 137
virtual interface *see* loopback interface
VLAN
  Bootp, 113
  configuring Bootp, 113
  ID, 35
  IP addressing with multiple, 106
  multinet, 105
  multinetting, 105, 109
  multiple IP addresses, 109
  primary, 105
  reboot required, 20
  subnet, 105, 108
  support enable/disable, 20
VLAN ID *see* VLAN
VT-100 terminal, 95

W
warranty, 1
web agent
  disabling access, 44
  enabled parameter, 44
web browser interface
  access configuration, 95
  access parameters, 47
  access security, 95
  disable access, 44
  enabling, 46
  fault detection policy, 47
  first-time install, 47
  Java applets, enabling, 46
  password lost, 48
  password, setting, 48
  security, 44, 47
  standalone, 46
  system requirements, 46
web-management
  listen, oobm, 98
  oobm, 98
write memory
  effect on menu interface, 24
  redundant management, 52

X
Xmodem OS download, 129

Z
zeroization, 62
zeroize
  file storage, 62
  from ROM console, 63
  management modules, 62
  redundant MM, 63
  with HA, 63