

Management Software

AT-S63



Command Line Interface User's Guide

AT-S63 Version 2.2.0 for AT-9400 Layer 2+ Switches

AT-S63 Version 3.0.0 for AT-9400 Basic Layer 3 Switches

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Preface

This guide contains instructions on how to configure the operating parameters of the AT-9400 Layer 2+ and Basic Layer 3 Gigabit Ethernet Switches from the command line interface of the AT-S63 Management Software.

This Preface contains the following sections:

- ❑ “How This Guide is Organized” on page 16
- ❑ “Product Documentation” on page 19
- ❑ “Where to Go First” on page 20
- ❑ “Starting a Management Session” on page 21
- ❑ “Command Line Interface Features” on page 22
- ❑ “Command Formatting” on page 23
- ❑ “Document Conventions” on page 24
- ❑ “Where to Find Web-based Guides” on page 25
- ❑ “Contacting Allied Telesis” on page 26



Caution

The software described in this documentation contains certain cryptographic functionality and its export is restricted by U.S. law. As of this writing, it has been submitted for review as a “retail encryption item” in accordance with the Export Administration Regulations, 15 C.F.R. Part 730-772, promulgated by the U.S. Department of Commerce, and conditionally may be exported in accordance with the pertinent terms of License Exception ENC (described in 15 C.F.R. Part 740.17). In no case may it be exported to Cuba, Iran, Iraq, Libya, North Korea, Sudan, or Syria. If you wish to transfer this software outside the United States or Canada, please contact your local Allied Telesis sales representative for current information on this product’s export status.

How This Guide is Organized

This guide has the following sections and chapters:

❑ Section I: Basic Operations

Chapter 1, “Basic Command Line Commands” on page 29

Chapter 2, “Basic Switch Commands” on page 39

Chapter 3, “Enhanced Stacking Commands” on page 65

Chapter 4, “Simple Network Time Protocol (SNTP) Commands” on page 73

Chapter 5, “SNMPv2 and SNMPv2c Commands” on page 85

Chapter 6, “Port Parameter Commands” on page 105

Chapter 7, “Port Statistics Commands” on page 133

Chapter 8, “MAC Address Table Commands” on page 139

Chapter 9, “Static Port Trunking Commands” on page 151

Chapter 10, “LACP Port Trunking Commands” on page 161

Chapter 11, “Port Mirroring Commands” on page 177

❑ Section II: Advanced Operations

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❑ Section III: Snooping Protocols

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- ❑ Section V: Spanning Tree Protocols
 - Chapter 25, “Spanning Tree Protocol Commands” on page 437
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- ❑ Section VI: Virtual LANs
 - Chapter 28, “Port-based, Tagged, and Multiple Mode VLAN Commands” on page 491
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- ❑ Section VII: Routing
 - Chapter 32, “Internet Protocol Version 4 Packet Routing Commands” on page 545
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 - Chapter 37, “Web Server Commands” on page 649
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 - Chapter 39, “Public Key Infrastructure (PKI) Certificate Commands” on page 667
 - Chapter 40, “Secure Sockets Layer (SSL) Commands” on page 683
 - Chapter 41, “Secure Shell (SSH) Commands” on page 687
 - Chapter 42, “TACACS+ and RADIUS Commands” on page 695

Chapter 43, “Management ACL Commands” on page 709

Product Documentation

For overview information on the features of the AT-9400 Switch and the AT-S63 Management Software, refer to:

- ❑ AT-S63 Management Software Features Guide
(PN 613-000801)

For instructions on how to start a local or remote management session, refer to:

- ❑ Starting an AT-S63 Management Session Guide
(PN 613-000817)

For instructions on installing or managing stand-alone switches, refer to:

- ❑ AT-9400 Gigabit Ethernet Switch Installation Guide
(PN 613-000357)
- ❑ AT-S63 Management Software Menus Interface User's Guide
(PN 613-50570-00)
- ❑ AT-S63 Management Software Command Line Interface User's Guide
(PN 613-50571-00)
- ❑ AT-S63 Management Software Web Browser Interface User's Guide
(PN 613-50592-00)

For instructions on installing or managing a stack of AT-9400 Basic Layer 3 Switches and the AT-StackXG Stacking Module, refer to:

- ❑ AT-9400 Stack Installation Guide
(PN 613-000796)
- ❑ AT-S63 Stack Command Line Interface User's Guide
(PN 613-000777)

Where to Go First

Allied Telesis recommends that you read Chapter 1, Overview, in the *AT-S63 Management Software Features Guide* before you begin to manage the switch for the first time. There you will find a variety of basic information about the unit and the management software, like the two levels of manager access levels and the different types of management sessions.

The *AT-S63 Management Software Features Guide* is also your resource for background information on the features of the switch. You can refer there for the relevant concepts and guidelines when you configure a feature for the first time.

Starting a Management Session

For instructions on how to start a local or remote management session on the AT-9400 Switch, refer to the *Starting an AT-S63 Management Session Guide*.

Command Line Interface Features

The following features are supported in the command line interface:

- ❑ Command history - Use the up and down arrow keys.
- ❑ Context-specific help - Press the question mark key at any time to see a list of legal next parameters.
- ❑ Keyword abbreviations - Any keyword can be recognized by typing an unambiguous prefix, for example, “sh” for “show”.
- ❑ Tab key - Pressing the Tab key fills in the rest of the keyword. For example, typing “di” and pressing the Tab key enters “disable.”

Command Formatting

The following formatting conventions are used in this manual:

- ❑ `screen text font` - This font illustrates the format of a command and command examples.
- ❑ *screen text font* - Italicized screen text indicates a variable for you to enter.
- ❑ [] - Brackets indicate optional parameters.
- ❑ | - Vertical line separates parameter options for you to choose from.

Document Conventions

This document uses the following conventions:

Note

Notes provide additional information.



Caution

Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.



Warning

Warnings inform you that performing or omitting a specific action may result in bodily injury.

Where to Find Web-based Guides

The installation and user guides for all Allied Telesis products are available in portable document format (PDF) on our web site at **www.alliedtelesyn.com**. You can view the documents online or download them onto a local workstation or server.

Contacting Allied Telesis

This section provides Allied Telesis contact information for technical support as well as sales and corporate information.

Online Support

You can request technical support online by accessing the Allied Telesis Knowledge Base: **<http://kb.alliedtelesis.com>**. You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Email and Telephone Support

For Technical Support via email or telephone, refer to the Support & Services section of the Allied Telesis web site: **www.alliedtelesis.com**.

Returning Products

Products for return or repair must first be assigned a return materials authorization (RMA) number. A product sent to Allied Telesis without an RMA number will be returned to the sender at the sender's expense.

To obtain an RMA number, contact Allied Telesis Technical Support through our web site: **www.alliedtelesis.com**.

Sales or Corporate Information

You can contact Allied Telesis for sales or corporate information through our web site: **www.alliedtelesis.com**. To find the contact information for your country, select Contact Us -> Worldwide Contacts.

Management Software Updates

New releases of management software for our managed products are available from either of the following Internet sites:

- ❑ Allied Telesis web site: **www.alliedtelesis.com**
- ❑ Allied Telesis FTP server: **<ftp://ftp.alliedtelesis.com>**

If the Allied Telesis FTP server asks you to log in, enter "anonymous" for the user name and your email address for the password.

Section I

Basic Operations

This section contains the following chapters:

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- ❑ Chapter 2, “Basic Switch Commands” on page 39
- ❑ Chapter 3, “Enhanced Stacking Commands” on page 65
- ❑ Chapter 4, “Simple Network Time Protocol (SNTP) Commands” on page 73
- ❑ Chapter 5, “SNMPv2 and SNMPv2c Commands” on page 85
- ❑ Chapter 6, “Port Parameter Commands” on page 105
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- ❑ Chapter 9, “Static Port Trunking Commands” on page 151
- ❑ Chapter 10, “LACP Port Trunking Commands” on page 161
- ❑ Chapter 11, “Port Mirroring Commands” on page 177

Chapter 1

Basic Command Line Commands

This chapter contains the following commands:

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- ❑ “EXIT” on page 31
- ❑ “HELP” on page 32
- ❑ “LOGOFF, LOGOUT and QUIT” on page 33
- ❑ “MENU” on page 34
- ❑ “SAVE CONFIGURATION” on page 35
- ❑ “SET PROMPT” on page 36
- ❑ “SET SWITCH CONSOLEMODE” on page 37
- ❑ “SHOW USER” on page 38

Note

Remember to save your changes with the SAVE CONFIGURATION command.

CLEAR SCREEN

Syntax

```
clear screen
```

Parameters

None.

Description

This command clears the screen.

Example

The following command clears the screen:

```
clear screen
```

EXIT

Syntax

`exit`

Parameters

None.

Description

This command ends a management session. If you are managing a slave switch, the command returns you to the master switch from where you started the management session.

Example

The following command ends the current management session:

```
exit
```

Equivalent Commands

`logoff`

`logout`

`quit`

For information, see “LOGOFF, LOGOUT and QUIT” on page 33.

HELP

Syntax

`help`

Parameters

None.

Description

This command displays a list of the CLI keywords with a brief description for each keyword.

Example

The following command displays the CLI keywords:

`help`

LOGOFF, LOGOUT and QUIT

Syntax

logoff

logout

quit

Parameters

None.

Description

These three commands all perform the same function: they end a management session. If you are managing a slave switch, the commands return you to the master switch from which you started the management session.

Example

The following command ends a management session:

```
logoff
```

MENU

Syntax

`menu`

Parameters

None.

Description

This command displays the AT-S63 Main Menu. For instructions on how to use the menus, refer to the *AT-S63 Management Software Menus Interface User's Guide*.

Example

The following command displays the AT-S63 Main Menu:

```
menu
```

Equivalent Command

```
exit
```

For information, see “EXIT” on page 31.

SAVE CONFIGURATION

Syntax

save configuration

Parameters

None.

Description

This command saves your changes to the switch's active boot configuration file for permanent storage.

Whenever you make a change to an operating parameter of the switch, such as enter a new IP address or create a new VLAN, the change is stored in temporary memory. It will be lost the next time you reset the switch or power cycle the unit.

To permanently save your changes, you must use this command. The changes are saved in the active boot configuration file as a series of commands. The commands in the file are used by the switch to recreate all of its settings, such as VLANs and port settings, whenever you reset or power cycle the unit.

To view the name of the currently active boot configuration file, see "SHOW CONFIG" on page 196. To view the contents of a configuration file, see "SHOW FILE" on page 197.

Example

The following command saves your configuration changes to the active boot configuration file:

```
save configuration
```

SET PROMPT

Syntax

```
set prompt="prompt"
```

Parameter

prompt	Specifies the command line prompt. The prompt can be from one to 12 alphanumeric characters. Spaces and special characters are allowed. The prompt must be enclosed in quotes.
--------	--

Description

This command changes the command prompt. Assigning each switch a different command prompt can make it easier for you to identify the different switches in your network when you manage them.

Note

If you define the system name before you set up a system prompt, the switch uses the first 16 characters of the system name as the prompt. See “SET SYSTEM” on page 52.

Example

The following command changes the command prompt to “Sales Switch”:

```
set prompt="Sales Switch"
```

Equivalent Command

```
set asyn prompt="prompt"
```

For information, see “SET ASYN” on page 48.

SET SWITCH CONSOLEMODE

Syntax

```
set switch consolemode=menu|cli
```

Parameter

consolemode Specifies the mode you want management sessions to start in. Options are:

menu Specifies the AT-S63 Main Menu.

cli Specifies the command line prompt. This is the default.

Description

You use this command to specify whether you want your management sessions to start by displaying the command line interface (CLI) or the AT-S63 Main Menu. The default is the CLI.

Example

The following command configures the management software to display the menus whenever you start a management session:

```
set switch consolemode=menu
```

SHOW USER

Syntax

`show user`

Parameter

None.

Description

Displays the user account you used to log on to manage the switch.

Example

`show user`

Chapter 2

Basic Switch Commands

This chapter contains the following commands:

- ❑ “DISABLE TELNET” on page 40
- ❑ “ENABLE TELNET” on page 41
- ❑ “PING” on page 42
- ❑ “RESET SWITCH” on page 43
- ❑ “RESET SYSTEM” on page 44
- ❑ “RESTART REBOOT” on page 45
- ❑ “RESTART SWITCH” on page 46
- ❑ “SET ASYN” on page 48
- ❑ “SET PASSWORD MANAGER” on page 49
- ❑ “SET PASSWORD OPERATOR” on page 50
- ❑ “SET SWITCH CONSOLETIMER” on page 51
- ❑ “SET SYSTEM” on page 52
- ❑ “SET TELNET INSERTNULL” on page 53
- ❑ “SET USER PASSWORD” on page 54
- ❑ “SHOW ASYN” on page 55
- ❑ “SHOW CONFIG DYNAMIC” on page 56
- ❑ “SHOW CONFIG INFO” on page 59
- ❑ “SHOW SWITCH” on page 60
- ❑ “SHOW SYSTEM” on page 63

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE TELNET

Syntax

```
disable telnet
```

Parameters

None.

Description

This command disables the Telnet server on the switch. You might disable the server to prevent anyone from managing the switch with the Telnet application protocol or in the event you decide to use the Secure Shell protocol for remote management. The default setting for the Telnet server is enabled.

Example

The following command deactivates the Telnet server:

```
disable telnet
```


ENABLE TELNET

Syntax

```
enable telnet
```

Parameters

None.

Description

This command activates the Telnet server on the switch. With the server activated, you can remotely manage the switch using the Telnet application protocol. To disable the server, refer to “DISABLE TELNET” on page 40. The default setting for the Telnet server is enabled.

Example

The following command activates the Telnet server:

```
enable telnet
```

PING

Syntax

`ping ipaddress`

Parameter

`ipaddress` Specifies the IP address of an end node to be pinged.

Description

This command instructs the switch to ping an end node. You can use this command to determine whether an active link exists between the switch and another network device.

Note

The switch must have a routing interface on the local subnet from where it is pinging the device. The switch uses the IP address of the interface as its source address. For instructions on how to add a routing interface to the switch, refer to “ADD IP INTERFACE” on page 548.

Example

The following command pings an end node with the IP address of 149.245.22.22

```
ping 149.245.22.22
```

The results of the ping are displayed on the screen.

RESET SWITCH

Syntax

`reset switch`

Parameters

None.

Description

This command does the following:

- ❑ Performs a soft reset on all ports. The reset takes less than a second to complete. The ports retain their current operating parameter settings. To perform this function on a per-port basis, refer to “RESET SWITCH PORT” on page 114.
- ❑ Resets the statistics counters for all ports to zero. To perform this function on a per-port basis, refer to “RESET SWITCH PORT COUNTER” on page 134.
- ❑ Deletes all dynamic MAC addresses from the MAC address table. To perform this function on a per-port basis, refer to “RESET SWITCH FDB” on page 144.

Example

This command resets the switch according to the description above:

`reset switch`

RESET SYSTEM

Syntax

```
reset system [name] [contact] [location]
```

Parameters

name Deletes the switch's name.

contact Deletes the switch's contact.

location Deletes the switch's location.

Description

This command delete's the switch's name, the name of the network administrator responsible for managing the unit, and the location of the unit. To set these parameters, refer to "SET SYSTEM" on page 52. To view the current settings, refer to "SHOW SYSTEM" on page 63.

Examples

This command deletes all three parameter settings:

```
reset system
```

This command deletes just the name:

```
reset system name
```

RESTART REBOOT

Syntax

```
restart reboot
```

Parameters

None.

Description

This command resets the switch. The switch runs its internal diagnostics, loads the AT-S63 Management Software, and configures its parameter settings using the active boot configuration file. The reset can take from 20 seconds to two minutes to complete, depending on the number and complexity of the commands in the active boot configuration file.

Note

The switch does not forward traffic during the reset process. Some network traffic may be lost.

Note

Be sure to use the SAVE CONFIGURATION command to save your changes before resetting the switch. Any unsaved changes are lost.

Your local or remote management session with the switch ends when the unit is reset. You must reestablish the session to continue managing the unit.

Example

The following resets the switch:

```
restart reboot
```

RESTART SWITCH

Syntax

```
restart switch config=none|filename.cfg
```

Parameters

config Specifies the configuration file. The file must already exist on the switch. The NONE option returns the switch to its default values.

Description

This command loads a different configuration file on the switch or returns the switch's parameter settings to their default values. This command can also be used to reset the switch.

If you specify a configuration file, the switch automatically resets itself and configures its parameters according to the settings in the configuration file specified in the command. However, the assignment of the active boot configuration file does not change. Resetting or power cycling the switch again causes the unit to revert to its previous configuration. To change the assignment of the active boot configuration file, refer to "SET CONFIG" on page 193.

Specifying the NONE option returns the switch's operating parameters to the default setting. Note the following before using this option:

- ❑ Returning all parameter settings to their default values deletes all routing interfaces as well as all port-based and tagged VLANs on the switch.
- ❑ This option does not delete files from the AT-S63 file system. To delete files, refer to "DELETE FILE" on page 187.
- ❑ This option does not delete encryption keys stored in the key database. To delete encryption keys, refer to "DESTROY ENCO KEY" on page 664.
- ❑ Returning a switch to its default values does not change the settings in the active boot configuration file. To return the active configuration file to the default settings, you must use the SAVE CONFIGURATION command after the switch reboots and you have reestablished your management session. Otherwise, the switch reverts to the previous configuration the next time you reset the switch.

Note

The switch does not forward network traffic during the reset process. Some network traffic may be lost.

Note

For a list of the default values, refer to the *AT-S63 Management Software Features Guide*.

Your local or remote management session with the switch ends when you reset the switch. You must reestablish the session to continue managing the switch.

Examples

The following command configures the switch using the configuration file named `switch12.cfg`:

```
restart switch config=switch12.cfg
```

The following command resets the switch to its default values:

```
restart switch config=none
```

The following command resets the switch:

```
restart switch
```

Equivalent Command

```
restart reboot
```

For information, see “RESTART REBOOT” on page 45.

SET ASYN

Syntax

```
set asyn [speed=1200|2400|4800|9600|19200|38400|  
57600|115200] [prompt="prompt"]
```

Parameters

speed	Sets the speed (baud rate) of the serial terminal port on the switch. The default is 9600 bps.
prompt	Specifies the command line prompt. The prompt can be from one to 12 alphanumeric characters. Spaces and special characters are allowed. The prompt must be enclosed in double quotes. This parameter performs the same function as "SET PROMPT" on page 36.

Description

This command sets the baud rate of the serial terminal port on the switch. The port is used for local management of the switch. You can also use this command to set the command line prompt.

Note

A change to the baud rate of the port ends your management session if you are managing the switch locally. To reestablish a local management session you must change the speed of the terminal or the terminal emulator program to match the new speed of the serial terminal port on the switch.

Example

The following command sets the baud rate to 115200 bps:

```
set asyn speed=115200
```

Equivalent Command

```
set prompt="prompt"
```

For information, see "SET PROMPT" on page 36.

SET PASSWORD MANAGER

Syntax

```
set password manager
```

Parameters

None.

Description

This command sets the manager's password. The manager account allows you to view and change all switch parameters. The default password is "friend." The password can be from 0 to 16 alphanumeric characters. Allied Telesis recommends that you avoid special characters, such as spaces, asterisks, or exclamation points because some web browsers do not accept them in passwords. The password is case sensitive.

Example

The following command changes the manager's password:

```
set password manager
```

Follow the prompts to enter the new password.

Equivalent Command

```
set user manager password=password
```

For information, see "SET USER PASSWORD" on page 54.

SET PASSWORD OPERATOR

Syntax

`set password operator`

Parameters

None.

Description

This command sets the operator's password. Logging in as operator allows you to only view the switch parameters. The default password is "operator." The password can be from 0 to 16 alphanumeric characters. Allied Telesis recommends that you avoid special characters, such as spaces, asterisks, or exclamation points because some web browsers do not accept them in passwords. The password is case sensitive.

Example

The following command changes the operator's password:

```
set password operator
```

Follow the prompts to enter the new password.

Equivalent Command

```
set user operator password=password
```

For information, see "SET USER PASSWORD" on page 54.

SET SWITCH CONSOLETIMER

Syntax

```
set switch consoletimer=value
```

Parameter

consoletimer	Specifies the console timer in minutes. The range is 1 to 60 minutes. The default is 10 minutes.
--------------	--

Description

This command sets the console timer, which is used by the management software to end inactive management sessions. The AT-S63 Management Software automatically ends a session if it does not detect any management activity for the duration of the console timer. This security feature can prevent unauthorized individuals from using your management station should you step away from your system while configuring a switch. To view the current console timer setting, refer to “SHOW SWITCH” on page 60.

Example

The following command sets the console timer to 25 minutes:

```
set switch consoletimer=25
```

SET SYSTEM

Syntax

```
set system [name="name"] [contact="contact"]  
[location="location"]
```

Parameters

name	Specifies the name of the switch. The name can be from 1 to 39 alphanumeric characters in length and must be enclosed in double quotes (" "). Spaces are allowed.
contact	Specifies the name of the network administrator responsible for managing the switch. The contact can be from 1 to 39 alphanumeric characters in length and must be enclosed in double quotes. Spaces are allowed.
location	Specifies the location of the switch. The location can be from 1 to 39 alphanumeric characters in length and must be enclosed in double quotes. Spaces are allowed.

Description

This command sets a switch's name, the name of the network administrator responsible for managing the unit, and the location of the unit.

If a parameter already has a value, the new value replaces the existing value. To view the current values for these parameters, refer to "SHOW SYSTEM" on page 63. To delete a value without assigning a new value, refer to "RESET SYSTEM" on page 44.

Note

If you define the system name before you set up a system prompt, the switch uses the first 16 characters of the system name as the prompt. See "SET PROMPT" on page 36.

Examples

The following command sets a switch's information:

```
set system name="Sales" contact="Jane Smith" location="Bldg  
3, rm 212"
```

The following command sets just the system's name:

```
set system name="PR Office"
```

SET TELNET INSERTNULL

Syntax

```
set telnet insertnull=on|off
```

Parameters

insertnull Controls whether a NULL character is inserted after each CR sent by the Telnet server to the remote client. Options are:

- on** Sends a NULL character after each CR sent to the remote client.
- off** Specifies that no NULL character is sent to the remote client. This is the default setting.

Description

You can use this command to toggle the Telnet server on the switch to add a NULL character after each CR for those Telnet clients that require the character in order to display the information correctly. The default setting on the switch is to not send the NULL character after a CR. To view the current setting, see “SHOW SWITCH” on page 60.

Example

This command configures the switch to send a NULL character after each CR during a Telnet management session:

```
set telnet insertnull=on
```

SET USER PASSWORD

Syntax

```
set user manager|operator password=password
```

Parameter

password Specifies the password.

Description

This command sets the manager or operator's password. The default manager password is "friend." The default operator password is "operator." The password can be from 0 to 16 alphanumeric characters. Allied Telesis recommends that you avoid special characters, such as spaces, asterisks, or exclamation points because some web browsers do not accept them in passwords. The password is case sensitive.

Example

The following command sets the operator's password to "newby":

```
set user operator password=newby
```

Equivalent Commands

```
set password manager
```

For information, see "SET PASSWORD MANAGER" on page 49

```
set password operator
```

For information, see "SET PASSWORD OPERATOR" on page 50

SHOW ASYN

Syntax

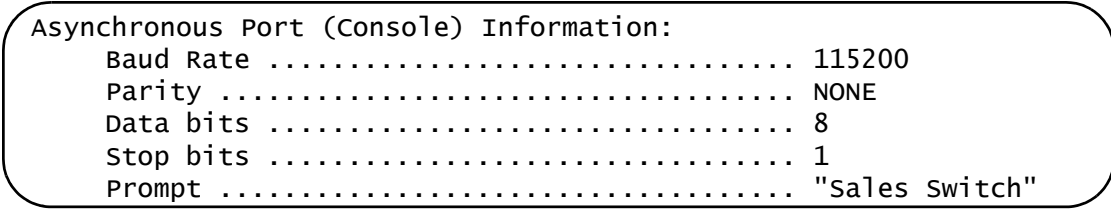
show asyn

Parameters

None.

Description

This command displays the settings for the serial terminal port on the switch, used for local management of the device. An example of the display is shown in Figure 1.



```
Asynchronous Port (Console) Information:
Baud Rate ..... 115200
Parity ..... NONE
Data bits ..... 8
Stop bits ..... 1
Prompt ..... "Sales Switch"
```

Figure 1. SHOW ASYN Command

To configure the serial port's baud rate, refer to "SET ASYN" on page 48. To configure the command line prompt, refer to "SET PROMPT" on page 36. You cannot adjust the parity, data bits, or stop bit of the serial terminal port.

Example

The following command displays the serial terminal port settings:

```
show asyn
```

SHOW CONFIG DYNAMIC

Syntax

```
show config dynamic[=module]
```

Parameters

module Displays the settings of a specific switch module. You can specify only one module. For a list of modules, refer to Table 1.

Description

This command displays the settings of the switch parameters that have been changed from their default values, including those not yet saved to the active boot configuration file. The parameters are displayed in their command line command equivalents. You can view all of the settings or limit the display to just those of a particular switch module. An example of the display is shown in Figure 2.

```
---Start of current configuration -----
#
# System Configuration
#
set system name="Production Server"
set system contact="Jane Smith"
set system location="Bldg. 2, room 411"
#
# IP Configuration
#
```

Figure 2. SHOW CONFIG DYNAMIC Command

The MODULE variable is used to limit the display to the parameter settings of a particular switch module. You can specify only one module per command. The modules are listed in Table 1.

Table 1. Module Variable

Variable	Description
ACL	Port access control list
ARP	Static ARP entries
AUTH	Manager and operator passwords (encrypted) and RADIUS and TACACS+

Table 1. Module Variable (Continued)

Variable	Description
CLASSIFIER	Classifiers for ACL and QoS
DOS	Denial of service defense
ENCO	Encryption keys
ENHSTACK	Enhanced stacking
EVTLOG	Event log and syslog client
GARP	GARP and GVRP
IGMPSNOOP	IGMP snooping
INTF	Routing interfaces
LACP	Link Aggregation Control Protocol
MAC	Static MAC addresses
MACTIMER	MAC address table timeout value
MACVLAN	MAC address-based VLANs
MGMTACL	Management access control list
MIRROR	Source ports of port mirror
MIRTO	Destination port of port mirror
MLDSNOOP	MLD snooping
PKI	Public Key Infrastructure
PORT	Port configuration
PORTACC	802.1x port-based access control
PORTSEC	MAC address-based port security
PORTTRUNK	Static port trunks
QOS	Quality of Service
RIP	Routing Information Protocol
ROUTE	Static routes
RRPSNOOP	RRP snooping
SNMP	SNMP
SNTP	SNTP
SSH	Secure Shell protocol

Table 1. Module Variable (Continued)

Variable	Description
SSL	Secure Sockets Layer protocol
STP	Spanning Tree, Rapid Spanning, and Multiple Spanning Tree protocols
SWITCH	Switch console timer, console startup mode, serial port baud rate, Telnet server
SYSTEM	Administrator name, switch name, and switch location
VLAN	Port-based and tagged VLANs, and multiple VLAN modes
WEBSERV	Web server

Examples

The following command displays all the switch parameter settings that have been changed from their default values:

```
show config dynamic
```

The following command displays the non-default parameter settings for IGMP snooping:

```
show config dynamic=igmpsnoop
```

SHOW CONFIG INFO

Syntax

```
show config info
```

Parameters

None.

Description

This command displays the settings of all the switch parameters, including those not yet saved to the active boot configuration file.

Examples

The following command displays all the parameter settings on the switch:

```
show config info
```

SHOW SWITCH

Syntax

show switch

Parameters

None.

Description

This command displays a variety of switch parameters. An example of the display is shown in Figure 3.

Switch Information:

```

Application Software Version ..... ATS63 v1.2.0 NE
Application Software Build Date ..... Jun 10 2005 16:27:38
Bootloader Version ..... ATS63_LOADER v1.3.0
Bootloader Build Date ..... Apr 7 2005 16:25:19
MAC Address ..... 00:21:46:A7:B4:43
VLAN Mode ..... User Configured
Ingress Filtering ..... OFF
Active Spanning Tree version ..... RSTP
Mirroring State ..... Disabled
Enhanced Stacking mode ..... Master
Console Disconnect Timer Interval .... 10 minute(s)
Web Server Status ..... Enabled
Telnet Server status ..... Enabled
Telnet insert NULL ..... OFF
MAC address aging time ..... 300 second(s)
Console Startup Mode ..... CLI
Multicast Mode ..... Forward Across VLANs

```

Figure 3. SHOW SWITCH Command

This command displays the following information:

- ❑ Application software version and Application software build date - The version number and build date of the AT-S63 Management Software.
- ❑ Bootloader version and Bootloader build date - The version number and build date of the AT-S63 bootloader.
- ❑ MAC address - The MAC address of the switch. This value cannot be changed.

- ❑ VLAN mode - The switch's VLAN mode. The three possible VLAN modes are:
 - ❑ User configured (for creating your own port-based and tagged VLANs)
 - ❑ 802.1Q-compliant
 - ❑ Non-802.1Q-compliant.

The default is user configured. To set a switch's VLAN mode, refer to "SET SWITCH VLANMODE" on page 504.

- ❑ Ingress filtering - The status of ingress filtering on the switch. When ingress filtering is activated, tagged frames are filtered when they are received on a port. When ingress filtering is deactivated, which is the default, tagged frames are filtered before they are transmitted out a port. To set ingress filtering, refer to "SET SWITCH INFILTERING" on page 503.
- ❑ Active Spanning Tree version - The spanning tree protocol that has been designated as the active protocol on the switch. To configure or enable a spanning tree protocol, you must first designate it as the active protocol on the switch. The switch supports, STP, RSTP, and MSTP. The default is RSTP. To select an active spanning tree protocol, refer to "ACTIVATE STP" on page 438, "ACTIVATE RSTP" on page 452, and "ACTIVATE MSTP" on page 466.
- ❑ Mirroring state - The status of port mirroring. The display includes the destination port as well as the ingress and egress source ports if port mirroring is activated on the switch. To configure port mirroring, refer to "SET SWITCH MIRROR" on page 178 and "SET SWITCH PORT MIRROR" on page 179.
- ❑ Enhanced stacking mode - The enhanced stacking mode of the switch, which can be master, slave, or unavailable. The default is slave. To set the enhanced stacking status, refer to "SET SWITCH STACKMODE" on page 68.
- ❑ Console disconnect timer interval - The current value of the console timer, used by the management software to end inactive management sessions. The AT-S63 Management Software ends a local or remote management session if it does not detect any management activity for the duration of the console timer. The default is 10 minutes. To set the console timer, refer to "SET SWITCH CONSOLETIMER" on page 51.
- ❑ Web server status - The status of the web server. When the web server is disabled, you cannot remotely manage the switch using a web browser and the web browser interface. The default setting is enabled. To enable or disable the server, refer to "ENABLE HTTP SERVER" on page 651 and "DISABLE HTTP SERVER" on page 650.
- ❑ Telnet server status - The status of the Telnet server. When the Telnet server is disabled, you cannot remotely manage the switch using the Telnet application protocol. The default setting is enabled. To enable or

disable the server, refer to “ENABLE TELNET” on page 41 and “DISABLE TELNET” on page 40.

- ❑ Telnet insert NULL - The status of the Telnet NULL parameter. When ON, the Telnet server on the switch adds a NULL character after each CR for those Telnet clients that require the character to display the information correctly. When OFF, the default setting, no NULL character is set after a CR. To set this feature, see “SET TELNET INSERTNULL” on page 53.
- ❑ MAC address aging time - The current value for the MAC address aging timer. The switch uses the aging timer to delete inactive dynamic MAC addresses from the MAC address table. To set this value, refer to “SET SWITCH AGINGTIMER|AGEINGTIMER” on page 145.
- ❑ Console startup mode - The management interface —menus or command line — that initially appears when you start a local or remote management session. The default is the command line interface. To set the startup mode, refer to “SET SWITCH CONSOLEMODE” on page 37.
- ❑ Multicast Mode - The multicast mode, which determines the behavior of the switch when forwarding ingress spanning tree BPDU packets and 802.1x port-based access control EAPOL packets To set the multicast mode, refer to “SET SWITCH MULTICASTMODE” on page 447.

Example

The following command displays the switch information described above:

```
show switch
```

SHOW SYSTEM

Syntax

show system

Parameters

None.

Description

This command displays the following information:

MAC Address

The MAC address of the switch.

Model Name

The model name of the switch.

Serial Number

The serial number of the switch.

IP Address

The IP address of the local interface.

Subnet Mask

The subnet mask of the local interface.

Note

To manage routing interfaces and designate a local interface, refer to Chapter 32, "Internet Protocol Version 4 Packet Routing Commands" on page 545

Default Gateway

For AT-9400 Switches that support IPv4 routing, such as the AT-9424Ts and AT-9448Ts/XP Switches, this field displays the IP address of the next hop of the switch's default route. The switch uses the default route when it receives a network packet for routing, but cannot find a route for it in the routing table. This field will contain 0.0.0.0 if no default route is defined on the switch.

For AT-9400 Switches that do not support IPv4 packet routing, such as the AT-9424T/GB and AT-9424T/SP Switches, this field displays the default gateway address. This is the IP address of a router interface on your network. The switch's management software uses this address as the next hop to reaching a remote network device when the switch's local interface and the remote device are on different subnets. The default value is

0.0.0.0.

System Up Time

The length of time since the switch was last reset or power cycled.

Bootloader

The version number and build date of the AT-S63 bootloader.

Application

The version number and build date of the AT-S63 Management Software.

System Name

The name of the switch.

Administrator

The name of the network administrator responsible for managing the switch.

Location

The location of the switch, (for example, 4th Floor - rm 402B).

Note

To configure the name, administrator, and location parameters, refer to “SET SYSTEM” on page 52.

Power Information

The status of the main power supply, the redundant power supply (if present), and internal power consumption.

Temperature (Deg.C)

The ambient temperature as measured where the air enters the cooling vents on the side of the unit.

Fan Information

The speed or operating status of the system fan(s).

Example

The following command displays the above information about the switch:

```
show system
```


Chapter 3

Enhanced Stacking Commands

This chapter contains the following commands:

- ❑ “ACCESS SWITCH” on page 66
- ❑ “SET SWITCH STACKMODE” on page 68
- ❑ “SHOW REMOTELIST” on page 70

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ACCESS SWITCH

Syntax

```
access switch number=number|macaddress=macaddress
```

Parameters

number	Specifies the number of the switch in an enhanced stack that you want to manage. You view this number using the SHOW REMOTELIST command.
macaddress	Specifies the MAC address of the switch you want to manage. This can also be displayed using the SHOW REMOTELIST command. You can enter the address in either of the following formats: xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx

Description

This command starts a management session on another switch that supports enhanced stacking, such as another AT-9400 Switch or an AT-8500 Switch. You can specify the switch by switch number or by MAC address, both of which are displayed with “SHOW REMOTELIST” on page 70.

Note

You must perform the ACCESS SWITCH command from the management session of the master switch where you started the session. This command will not work from a management session of a slave switch. To determine the master or slave status of your switch, use “SHOW SWITCH” on page 60.

Note

You must perform the SHOW REMOTELIST command before the ACCESS SWITCH command.

When you are finished managing a slave switch, use the LOGOFF, LOGOUT, or QUIT command to end the management session and return back to the master switch from which you started the management session. For information, refer to “LOGOFF, LOGOUT and QUIT” on page 33.

Examples

The following command starts a management session on switch number 12:

```
access switch number=12
```

The following command starts a management session on a switch with the MAC address 00:30:84:52:02:11

```
access switch macaddress=003084520211
```

SET SWITCH STACKMODE

Syntax

```
set switch stackmode=master|slave|unavailable
```

Parameter

stackmode	Specifies the enhanced stacking mode of the switch. The options are:	
	master	Specifies the switch’s stacking mode as master. A master switch must be assigned an IP address and subnet mask.
	slave	Specifies the switch’s stacking mode as slave. A slave does not need an IP address. This is the default setting for a switch.
	unavailable	Specifies the switch’s stacking mode as unavailable. A switch with this status cannot be managed from an enhanced stack. It can be managed locally through its RS-232 terminal port or remotely if it is assigned an IP address and subnet mask.

Description

This command sets a switch’s enhanced stacking status.

Note
To determine the master or slave status of a switch, use “SHOW SWITCH” on page 60.

Note
You cannot change the stacking status of a switch through enhanced stacking. If a switch does not have an IP address or subnet mask, such as a slave switch, you must use a local management session to change its stacking status. If the switch has an IP address and subnet mask, such as a master switch, you can use a local session or a remote Telnet or SSH management session to change its stacking status.

Example

The following command sets the switch's stacking status to master:

```
set switch stackmode=master
```

SHOW REMOTELIST

Syntax

`show remotelist [sorted by=macaddress|name]`

Parameter

sorted Sorts the list either by MAC address or by name. The default is by MAC address.

Description

This command displays the list of switches in an enhanced stack. The list does not include the master switch where you started the management session or switches with a stacking status of unavailable.

Note
You must perform the SHOW REMOTELIST command from the management session of the master switch where you started the management session. This command will not work from a slave switch. Nor will the command work from a master switch that you accessed through enhanced stacking from another master switch. To determine the master or slave status of your switch, use “SHOW SWITCH” on page 60.

An example of the information displayed by this command is shown in Figure 4.

Searching for slave devices. Please wait...

Num	MAC Address	Name	Switch Mode	Software Version	Switch Model
01	00:21:46:A7:B4:04	Production..	Slave	S63 v1.2.0	AT-9424T/SP
02	00:21:46:A7:B4:43	Marketing	Slave	S63 v1.2.0	AT-9424T/SP
03	00:30:84:00:00:02	Tech Suppo..	Slave	S62 v1.3.0	AT-8524M

Figure 4. SHOW REMOTELIST Command

Examples

The following command displays the switches in an enhanced stack, sorted by MAC address, the default sorting method:

`show remotelist`

The following command displays the switches sorted by name:

```
show remotelist sorted by=name
```


Chapter 4

Simple Network Time Protocol (SNTP) Commands

This chapter contains the following commands:

- ❑ “ADD SNTPSERVER PEER|IPADDRESS” on page 74
- ❑ “DELETE SNTPSERVER PEER|IPADDRESS” on page 75
- ❑ “DISABLE SNTP” on page 76
- ❑ “ENABLE SNTP” on page 77
- ❑ “PURGE SNTP” on page 78
- ❑ “SET DATE” on page 79
- ❑ “SET SNTP” on page 80
- ❑ “SET TIME” on page 81
- ❑ “SHOW SNTP” on page 82
- ❑ “SHOW TIME” on page 84

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD SNTPSERVER PEER|IPADDRESS

Syntax

```
add sntpserver peer|ipaddress=ipaddress
```

Parameter

peer or ipaddress	Specifies the IP address of an SNTP server. These parameters are equivalent.
-----------------------------	--

Description

This command adds the IP address of an SNTP or NTP server to the SNTP client on the switch. The switch uses the SNTP or NTP server to set its date and time. You can specify only one SNTP or NTP server.

Note

The switch must have a routing interface on the local subnet where the SNTP or NTP server is a member. The switch uses the IP address of the interface as its source address when sending packets to the server. For instructions on how to add a routing interface to the switch, refer to “ADD IP INTERFACE” on page 548.

If the routing interface obtains its IP address and subnet mask from a DHCP server, you can configure the DHCP server to provide the switch with an IP address of an NTP or SNTP server. If you configured the DHCP server to provide this address, then you do not need to enter it in this command.

Example

The following command specifies the IP address of 148.35.16.248 for the SNTP server:

```
add sntpserver ipaddress=148.35.16.248
```

DELETE SNTPSERVER PEER|IPADDRESS

Syntax

```
delete sntpserver peer|ipaddress=ipaddress
```

Parameter

peer or ipaddress	Specifies the IP address of an SNTP server. The parameters are equivalent.
-----------------------------	--

Description

This command deletes the IP address of the SNTP server from the SNTP client software on the switch and returns the parameter to the default value of 0.0.0.0. To view the IP address, refer to “SHOW SNTP” on page 82.

Example

The following command deletes the SNTP server with the IP address 148.35.16.248:

```
delete sntpserver ipaddress=148.35.16.248
```

DISABLE SNTP

Syntax

```
disable sntp
```

Parameters

None.

Description

This command disables the SNTP client software on the switch. The default setting for SNTP is disabled.

Example

The following command disables SNTP on the switch:

```
disable sntp
```

ENABLE SNTP

Syntax

```
enable sntp
```

Parameters

None.

Description

This command enables the SNTP client software on the switch. The default setting for SNTP is disabled. With SNTP enabled, the switch will obtain its date and time from an SNTP server, assuming that you have specified a server IP address with “ADD SNTPSERVER PEER|IPADDRESS” on page 74.

Example

The following command enables the SNTP client software:

```
enable sntp
```

PURGE SNTP

Syntax

```
purge sntp
```

Parameters

None.

Description

This command clears the SNTP configuration and disables the SNTP server. To disable SNTP and retain the configuration, see “DISABLE SNTP” on page 76.

Example

The following command clears the SNTP configuration and disables SNTP:

```
purge sntp
```

SET DATE

Syntax

```
set date=dd-mm-yyyy
```

Parameter

date	Specifies the date for the switch in day-month-year format.
------	---

Description

This command sets the date on the switch. You can use this command to set the switch's date if you are not using an SNTP server. With its onboard battery, the AT-9400 Switch can maintain the date even when the unit is powered off or reset.

Example

The following command sets the switch's date to December 11, 2004:

```
set date=11-12-2004
```

SET SNTP

Syntax

```
set sntp [dst=enabled|disabled] [pollinterval=value]  
[utcoffset=value]
```

Parameters

dst	Enables or disables daylight savings time.
pollinterval	Specifies the time interval between two successive queries to the SNTP server. The range is 60 to 1200 seconds. The default is 600 seconds.
utcoffset	Specifies the time difference in hours between UTC and local time. The range is -12 to +12 hours. The default is 0 hours.

Description

This command enables or disables daylight savings time and sets the polling and UTC offset times for the SNTP client software.

Note

The switch does not set DST automatically. If the switch is in a locale that uses DST, you must remember to enable this in April when DST begins and disable it in October when DST ends. If the switch is in a locale that does not use DST, set this option to disabled all the time.

Example

The following command enables daylight savings time, sets the poll interval to 300 seconds, and sets the UTC offset to -8 hours:

```
set sntp dst=enabled pollinterval=300 utcoffset=-8
```


SET TIME

Syntax

```
set time=hh:mm:ss
```

Parameter

time	Specifies the hour, minute, and second for the switch's time in 24-hour format.
------	---

Description

This command sets the time on the switch. You can use this command to set the switch's time if you are not using an SNTP server. With its onboard battery, the AT-9400 Switch can maintain the time even when the unit is powered off or reset.

Example

The following command sets the switch's time to 4:34 pm and 52 seconds:

```
set time=16:34:52
```

SHOW SNTP

Syntax

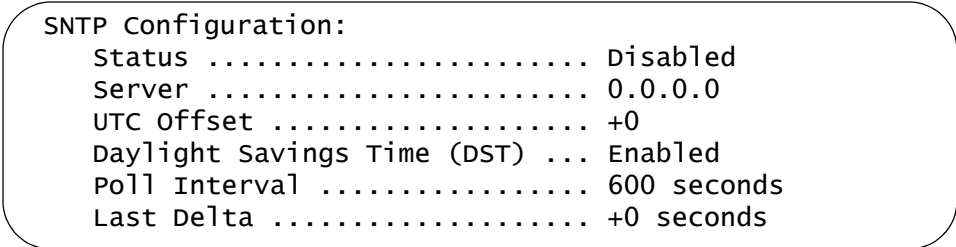
```
show sntp
```

Parameters

None.

Description

This command displays the current settings for the client SNTP software on the switch. An example of the display is shown in Figure 5.

The output of the 'show sntp' command is displayed within a rounded rectangular box. It shows the following configuration details:

```
SNTP Configuration:
Status ..... Disabled
Server ..... 0.0.0.0
UTC Offset ..... +0
Daylight Savings Time (DST) ... Enabled
Poll Interval ..... 600 seconds
Last Delta ..... +0 seconds
```

Figure 5. SHOW SNTP Command

The information displayed by this command is described here:

- ❑ **Status** - The status of the SNTP client software on the switch. The status can be either enabled or disabled. If enabled, the switch seeks its date and time from an SNTP server. The default is disabled.
- ❑ **SNTP** - The IP address of the SNTP server.
- ❑ **UTC Offset** - The time difference in hours between UTC and local time. The range is -12 to +12 hours. The default is 0 hours.
- ❑ **Daylight Savings Time (DST)** - The status of the daylight savings time setting. The status can be enabled or disabled.
- ❑ **Poll interval** - The time interval between two successive queries to the SNTP server. The range is 60 to 1200 seconds. The default is 600 seconds.
- ❑ **Last Delta** - The last adjustment applied to the system time. It is the drift in the system clock between two successive queries to the SNTP server.

Example

The following command displays SNTP client software information:

```
show sntp
```

SHOW TIME

Syntax

```
show time
```

Parameters

None.

Description

This command shows the system's current date and time.

Example

The following command shows the system's date and time.

```
show time
```

Chapter 5

SNMPv2 and SNMPv2c Commands

This chapter contains the following commands:

- ❑ “ADD SNMP COMMUNITY” on page 86
- ❑ “CREATE SNMP COMMUNITY” on page 88
- ❑ “DELETE SNMP COMMUNITY” on page 91
- ❑ “DESTROY SNMP COMMUNITY” on page 93
- ❑ “DISABLE SNMP” on page 94
- ❑ “DISABLE SNMP AUTHENTICATETRAP” on page 95
- ❑ “DISABLE SNMP COMMUNITY” on page 96
- ❑ “ENABLE SNMP” on page 97
- ❑ “ENABLE SNMP AUTHENTICATETRAP” on page 98
- ❑ “ENABLE SNMP COMMUNITY” on page 99
- ❑ “SET SNMP COMMUNITY” on page 100
- ❑ “SHOW SNMP” on page 102

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD SNMP COMMUNITY

Syntax

```
add snmp community="community" [traphost=ipaddress]  
[manager=ipaddress]
```

Parameters

community	Specifies an existing SNMP community string on the switch. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or special character such as an exclamation point. Otherwise, the quotes are optional.
traphost	Specifies the IP address of a trap receiver.
manager	Specifies the IP address of a management station to have SNMP access to the switch using the community string.

Description

This command adds the IP address of a trap receiver or a management station to an existing community string.

The TRAPHOST parameter specifies a trap receiver for the SNMP community string. This is the IP address of a device to which traps generated by the switch are sent. A community string can have up to eight IP addresses of trap receivers, but only one can be added at a time with this command.

The MANAGER parameter specifies a management station to be allowed SNMP management access to the switch using the community string. This parameter applies only to community strings with a closed status. A community string can have up to eight IP addresses of management stations, but only one can be added at a time with this command.

To create a new community string, refer to “CREATE SNMP COMMUNITY” on page 88. To view the current community strings, refer to “SHOW SNMP” on page 102.

Examples

The following command permits access by a management station with the IP address 149.212.11.22 to the switch through the “private” community string:

```
add snmp community=private manager=149.212.11.22
```

The following command adds the IP address 149.212.10.11 as a trap receiver to the “public” community string:

```
add snmp community=public traphost=149.212.10.11
```

CREATE SNMP COMMUNITY

Syntax

```
create snmp community="community" [access=read|write]
[open=yes|no|on|off|true|false] [traphost=ipaddress]
[manager=ipaddress]
```

Parameters

community	Specifies a new community string. The maximum length of a community string is 15 alphanumeric characters. Spaces are allowed. The name must be enclosed in double quotes if it includes a space or other special character such as an exclamation point. Otherwise, the quotes are optional. The string is case sensitive.				
access	Specifies the access level of the new community string. Options are “read” for read only access and “write” for both read and write access. The default is “read.”				
open	Specifies the open or closed status of the community string. The options are: <table> <tr> <td>yes, on, true</td><td>The community string is open, meaning any management station can use the string to access the switch. These values are equivalent.</td></tr> <tr> <td>no, off, false</td><td>The community string is closed, meaning only those management stations whose IP addresses are assigned to the string can use it to access the switch. You can assign a management IP address to the string using the MANAGER option in this command. The default setting for a community string is closed. These values are equivalent.</td></tr> </table>	yes, on, true	The community string is open, meaning any management station can use the string to access the switch. These values are equivalent.	no, off, false	The community string is closed, meaning only those management stations whose IP addresses are assigned to the string can use it to access the switch. You can assign a management IP address to the string using the MANAGER option in this command. The default setting for a community string is closed. These values are equivalent.
yes, on, true	The community string is open, meaning any management station can use the string to access the switch. These values are equivalent.				
no, off, false	The community string is closed, meaning only those management stations whose IP addresses are assigned to the string can use it to access the switch. You can assign a management IP address to the string using the MANAGER option in this command. The default setting for a community string is closed. These values are equivalent.				
traphost	Specifies the IP address of a trap receiver to receive system traps.				
manager	Specifies the IP address of a management station that can use the community string to access the switch. This option applies if you specify the status of the community string as closed. A community string can have up to eight IP addresses of management stations, but only one can be assigned with this option.				

Description

This command creates a new SNMP community string on the switch. The switch comes with two default community strings, “public,” with an access of read only, and “private,” with an access level of read and write. A switch can support up to eight community strings.

The COMMUNITY parameter specifies the new community string. The string can be up to 15 alphanumeric characters. The string is case sensitive.

The ACCESS parameter defines the access level for the new community string. The access level can be either read or read and write. The READ option specifies the read access level and the WRITE option specifies the read and write access level.

The OPEN parameters controls whether the string will have an open or closed status. If you specify YES, ON or TRUE, the string will have an open status. Any management station will be able to use the string to access the switch. If you specify NO, OFF or FALSE, the string will have a closed status and only those management stations whose IP addresses are assigned to the switch will be able to use the string. This is the default.

The TRAPHOST parameter specifies the IP address of a trap receiver to receive traps from the switch. A community string can have up to eight trap receivers, but only one can be assigned when a community string is created. To add IP addresses of trap receivers to an existing community string, see “ADD SNMP COMMUNITY” on page 86.

The MANAGER parameter specifies the IP address of a management station to be permitted SNMP access to the switch through the community string. You use this parameter when you give a community string a closed status. A community string with a closed status can only be used by those management stations whose IP addresses have been assigned to the string.

A community string can have up to eight manager IP addresses, but only one can be assigned when a community string is created. To add IP addresses of management stations to an existing community string, see “ADD SNMP COMMUNITY” on page 86.

Examples

The following command creates the new community string “serv12” with read access level and an access status of open:

```
create snmp community=serv12 access=read open=yes
```

The following command creates the new community string “wind11” with read and write access level. To limit the use of the string, its access status is specified as closed and it is assigned the IP address of the management

station that will use the string:

```
create snmp community=wind11 access=write open=no  
manager=149.35.24.22
```

(The OPEN=NO parameter can be omitted from the example because closed status is the default for a new community string.)

This command creates a community string called “serv12” with a closed status. The command assigns the string the IP address of a management station that can use the string and also receive SNMP traps:

```
create snmp community=serv12 access=write open=no  
traphost=149.35.24.22 manager=149.35.24.22
```

DELETE SNMP COMMUNITY

Syntax

```
delete snmp community="community" traphost=ipaddress  
manager=ipaddress
```

Parameters

community	Specifies the SNMP community string on the switch to be modified. The community string must already exist on the switch. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or special character, such as an exclamation point. Otherwise, the quotes are optional.
traphost	Specifies the IP address of a trap receiver to be removed from the community string.
manager	Specifies the IP address of a management station to be removed from the community string.

Description

This command removes the IP addresses of trap receivers and management workstations from a community string.

The TRAPHOST parameter removes the IP address of a trap receiver from an SNMP community string. Once an IP address is removed, the switch will not send SNMP traps to the trap receiver represented by the address.

The MANAGER parameter removes the IP address of a management station from the community string. A management station removed from a community string with a closed status can no longer use SNMP and the community string to manage the switch. If you remove the last management station IP address from a community string with a closed status, no SNMP management station can access the switch using that community string.

Examples

The following command deletes the IP address 149.212.11.22 of a management station from the community string "private."

```
delete snmp community=private  
manager=149.212.11.22
```

The following command deletes the IP address 149.212.44.45 of a trap receiver from the community string “public.”

```
delete snmp community=public traphost=149.212.44.45
```

DESTROY SNMP COMMUNITY

Syntax

```
destroy snmp community="community"
```

Parameter

community	Specifies an SNMP community string to delete from the switch. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or special character, such as an exclamation point. Otherwise, the quotes are optional.
-----------	---

Description

This command deletes an SNMP community string from the switch. IP addresses of management stations and SNMP trap receivers assigned to the community string are deleted as well.

Example

The following command deletes the community string "wind44":

```
destroy snmp community=wind44
```

DISABLE SNMP

Syntax

```
disable snmp
```

Parameters

None.

Description

This command disables SNMP on the switch. You cannot manage the unit from an SNMP management station when SNMP is disabled. The default setting for SNMP is disabled.

Example

The following command disables SNMP on the switch:

```
disable snmp
```

DISABLE SNMP AUTHENTICATETRAP

Syntax

```
disable snmp authenticatetrap|authenticate_trap
```

Parameters

None.

Description

This command stops the switch from sending authentication failure traps to trap receivers. However, the switch will continue to send other system traps, such as alarm traps. The default setting for sending authentication failure traps is disabled.

The AUTHENTICATETRAP and AUTHENTICATE_TRAP keywords are equivalent.

To activate the authentication failure trap, refer to “ENABLE SNMP AUTHENTICATETRAP” on page 98.

Example

The following command instructs the switch not to send authentication failure traps to SNMP trap receivers:

```
disable snmp authenticatetrap
```

DISABLE SNMP COMMUNITY

Syntax

```
disable snmp community="community"
```

Parameter

community	Specifies an SNMP community string to disable on the switch. This parameter is case sensitive. The string must be enclosed in double quotes if it contains a space or other special character such as an exclamation point. Otherwise, the quotes are optional.
-----------	---

Description

This command disables a community string on the switch, while leaving SNMP and all other community strings active. IP addresses of management stations or trap receivers assigned to the community string are also disabled. A disabled community string cannot be used by a management station to access the switch.

Example

The following command deactivates the SNMP community string "sw1200" and the IP addresses of any management stations and trap receivers assigned to the community string:

```
disable snmp community=sw1200
```


ENABLE SNMP

Syntax

```
enable snmp
```

Parameters

None.

Description

This command activates SNMP on the switch so that you can remotely manage the unit with an SNMP application program from a management station on your network. It also enables the switch to send SNMP traps to trap receivers. The default setting for SNMP on the switch is disabled.

Example

The following command activates SNMP on the switch:

```
enable snmp
```

ENABLE SNMP AUTHENTICATETRAP

Syntax

```
enable snmp authenticatetrap|authenticate_trap
```

Parameters

None.

Description

This command configures the switch to send authentication failure traps to trap receivers. The switch sends an authentication failure trap whenever a SNMP management station attempts to access the switch using an incorrect or invalid community string, or the management station's IP address has not been added to a community string that has a closed access status.

The default setting for sending authentication failure traps is disabled. Refer to "ADD SNMP COMMUNITY" on page 86 to enter the IP addresses of the SNMP trap receivers.

The AUTHENTICATETRAP and AUTHENTICATE_TRAP keywords are equivalent.

Example

The following command configures the switch to send authentication failure traps to SNMP trap receivers:

```
enable snmp authenticatetrap
```

ENABLE SNMP COMMUNITY

Syntax

```
enable snmp community="community"
```

Parameter

community	Specifies an SNMP community string. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or other special character such as an exclamation point. Otherwise, the quotes are optional.
-----------	--

Description

This command activates a community string on the switch. The default setting for a new community string is enabled. You can use this command to enable a community string that you disabled with the DISABLE SNMP COMMUNITY command.

Example

The following command enables the SNMP community string "private":

```
enable snmp community=private
```

SET SNMP COMMUNITY

Syntax

```
set snmp community="community" [access=read|write]
[open=yes|no|on|off|true|false]
```

Parameters

community	Specifies the SNMP community string whose access level or access status is to be changed. This community string must already exist on the switch. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or other special character such as an exclamation point. Otherwise, the quotes are optional.				
access	Specifies the new access level. Options are “read” for read only access and “write” for both read and write access. If no access level is specified, the default is “read.”				
open	Specifies the open or closed access status of the community string. The options are: <table> <tr> <td>yes, on, true</td><td>The community string is open, meaning that any management station can use the string to access the switch. These options are equivalent.</td></tr> <tr> <td>no, off, false</td><td>The community string is closed, meaning that only those management stations whose IP addresses are assigned to the string can use it to access the switch. To add IP addresses of management stations to a community string, refer to “ADD SNMP COMMUNITY” on page 86. The default setting for a community string is closed. These options are equivalent.</td></tr> </table>	yes, on, true	The community string is open, meaning that any management station can use the string to access the switch. These options are equivalent.	no, off, false	The community string is closed, meaning that only those management stations whose IP addresses are assigned to the string can use it to access the switch. To add IP addresses of management stations to a community string, refer to “ADD SNMP COMMUNITY” on page 86. The default setting for a community string is closed. These options are equivalent.
yes, on, true	The community string is open, meaning that any management station can use the string to access the switch. These options are equivalent.				
no, off, false	The community string is closed, meaning that only those management stations whose IP addresses are assigned to the string can use it to access the switch. To add IP addresses of management stations to a community string, refer to “ADD SNMP COMMUNITY” on page 86. The default setting for a community string is closed. These options are equivalent.				

Description

This command changes the access level and access status of an existing SNMP community string.

Examples

The following command changes the access status for the SNMP community string "sw44" to closed:

```
set snmp community=sw44 open=no
```

The following command changes the access level for the SNMP community string "serv12" to read and write with open access:

```
set snmp community=serv12 access=write open=yes
```

SHOW SNMP

Syntax

```
show snmp [community="community"]
```

Parameter

community	Specifies a community string on the switch. This parameter is case sensitive. The name must be enclosed in double quotes if it contains a space or other special character such as an exclamation point. Otherwise, the quotes are optional. Default community strings are "public" and "private."
-----------	--

Description

This command displays the following SNMP information:

- ❑ **SNMP status** - The status will be enabled or disabled. If enabled, you can manage the switch with an SNMP application program from a remote management station. If disabled, you cannot remotely manage the switch using SNMP. The default for SNMP is disabled. To enable SNMP, refer "ENABLE SNMP" on page 97. To disable SNMP, refer to "DISABLE SNMP" on page 94.
- ❑ **Authentication failure traps** - This status will be enabled or disabled. If enabled, the switch sends out authentication failure traps to trap receivers. If disabled, the switch will not send out authentication failure traps, but will send out other system traps. The switch sends an authentication failure trap whenever a SNMP management station attempts to access the switch using an incorrect or invalid community string, or the management station's IP address has not been added to a community string that has a closed access status. The default setting is enabled.

To enable authentication failure traps, refer to "ENABLE SNMP AUTHENTICATETRAP" on page 98. To disable the sending of this trap, see "DISABLE SNMP AUTHENTICATETRAP" on page 95. To add IP addresses of management stations to receive the trap, refer to the "ADD SNMP COMMUNITY" on page 86.

- ❑ **SNMP community strings** - The switch comes with the two default community strings public, which has read access, and private, which has read and write access. To add new community strings, see "CREATE SNMP COMMUNITY" on page 88. To delete community strings, refer to "DESTROY SNMP COMMUNITY" on page 93.
- ❑ **Management station IP addresses** - These are the IP addresses of management stations that can access the switch through a community

string that has a closed access status. (Management station IP addresses are displayed only when you specify a specific community string using the COMMUNITY parameter in this command.) To add IP addresses of management stations to a community string, refer to “ADD SNMP COMMUNITY” on page 86.

- ❑ **Trap receiver IP addresses** - These are the IP addresses of management stations to receive SNMP traps from the switch. (IP addresses or trap receivers are displayed only when you specify a specific community string using the COMMUNITY parameter in this command.) To add IP addresses to a community string, refer to “ADD SNMP COMMUNITY” on page 86.
- ❑ **Access Status** - If a community string shows an Open Access with Yes, the string has an open access status, meaning any management stations can use the string. A string with a Open Access of No has a closed access status; only those management stations whose IP addresses have been assigned to the string can use it. To change the access status, refer to “SET SNMP COMMUNITY” on page 100.

Examples

The following command displays the SNMP status and the community strings on the switch:

```
show snmp
```

The following command displays specific information about the “private” community string. The information includes the IP addresses of management stations that can use the string and the IP addresses of SNMP trap receivers:

```
show snmp community=private
```


Chapter 6

Port Parameter Commands

This chapter contains the following commands:

- ❑ “ACTIVATE SWITCH PORT” on page 106
- ❑ “DISABLE INTERFACE LINKTRAP” on page 107
- ❑ “DISABLE SWITCH PORT” on page 108
- ❑ “DISABLE SWITCH PORT FLOW” on page 109
- ❑ “ENABLE INTERFACE LINKTRAP” on page 110
- ❑ “ENABLE SWITCH PORT” on page 111
- ❑ “ENABLE SWITCH PORT FLOW” on page 112
- ❑ “PURGE SWITCH PORT” on page 113
- ❑ “RESET SWITCH PORT” on page 114
- ❑ “SET SWITCH PORT” on page 115
- ❑ “SET SWITCH PORT FILTERING” on page 119
- ❑ “SET SWITCH PORT RATELIMITING” on page 122
- ❑ “SHOW INTERFACE” on page 125
- ❑ “SHOW SWITCH PORT” on page 127

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ACTIVATE SWITCH PORT

Syntax

```
activate switch port=port autonegotiate
```

Parameter

port	Specifies a port. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command prompts a port that is using Auto-Negotiation to renegotiate its settings with its end node. The command can be helpful if you believe that a port and an end node have not successfully negotiated their settings.

Example

This command forces ports 1 and 4 to renegotiate their speed and duplex mode:

```
activate switch port=1,4 autonegotiate
```

DISABLE INTERFACE LINKTRAP

Syntax

```
disable interface=port linktrap
```

Parameter

port	Specifies the port on which you want to disable SNMP link traps. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	---

Description

This command disables SNMP link traps on a port. When disabled, the switch does not send an SNMP link trap when there is a change to the status of a link on a port.

Note

In order for the switch to send SNMP traps to SNMP trap receivers, you must activate SNMP on the unit and specify one or more trap receivers.

Example

The following command disables link traps on port 21:

```
disable interface=21 linktrap
```

DISABLE SWITCH PORT

Syntax

```
disable switch port=port
```

Parameter

port	Specifies the port to disable. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	---

Description

This command disables a port. When a port is disabled, it stops forwarding traffic. The default setting for a port is enabled.

Example

The following command disables ports 12 and 24:

```
disable switch port=12,24
```

Equivalent Command

```
set switch port=port status=disable
```

For information, see “SET SWITCH PORT” on page 115.

DISABLE SWITCH PORT FLOW

Syntax

```
disable switch port=port flow=pause
```

Parameter

port	Specifies the port where you want to deactivate flow control. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command deactivates flow control on a port. Flow control only applies to ports operating in full duplex mode.

Example

The following command deactivates flow control on port 6:

```
disable switch port=6 flow=pause
```

Equivalent Command

```
set switch port=port flowcontrol=disable
```

For information, see “SET SWITCH PORT” on page 115.

ENABLE INTERFACE LINKTRAP

Syntax

```
enable interface=port linktrap
```

Parameter

port	Specifies the port on which you want to enable SNMP link traps. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command activates SNMP link traps on the port. When enabled, the switch sends an SNMP link trap to an SNMP trap receiver whenever there is a change to the status of a link on a port.

Note

In order for the switch to send SNMP traps, you must activate SNMP on the unit and specify one or more trap receivers.

Example

The following command enables link traps on port 21:

```
enable interface=21 linktrap
```

ENABLE SWITCH PORT

Syntax

```
enable switch port=port
```

Parameter

port	Specifies the port to enable. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command enables a port. When a port is enabled, it forwards traffic. The default setting for a port is enabled.

Example

The following command enables ports 1 to 4:

```
enable switch port=1-4
```

Equivalent Command

```
set switch port=port status=enable
```

For information, see “SET SWITCH PORT” on page 115.

ENABLE SWITCH PORT FLOW

Syntax

```
enable switch port=port flow=pause
```

Parameter

port	Specifies the port where you want to activate flow control. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command activates flow control on a port. Flow control only applies to ports operating in full duplex mode. When flow control is activated, a port sends out a PAUSE packet whenever it wants the end node to stop sending packets.

Example

The following command activates flow control on port 5:

```
enable switch port=5 flow=pause
```

Equivalent Command

```
set switch port=port flowcontrol=enable
```

For information, see “SET SWITCH PORT” on page 115.

PURGE SWITCH PORT

Syntax

```
purge switch port=port
```

Parameters

port	Specifies the port whose parameter settings are to be returned to the default values. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	--

Description

This command returns all of the parameter settings of a port to the factory default values. To reset a port and retain its settings, use “RESET SWITCH PORT” on page 114.

Example

The following example resets the settings for port 10 to the factory default values:

```
purge switch port=10
```

RESET SWITCH PORT

Syntax

```
reset switch port=port
```

Parameter

port	Specifies the port to reset. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	---

Description

This command resets a port. The reset takes less than a second to complete. You might reset a port if it is experiencing a problem establishing a link with its end node. The port retains its current operating parameter settings. To reset a port to the factory default settings, use “PURGE SWITCH PORT” on page 113.

Example

The following command resets ports 5 to 8:

```
reset switch port=5-8
```

Equivalent Command

```
set switch port=port softreset
```

For information, see “SET SWITCH PORT” on page 115.

SET SWITCH PORT

Syntax

```
set switch port=port [description="description"]
[status=enabled|disabled]
[speed=autonegotiate|10mhalf|10mfull|100mhalf|100mfull|
1000mfull]
[mdimode=mdi|mdix|auto]
[flowcontrol=disable|enable|auto]
[fctrlimit=value]
[backpressure=yes|no|on|off|true|false|enabled|
disabled]
[bplimit=value]
[holbplimit=value]
[renegotiation=auto]
[softreset]
```

Parameters

port	Specifies the port to be configured. You can specify more than one port at a time, but the ports must be of the same medium type. For example, you cannot configure twisted pair and fiber optic ports with the same command. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
description	A description for the port, from 1 to 15 alphanumeric characters. Spaces are allowed but do not use special characters. If the name contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional. You cannot specify a description if you are configuring more than one port.
status	Specifies the operating status of the port. The options are: - enabled The port forwards network traffic. This is the default setting. - disabled The port does not forward network traffic.
speed	Sets the speed and duplex mode of the port. The options are: autonegotiate The port uses Auto-Negotiation for both speed and duplex mode. This is the default setting.

10mhalf	10 Mbps and half-duplex mode.
10mfull	10 Mbps and full-duplex mode.
100mhalf	100 Mbps and half-duplex mode.
100mfull	100 Mbps and full-duplex mode.
1000mfull	1000 Mbps and full-duplex mode. (Applies only to 1000Base SFP and GBIC modules. This selection should not be used. An SFP or GBIC module should use Auto-Negotiation to set its speed and duplex mode.)

Note

A 10/100/1000Base-T twisted pair port must be set to Auto-Negotiation to operate at 1000 Mbps.

mdimode	Sets the wiring configuration of the port. This parameter applies to twisted pair ports, and only when a port's speed and duplex mode are set manually. If a port is autonegotiating its speed and duplex mode, the MDI/MDIX setting is established automatically and cannot be changed. The options are: mdi Sets the port's configuration to MDI. mdix Sets the port's configuration to MDI-X.
flowcontrol	Specifies the flow control on the port. Flow control applies only to ports operating in full duplex mode. When flow control is activated, a port sends out a PAUSE packet whenever it wants the end node to stop sending packets. The options are: disabled No flow control. This is the default setting. enabled Flow control is activated.
fctrlimit	Specifies the number of cells for flow control. A cell represents 128 bytes. The range is 1 to 7935 cells. The default value is 7935 cells.
backpressure	Controls backpressure on the port. Backpressure applies only to ports operating in

half-duplex mode. The options are:

yes, on, true, enabled Activates backpressure on the port. These options are equivalent.

no, off, false, disabled Deactivates backpressure on the port. This is the default. These options are equivalent.

bplimit Specifies the number of cells for back pressure. A cell represents 128 bytes. The range is 1 to 7935 cells. The default value is 7935 cells.

holbplimit Specifies the threshold at which the switch signals a head of line blocking event on a port. The threshold is specified in cells. A cell is 128 bytes. The range is 1 to 61,440 cells; the default is 7,168.

renegotiation Prompts the port to renegotiate its speed and duplex mode with the end node. This parameter only works when the port is using autonegotiation. The only option is:

auto Renegotiates speed and duplex mode with the end node.

softreset Resets the port. This parameter does not change any of a port's operating parameters.

Description

This command configures the operating parameters of a port. You can set more than one parameter at a time.

Examples

The following command disables ports 1 to 6:

```
set switch port=1-6 status=disabled
```

The following command configures port 8 to operate at 10 Mbps, half duplex:

```
set switch port=8 speed=10mhalf
```

The following command sets the speed on ports 2 to 6 to 100 Mbps, the duplex mode to full duplex, the wiring configuration to MDI-X, and flow control to enabled:

```
set switch port=2-6 speed=100mfull mdimode=mdix  
flowcontrol=enabled
```

The following command resets port 5:

```
set switch port=5 softreset
```

Equivalent Commands

```
disable switch port=port
```

For information, see “DISABLE SWITCH PORT” on page 108.

```
disable switch port=port flow=pause
```

For information, see “DISABLE SWITCH PORT FLOW” on page 109.

```
enable switch port=port
```

For information, see “ENABLE SWITCH PORT” on page 111.

```
enable switch port=port flow=pause
```

For information, see “ENABLE SWITCH PORT FLOW” on page 112.

```
reset switch port=port
```

For information, see “RESET SWITCH PORT” on page 114.

SET SWITCH PORT FILTERING

Syntax

```
set switch port=port
[bcastfiltering=yes|no|on|off|true|false|enabled|
disabled]
[bcastegressfiltering=yes|no|on|off|true|false|enabled|
disabled]
[unkmcastfiltering=yes|no|on|off|true|false]
[unkmcastegressfiltering=yes|no|on|off|true|false]
[unkucastfiltering=yes|no|on|off|true|false]
[unkucastegressfiltering=yes|no|on|off|true|false]
```

Parameters

port	Specifies the port you want to configure. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).				
bcastfiltering	Controls the ingress broadcast frame filter. The options are: <table> <tr> <td>yes, on, true, enabled</td><td>The port discards all ingress broadcast frames. These options are equivalent.</td></tr> <tr> <td>no, off, false, disabled</td><td>The port forwards all ingress broadcast frames. This is the default. These options are equivalent.</td></tr> </table>	yes, on, true, enabled	The port discards all ingress broadcast frames. These options are equivalent.	no, off, false, disabled	The port forwards all ingress broadcast frames. This is the default. These options are equivalent.
yes, on, true, enabled	The port discards all ingress broadcast frames. These options are equivalent.				
no, off, false, disabled	The port forwards all ingress broadcast frames. This is the default. These options are equivalent.				
bcastegressfiltering	Controls the egress broadcast frame filter. The options are: <table> <tr> <td>yes, on, true, enabled</td><td>The port discards all egress broadcast frames. These options are equivalent.</td></tr> <tr> <td>no, off, false, disabled</td><td>The port forwards all egress broadcast frames. This is the default. These options are equivalent.</td></tr> </table>	yes, on, true, enabled	The port discards all egress broadcast frames. These options are equivalent.	no, off, false, disabled	The port forwards all egress broadcast frames. This is the default. These options are equivalent.
yes, on, true, enabled	The port discards all egress broadcast frames. These options are equivalent.				
no, off, false, disabled	The port forwards all egress broadcast frames. This is the default. These options are equivalent.				

unkmcastfiltering	Controls the unknown ingress multicast frame filter. The options are:	
	yes, on, true, enabled	The port discards all unknown ingress multicast frames. These options are equivalent.
	no, off, false, disabled	The port forwards all unknown ingress multicast frames. This is the default. These options are equivalent.
unkmcastegressfiltering	Controls the unknown egress multicast frame filter. The options are:	
	yes, on, true, enabled	The port discards all unknown egress multicast frames. These options are equivalent.
	no, off, false, disabled	The port forwards all unknown egress multicast frames. These options are equivalent.
unkucastfiltering	Controls the unknown ingress unicast frame filter. The options are:	
	yes, on, true, enabled	The port discards all unknown ingress unicast frames. These options are equivalent.
	no, off, false, disabled	The port forwards all unknown ingress unicast frames. This is the default. These options are equivalent.
unkucastegressfiltering	Controls the unknown egress unicast frame filter. The options are:	
	yes, on, true, enabled	The port discards all unknown egress unicast frames. These options are equivalent.
	no, off, false, disabled	The port forwards all unknown egress unicast

frames. This is the default. These options are equivalent.

Description

This command discards ingress and egress broadcast packets as well as unknown unicast and multicast packets on a port. When you activate this feature on a port, the port discards all ingress or egress packets of the type specified. The default setting for each type of packet filter is disabled.

Examples

The following command activates the ingress broadcast filter on ports 4 and 23 so that the ports discard all ingress broadcast packets:

```
set switch port=4,23 bcastfiltering=yes
```

The following command activates the unknown egress multicast and unicast filters on ports 3 and 6 so that the ports discard all unknown egress multicast and unicast packets:

```
set switch port=3,6 unkmcastegressfiltering=yes  
unkucastegressfiltering=yes
```

This command disables the unknown ingress unicast filter on port 24 so that the port again accepts all unknown ingress unicast packets:

```
set switch port=24 unkucastfiltering=no
```

SET SWITCH PORT RATELIMITING

Syntax

```
set switch port=port
[bcastratelimiting=yes|no|on|off|true|false|enabled|
disabled]
[bcastrate=value]
[mcastratelimiting=yes|no|on|off|true|false|enabled|
disabled]
[mcastrate=value]
[unkucastratelimiting=yes|no|on|off|true|false|enabled|
disabled]
[unkucastrate=value]
```

Parameters

port	Specifies the port you want to configure. You can specify more than one port at a time, but the ports must be of the same medium type. For example, you cannot configure twisted pair and fiber optic ports with the same command. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).	
bcastratelimiting	yes, on, true, enabled	Activates broadcast packet rate limiting on the port. The options are equivalent. The rate limit is set with the BCASTRATE parameter.
	no, off, false, disabled	Deactivates broadcast packet rate limit on the port. This is the default. The options are equivalent.
bcastrate	Specifies the maximum number of ingress broadcast packets a switch port accepts each second. The range is 0 to 262,134 packets. The default is 262,134 packets	

mcastratelimiting	Enables or disables a rate limit for ingress multicast packets. The options are:	
	yes, on, true, enabled	Activates multicast packet rate limit on the port. The options are equivalent.
	no, off, false, disabled	Deactivates multicast packet rate limit on the port. This is the default. The options are equivalent.
mcastrate	Specifies the maximum number of ingress multicast packets a switch port accepts each second. The range is 0 to 262,134 packets. The default is 262,134 packets.	
unkucastratelimiting	Enables or disables rate limit for unknown ingress unicast packets. The options are:	
	yes, on, true, enabled	Activates unknown unicast packet rate limit on the port. The options are equivalent.
	no, off, false, disabled	Deactivates unknown unicast packet rate limit on the port. This is the default. The options are equivalent.
unkucastrate	Specifies the maximum number of ingress unknown unicast packets a switch port accepts each second. The range is 0 to 262,134 packets. The default is 262,134 packets.	

Description

This command sets the maximum number of ingress packets a port accepts each second. Packets exceeding the threshold are discarded. You can enable the rate limiting threshold independently for broadcast, multicast and unknown unicast packets.

Examples

The following command activates rate limiting for ingress broadcast and multicast packets on port 6. It sets a threshold of 20,000 packets per second for broadcast packets and 100,000 for multicast packets:

```
set switch port=6 bcastratelimiting=yes bcastrate=20000  
mcastratelimiting=yes mcastrate=100000
```

The following command sets a threshold of 150,000 packets per second for unknown ingress unicast packets on ports 15 and 17:

```
set switch port=15,17 unkucastratelimiting=yes  
unkucastrate=150000
```

The following command disables the rate limiting feature for ingress broadcast packets on port 24:

```
set switch port=24 bcastratelimiting=no
```

SHOW INTERFACE

Syntax

```
show interface [=port]
```

Parameter

port Specifies the port whose interface information you want to display. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22). All ports are displayed if you omit the port number.

Description

This command displays the contents of the interface MIB for a specific port. An example of the information displayed by this command is shown in Figure 6.

```
ifIndex..... 1
ifMtu..... 9198
ifSpeed..... 100000000
ifAdminStatus..... Up
ifOperStatus..... Up
ifLinkUpDownTrapEnable..... Enabled
```

Figure 6. SHOW INTERFACE Command

This command provides the following information about a port:

- ❑ ifIndex - The index of the interface in the interface table.
- ❑ ifMTU - The size, in octets, of the largest packet that can be transmitted on the port.
- ❑ ifSpeed - An estimate of the port's current bandwidth, in bits per second. This MIB object is zero (0) when the port does not have a link to an end node.
- ❑ ifAdminStatus - The configured state of the port, one of the following:
 - Up - The port is up.
 - Down - The port is down.
- ❑ ifOperStatus - The current operational status of the port, one of the following:
 - Up - A valid link exists between the port and the end node.

Down - The port and the end node have not established a link.

unknown - The port status is unknown.

- ❑ ifLinkUpDownTrapEnable - Whether or not link traps have been enabled for the port, one of the following:

Enabled - Link traps are enabled. To disable link traps, see “DISABLE INTERFACE LINKTRAP” on page 107.

Disabled - Link traps are disabled. To enable link traps, see “ENABLE INTERFACE LINKTRAP” on page 110.

Example

The following command displays information about port 21:

```
show interface=21
```

SHOW SWITCH PORT

Syntax

```
show switch port[=port]
```

Parameter

port Specifies the port whose parameter settings you want to view. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22). All ports are displayed if you omit the port number.

Description

This command displays a port's current operating specifications, such as speed and duplex mode. The command displays the following port information. (For an example of the information displayed by this command, see Figure 7 on page 131.)

- ❑ **Port Description** - Displays the name of the port. The default name is "Port_" followed by the port number. To configure a port's name, refer to "SET SWITCH PORT" on page 115.
- ❑ **Port Type** - Displays the IEEE standard of a port. For example, the port type for a twisted pair port on an AT-9424T/SP switch is 10/100/1000Base-T.
- ❑ **Status** - Displays whether the port is currently enabled or disabled. When disabled, a port does not forward network traffic. The default is enabled. To disable or enable a port, refer to "DISABLE SWITCH PORT" on page 108, "ENABLE SWITCH PORT" on page 111, or "SET SWITCH PORT" on page 115.
- ❑ **Link State** - Displays the current link state between the port and the end node. If the port has established a link with an end node, link state will be "Up." If there is no link, link state will be "Down."
- ❑ **Configured Speed/Duplex** - Displays the current configured settings for speed and duplex mode on the port. The setting of "Auto" indicates the port has been set to Auto-Negotiation, the default setting. To adjust a port's speed and duplex mode, refer to "SET SWITCH PORT" on page 115.
- ❑ **Configured MDI Crossover** - Displays the current configured setting for MDI/MDIX on the port. If the port is set to Auto-Negotiation, this field displays N/A, because the MDI/MDIX setting is set automatically on the port. A value only appears in this field if you disable Auto-Negotiation on a twisted pair port and set MDI/MDIX manually. This

field does not apply to a fiber optic port. To adjust a port's MDI/MDIX setting, refer to "SET SWITCH PORT" on page 115.

- ❑ Actual Speed/Duplex - Displays the current operating speed and duplex mode of a port. This field displays no value (—) if the port does not have a link to an end node or has been disabled.
- ❑ Actual MDI Crossover- Displays the current operating MDI/MDIX setting of a twisted pair port. This field displays no value (—) if the port does not have a link to an end node or has been disabled. This field does not apply to a fiber optic port.
- ❑ Flow Control Status and Flow Control Threshold - Displays the status of flow control on a port. Flow control applies to ports operating in full duplex mode and is used by a port to stop an end node from sending packets when its ingress buffer is full. The default setting is disabled. The threshold marks the point at which flow control is activated. The threshold is measured in cells of 128 bytes. The range is 1 to 7935 cells. The default value is 7935 cells. To set flow control, refer to "DISABLE SWITCH PORT FLOW" on page 109, "ENABLE SWITCH PORT FLOW" on page 112, or "SET SWITCH PORT" on page 115.
- ❑ Backpressure Status and Backpressure Threshold - Displays the status of backpressure on a port. Backpressure applies to ports operating in half duplex mode. A port uses backpressure to stop an end node from sending packets when its ingress buffer is full. The default setting is disabled. The threshold marks the point at which backpressure is activated. The threshold is measured in cells of 128 bytes. The range is 1 to 7935 cells. The default value is 7935 cells. To set backpressure, refer to "SET SWITCH PORT" on page 115.
- ❑ HOL Blocking Prevention Threshold - Displays the threshold at which the switch signals a head of line blocking event. This event occurs when switch ports are unable to forward packets to another switch port because its egress queues are full. The switch responds to this event by instructing the other switch ports to discard any packets in their ingress queues that are destined for the oversubscribed port. The threshold is measured in cells of 128 bytes. The range is 0 to 8191 cells. The default is 682.
- ❑ Broadcast Ingress Filtering - Displays the status of ingress broadcast filtering. If enabled, the port discards all ingress broadcast packets. The default is disabled. To configure this parameter, refer to "SET SWITCH PORT FILTERING" on page 119.
- ❑ Broadcast Egress Filtering - Displays the status of egress broadcast filtering. If enabled, the port discards all egress broadcast packets. The default is disabled. To configure this parameter, refer to "SET SWITCH PORT FILTERING" on page 119.
- ❑ Unknown Multicast Ingress Filtering - Displays the status of unknown ingress multicast filtering. If enabled, the port discards all unknown ingress multicast packets. The default is disabled. To configure this parameter, refer to "SET SWITCH PORT FILTERING" on page 119.

- ❑ Unknown Multicast Egress Filtering - Displays the status of unknown egress multicast filtering. If enabled, the port discards all unknown egress multicast packets. The default is disabled. To configure this parameter, refer to “SET SWITCH PORT FILTERING” on page 119.
- ❑ Unknown Unicast Ingress Filtering - Displays the status of unknown ingress unicast filtering. If enabled, the port discards all unknown ingress unicast packets. The default is disabled. To configure this parameter, refer to “SET SWITCH PORT FILTERING” on page 119.
- ❑ Unknown Unicast Egress Filtering - Displays the status of unknown egress unicast filtering. If enabled, the port discards all unknown egress unicast packets. The default is disabled. To configure this parameter, refer to “SET SWITCH PORT FILTERING” on page 119.
- ❑ Broadcast Rate Limiting Status and Broadcast Rate - Displays the status of the broadcast rate limiting feature. If enabled, the port limits the number of ingress broadcast packets per second to the rate specified. Ingress broadcast packets that exceed the threshold are discarded by the port. The default setting for this feature is disabled. The default rate is 262,143 packets per second. To set this feature, refer to “SET SWITCH PORT RATELIMITING” on page 122.
- ❑ Multicast Rate Limiting Status and Multicast Rate - Displays the status of the multicast rate limiting feature. If enabled, the port limits the number of ingress multicast packets per second to the rate specified. Ingress multicast packets that exceed the threshold are discarded by the port. The default setting for this feature is disabled. The default rate is 262,143 packets per second. To set this feature, refer to “SET SWITCH PORT RATELIMITING” on page 122.
- ❑ Unknown Unicast Rate Limiting Status and Unknown Unicast Rate - Displays the status of the unicast rate limiting feature. If enabled, the port limits the number of unknown ingress unicast packets per second to the rate specified. Unknown ingress unicast packets that exceed the threshold are discarded by the port. The default setting for this feature is disabled. The default rate is 262,143 packets per second. To set this feature, refer to “SET SWITCH PORT RATELIMITING” on page 122.
- ❑ PVID - Displays the port's VLAN ID number. This number is equivalent to the VID of the VLAN where the port is currently an untagged member. The default is 1, the VID of the Default_VLAN. To add a port to an existing VLAN or to create a new VLAN, refer to “ADD VLAN” on page 492 and “CREATE VLAN” on page 495.
- ❑ Port Priority - Displays the Class of Service priority assigned to the port. This priority level applies to all ingress untagged packets received on the port. The default setting is 0. At the default setting, all ingress untagged packets received on the port are stored in the egress port's Q1 egress queue. To set this parameter, refer to “SET SWITCH PORT PRIORITY OVERRIDEPRIORITY” on page 280. To adjust the mappings of priority levels to egress queues, see “SET QOS COSP” on page 277.

- ❑ **Override Priority** - Displays whether the Class of Service priority level in ingress tagged packets is ignored when determining the egress queue for storing the packets. If this parameter is displaying Yes, the switch ignores the priority level in tagged packets and uses the priority level assigned to the port to determine the egress queue. The default setting is No. At the default setting the priority level in tagged packets is used to determine the appropriate egress queue. To set this parameter, refer to “SET SWITCH PORT PRIORITY OVERRIDEPRIORITY” on page 280. To adjust the mappings of priority levels to egress queues, see “SET QOS COSP” on page 277.
- ❑ **Mirroring State** - Displays the state of port mirroring on the switch. If port mirroring has been activated on the switch, this field will contain Enabled. If port mirroring has not been activated on the switch, the default setting, this field will contain Disabled. To configure port mirroring, refer to “SET SWITCH MIRROR” on page 178 and “SET SWITCH PORT MIRROR” on page 179.
- ❑ **Is this mirror port mirror** - Displays whether the port is functioning as the destination port of a port mirror. This field only appears if port mirroring has been activated on the switch. This field displays No if the port is not the destination port and Yes if it is the destination port.

Note

The information for an SFP or GBIC module includes additional nonadjustable operating specifications of the module.

An example of the information displayed by this command is shown in Figure 7 on page 131.

Port #11 Information:

```

Port Description ..... Port_11
Port Type ..... 10/100/1000Base-T
Status ..... Enabled
Link State ..... Up
Configured Speed/Duplex ..... Auto
Configured MDI Crossover ..... N/A
Actual Speed/Duplex ..... 100 Mbps/Full Duplex
Actual MDI Crossover ..... MDIX
Flow Control Status ..... Disabled
Flow Control Threshold ..... 7935 cells
Backpressure Status ..... Disabled
Backpressure Threshold ..... 7935 cells
HOL Blocking Prevention Threshold .... 682 cells
Broadcast Ingress Filtering ..... Disabled
Broadcast Egress Filtering ..... Disabled
Unknown Multicast Ingress Filtering .. Disabled
Unknown Multicast Egress Filtering ... Disabled
Unknown Unicast Ingress Filtering .... Disabled
Unknown Unicast Egress Filtering ..... Disabled
Broadcast Rate Limiting Status ..... Disabled
Broadcast Rate ..... 262143 packet/second
Multicast Rate Limiting Status ..... Disabled
Multicast Rate ..... 262143 packet/second
Unknown Unicast Rate Limiting Status . Disabled
Unknown Unicast Rate ..... 262143 packet/second
PVID ..... 1
Port Priority (0-7) 0=Low 7=High..... 0
Override Priority ..... No
Mirroring State..... Disabled

```

Figure 7. SHOW SWITCH PORT Command

Examples

The following command displays the operating settings for all ports:

```
show switch port
```

The following command displays the operating settings for port 14:

```
show switch port=14
```


Chapter 7

Port Statistics Commands

This chapter contains the following commands:

- ❑ “RESET SWITCH PORT COUNTER” on page 134
- ❑ “SHOW SWITCH COUNTER” on page 135
- ❑ “SHOW SWITCH PORT COUNTER” on page 138

RESET SWITCH PORT COUNTER

Syntax

```
reset switch port=port counter
```

Parameter

port	Specifies the port whose statistics counters you want to return to zero. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
------	---

Description

This command returns a port's statistics counters to zero.

Example

The following command returns the counters on ports 14 and 15 to zero:

```
reset switch port=14-15 counter
```

SHOW SWITCH COUNTER

Syntax

show switch counter

Parameters

None.

Description

This command displays operating statistics, such as the number of packets received and transmitted, and the number of CRC errors, for the entire switch. An example of the display is shown in Figure 8.

Port: All

Bytes Rx	983409801	Bytes Tx	965734443
Frames Rx	815423	Frames Tx	691396
Bcast Frames Rx...	107774	Bcast Frames Tx ..	1853
Mcast Frames Rx ..	11429	Mcast Frames Tx ..	0
Frames 64	110509	Frames 65-127	15192
Frames 128-255 ...	1928	Frames 256-511 ...	442
Frames 512-1023 ..	157796	Frames 1024-1518..	1221024
CRC Error	0	Jabber	0
No. of Rx Errors .	0	No. of Tx Errors .	0
UnderSize Frames .	0	OverSize Frames ..	0
Fragments	0	Collision	0
Frames 1519-1522 .	0	Dropped Frames ...	0

Figure 8. SHOW SWITCH COUNTER Command

The command provides the following information:

Bytes Rx

Number of bytes received by the switch.

Bytes Tx

Number of bytes transmitted by the switch.

Frames Rx

Number of frames received by the switch.

Frames Tx

Number of frames transmitted by the switch.

Bcast Frames Rx

Number of broadcast frames received by the switch.

Bcast Frames Tx

Number of broadcast frames transmitted by the switch.

Mcast Frames Rx

Number of multicast frames received by the switch.

Mcast Frames Tx

Number of multicast frames transmitted by the switch.

Frames 64

Frames 65-127

Frames 128-255

Frames 256-511

Frames 512-1023

Frames 1024-1518

Frames 1519-1522

Number of frames transmitted from the port, grouped by size.

CRC Error

Number of frames with a cyclic redundancy check (CRC) error but with the proper length (64-1518 bytes) received by the switch.

Jabber

Number of occurrences of corrupted data or useless signals appearing on the switch.

No. of Rx Errors

Number of receive errors.

No. of Tx Errors

Number of transmit errors.

Undersize Frames

Number of frames that were less than the minimum length specified by IEEE 802.3 (64 bytes including the CRC) received by the switch.

Oversize Frames

Number of frames exceeding the maximum specified by IEEE 802.3 (1518 bytes including the CRC) received by the switch.

Fragments

Number of undersized frames, frames with alignment errors, and frames with frame check sequence (FCS) errors (CRC errors) received by the switch.

Collision

Number of collisions that have occurred on the switch.

Dropped Frames

Number of frames successfully received and buffered by the switch, but discarded and not forwarded.

Example

The following command displays the switch's operating statistics:

```
show switch counter
```

SHOW SWITCH PORT COUNTER

Syntax

```
show switch port=port counter
```

Parameter

port	Specifies the port whose statistics you want to view. You can specify more than one port at a time. To view all ports, do not specify a port.
------	---

Description

This command displays the operating statistics for a port on the switch. Examples of the statistics include the number of packets transmitted and received, and the number of CRC errors. For an example of the display and definitions of the statistics, refer to “SHOW SWITCH COUNTER” on page 135.

Examples

The following command displays the operating statistics for port 14:

```
show switch port=14 counter
```

The following command displays the operating statistics for all ports:

```
show switch port counter
```

Chapter 8

MAC Address Table Commands

This chapter contains the following commands:

- ❑ “ADD SWITCH FDB|FILTER” on page 140
- ❑ “DELETE SWITCH FDB|FILTER” on page 142
- ❑ “RESET SWITCH FDB” on page 144
- ❑ “SET SWITCH AGINGTIMER|AGEINGTIMER” on page 145
- ❑ “SHOW SWITCH AGINGTIMER|AGEINGTIMER” on page 146
- ❑ “SHOW SWITCH FDB” on page 147

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD SWITCH FDB|FILTER

Syntax

```
add switch fdb|filter destaddress|macaddress=macaddress
port=port vlan=name|vid
```

Note

The FDB and FILTER keywords are equivalent.

Parameters

destaddress or macaddress	Specifies the static unicast or multicast address to be added to the switch's MAC address table. The parameters are equivalent. The address can be entered in either of the following formats: xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx
port	Specifies the port(s) where the MAC address is to be assigned. You can specify only one port when adding a unicast address. You can specify more than one port when adding a multicast address.
vlan	Specifies the name or VID of the VLAN where the node designated by the MAC address is a member.

Description

This command adds static unicast and multicast MAC addresses to the switch's MAC address table. A MAC address added with this command is never timed out from the MAC address table, even when the end node or, in the case of a multicast address, the multicast application is inactive.

If you are entering a static multicast address, the address must be assigned to the port when the multicast application is located and to the ports where the host nodes are connected. Assigning the address to only the port where the multicast application is located will result in the failure of the multicast packets to be properly forwarded to the host nodes.

Examples

The following command adds the static MAC address 00:A0:D2:18:1A:11 to port 7. It assumes the port where the MAC address is to be assigned is a member of the Default_VLAN:

```
add switch fdb macaddress=00A0D2181A11 port=7
vlan=default_vlan
```

The following command adds the multicast MAC address 01:00:51:00:00 10 to ports 1 to 5. The ports belong to the Engineering VLAN:

```
add switch fdb macaddress=010051000010 port=1-5  
vlan=Engineering
```

DELETE SWITCH FDB|FILTER

Syntax

```
delete switch fdb|filter
macaddress|destaddress=macaddress vlan=name|vid
type|status=static|staticunicast|staticmulticast|dynamic|
dynamicunicast|dynamicmulticast
```

Note
The FDB and FILTER keywords are equivalent.

Parameters

macaddress or destaddress	Deletes a dynamic or static unicast or multicast MAC address from the MAC address table. The address can be entered in either of the following formats: xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx This parameter must be accompanied with the VLAN parameter.	
vlan	Specifies the VLAN containing the port(s) where the address was learned or assigned. The VLAN can be specified by name or VID. This parameter must be used with the MACADDRESS and DESTADDRESS parameters.	
type or status	Deletes specific types of MAC addresses. Options are:	
	static	Deletes all static unicast and multicast MAC addresses.
	staticunicast	Deletes all static unicast addresses.
	staticmulticast	Deletes all static multicast addresses.
	dynamic	Deletes all dynamic unicast and multicast MAC addresses.
	dynamicunicast	Deletes all dynamic unicast addresses.
	dynamicmulticast	Deletes all dynamic multicast addresses.

Description

This command deletes dynamic and static unicast and multicast addresses from the switch's MAC address table.

Note

You cannot delete a switch's MAC address, an STP BPDU MAC address, or a broadcast address.

Examples

The following command deletes the static MAC address 00:A0:D2:18:1A:11 from the table. The port where the address was learned or assigned is part of the Default_VLAN, which has a VID of 1:

```
delete switch fdb macaddress=00A0D2181A11 vlan=1
```

The following command deletes the MAC address 00:A0:C1:11:22:44 from the table. The port where the address was learned or assigned is part of the Sales VLAN:

```
delete switch fdb macaddress=00a0c1112244 vlan=sales
```

The following command deletes all dynamic MAC addresses learned on the ports of the Default_VLAN:

```
delete switch fdb macaddress=dynamic vlan=default_vlan
```

The following command deletes all dynamic MAC addresses:

```
delete switch fdb type=dynamic
```

The following command deletes all static unicast MAC addresses:

```
delete switch fdb type=staticunicast
```

RESET SWITCH FDB

Syntax

```
reset switch fdb [port=port]
```

Parameter

port	Specifies the port whose dynamic MAC addresses are to be deleted from the MAC address table. You can specify more than one port at a time.
------	--

Description

This command deletes all of the dynamic MAC addresses learned by the entire switch or on a specific port. After a port's dynamic MAC addresses have been deleted, the port begins to learn new addresses.

Examples

The following command deletes all the dynamic MAC addresses in the switch's MAC address table:

```
reset switch fdb
```

The following command deletes all the dynamic MAC addresses learned on port 5:

```
reset switch fdb port=5
```


SET SWITCH AGINGTIMER|AGEINGTIMER

Syntax

```
set switch agingtimer|ageingtimer=value
```

Parameter

agingtimer or ageingtimer	Specifies the aging timer for the MAC address table. The value is in seconds. The range is 0 to 1048575. The default is 300 seconds (5 minutes). The parameters are equivalent.
-------------------------------------	---

Description

The switch uses the aging timer to delete inactive dynamic MAC addresses from the MAC address table. When the switch detects that no packets have been sent to or received from a particular MAC address in the table after the period specified by the aging time, the switch deletes the address. This prevents the table from becoming full of addresses of nodes that are no longer active.

Setting the aging timer to 0 disables the timer. No dynamic MAC addresses are aged out and the table stops learning new addresses after reaching its maximum capacity.

To view the current setting for the MAC address aging timer, refer to “SHOW SWITCH AGINGTIMER|AGEINGTIMER” on page 146.

Example

The following command sets the aging timer to 120 seconds (2 minutes):

```
set switch agingtimer=120
```

SHOW SWITCH AGINGTIMER|AGEINGTIMER

Syntax

```
show switch agingtimer|ageingtimer
```

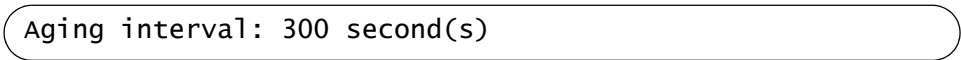
Parameters

None.

Description

This command displays the current setting for the aging timer. The switch uses the aging timer to delete inactive dynamic MAC addresses from the MAC address table. To set the aging timer, refer to “SET SWITCH AGINGTIMER|AGEINGTIMER” on page 145.

Figure 9 illustrates the information displayed by this command.



Aging interval: 300 second(s)

Figure 9. SHOW SWITCH AGINGTIMER|AGEINGTIMER Command

Example

The following command displays the current setting for the MAC address aging timer:

```
show switch agingtimer
```

SHOW SWITCH FDB

Syntax

```
show switch fdb [macaddress|destaddress=macaddress]  
[port=port] [type|status=static|staticunicast|  
staticmulticast|dynamic|dynamicunicast|dynamicmulticast]  
[vlan=name]
```

Parameters

address Specifies a MAC address. Use this parameter to determine the port on the switch on which a particular MAC address was learned (dynamic) or assigned (static). The address can be entered in either of the following formats:

xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx

port Specifies a port on the switch. Use this parameter to view all addresses learned on a particular port. You can specify more than one port.

type *or* status Displays specific types of MAC addresses. Options are:

static Displays all static unicast and multicast MAC addresses.

staticunicast Displays all static unicast addresses.

staticmulticast Displays all static multicast addresses.

dynamic Displays all dynamic unicast and multicast MAC addresses.

dynamicunicast Displays all dynamic unicast addresses.

dynamicmulticast Displays all dynamic multicast addresses.

vlan Specifies a VLAN name. Use this parameter to view the MAC addresses learned or assigned to the ports of a particular VLAN on the switch.

Note

You can specify more than one parameter at a time with this command.

Description

This command displays the unicast and multicast MAC addresses learned or assigned to the ports on the switch and stored in the switch's MAC address table.

Figure 10 is an example of the information displayed by this command for unicast addresses.

Switch Forwarding Database			
Total Number of MAC Addresses: 121			
VLAN ID	MAC Address	Port	Status
0	01:80:c1:00:02:01	0	Static (fixed, non-aging)
1	00:a0:d2:18:1a:c8	1	Dynamic
1	00:a0:c4:16:3b:80	2	Dynamic
1	00:a0:12:c2:10:c6	3	Dynamic
1	00:a0:c2:09:10:d8	4	Dynamic
1	00:a0:33:43:a1:87	4	Dynamic
1	00:a0:12:a7:14:68	4	Dynamic
1	00:a0:d2:22:15:10	4	Dynamic
1	00:a0:d4:18:a6:89	4	Dynamic

Figure 10. SHOW SWITCH FDB Command - Unicast Addresses

Note

The first address in the unicast MAC address table is the address of the switch.

The columns are defined here:

- ❑ VLAN ID - The ID number of the VLAN where the port is an untagged member.
- ❑ MAC - The dynamic or static unicast MAC address learned on or assigned to the port.
- ❑ Port - The port where the address was learned or assigned. The MAC address with port 0 is the address of the switch.
- ❑ Status - The type of address: static or dynamic.

Figure 11 is an example of a multicast address.

Multicast Switch Forwarding Database			
Total Number of MCAST MAC Addresses: 1			
MAC Address	VLANID	Type	Port Maps (U:Untagged T:Tagged)
01:00:51:00:00:01	1	Static	U:1-4
			T:

Figure 11. SHOW SWITCH FDB Command - Multicast Addresses

The columns are defined here:

- ❑ MAC Address - The static or dynamic unicast MAC address.
- ❑ VLAN ID - The ID number of the VLAN where the port is an untagged member.
- ❑ Type - The type of the address: static or dynamic.
- ❑ Port Maps - The tagged and untagged ports on the switch that are members of a multicast group. This column is useful in determining which ports belong to different groups.

Examples

The following command displays all the static and dynamic unicast MAC addresses in the switch's MAC address table:

```
show switch fdb
```

The following command displays just the static unicast MAC addresses:

```
show switch fdb type=static
```

The following command displays the static and dynamic multicast addresses:

```
show switch fdb type=multicast
```

The following command displays just the static multicast addresses:

```
show switch fdb type=staticmulticast
```

The following command displays the port where the MAC address 00:A0:D2:18:1A:11 was learned (dynamic) or added (static):

```
show switch fdb address=00A0D2181A11
```

The following command displays the MAC addresses learned on port 2:

```
show switch fdb port=2
```

The following command displays the MAC addresses learned on the ports in the Sales VLAN:

```
show switch fdb vlan=sales
```

The following command displays the static MAC addresses on port 17:

```
show switch fdb port=17 type=static
```


Chapter 9

Static Port Trunking Commands

This chapter contains the following commands:

- ❑ “ADD SWITCH TRUNK” on page 152
- ❑ “CREATE SWITCH TRUNK” on page 154
- ❑ “DELETE SWITCH TRUNK” on page 156
- ❑ “DESTROY SWITCH TRUNK” on page 157
- ❑ “SET SWITCH TRUNK” on page 158
- ❑ “SHOW SWITCH TRUNK” on page 159

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD SWITCH TRUNK

Syntax

```
add switch trunk=name [tgid=id_number] port=port
```

Parameters

trunk	Specifies the name of the static port trunk to be modified.
tgid	Specifies the ID number of the static port trunk to be modified. The range is 1 to 6. This parameter is optional.
port	Specifies the port to be added to the port trunk. You can add more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-20), or both (for example, 1,14-16).

Description

This command adds ports to an existing static port trunk. To initially create a static port trunk, refer to “CREATE SWITCH TRUNK” on page 154.



Caution

Disconnect all network cables from the ports of the trunk on the switch before using this command. Adding a port to a port trunk without first disconnecting the cables may result in loops in your network topology, which can produce broadcast storms and poor network performance.

Note

If the port you are adding will be the lowest numbered port in the trunk, its parameter settings will overwrite the settings of the existing ports in the trunk. Consequently, you check to see if its settings are appropriate prior to adding it to the trunk. If the port will not be the lowest numbered port, then its settings are changed to match the settings of the existing ports in the trunk.

Note

If the port to be added to a trunk is already a member of another static trunk, you must first remove it from its current trunk assignment. To remove ports from a trunk, see “DELETE SWITCH TRUNK” on page 156.

Example

The following command adds port 5 to a port trunk called load22:

```
add switch trunk=load22 port=5
```

CREATE SWITCH TRUNK

Syntax

```
create switch trunk=name port=ports
[select=macsrc|macdest|macboth|ipsrc|ipdest|ipboth]
```

Parameters

trunk	Specifies the name of the trunk. The name can be up to 16 alphanumeric characters. No spaces or special characters are allowed.												
port	Specifies the ports to be added to the port trunk. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).												
select	Specifies the load distribution method. Options are: <table> <tr> <td>macsrc</td><td>Source MAC address.</td></tr> <tr> <td>macdest</td><td>Destination MAC address.</td></tr> <tr> <td>macboth</td><td>Source address/destination MAC address.</td></tr> <tr> <td>ipsrc</td><td>Source IP address.</td></tr> <tr> <td>ipdest</td><td>Destination IP address.</td></tr> <tr> <td>ipboth</td><td>Source address/destination IP address.</td></tr> </table>	macsrc	Source MAC address.	macdest	Destination MAC address.	macboth	Source address/destination MAC address.	ipsrc	Source IP address.	ipdest	Destination IP address.	ipboth	Source address/destination IP address.
macsrc	Source MAC address.												
macdest	Destination MAC address.												
macboth	Source address/destination MAC address.												
ipsrc	Source IP address.												
ipdest	Destination IP address.												
ipboth	Source address/destination IP address.												

Description

This command creates a static port trunk. To create the trunk, you specify the ports on the switch that will constitute the trunk.



Caution

Do not connect the cables to the trunk ports on the switches until after you have created the trunk in the management software. Connecting the cables before configuring the software will create a loop in your network topology. Data loops can result in broadcast storms and poor network performance.

Note

Before creating a static port trunk, examine the speed, duplex mode, and flow control settings of the lowest numbered port to be in the trunk. Check to be sure that the settings are correct for the end node to which the trunk will be connected. When you create the trunk, the AT-S63 Management Software copies the settings of the lowest numbered port in the trunk to the other ports so that all the settings are the same.

You should also check to be sure that the ports are untagged members of the same VLAN. You cannot create a trunk of ports that are untagged members of different VLANs.

Note

All ports in a trunk must operate at the same speed. When you include port 23R or 24R in a trunk and the port transitions to redundant uplink status, the port speed is automatically adjusted to 1000 Mbps. If the other ports in the trunk are operating at a different speed, port trunking may be unpredictable. Because of these port speed variables, Allied Telesis suggests that you not include port 23R or 24R in a port trunk.

Note

If the ports that are to constitute the new trunk are already members of another static trunk, you must first remove them from their current trunk assignment. To remove ports from a static trunk, see “DELETE SWITCH TRUNK” on page 156.

Examples

The following command creates a static port trunk using ports 3 through 6. The command names the trunk “load22” and sets the load distribution method to destination MAC address.

```
create switch trunk=load22 port=3-6 select=macdest
```

The following command creates a port trunk consisting of ports 15, 17, and 22. The command names the trunk “trunk4”. No load distribution method is specified, so the default source and destination MAC addresses method is used:

```
create switch trunk=trunk4 port=15,17,22
```

DELETE SWITCH TRUNK

Syntax

```
delete switch trunk=name port=port
```

Parameters

trunk	Specifies the name of the static port trunk to be modified.
port	Specifies the port to be removed from the existing port trunk. You can specify more than one port at a time.

Description

This command removes ports from a static port trunk. To completely remove a port trunk from a switch, see “DESTROY SWITCH TRUNK” on page 157.



Caution

Disconnect all data cables from the ports of the trunk on the switch before using this command. Removing a port from a port trunk without first disconnecting the cables may result in loops in your network topology, which can produce broadcast storms and poor network performance.

Note

You cannot remove ports from a trunk that has only two ports because a static trunk must have a minimum of two ports.

Example

The following command removes port 9 from a port trunk called Dev_trunk:

```
delete switch trunk=Dev_trunk port=9
```

DESTROY SWITCH TRUNK

Syntax

```
destroy switch trunk=name
```

Parameter

trunk Specifies the name of the trunk to be deleted.

Description

This command deletes a static port trunk from a switch. After a port trunk has been deleted, the ports that made up the trunk can be connected to different end nodes.



Caution

Disconnect the cables from the port trunk on the switch before destroying the trunk. Deleting a port trunk without first disconnecting the cables can create loops in your network topology. Data loops can result in broadcast storms and poor network performance.

Example

The following command deletes the trunk called load22 from the switch:

```
destroy switch trunk=load22
```

SET SWITCH TRUNK

Syntax

```
set switch trunk=name  
select=macsrc|macdest|macboth|ipsrc|ipdest|ipboth
```

Parameters

trunk	Specifies the name of the static port trunk.												
select	Specifies the load distribution method. Options are: <table><tr><td>macsrc</td><td>Source MAC address.</td></tr><tr><td>macdest</td><td>Destination MAC address.</td></tr><tr><td>macboth</td><td>Source address/destination MAC address.</td></tr><tr><td>ipsrc</td><td>Source IP address.</td></tr><tr><td>ipdest</td><td>Destination IP address.</td></tr><tr><td>ipboth</td><td>Source address/destination IP address.</td></tr></table>	macsrc	Source MAC address.	macdest	Destination MAC address.	macboth	Source address/destination MAC address.	ipsrc	Source IP address.	ipdest	Destination IP address.	ipboth	Source address/destination IP address.
macsrc	Source MAC address.												
macdest	Destination MAC address.												
macboth	Source address/destination MAC address.												
ipsrc	Source IP address.												
ipdest	Destination IP address.												
ipboth	Source address/destination IP address.												

Description

This command changes the load distribution method of an existing static port trunk.

Example

The following command changes the load distribution method of a trunk named “Load11” to source MAC address:

```
set switch trunk=Load11 select=macsrc
```

SHOW SWITCH TRUNK

Syntax

```
show switch trunk
```

Parameters

None.

Description

This command displays the names, ports, and load distribution methods of the static port trunks on the switch. An example of the command is shown in Figure 12.

```
Trunk group ID ..... 2
Trunk status ..... UP
Trunk group name ..... Server11
Trunk method ..... SRC/DST MAC
Ports ..... 12-16
```

Figure 12. SHOW SWITCH TRUNK Command

The command displays the following information:

- ❑ Trunk group ID - The ID number of the static port trunk.
- ❑ Trunk status - The operational status of the trunk. If the trunk has established a link with the other device, status will be UP. If the trunk has not establish a link or the ports in the trunk are disabled, status will be DOWN.
- ❑ Trunk group name - The name of the static port trunk.
- ❑ Trunk method - One of the following load distribution methods:

SRC MAC	Source MAC address.
DST MAC	Destination MAC address.
SRC/DST MAC	Source address/destination MAC address.
SRC IP	Source IP address.
DST IP	Destination IP address.
SRC/DST IP	Source address/destination IP address.
- ❑ Ports - The ports of the static port trunk.

Example

The following command displays port trunking information:

```
show switch trunk
```


Chapter 10

LACP Port Trunking Commands

This chapter contains the following commands:

- ❑ “ADD LACP PORT” on page 162
- ❑ “CREATE LACP AGGREGATOR” on page 163
- ❑ “DELETE LACP PORT” on page 165
- ❑ “DESTROY LACP AGGREGATOR” on page 166
- ❑ “DISABLE LACP” on page 167
- ❑ “ENABLE LACP” on page 168
- ❑ “SET LACP AGGREGATOR” on page 169
- ❑ “SET LACP SYSPRIORITY” on page 171
- ❑ “SET LACP STATE” on page 172
- ❑ “SHOW LACP” on page 173

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD LACP PORT

Syntax

```
add lacp aggregator=name port=port
```

Parameters

aggregator	Specifies the name of the aggregator. The name is case-sensitive.
port	Specifies the port to be added to the aggregator. You can add more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-20), or both (for example, 5,14-16).

Description

This command adds ports to an existing aggregator. You must identify the aggregator by its name. To display the names of the aggregators on the switch, refer to “SHOW LACP” on page 173. To create an aggregator, refer to “CREATE LACP AGGREGATOR” on page 163.

Review the following before adding a port to an aggregator:

- ❑ Verify that the port’s speed is set to Auto-Negotiation or 100 Mbps, full-duplex. Aggregate trunks do not support half-duplex mode.
- ❑ The ports of an aggregator must be untagged ports of the same VLAN.
- ❑ You cannot add a port to an aggregator that is below the lowest numbered port in the aggregator, also referred to as the base port. For example, if an aggregator consists of ports 7 to 12, you cannot add ports 1 to 6. To change the base port of an aggregator, you must delete and recreate the aggregator.



Caution

A network cable should not be connected to a port on the switch until after the port is added to the aggregator. Connecting the cable before the port is a part of an aggregator can result in loops in your network topology, which can result in broadcast storms and poor network performance.

Examples

The following command adds ports 8 and 22 to an aggregator named “agg_1”:

```
add lacp aggregator=agg_1 port=8,22
```

CREATE LACP AGGREGATOR

Syntax

```
create lacp aggregator=name|adminkey=0xkey port=port
[distribution=macsrc|macdest|macboth|ipsrc|ipdest|ipboth]
```

Parameters

aggregator	Specifies a name for the new aggregator. The name can be up to 20 alphanumeric characters. No spaces or special characters are allowed. If no name is specified, the default name is DEFAULT_AGG followed by a number.												
adminkey	Specifies an adminkey number for the aggregator. This is a hexadecimal number in the range of 0x1 to 0xffff. If this parameter is omitted, the default adminkey of the lowest numbered port in the aggregator is used.												
port	Specifies the ports of the aggregator. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-20), or both (for example, 1,14-16).												
distribution	Specifies the load distribution method, which can be one of the following: <table> <tr> <td>macsrc</td><td>Source MAC address.</td></tr> <tr> <td>macdest</td><td>Destination MAC address.</td></tr> <tr> <td>macboth</td><td>Source and destination MAC addresses. This is the default.</td></tr> <tr> <td>ipsrc</td><td>Source IP address.</td></tr> <tr> <td>ipdest</td><td>Destination IP address.</td></tr> <tr> <td>ipboth</td><td>Source and destination IP addresses.</td></tr> </table> If this parameter is omitted, the source and destination MAC addresses load distributed method is selected by default.	macsrc	Source MAC address.	macdest	Destination MAC address.	macboth	Source and destination MAC addresses. This is the default.	ipsrc	Source IP address.	ipdest	Destination IP address.	ipboth	Source and destination IP addresses.
macsrc	Source MAC address.												
macdest	Destination MAC address.												
macboth	Source and destination MAC addresses. This is the default.												
ipsrc	Source IP address.												
ipdest	Destination IP address.												
ipboth	Source and destination IP addresses.												

Description

This command creates an LACP aggregator. Note the following when creating a new aggregator:

- ❑ You can specify either a name or an adminkey but not both when creating a new aggregator.
- ❑ When you create a new aggregator by specifying a name, the adminkey is based on the operator key of the lowest numbered port in the aggregator.
- ❑ When you create an aggregator by specifying an adminkey, the aggregator's default name is DEFAULT_AGG followed by the port number of the lowest numbered port in the aggregator. For instance, an aggregator of ports 12 to 16 is given the name DEFAULT_AGG12.
- ❑ Before creating an aggregator, you should verify that the ports that will be members of the aggregator are set to Auto-Negotiation or 100 Mbps, full-duplex. Aggregate trunks do not support half-duplex mode.
- ❑ All the ports of an aggregator must be untagged ports of the same VLAN.
- ❑ You cannot change the name or adminkey of an existing aggregator. That function requires deleting the aggregator and recreating it.



Caution

Do not connect the cables to the ports of the aggregator on the switch until after you have configured LACP and the aggregators on both devices that will be interconnected by the trunk. Connecting the cables before configuring the aggregators and activating the protocol will create a loop in your network topology. Data loops can result in broadcast storms and poor network performance.

Examples

The following command creates an LACP aggregator named "sw_agg_1" of ports 1 through 4. The load distribution method is source MAC address. Since the aggregator is being created by name, the default operator key for port 1, the lowest numbered port in the aggregator, becomes the adminkey:

```
create lacp aggregator=sw_agg_1 port=1-4 distribution=macsrc
```

The following command creates an LACP aggregator of ports 10, 12, 15 to 18 with an adminkey number of 0x7A. The default name for the aggregator is DEFAULT_AGG10 because the command specifies an adminkey and because port 10 is the lowest numbered port in the aggregator. Since no load distribution method is specified, the source and destination MAC addresses load distributed method is used by default:

```
create lacp adminkey=0x7A port=10,12,15-18
```

DELETE LACP PORT

Syntax

```
delete lacp aggregator=name port=port
```

Parameters

aggregator	Specifies the name of the aggregator. The name is case-sensitive.
port	Specifies the port to delete from an aggregator. You can delete more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-20), or both (for example, 1,14-16).

Description

This command removes a port from an aggregator. You must identify the aggregator by its name. To display the names of the aggregators on the switch, refer to “SHOW LACP” on page 173. To completely remove an aggregator, see “DESTROY LACP AGGREGATOR” on page 166.



Caution

Disconnect the network cable from a port before removing it from an aggregator. Removing a port without first disconnecting the cable can result in loops in your network topology, which can result in broadcast storms and poor network performance.

Note

You cannot delete the lowest numbered port from an aggregator, also referred to as the base port. For example, if an aggregator consists of ports 7 to 12, you cannot delete port 7. You must delete and recreate an aggregator to remove the base port.

Example

The following command removes port 9 from the “lacp_server” aggregator:

```
delete lacp aggregator=lacp_server port=9
```

DESTROY LACP AGGREGATOR

Syntax

```
destroy lacp aggregator=name|adminkey=0xkey
```

Parameter

aggregator	Specifies the name of the aggregator. The name is case-sensitive.
adminkey	Specifies the adminkey number of the aggregator. This is a hexadecimal number between 0x1 and 0xffff.

Description

This command deletes an LACP aggregator from the switch. You can identify the aggregator by its name or adminkey number. To display the names and adminkeys of the aggregators on the switch, refer to “SHOW LACP” on page 173.



Caution

Disconnect the network cables from the ports of the aggregator before performing this command. Deleting the aggregator without first disconnecting the cables can result in loops in your network topology, which can result in broadcast storms and poor network performance.

Example

The following command deletes an aggregator named “agg_15”:

```
destroy lacp aggregator=agg_15
```

The following command deletes an aggregator with an adminkey number of 0x1A:

```
destroy lacp adminkey=0x1a
```

DISABLE LACP

Syntax

```
disable lacp
```

Parameters

None.

Description

This command disables LACP on the switch. The default is disabled.



Caution

Do not disable LACP if there are defined aggregators without first disconnecting all cables connected to the aggregate trunk ports. Otherwise, a network loop may occur, resulting in a broadcast storm and poor network performance.

Example

The following command disables LACP on the switch:

```
disable lacp
```

Equivalent Command

```
set lacp state=disable
```

For information, see “SET LACP STATE” on page 172.

ENABLE LACP

Syntax

```
enable lacp
```

Parameters

None.

Description

This command activates LACP on the switch. The default is disabled.

Example

The following command activates LACP:

```
enable lacp
```

Equivalent Command

```
set lacp state=enable
```

For information, see “SET LACP STATE” on page 172.

SET LACP AGGREGATOR

Syntax

```
set lacp aggregator=name|adminkey=key
[distribution=macsrc|macdest|macboth|ipsrc|ipdest|ipboth]
```

Parameters

aggregator	Specifies the name of the aggregator you want to modify. The name is case-sensitive.												
adminkey	Specifies the adminkey number of the aggregator you want to modify. This is a hexadecimal number between 0x1 and 0xffff.												
distribution	Specifies one of the following load distribution methods: <table> <tr> <td>macsrc</td><td>Source MAC address.</td></tr> <tr> <td>macdest</td><td>Destination MAC address.</td></tr> <tr> <td>macboth</td><td>Source address/destination MAC address. This is the default.</td></tr> <tr> <td>ipsrc</td><td>Source IP address.</td></tr> <tr> <td>ipdest</td><td>Destination IP address.</td></tr> <tr> <td>ipboth</td><td>Source address/destination IP address.</td></tr> </table>	macsrc	Source MAC address.	macdest	Destination MAC address.	macboth	Source address/destination MAC address. This is the default.	ipsrc	Source IP address.	ipdest	Destination IP address.	ipboth	Source address/destination IP address.
macsrc	Source MAC address.												
macdest	Destination MAC address.												
macboth	Source address/destination MAC address. This is the default.												
ipsrc	Source IP address.												
ipdest	Destination IP address.												
ipboth	Source address/destination IP address.												

Description

This command modifies the load distribution method of an existing LACP aggregator. You can identify the aggregator by its name or adminkey. To display the names and adminkeys of the aggregators on the switch, refer to “SHOW LACP” on page 173.

Note

You cannot change the name or adminkey of an existing aggregator.

Examples

The following command changes the load distribution method of an LACP aggregator titled “agg_5” to the source MAC address method:

```
set lacp aggregator=agg_5 distribution=macsrc
```

The following command changes the load distribution method of an LACP aggregator with the adminkey 0x22 to the destination MAC address method:

```
set lacp adminkey=0x22 distribution=macdest
```

SET LACP SYSPRIORITY

Syntax

```
set lacp syspriority=0xpriority
```

Parameters

syspriority	Specifies the LACP system priority value for a switch. This is a hexadecimal value from 0x1 to 0xffff. The lower the number, the higher the priority. The default is 0x0080.
-------------	--

Description

This command sets the LACP priority of the switch. LACP uses the priority to resolve conflicts between two switches to decide which switch makes the decision about which ports to aggregate.

Example

The following command sets the LACP priority on the switch to 0x8000:

```
set lacp syspriority=0x8000
```

SET LACP STATE

Syntax

```
set lacp state=enable|disable
```

Parameters

state	Specifies the state of LACP on the switch. The options are:
enable	Enables LACP.
disable	Disables LACP. This is the default.

Description

This command enables or disables LACP on the switch.



Caution

Do not disable LACP if there are defined aggregators without first disconnecting all cables connected to the aggregate trunk ports. Otherwise, a network loop might occur, resulting in a broadcast storm and poor network performance.

Example

The following command activates LACP on the system:

```
set lacp state=enable
```

Equivalent Commands

```
disable lacp
```

For information, see “DISABLE LACP” on page 167.

```
enable lacp
```

For information, see “ENABLE LACP” on page 168.

SHOW LACP

Syntax

```
show lacp [port=port] [aggregator] [machine=port]
```

Parameter

port	Specifies the port(s) to display. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-20), or both (for example, 1,14-16).
aggregator	Displays information about the aggregators.
machine	Specifies the LACP machine state for a port or ports on the system.

Description

This command displays the configuration and/or machine states of the ports, and/or the aggregators. Entering the command without any parameters displays general LACP status information. Figure 13 illustrates the information displayed by this command.

```
Status .....: Enable
Mac Address .....: 00-21-46-A7-B4-43
Priority .....: 0x0080
Collector delay .....: 0 Seconds
```

Figure 13. SHOW LACP Command

The command displayed the following information:

- ❑ Status - Whether the LACP protocol is enabled or disabled on the switch.
- ❑ MAC Address - The MAC address of the switch.
- ❑ Priority - The LACP system priority value assigned to the switch.

The PORT parameter displays LACP port information. Figure 14 illustrates the information displayed by this parameter. For definitions, refer to the IEEE 802.3ad standard.

```

Port ..... 05
Aggregator ..... LACP sw22
ACTOR
=====
Actor Port ..... 05
Selected ..... SELECTED
Oper Key ..... 0xf705
Oper Port Priority .... 0x0005
Individual ..... NO
Synchronized..... YES
Collecting ..... YES
Distributing ..... YES
Defaulted ..... NO
Expired ..... NO
Actor Churn ..... YES
PARTNER
=====
Partner Port ..... 00
Partner System ..... 00-30-84-AB-EF-CD
Oper Key ..... 0xff07
Oper Port Priority ... 0x0007
Individual ..... NO
Synchronized..... YES
Collecting ..... YES
Distributing ..... YES
Defaulted ..... NO
Expired ..... NO
Partner Churn ..... YES

```

Figure 14. SHOW LACP Command with the PORT Parameter

The AGGREGATOR parameter displays information about each existing aggregator. Figure 15 illustrates the information displayed by this parameter.

```

Aggregator # 1 ..... DEFAULT_AGG5
Admin Key ..... 0x0001
Oper Key ..... 0x0045
Speed ..... 1000 Mbps
Distribution Mode .. MACBoth
Ports configured ... 5-8
Ports in LAGID..... 5-8
Aggregated Port .... 5-8

```

Figure 15. SHOW LACP Command with the AGGREGATOR Parameter

Examples

The following command displays general LACP status information:

```
show lacp
```

The following command displays the LACP configuration for ports 13 and 16:

```
show lacp port=13,16
```

The following command displays the configuration of the aggregators on the system:

```
show lacp aggregator
```

The following command displays the LACP machine states for each port on the system:

```
show lacp machine
```


Chapter 11

Port Mirroring Commands

This chapter contains the following commands:

- ❑ “SET SWITCH MIRROR” on page 178
- ❑ “SET SWITCH PORT MIRROR” on page 179
- ❑ “SHOW SWITCH MIRROR” on page 180

Note

Remember to save your changes with the SAVE CONFIGURATION command.

SET SWITCH MIRROR

Syntax

```
set switch mirror=port
```

Parameter

mirror Specifies the destination port for the port mirror. This is the port where the traffic from the source ports will be copied. You can specify only one port as the destination port. Specifying “0” (zero) stops port mirroring so that the destination port can again be used as a normal networking port.

Description

This command enables mirroring and specifies the destination port, or stops port mirroring. To select the source ports, refer to “SET SWITCH PORT MIRROR” on page 179.

Examples

The following command enables mirroring and makes port 11 the destination port:

```
set switch mirror=11
```

The following command stops port mirroring:

```
set switch mirror=0
```

SET SWITCH PORT MIRROR

Syntax

```
set switch port=port mirror=none|rx|tx|both
```

Parameters

port	Specifies the source port of a port mirror. You can specify more than one port. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).								
mirror	Specifies which traffic on the source ports is to be mirrored to the destination port. The options are: <table> <tr> <td>rx</td><td>Specifies ingress mirroring.</td></tr> <tr> <td>tx</td><td>Specifies egress mirroring.</td></tr> <tr> <td>both</td><td>Specifies both ingress and egress mirroring.</td></tr> <tr> <td>none</td><td>Removes a port as a source port.</td></tr> </table>	rx	Specifies ingress mirroring.	tx	Specifies egress mirroring.	both	Specifies both ingress and egress mirroring.	none	Removes a port as a source port.
rx	Specifies ingress mirroring.								
tx	Specifies egress mirroring.								
both	Specifies both ingress and egress mirroring.								
none	Removes a port as a source port.								

Description

This command specifies the source ports of a port mirror. If the port mirror already has source ports, the new source ports are added to the existing ports. You can also use the command to remove source ports.

You must set the destination port before you can select the source ports. To set the destination port, refer to “SET SWITCH MIRROR” on page 178.

Examples

The following command specifies ports 16 and 17 as new source ports for the port mirror. Only the ingress traffic is mirrored:

```
set switch port=16-17 mirror=rx
```

The following command removes ports 5, 7, and 10 as source ports of a port mirror:

```
set switch port=5,7,10 mirror=none
```

SHOW SWITCH MIRROR

Syntax

```
show switch mirror
```

Parameters

None.

Description

This command displays the source and destination ports of a port mirror on the switch. An example is shown in Figure 16.

```
Port Mirroring:  
Mirroring State ..... Enabled  
Mirror-To (Destination) Port ..... 22  
Ingress (Rx) Mirror (Source) Ports .. 1,3  
Egress (Tx) Mirror (Source) Ports ... 1,3,11-13
```

Figure 16. SHOW SWITCH MIRROR Command

The command provides the following information about the port mirror:

- ❑ Mirroring State - The port mirroring status, Enabled or Disabled. If port mirroring is disabled on the switch, only this line is displayed by the command.
- ❑ Mirror-To (Destination) Port - The port functioning as the destination port.
- ❑ Ingress (Rx) Mirror (Source) Port - The port(s) whose ingress (received) traffic is mirrored.
- ❑ Egress (Tx) Mirror (Source) Port - The port(s) whose egress (transmitted) traffic is mirrored.

Example

The following command displays the status and ports of a port mirror:

```
show switch mirror
```

Section II

Advanced Operations

This section contains the following chapters:

- ❑ Chapter 12, “File System Commands” on page 183
- ❑ Chapter 13, “File Download and Upload Commands” on page 199
- ❑ Chapter 14, “Event Log and Syslog Client Commands” on page 223
- ❑ Chapter 15, “Classifier Commands” on page 251
- ❑ Chapter 16, “Access Control List Commands” on page 263
- ❑ Chapter 17, “Class of Service (CoS) Commands” on page 273
- ❑ Chapter 18, “Quality of Service (QoS) Commands” on page 285
- ❑ Chapter 19, “Denial of Service Defense Commands” on page 329

Chapter 12

File System Commands

This chapter contains the following commands:

- ❑ “COPY” on page 184
- ❑ “CREATE CONFIG” on page 186
- ❑ “DELETE FILE” on page 187
- ❑ “FORMAT DEVICE” on page 189
- ❑ “RENAME” on page 190
- ❑ “SET CFLASH DIR” on page 192
- ❑ “SET CONFIG” on page 193
- ❑ “SHOW CFLASH” on page 195
- ❑ “SHOW CONFIG” on page 196
- ❑ “SHOW FILE” on page 197
- ❑ “SHOW FLASH” on page 198

COPY

Syntax

```
copy [cflash:]sourcefile.ext [cflash:]destinationfile.ext
```

Parameters

<i>sourcefile.ext</i>	Specifies the name of the source file. If the file is stored on a compact memory flash card, precede the name with “cflash:”. If the filename contains spaces, enclose it in double quotes. Otherwise, the quotes are optional.
<i>destinationfile.ext</i>	Specifies the name of the destination file. To store the copy on a compact memory flash card, precede the name with “cflash:”. If the filename contains spaces, enclose in double quotes. Otherwise, the quotes are optional.

Description

This command creates a copy of an existing file. It also copies files between the switch’s file system and a compact flash memory card, for those switches that support the card.

Note the following before using this command:

- ❑ This command does not accept a directory path. When copying a file to or from a compact flash card, you must first change to the appropriate directory on the card. For instructions, refer to “SET CFLASH DIR” on page 192. The default location is the root of the flash card.
- ❑ Files with the extension UKF are encryption key pairs. These files cannot be copied, renamed, or deleted from the file system.
- ❑ The new filename must be a valid filename from 1 to 16 alphanumeric characters. The name of the copy must be unique from the other files in the file system.
- ❑ *ext* is the three-letter file extension, and can be any of the types listed in Table 2. You must give the copy the same extension as the original file.

Table 2. File Extensions and File Types

Extension	File Type
.cfg	Configuration file

Table 2. File Extensions and File Types

Extension	File Type
.cer	Certificate file
.csr	Certificate enrollment request
.key	Public encryption key
.log	Event log

Examples

The following command creates a copy of the configuration file “admin.cfg” in the switch’s file system and names the copy “admin2.cfg”:

```
copy admin.cfg admin2.cfg
```

The following command creates a copy of the configuration file “switch 12.cfg” in the file system and names the copy “backup.cfg”:

```
copy "switch 12.cfg" backup.cfg
```

The following command copies the configuration file “9408switches.cfg” from the switch’s file system to a compact flash card:

```
copy 9408switches.cfg cflash:9408switches.cfg
```

The following command copies the configuration file “sales sw12.cfg” from a compact flash card to the switch’s file system and renames the file “presales_4.cfg”:

```
copy cflash:"sales sw12.cfg" presales_4.cfg
```

CREATE CONFIG

Syntax

```
create config=[cflash:] filename.cfg
```

Parameter

config	Specifies the name of a new configuration file. If the filename contains spaces, enclose it in double quotes. Otherwise, the quotes are optional. To store the configuration file on a flash memory card, precede the name with "cflash:".
--------	--

Description

This command creates a new configuration file. The file contains the commands necessary to recreate the current configuration of the switch.

The CONFIG parameter specifies the name for the configuration file. The file extension must be ".cfg". If the file already exists, it is replaced. If the file does not exist it is created.

The filename can be from 1 to 16 alphanumeric characters, not including the ".cfg" extension. Spaces are allowed. Be sure to enclose the name in double quotes if you include a space in the name. Wildcards are not allowed.

This command does not change the assignment of the active boot configuration file, which is the file the switch uses to configure itself the next time it is reset or power cycled. To change the active boot configuration file, refer to "SET CONFIG" on page 193.

Examples

The following command creates the new configuration file Switch12.cfg in the switch's file system. The file will contain all of the commands necessary to recreate the switch's current configuration:

```
create config=Switch12.cfg
```

The following command creates a configuration file named "l2 switches.cfg" and stores it on a compact flash card:

```
create config=cflash:"l2 switches.cfg"
```

DELETE FILE

Syntax

```
delete file=[cflash:] filename
```

Parameter

file	Specifies the name of the file to be deleted. A name with spaces must be enclosed in double quotes. Otherwise, the quotes are optional. If the file is stored on a compact memory flash card, precede the name with "cflash:".
------	--

Description

This command deletes a file from the file system or from a compact flash memory card.

Note the following before using this command:

- ☐ Deleting the configuration file that is acting as the active boot configuration file causes the switch to use its default settings the next time you reboot or power cycle the switch, unless you select another active boot configuration file. For instructions on how to change the active boot configuration file, refer to see "SET CONFIG" on page 193.
- ☐ To delete a PKI certificate, you must first remove the certificate from the certificate database using "DELETE PKI CERTIFICATE" on page 675.
- ☐ This command does not accept a directory path. To delete a file on a compact flash card, you must first change to the directory where the file is stored. For instructions, refer to "SET CFLASH DIR" on page 192.
- ☐ Files with a ".ukf" extension cannot be deleted with this command. These files are encryption key pairs. To delete an encryption key pair from the switch, refer to "DESTROY ENCO KEY" on page 664.

To list the files in the file system, refer to "SHOW FILE" on page 197.

Examples

The following command deletes the certificate enrollment request SW55a.csr:

```
delete file=SW55a.csr
```

The following command deletes the configuration file named “Switch 12.cfg” on a compact flash card:

```
delete file=cflash:"Switch 12.cfg"
```

FORMAT DEVICE

Syntax

```
format device=flash
```

Parameter

device	Specifies the device to format. The only option is “Flash” for the switch’s file system.
--------	--

Description

This command formats the flash memory in the switch.



Caution

Formatting the flash memory deletes ALL files from the switch, *including* the active configuration file, encryption keys, and certificates. Only the AT-S63 image file in the application block is retained.



Caution

This procedure causes a system reset. Some network traffic may be lost while the switch initializes the AT-S63 Management Software.

Example

The following example formats the flash memory in the switch:

```
format device=flash
```

RENAME

Syntax

```
rename [cflash:] filename1.ext [cflash:] filename2.ext
```

Parameters

<code>filename1.ext</code>	Specifies the name of the file to be renamed. If the name contains spaces, enclose it in double quotes. Otherwise, the quotes are optional. If the file is stored on a compact memory card, precede the name with “cflash:”.
<code>filename2.ext</code>	Specifies the new name for the file. The filename can be from 1 to 16 alphanumeric characters, not including the filename extension. Spaces are allowed. If the name contains spaces, it must be enclosed in double quotes. The filename extension must be the same as in the original filename. The new name must be unique in the file system. If the file is stored on a compact memory card, precede the name with “cflash:”.

Description

This command renames a file in a switch’s file system or on a compact flash memory card. The source and destination file extensions must be the same.

Note the following before using this command:

- ❑ Files with the extension UKF are encryption key pairs. These files cannot be copied, renamed, or deleted from the file system.
- ❑ Renaming the active boot configuration file and then resetting the switch returns the unit to its default parameter settings, unless you save the current configuration or select another active boot configuration file. For instructions on how to change the active boot configuration file, see “SET CONFIG” on page 193.
- ❑ The command does not accept a directory path. To rename a file on a compact flash card, you must first change to the directory where the file is stored. For instructions, refer to “SET CFLASH DIR” on page 192.
- ❑ The source and destination locations must be the same.

Examples

The following command renames the file “Switch12.cfg” in the switch’s file system to “Sw 44a.cfg”:

```
rename switch12.cfg "Sw 44a.cfg"
```

This command renames the file “sales_sw.cfg” on a flash memory card to “sales sw5.cfg”:

```
rename cflash:sales_sw.cfg cflash:"sales sw5.cfg"
```

SET CFLASH DIR

Syntax

```
set cflash dir=directory
```

Parameter

dir Specifies the directory path.

Description

This command changes the current directory on the compact flash card.

Note

You cannot create directories on a compact flash card from the AT-S63 Management Software.

Example

The following command changes the current directory on a compact flash card to “configs”:

```
set cflash dir=configs
```

This command changes the current directory back to the root on the compact flash card:

```
set cflash dir=\
```


SET CONFIG

Syntax

```
set config=[cf]lash:] filename.cfg | none
```

Parameter

config	Specifies the name of the configuration file to act as the active configuration file for the switch. The name can be from 1 to 16 alphanumeric characters, not including the extension “.cfg”. If the filename contains spaces, enclose it in double quotes.
--------	--

Description

This command specifies the active configuration file on a switch. The switch uses the active configuration file to save its parameter settings when the SAVE CONFIGURATION command is issued and to configure its settings when reset or power cycled.

Before using this command, note the following:

- ❑ To view the name of the currently active configuration file, see “SHOW CONFIG” on page 196.
- ❑ The configuration file must already exist. To view the files, see “SHOW FILE” on page 197. Configuration files have a “.cfg” extension. To create an entirely new configuration file, refer to “CREATE CONFIG” on page 186.
- ❑ Changing the active boot configuration file does not change the current operating configuration of the switch. You must reset or power cycle the switch after specifying the new active boot configuration file if you want the switch to use the settings in the file.
- ❑ If you specify a new active configuration file and enter the SAVE CONFIGURATION command without resetting the switch, the current settings of the switch overwrite the settings in the file.
- ❑ The NONE option does the following:
 - It removes the currently active configuration file without assigning a new one.
 - The switch continues to operate with its existing configuration settings.
 - You may make further parameter changes, but you cannot save them.
 - If you reset the switch, it uses the BOOT.CFG file to configure its settings.

- To be able to save configuration changes again, you must assign a new active boot configuration file.
- ❑ For those systems that support a flash memory card, you can specify a configuration file on a flash card as the active boot configuration file for a switch. However, the configuration file is not copied to the switch's file system, but is instead used and updated directly from the card. If you remove the card and reset the switch, the management software uses its default settings.
- ❑ If the file is on a flash memory card, you must change to the directory where the file is stored before performing this command. The command does not accept a directory path. To change directories on a flash card, see "SET CFLASH DIR" on page 192. The default location is the root of the flash card.

Examples

The following command selects the file `switch22.cfg` as the new active boot configuration file for the switch:

```
set config=switch22.cfg
```

If you want the switch to use the settings in the file, you reset or power cycle the unit. If, instead, you want to overwrite the settings in the file with the switch's current settings, you enter the `SAVE CONFIGURATION` command.

The following command uses the `NONE` option to remove the current active boot configuration file without specifying a new one. The switch does not allow you to save any further changes to the switch's configuration, though you can continue to make changes. If you reset the unit, it uses the `BOOT.CFG` file to configure its settings:

```
set config=none
```

The following command specifies the file `"sw sales.cfg"` on a flash memory card as the switch's active boot configuration file:

```
set config=cflash:"sw sales.cfg"
```

SHOW CFLASH

Syntax

show cflash

Parameter

None

Description

This command displays information about the compact flash card including the current directory, the number of files, how much space is used, and amount of space available. An example is shown in Figure 17.

Compact Flash:

Current Directory: \

Number of files 6

Number of directories 3

Bytes used 4468

Card Information:

Hardware detected Yes

Serial Number F000530211

Size 124666 KB

Used 22 KB (8 files)

Free 124644 KB

Figure 17. SHOW CFLASH Command

Example

show cflash

SHOW CONFIG

Syntax

```
show config [dynamic]
```

Parameter

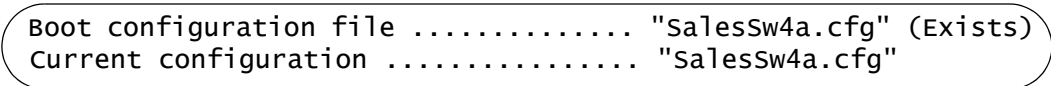
dynamic	Displays the settings for all the switch and port parameters in command line format.
---------	--

Description

This command, when used without the DYNAMIC parameter, displays two pieces of information. The first is the “Boot configuration file.” This is the configuration file the switch uses the next time it is reset or power cycled. This is also the configuration file the switch uses to save your configuration changes when you use the SAVE CONFIGURATION command. To change the boot configuration file, refer to “SET CONFIG” on page 193.

The second piece of information is the “Current Configuration.” This is the boot configuration file the switch used the last time it was reset or power cycled.

An example of the information displayed by the command is shownn in Figure 18.



```
Boot configuration file ..... "SalesSw4a.cfg" (Exists)
Current configuration ..... "SalesSw4a.cfg"
```

Figure 18. SHOW CONFIG Command

The DYNAMIC parameter displays all the switch settings in command line format for those switch parameters that have been changed from their default settings. For an example of the information displayed by the command, refer to Figure 2 on page 56.

Example

The following command displays the names of the active and current configuration files:

```
show config
```

SHOW FILE

Syntax

```
show file[=[cflash:] filename.ext]
```

Parameter

file	Specifies the name of the file to be displayed. Use double quotes to enclose the name if it contains spaces. Otherwise, the quotes are optional. To view a file on a flash memory card, precede the name with "cflash". If you do not specify a file name, the command displays a list of all files in flash memory as well as on the compact flash card.
------	--

Description

This command displays a list of the files in the switch's file system. You can use the wildcard "*" to replace any part of the filename to allow a more selective display.

You can also use this command to view the contents of a configuration file.

Examples

The following command displays all the files in the switch's file system and the current directory of the flash memory card:

```
show file
```

The following command displays all the configuration files on the switch:

```
show file=*.cfg
```

The following command displays the contents of the configuration file sw12.cfg in the switch's file system:

```
show file=sw12.cfg
```

The following command displays the contents of the configuration file boot.cfg on a compact flash card:

```
show file=cflash:boot.cfg
```

SHOW FLASH

Syntax

```
show flash
```

Parameter

None

Description

This command displays information about the file system in the switch. The information includes the number of files stored in the file system, how much space is used, and the amount of space available. An example of the information displayed by this command is shown in Figure 19.

Flash:

```
-----  
Files ..... 12288 bytes (5 files)  
Free ..... 8211456 bytes  
Total ..... 8223744 bytes  
-----
```

Figure 19. SHOW FLASH Command

Example

```
show flash
```

Chapter 13

File Download and Upload Commands

This chapter contains the following commands:

- ❑ “LOAD METHOD=LOCAL” on page 200
- ❑ “LOAD METHOD=TFTP” on page 202
- ❑ “LOAD METHOD=XMODEM” on page 207
- ❑ “UPLOAD METHOD=LOCAL” on page 211
- ❑ “UPLOAD METHOD=REMOTESWITCH” on page 213
- ❑ “UPLOAD METHOD=TFTP” on page 217
- ❑ “UPLOAD METHOD=XMODEM” on page 220

LOAD METHOD=LOCAL

Syntax

```
load method=local destfile=appblock
srcfile|file=[cflash:] filename
```

Parameters

method	Specifies a local download.
destfile	Specifies the application block (APPBLOCK) of the switch's flash memory. This is the area of memory reserved for the switch's active AT-S63 image file.
srcfile or file	Specifies the filename of the AT-S63 image file in the file system to be downloaded into the application block. If the image file is stored on a compact flash card, precede the filename with "cflash:". If the filename contains a space, enclose it in double quotes. These parameters are equivalent.

Description

This command downloads an AT-S63 image file from the switch's file system into the application block, which is the section of flash memory reserved for the active AT-S63 running image. This function makes the AT-S63 file the new active image file on the switch. This command assumes that at some earlier point you downloaded a new version of the AT-S63 image file into the file system of a switch and now want to copy it into application block so that it becomes the switch's active image file.

This command can also be used to download an AT-S63 image file from a compact flash card into the application block.

When performing a local download, note the following:

- ❑ The AT-S63 management image file must already be stored in the switch's file system or on a compact flash card.
- ❑ The command must include the DESTFILE parameter with the APPBLOCK option.
- ❑ Use the SRCFILE or FILE parameter to specify the name of the AT-S63 image file in the switch's file system or on the compact flash card.
- ❑ The current configuration of a switch is retained when a new AT-S63 software image is copied to the application block.

- ❑ After downloading an image file into the application block, you can delete the image file from the file system or compact flash card to free up space for other files.



Caution

The switch, after downloading the AT-S63 image file into its application block, automatically resets to initialize the new management software. The entire process can take a minute or so to complete. The switch does not forward network traffic during the reset process. Some network traffic may be lost.

Examples

This command downloads an AT-S63 image file stored in the switch's file system into the application block, the area of flash memory reserved for the active running image. This makes the file the active image file on the switch. The name of the image file in the file system in this example is "ats63v2.img":

```
load method=local destfile=appblock srcfile="ats63v2.img"
```

A confirmation prompt is displayed. Type **Y** for yes to transfer the file to the application block or **N** for no to cancel the procedure.

This command downloads an AT-S63 image file from a compact flash card to the switch's application block. The name of the image file on the compact flash card is "ats63v2.img":

```
load method=local destfile=appblock  
srcfile=cflash:"ats63v2.img"
```

LOAD METHOD=TFTP

Syntax

```
load method=tftp destfile=[cflash:] filename | appblock
server=ipaddress srcfile | file=filename
```

Parameters

method	Specifies a TFTP download.
destfile	Specifies the destination filename for the file. This is the name given to the file when it is stored in the switch's file system. The name can be from 1 to 15 alphanumeric characters, not including the three-letter extension. If the name includes spaces, enclose it in double quotes. The name must be unique from the files already stored in the file system. The command will not overwrite a preexisting file with the same name. To download a file onto a flash memory card in the switch rather than the file system, precede the name with "cflash:". The APPBLOCK option specifies the application block of the switch's flash memory. This is the area of memory reserved for the switch's active AT-S63 image file. The APPBLOCK option is used to download a new AT-S63 image file from a TFTP server to the application block of the switch so that it functions as the new active image file on the switch.
server	Specifies the IP address of the TFTP server on the network.
srcfile or file	Specifies the filename of the file on the TFTP server to download onto the switch. If the filename contains a space, enclose the name in double quotes. These parameters are equivalent.

Description

A TFTP download uses the TFTP client software on the switch to download files onto the unit from a TFTP server on your network. For example, you might use the command to update a switch's AT-S63 image file, or to download a different boot configuration file or a SSL public key certificate. You can also use this command to download a file from a TFTP server to a flash memory card in the switch.

Note

In earlier versions of the AT-S63 Management Software this command also performed switch to switch file transfers for copying files from a master switch to other switches in an enhanced stack. That function is now part of “UPLOAD METHOD=REMOTESWITCH” on page 213

The DESTFILE parameter specifies a name for the file when it is stored in the file system or a flash memory card in the switch. Enclose the name in double quotes if it contains a space. When specifying the new name of a downloaded file, be sure to give it the correct three-letter extension that corresponds to its file type. The extensions are shown in Table 3.

Table 3. File Name Extensions - Downloading Files

Extension	File Type
.cfg	AT-S63 configuration file
.cer	CA certificate
.img	AT-S63 Management Software image (An AT-S63 image file is assigned a named only if you are downloading the file into the switch's file system instead of the application block.)

To store a file in a flash memory card, the destination filename must be preceded with “cflash:”.

The APPBLOCK option of the DESTFILE parameter refers to the switch's application block, which is the portion of flash memory reserved for the active AT-S63 image. The application block is separate from the file system. The APPBLOCK option downloads a new version of the AT-S63 image file into the application block, making it the active image file on the switch.

Note

The APPBLOCK option can only be used to download a new AT-S63 image file.

The equivalent FILE and SCRFILE parameters specify the name of the file on the TFTP server to download onto the switch.

Before downloading a file onto a switch using TFTP, note the following:

- ❑ A TFTP download is supported from a local, Telnet or SSH management session.

- ❑ There must be a node on your network that contains TFTP server software and the file to be downloaded must be stored on the server.
- ❑ You should start the TFTP server software before performing the download command.
- ❑ For AT-9400 Switches running AT-S63 version 2.0.0 or later, the switch must have a routing interface on the local subnet from where it reaches the TFTP server. The switch uses the interface's IP address as its source address during the file transfer with the server. This rule applies equally to master and slave switches in an enhanced stack. For AT-9400 Switches without a routing interface, you can perform an Xmodem download from a local management session or, alternatively, a switch to switch upload using "UPLOAD METHOD=REMOTESWITCH" on page 213.
- ❑ For AT-9400 Switches running AT-S63 version 1.3.0 or earlier, the switch must be able to access the TFTP server through its management VLAN.
- ❑ If you are upgrading the AT-9400 Switch from AT-S63 version 1.3.0 or earlier and the switch has an IP address, the upgrade process automatically creates a routing interface on the switch to preserve the device's IP configuration. If the switch has a static address, the interface is assigned the same address. If the unit obtains its IP configuration from a DHCP or BOOTP server, the interface is created with its DHCP or BOOTP client activated. The interface is given the interface number 0 and assigned to the preexisting management VLAN. Furthermore, the interface is designated as the local interface on the switch.

For example, if the switch has the static IP address 149.44.44.44 and the management VLAN has a VID of 12, the upgrade process automatically creates a routing interface with the same IP address and names it VLAN12-0. It assigns the interface to the VLAN with the VID of 12 and designates it as the switch's local interface.

- ❑ If you download a configuration file, the switch receiving the file does not automatically designate it as its active boot configuration file. To designate a configuration file as the active boot file after you have downloaded it onto the switch, refer to "SET CONFIG" on page 193.
- ❑ The AT-S63 Management Software can be downloaded only onto an AT-9400 Switch.
- ❑ The current configuration of a switch is retained when a new AT-S63 software image is installed.
- ❑ The AT-S63 image file contains the bootloader for the switch. You cannot load the image file and bootloader separately.
- ❑ If you download a new AT-S63 image file and enter a filename for the DESTFILE parameter instead of APPBLOCK, the file is stored in the switch's file system. To copy the image file from the file system to the

application block so that its used by the switch as its active image file, refer to “UPLOAD METHOD=LOCAL” on page 211.

Note

Downloading an AT-S63 image file into a switch's file system rather than into the application block should be perform with care. The file will take up 2 megabytes of space in the file system.

- ❑ If you download a file onto a flash memory card in the switch and later want to copy the file from the card to a switch's file system, refer to “COPY” on page 184.

Examples

The following command downloads a new version of the AT-S63 software image directly to the switch's application block, making it the active image file on the switch. The IP address of the TFTP server is 149.11.11.11 and the name of the image file on the server is “ats63v2.img”:

```
load method=tftp destfile=appblock server=149.11.11.11
srcfile=ats63v2.img
```



Caution

After downloading an AT-S63 image file and writing it to the application block portion of flash memory, the switch resets and initializes its management software. The entire process can take a minute or so to complete. Do not interrupt the process by resetting or power cycling the switch. Some network traffic may be lost during the process.

The following command downloads a new configuration file into the switch's file system using TFTP. The configuration file is stored as “sw 111.cfg” on the TFTP server and is given the name “sw56a.cfg” when stored in the switch's file system. The TFTP server has the IP address 149.55.55.55:

```
load method=tftp destfile=sw56a.cfg server=149.55.55.55
srcfile="sw 111.cfg"
```

The following command downloads an SSL certificate to the switch's file system. The name of the file on the TFTP server is “sw12_ssl.cer”. The same name is used for the file in the switch's file system:

```
load method=tftp destfile=sw12_ssl.cer server=149.44.44.44
srcfile=sw12_ssl.cer
```

The following command downloads a new version of the AT-S63 image file from a TFTP server to the switch's file system, changing the name from “ats63v1_2_0.img” to “ats63.img”:

```
load method=tftp destfile=ats63.img server=149.11.11.11  
srcfile=ats63v1_2_0.img
```

Since the file is downloaded to the switch's file system and not to the application block, it is not used as the switch's active image file. If at some point in the future you want to make it the active image file, refer to "UPLOAD METHOD=LOCAL" on page 211.

This command downloads a configuration file called "sw12.cfg" onto a flash memory card in the switch. The configuration file retains the same name when stored on the card. The TFTP server has the IP address 149.142.44.44:

```
load method=tftp destfile=cflash:sw12.cfg  
server=149.142.44.44 srcfile=sw12.cfg
```

This command downloads an AT-S63 image file from a TFTP server to a flash memory card in the switch:

```
load method=tftp destfile=cflash:ats63.img  
server=149.11.11.11 srcfile=ats63.img
```

LOAD METHOD=XMODEM

Syntax

```
load method=xmodem destfile=[cflash:] filename | appblock
```

Parameters

method	Specifies an Xmodem download.
destfile	Specifies the destination filename for the file. This is the name given to the file when it is stored in the switch's file system. The name can be from 1 to 15 alphanumeric characters, not including the three-letter extension. If the name includes spaces, enclose it in double quotes. The name must be unique from any files already stored in the file system. The command will not overwrite a preexisting file with the same name.

To download a file onto a flash memory card in a switch rather than the file system, precede the name with "cflash:".

The APPBLOCK option specifies the application block of the switch's flash memory. This is the area of memory reserved for the switch's active AT-S63 image file. The APPBLOCK option is used to download a new AT-S63 image file into the application block so that it functions as the new active image file on the switch.

Description

An XMODEM download uses the XMODEM utility to download files onto a switch from a terminal or computer with a terminal emulator program connected to the switch's RS232 Terminal Port. You might use the command to update a switch's AT-S63 image file, or to download a different boot configuration file or a SSL public key certificate.

Note

In previous versions of the AT-S63 Management Software this command also performed switch to switch file transfers for copying files from a master switch to other switches in an enhanced stack. That function is now part of "UPLOAD METHOD=REMOTESWITCH" on page 213

The DESTFILE parameter specifies a name for the file. This is the name the file will be stored as in the file system on the switch. Enclose the name in double quotes if it contains a space. When specifying the new name of a

downloaded file, you must be sure to give it the correct three-letter extension, depending on the file type. The extensions are shown in Table 3 on page 203.

To download the file onto a flash memory card in the switch, precede the name with “cflash:”.

The APPBLOCK option of the DESTFILE parameter refers to the switch’s application block, which is the portion of flash memory reserved for the active AT-S63 image. This option downloads a new version of the AT-S63 image file into the application block, making it the active image file on the switch.

Note

The APPBLOCK option should only be used when downloading a new AT-S63 image file, and not with any other file type.

Before downloading a file onto a switch using Xmodem, note the following:

- ❑ You must use a local management session to download a file using Xmodem.
- ❑ You can only use Xmodem to download a file onto the switch where you started the local management session. You cannot use it to download a file onto a switch accessed through enhanced stacking.
- ❑ You must store the file to be downloaded on the computer or terminal connected to the RS232 Terminal Port on the switch.
- ❑ The transfer protocol can be Xmodem or 1K Xmodem.
- ❑ The switch does not automatically designate a newly downloaded configuration file as its active boot configuration file. To designate the active boot file, refer to “SET CONFIG” on page 193.
- ❑ The AT-S63 software image is only supported on AT-9400 Switches.
- ❑ The current configuration of a switch is retained when a new AT-S63 software image is installed.
- ❑ The AT-S63 image file also contains the bootloader for the switch. You cannot load the image file and bootloader separately.
- ❑ If you download a new AT-S63 image file and enter a filename for the DESTFILE parameter instead of APPBLOCK, the file is stored in the switch’s file system. To copy an image file from the file system to the switch’s application block, refer to “LOAD METHOD=LOCAL” on page 200.
- ❑ If you download a file onto a flash memory card in the switch and later want to copy the file from the card to a switch’s file system, refer to “COPY” on page 184.

- ❑ If you are upgrading the AT-9400 Switch from AT-S63 version 1.3.0 or earlier and the switch has an IP address, the upgrade process automatically creates a routing interface on the switch to preserve the device's IP configuration. If the switch has a static address, the interface is assigned the same address. If the unit obtained its IP configuration from a DHCP or BOOTP server, the interface is created with its DHCP or BOOTP client activated. The interface is given the interface number 0 and assigned to the preexisting management VLAN. Furthermore, the interface is designated as the local interface on the switch.

For example, if the switch has the static IP address 149.44.44.44 and the management VLAN has a VID of 12, the upgrade process automatically creates a routing interface with the same IP address and names it VLAN12-0. It assigns the interface to the VLAN with the VID of 12 and designates it as the switch's local interface.

Examples

The following command uses the APPBLOCK option of the DESTFILE parameter to download a new version of the AT-S63 software image directly to the application block, making it the active image file on the switch:

```
load method=xmodem destfile=appblock
```



Caution

After downloading an AT-S63 image file and writing it to the application block portion of flash memory, the switch resets itself and initializes the software. The entire process can take a minute or so to complete. Do not interrupt the process by resetting or power cycling the switch. Some network traffic may be lost during the reset process.

The following command downloads a new configuration file onto the switch. The configuration file is given the name "switch12.cfg" in the switch's file system:

```
load method=xmodem destfile=switch12.cfg
```

The source file is not specified when downloading a file using Xmodem. Rather, after you enter the command, the management software displays a confirmation prompt followed by another prompt instructing you to begin the file transfer. To start the transfer, you use your terminal emulation program to specify the file on your workstation that you want to download.

The following command uses Xmodem to download an SSL certificate into the switch's file system and assigns it the name sw12 ssl.cer:

```
load method=xmodem destfile="sw12 ssl.cer"
```

The following command downloads a configuration file onto a flash memory card in the switch. The configuration file is given the name “product_sw.cfg” on the card:

```
load method=xmodem destfile=cflash:product_sw.cfg
```

The following command downloads a new version of the AT-S63 image file to the switch’s file system instead of the application block. It does this by replacing the APPBLOCK option with a filename, in this case “ats63v1_2_0.img”. The image file is stored in the switch’s file system with this name:

```
load method=xmodem destfile=ats63v1_2_0.img
```

Since the file is stored in the switch’s file system and not the application block, the switch does not use it as its active image file. If, at some point in the future, you want to make it the active image file, use “LOAD METHOD=LOCAL” on page 200.

UPLOAD METHOD=LOCAL

Syntax

```
upload method=local destfile=[cflash:] filename
srcfile|file=appblock
```

Parameters

method	Specifies a local upload.
destfile	Specifies a filename for the AT-S63 image file. If the name contains spaces, enclose the name in quotes. To upload the active image file to a flash memory card in the switch, precede the name with "cflash:".
srcfile <i>or</i> file	Specifies the application block (APPBLOCK), where the active AT-S63 image file is stored.

Description

This command copies the switch's active AT-S63 image file from the application block, where the active AT-S63 image is stored, into the switch's file system or to a flash memory card.

Note

It is unlikely you will ever need to perform this type of upload.

The DESTFILE parameter specifies a name for the file. This is the name given to the AT-S63 image file when it is stored in the file system or on a compact flash memory card. The name should include the suffix ".img".

The equivalent SRCFILE and FILE parameters specify APPBLOCK, for application block.

Examples

The following command uploads the active AT-S63 image from the switch's application block to the file system and assigns it the name "sw12 s63 image.img":

```
upload method=local destfile="sw12 s63 image.img"
srcfile=appblock
```

This command uploads the active AT-S63 image from the switch's application block to a flash memory card in the switch and assigns the name "s63.img" to the file:

```
upload method=local destfile=cflash:s63.img"  
srcfile=appblock
```

UPLOAD METHOD=REMOTESWITCH

Syntax

```
upload method=remoteswitch
srcfile|file=filename|appblock|switchcfg
switchlist=switches [verbose=yes|no|on|off|true|false]
```

Parameters

method	Specifies a switch to switch upload.						
srcfile or file	Specifies the file to be uploaded from the master switch. Options are: <table border="0"> <tr> <td><i>filename</i></td><td>Uploads a configuration file from the master switch's file system.</td></tr> <tr> <td>appblock</td><td>Uploads the master switch's AT-S63 image file.</td></tr> <tr> <td>switchcfg</td><td>Uploads the master switch's active boot configuration file.</td></tr> </table>	<i>filename</i>	Uploads a configuration file from the master switch's file system.	appblock	Uploads the master switch's AT-S63 image file.	switchcfg	Uploads the master switch's active boot configuration file.
<i>filename</i>	Uploads a configuration file from the master switch's file system.						
appblock	Uploads the master switch's AT-S63 image file.						
switchcfg	Uploads the master switch's active boot configuration file.						
switchlist	Specifies the switches in an enhanced stack to receive the uploaded file. To view the switches, refer to "SHOW REMOTELIST" on page 70. You can specify more than one switch at a time (for example, 1,3,4).						
verbose	Specifies whether to display details of the upload operation. The options are: <table border="0"> <tr> <td>yes, on, true</td><td>Display the upload details. The options are equivalent.</td></tr> <tr> <td>no, off, false</td><td>Do not display the upload details. The options are equivalent.</td></tr> </table>	yes, on, true	Display the upload details. The options are equivalent.	no, off, false	Do not display the upload details. The options are equivalent.		
yes, on, true	Display the upload details. The options are equivalent.						
no, off, false	Do not display the upload details. The options are equivalent.						

Description

This command uploads the AT-S63 file image or a boot configuration file from a master switch to other switches in an enhanced stack. This is referred to as a switch to switch upload. You can use this command to simplify the task of updating the AT-S63 image file in the switches of an enhanced stack. By updating the image file on the master switch first, you can instruct the master switch with this command to update the other switches in the stack, automatically.

You can also use this command to distribute a configuration file on the master switch to other switches when switches are to share a similar

configuration.

The equivalent SRCFILE and FILE parameters specify the name of the file to be uploaded from the switch. You have three options:

- ❑ *filename* - Uploads a configuration file from the master switch's file system. The filename must include the ".cfg" suffix.
- ❑ APPBLOCK - Uploads the master switch's active AT-S63 image file.
- ❑ SWITCHCFG - Uploads the master switch's active boot configuration file. You can use this option in place of the *filename* option when uploading the active boot configuration file on the master switch.

The SWITCHLIST parameter specifies the switches in the enhanced stack to receive the uploaded file. You display the switch numbers using "SHOW REMOTELIST" on page 70.

The optional VERBOSE parameter displays information about the progress of the upload process.

When performing a switch to switch upload, note the following:

- ❑ The command can be performed from a local, Telnet, or SSH management session of a master switch.
- ❑ You must perform the SHOW REMOTELIST command prior to this command to display the switch numbers and allow the management software to determine the number of switches in the enhanced stack. For instructions, refer to "SHOW REMOTELIST" on page 70.
- ❑ This command can upload the master switch's active AT-S63 image file or a configuration file to another switch. This command cannot upload any other type of file, such as an encryption key or SSL certificate.
- ❑ An uploaded configuration file retains its original name.
- ❑ The manager and operator passwords are included in the upload of a configuration file.
- ❑ When uploading the master switch's active AT-S63 image file, the file is copied directly to the application block on the other switch. This automatically designates it as the switch's active image file. The switch receiving the image file resets and initializes the new image file. Some network traffic may be lost during the reset process.
- ❑ If you are upgrading the AT-9400 Switch from AT-S63 version 1.3.0 or earlier and the switch has an IP address, the upgrade process automatically creates a routing interface on the switch to preserve the device's IP configuration. If the switch has a static address, the interface is assigned the same address. If the unit obtained its IP configuration from a DHCP or BOOTP server, the interface is created with its DHCP or BOOTP client activated. The interface is given the interface number 0 and assigned to the preexisting management

VLAN. Furthermore, the interface is designated as the local interface on the switch.

For example, if the switch has the static IP address 149.44.44.44 and the management VLAN has a VID of 12, the upgrade process automatically creates a routing interface with the same IP address and names it VLAN12-0. It assigns the interface to the VLAN with the VID of 12 and designates it as the switch's local interface.

- ❑ After receiving a configuration file, a switch automatically marks it as its active boot configuration file and resets. Some network traffic may be lost while the switch initializes its operating software. After the reset is complete, the switch operates with the parameter settings contained in the uploaded configuration file.
- ❑ If the file system of a switch receiving a configuration file already contains a file with the same name, the existing file is overwritten.
- ❑ Uploading the same configuration file onto more than one switch can cause an IP address conflict among the device if the file contains commands for creating routing interfaces. To resolve the issue, after uploading the file you must modify the interfaces on the switches by changing the IP addresses.
- ❑ A configuration file should only be uploaded onto a switch of the same model as the unit where the file was created (for example, AT-9408LC/SP to AT-9408LC/SP). Allied Telesis does not recommend uploading a configuration file onto a switch of a different model (for example, AT-9408LC/SP to AT-9424T/SP). Undesirable switch behavior may result.
- ❑ This command does not support uploading files to or from a compact flash memory card.

Examples

The following command uploads the AT-S63 image file on a master switch to switch 2 in an enhanced stack. (Switch numbers are displayed with "SHOW REMOTELIST" on page 70.)

```
upload method=remoteswitch srcfile=appblock switchlist=2
```

The active AT-S63 image file on the master switch is indicated with the APPBLOCK option of the SRCFILE parameter.



Caution

After receiving the AT-S63 image file, the switch resets and initializes its software. The entire process can take a minute or so to complete. Do not interrupt the process by resetting or power cycling the switch. Some network traffic may be lost during the process.

You can upload the AT-S63 image file from the master switch to more than one switch at a time. The following command uploads the image file to switches 4, 8, and 15:

```
upload method=remoteswitch srcfile=appblock  
switchlist=4,8,15
```

The following command uploads the switch active boot configuration file from the master switch to switch 11:

```
upload method=remoteswitch srcfile=switchcfg switchlist=11
```

**Caution**

After receiving the configuration file the switch resets and initializes the software. The entire process can take a minute or so to complete. Do not interrupt the process by resetting or power cycling the switch. Some network traffic may be lost during the process.

The following command uploads the configuration file “sales_switches.cfg” from a master switch to switch 4:

```
upload method=remoteswitch srcfile=sales_switches.cfg  
switchlist=4
```

**Caution**

After receiving the configuration file the switch resets and initializes the software. The entire process can take a minute or so to complete. Do not interrupt the process by resetting or power cycling the switch. Some network traffic may be lost during the process.

UPLOAD METHOD=TFTP

Syntax

```
upload method=tftp destfile=filename server=ipaddress
srcfile|file=switchcfg|[cflash:]filename|appblock
```

Parameters

method	Specifies a TFTP upload.						
destfile	Specifies a filename for the uploaded file. This is the name given the file when it is stored on the TFTP server. If the name contains spaces, enclose it in quotes.						
server	Specifies the IP address of the network node containing the TFTP server software.						
srcfile <i>or</i> file	Specifies the file to be uploaded. Options are: <table> <tr> <td>switchcfg</td><td>Uploads the switch's active boot configuration file.</td></tr> <tr> <td><i>filename</i></td><td>Uploads a file from the switch's file system. If the file is stored on a compact flash card, precede the name with "cflash:".</td></tr> <tr> <td>appblock</td><td>Uploads the switch's active AT-S63 image file.</td></tr> </table>	switchcfg	Uploads the switch's active boot configuration file.	<i>filename</i>	Uploads a file from the switch's file system. If the file is stored on a compact flash card, precede the name with "cflash:".	appblock	Uploads the switch's active AT-S63 image file.
switchcfg	Uploads the switch's active boot configuration file.						
<i>filename</i>	Uploads a file from the switch's file system. If the file is stored on a compact flash card, precede the name with "cflash:".						
appblock	Uploads the switch's active AT-S63 image file.						

Description

A TFTP upload uses the TFTP client software on the switch to upload files from the file system on the system to a TFTP server on the network. You can use the command to upload a switch's active boot configuration file or any other file from the file system, such as an SSL certificate enrollment request or a public encryption key. This command can also upload a file from a compact flash memory card in the switch to a TFTP server. You can also use the command to upload the switch's active AT-S63 software image from the application block to a TFTP server, though it is unlikely you would ever have need for that function.

When performing a TFTP upload, note the following:

- ☐ A TFTP upload is supported from a local, Telnet, or SSH management session.
- ☐ There must be a node on your network that contains the TFTP server software. The uploaded file will be stored on the server.

- ❑ Start the TFTP server software before you perform the command.
- ❑ The AT-9400 Switch must have a routing interface on the local subnet from where it is reaching the TFTP server. The switch uses the interface's IP address as its source address during the file transfer with the server. This rule applies equally to master and slave switches in an enhanced stack. The server can be located on any interface on the switch, not just the local interface. If the AT-9400 Switch does not have a routing interface, you can perform an Xmodem upload from a local management session or, alternatively, a switch to switch upload using "UPLOAD METHOD=REMOTESWITCH" on page 213.

The DESTFILE parameter specifies a name for the file. This is a name for the file when it is stored on the TFTP server. The uploaded file should be given the same three-letter extension as the original file. The extensions are listed in Table 4.

Table 4. File Name Extensions - Uploaded Files

Extension	File Type
.cfg	Switch configuration file
.csr	CA certificate enrollment request
.log	Event log
.key	Public encryption key
.img	AT-S63 Management Software image

The SERVER parameter specifies the IP address of the network node with the TFTP server software where the uploaded file will be stored.

The equivalent SRCFILE and FILE parameters specify the name of the file to be uploaded from the switch. You have three options:

- ❑ SWITCHCFG - Uploads the switch's active boot configuration file to the TFTP server.
- ❑ *filename* - Uploads a file from the switch's file system to the TFTP server. This differs from the SWITCHCFG parameter in that the latter uploads just the active boot configuration file, while this parameter can upload any file in the file system. If the file to be uploaded is stored on a compact flash memory card in the switch, precede the name with "cflash:".
- ❑ APPBLOCK - Uploads the switch's active AT-S63 image file to the TFTP server.

Note

It is unlikely you will ever need to upload the active AT-S63 image file from a switch to a TFTP server. If you need the image file to transfer to another switch, you can simplify the process with a switch to switch upload using "UPLOAD METHOD=REMOTESWITCH" on page 213. Alternatively, you can obtain the latest version of the image file from the Allied Telesis web site.

Examples

The following command uses TFTP to upload a configuration file called "sw22 boot.cfg" from the switch's file system to a TFTP server with an IP address of 149.88.88.88. The command stores the file on the server with the same name that it has on the switch:

```
upload method=tftp destfile="sw22 boot.cfg"  
server=149.88.88.88 srcfile="sw22 boot.cfg"
```

The following command uses TFTP to upload the switch's active configuration file from the file system to a TFTP server with the IP address 149.11.11.11. The active boot file is signified with the SWITCHCFG option rather than by its filename. This option is useful in situations where you do not know the name of the active boot configuration file. The file is stored as "master112.cfg" on the TFTP server:

```
upload method=tftp destfile=master112.cfg  
server=149.11.11.11 srcfile=switchcfg
```

The following command uploads a SSL certificate enrollment request form titled "sw12_ssl_enroll.csr" from the file system to the TFTP server. It changes the name of the file to "slave5b enroll.csr":

```
upload method=tftp destfile="slave5b enroll.csr"  
server=149.11.11.11 srcfile=sw12_ssl_enroll.csr
```

The following command uploads a configuration file called "sales2.cfg" from a compact flash memory card in the switch to a TFTP server with an IP address of 149.124.88.88. The command stores the file on the server with the same name that it has on the card:

```
upload method=tftp destfile=sales2.cfg server=149.124.88.88  
srcfile=cflash:sales2.cfg
```

The following command uploads the switch's active AT-S63 image file to a TFTP server with an IP addresses 149.55.55.55. The file is given the name "ats63 sw12.img":

```
upload method=tftp destfile="ats63 sw12.img"  
server=149.55.55.55 srcfile=appblock
```

UPLOAD METHOD=XMODEM

Syntax

```
upload method=xmodem
srcfile|file=switchcfg|[cflash:]filename|appblock
```

Parameters

method	Specifies an Xmodem upload.
srcfile or file	Specifies the file to be uploaded. Options are:
switchcfg	Uploads the switch's active boot configuration file.
filename	Specifies the name of a file to upload from the switch's file system or compact flash card. If the file is stored on a compact flash card, precede the name with "cflash:".
appblock	Uploads the switch's active AT-S63 image file.

Description

An XMODEM upload uses the Xmodem utility to upload a file from the switch's file system to a terminal or computer with a terminal emulator program connected to the serial terminal port on the switch. You can use the command to upload a switch's active boot configuration file or any other file from the file system, such as an SSL certificate enrollment request or a public encryption key. You can also use this command to upload a file on a compact flash memory card to your workstation. The command also allows you to upload the switch's active AT-S63 software image from the application block to a your terminal or workstation, though it is unlikely you would ever have need for that function.

When performing an Xmodem upload, note the following:

- ❑ An Xmodem upload must be performed from a local management session.
- ❑ Xmodem can only upload a file from the switch where you started the local management session. Xmodem cannot upload a file from a switch accessed through enhanced stacking.

The equivalent SRCFILE and FILE parameters specify the name of the file to upload from the switch. You have three options:

- ❑ SWITCHCFG - Uploads the switch's active boot configuration file.
- ❑ *filename* - Uploads a file from the switch's file system or a compact flash memory card. This differs from the SWITCHCFG parameter in that the latter can upload just the active boot configuration file, while this parameter can upload any file on the switch. If the file is stored on a flash memory card in the switch, precede the filename with "cflash:".
- ❑ APPBLOCK - Uploads the switch's active AT-S63 image file.

Note

It is unlikely you will ever need to upload the active AT-S63 image file from a switch to your workstation. If you need the image file to transfer to another switch, you can simplify the process with a switch to switch upload using "UPLOAD METHOD=REMOTESWITCH" on page 213. Alternatively, you can obtain the latest version of the image file from the Allied Telesis web site.

Examples

The following command uses Xmodem to upload a configuration file called "sw22 boot.cfg" from the switch's file system to your workstation:

```
upload method=xmodem srcfile="sw22 boot.cfg"
```

An Xmodem upload command does not include a destination filename. After entering the command, use your terminal emulator program to indicate where to store the file on your workstation and its filename.

The following command uploads the switch's active configuration file from the file system to your workstation. The active boot file is signified with the SWITCHCFG option rather than by its filename. This option is useful in situations where you do not know the name of the active boot configuration file:

```
upload method=xmodem srcfile=switchcfg
```

The following command uploads a SSL certificate enrollment request named "sw12_ssl_enroll.csr" from the switch's file system to the workstation:

```
upload method=xmodem srcfile=sw12_ssl_enroll.csr
```

The following command uses Xmodem to upload a configuration file called "pre10.cfg" from a flash memory card to the workstation where you are running the local management session:

```
upload method=xmodem srcfile=cflash:pre10.cfg
```

The following command uploads the switch's active AT-S63 image file to the workstation:

```
upload method=xmodem srcfile=appblock
```

Event Log and Syslog Client Commands

This chapter contains the following commands:

- ❑ “ADD LOG OUTPUT” on page 224
- ❑ “CREATE LOG OUTPUT” on page 226
- ❑ “DESTROY LOG OUTPUT” on page 230
- ❑ “DISABLE LOG” on page 231
- ❑ “DISABLE LOG OUTPUT” on page 232
- ❑ “ENABLE LOG” on page 233
- ❑ “ENABLE LOG OUTPUT” on page 234
- ❑ “PURGE LOG” on page 235
- ❑ “SAVE LOG” on page 236
- ❑ “SET LOG FULLACTION” on page 238
- ❑ “SET LOG OUTPUT” on page 239
- ❑ “SHOW LOG” on page 242
- ❑ “SHOW LOG OUTPUT” on page 247
- ❑ “SHOW LOG STATUS” on page 249

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD LOG OUTPUT

Syntax

```
add log output=output-id module=[all | module]  
severity=[all | severity]
```

Parameters

output	Specifies the output definition ID number.				
module	Specifies what AT-S63 events to filter. The available options are: <table><tr><td>all</td><td>Sends events for all modules. This is the default.</td></tr><tr><td>module</td><td>Sends events for specific module(s). You can select more than one module at a time, for example, MAC,PACCESS. For a list of modules, see Table 7, “AT-S63 Modules” on page 243.</td></tr></table>	all	Sends events for all modules. This is the default.	module	Sends events for specific module(s). You can select more than one module at a time, for example, MAC,PACCESS. For a list of modules, see Table 7, “AT-S63 Modules” on page 243.
all	Sends events for all modules. This is the default.				
module	Sends events for specific module(s). You can select more than one module at a time, for example, MAC,PACCESS. For a list of modules, see Table 7, “AT-S63 Modules” on page 243.				
severity	Specifies the severity of events to be sent. The options are: <table><tr><td>all</td><td>Sends events of all severity levels.</td></tr><tr><td>severity</td><td>Sends events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, “Event Log Severity Levels” on page 245. The default is I, E, and W.</td></tr></table>	all	Sends events of all severity levels.	severity	Sends events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, “Event Log Severity Levels” on page 245. The default is I, E, and W.
all	Sends events of all severity levels.				
severity	Sends events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, “Event Log Severity Levels” on page 245. The default is I, E, and W.				

Description

This command configures an output definition.

Note
This version of the AT-S63 management software supports only syslog servers as output definitions.

There are two steps to creating a output definition from the command line interface. The first is to create the definition using “CREATE LOG OUTPUT” on page 226. With that command you assign the definition an ID number, the IP address of the syslog server, and other information.

The second step is to customize the definition by specifying which event messages generated by the switch are to be sent. This is accomplished with this command. You can customize the definition so that the switch sends all of its event messages or limit it to just a selection of events from particular modules in the AT-S63 management software. An alternative method to configuring a definition is with “SET LOG OUTPUT” on page 239.

Note

The default configuration for a new output definition is no event messages. The switch does not send any events until you customize the definition with this command or “SET LOG OUTPUT” on page 239.

The OUTPUT parameter specifies the ID number of the output definition you want to configure. The range is 2 to 20. The definition must already exist on the switch. To view the existing definitions and their ID numbers, refer to “SHOW LOG OUTPUT” on page 247.

The MODULE parameter specifies the modules whose events you want the switch to send. The AT-S63 management software consists of a number of modules. Each module is responsible for a different part of switch operation and generates its own events. The MODULE parameter's ALL option sends the events from all the modules. You can also specify individual modules, which are listed in Table 7 on page 243.

The SEVERITY parameter specifies the severity of the events to be sent. For example, you might configure the switch to send only error events of all the modules. Or, you might configure a definition so that the switch sends only warning events from a couple of the modules, such as the spanning tree protocol and the MAC address table. For a list of severity levels, refer to Table 8 on page 245.

Examples

The following command configures output definition 5 to send event messages from all modules and all severity levels:

```
add log output=3 module=all severity=all
```

The following command configures output definition 3 to send only messages related to enhanced stacking and the MAC address table with an error severity level:

```
add log output=3 module=estack,mac severity=e
```

CREATE LOG OUTPUT

Syntax

```
create log output=output-id destination=syslog
server=ipaddress
[facility=default|local1|local2|local3|local4|local5|local6
|local7] [syslogformat=extended|normal]
```

Parameters

output	Specifies an ID number that identifies the output definition. The possible output IDs are:	
	0	Reserved for permanent (nonvolatile) storage. You cannot change or delete this ID.
	1	Reserved for temporary (dynamic) storage. You cannot change or delete this ID.
	2 - 20	Available to be used for other outputs.
destination	Specifies the destination for the log messages. The only option currently supported is:	
	syslog	Forwards log messages in syslog format to a syslog server.
server	Specifies the IP address of the syslog server.	
facility	Specifies a facility level to be added to the events.	
	default	Adds a facility level based on the functional groupings defined in the RFC 3164 standard. The codes applicable to the AT-S63 management software and its modules are shown in Table 5 on page 228. This is the default setting.
	local1 to local7	Adds a set facility code of 17 (LOCAL1) to 23 (LOCAL7) to all event messages. For a list of the levels and their corresponding codes, refer to Table 6 on page 229.

syslogformat	Specifies the format of the generated messages. The possible options are:
extended	Messages include the date, time, and system name. This is the default.
normal	Messages do not include the date, time, and system name.

Description

This command creates a new output definition. The switch uses the definition to send event messages to a device on your network. You can create up to nineteen output definitions.

Note

This version of the AT-S63 management software supports only syslog servers as output definitions.

Note

The switch must have a routing interface on the local subnet where the syslog server is a member. The switch uses the IP address of the interface as its source address when sending packets to the server. For instructions on how to add a routing interface to the switch, refer to “ADD IP INTERFACE” on page 548.

After creating a output definition with this command, you must customize it by defining which event messages you want the switch to send. You can customize a definition so that the switch sends all of its event messages or limit it to just a selection of events from particular modules in the AT-S63 management software. Customizing a definition is accomplished with “ADD LOG OUTPUT” on page 224 or “SET LOG OUTPUT” on page 239.

Note

The default configuration for a new output definition is no event messages. The switch does not send events until you customize the definition.

The OUTPUT parameter specifies the ID number for the new output definition. The range is 2 to 20. Every definition must have a unique ID number.

The SERVER parameter specifies the IP address of the syslog server.

The FACILITY parameter adds a numerical code to the entries as they are sent to the syslog server. You can use this code to group entries on the syslog server according to the management module or switch that produced them. This is of particular value when a syslog server is collecting events from several different network devices. You can specify only one facility level for a syslog server definition.

There are two approaches to using this parameter. The first is to use the DEFAULT option. At this setting, the code is based on the functional groupings defined in the RFC 3164 standard. The codes that are applicable to the AT-S63 management software and its modules are shown in Table 5.

Table 5. Default Syslog Facilities

Facility Number	Syslog Protocol Definition	Mapped Event Log Modules and Events
4	Security/ authorization messages	Security and authorization messages from the following modules: DOS, ENCO, PACCESS (802.1x), PKI, PSEC (port security), RADIUS, SSH, SSL, TACACS+, and system events such as user login and logout.
9	Clock daemon	Time-based activities and events from the following modules: TIME, SNTP, and RTC.
16	Local use 0	All other modules and events.
22	Local use 6	Physical interface and data link events from the following modules: PCFG (port configuration), PMIRR (port mirroring), PTRUNK (port trunking), STP, and VLANs.
23	Local use 7	System events related to major exceptions.

For example, the setting of DEFAULT assigns port mirroring events a code of 22 and encryption key events a code of 4.

Another option is to assign all events from a switch the same numerical code using the LOCAL1 to LOCAL2 options. Each option represents a predefined RFC 3164 numerical code. The code mappings are listed in Table 6.

Table 6. Numerical Code and Facility Level Mappings

Numerical Code	Facility Level Setting
17	LOCAL1
18	LOCAL2
19	LOCAL3
20	LOCAL4
21	LOCAL5
22	LOCAL6
23	LOCAL7

For example, selecting LOCAL2 as the facility level assigns the numerical code of 18 to all events sent to the syslog server by the switch.

The SYSLOGFORMAT parameter defines the content of the events.

Examples

The following command creates output definition number 10, sends the messages to a syslog server in normal format with a facility level setting of LOCAL6:

```
create log output=10 destination=syslog server=149.65.10.99
facility=local6 syslog format=normal
```

The following command creates output definition number 18 and sends all of the messages to the syslog server. Because the FORMAT option is omitted from the command, the messages are sent in extended format, which is the default:

```
create log output=18 destination=syslog server=149.65.10.101
```

DESTROY LOG OUTPUT

Syntax

```
destroy log output=output-id
```

Parameters

output Specifies the output definition ID number.

Description

This command deletes the specified output definition. To disable the output definition without deleting it, see “DISABLE LOG OUTPUT” on page 232.

Example

The following command destroys output definition number 3:

```
destroy log output=3
```

DISABLE LOG

Syntax

```
disable log
```

Parameters

None.

Description

This command disables the event log module. When the log module is disabled, the AT-S63 management software stops storing events in the event logs and sending events to output definitions. The default setting for the event logs is enabled.

Note

The event log module, even when disabled, still logs all AT-S63 initialization events that occur when the switch is reset or power cycled. Any switch events that occur after AT-S63 initialization are recorded only if the event log module is enabled.

Examples

The following command disables the event log on the switch:

```
disable log
```

DISABLE LOG OUTPUT

Syntax

```
disable log output[=output-id]
```

Parameters

output	Specifies the output definition ID number to disable. Not specifying an output definition disables all definitions.
--------	---

Description

This command disables an output definition. When disabled, no event messages are sent to the specified device, although the definition still exists. To permanently remove an output definition, see “DESTROY LOG OUTPUT” on page 230. To enable the output definition again, see “ENABLE LOG OUTPUT” on page 234.

Example

The following command disables (but does not delete) output definition number 7:

```
disable log output=7
```

The following command disables all configured definitions:

```
disable log output
```


ENABLE LOG

Syntax

```
enable log
```

Parameters

None.

Description

This command activates the event logs. After the log is activated, the switch immediately starts to store events in the event logs and send events to defined outputs. The default setting for the event log is enabled.

Example

The following command activates the event log module on the switch:

```
enable log
```

ENABLE LOG OUTPUT

Syntax

```
enable log output[=output-id]
```

Parameters

output	Specifies the output definition ID number to enable. The range is 2 to 20.
--------	---

Description

This command enables an output definition that was disabled using “DISABLE LOG OUTPUT” on page 232.

Example

The following command enables output definition number 4:

```
enable log output=4
```

The following command enables all output definitions:

```
enable log output
```

PURGE LOG

Syntax

```
purge log[=permanent|temporary]
```

Parameter

log	Specifies the type of memory on the switch where the log file you want to purge is located. The options are:	
	permanent	Permanent (nonvolatile) memory. Deletes all events stored in nonvolatile memory, which can contain up to 2,000 events.
	temporary	Temporary memory. Deletes all events stored in temporary memory, which can contain up to 4,000 events. This is the default if you do not specify the "permanent" option.

Description

This command deletes all the entries stored in an event log.

Example

The following command deletes all the entries in the event log stored in temporary memory:

```
purge log=temporary
```

The following command deletes all the entries in both event logs:

```
purge log
```

SAVE LOG

Syntax

```
save log[=permanent|temporary] filename=filename.log [full]
[module=module] [reverse] [severity=all|severity]
[overwrite]
```

Parameters

log	Specifies the source of the events you want to save to the log file. The options are:
permanent	Permanent (nonvolatile) memory. Saves events stored in nonvolatile memory, which can contain up to 2,000 events.
temporary	Temporary memory. Saves events stored in temporary memory, which can contain up to 4,000 events. This is the default.
filename	Specifies the filename for the log. The name can be up to 16 alphanumeric characters, followed by the extension ".log." Spaces are allowed. The filename must be enclosed in quotes if it contains spaces. Otherwise, the quotes are optional.
full	Specifies the amount of information saved to the log. Without this option, the log saves only the time, module, severity, and description for each entry. With it, the log also saves the filename, line number, and event ID.
module	Specifies the AT-S63 module whose events are to be saved. For a list of modules, refer to Table 7 on page 243. Omitting this parameter saves the events from all the modules.
reverse	Specifies the order of the events in the log. Without this option, the events are saved oldest to newest. With this option, the events are saved newest to oldest.
severity	Specifies the severity of events to be saved. The options are:
all	Saves events of all severity levels.

severity	Saves events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, "Event Log Severity Levels" on page 245. The default is E, W, I.
overwrite	Overwrites the file if it already exists. Without this option, the command displays an error if a file with the same name already exists in the switch's file system.

Description

This command saves the current entries in an event log to a file in the file system. The parameters in the command allow you to specify which events you want saved in the log file.

Examples

The following command saves the event messages stored in the permanent event log to a file called "switch2.log". Because the MODULE and SEVERITY parameters are not included in the command, the defaults are used, which is events from all modules with an informational, error, or warning severity level:

```
save log=permanent filename=switch2.log
```

The following command saves the error messages of the VLAN module stored in the temporary event log in a file called "sw14.log.":

```
save log=temporary filename=sw14.log module=vlan severity=e
```

The following command saves informational messages from all modules in a file called "sw56.log" and overwrites the file of the same name if it already exists in the file system:

```
save log=permanent filename=sw56.log severity=i overwrite
```

SET LOG FULLACTION

Syntax

```
set log fullaction [temporary=halt|wrap]
[permanent=halt|wrap]
```

Parameters

fullaction	Specifies what happens when a log reaches maximum capacity. You can set the action separately for each log. The possible actions are:
halt	The log stops storing new events.
wrap	The log deletes the oldest entries as new ones are added. This is the default.

Description

This command defines the action of an event log when it has stored its maximum number of entries. The HALT option instructs the log to stop storing new entries. If the event log has already reached its maximum capacity, it immediately stops entering new entries. The WRAP option instructs the log to delete the oldest entries as new entries are added.

To view the current actions of the event logs, refer to “SHOW LOG OUTPUT” on page 247.

Example

The following command configures the event log in permanent memory to stop storing new entries after it has stored the maximum number of allowed entries:

```
set log fullaction permanent=halt
```

SET LOG OUTPUT

Syntax

```
set log output=output-id [destination=syslog]
server=ipaddress
[facility=default|local1|local2|local3|local4|local5|local6
|local7] [syslogformat=extended|normal] [module=all|module]
[severity=all|severity-list]
```

Parameters

output	Specifies an ID number that identifies the output definition to be modified. The possible output IDs are:	
	0	Reserved for permanent (nonvolatile) storage. You cannot change or delete this ID.
	1	Reserved for temporary (dynamic) storage. You cannot change or delete this ID.
	2 - 20	Available to be used for other outputs.
destination	Specifies the destination for the log messages. The only option currently supported is:	
	syslog	Forwards log messages in syslog format to a syslog server.
server	Specifies a new IP address for the syslog server.	
facility	Specifies a facility level to be added to the events.	
	default	Adds a facility level based on the functional groupings defined in the RFC 3164 standard. The codes applicable to the AT-S63 management software and its modules are shown in Table 5 on page 228. This is the default setting.
	local1 to local7	Adds a set facility code of 17 (LOCAL1) to 23 (LOCAL7) to all event messages. For a list of the levels and their corresponding codes, refer to Table 6 on page 229.

syslogformat	Specifies the format of the generated messages. The possible options are: extended Messages include the date, time, and system name. This is the default. normal Messages do not include the date, time, and system name.
module	Specifies what AT-S63 events to filter. The available options are: all Sends events for all modules. This is the default. module Sends events for specific module(s). You can select more than one module at a time, for example, MAC,PACCESS. For a list of modules, see Table 7, “AT-S63 Modules” on page 243.
severity	Specifies the severity of events to be sent. The options are: all Sends events of all severity levels. severity Sends events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, “Event Log Severity Levels” on page 245. The defaults are I, E, and W.

Description

This command modifies an existing output definition. For further information on the FACILITY and SYSLOGFORMAT parameters, see “CREATE LOG OUTPUT” on page 226. For further information about the MODULE and SEVERITY parameters, see “ADD LOG OUTPUT” on page 224.

Note
This version of the AT-S63 management software supports only syslog servers as output definitions.

Examples

The following command changes the IP address for output definition number 5 to 149.55.55.55:

```
set log output=5 server=149.55.55.55
```

The following command modifies output definition number 6 to only send messages from the RADIUS module of all severity levels:

```
set log output=6 module=radius severity=all
```

The following command changes the facility level and message format for output definition 4. The facility level is changed to LOCAL1 (numerical code 17) and the format to normal so that the messages include only severity, module, and description:

```
set log output=11 facility=local1 syslogformat=normal
```

The following command changes syslog server definition 11 to send only spanning tree and IGMP snooping events with a severity level of error or warning:

```
set log output=11 module=stp,igmpsnooping severity=e,w
```

SHOW LOG

Syntax

```
show log[=permanent|temporary] [full] [module=module]
[reverse] [severity=severity]
```

Parameters

log	Specifies which of the two event logs you want to view. The options are:
permanent	Displays the events stored in permanent memory.
temporary	Displays the events stored in temporary memory. This is the default.
full	Specifies the amount of information displayed by the log. Without this option, the log displays the time, module, severity, and description for each entry. With it, the log also displays the filename, line number, and event ID.
module	Specifies the AT-S63 module whose events you want displayed. For a list of modules, refer to Table 7 on page 243.
reverse	Specifies the order of the events in the log. Without this option, the events are displayed oldest to newest. With this option, the events are displayed newest to oldest.
severity	Specifies the severity of events to be displayed. The options are:
all	Displays events of all severity levels.
severity	Displays events of a particular severity. Choices are I for Informational, E for Error, W for Warning, and D for Debug. You can select more than one severity at a time (for example, E,W). For a definition of the severity levels, see Table 8, “Event Log Severity Levels” on page 245. The defaults are I, E, and W.

Description

This command displays the entries stored in an event log.

An event log can display entries in two modes: normal and full. In the normal mode, a log displays the time, module, severity, and description for each entry. In the full mode, a log also displays the filename, line number, and event ID. If you want to view the entries in the full mode, use the FULL parameter. To view entries in the normal mode, omit the parameter.

The MODULE parameter displays entries generated by a particular AT-S63 module. You can specify more than one module at a time. If you omit this parameter, the log displays the entries for all the modules. Table 7 lists the modules and their abbreviations.

Table 7. AT-S63 Modules

Module Name	Description
ALL	All modules
ACL	Port access control list
CFG	Switch configuration
CLASSIFIER	Classifiers used by ACL and QoS
CLI	Command line interface commands
DOS	Denial of service defense
ENCO	Encryption keys
ESTACK	Enhanced stacking
EVTLOG	Event log
FILE	File system
GARP	GARP GVRP
HTTP	Web server
IGMPSNOOP	IGMP snooping
IP	System IP configuration
LACP	Link Aggregation Control Protocol
MAC	MAC address table
MGMTACL	Management access control list
MLDSNOOP	MLD snooping
PACCESS	802.1x port-based access control

Table 7. AT-S63 Modules (Continued)

Module Name	Description
PCFG	Port configuration
PKI	Public Key Infrastructure
PMIRR	Port mirroring
PSEC	MAC address-based port security
PTRUNK	Static port trunking
QOS	Quality of Service
RADIUS	RADIUS authentication protocol
RPS	Redundant power supply
RRP	RRP snooping
RTC	Real time clock
SNMP	SNMP
SSH	Secure Shell protocol
SSL	Secure Sockets Layer protocol
STP	Spanning Tree, Rapid Spanning, and Multiple Spanning Tree protocols
SYSTEM	Hardware status; manager and operator log in and log off events.
TACACS	TACACS+ authentication protocol
TELNET	Telnet
TFTP	TFTP
TIME	System time and SNTP
VLAN	Port-based and tagged VLANs, and multiple VLAN modes
WATCHDOG	Watchdog timer

The log can display its entries in chronological order (oldest to newest), or reverse chronological order. The default is chronological order. To reverse the order, use the REVERSE parameter.

The SEVERITY parameter displays entries of a particular severity. Table 8 defines the different severity levels. You can specify more than one severity level at a time. The default is to display error, warning, and informational messages.

Table 8. Event Log Severity Levels

Value	Severity Level	Description
E	Error	Switch operation is severely impaired.
W	Warning	An issue may require manager attention.
I	Informational	Useful information that can be ignored during normal operation.
D	Debug	Messages intended for technical support and software development.

An example of the event log is shown in Figure 20. The example uses the full display mode.

S	Date	Time	EventID Event	Source File:Line Number
I	2/01/04	09:11:02	073001	garpmain.c:259
			garp: GARP initialized	
I	2/01/04	09:55:15	083001	portconfig.c:961
			pcfg: PortConfig initialized	
I	2/01/04	10:22:11	063001	vlanapp.c:444
			vlan: VLAN initialization succeeded	
I	2/01/04	12:24:12	093001	mirrorapp.c:158
			pmirr: Mirror initialization succeeded	
I	2/01/04	12:47:08	043016	macapp.c:1431
			mac: Delete Dynamic MAC by Port[2] succeeded	

Figure 20. Event Log Example

The columns in the log are described below:

- ❑ S (Severity) - The event's severity. Refer to Table 8 on page 245.
- ❑ Date/Time - The date and time the event occurred.
- ❑ Event - The module within the AT-S63 software that generated the event followed by a brief description of the event. For a list of the AT-S63 modules, see Table 7 on page 243.
- ❑ Event ID - A unique number that identifies the event. (Displayed only in the full display mode.)
- ❑ Filename and Line Number - The subpart of the AT-S63 module and the line number that generated the event. (Displayed only in the full display mode.)

Examples

The following command displays all the entries in the event log stored in permanent memory:

```
show log=permanent
```

The following command displays the events stored in temporary memory in the full display mode, which adds more information:

```
show log=temporary full
```

The following command displays only those entries stored in temporary memory and associated with the AT-S63 modules FILE and QOS:

```
show log=permanent module=file,qos
```

The following command displays the error and warning entries for the AT-S63 module VLAN. Because the log is not specified, the temporary log is displayed by default:

```
show log module=vlan severity=e,w
```

SHOW LOG OUTPUT

Syntax

```
show log output[=output-id] [full]
```

Parameters

output	Specifies the output definition ID number. If an output ID number is not specified, all output definitions currently configured on the switch are displayed.
full	Displays the details of the output definition. If not specified, only a summary is displayed.

Description

This command displays output definition details. An example of the information displayed by this command is shown in Figure 21.

OutputID	Type	Status	Details
0	Permanent	Enabled	wrap on Full
1	Temporary	Enabled	wrap on Full
2	Syslog	Enabled	169.55.55.55
3	Syslog	Enabled	149.88.88.88

Figure 21. SHOW LOG OUTPUT Command

The columns in the display are described below:

- ❑ Output ID - The ID number of the output definition. The permanent event log has the ID 0 and the temporary log has the ID 1. Syslog server definitions start with ID 2.
- ❑ Type - The type of output definition. Permanent is the permanent event log and Temporary is the temporary event log. Syslog indicates a syslog server definition.
- ❑ Status - The status of the output definition, which can be enabled or disabled.
- ❑ Details - The event log full action or a syslog server's IP address. For an event log, this column contains the log's full action. Wrap on Full indicates that the log adds new entries by deleting old entries when it reaches maximum capacity. Halt on Full means the log stops adding entries after reaching maximum capacity. To configure the full action for an event log, refer to "SET LOG FULLACTION" on page 238. For a syslog definition, this column contains the IP address of the syslog server.

An example of the information displayed by this command with the FULL parameter is shown in Figure 22.

```
Output ID ..... 2
Output Type ..... Syslog
Status ..... Enabled
Server IP Address ..... 149.88.88.88
Message Format ..... Extended
Facility Level ..... DEFAULT
Event Severity ..... E,W,I
Event Module ..... All
```

Figure 22. SHOW LOG OUTPUT Command with the FULL Parameter

For definitions of the parameters, refer to “SET LOG OUTPUT” on page 239.

Examples

The following command lists all the output definitions:

```
show log output
```

The following command displays the details of output definition number 5:

```
show log output=5 full
```


SHOW LOG STATUS

Syntax

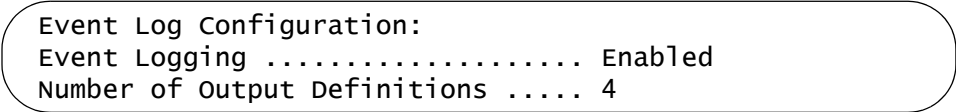
```
show log status
```

Parameter

None.

Description

This command displays information about the event log feature. Figure 23 is an example of the information displayed by this command.



```
Event Log Configuration:  
Event Logging ..... Enabled  
Number of Output Definitions ..... 4
```

Figure 23. SHOW LOG STATUS Command

The Event Logging field indicates whether the feature is enabled or disabled. If enabled, the switch stores events in the event logs and sends events to defined outputs. If disabled, no events are stored in the event logs or sent to defined outputs. To enable and disable the event logs, refer to “ENABLE LOG” on page 233 and “DISABLE LOG” on page 231.

The Number of Output Definitions is the sum of the two event logs plus any output definitions that you might have created. For instance, the number 4 for Number of Output Definitions in the above example indicates the existence of two output definitions in addition to the two event logs. To create new output definitions, refer to “CREATE LOG OUTPUT” on page 226 and “ADD LOG OUTPUT” on page 224.

Example

The following command displays event log status information:

```
show log status
```


Classifier Commands

This chapter contains the following commands:

- ❑ “CREATE CLASSIFIER” on page 252
- ❑ “DESTROY CLASSIFIER” on page 255
- ❑ “PURGE CLASSIFIER” on page 256
- ❑ “SET CLASSIFIER” on page 257
- ❑ “SHOW CLASSIFIER” on page 260

Note

Remember to use the SAVE CONFIGURATION command to save your changes on the switch.

CREATE CLASSIFIER

Syntax

```
create classifier=idnumber [description="string"]
[macdaddr=macaddress|any] [macsaddr=macaddress|any]
[ethformat=ethii-untagged|ethii-tagged|802.2-
untagged|802.2-tagged|any]
[priority=integer|any] [vlan=name|1..4094|any]
[protocol=ip|arp|rarp|number|any] [iptos=integer|any]
[ipdscp=integer] [ipprotocol=protocol|number|any]
[ipdaddr=ipaddress/mask|any]
[ipsaddr=ipaddress/mask|any] [tcpsport=integer|any]
[tcpdport=integer|any] [udpport=integer|any]
[udpdport=integer|any]
[tcpflags=[urg|ack|psh|rst|syn|fin|any]
```

Parameters

classifier	Specifies the ID number of the classifier. The number can be from 1 to 9999. Each classifier must have a unique ID number.
description	Specifies a description of up to fifteen alphanumeric characters for the classifier. Spaces are allowed, but a description with spaces must be enclosed in double quotes.
macdaddr	Defines a traffic flow by a destination MAC address. The address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx
macsaddr	Defines a traffic flow by a source MAC address. The address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx
ethformat	Defines a traffic flow by the type of Ethernet frame. The options are: ethII-untagged ethII-tagged 802.2-untagged 802.2-tagged
priority	Defines a traffic flow by the user priority level in a tagged Ethernet frame. The value can be 0 to 7.

vlan	Defines a traffic flow of a tagged or port-based VLAN by its name or VID number.
protocol	Defines a traffic flow by the protocol specified in the Ethertype field of the MAC header in an Ethernet II frame. Options are: IP ARP RARP You can specify the protocol by entering the protocol number in either decimal or hexadecimal format. If the latter, precede the number with "0x". The range is 1536 (0x600) to 65535 (0xFFFF).
iptos	Defines a traffic flow by the Type of Service value. The range is 0 to 7.
ipdscp	Defines a traffic flow by the DSCP value. The range is 0 to 63.
ipprotocol	Defines a traffic flow of a Layer 3 protocol. Options are: TCP UDP ICMP IGMP You can specify the protocol by entering the protocol number in either decimal or hexadecimal format. If the latter, precede the number with "0x". The range is 0 (0x0) to 255 (0xFF).
ipdaddr	Defines a traffic flow by a destination IP address. The address can be of a specific node or a subnet. To filter using the IP address of a subnet, you must include a mask. A mask is a decimal number that represents the number of bits in the address, from left to right, that constitute the network portion of the address. For example, the subnet address 149.11.11.0 would have a mask of "24" for the twenty-four bits that represent the network section of the address. The address and mask are separated by a slash (/); for example, "IPDADDR=149.11.11.0/24". No mask is necessary for the IP address of a specific end node.
ipsaddr	Defines a traffic flow by a source IP address. The address can be of a specific node or a subnet. If the latter, a mask must be included to indicate the subnet portion of the address. For an explanation of the mask, refer to the IPDADDR parameter.

<code>tcpsport</code>	Defines a traffic flow by a source TCP port.
<code>tcpdport</code>	Defines a traffic flow by a destination TCP port.
<code>udpsport</code>	Defines a traffic flow by a source UDP port.
<code>udpport</code>	Defines a traffic flow by a destination UDP port.
<code>tcpflags</code>	Defines a traffic flow by a TCP flag. Options are URG - Urgent ACK - Acknowledgement RST - Reset PSH - Push SYN - Synchronization FIN - Finish

Description

This command creates a classifier. A classifier defines a traffic flow. A traffic flow consists of packets that share one or more characteristics. A traffic flow can range from being very broad to very specific. An example of the former might be all IP traffic while an example of the latter could be packets with specific source and destination MAC addresses.

You use classifiers with access control lists (ACL) and Quality of Service policies to define the traffic flow to be affected by the ACL or QoS.

If you create a classifier without any parameters, then all incoming packets are classified.

The ANY option of a parameter is used when you want to delete the current setting of a parameter without setting a new value. This leaves the parameter blank so that it applies to all packets.

Examples

This command creates a classifier for all IP traffic:

```
create classifier=4 description="IP flow" protocol=ip
```

This command creates a classifier for all traffic originating from the subnet 149.22.22.0 destined to the device with the IP address 149.44.44.11:

```
create classifier=4 description="subnet flow"
ipsaddr=149.22.22.0/24 ipdaddr=149.44.44.11
```

This command creates a classifier for all HTTPS web traffic with a destination IP address of 149.44.44.44:

```
create classifier=7 description="HTTPS flow"
ipdaddr=149.44.44.44 tcpdport=443
```

DESTROY CLASSIFIER

Syntax

```
destroy classifier=idnumber
```

Parameters

classifier	Specifies the ID number of the classifier to be deleted. The number can be from 1 to 9999. You can delete more than one classifier at a time. You can specify the classifiers individually (e.g., 2,5,7) as a range (e.g., 11-14), or both (e.g., 2,4-8,12).
------------	--

Description

This command deletes a classifier from the switch. To delete a classifier, you need to know its ID number. To display the ID numbers of the classifiers, refer to “SHOW CLASSIFIER” on page 260.

You cannot delete a classifier if it is assigned to an ACL or QoS policy. You must remove the classifier from the ACL or policy before you can delete it.

Example

This command deletes classifiers 2 and 4:

```
destroy classifier=2,4
```

PURGE CLASSIFIER

Syntax

```
purge classifier
```

Parameters

None.

Description

This command deletes all classifiers from the switch. You cannot delete the classifier if they are assigned to an ACL or QoS policy. You must first remove the classifiers from the ACL and policies before you can delete them.

Example

This command deletes all classifiers on the switch:

```
purge classifier
```


SET CLASSIFIER

Syntax

```
set classifier=idnumber [description="string"]
[macdaddr=macaddress|any] [macsaddr=macaddress|any]
[priority=value] [vlan=name|1..4094|any]
[protocol=ip|arp|rarp|number|any] [iptos=value|any]
[ipdscp=value|any] [ipprotocol=protocol|number|any]
[ipdaddr=ipaddress/mask|any] [ipsaddr=ipaddress/
mask|any] [tcpsport=value|any] [tcpdport=value|any]
[udpsport=value|any] [udpport=value|any]
[tcpflags=[urg|ack|psh|rst|syn|fin|any]
```

Parameters

classifier	Specifies the ID number of the classifier to be modified. You can modify only one classifier at a time. The number can be from 1 to 9999.
description	Specifies a description of the classifier. A description can be up to fifteen alphanumeric characters. Spaces are allowed. If it contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional.
macdaddr	Specifies a destination MAC address. The address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx
macsaddr	Specifies a source MAC address. The address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx
priority	Specifies the user priority level in a tagged Ethernet frame. The value can be 0 to 7.
vlan	Specifies a tagged or port-based VLAN by its name or VID number.
protocol	Specifies a Layer 2 protocol. Options are: IP ARP RARP You can specify additional Layer 2 protocols by entering the protocol number in either decimal or hexadecimal format. For the latter, precede the number with "0x".

iptos	Specifies a Type of Service value. The range is 0 to 7.
ipdscp	Specifies a DSCP value. The range is 0 to 63.
ipprotocol	Specifies a Layer 3 protocol. Options are: TCP UDP ICMP IGMP You can specify other Layer 3 protocols by entering the protocol number in either decimal or hexadecimal format. If you use the latter, precede the number with "0x".
ipdaddr	Specifies a destination IP address. The address can be of a specific node or a subnet. To filter using the IP address of a subnet, you must include a mask. A mask is a decimal number that represents the number of bits in the address, from left to right, that constitute the network portion of the address. For example, the Class C subnet address 149.11.11.0 would have a mask of "24" for the twenty-four bits that represent the network section of the address. The address and mask are separated by a slash (/); for example, "IPDADDR=149.11.11.0/24". No mask is necessary for the IP address of a specific end node.
ipsaddr	Specifies a source IP address. The address can be of a specific node or a subnet. If the latter, a mask must be included to indicate the subnet portion of the address. For an explanation of the mask, refer to the IPDADDR parameter.
tcpsport	Specifies a source TCP port.
tcpdport	Specifies a destination TCP port.
udpsport	Specifies a source UDP port.
udpport	Specifies a destination UDP port.
tcpflags	Specifies a TCP flag. Options are URG - Urgent ACK - Acknowledgement RST - Reset PSH - Push SYN - Synchronization FIN - Finish

Description

This command modifies an existing classifier. The only setting of a classifier you cannot change is its ID number.

Specifying a new value for a variable that already has a value overwrites the current value with the new one. The ANY option removes a variable's value without assigning it a new value.

You cannot modify a classifier if it belongs to an ACL or QoS policy that is assigned to a port. You must first remove the port assignments from the ACL or policy before you can modify the it.

Examples

This command adds the destination IP address 149.22.22.22 and the source subnet IP address 149.44.44.0 to classifier ID 4:

```
set classifier=4 ipdaddr=149.22.22.22  
ipsaddr=149.44.44.0/24
```

This command adds the Layer 3 protocol IGMP to classifier ID 6:

```
set classifier=6 ipprotocol=igmp
```

This command removes the current setting for the UDP destination port variable from classifier ID 5 without assigning a new value:

```
set classifier=5 udpdport=any
```

SHOW CLASSIFIER

Syntax

```
show classifier[=idnumber]
```

Parameters

classifier Specifies the ID of the classifier you want to view. You can specify more than one classifier at a time.

Description

This command displays the classifiers on a switch. Figure 24 is an example of the information displayed by this command.

```

-----
Classifier ID: ..... 1
Description: ..... IP traffic
Protocol: ..... 0x800 (IP)
Number of References: ..... 4
Number of Active Associations: .. 3
-----
Classifier ID: ..... 2
Description: ..... subnet 214
Dst IP/Mask: ..... 169.254.44.214
Number of References: ..... 1
Number of Active Associations: .. 1
-----

```

Figure 24. SHOW CLASSIFIER Command

The information displayed by this command is described here:

- ❑ ID - The classifier's ID number.
- ❑ Description - The description of the classifier.
- ❑ The Description is followed by the parameter settings of the classifier. Only those parameters that have been assigned a value are displayed. For an explanation of the parameters, refer to "CREATE CLASSIFIER" on page 252 or "SET CLASSIFIER" on page 257.
- ❑ Number of References - The number of active and inactive ACL and QoS policy assignments where the classifier is currently assigned. An active ACL or QoS policy is assigned to at least one switch port while an inactive ACL or policy is not assigned to any ports. If this number is 0 (zero), the classifier has not been assigned to any ACLs or policies.

- ❑ **Number of Active Associations** - The number of active ACLs and QoS policy assignments where the classifier is currently assigned. An active ACL or policy is assigned to at least one switch port.

You can use this number together with the Number of References to determine the number of inactive ACLs and policies for a classifier. For example, if Number of References for a classifier is 4 and the Number of Active Associations is 3, one of the ACL or QoS policy assignments for the classifier is not assigned to a switch port.

Examples

This command displays all of the classifiers on the switch:

```
show classifier
```

This command displays the details for just classifier ID 12:

```
show classifier=12
```


Chapter 16

Access Control List Commands

This chapter contains the following commands:

- ❑ “CREATE ACL” on page 264
- ❑ “DESTROY ACL” on page 266
- ❑ “PURGE ACL” on page 267
- ❑ “SET ACL” on page 268
- ❑ “SHOW ACL” on page 270

Note

Remember to save your changes with the SAVE CONFIGURATION command.

CREATE ACL

Syntax

```
create acl=value [description="string"]
[action=deny|permit] classifierlist=value
[portlist=ports]
```

Parameters

acl	Specifies an ID number for the ACL. The number can be from 0 to 255. Each ACL must have a unique ID number.				
description	Specifies a description for the ACL. A description can be up to 15 alphanumeric characters. Spaces are allowed. If the description contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional.				
action	Specifies the action to be taken by the port when a ingress packet matches a classifier attached to the ACL. Options are: <table> <tr> <td>permit</td><td>The port accepts the packet.</td></tr> <tr> <td>deny</td><td>The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port. This is the default action.</td></tr> </table>	permit	The port accepts the packet.	deny	The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port. This is the default action.
permit	The port accepts the packet.				
deny	The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port. This is the default action.				
classifierlist	Specifies the ID numbers of the classifiers to be assigned to the ACL. When entering multiple ID numbers, separate the numbers with a comma (e.g., 4,6,7). The classifiers must already exist on the switch. The order in which you specify the classifiers is not important. An ACL must have at least one classifier.				
portlist	Specifies the port where this ACL is to be assigned. You can assign an ACL to more than one port. When entering multiple ports, the ports can be listed individually (e.g., 2,5,7), as a range (e.g., 8-12) or both (e.g., 1-4,6,8).				

Description

This command creates an ACL. An ACL is used to filter ingress packets on a port.

Examples

The following command creates an ACL that discards the ingress traffic flow specified in classifier ID 18 and applies the ACL to port 4:

```
create acl=12 description="IP flow deny" action=deny  
classifierlist=18 portlist=4
```

The following command creates an ACL that discards the ingress traffic flows specified in classifier ID 2 and 17 and applies the ACL to ports 2 and 6:

```
create acl=6 description="subnet flow deny"  
action=deny classifierlist=2,17 portlist=2,6
```

The following command creates an ACL that permits the ingress traffic flow specified in classifier ID 18 and applies the ACL to ports 8 to 10:

```
create acl=24 description="subnet flow deny"  
action=permit classifierlist=18 portlist=8-10
```

DESTROY ACL

Syntax

```
destroy acl=value
```

Parameters

acl Specifies ID number of the ACL you want to delete. You can delete more than ACL at a time.

Description

This command deletes an ACL from the switch.

Example

The following command deletes ACL IDs 14 and 17:

```
destroy acl=14,17
```

PURGE ACL

Syntax

```
purge acl
```

Parameters

None.

Description

This command deletes all ACLs on the switch.

Example

This command deletes all ACLs on the switch:

```
purge acl
```

SET ACL

Syntax

```
set acl=value [description=string]
[action=deny|permit] [classifierlist=value]
[portlist=ports|none]
```

Parameters

acl	Specifies the ID number of the ACL you want to modify. The number can be from 0 to 255. You can modify only one ACL at a time.				
description	Specifies a new description for the ACL. A description can be up to 15 alphanumeric characters. Spaces are allowed. If the description contains a space, it must be enclosed in double quotes. Otherwise, the quotes are optional.				
action	Specifies the new action to be taken by the port when an ingress packet matches a classifier attached to the ACL. Options are: <table> <tr> <td>permit</td><td>The port accepts the packet.</td></tr> <tr> <td>deny</td><td>The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port.</td></tr> </table>	permit	The port accepts the packet.	deny	The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port.
permit	The port accepts the packet.				
deny	The port discards the packet, provided that the packet does not match the classifier of a permit ACL assigned to the same port.				
classifierlist	Specifies the new ID numbers of the classifiers to be assigned to the ACL. Any classifier IDs already assigned to the ACL are overwritten. When entering multiple ID numbers, separate the numbers with a comma (e.g., 4,6,7). The classifiers must already exist on the switch. The order in which you specify the classifiers is not important. An ACL must be assigned at least one classifier.				
portlist	Specifies the new ports to be assigned this ACL. Any ports to which the ACL is assigned are overwritten. You can assign an ACL to more than one port. When entering multiple ports, the ports can be listed individually (e.g., 2,5,7), as a range (e.g., 8-12) or both (e.g., 1-4,6,8). Entering NONE removes all ports to which the ACL is already assigned without assigning any new ports. An ACL without assigned ports exists, but remains nonfunctional until assigned to a port.				

Description

This command modifies an ACL. You can use the command to change the description, action, classifiers, and ports of an ACL.

Examples

This command changes the description of ACL ID 4:

```
set acl=4 description="ARP flow"
```

This command changes the action of ACL ID 6 to permit and reassigns it to ports 4 to 7:

```
set acl=6 action=permit portlist=4-7
```

This command changes the classifiers of ACL ID 41:

```
set acl=41 classifierlist=22,24,36
```

SHOW ACL

Syntax

```
show acl [=id_number]
```

Parameters

acl Specifies the ID number of the ACL you want to view. You can specify more than one ACL at a time.

Description

This command displays the ACLs on the switch. An example of the information displayed by this command is shown in Figure 25.

```

-----
ACL ID ..... 1
Description ..... IP
Action ..... Deny
Classifier List ..... 1
Port List ..... 2-3
Is Active ..... Yes
-----
ACL ID ..... 2
Description ..... Subnets 211, 214
Action ..... Permit
Classifier List ..... 2,3
Port List ..... 2
Is Active ..... Yes
-----
ACL ID ..... 3
Description ..... Subnet 211
Action ..... Permit
Classifier List ..... 3
Port List .....
Is Active ..... No
-----

```

Figure 25. SHOW ACL Command

The command displays the following information:

- ❑ ACL ID - The ACL's ID number.
- ❑ Description - The description of the ACL.
- ❑ Action - The action of the ACL. An action of Permit means that the port(s) where the ACL is assigned accepts those packets that meet the criteria of the classifiers. An action of Deny means that the port(s)

discards the packets provided that the packets do not also meet the criteria of a classifier of a Permit ACL assigned to the same port.

- ❑ Classifier List - The classifiers assigned to the ACL.
- ❑ Port List - The ports where the ACL is assigned.
- ❑ Is Active - The status of the ACL. An ACL is active if it is assigned to at least one port, and inactive if it is not assigned to any ports.

Examples

This command displays all of the ACLs on the switch:

```
show acl
```

This command displays ACL ID 22:

```
show acl=22
```


Class of Service (CoS) Commands

This chapter contains the following commands:

- ❑ “MAP QOS COSP” on page 274
- ❑ “PURGE QOS” on page 276
- ❑ “SET QOS COSP” on page 277
- ❑ “SET QOS SCHEDULING” on page 278
- ❑ “SET SWITCH PORT PRIORITY OVERRIDEPRIORITY” on page 280
- ❑ “SHOW QOS CONFIG” on page 282

Note

Remember to save your changes with the SAVE CONFIGURATION command.

MAP QOS COSP

Syntax

```
map qos cosp=priority-number qid=queue-number
```

Parameters

- cosp** Specifies a Class of Service (CoS) priority level. The CoS priority levels are 0 through 7, with 0 as the lowest priority and 7 as the highest. You can specify more than one priority to assign to the same egress queue.
- qid** Specifies the egress queue number. The egress queues are numbered 0 through 7, with queue 0 as the lowest priority and 7 as the highest.

Description

This command maps CoS priorities to port egress queues. You must specify both the priority and the queue ID. You can specify more than one priority to assign to the same egress queue. Table 9 lists the default mappings between the eight CoS priority levels and the eight egress queues of a switch port.

Table 9. Default Mappings of IEEE 802.1p Priority Levels to Priority Queues

IEEE 802.1p Priority Level	Port Priority Queue
0	Q1
1	Q0 (lowest)
2	Q2
3	Q3
4	Q4
5	Q5
6	Q6
7	Q7 (highest)

Example

This command maps priorities 4 and 5, to queue 3:

```
map qos cosp=4,5 qid=3
```

Equivalent Command

```
set qos cosp=priority-number qid=queue-number
```

For information, see “SET QOS COSP” on page 277.

PURGE QOS

Syntax

```
purge qos
```

Parameters

None

Description

This command destroys all policies, traffic classes, and flow groups; resets the CoS priorities to port egress queues to the default values; and sets the scheduling mode and egress weight queues to their default values.

Example

The following command resets QoS to the default values:

```
purge qos
```

SET QOS COSP

Syntax

```
set qos cosp=priority-number qid=queue-number
```

Parameters

cosp	Specifies a Class of Service (CoS) priority level. The CoS priority levels are 0 through 7, with 0 as the lowest priority and 7 as the highest. You can specify more than one priority to assign to the same egress queue.
qid	Specifies the egress queue number. The egress queues are numbered 0 through 7, with queue 0 as the lowest priority and 7 as the highest.

Description

This command maps CoS priorities to port egress queues. You must specify both the priority and the queue ID. You can assign more than one priority to an egress queue. Table 9 on page 274 lists the default mappings between the eight CoS priority levels and the eight egress queues of a switch port.

Example

The following command maps priorities 5 and 6 to egress queue 1:

```
set qos cosp=5,6 qid=1
```

Equivalent Command

```
map qos cosp=priority-number qid=queue-number
```

For information, see “MAP QOS COSP” on page 274.

SET QOS SCHEDULING

Syntax

```
set qos scheduling=strict|wrr weights=weights
```

Parameters

scheduling	Specifies the type of scheduling. The options are:
strict	Strict priority. The port transmits all packets out of the higher priority queues before it transmits any from the low priority queues. This is the default.
wrr	Weighted round robin. The port transmits a set number of packets from each queue in a round robin manner.
weights	Specifies the weight given to each of a port's eight egress priority queues. You must specify the weights if scheduling will be weighted round robin. The range for Q0 to Q6 is 1 to 15 packets. The range for Q7 is 0 to 15 packets. A setting of 0 of Q7 means that its packets always take priority over the packets in the other queues, and that packets are transmitted from the other queues only when Q7 is empty. The weights are specified in the following order: Q0, Q1, Q2, Q3, Q4, Q5, Q6, Q7. For example, to assign Q0 and Q1 a weight of 1, Q2 and Q3 a weight of 5, Q4 and Q5 a weight of 10, and Q6 and Q7 a weight of 15, you enter this parameter as <code>weights=1,1,5,5,10,10,15,15</code>. The parameter must include all eight queues. The default setting for all queues is 1. At the default setting, all queues have the same weight.

Description

Sets the QoS scheduling method and the weights for round robin scheduling.

Examples

The following command sets the scheduling to strict:

```
set qos scheduling=strict
```

The following command sets the scheduling to weighted round robin and gives egress priority queues Q0 to Q3 a weight of 1, and Q4 to Q7 a weight of 15:

```
set qos scheduling=wrr weights=1,1,1,1,15,15,15,15
```

SET SWITCH PORT PRIORITY OVERRIDEPRIORITY

Syntax

```
set switch port=port [priority=value]  
[overridepriority=yes|no|on|off|true|false]
```

Parameters

port	Specifies the port you want to configure. You can specify more than one port at a time, but the ports must be of the same medium type. For example, you cannot configure twisted pair and fiber optic ports with the same command. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).
priority	Specifies a temporary priority level for all ingress untagged packets received on the port. If you include the OVERRIDEPRIORITY parameter, the temporary priority level will also apply to all ingress tagged packets. The range is 0 to 7; 0 is the lowest priority, and 7 is the highest. The default is 0. Table 9 on page 274 lists the default mappings between the priority levels and the egress queues:
overridepriority	Determines if a port should ignore the priority level in tagged packets and instead use the temporary priority level assigned to the port with the PRIORITY parameter. The options are: yes, on, true Overrides the priority level in tagged packets and uses the temporary priority level. This is the default. The options are equivalent. no, off, false Does not override the priority in tagged packets. The options are equivalent.

Description

This command can change a port's temporary priority level. It can also be used to determine whether a port receiving tagged packets should use the priority level in the frames or instead use a temporary priority level assigned to the port.

This command allows you to override the priority level mappings at the port level by assigning the packets a temporary priority. Note that this assignment is made when a packet is received on the ingress port and before the frame is forwarded to the egress port. Consequently, you need to configure this feature on the ingress port.

For example, you can configure a switch port so that all ingress frames are assigned a temporary priority level of 5, regardless of the actual priority levels that might be in the frames themselves, as found in tagged frames.

A temporary priority level applies only while a frame traverses the switching matrix. Tagged frames, which can contain a priority level, leave the switch with the same priority level they had when they entered the switch.

Examples

The following command changes the temporary priority level on ports 5, 8, and 12 to 5:

```
set switch port=5,8,12 priority=5
```

The following command activates the priority override feature on port 6 so that all ingress tagged packets use the port's temporary priority level:

```
set switch port=6 overridepriority=yes
```

SHOW QOS CONFIG

Syntax

```
show qos config
```

Parameters

None.

Description

Displays the CoS priority queues and scheduling. Figure 26 is an example of the information displayed by this command.

QoS Configuration information:	
Number of CoS Queues	8
CoS 0 Priority Queue	Q1
CoS 1 Priority Queue	Q0
CoS 2 Priority Queue	Q2
CoS 3 Priority Queue	Q3
CoS 4 Priority Queue	Q4
CoS 5 Priority Queue	Q5
CoS 6 Priority Queue	Q6
CoS 7 Priority Queue	Q7
Scheduling Mode	Strict Priority
Queue 0 weight	0
Queue 1 weight	0
Queue 2 weight	0
Queue 3 weight	0
Queue 4 weight	0
Queue 5 weight	0
Queue 6 weight	0
Queue 7 weight	0

Figure 26. SHOW QOS CONFIG Command

The current mapping of CoS priorities to port egress queues is displayed in the top section. As an example, at the default setting packets with a CoS priority of 3 are stored in egress queue 3 of a port.

The bottom section of the display shows the scheduling method of the switch ports. In strict priority, a port transmits all packets out of the higher priority queues before transmitting any from the low priority queues. This is the default. In weighted round robin, a port transmits a set number of packets from each queue. The weights only show a value when a port is

using weighted round robin and specify how many packets a port transmits from a queue before moving to the next queue.

Example

The following command displays the CoS priority queues and scheduling:

```
show qos config
```


Quality of Service (QoS) Commands

This chapter contains the following commands:

- ❑ “ADD QOS FLOWGROUP” on page 286
- ❑ “ADD QOS POLICY” on page 287
- ❑ “ADD QOS TRAFFICCLASS” on page 288
- ❑ “CREATE QOS FLOWGROUP” on page 289
- ❑ “CREATE QOS POLICY” on page 292
- ❑ “CREATE QOS TRAFFICCLASS” on page 299
- ❑ “DELETE QOS FLOWGROUP” on page 304
- ❑ “DELETE QOS POLICY” on page 305
- ❑ “DELETE QOS TRAFFICCLASS” on page 306
- ❑ “DESTROY QOS FLOWGROUP” on page 307
- ❑ “DESTROY QOS POLICY” on page 308
- ❑ “DESTROY QOS TRAFFICCLASS” on page 309
- ❑ “PURGE QOS” on page 310
- ❑ “SET QOS FLOWGROUP” on page 311
- ❑ “SET QOS POLICY” on page 314
- ❑ “SET QOS PORT” on page 317
- ❑ “SET QOS TRAFFICCLASS” on page 318
- ❑ “SHOW QOS FLOWGROUP” on page 323
- ❑ “SHOW QOS POLICY” on page 325
- ❑ “SHOW QOS TRAFFICCLASS” on page 327

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD QOS FLOWGROUP

Syntax

```
add qos flowgroup=value classifierlist=values
```

Parameter

flowgroup	Specifies the ID number of the flow group you want to modify. You can modify only one flow group at a time.
classifierlist	Specifies the new classifiers for the flow group. The new classifiers are added to any classifiers already assigned to the flow group. Separate multiple classifiers with commas (e.g., 4,11,12).

Description

This command adds classifiers to an existing flow group. The classifiers must already exist. Any classifiers already assigned to the flow group are retained by the group. If you want to add classifiers while removing the those already assigned, refer to “SET QOS FLOWGROUP” on page 311.

Example

This command adds the classifiers 4 and 7 to flow group 12:

```
add qos flowgroup=12 classifierlist=4,7
```

ADD QOS POLICY

Syntax

```
add qos policy=value trafficclasslist=values
```

Parameter

policy	Specifies the ID number of the policy you want to modify. You can modify only one policy at a time.
trafficclasslist	Specifies the new traffic classes of the policy. Traffic classes already assigned to the policy are retained. Separate multiple traffic classes with commas (e.g., 4,11,12).

Description

This command adds traffic classes to an existing policy. The traffic classes must already exist. Any traffic classes already assigned to the policy are retained by the policy. To add traffic classes while removing those already assigned, refer to “SET QOS POLICY” on page 314.

Example

This command adds the traffic class 16 to policy 11:

```
add qos policy=11 trafficclasslist=16
```

ADD QOS TRAFFICCLASS

Syntax

```
add qos trafficclass=value flowgrouplist=values
```

Parameter

trafficclass	Specifies the ID number of the traffic class you want to modify. You can modify only one traffic class at a time.
flowgroup list	Specifies the new flow groups of the traffic class. The new flow groups are added to any flow groups already assigned to the flow group. Separate multiple flow groups with commas (e.g., 4,11,12).

Description

This command adds flow groups to an existing traffic class. The flow groups must already exist. Any flow groups already assigned to the traffic class are retained by the class. If you want to add flow groups while removing those already assigned, refer to “SET QOS TRAFFICCLASS” on page 318.

Examples

This command adds flow group 21 to traffic class 17:

```
add qos trafficclass=17 flowgrouplist=21
```


CREATE QOS FLOWGROUP

Syntax

```
create qos flowgroup=value [description="string"]
[markvalue=value|none] [priority=value|none]
[remarkpriority=yes|no|on|off|true|false]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytos=value|none]
[classifierlist=values|none]
```

Parameters

flowgroup	Specifies an ID number for the flow group. Each flow group on the switch must have a unique number. The range is 0 to 1023. The default is 0. This parameter is required.
description	Specifies a description for the flow group. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. This parameter is optional, but recommended. Names can help you identify the groups on the switch. The description must be enclosed in double quotes if it contains spaces. Otherwise, the quotes are optional.
markvalue	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63. If the NONE option is used, the frame's current DSCP value is not overwritten. The default is NONE. A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level.
priority	Specifies a new user priority value for the packets. The range is 0 to 7. If you want packets to retain the new value when they exit the switch, use the REMARKPRIORITY parameter. If the NONE option is used, the frame's current priority value is not overridden. The default is NONE. A new priority can be set at both the flow group and traffic class levels. If it is set in both places, the value in the flow group overrides the value in the traffic class.

remarkpriority	Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter. This parameter is ignored if the PRIORITY parameter is omitted or set to NONE. Options are:
yes, on, true	Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter.
no, off, false	Does not replace the user priority value in the packets with the new value specified in with the PRIORITY parameter. This is the default.
tos	Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7. A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in a flow group overrides a ToS value specified at the traffic class or policy level.
movetostopriority	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are:
yes, on, true	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.
no, off, false	Does not replace the preexisting 802.1p priority level This is the default.
moveprioritytotos	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are:
yes, on, true	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.
no, off, false	Does not replace the ToS priority field. This is the default.
classifierlist	Specifies the classifiers to be assigned to the flow group. Separate multiple classifiers with commas (e.g., 4,7,8). The classifiers must already exist.

Description

This command creates a new flow group.

Note

For examples of command sequences used to create entire QoS policies, refer to “CREATE QOS POLICY” on page 292.

Examples

This command creates a flow group with an ID of 10 and a description “ of VoIP flow”. The flow group is assigned a priority level of 7 and defined by classifiers 15 and 17. In this example, the packets of the flow group leave the switch with the same priority level as when they entered. The new priority level is relevant only as the packets traverse the switch. To alter the packets so that they leave containing the new level, you would include the REMARKPRIORITY parameter:

```
create qos flowgroup=10 description="VoIP flow"  
priority=7 classifierlist=15,17
```

This command creates a similar flow group as in the previous example. The REMARKPRIORITY parameter is added so that the tagged packets of the flow group leave the switch with the new priority level of 7:

```
create qos flowgroup=10 description="VoIP flow"  
priority=7 remarkpriority=yes classifierlist=15,17
```

This command creates a flow group whose DSCP value is changed to 59. The MARKVALUE parameter overwrites the current DSCP value in the packets, meaning the packets leave the switch with the new value. The classifiers of the flow group are 3, 14, and 24:

```
create qos flowgroup=10 description="DSCP 59 flow"  
markvalue=59 classifierlist=3,14,24
```

CREATE QOS POLICY

Syntax

```
create qos policy=value [description="string"]
[indscpoverwrite=value|none] [remarkindscp=all|none]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytotos=yes|no|on|off|true|false]
[sendtomirror=yes|no|on|off|true|false]
[trafficclasslist=values|none]
[redirectport=value|none]
[ingressport=port|all|none] [egressport=port|none]
```

Parameters

policy	Specifies an ID number for the policy. Each policy on the switch must be assigned a unique number. The range is 0 to 255. The default is 0. This parameter is required.
description	Specifies a description for the policy. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. If the description contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional. This parameter is optional, but recommended. Names can help you identify the policies on the switch.
indscpoverwrite	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63. If None is specified, the DSCP value in the packets is not changed. The default is None. A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level. A DSCP value specified at the policy level is used only if no value has been specified at the flow group and traffic class levels.
remarkindscp	Specifies whether the DSCP value in ingress packets is overwritten. If All is specified, all packets are remarked. If None is specified, the function is disabled. The default is None.
tos	Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7.

A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in a flow group overrides a ToS value specified at the traffic class or policy level.

<code>movetostopriority</code>	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are:
<code>yes, on, true</code>	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.
<code>no, off, false</code>	Does not replace the preexisting 802.1p priority level. This is the default.
<code>moveprioritytos</code>	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are:
<code>yes, on, true</code>	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.
<code>no, off, false</code>	Does not replace the ToS priority field. This is the default.
<code>sendtomirror</code>	Copies the traffic that meets the criteria of the classifiers to a destination mirror port. Options are:
<code>yes, on, true</code>	Copies the traffic that meets the criteria of the classifiers to a destination mirror port. You must specify the destination port by creating a port mirror, as explained in Chapter 11, "Port Mirroring Commands" on page 177.
<code>no, off, false</code>	Does not copy the traffic to a destination mirror port. This is the default.
<code>trafficclasslist</code>	Specifies the traffic classes to be assigned to the policy. The specified traffic classes must already exist. Separate multiple IDs with commas (e.g., 4,11,13).
<code>redirectport</code>	Specifies the port to which the classified traffic from the ingress ports is redirected. The options are:
<code>value</code>	Specifies a port number.
<code>none</code>	No redirect port specified.

ingressport	Specifies the ingress ports to which the policy is to be assigned. Ports can be identified individually (e.g., 5,7,22), as a range (e.g., 18-23), or both (e.g., 1,5,14-22). A port can be an ingress port of only one policy at a time. If a port is already an ingress port of a policy, you must remove the port from its current policy assignment before adding it to another policy.
egressport	Specifies the egress port to which the policy is to be assigned. You can enter only one egress port. The egress port must be within the same port block as the ingress ports. On switches with 24 ports (plus uplinks), ports 1-26 form a port block. On switches with 48 ports (plus uplinks), ports 1-24 and 49 form one port block and ports 25-48 and 50 form a second port block. A port can be an egress port of only one policy at a time. If a port is already an egress port of a policy, you must remove the port from its current policy assignment before adding it to another policy.

Description

This command creates a new QoS policy.

Examples

This command creates a policy with an ID of 75 and the description “DB flow.” The policy is appointed the traffic classes 12 and 25 and is assigned to ingress port 5:

```
create qos policy=75 description="DB flow"
trafficclasslist=12,25 ingressport=5
```

This command creates a policy with an ID of 23 and the description “Video.” The ID of the traffic class for the policy is 19. The DSCP value is replaced with the value 50 for all ingress packets of the traffic class. The policy is assigned to port 14:

```
create qos policy=23 description=video
indscpoverwrite=50 remarkindscp=all
trafficclasslist=19 ingressport=14
```

QoS Command Sequence Examples

Creating a QoS policy involves a command sequence that creates one or more classifiers, a flow group, a traffic class, and finally the policy. The following sections contain examples of the command sequences for different types of policies.

Example 1: Voice Application

Voice applications typically require a small bandwidth but it must be consistent. They are sensitive to latency (interpacket delay) and jitter (delivery delay). Voice applications can be set up to have the highest priority.

This example creates two policies that ensure low latency for all traffic sent by and destined to a voice application located on a node with the IP address 149.44.44.44. The policies raise the priority level of the packets to 7, the highest level. Policy 6 is for traffic from the application that enter the switch on port 1. Policy 11 is for traffic arriving on port 8 going to the application.

Policy 6 Commands:

```
create classifier=22 description="VoIP flow"
ipsaddr=149.44.44.44

create qos flowgroup=14 description="VoIP flow"
priority=7 classifierlist=22

create qos trafficclass=18 description="VoIP flow"
flowgroup=14

create qos policy=6 description="VoIP flow"
trafficclasslist=18 ingressport=1
```

Policy 11 Commands:

```
create classifier=23 description="VoIP flow"
ipdaddr=149.44.44.44

create qos flowgroup=17 description="VoIP flow"
priority=7 classifierlist=23

create qos trafficclass=15 description="VoIP flow"
flowgroup=17

create qos policy=11 description="VoIP flow"
trafficclasslist=15 ingressport=8
```

The parts of the policies are:

- ❑ **Classifiers** - Define the traffic flow by specifying the IP address of the node with the voice application. The classifier for Policy 6 specifies the address as a source address since this classifier is part of a policy concerning packets coming from the application. The classifier for Policy 11 specifies the address as a destination address since this classifier is part of a policy concerning packets going to the application.
- ❑ **Flow Groups** - Specify the new priority level of 7 for the packets. It should be noted that in this example the packets leave the switch with the same priority level they had when they entered. The new priority level is relevant only as the packets traverse the switch. To alter the packets so that they leave containing the new level, you would use the REMARKPRIORITY option in the CREATE QOS FLOWGROUP command.
- ❑ **Traffic Classes** - No action is taken by the traffic classes, other than to specify the flow groups. Traffic class has a priority setting that can be used to override the priority level of packets, just as in a flow group. If you enter a priority value both in the flow group and the traffic class, the value in the flow group overrides the value in the traffic class.
- ❑ **Policies** - Specify the traffic class and the port to which the policy is to be assigned. Policy 6 is applied to port 1 since this is where the application is located. Policy 11 is applied to port 8 since this is where traffic going to the application will be received on the switch.

Example 2: Video Application

Video applications typically require a larger bandwidth than voice applications. Video applications can be set up to have a high priority and buffering, depending on the application.

This example creates policies with low latency and jitter for video streams (for example, net conference calls). The policies assign the packets a priority level of 4. The policies also limit the bandwidth for the video streams to 5 Mbps to illustrate how you can combine a change to the priority level with bandwidth restriction to further define traffic control. The node containing the application has the IP address 149.44.44.44. Policy 17 is assigned to port 1, where the application is located, and Policy 32 is assigned to port 8 where packets destined to the application enter the switch.

Policy 17 Commands:

```
create classifier=16 description="video flow"
ipsaddr=149.44.44.44

create qos flowgroup=41 description="video flow"
priority=4 classifierlist=16
```



```
create qos trafficclass=19 description="video flow"
maxbandwidth=5 flowgroup=41
```

```
create qos policy=17 description="video flow"
trafficclasslist=19 ingressport=1
```

Policy 32 Commands:

```
create classifier=42 description="video flow"
ipdaddr=149.44.44.44
```

```
create qos flowgroup=36 description="video flow"
priority=4 classifierlist=42
```

```
create qos trafficclass=21 description="video flow"
maxbandwidth=5 flowgroup=36
```

```
create qos policy=32 description="video flow"
trafficclasslist=21 ingressport=8
```

The parts of the policies are:

- ❑ Classifiers - Specify the IP address of the node with a video application. The classifier for Policy 17 specifies the address as a source address since this classifier is part of a policy concerning packets sent by the application. The classifier for Policy 32 specifies the address as a destination address since this classifier is part of a policy concerning packets going to the application.
- ❑ Flow Groups - Specify the new priority level of 4 for the packets. As with the previous example, the packets leave the switch with the same priority level they had when they entered. The new priority level is relevant only while the packets traverse the switch. To alter the packets so that they leave containing the new level, you would change option 5, Remark Priority, to Yes.
- ❑ Traffic Classes - Specify a maximum bandwidth of 5 Mbps for the packet stream. Bandwidth assignment can only be made at the traffic class level.
- ❑ Policies - Specify the traffic class and the port where the policy is to be assigned.

Example 3: Critical Database

Critical databases typically require a high bandwidth. They also typically require less priority than either voice or video.

The policies in this example assign 50 Mbps of bandwidth, with no change to priority, to traffic going to and from a database. The database is located on a node with the IP address 149.44.44.44 on port 1 of the switch.

Policy 15 Commands:

```
create classifier=42 description=database  
ipsaddr=149.44.44.44
```

```
create qos flowgroup=36 description=database  
classifierlist=42
```

```
create qos trafficclass=21 description=database  
maxbandwidth=50 flowgroup=36
```

```
create qos policy=15 description=database  
trafficclasslist=21 ingressport=1
```

Policy 17 Commands:

```
create classifier=10 description=database  
ipdaddr=149.44.44.44
```

```
create qos flowgroup=12 description=database  
classifierlist=10
```

```
create qos trafficclass=17 description=database  
maxbandwidth=50 flowgroup=12
```

```
create qos policy=17 description=database  
trafficclasslist=17 ingressport=8
```

CREATE QOS TRAFFICCLASS

Syntax

```
create qos trafficclass=value [description="string"]
[exceedaction=drop|remark]
[exceedremarkvalue=value|none] [markvalue=value|none]
[maxbandwidth=value|none] [burstsize=value|none]
[priority=value|none]
[remarkpriority=yes|no|on|off|true|false]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytos=yes|no|on|off|true|false]
[flowgrouplist=values|none]
```

Parameters

trafficclass	Specifies an ID number for the flow group. Each flow group on the switch must be assigned a unique number. The range is 0 to 511. The default is 0. This parameter is required.
description	Specifies a description for the traffic class. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. This parameter is optional, but recommended. Names can help you identify the traffic classes on the switch.
exceedaction	Specifies the action to be taken if the traffic of the traffic class exceeds the maximum bandwidth, specified with the MAXBANDWIDTH parameter. There are two possible exceed actions, drop and remark. If drop is selected, traffic exceeding the bandwidth is discarded. If remark is selected, the packets are forwarded after replacing the DSCP value with the new value specified in option 4, Exceed Remark Value. The default is drop.
exceedremarkvalue	Specifies the DSCP replacement value for traffic that exceeds the maximum bandwidth. This value takes precedence over the DSCP value set with the MARKVALUE parameter. The range is 0 to 63. The default is 0.
markvalue	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63.

A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level. A DSCP value specified at the traffic class level is used only if no value has been specified at the flow group level. It will override any value set at the policy level.

maxbandwidth

Specifies the maximum bandwidth available to the traffic class. This parameter determines the maximum rate at which the ingress port accepts data belonging to this traffic class before either dropping or remarking occurs, depending on the EXCEEDACTION parameter. If the sum of the maximum bandwidth for all traffic classes on a policy exceeds the (ingress) bandwidth of the port to which the policy is assigned, the bandwidth for the port takes precedence and the port discards packets before they can be classified. The range is 0 to 1016 Mbps.

The value for this parameter is rounded up to the nearest Mbps value when this traffic class is assigned to a policy on a 10/100 port, and up to the nearest 8 Mbps value when assigned to a policy on a gigabit port (for example, on a gigabit port, 1 Mbps is rounded to 8 Mbps, and 9 is rounded to 16).

burstsize

Specifies the size of a token bucket for the traffic class. The token bucket is used in situations where you have set a maximum bandwidth for a class, but where traffic activity may periodically exceed the maximum. A token bucket can provide a buffer for those periods where the maximum bandwidth is exceeded.

Tokens are added to the bucket at the same rate as the traffic class' maximum bandwidth, set with the MAXBANDWIDTH parameter. For example, a maximum bandwidth of 50 Mbps adds tokens to the bucket at that rate.

If the amount of the traffic flow matches the maximum bandwidth, no traffic is dropped because the number of tokens added to the bucket matches the number being used by the traffic. However, no unused tokens will accumulate in the bucket. If the traffic increases, the excess traffic will be discarded since no tokens are available for handling the increase.

If the traffic is below the maximum bandwidth, unused tokens will accumulate in the bucket since the actual bandwidth falls below the specified maximum. The unused tokens will be available for handling excess traffic should the traffic exceed the maximum bandwidth. Should an increase in traffic continue to the point where all the unused tokens are used up, packets will be discarded.

Unused tokens accumulate in the bucket until the bucket reaches maximum capacity, set by this parameter. Once the maximum capacity of the bucket is reached, no extra tokens are added. The range is 4 to 512 Kbps.

This parameter must be used with the MAXBANDWIDTH parameter. Specifying a token bucket size without also specifying a maximum bandwidth serves no function.

priority

Specifies the priority value in the IEEE 802.1p tag control field that traffic belonging to this traffic class is assigned. Priority values range from 0 to 7 with 0 being the lowest priority and 7 being the highest priority. Incoming frames are mapped into one of eight Class of Service (CoS) queues based on the priority value.

If you want the packets to retain the new value when they exit the switch, use the REMARKPRIORITY parameter.

A new priority can be set at both the flow group and traffic class levels. If it is set in both places, the value in the flow group overrides the value in the traffic class.

remarkpriority

Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter. This parameter is ignored if the PRIORITY parameter is omitted or set to NONE. Options are:

- yes, on, true Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter.
- no, off, false Does not replace the user priority value in the packets with the new value specified in with the PRIORITY

	parameter. This is the default.				
tos	Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7. A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in a flow group overrides a ToS value specified at the traffic class or policy level.				
movetostopriority	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are: <table><tr><td>yes, on, true</td><td>Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.</td></tr><tr><td>no, off, false</td><td>Does not replace the preexisting 802.1p priority level. This is the default.</td></tr></table>	yes, on, true	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.	no, off, false	Does not replace the preexisting 802.1p priority level. This is the default.
yes, on, true	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.				
no, off, false	Does not replace the preexisting 802.1p priority level. This is the default.				
moveprioritytotos	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are: <table><tr><td>yes, on, true</td><td>Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.</td></tr><tr><td>no, off, false</td><td>Does not replace the ToS priority field. This is the default.</td></tr></table>	yes, on, true	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.	no, off, false	Does not replace the ToS priority field. This is the default.
yes, on, true	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.				
no, off, false	Does not replace the ToS priority field. This is the default.				
flowgroupulist	Specifies the flow groups to be assigned to the traffic class. The specified flow groups must already exist. Separate multiple IDs with commas (e.g., 4,11,13).				

Description

This command creates a new traffic class.

Note
For examples of command sequences used to create entire QoS policies, refer to “CREATE QOS POLICY” on page 292.

Examples

The following command creates a traffic class with an ID number of 25 and the description "Database flow". The only parameter in the traffic class is the identification of the flow group, which is 11:

```
create qos trafficclass=25 description="Database flow"  
flowgroup1=11
```

This command creates a traffic class with the ID number of 41 and description "Video flow". The traffic class is assigned the flow group 3 and is given a maximum bandwidth of 5 Mbps:

```
create qos trafficclass=41 description="video flow"  
maxbandwidth=5 flowgroup1=3
```

This command creates a traffic class with the ID number of 51 and description "DB Eng". It assigns flow group 5 a maximum bandwidth of 50 Mbps. The DSCP value in all flow traffic that exceeds the maximum bandwidth is changed to 35:

```
create qos trafficclass=51 description="DB Eng"  
exceedaction=remark exceedremarkvalue=35  
maxbandwidth=50 flowgroup1=5
```

DELETE QOS FLOWGROUP

Syntax

```
delete qos flowgroup=value classifierlist=values
```

Parameter

flowgroup	Specifies the ID number of the flow group you want to modify. You can modify only one flow group at a time.
classifierlist	Specifies the classifiers you want to remove from the flow group. Separate multiple classifiers with commas (e.g., 4,11,12). (The online help for this command includes a NONE option for this parameter. Specifying the NONE option does not remove any classifiers. Since the purpose of this command is to remove classifiers from a flow group, it is unlikely you would ever use that option.)

Description

This command removes classifiers from a flow group.

Example

This command removes classifier 6 from flow group 22:

```
delete qos flowgroup=22 classifierlist=6
```


DELETE QOS POLICY

Syntax

```
delete qos policy=value trafficclasslist=values
```

Parameter

policy	Specifies the ID number of the policy you want to modify. You can modify only one policy at a time.
trafficclasslist	Specifies the IDs of the traffic classes you want to remove from the policy. Separate multiple traffic class with commas (e.g., 4,11,12). (The online help for this command includes a NONE option for this parameter. Specifying the NONE option does not remove any traffic classes. Since the purpose of this command is to remove traffic classes from a policy, it is unlikely you would ever use that option.)

Description

This command removes traffic classes from policies.

Example

This command removes traffic class 17 from policy 1:

```
delete qos policy=1 trafficclasslist=17
```

DELETE QOS TRAFFICCLASS

Syntax

```
delete qos trafficclass=value flowgrouplist=values
```

Parameter

flowgroup	Specifies the ID number of the traffic class you want to modify. You can modify only one traffic class at a time.
flowgroup list	Specifies the IDs of the flow groups you want to remove from the traffic class. Separate multiple flow groups with commas (e.g., 4,11,12). (The online help for this command includes a NONE option for this parameter. Specifying the NONE option does not remove any flow groups. Since the purpose of this command is to remove flow groups from a traffic class, it is unlikely you would ever use that option.)

Description

This command removes flow groups from traffic classes.

Example

This command removes flow group 5 from traffic class 22:

```
delete qos trafficclass=22 flowgrouplist=5
```

DESTROY QOS FLOWGROUP

Syntax

```
destroy qos flowgroup=value
```

Parameter

flowgroup Specifies the ID number of the flow group you want to delete. You can delete more than one flow group at a time. You can specify the flow groups individually, as a range, or both.

Description

This command deletes flow groups.

Examples

This command deletes the flow group 22:

```
destroy qos flowgroup=22
```

This command deletes the flow groups 16 to 20 and 23:

```
destroy qos flowgroup=16-20,23
```

DESTROY QOS POLICY

Syntax

```
destroy qos policy=value
```

Parameter

flowgroup	Specifies the ID number of the policy you want to delete. You can delete more than one policy at a time. You can specify the flow groups individually, as a range, or both.
-----------	---

Description

This command deletes QoS policies.

Examples

This command deletes policy 41:

```
destroy qos policy=41
```

This command deletes policies 5 and 23:

```
destroy qos policy=5,23
```

DESTROY QOS TRAFFICCLASS

Syntax

```
destroy qos trafficclass=value
```

Parameter

trafficclass Specifies the ID number of the traffic class you want to delete. You can delete more than one traffic class at a time. You can specify the flow groups individually, as a range, or both.

Description

This command deletes traffic classes.

Examples

This command deletes traffic class 22:

```
destroy qos trafficclass=22
```

This command deletes traffic classes 16 to 20 and 23:

```
destroy qos trafficclass=16-20,23
```

PURGE QOS

Syntax

```
purge qos
```

Parameters

None

Description

This command destroys all policies, traffic classes, and flow groups; resets the CoS priorities to port egress queues to the default values; and sets the scheduling mode and egress weight queues to their default values.

Example

The following command resets QoS to the default values:

```
purge qos
```

SET QOS FLOWGROUP

Syntax

```
set qos flowgroup=value [description=string]
[markvalue=value|none] [priority=value|NONE]
[remarkpriority=yes|no|on|off|true|false]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytos=value|none]
[classifierlist=values|none]
```

Parameters

flowgroup	Specifies the ID number of the flow group you want to modify. The range is 0 to 1023.
description	Specifies a new description for the flow group. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. This parameter is optional, but recommended. Names can help you identify the groups on the switch. The description must be enclosed in double quotes if it contains spaces. Otherwise, the quotes are optional.
markvalue	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63. If the NONE option is used, the frame's current DSCP value is not overwritten. The default is NONE. A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level.
priority	Specifies a new user priority value for the packets. The range is 0 to 7. You can specify only one value. If you want packets to retain the new value when they exit the switch, use the REMARKPRIORITY parameter. If the NONE option is used, the frame's current priority value is not overridden. The default is NONE. If you specify a new priority in a flow group and a traffic class, the value in the flow group overrides the value in the traffic class.
remarkpriority	Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter. This parameter is ignored if the PRIORITY parameter is

omitted or set to NONE. Options are:

yes, on, true Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter.

no, off, false Does not replace the user priority value in the packets with the new value specified in with the PRIORITY parameter. This is the default.

tos Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7.

A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in a flow group overrides a ToS value specified at the traffic class or policy level.

movetostopriority Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are:

yes, on, true Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.

no, off, false Does not replace the preexisting 802.1p priority level This is the default.

moveprioritytotos Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are:

yes, on, true Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.

no, off, false Does not replace the ToS priority field. This is the default.

classifierlist Specifies the classifiers to be assigned to the flow group. The specified classifiers replace any classifiers already assigned to the flow group. Separate multiple classifiers with commas (e.g., 4,7,8). The classifiers must already exist. The NONE options removes all classifiers currently assigned to the flow group without assigning any new ones. To add classifiers without replacing those already assigned, see “ADD QOS FLOWGROUP” on page 286.

Description

This command modifies the specifications of an existing flow group. The only parameter you cannot change is a flow group's ID number. To initially create a flow group, refer to "CREATE QOS FLOWGROUP" on page 289.

Note

For examples of command sequences used to create entire QoS policies, refer to "CREATE QOS POLICY" on page 292.

When modifying a flow group, note the following:

- ❑ You cannot change a flow group's ID number.
- ❑ Specifying an invalid value for a parameter that already has a value causes the parameter to revert to its default value.

Examples

This command changes the user priority value to 6 in flow group 15:

```
set qos flowgroup=15 priority=6
```

This command assigns classifiers 23 and 41 to flow group 25. Any classifiers already assigned to the flow group are replaced:

```
set qos flowgroup=25 classifierlist=23,41
```

This command returns the MARKVALUE setting in flow group 41 back to the default setting of NONE. At this setting, the flow group will not overwrite the ToS setting in the packets:

```
set qos flowgroup=41 markvalue=none
```

SET QOS POLICY

Syntax

```
set qos policy=value [description=string]
[indscpoverwrite=value|none] [remarkindscp=[all|none]]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytotos=yes|no|on|off|true|false]
[sendtomirror=yes|no|on|off|true|false]
[trafficclasslist=values|none]
[redirectport=value|none] [ingressport=port|all|none]
[egressport=port|none]
```

Parameters

policy	Specifies an ID number for the policy. Each policy on the switch must be assigned a unique number. The range is 0 to 255. The default is 0. This parameter is required.
description	Specifies a description for the policy. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. If the description contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional. This parameter is optional, but recommended. Names can help you identify the policies on the switch.
indscpoverwrite	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63. A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level. A DSCP value specified at the policy level is used only if no value has been specified at the flow group and traffic class levels.
remarkindscp	Specifies the conditions under which the ingress DSCP value is overwritten. If All is specified, all packets are remarked. If None is specified, the function is disabled. The default is None.
tos	Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7. A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in

a flow group overrides a ToS value specified at the traffic class or policy level.

<code>movetostopriority</code>	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are:
<code>yes, on, true</code>	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets.
<code>no, off, false</code>	Does not replace the preexisting 802.1p priority level. This is the default.
<code>moveprioritytos</code>	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are:
<code>yes, on, true</code>	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets.
<code>no, off, false</code>	Does not replace the ToS priority field. This is the default.
<code>sendtomirror</code>	Copies the traffic that meets the criteria of the classifiers to a destination mirror port. Options are:
<code>yes, on, true</code>	Copies the traffic that meets the criteria of the classifiers to a destination mirror port. You must specify the destination port by creating a port mirror, as explained in Chapter 11, "Port Mirroring Commands" on page 177.
<code>no, off, false</code>	Does not copy the traffic to a destination mirror port. This is the default.
<code>trafficclasslist</code>	Specifies the traffic classes to be assigned to the policy. The specified traffic classes must already exist. Separate multiple IDs with commas (e.g., 4,11,13).
<code>redirectport</code>	Specifies the port to which the classified traffic from the ingress ports is redirected.
<code>ingressport</code>	Specifies the ingress ports to which the policy is to be assigned. Ports can be identified individually (e.g., 5,7,22), as a range (e.g., 18-23), or both (e.g., 1,5,14-22). The NONE option removes the policy from all ingress ports to which it has been assigned. The ALL option adds it to all ports.

A port can be an ingress port of only one policy at a time. If a port is already an ingress port of a policy, you must remove the port from its current policy assignment before adding it to another policy. Alternatively, you can use “SET QOS PORT” on page 317, which removes a port from a policy and adds it to another policy with one command.

egressport Specifies the egress port to which the policy is to be assigned. You can enter only one egress port. The NONE option removes the policy from all egress ports to which it has been assigned. The ALL option adds it to all ports.

A port can be an egress port of only one policy at a time. If a port is already an egress port of a policy, you must remove the port from its current policy assignment before adding it to another policy. Alternatively, you can use “SET QOS PORT” on page 317, which removes a port from a policy and adds it to another policy with one command.

Description

This command modifies an existing policy. To initially create a policy, refer to “CREATE QOS POLICY” on page 292.

Note

For examples of command sequences used to create entire QoS policies, refer to “CREATE QOS POLICY” on page 292.

When modifying a policy, note the following:

- ❑ You cannot change a policy’s ID number.
- ❑ Specifying an invalid value for a parameter that already has a value causes the parameter to revert to its default value.

Examples

This command changes the ingress port for policy 8 to port 23:

```
set qos policy=8 ingressport=8
```

This command changes the traffic classes assigned to policy 41:

```
set qos policy=41 trafficclassList=12,23
```

SET QOS PORT

Syntax

```
set qos port=value type=ingress|egress  
policy=value|none
```

Parameter

port	Specifies the port to which the policy is to be assigned or removed. You can specify more than one port at a time if the port is an ingress port of the traffic flow. Ports can be identified individually (e.g., 5,7,22), as a range (e.g., 18-23), or both (e.g., 1,5,14-22). You can specify only one port if the port is functioning as an egress port for the flow.
type	Specifies whether the port is an ingress or egress port for the traffic flow of the policy. The default is ingress.
policy	Specifies the policy to be assigned to the port. You can specify only one policy. The NONE option removes the currently assigned policy from a port.

Description

This command adds and removes ports from policies.

A port can be an ingress or egress port of only one policy at a time. However, a port can be an ingress port and an egress port of different policies, simultaneously. If a port is already a port of a policy, this command automatically removes it from its current policy assignment before adding it to another policy.

Examples

This command assigns QoS policy 12 to ingress ports 5 through 8:

```
set qos port=5-8 type=ingress policy=12
```

This command removes the currently assigned policy to egress ports 1 and 5:

```
set qos port=1,5 type=egress policy=none
```

SET QOS TRAFFICCLASS

Syntax

```
set qos trafficclass=value [description="string"
[exceedaction=drop|remark]
[exceedremarkvalue=value|none] [markvalue=value|none]
[maxbandwidth=value|none] [burstsize=value|none]
[priority=value|none]
[remarkpriority=yes|no|on|off|true|false]
[tos=value|none]
[movetostopriority=yes|no|on|off|true|false]
[moveprioritytos=yes|no|on|off|true|false]
[flowgrouplist=values|none]
```

Parameters

trafficclass	Specifies an ID number for the flow group. Each flow group on the switch must be assigned a unique number. The range is 0 to 511. The default is 0. This parameter is required.
description	Specifies a description for the traffic class. The description can be from 1 to 15 alphanumeric characters. Spaces are allowed. If the description contains spaces, it must be enclosed in double quotes. Otherwise, the quotes are optional. This parameter is optional, but recommended. Names can help you identify the traffic classes on the switch.
exceedaction	Specifies the action to be taken if the flow group of the traffic class exceeds the maximum bandwidth, specified with the MAXBANDWIDTH parameter. There are two possible exceed actions, drop and remark. If drop is selected, traffic exceeding the bandwidth is discarded. If remark is selected, the packets are forwarded after replacing the DSCP value with the new value specified with the EXCEEDREMARKVALUE parameter. The default is drop.
exceedremarkvalue	Specifies the DSCP replacement value for traffic that exceeds the maximum bandwidth. This value takes precedence over the DSCP value set with the MARKVALUE parameter. The range is 0 to 63. The default is 0.

markvalue	Specifies a replacement value to write into the DSCP (TOS) field of the packets. The range is 0 to 63. A new DSCP value can be set at all three levels: flow group, traffic class, and policy. A DSCP value specified in a flow group overrides a DSCP value specified at the traffic class or policy level. A DSCP value specified at the traffic class level is used only if no value has been specified at the flow group level. It will override any value set at the policy level.
maxbandwidth	Specifies the maximum bandwidth available to the traffic class. This parameter determines the maximum rate at which the ingress port accepts data belonging to this traffic class before either dropping or remarking occurs, as specified with the EXCEEDACTION parameter. If the sum of the maximum bandwidth for all traffic classes on a policy exceeds the (ingress) bandwidth of the port to which the policy is assigned, the bandwidth for the port takes precedence and the port discards packets before they can be classified. The range is 0 to 1016 Mbps. The value for this parameter is rounded up to the nearest Mbps value when this traffic class is assigned to a policy on a 10/100 port, and up to the nearest 8 Mbps value when assigned to a policy on a gigabit port (for example, on a gigabit port, 1 Mbps is rounded to 8 Mbps, and 9 is rounded to 16).
burstsize	Specifies the size of a token bucket for the traffic class. The token bucket is used in situations where you have set a maximum bandwidth for a class, but where traffic activity may periodically exceed the maximum. A token bucket can provide a buffer for those periods where the maximum bandwidth is exceeded. Tokens are added to the bucket at the same rate as the traffic class' maximum bandwidth, set with the MAXBANDWIDTH parameter. For example, a maximum bandwidth of 50 Mbps adds tokens to the bucket at that rate. If the amount of the traffic flow matches the maximum bandwidth, no traffic is dropped because the number of tokens added to the bucket matches the number being used by the traffic. However, no

unused tokens will accumulate in the bucket. If the traffic increases, the excess traffic will be discarded since no tokens are available for handling the increase.

If the traffic is below the maximum bandwidth, unused tokens will accumulate in the bucket since the actual bandwidth falls below the specified maximum. The unused tokens will be available for handling excess traffic should the traffic exceed the maximum bandwidth. Should an increase in traffic continue to the point where all the unused tokens are used up, packets will be discarded.

Unused tokens accumulate in the bucket until the bucket reaches maximum capacity, set by this parameter. Once the maximum capacity of the bucket is reached, no extra tokens are added. The range is 4 to 512 Kbps.

This parameter should be used with the MAXBANDWIDTH parameter. Specifying a token bucket size without also specifying a maximum bandwidth serves no function.

priority

Specifies the priority value in the IEEE 802.1p tag control field that traffic belonging to this traffic class is assigned. Priority values range from 0 to 7 with 0 being the lowest priority and 7 being the highest priority. Incoming frames are mapped into one of eight Class of Service (CoS) queues based on the priority value.

If you want the packets to retain the new value when they exit the switch, change option 9, Remark Priority, to Yes.

If you specify a new priority in a flow group and a traffic class, the value in the flow group overrides the value in the traffic class.

remarkpriority

Replaces the user priority value in the packets with the new value specified with the PRIORITY parameter, if set to Yes. If set to No, which is the default, the packets retain their preexisting priority level when they leave the switch.

tos

Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7.

	A new ToS value can be set at all three levels: flow group, traffic class, and policy. A ToS value specified in a flow group overrides a ToS value specified at the traffic class or policy level.
movetostopriority	Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. Options are: yes, on, true Replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. no, off, false Does not replace the preexisting 802.1p priority level. This is the default.
moveprioritytos	Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. Options are: yes, on, true Replaces the value in the ToS priority field with the 802.1p priority field on IPv4 packets. no, off, false Does not replace the ToS priority field. This is the default.
flowgroupplist	Specifies the flow groups to be assigned to the traffic class. Any flow groups already assigned to the traffic class are replaced. The specified flow groups must already exist. Separate multiple IDs with commas (e.g., 4,11,13).

Description

This command modifies an existing traffic class. To initially create a traffic class, refer to “CREATE QOS TRAFFICCLASS” on page 299. The only parameter you cannot change is a traffic classes ID number.

Note

For examples of command sequences used to create entire QoS policies, refer to “CREATE QOS POLICY” on page 292.

When modifying a traffic class, note the following:

- ☐ You cannot change a traffic class' ID number.
- ☐ Specifying an invalid value for a parameter that already has a value causes the parameter to revert to its default value.

Examples

This command changes the exceed action in traffic class 18 to remark and specifies a remark value of 24. This command changes the DSCP value in traffic that exceeds the maximum bandwidth to 24:

```
set qos trafficclass=18 exceedaction=remark  
exceedremarkvalue=24
```

This command changes the user priority value to 17 for traffic belonging to traffic class 42:

```
set qos trafficclass=42 priority=17
```

This command changes the maximum bandwidth for traffic class 41 to 80 Mbps and the burst size to 400 Kbps.

```
set qos trafficclass=41 maxbandwidth=80 burstsize=400
```

SHOW QOS FLOWGROUP

Syntax

```
show qos flowgroup[=idnumber]
```

Parameters

flowgroup Specifies the ID of the flow group you want to view. You can specify more than one classifier at a time.

Description

This command displays the flow groups on a switch. An example is shown in Figure 27.

```
Flow Group ID ..... 2
Description ..... Video1
DSCP value ..... 0
Priority ..... 6
Remark Priority ..... No
ToS .....
Move ToS to Priority ..... No
Move Priority to ToS ..... No
Classifier List ..... 11
Parent Traffic Class ID .... 4
Is Active ..... Yes
```

Figure 27. SHOW QOS FLOWGROUP Command

The command displays the following information about a flow group:

- ❑ Flow Group ID - The flow group's ID number.
- ❑ Description - The flow group's description.
- ❑ DSCP value - The replacement value to write into the DSCP (TOS) field of the packets.
- ❑ Priority - The new user priority value for the packets.
- ❑ Remark Priority - Replaces the user priority value in the packets with the Priority value.
- ❑ ToS - Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7.
- ❑ Move ToS to Priority - If set to Yes, replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. If set to No, which is the default, the packets retain their preexisting 802.1p priority level.
- ❑ Move Priority to ToS - If set to Yes, replaces the value in the ToS priority field with the value in the 802.1p priority field on IPv4 packets. If

set to No, which is the default, the packets retain their preexisting ToS priority level.

- ❑ Classifier List - The classifiers assigned to the policy.
- ❑ Parent Traffic Class ID - The ID number of the traffic class to which the flow group is assigned. A flow group can belong to only one traffic class at a time.
- ❑ Is Active - The status of the flow group. If the flow group is part of a QoS policy that is assigned to one or more ports, the flow group is deemed active. If the flow group has not been assigned to a policy or if the policy has not been assigned to any ports, the flow group is considered inactive.

For further information about the parameters, refer to “CREATE QOS FLOWGROUP” on page 289.

Examples

This command displays all of the flow groups:

```
show qos flowgroup
```

This command displays flow group 12:

```
show qos flowgroup=12
```

SHOW QOS POLICY

Syntax

```
show qos policy[=idnumber]
```

Parameter

policy Specifies the ID of the policy you want to view. You can specify more than one policy at a time. Separate multiple policies with commas (e.g., 4,5,10).

Description

This command displays the policies on a switch. An example is shown in Figure 28.

```
Policy ID ..... 11
Description ..... policy_ca2
Remark DSCP ..... All
In DSCP overwrite ..... 42
ToS .....
Move ToS to Priority ..... No
Move Priority to ToS ..... No
Send to Mirror Port ..... No
Traffic Class List .....
Redirect Port .....
Ingress Port List ..... 15
Egress Port .....
Is Active ..... Yes
```

Figure 28. SHOW QOS POLICY Command

This command provides the following information:

- ❑ Policy ID - The policy's ID number.
- ❑ Description - The policy's description.
- ❑ Remark DSCP - Specifies whether the DSCP value of ingress packets is overwritten. If All is specified, all packets are remarked. If None is specified, the function is disabled. The default is None.
- ❑ In DSCP overwrite - The replacement value to write into the DSCP (TOS) field of the packets.
- ❑ ToS - Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7. A ToS value specified at the policy level is used only if no value has been specified at the flow group and traffic class levels.
- ❑ Move ToS to Priority - If set to yes, replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. If set to No, which is the default, the packets retain their preexisting

802.1p priority level.

- ❑ Move Priority to ToS - If set to yes, replaces the value in the ToS priority field with the value in the 802.1p priority field on IPv4 packets. If set to No, which is the default, the packets retain their preexisting ToS priority level.
- ❑ Send to Mirror Port - Copies the traffic that meets the criteria of the classifiers to a destination mirror port. If set to yes, you must specify the destination port of the port mirror with “SET SWITCH MIRROR” on page 178.
- ❑ Traffic Class List - The traffic classes assigned to the policy.
- ❑ Redirect Port - The egress port to which the classified traffic from the ingress port is reassigned.
- ❑ Ingress Port List - The ingress ports to which the policy is assigned.
- ❑ Egress Port - The egress port to which the policy is assigned.
- ❑ Active - The status of the policy. A policy that is assigned to one or more ports is deemed active while a policy that is not assigned to any ports is deemed inactive.

For further information about the parameters, refer to “CREATE QOS POLICY” on page 292.

Examples

This command displays all of the policies:

```
show qos policy
```

This command displays policy 54:

```
show qos policy=54
```

SHOW QOS TRAFFICCLASS

Syntax

```
show qos trafficclass[=idnumber]
```

Parameter

trafficclass Specifies the ID of the traffic class you want to view. You can specify more than one traffic class at a time. Separate multiple traffic classes with commas (e.g., 4,5,10).

Description

This command displays the traffic classes on a switch. An example is shown in Figure 29.

```
Traffic Class ID ..... 0
Description ..... Dev Database
Exceed Action ..... Drop
Exceed Remark Value ..... 0
DSCP value ..... 0
Max bandwidth ..... 50
Burst Size ..... 0
Priority ..... 0
Remark Priority ..... No
ToS .....
Move ToS to Priority ..... No
Move Priority to ToS ..... No
Flow Group List ..... 11
Parent Policy ID ..... 2
Is Active ..... Yes
```

Figure 29. DISPLAY QOS TRAFFICCLASS Command

This command provides the following information about a traffic class:

- ❑ Traffic Class ID - The traffic class' ID number.
- ❑ Description - The description of the traffic class.
- ❑ Exceed Action - The action taken if the traffic of the traffic class exceeds the maximum bandwidth.
- ❑ Exceed Remark Value - The DSCP replacement value for traffic that exceeds the maximum bandwidth.
- ❑ DSCP value - The replacement value to write into the DSCP (TOS) field of the packets.
- ❑ Max Bandwidth - The maximum bandwidth available to the traffic class.
- ❑ Burst Size - The size of a token bucket for the traffic class.

- ❑ **Priority** - The priority value in the IEEE 802.1p tag control field assigned to the traffic that belongs to this traffic class.
- ❑ **Remark Priority** - Replaces the user priority value in the packets with the Priority value.
- ❑ **ToS** - Specifies a replacement value to write into the Type of Service (ToS) field of IPv4 packets. The range is 0 to 7.
- ❑ **Move ToS to Priority** - If set to yes, replaces the value in the 802.1p priority field with the value in the ToS priority field on IPv4 packets. If set to No, which is the default, the packets retain their preexisting 802.1p priority level.
- ❑ **Move Priority to ToS** - If set to yes, replaces the value in the ToS priority field with the value in the 802.1p priority field on IPv4 packets. If set to No, which is the default, the packets retain their preexisting ToS priority level.
- ❑ **Flow Group List** - The flow groups assigned to the traffic class.
- ❑ **Parent Policy ID** - The ID number of the policy where the traffic class is assigned. A traffic class can belong to only one policy at a time.
- ❑ **Is Active** - The status of the traffic class. If the traffic class is part of a QoS policy that is assigned to one or more ports, the traffic class is deemed active. If the traffic class has not been assigned to a policy or if the policy has not been assigned to any ports, the traffic class is deemed inactive.

For further information about the parameters, refer to “CREATE QOS TRAFFICCLASS” on page 299.

Examples

This command displays all of the traffic classes:

```
show qos trafficclass
```

This command displays traffic class 14:

```
show qos trafficclass=14
```


Denial of Service Defense Commands

This chapter contains the following command:

- ❑ “SET DOS” on page 330
- ❑ “SET DOS IPOPTION” on page 331
- ❑ “SET DOS LAND” on page 333
- ❑ “SET DOS PINGOFDEATH” on page 334
- ❑ “SET DOS SMURF” on page 336
- ❑ “SET DOS SYNFLOOD” on page 337
- ❑ “SET DOS TEARDROP” on page 338
- ❑ “SHOW DOS” on page 340

Note

Remember to save your changes with the SAVE CONFIGURATION command.

SET DOS

Syntax

```
set dos ipaddress=ipaddress subnet=mask uplinkport=port
```

Parameters

ipaddress	Specifies the IP address of one of the devices connected to the switch, preferably the lowest IP address.
subnet	Specifies the subnet mask of the LAN. A binary “1” indicates the switch should filter on the corresponding bit of the address, while a “0” indicates that it should not.
uplinkport	Specifies the port on the switch that is connected to a device (for example, a DSL router) that leads outside the network. You can specify only one port. This parameter is required only for the Land defense. The default port is the highest numbered existing port in the switch.

Description

This command is required for the SMURF and Land defenses. The SMURF defense uses the LAN address and mask to determine the broadcast address of your network. The Land defense uses this information to determine which traffic is local and which is remote to your network.

As an example, assume that the devices connected to a switch are using the IP address range 149.11.11.1 to 149.11.11.50. The IP address would be 149.11.11.1 and the mask would be 0.0.0.63.

Examples

The following command sets the IP address to 149.11.11.1 and the mask to 0.0.0.63:

```
set dos ipaddress=149.11.11.1 subnet=0.0.0.63
```

The following command sets the IP address to 149.22.22.1, the mask to 0.0.0.255, and the uplink port for the Land defense to port 24:

```
set dos ipaddress=149.22.22.1 subnet=0.0.0.255 uplinkport=24
```

SET DOS IPOPTION

Syntax

```
set dos ipoption port=port state=enable|disable
[mirroring=yes|no|on|off|true|false|enabled|disabled]
```

Parameters

port	Specifies the switch port where you want to enable or disable the IP Option defense. You can specify more than one port at a time.	
state	Specifies the state of the IP Option defense. The options are:	
	enable	Activates the defense.
	disable	Deactivates the defense. This is the default.
mirroring	Specifies whether the examined traffic is copied to a mirror port. Options are:	
	yes, on, true enabled	Traffic is mirrored. These values are equivalent.
	no, off, false disabled	Traffic is not mirrored. This is the default. These values are equivalent.

Description

This command enables and disables the IP Option DoS defense.

This type of attack occurs when an attacker sends packets containing bad IP options to a victim node. There are many different types of IP options attacks and the AT-S63 Management Software does not try to distinguish between them. Rather, a switch port where this defense is activated counts the number of ingress IP packets containing IP options. If the number exceeds 20 packets per second, the switch considers this a possible IP options attack and does the following occurs:

- ❑ The switch sends a trap to the management stations.
- ❑ The switch blocks all traffic on the port for one minute.

This defense mechanism does not involve the switch's CPU. You can activate it on as many ports as you want without it impacting switch performance.

You can use the MIRRORING parameter to copy the examined traffic to a destination port mirror for analysis with a data analyzer. To define the destination port, refer to “SET SWITCH MIRROR” on page 178.

Example

The following command activates the IP Options defense on ports 5, 7, and 10:

```
set dos ipoption port=5,7,10 state=enable
```

The following command activates the IP Options defense on port 6 as well as the mirroring feature so the examined traffic is copied to a destination port mirror.

```
set dos ipoption port=6 state=enable mirroring=yes
```

The following command disables the IP Options defense on ports 5 and 7:

```
set dos ipoption port=5,7 state=disable
```

SET DOS LAND

Syntax

```
set dos land port=port state=enable|disable
[mirroring=yes|no|on|off|true|false|enabled|disabled]
```

Parameters

port	Specifies the switch port on which you want to enable or disable the Land defense. You can specify more than one port at a time.	
state	Specifies the state of the Land defense. The options are:	
	enable	Activates the defense.
	disable	Deactivates the defense. This is the default.
mirroring	Specifies whether the examined traffic is copied to a mirror port. Options are:	
	yes, on, true enabled	Traffic is mirrored. These values are equivalent.
	no, off, false disabled	Traffic is not mirrored. This is the default. These values are equivalent.

Description

This command enables and disables the Land DoS defense.

You can use the MIRRORING parameter to copy the intruding traffic to a destination port mirror for analysis with a data analyzer. To define the destination port, refer to “SET SWITCH MIRROR” on page 178.

Example

The following command activates the Land defense on ports 5 and 7:

```
set dos land port=5,7 state=enable
```

SET DOS PINGOFDEATH

Syntax

```
set dos pingofdeath port=port state=enable|disable
[mirroring=yes|no|on|off|true|false|enabled|disabled]
```

Parameters

port	Specifies the switch ports on which to enable or disable the Ping of Death defense. You can specify more than one port at a time.	
state	Specifies the state of the IP Option defense. The options are:	
	enable	Activates the defense.
	disable	Deactivates the defense. This is the default.
mirroring	Specifies whether the examined traffic is copied to a mirror port. Options are:	
	yes, on, true enabled	Traffic is mirrored. These values are equivalent.
	no, off, false disabled	Traffic is not mirrored. This is the default. These values are equivalent.

Description

This command activates and deactivates the Ping of Death DoS defense.

In this DoS, an attacker sends an oversized, fragmented Ping packet to the victim, which, if lacking a policy for handling oversized packets, may freeze.

To defend against this form of attack, a switch port searches for the last fragment of a fragmented Ping request and examines its offset to determine if the packet size is greater than 63,488 bits. If it is, the fragment is forwarded to the switch's CPU for final packet size determination. If the switch determines that the packet is oversized, the following occurs:

- ❑ The switch sends a trap to the management stations.
- ❑ The switch blocks all traffic on the port for one minute.

Note

This defense mechanism requires some involvement by the switch's CPU, though not as much as the Teardrop defense. This will not impact the forwarding of traffic between the switch ports, but it can affect the handling of CPU events, such as the processing of IGMP packets and spanning tree BPDUs. For this reason, Allied Telesis recommends that you strictly limit the use of this defense, activating it only on those ports where an attack is most likely to originate.

You can use the MIRRORING parameter to copy the offending traffic to a destination port mirror for analysis with a data analyzer. To define the destination port, refer to "SET SWITCH MIRROR" on page 178.

Example

The following command activates the defense on ports 1 and 5:

```
set dos pingofdeath port=1,5 state=enable
```

SET DOS SMURF

Syntax

```
set dos smurf port=port state=enable|disable
```

Parameters

port	Specifies the switch ports on which you want to enable or disable SMURF defense. You can select more than one port at a time.
state	Specifies the state of the SMURF defense. The options are: enable Activates the defense. disable Deactivates the defense. This is the default.

Description

This command activates and deactivates the SMURF DoS defense.

This DoS attack is instigated by an attacker sending a Ping request containing a broadcast address as the destination address and the address of the victim as the source of the Ping. This overwhelms the victim with a large number of Ping replies from other network nodes.

A switch port defends against this form of attack by examining the destination addresses of ingress Ping packets and discarding those that contain a broadcast address as a destination address.

To implement this defense, you need to specify the IP address of any device on your network, preferably the lowest IP address, and a mask using “SET DOS” on page 330. The switch uses the combination of the two to determine your network’s broadcast address. Any ingress Ping packets containing the broadcast address are discarded.

This defense mechanism does not involve the switch’s CPU. You can activate it on as many ports as you want without having it negatively impact switch performance.

Example

The following command activates this defense on port 17:

```
set dos smurf port=17 state=enable
```


SET DOS SYNFLOOD

Syntax

```
set dos synflood port=port state=enable|disable
```

Parameters

port	Specifies the switch ports on which you want to enable or disable this DoS defense. You can select more than one port at a time.				
state	Specifies the state of the DoS defense. The options are: <table> <tr> <td>enable</td><td>Activates the defense.</td></tr> <tr> <td>disable</td><td>Deactivates the defense. This is the default.</td></tr> </table>	enable	Activates the defense.	disable	Deactivates the defense. This is the default.
enable	Activates the defense.				
disable	Deactivates the defense. This is the default.				

Description

This command activates and deactivates the SYN ACK Flood DoS defense.

In this type of attack, an attacker, seeking to overwhelm a victim with TCP connection requests, sends a large number of TCP SYN packets with bogus source addresses to the victim. The victim responds with SYN ACK packets, but since the original source addresses are bogus, the victim node does not receive any replies. If the attacker sends enough requests in a short enough period, the victim may freeze operations once the requests exceed the capacity of its connections queue.

To defend against this form of attack, a switch port monitors the number of ingress TCP-SYN packets it receives. If a port receives more 60 TCP-SYN packets per second, the following occurs.

- ❑ The switch sends a trap to the management stations
- ❑ The switch blocks all traffic on the port for one minute.

This defense mechanism does not involve the switch's CPU. You can activate it on as many ports as you want without it impacting switch performance.

Example

The following command activates the defense on ports 18 to 20:

```
set dos synflood port=18-20 state=enable
```

SET DOS TEARDROP

Syntax

```
set dos teardrop port=port state=enable|disable
[mirroring=yes|no|on|off|true|false|enabled|disabled]
```

Parameters

port	Specifies the switch ports on which you want to enable or disable this DoS defense. You can select more than one port at a time.	
state	Specifies the state of the DoS defense. The options are:	
	enable	Activates the defense.
	disable	Deactivates the defense. This is the default.
mirroring	Specifies whether the examined traffic is copied to a mirror port. Options are:	
	yes, on, true enabled	Traffic is mirrored. These values are equivalent.
	no, off, false disabled	Traffic is not mirrored. This is the default. These values are equivalent.

Description

This command activates and deactivates the Teardrop DoS defense.

In this DoS attack, an attacker sends a packet in several fragments with a bogus offset value, used to reconstruct the packet, in one of the fragments to a victim. This results in the victim being unable to reassemble the packet, possibly causing it to freeze operations.

The defense mechanism for this type of attack has all ingress IP traffic received on a port sent to the switch's CPU. The CPU samples related, consecutive fragments, checking for fragments with invalid offset values. If one is found, the following occurs:

- ❑ The switch sends a trap to the management stations.
- ❑ The switch blocks all traffic on the port for one minute.

Because the CPU examines only a sampling of the ingress IP traffic on a port, there is no guarantee that the switch will catch or prevent all occurrences of this attack.

You can use the MIRRORING parameter to copy the offending traffic to a destination port mirror for analysis with a data analyzer. To define the destination port, refer to “SET SWITCH MIRROR” on page 178.



Caution

This defense is extremely CPU intensive and should be used with caution. Unrestricted use can cause a switch to halt operations if the CPU becomes overwhelmed with IP traffic. To prevent this, Allied Telesis recommends that you activate this defense on only one port at a time and where ingress fragments comprise only a small percentage of the port's total traffic.

Example

The following command activates the defense on port 22:

```
set dos teardrop port=22 state=enable
```

SHOW DOS

Syntax 1

```
show dos [ipaddress] [subnet] [uplinkport]
```

Syntax 2

```
show dos defense port=port
```

Parameters

ipaddress	Displays the IP address of the LAN.
subnet	Displays the subnet mask.
uplinkport	Displays the uplink port for the Land defense.
defense	Displays the status of a specified defense for a particular port. Defense can be any of the following: synflood smurf land teardrop ipoption pingofdeath
port	Specifies the port whose DoS status you want to view. You can specify only one port.

Description

These commands display DoS status information. Syntax 1 displays the current settings for the IP address, subnet mask, and uplink port parameters. Syntax 2 displays DoS status information for a specific defense mechanism on a specific port.

Examples

The following command displays the IP address and subnet mask for the Land and SMURF defenses:

```
show dos ipaddress subnet
```

The following command displays the status of the SMURF defense on port 4:

```
show dos smurf port=4
```


Section III

Snooping Protocols

This section has the following chapters:

- ❑ Chapter 20, “IGMP Snooping Commands” on page 345
- ❑ Chapter 21, “MLD Snooping Commands” on page 357
- ❑ Chapter 22, “RRP Snooping Commands” on page 367
- ❑ Chapter 23, “EPSR Snooping Commands” on page 371

IGMP Snooping Commands

This chapter contains the following commands:

- ❑ “DISABLE IGMP Snooping” on page 346
- ❑ “ENABLE IGMP Snooping” on page 347
- ❑ “SET IP IGMP” on page 348
- ❑ “SHOW IGMP Snooping” on page 351
- ❑ “SHOW IP IGMP” on page 353

Note

Remember to use the SAVE CONFIGURATION command to save your changes on the switch.

DISABLE IGMPSNOOPING

Syntax

```
disable igmpsnooping
```

Parameters

None.

Description

This command deactivates IGMP snooping on the switch.

Example

The following command deactivates IGMP snooping:

```
disable igmpsnooping
```

Equivalent Command

```
set ip igmp snoopingstatus=disabled
```

For information, refer to “SET IP IGMP” on page 348.

ENABLE IGMPSNOOPING

Syntax

```
enable igmpsnooping
```

Parameters

None.

Description

This command activates IGMP snooping on the switch.

Example

The following command activates IGMP snooping:

```
enable igmpsnooping
```

Equivalent Command

```
set ip igmp snoopingstatus=enabled
```

For information, refer to “SET IP IGMP” on page 348.

SET IP IGMP

Syntax

```
set ip igmp [snoopingstatus=enabled|disabled]
[hoststatus=singlehost|multihost] [timeout=value]
[numbermulticastgroups=value]
[routerport=port|all|none|auto]
```

Parameters

snoopingstatus	Activates and deactivates IGMP snooping on the switch. The options are: enabled Activates IGMP snooping. disabled Deactivates IGMP snooping. This is the default setting.
hoststatus	Specifies the IGMP host node topology. Options are: singlehost Activates the Single-Host/Port setting, which is appropriate when there is only one host node connected to a port on the switch. This is the default setting. multihost Activates the Multi-Host setting, which is appropriate if there is more than one host node connected to a switch port.
timeout	Specifies the time period in seconds at which the switch determines that a host node is inactive. An inactive host node is a node that has not sent an IGMP report during the specified time interval. The range is from 0 second to 86,400 seconds (24 hours). The default is 260 seconds. If you set the timeout to zero (0), the timer never times out, and the timeout interval is essentially disabled. This parameter also controls the time interval used by the switch in determining whether a multicast router is still active. The switch makes the determination by watching

for queries from the router. If the switch does not detect any queries from a multicast router during the specified time interval, the router is assumed to be no longer active on the port.

The actual timeout may be ten seconds less than the specified value. For example, a setting of 25 seconds can result in the switch classifying a host node or multicast router as inactive after just 15 seconds. A setting of 10 seconds or less can result in the immediate timeout of an inactive host node or router.

numbermulticastgroups	Specifies the maximum number of multicast addresses the switch can learn. This parameter is useful with networks that contain a large number of multicast groups. You can use the parameter to prevent the switch's MAC address table from filling up with multicast addresses, leaving no room for dynamic or static MAC addresses. The range is 0 to 255 addresses; the default is 64 addresses.
-----------------------	--

Note
The combined maximum number of multicast address groups for IGMP and MLD snooping cannot exceed 255.

routerport	Specifies the port(s) on the switch connected to a multicast router. Options are:	
	port	Specifies the router port(s) manually.
	all	Specifies all of the switch ports.
	none	Sets the mode to manual without any router ports specified.
	auto	Activates auto-detect, where the switch automatically determines the ports with multicast routers.

Description

This command configures the IGMP snooping parameters.

Examples

The following command activates IGMP snooping, sets the IGMP topology to Multi-Host, and sets the timeout value to 120 seconds:

```
set ip igmp snoopingstatus=enabled hoststatus=multihost  
timeout=120
```

The following command changes the topology to Single-Host:

```
set ip igmp hoststatus=singlehost
```

The following command disables IGMP snooping:

```
set ip igmp snoopingstatus=disabled
```

Equivalent Commands

```
disable igmpsnooping
```

For information, refer to “DISABLE IGMP SNOOPING” on page 346.

```
enable igmpsnooping
```

For information, refer to “ENABLE IGMP SNOOPING” on page 347.

SHOW IGMP Snooping

Syntax

```
show igmpsnooping
```

Parameters

None.

Description

This command displays the IGMP parameters. Figure 30 illustrates the information that is displayed by this command.

```
IGMP Snooping Configuration:
IGMP Snooping Status ..... Disabled
Host Topology ..... Single-Host/Port (Edge)
Host/Router Timeout Interval ..... 260 seconds
Maximum IGMP Multicast Groups ..... 64
Router Port(s) ..... Auto Detect

Router List:

VLAN  Port/Trunk ID  RouterIP
-----
1      14/-             172.16.01.1

Host List:
Number of IGMP Multicast Groups: 4

MulticastGroup      VLAN  Port/
ID                  TrunkID  HostIP      IGMP  Exp.
-----
01:00:5E:00:01:01   1      6/-        172.16.10.51  v2    21
01:00:5E:7F:FF:FA   1      5/-        149.35.200.75 v2    11
                   149.35.200.65 v2    65
01:00:5E:00:00:02   1      17/-       149.35.200.69 v2    34
01:00:5E:00:00:09   1      14/-       172.16.10.51  v2    32
```

Figure 30. SHOW IGMP Snooping Command

For an explanation of these parameters, refer to “SET IP IGMP” on page 348 and “SHOW IP IGMP” on page 353.

Examples

The following command displays the current IGMP parameter settings:

```
show igmpsnooping
```

Equivalent Command

```
show ip igmp
```

For information, see “SHOW IP IGMP” on page 353.

SHOW IP IGMP

Syntax

```
show ip igmp [hostlist] [routerlist]
```

Parameters

hostlist	Displays a list of the multicast groups learned by the switch, as well as the ports on the switch that are connected to host nodes. This parameter displays information only when there are active host nodes.
routerlist	Displays the ports on the switch where multicast routers are detected. This parameter displays information only when there are active multicast routers.

Description

This command displays the IGMP parameters. Figure 31 illustrates the information that is displayed by this command without the optional parameters.

```
IGMP Snooping Configuration:
IGMP Snooping Status ..... Disabled
Host Topology ..... Single-Host/Port (Edge)
Host/Router Timeout Interval ..... 260 seconds
Maximum IGMP Multicast Groups ..... 64
Router Port(s) ..... Auto Detect
```

Figure 31. SHOW IP IGMP Command

For an explanation of these parameters, refer to “SET IP IGMP” on page 348.

An example of the information displayed by the HOSTLIST parameter is shown in Figure 32.

Number of IGMP Multicast Groups: 4					
MulticastGroup	VLAN ID	Port/TrunkID	HostIP	IGMP Ver	Exp. Time
01:00:5E:00:01:01	1	6/-	172.16.10.51	v2	21
01:00:5E:7F:FF:FA	1	5/-	149.35.200.75	v2	11
			149.35.200.65	v2	65
01:00:5E:00:00:02	1	17/-	149.35.200.69	v2	34
01:00:5E:00:00:09	1	14/-	172.16.10.51	v2	32

Figure 32. SHOW IP IGMP Command with HOSTLIST Parameter

The HOSTLIST parameter displays the following information:

- ❑ Number of IGMP Multicast Groups - The number of IGMP multicast groups with active host nodes on the switch.
- ❑ Multicast Group - The multicast address of the group.
- ❑ VLAN - The VID of the VLAN where the port or trunk is an untagged member.
- ❑ Port/Trunk - The port on the switch where the host node is connected. If the host node is connected to the switch through a trunk, the trunk ID number instead of the port number is displayed.
- ❑ HostIP - The IP address of the host node connected to the port.
- ❑ IGMP Ver. - The version of IGMP being used by the host.
- ❑ Exp. Time - The number of seconds remaining before the host is timed out if no further IGMP reports are received from it.

An example of the information displayed by the ROUTERLIST parameter is shown in Figure 33.

VLAN	Port/Trunk ID	RouterIP
1	14/-	172.16.01.1

Figure 33. SHOW IP IGMP Command with ROUTERLIST Parameter

The ROUTERLIST parameter displays the following information:

- ❑ VLAN - The VID of the VLAN in which the port is an untagged member.
- ❑ Port/Trunk ID - The port on the switch where the multicast router is connected. If the switch learned the router on a port trunk, the trunk ID number instead of the port number is displayed.
- ❑ Router IP - The IP address of the multicast router.

Examples

The following command displays the current IGMP parameter settings:

```
show ip igmp
```

The following command displays a list of active host nodes connected to the switch:

```
show ip igmp hostlist
```

The following command displays a list of active multicast routers:

```
show ip igmp routerlist
```

Equivalent Command

```
show igmpsnooping
```

This command does not display the router and host lists. For information, see “SHOW IGMP Snooping” on page 351.

Chapter 21

MLD Snooping Commands

This chapter contains the following commands:

- ❑ “DISABLE MLDSNOOPING” on page 358
- ❑ “ENABLE MLDSNOOPING” on page 359
- ❑ “SET IPV6 MLDSNOOPING” on page 360
- ❑ “SHOW MLDSNOOPING” on page 362
- ❑ “SHOW IPV6 MLDSNOOPING” on page 364

Note

Remember to use the SAVE CONFIGURATION command to save your changes on the switch.

DISABLE MLDSNOOPING

Syntax

```
disable mldsnooping
```

Parameters

None.

Description

This command deactivates MLD snooping on the switch.

Example

The following command deactivates MLD snooping:

```
disable mldsnooping
```

Equivalent Command

```
set ipv6 mldsnooping snoopingstatus=disabled
```

For information, refer to “SET IPV6 MLDSNOOPING” on page 360.

ENABLE MLDSNOOPING

Syntax

```
enable mldsnooping
```

Parameters

None.

Description

This command activates MLD snooping on the switch.

Example

The following command activates MLD snooping:

```
enable mldsnooping
```

Equivalent Command

```
set ipv6 mldsnooping snoopingstatus=enabled
```

For information, refer to “SET IPV6 MLDSNOOPING” on page 360.

SET IPV6 MLDSNOOPING

Syntax

```
set ipv6 mldsnooping [snoopingstatus=enabled|disabled]
[hoststatus=singlehost|multihost] [timeout=value]
[numbermulticastgroups=value]
[routerport=port|all|none|auto]
```

Parameters

snoopingstatus	Activates and deactivates MLD snooping on the switch. The options are: enabled Activates MLD snooping. disabled Deactivates MLD snooping. This is the default setting.
hoststatus	Specifies the MLD host node topology. Options are: singlehost Activates the Single-Host/Port setting, which is appropriate when there is only one host node connected to a port on the switch. This is the default setting. multihost Activates the Multi-Host setting, which is appropriate if there is more than one host node connected to a switch port.
timeout	Specifies the time period, in seconds, used by the switch in determining inactive host nodes. An inactive host node is a node that has not sent an MLD report during the specified time interval. The range is 1 to 86,400 seconds (24 hours); the default is 260 seconds.
numbermulticastgroups	Specifies the maximum number of multicast addresses the switch learns. This parameter is useful with networks that contain a large number of multicast groups. You can use the parameter to prevent the switch's MAC address table from filling up with multicast addresses, leaving no room for dynamic or

static MAC addresses. The range is 1 to 255 addresses; the default is 64 addresses.

Note

The combined number of multicast address groups for IGMP and MLD snooping cannot exceed 255.

routerport	Specifies the port(s) on the switch connected to a multicast router. Options are:	
	port	Specifies the router port(s) manually.
	all	Specifies all of the switch ports.
	none	Sets the mode to manual without any router ports specified.
	auto	Activates auto-detect, where the switch automatically determines the ports with multicast routers.

Description

This command configures the MLD snooping parameters.

Examples

The following command activates MLD snooping, sets the MLD topology to Multi-Host, and sets the timeout value to 120 seconds:

```
set ipv6 mldsnooping snoopingstatus=enabled
hoststatus=multihost timeout=120
```

The following command changes the topology to Single-Host:

```
set ipv6 mldsnooping hoststatus=singlehost
```

The following command disables MLD snooping:

```
set ipv6 mldsnooping snoopingstatus=disabled
```

Equivalent Commands

```
disable mldsnooping
```

For information, see “DISABLE MLDSNOOPING” on page 358.

```
enable mldsnooping
```

For information, see “ENABLE MLDSNOOPING” on page 359.

SHOW MLDSNOOPING

Syntax

show mldsnooping

Parameters

None.

Description

This command displays the following MLD parameters:

- ❑ MLD snooping status
- ❑ Multicast host topology
- ❑ Host/router timeout interval
- ❑ Maximum multicast groups
- ❑ Host and router lists

To set the MLD parameters, refer to “SET IPV6 MLDSNOOPING” on page 360.

This command displays the information in Figure 34.

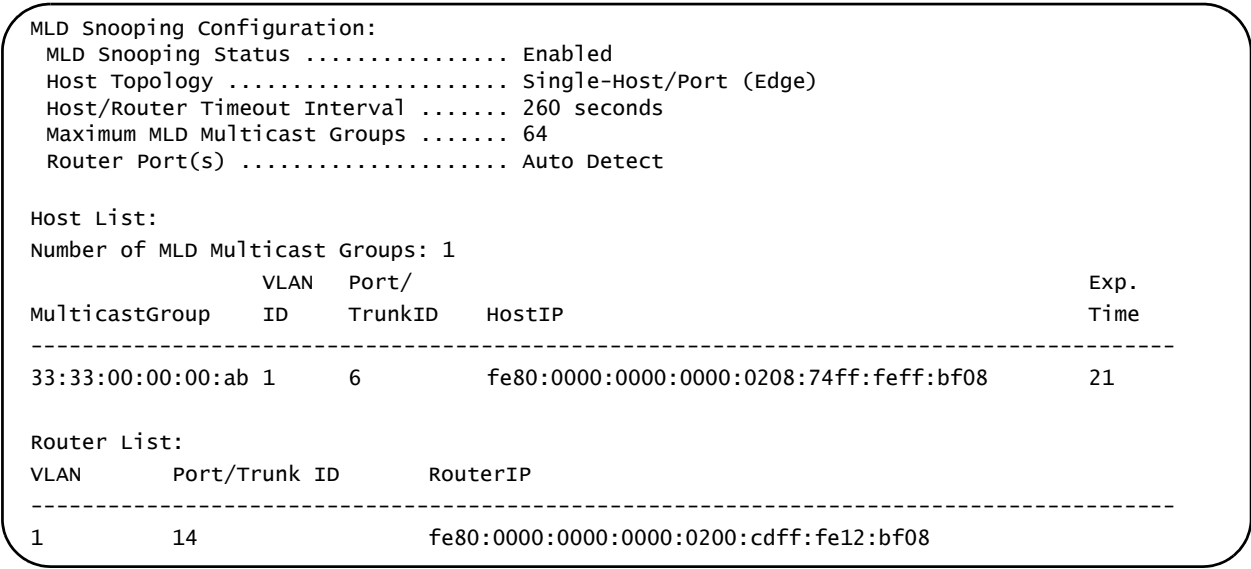


Figure 34. SHOW MLDSNOOPING Command

The parameters in the MLD Snooping Configuration section are explained “SET IPV6 MLDSNOOPING” on page 360.

The Host List section displays the following information:

- ❑ Multicast Group - The multicast address of the group.
- ❑ VLAN - The VID of the VLAN where the port is an untagged member.
- ❑ Port/TrunkID - The port on the switch where the host node is connected. If the host node is connected to the switch through a trunk, the trunk ID number, not the port number, is displayed.
- ❑ HostIP - The IP address of the host node connected to the port.
- ❑ Exp. Time - The number of seconds remaining before the host is timed out if no further MLD reports are received from it.

The Router List section displays this information:

- ❑ VLAN - The VID of the VLAN in which the port is an untagged member.
- ❑ Port/Trunk ID - The port on the switch where the multicast router is connected. If the switch learned the router on a port trunk, the trunk ID number, not the port number, is displayed.
- ❑ Router IP - The IP address of the multicast router.

Example

The following command displays the current MLD parameter settings, along with the host and router lists:

```
show mldsnooping
```

Equivalent Command

```
show ipv6 mldsnooping hostlist routerlist
```

For information, see “SHOW IPV6 MLDSNOOPING” on page 364.

SHOW IPV6 MLDSNOOPING

Syntax

show ipv6 mldsnooping [hostlist] [routerlist]

Parameters

hostlist	Displays a list of the multicast groups learned by the switch, as well as the ports on the switch that are connected to host nodes. This parameter displays information only when there are active host nodes.
routerlist	Displays the ports on the switch where multicast routers are detected. This parameter displays information only when there are active multicast routers.

Description

This command displays the following MLD parameters:

- ❑ MLD snooping status
- ❑ Multicast host topology
- ❑ Host/router timeout interval
- ❑ Maximum multicast groups
- ❑ Multicast router port(s)
- ❑ Host and router lists

For instructions on how to set the MLD parameters, refer to “SET IPV6 MLDSNOOPING” on page 360.

This command without optional parameters displays the information in Figure 35.

MLD Snooping Configuration:

MLD Snooping Status	Enabled
Host Topology	Single-Host/Port (Edge)
Host/Router Timeout Interval	260 seconds
Maximum MLD Multicast Groups	64
Router Port(s)	Auto Detect

Figure 35. SHOW IPV6 MLDSNOOPING Command

Refer to “SET IPV6 MLDSNOOPING” on page 360 for an explanation of the parameters.

The HOSTLIST option displays the information in Figure 36.

Host List:				
Number of MLD Multicast Groups: 1				
MulticastGroup	VLAN ID	Port/TrunkID	HostIP	Exp. Time
33:33:00:00:00:ab	1	6	fe80:0000:0000:0000:0208:74ff:feff:bf08	21

Figure 36. SHOW IPV6 MLDSNOOPING Command with HOSTLIST Option

The information is described here:

- ❑ Multicast Group - The multicast address of the group.
- ❑ VLAN - The VID of the VLAN where the port is an untagged member.
- ❑ Port/TrunkID - The port on the switch where the host node is connected. If the host node is connected to the switch through a trunk, the trunk ID number, not the port number, is displayed.
- ❑ HostIP - The IP address of the host node connected to the port.
- ❑ Exp. Time - The number of seconds remaining before the host is timed out if no further MLD reports are received from it.

The ROUTERLIST option displays the information in Figure 37.

Router List:		
VLAN	Port/Trunk ID	RouterIP
1	14	fe80:0000:0000:0000:0200:cdff:fe12:bf08

Figure 37. SHOW IPV6 MLDSNOOPING Command with ROUTERLIST Option

The information displayed by the option is described here:

- ❑ VLAN - The VID of the VLAN in which the port is an untagged member.
- ❑ Port/Trunk ID - The port on the switch where the multicast router is connected. If the switch learned the router on a port trunk, the trunk ID number, not the port number, is displayed.
- ❑ Router IP - The IP address of the multicast router.

Examples

The following command displays the current MLD parameter settings:

```
show ipv6 mldsnooping
```

The following command displays a list of active host nodes connected to the switch:

```
show ipv6 mldsnooping hostlist
```

The following command displays a list of active multicast routers:

```
show ipv6 mldsnooping routerlist
```

Equivalent Command

```
show mldsnooping
```

For information, see “SHOW MLDSNOOPING” on page 362.

Chapter 22

RRP Snooping Commands

This chapter contains the following commands:

- ❑ “DISABLE RRPSNOOPING” on page 368
- ❑ “ENABLE RRPSNOOPING” on page 369
- ❑ “SHOW RRPSNOOPING” on page 370

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE RRPSNOOPING

Syntax

```
disable rrpsnooping
```

Parameters

None.

Description

This command disables RRP snooping. This is the default setting.

Example

The following command disables RRP snooping:

```
disable rrpsnooping
```


ENABLE RRPSNOOPING

Syntax

```
enable rrpsnooping
```

Parameters

None.

Description

This command enables RRP snooping.

Example

The following command activates RRP snooping on the switch:

```
enable rrpsnooping
```

SHOW RRPSNOOPING

Syntax

```
show rrpsnooping
```

Parameter

None.

Description

This command displays the status of RRP snooping, enabled or disabled.

Example

The following command displays the status of RRP snooping:

```
show rrpsnooping
```

EPSR Snooping Commands

This chapter contains the following commands:

- ❑ “DISABLE EPSRSNOOPING” on page 372
- ❑ “ENABLE EPSRSNOOPING” on page 373
- ❑ “SHOW EPSRSNOOPING” on page 374

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE EPSRSNOOPING

Syntax

```
disable epsrsnooping [controlvlan=vid|vlan_name|all]
```

Parameter

controlvlan	Specifies the control VLAN where Ethernet Protected Switching Ring (EPSR) snooping is to be disabled. The VLAN can be identified by its VID or name. A VLAN name is case-sensitive. To disable EPSR snooping on all the control VLANs on the switch, either omit this parameter or specify ALL.
-------------	---

Description

This command disables EPSR snooping on a control VLAN.

Note

Do not disable EPSR on a control VLAN on the master and transit nodes without first disconnecting one of the network cables that form the ring. Without EPSR, your network's performance could be adversely affected from the loop in the network topology.

Example

This command disables EPSR snooping on the VLAN with the VID 22:

```
disable epsrsnooping controlvlan=22
```

This command disables EPSR snooping on all the controls VLANs on the switch:

```
disable epsrsnooping controlvlan=all
```

ENABLE EPSRSNOOPING

Syntax

```
enable epsrsnooping controlvlan=vid|vlan_name
```

Parameter

controlvlan	Specifies the control VLAN where Ethernet Protected Switching Ring (EPSR) snooping is to be enabled. The VLAN can be identified by its VID or name. A VLAN name is case-sensitive. You can specify only one control VLAN at a time with this command.
-------------	---

Description

This command activates EPSR snooping on a control VLAN.

Example

This command activates EPSR snooping on the control VLAN with the VID 4:

```
enable epsrsnooping controlvlan=4
```

SHOW EPSRSNOOPING

Syntax

```
show epsrsnooping
```

Parameter

None.

Description

This command displays the status of EPSR snooping.

Example

```
show epsrsnooping
```

Section IV

SNMPv3

This section has the following chapter:

- ❑ Chapter 24, “SNMPv3 Commands” on page 377

SNMPv3 Commands

This chapter contains the following commands:

- ❑ “ADD SNMPV3 USER” on page 379
- ❑ “CREATE SNMPV3 ACCESS” on page 381
- ❑ “CREATE SNMPV3 COMMUNITY” on page 384
- ❑ “CREATE SNMPV3 GROUP” on page 386
- ❑ “CREATE SNMPV3 NOTIFY” on page 388
- ❑ “CREATE SNMPV3 TARGETADDR” on page 390
- ❑ “CREATE SNMPV3 TARGETPARAMS” on page 392
- ❑ “CREATE SNMPV3 VIEW” on page 394
- ❑ “DELETE SNMPV3 USER” on page 396
- ❑ “DESTROY SNMPv3 ACCESS” on page 397
- ❑ “DESTROY SNMPv3 COMMUNITY” on page 399
- ❑ “DESTROY SNMPv3 GROUP” on page 400
- ❑ “DESTROY SNMPv3 NOTIFY” on page 401
- ❑ “DESTROY SNMPv3 TARGETADDR” on page 402
- ❑ “DESTROY SNMPv3 TARGETPARMS” on page 403
- ❑ “DESTROY SNMPV3 VIEW” on page 404
- ❑ “PURGE SNMPV3 ACCESS” on page 405
- ❑ “PURGE SNMPV3 COMMUNITY” on page 406
- ❑ “PURGE SNMPV3 NOTIFY” on page 407
- ❑ “PURGE SNMPV3 TARGETADDR” on page 408
- ❑ “PURGE SNMPV3 VIEW” on page 409
- ❑ “SET SNMPV3 ACCESS” on page 410
- ❑ “SET SNMPV3 COMMUNITY” on page 412
- ❑ “SET SNMPV3 GROUP” on page 414
- ❑ “SET SNMPV3 NOTIFY” on page 416
- ❑ “SET SNMPV3 TARGETADDR” on page 418
- ❑ “SET SNMPV3 TARGETPARAMS” on page 420
- ❑ “SET SNMPV3 USER” on page 422
- ❑ “SET SNMPV3 VIEW” on page 424

- ❑ “SHOW SNMPV3 ACCESS” on page 426
- ❑ “SHOW SNMPV3 COMMUNITY” on page 427
- ❑ “SHOW SNMPv3 GROUP” on page 428
- ❑ “SHOW SNMPV3 NOTIFY” on page 429
- ❑ “SHOW SNMPV3 TARGETADDR” on page 430
- ❑ “SHOW SNMPV3 TARGETPARAMS” on page 431
- ❑ “SHOW SNMPV3 USER” on page 432
- ❑ “SHOW SNMPV3 VIEW” on page 433

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD SNMPV3 USER

Syntax

```
add snmpv3 user=user [authentication=md5|sha]
authpassword=password privpassword=password
[storagetype=volatile|nonvolatile]
```

Parameters

user	Specifies the name of an SNMPv3 user, up to 32 alphanumeric characters.				
authentication	Specifies the authentication protocol that is used to authenticate this user with an SNMP entity (manager or NMS). If you do not specify an authentication protocol, this parameter is automatically set to None. The options are: <table> <tr> <td>md5</td><td>The MD5 authentication protocol. SNMPv3 Users are authenticated with the MD5 authentication protocol after a message is received.</td></tr> <tr> <td>sha</td><td>The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.</td></tr> </table> Note: You must specify the authentication protocol before you specify the authentication password.	md5	The MD5 authentication protocol. SNMPv3 Users are authenticated with the MD5 authentication protocol after a message is received.	sha	The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.
md5	The MD5 authentication protocol. SNMPv3 Users are authenticated with the MD5 authentication protocol after a message is received.				
sha	The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.				
authpassword	Specifies a password for the authentication protocol, up to 32 alphanumeric characters. If you specify an authentication protocol, then you must configure an authentication protocol password.				
privpassword	Specifies a password for the 3DES privacy, or encryption protocol, up to 32 alphanumeric characters. This is an optional parameter. Note: If you specify a privacy password, the privacy protocol is set to DES. You must also specify an authentication protocol and password.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table</td></tr> </table>	volatile	Does not allow you to save the table		
volatile	Does not allow you to save the table				

entry to the configuration file on the switch. This is the default.

nonvolatile Allows you to save the table entry to the configuration file on the switch.

Description

This command creates an SNMPv3 User Table entry.

Examples

The following command creates an SNMPv3 user with the name “steven142” with an authentication protocol of MD5, an authentication password of “99doublesecret12”, a privacy password of “encrypt178” and a storage type of nonvolatile.

```
add snmpv3 user=steven142 authentication=md5
authpassword=99doublesecret12 privpassword=encrypt178
storagetype=nonvolatile
```

The following command creates an SNMPv3 user with the name “77hoa” an authentication protocol of SHA, an authentication password of “youvegottobekidding88” and a storage type of nonvolatile.

```
add snmpv3 user=77hoa authentication=sha
authpassword=youvegottobekidding88 storagetype=nonvolatile
```

CREATE SNMPV3 ACCESS

Syntax

```
create snmpv3 access=access [securitymodel=v1|v2c|v3]
[securitylevel=noauthentication|authentication|
privacy] readview=readview writeview=writeview
notifyview=notifyview [storagetype=volatile|nonvolatile]
```

Parameters

access	Specifies the name of the security group, up to 32 alphanumeric characters.
securitymodel	Specifies the security model. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.
securitylevel	Specifies the security level. The options are: - noauthentication This option provides no authentication protocol and no privacy protocol. - authentication This option provides an authentication protocol, but no privacy protocol.
privacy	This option provides an authentication protocol and the privacy protocol.
readview	Specifies a Read View Name that allows the users assigned to this Group Name to view the information specified by the View Table entry. This is an optional parameter. If you do not assign a value to this parameter, then the readview parameter defaults to none.
writeview	Specifies a Write View Name that allows the users assigned to this Security Group to write, or modify, the information in the specified View Table. This is an optional parameter. If you do not assign a value to this parameter, then the writeview parameter

defaults to none.

notifyview	Specifies a Notify View Name that allows the users assigned to this Group Name to send traps permitted in the specified View. This is an optional parameter. If you do not assign a value to this parameter, then the notifyview parameter defaults to none.	
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:	
	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
	nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command creates an SNMPv3 Access Table entry.

Examples

The following command creates a security group called “testengineering” with a security model of SNMPv3 and a security level of privacy. The security group has a read view named “internet,” a write view named private, and a notify view named “internet.” The storage type is nonvolatile storage.

```
create snmpv3 access=testengineering securitymodel=v3
securitylevel=privacy readview=internet writeview=private
notifyview=internet storage=nonvolatile
```

The following command creates a security group called “swengineering” with a security model of SNMPv3 and a security level of authentication. In addition, the security group has a read view named “internet,” a write view named experimental, and a notify view named “mgmt” (management). The storage type group is nonvolatile storage.

```
create snmpv3 access=swengineering securitymodel=v3
securitylevel=authentication readview=internet
writeview=experimental notifyview=mgmt storage=nonvolatile
```

The following command creates a security group called “hwengineering” with a security model of SNMPv3 and a security level of noauthentication. In addition, the security group has a read view named “internet.”

```
create snmpv3 access=hwengineering securitymodel=v3
securitylevel=authentication readview=internet
```

Note

In the above example, the storage type has not been specified. As a result, the storage type for the hwengineering security group is volatile storage.

CREATE SNMPV3 COMMUNITY

Syntax

```
create snmpv3 community index=index
communityname=communityname securityname=securityname
transporttag=transporttag
[storagetype=volatile|nonvolatile]
```

Parameters

index	Specifies the name of this SNMPv3 Community Table entry, up to 32 alphanumeric characters.				
communityname	Specifies a password for this community entry, up to 32 alphanumeric characters.				
securityname	Specifies the name of an SNMPv1 and SNMPv2 user, up to 32 alphanumeric characters.				
transporttag	Specifies the transport tag, up to 32 alphanumeric characters. This is an optional parameter.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command creates an SNMPv3 Community Table entry.

Examples

The following command creates an SNMP community with an index of 1213 and a community name of “sunnyvale145.” The user is “chitra34” and the transport tag is “testengtag.” The storage type for this community is nonvolatile storage.

```
create snmpv3 community index=1213
communityname=sunnyvale145 securityname=chitra34
transporttag=testengtag storagetype=nonvolatile
```


The following command creates an SNMP community with an index of 95 and a community name of "12sacramento49." The user is "regina" and the transport tag "trainingtag." The storage type for this community is nonvolatile storage.

```
create snmpv3 community index=95  
communityname=12sacramento49 securityname=regina  
transporttag=trainingtag storagetype=nonvolatile
```

CREATE SNMPV3 GROUP

Syntax

```
create snmpv3 group username=username
[securitymodel=v1|v2c|v3] groupname=groupname
[storagetype=volatile|nonvolatile]
```

Parameter

username	Specifies a user name configured in the SNMPv3 User Table.						
securitymodel	Specifies the security model of the above user name. The options are: <table> <tr> <td>v1</td><td>Associates the Security Name, or User Name, with the SNMPv1 protocol.</td></tr> <tr> <td>v2c</td><td>Associates the Security Name, or User Name, with the SNMPv2c protocol.</td></tr> <tr> <td>v3</td><td>Associates the Security Name, or User Name, with the SNMPv3 protocol.</td></tr> </table>	v1	Associates the Security Name, or User Name, with the SNMPv1 protocol.	v2c	Associates the Security Name, or User Name, with the SNMPv2c protocol.	v3	Associates the Security Name, or User Name, with the SNMPv3 protocol.
v1	Associates the Security Name, or User Name, with the SNMPv1 protocol.						
v2c	Associates the Security Name, or User Name, with the SNMPv2c protocol.						
v3	Associates the Security Name, or User Name, with the SNMPv3 protocol.						
groupname	Specifies a group name configured in the SNMPv3 Access Table with the access parameter. See “CREATE SNMPV3 ACCESS” on page 381.						
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.		
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.						
nonvolatile	Allows you to save the table entry to the configuration file on the switch.						

Description

This command creates an SNMPv3 SecurityToGroup Table entry.

Examples

The following command creates the SNMPv3 SecurityToGroup Table entry for a user named Nancy. The security model is set to the SNMPv3 protocol. The group name, or security group, for this user is the “admin” group. The storage type is set to nonvolatile storage.

```
create snmpv3 group username=Nancy securitymodel=v3  
groupname=admin storagetype=nonvolatile
```

The following command creates the SNMPv3 SecurityToGroup Table entry for a user named princess. The security model is set to the SNMPv3 protocol. The group name, or security group, for this user is the “training” group. The storage type is set to nonvolatile storage.

```
create snmpv3 group username=princess securitymodel=v3  
groupname=training storagetype=nonvolatile
```

CREATE SNMPV3 NOTIFY

Syntax

```
create snmpv3 notify=notify tag=tag [type=trap|inform]
[storagetype=volatile|nonvolatile]
```

Parameters

notify	Specifies the name of an SNMPv3 Notify Table entry, up to 32 alphanumeric characters.				
tag	Specifies the notify tag name, up to 32 alphanumeric characters. This is an optional parameter.				
type	Specifies the message type. This is an optional parameter. The options are: <table> <tr> <td>trap</td><td>Trap messages are sent, with no response expected from another entity (NMS or manager). This is the default.</td></tr> <tr> <td>inform</td><td>Inform messages are sent, with a response expected from another entity (NMS or manager).</td></tr> </table>	trap	Trap messages are sent, with no response expected from another entity (NMS or manager). This is the default.	inform	Inform messages are sent, with a response expected from another entity (NMS or manager).
trap	Trap messages are sent, with no response expected from another entity (NMS or manager). This is the default.				
inform	Inform messages are sent, with a response expected from another entity (NMS or manager).				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command creates an SNMPv3 Notify Table entry.

Examples

The following command creates the SNMPv3 Notify Table entry called “testengtrap1” and the notify tag is “testengtag1.” The message type is defined as a trap message and the storage type for this entry is nonvolatile storage.

```
create snmpv3 notify=testengtrap1 tag=testengtag1 type=trap
storagetype=nonvolatile
```

The following command creates the SNMPv3 Notify Table entry called "testenginform5" and the notify tag is "testenginformtag5." The message type is defined as an inform message and the storage type for this entry is nonvolatile storage.

```
create snmpv3 notify=testenginform5 tag=testenginformtag5  
type=inform storagetype=nonvolatile
```

CREATE SNMPV3 TARGETADDR

Syntax

```
create snmpv3 targetaddr=targetaddr params=params
ipaddress=ipaddress udpport=udpport timeout=timeout
retries=retries taglist=taglist
[storagetype=volatile|nonvolatile]
```

Parameters

targetaddr	Specifies the name of the SNMP manager, or host, that manages the SNMP activity on the switch, up to 32 alphanumeric characters.				
params	Specifies the target parameters name, up to 32 alphanumeric characters.				
ipaddress	Specifies the IP address of the host.				
udpport	Specifies the UDP port in the range of 0 to 65535. The default UDP port is 162. This is an optional parameter.				
timeout	Specifies the timeout value in milliseconds. The range is 0 to 2,147,483,647 milliseconds, and the default is 1500 milliseconds. This is an optional parameter.				
retries	Specifies the number of times the switch resends an inform message. The default is 3. This is an optional parameter.				
taglist	Specifies a tag or list of tags, up to 256 alphanumeric characters. Use a space to separate entries. This is an optional parameter.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command creates an SNMPv3 Target Address Table entry.

Examples

In the following command, the name of the Target Address Table entry is "snmphost1." In addition, the params parameter is assigned to "snmpv3manager" and the IP address is 198.1.1.1. The tag list consists of "swengtag," "hwengtag," and "testengtag." The storage type for this table entry is nonvolatile storage.

```
create snmpv3 targetaddr=snmphost1 params=snmpv3manager  
ipaddress=198.1.1.1 taglist=swengtag hwengtag testengtag  
storagetype=nonvolatile
```

In the following command, the name of the Target Address Table entry is snmphost99. The params parameter is "snmpmanager7" and the IP address is 198.1.2.2. The tag list is "trainingtag." The storage type for this table entry is nonvolatile storage.

```
create snmpv3 targetaddr=snmphost99 params=snmpmanager7  
ipaddress=198.1.2.2 taglist=trainingtag  
storagetype=nonvolatile
```

CREATE SNMPV3 TARGETPARAMS

Syntax

```
create snmpv3 targetparams=targetparams username=username
[securitymodel=v1|v2c|v3] [messageprocessing=v1|v2c|v3]
[securitylevel=noauthentication|authentication|
privacy] [storagetype=volatile|nonvolatile]
```

Parameters

targetparams	Specifies the name of the SNMPv3 Target Parameters Table entry, up to 32 alphanumeric characters.
username	Specifies a user name configured in the SNMPv3 User Table.
securitymodel	Specifies the security model of the above user name. The options are: - v1 Associates the User Name, or Security Name, with the SNMPv1 protocol. - v2c Associates the User Name, or Security Name, with the SNMPv2c protocol. - v3 Associates the User Name, or Security Name, with the SNMPv3 protocol.
messageprocessing	Specifies the SNMP protocol that is used to process, or send messages. Configure this parameter only if you have selected the SNMPv1 or SNMPv2c protocols as the security model. If you have selected the SNMPv3 protocol as the security model, message processing is automatically set to the SNMPv3 protocol. The options are: - v1 Messages are processed with the SNMPv1 protocol. - v2c Messages are processed with the SNMPv2c protocol. - v3 Messages are processed with the SNMPv3 protocol.

securitylevel	Specifies the security level. The options are:	
	noauthentication	This option provides no authentication protocol and no privacy protocol.
	authentication	This option provides an authentication protocol, but no privacy protocol.
	privacy	This option provides an authentication protocol and the privacy protocol.
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:	
	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
	nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command creates an SNMPv3 Target Parameters Table entry.

Examples

In the following command, the Target Parameters Table entry is called “snmpv3mgr13” and user name is “user444.” The security model is set to the SNMPv3 protocol. In addition, the security level is set to privacy and the storage type is nonvolatile.

```
create snmpv3 targetparams=snmpv3mgr13 username=user444
securitymodel=v3 securitylevel=privacy
storagetype=nonvolatile
```

In the following command, the Target Parameters Table entry is called “snmpmanager” and the user name is “pat365.” The security model is set to SNMPv3 protocol. In addition, the security level is set to authentication and the storage type is nonvolatile.

```
create snmpv3 targetparams=snmpmanager username=pat365
securitymodel=v3 securitylevel=authentication
storagetype=nonvolatile
```

CREATE SNMPV3 VIEW

Syntax

```
create snmpv3 view=view [subtree=OID|text] mask=mask  
[type=included|excluded]  
[storagetype=volatile|nonvolatile]
```

Parameters

view	Specifies the name of the view, up to 32 alphanumeric characters.	
subtree	Specifies the view of the MIB Tree. The options are:	
	OID	A numeric value in hexadecimal format.
	text	Text name of the view.
mask	Specifies the subtree mask, in hexadecimal format.	
type	Specifies the view type. This is an optional parameter. The options are:	
	included	Permits a user to view the specified subtree. This is the default.
	excluded	Does not permit a user to view the specified subtree.
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:	
	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
	nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command creates an SNMPv3 View Table entry.

Examples

The following command creates an SNMPv3 View Table entry called “internet1” with a subtree value of the Internet MIBs and a view type of included. The storage type for this table entry is nonvolatile storage.

```
create snmpv3 view=internet1 subtree=internet type=included  
storagetype=nonvolatile
```

The following command creates an SNMPv3 View Table entry called "tcp1" with a subtree value of the TCP/IP MIBs and a view type of excluded. The storage type for this table entry is nonvolatile storage.

```
create snmpv3 view=tcp1 subtree=tcp type=excluded  
storagetype=nonvolatile
```

DELETE SNMPV3 USER

Syntax

```
delete snmpv3 user=user
```

Parameters

user	Specifies the name of an SNMPv3 user to delete from the switch.
------	---

Description

This command deletes an SNMPv3 User Table entry. After you delete an SNMPv3 user from the switch, you cannot recover it.

Examples

The following command deletes the user named “wilson890.”

```
delete snmpv3 user=wilson890
```

The following command deletes the user named “75murthy75.”

```
delete snmpv3 user=75murthy75
```

DESTROY SNMPv3 ACCESS

Syntax

```
destroy snmpv3 access=access [securitymodel=v1|v2c|v3]
[securitylevel=noauthentication|authentication|
privacy]
```

Parameter

access	Specifies an SNMPv3 Access Table entry.
securitymodel	Specifies the security model of the user name specified above. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.
securitylevel	Specifies the security level. The options are: - noauthentication This option provides no authentication protocol and no privacy protocol. - authentication This option provides an authentication protocol, but no privacy protocol. - privacy This option provides an authentication protocol and the privacy protocol.

Description

This command deletes an SNMPv3 Access Table entry. After you delete an SNMPv3 Access Table entry, you cannot recover it.

Examples

The following command deletes the SNMPv3 Access Table entry called "swengineering" with a security model of the SNMPv3 protocol and a security level of authentication.

```
destroy snmpv3 access=swengineering securitymodel=v3  
securitylevel=authentication
```

The following command deletes the SNMPv3 Access Table entry called “testengineering” with a security model of the SNMPv3 protocol and a security level of privacy.

```
destroy snmpv3 access=testengineering securitymodel=v3  
securitylevel=privacy
```

DESTROY SNMPv3 COMMUNITY

Syntax

```
destroy snmpv3 community index=index
```

Parameter

index	Specifies the name of this SNMPv3 Community Table entry, up to 32 alphanumeric characters.
-------	--

Description

This command deletes an SNMPv3 Community Table entry. After you delete an SNMPv3 Community Table entry, you cannot recover it.

Examples

The following command deletes an SNMPv3 Community Table entry with an index of 1001.

```
destroy snmpv3 community index=1001
```

The following command deletes an SNMPv3 Community Table entry with an index of 5.

```
destroy snmpv3 community index=5
```

DESTROY SNMPv3 GROUP

Syntax

```
destroy snmpv3 group username=username  
[securitymodel=v1|v2c|v3]
```

Parameter

username	Specifies a user name configured in the SNMPv3 User Table.
securitymodel	Specifies the security model of the above user name. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.

Description

This command deletes an SNMPv3 SecurityToGroup Table entry. After you delete an SNMPv3 SecurityToGroup Table entry, you cannot recover it.

Examples

The following command deletes an SNMPv3 User Table entry for a user called Dave with an security model of the SNMPv3 protocol:

```
destroy snmpv3 group username=Dave securitymodel=v3
```

The following command deletes an SNMPv3 User Table entry for a user called May with an security model of the SNMPv3 protocol:

```
destroy snmpv3 group username=May securitymodel=v3
```


DESTROY SNMPv3 NOTIFY

Syntax

```
destroy snmpv3 notify=notify
```

Parameter

notify Specifies an SNMPv3 Notify Table entry.

Description

This command deletes an SNMPv3 Notify Table entry. After you delete an SNMPv3 Notify Table entry, you cannot recover it.

Examples

The following command deletes an SNMPv3 Notify Table entry called "systemtestnotifytrap."

```
destroy snmpv3 notify=systemtestnotifytrap
```

The following command deletes an SNMPv3 Notify Table entry called "engineeringinform1."

```
destroy snmpv3 notify=engineeringinform1
```

DESTROY SNMPv3 TARGETADDR

Syntax

```
destroy snmpv3 targetaddr=target
```

Parameter

targetaddr Specifies an SNMPv3 Target Address table entry.

Description

This command deletes an SNMPv3 Target Address Table entry. After you delete an SNMPv3 Target Address Table entry, you cannot recover it.

Example

The following command deletes an SNMPv3 Address Table entry called “snmpmanager.”

```
destroy snmpv3 targetaddr=snmpmanager
```

DESTROY SNMPv3 TARGETPARMS

Syntax

```
destroy snmpv3 targetparams=targetparams
```

Parameter

targetparams	Specifies an SNMPv3 Target Parameters table entry.
--------------	--

Description

This command deletes an SNMPv3 Target Parameters Table entry. After you delete an SNMPv3 Target Parameters Table entry, you cannot recover it.

Examples

The following command deletes the SNMPv3 Target Parameters Table entry called "targetparameter1."

```
destroy snmpv3 targetparams=targetparameter1
```

The following command deletes the SNMPv3 Target Parameters Table entry called "snmpmanager."

```
destroy snmpv3 targetparams=snmpmanager
```

DESTROY SNMPV3 VIEW

Syntax

```
destroy snmpv3 view=view [subtree=OID|text]
```

Parameters

view	Specifies the name of the view, up to 32 alphanumeric characters.
subtree	Specifies the view subtree view. The options are: OID A numeric value in hexadecimal format. text Text name of the view.

Description

This command deletes an SNMPv3 View Table entry. After you delete an SNMPv3 View Table entry, you cannot recover it.

Examples

The following command deletes the SNMPv3 View Table entry named “experimental.” The subtree value of this table entry is experimental.

```
destroy snmpv3 view=experimental subtree=experimental
```

The following command deletes the SNMPv3 View Table entry named “directory.” The subtree value of this table entry is 1.3.6.1.3.

```
destroy snmpv3 view=directory subtree=1.3.6.1.3
```

PURGE SNMPV3 ACCESS

Syntax

```
purge snmpv3 access
```

Parameters

None

Description

This command resets the SNMPv3 Access Table to its default value by removing all the access table entries. To remove a single entry, use “DESTROY SNMPv3 ACCESS” on page 397.

Example

The following example removes all the SNMPv3 Access Table entries:

```
purge snmpv3 access
```

PURGE SNMPV3 COMMUNITY

Syntax

```
purge snmpv3 community
```

Parameters

None

Description

This command resets the SNMPv3 Community Table to its default value by removing all the community table entries. To remove a single entry, use “DESTROY SNMPv3 COMMUNITY” on page 399.

Example

The following example removes all the SNMPv3 Community Table entries:

```
purge snmpv3 community
```

PURGE SNMPV3 NOTIFY

Syntax

```
purge snmpv3 notify
```

Parameters

None

Description

This command resets the SNMPv3 Notify Table to its default value by removing all the notify table entries. To remove a single entry, use “DESTROY SNMPv3 NOTIFY” on page 401.

Example

The following example removes all the entries from the SNMPv3 Notify Table:

```
purge snmpv3 notify
```

PURGE SNMPV3 TARGETADDR

Syntax

```
purge snmpv3 targetaddr
```

Parameters

None

Description

This command resets the SNMPv3 Target Address Table to its default values by removing all the target address table entries. To remove a single entry, use “DESTROY SNMPv3 TARGETADDR” on page 402.

Example

The following example removes all the entries from the SNMPv3 Target Address Table:

```
purge snmpv3 targetaddr
```


PURGE SNMPV3 VIEW

Syntax

```
purge snmpv3 view
```

Parameters

None

Description

This command resets the SNMPv3 View Table to its default values by removing all the view table entries. To remove a single entry, use “DESTROY SNMPV3 VIEW” on page 404.

Example

The following example removes all the entries from the SNMPv3 View Table:

```
purge snmpv3 view
```

SET SNMPV3 ACCESS

Syntax

```
set snmpv3 access=access [securitymodel=v1|v2c|v3
[securitylevel=noauthentication|authentication|
privacy] readview=readview writeview=writeview
notifyview=notifyview [storagetype=volatile|nonvolatile]
```

Parameters

access	Specifies the name of the group, up to 32 alphanumeric characters.
securitymodel	Specifies the security model. Options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.
securitylevel	Specifies the security level. The options are: - noauthentication This option provides no authentication protocol and no privacy protocol. - authentication This option provides an authentication protocol, but no privacy protocol. - privacy This option provides an authentication protocol and the privacy protocol.
readview	Specifies a Read View Name that allows the users assigned to this Group Name to view the information specified by the View Table entry.
writeview	Specifies a Write View Name that allows the users assigned to this Security Group to write, or modify, the information in the specified View Table.
notifyview	Specifies a Notify View Name that allows the users assigned to this Group Name to send traps permitted in the specified View.

storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:	
	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
	nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command modifies an SNMPv3 Access Table entry.

Examples

The following command modifies the group called engineering. The new read view is the Internet MIBs and the storage type is volatile storage.

```
set snmpv3 access=engineering securitymodel=v3
securitylevel=authentication readview=internet
storagetype=volatile
```

The following command modifies the group called training. The read view, write view, and notify view are set to the Internet MIBs. The storage type is nonvolatile storage.

```
set snmpv3 access=training securitymodel=v3
securitylevel=privacy readview=internet writeview=internet
notifyview=internet storagetype=nonvolatile
```

SET SNMPV3 COMMUNITY

Syntax

```
set snmpv3 community index=index communityname=communityname
securityname=securityname transporttag=transporttag
[storagetype=volatile|nonvolatile]
```

Parameters

index	Specifies the name of this SNMPv3 Community Table entry, up to 32 alphanumeric characters.				
communityname	Specifies a password of this community, up to 32 alphanumeric characters.				
securityname	Specifies the name of an SNMPv1 and SNMPv2 user, up to 32 alphanumeric characters.				
transporttag	Specifies the transport tag, up to 32 alphanumeric characters.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command modifies an SNMPv3 Community Table entry.

Examples

The following command modifies the community table entry with an index of 1001. The community has a password of “secretpassword98” and a security name of “user451.” The transport tag is set to “sampletag4” and the storage type is set to nonvolatile storage.

```
set snmpv3 community index=1001
communityname=secretpassword98 securityname=user451
transporttag=sampletag4 storagetype=nonvolatile
```

The following command modifies the community table entry with an index of 52. The community has a password of “oldmiss71” and a security name of “jjhuser234.” The transport tag is set to “testtag40.”

```
set snmpv3 community index=52 communityname=oldmiss71  
securityname=jjhuser234 transporttag=testtag40
```

SET SNMPV3 GROUP

Syntax

```
set snmpv3 group username=username [securitymodel=v1|v2c|v3]
groupname=groupname [storagetype=volatile|nonvolatile]
```

Parameter

username	Specifies a user name configured in the SNMPv3 User Table.
securitymodel	Specifies the security model of the above user name. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.
groupname	Specifies a group name configured in the SNMPv3 Access Table.
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command modifies an SNMPv3 SecurityToGroup Table entry.

Examples

The following command modifies the SecurityToGroup Table entry with a user name of “nancy28.” The security model is the SNMPv3 protocol. and the group name is set to engineering.

```
set snmpv3 group username=nancy28 securitymodel=v3
groupname=engineering
```

The following command modifies the SecurityToGroup Table entry with a user name of "nelvid." The security model is the SNMPv3 protocol and the group name "systemtest."

```
set snmpv3 group username=nelvid securitymodel=v3  
groupname=systemtest
```

SET SNMPV3 NOTIFY

Syntax

```
set snmpv3 notify=notify tag=tag [type=trap|inform]
[storagetype=volatile|nonvolatile]
```

Parameters

notify	Specifies the name associated with the trap message, up to 32 alphanumeric characters.				
tag	Specifies the notify tag name, up to 32 alphanumeric characters.				
type	Specifies the message type. Options are: <table> <tr> <td>trap</td><td>Trap messages are sent, with no response expected from the host.</td></tr> <tr> <td>inform</td><td>Inform messages are sent, with a response expected from the host.</td></tr> </table>	trap	Trap messages are sent, with no response expected from the host.	inform	Inform messages are sent, with a response expected from the host.
trap	Trap messages are sent, with no response expected from the host.				
inform	Inform messages are sent, with a response expected from the host.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command modifies an SNMPv3 Notify Table entry.

Examples

The following command modifies an SNMPv3 Notify Table entry called “systemtesttrap2.” The notify tag is “systemtesttag2” and the message type is a trap message.

```
set snmpv3 notify=systemtesttrap2 tag=systemtesttag2
type=trap
```


The following command modifies an SNMPv3 Notify Table entry called "systemtestinform5." The notify tag is "systemtestinform5tag" and the message type is an inform message.

```
set snmpv3 notify=systemtestinform5 tag=systemtestinform5tag  
type=inform
```

SET SNMPV3 TARGETADDR

Syntax

```
set snmpv3 targetaddr=targetaddr params=params
ipaddress=ipaddress udpport=udpport timeout=timeout
retries=retries taglist=taglist
[storagetype=volatile|nonvolatile]
```

Parameters

targetaddr	Specifies the name of the SNMP entity (NMS or manager) that manages the SNMP activity on the switch, up to 32 alphanumeric characters.				
params	Specifies the target parameters name, up to 32 alphanumeric characters. This is an optional parameter.				
ipaddress	Specifies the IP address of the host. This is an optional parameter.				
udpport	Specifies the UDP port in the range of 0 to 65535. The default UDP port is 162. This is an optional parameter.				
timeout	Specifies the timeout value in milliseconds. The range is 0 to 2,147,483,647 milliseconds, and the default is 1500 milliseconds. This is an optional parameter.				
retries	Specifies the number of times the switch retries to send an inform message. The default is 3. This is an optional parameter.				
taglist	Specifies a tag or list of tags, up to 256 alphanumeric characters. Use a space to separate entries. This is an optional parameter.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command modifies an SNMPv3 Target Address Table entry.

Examples

The following command modifies the Target Address Table entry with a value of "snmphost." The params parameter is set to "targetparameter7" and the IP address is 198.1.1.1. The taglist is set to "systemtesttraptag" and "systemtestinformtag."

```
set snmpv3 targetaddr=snmphost params=targetparameter7  
ipaddress=198.1.1.1 taglist=systemtesttraptag  
systemtestinformtag
```

The following command modifies the Target Address Table entry with a value of "host." The params parameter is set to "targetparameter22" and the IP address is 198.1.1.198. The taglist is set to "engineeringtraptag" and "engineeringinformtag."

```
set snmpv3 targetaddr=host params=targetparameter22  
ipaddress=198.1.1.198 taglist=engineeringtraptag  
engineeringinformtag
```

SET SNMPV3 TARGETPARAMS

Syntax

```
set snmpv3 targetparams=targetparams username=username
[securitymodel=v1|v2c|v3] [messageprocessing=v1|v2c|v3]
[securitylevel=noauthentication|authentication|
privacy] [storagetype=volatile|nonvolatile]
```

Parameters

targetparams	Specifies the target parameters name, up to 32 alphanumeric characters.
username	Specifies the user name.
securitymodel	Specifies the security model of the above user name. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.
messageprocessing	Specifies the SNMP protocol that is used to process, or send messages. Configure this parameter only if you have selected the SNMPv1 or SNMPv2c protocols as the security model. If you have selected the SNMPv3 protocol as the security model, message processing is automatically set to the SNMPv3 protocol. The options are: - v1 Messages are processed with the SNMPv1 protocol. - v2c Messages are processed with the SNMPv2c protocol. - v3 Messages are processed with the SNMPv3 protocol.
securitylevel	Specifies the security level. The options are: noauthentication This option provides no authentication protocol and no privacy protocol.

authentication	This option provides an authentication protocol, but no privacy protocol.
privacy	This option provides an authentication protocol and the privacy protocol.
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are:
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.
nonvolatile	Allows you to save the table entry to the configuration file on the switch.

Description

This command modifies a Target Parameters Table entry.

Examples

The following command modifies the Target Parameters Table entry called "host23." The user name is "user7990" and the security model is the SNMPv3 protocol. The security level is set to the privacy level.

```
set snmpv3 targetparams=host23 username=loan1
securitymodel=v3 securitylevel=privacy
```

The following command modifies the Target Parameters Table entry called "manager9". The user name is "loan1" and the security model is the SNMPv3 protocol. The security level is set to the authentication protocol.

```
set snmpv3 targetparams=manager9 username=loan1
securitymodel=v3 securitylevel=authentication
```

SET SNMPV3 USER

Syntax

```
set snmpv3 user=user [authentication=md5|sha]
authpassword=password privpassword=password
[storagetype=volatile|nonvolatile]
```

Parameters

user	Specifies the name of an SNMPv3 user, up to 32 alphanumeric characters.				
authentication	Specifies the authentication protocol that is used to authenticate this user with an SNMPv3 entity (or NMS). The default is no authentication. The options are: <table> <tr> <td>md5</td><td>The MD5 authentication protocol. Users are authenticated with the MD5 authentication protocol after a message is received.</td></tr> <tr> <td>sha</td><td>The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.</td></tr> </table>	md5	The MD5 authentication protocol. Users are authenticated with the MD5 authentication protocol after a message is received.	sha	The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.
md5	The MD5 authentication protocol. Users are authenticated with the MD5 authentication protocol after a message is received.				
sha	The SHA authentication protocol. Users are authenticated with the SHA authentication protocol after a message is received.				
authpassword	Specifies a password for the authentication protocol, up to 32 alphanumeric characters.				
privpassword	Specifies a password for the 3DES privacy, or encryption protocol, up to 32 alphanumeric characters. Configuring a privacy protocol password, turns on the DES privacy protocol.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command modifies an SNMPv3 User Table entry.

Examples

The following command modifies a User Table entry called "atiuser104". The authentication protocol is set to the MD5 protocol and the authentication password is "atlanta45denver." The DES privacy protocol is on and the privacy password is "denvertoatlanta3."

```
set snmpv3 user=atiuser104 authentication=md5  
authpassword=atlanta45denver privpassword=denvertoatlanta3
```

The following command modifies a User Table entry called "atiuser104." The authentication protocol is set to the MD5 protocol and the authentication password is "nycbostonwash56." The privacy protocol is on and the privacy password is "bostontoamherst7." The storage type is set to nonvolatile storage.

```
set snmpv3 user=atiuser104 authentication=md5  
authpassword=nycbostonwash56 privpassword=bostontoamherst7  
storagetype=nonvolatile
```

SET SNMPV3 VIEW

Syntax

```
set snmpv3 view=view [subtree=OID|text] mask=mask
[type=included|excluded]
[storagetype=volatile|nonvolatile]
```

Parameters

view	Specifies the name of the view, up to 32 alphanumeric characters.				
subtree	Specifies the view subtree view. Options are: <table> <tr> <td>OID</td><td>A numeric value in hexadecimal format.</td></tr> <tr> <td>text</td><td>Text name of the view.</td></tr> </table>	OID	A numeric value in hexadecimal format.	text	Text name of the view.
OID	A numeric value in hexadecimal format.				
text	Text name of the view.				
mask	Specifies the subtree mask, in hexadecimal format.				
type	Specifies the view type. Options are: <table> <tr> <td>included</td><td>Permits the user assign to this View Name to see the specified subtree.</td></tr> <tr> <td>excluded</td><td>Does not permit the user assigned to this View Name to see the specified subtree.</td></tr> </table>	included	Permits the user assign to this View Name to see the specified subtree.	excluded	Does not permit the user assigned to this View Name to see the specified subtree.
included	Permits the user assign to this View Name to see the specified subtree.				
excluded	Does not permit the user assigned to this View Name to see the specified subtree.				
storagetype	Specifies the storage type of this table entry. This is an optional parameter. The options are: <table> <tr> <td>volatile</td><td>Does not allow you to save the table entry to the configuration file on the switch. This is the default.</td></tr> <tr> <td>nonvolatile</td><td>Allows you to save the table entry to the configuration file on the switch.</td></tr> </table>	volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.	nonvolatile	Allows you to save the table entry to the configuration file on the switch.
volatile	Does not allow you to save the table entry to the configuration file on the switch. This is the default.				
nonvolatile	Allows you to save the table entry to the configuration file on the switch.				

Description

This command modifies an SNMPv3 View Table entry.

Examples

The following command modifies the view called “internet1.” The subtree is set to the Internet MIBs and the view type is included.

```
set snmpv3 view=internet1 subtree=internet type=included
```


The following command modifies the view called system. The subtree is set to 1.3.6.1.2.1 (System MIBs) and the view type is excluded.

```
set snmpv3 view=system subtree=1.3.6.1.2.1 type=excluded
```

SHOW SNMPV3 ACCESS

Syntax

```
show snmpv3 access=access
```

Parameter

access Specifies an SNMPv3 Access Table entry.

Description

This command displays the SNMPv3 Access Table. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 Access Table entry called “production.”

```
show snmpv3 access=production
```

The following command displays all of the SNMPv3 Access Table entries:

```
show snmpv3 access
```

SHOW SNMPV3 COMMUNITY

Syntax

```
show snmpv3 community index=index
```

Parameter

index	Specifies the name of this SNMPv3 Community Table entry, up to 32 alphanumeric characters.
-------	--

Description

This command displays the SNMPv3 Community Table. You can display one or all of the SNMPv3 Community Table entries.

Examples

The following command displays the Community Table entry with an index of 246:

```
show snmpv3 community index=246
```

The following command displays all of the Community Table entries:

```
show snmpv3 community
```

SHOW SNMPv3 GROUP

Syntax

```
show snmpv3 group username=username  
[securitymodel=v1|v2c|v3]
```

Parameter

username	Specifies a user name configured in the SNMPv3 User Table.
securitymodel	Specifies the security model of the above user name. The options are: - v1 Associates the Security Name, or User Name, with the SNMPv1 protocol. - v2c Associates the Security Name, or User Name, with the SNMPv2c protocol. - v3 Associates the Security Name, or User Name, with the SNMPv3 protocol.

Description

This command displays SNMPv3 SecurityToGroup Table entries. You can display one or all of the table entries.

Example

The following command displays the SNMPv3 SecurityToGroup Table entry for a user named Dave who is assigned a security model of the SNMPv3 protocol.

```
show snmpv3 group username=Dave securitymodel=v3
```

The following command displays all of the SNMPv3 SecurityToGroup Table entries:

```
show snmpv3 group
```

SHOW SNMPV3 NOTIFY

Syntax

```
show snmpv3 notify=notify
```

Parameter

notify Specifies an SNMPv3 Notify Table entry.

Description

This command displays SNMPv3 Notify Table entries. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 Notify Table entry called "testengtrap1":

```
show snmpv3 notify=testengtrap1
```

The following command displays all of the SNMPv3 Notify Table entries:

```
show snmpv3 notify
```

SHOW SNMPV3 TARGETADDR

Syntax

```
show snmpv3 targetaddr=targetaddr
```

Parameter

targetaddr Specifies an SNMPv3 Target Address Table entry.

Description

This command displays SNMPv3 Target Address Table entries. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 Target Address Table entry called “snmpv3host55”:

```
show snmpv3 targetaddr=snmpv3host55
```

The following command displays all of the SNMPv3 Target Address Table entries:

```
show snmpv3 targetaddr
```

SHOW SNMPV3 TARGETPARAMS

Syntax

```
show snmpv3 targetparams=targetparams
```

Parameter

targetparams Specifies an SNMPv3 Target Parameters Table entry.

Description

This command displays SNMPv3 Target Parameters Table entries. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 Target Parameters Table entry called "snmpv3manager95":

```
show snmpv3 targetparams=snmpv3manager95
```

The following command displays all of the SNMPv3 Target Parameters Table entries:

```
show snmpv3 targetparams
```

SHOW SNMPV3 USER

Syntax

```
show snmpv3 user=user
```

Parameters

user Specifies the name of an SNMPv3 user, up to 32 alphanumeric characters.

Description

This command displays SNMPv3 User Table entries. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 User Table entry for a user name of Robert:

```
show snmpv3 user=Robert
```

The following command displays all of the SNMPv3 User Table entries:

```
show snmpv3 user
```


SHOW SNMPV3 VIEW

Syntax

```
show snmpv3 view=view [subtree=OID|text]
```

Parameter

view	Specifies an SNMPv3 View Table entry.
subtree	Specifies the view subtree view. Options are: OID A numeric value in hexadecimal format. text Text name of the view.

Description

This command displays the SNMPv3 View Table entries. You can display one or all of the table entries.

Examples

The following command displays the SNMPv3 View Table entry called "snmpv3manager95":

```
show snmpv3 targetparams=snmpv3manager95
```

The following command displays all the SNMPv3 View Table entries:

```
show snmpv3 targetparams
```


Section V

Spanning Tree Protocols

This section has the following chapters:

- ❑ Chapter 25, “Spanning Tree Protocol Commands” on page 437
- ❑ Chapter 26, “Rapid Spanning Tree Protocols Commands” on page 451
- ❑ Chapter 27, “Multiple Spanning Tree Protocol Commands” on page 465

Spanning Tree Protocol Commands

This chapter contains the following commands:

- ❑ “ACTIVATE STP” on page 438
- ❑ “DISABLE STP” on page 439
- ❑ “ENABLE STP” on page 440
- ❑ “PURGE STP” on page 441
- ❑ “SET STP” on page 442
- ❑ “SET STP PORT” on page 445
- ❑ “SET SWITCH MULTICASTMODE” on page 447
- ❑ “SHOW STP” on page 449

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ACTIVATE STP

Syntax

```
activate stp
```

Parameters

None.

Description

Use this command to designate STP as the active spanning tree on the switch. You cannot enable STP or configure its parameters until you have designated it as the active spanning tree with this command.

Only one spanning tree protocol, STP, RSTP, or MSTP, can be active on the switch at a time.

Example

The following command designates STP as the active spanning tree:

```
activate stp
```

DISABLE STP

Syntax

```
disable stp
```

Parameters

None.

Description

This command disables the Spanning Tree Protocol on the switch. The default setting for STP is disabled. To view the current status of STP, refer to “SHOW STP” on page 449.

Example

The following command disables STP:

```
disable stp
```

ENABLE STP

Syntax

```
enable stp
```

Parameters

None.

Description

This command enables the Spanning Tree Protocol on the switch. The default setting for STP is disabled. To view the current status of STP, refer to “SHOW STP” on page 449.

Note

You cannot enable STP until after you have activated it with “ACTIVATE STP” on page 438.

Example

The following command enables STP on the switch:

```
enable stp
```


PURGE STP

Syntax

```
purge stp
```

Parameters

None.

Description

This command returns all STP bridge and port parameters to the default settings. STP must be disabled in order for you to use this command. To disable STP, see “DISABLE STP” on page 439.

Example

The following command resets the STP parameter settings to their default values:

```
purge stp
```

Equivalent Command

```
set stp default
```

For information, see “SET STP” on page 442.

SET STP

Syntax

```
set stp [default] [priority=priority] [hellotime=hellotime]
[forwarddelay=forwarddelay] [maxage=maxage]
```

Parameters

default Disables STP and returns all bridge and port STP settings to the default values. This parameter cannot be used with any other command parameter and can only be used when STP is disabled. (This parameter performs the same function as the PURGE STP command.)

priority Specifies the priority number for the bridge. This number is used in determining the root bridge for STP. The bridge with the lowest priority number is selected as the root bridge. If two or more bridges have the same priority value, the bridge with the numerically lowest MAC address becomes the root bridge.

The range is 0 to 61,440 in increments of 4,096. The range is divided into sixteen increments, as shown in Table 10. You specify the increment that represents the desired bridge priority value. The default value is 32,768 (increment 8).

Table 10. Bridge Priority Value Increments

Increment	Bridge Priority	Increment	Bridge Priority
0	0	8	32768
1	4096	9	36864
2	8192	10	40960
3	12288	11	45056
4	16384	12	49152
5	20480	13	53248
6	24576	14	57344
7	28672	15	61440

hellotime	Specifies the time interval between generating and sending configuration messages by the bridge. This parameter can be from 1 to 10 seconds. The default is 2 seconds.
forwarddelay	Specifies the waiting period before a bridge changes to a new state, for example, becomes the new root bridge after the topology changes. If the bridge transitions too soon, all links may not have had time to adapt to the change, resulting in network loops. The range is 4 to 30 seconds. The default is 15 seconds.
maxage	Specifies the length of time after which stored bridge protocol data units (BPDUs) are deleted by the bridge. All bridges in a bridged LAN use this aging time to test the age of stored configuration messages called bridge protocol data units (BPDUs). For example, if you use the default 20, all bridges delete current configuration messages after 20 seconds. The range is 6 to 40 seconds. The default is 20 seconds.

Note

The value for the maxage parameter must be greater than $(2 \times (\text{hellotime} + 1))$ and less than $(2 \times (\text{forwarddelay} - 1))$.

Description

This command sets the following STP parameters:

- ☐ Bridge priority
- ☐ Hello time
- ☐ Forwarding delay
- ☐ Maximum age time

This command can also disable STP and return the STP parameters to their default settings.

Note

You can use this command only if STP is designated as the active spanning tree protocol on the switch. See "ACTIVATE STP" on page 438.

Examples

The following command sets the switch's bridge priority value to 45,056 (increment 11):

```
set stp priority=11
```

The following command sets the hello time to 7 seconds and the forwarding delay to 25 seconds:

```
set stp hellotime=7 forwarddelay=25
```

The following command returns all STP parameters on the switch to the default values:

```
set stp default
```

Equivalent Command

```
purge stp
```

For information, see "PURGE STP" on page 441.

SET STP PORT

Syntax

```
set stp port=port [pathcost|portcost=auto|portcost]  
[portpriority=portpriority]
```

Parameters

port	Specifies the port you want to configure. You can configure more than one port at a time. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).
pathcost or portcost	Specifies the port's cost. The parameters are equivalent. The spanning tree algorithm uses the cost parameter to decide which port provides the lowest cost to the root bridge for that LAN. This parameter can take the range of 1 to 65,535, or AUTO. The default setting is AUTO, for Automatic Update, which automatically sets port cost according to the speed of the port. Table 11 lists the STP port costs with Auto-Detect.

Table 11. STP Auto-Detect Port Costs

Port Speed	Port Cost
10 Mbps	100
100 Mbps	10
1000 Mbps	4

Table 12 lists the STP port costs with Auto-Detect when a port is part of a port trunk.

Table 12. Auto-Detect Port Trunk Costs

Port Speed	Port Cost
10 Mbps	4
100 Mbps	4
1000 Mbps	1

portpriority	Specifies the port's priority. This parameter is used as a tie breaker when two or more ports are determined to have equal costs to the root bridge. The range is 0 to 240 in increments of 16, for a total of 16 increments as
--------------	---

shown in Table 13. You specify the increment of the desired value. The default is 128 (increment 8).

Table 13. Port Priority Value Increments

Increment	Port Priority	Increment	Port Priority
0	0	8	128
1	16	9	144
2	32	10	160
3	48	11	176
4	64	12	192
5	80	13	208
6	96	14	224
7	112	15	240

Description

This command configures the following STP parameter settings for a switch port:

- ☐ Port cost
- ☐ Port priority

Examples

The following command sets the port cost to 15 and the port priority to 192 (increment 12) for port 6:

```
set stp port=6 portcost=15 portpriority=12
```

The following command sets the port cost to auto-detect on ports 7 to 10:

```
set stp port=7-10 portcost=auto
```

SET SWITCH MULTICASTMODE

Syntax

```
set switch multicastmode=[a|b|c|d]
```

Parameter

multicast mode	Specifies the multicast mode. The options are:
a	Discards all ingress spanning tree BPDU and 802.1x EAPOL packets on all ports.
b	Forwards ingress spanning tree BPDU and 802.1x EAPOL packets across all VLANs and ports.
c	Forwards ingress BPDU and EAPOL packets only among the untagged ports of the VLAN where the ingress port is a member.
d	Forwards ingress BPDU and EAP packets on both tagged and untagged ports of the VLAN where the ingress port is a member.

Description

This command controls the behavior of the switch when forwarding ingress spanning tree BPDU packets and 802.1x port-based access control EAPOL packets when these features are disabled on the switch. Note the following when setting this parameter:

- ☐ This parameter is only adjustable with this command. It cannot be configured from the menus or web browser interface.
- ☐ The mode is set at the switch level. It is not adjustable on a per-port basis.
- ☐ Only one mode can be active on a switch at a time.
- ☐ The mode setting applies to spanning tree protocol BPDUs when STP, RSTP, and MSTP are disabled on the switch.
- ☐ The mode setting applies to 802.1x port-based access control EAPOL packets when 802.1x is disabled.
- ☐ There are four possible states: A, B, C, and D:

A - Discards all ingress spanning tree BPDU and 802.1x EAPOL packets on all ports. The switch behaves as follows:

- ☐ If STP, RSTP, and MSTP are disabled, all ingress BPDUs are discarded.

- ❑ If 802.1x port-based access control is disabled, all ingress EAPOL packets are discarded.

B - Forwards ingress spanning tree BPDU and 802.1x EAPOL packets across all VLANs and ports. The switch behaves as follows:

- ❑ If STP, RSTP, and MSTP are disabled, ingress BPDUs are flooded on all ports.
- ❑ If STP, RSTP, MSTP, and 802.1x are disabled on the switch, BPDUs and EAPOL packets are flooded on all ports.
- ❑ If the switch is running STP or RSTP and 802.1x is disabled, EAPOL packets are flooded on all ports, except ports in the blocking state.
- ❑ If the switch is running MSTP and 802.1x is disabled, EAPOL packets are flooded on all ports, including ports in the blocking state.

C - Forwards ingress BPDU and EAPOL packets only on untagged ports of the VLAN where the ingress port is a member. Packets are not forwarded from tagged ports. The VLAN is identified by the PVID assigned to the ingress port.

D - Forwards ingress BPDU and EAP packets from both tagged and untagged ports of the VLAN where the ingress port is a member. The VLAN is identified by the PVID assigned to the ingress port.

Example

This command sets the switch's mode to A to discard all ingress BPDUs and 802.1 EAPOL packets:

```
set switch multicastmode=a
```


SHOW STP

Syntax

```
show stp [port=port]
```

Parameter

port Specifies the port whose STP parameters you want to view. You can view more than one port at a time. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).

Description

This command displays the current values for the STP parameters. An example of the display is shown in Figure 38.

```
Status ..... Enabled
Bridge Priority ..... 32768 (In multiples of 4096: 8)
Bridge Hello Time ..... 2/2 (Configured/Actual)
Bridge Forwarding Delay ..... 15/15 (Configured/Actual)
Bridge Max Age ..... 20/20 (Configured/Actual)
Bridge Identifier ..... 32768/00:21:46:A7:B4:11
Root Bridge ..... 32768/00:21:46:A7:B4:11
Root Path Cost ..... 0
```

Figure 38. SHOW STP Command

The bridge priority, bridge hello time, and bridge max age parameters display two values when STP is enabled on the switch (for example, Bridge Forwarding Delay .. 15/15). The first number is the configured value on the switch for the parameter and the second is the value the switch obtained from the root bridge and is actually using for the parameter. The switch displays only the configured values when spanning tree is not activated on the switch.

The Status parameter displays whether STP is enabled or disabled on the switch.

For definitions of the bridge priority, hello time, forwarding delay, and max age parameters, refer to “SET STP” on page 442.

The bridge Identifier parameter consists of the switch's bridge priority value and MAC address, separated by a slash (/). To change the switch's priority value, refer to “SET STP” on page 442. The MAC address of the switch cannot be changed. the MAC address of the switch.

The root bridge parameter specifies the bridge identifier of the root bridge of the spanning tree domain. The identifier consists of the bridge priority value and MAC address of the root switch, separated by a slash (/). This parameter only appears when STP is activated on the switch.

The root path cost parameter displays the path cost from the switch to the root bridge of the spanning tree domain. If the switch is the root bridge, the path cost is 0. This parameter only appears when STP is activated on the switch.

The PORT parameter allows you to view the STP parameter settings for the switch ports: An example of the display is shown in Figure 39.

Port	State	Cost	Priority
1	Forwarding	4	128
2	Forwarding	4	128
3	Forwarding	4	128
4	Forwarding	4	128
5	Forwarding	4	128
6	Forwarding	4	128
7	Forwarding	4	128
8	Forwarding	4	128
9	Forwarding	4	128
10	Forwarding	4	128
11	Forwarding	4	128

Figure 39. SHOW STP PORT Command

Port is the port number.

State is the current state of a port. The possible states are Listening, Learning, Forwarding, or Blocking when spanning tree is enabled on the switch. When spanning tree is not enabled on the switch or if a port is not being used, its state will be disabled.

Cost is the port cost of the port.

Priority is the port's priority value. The number is used as a tie breaker when two or more ports have equal costs to the root bridge.

Examples

The following command displays the switch's STP settings:

```
show stp
```

The following command displays the STP settings for ports 1 to 4:

```
show stp port=1-4
```

Chapter 26

Rapid Spanning Tree Protocols Commands

This chapter contains the following commands:

- ❑ “ACTIVATE RSTP” on page 452
- ❑ “DISABLE RSTP” on page 453
- ❑ “ENABLE RSTP” on page 454
- ❑ “PURGE RSTP” on page 455
- ❑ “SET RSTP” on page 456
- ❑ “SET RSTP PORT” on page 459
- ❑ “SHOW RSTP” on page 462

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ACTIVATE RSTP

Syntax

```
activate rstp
```

Parameters

None.

Description

Use this command to designate RSTP as the active spanning tree on the switch. After you have selected RSTP, you can enable or disable it using the ENABLE RSTP and DISABLE RSTP commands. RSTP is active on a switch only after you have designated it as the active spanning tree with this command and enabled it with the ENABLE RSTP command.

Only one spanning tree protocol, STP, RSTP, or MSTP, can be active on the switch at a time.

Example

The following command designates RSTP as the active spanning tree:

```
activate rstp
```

DISABLE RSTP

Syntax

```
disable rstp
```

Parameters

None.

Description

This command disables the Rapid Spanning Tree Protocol on the switch. To view the current status of RSTP, use “SHOW RSTP” on page 462.

Example

The following command disables RSTP:

```
disable rstp
```

ENABLE RSTP

Syntax

```
enable rstp
```

Parameters

None.

Description

This command enables the Rapid Spanning Tree Protocol on the switch. The default setting for RSTP is disabled. To view the current status of RSTP, use “SHOW RSTP” on page 462.

You cannot enable RSTP until you have activated it with the ACTIVATE RSTP command.

Example

The following command enables RSTP:

```
enable rstp
```

PURGE RSTP

Syntax

```
purge rstp
```

Parameters

None.

Description

This command returns all RSTP bridge and port parameters to the default settings. RSTP must be disabled before you can use this command. To disable RSTP, refer to “DISABLE RSTP” on page 453.

Example

The following command resets RSTP:

```
purge rstp
```

Equivalent Command

```
set rstp default
```

For information, refer to “SET RSTP” on page 456.

SET RSTP

Syntax

```
set rstp [default] [priority=priority] [hellotime=hellotime]
[forwarddelay=forwarddelay] [maxage=maxage]
[rstptype|forceversion=stpcompatible|
forcestpcompatible|normalrstp]
```

Parameters

- default** Returns all bridge and port RSTP settings to the default values. This parameter cannot be used with any other command parameter and only when RSTP is disabled. (This parameter performs the same function as the PURGE RSTP command.)
- priority** Specifies the priority number for the bridge. This number is used in determining the root bridge for RSTP. The bridge with the lowest priority number is selected as the root bridge. If two or more bridges have the same priority value, the bridge with the numerically lowest MAC address becomes the root bridge. The range is 0 to 61,440 in increments of 4,096. The range is divided into sixteen increments, as shown in Table 14. You specify the increment that represents the desired bridge priority value. The default value is 32,768, which is increment 8.

Table 14. Bridge Priority Value Increments

Increment	Bridge Priority	Increment	Bridge Priority
0	0	8	32768
1	4096	9	36864
2	8192	10	40960
3	12288	11	45056
4	16384	12	49152
5	20480	13	53248
6	24576	14	57344
7	28672	15	61440

hellotime	Specifies the time interval between generating and sending configuration messages by the bridge. This parameter can be from 1 to 10 seconds. The default is 2 seconds.
forwarddelay	Specifies the waiting period before a bridge changes to a new state, for example, becomes the new root bridge after the topology changes. If the bridge transitions too soon, not all links may have yet adapted to the change, resulting in network loops. The range is 4 to 30 seconds. The default is 15 seconds. This parameter effects only those ports operating in the STP compatible mode.
maxage	Specifies the length of time, in seconds, after which stored bridge protocol data units (BPDUs) are deleted by the bridge. All bridges in a bridged LAN use this aging time to test the age of stored configuration messages called bridge protocol data units (BPDUs). For example, if you use the default value of 20, all bridges delete current configuration messages after 20 seconds. The range of this parameter is 6 to 40 seconds. The default is 20 seconds.

Note

The value for the maxage parameter must be greater than $(2 \times (\text{hellotime} + 1))$ and less than $(2 \times (\text{forwarddelay} - 1))$.

rstptype <i>or</i> forceversion	Sets the RSTP mode. The parameters are equivalent. The options are:
stpcompatible <i>or</i> forcestpcompatible	The bridge uses the RSTP parameter settings, but transmits only STP BPDU packets from the ports. These options are equivalent.
normalrspt	The bridge uses RSTP. It transmits RSTP BPDU packets, except on ports connected to bridges running STP. This is the default setting.

Description

This command configures the following RSTP parameter settings.

- ☐ Bridge priority
- ☐ Hello time

- ☐ Forwarding delay
- ☐ Maximum age time
- ☐ Port priority
- ☐ Force version of STP or normal RSTP

This command can also return the RSTP parameters to their default settings.

Note

You can use this command only if RSTP is the active spanning tree protocol on the switch. See “ACTIVATE RSTP” on page 452.

Examples

The following command sets the bridge priority to 20480 (increment 5), the hello time to 5 seconds, and the forwarding delay to 20 seconds:

```
set rstp priority=5 hellotime=5 forwarddelay=20
```

The following command uses the FORCEVERSION parameter to configure the bridge to use the RSTP parameters but to transmit only STP BPDU packets:

```
set rstp forceversion=stpcompatible
```

The following command returns all RSTP parameter settings to their default values:

```
set rstp default
```

Equivalent Command

```
purge rstp
```

For information, see “PURGE RSTP” on page 455.

SET RSTP PORT

Syntax

```
set rstp port=port [pathcost|portcost=cost|auto]
[portpriority=portpriority]
[edgeport=yes|no|on|off|true|false]
[ptp|pointtopoint=yes|no|on|off|true|false|autoupdate]
[migrationcheck=yes|no|on|off|true|false]
```

Parameters

port	Specifies the port you want to configure. You can specify more than one port at a time. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).				
pathcost <i>or</i> portcost	Specifies the port's cost. The parameters are equivalent. The spanning tree algorithm uses the cost parameter to decide which port provides the lowest cost path to the root bridge for that LAN. The options are: <table> <tr> <td>cost</td><td>A number for the port cost. The range is 1 to 200,000,000.</td></tr> <tr> <td>auto</td><td>Automatically sets the port cost according to the speed of the port. This is the default. Table 15 lists the port cost with auto-detect.</td></tr> </table>	cost	A number for the port cost. The range is 1 to 200,000,000.	auto	Automatically sets the port cost according to the speed of the port. This is the default. Table 15 lists the port cost with auto-detect.
cost	A number for the port cost. The range is 1 to 200,000,000.				
auto	Automatically sets the port cost according to the speed of the port. This is the default. Table 15 lists the port cost with auto-detect.				

Table 15. RSTP Auto-Detect Port Costs

Port Speed	Port Cost
10 Mbps	2,000,000
100 Mbps	200,000
1000 Mbps	20,000

Table 16 lists the RSTP port costs with Auto-Detect when the port is part of a port trunk.

Table 16. RSTP Auto-Detect Port Trunk Costs

Port Speed	Port Cost
10 Mbps	20,000

Table 16. RSTP Auto-Detect Port Trunk Costs

Port Speed	Port Cost
100 Mbps	20,000
1000 Mbps	2,000

portpriority Specifies the port's priority. This parameter is used as a tie breaker when two or more ports are determined to have equal costs to the root bridge. The range is 0 to 240 in increments of 16, for a total of 16 increments, as shown in Table 17. You specify the increment that corresponds to the desired value. The default is 128, which is increment 8.

Table 17. Port Priority Value Increments

Increment	Bridge Priority	Increment	Bridge Priority
0	0	8	128
1	16	9	144
2	32	10	160
3	48	11	176
4	64	12	192
5	80	13	208
6	96	14	224
7	112	15	240

edgeport Defines whether the port is functioning as an edge port. An edge port is connected to a device operating at half-duplex mode and is not connected to any device running STP or RSTP. The options are:

yes, on, true The port is an edge port. The options are equivalent. This is the default.

no, off, false The port is not an edge port. The options are equivalent.

ptp *or* pointtopoint Defines whether the port is functioning as a point-to-point port. The parameters are equivalent. This type of port is connected to a device operating at full-duplex mode. The options are:

	yes, on, true	The port is an point-to-point port. The options are equivalent.
	no, off, false	The port is not an point-to-point port. The parameters are equivalent. are equivalent.
	autoupdate	The port's status is determined automatically. This is the default.
migrationcheck	Enables and disables migration check. The purpose of this feature is to change from the RSTP mode to the STP mode if STP BPDU packets are received on the selected port. When you enable this option, the bridge will send out RSTP BPDU packets from the selected port until STP BPDU packets are received. The port will remain in the RSTP mode until it receives an STP BPDU packet. The options are:	
	yes, on, true	Enable migration check. The options are equivalent.
	no, off, false	Disable migration check. The options are equivalent.

Description

This command sets a port's RSTP settings.

Examples

The following command sets the port cost to 1,000,000 and port priority to 224 (increment 14) on port 4:

```
set rstp port=4 portcost=1000000 portpriority=14
```

The following command changes ports 6 to 8 so they are not considered edge ports:

```
set rstp port=6-8 edgeport=no
```

SHOW RSTP

Syntax

```
show rstp [portconfig=port|portstate=port]
```

Parameters

portconfig	Displays the RSTP port settings. You can specify more than one port at a time.
portstate	Displays the RSTP port status. You can specify more than one port at a time.

Description

You can use this command to display the RSTP parameter settings. An example of the display is shown in Figure 40.

```
Status ..... Enabled
Force Version ..... NormalRSTP
Bridge Priority ..... 32768 (In multiples of 4096: 8)
Bridge Hello Time ..... 2/2 (Configured/Actual)
Bridge Forward Delay ..... 15/15 (Configured/Actual)
Bridge Max Age ..... 20/20 (Configured/Actual)
Bridge Identifier ..... 32768/00:21:46:A7:B4:11
Root Bridge Identifier ..... 32768/00:21:46:A7:B4:11
Root Path Cost ..... 0
```

Figure 40. Example of the SHOW RSTP Command

The bridge priority, bridge hello time, and bridge max age parameters will have two values if RSTP is enabled on the switch (for example, Bridge Forwarding .. 15/15). The first number is the configured value on the switch for the parameter and the second is the value the switch obtained from the root bridge and is currently using for the parameter. The switch displays only the configured values for these parameters if spanning tree is not enabled on the switch.

The Status parameter displays whether STP is enabled or disabled on the switch.

For definitions of the force version, bridge priority, hello time, forward delay, and max age parameters, refer to “SET RSTP” on page 456.

The bridge Identifier parameter consists of the switch’s bridge priority value and MAC address, separated by a slash (/). To change the switch’s priority value, refer to “SET RSTP” on page 456. The MAC address of the switch cannot be changed.

The root bridge identifier parameter displays the bridge priority value and MAC address of the root switch of the spanning tree domain. The values are separated by a slash (/). This parameter only appears when RSTP is activated on the switch.

The root path cost parameter displays the path cost from the switch to the root bridge of the spanning tree domain. If the switch is the root bridge, the path cost is 0. This parameter only appears when RSTP is activated on the switch.

The PORTCONFIG parameter displays the current RSTP parameter settings for the ports. An example is shown in Figure 41.

Port	Edge-Port	Point-to-Point	Cost	Priority
1	Yes	Auto Update	Auto Update	128
2	Yes	Auto Update	Auto Update	128
3	Yes	Auto Update	Auto Update	128
4	Yes	Auto Update	Auto Update	128
5	Yes	Auto Update	Auto Update	128
6	Yes	Auto Update	Auto Update	128
7	Yes	Auto Update	Auto Update	128
8	Yes	Auto Update	Auto Update	128
10	Yes	Auto Update	Auto Update	128
11	Yes	Auto Update	Auto Update	128

Figure 41. Example of the SHOW RSTP PORTCONFIG Command

For definitions of these parameters, refer to “SET RSTP PORT” on page 459.

The PORTSTATE parameter displays the current operating settings and status of the ports. An example is shown in Figure 42.

Port	State	Role	Edge	P2P	Version	Port-Cost
1	Disabled	-----	-----	-----	-----	-----
2	Forwarding	Designated	No	Yes	RSTP	200000
3	Forwarding	Designated	No	Yes	RSTP	200000
4	Forwarding	Designated	No	Yes	RSTP	200000
5	Forwarding	Designated	No	Yes	RSTP	200000
6	Forwarding	Designated	No	Yes	RSTP	200000
7	Forwarding	Designated	No	Yes	RSTP	200000
8	Forwarding	Designated	No	Yes	RSTP	200000
9	Forwarding	Designated	No	Yes	RSTP	200000
10	Forwarding	Designated	No	Yes	RSTP	200000
11	Forwarding	Designated	No	Yes	RSTP	200000

Figure 42. Example of the SHOW RSTP PORTSTATE Command

The information displayed by the command is as follows:

- ❑ Port — The port number.
- ❑ State — The RSTP state of the port. The possible states for a port connected to another device running RSTP are Discarding and Forwarding.

The possible states for a port connected to a device running STP are Listening, Learning, Forwarding, and Blocking.

The possible states for a port not being used or where spanning tree is not activated is Disabled.

- ❑ Role — The RSTP role of the port. Possible roles are:

Root - The port is connected to the root switch, directly or through other switches, with the least path cost.

Alternate - The port offers an alternate path to the root switch.

Backup - The port on a designated switch that provides a backup for the path provided by the designated port.

Designated - The port has the least cost path to the root switch.

- ❑ P2P — Whether or not the port is functioning as a point-to-point port. The possible settings are Yes and No.
- ❑ Version — Whether the port is operating in RSTP mode or STP-compatible mode.
- ❑ Port Cost — The current operating cost of the port.

Examples

The following command displays the bridge's RSTP settings:

```
show rstp
```

The following command displays the RSTP port settings for ports 1 to 4:

```
show rstp portconfig=1-4
```

The following command displays RSTP port status for port 15:

```
show rstp portstate=15
```


Multiple Spanning Tree Protocol Commands

This chapter contains the following commands:

- ❑ “ACTIVATE MSTP” on page 466
- ❑ “ADD MSTP” on page 467
- ❑ “CREATE MSTP” on page 468
- ❑ “DELETE MSTP” on page 469
- ❑ “DESTROY MSTP MSTIID” on page 470
- ❑ “DISABLE MSTP” on page 471
- ❑ “ENABLE MSTP” on page 472
- ❑ “PURGE MSTP” on page 473
- ❑ “SET MSTP” on page 474
- ❑ “SET MSTP CIST” on page 477
- ❑ “SET MSTP MSTI” on page 478
- ❑ “SET MSTP MSTIVLANASSOC” on page 480
- ❑ “SET MSTP PORT” on page 481
- ❑ “SHOW MSTP” on page 485

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ACTIVATE MSTP

Syntax

```
activate mstp
```

Parameters

None.

Description

This command designates MSTP as the active spanning tree on the switch. You cannot enable MSTP or configure its parameters until after you have designated it as the active spanning tree with this command.

Only one spanning tree protocol can be active on the switch at a time.

Example

The following command designates MSTP as the active spanning tree:

```
activate mstp
```

ADD MSTP

Syntax

```
add mstp mstiid=mstiid mstivlanassoc=vids
```

Parameters

mstiid	Specifies the ID of the multiple spanning tree instance (MSTI) to which you want to associate VLANs. You can specify only one MSTI ID at a time. The range is 1 to 15.
mstivlanassoc	Specifies the VID of the VLAN you want to associate with the MSTI ID. You can specify more than one VID at a time (for example, 2,5,44).

Description

This command associates VLANs to a MSTI.

The MSTIID parameter specifies the MSTI ID. The MSTI must already exist on the switch. To create a spanning tree instance, see “CREATE MSTP” on page 468.

The MSTIVLANASSOC parameter specifies the VIDs of the VLANs you want to associate with the MSTI. The VLANs must already exist on the switch. Any VLANs already associated with the MSTI are retained. If you want to add VLANs to a MSTI while removing those already associated to it, see “SET MSTP MSTIVLANASSOC” on page 480.

Examples

The following command associates the VLAN with the VID 4 to MSTI ID 8:

```
add mstp mstiid=8 mstivlanassoc=4
```

The following command associates the VLANs with the VIDs 24 and 44 to MSTI ID 11:

```
add mstp mstiid=11 mstivlanassoc=24,44
```

CREATE MSTP

Syntax

```
create mstp mstiid=mstiid [mstivlanassoc=vids]
```

Parameters

mstiid	Specifies the MSTI ID of the spanning tree instance you want to create. You can specify only one MSTI ID at a time. The range is 1 to 15.
mstivlanassoc	Specifies the VID of the VLAN you want to associate with the MSTI ID. You can specify more than one VID at a time (for example, 2,5,44).

Description

This command creates an MSTI ID and associates VLANs to the new spanning tree instance.

The MSTIID parameter specifies the new MSTI ID.

The MSTIVLANASSOC parameter specifies the VIDs of the VLANs you want to associate with the new MSTI. The VLANs must already exist on the switch. If you do not specify any VLANs, you can add them later using “ADD MSTP” on page 467 or “SET MSTP MSTIVLANASSOC” on page 480.

Examples

The following command creates the MSTI ID 8 and associates to it the VLAN with the VID 4:

```
create mstp mstiid=8 mstivlanassoc=4
```

The following command creates the MSTI ID 11 and associates to it the VLANs with the VIDs 24 and 44:

```
create mstp mstiid=11 mstivlanassoc=24,44
```

DELETE MSTP

Syntax

```
delete mstp mstiid=mstiid mstivlanassoc=vids
```

Parameters

mstiid	Specifies the MSTI ID of the spanning tree instance where you want to remove VLANs. You can specify only one MSTI ID at a time. The range is 1 to 15.
mstivlanassoc	Specifies the VID of the VLAN you want to remove from the spanning tree instance. You can specify more than one VID at a time (for example, 2,5,44).

Description

This command removes a VLAN from a spanning tree instance. A VLAN removed from a spanning tree instance is automatically returned to CIST.

The MSTIID parameter specifies the MSTI ID.

The MSTIVLANASSOC parameter specifies the VIDs of the VLANs you want to remove from the spanning tree instance.

Examples

The following command deletes the VLAN with the VID 4 from MSTI ID 8:

```
delete mstp mstiid=8 mstivlanassoc=4
```

The following command deletes the VLANs with the VIDs 24 and 44 from MSTI ID 11:

```
delete mstp mstiid=11 mstivlanassoc=24,44
```

DESTROY MSTP MSTIID

Syntax

```
destroy mstp mstiid=mstiid
```

Parameter

mstiid	Specifies the MSTI ID of the spanning tree instance you want to delete. You can specify only one MSTI ID at a time. The range is 1 to 15.
--------	---

Description

This command deletes a spanning tree instance. VLANs associated with a deleted MSTI are returned to CIST.

Example

The following command deletes the spanning tree instance 4:

```
destroy mstp mstiid=4
```

DISABLE MSTP

Syntax

```
disable mstp
```

Parameters

None.

Description

This command disables the Multiple Spanning Tree Protocol on the switch. To view the current status of MSTP, refer to “SHOW MSTP” on page 485.

Example

The following command disables MSTP:

```
disable mstp
```

ENABLE MSTP

Syntax

```
enable mstp
```

Parameters

None.

Description

This command enables Multiple Spanning Tree Protocol on the switch. To view the current status of MSTP, refer to “SHOW MSTP” on page 485.

You must select MSTP as the active spanning tree on the switch before you can enable it with this command. To activate MSTP, see “ACTIVATE MSTP” on page 466.

Example

The following command enables MSTP:

```
enable mstp
```


PURGE MSTP

Syntax

```
purge mstp
```

Parameters

None.

This command returns all MSTP bridge and port parameters settings to their default values. This command also deletes all multiple spanning tree instances and VLAN associations.

In order for you to use this command, MSTP must be the active spanning tree protocol on the switch and the protocol must be disabled. To select MSTP as the active spanning tree protocol on the switch, see “ACTIVATE MSTP” on page 466. To disable MSTP, refer to “DISABLE MSTP” on page 471.

Example

The following command resets the MSTP bridge and port parameter settings:

```
purge mstp
```

Equivalent Command

```
set mstp default
```

For information, see “SET MSTP” on page 474.

SET MSTP

Syntax

```
set mstp [default]
[forceversion=stpcompatible|forcestpcompatible|
normalmstp] [hellotime=hellotime]
[forwarddelay=forwarddelay] [maxage=maxage]
[maxhops=maxhops] [configname="name"]
[revisionlevel=number]
```

Parameters

default	Disables MSTP and returns all bridge and port MSTP settings to the default values. This parameter cannot be used with any other parameter. (This parameter performs the same function as the PURGE MSTP command.) The spanning tree protocol must be disabled to use this parameter.				
forceversion	Controls whether the bridge will operate with MSTP or in an STP-compatible mode. If you select MSTP, the bridge will operate all ports in MSTP, except for those ports that receive STP or RSTP BPDU packets. If you select STP Compatible or Force STP Compatible, the bridge uses its MSTP parameter settings, but sends only STP BPDU packets from the ports The options are: <table><tr><td>normalmspt</td><td>The bridge uses MSTP. The bridge sends out MSTP BPDU packets from all ports except for those ports connected to bridges running STP. This is the default setting.</td></tr><tr><td>stpcompatible <i>or</i> forcestpcompatible</td><td>The bridge operates in an STP-compatible mode where it uses the MSTP parameter settings, but transmits only STP BPDU packets from the ports. These options are equivalent.</td></tr></table>	normalmspt	The bridge uses MSTP. The bridge sends out MSTP BPDU packets from all ports except for those ports connected to bridges running STP. This is the default setting.	stpcompatible <i>or</i> forcestpcompatible	The bridge operates in an STP-compatible mode where it uses the MSTP parameter settings, but transmits only STP BPDU packets from the ports. These options are equivalent.
normalmspt	The bridge uses MSTP. The bridge sends out MSTP BPDU packets from all ports except for those ports connected to bridges running STP. This is the default setting.				
stpcompatible <i>or</i> forcestpcompatible	The bridge operates in an STP-compatible mode where it uses the MSTP parameter settings, but transmits only STP BPDU packets from the ports. These options are equivalent.				

Note
Selecting the STP-compatible mode deletes all spanning tree instances on the switch.

hellotime	Specifies the time interval between generating and sending configuration messages by the bridge. This parameter can be from 1 to 10 seconds. The default is 2 seconds.
forwarddelay	Specifies the waiting period before a bridge changes to a new state, for example, becomes the new root bridge after the topology changes. If the bridge transitions too soon, not all links may have yet adapted to the change, resulting in network loops. The default is 15 seconds. This parameter effects only those ports operating in the STP compatible mode.
maxage	Specifies the length of time, in seconds, after which stored bridge protocol data units (BPDUs) are deleted by the bridge. All bridges in a bridged LAN use this aging time to test the age of stored configuration messages called bridge protocol data units (BPDUs). For example, if you use the default value of 20, all bridges delete current configuration messages after 20 seconds. The range of this parameter is 6 to 40 seconds. The default is 20 seconds.

Note

The value for the maxage parameter must be greater than $(2 \times (\text{hellotime} + 1))$ and less than $(2 \times (\text{forwarddelay} - 1))$.

maxhops	Specifies the maximum hops counter. MSTP regions use this parameter to discard BPDUs. The Max Hop counter in a BPDU is decremented every time the BPDU crosses a bridge within a MSTP region. After the counter reaches zero, the BPDU is deleted. The counter is reset to its original value if the BPDU crosses a MSTP regional boundary.
configname	Specifies the name of the MSTP region. The range is 0 (zero) to 32 alphanumeric characters. The name is case-sensitive and must be the same on all bridges in a region. Examples include Sales Region and Production Region. The name must be enclosed in quotes.
revisionlevel	Specifies the reversion number of an MSTP region. The range is 0 (zero) to 255. This is an arbitrary number that you assign to a region. The reversion level must be the same on all bridges in a region. Different regions can have the same reversion level without conflict.

Description

This command configures the following MSTP parameter settings.

- ☐ Hello time
- ☐ Forwarding delay
- ☐ Maximum age time
- ☐ Maximum hop count
- ☐ Force version of STP or normal MSTP
- ☐ Configuration name
- ☐ Revision level

Examples

The following command disables MSTP and returns all MSTP parameter settings to their default values:

```
set mstp default
```

The following command sets the hop count to 10, the configuration name to Engineering Region, and the reversion level to 2:

```
set mstp maxhops=10 configname="Engineering Region"  
revisionlevel=2
```

The following command uses the FORCEVERSION parameter to configure the bridge to use the MSTP parameters but to transmit only STP BPDU packets:

```
set mstp forceversion=forcestpcompatible
```

Equivalent Command

```
purge mstp
```

For information, see “PURGE MSTP” on page 473. This command performs the same function as the DEFAULT parameter.

SET MSTP CIST

Syntax

```
set mstp cist priority=priority
```

Parameter

priority Specifies the CIST priority number for the switch. The range is 0 to 61,440 in increments of 4,096. The range is divided into sixteen increments, as shown in Table 18. You specify the increment that represents the desired bridge priority value. The default value is 32,768, which is increment 8.

Table 18. CIST Priority Value Increments

Increment	CIST Priority	Increment	CIST Priority
0	0	8	32768
1	4096	9	36864
2	8192	10	40960
3	12288	11	45056
4	16384	12	49152
5	20480	13	53248
6	24576	14	57344
7	28672	15	61440

Description

This command sets the CIST priority number on the switch. This number is used in determining the root bridge for the bridged network. The bridge with the lowest priority number acts as the root bridge. If two or more bridges have the same priority value, the bridge with the numerically lowest MAC address becomes the root bridge. To view the current CIST priority number, see “SHOW MSTP” on page 485.

Example

The following command sets the CIST priority value to 45,056, which is increment 11:

```
set mstp cist priority=11
```

SET MSTP MSTI

Syntax

```
set mstp msti mstiid=mstiid priority=priority
```

Parameters

mstiid Specifies a MSTI ID. You can specify only one MSTI ID at a time. The range is 1 to 15.

priority Specifies the MSTI priority value for the switch. The range is 0 to 61,440 in increments of 4,096. The range is divided into sixteen increments, as shown in Table 19. You specify the increment that represents the desired bridge priority value. The default value is 32,768, which is increment 8.

Table 19. MSTI Priority Value Increments

Increment	MSTI Priority	Increment	MSTI Priority
0	0	8	32,768
1	4,096	9	36,864
2	8,192	10	40,960
3	12,288	11	45,056
4	16,384	12	49,152
5	20,480	13	53,248
6	24,576	14	57,344
7	28,672	15	61,440

Description

This command changes the MSTI priority value of a spanning tree instance on a bridge. This value is used in determining the regional root bridge of a spanning tree instance.

The MSTIID parameter specifies the MSTI ID whose MSTI priority you want to change. The range is 1 to 15.

The PRIORITY parameter specifies the new MSTI priority value. The range is 0 (zero) to 61,440 in increments of 4,096, with 0 being the highest priority.

Examples

The following command changes the MSTI priority value to 45,056 (increment 11) for the MSTI ID 4:

```
set mstp msti mstiid=4 priority=11
```

The following command changes the MSTI priority value to 8,192 (increment 2) for the MSTI ID 6:

```
set mstp msti mstiid=6 priority=2
```

SET MSTP MSTIVLANASSOC

Syntax

```
set mstp mstivlanassoc mstiid=mstiid vlanlist=vids
```

Parameters

mstiid	Specifies the ID of the spanning tree instance where you want to associate VLANs. You can specify only one MSTI ID at a time. The range is 1 to 15.
vlanlist	Specifies the VID of the VLAN you want to associate with the MSTI ID. You can specify more than one VID at a time (for example, 2,5,44). If VLANs have already been associated with the MSTI, they are overwritten.

Description

This command associates VLANs to spanning tree instances.

The MSTIID parameter specifies the ID of the spanning tree instance. The spanning tree instance must already exist on the switch. To create a spanning tree instance, see “CREATE MSTP” on page 468.

The VLANLIST parameter specifies the VID of the VLANs you want to associate with the MSTI. The VLANs must already exist on the switch. If VLANs are already associated with the MSTI, they are removed and returned to CIST. If you want to add VLANs to an MSTI and retain those VLANs already associated with it, see “ADD MSTP” on page 467.

Examples

The following command associates the VLAN with the VID 4 to MSTI ID 8:

```
set mstp mstivlanassoc mstiid=8 vlanlist=4
```

The following command associates VIDs 24 and 44 to MSTI ID 11:

```
set mstp mstivlanassoc mstiid=11 vlanlist=24,44
```


SET MSTP PORT

Syntax 1

```
set mstp port=port|all [extportcost=auto|portcost]
[edgeport=yes|no|no|on|off|true|false]
[ptp|pointtopoint=yes|no|on|off|true|false|autoupdate]
[migrationcheck=yes|no|on|off|true|false]
```

Syntax 2

```
set mstp port=port|all [intportcost=auto|portcost]
[portpriority=priority] [stpid=msti_id]
```

Parameters

port	Specifies the port you want to configure. You can specify more than one port at a time. To configure all ports in the switch, enter ALL.
extportcost	Specifies the cost of a port connected to a bridge that is a member of another MSTP region or is running STP or RSTP. This is referred to as an external port cost. The range is 0 to 200,000,000. The default setting is Auto, which sets port cost based on port speed. Table 20 lists the MSTP external port costs with the Auto setting when the port is not a member of a trunk.

Table 20. Auto External Path Costs

Port Speed	Port Cost
10 Mbps	2,000,000
100 Mbps	200,000
1000 Mbps	20,000

Table 21 lists the MSTP port costs with the Auto setting when the port is part of a port trunk.

Table 21. Auto External Path Trunk Costs

Port Speed	Port Cost
10 Mbps	20,000
100 Mbps	20,000
1000 Mbps	2,000

edgeport	Defines whether the port is functioning as an edge port. An edge port is connected to a device operating at half-duplex mode and is not connected to any device running STP or MSTP. Selections are:	
	yes, on, true	The port is an edge port. These values are equivalent. This is the default.
	no, off, false	The port is not an edge port. These values are equivalent.
ptp <i>or</i> pointtopoint	Defines whether the port is functioning as a point-to-point port. This type of port is connected to a device operating at full-duplex mode. Selections are:	
	yes, on, true	The port is an point-to-point port.
	no, off, false	The port is not an point-to-point port.
	autoupdate	The port's status is determined automatically. This is the default.
migrationcheck	This parameter resets a MSTP port, allowing it to send MSTP BPDUs. When a MSTP bridge receives STP BPDUs on an MSTP port, the port transmits STP BPDUs. The MSTP port continues to transmit STP BPDUs indefinitely. Set the migrationcheck parameter to yes to reset the MSTP port to transmit MSTP BPDUs.	
	yes, on, true	Enable migration check. The values are equivalent.
	no, off, false	Disable migration check. The values are equivalent.

Note

Each time a MSTP port is reset by receiving STP BPDUs, set the migrationcheck parameter to yes, allowing the port to send MSTP BPDUs.

intportcost	Specifies the cost of a port connected to a bridge that is part of the same MSTP region. This is referred to as an internal port cost. The range is 0 to 200,000,000. The default setting is Auto-detect (0), which sets port cost depending on the speed of the port. Default values are 2,000,000 for 10 Mbps ports, 200,000 for a 100 Mbps ports, and 20,000 for one gigabit ports.
-------------	--

portpriority Specifies the port's priority. This parameter is used as a tie breaker when two or more ports are determined to have equal costs to the root bridge. The range is 0 to 240 in increments of 16. There are sixteen increments, as shown in Table 22 on page 483. You specify the increment of the desired value. The default is 128, which is increment 8.

Table 22. Port Priority Value Increments

Increment	Port Priority	Increment	Port Priority
0	0	8	128
1	16	9	144
2	32	10	160
3	48	11	176
4	64	12	192
5	80	13	208
6	96	14	224
7	112	15	240

stpid Specifies the ID number of an MSTI in which the VLAN of a port is a member. This parameter is used with the **INTPORTCOST** and **PORTPRIORITY** parameters to assign different path costs and priority values to untagged and tagged ports whose VLANs belong to more than one MSTI. You can specify more than one MSTI at a time (e.g., 4,6,11). If the VLANs of a port belong to just one MSTI, you can omit this parameter.

Description

This command sets a port's MSTP settings. The command is illustrated in two syntaxes to represent the two groups of MSTI port parameters. The first group is referred to as generic parameters. They are set just once on a port, regardless of the number of MSTIs where a port is a member. These parameters are the external path cost and edge port and point-to-point port designations.

The second group can be applied independently on a port on a per-MSTI basis. There are two parameters in this group — internal path cost and priority. A port whose VLANs are members of different MSTIs can have different settings in each MSTI. The MSTI is identified with the **STPID** parameter. You can omit the **STPID** parameter if a port is a member of one or more VLANs that all belong to the same MSTI, or if you want to assign the port the same path cost or priority value in all of its MSTI assignments.

Syntax 1 Examples

The following command sets the external port cost to 500 for Ports 14 and 23:

```
set mstp port=14,23 extportcost=500
```

The following command sets the external port cost to 1,000,000 for Port 4 and designates it as an edge port:

```
set mstp port=6-8 edgeport=yes
```

The following command sets the external port cost for Ports 2 and 5 to Auto, which sets the port cost based on speed:

```
set mstp port=2-5 extportcost=auto
```

The following command designates Ports 6 to 8 as point-to-point ports:

```
set mstp port=6-8 ptp=yes
```

Syntax 2 Examples

The following command sets the internal port cost to 500 for Ports 7 and 10. If the ports are members of more than one VLAN and the VLANs are assigned to more than one MSTI, the new internal port cost is assigned to all of their MSTI assignments:

```
set mstp port=7,10 intportcost=500
```

This example illustrates the STPID parameter. This parameter is used when a port belongs to more than one VLAN and the VLANs are assigned to different MSTIs. You can use the parameter to specify different priority and internal port costs on a port for each MSTI assignment. This command assigns Port 15 in MSTI 2 a priority of 64 (increment 4):

```
set mstp port=7,10 portpriority=4 stpid=2
```

The following command sets the internal port cost to 1,000,000 and port priority to 224 (increment 14) for Port 4:

```
set mstp port=4 intportcost=1000000 portpriority=14
```

The following command is similar to the previous example, except it assumes port 4 is a member of more than one MSTI and you want to assign the new values to only one of its MSTI assignments, in this case MSTI 12:

```
set mstp port=4 intportcost=1000000 portpriority=14 stpid=12
```

The following command sets the internal port cost for Ports 2 and 5 to Auto, which sets the port cost based on speed:

```
set mstp port=2-5 intportcost=auto
```

SHOW MSTP

Syntax

```
show mstp [portconfig=ports] [portstate=ports]
[stpid=msti_id] [mstistate] [cist] [mstivlanassoc]
```

Parameters

portconfig	Displays the MSTP settings of a port. You can specify more than one port at a time. For a list of the MSTP information displayed by this parameter, refer to Description below.
portstate	Displays the MSTP state of a port. You can specify more than one port at a time. For a list of the MSTP information displayed by this parameter, refer to Description below.
stpid	Specifies an MSTI ID. This parameter is used with the PORTCONFIG and PORTSTATE parameters to view MSTP settings for a port whose VLANs are members of different MSTIs. You can specify more than one MSTI ID.
mstistate	Displays a list of the MSTIs on the switch and their associated VLANs. The list does not include the CIST.
cist	Displays the CIST priority and the VLANs associated with CIST.
mstivlanassoc	Displays a list of the MSTIs on the switch, including the CIST, and their associated VLANs.

Note

You can specify only one parameter at a time in this command. The only exception is the STPID parameter, which can be used together with the PORTCONFIG and PORTSTATE parameters.

Description

This command displays MSTP parameters. Entering SHOW MSTP without any parameters displays the following MSTP settings:

- ☐ MSTP status
- ☐ Force version
- ☐ Hello time

- ☐ Forwarding delay
- ☐ Maximum age
- ☐ Maximum hops
- ☐ Configuration name
- ☐ Reversion level
- ☐ Bridge identifier
- ☐ Root identifier

The hello time, forwarding delay, and bridge max age parameters will have two values if MSTP is enabled on the switch (for example, Forwarding Delay .. 15/15). The first number is the configured value on the switch for the parameter and the second is the value the switch obtained from the root bridge and is actually using for the parameter. The switch displays only the configured values for these parameters if spanning tree is not enabled on the switch.

The bridge Identifier parameter consists of the switch's CIST priority value and MAC address, separated by a slash (/). To change the CIST priority value, refer to "SET MSTP CIST" on page 477. The MAC address of the switch cannot be changed. the MAC address of the switch.

The root bridge parameter specifies the bridge identifier of the root bridge of the spanning tree domain. The identifier consists of the bridge or CIST priority value and MAC address of the root switch, separated by a slash (/). This parameter only appears when STP is activated on the switch.

The PORTCONFIG parameter displays the following MSTP port parameter settings:

- ☐ Edge-port status
- ☐ Point-to-point status
- ☐ External and internal port costs
- ☐ Port priority

The PORTSTATE parameter displays the following MSTP port status information:

- ☐ MSTP port state
- ☐ MSTP role
- ☐ Point-to-point status
- ☐ Spanning tree version
- ☐ Internal and external port costs

The MSTI parameter displays the following information for each spanning tree instance (excluding the CIST) on the switch:

- ❑ MSTI ID
- ❑ MSTI priority
- ❑ Regional root ID
- ❑ Path cost
- ❑ Associated VLANs

The CIST parameter displays the following CIST information:

- ❑ CIST priority value
- ❑ Root ID
- ❑ Root path cost
- ❑ Regional root ID
- ❑ Regional root path cost
- ❑ Associated VLANs

The MSTIVLANASSOC parameter displays the VLAN to MSTI associations.

Examples

This command displays basic MSTP operating information:

```
show mstp
```

This command displays the MSTP state of Port 4:

```
show mstp portstate=4
```

This command displays the configuration of Port 5 in MSTI 2:

```
show mstp portconfig=5 stpid=2
```

This command displays the CIST information:

```
show mstp cist
```

This command displays the VLAN associations:

```
show mstp mstvlanassoc
```


Section VI

Virtual LANs

This section contains the following chapters:

- ❑ Chapter 28, “Port-based, Tagged, and Multiple Mode VLAN Commands” on page 491
- ❑ Chapter 29, “GARP VLAN Registration Protocol Commands” on page 509
- ❑ Chapter 30, “Protected Ports VLAN Commands” on page 523
- ❑ Chapter 31, “MAC Address-based VLAN Commands” on page 533

Chapter 28

Port-based, Tagged, and Multiple Mode VLAN Commands

This chapter contains the following commands:

- ❑ “ADD VLAN” on page 492
- ❑ “CREATE VLAN” on page 495
- ❑ “DELETE VLAN” on page 499
- ❑ “DESTROY VLAN” on page 502
- ❑ “SET SWITCH INFILTERING” on page 503
- ❑ “SET SWITCH VLANMODE” on page 504
- ❑ “SET VLAN” on page 505
- ❑ “SHOW VLAN” on page 506

Note

Remember to use the SAVE CONFIGURATION command to save your changes on the switch.

ADD VLAN

Syntax 1

```
add vlan=name [vid=vid] ports=ports|all  
frame=untagged|tagged
```

Syntax 2

```
add vlan=name [vid=vid] taggedports=ports|all  
untaggedports=ports|all
```

Parameters

vlan	Specifies the name of the VLAN to modify.
vid	Specifies the VID of the VLAN you want to modify. This parameter is optional.
ports	Specifies the ports to be added to the VLAN. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22).
frame	Identifies the new ports as either tagged or untagged. This parameter must be used with the PORT parameter.
taggedports	Specifies the ports to be added as tagged ports to the VLAN. To include all ports on the switch as tagged ports in the VLAN, use ALL.
untaggedports	Specifies the ports to be added as untagged ports to the VLAN. Specifying ALL adds all ports on the switch as untagged ports to the VLAN.

Description

This command adds tagged and untagged ports to an existing port-based or tagged VLAN.

Note

To initially create a VLAN, see “CREATE VLAN” on page 495. To remove ports from a VLAN, see “DELETE VLAN” on page 499.

This command has two syntaxes. You can use either command to add ports to a VLAN. The difference between the two is that Syntax 1 can add only one type of port, tagged or untagged, at a time to a VLAN, while Syntax 2 can add both in the same command. This is illustrated in Examples below.

When you add untagged ports to a VLAN, the ports are automatically removed from their current untagged VLAN assignment. This is because a port can be an untagged member of only one VLAN at a time. For example, if you add port 4 as an untagged port to a VLAN, the port is automatically removed from whichever VLAN it is currently an untagged member.

Adding a tagged port to a VLAN does not change the port's current tagged and untagged VLAN assignments. This is because a tagged port can belong to more than one VLAN at a time. For instance, if you add port 6 as an tagged port to a new VLAN, port 6 remains a tagged and untagged member of its other VLAN assignments.

If the switch is using 802.1x port-based network access control, a port set to the authenticator or supplicant role must be changed to the 802.1x none role before its untagged VLAN assignment can be changed. After the VLAN assignment is made, the port's role can be changed back again to authenticator or supplicant, if necessary.

Examples

The following command uses Syntax 1 to add ports 4 and 7 as untagged members to a VLAN called Sales:

```
add vlan=sales ports=4,7 frame=untagged
```

The following command does the same thing using Syntax 2:

```
add vlan=sales untaggedports=4,7
```

The following command uses Syntax 1 to add port 3 as a tagged member to a VLAN called Production:

```
add vlan=production ports=3 frame=tagged
```

The following command does the same thing using Syntax 2:

```
add vlan=production untaggedports=3
```

Adding both tagged and untagged ports to a VLAN using Syntax 1 takes two commands, one command for each port type. For example, if you had a VLAN called Service and you wanted to add port 5 as a tagged port and ports 7 and 8 as untagged ports, the commands would be:

```
add vlan=Service ports=5 frame=tagged
```

```
add vlan=Service ports=7-8 frame=untagged
```

Using Syntax 2, you can add both types of ports with just one command:

```
add vlan=Service untaggedports=7-8 taggedports=5
```

CREATE VLAN

Syntax 1

```
create vlan=name vid=vid [type=port] ports=ports|all
frame=untagged|tagged
```

Syntax 2

```
create vlan=name vid=vid [type=port] taggedports=ports|all
untaggedports=ports|all
```

Parameters

vlan Specifies the name of the VLAN. You must assign a name to a VLAN.

The name can be from 1 to 20 characters in length and should reflect the function of the nodes that will be a part of the VLAN (for example, Sales or Accounting). The name cannot contain spaces or special characters, such as asterisks (*) or exclamation points (!).

The name cannot be the same as the name of an existing VLAN on the switch.

If the VLAN is unique in your network, then the name needs to be unique as well. If the VLAN spans multiple switches, then the name for the VLAN should be the same on each switch.

vid Specifies the VLAN identifier. The range is 2 to 4094. The VLAN must be assigned a VID.

You cannot use the VID 1, which is reserved for the Default_VLAN.

The VID cannot be the same as the VID of an existing VLAN on the switch.

If this VLAN is unique in your network, then its VID should also be unique. If this VLAN is part of a larger VLAN that spans multiple switches, then the VID value for the VLAN should be the same on each switch. For example, if you are creating a VLAN called Sales that spans three switches, assign the Sales VLAN on each switch the same VID value.

type	Specifies the type of VLAN to be created. The option PORT signifies a port-based or tagged VLAN. This parameter is optional.
ports	Specifies the ports on the switch that are either tagged or untagged members of the new VLAN. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-23), or both (for example, 1, 5, 14-22). To specify all ports on the switch, use ALL. This parameter must be followed by the FRAME parameter.
frame	Specifies whether the ports of the VLAN are to be tagged or untagged. This parameter must be used with the PORT parameter.
taggedports	Specifies the ports on the switch to serve as tagged ports in the VLAN. To specify all ports on the switch, use ALL. Omit this parameter if the VLAN does not contain tagged ports.
untaggedports	Specifies the ports on the switch to function as untagged ports in the VLAN. To specify all ports on the switch, use ALL. Omit this parameter if the VLAN does not contain untagged ports.

Description

This command creates a port-based or tagged VLAN.

This command has two syntaxes. You can use either syntax to create a port-based or tagged VLAN. The difference between the two syntaxes is how you specify which ports are members of the VLAN and whether the ports are tagged or untagged. Syntax 1 is limited because it allows you to specify either tagged or untagged ports, but not both at the same time. On the other hand, you can use Syntax 2 to create a VLAN that has both types of ports. This is illustrated in the Examples section below.

When you create a new VLAN, untagged ports of the new VLAN are automatically removed from their current untagged VLAN assignment. This is because a port can be an untagged member of only one VLAN at a time. For example, creating a new VLAN with untagged Ports 1 to 4 automatically removes these ports from whichever VLAN they are currently untagged members.

The PVID of an untagged port is automatically changed to match the VID number of the VLAN where it is added. For instance, if you add port 4 as an untagged member of a VLAN with a VID of 15, the PVID for port 4 is automatically changed to 15.

Tagged ports of the new VLAN remain as tagged and untagged members of their current VLAN assignments. No change is made to a tagged port's current VLAN assignments, other than its addition to the new VLAN. This is because a tagged port can belong to more than one VLAN at a time. For example, if you add port 6 as a tagged port to a new VLAN, port 6 remains a member of its other current untagged and tagged VLAN assignments.

If the switch is using 802.1x port-based network access control, a port set to the authenticator or supplicant role must be changed to the 802.1x none role before its untagged VLAN assignment can be changed. After the VLAN assignment is made, the port's role can be changed back again to authenticator or supplicant, if necessary.

Examples

The following command uses Syntax 1 to create a port-based VLAN called Sales with a VID of 3. The VLAN consists of ports 4 to 8 and ports 12 to 16. All ports will be untagged ports in the VLAN:

```
create vlan=Sales vid=3 ports=4-8,12-16 frame=untagged
```

The following command uses Syntax 2 to create the same VLAN:

```
create vlan=Sales vid=3 untaggedports=4-8,12-16
```

In the following command, Syntax 1 is used to create a tagged VLAN called Production with a VID of 22. The VLAN consists of two tagged ports, ports 3 and 6:

```
create vlan=Production vid=22 ports=3,6 frame=tagged
```

The following command uses Syntax 2 to create the same VLAN:

```
create vlan=Sales vid=22 taggedports=3,6
```

You cannot use Syntax 1 to create a tagged VLAN that contains both untagged and tagged ports. For instance, suppose you wanted to create a VLAN called Service with a VID of 16 and untagged ports 1, 4, 5-7 and tagged ports 11 and 12. Creating this VLAN using Syntax 1 would actually require two commands. You would first need to create the VLAN, specifying either the untagged or tagged ports. As an example, the following command creates the VLAN and specifies the untagged ports:

```
create vlan=Service vid=16 ports=1,4,5-7 frame=untagged
```

Then, to add the other ports (in this case tagged ports), you would need to use the ADD VLAN command.

Syntax 2 allows you to create a VLAN of both tagged and untagged ports all in one command. Here is the command that would create our example:

```
create vlan=Service vid=16 untaggedports=1,4,5-7  
taggedports=11-12
```

The advantage of Syntax 2 over Syntax 1 is that you can create VLANs containing both types of ports with one rather than two commands.

DELETE VLAN

Syntax 1

```
delete vlan=name [vid=vid] ports=ports frame=untagged|tagged
```

Syntax 2

```
delete vlan=name [vid=vid] taggedports=ports  
untaggedports=ports
```

Parameters

vlan	Specifies the name of the VLAN to be modified.
vid	Specifies the VID of the VLAN to be modified. This parameter is optional.
ports	Specifies the ports to be removed from the VLAN. This parameter must be used with the FRAME parameter.
frame	Identifies the ports to be removed as tagged or untagged. This parameter must be used with the PORT parameter.
taggedports	Specifies the tagged ports to be removed from the VLAN.
untaggedports	Specifies the untagged ports to be removed from the VLAN.

Description

This command removes tagged and untagged ports from a port-based or tagged VLAN.

This command has two syntaxes. You can use either command to delete ports from a VLAN. The difference between the two is that Syntax 1 can remove only one type of port, tagged or untagged, at a time from a VLAN, while Syntax 2 allows you to remove both port types in the same command. This is illustrated in the Examples section below.

Note

To delete a VLAN, see “DESTROY VLAN” on page 502.

Note

You cannot change a VLAN's name or VID.

When you remove an untagged port from a VLAN, the following happens:

- ❑ The port is returned to the Default_VLAN as an untagged port.
- ❑ If the port is also a tagged member of other VLANs, those VLAN assignments are not changed. The port remains a tagged member of the other VLANs. For example, if you remove Port 4 from a VLAN, the port is automatically returned as an untagged port to the Default VLAN. If Port 4 is functioning as a tagged member in one or more other VLANs, it remains as a tagged member of those VLANs.
- ❑ If you remove an untagged port from the Default_VLAN without assigning it to another VLAN, the port is excluded as an untagged member from all VLANs on the switch.

When you remove a tagged port from a VLAN, all of its other tagged and untagged VLAN assignments remain unchanged.

If the switch is using 802.1x port-based network access control, a port set to the authenticator or supplicant role must be changed to the 802.1x none role before its untagged VLAN assignment can be changed. After the VLAN assignment is made, the port's role can be changed back again to authenticator or supplicant, if necessary.

Examples

The following command uses Syntax 1 to delete untagged ports 4 and 7 from a VLAN called Sales:

```
delete vlan=sales ports=4,7 frame=untagged
```

The following command does the same thing using Syntax 2:

```
delete vlan=sales untaggedports=4,7
```

The following command uses Syntax 1 to delete tagged port 13 from a VLAN called Production:

```
delete vlan=production ports=13 frame=tagged
```

The following command does the same thing using Syntax 2:

```
delete vlan=production untaggedports=13
```

To delete both tagged and untagged ports from a VLAN using Syntax 1 takes two commands. For example, if you had a VLAN called Service and you wanted to delete tagged port 2 and untagged ports 6 to 8, the commands would be:

```
delete vlan=Service ports=2 frame=tagged
```

```
delete vlan=Service ports=6-8 frame=untagged
```

Using Syntax 2, you can do the whole thing with just one command:

```
delete vlan=Service untaggedports=6-8 taggedports=2
```

DESTROY VLAN

Syntax

```
destroy vlan=name|vid|all
```

Parameters

vlan Specifies the name or VID of the VLAN to be deleted. To delete all VLANs, use the ALL option.

Description

This command deletes port-based, tagged, and MAC address-based VLANs from a switch. You can use the command to delete selected VLANs or all the VLANs on the switch. Note the following before using this command:

- ❑ You cannot delete the Default_VLAN.
- ❑ You cannot delete a VLAN if it has a routing interface. You must first delete the interface from the VLAN. To delete an interface, refer to “DELETE IP INTERFACE” on page 556.
- ❑ All untagged ports in a deleted VLAN are returned to the Default_VLAN as untagged ports.
- ❑ Static addresses assigned to the ports of a deleted VLAN become obsolete and should be deleted from the MAC address table. For instructions, refer to “DELETE SWITCH FDB|FILTER” on page 142.
- ❑ You cannot delete a VLAN if it is a monitored interface of a VRRP. To remove the VLAN from a monitored interface, refer to “DELETE VRRP MONITOREDINTERFACE” on page 602.

Examples

The following command deletes the Sales VLAN from the switch:

```
destroy vlan=Sales
```

The following command deletes the Sales VLAN using both the name and the VID:

```
destroy vlan=Sales vid=102
```

The following command deletes all port-based and tagged VLANs on a switch:

```
destroy vlan=all
```

SET SWITCH INFILTERING

Syntax

```
set switch infiltering=yes|no|on|off|true|false
```

Parameters

infiltering Specifies the operating status of ingress filtering. The options are:

yes, on, true Activates ingress filtering. The options are equivalent. This is the default.

no, off, false Deactivates ingress filtering. The options are equivalent.

Description

This command controls the status of ingress filtering. When ingress filtering is activated, which is the default, tagged frames are filtered when they are received on a port. When ingress filtering is deactivated, tagged frames are filtered before they are transmitted out a port. To view the current setting, use the “SHOW SWITCH” on page 60. For further information on ingress filtering, refer to the *AT-S63 Management Software Menus Interface User's Guide*.

Example

The following command deactivates ingress filtering:

```
set switch infiltering=off
```

SET SWITCH VLANMODE

Syntax

```
set switch vlanmode=userconfig|dotqmultiple|multiple
[uplinkport=port]
```

Parameters

vlanmode	Controls the switch's VLAN mode. Options are:	
	userconfig	This mode allows you to create your own port-based and tagged VLANs. This is the default setting.
	dotqmultiple	This option configures the switch for the 802.1Q-compliant multiple VLAN mode.
	multiple	This option configures the switch for the non-802.1Q compliant multiple VLAN mode.
uplinkport	Specifies the port on the switch to function as the uplink port when the switch is operating in one of the two multiple VLAN modes. You can specify only one port.	

Description

You use this command to configure the switch for one of the multiple VLAN modes or so that you can create port-based and tagged VLANs.

If you select one of the multiple VLAN modes, you must also set an uplink port with the UPLINKPORT parameter. You can specify only one uplink port.

Examples

The following command configures the switch for the 802.1Q-compliant multiple VLAN mode and specifies port 4 as the uplink port:

```
set switch vlanmode=dotqmultiple uplinkport=4
```

The following command sets the switch so that you can create your own port-based and tagged VLANs:

```
set switch vlanmode=userconfig
```


SET VLAN

Syntax

```
set vlan=name [vid=vid] type=portbased
```

Parameter

vlan	Specifies the name of the dynamic GVRP VLAN you want to convert into a static VLAN. To view VLAN names, refer to “SHOW VLAN” on page 506.
vid	Specifies the VID of the dynamic VLAN. To view VIDs, refer to “SHOW VLAN” on page 506. This parameter is optional.
type	Specifies the type of static VLAN to which the dynamic VLAN is to be converted. There is only one option: PORTBASED.

Description

This command converts a dynamic GVRP VLAN into a static tagged VLAN. You can perform this command to permanently retain the VLANs the switch learned through GVRP.

Note

This command cannot convert a dynamic GVRP port in a static VLAN into a static port. For that you must manually modify the static VLAN, specifying the dynamic port as either a tagged or untagged member of the VLAN.

Example

This command changes the dynamic VLAN GVRP_VLAN_22 into a static VLAN:

```
set vlan=gvrp_vlan_22 type=portbased
```

SHOW VLAN

Syntax

```
show vlan[=name|vid]
```

Parameter

vlan Specifies the name or VID of the VLAN.

Description

This command displays the VLANs on the switch. An example of the information displayed by this command for port-based and tagged VLANs is shown in Figure 43.

```

VLAN Name ..... Sales
VLAN ID ..... 4
VLAN Type ..... Port Based
Protected Ports ..... No
Untagged Port(s)
  Configured ..... 2,8-12
  Actual ..... 2,8-12
Tagged Port(s) ..... 24

VLAN Name ..... Engineering
VLAN ID ..... 5
VLAN Type ..... Port Based
Protected Ports ..... No
Untagged Port(s)
  Configured ..... 5-7
  Actual ..... 5-7
Tagged Port(s) ..... 24

```

Figure 43. SHOW VLAN Command for Port-based and Tagged VLANs

The information displayed by the command is described here:

- ❑ VLAN name - The name of the VLAN.
- ❑ VLAN ID - The ID number assigned to the VLAN.
- ❑ VLAN Type - The type of VLAN. This will be Port Based for port-based and tagged VLANs.
- ❑ Protected Ports - The status of protected ports. Since port-based and tagged VLANs are not protected ports VLANs, this will be No.
- ❑ Untagged port(s) - The untagged ports of the VLAN. The untagged ports are listed as follows.
 - Configured: The untagged ports assigned to the VLAN when the VLAN was created or modified.

- Actual: The current untagged ports of the VLAN. If you are not using 802.1x port-based network access control, both the Configured and Actual untagged ports of a VLAN will always be the same.

If you are using 802.1x and you assigned a guest VLAN to an authenticator port or you associated an 802.1x supplicant to a VLAN on the authentication server, it is possible for ports to be in different VLANs than the virtual LANs where they were originally assigned as untagged ports. In these situations, the Configured and Actual port lists can differ, with the Actual list detailing the ports that are currently functioning as untagged ports of the VLAN.

For example, if a particular port is listed as a Configured member of a VLAN, but not as an Actual member, that would mean either the port is currently a part of a Guest VLAN or the supplicant who logged on the port was associated with a VLAN assignment on the authentication server.

- ❑ Tagged port(s) - The tagged ports of the VLAN. A tagged port can belong to more than one VLAN at a time.

An example of the information displayed by this command for the 802.1Q-compliant multiple VLAN mode is shown in Figure 44.

```
VLAN Mode: Pre Configured (802.1Q Multiple VLANs)
VLAN Information:

VLAN Name ..... Client_VLAN_1
VLAN ID ..... 1
VLAN Type ..... Port Based
Protected Ports ..... No
Untagged Port(s) ..... 1
Tagged Port(s) ..... 23

VLAN Name ..... Client_VLAN_2
VLAN ID ..... 2
VLAN Type ..... Port Based
Protected Ports ..... No
Untagged Port(s) ..... 2
Tagged Port(s) ..... 23

VLAN Name ..... Client_VLAN_3
VLAN ID ..... 3
VLAN Type ..... Port Based
Protected Ports ..... No
Untagged Port(s) ..... 3
Tagged Port(s) ..... 23
```

Figure 44. SHOW VLAN Command for the 802.1Q-compliant Multiple VLAN Mode

The information displayed by the command is described here:

- ❑ VLAN name - The name of the VLAN. The name is Client_VLAN followed by the port number.
- ❑ VLAN ID - The ID number assigned to the VLAN.
- ❑ VLAN Type - The type of VLAN. This will be Port Based for the VLANs of a multiple VLAN mode.
- ❑ Protected Ports - The status of protected ports. Since the VLANs of a multiple VLAN mode are not protected ports VLANs, this will be No.
- ❑ Untagged port(s) - The untagged port of the VLAN.
- ❑ Tagged port(s) - The tagged port that is functioning as the uplink port for the VLANs.

For an example of the information displayed by this command for a protected ports VLAN, see Figure 45 on page 531. For an example of a MAC address-based VLAN, see Figure 46 on page 541.

Examples

The following command displays all the VLANs on the switch:

```
show vlan
```

The following command displays information on just the Sales VLAN:

```
show vlan=sales
```

The following command displays information for the VLAN with the VID of 22:

```
show vlan=22
```

Chapter 29

GARP VLAN Registration Protocol Commands

This chapter contains the following commands:

- ❑ “DISABLE GARP” on page 510
- ❑ “ENABLE GARP” on page 511
- ❑ “PURGE GARP” on page 512
- ❑ “SET GARP PORT” on page 513
- ❑ “SET GARP TIMER” on page 514
- ❑ “SHOW GARP” on page 516
- ❑ “SHOW GARP COUNTER” on page 517
- ❑ “SHOW GARP DATABASE” on page 519
- ❑ “SHOW GARP GIP” on page 520
- ❑ “SHOW GARP MACHINE” on page 521

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE GARP

Syntax

```
disable garp=gvrp [gip]
```

Parameters

garp	Specifies the GARP application to be disabled. GVRP is the only GARP application supported by the AT-9400 Switch.
gip	Disables GARP Information Propagation (GIP).

Note

The online help for this command contains an STP option. The option is not supported.

Description

This command disables GVRP on the switch. After disabled, the switch will not learn any new dynamic GVRP VLANs or dynamic GVRP ports.

You can also use this command to disable GIP.

Note

Do not disable GIP if the switch is running GVRP. GIP is required for proper GVRP operation.

Examples

The following command disables GVRP on the switch:

```
disable garp=gvrp
```

The following command disables GIP only:

```
disable garp=gvrp gip
```

ENABLE GARP

Syntax

```
enable garp=gvrp [gip]
```

Parameters

garp	Specifies the GARP application to be activated. GVRP is the only GARP application supported by the AT-9400 Switch.
gip	Enables GARP Information Propagation (GIP).

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command enables GVRP on the switch. After activated, the switch will learn dynamic GVRP VLANs and dynamic GVRP ports.

You can also use this command to enable GIP. GIP must be enabled for GVRP to operate properly.

Examples

The following command enables GVRP on the switch:

```
enable garp=gvrp
```

The following command enables GIP only:

```
enable garp=gvrp gip
```

PURGE GARP

Syntax

```
purge garp=gvrp
```

Parameter

garp	Specifies the GARP application to be reset. GVRP is the only GARP application supported by the AT-9400 Switch.
------	--

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command disables GVRP and returns all GVRP parameters to their default settings. All GVRP-related statistics counters are returned to zero.

Example

The following command disables GVRP and returns all GVRP parameters to their default values:

```
purge garp=gvrp
```


SET GARP PORT

Syntax

```
set garp=gvrp port=port mode=normal|none
```

Parameters

garp	Specifies the GARP application to be configured. GVRP is the only GARP application supported by the AT-9400 Switch.				
port	Specifies the port to be configured. You can specify more than one port at a time.				
mode	Specifies the GVRP mode of the port. Modes are: <table><tr><td>normal</td><td>The port participates in GVRP. The port processes GVRP information and transmits PDUs. This is the default.</td></tr><tr><td>none</td><td>The port does not participate in GVRP. The port does not process GVRP information nor transmit PDUs.</td></tr></table>	normal	The port participates in GVRP. The port processes GVRP information and transmits PDUs. This is the default.	none	The port does not participate in GVRP. The port does not process GVRP information nor transmit PDUs.
normal	The port participates in GVRP. The port processes GVRP information and transmits PDUs. This is the default.				
none	The port does not participate in GVRP. The port does not process GVRP information nor transmit PDUs.				

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command sets a port's GVRP status. Set a port's mode to Normal if it is to learn remote VLANs and transmit PDUs. Set its mode to None if it is not to participate in GVRP.

Examples

The following command prevents ports 1 to 4 from participating in GVRP:

```
set garp=gvrp port=1-4 mode=none
```

The following command activates GVRP on port 3:

```
set garp=gvrp port=3 mode=normal
```

SET GARP TIMER

Syntax

```
set garp=gvrp timer [default] [jointime=value]  
[leavetime=value] [leavealltime=value]
```

Parameters

garp	Specifies the GARP application to be configured. GVRP is the only GARP application supported by the AT-9400 Switch.
default	Returns the GARP timers to their default settings.
jointime	Specifies the Join Timer in centiseconds, which are one hundredths of a second. The default is 20 centiseconds. If you change this timer, it must be in relation to the GVRP Leave Timer according to the following equation: $\text{Join Timer} \leq (2 \times (\text{GVRP Leave Timer}))$
leavetimer	Specifies the LeaveTimer in centiseconds, which are one hundredths of a second. The default is 60 centiseconds.
leavealltime	Specifies the LeaveAllTimer in centiseconds. The default is 1000 centiseconds.

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command sets the GARP timers.

Note

The settings for these timers must be the same on all GVRP-active network devices.

Examples

The following command sets the Join Period timer to 0.1 second, Leave Period timer to 0.35 seconds, and the LeaveAllPeriod timer to 11 seconds for all GVRP applications:

```
set garp=gvrp timer jointime=10 leavetime=35  
leavealltime=1100
```

The following command sets the timers to their default values:

```
set garp=gvrp timer default
```

SHOW GARP

Syntax

```
show garp=gvrp
```

Parameter

garp	Specifies the GARP application to display. GVRP is the only GARP application supported by the AT-9400 Switch.
------	---

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command displays current values for the following GARP application parameters:

- ☐ GARP application protocol
- ☐ GVRP status
- ☐ GVRP GIP status
- ☐ GVRP Join Time
- ☐ GVRP Leave Time
- ☐ GVRP Leaveall Time
- ☐ Port information
- ☐ Mode

Example

The following command displays GVRP information:

```
show garp=gvrp
```

SHOW GARP COUNTER

Syntax

```
show garp=gvrp counter
```

Parameter

garp	Specifies the GARP application to be displayed. GVRP is the only GARP application supported by the AT-9400 Switch.
------	--

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command displays the current values for the following GARP packet and message counters:

- ☐ GARP application
- ☐ Receive: Total GARP Packets
- ☐ Transmit: Total GARP Packets
- ☐ Receive: Invalid GARP Packets
- ☐ Receive Discarded: GARP Disabled
- ☐ Receive Discarded: Port Not Listening
- ☐ Transmit Discarded: Port Not Sending
- ☐ Receive Discarded: Invalid Port
- ☐ Receive Discarded: Invalid Protocol
- ☐ Receive Discarded: Invalid Format
- ☐ Receive Discarded: Database Full
- ☐ Receive GARP Messages: LeaveAll
- ☐ Transmit GARP Messages: LeaveAll
- ☐ Receive GARP Messages: JoinEmpty
- ☐ Transmit GARP Messages: JoinEmpty
- ☐ Receive GARP Messages: JoinIn
- ☐ Transmit GARP Messages: JoinIn
- ☐ Receive GARP Messages: LeaveEmpty
- ☐ Transmit GARP Messages: LeaveEmpty

- ❑ Receive GARP Messages: LeaveIn
- ❑ Transmit GARP Messages: LeaveIn
- ❑ Receive GARP Messages: Empty
- ❑ Transmit GARP Messages: Empty
- ❑ Receive GARP Messages: Bad Message
- ❑ Receive GARP Messages: Bad Attribute

Example

The following command displays information for all GARP application counters:

```
show garp=gvrp counter
```

SHOW GARP DATABASE

Syntax

```
show garp=gvrp db|database
```

Parameters

garp	Specifies the GARP application to be displayed. GVRP is the only GARP application supported by the AT-9400 Switch.
------	--

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command displays the following parameters for the internal database for the GARP application. Each attribute is represented by a GID index within the GARP application.

- ☐ GARP Application
- ☐ GID Index
- ☐ Attribute
- ☐ Used

Example

The following command displays the database for all GARP applications:

```
show garp=gvrp database
```

SHOW GARP GIP

Syntax

```
show garp=gvrp gip
```

Parameter

garp	Specifies the GARP application to be displayed. GVRP is the only GARP application supported by the AT-9400 Switch.
------	--

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command displays the following parameters for the GIP-connected ring for the GARP application:

- ☐ GARP Application
- ☐ GIP contact
- ☐ STP ID

Example

The following command displays the GIP-connected ring for all GARP applications:

```
show garp=gvrp gip
```


SHOW GARP MACHINE

Syntax

```
show garp=gvrp machine
```

Parameter

garp	Specifies the GARP application to be displayed. GVRP is the only GARP application supported by the AT-9400 Switch.
------	--

Note

The online help for this command contains an STP option. This option is not supported.

Description

This command displays the following parameters for the GID state machines for the GARP application. The output is shown on a per-GID index basis; each attribute is represented by a GID index within the GARP application.

- ☐ VLAN
- ☐ Port
- ☐ App
- ☐ Reg

Example

The following command displays GID state machines for all GARP applications:

```
show garp=gvrp machine
```


Protected Ports VLAN Commands

This chapter contains the following commands:

- ❑ “ADD VLAN GROUP” on page 524
- ❑ “CREATE VLAN PORTPROTECTED” on page 526
- ❑ “DELETE VLAN” on page 527
- ❑ “DESTROY VLAN” on page 529
- ❑ “SET VLAN” on page 530
- ❑ “SHOW VLAN” on page 531

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD VLAN GROUP

Syntax 1

```
add vlan=name|vid ports=ports frame=tagged|untagged
group=uplink|1..256
```

Syntax 2

```
add vlan=name|vid [taggedports=ports] [untaggedports=ports]
group=uplink|1..256
```

Parameters

vlan	Specifies the name or VID of the protected ports VLAN where ports are to be added. You can identify the VLAN by either its name or VID.
ports	Specifies the uplink port(s) or the ports of a group. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-22), or both (for example, 1, 5, 14-22). This parameter must be used with the FRAME parameter.
frame	Identifies the new ports as either tagged or untagged. This parameter must be used with the PORTS parameter.
taggedports	Specifies the tagged ports to be added to the VLAN.
untaggedports	Specifies the untagged ports to be added to the VLAN.
group	Specifies that the port(s) being added is an uplink port or belongs to a new group. If the port(s) being added is an uplink port, specify the UPLINK option. Otherwise, specify the group number for the port. The group range is 1 to 256. The number must be unique for each group on the switch.

Description

These commands perform two functions. One is to specify the uplink port of a protected ports VLAN. The other function is to add ports to groups within a VLAN.

Note the following before using this command:

- ❑ You must first create the protected ports VLAN by giving it a name and a VID before you can add ports. Creating a VLAN is accomplished with “CREATE VLAN PORTPROTECTED” on page 526.
- ❑ Both command syntaxes perform the same function. The difference is that with syntax 1 you can add ports of only one type, tagged or untagged, at a time. With syntax 2, you can add both at the same time.
- ❑ If you are adding an untagged port to a group, the port cannot be an untagged member of another protected port VLAN. It must be an untagged member of the Default_VLAN or a port-based or tagged VLAN. To remove a port from a protected port VLAN, use “DELETE VLAN” on page 527.
- ❑ You cannot add a new uplink port to a VLAN if the VLAN has already been assigned an uplink port. Instead, you must delete the existing uplink port(s) using the “DELETE VLAN” on page 527 and then re-add the uplink port(s) using this command.
- ❑ You cannot add ports to an existing group. To modify an existing group, you must delete the group by removing all ports from it, using “DELETE VLAN” on page 527, and then add the ports back to the group using this command.

Examples

The following command uses Syntax 1 to specify that port 11 is to be an untagged uplink port for the protected ports VLAN called InternetGroups:

```
add vlan=InternetGroups ports=11 frame=untagged group=uplink
```

The following command accomplishes the same thing using Syntax 2:

```
add vlan=InternetGroups untaggedports=11 group=uplink
```

The following command uses Syntax 1 to create group 4 in the InternetGroups VLAN. The group will consist of two untagged ports, 5 and 6:

```
add vlan=InternetGroups port=5,6 frame=untagged group=4
```

The following command does the same thing using Syntax 2:

```
add vlan=InternetGroups untaggedports=5,6 group=4
```

CREATE VLAN PORTPROTECTED

Syntax

```
create vlan=name vid=vid portprotected
```

Parameters

vlan	Specifies the name of the new protected ports VLAN. The name can be from one to fifteen alphanumeric characters in length. The name should reflect the function of the nodes that will be a part of the protected ports VLAN (for example, InternetGroups). The name cannot contain spaces or special characters, such as an asterisk (*) or exclamation point (!).
vid	Specifies a VID for the new protected ports VLAN. The range is 2 to 4094. This number must be unique from the VIDs of all other tagged, untagged, and port protected VLANs on the switch.

Description

This command is the first step to creating a protected ports VLAN. This command assigns a name and VID to the VLAN. The second step is to specify an uplink port and the port groups using “ADD VLAN GROUP” on page 524.

Examples

The following command creates a protected ports VLAN called InternetGroups and assigns it a VID of 12:

```
create vlan=InternetGroups vid=12 portprotected
```

DELETE VLAN

Syntax 1

```
delete vlan=name|vid ports=ports frame=tagged|untagged
```

Syntax 2

```
delete vlan=name|vid [taggedports=ports]  
[untaggedports=ports]
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified. You can specify the VLAN by its name or VID.
port	Specifies the port to be removed from the VLAN. You can specify more than one port at a time. This parameter must be used with the FRAME parameter.
frame	Identifies the ports to be removed as tagged or untagged. This parameter must be used with the PORT parameter.
taggedports	Specifies the tagged ports to be removed from the VLAN.
untaggedports	Specifies the untagged ports to be removed from the VLAN.

Description

This command removes ports from a protected ports VLAN. You can use this command to remove an uplink port or a port from a group.

Note the following before using this command:

- ❑ Both command syntaxes perform the same function. The difference is that with Syntax 1 you can delete ports of only one type, tagged or untagged, at a time. With Syntax 2, you can delete both types at the same time.
- ❑ Deleting all ports from a group deletes the group from the VLAN.
- ❑ Deleted untagged ports are returned to the Default_VLAN as untagged.
- ❑ You can delete ports from only one group at a time.

Examples

The following command uses Syntax 1 to delete untagged port 12 from the InternetGroups VLAN:

```
delete vlan=InternetGroups port=12 frame=untagged
```

The following command accomplishes the same thing using Syntax 2:

```
delete vlan=InternetGroups untaggedports=12
```


DESTROY VLAN

Syntax

```
destroy vlan=name|vid|all
```

Parameters

vlan	Specifies the name or VID of the VLAN to be destroyed. To delete all tagged, port-based, and protected ports VLANs on the switch, use the ALL option.
------	---

Description

This command deletes VLANs from the switch. You can use this command to delete tagged, port-based, and protected port VLANs. All untagged ports in a deleted VLAN are automatically returned to the Default_VLAN. You cannot delete the Default_VLAN.

Example

The following command deletes the VLAN called InternetGroups:

```
destroy vlan=InternetGroups
```

The following command deletes all VLANs:

```
destroy vlan=all
```

SET VLAN

Syntax

```
set vlan=name|vid port=ports frame=tagged|untagged
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified.
ports	Specifies the port whose VLAN type is to be changed. You can specify more than one port at a time. You can specify the ports individually (for example, 5, 7, 22), as a range (for example, 18-22), or both (for example, 1, 5, 14-22).
frame	Identifies the new VLAN type for the port. The type can be tagged or untagged.

Description

This command changes a port's VLAN type. You can use this command to change a tagged port to untagged and vice versa.

Before using this command, note the following:

- ❑ Changing a port in a port-based, tagged, or protected ports VLAN from untagged to tagged adds the port to the Default_VLAN as untagged.
- ❑ Changing a port in the Default_VLAN from untagged to tagged results in the port being an untagged member of no VLAN.
- ❑ Changing a port from tagged to untagged removes the port from its current untagged port assignment.

Examples

The following command changes port 4 in the Sales VLAN from tagged to untagged:

```
set vlan=Sales port=4 frame=untagged
```

SHOW VLAN

Syntax

```
show vlan[=name|vid]
```

Parameter

vlan Specifies the name or VID of the VLAN you want to view. Omitting this displays all VLANs.

Description

This command displays information about the VLANs on the switch. An example of the information displayed by this command for a protected ports VLAN is shown in Figure 45.

```
VLAN Name ..... Phone_staff_2
VLAN ID ..... 12
VLAN Type ..... Protected
Protected Ports ..... Yes
Uplink Port(s) ..... 23

Group (ports) ..... 1(14)
Group (ports) ..... 2(15)
Group (ports) ..... 3(16-17)
Group (ports) ..... 4(18-19)
Group (ports) ..... 5(20)
Untagged Port(s) ..... 14-20
Tagged Port(s) ..... 23
```

Figure 45. SHOW VLAN Command for a Protected Ports VLAN

The information displayed by this command is described here:

- ❑ VLAN name - The name of the VLAN.
- ❑ VLAN ID - The ID number assigned to the VLAN.
- ❑ VLAN Type - The type of VLAN. This will be Protected for a protected ports VLAN.
- ❑ Protected Ports - The status of protected ports. This will be Yes for a protected ports VLANs.
- ❑ Uplink Port(s) - The port that is functioning as the unlink port for the groups of the VLAN. There can be more than one uplink port.
- ❑ Group (ports) - The group number followed by the ports of the group.
- ❑ Untagged port(s) - The untagged ports of the VLAN.
- ❑ Tagged port(s) - The tagged ports of the VLAN.

For an example of the information displayed by this command for a port-based or tagged VLAN, see Figure 43 on page 506. For an example of a MAC address-based VLAN, see Figure 46 on page 541.

Examples

The following command displays all the VLANs on the switch:

```
show vlan
```

The following command displays the Sales VLAN:

```
show vlan=Sales
```

Chapter 31

MAC Address-based VLAN Commands

This chapter contains the following commands:

- ❑ “ADD VLAN MACADDRESS” on page 534
- ❑ “ADD VLAN PORT MACADDRESS” on page 535
- ❑ “CREATE VLAN TYPE=MACADDRESS” on page 536
- ❑ “DELETE VLAN MACADDRESS” on page 538
- ❑ “DELETE VLAN PORT MACADDRESS” on page 539
- ❑ “DESTROY VLAN” on page 540
- ❑ “SHOW VLAN” on page 541

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD VLAN MACADDRESS

Syntax

```
add vlan=name|vid macaddress|destaddress=mac-address
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified.
macaddress or destaddress	Specifies the MAC address to add to the VLAN. These parameters are equivalent. A MAC address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx

Description

This command adds a MAC address to a MAC address-based VLAN. You can add only one address at a time with this command. The command does not accept ranges or wildcards.

The VLAN must already exist. To create a MAC address-based VLAN, see “CREATE VLAN TYPE=MACADDRESS” on page 536. After you add a MAC address to a VLAN, you can assign it one or more egress ports using “ADD VLAN PORT MACADDRESS” on page 535.

Examples

The following command adds the MAC address 00:30:84:32:8A:5D to the Sales VLAN:

```
add vlan=sales macaddress=00:30:84:32:8a:5d
```

The following command adds the MAC address 00:30:84:32:76:1A to the VLAN with the VID 12:

```
add vlan=12 macaddress=00308432761a
```

ADD VLAN PORT MACADDRESS

Syntax

```
add vlan=name|vid port=ports macaddress|destaddress=mac-  
address
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified.
port	Specifies the egress port(s) to assign to the MAC address. You can specify more than one egress port.
macaddress or destaddress	Specifies the MAC address to be assigned the egress port(s). The MAC address can be entered in either of the following formats:

xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx

Description

This command assigns egress ports to a MAC address in a MAC address-based VLAN. The MAC address must already be in the VLAN before you can assign it egress ports. To assign a MAC address to a VLAN, refer to “ADD VLAN MACADDRESS” on page 534.

Examples

The following command assigns ports 1 and 4 as egress ports for the MAC address 00:30:84:32:8A:5D in the Sales VLAN:

```
add vlan=sales port=1,4 macaddress=00:30:84:32:8a:5d
```

The following command assigns port 11 to 14 as egress ports for the MAC address 00:30:84:75:11:B2 from the VLAN with the VID 24:

```
add vlan=24 port=11-14 macaddress=00:30:84:75:11:b2
```

CREATE VLAN TYPE=MACADDRESS

Syntax

```
create vlan=name vid=vid type=macaddress
```

Parameters

vlan Specifies the name of the VLAN. You must assign a name to a VLAN.

The name can be from 1 to 20 characters in length and should reflect the function of the nodes that will be a part of the VLAN (for example, Sales or Accounting). The name cannot contain spaces or special characters, such as asterisks (*) or exclamation points (!).

The name cannot be the same as the name of an existing VLAN on the switch.

If the VLAN is unique in your network, then the name needs to be unique as well. If the VLAN spans multiple switches, then the name for the VLAN should be the same on each switch.

vid Specifies the VLAN identifier. The range is 2 to 4094. The VLAN must be assigned a VID.

You cannot use the VID 1, which is reserved for the Default_VLAN.

The VID cannot be the same as the VID of an existing VLAN on the switch.

If this VLAN is unique in your network, then its VID should also be unique. If this VLAN is part of a larger VLAN that spans multiple switches, then the VID value for the VLAN should be the same on each switch. For example, if you are creating a VLAN called Sales that spans three switches, assign the Sales VLAN on each switch the same VID value.

type Specifies the type of VLAN. To create a MAC address-based VLAN, the type must be MACADDRESS.

Description

This command is the first in the series to creating a MAC address-based VLAN. This command assigns the VLAN a name and a VID and sets the VLAN type. After you have initially created the VLAN with this command, you must assign the MAC addresses. These are the source addresses of the nodes that are to belong to the VLAN. The command for adding MAC addresses to a VLAN is “ADD VLAN MACADDRESS” on page 534.

The final step to creating a new MAC address-based VLAN is assigning the egress ports to the MAC addresses. The command for this is “ADD VLAN PORT MACADDRESS” on page 535.

Examples

The following command creates a MAC address-based VLAN called Sales and assigns it a VID of 3:

```
create vlan=Sales vid=3 type=macaddress
```

DELETE VLAN MACADDRESS

Syntax

```
delete vlan=name|vid macaddress|destaddress=mac-address
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified.
macaddress or destaddress	Specifies the MAC address to be removed from the VLAN. These parameters are equivalent. You can remove only one MAC address at a time. A MAC address can be entered in either of the following formats:

XX:XX:XX:XX:XX:XX or XXXXXXXXXXXX

Description

This command removes MAC addresses from a MAC address-based VLAN. You can remove only one MAC address at a time with this command.

You cannot remove a MAC address if it has been assigned egress ports. You must first remove the ports from the MAC address before you can delete it. To remove egress ports from a MAC address, refer to “DELETE VLAN PORT MACADDRESS” on page 539.

Examples

The following command removes the MAC address 00:30:84:32:8A:5D from the Sales VLAN:

```
delete vlan=Sales macaddress=00:30:84:32:8A:5D
```

The following command removes the MAC address 00:30:84:75:11:B2 from the VLAN with the VID 24:

```
delete vlan=24 macaddress=0030847511b2
```

DELETE VLAN PORT MACADDRESS

Syntax

```
delete vlan=name|vid port=ports macaddress=mac-address
```

Parameters

vlan	Specifies the name or VID of the VLAN to be modified.
port	Specifies the egress port to be removed for the MAC address. You can remove more than one egress port at a time.
macaddress	Specifies a MAC address to which the port is assigned. A MAC address can be entered in either of the following formats: xx:xx:xx:xx:xx:xx or xxxxxxxxxxxx

Description

This command removes egress ports from a MAC address of a MAC address-based VLAN. You might remove an egress port from a MAC address-based VLAN if you no longer want it to be a part of the VLAN.

Examples

The following command removes port 4 from the MAC address 00:30:84:32:8A:5D in the Sales VLAN:

```
delete vlan=Sales port=4 macaddress=00:30:84:32:8A:5D
```

The following command removes ports 11 to 14 from the MAC address 00:30:84:75:11:B2 in the VLAN with the VID 24:

```
delete vlan=24 port=11-14 macaddress=0030847511b2
```

DESTROY VLAN

Syntax

```
destroy vlan vlan=name|all [vid=vid]
```

Parameters

vlan	Specifies the name of the VLAN to be deleted. To delete all VLANs, use the ALL option.
vid	Specifies the VID of the VLAN to be deleted. This parameter is optional.

Description

The command deletes port-based, tagged, and MAC address-based VLANs. You can use the command to delete selected VLANs or to delete all VLANs, with the exception of the Default_VLAN.

Examples

The following command deletes the Sales VLAN from the switch:

```
destroy vlan vlan=Sales
```

The following command deletes the Sales VLAN using both the name and the VID:

```
destroy vlan vlan=Sales vid=102
```

The following command deletes all port-based and tagged VLANs on a switch:

```
destroy vlan=all
```

SHOW VLAN

Syntax

```
show vlan[=name|vid]
```

Parameter

vlan Specifies the name or VID of the VLAN.

Description

This command displays the VLANs on the switch. An example of the information displayed by this command for a MAC address-based VLAN is shown in Figure 46.

```
VLAN Name ..... Sales
VLAN ID ..... 4
VLAN Type ..... MAC Based
Protected Ports ..... No
Untagged Port(s) ..... None
Tagged Port(s) ..... None
```

MAC Associations:

Total number of associated MAC addresses: 5

MAC Address	Ports
00:06:5B:44:44:44	4-8
00:06:5B:55:55:55	4
00:06:5B:66:66:66	4
00:06:5B:77:77:77	4
00:06:5B:88:88:88	4

Figure 46. SHOW VLAN Command for a MAC Address-based VLAN

The information displayed by the command is described here:

- ❑ VLAN name - The name of the VLAN.
- ❑ VLAN ID - The ID number assigned to the VLAN.
- ❑ VLAN Type - The type of VLAN. This will be MAC Based for a MAC address-based VLAN.
- ❑ Protected Ports - The status of protected ports. This will be No for a MAC address-based VLAN.
- ❑ Untagged port(s) - The untagged ports of the VLAN. This will be None for a MAC address-based VLAN.
- ❑ Tagged port(s) - The tagged ports of the VLAN. This will be None for a MAC address-based VLAN.

- ❑ **MAC Address / Ports** - The MAC addresses of the VLAN and the egress ports.

For an example of the information displayed by this command for a port-based or tagged VLAN, see Figure 43 on page 506. For an example of a protected ports VLAN, see Figure 45 on page 531.

Examples

The following command displays all the VLANs on the switch:

```
show vlan
```

The following command displays information on only the Sales VLAN:

```
show vlan=sales
```

The following command displays information the VLAN with the VID of 22:

```
show vlan=22
```

Section VII

Routing

This section contains the following chapters:

- ❑ Chapter 32, “Internet Protocol Version 4 Packet Routing Commands” on page 545
- ❑ Chapter 33, “BOOTP Relay Commands” on page 587
- ❑ Chapter 34, “Virtual Router Redundancy Protocol (VRRP) Commands” on page 595

Internet Protocol Version 4 Packet Routing Commands

This chapter has the following commands:

- ❑ “ADD IP ARP” on page 546
- ❑ “ADD IP INTERFACE” on page 548
- ❑ “ADD IP RIP” on page 550
- ❑ “ADD IP ROUTE” on page 553
- ❑ “DELETE IP ARP” on page 555
- ❑ “DELETE IP INTERFACE” on page 556
- ❑ “DELETE IP RIP” on page 557
- ❑ “DELETE IP ROUTE” on page 558
- ❑ “DISABLE IP ROUTE MULTIPATH” on page 559
- ❑ “ENABLE IP ROUTE MULTIPATH” on page 560
- ❑ “PURGE IP” on page 561
- ❑ “SET IP ARP” on page 562
- ❑ “SET IP ARP TIMEOUT” on page 563
- ❑ “SET IP INTERFACE” on page 564
- ❑ “SET IP LOCAL INTERFACE” on page 566
- ❑ “SET IP RIP” on page 567
- ❑ “SET IP ROUTE” on page 570
- ❑ “SHOW IP ARP” on page 572
- ❑ “SHOW IP COUNTER” on page 574
- ❑ “SHOW IP INTERFACE” on page 576
- ❑ “SHOW IP RIP COUNTER” on page 578
- ❑ “SHOW IP RIP INTERFACE” on page 580
- ❑ “SHOW IP ROUTE” on page 582

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD IP ARP

Syntax

```
add ip arp=ipaddress interface=interface port=port
ethernet=macaddress
```

Parameters

arp	Specifies the IP address of the host. The IP address must be a member of a local subnet or network that has a routing interface on the switch.
interface	Specifies the name of the interface from where the host is reached. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).
port	Specifies the physical port on the switch where the host is reached.
ethernet	Specifies the MAC address of the host. The MAC address can be entered in either of the following formats: xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx

Description

This command adds a static ARP entry to the ARP cache. This is typically used to add entries for local hosts that do not support ARP or to speed up the address resolution function for a host. The ARP entry must not already exist in the cache. The switch can support up to 1024 static ARP entries.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command adds a static ARP entry for a host with an IP address of 149.42.67.8 and a MAC address of 00:06:5B:BB:72:88. The host is a member of the subnet of the VLAN8-0 interface and is located on port 15:

```
add ip arp=149.42.67.8 interface=vlan8-0 port=15
ethernet=00:06:5b:bb:72:88
```

This command adds a static ARP entry for a host with an IP address of 149.124.85.14 and a MAC address of 00:06:7A:22:11:A4. The host is located on port 6 in the VLAN14-1 interface:

```
add ip arp=149.124.85.14 interface=vlan14-1 port=6  
ethernet=00:06:7a:22:11:a4
```

ADD IP INTERFACE

Syntax

```
add ip interface=interface ipaddress=ipaddress [dhcp|bootp
[mask|netmask=subnetmask] [ripmetric=value]
```

Parameters

interface	Specifies a name for the new routing interface. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). The range of the interface number is 0 to 15.
ipaddress	Specifies an IP address for the interface. The address must be a unique member of the subnet or network where the interface is to be assigned. You can assign an address manually or activate the DHCP or BOOTP client and have a DHCP or BOOTP server on the network assign the address automatically. When there is more than one interface in a VLAN, only one of the interfaces can obtain its IP address from a DHCP or BOOTP server. The IP addresses of the other interfaces in the same VLAN must be assigned manually.
mask or netmask	Specifies the subnet mask of the IP address of the routing interface. Do not specify a mask if the IP address will be assigned by a DHCP or BOOTP server. The default value is based on the address’ network type. The default values are: Class A address - 255.0.0.0 Class B address - 255.255.0.0 Class C address - 255.255.255.0

Note

In version 2.0.0, the routing table supported only these three values for subnet masks. In all later versions, subnet masks can be of variable lengths, provided that the “1” bits are consecutive (e.g., 128, 192, 224, etc.).

ripmetric	Specifies the cost of crossing the interface for RIP. The range is 1 to 16. The default is 1.
-----------	---

Description

This command creates a new interface for routing IPv4 packets to a local network or subnet. Note the following before using this command:

- ❑ The VLAN must already exist on the switch.
- ❑ You cannot assign more than one interface to the same local network or subnet on a switch.
- ❑ When there are multiple interfaces within a VLAN, each must be assigned a unique interface number.
- ❑ Only one interface in a VLAN can obtain its IP configuration from a DHCP or BOOTP server.
- ❑ If an interface is configured to use the DHCP or BOOTP client to obtain its IP address and subnet mask, it does not participate in IP routing until its IP address and subnet mask have been obtained from the DHCP or BOOTP server.
- ❑ The AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches support only one routing interface.

Examples

This command creates an interface with an IP address 149.123.44.56 and a mask of 255.255.255.0. The interface is assigned to the VLAN with the VID of 6 and given the interface number 0. Since no RIP metric is specified, the default value of 1 is applied to the interface:

```
add ip interface=vlan6-0 ipaddress=149.123.44.56
netmask=255.255.255.0
```

This command creates an interface with an IP address 149.211.126.14 and a mask of 255.255.240.0. The interface is assigned to the VLAN with the VID of 24 and given the interface number 2. The RIP hop count for the interface is set to 2:

```
add ip interface=vlan24-2 ipaddress=149.211.126.14
netmask=255.255.240.0 ripmetric=2
```

This command creates an interface with an IP address and subnet mask set by a DHCP server. The interface is assigned to the VLAN with the VID of 18 and given the interface number 1. The hop count for RIP is increased to 4:

```
add ip interface=vlan18-1 ipaddress=dhcp ripmetric=4
```

ADD IP RIP

Syntax

```
add ip rip interface=interface [send=rip1|rip2]
[receive=rip1|rip2|both] [authentication=pass|none]
[password=password]
[poisonreverse=yes|no|on|off|true|false]
[autosummary=yes|no|on|off|true|false]
```

Parameters

interface	Specifies the name of the routing interface where RIP is to be added. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).						
send	Specifies the version of RIP packets to be sent by the routing protocol. Options are: <table> <tr> <td>rip1</td><td>Sends RIP version 1 packets. This is the default value.</td></tr> <tr> <td>rip2</td><td>Sends RIP version 2 packets.</td></tr> </table>	rip1	Sends RIP version 1 packets. This is the default value.	rip2	Sends RIP version 2 packets.		
rip1	Sends RIP version 1 packets. This is the default value.						
rip2	Sends RIP version 2 packets.						
receive	Specifies the version of RIP packets to be accepted by the routing protocol. Options are: <table> <tr> <td>rip1</td><td>Accepts RIP version 1 packets.</td></tr> <tr> <td>rip2</td><td>Accepts RIP version 2 packets.</td></tr> <tr> <td>both</td><td>Accepts RIP version 1 and 2 packets. This is the default value.</td></tr> </table>	rip1	Accepts RIP version 1 packets.	rip2	Accepts RIP version 2 packets.	both	Accepts RIP version 1 and 2 packets. This is the default value.
rip1	Accepts RIP version 1 packets.						
rip2	Accepts RIP version 2 packets.						
both	Accepts RIP version 1 and 2 packets. This is the default value.						
authentication	Specifies whether there is password protection. This option only applies to RIP version 2. Options are: <table> <tr> <td>pass</td><td>Specifies password protection. The password is assigned with the PASSWORD parameter.</td></tr> <tr> <td>none</td><td>Specifies no password protection. This is the default setting.</td></tr> </table>	pass	Specifies password protection. The password is assigned with the PASSWORD parameter.	none	Specifies no password protection. This is the default setting.		
pass	Specifies password protection. The password is assigned with the PASSWORD parameter.						
none	Specifies no password protection. This is the default setting.						
password	Specifies the password used to authenticate RIP version 2 packets. The password can be up to sixteen alphanumeric characters. The password is case sensitive and can include the hyphen and underscore.						

Passwords are sent in plaintext. The AT-S63 Management Software does not support encrypted passwords.

Passwords are not supported in RIP version 1.

poisonreverse	Specifies the status for split horizon and split horizon with poison reverse. The options are:	
yes, on, true	Split horizon with poison reverse is enabled. These values are equivalent.	
no, off, false	Split horizon with poison reverse is disabled, and split horizon is executed. This is the default setting. These values are equivalent.	
autosummary	Specifies the status of autosummary of routes. The options are:	
yes, on, true	Activates autosummarization of routes. These values are equivalent.	
no, off, false	Disables autosummarization. This is the default setting. These values are equivalent.	

Description

This command adds RIP to an interface. It also controls the type of RIP packets sent to and accepted by the interface.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command adds RIP to the VLAN5-0 interface and configures the routing protocol to send and accept only version 1 packets. No password is specified since RIP version 1 does not support passwords.

```
add ip rip interface=vlan5-0 send=rip1 receive=rip1
```

This command adds RIP to the VLAN10-0 interface and configures the routing protocol to send version 2 packets and accept packets of either version. Password protection is not used:

```
add ip rip interface=vlan10-0 send=rip2 receive=both
authentication=none
```

This command adds RIP to the VLAN12-2 interface. It configures the protocol to send version 2 packets and accept packets of either version. The password “net25aqy” is used for authentication:

```
add ip rip interface=vlan12-2 send=rip2 receive=both  
authentication=pass password=net25aqy
```


ADD IP ROUTE

Syntax

```
add ip route=ipaddress [interface=interface]
nexthop=ipaddress [mask=subnetmask] [metric=value]
[preference=value]
```

Parameters

route	Specifies the IP address of the destination network, subnet, or node. The IP address for a default route is 0.0.0.0.
interface	Specifies the name of the routing interface where the static route is to be added. To view the interfaces on the switch, refer to "SHOW IP INTERFACE" on page 576. This parameter is optional. The switch automatically determines the appropriate interface by adding a route to the interface whose IP address is a member of the same subnet as the next hop. (An error message is displayed if you try to add a route to an interface whose IP address is a member of a different subnet than the next hop in the route.)
nexthop	Specifies the IP address of the next hop for the route. The next hop's IP address must be a member of a local subnet on the switch and the subnet must have an interface.
mask	Specifies the subnet mask of the destination IP address of the static route. The default value is based of the address' network type. The default values are: Class A address - 255.0.0.0 Class B address - 255.255.0.0 Class C address - 255.255.255.0 Do not include a mask for the default route.

Note

In version 2.0.0, the routing table supported only these three values for subnet masks. In all later versions, subnet masks can be of variable lengths, provided that the "1" bits are consecutive (e.g., 128, 192, 224, etc.).

metric	Specifies the cost of crossing the route. The range is 1 to 16. The default is 1.
preference	Assigns a preference value to the static route. The switch uses the preference values to select the active routes when there are more than eight static or dynamic routes in the routing table to the same remote destination. The range is 0 to 65535. The lower the value, the higher the preference. The default value for a static route is 60. The default value for the default route is 360.

Description

For AT-9400 Switches that support IPv4 packet routing, this command creates new static routes and a default route.

The only route you can define on a switch that does not support IPv4 packet routing is a default route. The default route specifies the switch's default gateway. You cannot create any static routes. The management software uses the default route to communicate with other network devices, such as syslog and RADIUS servers, on a remote subnet when performing a management function.

Examples

This command adds a static route to a remote subnet with the IP address 149.124.55.0 and a mask of 255.255.255.0. The IP address of the next hop is 149.111.12.4. Specifying an interface is unnecessary since the management software automatically adds the route to whichever interface is a member of the same subnet as the next hop:

```
add ip route=149.124.55.0 nexthop=149.111.12.4
mask=255.255.255.0
```

This command adds a static route to a remote subnet with the IP address 149.14.150.0 and the mask 255.255.224.0. The IP address of the next hop is 162.76.44.12. The metric for the route is 5 and the preference is 25:

```
add ip route=162.14.150.0 nexthop=162.76.44.12
mask=255.255.224.0 metric=5 preference=25
```

This command adds a default route. The IP address of the next hop is 172.211.16.12. No mask is specified for a default route. As with a static route, specifying an interface for the default route is unnecessary since the switch automatically adds the route to the interface on the same subnet as the next hop:

```
add ip route=0.0.0.0 nexthop=172.211.16.12
```

DELETE IP ARP

Syntax

```
delete ip arp=ipaddress
```

Parameters

arp	Specifies the IP address of the host to be deleted from the ARP cache.
-----	--

Description

This command deletes static and dynamic ARP entries from the ARP cache. This command can delete only one ARP entry at a time. To view the entries in the cache, refer to “SHOW IP ARP” on page 572.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Example

This command deletes the ARP entry for a host with the IP address 149.42.67.8:

```
delete ip arp=149.42.67.8
```

DELETE IP INTERFACE

Syntax

```
delete ip interface=interface
```

Parameters

interface	Specifies the name of the interface to be deleted from the switch. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).
-----------	--

Description

This command deletes an interface from the switch. You can only delete one interface at a time. To display the names of the existing interfaces, refer to “SHOW IP INTERFACE” on page 576.

Note the following before performing this command:

- ❑ All IPv4 packet routing to the local network or subnet of a deleted interface ceases.
- ❑ All static routes assigned to the interface are deleted from the route table.
- ❑ Deleting an interface used by the AT-S63 Management Software to access a network management device (e.g., a RADIUS or syslog server) causes the switch to stop performing the management function. Deleting the local interface on a master switch disables the device’s ability to function as the master switch of the stack.
- ❑ Deleting the local interface of a switch during a remote Telnet or SSH management session immediately ends the session if you accessed the switch directly (i.e., not through enhanced stacking). To continue managing the switch, you must start a local management session using the Terminal Port on the unit.

Examples

This command deletes the VLAN6-2 interface from the switch:

```
delete ip interface=vlan6-2
```

This command deletes an interface using the name of the VLAN, in this case Sales, instead of the VID:

```
delete ip interface=vlan-Sales-2
```

DELETE IP RIP

Syntax

```
delete ip rip interface=interface
```

Parameters

interface	Specifies the name of the interface where RIP is to be removed. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).
-----------	---

Description

This command removes RIP from an interface, which stops the interface from routing packets with RIP. However, an interface, even without RIP, can route packets to other interfaces on the same switch and to remote networks and subnets using static routes.

To view the names of the interfaces using RIP, refer to "SHOW IP RIP COUNTER" on page 578.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command removes RIP from the VLAN8-0 interface:

```
delete ip rip interface=vlan8-0
```

DELETE IP ROUTE

Syntax

```
delete ip route=ipaddress [interface=interface]  
nexthop=ipaddress mask=subnetmask
```

Parameters

route	Specifies the destination IP address of the static, dynamic, or default route to be deleted. The IP address for the default route is 0.0.0.0.
interface	Specifies the name of the interface where the static or dynamic route is assigned. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). This parameter is optional.
nexthop	Specifies the IP address of the next hop of the route. The next hop is required when deleting a static or dynamic route, but not when deleting a default route.
mask	Specifies the subnet mask for the destination IP address. The mask for the default route is 255.255.255.255.

Description

This command deletes static, dynamic, and default routes from the routing table. To display the existing routes, refer to "SHOW IP ROUTE" on page 582.

Examples

This command deletes the static route to the remote subnet 149.124.55.0 with the subnet mask 255.255.255.0 and the next hop 149.124.22.12

```
delete ip route=149.124.55.0 mask=255.255.255.0  
nexthop=149.124.22.12
```

This command deletes the default route:

```
delete ip route=0.0.0.0 mask=255.255.255.255
```

DISABLE IP ROUTE MULTIPATH

Syntax

```
disable ip route multipath
```

Parameters

None.

Description

This command disables the ECMP feature. When the feature is disabled, the routing table in the switch will route packets to a specific remote destination using only one route even in cases where the table contains multiple static or dynamic routes to the destination. Additional routes to the same destination are placed in a standby mode. The default setting for ECMP is enabled. To view the current status of ECMP on the switch, use the SHOW IP ROUTE command with the GENERAL parameter. For instructions, refer to “SHOW IP ROUTE” on page 582.

Example

The following example disables ECMP on the switch:

```
disable ip route multipath
```

ENABLE IP ROUTE MULTIPATH

Syntax

```
enable ip route multipath
```

Parameters

None.

Description

This command enables the ECMP feature. When this feature is enabled, the routing table in the switch routes packets to a specific remote destination using more than one route when the table contains multiple static or dynamic routes to the destination. The table can contain up to 32 routes to the same destination and up to eight of the routes can be active at one time. The default setting for ECMP is enabled. To view the current status of ECMP on the switch, use the `SHOW IP ROUTE` command with the `GENERAL` parameter. For instructions, refer to “`SHOW IP ROUTE`” on page 582.

Example

The following example enables ECMP on the switch:

```
enable ip route multipath
```


PURGE IP

Syntax

```
purge ip
```

Parameters

None.

Description

This command deletes all routing interfaces on the switch. Note the following before performing this command:

- ❑ All IPv4 packet routing on the switch ceases. The device, however, continues to switch packets among the ports within the VLANs (but not across the VLAN boundaries) using Layer 2.
- ❑ All static routes are deleted from the route table.
- ❑ The AT-S63 Management Software stops performing those management functions that require access to a network management device (e.g., a RADIUS server).
- ❑ Deleting all interfaces deletes the local interface. This prohibits you from remotely managing the device with a Telnet or SSH client, or with a web browser.
- ❑ Deleting all interfaces during a remote Telnet or SSH management session immediately ends your session. To continue managing the switch, you must start a local management session using the Terminal Port on the unit.
- ❑ Deleting all interfaces on the master switch of an enhanced stack disables the device's ability to function as the master switch of the stack.

Example

This command deletes all routing interfaces on the switch:

```
purge ip interface
```

SET IP ARP

Syntax

```
set ip arp=ipaddress [interface=interface] [port=port]
[ethernet=macaddress]
```

Parameters

arp	Specifies the IP address of the static route entry to be modified.
interface	Specifies the interface where the host is located. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). The interface must already exist on the switch.
port	Specifies a new physical port on the switch where the host is located.
ethernet	Specifies a new MAC address of the host. The MAC address can be entered in either of the following formats: xxxxxxxxxxxx or xx:xx:xx:xx:xx:xx

Description

This command modifies an existing static ARP entry in the ARP cache. You can change all of the settings of an entry, except the IP address. To change the IP address, you must delete the entry and add it again. To view the ARP entries, refer to "SHOW IP ARP" on page 572.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command modifies the port number for the static ARP entry with the IP address 149.42.67.8:

```
set ip arp=149.42.67.8 port=24
```

This command changes the MAC address for the static ARP entry with the IP address 149.124.85.14:

```
set ip arp=149.124.85.14 ethernet=00:06:7a:22:11:24
```

SET IP ARP TIMEOUT

Syntax

```
set ip arp timeout=integer
```

Parameter

timeout	Specifies the ARP cache timeout value. The range is 150 to 260000 seconds. The default setting is 600 seconds.
---------	--

Description

This command sets the ARP cache timeout value. The timer prevents the ARP table from becoming full with inactive entries. An entry that is not used for the length of the timeout period is designated as inactive and deleted from the table.

Example

The following command sets the timer to 400 seconds:

```
set ip arp timeout=400
```

SET IP INTERFACE

Syntax

```
set ip interface=interface|eth0
[ipaddress=ipaddress|dhcp|bootp] [mask|netmask=subnetmask]
[ripmetric=value]
```

Parameters

interface	Specifies the name of the routing interface to be modified. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). The “eth0” value can be used in place of the interface name to specify the local interface.
ipaddress	Specifies a new IP address for the interface.
mask or netmask	Specifies a new subnet mask for the interface. Do not specify a mask if the IP address is assigned by a DHCP or BOOTP server. To change the subnet mask, you must also include the IP address of the interface. The default value is based on the address’ network type. The default values are: Class A address - 255.0.0.0 Class B address - 255.255.0.0 Class C address - 255.255.255.0

Note

In version 2.0.0, the routing table supported only these three values for subnet masks. In all later versions, subnet masks can be of variable lengths, provided that the “1” bits are consecutive (e.g., 128, 192, 224, etc.).

ripmetric	Specifies the new cost of crossing the interface for RIP. The range is 1 to 16. The default is 1.
-----------	---

Description

This command modifies the IP address, subnet mask and RIP metric attribute of an existing routing interface. To initially create an interface, refer to “ADD IP INTERFACE” on page 548. To view the interfaces, refer to “SHOW IP INTERFACE” on page 576

Note the following before performing this command:

- ❑ Modifying the IP address of a routing interface deletes all static routes assigned to the interface.
- ❑ Modifying the IP address of a routing interface that has RIP removes the routing protocol from the interface and deletes all RIP routes learned on the interface from the routing table.
- ❑ You cannot change the name of a routing interface. You must delete the interface and recreate it to change its VID or interface number.
- ❑ You can specify the local interface two ways. You can specify its interface name (for example, VLAN5-1) or use the “eth0” value. The “0” in the value is not a VID, as in an interface name. Rather, the “eth0” value signifies the local interface. To designate the local interface of a switch, refer to “SET IP LOCAL INTERFACE” on page 566.

Examples

This command changes the IP address of the VLAN7-0 interface to 149.188.27.55 and the subnet mask to 255.255.255.0:

```
set ip interface=vlan7-0 ipaddress=149.188.27.55
mask=255.255.255.0
```

This command activates the DHCP client on the VLAN 28-5 interface so that it obtain its IP address and subnet mask from a DHCP server:

```
set ip interface=vlan28-5 ipaddress=dhcp
```

This command changes the RIP metric for the VLAN12-0 interface to 2:

```
set ip interface=vlan12-0 ripmetric=2
```

This command changes the IP address and subnet mask of the local interface to 149.24.252.6 and 255.255.240.0, respectively. The example uses “eth0” rather than the interface name to designate the local interface:

```
set ip interface=eth0 ipaddress=149.24.252.6
mask=255.255.240.0
```

SET IP LOCAL INTERFACE

Syntax

```
set ip local interface=interface|none
```

Parameters

interface	Specifies the name of the interface to act as the local interface on the switch. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). Use the NONE option to remove the currently assigned local interface without assigning a new one. The default is no local interface.
-----------	---

Description

This command specifies the local interface of the switch. The selected interface must already exist on the switch. The local interface is used for enhanced stacking and for remote management of the unit with a Telnet or SSH client, or a web browser. A switch can have only one local interface at a time. To view the interfaces on the switch, refer to “SHOW IP INTERFACE” on page 576.

Examples

This command specifies the VLAN6-0 interface as the local interface on the switch:

```
set ip local interface=vlan6-0
```

This command specifies the interface with the interface number 2 in the Sales VLAN as the local interface on the switch:

```
set ip local interface=vlan-Sales-2
```

This command removes the currently assigned local interface without assigning a new one:

```
set ip local interface=none
```

SET IP RIP

Syntax

```
set ip rip interface=interface [send=rip1|rip2]
[receive=rip1|rip2|both] [authentication=pass|none]
[password=password]
[poisonreverse=yes|no|on|off|true|false]
[autosummary=yes|no|on|off|true|false]
```

Parameters

interface	Specifies the name of an interface whose RIP settings are to be modified. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).						
send	Specifies the version of the RIP packets to be sent by the interface. Options are: <table> <tr> <td>rip1</td><td>Sends RIP version 1 packets. This is the default value.</td></tr> <tr> <td>rip2</td><td>Sends RIP version 2 packets.</td></tr> </table>	rip1	Sends RIP version 1 packets. This is the default value.	rip2	Sends RIP version 2 packets.		
rip1	Sends RIP version 1 packets. This is the default value.						
rip2	Sends RIP version 2 packets.						
receive	Specifies the version of the RIP packets to be accepted by the interface. Options are: <table> <tr> <td>rip1</td><td>Accepts RIP version 1 packets.</td></tr> <tr> <td>rip2</td><td>Accepts RIP version 2 packets.</td></tr> <tr> <td>both</td><td>Accepts RIP version 1 and 2 packets. This is the default value.</td></tr> </table>	rip1	Accepts RIP version 1 packets.	rip2	Accepts RIP version 2 packets.	both	Accepts RIP version 1 and 2 packets. This is the default value.
rip1	Accepts RIP version 1 packets.						
rip2	Accepts RIP version 2 packets.						
both	Accepts RIP version 1 and 2 packets. This is the default value.						
authentication	Specifies whether there is password protection. This option only applies to RIP version 2. Options are: <table> <tr> <td>pass</td><td>Specifies password protection. The password is specified with the PASSWORD parameter.</td></tr> <tr> <td>none</td><td>Specifies no password protection. This is the default setting.</td></tr> </table>	pass	Specifies password protection. The password is specified with the PASSWORD parameter.	none	Specifies no password protection. This is the default setting.		
pass	Specifies password protection. The password is specified with the PASSWORD parameter.						
none	Specifies no password protection. This is the default setting.						
password	Specifies the password used to authenticate RIP version 2 packets. The password can be up to sixteen alphanumeric characters. The password is case sensitive and can include the hyphen and underscore.						

The interface must be configured for RIP version 2 in order for you to specify a password. Passwords are not supported in RIP version 1.

Passwords are sent in plaintext. The AT-S63 Management Software does not support encrypted passwords.

poisonreverse	Specifies the status for split horizon and split horizon with poison reverse. The options are:	
	yes, on, true	Split horizon poison reverse is enabled. These values are equivalent.
	no, off, false	Split horizon poison reverse is disabled, and split horizon is executed. This is the default setting. These values are equivalent.
autosummary	Specifies the status for autosummarization of routes. The options are:	
	yes, on, true	Autosummarization of routes on the RIP interface is enabled. These values are equivalent.
	no, off, false	Autosummarization of routes on the RIP interface is disabled. This is the default setting. These values are equivalent.

Description

This command modifies the RIP settings of an interface. To initially add RIP to an interface, refer to “ADD IP RIP” on page 550. To view the interfaces on the switch, refer to “SHOW IP INTERFACE” on page 576.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command changes RIP on the VLAN4-3 interface to send version 2 packets, accept either version 1 or 2, and use the password “wa24pt” for authentication:

```
set ip rip interface=vlan4-3 send=rip2 receive=both
authentication=pass password=wa24pt
```


This command changes RIP on the VLAN11-0 interface to accept both RIP version 1 and version 2 packets:

```
set ip rip interface=vlan11-0 receive=both
```

This command changes RIP on the VLAN22-1 interface to send and receive RIP version 1 packets. Since version 1 does not support password authentication, the command disables it:

```
set ip rip interface=vlan22-1 send=rip1 receive=rip1  
authentication=none
```

Note

Password authentication must be disabled to change an interface from RIP version 2 to version 1.

SET IP ROUTE

Syntax

```
set ip route=ipaddress [interface=interface]  
nexthop=ipaddress mask=subnetmask [metric=value]  
[preference=value]
```

Parameters

route	Specifies the IP address of the remote destination of the static route to be modified. The IP address of the default route is 0.0.0.0. You cannot change the destination IP address of a static route. If the destination address changes, you must delete the old route and enter a new route.
interface	Specifies the name of the interface where the next hop is located. To view the interfaces on the switch, refer to “SHOW IP INTERFACE” on page 576. Allied Telesis recommends omitting this optional parameter. The appropriate interface for a static route is determined automatically by the switch when it examines the IP address of the next hop and adds the route to the interface of the same subnet.
nexthop	Specifies the IP address of the next hop of the route. You must specify the next hop even if you are not changing it. If the IP address of the next hop belongs to a different subnet than the original IP address, the switch automatically moves the route to the appropriate interface.
mask	Specifies the subnet mask for the destination IP address. The default value is based of the address' network type. The default values are: Class A address - 255.0.0.0 Class B address - 255.255.0.0 Class C address - 255.255.255.0 Do not include a mask for a default route.

Note

In version 2.0.0, the routing table supported only these three values for subnet masks. In all later versions, subnet masks can be of variable lengths, provided that the “1” bits are consecutive (e.g., 128, 192, 224, etc.).

metric	Specifies a new cost for crossing the route. The range is 1 to 16. The default is 1.
preference	Assigns a preference value to the static route. The switch uses the preference values to select the active routes when there are more than eight static or dynamic routes in the routing table to the same remote destination. The range is 0 to 65535. The lower the value, the higher the preference. The default value for a static route is 60. The default value for the default route is 360.

Description

This command modifies the attributes of an existing static route or default route. You can use the command to change the IP address of the next hop or the subnet mask of the destination address. The command can also change the metric cost of a route. This command cannot change the destination address. Changing the destination address requires deleting the static route and recreating it with the new address. To view the static routes, refer to “SHOW IP ROUTE” on page 582.

Examples

This command changes the IP address of the next hop for the static route to the remote subnet 149.124.55.0. The IP address of the next hop is changed to 149.124.52.4:

```
set ip route=149.124.55.0 nexthop=149.124.52.4
mask=255.255.255.0
```

This command changes the metric value to 7 for the static route to the remote subnet 172.55.156.0:

```
set ip route=172.55.156.0 nexthop=172.55.101.2
mask=255.255.255.0 metric=7
```

This command changes the IP address of the next hop to 149.211.16.12 for the default route:

```
set ip route=0.0.0.0 nexthop=149.211.16.12
```

SHOW IP ARP

Syntax

```
show ip arp
```

Parameters

None.

Description

This command displays the entries in the ARP cache. The ARP cache contains mappings of IP addresses to physical addresses for hosts where the switch has recently routed packets. Figure 47 is an example of the information displayed by this command.

Interface	IP Address	MAC Address	Port	Type
vlan2-0	149.122.34.4	00:06:5B:B2:44:21	2	Dynamic
vlan2-0	149.122.34.12	00:A0:D2:18:EE:A1	3	Dynamic
vlan2-0	149.122.34.21	00:A0:C3:57:32:14	4	Dynamic
vlan8-1	149.122.35.1	00:A0:64:B1:76:A5	7	Dynamic

Figure 47. SHOW IP ARP Command

The columns in the display are:

- ❑ Interface - Interface from where the network device is accessed.
- ❑ IP Address - IP address of the node.
- ❑ MAC Address - MAC address of the node.
- ❑ Port - Port on the switch from where the node is accessed.
- ❑ Type - Type of entry. This is one of the following:
 - Static: Static entry added with “ADD IP ARP” on page 546.
 - Dynamic: Entry learned from ARP request/reply exchanges.
 - Invalid: Possible nonexistent entry.
 - Other: Entry automatically generated by the system.

To set the ARP timeout value, refer to “SET IP ARP TIMEOUT” on page 563.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Example

This command displays the entries in the ARP cache:

```
show ip arp
```

SHOW IP COUNTER

Syntax

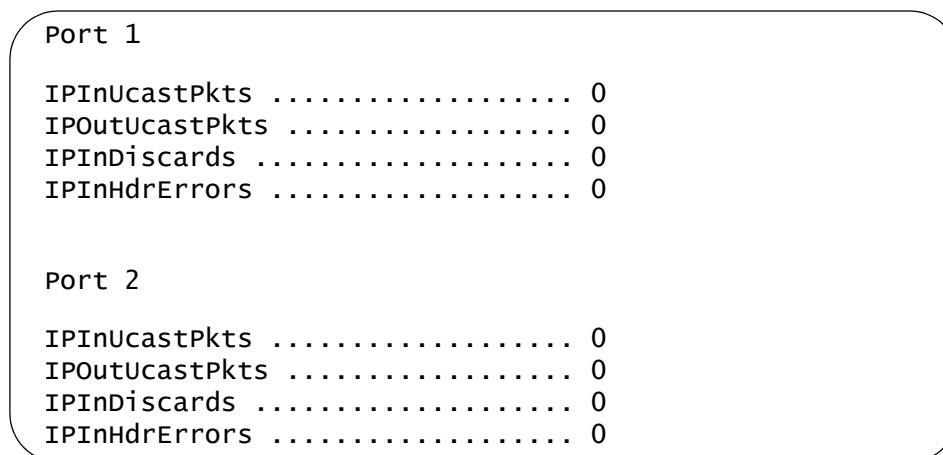
```
show ip counter [port=ports|all]
```

Parameters

port Specifies the ports whose IP statistics are to be displayed. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22). Omitting this parameter displays the statistics for all ports.

Description

This command displays Layer 3 counters for the individual ports on a switch. Figure 48 is an example of the information displayed by this command.



```

Port 1
IPInUcastPkts ..... 0
IPOutUcastPkts ..... 0
IPInDiscards ..... 0
IPInHdrErrors ..... 0

Port 2
IPInUcastPkts ..... 0
IPOutUcastPkts ..... 0
IPInDiscards ..... 0
IPInHdrErrors ..... 0

```

Figure 48. SHOW IP COUNTER Command

The lines in the display are:

- ❑ IPInUcastPkts - Number of IP packets received on a port.
- ❑ IPOutUcastPkts - Number of IP packets transmitted from a port.
- ❑ IPInDiscards - Number of IP packets received but discarded due to resource limitations at the IP level.
- ❑ IPInHdrErrors - Number of IP packets received with header errors.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Examples

This command displays the statistics for all the ports:

```
show ip counter
```

This command displays the statistics for ports 1 to 4:

```
show ip counter port=1-4
```

SHOW IP INTERFACE

Syntax

```
show ip interface[=interface|eth0]
```

Parameters

interface Specifies the interface name. An interface name consists of “VLAN” followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). If no interface value is specified, the switch displays all the interfaces.

The “eth0” value can be used to designate the local interface.

Description

This command displays the routing interfaces on a switch. An example of the information displayed by this command is shown in Figure 49.

Interface	IPAddress	NetMask	RipMet
eth0	149.55.14.8	255.255.255.0	1
vlan2-0	149.123.11.21	255.255.255.0	1
vlan5-0#	149.55.12.15	255.255.255.0	2
vlan8-0	149.55.13.2	255.255.255.0	1
vlan8-1	149.55.14.8	255.255.255.0	1

Figure 49. SHOW IP INTERFACE Command

The local interface of a switch, if one has been designated, is listed twice in the table, as “eth0” at the top of the table and again as a regular entry. For instance, the local interface on the switch in the above example is the VLAN8-1 interface because its values and those of the “eth0” interface are identical. The “eth0” entry contains null values (i.e., 0.0.0.0) if no local interface is designated on the unit.

The columns in the display are:

- ❑ **Interface** - The interface name consisting of the VLAN’s identification (VID) and interface number. A hash symbol (#) marks IP interfaces where there are no active nodes in the VLAN on the switch.
- ❑ **IPAddress** - The interface’s IP address. The address is assigned manually to the interface or automatically by a DHCP or BOOTP server. If the address is 0.0.0.0, the interface is configured to receive

its IP configuration from a DHCP or BOOTP server, but the server has not responded.

- ❑ NetMask - The interface's subnet mask. The subnet mask is assigned manually to the interface or automatically by a DHCP or BOOTP server. If the mask is 0.0.0.0, the DHCP or BOOTP server has not responded.
- ❑ RipMet - The hop count for this interface when routing packets with RIP.

Examples

This command displays all the routing interfaces on a switch:

```
show ip interface
```

This command displays just the VLAN2-6 interface:

```
show ip interface=vlan2-6
```

SHOW IP RIP COUNTER

Syntax

```
show ip rip counter
```

Parameters

counter Displays RIP packet statistics for all interfaces where RIP has been added. This parameter cannot be used with the INTERFACE parameter.

Description

This command displays RIP statistics for the entire switch. An example of the information displayed by this command is shown in Figure 50.

```
IP RIP Counter Summary
Input:
  inResponses.....5
  inRequests.....1
  inDiscards.....0
Output:
  outResponses.....6
  outRequests.....2
  outTrigResponses.....0
  outErrors.....0
```

Figure 50. SHOW IP RIP Command with COUNTER Parameter

The columns in the display are described here:

- ❑ inResponse - The number of response packets received.
- ❑ inRequests - The number of request packets received.
- ❑ inDiscards - The number of packets discarded. Packets may be discarded due to an authentication failure or a mismatched sequence number of a triggered acknowledgement.
- ❑ outResponse - The number of response packets sent.
- ❑ outRequests - The number of request packets sent.
- ❑ outTrigResponse - The number of triggered response packets sent.
- ❑ outErrors - The number of errors encountered when sending a request or response RIP message.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP switches.

Example

This command displays RIP packet statistics:

```
show ip rip counter
```

SHOW IP RIP INTERFACE

Syntax

```
show ip rip interface[=interface]
```

Parameters

interface Specifies the interface name. An interface name consists of “VLAN” and the ID (VID) followed by the VLAN name or interface number, separated by a dash (e.g., vlan4-Sales or vlan4-0). If no interface value is specified, the switch displays all the interfaces with the routing protocol.

Description

This command lists the RIP settings on those routing interfaces that have RIP. An example of the information displayed by this command is shown in Figure 51.

Interface	Send	Recv	Auth	Password	PoisonReverse	AutoSummary
vlan2-0	RIP2	BOTH	PASS	*****	On	On
vlan5-0	RIP1	BOTH	NONE	NOT SET	off	On
vlan8-0	RIP2	BOTH	PASS	*****	off	Off
vlan8-1	RIP2	BOTH	PASS	*****	On	On

Figure 51. SHOW IP RIP Command

The columns in the display are described here:

- ❑ Interface - An interface name consisting of a VLAN's identification (VID) number and interface number.
- ❑ Send - The version of RIP packets sent by the interface. Possible settings are:
 - RIP1: version 1 packets
 - RIP2: version 2 packets
- ❑ Receive - The version of RIP packets the interface will accept. Possible settings are:
 - RIP1: version 1 packets
 - RIP2: version 2 packets
 - BOTH: both version 1 and 2 packets

- ❑ Auth - The form of authentication. Possible settings are:
 - NONE: no password authentication
 - PASS: plaintext password authentication
- ❑ Password - The authentication password, displayed with asterisks. A value of NOT SET in this column indicates the interface does not have a password for RIP.
- ❑ PoisonReverse - The status of split horizon and split horizon with poison reverse:
 - OFF: The interface is using split horizon only. This is the default setting.
 - ON: The interface is using split horizon with poison reverse.
- ❑ AutoSummary - The status of route autosummarization:
 - OFF: The interface is not using route autosummarization. This is the default setting.
 - ON: The interface is using autosummarization.

To add RIP to an interface, refer to “ADD IP RIP” on page 550. To modify the RIP settings of an interface, refer to “SET IP RIP” on page 567.

This command is not available on the AT-9408LC/SP, AT-9424T/GB, and AT-9424T/SP Switches.

Examples

This command displays the RIP settings for all the interfaces that have the routing protocol:

```
show ip rip interface
```

This command displays the RIP settings for the VLAN17-2 interface:

```
show ip rip interface=vlan17-2
```

The command does not display anything if the VLAN17-2 interface does not have RIP.

SHOW IP ROUTE

Syntax

```
show ip route [general] [fdb] [full]
```

Parameters

general	Displays general routing information, such as the total number of routes in the cache and the cache size.
fdb	Displays the status of the static and dynamic routes.
full	Displays both the routes and the general routing information.

Description

Entering this command without any parameters displays all of the IPv4 interface, static and RIP routes. An example of the information displayed by this command without the parameters is shown in Figure 52.

IP Routes			
Destination	Mask Protocol	NextHop RipMetric	Interface Preference
0.0.0.0	0.0.0.0 Static	202.24.124.2 1	VLAN2-0 60
149.102.34.0	255.255.255.0 Interface	149.211.54.6 1	VLAN14-0 1
149.102.37.0	255.255.255.0 Interface	149.211.54.6 1	VLAN14-0 1

Figure 52. SHOW IP ROUTE Command

The columns are described here:

- ❑ Destination - Destination IP address of the network or subnet. The default route is 0.0.0.0.
- ❑ Mask - Subnet mask of the destination IP address.
- ❑ Protocol - Source of the route. Possible options are:
 - Interface - Route was learned by a routing interface.
 - Static - Route was entered manually as a static route.
 - RIP - Route was learned by RIP.

- ❑ NextHop - IP address of the next hop to the destination network or subnet.
- ❑ RipMetric - RIP metric (cost) to reaching the destination.
- ❑ Interface - Name of the interface where the next hop of the route is located. A hash symbol (#) following the name signifies that the route is physically “down,” meaning there are no active nodes in the VLAN of the interface.
- ❑ Preference - The preference value of the route. The preference value is used by the switch to select a route when there is more than one route to a remote destination.

Though this command always displays interface and static routes, RIP routes are only displayed when the outgoing interface is up. Note that routes are only propagated by RIP when their status at the physical level is up. This means that a VLAN's interface route is propagated if at least one port in the VLAN is active.

The FDB parameter allows you to view the status of the static and RIP routes on the switch. Figure 53 is an example of the information provided by the FDB parameter.

IP FDB			
Destination Installed	Mask Protocol	NextHop RipMetric	Interface Preference
0.0.0.0 Yes	255.255.255.0 Static	149.111.44.22 1	VLAN4-0 60
149.222.66.0 Yes	255.255.255.0 Static	149.111.22.11 1	VLAN2-0 60
149.222.66.0 Yes	255.255.255.0 Static	149.111.44.22 1	VLAN4-0 60
149.222.66.0 Yes	255.255.255.0 Static	149.111.55.17 1	VLAN8-0 60
149.125.10.0 Yes	255.255.255.0 Static	149.111.22.11 1	VLAN2-0 60

Figure 53. SHOW IP ROUTE Command with the FDB Parameter

Most of the information displayed by the FDB parameter is identical to that displayed when the command is entered without any parameters. The difference is the addition of the Installed variable which displays the status of the static and RIP routes, and the default route. (The FDB parameter does not display interface routes.) A route with an Installed status of Yes has been installed by the switch in its routing hardware. The route is ready for use (or is already being used) and meets both of the following conditions:

- ❑ The interface with the next hop of the route is up (i.e., there is at least one active port in the VLAN)
- ❑ There is a static or dynamic ARP entry for the next hop in the routing table.

A route with a status of No has not been installed by the switch in its routing hardware and is not currently being used. Any one of the following conditions can cause a route to have this status:

- ❑ The interface for the next hop of the route is down (i.e., there are no active ports in the VLAN)
- ❑ The ARP table does not contain a static or dynamic entry for the next hop.
- ❑ There are already eight active routes to the same remote destination in the routing table and the route has been placed in the standby mode.

Figure 54 is an example of the information provided by the GENERAL parameter.

```

IP Route General Information
Number of routes..... 25
Interface routes..... 11
RIP routes..... 12
Static routes..... 2
Cache size..... 1024
Source route byte counting ..... no
Route debugging..... no
Multipath routing..... yes

```

Figure 54. SHOW IP ROUTE Command with the GENERAL Parameter

The information displayed by the GENERAL parameter is described here:

- ❑ Number of routes - Total number of routing interfaces, static routes, and dynamic RIP routes.
- ❑ Interface routes - Number of routing interfaces on the switch.
- ❑ RIP routes - Number of routes learned by RIP.
- ❑ Static routes - Number of static routes.
- ❑ Cache size - Size of the route cache (the maximum number of entries)
- ❑ Source route byte counting - Whether source route byte counting is enabled.
- ❑ Route debugging - Whether route debugging is enabled.
- ❑ Multipath routing - Whether ECMP routing is enabled or disabled on the switch. To enable or disable the feature, refer to “ENABLE IP ROUTE MULTIPATH” on page 560 and “DISABLE IP ROUTE MULTIPATH” on page 559.

Examples

This command displays the IPv4 packet routes on the switch:

```
show ip route
```

This command displays general routing information:

```
add ip route general
```

This command displays both the routes and the general routing information:

```
add ip route full
```


BOOTP Relay Commands

This chapter has the following commands:

- ❑ “ADD BOOTP RELAY” on page 588
- ❑ “DELETE BOOTP RELAY” on page 589
- ❑ “DISABLE BOOTP RELAY” on page 590
- ❑ “ENABLE BOOTP RELAY” on page 591
- ❑ “PURGE BOOTP RELAY” on page 592
- ❑ “SHOW BOOTP RELAY” on page 593

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD BOOTP RELAY

Syntax

```
add bootp relay=ipaddress
```

Parameters

<code>ipaddress</code>	Specifies the IP address of a DHCP or BOOTP server.
------------------------	---

Description

This command specifies the IP address of a DHCP or BOOTP server. The switch can store up to eight server IP addresses, but you can specify only one at a time with this command.

Example

This example adds the IP address 145.42.19.162 as a DHCP or BOOTP server:

```
add bootp relay=145.42.19.162
```

DELETE BOOTP RELAY

Syntax

```
delete bootp relay=ipaddress
```

Parameters

<code>ipaddress</code>	Specifies the IP address of a DHCP or BOOTP server to be deleted from the switch.
------------------------	---

Description

This command deletes the IP address of a DHCP or BOOTP server from the switch. You can delete only one address one at a time with this command.

Example

This example deletes the server IP address 145.42.19.162:

```
delete bootp relay=145.42.19.162
```

DISABLE BOOTP RELAY

Syntax

```
disable bootp relay
```

Parameters

None.

Description

This command deactivates the BOOTP relay agent on the switch. The routing interfaces stop forwarding BOOTP requests to DHCP or BOOTP servers from the clients on the local subnets of the switch.

Example

```
disable boot relay
```

ENABLE BOOTP RELAY

Syntax

```
enable bootp relay
```

Parameters

None.

Description

This command activates the BOOTP relay agent on the switch. The routing interfaces act as relay agents for the clients of the local subnets on the switch.

Example

```
enable boot relay
```

PURGE BOOTP RELAY

Syntax

```
purge bootp relay
```

Parameters

None.

Description

This command deactivates the BOOTP relay agent on the switch and deletes all DHCP and BOOTP server IP addresses.

Example

```
purge boot relay
```


SHOW BOOTP RELAY

Syntax

show bootp relay

Parameters

None.

Description

This command displays the status of the BOOTP relay agent, the IP addresses of the servers, and packet statistics. An example of the display is shown in Figure 55.

```

BOOTP Relaying Agent Configuration
-----
Status ..... Disabled
Maximum hops ..... 4

BOOTP Relay Destinations
-----
149.55.78.2
149.55.72.12
-----

BOOTP Counters
  InPackets ..... 0      OutPackets ..... 0
  InRejects ..... 0
  InRequests ..... 0
  InReplies ..... 0
  
```

Figure 55. SHOW BOOTP RELAY Command

The fields in the display are:

- ❑ **Status:** The agent's status of disabled, the default, or enabled. The routing interfaces do not forward BOOTP requests when the status of the BOOTP relay agent is disabled, and do when the status is enabled. The status is set with "DISABLE BOOTP RELAY" on page 590 and "ENABLE BOOTP RELAY" on page 591.
- ❑ **Maximum hops:** Maximum value allowed for the hops field in a BOOTP message before the message is discarded. The default is 4 hops. This value cannot be changed.
- ❑ **BOOTP Relay Destinations:** The IP addresses of the DHCP or BOOTP servers, set with "ADD BOOTP RELAY" on page 588.

The BOOTP statistics are:

- ❑ InPackets: Total number of BOOTP packets received.
- ❑ InRejects: Total number of incoming BOOTP packets rejected because of an error in the packet.
- ❑ InRequests: Number of BOOTP requests received.
- ❑ InReplies: Number of BOOTP replies received.
- ❑ OutPackets: Total number of BOOTP packets transmitted.

Example

```
show boot relay
```

Chapter 34

Virtual Router Redundancy Protocol (VRRP) Commands

This chapter has the following commands:

- ❑ “ADD VRRP IPADDRESS” on page 596
- ❑ “ADD VRRP MONITOREDINTERFACE” on page 597
- ❑ “CREATE VRRP” on page 598
- ❑ “DELETE VRRP IPADDRESS” on page 601
- ❑ “DELETE VRRP MONITOREDINTERFACE” on page 602
- ❑ “DESTROY VRRP” on page 603
- ❑ “DISABLE VRRP” on page 604
- ❑ “ENABLE VRRP” on page 605
- ❑ “SET VRRP” on page 606
- ❑ “SHOW VRRP” on page 609

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD VRRP IPADDRESS

Syntax

```
add vrrp=vrid ipaddress=ipaddress
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.
ipaddress	Specifies a secondary IP address to be backed up by the specified virtual router. The IP address must be compatible with the IP address and subnet mask associated with the Ethernet interface over which the virtual router is operating.

Description

This command adds a secondary IP address to the group of IP addresses that are backed up by the specified virtual router. The new IP address must be added to all the switches participating in the virtual router. The maximum number of secondary addresses is 16.

Example

This example adds the IP address 205.42.19.162 to the group of IP addresses that are backed up by the virtual router whose VRID is 34:

```
add vrrp=34 ipaddress=205.42.19.162
```

ADD VRRP MONITOREDINTERFACE

Syntax

```
add vrrp=vr-id monitoredinterface=interface
[newpriority=1...254]
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.
monitoredinterface	Specifies the name of the monitored interface from where the host is reached. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0). The interface must already exist. A virtual router can monitor up to 60 interfaces.
newpriority	Specifies the value that is to be used as the switch's priority if the interface specified by the monitoredinterface parameter becomes inoperative. The range is 1 to 254 and the default is 50.

Description

This command adds a new monitored interface to a virtual router. The monitored interface is the one that the virtual router is dependent upon, usually an interface that provides a WAN link to the switch. This interface must not be the same interface that the virtual router is operating over, as specified in the CREATE VRRP command.

Example

This example adds the VLAN2-2 interface to the group of interfaces monitored by the virtual router with a VRID of 8, with a new priority of 30:

```
add vrrp=8 monitoredinterface=vlan2-2 newpriority=30
```

CREATE VRRP

Syntax

```
create vrrp=vrid over=interface ipaddress=ipaddress
[adinterval=1..255] [authentication=none|plaintext]
[password=password] [portmonitoring=on|off]
[portreset=on|off] [preempt=on|off] [priority=1..254]
[stepvalue=1..254|proportional] [delay=0..3600]
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.				
over	Specifies the interface over which the virtual router will send and receive packets. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).				
ipaddress	Specifies a secondary IP address to be backed up by the specified virtual router. The IP address must be compatible with the IP address and subnet mask associated with the Ethernet interface over which the virtual router is operating.				
adinterval	Specifies the interval in seconds between advertisement packets. The range is 1 to 255 seconds and the default is 1 second. You must configure all switches in the same virtual router with the same adinterval.				
authentication	Specifies whether there is authentication. Options are: <table> <tr> <td>none</td><td>Specifies no authentication. This is the default setting.</td></tr> <tr> <td>plaintext</td><td>Specifies that authentication is required, which you set with the password parameter.</td></tr> </table>	none	Specifies no authentication. This is the default setting.	plaintext	Specifies that authentication is required, which you set with the password parameter.
none	Specifies no authentication. This is the default setting.				
plaintext	Specifies that authentication is required, which you set with the password parameter.				
password	Specifies the password used to authenticate VRRP packets. The password can be up to 8 alphanumeric characters. The password is case sensitive and can include the hyphen and underscore. Passwords are sent in plaintext. The AT-S63 Management Software does not support encrypted				

passwords.

You must configure all switches in the same virtual router with the same password.

portmonitoring Specifies whether the VRRP should monitor the ports of the VLAN and alter the priority value if ports fail or are disabled. The options are:

on Specifies that port monitoring should be on. If you choose not to specify a **stepvalue**, the **stepvalue** is set to proportional by default.

off Specifies that port monitoring should be off. This is the default.

portreset Specifies that ports of a VLAN that has a virtual router be reset when a virtual router transitions from backup to master status. The options are:

on Specifies that the VLAN ports be reset.

off Specifies that the VLAN ports are not reset.

preempt Specifies whether a higher priority switch preempts a lower priority switch acting as the master. The preferred master (with a priority of 255) always assumes the master role when it is available, regardless of how this parameter is set. The options are:

on Specifies that preempting should occur. This is the default.

off Specifies that preempt mode not be used.

You must configure all switches in the same virtual router with the same preempt setting.

priority Specifies the switch's priority for becoming the master for the virtual router. The higher the value, the greater the priority. The range is 1 to 254 and the default is 100. The value of 255 is reserved for and assigned to the switch that is the preferred master (the switch owning the virtual router's IP address), regardless of how this parameter is set.

stepvalue	Specifies the value by which the priority of the virtual router should be decremented each time a VLAN port fails or is disabled when the portmonitoring parameter is set to ON. The options are:
1...254	Specifies a value to decrement the priority of the virtual router.
proportional	Specifies that the virtual router reduces the priority in proportion to the percentage of available ports.
delay	Specifies the number of seconds that a higher priority switch must wait before preempting a lower priority switch. This parameter is only valid when the preempt parameter is set to ON. After the switch assumes the highest priority, it waits the delay time and then assumes control. A delay ensures that there is enough time for the master to update its routing tables before taking over. The range is 0 to 3600 and the default is 0 (off).

Description

This command creates a VRRP virtual router. If other VRRP virtual routers have been created on the LAN with the same VRID, the combined group forms a single virtual router.

Note

You must create the virtual router on at least two switches for VRRP to operate correctly.

Note

All switches involved in a virtual router must be configured with the same values for the VRID, IP ADDRESS, ADINTERVAL, PREEMPT, AUTHENTICATION and PASSWORD values in order to operate properly.

Example

This example creates a virtual router with a VRID of 7, an IP address of 12.37.8.2 over VLAN2-0, with port monitoring enabled and a stepvalue of 45:

```
create vrrp=7 over=vlan2-0 ip=12.37.8.2 portmonitoring=on
stepvalue=45
```


DELETE VRRP IPADDRESS

Syntax

```
delete vrrp=vrid ipaddress=ipaddress
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.
ipaddress	Specifies a secondary IP address to be deleted from the group of IP addresses backed up by the specified virtual router.

Description

This command deletes a secondary IP address from the group of IP addresses backed up by the specified virtual router.

Example

This example deletes the IP address 205.42.19.162 from the group of IP addresses that are backed up by the virtual router whose VRID is 34:

```
delete vrrp=34 ipaddress=205.42.19.162
```

DELETE VRRP MONITOREDINTERFACE

Syntax

```
delete vrrp=vrid monitoredinterface=interface
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.
monitoredinterface	Specifies the monitored interface to be deleted. An interface name consists of "VLAN" followed by the name or ID (VID) of the VLAN and the interface number (e.g., vlan-Sales-0 or vlan4-0).

Description

This command deletes a monitored interface.

Example

This example deletes the VLAN1-0 interface from the group of interfaces monitored by the virtual router with a VRID of 8:

```
add vrrp=8 monitoredinterface=VLAN1-0
```

DESTROY VRRP

Syntax

```
destroy vrrp=[vrid|all]
```

Parameters

vrrp	Specifies the ID of the virtual router. The options are:
vrid	Specifies the ID of a single virtual router, a number between 1 and 255.
all	Specifies that the switch be removed from all the virtual routers in which it participates.

Note

To destroy a virtual router completely on the LAN, you must destroy it on all the switches participating in it.

Description

This command removes the switch from the group that forms the specified VRRP virtual router.

Example

This command stops the switch from participating in virtual router 32:

```
destroy vrrp=32
```

DISABLE VRRP

Syntax

```
disable vrrp=[vrid|all]
```

Parameters

vrrp	Specifies the ID of the virtual router. The options are:
vrid	Specifies the ID of a single virtual router, a number between 1 and 255.
all	Specifies that the switch be removed from all the virtual routers in which it participates.

Description

This command disables VRRP on the switch or disables a switch's participation in the specified virtual router. VRRP is disabled on the switch by default, and virtual routers are enabled by default when you create them. You must enable both VRRP and the virtual router for the virtual router to operate.

Example

This command stops the switch from participating in virtual router 32:

```
disable vrrp=32
```

ENABLE VRRP

Syntax

```
enable vrrp=[vrid|all]
```

Parameters

vrrp	Specifies the ID of the virtual router. The options are:
vrid	Specifies the ID of a single virtual router, a number between 1 and 255.
all	Specifies that all the virtual routers in which the switch participates be enabled.

Description

This command enables VRRP on the switch, or enables the switch's participation in a specific virtual router. VRRP is disabled on the switch by default, and virtual routers are enabled by default when you create them. You must enable both VRRP and the virtual router for the virtual router to operate.

Example

This example enables the switch to participate in virtual router 42:

```
enable vrrp=42
```

SET VRRP

Syntax

```
set vrrp=vrid [adinterval=1..255]
[authentication=none|plaintext] [password=password]
[portmonitoring=on|off] [portreset=on|off] [preempt=on|off]
[priority=1..254] [stepvalue=1..254|proportional]
[delay=0..3600]
```

Parameters

vrrp	Specifies the ID of the virtual router, a number between 1 and 255.
adinterval	Specifies the interval in seconds between advertisement packets. The range is 1 to 255 seconds and the default is 1 second. You must configure all switches in the same virtual router with the same adinterval.
authentication	Specifies whether there is password protection. Options are: none Specifies no password protection. This is the default setting. plaintext Specifies that a password is required, which you set with the password parameter.
password	Specifies the password used to authenticate VRRP packets. The password can be up to 16 alphanumeric characters. The password is case sensitive and can include the hyphen and underscore. Passwords are sent in plaintext. The AT-S63 Management Software does not support encrypted passwords. You must configure all switches in the same virtual router with the same password.
portmonitoring	Specifies whether the VRRP should monitor the ports of the VLAN and alter the priority value if ports fail or are disabled. The options are: on Specifies that port monitoring should be on.

	off	Specifies that port monitoring should be off. This is the default.
portreset	Specifies that ports of a VLAN that has a virtual router be reset when a virtual router transitions from backup to master status. The options are:	
	on	Specifies that the VLAN ports be reset.
	off	Specifies that the VLAN ports are not reset.
preempt	Specifies whether a higher priority switch preempts a lower priority switch acting as the master. The preferred master (with a priority of 255) always assumes the master role when it is available, regardless of how this parameter is set. The options are:	
	on	Specifies that preempting should occur. This is the default.
	off	Specifies that preempt mode not be used.
	You must configure all switches in the same virtual router with the same preempt setting.	
priority	Specifies the switch's priority for becoming the master for the virtual router. The higher the value, the greater the priority. The value of 255 is reserved for the switch that is the preferred master (the switch owning the virtual router's IP address). The value of 255 is always assigned to the preferred master, regardless of how this parameter is set. The range is 1 to 254 and the default is 100.	
stepvalue	Specifies the value by which the priority of the virtual router should be decremented each time a VLAN port fails or is disabled when the portmonitoring parameter is set to ON. The options are:	
	1...254	Specifies a value to decrement the priority of the virtual router.
	proportional	Specifies that the virtual router reduces the priority in proportion to the percentage of available ports.

delay	Specifies the number of seconds that a higher priority switch must wait before preempting a lower priority switch. This parameter is only valid when the preempt parameter is set to ON. After the switch assumes the highest priority, it waits the delay time and then assumes control. A delay ensures that there is enough time for the master to update its routing tables before taking over. The range is 0 to 3600 and the default is 0 (off).
--------------	--

Description

This command modifies the settings of a specified virtual router.

Examples

This example activates the port monitoring feature on the virtual router with a VRID of 7, and sets the stepvalue to 15:

```
set vrrp=7 portmonitoring=on stepvalue=15
```


SHOW VRRP

Syntax

```
show vrrp=[vrid|all]
```

Parameters

vrrp	Specifies the ID of the virtual router. The options are:
vrid	Specifies the ID of a single virtual router, a number between 1 and 255.
all	Specifies that all the virtual routers in which the switch participates be enabled.

Description

This command displays information about a specific virtual router of all the virtual routers in which the switch is participating.

Figure 56 is an example of the information displayed by this command.

```

Virtual Router Identifier .....1

Configuration
VR MAC Address ..... 00-00-5R-00-01-01
Interface ..... VLAN
Priority ..... 34
State ..... Backup
Authentication ..... Plaintext
Password ..... Set
IP Address(es) ..... 34.12.163.156
Advertisement Interval ..... 1
Preempt Mode ..... ON
Preempt Delay (seconds) ..... 60
Original Priority ..... 34
Port Monitoring ..... ON
Step Value ..... 40
Port Reset ..... ON
Monitored Interfaces
Interface ..... VLAN
New Priority ..... 40
Counters
Good Advertisements Received ..... 0
Bad Advertisements Received ..... 0
Master Periods ..... 1
Advertisements Sent ..... 0

```

Figure 56. SHOW VRRP Command

The information in the display is described in Table 23.

Table 23. SHOW VRRP Command Information

Section	Parameter	Description
	Virtual Router Identifier	Virtual router identifier.
Configuration	VR MAC Address	Virtual router's MAC address, derived from the virtual router identifier.
	Interface	LAN interface that the virtual router is operating on.
	Priority	Priority of the switch for assuming the master role for the virtual router.
	State	Current status of the switch in the virtual router which may be master, backup, or initial. Initial indicates that either the virtual router or VRRP is disabled.
	Authentication	If the virtual router uses no authentication or plaintext or HMAC authentication.
	Password	Whether or not the password is set.
	IP Address(es)	Shows the IP addresses associated with the virtual router.
	Advertisement Interval	Period in seconds between advertisement packets.
	Preempt Mode	Whether preempt mode is on. When on, the switch determines whether a higher priority switch assumes the master role over one with lower priority.
	Preempt Delay (seconds)	Period in seconds that the switch delays before assuming the master role after it has determined that its priority is greater than all other switches. Valid only when preempt mode is on.
	Original Priority	The original priority of the port before being affected by either the port monitoring or monitored interface feature.
	Port Monitoring	Whether the port monitoring feature is on. This parameter is displayed only when the virtual router operates over a VLAN interface.

Table 23. SHOW VRRP Command Information (Continued)

Section	Parameter	Description
	Step Value	If a number is displayed, this is the value by which the priority of the virtual router is reduced by each VLAN port that fails or is disabled. If "Proportional" is shown, the priority is reduced in proportion to the percentage of VLAN ports that are out of service.
	Port Reset	Whether port reset is on. When on, the ports of a VLAN that has a virtual router are reset when a virtual router transitions from backup to master status.
Monitored Interfaces	Interface	The name of an interface being monitored by VRRP for this virtual router.
	New Priority	The new priority that the switch uses when this interface becomes inoperative.
Counters	Good Advertisements Received	Number of acceptable advertisement packets received by the switch for this virtual router.
	Bad Advertisements Received	Number of unacceptable advertisement packets received by the switch for this virtual router.
	Master Periods	Number of periods when the switch has been the master switch.
	Advertisements Sent	Number of advertisement packets sent by the switch.

Example

This example displays the information about virtual router 16:

```
show vrrp=16
```


Section VIII

Port Security

This section contains the following chapters:

- ❑ Chapter 35, “MAC Address-based Port Security Commands” on page 615
- ❑ Chapter 36, “802.1x Port-based Network Access Control Commands” on page 623

Chapter 35

MAC Address-based Port Security Commands

This chapter contains the following command:

- ❑ “SET SWITCH PORT INTRUSIONACTION” on page 616
- ❑ “SET SWITCH PORT SECURITYMODE” on page 617
- ❑ “SHOW SWITCH PORT INTRUSION” on page 620
- ❑ “SHOW SWITCH PORT SECURITYMODE” on page 621

Note

Remember to save your changes with the SAVE CONFIGURATION command.

SET SWITCH PORT INTRUSIONACTION

Syntax

```
set switch port=port intrusionaction=discard|trap|disable
```

Parameters

port	Specifies the port where you want to change the intrusion action. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).						
intrusionaction	Specifies the action the port takes when it receives an invalid frame. The options are: <table><tr><td>discard</td><td>The port discards invalid frames. This is the default.</td></tr><tr><td>trap</td><td>The port discards invalid frames and sends an SNMP trap.</td></tr><tr><td>disable</td><td>The port discards invalid frames, sends an SNMP trap, and disables the port.</td></tr></table>	discard	The port discards invalid frames. This is the default.	trap	The port discards invalid frames and sends an SNMP trap.	disable	The port discards invalid frames, sends an SNMP trap, and disables the port.
discard	The port discards invalid frames. This is the default.						
trap	The port discards invalid frames and sends an SNMP trap.						
disable	The port discards invalid frames, sends an SNMP trap, and disables the port.						

Description

This command defines what a port does when it receives an invalid frame. and applies only to ports operating in the Limited security mode.

Example

The following command sets the intrusion action to trap on ports 12 and 21:

```
set switch port=12,21 intrusionaction=trap
```


SET SWITCH PORT SECURITYMODE

Syntax

```
set switch port=port
[securitymode=automatic|limited|secured|locked]
[intrusionaction=discard|trap|disable]
[learn=value] [participate=yes|no|on|off|true|false]
```

Parameters

port	Specifies the port where you want to set security. You can specify more than one port at a time. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).								
securitymode	Specifies the port's security mode. Options are: <table> <tr> <td>automatic</td><td>Disables security on the port. This is the default setting.</td></tr> <tr> <td>limited</td><td>Sets the port to the Limited security mode. The port learns a limited number of dynamic MAC addresses, set with the LEARN parameter.</td></tr> <tr> <td>secured</td><td>Sets the port to the Secured security mode. The port accepts frames based only on static MAC addresses. You must enter the static MAC addresses of the nodes with frames the port is to accept after you have activated this security mode on a port. To add static MAC addresses, use the command "ADD SWITCH FDB FILTER" on page 140.</td></tr> <tr> <td>locked</td><td>Sets the switch to the Locked security mode. The port stops learning new dynamic MAC addresses. The port forwards frames based on static MAC addresses and on those dynamic addresses it has already learned.</td></tr> </table>	automatic	Disables security on the port. This is the default setting.	limited	Sets the port to the Limited security mode. The port learns a limited number of dynamic MAC addresses, set with the LEARN parameter.	secured	Sets the port to the Secured security mode. The port accepts frames based only on static MAC addresses. You must enter the static MAC addresses of the nodes with frames the port is to accept after you have activated this security mode on a port. To add static MAC addresses, use the command "ADD SWITCH FDB FILTER" on page 140.	locked	Sets the switch to the Locked security mode. The port stops learning new dynamic MAC addresses. The port forwards frames based on static MAC addresses and on those dynamic addresses it has already learned.
automatic	Disables security on the port. This is the default setting.								
limited	Sets the port to the Limited security mode. The port learns a limited number of dynamic MAC addresses, set with the LEARN parameter.								
secured	Sets the port to the Secured security mode. The port accepts frames based only on static MAC addresses. You must enter the static MAC addresses of the nodes with frames the port is to accept after you have activated this security mode on a port. To add static MAC addresses, use the command "ADD SWITCH FDB FILTER" on page 140.								
locked	Sets the switch to the Locked security mode. The port stops learning new dynamic MAC addresses. The port forwards frames based on static MAC addresses and on those dynamic addresses it has already learned.								

Note

The online help for this command includes a "pacontrol" option for this parameter. The option is nonfunctional.

intrusionaction	Specifies the action taken by the port in the event port security is violated. This parameter applies only to the Limited security mode. Intrusion actions are:	
	discard	Discards invalid frames. This is the default setting.
	trap	Discards invalid frames and sends a management trap.
	disable	Discards invalid frames, sends a management trap, and disables the port.
	The intrusion action of a port operating in the Secured or Locked security level is to discard invalid frames.	
learn	Specifies the maximum number of dynamic MAC addresses a port on the switch can learn. This parameter applies only to ports set to the Limited security mode. The range is 1 to 255 addresses. The default is 255.	
participate	Enables or disables the intrusion action on the port. This option only applies to the Limited security mode and only when a port's intrusion action is set to trap or disable. This option does not apply when intrusion action is set to discard. The options are:	
	yes, on, true	Enables the trap or disable intrusion action. These options are equivalent.
	no, off, false	Disables the trap or disable intrusion action. The port still discards invalid ingress frames. This is the default. These options are equivalent.

Description

This command sets and configures a port's security mode. Only one mode can be active on a port at a time.

To view a port's current security mode, use the command "SHOW SWITCH PORT SECURITYMODE" on page 621.

The management software displays a confirmation prompt whenever you perform this command. Responding with **Y** for yes completes your command, while **N** for no cancels the command.

Examples

The following command sets the security level for port 8 to the Limited mode and specifies a limit of 5 dynamic MAC addresses. Because no intrusion action is specified, the discard action is assigned by default:

```
set switch port=8 securitymode=limited learn=5
```

The following command sets the security level for ports 9 and 12 to the Limited mode and specifies a limit of 15 dynamic MAC addresses per port. The disable intrusion action is specified:

```
set switch port=9,12 securitymode=limited learn=15  
intrusionaction=disable participate=yes
```

In the above example, the Participate option is required to activate the disable intrusion action. Without it, the port would discard invalid ingress frames but would not send an SNMP trap and disable the port.

The following command changes the maximum number of learned MAC addresses to 150 on ports 15 and 16. The command assumes that the ports have already be set to the Limited security mode:

```
set switch port=15-16 learn=150
```

The following command sets the security level to Locked for ports 2, 6, and 18:

```
set switch port=2,6,18 securitymode=locked
```

The Limit and Participate options are not included with the above command because they do not apply to the Locked mode, nor to the Secured mode.

The following command sets the security level to Secured for ports 12 to 24:

```
set switch port=12-24 securitymode=secured
```

The following command returns ports 8 to 11 to the automatic security level, which disables port security:

```
set switch port=8-11 securitymode=automatic
```

SHOW SWITCH PORT INTRUSION

Syntax

```
show switch port=port intrusion
```

Parameter

port	Specifies the port where you want to view the number of intrusions that have occurred. You can specify more than one port at a time.
------	--

Description

This command displays the number of times a port has detected an intrusion violation. An intrusion violation varies depending on the security mode:

- ❑ Limited Security Level - An intrusion is an ingress frame with a source MAC address not already learned by a port after the port had reached its maximum number of dynamic MAC addresses, or that was not assigned to the port as a static address.
- ❑ Secured Security Level - An intrusion is an ingress frame with a source MAC address that was not entered as a static address on the port.
- ❑ Locked - An intrusion is an ingress frame with a source MAC address that the port has not already learned or that was not assigned as a static address.

Example

The following command displays the number of intrusion violations detected on ports 12 and 21:

```
set switch port=12,21 intrusion
```

SHOW SWITCH PORT SECURITYMODE

Syntax

```
show switch port=port securitymode
```

Parameters

port Specifies the port whose security mode settings you want to view. You can specify the ports individually (for example, 5,7,22), as a range (for example, 18-23), or both (for example, 1,5,14-22).

Description

This command displays the security mode settings for the ports on the switch. An example of the information displayed by this command is shown in Figure 57.

Port	Security Mode	Intrusion Action	Participating	MAC Limit
1	Secured	----	----	----
2	Limited	Trap	Yes	20
3	Limited	Trap	Yes	20
4	Limited	Trap	Yes	20
5	Automatic	----	----	----
6	Automatic	----	----	----

Figure 57. SHOW SWITCH PORT SECURITYMODE Command

The columns in the display are defined here:

- ❑ Port - Port number.
- ❑ Security Mode - The current security mode of the port. Possible settings are Automatic (no security), Limited, Secured, and Locked. For definitions of the security levels, refer to “SET SWITCH PORT SECURITYMODE” on page 617.
- ❑ Intrusion Action - The action taken by a port operating with the Limited security level when it detects an intrusion violation.
- ❑ Participating - The status of intrusion action on the port. This option only applies to the Limited security mode and only when a port's intrusion action is set to trap or disable. This option does not apply when intrusion action is set to discard.
- ❑ MAC Limit - The maximum number of dynamic MAC addresses the port can learn. This parameter applies only to the Limited security mode.

Example

The following command displays the security mode settings for ports 1 to 5:

```
show switch port=1-5 securitymode
```

Chapter 36

802.1x Port-based Network Access Control Commands

This chapter contains the following commands:

- ❑ “DISABLE PORTACCESS|PORTAUTH” on page 624
- ❑ “DISABLE RADIUSACCOUNTING” on page 625
- ❑ “ENABLE PORTACCESS|PORTAUTH” on page 626
- ❑ “ENABLE RADIUSACCOUNTING” on page 627
- ❑ “SET PORTACCESS|PORTAUTH PORT ROLE=AUTHENTICATOR” on page 628
- ❑ “SET PORTACCESS|PORTAUTH PORT ROLE=SUPPLICANT” on page 636
- ❑ “SET RADIUSACCOUNTING” on page 638
- ❑ “SHOW PORTACCESS|PORTAUTH” on page 640
- ❑ “SHOW PORTACCESS|PORTAUTH PORT” on page 642
- ❑ “SHOW RADIUSACCOUNTING” on page 645

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE PORTACCESS|PORTAUTH

Syntax

```
disable portaccess|portauth
```

Note

The PORTACCESS and PORTAUTH keywords are equivalent.

Parameters

None.

Description

This command disables 802.1x Port-based Network Access Control on the switch. This is the default setting.

Example

The following command disables 802.1x Port-based Network Access Control on the switch:

```
disable portaccess
```


DISABLE RADIUSACCOUNTING

Syntax

```
disable radiusaccounting
```

Parameters

None

Description

This command disables RADIUS accounting on the switch.

Example

The following command disables RADIUS accounting:

```
disable radiusaccounting
```

Equivalent Command

```
set radiusaccounting status=disabled
```

For information, see “SET RADIUSACCOUNTING” on page 638.

ENABLE PORTACCESS|PORTAUTH

Syntax

```
enable portaccess|portauth
```

Note

The PORTACCESS and PORTAUTH keywords are equivalent.

Parameters

None.

Description

This command activates 802.1x Port-based Network Access Control on the switch. The default setting for this feature is disabled.

Note

You should activate and configure the RADIUS client software on the switch before activating port-based access control. Refer to “SET AUTHENTICATION” on page 705.

Example

The following command activates 802.1x Port-based Network Access Control on the switch:

```
enable portaccess
```

ENABLE RADIUSACCOUNTING

Syntax

```
enable radiusaccounting
```

Parameters

None

Description

This command activates RADIUS accounting on the switch.

Example

The following command activates RADIUS accounting:

```
enable radiusaccounting
```

Equivalent Command

```
set radiusaccounting status=enabled
```

For information, see “SET RADIUSACCOUNTING” on page 638.

SET PORTACCESS|PORTAUTH PORT ROLE=AUTHENTICATOR

Syntax

```
set portaccess|portauth=8021x|macbased port=port
type|role=authenticator|none [mode=single|multi]
[control=auto|authorised|forceauthenticate|
unauthorised|forceunauthenticate]
[quietperiod=value] [txperiod=value]
[reauthenabed=enabled|disabled] [reauthperiod=value]
[suptimeout=value] [servertimeout|servtimeout=value]
[maxreq=value] [ctrlkdirboth=ingress|both]
[piggyback=enabled|disabled] [guestvlan=vlan-name|vid|none]
[vlanassignment=enabled|disabled] [securevlan=on|off]
```

Parameters

portaccess or portauth	Specifies the authentication method. The two choices are:	
	8021x	Specifies 802.1x username and password authentication. With this authentication method the supplicant must provide, either manually or automatically, a username and password. This authentication method requires 802.1x client software on the supplicant nodes.
	macbased	Specifies MAC address-based authentication. The authenticator port extracts the source MAC address from the initial frames received from a supplicant and automatically sends the address as both the username and password of the supplicant to the authentication server. This authentication method does not require 802.1x client software on the supplicant nodes.
port	Specifies the port to set to the Authenticator role or whose Authenticator settings you want to adjust. You can specify more than one port at a time.	

type <i>or</i> role	Specifies the role of the port. The parameters are equivalent. The options are:	
	authenticator	Specifies the authenticator role.
	none	Disables port-based access control on the port.
mode	Controls the operating mode of an authenticator port. The options are:	
	single	Configures the port to accept only one authentication. This authenticator mode should be used together with the piggy-back mode. When an authenticator port is set to the single mode and the piggy-back mode is disabled, only the one client who is authenticated can use the port. Packets from or to other clients on the port are discarded. If piggy-back mode is enabled, other clients can piggy-back onto another client's authentication and so be able to use the port. This is the default setting.
	multi	Configures the port to accept up to 320 authentications. Every client using an authenticator port in this mode must have a username and password combination and log on separately.
control	Specifies the authenticator state. The options are:	
	auto	Sets the port state to 802.1X port-based authentication. The port begins in the unauthorized state, allowing only EAPOL frames to be sent and received through the port. The authentication process begins when the link state of the port changes. The switch requests the identity of the client and begins relaying authentication messages between the client

		and the authentication server. Each client that attempts to access the network is uniquely identified by the switch by using the client's MAC address. This is the default setting.
	authorised or forceauthenticate	Disables 802.1X port-based authentication and causes the port to transition to the authorized state without any authentication exchange required. The port transmits and receives normal traffic without 802.1X-based authentication of the client. The parameters are equivalent.
	unauthorised or forceunauthenticate	Causes the port to remain in the unauthorized state, ignoring all attempts by the client to authenticate. The switch blocks all authentication on the port. The parameters are equivalent.
quietperiod		Sets the number of seconds that the switch remains in the quiet state following a failed authentication exchange with the client. The default value is 60 seconds. The range is 0 to 65,535 seconds.
txperiod		Sets the number of seconds that the switch waits for a response to an EAP-request/identity frame from the client before retransmitting the request. The default value is 30 seconds. The range is 1 to 65,535 seconds.
reauthenable		Controls whether the client must periodically reauthenticate. The options are:
	enabled	Specifies that the client must periodically reauthenticate. This is the default setting. The time period between reauthentications is set with the reauthperiod parameter.
	disabled	Specifies that reauthentication by the client is not required after the initial authentication. Reauthentication is only required if there is a change to the status of the link between the supplicant and

the switch or the switch is reset or power cycled.

reauthperiod	Enables periodic reauthentication of the client, which is disabled by default. The default value is 3600 seconds. The range is 1 to 65,535 seconds.
supptimeout	Sets the switch-to-client retransmission time for the EAP-request frame. The default value for this parameter is 30 seconds. The range is 1 to 600 seconds.
servertimeout or servtimeout	Sets the timer used by the switch to determine authentication server timeout conditions. The default value is 30 seconds. The range is 1 to 600 seconds. The parameters are equivalent.
maxreq	Specifies the maximum number of times that the switch retransmits an EAP Request packet to the client before it times out the authentication session. The range is 1 to 10 retransmissions and the default is 2.
ctrlkdirboth	Specifies how the port is to handle ingress and egress broadcast and multicast packets when in the unauthorized state.

When a port is set to the authenticator role, it remains in the unauthorized state until a client is authenticated by the authentication server. In the unauthorized state, the port accepts only EAP packets from the client. All other ingress packets the port might receive from the supplicant, including multicast and broadcast traffic, are discarded until the supplicant has been authenticated.

You can use this selection to control how an authenticator port handles egress broadcast and multicast traffic when in the unauthorized state. You can instruct the port to forward this traffic to the client, even though the client has not logged on, or you can have the port discard the traffic.

The options are:

ingress	An authenticator port, when in the unauthorized state, discards all ingress broadcast and multicast packets from the client while forwarding all egress broadcast and multicast traffic to the same client. This is the default setting.
---------	--

both An authenticator port, when in the unauthorized state, does not forward ingress or egress broadcast and multicast packets from or to the client until the client has logged on.

This parameter is only available when the authenticator's operating mode is set to single. When set to multiple, an authenticator port does not forward ingress or egress broadcast or multicast packets until at least one client has logged on.

piggyback Controls who can use the switch port in cases where there are multiple clients using the port, for example the port is connected to an Ethernet hub. This parameter is applicable when the authenticator's operating mode is set to single. The options are:

enabled Allows all clients on the port to piggy-back onto the initial client's authentication, causing the port to forward all packets after one client is authenticated. This is the default setting.

disabled Specifies that the switch port forward only those packets from the client who is authenticated and discard packets from all other users.

guestvlan Specifies the name or VID of a Guest VLAN. The authenticator port is a member of a Guest VLAN when no supplicant is logged on. Clients do not log on to access a Guest VLAN.

If an authenticator port where a Guest VLAN has been defined starts to receive EAPOL packets, signalling that a supplicant is logging on, it changes to the unauthorized state and moves from the Guest VLAN to its predefined VLAN. The port remains in the unauthorized state until the log on process between the supplicant and the RADIUS server is completed.

The options are:

vlan-name Specifies the name of the Guest VLAN.

vlan-id Specifies the VID of the Guest VLAN.

none Removes a predefined Guest VLAN from an authenticator port.

A Guest VLAN is only supported when the operating mode of the port is set to Single. The specified VLAN must already exist on the switch.

vlanassignment	Specifies whether to use the VLAN assignments entered in the user accounts on the RADIUS server. Options are:
enabled	Specifies that the authenticator port is to use the VLAN assignments returned by the RADIUS server when a supplicant logs on. This is the default setting.
disabled	Specifies that the authenticator port ignore any VLAN assignment information returned by the RADIUS server when a supplicant logs on. The authenticator port remains in its predefined VLAN assignment even when the RADIUS server returns a VLAN assignment when a supplicant logs on.
securevlan	Controls the action of an authenticator port to subsequent authentications after the initial authentication where VLAN assignments have been added to the user accounts on the RADIUS server. This parameter only applies when the port is operating in the Multiple operating mode. Options are:
on	Specifies that only those supplicants with the same VLAN assignment as the initial supplicant are authenticated. Supplicants with a different or no VLAN assignment are denied entry to the port. This is the default setting.
off	Specifies that all supplicants, regardless of their assigned VLANs, are authenticated. However, the port remains in the VLAN specified in the initial authentication, regardless of the VLAN assignments of subsequent authentications.

Description

This command sets ports to the authenticator role and configures the authenticator role parameters. This command also removes port-based access control from a port.

Examples

The following command sets ports 4 to 6 to the authenticator role. The authentication method is set to 802.1x, meaning that the supplicants must have 802.1x client software and provide a username and password, either automatically or manually, when logging on and during reauthentications. The operating mode is set to Single and the piggy back mode to disabled. With these settings, only one supplicant can use each port. After a supplicant logs on, access by any other client to the same port is denied:

```
set portaccess=8021x port=4-6 role=authenticator mode=single
piggyback=disabled
```

The next command is identical to the previous example, except the authentication method is MAC address-based, meaning the authenticator ports use the MAC addresses of the supplicants as the usernames and passwords. With MAC address-based authentication, an authenticator port automatically extracts the MAC address from the initial frames received from a supplicant and sends it to the RADIUS server. The supplicants do not need 802.1x client software. Again, as in the previous example, since the operating mode is Single and the piggy back mode is disabled, only one supplicant can use each port.

```
set portaccess=macbased port=4-6 role=authenticator
mode=single piggyback=disabled
```

Note

The remaining examples are limited to the 802.1x authentication method, but apply equally to the MAC address-based authentication method.

The following command sets port 12 to the authenticator role and the operating mode to Single. The difference between this and the previous example is the piggy back mode is enabled. This configuration is appropriate when an authenticator port is supporting multiple clients, such as when a port is connected to an Ethernet hub, and you do not want to give each supplicant a separate username and password combination on the RADIUS server. With the piggy back mode enabled, all of the clients connected to the port can access it after one supplicant logs on:

```
set portaccess=8021x port=12 role=authenticator mode=single
piggyback=enabled
```

The following command sets port 22 to the authenticator role and the operating mode to Multiple. This configuration is also appropriate where there is more than one supplicant on a port. But an authenticator port in the Multiple mode requires that all supplicants have their own username and password combinations on the RADIUS server and that they log on before they can use the authenticator port on the switch:

```
set portaccess=8021x port=22 role=authenticator mode=multi
```

The following command assigns the Guest VLAN "Product_show" to authenticator ports 5 and 12. The ports function as untagged members of the VLAN and allow any network user access to the VLAN without logging on. However, should a port start to receive EAPOL packets, it assumes that a supplicant is initiating a log on and changes to the unauthorized state. After the log on is completed, the port moves to its predefined VLAN:

```
set portaccess=8021x port=5,12 role=authenticator
guestvlan=product_show
```

The following command configures port 15 as an authenticator port. This example assumes that the user accounts on the RADIUS server have VLAN assignments. With the VLANASSIGNMENT parameter set to enabled, the port processes the VLAN assignments it receives from the RADIUS server. Had this parameter been disabled, the port would ignore the VLAN assignments and leave the port in its predefined VLAN assignment. The VLAN assignment of the port is determined by the initial log on by a client. With the SECUREVLAN parameter set to enabled, only those subsequent supplicants having the same VLAN assignment as the initial supplicant are allowed to use the port:

```
set portaccess=8021x port=15 role=authenticator mode=multi
vlanassignment=enabled securevlan=on
```

The following command sets port 7 to the authenticator role, the quiet period on the port to 30 seconds, and the server timeout period to 200 seconds:

```
set portaccess=8021x port=7 role=authenticator
quietperiod=30 servtimeout=200
```

The following command configures authenticator port 5 to the multiple operating mode:

```
set portaccess=8021x port=5 role=authenticator mode=multi
```

The following command configures authenticator port 5 to the single operating mode and disables piggy backing:

```
set portaccess=8021x port=5 role=authenticator mode=single
piggyback=disabled
```

The following command removes port-based access control from ports 12 and 15:

```
set portaccess port=12,15 role=none
```

SET PORTACCESS|PORTAUTH PORT ROLE=SUPPLICANT

Syntax

```
set portaccess|portauth port=port type|role=supplicant|none
[authperiod=value] [heldperiod=value] [maxstart=value]
[startperiod=value] [username|name=name]
[password=password]
```

Note

The PORTACCESS and PORTAUTH keywords are equivalent.

Parameters

port	Specifies the port that you want to set to the supplicant role or whose supplicant settings you want to adjust. You can specify more than one port at a time.
type or role	Specifies the role of the port. The parameters are equivalent. The options are: supplicant Specifies the supplicant role. none Disables port-based access control on the port.
authperiod	Specifies the period of time in seconds that the supplicant will wait for a reply from the authenticator after sending an EAP-Response frame. The range is 1 to 300 seconds. The default is 30 seconds.
heldperiod	Specifies the amount of time in seconds the supplicant is to refrain from retrying to re-contact the authenticator in the event the end user provides an invalid username and/or password. After the time period has expired, the supplicant can attempt to log on again. The range is 0 to 65,535. The default value is 60.
maxstart	Specifies the maximum number of times the supplicant will send EAPOL-Start frames before assuming that there is no authenticator present. The range is 1 to 10. The default is 3.
startperiod	Specifies the time period in seconds between successive attempts by the supplicant to establish contact with an authenticator when there is no reply. The range is 1 to 60. The default is 30.

username or name	Specifies the username for the switch port. The parameters are equivalent. The port sends the name to the authentication server for verification when the port logs on to the network. The username can be from 1 to 16 alphanumeric characters (A to Z, a to z, 1 to 9). Do not use spaces or special characters, such as asterisks or exclamation points. The username is case-sensitive.
password	Specifies the password for the switch port. The port sends the password to the authentication server for verification when the port logs on to the network. The password can be from 1 to 16 alphanumeric characters (A to Z, a to z, 1 to 9). Do not use spaces or special characters, such as asterisks or exclamation points. The password is case-sensitive.

Description

This command sets ports to the supplicant role and configures the supplicant role parameters. This command also removes port-based access control on a port.

Examples

The following command sets ports 4 to 6 to the supplicant role:

```
set portaccess port=4-6 role=supplicant
```

The following command sets port 8 to the supplicant role, the name to "switch22," and the password to "bluebird":

```
set portaccess port=8 role=supplicant name=switch22  
password=bluebird
```

The following command removes port-based access control on ports 12 and 15:

```
set portaccess port=12,15 role=none
```

SET RADIUSACCOUNTING

Syntax

```
set radiusaccounting [status=enabled|disabled]
[serverport=value] [type=network]
[trigger=start_stop|stop_only]
[updateenable=enabled|disabled] [interval=value]
```

Parameters

status	Activates and deactivates RADIUS accounting on the switch. The options are:
	enabled Activates RADIUS accounting. This option is equivalent to “ENABLE RADIUSACCOUNTING” on page 627.
	disabled Deactivates the feature. This is the default. This option is equivalent to “DISABLE RADIUSACCOUNTING” on page 625.
serverport	Specifies the UDP port for RADIUS accounting. The default is port 1813.
type	Specifies the type of RADIUS accounting. The default is Network. This value cannot be changed.
trigger	Specifies the action that causes the switch to send accounting information to the RADIUS server. The options are:
	start_stop The switch sends accounting information whenever a client logs on or logs off the network. This is the default.
	stop_only The switch sends accounting information only when a client logs off.
updateenable	Specifies whether the switch is to send interim accounting updates to the RADIUS server. The default is disabled. If you enable this feature, use the INTERVAL parameter to specify the intervals at which the switch is to send the accounting updates.
interval	Specifies the intervals at which the switch is to send interim accounting updates to the RADIUS server. The range is 30 to 300 seconds. The default is 60 seconds.

Description

RADIUS accounting is supported on those switch ports operating in the Authenticator role. The accounting information sent by the switch to a RADIUS server includes the date and time when clients log on and log off, as well as the number of packets sent and received by a switch port during a client session. This feature is disabled by default on the switch.

Examples

The following command activates RADIUS accounting and sets the trigger to stop only:

```
set radiusaccounting status=enabled trigger=stop_only
```

The following command enables the update feature and sets the interval period to 200 seconds:

```
set radiusaccounting updateenable=enabled interval=200
```

SHOW PORTACCESS|PORTAUTH

Syntax

show portaccess|portauth=8021x|macbased

Parameters

portaccess or portauth	Specifies the authenticator method of the port. Options are:
8021x	Displays information for an 802.1x authenticator port.
macbased	Displays information for a MAC address-based authenticator port.
config	Displays whether port-based access control is enabled or disabled on the switch.
status	Displays the role and status of each port.

Description

This command displays the port roles. Figure 58 is an example of the information displayed by this command.

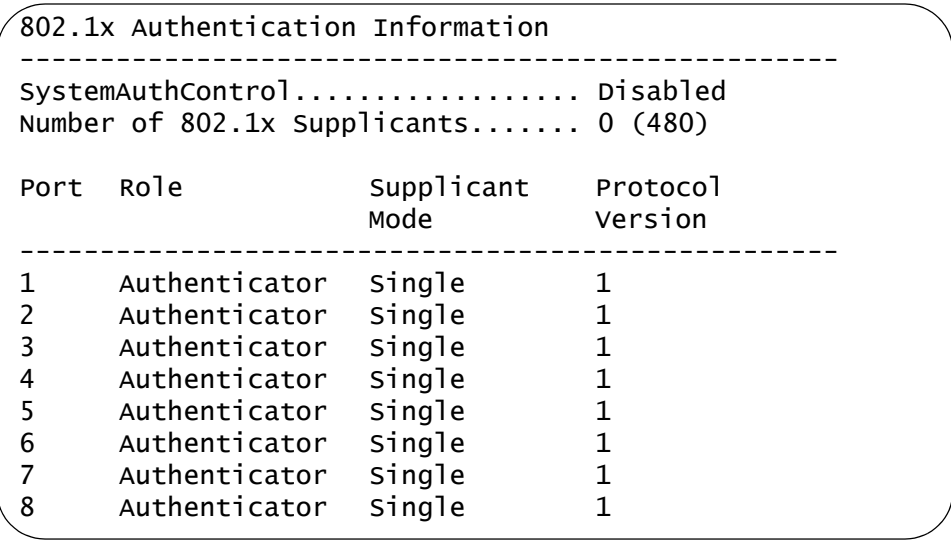


Figure 58. SHOW PORTACCESS|PORTAUTH Command

Examples

The following command displays the 802.1x authenticator ports:

```
show portaccess=8021x
```

The following command displays the MAC address-based authenticator ports:

```
show portaccess=macbased
```

SHOW PORTACCESS|PORTAUTH PORT

Syntax

show portaccess|portauth=8021x|macbased port=*port*
authenticator|supplicant [config] [status]

Parameters

portaccess or portauth	Specifies the authenticator method of the port. Options are: 8021x Displays information for an 802.1x authenticator port. macbased Displays information for a MAC address-based authenticator port.
port	Specifies the port whose port-based access control settings you want to view. You can specify more than one port at a time.
authenticator	Indicates that the port is an authenticator.
supplicant	Indicates that the port is a supplicant.
config	Displays the port-based access control settings for the port. Omitting this option and the STATUS option displays information on both.
status	Displays the status and role of the port. Omitting this option and the CONFIG option displays information on both.

Description

This command displays information about authenticator and supplicant ports.

Figure 59 illustrates the information displayed by this command for an authenticator port. For an explanation of the parameters, refer to “SET PORTACCESS|PORTAUTH PORT ROLE=AUTHENTICATOR” on page 628.

Port 1

```

PAE Type..... Authenticator
Supplicant Mode..... Single
AuthControlPortControl.... Auto
quietPeriod..... 60
txPeriod..... 30
suppTimeout..... 30
serverTimeout..... 30
maxReq..... 2
reAuthPeriod..... 3600
reAuthEnabled..... Enabled
vlanAssignment..... Enabled
secureVlan..... On
guestVlan..... None (VID=0)
adminControlDirection..... Both
piggyBack..... Disabled

Attached Supplicant(s)
MAC Address..... -
    Authenticator PAE State..... Connecting
    Port Status..... Unauthorized
    Backend Authenticator State..... Initialize

```

Figure 59. Authenticator Port Information

Figure 60 illustrates the information displayed for a supplicant port. For an explanation of the parameters, refer to “SET PORTACCESS|PORTAUTH PORT ROLE=SUPPLICANT” on page 636.

Port 5

```

PAE Type..... Supplicant
heldPeriod..... 60
authPeriod..... 30
startPeriod..... 30
maxStart..... 3
Supplicant PAE State..... Connecting

```

Figure 60. Supplicant Port Information

Examples

The following command displays the configuration and status for port 10, which is an 802.1x authenticator port:

```
show portaccess=8021x port=10 authenticator
```

The following command displays the configuration and status for port 12 which is a MAC address-based authenticator port:

```
show portaccess=8021x=macbased port=12 authenticator
```

This command displays the port access configuration of port 17, which is a supplicant port:

```
show portaccess port=17 supplicant
```

SHOW RADIUSACCOUNTING

Syntax

show radiusaccounting

Parameters

None.

Description

This command displays the current parameter settings for RADIUS accounting, which sends updates of supplicant activity on the switch's authenticator ports to the RADIUS server. Figure 61 is an example of the information displayed by this command.

```

Radius Accounting Configuration
-----
Radius Accounting Status .....: Enabled
Radius Accounting Port.....: 1813
Radius Accounting Type.....: Network
Radius Accounting Trigger Type.....: Start_Stop
Radius Accounting Update Status.....: Disabled
Radius Accounting Update Interval....: 60
  
```

Figure 61. SHOW RADIUSACCOUNTING Command

The information displayed by this command is described here:

- ❑ Radius Accounting Status - Specifies the status of RADIUS accounting on the switch. A status of Enabled means that the switch is sending supplicant updates to the RADIUS server: A status of Disabled means that the feature is not activated. The default is disabled.
- ❑ Radius Accounting Port - Specifies the UDP port for RADIUS accounting. The default is port 1813.
- ❑ Radius Accounting Type - Specifies the type of RADIUS accounting. The only possible setting is Network.
- ❑ Radius Accounting Trigger Type - Specifies the action that causes the switch to send accounting information to the RADIUS server. An action of Start_Stop sends accounting information whenever a client logs on or logs off the network. This is the default. An action of Stop_Only sends accounting information only when a client logs off.
- ❑ Radius Accounting Update Status - Specifies whether the switch is to send interim accounting updates to the RADIUS server. The default is disabled.

- ❑ Radius Accounting Update Interval - Specifies the interval at which the switch sends interim accounting updates to the RADIUS server. The default is 60 seconds.

Example

The following command displays the current parameter settings for RADIUS accounting:

```
show radiusaccounting
```

Section IX

Management Security

This section contains the following chapters:

- ❑ Chapter 37, “Web Server Commands” on page 649
- ❑ Chapter 38, “Encryption Key Commands” on page 659
- ❑ Chapter 39, “Public Key Infrastructure (PKI) Certificate Commands” on page 667
- ❑ Chapter 40, “Secure Sockets Layer (SSL) Commands” on page 683
- ❑ Chapter 41, “Secure Shell (SSH) Commands” on page 687
- ❑ Chapter 42, “TACACS+ and RADIUS Commands” on page 695
- ❑ Chapter 43, “Management ACL Commands” on page 709

Chapter 37

Web Server Commands

This chapter contains the following commands:

- ❑ “DISABLE HTTP SERVER” on page 650
- ❑ “ENABLE HTTP SERVER” on page 651
- ❑ “PURGE HTTP SERVER” on page 652
- ❑ “SET HTTP SERVER” on page 653
- ❑ “SHOW HTTP SERVER” on page 658

Note

Remember to use the SAVE CONFIGURATION command to save your changes.

DISABLE HTTP SERVER

Syntax

```
disable http server
```

Parameters

None.

Description

This command disables the web server on the switch. When the server is disabled, you cannot manage the switch from a web browser. To view the current status of the web server, see “SHOW HTTP SERVER” on page 658. The default setting for the web server is enabled.

Example

The following command disables the web server:

```
disable http server
```

ENABLE HTTP SERVER

Syntax

```
enable http server
```

Parameters

None.

Description

This command activates the web server on the switch. Activating the server allows you to manage the unit from a web browser. To view the current status of the web server, see “SHOW HTTP SERVER” on page 658. The default setting for the web server is enabled.

Example

The following command activates the web server:

```
enable http server
```

PURGE HTTP SERVER

Syntax

```
purge http server
```

Parameters

None.

Description

This command resets the HTTP server to its default values, as specified in Appendix A, “AT-S63 Default Settings” in the *AT-S63 Management Software Menus Interface User’s Guide*. To view the current web server settings, refer to “SHOW HTTP SERVER” on page 658.

Example

The following command resets the web server parameters to their default values:

```
purge http server
```

SET HTTP SERVER

Syntax

```
set http server [security=enabled|disabled] [sslkeyid=key-id] [port=port]
```

Parameters

security	Specifies the security mode of the web server. The options are:	
	enabled	Specifies that the web server is to function in the secure HTTPS mode.
	disabled	Specifies that the web server is to function in the non-secure HTTP mode. This is the default.
sslkeyid	Specifies a key pair ID. This parameter is required if you are configuring the web server to operate in the secure HTTPS mode.	
port	Specifies the TCP port number that the web server will listen on. The default for non-secure HTTP operation is port 80. The default for secure HTTPS operation is port 443.	

Description

This command configures the web server. You can configure the server for either secure HTTPS or non-secure HTTP operation.

Before configuring the web server, please note the following:

- ❑ You cannot use this command when the web server is enabled. You must first disable the web server before making changes. To disable the server, refer to “DISABLE HTTP SERVER” on page 650.
- ❑ To configure the web server for the HTTPS secure mode, you must first create an encryption key and a certificate, and add the certificate to the certificate database. The management software will not allow you to configure the web server for the secure HTTPS mode until those steps have been completed.

Examples

The following command configures the web server for the non-secure HTTP mode. Since no port is specified, the default HTTP port 80 is used:

```
set http server security=disabled
```

The following command configures the web server for the secure HTTPS mode. It specifies the key pair ID as 5. Since no port is specified, the default HTTPS port 443 is used:

```
set http server security=enabled sslkeyid=5
```

General Configuration Steps for a Self-signed Certificate

Below are the steps to configuring the switch's web server for a self-signed certificate using the command line commands:

1. Set the switch's date and time. You can do this manually using "SET DATE" on page 79 or you can configure the switch to obtain the date and time from an SNTP server using "ADD SNTPSERVER PEER|IPADDRESS" on page 74.
2. Create an encryption key pair using "CREATE ENCO KEY" on page 660 (syntax 1).
3. Create the self-signed certificate using "CREATE PKI CERTIFICATE" on page 670.
4. Add the self-signed certificate to the certificate database using "ADD PKI CERTIFICATE" on page 668.
5. Disable the switch's web server using "DISABLE HTTP SERVER" on page 650.
6. Configure the web server using "SET HTTP SERVER" on page 653.
7. Activate the web server using "ENABLE HTTP SERVER" on page 651.

The following is an example of the command sequence to configuring the web server for a self-signed certificate. (The example does not include step 1, setting the system time.)

1. This command creates the encryption key pair with an ID of 4, a length of 512 bits, and the description "Switch 12 key":

```
create enco key=4 type=rsa length=512 description="Switch 12 key"
```

2. This command creates a self-signed certificate using the key created in step 1. The certificate is assigned the filename "Sw12cert.cer. (The ".cer" extension is not included in the command because it is added automatically by the management software.) The certificate is assigned the serial number 0 and a distinguished name of 149.11.11.11, which is the IP address of a master switch:

```
create pki certificate=Sw12cert keypair=4 serialnumber=0
subject="cn=149.11.11.11"
```

3. This command adds the new certificate to the certificate database. The certificate is given a description of "Switch 12 certificate":

```
add pki certificate="Switch 12 certificate"
location=Sw12cert.cer
```

4. This command disables the web server:

```
disable http server
```

5. This command configures the web server by activating HTTPS and specifying the encryption key pair created in step 1:

```
set http server security=enabled sslkeyid=4
```

6. This command enables the web server:

```
enable http server
```

General Configuration Steps for a CA Certificate

Below are the steps to configuring the switch's web server for CA certificates using the command line commands. The steps explain how to create an encryption key and a self-signed certificate, and how to configure the web server for the certificate:

1. Set the switch's date and time. You can do this manually using the "SET DATE" on page 79 or you can configure the switch to obtain the date and time from an SNTP server using "ADD SNTPSERVER PEER|IPADDRESS" on page 74.
2. Create an encryption key pair using "CREATE ENCO KEY" on page 660 (syntax 1).
3. Set the switch's distinguished name using "SET SYSTEM DISTINGUISHEDNAME" on page 680.
4. Create an enrollment request using "CREATE PKI ENROLLMENTREQUEST" on page 673.

5. Upload the enrollment request from the switch to a management station or FTP server using “UPLOAD METHOD=XMODEM” on page 220 or “UPLOAD METHOD=TFTP” on page 217.
6. Submit the enrollment request to a CA.
7. After you have received the CA certificates, download them into the switch’s file system using “LOAD METHOD=XMODEM” on page 207 or “LOAD METHOD=TFTP” on page 202.
8. Add the CA certificates to the certificate database using “ADD PKI CERTIFICATE” on page 668.
9. Disable the switch’s web server using the command “DISABLE HTTP SERVER” on page 650.
10. Configure the web server using “SET HTTP SERVER” on page 653.
11. Activate the web server using “ENABLE HTTP SERVER” on page 651

The following is an example of the command sequence for configuring the web server for CA certificates. It explains how to create an encryption key and enrollment request, and how to download the CA certificates on the switch. (The example does not include step 1, setting the system time, and the procedure for submitting the request to a CA, which will vary depending on the enrollment requirements of the CA.)

1. This command creates the encryption key pair with an ID of 8, a length of 512 bits, and the description “Switch 24 key”:

```
create enco key=8 type=rsa length=512 description="Switch
24 key"
```

2. This command sets the switch’s distinguished name to the IP address 149.44.44.44, which is the IP address of a master switch:

```
set system distinguishedname="cn=149.44.44.44"
```

3. This command creates an enrollment request using the encryption key created in step 1. It assigns the request the filename “sw24cer.csr”. The command omits the “.csr” extension because the management software adds it automatically:

```
create pki enrollmentrequest=sw24cer keypair=8
```

4. This command uploads the enrollment request from the switch’s file system to a TFTP server. The command assumes that the TFTP server has the IP address 149.88.88.88. (This step could also be performed using Xmodem.)

```
upload method=tftp destfile=c:sw24cer.csr
server=149.88.88.88 file=sw24cer.csr
```


5. These commands download the CA certificates into the switch's file system from the TFTP server. The commands assume that the IP address of the server is 149.88.88.88 and that the certificate names are "sw24cer.cer" and "ca.cer". (This step could be performed using Xmodem.)

```
load method=tftp destfile=sw24cer.cer server=149.88.88.88  
file=c:sw24cer.cer
```

```
load method=tftp destfile=ca.cer server=149.88.88.88  
file=c:ca.cer
```

6. These commands load the certificates into the certificate database:

```
add pki certificate="Switch 24 certificate"  
location=sw24cert.cer
```

```
add pki certificate="CA certificate" location=ca.cer
```

7. This command disables the web server:

```
disable http server
```

8. This command configures the web server. It activates HTTPS and specifies the key created in step 1:

```
set http server security=enabled sslkeyid=8
```

9. This command enables the web server:

```
enable http server
```

SHOW HTTP SERVER

Syntax

```
show http server
```

Parameters

None.

Description

This command displays the following information about the web server on the switch:

- ☐ Status
- ☐ SSL security
- ☐ SSL key ID
- ☐ Listen port

Example

The following command displays the status of the web server:

```
show http server
```

Encryption Key Commands

This chapter contains the following commands:

- ❑ “CREATE ENCO KEY” on page 660
- ❑ “DESTROY ENCO KEY” on page 664
- ❑ “SET ENCO KEY” on page 665
- ❑ “SHOW ENCO” on page 666

Note

Remember to save your changes with the SAVE CONFIGURATION command.

CREATE ENCO KEY

Syntax 1

```
create enco key=key-id type=rsa length=value
[description="description"]
```

Syntax 2

```
create enco key=key-id type=rsa [description="description"]
[file=filename.key] [format=hex|ssh|ssh2]
```

Parameters

key	Specifies a key ID. The range is 0 to 65,535. The default is 0. When creating a new key this value must be unique from all other key IDs on the switch.		
type	Specifies the type of key, which can only be a random RSA key.		
length	Specifies the length of the key in bits. The range is 512 to 1536 bits, in increments of 256 bits (for example, 512, 768, 1024, etc). The default is 512 bits. This parameter is only used when creating a new encryption key pair.		
description	Specifies a description for the encryption key. The description can be up to 40 alphanumeric characters. Spaces are allowed. The description must be enclosed in quotes. This parameter, which is optional, is used when creating a new key pair and when importing a public key from the AT-S63 file system to the key database. This parameter should not be used when exporting a public key to the file system.		
file	Specifies a filename for the key. The filename must include the ".key" extension. This parameter is used when you are importing or exporting a public key from the key database. This parameter is not used when creating a new encryption key pair.		
format	Specifies the format when importing or exporting a public encryption key. The options are: <table> <tr> <td>hex</td><td>Specifies a hexadecimal format used to transfer a key between devices other than switches. This is the default.</td></tr> </table>	hex	Specifies a hexadecimal format used to transfer a key between devices other than switches. This is the default.
hex	Specifies a hexadecimal format used to transfer a key between devices other than switches. This is the default.		

ssh	Specifies a format for Secure Shell version 1 users.
ssh2	Specifies a format for Secure Shell version 2 users.

Description

This command serves two functions. One is to create encryption keys. The other is to import and export public encryption keys from the AT-S63 file system to the key database.



Caution

Key generation is a CPU-intensive process. Because this process may affect switch behavior, Allied Telesis recommends creating keys when the switch is not connected to a network or during periods of low network activity.

Syntax 1 Description

Syntax 1 creates encryption key pairs. It creates both the public and private keys of a key pair. A new key pair is automatically stored in the key database and the file system. To view the current keys on a switch, use the “SHOW ENCO” on page 666.

The KEY parameter specifies the identification number for the key. The number must be unique from all other key pairs already on the switch. The range is 0 to 65,535. This number is used only for identification purposes and not in generating the actual encryption key pair.

The TYPE parameter specifies the type of key to be created. The only option is RSA.

The LENGTH parameter specifies the length of the key in bits. The range is 512 to 1,536 bits, in increments of 256 bits (for example, 512, 768, 1024, etc). Before selecting a key length, note the following:

- ❑ For SSL and web browser encryption, key length can be any valid value within the range.
- ❑ For SSH host and server key pairs, the two key pairs must be created separately and be of different lengths of at least one increment (256 bits) apart. The recommended length for the server key is 768 bits and the recommended length for the host key is 1024 bits.

The DESCRIPTION parameter is optional. You can use it to add a description to the key. This can help you identify the different keys on the switch. The description can be up to forty alphanumeric characters. It must be enclosed in quotes and spaces are allowed.

Syntax 1 Examples

This example creates a key with the ID of 12 and a length of 512 bits:

```
create enco key=12 type=rsa length=512
```

This example creates a key with the ID of 4, a length of 1024 bits, and a description of "Switch12a encryption key":

```
create enco key=4 type=rsa length=1024
description="Switch12a encryption key"
```

Syntax 2 Description

Syntax 2 is used to import and export public encryption keys. You can import a public key from the AT-S63 file system to the key database or vice versa.

The only circumstance in which you are likely to use this command is if you are using an SSH client that does not download the key automatically when you start an SSH management session. In that situation, you can use this procedure to export the SSH client key from the key database into the AT-S63 file system, from where you can upload it onto the SSH management session for incorporation in your SSH client software.

You should not use this command to export an SSL public key. Typically, an SSL public key only has value when incorporated into a certificate or enrollment request.

The KEY parameter specifies the identification number for the key. The range is 0 to 65,535. To import a public key from the file system to the key database, the key ID must be unused; it cannot already be assigned to another key pair. Importing a public key to the database assumes that you have already stored the public key in the file system.

If you are exporting a public key from the key database to the file system, the KEY parameter should specify the ID of the key that you want to export. Only the public key of a key pair is exported to the file system. You cannot export a private key.

The TYPE parameter specifies the type of key to be imported or exported. The only option is RSA.

The FILE parameter specifies the filename of the encryption key. The filename must include the ".key" extension. If you are exporting a key from the key database to the file system, the filename must be unique from all other files in the file system. If you are importing a key, the filename should specify the name of the file in the file system that contains the key you want to import into the key database.

The DESCRIPTION parameter specifies a user-defined description for the

key. This parameter should be used only when importing a key and not when exporting a key. The description will appear next to the key when you view the key database. Descriptions can help you identify the different keys stored in the switch.

The FORMAT parameter specifies the format of the key, which can be either Secure Shell format (SSH version 1 or 2) or hexadecimal format (HEX). The FORMAT parameter must be specified when importing or exporting keys. The default is HEX.

Syntax 2 Examples

This is an example of exporting a public key from the key database to the file system. The example assumes that the ID of the key pair with the public key to be exported is 12 and that you want to store the key as a file called "public12.key" in the file system. It specifies the format as SSH version 1 and the type as RSA:

```
create enco key=12 type=rsa file=public12.key format=ssh
```

This is an example of importing a public key from the file system to the key database. It assumes that the name of the file containing the public key is swpub24.key and that the key is to be given the ID number 6 in the key database. It gives the key the description "Switch 24 public key." The format is SSH version 2 and the type is RSA:

```
create enco key=6 type=rsa description="Switch 24 public key" file=swpub24.key format=ssh2
```

DESTROY ENCO KEY

Syntax

```
destroy enco key=key-id
```

Parameter

key	Specifies the ID number of the key pair to be deleted from the key database.
-----	--

Description

This command deletes an encryption key pair from the key database. This command also deletes a key's corresponding ".UKF" file from the file system. After a key pair is deleted, any SSL certificate created using the public key of the key pair will be invalid and cannot be used to manage the switch. To view the keys, see "SHOW ENCO" on page 666.

You cannot delete a key pair if it is being used by SSL or SSH. You must first either disable the SSL or SSH server software on the switch or reconfigure the software by specifying another key.

Example

The following command destroys the encryption key pair with the key ID 4:

```
destroy enco key=4
```


SET ENCO KEY

Syntax

```
set enco key=key-id description="description"
```

Parameters

key	Specifies the ID number of the key pair whose description you want to change.
description	Specifies the new description of the key. The description can contain up to 25 alphanumeric characters. Spaces are allowed. The description must be enclosed in double quotes.

Description

This command changes the description of a key pair. Descriptions can make it easier to identify the different keys on a switch.

The KEY parameter specifies the identification number of the key. The encryption key must already exist. To view the keys on a switch, see "SHOW ENCO" on page 666.

The DESCRIPTION parameter specifies the new description for the key.

Example

The following command changes the description for the key with the ID 6 to "Switch 22 key":

```
set enco key=1 description="Switch 22 key"
```

SHOW ENCO

Syntax

```
show enco key=[key-id]
```

Parameters

key	Specifies the ID of a specific key whose information you want to display. Otherwise, all keys are displayed.
-----	--

Description

This command displays information about encryption key pairs stored in the key database. This command displays the following information about each key:

- ❑ ID
- ❑ Algorithm
- ❑ Length Digest
- ❑ Description

Example

The following command displays the information on encryption key 1:

```
show enco key=1
```

Chapter 39

Public Key Infrastructure (PKI) Certificate Commands

This chapter contains the following commands:

- ❑ “ADD PKI CERTIFICATE” on page 668
- ❑ “CREATE PKI CERTIFICATE” on page 670
- ❑ “CREATE PKI ENROLLMENTREQUEST” on page 673
- ❑ “DELETE PKI CERTIFICATE” on page 675
- ❑ “PURGE PKI” on page 676
- ❑ “SET PKI CERTIFICATE” on page 677
- ❑ “SET PKI CERTSTORELIMIT” on page 679
- ❑ “SET SYSTEM DISTINGUISHEDNAME” on page 680
- ❑ “SHOW PKI” on page 681
- ❑ “SHOW PKI CERTIFICATE” on page 682

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD PKI CERTIFICATE

Syntax

```
add pki certificate="name" location="filename.cer"  
[trusted=yes|no|on|off|true|false] [type=ca|ee|self]
```

Parameters

certificate	Specifies a name for the certificate. This is the name for the certificate as it will appear in the certificate database list. The name can up to 40 alphanumeric characters. Spaces are allowed. If the name contains spaces, it must be enclosed in double quotes. Each certificate must be given a unique name.	
location	Specifies the filename of the certificate, with the “.cer” file extension, as it is stored in the switch’s file system.	
trusted	Specifies whether or not the certificate is from a trusted CA. The options are:	
	yes, on, true	Specifies that the certificate is from a trusted CA. This is the default.
	no, off, false	Specifies that the certificate is not from a trusted CA.
type	Specifies the type of certificate being added. The options are:	
	ca	Tags the certificate as a CA certificate.
	ee	Tags the certificate as belonging to another end entity (EE). This is the default.
	self	Tags the certificate as its own.

Description

This command adds a certificate to the certificate database from the AT-S63 file system. To view the certificate files in the file system, refer to “SHOW FILE” on page 197. To view the certificates already in the database, refer to “SHOW PKI CERTIFICATE” on page 682.

The CERTIFICATE parameter assigns the certificate a name. The name can be from 1 to 40 alphanumeric characters. Each certificate in the database should be given a unique name.

The LOCATION parameter specifies the filename of the certificate as stored in the switch's file system. When specifying the filename, be sure to include the file extension ".cer".

The TRUSTED parameter specifies whether the certificate is from a trusted CA. The default is TRUE. Only self-signed root CA certificates are typically set to be automatically trusted, and only after the user has checked the certificate's fingerprint and other details using "SHOW PKI CERTIFICATE" on page 682.

The TYPE parameter specifies what type of certificate is being added. Self signed certificates should be assigned a type of SELF. If CA is specified, the switch tags this certificate as a CA certificate. If ENDENTITY or EE is specified, the switch tags the certificate to indicate that it belongs to an end entity. The default is ENDENTITY.

Note

The TRUSTED and TYPE parameters have no affect on the operation of a certificate. You can select any permitted value for either parameter, or you can omit the parameters. The parameters are included only as placeholders for information in the certificate database.

Example

The following command loads the certificate "sw12.cer" from the file system into the certificate database. The certificate is assigned the name "Switch 12 certificate":

```
add pki certificate="Switch 12 certificate"  
location="sw12.cer" type=self
```

CREATE PKI CERTIFICATE

Syntax

```
create pki certificate=name keypair=key-id
serialnumber=value [format=der|pem]
subject="distinguished-name"
```

Parameters

certificate	Specifies a name for the self-signed certificate. The name can be from one to eight alphanumeric characters. Spaces are allowed; if included, the name must be enclosed in double quotes. The management software automatically adds the “.cer” extension.				
keypair	Specifies the ID of the key pair that you want to use to create the certificate.				
serialnumber	Specifies the serial number for the certificate. The range is 0 to 2147483647. The default is 0.				
format	Specifies the type of encoding the certificate will use. The options are: <table border="0"> <tr> <td>der</td><td>Specifies binary format which cannot be displayed. This is the default.</td></tr> <tr> <td>pem</td><td>Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.</td></tr> </table>	der	Specifies binary format which cannot be displayed. This is the default.	pem	Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.
der	Specifies binary format which cannot be displayed. This is the default.				
pem	Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.				
subject	Specifies the distinguished name for the certificate. The name must be enclosed in quotes.				

Description

This command creates a self-signed certificate. You can use the certificate to add encryption to your web browser management sessions of the switch. A new self-signed certificate is automatically stored in the switch's file system.

Before you can create a self-signed certificate, you must create an encryption key pair. The certificate will contain the public key of the key pair. To create a key pair, refer to “CREATE PKI CERTIFICATE” on page 670.

After you have created a new self-signed certificate, you need to load it into the certificate database. The switch cannot use the certificate for

encrypted web browser management systems until it is loaded into the database. For instructions, refer to “ADD PKI CERTIFICATE” on page 668.

Note

For a review of the steps to configuring the web server for a self-signed certificate, refer to “SET HTTP SERVER” on page 653.

The CERTIFICATE parameter assigns a file name to the certificate. This is the name under which the certificate will be stored as in the switch's file system. The name can be from one to eight alphanumeric characters. If the name includes a space, it must be enclosed in double quotes. The software automatically adds the extension “.cer” to the name.

The KEYPAIR parameter specifies the ID of the encryption key that you want to use to create the certificate. The public key of the pair will be incorporated into the certificate. The key pair that you select must already exist on the switch. To create a key pair, refer to “CREATE ENCO KEY” on page 660. To view the IDs of the keys already on the switch, refer to “SHOW ENCO” on page 666.

The SERIALNUMBER parameter specifies the number to be inserted into the serial number field of the certificate. A serial number is typically used to distinguish a certificate from all others issued by the same issuer, in this case the switch. Self-signed certificates are usually assigned a serial number of 0.

The FORMAT parameter specifies the type of encoding the certificate will use. PEM is ASCII-encoded and allows the certificate to be displayed once it has been generated. DER encoding is binary and so cannot be displayed. The default is DER.

The SUBJECT parameter specifies the distinguished name for the certificate. The name is inserted in the subject field of the certificate. Allied Telesis recommends using the IP address of the master switch as the distinguished name (for example, “cn=149.11.11.11”). If your network has a Domain Name System and you mapped a name to the IP address of a switch, you can specify the switch's name instead of the IP address as the distinguished name.

Examples

The following command creates a self-signed certificate. It assigns the certificate the filename "sw12.cer". (The management software automatically adds the ".cer" extension.) The command uses the key pair with the ID 12 to create the certificate. The format is ASCII and the distinguished name is the IP address of a master switch:

```
create pki certificate=sw12 keypair=12 serialnumber=0  
format=pem subject="cn=149.11.11.11"
```

The following command creates a self-signed certificate with a filename of "S45 cert". The key pair used to create it has the ID 5. No format is specified, so the default binary format is used. The distinguished name is the IP address of another master switch:

```
create pki certificate="S45 cert" keypair=5 serialnumber=0  
subject="cn=149.22.22.22"
```


CREATE PKI ENROLLMENTREQUEST

Syntax

```
create pki enrollmentrequest="name" keypair=key-id
[format=der|pem] [type=pkcs10]
```

Parameters

enrollmentrequest	Specifies a filename for the enrollment request. The filename can be from 1 to 8 alphanumeric characters. If the name contains spaces, it must be enclosed in double quotes. The management software automatically adds the ".csr" extension.				
keypair	Specifies the key pair that you want to use to create the enrollment request.				
format	Specifies the type of encoding the certificate request will use. The options are: <table border="0"> <tr> <td>der</td><td>Specifies binary format which cannot be displayed. This is the default.</td></tr> <tr> <td>pem</td><td>Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.</td></tr> </table>	der	Specifies binary format which cannot be displayed. This is the default.	pem	Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.
der	Specifies binary format which cannot be displayed. This is the default.				
pem	Specifies an ASCII-encoded format that allows the certificate to be displayed once it is generated.				
type	Formats the request according to PKCS #10.				

Description

This command creates a certificate enrollment request. You create an enrollment request when you want a public or private CA to issue a certificate.

Before you can create an enrollment request, you must create the key pair that you want the CA to use when creating the certificate. The enrollment request will contain the public key of the key pair. To create a key pair, refer to "CREATE PKI CERTIFICATE" on page 670.

You must also set the system's distinguished name before using this command. To set the distinguished name, refer to "SET SYSTEM DISTINGUISHEDNAME" on page 680.

Note

For a review of the steps to configuring the web server for a CA certificate, refer to "SET HTTP SERVER" on page 653.

The ENROLLMENTREQUEST parameter specifies a filename for the request. The filename can contain from 1 to 8 alphanumeric characters. If spaces are used, the name must be enclosed in quotes. The management software automatically adds the “.csr” extension. This is the filename under which the request will be stored in the file system.

The KEYPAIR parameter specifies the key that you want to use to create the enrollment request. The public key of the pair is incorporated into the request.

The FORMAT parameter specifies the type of encoding format for the request. DER specifies that the enrollment request should be written straight to the binary file. PEM specifies that the enrollment request should be encoded using the “Privacy Enhanced Mail” format. The default is DER. This parameter is only valid for manual enrollment.

The TYPE parameter specifies the type of request. The only option is PKCS10.

You do not need to use the SAVE CONFIGURATION command after you create an enrollment request. The file is permanently saved in the file system until you manually delete it.

Example

The following command creates an enrollment request. It names the enrollment request file “Switch12” and uses the key pair with the ID 4 to generate the request:

```
create pki enrollmentrequest=Switch12 keypair=4
```

DELETE PKI CERTIFICATE

Syntax

```
delete pki certificate="name"
```

Parameter

certificate	Specifies the name of the certificate you want to delete from the certificate database. The name is case sensitive. If the name contains spaces, it must be enclosed in double quotes. Wildcards are not allowed.
-------------	---

Description

This command deletes a certificate from the switch's certificate database. To view the certificates in the database, refer to "SHOW PKI CERTIFICATE" on page 682.

Deleting a certificate from the database does not delete it from the file system. To delete a file from the file system, refer to "DELETE FILE" on page 187.

You cannot delete a certificate from the database if you specified its corresponding encryption key as the active key in the web server configuration. The switch considers the certificate to be in use and will not allow you to delete it. You must first configure the web server with another encryption key pair for a different certificate.

Example

The following command deletes the certificate "Switch 12 certificate" from the certificate database:

```
delete pki certificate="Switch 12 certificate"
```

PURGE PKI

Syntax

```
purge pki
```

Parameters

None.

Description

This command deletes all certificates from the certificate database and resets the certificate database storage limit to the default. This command does not delete the certificates from the file system. To delete files from the file system, refer to “DELETE FILE” on page 187.

Example

The following command deletes the certificates from the database and resets the storage limit to the default:

```
purge pki
```

SET PKI CERTIFICATE

Syntax

```
set pki certificate="name"
[trusted=yes|no|on|off|true|false] [type=ca|ee|self]
```

Parameters

certificate	Specifies the certificate name whose trust or type you want to change. The name is case sensitive. If the name contains spaces, it must be enclosed in quotes.	
trusted	Specifies whether or not the certificate is from a trusted CA. The options are:	
	yes, on, true	Specifies that the certificate is from a trusted CA. This is the default. The options are equivalent.
	no, off, false	Specifies that the certificate is not from a trusted CA. The options are equivalent.
type	Specifies a type for the certificate. The options are:	
	ca	Tags the certificate as a CA certificate.
	ee	Tags the certificate as belonging to another end entity (EE). This is the default.
	self	Tags the certificate as its own.

Description

This command changes the level of trust and type for a certificate in the switch's certificate database. To list the certificates in the database, refer to "SHOW PKI CERTIFICATE" on page 682.

The TRUSTED parameter specifies whether the certificate is from a trusted CA. The default is TRUE. Only self-signed root CA certificates are typically set to be automatically trusted, and only after the user has checked the certificate's fingerprint and other details using "SHOW PKI CERTIFICATE" on page 682.

The TYPE parameter specifies the certificate type. If CA is specified, the switch tags this certificate as a CA certificate. If ENDENTITY or EE is specified, the switch tags the certificate to indicate that it belongs to an end entity. If SELF is specified, the switch tags the certificate as its own. The default is ENDENTITY.

Note

The TRUSTED and TYPE parameters have no affect on the operation of a certificate. You can select any permitted value for either parameter. The parameters are included only as placeholders for information in the certificate database.

Example

The following command sets the certificate named “Switch 12 certificate” to be trusted.

```
set pki certificate="Switch 12 certificate" trusted=true
```

SET PKI CERTSTORELIMIT

Syntax

```
set pki certstorelimit=value
```

Parameter

certstorelimit	Specifies the maximum number of certificates the certificate database can store. The range is 12 and 256; the default is 256.
----------------	---

Description

This command sets the maximum number of certificates the database can store.

Example

The following command sets the certificate storage limit to 100:

```
set pki certstorelimit=100
```

SET SYSTEM DISTINGUISHEDNAME

Syntax

```
set system distinguishedname="name"
```

Parameter

distinguishedname	Specifies the distinguished name for the switch. The name must be enclosed in quotes.
-------------------	---

Description

This command sets the distinguished name for the switch. The distinguished name is used to create a self signed certificate or enrollment request. Allied Telesis recommends using the switch's IP address or, for networks with a Domain Name System, its domain name as the distinguished name. For slave switches, which do not have an IP address, you can use the IP address or domain name of the master switch of the enhanced stack as the slave switch's distinguished name.

To set the distinguished name when creating a self signed certificate, you can use this command or you can set it directly in "CREATE PKI CERTIFICATE" on page 670, which is the command for creating a self signed certificate. It has a parameter for setting the distinguished name.

If you are creating an enrollment request, you must set the distinguished name with this command first before creating the request. The command for creating an enrollment request is "CREATE PKI ENROLLMENTREQUEST" on page 673.

Example

The following command sets the switch's distinguished name to the IP address 169.22.22.22:

```
set system distinguishedname="cn=169.22.22.22"
```


SHOW PKI

Syntax

```
show pki
```

Parameters

None.

Description

This command displays the current setting for the maximum number of certificates the switch will allow you to store in the certificate database. To change this value, refer to “SET PKI CERTSTORELIMIT” on page 679.

Example

The following command displays the current PKI settings:

```
show pki
```

SHOW PKI CERTIFICATE

Syntax

```
show pki certificate[="name"]
```

Parameter

certificate	Specifies the name of a certificate. If the name contains spaces, it must be enclosed in double quotes. This parameter is case sensitive. Wildcards are not allowed.
-------------	--

Description

This command lists all of the certificates in the certificates database. This command can also display information about a specific certificate in the database.

Example

The following command lists all of the certificates in the database:

```
show pki certificate
```

The following command displays information specific to the certificate "Switch 12 certificate":

```
show pki certificate="Switch 12 certificate"
```

Chapter 40

Secure Sockets Layer (SSL) Commands

This chapter contains the following command:

- ❑ “SET SSL” on page 684
- ❑ “SHOW SSL” on page 685

Note

Remember to save your changes with the SAVE CONFIGURATION command.

SET SSL

Syntax

```
set ssl [cachetimeout=value] [maxsessions=value]
```

Parameters

cachetimeout	Specifies the maximum time in seconds that a session will be retained in the cache. The range is 1 to 600 seconds. The default is 300 seconds.
maxsessions	Specifies the maximum number of sessions that will be allowed in the session resumption cache. The range is 0 to 100 sessions. The default is 50 sessions.

Description

This command configures the SSL parameters.

The CACHETIMEOUT parameter determines the maximum time that a session will be retained in the cache. The cache stores information about closed connections so they can be resumed quickly. The default is 300 seconds.

The MAXSESSIONS parameter specifies the maximum number of sessions that will be allowed in the session resumption cache. The number of ENCO channels supported by the switch limits this number. The default is 50 sessions.

Example

The following command sets the session resumption cache to 180 seconds:

```
set ssl cachetimeout=180
```

SHOW SSL

Syntax

```
show ssl
```

Parameters

None.

Description

This command displays the current settings for the following SSL values:

- ☐ Version
- ☐ Available ciphers
- ☐ Maximum number of sessions
- ☐ Cache timeout

Example

The following command displays the current SSL settings:

```
show ssl
```


Chapter 41

Secure Shell (SSH) Commands

This chapter contains the following commands:

- ❑ “DISABLE SSH SERVER” on page 688
- ❑ “ENABLE SSH SERVER” on page 689
- ❑ “SET SSH SERVER” on page 692
- ❑ “SHOW SSH” on page 694

Note

Remember to save your changes with the SAVE CONFIGURATION command.

DISABLE SSH SERVER

Syntax

```
disable ssh server
```

Parameters

None.

Description

This command disables the Secure Shell server. When the Secure Shell server is disabled, connections from Secure Shell clients are not accepted.

By default, the Secure Shell server is disabled.

Example

The following command disables the Secure Shell server:

```
disable ssh server
```


ENABLE SSH SERVER

Syntax

```
enable ssh server hostkey=key-id serverkey=key-id
[expirytime=hours] [logintimeout=seconds]
```

Parameters

hostkey	Specifies the ID number of the encryption key pair to function as the host key.
serverkey	Specifies the ID number of the encryption key pair to function as the server key.
expirytime	Specifies the length of time, in hours, after which the server key pair is regenerated. The range is 0 to 5 hours. Entering 0 never regenerates the key. The default is 0.
logintimeout	Specifies the length of time the server waits before disconnecting an un-authenticated client. The range is 60 to 600 and the default is 180.

Description

This command enables the Secure Shell server and sets the server's parameters. When the Secure Shell server is enabled, connections from Secure Shell clients are accepted. The default setting for the server is disabled.

The HOSTKEY parameter specifies the key ID of the host key pair. The specified key pair must already exist. To create a key pair, refer to "CREATE ENCO KEY" on page 660 (syntax 1).

The SERVERKEY parameter specifies the key of the server key pair. The specified key pair must already exist.

The EXPIRYTIME parameter specifies the time, in hours, after which the Secure Shell server key will expire and will be regenerated. If 0 is specified the key does not expire. The range is 0 to 5 and the default is 0.

The LOGINTIMEOUT parameter specifies the length of time the server waits before disconnecting an unauthenticated client. The range is 60 to 600 and the default is 180.

Note

Before you enable SSH, disable the Telnet management session. Otherwise, the security provided by SSH is not active. See “DISABLE TELNET” on page 40.

Example

The following command activates the Secure Shell server and specifies encryption key pair 0 as the host key and key pair 1 as the server key:

```
enable ssh server hostkey=0 serverkey=1
```

General Configuration Steps for SSH Operation

Configuring the SSH server involves several commands. The information in this section lists the functions and commands you need to perform to configure the SSH feature.

1. Create two encryption key pairs. One pair will function as the SSH host key and another as the SSH server key. The keys must be of different lengths of at least one increment (256 bits) apart. The recommended size for the server key is 768 bits. The recommended size for the server key is 1024 bits. To create a key pair, see to “CREATE ENCO KEY” on page 660.
2. Disable Telnet access to the switch with the DISABLE TELNET command. See “DISABLE TELNET” on page 40.

Although the AT-S63 Management Software allows the SSH and Telnet servers to be active on the switch simultaneously, allowing Telnet to remain active negates the security of the SSH feature.

3. Configure and activate SSH on the switch using “ENABLE SSH SERVER” on page 689.
4. Install SSH client software on your PC.

Follow the directions provided with the client software. You can download SSH client software from the Internet. Two popular SSH clients are PuTTY and CYGWIN.

5. Log on to the SSH server from the SSH client.

Acceptable users are those with a Manager or Operator login as well as users configured with the RADIUS and TACACS+ protocols.

Example

The following is an example of the command sequence to configuring the SSH software on the server:

1. The first step is to create the two encryption key pairs. Each key must be created separately and the key lengths must be at least one increment (256 bits) apart. The following two commands create the host and server keys using the recommended key lengths:

```
create enco key=1 type=rsa length=1024 description="host  
key"
```

```
create enco key=2 type=rsa length=768 description="server  
key"
```

2. The following command disables Telnet:

```
disable telnet
```

3. The last command activates the SSH software and sets the host key as encryption key pair 1 and the server key as key pair 2:

```
enable ssh server hostkey=1 serverkey=2
```

SET SSH SERVER

Syntax

```
set ssh server hostkey=key-id serverkey=key-id
[expirytime=hours] [logintimeout=seconds]
```

Parameters

hostkey	Specifies the ID number of the encryption key pair to function as the host key.
serverkey	Specifies the ID number of the encryption key pair to function as the server key.
expirytime	Specifies the length of time, in hours, after which the server key pair is regenerated. The range is 0 to 5 hours. Entering 0 never regenerates the key. The default is 0.
logintimeout	Specifies the length of time the server waits before disconnecting an un-authenticated client. The range is 60 to 600 and the default is 180.

Description

This command modifies the configuration of the Secure Shell server parameters.

The HOSTKEY parameter specifies the key ID of the host key pair. The specified key pair must already exist. To create a key pair, refer to “CREATE ENCO KEY” on page 660 (syntax 1).

The SERVERKEY parameter specifies the key of the server key pair. The specified key pair must already exist.

The EXPIRYTIME parameter specifies the time, in hours, after which the Secure Shell server key will expire and will be regenerated. If 0 is specified the key does not expire. The range is 0 to 5 and the default is 0.

The LOGINTIMEOUT parameter specifies the length of time the server waits before disconnecting an un-authenticated client. The range is 60 to 600 seconds. The default is 180 seconds.

Example

The following command sets the Secure Shell server key expiry time to 1 hour:

```
set ssh server expirytime=1
```

SHOW SSH

Syntax

```
show ssh
```

Parameters

None.

Description

This command displays the current values for the following SSH parameters:

- ☐ Versions supported
- ☐ Server Status
- ☐ Server Port
- ☐ Host Key ID
- ☐ Host Key Bits (size of host key in bits)
- ☐ Server Key ID
- ☐ Server Key Bits (size of server key in bits)
- ☐ Server Key Expiry (hours)
- ☐ Login Timeout (seconds)
- ☐ Authentication Available
- ☐ Ciphers Available
- ☐ MACs Available
- ☐ Data Compression

Example

The following command displays the configuration of the Secure Shell server:

```
show ssh
```

Chapter 42

TACACS+ and RADIUS Commands

This chapter contains the following commands:

- ❑ “ADD RADIUSSERVER” on page 696
- ❑ “ADD TACACSSERVER” on page 698
- ❑ “DELETE RADIUSSERVER” on page 700
- ❑ “DELETE TACACSSERVER” on page 701
- ❑ “DISABLE AUTHENTICATION” on page 702
- ❑ “ENABLE AUTHENTICATION” on page 703
- ❑ “PURGE AUTHENTICATION” on page 704
- ❑ “SET AUTHENTICATION” on page 705
- ❑ “SHOW AUTHENTICATION” on page 707

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD RADIUSSERVER

Syntax

```
add radiusserver server|ipaddress=ipaddress order=value  
[secret=string] [port=value] [accport=value]
```

Parameters

server or ipaddress	Specifies an IP address of a RADIUS server. The parameters are equivalent.
order	Specifies the order that the RADIUS servers are queried by the switch. This value can be from 1 to 3. The servers are queried starting with 1.
secret	Specifies the encryption key used for this server. The maximum length is 39 characters.
port	Specifies the UDP (User Datagram Protocol) port of the RADIUS server. The default is port 1812.
accport	Specifies the UDP port for RADIUS accounting. The default is port 1813.

Description

This command specifies the IP addresses of the RADIUS servers and the order they are to be queried by the switch. There can be up to three servers, but you can specify only one at a time with this command. You may specify an encryption key, a RADIUS UDP port, and a RADIUS accounting UDP port.

Note

The switch must have a routing interface on the local subnet where the authentication server is a member. The switch uses the IP address of the interface as its source address when sending packets to the server. For instructions on how to add a routing interface to the switch, refer to “ADD IP INTERFACE” on page 548.

Examples

The following command adds a RADIUS server with the 149.245.22.22 IP address and specifies it as the first server in the list:

```
add radiusserver ipaddress=149.245.22.22 order=1
```


The following command adds the RADIUS server with the IP address 149.245.22.22. In addition, it specifies the server as the third RADIUS server to be queried by the switch and has a UDP port of 3:

```
add radiusserver ipaddress=149.245.22.22 order=3 port=3
```

The following command adds a RADIUS server with an IP address of 149.245.22.22. It specifies the order is 2, the encryption key is tiger74, and the UDP port is 1811:

```
add radiusserver ipaddress=149.245.22.22 order=2  
secret=tiger74 port=1811
```

ADD TACACSSERVER

Syntax

```
add tacacsserver server|ipaddress=ipaddress order=value  
[secret=string]
```

Parameters

server or ipaddress	Specifies the IP address of a TACACS+ server. The parameters are equivalent.
order	Specifies the order the switch queries the TACACS+ servers. The range is 1 to 3. The server assigned the order value of 1 is queried first.
secret	Specifies the optional encryption key used on this server. The maximum length is 39 characters.

Description

This command adds the IP address and encryption key of a TACACS+ server to the switch. This command can also specify the order the TACACS+ servers are queried by the switch. You can add the IP addresses of up to three TACACS+ servers on the AT-9400 Switch. This command can add only one TACACS+ server at a time.

Note

The switch must have a routing interface on the local subnet where the authentication server is a member. For instructions on how to add a routing interface to the switch, refer to “ADD IP INTERFACE” on page 548.

Examples

The following command adds a TACACS+ server with the IP address 149.245.22.20 and an order value of 1:

```
add tacacsserver ipaddress=149.245.22.20 order=1
```

The following command adds a TACACS+ server with an IP address of 149.245.22.24, an order of 2, and an encryption key of lioness54:

```
add tacacsserver ipaddress=149.245.22.24 order=2  
secret=lioness54
```

The following command adds a TACACS+ server with an IP address 149.245.22.26 and specifies that this TACACS+ server is the third

TACACS+ server to be queried by the switch:

```
add tacacsserver ipaddress=149.245.22.26 order=3
```

DELETE RADIUSSERVER

Syntax

```
delete radiusserver server|ipaddress=ipaddress
```

Parameter

server <i>or</i>	Specifies the IP address of a RADIUS server to be deleted from the management software. The parameters are equivalent.
ipaddress	

Description

This command deletes the IP address of a RADIUS from your switch.

Example

The following command deletes the RADIUS server with the IP address 149.245.22.22:

```
delete radiusserver ipaddress=149.245.22.22
```

DELETE TACACSSERVER

Syntax

```
delete tacacsserver server|ipaddress=ipaddress
```

Parameter

server or	Specifies the IP address of a TACACS+ server to be deleted from the management software. The parameters are equivalent.
ipaddress	

Description

This command deletes the IP address of a TACACS+ server from your switch.

Example

The following command deletes the TACACS+ server with the IP address 149.245.22.20:

```
delete tacacsserver ipaddress=149.245.22.20
```

DISABLE AUTHENTICATION

Syntax

```
disable authentication
```

Parameters

None.

Description

This command disables TACACS+ and RADIUS manager account authentication on your switch. When you disable authentication you retain your current authentication parameter settings.

Note

This command applies only to TACACS+ and RADIUS manager accounts. Disabling authentication means that you must use the default manager accounts of manager and operator to manage the switch. This command does not affect 802.1x port-based access control.

Example

The following command disables TACACS+ and RADIUS manager account authentication on your switch:

```
disable authentication
```

ENABLE AUTHENTICATION

Syntax

```
enable authentication
```

Parameters

None.

Description

This command enables TACACS+ or RADIUS manager account authentication on your switch. You must use the manager accounts you defined on the TACACS+ or RADIUS server to manage the switch when you enable manager authentication. To select an authenticator protocol, refer to “SET AUTHENTICATION” on page 705.

Note

If you are using the RADIUS authentication protocol for 802.1x Port-based Network Access Control but not for manager account authentication, you do not need to use this command. Even when the RADIUS manager account feature is disabled, the switch still has access to the RADIUS configuration information for 802.1x port-based access control.

Example

The following command enables manager account authentication on your switch:

```
enable authentication
```

PURGE AUTHENTICATION

Syntax

```
purge authentication
```

Parameters

None.

Description

This command disables authentication, returns the authentication method to TACACS+, deletes any global secret, and returns the timeout value to its default setting of 10 seconds. This command does not delete the IP address or secret of any RADIUS or TACACS+ authentication servers you may have specified.

Example

The following command returns the authentication settings to their default values:

```
purge authentication
```


SET AUTHENTICATION

Syntax

```
set authentication method=tacacs|radius [secret=string]  
[timeout=value]
```

Parameters

method	Specifies which authenticator protocol, TACACS+ or RADIUS, is to be the active protocol on the switch.
secret	Specifies the global encryption key of the TACACS+ or RADIUS servers. If the servers use different encryption keys, you can leave this parameter blank and set individual encryption keys with “ADD TACACSSERVER” on page 698 or “ADD RADIUSSERVER” on page 696. To remove a previously assigned global key without specifying a new value, enter the string as “none”. The maximum length is 39 characters.
timeout	Specifies the maximum amount of time the switch waits for a response from an authentication server before the switch assumes the server will not respond. If the timeout expires and the server has not responded, the switch queries the next server in the list. After the switch has exhausted the list of servers, the switch defaults to the standard Manager and Operator accounts. The default is 30 seconds. The range is 1 to 300 seconds.

Description

This command selects the authentication protocol. One authentication protocol can be active on the switch at a time. You may specify a global encryption code and the maximum number of seconds the switch waits for a response from an authenticator server.

Examples

The following command selects TACACS+ as the authentication protocol on the switch:

```
set authentication method=tacacs
```

The following command selects TACACS+ as the authentication protocol and specifies a global encryption key of tiger54:

```
set authentication method=tacacs secret=tiger54
```

The following command selects RADIUS as the authentication protocol with a global encryption key of leopard09 and a timeout of 15 seconds:

```
set authentication method=radius secret=leopard09 timeout=15
```

The following command removes the current global secret from the RADIUS client without assigning a new value:

```
set authentication method=radius secret=none
```

SHOW AUTHENTICATION

Syntax

```
show authentication[=tacacs|radius]
```

Parameters

None.

Description

This command displays the following information about the authenticated protocols on the switch:

- ❑ Status - The status of your authenticated protocol: enabled or disabled.
- ❑ Authentication Method - The authentication protocol activated on your switch. Either TACACS+ or RADIUS protocol may be active. The TACACS+ protocol is the default.
- ❑ The IP addresses of up to three authentication servers.
- ❑ The server encryption keys, if defined.
- ❑ TAC global secret - The global encryption code that applies to all authentication servers.
- ❑ Timeout - The length of the time, in seconds, before the switch assumes the server will not respond.

Entering the command without specifying either TACACS or RADIUS displays the current status of the authentication feature and the specifics of the currently selected authentication protocol. Specifying TACACS or RADIUS in the command displays the specifics for that authentication protocol.

Example

The following command displays authentication protocol information on your switch:

```
show authentication
```

The following command displays the information for the RADIUS protocol:

```
show authentication=radius
```


Management ACL Commands

This chapter contains the following commands:

- ❑ “ADD MGMTACL” on page 710
- ❑ “CREATE MGMTACL” on page 711
- ❑ “DESTROY MGMTACL” on page 713
- ❑ “DISABLE MGMTACL” on page 714
- ❑ “ENABLE MGMTACL” on page 715
- ❑ “PURGE MGMTACL” on page 716
- ❑ “SET MGMTACL” on page 717
- ❑ “SHOW MGMTACL” on page 718

Note

Remember to save your changes with the SAVE CONFIGURATION command.

ADD MGMTACL

Syntax

```
add mgmtacl id=value application=telnet|web|ping|all
```

Parameters

id	Specifies the identification number of the access control entry to be modified. The range is 1 to 256. To view the ID numbers of the existing ACEs, refer to “SHOW MGMTACL” on page 718.								
application	Specifies the permitted applications of the ACE. The options are: <table> <tr> <td>telnet</td><td>Permits Telnet management.</td></tr> <tr> <td>web</td><td>Permits web browser management.</td></tr> <tr> <td>ping</td><td>Permits the management workstation to ping the switch.</td></tr> <tr> <td>all</td><td>Permits all of the above.</td></tr> </table> You can specify more than one option by separating them with a comma (for example, “Web,Ping”). The new application is added to the existing application of the ACE.	telnet	Permits Telnet management.	web	Permits web browser management.	ping	Permits the management workstation to ping the switch.	all	Permits all of the above.
telnet	Permits Telnet management.								
web	Permits web browser management.								
ping	Permits the management workstation to ping the switch.								
all	Permits all of the above.								

Description

This command modifies the permitted application of an ACE. The new application is added to any application already assigned to the ACE. If you want to assign a new application while overriding the existing one, refer to “SET MGMTACL” on page 717.

Examples

The following command adds web browser as a permitted application to ACE ID 12:

```
add mgmtacl id=12 application=web
```

The following command adds pinging as a permitted application to ACE ID 27:

```
add mgmtacl id=27 application=ping
```

CREATE MGMTACL

Syntax

```
create mgmtacl id=value ipaddress=ipaddress mask=string
application=telnet|web|ping|all
```

Parameters

id	Specifies an identification number for the new access control entry. The range is 1 to 256. Every ACE must have a unique identification number.								
ipaddress	Specifies the IP address of a subnet or a specific management station.								
mask	Specifies the mask used by the switch to filter the IP address. A binary "1" indicates the switch should filter on the corresponding bit of the address, while a "0" indicates that it should not. If, with the IPADDRESS parameter, you specify the IP address of a specific management station, the appropriate mask is 255.255.255.255. If you are filtering on a subnet, then the mask would depend on the address. For example, for a Class C subnet address of 149.11.11.32, the mask would be 255.255.255.224.								
application	Specifies the permitted type of remote management. The options are: <table> <tr> <td>telnet</td><td>Permits Telnet management.</td></tr> <tr> <td>web</td><td>Permits web browser management.</td></tr> <tr> <td>ping</td><td>Permits the management workstation to ping the switch.</td></tr> <tr> <td>all</td><td>Permits all of the above.</td></tr> </table>	telnet	Permits Telnet management.	web	Permits web browser management.	ping	Permits the management workstation to ping the switch.	all	Permits all of the above.
telnet	Permits Telnet management.								
web	Permits web browser management.								
ping	Permits the management workstation to ping the switch.								
all	Permits all of the above.								

You can specify more than one option by separating them with a comma (for example, "Web,Ping").

Description

This command creates a new access control entry for the Management ACL. The Management ACL controls who can manage the switch remotely using a web browser or the Telnet application protocol. There can be up to 256 ACEs in a Management ACL.

An ACE is an implicit “permit” statement. A workstation that meets the criteria of the ACE is allowed to remotely manage the switch.

The IPADDRESS parameter specifies the IP address of a specific management station or a subnet.

The MASK parameter indicates the parts of the IP address the switch should filter on. A binary “1” indicates the switch should filter on the corresponding bit of the address, while a “0” indicates that it should not. If you are filtering on a specific IP address, use the mask 255.255.255.255. For a subnet, you need to enter the appropriate mask. For example, to allow all management stations in the subnet 149.11.11.0 to manage the switch, you would enter the mask 255.255.255.0.

The APPLICATION parameter allows you control whether the remote management station can manage the switch using Telnet, a web browser, or both. You can also use it to control whether the workstation can ping the device. For example, you might create an ACE that states that a particular remote management station can only use a web browser to manage the switch.

Note

You must specify all the parameters when creating a new entry.

Examples

The following command creates an ACE that allows the management station with the IP address 169.254.134.247 to manage the switch from either a Telnet or web browser management session and to ping the device:

```
create mgmtacl id=1 ipaddress=169.254.134.247
mask=255.255.255.255 application=all
```

The following command creates an ACE that allows the management station with the IP address 169.254.134.12 to manage the switch with a web browser and to ping the device. However, the workstation cannot manage the switch with the Telnet application protocol:

```
create mgmtacl id=12 ipaddress=169.254.134.12
mask=255.255.255.255 application=web,ping
```

The following command creates an ACE that allows all management stations in the Class A subnet 169.24.144.128 to manage the switch using the Telnet protocol application:

```
create mgmtacl id=17 ipaddress=169.24.144.128
mask=255.255.255.224 application=telnet
```


DESTROY MGMTACL

Syntax

```
destroy mgmtacl id=value
```

Parameters

id	Specifies the identification number of the ACE to be deleted.
----	---

Description

This command deletes an ACE from the Management ACL. You specify the ACE by its identification number, which is displayed with “SHOW MGMTACL” on page 718.

Note

If you are remotely managing the switch from a Telnet management session and the Management ACL is active, your management session will end and you will be unable to reestablish it should you delete the ACE that specifies your management workstation.

Example

The following command deletes the ACE with the identification number 18 from the Management ACL:

```
destroy mgmtacl id=18
```

DISABLE MGMTACL

Syntax

```
disable mgmtacl
```

Parameters

None

Description

This command disables the Management ACL.

Example

The following command disables the Management ACL:

```
disable mgmtacl
```

ENABLE MGMTACL

Syntax

```
enable mgmtacl
```

Parameters

None.

Description

This command activates the Management ACL.

Note

Activating the Management ACL without entering any access control entries (ACEs) prohibits you from remotely managing the switch from a Telnet or web browser management session, or pinging the device.

Example

The following command activates the Management ACL:

```
enable mgmtacl
```

PURGE MGMTACL

Syntax

```
purge mgmtacl
```

Parameters

None.

Description

This command deletes all access control entries from the Management ACL.

Note

If you are remotely managing the switch from a Telnet management session and the Management ACL is active, your management session will end and you will be unable to reestablish it if you delete all ACEs.

Example

The following command deletes all ACEs from the Management ACL:

```
purge mgmtacl
```

SET MGMTACL

Syntax

```
set mgmtacl id=value [ipaddress=ipaddress] [mask=string]
[application=telnet|web|ping|all]
```

Parameters

id The identification number of the ACE to be modified. To view the ID numbers of the ACEs, refer to “SHOW MGMTACL” on page 718.

ipaddress Specifies a new IP address for the ACE.

mask Specifies a new mask for the ACE.

application Specifies the permitted type of remote management. The options are:

telnet Permits Telnet management.

web Permits web browser management.

ping Permits the management workstation to ping the switch.

all Permits all of the above.

You can specify more than one option by separating them with a comma (for example, “Web,Ping”). The new application replaces the current permitted application of the ACE.

Description

This command modifies an existing management access control entry in the Management ACL. You can use the command to change the IP address, subnet mask, or permitted applications of an ACE.

Examples

The following command changes the IP address of ACE ID 22 to 169.254.134.247:

```
set mgmtacl id=22 ipaddress=169.254.134.247
```

The following command changes the permitted applications of ACE ID 45 to web browser and pinging:

```
set mgmtacl id=45 application=web,ping
```

SHOW MGMTACL

Syntax

`show mgmtacl [id=value]`

Parameters

`id` Specifies the ID number of an ACE to view.

Description

This command displays the state of the Management ACL and ACL entries. Figure 62 is an example of the information displayed by this command.

Management ACL Status Disable			
ID	IP Address	Mask	Application

1	149.44.44.44	255.255.255.255	TELNET
2	149.55.55.0	255.255.255.0	ALL

Figure 62. SHOW MGMTACL Command with ENTRIES Option

For an explanation of the parameters, refer to “CREATE MGMTACL” on page 711.

Examples

The following command displays the status of all the ACEs in the Management ACL:

`show mgmtacl`

The following command displays the details of just ACE ID 14:

`show mgmtacl id=14`

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- VLAN. *See* 802.1Q multiple VLAN mode, MAC address-based VLAN, multiple VLAN mode, port-based VLAN, protected ports VLAN, and tagged VLAN

