



# **DES-3550**

Layer 2 Switch  
Command Line Interface Reference Manual  
Release 3.5

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May 2005

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**651ES3550055**



RECYCLABLE



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## INTRODUCTION

The Switch can be managed through the Switch's serial port, Telnet, or the Web-based management agent. The Command Line Interface (CLI) can be used to configure and manage the Switch via the serial port or Telnet interfaces.

This manual provides a reference for all of the commands contained in the CLI. Configuration and management of the Switch via the Web-based management agent is discussed in the Manual.

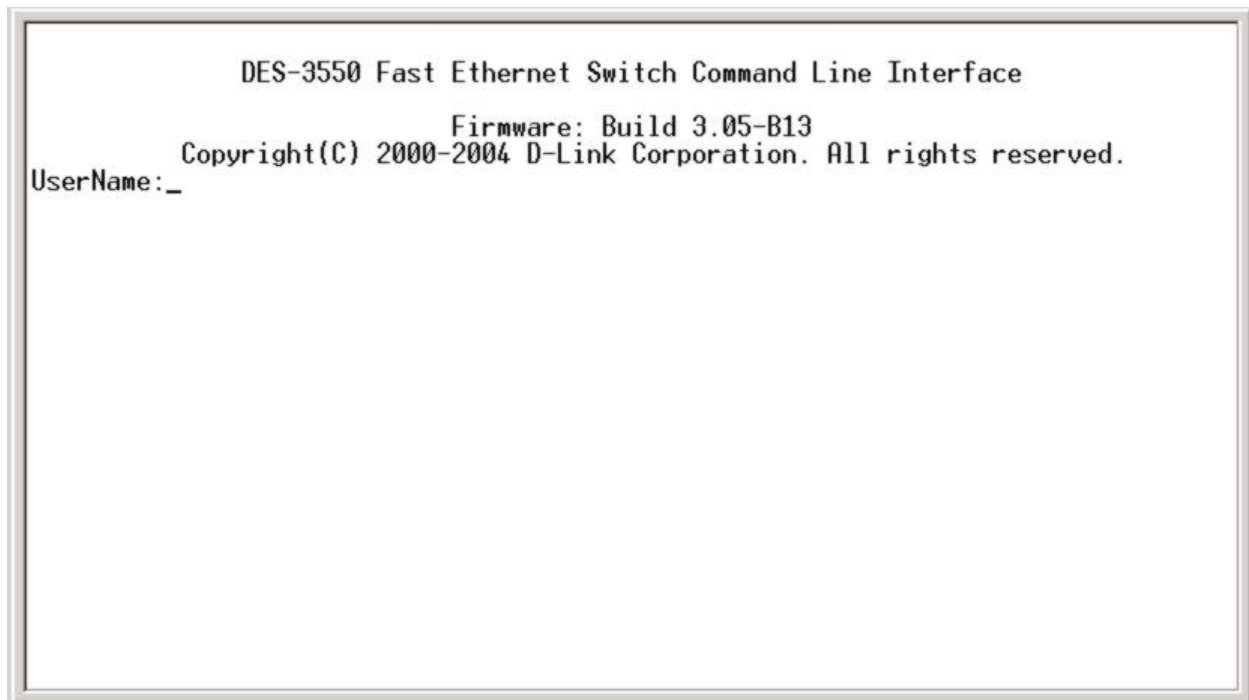
### Accessing the Switch via the Serial Port

The default settings of the Switch's serial port are as follows:

- **9600 baud**
- **no parity**
- **8 data bits**
- **1 stop bit**

A computer running a terminal emulation program capable of emulating a VT-100 terminal and a serial port configured as above is then connected to the Switch's serial port via an RS-232 DB-9 cable.

With the serial port properly connected to a management computer, the following screen should be visible. If this screen does not appear, try pressing Ctrl+r to refresh the console screen.



```
DES-3550 Fast Ethernet Switch Command Line Interface
                          Firmware: Build 3.05-B13
Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.
UserName: _
```

**Figure 1-1. Initial CLI screen**

There is no initial username or password. Just press the **Enter** key twice to display the CLI input cursor – **DES-3550:4#**. This is the command line where all commands are input.

## Setting the Switch's IP Address

Each Switch must be assigned its own IP Address, which is used for communication with an SNMP network manager or other TCP/IP application (for example BOOTP, TFTP). The Switch's default IP address is 10.90.90.90. You can change the default Switch IP address to meet the specification of your networking address scheme.

The Switch is also assigned a unique MAC address by the factory. This MAC address cannot be changed, and can be found on the initial boot console screen – shown below.

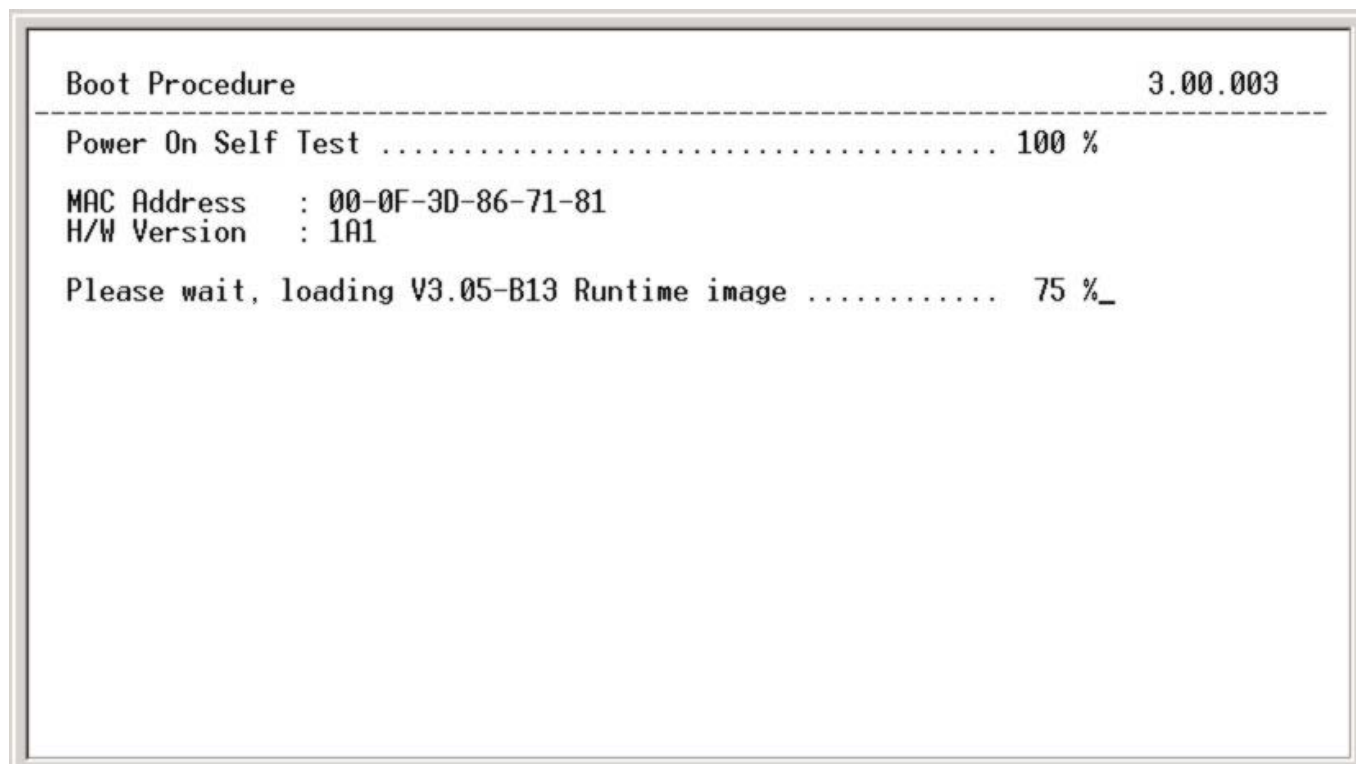


Figure 1-2. Boot Screen

The Switch's MAC address can also be found in the Web management program on the Switch Information (Basic Settings) window on the Configuration menu.

The IP address for the Switch must be set before it can be managed with the Web-based manager. The Switch IP address can be automatically set using BOOTP or DHCP protocols, in which case the actual address assigned to the Switch must be known.

The IP address may be set using the Command Line Interface (CLI) over the console serial port as follows:

1. Starting at the command line prompt, enter the commands **config ipif System ipaddress xxx.xxx.xxx.xxx/yyy.yyy.yyy.yyy**. Where the **x**'s represent the IP address to be assigned to the IP interface named **System** and the **y**'s represent the corresponding subnet mask.
2. Alternatively, you can enter **config ipif System ipaddress xxx.xxx.xxx.xxx/z**. Where the **x**'s represent the IP address to be assigned to the IP interface named **System** and the **z** represents the corresponding number of subnets in CIDR notation.

The IP interface named **System** on the Switch can be assigned an IP address and subnet mask which can then be used to connect a management station to the Switch's Telnet or Web-based management agent.

```
DES-3550 Fast Ethernet Switch Command Line Interface
                          Firmware: Build 3.05-B13
                          Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.
UserName:
Password:
DES-3550:4#config ipif System ipaddress 10.20.25.30/8
Command: config ipif System ipaddress 10.20.25.30/8
Success.
DES-3550:4#_
```

**Figure 1-3. Assigning an IP Address**

In the above example, the Switch was assigned an IP address of 10.20.25.30 with a subnet mask of 255.0.0.0. The system message **Success** indicates that the command was executed successfully. The Switch can now be configured and managed via Telnet, SNMP MIB browser and the CLI or via the Web-based management agent using the above IP address to connect to the Switch.

## USING THE CONSOLE CLI

The DES-3550 supports a console management interface that allows the user to connect to the Switch's management agent via a serial port and a terminal or a computer running a terminal emulation program. The console can also be used over the network using the TCP/IP Telnet protocol. The console program can be used to configure the Switch to use an SNMP based network management software over the network.

This chapter describes how to use the console interface to access the Switch, change its settings, and monitor its operation.



**Note:** Switch configuration settings are saved to non-volatile RAM using the `save` command. The current configuration will then be retained in the Switch's NV-RAM, and reloaded when the Switch is rebooted. If the Switch is rebooted without using the `save` command, the last configuration saved to NV-RAM will be loaded.

### Connecting to the Switch

The console interface is used by connecting the Switch to a VT100-compatible terminal or a computer running an ordinary terminal emulator program (e.g., the **HyperTerminal** program included with the Windows operating system) using an RS-232C serial cable. Your terminal parameters will need to be set to:

- **VT-100 compatible**
- **9600 baud**
- **8 data bits**
- **No parity**
- **One stop bit**
- **No flow control**

You can also access the same functions over a Telnet interface. Once you have set an IP address for your Switch, you can use a Telnet program (in VT-100 compatible terminal mode) to access and control the Switch. All of the screens are identical, whether accessed from the console port or from a Telnet interface.

After the Switch reboots and you have logged in, the console looks like this:

```
DES-3550 Fast Ethernet Switch Command Line Interface
                          Firmware: Build 3.05-B13
Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.
UserName:
Password:
DES-3550:4#_
```

**Figure 2-1. Initial Console Screen after login**



Commands are entered at the command prompt, **DES-3550:4#**.

There are a number of helpful features included in the CLI. Entering the ? command will display a list of all of the top-level commands.

```
?  
clear  
clear arptable  
clear counters  
clear fdb  
clear log  
clear port_security_entry port  
config 802.1p default_priority  
config 802.1p user_priority  
config 802.1x auth_mode  
config 802.1x auth_parameter ports  
config 802.1x auth_protocol  
config 802.1x capability ports  
config 802.1x init  
config 802.1x reauth  
config access_profile profile_id  
config account  
config admin local_enable  
config arp_aging time  
config arpentry  
config authen application  
CTRL+C ESC Quit SPACE Next Page ENTER Next Entry All
```

**Figure 2-2. The ? Command**

When you enter a command without its required parameters, the CLI will prompt you with a **Next possible completions:** message.

```
DES-3550:4#config account  
Command: config account  
  
Next possible completions:  
<username>  
  
DES-3550:4#
```

**Figure 2-3. Example Command Parameter Help**

In this case, the command **config account** was entered with the parameter **<username>**. The CLI will then prompt you to enter the **<username>** with the message, **Next possible completions:**. Every command in the CLI has this feature, and complex commands have several layers of parameter prompting.

In addition, after typing any given command plus one space, you can see all of the next possible sub-commands, in sequential order, by repeatedly pressing the **Tab** key.

To re-enter the previous command at the command prompt, press the up arrow cursor key. The previous command will appear at the command prompt.

```
DES-3550:4#config account
Command: config account

Next possible completions:
<username>

DES-3550:4#config account
Command: config account

Next possible completions:
<username>

DES-3550:4#
```

Figure 2-4. Using the Up Arrow to Re-enter a Command

In the above example, the command **config account** was entered without the required parameter **<username>**, the CLI returned the **Next possible completions: <username>** prompt. The up arrow cursor control key was pressed to re-enter the previous command (**config account**) at the command prompt. Now the appropriate username can be entered and the **config account** command re-executed.

All commands in the CLI function in this way. In addition, the syntax of the help prompts are the same as presented in this manual – angle brackets < > indicate a numerical value or character string, braces { } indicate optional parameters or a choice of parameters, and brackets [ ] indicate required parameters.

If a command is entered that is unrecognized by the CLI, the top-level commands will be displayed under the **Available commands:** prompt.

```
DES-3550:4#the

Available commands:
..                ?                clear                config
create            delete            dir                  disable
download          enable            factory              login
logout            ping              reboot               reconfig
reset             save              show                 upload

DES-3550:4#
```

Figure 2-5. The Next Available Commands Prompt

The top-level commands consist of commands such as **show** or **config**. Most of these commands require one or more parameters to narrow the top-level command. This is equivalent to **show** what? or **config** what? Where the what? is the next parameter.

For example, if you enter the **show** command with no additional parameters, the CLI will then display all of the possible next parameters.

```
show vlan
upload
upload sim_ms

DES-3550:4#show
Command: show

Next possible completions:
802.1p          802.1x          access_profile  account
arprentry      asymmetric_vlan authen           authen_enable
authen_login   authen_policy   autoconfig      bandwidth_control
command_history config           error           fdb
firmware       gvrp            igmp_snooping  ipif
iproute        lacp_port       link_aggregation log
mac_notification mirror          multicast       multicast_fdb
packet         port_security   ports           radius
router_ports   scheduling      serial_port     session
sim            snmp            snmp            ssh
ssl            stp             switch          syslog
system_severity time            traffic         trusted_host
traffic_segmentation
vlan

DES-3550:4#_
```

Figure 2-6. Next possible completions: Show Command

In the above example, all of the possible next parameters for the **show** command are displayed. At the next command prompt, the up arrow was used to re-enter the **show** command, followed by the **account** parameter. The CLI then displays the user accounts configured on the Switch.

## COMMAND SYNTAX

The following symbols are used to describe how command entries are made and values and arguments are specified in this manual. The online help contained in the CLI and available through the console interface uses the same syntax.



**Note:** All commands are case-sensitive. Be sure to disable Caps Lock or any other unwanted function that changes text case.

<b>&lt;angle brackets&gt;</b>	
Purpose	Encloses a variable or value that must be specified.
Syntax	<b>create ipif &lt;ipif_name&gt; vlan &lt;vlan_name 32&gt; ipaddress &lt;network_address&gt;</b>
Description	In the above syntax example, you must supply an IP interface name in the <ipif_name> space, a VLAN name in the <vlan_name 32> space, and the network address in the <network_address> space. Do not type the angle brackets.
Example Command	<b>create ipif Engineering vlan Design ipaddress 10.24.22.5/255.0.0.0</b>

<b>[square brackets]</b>	
Purpose	Encloses a required value or set of required arguments. One value or argument can be specified.
Syntax	<b>create account [admin   user]</b>
Description	In the above syntax example, you must specify either an <b>admin</b> or a <b>user</b> level account to be created. Do not type the square brackets.
Example Command	<b>create account admin</b>

<b>  vertical bar</b>	
Purpose	Separates two or more mutually exclusive items in a list, one of which must be entered.
Syntax	<b>show snmp [community   detail]</b>
Description	In the above syntax example, you must specify either <b>community</b> , or <b>detail</b> . Do not type the backslash.
Example Command	<b>show snmp community</b>

<b>{braces}</b>	
Purpose	Encloses an optional value or set of optional arguments.
Syntax	<b>reset {[config   system]}</b>
Description	In the above syntax example, you have the option to specify <b>config</b> or <b>system</b> . It is not necessary to specify either optional value, however the effect of the system reset is dependent on which, if any, value is specified. Therefore, with this example there are three possible outcomes of performing a system reset. See the following chapter, Basic Commands for more details about the reset command.
Example command	<b>reset config</b>

<b>Line Editing Key Usage</b>	
Delete	Deletes the character under the cursor and then shifts the remaining characters in the line to the left.
Backspace	Deletes the character to the left of the cursor and then shifts the remaining characters in the line to the left.
Insert or Ctrl+R	Toggle on and off. When toggled on, inserts text and shifts previous text to the right.
Left Arrow	Moves the cursor to the left.
Right Arrow	Moves the cursor to the right.
Up Arrow	Repeats the previously entered command. Each time the up arrow is pressed, the command previous to that displayed appears. This way it is possible to review the command history for the current session. Use the down arrow to progress sequentially forward through the command history list.
Down Arrow	The down arrow will display the next command in the command history entered in the current session. This displays each command sequentially as it was entered. Use the up arrow to review previous commands.
Tab	Shifts the cursor to the next field to the left.

<b>Multiple Page Display Control Keys</b>	
Space	Displays the next page.
CTRL+c	Stops the display of remaining pages when multiple pages are to be displayed.
ESC	Stops the display of remaining pages when multiple pages are to be displayed.
n	Displays the next page.
p	Displays the previous page.
q	Stops the display of remaining pages when multiple pages are to be displayed.
r	Refreshes the pages currently displayed.
a	Displays the remaining pages without pausing between pages.
Enter	Displays the next line or table entry.

**BASIC SWITCH COMMANDS**

The basic switch commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
create account	[admin   user] <username 15>
config account	<username 15>
show account	
delete account	<username 15>
show session	
show switch	
show serial_port	
config serial_port	{baud_rate [9600   19200   38400   115200] auto_logout [never   2_minutes   5_minutes   10_minutes   15_minutes]}
enable clipaging	
disable clipaging	
enable telnet	<tcp_port_number 1-65535>
disable telnet	
enable web	<tcp_port_number 1-65535>
disable web	
save	
reboot	
reset	{{config   system}}
login	
logout	

Each command is listed, in detail, in the following sections.

**create account**

<b>Purpose</b>	Used to create user accounts.
<b>Syntax</b>	<b>create [admin   user] &lt;username 15&gt;</b>
<b>Description</b>	The create account command is used to create user accounts that consist of a username of 1 to 15 characters and a password of 0 to 15 characters. Up to 8 user accounts can be created.
<b>Parameters</b>	<i>admin &lt;username&gt;</i>  <i>user &lt;username&gt;</i>
<b>Restrictions</b>	Only Administrator-level users can issue this command.  Usernames can be between 1 and 15 characters.  Passwords can be between 0 and 15 characters.

Example usage:

To create an administrator-level user account with the username “dlink”.

```
DES-3550:4#create account admin dlink
Command: create account admin dlink

Enter a case-sensitive new password:****
Enter the new password again for confirmation:****

Success.

DES-3550:4#
```

**config account**

<b>Purpose</b>	Used to configure user accounts
<b>Syntax</b>	<b>config account &lt;username&gt;</b>
<b>Description</b>	The config account command configures a user account that has been created using the <i>create account</i> command.
<b>Parameters</b>	<i>&lt;username&gt;</i>
<b>Restrictions</b>	Only Administrator-level users can issue this command.  Usernames can be between 1 and 15 characters.  Passwords can be between 0 and 15 characters.



Example usage:

To configure the user password of “dlink” account:

```
DES-3550:4#config account dlink
Command: config account dlink

Enter a old password:****
Enter a case-sensitive new password:****
Enter the new password again for confirmation:****

Success.
DES-3550:4#
```

<b>show account</b>	
<b>Purpose</b>	Used to display user accounts
<b>Syntax</b>	<b>show account</b>
<b>Description</b>	Displays all user accounts created on the Switch. Up to 8 user accounts can exist at one time.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only Administrator-level users can issue this command.

Example usage:

To display the accounts that have been created:

```
DES-3550:4#show account
Command: show account

Current Accounts:
Username      Access Level
-----
dlink         Admin

Total Entries: 1
DES-3550:4#
```

**delete account**

<b>Purpose</b>	Used to delete an existing user account.
<b>Syntax</b>	<b>delete account &lt;username&gt;</b>
<b>Description</b>	The delete account command deletes a user account that has been created using the <b>create account</b> command.
<b>Parameters</b>	<username>
<b>Restrictions</b>	Only Administrator-level users can issue this command.

Example usage:

To delete the user account "System":

```
DES-3550:4#delete account System
Command: delete account System

Success.

DES-3550:4#
```

**show session**

<b>Purpose</b>	Used to display a list of currently logged-in users.
<b>Syntax</b>	<b>show session</b>
<b>Description</b>	This command displays a list of all the users that are logged-in at the time the command is issued.
<b>Parameters</b>	None
<b>Restrictions</b>	None.

Example usage:

To display the way that the users logged in:

```
DES-3550:4#show session
Command: show session

ID  Login Time          Live Time From      Level  Name
--  -
*8  00000 days 00:00:37  03:36:27  Serial Port  4      Anonymous
```

**show switch**

<b>Purpose</b>	Used to display general information about the Switch.
<b>Syntax</b>	<b>show switch</b>
<b>Description</b>	This command displays information about the Switch.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only Administrator-level users can issue this command.

Example usage:

To display the Switch's information:

```
DES-3550:4#show switch
Command: show switch

Device Type       : DES-3550 Fast Ethernet Switch
Combo Port       : 1000Base-T + 1000Base-T
MAC Address      : 00-01-02-03-04-00
IP Address       : 10.41.44.22 (Manual)
VLAN Name        : default
Subnet Mask      : 255.0.0.0
Default Gateway  : 0.0.0.0
Boot PROM Version : Build 3.00.000
Firmware Version : Build 2.00-B07
Hardware Version  : 2A1
Device S/N       :
Power Status     : Main – Normal, Redundant – Not Present
System Name      : DES-3550
System Location  : 7th_flr_east_cabinet
System Contact   : Julius_Erving_212-555-6666
Spanning Tree    : Disabled
GVRP             : Disabled
IGMP Snooping    : Disabled
TELNET           : Enabled (TCP 23)
WEB              : Enabled (TCP 80)
RMON             : Enabled
Asymmetric VLAN  : Disabled

DES-3550:4#
```

## show serial\_port

<b>Purpose</b>	Used to display the current serial port settings.
<b>Syntax</b>	<b>show serial_port</b>
<b>Description</b>	This command displays the current serial port settings.
<b>Parameters</b>	None.
<b>Restrictions</b>	None

Example usage:

To display the serial port setting:

```
DES-3550:4#show serial_port
Command: show serial_port

Baud Rate      : 9600
Data Bits      : 8
Parity Bits     : None
Stop Bits      : 1
Auto-Logout    : 10 mins

DES-3550:4#
```

**config serial\_port**

<b>Purpose</b>	Used to configure the serial port.
<b>Syntax</b>	<b>config serial_port {baud_rate [9600   19200   38400   115200]   auto_logout [never   2_minutes   5_minutes   10_minutes   15_minutes]}</b>
<b>Description</b>	This command is used to configure the serial port's baud rate and auto logout settings.
<b>Parameters</b>	<p><i>baud_rate [9600   19200   38400   115200]</i>– The serial bit rate that will be used to communicate with the management host. There are four options: 9600, 19200, 38400, 115200.</p> <p><i>never</i> – No time limit on the length of time the console can be open with no user input.</p> <p><i>2_minutes</i> – The console will log out the current user if there is no user input for 2 minutes.</p> <p><i>5_minutes</i> – The console will log out the current user if there is no user input for 5 minutes.</p> <p><i>10_minutes</i> – The console will log out the current user if there is no user input for 10 minutes.</p> <p><i>15_minutes</i> – The console will log out the current user if there is no user input for 15 minutes.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To configure baud rate:

```
DES-3550:4#config serial_port baud_rate 115200
Command: config serial_port baud_rate 115200

Success.

DES-3550:4#
```

## enable clipaging

<b>Purpose</b>	Used to pause the scrolling of the console screen when the show command displays more than one page.
<b>Syntax</b>	<b>enable clipaging</b>
<b>Description</b>	This command is used when issuing the show command which causes the console screen to rapidly scroll through several pages. This command will cause the console to pause at the end of each page. The default setting is enabled.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To enable pausing of the screen display when the show command output reaches the end of the page:

```
DES-3550:4#enable clipaging
Command: enable clipaging

Success.

DES-3550:4#
```

## disable clipaging

<b>Purpose</b>	Used to disable the pausing of the console screen scrolling at the end of each page when the show command displays more than one screen of information.
<b>Syntax</b>	<b>disable clipaging</b>
<b>Description</b>	This command is used to disable the pausing of the console screen at the end of each page when the show command would display more than one screen of information.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To disable pausing of the screen display when show command output reaches the end of the page:

```
DES-3550:4#disable clipaging
Command: disable clipaging

Success.

DES-3550:4#
```

<b>enable telnet</b>	
<b>Purpose</b>	Used to enable communication with and management of the Switch using the Telnet protocol.
<b>Syntax</b>	<b>enable telnet &lt;tcp_port_number 1-65535&gt;</b>
<b>Description</b>	This command is used to enable the Telnet protocol on the Switch. The user can specify the TCP or UDP port number the Switch will use to listen for Telnet requests.
<b>Parameters</b>	<tcp_port_number 1-65535> – The TCP port number. TCP ports are numbered between 1 and 65535. The “well-known” TCP port for the Telnet protocol is 23.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To enable Telnet and configure port number:

```
DES-3550:4#enable telnet 23
Command: enable telnet 23

Success.

DES-3550:4#
```

**disable telnet**

<b>Purpose</b>	Used to disable the Telnet protocol on the Switch.
<b>Syntax</b>	<b>disable telnet</b>
<b>Description</b>	This command is used to disable the Telnet protocol on the Switch.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To disable the Telnet protocol on the Switch:

```
DES-3550:4#disable telnet
Command: disable telnet

Success.

DES-3550:4#
```

**enable web**

<b>Purpose</b>	Used to enable the HTTP-based management software on the Switch.
<b>Syntax</b>	<b>enable web &lt;tcp_port_number 1-65535&gt;</b>
<b>Description</b>	This command is used to enable the Web-based management software on the Switch. The user can specify the TCP port number the Switch will use to listen for Telnet requests.
<b>Parameters</b>	<tcp_port_number 1-65535> – The TCP port number. TCP ports are numbered between 1 and 65535. The “well-known” port for the Web-based management software is 80.
<b>Restrictions</b>	Only administrator-level users can issue this command.



**NOTE:** If the SSL function on the Switch has been enabled, this will disable the port for the web manager (port 80). To log on to the web based manager when SSL is enabled, the entry of your URL must begin with *https://*. (ex. *https://10.90.90.90*)



Example usage:

To enable HTTP and configure port number:

```
DES-3550:4#enable web 80
Command: enable web 80

Success.

DES-3550:4#
```

### disable web

<b>Purpose</b>	Used to disable the HTTP-based management software on the Switch.
<b>Syntax</b>	<b>disable web</b>
<b>Description</b>	This command disables the Web-based management software on the Switch.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To disable HTTP:

```
DES-3550:4#disable web
Command: disable web

Success.

DES-3550:4#
```

<b>save</b>	
<b>Purpose</b>	Used to save changes in the Switch's configuration to non-volatile RAM.
<b>Syntax</b>	<b>save</b>
<b>Description</b>	This command is used to enter the current switch configuration into non-volatile RAM. The saved switch configuration will be loaded into the Switch's memory each time the Switch is restarted.
<b>Parameters</b>	None.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To save the Switch's current configuration to non-volatile RAM:

```
DES-3550:4#save
Command: save

Saving all configurations to NV-RAM... Done.

DES-3550:4#
```

<b>reboot</b>	
<b>Purpose</b>	Used to restart the Switch.
<b>Syntax</b>	<b>reboot</b>
<b>Description</b>	This command is used to restart the Switch.
<b>Parameters</b>	None.
<b>Restrictions</b>	None.

Example usage:

To restart the Switch:

```
DES-3550:4#reboot
Command: reboot
Are you sure want to proceed with the system reboot? (y/n)
Please wait, the switch is rebooting...
```

<b>reset</b>	
<b>Purpose</b>	Used to reset the Switch to the factory default settings.
<b>Syntax</b>	<b>reset {[config   system]}</b>
<b>Description</b>	This command is used to restore the Switch's configuration to the default settings assigned from the factory.
<b>Parameters</b>	<p><i>config</i> – If the keyword 'config' is specified, all of the factory default settings are restored on the Switch including the IP address, user accounts, and the switch history log. The Switch will not save or reboot.</p> <p><i>system</i> – If the keyword 'system' is specified all of the factory default settings are restored on the Switch. The Switch will save and reboot after the settings are changed to default. Rebooting will clear all entries in the Forwarding Data Base.</p> <p>If no parameter is specified, the Switch's current IP address, user accounts, and the switch history log are not changed. All other parameters are restored to the factory default settings. The Switch will not save or reboot.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To restore all of the Switch's parameters to their default values:

```
DES-3550:4#reset config
Command: reset config
Are you sure to proceed with system reset?(y/n)

Success.

DES-3550:4#
```

## login

<b>Purpose</b>	Used to log in a user to the Switch's console.
<b>Syntax</b>	<b>login</b>
<b>Description</b>	This command is used to initiate the login procedure. The user will be prompted for a Username and Password.
<b>Parameters</b>	None.
<b>Restrictions</b>	None.

Example usage:

To initiate the login procedure:

```
DES-3550:4#login
Command: login
UserName:
```

## logout

<b>Purpose</b>	Used to log out a user from the Switch's console.
<b>Syntax</b>	<b>logout</b>
<b>Description</b>	This command terminates the current user's session on the Switch's console.
<b>Parameters</b>	None.
<b>Restrictions</b>	None.

Example usage:

To terminate the current user's console session:

```
DES-3550:4#logout
```

## SWITCH PORT COMMANDS

The switch port commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config ports	[<portlist   all> {speed [auto   10_half   10_full   100_half   100_full   1000_full]   flow_control [enable   disable]   learning [enable   disable] state [enable   disable]} description <desc 32>
show ports	<portlist> {description}

Each command is listed, in detail, in the following sections.

<b>config ports</b>	
<b>Purpose</b>	Used to configure the Switch's Ethernet port settings.
<b>Syntax</b>	<b>config ports</b> [<portlist   all> {speed [auto   10_half   10_full   100_half   100_full   1000_full]   flow_control [enable   disable]   learning [enable   disable] state [enable   disable] description <desc 32>
<b>Description</b>	This command allows for the configuration of the Switch's Ethernet ports. Only the ports listed in the <portlist> will be affected.
<b>Parameters</b>	<p><i>all</i> – Configure all ports on the Switch.</p> <p>&lt;portlist&gt; – Specifies a port or range of ports to be configured.</p> <p><i>speed</i> – Allows the user to adjust the speed for a port or range of ports. The user has a choice of the following:</p> <ul style="list-style-type: none"> <li>• <i>auto</i> – Enables auto-negotiation for the specified range of ports.</li> <li>• [<i>10</i>   <i>100</i>   <i>1000</i>] – Configures the speed in Mbps for the specified range of ports. Gigabit ports are statically set to 1000 and cannot be set to slower speeds.</li> <li>• [<i>half</i>   <i>full</i>] – Configures the specified range of ports as either full-duplex or half-duplex.</li> </ul> <p><i>flow_control</i> [<i>enable</i>   <i>disable</i>] – Enable or disable flow control for the specified ports.</p> <p><i>learning</i> [<i>enable</i>   <i>disable</i>] – Enables or disables the MAC address learning on the specified range of ports.</p> <p><i>state</i> [<i>enable</i>   <i>disable</i>] – Enables or disables the specified range of ports.</p> <p><i>description</i> &lt;desc 32&gt; - Enter an alphanumeric string of no more than 32 characters to describe a selected port interface.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To configure the speed of port 3 to be 10 Mbps, full duplex, with learning and state enabled:

```
DES-3550:4#config ports 1-3 speed 10_full learning enable state
enable
Command: config ports 1-3 speed 10_full learning enable state
enable

Success.

DES-3550:4#
```

**show ports**

<b>Purpose</b>	Used to display the current configuration of a range of ports.
<b>Syntax</b>	<b>show ports &lt;portlist&gt; {description}</b>
<b>Description</b>	This command is used to display the current configuration of a range of ports.
<b>Parameters</b>	<p>&lt;portlist&gt; – Specifies a port or range of ports to be displayed.</p> <p>{description} – Adding this parameter to the <b>show ports</b> command indicates that a previously entered port description will be included in the display.</p>
<b>Restrictions</b>	None.

Example usage:

To display the configuration of all ports on a standalone switch:

```
DES-3550:4#show ports
Command show ports:

Port  Port    Settings          Connection          Address
  State  Speed/Duplex/FlowCtrl  Speed/Duplex/FlowCtrl  Learning
-----
 1  Enabled Auto/Enabled      Link Down           Enabled
 2  Enabled Auto/Enabled      Link Down           Enabled
 3  Enabled Auto/Enabled      Link Down           Enabled
 4  Enabled Auto/Enabled      Link Down           Enabled
 5  Enabled Auto/Enabled      Link Down           Enabled
 6  Enabled Auto/Enabled      Link Down           Enabled
 7  Enabled Auto/Enabled      Link Down           Enabled
 8  Enabled Auto/Enabled      Link Down           Enabled
 9  Enabled Auto/Enabled      Link Down           Enabled
10  Enabled Auto/Enabled      100M/Full/None     Enabled
11  Enabled Auto/Enabled      Link Down           Enabled
12  Enabled Auto/Enabled      Link Down           Enabled
13  Enabled Auto/Disabled  Link Down           Enabled
14  Enabled Auto/Disabled  Link Down           Enabled
15  Enabled Auto/Disabled  Link Down           Enabled
16  Enabled Auto/Disabled  Link Down           Enabled
17  Enabled Auto/Disabled  Link Down           Enabled
18  Enabled Auto/Disabled  Link Down           Enabled
19  Enabled Auto/Disabled  Link Down           Enabled
20  Enabled Auto/Disabled  Link Down           Enabled

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

Example usage:

To display the configuration of all ports on a standalone switch, with description:

```
DES-3550:4#show ports description
Command: show ports description

Port  Port      Settings          Connection          Address
      State    Speed/Duplex/FlowCtrl  Speed/Duplex/FlowCtrl  Learning
-----  -----  -----
1      Enabled  Auto/Disabled    Link Down           Enabled
Description: dads1
2      Enabled  Auto/Disabled    Link Down           Enabled
Description:
3      Enabled  Auto/Disabled    Link Down           Enabled
Description:
4      Enabled  Auto/Disabled    Link Down           Enabled
Description:
5      Enabled  Auto/Disabled    Link Down           Enabled
Description:
6      Enabled  Auto/Disabled    Link Down           Enabled
Description:
7      Enabled  Auto/Disabled    Link Down           Enabled
Description:
8      Enabled  Auto/Disabled    Link Down           Enabled
Description:
9      Enabled  Auto/Disabled    Link Down           Enabled
Description:
10     Enabled  Auto/Disabled    Link Down           Enabled
Description:
CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```



## PORT SECURITY COMMANDS

The Switch's port security commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config port_security ports	[<portlist>   all ] {admin_state [enable  disable]   max_learning_addr <max_lock_no 0-20>   lock_address_mode [Permanent   DeleteOnTimeout   DeleteOnReset]}
delete port_security_entry	vlan_name <vlan_name 32> mac_address <macaddr> port <port>
clear port_security_entry	port <portlist>
show port_security	{ports <portlist>}

Each command is listed, in detail, in the following sections.

**config port\_security ports**

<b>Purpose</b>	Used to configure port security settings.
<b>Syntax</b>	<b>config port_security ports [&lt;portlist&gt;   all ] {admin_state [enable disable]   max_learning_addr &lt;max_lock_no 0-20&gt;   lock_address_mode [Permanent   DeleteOnTimeout   DeleteOnReset]}</b>
<b>Description</b>	This command allows for the configuration of the port security feature. Only the ports listed in the <portlist> are affected.
<b>Parameters</b>	<p><i>portlist</i> – Specifies a port or range of ports to be configured.</p> <p><i>all</i> – Configure port security for all ports on the Switch.</p> <p><i>admin_state [enable   disable]</i> – Enable or disable port security for the listed ports.</p> <p><i>max_learning_addr &lt;max_lock_no 0-20&gt;</i> - Use this to limit the number of MAC addresses dynamically listed in the FDB for the ports.</p> <p><i>lock_address_mode [Permanent   DeleteOnTimeout   DeleteOnReset]</i> – Indicates the method of locking addresses. The user has three choices:</p> <ul style="list-style-type: none"> <li>▪ <i>Permanent</i> – The locked addresses will not age out after the aging timer expires.</li> <li>▪ <i>DeleteOnTimeout</i> – The locked addresses will age out after the aging timer expires.</li> <li>▪ <i>DeleteOnReset</i> – The locked addresses will not age out until the Switch has been reset.</li> </ul>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To configure the port security:

```
DES-3550:4#config port_security ports 1-5 admin_state enable
max_learning_addr 5 lock_address_mode DeleteOnReset

Command: config port_security ports 1-5 admin_state enable
max_learning_addr 5 lock_address_mode DeleteOnReset

Success.

DES-3550:4#
```

**delete port\_security\_entry**

<b>Purpose</b>	Used to delete a port security entry by MAC address, port number and VLAN ID.
<b>Syntax</b>	<b>delete port_security_entry vlan name &lt;vlan_name 32&gt; mac_address &lt;macaddr&gt; port &lt;port&gt;</b>
<b>Description</b>	This command is used to delete a single, previously learned port security entry by port, VLAN name, and MAC Address.
<b>Parameters</b>	<p><i>vlan name &lt;vlan_name 32&gt;</i> - Enter the corresponding vlan name of the port which the user wishes to delete.</p> <p><i>mac_address &lt;macaddr&gt;</i> - Enter the corresponding MAC address, previously learned by the port, which the user wishes to delete.</p> <p><i>port &lt;port&gt;</i> - Enter the port number which has learned the previously entered MAC address.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To delete a port security entry:

```
DES-3550:4#delete port_security_entry vlan_name default
mac_address 00-01-30-10-2C-C7 port 6
```

```
Command: delete port_security_entry vlan_name default
mac_address 00-01-30-10-2C-C7 port 6
```

```
Success.
```

```
DES-3550:4#
```

**clear port\_security\_entry**

<b>Purpose</b>	Used to clear MAC address entries learned from a specified port for the port security function.
<b>Syntax</b>	<b>clear port_security_entry ports &lt;portlist&gt;</b>
<b>Description</b>	This command is used to clear MAC address entries which were learned by the Switch by a specified port. This command only relates to the port security function.
<b>Parameters</b>	<i>&lt;portlist&gt;</i> – Specifies a port or port range to clear.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To clear a port security entry by port:

```
DES-3550:4# clear port_security_entry port 6
Command: clear port_security_entry port 6

Success.

DES-3550:4#
```

## show port\_security

<b>Purpose</b>	Used to display the current port security configuration.
<b>Syntax</b>	<b>show port_security {ports &lt;portlist&gt;}</b>
<b>Description</b>	This command is used to display port security information of the Switch's ports. The information displayed includes port security, admin state, maximum number of learning address and lock mode.
<b>Parameters</b>	<portlist> – Specifies a port or range of ports to be viewed.
<b>Restrictions</b>	None.

Example usage:

To display the port security configuration:

```
DES-3550:4#show port_security ports 1-5
Command: show port_security ports 1-5

Port Admin State Max. Learning Addr. Lock Address Mode
---- -
1 Disabled 1 DeleteOnReset
2 Disabled 1 DeleteOnReset
3 Disabled 1 DeleteOnReset
4 Disabled 1 DeleteOnReset
5 Disabled 1 DeleteOnReset

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

## NETWORK MANAGEMENT (SNMP) COMMANDS

The network management commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

The DES-3550 supports the Simple Network Management Protocol (SNMP) versions 1, 2c, and 3. You can specify which version of the SNMP you want to use to monitor and control the Switch. The three versions of SNMP vary in the level of security provided between the management station and the network device. The following table lists the security features of the three SNMP versions:

SNMP Version	Authentication Method	Description
v1	Community String	Community String is used for authentication – NoAuthNoPriv
v2c	Community String	Community String is used for authentication – NoAuthNoPriv
v3	Username	Username is used for authentication – NoAuthNoPriv
v3	MD5 or SHA	Authentication is based on the HMAC-MD5 or HMAC-SHA algorithms – AuthNoPriv
v3	MD5 DES or SHA DES	Authentication is based on the HMAC-MD5 or HMAC-SHA algorithms – AuthPriv.  DES 56-bit encryption is added based on the CBC-DES (DES-56) standard

Command	Parameters
create snmp user	<username 32> <groupname 32> {encrypted [by_password auth [md5 <auth_password 8-16 >   sha <auth_password 8-20 >] priv [none   des <priv_password 8-16> ]   by_key auth [md5 <auth_key 32-32>  sha <auth_key 40-40>] priv [none   des <priv_key 32-32> ]]}
delete snmp user	<SNMP_name 32>
show snmp user	
create snmp view	<view_name 32> <oid> view_type [included   excluded]
delete snmp view	<view_name 32> [all   oid]
show snmp view	<view_name 32>
create snmp community	<community_string 32> view <view_name 32> [read_only   read_write]
delete snmp community	<community_string 32>
show snmp community	<community_string 32>

Command	Parameters
config snmp engineID	<snmp_engineID>
show snmp engineID	
create snmp group	<groupname 32> {v1   v2c   v3 [noauth_nopriv   auth_nopriv   auth_priv ]} {read_view <view_name 32>   write_view <view_name 32>   notify_view <view_name 32>}
delete snmp group	<groupname 32>
show snmp groups	
create snmp host	<ipaddr> {v1   v2c   v3 [noauth_nopriv   auth_nopriv   auth_priv]} <auth_string 32>
delete snmp host	<ipaddr>
show snmp host	<ipaddr>
create trusted_host	<ipaddr>
delete trusted_host	<ipaddr>
show trusted_host	<ipaddr>
enable snmp traps	
enable snmp authenticate_traps	
show snmp traps	
disable snmp traps	
disable snmp authenticate_traps	
config snmp system contact	<sw_contact>
config snmp system location	<sw_location>
config snmp system name	<sw_name>
enable rmon	
disable rmon	

Each command is listed, in detail, in the following sections.

**create snmp user**

<b>Purpose</b>	Used to create a new SNMP user and adds the user to an SNMP group that is also created by this command.
<b>Syntax</b>	<b>create snmp user &lt;username 32&gt; &lt;groupname 32&gt; {encrypted [ by_password auth [md5 &lt;auth_password 8-16&gt;   sha &lt;auth_password 8-20&gt;] priv [none   des &lt;priv_password 8-16&gt;]   by_key auth [md5 &lt;auth_key 32-32&gt;   sha &lt;auth_key 40-40&gt;] priv [none   des &lt;priv_key 32-32&gt; ]]}</b>
<b>Description</b>	The <b>create snmp user</b> command creates a new SNMP user and adds the user to an SNMP group that is also created by this command. SNMP ensures: Message integrity – Ensures that packets have not been tampered with during transit. Authentication – Determines if an SNMP message is from a valid source. Encryption – Scrambles the contents of messages to prevent it from being viewed by an unauthorized source.
<b>Parameters</b>	<p>&lt;username 32&gt; – An alphanumeric name of up to 32 characters that will identify the new SNMP user.</p> <p>&lt;groupname 32&gt; – An alphanumeric name of up to 32 characters that will identify the SNMP group the new SNMP user will be associated with.</p> <p><i>encrypted</i> – Allows the user to choose a type of authorization for authentication using SNMP. The user may choose:</p> <ul style="list-style-type: none"> <li>• <i>by_password</i> – Requires the SNMP user to enter a password for authentication and privacy. The password is defined by specifying the <i>auth_password</i> below. This method is recommended.</li> <li>• <i>by_key</i> – Requires the SNMP user to enter a encryption key for authentication and privacy. The key is defined by specifying the key in hex form below. This method is not recommended.</li> </ul> <p><i>auth</i> - The user may also choose the type of authentication algorithms used to authenticate the snmp user. The choices are:</p> <p><i>md5</i> – Specifies that the HMAC-MD5-96 authentication level will be used. <i>md5</i> may be utilized by entering one of the following:</p> <ul style="list-style-type: none"> <li>• &lt;auth_password 8-16&gt; - An alphanumeric sting of between 8 and 16 characters that will be used to authorize the agent to receive packets for the host.</li> <li>• &lt;auth_key 32-32&gt; - Enter an alphanumeric sting of exactly 32 characters, in hex form, to define the key that will be used to authorize the agent to receive packets for the host.</li> </ul> <p><i>sha</i> – Specifies that the HMAC-SHA-96 authentication level will be used.</p> <ul style="list-style-type: none"> <li>• &lt;auth_password 8-20&gt; - An alphanumeric sting of between 8 and 20 characters that will be used to authorize the agent to receive packets for the host.</li> <li>• &lt;auth_key 40-40&gt; - Enter an alphanumeric sting of exactly 40 characters, in hex form, to define the key that will be used to authorize the agent to receive packets for the host.</li> </ul> <p><i>priv</i> – Adding the <i>priv</i> (privacy) parameter will allow for encryption in addition to the authentication algorithm for higher security. The user may choose:</p> <ul style="list-style-type: none"> <li>• <i>des</i> – Adding this parameter will allow for a 56-bit encryption to be added using the DES-56 standard using: <ul style="list-style-type: none"> <li>• &lt;priv_password 8-16&gt; - An alphanumeric string of between 8 and 16 characters that will be used to encrypt the contents of messages the host sends to the agent.</li> <li>• &lt;priv_key 32-32&gt; - Enter an alphanumeric key string of exactly 32 characters, in hex form, that will be used to encrypt the contents of messages the host sends to the agent.</li> </ul> </li> <li>• <i>none</i> – Adding this parameter will add no encryption.</li> </ul>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To create an SNMP user on the Switch:

```
DES-3550:4#create snmp user dlink default encrypted by_password
auth md5 canadian priv none
Command: create snmp user dlink default encrypted by_password
auth md5 canadian priv none

Success.

DES-3550:4#
```

<b>delete snmp user</b>	
<b>Purpose</b>	Used to remove an SNMP user from an SNMP group and also to delete the associated SNMP group.
<b>Syntax</b>	<b>delete snmp user &lt;username 32&gt;</b>
<b>Description</b>	The <b>delete snmp user</b> command removes an SNMP user from its SNMP group and then deletes the associated SNMP group.
<b>Parameters</b>	<username 32> – An alphanumeric string of up to 32 characters that identifies the SNMP user that will be deleted.
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To delete a previously entered SNMP user on the Switch:

```
DES-3550:4#delete snmp user dlink
Command: delete snmp user dlink

Success.

DES-3550:4#
```



## show snmp user

Purpose	Used to display information about each SNMP username in the SNMP group username table.
Syntax	<b>show snmp user</b>
Description	The <b>show snmp user</b> command displays information about each SNMP username in the SNMP group username table.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display the SNMP users currently configured on the Switch:

```
DES-3550:4#show snmp user
Command: show snmp user

Username  Group Name  SNMP Version  Auth-Protocol  PrivProtocol
-----  -
initial   initial     V3            None           None

Total Entries: 1

DES-3550:4#
```

<b>create snmp view</b>	
Purpose	Used to assign views to community strings to limit which MIB objects and SNMP manager can access.
Syntax	<b>create snmp view &lt;view_name 32&gt; &lt;oid&gt; view_type [included   excluded]</b>
Description	The <b>create snmp view</b> command assigns views to community strings to limit which MIB objects an SNMP manager can access.
Parameters	<p><b>&lt;view_name 32&gt;</b> – An alphanumeric string of up to 32 characters that identifies the SNMP view that will be created.</p> <p><b>&lt;oid&gt;</b> – The object ID that identifies an object tree (MIB tree) that will be included or excluded from access by an SNMP manager.</p> <p><b>view type</b> – Sets the view type to be:</p> <ul style="list-style-type: none"> <li>• <i>included</i> – Include this object in the list of objects that an SNMP manager can access.</li> <li>• <i>excluded</i> – Exclude this object from the list of objects that an SNMP manager can access.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create an SNMP view:

```
DES-3550:4#create snmp view dlinkview 1.3.6 view_type included
Command: create snmp view dlinkview 1.3.6 view_type included

Success.

DES-3550:4#
```

**delete snmp view**

Purpose	Used to remove an SNMP view entry previously created on the Switch.
Syntax	<b>delete snmp view &lt;view_name 32&gt; [all   &lt;oid&gt;]</b>
Description	The <b>delete snmp view</b> command is used to remove an SNMP view previously created on the Switch.
Parameters	<p><i>&lt;view_name 32&gt;</i> – An alphanumeric string of up to 32 characters that identifies the SNMP view to be deleted.</p> <p><i>all</i> – Specifies that all of the SNMP views on the Switch will be deleted.</p> <p><i>&lt;oid&gt;</i> – The object ID that identifies an object tree (MIB tree) that will be deleted from the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete a previously configured SNMP view from the Switch:

```
DES-3550:4#delete snmp view dlinkview all
Command: delete snmp view dlinkview all

Success.

DES-3550:4#
```

**show snmp view**

Purpose	Used to display an SNMP view previously created on the Switch.
Syntax	<b>show snmp view {&lt;view_name 32&gt;}</b>
Description	The <b>show snmp view</b> command displays an SNMP view previously created on the Switch.
Parameters	<view_name 32> – An alphanumeric string of up to 32 characters that identifies the SNMP view that will be displayed.
Restrictions	None.

Example usage:

To display SNMP view configuration:

```
DES-3550:4#show snmp view
Command: show snmp view

Vacm View Table Settings
View Name          Subtree          View Type
-----
ReadView           1                Included
WriteView          1                Included
NotifyView         1.3.6            Included
restricted         1.3.6.1.2.1.1   Included
restricted         1.3.6.1.2.1.11  Included
restricted         1.3.6.1.6.3.10.2.1 Included
restricted         1.3.6.1.6.3.11.2.1 Included
restricted         1.3.6.1.6.3.15.1.1 Included
CommunityView      1                Included
CommunityView      1.3.6.1.6.3      Excluded
CommunityView      1.3.6.1.6.3.1    Included

Total Entries: 11

DES-3550:4#
```

<b>create snmp community</b>	
Purpose	<p>Used to create an SNMP community string to define the relationship between the SNMP manager and an agent. The community string acts like a password to permit access to the agent on the Switch. One or more of the following characteristics can be associated with the community string:</p> <p>An Access List of IP addresses of SNMP managers that are permitted to use the community string to gain access to the Switch's SNMP agent.</p> <p>An MIB view that defines the subset of all MIB objects that will be accessible to the SNMP community.</p> <p><i>read_write</i> or <i>read_only</i> level permission for the MIB objects accessible to the SNMP community.</p>
Syntax	<b>create snmp community &lt;community_string 32&gt; view &lt;view_name 32&gt; [read_only   read_write]</b>
Description	The <b>create snmp community</b> command is used to create an SNMP community string and to assign access-limiting characteristics to this community string.
Parameters	<p><i>&lt;community_string 32&gt;</i> – An alphanumeric string of up to 32 characters that is used to identify members of an SNMP community. This string is used like a password to give remote SNMP managers access to MIB objects in the Switch's SNMP agent.</p> <p><i>&lt;view_name 32&gt;</i> – An alphanumeric string of up to 32 characters that is used to identify the group of MIB objects that a remote SNMP manager is allowed to access on the Switch.</p> <p><i>read_only</i> – Specifies that SNMP community members using the community string created with this command can only read the contents of the MIBs on the Switch.</p> <p><i>read_write</i> – Specifies that SNMP community members using the community string created with this command can read from and write to the contents of the MIBs on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create the SNMP community string “dlink:”

```
DES-3550:4#create snmp community dlink view ReadView read_write
Command: create snmp community dlink view ReadView read_write

Success.

DES-3550:4#
```

## delete snmp community

Purpose	Used to remove a specific SNMP community string from the Switch.
Syntax	<b>delete snmp community &lt;community_string 32&gt;</b>
Description	The <b>delete snmp community</b> command is used to remove a previously defined SNMP community string from the Switch.
Parameters	<i>&lt;community_string 32&gt;</i> – An alphanumeric string of up to 32 characters that is used to identify members of an SNMP community. This string is used like a password to give remote SNMP managers access to MIB objects in the Switch's SNMP agent.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the SNMP community string “dlink:”

```
DES-3550:4#delete snmp community dlink
Command: delete snmp community dlink

Success.

DES-3550:4#
```

**show snmp community**

Purpose	Used to display SNMP community strings configured on the Switch.
Syntax	<b>show snmp community {&lt;community_string 32&gt;}</b>
Description	The <b>show snmp community</b> command is used to display SNMP community strings that are configured on the Switch.
Parameters	<community_string 32> – An alphanumeric string of up to 32 characters that is used to identify members of an SNMP community. This string is used like a password to give remote SNMP managers access to MIB objects in the Switch's SNMP agent.
Restrictions	None.

Example usage:

To display the currently entered SNMP community strings:

```
DES-3550:4#show snmp community
Command: show snmp community

SNMP Community Table

Community Name      View Name          Access Right
-----
dlink               ReadView          read_write
private            CommunityView     read_write
public             CommunityView     read_only

Total Entries: 3

DES-3550:4#
```

**config snmp engineID**

Purpose	Used to configure a name for the SNMP engine on the Switch.
Syntax	<b>config snmp engineID &lt;snmp_engineID&gt;</b>
Description	The <b>config snmp engineID</b> command configures a name for the SNMP engine on the Switch.
Parameters	<i>&lt;snmp_engineID&gt;</i> – An alphanumeric string that will be used to identify the SNMP engine on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To give the SNMP agent on the Switch the name “0035636666”

```
DES-3550:4#config snmp 0035636666
Command: config snmp engineID 0035636666

Success.

DES-3550:4#
```

**show snmp engineID**

Purpose	Used to display the identification of the SNMP engine on the Switch.
Syntax	<b>show snmp engineID</b>
Description	The <b>show snmp engineID</b> command displays the identification of the SNMP engine on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To display the current name of the SNMP engine on the Switch:

```
DES-3550:4#show snmp engineID
Command: show snmp engineID

SNMP Engine ID : 0035636666

DES-3550:4#
```



## create snmp group

<b>Purpose</b>	Used to create a new SNMP group, or a table that maps SNMP users to SNMP views.
<b>Syntax</b>	<b>create snmp group &lt;groupname 32&gt; [v1   v2c   v3 [noauth_nopriv   auth_nopriv   auth_priv]] {read_view &lt;view_name 32&gt;   write_view &lt;view_name 32&gt;   notify_view &lt;view_name 32&gt;}</b>
<b>Description</b>	The <b>create snmp group</b> command creates a new SNMP group, or a table that maps SNMP users to SNMP views.
<b>Parameters</b>	<p><i>&lt;groupname 32&gt;</i> – An alphanumeric name of up to 32 characters that will identify the SNMP group the new SNMP user will be associated with.</p> <p><i>v1</i> – Specifies that SNMP version 1 will be used. The Simple Network Management Protocol (SNMP), version 1, is a network management protocol that provides a means to monitor and control network devices.</p> <p><i>v2c</i> – Specifies that SNMP version 2c will be used. The SNMP v2c supports both centralized and distributed network management strategies. It includes improvements in the Structure of Management Information (SMI) and adds some security features.</p> <p><i>v3</i> – Specifies that the SNMP version 3 will be used. SNMP v3 provides secure access to devices through a combination of authentication and encrypting packets over the network. SNMP v3 adds:</p> <p><i>Message integrity</i> – Ensures that packets have not been tampered with during transit.</p> <p><i>Authentication</i> – Determines if an SNMP message is from a valid source.</p> <p><i>Encryption</i> – Scrambles the contents of messages to prevent it being viewed by an unauthorized source.</p> <p><i>noauth_nopriv</i> – Specifies that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>auth_nopriv</i> – Specifies that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>auth_priv</i> – Specifies that authorization will be required, and that packets sent between the Switch and a remote SNMP manger will be encrypted.</p> <p><i>read_view</i> – Specifies that the SNMP group being created can request SNMP messages.</p> <p><i>write_view</i> – Specifies that the SNMP group being created has write privileges.</p> <p><i>notify_view</i> – Specifies that the SNMP group being created can receive SNMP trap messages generated by the Switch's SNMP agent.</p> <p><i>&lt;view_name 32&gt;</i> – An alphanumeric string of up to 32 characters that is used to identify the group of MIB objects that a remote SNMP manager is allowed to access on the Switch.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To create an SNMP group named “sg1.”

```
DES-3550:4#create snmp group sg1 v3 noauth_nopriv read_view v1
write_view v1 notify_view v1
Command: create snmp group sg1 v3 noauth_nopriv read_view v1
write_view v1 notify_view v1

Success.

DES-3550:4#
```

### delete snmp group

Purpose	Used to remove an SNMP group from the Switch.
Syntax	<b>delete snmp group &lt;groupname 32&gt;</b>
Description	The <b>delete snmp group</b> command is used to remove an SNMP group from the Switch.
Parameters	<groupname 32> – An alphanumeric name of up to 32 characters that will identify the SNMP group the new SNMP user will be associated with.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the SNMP group named “sg1”.

```
DES-3550:4#delete snmp group sg1
Command: delete snmp group sg1

Success.

DES-3550:4#
```

**show snmp groups**

Purpose	Used to display the group-names of SNMP groups currently configured on the Switch. The security model, level, and status of each group are also displayed.
Syntax	<b>show snmp groups</b>
Description	The <b>show snmp groups</b> command displays the group-names of SNMP groups currently configured on the Switch. The security model, level, and status of each group are also displayed.
Parameters	None.
Restrictions	None.

Example usage:

To display the currently configured SNMP groups on the Switch:

```
DES-3550:4#show snmp groups
Command: show snmp groups
Vacm Access      Table Settings

Group Name       : Group3
ReadView Name    : ReadView
WriteView Name   : WriteView
Notify View Name : NotifyView
Security Model   : SNMPv3
Security Level   : NoAuthNoPriv

Group Name       : Group4
ReadView Name    : ReadView
WriteView Name   : WriteView
Notify View Name : NotifyView
Security Model   : SNMPv3
Security Level   : authNoPriv

Group Name       : Group5
ReadView Name    : ReadView
WriteView Name   : WriteView
Notify View Name : NotifyView
Security Model   : SNMPv3
Security Level   : authNoPriv

Group Name       : Group6
ReadView Name    : ReadView
WriteView Name   : WriteView
Notify View Name : NotifyView
Security Model   : SNMPv3
Security Level   : authPriv
```

```
Group Name      : Group7
ReadView Name   : ReadView
WriteView Name  : WriteView
Notify View Name : NotifyView
Security Model  : SNMPv3
Security Level  : authPriv

Group Name      : initial
ReadView Name   : restricted
WriteView Name  :
Notify View Name : restricted
Security Model  : SNMPv3
Security Level  : NoAuthNoPriv

Group Name      : ReadGroup
ReadView Name   : CommunityView
WriteView Name  :
Notify View Name : CommunityView
Security Model  : SNMPv1
Security Level  : NoAuthNoPriv

Group Name      : ReadGroup
ReadView Name   : CommunityView
WriteView Name  :
Notify View Name : CommunityView
Security Model  : SNMPv2
Security Level  : NoAuthNoPriv

Group Name      : WriteGroup
ReadView Name   : CommunityView
WriteView Name  : CommunityView
Notify View Name : CommunityView
Security Model  : SNMPv1
Security Level  : NoAuthNoPriv

Group Name      : WriteGroup
ReadView Name   : CommunityView
WriteView Name  : CommunityView
Notify View Name : CommunityView
Security Model  : SNMPv2
Security Level  : NoAuthNoPriv

Total Entries: 10

DES-3550:4#
```

**create snmp host**

Purpose	Used to create a recipient of SNMP traps generated by the Switch's SNMP agent.
Syntax	<b>create snmp host &lt;ipaddr&gt; [v1   v2c   v3 [noauth_nopriv   auth_nopriv   auth_priv] &lt;auth_string 32&gt;]</b>
Description	The <b>create snmp host</b> command creates a recipient of SNMP traps generated by the Switch's SNMP agent.
Parameters	<p><i>&lt;ipaddr&gt;</i> – The IP address of the remote management station that will serve as the SNMP host for the Switch.</p> <p><i>v1</i> – Specifies that SNMP version 1 will be used. The Simple Network Management Protocol (SNMP), version 1, is a network management protocol that provides a means to monitor and control network devices.</p> <p><i>v2c</i> – Specifies that SNMP version 2c will be used. The SNMP v2c supports both centralized and distributed network management strategies. It includes improvements in the Structure of Management Information (SMI) and adds some security features.</p> <p><i>v3</i> – Specifies that the SNMP version 3 will be used. SNMP v3 provides secure access to devices through a combination of authentication and encrypting packets over the network. SNMP v3 adds:</p> <ul style="list-style-type: none"> <li>• Message integrity – ensures that packets have not been tampered with during transit.</li> <li>• Authentication – determines if an SNMP message is from a valid source.</li> <li>• Encryption – scrambles the contents of messages to prevent it being viewed by an unauthorized source.</li> </ul> <p><i>noauth_nopriv</i> – Specifies that there will be no authorization and no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>auth_nopriv</i> – Specifies that authorization will be required, but there will be no encryption of packets sent between the Switch and a remote SNMP manager.</p> <p><i>auth_priv</i> – Specifies that authorization will be required, and that packets sent between the Switch and a remote SNMP manager will be encrypted.</p> <p><i>&lt;auth_string 32&gt;</i> – An alphanumeric string used to authorize a remote SNMP manager to access the Switch's SNMP agent.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create an SNMP host to receive SNMP messages:

```
DES-3550:4#create snmp host 10.48.74.100 v3 auth_priv public
Command: create snmp host 10.48.74.100 v3 auth_priv public

Success.

DES-3550:4#
```

### delete snmp host

Purpose	Used to remove a recipient of SNMP traps generated by the Switch's SNMP agent.
Syntax	<b>delete snmp host &lt;ipaddr&gt;</b>
Description	The <b>delete snmp host</b> command deletes a recipient of SNMP traps generated by the Switch's SNMP agent.
Parameters	<ipaddr> – The IP address of a remote SNMP manager that will receive SNMP traps generated by the Switch's SNMP agent.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete an SNMP host entry:

```
DES-3550:4#delete snmp host 10.48.74.100
Command: delete snmp host 10.48.74.100

Success.

DES-3550:4#
```

**show snmp host**

Purpose	Used to display the recipient of SNMP traps generated by the Switch's SNMP agent.
Syntax	<b>show snmp host {&lt;ipaddr&gt;}</b>
Description	The <b>show snmp host</b> command is used to display the IP addresses and configuration information of remote SNMP managers that are designated as recipients of SNMP traps that are generated by the Switch's SNMP agent.
Parameters	<ipaddr> – The IP address of a remote SNMP manager that will receive SNMP traps generated by the Switch's SNMP agent.
Restrictions	None.

Example usage:

To display the currently configured SNMP hosts on the Switch:

```
DES-3550:4#show snmp host
Command: show snmp host

SNMP Host Table
Host IP Address  SNMP Version  Community Name/SNMPv3
                  User Name
-----
10.48.76.23     V2c           private
10.48.74.100   V3 authpriv   public

Total Entries: 2

DES-3550:4#
```

**create trusted\_host**

Purpose	Used to create the trusted host.
Syntax	<b>create trusted_host &lt;ipaddr&gt;</b>
Description	The <i>create trusted_host</i> command creates the trusted host. The Switch allows you to specify up to four IP addresses that are allowed to manage the Switch via in-band SNMP or TELNET based management software. These IP addresses must be members of the Management VLAN. If no IP addresses are specified, then there is nothing to prevent any IP address from accessing the Switch, provided the user knows the Username and Password.
Parameters	<ipaddr> – The IP address of the trusted host to be created.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create the trusted host:

```
DES-3550:4#create trusted_host 10.48.74.121
Command: create trusted_host 10.48.74.121

Success.

DES-3550:4#
```



## show trusted\_host

Purpose	Used to display a list of trusted hosts entered on the Switch using the <b>create trusted_host</b> command above.
Syntax	<b>show trusted_host &lt;ipaddr&gt;</b>
Description	This command is used to display a list of trusted hosts entered on the Switch using the <i>create trusted_host</i> command above.
Parameters	<ipaddr> – The IP address of the trusted host.
Restrictions	None.

Example Usage:

To display the list of trust hosts:

```
DES-3550:4#show trusted_host
Command: show trusted_host

Management Stations

IP Address
-----
10.53.13.94

Total Entries: 1

DES-3550:4#
```

## **delete trusted\_host**

Purpose	Used to delete a trusted host entry made using the <i>create trusted_host</i> command above.
Syntax	<b>delete trusted_host &lt;ipaddr&gt;</b>
Description	This command is used to delete a trusted host entry made using the <i>create trusted_host</i> command above.
Parameters	<ipaddr> – The IP address of the trusted host.
Restrictions	Only administrator-level users can issue this command.

### Example Usage:

To delete a trusted host with an IP address 10.48.74.121:

```
DES-3550:4#delete trusted_host 10.48.74.121  
Command: delete trusted_host 10.48.74.121  
  
Success.  
  
DES-3550:4#
```

## enable snmp traps

Purpose	Used to enable SNMP trap support.
Syntax	<b>enable snmp traps</b>
Description	The enable snmp traps command is used to enable SNMP trap support on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable SNMP trap support on the Switch:

```
DES-3550:4#enable snmp traps
```

```
Command: enable snmp traps
```

```
Success.
```

```
DES-3550:4#
```

## enable snmp authenticate\_traps

Purpose	Used to enable SNMP authentication trap support.
Syntax	<b>enable snmp authenticate_traps</b>
Description	This command is used to enable SNMP authentication trap support on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To turn on SNMP authentication trap support:

```
DES-3550:4#enable snmp authenticate_traps
```

```
Command: enable snmp authenticate_traps
```

```
Success.
```

```
DES-3550:4#
```

## show snmp traps

Purpose	Used to show SNMP trap support on the Switch .
Syntax	<b>show snmp traps</b>
Description	This command is used to view the SNMP trap support status currently configured on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To view the current SNMP trap support:

```
DES-3550:4#show snmp traps
Command: show snmp traps

SNMP Traps      : Enabled
Authenticate Traps : Enabled

DES-3550:4#
```

## disable snmp traps

Purpose	Used to disable SNMP trap support on the Switch.
Syntax	<b>disable snmp traps</b>
Description	This command is used to disable SNMP trap support on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To prevent SNMP traps from being sent from the Switch:

```
DES-3550:4#disable snmp traps
Command: disable snmp traps

Success.

DES-3550:4#
```

## disable snmp authenticate\_traps

Purpose	Used to disable SNMP authentication trap support.
Syntax	<b>disable snmp authenticate_traps</b>
Description	This command is used to disable SNMP authentication support on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To disable the SNMP authentication trap support:

```
DES-3550:4#disable snmp authenticate_traps
Command: disable snmp authenticate_traps

Success.

DES-3550:4#
```

**config snmp system\_contact**

Purpose	Used to enter the name of a contact person who is responsible for the Switch.
Syntax	<b>config snmp system_contact{&lt;sw_contact&gt;}</b>
Description	The config snmp system_contact command is used to enter the name and/or other information to identify a contact person who is responsible for the Switch. A maximum of 255 character can be used.
Parameters	<sw_contact> - A maximum of 255 characters is allowed. A NULL string is accepted if there is no contact.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the Switch contact to “MIS Department II”:

```
DES-3550:4#config snmp system_contact MIS Department II
Command: config snmp system_contact MIS Department II

Success.

DES-3550:4#
```

**config snmp system\_location**

Purpose	Used to enter a description of the location of the Switch.
Syntax	<b>config snmp system_location {&lt;sw_location&gt;}</b>
Description	The config snmp system_location command is used to enter a description of the location of the Switch. A maximum of 255 characters can be used.
Parameters	<sw_location> - A maximum of 255 characters is allowed. A NULL string is accepted if there is no location desired.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the Switch location for “HQ 5F”:

```
DES-3550:4#config snmp system_location HQ 5F
Command: config snmp system_location HQ 5F
Success.
DES-3550:4#
```

## config snmp system\_name

Purpose	Used to configure the name for the Switch.
Syntax	<b>config snmp system_name {&lt;sw_name&gt;}</b>
Description	The <i>config snmp system_name</i> command configures the name of the Switch.
Parameters	<sw_name> - A maximum of 255 characters is allowed. A NULL string is accepted if no name is desired.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the Switch name for “DES-3550 Switch”:

```
DES-3550:4#config snmp system_name DES-3550 Switch
Command: config snmp system_name DES-3550 Switch
Success.
DES-3550:4#
```

## enable rmon

Purpose	Used to enable RMON on the Switch.
Syntax	<b>enable rmon</b>
Description	This command is used, in conjunction with the <i>disable rmon</i> command below, to enable and disable remote monitoring (RMON) on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To enable RMON:

```
DES-3550:4#enable rmon
```

```
Command: enable rmon
```

```
Success.
```

```
DES-3550:4#
```



## disable rmon

Purpose	Used to disable RMON on the Switch.
Syntax	<b>disable rmon</b>
Description	This command is used, in conjunction with the <i>enable rmon</i> command above, to enable and disable remote monitoring (RMON) on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To disable RMON:

```
DES-3550:4#disable rmon
```

```
Command: disable rmon
```

```
Success.
```

```
DES-3550:4#
```

## SWITCH UTILITY COMMANDS

The download/upload commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
download	[ firmware <ipaddr> <path_filename 64> {section_id <int 1-2>} configuration <ipaddr> <path_filename 64> {increment} ]
config firmware	image_id <value 1-2> [delete   boot_up]
show firmware_information	
show config	[ current_config   config_in_nvram ]
upload	[ configuration   log ] <ipaddr> <path_filename 64>
enable autoconfig	
disable autoconfig	
show autoconfig	
ping	<ipaddr> {times <value 1-255>} {timeout <sec 1-99>}

Each command is listed, in detail, in the following sections.

<b>download</b>	
Purpose	Used to download and install new firmware or a Switch configuration file from a TFTP server.
Syntax	<b>download [firmware &lt;ipaddr&gt; &lt;path_filename 64&gt; {image_id &lt;int 1-2&gt;} configuration &lt;ipaddr&gt; &lt;path_filename 64&gt; {increment} ]</b>
Description	This command is used to download a new firmware or a Switch configuration file from a TFTP server.
Parameters	<p><i>firmware</i> – Download and install new firmware on the Switch from a TFTP server.</p> <p><i>configuration</i> – Download a switch configuration file from a TFTP server.</p> <p><i>&lt;ipaddr&gt;</i> – The IP address of the TFTP server.</p> <p><i>&lt;path_filename&gt;</i> – The DOS path and filename of the firmware or switch configuration file on the TFTP server. For example, C:\3226S.had.</p> <p><i>image_id &lt;int 1-2&gt;</i> - Specify the working section ID. The Switch can hold two firmware versions for the user to select from, which are specified by section ID.</p> <p><i>increment</i> – Allows the download of a partial switch configuration file. This allows a file to be downloaded that will change only the switch parameters explicitly stated in the configuration file. All other switch parameters will remain unchanged.</p>
Restrictions	The TFTP server must be on the same IP subnet as the Switch. Only administrator-level users can issue this command.

Example usage:

To download a configuration file:

```
DES-3550:4#download configuration 10.48.74.121 c:\cfg\setting.txt
Command: download configuration 10.48.74.121 c:\cfg\setting.txt

Connecting to server..... Done.
Download configuration..... Done.

DES-3550:4#
DES-3550:4##-----
DES-3550:4##          DES-3550 Configuration
DES-3550:4##
DES-3550:4##          Firmware: Build 3.01-B20
DES-3550:4##          Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.
DES-3550:4##-----
DES-3550:4#
DES-3550:4#
DES-3550:4## BASIC
DES-3550:4#
DES-3550:4#config serial_port baud_rate 9600 auto_logout 10_minutes
Command: config serial_port baud_rate 9600 auto_logout 10_minutes
```

The download configuration command will initiate the loading of the various settings in the order listed in the configuration file. When the file has been successfully loaded the message “End of configuration file for DES-3550” appears followed by the command prompt.

```
DES-3550:4#disable authen_policy
Command: disable authen_policy

Success.

DES-3550:4#
DES-3550:4##-----
DES-3550:4##          End of configuration file for DES-3550
DES-3550:4##-----
DES-3550:4#
```

<b>config firmware</b>	
Purpose	Used to configure the firmware section as a boot up section, or to delete the firmware section
Syntax	<b>config firmware image_id &lt;int 1-2&gt; [delete   boot_up]</b>
Description	This command is used to configure the firmware section. The user may choose to remove the firmware section or use it as a boot up section.
Parameters	<p><i>image_id</i> – Specifies the working section. The Switch can hold two firmware versions for the user to select from, which are specified by image ID.</p> <p><i>delete</i> – Entering this parameter will delete the specified firmware section.</p> <p><i>boot_up</i> – Entering this parameter will specify the firmware image ID as a boot up section.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure firmware section 1 as a boot up section:

```
DES-3550:4# config firmware section_id 1 boot_up
Command: config firmware section_id 1 boot_up

Success.

DES-3550:4#
```

**show firmware information**

Purpose	Used to display the firmware section information.
Syntax	<b>show firmware information</b>
Description	This command is used to display the firmware section information
Parameters	None.
Restrictions	None

Example usage:

To display the current firmware information on the Switch:

```
DES-3550:4#show firmware information
Command: show firmware information

ID  Version  Size(B)  Update Time          From                User
--  -
1   2.00-B19  1360471  00000 days 00:00:00  Serial Port (PROM)  Unknown
*2  1.00-B20  2052372  00000 days 00:00:56  10.53.13.94         Anonymous

** means boot up section
(T) means firmware update thru TELNET
(S) means firmware update thru SNMP
(W) means firmware update thru WEB

Free space: 3145728 bytes

DES-3550:4#
```

**show config**

Purpose	Used to display the current or saved version of the configuration settings of the switch.																												
Syntax	<b>show config [ current_config   config_in_nvram ]</b>																												
Description	<p>Use this command to display all the configuration settings that are saved to NV RAM or display the configuration settings as they are currently configured. Use the keyboard to list settings one line at a time (Enter), one page at a time (Space) or view all (a).</p> <p>The configuration settings are listed by category in the following order:</p> <table border="0"> <tr> <td>1. Basic (serial port, Telnet and web management status)</td> <td>13. vlan</td> </tr> <tr> <td>2. storm control</td> <td>14. FDB (forwarding data base)</td> </tr> <tr> <td>3. IP group management</td> <td>15. MAC address table notification</td> </tr> <tr> <td>4. syslog</td> <td>16. STP</td> </tr> <tr> <td>5. QoS</td> <td>17. SSH</td> </tr> <tr> <td>6. port mirroring</td> <td>18. SSL</td> </tr> <tr> <td>7. traffic segmentation</td> <td>19. ACL</td> </tr> <tr> <td>8. port</td> <td>20. SNTP</td> </tr> <tr> <td>9. port lock</td> <td>21. IP route</td> </tr> <tr> <td>10. 8021x</td> <td>22. LACP</td> </tr> <tr> <td>11. SNMPv3</td> <td>23. ARP</td> </tr> <tr> <td>12. management (SNMP traps RMON)</td> <td>24. IP</td> </tr> <tr> <td></td> <td>25. IGMP snooping</td> </tr> <tr> <td></td> <td>26. access authentication control (TACACS etc.)</td> </tr> </table>	1. Basic (serial port, Telnet and web management status)	13. vlan	2. storm control	14. FDB (forwarding data base)	3. IP group management	15. MAC address table notification	4. syslog	16. STP	5. QoS	17. SSH	6. port mirroring	18. SSL	7. traffic segmentation	19. ACL	8. port	20. SNTP	9. port lock	21. IP route	10. 8021x	22. LACP	11. SNMPv3	23. ARP	12. management (SNMP traps RMON)	24. IP		25. IGMP snooping		26. access authentication control (TACACS etc.)
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12. management (SNMP traps RMON)	24. IP																												
	25. IGMP snooping																												
	26. access authentication control (TACACS etc.)																												
Parameters	<p><i>current_config</i> – Entering this parameter will display configurations entered without being saved to NVRAM.</p> <p><i>config_in_NVRAM</i> - Entering this parameter will display configurations entered and saved to NVRAM.</p>																												
Restrictions	None.																												

Example usage:

To view the current configuration settings:

```
DES-3550:4#show config current_config
Command: show config current_config

#-----
#           DES-3550 Configuration
#
#           Firmware: Build 3.01-B20
#           Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.
#-----

# BASIC

config serial_port baud_rate 9600 auto_logout 10_minutes
enable telnet 23
enable web 80

# STORM

config traffic control 1-5 broadcast disable multicast disable dlif
disable thres
hold 128

# GM

config sim candidate
CTRL+C ESC q Quit SPACE n Next Page ENTER Next Entry a All
```



<b>upload</b>	
Purpose	Used to upload the current switch settings or the switch history log to a TFTP.
Syntax	<b>upload [ configuration   log ] &lt;ipaddr&gt; &lt;path_filename 64&gt;</b>
Description	This command is used to upload either the Switch's current settings or the Switch's history log to a TFTP server.
Parameters	<p><i>configuration</i> – Specifies that the Switch's current settings will be uploaded to the TFTP server.</p> <p><i>log</i> – Specifies that the switch history log will be uploaded to the TFTP server.</p> <p><i>&lt;ipaddr&gt;</i> – The IP address of the TFTP server. The TFTP server must be on the same IP subnet as the Switch.</p> <p><i>&lt;path_filename 64&gt;</i> – Specifies the location of the Switch configuration file on the TFTP server. This file will be replaced by the uploaded file from the Switch.</p>
Restrictions	The TFTP server must be on the same IP subnet as the Switch. Only administrator-level users can issue this command.

Example usage:

To upload a configuration file:

```
DES-3550:4#upload configuration 10.48.74.121 c:\cfg\log.txt
Command: upload configuration 10.48.74.121 c:\cfg\log.txt

Connecting to server..... Done.
Upload configuration.....Done.

DES-3550:4#
```

## enable autoconfig

Purpose	Used to activate the autoconfiguration function for the Switch. This will load a previously saved configuration file stored on a designated TFTP server.
Syntax	<b>enable autoconfig</b>
Description	When autoconfig is enabled on the Switch, the DHCP reply will contain a configuration file and path name. The Switch will then request the file from the TFTP server specified in the reply. When autoconfig is enabled, the ipif settings will automatically become DHCP client (same as: config ipif System dhcp).
Parameters	None.
Restrictions	When autoconfig is enabled, the Switch becomes a DHCP client automatically (same as: config ipif System dhcp). The DHCP server must have the TFTP server IP address and configuration file name, and be configured to deliver this information in the data field of the DHCP reply packet. The TFTP server must be running and have the requested configuration file in its base directory when the request is received from the Switch. Consult the DHCP server and TFTP server software instructions for information on loading a configuration file.  If the Switch is unable to complete the autoconfiguration process the previously saved local configuration file present in Switch memory will be loaded.



**NOTE:** Dual-purpose (DHCP/TFTP) server utility software may require entry of the configuration file name and path within the user interface. Alternatively, the DHCP software may require creating a separate ext file with the configuration file name and path in a specific directory on the server. Consult the documentation for the DHCP server software if you are unsure.

Example usage:

To enable autoconfiguration on the Switch:

```
DES-3550:4#enable autoconfig
Command: enable autoconfig

Success.

DES-3550:4#
```

When autoconfig is enabled and the Switch is rebooted, the normal login screen will appear for a few moments while the autoconfig request (i.e. download configuration) is initiated. The console will then display the configuration parameters as they are loaded from the configuration file specified in the DHCP or TFTP server. This is exactly the same as using a **download configuration** command. After the entire Switch configuration is loaded, the Switch will automatically “logout” the server. The configuration settings will be saved automatically and become the active configuration.

Upon booting up the autoconfig process is initiated, the console screen will appear similar to the example below. The configuration settings will be loaded in normal order.

```
DES-3550 Fast Ethernet Switch Command Line Interface

Firmware: Build 3.01-B20
Copyright(C) 2000-2004 D-Link Corporation. All rights reserved.

DES-3550:4#
DES-3550:4#
DES-3550:4#download configuration 10.41.44.44 c:\cfg\setting.txt
Command: download configuration 10.41.44.44 c:\cfg\setting.txt

Connecting to server..... Done.
Download configuration..... Done.
```

The very end of the autoconfig process including the logout appears like this:

```
DES-3550:4#disable authen_policy
Command: disable authen_policy

Success.

DES-3550:4#
DES-3550:4##-----
DES-3550:4##      End of configuration file for DES-3550
DES-3550:4#

*****
* Logout *
*****
```



**NOTE:** With autoconfig enabled, the Switch ipif settings now define the Switch as a DHCP client. Use the show switch command to display the new IP settings status.

### **disable autoconfig**

Purpose	Use this to deactivate autoconfiguration from DHCP.
Syntax	<b>disable autoconfig</b>
Description	This instructs the Switch not to request autoconfiguration instruction from the DHCP server. This does not change the IP settings of the Switch. The ipif settings will continue as DHCP client until changed with the config ipif command.
Parameters	None.
Restrictions	None.

Example usage:

To stop the autoconfiguration function:

```
DES-3550:4#disable autoconfig
Command: disable autoconfig

Success.

DES-3550:4#
```

## show autoconfig

Purpose	Used to display the current autoconfig status of the Switch.
Syntax	<b>show autoconfig</b>
Description	This will list the current status of the autoconfiguration function.
Parameters	None.
Restrictions	None.

Example usage:

To upload a:

```
DES-3550:4#show autoconfig
Command: show autoconfig
Autoconfig disabled.

Success.

DES-3550:4#
```

<b>ping</b>	
Purpose	Used to test the connectivity between network devices.
Syntax	<b>ping &lt;ipaddr&gt; {times &lt;value 1-255&gt;} {timeout &lt;sec 1-99&gt;}</b>
Description	The ping command sends Internet Control Message Protocol (ICMP) echo messages to a remote IP address. The remote IP address will then “echo” or return the message. This is used to confirm connectivity between the Switch and the remote device.
Parameters	<p><i>&lt;ipaddr&gt;</i> - Specifies the IP address of the host.</p> <p><i>times &lt;value 1-255&gt;</i> - The number of individual ICMP echo messages to be sent. A value of 0 will send an infinite ICMP echo messages. The maximum value is 255. The default is 0.</p> <p><i>timeout &lt;sec 1-99&gt;</i> - Defines the time-out period while waiting for a response from the remote device. A value of 1 to 99 seconds can be specified. The default is 1 second</p>
Restrictions	None.

Example usage:

To ping the IP address 10.48.74.121 four times:

```

DES-3550:4#ping 10.48.74.121 times 4
Command: ping 10.48.74.121

Reply from 10.48.74.121, time<10ms
Reply from 10.48.74.121, time<10ms
Reply from 10.48.74.121, time<10ms
Reply from 10.48.74.121, time<10ms

Ping statistics for 10.48.74.121
Packets: Sent =4, Received =4, Lost =0

DES-3550:4#

```

## NETWORK MONITORING COMMANDS

The network monitoring commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
show packet ports	<portlist>
show error ports	<portlist>
show utilization	[cpu   ports {<portlist>}]
clear counters	ports <portlist>
clear log	
show log	index <value>
enable syslog	
disable syslog	
show syslog	
create syslog host	<index 1-4> ipaddress <ipaddr> {severity [informational   warning   all]   facility [local0   local1   local2   local3   local4   local5   local6   local7]   udp_port <udp_port_number>   state [enable   disable]}
config syslog host	[all   <index 1-4>] {severity [informational   warning   all]   facility [local0   local1   local2   local3   local4   local5   local6   local7]   udp_port <udp_port_number>   ipaddress <ipaddr>   state [enable   disable]}
delete syslog host	[<index 1-4>   all]
show syslog host	<index 1-4>
config system_severity	[[all   trap   log] [critical   warning   information]]
show system_severity	

Each command is listed, in detail, in the following sections.

**show packet ports**

Purpose	Used to display statistics about the packets sent and received by the Switch.
Syntax	<b>show packet ports &lt;portlist&gt;</b>
Description	This command is used to display statistics about packets sent and received by ports specified in the <portlist>.
Parameters	<portlist> – Specifies a port or range of ports to be displayed.
Restrictions	None.

Example usage:

To display the packets analysis for port 7 of module 2:

```
DES-3550:4#show packet port 2
```

Port number : 2					
Frame Size	Frame Counts	Frame/sec	Frame Type	Total	Total/sec
-----	-----	-----	-----	-----	-----
64	3275	10	RX Bytes	408973	1657
65-127	755	10	RX Frames	395	19
128-255	316	1			
256-511	145	0	TX Bytes	7918	178
512-1023	15	0	TX Frames	111	2
1024-1518	0	0			
Unicast RX	152	1			
Multicast RX	557	2			
Broadcast RX	3686	16			

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh



**show error ports**

Purpose	Used to display the error statistics for a range of ports.
Syntax	<b>show error ports &lt;portlist&gt;</b>
Description	This command will display all of the packet error statistics collected and logged by the Switch for a given port list.
Parameters	<portlist> – Specifies a port or range of ports to be displayed.
Restrictions	None.

Example usage:

To display the errors of the port 3 of module 1:

```
DES-3550:4#show error ports 3
Command: show error ports 3

Port number : 1

          RX Frames                TX Frames
          -----                -
CRC Error   19          Excessive Deferral  0
Undersize   0           CRC Error           0
Oversize    0           Late Collision        0
Fragment    0           Excessive Collision   0
Jabber      11          Single Collision      0
Drop Pkts   20837       Collision             0

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

## show utilization

Purpose	Used to display real-time port and cpu utilization statistics.
Syntax	<b>show utilization [cpu   ports {&lt;portlist&gt;}]</b>
Description	This command will display the real-time port and cpu utilization statistics for the Switch.
Parameters	<p><i>cpu</i> – Entering this parameter will display the current cpu utilization of the Switch.</p> <p><i>ports</i> - Entering this parameter will display the current port utilization of the Switch.</p> <ul style="list-style-type: none"><li>▪ &lt;portlist&gt; - Specifies a port or range of ports to be displayed.</li></ul>
Restrictions	None.

Example usage:

To display the port utilization statistics:

```
DES-3550:4#show utilization ports
Command: show utilization ports
```

Port	TX/sec	RX/sec	Util	Port	TX/sec	RX/sec	Util
1	0	0	0	22	0	0	0
2	0	0	0	23	0	0	0
3	0	0	0	24	0	0	0
4	0	0	0	25	0	26	1
5	0	0	0	26	0	0	0
6	0	0	0	27	0	0	0
7	0	0	0	28	0	0	0
8	0	0	0	29	0	0	0
9	0	0	0	30	0	0	0
10	0	0	0	31	0	0	0
11	0	0	0	32	0	0	0
12	0	0	0	33	0	0	0
13	0	0	0	34	0	0	0
14	0	0	0	35	0	0	0
15	0	0	0	36	0	0	0
16	0	0	0	37	0	0	0
17	0	0	0	38	0	0	0
18	0	0	0	39	0	0	0
19	0	0	0	40	0	0	0
20	0	0	0	41	0	0	0
21	0	0	0	42	0	0	0

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh

To display the current cpu utilization:

```
DES-3550:4#show utilization cpu
Command: show utilization cpu

CPU utilization :
-----
Five seconds - 15%   One minute - 25%   Five minutes - 14%

DES-3550:4#
```

## clear counters

Purpose	Used to clear the Switch's statistics counters.
Syntax	<b>clear counters {ports &lt;portlist&gt;}</b>
Description	This command will clear the counters used by the Switch to compile statistics.
Parameters	<portlist> – Specifies a port or range of ports to be displayed.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To clear the counters:

```
DES-3550:4#clear counters ports 2-9
Command: clear counters ports 2-9

Success.

DES-3550:4#
```

**clear log**

Purpose	Used to clear the Switch's history log.
Syntax	<b>clear log</b>
Description	This command will clear the Switch's history log.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To clear the log information:

```
DES-3550:4#clear log
Command: clear log

Success.

DES-3550:4#
```

**show log**

Purpose	Used to display the switch history log.
Syntax	<b>show log {index &lt;value&gt;}</b>
Description	This command will display the contents of the Switch's history log.
Parameters	<i>index &lt;value&gt;</i> – This command will display the history log, beginning at 1 and ending at the value specified by the user in the <value> field.  If no parameter is specified, all history log entries will be displayed.
Restrictions	None.

Example usage:

To display the switch history log:

```
DES-3550:4#show log index 5
Command: show log index 5

Index  Time                Log Text
-----  -
5      00000 days 00:01:09    Successful login through Console (Username: Anonymous)
4      00000 days 00:00:14    System started up
3      00000 days 00:00:06    Port 1 link up, 100Mbps FULL duplex
2      00000 days 00:00:01    Spanning Tree Protocol is disabled
1      00000 days 00:06:31    Configuration saved to flash (Username: Anonymous)

DES-3550:4#
```

## enable syslog

Purpose	Used to enable the system log to be sent to a remote host.
Syntax	<b>enable syslog</b>
Description	The <i>enable syslog</i> command enables the system log to be sent to a remote host.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To the syslog function on the Switch:

```
DES-3550:4#enable syslog
Command: enable syslog

Success.

DES-3550:4#
```

**disable syslog**

Purpose	Used to enable the system log to be sent to a remote host.
Syntax	<b>disable syslog</b>
Description	The <b>disable syslog</b> command enables the system log to be sent to a remote host.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable the syslog function on the Switch:

```
DES-3550:4#disable syslog
Command: disable syslog

Success.

DES-3550:4#
```

**show syslog**

Purpose	Used to display the syslog protocol status as enabled or disabled.
Syntax	<b>show syslog</b>
Description	The <b>show syslog</b> command displays the syslog status as enabled or disabled.
Parameters	None.
Restrictions	None.

Example usage:

To display the current status of the syslog function:

```
DES-3550:4#show syslog
Command: show syslog

Syslog Global State: Enabled

DES-3550:4#
```

**create syslog host**

**Purpose** Used to create a new syslog host.

**Syntax** **create syslog host <index 1-4> ipaddress <ipaddr> {severity [informational | warning | all] | facility [local0 | local1 | local2 | local3 | local4 | local5 | local6 | local7] | udp\_port <udp\_port\_number> | state [enable | disable]}**

**Description** The create syslog host command is used to create a new syslog host.

**Parameters** <index 1-4> – Specifies that the command will be applied to an index of hosts. There are four available indexes, numbered 1 through 4.

ipaddress <ipaddr> – Specifies the IP address of the remote host where syslog messages will be sent.

severity – Severity level indicator. These are described in the following:

Bold font indicates that the corresponding severity level is currently supported on the Switch.

Numerical Code	Severity
0	Emergency: system is unusable
1	Alert: action must be taken immediately
2	Critical: critical conditions
3	Error: error conditions
<b>4</b>	<b>Warning: warning conditions</b>
5	Notice: normal but significant condition
<b>6</b>	<b>Informational: informational messages</b>
7	Debug: debug-level messages

informational – Specifies that informational messages will be sent to the remote host. This corresponds to number 6 from the list above.

warning – Specifies that warning messages will be sent to the remote host. This corresponds to number 4 from the list above.

all – Specifies that all of the currently supported syslog messages that are generated by the Switch will be sent to the remote host.

facility – Some of the operating system daemons and processes have been assigned Facility values. Processes and daemons that have not been explicitly assigned a Facility may use any of the "local use" facilities or they may use the "user-level" Facility. Those Facilities that have been designated are shown in the following: Bold font indicates the facility values that the Switch currently supports.

Parameters	Numerical Code	Facility	Numerical Code	Facility
	0	kernel messages	12	NTP subsystem
	1	user-level messages	13	log audit
	2	mail system	14	log alert
	3	system daemons	15	clock daemon
	4	security/authorization messages	<b>16</b>	<b>local use 0 (local0)</b>
	5	messages generated internally by syslog	<b>17</b>	<b>local use 1 (local1)</b>
	6	line printer subsystem	<b>18</b>	<b>local use 2 (local2)</b>
	7	network news subsystem	<b>19</b>	<b>local use 3 (local3)</b>
	8	UUCP subsystem	<b>20</b>	<b>local use 4 (local4)</b>
	9	clock daemon	<b>21</b>	<b>local use 5 (local5)</b>
	10	security authorization messages	<b>22</b>	<b>local use 6 (local6)</b>
	11	FTP daemon	<b>23</b>	<b>local use 7 (local7)</b>



**create syslog host**

Parameters	<p>local0 – Specifies that local use 0 messages will be sent to the remote host. This corresponds to number 16 from the list above.</p> <p>local1 – Specifies that local use 1 messages will be sent to the remote host. This corresponds to number 17 from the list above.</p> <p>local2 – Specifies that local use 2 messages will be sent to the remote host. This corresponds to number 18 from the list above.</p> <p>local3 – Specifies that local use 3 messages will be sent to the remote host. This corresponds to number 19 from the list above.</p> <p>local4 – Specifies that local use 4 messages will be sent to the remote host. This corresponds to number 20 from the list above.</p> <p>local5 – Specifies that local use 5 messages will be sent to the remote host. This corresponds to number 21 from the list above.</p> <p>local6 – Specifies that local use 6 messages will be sent to the remote host. This corresponds to number 22 from the list above.</p> <p>local7 – Specifies that local use 7 messages will be sent to the remote host. This corresponds to number 23 from the list above.</p> <p>udp_port &lt;udp_port_number&gt; – Specifies the UDP port number that the syslog protocol will use to send messages to the remote host.</p> <p>state [enable   disable] – Allows the sending of syslog messages to the remote host, specified above, to be enabled and disabled.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create syslog host:

```

DES-3550:4#create syslog host 1 severity all facility local0
Command: create syslog host 1 severity all facility local0

Success.

DES-3550:4#

```

## config syslog host

Purpose	Used to configure the syslog protocol to send system log data to a remote host.
Syntax	<b>config syslog host</b> [ <b>all</b>   <index 1-4>] {severity [ <b>informational</b>   <b>warning</b>   <b>all</b> ]   <b>facility</b> [ <b>local0</b>   <b>local1</b>   <b>local2</b>   <b>local3</b>   <b>local4</b>   <b>local5</b>   <b>local6</b>   <b>local7</b> ]   <b>udp_port</b> <udp_port_number>   <b>ipaddress</b> <ipaddr>   <b>state</b> [ <b>enable</b>   <b>disable</b> ]}
Description	The <b>config syslog host</b> command is used to configure the syslog protocol to send system log information to a remote host.

Parameters	<p>&lt;index 1-4&gt; – Specifies that the command will be applied to an index of hosts. There are four available indexes, numbered 1 through 4.</p> <p>ipaddress &lt;ipaddr&gt; – Specifies the IP address of the remote host where syslog messages will be sent.</p> <p>severity – Severity level indicator. These are described in the following:</p> <p>Bold font indicates that the corresponding severity level is currently supported on the Switch.</p>
------------	--

Numerical Code	Severity
0	Emergency: system is unusable
1	Alert: action must be taken immediately
2	Critical: critical conditions
3	Error: error conditions
<b>4</b>	<b>Warning: warning conditions</b>
5	Notice: normal but significant condition
<b>6</b>	<b>Informational: informational messages</b>
7	Debug: debug-level messages

*informational* – Specifies that informational messages will be sent to the remote host. This corresponds to number 6 from the list above.

*warning* – Specifies that warning messages will be sent to the remote host. This corresponds to number 4 from the list above.

*all* – Specifies that all of the currently supported syslog messages that are generated by the Switch will be sent to the remote host.

*facility* – Some of the operating system daemons and processes have been assigned Facility values. Processes and daemons that have not been explicitly assigned a Facility may use any of the "local use" facilities or they may use the "user-level" Facility. Those Facilities that have been designated are shown in the following: Bold font indicates the facility values the Switch currently supports.

**config syslog host**

Parameters	Numerical Code	Facility	Numerical Code	Facility
	0	kernel messages	12	NTP subsystem
	1	user-level messages	13	log audit
	2	mail system	14	log alert
	3	system daemons	15	clock daemon
	4	security/authorization messages	16	local use 0 (local0)
	5	messages generated internally by syslog	17	local use 1 (local1)
	6	line printer subsystem	18	local use 2 (local2)
	7	network news subsystem	19	local use 3 (local3)
	8	UUCP subsystem	20	local use 4 (local4)
	9	clock daemon	21	local use 5 (local5)
	10	security authorization messages	22	local use 6 (local6)
	11	FTP daemon	23	local use 7 (local7)

local0 – Specifies that local use 0 messages will be sent to the remote host. This corresponds to number 16 from the list above.

local1 – Specifies that local use 1 messages will be sent to the remote host. This corresponds to number 17 from the list above.

local2 – Specifies that local use 2 messages will be sent to the remote host. This corresponds to number 18 from the list above.

local3 – Specifies that local use 3 messages will be sent to the remote host. This corresponds to number 19 from the list above.

local4 – Specifies that local use 4 messages will be sent to the remote host. This corresponds to number 20 from the list above.

local5 – Specifies that local use 5 messages will be sent to the remote host. This corresponds to number 21 from the list above.

local6 – Specifies that local use 6 messages will be sent to the remote host. This corresponds to number 22 from the list above.

local7 – Specifies that local use 7 messages will be sent to the remote host. This corresponds to number 23 from the list above.

udp\_port <udp\_port\_number> – Specifies the UDP port number that the syslog protocol will use to send messages to the remote host.

state [enable | disable] – Allows the sending of syslog messages to the remote host, specified above, to be enabled and disabled.

Restrictions Only administrator-level users can issue this command.

Example usage:

To configure a syslog host:

```
DES-3550:4#config syslog host 1 severity all facility local0
Command: config syslog host all severity all facility local0
```

```
Success.
```

```
DES-3550:4#
```

Example usage:

To configure a syslog host for all hosts:

```
DES-3550:4#config syslog host all severity all facility local0
Command: config syslog host all severity all facility local0

Success.

DES-3550:4#
```

## delete syslog host

Purpose	Used to remove a syslog host, that has been previously configured, from the Switch.
Syntax	<b>delete syslog host [&lt;index 1-4&gt;   all]</b>
Description	The <i>delete syslog host</i> command is used to remove a syslog host that has been previously configured from the Switch.
Parameters	<p>&lt;index 1-4&gt; – Specifies that the command will be applied to an index of hosts. There are four available indexes, numbered 1 through 4.</p> <p><i>all</i> – Specifies that the command will be applied to all hosts.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete a previously configured syslog host:

```
DES-3550:4#delete syslog host 4
Command: delete syslog host 4

Success.

DES-3550:4#
```

**show syslog host**

Purpose	Used to display the syslog hosts currently configured on the Switch.
Syntax	<b>show syslog host {&lt;index 1-4&gt;}</b>
Description	The <b>show syslog host</b> command is used to display the syslog hosts that are currently configured on the Switch.
Parameters	<index 1-4> – Specifies that the command will be applied to an index of hosts. There are four available indexes, numbered 1 through 4.
Restrictions	None.

Example usage:

To show Syslog host information:

```
DES-3550:4#show syslog host
Command: show syslog host

Syslog Global State: Disabled

Host Id  Host IP Address  Severity  Facility  UDP port  Status
-----  -
1        10.1.1.2         All       Local0    514       Disabled
2        10.40.2.3        All       Local0    514       Disabled
3        10.21.13.1       All       Local0    514       Disabled

Total Entries : 3

DES-3550:4#
```

**config system\_severity**

Purpose	To configure severity level of an alert required for log entry or trap message.
Syntax	<b>config system_severity [trap   log   all] [critical   warning   information]</b>
Description	<p>This command is used to configure the system severity levels on the Switch. When an event occurs on the Switch, a message will be sent to the SNMP agent (trap), the Switch's log or both. Events occurring on the Switch are separated into three main categories, these categories are NOT precisely the same as the parameters of the same name (see below).</p> <ul style="list-style-type: none"> <li>• Information – Events classified as information are basic events occurring on the Switch that are not deemed as problematic, such as enabling or disabling various functions on the Switch.</li> <li>• Warning - Events classified as warning are problematic events that are not critical to the overall function of the Switch but do require attention, such as unsuccessful downloads or uploads and failed logins.</li> <li>• Critical – Events classified as critical are fatal exceptions occurring on the Switch, such as hardware failures or spoofing attacks.</li> </ul>
Parameters	<p>Choose one of the following to identify where severity messages are to be sent.</p> <ul style="list-style-type: none"> <li>• <i>trap</i> – Entering this parameter will define which events occurring on the Switch will be sent to a SNMP agent for analysis.</li> <li>• <i>log</i> – Entering this parameter will define which events occurring on the Switch will be sent to the Switch's log for analysis.</li> <li>• <i>all</i> – Entering this parameter will define which events occurring on the Switch will be sent to a SNMP agent and the Switch's log for analysis.</li> </ul> <p>Choose one of the following to identify what level of severity warnings are to be sent to the destination entered above.</p> <ul style="list-style-type: none"> <li>• <i>critical</i> – Entering this parameter along with the proper destination, stated above, will instruct the Switch to send only critical events to the Switch's log or SNMP agent.</li> <li>• <i>warning</i> – Entering this parameter along with the proper destination, stated above, will instruct the Switch to send critical and warning events to the Switch's log or SNMP agent.</li> <li>• <i>information</i> – Entering this parameter along with the proper destination, stated above, will instruct the switch to send informational, warning and critical events to the Switch's log or SNMP agent.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To log critical warnings and send critical warnings to the SNMP agent:

```
DES-3550:4#config system_severity all critical
```

```
Command: config system_severity all critical
```

```
Success.
```

```
DES-3550:4#
```

## **MULTIPLE SPANNING TREE PROTOCOL (MSTP) COMMANDS**

This Switch supports three versions of the Spanning Tree Protocol; 802.1d STP, 802.1w Rapid STP and 802.1s MSTP. Multiple Spanning Tree Protocol, or MSTP, is a standard defined by the IEEE community that allows multiple VLANs to be mapped to a single spanning tree instance, which will provide multiple pathways across the network. Therefore, these MSTP configurations will balance the traffic load, preventing wide scale disruptions when a single spanning tree instance fails. This will allow for faster convergences of new topologies for the failed instance. Frames designated for these VLANs will be processed quickly and completely throughout interconnected bridges utilizing either of the three spanning tree protocols (STP, RSTP or MSTP). This protocol will also tag BPDU packets so receiving devices can distinguish spanning tree instances, spanning tree regions and the VLANs associated with them. These instances will be classified by an *instance\_id*. MSTP will connect multiple spanning trees with a Common and Internal Spanning Tree (CIST). The CIST will automatically determine each MSTP region, its maximum possible extent and will appear as one virtual bridge that runs a single spanning tree. Consequentially, frames assigned to different VLANs will follow different data routes within administratively established regions on the network, continuing to allow simple and full processing of frames, regardless of administrative errors in defining VLANs and their respective spanning trees. Each switch utilizing the MSTP on a network will have a single MSTP configuration that will have the following three attributes:

- a) A configuration name defined by an alphanumeric string of up to 32 characters (defined in the *config stp mst\_config\_id* command as *name <string>*).
- b) A configuration revision number (named here as a *revision\_level*) and;
- c) A 4096 element table (defined here as a *vid\_range*) which will associate each of the possible 4096 VLANs supported by the Switch for a given instance.

To utilize the MSTP function on the Switch, three steps need to be taken:

- a) The Switch must be set to the MSTP setting (*config stp version*)
- b) The correct spanning tree priority for the MSTP instance must be entered (*config stp priority*).
- c) VLANs that will be shared must be added to the MSTP Instance ID (*config stp instance\_id*).



The Multiple Spanning Tree Protocol commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable stp	
disable stp	
config stp version	[mstp   rstp   stp]
config stp	{maxage <value 6-40>   maxhops <value 1-20>   hellotime <value 1-10>   forwarddelay <value 4-30>   txholdcount <value 1-10>   fbpdu [enable   disable]}
config stp ports	<portlist> {externalCost [auto   <value 1-200000000>]   hellotime <value 1-10>   migrate [yes   no] edge [true   false]   p2p [true   false   auto]   state [enable   disable]   fbpdu [enable disable] }
create stp instance_id	<value 1-4>
config stp instance_id	<value 1-4> [add_vlan   remove_vlan] <vidlist>
delete stp instance_id	<value 1-4>
config stp priority	<value 0-61440> instance_id <value 0-4>
config stp mst_config_id	{revision_level <int 0-65535>   name <string>}
config stp mst_ports	<portlist> instance_id <value 0-4> {internalCost [auto   value 1-200000000]   priority <value 0-240>}
show stp	
show stp ports	{<portlist>}
show stp instance	{<value 0-4>}
show stp mst_config id	

Each command is listed, in detail, in the following sections.

## enable stp

Purpose	Used to globally enable STP on the Switch.
Syntax	<b>enable stp</b>
Description	This command allows the Spanning Tree Protocol to be globally enabled on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable STP, globally, on the Switch:

```
DES-3550:4#enable stp
Command: enable stp

Success.

DES-3550:4#
```

## disable stp

Purpose	Used to globally disable STP on the Switch.
Syntax	<b>disable stp</b>
Description	This command allows the Spanning Tree Protocol to be globally disabled on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable STP on the Switch:

```
DES-3550:4#disable stp
Command: disable stp

Success.

DES-3550:4#
```



**config stp version**

Purpose	Used to globally set the version of STP on the Switch.
Syntax	<b>config stp version [mstp   rstp   stp]</b>
Description	This command allows the user to choose the version of the spanning tree to be implemented on the Switch.
Parameters	<p><i>mstp</i> – Selecting this parameter will set the Multiple Spanning Tree Protocol (MSTP) globally on the Switch.</p> <p><i>rstp</i> - Selecting this parameter will set the Rapid Spanning Tree Protocol (RSTP) globally on the Switch.</p> <p><i>stp</i> - Selecting this parameter will set the Spanning Tree Protocol (STP) globally on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:


To set the Switch globally for the Multiple Spanning Tree Protocol(MSTP):

```
DES-3550:4#config stp version mstp
Command: config stp version mstp

Success.

DES-3550:4#
```

**config stp**

<b>Purpose</b>	Used to setup STP, RSTP and MSTP on the Switch.
<b>Syntax</b>	<b>config stp {maxage &lt;value 6-40&gt;   maxhops &lt;value 1-20&gt;   hellotime &lt;1-10&gt;   forwarddelay &lt;value 4-30&gt;  txholdcount &lt;value 1-10&gt;   fbpdu [enable   disable]}</b>
<b>Description</b>	This command is used to setup the Spanning Tree Protocol (STP) for the entire Switch. All commands here will be implemented for the STP version that is currently set on the Switch.
<b>Parameters</b>	<p><i>maxage</i> &lt;value 6-40&gt; – This value may be set to ensure that old information does not endlessly circulate through redundant paths in the network, preventing the effective propagation of the new information. Set by the Root Bridge, this value will aid in determining that the Switch has spanning tree configuration values consistent with other devices on the bridged LAN. If the value ages out and a BPDU has still not been received from the Root Bridge, the Switch will start sending its own BPDU to all other switches for permission to become the Root Bridge. If it turns out that your switch has the lowest Bridge Identifier, it will become the Root Bridge. The user may choose a time between 6 and 40 seconds. The default value is 20.</p> <p><i>maxhops</i> &lt;value 1-20&gt; - The number of hops between devices in a spanning tree region before the BPDU (bridge protocol data unit) packet sent by the Switch will be discarded. Each switch on the hop count will reduce the hop count by one until the value reaches zero. The Switch will then discard the BPDU packet and the information held for the port will age out. The user may set a hop count from 1 to 20. The default is 20.</p> <p><i>hellotime</i> &lt;value 1-10&gt; – The user may set the time interval between transmission of configuration messages by the root device, thus stating that the Switch is still functioning. A time between 1 and 10 seconds may be chosen, with a default setting of 2 seconds.</p> <p> <b>NOTE:</b> In MSTP, the spanning tree is configured by port and therefore, the <i>hellotime</i> must be set using the <i>configure stp ports</i> command for switches utilizing the Multiple Spanning Tree Protocol.</p> <p><i>forwarddelay</i> &lt;value 4-30&gt; – The maximum amount of time (in seconds) that the root device will wait before changing states. The user may choose a time between 4 and 30 seconds. The default is 15 seconds.</p> <p><i>txholdcount</i> &lt;1-10&gt; - The maximum number of BPDU Hello packets transmitted per interval. Default value = 3.</p> <p><i>fbpdu</i> [enable   disable] – Allows the forwarding of STP BPDU packets from other network devices when STP is disabled on the Switch. The default is <i>enable</i>.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To configure STP with maxage 18 and maxhops of 15:

```
DES-3550:4#config stp maxage 18 maxhops 15
Command: config stp maxage 18 maxhops 15

Success.

DES-3550:4#
```

**config stp ports**

<b>Purpose</b>	Used to setup STP on the port level.
<b>Syntax</b>	<code>config stp ports &lt;portlist&gt; {externalCost [auto   &lt;value 1-200000000&gt;]   hellotime &lt;value 1-10&gt;   migrate [yes   no] edge [true   false]   p2p [true   false   auto]   state [enable   disable]   fbpdudisable [enable disable] }</code>
<b>Description</b>	This command is used to create and configure STP for a group of ports.
<b>Parameters</b>	<p><i>&lt;portlist&gt;</i> – Specifies a range of ports to be configured.</p> <p><i>externalCost</i> – This defines a metric that indicates the relative cost of forwarding packets to the specified port list. Port cost can be set automatically or as a metric value. The default value is <i>auto</i>.</p> <ul style="list-style-type: none"> <li><i>auto</i> – Setting this parameter for the external cost will automatically set the speed for forwarding packets to the specified port(s) in the list for optimal efficiency. Default port cost: 100Mbps port = 200000. Gigabit port = 20000.</li> <li><i>&lt;value 1-200000000&gt;</i> - Define a value between 1 and 200000000 to determine the external cost. The lower the number, the greater the probability the port will be chosen to forward packets.</li> </ul> <p><i>hellotime &lt;value 1-10&gt;</i> – The time interval between transmission of configuration messages by the designated port, to other devices on the bridged LAN, thus stating that the Switch is still functioning. The user may choose a time between 1 and 10 seconds. The default is 2 seconds.</p> <p><i>migrate [yes   no]</i> – Setting this parameter as “yes” will set the ports to send out BPDU packets to other bridges, requesting information on their STP setting. If the Switch is configured for RSTP, the port will be capable to migrate from 802.1d STP to 802.1w RSTP. If the Switch is configured for MSTP, the port is capable of migrating from 802.1d STP to 802.1s MSTP. RSTP and MSTP can coexist with standard STP, however the benefits of RSTP and MSTP are not realized on a port where an 802.1d network connects to an 802.1w or 802.1s enabled network. Migration should be set as <i>yes</i> on ports connected to network stations or segments that are capable of being upgraded to 802.1w RSTP or 802.1s MSTP on all or some portion of the segment.</p> <p><i>edge [true   false]</i> – <i>true</i> designates the port as an edge port. Edge ports cannot create loops, however an edge port can lose edge port status if a topology change creates a potential for a loop. An edge port normally should not receive BPDU packets. If a BPDU packet is received it automatically loses edge port status. <i>false</i> indicates that the port does not have edge port status.</p> <p><i>p2p [true   false   auto]</i> – <i>true</i> indicates a point-to-point (P2P) shared link. P2P ports are similar to edge ports however they are restricted in that a P2P port must operate in full-duplex. Like edge ports, P2P ports transition to a forwarding state rapidly thus benefiting from RSTP. A <i>p2p</i> value of <i>false</i> indicates that the port cannot have <i>p2p</i> status. <i>Auto</i> allows the port to have <i>p2p</i> status whenever possible and operate as if the <i>p2p</i> status were <i>true</i>. If the port cannot maintain this status (for example if the port is forced to half-duplex operation) the <i>p2p</i> status changes to operate as if the <i>p2p</i> value were <i>false</i>. The default setting for this parameter is <i>auto</i>.</p> <p><i>state [enable   disable]</i> – Allows STP to be enabled or disabled for the ports specified in the port list. The default is <i>enable</i>.</p> <p><i>fbpdudisable [enable   disable]</i> – When enabled, this allows the forwarding of STP BPDU packets from other network devices when STP is disabled in the specified ports. If you want to enable Forwarding BPDU on a per port basis, the following settings must first be in effect: 1. STP must be globally disabled and 2. Forwarding BPDU must be globally enabled. To globally disable STP, use the <b>disable stp</b> command, to globally enable <i>fbpdudisable</i>, use the <b>config stp</b> command. The default is <i>disable</i>.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To configure STP with path cost 19, hellotime set to 5 seconds, migration enable, and state enable for ports 1-5 of module 1.

```
DES-3550:4#config stp ports 1-5 externalCost 19 hellotime 5 migrate yes state enable
Command: config stp ports 1-5 externalCost 19 hellotime 5 migrate yes state enable

Success.

DES-3550:4#
```

If you want to enable Forwarding BPDU on a per port basis, the following settings must first be in effect: 1. STP must be globally disabled and 2. Forwarding BPDU must be globally enabled. These are the default settings configurable using the **config stp** command discussed previously.

<b>create stp instance_id</b>	
Purpose	Used to create a STP instance ID for MSTP.
Syntax	<b>create stp instance_id &lt;value 1-4&gt;</b>
Description	This command allows the user to create a STP instance ID for the Multiple Spanning Tree Protocol. There are 5 STP instances on the Switch (one internal CIST, unchangeable) and the user may create up to 4 instance IDs for the Switch.
Parameters	<value 1-4> Enter a value between 1 and 4 to identify the Spanning Tree instance on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:


To create a spanning tree instance 2:

```
DES-3550:4#create stp instance_id 2
Command: create stp instance_id 2

Success.

DES-3550:4#
```

**config stp instance\_id**

Purpose	Used to add or delete an STP instance ID.
Syntax	<b>config stp instance_id &lt;value 1-4&gt; [add_vlan   remove_vlan] &lt;vidlist&gt;</b>
Description	This command is used to map VIDs (VLAN IDs) to previously configured STP instances on the Switch by creating an <i>instance_id</i> . A STP instance may have multiple members with the same MSTP configuration. There is no limit to the number of STP regions in a network but each region only supports a maximum of 5 spanning tree instances (one unchangeable default entry). VIDs can belong to only one spanning tree instance at a time.   <b>NOTE:</b> Switches in the same spanning tree region having the same STP <i>instance_id</i> must be mapped identically, and have the same configuration <i>revision_level</i> number and the same <i>name</i> .
Parameters	<i>&lt;value 1-4&gt;</i> - Enter a number between 1 and 4 to define the <i>instance_id</i> . The switch supports 5 STP regions with one unchangeable default instance ID set as 0.  <i>add_vlan</i> – Along with the <i>vid_range &lt;vidlist&gt;</i> parameter, this command will add VIDs to the previously configured STP <i>instance_id</i> .  <i>remove_vlan</i> - Along with the <i>vid_range &lt;vidlist&gt;</i> parameter, this command will remove VIDs to the previously configured STP <i>instance_id</i> .  <i>&lt;vidlist&gt;</i> - Specify the VID range from configured VLANs set on the Switch. Supported VIDs on the Switch range from ID number 1 to 4094.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure instance id 2 to add VID 10:

```
DES-3550:4#config stp instance_id 2 add_vlan 10
Command : config stp instance_id 2 add_vlan 10

Success.

DES-3550:4#
```

Example usage:

To remove VID 10 from instance id 2:

```
DES-3550:4#config stp instance_id 2 remove_vlan 10
Command : config stp instance_id 2 remove_vlan 10

Success.

DES-3550:4#
```



**delete stp instance\_id**

Purpose	Used to delete a STP instance ID from the Switch.
Syntax	<b>delete stp instance_id &lt;value 1-4&gt;</b>
Description	This command allows the user to delete a previously configured STP instance ID from the Switch.
Parameters	<value 1-4> - Enter a value between 1 and 4 to identify the Spanning Tree instance on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete STP instance ID 2 from the Switch.

```
DES-3550:4#delete stp instance_id 2
```

```
Command: delete stp instance_id 2
```

```
Success.
```

```
DES-3550:4#
```

**config stp priority**

Purpose	Used to update the STP instance configuration
Syntax	<b>config stp priority &lt;value 0-61440&gt; instance_id &lt;value 0-4&gt;</b>
Description	This command is used to update the STP instance configuration settings on the Switch. The MSTP will utilize the priority in selecting the root bridge, root port and designated port. Assigning higher priorities to STP regions will instruct the Switch to give precedence to the selected <i>instance_id</i> for forwarding packets. The lower the priority value set, the higher the priority.
Parameters	<p><i>priority</i> &lt;value 0-61440&gt; - Select a value between 0 and 61440 to specify the priority for a specified instance ID for forwarding packets. The lower the value, the higher the priority. This entry must be divisible by 4094.</p> <p><i>instance_id</i> &lt;value 0-4&gt; - Enter the value corresponding to the previously configured instance ID of which the user wishes to set the priority value. An instance id of 0 denotes the default <i>instance_id</i> (CIST) internally set on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set the priority value for instance\_id 2 as 4096.

```
DES-3550:4#config stp priority 4096 instance_id 2
```

```
Command : config stp priority 4096 instance_id 2
```

```
Success.
```

```
DES-3550:4#
```

### config stp mst\_config\_id

Purpose	Used to update the MSTP configuration identification.
Syntax	<b>config stp mst_config_id {revision_level &lt;int 0-65535&gt;   name &lt;string 32&gt;}</b>
Description	This command will uniquely identify the MSTP configuration currently configured on the Switch. Information entered here will be attached to BPDU packets as an identifier for the MSTP region to which it belongs. Switches having the same <i>revision_level</i> and <i>name</i> will be considered as part of the same MSTP region.
Parameters	<p><i>revision_level</i> &lt;int 0-65535&gt; – Enter a number between 0 and 65535 to identify the MSTP region. This value, along with the name will identify the MSTP region configured on the Switch. The default setting is 0.</p> <p><i>name</i> &lt;string&gt; - Enter an alphanumeric string of up to 32 characters to uniquely identify the MSTP region on the Switch. This <i>name</i>, along with the <i>revision_level</i> value will identify the MSTP region configured on the Switch. If no <i>name</i> is entered, the default name will be the MAC address of the device.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the MSTP region of the Switch with *revision\_level* 10 and the *name* “Trinity”:

```
DES-3550:4#config stp mst_config_id revision_level 10 name Trinity
```

```
Command : config stp mst_config_id revision_level 10 name Trinity
```

```
Success.
```

```
DES-3550:4#
```

## config stp mst\_ports

Purpose	Used to update the port configuration for a MSTP instance.
Syntax	<b>config stp mst_ports &lt;portlist&gt; instance_id &lt;value 0-4&gt; {internalCost [auto   &lt;value 1-2000000&gt;] priority &lt;value 0-240&gt;</b>
Description	This command will update the port configuration for a STP <i>instance_id</i> . If a loop occurs, the MSTP function will use the port priority to select an interface to put into the forwarding state. Set a higher priority value for interfaces to be selected for forwarding first. In instances where the priority value is identical, the MSTP function will implement the lowest MAC address into the forwarding state and other interfaces will be blocked. Remember that lower priority values mean higher priorities for forwarding packets.
Parameters	<p><i>&lt;portlist&gt;</i> - Specifies a port or range of ports to be configured.</p> <p><i>instance_id &lt;value 0-4&gt;</i> - Enter a numerical value between 0 and 4 to identify the <i>instance_id</i> previously configured on the Switch. An entry of 0 will denote the CIST (Common and Internal Spanning Tree).</p> <p><i>internalCost</i> – This parameter is set to represent the relative cost of forwarding packets to specified ports when an interface is selected within a STP instance. The default setting is <i>auto</i>. There are two options:</p> <ul style="list-style-type: none"> <li>• <i>auto</i> – Selecting this parameter for the <i>internalCost</i> will set quickest route automatically and optimally for an interface. The default value is derived from the media speed of the interface.</li> <li>• <i>value 1-2000000</i> – Selecting this parameter with a value in the range of 1-2000000 will set the quickest route when a loop occurs. A lower <i>internalCost</i> represents a quicker transmission.</li> </ul> <p><i>priority &lt;value 0-240&gt;</i> - Enter a value between 0 and 240 to set the priority for the port interface. A higher priority will designate the interface to forward packets first. A lower number denotes a higher priority.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To designate ports 1 through 5, with instance id 2, to have an auto internalCost and a priority of 16:

```
DES-3550:4#config stp mst_config_id ports 1-5 instance_id 2
internalCost auto priority 16
```

```
Command : config stp mst_config_id ports 1-5 instance_id 2
internalCost auto priority 16
```

Success.

```
DES-3550:4#
```

## show stp

Purpose	Used to display the Switch's current STP configuration.
Syntax	<b>show stp</b>
Description	This command displays the Switch's current STP configuration.
Parameters	None
Restrictions	None.

Example usage:

To display the status of STP on the Switch:

**Status 1: STP enabled with STP compatible version**

```
DES-3550:4#show stp
Command: show stp

STP Status           : Enabled
STP Version          : STP Compatible
Max Age               : 20
Hello Time            : 2
Forward Delay        : 15
Max Age               : 20
TX Hold Count        : 3
Forwarding BPDU      : Enabled

DES-3550:4#
```

**Status 2 : STP enabled for RSTP**

```
DES-3550:4#show stp
Command: show stp

STP Status           : Enabled
STP Version          : RSTP
Max Age               : 20
Hello Time            : 2
Forward Delay        : 15
Max Age               : 20
TX Hold Count        : 3
Forwarding BPDU      : Enabled

DES-3550:4#
```

**Status 3 : STP enabled for MSTP**

```
DES-3550:4#show stp
Command: show stp

STP Status           : Enabled
STP Version          : MSTP
Max Age               : 20
Forward Delay        : 15
Max Age               : 20
TX Hold Count        : 3
Forwarding BPDU      : Enabled

DES-3550:4#
```

**show stp ports**

Purpose	Used to display the Switch's current STP ports configuration.
Syntax	<b>show stp ports &lt;portlist&gt;</b>
Description	This command displays the STP ports settings for a specified port or group of ports (one port at a time).
Parameters	<portlist> – Specifies a port or range of ports to be viewed. Information for a single port is displayed. If no ports are specified the STP information for port 1 will be displayed. You may use the Space bar, p and n keys to view information for the remaining ports.
Restrictions	None.

Example usage:

To show STP ports information for port 5 (STP enabled on Switch):

```
DES-3550:4#show stp ports
Command: show stp ports

MSTP Port Information
-----
Port Index      : 5   , Hello Time: 2 /2 , Port STP enabled
External PathCost : Auto/200000 , Edge Port : No /No , P2P : Auto /Yes
Port Forward BPDU disabled

Msti  Designated Bridge  Internal PathCost  Prio  Status  Role
-----
0     8000/0050BA7120D6  200000            128   Forwarding  Root

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

**show stp instance\_id**

Purpose	Used to display the Switch's STP instance configuration
Syntax	<b>show stp instance_id &lt;value 0-4&gt;</b>
Description	This command displays the Switch's current STP Instance Settings and the STP Instance Operational Status.
Parameters	<value 0-4> - Enter a value defining the previously configured <i>instance_id</i> on the Switch. An entry of 0 will display the STP configuration for the CIST internally set on the Switch.
Restrictions	None

Example usage:

To display the STP instance configuration for instance 0 (the internal CIST) on the Switch:

```
DES-3550:4#show stp instance 0
Command: show stp instance 0

STP Instance Settings
-----
Instance Type       : CIST
Instance Status    : Enabled
Instance Priority   : 32768(bridge priority : 32768, sys ID ext : 0 )

STP Instance Operational Status
-----
Designated Root Bridge : 32766/00-90-27-39-78-E2
External Root Cost     : 200012
Regional Root Bridge   : 32768/00-53-13-1A-33-24
Internal Root Cost     : 0
Designated Bridge      : 32768/00-50-BA-71-20-D6
Root Port              : 1
Max Age                : 20
Forward Delay         : 15
Last Topology Change   : 856
Topology Changes Count : 2987

CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

**show stp mst\_config\_id**

Purpose	Used to display the MSTP configuration identification.
Syntax	<b>show stp mst_config_id</b>
Description	This command displays the Switch's current MSTP configuration identification.
Parameters	None
Restrictions	None

Example usage:

To show the MSTP configuration identification currently set on the Switch:

```
DES-3550:4#show stp mst_config_id
Command: show stp mst_config_id

Current MST Configuration Identification
-----

Configuration Name : [00:53:13:1A:33:24 ]    Revision Level :0
MSTI ID   Vid list
-----   -
  CIST    2-4094
    1     1

DES-3526:4#
```



## FORWARDING DATABASE COMMANDS

The layer 2 forwarding database commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
create fdb	<vlan_name 32> <macaddr> port <port>
create multicast_fdb	<vlan_name 32> <macaddr>
config multicast_fdb	<vlan_name 32> <macaddr> [add   delete] <portlist>
config fdb aging_time	<sec 10-1000000>
delete fdb	<vlan_name 32> <macaddr>
clear fdb	[vlan <vlan_name 32>   port <port>   all]
show multicast_fdb	{vlan <vlan_name 32>   mac_address <macaddr>}
show fdb	{port <port>   vlan <vlan_name 32>   mac_address <macaddr>   static   aging_time}
config multicast port_filtering_mode	[<portlist>   all] [forward_all_groups   forward_unregistered_groups   filter_unregistered_groups]
show multicast port_filtering_mode	{<portlist>}

Each command is listed, in detail, in the following sections.

<b>create fdb</b>	
Purpose	Used to create a static entry to the unicast MAC address forwarding table (database).
Syntax	<b>create fdb &lt;vlan_name 32&gt; &lt;macaddr&gt; port &lt;port&gt;</b>
Description	This command will make an entry into the Switch's unicast MAC address forwarding database.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides.</p> <p><i>&lt;macaddr&gt;</i> – The MAC address that will be added to the forwarding table.</p> <p><i>port &lt;port&gt;</i> – The port number corresponding to the MAC destination address. The Switch will always forward traffic to the specified device through this port.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create a unicast MAC FDB entry:

```
DES-3550:4#create fdb default 00-00-00-00-01-02 port 5
Command: create fdb default 00-00-00-00-01-02 port 5

Success.

DES-3550:4#
```

## **create multicast\_fdb**

Purpose	Used to create a static entry to the multicast MAC address forwarding table (database)
Syntax	<b>create multicast_fdb &lt;vlan_name 32&gt; &lt;macaddr&gt;</b>
Description	This command will make an entry into the Switch's multicast MAC address forwarding database.
Parameters	<i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides.  <i>&lt;macaddr&gt;</i> – The MAC address that will be added to the forwarding table.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create multicast MAC forwarding:

```
DES-3550:4#create multicast_fdb default 01-00-00-00-00-01  
Command: create multicast_fdb default 01-00-00-00-00-01  
  
Success.  
  
DES-3550:4#
```

<b>config multicast_fdb</b>	
Purpose	Used to configure the Switch's multicast MAC address forwarding database.
Syntax	<b>config multicast_fdb &lt;vlan_name 32&gt; &lt;macaddr&gt; [add   delete] &lt;portlist&gt;</b>
Description	This command configures the multicast MAC address forwarding table.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides.</p> <p><i>&lt;macaddr&gt;</i> – The MAC address that will be added to the multicast forwarding table.</p> <p><i>[add   delete]</i> – <i>add</i> will add ports to the forwarding table. <i>delete</i> will remove ports from the multicast forwarding table.</p> <p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To add multicast MAC forwarding:

```
DES-3550:4#config multicast_fdb default 01-00-00-00-00-01 add 1-5
Command: config multicast_fdb default 01-00-00-00-00-01 add 1-1-5

Success.

DES-3550:4#
```

<b>config fdb aging_time</b>	
Purpose	Used to set the aging time of the forwarding database.
Syntax	<b>config fdb aging_time &lt;sec 10-1000000&gt;</b>
Description	The aging time affects the learning process of the Switch. Dynamic forwarding table entries, which are made up of the source MAC addresses and their associated port numbers, are deleted from the table if they are not accessed within the aging time. The aging time can be from 10 to 1000000 seconds with a default value of 300 seconds. A very long aging time can result in dynamic forwarding table entries that are out-of-date or no longer exist. This may cause incorrect packet forwarding decisions by the Switch. If the aging time is too short however, many entries may be aged out too soon. This will result in a high percentage of received packets whose source addresses cannot be found in the forwarding table, in which case the Switch will broadcast the packet to all ports, negating many of the benefits of having a switch.
Parameters	<sec 10-1000000> – The aging time for the MAC address forwarding database value. The value in seconds may be between 10 and 1000000 seconds.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set the fdb aging time:

```
DES-3550:4#config fdb aging_time 300
Command: config fdb aging_time 300

Success.

DES-3550:4#
```

**delete fdb**

Purpose	Used to delete an entry to the Switch's forwarding database.
Syntax	<b>delete fdb &lt;vlan_name 32&gt; &lt;macaddr&gt;</b>
Description	This command is used to delete a previous entry to the Switch's MAC address forwarding database.
Parameters	<i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides.  <i>&lt;macaddr&gt;</i> – The MAC address that will be added to the forwarding table.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete a permanent FDB entry:

```
DES-3550:4#delete fdb default 00-00-00-00-01-02
Command: delete fdb default 00-00-00-00-01-02

Success.

DES-3550:4#
```

Example usage:

To delete a multicast fdb entry:

```
DES-3550:4#delete fdb default 01-00-00-00-01-02
Command: delete fdb default 01-00-00-00-01-02

Success.

DES-3550:4#
```

**clear fdb**

Purpose	Used to clear the Switch's forwarding database of all dynamically learned MAC addresses.
Syntax	<b>clear fdb [vlan &lt;vlan_name 32&gt;   port &lt;port&gt;   all]</b>
Description	This command is used to clear dynamically learned entries to the Switch's forwarding database.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides.</p> <p><i>port &lt;port&gt;</i> – The port number corresponding to the MAC destination address. The Switch will always forward traffic to the specified device through this port.</p> <p><i>all</i> – Clears all dynamic entries to the Switch's forwarding database.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To clear all FDB dynamic entries:

```
DES-3550:4#clear fdb all
```

```
Command: clear fdb all
```

```
Success.
```

```
DES-3550:4#
```

**show multicast\_fdb**

Purpose	Used to display the contents of the Switch's multicast forwarding database.
Syntax	<b>show mulitcast_fdb [vlan &lt;vlan_name 32&gt;   mac_address &lt;macaddr&gt;]</b>
Description	This command is used to display the current contents of the Switch's multicast MAC address forwarding database.
Parameters	<p>&lt;vlan_name 32&gt; – The name of the VLAN on which the MAC address resides.</p> <p>&lt;macaddr&gt; – The MAC address that is present in the forwarding database table.</p>
Restrictions	None.

Example usage:

To display multicast MAC address table:

```
DES-3550:4#show multicast_fdb vlan default
Command: show multicast_fdb vlan default

VLAN Name      : default
MAC Address    : 01-00-5E-00-00-00
Egress Ports   : 1-5
Mode           : Static

Total Entries  : 1

DES-3550:4#
```



**show fdb**

Purpose	Used to display the current unicast MAC address forwarding database.
Syntax	<b>show fdb {port &lt;port&gt;   vlan &lt;vlan_name 32&gt;   mac_address &lt;macaddr&gt;   static   aging_time}</b>
Description	This command will display the current contents of the Switch's forwarding database.
Parameters	<i>port &lt;port&gt;</i> – The port number corresponding to the MAC destination address. The Switch will always forward traffic to the specified device through this port. <i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the MAC address resides. <i>&lt;macaddr&gt;</i> – The MAC address that is present in the forwarding database table. <i>static</i> – Displays the static MAC address entries. <i>aging_time</i> – Displays the aging time for the MAC address forwarding database.
Restrictions	None.

Example usage:

To display unicast MAC address table:

```
DES-3550:4#show fdb
Command: show fdb

Unicast MAC Address Aging Time = 300

VID  VLAN Name      MAC Address      Port    Type
----  -
1    default        00-00-39-34-66-9A  10     Dynamic
1    default        00-00-51-43-70-00  10     Dynamic
1    default        00-00-5E-00-01-01  10     Dynamic
1    default        00-00-74-60-72-2D  10     Dynamic
1    default        00-00-81-05-00-80  10     Dynamic
1    default        00-00-81-05-02-00  10     Dynamic
1    default        00-00-81-48-70-01  10     Dynamic
1    default        00-00-E2-4F-57-03  10     Dynamic
1    default        00-00-E2-61-53-18  10     Dynamic
1    default        00-00-E2-6B-BC-F6  10     Dynamic
1    default        00-00-E2-7F-6B-53  10     Dynamic
1    default        00-00-E2-82-7D-90  10     Dynamic
1    default        00-00-F8-7C-1C-29  10     Dynamic
1    default        00-01-02-03-04-00  CPU    Self
1    default        00-01-02-03-04-05  10     Dynamic
1    default        00-01-30-10-2C-C7  10     Dynamic
1    default        00-01-30-FA-5F-00  10     Dynamic
1    default        00-02-3F-63-DD-68  10     Dynamic
CTRL+C ESC q Quit SPACE n Next Page ENTER Next Entry a All
```

**config multicast port\_filtering\_mode**

Purpose	Used to configure the multicast packet filtering mode on a port per port basis.
Syntax	<b>config multicast port_filtering_mode [&lt;portlist&gt;   all] [forward_all_groups   forward_unregistered_groups   filter_unregistered_groups]</b>
Description	This command will configure the multicast packet filtering mode for specified ports on the Switch.
Parameters	<portlist> - Specifies a port or range of ports to view.  [forward_all_groups   forward_unregistered_groups   filter_unregistered_groups] – The user may set the filtering mode to any of these three options
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the multicast filtering mode to forward all groups on ports 1 through 4.

```
DES-3550:4#config multicast port_filtering_mode 1-4
forward_all_groups
Command: config multicast port_filtering_mode 1-4
forward_all_groups

Success.

DES-3550:4#
```

**show multicast port\_filtering\_mode**

Purpose	Used to show the multicast packet filtering mode on a port per port basis.
Syntax	<b>show multicast port_filtering_mode {&lt;portlist&gt;}</b>
Description	This command will display the current multicast packet filtering mode for specified ports on the Switch.
Parameters	<portlist> - Specifies a port or range of ports to view.
Restrictions	None.

Example usage:

To view the multicast port filtering mode for all ports:

```
DES-3550:4#show multicast port_filtering_mode
Command: show multicast port_filtering_mode

Port      Multicast Filter Mode
-----  -----
1         forward_unregistered_groups
2         forward_unregistered_groups
3         forward_unregistered_groups
4         forward_unregistered_groups
5         forward_unregistered_groups
6         forward_unregistered_groups
7         forward_unregistered_groups
8         forward_unregistered_groups
9         forward_unregistered_groups
10        forward_unregistered_groups
11        forward_unregistered_groups
12        forward_unregistered_groups
13        forward_unregistered_groups
14        forward_unregistered_groups
15        forward_unregistered_groups
16        forward_unregistered_groups
17        forward_unregistered_groups
18        forward_unregistered_groups
19        forward_unregistered_groups
20        forward_unregistered_groups
CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

## **BROADCAST STORM CONTROL COMMANDS**

The broadcast storm control commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
config traffic control	[<storm_grouplist>   all ] { broadcast [enable   disable]   multicast [enable   disable]   dlf [enable   disable]   threshold <value 0-255> }
show traffic control	{group_list <storm_grouplist>}

Each command is listed, in detail, in the following sections.

**config traffic control**

Purpose	Used to configure broadcast/multicast traffic control.
Syntax	<b>config traffic control [&lt;storm_grouplist&gt;   all] broadcast [enable   disable]   multicast [enable   disable]   dlf [enable   disable]   threshold &lt;value 0-255&gt;</b>
Description	This command is used to configure broadcast storm control.
Parameters	<p><i>&lt;storm_grouplist&gt;</i> – Used to specify a broadcast storm control group. This is specified by entering the syntax <i>unit_id</i>.</p> <p><i>all</i> – Specifies all broadcast storm control groups on the Switch.</p> <p><i>broadcast [enable   disable]</i> – Enables or disables broadcast storm control.</p> <p><i>multicast [enable   disable]</i> – Enables or disables multicast storm control.</p> <p><i>dlf [enable   disable]</i> – Enables or disables dlf traffic control.</p> <p><i>threshold &lt;value 0-255&gt;</i> – The upper threshold at which the specified traffic control is switched on. The <i>&lt;value&gt;</i> is the number of broadcast/multicast/dlf packets, in Kpps, received by the Switch that will trigger the storm traffic control measures.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure traffic control and enable broadcast storm control system wide:

```
DES-3550:4#config traffic control all broadcast enable
Command: config traffic control all broadcast enable

Success.

DES-3550:4#
```

**show traffic control**

Purpose	Used to display current traffic control settings.
Syntax	<b>show traffic control {group_list &lt;storm_group&gt;}</b>
Description	This command displays the current storm traffic control configuration on the Switch.
Parameters	<i>group_list &lt;storm_group&gt;</i> – Used to specify a broadcast storm control group. This is specified by entering the <i>&lt;storm_group&gt;</i> .
Restrictions	None.

Example usage:

To display traffic control setting:

```
DES-3550:4#show traffic control
Command: show traffic control
Traffic Control

Module  Group [ports]  Threshold  Broadcast Storm  Multicast Storm  Destination Lookup Fail
-----  -
1       1 [ 1-8 ]      128        Disabled         Disabled         Disabled
1       2 [ 9-18 ]     128        Disabled         Disabled         Disabled
1       3 [ 17-24 ]    128        Disabled         Disabled         Disabled
1       4 [ 25 ]       128        Disabled         Disabled         Disabled
1       5 [ 26 ]       128        Disabled         Disabled         Disabled

Total Entries: 5

DES-3550:4#
```

## QoS COMMANDS

The DES-3550 switch supports 802.1p priority queuing. The Switch has 4 priority queues. These priority queues are numbered from 3 (Class 3) — the highest priority queue — to 0 (Class 0) — the lowest priority queue. The eight priority tags specified in IEEE 802.1p (p0 to p7) are mapped to the Switch's priority queues as follows:

- Priority 0 is assigned to the Switch's Q1 queue.
- Priority 1 is assigned to the Switch's Q0 queue.
- Priority 2 is assigned to the Switch's Q0 queue.
- Priority 3 is assigned to the Switch's Q1 queue.
- Priority 4 is assigned to the Switch's Q2 queue.
- Priority 5 is assigned to the Switch's Q2 queue.
- Priority 6 is assigned to the Switch's Q3 queue.
- Priority 7 is assigned to the Switch's Q3 queue.

Priority scheduling is implemented by the priority queues stated above. The Switch will empty the four hardware priority queues in order, beginning with the highest priority queue, 4, to the lowest priority queue, 0. Each hardware queue will transmit all of the packets in its buffer before permitting the next lower priority to transmit its packets. When the lowest hardware priority queue has finished transmitting all of its packets, the highest hardware priority queue will begin transmitting any packets it may have received.

The commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config bandwidth_control	[<portlist>] {rx_rate [no_limit   <value 1-1000>]   tx_rate [no_limit<value 1-1000>]}
show bandwidth_control	<portlist>
config scheduling	<class_id 0-3> {max_packet <value 0-255>   max_latency <value 0-255>}
show scheduling	
config 802.1p user_priority	<priority 0-7> <class_id 0-3>
show 802.1p user_priority	
config 802.1p default_priority	[<portlist>  all ] <priority 0-7>
show 802.1p default_priority	<portlist>

Each command is listed, in detail, in the following sections.



<b>config bandwidth_control</b>	
Purpose	Used to configure bandwidth control on a port by-port basis.
Syntax	<b>config bandwidth_control [&lt;portlist&gt;] {rx_rate [no_limit   &lt;value 1-1000&gt;]   tx_rate [no_limit&lt;value 1-1000&gt;]}</b>
Description	The <i>config bandwidth_control</i> command is used to configure bandwidth on a port by-port basis.
Parameters	<p>&lt;portlist&gt; – Specifies a port or range of ports to be configured.</p> <p><i>rx_rate</i> – Specifies that one of the parameters below (<i>no_limit</i> or &lt;value 1-1000&gt;) will be applied to the rate at which the above specified ports will be allowed to receive packets</p> <ul style="list-style-type: none"> <li>▪ <i>no_limit</i> – Specifies that there will be no limit on the rate of packets received by the above specified ports.</li> <li>▪ &lt;value 1-1000&gt; – Specifies the packet limit, in Mbps, that the above ports will be allowed to receive.</li> </ul> <p><i>tx_rate</i> – Specifies that one of the parameters below (<i>no_limit</i> or &lt;value 1-1000&gt;) will be applied to the rate at which the above specified ports will be allowed to transmit packets.</p> <ul style="list-style-type: none"> <li>▪ <i>no_limit</i> – Specifies that there will be no limit on the rate of packets received by the above specified ports.</li> <li>▪ &lt;value 1-1000&gt; – Specifies the packet limit, in Mbps, that the above ports will be allowed to receive.</li> </ul> <p>The transfer(tx) and receive(rx) rate of packets for Gigabit ports must be configured in a multiple of 8 Mbits. (8, 16, 24...)</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure bandwidth control:

```
DES-3550:4#config bandwidth_control 1-10 tx_rate 10
Command: config bandwidth_control 1-10 tx_rate 10

Success.

DES-3550:4#
```

**show bandwidth\_control**

Purpose	Used to display the bandwidth control table.
Syntax	<b>show bandwidth_control {&lt;portlist&gt;}</b>
Description	The <b>show bandwidth_control</b> command displays the current bandwidth control configuration on the Switch, on a port-by-port basis.
Parameters	<portlist> – Specifies a port or range of ports to be viewed.
Restrictions	None.

Example usage:

To display bandwidth control settings:

```
DES-3550:4#show bandwidth_control 1-10
Command: show bandwidth_control 1-10

Bandwidth Control Table

Port RX Rate (Mbit/sec) TX_RATE (Mbit/sec)
---- -
1    no_limit           10
2    no_limit           10
3    no_limit           10
4    no_limit           10
5    no_limit           10
6    no_limit           10
7    no_limit           10
8    no_limit           10
9    no_limit           10
10   no_limit           10

DES-3550:4#
```

<b>config scheduling</b>	
Purpose	Used to configure the traffic scheduling mechanism for each COS queue.
Syntax	<b>config scheduling &lt;class_id 0-3&gt; [max_packet &lt;value 0-255&gt;   max_latency &lt;value 0-255&gt;]</b>
Description	<p>The Switch contains 4 hardware priority queues. Incoming packets must be mapped to one of these four queues. This command is used to specify the rotation by which these four hardware priority queues are emptied.</p> <p>The Switch's default (if the config scheduling command is not used, or if the config scheduling command is entered with both <i>max_packet</i> and <i>max_latency</i> parameters are set to 0) is to empty the 4 hardware priority queues in order – from the highest priority queue (hardware queue 3) to the lowest priority queue (hardware queue 0). Each hardware queue will transmit all of the packets in its buffer before allowing the next lower priority queue to transmit its packets. When the lowest hardware priority queue has finished transmitting all of its packets, the highest hardware priority queue can again transmit any packets it may have received.</p> <p>The <i>max_packets</i> parameter allows you to specify the maximum number of packets a given hardware priority queue can transmit before allowing the next lowest hardware priority queue to begin transmitting its packets. A value between 0 and 255 can be specified. For example, if a value of 3 is specified, then the highest hardware priority queue (number 3) will be allowed to transmit 3 packets – then the next lowest hardware priority queue (number 2) will be allowed to transmit 3 packets, and so on, until all of the queues have transmitted 3 packets. The process will then repeat.</p> <p>The <i>max_latency</i> parameter allows you to specify the maximum amount of time that packets are delayed before being transmitted to a given hardware priority queue. A value between 0 and 255 can be specified. This number is then multiplied by 16 ms to determine the maximum latency. For example, if 3 is specified, the maximum latency allowed will be 3 X 16 = 48 ms.</p> <p>When the specified hardware priority queue has been waiting to transmit packets for this amount of time, the current queue will finish transmitting its current packet, and then allow the hardware priority queue whose <i>max_latency</i> timer has expired to begin transmitting packets.</p>
Parameters	<p><i>&lt;class_id 0-3&gt;</i> – This specifies which of the four hardware priority queues the <i>config scheduling</i> command will apply to. The four hardware priority queues are identified by number – from 0 to 3 – with the 0 queue being the lowest priority.</p> <p><i>max_packet &lt;value 0-255&gt;</i> – Specifies the maximum number of packets the above specified hardware priority queue will be allowed to transmit before allowing the next lowest priority queue to transmit its packets. A value between 0 and 255 can be specified.</p> <p><i>max_latency &lt;value 0-255&gt;</i> – Specifies the maximum amount of time the above specified hardware priority queue will be allowed to transmit packets before allowing the next lowest hardware priority queue to begin transmitting its packets. A value between 0 and 255 can be specified – with this value multiplied by 16 ms to arrive at the total allowed time for the queue to transmit packets. For example, a value of 3 specifies 3 X 16 = 48 ms. The queue will continue transmitting the last packet until it is finished when the <i>max_latency</i> timer expires.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the traffic scheduling mechanism for each queue:

```
DES-3550:4# config scheduling 0 max_packet 100 max_latency 150
Command: config scheduling 0 max_packet 100 max_latency 150

Success.

DES-3550:4#
```

## show scheduling

Purpose	Used to display the currently configured traffic scheduling on the Switch.
Syntax	<b>show scheduling</b>
Description	The <b>show scheduling</b> command will display the current traffic scheduling mechanisms in use on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To display the current scheduling configuration:

```
DES-3550:4# show scheduling
Command: show scheduling

QOS Output Scheduling

Class ID   MAX. Packets  MAX. Latency
-----
Class-0    100           150
Class-1    99            100
Class-2    91            101
Class-3    21            201

DES-3550:4#
```

**config 802.1p user\_priority**

Purpose	Used to map the 802.1p user priority of an incoming packet to one of the four hardware queues available on the Switch.																											
Syntax	<b>config 802.1p user_priority &lt;priority 0-7&gt; &lt;class_id 0-3&gt;</b>																											
Description	<p>This command allows you to configure the way the Switch will map an incoming packet, based on its 802.1p user priority, to one of the four available hardware priority queues on the Switch.</p> <p>The Switch's default is to map the following incoming 802.1p user priority values to the four hardware priority queues:</p> <table border="1"> <thead> <tr> <th>802.1p</th> <th>Hardware Queue</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>1</td> <td>Mid-low</td> </tr> <tr> <td>1</td> <td>0</td> <td>Lowest</td> </tr> <tr> <td>2</td> <td>0</td> <td>Lowest</td> </tr> <tr> <td>3</td> <td>1</td> <td>Mid-low</td> </tr> <tr> <td>4</td> <td>2</td> <td>Mid-high</td> </tr> <tr> <td>5</td> <td>2</td> <td>Mid-high</td> </tr> <tr> <td>6</td> <td>3</td> <td>Highest</td> </tr> <tr> <td>7</td> <td>3</td> <td>Highest.</td> </tr> </tbody> </table> <p>This mapping scheme is based upon recommendations contained in IEEE 802.1D.</p> <p>You can change this mapping by specifying the 802.1p user priority you want to go to the &lt;class_id 0-3&gt; (the number of the hardware queue).</p> <p>&lt;priority 0-7&gt; – The 802.1p user priority you want to associate with the &lt;class_id 0-3&gt; (the number of the hardware queue) with.</p> <p>&lt;class_id 0-3&gt; – The number of the Switch's hardware priority queue. The Switch has four hardware priority queues available. They are numbered between 0 (the lowest priority) and 3 (the highest priority).</p>	802.1p	Hardware Queue	Remark	0	1	Mid-low	1	0	Lowest	2	0	Lowest	3	1	Mid-low	4	2	Mid-high	5	2	Mid-high	6	3	Highest	7	3	Highest.
802.1p	Hardware Queue	Remark																										
0	1	Mid-low																										
1	0	Lowest																										
2	0	Lowest																										
3	1	Mid-low																										
4	2	Mid-high																										
5	2	Mid-high																										
6	3	Highest																										
7	3	Highest.																										
Restrictions	Only administrator-level users can issue this command.																											

Example usage:

To configure 802.1p user priority on the Switch:

```
DES-3550:4# config 802.1p user_priority 1 3
Command: config 802.1p user_priority 1 3

Success.

DES-3550:4#
```

**show 802.1p user\_priority**

Purpose	Used to display the current mapping between an incoming packet's 802.1p priority value and one of the Switch's four hardware priority queues.
Syntax	<b>show 802.1p user_priority</b>
Description	The <i>show 802.1p user_priority</i> command displays the current mapping of an incoming packet's 802.1p priority value to one of the Switch's four hardware priority queues.
Parameters	None.
Restrictions	None.

Example usage:

To show 802.1p user priority:

```
DES-3550:4# show 802.1p user_priority
Command: show 802.1p user_priority

QOS Class of Traffic

Priority-0 -> <Class-1>
Priority-1 -> <Class-0>
Priority-2 -> <Class-0>
Priority-3 -> <Class-1>
Priority-4 -> <Class-2>
Priority-5 -> <Class-2>
Priority-6 -> <Class-3>
Priority-7 -> <Class-3>

DES-3550:4#
```

**config 802.1p default\_priority**

Purpose	Used to configure the 802.1p default priority settings on the Switch. If an untagged packet is received by the Switch, the priority configured with this command will be written to the packet's priority field.
Syntax	<b>config 802.1p default_priority [&lt;portlist&gt;   all] &lt;priority 0-7&gt;</b>
Description	This command allows you to specify default priority handling of untagged packets received by the Switch. The priority value entered with this command will be used to determine which of the four hardware priority queues the packet is forwarded to.
Parameters	<p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p> <p><i>all</i> – Specifies that the command applies to all ports on the Switch.</p> <p><i>&lt;priority 0-7&gt;</i> – The priority value you want to assign to untagged packets received by the Switch or a range of ports on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure 802.1p default priority on the Switch:

```
DES-3550:4#config 802.1p default_priority all 5
Command: config 802.1p default_priority all 5

Success.

DES-3550:4#
```

**show 802.1p default\_priority**

Purpose	Used to display the currently configured 802.1p priority value that will be assigned to an incoming, untagged packet before being forwarded to its destination.
Syntax	<b>show 802.1p default_priority {&lt;portlist&gt;}</b>
Description	The <b>show 802.1p default_priority</b> command displays the currently configured 802.1p priority value that will be assigned to an incoming, untagged packet before being forwarded to its destination.
Parameters	<portlist> – Specifies a port or range of ports to be configured.
Restrictions	None.

Example usage:

To display the current 802.1p default priority configuration on the Switch:

```
DES-3550:4# show 802.1p default_priority
Command: show 802.1p default_priority

Port   Priority
-----
1       0
2       0
3       0
4       0
5       0
6       0
7       0
8       0
9       0
10      0
11      0
12      0
13      0
14      0
15      0
16      0
17      0
18      0
19      0
20      0
21      0
22      0
CTRL+C | ESC | q Quit | SPACE | n Next Page | Enter Next Entry | a All
```



---

## ***PORT MIRRORING COMMANDS***

The port mirroring commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
config mirror port	<port> [add   delete] source ports <portlist> [rx   tx   both]
enable mirror	
disable mirror	
show mirror	

Each command is listed, in detail, in the following sections.

**config mirror port**

Purpose	Used to configure a mirror port – source port pair on the Switch. Traffic from any source port to a target port can be mirrored for real-time analysis. A logic analyzer or an RMON probe can then be attached to study the traffic crossing the source port in a completely obtrusive manner.
Syntax	<b>config mirror port &lt;port&gt; [add   delete] source ports &lt;portlist&gt; [rx   tx   both]</b>
Description	This command allows a range of ports to have all of their traffic also sent to a designated port, where a network sniffer or other device can monitor the network traffic. In addition, you can specify that only traffic received by or sent by one or both is mirrored to the Target port.
Parameters	<p><i>&lt;port&gt;</i> – This specifies the Target port (the port where mirrored packets will be received). The target port must be configured in the same VLAN and must be operating at the same speed as the source port. If the target port is operating at a lower speed, the source port will be forced to drop its operating speed to match that of the target port.</p> <p><i>[add   delete]</i> – Specifies if the user wishes to add or delete ports to be mirrored that are specified in the <i>source ports</i> parameter.</p> <p><i>source ports</i> – The port or ports being mirrored. This cannot include the Target port.</p> <p><i>&lt;portlist&gt;</i> – This specifies a port or range of ports that will be mirrored. That is, the range of ports in which all traffic will be copied and sent to the Target port.</p> <p><i>rx</i> – Allows the mirroring of only packets received by (flowing into) the port or ports in the port list.</p> <p><i>tx</i> – Allows the mirroring of only packets sent to (flowing out of) the port or ports in the port list.</p> <p><i>both</i> – Mirrors all the packets received or sent by the port or ports in the port list.</p>
Restrictions	The Target port cannot be listed as a source port. Only administrator-level users can issue this command.

Example usage:

To add the mirroring ports:

```
DES-3550:4# config mirror port 1 add source ports 2-7 both
Command: config mirror port 1 add source ports 2-7 both

Success.

DES-3550:4#
```

Example usage:

To delete the mirroring ports:

```
DES-3550:4#config mirror port 1 delete source port 2-4
Command: config mirror 1 delete source 2-4

Success.

DES-3550:4#
```

### enable mirror

Purpose	Used to enable a previously entered port mirroring configuration.
Syntax	<b>enable mirror</b>
Description	This command, combined with <i>the disable mirror</i> command below, allows you to enter a port mirroring configuration into the Switch, and then turn the port mirroring on and off without having to modify the port mirroring configuration.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable mirroring configurations:

```
DES-3550:4#enable mirror
Command: enable mirror

Success.

DES-3550:4#
```

## **disable mirror**

Purpose	Used to disable a previously entered port mirroring configuration.
Syntax	<b>disable mirror</b>
Description	This command, combined with <i>the enable mirror</i> command above, allows you to enter a port mirroring configuration into the Switch, and then turn the port mirroring on and off without having to modify the port mirroring configuration.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable mirroring configurations:

```
DES-3550:4#disable mirror  
Command: disable mirror  
  
Success.  
  
DES-3550:4#
```

## show mirror

Purpose	Used to show the current port mirroring configuration on the Switch.
Syntax	<b>show mirror</b>
Description	This command displays the current port mirroring configuration on the Switch.
Parameters	None
Restrictions	None.

Example usage:

To display mirroring configuration:

```
DES-3550:4#show mirror
Command: show mirror

Current Settings
Mirror Status : Enabled
Target Port   : 1
Mirrored Port :
              RX :
              TX : 5-7

DES-3550:4#
```

**VLAN COMMANDS**

The VLAN commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
create vlan	<vlan_name 32> {tag <vlanid 1-4094>   advertisement}
delete vlan	<vlan_name 32>
config vlan	<vlan_name 32> {[add [tagged   untagged   forbidden]   delete] <portlist>   advertisement [enable   disable]}
config gvrp	[<portlist>   all] {state [enable   disable]   ingress_checking [enable   disable]   acceptable_frame [tagged_only   admit_all]   pvid <vlanid 1-4094>}
enable gvrp	
disable gvrp	
show vlan	<vlan_name 32>
show gvrp	<portlist>

Each command is listed, in detail, in the following sections.

**create vlan**

Purpose	Used to create a VLAN on the Switch.
Syntax	<b>create vlan &lt;vlan_name 32&gt; {tag &lt;vlanid 1-4094&gt;   advertisement}</b>
Description	This command allows you to create a VLAN on the Switch.
Parameters	<p>&lt;vlan_name 32&gt; – The name of the VLAN to be created.</p> <p>&lt;vlanid 1-4094&gt; – The VLAN ID of the VLAN to be created. Allowed values = 1-4094</p> <p><i>advertisement</i> – Specifies that the VLAN is able to join GVRP. If this parameter is not set, the VLAN cannot be configured to have forbidden ports.</p>
Restrictions	Each VLAN name can be up to 32 characters. If the VLAN is not given a tag, it will be a port-based VLAN. Only administrator-level users can issue this command.

Example usage:

To create a VLAN v1, tag 2:

```
DES-3550:4#create vlan v1 tag 2
Command: create vlan v1 tag 2

Success.

DES-3550:4#
```

## delete vlan

Purpose	Used to delete a previously configured VLAN on the Switch.
Syntax	<b>delete vlan &lt;vlan_name 32&gt;</b>
Description	This command will delete a previously configured VLAN on the Switch.
Parameters	<vlan_name 32> – The VLAN name of the VLAN you want to delete.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To remove the vlan “v1”:

```
DES-3550:4#delete vlan v1
Command: delete vlan v1

Success.

DES-3550:4#
```



**config vlan**

Purpose	Used to add additional ports to a previously configured VLAN.
Syntax	<b>config vlan &lt;vlan_name 32&gt; {[add [tagged   untagged   forbidden]   delete] &lt;portlist&gt;   advertisement [enable   disable]}</b>
Description	This command allows you to add ports to the port list of a previously configured VLAN. You can specify the additional ports as tagging, untagging, or forbidden. The default is to assign the ports as untagging.
Parameters	<p><b>&lt;vlan_name 32&gt;</b> – The name of the VLAN you want to add ports to.</p> <p><b>add</b> – Entering the add parameter will add ports to the VLAN. There are three types of ports to add:</p> <ul style="list-style-type: none"> <li>• <i>tagged</i> – Specifies the additional ports as tagged.</li> <li>• <i>untagged</i> – Specifies the additional ports as untagged.</li> <li>• <i>forbidden</i> – Specifies the additional ports as forbidden</li> </ul> <p><b>delete</b> – Deletes ports from the specified VLAN.</p> <p><b>&lt;portlist&gt;</b> – A port or range of ports to add to, or delete from the specified VLAN.</p> <p><b>advertisement [enable   disable]</b> – Enables or disables GVRP on the specified VLAN.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To add 4 through 8 as tagged ports to the VLAN v1:

```
DES-3550:4#config vlan v1 add tagged 4-8
```

```
Command: config vlan v1 add tagged 4-8
```

```
Success.
```

```
DES-3550:4#
```

To delete ports from a VLAN:

```
DES-3550:4#config vlan v1 delete 6-8
```

```
Command: config vlan v1 delete 6-8
```

```
Success.
```

```
DES-3550:4#
```

## config gvrp

Purpose	Used to configure GVRP on the Switch.
Syntax	<b>config gvrp</b> [ <i>&lt;portlist&gt;</i>   <b>all</b> ] { <b>state</b> [ <b>enable</b>   <b>disable</b> ]   <b>ingress_checking</b> [ <b>enable</b>   <b>disable</b> ]   <b>acceptable_frame</b> [ <b>tagged_only</b>   <b>admit_all</b> ]   <b>pvid</b> <i>&lt;vlanid 1-4094&gt;</i> }
Description	This command is used to configure the Group VLAN Registration Protocol on the Switch. You can configure ingress checking, the sending and receiving of GVRP information, and the Port VLAN ID (PVID).
Parameters	<p><i>&lt;portlist&gt;</i> – A port or range of ports for which you want to enable GVRP for.</p> <p><i>all</i> – Specifies all of the ports on the Switch.</p> <p><i>state</i> [<b>enable</b>   <b>disable</b>] – Enables or disables GVRP for the ports specified in the port list.</p> <p><i>ingress_checking</i> [<b>enable</b>   <b>disable</b>] – Enables or disables ingress checking for the specified port list.</p> <p><i>acceptable_frame</i> [<b>tagged_only</b>   <b>admit_all</b>] – This parameter states the frame type that will be accepted by the Switch for this function. <i>tagged_only</i> implies that only VLAN tagged frames will be accepted, while <i>admit_all</i> implies tagged and untagged frames will be accepted by the Switch.</p> <p><i>pvid</i> <i>&lt;vlanid 1-4094&gt;</i> – Specifies the default VLAN associated with the port.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set the ingress checking status, the sending and receiving GVRP information :

```
DES-3550:4#config gvrp 1-4 state enable ingress_checking enable  
acceptable_frame tagged_only pvid 2
```

```
Command: config gvrp 1-4 state enable ingress_checking enable  
acceptable_frame tagged_only pvid 2
```

```
Success.
```

```
DES-3550:4#
```

## enable gvrp

Purpose	Used to enable GVRP on the Switch.
Syntax	<b>enable gvrp</b>
Description	This command, along with <i>disable gvrp</i> below, is used to enable and disable GVRP on the Switch, without changing the GVRP configuration on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable the generic VLAN Registration Protocol (GVRP):

```
DES-3550:4#enable gvrp
```

```
Command: enable gvrp
```

```
Success.
```

```
DES-3550:4#
```

**disable gvrp**

Purpose	Used to disable GVRP on the Switch.
Syntax	<b>disable gvrp</b>
Description	This command, along with <i>enable gvrp</i> , is used to enable and disable GVRP on the Switch, without changing the GVRP configuration on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable the Generic VLAN Registration Protocol (GVRP):

```
DES-3550:4#disable gvrp
```

```
Command: disable gvrp
```

```
Success.
```

```
DES-3550:4#
```

**show vlan**

Purpose	Used to display the current VLAN configuration on the Switch
Syntax	<b>show vlan {&lt;vlan_name 32&gt;}</b>
Description	This command displays summary information about each VLAN including the VLAN ID, VLAN name, the Tagging/Untagging status, and the Member/Non-member/Forbidden status of each port that is a member of the VLAN.
Parameters	<vlan_name 32> – The VLAN name of the VLAN for which you want to display a summary of settings.
Restrictions	None.

Example usage:

To display the Switch's current VLAN settings:

```
DES-3550:4#show vlan
Command: show vlan

VID          : 1          VLAN Name    : default
VLAN TYPE    : static    Advertisement : Enabled
Member ports : 1,5-50
Static ports  : 1,5-50
Current Untagged ports : 1,5-50
Static Untagged ports  : 1,5-50
Forbidden ports :

VID          : 4094       VLAN Name    : Trinity
VLAN TYPE    : static    Advertisement : Enabled
Member ports : 2-4
Static ports  : 2-4
Current Untagged ports : 2-4
Static Untagged ports  : 2-4
Forbidden ports :

Total Entries : 2

DES-3550:4#
```

**show gvrp**

Purpose	Used to display the GVRP status for a port list on the Switch.
Syntax	<b>show gvrp {&lt;portlist&gt;}</b>
Description	This command displays the GVRP status for a port list on the Switch
Parameters	<portlist> – Specifies a port or range of ports for which the GVRP status is to be displayed.
Restrictions	None.

Example usage:

To display GVRP port status:

```
DES-3550:4#show gvrp
Command: show gvrp

Global GVRP : Disabled

Port    PVID    GVRP      Ingress Checking  Acceptable Frame Type
-----  ---
1       1       Disabled  Enabled           All Frames
2       1       Disabled  Enabled           All Frames
3       1       Disabled  Enabled           All Frames
4       1       Disabled  Enabled           All Frames
5       1       Disabled  Enabled           All Frames
6       1       Disabled  Enabled           All Frames
7       1       Disabled  Enabled           All Frames
8       1       Disabled  Enabled           All Frames
9       1       Disabled  Enabled           All Frames
10      1       Disabled  Enabled           All Frames
11      1       Disabled  Enabled           All Frames
12      1       Disabled  Enabled           All Frames
13      1       Disabled  Enabled           All Frames
14      1       Disabled  Enabled           All Frames
15      1       Disabled  Enabled           All Frames
16      1       Disabled  Enabled           All Frames
17      1       Disabled  Enabled           All Frames
18      1       Disabled  Enabled           All Frames
CTRL+C ESC q Quit SPACE n Next Page Enter Next Entry a All
```

## ASYMMETRIC VLAN COMMANDS

The asymmetric VLAN commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable asymmetric_vlan	
disable asymmetric_vlan	
show asymmetric_vlan	

Each command is listed, in detail, in the following sections.

### **enable asymmetric\_vlan**

Purpose	Used to enable the asymmetric VLAN function on the Switch.
Syntax	<b>enable asymmetric_vlan</b>
Description	This command enables the asymmetric VLAN function on the Switch
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable asymmetric VLANs:

```
DES-3550:4#enable asymmetric_vlan
Command: enable asymmetric_vlan

Success.

DES-3550:4#
```

### **disable asymmetric\_vlan**

Purpose	Used to disable the asymmetric VLAN function on the Switch.
Syntax	<b>disable asymmetric_vlan</b>
Description	This command disables the asymmetric VLAN function on the Switch
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable asymmetric VLANs:

```
DES-3550:4#disable asymmetric_vlan
Command: disable asymmetric_vlan

Success.

DES-3550:4#
```



## **show asymmetric\_vlan**

Purpose	Used to view the asymmetric VLAN state on the Switch.
Syntax	<b>show asymmetric_vlan</b>
Description	This command displays the asymmetric VLAN state on the Switch
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display the asymmetric VLAN state currently set on the Switch:

```
DES-3550:4#show asymmetric_vlan
Command: show asymmetric_vlan

Asymmetric Vlan: Enabled

DES-3550:4#
```

## LINK AGGREGATION COMMANDS

The link aggregation commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
create link_aggregation	group_id <value 1-6> {type [lacp   static]}
delete link_aggregation	group_id <value 1-6>
config link_aggregation	group_id <value 1-6> {master_port <port>   ports <portlist> state [enable   disable]}
config link_aggregation algorithm	[mac_source   mac_destination   mac_source_dest   ip_source   ip_destination   ip_source_dest]
show link_aggregation	{group_id <value 1-6>   algorithm}
config lacp_port	<portlist> mode [active   passive]
show lacp_port	{<portlist>}

Each command is listed, in detail, in the following sections.

**create link\_aggregation**

Purpose	Used to create a link aggregation group on the Switch.
Syntax	<b>create link_aggregation group_id &lt;value 1-6&gt; {type [lacp   static]}</b>
Description	This command will create a link aggregation group with a unique identifier.
Parameters	<p>&lt;value 1-6&gt; – Specifies the group ID. The Switch allows up to 6 link aggregation groups to be configured. The group number identifies each of the groups.</p> <p><i>type</i> – Specify the type of link aggregation used for the group. If the type is not specified the default type is <i>static</i>.</p> <ul style="list-style-type: none"> <li>• <i>lacp</i> – This designates the port group as LACP compliant. LACP allows dynamic adjustment to the aggregated port group. LACP compliant ports may be further configured (see config lacp_ports). LACP compliant must be connected to LACP compliant devices.</li> <li>• <i>static</i> – This designates the aggregated port group as static. Static port groups can not be changed as easily as LACP compliant port groups since both linked devices must be manually configured if the configuration of the trunked group is changed. If static link aggregation is used, be sure that both ends of the connection are properly configured and that all ports have the same speed/duplex settings.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create a link aggregation group:

```
DES-3550:4#create link_aggregation group_id 1
Command: create link_aggregation group_id 1

Success.

DES-3550:4#
```

## **delete link\_aggregation group\_id**

Purpose	Used to delete a previously configured link aggregation group.
Syntax	<b>delete link_aggregation group_id &lt;value 1-6&gt;</b>
Description	This command is used to delete a previously configured link aggregation group.
Parameters	<value 1-6> – Specifies the group ID. The Switch allows up to 6 link aggregation groups to be configured. The group number identifies each of the groups.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete link aggregation group:

```
DES-3550:4#delete link_aggregation group_id 6
Command: delete link_aggregation group_id 6

Success.

DES-3550:4#
```

**config link\_aggregation**

Purpose	Used to configure a previously created link aggregation group.
Syntax	<b>config link_aggregation group_id &lt;value 1-6&gt; {master_port &lt;port&gt;   ports &lt;portlist&gt;   state [enable   disable]}</b>
Description	This command allows you to configure a link aggregation group that was created with the <i>create link_aggregation</i> command above. The DES-3550 supports link_aggregation cross box which specifies that link aggregation groups may be spread over multiple switches in the switching stack.
Parameters	<p><i>group_id</i> &lt;value 1-6&gt; – Specifies the group ID. The Switch allows up to 6 link aggregation groups to be configured. The group number identifies each of the groups.</p> <p><i>master_port</i> &lt;port&gt; – Master port ID. Specifies which port (by port number) of the link aggregation group will be the master port. All of the ports in a link aggregation group will share the port configuration with the master port.</p> <p><i>ports</i> &lt;portlist&gt; – Specifies a port or range of ports that will belong to the link aggregation group.</p> <p><i>state</i> [enable   disable] – Allows you to enable or disable the specified link aggregation group.</p>
Restrictions	Only administrator-level users can issue this command. Link aggregation groups may not overlap.

Example usage:

To define a load-sharing group of ports, group-id 1, master port 5 with group members ports 5-7 plus port 9:

```
DES-3550:4#config link_aggregation group_id 1 master_port 1 ports 5-7, 9
Command: config link_aggregation group_id 1 master_port 1 ports 5-7, 9

Success.

DES-3550:4#
```

**config link\_aggregation algorithm**

Purpose	Used to configure the link aggregation algorithm.
Syntax	<b>config link_aggregation algorithm [mac_source   mac_destination   mac_source_dest   ip_source   ip_destination   ip_source_dest]</b>
Description	This command configures the part of the packet examined by the Switch when selecting the egress port for transmitting load-sharing data. This feature is only available using the address-based load-sharing algorithm.
Parameters	<p><i>mac_source</i> – Indicates that the Switch should examine the MAC source address.</p> <p><i>mac_destination</i> – Indicates that the Switch should examine the MAC destination address.</p> <p><i>mac_source_dest</i> – Indicates that the Switch should examine the MAC source and destination addresses</p> <p><i>ip_source</i> – Indicates that the Switch should examine the IP source address.</p> <p><i>ip_destination</i> – Indicates that the Switch should examine the IP destination address.</p> <p><i>ip_source_dest</i> – Indicates that the Switch should examine the IP source address and the destination address.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure link aggregation algorithm for mac-source-dest:

```
DES-3550:4#config link_aggregation algorithm mac_source_dest
Command: config link_aggregation algorithm mac_source_dest

Success.

DES-3550:4#
```

**show link\_aggregation**

Purpose	Used to display the current link aggregation configuration on the Switch.
Syntax	<b>show link_aggregation {group_id &lt;value 1-6&gt;   algorithm}</b>
Description	This command will display the current link aggregation configuration of the Switch.
Parameters	<p>&lt;value 1-6&gt; – Specifies the group ID. The Switch allows up to 6 link aggregation groups to be configured. The group number identifies each of the groups.</p> <p><i>algorithm</i> – Allows you to specify the display of link aggregation by the algorithm in use by that group.</p>
Restrictions	None.

Example usage:

To display Link Aggregation configuration:

```
DES-3550:4#show link_aggregation
Command: show link_aggregation

Link Aggregation Algorithm = MAC-source-dest

Group ID      : 1
Master Port   : 1
Member Port   : 5-10
Active Port   :
Status        : Disabled
Flooding Port : 5

DES-3550:4#
```

**config lacp\_ports**

Purpose	Used to configure settings for LACP compliant ports.
Syntax	<b>config lacp_ports &lt;portlist&gt; mode [active   passive]</b>
Description	This command is used to configure ports that have been previously designated as LACP ports (see <i>create link_aggregation</i> ).
Parameters	<p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p> <p><i>mode</i> – Select the mode to determine if LACP ports will process LACP control frames.</p> <ul style="list-style-type: none"> <li>• <i>active</i> – Active LACP ports are capable of processing and sending LACP control frames. This allows LACP compliant devices to negotiate the aggregated link so the group may be changed dynamically as needs require. In order to utilize the ability to change an aggregated port group, that is, to add or subtract ports from the group, at least one of the participating devices must designate LACP ports as active. Both devices must support LACP.</li> <li>• <i>passive</i> – LACP ports that are designated as passive cannot process LACP control frames. In order to allow the linked port group to negotiate adjustments and make changes dynamically, at one end of the connection must have “active” LACP ports (see above).</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure LACP port mode settings:

```
DES-3550:4#config lacp_port 1-12 mode active
Command: config lacp_port 1-12 mode active

Success.

DES-3550:4#
```



**show lacp\_port**

Purpose	Used to display current LACP port mode settings.
Syntax	<b>show lacp_port {&lt;portlist&gt;}</b>
Description	This command will display the LACP mode settings as they are currently configured.
Parameters	<i>&lt;portlist&gt;</i> - Specifies a port or range of ports to be configured.  If no parameter is specified, the system will display the current LACP status for all ports.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display LACP port mode settings:

```
DES-3550:4#show lacp_port 1-10
```

```
Command: show lacp_port 1-10
```

```
Port   Activity
```

```
-----
```

```
1      Active
```

```
2      Active
```

```
3      Active
```

```
4      Active
```

```
5      Active
```

```
6      Active
```

```
7      Active
```

```
8      Active
```

```
9      Active
```

```
10     Active
```

```
DES-3550:4#
```

**BASIC IP COMMANDS**

The IP interface commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
config ipif	<ipif_name 12> [{ipaddress <network_address>   vlan <vlan_name 32>  state [enable   disable]} bootp   dhcp]
show ipif	<ipif_name 12>

Each command is listed, in detail, in the following sections.

**config ipif**

Purpose	Used to configure the System IP interface.
Syntax	<b>config ipif &lt;ipif_name 12&gt; [{ ipaddress &lt;network_address&gt; [ vlan &lt;vlan_name 32&gt;   state [enable   disable]]   bootp   dhcp]</b>
Description	This command is used to configure the System IP interface on the Switch.
Parameters	<p><i>&lt;ipif_name 12&gt;</i> - Enter an alphanumeric string of up to 12 characters to identify this IP interface.</p> <p><i>ipaddress &lt;network_address&gt;</i> – IP address and netmask of the IP interface to be created. You can specify the address and mask information using the traditional format (for example, 10.1.2.3/255.0.0.0 or in CIDR format, 10.1.2.3/8).</p> <p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN corresponding to the System IP interface.</p> <p><i>state [enable   disable]</i> – Allows you to enable or disable the IP interface.</p> <p><i>bootp</i> – Allows the selection of the BOOTP protocol for the assignment of an IP address to the Switch's System IP interface.</p> <p><i>dhcp</i> – Allows the selection of the DHCP protocol for the assignment of an IP address to the Switch's System IP interface.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the IP interface System:

```
DES-3550:4#config ipif System ipaddress 10.48.74.122/8
Command: config ipif System ipaddress 10.48.74.122/8

Success.

DES-3550:4#
```

## show ipif

Purpose	Used to display the configuration of an IP interface on the Switch.
Syntax	<b>show ipif &lt;ipif_name 12&gt;</b>
Description	This command will display the configuration of an IP interface on the Switch.
Parameters	<ipif_name 12> – The name created for the IP interface.
Restrictions	None.

Example usage:

To display IP interface settings.

```
DES-3550:4#show ipif System
Command: show ipif System

IP Interface Settings

Interface Name : System
IP Address    : 10.48.74.122 (MANUAL)
Subnet Mask   : 255.0.0.0
VLAN Name     : default
Admin. State  : Disabled
Link Status   : Link UP
Member Ports  : 1-26

Total Entries : 1

DES-3550:4#
```

**IGMP SNOOPING COMMANDS**

The IGMP Snooping commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
config igmp_snooping	[<vlan_name 32>   all] {host_timeout <sec 1-16711450>   router_timeout < sec 1-16711450>   leave_timer <sec 0-16711450>   state [enable   disable]}
config igmp_snooping querier	[<vlan_name 32>   all] {query_interval <sec 1-65535>   max_response_time <sec 1-25>   robustness_variable <value 1-255>   last_member_query_interval <sec 1-25>   state [enable   disable]}
config router_ports	<vlan_name 32> [add   delete] <portlist>
enable igmp snooping	forward_mcrouter_only
show igmp snooping	vlan <vlan_name 32>
disable igmp snooping	
show igmp snooping group	vlan <vlan_name 32>
show router ports	{vlan <vlan_name 32>} {static   dynamic   forbidden}
show igmp_snooping forwarding	{vlan<vlan_name 32>}
show igmp_snooping group	{vlan<vlan_name 32>}

Each command is listed, in detail, in the following sections.

<b>config igmp_snooping</b>	
Purpose	Used to configure IGMP snooping on the Switch.
Syntax	<b>config igmp_snooping [&lt;vlan_name 32&gt;   all] {host_timeout &lt;sec 1-16711450&gt;   router_timeout &lt;sec 1-16711450&gt;   leave_timer &lt;sec 0-16711450&gt;   state [enable   disable]}</b>
Description	This command allows you to configure IGMP snooping on the Switch.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN for which IGMP snooping is to be configured.</p> <p><i>host_timeout &lt;sec 1-16711450&gt;</i> – Specifies the maximum amount of time a host can be a member of a multicast group without the Switch receiving a host membership report. The default is 260 seconds.</p> <p><i>router_timeout &lt;sec 1-16711450&gt;</i> – Specifies the maximum amount of time a route can be a member of a multicast group without the Switch receiving a host membership report. The default is 260 seconds.</p> <p><i>leave_timer &lt;sec 1-16711450&gt;</i> – Specifies the amount of time a Multicast address will stay in the database before it is deleted, after it has sent out a leave group message. An entry of zero (0) specifies an immediate deletion of the Multicast address. The default is 2 seconds.</p> <p><i>state [enable   disable]</i> – Allows you to enable or disable IGMP snooping for the specified VLAN.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure IGMP snooping:

```
DES-3550:4#config igmp_snooping default host_timeout 250 state
enable
Command: config igmp_snooping default host_timeout 250 state
enable

Success.

DES-3550:4#
```

**config igmp\_snooping querier**

Purpose	This command configures IGMP snooping querier.
Syntax	<b>config igmp_snooping querier</b> [ <i>&lt;vlan_name 32&gt;</i>   <b>all</b> ] { <i>query_interval &lt;sec 1-65535&gt;</i>   <i>max_response_time &lt;sec 1-25&gt;</i>   <i>robustness_variable &lt;value 1-255&gt;</i>   <i>last_member_query_interval &lt;sec 1-25&gt;</i>   <b>state</b> [ <b>enable</b>   <b>disable</b> ]}
Description	Used to configure the time in seconds between general query transmissions, the maximum time in seconds to wait for reports from members and the permitted packet loss that guarantees IGMP snooping.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN for which IGMP snooping querier is to be configured.</p> <p><i>query_interval &lt;sec 1-65535&gt;</i> – Specifies the amount of time in seconds between general query transmissions. The default setting is 125 seconds.</p> <p><i>max_response_time &lt;sec 1-25&gt;</i> – Specifies the maximum time in seconds to wait for reports from members. The default setting is 10 seconds.</p> <p><i>robustness_variable &lt;value 1-255&gt;</i> – Provides fine-tuning to allow for expected packet loss on a subnet. The value of the robustness variable is used in calculating the following IGMP message intervals:</p> <ul style="list-style-type: none"> <li>• Group member interval — Amount of time that must pass before a multicast router decides there are no more members of a group on a network. This interval is calculated as follows: (robustness variable x query interval) + (1 x query response interval).</li> <li>• Other querier present interval — Amount of time that must pass before a multicast router decides that there is no longer another multicast router that is the querier. This interval is calculated as follows: (robustness variable x query interval) + (0.5 x query response interval).</li> <li>• Last member query count — Number of group-specific queries sent before the router assumes there are no local members of a group. The default number is the value of the robustness variable.</li> <li>• By default, the robustness variable is set to 2. You might want to increase this value if you expect a subnet to be lossy. Although 1 is specified as a valid entry, the robustness variable should not be one or problems may arise.</li> </ul> <p><i>last_member_query_interval &lt;sec 1-25&gt;</i> – The maximum amount of time between group-specific query messages, including those sent in response to leave-group messages. You might lower this interval to reduce the amount of time it takes a router to detect the loss of the last member of a group.</p> <p><b>state</b> [<b>enable</b>   <b>disable</b>] – Allows the Switch to be specified as an IGMP Querier or Non-querier.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure IGMP snooping:

```
DES-3550:4#config igmp_snooping querier default query_interval 125 state enable
Command: config igmp_snooping querier default query_interval 125 state enable

Success.

DES-3550:4#
```

### config router\_ports

Purpose	Used to configure ports as router ports.
Syntax	<b>config router_ports &lt;vlan_name 32&gt; [add   delete] &lt;portlist&gt;</b>
Description	This command allows you to designate a range of ports as being connected to multicast-enabled routers. This will ensure that all packets with such a router as its destination will reach the multicast-enabled router – regardless of protocol, etc.
Parameters	<p><i>&lt;vlan_name 32&gt;</i> – The name of the VLAN on which the router port resides.</p> <p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports that will be configured as router ports.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set up static router ports:

```
DES-3550:4#config router_ports default add 1-10
Command: config router_ports default add 1-10

Success.

DES-3550:4#
```



**enable igmp\_snooping**

Purpose	Used to enable IGMP snooping on the Switch.
Syntax	<b>enable igmp_snooping {forward_mcrouter_only}</b>
Description	This command allows you to enable IGMP snooping on the Switch. If <i>forward_mcrouter_only</i> is specified, the Switch will only forward all multicast traffic to the multicast router, only. Otherwise, the Switch forwards all multicast traffic to any IP router.
Parameters	<i>forward_mcrouter_only</i> – Specifies that the Switch should only forward all multicast traffic to a multicast-enabled router. Otherwise, the Switch will forward all multicast traffic to any IP router.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable IGMP snooping on the Switch:

```
DES-3550:4#enable igmp_snooping
Command: enable igmp_snooping

Success.

DES-3550:4#
```

**disable igmp\_snooping**

Purpose	Used to enable IGMP snooping on the Switch.
Syntax	<b>disable igmp_snooping {forward_mcrouter_only}</b>
Description	This command disables IGMP snooping on the Switch. IGMP snooping can be disabled only if IP multicast routing is not being used. Disabling IGMP snooping allows all IGMP and IP multicast traffic to flood within a given IP interface.
Parameters	<i>forward_mcrouter_only</i> – Adding this parameter to this command will disable forwarding all multicast traffic to a multicast-enabled routers. The Switch will then forward all multicast traffic to any IP router.  Entering this command without the parameter will disable igmp snooping on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable IGMP snooping on the Switch:

```
DES-3550:4#disable igmp_snooping
Command: disable igmp_snooping

Success.

DES-3550:4#
```

Example usage:

To disable forwarding all multicast traffic to a multicast-enabled router:

```
DES-3550:4#disable igmp_snooping forward_mcrouter_only
Command: disable igmp_snooping forward_mcrouter_only

Success.

DES-3550:4#
```

**show igmp\_snooping**

Purpose	Used to show the current status of IGMP snooping on the Switch.
Syntax	<b>show igmp_snooping {vlan &lt;vlan_name 32&gt;}</b>
Description	This command will display the current IGMP snooping configuration on the Switch.
Parameters	<vlan_name 32> – The name of the VLAN to view the IGMP snooping configuration for.
Restrictions	None.

Example usage:

To show IGMP snooping:

```
DES-3550:4#show igmp_snooping
Command: show igmp_snooping

IGMP Snooping Global State : Disabled
Multicast router Only      : Disabled

VLAN Name                   : default
Query Interval              : 125
Max Response Time          : 10
Robustness Value           : 2
Last Member Query Interval : 1
Host Timeout               : 260
Route Timeout              : 260
Leave Timer                 : 2
Querier State              : Disabled
Querier Router Behavior    : Non-Querier
State                      : Disabled

VLAN Name                   : vlan2
Query Interval              : 125
Max Response Time          : 10
Robustness Value           : 2
Last Member Query Interval : 1
Host Timeout               : 260
Route Timeout              : 260
Leave Timer                 : 2
Querier State              : Disabled
Querier Router Behavior    : Non-Querier
State                      : Disabled

Total Entries: 2
DES-3550:4#
```

**show igmp\_snooping group**

Purpose	Used to display the current IGMP snooping group configuration on the Switch.
Syntax	<b>show igmp_snooping group {vlan &lt;vlan_name 32&gt;}</b>
Description	This command will display the current IGMP snooping group configuration on the Switch.
Parameters	<vlan_name 32> – The name of the VLAN for which to view IGMP snooping group configuration information.
Restrictions	None.

Example usage:

To show IGMP snooping group:

```
DES-3550:4#show igmp_snooping group
Command: show igmp_snooping group

VLAN Name      : default
Multicast group: 224.0.0.2
MAC address    : 01-00-5E-00-00-02
Reports       : 1
Port Member    : 2,5

VLAN Name      : default
Multicast group: 224.0.0.9
MAC address    : 01-00-5E-00-00-09
Reports       : 1
Port Member    : 6,8

VLAN Name      : default
Multicast group: 234.5.6.7
MAC address    : 01-00-5E-05-06-07
Reports       : 1
Port Member    : 4,10

VLAN Name      : default
Multicast group: 236.54.63.75
MAC address    : 01-00-5E-36-3F-4B
Reports       : 1
Port Member    : 18,22

VLAN Name      : default
Multicast group: 239.255.255.250
MAC address    : 01-00-5E-7F-FF-FA
Reports       : 2
Port Member    : 9,19

VLAN Name      : default
Multicast group: 239.255.255.254
MAC address    : 01-00-5E-7F-FF-FE
Reports       : 1
Port Member    : 13,17

Total Entries  : 6
DES-3550:4#
```

**show router\_ports**

Purpose	Used to display the currently configured router ports on the Switch.
Syntax	<b>show router_ports {vlan &lt;vlan_name 32&gt;} {static   dynamic}</b>
Description	This command will display the router ports currently configured on the Switch.
Parameters	<p>&lt;vlan_name 32&gt; – The name of the VLAN on which the router port resides.</p> <p><i>static</i> – Displays router ports that have been statically configured.</p> <p><i>dynamic</i> – Displays router ports that have been dynamically configured.</p>
Restrictions	None.

Example usage:

To display the router ports.

```
DES-3550:4#show router_ports
Command: show router_ports

VLAN Name       : default
Static router port : 1-2,10
Dynamic router port :

Total Entries: 1

DES-3550:4#
```

**show igmp\_snooping forwarding**

Purpose	Used to display the IGMP snooping forwarding table entries on the Switch.
Syntax	<b>show igmp_snooping forwarding {vlan &lt;vlan_name 32&gt;}</b>
Description	This command will display the current IGMP snooping forwarding table entries currently configured on the Switch.
Parameters	<vlan_name 32> – The name of the VLAN for which to view IGMP snooping forwarding table information.
Restrictions	None.

Example usage:

To view the IGMP snooping forwarding table for VLAN “Trinity”:

```
DES-3550:4#show igmp_snooping forwarding vlan Trinity
Command: show igmp_snooping forwarding vlan Trinity

VLAN Name      : Trinity
Multicast group : 224.0.0.2
MAC address    : 01-00-5E-00-00-02
Port Member    : 17

Total Entries: 1

DES-3550:4#
```

**show igmp\_snooping group**

Purpose	Used to display the current IGMP snooping configuration on the Switch.
Syntax	<b>show igmp_snooping group {vlan &lt;vlan_name 32&gt;}</b>
Description	This command will display the current IGMP setup currently configured on the Switch.
Parameters	<vlan_name 32> – The name of the VLAN for which to view IGMP snooping group information.
Restrictions	None.

Example usage:

To view the current IGMP snooping group:

```
DES-3550:4#show igmp_snooping group
Command: show igmp_snooping group

VLAN Name      : default
Multicast group : 224.0.0.2
MAC address    : 01-00-5E-00-00-02
Reports       : 1
Port Member    : 2,4

VLAN Name      : default
Multicast group : 224.0.0.9
MAC address    : 01-00-5E-00-00-09
Reports       : 1
Port Member    : 6,8

VLAN Name      : default
Multicast group : 234.5.6.7
MAC address    : 01-00-5E-05-06-07
Reports       : 1
Port Member    : 10,12

VLAN Name      : default
Multicast group : 236.54.63.75
MAC address    : 01-00-5E-36-3F-4B
Reports       : 1
Port Member    : 14,16

VLAN Name      : default
Multicast group : 239.255.255.250
MAC address    : 01-00-5E-7F-FF-FA
Reports       : 2
Port Member    : 18,20

VLAN Name      : default
Multicast group : 239.255.255.254
MAC address    : 01-00-5E-7F-FF-FE
Reports       : 1
Port Member    : 22,24

Total Entries : 6

DES-3550:4#
```

## LIMITED IP MULTICAST ADDRESS

The Limited IP Multicast command allows the administrator to permit or deny access to a port or range of ports by specifying a range of multicast addresses. The Limited IP Multicast Commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config limited multicast address	<portlist> { from <multicast_ipaddr> to <multicast_ipaddr> access [ permit   deny ]   state [enable   disable ] }
delete limited multicast address	[ all   <portlist> ]
show limited multicast address	{ <portlist> }



**config limited multicast address**

Purpose	Used to configure limited IP multicast address range.
Syntax	<b>config limited multicast address &lt;portlist&gt; {from &lt;multicast_ipaddr&gt; to &lt;multicast_ipaddr&gt; access [permit   deny]   state [enable   disable]}</b>
Description	The config limited multicast address command allows the user to configure the multicast address range, access level, and state.
Parameters	<p><i>&lt;portlist&gt;</i> A port or range of ports to config the limited multicast address.</p> <p><i>from</i> Enter the lowest multicast IP address of the range.</p> <p><i>to</i> Enter the highest multicast IP address of the range.</p> <p><i>access</i> Use the access field to either <i>permit</i> or <i>deny</i> to limit or grant access to a specified range of Multicast addresses on a particular port or range of ports.</p> <p><i>state</i> This parameter allows the user to <i>enable</i> or <i>disable</i> the limited multicast address range on a specific port or range of ports.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the limited multicast address on ports 1-3:

```
DES-3550:4#config limited multicast address 1-3 from 224.1.1.1 to 224.1.1.2 access permit state enable
```

```
Command: config limited multicast address 1-3 from 224.1.1.1 to 224.1.1.2 access permit state enable
```

```
Success.
```

```
DES-3550:4#
```

**delete limited multicast address**

Purpose	Used to delete Limited IP multicast address range.
Syntax	<b>delete limited multicast address [all   &lt;portlist&gt;]</b>
Description	The delete limited multicast address command allows the user to delete all multicast address ranges or a selected range based on what port or ports the range has been assigned to.
Parameters	<i>all</i> Allows the user to delete all limited multicast addresses that have been configured on the Switch.  <portlist> allows the user to delete only those multicast address ranges that have been assigned to a particular port or range of ports.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the limited multicast address on ports 1-3:

```
DES-3550:4#delete limited multicast address 1-3
Command: delete limited multicast address 1-3

Success.

DES-3550:4#
```

**show limited multicast address**

Purpose	Used to show per-port Limited IP multicast address range.
Syntax	<b>show limited multicast address {&lt;portlist&gt;}</b>
Description	The show limited multicast address command allows you to show multicat address range by ports.
Parameters	<portlist> A port or range of ports on which the limited multicast address range to be shown has been assigned.
Restrictions	None.

Example usage:

To show the limited multicast address on ports 1-3:

```
DES-3550:4#show limited multicast address 1-3
Command: show limited multicast address 1-3

Port From      To      Access  Status
-----
1  224.1.1.1    224.1.1.2    permit  enable
2  224.1.1.1    224.1.1.2    permit  enable
3  224.1.1.1    224.1.1.2    permit  enable

DES-3550:4#
```

**DHCP RELAY**

The Switch can setup as a DHCP relay agent. A DHCP relay agent extends the reach of a DHCP server so that it is not necessary to use multiple DHCP servers to accommodate multiple IP subnets. As a relay agent, the Switch does not manage IP addresses. It relays DHCP requests on behalf of clients located on a local subnet to a remote or centralized DHCP server.

An additional feature has been created to further aid in local management of the IP addresses. Option 82 is used by the relay agent to insert additional information into the client's DHCP request. This information can be used to implement policies intended to improve security and efficiency.

For simplicity, references to DHCP include BOOTP, i.e. DHCP requests are treated identically to BOOTP requests for the DHCP relay agent.

The DHCP relay commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config dhcp_relay	{hops <value 1-16>   time <sec 0-65535>} [add   delete] ipif <ipif_name 12> <ipaddr>
config dhcp_relay option_82	{state [enable   disable]   check [enable   disable]   policy [replace   drop   keep] }
show dhcp_relay	{ ipif <ipif_name 12> }
enable dhcp_relay	
disable dhcp_relay	

Each command is listed in detail in the following sections.

**config dhcp\_relay**

Purpose	Used to configure the DHCP/BOOTP relay feature of the Switch.
Syntax	<b>config dhcp_relay { hops &lt;value 1-16&gt;   time &lt;sec 0-65535&gt; } [ add   delete ] ipif &lt;ipif_name 12&gt; &lt;ipaddr&gt;</b>
Description	This command is used to configure Switch to act as a DHCP or BOOTP relay agent, that is, a third-party agent that transfers BOOTP and DHCP messages between clients and servers residing on different subnets; and add or remove specified DHCP or BOOTP servers to/from the list of recipients.
Parameters	<p>hops &lt;value 1-16&gt; - Specifies the maximum number of router hops allowed for DHCP or BOOTP packets. Default is 4.</p> <p>time &lt;sec 0-65535&gt; - This is used to make a forwarding decision. When a DHCP/BOOTP client sends a request, information is inserted regarding the time (in seconds) elapsed since that client began booting up. This information is read by the Switch. The Switch forwards a DHCP request if the time elapsed is equal to or greater than the time parameter entered here. If the elapsed time is less, the DHCP request is dropped. The default value = 0, so the default setting requires the Switch to forward all DHCP requests. Entering a value greater than zero here can be used to provide redundancy or backup in order to forward a DHCP request from a client that is not normally served by the Switch.</p> <p>add – This adds the DHCP or BOOTP server specified by IP interface name (ipif) and IP address to the list used</p> <p>delete – This deletes a previous addition to the DHCP relay list of eligible servers.</p> <p>ipif – Specifies that a IP interface is named for the DHCP server for the relay list.</p> <p>&lt;ipif_name 12&gt; The name of the IP interface in which DHCP relay is to be enabled.</p> <p>&lt;ipaddr&gt; The DHCP or BOOTP server IP address.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure DHCP relay hops and timeout:

```
DES-3550:4#config dhcp_relay hops 2 time 23
Command: config dhcp_relay hops 2 time 23

Success.

DES-3550:4#
```

To add an IP destination to the DHCP relay table:

```
DES-3550:4#config dhcp_relay add ipif System 10.58.44.6
Command: config dhcp_relay add ipif System 10.58.44.6

Success.

DES-3550:4#
```

**config dhcp\_relay option\_82**

Purpose	Used to configure the DHCP relay agent option 82 of the Switch.
Syntax	<b>config dhcp_relay option_82 {state [enable   disable]   check [enable   disable]   policy [replace   drop   keep] }</b>
Description	This command is used to configure the use of the Relay Agent Information Option or option 82 as defined in RFC 3046.
Parameters	<p><i>state</i> – Used to specify use of Option 82 as described in RFC 3046. When enabled, information is inserted into the DHCP request forwarded by the relay agent (the Switch) to the DHCP/BOOTP server. The inserted information may be used by the DHCP server for policy implementation such as restrictions applied to IP address assignment. The DHCP server responds with a unicast reply to the forwarded request back to the Switch. Upon reception, the Switch verifies the option 82 data and removes it from the option 82 field before forwarding it to the port where the initial request originated.</p> <p><i>enable</i> - When the option 82 state is enabled the relay agent will insert and remove DHCP relay information (option 82 field) in messages between DHCP server and client.</p> <p><i>disable</i>- This will disable the option 82 state if it has previously been enabled.</p> <p><i>check</i> – Used to specify a validity check of the option 82 field when enabled. If the option 82 field is determined invalid the DHCP request is dropped.</p> <p><i>enable</i> – If the option 82 check is enabled, a validity check is applied to the option 82 field.</p> <p><i>disable</i> - This will disable the option 82 check if it has previously been enabled.</p> <p><i>policy</i> - Used to specify a policy implementation in the option 82 field when enabled. The policy instructions are one of the following:</p> <p><i>replace</i>- The option 82 field will be replaced if the option 82 field already exists in the packet received from the DHCP client.</p> <p><i>drop</i>- The packet will be dropped if the option 82 field already exists in the packet received from the DHCP client.</p> <p><i>keep</i>- The option 82 field will be retained if the option 82 field already exists in the packet received from the DHCP client.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure DHCP relay option 82 state:

```
DES-3550:4#config dhcp_relay option_82 state enable
Command: config dhcp_relay option_82 state enable

Success.

DES-3550:4#
```

To configure DHCP relay option 82 check:

```
DES-3550:4#config dhcp_relay option_82 check enable
Command: config dhcp_relay option_82 check enable

Success.

DES-3550:4#
```

To configure DHCP relay option 82 policy:

```
DES-3550:4#config dhcp_relay option_82 policy replace
Command: config dhcp_relay option_82 policy replace

Success.

DES-3550:4#
```



**show dhcp\_relay**

Purpose	Used to display the current DHCP/BOOTP relay configuration.
Syntax	<b>show dhcp_relay {ipif &lt;ipif_name 12&gt;}</b>
Description	This command will display the current DHCP relay configuration for the Switch, or if an IP interface name is specified, the DHCP relay configuration for that IP interface.
Parameters	<i>ipif &lt;ipif_name 12&gt;</i> The name of the IP interface for which to display the current DHCP relay configuration.
Restrictions	None.

Example usage:

To show the DHCP relay configuration:

```
DES-3550:4#show dhcp_relay
Command: show dhcp_relay

DHCP/BOOTP Relay Status           : Enabled
DHCP/BOOTP Hops Count Limit       : 2
DHCP/BOOTP Relay Time Threshold   : 23
DHCP Relay Agent Information Option 82 State : Enabled
DHCP Relay Agent Information Option 82 Check : Enabled
DHCP Relay Agent Information Option 82 Policy : Replace

Interface  Server 1      Server 2      Server 3      Server 4
-----
System     10.58.44.6

DES-3550:4#
```

Example usage:

To show a single IP destination of the DHCP relay configuration:

```
DES-3550:4#show dhcp_relay ipif System
Command: show dhcp_relay ipif System

Interface  Server 1      Server 2      Server 3      Server 4
-----
System     10.58.44.6

DES-3550:4#
```

## enable dhcp\_relay

Purpose	Used to enable the DHCP/BOOTP relay function on the switch.
Syntax	enable dhcp_relay
Description	This command is used to enable the DHCP/BOOTP relay function on the switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable DHCP relay:

```
DES-3550:4#enable dhcp_relay
Command: enable dhcp_relay

Success.

DES-3550:4#
```

## **disable dhcp\_relay**

Purpose	Used to disable the DHCP/BOOTP relay function on the switch.
Syntax	<b>disable dhcp_relay</b>
Description	This command is used to disable the DHCP/BOOTP relay function on the switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable DHCP relay:

```
DES-3550:4#disable dhcp_relay
Command: disable dhcp_relay

Success.

DES-3550:4#
```

**802.1X COMMANDS**

The DES-3550 implements the server-side of the IEEE 802.1x Port-based and MAC-based Network Access Control. This mechanism is intended to allow only authorized users, or other network devices, access to network resources by establishing criteria for each port on the Switch that a user or network device must meet before allowing that port to forward or receive frames.

Command	Parameters
enable 802.1x	
disable 802.1x	
show 802.1x auth_state	{ports <portlist>}
show 802.1x auth_configuration	{ports <portlist>}
config 802.1x capability ports	[<portlist>   all] [authenticator   none]
config 802.1x auth_parameter ports	[<portlist>   all] [default   {direction [both   in]   port_control [force_unauth   auto   force_auth]   quiet_period <sec 0-65535>   tx_period <sec 1-65535>   supp_timeout <sec 1-65535>   server_timeout <sec 1-65535>   max_req <value 1-10>   reauth_period <sec 1-65535>   enable_reauth [enable   disable]}]
config 802.1x auth_protocol	[radius eap   radius pap]
config 802.1x init	{port_based ports [<portlist>   all]   mac_based [ports] [<portlist>  all] {mac_address <macaddr>}}
config 802.1x auth_mode	[port_based   mac_based]
config 802.1x reauth	{port_based ports [<portlist>   all]   mac_based [ports] [<portlist>  all] {mac_address <macaddr>}}
config radius add	<server_index 1-3> <server_ip> key <passwd 32> [default   {auth_port <udp_port_number 1-65535>   acct_port <udp_port_number 1-65535>}]
config radius delete	<server_index 1-3>
config radius	<server_index 1-3> {ipaddress <server_ip>   key <passwd 32> [auth_port <udp_port_number 1-65535> acct_port <udp_port_number 1-65535>}]
show radius	

Each command is listed, in detail, in the following sections.

**enable 802.1x**

Purpose	Used to enable the 802.1x server on the Switch.
Syntax	<b>enable 802.1x</b>
Description	The <b>enable 802.1x</b> command enables the 802.1x Network Access control server application on the Switch. To select between port-based or MAC-based, use the <b>config 802.1x auth_mode</b> command.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable 802.1x switch wide:

```
DES-3550:4#enable 802.1x
Command: enable 802.1x

Success.

DES-3550:4#
```

**disable 802.1x**

Purpose	Used to disable the 802.1x server on the Switch.
Syntax	<b>disable 802.1x</b>
Description	The <b>disable 802.1x</b> command is used to disable the 802.1x Network Access control server application on the Switch. To select between port-based or MAC-based, use the <b>config 802.1x auth_mode</b> command.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable 802.1x on the Switch:

```
DES-3550:4#disable 802.1x
Command: disable 802.1x

Success.

DES-3550:4#
```

**show 802.1x auth\_configuration**

Purpose	Used to display the current configuration of the 802.1x server on the Switch.
Syntax	<b>show 802.1x auth_configuration {ports &lt;portlist&gt;}</b>
Description	The <b>show 802.1x user</b> command is used to display the 802.1x Port-based or MAC-based Network Access control local users currently configured on the Switch.
Parameters	<p><i>ports &lt;portlist&gt;</i> – Specifies a port or range of ports to view.</p> <p>The following details are displayed:</p> <p>802.1x Enabled / Disabled – Shows the current status of 802.1x functions on the Switch.</p> <p>Authentication Mode – Shows the authentication mode, whether it be by MAC address or by port.</p> <p>Authentication Protocol: Radius_Eap – Shows the authentication protocol suite in use between the Switch and a RADIUS server. May read <i>Radius_Eap</i> or <i>Radius_Pap</i>.</p> <p>Port number – Shows the physical port number on the Switch.</p> <p>Capability: Authenticator None – Shows the capability of 802.1x functions on the port number displayed above. There are two 802.1x capabilities that can be set on the Switch: Authenticator and None.</p> <p>AdminCtlDir: Both / In – Shows whether a controlled Port that is unauthorized will exert control over communication in both receiving and transmitting directions, or just the receiving direction.</p> <p>OpenCtlDir: Both / In – Shows whether a controlled Port that is unauthorized will exert control over communication in both receiving and transmitting directions, or just the receiving direction.</p> <p>Port Control: ForceAuth / ForceUnauth / Auto – Shows the administrative control over the port's authorization status. ForceAuth forces the Authenticator of the port to become Authorized. ForceUnauth forces the port to become Unauthorized.</p> <p>QuietPeriod – Shows the time interval between authentication failure and the start of a new authentication attempt.</p> <p>TxPeriod – Shows the time to wait for a response from a supplicant (user) to send EAP Request / Identity packets.</p> <p>SuppTimeout – Shows the time to wait for a response from a supplicant (user) for all EAP packets, except for the Request / Identity packets.</p> <p>ServerTimeout – Shows the length of time to wait for a response from a Radius server.</p> <p>MaxReq – Shows the maximum number of times to retry sending packets to the supplicant.</p> <p>ReAuthPeriod – Shows the time interval between successive re-authentications.</p> <p>ReAuthenticate: Enabled / Disabled – Shows whether or not to re-authenticate.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display the 802.1x authentication states:

```
DES-3550:4#show 802.1x auth_configuration ports 1
Command: show 802.1x auth_configuration ports 1

802.1X           : Enabled
Authentication Mode   : Port_based
Authentication Protocol : Radius_Eap

Port number       : 1
Capability        : None
AdminCrIDir      : Both
OpenCrIDir       : Both
Port Control      : Auto
QuietPeriod      : 60  sec
TxPeriod         : 30  sec
SuppTimeout      : 30  sec
ServerTimeout    : 30  sec
MaxReq           : 2   times
ReAuthPeriod     : 3600 sec
ReAuthenticate    : Disabled

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```

**show 802.1x auth\_state**

Purpose	Used to display the current authentication state of the 802.1x server on the Switch.
Syntax	<b>show 802.1x auth_state {ports &lt;portlist&gt;}</b>
Description	The show 802.1x auth_state command is used to display the current authentication state of the 802.1x Port-based and MAC-based Network Access Control server application on the Switch.
Parameters	<p><i>ports &lt;portlist&gt;</i> – Specifies a port or range of ports to be viewed.</p> <p>The following details what is displayed:</p> <p>Port number – Shows the physical port number on the Switch.</p> <p>Auth PAE State: Initialize / Disconnected / Connecting / Authenticating / Authenticated / Held / ForceAuth / ForceUnauth – Shows the current state of the Authenticator PAE.</p> <p>Backend State: Request / Response / Fail / Idle / Initialize / Success / Timeout – Shows the current state of the Backend Authenticator.</p> <p>Port Status: Authorized / Unauthorized – Shows the result of the authentication process. Authorized means that the user was authenticated, and can access the network. Unauthorized means that the user was not authenticated, and cannot access the network.</p>
Restrictions	Only administrator-level users can issue this command.



Example usage:

To display the 802.1x auth state for Port-based 802.1x:

```
DES-3550:4#show 802.1x auth_state
Command: show 802.1x auth_state
```

Port	Auth PAE State	Backend State	Port Status
1	ForceAuth	Success	Authorized
2	ForceAuth	Success	Authorized
3	ForceAuth	Success	Authorized
4	ForceAuth	Success	Authorized
5	ForceAuth	Success	Authorized
6	ForceAuth	Success	Authorized
7	ForceAuth	Success	Authorized
8	ForceAuth	Success	Authorized
9	ForceAuth	Success	Authorized
10	ForceAuth	Success	Authorized
11	ForceAuth	Success	Authorized
12	ForceAuth	Success	Authorized
13	ForceAuth	Success	Authorized
14	ForceAuth	Success	Authorized
15	ForceAuth	Success	Authorized
16	ForceAuth	Success	Authorized
17	ForceAuth	Success	Authorized
18	ForceAuth	Success	Authorized
19	ForceAuth	Success	Authorized
20	ForceAuth	Success	Authorized

```
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```

Example usage:

To display the 802.1x auth state for MAC-based 802.1x:

```
DES-3550:4#show 802.1x auth_state
Command: show 802.1x auth_state

Port number : 1:1

Index   MAC Address      Auth PAE State   Backend State    Port Status
-----  -
1       00-08-02-4E-DA-FA  Authenticated    Idle             Authorized
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

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```

## config 802.1x auth\_mode

Purpose	Used to configure the 802.1x authentication mode on the Switch.
Syntax	<b>config 802.1x auth_mode {port_based   mac_based}</b>
Description	The config 802.1x authentication mode command is used to enable either the port-based or MAC-based 802.1x authentication feature on the Switch.
Parameters	<i>[port_based   mac_based ports]</i> – The Switch allows you to authenticate 802.1x by either port or MAC address.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure 802.1x authentication by MAC address:

```
DES-3550:4#config 802.1x auth_mode mac_based
Command: config 802.1x auth_mode mac_based

Success.

DES-3550:4#
```

**config 802.1x capability ports**

Purpose	Used to configure the 802.1x capability of a range of ports on the Switch.
Syntax	<b>config 802.1x capability ports [&lt;portlist&gt;   all] [authenticator   none]</b>
Description	The <b>config 802.1x</b> command has four capabilities that can be set for each port. Authenticator, Supplicant, Authenticator and Supplicant, and None.
Parameters	<p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p> <p><i>all</i> – Specifies all of the ports on the Switch.</p> <p><i>authenticator</i> – A user must pass the authentication process to gain access to the network.</p> <p><i>none</i> – The port is not controlled by the 802.1x functions.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure 802.1x capability on ports 1-10:

```
DES-3550:4#config 802.1x capability ports 1 – 10 authenticator
Command: config 802.1x capability ports 1 – 10 authenticator

Success.

DES-3550:4#
```

**config 802.1x auth\_parameter**

Purpose	Used to configure the 802.1x Authentication parameters on a range of ports. The default parameter will return all ports in the specified range to their default 802.1x settings.
Syntax	<b>config 802.1x auth_parameter ports [&lt;portlist&gt;   all] [default   {direction [both   in]   port_control [force_unauth   auto   force_auth]   quiet_period &lt;sec 0-65535&gt;   tx_period &lt;sec 1-65535&gt;   supp_timeout &lt;sec 1-65535&gt;   server_timeout &lt;sec 1-65535&gt;   max_req &lt;value 1-10&gt;   reauth_period &lt;sec 1-65535&gt;   enable_reauth [enable   disable]}]</b>
Description	The <b>config 802.1x auth_parameter</b> command is used to configure the 802.1x Authentication parameters on a range of ports. The default parameter will return all ports in the specified range to their default 802.1x settings.
Parameters	<p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p> <p><i>all</i> – Specifies all of the ports on the Switch.</p> <p><i>default</i> – Returns all of the ports in the specified range to their 802.1x default settings.</p> <p><i>direction [both   in]</i> – Determines whether a controlled port blocks communication in both the receiving and transmitting directions, or just the receiving direction.</p> <p><i>port_control</i> – Configures the administrative control over the authentication process for the range of ports. The user has the following authentication options:</p> <ul style="list-style-type: none"> <li>• <i>force_auth</i> – Forces the Authenticator for the port to become authorized. Network access is allowed.</li> <li>• <i>auto</i> – Allows the port's status to reflect the outcome of the authentication process.</li> <li>• <i>force_unauth</i> – Forces the Authenticator for the port to become unauthorized. Network access will be blocked.</li> </ul> <p><i>quiet_period &lt;sec 0-65535&gt;</i> – Configures the time interval between authentication failure and the start of a new authentication attempt.</p> <p><i>tx_period &lt;sec 1-65535&gt;</i> - Configures the time to wait for a response from a supplicant (user) to send EAP Request/Identity packets.</p> <p><i>supp_timeout &lt;sec 1-65535&gt;</i> - Configures the time to wait for a response from a supplicant (user) for all EAP packets, except for the Request/Identity packets.</p> <p><i>server_timeout &lt;sec 1-65535&gt;</i> - Configure the length of time to wait for a response from a RADIUS server.</p> <p><i>max_req &lt;value 1-10&gt;</i> – Configures the number of times to retry sending packets to a supplicant (user).</p> <p><i>reauth_period &lt;sec 1-65535&gt;</i> – Configures the time interval between successive re-authentications.</p> <p><i>enable_reauth [enable   disable]</i> – Determines whether or not the Switch will re-authenticate. Enabled causes re-authentication of users at the time interval specified in the Re-authentication Period field, above.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure 802.1x authentication parameters for ports 1 – 20:

```
DES-3550:4#config 802.1x auth_parameter ports 1-20 direction both
Command: config 802.1x auth_parameter ports 1-20 direction both

Success.

DES-3550:4#
```

### config 802.1x auth\_protocol

Purpose	Used to configure the 802.1x authentication protocol on the Switch.
Syntax	<b>config 802.1x auth_protocol [radius_eap   radius_pap]</b>
Description	The <i>config 802.1x auth_protocol</i> command enables you to configure the authentication protocol.
Parameters	<i>[radius_eap   radius_pap]</i> – Specify the type of authentication protocol desired.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the authentication protocol on the Switch:

```
DES-3550:4# config 802.1x auth_protocol radius_pap
Command: config 802.1x auth_protocol local radius_pap

Success.

DES-3550:4#
```

**config 802.1x init**

Purpose	Used to initialize the 802.1x function on a range of ports.
Syntax	<b>config 802.1x init {port_based ports [&lt;portlist&gt;   all]   mac_based [ports] [&lt;portlist&gt;   all] {mac_address &lt;macaddr&gt;}}</b>
Description	The <i>config 802.1x init</i> command is used to immediately initialize the 802.1x functions on a specified range of ports or for specified MAC addresses operating from a specified range of ports.
Parameters	<p><i>port_based</i> – This instructs the Switch to initialize 802.1x functions based only on the port number. Ports approved for initialization can then be specified.</p> <p><i>mac_based</i> – This instructs the Switch to initialize 802.1x functions based only on the MAC address. MAC addresses approved for initialization can then be specified.</p> <p><i>ports &lt;portlist&gt;</i> – Specifies a port or range of ports to be configured.</p> <p><i>all</i> – Specifies all of the ports on the Switch.</p> <p><i>mac_address &lt;macaddr&gt;</i> - Enter the MAC address to be initialized.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To initialize the authentication state machine of all ports:

```
DES-3550:4# config 802.1x init port_based ports all
Command: config 802.1x init port_based ports all

Success.

DES-3550:4#
```

**config 802.1x reauth**

Purpose	Used to configure the 802.1x re-authentication feature of the Switch.
Syntax	<b>config 802.1x reauth {port_based ports [&lt;portlist&gt;   all]   mac_based [ports] [&lt;portlist&gt;   all] {mac_address &lt;macaddr&gt;}}</b>
Description	The config 802.1x reauth command is used to re-authenticate a previously authenticated device based on port number.
Parameters	<p><i>port_based</i> – This instructs the Switch to re-authorize 802.1x functions based only on the port number. Ports approved for re-authorization can then be specified.</p> <p><i>mac_based</i> – This instructs the Switch to re-authorize 802.1x functions based only on the MAC address. MAC addresses approved for re-authorization can then be specified.</p> <p><i>ports &lt;portlist&gt;</i> – Specifies a port or range of ports to be re-authorized.</p> <p><i>all</i> – Specifies all of the ports on the Switch.</p> <p><i>mac_address &lt;macaddr&gt;</i> - Enter the MAC address to be re-authorized.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure 802.1x reauthentication for ports 1-18:

```
DES-3550:4#config 802.1x reauth port_based ports 1-18
Command: config 802.1x reauth port_based ports 1-18

Success.

DES-3550:4#
```



**config radius add**

Purpose	Used to configure the settings the Switch will use to communicate with a RADIUS server.
Syntax	<b>config radius add &lt;server_index 1-3&gt; &lt;server_ip&gt; key &lt;passwd 32&gt; [default   {auth_port &lt;udp_port_number 1-65535&gt;   acct_port &lt;udp_port_number 1-65535&gt;}]</b>
Description	The <i>config radius add</i> command is used to configure the settings the Switch will use to communicate with a RADIUS server.
Parameters	<p><i>&lt;server_index 1-3&gt;</i> – Assigns a number to the current set of RADIUS server settings. Up to 3 groups of RADIUS server settings can be entered on the Switch.</p> <p><i>&lt;server_ip&gt;</i> – The IP address of the RADIUS server.</p> <p><i>key</i> – Specifies that a password and encryption key will be used between the Switch and the Radius server.</p> <p><i>&lt;passwd 32&gt;</i> – The shared-secret key used by the RADIUS server and the Switch. Up to 32 characters can be used.</p> <p><i>default</i> – Uses the default udp port number in both the “auth_port” and “acct_port” settings.</p> <p><i>auth_port &lt;udp_port_number 1-65535&gt;</i> – The UDP port number for authentication requests. The default is 1812.</p> <p><i>acct_port &lt;udp_port_number 1-65535&gt;</i> – The UDP port number for accounting requests. The default is 1813.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the RADIUS server communication settings:

```
DES-3550:4#config radius add 1 10.48.74.121 key dlink default
Command: config radius add 1 10.48.74.121 key dlink default

Success.

DES-3550:4#
```

**config radius delete**

Purpose	Used to delete a previously entered RADIUS server configuration.
Syntax	<b>config radius delete &lt;server_index 1-3&gt;</b>
Description	The <i>config radius delete</i> command is used to delete a previously entered RADIUS server configuration.
Parameters	<server_index 1-3> – Assigns a number to the current set of RADIUS server settings. Up to 3 groups of RADIUS server settings can be entered on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete previously configured RADIUS server communication settings:

```
DES-3550:4#config radius delete 1
```

```
Command: config radius delete 1
```

```
Success.
```

```
DES-3550:4#
```

<b>config radius</b>	
Purpose	Used to configure the Switch's RADIUS settings.
Syntax	<b>config radius &lt;server_index 1-3&gt; {ipaddress &lt;server_ip&gt;   key &lt;passwd 32&gt;   auth_port &lt;udp_port_number 1-65535&gt;   acct_port &lt;udp_port_number 1-65535&gt;}</b>
Description	The <i>config radius</i> command is used to configure the Switch's RADIUS settings.
Parameters	<p><i>&lt;server_index 1-3&gt;</i> – Assigns a number to the current set of RADIUS server settings. Up to 3 groups of RADIUS server settings can be entered on the Switch.</p> <p><i>ipaddress &lt;server_ip&gt;</i> – The IP address of the RADIUS server.</p> <p><i>key</i> – Specifies that a password and encryption key will be used between the Switch and the RADIUS server.</p> <ul style="list-style-type: none"> <li><i>&lt;passwd 32&gt;</i> – The shared-secret key used by the RADIUS server and the Switch. Up to 32 characters can be used.</li> </ul> <p><i>auth_port &lt;udp_port_number 1-65535&gt;</i> – The UDP port number for authentication requests. The default is 1812.</p> <p><i>acct_port &lt;udp_port_number 1-65535&gt;</i> – The UDP port number for accounting requests. The default is 1813.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the RADIUS settings:

```
DES-3550:4#config radius 1 10.48.74.121 key dlink default
Command: config radius 1 10.48.74.121 key dlink default

Success.

DES-3550:4#
```

**show radius**

Purpose	Used to display the current RADIUS configurations on the Switch.
Syntax	<b>show radius</b>
Description	The <i>show radius</i> command is used to display the current RADIUS configurations on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To display RADIUS settings on the Switch:

```
DES-3550:4#show radius
Command: show radius

Index  IP Address      Auth-Port  Acct-Port  Status  Key
-----  -
1      10.1.1.1       1812      1813      Active  switch
2      20.1.1.1       1800      1813      Active  des3226
3      30.1.1.1       1812      1813      Active  dlink

Total Entries : 3

DES-3550:4#
```

## ACCESS CONTROL LIST (ACL) COMMANDS

The DES-3550 implements Access Control Lists that enable the Switch to deny network access to specific devices or device groups based on IP settings or MAC address.



**Note:** The ACL command set has been changed for the Release III firmware. In particular, note the different role of the profile\_id and access\_id parameters. The new treatment has changed some of the command parameters as well.

Command	Parameters
create access_profile	[ ethernet { vlan   source_mac <macmask>   destination_mac <macmask>   802.1p   ethernet_type } ip { vlan   source_ip_mask <netmask>   destination_ip_mask <netmask>   dscp   [ icmp {type   code }   igmp {type }   tcp {src_port_mask <hex 0x0-0xffff>   dst_port_mask <hex 0x0-0xffff>   flag_mask [all   {urg   ack   psh   rst   syn   fin}]}   udp {src_port_mask <hex 0x0-0xffff>   dst_port_mask <hex 0x0-0xffff>}   protocol_id_mask <hex 0x0 - 0xFF> {user_define_mask <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> } ]   packet_content_mask {offset_0-15 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_16-31 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_32-47 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_48-63 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_64-79 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> } ] [profile_id <value 1-255>]
delete access_profile	profile_id <value 1-255>
config access_profile	profile_id <value 1-255> [ add access_id <value 1-65535> [ ethernet { vlan <vlan_name 32>   source_mac <macaddr>   destination_mac <macaddr>   802.1p <value 0-7>   ethernet_type <hex 0x0-0xffff> }   ip { vlan <vlan_name 32>   source_ip <ipaddr>   destination_ip <ipaddr>   dscp <value 0-63>   [ icmp {type <value 0-255> code <value 0-255>}   igmp {type <value 0-255>}   tcp {src_port <value 0-65535>   dst_port <value 0-65535>   flag_mask [all   {urg   ack   psh   rst   syn   fin}   udp {src_port <value 0-65535>   dst_port <value 0-65535>}   protocol_id <value 0 - 255> {user_define <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> } ] }   packet_content_mask {offset_0-15 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_16-31 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_32-47 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_48-63 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff>   offset_64-79 <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> <hex 0x0-0xffffffff> } ] port <portlist> [ permit {priority <value 0-7> {replace_priority}   replace_dscp_with <value 0-63>}   deny ]   delete access_id <value 1-65535> ]
show access_profile	{profile_id <value 1-255> {access_id <value 1-65535>}}

Access profiles allow you to establish criteria to determine whether or not the Switch will forward packets based on the information contained in each packet's header.

Creating an access profile is divided into two basic parts. First, an access profile must be created using the **create access\_profile** command. For example, if you want to deny all traffic to the subnet 10.42.73.0 to 10.42.73.255, you must first **create** an access profile that instructs the Switch to examine all of the relevant fields of each frame.

First create an access profile that uses IP addresses as the criteria for examination:

```
create access_profile ip source_ip_mask 255.255.255.0 profile_id 1
```

Here we have created an access profile that will examine the IP field of each frame received by the Switch. Each source IP address the Switch finds will be combined with the **source\_ip\_mask** with a logical AND operation. The **profile\_id** parameter is used to give the access profile an identifying number – in this case, 1 – and it is used to assign a priority in case a conflict occurs. The **profile\_id** establishes a priority within the list of profiles. A lower **profile\_id** gives the rule a higher priority. In case of a conflict in the rules entered for different profiles, the rule with the highest priority (lowest **profile\_id**) will take precedence. *See below for information regarding limitations on access profiles and access rules.*

The **deny** parameter instructs the Switch to filter any frames that meet the criteria – in this case, when a logical AND operation between an IP address specified in the next step and the **ip\_source\_mask** match.

The default for an access profile on the Switch is to **permit** traffic flow. If you want to restrict traffic, you must use the **deny** parameter.

Now that an access profile has been created, you must add the criteria the Switch will use to decide if a given frame should be forwarded or filtered. Let's further specify a rule that denies access to a range of IP addresses through an individual port: Here, we want to filter any packets that have an IP source address between 10.42.73.0 and 10.42.73.255, and specify the port that will not be allowed:

```
config access_profile profile_id 1 add access_id 1 ip source_ip 10.42.73.1 port 7 deny
```

We use the **profile\_id 1** which was specified when the access profile was created. The **add** parameter instructs the Switch to add the criteria that follows to the list of rules that are associated with access profile 1. For each rule entered into the access profile, you can assign an **access\_id** that identifies the rule within the list of rules. The **access\_id** is an index number only and does not effect priority within the **profile\_id**. This **access\_id** may be used later if you want to remove the individual rule from the profile.

The **ip** parameter instructs the Switch that this new rule will be applied to the IP addresses contained within each frame's header. **source\_ip** tells the Switch that this rule will apply to the source IP addresses in each frame's header. The IP address **10.42.73.1** will be combined with the **source\_ip\_mask 255.255.255.0** to give the IP address 10.42.73.0 for any source IP address between 10.42.73.0 to 10.42.73.255. Finally the restricted port - port number 7 - is specified.

Due to a chipset limitation, the Switch supports a maximum of 9 access profiles. The rules used to define the access profiles are limited to a total of 800 rules for the Switch.

There is an additional limitation on how the rules are distributed among the Fast Ethernet and Gigabit Ethernet ports. This limitation is described as follows: Fast Ethernet ports are limited to 200 rules for each of the three sequential groups of eight ports. That is, 200 ACL profile rules may be configured for ports 1 to 8. Likewise, 200 rules may be configured for ports 9 to 16, another 200 rules for ports 17 to 24, another 200 for ports 25 to 32 and so on. Up to 100 rules may be configured for each Gigabit Ethernet port. **The total number of rules configured for the whole Switch however, cannot exceed 800.** The table below provides a summary of the maximum ACL profile rule limits.

Port Numbers	Maximum ACL Profile Rules per Port Group
1 - 8	200
9 - 16	200
17 - 24	200
25 - 32	200
33 - 40	200
41 - 48	200
49 (Gigabit)	100
50 (Gigabit)	100

It is important to keep this in mind when setting up VLANs as well. Access rules applied to a VLAN require that a rule be created for each port in the VLAN. For example, let's say VLAN10 contains ports 2, 11 and 12. If you create an access profile specifically for VLAN10, you must create a separate rule for each port. Now take into account the rule limit. The rule limit applies to both port groups 1-8 and 9-16 since VLAN10 spans these groups. One less rule is available for port group 1-8. Two less rules are available for port group 9-16. In addition, a total of three rules apply to the 800 rule Switch limit.

In the example used above - `config access_profile profile_id 1 add access_id 1 ip source_ip 10.42.73.1 port 7 deny` – a single access rule was created. This rule will subtract one rule available for the port group 1 – 8, as well as one rule from the total available rules.

**create access\_profile**

Purpose	Used to create an access profile on the Switch and to define which parts of each incoming frame's header the Switch will examine. Masks can be entered that will be combined with the values the Switch finds in the specified frame header fields. Specific values for the rules are entered using the <b>config access_profile</b> command, below.
Syntax	<pre> <b>create access_profile</b> [ ethernet { vlan   source_mac &lt;macmask&gt;   destination_mac &lt;macmask&gt;   802.1p   ethernet_type } ip { vlan   source_ip_mask &lt;netmask&gt;   destination_ip_mask &lt;netmask&gt;   dscp   [ icmp {type   code }   igmp {type }   tcp {src_port_mask &lt;hex 0x0-0xffff&gt;   dst_port_mask &lt;hex 0x0-0xffff&gt;   flag_mask [all   {urg   ack   psh   rst   syn   fin}]}   udp {src_port_mask &lt;hex 0x0-0xffff&gt;   dst_port_mask &lt;hex 0x0-0xffff&gt;}   protocol_id_mask &lt;hex 0x0 - 0xFF&gt; {user_define_mask &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;} ]   packet_content_mask {offset_0-15 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_16-31 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_32-47 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_48-63 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0- 0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_64-79 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;} ] [profile_id &lt;value 1-255&gt;] </pre>
Description	<p>The <b>create access_profile</b> command is used to create an access profile on the Switch and to define which parts of each incoming frame's header the Switch will examine. Masks can be entered that will be combined with the values the Switch finds in the specified frame header fields. Specific values for the rules are entered using the <b>config access_profile</b> command, below.</p> <p><i>ethernet</i> – Specifies that the Switch will examine the layer 2 part of each packet header.</p> <ul style="list-style-type: none"> <li><i>vlan</i> – Specifies that the Switch will examine the VLAN part of each packet header.</li> <li><i>source_mac &lt;macmask&gt;</i> – Specifies a MAC address mask for the source MAC address. This mask is entered in a hexadecimal format.</li> <li><i>destination_mac &lt;macmask&gt;</i> – Specifies a MAC address mask for the destination MAC address.</li> <li><i>802.1p</i> – Specifies that the Switch will examine the 802.1p priority value in the frame's header.</li> <li><i>ethernet_type</i> – Specifies that the Switch will examine the Ethernet type value in each frame's header.</li> </ul>



## create access\_profile

- Parameters** *ip* – Specifies that the Switch will examine the IP address in each frame’s header.
- *vlan* – Specifies a VLAN mask.
  - *source\_ip\_mask* <netmask> – Specifies an IP address mask for the source IP address.
  - *destination\_ip\_mask* <netmask> – Specifies an IP address mask for the destination IP address. |
  - *dscp* – Specifies that the Switch will examine the DiffServ Code Point (DSCP) field in each frame’s header.
  - *icmp* – Specifies that the Switch will examine the Internet Control Message Protocol (ICMP) field in each frame’s header.
  - *type* – Specifies that the Switch will examine each frame’s ICMP Type field.
  - *code* – Specifies that the Switch will examine each frame’s ICMP Code field.
  - *igmp* – Specifies that the Switch will examine each frame’s Internet Group Management Protocol (IGMP) field.
  - *type* – Specifies that the Switch will examine each frame’s IGMP Type field.
  - *tcp* – Specifies that the Switch will examine each frames Transport Control Protocol (TCP) field.
  - *src\_port\_mask* <hex 0x0-0xffff> – Specifies a TCP port mask for the source port.
  - *dst\_port\_mask* <hex 0x0-0xffff> – Specifies a TCP port mask for the destination port.
  - *flag\_mask* – Enter the appropriate flag\_mask parameter. All incoming packets have TCP port numbers contained in them as the forwarding criterion. These numbers have flag bits associated with them which are parts of a packet that determine what to do with the packet. The user may deny packets by denying certain flag bits within the packets. The user may choose between *all*, *urg* (urgent), *ack* (acknowledgement), *psh* (push), *rst* (reset), *syn* (synchronize) and *fin* (finish).
  - *udp* – Specifies that the Switch will examine each frame’s Universal Datagram Protocol (UDP) field.
  - *src\_port\_mask* <hex 0x0-0xffff> – Specifies a UDP port mask for the source port
  - *dst\_port\_mask* <hex 0x0-0xffff> – Specifies a UDP port mask for the destination port.
  - *protocol\_id* <value 0-255> – Specifies that the Switch will examine the protocol field in each packet and if this field contains the value entered here, apply the following rules
  - *user\_define\_mask* <hex 0x0-0xffffffff> – Specifies that the rule applies to the IP protocol ID and the mask options behind the IP header.

**create access\_profile**

<b>Parameters</b>	<p><i>packet_content_mask</i> – Specifies that the Switch will mask the packet header beginning with the offset value specified as follows:</p> <ul style="list-style-type: none"> <li>• <i>offset_0-15</i> – Enter a value in hex form to mask the packet from the beginning of the packet to the 16<sup>th</sup> byte.</li> <li>• <i>offset_16-31</i> – Enter a value in hex form to mask the packet from byte 16 to byte 31.</li> <li>• <i>offset_32-47</i> – Enter a value in hex form to mask the packet from byte 32 to byte 47.</li> <li>• <i>offset_48-63</i> – Enter a value in hex form to mask the packet from byte 48 to byte 63.</li> <li>• <i>offset_64-79</i> – Enter a value in hex form to mask the packet from byte 64 to byte 79.</li> </ul> <p><i>profile_id</i> &lt;value 1-255&gt; – Sets the relative priority for the profile. Priority is set relative to other profiles where the lowest profile ID has the highest priority.</p>
<b>Restrictions</b>	Only administrator-level users can issue this command.

Example usage:

To create an access list rules:

```
DES-3550:4#create access_profile ip vlan source_ip_mask 20.0.0.0
destination_ip_mask 10.0.0.0 dscp icmp type code permit profile_id 101
Command: create access_profile ip vlan source_ip_mask 20.0.0.0
destination_ip_mask 10.0.0.0 dscp icmp type code permit profile_id 101

Success.

DES-3550:4#
```

**delete access\_profile**

Purpose	Used to delete a previously created access profile.
Syntax	<b>delete access_profile [profile_id &lt;value 1-255&gt;]</b>
Description	The <i>delete access_profile</i> command is used to delete a previously created access profile on the Switch.
Parameters	<i>profile_id &lt;value 1-255&gt;</i> – Enter an integer between 1 and 255 that is used to identify the access profile that will be deleted with this command. This value is assigned to the access profile when it is created with the <i>create access_profile</i> command.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the access profile with a profile ID of 1:

```
DES-3550:4# delete access_profile profile_id 1
Command: delete access_profile profile_id 1

Success.

DES-3550:4#
```

**config access\_profile**

<b>Purpose</b>	Used to configure an access profile on the Switch and to define specific values that will be used to by the Switch to determine if a given packet should be forwarded or filtered. Masks entered using the <b>create access_profile</b> command will be combined, using a logical AND operation, with the values the Switch finds in the specified frame header fields. Specific values for the rules are entered using the <b>config access_profile</b> command, below.
<b>Syntax</b>	<b>config access_profile profile_id &lt;value 1-255&gt; [ add access_id &lt;value 1-65535&gt; [ ethernet { vlan &lt;vlan_name 32&gt;   source_mac &lt;macaddr&gt;   destination_mac &lt;macaddr&gt;   802.1p &lt;value 0-7&gt;   ethernet_type &lt;hex 0x0-0xffff&gt; }   ip { vlan &lt;vlan_name 32&gt;   source_ip &lt;ipaddr&gt;   destination_ip &lt;ipaddr&gt;   dscp &lt;value 0-63&gt;   [ icmp {type &lt;value 0-255&gt; code &lt;value 0-255&gt;}   igmp {type &lt;value 0-255&gt;}   tcp {src_port &lt;value 0-65535&gt;   dst_port &lt;value 0-65535&gt;   flag_mask [all   {urg   ack   psh   rst   syn   fin}   udp {src_port &lt;value 0-65535&gt;   dst_port &lt;value 0-65535&gt;}   protocol_id &lt;value 0 - 255&gt; {user_define &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;} ] }   packet_content_mask {offset_0-15 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_16-31 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_32-47 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_48-63 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt;   offset_64-79 &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; &lt;hex 0x0-0xffffffff&gt; } ] port &lt;portlist&gt; [ permit {priority &lt;value 0-7&gt; {replace_priority}   replace_dscp_with &lt;value 0-63&gt; }   deny ]   delete access_id &lt;value 1-65535&gt; ]</b>
<b>Description</b>	The <b>config access_profile</b> command is used to configure an access profile on the Switch and to enter specific values that will be combined, using a logical AND operation, with masks entered with the <b>create access_profile</b> command, above.
<b>Parameters</b>	<p><i>profile_id</i> &lt;value 1-255&gt; – Enter an integer used to identify the access profile that will be configured with this command. This value is assigned to the access profile when it is created with the create access_profile command. The profile ID sets the relative priority for the profile and specifies an index number that will identify the access profile being created with this command. Priority is set relative to other profiles where the lowest profile ID has the highest priority.</p> <ul style="list-style-type: none"> <li><i>add access_id</i> &lt;value 1-255&gt; – Adds an additional rule to the above specified access profile. The value is used to index the rule created.</li> </ul> <p><i>ethernet</i> – Specifies that the Switch will look only into the layer 2 part of each packet.</p> <ul style="list-style-type: none"> <li><i>vlan</i> &lt;vlan_name 32&gt; – Specifies that the access profile will apply to only to this VLAN.</li> <li><i>source_mac</i> &lt;macaddr&gt; – Specifies that the access profile will apply to only packets with this source MAC address.</li> <li><i>destination_mac</i> &lt;macaddr&gt; – Specifies that the access profile will apply to only packets with this destination MAC address.</li> <li><i>802.1p</i> &lt;value 0-7&gt; – Specifies that the access profile will apply only to packets with this 802.1p priority value.</li> <li><i>ethernet_type</i> &lt;hex 0x0-0xffff&gt; – Specifies that the access profile will apply only to packets with this hexadecimal 802.1Q Ethernet type value in the packet header.</li> </ul>

## config access\_profile

- Parameters**
- ip* – Specifies that the Switch will look into the IP fields in each packet.
    - *vlan* <vlan\_name 32> – Specifies that the access profile will apply to only this VLAN.
    - *source\_ip* <ipaddr> – Specifies that the access profile will apply to only packets with this source IP address.
    - *destination\_id* <value 0-255> – Specifies that the access profile will apply to only packets with this destination IP address.
    - *dscp* <value 0-63> – Specifies that the access profile will apply only to packets that have this value in their Type-of-Service (DiffServ code point, DSCP) field in their IP packet header
    - *icmp* – Specifies that the Switch will examine the Internet Control Message Protocol (ICMP) field within each packet.
      - *type* <value 0-65535> – Specifies that the access profile will apply to this ICMP type value.
      - *code* <value 0-255> – Specifies that the access profile will apply to this ICMP code.
    - *igmp* – Specifies that the Switch will examine the Internet Group Management Protocol (IGMP) field within each packet.
      - *type* <value 0-255> – Specifies that the access profile will apply to packets that have this IGMP type value.
    - *tcp* – Specifies that the Switch will examine the Transmission Control Protocol (TCP) field within each packet.
    - *src\_port* <value 0-65535> – Specifies that the access profile will apply only to packets that have this TCP source port in their TCP header.
    - *dst\_port* <value 0-65535> – Specifies that the access profile will apply only to packets that have this TCP destination port in their TCP header.
    - *flag\_mask* – Enter the type of TCP flag to be masked.
      - *all*: all flags are selected.
      - *urg*: TCP control flag (urgent)
      - *ack*: TCP control flag (acknowledgement)
      - *psh*: TCP control flag (push)
      - *rst*: TCP control flag (reset)
      - *syn*: TCP control flag (synchronize)
      - *fin*: TCP control flag (finish)
      - *udp* – Specifies that the Switch will examine the Universal Datagram Protocol (UDP) field in each packet.
    - *src\_port* <value 0-65535> – Specifies that the access profile will apply only to packets that have this UDP source port in their header.
    - *dst\_port* <value 0-65535> – Specifies that the access profile will apply only to packets that have this UDP destination port in their header.
    - *protocol\_id* <value 0-255> – Specifies that the Switch will examine the protocol field in each packet and if this field contains the value entered here, apply the following rules.

**config access\_profile**

- Parameters** *user\_define* <hex 0x0-0xffffffff> – Specifies a mask to be combined with the value found in the frame header using a logical AND operation.
- *packet\_content\_mask* – Specifies that the Switch will mask the packet header beginning with the offset value specified as follows:
    - *offset\_0-15* - Enter a value in hex form to mask the packet from the beginning of the packet to the 15<sup>th</sup> byte.
    - *offset\_16-31* - Enter a value in hex form to mask the packet from byte 16 to byte 32.
    - *offset\_32-47* - Enter a value in hex form to mask the packet from byte 32 to byte 47.
    - *offset\_48-63* - Enter a value in hex form to mask the packet from byte 48 to byte 63
    - *offset\_64-79* - Enter a value in hex form to mask the packet from byte 64 to byte 79.
- port* <portlist> - Specifies the ports on the Switch to permit or deny access for the rule.
- *permit* - Specifies the rule permit access for incoming packets on the previously specified port.
  - *priority* <value 0-7> – Specifies that the access profile will apply to packets that contain this value in their 802.1p priority field of their header for incoming packets on the previously specified port.
  - *{replace\_priority}* - Allows you to specify a new value to be written to the priority field of an incoming packet on the previously specified port.
  - *replace\_dscp\_with* <value 0-63> – Allows you to specify a new value to be written to the DSCP field of an incoming packet on the previously specified port.
  - *deny* - Specifies the rule will deny access for incoming packets on the previously specified port.
  - *delete\_access\_id* <value 1-65535> - Use this to remove a previously created access rule in a profile id.
- Restriction** Only administrator-level users can issue this command.

s

Example usage:

To configure the access profile with the profile ID of 1 to filter frames on port 7 that have IP addresses in the range between 10.42.73.0 to 10.42.73.255:

```
DES-3550:4# config access_profile profile_id 1 add access_id 1 ip source_ip 10.42.73.1 port 7 deny
Command: config access_profile profile_id 1 add access_id 1 ip source_ip 10.42.73.1 port 7 deny

Success.

DES-3550:4#
```

## show access\_profile

Purpose	Used to display the currently configured access profiles on the Switch.
Syntax	<b>show access_profile {profile_id &lt;value 1-255&gt; {access_id &lt;value 1-65535&gt;}}</b>
Description	The <i>show access_profile</i> command is used to display the currently configured access profiles.
Parameters	<i>profile_id</i> – Specify the profile id to display only the access rules configuration for a single profile id.  <i>access_id</i> - Specify the access id to display the access rule configuration for the access id.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display all of the currently configured access profiles on the Switch:

```
DES-3550:4#show access_profile
Command: show access_profile

Access Profile Table

Access Profile ID : 4
Type   : IP Frame Filter
Ports  : All
Masks  : VLAN
-----

ID Mode
--- ----
1 Permit default

Access Profile ID : 246
Type   : IP Frame Filter
Ports  : All
Masks  : Source IP Addr
-----
      255.0.0.0
ID Mode
--- ----

Access Profile ID : 247
Type   : Ethernet Frame Filter
Ports  : All
Masks  : 802.1p
-----

ID Mode
--- ----

Access Profile ID : 249
Type   : Packet Content Filter
Ports  : All
Masks  : Offset 0-15 : 0x00000000 00000000 00000000 00000000
        Offset 16-31 : 0x00000000 00000000 00000000 00000000
        Offset 32-47 : 0x00000000 00000000 00000000 00000000
        Offset 48-63 : 0x00000000 00000000 00000000 00000000
        Offset 64-79 : 0x00000000 00000000 00000000 00000000

DES-3550:4#
```



## TRAFFIC SEGMENTATION COMMANDS

Traffic segmentation allows you to further sub-divide VLANs into smaller groups of ports that will help to reduce traffic on the VLAN. The VLAN rules take precedence, and then the traffic segmentation rules are applied.

Command	Parameters
config traffic_segmentation	[<portlist>] forward_list [null   <portlist>]
show traffic_segmentation	<portlist>

Each command is listed, in detail, in the following sections.

<b>config traffic_segmentation</b>	
Purpose	Used to configure traffic segmentation on the Switch.
Syntax	<b>config traffic_segmentation [&lt;portlist&gt;] forward_list [null   &lt;portlist&gt;]</b>
Description	The <i>config traffic_segmentation</i> command is used to configure traffic segmentation on the Switch.
Parameters	<p><i>&lt;portlist&gt;</i> – Specifies a port or range of ports that will be configured for traffic segmentation.</p> <p><i>forward_list</i> – Specifies a range of ports that will receive forwarded frames from the ports specified in the portlist, above.</p> <ul style="list-style-type: none"> <li>• <i>null</i> – No ports are specified</li> <li>• <i>&lt;portlist&gt;</i> – Specifies a range of ports for the forwarding list. This list must be on the same Switch previously specified for traffic segmentation (i.e. following the <i>&lt;portlist&gt;</i> specified above for config traffic_segmentation).</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure ports 1 through 10 to be able to forward frames to port 11 through 15:

```
DES-3550:4# config traffic_segmentation 1-10 forward_list 11-15
Command: config traffic_segmentation 1-10 forward_list 11-15

Success.

DES-3550:4#
```

**show traffic\_segmentation**

Purpose	Used to display the current traffic segmentation configuration on the Switch.
Syntax	<b>show traffic_segmentation &lt;portlist&gt;</b>
Description	The <i>show traffic_segmentation</i> command is used to display the current traffic segmentation configuration on the Switch.
Parameters	<portlist> – Specifies a port or range of ports for which the current traffic segmentation configuration on the Switch will be displayed.
Restrictions	The port lists for segmentation and the forward list must be on the same Switch.

Example usage:

To display the current traffic segmentation configuration on the Switch.

```
DES-3550:4#show traffic_segmentation
Command: show traffic_segmentation

Traffic Segmentation Table

Port  Forward Portlist
----  -
1     1-50
2     1-50
3     1-50
4     1-50
5     1-50
6     1-50
7     1-50
8     1-50
9     1-50
10    1-50
11    1-50
12    1-50
13    1-50
14    1-50
15    1-50
16    1-50
17    1-50
18    1-50
CTRL+C ESC q Quit SPACE n Next Page ENTER Next Entry a All
```

## TIME AND SNTP COMMANDS

The Simple Network Time Protocol (SNTP) (an adaptation of the Network Time Protocol (NTP)) commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
config sntp	{primary <ipaddr>   secondary <ipaddr>   poll-interval <int 30-99999>}
show sntp	
enable sntp	
disable sntp	
config time	<date ddmmmyyyy > <time hh:mm:ss >
config time_zone	{operator [+   -]   hour <gmt_hour 0-13>   min <minute 0-59>}
config dst	[disable   repeating {s_week <start_week 1-4,last>   s_day <start_day sun-sat>   s_mth <start_mth 1-12>   s_time <start_time hh:mm>   e_week <end_week 1-4,last>   e-day <end_day sun-sat>   e_mth <end_mth 1-12>   e_time <end_time hh:mm>   offset [30   60   90   120]}   annual {s_date <start_date 1-31>   s_mth <start_mth 1-12>   s_time <start_time hh:mm>   e_date <end_date 1-31>   e_mth <end_mth 1-12>   e_time <end_time hh:mm>   offset [30   60   90   120]}]
show time	

Each command is listed, in detail, in the following sections.

<b>config sntp</b>	
Purpose	Used to setup SNTP service.
Syntax	<b>config sntp {primary &lt;ipaddr&gt;   secondary &lt;ipaddr&gt;   poll-interval &lt;int 30-99999&gt;}</b>
Description	Use this command to configure SNTP service from an SNTP server. SNTP must be enabled for this command to function (See <i>enable sntp</i> ).
Parameters	<p><i>primary</i> – This is the primary server the SNTP information will be taken from.</p> <ul style="list-style-type: none"> <li>• <i>&lt;ipaddr&gt;</i> – The IP address of the primary server.</li> </ul> <p><i>secondary</i> – This is the secondary server the SNTP information will be taken from in the event the primary server is unavailable.</p> <ul style="list-style-type: none"> <li>• <i>&lt;ipaddr&gt;</i> – The IP address for the secondary server.</li> </ul> <p><i>poll-interval &lt;int 30-99999&gt;</i> – This is the interval between requests for updated SNTP information. The polling interval ranges from 30 to 99,999 seconds.</p>
Restrictions	Only administrator-level users can issue this command. SNTP service must be enabled for this command to function ( <i>enable sntp</i> ).

Example usage:

To configure SNTP settings:

```
DES-3550:4#config sntp primary 10.1.1.1 secondary 10.1.1.2 poll-interval 30
Command: config sntp primary 10.1.1.1 secondary 10.1.1.2 poll-interval 30

Success.

DES-3550:4#
```

## show sntp

Purpose	Used to display the SNTP information.
Syntax	<b>show sntp</b>
Description	This command will display SNTP settings information including the source IP address, time and poll interval.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To display SNTP configuration information:

```
DES-3550:4#show sntp
Command: show sntp

Current Time Source   : System Clock
SNTP                  : Disabled
SNTP Primary Server  : 10.1.1.1
SNTP Secondary Server: 10.1.1.2
SNTP Poll Interval   : 30 sec

DES-3550:4#
```

## **enable sntp**

Purpose	To enable SNTP server support.
Syntax	<b>enable sntp</b>
Description	This will enable SNTP support. SNTP service must be separately configured (see <i>config sntp</i> ). Enabling and configuring SNTP support will override any manually configured system time settings.
Parameters	None.
Restrictions	Only administrator-level users can issue this command. SNTP settings must be configured for SNTP to function ( <i>config sntp</i> ).

Example usage:

To enable the SNTP function:

```
DES-3550:4#enable sntp
```

```
Command: enable sntp
```

```
Success.
```

```
DES-3550:4#
```

## **disable sntp**

Purpose	To disable SNTP server support.
Syntax	<b>disable sntp</b>
Description	This will disable SNTP support. SNTP service must be separately configured (see <i>config sntp</i> ).
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example:

To disable SNTP support:

```
DES-3550:4#disable sntp  
Command: disable sntp  
  
Success.  
  
DES-3550:4#
```



<b>config time</b>	
Purpose	Used to manually configure system time and date settings.
Syntax	<b>config time &lt;date ddmmyyyy&gt; &lt;time hh:mm:ss&gt;</b>
Description	This will configure the system time and date settings. These will be overridden if SNTP is configured and enabled.
Parameters	<p><i>date</i> – Express the date using two numerical characters for the day of the month, three alphabetical characters for the name of the month, and four numerical characters for the year. For example: 03aug2003.</p> <p><i>time</i> – Express the system time using the format hh:mm:ss, that is, two numerical characters each for the hour using a 24-hour clock, the minute and second. For example: 19:42:30.</p>
Restrictions	Only administrator-level users can issue this command. Manually configured system time and date settings are overridden if SNTP support is enabled.

Example usage:

To manually set system time and date settings:

```
DES-3550:4#config time 30jun2003 16:30:30
Command: config time 30jun2003 16:30:30

Success.

DES-3550:4#
```

**config time\_zone**

Purpose	Used to determine the time zone used in order to adjust the system clock.
Syntax	<b>config time_zone {operator [+   -]   hour &lt;gmt_hour 0-13&gt;   min &lt;minute 0-59&gt;}</b>
Description	This will adjust system clock settings according to the time zone. Time zone settings will adjust SNTP information accordingly.
Parameters	<p><i>operator</i> – Choose to add (+) or subtract (-) time to adjust for time zone relative to GMT.</p> <p><i>hour</i> – Select the number of hours different from GMT.</p> <p><i>min</i> – Select the number of minutes difference added or subtracted to adjust the time zone.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure time zone settings:

```
DES-3550:4#config time_zone operator + hour 2 min 30
Command: config time_zone operator + hour 2 min 30

Success.

DES-3550:4#
```

**config dst**

Purpose	Used to enable and configure time adjustments to allow for the use of Daylight Savings Time (DST).
Syntax	<b>config dst [disable   repeating {s_week &lt;start_week 1-4,last&gt;   s_day &lt;start_day sun-sat&gt;   s_mth &lt;start_mth 1-12&gt;   s_time start_time hh:mm&gt;   e_week &lt;end_week 1-4,last&gt;   e_day &lt;end_day sun-sat&gt;   e_mth &lt;end_mth 1-12&gt;   e_time &lt;end_time hh:mm&gt;   offset [30   60   90   120]}   annual {s_date start_date 1-31&gt;   s_mth &lt;start_mth 1-12&gt;   s_time &lt;start_time hh:mm&gt;   e_date &lt;end_date 1-31&gt;   e_mth &lt;end_mth 1-12&gt;   e_time &lt;end_time hh:mm&gt;   offset [30   60   90   120]}]</b>
Description	DST can be enabled and configured using this command. When enabled this will adjust the system clock to comply with any DST requirement. DST adjustment effects system time for both manually configured time and time set using SNTP service.
Parameters	<p><i>disable</i> - Disable the DST seasonal time adjustment for the Switch.</p> <p><i>repeating</i> - Using repeating mode will enable DST seasonal time adjustment. Repeating mode requires that the DST beginning and ending date be specified using a formula. For example, specify to begin DST on Saturday during the second week of April and end DST on Sunday during the last week of October.</p>

**config dst**

*annual* - Using annual mode will enable DST seasonal time adjustment. Annual mode requires that the DST beginning and ending date be specified concisely. For example, specify to begin DST on April 3 and end DST on October 14.

*s\_week* - Configure the week of the month in which DST begins.

- *<start\_week 1-4,last>* - The number of the week during the month in which DST begins where 1 is the first week, 2 is the second week and so on, last is the last week of the month.

*e\_week* - Configure the week of the month in which DST ends.

- *<end\_week 1-4,last>* - The number of the week during the month in which DST ends where 1 is the first week, 2 is the second week and so on, last is the last week of the month.

*s\_day* - Configure the day of the week in which DST begins.

- *<start\_day sun-sat>* - The day of the week in which DST begins expressed using a three character abbreviation (sun, mon, tue, wed, thu, fri, sat)

*e\_day* - Configure the day of the week in which DST ends.

- *<end\_day sun-sat>* - The day of the week in which DST ends expressed using a three character abbreviation (sun, mon, tue, wed, thu, fri, sat)

*s\_mth* - Configure the month in which DST begins.

- *<start\_mth 1-12>* - The month to begin DST expressed as a number.

*e\_mth* - Configure the month in which DST ends.

- *<end\_mth 1-12>* - The month to end DST expressed as a number.

*s\_time* - Configure the time of day to begin DST.

- *<start\_time hh:mm>* - Time is expressed using a 24-hour clock, in hours and minutes.

*e\_time* - Configure the time of day to end DST.

- *<end\_time hh:mm>* - Time is expressed using a 24-hour clock, in hours and minutes.

*s\_date* - Configure the specific date (day of the month) to begin DST.

- *<start\_date 1-31>* - The start date is expressed numerically.

*e\_date* - Configure the specific date (day of the month) to begin DST.

- *<end\_date 1-31>* - The end date is expressed numerically.

*offset [30 | 60 | 90 | 120]* - Indicates number of minutes to add or to subtract during the summertime. The possible offset times are 30,60,90,120. The default value is 60

**Restrictions** Only administrator-level users can issue this command.

Example usage:

To configure daylight savings time on the Switch:

```
DES-3550:4#config dst repeating s_week 2 s_day tue s_mth 4 s_time
15:00 e_week 2 e_day wed e_mth 10 e_time 15:30 offset 30
```

```
Command: config dst repeating s_week 2 s_day tue s_mth 4 s_time
15:00 e_week 2 e_day wed e_mth 10 e_time 15:30 offset 30
```

Success.

```
DES-3550:4#
```

## show time

Purpose	Used to display the current time settings and status.
Syntax	<b>show time</b>
Description	This will display system time and date configuration as well as display current system time.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To show the time currently set on the Switch's System clock:

```
DES-3550:4#show time
Command: show time

Current Time Source : System Clock
Boot Time           : 0 Days 00:00:00
Current Time        : 1 Days 01:39:17
Time Zone           : GMT +02:30
Daylight Saving Time : Repeating
Offset in Minutes   : 30
  Repeating From     : Apr 2nd Tue 15:00
                    To       : Oct 2nd Wed 15:30
  Annual From        : 29 Apr 00:00
                    To       : 12 Oct 00:00

DES-3550:4#
```

**IP-MAC BINDING**

The IP-MAC binding feature is a security measure that restricts access to a Switch to authorized users. Only the authorized client can access a Switch's port by comparing a pre-configured IP/MAC matching database to the IP/MAC match extracted from ARP request or acknowledgement packets. If the comparison test fails, the user is not authorized, the packet is dropped and the user is effectively blocked from access. IP-MAC binding may be enabled on a per port basis. IP-MAC binding is useful for preventing IP spoofing and other abuses.

The IP-MAC Binding commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
create address_binding ip_mac ipaddress	<ipaddr> mac_address <macaddr>
config address_binding ip_mac ipaddress	<ipaddr> mac_address <macaddr>
config address_binding ip_mac ports	[ <portlist>   all ] state [enable   disable]
show address_binding	[ ip_mac { [ all   ipaddress<ipaddr> mac_address<macaddr> ] }   blocked { [ all   vlan_name <vlan_name> mac_address<macaddr> ] }   ports ]
delete address-binding	[ ip-mac [ ipaddress<ipaddr> mac_address<macaddr>   all ]   blocked [ all   vlan_name<vlan_name> mac_address<macaddr> ] ]

Each command is listed, in detail, in the following sections.

**create address\_binding ip\_mac ipaddress**

Purpose	Used to create an IP-MAC Binding entry.
Syntax	<b>&lt;ipaddr&gt; mac_address &lt;macaddr&gt;</b>
Description	This command will create an IP-MAC Binding entry for authorized access. An IP/MAC table is created and used for comparison to ARP packet information. ARP request or ACK packets containing IP/MAC information that does not match the IP-MAC binding database entry will be dropped. Furthermore, the offending MAC address is placed in a black list and refused future access.
Parameters	<p>&lt;ipaddr&gt; The IP address of the device where the IP-MAC binding is made.</p> <p>&lt;macaddr&gt; The MAC address of the device where the IP-MAC binding is made.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create address binding on the switch:

```
DES-3550:4# create address_binding ip_mac ipaddress 10.1.1.3 mac_address 00-00-00-00-00-04
Command: create address_binding ip_mac ipaddress 10.1.1.3 mac_address 00-00-00-00-00-04
```

**Success.**

```
DES-3550:4#
```

**config address\_binding ip\_mac ipaddress**

Purpose	Used to change an existing IP-MAC Binding entry.
Syntax	<b>&lt;ipaddr&gt; mac_address &lt;macaddr&gt;</b>
Description	Use this to change the IP address/MAC address association of an IP-MAC binding entry that has already been created.
Parameters	<p>&lt;ipaddr&gt; The IP address of the device where the IP-MAC binding is made.</p> <p>&lt;macaddr&gt; The MAC address of the device where the IP-MAC binding is made.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To config address binding on the switch:

```
DES-3550:4# config address_binding ip_mac ipaddress 10.1.1.3 mac_address 00-00-00-00-00-05
Command: config address_binding ip_mac ipaddress 10.1.1.3 mac_address 00-00-00-00-00-05

Success.
DES-3550:4#
```

### config address\_binding ip\_mac ports

Purpose	Used to configure an IP-MAC state to enable or disable for specified ports.
Syntax	<b>config address_binding ip_mac ports [ &lt;portlist&gt;   all ] state [ enable   disable ]</b>
Description	This command is used to enable disable IP-MAC binding for specified ports. The IP-MAC binding entry applies only to the specified port or ports.
Parameters	<p>&lt;portlist&gt; – Specifies a port or range of ports.</p> <p>all – Specifies all ports on the switch.</p> <p>state [ enable   disable ] – Enables or disables IP-MAC binding for the specified range of ports. When enabled the IP-MAC binding comparison is applied to traffic (ARP packets) through the specified ports.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To config address binding on the switch:

```
DES-3550:4# config address_binding ip_mac ports 2 state enable
Command: config address_binding ip_mac ports 2 state enable

Success.
DES-3550:4#
```

**show address\_binding**

Purpose	Used to display IP-MAC Binding entries, port status and list blocked addresses.
Syntax	<b>show address_binding [ ip_mac { [ all   ipaddress &lt;ipaddr&gt; mac_address&lt;macaddr&gt; ] }   blocked { [ all   vlan_name &lt;vlan_name&gt; mac_address &lt;macaddr&gt; ] }   ports ]</b>
Description	This command will display IP-MAC Binding entries according to the following criteria: <ul style="list-style-type: none"> <li>• <i>IP_MAC</i> –Address Binding entries can be viewed by entering the MAC and IP addresses of the device.</li> <li>• <i>Blocked</i> – MAC addresses that have been blocked and black listed after failing the IP-MAC binding comparison.</li> <li>• <i>Ports</i> - IP-MAC binding entries listed by port number.</li> </ul>
Parameters	<p><i>all</i> – For IP_MAC binding <i>all</i> specifies all the IP-MAC binding entries; for Blocked Address Binding entries <i>all</i> specifies all the blocked VLANs and their bound physical addresses.</p> <p>&lt;ipaddr&gt; The IP address of the device where the IP-MAC binding is made.</p> <p>&lt;macaddr&gt; The MAC address of the device where the IP-MAC binding is made.</p> <p>&lt;vlan_name&gt; The VLAN name of the VLAN that is bound to a MAC address in order to block a specific device on a known VLAN.</p>
Restrictions	None

Example usage:

To display the address binding information:

```
DES-3550:4# show address_binding ip_mac
Command: show address_binding ip_mac

Enabled ports: 1-8

IP Address      MAC Address
-----
10.1.1.1       00-00-00-00-00-11

Success.

DES-3550:4#
```



**delete address-binding**

Purpose	Used to delete IP-MAC Binding entries from the database of authorized addresses or the black list of blocked addresses.
Syntax	<b>[ ip-mac [ ipaddress &lt;ipaddr&gt; mac_address &lt;macaddr&gt;   all ]   blocked [ all   vlan_name &lt;vlan_name&gt; mac_address &lt;macaddr&gt; ] ]</b>
Description	<p>This command will delete IP-MAC Binding entries of authorized or blocked addresses. Two types of entries may be deleted:</p> <ul style="list-style-type: none"> <li>• <i>IP_MAC</i> – Individual Address Binding entries can be deleted by entering the physical and IP addresses of the device. Specify <i>all</i> to delete all the Address Binding entries.</li> <li>• <i>Blocked</i> – Blocked address binding entries (bindings between VLAN names and MAC addresses) can be deleted by entering the VLAN name and the physical address of the device. To delete all the Blocked Address Binding entries, toggle <i>all</i>.</li> </ul>
Parameters	<p><i>&lt;ipaddr&gt;</i> The IP address of the device where the IP-MAC binding is made.</p> <p><i>&lt;macaddr&gt;</i> The MAC address of the device where the IP-MAC binding is made.</p> <p><i>&lt;vlan_name&gt;</i> The VLAN name of the VLAN that is bound to a MAC address in order to block a specific device on a known VLAN.</p> <p><i>all</i> – For <i>IP_MAC</i> binding <i>all</i> specifies all the IP-MAC binding entries; for Blocked Address Binding entries <i>all</i> specifies all the blocked VLANs and their bound physical addresses.</p>
Restrictions	Only administrator-level users can issue this command.

## Example usage:

To delete an IP-MAC binding entry from the database of authorized addresses:

```
DES-3550:4# delete address-binding ip-mac ipaddress 10.1.1.1 mac_address 00-00-00-00-00-06
Command: delete address-binding ip-mac ipaddress 10.1.1.1 mac_address 00-00-00-00-00-06
```

**Success.**

```
DES-3550:4#
```

**ARP COMMANDS**

The ARP commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
create arpentry	<ipaddr> <macaddr>
config arpentry	<ipaddr> <macaddr>
delete arpentry	{[<ipaddr>   all]}
show arpentry	{[pif <ipif_name 12>   ipaddress <ipaddr>   [static   local]}
config arp_aging time	<value 0-65535>
clear arptable	

Each command is listed, in detail, in the following sections.

**create arpentry**

Purpose	Used to make a static entry into the ARP table.
Syntax	<b>create arpentry &lt;ipaddr&gt; &lt;macaddr&gt;</b>
Description	This command is used to enter an IP address and the corresponding MAC address into the Switch's ARP table.
Parameters	<ipaddr> – The IP address of the end node or station.  <macaddr> – The MAC address corresponding to the IP address above.
Restrictions	Only administrator-level users can issue this command.

## Example Usage:

To create a static arp entry for the IP address 10.48.74.121 and MAC address 00:50:BA:00:07:36:

```
DES-3550:4#create arpentry 10.48.74.121 00-50-BA-00-07-36
Command: create arpentry 10.48.74.121 00-50-BA-00-07-36

Success.

DES-3550:4#
```

**config arpentry**

Purpose	Used to configure a static entry in the ARP table.
Syntax	<b>config arpentry &lt;ipaddr&gt; &lt;macaddr&gt;</b>
Description	This command is used to configure a static entry in the ARP Table. The user may specify the IP address and the corresponding MAC address of an entry in the Switch's ARP table.
Parameters	<ipaddr> – The IP address of the end node or station.  <macaddr> – The MAC address corresponding to the IP address above.
Restrictions	Only administrator-level users can issue this command.

## Example Usage:

To configure a static arp entry for the IP address 10.48.74.12 and MAC address 00:50:BA:00:07:36:

```
DES-3550:4#config arpentry 10.48.74.12 00-50-BA-00-07-36
Command: config arpentry 10.48.74.12 00-50-BA-00-07-36

Success.

DES-3550:4#
```

**delete arpentry**

Purpose	Used to delete a static entry into the ARP table.
Syntax	<b>delete arpentry</b> {[<ipaddr>   all]}
Description	This command is used to delete a static ARP entry, made using the <i>create arpentry</i> command above, by specifying either the IP address of the entry or all. Specifying <i>all</i> clears the Switch's ARP table.
Parameters	<i>&lt;ipaddr&gt;</i> – The IP address of the end node or station.  <i>all</i> – Deletes all ARP entries.
Restrictions	Only administrator-level users can issue this command.

## Example Usage:

To delete an entry of IP address 10.48.74.121 from the ARP table:

```
DES-3550:4#delete arpentry 10.48.74.121
Command: delete arpentry 10.48.74.121

Success.

DES-3550:4#
```

## config arp\_aging time

Purpose	Used to configure the age-out timer for ARP table entries on the Switch.
Syntax	<b>config arp_aging time &lt;value 0-65535&gt;</b>
Description	This command sets the maximum amount of time, in minutes, that an ARP entry can remain in the Switch's ARP table, without being accessed, before it is dropped from the table.
Parameters	<i>time</i> <value 0-65535> – The ARP age-out time, in minutes. The value may be set in the range of 0-65535 minutes with a default setting of 20 minutes.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To configure ARP aging time:

```
DES-3550:4#config arp_aging time 30
Command: config arp_aging time 30

Success.

DES-3550:4#
```

**show arpentry**

Purpose	Used to display the ARP table.
Syntax	<b>show arpentry {ipif &lt;ipif_name 12&gt;   ipaddress &lt;ipaddr&gt;   [static   local]}</b>
Description	This command is used to display the current contents of the Switch's ARP table.
Parameters	<p><i>ipif &lt;ipif_name 12&gt;</i> – The name of the IP interface the end node or station for which the ARP table entry was made, resides on.</p> <p><i>ipaddress &lt;ipaddr&gt;</i> – The network address corresponding to the IP interface name above.</p> <p><i>static</i> – Displays the static entries to the ARP table.</p> <p><i>local</i> – Displays the local entries in the ARP table.</p>
Restrictions	None.

## Example Usage:

To display the ARP table:

```
DES-3550:4#show arpentry
Command: show arpentry

ARP Aging Time : 30

Interface      IP Address      MAC Address      Type
-----
System        10.0.0.0        FF-FF-FF-FF-FF-FF  Local/Broadcast
System        10.1.1.169      00-50-BA-70-E4-4E  Dynamic
System        10.1.1.254      00-01-30-FA-5F-00  Dynamic
System        10.9.68.1       00-A0-C9-A4-22-5B  Dynamic
System        10.9.68.4       00-80-C8-2E-C7-45  Dynamic
System        10.10.27.51     00-80-C8-48-DF-AB  Dynamic
System        10.11.22.145    00-80-C8-93-05-6B  Dynamic
System        10.11.94.10     00-10-83-F9-37-6E  Dynamic
System        10.14.82.24     00-50-BA-90-37-10  Dynamic
System        10.15.1.60      00-80-C8-17-42-55  Dynamic
System        10.17.42.153    00-80-C8-4D-4E-0A  Dynamic
System        10.19.72.100    00-50-BA-38-7D-5E  Dynamic
System        10.21.32.203    00-80-C8-40-C1-06  Dynamic
System        10.40.44.60     00-50-BA-6B-2A-1E  Dynamic
System        10.42.73.221    00-01-02-03-04-00  Dynamic
System        10.44.67.1      00-50-BA-DA-02-51  Dynamic
System        10.47.65.25     00-50-BA-DA-03-2B  Dynamic
System        10.50.8.7       00-E0-18-45-C7-28  Dynamic
System        10.90.90.90     00-01-02-03-04-00  Local
System        10.255.255.255  FF-FF-FF-FF-FF-FF  Local/Broadcast

Total Entries = 20

DES-3550:4#
```

## **clear arptable**

Purpose	Used to remove all dynamic ARP table entries.
Syntax	<b>clear arptable</b>
Description	This command is used to remove dynamic ARP table entries from the Switch's ARP table. Static ARP table entries are not affected.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To remove dynamic entries in the ARP table:

```
DES-3550:4#clear arptable
Command: clear arptable

Success.

DES-3550:4#
```



---

**ROUTING TABLE COMMANDS**

The routing table commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
create iproute	[default] <ipaddr> {<metric 1-65535>}
delete iproute	[default]
show iproute	

Each command is listed, in detail, in the following sections.

**create iproute default**

Purpose	Used to create IP route entries to the Switch's IP routing table.
Syntax	<b>create iproute [default] &lt;ipaddr&gt; {&lt;metric 1-65535&gt;}</b>
Description	This command is used to create a default static IP route entry to the Switch's IP routing table.
Parameters	<i>&lt;ipaddr&gt;</i> – The gateway IP address for the next hop router.  <i>&lt;metric 1-65535&gt;</i> – Allows the entry of a routing protocol metric entry representing the number of routers between the Switch and the IP address above. The default setting is 1.
Restrictions	Only administrator-level users can issue this command.

## Example Usage:

To add the default static address 10.48.74.121, with a metric setting of 1, to the routing table:

```
DES-3550:4#create iproute default 10.48.74.121 1
Command: create iproute default 10.48.74.121 1

Success.

DES-3550:4#
```

## **delete iproute default**

Purpose	Used to delete a default IP route entry from the Switch's IP routing table.
Syntax	<b>delete iproute [default]</b>
Description	This command will delete an existing default entry from the Switch's IP routing table.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the default IP route 10.53.13.254:

```
DES-3550:4#delete iproute default 10.53.13.254
```

```
Command: delete iproute default 10.53.13.254
```

```
Success.
```

```
DES-3550:4#
```

**show iproute**

Purpose	Used to display the Switch's current IP routing table.
Syntax	<b>show iproute</b>
Description	This command will display the Switch's current IP routing table.
Parameters	None.
Restrictions	None.

Example Usage:

To display the contents of the IP routing table:

```
DES-3550:4#show iproute
Command: show iproute

Routing Table

IP Address/Netmask  Gateway          Interface        Hops  Protocol
-----
0.0.0.0             10.1.1.254      System           1     Default
10.0.0.0/8         10.48.74.122   System           1     Local

Total Entries: 2

DES-3550:4#
```

## MAC NOTIFICATION COMMANDS

The MAC notification commands in the Command Line Interface (CLI) are listed, in the following table, along with their appropriate parameters.

Command	Parameters
enable mac_notification	
disable mac_notification	
config mac_notification	{interval <int 1-2147483647>   historysize <int 1-500>
config mac_notification ports	[<portlist>   all] [enable   disable]
show mac_notification	
show mac_notification ports	<portlist>

Each command is listed, in detail, in the following sections.

### **enable mac\_notification**

Purpose	Used to enable global MAC address table notification on the Switch.
Syntax	<b>enable mac_notification</b>
Description	This command is used to enable MAC address notification without changing configuration.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To enable MAC notification without changing basic configuration:

```
DES-3550:4#enable mac_notification
Command: enable mac_notification

Success.

DES-3550:4#
```

### **disable mac\_notification**

Purpose	Used to disable global MAC address table notification on the Switch.
Syntax	<b>disable mac_notification</b>
Description	This command is used to disable MAC address notification without changing configuration.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example Usage:

To disable MAC notification without changing basic configuration:

```
DES-3550:4#disable mac_notification
Command: disable mac_notification

Success.

DES-3550:4#
```

**config mac\_notification**

Purpose	Used to configure MAC address notification.
Syntax	<b>config mac_notification {interval &lt;int 1-2147483647&gt;   historysize &lt;int 1-500&gt;</b>
Description	MAC address notification is used to monitor MAC addresses learned and entered into the FDB.
Parameters	<p><i>interval &lt;sec 1-2147483647&gt;</i> - The time in seconds between notifications. The user may choose an interval between 1 and 2,147,483,647 seconds.</p> <p><i>historysize &lt;1 - 500&gt;</i> - The maximum number of entries listed in the history log used for notification.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the Switch's MAC address table notification global settings:

```
DES-3550:4#config mac_notification interval 1 historysize 500
Command: config mac_notification interval 1 historysize 500

Success.

DES-3550:4#
```

**config mac\_notification ports**

Purpose	Used to configure MAC address notification status settings.
Syntax	<b>config mac_notification ports [&lt;portlist   all] [enable   disable]</b>
Description	MAC address notification is used to monitor MAC addresses learned and entered into the FDB.
Parameters	<i>&lt;portlist&gt;</i> - Specify a port or range of ports to be configured.  <i>all</i> – Entering this command will set all ports on the system.  <i>[enable   disable]</i> – These commands will enable or disable MAC address table notification on the Switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable port 7 for MAC address table notification:

```
DES-3550:4#config mac_notification ports 7 enable
Command: config mac_notification ports 7 enable

Success.

DES-3550:4#
```



**show mac\_notification**

Purpose	Used to display the Switch's MAC address table notification global settings
Syntax	<b>show mac_notification</b>
Description	This command is used to display the Switch's MAC address table notification global settings.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To view the Switch's MAC address table notification global settings:

```
DES-3550:4#show mac_notification
Command: show mac_notification

Global Mac Notification Settings

State      : Enabled
Interval   : 1
History Size : 1

DES-3550:4#
```

**show mac\_notification ports**

Purpose	Used to display the Switch's MAC address table notification status settings
Syntax	<b>show mac_notification ports &lt;portlist&gt;</b>
Description	This command is used to display the Switch's MAC address table notification status settings.
Parameters	<portlist> - Specify a port or group of ports to be viewed. Entering this command without the parameter will display the MAC notification table for all ports.
Restrictions	None

Example usage:

To display all port's MAC address table notification status settings:

```
DES-3550:4#show mac_notification ports
Command: show mac_notification ports

Port #  MAC Address Table Notification State
-----  -----
1          Disabled
2          Disabled
3          Disabled
4          Disabled
5          Disabled
6          Disabled
7          Disabled
8          Disabled
9          Disabled
10         Disabled
11         Disabled
12         Disabled
13         Disabled
14         Disabled
15         Disabled
16         Disabled
17         Disabled
18         Disabled
19         Disabled
20         Disabled
CTRL+C ESC q Quit SPACE n Next Page p Previous Page r Refresh
```

## ACCESS AUTHENTICATION CONTROL COMMANDS

The TACACS / XTACACS / TACACS+ / RADIUS commands let you secure access to the Switch using the TACACS / XTACACS / TACACS+ / RADIUS protocols. When a user logs in to the Switch or tries to access the administrator level privilege, he or she is prompted for a password. If TACACS / XTACACS / TACACS+ / RADIUS authentication is enabled on the Switch, it will contact a TACACS / XTACACS / TACACS+ / RADIUS server to verify the user. If the user is verified, he or she is granted access to the Switch.

There are currently three versions of the TACACS security protocol, each a separate entity. The Switch's software supports the following versions of TACACS:

- TACACS (Terminal Access Controller Access Control System) — Provides password checking and authentication, and notification of user actions for security purposes utilizing via one or more centralized TACACS servers, utilizing the UDP protocol for packet transmission.
- Extended TACACS (XTACACS) — An extension of the TACACS protocol with the ability to provide more types of authentication requests and more types of response codes than TACACS. This protocol also uses UDP to transmit packets.
- TACACS+ (Terminal Access Controller Access Control System plus) — Provides detailed access control for authentication for network devices. TACACS+ is facilitated through Authentication commands via one or more centralized servers. The TACACS+ protocol encrypts all traffic between the Switch and the TACACS+ daemon, using the TCP protocol to ensure reliable delivery.

The Switch also supports the RADIUS protocol for authentication using the Access Authentication Control commands. RADIUS or Remote Authentication Dial In User Server also uses a remote server for authentication and can be responsible for receiving user connection requests, authenticating the user and returning all configuration information necessary for the client to deliver service through the user. RADIUS may be facilitated on this Switch using the commands listed in this section.

In order for the TACACS / XTACACS / TACACS+ / RADIUS security function to work properly, a TACACS / XTACACS / TACACS+ / RADIUS server must be configured on a device other than the Switch, called a *server host* and it must include usernames and passwords for authentication. When the user is prompted by the Switch to enter usernames and passwords for authentication, the Switch contacts the TACACS / XTACACS / TACACS+ / RADIUS server to verify, and the server will respond with one of three messages:

- A) The server verifies the username and password, and the user is granted normal user privileges on the Switch.
- B) The server will not accept the username and password and the user is denied access to the Switch.
- C) The server doesn't respond to the verification query. At this point, the Switch receives the timeout from the server and then moves to the next method of verification configured in the method list.

The Switch has four built-in *server groups*, one for each of the TACACS, XTACACS, TACACS+ and RADIUS protocols. These built-in *server groups* are used to authenticate users trying to access the Switch. The users will set *server hosts* in a preferable order in the built-in *server group* and when a user tries to gain access to the Switch, the Switch will ask the first *server host* for authentication. If no authentication is made, the second *server host* in the list will be queried, and so on. The built-in *server group* can only have hosts that are running the specified protocol. For example, the TACACS *server group* can only have TACACS *server hosts*.

The administrator for the Switch may set up 6 different authentication techniques per user-defined *method list* (TACACS / XTACACS / TACACS+ / RADIUS / local / none) for authentication. These techniques will be listed in an order preferable, and defined by the user for normal user authentication on the Switch, and may contain up to eight authentication techniques. When a user attempts to access the Switch, the Switch will select the first technique listed for authentication. If the first technique goes through its *server hosts* and no authentication is returned, the Switch will then go to the next technique listed in the server group for authentication, until the authentication has been verified or denied, or the list is exhausted.

Please note that user granted access to the Switch will be granted normal user privileges on the Switch. To gain access to admin level privileges, the user must enter the *enable admin* command and then enter a password, which was previously configured by the administrator of the Switch.



**NOTE:** TACACS, XTACACS and TACACS+ are separate entities and are not compatible. The Switch and the server must be configured exactly the same, using the same protocol. (For example, if the Switch is set up for TACACS authentication, so must be the host server.)

The TACACS commands are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable authen_policy	
disable authen_policy	
show authen_policy	
create authen_login method_list_name	<string 15>
config authen_login	[default   method_list_name <string 15>] method {tacacs   xtacacs   tacacs+   radius   server_group <string 15>   local   none}
delete authen_login method_list_name	<string 15>
show authen_login	{default   method_list_name <string 15>   all}
create authen_enable method_list_name	<string 15>
config authen_enable	[default   method_list_name <string 15>] method {tacacs   xtacacs   tacacs+   radius   server_group <string 15>   local_enable   none}
delete authen_enable method_list_name	<string 15>
show authen_enable	[default   method_list_name <string 15>   all]
config authen application	{console   telnet   ssh   http   all} [login   enable] [default   method_list_name <string 15>]
show authen application	
create authen server_group	<string 15>
config authen server_group	[tacacs   xtacacs   tacacs+   radius   <string 15>] [add   delete] server_host <ipaddr> protocol [tacacs   xtacacs   tacacs+   radius]
delete authen server_group	<string 15>
show authen server_group	<string 15>
create authen server_host	<ipaddr> protocol [tacacs   xtacacs   tacacs+   radius] {port <int 1-65535>   key [<key_string 254>   none]   timeout <int 1-255>   retransmit <int 1-255>}
config authen server_host	<ipaddr> protocol [tacacs   xtacacs   tacacs+   radius] {port <int 1-65535>   key [<key_string 254>   none]   timeout <int 1-255>   retransmit <int 1-255>}
delete authen server_host	<ipaddr> protocol [tacacs   xtacacs   tacacs+   radius]
show authen server_host	
config authen parameter response_timeout	<int 1-255>
config authen parameter attempt	<int 1-255>
show authen parameter	
enable admin	
config admin local_enable	

Each command is listed, in detail, in the following sections.

### **enable authen\_policy**

Purpose	Used to enable system access authentication policy.
Syntax	<b>enable authen_policy</b>
Description	This command will enable an administrator-defined authentication policy for users trying to access the Switch. When enabled, the device will check the method list and choose a technique for user authentication upon login.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable the system access authentication policy:

```
DES-3550:4#enable authen_policy
Command: enable authen_policy

Success.

DES-3550:4#
```

## **disable authen\_policy**

Purpose	Used to disable system access authentication policy.
Syntax	<b>disable authen_policy</b>
Description	This command will disable the administrator-defined authentication policy for users trying to access the Switch. When disabled, the Switch will access the local user account database for username and password verification. In addition, the Switch will now accept the local enable password as the authentication for normal users attempting to access administrator level privileges.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable the system access authentication policy:

```
DES-3550:4#disable authen_policy  
Command: disable authen_policy  
  
Success.  
  
DES-3550:4#
```

## **show authen\_policy**

Purpose	Used to display the system access authentication policy status on the Switch.
Syntax	<b>show authen_policy</b>
Description	This command will show the current status of the access authentication policy on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To display the system access authentication policy:

```
DES-3550:4#show authen_policy  
Command: show authen_policy  
  
Authentication Policy: Enabled  
  
DES-3550:4#
```



## **create authen\_login method\_list\_name**

Purpose	Used to create a user defined method list of authentication methods for users logging on to the Switch.
Syntax	<b>create authen_login method_list_name &lt;string 15&gt;</b>
Description	This command is used to create a list for authentication techniques for user login. The Switch can support up to eight method lists, but one is reserved as a default and cannot be deleted. Multiple method lists must be created and configured separately.
Parameters	<string 15> - Enter an alphanumeric string of up to 15 characters to define the given <i>method list</i> .
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create the method list “Trinity.”:

```
DES-3550:4#create authen_login method_list_name Trinity  
Command: create authen_login method_list_name Trinity  
  
Success.  
  
DES-3550:4#
```

**config\_authen\_login**

Purpose	Used to configure a user-defined or default <i>method list</i> of authentication methods for user login.
Syntax	<b>config_authen_login [default   method_list_name &lt;string 15&gt;] method {tacacs   xtacacs   tacacs+   radius   server_group &lt;string 15&gt;   local   none}</b>
Description	<p>This command will configure a user-defined or default <i>method list</i> of authentication methods for users logging on to the Switch. The sequence of methods implemented in this command will affect the authentication result. For example, if a user enters a sequence of methods like <i>tacacs – xtacacs – local</i>, the Switch will send an authentication request to the first <i>tacacs</i> host in the server group. If no response comes from the server host, the Switch will send an authentication request to the second <i>tacacs</i> host in the server group and so on, until the list is exhausted. At that point, the Switch will restart the same sequence with the following protocol listed, <i>xtacacs</i>. If no authentication takes place using the <i>xtacacs</i> list, the <i>local</i> account database set in the Switch is used to authenticate the user. When the local method is used, the privilege level will be dependant on the local account privilege configured on the Switch.</p> <p>Successful login using any of these methods will give the user a “user” privilege only. If the user wishes to upgrade his or her status to the administrator level, the user must implement the <i>enable_admin</i> command, followed by a previously configured password. (See the <b>enable_admin</b> part of this section for more detailed information, concerning the <b>enable_admin</b> command.)</p>
Parameters	<p><i>default</i> – The default method list for access authentication, as defined by the user. The user may choose one or a combination of up to four(4) of the following authentication methods:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Adding this parameter will require the user to be authenticated using the TACACS protocol from the remote TACACS <i>server hosts</i> of the TACACS <i>server group</i> list.</li> <li>▪ <i>xtacacs</i> – Adding this parameter will require the user to be authenticated using the XTACACS protocol from the remote XTACACS <i>server hosts</i> of the XTACACS <i>server group</i> list.</li> <li>▪ <i>tacacs+</i> – Adding this parameter will require the user to be authenticated using the TACACS+ protocol from the remote TACACS+ <i>server hosts</i> of the TACACS+ <i>server group</i> list.</li> <li>▪ <i>radius</i> - Adding this parameter will require the user to be authenticated using the RADIUS protocol from the remote RADIUS <i>server hosts</i> of the RADIUS <i>server group</i> list.</li> <li>▪ <i>server_group &lt;string 15&gt;</i> - Adding this parameter will require the user to be authenticated using a user-defined server group previously configured on the Switch.</li> <li>▪ <i>local</i> - Adding this parameter will require the user to be authenticated using the local <i>user account</i> database on the Switch.</li> <li>▪ <i>none</i> – Adding this parameter will require no authentication to access the sSwitch.</li> </ul> <p><i>method_list_name</i> – Enter a previously implemented method list name defined by the user. The user may add one, or a combination of up to four (4) of the following authentication methods to this method list:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Adding this parameter will require the user to be authenticated using the</li> </ul>

## config authen\_login

TACACS protocol from a remote TACACS server.

- *xtacacs* – Adding this parameter will require the user to be authenticated using the XTACACS protocol from a remote XTACACS server.
- *tacacs+* – Adding this parameter will require the user to be authenticated using the TACACS+ protocol from a remote TACACS+ server.
- *radius* - Adding this parameter will require the user to be authenticated using the RADIUS protocol from a remote RADIUS server.
- *server\_group <string 15>* - Adding this parameter will require the user to be authenticated using a user-defined server group previously configured on the Switch.
- *local* - Adding this parameter will require the user to be authenticated using the local *user account* database on the Switch.
- *none* – Adding this parameter will require no authentication to access the Switch.



**NOTE:** Entering *none* or *local* as an authentication protocol will override any other authentication that follows it on a method list or on the default method list.

### Restrictions

Only administrator-level users can issue this command.

Example usage:

To configure the user defined method list “Trinity” with authentication methods tacacs, xtacacs and local, in that order.

```
DES-3550:4#config authen_login method_list_name Trinity method
tacacs xtacacs local
Command: config authen_login method_list_name Trinity method tacacs
xtacacs local

Success.

DES-3550:4#
```

Example usage:

To configure the default method list with authentication methods xtacacs, tacacs+ and local, in that order:

```
DES-3550:4#config authen_login default method xtacacs tacacs+ local
Command: config authen_login default method xtacacs tacacs+ local

Success.

DES-3550:4#
```

## **delete authen\_login method\_list\_name**

Purpose	Used to delete a previously configured user defined method list of authentication methods for users logging on to the Switch.
Syntax	<b>delete authen_login method_list_name &lt;string 15&gt;</b>
Description	This command is used to delete a list for authentication methods for user login.
Parameters	<string 15> - Enter an alphanumeric string of up to 15 characters to define the given <i>method list</i> the user wishes to delete.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the method list name “Trinity”:

```
DES-3550:4#delete authen_login method_list_name Trinity  
Command: delete authen_login method_list_name Trinity  
  
Success.  
  
DES-3550:4#
```

**show authen\_login**

Purpose	Used to display a previously configured user defined method list of authentication methods for users logging on to the Switch.
Syntax	<b>show authen_login [default   method_list_name &lt;string 15&gt;   all]</b>
Description	This command is used to show a list of authentication methods for user login.
Parameters	<p><i>default</i> – Entering this parameter will display the default method list for users logging on to the Switch.</p> <p><i>method_list_name &lt;string 15&gt;</i> - Enter an alphanumeric string of up to 15 characters to define the given <i>method list</i> the user wishes to view.</p> <p><i>all</i> – Entering this parameter will display all the authentication login methods currently configured on the Switch.</p> <p>The window will display the following parameters:</p> <ul style="list-style-type: none"> <li>▪ Method List Name – The name of a previously configured method list name.</li> <li>▪ Priority – Defines which order the method list protocols will be queried for authentication when a user attempts to log on to the Switch. Priority ranges from 1(highest) to 4 (lowest).</li> <li>▪ Method Name – Defines which security protocols are implemented, per method list name.</li> <li>▪ Comment – Defines the type of Method. <i>User-defined Group</i> refers to server group defined by the user. <i>Built-in Group</i> refers to the TACACS, XTACACS, TACACS+ and RADIUS security protocols which are permanently set in the Switch. <i>Keyword</i> refers to authentication using a technique INSTEAD of TACACS / XTACACS / TACACS+ / RADIUS which are local (authentication through the user account on the Switch) and none (no authentication necessary to access any function on the Switch).</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To view the authentication login method list named Trinity:

```
DES-3550:4#show authen_login method_list_name Trinity
Command: show authen_login method_list_name Trinity

Method List Name  Priority  Method Name  Comment
-----
Trinity           1        tacacs+      Built-in Group
                  2        tacacs       Built-in Group
                  3        Darren       User-defined Group
                  4        local        Keyword

DES-3550:4#
```

**create authen\_enable method\_list\_name**

Purpose	Used to create a user-defined method list of authentication methods for promoting normal user level privileges to Administrator level privileges on the Switch.
Syntax	<b>create authen_enable method_list_name &lt;string 15&gt;</b>
Description	This command is used to promote users with normal level privileges to Administrator level privileges using authentication methods on the Switch. Once a user acquires normal user level privileges on the Switch, he or she must be authenticated by a method on the Switch to gain administrator privileges on the Switch, which is defined by the Administrator. A maximum of eight (8) enable method lists can be implemented on the Switch.
Parameters	<i>&lt;string 15&gt;</i> - Enter an alphanumeric string of up to 15 characters to define the given <i>enable method list</i> the user wishes to create.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create a user-defined method list, named “Permit” for promoting user privileges to Administrator privileges:

```
DES-3550:4#create authen_enable method_list_name Permit
Command: show authen_login method_list_name Permit

Success.

DES-3550:4#
```

**config authen\_enable**

Purpose	Used to configure a user-defined method list of authentication methods for promoting normal user level privileges to Administrator level privileges on the Switch.
Syntax	<b>config authen_enable [default   method_list_name &lt;string 15&gt;] method {tacacs   xtacacs   tacacs+   radius   server_group &lt;string 15&gt;   local_enable   none}</b>
Description	<p>This command is used to promote users with normal level privileges to Administrator level privileges using authentication methods on the Switch. Once a user acquires normal user level privileges on the Switch, he or she must be authenticated by a method on the Switch to gain administrator privileges on the Switch, which is defined by the Administrator. A maximum of eight (8) enable method lists can be implemented simultaneously on the Switch.</p> <p>The sequence of methods implemented in this command will affect the authentication result. For example, if a user enters a sequence of methods like <i>tacacs – xtacacs – local_enable</i>, the Switch will send an authentication request to the first TACACS host in the server group. If no verification is found, the Switch will send an authentication request to the second TACACS host in the server group and so on, until the list is exhausted. At that point, the Switch will restart the same sequence with the following protocol listed, <i>xtacacs</i>. If no authentication takes place using the <i>xtacacs</i> list, the <i>local_enable</i> password set in the Switch is used to authenticate the user.</p> <p>Successful authentication using any of these methods will give the user an “Admin” level privilege.</p>
Parameters	<p><i>default</i> – The default method list for administration rights authentication, as defined by the user. The user may choose one or a combination of up to four (4) of the following authentication methods:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Adding this parameter will require the user to be authenticated using the TACACS protocol from the remote TACACS <i>server hosts</i> of the TACACS <i>server group</i> list.</li> <li>▪ <i>xtacacs</i> – Adding this parameter will require the user to be authenticated using the XTACACS protocol from the remote XTACACS <i>server hosts</i> of the XTACACS <i>server group</i> list.</li> <li>▪ <i>tacacs+</i> – Adding this parameter will require the user to be authenticated using the TACACS+ protocol from the remote TACACS+ <i>server hosts</i> of the TACACS+ <i>server group</i> list.</li> <li>▪ <i>radius</i> – Adding this parameter will require the user to be authenticated using the RADIUS protocol from the remote RADIUS <i>server hosts</i> of the RADIUS <i>server group</i> list.</li> <li>▪ <i>server_group &lt;string 15&gt;</i> - Adding this parameter will require the user to be authenticated using a user-defined server group previously configured on the Switch.</li> <li>▪ <i>local_enable</i> - Adding this parameter will require the user to be authenticated using the local <i>user account</i> database on the Switch.</li> <li>▪ <i>none</i> – Adding this parameter will require no authentication to access the Switch.</li> </ul> <p><i>method_list_name</i> – Enter a previously implemented method list name defined by the user (<i>create authen_enable</i>). The user may add one, or a combination of up to four (4) of the following authentication methods to this method list:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Adding this parameter will require the user to be authenticated using the</li> </ul>



**config authen\_enable**

TACACS protocol from a remote TACACS server.

- *xtacacs* – Adding this parameter will require the user to be authenticated using the XTACACS protocol from a remote XTACACS server.
- *tacacs+* – Adding this parameter will require the user to be authenticated using the TACACS+ protocol from a remote TACACS+ server.
- *radius* - Adding this parameter will require the user to be authenticated using the RADIUS protocol from a remote RADIUS server.
- *server\_group* <string 15> - Adding this parameter will require the user to be authenticated using a user-defined server group previously configured on the Switch.
- *local\_enable* - Adding this parameter will require the user to be authenticated using the local *user account* database on the Switch. The local enable password of the device can be configured using the “*config admin local\_password*” command.
- *none* – Adding this parameter will require no authentication to access the administration level privileges on the Switch.

Restrictions            Only administrator-level users can issue this command.

Example usage:

To configure the user defined method list “Permit” with authentication methods tacacs, xtacacs and local, in that order.

```
DES-3550:4#config authen_enable method_list_name Trinity method
tacacs xtacacs local
Command: config authen_enable method_list_name Trinity method
tacacs xtacacs local

Success.

DES-3550:4#
```

Example usage:

To configure the default method list with authentication methods xtacacs, tacacs+ and local, in that order:

```
DES-3550:4#config authen_enable default method xtacacs tacacs+ local
Command: config authen_enable default method xtacacs tacacs+ local

Success.

DES-3550:4#
```

**delete authen\_enable method\_list\_name**

Purpose	Used to delete a user-defined method list of authentication methods for promoting normal user level privileges to Administrator level privileges on the Switch.
Syntax	<b>delete authen_enable method_list_name &lt;string 15&gt;</b>
Description	This command is used to delete a user-defined method list of authentication methods for promoting user level privileges to Administrator level privileges.
Parameters	<string 15> - Enter an alphanumeric string of up to 15 characters to define the given <i>enable method list</i> the user wishes to delete.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the user-defined method list "Permit"

```
DES-3550:4#delete authen_enable method_list_name Permit
Command: delete authen_enable method_list_name Permit

Success.

DES-3550:4#
```

**show authen\_enable**

Purpose	Used to display the method list of authentication methods for promoting normal user level privileges to Administrator level privileges on the Switch.
Syntax	<b>show authen_enable [default   method_list_name &lt;string 15&gt;   all]</b>
Description	This command is used to delete a user-defined method list of authentication methods for promoting user level privileges to Administrator level privileges.
Parameters	<p><i>default</i> – Entering this parameter will display the default method list for users attempting to gain access to Administrator level privileges on the Switch.</p> <p><i>method_list_name &lt;string 15&gt;</i> - Enter an alphanumeric string of up to 15 characters to define the given <i>method list</i> the user wishes to view.</p> <p><i>all</i> – Entering this parameter will display all the authentication login methods currently configured on the Switch.</p> <p>The window will display the following parameters:</p> <ul style="list-style-type: none"> <li>▪ Method List Name – The name of a previously configured method list name.</li> <li>▪ Priority – Defines which order the method list protocols will be queried for authentication when a user attempts to log on to the Switch. Priority ranges from 1(highest) to 4 (lowest).</li> <li>▪ Method Name – Defines which security protocols are implemented, per method list name.</li> <li>▪ Comment – Defines the type of Method. <i>User-defined Group</i> refers to <i>server groups</i> defined by the user. <i>Built-in Group</i> refers to the TACACS, XTACACS, TACACS+ and RADIUS security protocols which are permanently set in the Switch. <i>Keyword</i> refers to authentication using a technique INSTEAD of TACACS/XTACACS/TACACS+/RADIUS which are local (authentication through the <i>local_enable</i> password on the Switch) and none (no authentication necessary to access any function on the Switch).</li> </ul>
Restrictions	None

Example usage:

To display all method lists for promoting user level privileges to administrator level privileges.

```
DES-3550:4#show authen_enable all
Command: show authen_enable all

Method List Name Priority Method Name Comment
-----
Permit            1      tacacs+   Built-in Group
                  2      tacacs    Built-in Group
                  3      Darren    User-defined Group
                  4      local     Keyword

default           1      tacacs+   Built-in Group
                  2      local     Keyword

Total Entries : 2

DES-3550:4#
```

<b>config authen application</b>	
Purpose	Used to configure various applications on the Switch for authentication using a previously configured method list.
Syntax	<b>config authen application [console   telnet   ssh   http   all] [login   enable] [default   method_list_name &lt;string 15&gt;]</b>
Description	This command is used to configure Switch configuration applications (console, telnet, ssh, web) for login at the user level and at the administration level ( <i>authen_enable</i> ) utilizing a previously configured method list.
Parameters	<p><i>application</i> – Choose the application to configure. The user may choose one of the following five options to configure.</p> <ul style="list-style-type: none"> <li>▪ <i>console</i> – Choose this parameter to configure the command line interface login method.</li> <li>▪ <i>telnet</i> – Choose this parameter to configure the telnet login method.</li> <li>▪ <i>ssh</i> – Choose this parameter to configure the Secure Shell login method.</li> <li>▪ <i>http</i> – Choose this parameter to configure the web interface login method.</li> <li>▪ <i>all</i> – Choose this parameter to configure all applications (console, telnet, ssh, web) login method.</li> </ul> <p><i>login</i> – Use this parameter to configure an application for normal login on the user level, using a previously configured method list.</p> <p><i>enable</i> - Use this parameter to configure an application for upgrading a normal user level to administrator privileges, using a previously configured method list.</p> <p><i>default</i> – Use this parameter to configure an application for user authentication using the default method list.</p> <p><i>method_list_name</i> &lt;string 15&gt; - Use this parameter to configure an application for user authentication using a previously configured method list. Enter an alphanumeric string of up to 15 characters to define a previously configured method list.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the default method list for the web interface:

```
DES-3550:4#config authen application http login default
Command: config authen application http login default

Success.

DES-3550:4#
```

**show authn application**

Purpose	Used to display authentication methods for the various applications on the Switch.
Syntax	<b>show authn application</b>
Description	This command will display all of the authentication method lists (login, enable administrator privileges) for Switch configuration applications (console, telnet, ssh, web) currently configured on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To display the login and enable method list for all applications on the Switch:

```
DES-3550:4#show authn application
Command: show authn application

Application  Login Method List  Enable Method List
-----
Console     default            default
Telnet      Trinity            default
SSH         default            default
HTTP        default            default

DES-3550:4#
```

**create authen server\_host**

Purpose	Used to create an authentication server host.
Syntax	<b>create authen server_host &lt;ipaddr&gt; protocol [tacacs   xtacacs   tacacs+   radius] {port &lt;int 1-65535&gt;   key [&lt;key_string 254&gt;   none]   timeout &lt;int 1-255&gt;   retransmit &lt; 1-255&gt;}</b>
Description	This command will create an authentication server host for the TACACS/XTACACS/TACACS+/RADIUS security protocols on the Switch. When a user attempts to access the Switch with authentication protocol enabled, the Switch will send authentication packets to a remote TACACS/XTACACS/TACACS+/RADIUS server host on a remote host. The TACACS/XTACACS/TACACS+/RADIUS server host will then verify or deny the request and return the appropriate message to the Switch. More than one authentication protocol can be run on the same physical server host but, remember that TACACS/XTACACS/TACACS+/RADIUS are separate entities and are not compatible with each other. The maximum supported number of server hosts is 16.
Parameters	<p><i>server_host</i> &lt;ipaddr&gt; - The IP address of the remote server host to add.</p> <p><i>protocol</i> – The protocol used by the server host. The user may choose one of the following:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Enter this parameter if the server host utilizes the TACACS protocol.</li> <li>▪ <i>xtacacs</i> - Enter this parameter if the server host utilizes the XTACACS protocol.</li> <li>▪ <i>tacacs+</i> - Enter this parameter if the server host utilizes the TACACS+ protocol.</li> <li>▪ <i>radius</i> - Enter this parameter if the server host utilizes the RADIUS protocol.</li> </ul> <p><i>port</i> &lt;int 1-65535&gt; - Enter a number between 1 and 65535 to define the virtual port number of the authentication protocol on a server host. The default port number is 49 for TACACS/XTACACS/TACACS+ servers and 1812 and 1813 for RADIUS servers but the user may set a unique port number for higher security.</p> <p><i>key</i> &lt;key_string 254&gt; - Authentication key to be shared with a configured TACACS+ or RADIUS server only. Specify an alphanumeric string up to 254 characters.</p> <p><i>timeout</i> &lt;int 1-255&gt; - Enter the time in seconds the Switch will wait for the server host to reply to an authentication request. The default value is 5 seconds.</p> <p><i>retransmit</i> &lt;int 1-255&gt; - Enter the value in the retransmit field to change how many times the device will resend an authentication request when the server does not respond.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create a TACACS+ authentication server host, with port number 1234, a timeout value of 10 seconds and a retransmit count of 5.

```
DES-3550:4#create authen server_host 10.1.1.121 protocol tacacs+ port  
1234 timeout 10 retransmit 5
```

```
Command: create authen server_host 10.1.1.121 protocol tacacs+ port  
1234 timeout 10 retransmit 5
```

```
Success.
```

```
DES-3550:4#
```



**config authen server\_host**

Purpose	Used to configure a user-defined authentication server host.
Syntax	<b>create authen server_host &lt;ipaddr&gt; protocol [tacacs   xtacacs   tacacs+   radius] {port &lt;int 1-65535&gt;   key [&lt;key_string 254&gt;   none]   timeout &lt;int 1-255&gt;   retransmit &lt; 1-255&gt;}</b>
Description	This command will configure a user-defined authentication server host for the TACACS/XTACACS/TACACS+/RADIUS security protocols on the Switch. When a user attempts to access the Switch with the authentication protocol enabled, the Switch will send authentication packets to a remote TACACS/XTACACS/TACACS+/RADIUS server host on a remote host. The TACACS/XTACACS/TACACS+/RADIUS server host will then verify or deny the request and return the appropriate message to the Switch. More than one authentication protocol can be run on the same physical server host but, remember that TACACS/XTACACS/TACACS+/RADIUS are separate entities and are not compatible with each other. The maximum supported number of server hosts is 16.
Parameters	<p><i>server_host &lt;ipaddr&gt;</i> - The IP address of the remote server host the user wishes to alter.</p> <p><i>protocol</i> – The protocol used by the server host. The user may choose one of the following:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Enter this parameter if the server host utilizes the TACACS protocol.</li> <li>▪ <i>xtacacs</i> - Enter this parameter if the server host utilizes the XTACACS protocol.</li> <li>▪ <i>tacacs+</i> - Enter this parameter if the server host utilizes the TACACS+ protocol.</li> <li>▪ <i>radius</i> - Enter this parameter if the server host utilizes the RADIUS protocol.</li> </ul> <p><i>port &lt;int 1-65535&gt;</i> - Enter a number between 1 and 65535 to define the virtual port number of the authentication protocol on a server host. The default port number is 49 for TACACS/XTACACS/TACACS+ servers and 1812 and 1813 for RADIUS servers but the user may set a unique port number for higher security.</p> <p><i>key &lt;key_string 254&gt;</i> - Authentication key to be shared with a configured TACACS+ or RADIUS server only. Specify an alphanumeric string up to 254 characters or choose none.</p> <p><i>timeout &lt;int 1-255&gt;</i> - Enter the time in seconds the Switch will wait for the server host to reply to an authentication request. The default value is 5 seconds.</p> <p><i>retransmit &lt;int 1-255&gt;</i> - Enter the value in the retransmit field to change how many times the device will resend an authentication request when the server does not respond. This field is inoperable for the TACACS+ protocol.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure a TACACS+ authentication server host, with port number 4321, a timeout value of 12 seconds and a retransmit count of 4.

```
DES-3550:4#config authen server_host 10.1.1.121 protocol tacacs+
port 4321 timeout 12 retransmit 4

Command: config authen server_host 10.1.1.121 protocol tacacs+ port
4321 timeout 12 retransmit 4

Success.

DES-3550:4#
```

## delete authen server\_host

Purpose	Used to delete a user-defined authentication server host.
Syntax	<b>delete authen server_host &lt;ipaddr&gt; protocol [tacacs   xtacacs   tacacs+   radius]</b>
Description	This command is used to delete a user-defined authentication server host previously created on the Switch.
Parameters	<p><i>server_host</i> &lt;ipaddr&gt; - The IP address of the remote server host to be deleted.</p> <p><i>protocol</i> – The protocol used by the server host the user wishes to delete. The user may choose one of the following:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Enter this parameter if the server host utilizes the TACACS protocol.</li> <li>▪ <i>xtacacs</i> - Enter this parameter if the server host utilizes the XTACACS protocol.</li> <li>▪ <i>tacacs+</i> - Enter this parameter if the server host utilizes the TACACS+ protocol.</li> <li>▪ <i>radius</i> - Enter this parameter if the server host utilizes the RADIUS protocol.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete a user-defined TACACS+ authentication server host:

```
DES-3550:4#delete authn server_host 10.1.1.121 protocol tacacs+
Command: delete authn server_host 10.1.1.121 protocol tacacs+

Success.

DES-3550:4#
```

## show authn server\_host

Purpose	Used to view a user-defined authentication server host.
Syntax	<b>show authn server_host</b>
Description	<p>This command is used to view user-defined authentication server hosts previously created on the Switch.</p> <p>The following parameters are displayed:</p> <p>IP Address – The IP address of the authentication server host.</p> <p>Protocol – The protocol used by the server host. Possible results will include TACACS, XTACACS, TACACS+ or RADIUS.</p> <p>Port – The virtual port number on the server host. The default value is 49.</p> <p>Timeout - The time in seconds the Switch will wait for the server host to reply to an authentication request.</p> <p>Retransmit - The value in the retransmit field denotes how many times the device will resend an authentication request when the TACACS server does not respond. This field is inoperable for the tacacs+ protocol.</p> <p>Key - Authentication key to be shared with a configured TACACS+ server only.</p>
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To view authentication server hosts currently set on the Switch:

```
DES-3550:4#show authen server_host
Command: show authen server_host

IP Address  Protocol  Port  Timeout  Retransmit  Key
-----
10.53.13.94  TACACS   49    5         2           No Use

Total Entries : 1

DES-3550:4#
```

### create authen server\_group

Purpose	Used to create a user-defined authentication server group.
Syntax	<b>create authen server_group &lt;string 15&gt;</b>
Description	This command will create an authentication server group. A server group is a technique used to group TACACS/XTACACS/TACACS+/RADIUS server hosts into user defined categories for authentication using method lists. The user may add up to eight (8) authentication server hosts to this group using the <i>config authen server_group</i> command.
Parameters	<string 15> - Enter an alphanumeric string of up to 15 characters to define the newly created server group.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To create the server group “group\_1”:

```
DES-3550:4#create authen server_group group_1
Command: create authen server_group group_1

Success.

DES-3550:4#
```

**config authn server\_group**

Purpose	Used to configure a user-defined authentication server group.
Syntax	<b>config authn server_group [tacacs   xtacacs   tacacs+   radius   &lt;string 15&gt;] [add   delete] server_host &lt;ipaddr&gt; protocol [tacacs   xtacacs   tacacs+   radius]</b>
Description	This command will configure an authentication server group. A server group is a technique used to group TACACS/XTACACS/TACACS+/RADIUS server hosts into user defined categories for authentication using method lists. The user may define the type of server group by protocol or by previously defined server group. Up to eight (8) authentication server hosts may be added to any particular group
Parameters	<p><i>server_group</i> - The user may define the group by protocol groups built into the Switch (TACACS/XTACACS/TACACS+/RADIUS), or by a user-defined group previously created using the <i>create authn server_group</i> command.</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Use this parameter to utilize the built-in TACACS server protocol on the Switch. Only server hosts utilizing the TACACS protocol may be added to this group.</li> <li>▪ <i>xtacacs</i> – Use this parameter to utilize the built-in XTACACS server protocol on the Switch. Only server hosts utilizing the XTACACS protocol may be added to this group.</li> <li>▪ <i>tacacs+</i> – Use this parameter to utilize the built-in TACACS+ server protocol on the Switch. Only server hosts utilizing the TACACS+ protocol may be added to this group.</li> <li>▪ <i>radius</i> – Use this parameter to utilize the built-in RADIUS server protocol on the Switch. Only server hosts utilizing the RADIUS protocol may be added to this group.</li> <li>▪ <i>&lt;string 15&gt;</i> - Enter an alphanumeric string of up to 15 characters to define the previously created server group. This group may add any combination of server hosts to it, regardless of protocol.</li> </ul> <p><i>add/delete</i> – Enter the correct parameter to add or delete a server host from a server group.</p> <p><i>server_host &lt;ipaddr&gt;</i> - Enter the IP address of the previously configured server host to add or delete.</p> <p><i>protocol</i> – Enter the protocol utilized by the server host. There are three options:</p> <ul style="list-style-type: none"> <li>▪ <i>tacacs</i> – Use this parameter to define the protocol if the server host is using the TACACS authentication protocol.</li> <li>▪ <i>xtacacs</i> – Use this parameter to define the protocol if the server host is using the XTACACS authentication protocol.</li> <li>▪ <i>tacacs+</i> – Use this parameter to define the protocol if the server host is using the TACACS+ authentication protocol.</li> <li>▪ <i>radius</i> – Use this parameter to define the protocol if the server host is using the RADIUS authentication protocol.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To add an authentication host to server group “group\_1”:

```
DES-3550:4# config authn server_group group_1 add server_host
10.1.1.121 protocol tacacs+
Command: config authn server_group group_1 add server_host
10.1.1.121 protocol tacacs+

Success.

DES-3550:4#
```

### **delete authn server\_group**

Purpose	Used to delete a user-defined authentication server group.
Syntax	<b>delete authn server_group &lt;string 15&gt;</b>
Description	This command will delete an authentication server group.
Parameters	<string 15> - Enter an alphanumeric string of up to 15 characters to define the previously created server group to be deleted.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To delete the server group “group\_1”:

```
DES-3550:4#delete server_group group_1
Command: delete server_group group_1

Success.

DES-3550:4#
```

**show authen server\_group**

Purpose	Used to view authentication server groups on the Switch.
Syntax	<b>show authen server_group &lt;string 15&gt;</b>
Description	<p>This command will display authentication server groups currently configured on the Switch.</p> <p>This command will display the following fields:</p> <p>Group Name: The name of the server group currently configured on the Switch, including built in groups and user defined groups.</p> <p>IP Address: The IP address of the server host.</p> <p>Protocol: The authentication protocol used by the server host.</p>
Parameters	<p><i>&lt;string 15&gt;</i> - Enter an alphanumeric string of up to 15 characters to define the previously created server group to be viewed.</p> <p>Entering this command without the <i>&lt;string&gt;</i> parameter will display all authentication server groups on the Switch.</p>
Restrictions	None.

Example usage:

To view authentication server groups currently set on the Switch.

```

DES-3550:4#show authen server_group
Command: show authen server_group

Group Name  IP Address          Protocol
-----
Darren      10.53.13.2          TACACS
tacacs      10.53.13.94         TACACS
tacacs+     (This group has no entry)
xtacacs     (This group has no entry)

Total Entries : 4

DES-3550:4#

```

### **config authen parameter response\_timeout**

Purpose	Used to configure the amount of time the Switch will wait for a user to enter authentication before timing out.
Syntax	<b>config authen parameter response_timeout &lt;int 1-255&gt;</b>
Description	This command will set the time the Switch will wait for a response of authentication from the user.
Parameters	<i>response_timeout</i> <int 1-255> - Set the time, in seconds, the Switch will wait for a response of authentication from the user attempting to log in from the command line interface or telnet interface.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the response timeout for 60 seconds:

```
DES-3550:4# config authen parameter response_timeout 60  
Command: config authen parameter response_timeout 60  
  
Success.  
  
DES-3550:4#
```



**config authen parameter attempt**

Purpose	Used to configure the maximum number of times the Switch will accept authentication attempts.
Syntax	<b>config authen parameter attempt &lt;int 1-255&gt;</b>
Description	This command will configure the maximum number of times the Switch will accept authentication attempts. Users failing to be authenticated after the set amount of attempts will be denied access to the Switch and will be locked out of further authentication attempts. Command line interface users will have to wait 60 seconds before another authentication attempt. Telnet users will be disconnected from the Switch.
Parameters	<i>parameter attempt &lt;int 1-255&gt;</i> - Set the maximum number of attempts the user may try to become authenticated by the Switch, before being locked out.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set the maximum number of authentication attempts at 5:

```
DES-3550:4# config authen parameter attempt 5
Command: config authen parameter attempt 5

Success.

DES-3550:4#
```

## show authen parameter

Purpose	Used to display the authentication parameters currently configured on the Switch.
Syntax	<b>show authen parameter</b>
Description	<p>This command will display the authentication parameters currently configured on the Switch, including the response timeout and user authentication attempts.</p> <p>This command will display the following fields:</p> <p>Response timeout – The configured time allotted for the Switch to wait for a response of authentication from the user attempting to log in from the command line interface or telnet interface.</p> <p>User attempts: The maximum number of attempts the user may try to become authenticated by the Switch, before being locked out.</p>
Parameters	None.
Restrictions	None.

Example usage:

To view the authentication parameters currently set on the Switch:

```
DES-3550:4#show authen parameter
Command: show authen parameter

Response timeout : 60 seconds
User attempts    : 5

DES-3550:4#
```

<b>enable admin</b>	
Purpose	Used to promote user level privileges to administrator level privileges
Syntax	<b>enable admin</b>
Description	This command is for users who have logged on to the Switch on the normal user level, to become promoted to the administrator level. After logging on to the Switch users will have only user level privileges. To gain access to administrator level privileges, the user will enter this command and will have to enter an authentication password. Possible authentication methods for this function include TACACS, XTACACS, TACACS+, RADIUS, user defined server groups, local enable (local account on the Switch), or no authentication ( <i>none</i> ). Because XTACACS and TACACS do not support the enable function, the user must create a special account on the server host which has the username "enable", and a password configured by the administrator that will support the "enable" function. This function becomes inoperable when the authentication policy is disabled.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable administrator privileges on the Switch:

```
DES-3550:4#enable admin
Password: *****

DES-3550:4#
```

<b>config admin local_enable</b>	
Purpose	Used to configure the local enable password for administrator level privileges.
Syntax	<b>config admin local_enable</b>
Description	This command will configure the locally enabled password for the <i>enable admin</i> command. When a user chooses the “ <i>local_enable</i> ” method to promote user level privileges to administrator privileges, he or she will be prompted to enter the password configured here, that is set locally on the Switch.
Parameters	< <i>password 15</i> > - After entering this command, the user will be prompted to enter the old password, then a new password in an alphanumeric string of no more than 15 characters, and finally prompted to enter the new password again for confirmation. See the example below.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the password for the “local\_enable” authentication method.

```
DES-3550:4#config admin local_enable
Command: config admin local_enable

Enter the old password:
Enter the case-sensitive new password:*****
Enter the new password again for confirmation:*****
Success.

DES-3550:4#
```

**SSH COMMANDS**

The steps required to use the Secure Shell (SSH) protocol for secure communication between a remote PC (the SSH Client) and the Switch (the SSH Server), are as follows:

- Create a user account with admin-level access using the *create account admin <username> <password>* command. This is identical to creating any other admin-level user account on the Switch, including specifying a password. This password is used to login to the Switch, once secure communication has been established using the SSH protocol.
- Configure the user account to use a specified authorization method to identify users that are allowed to establish SSH connections with the Switch using the *config ssh user authmode* command. There are three choices as to the method SSH will use to authorize the user, and they are password, publickey and hostbased.
- Configure the encryption algorithm that SSH will use to encrypt and decrypt messages sent between the SSH Client and the SSH Server.
- Finally, enable SSH on the Switch using the *enable ssh* command.
- After following the above steps, you can configure an SSH Client on the remote PC and manage the Switch using secure, in-band communication.

The Secure Shell (SSH) commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable ssh	
disable ssh	
config ssh authmode	[password   publickey   hostbased] [enable   disable]
show ssh authmode	
config ssh server	{maxsession <int 1-8>   contimeout <sec 120-600>   authfail <int 2-20>   rekey [10min   30min   60min   never]}
show ssh server	
config ssh user	<username> authmode [hostbased [hostname <domain_name>   hostname_IP <domain_name> <ipaddr>]   password   publickey]
show ssh user	
config ssh algorithm	[3DES   AES128   AES192   AES256   arcfour   blowfish   cast128   twofish128   twofish192   twofish256   MD5   SHA1   RSA   DSA] [enable   disable]
show ssh algorithm	

Each command is listed, in detail, in the following sections.

## enable ssh

Purpose	Used to enable SSH.
Syntax	<b>enable ssh</b>
Description	This command allows you to enable SSH on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Usage Example:

To enable SSH:

```
DES-3550:4#enable ssh
Command: enable ssh

Success.

DES-3550:4#
```

## disable ssh

Purpose	Used to disable SSH.
Syntax	<b>disable ssh</b>
Description	This command allows you to disable SSH on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Usage Example:

To disable SSH:

```
DES-3550:4# disable ssh
Command: disable ssh

Success.

DES-3550:4#
```

<b>config ssh authmode</b>	
Purpose	Used to configure the SSH authentication mode setting.
Syntax	<b>config ssh authmode [password   publickey   hostbased] [enable   disable]</b>
Description	This command will allow you to configure the SSH authentication mode for users attempting to access the Switch.
Parameters	<p><i>password</i> – This parameter may be chosen if the administrator wishes to use a locally configured password for authentication on the Switch.</p> <p><i>publickey</i> - This parameter may be chosen if the administrator wishes to use a publickey configuration set on a SSH server, for authentication.</p> <p><i>hostbased</i> - This parameter may be chosen if the administrator wishes to use a host computer for authentication. This parameter is intended for Linux users requiring SSH authentication techniques and the host computer is running the Linux operating system with a SSH program previously installed.</p> <p><i>[enable   disable]</i> - This allows you to enable or disable SSH authentication on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable the SSH authentication mode by password:

```
DES-3550:4#config ssh authmode password enable
Command: config ssh authmode password enable

Success.

DES-3550:4#
```

## show ssh authmode

Purpose	Used to display the SSH authentication mode setting.
Syntax	<b>show ssh authmode</b>
Description	This command will allow you to display the current SSH authentication set on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To view the current authentication mode set on the Switch:

```
DES-3550:4#show ssh authmode
```

```
Command: show ssh authmode
```

```
The SSH authmode:
```

```
Password : Enabled
```

```
Publickey : Enabled
```

```
Hosatbased : Enabled
```

```
DES-3550:4#
```



**config ssh server**

Purpose	Used to configure the SSH server.
Syntax	<b>config ssh server {maxsession &lt;int 1-8&gt;   timeout &lt;sec 120-600&gt;   authfail &lt;int 2-20&gt;   rekey [10min   30min   60min   never]}</b>
Description	This command allows you to configure the SSH server.
Parameters	<p><i>maxsession &lt;int 1-8&gt;</i> - Allows the user to set the number of users that may simultaneously access the Switch. The default is 8.</p> <p><i>contimeout &lt;sec 120-600&gt;</i> - Allows the user to set the connection timeout. The user may set a time between 120 and 600 seconds. The default is 300 seconds.</p> <p><i>authfail &lt;int 2-20&gt;</i> - Allows the administrator to set the maximum number of attempts that a user may try to logon utilizing SSH authentication. After the maximum number of attempts is exceeded, the Switch will be disconnected and the user must reconnect to the Switch to attempt another login.</p> <p><i>rekey [10min   30min   60min   never]</i> - Sets the time period that the Switch will change the security shell encryptions.</p>
Restrictions	Only administrator-level users can issue this command.

Usage Example:

To configure the SSH server:

```
DES-3550:4# config ssh server maxsession 2 contimeout 300 authfail 2
Command: config ssh server maxsession 2 contimeout 300 authfail 2

Success.

DES-3550:4#
```

## show ssh server

Purpose	Used to display the SSH server setting.
Syntax	<b>show ssh server</b>
Description	This command allows you to display the current SSH server setting.
Parameters	None.
Restrictions	None.

Usage Example:

To display the SSH server:

```
DES-3550:4# show ssh server
Command: show ssh server

The SSH server configuration
max Session           : 8
Connection timeout    : 300
Authfail attempts     : 2
Rekey timeout         : never
port                  : 22

DES-3550:4#
```

<b>config ssh user</b>	
Purpose	Used to configure the SSH user.
Syntax	<b>config ssh user &lt;username 15&gt; authmode {hostbased [hostname &lt;domain_name&gt;   hostname_IP &lt;domain_name&gt; &lt;ipaddr&gt;}   password   publickey]</b>
Description	This command allows you to configure the SSH user authentication method.
Parameters	<p><i>&lt;username 15&gt;</i> - Enter a username of no more than 15 characters to identify the SSH user.</p> <p><i>authmode</i> – Specifies the authentication mode of the SSH user wishing to log on to the Switch. The administrator may choose between:</p> <ul style="list-style-type: none"> <li>• <i>hostbased</i> – This parameter should be chosen if the user wishes to use a remote SSH server for authentication purposes. Choosing this parameter requires the user to input the following information to identify the SSH user.</li> <li>• <i>hostname &lt;domain_name&gt;</i> - Enter an alphanumeric string of up to 31 characters identifying the remote SSH user.</li> <li>• <i>hostname_IP &lt;domain_name&gt; &lt;ipaddr&gt;</i> - Enter the hostname and the corresponding IP address of the SSH user.</li> <li>• <i>password</i> – This parameter should be chosen if the user wishes to use an administrator defined password for authentication. Upon entry of this command, the Switch will prompt the user for a password, and then to retype the password for confirmation.</li> <li>• <i>publickey</i> – This parameter should be chosen if the user wishes to use the publickey on a SSH server for authentication.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To configure the SSH user:

```

DES-3550:4# config ssh user Trinity authmode Password
Command: config ssh user Trinity authmode Password

Enter a case sensitive new password: *****
Enter the new password again for conformation:*****

Success.

DES-3550:4#

```

**show ssh user**

Purpose	Used to display the SSH user setting.
Syntax	<b>show ssh user</b>
Description	This command allows you to display the current SSH user setting.
Parameters	None.
Restrictions	None.

Example usage:

To display the SSH user:

```
DES-3550:4#show ssh user
Command: show ssh user

Current Accounts:
UserName          Authentication
-----          -
Trinity           Publickey

DES-3550:4#
```



**Note:** To configure the SSH user, the administrator must create a user account on the Switch. For information concerning configuring a user account, please see the section of this manual entitled **Basic Switch Commands** and then the command, *create user account*.

**config ssh algorithm**

Purpose	Used to configure the SSH algorithm.
Syntax	<b>config ssh algorithm [3DES   AES128   AES192   AES256   arcfour   blowfish   cast128   twofish128   twofish192   twofish256   MD5   SHA1   RSA   DSA] [enable   disable]</b>
Description	This command allows you to configure the desired type of SSH algorithm used for authentication encryption.
Parameters	<p><i>3DES</i> – This parameter will enable or disable the Triple_Data Encryption Standard encryption algorithm.</p> <p><i>AES128</i> - This parameter will enable or disable the Advanced Encryption Standard AES128 encryption algorithm.</p> <p><i>AES192</i> - This parameter will enable or disable the Advanced Encryption Standard AES192 encryption algorithm.</p> <p><i>AES256</i> - This parameter will enable or disable the Advanced Encryption Standard AES256 encryption algorithm.</p> <p><i>arcfour</i> - This parameter will enable or disable the Arcfour encryption algorithm.</p> <p><i>blowfish</i> - This parameter will enable or disable the Blowfish encryption algorithm.</p> <p><i>cast128</i> - This parameter will enable or disable the Cast128 encryption algorithm.</p> <p><i>twofish128</i> - This parameter will enable or disable the twofish128 encryption algorithm.</p> <p><i>twofish192</i> - This parameter will enable or disable the twofish192 encryption algorithm.</p> <p><i>MD5</i> - This parameter will enable or disable the MD5 Message Digest encryption algorithm.</p> <p><i>SHA1</i> - This parameter will enable or disable the Secure Hash Algorithm encryption.</p> <p><i>RSA</i> - This parameter will enable or disable the RSA encryption algorithm.</p> <p><i>DSA</i> - This parameter will enable or disable the Digital Signature Algorithm encryption.</p> <p><i>[enable   disable]</i> – This allows you to enable or disable algorithms entered in this command, on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

Usage Example:

To configure SSH algorithm:

```

DES-3550:4# config ssh algorithm Blowfish enable
Command: config ssh algorithm Blowfish enable

Success.

DES-3550:4#

```

**show ssh algorithm**

Purpose	Used to display the SSH algorithm setting.
Syntax	<b>show ssh algorithm</b>
Description	This command will display the current SSH algorithm setting status.
Parameters	None.
Restrictions	None.

Usage Example:

To display SSH algorithms currently set on the Switch:

```
DES-3550:4#show ssh algorithm
```

```
Command: show ssh algorithm
```

```
Encryption Algorithm
```

```
3DES           :Enabled
```

```
AES128        :Enabled
```

```
AES192        :Enabled
```

```
AES256        :Enabled
```

```
ARC4          :Enabled
```

```
Blowfish      :Enabled
```

```
Cast128       :Enabled
```

```
Twofish128   :Enabled
```

```
Twofish192   :Enabled
```

```
Twofish256   :Enabled
```

```
Data Integrity Algorithm
```

```
MD5           :Enabled
```

```
SHA1          :Enabled
```

```
Public Key Algorithm
```

```
RSA           :Enabled
```

```
DSA           :Enabled
```

```
DES-3550:4#
```

## SSL COMMANDS

*Secure Sockets Layer* or *SSL* is a security feature that will provide a secure communication path between a host and client through the use of authentication, digital signatures and encryption. These security functions are implemented through the use of a *ciphersuite*, which is a security string that determines the exact cryptographic parameters, specific encryption algorithms and key sizes to be used for an authentication session and consists of three levels:

1. **Key Exchange:** The first part of the cyphersuite string specifies the public key algorithm to be used. This Switch utilizes the Rivest Shamir Adleman (RSA) public key algorithm and the Digital Signature Algorithm (DSA), specified here as the *DHE\_DSS* Diffie-Hellman (DHE) public key algorithm. This is the first authentication process between client and host as they “exchange keys” in looking for a match and therefore authentication to be accepted to negotiate encryptions on the following level.
2. **Encryption:** The second part of the ciphersuite that includes the encryption used for encrypting the messages sent between client and host. The Switch supports two types of cryptology algorithms:

Stream Ciphers – There are two types of stream ciphers on the Switch, *RC4 with 40-bit keys* and *RC4 with 128-bit keys*. These keys are used to encrypt messages and need to be consistent between client and host for optimal use.

CBC Block Ciphers – CBC refers to Cipher Block Chaining, which means that a portion of the previously encrypted block of encrypted text is used in the encryption of the current block. The Switch supports the *3DES\_EDE* encryption code defined by the Data Encryption Standard (DES) to create the encrypted text.

3. **Hash Algorithm:** This part of the ciphersuite allows the user to choose a message digest function which will determine a Message Authentication Code. This Message Authentication Code will be encrypted with a sent message to provide integrity and prevent against replay attacks. The Switch supports two hash algorithms, *MD5* (Message Digest 5) and *SHA* (Secure Hash Algorithm).

These three parameters are uniquely assembled in four choices on the Switch to create a three-layered encryption code for secure communication between the server and the host. The user may implement any one or combination of the ciphersuites available, yet different ciphersuites will affect the security level and the performance of the secured connection. The information included in the ciphersuites is not included with the Switch and requires downloading from a third source in a file form called a *certificate*. This function of the Switch cannot be executed without the presence and implementation of the certificate file and can be downloaded to the Switch by utilizing a TFTP server. The Switch supports SSLv3 and TLSv1. Other versions of SSL may not be compatible with this Switch and may cause problems upon authentication and transfer of messages from client to host.

The Secure Sockets Layer (SSL) commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable ssl	{ciphersuite {RSA_with_RC4_128_MD5   RSA_with_3DES_EDE_CBC_SHA   DHE_DSS_with_3DES_EDE_CBC_SHA   RSA_EXPORT with RC4 40 MD5}}
disable ssl	{ciphersuite {RSA_with_RC4_128_MD5   RSA_with_3DES_EDE_CBC_SHA   DHE_DSS_with_3DES_EDE_CBC_SHA   RSA_EXPORT with RC4 40 MD5}}
config ssl cachetimeout timeout	<value 60-86400>
show ssl	
show ssl certificate	
show ssl cachetimeout	
download certificate_fromTFTP	<ipaddr> certfilename <path_filename 64> keyfilename <path_filename 64>

Each command is listed, in detail, in the following sections.



**enable ssl**

Purpose	To enable the SSL function on the Switch.
Syntax	<b>enable ssl {ciphersuite {RSA_with_RC4_128_MD5   RSA_with_3DES_EDE_CBC_SHA   DHE_DSS_with_3DES_EDE_CBC_SHA   RSA_EXPORT_with_RC4_40_MD5}}</b>
Description	This command will enable SSL on the Switch by implementing any one or combination of listed ciphersuites on the Switch. Entering this command without a parameter will enable the SSL status on the Switch. Enabling SSL will disable the web-manager on the Switch.
Parameters	<p><i>ciphersuite</i> - A security string that determines the exact cryptographic parameters, specific encryption algorithms and key sizes to be used for an authentication session. The user may choose any combination of the following:</p> <ul style="list-style-type: none"> <li>• <i>RSA_with_RC4_128_MD5</i> – This ciphersuite combines the RSA key exchange, stream cipher RC4 encryption with 128-bit keys and the MD5 Hash Algorithm.</li> <li>• <i>RSA_with_3DES_EDE_CBC_SHA</i> - This ciphersuite combines the RSA key exchange, CBC Block Cipher 3DES_EDE encryption and the SHA Hash Algorithm.</li> <li>• <i>DHE_DSS_with_3DES_EDE_CBC_SHA</i> - This ciphersuite combines the DSA Diffie Hellman key exchange, CBC Block Cipher 3DES_EDE encryption and SHA Hash Algorithm.</li> <li>• <i>RSA_EXPORT_with_RC4_40_MD5</i> - This ciphersuite combines the RSA Export key exchange, stream cipher RC4 encryption with 40-bit keys.</li> </ul> <p>The ciphersuites are enabled by default on the Switch, yet the SSL status is disabled by default. Enabling SSL with a ciphersuite will not enable the SSL status on the Switch.</p>
Restrictions	Only administrator-level users can issue this command.

## Example usage:

To enable SSL on the Switch for all ciphersuites:

```
DES-3550:4#enable ssl
```

```
Command:enable ssl
```

**Note: Web will be disabled if SSL is enabled.**

**Success.**

```
DES-3550:4#
```



**NOTE:** Enabling SSL on the Switch will enable all ciphersuites. To utilize a particular ciphersuite, the user must eliminate other ciphersuites by using the *disable ssl* command along with the appropriate ciphersuites.



**NOTE:** Enabling the SSL function on the Switch will disable the port for the web manager (port 80). To log on to the web based manager, the entry of your URL must begin with *https://*. (ex. *https://10.90.90.90*)

<b>disable ssl</b>	
Purpose	To disable the SSL function on the Switch.
Syntax	<b>disable ssl {ciphersuite {RSA_with_RC4_128_MD5   RSA_with_3DES_EDE_CBC_SHA   DHE_DSS_with_3DES_EDE_CBC_SHA   RSA_EXPORT_with_RC4_40_MD5}}</b>
Description	This command will disable SSL on the Switch and can be used to disable any one or combination of listed ciphersuites on the Switch.
Parameters	<p><i>ciphersuite</i> - A security string that determines the exact cryptographic parameters, specific encryption algorithms and key sizes to be used for an authentication session. The user may choose any combination of the following:</p> <ul style="list-style-type: none"> <li>• <i>RSA_with_RC4_128_MD5</i> – This ciphersuite combines the RSA key exchange, stream cipher RC4 encryption with 128-bit keys and the MD5 Hash Algorithm.</li> <li>• <i>RSA_with_3DES_EDE_CBC_SHA</i> - This ciphersuite combines the RSA key exchange, CBC Block Cipher 3DES_EDE encryption and the SHA Hash Algorithm.</li> <li>• <i>DHE_DSS_with_3DES_EDE_CBC_SHA</i> - This ciphersuite combines the DSA Diffie Hellman key exchange, CBC Block Cipher 3DES_EDE encryption and SHA Hash Algorithm.</li> <li>• <i>RSA_EXPORT_with_RC4_40_MD5</i> - This ciphersuite combines the RSA Export key exchange, stream cipher RC4 encryption with 40-bit keys.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable the SSL status on the Switch:

**DES-3550:4#disable ssl**

**Command: disable ssl**

**Success.**

**DES-3550:4#**

To disable ciphersuite *RSA\_EXPORT\_with\_RC4\_40\_MD5* only:

```
DES-3550:4#disable ssl ciphersuite RSA_EXPORT_with_RC4_40_MD5
Command: disable ssl ciphersuite RSA_EXPORT_with_RC4_40_MD5
```

```
Success.
```

```
DES-3550:4#
```

### config ssl cachetimeout timeout

Purpose	Used to configure the SSL cache timeout.
Syntax	<b>config ssl cachetimeout timeout &lt;value 60-86400&gt;</b>
Description	This command will set the time between a new key exchange between a client and a host using the SSL function. A new SSL session is established every time the client and host go through a key exchange. Specifying a longer timeout will allow the SSL session to reuse the master key on future connections with that particular host, therefore accelerating the negotiation process.
Parameters	<i>timeout &lt;value 60-86400&gt;</i> - Enter a timeout value between 60 and 86400 seconds to specify the total time an SSL key exchange ID stays valid before the SSL module will require a new, full SSL negotiation for connection. The default cache timeout is 600 seconds
Restrictions	Only administrator-level users can issue this command.

Example usage:

To set the SSL cachetimeout for 7200 seconds:

```
DES-3550:4#config ssl cachetimeout timeout 7200
```

```
Command: config ssl cachetimeout timeout 7200
```

```
Success.
```

```
DES-3550:4#
```

## show ssl cachetimeout

Purpose	Used to show the SSL cache timeout.
Syntax	<b>show ssl cachetimeout</b>
Description	Entering this command will allow the user to view the SSL cache timeout currently implemented on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To view the SSL cache timeout on the Switch:

```
DES-3550:4#show ssl cachetimeout
Command: show ssl cachetimeout

Cache timeout is 600 second(s).

DES-3550:4#
```

## show ssl

Purpose	Used to view the SSL status and the certificate file status on the Switch.
Syntax	<b>show ssl</b>
Description	This command is used to view the SSL status on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To view the SSL status on the Switch:

```
DES-3550:4#show ssl
Command: show ssl

SSL status                               Disabled
RSA_WITH_RC4_128_MD5                     0x0004 Enabled
RSA_WITH_3DES_EDE_CBC_SHA                0x000A Enabled
DHE_DSS_WITH_3DES_EDE_CBC_SHA           0x0013 Enabled
RSA_EXPORT_WITH_RC4_40_MD5              0x0003 Enabled

DES-3550:4#
```

<b>show ssl certificate</b>	
Purpose	Used to view the SSL certificate file status on the Switch.
Syntax	<b>show ssl certificate</b>
Description	This command is used to view the SSL certificate file information currently implemented on the Switch.
Parameters	None.
Restrictions	None.

Example usage:

To view certificate file information on the Switch:

```
DES-3550:4# show ssl certificate
Command: show ssl certificate

Loaded with RSA Certificate!

DES-3550:4#
```

**download certificate\_fromTFTP**

Purpose	Used to download a certificate file for the SSL function on the Switch.
Syntax	<b>download certificate_fromTFTP &lt;ipaddr&gt; certfilename &lt;path_filename 64&gt; keyfilename &lt;path_filename 64&gt;</b>
Description	This command is used to download a certificate file for the SSL function on the Switch from a TFTP server. The certificate file is a data record used for authenticating devices on the network. It contains information on the owner, keys for authentication and digital signatures. Both the server and the client must have consistent certificate files for optimal use of the SSL function. The Switch only supports certificate files with .der file extensions.
Parameters	<p><i>&lt;ipaddr&gt;</i> - Enter the IP address of the TFTP server.</p> <p><i>certfilename &lt;path_filename 64&gt;</i> - Enter the path and the filename of the certificate file you wish to download.</p> <p><i>keyfilename &lt;path_filename 64&gt;</i> - Enter the path and the filename of the key exchange file you wish to download.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To download a certificate file and key file to the Switch:

```
DES-3550:4# DES-3550:4#download certificate_fromTFTP 10.53.13.94
certfilename c:/cert.der keyfilename c:/pkey.der

Command: download certificate_fromTFTP 10.53.13.94 certfilename
c:/cert.der keyfilename c:/pkey.der

Certificate Loaded Successfully!

DES-3550:4#
```

## D-LINK SINGLE IP MANAGEMENT COMMANDS

Simply put, D-Link Single IP Management is a concept that will stack switches together over Ethernet instead of using stacking ports or modules. Switches using D-Link Single IP Management (labeled here as SIM) must conform to the following rules:

- SIM is an optional feature on the Switch and can easily be enabled or disabled. SIM grouping has no effect on the normal operation of the Switch in the user's network.
- There are three classifications for switches using SIM. The **Commander Switch (CS)**, which is the master switch of the group, **Member Switch (MS)**, which is a switch that is recognized by the CS as a member of a SIM group, and a **Candidate Switch (CaS)**, which is a switch that has a physical link to the SIM group but has not been recognized by the CS as a member of the SIM group.
- A SIM group can only have one Commander Switch (CS).
- All switches in a particular SIM group must be in the same IP subnet (broadcast domain). Members of a SIM group cannot cross a router.
- A SIM group accepts up to 32 switches (numbered 0-31), including the Commander Switch (numbered 0).
- There is no limit to the number of SIM groups in the same IP subnet (broadcast domain), however a single switch can only belong to one group.
- If multiple VLANs are configured, the SIM group will only utilize the default VLAN on any switch.
- SIM allows intermediate devices that do not support SIM. This enables the user to manage a switch that is more than one hop away from the CS.

The SIM group is a group of switches that are managed as a single entity. The DES-3550 may take on three different roles:

**Commander Switch (CS)** – This is a switch that has been manually configured as the controlling device for a group, and takes on the following characteristics:

- It has an IP Address.
- It is not a Commander Switch or Member Switch of another Single IP group.
- It is connected to the Member Switches through its management VLAN.

**Member Switch (MS)** – This is a switch that has joined a single IP group and is accessible from the CS, and it takes on the following characteristics:

- It is not a CS or MS of another IP group.
- It is connected to the CS through the CS management VLAN.

**Candidate Switch (CaS)** – This is a switch that is ready to join a SIM group but is not yet a member of the SIM group. The Candidate Switch may join the SIM group through an automatic function of the DES-3550, or by manually configuring it to be a MS of a SIM group. A switch configured as a CaS is not a member of a SIM group and will take on the following characteristics:

- It is not a CS or MS of another Single IP group.
- It is connected to the CS through the CS management VLAN.

The following rules also apply to the above roles:

1. Each device begins in the Commander state.
2. CS's must change their role to CaS and then to MS, to become a MS of a SIM group. Thus, the CS cannot directly be converted to a MS.
3. The user can manually configure a CS to become a CaS.
4. A MS can become a CaS by:
  - a. Being configured as a CaS through the CS.
  - b. If report packets from the CS to the MS time out.
5. The user can manually configure a CaS to become a CS
6. The CaS can be configured through the CS to become a MS.

After configuring one switch to operate as the CS of a SIM group, additional DES-3550 switches may join the group by either an automatic method or by manually configuring the Switch to be a MS. The CS will then serve as the in band entry point for access to the MS. The CS's IP address will become the path to all MS's of the group and the CS's Administrator's password, and/or authentication will control access to all MS's of the SIM group.

With SIM enabled, the applications in the CS will redirect the packet instead of executing the packets. The applications will decode the packet from the administrator, modify some data, then send it to the MS. After execution, the CS may receive a response packet from the MS, which it will encode and send back to the administrator.

When a CS becomes a MS, it automatically becomes a member of the first SNMP community (include read/write and read only) to which the CS belongs. However, if a MS has its own IP address, it can belong to SNMP communities to which other switches in the group, including the CS, do not belong.

The SIM commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

Command	Parameters
enable sim	
disable sim	
show sim	{[candidates {<candidate_id 1-32>}   members {<member_id 1-32> }   group {commander_mac <macaddr>}]   neighbor}
reconfig	{member_id <value 1-32>   exit}
config sim_group	[add <candidate_id 1-32> {<password>}   delete <member_id 1-32> ]
config sim	[[{ commander {group_name <groupname 64>   candidate}   dp_interval <sec 30-90>   hold_time <sec 100-300>}]
download sim_ms	[firmware   configuration] <ipaddr> <path_filename> {members <mslist>   all}
upload sim_ms	[configuration] <ipaddr> <path_filename> <member_id 1-32>

Each command is listed, in detail, in the following sections.



## enable sim

Purpose	Used to enable Single IP Management (SIM) on the Switch
Syntax	<b>enable sim</b>
Description	This command will enable SIM globally on the Switch. SIM features and functions will not function properly unless this function is enabled.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To enable SIM on the Switch:

```
DES-3550:4#enable sim
Command: enable sim

Success.

DES-3550:4#
```

## disable sim

Purpose	Used to disable Single IP Management (SIM) on the Switch
Syntax	<b>disable sim</b>
Description	This command will disable SIM globally on the Switch.
Parameters	None.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To disable SIM on the Switch:

```
DES-3550:4#disable sim
Command: disable sim

Success.

DES-3550:4#
```

**show sim**

Purpose	Used to view the current information regarding the SIM group on the Switch.
Syntax	<b>show sim</b> {[ <b>candidates</b> {<candidate_id 1-32>}   <b>members</b> {<member_id 1-32>}   <b>group</b> {commander_mac <macaddr>}}   <b>neighbor</b> ]}
Description	<p>This command will display the current information regarding the SIM group on the Switch, including the following:</p> <p>SIM Version - Displays the current Single IP Management version on the Switch.</p> <p>Firmware Version - Displays the current Firmware version on the Switch.</p> <p>Device Name - Displays the user-defined device name on the Switch.</p> <p>MAC Address - Displays the MAC Address of the Switch.</p> <p>Capabilities – Displays the type of switch, be it Layer 2 (L2) or Layer 3 (L3).</p> <p>Platform – Switch Description including name and model number.</p> <p>SIM State –Displays the current Single IP Management State of the Switch, whether it be enabled or disabled.</p> <p>Role State – Displays the current role the Switch is taking, including Commander, Member or Candidate. A Stand-alone switch will always have the commander role.</p> <p>Discovery Interval - Time in seconds the Switch will send discovery packets out over the network.</p> <p>Hold time – Displays the time in seconds the Switch will hold discovery results before dropping it or utilizing it.</p>
Parameters	<p><b>candidates</b> &lt;candidate_id 1-32&gt; - Entering this parameter will display information concerning candidates of the SIM group. To view a specific candidate, include that candidate's ID number, listed from 1 to 32.</p> <p><b>members</b> &lt;member_id 1-32&gt; - Entering this parameter will display information concerning members of the SIM group. To view a specific member, include that member's id number, listed from 1 to 32.</p> <p><b>group</b> {commander_mac &lt;macaddr&gt;} - Entering this parameter will display information concerning the SIM group. To view a specific group, include the commander's MAC address of the group.</p> <p><b>neighbor</b> – Entering this parameter will display neighboring devices of the Switch. A SIM neighbor is defined as a switch that is physically connected to the Switch but is not part of the SIM group. This screen will produce the following results:</p> <p><b>Port</b> – Displays the physical port number of the commander switch where the uplink to the neighbor switch is located.</p> <p><b>MAC Address</b> – Displays the MAC Address of the neighbor switch.</p> <p><b>Role</b> – Displays the role (CS, CaS, MS) of the neighbor switch.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To show the SIM information in detail:

```

DES-3550:4#show sim
Command: show sim

SIM Version      : VER-1
Firmware Version : Build 2.00-B02
Device Name      :
MAC Address      : 00-35-26-11-11-00
Capabilities     : L3
Platform        : DES-3550 L2 Switch
SIM State       : Enabled
Role State      : Commander
Discovery Interval : 60 sec
Hold Time       : 180 sec

DES-3550:4#
    
```

To show the candidate information in summary, if the candidate ID is specified:

```

DES-3550:4#show sim candidates
Command: show sim candidates

ID  MAC Address      Platform /      Hold  Firmware  Device Name
    -----          Capability      Time   Version   -----
---
1  00-01-02-03-04-00  DES-3550 L2 Switch  40    2.00-B02  The Man
2  00-55-55-00-55-00  DES-3550 L2 Switch  140   2.00-B02  default master

Total Entries: 2

DES-3550:4#
    
```

To show the member information in summary, if the member id is specified:

```
DES-3550:4#show sim member
Command: show sim member

ID  MAC Address      Platform /          Hold  Firmware  Device Name
   MAC Address      Capability          Time  Version
---  -----
1  00-01-02-03-04-00  DES-3550 L2 Switch  40    2.00-B02  The Man
2  00-55-55-00-55-00  DES-3550 L2 Switch  140   2.00-B02  default master

Total Entries: 2

DES-3550:4#
```

To show other groups information in summary, if group is specified:

```
DES-3550:4#show sim group
Command: show sim group

SIM Group Name : default

ID  MAC Address      Platform /          Hold  Firmware  Device Name
   MAC Address      Capability          Time  Version
---  -----
*1  00-01-02-03-04-00  DES-3550 L2 Switch  40    2.00-B02  Trinity
2  00-55-55-00-55-00  DES-3550 L2 Switch  140   2.00-B02  default master

SIM Group Name : SIM2

ID  MAC Address      Platform /          Hold  Firmware  Device Name
   MAC Address      Capability          Time  Version
---  -----
*1  00-01-02-03-04-00  DES-3550 L2 Switch  40    2.00-B02  Neo
2  00-55-55-00-55-00  DES-3550 L2 Switch  140   2.00-B02  default master

** means commander switch.

DES-3550:4#
```

Example usage:

To view SIM neighbors:

```
DES-3550:4#show sim neighbor
Command: show sim neighbor

Neighbor Info Table

Port   MAC Address      Role
-----  -
23     00-35-26-00-11-99  Commander
23     00-35-26-00-11-91  Member
24     00-35-26-00-11-90  Candidate

Total Entries: 3

DES-3550:4#
```

<b>reconfig</b>	
Purpose	Used to connect to a member switch, through the commander switch, using telnet.
Syntax	<b>reconfig {member_id &lt;value 1-32   exit}</b>
Description	This command is used to reconnect to a member switch using telnet.
Parameters	<i>member_id</i> <value 1-32> - Select the ID number of the member switch the user desires to configure.  <i>exit</i> – This command is used to exit from managing the member switch and will return to managing the commander switch.
Restrictions	Only administrator-level users can issue this command.

Example usage:

To connect to the MS, with member id 2, through the CS, using the command line interface:

```
DES-3550:4#reconfig member_id 2
Command: reconfig member_id 2

DES-3550:4#
Login:
```

<b>config sim_group</b>	
Purpose	Used to add candidates and delete members from the SIM group.
Syntax	<b>config sim [add &lt;candidate_id 1-32&gt; {&lt;password&gt;}   delete &lt;member_id 1-32&gt;]</b>
Description	This command is used to add candidates and delete members from the SIM group by ID number.
Parameters	<p><i>add &lt;candidate_id&gt; &lt;password&gt;</i> - Use this parameter to change a candidate switch (CaS) to a member switch (MS) of a SIM group. The CaS may be defined by its ID number and a password (if necessary).</p> <p><i>delete &lt;member_id 1-32&gt;</i> - Use this parameter to delete a member switch of a SIM group. The member switch should be defined by ID number.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To add a member:

```
DES-3550:4#config sim_group add 2
Command: config sim_group add 2

Please wait for ACK...
GM Config Success !!!

Success.

DES-3550:4#
```

To delete a member:

```
DES-3550:4# config sim delete 1
Command: config sim delete 1

Please wait for ACK...
Success.

DES-3550:4#
```

<b>config sim</b>	
Purpose	Used to configure role parameters for the SIM protocol on the Switch.
Syntax	<b>config sim</b> <b>[{[commander {group_name &lt;groupname 64&gt;   candidate}   dp_interval &lt;30-90&gt;   hold_time &lt;sec 100-300&gt;}]</b>
Description	This command is used to configure parameters of switches of the SIM.
Parameters	<p><i>commander</i> – Use this parameter to configure the commander switch(CS) for the following parameters:</p> <ul style="list-style-type: none"> <li>▪ <i>group_name &lt;groupname 64&gt;</i> - Used to update the name of the group. Enter an alphanumeric string of up to 64 characters to rename the SIM group.</li> <li>▪ <i>dp_interval &lt;30-90&gt;</i> – The user may set the discovery protocol interval, in seconds that the Switch will send out discovery packets. Returning information to the CS will include information about other switches connected to it. (Ex. MS, CaS). The user may set the <i>dp_interval</i> from 30 to 90 seconds.</li> <li>▪ <i>hold time &lt;sec 100-300&gt;</i> – Using this parameter, the user may set the time, in seconds, the CS will hold information sent to it from other switches, utilizing the discovery interval protocol. The user may set the hold time from 100 to 300 seconds.</li> </ul> <p><i>candidate</i> – Used to change the role of a CS (commander) to a CaS (candidate).</p> <ul style="list-style-type: none"> <li>▪ <i>dp_interval &lt;30-90&gt;</i> – The user may set the discovery protocol interval, in seconds that the Switch will send out discovery packets. Returning information to the CS will include information about other switches connected to it. (Ex. MS, CaS). The user may set the <i>dp_interval</i> from 30 to 90 seconds.</li> <li>▪ <i>hold time &lt;100-300&gt;</i> – Using this parameter, the user may set the time, in seconds, the Switch will hold information sent to it from other switches, utilizing the discovery interval protocol. The user may set the hold time from 100 to 300 seconds.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To change the time interval of the discovery protocol:

```
DES-3550:4# config sim commander dp_interval 30
Command: config sim commander dp_interval 30

Success.

DES-3550:4#
```

To change the hold time of the discovery protocol:

```
DES-3550:4# config sim commander hold_time 120
Command: config sim commander hold_time 120

Success.

DES-3550:4#
```

To transfer the CS (commander) to be a CaS (candidate):

```
DES-3550:4# config sim candidate
Command: config sim candidate

Success.

DES-3550:4#
```

To transfer the Switch to be a CS:

```
DES-3550:4# config sim commander
Command: config sim commander

Success.

DES-3550:4#
```

To update the name of a group:



```
DES-3550:4# config sim commander group_name Trinity
Command: config sim commander group_name Trinity
```

```
Success.
```

```
DES-3550:4#
```

## download sim

Purpose	Used to download firmware or configuration file to an indicated device.
Syntax	<b>download sim [ firmware   configuration] &lt;ipaddr&gt; &lt;path_filename&gt; {members &lt;mslist&gt;   all}</b>
Description	This command will download a firmware file or configuration file to a specified device from a TFTP server.
Parameters	<p><i>firmware</i> – Specify this parameter if the user wishes to download firmware to members of a SIM group.</p> <p><i>configuration</i> - Specify this parameter if the user wishes to download a switch configuration to members of a SIM group.</p> <p>&lt;ipaddr&gt; – Enter the IP address of the TFTP server.</p> <p>&lt;path_filename&gt; – Enter the path and the filename of the firmware or switch on the TFTP server.</p> <p><i>members</i> – Enter this parameter to specify the members the user prefers to download firmware or switch configuration files to. The user may specify a member or members by adding one of the following:</p> <ul style="list-style-type: none"> <li>▪ &lt;mslist&gt; - Enter a value, or values to specify which members of the SIM group will receive the firmware or switch configuration.</li> <li>▪ <i>all</i> – Add this parameter to specify all members of the SIM group will receive the firmware or switch configuration.</li> </ul>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To download firmware:

**DES-3550:4# download sim firmware 10.53.13.94 c:/des3526.had members all**

**Command: download sim firmware 10.53.13.94 c:/des3526.had members all**

**This device is updating firmware. Please wait...**

**Download Status :**

<b>ID</b>	<b>MAC Address</b>	<b>Result</b>
<b>1</b>	<b>00-01-02-03-04-00</b>	<b>Success</b>
<b>2</b>	<b>00-07-06-05-04-03</b>	<b>Success</b>
<b>3</b>	<b>00-07-06-05-04-03</b>	<b>Success</b>

**DES-3550:4#**

To download configuration files:

**DES-3550:4# download sim configuration 10.53.13.94 c:/des3526.txt members all**

**Command: download sim firmware 10.53.13.94 c:/des3526.txt members all**

**This device is updating configuration. Please wait...**

**Download Status :**

<b>ID</b>	<b>MAC Address</b>	<b>Result</b>
<b>1</b>	<b>00-01-02-03-04-00</b>	<b>Success</b>
<b>2</b>	<b>00-07-06-05-04-03</b>	<b>Success</b>
<b>3</b>	<b>00-07-06-05-04-03</b>	<b>Success</b>

**DES-3550:4#**

**upload sim\_ms**

Purpose	User to upload a configuration file to a TFTP server from a specified member of a SIM group.
Syntax	<b>upload sim_ms &lt;ipaddr&gt; &lt;path_filename&gt; &lt;member_id 1-32&gt;</b>
Description	This command will upload a configuration file to a TFTP server from a specified member of a SIM group.
Parameters	<p><i>&lt;ipaddr&gt;</i> - Enter the IP address of the TFTP server the user wishes to upload a configuration file to.</p> <p><i>&lt;path_filename&gt;</i> – Enter a user-defined path and file name on the TFTP server the user wishes to upload configuration files to.</p> <p><i>&lt;member_id 1-32&gt;</i> - Enter this parameter to specify the member the user prefers to upload a switch configuration file to. The user may specify a member or members by adding the ID number of the specified member.</p>
Restrictions	Only administrator-level users can issue this command.

Example usage:

To upload configuration files to a TFTP server:

```
DES-3550:4# upload sim_ms configuration 10.55.47.1
D:\configuration.txt 1

Command: upload sim_ms configuration 10.55.47.1
D:\configuration.txt 1

Success.

DES-3550:4#
```

**COMMAND HISTORY LIST**

The switch history commands in the Command Line Interface (CLI) are listed (along with the appropriate parameters) in the following table.

<b>Command</b>	<b>Parameters</b>
?	
dir	
config command_history	<value 1-40>
show command_history	

Each command is listed, in detail, in the following sections.

?	
Purpose	Used to display all commands in the Command Line Interface (CLI).
Syntax	?
Description	This command will display all of the commands available through the Command Line Interface (CLI).
Parameters	None.
Restrictions	None.

#### Example usage

To display all of the commands in the CLI:

```
DES-3550:4#?
..
?
clear
clear arptable
clear counters
clear fdb
clear log
clear port_security_entry port
config 802.1p default_priority
config 802.1p user_priority
config 802.1x auth_mode
config 802.1x auth_parameter ports
config 802.1x auth_protocol
config 802.1x capability ports
config 802.1x init
config 802.1x reauth
config access_profile profile_id
config account
config admin local_enable
config arp_aging time
config arpentry
config authen application
CTRL+C ESC q Quit SPACE n Next Page ENTER Next Entry a All
```



<b>dir</b>	
Purpose	Used to display all commands in the Command Line Interface (CLI).
Syntax	<b>dir</b>
Description	This command will display all of the commands available through the Command Line Interface (CLI).
Parameters	None.
Restrictions	None.

Example usage:

To display all commands:

```
DES-3550:4#dir
..
?
clear
clear arptable
clear counters
clear fdb
clear log
clear port_security_entry port
config 802.1p default_priority
config 802.1p user_priority
config 802.1x auth_mode
config 802.1x auth_parameter ports
config 802.1x auth_protocol
config 802.1x capability ports
config 802.1x init
config 802.1x reauth
config access_profile profile_id
config account
config admin local_enable
config arp_aging time
config arpentry
config authen application
CTRL+C ESC q Quit SPACE n Next Page ENTER Next Entry a All
```

**config command\_history**

Purpose	Used to configure the command history.
Syntax	<b>config command_history &lt;value 1-40&gt;</b>
Description	This command is used to configure the command history.
Parameters	<value 1-40> – The number of previously executed commands maintained in the buffer. Up to 40 of the latest executed commands may be viewed.
Restrictions	None.

## Example usage

To configure the command history:

```
DES-3550:4#config command_history 20
Command: config command_history 20

Success.

DES-3550:4#
```

**show command\_history**

Purpose	Used to display the command history.
Syntax	<b>show command_history</b>
Description	This command will display the command history.
Parameters	None.
Restrictions	None.

## Example usage

To display the command history:

```
DES-3550:4#show command_history
Command: show command_history

?
? show
show vlan
show command history

DES-3550:4#
```



**TECHNICAL SPECIFICATIONS**

<b>Physical and Environmental</b>	
<b>AC input &amp; External Redundant Power Supply:</b>	100 - 240 VAC, 50-60 Hz (internal universal power supply) Redundant power supply will take over when internal power supply fails.
<b>Power Consumption:</b>	60 watts maximum
<b>DC fans:</b>	2 built-in 40 x 40 x10 mm fans
<b>Operating Temperature:</b>	0 to 40 degrees Celsius (32 to 104 degrees Fahrenheit)
<b>Storage Temperature:</b>	-40 to 70 degrees Celsius (-40 to 158 degrees Fahrenheit)
<b>Humidity:</b>	Operating: 5% to 95% RH non-condensing;
<b>Dimensions:</b>	441 mm x 309 mm x 44 mm (1U), 19 inch rack-mount width
<b>Weight:</b>	5 kg
<b>EMC:</b>	CE Class A FCC Class A C-Tick
<b>Safety:</b>	CSA International

<b>General</b>													
<b>Standards:</b>	<p>IEEE 802.3 10BASE-T Ethernet</p> <p>IEEE 802.3u 100BASE-TX Fast Ethernet</p> <p>IEEE 802.3ab 1000BASE-T Gigabit Ethernet</p> <p>IEEE 802.3z 1000BASE-T (SFP "Mini GBIC")</p> <p>IEEE 802.1D Spanning Tree</p> <p>IEEE 802.1W Rapid Spanning Tree</p> <p>IEEE 802.1 P/Q VLAN</p> <p>IEEE 802.1p Priority Queues</p> <p>IEEE 802.3ad Link Aggregation Control</p> <p>IEEE 802.3x Full-duplex Flow Control</p> <p>IEEE 802.3 Nway auto-negotiation</p>												
<b>Protocols:</b>	CSMA/CD												
<b>Data Transfer Rates:</b>	<table border="0"> <thead> <tr> <th></th> <th>Half-duplex</th> <th>Full-duplex</th> </tr> </thead> <tbody> <tr> <td><b>Ethernet</b></td> <td>10 Mbps</td> <td>20Mbps</td> </tr> <tr> <td><b>Fast Ethernet</b></td> <td>100Mbps</td> <td>200Mbps</td> </tr> <tr> <td><b>Gigabit Ethernet</b></td> <td>n/a</td> <td>2000Mbps</td> </tr> </tbody> </table>		Half-duplex	Full-duplex	<b>Ethernet</b>	10 Mbps	20Mbps	<b>Fast Ethernet</b>	100Mbps	200Mbps	<b>Gigabit Ethernet</b>	n/a	2000Mbps
	Half-duplex	Full-duplex											
<b>Ethernet</b>	10 Mbps	20Mbps											
<b>Fast Ethernet</b>	100Mbps	200Mbps											
<b>Gigabit Ethernet</b>	n/a	2000Mbps											
<b>Fiber Optic</b>	<p>SFP (Mini GBIC) Support</p> <p>IEEE 802.3z 1000BASE-LX (DEM-310GT transceiver)</p> <p>IEEE 802.3z 1000BASE-SX (DEM-311GT transceiver)</p> <p>IEEE 802.3z 1000BASE-LH (DEM-314GT transceiver)</p> <p>IEEE 802.3z 1000BASE-ZX (DEM-315GT transceiver)</p>												
<b>Network Cables:</b>	<p>Cat.5 Enhanced for 1000BASE-T</p> <p>UTP Cat.5, Cat. 5 Enhanced for 100BASE-TX</p> <p>UTP Cat.3, 4, 5 for 10BASE-T</p> <p>EIA/TIA-568 100-ohm screened twisted-pair (STP)(100m)</p>												
<b>Number of Ports:</b>	<p>48 x 10/100 Mbps NWay ports</p> <p>2 Gigabit Ethernet</p>												

<b>Performance</b>	
<b>Transmission Method:</b>	Store-and-forward
<b>RAM Buffer:</b>	64 MB per device
<b>Filtering Address Table:</b>	8K MAC address per device
<b>Packet Filtering / Forwarding Rate:</b>	Full-wire speed for all connections. 148,810 pps per port (for 100Mbps) 1,488,100 pps per port (for 1000Mbps)
<b>MAC Address Learning:</b>	Automatic update
<b>Forwarding Table Age Time:</b>	Max age: 10 - 1000000 seconds Default = 300